U.S. Navy (Tommy Lamkin)

Crewman directs BF-04, a Marine Corps F-35B Lightning II, after vertical landing on USS *Wasp*, as second F-35 approaches

# THE F-35 AND THE Future of Power Projection

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The F-35 is called a joint strike fighter (JSF), and its ability to work with, leverage, and enhance the capability of power projection forces is at the heart of the next 20 years of rebuilding U.S. and allied forces. The "geriatric condition" of U.S. forces and the past 10 years of ground combat in faraway areas make it clear that a fundamental reconstruction is required. Yet much of the discussion inside the Beltway treats the F-35 as if it were simply a tactical aircraft replacement for the Air Force, Navy, and Marine Corps fleets. It is really a "flying combat system" rather than a tactical aircraft, which allows the United States and its allies to look at power projection in a very different way.[1] It also allows the United States and its allies to get the best value out of their forces.

The F-35 will replace multiple aircraft in the fleet, and by so doing, it will create significant economies of scale and savings. The aircraft is 80 percent common across the fleet, and savings come from software commonality, new approaches to digital maintenance, and flight-line enhancements and improvements. Possibly the F-35's most important capability is its ability to combine information with Aegis systems and other command and control systems operated by allies worldwide. This sharing capability will not only enhance combat capability but also dramatically change the way the United States can work with its allies. This article discusses several aspects of the change, which is disruptive in nature. If the culture of thinking about combat does not change, and we think of this as the next iteration of what the Services will have for combat aircraft, the entire revolution will be missed.

## Anticipating the "Re-Norming" Revolution

The F-22 has been deployed for several years, and its evolution is having a significant impact on rethinking air operations. The decade or more of deployment prior to the F-35 will provide a significant impact on the F-35 and its concept of operations.[2] The primary task of the F-22 is air-to-air dominance followed by core competence in counterair defense missions. It also provides a key gap-filler capability between the now retired F-117 and the exceptional capabilities of the F-35 against increasingly lethal mobile air defense systems. For example, SA-10s and SA-20s can be dismantled, moved, and ready for action in a short time. The trend line is toward rapid mobility in the adversary's air defenses, and mobility in this domain means that the incoming strike aircraft must be able to execute target identification, target acquisition, and strike missions virtually simultaneously. A key aspect of the new fifth-generation aircraft is its onboard machine processing capability, which allows the pilot to perform operations simultaneously that historically required several platforms operating sequentially. But the limited number of F-22s ensures that the F-35 will be the dominant fifth-generation aircraft both in terms of numbers and in its availability in a coalition environment. From the standpoint of thinking through 21st-century air operations, the ability of the F-22 and F-35 to work together and to lead a strike force will be central to U.S. core capabilities for projecting power and will be a crucial role of the 21st-century Air Force.

*fourth-generation aircraft join the fray as areas of the battlefield are cleared of the most lethal threat systems*

For the Air Force, the largest stakeholder in the F-35, the challenge and opportunity is to blend the F-22s with the F-35s in creating a "re-normed" concept of air operations. For example, the F-22 and F-35 will work together in supporting air dominance—to "kick in the door" to open the enemy's battlespace—for the insertion of a joint power projection force. Here the F-22 largely provides the initial strike and guides the initial air dominance operations; the F-35 supports the effort with stealth and sensor capabilities able to operate in a distributed network, providing strike; intelligence, surveillance, and reconnaissance (ISR); and capabilities to suppress enemy air defenses as well as attack shore defenses against maritime projection forces. Fourth-generation aircraft join the fray as areas of the battlefield are cleared of the most lethal threat systems, expediting participation and increasing survivability by linking into the fifth-generation networked situational awareness. An excellent insight into the role of the F-22 in anticipating the F-35 was provided by a Marine Corps F-22 pilot. Lieutenant Colonel Dave Berke is becoming a key F-35 squadron commander, but he provided an interview while at Nellis Air Force Base (AFB) regarding his experience with the F-22 and how he saw the plane as part of the ongoing revolution in re-norming air operations.

In response to a question about what the fused sensor experience is all about in fifth-generation aircraft and how the whole capability of an aircraft is not really an F series but a flying combat system, Berke provided the following explanation:

*I think you're hitting the nail on the head with what the JSF is going to do, but it's also what the Raptor missions have already morphed into. The concept of Raptor employment covers two basic concepts. You've got an antiaccess/global strike mission; and you have the integration mission as well. And the bottom line is that the integration mission is our bread and butter. When I say "us," I'm talking about the Air Force and the F-22. Most of our expected operating environments are going to be integrated.*[3]

As a pilot with significant operational experience across the legacy fleet, Berke provided insight into how the fifth-generation solution was different:

