

# trajectory

THE OFFICIAL MAGAZINE OF THE UNITED STATES GEOSPATIAL INTELLIGENCE FOUNDATION




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# Eyes *Wide Open*

Thanks to the **Five Eyes intelligence alliance** among the United States, Canada, Australia, New Zealand, and the United Kingdom, geospatial intelligence is a truly global affair

# 'eyes' wide

 **EVERY FIFTH GRADER KNOWS** Earth has seven continents and five oceans. Some 270 million years ago, however, there was just one of each. According to the “continental drift theory,” during the Paleozoic era the planet comprised a single supercontinent, Pangaea, surrounded by a single superocean: Panthalassa.

When Pangaea broke apart, it changed world geography forever. But the implications weren't just geographic. Because its fractures foretold a world in which nations compete for power and resources, they were also political. Hence, one of the most important questions facing the global defense and intelligence communities today: How can nations with a limited field of vision gain a holistic picture of the world? >>



# open

Thanks to the Five Eyes intelligence alliance among the United States, Canada, Australia, New Zealand, and the United Kingdom, geospatial intelligence is a truly global affair

*BY MATT ALDERTON*

The answer is teamwork. And thanks to the Allied System for Geospatial Intelligence (ASG), which for nearly a decade has seeded collaboration and cooperation among the United States and its closest allies, “Team GEOINT” enjoys a strategic cohesion that yields tangible benefits for each of its members: the U.S., Canada, Australia, New Zealand, and the United Kingdom—known collectively as the “Five Eyes” (FVEY). Their intelligence alliance is the genesis of a new kind of supercontinent united by common interests rather than shared soil.

### STRENGTH IN NUMBERS

After the American Revolution, the U.S. and the U.K. went from enemies to fast friends. Their relationship became especially close during World War II. Created in 1943 by a secret pact known as the British-U.S. Communication Intelligence Agreement, their partnership bore fruit so critical to the Allied forces’ victory that it was formalized after the war as the UKUSA Agreement. As the agreement evolved, Canada became an official treaty partner in 1948, followed by Australia and New Zealand in 1956.

The term “Five Eyes” became verbal shorthand for “AUS/CAN/NZ/UK/US EYES ONLY,” which was stamped on all top-secret documents shared among Commonwealth allies.

And yet, the alliance is much more than a rubber stamp. It’s a deep and loyal friendship, according to Gary Dunow, chief of the International Support Team for Europe and Canada at the National Geospatial-Intelligence Agency (NGA).

“I’ve got a couple of friends I’ve known for almost 30 years ... If I need to call them at 2 o’clock in the morning—no matter what the topic is—I know those two guys are going to answer,” said Dunow, who’s based in London. “That’s how I think of the Five Eyes. They’re partners around the world who will always answer when the U.S. needs them, and we’ll do the same for them.”

The allies’ friendship comes naturally, added Fred Kemp, who recently retired from his position as NGA’s director of international affairs. “The fact that we have a common language—and, in many cases, a common history together—clearly unites our Five Eyes nations,” he said. “We see the world very similarly.”

But necessity, in addition to a common worldview, explains why FVEY continues to endure.

“This is as much pragmatic as anything else,” said Air Vice Marshal Sean Corbett of the U.K.’s Royal Air Force (RAF). In January, Corbett completed a 27-month rotation as the U.S. Defense Intelligence Agency’s (DIA) first deputy director for Commonwealth integration (DDCI)—the first foreign national deputy director of any U.S. intelligence agency.



*Air Vice-Marshal Sean Corbett of the Royal Air Force, who recently completed a rotation as the U.S. Defense Intelligence Agency’s first deputy director for Commonwealth integration, sits with colleagues at a briefing for Chairman of the Joint Chiefs of Staff Gen. Joseph F. Dunford, Jr.*

PHOTO COURTESY OF DIA PUBLIC AFFAIRS

“The world we live in right now is a very dangerous place and the U.S. can’t do everything,” continued Corbett, whose replacement at DIA is Maj. Gen. John Howard of New Zealand. “We can’t be everywhere, all the time.”

