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(U) National Reconnaissance Office Review and Redaction Guide



For Automatic Declassification Of 25-Year-Old Information

*Version 1.0
2015 Edition*

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(U) Table of Contents

(U) Preface..... iv

(U) Background..... 1

(U) General Methodology..... 4

(U) File Series Exemptions..... 6

(U) Continued Exemption from Declassification..... 6

(U) The Application of 25X and 50X Exemptions:..... 6

(U) Exemption incorporation in classification guidance:..... 7

(U) Declassification of IMINT systems- E.O. 12951:..... 7

(U) Declassification of SIGINT and COMM Systems:..... 8

(U) The Dissemination of Declassification Guidance to the
National Declassification Center:..... **Error! Bookmark not
defined.**

1. (U) Exemption Category 25X1: Reveal Sources and Methods... 10

1.1 (U) General Guidance 11

1.2 (U) About the National Reconnaissance Program (NRP) 15

1.2.1 (U) Fact of Satellite Reconnaissance 15

1.2.2 (U) National Reconnaissance Program Information 17

1.2.3 (U) Organizational Relationships 18

1.2.3.4. (U) Navy (Program C) 22

1.2.3.5. (U) Defense Recon Support Program (DRSP/DSRP) 22

1.3 (U) Satellite Imagery (IMINT) Systems 24

1.3.1 (U) Imagery System Information 24

1.3.2 (U) Non-Operational IMINT Systems 27

1.3.3 (U) Current and Future IMINT Operational Systems 31

1.3.4 (U) Meteorological Forecasting 32

1.3.5 (U) IMINT System Ground Operations 33

1.4 (U) Signals Intelligence (SIGINT) Systems 35

1.4.1 (U) Signals Intelligence System Information 35

1.4.2 (U) Non-Operational SIGINT Systems 37

1.4.3 (U) Current and Future SIGINT Operational Systems ... 38

1.4.4 (U) SIGINT Signal Parameters 39

1.4.5 SIGINT System Ground Operations 40

1.5 (U) Measurement and Signature Intelligence (MASINT) 41

1.6 (U) Communications 42

1.6.1 (U) General Communications Information 42

1.6.2 (U) Communication Satellite Payloads 43

1.6.3 (U) Relay Backup Mission Control Center 43

1.6.4 (U) Relay Satellites 43

1.7 (U) Satellite Ground and Space System Vulnerabilities and
Countermeasures 45

1.8 (U) Collection Planning, Targeting, and Support 46

1.8.1 (U) Overall Targeting Strategy 46

1.8.2 (U) Ground Collection Planning and Computer Software 46

1.8.3 (U) Satellite Tasking 47

1.9 (U) Mission Ground Stations (MGS) 49

 1.9.1 (U) MGS and Remote Tracking Station Locations 49

1.10 (U) Launch Activities 55

 1.10.1 (U) Pre-Launch Activities 55

 1.10.2 (U) Launch Vehicle (LV) Utilization 56

 1.10.3 (U) Launch Dates 58

 1.10.4 (U) Payload Integration and Pre-Launch Support 59

 1.10.5 (U) Launch Operations, Trajectory, Tracking, Telemetry
 60

1.11 (U) Development and Acquisition 62

 1.11.1 (U) General Participant Relationships 62

 1.11.2 (U) Funding and Budget 64

 1.11.3 (U) Contract Administration 66

1.12 (U) Product-Related Information 66

 1.12.1 (U) IMINT-Related Products 67

 1.12.2 (U) SIGINT-Related Products 68

1.13 (U) Terms and Code Words 69

1.14 (U) Program D 70

 1.14.1 (U) Program D - General 70

 1.14.2 ~~(S//TK//REL)~~ [redacted] 73 (b)(1)
 [redacted] 73 (b)(3)

 1.14.3 (U) Logistics Support to NRP Facilities & Locations 74

 1.14.4 ~~(S//TK//REL)~~ [redacted] 76

 1.14.5 ~~(S//NF)~~ [redacted] 77

 1.14.6 (U) Program D-Related Code Words and Terms 79

1.15 (U) NRO Security Policy - General Administration 81

2. (U) Exemption Category 25X2: Reveal Information That Would
 Assist in the Development or Use of Weapons of Mass
 Destruction 83

3. (U) Exemption Category 25X3: Reveal Information That Would
 Impair U.S. Cryptologic Systems or Activities 84

4. (U) Exemption Category 25X4: Reveal Information That Would
 Impair the Application of the State-of-the-Art Technology
 Within a U.S. Weapon System 85

5. (U) Exemption Category 25X5: Reveal Actual U.S. Military War
 Plans That Remain in Effect 86

6. (U) Exemption Category 25X6: Reveal Information That Would
 Seriously and Demonstrably Impair Relations between the
 U.S. and a Foreign Government, or Seriously and
 Demonstrably Undermine Ongoing Diplomatic Activities of the
 U.S. 87

8. (U) Exemption Category 25X8: Reveal Information That Would
 Seriously and Demonstrably Impair Current National Security
 Emergency Preparedness Plans 88

9. (U) Exemption Category 25X9: Violate a Statute, Treaty, or
 International Agreement 89

~~TOP SECRET//TK//RSEN/NOFORN~~

10. (U) Other Exemption Factors..... 90
10.1 (U) Names and Signatures..... 91
10.2 (U) Proprietary Information..... 94
10.3 (U) NRO-NASA Relationship..... 95
10.4 (U) NSAM 156 Committee..... 99
10.5 (U) ARGO & the Civil Applications Committee..... 101
10.6 (U) International Traffic in Arms Regulations (ITAR),
Export Controlled Technology and Technical Data 104
(U) Appendix A - GRAB/POPPY Review Guide..... 105
(U) Addendum 1: GRAB/POPPY Terms, Cryptonyms and Codewords . 146
(U) Addendum 2: Releasable Personnel Names Associated with
GRAB/POPPY 157
(U) Appendix B - Acknowledged Names and Functions..... 167
(U) Appendix C - Glossary of Code Words and Terms..... 203
(U) Appendix D - Footnoted Sources..... 219
(U) Appendix E - WS-117L: SENTRY/SAMOS..... 220
(U) Appendix F - CORONA, ARGON, and LANYARD..... 224
(U) Appendix G - GAMBIT/HEXAGON Family..... 231
(U) Appendix H - QUILL..... 251
(U) Appendix I - 50-Year Exemptions..... 259
(U) Appendix J - DORIAN/MOL 272

~~TOP SECRET//TK//RSEN/NOFORN~~

~~TOP SECRET//TK//RSEN/NOFORN~~

(U) Preface

(U) This document represents the current policy of the National Reconnaissance Office (NRO) for the declassification of all 25-year-old and older NRO information covered by Executive Order (E.O.) 13526. Such declassification is conducted under the NRO Instruction 56-2-3 "25-Year Automatic, Systematic and Mandatory Declassification Review" as approved on 24 February 2014. The Director, National Reconnaissance Office (DNRO) has appointed the Chief of the Information Review and Release Group (C/IRRG) in the Information Management Services Office in the Communications Systems Directorate (IMSO/COMM) as the NRO's initial 25-Year Release and Denial Authority. The IRRG is responsible for the review, pursuant to a variety of mandatory and discretionary release programs, of 25-year-old NRO information for declassification or continued protection. The need to protect sensitive space intelligence operations and capabilities and to establish policies for the classification, declassification, and release of related information were reaffirmed by the President in National Space Policy, dated 28 June 2010.

(U) This Review and Redaction Guide (RRG) is a living document intended to achieve the spirit of greater public access to government records as envisioned in E.O. 13526. The IRRG incorporates policy changes and necessary clarifications (as vetted by the appropriate equity-holding Directorates and Offices) into the RRG on an ongoing basis, and interprets and applies the RRG's guidance on behalf of the DNRO. Questions concerning information contained in this guide, or about updating it, should be addressed to C/IRRG at

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(U) SECURITY NOTE: All paragraphs in this document designated REL are REL TO FVEY unless otherwise indicated.

(U) Background

(U) On 17 April 1995, the President signed E.O. 12958, "Classified National Security Information." This order, subsequently amended on 25 March 2003, and replaced by E.O. 13526 on 29 December 2009, directs the automatic declassification and release to the public of information on a specific date or event determined by the original classification authority, or on the expiration of a maximum period for classification established by the Order. It features two simple mandates: classify information only when necessary to do so, and declassify as much as possible as soon as possible. The order also calls for creating the proper balance between the free-flow of information to the public--including 25-year-old information of historical significance--and protecting the nation's legitimate secrets, even when they are recorded in documents of historical significance.

(U) The sensitivity of the NRO's Cold War mission required the organization to remain covert until 1992. Significant amounts of the technology developed by the NRO, and the methodologies for employing that technology, remain sensitive today, even though they fall within the 25-year-old information declassification framework of E.O. 13526. The need to protect sensitive space intelligence operations and capabilities was reaffirmed by the President in Presidential Directive-4.

(U) The release of satellite reconnaissance information as described in this guide is consistent with provisions of National Security Policy Directive (NSPD)-49 and with the Director of National Intelligence's (DNI) statutory responsibility to protect sources and methods. The NRO serves as the Executive Agent for the DNI in providing guidance for protecting the non-product aspects of satellite reconnaissance systems.

(U) This declassification guide remains organized around the applicable exemptions from automatic declassification contained in E.O. 13526 (Sec 3.3(b)). Eight of the nine exemptions apply to the review of NRO records based on the NRO Files Series Exemption Plan. These eight exemptions pertain to information that would:

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a. (U) "reveal... a nonhuman intelligence source; or impair the effectiveness of an intelligence method currently in use, available for use, or under development" (Exemption 1)

b. (U) "reveal information that would assist in the development or use of weapons of mass destruction" (Exemption 2)

c. (U) "reveal information that would impair U.S. cryptologic systems or activities" (Exemption 3)

d. (U) "reveal information that would impair the application of state-of-the-art technology within a U.S. weapon system" (Exemption 4)

e. (U) "reveal formally named or numbered U.S. military war plans that remain in effect, or reveal operational or tactical elements of prior plans... contained in such active plans" (Exemption 5)

f. (U) "reveal information... that would cause serious harm to relations between the United States and a foreign government, or to ongoing diplomatic activities of the United States" (Exemption 6)

g. (U) "reveal information that would seriously impair current national security emergency preparedness plans or reveal vulnerabilities of systems... relating to the national security" (Exemption 8)

h. (U) "violate a statute, treaty, or international agreement" (Exemption 9)

(U) In approving the 2012 RRG update the Interagency Security Classification Appeals Panel (ISCAP) approved a 50-year declassification exemption for NRO space systems. NRO Security Note 2013-03 (3 April 2013) subsequently directed that NRO classification blocks on derivative classification decisions related to specific NRO satellites, R&D efforts, or systems acquisitions will be marked 25X1 and will use a date 50 years from the date of the document, per the NRO Office of Security and Counterintelligence Guide to Marking Classified Documents:

CL BY: XXXXXX (Enter Employee CLID)
DECL ON: 25X1 YYYYMMDD
DRV FM: INCG, v. 1.0, 13 Feb 2012

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(U) NOTE: Non-satellite classified information will employ a three-line classification block, will use a date 25 years from the date of the document:

CL BY: XXXXXX (Enter Employee CLID)
DECL ON: YYYYMMDD
DRV From: INCG, v. 1.0, 13 Feb 2012

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(U) General Methodology

(U) This document establishes the criteria for determining what 25-year-old NRO information shall be declassified and what must remain classified. To maximize the release of information when a document cannot be declassified in its entirety, residual classified information will be redacted (rendered unreadable) so that the rest may be released. Any information that falls under the purview of another government agency must be referred to, or coordinated with, that agency for a release determination.

(U) Information reviewed is therefore recommended for one of three results: Redaction, Release, or Referral to another authority for further review, coordination, or disposition. The three potential results are explained below. Referred NRO information will be redacted as necessary before leaving NRO control for action by other government agencies. Final approval for release of 25-year-old NRO records in any form always rests with the C/IRRG.

(U) Release: All readers should note that the main objective of review, per the President's intention in E.O. 13526, is to release as much information as possible without compromising national security. Information not meeting any of the E.O. 13526 exemption criteria for continued classification or for withholding otherwise authorized and warranted under applicable law must be recommended for release.

(U) Redact: Redaction involves removing still-classified information in order to make a document unclassified and releasable. The actual mechanics of redacting information will depend on whether hard copy paper records or soft copy computerized records are being processed. Specific redaction methodology is explained in the NRO Review and Redaction Procedures (RRP) (published separately).

(U) IRRG reviewers have authority to redact NRO information only unless specifically authorized otherwise in this guide or in written agreements between the NRO and other original classification authorities.

(U) The basic redaction philosophy calls for redacting only information that qualifies for one of the automatic declassification exemptions in E.O.13526, or that is otherwise covered by applicable law or statute. Information may not be redacted to avoid revealing poor judgment, an illegal act, or an

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embarrassment to the document's author or any U.S. Government agency or department.

(U) Redacted information should be limited to the smallest amount possible that still adequately protects sensitive information. Rewriting to generalize or smooth the text where redaction has created disjointed phrases or sentences is not permitted. However, additional words, sentences, paragraphs, or entire sections of a document may be redacted for the following reasons:

- a. (U) To prevent easy reconstruction of the deleted material, or
- b. (U) If the required deletion distorts the meaning of the remaining text or renders it meaningless (this is referred to as "reasonable segregability." A document may, in fact, be denied in full if there is no information that is "reasonably segregable" from what must remain protected.)

(U) In exercising this authorization to redact additional words, sentences, paragraphs, or entire sections of a document, reviewers are not to violate the objective of releasing as much information as possible without compromising national security.

(U) Refer: Some documents are referred to another government agency for review and final release authorization because they were originally created by that agency. Referral also may be required when documents originally created by the NRO contain equities of concern to another agency (this is technically a request for coordination, because the other agency or agencies will return the document(s) to the NRO for a final release decision.) In making referral decisions, NRO reviewers have the authority to redact only NRO information unless specifically authorized otherwise in this guide or written agreements between the NRO and other original classification authorities. The guidelines contained in this document identify information requiring referral to the extent possible. The IRRG's Review and Redaction Procedures manual explains the mechanics of processing information that requires referral.

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(U) File Series Exemptions

(U) Executive Order 13526, Section 3.3(c), authorizes the NRO Director to recommend certain file series of NRO records for exemption from automatic declassification. The series in question invariably contain classified information falling into one or more of the nine exemption categories specified in Section 3.3(b). A list of exempted Records Control Schedule (RCS) item numbers is contained in the NRO IMSO/IRRG Internal SharePoint Site. For detailed information regarding NRO exempted file series, see the NRO File Series Exemption Plan submitted by the DNRO to the Information Security Oversight Office (ISOO) on 7 Oct 2010, subsequently approved by the Information Security Classification Appeals Panel (ISCAP) on 27 Dec 2010.

(U) Continued Exemption from Declassification

(U) All NRO documents exempted from automatic declassification in full or in part during the initial 25-year review will be declassified if they are not re-evaluated and exempted again by 31 December of the year in which they become 50 years old. Any document(s) given follow-on exemption will be individually marked with the appropriate 50X code and assigned a future date or event for declassification. See Appendix I for 50-year declassification guidance.

(U) The Application of 25X and 50X Exemptions:

(U) Only 25X exemptions may be applied to records reviewed in anticipation of automatic declassification at 25 years (i.e., in reviews conducted in 2015, for records dated between 1971 and 1995). Other than the 50X1-HUM and 50X2-WMD exemptions, approved 50X exemptions may only be applied to records approaching automatic declassification at 50 years (i.e., in reviews conducted in 2015, for records dated between 1946 and 1970). 50X may be applied to 50 year old records and the Executive Order provides for five years headroom for review. A review of records older than 50 years may begin now that exemptions have been granted. Example: in 2015 NRO may exempt records older than 50 years or dating before 1965 AND may begin exempting records between 1965 and 1970 working in the five year window allowed by the executive order. Records exempted under 25X will be automatically declassified on December 31 of a year that is no more than 50 years from the date of origin of the record, unless an approved 50X exemption is applied within 5

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years of that automatic declassification date. Records exempted under 50X shall be automatically declassified on a date that is no more than 75 years from the date of origin of the record, unless an approved 75X exemption is applied within 5 years of that automatic declassification date.

(U) Exemption incorporation in classification guidance:

(U) This guide allows NRO to incorporate its approved exemptions from declassification into its classification guidance for information that remains in current use or reveals capabilities or vulnerabilities of current systems, as allowed under section 2.2(e) of E.O. 13526. The declassification date or event for records identified as exempt from automatic declassification at 25 years at the time of derivative classification will be no later than 50 years from the date of origin of the record. As programs become eligible for declassification as directed by the Director of National Intelligence and the Director of the National Reconnaissance Office, the records associated with those programs will be reviewed for declassification and release regardless of the declassification instructions marked on those records.

(U) Declassification of IMINT systems- E.O. 12951:

(U) E.O. 12951 requires the DNI to conduct a periodic review with the objective of making available to the public as much imagery as possible, consistent with the interests of national defense and foreign policy. In accordance with E.O. 12951, the determination for declassification rests with the DNI, in consultation with the Secretary of State and the Secretary of Defense.

(U) Under terms of E.O. 12951, only imagery data from US space-based national intelligence reconnaissance systems deemed obsolete by DNI will be considered for declassification. Legacy space-based national intelligence reconnaissance systems will, nevertheless, not be considered "obsolete" if they are of continued relevance to current or planned space-based national reconnaissance systems.

(U) D/NGA recommendations for a determination of obsolescence for space-based national intelligence reconnaissance systems will require the support of the NRO. The NRO's Office of Policy and Strategy (OP&S) chairs the Systems

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Review Working Group (SRWG) which is part of the NGA-led Historical Imagery Declassification Panel (HID). The C/IRRG serves as a subject matter expert for the Group. The SRWG determines that a particular system is obsolete and makes that recommendation to the HID. The HID report, signed by D/NGA, is provided to the DNI for his concurrence.

(U) Declassification of the systems themselves rests with the DNRO, in coordination and concurrence with the DNI.

(U) Declassification of SIGINT and COMM Systems:

(U) There is no Executive Order like E.O. 12951 requiring the DNI to conduct a periodic review with the objective of making available to the public as much SIGINT product as possible, consistent with the interests of national defense and foreign policy.

(U) Declassification of legacy SIGINT and COMM systems rests with the DNRO, in coordination and concurrence with the DNI. Similar to the terms of E.O. 12951, legacy space-based national intelligence reconnaissance SIGINT and COMM systems will not be considered "obsolete" if they are of continued relevance to current or planned space-based national reconnaissance systems.

(U) For SIGINT systems: DNRO has authority to determine obsolescence for space-based national intelligence reconnaissance systems, but declassification will require the support of NSA. The NRO's SIGINT directorate works with IC counterparts to come to a decision. The Chief of the Information Review and Release Group serves as a subject matter expert on a working group convened to determine if a legacy system still requires protection under E.O. 13526. The working group's determination is then provided to the DNRO who provides a recommendation for declassification to the DNI.

(U) For COMM systems: DNRO has authority to determine obsolescence for space-based national intelligence reconnaissance COMM systems. The NRO's Communications Directorate works with IC counterparts to come to a decision. The C/IRRG serves as a subject matter expert on a working group convened to determine if a legacy COMM system still requires protection under E.O. 13526. The working group's determination is then provided to the DNRO who provides a recommendation for declassification to the DNI.

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(U) Release and Redaction Guidelines

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**1. (U) Exemption Category 25X1: Reveal Sources
and Methods**

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1.1 (U) General Guidance

This section contains general guidance only. Further details and special cases may be found in the relevant specialized section of the RRG. Guidance for the release and redaction of names can be found in Section 10.1 of this guide.

Redact:

- a. (U) Redact all Social Security Numbers wherever they appear. Treat DoD serial/service numbers as Social Security Numbers for this purpose.
- b. (U) Redact all cable address slugs **not** identified below for release.
- c. (U) Redact administrative, security, and codeword markings **not** identified below for release.
- d. (U) Redact all digraphs, trigraphs, and other abbreviations for NRP codewords, etc. regardless of unclassified status as stand-alone terms wherever their context reveals a still-classified meaning or otherwise discloses classified information. For example, the date and location of a Nondisclosure Agreement (NDA) may preclude the release of such abbreviations.

Release:

- a. (U) Release Document Control Numbers:
 - (1) (U) Release the BYE prefix to BYEMAN Document Accountability Numbers (DAN) and numbers associated with the BYE prefix.
 - (2) (U) Release BIF DANs/message-cite numbers and specific program-related document control numbers/message-cite numbers associated with the BYEMAN control system.
 - (3) (U) Release BYEMAN Cover Sheets and BYEMAN security terminology, to include the word BYEMAN and its abbreviations "BYE," "Bravo" and references to "B" system.

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b. (U) Release Non-BYEMAN document control numbers or message cite numbers, or similar designators associated with officially declassified and acknowledged former BYEMAN programs,

c. (U) Release "SPECIAL HANDLING" caveats that were predecessors to the BYEMAN control system for protecting satellite reconnaissance programmatic information.

d. (U) Release identification markings for specific copy numbers assigned to a document, i.e., "copy 4 of 10 copies."

e. (U) Release the security channel code words TALENT-KEYHOLE and the abbreviation "TK."

f. (U) Release the satellite product code words

RUFF DAFF ZARF

g. (U) Release references to "continued control" control markings.

h. (U) Release references to the term, "Sensitive Compartmented Information" and its abbreviation "SCI."

i. (U) Release the following SIGINT product code words:

ACORN	CREAM	FLARE	KIMBO	PIXIE	THUMB
AMBLE	KRONE	FROTH	LARUM	SABRE	TRINE
BASTE	DAUNT	GAVEL	MAGIC	SAPPY	TWEED
CANOE	DENIM	GLINT	MORAY	SAVIN	ULTRA
CHEER	DINAR	HERON	PEARL	SPOKE	UMBRA
CHUTE	EIDER	HYSON	PINUP	SPRIG	USHER
COPSE	BOOTY	IVORY	PIVOT	SUEDE	WITCH

j. (U) Release the following SIGINT Exchange Designators:

ARCA	FRONTO	NECTAR	SARDINE
DIKTER	KAMPUS	PROTEIN	SEABOOT
DIVERSITY	KEYRUT	PYLON	SETTEE
DRUID	MUSKET	RORIPA	THESPIS

k. (U) Release the following COMINT flags:

DELTA
 ECI
 GAMMA
 Handle via COMINT Channels Only

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Special Intelligence (SI)
Very Restricted Knowledge (VRK)

l. (U) Release the following SIGINT-related paragraph portion-marking conventions:

- (1) (C-CCO) "CONFIDENTIAL-Handle via COMINT Channels Only"
- (2) (G) "GAMMA"
- (3) (S-CCO) "SECRET-Handle via COMINT Channels Only"
- (4) (SC) "SECRET SPOKE"
- (5) (SCX) "SECRET MORAY"
- (6) (TS/C) "TOP SECRET SPOKE"
- (7) (TS-CCO) "TOP SECRET Handle via COMINT Channels only"
- (8) (TS-TKC) "TOP SECRET-Handle via TALENT-KEYHOLE COMINT Control Systems Jointly"
- (9) (TSC) "TOP SECRET UMBRA"

m. (U) Release distribution lists **as long as classified or unacknowledged activities and/or personnel that might be present in such lists are redacted.**

n. (U) Release citations of or references to classified records in the body of the document or as part of a bibliography, **as long as any classified information is redacted from within the citation or reference itself.**

o. (U) Release barcodes.

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Slug	What is it?
ADIC	OSA/DD/S&T
BISON	SAFSP (LA)
BRISK	Eastman Kodak (Hardware)
CHARGE	SAFSP (LA)
DITTO	Air Force Satellite Control Facility (Sunnyvale)
PILOT	OSP/DD/S&T. Langley VA
SPECTRE	NPIC
WADDY	AFSPPF Westover AFB MA
WHIG	Early NRO Headquarters

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1.2 (U) About the National Reconnaissance Program (NRP)

1.2.1 (U) Fact of Satellite Reconnaissance

Redact:

a. ~~(TS//TK//REL)~~ Redact information that reveals:

- [redacted]
[redacted]
[redacted] CORONA, GAMBIT and HEXAGON carried color and infrared film.
- [redacted]
- general association of [redacted]
[redacted] with the NRO.
 - o [redacted] (b)(1)
(b)(3)
- Any information beyond the fact of NRO radar/synthetic aperture radar (SAR) intelligence collection from space, and all mention of such collection [redacted]
[redacted] except for information about QUILL identified for release in Appendix H.

~~(S//REL)~~ **Redactor's Note:** Redactors will need to differentiate from context between references to the Space Based Radar/Space Radar program, generic discussion of radar and SAR(unclassified), and specific references to [redacted]
[redacted] Seemingly generic references to "space based radar" or "space radar" may refer to the USAF/NRO Space Radar system, which was openly acknowledged as a radar system with moving target indication, SAR, and intelligence collection capabilities until its 2008 cancellation. If in doubt, redactors should consult the Redaction Quality Control (RQC) Supervisor for guidance.

Release:

a. (U) Release fact of satellite photoreconnaissance for peaceful purposes, including intelligence collection and monitoring of arms control agreements.

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b. (U) Release fact that satellite photoreconnaissance includes a near-real-time capability and is used to provide defense-related information for indications and warning and the planning and conduct of military operations.

c. (U) Release fact of satellite photoreconnaissance for the collection of mapping, charting, and geodetic (MC&G) data for the development of global geodetic and cartographic materials to support defense and other mapping-related activities, and the fact that such data is released to authorized federal agencies.

d. ~~(S//REL)~~ Release fact of NRO radar satellite reconnaissance, including Synthetic Aperture Radar (SAR), after 9 June 2008 **but no "facts about" the activity or acknowledgement of NRO satellite radar reconnaissance prior to that date other than Quill as a 1964 radar imaging experiment** (See guidance in Appendix H) This guidance does not apply to the former developmental Space Based Radar/Space Radar system, cancelled in 2008, which remains largely unclassified and releasable.

e. (U) Release fact that scientific and environmental data and data on natural or human made disasters can be collected by satellite photoreconnaissance assets and disseminated to authorized federal agencies. (See guidance RE Civil Applications Committee in section 10.5)

f. (U) Release fact that photoreconnaissance assets can be used to image the United States and its territories and possessions.

g. (U) Release fact that the U.S. conducts satellite collection of signals intelligence (SIGINT), to include the SIGINT component disciplines of communications intelligence (COMINT), electronic intelligence (ELINT), and foreign instrumentation signals (FISINT).

h. (U) Release fact that U.S./NRO systems perform overhead measurement and signature intelligence (MASINT) collection(see section 1.5).

i. (U) Release general facts surrounding official disclosure of the U.S. satellite reconnaissance program in the summer of 1962 to all NATO heads of government, Foreign Ministers, and Permanent Representatives to the North Atlantic Council.

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j. (U) Release fact of and generic information about the NRO/NRP association with tactical reconnaissance and the Tactical Exploitation of National Capabilities (TENCAP) program within the Department of Defense.

k. (U) Release fact of intelligence sharing relationships with second-party countries (UK, Canada, Australia, and New Zealand), and of second-party imagery sharing.

l. (U) Release Fact that NRO systems employ real-time command and control telemetry.

1.2.2 (U) National Reconnaissance Program Information

Release:

a. (U) Release fact of the NRP and NRO.

b. (U) Release fact of Intelligence Community participation in the NRO.

c. (U) Release fact that the NRO is an agency of the Department of Defense (DOD), and that the Secretary of Defense (SECDEF) has ultimate responsibility, exercised in concert with the Director of National Intelligence (DNI), for its management and operation.

d. (U) Release fact that the NRO executes programs through the CIA and DOD.

e. (U) Release the following "facts about" DNI NRP responsibilities:

- (1) (U) Establishes NRP collection priorities and requirements for the site-targeting of NRP satellites and their frequency of coverage,
- (2) (U) Establishes the NRP budget with the Secretary of Defense (SECDEF),
- (3) (U) Provides security policy guidance for the NRP,
- (4) (U) Guides/participates in formulation of the NRP through the DNRO.

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f. (U) Release fact that the NRP is a part of the National Foreign Intelligence Program/National Intelligence Program (NFIP/NIP).

g. (U) Release only those program mission numbers associated with the declassified imaging systems(see section 1.3.2).

h. (U) Release fact of and general information about the DNRO's role in chairing the Interdepartmental Contingency Planning Committee (ICPC). This body served as a mechanism to ensure a fully coordinated US Government response to contingencies relating to satellite or air vehicle overflight of denied territory.

1.2.3 (U) Organizational Relationships

(U) This section contains redaction and release guidelines for legacy organizations within the NRO, CIA, and Department of Defense: Secretary of the Air Force Space Systems (SAF/SS); Secretary of the Air Force Special Projects (SAF/SP) Program A; CIA Office of Engineering and Development (OD&E) Program B; Naval Research Lab and elements of Naval Security Group, Program C); and Defense Reconnaissance Support Program (DRSP) and its Defense Support Project Office (DSPO). Guidance for NRP Aircraft Reconnaissance through July 1974 (Program D) can be found in section 1.14.

1.2.3.1. (U) SAF/SS

Redact:

a. ~~(S//TK//REL)~~ Redact details concerning the association of the NRO headquarters unit, Secretary of the Air Force Space Systems (SAF/SS) [redacted] or above, with the NRO. One specific example is the [redacted]

(b)(1)
(b)(3)

[redacted] organization. [redacted]

Thus, this fact and any information indicating or implying a specific individual was the NRO Comptroller needs to be protected. **REDACTOR NOTE:** The fact of an NRO Comptroller is otherwise releasable.

b. ~~(S//TK//REL)~~ Redact details concerning SAF/SS [redacted] or above support provided to personnel at NRO mission ground stations, [redacted] certain government and

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contractor activities, and wherever it appears that a SAF/SS association is other than at the Pentagon headquarters or with SAF/SP locations releasable under 1.2.3.2 Release **A & B**.

c. (U) Redact all references to office designations in SAF/SS in the Pentagon **that are not identified** in **Release** below.

d. (U) Redact references to Pentagon 4C1000 and SOC where linkage between special programs and the NRO remains classified.

Release:

a. (U) Release fact of the creation of the Office of Missile and Satellite Systems (SAF/MSS) in September 1960 under the direction of Air Force Undersecretary Joseph Charyk. Fact that SAF/MSS became the National Reconnaissance Office (NRO) in September 1961, with its name changed to SAF/SS.

b. (U) Release fact that the NRO was governed by the "Agreement for Reorganization of the National Reconnaissance Office" dated 11 August 1965, signed by the Deputy Secretary of Defense and the DCI. This agreement is releasable.

c. (U) Release fact that NRO is currently governed by DoD directive No. 5105.23 dated June 28 2011.

d. (U) Release fact that the early NRO satellite reconnaissance Programs A, B, and C were associated with the Air Force, CIA, and Navy, respectively. Also the fact that Program A was associated with high resolution imaging and SIGINT satellite development; Program B was associated with imaging (to include electro-optical) and SIGINT satellite development; and Program C was associated with SIGINT satellite development.⁶²

e. (U) Release fact that in early 1964 an NRO Executive Committee was established and its members consisted of Director of Central Intelligence (DCI) McCone, Deputy Director of Central Intelligence (DDCI) Carter, Deputy Secretary of Defense (DEPSECDEF) Vance, Office of the Secretary of Defense/ Director, Defense Research and Engineering (OSD/DDR&E) Fubini, and Director NRO (DNRO) McMillan.

f. (U) Release general information regarding SAF/SS. From 1961 to April 1995, SAF/SS was the unclassified designator for the advisory element of the NRO that performed staff functions for the Director and Deputy Director. The following "facts of"

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and "facts about" SAF/SS and its SAF/MSS predecessor organization also are releasable.

- (1) (U) Release fact that personnel assigned to SAF/SS and SAF/MSS provided support to the Secretary, Under Secretary and Assistant Secretary of the Air Force (Space) on aircraft and space reconnaissance matters.
- (2) (U) Release names of all past SAF/SS and SAF/MSS Staff Directors.
- (3) (U) Release general association of with SAF/SS declassified NRO programs.
- (4) (U) Release general description of SAF/SS operations and support functions if not associated with currently classified NRO information.
- (5) (U) Release SAF/SS office designators and respective titles only for SS-1 through SS-9, P&B, L&A, S&T, Programs & Budget, Policy & Security, Liaison & Administration, Systems & Technology, DD for Systems, DD for R&D, DD for Programs & Analysis, Assistant for Security, and Director TENCAP, all of them located at the Pentagon headquarters.
- (6) (U) Release fact of the SAF/SS role as Secretariat for the Interdepartmental Contingency Planning Committee (ICPC). Release fact of and general information about the DNRO role in chairing the ICPC. Release fact that this body served as a mechanism to insure a fully coordinated US Government response to contingencies relating to satellite or air vehicle overflight of denied territory.
- (7) (U) Release location of SAF/SS in the Pentagon.
- (8) (U) Release fact of the Satellite Operations Center (SOC) located in the Pentagon and generic information surrounding its function of forwarding collection requirements from the U.S. Intelligence Board (USIB) for implementation/tasking by the satellite ground stations.

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g. (U) Release the existence of a position titled "NRO Comptroller," subject to the guidance in Redact A, above.

1.2.3.2. (U) SAF/SP (Program A)

Redact:

a. (U) Redact any references to the identity, functions, missions, and locations of the various office components of the Secretary of the Air Force Special Projects (SAF/SP) designated **SP-8 and higher**.

b. ~~(S//TK//REL)~~ Redact any references to in connection with the NRP or NRO.

(b)(1)
(b)(3)

Release:

a. (U) Release general information regarding the fact that SAF/SP was the overt office designator for NRO Program A and was based in Los Angeles, CA. Fact that its Director overtly served as Deputy Commander of the Air Force Ballistic Missile Division and its successor organizations. Release fact that other acknowledged SAF/SP locations included Los Angeles Air Force Station (AFS), CA (later named Los Angeles Air Force Base [AFB]), Sunnyvale AFS (later named Onizuka AFB), CA, Washington, D.C., Vandenberg AFB, CA, and Cape Canaveral Air Station, FL. SAF/SP offices designated SP-1 through SP-6, along with the office titles, can be released unless such disclosure would reveal information regarding classified operations and technologies.

b. (U) Release SAF/SP office designated SP-7, along with the office titles, when associated with the GAMBIT and HEXAGON programs unless such disclosure would reveal information regarding classified operations and technologies.

1.2.3.3. (U) CIA (Program B)

Release

a. (U) Release fact that CIA/Office of Development and Engineering (OD&E), previously the Office of Special Activities (OSA), a part of the Directorate of Science and Technology

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(DS&T), was the overt office designator for Program B, and was located in the Washington, D.C. area.

1.2.3.4. (U) Navy (Program C)

Release

- a. (U) Release fact that Program C was located in the Washington, D.C. area and included elements of the Naval Research Laboratory and the Naval Security Group.
- d. (U) Release historical relationships between the NRO and SPAWAR 40, NAVSECGRUCOM.

1.2.3.5. (U) Defense Recon Support Program (DRSP/DSRP)

Redact:

- a. (U) Redact all information associated with the Tactical Intelligence and Related Activities (TIARA) budget line that supported the DRSP and supports what is now the Defense Space Reconnaissance Program (DSRP).
- b. (U) Redact all details about the methods, procedures, systems and equipment (tasking, communicating, etc.) involved in providing overhead intelligence in support of tactical forces.

Release:

- a. (U) Release the fact that the Secretary of Defense established the DRSP (renamed DSRP in 1994) on 14 May 1980 to provide space reconnaissance products to tactical combat forces in response to President Jimmy Carter's NSC/PD-37, *National Space Policy* (1978).
- b. (U) Release the fact that this effort expanded the Tactical Exploitation of National Capabilities (TENCAP) program and that it was funded separately through a defense budget line, not through the NRP.
- c. (U) Release the fact that the defense department established the Defense Support Project Office (DSPO) on 16 November 1981 to manage and provide oversight of the DRSP/DSRP.

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d. (U) Release the fact that the defense department established the Airborne Reconnaissance Support Program on 19 November 1987 in response to Congressional pressure, to include all U.S. airborne reconnaissance platforms funded within the GDIP, and assigned management of it to the DSPO.

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1.3 (U) Satellite Imagery (IMINT) Systems

1.3.1 (U) Imagery System Information

Redact:

a. ~~(S//RS)~~ Redact any information indicating or implying the following: (outside of association with declassified imaging systems).

(1) ~~(S//RS//REL)~~ [redacted]

(2) ~~(S//RS//REL)~~ [redacted]
[redacted] imaging operations.

(3) ~~(S//REL)~~ Imaging operations [redacted]
[redacted]

b. ~~(S//REL)~~ Redact all information on payload/sensor performance for classified systems. This includes collection parameters (for example, look angles and distance to target, the number of square miles imaged per mission/annually, or the percentage of cloud-free imagery obtained), response time to tasking, and image quality achieved.

(b)(1)
(b)(3)

c. (U) Redact all information that discloses IMINT satellite vehicle planned/actual on-orbit lifetimes or planned/actual dates of Initial Operational Capability (IOC) and Full Operational Capability (FOC) on classified systems.

d. ~~(S//TK//REL)~~ [redacted]

e. ~~(S//TK//REL)~~ Redact all other information not cited below for release including any references that connect the NRO to [redacted]

[redacted]

and the code words and mission numbers associated with these activities (e.g., [redacted] etc.).

~~TOP SECRET//TK//RSEN/NOFORN~~

- f. (U) Redact the KH-12 or the KH-13 system designator when erroneously associated with a still classified NRO program. The KH designators were discontinued after KH-11.

Release:

- a. (U) Release fact of and limited information about electro-optical imaging (EOI). (See paragraph 1.3.2)
- b. (U) Release the fact that NRO spacecraft employ control moment gyroscopes **as long as** it is not associated with a specific vehicle or program.
- c. (U) Release fact of NRO radar satellite reconnaissance, including use of SAR, after 9 June 2008 acknowledge Quill as a 1964 radar imaging experiment per guidance concerning that system in appendix H.
- d. (U) Release KH-11 system designator for the first EOI satellite, in isolation or related in a general way with intelligence activities, **without reference to** specific intelligence operations, organizations, or related national security matters.
- e. (U) Release fact that the KH-11 EOI satellite was first launched on 19 December 1976 and that President Gerald Ford declared it operational on 20 January 1977.
- f. (U) Release fact of research and development in Image Fusion Techniques.
- g. (U) Release general IMINT program acquisition management plans and schedules for commercial off-the-shelf subsystems **without** program association.
- h. (U) Release fact that IMINT systems use non-specified relay satellites for data return.
- i. (U) Release fact that data return is near-real-time. **Note that** exact response times are classified S/TK//NF.
- j. (U) Release conceptual line, non-scale silhouette drawings of IMINT satellite vehicles (SV) **without** antenna size and location and/or interior detail.

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k. (U) Release development documentation and usage documentation of program star catalogs.

l. (U) Release number of stars used to create catalogs and source catalogs.

m. (U) Release documentation relating to how star catalogs are applied.

n. (U) Release position accuracy of the stars in a star catalog.

o. (U) Release fact that the IMINT program uses a particular star catalog.

p. ~~(S//TK//REL)~~ Release the name "Defense Mapping Agency" or "DMA" when related to satellite reconnaissance or IMINT programs **but not to**

[REDACTED]

(b)(1)
(b)(3)

q. (U) Release data content of the raw DMA/Special Mission Tracking Program (SMTP) collection.

r. (U) Release performance characteristics of the mapping, charting, and geodesy (MC&G) mission derived via the DMA segment, i.e., stereo image, linear error, circular error.

s. (U) Release fact of the Southwest Geodetic Control Network (SWGNCN) and its characteristics.

t. (U) Release utilization of the SWGNCN to verify MC&G performance on IMINT systems.

u. (U) Release title, "Metric Assessment Program" (MAP).

v. (U) Release the best-achieved resolution of any imaging system as being "better than" 2 feet. The single exception is the projected one-foot resolution associated with the failed P-camera experiment flown on CORONA mission 9056 in late June 1963. Information relating to this experiment and its anticipated resolution is releasable.

w. (U) Release references to the NRO's role in establishing the requirements for initiating and managing the first operational polar orbiting meteorological satellite program. Other NRO-related facts about this program and its relationship to imaging reconnaissance satellites, as detailed

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in the unclassified NRO history of this effort issued in 2001, are also releasable.

x. (U) Release KH-12 & KH-13 system designators, they were not used officially and are unclassified when not associated with any NRO program details. The KH designators were discontinued after KH-11.

Refer:

a. (U) Refer to National Geospatial-Intelligence Agency (NGA), formerly the National Imagery and Mapping Agency (NIMA): all Defense Mapping Agency (DMA) computer hardware (minus crypto) and software modules, computation algorithms **not related** to NRO IMINT systems activities, and overhead imagery not already released in CAL and KH-7, KH-8, KH-9 actions.

1.3.2 (U) Non-Operational IMINT Systems

(U) The NRO has declassified most of the information on the SENTRY/SAMOS IMINT systems (see Appendix E), the CORONA, ARGON, and LANYARD (CAL) IMINT systems (see Appendix F), the GAMBIT/HEXAGON IMINT systems (see Appendix G), and limited information about the QUILL (Appendix H). All other IMINT systems remain classified.

Redact:

a. ~~(S//TK//REL)~~ Redact all information concerning non-operational IMINT programs that remain classified. This includes the IMINT terms and code words listed below. Should a redactor encounter a term or code word that may still be classified but is not on this list, consult the Redaction Quality Control Supervisor for guidance.

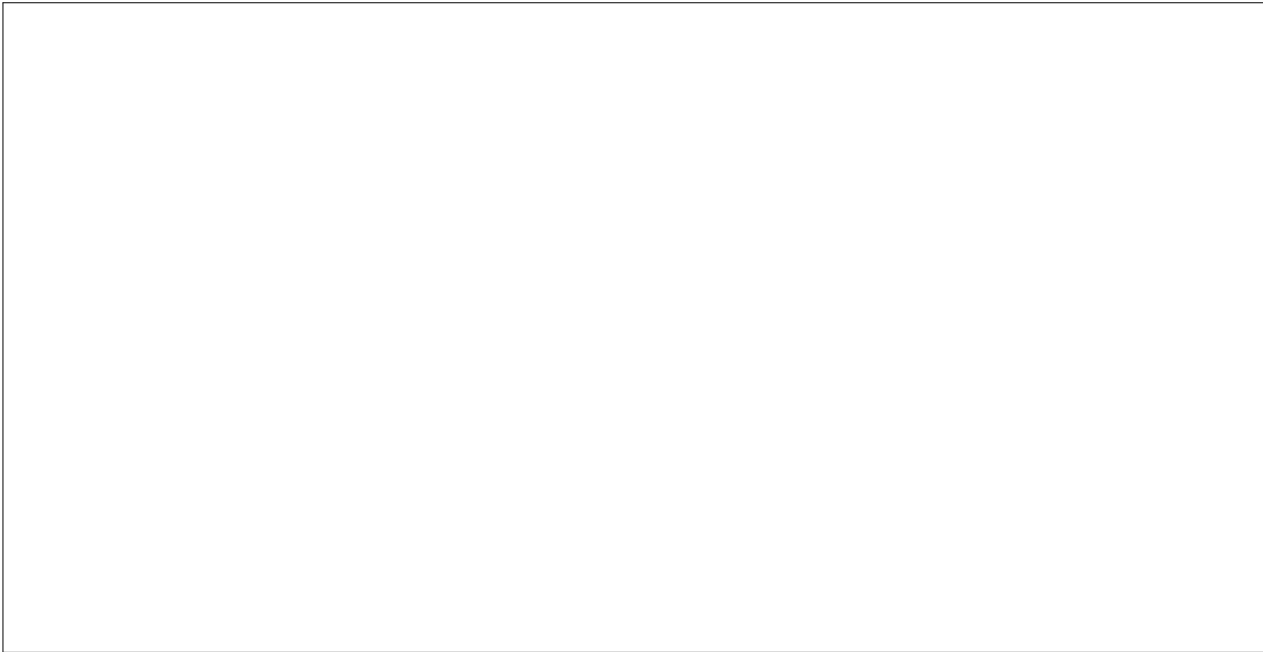


(b)(1)
(b)(3)

KENNEN (Early name of Program B's EOI satellite system, later called)
KPO KENNEN Project Office

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STOPPER (Vulnerability package on reconnaissance satellites) (b)(1)
(b)(3)



ZAMAN (Early name for Program B's KENNEN EOI satellite system)

ZOSTER (Program B pre-ZAMAN study of EOI)

b. ~~(TS//TK//NF)~~ Redact fact of and all references to



c. ~~(S//REL)~~ Redact all references to the KENNEN program except for the limited information on the KH-11 designator at the previous "Release" (see a. under paragraph 1.3.1.) Other redaction exceptions are the limited information designated for release below and in other parts of this document as follows:

- (1) (U) Paragraph 1.3.5, IMINT Systems Ground Operations
- (2) (U) Paragraph 1.6.4, Relay Satellites
- (3) (U) Paragraph 1.10.3, Launch Dates
- (4) (U) Paragraph 1.11.1, Development and Acquisition, General Participant Relationships
- (5) (U S) Appendix B, Releasable Names

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~~TOP SECRET//TK//RSEN/NOFORN~~

d. (~~S//TK//REL~~) Redact the non-operational IMINT mission numbers listed below:

	(b)(1) (b)(3)
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e. (U) Redaction guidance for KH-7 GAMBIT, KH-8 GAMBIT-3, HIGHERBOY, FULCRUM/HELIX, and KH-9 HEXAGON see Appendix G.

Release:

a. (U) Release the non-operational IMINT mission numbers listed below can be released as a mission group (all flights) and individually, associated with mission dates and operations:

1000	CORONA	(KH-4A, Aug 63 - Sep 69)
1100	CORONA	(KH4-B, Dec 67 - May 72)
1200	HEXAGON	(KH-9, Jun 71 - Apr 86)
2355	QUILL	(Dec 1964)
4000	GAMBIT	(KH-7, Jul 63 - Jun 67)
4300	GAMBIT-3	(KH-8, Jul 66 - Apr 84)
9000	CORONA	(KH-1 - KH-4, Feb 59 - Dec 63)
8000	LANYARD	(KH-6, Mar 63 - Jul 63)
9000A	ARGON	(KH-5, Feb 61 - Aug 64)

b. (U) Release facts about the S-2 program, a development effort sponsored by Program A (SAF/SP) in the early to mid-1960s as a follow-on to the CORONA photo-satellite system which contributed to development of the HEXAGON system (See Appendix G.)

c. (U) Release the fact of charge-coupled device (CCD) array technology used in the E.O. imaging satellite.

d. (U) Release the association of Programs A and B with development of the GAMBIT and HEXAGON family of systems.

e. (U) Release the fact that NRO high resolution imaging satellite payloads have a distinctive pointing capability.

f. (U) Release guidance for KH-7 GAMBIT, KH-8 GAMBIT-3, HIGHERBOY, FULCRUM/HELIX, and KH-9 HEXAGON can be found in Appendix G.

