

## The Crest of the Wave

Defense aerospace procurement is set to drop





U.S. Air Force officials delivered the first of 18 new F-16 Fighting Falcon jet fighters to the Pakistani air force in 2010. U.S. Air Force photo

In a few years' time the world's defense aerospace community will look back at the decade 2000-2010 and say, "Those were the days."

The global recession, changing demographics, and money flows indicate that the wave of defense procurement has crested. Now comes the drop.

This year and last were healthy for the industry. Global defense spending continued to grow, with the United States and China boosting budgets, albeit at lower rates. According to the Stockholm International Peace Research Institute, worldwide military spending increased 5.9 percent in 2009 to \$1.5 trillion, up 49 percent compared with 2000 levels. Stockholm International ranked the United States first, with an estimated \$661 billion budget, China at \$100 billion, France at \$63.9 billion, the U.K. at \$58.3 billion, and Russia at \$53.3 billion.

Of the five, China (217 percent) and Russia had the biggest growth rates over the past decade. By contrast, Japan and Germany (sixth and seventh) posted budget declines of 1.3 and 6.7 percent, respectively. Tenth-ranked Italy's budget declined 13.3 percent over the decade. Turkey bucked the trend, spending \$16 billion in 2010. But with significant defense expenditure reductions announced by the U.K. and other continental heavyweights by year's end, Europe's status as a strategic force will warrant re-examination.

Aerospace bellwether Lockheed Martin reported a 28 percent decline in its Q3 profit in part due to its buyout of 600 executives as a cost-reduction measure ahead of diminished global defense spending. November's Republican electoral success in the United States ironically suggested possible defense cuts. European defense contractors enjoyed a profitable 2010 but were also crafting cost-cutting measures during the summer.

U.S. Air Force (USAF) Chief of Staff Gen. Norton Schwartz observed that defense spending would likely continue to flatten while actual buying power decreases. He added that sustaining the budget will require service members/retirees to pay a larger portion of their medical costs. Military health care costs, now \$40 billion per year, will rise to between \$60 billion and \$65 billion by 2015, constituting 12 to 15 percent of the defense budget. More bases will be closed, and older aircraft will be modernized and serve longer as a result of too few new aircraft to replace them, Schwartz said. With the budget already targeted for \$1 trillion in cuts over the next decade by a bipartisan faction of lawmakers, it is inevitable there will be fewer new aerospace programs.

Schwartz's observations simply followed Defense Secretary Robert Gates' midsummer mandate for more than \$100 billion in spending cuts in services and personnel between fiscal years 2012 and 2016 in an effort to gain 2 to 3 percent back for core warfighting capability. The \$708 million 2011 budget request was a moderate 1.8 percent



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Generated by <u>www.PDFonFly.com</u> at 5/25/2011 8:39:03 PM URL: <u>http://www.defensemedianetwork.com/stories/the-crest-of-the-wave/</u> increase from 2010 spending, emphasizing the reforms Gates favors (less technologically risky dual-use efforts) and prioritizing current conflicts even as President Barack Obama publicly outlined a 2011 force drawdown in Afghanistan.

### The 2010 Quadrennial and Ballistic Missile Defense Reviews

likewise favored "needed now" capabilities including intelligence, surveillance, and reconnaissance, which got a 2011 budget boost with funding increases for advanced unmanned aerial vehicle (UAV) Austrian air force Eurofighters based at Zeltweg. They have IRIS-T missiles. The aerospace industry is chasing a shrinking market for tactical aircraft. Photograph by Geoffrey Lee, Planefocus Ltd

combat air patrols and helicopter acquisition (\$9 billion worth). Sikorsky's UH-60M Black Hawk and Boeing's CH-47F and AH-64 are, not surprisingly, receiving production, upgrade, and development funding. The Armed Aerial Scout, which replaces the terminated Armed Reconnaissance Helicopter program, received no funding.

