PARIS POWER PLAYS

- Battle of the Airframers
- Europe’s Rotorcraft Surge
- Exam Time for JSF
- Geared Turbofan First Flight
MARKET FOCUS

AW&ST/S&P Market Indexes

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COMMENTS

When a Bad Board Trumps a Good Strategy

A ta pre-air show briefing for journalists in Paris, EADS leaders presented a graphic that would suggest the Pentagon owes them a big favor. In the 2008 competition for the U.S. Air Force’s tanker contract, Boeing bid $42 billion. When the program was re-competed, Boeing’s ultimately successful bid came in at $31.5 billion. The not-so-subtle implication: EADS’s decision not to pull out of the tanker competition last year after U.S. partner Northrop Grumman quit will save U.S. taxpayers more than $10 billion.

With defense budgets being curtailed sharply across Europe, companies on this side of the Atlantic Ocean are eager to increase their presence in the U.S. market, which stopped growing but still accounts for half of global expenditures. “The future for EADS is beyond Europe,” says CEO Louis Gallois. “We have to focus on growth in North America.” But if the European aerospace giant is to reach its goal of growing revenues in the region seven-fold by 2020, to $10 billion a year, a big shift in attitude will have to take place in its fractured multinational board.

Earlier this year, EADS ended a three-year acquisition drought in North America with the (U.S.) $687 million acquisition of Vector Aerospace, a Canadian maintenance provider. But EADS’s U.S. strategy still relies too much on organic growth: increased sales of military and civil helicopters, maritime radar systems, homeland security sensors, human-rated space capsules and services. Impressive as those offerings may be, they are not going to carry the company to $10 billion in annual sales.

Gallois complains that U.S. regulators have acted as a speed bump to his plans. He says EADS recently lost an acquisition target in the U.S. because the seller of the company—which sources describe as a privately owned space services operator—did not want to wait 3-4 months for the Committee on Foreign Investment in the United States to vet the deal, which assuredly would have been approved. What Gallois cannot say publicly is that a much bigger impediment is his own board, which cannot agree to pull the trigger on a big military acquisition.

Three years ago, a large industrial shareholder on the board killed a deal Gallois crafted to buy the parent company of AAI Corp., a U.S. supplier of unmanned aerial systems. (AAI was later sold to Textron for $81.1 billion.) Investment community sources say that was not the only time EADS has gotten cold feet after submitting a credible bid. “In the last few years they’ve gotten near the finish line on a number of deals over $500 million but haven’t crossed it,” says a U.S. investment banker. Favors are nice, but money talks. With the 67-year-old Gallois planning to retire next year, it would be nice if the board would permit him to use some of EADS’s huge cash reserves to make a game-changing acquisition. That would be a fitting cap to his long career. But don’t hold your breath.

The scale of the business deals brought to the market is staggering. Airbus secured more than 660 orders for its A320NEO (new engine option) family, driving its six-month order total since program launch to more than 1,620 aircraft. This year was “the best air show ever for Airbus in terms of aircraft numbers sold,” says Tom Enders, Airbus CEO. Most of the 730 deals are firm orders, he says, valued at over €67 billion. “I was pretty much amazed that we sold that many aircraft here,” Enders says of the NEO.

The U.S. airframer, meanwhile, beat Airbus in widebody orders, securing deals for 19 Boeing 787-8s, 37 777s, four 767s and one 777X. The company booked 322 billion in commercial aircraft deals.

And it was not just Airbus and Boeing that secured large numbers—Embraer took orders for more than 300 aircraft. That has Frederico Curado, Embraer’s CEO, saying a production ramp-up is underway, although it will depend on how much the order book grows in the second half of this year.

Still, Airbus’ NEO order surge has left an impression on airlines and industry observers and raised the stakes for Boeing to make a narrowerbody strategy decision. The U.S. aircraft manufacturer has said a Boeing 737 replacement or upgrade choice will be made by year-end. But Boeing is receiving mixed signals from the increasingly important lessor market about which path to take. Air Lease Corp. CEO Steven Udvar-Hazy, one of the commercial aircraft industry’s most influential buyers, is urging to pursue an all-new design. “Boeing needs to show leadership,” he says. “My feelings are heavily biased toward a new family of aircraft.”

Udvar-Hazy downplays concerns that Boeing risks losing a lot of business to the NEO as it takes time to decide on a strategy. “Airbus won’t have many positions left after this air show,” he noted here. “If [Boeing] can get it out by 2019 or early 2020, we’re very interested.”

Brian Kig, CEO of Norwegian Air Shuttle, says he is “lining up in the long queue of airlines that tell Boeing they have to build a new aircraft.”

