



# NORAD's Next Evolution

NORAD's mission fundamentally shifted after Sept. 11, 2001, to address the threat of asymmetric terrorist attacks aimed at North America. But now North American Aerospace Defense Command is changing its focus once again, re-emphasizing advanced threats from outside the homeland.

While the internal terrorism threat endures and continues to change, the last five years have seen NORAD attune itself to an increasingly capable and expeditionary Russian military.

This latest evolution of the NORAD mission also marks a return of sorts. In May 1958, the first NORAD agreement established a binational command that would allow Canada and the United States to better coordinate a common air defense of North America. "There was one threat, which was the Soviet threat, at that point," Canadian Lt.-Gen. Pierre St-Amand, deputy commander of NORAD, told *Air Force Magazine*.

In the early years, NORAD was forced to "evolve with evolving capabilities," but for decades the raison d'être of a combined air defense remained fixed on the Soviet Union. It's

**Air defense was focused on the Russians. Then it was terrorists. Now it is both.**

no surprise, then, that the end of the Cold War brought with it a relaxation of NORAD's posture.

One of the key findings of the 9/11 Commission Report was that the dwindling of NORAD's once-expansive array of alert sites—there were 26 at the height of the Cold War, but only seven on the eve of 9/11—left the command inadequately prepared to respond to the attacks.

After the shock of the successful 2001 attacks on the commercial airline system, the World Trade Center, and the Pentagon, "NORAD started looking in," said a NORAD official.

The new focus was on how to defend North America against a recurrence of similar attacks, and "we kind of relaxed our vigilance" on peer adversaries after 9/11, said St-Amand. Operation Noble Eagle and the expansion of NORAD's alert sites and related air missions were focused on the terrorist threat, not necessarily on the threat posed by Russia or other

nations with advanced air forces. These changes were defined by the threat of the moment.

Now the pendulum is swinging back. NORAD is no longer in a post-9/11 posture. While the terrorist threat persists, in the last five years Russia is back at the top of NORAD's list of dangers to the homeland. "Since 2008, we've seen the external threat return," said the NORAD official.

St-Amand confirmed that NORAD has become "concerned about capabilities that have long range," those that "can reach out and touch North America" from abroad, especially those demonstrated by Russia.

NORAD commander US Air Force Gen. Lori J. Robinson, in an interview with *Air Force Magazine*, simply declared Russia to be "one of our primary air domain threats." The focus of the threat is "long-range aviation," according to Col. Jeremy Sloane, vice director of operations at NORAD. He is concerned by "the



increase in the number of flights that we've seen, specifically starting back in the 2007 to 2008 time frame, and then highlighted by an uptick over the past couple of years."

In response, NORAD fighters have—over the past five years—conducted “an average of five intercepts per year of Russian military aircraft” in the US or Canadian Air Defense Identification Zones, according to NORAD. The ADIZ/CADIZ is defined as a zone of airspace that extends approximately 200 miles from the coastline of Canada and the US and is mainly within international airspace.



Robinson

But it's not just the “expeditionary” long-range aviation (LRA, or bombers) that worries NORAD. Russia's willingness to fly closer to North America must be viewed within the context of “an increasing Russian willingness to use force—and to use force in unexpected ways in Georgia, Ukraine, Syria,” the NORAD official insisted.

These Russian military excursions in other parts of the world are concerning to Sloane not just as adventurism,

but also as showing off. “The types of operations they're doing in combat now,” he said, are a kind of “messaging test, if you will, on what they're capable of—and perhaps willing to do”—in a North American theater.

That the Russian message is aimed primarily at the United States is clear to NORAD, but much else about Russian intentions is hard to ascertain. Steve Armstrong, chief of strategic engagement at NORAD, cautioned that Russia's “legacy cruise missiles and their legacy tactics, techniques, and procedures were very predictable. Now they have become very unpredictable.” The evolution of Russia's capabilities is marked by advanced cruise missiles and advanced GPS capabilities. “They don't have to fly to a certain piece of sky or a place on a map ... to update their initial navigation systems,” he explained.

As a result, Armstrong said, “now our swath of what we have to cover is huge.” The emergence of Russia as a threat to North America is measured for Sloane by “how far north we have to engage in order to ensure protection of the homelands.”

### EAGLE VISION

It's no wonder then that Robinson said one of NORAD's greatest priorities going forward is “to be able to

**NORAD launched F-15s (top) on Sept. 28, 2006, in response to the incursion of Russian Tu-95 Bear bombers into North America's Air Defense Identification Zone.**

detect at range, to track at range, ID at range, because things have changed with Russian long-range aviation.”

The key to this sort of advanced tracking is persistent, over-the-horizon (OTH) radar. While advanced fighters and intelligence, surveillance, and reconnaissance aircraft can perform OTH tracking, the cost of the 24/7 patrol flights to provide a persistent view with these systems is prohibitive. NORAD needs something that can stay in one place and watch the horizon.