*It's a major evolution. There's no question about it. My career has been in F-18s, but I also flew F-16s for 3 years. I was dual operational in the Hornet and the Viper when I was a TOPGUN instructor. I am now coming up on 3 years flying Raptors. I was also on carriers for 4 years, so I've done a lot of integration with the Navy and a lot of integration with the Air Force. Three years flying with the Air Force has been pretty broadening.*

*For me, it's a great experience to see the similarities and difference between the Services. Navy and Marine aviation is very similar. USAF aviation is very different in some ways. I actually was with the Army for a year as FAC* [forward air controller] *in Iraq as well. So from a tactical level, I've got a lot of tactical operator experience with all three Services—Navy, Army, and the Air Force. This has been really illuminating for me having the experience with all of the Services in tactical operations. Obviously I will draw upon that experience when I fully engage with the JSF. But flying a Raptor, the left, right, up, down, is just flying; flying is flying. So getting in an airplane and flying around really is not that cosmic no matter what type of airplane you're sitting in.*

*But the difference between a Hornet or a Viper and the Raptor isn't just the way you turn or which way you move the jet or what is the best way to attack a particular problem. The difference is how you think. You work totally differently to garner situational awareness* [SA] *and make decisions; it's all different in the F-22. With the F-22 and certainly it will be the case with the F-35, you're operating at a level where you perform several functions of classic air battle management and that's a whole different experience and a different kind of training. . . .*

*In the Raptor, the data is already fused into information thereby providing the situational awareness. SA is extremely high in the F-22 and obviously will be in the JSF; and it's very easy for the pilot to process the SA. Indeed, the processing of data is the key to having high SA and the key to making smart decisions. There's virtually no data in the F-22 that you have to process; it's almost all information.*[4]

Air Force pilots have underscored some of the changes articulated by Berke and have reinforced the need for culture change to get a different air combat and overall combat capability into the Nation's 21st-century force structure. An interview with three senior Air Force pilots at Langley AFB in late 2010 underscored the significance of the change. The pilots—Lieutenant Colonel Damon Anthony, Major James Akers, and Lieutenant Colonel Steve Pieper—provided an understanding of how classic combat operations built around the use of Airborne Warning and Control Systems and the Combined Air Operation Center (CAOC) will be modified as new aircraft reshape operational capabilities. As Lieutenant Colonel Pieper put it:

*I think the most difficult and the most painful set of shifts will be organizational. They will relate to the people who are now forced to relinquish operational strategic decisions to folks like us in the room, which has always been the case.*

*So tactical decisions have always had operational strategic and national impact. The difference is that organizationally, we'll be forced to reconcile that notion, and understand that the individual who's charged with those tactical decisions will now have the kind of information that was previously only available nearly fused but far more imperfectly fused in the CAOC. That information will now be distributed in the battlespace.*

*So that speaks to an entirely different not just physical architecture, also personnel architecture, but more importantly leadership paradigm and approach to solving a problem. You now are far more able to remove fat layers of intermediate data processing and you're able to sic a force of very capable assets on an objective.*

*We're able dynamically to adapt in the middle of that process and make appropriate decisions in support of your objective far more effectively than if you had just sent planes out on a specific task.*[5]

In other words, the F-22 has paved the way for the F-35, and integrating the F-22 with the F-35 will be a core contribution of the Air Force in shaping innovative combat capabilities for the United States and its allies in the decade ahead. Both planes are shapers of an entirely new approach to combat capabilities across the joint and coalition force.

### The F-35 Is More Than Stealth, More Than a Weapons System

The F-35 joint strike fighter is often defined by its stealth characteristics, and the debate revolves around whether one needs "a high-end aircraft" or, if one is pessimistic, whether "stealth is really stealthy." Although interesting, such discussions miss the point. Stealth is an enabler for this aircraft, not its central definition. As a Marine F-18 pilot put it:

*I would say low observability is a capability set or is an asset to the platform, but the platform as a whole brings a lot by itself. There are situations where low observability will be very important to the mission set that you're operating in. And then there will be situations where the ISR package or the imaging package that comes with that aircraft, the ability to see things, will be more important; that will change based on the mission set and how you define the mission.*[6]

Moreover, one of the challenges facing the F-35 is that it is often described using historical aviation words, generally obscuring the technological advance of stealth itself. As Lieutenant General David Deptula, USAF (Ret.), constantly reminded his Service and others, the "F" before the F-22 and the F-35 is somewhat of a misnomer. There are significant generational changes in the way individual combat aircraft and fleets of aircraft handle data and can make decisions.[7]

Stealth on this aircraft is a function of the manufacturing process; it is not hand built into the aircraft and maintained as such. It is a *characteristic* of high-tolerance manufacturing, and as such, stealth will be maintained in the field, not in the factory or depot. This is revolutionary in character.