Another major European airline buyer says a new aircraft is a must for Boeing.

But International Lease Finance Corp. CEO Henri Courpron believes it is best left to Boeing to determine which option to take. “Does a child want a new toy?” Of course,” he said here. “Everybody wants a new airplane, but there comes a time to ask the parental, adult questions [such as], ‘How much will it cost?’ and ‘Do we need it?’”

At the air show, Boeing Commercial Airplanes CEO James Albaugh reiterated the company’s position that it does not have to make a decision on re-engining until the end of the year. “We have the design pretty much on the shelf to do the re-engine,” he said. “The question is, do we want to evolve... or do we want to take more risk and design an airplane for the next 50 years?”

Mike Bair, vice president of advanced 737 product development, adds that “there’s no need for an artificial deadline, and by the end of the year we’ll have got more direction.” A slip of an announcement into 2013 may indicate a decision to go for an all-new product. However, he says, “we’re still going to have re-engining available to us if we hit a showstopper with NSD.”

Airbus has long suspected Boeing will launch a new program and then pull back, as it has done before, to pursue a more modest effort. Bair says re-engining would produce a 10-12% improvement. For the new aircraft, CFM International, Rolls-Royce and Pratt & Whitney all could offer viable engines that could be ready by 2019, according to Bair.

Regardless of what Boeing does, Jeffrey Knittel, CIT Group’s president of transportation finance, says Airbus will be in good shape. “We believe the NEO can stand on its own, whether there is a re-engined 737 or an all-new aircraft,” he said after placing an order for 50 NEOs. Still, he added, “I would hope [Boeing] will come to a decision soon.”

For the time being, Knittel says, “we think the A320 specifically presents a unique opportunity to fill a gap we see in the future.” He notes that it’s “getting us close to filling the [Boeing] 757 void in the market.”

In addition to the NEO orders, Airbus also secured strong sales for its standard single-aisle product and, perhaps equally importantly, a big commitment from Jet-Blue to retrofit all its A320s with winglets. The winglet upgrade is part of Jet-Blue’s deal for 40 A320NEOs and conversion of some backlog A320s to A321s. The retrofits are available for A319s, A320s and A321s beginning in 2013 and should offer 5%-6% fuel burn savings, similar to the forward-flying winglets. Leehy says. The winglets price will also be similar to the forward-flying version, around $563,000, although the retrofit kit could add to the cost. For Jet-Blue, the winglets promise range assurance on transatlantic flights.

Another key NEO order—formance Repub- }
deal to sell 80 NEOs to Republic, including the first 40 A319NEOs to be sold. Republic officials insist they have no plans to change their CSeries order, noting that the Canadian narrowbody will arrive in 2015 and the A319NEO a year later.

However, Teal Group analyst Richard Aboulafia says it makes no sense that Republic would want both jets. “Competition doesn’t get any more direct than the A319 and CS300,” he giving new momentum to a program that some competitors have written off as a lost cause. The orders came from an undisclosed “major airline” that will become the launch operator for the C10-145-seat CSeries family.

Bombardier also received a letter of intent from Korean Air to acquire up to 30 CSeries jets, including 10 firm CS300 orders, potentially giving the CSeries its first customer in the Asia-Pacific region first flight next year and enter service in late 2013, powered by new Pratt & Whitney 1000G geared turbofan engines.

Despite the relatively low order intake compared with the NEO, Ben Boehm, Bombardier vice president for international business, says, “we’re not threatened by them.”

It is not just the jet airliner market that is clearly out of the doldrums of the past three years. ATR has announced orders for 88 aircraft through the first six months of 2011, a record for the turboprop maker, supporting its plans to boost output.

But for every upside, there is a downside. One is concern about the ability to satisfy the tremendous demand. “We certainly don’t want to get to the point that slots are constrained,” says Tom Williams, Airbus executive vice president for programs. The company has already talked with engine makers about a further production ramp-up, having recently moved to increase single-aisle output to a record 42 aircraft per month.

“We will investigate if we can go considerably higher,” Enders says. Airbus has a few production slots for standard A320s free in 2014 and for NEOs in 2018-19, depending on the turnover from standards to NEOs. Production for the A350 is sold out until 2018-19 and for the A330 until 2013-14.

Curado also notes that supplier issues are a concern as Embraer considers boosting output. “We may have some bottlenecks,” he says, adding that any production increase would be modest at first.

