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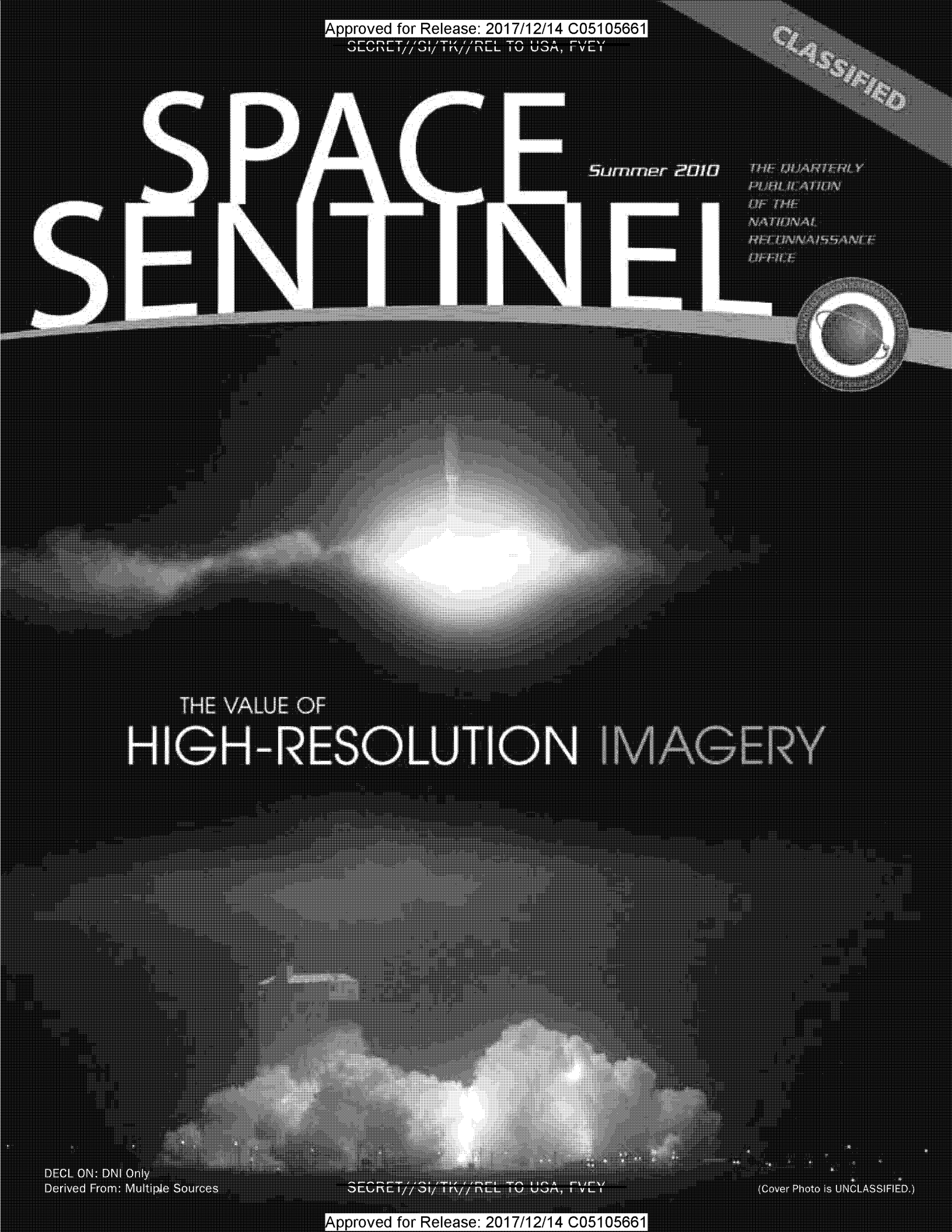
SPACE SENTINEL

Summer 2010

THE QUARTERLY PUBLICATION OF THE NATIONAL RECONNAISSANCE OFFICE



THE VALUE OF HIGH-RESOLUTION IMAGERY

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SECRET//SI/TK//REL TO USA, FVEY

(Cover Photo is UNCLASSIFIED.)

Approved for Release: 2017/12/14 C05105661

(U) View from the **Top**

(Photo is UNCLASSIFIED.)

(U) High-resolution imagery and the other remarkable capabilities NRO systems provide enable our Nation to track adversaries, take the fight to their doorsteps, and ultimately deny them sanctuary on a global scale.

(U) THIS *SPACE SENTINEL* EDITION EXAMINES AMERICA'S RELIANCE ON HIGH-RESOLUTION SATELLITE IMAGERY. A few months ago, when I visited Qatar and Iraq, I met with intelligence users who experience the value of National Reconnaissance Office (NRO) systems first-hand. Several top commanders, including General Ray Odierno, then Commander U.S. Forces-Iraq, described the complex situation on the ground and the important role NRO plays in their Intelligence, Surveillance, and Reconnaissance strategy.

~~(S//TK//REL)~~ To continue supporting our high-resolution imagery customers, my priorities include [redacted] The best way to affirm our abilities is to deliver on our promises, including performance, cost, and schedule. Nothing we say is more important than what we do. (b)(1) (b)(3)

~~(S//TK//REL)~~ It is beyond question that high-resolution imagery is critical to confronting the hardest intelligence problems and supporting warfighters in the field. Resolution, though, is only one aspect of NRO imaging systems that our users rely on every day. [redacted] and near-real-time products are other unique capabilities that the NRO brings to the fight. In addition, we are constantly finding ways to enhance the utility of our on-orbit systems and improve our constellations. (b)(1) (b)(3)

(U) High-resolution imagery and the other remarkable capabilities NRO systems provide enable our Nation to track adversaries, take the fight to their doorsteps, and ultimately deny them sanctuary on a global scale. I commend the NRO workforce for sustaining and continually improving upon our spaceborne imaging constellation.

