# Intelligence Support for the F-35A Lightning II

Capt Stephanie Anne Fraioli, USAF



The F-35 Lightning II is the first joint fifth-generation fighter aircraft; therefore, the Air Force, Navy, and Marine Corps need to codify the requirements for intelligence support to fifth-generation airframes. Making informed decisions necessitates an operational understanding of current intelligence gaps, shortfalls, and their impact on the Air Force's ability to execute assigned missions. To obtain this level of understanding, the service's leaders must have a clear picture of the threat. This article seeks to inform readers about the F-35's capabilities and mission-planning considerations, identify deficiencies in intelligence employment and dissemination, and recommend a way forward for unit-level intelligence. The article does not address either the tasking or allocation of the F-35A; neither does it examine processing, exploitation, and dissemination since these subjects deserve their own discussion. Follow-on submissions will detail additional topics.

## F-35 Capabilities

Fifth-generation technology was designed to penetrate denied airspace. Specifically, the F-35 Lightning II is advertised as a multirole follow-on to the A-10, AV-8B, F-16, and F/A-18A/B/C/D aircraft. The F-35 is not a chronological replacement to any airframe but a fifth-generation platform that demands increased information. Therefore, one cannot approach the subject of intelligence support to this aircraft with a fourth-generation mind-set.

A shift into the fifth-generation mind-set is imperative for any fifth-generation plan. This technology relies primarily on low observable (LO) signatures, which are optimized by effective mission planning. Fifth-generation aircraft derive LO properties from five major areas: radar cross section, the infrared spectrum, the visual spectrum, acoustic emissions, and radio frequency emissions. Because of these technological advances, these airframes are even more reliant on mission planning for effective employment. A baseline understanding of LO principles is critical to our Airmen's effectiveness. These underlying concepts are generally unclassified and should be incorporated into introductory schooling for intelligence professionals.

With fourth-generation fighter airframes, speed and energy equaled life and survivability. In the fifth-generation realm, information equals life. The evolution of the F-16 to the F-35 can be likened to that of a landline phone to a smart phone,

which can automate every aspect of one's life, constantly maintain situational awareness of social media and electronic mail, and make bank account information constantly accessible. Operators of fifth-generation aircraft do not need to perform antiquated functions because the jet automatically provides them with fused information—what the community calls *sensor fusion*, produced by electromagnetic and infrared spectrum dominance.

In fourth-generation platforms, the pilot has to manipulate labor-intensive avionics with less accurate sensors. By comparison, the F-35 attains spectrum dominance by utilizing sensitive, intricate sensors and then sending information from them to a sophisticated computer that supplies actionable data at a rapid processing rate. The F-35 is an information-hungry aircraft. Because fourth-generation technology places a significantly larger information burden on the pilot, the impetus is on intelligence support to ensure that flyers are prepared. A fifth-generation airframe will alleviate ambiguities with factual confidence ratings. If intelligence support to this airframe is effective, then the F-35 becomes a force multiplier. By default, its presence makes other aircraft more lethal, bridging the gap between fourth- and fifth-generation platforms. The F-35 Lightning II has a number of unprecedented collection capabilities that will require quick analysis and dissemination to guarantee the success of future missions.

## Gaps in F-35 Employment and Dissemination

Air Force leaders must understand the direct correlation between fielding a new platform and ensuring sufficient capability to collect, exploit, analyze, and disseminate battlefield intelligence to operational decision makers. Getting the right findings from these airframes to the right customer in a timely and effective manner is critical to combat effectiveness. In the war of information, the speed and accuracy with which one does so determines the victor.

Currently, the analytic cycle is too slow to accommodate the needs of the F-35's capabilities. As information technology advances at an exponential rate, the intelligence community must transform the way data is processed. Activity based intelligence (ABI), the latest trend in advanced analytics, is a methodology that enables identification of patterns, trends, and networks hidden within large amounts of data from multiple sensors. Although ABI and big data are separate concepts, this method of approaching F-35 intelligence analysis lends itself well to big-data problem sets like the considerable amounts of information that the F-35 can produce.

Additionally, unit intelligence support does not have access to the mission-planning software that the F-35 utilizes. Currently, inherent postmission products such as weapon system video cannot be created or disseminated. Air Force initial operational capability is approximately one year away for the F-35, but this gap will continue to be problematic with regard to getting the right intelligence to the right people at the right time. F-35 intelligence support personnel must have access to mission-planning software in order to satisfy this requirement.

Other fifth-generation aircraft can off-load data at a rudimentary level for exploitation and dissemination after the platform has landed; however, leveraging the Air

Force's distributed common ground system architecture for real-time exploitation ensures that the customer receives the intelligence in the swiftest possible manner. Because analyzing all of the information that the F-35 could provide would be impossible, one must utilize the collection-management process and ABI to identify specific intelligence demands.