Dunow agrees. “Our intelligence challenges are global and unending,” he said. “We need to apply as many resources as we can to problems like counterterrorism, counterproliferation, and global warming.”

By providing resource assistance to one another, the partners improve their own intelligence capabilities.

“When you’re conducting intelligence and analysis, you need diversity in order to get to the best possible answer,” Dunow continued. “We look at things through our culture, our geographic location, and our national security paradigm differently than Canada, Australia, New Zealand, or the U.K. Their location, history, culture, and national security concerns all add value to the way [the Five Eyes] look at problems as a whole.”

### SOLVING GEOINT PUZZLES

Escape rooms are live interactive puzzles intended to be solved via groupthink. Participants are locked in a themed room with a fictional mission—for example, defuse a ticking time bomb—and must solve a series of clues in order to complete it successfully. Generally, no one person can solve all the clues, and the only way to “escape” the room is to work together. That’s how FVEY works: In order to solve GEOINT puzzles, each partner must bring its own unique competencies to bear. The U.S., for example, benefits from each of its partners’ contributions, each of which is flavored by different contexts, capacities, and capabilities.

### THE UNITED KINGDOM-

GEOINT has a long history in the U.K. dating back to at least World War II, when the British turned the war’s tide with their superior air reconnaissance and photographic

interpretation. Developed during covert aerial operations by the country's Secret Intelligence Service, those capabilities were originally housed in RAF's Photographic Development Unit, which after the war became known as the Joint Air Reconnaissance Intelligence Centre (JARIC). For decades, JARIC managed British imagery needs, while a separate entity, the Defence Geographic Centre (DGC) at Feltham, led foundation GEOINT. In 2012, both were subsumed under a new command known as the Joint Forces Intelligence Group, whose Defence Intelligence Fusion Centre (DIFC) became the U.K.'s principal GEOINT provider. In fact, DIFC was initially known as the Defense Geospatial Intelligence Fusion Center but dropped "Geospatial" from its name in 2014 to reflect and inculcate the group's multi-INT nature.

"In the U.S., [former Director of National Intelligence] Jim Clapper saw the benefits of bringing mapping and imagery agencies together into a coherent whole when he shaped the modern NGA. We've been following a similar pathway here in the U.K.," explained Mark Ashwell, a retired RAF air commodore and former director of intelligence capability, strategy, and policy with the British Ministry of Defence (MoD). "Because of our smaller size and scale, however, there's a different construct here in the U.K. Whereas NGA exists in its own right, there was not a direct equivalent of a U.K. geospatial intelligence organization; instead, geospatial intelligence has always lived alongside strategic intelligence in the Defence Intelligence organization."

That organization is currently in the midst of an ongoing transformation—in 2016, the National Centre for Geospatial Intelligence (NCGI) was formed and replaced DIFC as the functional manager of GEOINT in the U.K.

"Over the past two years, Chief of Defence Intelligence Air Marshal Phil Osborn has led Defence Intelligence through a significant transformation program," explained Brig. Ben Kite, head of NCGI. "During this process, the critical value that GEOINT provides to the U.K. was fully recognized and the requirement for a national capability was agreed. NCGI combines the former JARIC, DGC Feltham, No.1 Aeronautical Information Documents Unit, and 42 Engineer Regiment (Geographic) under a 2-star led organization, [overseen] by Air Vice Marshal Ian Valleley and managed daily by myself. It assumed the authority for GEOINT in the U.K., a major step forward for the U.K.'s GEOINT community."

According to Kite, NCGI is organized into three functional areas: Analysis, Foundation, and Deployable. "The organization combines the expertise of 1,200 military and civilian imagery analysts, geographers, and geospatial analysts in a mutually supporting structure," he added.

Ashwell said further evidence of British GEOINT's evolution exists in the U.K.'s Single Intelligence Enterprise initiative, through which MoD is attempting to create shared architectures and processes to unite disparate intelligence organizations and disciplines.