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g. (U) Release general information concerning the following LANYARD roll joint capabilities.

- (1) (U) Roll steering was accomplished in three discrete angles of 0° , $+ 15^{\circ}$, and $+ 30^{\circ}$, offering a total available target swath width of 192 nautical miles.
- (2) (U) A maximum response time of 30 seconds was required for rolling from one 30° extreme to the other. Approximately 3 seconds were required for rolling a 15° increment.
- (3) (U) The roll joint was capable of 200 maneuvers per mission.

g. (U) Release the fact that NRO spacecraft employ control moment gyroscopes provided there is no association of CMGs with specific vehicles or programs.

h. (U) Release the fact of, QUILL as an experimental radar imager flown in 1964. See appendix H for further release guidance.

i. (U) Release the following facts and information about DORIAN/KH-10:

- (1) (U) Release that DORIAN and KH-10 were the classified designations for the reconnaissance mission and equipment of the experimental Manned Orbiting Laboratory (MOL), also inaccurately referred to as Gemini-B.
- (2) (U) Release that, after DORIAN's cancellation, Project COLT provided six surplus 72" optical blanks for use in the Smithsonian Institution/University of Arizona's Multi-Mirror Telescope.
- (3) (U) Release that the 72" optical blanks, manufactured by Corning, were constructed of honeycombed borosilicate to reduce weight.
- (4) (U) Release that the 72" optical blanks were associated with imagery collection.

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~~TOP SECRET//TK//RSEN/NOFORN~~

(5) (U) Release that the proposed DORIAN mission also included SIGINT collection.

(6) (U) Release that a single, unmanned launch experiment verified the feasibility of the Gemini-B heat shield which made DORIAN possible, and that the program was subsequently cancelled and never flew.

(7) (U) Release programmatic facts about DORIAN, to include all previously published information about the MOL project, its NRO affiliation, and the names of major contractors and their senior personnel, but excluding specific reconnaissance capabilities beyond the 'fact of' IMINT and SIGINT collection.

(8) (U) Release technical information about the 72" optical blanks previously released by the Smithsonian or University of Arizona.

(9) (U) Release in association with KH-10/DORIAN the names of NRO personnel otherwise approved for release.

(10) ~~(S//TK//REL)~~ All other details remain classified, to include the fact of, and facts about, DORIAN

[Redacted]

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(b)(3)

1.3.3 (U) Current and Future IMINT Operational Systems

Redact:

~~(S//TK//REL)~~ Redact all information concerning current and future IMINT systems that might be reflected in 25-year-old records.

[Redacted]

(b)(1)
(b)(3)

Release:

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(U) None. No information about these IMINT systems has been declassified.

1.3.4 (U) Meteorological Forecasting

Redact:

(U) Redact information related to funding of the low altitude polar orbiting meteorological satellite (Program 35, 417, etc.) while a part of the NRP before 1966, and to the amount of (percent of) cloud free imaging that the military weather satellites allowed and continue to permit.

Release:

a. (U) Release all information about the NRO's role in the early-1960s initiating and developing what became the Defense Meteorological Satellite Program (DMSP) to support satellite imaging operations. General release information includes the various program designators used during DMSP development and operation (e.g., Program 35, Program 417, and Program 698BH).

b. (U) Release all information found in *A History of the Military Polar Orbiting Meteorological Satellite Program*, by R. Cargill Hall. This history, reflecting the guidance in release (a), above, is unclassified and approved for public release. It includes TIROS and other programs related to DMSP.

c. (U) Release the fact that the following agencies provided (and continue to provide) meteorological forecast data and atmospheric point analyses to IMINT projects.

- (1) (U) HQ USAF/XOW
- (2) (U) USAF Air Weather Service
- (3) (U) USAF Global Weather Central
- (4) (U) USAF Environmental Technical Applications Center
- (5) (U) USAF Space Forecast Center

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1.3.5 (U) IMINT System Ground Operations

Redact:

a. ~~(S//TK//REL)~~ Redact any information indicating or suggesting the presence of a

[Redacted]

[Redacted] Air Force Special Photographic Processing Facility (AFSPPF) at Westover AFB, Massachusetts.

b. ~~(S//TK//REL)~~ Redact information that refers to the AFSPPF processing of color film after the termination of the CORONA Program in 1972.

(b)(1)
(b)(3)

c. ~~(S//TK//REL)~~ Redact any information indicating or suggesting that the Air Force Satellite Control Network's Satellite Test Center (STC)

[Redacted]

d. ~~(S//TK//REL)~~ Redact - Although the acronyms and names of the [Redacted] mission ground stations [Redacted]

[Redacted]

e. ~~(S//TK//REL)~~ In addition to guidance above regarding the IMINT mission ground stations, redact any information indicating or implying the specific location of these ground stations (e.g., [Redacted])

f. (U) Redact all other information not cited below for release.

Release:

a. (U) Without revealing its actual location, release the fact that the ground station for the electro-optical imaging satellite system is located in the continental U.S.

b. (U) Release the term "Area 58" or "A-58" when limited to the context of a very general association with the NRO, intelligence activities, imagery intelligence, or satellite

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reconnaissance **but not revealing any** geographic location information.

c. (U) Release the AFSPPF as part of NRO Program A. Located at Westover AFB, Massachusetts, it has been acknowledged as a site for processing CAL program film. [redacted] (b)(1)
[redacted] (b)(3)
[redacted] in Rochester, NY, until it was closed in 1974-75.)

d. (U) Release the fact that the 544th Reconnaissance Technical Wing at Headquarters Strategic Air Command processed some of the film from NRO satellites after the closure of the AFSPPF in 1974-75.

e. (U) Release descriptions of film processing equipment and of film processing problems, **provided that** this information does not disclose classified facts about the satellite systems.

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1.4 (U) Signals Intelligence (SIGINT) Systems

1.4.1 (U) Signals Intelligence System Information

(U) Three NRO SIGINT satellite systems have been declassified to a limited degree: the GRAB/POPPY programs (see Appendix A) and the WS-117L SENTRY/SAMOS program (see appendix E). All other NRO SIGINT systems remain classified. Selected general facts about the systems that have been declassified appear below under "Release."

Redact:

~~(S//TK//REL)~~ Redact all information about R&D, operational and non-operational NRO SIGINT collection and processing programs, with the exception of the three programs noted above and the general information cited below for release. Information to be redacted will typically include signal parameters against which a system is designed to collect, system descriptions, technology, capabilities and operations [redacted]

[redacted] program names and mission numbers, dates, contractors, funding, facility locations, and satellite vulnerabilities including susceptibility to denial, deception, and countermeasures. It also includes information about [redacted] on LEO, HEO, and GEO SIGINT spacecraft, [redacted]

(b)(1)
(b)(3)

~~(S//TK//REL)~~ Redact reference and details to [redacted] See 1.4.3 for further details.

Release:

- a. (U) Release fact of satellite SIGINT collection capability.
- b. (U) Release fact of satellite COMINT collection capability.
- c. (U) Release fact of satellite ELINT collection capability.

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- d. (U) Release fact of satellite FISINT collection capability.
- e. (U) Release generic references to U.S. government SIGINT relationships with unspecified foreign governments.
- f. (U) Release fact that SIGINT satellites incorporate a direction finding capability for locating electronic emitters on earth.
- g. (U) Release NSA as the RANGER SPO.
- h. (U) Release fact that NRO SIGINT satellites operate in LEO, HEO, and GEO orbits.
- i. (U) Release fact that NRP SIGINT satellites support military Combat Search and Rescue (CSAR) operations. All facts about CSAR remain classified.
- j. (U) Release fact that SIGINT reporting by NRP space systems is conducted in near real time.
- k. (U) Release the following facts regarding NRO SIGINT satellite systems.
 - (1) (U) Capable of on-orbit processing of complex intercepted signals.
 - (2) (U) Featured wideband distributed amplifiers and pulse signal processors.
 - (3) (U) Developed a long-life, multi-purpose SIGINT satellite system in the 1960s that proved to be the model for follow on systems.
 - (4) (U) Developed satellite constellations for broader coverage.
- l. (U) Release the following "facts about" SIGINT Ground Data Processing.
 - (1) (U) Data collected by SIGINT satellites are delivered to the National Security Agency (NSA) for processing.
 - (2) (U) The Strategic Air Command (SAC) received duplicates of ELINT data and processed them

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primarily for ELINT Order of Battle analysis of significance to the Single Integrated Operations Plan (SIOP).

- (3) (U) All information contained in the NRO GRAB history brochure published in June 1998. See Appendix A, GRAB/POPPY, for more specific guidance on these two programs.

1.4.2 (U) Non-Operational SIGINT Systems

(U) See Appendix E for guidance on SENTRY/SAMOS SIGINT information, Appendix A for GRAB and POPPY SIGINT information.

Redact:

a. ~~(S//TK//REL)~~ Redact all information, including the words themselves, concerning non-operational SIGINT programs and missions that remain classified. This includes but is not limited to those programs and missions listed below. Should a redactor encounter a term or code word that may still be classified but is not on this list, consult the Redaction Quality Control supervisor for guidance.

AFTRACK	GRAPE JUICE	P-11	[REDACTED]	VAMPAN
[REDACTED]	HARVESTER	[REDACTED]	SAMPAN	WILD BILL
ARROYO	HAYLOFT	PLICAT	SAVANT	WESTON
BIRD DOG	[REDACTED]	PLYMOUTH ROCK	SETTER	[REDACTED]
BIT IX	LAMPAN	Project 698BK	SLEW-TO	
[REDACTED]	LIEGE	[REDACTED]	SOCTOP	
CARRIE	LONG JOHN	Project 770	SOUSEA	
[REDACTED]	LORRI	[REDACTED]	SQUARE 20	
CONVOY	MABELI	Project 989	STRAWMAN	
DONKEY	[REDACTED]	PUNDIT	THRESHER	
[REDACTED]	NEW HAMPSHIRE	RAQUEL	TIVOLI	All redactions this page:
FACADE	NEW JERSEY	[REDACTED]	TOP HAT	(b)(1) and (b)(3).
FANION	NOAH'S ARK	REAPER	TOPSOC	
FARRAH	OPPOR-KNOCKITY	[REDACTED]	TRIPOS	
[REDACTED]	[REDACTED]	[REDACTED]	URSALA	
GLORIA			VINO	

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b. (U) Redact any other SIGINT program and code words not indicated under Release, below.

c. ~~(S//TK//REL)~~ Redact all information indicating or implying in a fact of context that any SIGINT or vulnerability detection piggyback payloads were carried on CAL missions.

Release:

(U) Release fact of and general information about the GRAB and POPPY ELINT satellite projects (see Appendix A).

(U) Release fact of and general information about the SENTRY/SAMOS ELINT satellite project (see Appendix E).

1.4.3 (U) Current and Future SIGINT Operational Systems

Redact:

a. ~~(S//TK//REL)~~ Redact all information concerning the following current and future SIGINT systems.



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Release:

(U) None. No information about these SIGINT systems has been declassified.

1.4.4 (U) SIGINT Signal Parameters

Redact:

(U) *Redact* all information on SIGINT collection, uplink, and downlink parameters except the very limited releasable information regarding GRAB, POPPY, and SAMOS Ferret Payloads. (See appendices A & E)

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1.4.5 SIGINT System Ground Operations

Redact:

(U) Redact all information on ground operations and remote tracking stations except for the limited information approved for release in the GRAB/POPPY and SAMOS Appendixes: A and E, respectively.

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1.5 (U) Measurement and Signature Intelligence (MASINT)

(U) No MASINT programs have been declassified. Only a limited amount of general information about MASINT has been declassified, as specified below under "Release."

(U) MASINT is the discipline harnessing technically-derived intelligence, SIGINT or IMINT, to detect and classify targets or signatures.

Redact:

(U) Redact all information about R&D, operational and non-operational NRO MASINT collection and processing, with only a few exceptions, as indicated below. Information to be redacted includes system descriptions, technology, capabilities and operations, program names and numbers, dates, contractors, funding, facility locations, and satellite vulnerabilities, including susceptibility to denial, deception, and countermeasures.

Release:

a. (U) Release fact that NRO systems perform MASINT collection.

b. (U) Release general information surrounding the fact that the NRO is associated with MASINT in an R&D connotation.

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1.6 (U) Communications

1.6.1 (U) General Communications Information

(U) No dedicated NRO communication programs have been declassified. Communications information related to CORONA, ARGON, and LANYARD programs (see Appendix F), the GRAB and POPPY SIGINT satellite programs (see Appendix A), and the WS-117L: SENTRY/SAMOS program (see Appendix E) has been declassified and is described in guidance for those programs. General information about NRO communication programs has been declassified and is releasable, as indicated under "Release" below and in the remainder of Section 1.6.

Redact:

~~(S//TK//REL)~~ Redact all information about R&D, operational and non-operational NRO communications programs, subsystems, and architectures, with the exception of the information cited in the appendixes noted above and the general information cited for release below in sections 1.6.2 through 1.6.4. Information to be redacted includes all references to [redacted]

[redacted]

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All system and architecture descriptions, including any mention of: the [redacted] frequencies, technology, capabilities, or operations. Also, redact all references to [redacted] program names and numbers, dates, contractors, funding, organization, and facility locations, and system vulnerabilities, including susceptibility to countermeasures.

Release:

a. (U) Release Space Ground Link System command and telemetry (SGLS CMD/TLM) frequencies when associated with Air Force Satellite Control Network (AFSCN) Inter Range Operational Number (IRON).

b. (U) Release fact of NRO link with the Defense Satellite Communication System (DSCS).

c. (U) Release fact of space-to-space lasercom tests and usage.

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1.6.2 (U) Communication Satellite Payloads

Redact:

(U) Redact all information except for the limited release authority concerning the NRO relay satellite (see section 1.6.4).

1.6.3 (U) Relay Backup Mission Control Center

Redact:

(U) Redact all references to the backup mission control center for the relay satellites. Sensitive information includes, but is not limited to, the term Backup Relay Satellite Operations Center (BRSO) when associated with a specific location; operational reason(s) for activation date and time; and details of transfer timelines and functions transferred to the backup facility.

1.6.4 (U) Relay Satellites

Redact:

~~(S//TK//REL)~~ Redact all information about [redacted] or about NRO relay satellites not indicated below for release. This includes but is not limited to: design data, fact that the [redacted] system is a relay satellite program, general capabilities or the orbits and frequency bands used, number of satellites, or subsystem details. Also redact any information that reveals specific vulnerabilities and any reference to the [redacted]

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[redacted] (Note: On 23 December 2004 the NRO acknowledged "the fact of a SDS satellite" **without** identifying any functions that it performed on orbit. Releasable information, below, includes limited disclosure of SDS functions.)

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Release:

a. (U) Release the fact that the NRO sponsors a relay satellite program.

b. ~~(S//TK//REL)~~ **Without** disclosing program names [redacted] [redacted] release the fact that a relay satellite was developed at Hughes in the 1970s to operate with the first near real time E.O. imaging satellite.

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c. (U) Release fact that the relay satellite operated in a higher orbit than the E.O. imaging satellite, thus providing long periods of joint visibility over the USSR and the continental U.S.

d. (U) Release fact that the relay satellite functioned perfectly the first time it operated in conjunction with the E.O. imaging satellite in 1976, at a data rate equivalent to 100 digital TV channels.

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1.7 (U) Satellite Ground and Space System Vulnerabilities and Countermeasures

Redact:

a. (U) Redact all information that identifies *specific* threats to and vulnerabilities of satellite ground and space systems, deception and denial countermeasures to which space systems are susceptible or that they may employ, and defensive countermeasures taken to minimize damage or disruption to ground and space systems, or reduce susceptibility to deception and denial. (**Note:** "Defensive countermeasures" are sometimes termed measures for "Survivability." For guidance on reconnaissance aircraft countermeasures, see Section 1.14.5)

b. ~~(S//TK//REL)~~ Redact all references to satellite



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Release:

a. (U) Release generic fact that satellite ground and space systems are vulnerable to attack, but without specific program identification, system node or program orbit locations, or countermeasures in place to mitigate vulnerabilities.

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1.8 (U) Collection Planning, Targeting, and Support

(U) Only a few specified facts about collection planning and targeting in the CAL, GAMBIT, GAMBIT-3, HEXAGON, QUILL, and GRAB programs have been released. Information concerning other NRO operational and non-operational programs remains classified.

1.8.1 (U) Overall Targeting Strategy

Redact:

(U) Redact information that refers to the methods used to identify, select, prioritize, and process target sites for NRO overhead reconnaissance systems. This includes but is not limited to the content of regional and mission-specific data bases; software and documentation or special collection parameters that reveal special imaging capabilities or (b)(1)
(b)(3)
(b)(3)
 or any details about NRO support to law enforcement, counternarcotics, and counterterrorism.

Release:

a. (U) Release generic fact that satellite reconnaissance operations stem from a systematic process within the Intelligence Community that plans collection against designated areas of interest.

b. (U) Release fact of NRO support to law enforcement, counternarcotics, and counterterrorism.

c. (U) Release fact that NRO satellites can collect scientific and environmental data as well as data on natural and man-made disasters, and that such data can be furnished to authorized federal agencies.

d. (U) Release total number of collection targets for a given declassified IMINT system, mission, or bucket, and tabulation of such targets by broad geographical area, where precise target identity will not be revealed.

1.8.2 (U) Ground Collection Planning and Computer Software

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(U) Redact information about NRO ground collection planning including but not limited to computer software specifications, algorithms, and documentation of ground processing programs; target and requirements databases; and schedules, contracts, and costs for the development and implementation of collection planning activities.

Release:

(U) Release fact that the Committee on Imagery Requirements and Exploitation [COMIREX] Automated Management Systems (CAMS) [predecessor to current Requirements Management System (RMS)] was developed to support tasking of IMINT programs without reference to specific program names or national system mission numbers.

1.8.3 (U) Satellite Tasking**Redact:**

(U) Redact information about tasking of NRO satellites including but not limited to satellite ephemerides when associated with specific target information or prior to imaging; target areas when associated with operational systems; targeting accuracy; real time operations planning capability including tasking of spacecraft; and the general response time to tasking.

Release:

a. (U) Release generic references to the fact that collection operations by reconnaissance satellites result from "tasking" actions transmitted from the ground to the satellite in orbit.

b. (U) Release identification of the following computer programs relating to CORONA satellite operations: (Unclassified in CORONA context only.)

- (1) (U) CORONA Target Program (CTP): orbit-by-orbit camera operation selection based on weather (WX) forecasts and on displays of operational information and accomplishments.

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- (2) (U) CALICO: determined camera operations and displayed operational information.
- (3) (U) CACTUS: listed target locations for photo-interpreting.
- (4) (U) COMET: determined orbit selections.
- (5) (U) LETHAL: program for automatic command and control of the satellite.

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1.9 (U) Mission Ground Stations (MGS)

(U) Much of the information about NRP mission ground stations remains classified. This includes their manning, functions performed, connectivity, etc. A few general facts about them have been declassified, as indicated below under "Release."

~~(S//TK//REL)~~ As of **15 October 2008** the location of NRO mission ground stations within the Continental United States, renamed Aerospace Data Facilities on that date, and the fact of an NRO presence at the Joint Defence Facility Pine Gap and Royal Air Force Menwith Hill Station as of that date, were declassified and releasable. [redacted]

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[redacted] See NRO MGS Declassification Guide for additional details.

~~(S//TK//REL)~~ **Note:** The names and acronyms of NRO mission ground stations are not classified uniformly.

- [redacted] declassified specifically in association with GRAB/POPPY (See Appendix A)
- The pre-15 October 2008 names and acronyms of two [redacted] mission ground stations are unclassified as long as they are not associated with a specific geographic location, an intelligence organization, or a satellite system/mission number. These are:
 - o Consolidated Washington Mission Ground Station (CWMGS) and
 - o Consolidated Southwest Mission Ground Station (CSWMGS).

[redacted]

1.9.1 (U) MGS and Remote Tracking Station Locations

Redact:

- a. (U) Redact any information indicating, suggesting, or acknowledging that:

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(1) ~~(S//TK//REL)~~ [Redacted]

(2) ~~(S//TK//REL)~~ [Redacted]

(3) ~~(S//TK//REL)~~ [Redacted]

(4) ~~(S//TK//REL)~~ [Redacted]

(5) ~~(S//TK//REL)~~ [Redacted]

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[Redacted]

(6) ~~(S//TK//REL)~~

[Redacted]

(7) ~~(S//TK//REL)~~

[Redacted]

(8) ~~(S//TK//REL)~~

[Redacted]

(9) ~~(S//TK//REL)~~

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this page:
(b) (1) and
(b) (3).

(10) ~~(S//TK//REL)~~ [redacted]

b. ~~(S//TK//REL)~~ Aside from the specific release authority
below, [redacted]

(1) [redacted]

c. (U) Redact information about NRO SIGINT and IMINT MGS functions/operations including but not limited to descriptions of general functions performed; identification/identity of ground station personnel; description or details of specific functions performed at any of these MGS that reveal possible vulnerability or survivability issues; design and performance characteristics of all ground segments at these ground stations; and MGS antenna locations.

d. (U) Redact all other information not cited below for release.

Release:

a. (U) Release fact that the Woomera Satellite Tracking Station in Australia was used to support DISCOVERER (CORONA) (at least for Agena 1101/Rm-1).

b. (U) Release fact that the following remote tracking stations (RTS) supported DISCOVERER (CORONA) and/or SAMOS reconnaissance satellite programs, and any of these locations' support for the GAMBIT/HEXAGON family of systems.

- o Annette Island, Alaska
- o Fort Greeley (aka Donnelly Flats), Alaska
- o Fort Stevens, Oregon
- o Kaena Point, Hawaii
- o Kodiak (aka Chiniak), Alaska
- o New Boston, New Hampshire
- o Ottumwa, Iowa
- o Palo Alto, California
- o Point Mugu, California
- o Vandenberg AFB, California

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- o Christmas Island
- o Guam

c. (U) Release term, "MGS" or "Mission Ground Station" without reference to programs/systems or a specific geographical location.

d. (~~S//TK//REL~~) Release generic references to NRO Mission Ground Stations (MGS) located in the "Washington Area" OR the "Southwestern United States" prior to 15 October 2008. [REDACTED]

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e. (U) Release the fact that SAF/SP was the overt office designator for NRO Program A and was based in Los Angeles, CA. Other acknowledged SAF/SP locations include Los Angeles Air Force Station (AFS), CA (later named Los Angeles Air Force Base [AFB]), Sunnyvale AFS (later named Onizuka AFB), CA, Washington, D.C., Vandenberg AFB, CA, and Cape Canaveral AFS, FL.

f. (U) Release the fact of Aerospace Data Facilities East, Colorado, and Southwest (ADF-E, ADF-C, ADF-SW) as NRO Mission Ground Stations and their mission as multi-mission ground stations responsible for supporting worldwide defense operations and multi-agency collection, analysis, reporting, and dissemination of intelligence information, providing data to defense, intelligence, and civil agencies supporting the U.S. government after October 15, 2008. Also release the locations of ADF-E (Fort Belvoir, VA), ADF-C (Buckley AFB, CO), and ADF-SW (White Sands Missile Test Range). See NRO MGS Declassification Guide for additional details.

g. (U) Release the fact of an NRO presence at the Joint Defence Facility Pine Gap (JDFPG) and Royal Air Force Menwith Hill Station (MHS) on and after 15 October 2008. See NRO MGS Declassification Guide for additional details.

h. (U) Release the fact that NGA and NSA are present at ADF-E, ADF-C, ADF-SW, MHS, and JDFPG, and that the CIA is present at ADF-E. See NRO MGS Declassification Guide for additional details.

i. (U) Release the fact that the NRO supports the joint missions at JDFPG and MHS through the provision of technical systems and shared research and development. The NRO participates with the consent of the Host governments and

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contributes to the national security of the countries involved. See NRO MGS Declassification Guide for additional details.

j. (U) Release AFSCN stations in association with declassified NRO programs and in general association with AFSCN support to NRO.

k. (U) Release the fact that AFSCN is responsible for providing tracking, telemetry, command and control support functions for satellite operations.

l. (U) Release the fact that the AFSCN supports the NRO.

m. (U) Release the locations of all current and previous AFSCN stations, to include

Station	Abbreviation	Call sign
Vandenberg Tracking Station	VTS	COOK
Hawaii Tracking Station	HTS	HULA
Schriever Control Node	SCN	
Colorado Tracking Station	CTS	
Diego Garcia Station	DGS	
Guam Tracking Station	GTS	GUAM
Telemetry and Command Squadron, Oakhanger, UK	TCS	
Thule Tracking Station	TTS	POGO
New Hampshire Station	NHS	BOSS
Onizuka Control Node	OAFS	

n. (U) Release System Program Office (SPO) designation MCS (Mission Control Segment).

o. (U) Release information acknowledging MGS support of a specific operation or mission- for example named military operations, counter-narcotics, GWOT- consistent with classification of the operation in question. If the support reveals a specific type of intelligence capability (SIGINT, IMINT, etc.), that support remains classified S//TK//REL FVEY in the absence of other, specific authorization.

Refer:

(U) Refer all information that provides details of Air Force Satellite Control Network (AFSCN) support of the NRO to Air Force Space Command (AFSPC).

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1.10 (U) Launch Activities

1.10.1 (U) Pre-Launch Activities

(U) Although a great deal of launch-related information about various NRO programs (CAL, DMSP, GRAB, POPPY, STEX, GeoLITE, GAMBIT, GAMBIT-3, HEXAGON, QUILL, and SENTRY/SAMOS) has been declassified and released, the NRO continues to classify information that connects specific NRO satellite programs to specific pre-launch events in the absence of other guidance.

Redact:

(U) Redact information about NRO pre- and post-launch activities, categories which include but are not limited to: flight mission objectives, program names (platform identifiers), planned launch dates, trajectories selected, collection mission numbers, capabilities, operational configurations, vulnerabilities, satellite vehicle (SV) replenishment needs or strategies, and program and SV plans or requirements. Specifically protected launch-related information includes descriptions of SV size, shape, weight, mechanical characteristics and structural dynamics, and operational planning and requirements for launch in the absence of other guidance.

Release:

a. (U) Release fact that NRO satellites are launched from Cape Canaveral Air Station, FL, and Vandenberg AFB, CA.

b. (U) Release fact that as of December 1996 the NRO has had "well over 300" launches since 1959, including 145 CORONA, ARGON, LANYARD launches from Vandenberg AFB between 1959-1972. Also see Appendix A for launch history associated with the GRAB and Poppy ELINT satellites, Appendix E for SENTRY/SAMOS, Appendix F for CAL, and Appendix G for GAMBIT/HEXAGON.

c. (U) Release fact that NRO launch support assets were (and continue to be) located at Onizuka Air Force Base (formerly Onizuka Air Force Station and Sunnyvale Air Force Station), CA; Cape Canaveral Air Force Station, FL; Los Angeles AFB, CA (formerly LA AFS); NRO Operations Squadron, Schriever AFB, CO; and Vandenberg AFB, CA.

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d. (U) Release fact that some NRO satellite vehicles were integrated, launched, and operated under Air Force Program (AFP) designators. Only selected AFP designators can be released, as indicated in the following paragraphs.

e. (U) Release the following AFP numbers associated with the CORONA, ARGON, LANYARD imaging satellite programs.

- 162 - 241 -622A -846

f. (U) Release the following AFP numbers associated with the SAMOS satellite program.

- 101B (related to the E-5 payload that evolved into the LANYARD imaging satellite)
- 201 (related to the E-6 film return imaging payload)
- 315A (related to the revamped E-6 imaging payload)
- 722 (related to the E-6 film return imaging payload)

g. (U) Release the fact that the following AFP numbers also are NRO programs (without identifying the specific payload).

- 104 - 580
 - 141 - 623
 - 259 - 732
 - 326 - 774
 - 465 - 843
 - 475 - 868
 - 491 - 878
 - 557 - 946

h. (U) Release the fact that NRO satellite vehicles have been integrated and launched using "NROL" (NRO Launch) designators since December 1996.

1.10.2 (U) Launch Vehicle (LV) Utilization

Redact:

(U) Redact information about NRO launch vehicle utilization that includes but is not limited to the association of specific

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NRO payloads (by platform identifier, collection mission number, or AFP number) with specific launch vehicles (except for the declassified CAL, SAMOS, DMSP, GRAB, STEX, GeoLITE, GAMBIT, GAMBIT-3, HEXAGON, QUILL, and POPPY launch vehicles).

Release:

A.(U) Release fact that NRO payloads launched during the 25-year-old timeframe of RRG guidance were carried by the following launch vehicles (LVs) **without associating them with specific program payloads unless specifically indicated in appendices**, AFP numbers, or specific launches. Fact that the NRO launched payloads on the Space Transportation System (STS or Space Shuttle), was acknowledged in 2001.

- (1) Atlas/Agena (SAMOS, GAMBIT)
- (2) Atlas IIA (NROL-5)
- (3) Atlas IIAS (NROL-1, 10, 12, 13, and 18)
- (4) Atlas III (NROL-23)
- (5) Scout (One unsuccessful GRAB launch attempt)
- (6) Scout/MG-18 (Five launches, Program 417/DMSP)
- (7) Thor/Agena (CORONA, ARGON, LANYARD, POPPY)
- (8) Thor/Able-Star (Launched GRAB payloads)
- (9) Thorad/Agena (CORONA, ARGON, LANYARD, POPPY)
- (10) Thor/Burner I (DMSP)
- (11) Thrust Augmented Thor (TAT)/Agena (CORONA, ARGON, LANYARD, POPPY)
- (12) Titan 3B (GAMBIT-3)
- (13) Titan 23D (HEXAGON)
- (14) Titan 401/Centaur
- (15) Titan 4/Centaur
- (16) STS (Space Shuttle)

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- (17) Taurus (STEX)
- (18) Delta II (GeoLITE)
- (19) Delta IV (NROL-22)

B. (U) Release that the Space Shuttle's cargo bay dimensions were dictated by the plan to use it to launch the HEXAGON system, and the subsequent ZEUS program. See appendix G.

1.10.3 (U) Launch Dates

(U) The launch dates of declassified/partially declassified NRO programs including CAL, GRAB, POPPY, SAMOS, STEX, GeoLITE, and DMSP, GAMBIT/GAMBIT-3 and HEXAGON have been released. Beginning on 20 December 1996, the NRO has released the launch dates of NRO satellites without disclosing their specific, classified missions. All other NRO launch dates before 20 December 1996 remain classified.

Redact:

(U) Redact all information about NRO satellite launch dates not specified below for release.

Release:

a. (U) Release fact that NRO launches were (and continue to be) placed in the UN Launch Registry by U.S. Space Command and its predecessor organizations.

b. (U) Release list, schedule, or manifest of the following acknowledged NRO launches:

- (1) (U) CORONA, ARGON, and LANYARD launches from Vandenberg AFB between 1959-1972.
- (2) (U) GRAB/DYNO launches between 22 June 1960 and 22 April 1962 from Cape Canaveral Air Station, Florida and Point Arguello, California.
- (3) (U) POPPY launches between 13 December 1962 and 14 December 1971 from Vandenberg Air Force Base, California.

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- (4) (U) Fact that the first launch of the KH-11 near real time electro-optical imagery satellite occurred 19 December 1976.
- (5) (U) The date and place of launch activities identified with an NRO Launch (NROL) designator, without disclosure of specific missions, for all NRO satellites launched after 20 December 1996.
- (6) (U) STEX launch on 3 October 1998 from Vandenberg AFB.
- (7) (U) GeoLITE launch on 18 May 2001 from Cape Canaveral.

1.10.4 (U) Payload Integration and Pre-Launch Support

Redact:

(U) Redact Trailblazer/Pathfinder plans, activities, requirements, and schedules that reveal satellite vehicle (SV) programmatic information, to include mission, objectives, capabilities, vulnerabilities, priorities, constellation size and status, operational and technical limitations, and operational infrastructure and interfaces.

Release:

a. (U) Release the following if it may be done without revealing a specific program (platform identifier, collection mission number, or an AFP number):

- (1) (U) SV/Launch Vehicle (LV) combined lift-off weight.
- (2) (U) LV-provided SV destruction system or termination system details that do not reveal the Flight Termination System (FTS) Receiver flight code.
- (3) (U) SV support equipment that does not reveal SV mission, capabilities, operational configuration, vulnerabilities, or identify the contractor providing the equipment.

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- (4) (U) The fact of an SV anomaly during integration, ground processing, or launch operations and its effects on launch schedule, processing, or base assets.
- (5) (U) Association of the launch vehicle or launch system integration contractors with the NRO.
- (6) (U) A specific NROL LV or launch service or launch date.
- (7) (U) Space launch manifests after December 1996 when identified by an NROL number.

b. (U) Release transportation of an SV, SV ASE, and/or SV AGE that does NOT reveal an AFP number, methods, and/or off-site routes.

1.10.5 (U) Launch Operations, Trajectory, Tracking, Telemetry

Redact:

(U) Redact information about NRO launch operations to include launch window, planned launch time, and any identification of the specific NRO payload except by NROL designator. All information about planned SV operations during ascent and on orbit, unless directed otherwise by specific guidance.

Release:

- a. (U) Without revealing IRON or an AFP number, release:
 - (1) (U) AFSCN or Range radar and telemetry coverage estimates.
 - (2) (U) Transportable/mobile AFSCN assets, deployment plans or locations supporting a launch.
- b. (U) Release real time pictures, video, and/or optical data from on-board imaging systems prior to 60 seconds before SV separation.

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c. (U) Release real time pictures, video, and/or optical data from ground-based imaging systems.

d. (U) Release flight of an LV from lift-off through spacecraft separation for a program identified with an NROL designator, including: fact of successful SV separation, real time/actual trajectory, tracking, and metric data; flight operations; mark event items, numbers, and descriptions; and command or telemetry data after separation.

e. (U) Release fact of SV communications security (COMSEC) capabilities to include fact of encryption.

f. (U) Release fact that an SV has station keeping and/or attitude control capability.

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1.11 (U) Development and Acquisition

1.11.1 (U) General Participant Relationships

Redact:

a. (U) Redact any references to contractors having an NRO association unless otherwise indicated below.

b. ~~(S//NF)~~ Unless identified for release elsewhere, redact any references to CIA covert contracting/procurement relationships with any contractor.

c. (U) Redact all other participant relationship information not cited below for release.

Release:

a. (U) In addition to Eastman Kodak's previously acknowledged film R&D role in the CORONA Program, release their role in processing the CORONA film at their Hawkeye facility.

b. (U) Release Defense Meteorological Support Program (DSMP) contractors included:

- (1) (U) RCA (spacecraft)
- (2) (U) Chance Vought (prime booster)
- (3) (U) Minneapolis Honeywell (guidance and control)
- (4) (U) Aerojet General (solid-fuel rocket fabricators)
- (5) (U) Thiokol (solid-fuel rocket fabricators)
- (6) (U) Allegheny Ballistic Laboratories of Hercules Powder Company

c. (U) Release contractors associated with the SAMOS Program: (See Appendix E for more complete list)

- (1) (U) General Dynamics/Astronautics (Atlas booster assembly and test)
- (2) (U) Space Technology Laboratories (Atlas Systems

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Engineering and Technical Direction)

- (3) (U) General Electric Company (Atlas guidance)
- (4) (U) Burroughs Corporation (Atlas ground based computer guidance)
- (5) (U) Rocketdyne Division of NAA (Atlas propulsion)
- (6) (U) Lockheed (AGENA prime contractor)
- (7) (U) Bell (AGENA propulsion)
- (8) (U) Philco (AGENA ground-based communications)
- (9) (U) Eastman Kodak
- (10) (U) TRW
- (11) (U) ITEK

d. (U) Release Eastman Kodak's role in developing and processing the mission film for Program D U-2 and A-12/OXCART aircraft systems.

e. (U) Release Autometric role in the ARGON satellite mapping program.

f. (U) Release fact that Hughes was the primary contractor that built the relay satellite in the 1970s in conjunction with the operational concept for the E.O. imaging satellite.

g. (U) Release fact of Aerospace Corporation association with declassified Program A imaging systems.

h. (U) Release fact of TRW association with Program B SIGINT satellite systems.

i. (U) Release fact of Advent Systems association with Program A SIGINT activities.

j. (U) Release fact of General Electric association with Program B development of the E.O. imaging satellite system.

k. (U) Release fact of Lockheed association with E.O. imaging satellite development in support of Program B.

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l. (U) Release fact of Lockheed association with Program A SIGINT satellite activity.

m. (U) Release fact of Technology Services Corporation (TSC) association with and support of SAF/SP in the early 1970s time frame.

n. (U) Release fact that the Stanford Electronic Laboratory (SEL) at Stanford University supported NRO SIGINT programs during the 1960s until the university terminated all government contracts in 1969.

o. (U) Release information for NRO contractors and subcontractors associated with the design, development, launch, and operation of the GAMBIT and HEXAGON family of programs can be found in Appendix G

1.11.2 (U) Funding and Budget

Redact:

a. ~~(S//NF)~~ Redact all information about NRO funding and budget, which includes but is not limited to: funding of the National Reconnaissance Program (NRP) or of the National Foreign Intelligence Program (NFIP), percentage of increase or decrease in fiscal year budgets, data that may directly or indirectly expose NFIP/NRP funding profiles, or that may reveal the



(b)(1)
(b)(3)

Release:

a. (U) Release any funding figure for SAMOS that falls within the funding previously allocated by the Advanced Research Projects Agency (ARPA) in millions as of 30 June 1960.

- (1) (U) Funding in fiscal year (FY) 1959 and prior years \$105.6
- (2) (U) Amounts Programmed in FY 1960 \$164.5
- (3) (U) Cumulative Obligations \$247.2
- (4) (U) Cumulative Expenditures \$187.8

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Above figures do not include \$85.7 million programmed by the Air Force during FY 1958 and prior years for a broader scope WS 117L program. **Note:** SAMOS funding figures for FY 1961 and thereafter are not releasable.

b. (U) Release fact that Presidential Science Advisor Kistiakowsky indicated in a 6 June 1960 memo that a \$30 million supplemental increase for satellite reconnaissance would be helpful but not essential.

c. (U) Release all program costs & overall budget, for the CORONA program, without revealing any funding sources and methods; see RRG section 1.11.2 for further clarification on what items still need to be protected.

d. (U) Release any budget or spending figures that clearly are not related to the NRP or NFIP. For instance, although the NRO used the BIG SAFARI testbed aircraft program in the 1970s, this activity was a pure Air Force effort funded through the normal Department of Defense budget (as opposed to the NFIP) since at least the early to mid-1950s. (See section 1.14.6, information element a.) Other examples include MIDAS satellite funding under the old WS-117L Air Force satellite development project, and/or Air Force funding for launch services that are not, directly or indirectly, related to NRO programs but may be in documents that also address NRP activities.

e. (U) Release funding figures for the DISCOVERER program (CORONA's cover project) found in Air Force (but not Program A) documents. Those figures include items unrelated to intelligence activities, such as the care and feeding of chimpanzees, were presented to Congress each year for approval, and appear in unclassified congressional records.

f. (U) Release total program budgets for GAMBIT, GAMBIT-3, HEXAGON, and related programs, but no breakdown figures:

Total cost of the GAMBIT program between FY1963 and FY1967, was \$651,000,000 in 1963 dollars.

Total cost of the GAMBIT-3 program between FY1964 and FY1985 was approximately \$2,300,000,000 in respective year dollars.

Total cost of the HEXAGON program, including the CIA-managed portion, between FY1966 and FY1986, was \$3,262,000,000.

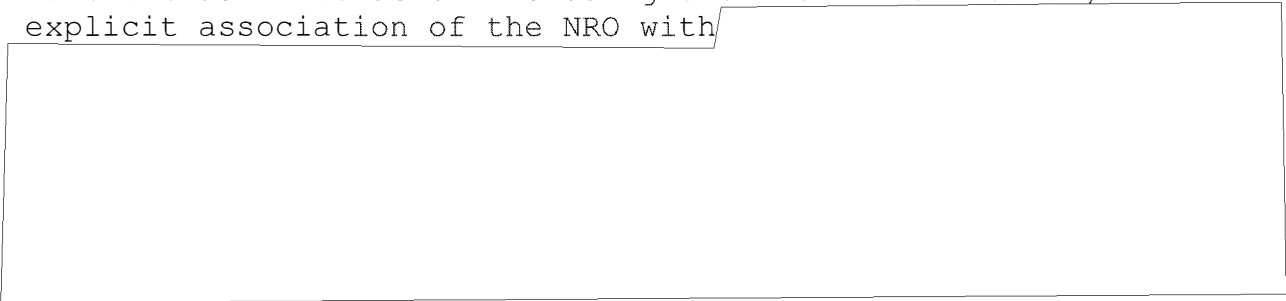
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1.11.3 (U) Contract Administration

Redact:

a. ~~(S//TK//REL)~~ Redact all information related to NRO contract administration including but not limited to any explicit association of the NRO with



(b)(1)
(b)(3)

b. (U) Redact all contract numbers associated with NRP contractors, and identification of all contractors, where the relevant NRO association or scope of association has not been approved for release.

Release:

- a. (U) Release fact that the NRO does covert procurements.
- b. (U) Without revealing details, release fact of special banking mechanisms and transaction procedures.
- c. (U) Release any standardized federal or Department of Defense contract clauses or provisions so long as they have not been modified to include NRO-specific information or reveal sensitive aspects of NRO business practices. Questions regarding release of specific clauses or provisions must be referred to the NRO Office of Contracts.
- d. (U) Release entire contract numbers that begin with the prefix "NRO," (e.g. NROxxxx-xx-x-xxxx).
- e. (U) Release last four digits of a contract number not covered by other portions of 1.11.3.

1.12 (U) Product-Related Information

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All redactions this page: (b) (1) and (b) (3).

1.12.1 (U) IMINT-Related Products

(U) The classification of disseminated IMINT-related products and the methods used for exploiting them is under the purview of the National Geospatial-Intelligence Agency (NGA). Classification of certain product-related activities within NRO mission ground stations remains under NRO control and, in general, has not been declassified with the exception of the general facts identified below and in CAL-related information contained in Appendix F.

Redact:

~~(S//REL)~~ Redact all information about NRO-controlled product-related activities that is not referred to NGA or specifically cited below or in Appendix F for release. This includes but is not limited to the [redacted] [redacted] format of film image when in context of system type; ground coordinates of reconnaissance imagery; image quantity, quality, and resolution (if less than two feet); and imagery support data.

Release:

- a. (U) Release the phrase, "Image Data Exploitation."
- b. (U) Release the acronym "IDEX" (Image Data Exploitation System).
- c. ~~(S//TK//REL)~~ Release the existence of IAG (Imagery Analysis Group, formerly IAD) **absent any associations with:**
 - (1) ~~(S//TK//REL)~~ Its location
 - (2) ~~(S//TK//REL)~~ [redacted]
[redacted]
 - (3) ~~(S//TK//REL)~~ [redacted]
[redacted]
- d. (U) Release the relationship between IAG and the U.S. Army Topographic Engineering Center (TEC) (formerly ETL).
- e. (U) Release the interagency composition of IAG.

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Refer:

(U) Refer to NGA: All product-related information not identified above for release.

1.12.2 (U) SIGINT-Related Products

Refer:

(U) Refer to NSA: All product related information.

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1.13 (U) Terms and Code Words

Redact:

a. (U) Redact all Project Study Numbers that are clearly associated with the NRO/NRP unless specifically authorized otherwise in Appendix C.

b. (U) Redact project study numbers associated with study efforts, in an NRO context, that came into existence during CORONA development or after creation of SAF/SP in September 1960 unless specifically authorized otherwise in Appendix C.

c. (S//TK//REL) Redact all NRO/NRP code words, KH-suffixes, and project terms not listed below or in Appendix C.

Release:

a. (U) Release mission designator prefix, "KH-" when used alone or as specified below.

b. (U) Release the following KH suffixes: KH-1, KH-2, KH-3, KH-4, KH-4A, KH-4B, KH-5, KH-6, KH-7, KH-8, KH-9, KH-10, and KH-11.

c. (U) Release all pre-1960 Air Force program numbers (e.g., WS-461L, WS-119L, WS-117L), and the code words/terms listed in Appendix C.

d. (U) Release all common military acronyms or terms found in JP 1-02 (the *DoD Dictionary*), and all other unclassified U.S. or NATO terminology.

Refer:

a. (U) Refer non-NRO codewords to the appropriate Original Classification Authority in the absence of a signed Memorandum of Understanding or other authorization for NRO redaction.

Redactor Note: Terms listed in the *DoD Dictionary*, JP 1-02, are not classified and do not require referral or redaction.

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All redactions this page: (b) (1) and (b) (3).

1.14 (U) Program D

~~(S//TK//REL)~~ Although the NRO no longer considers as sensitive most information related to the former aerial reconnaissance Program D, the following sections address information that remains classified.

(U) The *Aerial Reconnaissance Review and Redaction Guide*, approved by the NRO, Air Force, and CIA, contains specific joint guidance for the treatment of aerial equities. That guidance is to be applied in NRO declassification decisions, in conjunction with the following NRO-specific guidance. In the event of conflicting guidance, the guidance most recently approved by the Director, National Reconnaissance Office will provide the basis for decisions by the Seal and Release Authority and/or authorized members of the Information Review and Release Group, consistent with E.O. 13526 and its presumption of disclosure.

1.14.1 (U) Program D - General

Redact:

a. (U) Redact all references to Program D funding, regardless of project.

b. ~~(S//TK//REL)~~ Redact references to **any** study numbers and in particular to the following Program D-related study numbers:

- [Redacted]
- [Redacted]
- [Redacted]
- [Redacted]
- [Redacted]

c. ~~(S//TK//REL)~~ Redact references to coordination and liaison between NRO/Program D and [Redacted]

[Redacted] or other NRO program offices, including references to site access, clearances, etc.

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All redactions this page: (b)(1) and (b)(3).

d. ~~(S//NF)~~ Redact references to Program D [redacted]

[redacted]

e. ~~(S//NF)~~ Redact fact that as a result of the Program D realignment in 1974, manpower formerly assigned to the Program D office in [redacted] was assigned to [redacted]

f. ~~(S//TK//REL)~~ Redact fact that as a result of the Program D realignment in 1974, [redacted] were the Air Staff points of contact (POC) for coordinating continuing NRO requirements for [redacted] activities.

g. ~~(S//NF)~~ Redact fact that as a result of the Program D realignment in 1974, [redacted]

[redacted]

h. ~~(S//TK//REL)~~ Redact any references to [redacted]

[redacted]

i. ~~(S//TK//REL)~~ Redact references to the possibility of using the [redacted]

[redacted]

i. ~~(S//NF)~~ Redact references to [redacted]

[redacted] and to the benefit that the NRO could bring to making such a capability a reality.

k. ~~(S//NF)~~ Redact information revealing or inferring that

[redacted]

l. ~~(S//TK//REL)~~ Redact references to [redacted] association with [redacted]

[redacted]

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m. ~~(S//TK//REL)~~ Redact association of

(b)(1)
(b)(3)

Release:

- a. (U) Release general information about Program D not identified above for redaction.
- b. (U) Release the identities of all Program D directors.