The administration's wind-down of America's manned space program in favor of a fleet of commercial "space taxis" to take astronauts to the International Space Station (ISS) butted up against congressional opposition. The cancellation of NASA's Constellation program also prompted the agency to warn of 2,500 to 5,000 job cuts and contractors to tighten their belts. Even firms like SpaceX and Orbital Sciences, which received stimulus funding to develop commercial ISS transport alternatives, saw a murky funding future post 2012. Meanwhile, NASA ended the year looking to partner with international space agencies like Germany's DLR. NASA Administrator Charles Bolden's October trip to Beijing introduced the agency delegation to its Chinese counterparts but yielded no concrete cooperation.

The world's most costly defense acquisition program made news all year as the Joint Strike Fighter (JSF) experienced significant delays, cost growth, and shaky international support.

Delays in F-35 software and short takeoff/vertical landing (STOVL) variant development were acknowledged early in the year, with Gates' decision to extend the system design and development (SDD) phase for F-35 by 13 months to November 2015 and to restructure the JSF program office and replace the program executive officer, Marine Corps Maj. Gen. David Heinz. Gates also withheld \$614 million of the F-35 contract award fee from Lockheed Martin. Subsequently, the Air Force and Navy announced that initial operating capability (IOC) for their F-35A and F-35C variants would slip to 2016 while the U.S. Marine Corps (USMC) for the moment held to a 2012 IOC for its STOVL F-35B. Today, Gates has recommended moving the F-35B behind the other two variants while it is on "probation."



The arrival of the first F-35C at Patuxent River NAS was one of the bright spots for the JSF program in 2010. Staff Flight Test Photographer

The Pentagon announced a 122-aircraft cut from the planned joint service buy between fiscal years 2011 and 2015 and low rate initial production (LRIP) was shaved from 465 jets to 420. The F-35's cost growth triggered a Nunn-McCurdy breach, requiring the program to be reviewed for recertification. Under Secretary of Defense for Acquisition Ashton Carter recertified JSF on June 1 despite an estimated \$54.2 billion increase in the aircraft's total acquisition cost, citing its criticality for national security and a lack of suitable alternatives.

The June recertification estimates put JSF overall unit cost at \$155.6 million, up from \$112 million, with flyaway pricing rising from \$92.4 million to \$133 million. Lockheed Martin General Manager of F-35 Program Integration Tom Burbage differed, telling JSF international partners during a summer tour that actual unit costs in successive production batches would be 20 percent below the Pentagon's

independent estimates. By the fall, Lockheed Martin claimed that F-35A flyaway cost would be approximately \$60 million, comparable to a Block 60 F-16 or Super Hornet. In November, the Pentagon put the total cost for the program at more than \$380 billion.

Whatever the cost, congressional support continued for the General Electric/Rolls-Royce F136 alternate engine, with \$485 million directed to its continued development and fiscal strings obligating the Pentagon to do so as instructed.

Delivery of the first F-35 with full mission systems (BF-4) to Naval Air Station (NAS) Patuxent River in June was good news, the aircraft equipped with Block 0.5 software. As BF-4 arrived, F-35 software development was declared 80 percent complete, but mission software was only 56 percent finished and six months behind schedule. Block 1 and 2 software packages were slated to fly in 2011, with Block 3 the final SDD version. The first flight of the F-35C naval variant added to the month's positives.

The pace of flight testing was largely on schedule in June, but slowed in July, with the STOVL prototype (BF-1) making fewer flights than its counterparts. Test delays notwithstanding, Canada announced its intent to buy 65 F-35As with delivery to start in 2016.

Flight testing continued into the fall though the F-35B remained in arrears, making only 19 of 28 planned sorties in September. All prototypes were briefly grounded in the same month after fuel system problems cropped up. Though the grounding was lifted by Oct. 5, the four STOVL prototypes remained restricted to conventional flight mode until a fix for an engine auxiliary inlet door hinge was engineered. Contractor Lockheed Martin found itself in the doghouse after being cited for not adhering to government auditing standards.