"The concept is to ... bring all of the INTs together and use them as a fused entity to provide solutions and decision support to the people who are wrestling with the macro-problems of the time," said Ashwell, who likened the Single Intelligence Enterprise to the Intelligence Community Information Technology Enterprise and Joint Intelligence Enterprise initiatives in the U.S.

**"We're bringing a lot to bear in terms of the construct of massive data exploitation and innovative enhanced visualizations of data, as well as cognitive inter-relational databases."**

—BRIG. BEN KITE, NATIONAL CENTRE FOR GEOSPATIAL INTELLIGENCE, U.K.

"Access to an expanding number of cross-domain data sets will provide the breadth and depth of information needed to allow NCGI analysts to provide accurate and timely foundation and intelligence products," Kite said. "The integration of all the national GEOINT capabilities, along with our partners' capabilities, will give the NCGI the competitive edge to meet current and future challenges."

Multi-INT fusion will help the U.K. extract maximal intelligence impact from minimal intelligence resources. This "more with less" spirit is well-suited to contemporary big data challenges, which will be another British competency benefiting FVEY partners going forward, Ashwell predicted. "There are lots of people in the U.K. looking at manipulation of data," he said, citing as examples U.K. companies such as Daden and BAE Systems Applied Intelligence. "We're bringing a lot to bear in terms of the construct of massive data exploitation and innovative enhanced visualizations of data, as well as cognitive inter-relational databases."

Even as it develops new centers of excellence, the U.K. continues to leverage long-established talents.

"The U.K., in particular, has a long legacy with hydrographic work because of its naval history," Dunow said.

And finally, there's its location—adjacent to some of the world's largest and most important economies. "The British history in Europe is different than the U.S. history in Europe," Kemp said. "Having that lens is incredibly important to us."

*Panelists from the Allied System for Geospatial Intelligence discussed the evolution of GEOINT in their respective nations at the GEOINT 2017 Symposium.*



## -AUSTRALIA AND NEW ZEALAND-

What the U.K. is to Europe, Australia and New Zealand are to the Asia Pacific.

“New Zealanders, for example, certainly enjoy a unique perspective of the Antarctic that we don’t have because they’re closer to it,” Kemp said.

Tom Mayberry, NGA’s international support team chief for Asia Pacific, added, “We work very closely with our mission partners [in Australia and New Zealand] on GEOINT issues throughout the region. Some common threats we’re worried about, for example, are China and North Korea.”

Although it’s the smallest of the FVEY partners, New Zealand nonetheless makes important GEOINT contributions, according to Mayberry, who is based in Canberra, Australia. “New Zealand is a little bit more conservative—it’s a smaller effort—but they contribute significantly and regularly outpunch their weight from a GEOINT perspective in the region,” he said.

New Zealand’s GEOINT functional leader is GEOINT New Zealand (GNZ), which was originally the Hydrographic Office of the Royal New Zealand Navy and is now part of Defence Intelligence within the New Zealand Defence Force (NZDF).

“The real genesis of GNZ as it stands today occurred in 2002 with the standing up of the Joint Geospatial Support Facility, which was established to support NZDF across all three environmental domains,” explained GNZ Director Lt. Col. Damon Taylor. “In 2008, the organization changed its name again to the Geospatial Intelligence Organisation to reflect the fact that its role was now wider than purely the provision of foundation geospatial support—but also included an analytical intelligence output.”

In 2012, a government review of intelligence structures within New Zealand suggested the formation of a single geospatial intelligence organization to support both NZDF

and the wider New Zealand government. And so, GNZ was born.

“GNZ—similar to NGA—has a mandate to support both the military as well as the wider government. To do this, we have a robust governance model that helps ensure we deliver what is required by all our stakeholders,” Taylor said. “The biggest difference between us and our partner agencies within the FVEY is our size ... But our size is also an advantage. When you are only one or two analysts deep in some areas you need to make sure you hire the best people you can get—and we do. Our size also makes us very agile; we can change focus onto new areas relatively quickly or take part in new initiatives without having to jump through large layers of bureaucracy.”

