Enhanced View Webhosting:

A Tactically Responsible Imagery Intelligence Tool

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Since the turn of the 21st century, satellite imagery has become increasingly available to the tactical user. Originally the product of highly classified photo-reconnaissance satellites, the advent of the commercial imagery industry combined with improved data distribution technologies has made imagery that was once only available to strategic customers a ready tool for companies and platoons. While an Army unit may request imagery from national satellites, the likelihood that a tactical unit will receive significant priority in the collection process is small. Further, the classification of such imagery is often problematic.

On the opposite end of the spectrum of availability, web-based imagery sources like Google Earth are readily available and sharable with coalition partners. Such sources suffer two serious weaknesses for the tactical user, however. First, web-based imagery may be multiple years old. Second, their utilization depends upon access to the internet at the time of need, a capability that may not be available in future operating environments.

The Enhanced View (EV) WebHosting system offers a middle-of-the-road alternative to formal imagery collection through intelligence channels and informal collection at the Soldier level. Unlike many government sources, the imagery on EV WebHosting is unclassified, sharable, and available to all federal employees. Unlike much website imagery, EV Webhosting allows users to download current products and to perform basic operations within common geospatial intelligence software packages. In short, EV WebHosting provides a valuable tool to supplement a tactical unit's imagery needs.

A Very Brief History of Satellite Imagery

To understand the way that satellite imagery enables the tactical user on today's battlefield requires a brief look at the development of space-based imagery intelligence (IMINT). Like the Abrams tank or the Bradley Infantry Fighting Vehicle, imagery satellites were born out of Cold War fears of Soviet aggression. Specifically, President Dwight Eisenhower and his security advisors feared that the U.S. trailed the USSR in long-range bombers and intercontinental ballistic missiles (ICBMs), the two most effective means of delivering atomic weapons.[1] Conventional intelligence collection, including the high-altitude U2 flights that violated Soviet air space, provided limited intelligence of the border regions but almost nothing about the hinterland.[2] Part of the solution to closing the intelligence gap was Project Corona, which fell under a security umbrella referred to as Keyhole.[3] Corona consisted of a series of imagery satellites that relied on film cameras (see Figure 1). Upon completion of the mission, the film canisters reentered the atmosphere and parachuted toward a patrolling aircraft, which caught (or attempted to catch) the canisters mid-air. Much to Eisenhower's relief, satellite imagery confirmed that the missile and bomber gaps were nonexistent. [4]

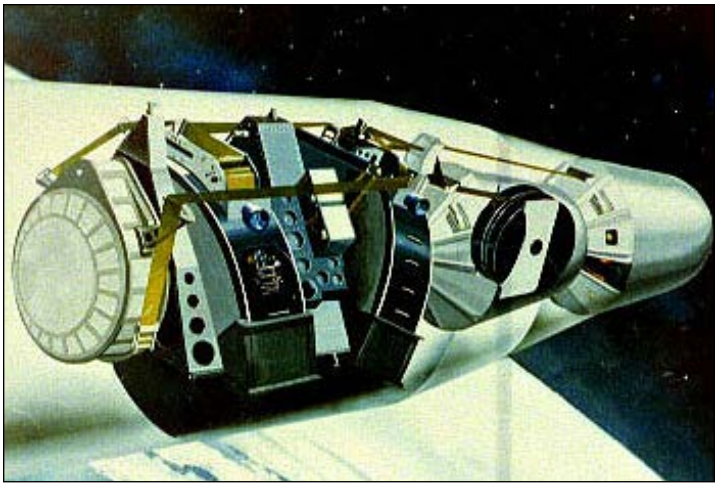

Figure 1 — Artist's Rendering of the Internal Workings of a Corona Spacecraft
(Note the strips of film wound through the vehicle)[5]