Enter the Army's JLENS (Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System) program. In 2015 it deployed a helium-filled aerostat, tethered near the Maryland coastline to provide airspace defense for the National Capitol Region (NCR) through persistent, OTH radar.

Less than a year into its initial three-year test period, and before subsequent aerostats in the system could be deployed, JLENS slipped its tether in rough weather. It had to be chased down by F-16s after it floated to Pennsylvania, where the aerostat cut power lines and caused outages.

In 2005, the Army planned to develop 16 aerostats. In 2009, however,

Top: USAF photo. Left: USCG photo by PO2 Patrick Kelley

the Government Accountability Office reported design problems with the mooring system and delays related to integration with other Army systems. In 2010, an accident resulted in the destruction of a program aerostat, and the program incurred a Nunn-McCurdy breach for cost overruns in 2013. By 2015, the Army was only planning for two JLENS balloons.

Navy Capt. Scott Miller, director of NORAD public affairs, said, “The program has been boxed up, put into storage.” Despite the unlikely return of JLENS, given its troubled history, “persistent, OTH radar is something that we certainly require,” Miller said. “And so while we certainly have OTH targeting capability, it’s not as persistent as we would like. And so there is an ongoing effort to identify a replacement for a JLENS-type program” that could provide it.

NORAD faces modernization challenges, too. The North Warning System (NWS), an array of air defense radars in the northern US and Canada that NORAD relies heavily on for its view of airspace traffic, is aging.

St-Amand said the system, built in the 1980s, “is coming to the end of its useful life.” NWS radars are “scheduled to become not sustainable, unless we invest in them, around 2025.”

NORAD has not decided whether to upgrade or replace the system, St-Amand said, but whatever emerges will be “a binational effort” that will include “an agreement for cost sharing.”

Attention will need to be given to the fighters that fly NORAD missions. “Both in the United States and in Canada our fleets are getting old,” St-Amand acknowledged. In the US, F-16s do the heavy lifting for NORAD combat air patrols and alert missions. To keep the fleet current, Air Combat Command is planning to upgrade 52 F-16s with active electronically scanned array (AESA) radars specifically to improve their performance in Noble Eagle air defense missions.

In Canada, the need to find a CF-18 replacement is more urgent. While Canada was a partner nation in the F-35 development program, Ottawa’s intention to buy 65 of the fifth generation fighters was thrown



**TSgt. Alex Gaviria, a senior system controller, takes a call at the 721st Communications Squadron’s systems center in the Cheyenne Mountain Complex in Colorado Springs, Colo.**

into serious doubt after Prime Minister Justin Trudeau was elected in October 2015 on a platform that included a promise to cancel the F-35 purchase. The Department of National Defense is scheduled to release a long-awaited defense policy review in 2017, and that document may settle the question.

In the meantime, Canada is contemplating the purchase of 18 F/A-18 Super Hornets to fill the capability gap on a temporary basis until a long-term decision can be reached on replacing the CF-18.

For its part, NORAD is more willing to talk about capabilities than platforms. “We try to stay away from dictating the platforms,” St-Amand said, because that’s a “decision for governments” to make. “The command really is agnostic about the platform,” the NORAD official commented. “As long as it has the radar and engagement capabilities we require, we really don’t care if it’s an F-16 or an F-18 or an F-22 or an F-35.”

On the US side, Sloane is similarly cautious but sees a definite future role for the F-35. “There’s no immediate plan ... to replace the ACA [Aerospace Control Alert] fighters,” he said, “but certainly that is something that is not just within the realm of possibility but is in the future for the platform.” For NORAD’s mission, he said the F-35

would bring “a significant increase” in capability “from an interconnectivity, data link, info-sharing infusion standpoint.”

#### **SMALL AIRCRAFT, BIG PROBLEMS**

In addition to the ongoing terrorist threat and a resurgent Russia, NORAD is focused on emerging threats. Command historian Lance Blyth thinks NORAD today faces “a greater proliferation of threats than we have in the past.” Primary among new capabilities is the use of low-profile aircraft that fly slowly at a low altitude, making them difficult to detect on radar. For the previous NORAD commander, Adm. William E. Gortney, this threat was demonstrated alarmingly on April 15, 2015, when a manned gyrocopter was flown from Gettysburg, Pa., to Washington, D.C., and landed on the Capitol grounds.

In testimony before the Senate Armed Service Committee, Gortney said the aircraft was not detected because its “speed, altitude, and radar cross-section fell below the thresholds necessary to differentiate it from surrounding objects, including weather, terrain, and birds.” The lesson he drew from this event was that “detecting and tracking low-altitude and slow-speed aerial vehicles is a significant technical challenge.”