Bruce Carlson
Director, National Reconnaissance Office

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(Photo is UNCLASSIFIED.)

FEATURE ARTICLES

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

DEPARTMENTS


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COLUMNS

SPACE SENTINEL

Official Magazine of the National Reconnaissance Office

SUMMER 2010 | VOLUME 8 | NUMBER 2

The *Space Sentinel* is published quarterly by the NRO Office of Strategic Communications. As the official magazine of the National Reconnaissance Office, it is a medium of information and education for NRO personnel, mission partners, intelligence users, and Congressional oversight committees. The *Space Sentinel* welcomes story ideas, articles, comments, questions, and suggestions.

Director of the National Reconnaissance Office
Gen Bruce Carlson, USAF (Ret)

Director of the NRO Office of Strategic Communications
Clinton West

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(U) This issue of the *Space Sentinel* presents information on the value of high-resolution imagery, and my Samana experience showed the need to look beyond the broad picture.

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(b)(6)

(Photo is UNCLASSIFIED.)

(U) IT WAS LATE MORNING WHEN I FOUND MYSELF IN A SMALL RURAL VILLAGE A FEW MILES OUTSIDE THE PORT OF SAMANA, DOMINICAN REPUBLIC. My guide busily described the story behind the local drink, *Mama Juana* — a rum, red wine, and honey-based concoction reportedly used originally to disinfect women after childbirth — while I took in the view. From this vantage, Samana seemed an exotic oasis, a place you read about in adventure magazines, but as I sipped my drink, a very different picture emerged. Impoverished children sold flowers, seashells, and anything else they could find in crowded trash-ridden dirt streets. Jeeps, equipped with giant loud speakers, blaring something unrecognizable to me in Spanish, roared up and down the road as if I was in a movie right before the revolution broke out. And chickens, horses, pigs, as well as an assortment of other animals scoured about in the tropical heat.

(b)(3)

(U) This issue of the *Space Sentinel* presents information on the value of high-resolution imagery, and my Samana experience showed the need to look beyond the broad picture. Just as the lush forests and pristine beaches seen from distant private, secluded, spots hid Samana's poverty, pursuing a national strategy at the expense of high-resolution imagery would leave America with an incomplete worldview at a time when we need clarity most of all.

(U) I returned from vacation not only appreciating the blessings life has bestowed on me, but aware that the landscape provides part of the story: the truth is often in the fine details. ■ ***(This is UNCLASSIFIED)***

NRO Office of Strategic Communications

(U) After seven years, this is our final issue of the *Space Sentinel*. Stay tuned for other NRO products telling our remarkable story.

(U) Key Contributions of NRO Systems and Personnel

(U) Operation Highlights

COMPILED BY [redacted] BPO/OSC (b)(3)

[redacted] (b)(1) (b)(3)

(Photo is UNCLASSIFIED.)

(U) U.S. Marine with 3rd BN, 1ST Marine Regiment, RCT 7, patrols near Kochibad, Afghanistan.

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

(U) High-Resolution Imagery Critical For Analysts and Warfighters

This page consist of (b)(1) and (b)(3) redactions.

(Photo is UNCLASSIFIED.)

(U) U.S. Soldiers from Legion CO, 1ST BN, 503RD Airborne Infantry Regiment dismount from a CH-47 Chinook helicopter after a mission to a nearby valley at Combat Outpost Nerkh, Wardak Province, Afghanistan.

~~(S//TK//REL)~~ Satellites Detect

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

~~(S//SI/TK//REL)~~ Overhead Targets

(U) New Capability Warns Warfighters Unclassified Level

This page consist of (b)(1) and (b)(3) redactions.

(Photo is UNCLASSIFIED.)

(U) U.S. Soldiers from 1st Platoon, Delta CO, 1ST BN, 4TH Infantry Regiment depart Forward Operating Base Baylough, Afghanistan, to conduct a patrol.

~~(S//REL)~~ Hunting the Hunters — Afghanistan

(U) GForge: Enabling Collaboration across IC Networks

(U//~~FOUO~~) As the spring 2009 Space Sentinel described, the NRO GForge collaboration environment bridges multiple IC communities by providing highly tailorable workspaces to users across networks. Government auditing and security requirements previously required the 12,000 plus users to register for an account and take short online training before browsing the site.

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

(b)(3)

(U) Since last year's article, GForge also added a tailorable survey tool and custom tool capability, requiring no HTML or coding experience with built-in Excel exporting. We plan to deploy a more advanced webpage designer in June 2010 to allow users to create visually dynamic pages without using HTML.

■ *(This is ~~SECRET//SI/TK//REL TO USA, FVEY.~~)*

(U) *is the editor of the* Space Sentinel *magazine in the NRO Office of Strategic Communications (BPO/OSC).*

(U) National Incident Response in the Gulf of Mexico

(b)(3)

BY [redacted] MOD

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

~~(S//TK//REL)~~ THE NATIONAL RECONNAISSANCE OFFICE (NRO) SUPPORTED THE NATIONAL GEOSPATIAL-INTELLIGENCE AGENCY (NGA), U.S. Coast Guard, and other organizations respond to the oil spill in the Gulf of Mexico following the April 20, 2010 sinking of the Deepwater Horizon oil rig. The spill initially collected in the northern portions of the Gulf, east of the Mississippi delta. Over time, however, the oil moved in several directions. NRO played a key role in [redacted] resulting in a more effective multi-agency approach than would be possible without such cooperation.