The imagery from Corona was neither timely nor intended for tactical use. The high cost of the system, advanced technology, limited amount of film, and desire for secrecy ensured that only select people within the federal government had access to products that the Central Intelligence Agency (CIA) produced from the returned film. Furthermore, from the moment the image was taken to the time it could be interpreted was days to weeks — slow by today's standards but adequate for its mission of assessing the bomber and missile capabilities. In the days before digital information, sharing the imagery required replication of film from the negatives and heavily regulated distribution procedures. Thus, while Corona ultimately was

able to distinguish objects as small as 5-7 feet — adequate resolution to be tactically useful — the images were not used for tactical purposes.[6]

Between the first successful Corona mission in 1960 and the launch of IKONOS, the first commercial imagery satellite in 1999, technology had advanced greatly, hinting at the possibility of wider access to satellite imagery for the tactical community.[7] First, digital downlink had replaced parachuting film canisters, which not only greatly simplified the collection process but also greatly extended the useful life of a satellite. A digital imagery satellite may last for a decade or more whereas the Corona satellites were useless after a few months when they ran out of film. Second, distribution of imagery no longer depended on hard-copy photographs. In the late 1990s, high-speed fiber optics, high-throughput communications satellites, and the expansion of the internet provided new means of transmitting large amounts of data. For the first time, a commercial company was photographing the earth at resolutions approaching what had previously only been available from tightly controlled intelligence community satellites (ground sample distances of less than one meter), and the information was becoming available to an unprecedented number of users.

With large amounts of data and the infrastructure to distribute it, it was only a matter of time before someone assembled the available imagery into a user-friendly, web-based format. The original satellite imagery service website belonged to the Keyhole Corporation of Mountain View, CA, so named in honor of Project Corona's security designation. In 2004, Google acquired the company and renamed it Google Earth.[8] Today, many sites offer satellite imagery (Bing Maps, Yahoo Maps, MapQuest, just to name a few), but the original Google Earth format based on Keyhole's work remains the most widely used. The capability of Google Earth has continued to expand, allowing for user-defined graphics and overlays, information sharing, and even intelligence analysis.

While tools like Google Earth are incredibly useful for many applications, the dependence of tactical users on such web-based imagery has two potentially fatal flaws. First, the imagery may be three or more years old. In Google's case, the company advertises that "most of the images are about one to three years old."[9] Using imagery for tactical planning that does not accurately reflect the current operational environment can render the plans useless and possibly quite dangerous. Second, and perhaps more importantly, reliance on web-based imagery presumes internet access, a capability that may not exist in immature theaters or in a conflict against an enemy capable of denying, degrading, or destroying friendly communications networks. Warfighters, then, require a source of satellite imagery that is current, tactically useful, and storable.

Current Imagery Practices and the Case for Decentralization

Imagine this: an infantry battalion is deployed in support of a humanitarian response mission and needs high-resolution imagery to plan its operations. The designated member of the battalion staff, perhaps someone in the S2 shop, programs in a direct request to a dedicated imaging satellite, which captures the imagery and begins downlinking it to a nearby ground terminal. The imagery to begin planning is available within minutes.

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For multiple reasons, of course, the capabilities of space-based collection assets are not so responsive. As mentioned in the overview of Corona, satellites have historically existed as strategic-level assets, and as such, the priority of collection targets remains a matter of great concern. The Army's standard imagery collection process requires that all imagery requests funnel to the unit collection manager. In a division, the collection manager resides within the intelligence section (G2). Any unit may request imagery from a national-level satellite, but even if the request is high enough on the priority list, the image itself may not be sharable with combat Soldiers, coalition partners, or host-nation partners because of classification concerns.