NORAD now says it has made progress in this area. Armstrong said they held a tabletop exercise recently where they “reflew the gyrocopter event exactly the way it played out on the 15th of April.” This time, “we were able to track that thing ... with enough fidelity that we were able to know where he was pretty much all the time.” This sort of exercise has led NORAD to make “some adjustments” to the way low-profile aircraft are tracked, especially in the NCR.

The changes involve collaboration between the FAA and military radar data, in terms of what feeds the air picture. Getting a view that is clearer and more detailed is crucial for the low and slow threat partly because of the sheer numbers involved in air traffic. In 2016, there were 35 million domestic commercial flights in the US, the FAA’s senior advisor at NORAD Eugene Jiggitts Jr. said. “It’s a complex task to filter all those things out” and isolate the tiny bit of significant data on the airspace map.

Another “leading-edge technology that causes us concern,” according to St-Amand, are drones or unmanned aerial vehicles (UAVs). They present another low-profile threat, but one that is becoming more widely available and is potentially more dangerous. What worries Sloane is “the proliferation of it, just the sheer amount of availability to the private sector.” At a time when “just any old civilian off the street” can walk into a Best Buy and come out with a UAV, “it’s really, really hard to police that.”

The problem is only going to get more complicated. The FAA expects commercial and hobbyist UAV sales to nearly double in 2017, and in 2020 the FAA forecasts that seven million drones will be sold in the US.

“We know the capabilities are there to weaponize those,” Armstrong warned. “We have entire teams that are working with interagency on it.”

A remaining area of concern with UAVs, however, is the law. “Everything we do has to be supported by legal authority,” the NORAD official said, and the rules surrounding private drone use are a brave new world. Jiggitts said it is “now legal to fly [UAVs] in the United States,” and the air traffic

system is straining to accommodate the new presence, especially along the East Coast of the US, which is already “saturated with airplanes.” Congress has some work to do, Jiggitts said, to “integrate [UAVs] into the national airspace system.”

Counter-action against a dangerous UAV in North American airspace is the key question NORAD faces. “If we got to the point where we had to do some type of engagement, be it kinetic or other engagement,” Armstrong admitted, “the authorities are not fully vetted right now.” The legal problem is particularly challenging because so many agencies have a role in the issue.

Armstrong said NORAD is working with the Joint Staff, FAA, Department of Justice, FCC, and National Telecommunications and Information Administration to gain authorization for an adequate response to the threat. Also, “Congress has stepped up and is helping significantly, making some adjustments to the [National Defense Authorization Act] language that helps us.” But because the situation is new and the legal framework is in development, the NORAD official said, “it’s obviously going to be slower for the government of Canada and the government of the United States to respond” to UAVs.

The proliferation of unmanned aircraft presents a budgetary concern for NORAD. “Having airspace violators [creates] a money issue,” Jiggitts said. “It costs money when there’s somebody breaking our airspace.” The cost of intercept flights hits NORAD in terms of fuel for fighters, tankers, and airborne warning and control system (E-3 AWACS) aircraft. But it’s expensive in other ways too, Armstrong said, like when NORAD detects an errant aircraft and has to “sanitize airspace.” That involves “vectoring United and American and everybody else and it becomes a cost issue for the airlines.”

NORAD said that between 9/11 and this January, it had flown 5,000 flights in response to aircraft operating outside of flight plan activity—an average of just over 300 per year, or nearly one per day. All of those flights have fallen under Noble Eagle, now

numbering more than 68,000 sorties for all missions and all platforms.

The operations tempo of this mission has been challenging, and Air National Guard units carry the bulk of the burden. The ANG “provides the preponderance of our fighter force,” Sloane said, including all NORAD missions in the continental US. Only the F-22s in the Alaskan NORAD region are flown by Active Duty airmen for the Noble Eagle mission.

## GUARD DUTY

The Air National Guard brings more than just numbers to the NORAD fight, though. Col. Gregor J. Leist, commander of NORAD’s Western Air Defense Sector, said Guard units bring to the mission “continuity” and “length of service,” as well as “specialized skill sets.” Their ANG status allows these airmen to stay in the same mission for years, or even decades, getting to know the equipment, procedures, and challenges associated with NORAD’s work.

One of three NORAD regions is Continental US NORAD Region (CONR), which also serves as 1st Air Force (Air Forces Northern), at Tyndall AFB, Fla., one of three numbered air forces assigned to Air Combat Command. The concept of Total Force is central to CONR, encompassing Active Duty, ANG, Air Force Reserve, and Civil Air Patrol members.

“First Air Force has been a Total Force since Day One,” CONR Chief of Staff John O. Griffin said. Lt. Gen. R. Scott Williams, commander of 1st Air Force/CONR, told *Air Force Magazine*, “Total Force is a great strength.”