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

~~(S//TK//REL)~~ The NRO provided [redacted] as of August 8. The [redacted] The NRO, [redacted] also processed [redacted] create daily mosaics of the oil's migration in the Gulf.

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

~~(S//TK//REL)~~ [redacted] using unclassified or commercially available sources alone.

(U) The collaborative relationship among agencies like NRO, NGA, and the Coast Guard helps to optimize available resources, accurate track the extent of the damage, and to focus relief efforts where they are needed most.

~~(S//TK//REL)~~ The NGA is using several [redacted]

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

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

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

(Graphic is ~~SECRET//REL FVEY.~~)
(Photo is UNCLASSIFIED.)

Above: *(U) NRO Imagery*
Below: *(U//~~FOUO~~)* *NIC Strategic Information Manager, uses the TAP Table to brief presidential advisor Valerie Jarrett and NIC commander ADM Thad Allen (Ret.) on Jul 26.*

~~(S//TK//REL)~~ Imagery analysts exploiting NRO collection noted that (b)(1) (b)(3) NRO imagery taken on the Louisianan Delta National Wildlife Refuge, northwest of the sunken Deepwater Horizon. Additional imagery collected analysts saw in imagery of the Atchafalaya Bay Coastal Habitats. Analysts further detected of Lake Barrer, Louisiana, indicating the possibility of in the Imagery taken

~~(S//TK//REL)~~ The NRO Mission Support Directorate, on June 17, installed a Tactics and Planning (TAP) table, and provided on-site technical support, at National Incident Command, Coast Guard Headquarters, in Washington D.C. the touch-activated TAP tables to help generate a common operational picture. This tool provided Coast Guard leadership with data on (b)(3) Since its installation, the Coast Guard has requested four additional installations at the Unified Area Command in New Orleans, the Incident Command Post in Houma, LA, the Incident Command Post in Mobile, AL and a future Incident Command Post in Miami, FL. The NRO is currently working with the Coast Guard to identify other areas of support.

~~(S//TK//REL)~~ NRO products and services enhance the capabilities of organizations responding to environmental disasters. The responsiveness of national systems, and the quality of the products they generate, is invaluable. The collaborative relationship among agencies like NRO, NGA, and the Coast Guard helps to optimize available resources, accurate track the extent of the damage, and to focus relief efforts where they are needed most. ■ *(This is ~~SECRET//TK//REL TO USA, FVEY.~~)*

(U) *support the Mission Operations Directorate (MOD). Dr. Gerald Arp, NGA, provided examples of intelligence products.* (b)(3)

This page consist of (b)(1) and (b)(3) redactions.

(U) It's on Seeing the Finer Points of [redacted] Analysis

BY [redacted] MOD, ADF-C

(b)(3)

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

(U) "NGA analysts and scientists team with NRO experts to achieve information dominance over current and potential adversaries that significantly contributes to our combat edge."

[redacted]

[1] ~~(S//REL)~~ *NIIRS ratings serve as objective descriptions of the quality of collected images. NIIRS ratings for each type of imagery are on scales from zero to nine, nine being the best possible rating.*

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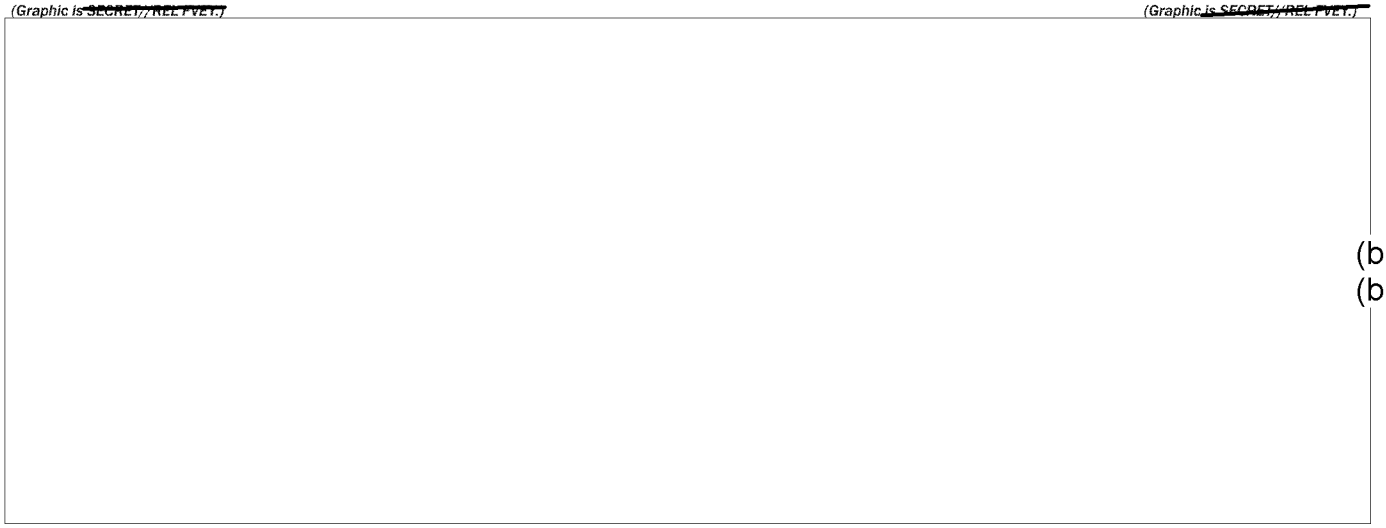
(Graphic is ~~SECRET//REL FVEY.~~)

(Graphic is ~~SECRET//REL FVEY.~~)