At the heart of the F-35 is a new comprehensive combat systems enterprise.[8] The F-35 is the first combat aircraft that sees completely around itself. The Electro Optical Distributed Aperture System (DAS) makes this happen, and it allows the operator or the fleet managers to see hundreds of miles away on a 360-degree basis. The combat system enterprise allows the aircraft to manage the battlespace within this seamless 360-degree space. Unlike legacy aircraft, which add systems that have to be managed by the pilot, the F-35 creates a synergy workspace where the core combat systems work interactively to create functional outcomes; for example, jamming can be performed by the overall systems, not just by a dedicated electronic warfare system.

*integrating the F-22 with the F-35 will be a core contribution of the Air Force in shaping innovative combat capabilities for the United States and its allies*

The F-35 is a flying combat system integrator and in a different historical epoch than the F-15s, F-18s, and F-16s. The 360-degree capability, coupled with the combat system enterprise, explains these historic differences on a per plane basis. The ability of the new aircraft to shape distributed air operations collectively is another historic change that the United States and its allies need to make, especially with the growing missile, air defense, and offensive air capabilities in the global market space and battlespace. The legacy combat aircraft have added new combat subsystems over a 30-year period. These evolved aircraft and their new subsystems are additive, iterative, and sequential. The resulting configurations are built over the core foundational

Courtesy (Paul Weatherman)


**F-35A Lightning II over Rogers Dry Lakebed, Edwards Air Force Base**

aircraft. All of the legacy U.S. aircraft with the latest modifications, when offered for foreign sale, were rejected in India's fighter competition for the much newer European fighters, the Eurofighter and Rafale.

The F-35 was built with a foundation that allows interactivity across the combat systems, permitting the forging of a combat system enterprise managed by the computer on the aircraft. Said another way, F-35 core combat systems are interactive with one another, creating a synergistic outcome and capability rather than providing an additive-segmented tool. The aircraft's systems are built on a physical link, namely, a high-speed data bus built on high-speed fiber optical systems. To provide a rough comparison, legacy aircraft are communicating over a dial-up modem compared to the F-35 system, which is equivalent to a high-speed broadband system. The new data bus and high-speed broadband are the facilitators of this fully integrated data-sharing environment on the aircraft. While legacy aircraft have had similar subsystems, integration was far less mature.

Connected to the other combat systems via the high-speed data bus is the CNI system (communications, navigation, and identification). This is a flexible radio frequency system that enables the aircraft to operate against a variety of threats. The other core combat systems, which interact to create the combat systems enterprise, are the Active Electronically Scanned Array (AESA) radar, DAS, Electrical Optical Targeting System (EOTS), and electronic warfare (EW) system. As Pete Bartos, a former Strike Eagle Pilot now with Northrop Grumman, put it:

*When this plane was designed, the avionics suite from the ground up, the designers looked at the different elements that can be mutually supporting as one of the integration tenets. For example, the radar didn't have to do everything; the Electrical Optical Targeting System didn't have to do everything. And they were designed together.*

*Fusion is the way to leverage the other sensors' strengths. To make up for any weaknesses, perhaps in the field of regard or a certain mode, a certain spectrum, with each of the sensor building blocks, they were all designed to be multifunction avionics.*

*For example, the AESA is an MFA—a multifunction array. It has, of course, the standard air-to-air modes, the standard air-to-ground modes. But in addition, it's really built from the ground up to be an EW aperture for electronic protection, electronic support, which is sensing, passive ops, and electronic attack.*[9]

A way to look at the cross-functionality of the combat systems is to think past the narrow focus of additive systems. A system is added to do a task. The pilot needs to use that system to manage the task. With the F-35 interactive systems, the pilot will perform a function without caring which system is actually executing the mission. For example, for electronic warfare, including cyber, he could be using the EOTS, EW system, or AESA radar. The pilot really does not care, and the interactivity among the systems creates a future evolution whereby synergy among the systems creates new options and possibilities. Furthermore, the system rests on an upgradable computer with chip replacement, allowing generational leaps in computational power.

The F-35 provides a flexible architecture similar to a smart phone. With the F-35, we define a synergy space to draw on the menu of applications. And the F-35 combat systems are built to permit open-ended growing capability. In mathematical analogies, we are describing something that can create battlespace

"fractals," notably with a joint force able to execute distributed operations. The aircraft is a facilitator of a more robust combat environment than was available with legacy aircraft and command and control. This change requires pilots to rethink how to operate. F-35 performance and its pilot allow a revolution along the information axis of combat, or what might be identified as the "z-axis."

## Operating on the Z-axis: Shaping a New Pilot Culture

The design characteristics blended together prior to the F-35 have been constantly improving range, payload (improved by system and weapons carried), maneuverability (measured by "P Sub s"), useful speed, and range (modified by VSTOL [vertical short takeoff and landing]—a plus factor). The F-35 is also designed with inherent survivability factors; first, redundancy and hardening, and then stealth. Stealth is usually seen as the fifth-generation improvement. Nevertheless, reducing the F-35 to a linear x-y axis improvement or to stealth misses the point. The F-35 is taking technology into a revolutionary three-dimensional situational awareness capability. This capability establishes a new vector for TacAir (tactical air) aircraft design. This can be measured on a z-axis.