Realizing the need for a decentralized approach to obtaining timely, high-quality unclassified satellite imagery, the Army's Space and Missile Defense Command (SMDC) fielded specialized commercial exploitation teams (CETs) — later renamed commercial imagery teams (CITs) — throughout Operations Iraqi Freedom and Enduring Freedom (OIF and OEF). CITs deployed to Naval Support Activity (NSA) Bahrain and consisted of six people with expertise in space-based capabilities, geospatial intelligence, and network communications. While these teams, like collection managers at higher echelons, maintained the capability to request imagery from national assets, they specialized in obtaining commercial imagery and exporting it via a variety of means, including hard copy, email, external hard drives, or the Global Broadcast Service (GBS). In this way, CITs provided a service that freed the customer's organic intelligence analysts and supported ad hoc requests from Soldiers and units — even units outside of Central Command (CENTCOM) — sidestepping the more hierarchical imagery collection process.

Despite the teams' value-added products and regular training missions to assist coalition forces in their use of commercial imagery, their existence was relatively unknown by the Army at-large. Regardless, the CIT kept steadily busy until the transfer of their mission to a Continental U.S. (CONUS) reach-back node within the SMDC G2. To augment the commercial imagery capability available to the force, Army Space Support Teams (ARSSTs) provide limited commercial imagery services and the ability to reach back to SMDC. ARSSTs continue to attach to divisions and corps for major exercises and deployments.

While the hierarchical imagery request process and the less formal CIT imagery request process were available, commercial websites like Google Earth have filled a critical role since 2004 because they are readily available and sharable with everyone. As mentioned, however, such web-based services have their limitations. In an attempt to address the same capability gap that the Army meant to fill with the CITs, the National Geospatial-Intelligence Agency (NGA) began sponsoring web-based archives for commercial satellite imagery companies. Early interfaces were not user friendly, but a current service offered by DigitalGlobe Inc. of Longmont, CO, combines a timely, high-quality, commercial imagery database that is user-friendly and allows for imagery download, sidestepping the requirement for continuous internet connectivity.