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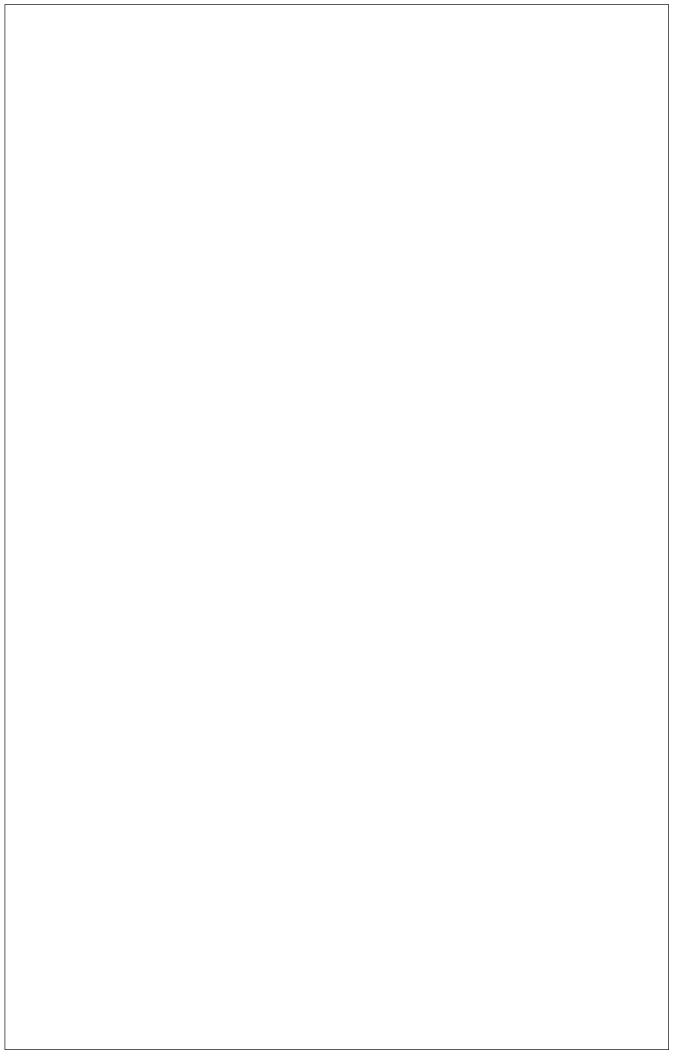

the benefit of high-resolution imagery. While we can solve many intelligence problems using medium-resolution imagery, we simply cannot resolve others without the benefit of high-resolution collection. NGA analysts and scientists team with NRO experts to achieve information dominance over current and potential adversaries that significantly contributes to our combat edge. ■

(This is ~~SECRET//TK//REL TO USA, FVEY.~~)

(U) [redacted] *is editor of* GEOSIG Weekly *in the NRO Mission Operations Directorate at the Aerospace Data Facility-Colorado.*

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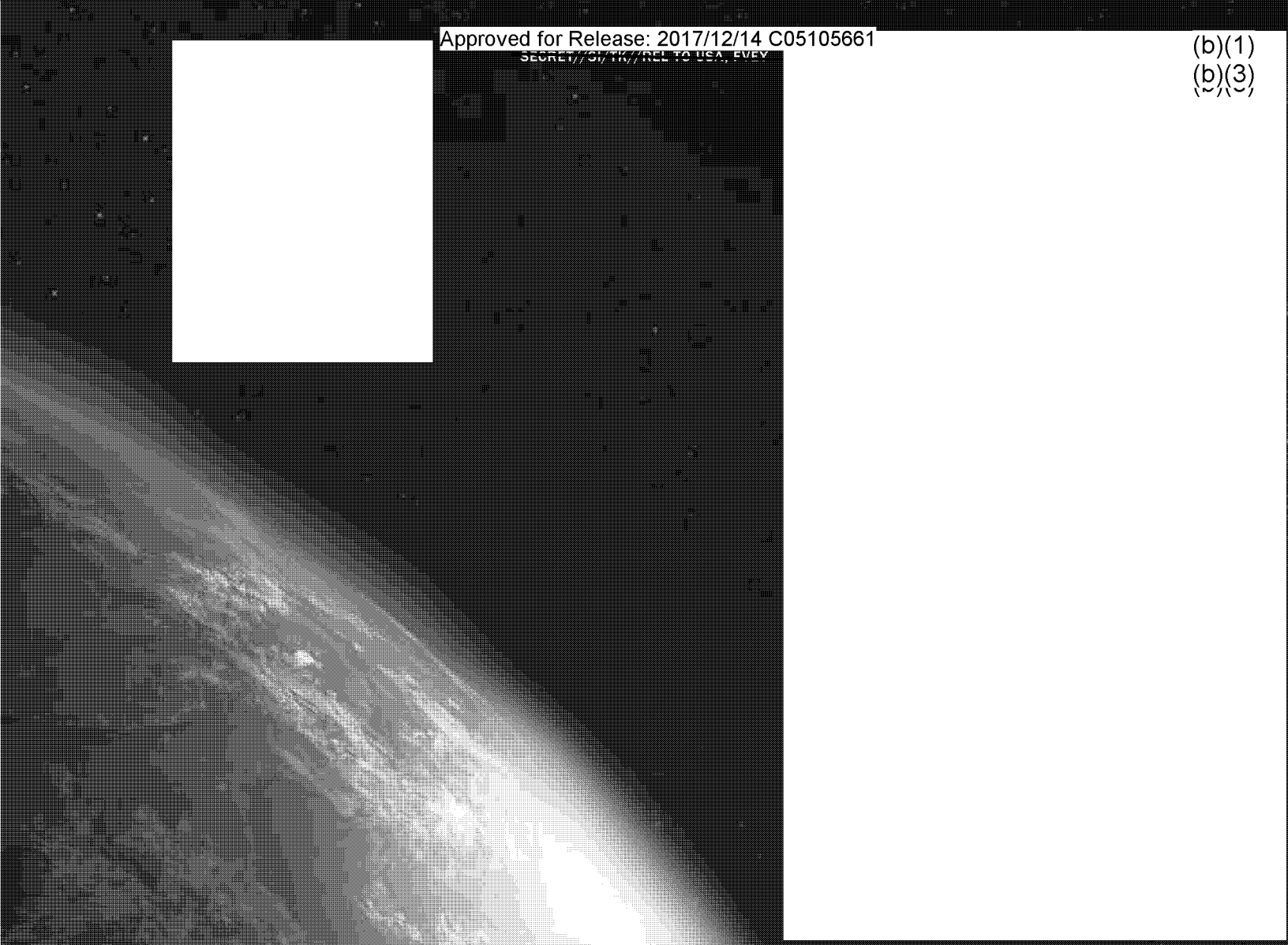