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The JSF program also grappled with electronic warfare capability/control issues for the international partners. The program delays prompted an announcement that the first F-35B would not be delivered to the joint 33rd Wing at Eglin Air Force Base (AFB), Fla., until summer 2011. Then-Marine Corps Deputy Commandant for Aviation Lt. Gen. George Trautman was already talking about pushing F-35B IOC back from 2012.

The program landed its first foreign military sales customer in October, with Israel's \$2.75 billion deal for 19 F-35As with an option for 25 more. Shortly thereafter, engine makers Pratt & Whitney and GE/Rolls-Royce engaged in a dispute over Israel's purported verbal agreement to buy the former's F135 rather than the latter's F136.

The year's second major JSF development stemmed from the United Kingdom's Strategic Defense and Security Review (SDSR), which recommended cutting the country's defense spending by 8 percent over four years. SDSR called for a reduction in the number of Joint Strike Fighters on order (135) and, vitally, for switching the purchase



MBDA's Storm Shadow, seen here on the fuselage racks of an RAF Tornado, was spared the U.K. budget axe that felled so many other units and assets in 2010. MBDA photo by G.H. Lee

to the F-35C variant, with deliveries delayed until 2020. The F-35Cs are destined for the first of Britain's two new Queen Elizabeth-class carriers (the second will be built then immediately mothballed).

The U.K.'s abandonment of the STOVL F-35B (for which it signed onto the JSF program 15 years ago) represented a major strategic and acquisition shift emphasized by SDSR's plan to retire the carrier HMS *Ark Royal* immediately and Britain's entire Harrier fleet beginning in 2011. U.K. officials cited lower cost, greater range and payload, and better coalition interoperability as the logic for choosing the F-35C. That choice leaves the USMC and Italian navy as the only significant customers for the B version, with consequent cost and operational implications.

JSF struggles sent ripples throughout the international fighter market, with competitors from Boeing's Super Hornet to EADS' Eurofighter sensing possible sales opportunities. Boeing is considering the addition of infrared search and track capability to its F/A-18E/F. In view of potential U.S. Navy (USN) and foreign orders, Boeing officials anticipate the Super Hornet production line could remain open beyond 2020. The thesis was bolstered in September when the Navy awarded Boeing a new multi-year procurement contract for 124 F/A-18E/F Super Hornet and EA-18G Growler aircraft valued at \$5.297 billion. Boeing will deliver 66 Super Hornets and 58 Growlers to the Navy from 2012 through 2015. With a predicted 177 aircraft USN/USMC "fighter gap" and further F-35 delays, additional Super Hornet sales (or unmanned combat aerial vehicle alternatives) may be on the cards.

The USAF cites its own shortfall of 185 fighters by 2024. Given the F-35 situation, budgetary pressures, and the potential of currently developing long range AESA (active electronically scanned array) radars for ballistic missile interception, Boeing's proposed F-15SE ("Silent Eagle") could spark Air Force interest. Perceived as having an edge in South Korea's next fighter procurement, the SE combines a versatile AESA radar with a new stealth aspect conferred by a conformal weapons bay and possible canted twin tails. A prototype fired weapons from the conformal bay in August and Boeing touted an improved cockpit crew station with a reconfigurable 9x11-inch display with iPhone®-like functionality (also for Super Hornet).



While flight testing of the Airbus A400M proceeds, partner nations are cutting procurement numbers of the airlifter. Airbus photo by Bill Scott Naval and especially Marine aviators will long for such functionality as their aging Hornets and Harriers soldier on. The legacy F/A-18A-D fleet is going through a service-life extension (SLEP phase B) to keep the jets operational well beyond their planned cycles. A Navy service-life assessment program has concluded Hornets designed to fly to 6,000 hours can, with proper management and refurbishment, get to 8,000 hours. The service would like to extend some to 10,000 hours.