Three key obstacles have prevented exploitation nodes from using information derived from fifth-generation sources. First, the data is compatible with a system not installed at most exploitation locations. Outfitting nodes with the common operating system presently employed by F-35 units will enable analysts to view, exploit, and produce intelligence in a timely manner.

Second, there is still severe separation outside the fifth-generation community concerning program access. For example, it is difficult for the F-22 and F-35 communities to plan missions at the program level in the same physical environment. To optimize these airframes, they must be able to plan and live in the same space. A fifth-generation combat ecosystem must exist within which all airframes and support systems can successfully communicate. This ecosystem should consist of common special access program clearances for all participants, common mission-planning spaces, and systems for all fifth-generation platforms.

Third, we have no fielded capability to disseminate near-real-time video and/or images through a line-of-sight architecture in order to effectively enable close air support missions. The absence of this ability decreases the level of verification between the joint terminal attack controller and pilot. Incorporating a remote operational video enhanced receiver (ROVER) capability would allow visual correlation between what the pilot sees at altitude and what the controller sees from the ground.

## Unit-Level Intelligence Support

Fifth-generation unit-level intelligence is critical at several junctures in the mission-planning process. First, the unit offers intelligence preparation of the operational environment / predictive battlespace awareness assessments to leadership and mission planners. This step sets the foundation for how the mission-planning cell will leverage LO characteristics to deny the enemy's integrated air defense system (IADS) the ability to engage, and it identifies threats relevant to the tasked mission. Second, unit-level intelligence offers the most up-to-date order of battle to mission planners. Analysis of the threat country's IADS in the predictive battlespace awareness—combined with the air order of battle, naval order of battle, ground order of battle, electronic order of battle, and defensive missile order of battle—permits the mission planners to reduce the order of battle to a strict examination of the factor threats and thus optimize a fifth-generation route.

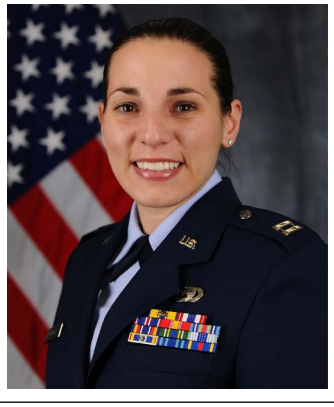
Based on the mission-planning considerations under discussion, unit-level intelligence plays a significant role in assuring the survivability of both the fifth-generation pilot and mission success. Primarily, unit-level intelligence supplies a detailed enemy threat analysis that produces recommendations on weaponeering, rules of engagement, special instructions, route analysis, and overall airframe integration. The unit compares a country's systems within the three functions of its IADS (air

surveillance, battle management, and weapons control) against the airframe's ability to discern any weaknesses for exploitation.

Lastly, the intelligence community is always focused on 1N0 (intelligence applications) support to fifth-generation issues but frequently overlooks the following enlisted Air Force specialty codes: 1N1A (geospatial intelligence analysis), 1N1B (targeting), and 1N2A (signals analysis). Arguably, imagery and signals intelligence are equally or more important than 1N0 support. Specific information coming off these airframes must be analyzable and digestible as quickly as possible. All of these disciplines will prove instrumental in F-35 exploitation; therefore, fifth-generation basics should be incorporated into formal training at a primary level for these specialty codes.

## Conclusion

Examining fifth-generation capabilities and associated gaps in different operational environments will help planners better understand their ramifications, develop viable mitigation strategies, and adapt new capabilities to reduce the effect of such deficiencies. It is important for all services to realize that the platform, though designed to counter advanced threats, can also be employed in a reconnaissance role. The future of intelligence support to fifth-generation airframes will be a hybrid of traditional unit support; intelligence, surveillance, and reconnaissance; and targeting support now tailored to LO platforms. Additionally, security considerations with regard to information digestible by the distributed ground station and within the fifth-generation community can be cumbersome to navigate in today's multinational environment. Despite these limitations, fifth-generation aircraft bring a significant capability to the table. The intelligence community cannot wait until hostilities commence to address these gaps. To effectively accommodate the joint fifth-generation community, the Air Force should not overlook an increased level of intelligence support; instead, the service must demand it ✪



**Capt Stephanie Anne Fraioli, USAF**

Captain Fraioli (BA, University of Pittsburgh; MA, American Military University) is an instructor and course chief of the F-35A Intelligence Formal Training Unit at Eglin AFB, Florida. She is responsible for conducting intelligence training and all of the associated course material, providing instruction on intelligence support to fifth-generation assets. She previously served as a distributed common ground system intelligence, surveillance, and reconnaissance (ISR) mission operations commander at the 24th and 450th Intelligence Squadrons, deploying to Afghanistan as an ISR liaison officer in support of US Army and Australian task force units. Additionally, Captain Fraioli served as a mission intelligence coordinator for Air Force Special Operations Command and chief of intelligence for F-16 support at the 80th Fighter Squadron, Kunsan AB, Republic of Korea.