(U) The Case for High-Resolution Electro-Optical Imagery

by Robert Zitz, MSD

(Graphic is SECRET//TK//25X1.)

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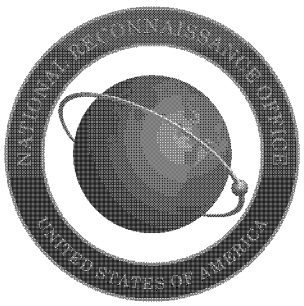

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(U) Background

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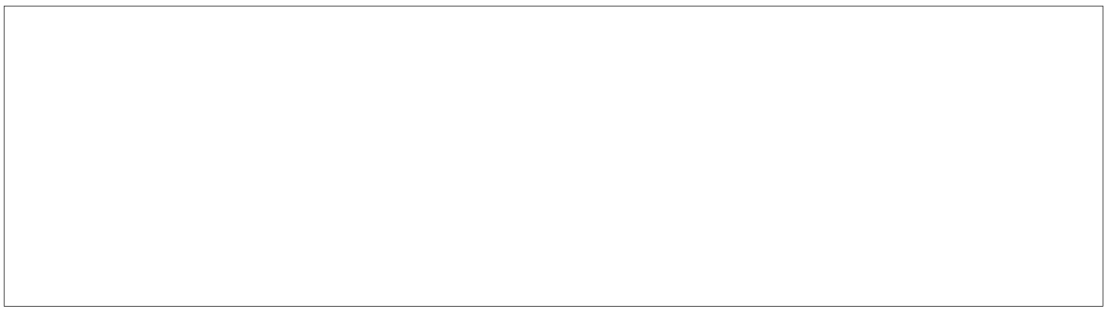
> (U) When National Geospatial-Intelligence Agency (NGA) analysts responded to the question how important high-resolution electro-optical imagery is to their work, a strong consensus formed endorsing the need.

(b)(3)

(U) High-Resolution Imagery and Counter Proliferation



(U) Case 1: Assessing

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(U) Case 2: Monitoring Program

(U) High-Resolution Imagery and Counterterrorism

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(b)(3)

(U) Case 3: Identifying

(U) Case 4: Confirming a

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(Graphic is ~~S//REL FVEY.~~)

(U) Case 5: Correlating

(U) High-Resolution Imagery and

(U) Case 6: Assessing

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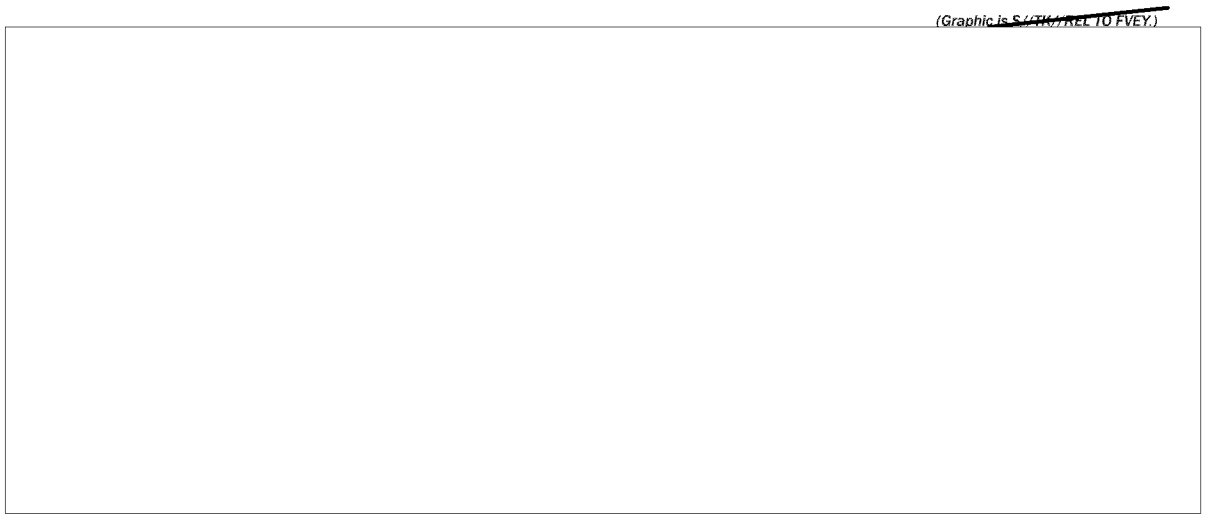
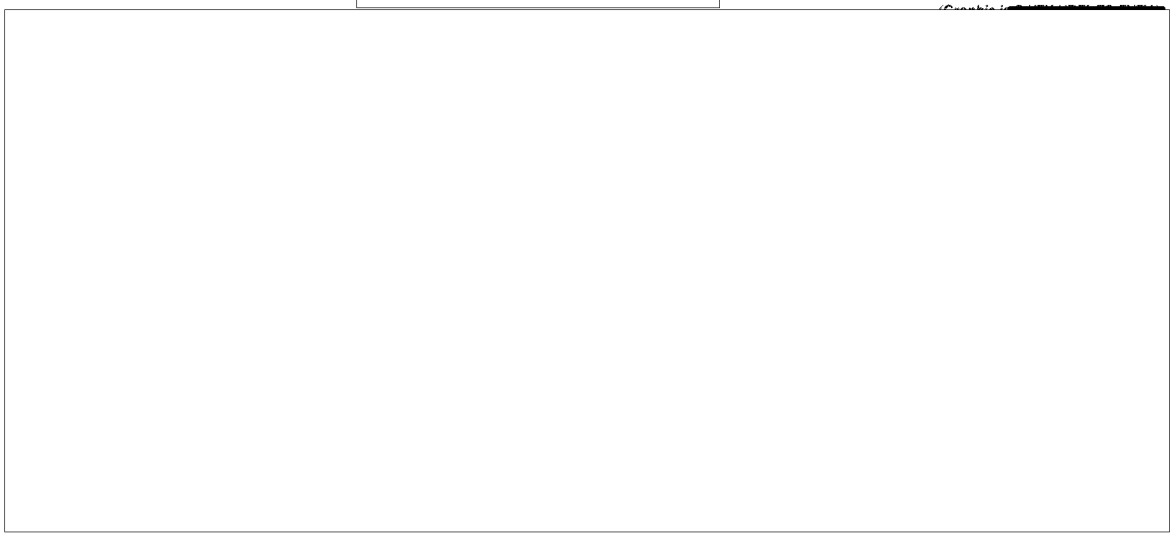