Traditionally, the two dimensional depiction is that the x-axis is time and the y-axis is performance and captures individual airplanes that tend to cluster in generation improvement. Each aircraft clustered in a "generation" is a combination of improvements. Essentially, the aeronautical design "art" of blending together ever improving and evolving technology eventually creates improvements in a linear fashion. The F-35 is not a linear performance enhancement over legacy or fourth-generation fighter aircraft. When we consider information and the speed at which it can be collected, fused, presented, and acted on in the combat environment, those who possess this advanced decision capability will have a clear advantage.

While this is not a new concept, having been originally conceived in John Boyd's famous OODA (observe, orient, decide, and act) loop, the information dimension of combat aircraft design now is so important that it forces us to gauge the value of such a weapons system along the z-axis, which is the pilot's cockpit OODA loop axis. This OODA loop ability is measured as the combined capability the pilot gains from integrated command, control, communications, computers, ISR, and his resultant decisionmaking ($C^4$ISR-D) and employment or action. From Boyd's theory, we know that victory in the air or, for that matter, anywhere in combat is dependent on the speed and accuracy of the combatant in making a decision. The better support the pilot in a combat aircraft receives from his information systems, the better the combat engagement outcome. The advantage goes to the better information enabled. Pilots have always known this, but the revolutionary fifth generation, designed in $C^4$ISR-D, requires a similar advancement in how pilots approach their work.

In addition, today's industrial learning curve to improve sensors, system capability, and weapons carried is likely flatter than that required to build another airframe, and it may be a new American way of industrial surging.[10] The U.S. arsenal of democracy may be shifting from an industrial production line to a clean room and a computer lab as key shapers of competitive advantage. This progress can be best seen in movement out the z-axis. The Air Force F-22 pilot community has been experiencing this revolution for some time, and their lessons learned are being incorporated into a pilot's F-35 training. Learning from those experiences as well as those of the legacy fleet, the Marine Corps recognizes that a new pilot culture will emerge because of operating on the z-axis. General Jon Davis, 2nd Marine Aircraft Wing commander, underscored that three pilot cultures are being rolled into a very new one. The commander linked this to generational change:

*The F-35B is going to provide the USMC aviator cultures in our Harriers, Hornets and Prowlers to coalesce and I think to shape an innovative new launch point for the USMC aviation community. We are going to blend three outstanding communities. Each community has a slightly different approach to problem-solving. You've got the expeditionary basing that the Harrier guys are bringing to you. You have the electronic warfare side of the equation and the high-end fight that the Prowler guys think about and the* [communications] *and jamming side of the equation, which the Prowler guys think about. And you have the multi-role approach of the F-18 guys.*[11]

What General Davis discussed concerning the new pilot culture is shaped in large part by bringing EW into the cockpit. The Marine Aviation Weapons and Tactics Squadron 1 (MAWTS-1) is currently working to shape that new pilot culture. MAWTS-1 pilots and trainers are looking at the impact of the V-22 and F-35 on the changes in tactics and training generated by the new aircraft. MAWTS-1 is taking a much older curriculum and adjusting it to the realities of the impact of the V-22 and the anticipated impact of the F-35.

MAWTS-1 is highly interactive with the various centers of excellence such as Nellis AFB, Eglin AFB, and the Navy/Marine test community at Pax River, as well as the United Kingdom, in shaping F-35 transition. In fact, the advantage of having a common fleet will be to provide for significant advances in cross-Service training and evolutions in concepts of operations. Additionally, the fact that MAWTS-1 is studying the way the Air Force trains combat pilots to fly the F-16 in shaping the Marine F-35B Training and Readiness Manual is a testimony to a joint-Service approach. This is extremely important in how MAWTS-1 addresses the future. An emerging approach may well be to take functions and then to redesign the curriculum around those functions. For example, the inherent capabilities of the emerging F-35 $C^4$ISR-D cockpit with 360-degree SA may turn out with appropriately designed data links to be a force multiplier in the tactical employment of the MV-22 Osprey and the helicopter community, and reach back to Navy combat forces afloat.[12]

*the better support the pilot in a combat aircraft receives from his information systems, the better the combat engagement outcome*

## Northern Edge 2011

The F-35 can be understood as a combat aircraft that can operate and manage combat space within a 360-degree radius for more than 800 miles. A recent operational test of the F-35 radar and the DAS occurred in Northern Edge 2011, a joint and combined exercise that serves as a focal point for the restructuring of U.S. power projection forces.