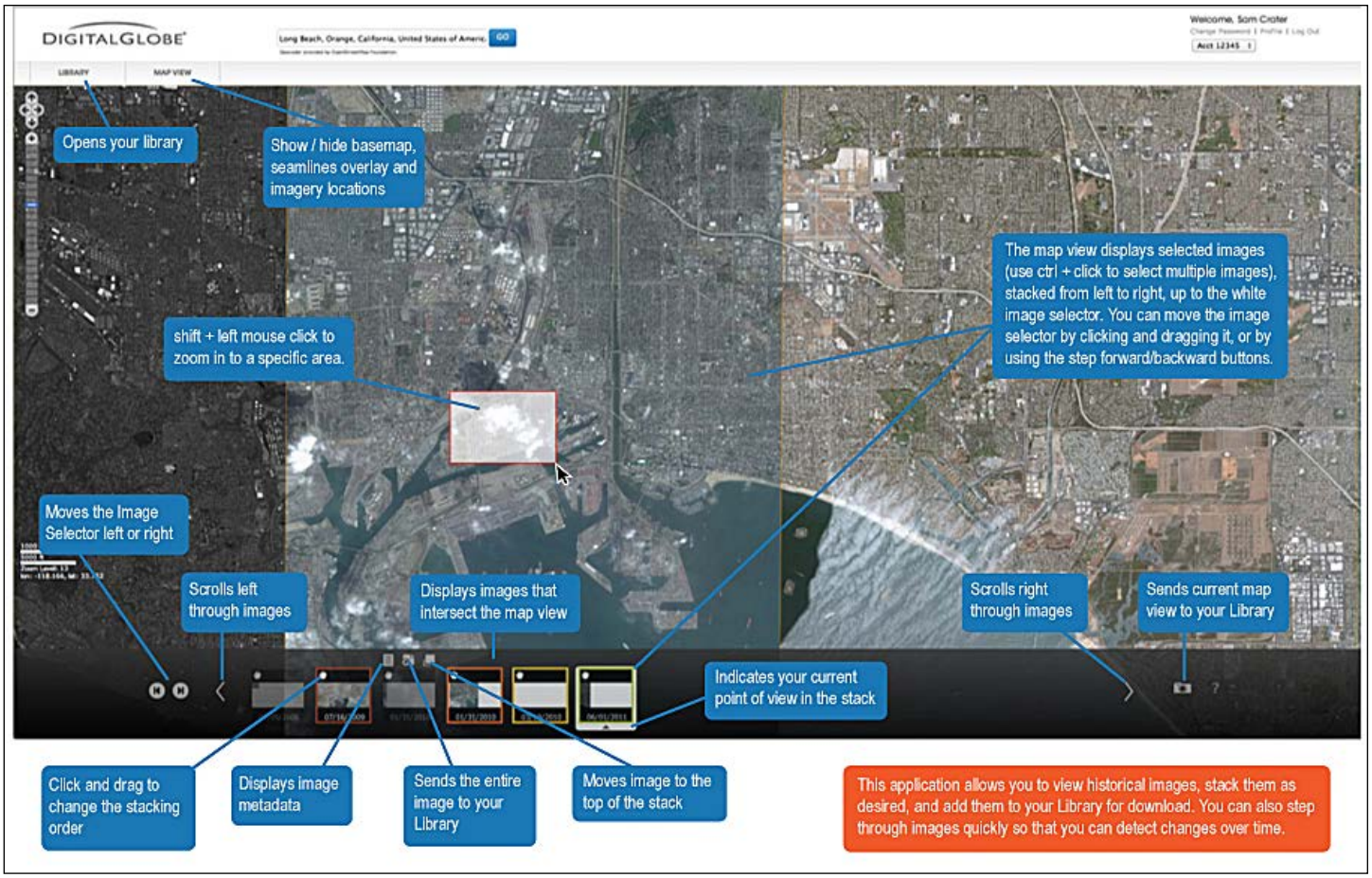
EV WebHosting

The EV WebHosting program is an effective web-based tool for accessing satellite imagery that allows users to obtain current imagery and perform basic operations that a tactical user may require. Among the most important functions provided in EV WebHosting are the ability to create graphics and export the data to other devices or software suites such as Google Earth or ArcGis, the common software suite of geospatial intelligence engineers. Further, EV Webhosting allows for the comparison of multiple images of the same area over a period of time to assess any changes. The EV WebHosting user interface is intuitive enough that anyone can make use of the system with a minimal time investment but also expansive enough that more advanced users (for example, intelligence analysts and geospatial intelligence engineers) can use it for their purposes.

All of the imagery within the system is commercially produced and is therefore unclassified, but a classified version of the system exists to allow for the addition of graphics or annotations that may increase the classification of the manipulated image. The site is available on non-classified internet protocol router network (NIPRnet) at https://rdog.digitalglobe.nga.mil/myDigitalGlobe and on the secret internet protocol router network (SIPRnet) at https://evwhs.nga.smil.mil. DigitalGlobe offers an expansive user's guide, which is linked to the site's homepage, and customer support via email or telephone.

The service is offered to all persons in federal service and is accessible either via common access card (CAC) or via a username and password established during initial account setup. It is important to note that although National Guard Soldiers cannot access the website unless federalized, the Nextview End User License Agreement, the agreement between DigitalGlobe and the NGA that governs the use of EV WebHosting's products, states that federal users may share the data with "state governments, local governments, foreign governments and inter-governmental organizations, [non-

Figure 2 — A One-Page Annotated Help Guide Produced by DigitalGlobe



governmental organizations] and other non-profit organizations." In other words, the imagery is intended for widest dissemination, and any authorized user may distribute it at his or her discretion.

For all the benefits of the system, EV WebHosting is still a planning tool that is most effective when used well in advance of an operation. Prior to exercise or deployment when the internet connectivity is still robust, EV WebHosting allows a unit to create its own set of baseline commercial imagery, which can be stored and updated as the mission requires or allows. A useful feature of EV WebHosting allows the user to set up alerts to receive notification when a region of interest has changed.[10] It is worth noting that Google Earth's "Follow Your World" tool, in beta testing, "allows the user to mark a location and receive notifications when the imagery is updated."[11] In this way, a Soldier in a company intelligence support team (COIST) or battalion S2 does not need to continuously troll for updated imagery; the system will notify the user.