The number of aircraft to go through SLEP has yet to be decided. With its analysis ongoing and varying levels of fatigue per aircraft, the Navy has no estimated total cost for F/A-18 SLEP. A June report for the Senate Armed Services Committee recommended a provision requiring the Navy to compare the business cases of extending legacy

Hornets versus buying new Super Hornets.

Life-extension work continued on the USAF's A-10, with Boeing producing as many as 233 wing replacement sets for the valued close air support platform through the \$1.6 billion Thunderbolt Lifecycle Program. Re-winged A-10s are to keep flying through 2028.

The Air Force took a hard course change with its \$2.3 billion Advanced Targeting Pod – Sensor Enhancement acquisition, splitting its surveillance/targeting pod buys between the Northrop Grumman "LITENING SE" (a variant of its new LITENING G4) and Lockheed Martin's AN/AAQ-33 Sniper pods on the theory that more competition is better. Each system offers advantages, though their compatibility differs with fighter types from the F-16 to the Su-30.

India's MMRCA (Medium Multi-Role Combat Aircraft) program continued to be the world's biggest non-JSF fighter sales opportunity (126 aircraft) and continued to drag on (it began in 2001). Competitors EADS Generated by <u>www.PDFonFly.com</u> at 5/25/2011 8:39:03 PM (Eurofighter Typhoon), MiG (MiG-35), Dassault (Rafale), Saab (JAS-39NG), Lockheed Martitol (RE16) (Ref. 16) (Ref. 1

and Boeing (Super Hornet) continued their participation in India's evaluation trials. The October announcement that India had chosen GE's F414 power plant for its Tejas MkII lightweight fighter, the same engine that powers the F/A-18E/F, may well give the Super Hornet a leg up in the competition. (In April 2011, India informed the respective governments of the competitors that it had the Eurofighter Typhoon and Dassault Rafale had made the downselect.)

India inducted the first of its MiG-29K maritime fighters, set to operate from the ex-Russian aircraft carrier now renamed INS *Vikramaditya*. The MiGs are slated for operations in 2013 barring delays. India discussed modernization of its indigenously assembled Sukhoi Su-30MKI fighters with Russia, outlining a program (dubbed "Super 30") that would include new avionics, radar, and integration of an air-launched version of the Brahmos supersonic missile. A contract could be finalized by year's end.

Russia's Lipetsk Training Center saw the first of 32 deliveries of the Su-34 strike aircraft, five simulators, and support equipment, which will continue through 2013. The country's fifth-generation Sukhoi T-50 (PAK FA) fighter was assigned a nominal 2015 in-service date in the spring but that date will surely slip. Nevertheless, Russian Prime Minister Vladimir Putin watched the T-50 prototype go through its paces at the Zhukovsky flight test center near Moscow in June. In October, Russia announced that India would commit to buy 250 to 300 T-50s, which could be fielded by 2017.

Brazil's F-2X competition remained undecided as the Brazilian presidential election unfolded. The election of Dilma Rousseff signals a continuation of the policies of the outgoing Luiz Inácio Lula da Silva, including the fighter acquisition that pits the Rafale, Gripen, and Super Hornet against each other. The October discovery of a massive oil field off Brazil's coast may speed a decision and tilt the choice to a navalized aircraft.

EADS acknowledged the widely accepted fact that its Eurofighter can only achieve real export (not to mention inservice) success with a scanned array radar by announcing development of a Typhoon-specific AESA radar at the Farnborough Airshow in July. Continued production of the Eurofighter appeared in question as the U.K. announced during the summer that it would not buy any Tranche 3 aircraft, though a purchase of Tranche 2 Typhoons by Oman could change that. Germany weighed diverting its Tranche 3 numbers for export as well.

Britain's October SDSR left the Eurofighter question unanswered but axed the Nimrod MR4A maritime reconnaissance aircraft, cut short the Raytheon R1 Sentinel ISR aircraft program, and moved forward retirement of the C-130J by 10 years, though it spared the MBDA Storm Shadow cruise missile.