Owing to its roots, GNZ maintains a core hydrographic and maritime competence and therefore plays a lead role in many disaster relief missions. In 2015, for instance, relief agencies leveraged GNZ’s damage assessment reports to target support in the aftermath of Severe Tropical Cyclone Pam, which killed 24 people in the Pacific island nation of Vanuatu.

“When there is a human disaster in the Pacific, [New Zealand brings] capabilities and perspective to those nations that are affected, just as [the U.S. does] when there are issues in the Caribbean,” Kemp said.

Echoed Taylor, “Given our physical location on the globe—Henry Kissinger described New Zealand as ‘a dagger pointed at the heart of Antarctica’—we view our immediate area of interest as the Southwest Pacific.”

Australia’s larger size means the country offers even more resources in the region.

Australia is on the upswing,” Mayberry said. “I see them taking on a strong leadership role in terms of [execution] of GEOINT in the Asia Pacific region at the FVEY level and beyond.”

Australia’s “upswing” within the FVEY community is thanks in part to a national GEOINT evolution currently underway. In 2000, the Australian Department of Defence established the Defence Imagery and Geospatial Organisation (DIGO), which was modeled after the U.S. National Imagery and Mapping Agency (NIMA)—NGA’s antecedent. Like NIMA, DIGO was an amalgamation of imagery and mapping agencies.

When Clapper coined the term “geospatial intelligence” in 2003, Australia eventually followed suit; like NIMA became NGA, DIGO in 2013 became the Australian Geospatial-Intelligence Organisation (AGO).

“When we were in Afghanistan and Iraq, we worked very closely with U.S. Special Operations Command, and we saw firsthand the utility of really granular geospatially enabled targeting,” said retired Australian Army Officer Chris Hawkes, now an intelligence and investigations consultant at Point Duty, an Australian company that specializes in GEOINT. “I think that led to a realization ... about how important

*Australia  
Department of  
Defence Lance  
Corporal Emily  
Goeman of the  
Combined Team  
Uruzgan Geospatial  
Intelligence Cell  
prepares imagery  
in her role as  
a geospatial  
technician.*



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geospatial capability is and how lightweight we'd been on it."

In 2017, Australia further championed GEOINT when it gave AGO oversight of the Australian Hydrographic Office, which previously reported to the Royal Australian Navy. Additionally, Mayberry said AGO has hired so many new employees it had to lease a second facility to house them all.

One notable employee illustrates how AGO is scaling up its capabilities. "NGA is evolving into new types of [trade-craft], including structured observation management and modeling," Mayberry said. "AGO has followed suit to the point where it is actually paying for [an NGA employee] to be in its footprint ... for a three-year tour to assist AGO in standing up a modeling and structured observation management capability."

NGA has also loaned Australia a senior manager to help it establish a new Office of National Intelligence modeled after the U.S. Office of the Director of National Intelligence. "She's embedded in the Department of the Prime Minister and Cabinet to assist with the standup of this office," Mayberry said. He added yet another example of Australia's growing intelligence profile is Defence Project 799, through which Australia will invest AU\$500 million to acquire regional commercial satellite imagery in support of GEOINT missions for itself and FVEY partners.

Even as its capabilities grow, however, what remain most valuable to the FVEY community are Australia's connections.

"I see Australia getting bigger and bigger, and potentially taking on a role working with other countries in the region through a multilateral approach—even beyond FVEY," Mayberry said. "They've got some very strong, historic relationships with other countries in theater, and we hope to leverage that."

## -CANADA-

Canada's GEOINT capabilities are particularly robust, according to Canadian Army Lt. Col. Kevin Ng, senior liaison officer to NGA from the Canadian Department of National Defence (DND).

"The landscape of GEOINT within the government of Canada is very broad," explained Ng, who said Canada's GEOINT enterprise includes diverse stakeholders like the Royal Canadian Air Force, which oversees space-based defense capabilities; Defense Research and Development Canada; Natural Resources Canada, whose Canada Centre for Mapping and Earth Observation specializes in geomatics; and the Canadian Space Agency. "There are many partners involved, but [DND is] the key player leading GEOINT policy and driving GEOINT capabilities forward."