For homeland defense missions, Total Force involvement makes particular sense. “Your Guard units keep and retain their experience,” Sloane said. Guardsmen have “grown up with the mission.” Because Active Duty pilots rotate through a wide variety of mission sets, “they won’t have necessarily the kind of experience flying low, slow intercepts” that ANG pilots perform regularly. “They can train to it,” but they don’t live and breathe it like the Guard units.

These ANG units have been hard hit by tightening military budgets

and force drawdowns in recent years. “Over time the number of fighter units ... available to [fly Noble Eagle] has decreased,” Robinson said. “So what that has done is put an optempo on the guys that are still doing it.”

With budgets tight across the board, one of the primary ways NORAD works to keep costs down is through outreach programs. For national security events like the Super Bowl or the Democratic and Republican national conventions, NORAD provides dedicated security. One of the first things it does is send an advance team to the location of the event to educate private pilots. They go 200—or in some cases 500—miles in every direction, briefing the local aviation community on how the upcoming situation will alter the airspace rules. In this way they hope to cut down on the number of accidental airspace violations and therefore on the need to spend money intercepting errant aircraft.

Facilitating the security mission in these cases is the DEN, for Domestic Event Network. NORAD says this communications device is the single most important change since 9/11 that has enabled faster coordination and response in case of a national airspace emergency. DEN is a little black box that looks like an audio speaker. But it’s actually a phone line, said Jiggitts, that was “created the day of 9/11” and that has “never been hung up” since. NORAD uses it not just for national security events, but to coordinate response to asymmetric threats on a daily basis. Jiggitts said the DEN

could “possibly” be useful in the case of a symmetric threat as well.

More than 200 government entities have access to the line, and “NORAD is one of the permanent parties on that phone line now,” Jiggitts said. “Any air incident, emergency, change of destination, ... bad guy on board—whatever you can think of—is reported on that line initially so that NORAD knows what’s going on.”

DEN also connects NORAD with its Alaskan, Canadian, and CONR air component commands, as well as the Eastern and Western air defense sectors. Because it allows instantaneous collaboration on real-time airspace threats, Jiggitts calls it “the tip of the spear” for the NORAD mission.

How that mission will develop in the future is difficult to tell. One possibility is that NORAD may take a more active role in the cyber defense of North America. Currently, the command focuses its cyber energies on defending its own systems from attack, and the leadership defers to US Cyber Command on matters of strategy. But St-Amand and Robinson both left the door open for an evolution in this domain. Both Canada and the US “have been touched by cyber,” St-Amand said, and he sees how “combining our capabilities” and “integrating our efforts” to prevent cyber attacks could make sense.

The possibility of NORAD taking on more of the cyberdefense portfolio, he said, is “maybe a good idea,” but it’s a decision for the governments to make

in the end. “We’re talking a little bit about cyber,” Robinson conceded. “I don’t know where we’ll come down with that.” In 2012, however, NORAD and US Northern Command stood up a Joint Cyber Center that liaises with USCYBERCOM “in both directions,” according to Steven Rose, deputy director of Cheyenne Mountain AFS, Colo., which houses NORAD’s alternate command center and its Integrated Tactical Warning and Attack Assessment system. One might take this as a sign of future directions for NORAD, but that path remains unsure at this time.

Either way, when the mission is homeland defense, there’s always plenty to do. Robinson said it’s “an away game.” What that means is “the more we can take care of things overseas, the less we have to worry about things coming to NORAD, Canada, and the United States.” For its part, NORAD “can also be considered a catcher’s mitt,” she said. “If something isn’t taken care of [in] the away game, at the end of the day, from a defense of Canada and the United States, NORAD’s responsible in the air domain.”

## THE EERIE SILENCE

The significance of this “sacred responsibility” was brought home to Robinson long before she became NORAD commander. On Sept. 11, 2001, she was living in downtown Washington, D.C., about four miles from the Pentagon.

After the terrible events of the day unfolded, Robinson remembers trying to drift off to sleep. “As Washington, D.C., emptied out that night,” she recalled, there was “utter, sheer silence. It was so silent that I could hear in the middle of the night when the E-3s would swap out overhead and the fighters would swap out overhead.”

The silence following the day’s attacks had created space within the usual bustle of the city for her to hear the typically unnoticeable sounds of the ongoing mission in the air. That mission continues, now with Robinson in charge. And while it has evolved many times, and again even since 9/11, what doesn’t change is that “the mission is defending the homeland,” as Sloane said. There’s no end in sight of the need for that vigilance.

**F-15 Eagles arrive in Yellowknife, Northwest Territories, Canada, for Exercise Vigilant Shield 2017. The exercise is an opportunity for Canada and the US to hone their bilateral skills.**