In April, Trautman told the Senate Armed Services Committee that the UH-1Y "has made a huge difference in Afghanistan." The Marine general called the redesigned helicopter a vital complement to V-22, citing its excellent high-altitude performance. Its sister AH-1Z attack variant completed operational evaluation in August and should achieve IOC in early 2011. The UH-1Y/AH-1Z upgrade program cost is now estimated at \$8.7 billion, nearly double the initial projection.

The V-22's performance in Afghanistan earned it the lion's share of funding in the Navy's budget, with provision of \$2.8 billion for the procurement of 35 Ospreys, including five CV-22s for USAF Special Operations Command. The sorely needed CH-53 replacement, the redesigned Sikorsky CH-53K, passed its critical design review in July and is reportedly on track for an IOC of 2018. The sole-source procurement is generating interest from Taiwan, India, Israel, Germany, and France.

Elsewhere, the heavy-lift rotary market saw change as Boeing and Eurocopter agreed to collaborate on the Future Transport Helicopter project to replace U.S. Army CH-47s and German CH-53s with a helicopter that could carry large loads internally in a cabin equivalent in size to a C-130. The effort may prove the only meaningful transatlantic rotary-wing project for some time.

In June, Boeing announced its acquisition of full intellectual property, data, and production rights from Augusta Westland for its AW101 with intent to offer the design as a solely Boeing-built competitor for the re-launched V-XX presidential helicopter program. Boeing is hedging its bet for V-XX by partnering with Bell on a V-22 offering. Lockheed Martin is now teaming with Sikorsky to pitch the S-92 for the 23- to 28-unit order. As of June, the Navy was still assessing alternatives and no request for proposal had been issued. Meanwhile, seven Agusta Westland VH-71s from the first go-round sit idle in storage at NAS Patuxent River, possibly being sold to Canada for parts.

In Europe, Germany's naval rotary-wing requirement for 30 maritime helicopters and 19 combat search and rescue (CSAR) machines for the German air force looked open to foreign competitors following Eurocopter's stumbles in delivering the NH90 and Tiger attack helicopters. Sikorsky planned to offer CSAR and naval versions of its S-92, while Agusta Westland is offering its AW101, which the U.K. and Italian navy already employ in both roles. Boeing will offer its CSAR CH-47 using technology already developed for other



A Marine with the 1st Marine Division (Forward)'s Personal Security Detachment (PSD) watches as a UH-1Y Huey from Marine Light Attack Helicopter Squadron 369, 3rd Marine Aircraft Wing (Forward), lands in Khan Neshin Gahr. Afghanistan, to deliver water to the PSD and six geologists Aug. 16 in support of Operation Centrum. The team was awaiting extraction by Marine Heavy Helicopter Squadron 361, 3rd MAW (Forward), when the Huey pilots offered to drop extra water to the group. The UH-1Y and AH-1Z programs made strides during the year, with the AH-1Z nearing IOC and the UH-1Y entering service in increasing numbers. U.S. Marine Corps photo by Cpl. Ryan Rholes

programs, including in-flight refueling. Eurocopter's NH90 remains a low-cost option.

Germany's C-160 Transall fleet was under strain in Afghanistan, and with delays in the A400M, the Germans looked to enhance Transall capabilities over the summer with the addition of night vision goggle capability and other technologies. In early November, the seven NATO countries that are to purchase the Airbus A400M appeared likely to reach an agreement on financing 5.2 billion euros (\$7.2 billion) of cost over-runs. The U.K. and Germany have both reduced their buys, dropping the total number of aircraft on order from 184 to 170. Now three years behind schedule, the program added a third prototype over the summer and flight testing Generating Control of the summer addition of the summer addition.

three years behind schedule, the program added a third prototype over the summer and flight testing Generated by <u>www.PDFonFly.com</u> at 5/25/2011 8:39:03 PM progressed, with basic handling qualities and fuel consumption reported as better than expected <u>http://www.defensemedianetwork.com/stories/the-crest-of-the-wave/</u>

The Russian air force announced ambitious modernization plans for its airlift fleet in the next decade, including introduction of the Antonov An-70. Modernized II-112 and II-76 transports could begin delivery in 2012 and fleet renewal is slated to be complete by 2020.