(U) Case 7: (b)(3)

(U) Case 8: Understanding (b)(3)



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(U) Case 9: Detecting [redacted] (b)(3)

(Graphic is ~~S//TK//REL TO FVEY.~~)

(U) Additional Considerations

(U) *Robert S. Zitz is Deputy Director of the Mission Support Directorate.*

(U) An Interview with Darlene Minick

by [redacted] BPO/OSC (b)(3)

(Photo is UNCLASSIFIED.)
(Credit: NRO)

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(Graphic is UNCLASSIFIED.)

(U) Ms. Darlene Minick was appointed Director, Imagery Intelligence Systems Acquisition in July 2008. As IMINT Director, she is responsible for all national imagery intelligence satellite systems acquisitions within the NRO. Her responsibilities span the design, acquisition, launch, deployment and operations support for current and future IMINT constellations. She is also charged with sustaining mission partner relationships and representing NRO programs to Congress, the Director of National Intelligence, the Department of Defense, the Office of Management and Budget and the Community Management Staff.

(U) *Space Sentinel*: This issue of the *Space Sentinel* focuses on showing the value of high-resolution imagery. Please briefly explain, from your perspective as Director of IMINT, your view on high-resolution imagery's value.

~~(S//REL)~~ **Ms. Minick:** High-resolution imagery provides capabilities that the Intelligence Community (IC) needs and that warfighters depend on

(U~~//FOUO)~~ We continually receive feedback from mission partners and imagery users stressing the importance of high resolution. A recent example is a letter to DNRO Carlson from Commander of the wrote,

~~(S//TK//REL)~~ ***Space Sentinel*: The NRO has various in its imagery intelligence arsenal. How is NRO improving the imagery of those different**

~~(S//REL)~~ **Ms. Minick:** Our current on-orbit imaging systems establish the baseline. We have

This page consist of (b)(1) and (b)(3) redactions.

(U) *Space Sentinel:* **In the November 2009 issue of High Frontier, the Air Force Space Command's unclassified journal, then deputy director of the NRO Maj Gen Ellen Pawlikowski said NRO is applying the lessons of FIA to NGEO. Can you tell us what lessons you learned from FIA and how are we applying them to NGEO.**

(U) **Ms. Minick:** We have documented the lessons learned from FIA across the NRO and the Intelligence Community for many years now. Let me highlight three key lessons that shape our acquisition programs today.

- Ensure up front that the requirements, statements of work, and incentive plans are clear
- Strong systems engineering — corporately and at the program office and contractors — is critical for execution
- Clear, unambiguous Government leadership is imperative

(U) These principles are the cornerstone of how we are executing NGEO today. The system and collection segment requirements have been reviewed and approved across the NRO and mission partners. We are working jointly across the NRO with a strong systems engineering approach to execute trade studies to buy down risk on the NGEO system. We have government leadership and insight firmly in place for all components of the NGEO system.

~~(S//REL)~~ *Space Sentinel:* **Some people maintain that the United States does not need**

~~(S//REL)~~ *Space Sentinel:* **a series of problems and schedule delays over the years. How is the IMINT Directorate addressing these problems?**

~~(S//TK//REL)~~ **Ms. Minick:**

This page consist of (b)(1) and (b)(3) redactions.

(U//~~FOUO~~) And as you mentioned, we have overcome significant challenges that impacted this program [redacted] We have overcome these challenges through strong leadership, commitment from both the Government and contractor teams, and [redacted] (b)(1) (b)(3)

(S//~~REL~~) *Space Sentinel*: [redacted] is generally considered a phenomenal success. What is the secret of this success?

(S//~~REL~~) Ms. Minick: [redacted]

(U) *Space Sentinel*: The NRO ground architecture and the creation of multi-INT intelligence has received much attention in the last several years. What is the IMINT Directorate doing to improve the fusion of intelligence and information sharing?