The need for commercial satellite imagery has never been greater, nor has the ability of the warfighter to utilize it for tactical success. Odds of success greatly increase, however, when the imagery being used is high-quality, current, and easily accessible by the intended users. While the formal intelligence collection process and Google Earth remain powerful tools that are still useful for many applications, as a system for acquiring satellite imagery for tactical purposes, EV WebHosting meets the criteria of being timely, high-quality, sharable, and downloadable. It is therefore a more responsible choice than other imagery acquired off of the open-source internet.

Notes

[1] Bruce Berkowitz, "The National Reconnaissance Office at 50 Years: A Brief History," Center for the Study of National Reconnaissance, Chantilly, VA, 2011, 9.

[2] James Clay Moltz, *The Politics of Space Security: Strategic Restraint and the Pursuit of National Interests* (Stanford, CA: Stanford University Press, 2011), 101.

[3] Berkowitz, 11.

[4] William E. Burrows, *This New Ocean: The Story of the First Space Age* (NY: Modern Library, 1999), 321.

[5] National Reconnaissance Office, "Corona Imagery," Accessed 14 April 2016 from http://www.nro.gov/history/csnr/corona/imagery.html.

[6] Berkowitz, 11.

[7] See, for example, DigitalGlobe, "IKONOS Data Sheet." Accessed 14 April 2016 from http://global.digitalglobe.com/sites/default/files/DG_IKONOS_DS.pdf.

[8] "Google Acquires Keyhole, Digital-Mapping Software Used by CNN in Iraq War," *Wall Street Journal*, 27 October 2004. Accessed 9 February 2016 from http://www.wsj.com/articles/SB109888284313557107.

[9] Google, "Maps Imagery Updates." Accessed 14 April 2016 from https://support.google.com/maps/answer/2789536?hl=en.

[10] DigitalGlobe, "My DigitalGlobe with EnhancedView Web Hosting Service User Guide v.7.4." Accessed 9 February 2017 from https://evwhs.digitalglobe.com/myDigitalGlobe/login.

[11] Google, "Follow Your World." Accessed 9 February 2017 from https://followyourworld.appspot.com.

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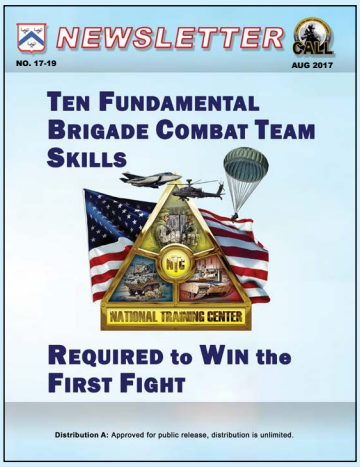
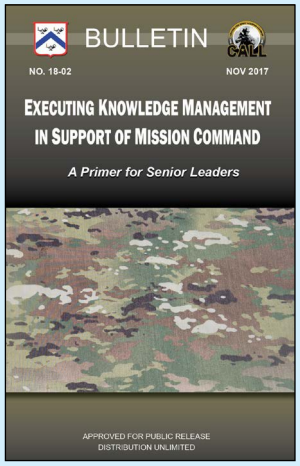


This newsletter consists of 10 chapters focusing on fundamental skills designed to communicate doctrinal solutions to the persistent observations from the National Training Center. The goal is to better prepare brigade combat teams to decisively win the first fight of the next war.

http://usacac.army.mil/sites/default/files/publications/17-19.pdf



This bulletin is intended to provide senior Army leaders a concise understanding of knowledge management (KM) and what they can do to improve important organizational processes (e.g., the military decision-making process and operations process).

http://usacac.army.mil/sites/default/files/publications/18-02_KM.pdf