As the results from the exercise are evaluated, military leadership and program managers should be able to make a definitive judgment on the way ahead for the program *now*, not in some distant future. In both Northern Edge 2009 and 2011, the air combat baseline was being re-normed and the limitations of legacy aircraft were well highlighted when compared to newer systems. Northern Edge validated, in real time, the ability of American and soon allied TacAir fleets to give total concurrent SA to each combat pilot. In a robust jamming operating environment, the F-35 radar and DAS separated themselves from the pack and have initiated a new era in thinking about combat operations.

As an F-35 joint program office release underscores, this is not only about the ability of airpower to operate in a robust EW environment in which cyber conflict is a key dimension, but it is also about the ability of an airborne capability to support maritime operations:

*This year provided an opportunity to observe the performance of the F-35 JSF systems in multiple robust electronic warfare scenarios. The AN/APG-81 active electronically scanned array radar and AN/AAQ-37 distributed aperture system were mounted aboard Northrop Grumman's BAC 1-11 test aircraft. Making its debut, the AN/AAQ-37 DAS demonstrated spherical situational awareness and target tracking capabilities. The DAS is designed to simultaneously track multiple aircraft in every direction, which has never been seen in an air combat environment.*

*A return participant, the AN/APG-81 AESA, demonstrated robust electronic protection, electronic attack, passive maritime and experimental modes, and data-linked air and surface tracks to improve legacy fighter situational awareness. It also searched the entire 50,000 square-mile Gulf of Alaska operating area for surface vessels, and accurately detected and tracked them in minimal time.*[13]

The C[4]ISR-D capability in each cockpit takes the F-35 out of the linear fifth-generation development path. The F-35 radar was validated in a tactically relevant environment. Until proven otherwise, America still has the most capable EW and, to use an older phrase, ECCM (electronic counter-countermeasures) fighting force in the world. So being tactically "validated" in an American-designed exercise is the gold standard. Northern Edge exercises provide operational—not test—environments. Block 2 is ready for Marine F-35B initial operational capability. In 2009, Block 2 was the first improvement up the z-axis, and pilots from MAWTS (the Marine equivalent of TOPGUN) are paying close attention. Block 3—the next step up the z-axis—demonstrated that the radar worked effectively in sea surface search and ship target track. If American TacAir forces afloat can see an enemy, they will kill that enemy. Block 4 is the next step up for "Three Dimensional Warriors" and a z-axis cockpit. A fighter pilot knowledgeable about Northern Edge, when asked about DAS, stated that it had a feature of "passive ranging." When asked what that meant, he casually remarked, "Shooting people off your tail and all that stuff."[14]

*the use of the Osprey underscored the game-changing possibilities of the ARG in littoral operations*

## Operating Differently: A Peek into the Future

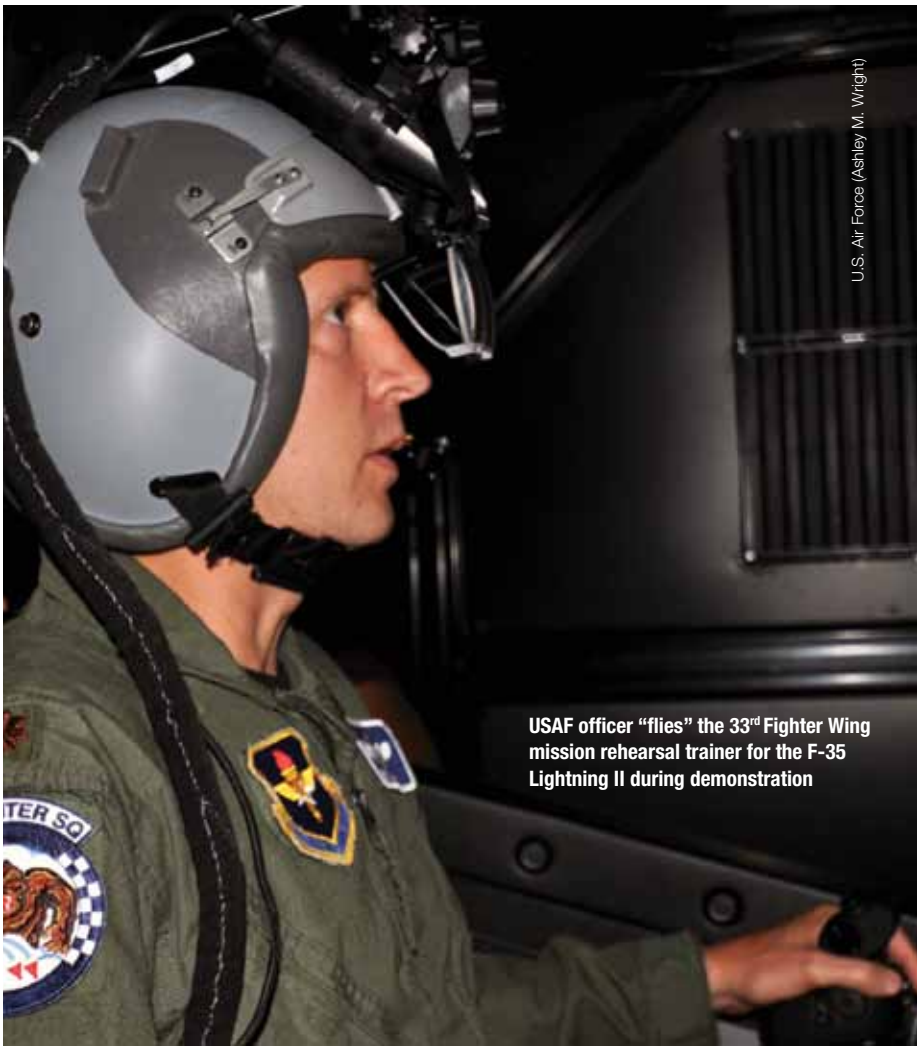
Rediscovered operationally during recent maneuvers off the shores of Libya is what the Amphibious Ready Group (ARG)—what we prefer to call the "agile response group"—can do with transformational aircraft. The aircraft in this case was the Osprey, but the Osprey paired with the F-35B will make the Gator Navy not just a troop carrier but a capital ship. It is harder to find a greater value proposition than adding the F-35B to the fleet and turning amphibious "tigers" into air combat "lions." The ARG is experiencing fundamental change, with new ships and new planes providing new capabilities, and these new capabilities are congruent with recent Libyan operational experiences. Given the Marines' battle hymn, it seems that "the shores of Tripoli" can have a whole new meaning for the evolution of the U.S. force structure.