Refer:

- a. (U) Refer to CIA any information that mentions:
 - CIA U-2 and OXCART flight operations
 - U-2 or OXCART aircraft maximum speed/height
 - Code words for U-2 various worldwide missions
 - Identification of countries that participated in covert U-2 flight operations, that provided bases or otherwise provided support to covert overflights
 - Non-photographic intelligence collection
 - Electronic countermeasure
- b. (U) Refer to the Air Force: any information concerning the missions, flight performance, or vulnerabilities of the U-2 and SR-71 aircraft.
- c. (U) Refer to JCS/JRC: information concerning tasking and targeting for U-2, OXCART, and SR-71 missions.
- d. (U) Refer to Secretary of the Air Force SAF/AQ Security: All reconnaissance aircraft information after 1974 not covered in the joint Aerial Reconnaissance Review and Redaction Guide.
- e. (U) Refer to the National Security Council (NSC): Any records addressing the 5412, 303, or 40 Committee meetings and their role in approving specific overflight reconnaissance operations. (These committees are sometimes referred to as the "Special Group.")

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All redactions this page: (b) (1) and (b) (3).

1.14.2 ~~(S//TK//REL)~~ [redacted]

Redact:

~~(S//TK/NF)~~ Redact all information that reveals or implies a

[redacted]

[redacted] This information includes but is not limited to:

a. ~~(S//NF)~~ [redacted]

[redacted]

b. ~~(S//TK//REL)~~ Redact references to the fact that the NRO provided [redacted]

[redacted]

c. ~~(S//TK//REL)~~ Redact references to any NRO association with the [redacted]

[redacted]

d. ~~(S//TK//REL)~~ Redact references to any NRO association with [redacted]

e. ~~(S//TK//REL)~~ Redact fact that Program D provided

[redacted]

f. ~~(S//TK//REL)~~ Redact references to [redacted]

[redacted]

g. ~~(S//TK//REL)~~ Redact references to the following [redacted]

[redacted]

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[Redacted]

(1) ~~(S//TK//REL)~~ [Redacted]

[Redacted]

(2) ~~(S//TK//REL)~~ [Redacted]

[Redacted]

(3) ~~(S//TK//REL)~~ [Redacted]

[Redacted]

(4) ~~(S//TK//REL)~~ [Redacted]

[Redacted]

Release:

a. (U) Release information not identified above for redaction. If in doubt, the redactor should consult the Redaction Quality Control supervisor for guidance.

1.14.3 (U) Logistics Support to NRP Facilities & Locations

Redact:

(U) Redact information relating to logistics support of NRP facilities and locations. This information includes but is not limited to:

a. ~~(S//TK//REL)~~ Redact information revealing or inferring that the Program D office (and its various now-acknowledged

[Redacted]

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All redactions this page: (b) (1) and (b) (3).

[Redacted]

b. ~~(S//TK//REL)~~ Redact information revealing or inferring that the [Redacted]

[Redacted]

c. ~~(S//TK//REL)~~ Redact explicit or implied association of the NRO with the terms, [Redacted]

[Redacted]

d. ~~(S//TK//REL)~~ Redact references to [Redacted]

[Redacted]

e. ~~(S//TK//REL)~~ Redact references to the [Redacted]

[Redacted]

f. ~~(S//TK//REL)~~ Redact fact that the [Redacted]

[Redacted]

g. ~~(S//TK//REL)~~ Redact fact that the [Redacted]

[Redacted]

h. ~~(S//TK//REL)~~ Redact use of [Redacted]

[Redacted]

i. ~~(S//TK//REL)~~ Redact references to temporary space at various Air Force installations in support of [Redacted]

j. ~~(S//NF)~~ Redact references to any NRO association with [Redacted]

[Redacted]

k. ~~(S//TK//REL)~~ Redact [Redacted]

[Redacted]

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~~TOP SECRET//TK//RSEN/NOFORN~~

All redactions this page: (b) (1) and (b) (3).

l. ~~(S//TK//REL)~~ Redact any reference that locates the

[Redacted]

m. ~~(S//TK//REL)~~ Redact Fact that the

[Redacted]

[Redacted]

n. ~~(S//TK//REL)~~ Redact Association of the

[Redacted]

[Redacted]

o. ~~(S//TK//REL)~~ Redact Association of the

[Redacted]

[Redacted]

p. ~~(S//TK//REL)~~ Redact all references to

[Redacted]

[Redacted]

Release:

a. (U) Release information not identified above for redaction. If in doubt, the redactor should consult the Redaction Quality Control supervisor.

1.14.4 ~~(S//TK//REL)~~

[Redacted]

[Redacted]

Redact:

~~(S//TK//REL)~~ Redact all information about

[Redacted]

[Redacted]

This information includes

but is not limited to:

a. ~~(S//TK//REL)~~ Redact references to

[Redacted]

[Redacted]

b. ~~(S//TK//REL)~~ Redact references to the

[Redacted]

[Redacted]

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~~TOP SECRET//TK//RSEN/NOFORN~~

All redactions this page: (b) (1) and (b) (3).

c. ~~(S//TK//REL)~~ Redact information revealing or inferring Program D [redacted]

d. ~~(S//TK//REL)~~ Redact information revealing or inferring Program D [redacted]

e. ~~(S//TK//REL)~~ Redact information revealing or inferring Program D [redacted]

f. ~~(S//NF)~~ Redact fact of and information about [redacted]

1.14.5 ~~(S//NF)~~ [redacted]

Redact:

~~(S//NF)~~ Redact information about [redacted] includes but is not limited to:

a. ~~(S//NF)~~ Redact information that reveals or implies [redacted] including:

(1) ~~(S//NF)~~ Redact [redacted]

(2) ~~(S//NF)~~ Redact Program D management of the [redacted]

(3) ~~(S//NF)~~ Redact [redacted]

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~~TOP SECRET//TK//RSEN/NOFORN~~

All redactions this page: (b) (1) and (b) (3).

(4) ~~(S//NF)~~ Redact Program D technology support for

[Redacted]

(5) ~~(S//NF)~~ Redact

[Redacted]

(6) ~~(S//NF)~~ Redact

[Redacted]

(7) ~~(S//NF)~~ Redact

[Redacted]

(8) ~~(S//NF)~~ Redact Program D technology support for
SAF/SP

[Redacted]

(9) ~~(S//NF)~~ Redact references to Project

[Redacted]

(10) ~~(S//NF)~~ Redact references to tests using the

[Redacted]

b. ~~(S//NF)~~ Redact references to R&D efforts in the late
1960s to develop an

[Redacted]

c. ~~(S//NF)~~ Redact references to the

[Redacted]

d. ~~(S//NF)~~ Redact information regarding intent to

[Redacted]

e. ~~(C//NF)~~ Redact all references to

[Redacted]

f. ~~(C//NF)~~ Redact fact of

[Redacted]

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~~TOP SECRET//TK//RSEN/NOFORN~~

All redactions this page: (b) (1) and (b) (3).

g. ~~(C//NF)~~ Redact fact of research into or use of [redacted]

h. ~~(C//NF)~~ Redact fact of [redacted]

i. ~~(C//NF)~~ Redact fact of [redacted]

Release:

a. (U) Release information not identified above for redaction; for example, the fact of BIG SAFARI modifications of USAF aircraft for SIGINT missions in the 1950s. If in doubt, the redactor should consult the Redaction Quality Control supervisor.

1.14.6 (U) Program D-Related Code Words and Terms

Redact:

(U) Redact all information concerning program D-related code words and terms that remain classified. This includes but is not limited to those code words and terms listed below. If a redactor encounters a term or code word that may still be classified but is not on this list, consult the Redaction Quality Control supervisor for guidance.

a. ~~(S//TK//REL)~~ Redact [redacted]

[redacted] The unclassified code word "BIG SAFARI" is not an NRO information equity and it is unclassified if used outside the above context. This activity was an Air Force program for modifying and testing aircraft for a number of non-NRO development purposes. It existed from at least the early to mid 1950s, thus predating the [redacted] development program.

b. ~~(S//TK//REL)~~ Redact [redacted]

c. ~~(S//TK//REL)~~ Redact [redacted]

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All redactions this page: (b) (1) and (b) (3).

d. ~~(S//TK//REL)~~ Redact [redacted]
[redacted]

e. ~~(S//TK//REL)~~ Redact [redacted]
[redacted]

f. ~~(S//TK//REL)~~ Redact [redacted]
[redacted]

g. ~~(S//TK//REL)~~ Redact [redacted]
[redacted]

Release:

a. (U) Release Program D code words and terms not identified above for redaction; for example BLACK SHIELD, GLASS LAMP, EBONY, ISINGLASS, OLYMPIC TORCH, SENIOR BOOK, and TROJAN HORSE.

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All redactions this page: (b) (1) and (b) (3).

1.15 (U) NRO Security Policy - General Administration

(U) The word BYEMAN and its tri-graph BYE are unclassified and releasable.

Redact:

a. (U) Redact any information revealing or implying the frequency requirement for technical countermeasures inspections of all NRP physical areas where classified conversations take place.

b. ~~(C//NF)~~ Redact any information revealing or implying

[Redacted]

c. ~~(C//NF)~~ Redact any information revealing or implying how

[Redacted]

d. ~~(C//NF)~~ Redact any information revealing or implying that the

[Redacted]

e. ~~(C//NF)~~ Redact any information revealing or implying the

[Redacted]

f. (U) Redact any information revealing or implying the physical security safeguards applicable to the handling and control of NRO information by prime contractors, sub-contractors, vendors and suppliers in the physical security plan of an industrial complex used by the NRO.

g. (U) Redact details about and methodologies used in security practices and cover planning, SCI adjudication and appeals practices, counterintelligence, and covert contracting, except as detailed below.

Release:

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~~TOP SECRET//TK//RSEN/NOFORN~~

(U) Release the fact of but no details about:

a. (U) Release Area Security Controls, including:

- (1) (U) Perimeter Protection (Fencing, Lighting, Entrances, Fire Control)
- (2) (U) Facility Guard Force
- (3) (U) Personnel Controls
- (4) (U) Release General Security Practices (Safe combination security, daily security check system, security violations)

b. (U) Release secure storage of NRO classified materials involving the following parameters:

- (1) (U) NRO Classified Documents in Vaults and Secure Areas
- (2) (U) Classified Hardware, Components and Equipment
- (3) (U) Physical Security Construction Standards for Vaults and Secure Areas

c. (U) Release the existence of the NRP Electrical Communications Network under the Air Force Communications Service.

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2. (U) Exemption Category 25X2: Reveal Information That Would Assist in the Development or Use of Weapons of Mass Destruction

Redact:

- a. (U) Redact information relating to the survivability and vulnerability of NRP satellite systems to the effects of nuclear weapons.
- b. (U) Redact information describing NRP satellite system countermeasures against the effects of nuclear weapons and those countermeasures' effectiveness.
- c. (U) Redact information detailing the survivability and vulnerability of NRP ground systems to the effects of weapons of mass destruction, including nuclear, biological, and chemical weapons.
- d. (U) Redact information describing NRP ground system countermeasures against the effects of weapons of mass destruction and the effectiveness of those countermeasures.

Refer:

(U) Unless contained in a document generated by another government agency, refer any classified or unclassified information related to weapons of mass destruction concerning chemical or biological weapons to the U.S. Army. Refer similar information concerning radiological and nuclear weapons of mass destruction to the Department of Energy.

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3. (U) Exemption Category 25X3: Reveal Information That Would Impair U.S. Cryptologic Systems or Activities

(b)(1)
(b)(3)

~~(C//NF)~~ [Redacted]

Redact:

(U) Redact information relating to cryptographic equipment employed on an NRP program. This includes but is not limited to information related to techniques, design, and/or use.

Refer:

(U) Refer to NSA any information related to cryptologic system descriptions, technology, capabilities, operations, program names and numbers, dates, contractors, funding, or vulnerabilities of these systems, whether used in NRO satellites, ground stations, or by some other federal agency.

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4. (U) Exemption Category 25X4: Reveal Information That Would Impair the Application of the State-of-the-Art Technology Within a U.S. Weapon System

(U) NRO-developed technology may be used in U.S. non-space systems, including weapon systems; conversely, U.S. weapon system technology may be used in NRO overhead systems. NRO near real time overhead systems also provide defense-related information for the planning and conduct of military operations.

Redact:

(U) Redact information that identifies exactly how NRP overhead systems directly support U.S. forces, and where and when these NRP systems provide critical information to U.S. weapon systems that improves their battlefield accuracy and lethality. This information includes but is not limited to NRP collectors, data provided (including formats), communications methods and limitations, recipients, planned uses, and vulnerabilities. (**Note:** the fact that NRP overhead systems support the warfighter with imagery and signals intelligence is unclassified.)

Refer:

(U) Refer information relating to state-of-the-art technology employed in U.S. weapon systems to the appropriate DoD agency.

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5. (U) Exemption Category 25X5: Reveal Actual U.S. Military War Plans That Remain in Effect

Redact:

a. (U) Redact one or more Basic Encyclopedia (BE) numbers if associated with past or present editions of the Single Integrated Operations Plan.

b. (U) Redact one or more BE numbers if connected to a specific ground installation/facility that may be associated with current war planning.

c. ~~(C//NF)~~ Redact one or more BE numbers associated with ground installations/facilities which by their nature reveal a U.S. intelligence interest in [redacted]
[redacted]

d. ~~(C)~~ Redact any BE number if it is revealed that a [redacted]
[redacted] concerning the installation/facility associated with the BE number.

e. (U) Redact all lists of BE numbers if revelation of their association provides an inclusive view into U.S. intelligence interest or knowledge, for example, a list that identifies all targets in support of OPLAN XYZ.

Release:

a. (U) Release single BE numbers or lists of BE numbers not revealing above classified associations.

b. (U) Release any and all BE numbers from the Southeast Asia theater of operations (Vietnam, Thailand, Cambodia, Laos) 15 Nov 1961- 30 April 1975.

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6. (U) Exemption Category 25X6: Reveal Information That Would Seriously and Demonstrably Impair Relations between the U.S. and a Foreign Government, or Seriously and Demonstrably Undermine Ongoing Diplomatic Activities of the U.S.

Redact:

~~(S//NF)~~ Redact fact of and details about [redacted]
[redacted]

Refer:

a. ~~(S//TK//REL)~~ Refer to the National Geospatial-Intelligence Agency (NGA—formerly NIMA): Indications of sensitive tasking (e.g., [redacted])
[redacted]

b. ~~(S//TK//REL)~~ Also refer to NGA: fact of and details about [redacted]
[redacted]

c. ~~(S)~~ Refer to the State Department: fact of and details about [redacted]
[redacted]

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8. (U) Exemption Category 25X8: Reveal Information That Would Seriously and Demonstrably Impair Current National Security Emergency Preparedness Plans

~~(U//FOUO)~~ The NRO

[Redacted]

(b)(3)

Redact:

(U) Redact all information of NRO plans

[Redacted]

(b)(3)

Refer:

(U) Refer to the Federal Emergency Management Agency/Office of Homeland Security: All information on national security emergency preparedness planning by other federal agencies, including the defunct Office of Civil Defense and the Office of Defense Mobilization.

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9. (U) Exemption Category 25X9: Violate a Statute, Treaty, or International Agreement

Refer:

(U) (Also see Section 6 for guidance on referring international agreements to the State Department.) There may be instances where statutes, treaties, and/or international agreements may affect the outcome of declassification decisions regarding information in NRO records. Before citing this exemption as the basis for a declassification decision, refer it to the Seal and Release Authority, who will effect coordination with the appropriate NRO officials to confirm the public disclosure status of the pertinent information, pursuant to the terms of a specific law, treaty or agreement.

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10. (U) Other Exemption Factors

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10.1 (U) Names and Signatures

Redact:

- a. (U) Redact the names, labeled photographs, and signatures of government and military personnel, foreign or American, employed, assigned, detailed to, or participating in the NRO/NRP who are not senior government officials: Unless they appear on the release list in Appendix B, fall under an approved release category below, or have been publicly released elsewhere in connection with the NRO/NRP by a duly authorized source.
- b. (U) Redact the names of contractor personnel who have worked on the NRO/NRP unless they appear in Appendix B, fall under an approved release category below, or have been publicly released elsewhere in connection with the NRO/NRP by a duly authorized source.
- c. (U) Redact the names of Air Force personnel assigned to CIA overhead systems unless they appear in Appendix B, on the CIA list of releasable names, fall under an approved release category below, or have been publicly released elsewhere in connection with the NRO/NRP by a duly authorized source.
- d. (U) Redact Social Security Numbers wherever they are encountered.

Release:

- a. (U) It is IRRG policy to Release the names of Department of Defense personnel, with the exception of DoD personnel assigned to or participating in the NRO/NRP, or IC individuals.
- b. (U) Release the names and labeled photographs of the following people:
 - (1) (U) All past and present DNROs.
 - (2) (U) All past and present NRO Deputy Directors (DDNROs).
 - (3) (U) Past Directors of NRO Programs A, B, C, & D.

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- (4) (U) Past Directors of the NRO Staff (SAF/SS & SAF/MSS).
- (5) (U) Past and present directors or deputy directors of NRO Headquarters Directorates, Offices.
- (6) (U) Elected or presidentially-appointed government officials guiding CAL development or using its product.
- (7) (U) Corporate senior executives, where their corporations are releasable.
- (8) (U) Senior foreign government officials are releasable unless context indicates otherwise.
- (9) (U) Senior government officials. These include, but are not limited to:
 - Department Secretaries or Agency Heads and their Deputies;
 - **NOTE:** For IC, senior government officials include only the Directors and their Deputies.
 - Associate and Assistant Secretaries of Departments and Agencies.
 - Senior staff members of the Executive Office of the President (Assistants to the President or the equivalent).
 - Members of Congress and committee staff.
 - Military flag officers and General Officers.
- (10) (U) Contractor personnel who worked on the WS-117L/SENTRY/SAMOS Program before 1 September 1960.
- (11) (U) Names and labeled photographs of government and all military personnel (regardless of rank) who were **assigned to the NRO AND associated with declassified programs.**
 - EXCEPT CIA personnel whose names should be referred to their agency to ascertain if their names are releasable.
- (12) (U) Names of US military photo-interpreters working at NPIC associated with CORONA
- (13) (U) Names and pictures of USAF bucket Recovery Pilots and air crews associated with the film return systems.
- (14) (U) NSAM 156 Committee members.
- (15) (U) Advisory committee members advising on an NRO/NRP program are releasable unless context indicates otherwise.

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(16) (U) NRO authors publishing papers at the unclassified level.

- c. (U) Release the names of personnel in executive branch agencies outside the Intelligence Community barring any privacy or current security concerns.
- d. (U) Release 25-year-old photographs of unnamed individuals where the context does not present a substantial risk of inadvertently identifying an individual whose name would be redacted.
- e. (U) Release all other names unless specifically authorized to redact them.

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10.2 (U) Proprietary Information

(U) Even though "Proprietary" information may not be classified, *redact* any information so marked that has been designated for non-disclosure by an NRO contractor after documented consultation. Redaction of proprietary information must refer to these legal citations: 41 USC 423 (Procurement Integrity Act) and 18 USC 1905 (Trade Secrets Act).

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10.3 (U) NRO-NASA Relationship

~~(S//REL)~~ The NRO has supported NASA space flight programs with advanced technology and imaging sensors developed in the National Reconnaissance Program (NRP) since 1962. During the Cold War years, the NRO and the NSAM (National Security Action Memorandum) 156 Committee imposed limits on the resolution that NASA's imaging sensors could achieve at the earth's surface. The first formal agreement between the two agencies, pertaining to NASA's Lunar Program, was signed in August 1963 and provided for NRO support of the Lunar Orbiter and Apollo projects. American leaders originally sought to avoid any revelation that connected NASA with the intelligence community, given the international repercussions such a revelation might have among foreign nations that hosted NASA activities on their soil. The NRO has provided technical assistance, guidance, and/or instruments to the space agency for its Lunar Program, Apollo Applications Program, [REDACTED] Program, Space Transportation System (Space Shuttle), [REDACTED]

[REDACTED] This "dual-use" of NRP technology over the years has resulted in substantial savings to the government. Some aspects of this assistance have been publicly released; other aspects remain classified as described below.

Redact:

a. ~~(S//NF)~~ Redact all information related to the CIA/NRO contract cover and security controls developed to handle NASA/NRO contracts and image processing for Lunar Orbiter, UPWARD, and later joint efforts.

b. ~~(S//TK//REL)~~ Redact all references to NRO or NRO-contractor/ [REDACTED]

c. ~~(S//TK//REL)~~ Redact all references to NRO or NRO-contractor [REDACTED]

d. ~~(S//TK//REL)~~ Redact all reference to [REDACTED]

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[redacted]
 [redacted]
 were released through NASA for the benefit of the scientific community, [redacted]

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e. (U) Redact all information not specifically identified for release below.

Release:

a. (U//~~FOUO~~) Release Lunar Orbiter Project details, **except** for NRO contract cover/security and image processing controls identified above under redact.

b. (U) Release fact of Project UPWARD, described to the public as the Lunar Mapping and Survey System (LM&SS). UPWARD provided NRO cameras to NASA's Project Apollo, intended for lunar surveillance as a backup to the SAMOS-derived Lunar Orbiter Project. In 1967, with the success of Lunar Orbiter, UPWARD was redirected for use in earth orbit on the Apollo Applications Program (AAP). The AAP-UPWARD effort was ultimately cancelled. Technical and programmatic details for UPWARD are releasable per the guidance found for GAMBIT in Appendix G.

c. (U) Release all information related to Project PERCHERON, the GE-proposed use of GAMBIT KH-7 Orbital Control Vehicle (OCV) to support NASA imaging experiments in earth orbit.

d. (U) Release fact that the NRO provided the Itek optical bar camera that NASA used in the Apollo Command/Service Module on Apollo 15-17 missions and that stayed in lunar orbit during flights to the moon. (NOTE: The camera and descriptions of its use to map the moon are unclassified and appear in numerous NASA records.)

e. (U//~~FOUO~~) Release fact of and limited details about the 28 August 1963 "DOD/CIA-NASA Agreement on NASA Reconnaissance Programs." Discussion of contractor cover arrangements and security controls, as specified above under redact, remain protected.

f. (U) Release fact of and details about a DOD-NASA committee established in 1966 to review, coordinate and monitor NASA activities that involved the NRP, known as the Survey Applications Coordinating Committee (SACC). The SACC reported to the DOD-NASA Manned Space Flight Policy Committee (MSFPC,

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composed of three seniors from DDR&E, NASA, and NRO). MSFPC functions were expanded to include responsibility for approving the recommendations of the SACC.

g. (U) Release fact that the SACC and NSAM 156 Committee reviewed and approved Apollo earth orbit Contingency Mission Plans for missions 13-17, and that the 18-inch focal length Hycon camera in Apollo 13 and 14 Service Modules could be used to image the earth, and that the Itek 24-inch focal length panoramic camera in the Apollo 15-17 Service Modules likewise could image the earth.

h. (U) Release fact that approval of the 303 and 40 Committees (Presidential principals) was sometimes sought for these decisions made by the SACC, MSFPC, and NSAM 156 committees.

i. (U) Release fact that the SACC/MSFPC and NSAM 156 Committee in 1966 imposed a resolution at the earth's surface of 20 meters (from any altitude), eventually reduced in stages to 5 meters, on all NASA image-forming sensors. Fact that these imaging restrictions did not apply to NASA astronomical experiments, which involved non-earth-looking efforts.

j. (U) Release fact that the preceding committees in 1973 authorized an Earth Terrain Camera for flight on NASA's SKYLAB that had a resolution at the earth's surface between 10 and 20 meters, which exceeded the 20-meter constraint imposed in 1966. Fact that a joint agency group organized by the intelligence community conducted a post-launch screening of imagery taken by this camera before the photography was publicly released.

k. (U) Release fact that NASA and the NRO established a joint "NASA/NRO Payload Accommodations Working Group" in the mid-1970s to examine engineering technical problems and costs of transitioning NRO payloads from expendable launch vehicles to the Space Shuttle. And fact that NASA and the NRO also established a joint "Program Review Board" at this time to coordinate their respective programs and ensure that these programs utilized common techniques and services when appropriate.

l. (U) Release NASA's limited role in the P-35 and P-417 programs of the Defense Meteorological Satellite Program (DMSP).

m (U) Release NASA's use of NRO SAMOS E-1 payload technology in its 1966 Lunar Orbiter mission.

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n. (U) Release NRO support of NASA's lunar reconnaissance operations in the 1960s that involved unmanned and manned [Lunar Orbiter and Apollo] projects, as established in the 28 August 1963 "DOD/CIA-NASA Agreement on NASA Reconnaissance Programs" and associated correspondence (released by E06-0005). Include information about the NRO's support for the subsequent Apollo Applications Program, and the codeword UPWARD in association with these efforts. See Appendix G.

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10.4 (U) NSAM 156 Committee

(U) President John F. Kennedy judged American signals intelligence and film recovery reconnaissance satellites, which had begun operating in 1960, to be national assets essential for defense preparedness. Seeking ways of securing international acceptance of overhead reconnaissance conducted from outer space, Kennedy issued National Security Action Memorandum No. 156 on 26 May 1962, which requested an assessment of the political and informational aspects of satellite reconnaissance policy. The NSC group formed to conduct this assessment, which became known as the "NSAM 156 Committee," issued its *Report on Political and Informational Aspects of Satellite Reconnaissance Policy* on 29 June. The report's policy recommendations were adopted as National Security Council Action (NSCA) 2454, *Space Policy and Intelligence Requirements*, at the 502nd NSC meeting on 10 July 1962. This action established national policy for reconnaissance satellites for the next thirty years.

(U) Keeping in mind the need to protect NRO information equities identified above and elsewhere in this guide:

Release

- a. (U) Release NSAM 156 (26 May 1962) and NSCA 2454 (approved 10 July 1962).
- b. (U) Release the names of NSAM 156 Committee members.
- c. (U) Release the minutes of NSAM 156 Committee Meetings and related correspondence that address:
 - (1) (U) Reconnaissance satellite fact of disclosure policy.
 - (2) (U) Political and security aspects of NASA earth sensing.
 - (3) (U) Reconnaissance satellite fact of disclosure policy in Strategic Arms Limitation (SAL) talks.
 - (4) (U) Release impact of SALT I ratification on reconnaissance satellite disclosure policy.
 - (5) (U) Release monitoring of SKYLAB mission planning and approval of use of 10-meter resolution camera on SKYLAB.

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- (6) (U) Release likely Soviet reaction to fact of disclosure and to proposals for joint (US-USSR) space programs.

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10.5 (U) ARGO & the Civil Applications Committee

(U) Could NRP satellite imagery be used for U. S. civil applications? Unquestionably it could, a fact that became obvious to many government officials when Corona satellites began to return large quantities of photography of the earth in the early 1960s. As a result, in 1966 the NASM 156 committee recommended, and the United States Intelligence Board approved, granting a limited number of TS//TK clearances to employees and consultants of various civil agencies to permit their review of reconnaissance satellite photography. In early 1967, Presidential Science Advisor Donald F. Hornig, with the approval of the DCI and Secretary of Defense, authorized a study of selected satellite imagery by the Departments of Agriculture, Interior, and Commerce, along with the Agency for International Development and NASA. "Project Argo" sought to determine satellite imagery's usefulness for economic, social, and natural resource surveys. The group of resource experts issued a four volume report in March 1968, concluding that existing imagery would be of considerable value in archeological, glacial, hydrological, geological, and agricultural studies; forestry management, surveys of land use and natural disasters; and mapping and urban area analyses; among other uses.

(U) An ARGO Steering Committee representing relevant federal departments and agencies was subsequently formed to consolidate their data requirements and submit them to the appropriate components of the intelligence community for tasking in the NRP. A charter for this group was issued in 1970. Subsequent formation of the Committee for Civil Application of Classified Overhead Photography of the United States, popularly known as the Civil Applications Committee (CAC), formally established the group in 1975. Headquartered at the U.S. Geological Service Advanced Systems Center in Reston, Virginia, the CAC oversees and facilitates "civilian agencies' use of classified systems and coordinates the incorporation of photography, derived data, and technology in the performance of domestic civilian functions ..." The CAC charter, revised later in the 20th century, expanded natural disaster monitoring worldwide, with a network for assessment and response. It also changed the official name to Committee on Civil Applications of Classified Remotely Sensed Data.

(U) At the USGS Advanced Systems Center, major applications of NRO-furnished overhead data include responding to natural disasters, detecting and mapping the spread of wildfires, monitoring volcanoes and ecosystems, and mapping wetlands. The

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NRO was and is a non-voting Associate CAC member, along with the Department of State and the National Geospatial-Intelligence Agency (NGA—one of whose predecessor organizations was NPIC). CAC Voting Members include the Departments of Agriculture, Energy, Transportation, Commerce, Interior, the Federal Emergency Management Agency, the National Science Foundation, the Environmental Protection Agency, the National Aeronautics and Space Administration, and the U.S. Army Corps of Engineers.

(U) Any questions about the release of information not covered in the instructions below should be referred to your redaction supervisor.

Redact:

a. ~~(S//TK//REL)~~ Redact all references to the use of currently classified NRO overhead system products employed by ARGO and CAC

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b. (U) Redaction guidance for names can be found in Section 10.1 of this guide.

c. ~~(U//FOUO)~~ Redact all information related to CIA/NRO cover and security controls adopted for this effort, including procedures for security clearances, which were developed to facilitate transfer of NRP overhead data from the intelligence community to the civilian agencies that composed ARGO/CAC.

Release:

a. (U) Subject to the redaction instructions listed above and elsewhere in this guide, release all memoranda, letters, briefings, reports and charters that cover the establishment and evolution of ARGO and CAC, including their working groups.

b. (U) Release the names of all principals involved in establishing and operating ARGO and CAC from the civilian agencies, the intelligence community, and the Department of Defense (e.g., committee members, chairmen, DCIs, Deputy Secretaries of Defense, president's science advisors, etc.).

c. (U) Release the fact that the NRO provided classified remote sensing data to other federal agencies for civil support purposes, to include general information about the following aspects of that support.

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- a. (U) Classified overhead imagery support to other federal agencies began in the mid-1960s under the auspices of the Presidential Science Advisor.
- b. (U) In 1969 a special facility, operated by the U.S. Geological Survey, was established in the Washington DC area to support use of classified remote sensing data by federal civilian agencies.
- c. (U) A Presidential Executive Order created the Civil Applications Committee (CAC) in 1975. The CAC provided and continues to provide interagency oversight and advocacy for the collection and use of classified overhead imagery and data by federal civil agencies.

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10.6 (U) International Traffic in Arms Regulations (ITAR), Export Controlled Technology and Technical Data

~~(U//FOUO)~~ Some 25-year-old or older NRO records that describe a space system's design and operation completely, with specificity and in great detail, may assist an adversary to build and launch similar modernized versions. Such records could be subject to export controls under the ITAR. Manuals associated with the Standard Agena D booster-satellite, which were serially produced and used in the NRP for 25 years, are a case in point. Similar records or technical manuals that describe obsolescent launch vehicles may also fall under the Missile Technology Control Regime (MTCR).

~~(U//FOUO)~~ Although the spacecraft and launch vehicles in question are no longer state-of-the-art, public release of detailed information about their design, construction, and operation can be tantamount to an export. These records will be marked Unclassified and designated For Official Use Only (FOUO), and shall not be publicly released. Questions on whether a specific record is subject to export control restrictions will be referred to the Office of Policy and Strategy.

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(U) Appendix A - GRAB/POPPY Review Guide

(U) Preface

(U) This document contains declassification guidance for the protection of NRO information equities involving the GRAB and POPPY electronic intelligence reconnaissance satellites. Such declassification is conducted under the NRO Business Function, Automatic and Systematic 25-year Declassification Review Instruction 56-2-3, as approved on 22 July 2009. The DNRO has appointed the Management Services and Operations Directorate's Chief, Information Review and Release Group (C/IRRG) as the NRO's initial 25-Year Release and Denial Authority. Only the Information Review and Release Group (IRRG) is authorized to review 25-year-old NRO records and information equities for declassification or exemption from declassification.

(U) This appendix updates and replaces declassification guidance contained in Appendices A and G of version 1.0 of the "National Reconnaissance Office (NRO) Review and Redaction Guide" (RRG). It is based on DCI decisions in 1998 and 2004 to declassify these programs, and takes into account information officially authorized for release in unclassified brochures at the program declassification ceremonies. Limited public information on GRAB and POPPY is also available from authorized releases of satellite models, museum displays, and responses to Freedom of Information Act (FOIA) requests.

(U) Original authority for protecting and releasing information comes from three basic sources:

- (U) The NRO *Review and Redaction Guide*, Version 1.0.
- (U) DCI approval on 29 April 1998 of the "Proposal for the Declassification and Release of Information Regarding the First Satellite ELINT Collection Program".
- (U) DCI approval on 17 March 2004 of the "Declassification Proposal for the Poppy Electronic Intelligence Satellite Program (1962-1977)". This included a Boundary Document that provided guidance for the protection of POPPY and GRAB information.

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(U) GRAB/POPPY Reconnaissance Assets - Equity Considerations

- (U) NRO: Owns GRAB and POPPY programmatic and space system equities, shares processing equities with NSA, and acts as the initial point of contact for NRL and USN programmatic equities.
- (U) NSA: Owns collection guidance and priorities, reporting, and product evaluation, and shares processing, and collection planning and targeting with the NRO. Acts as the initial point of contact for processing operations conducted by service cryptologic organizations.
- (U) USN/NRL: NRO is the initial point of contact for NRL and USN equities.
- (U) If questions arise, refer to the respective agencies' declassification units as appropriate.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Program Overview****(U) GRAB**

(U) GRAB was the first operational U.S. intelligence satellite. The project formally began as a U.S. Navy ELINT satellite system in 1959, launched its first satellite in June 1960, and the satellite operated successfully until August 1962. Its mission was to obtain information on Soviet air defense radars inside the country that could not be observed by Air Force and Navy ferret aircraft flying ELINT missions along accessible borders in Europe and the western Pacific.

(U) The Naval Research Laboratory (NRL) proposed an ELINT satellite collection system in the spring of 1958, and President Eisenhower approved full development on 24 August 1959. Initially called Project TATTLETALE, after the President's approval it was put in a tighter security control system named CANES. Access was limited to less than 200 persons in the Washington D.C. area.

(U) The first launch occurred from Cape Canaveral on 22 June 1960 on Thor Able Star booster number 283 as a piggyback payload accompanying the Navy's TRANSIT II navigation satellite. With initial launch a success, GRAB (also referred to as DYN0) subsequently became the world's first operational reconnaissance satellite.

(U) The GRAB satellite carried two electronic payloads, the classified ELINT package and scientific instrumentation to measure solar radiation (SOLRAD). A legitimate experiment, the SOLRAD payload was publicly disclosed in DOD press releases and served as a cover for the undisclosed ELINT payload.

(U) GRAB was inserted into near-polar orbit at 500 nm with a ground swath of 3500 nm. Its antennas intercepted radar pulses of a certain bandwidth within the S-band, and transponded a corresponding signal to collection ground sites within GRAB's field of view.

(U) GRAB was controlled by a series of Earth Satellite Vehicle (ESV) huts deployed worldwide.

(U) The Director of Naval Intelligence exercised overall control. Operators in the ESV huts recorded GRAB's transponded

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information onto magnetic tape and couriered it to NRL for evaluation. The NRL then duplicated the tapes and forwarded them for processing and analysis by the NSA in Maryland, and by the Strategic Air Command (SAC) in Nebraska. Processing revealed the radar's antenna scan rate, its pulse repetition frequency, the type of radar, the radar disposition, and permitted analysis of the threat and approximate location. SAC's processing was aimed at defining the characteristics and locations of air defense equipment to support preparing the Single Integrated Operational Plan (SIOP), a war plan responsibility of the Joint Strategic Targeting Planning Staff at Offutt AFB, Nebraska. In searching the tapes for new and unusual signals, NSA discovered the Soviets were already operating a radar system that supported a capability to destroy ballistic missiles.

(U) GRAB ended with the termination of GRAB 2 in August 1962.

(U) POPPY

(U) The U.S. Navy began the POPPY project as a successor to GRAB. In time, its mission expanded to collect radar emissions from Soviet naval vessels on the high seas. In July 1962 this U.S. Navy reconnaissance satellite project and the organizations that supported it formally became Program C of the National Reconnaissance Office (NRO), funded through the National Reconnaissance Program (NRP). The launch of POPPY 1 occurred five months later, in December 1962. The Strategic Air Command (SAC) used GRAB- and POPPY-furnished intelligence on the location and capabilities of Soviet air defense radar sites to prepare the U.S. nuclear war plan, known as the Single Integrated Operational Plan (SIOP).

(U) The man appointed first director of NRO Program C, RADM Vernon L. Lowrance, USN, (who also served as the Director of Naval Intelligence), in January 1963 notified the Director of the National Reconnaissance Office, Air Force Under Secretary Joseph V. Charyk, of the existing assignments and responsibilities shared among the organizations participating in Project POPPY. Within Program C, the Naval Research Laboratory designed, developed, and operated the POPPY satellites. The NRO's Air Force element, Program A, launched them, and the National Security Agency (NSA) received, analyzed, and reported findings derived from the intercepted radar signals. The Naval Security Group (NSG) coordinated field operations involving personnel from

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the Air Force Security Service (AFSS) and the Army Security Agency (ASA), and maintained and operated POPPY ground sites at various locations that changed over the years. Project coordination was effected through monthly meetings of a POPPY Technical Operations Group (TOG) made up of representatives from each of the participating organizations.

(U) In 1968, POPPY's demonstrated capabilities prompted the Chief of Naval Operations, Admiral Thomas Moorer, to request that these ELINT satellites be used experimentally to collect radar emissions from Soviet naval ships at sea. The success of that experiment led Secretary of the Navy John H. Chaffee to submit a formal operational requirement for that mission to the intelligence community in 1970. By the time that POPPY 7 ceased operating on orbit in August 1977, the project's mission emphasized ocean surveillance for operational naval commanders. GRAB and POPPY launch dates and results, released publicly on 12 September 2005, appear in section 9.2 of this appendix. Each of the POPPY satellites averaged 34 months of useful life on orbit.

~~(S//TK//REL)~~ The POPPY system depended on

Two to four satellites were carried on each launch vehicle.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) GRAB/POPPY Organization Information****Release:**~~S//TK//REL~~

1. (U) Release the history, key events, antecedents, government organizational participants and interfaces, and program structure of the GRAB program, including the later role of the NRO, unless directed otherwise by the RRG or this appendix. References to detailed technical characteristics of related non-satellite programs, e.g., [redacted] [redacted] should be redacted or referred to NSA or Navy.
2. (U) Release the fact that Program C was located in the Washington, D.C. area and included elements of the Naval Research Laboratory and the Naval Security Group.
3. (U) Release the historical relationship between the NRO and Naval Supply Systems Command (NAVSUPSYSCOM [OSP]), Naval Security Group Command (NAVSECGRUCOM) and Naval Space Warfare Command (SPAWAR-40).
4. (U) Release membership and functions of the Technical Operating Group (TOG) for the GRAB predecessor system to POPPY.¹ During the POPPY program, the TOG operated as the staff for the Director, Program C.
 - a. (U) Formed by the DNI in August, 1959
 - b. (U) Reps from NRL, NSG, NSA, and the ONI STIC
 - c. (U) NRL member was designated project manager/technical representative, and was responsible for overall system concept.
 - d. (U) The NSG member was designated the project operational representative. NSG was responsible for directing and coordinating all mission ground station operations, including commanding the satellite operations
 - e. (U) The NSA member was designated the advisor to the staff. NSA authorized the allocation of service personnel to man and operate the mission ground stations. It also processed all intercept data and disseminated the ELINT product to the Intelligence

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Community. NSA also interpreted national intelligence collection and processing requirements governing selection of the frequency ranges for GRAB collection.

- f. (U) The STIC member provided intelligence requirements to the director, provided signal analysis support to NSA, monitored the signal analysis program, and disseminated quality control technical data to the mission ground stations.
5. (U) Release that the Navy GRAB ELINT program was transferred to the NRP and redesignated POPPY on 16 Sept 1961.
 6. (U) Release that on 23 July 1962 the DNRO established Program C. The DNI was designated Director, Program C. The following arrangements relative to Program C were instituted:
 - a. (U) Funding formerly provided by ARPA and the Navy was transferred to the NRP.
 - b. (U) The NRO Deputy Director for Operations prepared routine tasking schedules for operational control of POPPY satellites with technical support from the TOG.
 - c. (U) The Navy Bureau of Weapons (BUWEPS) provided a fiscal representative to the Technical Operations Group who was responsible for: preparing the annual budget; disbursing funds to the NRL; and submitting records of expenditures to the Director, Program C.
 - d. (U) NSA continued to fund manning and support of the ground stations, magnetic tape costs, as well as processing and analysis accomplished by NSA.
 - e. (U) The NRO Program A (SAFSP) assumed responsibility for launching Program C satellites and for launch vehicle/satellite integration.
 7. (U) Release that in 1967, ONI was redesignated as the Naval Intelligence Command (NIC). COMNAVINTCOM retained the responsibility of Director, Program C.
 8. (U) Release that in 1970, the Director, Program C was dual-hatted as Manager of the Navy Space Project Office (PM-16) within the Naval Materiel Command.

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9. (U) Release that in 1973, the Navy's PM-16 was redesignated PME-106 of the Naval Electronic Systems Command. Its manager continued as Director, Program C.
10. (U) Release that on 30 September 1977, the DNRO directed termination of the POPPY program.

Refer:

(U) Refer to NSA, information related to NSA's organization relating to GRAB/POPPY, except as specified above. Note: POPPY-related NSA organization information (based on NSA's FOIA F07-0088 coordination) is provided in Addendum 1: GRAB/POPPY Terms, Cryptonyms and Codewords section to this appendix)

(U) Security**Redact:**

1. (~~S//TK//REL~~) Redact descriptions, methodologies, and procedures of any planned or executed U.S. associated with GRAB or POPPY. Associated security plans remain classified. (See exception at Release 1, below.)
2. (U) Redact Identification of buildings and room numbers for NRL GRAB/POPPY activities.

(b)(1)
(b)(3)**Release:**

1. (U) Release that GRAB shared satellite platforms with unclassified, publicly recognized scientific payloads that incidentally provided a legitimate "white world" cover. The following facts and general information concerning GRAB program security planning may be released:
 - a. (U) DYN0 program originally was initiated at the DOD SECRET level with the code name TATTLETALE.

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- b. (U) The project was later put in a tighter security control system named CANES. Access was limited to less than 200 persons in the Washington D.C. area.
2. (U) Release that the GRAB satellite carried two electronic payloads, the classified ELINT package and scientific instrumentation to measure solar radiation (SOLRAD). A legitimate experiment, the SOLRAD payload was publicly disclosed in DOD press releases and served as a cover for the undisclosed ELINT payload. The cover name GRAB (galactic radiation and background) was used for the combined DYNO intelligence mission.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Terms, Code Words and Project Names****Redact:**

1. (U) Redact all classified terms and accompanying explanatory information for items designated as classified in Appendix C of the RRG. Note: POPPY-related terms are also provided in *Addendum 1: GRAB/POPPY Terms, Cryptonyms and Codewords section of this appendix*)

Release:

(U) Release GRAB and POPPY association with the following names and terms can be publicly revealed. See Appendix C of the RRG and Addendum 1: GRAB/POPPY Terms, Cryptonyms and Codewords section of this appendix for a more complete listing of releasable terms, code words, and project names.

CANES	CANIS	CHARLIE	DOSIMETER
DYNO	ECM	EROS	GGSE
GRAB	GREB	HOLD	Navy ELINT
POPPY	REPTILE	SISS ZULU	SOLRAD
TATTLETALE	WALNUT		

Refer:

(U) Refer to NSA information related to NSA-related terms, code words, and project names relating to GRAB/POPPY, except as specified above or in Appendix C of the RRG or Addendum 1: GRAB/POPPY Terms, Cryptonyms and Codewords section of this appendix.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) GRAB and POPPY Program Declassification**

(U) Senior level correspondence and associated attachments relating to the program declassifications of GRAB and POPPY was released in part through responses to FOIA requests between 2003 and 2006.

Redact:

1. (U) Redact information concerning GRAB and POPPY program declassification not specifically authorized for release below.

Release:

1. (U) Release descriptions of actions taken after 1997 to declassify the GRAB and POPPY programs, including the previously released positions taken by the DCI, DNRO, and DIRNSA and associated dates, provided non-releasable information as specified above and elsewhere in the *Review and Redaction Guide for Automatic Declassification of 25-Year-Old Information* is not released.
2. (U) Release information in the report of the GRAB risk assessment team relating to the proposed release of textual information and display panels, provided non-releasable information as specified above and elsewhere in the *Review and Redaction Guide for Automatic Declassification of 25-Year-Old Information* is not released.

Refer:

(U) Refer to NSA, NSA correspondence or references to NSA actions or positions regarding GRAB/POPPY declassification that have not been previously released.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Acquisition Activities****(U) PARTICIPANTS AND RELATIONSHIPS****Redact:**

1. (U) Redact all contractors and subcontractors associated with the design, development, launch, and operation of the GRAB and POPPY Navy ELINT reconnaissance satellites that are not listed below or otherwise properly approved for public release.
2. (U) Redact detailed contractual information not approved for release or otherwise specified for redaction under RRG 1.11.3.

Release:

1. (U) Release NRO and NRL contractors and subcontractors associated with the design, development, launch, and operation of the GRAB and POPPY Navy ELINT reconnaissance satellites, including those that are listed below as authorized for public release:

American Electronic Laboratories
 Ampex
 Applied Physics Laboratory (APL)
 Applied Research Inc.
 Bendix
 Consolidated Electrodynamics
 Craig Systems
 DuKane
 Electronic Engineering Company
 General Electric
 General Electronics Lab
 General Dynamics
 Haller, Raymond, and Brown (HRB)
 ITT
 Keithley
 Magnecord Inc.
 RACAL
 Scientific Atlanta
 Sylvania
 Systems Engineering Laboratory
 TACO
 Tapetone, Inc.

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116

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1. (U) Refer to NSA information regarding contractors (not listed as releasable above) involved with NSA processing or development of NSA processing systems for the ELINT data collected by the GRAB/POPPY satellites.