(S//~~REL~~) Ms. Minick: [redacted]

(U) *Space Sentinel*: Warfighter support is now a critical NRO mission. How is the IMINT Directorate supporting warfighters?

(U) Ms. Minick: IMINT works closely with the Systems Engineering Directorate, GED and MOD to develop, deliver and support the operations of overhead collection assets that ensure the continuity of support to our users and deliver new capabilities to our mission partners.

(U//~~FOUO~~) In addition, we [redacted] provide them with NRO system-specific intelligence support.

(U) *Space Sentinel*: What are your top priorities for the IMINT Directorate? What challenges do you anticipate in achieving those goals?

(S//~~REL~~) Ms. Minick: [redacted]

(U) *Space Sentinel*: Ms. Minick, thank you for your time and sharing your thoughts. ■ *(This is S//TK//~~REL TO USA, FVEY~~.)*

(U) Darlene Minick, Director, Imagery Intelligence Systems Acquisition, has over 24 years Government service, including many years in the Signals Intelligence Systems Acquisition Directorate (SIGINT) where she most recently served as [redacted] (b)(3)

(U) Jim Arnold
Director of the NRO AS&T Directorate

BY [redacted] BPO/OSC (b)(3)

(U) JAMES "JIM" EVERETTE ARNOLD, 55, DIRECTOR OF THE NATIONAL RECONNAISSANCE OFFICE (NRO) Advanced Systems and Technology Directorate (AS&T), passed away at Carteret General Hospital in Morehead City, NC, after a swimming accident.

~~(S//REL)~~ His achievements and leadership in clandestine signals and national overhead collection systems spanned 35 years and made lasting contributions to United States security. He began his Central Intelligence Agency (CIA) career in 1975 as a student trainee. After graduating from the Georgia Institute of Technology in 1977 with a BS degree in Electrical Engineering and Digital Communications, he conducted exploratory development in loop transmission at AT&T/Bell Laboratories. In 1979, he received an MS degree in Electrical Engineering and Computer Science with an emphasis in Digital Signal Processing from the Massachusetts Institute of Technology. He then returned to the CIA in 1983, taking an assignment in the Office of Technical Service [redacted] for the Office of Security. Since then, he has assumed positions of increasing responsibility across numerous offices in the CIA Directorate of Science and Technology (DS&T) culminating in his final assignment in the Office of Development and Engineering (OD&E) where he was selected as the Director of AS&T at the NRO. (b)(3) (b)(1)

~~(S//REL)~~ Colleagues remember him widely for his critical contributions to the NRO. As Director of AS&T, he managed the Intelligence Community's (IC) largest research and development portfolio encompassing more than [redacted] programs and hundreds of multi-discipline officers from across the IC and Department of Defense. As the direct result of his technical expertise and leadership, numerous examples of technologies that were only a gleam in the eyes of scientists [redacted] (b)(3)

(U) DNRO Bruce Carlson, in summarizing Mr. Arnold's career, said during a June 21, 2010 memorial service, "The mission that we [the NRO] perform is the safety of our homeland and our warfighters who are deployed around the globe. Jim played a vital vole in that mission. The legacy he leaves behind will continue to support that mission for years, and even decades, to come….He was instrumental in developing many of the key technologies that are designed to fly on future NRO space vehicles." In his eulogy, longtime friend Dr. Pete Rustan, Director of the Mission Support Directorate, called (b)(1) Mr. Arnold "a very spiritual man, fully (b)(3) dedicated to his family, his country, his church, and our God." Rustan told the

(Photo is UNCLASSIFIED.)

(U) Jim Arnold

memorial service guests, "it will be hard to fill the vacuum he has created here, in your lives, and in every technology you will ever do for the Department of Defense and the Intelligence Community. Somehow, not having Jim in that discussion would create huge vacuum." Rustan concluded by quipping, "We know that he's in heaven and probably teaching science and technology classes to the new recruits."

(U) Mr. Arnold is the recipient of six Exceptional Performance Awards, an Exceptional Accomplishment Award, a Special Achievement Award, an Agency Performance Award, two prestigious Meritorious Unit Awards, the Director of National Intelligence Medallion, the CIA Distinguished Career Intelligence Medal, the NRO Gold Medal, and the OD&E Crystal.

~~(S//TK//REL)~~ The NRO has dedicated the [redacted] scheduled to launch later this year, to Mr. Arnold in tribute to his lifetime of technical leadership and dedication to the reconnaissance mission. Over 60 percent of the technology incorporated into that spacecraft is based on technology developed by Mr. Arnold's AS&T team. "From now until forever they'll be a spaceship known as the Jim Arnold spaceship orbiting the Earth," said DNRO Carlson during the memorial service. ■

(This is ~~SECRET//TK//REL TO USA, FVEY.~~)

(U) [redacted] *is the editor of the* Space Sentinel *magazine, in the Office of Strategic Communications.*

(b)(3)

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

(U) Gladys H. Mena: An NRO Legend

BY WILLIAM NAYLOR, BPO/CSNR/REO

(Photo is UNCLASSIFIED.)

(U) Gladys H. Mena

(U) GLADYS H. MENA, LONGTIME SECRETARY AT THE WEST COAST OFFICE OF SPACE LAUNCH, passed away quietly in her sleep on March 23, 2010. As the National Reconnaissance Office's (NRO) eldest and longest tenured government civilian employee actively performing full-time duty, Gladys served with distinction for more than 55 years.

(U) Born in Johnstown, Pennsylvania on September 26, 1923, to Rhoda and Jake Mena, she was one year old when the family moved to Buffalo, New York, where she lived for the next 30 years. After high school, she attended Bryant and Stratton Business College and the University of Buffalo. At Bryant and Stratton, she gained the foundation of her legendary secretarial career, developing the blazing typing speed of 110 words per minute, prompting the necessity of a fire extinguisher strapped to her desk all through her career.