The ARG was used in several unprecedented ways in the Libyan operation. First, the V-22 Osprey was a key element of changing how U.S. forces operated. The Osprey provided a logistical linchpin that allowed the ARG to stay on station and the Harriers to create greater sortie generation rates and quicker operations tempo. The use of the Osprey in the operation underscored the game-changing possibilities of the ARG in littoral operations in the future. The key point is that the sea base, which in effect is represented by the ARG, can provide a very flexible strike package. Given their proximity to shore, the Harriers could operate with significant sortie rates against enemy forces. Not only could they come and go rapidly, but the information they obtained with their LITENING pods could be delivered to their ship and be processed and used to inform the next strike package. Commanders did not need a long command and control or C[4]ISR chain to inform combat. This meant that Muammar Qadhafi's ground forces would not have moved far from the last positions Harriers noted before the new Harriers moved into attack positions.[15]

This combination of compressed C[4]ISR and sortie rates created a deadly combination for enemy forces and underscored that using sea bases in a compressed strike package had clear advantages over land-based aircraft still several hours from the fight and dependent on C[4]ISR coming from hundreds or even thousands of miles away. One more point about the ARG's operations is that the Osprey and Harrier worked together closely to enhance combat capabilities. One aspect of this was the ability of the Ospreys to bring parts and support elements to the Harriers. Instead of waiting for ships to bring parts, or for much slower legacy rotorcraft to fly them out, the Osprey, traveling at 300 miles per hour, could bring parts from land bases to keep up with the Harrier's operations tempo.[16]

The highly visible pilot rescue mission certainly underscored how a vertically launched aircraft working with the Osprey off of the ARG can create new capabilities. The elapsed time of authorization to the recovery of a pilot and his return to the USS *Kearsarge* was 43 minutes. This rescue took place even though the Air Force had a rescue helicopter aboard USS *Ponce*. It was not used for two reasons: It would have gotten to the pilot much later than an Osprey team, and the command and control would have been much slower than what the Marines could deliver.[17]

The key to the Marines' command and control was that the pilots of the Ospreys and Harriers planned the operation together in




USAF officer "flies" the 33rd Fighter Wing mission rehearsal trainer for the F-35 Lightning II during demonstration

the ready room of USS *Kearsarge*. They did not meet in virtual space. They exchanged information in real time and were in the same room. They could look at the briefing materials together. The Harriers were informed by fresh intelligence aboard the *Kearsarge*. The sea base brought together the assets and intelligence to execute the mission. The Marines used their land base largely to supply the sea-based air operations via Ospreys. Second, having the C4ISR forward-deployed with the pilot as the key decisionmaker is crucial to mission success.

The Navy–Marine Corps team has a number of new capabilities being deployed or acquired that will enhance its ability to perform such operations. The F-35B will give the Marines an integrated electronic warfare and C4ISR capability. The new landing platform docks have significant command and control capabilities. The new Littoral Combat Ship could provide—along with the Osprey—significant combat insertion capability for ground forces along with rapid withdrawal capability.