(U) FUNDING AND PERSONNEL

Redact:

1. (U) Redact NRO Program C funding information and methods, including amounts in programming and budget proposals, approved budgets, and transfers of funds per approved budgets.
2. (U) Redact all information (CCP and Navy) specifying or implying funding/cost data for the processing of, and/or for the design, development, and operation of systems used to process the ELINT collection results of the GRAB/POPPY satellites.
3. (U) Redact manning totals for Program C organizational elements at NRL.
4. (U) Redact names and labeled photographs of individuals who are not senior government officials or listed as releasable in Addendum 1: GRAB/POPPY Terms, Cryptonyms and Codewords section of this appendix. (See Release 3 below). Senior government officials include but are not limited to individuals at or above the following levels: Department Secretaries or Agency Heads and their Deputies; Associate and Assistant Secretaries of Departments and Agencies; senior staff members of the Executive Office of the President (Assistants to the President or the equivalent); members of Congress and committee staff directors; and O-7 military officers or above (General Officers and Admirals). For NRO, NSA and CIA, government officials include only the Directors and their Deputies. Note: information on names released in FOIA F-05-0054 and released in FOIA F-07-0088 is provided in the related tables for this appendix.

Release:

1. (U) Release Navy funds spent on GRAB prior to formation of the NRO's Program C (23 July 1962).

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2. (U) Release non-NRO funding information for components of GRAB/POPPY-associated space and ground systems and related services.
3. (U) Release names and labeled photographs of individuals listed as releasable in Section 10.1 and Appendix B of the RRG and names of senior government officials (other than NRO or CIA) associated with the GRAB/POPPY programs. (See Redact 4 above for definition of senior government officials.) Photographs without identification are releasable. Note: information on names released in FOIA F-05-0054 and to be released in FOIA F-07-0088 are provided in the related tables for this appendix.

(U) SCHEDULES, CONCEPTS, AND PLANS

Redact:

1. (~~S//TK//REL~~) Redact schedule-related information (schedules, requirements, concepts and plans), including schedule-related information on related NSA systems or programs, which would reveal sensitive information on GRAB/POPPY.
2. (~~S//TK//REL~~) Redact schedule-related information relating to the POPPY follow-on system (including all information and the designator). The fact of a follow-on system, without explanatory detail, may be released. (b)(1)
(b)(3)

Release:

(U) Release general information on POPPY and GRAB schedules, requirements, concepts, and plans subject to redact item above.

Refer:

(U) Refer to NSA, schedule-related information for NSA GRAB/POPPY systems or programs, unless redacted in accordance with redact 1 or redact 2 above.

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(U) System Description

(U) General

Redact:

1. ~~(S//TK//REL)~~ Redact all references to POPPY mission numbers [redacted] and payload numbers, and letter designations [redacted]

2. (U) Redact information revealing POPPY mission durations.

3. ~~(S//TK//REL)~~ Redact information revealing or implying "fact of" POPPY dependence on [redacted]

[redacted]

4. ~~(S//TK//REL)~~ Redact [redacted]

[redacted]

5. ~~(S//TK//REL)~~ Redact [redacted]

[redacted]

[redacted] (See Section 8 below.)

6. ~~(S//TK//REL)~~ Redact all references which would reveal information about other classified NRO SIGINT systems, including all information on or references to the POPPY follow-on system (including references to [redacted]

[redacted] in accordance with guidance in the RRG.

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7. ~~(S//TK//REL)~~ Redact

8. ~~(S//TK//REL)~~ Redact overhead SIGINT or ELINT collection requirements when they could be used to infer classified capabilities of GRAB/POPPY or other NRO SIGINT collectors. If requirements documents are to be referred to the originators because non-NRO information needs to be addressed, the NRO-related classified requirements should first be redacted.

9. ~~(S//TK//NF)~~ Redact

10. (U) Redact any other information not specified below for release.

Release:

1. (U) Release general information about the GRAB basic operational concept:
 - a. (U) Called for placing the satellite in an approximately 70 degree-inclined circular orbit, at an altitude of about 500 miles. The first launch was as an added payload along with the much larger TRANSIT IIA navigation satellite, also developed by the Navy.
 - b. (U) Without divulging any ground site location or other identifying information, general information about the fact that the GRAB satellites transponded collected data to ground sites located around the world where the information was recorded on magnetic tapes and transported to NRL and subsequently to NSA and SAC.
 - c. (U) General information that GRAB had the collection sensitivity for radar main beam collection capability.
 - d. (U) SAC's analysis and processing of GRAB data was to determine the characteristics and locations of Soviet air defense radars, such as GAGE and TOKEN, in support of the SIOP. NSA analysis and processing included search for new and unusual signals.

120

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- e. (U) The GRAB launch dates, launch vehicles/sites, and indications of mission success/failure (see table in section 9.3). Release information on the actual satellite orbits as it has been released to the public and could also have been easily determined by the Soviet Union from their space tracking system.
 - f. (U) Durations of all GRAB missions.
2. (U) Release general information about the POPPY basic operational concept:
- a. (U) Called for placing multiple satellites in an approximately 70 degree-inclined circular orbit, at an altitude of about 500 miles.
 - b. (U) Without divulging any ground site location or other identifying information, general information about the fact that the POPPY satellites transponded collected data to ground sites located around the world where the information was recorded on magnetic tapes and transported to NRL and subsequently to NSA and SAC.
 - c. (U) That POPPY stretched transponded pulses resulting in the fact that transmitted pulses would bear no fidelity to pulses detected other than the spacing between their arrivals.
 - d. (U) General information that POPPY had the collection sensitivity for radar main beam collection capability.
 - e. (U) The POPPY launch dates, launch vehicles/sites, and indications of mission success/failure (see table in section 9.3). Release information on the actual satellite orbits as it has been released to the public and could also have been easily determined by the Soviet Union from their space tracking system. **Note:** POPPY mission durations are not releasable. (See Section 4.1, redact 2.)
 - f. (U) Subject to redaction information elements listed above, the fact that the POPPY operational concept evolved into one featuring two or more satellites in one launch for improved coverage. The "fact of" and general facts about R&D payloads are releasable;

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information about the collection techniques being investigated is not releasable.

3. (~~S//TK//REL~~) Release general information regarding the techniques used and the accuracy of single satellite geolocation techniques and that they can be used to achieve gross miss distances (e.g., scores of miles) and large areas of uncertainty (e.g., hundreds of square miles). GRAB's single ball emitter location accuracies may be disclosed

4. (~~S//TK//REL~~) Release general information on POPPY station keeping and the fact of stabilization systems, designs and techniques, including the gravity-gradient stabilization experiment (GGSE). Details that disclose the specific techniques used or

5. (U) Release general information on NRL test chambers, such as thermal-vacuum, used for satellite design and development.

(U) Overall Collection Strategy

Redact:

1. (~~S//TK//REL~~) Redact information revealing the capability to

2. (U) Redact all references to the frequency bands or specific frequencies targeted by POPPY satellites or their GRAB predecessors.

3. (~~S//TK//REL~~) Redact references to POPPY collection, tasking, processing, or reporting of signals

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4. (U) Redact any other information not specified for release below.

Release:

1. (U) Release "Fact that" collection and measurement of the following radar parameters was to be derived from GRAB signal processing:
 - a. (U) Radar Radio Frequency Band (RF)
 - b. (U) Pulse Repetition Frequency/ Pulse Repetition Interval (PRF/PRI)
 - c. (U) Antenna Scan Rate
2. (U) Release general information that the original mission of GRAB was to intercept and identify known types of S-band radars in the Soviet Union, especially in its deep interior, and to discover and describe new types of radars. A further ELINT goal was to locate these radars as accurately as possible.
3. (U) Release the fact that NSA and SAC exploited GRAB data to develop technical intelligence about Soviet radar and to support building the SIOP.
4. (U) Release that after GRAB had first detected the Soviet ABM radar candidate in 1961, collection requirements and collection emphasis for follow-on GRAB/POPPY focused on gaining detailed information about the ABM radars during the period up to 1967.
5. (U) Release "Fact that" POPPY missions first conducted ocean surveillance of ship borne radars in 1967. General information about POPPY's mission evolution into one of predominantly ocean surveillance until program termination in 1977.

Refer:

(U) Refer to NSA, GRAB/POPPY collection strategy information except as specified above.

(U) Tasking and Reporting~~TOP SECRET//TK//RSEN/NOFORN~~

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Redact:

1. ~~(S//TK//REL)~~ Redact references to and implications of

[Redacted]

2. (U) Redact processing and reporting timeliness specifications and statistics of actual timeliness performance.

3. ~~(S//NF)~~ Redact

[Redacted]

4. ~~(S//NF)~~ Redact

[Redacted]

5. (U) Redact any other information not specifically identified below for release.

Release:

1. (U) Release the fact that the NRO Satellite Operations Center (SOC) in the Pentagon coordinated tasking of the POPPY satellites against the collection requirements of the U.S. Intelligence Board (USIB). Naval Security Group Headquarters retained responsibility for operating the Control Center that translated the SOC's interpretation of Intelligence Community instruction into commands for the satellite.

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2. (~~S//NF~~) Release references to inadvertent, non-specific collection of allied radar systems can be admitted as a matter of physics.
3. (~~S//NF~~) Release the facts of SIGINT targeting of (1) Asia, in general, and (2) Warsaw Pact Conventional Forces from 1964-1967 have been declassified by NSA and may be released



4. (U) Release instances of Intelligence Community assimilation of intelligence products from multiple unclassified or declassified systems.
5. (U) Release the fact of, but no details on, the transmission of POPPY ocean surveillance information to operational naval forces.

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Refer:

(U) Refer to NSA, all tasking and reporting information except as specified above.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Space Segment****(U) Satellite Vehicles****Redact:**

(U) Redact any information not indicated below for release.

Release:

1. (U) Release photographs, drawings, and models/artifacts of all GRAB and POPPY satellites, including ELINT payload antenna configurations and receiver components (full-scale models of the various GRAB and POPPY satellites are on public display). The weights and dimensions of all satellites and subsystems are also releasable. A top level GRAB satellite functional block diagram with interpretation is releasable.
 - a. (U) Release general information concerning the GRAB satellites being of spherical configuration with a diameter of 20 inches. The first satellite weighed 42 pounds, while later GRAB satellites weighed up to 55 pounds.
 - b. (U) Release general information about the fact that the first POPPY launch occurred on 13 December 1962 when a 2-satellite configuration was put into orbit. These satellites had a stretched spherical shape and weighed about 55 pounds.
 - c. (U) Release general information about the fact that first of two POPPY 3-satellite configurations was put into orbit in June 1963. These satellites also had a stretched spherical shape and eventually weighed up to 130 pounds.
2. (U) Release general information about the fact that the first POPPY 4-satellite configuration was put into orbit in March 1965, and that all remaining POPPY missions featured the 4-satellite configuration.
3. (U) Release that the POPPY multi-face design was first used in 1967, with three of the four satellites being multi-

126

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face. The multi-face satellite measured 27 inches across flats at its 12-sided equator. The basic multi-face structure was used on all POPPY satellites thereafter. They weighed between 162 - 282 pounds.

4. (U) Release general information related to the power generation subsystems and capacities of the GRAB and POPPY satellites.
5. (U) Release general information, including specific RFs, regarding the design and operation of the command receiver in the satellites. (See section 7.1 for redactions required for formats and contents of the uplinks.)

(U) Sensors


Redact:

1. ~~(S//TK//REL)~~ Redact
2. ~~(S//TK//REL)~~ Redact data concerning detection probability calculations and detection probability for specific classes of targeted emitters by GRAB/POPPY ELINT receiver systems. This includes receiver detection sensitivity.
3. ~~(S//TK//REL)~~ Redact ELINT intercept antenna/receiver detection patterns and plots
4. ~~(S//TK//REL)~~ Redact all references to specific ELINT intercept radio frequency bandwidths cited in proposed or as-built specifications of RF band plans for individual GRAB or POPPY satellites. Redact upper and lower frequency limits of GRAB 1 because it carried a single ELINT receiver (see Release 4 below).
5. ~~(S//TK//REL)~~ Redact references to implementation of

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6. ~~(S//TK//REL)~~ Redact 
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7. (U) Redact any other information not specifically identified below for release.

Release:

1. (U) Release general information concerning use of the open crystal video receiver for all GRAB and POPPY missions, including a photograph of the GRAB receiver assembly. Also release general information that pulse time of arrival was first determined by analog means but that digital means was used later.
2. (U) Release general information that for initial ELINT receivers, omni-directional azimuth coverage was provided by deploying six monopoles around the surface of the sphere.
3. (U) Release the fact that as POPPY frequency coverage expanded, the "antenna farms" on the satellites grew to contain turnstile arrays, conical monopoles, open-end waveguides, dipoles and horns.
4. (U) Release the upper and lower limits of a satellite mission's (not that for an individual POPPY satellite) overall RF coverage except for GRAB 1, which carried a single ELINT receiver. The fact that GRAB 1 frequency coverage was within the S-band is releasable.
5. (U) Release non-mathematical qualitative statements of detection intercept likelihood, **provided that** unacknowledged detection capabilities are not revealed.
6. (U) Release references to the fact of implementation of pulse width measurements without explanatory detail. References to fact of investigations into signal parameter measurements other than pulse width, **provided that** no details are released.

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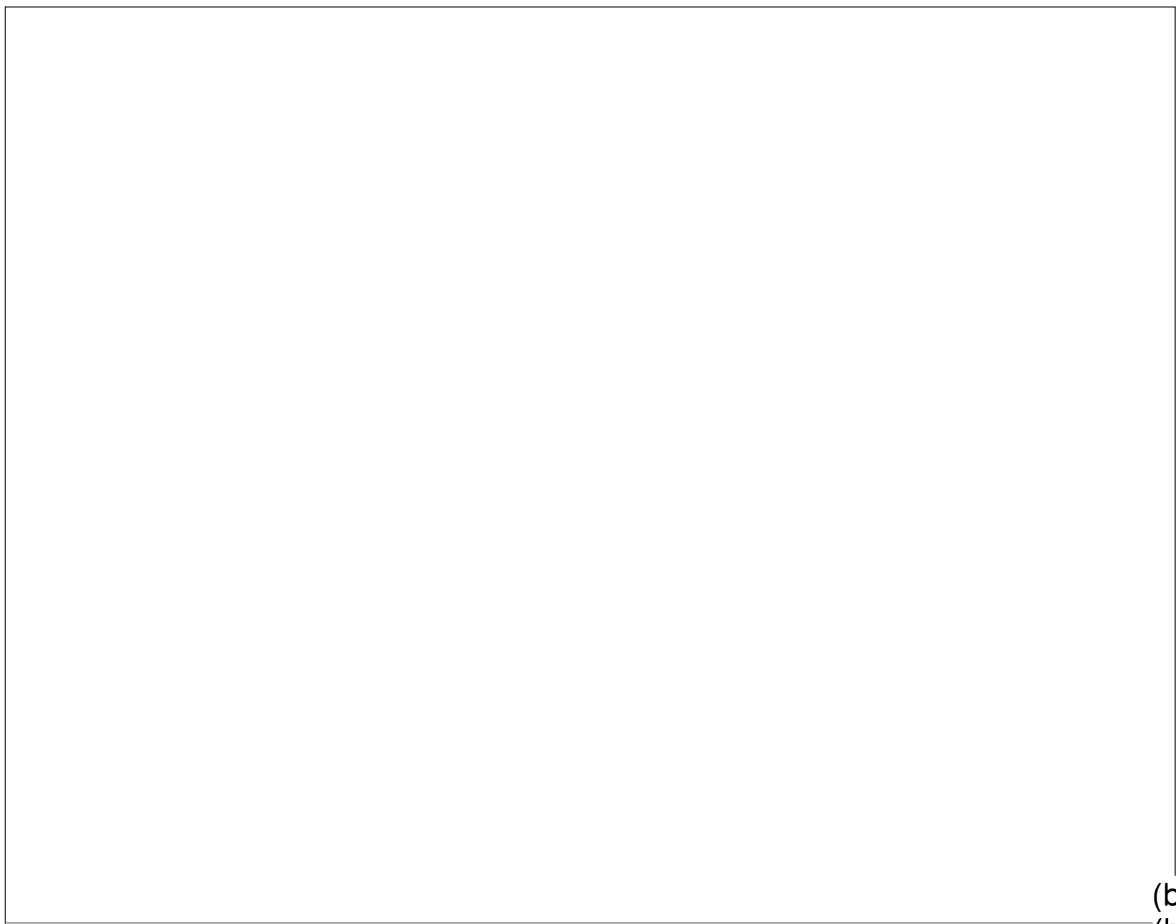
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(U) Ground Segment

(U) Location

Redact:

1. ~~(S//TK//REL)~~ Redact location and identification of all stations, detachments, activities, and facilities that hosted ground interrogation, collection, analysis, processing, and reporting for GRAB and POPPY missions, including those listed below, but not including Wahiawa, Hawaii, Hybla Valley, VA, (see release 1 below). Also redact any information that can be used to deduce location of ground stations. Such information might include data link ground slant range or periods of visibility. It might also include the station designation for specific ground stations or other anecdotal information such as nearby points of interest.



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All redactions this page: (b) (1) and (b) (3).

2. ~~(S//TK//REL)~~ Redact the fact that the GRAB engineering data readout and commanding facility at Hybla Valley, Virginia was relocated to in 1967.
3. (U) Redact any other information not specified for release below.

Release:

1. (U) Release the fact that the TATTLETALE/CANES/GRAB operational concept called for a dual interrogation/receiving hut, called the calibration hut. The calibration hut was deployed to Naval Communication Station, Wahiawa, Hawaii for initial on-orbit checkout by NRL during the mission of GRAB 1. This operation was later relocated to an NRL site located at the Coast Guard Communications Station in Hybla Valley, Virginia. The Hybla Valley facility was relocated in 1967. **NOTE:** Station designation numbers for these releasable locations are not releasable.
2. (U) Release the fact that GRAB calibration huts were placed at ground SIGINT sites around the periphery of the USSR. General location descriptors such as "Europe", "Asia", or "Africa" may be used.

(U) MGS General Functions**Redact:**

1. ~~(S//NF)~~ Redact the fact that some ground sites associated with GRAB/POPPY
2. (U) Redact any other information not specified below for release.

Release:

1. (U) Release the fact that ground sites associated with GRAB were manned and operated by the Naval Security Group (NSG) and that some of the GRAB/POPPY ground sites were operated by the Air Force Security Service and the Army Security Service.

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2. (U) Without divulging any location or other identifying information, release general information about the fact that the GRAB satellites transmitted collected data to ground sites located around the world.
3. (U) Release general information concerning the fact TATTLETALE/CANES/GRAB ground stations were installed in self-contained transportable shelters known as Earth satellite vehicle (ESV) huts. These were lightweight, aluminum structures designed for worldwide service conditions. All equipment was installed at the NRL. Transportable by helicopter, aircraft, truck, rail, or ship, the huts were shipped to various worldwide locations as essentially stand-alone facilities. Photographs of the exterior (including antennas) are releasable provided the photographs do not indirectly reveal ground station location from the photo background. Photos of the interior of the huts are releasable, as are general descriptions of the GRAB ground collection configuration, including commercial equipment identifiers, and a simplified functional block diagram and interpretation for the intercept and record functions.
4. (U) Release the fact that GRAB ground stations were gradually replaced by permanent buildings, thus permitting installation of better processing equipment. Photographs of the prefabricated POPPY operations buildings used in the 1970s (without antenna detail) are releasable. Release general facts regarding ground antenna tracking capabilities and systems.

(U) Processing**Redact:**

1. (~~S//TK//REL~~) Redact all information revealing the processing results of GRAB and POPPY collected signals in terms of numbers of radar locations, accuracies [redacted] [redacted] and timeliness of reporting. Redact [redacted] measurement techniques and capabilities, and intermediate quantitative performance descriptors [redacted]
[redacted]

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2. (U) Redact ELINT digital data processing techniques and methodologies, including (1) algorithms, (2) computer code, and (3) intermediate results (i.e. computer printouts). Redact information about the use and value of

(b)(1)
(b)(3)

3. ~~(C//REL)~~ Redact

4. (U) Redact system descriptions and performance information regarding computers and processing systems developed for or by NSA.
5. (U) Redact all other information not specified below for release.

Release:

1. (U) Release general information about the fact that analysis of the GRAB and POPPY data was performed at NSA [with some analytic support from NRL and the Navy Scientific and Technical Center (STIC)] and SAC.
 - a. (U) Release general information that signals collected by the early GRAB ELINT payloads in 1960 revealed that the actual density of radar data over the Soviet interior was many times greater than anticipated. Volume and density of data overwhelmed existing US analytical capabilities and stimulated development of computer-aided approaches. Grab's yield provided intelligence analysts at the National Security Agency (NSA) with ELINT data that kept them busy during the period between GRAB 1 and GRAB 2. By October 1961, NSA had developed an automatic system to improve the time-consuming processing of GRAB ELINT data.

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- b. (U) Release the fact that NSA's data analysis of signals collected by GRAB was intended to allow the determination of radar characteristics of pulse repetition frequency, antenna scan rate, and radio frequency band, as well as a very rough approximation of emitter location. Further analysis allowed determination of radar disposition and analysis of threat.
 - c. (U) Release references to the fact that GRAB was used by SAC to define the characteristics and location of air defense equipment in support of the SIOP. Release references to SAC's processing philosophy for GRAB.
 - d. (U) Release references to the fact that NSA, in searching the collection tapes for new and unusual signals, found a Soviet radar that supported an ABM capability.
2. (U) Release information describing general manual processing procedures at the POPPY ground sites along the following lines. One operator tracked the pass in azimuth/elevation and selected polarization for recording. A second operator logged signals of interest. After a pass, analog analysts at the ground site played back the tapes and performed aural and visual scans of each of the recorded data links. Parameters of these signals of interest were measured and tabulated. After verification of the parameters, analysts at the ground site prepared a daily signal of interest (SOI) report for transmission to NSA and others.
3. (U) Release information, including performance, regarding the supporting external systems used to estimate the satellite ephemeris as an input to ground processing.
4. (U) Release analog analysis techniques and methodologies, including those at ground sites, NRL, NSA, and SAC, may be disclosed provided they do not disclose system performance information that must be withheld. Terms such as PRI bridging, pulse deinterleaving, burst duration angle, and burst maker may be released without explanatory details. Quantitative performance descriptors are not releasable.
5. (U) Release the general history of GRAB/POPPY processing developments, including the names of computers and tape

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processing equipment employed, and the organizations involved.

Refer:

(U) Refer to NSA all information related to GRAB/POPPY ground processing, except as specified above.

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(U) Communications Segment

(U) Trajectory, Tracking, Telemetry and Command

Redact:

1. ~~(C//REL)~~ Redact descriptions of operational command protocols associated with payload receivers, [redacted]
[redacted]
2. ~~(S//TK//REL)~~ Redact information about the specific POPPY RFs and the format and information content of the VHF command uplinks for GRAB and POPPY. [redacted]
[redacted]
3. ~~(S//TK//REL)~~ Redact [redacted]
[redacted]
4. ~~(S//TK//REL)~~ Redact all information regarding details of link vulnerability to intercept by adversaries and encryption options.
5. (U) Redact any other information not specified below for release.

Release:

1. (U) Release, for VHF telemetry downlinks, general information (see Boundary Document, paragraph 3) about the information content of the signal, and specific RFs.
2. (U) Release, for VHF command uplinks, specific RFs for GRAB and POPPY. Information about the format and information content of the uplinks is not releasable. (See Redact 2 above.)
3. (U) Release general information about the link intercept analysis and resulting debate prior to the approval of the first GRAB (CANES) launch.

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Refer to NSA, information about COMSEC techniques and capabilities except as specified above.

(U) ELINT Downlinks**Redact:**

1. (U) Redact information that would reveal the content of specific downlinks (see Section 7.1, Redact 2).
2. (~~S//TK//REL~~) Redact all information regarding details of link vulnerability to intercept by adversaries and encryption options.
3. (U) Redact any other information not specified below for release.

Release:

1. (~~S//TK//REL~~) Release, for VHF ELINT downlinks, release specific RFs, bandwidth, and average transmitter power. Information that would reveal the content of specific downlinks is not releasable because it would reveal tasking, and collection capability.
2. (U) Release general information about the link intercept analysis and resulting debate prior to the approval of the first GRAB (CANES) launch.

Refer:

Refer to NSA, information about COMSEC techniques and capabilities except as specified above.

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(U) Capabilities, Accomplishments and Products

Redact:

1. ~~(C//TK//REL)~~ Redact references to the types of radars collected, [redacted] (Note: Gage and Token as examples of GRAB detection capability have been released and are exceptions provided details such as frequencies are not released.) Redact references to the details of [redacted] [redacted] signals, [redacted] Redact quantitative information on SAC's SIOP-related mission success for GRAB or POPPY.

2. ~~(S//NF)~~ Redact references to mission objectives or [redacted] [redacted] A capability to detect other emitters cannot be denied; thus inadvertent, non-specific collection can be admitted as a consequence of Physics (see release 9 below).

3. ~~(S//TK//REL)~~ Redact [redacted] [redacted]

a. ~~(S//TK//REL)~~ Redact [redacted] [redacted]

b. ~~(S//TK//REL)~~ Redact [redacted] [redacted]

c. ~~(S//TK//REL)~~ Redact [redacted] [redacted]

d. ~~(S//TK//REL)~~ Redact [redacted] [redacted]

e. ~~(S//TK//REL)~~ Redact [redacted] [redacted]

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[Redacted]

f. (~~S//TK//REL~~) Redact [Redacted]

[Redacted]

g. (~~S//TK//REL~~) Redact references to detection by POPPY of

[Redacted]

[Redacted] The term "Soviet naval radar" is permissible.

h. (~~S//TK//REL~~) Redact reference [Redacted]

"General intelligence" is acceptable.

i. (~~S//TK//REL~~) Redact [Redacted]

[Redacted]

4. (~~S//TK//REL~~) Redact [Redacted]

[Redacted]

5. (~~S//TK//REL~~) Redact details of POPPY collection accomplishments against high-powered ABM signals. General statements referencing these systems as targets for POPPY are releasable [Redacted]

[Redacted]

6. (~~C//TK//REL~~) Redact details of POPPY collection accomplishments in support of ocean surveillance, including quantitative requirements, including references to detection by POPPY of [Redacted]

[Redacted] Use of the generic term "Soviet naval radar" is acceptable (see release 5 below). Times of detections of specific naval signals (direct or indirect) are not releasable [Redacted]

[Redacted]

[Redacted] References to specific dates are acceptable. Detailed descriptions of ship tracking events are not releasable for similar reasons. [Redacted]

[Redacted]

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[Redacted]

General information describing examples of ship tracking may be released if specific times, ship identities, and ship locations are not released. No information that reveals capabilities to [Redacted] may be released. No quantitative information on timeliness of reporting.

7. (~~C//TK//REL~~) Redact [Redacted]

[Redacted]

[Redacted]

8. (~~S//TK//REL~~) Redact [Redacted]

[Redacted]

9. (~~S//TK//REL~~) Redact information about on-orbit subsystem failures and the resulting effects on mission capabilities in specific time periods.

10. (U) Redact any other information not specified for release below.

Release:

1. (U) Release, only general information regarding the radar type and, time, of an intercept. Use of generic terms, such as "Soviet naval radar", "mobile threat emitter" or "high powered ABM radar", are acceptable for describing radar type. Date/times should generally include only the date of detection (no times); even broad statements regarding the intercept location should not be released.

2. (U) Release the fact that GRAB and POPPY intercepts contributed to EOB production.

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3. (U) Release qualitative general information on SAC's mission success (see redact 1 above). SAC's processing was aimed at defining the characteristics and locations of air defense equipment to support preparing the single integrated operations plan (SIOP), a war plan responsibility of the Joint Strategic Targeting Planning Staff at Offutt AFB, Nebraska. Release information indicating that the results from GRAB were felt to have a direct and significant bearing on this effort as well as on strike force tactics and EW hardware.
4. (U) Release, subject to release 1 above, general references to ABM search and the contributions of GRAB and POPPY to general intelligence and technical intelligence on Soviet high powered ABM systems
5. (U) Release general references (no details) to the evolution of POPPY from an ABM signal detector to a system which primarily supported naval ocean surveillance.
6. (U) Release general descriptions of Poppy's capabilities to perform the ocean surveillance mission as described below (see redact 6 above).
- a. (U) Release references to detections of Soviet naval ship emitters **provided that** timeliness of the reporting, radar type, specific location, time of detection is not identified (see release 1 above).
- b. (U) Release references to general qualitative information describing examples of ship tracking may be released **in the absence of** specific times, emitter types, ship identities/types, or ship locations.
7. (~~C//TK//REL~~) Release the "fact of"
-
- (b)(1)
(b)(3)
8. (U) Release inadvertent, non-specific collection of emitters in non- Soviet countries as a consequence of Physics (see redact 2 above). The facts of SIGINT targeting of (1) Asia, in general, and (2) Warsaw Pact

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Conventional Forces from 1964-1967 have been declassified by NSA and may be disclosed.

Refer:

(U) Refer to NSA information about GRAB/POPPY accomplishments and products except as specified above. Except as specified above, refer all reporting if the intelligence content is identified as derived from SIGINT.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Launch Operations****(U) Launch Vehicle Utilization****Redact:**

(U) Redact any GRAB/POPPY related information not specified below for release.

Release:

1. (U) Release design and performance information related to the GRAB/POPPY launch vehicle systems and the interfaces with other unclassified payloads: Thor Able Star, Scout, Thor-Agena, and Thorad-Agena. Design details are not releasable for Thor-Agena and Thorad-Agena. On-pad photographs of launch vehicles with payloads are releasable.
2. (U) Release information on ascent trajectories for specific launches.
3. (U) Release the fact that GRAB 1, because of presidential constraints, had 22 data collection passes during its lifetime.
4. (U) Release the fact of and general information about the second GRAB launch on 30 November 1960 that had to be destroyed before achieving orbit. Debris landed in Cuba, killing a cow and causing subsequent launches from Cape Canaveral to be modified to avoid over-flights of Cuba in the future.

(U) Launch Dates**Release:**

1. (U) Release all launch dates and associated information on launch vehicle, launch location, mission identification (GRAB vice POPPY), and success/failure information as specified in the table below is releasable.

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~~TOP SECRET//TK//RSEN/NOFORN~~(U) GRAB and POPPY Launch Dates and Results

<u>No.</u>	<u>Date</u>	<u>Site¹</u>	<u>Launch Vehicle/Result</u>	<u>Mission</u>
1	6/22/60	CC	Thor Able Star	GRAB 1
2	11/30/60	CC	Thor Able Star (failed)	GRAB
3	6/29/61	CC	Thor Able Star	GRAB 2
4	1/24/62	CC	Thor Able Star (failed)	GRAB
5	4/26/62	PA	Scout (failed)	GRAB
6	12/13/62	VAFB	Thor Agena D	POPPY 1
7	6/15/63	VAFB	Thor Agena D	POPPY 2
8	1/11/64	VAFB	TAT Agena D	POPPY 3
9	3/9/65	VAFB	Thor Agena D	POPPY 4
10	5/31/67	VAFB	Thor Agena D	POPPY 5
11	9/30/69	VAFB	Thorad Agena D	POPPY 6
12	12/14/71	VAFB	Thorad Agena D	POPPY 7

¹(U) Launch Site: CC = Cape Canaveral FL; PA= Naval Missile Facility at Point Arguello, CA (later part of VAFB); VAFB = Vandenberg Air Force Base, CA.

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(U) Redaction Categories Other Than Sources and Methods

**(U) Reveal Information that would Impair US
Cryptologic Systems or Activities (25X3)**

Refer:

Refer to NSA, information that would impair US cryptologic systems or activities except as specified for GRAB/POPPY elsewhere in this guide.

(U) Impair Relations with a Foreign Country (25X6)

Redact:

1. ~~(S//TK/NF)~~ Redact [redacted]

2. ~~(S//NF)~~ Redact [redacted]

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3. ~~(S//NF)~~ Redact [redacted]

**(U) Violate a Statute, Treaty or International
Agreement (25X9)**

Refer

~~(U//FOUO)~~ There may be instances where statutes, treaties, and/or international agreements may affect the outcome of declassification decisions regarding information in POPPY records. Before citing this exemption as the basis for a declassification decision, refer it to the Government Approving Authority, who will coordinate with the appropriate NRO authorities to confirm the public disclosure status of the

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information at issue pursuant to the terms of a specific law, treaty, or agreement.

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(U) Addendum 1: GRAB/POPPY Terms, Cryptonyms and Codewords

(U) **Column One** identifies the term, cryptonym, codeword, codename, indicator, etc.

(U) **Column Two** identifies the current classification status of the term or codeword and contains a number between 1 and 3 that identifies the classification relationship between the codeword and the activity:

"1" means that both the codeword and the activity are classified. In many cases, NRO does not have authoritative information on the appropriate designator. These cases have been conservatively designated as "1" and noted as "interim", pending receipt of additional information.

"2" means that the codeword is currently unclassified, but all information about the activity and any revealing context remain classified. (Note: the codeword must be redacted if it reveals still classified information.)

"3" means that both the codeword and the activity are unclassified. (Note that some aspects of the activity may still be classified.)

(U) **Column Three** provides background or context for the codeword and often guidance and/or instructions regarding information associated with the codeword. The classification and content of the column 3 information for items designated "classi 1 (interim)" are not authoritative. They represent NRO's best current information on the item.

(U) AFSCN: Air Force Satellite Control Network.	declas-3	(U) A global configuration of space-ground link resources interconnected through communications links to provide tracking, telemetry, command, and control functions primarily for manned and unmanned DoD and non-DoD satellite operations and space vehicle missions.
(U) A-Group	declas-3	NSA group targeted on European Communist and Warsaw Pact countries.
(U) AFSS: The	declas-3	(S) Provided overseas facilities for

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Air Force Security Service		one of the GRAB ground sites. (NOTE: [redacted])	(b)(1)
(U) ASA: The Army Security Agency	declas-3	(S) Provided facilities for GRAB ground sites. (NOTE: [redacted])	
(U) Athos	Declas-3	(U) German-developed crystal video receiver of WWII.	
(U) AUDICO: Automatic digital conversion computers	declas-3	(U) Developed by NSA to convert analog ELINT signals collected by GRAB/POPPY to digital.	
(U) BOGART	declas-3	(U) A special purpose computer designed by NSA for efficient data conversion and formatting of the GRAB ELINT intercept data.	
(U) BORESIGHT	declas-2 S//REL	(U) [redacted]	(b)(1) (b)(3)
(U) BUCKSHOT	declas-3	(U) The nickname associated with the unsuccessful NRL multi-payload launch in January 1962 called COMPOSITE. See COMPOSITE.	
[redacted]	classi-1 (interim)	To be supplied.	(b)(1) (b)(3)
(C//REL) [redacted]	classi-1 (interim)	(C) [redacted]	
(U) BULLSEYE	declas-2	(U) [redacted]	(b)(3)
(U) BUWEPS: The Navy Bureau of Weapons	declas-3	(U) Assumed responsibility for financial execution of the POPPY program within the Navy in the early 1960s. It provided a fiscal representative to the POPPY TOG to carry out such functions.	
(U) CAMS: The Computer-Aided Manual System	declas-3	(U) Interactive software programs, written by HRB and installed at the ground sites by NRL.	

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computer software		
(U) CANES	declas-3	(U) The Navy ONI security compartment established to protect information concerning the Navy ELINT reconnaissance satellite program when it was ostensibly cancelled under its original name of TATTLETALE.
(U) CANIS	declas-3	(U) A misspelling of the term CANES described above that may be present in documents dealing especially with the GRAB Navy ELINT project.
(S//TK)	classi-1	(S//TK)
(U) CHARLIE	declas-3	(U) Nickname for Program C.
(U) CLASSIC WIZARD		
(U) COMPOSITE	declas-3	(U) The name for an unsuccessful multi-payload launch on 24 January 1962 of three NRL experimental satellites and two other non-NRL satellites. A GRAB satellite was one of the NRL payloads. It also was nicknamed BUCKSHOT. See also SurCal, LOFTI, INJUN.
(U) COSA-5. The advanced signals analysis division of the office of <u>C</u> ollection and <u>S</u> ignal <u>A</u> nalysis (COSA)	declas-3	(U) Was the first organizational element in NSA dedicated to analysis of ELINT intercepts. It evolved from the former NTPC. COSA-5 later became C-15. COSA became C-1. C-14 was special projects division involved in machine processing of ELINT data. C-13 was Communications Intelligence Div.
(U) COURIER	declas-3	(U) A communication satellite project whose transfer to Army control per a September 1959 decision by SECDEF McElroy also affected management arrangements for DISCOVERER, SAMOS, MIDAS, TRANSIT, and SpaSur.
(U) DOSIMETER	declas-3	(U) Unclassified payload launched with POPPY/GRAB.
(U) DYNO	declas-3	(U) The name assigned to a GRAB upgrade (superseded by POPPY) and applied retroactively to all GRAB flights.

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(C//REL)	classi-1	(C)
(U) ECM: <i>Electronic Counter Measures</i>	declas-3	(U) Acronym for electronic countermeasures systems.
(S//REL) EGGSHELL	classi-1	(S) Early code word for the CIA's SIGINT collection site in Iran along the Soviet border.
(U) ELCOM	declas-3	(U) ELINT committee of a joint intelligence board (USIB).
(U) ELT: ELINT Technical Report	declas-3	(U) ELINT report issued by NSA.
(U) EPHEMERIS	declas-3	(U) The orbital parameters of any satellite, such as inclination, apogee, perigee, and periodicity.
(U) EPL: ELINT Parameter Limits	declas-3	(U) Comprehensive report on foreign system ELINT parameters issued by NSA.
(S//REL) EROS	classi-1 (interim)	To be supplied.
(U) EXPLORER	declas-3	(U) The first satellite orbited by the United States. It was launched on 31 January 1958.
(U) FERRET	declas-3	(U) The generic name applied to the ELINT reconnaissance satellite variants within the SAMOS development program. The respective variants were F-1, F-2, and F-3. (S) [Note: Continue to protect the
(U) FOV: Field of View.	declas-3	(U) An ELINT satellite will detect any emitter radiating on a targeted frequency in its field of view on the earth's surface.
(U) GAGE	declas-2	(U) NATO designator for Soviet air defense radar. NSA redacts.
(U) GERBER	declas-3	(U) A unique oscillograph developed by NRL to convert GRAB analog tape to

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All redactions this page: (b) (1) and (b) (3).

		digital data for further analysis.
(U) GGSE: Gravity Gradient Stabilization Experiment	declas-3	(U) Unclassified payload launched with GRAB/POPPY.
(U) GRAB	declas-3	(U) The unclassified program name for the Navy ELINT reconnaissance satellite project after it was placed in the CANES security compartment by the Navy Director of Naval Intelligence. It also was an acronym that stood for Galactic Radiation Background, which was a legitimate scientific experiment used as cover for the ELINT mission.
(U) GREB: The acronym for Galactic Radiation Energy Balance	declas-3	(U) Was a solar radiation measurement payload that also served as a cover mission for the GRAB Navy ELINT reconnaissance satellite project. It was the progenitor to the legitimate Solar Radiation experiment. See SOLRAD.
(U) HOLD	declas-3	(C) The security control system instituted by the Office of Naval Intelligence in 1961 to replace the CANES control mechanisms and procedures associated with the GRAB ELINT satellite system.
(U) [redacted]	declas-2	(S) [redacted]
(U) INJUN	declas-3	(C) A piggyback scientific satellite sponsored by Dr. James Van Allen to study the radiation belts around the earth. It was connected to the GRAB-2 ELINT satellite and both were launched in piggyback fashion with a TRANSIT IIIB communication satellite. [redacted]

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(U) JUNO	declas-3	(U) A modified version of the JUPITER C IRBM that launched the EXPLORER satellite, the first successful U.S. satellite.
(U) JUPITER C	declas-3	(U) An intermediate range ballistic missile that was used to put small satellites into orbit in the early 1950s
(U) K-4/SP	declas-3 S//Rel	(U) NSA Office of Special Projects (formerly divisions in C-Group). Processed and analyzed ELINT data. Included [redacted]
(U) LOFTI	declas-3	(U) A 60 pound NRL experimental satellite to study ionospheric effects on very low frequency propagation. It was lost during the January 1962 unsuccessful COMPOSITE launch.
(S//REL) [redacted]	clasi-1	(S) [redacted]
(U) MIDAS	declas-3	(U) The name of an Air Force project under the WS-117L development umbrella program with the objective of developing an infrared missile warning satellite.
(U) MOON BOUNCE	declas-2	(S) [redacted]
(U) MPRO	declas-3	NSA Office of Machine Processing
(C//REL) [redacted]	classi-1 (interim)	(C) [redacted]

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(U) NASA: The National Aeronautics and Space Administration	declas-3	(U) Continues to exercise leadership over the civilian space program. Their tracking facilities supported the launches of the GRAB ELINT satellite.	(b)(3) (b)(1)
(U) Navy ELINT	declas-3	(U) Nicknames for GRAB and POPPY programs.	
(U) NEW HORIZON	declas-3	(U) Official nickname for the Air Force WS-117L military satellite development effort in the 1950s.	
(U) NRL. The Naval Research Laboratory	declas-3	(U) Organization within the Navy that designed and developed the GRAB and POPPY ELINT satellites.	
(U) NSG. The Naval Security Group	declas-3	(S) Was the Navy organization that performed on-orbit operational control of the GRAB and POPPY ELINT satellites. May also be referred to as COMNAVSECGRU or NAVSECGRU. [redacted]	(b)(1)
(U) NTPC. The National Technical Processing Center	declas-3	(S) Was the primary interagency ELINT analysis organization at the early stages of development for the GRAB ELINT satellite project. It soon relocated and became integrated into NSA, where it became part of the fledgling ELINT organization within NSA named COSA-5. Formerly known as Army and Navy Electronic Evaluation Group.	
(U) ONI. The Office of Naval Intelligence	declas-3	(U) Was the organization that provided overall executive direction within the Navy for the design and development of the GRAB ELINT satellite.	
(U) PAPS: POPPY Automated Processing System	declas-3	(U) POPPY Ground Station processing system developed by NRL.	
(U) PIED PIPER	declas-3	(U) The original cryptonym assigned to the Air Force WS-117L advanced reconnaissance satellite program in 1955.	
(U) POPPY	declas-3	(U) Navy ELINT project. Follow-on to GRAB.	

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(U) PROD	declas-3	(U) NSA Office of Production. PROD-03 was the techniques group.
(U) PROJECT SCORE	declas-3	(U) The first military communications satellite, it was developed by the Air Force and broadcast the first voice message from space -- President Eisenhower's Christmas message in 1958.
(C//REL) [redacted]	classi-1 (interim)	(C) [redacted]
(U) REPTILE	declas-3	(U) The code word used by NSA for POPPY-related exploitation and product reporting [redacted]
(U) R-Group	declas-3 s//TK	(U) NSA Office of R&D. [redacted]
(U) SAMOS	declas-3	(U) An Air Force reconnaissance satellite development effort under the auspices of the WS-117L umbrella development program. It included imaging and ELINT reconnaissance satellite projects.
(S//REL) [redacted]	classi-1 (interim)	(S//TK) [redacted] d
(U) SCOUT	declas-3	(U) An Air Force booster used in unsuccessful attempts to launch GRAB GRAB in April 1962.
(b)(3)	declas-2	(S) [redacted]
(U) SENTRY	declas-3	(U) An earlier name for the SAMOS reconnaissance satellite development effort outlined above.
(S//REL) [redacted]	classi-1 (interim)	(S//TK) [redacted]

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All redactions this page: (b) (1) and (b) (3).

(U) SIOP: The <u>Single Integrated Operational Plan</u>	declas-3	(S) The U.S. nuclear war plan. Soviet ELINT threat data from GRAB and POPPY was used for planning USAF/SAC bomber routes to the various targets contained within the plan.
(U) SISS ZULU	declas-3	(U) The unclassified covername used by the Naval Security Group to refer to its participation in the POPPY program (chiefly with regard to organization, billets, budgeting, & logistics).
(U) SOC: The <u>NRO Satellite Operations Center</u> .	declas-3	(U) Located in the Pentagon, it translated the collection requirements levied by the intelligence community for tasking by the satellite ground stations. It was disestablished in the late 1970s.
(U) SOLRAD: A <u>solar radiation payload</u>	declas-3	(U) Was a legitimate scientific experiment launched with the GRAB ELINT satellite. Acknowledgment of the SOLRAD experiment provided protection for the classified ELINT payload. See GREB.
(U) SPASUR: The <u>Naval Space Surveillance facility</u>	declas-3	(U) Space surveillance system comprised of a chain of transmitter sites and receiver sites, forming a continuous wave electronic fence above the southern states from coast to coast. Can also be referred to in the records as NAVSPASUR.
(U) STAR	declas-3	(U) The codeword assigned to describe ELINT variants being developed under the Air Force WS-117L satellite developmental umbrella.
(S//TK//REL)	classi-1	(S//TK)
(U) STIC. The <u>Scientific and Technical Intelligence Center</u> under the Office of Naval Intelligence	declas-3	(U) STIC provided a representative to the GRAB TOG. The STIC member of the TOG provided intelligence requirements to the TOG director; provided signal analysis support to NSA; monitored the signal analysis program; and disseminated quality control technical data to the mission ground stations.

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(U) SURCAL	declas-3	(U) The term associated with a small nine pound NRL satellite designed as a space object to calibrate the Naval Space Surveillance fence. It was lost during the unsuccessful January 1962 COMPOSITE launch.
(S//REL) TACKSMAN	classi-1	(S) Later code word for a CIA SIGINT collection site in Iran along the Soviet border.
(U) TATTLETALE	declas-3	(U) The DoD-SECRET name given originally to the Navy ELINT reconnaissance project which later became GRAB.
(U) THOR ABLE STAR	declas-3	(U) An Air Force launch vehicle used to launch GRAB satellites.
(U) TIROS: Acronym for <u>T</u> elevisi <u>o</u> n and <u>I</u> nfra <u>r</u> ed <u>O</u> bservati <u>o</u> n <u>S</u> ystem	declas-3	(U) Originally a Navy Vanguard program to record developing cloud formations, storm systems, and cloud cover images for weather forecasting purposes.
(U) TOG: <u>T</u> echnical <u>O</u> perations <u>G</u> roup.	declas-3	(U) The interagency body established by the Navy to coordinate and control activities related to the GRAB ELINT satellite project.
(U) TOKEN	declas-2	(U) NATO designator for Soviet air defense radar. NSA redacts.
(U) TRANSIT	declas-3	(U) The name of the Navy navigation satellite payloads from which early GRAB payloads were launched in a piggyback mode.
(U) VANGUARD	declas-3	(U) The Navy space program from which many important features of the GRAB Program took root after Vanguard was transferred to the control of NASA.
(U) WALNUT	declas-3	(U) A security compartment established by the Office of Naval Intelligence to protect the Navy ELINT reconnaissance satellite project after classification protection at the DoD SECRET level became untenable under the name TATTLETALE.
(U) WHITECLOUD	declas-2	(S) [REDACTED]
(U) WS-117L	declas-3	(U) The term associated with an Air Force umbrella project begun in the mid

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	1950s to develop satellites for a variety of functions, including reconnaissance. See DISCOVERER, MIDAS, PIED PIPER, SENTRY, and SAMOS.
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(U) Addendum 2: Releasable Personnel Names Associated with GRAB/POPPY

(Addendum 2 of the GRAB/POPPY appendix is UNCLASSIFIED in its entirety)

RELEASE the following names and functions for either the GRAB or POPPY, as indicated. Additional releasable names and functions may also be found in Appendix B of the RRG.