(U) Her first government job was as a secretary at the Buffalo Internal Revenue Service office, later transferring to the U.S. Navy. In 1957, she began her long relationship with the Air Force. The Air Force afforded her a chance to see the world beyond Buffalo and that world included her parents' home country of Lebanon, as well as Egypt and Germany. Upon returning to the United States in early 1961, she left government service for a short time, returning that same year. She headed to California and a reunion with the Air Force. After many different positions within the Secretary of Air Force Special Projects Office, she eventually worked for the [redacted] program, today's Office of Space Launch. Her talent and skill quickly advanced her career, culminating in her final GG-11 position as Protocol Officer and Executive Secretary. Upon her retirement in December 2009, Director of the NRO Scott F. Large awarded her the NRO Medal of Distinguished Service for 40 plus years of lasting and critical contributions to the NRO mission.

(U) She was also notoriously known for her "special brew of coffee" made with a mixture of old coffee grounds with some new grounds added. In many ways, her ability to mix old and new defined her as an unparalleled and brilliant administrative, security, and protocol officer to more than 20 NRO space programs, yet still able to mentor innumerable government, civilian, and industry seniors, significantly impacting them and their work. Her peers credit her with being an honest broker yet capable of occasional mischief; tireless and exacting in her desire to achieve mission success by instituting and leading administrative change and overcoming challenges, yet "hell-on-wheels" when driving her Chevy Impala on the busy LA streets and freeways.

(U) Though the legend has passed, the organization she was so fiercely devoted to continues, even better for knowing Gladys Mena. ■

(This is UNCLASSIFIED.)

(U) William Naylor is Chief of Staff in the Center for the Study of National Reconnaissance (BPO/CSNR/REO).

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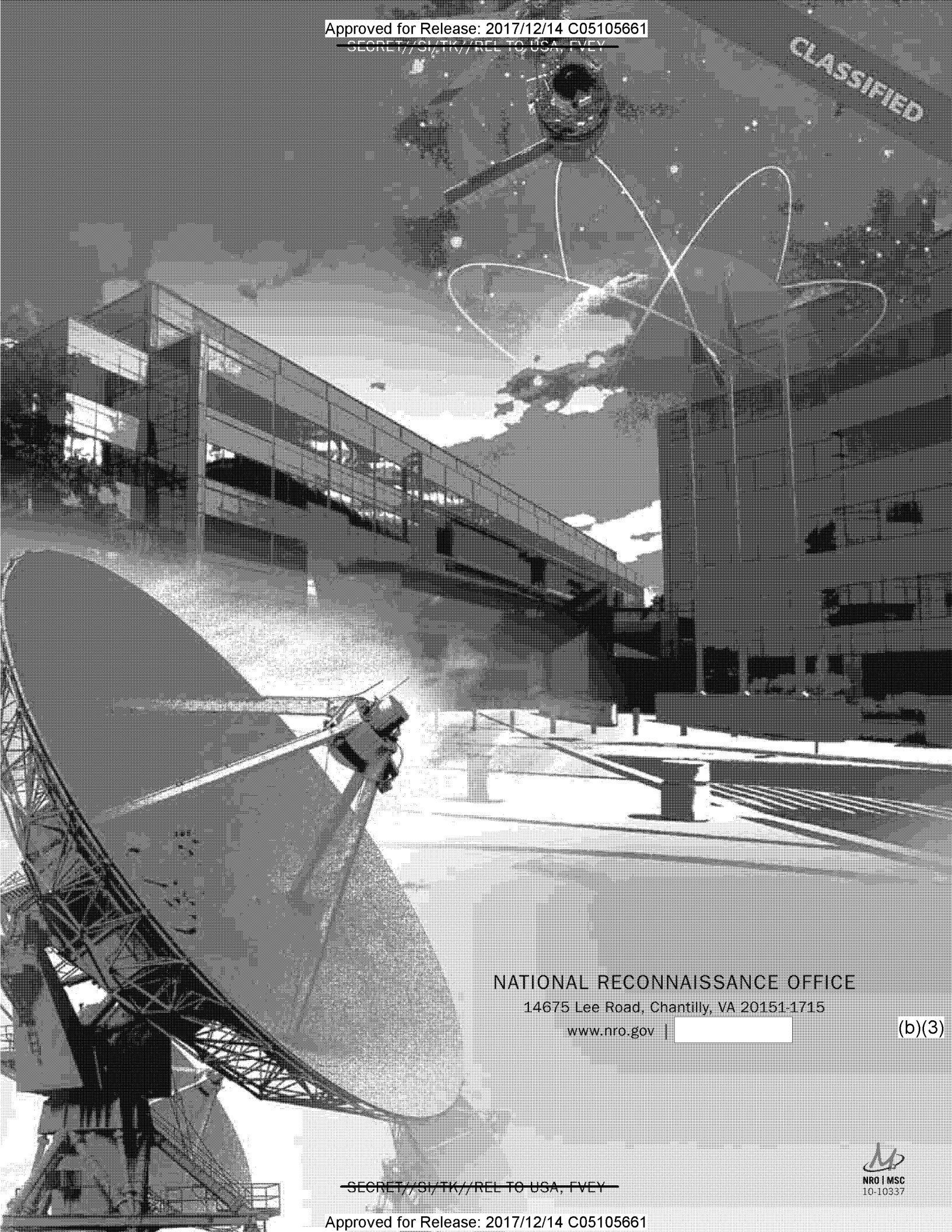

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