## Honeycombing the Pacific: Crafting Scalable Forces

A new Pacific strategy can be built in part around the cultural revolution that the new F-35 engenders in interconnecting capabilities through the C4ISR-D enablement strategy. No platform fights alone, and shaping a honeycomb approach where force structure is shaped appropriately to the local problem but can reach back to provide capabilities beyond a particular area of interest within the honeycomb is key. The strategy is founded on having platform presence. By deploying such assets as those of the U.S. Coast Guard (for example, the National Security Cutter—or Navy surface platforms such as Aegis, LCS, or other surface assets) and by deploying sub-Service assets and having bases forward-deployed, the Nation has core assets that, if networked together, are capable of making significant gains possible. Scalability is the crucial glue to making a honeycomb force possible. That is why a Navy, Marine Corps, and Air Force common fleet is the crucial glue. And when "Aegis becomes my wingman" or "the SSGN [guided missile submarines] becomes the ARG fire support" through the F-35 C4ISR-D systems, a combat and cultural revolution is both possible and necessary. Basing becomes transformed as allied and U.S. capabilities become blended into a scalable presence and engagement capability. Presence is rooted in basing; scalability is inherently doable because of C4ISR enablement, deployed decisionmaking, and honeycomb robustness.

The reach from Japan to South Korea to Singapore to Australia is about how allies are reshaping their forces and working toward greater reach and capabilities. For example, by shaping a defense strategy, which is not simply a modern variant of *Sitzkreig* in South Korea and Japan, more mobile assets such as the F-35 allow states in the region to reach out, back, and up to craft coalition capabilities. In the case of South Korea, instead of strengthening relatively static ground capabilities, shaping a mobile engagement force allows for better South Korean defense as well as better regional capabilities to deal with myriad challenges likely to unfold in the decades ahead.

The introduction of F-35As into the Air Force and Republic of Korea (ROK) wings deployed to South Korea can set innovations in motion that can help U.S. and ROK forces redesign and improve defense capability within the Korean Peninsula while allowing ROK capabilities to play a greater role within the region. South Korea could be an ideal area to shape a new concept-of-operations approach. North Korea has a large but linear force. By basing F-35As in South Korea, a nonlinear combat system is inserted. And the United States can bring F-22s from Guam. It would then have multiple vectors to confuse enemies about its military planning and disrupt any kind of attempted linear attack.

Introducing the F-35As into South Korea will generate a whole new approach to linking C4ISR into a more effective deployable force. As former Secretary of the Air Force Michael Wynne emphasized:

*The gains are really if you have a distributed shooter set, it's chaos to start with because the*

*North Koreans have a very linear plan. In the artillery exchange, it was a very linear plan. In the points of crossings on the borders, it's a very linear plan. The placement of their artillery pieces in the mountains depicts a very linear thinking on their part. And what they can't stand and I don't think they have the citizenry support to actually stand* [is] *a nonlinear solution set. So it will cause us to essentially rethink our whole game plan because it has to involve the surrounding terrain, the surrounding military where frankly we have to show the Chinese that we're not planning on invading them and we will stop at the North Korean border. Korea is after all the last vestige of Yalta.*[18]

Lockheed Martin

**F-35C Joint Strike Fighter test launches from steam catapult for carrier suitability at NAS Patuxent River**

The recent decision by Japan to buy the F-35A is a significant move forward in shaping a new Pacific approach and capability. The Japanese understand the opportunity to leverage the F-35 combat systems enterprise, and that is a key reason why the Japanese down-selected the aircraft. The Japanese—a key Aegis partner—also understand the significant opportunity provided by integrating the Aegis with the F-35. Combining the Aegis with the F-35 means joining their sensors for wide-area coverage. Because of a new generation of weapons on the F-35 and the ability to operate a broad wolf pack of air and sea capabilities, the JSF can perform as the directing point for combat action. With the Aegis and its new SM-3 missiles, the F-35 can leverage a sea-based missile to expand its strike area. Together, the F-35 and Aegis significantly expand the defense of land and sea bases.

The commonality across the combat systems of the F-35's three variants provides a notable advantage. Aegis is a pilot's wingman whether he is flying an F-35A, B, or C. Eighty percent of the F-35s in the Pacific are likely to be F-35As, many of them coalition aircraft. Therefore, building an F-35 and Aegis global enterprise provides coverage and capability across the Pacific, which is essential for the defense of Japan.

Moreover, the commonality of the fleet allows hubs to be built in the region supporting common operations, shaping convergent capabilities. The distributed character of allied forces in the region as well as the connectivity which the F-35 allows as an interdependent flying combat system diversifies capabilities with which a core adversary would have to cope. Reducing concentration of forces and targets is a significant enhancer of deterrence.