NOTE: *With the exception of the NRO and other Intelligence Community components, names of Department of Defense officials appearing in records twenty-five-years old or older are releasable, as are the names of officials in other executive branch agencies (e.g., DOE, NASA, etc.) or in the Congress. The names of contractor personnel who have worked on GRAB or POPPY are not releasable unless they appear below, in Section 10.1 or in Appendix B of the RRG. CIA or NSA personnel, or personnel assigned to the CIA or NSA likewise are not releasable unless their names appear below, in Appendix B of the RRG, or in the CIA list of releasable names. Any names that appear below, when associated with more recent, specific NRO satellite programs or activities outside of the GRAB/POPPY timeframe, should be redacted under the Privacy Act exemption. See also release authority regarding signatures in Section 9 of the RRG. Note: Social Security Numbers will be redacted wherever they are encountered.*

NAME	PROGR	AGNCY	COMMENTS
Anderle, Richard J.	POPPY	NWL	Orbital modeling
Arnold, James M. (Naval enlisted)	POPPY	NSG	CAMS operation/digital analysis
Ashbacher, Raymond W. (Naval offcr)	POPPY	NSG	Standard operating procedures
Bachelor, William B.	GRAB	NRL	Site Prep/Engineering Eval
Beal, Robert T.	POPPY	NRL	Satellite stabilization

157

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Becke, Edward G.	GRAB, POPPY	NRL	Satellite equipment deployment/installation
Betz, Fred	POPPY	NRL	On-orbit command & control
Bickham, William W jr	POPPY	HRB	Software development & enhancement
Blodgett, Robert P. (Naval enlisted)	POPPY	NSG	Signals search
Boenning, William R.	POPPY	NSA	NRO engineering oversight (1967-69)
Booth, Bryant F. (Naval offcr)	POPPY	NSG	PAPS operational implementation
Boyd, Albert P.	GRAB	NRL	Equipment Shelter Assembly/Engineering Services Div.
Brooks, Ronnie (Naval enlisted)	POPPY	NSG	Field site analog analysis mgmt
Bryant, Robert	POPPY	NRL	Logistics Support
Calderwood, W. (Naval enlisted)	?	NSG	Field site signals search
Carey, Paul F.	POPPY	NRL	Satellite thrusting participation
Carpenter, Ralph A.	GRAB	NRL	Site Prep/Engineering Eval
Christman, Donald B.	GRAB	NRL	Data Recorders
Chumbley, William T. (Naval enlisted)	POPPY	NSG	[redacted] file maintenance
Cokefair, Judd	POPPY	Navy	Navy SORS rep
Cole, Isaiah C. ,Naval offcr (flag)	POPPY	NSG	Operations mgmt, TOG (1973-76)
Conley, Herbert L.		NSA	Chief, COSA-5
Conlon, John J.	GRAB, POPPY	NSA, NTPC	Data exploitation and search/technical intelligence (1960-1968); NRO engineering

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			oversight (1962-65)
Connolly, Thomas F. (Naval offcr)	GRAB	BUWEPS	BUWEPS sponsorship
Conway, John (Jack), Naval enlisted	POPPY	NSG	Signals search, program analysis
Conover, Alfred R.	GRAB	NRL	Engineering Drawings
Cook, Ralph E. ,Naval offcr(flag)	POPPY	NSG	Operations direction (1963-71)
Copley, Col John O.		NSA	Chief, [redacted] classified)
Cram, Charles		NSA	Chief, [redacted] classified)
Cudmore, Patrick H.	GRAB	NRL	RF Systems
Daniels, Robert E.	POPPY	HRB	Computer aided manual system software
Dean, Mr.	GRAB	NRL	Bureau of Naval Weapons Rep.
DeCourt, Henry F.	GRAB, POPPY	NSA	Planning, data evaluation & analysis, [redacted] (Release only when at NSA)
Deeley, Walter G.	GRAB	NSA	TOKEN location task force leadership, NRO transition planning
DeMark, Eugene C.	POPPY	HRB	NRL support contract mgr, [redacted] concept, prototype
Dennis, Marion Gary	GRAB	NRL	RF Transmitters Design
Dix, Edgar L.	GRAB	NRL	Space/Ground Interfaces & Launch Vehicle Integration
Doheny, John F.		NSA	Chief, NSA W-24
Drake, Robert E.		NSA	Member, USIB ELCOM
Earl, Lawrence E.	GRAB, POPPY	NRL	Payload installation
Eichel, Lary A. (Naval Offcr)	POPPY	NSG	Assembly language software, Siss Zulu operations
Eisenhauer, Robert E.	POPPY	NRL	On board signal measurement systems
Ellis,	GRAB,	CIA	CIA operations and representation

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Marshall	POPPY		to TOG
Fisher, Terry W.	POPPY	NRL	Analog/digital data systems
Flach, George E.	POPPY	NRL	Active satellite stabilization
Fraser, Lloyd C.	POPPY	NSG	
Gallagher, Kenneth J.	POPPY	NSA	NSA manual data search and technical feedback, power measurement mission advocacy, (1968-77)
Garwin, Richard	GRAB, POPPY	IBM	
Gebhard, Louis A.	?	NRL	Co-author "Electronic Intelligence Satellite" (1957)
Getchell, Bassford C.	GRAB, POPPY	NSA	Geolocation processing
Geyer, Gary (USAF offcr)	POPPY	SAFSP	West coast launch support
Gorday, Charles M.	GRAB	NRL	Telemetry Assembly/Integration
Gran, Ralph M.	GRAB	NRL	Ground Instrumentation
Haines, Clarence R. Jr.	GRAB	NRL	Printed Circuit Board Design
Hammarstrom, Lee M.	POPPY	HRB, NRL	NRL support contract (analysis, mgmt), project engineering support
Harding, Loretta	POPPY	NRL	Administration
Harding, Roy A.	GRAB	NRL	Structures Assembly/Integration
Hatch, D.		NSA	NCM
Hearton, Leonard E.	POPPY	NRL	Telemetry, tracking, satellite command & control
Heindl, Floyd H.	POPPY	NSG	Operations mgmt
Hellrich, Frederick V.	POPPY	NRL	Ground systems engineering
Hitz, Frederick W. jr (Naval offcr)	GRAB	NSG	Planning & operations mgmt
Hubbard, Samuel H.	GRAB, POPPY	BUWEPS	Program mgmt support (cost)
Hubble, PO1	GRAB	NRL	Interrogation Operator

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Hilbert R.			
Huntley, William J.J.	POPPY	NRL	Satellite tracking facility
Joerger, Charles (Naval enlisted)	POPPY	NSG	Software configuration mgmt, quality control
Johnson, T.		NSA	Historian
Kargle, Rayman B. (Naval enlisted)	POPPY	NSG	SISS/Zulu collection/analysis supervision
Keebaugh, Michael D.	POPPY	HRB	Operating system documentation
Kellogg, Robert L. (Naval offcr)	POPPY	NSG	SISS ZULU field operations mgmt
Kelly, George W. Jr.	GRAB	NRL	Documentation
Krapf, CAPT Arthur E.	GRAB	NRL	NRL Director
Kronmiller, George G.	GRAB	NRL	RF Systems
Kurtz, RADM Thomas R.		NSA	Asst. Director, Production
Lawton, Thomas F.	POPPY	HRB, NRL	Geolocation accuracy
Lee, PO2	GRAB	?	Interrogation Operator
Lenker, Paul L. (Naval enlisted)	POPPY	NSG	Digital systems maintenance
Lentz, Robert E. (naval offcr)	POPPY	NSG	Siss Zulu field operations mgmt
Lester, Paul	GRAB	NRL	SolRad Technician
Libbert, John E.	GRAB, POPPY	NSA	TOG adviser (1959-65), NSA ELINT mgmt (COSA-5,C-1) (1960-65),EOB mission advocacy (1969-70)
Lindley, John R.	POPPY	NRL	Tape system acquisition mgmt
Lorenzen, Howard O.	GRAB, POPPY	NRL	Countermeasures Branch Head, GRAB& POPPY Technical Direction

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Lybarger, Earl D.	POPPY	HRB	Software development
Martin, Johnny D. (Naval enlisted, contractor)	POPPY	NSG, HRB	Field analog analysis, equipment testing
Mast, Paul L.	GRAB, POPPY	ITT	Crystal video receiver, RF amplification
Mayo, Reid D.	GRAB, POPPY	NRL	Concept & Project Engineer
McAdams, James	POPPY	NSA	NSA technical feedback, on-site SOI reports
McCray, Phillip R.	GRAB, POPPY	NRL	Ground Instrumentation Operation
McDavitt, William H.	POPPY	NRL	Ground equipment installation & test
McGraw, Lloyd H. (Naval offcr)	POPPY	NSG	Operations mgmt
Meade, Kenneth E. (Naval enlisted)	POPPY	NSG	Field site signals search
Michael, Andrew N. (Naval offcr)	POPPY	NSG	Standard operating procedures
Miles, John M.	GRAB	NRL	Site Prep/Engineering Eval
Milner, David F. (Naval enlisted)	POPPY	NSG	CAMS operation/digital analysis
Misner, Robert D.	GRAB	NRL	Signal Processing
Moffitt, Lloyd W. (Naval offcr)	POPPY	NIC, OPNAV	TOG project direction, ocean surveillance mission validation
Monacelli, Nancy A.	GRAB, Poppy	NRL	Graphics
Morgan, James E. (Naval	POPPY	NSG	SISS Zulu operations coordination, <input type="text"/> management, POCG

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Offcr.)			
O'Connor, James N.	POPPY	HRB, NRL	Field quality control, hardware integration and test
Oesterling, Paul A.	POPPY	HRB	Hardware integration and test
Olson, Ross W. (Naval offcr)	POPPY	NSG	Siss Zulu focal point mgmt
Over, John J. (Jack) Jr.	GRAB	NRL	Telemetry Engineering
Owens, Raymond B.	GRAB	NRL	Program Management
Phillips, Chester G. (Naval offcr, Flag)	POPPY	NSG	Satellite ocean surveillance advocacy (1968-72), Operations direction (1971-74)
Phillips, Jerry W.	POPPY	NRL	Satellite digital telemetry
Poole, John S.	POPPY	NRL	Satellite systems integration
Potts, Raymond B.	GRAB, POPPY	NSA	NSA/NRL machine processing participation(1961), Data exploitation mgmt(1965-67)
Potts, Ronald L. (Naval offcr)	POPPY	NSG	Siss Zulu operations
Price, Charles W.	GRAB	NRL	Equipment Shelters & Site Installation
Price, George E.	POPPY	NRL	Satellite payload acquisition, ground equipment design
Randleman, Sadie M.	GRAB, POPPY	NRL	Administration
Ratcliffe, Louis T.	GRAB	NRL	Structures & Satellite Installation
Raymond, Frederick W.	POPPY	NRL	Solar sensors, ephemeris, station keeping
Riale, Joseph L.	POPPY	HRB	Operating system programs
Roeder, Bernard F. (Naval offcr)	GRAB, POPPY	NSG, OPNAV	Operations direction, communications support
Roman, Stephen	POPPY	NSA	NSA analysis & dissemination of end product

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Rose, Vincent S.	GRAB, POPPY	NRL	ELINT Payload & Engineering Eval
Roszak, Joseph R.	GRAB	NRL	Command Decoder
Rovinski, Robert S.	POPPY	NRL	Satellite design (structures, thermal)
Ryon, Bernard W.	POPPY	NRL	Signal parameter measurement
Saxton, Dr. H. L.	GRAB	NRL	Superintendent, Sound Div.
Seal, Virginia Jane	GRAB	NRL	Secretary
Shaw, G. (Naval enlisted)	?	NSG	Field site signals search
Sheets, Mack J.	GRAB, POPPY	NRL	Ground site processing equipment
Shover, Harry T. (Sam)	GRAB, POPPY	NRL	RF Transmitters Assembly/Integration
Shulz, Capt. L. R. (USN)	GRAB	NSG	Director, NSG, early 1960s
Smith, Ethel M.	GRAB, POPPY	NTPC, O NI (NAV- STIC)	ELINT technical support
Smith, Richard H., jr	POPPY	NAV- SPASUR	Extended theory elements
Smith, Ronald H.	POPPY	NRL	Analog/digital data system
Smith, Wayman A. (Naval enlisted)	POPPY	NSG	Signals search, <input type="text"/>
Snodgrass, Lane K. (Naval enlisted)	POPPY	NSG	CAMS operation/digital analysis
Sperberg, Franklynne R. (Naval officer)	GRAB, POPPY	NSG, NRO	NRO transition planning, operations oversight
Streibel, Joseph	POPPY	HRB	Processing software

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Struve, Joseph H.	GRAB, POPPY	NSA	Digital conversion & machine processing, NSA overhead ELINT data processing mgmt
Thom, Art		NSA	
Tool, Arthur Q.	GRAB, POPPY	NRL	Site Prep/Engineering Eval, co-developer command complex
Trexler, James H.	GRAB	NRL	Tattletale architecture, planning
Urman, Wally	GRAB	NRL	Structures design
Unzicker, W. A.	GRAB	NRL	SolRad Scientist
Urman, Wally	GRAB	NRL	Structures Design
Van de Walle, Mark J.	POPPY	HRB, NRL	Receiver design, development
Van Loo, Gordon	GRAB	NRL	Structures Technician
Van Shura, Carl	GRAB	NRL	Telemetry
Votaw, Martin J.	GRAB, POPPY	NRL	Satellite Techniques Branch Head, Satellite & Launch Coordination
Wald, Bruce	GRAB, POPPY	NRL	Studies, Site Prep/Engineering Eval & Softwre, field digitization concept
Wales, Richard L.	POPPY	HRB	Computer hardware & test
Wheelbarger, William L. (Naval enlisted)	POPPY	NSG	Signals search
Wilhelm, Peter G.	GRAB, POPPY	NRL	RF Transmitters, Satellite system design & engineering
Williams, John R.	GRAB	NRL	Site Prep/Engineering Eval
Willis, CDR Irving E.	GRAB	NRL	Site Executive Officer
Wilson, Robert O.	POPPY	NRL	Parameter measurement implementation, satellite telemetry
Winfree, Vance C.	GRAB, POPPY	NRL	RF Antenna Assembly/Integration
Winkler, James G.	GRAB, POPPY	NRL	Power Conditioning & Telemetry
Winterbottom , Sergeant (USAF enlisted)	GRAB	NTPC	NRL Gerber machine operation

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Withrow, William Edgar	GRAB, POPPY	NRL	Payload Interrogation, payload antenna, co-developer, command complex
Wray, William D.		NSA	Chief, PROD-03
Wulfhorst, LT John K.	GRAB	NRL	Site Operations Officer
Yuen, Joseph Y.	GRAB, POPPY	NRL	Electrical Power

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(U) Appendix B - Acknowledged Names and Functions

(Appendix B is UNCLASSIFIED in its entirety)

(U) *See also release authority regarding names and signatures in Section 10.1 of RRG.*

Release: *The names listed below:*

ABPLANALP, Raymond T. NSA, Poppy Program, Coordinated w/NRL and field sites.

ABRAMSON, Vic. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem, Oct 1980-Jan 1985.

ADAMS, Bruce L. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Dec 1969-Apr 1973.

AHOLA, Teuvo A. (Gus) (Col, USAF). Commander, 6594th Recovery Group. Responsible for the CORONA recovery effort in the 1960s.

ALDRIDGE, Edward C. ("Pete"). Undersecretary of the Air Force and Director, NRO, (1981-1988).

ALKOFER, James. Eastman Kodak. Instrumental in investigating and characterizing the unique technical challenges for high altitude reconnaissance films. Helped develop and define the film sensitometric and spatial performance requirements for the CORONA program and assisted the government in monitoring operational system performance.

ALLEN, Edward L. A CIA member who supported the U-2 program in the 1950s.

ALLEN, Lew (Gen, USAF). Director, Secretary of the Air Force Special Projects (SAF/SP) and Program A from 1 April 1971 to 21 January 1973. Also served as Director of the NRO Staff (Secretary of the Air Force for Space Systems[SAF/SS]) from 20 June 1969 to 20 August 1970.) Later became Air Force Chief of Staff.

ALPAUGH, Harold. ITEK. Worked on Hexagon Mapping Camera PFA Team. Served on PET for Corona.

ALSER, Donald. (Maj USAF). A member of SAF/SS, 1969-70.

ALVAREZ, Luis. A member of the Drell Committee established by DDS&T Bud Wheelon in the mid 1960s.

AMORY, Robert. CIA Deputy Director, Intelligence, 1960.

ANDERLE, Richard J. NWL, Poppy Prog., Orbital Modelling.

ANDERSON, David (Lt. Col, USAF) SAFSS, GAMBIT program.

ANDERSON, Everett E. 6593rd Test Squadron.

ANDERSON, John R. (Maj, USAF). Member of SAF/SS 1973-74.

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ANDERSON, Raymond A. (Col, USAF) HEXAGON Program Manager Aug 73-Jul 78.

ARAKI, Samuel. President of Lockheed Missiles and Space Co. Designated NRO Pioneer, 2004. Consult Center for the Study of National Reconnaissance for additional information.

ARTHUR, GEORGE. NPIC during CORONA years.

BACALIS, Paul. A CIA member (later D/OSA) who supported the U-2, A-12, and CORONA programs in the 1950s and 1960s.

BACHELOR, William B. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

BAGWELL, Jim (Lt Col, USAF). Assigned to SAF/SP in 1971 time frame.

BAILEY, Bernard L. (Col, USAF). Director, Program D, 21 July 1972 - 1 October 1974.

BAKER, James G. Harvard Astronomer, member of the 1954 Technology Capabilities Panel. Designed virtually all of the lenses and many of the cameras used in the SENSINT and AQUATONE aerial overflights of "denied territory" that took place in the 1950s. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

BAKER, William O. A physical chemist and signals intelligence expert at AT&T Bell Laboratories who served as scientific counselor to the NSA, CIA, USN, and NRO on the overhead Advisory Committee and the President's Foreign Intelligence Advisory Board. Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

BAILEY, Bernard L. (Col, USAF). Member of Program D, 1970-74.

BARNES, C. Tracy. CIA Assistant Deputy Director, Plans.

BARRETT, Bruce. NPIC during CORONA years.

BASS, Gordon. (Maj, USAF). Member of SAF/SS, 1970-71.

BATTLE, Clarence L., Jr. CORONA Program Manager. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

BAUMGARDNER, (Capt, USAF). Member of Program D, 1970-72.

BEALE, Robert T. Associated with the Naval Research Laboratory's development of the GRAB/POPPY ELINT reconnaissance satellites.

BECKE, Edward G. Associated with the Naval Research Laboratory's development of the GRAB/POPPY ELINT reconnaissance satellites.

BECKETT, NORMAN. NPIC during CORONA years.

BEEDE, Donald. Air Force officer assigned to SAF/SP in the 1971 time frame.

BEERLI, Stanley W. (Col, USAF). Served on the U-2 program reporting to Richard Bissell, and later as Deputy to CIA Deputy Director for Research (DDR) Herbert Scoville, representing him at meetings with DNRO Charyk in 1962.

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BEERS, Larry D. NRO staff worked on HEXAGON MCS.

BELL, (Lt Col, USAF). Member of Program D, 1970-73.

BENNETT, John P. TRW's chief engineer in support of Program B, Mr. John Bennett conceived the spacecraft design, including the reflectors, used in signals intelligence satellite systems.

BENNETT, John T. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

BERG, Russell A. (Brig Gen, USAF). Deputy Director, SAF/SP from 1962-1965. Later served as NRO Staff Director, SAF/SS, from 1 February 1967 to 19 June 1969.

BERGANINI, David F. SAFSP HEXAGON MCS Payload Division Feb 1966-June 1970.

BERRY, Lon. 6594th Aerospace Test Wing.

BETTERTON, Thomas C. (RADM, USN). Director, Program C, 20 March 1985-31 January 1992.

BETTS, Austin W. OSD Director, Advanced Research Projects Agency (ARPA).

BETZ, Fred. Associated with the Naval Research Laboratory's development of the GRAB/POPPY ELINT reconnaissance satellites.

BICKHAM, William W. Jr. Associated with the Naval Research Laboratory's development of the GRAB/POPPY ELINT reconnaissance satellites.

BILLINGS, Bruce H. OSD Deputy Director, Research and Engineering, 1960.

BISHOP, Charles. As a major in the USAF in the mid 1970s, served as the North American Air Defense Command (NORAD) interface with SAF/SP. Later became a Brigadier General and served as Chief of Intelligence for HQ USAFE.

BISSELL, Richard, M. CIA, U-2 and CORONA Project Director, 1954-1960.

BLACK, Edwin F. Military Assistant to DEPSECDEF.

BLACKWELL, Arthur. An Aerospace Corporation engineer during the CORONA program who later became the first African-American to achieve supergrade status at CIA.

BLANKENSHIP, James R. (Maj, later Col, USAF). An Air Weather Service member of the DMSP program, late 1960s; member of SAF/SS 1977-78.

BLANTON, Forrest D. McDonnell/Douglas Astronautics Co. Mark 8 Reentry Vehicle team lead, HEXAGON Program. 1974-1984.

BLUM, Edward F. Lockheed, Engineering Development Manager. Development and manufacture of Agena A, B, and D upper stage to which CORONA payload was integrated.

BOENNING, William R. Associated with the Naval Research Laboratory's development of the GRAB/POPPY ELINT reconnaissance satellites 1967-1969.

BONNER, Edward J. GE. Worked on HEXAGON.

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BOREL, Paul A. CIA, Assistant Director Office of Current Research, 1960.

BOTZONG, Wilbur B. (Lt Col, USAF). DMSP Program Director in the early 1970s.

BOYD, Albert P. Associated with the Naval Research Laboratory's development of the GRAB/POPPY ELINT reconnaissance satellite.

BOYD, ROBERT. NPIC during CORONA years.

BRADBURN, David D. (Brig Gen, USAF). Director, SAF/SP and Program A from 22 January 1973 to 31 July 1975. Earlier served as Staff Director, National Reconnaissance Office (SAF/SS) from 1 June 1971 to 7 January 1973.

BROOKS, Dennis (COMM, USN). Director, Program C, 4 October 1982-19 March 1985.

BROSS, John. Director, National Intelligence Programs Evaluation. Led negotiations that resulted in the fourth NRP agreement in August 1965.

BROTHERTON, Howard G. Pioneered innovative advances in satellite technology that improved target accuracy, provided better product quality, delivered more efficient throughput, and extended satellite life. Also instrumental in the digitalization of the mapping, charting, and geodesy system. Designated NRO Pioneer, 2008. Consult Center for the Study of National Reconnaissance for additional information.

BROWN, George S. (Gen, USAF). Military Assistant to SECDEF, 1960. Later became Air Force Chief of Staff and Chairman, JCS (CJCS).

BROWN, Lee. A member of the COMIREX staff who helped develop the NIIRS rating scheme, an empirical way to define resolution for interpretation of satellite imagery.

BROWNING, John W. (Col, USAF). Directed a key SIGINT satellite project for NRO Program A, managing its first launch and operations. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

BROWNMANN, Harold. Director, OSP.

BRUGIONI, Dino. Manager, National Photographic Interpretation Center (NPIC).

BRACKEY, Thomas A. - Pioneered critical breakthroughs, including first-of-a-kind hardware, in space-based communications technology and operational concepts that enabled near real-time collection and dissemination of data. Designated NRO Pioneer, 2011. Consult the Center for the Study of National Reconnaissance for additional information.

BRICKER, John C. SAFSP. Worked on HEXAGON Mapping Camera System. Was a Lt. Colonel in 1973.

BRYANT, Robert. Associated with the Naval Research Laboratory's development of the GRAB/POPPY ELINT reconnaissance satellites.

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BRYSON, Jon H. (Col, USAF). Directed the development, acquisition, and operation of a Program A signals intelligence satellite system that handled rapidly increasing data rates. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

BUCK, William V. Thompson-Ramo-Woolridge Inc, T'Unity Software team lead, HEXAGON Program. Mar 1972-Sep 1972.

BUSCHMAN, Rudi. Lockheed Missiles and Space Company, GAMBIT program principle.

BUMM, William. One of the original 13 individuals assigned to work space operations at the Satellite Test Center during the CORONA program. Provided the vital link between the operations at the Advanced Projects Integration Facility and the on-orbit controllers at the Satellite Test Center.

BURKE, William (Col, USAF). Assigned to the CIA in support of the U-2 program in the 1950s.

BURKS, Roy A. Served as Technical Director of the NRO Program B CORONA Program. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

BURNETT, Maurice G. ITEK Corp. Optical Systems Division, team lead, HEXAGON Program Mapping Camera Module. Oct 1976-1981.

BUSH, George H. W., DCI 30 January 1976-20 January 1977. Later President of the United States.

BUTLER, Robert A. Was a consultant with Technology Service Corporation while Perry researched for the Hexagon volume.

BUZARD, Frank S. (Col, USAF). CORONA System Integration Manager. Became the first Air Force Director of Program B's follow-on KH-9 HEXAGON imaging satellite Jul 1966- Jun 1971, described as "the most complex electromechanical device ever placed in orbit". Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

CABALLERO, Julian. Provided executive leadership to NRO satellite system development and operation as Program B Director.

CABELL, C.P. Deputy Director Central Intelligence (DDCI), 1957.

CALVIN, Clair, D. TRW Program Manager for HEXAGON April 1975-May 1979.

CAMINITI, Lee. Involved with CORONA launch activity.

CAMPBELL, James P. - Pioneered early conceptual studies and analysis, which resulted in a new, innovative, operational imaging reconnaissance capability. He provided key technical improvements that have extended the operational lifespan of spacecraft to lengths unprecedented in space-based national reconnaissance. Designated NRO Pioneer, 2009. Consult the Center for the Study of National Reconnaissance for additional information.

CARLSON, William Dr. Chief Scientist for TRW.

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CARPENTER, Ralph A. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

CARROLL, F.P. (Lt Gen, USAF). Director, Defense Intelligence Agency. He participated in the interagency debate in the 1970s about development of an EOI imaging capability.

CARTER, D.L. (Col, USAF). A member of the NRO Staff, mid 1960s.

CARTER, Marshal S. (Lt Gen, USA). Served as DDCI under DCI John McCone, 1961-1966; subsequently named Director, National Security Agency (DIRNSA).

CASEY, William J., DCI, 28 January 1981-29 January 1987.

CHAMBERS, Cornelius W. Contributed flight "protective measures" adopted for use on most NRO satellites, developing a novel approach to on-board fault detection. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

CHARLSTON, Dr. Jeffrey A. Senior Historian for CSNR 2006-2008. Co-chair, Quill Declassification Integrated Process Team (IPT).

CHARYK, Joseph V. Director, National Reconnaissance Office (DNRO), 6 September 1961 to 1 March 1963.

CHUBB, Melvin F. "Nick" (Capt, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

CHRISTMAN, Donald B. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

CLARK, Edward. An Aerospace Corporation employee.

CLARK, John (ADM, USN). ARPA, 1957.

CLAUSEN, Ingard M. Original General Electric Program Manager for the CORONA space return vehicle assembly. Designated NRO Pioneer, 2006. Consult Center for the Study of National Reconnaissance for additional information.

CLINE, Raymond. Director of State Department's Bureau for Intelligence and Research in the 1970s. He participated in the interagency debate over development of the EOI imaging system during that period.

CODY, Joseph J., General, USAF. Commander, 6555 Aerospace Squadron at Vandenberg AFB (VAFB) during the CORONA program.

COFFMAN, Vance D. Associated with NRO programs at Lockheed since 1971. Led the development of a new satellite attitude control capability needed to provide major improvements in producing large quantities of geographically accurate, highly-detailed maps from satellite-collected images. Designated NRO Pioneer, 2002. Consult Center for the Study of National Reconnaissance for additional information.

COGGAN, George L. ITEK Optical Systems Division. Worked on HEXAGON.

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COHEN, Harvey. Designated NRO Pioneer, 2004. Consult Center for the Study of National Reconnaissance for additional information.

COHEN, Randall (Capt. USAF). SASP, GAMBIT program.

COLBY, William E. DCI 4 September 1973-29 January 1976.

COLE, (Capt, USN). Member of SAF/SS 1976-77.

COLLINS, James. SAFSP worked on HEXAGON Mapping Camera System. Captain in 1973.

COLEMAN, David G. Involved with E-4 while at Aeronautical Systems Division.

COMBS, Henry. Lockheed engineer who headed the structural analysis team for the U-2 and later worked on the A-12 and SR-71 programs.

CONOVER, Alfred R. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

CONWAY, Harry L. Worked with the 6593rd Test Squadron to pioneer air-to-air pickup of space capsules used in the CORONA program.

COOK, D. David. ITEK Corp. Optical Systems Division, team lead, HEXAGON Program Mapping Camera Module. Feb 1972-Aug 1973.

COOK, Charles, W. Deputy Director, NRO (16 July 1974 - 30 November 1979) and Acting Director, NRO (1977).

COOK, Lacy G. - Pioneered the development and application of unique technology to add new capability to an existing NRO satellite. Mr. Cook's innovative approach provided national policymakers with unprecedented capability and solved highly complex technical challenges. Designated NRO Pioneer, 2009. Consult the Center for the Study of National Reconnaissance for additional information.

COPLEY, John O. (Col, USAF). Guided the development of Program A signals intelligence satellites from the earliest experiments to the later constellations that provided broader coverage.

Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

CORBETT, Donald A. TRW employee who worked on NRO programs.

COYLE, Harold S. Jr. (Lt Col, USAF). Member of SAF/SS who worked policy issues for the DNRO, 1971-1975.

CRAIG, (nfi) (Lt Col, USAF). Member of the NRO Staff (SAF/SS) in the 1970s.

CRESS, Larry (Col, USAF). HEXAGON Program Manager Mar 1983-Apr 1986.

CRETCHER, James R. Manager of Corona Engineering, Operations, and Analysis for the Lockheed Missiles and Space Company, 1965-1972.

CRICKMAY, C. James. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Apr 1973-Jun 1979.

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CRISTY, J. Lockheed, Manager AGE, GAMBIT-3 program.

CROFT, Charles (Capt, USAF). Member of the DMSP Program staff within SAF/SP, in charge of contracts.

CROMER, Donald L. (Brig Gen USAF), Director, NRO Staff (SAF/SS) 5 May 1982-11 June 1984. Designated NRO Pioneer, 2001. Consult Center for the Study of National Reconnaissance for additional information.

CROTSEY, Robert H. Business manager for the contractor supporting the Program B electro-optical imaging satellite and wrote the handbook on cost and schedule management that remains a standard reference in spacecraft acquisition. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

CROUCH, Leonard. Involved with E-4 while at Aeronautical Systems Division.

CROWLEY, John J. Served as chief of Program B's Office of Special Projects (OSP), and is credited with establishing a true partnership between the CIA and SAF/SP elements of the NRO. Designated NRO Pioneer, 2002. Consult Center for the Study of National Reconnaissance for additional information.

CSENCSTZ, Stephen F. General Electric Co., Reentry Systems Division, team lead, HEXAGON Program Mark V reentry vehicle. Mar 1970-Feb 1975.

CUDMORE, Patrick H. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

CULLEN, Paul E. Air Force officer.

CUNNINGHAM, James A. Assistant to Richard Bissell in CIA's U-2 Project Office.

CULLINANE, Eugene T. M. (Lt Col, USAF). Member of SAF/SS in 1976-77.

CURTIN, Richard D. (Brig Gen, USAF). First Director, SAF/SS (NRO Staff) from 31 August 1960 to 14 June 1962.

CUTHER, Otto E. CIA Assistant Director, Office of Research and Reference, 1960.

DARCY, Robert T. (CAPT, USN). Director, Program C, 24 July 1975 to 30 June 1977.

DAUGHERTY, Kenneth I. Geodesist.

DAVIDSON, H. Lockheed, manufacturing manager, GAMBIT-3 program.

DAVIES, Merton E. An engineer, reconnaissance system designer, imagery interpreter, and space cartographer who invented the Spin-Pan camera and worked on designs for a family of film-based reconnaissance satellites that led to CORONA. Employed throughout his career at RAND, he also served on the panels that established reconnaissance requirements and advised on competing systems. Designated a Founder of National Reconnaissance, 2000.

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Consult Center for the Study of National Reconnaissance for additional information.

DAVIS, Arthur. (Capt, USAF). Member of SAF/SS 1979-80.

de BROEKERT, James C. A contractor with Advent Systems, Inc., contributed key payload designs for several of Program A's first-generation signals intelligence satellites. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

DENNIS, Marion Gary. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

DIENER, William. Air Force officer who served with the CORONA launch crew during the CORONA program.

DIOSY, Tom. Eastman Kodak, GAMBIT program principle.

DIRENZO, Vince. NPIC during CORONA years.

DIRKS, Leslie C. As Director, Program B from 6 June 1976 to 2 July 1982, provided executive leadership to NRO satellite system development and operation, especially the technical development of the electro-optical imaging system in the 1960s and 1970s.

DIX, Edgar L. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

DOLAN, Don. A TRW employee who worked with NRO Pioneer John Bennett on SIGINT systems for the NRO.

DONOVAN, A. F. A member of the Purcell Panel.

DORNBRAND, Harry. A Naval Research Laboratory employee.

DOYLE, John F. ITEK Corp. Optical Systems Division, team lead, HEXAGON Program Mapping Camera Module. Nov 1968-Jan 1970

DOYLE, David. NPIC during CORONA years.

DRELL, Sidney D., Ph.D. Stanford University scientist recruited by Wheelon (CIA/Deputy Director for Science and Technology) to tackle CORONA problems. A theoretical physicist, he also served on the President's Foreign Intelligence Advisory Board and the President's Science Advisory Committee. He served as a key scientific consultant to Program B, and served on the Technology Review Panel of the Senate Select Committee on Intelligence where he was instrumental in securing approval and support for several NRO special projects.⁶² Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

DUCKETT, Carl E. Succeeded Bud Wheelon as CIA DDS&T and Director, Program B.

DULLES, Allen W. Director of Central Intelligence (DCI), 1953-1961.

DUMAIS, Robert H. - Pioneered the intelligence utility of an innovative capability for an imaging satellite system. This led to the subsequent design of a new subsystem on an existing imaging satellite that greatly improved the quality of imagery

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products from space. Designated NRO Pioneer, 2010. Consult the Center for the Study of National Reconnaissance for additional information.

DURBIN, William. COMIREX MC&G Working Group lead.

DUVALL, Gordon. NPIC during CORONA years.

DVORCHAK, Stephen (Capt. USAF), worked launch vehicles for DMSP in the early 1960s.

EARMAN, John S. CIA Special Assistant to the DCI, 1960.

EASH, Col Joseph J USAF (ret). Pioneer of National Reconnaissance. Pioneered the application of special innovative technologies to the NRO overhead reconnaissance mission. In his position as Chief of the NRO's "Special Staff," Col Eash led the way in the development of new, highly sensitive NRO missions for both aircraft and satellite systems.

ECHOLS, Emmett D. CIA Director of Personnel, 1960.

EDWARDS, Sheffield. CIA Director for Security, 1960.

EISENHAUER, Robert E. Developed high-speed, real-time, onboard integration, synchronization, and processing of SIGINT data from multiple satellites, 1962 - 2005. Designated NRO Pioneer, 2005. Consult Center for the Study of National Reconnaissance for additional information.

ELSBY, C. Neal (Capt, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

ENNIS, William P. OSD, Director, Weapon System Evaluation Group, 1960.

ERKELENS, Mitchell. (Lt Col, USAF). Member of Program D, 1970-72.

ERSKINE, Graves G. (GEN, USA). OSD Special Assistant to SECDEF for Special Operations, 1960.

EVANS, Fred. Provided executive leadership to NRO satellite system development and operation.

EVANS, Harry. L. (Col, USAF). Deputy Director, SAF/SP, 1960-1964.

EVERETT, James. Air Force officer who participated in NRO programs.

EWIN, Harold. Harvard University professor who worked on the 1960's Purcell Panel that recommended increased resolution capabilities for reconnaissance satellites.

FAGA, Martin. Director, NRO (1989-1993).

FARKAS, Leonard J. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem, Jan 1985-Apr 1986.

FARNUM, Mark. (Lt Col, USAF). Member of SAF/SS in 1963-64.

FEAK, D. Lockheed, Manager, Payload Adapter Section (Roll Joint), GAMBIT-3 program.

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FELDMAN, Norman N. General Electric Co. Aerospace Electronics Systems Department, Extended Command System team lead, HEXAGON Program. 1966-1967.

FELDMAN, William. A Kodak employee involved in developing NRO imaging payloads as mentioned in the NRO Pioneer memoir of Charles Spoelhof.

FERDENSI, Carl L., Jr. Pioneered algorithms and computer processing techniques for foreign instrumentation signals intelligence data, leading to dramatic improvements in telemetry collection. Designated NRO Pioneer, 2003. Consult Center for the Study of National Reconnaissance for additional information.

FITZGERALD, William. NPIC during CORONA years.

FITZPATRICK, James C. Author of declassified NRO histories.

FLAX, Alexander. Director, NRO from 1 October 1965 to 17 March 1970.

FLUCKEY, Eugene G. (ADM, USN). Director, Program C, 8 July 1966 to 30 January 1968.

FOECHTERLE, Edward R. (Lt, USAF). A SAF/SP member of the DMSF program in the mid 1960s.

FOLEY, Paul F. (Col, USAF). Director, NRO Staff (SAF/SS), 15 July 1984-31 January 1985

FORD, Ralph J. Assistant CORONA Program Manager.

FORSYTHE, nfi (Capt, USAF). Member of SAF/SS in 1964-65.

FOSS, Joe (Col, USAF). Deputy Wing Commander at Vandenberg, AFB during the CORONA Program.

FOSTER, John S. Addressed NRO programs while serving as Director of Defense Research and Engineering (DDR&E) in the Department of Defense, late 1960s.

FROST, Laurence H. (RADM, USN). Director of Naval Intelligence, 1960.

FUBINI, Eugene. Director of Defense Research and Engineering (DDR&E) in the Department of Defense, early-mid 1960s. Addressed NRO issues for the SECDEF and served on the NRO Executive Committee.

GALLOF, Sanford. SAFSP. Worked on Hexagon. Was a Lt. Colonel in 1982.

GARWIN, Richard L., Ph.D. A physicist who served on the President's Science Advisory Committee, and chaired its panels on Military Aircraft, Anti-submarine and Naval Warfare. He established standards and found solutions for electromechanical design of modern spacecraft. As a champion of Electro-Optical Imaging, he helped Henry Kissinger understand its role for our national defense. Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

GATES, Thomas. SECDEF 1960.

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GAVLAK, Ray. Lockheed. Supervised the engineers and technicians at the Lockheed facility at VAFB and coordinated CORONA launch efforts with the other contractors.

GEARY, Leo (Brig Gen, USAF). The first Director of Program D from 2 May 1962 to 15 July 1966.

GEER, Richard L. (Capt, USAF). Member of DMSP Program staff responsible for DMSP launch vehicles, 1961-1965.

GEIGER, Robert K. (ADM, USN). Director, Program C, 5 January 1971 to 23 July 1975.

GEIGER, William. (Maj, USAF). Member of SAF/SS in 1976-77.

GENEZ, Victor M. (Col, USAF). The Director of Intelligence in AF Air Research and Development Center in the 1950s when WS-117L was established.

GEYER, Gary S. (Col, USAF). Contributed to notable improvements in processing and dissemination that permitted the product to reach military and civil users in near real time. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

GIBBS, Jack A. - Pioneered the application of innovative techniques to U-2 operations. Brig. Gen. Gibbs, USAF (Ret), contributions resulted in the effective use of high-altitude airborne reconnaissance for intelligence collection over denied areas during the Cold War. Designated NRO Pioneer, 2010. Consult the Center for the Study of National Reconnaissance for additional information.

GIFFORD, David. A NPIC employee involved with interpreting satellite imagery.

GIFFORD, Elaine A. NPIC Photogrammetrist.

GILLER, Edward B. A CIA member of the U-2 and A-12 programs in the 1950s and 1960s.

GOETSCH, Fred. McDonnell/Douglas Astronautics Co. Mark 8 Reentry Vehicle team lead, HEXAGON Program. 1984-1986.

GOODPASTER, Andrew J. (GEN, USA). Eisenhower Staff Secretary.

GORDAY, Charles A. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

GORMAN, Frank B. (Capt, USN). An original member of the first NRO staff (SAF/SS).

GRAFE, Arthur H. CORONA Operations officer, 6594 Recovery Control Group.

GRAN, Ralph M. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

GRAY, Gordon. Eisenhower Assistant for National Security Affairs.

GREEN, Edgar. Eastman Kodak. Program Manager for the Kodak interface with the government and camera manufacturers during the critical CORONA program implementation years.

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GREER, Kenneth E. CIA historian and author of a Corona history.

GREER, Robert E. (Maj Gen, USAF). First Director, SAF/SP and Program A, 20 September 1960 to 30 June 1965.

GRIEGO, William. (Maj, USAF). Member of SAF/SS in 1976-77.

GRIPMAN, Ray. NPIC during CORONA years.

GRISWALD, John H. General Electric Co. Aerospace Electronics Systems Department, Extended Command System team lead, HEXAGON Program. 1964-1966.

HAAS, Donald, L. Deputy Director, NRO from 9 December 1979 to 11 April 1982.

HAGERTY, James. Eisenhower Press Secretary.

HAIG, Thomas O. (Lt Col, USAF). First 417/DMSP Program Director at SAF/SP. Led a team in 1961 that developed an operational polar-orbiting meteorological satellite, its launch vehicle, and associated ground command and control stations. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

HAINES, Clarence R. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

HALL, Keith, R. Director, NRO (1997-2002) and Deputy Director, NRO (1996-1997).

HALL, R. Cargill. (NASA, Air Force, and CIA Historian, retired). Author of various NASA, NRO and Air Force histories; a number of unclassified ones are in the public domain.

HAMMARSTROM, Lee M. Associated with NRO programs since 1962. His concepts and developments for satellite, ground station, and processing systems greatly improved the accuracy, timeliness, and volume of NRO ELINT products. He also served as the head of the NRO's Technology Office, and as the NRO's Chief Scientist. Designated NRO Pioneer, 2002. Consult Center for the Study of National Reconnaissance for additional information.

HANE, James L. (Col, USAF). GAMBIT Program.

HANLEN, William. NPIC during CORONA years.

HARD, Donald G. (Brig Gen, USAF). Served as part of the CORONA Recovery Group in the late 1960s and early 1970s. Later, Director NRO Staff (SAF/SS), 5 November 1987-5 February 1989.

HARDING, Roy A. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

HARLEY, John. Lockheed, Design Engineering manager, GAMBIT-3 program.

HARLFINGER, Frederick J. (ADM, USN). Director, Program C, 10 September 1968 to 4 January 1971.

HARRIS, Jeffery D. Director, NRO (1994-1996).

HARRIS, William R. A Lockheed employee who worked on early NRO SIGINT systems in the 1960s.

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HARTLEY, Frank (Col, USAF). Director, Program D from 1 November 1967 to 30 June 1972.

HATCH, David. NSA Historian, acknowledged in the GRAB and POPPY brochure.

HAWKINS, Willis M. General Manager of the Lockheed space vehicle effort during the formative days of the CORONA program.

HEISLER, Ernest. (Col, USAF). Chief, CORONA Launch Control Team (VAFB).

HELMKEY, Tom. NPIC during CORONA years.

HELMS, Richard. DCI, 30 June 1966-2 February 1973.

HELLRICH, Fred V. Designated NRO Pioneer, 2006. Consult Center for the Study of National Reconnaissance for additional information.

HENRY, James R. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Jun 1979-Mar 1983.

HERAN, Paul (Col, USAF). SAMOS E-6 Program Director. Also involved with the CORONA program and later on NRO Staff.

HERAN, Paul J. Lockheed Missile and Space Co. Satellite Basic Assembly and System Integration. HEXAGON Program. Feb 1970-Feb 1980.

HERMAN, Stephan "Steve". ITEK Team Lead at Cloudcroft, New Mexico.

HERMANN, Robert J. Director, NRO from 8 October 1979 to 2 August 1981.

HERRON, Thomas J. (Lt Col, USAF). A member of the first NRO staff (SAF/SS).

HEYROTH, James. Air Force officer cognizant of NRO programs.

HICKS, Frank, Ph.D. Eastman Kodak, GAMBIT program principle.

HICKS, John J. Director of NPIC who approved the NIIRS developed by NRO Pioneer Kohler and his team.

HILL, Jimmie D. Deputy Director, NRO and Acting Director, NRO (1993-1994). Also served as NRO Staff Director (SAC/SS), 12 June 1978-9 April 1982.

HINEMAN, Evan. CIA director of DS&T, and of Program B, 1982-1986.

HOFMANN, Frederick L. "Fritz" (Maj, later Col, USAF).⁷¹ Member of the NRO Staff (SAF/SS) in the 1970s.

HOFFMAN, Ralph (Lt, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

HOGARTY, (Lt, USAF). Member of Program D, 1970-73.

HORNER, Richard. Assistant Secretary of the Air Force, 1957.

HOUSTON, Lawrence R. CIA, General Counsel.

HOWARD, Henry C. (Major, USAF). A member of the first NRO staff (SAF/SS), 1961-1965.

HUBBLE, Hilbert R. (PO1, USN). A USN technician mentioned in the memoirs of NRO Pioneer Mayo as working in the GRAB radio control and interrogation hut in Hawaii.

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HUFFSTUTLER, R. M. (Rae). CIA, Executive Director, Deputy Director for Administration, and Director, NPIC.

HUNTLEY, Hal. Employee of Lockheed Martin Corporation.

INLOW, Roland S. CIA Officer who served as Chairman, COMIREX, late 1960s and 1970s.

IORILLO, Tony. Mr. Iorillo conceived a new concept in spacecraft control and operation, which became a fundamental design for many NRO spacecraft. He also was a leader in the Hughes design and development effort that fielded the critical, near-real-time optical-imagery-transmission relay system. He guided corporate and government funded research efforts on critical technologies that produced significant advances in national reconnaissance capabilities. His efforts contributed to the successful achievement of a challenging and important vision: near-real-time optical imaging, with data relayed directly from space to a ground processing system. Designated NRO Pioneer, 2001. Consult Center for the Study of National Reconnaissance for additional information.

ISTVAN, Edwin J. (Lt Col, USAF). An original member of the first NRO staff (SAF/SS).

JACOBSON, Ralph H. (Brig Gen, USAF). Director of Program A, 20 January 1973-19 February 1987.

JAMES, Clifton E. (Major, USAF). An original member of the first NRO staff (SAF/SS).

JOHNSON, Albert W. CORONA Payload Recovery Manager.

JOHNSON, Bob. Lockheed Missile and Space Co. Satellite Basic Assembly and System Integration. HEXAGON Program. 1983-1986.