In search of ways to keep its C-17 line open, Boeing mulled a derivative "FE" (fuel efficient) C-17 with narrower fuselage and lightened structure to meet nominal Joint Future Theater Lift requirements and perhaps commercial cargo needs. The C-17 program was boosted by an Indian air force purchase of 10 in late 2010, with possible follow-on buys.

India is also buying six C-130Js, the first of which will be delivered in February 2011. Lockheed Martin increased C-130J production this year in view of a USAF effort to buy 16 AC-130J gunships and export sales. The 130J will shortly be joined in the export market by Embraer's KC-390, which aims to compete for the estimated 700-unit global C-130 replacement market. Possible South American and European participants expect to see a prototype by 2014.

America still has no new air tanker as the KC-X program staggers along. August saw a bid from U.S. Aerospace/Antonov rejected for late submission. The Pentagon hoped to announce a winner in mid-November but this never happened. Demand for air tankers in Afghanistan and Iraq forced USAF officials to cancel October Red Flag exercises when it became clear that Aviano-based F-16s would not have tankers available for the trip to Nellis AFB.

The U.S. Navy's P-8A Poseidon multi-role maritime aircraft was testing in numbers (three) at NAS Patuxent River by September. Three more under construction are to be used in simultaneous evaluation/operational testing. The Pentagon formally OK'd P-8 LRIP using the P-3C-based sensor suite. The Navy will ultimately get 117 P-8As with high-altitude anti-submarine warfare weapons. Australia is buying eight and the Indian navy a further eight with its own sensor package.



Euro Hawk in Luftwaffe markings shown over the Mojave Desert near Edwards Air Force Base, during the aircraft's first flight on June 29, 2010. Denmark withdrew from the program in 2010. F-16 Chase Pilot Maj. Tim "Spike" Pesek USAF photo by Bobbi Zapka Northrop Grumman is still trying to clinch an Indian navy requirement to acquire four carrier-based fixed-wing airborne early warning (AEW) aircraft with its E-2D Hawkeye after pitching the aircraft for six years. A mid-2011 decision is possible. Embraer hoped to have the first flight of its EMB-145 AEW aircraft complete by year-end. Developed for the Indian air force, the EMB-145 will carry an Indian-built active array antenna similar to Saab's Erieye system.

Ongoing Next Generation Jammer (NGJ) development spawned a variety of roles and missions planning for NGJ-equipped F/A-18Gs and F-35s, though the system may not be available to foreign buyers.

In August, USAF Gen. Robert Otto warned that American forces would soon "be swimming in sensors and drowning in data" from UAVs. He also pointed out that U.S. airspace flight restrictions were cramping the Department of Defense's need for more than 1 million flight hours to train UAV personnel by 2013.

Recessionary concerns suggest other NATO nations could follow Denmark in withdrawing from the 15-nation, \$1.7 billion Alliance Ground Surveillance program, which is buying eight Northrop Grumman Global Hawk UAVs. During the summer, the SIGINT (signals intelligence) version of the UAV (intended to replace the U-2) experienced performance/price issues, though the Air Force still plans to buy 77, including 22 with Multi-Platform Radar Technology Insertion Program radar. The Luftwaffe-destined Euro Hawk commenced flight trials in the summer, followed by integration of its EADS-designed signit payload.

Europe attempted catch up in UAV development with the debut of medium altitude long range UAVs, including BAE Systems' Mantis, a derivative of EADS's Talarion, called X-UAS. The platform may attract a joint Anglo-French or German/French/Spanish procurement program.

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