During President Barack Obama's recent visit to Darwin, Australia, the opportunity provided by commonality across the F-35 fleet was highlighted by the possibility of building a hub in Darwin for sustainment of an allied fleet as well as ISR sharing for common decisionmaking. Darwin's strategic location could become a hub of Pacific operations for Australia and a place to visit for its core allies. Singapore, South Korea, Japan, and the United States could all become key members of an Australia-based and Australian-run F-35 hub.

Australia rightly wishes to preserve its independence in being a partner in flying the F-35. The Royal Australian Air Force (RAAF) is joining a fleet of aircraft—F-35 As, Bs, and Cs—that can be deployed to Australia for training, from bases in Singapore, South Korea, and Japan, and off U.S. ships and U.S. Air Force air bases in the Pacific. The entire allied team can draw upon Australian air modernization to shape new capabilities for Australia and diversify support for the F-35 multinational fleet. The RAAF can go from being on its forward deployed airfield to becoming a hub for the F-35 fleet in several ways.

First, given the significant commonality among the three types of F-35s, a logistics and support hub can be based in the Northern Territories. The differences among naval air and air force air are significantly blurred by the commonality of the F-35s. This means that specific support for the As, Bs, and Cs could be generated. Based on the earnings from a logistics hub, Australia will be able to pay for a significant part of its own fleet modernization. And a hub is not a permanent base. As an on-call service facility, it enables allies to draw on its support when they work with Australia on regional security missions.

Second, Australia has the large territory necessary for Asian F-35 fleets to train. The F-35 is not a replacement tactical aircraft; it is new flying combat system that will need significant training territory for pilots to learn how to use all of its capabilities. As an aircraft that has EW built in, training to do cyber and EW ops is important. As a fifth-generation aircraft, its ability to engage "aggressors" and to "defeat" air defense assets requires enough space to operate as well. Instrumented training ranges over Australia and the contiguous ocean are invaluable for building the necessary skills to deter any aggressor. As an added benefit, Australia will gain substantial revenue from allies when its training facilities are used. With the logistics facilities and the training facilities, the F-35 could gain significant cash for Australia's military modernization efforts.

Third, the F-35 is a significant ISR asset. The Aussies can build ISR collection facilities that can leverage the entire allied fleet of F-35s operating in a regional security setting. They can use such facilities to shape an approach to link other allied ISR assets to establish a honeycomb network or grid along the Pacific Rim.

If each element of the deployed honeycomb can reach out, up, and back for weapons, which can be directed by the z-axis of the F-35, a significant jump in capability, survivability, flexibility, and lethality can be achieved. A scalable structure allows for an economy of force. Presence and engagement in various local cells of the honeycomb may well be able to deal with whatever the problem in that vector might be. Moreover,

remembering that in the era of Black Swans, one is not certain where the next "crisis" or "engagement" might be. By being part of a honeycomb, the U.S. or allied force can be part of a greater whole.

*Singapore, South Korea, Japan, and the United States could all become key members of an Australia-based and Australian-run F-35 hub*

This means that the goal is *not* to deploy more than we need to perform to the task. Vulnerability is reduced, risk management is enhanced, and the logistics and sustainment cost of an operation is significantly reduced. We do not have to deploy a Carrier Battle Group or multiple air wings when an ARG is enough. By leveraging the new platforms, which are C[4]ISR enabled and linked by the F-35 across the Navy, Marine Corps, Air Force, and allied fleets, a new Pacific strategy can be built. This strategy meets the needs of *this* century and the centrality of allied capabilities, unlike the last decade when the United States dealt largely with asymmetric adversaries with limited power projection tools.

## The Way Ahead

By building on the F-35 and leveraging its capabilities, the United States and its allies can build the next phase of power projection within affordable limits. U.S. forces need to become more agile, flexible, and global in order to work with allies and partners to deal with evolving global realities. Protecting access points (the global conveyer of goods and services), ensuring an ability to work with global partners in having access to commodities, shaping insertion forces that can pursue terrorist elements wherever necessary, and partnering with global players all require a reinforced maritime and air capability. This is thus a priority for all Services in the reconfiguring effort. Balanced force structure reduction makes no sense because the force structure was redesigned for land wars that the Nation will not take on in the decade ahead. The U.S. Army can be recast by the overall effort to shape new power projection capabilities and competencies.

Retiring older Service systems, which are logistical money hogs and high maintenance, can shape affordability. Core new systems can be leveraged to shape a pull rather than a push transition strategy. Fortunately, the country is already building these new systems and is in a position to shape an effective transition to a more affordable power projection capability. At the heart of the approach is to move from the platform-centric focus, where the cost of a new product is considered the debate point, to the inherent value of new systems and their ability to be conjoined. "No platform fights alone" is the mantra, and core recognition of how the new platforms work with one another to shape the collaborative concept of operations and capabilities is central to a strategic redesign of U.S. forces. **JFQ**

### NOTES

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