JOHNSON, Clarence Leonard "Kelly". Aircraft engineer, head of Lockheed Skunk Works. Designer of 40+ aircraft, including B-37, P-38, Constellation, F-80, T-33, P2V, F-104, F-117, C-130, U-2, and the Blackbird Family (A-12, YF-12, SR-71, M-21, D-21).

JOHNSON, David. NSA historian, retired, acknowledged in the GRAB and POPPY brochure.

JOHNSON, Roy. First director of ARPA, 1957-59.

JOHNSON, William (Capt, USAF). Involved in Corona payload integration and recovery during the early 1960s.

JOHNSTON, Means. Military Assistant to SECDEF, 1960.

JOINER, Ernest. Lockheed Chief Flight Test Engineer on U-2 Program, 1955-1959.

JONES, Dana. ITEK mapping camera contracting officer. Worked on HEXAGON.

JONES, Thomas (Maj, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

KAEMMERER, Robert S. TRW employee involved with NRO programs. Designated NRO Pioneer, 2004. Consult Center for the Study of National Reconnaissance for additional information.

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KATZ, Amrom H. A physicist involved in lens and camera design who performed the first experimental simulation of electro-optical satellite imaging. At RAND, he co-directed a project on overflight reconnaissance, and co-proposed film-recovery satellites as an immediate alternative to the near-real-time readout satellite, a proposal eventually established as the CORONA Project. Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

KAMINSKI, Paul G. Designated NRO Pioneer, 2007. Consult Center for the Study of National Reconnaissance for additional information.

KAUFMAN, Frederick H. Directed the TRW team that produced two important Program B signals intelligence satellites, including the first communications cross-link system in space. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

KELLY, Daniel. CORONA Contracts. Negotiated the initial contract with Lockheed Missiles and Space Company in April 1958.

KELLY, George W. Jr. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

KELSEY, George M. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Jul 1966-Dec 1966.

KENNEDY, Joseph. A member of Edwin Land's Technology Capabilities Panel Project Three that explored ways to improve the nation's intelligence capabilities in the 1950s.

KENT, Sherman. CIA Assistant Director, National Estimates 1960.

KERR, Richard J. CIA/DDCI.

KIEFER, Eugene P. Special Assistant for Technical Assistance to Richard Bissell and later Deputy Director, NRO, 2 July 1963-18 February 1965.

KIEFER, Richard. (Lt Col, USAF). A member of SAF/SS in 1969-70.

KIERTON, R. Lockheed, General Manager, Special Division (GAMBIT-3 program office).

KILLIAN, James. President of the Massachusetts Institute of Technology, he chaired the panel that recommended building the U-2 aircraft and reconnaissance satellites. He chaired the President's Foreign Intelligence Advisory Board and the President's Science Advisory Committee. He also worked on Department of Defense-CIA agreements that structured the NRO.⁶² Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

KING, William G. (Brig Gen, USAF). Director, SAF/SP and Program A from 1 August 1969 to 31 March 1971. As a Lt Col in 1956, he

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was a member of USAF board that selected Lockheed as the prime contractor for WS-117L.

KIRKPATRICK, Lyman B. CIA, Inspector General, 1960.

KISTIASKOWSKY, George. Eisenhower Science Advisor.

KLEBAN, John S. General Electric Co., Reentry Systems Division, team lead, HEXAGON Program Mark V reentry vehicle. Feb 1975-1981.

KLEYLA, Helen H. Author of declassified NRO history.

KLINGER, David L. Designated NRO Pioneer, 2006. Consult Center for the Study of National Reconnaissance for additional information.

KNOCHE, E. Henry. Director of NPIC and later DDCI, Acting DCI 21 January 1977-8 March 1977.

KOCH, Robert. Captain in USN in 1964. Worked on HEXAGON Performance Interim Evaluation Reports.

KOCHE, Robert "Bob". Lockheed GAMBIT-3 Program Manager.

KOHLER, Robert. A CIA photographic specialist who introduced photographic edge measurement and edge sharpening tools used to evaluate and enhance overhead imagery. Also provided executive leadership to NRO satellite system development and operation later in his career. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

KOZIOL, Benedict J. Pratt Whitney engineer who played a key role in the development of the J57 engine for the U-2, 1955-1960.

KRAPF, Arthur E. Captain, USN. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

KRONMILLER, George G. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

KRUMPE, Robert H. (Col. USAF) HEXAGON Program Director Jun 1971-Aug 1973.

KUCERA, George. First Chief of the CIA CORONA Development Staff.

KUEPER, Robert. Lockheed, Controls (business) manager, GAMBIT-3 program.

KULPA, John E. (Maj, later Maj Gen, USAF). Director of the DMSP Program between 1966-1969. Later, Director, SAF/SP and Program A from 1 August 1975 to 19 January 1983. Earlier served as NRO Staff Director (SAF/SS) from 8 January 1973 to 20 September 1974.

KUNICA, Serge. ITEK. Worked on Ultra Thin Base (UTB) Film Implementation.

LAMBERT, Gerald K. Thompson-Ramo-Woolridge Inc, T'Unity Software team lead, HEXAGON Program. Sep 1972-Nov 1973.

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LAND, Edwin H. An imagery intelligence expert who was the CEO of the Polaroid Corporation and chaired the Intelligence Subcommittee of the Technology Capabilities Panel. As Chairman of the President's Science Advisory Committee Intelligence Panel, he advised the NRO on new and existing overhead systems. He played a vital role in advising President Nixon on the capabilities of Electro-Optical Imaging. Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

LANSDALE, Edward C. OSD, 1960.

LAPIN, Ellis E. Managed the Aerospace Corporation's system design and engineering efforts for Program A imaging satellites, improving flight operations by nearly doubling functional on-orbit time. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

LARGE, Scott. Director, NRO from Oct 2007 to Apr 2009.

LARKIN, Bert. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Mar 1983-Mar 1986.

LARKIN, Robert M. General Electric Co. Aerospace Electronics Systems Department, Extended Command System team lead, HEXAGON Program. 1967-1969.

LASHER, Richard J. GE. Worked on HEXAGON.

LATHAM, Allen. A member of Edwin Land's Technology Capabilities Panel Project Three that explored ways to improve the nation's intelligence capabilities in the 1950s.

LAUDERDALE, Lloyd K. Program manager for the CIA Program B team that developed an advance signals intelligence satellite from concept through first launch. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

LAY, James S. Jr., Executive Secretary of the National Security Council during the Eisenhower administration, 1953-1961.

LEACH, (nfi) (Col, USAF). A SAF/SP staff member.

LEDFORD, Jack (Brig Gen, USAF). As a Colonel, served as deputy to CIA DDR Herbert Scoville, and represented him at meetings in 1962 with DNRO Charyk. Later served as Director, Program B from 12 August 1963 to 27 September 1965.

LEE, (nfi) PO1, USN. A USN technician mentioned in the memoirs of NRO Pioneer Mayo who worked at the GRAB radio control and interrogation hut in Hawaii.

LEFSTAD, Roy B. CORONA Launch Control Officer (VAFB).

LEGHORN, Richard. Principal contributor to the early CORONA camera development as a consultant to the USAF Scientific Advisory Board and the Special Assistant to the President for Disarmament Affairs. Co-founder and the first President of the Itek Corporation. Designated NRO Pioneer, 2000. Consult Center

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for the Study of National Reconnaissance for additional information.

LEHAN, Frank W. An electrical engineer who was a member of the President's Science Advisory Committee and served on the Land Panel that advised the NRO and Program B on overhead reconnaissance systems. He was instrumental in the decision to proceed with an important high altitude signals intelligence satellite system, and contributed to the reflector design for that system. Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

LEHMANN, Clark. SAFSP. In 1973 he was a Lt. Colonel at the SOC. Colonel by June 1976 working on HEXAGON.

LEVERTON, Dr. Walter F. Aerospace Corporation. Discovered GAMBIT debris in Britain.

LEVISON, Walter J. Itek CORONA Program Manager. Principal proponent of the proposal that CORONA employ a high resolution 24 inch focal length Petzval lens in a panoramic camera to be used on a stable body space vehicle. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

LIDSTROM, Leonard C. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Jan 1969-Aug 1969.

LINDSAY, Nathan J. (Maj. Gen., USAF). On the NRO staff and, as a general officer, served as Director, SAF/SP and Program A 1987-1992.

LINDSEY, Frank. OSS in WWII, CEO, Itek Corporation in the mid-1960s.

LINZ, D. P. A member of the Purcell Panel.

LISCIOTTI, Francis L. (Capt, USAF). A member of the first NRO staff (SAF/SS).

LLOYD, H. Gates. CIA Assistant Deputy Director, Security, 1960.

LORENZEN, Howard O. An early advocate of signals intelligence satellites who directed the development of GRAB, the nation's first such program, at the Naval Research Laboratory. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

LOWRANCE, Vernon L. (ADM, USN). Director, Program C from 23 July 1962 to 19 June 1963.

LUECHT, John W. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Aug 1967-Dec 1968.

LUNDAHL, Arthur C. CIA, Director Photographic Interpretation Center, 1960 and later Director, NPIC.

LYDON, Eugene. NPIC during CORONA years.

MACDONALD, Duncan. Postwar director of the Boston University Physical Research Laboratory, in 1957 he co-founded with Richard Leghorn the Itek Corporation that built the CORONA cameras.

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MACLEISH, Kenneth. A Kodak employee involved in developing NRO imaging payloads as mentioned in the NRO Pioneer memoir of Charles Spoelhof.

MACMILLAN, Logan T. McDonnell/Douglas Astronautics Co. Mark 8 Reentry Vehicle team lead, HEXAGON Program manager Jun 1968-1974.

MADDEN, Francis J. (Frank). Itek Corporation. Chief engineer for development of the HYAC panoramic camera and subsequently responsible for all engineering development of the CORONA camera and its improved versions. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MAGNESS, Thomas A. Thompson-Ramo-Woolridge Inc, T'Unity Software team lead, HEXAGON Program. Oct 1969-Nov 1971.

MAGUIRE, Michael F. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem. Oct 1966-Aug 1969.

MAHAR, James. Eastman Kodak, systems engineering. GAMBIT program principle.

MAHON, J. E. COL, USA. Staff Officer, JCS, 1960.

MAHONEY, William C. Photogrammetrist during the CORONA program.

MAILHOT, Paul J. ITEK Corp. Optical Systems Division, team lead, HEXAGON Program Mapping Camera Module. Jan 1970-Feb 1972.

MALIN, Bernard. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem. Aug 1969-Jan 1971 and Sep 1975-Dec 1977.

MANENT, Jean R. ITEK Corp. Optical Systems Division, team lead, HEXAGON Program Mapping Camera Module. Apr 1974-Oct 1976.

MANNEN, James T. (Col, USAF). As director of a vital imagery satellite program, introduced procedures that improved target tasking and significantly increased ground resolution and on-orbit system reliability. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MARK, Hans. Director, NRO (1977-1979).

MARKWOOD, Calvin H. (Capt, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

MARSH, Roger C. Developed means to construct, operate, and manage covert organizations using open source methods, 1971-2001. Designated NRO Pioneer, 2005. Consult Center for the Study of National Reconnaissance for additional information.

MARTIN, John L. Jr. (Brig Gen, USAF). Aide to DNRO Charyk and later, as a general officer, Director of SAF/SP, Program A, and NRO Staff Director (SAF/SS), 1 July 1962-3 August 1964.

MASON, Charles W. CIA Chief, Budgeting and Comptroller, 1960.

MATHISON, Charles G. Vice Commander, 6594 Recovery Group.

MAXEY, Jackson. Head of the CIA office that was directly responsible for development and system integration of the CORONA cameras through 1965.

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MAYHEW, Paul W., Ph.D. Served as TRW's payload project manager and system engineer for two unprecedented signals intelligence satellite systems. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MAYO, Reid D. Working at the Naval Research Laboratory, conceived and designed the first Navy signals intelligence satellite, GRAB/DYNO. Later served as project engineer and technical director of Program C. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MAZAIKA, Michael A. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem. Dec 1977-Jul 1979.

MAZZA, Louis F. QUILL Chief Security Officer.

McANALLY, James W. Designated NRO Pioneer, 2004. Consult Center for the Study of National Reconnaissance for additional information.

McBRIDE, Charles C (Jr.). SAF/SP staff member involved with financial management. Contracting Officer working on HEXAGON.

McCARTNEY, Forrest S. (Lt. Gen., USAF) Satellite Test Center. Responsible for the on-orbit control of early CORONA satellites and was at the console during the first successful CORONA mission. Later became Commander, AF Space Division.

McChristian, Lester S (Col, USAF). HEXAGON Program Manager, Jul 1978-Mar 1983. Also participated in GAMBIT program.

McCLELLAND, Harold M. CORONA Staff. Principal liaison between the Pentagon's Advanced Research Projects Agency (ARPA) and the CIA CORONA Program Office during the formative years of the program.

McCONE, John A. DCI, 28 November 1961-28 April 1965.

McCRAY, Phillip R. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

McDonald, James H. CIA member of the CORONA team, (1960-1972).

McLUCAS, John L. Dr. Director, NRO (1969-1973).

McMAHON, John N. CORONA Development Team and later DDCI.

McMILLAN, Brockway. Director, National Reconnaissance Office from 1 March 1963 to 1 October 1965.

McMILLAN, Logan T. McDonnell Douglas Astronautics Company (MDAC) Program Manager for HEXAGON 1968-1974.

MECEDA, John. (Capt, USAF). A member of SAF/SS in 1968-69.

MESERVE, Kent H. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem, Jul 1979-Oct 1980.

MESSNER, David. (Capt, USAF). A member of SAF/SS in 1976-77.

METTLER, Reuben. TRW official who was cognizant of NRO programs.

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MILES, John M. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

MILLER, Edward A. GE CORONA Project Manager. Led the team that successfully developed the recovery vehicle in record time. Designated NRO Pioneer, 2005. Consult Center for the Study of National Reconnaissance for additional information.

MILLER, George. CIA/DDS&T/D/OEL, involved in POPPY.

MILLER, Herbert I. CIA member who supported the U-2 and A-12 programs in the 1950s and 1960s.

MISNER, Robert D. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

MITCHELL, Harold E. Air Force pilot during the first aerial recovery of the CORONA film return capsule.

MITCHELL, Leslie. Eastman Kodak, payload design, GAMBIT program principle.

MIZGORSKI, Richard J. SAFSP. Worked on Hexagon MCS. Captain in 1982.

MONTGOMERY, William G. - Pioneered precision control and pointing accuracies for a new generation national reconnaissance system that enhanced volume, resolution, and accuracy in imagery intelligence collection. Led the application of precision sensing and control instruments and advanced systems engineering methods to balance performance contributions from multiple space and ground segments. Designated NRO Pioneer, 2013. Consult the Center for the Study of National Reconnaissance for additional information.

MOORE, James O. General Electric Co. Aerospace Electronics Systems Department, Extended Command System team lead, HEXAGON Program. 1969-1978.

MOORE, Richard R. Involved with CORONA Thor booster modifications.

MOORMAN, Thomas S., Jr. (Brig Gen, USAF). NRO Staff Director (SAF/SS), 5 February 1985-18 October 1987.

MORGAN, James E. An early Navy champion of electronic intelligence satellite tactical support to military operations, developed the target tasking and data dissemination architectures for key Program C systems. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MORTON, Mark. GE General Manager responsible for ensuring all GE support to CORONA was delivered on schedule. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MUNSON, Alden V., Jr. A contractor with the Aerospace Corporation and TRW who conceived and developed a fully automatic electronic intelligence system that directly supported

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U.S. military forces in the field. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MURPHY, Charles L. (LtCol, USAF). The first CIA Field Technical Director, Advanced Project Integration Facility. Managed the integration, test, launch, and on-orbit operations of the CORONA system. Murphy's Air Force and CIA affiliations can be acknowledged. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

MURPHY, Frank (CAPT, USN). Interim Director, Program C.

NAKA, F. Robert. Deputy Director, NRO from 1 July 1969 to 31 August 1972.

NALLY, (Lt Col, USAF). Member of Program D, 1970-72.

NELSON, David F. Aerospace Corp. Worked on HEXAGON Mapping Camera System.

NETHERCOTT, Boyd. COMIREX Exploitation R&D Working Group lead.

NEUNER, L (Lt Col, USAF). Analysis Branch, SAFSS.

NEWMAN, Mark. Employee of TRW who was cognizant of NRO programs.

NEWMAN, Mark. A TRW employee who worked with NRO Pioneer John Bennett on SIGINT systems for the NRO.

NOLAN, Donald. Employee of TRW who was cognizant of NRO programs.

NORMAN, L.S. (Col USAF), NRO Directorate of Special Projects, HEXAGON Program.

NOWINSKI, Edward. Provided executive leadership to NRO satellite system development and operations.

O'CONNELL, John M. (Lt Col, USAF). Air Force officer who worked on SIGINT programs in SAF/SP. Later worked for Lockheed.

O'DONNELL, Robert F. - Developed analysis and simulation techniques which made possible the precision pointing and flexible structure deployment and control of a new generation of collection satellites. His career in national reconnaissance spans from 1972 to the present. Designated NRO Pioneer, 2012. Consult the Center for the Study of National Reconnaissance for additional information.

ODER, Frederick (Col, USAF). Program Manager. Deputy to General Shreiver for WS-117L and DISCOVERER/CORONA. Played crucial role in early CORONA Technical Development. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

O'GREEN, Fred. Lockheed manager for the design, manufacture, and test of the Agena vehicle for CORONA.

O'TOOLE, Joseph P. Satellite Test Center. Control Chief for CORONA operations at Sunnyvale and supervised the duty controllers.

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OVER, John J. (Jack). Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

OWENS, Raymond B. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

OWENS, Wesley D. (Col, USAF). A member of SAF/SS in 1969-75.

PAIGE, Hilliard. GE General Manager with overall responsibility for development of the CORONA bucket reentry systems.

PARANGOSKY, John. CORONA Program Staff. Served as Deputy Chief, then later as Chief of the CORONA Program Office Development Staff in CIA DS&T. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

PARKER, Dr. Michael N. 2011 Pioneer of National Reconnaissance. Pioneered tracking and geolocation techniques based on precision signal external measurements. In the 1970s, he developed missile-tracking techniques that directly supported arms limitation treaty negotiations. He also demonstrated the first time-difference of arrival (TDOA)/frequency-difference of arrival (FDOA) geolocation capability from space, a technology now at the heart of signals intelligence.

PARRISH, David P. (Col, USAF). Air Force officer assigned to SAF/SP.

PATTERSON, Donald W. HEXAGON Sensor Subsystem Program Office, CIA/OSP Sep 1965-Jun 1973.

PATTERSON, Lee Roy (CAPT, USN). Director, Program C, from 31 August 1981-10 September 1982.

PAULSON, Robert L. (Col, USAF). Associated with NRO programs between 1973 and 1989. Served as the Air Force Program Manager for a multi-agency IMINT satellite system program. He successfully led his program office and operations team through the critical design, development, and testing of the system, and developed its complex ground architecture. Designated NRO Pioneer, 2002. Consult Center for the Study of National Reconnaissance for additional information.

PEAKE, Hayden. (Lt Col, USA). A member of SAF/SS in 1969-70.

PELINE, Julius P., Ph.D. Served as Lockheed's system test director and program manager for a key imagery intelligence satellite program. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

PENCE, Lawrence. (Maj, USAF). Member of SAF/SS 1969-70.

PERRY, Robert L. Member of RAND and an NRO contract historian, 1966-1974.

PERRY, William J. An Army mathematician who advised the NSA and CIA on programs to intercept and evaluate Soviet missile

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telemetry and communications intelligence. He chaired the "Perry Panel" that advised the CIA on all overhead signals intelligence collection, and later served as Under Secretary of Defense for Research and Engineering and as Secretary of Defense. Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

PETTY, Paul E. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem, Jan 1971-Apr 1973.

PEYTON, Keith. (Capt, USAF). Member of SAF/SS 1972-1975.

PHILBRICK, Richard W. (Col, USAF). Aerial reconnaissance pioneer with the Army Air Corps (later USAF) and a top leader at the Itek Corporation on the Corona Program in the 1960s.

PHILMEYER, Gil. Employee of Eastman Kodak who was cognizant of NRO programs.

PIETZ, John (Maj, USAF). A staff member of SAF/SP.

PLUMMER, James W. Director, National Reconnaissance Office from 21 December 1973 to 28 June 1976. Earlier in his private industry career, he led the Lockheed team from the early days of WS-117L, and as the Lockheed program manager for the CORONA program, led the prime contractor efforts all the way through its formative years to full operational capability.

PONCE, Rayes. NPIC during CORONA years.

POTTS, Harold "Harry". SAFSP. Program contractual and technical management for HEXAGON in 1977.

POTTS, Ronald. Retired NRL engineer and historian, acknowledged in the GRAB and POPPY brochure.

POST, William S. (RADM, USN). Deputy J-2, Joint Chiefs of Staff (JCS) 1960.

POWELL, Robert M. Lockheed program manager for the GAMBIT high-resolution satellite reconnaissance program who devised a novel orbital maneuver that greatly extended the lifetimes of satellites in orbit. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

POWELL, William G. SAFSP. Lt. Colonel in 1974. Worked on HEXAGON Mapping Camera System Payload Division Aug 1973- July 1976.

POWERS, Francis Gary. CIA U-2 pilot shot down over the Soviet Union on 1 May 1960.

PRICE, Charles W. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

PROFFITT, Wayne L. Designed the mechanism that permitted a satellite to point its communications antenna toward a relay satellite and maintain continuous contact. Designated NRO Pioneer, 2005. Consult Center for the Study of National Reconnaissance for additional information.

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PURCELL, Edward M., Ph.D. A Harvard Nobel Laureate and radar expert who worked on all early overhead reconnaissance projects that operated at extreme altitudes. His main contribution involved methods to make these vehicles, if not invisible to radar, hard to observe with radar. He also chaired the Land Panel subcommittee that selected the Program B follow-on film recovery reconnaissance system. Designated a Founder of National Reconnaissance, 2000. Consult Center for the Study of National Reconnaissance for additional information.

QUARLES, Donald A. DEPSECDEF, 1957-59. Drafted the first "Freedom of Space" presidential directive for the IGY satellite program while serving as Asst SECDEF R&D in 1955.

QUIGGINS, Richard S. (Lt Col, USAF). Member of SAF/SS 1963-65.

QUIGLEY, Frank. As a Captain in the Navy was Director of a satellite ELINT System Program Office (SPO) during the development and early operational period of the automated ELINT processing system.

RABORN, William F., (ADM, USN). DCI, 28 April 1965-26 April 1966.

RAGUSA, Peter. Lockheed Missiles and Space Company, GAMBIT program principle. Engineering manager, GAMBIT-3 roll joint.

RAMBOLT, William. A Stanford University Laboratory employee who worked on early NRO SIGINT systems in the 1960s.

RANDAZZO, Richard J. - Pioneered the introduction and application of new operational techniques for NRO imaging systems. Col. Randazzo, USAF (Ret), made a profound contribution to the acquisition and operation by all NRO imaging systems from 1964 to 1986. Designated NRO Pioneer, 2010. Consult the Center for the Study of National Reconnaissance for additional information.

RASPET, David Colonel, USAF.¹⁰² Developed advanced methods of integrating spacecraft into launch vehicles and provided crucial leadership that enabled sustained operation of reconnaissance satellites. Designated NRO Pioneer, 2003. Consult Center for the Study of National Reconnaissance for additional information.

RATCLIFFE, Louis T. (Jack). Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

REBER, James Q. Deputy Director, NRO from 1 September 1965 to 30 June 1969. Had earlier served as Chairman, Committee on Overhead Requirements (COMOR).

REDWINE, Charles "Charley". QUILL Project Office.

REED, Thomas C. Director, NRO 9 August 1976 to 7 April 1977.

REED, nfi (Lt Col, USAF). Member of Program D, 1970-72.

REESE, Edward H. General Electric's program technical director, led the development of the ground data system that integrated hardware and software to process digital imagery from electro-

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optical imaging satellites. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

REUSCH, William J. ITEK Corp. Optical Systems Division, team lead, HEXAGON Program Mapping Camera Module. Aug 1973-Apr 1974.

RICKS, Luin (Capt, USAF). Member of the DMSP Program staff responsible for ground station support (tracking, command and control) in mid-1960s.

RIEPE, Quentin A. ("Que") (Col, USAF). Planned and established ground facilities for the WS-117L/Samos program at Vandenberg and elsewhere, and set up the remote tracking stations for the CORONA program. Served as first director of the MIDAS Program (1959-1961).

RINDSKOPF, M. H. (CAPT, USN). Director, Program C, 14 June 1966-12 September 1966.

RITLAND, Osmund (Maj Gen, USAF). Assistant to Richard Bissell for the overall CORONA Program. Later became Commander, AF Space System Division. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

ROBERTS, Lee W. (Col, USAF). Directed improvements in an important Program A satellite reconnaissance effort that produced high-resolution imagery of the earth's surface. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

ROBERTS, James F. (Capt, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

ROOT, Betty. Transcriber of declassified NRO history.

ROOT, L.Eugene. President, Lockheed Missile and Space Company at the initiation of Lockheed's effort on the Air Force's space programs.

ROSE, Vincent S. At the Naval Research Laboratory he designed the first ELINT payload used in SIGINT reconnaissance satellites. His achievements enabled the earliest receivers to collect radar emissions across broad frequency ranges that produced "horizon to horizon" area coverage capabilities. His exceptional designs gave the U.S. its first space reconnaissance collection success, and he contributed to the development of advanced ELINT receivers, antennas, and associated elements for four decades. Designated NRO Pioneer, 2001. Consult Center for the Study of National Reconnaissance for additional information.

ROSENBERG, Robert A., "Rosie." (Col, later Brig Gen, USAF). Served in SAF/SP in 1960s and early 70s. Acting Staff Director, SAF/SS, February-March, 1976; later served on the White House Staff, 1977-79.

ROSS, B. Alan. Perkin-Elmer Corp. HEXAGON Program Sensor Subsystem. Apr 1973-Sep 1975.

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ROSS, Grant D. Field Operation Manager for ITEK. In 1977 he was the Itek Program Operations Manager for HEXAGON.

ROSZAK, Joseph R. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

ROTELIUK, Luchy. A TRW employee cognizant of NRO program activity.

ROTH, Charles. Program Manager for the first electro-optical imaging satellite to be put into orbit. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

ROWLETT, Frank B. Special Assistant to Director, National Security Agency (NSA).

ROY, Rob. The first CORONA launch controller at VAFB. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

ROYCE, Winston W. Thompson-Ramo-Woolridge Inc, T'Unity Software team lead, HEXAGON Program. Nov 1971-Mar 1972.

RUDERMAN, Malvin. A member of the Drell Committee established by DDS&T Bud Wheelon.

RUEBEL, J.H. (Col, USAF). A staff member of SAF/SP.

RUFFNER, Kevin C. CIA historian and editor of *CORONA: America's First Satellite Program*, 1995.

RUNGE, Fritz. Worked for Lt Col Haig in the DMSP Program Office.

RUPERT, nfi (Lt Col, USAF). Member of Program D, 1970-73.

RUSSO, Joseph P. EK. Project officer for closeout of the operational phase of the HEXAGON Mapping Camera.

RUZECK, Charles (COL, USA). An original member of the first NRO staff (SAF/SS). Worked on HEXAGON while a Colonel at SP-6.

RZEPNICK, Irving. Aerospace Corporation. Discovered GAMBIT debris in Britain.

SABELHAUS, Anthony H. A TRW employee cognizant of NRO program activity.

SAMFORD, John A. (Lt Gen, USAF). Director, NSA 1960.

SAMPSON, William F. An Aerospace Corporation technical manager involved with NRO program activities.

SAUNDERS, Clason B. (Col, USAF). Director, Program D, from 15 July 1966-31 October 1967.

SAUNDERS, Edward R. CIA, Comptroller, 1960.

SAXTON, H. L. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

SCHADEGG, John J. COMIREX Imagery Collection Requirements Subcommittee chair; chief NRO photo branch.

SCHALK, Louis. CIA A-12 pilot in the 1960s.

SCHOESSLER, Donald. Eastman Kodak. Liaison with the Kodak film manufacturing division, providing the interface necessary for

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communicating the CORONA program's film requirements and directing development of films to these unique requirements. **SCHOW**, Robert A. SAFSP. Worked on HEXAGON. Was a Lt. Colonel in 1971.

SCHRIEVER, Bernard A. (Gen, USAF). Commander, AF Ballistic Missile Division during the CORONA program. Later became Commander of the AF Research and Development and of the Air Force Systems Command.

SCOTT, Roderick M. Perkin-Elmer engineer who participated in the design of the U-2 and A-12 cameras.

SCOVILLE, Herbert Jr. CIA Office of Scientific Intelligence, 1960. Director of Program B from 1 March 1962 to 14 June 1963.

SEAL, Virginia Jane. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

SEAWELL, William T. Military Assistant to DEPSECDEF, 1960.

SEAY, J. S. (Col, USAF). A staff member of SAF/SP, in procurement.

SELTER, nfi (Capt, USAF). Member of Program D, 1970-72.

SENG, Joseph. NPIC during CORONA years.

SEWELL, John M. Eastman Kodak, test and support equipment, GAMBIT program principle.

SHAMBLE, J. Alfred. ITEK. Worked on Ultra Thin Base (UTB) Film Implementation.

SHARP, Dudley C. SECAF, 1960.

SHELDON, Huntington D. CIA Director of Program B from 27 September 1965 to 13 January 1967.

SHELTON, William (Col, USAF). Commander, U-2 Detachment B.

SHEPPARD, William A. ("Red") (Col, USAF). CORONA Program Office. Established the early processes and procedures that provided the transition between the unclassified Discoverer Program and the classified CIA activities. Interacted with senior Air Force leadership to maintain booster funding and also responsible for establishing the Autumn Leaves study to determine how conventional film could be modified to survive the space environment.

SHERRILL, J.C. Executive Officer to Chairman, JCS, 1960.

SHIELDS, William L. Jr. (Brig Gen, USAF). NRO Staff Director (SAF/SS) from 18 March 1976 to 12 June 1978.

SHIPLEY, Dr. John W. Pioneer of National Reconnaissance. Pioneered the concept development, architectural approach, and initial system definition that led to the successful development of a revolutionary NRO collection asset. His unique beam-forming design led to proven on-orbit performance and critical collections that have exceeded expectations.

SHOEMAKER, Earl. NPIC during CORONA years.

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SHOVER, Harry T. (Sam) Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

SHURA, Carl Van. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

SIDES, Jack (Lt Col, USAF). An original member of the first NRO staff (SAF/SS).

SIMKINS, Donald N. - Pioneered development of signal processing techniques that allowed geolocation algorithms to be dramatically advanced. Dr. Simkins also developed automated techniques to include use of long term coherency to expand and improve collection, exploitation, and display of target information. Designated NRO Pioneer, 2013. Consult the Center for the Study of National Reconnaissance for additional information.

SIMMONS, Arthur B. Eastman Kodak Director of Research and Engineering during the CORONA program.

SIMONTON, Jack, (Col, USAF). Assigned to SAF/SP in the 1970s in the area of launch integration.

SINEX, Charles H. (Col, USAF). An original member of the first NRO staff (SAF/SS).

SINGEL, Robert D. Deputy Director, NRO from 18 September 1972 to 15 July 1974.

SMITH, Francis. General Electric Co. Aerospace Electronics Systems Department, Extended Command System team lead, HEXAGON Program. 1980-1986.

SMITH, J. R. (Lt Col, USAF). Deputy Program Manager, Defense Meteorological Support Program within SAF/SP.

SORRELS, Dr. John D. Aerospace Corp., General Systems Engineering division, HEXAGON Program. Dec 1966-Jul 1967.

SPOELHOF, Charles P. An Eastman Kodak official who collaborated on the design of the U-2, A-12, and SAMOS cameras, and directed efforts that led to the application of thin-based Mylar film in NRO reconnaissance satellites. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

SPORKEN, Stanley. CIA General Counsel who was cognizant of NRO/NRP activities.

SPRAGUE, Jay W. (RADM, USN). Last Director, Program C, 31 January 1992-31 December 1992.

STARNES, Arthur (Lt Col, USAF). A SAF/SP officer in the 1970s credited with inventing modern launch integration techniques and procedures.

STEARNS, Clifford B. (Lt. USAF). A SAF/SP officer assigned to DMSP in the mid 1960s.

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STEININGER, Donald. A retired Lieutenant Colonel who was a staffer to the President's Science Advisor in the early 1960s and supported the Drell Committee's investigation of ways to improve reconnaissance satellite capabilities.

STELLING, Henry, B (Hank) (Col, USAF). Assigned to the SAF/SP office involved with NRO launch operations in the 1970s.

STEVENS, Don. Eastman Kodak, support and administration, GAMBIT program.

STEWART, James T. (Brig Gen, USAF). Director of the NRO Staff (SAF/SS) from 3 August 1964 to 1 February 1967.

STIEG, Forrest H. A CIA engineer and spacecraft operations specialist in Program B who devised a process for selecting an optimum orbit that balanced signals collection with vehicle longevity. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

STINE, D.A. BMD Scout booster Office. Worked on HEXAGON.

STONE, Marvin S., Ph.D. Served as a TRW payload systems engineer and project manager on Program B electronic intelligence satellite programs. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

STONER, James W. Pioneered techniques for near-real-time processing of electronic intelligence signals and whose algorithm prototyping and quality control were critical to satellite programmatic successes. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

STOWE, Richard. Eastman Kodak. Provided management and technical guidance for the development, integration, and quality assurance of Kodak ground handling equipment, for films and chemistries used in government facilities, and for processing and duplication of the program films.

STRAND, John H. (Col, USAF). Member of SAFSS in 1964-65.

SUKOW, William. COMIREX Exploitation Subcommittee chair.

SUOMI, Verner. Worked with Colonel Thomas Haig during development of the DMSP payload.

SWEENEY, Edwin F. (Col, USAF). Director of NRO Staff (SAF/SS) from 21 August 1970 to 31 May 1971.

TALIOFERRO, W.R. NRO Staff. Chair of the Booster Source Selection board. In 1966 he was a Colonel with the Titan III System Program Office.

TAMANINI, Elmer B. General Electric Co. Aerospace Electronics Systems Department, Extended Command System team lead, HEXAGON Program. 1978-1980.

TANG, Don F. A Lockheed spacecraft engineer in Program A who established a "collection scale" for determining what signals could be technically collected at affordable costs. Designated

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NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

TAYLOR, Rufus L. (VADM, USN). Director Program C, 19 June 1963 to 14 June 1966, subsequently DDCI from 13 October 1966 to 1 February 1969.

TEVIS, Charles C. His advocacy for space-based signals intelligence collection resulted in the deployment of several innovative systems, and who was instrumental in the founding of the Defense Special Missile and Aeronautics Center. Designated NRO Pioneer, 2003. Consult Center for the Study of National Reconnaissance for additional information.

TENET, George. DCI July 1997- July 2004, second longest serving DCI after Allen Dulles. Previously served as Deputy DCI and Acting Director.

THOMAS, Herbert. QUILL Project Office.

TIDWELL, William A. CIA, Assistant Deputy Director for Intelligence 1960, and later served as the director of COMIREX.

TOMAN, Ronald G. SAFSP worked on HEXAGON Mapping Camera System. Major in 1976.

TOOL, Arthur Q. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

TORDELLA, Louis W. Deputy Director, National Security Agency, 1960-1980.

TREAT, Steve P. Lockheed Missile and Space Co. Satellite Basic Assembly and System Integration. HEXAGON Program. Feb 1980-1983.

TRUAX, R.C. (CAPT, USN). An original member of the first Air Force WS-117L staff and later a staff member of SAF/SP.

TSUTOMI, Janet. Secretary for the CORONA Recovery Group Commander.

TUKEY, John. A member of Edwin Land's Technology Capabilities Panel Project Three that explored ways to improve the nation's intelligence capabilities in the 1950s.

TURNER, Richard (Maj, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

TURNER, Stansfield (ADM USN). DCI, 9 March 1977-27 January 1981.

TWINING, Nathan F. (Gen, USAF). Chairman, JCS, (CJCS) 1960.

URMAN, Wally. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

VAN KEUREN, David. NRL historian acknowledged in the GRAB and POPPY brochure.

VAN MATER, Robert A. (Lt Col, USAF). An original member of the first NRO staff (SAF/SS).

VAN WAGONER, Richard C. Pioneer of National Reconnaissance. Pioneered antenna and system design and the evaluation of system performance critical to the successful execution of the NRO

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SIGINT mission. His ground-breaking development of innovative technology has resulted in the high quality SIGINT collection now available to the Intelligence and DoD Communities.

VELDERS, (Col, USAF). Member of Program D, 1970-73.

VOTAW, Martin J. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

WADDELL, Kirk. Cited but no information available.

WAGGERSHAUSER, Herman. Eastman Kodak, Vice President and General Manager Apparatus and Optical Division. GAMBIT program principle.

WAKITSCH, Harold E. (Capt, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

WALD, Bruce. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

WALKER, Donald R. (Brig Gen, USAF). NRO Staff Director (SAF/SS), 6 February 1989-1992.

WALSH, James H. (Maj Gen, USAF). Assistant Chief of Staff, Intelligence, 1960.

WALTON, John. Mr. Walton, as manager of the General Electric system integration organization for the first near-real-time electro-optical reconnaissance satellite, made possible the combined, successful operation of the earth and space-based program elements. He served as a key architect and leader in the system's definition, development, and deployment, and established and implemented management processes for the system integration and execution of this large, complex, multi-contractor acquisition program. Mr. Walton provided leadership to decision-making forums in defining and evaluating program cost, schedule, and performance data, and facilitated a cohesive government and contractor team. His revolutionary methodology addressed the entire life cycle of program events, and has been applied to other NRO programs. Designated NRO Pioneer, 2001. Consult Center for the Study of National Reconnaissance for additional information.

WARNER, John S. CIA Legislative Liaison/Office of General Counsel, 1960.

WATSON, John T. ITEK Corp. Optical Systems Division, team lead, HEXAGON Program Mapping Camera Module. Jun 1968-Nov 1968

WATTS, Sherilyn. NRO Staff.

WAYNE, James (Lt Col, USAF). A SAF/SP member of the DMSP program in the mid 1960s.

WEBB, Vernard H. (Curly) (Lt Col, USAF). Deputy Chief of Operations, CIA'S Advanced Projects Integration Facility, 1960-1964. Played an important role in the test and acceptance of the CORONA camera systems and also in the on-orbit operations of the satellite.

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WEBSTER, William H. DCI, 26 May 1987-31 August 1991.

WEINSTEIN, Melvin (Lt Col, USAF). An SAF/SP officer assigned to DMSP in the mid 1960s.

WEISS, Stanley I. Ph.D. Lockheed Missile and Space Co. Satellite Basic Assembly and System Integration. HEXAGON Program. Jul 1967-Feb 1970.

WEISNER, Jerome. The President's Scientific Advisor in the early 1960s who convinced NRO Founder Sidney Drell to join the Strategic Military Panel of the Presidents' Scientific Advisory Committee.

WELCH, Guy F. SAFSP. Lt Colonel, Deputy for Payloads, SAFSP. HEXAGON Mapping Camera System Payload Division July 1976-July 1982. Captain in SAFSP MCS Payload Division between July 1970-May 1971.

WELZENBACH, Donald E. (CIA Historian, retired). Author of *The CIA and the U-2*, among other published works.

WHEELER, Earle G. (GEN, USA). Army Chief of Staff, 1960.

WHEELER, Harold P. Jr. (Col USAF), NRO Staff Director (SAF/SS), 1 October 1974-17 March 1976.

WHEELON, Albert D. (Bud). First CIA Director of DS&T (1963-66). Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

WHISENAND, James F. (MG, USA). Special Assistant to CJCS, 1960.

WHITE, Thomas D. (Gen, USAF). Air Force Chief of Staff, 1960.

WILCOX, Fred. CEO of Fairchild Camera and Instrument Corporation in the 1950s.

WILHELM, Peter G. Chief spacecraft engineer at the Naval Research Laboratory who invented new techniques and devices that added capabilities and improved performance of signals intelligence satellites. Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

WILKINSON, John T. ITEK Optical Systems Division. Worked on HEXAGON.

WILLEMS, John (MG, USA). Army Assistant Chief of Staff, Intelligence, 1960.

WILLIAMS, John R. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

WILLIAMSON, William E. (Lt Col, USA). Member of SAF/SS 1966-69.

WILLIAMSON, R. E. Lockheed, HEXAGON participant.

WILLIS, Harold W. CIA Office of ELINT; served on Fubini SIGINT Panel in 1961 and worked on Program C POPPY project, later worked with NRO Pioneer John Bennett on Program B SIGINT systems for the NRO.

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WILLIS, Irving E., CDR, USN. A U.S. Navy officer mentioned in the memoirs of NRO Pioneer Mayo as participating in the GRAB ELINT satellite project.

WINFREE, Vance C. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

WINKLER, James G. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

WITHROW, William Edgar. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite radio control huts.

WOLFE, John. The first ITEK CORONA Program Manager.

WONG, Sun Yet. Designated NRO Pioneer, 2007. Consult Center for the Study of National Reconnaissance for additional information.

WOOD, Janet A. Designated NRO Pioneer, 2006. Consult Center for the Study of National Reconnaissance for additional information.

WORTHINGTON, Roy (Col, USAF). CORONA Program Office. Managed development of the three-axis stabilized Agena space vehicle. Later served as the CORONA Program Manager. As Deputy Commander of the 6594th Aerospace Test Wing, directed the integration and launch of some 200 satellites from the Western Test Range.⁶² Designated NRO Pioneer, 2000. Consult Center for the Study of National Reconnaissance for additional information.

WORTHMAN, Paul E. (Col, USAF). CORONA Program Office. Headed an Air Force Laboratory which developed aerial recovery; member, SAF/SS 1964-1970.

WULFHORST, John K. Lt, USN. A U.S. Navy officer mentioned in the memoirs of NRO Pioneer Mayo as participating in the GRAB ELINT satellite project.

YAKSICK, David M. Thompson-Ramo-Woolridge Inc, T'Unity Software team lead, HEXAGON Program. Aug 1979-1986.

YATES, Donald N. OSD, Deputy Director for Research and Engineering, 1960.

YORK, Herbert F. OSD, Director for Research and Engineering, 1960.

YOST, William R. (Lt Col, Col, USAF). Member SAF/SS, 1966-71.

YOUNG, Peter W. SAFSP. Worked on Hexagon. Was a Captain in 1982.

YOWELL, Grover M. (ADM, USN). Director, Program C from 1 July 1977 to 29 August 1981.

YUEN, Joseph Y. Associated with the Naval Research Laboratory's development of the GRAB ELINT reconnaissance satellite.

YUNDT, Robert W. Directed the Signals Intelligence Project Office in Program A, introducing a new, long-lived, multipurpose signals intelligence satellite. In 1960, served as Deputy

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Director of the SAMOS program. Designated NRO Pioneer, 2000.
Consult Center for the Study of National Reconnaissance for
additional information.

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(U) Appendix C - Glossary of Code Words and Terms

Appendix C is UNCLASSIFIED except as indicated by portion markings. Redactors may find additional current guidance on code words and terms in the separately maintained "all codewords list" and the appropriate classification guide. See also the DoD Dictionary, JP 1-02, unclassified internet www.dtic.mil/doctrine/jel/DoDdict or [https://nediacappv002j.ne.DoDiis.ic.gov/wsurl/mil/smil/js/jdeis/http/wspath/jdeis/dictionary/qsDictionaryPortlet.jsp?group=DoD](http://intellink.https://nediacappv002j.ne.DoDiis.ic.gov/wsurl/mil/smil/js/jdeis/http/wspath/jdeis/dictionary/qsDictionaryPortlet.jsp?group=DoD) for common unclassified terms and acronyms. This Guide does not replace JP 1-02, substitute for the information contained therein, or unnecessarily duplicate general historical or grammatical information readily available in more appropriate sources. Classified terms are identified elsewhere in the RRG.

AFSCN **Air Force Satellite Control Network.** An interconnected, global set of ground stations that provided tracking, telemetry, command, and control functions primarily for manned and unmanned Department of Defense (DOD) and non-DOD satellite operations and space vehicle missions.

AGE **Aerospace Ground Equipment.** All ground equipment required to prepare and checkout the payload and launch vehicle prior to launch.

Angel An informal nickname for the U-2 high altitude reconnaissance aircraft used by the staff of Lockheed's Advanced Development facility.

AQUATONE The code word assigned to the U-2 development and early operations in the late 1950s.

ARGO The code word for a joint program established in 1967 by President's Science Advisor that coordinated the needs and use of classified reconnaissance imagery for civil purposes. The only imagery that can be acknowledged as supporting ARGO is that from the CORONA, ARGON, or LANYARD programs. Succeeded by the Civil Applications Committee (CAC) in 1975.

ARGON The code word associated with first satellite

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mapping camera that flew in the early to mid 1960s.

ARPA

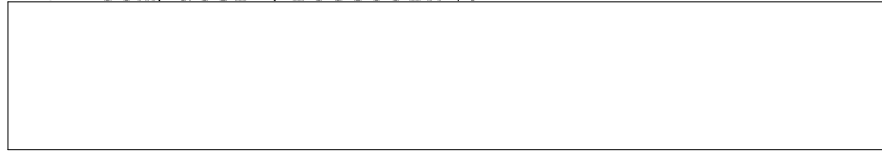
Advanced Research Projects Agency (later DARPA)

Athos

A WWII German video receiver

AUDICO

An analog-to-digital converter used by NSA to prepare GRAB ELINT satellite downlink data for computer processing.



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(b)(3)

BE Number

Basic Encyclopedia Number. A unique number assigned to a foreign installation or facility that identified it in intelligence products and databases.

BEACON HILL

An Air Force study group formed in the early 1950s to research new approaches to overhead reconnaissance, including high altitude balloons, aircraft, and earth satellites.

BLACK KNIGHT

A SENSINT overflight of Vladivostok by three USAF RB-57Ds on 11 December 1956. When protested by the Soviets, President Dwight Eisenhower ordered a halt to all SENSINT and TALENT overflights of Sino-Soviet countries.

BLACK SHIELD

The operational code word associated with the operational deployment of A-12/OXCART aircraft to Kadena Air Base in 1968 to support U.S. military operations in Southeast Asia. BLACK SHIELD aircraft primarily overflew North Vietnam. On three occasions in 1968, A-12 aircraft overflew North Korea after that country's seizure of the USS Pueblo in January of that year.

BLUE BOOK

The Air Force effort to investigate unexplained aerial phenomena commonly known as UFOs. Investigators checked reported sightings against U-2 and later OXCART flight records, which accounted for a number of them.

BORESIGHT

Nickname for Naval Security Group network of high frequency radio direction finding stations. See also BULLSEYE.

BRIDGEHEAD

A generic name ascribed to processing of overhead program film by Eastman Kodak.

BUCKSHOT

The nickname associated with the unsuccessful NRL multipayload launch in January 1962

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called COMPOSITE.

BUGH The name given by NSA to the first detected signal associated with a Soviet ABM radar. It was intercepted by the GRAB ELINT satellite.