The history of the Canadian Forces Intelligence Group closely mirrors that of its FVEY counterparts: For decades, the Canadian Armed Forces had separate imagery and mapping organizations—the Canadian Forces Joint Imagery Centre and the Canadian Forces Mapping and Charting Establishment, respectively—that were ultimately combined into a single formation, J2 Geomatics, in the early 2000s. In 2003, that formation became the Directorate of Geospatial Intelligence, which in 2013 became the Canadian Forces Intelligence Group, encompassing not only GEOINT, but also HUMINT, counterintelligence, and meteorological units.



PHOTO COURTESY OF DIA PUBLIC AFFAIRS

"The Canadian trajectory was very much an evolutionary process," said Ng, adding Canada's GEOINT progression has culminated in an all-source approach to intelligence problems in theaters like Iraq and Afghanistan, where the Canadian Armed Forces is known for forward-deployed, all-source intelligence centers.

While its all-source approach gives Canada a big bite, the reality is that at just under 70,000 troops, the Canadian Armed Forces is relatively small. To be effective, it must play to its core strengths, the most significant of which is maritime domain awareness.

"The maritime domain awareness capability is a niche area Canada has developed," explained Ng, who said Canada's maritime mastery stems from the fact that it has three coasts—including one in the Arctic, which was the basis for launching Canada's first commercial Earth observation satellite, RADARSAT-1, in 1995. "The primary Canadian interest in [RADARSAT-1] was surveillance of the Arctic and monitoring our coastline. Because there obviously are a lot of other applications, however, industry and government partners got together and identified the potential for us to exploit RADARSAT-1 for near real-time ship detection."

With the launch of RADARSAT-2 in 2007, and two associated ground stations for data processing, exploitation, and dissemination in 2012, Canadian Armed Forces evolved its capabilities even further.

"Back in 1998, it took us hours to process RADARSAT-1 imagery for ship detection purposes. Now we've reduced that time lag down to about 15 minutes or less," continued Ng, who also highlighted Canada's ability to automatically combine radar and Automatic Identification System (AIS) technology for the purpose of identifying "dark" targets (ships not emitting AIS signals).

Canada brought that capability to bear for its coalition partners in 2016 as part of multinational counterterrorism efforts in the Middle East, where Canadian Armed Forces' Unclassified Remote-sensing Situational Awareness (URSA) mobile ground station made its operational debut in Bahrain. URSA's near real-time ship detection capability provides a maritime operating picture for Canadian, U.S., and allied commanders by directly downloading imagery from commercial satellites—including RADARSAT-2—as they pass over a deployable ground station.

In the future, Canada hopes to add similar value to FVEY partners operating in other, dryer domains. "We're not just looking at maritime contacts in an automated fashion;

The corridor outside the Five Eyes Coordination Cell at U.S. Defense Intelligence Agency headquarters.



“A fully operationalized global GEOINT enterprise will fortify reliability and availability of GEOINT, ensuring mission-readiness in times of war, crisis, and peace.”

—DUSTIN GARD-WEISS, ODNI

we’re going to be looking at land targets as well,” Ng said. Canada’s forthcoming RADARSAT Constellation mission, for example, is scheduled to put three new Earth-observation satellites on orbit in November, providing daily revisits of Canada’s vast territory and maritime approaches, as well as daily access to 90 percent of the Earth’s surface.

### **NEXT STOP: CLOSER COLLABORATION**

The Commonwealth allies have much to gain from leveraging one another’s assets and expertise. Still, collaboration doesn’t always come easy.

One of the biggest hurdles facing FVEY is technology, as partners must have complementary systems even as they have disparate budgets and requirements.