BULLSEYE Successor nickname for BORESIGHT

CACTUS CORONA computer program that listed target locations for photo-interpreting. Unclassified in CORONA context only.

CALICO CORONA computer program that determined camera operations and displayed operational data. Unclassified in CORONA context only.

CANES The Navy access and security control system for the GRAB ELINT satellite project started by the Naval Research Laboratory.

CANIS A misspelling of CANES, often found in the records.

CAT EYE A WS-117L project circa 1956 dealing with light amplification.

CCAM **Controlled Collision Avoidance Maneuver.**

CDRL **Contract Data Requirements List.**

CHALICE The operational code word associated with the U-2 program before the shoot down of Gary Powers. It was replaced by the code word IDEALIST.

CHESS Code name assigned the U-2 imagery product.

CIO **Central Imagery Office.**

CL-282 The Lockheed designation for the preliminary design concept that evolved into the U-2 high altitude reconnaissance aircraft.

COMET CORONA computer program that determined orbit selections. Unclassified in CORONA context only.

COMINT **Communications Intelligence.** See SIGINT.

COMINT Control System An intelligence security compartment for communications intelligence.

COMIREX **Committee on Imagery Requirements and Exploitation.**

COMOR **Committee on Overhead Reconnaissance.** The predecessor to COMIREX, it defined overhead collection requirements.

COMPOSITE A term used to describe an unsuccessful NRL multipayload launch in January 1962, including a GRAB ELINT satellite.

COMSEC **Communications Security.**

CORONA The once-classified name for the covert photoreconnaissance satellite program that

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CORONA TARGET PROGRAM (CTP) first returned images to earth. CORONA computer program that selected orbit-by-orbit camera operation based on weather forecasts and on displays of operational information and accomplishment.

COURIER COMSAT project transferred to Army control, Sept. 1959. Related to management of Discoverer, SAMOS, MIDAS, Transit, and SpaSur.

Derated The operation of a system at less than its design capability.

DEFCON **Defense Condition.**

DCI **Director of Central Intelligence.**

DCIA **Director of the Central Intelligence Agency**

DDL **Direct Down Link.**

Dirty Bird The term used to refer to U-2 aircraft using radar signature reduction techniques.

DISCOVERER The unclassified cover name for the covert CORONA program, used until 1962 when it was replaced with numbers.

DNI **Director of National Intelligence.**

DNRO **Director, National Reconnaissance Office.**

DOD **Department of Defense.**

DOSIMITER Unclassified payload launched with GRAB/Poppy

DRAGON LADY The name of the Air Force project in 1956 to procure its own fleet of U-2 aircraft, with the cooperation of CIA for security purposes.

DSP **Defense Support Program.** An Air Force satellite that uses infrared sensors to detect ballistic missile launches. It was an outgrowth of the early WS-117L MIDAS R&D program.

DYNO An operational code word associated with GRAB, the first satellite ELINT system, which was developed and operated by the Naval Research Laboratory until it transferred to the National Reconnaissance office in 1962.

DYNASOAR A 1960s era Air Force program to develop a space plane. It never progressed beyond R&D.

EBONY The code word associated with a solitary U-2 overflight of North Vietnam in the summer of 1961.

ECI **Exceptionally Controlled Information.** An NSA administrative COMINT flag.

ELINT **Electronic Intelligence.** See SIGINT.

EMC **Electromagnetic Compatibility.**

EMI **Electromagnetic Interference.**

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EMP **Electromagnetic Pulse.**
Ephemeris Data Information regarding a satellite's orbital parameters, altitude, inclination, etc.

EQUINE The code word for the initial planning to exploit the photography taken by the U-2 high altitude reconnaissance aircraft.

EVEN STEVEN The code word associated with 29 U-2 flights in 1970 that overflew the Suez Canal ceasefire zone between Israel and Egypt.

Executive Order 12951 Signed on 22 February 1995, it directs the declassification and release to the public by October 1996 of all imagery collected by the CORONA, ARGON, and LANYARD satellite reconnaissance systems.

Executive Order 12958 Signed on 19 April 1995 and amended on 25 March 2003, it directs the automatic declassification of records on a specific date or event determined by the original classification authority, or on the expiration of a maximum period of time for classification established by this order.

Exemption Categories The nine specified criteria in amended Executive Order 12958 that justify exemption from automatic declassification.

FFRDC Federally Funded Research and Development Center.

FIS Foreign Instrumentation Signals. See SIGINT.

FEED BACK The RAND study project on the feasibility of reconnaissance satellites that culminated in a 1954 decision by the Air Force's Air Research and Development Command (ARDC) to study the potential for translating the FEED BACK recommendations into actual hardware. ARDC's decision evolved into the WS-117L PIED PIPER program.

FERRET The generic term applied to the SIGINT variants of the SAMOS WS-117L satellite development effort. (See Appendix E)

FLIP TOP The code word associated with 15 U-2 over flights of Cuba in April 1961 to provide photographic coverage of the Bay of Pigs invasion and its aftermath.

FOG Refers to the **F**ollow-**O**n-**G**roup of 31 U-2 aircraft purchased by the Air Force, separate from those purchased initially by the CIA.

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207

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GAMMA

[Redacted]

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[Redacted]

[Redacted] The code word is unclassified when divorced from its meaning.

GENETRIX

Program name for a covert effort to perform high altitude balloon reconnaissance over the Soviet Union in the mid-1950s. Also assigned AFP number **WS-119L**. A follow-on project in 1958 was identified as **461L**.

GGSE

[Redacted]

Gravity Gradient Stabilization Experiment, unclassified GRAB/POPPY payload.

[Redacted]

GRAB

The cover term for the first satellite ELINT system, which was called DYN0, and developed by the Naval Research Laboratory before being transferred to the NRO in 1962. The term was an acronym for "Galactic Radiation And Background." (See Appendix A)

GRAND SLAM

The operations code word associated with the final over flight of the Soviet Union that resulted in the downing of Gary Powers' U-2 on 1 May 1960.

GREB

A variation of the cover term for DYN0 first introduced by DARPA. It is an acronym representing the term Galactic Radiation Experiment Background.

GREEN EYES

The code word associated with three U-2 missions over Cuba in Nov-Dec 1960.

GSE

Ground Support Equipment.

HEMP

High Energy Magnetic Pulse.

HOLD

The security control system instituted by the Office of Naval Intelligence in 1961 to replace the CANES control systems associated with the GRAB/DYN0 ELINT satellite system.

HOT SHOP

The operations code word associated with two U-2 peripheral electronic intelligence collection flights along the Soviet-Iranian border in June 1959. The first mission involved operations with an USAF RB-57D and made the first telemetry intercept from a

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~~TOP SECRET//TK//RSEN/NOFORN~~**HTAUTOMAT**

Soviet ICBM during its first-stage flight. The name given to the project designed to exploit U-2 imagery in January 1956 that evolved into NPIC.

(b)(1)
(b)(3)**IDEALIST**

The cryptonym used to describe the overall U-2 program after the Soviets shot down Francis Gary Powers' mission on 1 May 1960.

ILC

Initial Launch Capability.

IMINT

Imagery Intelligence. The collection and analysis of photography and electronic imaging across the electromagnetic spectrum, to include visual, radar, infrared, and ultraviolet data.

Information Element (IE)

A specific category of information contained in NRO security classification guides or declassification guides.

INJUN

A sub satellite launched as a co-piggyback payload with GRAB/DYNO2 on 29 June 1961 onboard a TRANSIT II Navy communication satellite. Sponsored by Dr. James Van Allen, its purpose was the legitimate scientific study of the radiation belts around the earth.

IOC

Initial Operational Capability.

IR

Infrared

IRON

Inter-Range Operations Number. A randomly selected four-digit number used to schedule and identify AFSCN support for booster, launch, and/or on-orbit operations.

ISOO

Information Security Oversight Office. The organization responsible for overseeing the implementation of amended Executive Order 12958 within all Executive departments and agencies.

JANUS

The name of the last-generation CORONA J cameras. Often referred to as the J-1, J-2, J-3, or J-4 cameras.

JCS

Joint Chiefs of Staff.

KICK OFF

The operations code word associated with the overall Cuba overflight effort in support of the Bay of Pigs invasion in 1960.

LANYARD

Program name for the unsuccessful first effort to develop a high resolution surveillance photosatellite.

Launch Date

A term that indicates when a space launch is to (or was to) occur; year, quarter, month,

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week or day.

Launch Period The calendar period during which launch targeting information is available. The time span (encompassing the launch window) during which a LV launch is intended to occur.

Launch Window A specified period of time during which a space launch must occur to satisfy technical constraints and requirements.

LCO **Launch Communications Office.**

LETHAL CORONA computer program that automatically commanded and controlled the satellite. Unclassified in CORONA context only.

LOFTI A 60-pound NRL experimental satellite to study ionospheric effects on very low frequency propagation. It was lost during the January 1962 unsuccessful COMPOSITE launch.

LONG GREEN Two U-2 flights over Cuba in March 1961 to aid preparations for the subsequent Bay of Pigs invasion.

LPO **Launch Program Office.** The NRO OSL integration and launch SPO. Formerly known as SMC/CLX, SMC/IMO and/or Launch Office.

Lifeboat A redundant and self-contained back-up stabilization system (BUSS) used on the AGENA space vehicle that could be activated for recovering the satellite reentry vehicle in the case of an AGENA power failure.

LV **Launch Vehicle.** Consists of the entire space delivery system including, as appropriate, the booster, core vehicle, upper stage, and the payload fairing for all current and currently planned launch systems.

MASINT **Measurement and Signature Intelligence.**

MCC **Mission Control Complex.**

MC&G **Mapping, Charting, & Geodesy.**

MCS **Mission Control Station.**

MGS **Mission Ground Station.**

Methods Operational techniques used to gather intelligence or support clandestine or covert actions.

MIDAS A component of the USAF WS-117L developmental program with the objective of detecting ballistic missile launches. It evolved into the operational Defense Support Program (DSP) ballistic missile warning satellite. The Midas R&D Program was declassified entirely

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~~TOP SECRET//TK//RSEN/NOFORN~~in 1998.¹¹⁰**MILSATCOM**
MOBY DICK**Military Satellite Communications.**

Program name for overt balloon meteorological experiments from the early-to-late-1950s.

MOON BOUNCE

A project started in 1949 to collect Soviet radar signals reflected off the moon.

MURAL

The first two-camera CORONA variant that provided the first stereo capability.

NCA**National Command Authority.****NACA****The National Advisory Committee on****Aeronautics.** The predecessor to the National Aeronautics and Space Administration (NASA) that played a part in the cover story for the U-2 in the early development of the aircraft. Under the cover scenario, the U-2's ostensible mission was to support NACA with high altitude weather research.**NAREC**

An NRL computer used for signals search in conjunction with the GRAB ELINT satellite.

NEW HORIZON

Official nickname for the WS-117L military reconnaissance satellite development effort.

NGA**National Geospatial Intelligence Agency.****NIMA****National Imagery and Mapping Agency. See NGA.****NIMBUS**

The code word associated with monthly U-2 over flights of Cuba after the Bay of Pigs invasion that eventually led to detection of Soviet strategic missiles on the island.

(Also the name of an experimental NASA weather satellite.)

NMCC**National Military Command Center.****NORAD****North American Aerospace Defense Command.****NPIC****National Photographic Interpretation Center.**

A national-level imagery exploitation organization that had primary Governmental responsibility for CAL photographic interpretation.

NRO**National Reconnaissance Office.****NRP****National Reconnaissance Program.****NSA****National Security Agency.****NTPC****National Technical Processing Center****OARFISH**

The code word assigned to the CIA contract with Lockheed to develop the U-2.

OBP**On board processor.****OILSTONE**

The Air Force code word for the development program of the U-2 high altitude reconnaissance program.

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ONI **Office of Naval Intelligence.**

OPSEC **Operations Security.**

OSD **Office of the Secretary of Defense.**

Overhead A term that refers to airborne and space borne reconnaissance.

OXCART The code word assigned to the A-12, the high altitude, supersonic successor to the U-2. The military variant became the SR-71.

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[redacted]

PAPERCLIP The name of the project whereby German rocket scientists were engaged by the U.S. Army in 1950 to develop battlefield missiles.

PARAMOUNT Committee The name of a multi-agency body during the Suez Crisis of 1956 that produced all source intelligence reports, including the use of U-2 high altitude imagery.

PATHFINDER A mechanical test to verify the compatibility of the space vehicle and its interface with the AGE.

Payload(s) One or more combinations of mission enhancing hardware packages that are integrated onto the space vehicle bus to perform program requirements.

Payload Identity The combination of the Adapter Support Equipment (ASE) and the satellites.

PFIAB **President's Foreign Intelligence Advisory Board.**

PIED PIPER The original cryptonym assigned to the WS-117L advanced reconnaissance satellite program in 1955-56 and used in the design competition.

PLF **Payload Fairing.** The hardware that covers the payload while awaiting launch on top of the booster.

POPPY Navy ELINT project. Follow on to GRAB.

PROFORMA Signals with machine generated data, usually digital, machine-to-machine.

Programmatic Data Non-product or non-product-related information concerning space-based reconnaissance systems in the following

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areas:

- Research, development, and operation
- Budgeting and funding
- Contractor relationships
- Integration of launch and sensor platforms
- Command and control operations
- Key design and development details
- Survivability and vulnerability.

PSAC**RAINBOW****President's Scientific Advisory Committee.**

The code word associated with the project to reduce the U-2's vulnerability to radar detection.

RAINCOAT

The name of the policy instituted by DNRO Charyk in early 1962 to classify launches of all military satellites. Its impetus was the increasing difficulty of maintaining the DISCOVERER cover story for the CORONA program. It can be associated with the SAMOS, CORONA (DISCOVERER), ARGON, and LANYARD programs. However, remaining classified are details concerning specific methodologies of this security strategy and considerations for its application vis-à-vis currently unacknowledged programs.⁴⁹

RAPPORT**Reflight**

A COMINT product identifier.

Information that reveals relationships and/or plans to launch another SV with similar configuration to a previously flown SV.

REPTILE

NSA codeword for POPPY-related exploitation and reporting

RD**Restricted Data.****RF****Radio Frequency.****RTS****Remote Tracking Station.****SAF/SL****Office of the Secretary of the Air Force/Space Launch.****SAP****Special Access Program.****SAMOS**

An early Air Force reconnaissance satellite program that emphasized film read-out systems. One SAMOS photo satellite project attempted to develop a high-resolution film return system. Another SAMOS project was involved with ELINT "ferret" satellites. (See Appendix E)

SCI**Special Compartmented Information.****SCIF****Special Compartmented Information Facility.****SCOPE SAINT**

A series of U-2 overseas deployment

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exercises.

SCOPE SHIELD

U-2 missions flown on the periphery of North Vietnam mostly in 1973 to monitor that country's compliance with cease fire agreements.

SCORE

First military comsat, developed by the USAF, broadcast first voice message from space-President Eisenhower's 1958 Christmas message.

SEAFOAM

The code word associated with six U-2 flights from Ramey AFB, Puerto Rico in December 1963.

~~(S//NF)~~ [Redacted]

SECAF

Secretary of the Air Force.

SECDEF

Secretary of Defense.

SENSINT Control System

Sensitive Intelligence was an access and security control system for a compartmented military reconnaissance overflight program conducted in the 1950s, one that predated the U-2 program. It featured a variety of modified military aircraft that flew missions over mainland China, the Soviet satellite states in Eastern Europe, and the USSR. Its imagery product was held in a compartment called WINDFALL.

SENTRY

The predecessor name for the SAMOS program.

SGLS

Space Ground Link System.

SIGINT

Signals Intelligence. The interception, analysis, and reporting of information comprising either individually or in combination, all COMINT, ELINT, and FISINT. SIGINT includes both raw data and the analysis product of that data. Subsets of SIGINT include:

- a. **Communications Intelligence (COMINT).**
Technical and intelligence information derived from foreign communication by other than the intended recipients.
- b. **Electronic Intelligence (ELINT).**
Technical and intelligence information derived from foreign electromagnetic non-communications transmissions by other than intended recipients, and foreign non-communications electromagnetic radiation emanations from other than atomic detonation or radioactive sources.
- c. **Foreign Instrumentation Signals**

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Intelligence (FISINT). Technical and intelligence information derived from the intercept of foreign instrumentation signals (i.e., electromagnetic emissions) associated with the testing and operational deployment of non-U.S. aerospace, surface, and subsurface systems. Signals include telemetry, beacons, electronic interrogators, tracking/fusing/arming/command systems, and video data links.

SISS ZULU

Naval Security Group nickname for its participation in the POPPY program.

Skunk Works

The term applied to the Lockheed's Advanced Development facility at Burbank, California that developed the U-2, the A-12, and the SR-71 high performance reconnaissance aircraft.

SOC

The NRO Satellite Operations Center. Located in the Pentagon in the early 1960s, it translated the collection requirements levied by the intelligence community for tasking by the satellite ground stations. It was disestablished in the late 1970s.

SOFT TOUCH

The operations code word associated with nine U-2 over flights of the Soviet Union and two over flights of the People's Republic of China during a 23-day span in 1957. Resulted in discovery of the Tyuratam Missile Test Center in the USSR.

SOLRAD

Solar Radiation Experiment. A legitimate scientific experiment launched with the Navy GRAB ELINT satellite. The SOLRAD payload was publicly acknowledged while the classified ELINT payload was not, thus providing cover for the latter.

SPARTAN

Name given to the SAMOS E-6 imaging payload development effort when the E-6 was cancelled in 1963 and reoriented from a two-camera system launched on ATLAS to a one-camera system launched on Thrust-Assisted-THOR (TAT).

SP-AS-63

A second derivative development effort of the SAMOS E-6 imaging payload after the first derivative effort, designated SPARTAN, was cancelled in 1963.

SPASUR

The Naval Space Surveillance facility comprised of a chain of transmitter sites and receiver sites, forming a continuous wave

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electronic fence above the southern states from coast to coast. Can also be referred to in the records as NAVSPASUR.

SPCI**Special Program Controlled Information.**

Includes information relating to Special Program activities, but not warranting a TOP SECRET or SECRET classification. SPCI is handled only by briefed personnel and may not leave the Special Program Controlled area.

SPO**System Program Office.****SRV**

Satellite Recovery Vehicle. A detachable part of the spacecraft in film-return satellite reconnaissance systems that was de-orbited for delivering exposed film back to earth for processing and exploitation.

STAR

Codeword for ELINT variants developed under WS-117L.

STARFISH

The name associated with a U.S. high altitude nuclear test in 1962. See *related redaction guidance in Appendix F.*

STEX

A SIGINT technology satellite, fact of only.

STIC

Scientific and Technical Intelligence Center, Office of Naval Intelligence.

SURCAL

A small nine-pound NRL satellite designed as a space object to calibrate the Naval Space Surveillance fence. It was lost during the unsuccessful January 1962 COMPOSITE launch.

SV

Satellite Vehicle. The satellite carried into space to perform an operational, research, or test mission. See Payload.

SVC**Satellite Vehicle Contractor.****SV Mission**

The activity the satellite will accomplish in space.

System-V

The first electronic intercept equipment to be flown aboard the U-2.

System 438L

A separate Weapon System designation under which the WS-117L intelligence data handling system (IDHS) was to be developed by the Air Force. Development of the IDHS part of the WS-117L Advanced Reconnaissance System was eventually abandoned.

TAGBOARD

A supersonic reconnaissance drone designed in the 1960s originally to be launched from the A-12/OXCART aircraft. It flew only a few operational missions launched from a B-52.

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TALENT Control System The access and security control system employed for the U-2 program. U-2 imagery products held in two other compartments: CHESS and CHURCHDOOR.

TALENT-KEYHOLE Control System The access and security control system established for reconnaissance satellites in August 1960.

TATTLETALE The code word initially assigned to the Navy GRAB ELINT satellite project in the late 1950s.

TIME STEP The code word associated with a planned U-2 overflight of the Soviet Union in late April, 1960. It was discarded in favor of another overflight plan that resulted in the shoot down of Gary Powers' U-2 on 1 May 1960.

TIGER The non-compartmented code word for the then compartmented TAGBOARD supersonic reconnaissance drone managed by former Program D.

TIROS Television and Infrared Observation System, a Vanguard program to record cloud formations for weather forecasting.

TOG **Technical Operations Group.** The interagency body established by the Navy to coordinate and control activities related to the GRAB/DYNO ELINT satellite project.

TOMAS See VAULT/TOMAS.

TRAILBLAZER A test to verify the compatibility of the SV and its interface with the LV.

TRAP **Tactical Related Applications.**

TRANSIT The Navy's first navigation satellite, it also provided a covert piggyback ride for the GRAB ELINT payload, the nation's first operational reconnaissance satellite

TRAPEZE The name given to attempts to reduce the U-2's radar signature under Project RAINBOW through the use of attached fiberglass rods and small gauge wire with precisely spaced ferrite beads.

UV **Ultraviolet.**

VAULT/TOMAS A proposed, but never developed, successor to the ARGON satellite mapping system.

VRK **Very Restricted Knowledge.** An NSA administrative COMINT flag.

WALNUT A compartmented TOP SECRET security system administered by the Office of Naval Intelligence for the GRAB ELINT satellite

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project. It replaced the SECRET level TATTLETALE security system.

WALLPAPER

A name given to attempts to reduce the U-2's radar signature under Project RAINBOW through the use of plastic material containing a printed circuit designed to absorb radar pulses in the 65 to 85-MHZ range.

WINDFALL

Access and control system assigned to the imagery product of the SENSINT Program.

WRSP-1

1st Weather Reconnaissance Squadron, Provisional. The cover name given to the first U-2 operational detachment, which consisted of four aircraft.

WS-117L

The umbrella Air Force development effort in the 1950s for reconnaissance satellites stemming from Rand's Project FEEDBACK. It eventually included three main components- MIDAS, SENTRY (later SAMOS), and DISCOVERER (CORONA).

WS-119L

Air Force Program number assigned to the Genetrix reconnaissance balloon project in 1955-56. A follow-on project in 1958 was called **WS-461L**.

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(U) Appendix D - Footnoted Sources

(U) Note: This appendix provides a record of the decision process supporting newly approved information releases. Origins of previous changes may be found in earlier editions of the RRG. The 2008 edition included documentation for all changes authorized to that point.

1. (~~U//FOUO~~) New guidance determined in consultation with NRO Classification Working Group in response to a FOIA, and per the spirit of E.O. 13526 and previous RRG guidance.

(U) After the 2012 RRG update additional changes to the RRG will be documented using the authorized Request for Change form. Footnotes will be discontinued.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Appendix E - WS-117L: SENTRY/SAMOS**

(U) WS-117L served as the umbrella R&D program for Air Force reconnaissance satellites in the 1950s. It eventually included three main components: MIDAS (a space-based infrared sensor system capable of detecting ballistic missile launches on land and at sea, predecessor of DSP and SBIRS), SENTRY (later SAMOS, divided between visual "E" series and electronic intelligence "F" series reconnaissance systems, see below), and DISCOVERER (CORONA, see Appendix F). **The Air Force declassified the MIDAS R&D Program (1956-1968) in its entirety in 1998.**

Redact:

1. (~~S//TK//REL~~) Redact any information indicating or implying evolution of SAF/SP Program A low earth orbit ELINT satellites from the SAMOS F-2 or F-3 ELINT payload variants, such as 698BK and 770.
2. (~~S//TK//REL~~) Redact mission series numbers.
3. (U) Redact all funding information after 1 July 1960 (Fiscal Year 1961).

Release:

1. (~~S//REL~~) Release all information regarding the SAMOS imaging payload variants (E-1, E-2, E-3, E-4, E-5, and E-6). This includes project nomenclature for the E-5 [698A(X)] and the E-6 (201, 698BJ, 722) payloads, but not any information revealing that a fact that is not releasable. Similar nomenclature for the SIGINT payload variants (698BK) will be redacted per guidance above. (b)(1)
(b)(3)
2. (U) Release general information regarding the technical capabilities of the F-1 through F-4 "ferret" ELINT payloads, to include:
 - a. The F-1 and F-2 payload variants were intended to collect radar emissions in the region of the electromagnetic spectrum between 50 and 40,000 megacycles (mc, aka megahertz, Mhz) per second. The objective of this collection would be to gather information describing the signal parameters and location of previously unknown emitters.

220

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- b. The F-2/F-2A was capable of collecting against two frequency bands; however, the bands can not be identified.
 - c. The F-3 possessed analog signal recording with a bandwidth up to 6 mc/Mhz, used receivers with stop-scan capability and controllable antennas, and a programmable capability permitting satellite search of a given area or frequency range.
 - d. Airborne Instruments Laboratory (AIL) performed studies and development work on all of these ferret payloads.
 - e. The WS-117L/SAMOS ELINT payloads could store, filter, and process information. At the proper time, the stored information would be transmitted to the earth.
 - f. The estimated accuracy in geolocating emitters on earth was set at 50-100 miles for the F-1 and F-2 ELINT payloads.
 - g. Fact that additional planned Ferret ELINT receivers would seek to incorporate a direction finding capability that could geolocate emitters on earth within a five mile CEP.
 - h. The fact that a COMINT collection capability was planned for a future SAMOS F- payload. (**Note:** Any discussion of targets, collection strategy, or actual performance remains classified.)
3. (U) Release names of all Air Force and contractor personnel involved in the WS-117L SENTRY/SAMOS program before 1 September 1960. Names appearing after that date will be handled in accordance with Section 9 of this guide.
4. (U) Release names of all of the WS-117L contractors.
5. (U) Release all of the WS-117L R&D Program Identifiers contained in Lockheed's statement of work, issued shortly before the various components received formal names (i.e. SENTRY, MIDAS, DISCOVERER) in August/September 1958.
- a. Program I, Prototype Development of the SM 65 (Atlas) booster

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- b. Program II, Pioneer Visual Reconnaissance - SM 65
 - c. Program IIA, Prototype development biomedical recovery - SM 75 (Thor) booster
 - d. Program III, Pioneer Ferret Reconnaissance - SM 65
 - e. Program IV, Advanced Visual Reconnaissance - SM 65
 - f. Program V, Advanced Ferret Reconnaissance - SM 65
 - g. Program VI, Visual Surveillance - SM 65
 - h. Program VII, Infrared Early Warning - SM 65
 - i. Program VIII, Ferret Surveillance - SM 65
6. (U) Release all Air Force Program (AFP) numbers for the following SAMOS visual systems:
- 101B (related to the E-5 payload that evolved into the LANYARD imaging satellite)
 - 201 (related to the E-6 film return imaging payload)
 - 315A (related to the revamped E-6 imaging payload)
 - 722 (related to the E-6 film return imaging payload)
7. (U) Release all SENTRY/SAMOS funding data prior to 1 July 1960 (Fiscal Year 1961), to include contract numbers for contracts let prior to that date. **Note:** Funding identified with CORONA (which stood up under that name in March-April 1958), will be redacted. Funding identified with DISCOVERER (CORONA's cover project) found in Air Force (but not Program A) records embraced other items such as the care and feeding of chimpanzees, was presented to Congress for approval, appears in congressional documents, and may be released.
8. (U) Release organizational elements within SAF/SP, SAF/MSS and SAF/SS involved with the SAMOS program.
9. (~~S//REL~~) Release launch information, except for information dealing with launches of the F-2 and F-3 SIGINT payloads or their derivative payloads (Projects 102, 698BK, and 770).

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10. (U) Release general information concerning the use of Atlas launch vehicles for the E-1/F-1 and E-2 imaging payloads, or plans to use a specific launch vehicle for the imaging payloads that did not fly.
11. (U) Release fact of F-2/F-3 SIGINT variants' use of the Thor launch vehicle without launch or payload details.
12. (U) Release fact that the following remote tracking stations (RTS) supported DISCOVERER (CORONA) and/or SENTRY/SAMOS reconnaissance programs.
 - a. Annette Island, Alaska
 - b. Fort Greeley (aka Donnelly Flats), Alaska
 - c. Fort Stevens, Oregon
 - d. Kaena Point, Hawaii
 - e. Kodiak (aka Chiniak), Alaska
 - f. New Boston, New Hampshire
 - g. Ottumwa, Iowa
 - h. Palo Alto, California
 - i. Point Mugu, California
 - j. Vandenberg AFB, California
 - k. Christmas Island
 - l. Guam
13. (U) Release fact of Project 102, the SAMOS ferret missions.

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(U) Appendix F - CORONA, ARGON, and LANYARD

(U) Information in this appendix has been incorporated from the CORONA, ARGON, and LANYARD (CAL) Declassification Guide and more recent instructions. The DNRO approved the CAL Guide in May 1996 as part of a systematic declassification review (SDR). That SDR was completed in November 1997.

1. DEVELOPMENT

Redact:

(U) See paragraph 2 below.

Release:

- a. (U) Release "facts about" the CORONA program concept that called for first concealing the program with its overt cancellation as an ostensibly experimental part of the umbrella project WS-117L, only to be followed by its covert resurrection.
- b. (U) Release fact of and details about the CORONA program cover attributing an animal-carrying purpose to DISCOVERER missions.
- c. (U) Release fact that in April 1962 the Air Force changed the CORONA program cover from that of DISCOVERER being experimental satellites to the announcement that further launches involved secret military satellites. At the same time, the Air Force announced a new directive classifying all information regarding military satellites and eliminating series designations for DISCOVERER, SAMOS, and MIDAS.
- d. (U) Release details about the design and operation of the Itek panoramic and frame cameras used in the CORONA, ARGON, and LANYARD satellites (KH-1 through KH-6).
- e. (U) Release any other information not specifically identified for redaction below.

2. PARTICIPANTS AND RELATIONSHIPS

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- a. (U) Redact any tradecraft details concerning cover arrangements used by the CIA, Lockheed Missiles & Space Company (LMSC), and Hiller Helicopter Corporation for the leasing, staffing, and operation of the Hiller Helicopter plant in the CORONA Program.
- b. (U) Except as identified below, redact any references to a CIA covert procurement relationship with any contractor.
- c. (U) Redact names of NRO contractor personnel unless they are identified under Release below or acknowledged in Appendix B.

Release:

- a. (U) Release names of elected or presidentially-appointed Government officials guiding CAL development or using its product. When reflected in the context of being users of the CAL product, military flag officers are considered to be presidentially-appointed Government officials whose names can be released. (e.g., CINCSAC or CINCPAC articulating opinions about the value of CORONA to their operational planning).
- b. (U) Release fact of CIA's management role in CORONA for classified procurement and maintenance of security.
- c. (U) Release fact of and non-security-related details about the roles of following contractors:
- Aerospace Corporation
 - Lockheed Missile and Space Company
 - Itek Corporation
 - Fairchild Camera & Instrument Corporation
 - General Electric
 - Douglas Aircraft Corporation
 - Space Technology Laboratories (STL)
 - (U) Bell Telephone Laboratories (BTL). BTL had a contract with the Pacific Missile Range to provide radio

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guidance commands to all first stage burns from VAFB (Thor, Atlas, Titan, and possibly Delta).

- (U) Eastman-Kodak Company and its roles in film technology research and processing the CAL mission film at its Hawkeye facility in Rochester, NY.

- (U) Autometric as an ARGON contractor

d. (U) Release the names and pictures of employees of the following contractors associated with CAL:

- Lockheed Missile and Space Company
- Itek Corporation
- General Electric
- Eastman-Kodak Company

e. (U) Release fact that the Hiller Helicopter plant, also known as the Advanced Projects Integration Facility, or Advanced Projects Facility (APF, or simply AP), in Palo Alto, California, served until 1969 as a cover in which the CORONA second stage Agena satellites, Itek cameras, EKC film, and General Electric reentry capsules were assembled and tested before shipment to Vandenberg AFB.

f. (U) Release Names of US military photo-interpreters working at NPIC associated with CAL

3. FUNDING

Redact:

(U) Redact all other information not identified for release below.

Release:

(U) Release all program costs & overall budget, for the CORONA program, without revealing any funding sources and methods, see RRG section 1.11.2 for further clarification on what items that still need to be protected.

(U) Release funding figures for the DISCOVERER Program (CORONA's cover project) found in Air Force (but not Program A) documents included additional items such as the care and feeding of chimpanzees. DISCOVERER Program funding was presented to

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Congress each year for approval, appear in congressional records, and may be released.

4. OPERATIONS - GENERAL

Redact:

a. ~~(S//TK//REL)~~ Redact information in a fact of context that indicates or implies a small "piggyback" ELINT detection package (called SOCTOP) was carried on board DISCOVERER XIII.

b. ~~(S//TK//REL)~~ Redact information indicating or implying in a "fact of" context that any other SIGINT or vulnerability detection piggyback payloads were carried on CAL missions.

c. ~~(S//TK//REL)~~ Redact fact of and details about

(b)(1)
(b)(3)

d. ~~(S//TK//REL)~~ Redact methodology used by agents to retrieve mission hardware on foreign soil.

Release:

a. (U) Release AFP numbers associated with the CORONA, ARGON, LANYARD imaging satellite programs: - 162, - 241, -622A, -846, and specific CAL mission numbers in the following blocks: 1000, 1100, 8000, 9000.

b. (U) Release fact that CORONA carried color and infrared film on some missions.

c. (U) Release fact that CORONA carried a payload called OSCAR (Orbiting Satellite Carrying Amateur Radio), and other scientific "piggyback" payloads such as radiometric experiments for MIDAS and X-Ray and Gamma Ray sensors tested for VELA HOTEL that were not directly related to intelligence operations. The fact of "piggyback" payloads in general can be acknowledged since these were registered with the UN. [CAUTION: see redaction guidance ~~below~~ above.]

d. (U) Release all CAL spacecraft ephemeris data.

e. (U) Release health and status data for all CAL spacecraft.

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- f. (U) Release spacecraft system lifetimes for all CAL missions.
- g. (U) Release CAL spacecraft maneuverability data.
- h. (U) Release fact that the DISCOVERER II capsule might have been recovered by the Soviets after reentering and returning to earth on Spitzbergen Island, and fact that Norwegian authorities may have provided credible evidence of that possibility.
- i. (U) Release fact of the resemblance of the loss of the DISCOVERER II capsule, and its probable recovery by the Soviets, to the book Ice Station Zebra by Alistar MacLean and the movie of the same name.
- j. (U) Release fact that an individual formerly possessing CORONA access was the technical advisor to the movie "Ice Station Zebra."
- k. (U) Release details about procedures for film capsule recovery by air or on the water.
- l. (U) Release fact that Corona film was flown from Hawaii to Rochester, New York, and, after it was developed at EKC, from Rochester to NPIC in Washington, D.C.
- m. ~~(S//NF)~~ Release details about the recovery from Venezuela of an errant CORONA mission 1005 capsule in summer 1964, except any information dealing with CIA agent recovery methodology.
- n. (U) Release Computer Programs/OSP//relating to CORONA satellite operations:
- 1) (U) CORONA Target Program (CTP): orbit-by-orbit camera operation selection based on weather (WX) forecasts and on displays of operational information and accomplishments.
 - 2) (U) CALICO: determined camera operations and displayed operational information.
 - 3) (U) CACTUS: listed target locations for photo-interpreting.
 - 4) (U) COMET: determined orbit selections.
 - 5) (U) LETHAL: program for automatic command and control of the satellite.

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~~TOP SECRET//TK//RSEN/NOFORN~~**Refer:**

(U) Proposed releases about the internal operations of the 6594th Recovery Group and 6593rd Test Squadron should be referred to Air Force Space Command.

5. OPERATIONS - MGS and RTS**Redact:**

a. ~~(S//TK//REL)~~ Redact specific details about the Mission Ground Station (MGS) or Remote Tracking Station (RTS) commands that were uplinked to the satellite, i.e., orbit adjustment, deorbit, camera operations, SIGINT payload operations, etc.

Release:

a. (U) See RRG section 1.9.1 regarding release of locations of MGS associated with CAL missions.

b. (U) Release fact that the following U.S. remote tracking stations supported DISCOVERER (CORONA) and/or SAMOS reconnaissance satellite programs. (**Note:** CORONA/DISCOVERER 19 carried a non-recoverable MIDAS radiometer to collect earth radiation background data. Three additional remote tracking stations supported this radiometric mission and are releasable: Cape Canaveral, Ascension Island, and Woomera, Australia.)

- 1) Annette Island, Alaska
- 2) Fort Greeley (aka Donnelly Flats), Alaska
- 3) Fort Stevens, Oregon
- 4) Kaena Point, Hawaii
- 5) Kodiak (aka Chiniak), Alaska
- 6) New Boston, New Hampshire
- 7) Ottumwa, Iowa
- 8) Palo Alto, California

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- 9) Point Mugu, California
- 10) Vandenberg AFB, California
- 11) Christmas Island
- 12) Guam

c. (U) Release fact of and names of tracking ships and aircraft can be released in association with CAL launches.

d. (U) Release references to the generic command function of the AFSCF or the dedicated MGSs. For example, information that mentions explicitly or in context the fact that an unspecified MGS or RTS provided and/or relayed uplink commands to a satellite vehicle would not be considered sensitive. [CAUTION: See related redaction element above.]

6. TRAJECTORY, TRACKING, TELEMETRY

Release:

~~(S//TK//REL)~~ Release any data associated with the trajectory, tracking, and telemetry of the CAL program's boosters and satellite vehicles. [CAUTION: In accordance with RRG section 1.9.1, do not betray location of any RTS that might have processed such data.]

(b)(1)

(b)(3)

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(U) Appendix G - GAMBIT/HEXAGON Family

(U) Preface

(U) This document contains declassification guidance for the protection of National Reconnaissance Office (NRO) information equities involving the GAMBIT and HEXAGON families of reconnaissance satellites. It applies only to the declassification of NRO equities; other agency information is referred to the appropriate office in accordance with E.O. 13526 and established procedures. Declassification of NRO records is conducted under the Corporate Business Process, Automatic and Systematic 25-year Declassification Review Instruction 90-5, as approved on 22 July 2009. Per E.O. 13526 physical artifacts constitute records for the purposes of declassification review. The Director of the National Reconnaissance Office (DNRO) has appointed the Management Services and Operations' Information Review and Release Group (C/IRRG) as the NRO's initial 25-Year Release and Denial Authority. Only the Information Review and Release Group (IRRG) is authorized to review 25-year old NRO records and information equities for declassification or exemption from declassification.

(U) This programmatic declassification guidance updates and replaces relevant guidance currently contained in the *National Reconnaissance Office Review and Redaction Guide for Automatic Declassification of 25-Year-Old Information* (RRG). The guidance that follows is intended for integration into the RRG and does not constitute a stand-alone declassification guide. This document therefore assumes currently authorized standard declassification procedures and does not duplicate general guidance found within the current RRG.

(U) Original authority for protecting or releasing GAMBIT and HEXAGON information comes from four basic sources:

- (U) Executive Order 13526, 29 December 2009.
- (U) 10 USC 424, January 2004.
- (U) The NRO *Review and Redaction Guide*, Version 2.0, 28 April 2011.
- (U) DNRO approval of this guide on [-date-].

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Program Overview**

(U) The following programs constitute the GAMBIT and HEXAGON family of programs covered in this guidance. Collectively they fill the gap between the currently declassified CORONA, ARGON, and LANYARD (KH-1 through KH-6) systems and the end of U.S. film-based imagery satellite missions.

(U) E-6, initially BLANKET, was a component of the WS-117L/SAMOS project that became GAMBIT. Initiated by SAFSP in 1960, it was intended as a film-return search system with capabilities beyond CORONA. Many programmatic details are already declassified. See the RRG Appendix E.

(U) Project 307, established as an unclassified "null program" under USAF Space Systems Division in July 1961, provided security as the cover for E-6 wore thin. Under Project (or Program) 307 Air Force Systems Command procured four Agena-Bs and six Atlas boosters for EXEMPLAR.

(U) EXEMPLAR, established in September 1961, was the Confidential-classified name for the destination of materials obtained through Project 307. This term provided cover for the first four GAMBIT launches.

(U) CUE BALL, also known as Air Force system No. 483A, provided an unclassified name for EXEMPLAR.

(U) Project (or Program) 206 provided an additional unclassified name for CUE BALL/EXEMPLAR, the USAF Space Systems Division E-6 (GAMBIT) effort. The effort was transferred to SAFSP in late 1962.

(U) GAMBIT (KH-7), also known as or partially contained in E-6, Project 307, EXEMPLAR, CUE BALL, 483A, and Project 206, was the film return system flown from July 1963 through June 1967 (Missions 4001-4038). GAMBIT (KH-7) served as the first high-resolution surveillance satellite. Considerable KH-7 imagery has been declassified and released. Considerable GAMBIT (KH-7) programmatic information has been declassified and released under KH-7, the unclassified designation for GAMBIT's camera system often used as an unclassified designator for the entire GAMBIT (KH-7) program.

(U) HIGHERBOY, also known as HIGHBOY and DUAL MODE, emerged in the late 1960's out of concern that the HEXAGON system might not be available on schedule or perform as promised. HIGHERBOY would

232

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place a modified GAMBIT vehicle into a high altitude (300-350 mile perigee) orbit on 90 day missions, providing coverage similar to HEXAGON, before transit to lower (78 mile perigee) altitude for the balance of the mission. HIGHERBOY flew a single mission, on GAMBIT-3 vehicle No. 52 (Mission 4352). One of its two buckets failed to return on schedule; the second also suffered a malfunction and returned degraded film.

(U) Film Read-Out GAMBIT (FROG) served as NRO Program A's competitor to NRO Program B's initial electro-optical imagery (EOI) satellite.

~~(S//REL)~~ UPWARD, recently declassified, and DORIAN (KH-10), utilized KH-7 cameras and are also part of the GAMBIT family of systems. They do not, however, fall under the guidance in this document unless specifically included.

(U) GAMBIT-3 (KH-8) developed out of GAMBIT to fly a higher resolution camera system designated KH-8. It flew 54 missions (4301-4354) from July 1966 through April 1984. Imagery and some hardware specifics remain classified.

(U) FULCRUM emerged in late 1963 as a Central Intelligence Agency (CIA) concept for an NRO system combining CORONA coverage with GAMBIT resolution. Program A's similar S-2 concept provided competition for what became the HEXAGON system.

(U) HELIX served as a later name for the FULCRUM effort.

(U) HEXAGON (KH-9) also known as or partially contained in FULCRUM, S-2, and HELIX, emerged from competing concepts to provide a surveillance system that flew 20 missions (1201-1220) from June 1971 through April 1986. Considerable imagery from HEXAGON's mapping camera, flown on missions 1205-1216, has been declassified and released. Considerable HEXAGON mapping system programmatic information has been declassified and released under KH-9, the declassified designation for HEXAGON's camera system often used as an unclassified designator for the entire HEXAGON program.

(U) Mission planning, tasking, command and control, recovery, and film processing are inseparable components of the operational systems.

(U) Implementation

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(U) Upon approval by the Director, National Reconnaissance Office (DNRO) this document will be incorporated into the 2012 update of the *National Reconnaissance Office Review and Redaction Guide for Automatic Declassification of 25-Year-Old Information* (RRG) as Appendix G. The main text of the 2012 RRG will also be edited to incorporate the guidance contained in this document. This guidance applies only to NRO equities and does not apply to other agencies' equities, including images or intelligence obtained through NRO systems. Declassification of programmatic information does not imply or require the declassification of collection taskings, collected data, or the results of such collection.

(U) During the approval process for the 2012 RRG update, initiated in the first quarter of FY 2012, NRO offices will have an opportunity to review the integration of this guidance into the main text of the RRG. Approval of that integration will render Appendix G superfluous. Therefore the appendix will be removed from the RRG for the 2013 update, while this original guidance and the 2012 RRG are preserved through normal records management procedures.

(U) The guidance contained in this document goes into effect upon approval by the DNRO, in keeping with the spirit of Executive Order 13526 (29 December 2009) Sec. 3.1.(a). Approval of this guidance shall be understood as the DNRO's determination that little information about the programs in question continues to meet the standards for classification. In accordance with Sec. 1.4 of the Order, only information about the programs in question that could reasonably be expected to cause identifiable or describable damage to the national security shall remain classified. In accordance with Sec. 1.2.(c) of the order, information about the programs in question shall be declassified if there is significant doubt about the need for continued protection.

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General Approach

(U) Release:

(U) Release key events, programmatic development, government organizational participants and interfaces, and program structure of the GAMBIT and HEXAGON reconnaissance satellite families, and the role of the NRO within them, unless directed otherwise in this document or the RRG.

(U) Release information specifically identified for release in this document regardless of current RRG instructions.

(U) Redact:

~~(S//TK//REL)~~ Redact images from KH-8 and references to piggybacks (independent sub sats and pallets)

(U) Refer:

(U) Refer requests for imagery to NGA. This guidance applies only to NRO equities and programmatic information regarding the GAMBIT and HEXAGON family of programs. It does **not** apply to other agencies' equities, including images or intelligence obtained through NRO systems. Declassification of programmatic information does **not** imply or require the declassification of collected data or the results of such collection.

(U) Exemption Category 25X1: Reveal Sources and Methods

(U) *Terms, Code Words, Program and Project Names*

(U) Redact:

(U) Redact all classified terms and accompanying explanatory information for items designated as classified in Appendix C of the RRG unless directed otherwise in the following guidance.

(U) Release:

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(U) **Release** the following names and terms in association with each other and the GAMBIT and HEXAGON programs. These programs, as part of the larger GAMBIT and HEXAGON reconnaissance satellite families, are included within this declassification guidance. See Appendix C of the RRG for a more complete listing of releasable terms, code words, and project names. The RRG contains additional specifics about the terms and code words below that have already been partially declassified.

BLANKET	EXEMPLAR	GAMBIT	UPWARD
E-6	CUE BALL	HIGHERBOY	PROJECT 307
PROJECT 206	FROG	GAMBIT-3	FULCRUM
HELIX	S-2	HEXAGON	HIGH BOY
DUAL MODE	483A	KH-7	KH-8
KH-9	Sunset Strip	698-AL	VALLEY
ZEUS			

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~~TOP SECRET//TK//RSEN/NOFORN~~2. (U) *Acquisition Participants and Relationships*(U) **Redact**:

A. (U) **Redact** all contractors and subcontractors associated with the design, development, launch, and operation of the GAMBIT and HEXAGON reconnaissance satellite families that are not listed below or otherwise properly approved for public release.

B. (U) **Redact** detailed contractual information not approved for release or otherwise specified for redaction under RRG 1.11.3.

C. (U) **Redact** management data related to sensitive budgetary details and trends, classified contracting methodologies and measures, identities of individuals under cover, or still sensitive relationships and facilities, unless specifically directed otherwise in approved guidance.

(U) **Release**:

A. (U) **Release** the following NRO contractors and their subcontractors associated with the design, development, launch, and operation of the GAMBIT and HEXAGON family of programs:

Avco	Lockheed-Martin
Aerospace	Martin Marietta
Barnes Engineering	McDonnell Douglas
Boeing	North American
Corning Glass	Owens-Illinois
Eastman Kodak	Para Dynamics
Fairchild	Perkin-Elmer
General Electric	Philco
General Dynamics	Raytheon
Goodyear	RCA
Hughes Danbury	Rockwell
Irving Air Chute	STL
Itek	Textron
ITT	TRW
Lockheed	

B. (U) **Release** all employee names and photographs associated with the following contractors:

Perkin Elmer	Lockheed-Martin
Lockheed	Eastman Kodak

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3. (U) *Funding and Personnel*

(U) **Redact**:

A. (U) **Redact** NRO program funding information and methods, including amounts in programming and budget proposals, approved budgets, and transfers of funds per approved budgets, unless specifically directed otherwise.

B. (U) **Redact** manning totals for NRO organizational elements.

C. (U) **Redact** security mechanisms related to contracting, financial practices, operational security, and personnel security.

D. (U) **Redact** covert or still sensitive contracting security practices related to current security practices.

E. (U) **Redaction** guidance for names can be found in Section 10.1 of the RRG.

(U) **Release**:

A. (U) **Release** total program budgets for GAMBIT, HEXAGON, and related programs, **but no** breakdown figures.

B. (U) **Release** guidance for names (government or contractor) can be found in Section 10.1 of the RRG.

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4. (U) *Schedules, Concepts, and Plans*

(U) **Redact**:

A. (U) **Redact** post-launch mission timelines, operational concepts related to sensitive aspects of current systems (identified in the RRG and current classification guides), collection plans, and collection success or failure against any specific target unless directed otherwise by specific guidance.

(U) **Release**:

A. (U) **Release** general information on program schedules, program requirements, concepts, and plans, subject to redaction guidance above, unless directed otherwise by specific guidance.

B. (U) **Release** general information about major target categories (i.e. ICBMs, airfields, industrial facilities)

C. (U) **Release** Information pertaining to National Intelligence Estimates (NIEs) already declassified by the CIA, which appear in NRO documents being reviewed for declassification.

- a. Examples: "CIA's Analysis of the Soviet Union 1947-1991" (Published 2001: ID: CSI-1457), "CIA Cold War Records Selected Estimates on the Soviet Union 1950-1959" (Published 1993: ID: CSI-1637).

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~~TOP SECRET//TK//RSEN/NOFORN~~5. (U) *System Description*5.1. (U) *General*(U) Redact:

(U) Redact the following information about the GAMBIT and HEXAGON family of programs, identified in section 1.2 of this document, unless directed otherwise by specific guidance:

A. (U) Redact engineering data related to sensors, vehicle capabilities, or the development of future systems. Consistent with RRG 1.7 Redact (b.), IMINT Security and Systems Engineering Directorate Security may, upon request from the Information Review and Release Group, certify that technical information otherwise redacted under this guidance is outdated, offers no substantial assistance to potential adversaries, and represents no substantial risk to currently operational systems. That information may be found in photographs, illustrations, or physical artifacts as well as text. Such certification renders the information releasable in the absence of additional concerns.

B. (U) Redact operational data related to collection strategy, sensitive collection operations, satellite command and control, collection by or in cooperation with other intelligence disciplines, [] sensor slew rates, and still sensitive intelligence activities or covert operations as identified in the RRG or NRO classification guidance.

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C. ~~(S//TK//REL)~~ Redact piggyback payloads unless specifically directed otherwise in RRG guidance.

D. (U) Redact vulnerability and countermeasure information and other sensitive information as identified in the RRG.

(U) Release:

A. (U) (Subject to contractor consultation where required) Release programmatic details of the GAMBIT and HEXAGON family of programs, including contracting firm identities, unless directed otherwise by specific guidance.

B. (U) Release the non-operational IMINT mission numbers listed below as a mission group (all flights) and individually,

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associated with mission launch and recovery dates and general operations:

4000	GAMBIT (KH-7, Jul 63 - Jun 67)
4300	GAMBIT-3 (KH-8, Jul 66 - Apr 84)
1200	HEXAGON (KH-9, Jun 71 - Apr 86)

C. (U) Release the S-2 program as a development effort sponsored by Program A (SAF/SP) in the early to mid-1960s as a follow-on to the CORONA photo-satellite system.

D. (U) Release orbital ephemerides and ground traces for KH-7, KH-8, and KH-9 missions.

E. (U) Release information about major program milestones, unless directed otherwise by specific guidance.

F. (U) Release discussion of film types and specific details currently approved for release under the Corona-Argon-Lanyard programs. See RRG Appendix F.

G. (~~S//REL~~) Release Eastman Kodak's association with KH-7, KH-8, KH-9, the film used, and the facilities where the film was burned and the silver extracted, unless such a facility is currently classified under other guidance.

H. (U) Release association of the GAMBIT and HEXAGON programs with the Air Force Satellite Control Network's Satellite Test Center in Sunnyvale, California as otherwise currently approved for release under the Corona-Argon-Lanyard programs. This includes release of all AFSCN tracking stations in association with declassified NRO programs. See RRG Appendix F.

I. (U) Release photographs, drawings, and models/artifacts of the GAMBIT and HEXAGON family of programs, provided they do not offer substantial assistance to potential adversaries or represent any substantial risk to currently operational systems. Per 1.7.1 Redact (a.) above and RRG 1.7 Redact (b.), IMINT Security and Systems Engineering Directorate Security may, upon request from the Information Review and Release Group, certify that a specific depiction or artifact meets this standard. Such certification renders the depiction or artifact releasable in the absence of additional concerns, such as International Traffic in Arms Regulations or the Missile Technology Control Regime.

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J. (U) Release information about system boosters and launches unless specifically directed otherwise.

K. (U) Release information about Lifeboat, a redundant and self-contained back-up stabilization system (BUSS) used on the AGENA space Vehicle that could be activated for recovering the satellite reentry vehicle in the case of an AGENA power failure.

(U) Refer:

A. (U) Refer to NGA detailed product or target information for KH-8

B. (U) Refer to NGA's KH-9 Redaction Guide (January 2013) for excluded targets. All other targets are releasable per NGA guidance.

(1) (U) Performance Evaluation Team Reports do not require referral to NGA. For these reports redact NPIC names not on the releasable list on Appendix B.

5.2. (U) *GAMBIT (KH-7)*

(U) Redact:

A. (U) Redact any information specified for continued protection in this guidance or the current RRG.

(U) Release:

(U) Release the fact of the GAMBIT KH-7 surveillance system and the following facts about it:

A. (U) Operational from July 1963 to June 1967. The Intelligence Community's first high resolution surveillance or spotting satellite.

B. (U) Mission Numbers (4001-4038) and individual mission dates.

C. (U) Returned single bucket of film to earth for each mission.

D. (U) Date of bucket reentry.

E. (U) Successfully returned film on 34 of 38 missions; usable images were obtained from 30 of those 34 missions.

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- F. (U) Returned 19,000 mappings, totaling 43,000 linear feet.
- G. (U) "Footprint" on the ground for KH-7 collections was approximately 10 nm by 12 nm; total ground coverage for all missions was about 6.6 million square nm.
- H. (U) Best resolution was initially four feet (1.2 meters) on ground; by 1966, best resolution improved to two feet (.6 meters).
- I. (U) Capable of imaging areas 12nm wide, ranging from 5 to 400 nm long.
- J. (U) Provided cartographic information for large scale (1:50,000) maps for Department of Defense.
- K. (U) Priority targets for the system included Soviet and Chinese nuclear installations and ICBM sites.
- L. (U) Release "fact of" Film Readout of Gambit (FROG) as a competitor for initial EOI development and general description of the film readout approach, but no additional details.
- M. (U) GAMBIT provided the optical system considered for later use in UPWARD.
- N. (U) Total cost of the GAMBIT program between FY1963 and FY1967, was \$651,000,000 in 1963 dollars.
- O. (U) Release information about Project Van Winkle, storage of remaining two KH-7 vehicles with associated artifacts and records at Vandenberg AFB in preparation for program declassification, unless other guidance requires continued protection of specific details.
- P. (U) Release general information about major target categories (i.e. ICBMs, airfields, industrial facilities), quantities per mission or bucket, and general geographic region (i.e. Soviet Union, Central America, CONUS) as well as Information pertaining to National Intelligence Estimates (NIEs) already declassified by the CIA, which appear in NRO documents being reviewed for declassification.

5.3. (U) *GAMBIT-3 (KH-8)*

(U) Redact:

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- A. (U) Redact targeting information beyond "fact of" targets in the Soviet Union and China.
- B. (U) Redact any information specified for continued protection in this guidance or the current RRG.
- C. (U) Redact best resolution and specific quantifications of resolution better than 2 feet.

(U) Release:

(U) Release the fact of the GAMBIT-3 KH-8 surveillance system and the following facts about it:

- A. (U) The GAMBIT-3/KH-8 system developed out of the GAMBIT/KH-7 system and achieved greater resolution than its predecessor.
- B. (U) Operational from July 1966 - April 1984.
- C. (U) Mission Numbers (4301-4354) and dates.
- D. (U) Designed to return 1 bucket of film to earth for vehicle numbers 1-22 and 2 buckets for vehicles 23-54.
- E. (U) The 54 KH-8 missions failed to reach orbit 3 times. They returned images each time they reached orbit, achieving over 94 percent reliability.
- F. (U) Total cost of the GAMBIT-3 program between FY1964 and FY1985 was approximately \$2,300,000,000 in respective year dollars.
- G. (U) The roll joint's design and capabilities can be released.
- H. (U) Release general information about major target categories (i.e. ICBMs, airfields, industrial facilities), quantities per mission or bucket, and general geographic region (i.e. Soviet Union, Central America, CONUS) as well as Information pertaining to National Intelligence Estimates (NIEs) already declassified by the CIA, which appear in NRO documents being reviewed for declassification.

5.4. (U) *HIGHERBOY*

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(U) Redact:

A. (U) Redact any information specified for continued protection in this guidance or the current RRG.

(U) Release:

(U) Release the fact of HIGHERBOY as a proposed high altitude GAMBIT mapping mission and the following facts about it:

A. (U) The HIGHERBOY/HIGHBOY/DUAL MODE concept emerged in the late 1960's out of concern that the HEXAGON system might not be available on schedule or perform as promised.

B. (U) HIGHERBOY would place a GAMBIT vehicle into a high altitude (300-350 mile perigee) orbit on 90 day missions before lowering it to lower (78 mile perigee) altitude for the balance of the mission.

C. (U) From a high altitude orbit the system would provide coverage similar to Hexagon.

D. (U) Configuration changes were necessary to both the payload and satellite control sections of the vehicle to support dual-mode operations.

E. (U) HIGHERBOY flew a single mission, on GAMBIT-3 vehicle No. 52. One of its two buckets proved unrecoverable; the second also suffered a malfunction and returned degraded film.

5.5. (U) *FULCRUM/HELIX*

(U) Redact:

A. (U) Redact any information specified for continued protection in this guidance or the current RRG.

(U) Release:

(U) Release the fact of FULCRUM and HELIX and the following facts about them:

A. (U) The CIA developed the FULCRUM concept for an NRO system, beginning in late 1963, as a vehicle combining CORONA coverage with GAMBIT resolution.

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B. (U) FULCRUM and Program A's S-2 were competing concepts for what became the HEXAGON system.

C. (U) HELIX served as a later name for the FULCRUM effort.

D. (U) Information about the FULCRUM and HELIX efforts is releasable under the HEXAGON guidance.

5.6. (U) *HEXAGON (KH-9)*

(U) Redact:

A. (U) Redact any information specified for continued protection in this guidance or the current RRG.

(U) Release:

(U) Release the fact of the Hexagon KH-9 surveillance system and the following facts about it:

A. (U) Operational from June 1971 to April 1986.

B. (U) Mission Numbers and dates, including dates of bucket reentry.

C. (U) The mapping camera was flown on 12 of the 20 missions (1205-5 through 1216-5), all of them successful; duration of each of these missions (ranging from 42 to 119 days).

D. (U) This "mapping camera" imagery system was devoted solely to mapping, charting, and geodesy (MC&G).

E. (U) The mapping camera returned single bucket of film to earth for each mission.

F. (U) The mapping camera returned 29,000 mappings totaling 48,000 linear feet.

G. (U) The mapping camera "footprint" on the ground was approximately 70 nm by 140 nm; total ground coverage for all 12 missions was about 104 million square nm.

H. (U) The mapping camera provided key cartographic information for Level 1 Digital Terrain Elevation Data (DTED) and 1:200,000 scale maps.

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- I. (U) Average mapping camera resolution was initially about 30 ft on the ground; improved to about 20 ft on later missions.
- J. (U) The mapping camera was designed to support foreign and domestic mapping requirements and global geodetic positioning; biggest users were the Defense Mapping Agency (DMA) and United States Geological Survey (USGS).
- K. (U) The panoramic (main) camera achieved 2-7 foot resolution with a footprint approximately 16.8 nm by 300 nm. Total ground coverage for all missions was about 230,000,000 square nm.
- L. (U) Coverage of key control point areas was imaged in stereo or tri-laps (three times) on a single operation to provide analysts with enough detailed information.
- M. (U) Hexagon employed a maximum of 5 buckets per vehicle, 4 for the main camera and one for the mapping camera when it was flown.
- N. (U) Total cost of the HEXAGON program, including the CIA-managed portion, between FY1966 and FY1986, was \$3,262,000,000.
- O. (U) Release general information about major target categories (i.e. ICBMs, airfields, industrial facilities), quantities per mission or bucket, and general geographic region (i.e. Soviet Union, Central America, CONUS) as well as Information pertaining to National Intelligence Estimates (NIEs) already declassified by the CIA, which appear in NRO documents being reviewed for declassification.
- (1).(U) Refer to NGA's KH-9 Redaction Guide (January 2013) for excluded targets. All other targets are releasable per NGA guidance.
- P. (U) during the recovery attempt of Mission 1201-3 on 10 July 1971, the recovery parachute was completely destroyed and the capsule sank on impact, coming to rest at on the floor of the Pacific Ocean off the Hawaiian Islands. This event provided the opportunity for the U.S. for the first time to seriously attempt to retrieve a space capsule from the bottom of the Pacific Ocean.
- (U) Release the general information surrounding the event as described above and the following details:

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- a. The CIA, supported by the U.S. Navy, attempted to retrieve the recovery vehicle from a depth of 16,400 feet using the Navy's deep submersible Trieste-11 after the capsule was located by the Scripps Institute's undersea survey ships which were under charter to the USN;
- b. Release details of the discussions between members of the USN, including the Assistant Secretary of the Navy, the NRO (Dr. Naka and DNRO Lucas) and CIA (Duckett) about the feasibility of recovering the Mission 1201-3 capsule using the TRIESTE II;
- c. Release discussions between the NRO, CIA and KODAK regarding the possible survivability of the film and its possible exploitation after recovery;
- d. Release details surrounding the recovery effort including the techniques employed and concerns of Soviet interest in the activity involving the US sea-bottom survey ships;
- e. Release the timeline of the 8 month 1971-1972 recovery effort ;
- f. Release details related to the 26 April 1972 failed recovery effort, including information on the condition of the recovered film.

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(U) Redaction Categories Other Than Sources and Methods

1. (U) *Impair Relations with a Foreign Country (25X6)*

(U) See RRG 6

2. (U) *Violate a Statute, Treaty or International Agreement (25X9)*

(U) See RRG 9. There may be instances where statutes, treaties, and/or international agreements may affect the outcome of declassification decisions regarding information in GAMBIT or HEXAGON records. Before citing this exemption as the basis for a declassification decision, refer it to the Government Approving Authority, who will coordinate with the appropriate NRO authorities to confirm the public disclosure status of the information at issue pursuant to the terms of a specific law, treaty, or agreement.

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(U) GAMBIT and HEXAGON Programmatic Declassification Decision Process and Guidance

(U) Redact:

A. (U) Redact information concerning the GAMBIT and HEXAGON declassification decision process that is properly classified under this or other guidance.

(U) Release:

A. (U) Release descriptions of actions taken after 1997 to declassify the GAMBIT and HEXAGON programs, and associated reports, memorandums, and correspondence, **provided that** classified information as specified above and elsewhere in the Review and Redaction Guide for Automatic Declassification of 25-Year Old Information and relevant classification guides is not released.

B. (U) Release information in the various Policy Decision Risk Assessments, declassification authorizations, and declassification review and redaction guidance, **provided that** classified information as specified above and elsewhere in the Review and Redaction Guide for Automatic Declassification of 25-Year Old Information and relevant classification guides is not released.

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(U) Appendix H - QUILL

(U) Quill was an experimental Synthetic Aperture Radar (SAR) satellite, based on Corona satellite and available SAR hardware, which flew in 1964. Because of diplomatic and security concerns the brief mission imaged only selected targets within the United States. Those targets could be inspected on the ground to validate the intelligence value of orbital SAR without alerting the Soviets to the capability or touching off diplomatic protest over active illumination of sovereign territory. The mission provided proof-of-concept, but development of the first operational SAR system proceeded slowly. Much of the technology and basic science behind Quill is available to the general public.

Redact:

1. ~~(S//TK//NF)~~ Redact
2. ~~(S//TK//NF)~~ Redact
 (b)(1)
(b)(3)
3. ~~(S//TK//NF)~~ redact
4. ~~(S//TK//NF)~~ Redact
5. (U) Redact any information not specifically approved for release below.

Release:

1. (U) Release the fact of the Quill experimental synthetic aperture radar satellite as the world's first imaging radar satellite.
2. (U) Release photographs and drawings of the Quill satellite and

251

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associated hardware only after Systems Engineering Directorate, Imagery Intelligence Systems Acquisitions Directorate, and the Office of Security and Counterintelligence have certified that the specific image in question offers no substantial assistance to potential adversaries and represents no substantial risk to currently operational systems. Such certification renders the image releasable in the absence of additional concerns.

3. (U) Release the fact that Quill's synthetic aperture radar technology emerged from the work of Louis Cutrona's team at the University of Michigan's Environmental Research Institute of Michigan (ERIM), publicized in 1960 when the U.S. Army released images of American cities captured by the airborne AN/UPD-1 SAR system.
4. (U) Release the fact that in the late fall of 1961 Col. William G. King, Director, Program A, began examining the possibility of launching an experimental proof-of-concept SAR satellite. Release fact that King assigned then-Major David D. Bradburn to investigate the potential utility and merits of such an experiment.
5. (U) Release the fact that Director of the National Reconnaissance Office (DNRO) Joseph V. Charyk approved the proposed proof-of-concept experiment in mid-November 1962.
6. (U) Release the fact that the SAR proof-of-concept program was identified as "P-40" and that the satellite itself was identified as "Quill".
7. (U) Release the fact that Quill used technology from the Corona program, including the Agena space vehicle and the physical return of data on optical film.
8. (U) Release the fact of and facts about the optical correlator technology which, in the absence of adequate electronic computer technology, used optics to process SAR data into useful analog images.
9. (U) Release the fact that P-40 called for the launch of two identical Quill vehicles, designated 2355 and 2356, with first launch planned for April 1964. Release the fact that a third vehicle's payload was also prepared, with no booster identified for it.
10. (U) Release in relation to Quill the fact that original project goals included 50-foot resolution in both azimuth and slant range; quantitative evaluations of radar system

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performance, including azimuth-direction; limitations imposed by design parameters; in-flight performance; vehicle attitude behavior; impact of atmospheric conditions; data link design and performance; data on target field reflectivity; general engineering parameters for aerospace radar system designs used or available to the public during the Quill program; and ground recording and processing capabilities. Consistent with RRG 1.7 Redact (b.), IMINT Security, the Reconnaissance Systems Office, and Systems Engineering may, upon request from the Information Review and Release Group, certify that technical information related to Quill offers no substantial assistance to potential adversaries and represents no substantial risk to currently operational systems. That information may be found in photographs, illustrations, or physical artifacts as well as text. Such certification renders the information releasable in the absence of additional concerns.

11. (U) Release the fact that Maj. Bradburn subsequently determined that range resolution would not be a significant project goal.

12. (U) Release the fact that Quill's SAR unit, designated KP-II, was a modified version of the AN/UPQ-102 pulsed-Doppler system Goodyear produced for the RF-4C reconnaissance aircraft. Release the fact that modifications included removing unnecessary aerial or operational system components, such as lateral motion compensation and swath modification capabilities, from the original design.

13. (U) Release the fact that the fifteen feet long by two feet wide SAR antenna, covered by a protective fairing during launch, was flush-mounted on the Agena bus, protruded 2.5 inches from its surface, and was fixed at a 55-degree downlook angle. Release that three of the four antenna mounts slid along fixed tracks to account for thermal stress.

14. (U) Release the fact that the SAR unit's klystron used a heat sink in the form of an aluminum plate about ten inches long and five inches high, painted with a special thermally conductive white paint, with several copper fingers braised to its back. The plate bolted to the anode of the klystron, and the copper fingers conducted heat to another metal heat sink, placed next to the satellite's skin so the klystron's heat could radiate into space.

15. (U) Release the fact that the experimental mission was intended to last only 96 hours, with the radar operating no longer than five minutes per orbit, for no more than three orbits in succession, and for no more than 80 minutes altogether. Release the fact that three silver-zinc batteries provided power, without

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provision for recharging, and so determined the duration of the experiment.

16. (U) Release the fact that Quill employed the same Agena upper stage used as a bus for the Corona imagery satellite. Release the fact that Quill launched on an augmented Thor missile, like a Corona satellite. Release that this Agena-Thor combination was expected to support effective operation of the SAR experiment, with an anticipated ± 0.4 degrees of attitude uncertainty and ± 0.25 degrees limit cycle in pitch, yaw, and roll, with rates of change not greater than .002 degrees/second in pitch, .005 degrees/second in yaw, and .003 degrees/second in roll.

17. (U) Release the fact that in Quill's KP-II radar unit the reflections from each signal pulse produced a line on the display of a cathode ray tube. The line's length fluctuated according to the intensity of the return. Photographic film recorded an image of the display, with varying densities on the film corresponding to the varying intensity of the radar returns. The film moved across the display to record successive intensity trace displays as adjacent positions on the film. Engineers anticipated an aspect ratio of roughly 6:9 between range and azimuth scales.

18. (U) Release the fact that ground tests showed the system capable of achieving slant range resolution of 25-35 feet.

19. (U) Release the fact that Quill conveyed radar data to the ground in two ways. As in Corona, exposed film went into an Itek take-up cassette in a General Electric re-entry vehicle for recovery by special Air Force C-130 teams. This approach to data recovery had appeared in a 14 October 1958 *Aviation Week* article. The other method employed a UHF wideband data link to transmit radar data to recorders at the Vandenberg, California, and New Boston, New Hampshire, tracking stations used for Corona. Each station translated the data into a cathode ray tube image and recorded it on film, using equipment identical to that on the satellite. Preflight engineering analysis considered this task simple and straightforward. Each location thus had a recorder identical to the one on Quill, together with control systems for establishing synchronized reception from the satellite.

20. (U) Release the fact that the product of either method of data transmission was a film transparency. This film preserved the Doppler-coded return signal from the KP-II radar unit. Technicians could convert the preserved analog information into visual imagery using a purpose-built device, the Precision Optical Processor.

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Release the unclassified fact that ERIM's Lou Cutrona had developed this technique for processing SAR Doppler data in the 1950's, using analog optics to perform a task beyond the capabilities of that era's digital electronic computers.

21. (U) Release the fact that the Precision Optical Processor used optical lenses to perform fast Fourier transforms. The film defracted a laser beam into three emerging waves, two of them producing images at focal lengths varying with the SAR data's slant range. An amorphic telescope focused the resulting images, which could then be photographed in high resolution to produce intelligible imagery.

22. (U) Release the fact that the complete Quill system filled the Agena's three payload sections: barrel, conical, and nose. The KP-II radar system, weighing 370 pounds, went in the barrel section, which measured five feet across with structure rings 15 inches apart and a .06-inch skin. The recorder system, including the recorder and the film-supply cassette, weighed approximately 99 pounds and went in the conical section, which tapered 15 degrees from a five-foot diameter at its base, where it joined the barrel section, through its height of 32.95 inches. The reentry capsule, located in the vehicle's nose cone, protected exposed film containing the raw data until it arrived safely back on Earth.

23. (U) Release the security procedures used to transfer Corona materiel to Quill.

24. (U) Release the fact that Quill followed a typical Corona mission profile. The Agena vehicle would rotate 180 degrees after reaching orbit, flying tail first to facilitate film recovery and terrestrial coverage. The antenna would then be oriented with the main lobe of the radar pointed 55 degrees below horizontal at a strip that would be 93 miles to the left of the satellite's ground track and 10 nautical miles wide.

25. (U) Release the Quill program schedule and schedule changes. Release the fact that an approaching train threatened the scheduled 21 December 1964 launch from Vandenberg Air Force Base. Release that the launch occurred at 11:08 am Pacific Standard Time.

26. (U) Release the fact that Quill was identified and registered as Satellite 1964 87a.

27. (U) Release that the Quill mission lasted four days, as planned, before battery failure during orbits 72-73. Release that the radar operated fourteen times in orbit between 0644 Coordinated

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Universal Time (UTC) 22 December 1964 and 0618 UTC 26 December 1964, imaging large swaths of the northeastern and western United States.

28. (U) Release orbital ephemerides and ground traces for the Quill mission.

29. (U) Release the fact that data from the fourteen radar passes went to the ground station in view, either Vandenberg or New Boston, over a wideband (UHF) data link in real time and that the onboard film recording system captured data from the first seven radar passes. Release the fact that on 23 December, during the 33rd orbit, the satellite jettisoned its reentry capsule for a successful recovery. Release the fact that technicians developed the film at Westover Air Force Base and dispatched it to a facility that ran it through the specially made Precision Optical Processor and produced image films.

30. (~~S//REL~~) Release general descriptions of the ground calibration tests,

(b)(1)
(b)(3)

31. (U) Release the fact that the Quill system achieved azimuth resolution of 7.5 feet, the theoretical maximum for the 15-foot antenna, surpassing its 10-foot goal. Release the fact that it achieved slant range resolution of approximately 80 feet, limited by available bandwidth, and had illuminated approximately 100,000 square miles, producing useful images of nearly 80 percent of the area illuminated. Release the fact that approximately 63 percent of the images produced were of the best possible quality that the Precision Optical Processor could provide; the rest were degraded for radar testing or by slight errors in setting the pulse repetition frequency. Release that the Quill system lost only 4 percent of its captured images unintentionally.

32. (U) Release the fact that the resulting imagery revealed terrain features and human construction, holding promise for strategic reconnaissance. Release that weather had minimal affect on image quality.

33. (U) Release the fact that the satellite re-entered the atmosphere at 1027 UTC 11 January 1965, on orbit 333.

34. (U) Release the fact that DNRO Brockway McMillan ordered the second Quill vehicle removed from the launch schedule on 5 Jan 1965 pending full review of the first mission. Release that Program A Director Maj. Gen. Robert Greer subsequently recommended

256

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cancellation of the launch program, having achieved its experimental proof-of-concept objectives. The program was suspended with DNRO McMillan's concurrence and substantial unexpended funds remaining. The Thor-Agena launch vehicles were recycled into the Corona program, and the radar equipment was destroyed.

35. (U) Release, per their concurrence, the role of mission partners Goodyear, General Electric and Lockheed Missile and Space Company in the Quill program, including previously acknowledged company locations and the names of senior corporate and corporate project management staff.

36. (U) Release [REDACTED]

(b)(3)

37. (U) Release LMSC (Hiller) in association with QUILL. Hiller Helicopter plant, also known as the Advanced Projects Integration Facility, or Advanced Projects Facility (APF, or simply AP), in Palo Alto, California, served until 1969 as a cover in which the CORONA second stage Agena satellites, Itek cameras, EKC film, and General Electric reentry capsules were assembled and tested before shipment to Vandenberg AFB.

38. (U) Release AFSSPL was the Laboratory and AFSPPF was the proposed processing facility for the film.

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Refer:

1. ~~(S//REL)~~ Refer to U.S. Air Force references to the Higasser program, circa 1960, examining the possibility of high orbital SAR and parallel Logasser program examining SAR potential at 10-300 mile ranges.

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(U) Appendix I - 50-Year Exemptions

Note: Portion marks reading REL in this appendix indicate REL to USA, FVEY.

(U) This document establishes the criteria for determining what 50-year-old NRO information shall be declassified and what 50-year-old NRO information must remain classified, as required by E.O. 13526. To maximize the release of information when a document cannot be declassified in its entirety, residual classified information will be redacted (rendered unreadable) so that the rest may be released. Before release, certain information may have to be referred to an outside agency that had original classification responsibility, or otherwise has concern for the information.

(U) The sensitivity of the NRO's Cold War mission required the organization to remain covert until 1992. Significant amounts of the technology developed by the NRO, and the methodologies for employing that technology, may remain sensitive even though they fall within the 50-year-old information declassification framework of E.O. 13526. The need to protect sensitive space intelligence operations and capabilities was reaffirmed by the President in *National Space Policy*, 28 June 2010.

(U) Release: All readers should note that the main objective of this process, per the President's intention in E.O. 13526, is to release as much information as possible without compromising national security. 50-year-old Information not meeting any of the E.O. 13526 exemption criteria below must be recommended for release.

(U) Upon identification of 50-year-old NRO programs that remain partially or fully classified, IRRG shall declassify and release their codewords/cover names in association with the NRO and pursue the possibility of securing programmatic declassification approval, reporting the rationale for any continued classification of such programs to the Interagency Security Classification Appeals Panel (ISCAP).

(U) All NRO documents *exempted* from automatic declassification in full or in part during the initial 25-year review and subsequent 50-year review will be declassified if they are not re-evaluated and exempted again by 31 December of the year in

259

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which they become 75 years old. Any date or event given for declassification is reliant on the required DNI approval for declassification of any system (legacy or current).

Exemptions from Declassification at 50 Years Old:

(U) NRO systems provide the foundation for global situational awareness, and address the nation's toughest intelligence challenges. NRO systems are frequently the only collectors with access to critical areas of interest, and data from overhead sensors provides unique information and perspectives not available from other sources. Intelligence collected by NRO systems has provided advance warning of potential military aggression, identified weapons of mass destruction programs, supported traditional military and counterinsurgency operations, and located and tracked targets of highest interest. NRO systems have also been critical to enforcing arms control and environmental treaties, and supporting humanitarian relief efforts. NRO systems are the first responders of choice for the DoD, IC, and policy decision makers. In order to continue this work we require the ability to appropriately protect our equities.

~~(S//TK//REL)~~ [Redacted]
[Redacted] (b)(1)
(b)(3)

~~(S//TK//REL)~~ [Redacted]
[Redacted]
[Redacted]

(U) 1.0 Reveal Sources and Methods- 50X1

Justifications:

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(U) SUBJECT: Protect "Sensitive" Sites/Locations

~~(S//TK//REL)~~ Continued protection will be required of much of the information about NRP SIGINT and IMINT mission ground stations.

[Redacted]

(b)(1)
(b)(3)

Declassification of information related to ground stations at 50 years will cause exceptionally grave harm to national security.

(U) SUBJECT: Processing Techniques and Methodologies:

~~(S//TK//REL)~~ Operational details that offer insight into current command and control methodologies remain sensitive and must continue to be classified.

[Redacted]

(b)(1)
(b)(3)

Declassification of information related to processing techniques and methodologies at 50 years will cause exceptionally grave harm to national security.

(U) SUBJECT: Programmatic Data (to include Launch Operations, Trajectory, Tracking, Telemetry)

~~(S//TK//REL)~~ Specific programmatic data requires continued classification protection into the 21st Century.

[Redacted]

(b)(1)
(b)(3)

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[redacted] declassifying such information will cause exceptionally grave harm to national security.

(b)(1)

(b)(3)

Redact:

- a. (U) Redact all cable address slugs **not** specifically identified for release in the RRG and current classification guide, due to continued use or association with activities requiring continued protection.
- b. (U) Redact all digraphs, trigraphs, and other abbreviations for NRP codewords, etc. regardless of unclassified status as stand-alone terms wherever their context reveals a still-classified meaning or otherwise discloses still-classified information.
- c. (U) Redact all contract numbers associated with NRP contractors, and identification of all contractors, where the relevant NRO association or scope of association has not been approved for release. See RRG 1.11.3. Where such 50-year old associations are identified, IRRG shall pursue the possibility of securing release approval.
- d. (U) Redact any information indicating or implying a specific individual was the NRO Comptroller. This information needs to be protected due to covert contracting and budgeting procedures, in the absence of specific guidance. Where such 50-year old information is identified, IRRG shall pursue the possibility of securing such specific declassification guidance.
- e. (U) Redact all information associated with the Tactical Intelligence and Related Activities (TIARA) budget line that supported the DRSP and supports what is now the Defense Space Reconnaissance Program (DSRP), due to continued use of this budget procedure and the associated current classification guidance.
- f. (U) Redact all details about the methods, procedures, systems and equipment (tasking, communicating, etc.) involved in providing overhead intelligence in support of tactical forces, in the absence of specific guidance. Where such 50-year old information is identified, IRRG shall pursue the possibility of securing such declassification guidance.
- g. (U) Redact all 50-year old information about former NRO programs that identifies *specific* threats to and vulnerabilities of *current or planned* satellite ground and space systems,

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deception and denial countermeasures to which *current or planned* space systems are susceptible or that they may employ, and defensive countermeasures taken to minimize damage or disruption to *current or planned* ground and space systems, or to reduce their susceptibility to deception and denial.

h. (U) Redact 50-year old information that reveals the existence of currently operational facilities or relationships associated with currently operational classified systems. See listing in RRG 1.3.3 (IMINT systems) and 1.4.2 (SIGINT systems).

i. (U) Redact 50-year old information that reveals the existence of covert facilities or relationships in non-operational classified systems. See listing in RRG 1.3.2 (IMINT systems) and 1.4.2 (SIGINT systems).

j. (U) Redact all 50-year old information related to NRO contract administration as identified in RRG 1.11.3, in the absence of specific release guidance, due to continued association with sensitive procedures and programs. Prior to invoking this exemption, IRRG shall consult current classification guides and relevant subject matter experts to confirm that such 50-year old information still represents a reasonable and specific threat to NRO activities.

k. ~~(C//NF)~~ Redact any 50-year old information revealing or implying the development and execution of cover stories to disguise NRP facilities and their associated project activities in the absence of other guidance. This protection extends to cover certain types of personnel involved with program activities at the affected facilities. Prior to invoking this exemption, IRRG shall consult current classification guides and relevant subject matter experts to confirm that such 50-year old information still represents a reasonable and specific threat to NRO activities.

l. (U) Redact any 50-year old information revealing personnel or physical security procedures and processes that remain in effect and sensitive under current classification guidance.

m. (U) Redact all 50-year old information, other than KH-numbers and unclassified codewords/cover names, concerning programs that remain classified under current classification guides. Upon identification of such 50-year old programs, IRRG shall pursue the possibility of securing programmatic declassification approval and report the rationale for any

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continued classification of such programs to the Interagency Security Classification Appeals Panel (ISCAP) for confirmation.

n. ~~(TS//TK//REL)~~ Redact 50-year old information that reveals:

- the fact of or facts about any system used for [redacted] or special access programs, in the absence of specific approved declassification guidance. See n., above, for action upon identification of such system or program.
- [redacted] in the absence of program-specific declassification approval.
- the fact of [redacted]
- general association of [redacted] with the NRO.
 - o [redacted]
- [redacted] in the absence of program-specific declassification approval.
- details beyond the fact of any [redacted] NRO program and its unclassified codeword/cover name, in the absence of specific approved declassification guidance.

Refer:

(U) Refer to NSA or NGA information that may refer to 50-year old methods used to identify, select, prioritize, and process target sites for *current or planned* NRO overhead reconnaissance systems, in the absence of program-specific release guidance.

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(U) 2.0 Reveal Information That Would Assist in the Development or Use of Weapons of Mass Destruction- 50X2

Justifications:

~~(S//TK//REL)~~ At the NRO, documents that include information on WMDs [redacted]

[redacted] The
declassification of information relating to the survivability and vulnerability of NRP satellite systems and ground operations to the effects of nuclear, biological, and chemical weapons will do exceptionally grave harm to national security. Declassification of these details will allow hostile forces to protect against NRO's countermeasures or exploit vulnerabilities in our systems.

(b)(1)
(b)(3)

Redact:

a. (U) Redact information relating to the survivability and vulnerability of NRP satellite systems to the effects of nuclear weapons.

b. (U) Redact information describing NRP satellite system countermeasures against the effects of nuclear weapons and those countermeasures' effectiveness.

c. (U) Redact information detailing the survivability and vulnerability of NRP ground systems to the effects of weapons of mass destruction, including nuclear, biological, and chemical weapons.

d. (U) Redact information describing NRP ground system countermeasures against the effects of weapons of mass destruction and the effectiveness of those countermeasures.

Refer:

(U) Unless contained in a document generated by another government agency, refer any classified or unclassified information related to weapons of mass destruction concerning chemical or biological weapons to the U.S. Army. Refer similar information concerning radiological and nuclear weapons of mass destruction to the Department of Energy.

(U) 3.0 Reveal Information That Would Impair U.S. Cryptologic Systems or Activities - 50X3

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(b)(3)

Justifications:

(U) [REDACTED]

[REDACTED] The declassification of specific details about cryptologic equipment, software, and related services on any particular NRP program will do exceptionally grave harm to national security.

Redact:

(U) Redact 50-year old information relating to cryptographic equipment employed on an NRP program. This includes but is not limited to information related to techniques, design, and/or use.

Refer:

(U) Refer to NSA any information related to cryptologic system descriptions, technology, capabilities, operations, program names and numbers, dates, contractors, funding, or vulnerabilities of these systems, whether used in NRO satellites, ground stations, or by some other federal agency.

(U) 4.0 Reveal Information That Would Impair the Application of the State-of-the-Art Technology Within a U.S. Weapon System - 50X4

Justifications:

~~(S//TK//REL)~~ NRO-developed technology may be used in U.S. non-space systems, including weapon systems; conversely, U.S. weapon system technology may be used in NRO overhead systems. NRO near real time overhead systems also provide defense-related information for the planning and conduct of military operations. The declassification of this information at 50 years will do exceptionally grave harm to national security because IMINT, SIGINT and COMM systems in use now have evolved incrementally from the earliest systems. Methods used to assist in and conduct military operations against legacy military technology (for example: older aircrafts still used in developing parts of the world) remain in operation today.

Redact:

266

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(U) Redact 50-year old information that identifies exactly how NRP overhead systems directly support U.S. forces, and where and when these NRP systems provide critical information to U.S. weapon systems that improves their battlefield accuracy and lethality. This information includes but is not limited to NRP collectors, data provided (including formats), communications methods and limitations, recipients, planned uses, and vulnerabilities. (**Note:** the fact that NRP overhead systems support the warfighter with imagery and signals intelligence is unclassified.)

Refer:

(U) Refer information relating to state-of-the-art technology employed in U.S. weapon systems to the appropriate DoD agency.

(U) 5.0 Reveal Actual U.S. Military War Plans That Remain in Effect - 50X5**Justifications:**

(U) Due to damage to U.S. war plans that remain in effect the NRO will continue to protect BE numbers that present themselves in NRO documents.

Redact:

a. (U) Redact one or more Basic Encyclopedia (BE) numbers if associated with past or present editions of the Single Integrated Operations Plan.

b. (U) Redact one or more BE numbers if connected to a specific ground installation/facility that may be associated with current war planning.

c. ~~(C//NF)~~ Redact one or more BE numbers associated with ground installations/facilities which by their nature reveal a U.S. intelligence interest in [redacted]

(b)(1)

(b)(3)

d. ~~(C)~~ Redact any BE number if it is revealed that a [redacted] concerning the installation/facility associated with the BE number.

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All redactions this page: (b) (1) and (b) (3).

e. (U) Redact all lists of BE numbers if revelation of their association provides an inclusive view into U.S. intelligence interest or knowledge, for example, a list that identifies all targets in support of OPLAN XYZ.

(U) 6.0 Reveal Information That Would Seriously and Demonstrably Impair Relations between the U.S. and a Foreign Government, or Seriously and Demonstrably Undermine Ongoing Diplomatic Activities of the U.S. - 50X6

Justifications:

~~(S//TK//REL)~~

[Redacted]

Redact:

~~(S//NF)~~ Redact fact of and details about

[Redacted]

Refer:

a. ~~(S//TK//REL)~~ Refer to the National Geospatial-Intelligence Agency (NGA-formerly NIMA): Indications of sensitive tasking (e.g.,

[Redacted]

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~~TOP SECRET//TK//RSEN/NOFORN~~

All redactions this page: (b) (1) and (b) (3).

b. ~~(S//TK//REL)~~ Also refer to NGA: fact of and details about [redacted]

c. ~~(S//REL)~~ Refer to the State Department: fact of and details about [redacted]

(U) 8.0 Reveal Information That Would Seriously and Demonstrably Impair Current National Security Emergency Preparedness Plans - 50X8

Justifications:

(U//~~FOUO~~) The NRO supports executive and legislative branches of the federal government in "continuity of government" national security emergency preparedness planning. The NRO also holds plans for continued operation in the event of a national security emergency. The declassification of this information at 50 years will cause exceptionally grave harm to national security.

Redact:

(U) Redact all information of NRO plans to continue its operations and support other federal organizations in the event of a national security emergency.

Refer:

(U) Refer to the Federal Emergency Management Agency/Office of Homeland Security: All information on national security emergency preparedness planning by other federal agencies, including the defunct Office of Civil Defense and the Office of Defense Mobilization.

(U) 9.0 Violate a Statute, Treaty, or International Agreement - 50X9

Justifications:

~~(S//TK//REL)~~ Continued protection may be required of much of the information about NRP [redacted]

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(b)(1)
(b)(3)

(U) There may be instances where statutes, treaties, and international agreements do not permit the automatic or unilateral declassification of information at 50 years. Before citing this or a declassification decision, refer it to the Seal and Release officials, who will effect coordination with the appropriate NRO officials and, if necessary, the Department of State, to confirm the public disclosure status of the pertinent information, pursuant to the specific law, treaty, or agreement.

Refer:

(U) Refer to State Department to confirm the public disclosure status of the pertinent information, pursuant to the terms of a specific law, treaty or agreement.

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~~TOP SECRET//TK//RSEN/NOFORN~~**(U) Appendix J -DORIAN/MOL**

(U) The Manned Orbiting Laboratory (MOL) was a 1960s Air Force program with the ostensible mission to place military personnel in orbit to conduct scientific experiments to determine the "military usefulness" of placing man into space and the techniques and procedures for doing so if the need ever arose. The actual, classified, mission of the MOL program was to place a manned surveillance satellite into orbit. At the time, several military and contractor studies estimated that manned surveillance satellites could acquire photographic coverage of the Soviet Union with resolution better than the best system at the time (the first generation Gambit satellite). Additionally, the Air force billed the MOL as a reconnaissance system that could more efficiently and quickly adjust coverage for crises and targets of opportunity than unmanned systems. The Air Force controlled development of the satellite, which was consistent with MOL's unclassified mission, while the NRO ran development of the covert reconnaissance mission of the program, including the camera system and other subsystems.

Secretary of Defense McNamara publicly announced the start of the MOL program in December 1963. However, even though the program had support from the military and the President, it was seldom full-funded due to competition from other DoD programs, NASA, and general governmental budgetary pressure. By the time initial studies, planning, and organization were completed and the program was ready to expand into full-scale development and production in the late-60s, budgetary pressure had significantly increased due to NASA's Apollo program and the Vietnam War. At a time when the program required increased expenditures, its budget was being slashed, and as a result, its timelines and costs were expanded and increased. With growing pressure from the expansion of the Vietnam War, the perceived duplication of effort with NASA programs, and improved performance of operating unmanned surveillance systems, in June 1969 the President cancelled the MOL program, and with it, the Air Force's last chance to develop a manned space flight program. The MOL program operated for five and one half years and spent \$1.56 billion, but never launched a manned vehicle into space.

Redact:

- A. (U) The application of DORIAN/KH-10 technologies to later NRO programs.
- B. (U) The facts and details about DORIAN/KH-10 proposed COMINT

271

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collection and capabilities.

- C. (U) **All of** DORIAN's/KH-10 proposed camera's focal lengths.
- D. ~~(S//TK//NF)~~ All information about the Electromagnetic Pointing System (EPS) (b)(1)
(b)(3)
- E. (U) All details of the proposed DORIAN/KH-10 SAR capability.
- F. (U) All details of the proposed DORIAN/KH-10 IR capability.
- G. ~~(S//TK//NF)~~ The "fact of" and the "facts about" DORIAN/KH-10s (b)(1)
(b)(3)
- H. (U) Redact any information not specifically approved for release below.

Release:

- A. (U) Release programmatic facts about DORIAN/KH-10, to include all previously published information about the MOL project, and its NRO affiliation.
- B. (U) Release that a single, unmanned launch experiment verified the feasibility of the Gemini-B heat shield which made DORIAN/KH-10 possible, and that the program was subsequently cancelled and never flew.
- C. (U) Release in association with KH-10/DORIAN the names of NRO personnel otherwise approved for release.
- D. (U) Release the names of major-contractors and sub-contractors and their employees for the MOL/DORIAN/KH-10 program.
- E. (U) Release the USAF and NRO budget figures for MOL/DORIAN/KH-10 program.
- F. (U) Release that the proposed DORIAN/KH-10 mission also included an IMINT collection.
- G. (U) Release the fact that MOL/DORIAN/KH-10 was to carry color and infrared film on some missions.
- H. (U) Release all DORIAN/KH-10 camera information not cited for redaction.

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- I. (U) Release that DORIAN and KH-10 were the classified designations for the reconnaissance mission and equipment of the experimental Manned Orbiting Laboratory (MOL), also inaccurately referred to as Gemini-B.
- J. (U) Release that, after DORIAN/KH-10 cancellation, Project COLT provided six surplus 72" optical blanks for use in the Smithsonian Institution/University of Arizona's Multi-Mirror Telescope.
- K. (U) Release that the 72" optical blanks, manufactured by Corning, were constructed of honeycombed borosilicate to reduce weight.
- L. (U) Release that the 72" optical blanks were associated with imagery collection.
- M. (U) Release technical information about the 72" optical blanks previously released by the Smithsonian or University of Arizona.
- N. (U) Release the fact of and the details about of an Electromagnetic Pointing System (EPS) capability to provide input for the IMINT mission.
- O. (U) Release all targets that were to be collected by either DORIAN's ELINT and IMINT missions to include land based, Air, and Sea based or ocean surveillance.
- P. (U) Release all countries that would have been targeted by DORIAN/KH-10 proposed ELINT and IMINT missions.
- Q. (U) Release that the proposed DORIAN/KH-10 mission also included SIGINT collection.
- R. (U) Release "fact of" DORIAN/KH-10s ELINT capability and all the details about the proposed ELINT equipment.
- S. (U) Release the "fact of" DORIAN/KH-10 proposed COMINT collection capability.
- T. (U) Release the "fact of" of the proposed DORIAN/KH-10 SAR capability.

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U. (U) Release the "fact of" DORIAN/KH-10s proposed IR capability.

V. ~~(S//TK//NF)~~ Release the "fact of", and facts about, DORIAN/KH-10's planned astronomy capability

[Redacted]

(b)(1)
(b)(3)

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