“As you try to improve the speed at which you make decisions, technology is a key enabler of that. So, interoperability is a big deal,” said Kemp, who stressed the importance of investing in technology that facilitates information sharing. “We shouldn’t make resource decisions in isolation. If we’re going to modernize a particular approach, we need to take into consideration what effect that modernization will have on the people we’re partnering with.”

Added former NGA Associate Director for Enterprise Dustin Gard-Weiss, who recently joined the Office of the Director of National Intelligence (ODNI) as associate deputy director of national intelligence for enterprise capacity, “An enduring challenge is to share consequential geospatial intelligence, data, and analytics ... through seamless operations across the National and Allied Systems for Geospatial Intelligence. Technology, long a barrier to interoperability, has advanced sufficiently to enable us to work in ways we have always envisioned and desired. We are seizing opportunities to increase interoperability through analytic modernization and professionalization initiatives.”

The goal of one such initiative is managing the complexity of GEOINT analytic data and collection operations among Commonwealth partners with a shared approach to artificial intelligence and machine learning.

“Together, we are embracing and harnessing the power of GEOINT algorithms and models while adopting a risk-aware mindset and approach to machine learning, computer vision, and artificial intelligence,” Gard-Weiss continued.

Across this and other initiatives, data security is of particular concern. “Classification is always an issue,” Kemp continued. “We need to ensure that we have the proper identity management capabilities in place, and that we’re sharing the right information with the right partner, at the right time, and for the right purpose.”

Policy can complicate that task. “Our policy community is very forward-leaning. It’s also very inclusive, which means there are a lot of different equities that are considered when we draft and promulgate policy,” Dunow said.

Even things as minor as language and workflows can pose major challenges, according to Corbett, who said FVEY must develop shared terminology and compatible systems architecture that facilitate the cross-flow of information.

Perhaps the greatest challenge is organizational culture and buy-in. “To me, the biggest challenge is getting it into the DNA of the analyst and others that it’s a good thing to work at the FVEY level,” Corbett said. “Not just because somebody higher up is telling you to do so, but because you gain benefits from it—because some of the FVEY partners may have that missing piece of the jigsaw puzzle you need.”

In the GEOINT realm, the ASG offers a framework through which FVEY can discuss these challenges and collaborate on solutions. One of its most fruitful mechanisms is the liaison role.

“In addition to having exchanges throughout the year on different topics and technical areas, our FVEY partners send folks to work in our facilities and we do the same in their locations,” Dunow said. “When you sit, work, and go to lunch together that relationship gets stronger.”

At DIA, the DDCI post is an effort to achieve the same international synergy with all-source intelligence that the ASG promotes with GEOINT.

“We’ve all fought together and sometimes died together. But the closer you get to the beltway, the harder it becomes to work together,” said Corbett. “I was brought in specifically to address that for defense intelligence by optimizing FVEY integration within DIA.”

Corbett’s efforts included encouraging analysts and technical staff to confer directly with their FVEY counterparts to achieve mutual understanding of one another’s intelligence products; conducting outreach and training with intelligence analysts to familiarize them with FVEY capabilities, benefits, and workflows; and defining requirements for releasable intelligence products so they could be shared optimally.

As a result of Corbett’s efforts, DIA has more than doubled the amount of intelligence products made available to FVEY partners: from 17 percent of releasable intelligence shared in 2015 to 54 percent presently.

Improvements in multinational intelligence sharing aren’t just numbers; on battlefields in Afghanistan, storm-ravaged islands in the Pacific, and in countless other theaters, they’re strategic advantages and lives saved. Which is why the next frontier in FVEY collaboration will be putting even more “eyes” on the shared picture.

The ultimate goal is creating a bigger, broader ASG—a global system for geospatial intelligence instead of merely an allied system.

“We seek to better understand our partners’ needs and unique strengths, and to harness GEOINT capabilities—wherever they reside—to the highest priority missions,” Gard-Weiss concluded. “A fully operationalized global GEOINT enterprise will fortify reliability and availability of GEOINT, ensuring mission-readiness in times of war, crisis, and peace. Together, we will achieve the full potential of the global GEOINT enterprise for those we serve.” 🌐