Boeing’s Albaugh says, “We have seven years’ worth of backlog, but it really needs to be in the three-to-four-year range. We need to burn down the backlog, and we have to respond to the marketplace.” Although Boeing has ramped up production, the order surge in recent days has taken up many of the new slots created through planned production increases.

Some skeptics wonder if the tens of billions of dollars in orders reaped at the Paris air show are too good to be true. Several institutional investors are privately questioning whether the market is growing fast enough to absorb so many new aircraft. Others fret about the ability of the supply chain to keep pace with the production buildup of the Boeing 787 and F-35 Joint Strike Fighter as well as the robust rate increases in narrowbody and widebody jets that Airbus and Boeing have planned for the next few years.  

Korean Air signed up for Bombardier CSeries CS300s, but Republic Airways ordered A319NEOs, drawing into question its commitment to the CSeries airplanes it is to receive in 2015.
Waiting Game

Airbus restructures A350 as customers wait for improved versions

ROBERT WALL and JENS FLOTTAU/LE BOURGET

According to Airbus’s script, the decision to delay elements of the A350XWB twin-widebody and revamp its technical parameters should leave customers more at ease with the program and glad to be getting a better airplane. But some airlines just aren’t buying it.

Airbus is once more rewriting its plans for the A350XWB, delaying entry into service of two models while promising much-improved performance on the largest version in the family of twin widebodies. The smallest model, the A350-800, now will not be delivered until mid-2016, two years than planned, and the largest, the A350-1000, will only emerge in mid-2017, about 18 months later than customers have been promised. However, Airbus officials insist the design changes will yield a much-improved product.

It is the third time Airbus has made major changes to its A350 plan since it first tried to determine how to compete with Boeing’s 787.

It is not just higher performance that is causing the schedule delay, however. Airbus is trying free up its own engineering resources to ease development pressure on the already-late A350-900, the first of the aircraft family due to be delivered, and to develop the A220NEO (new engine option). “We are quite stretched” in some areas, concedes Airbus Chief Operating Officer Fabrice Bregier, pointing to stress engineers and composite specialists. The delay, particular of the -800 “relaxes a little bit the constraints on key resources,” he notes. Shifting the -800 “will definitely help” on the -900, adds Airbus A350 Executive Vice President Didier Evrard.

The -800 adjustment was made possible because many customers for the type have migrated to the -900, says John Leahy, Airbus COO for customers. That means that no customers were due to receive the aircraft until mid-2016, so the delay has no direct customer impact.

Airbus officials insist that so far there are no indications the -900 will suffer any more delays (the in-service date has already slipped several months). The final assembly line (FAL) process to start building aircraft in Toulouse is to begin by end of the first quarter of 2012. The first aircraft to be built is the static test model, with the first flight aircraft (MSN1) to follow in 2012; it should fly late that year, leading to service entry of the first production A350 in late 2013.

But that doesn’t mean there are not still hurdles. One area being watched closely is the large number of clips and other smaller items that are needed to assemble the aircraft, says Evrard. “It is not rocket science, but it is a question of coping with the volume on the accelerated schedule.” However, he insists there are “no blockers” to the start of the pre-FAL work at Airbus sites in the summer.

Not everyone is so sanguine about the situation, though. Several suppliers and customers are increasingly concerned that the first version of the -900 will be delayed further. They assert that Airbus is likely to announce a delay of 1-2 years for the A350-900 by the end of this year at the latest.

“I would not bet my retirement on it being on-time,” says Steven Udvar-Hazy, chairman/CEO of Air Lease Corp. An airline official expects at least a one-year—potentially a two-year—delay and argues Airbus should consider telling its customers about that reality as soon as possible to minimize the backlash.

An industry official adds that there are still significant quality and tolerance issues with composite fuselage panels, although Evrard rejects that claim.

Still, the skeptics worry that the A350 will suffer a significant amount of rework and rebuild particularly for fuselage components, which could slow the program. “It could be a similar story to the 787,” says an industry insider. One source close to the program believes that the A350-900 will be 15-18 months later because of the technology issues.

Another manager working in the A350’s supply chain says there are still late—and sometimes conflicting—design changes for key parts that are not yet visible to Airbus’s top management and senior program officials. Those alone would need several additional months to be rectified once they have gained program managers’ attention.

Evrard acknowledges “traveled work” will be unavoidable, the kind of late work that has to be undertaken on the FAL rather than where it was supposed to be done earlier. An abundance of traveled work crippled the Boeing 787 production ramp-up. Evrard says managing the amount of traveled work will be important.

Another challenge for program leaders is that the first development aircraft are heavier than Airbus would like. “We are about 2% away for the first aircraft from where we want to be,” says Gordon McConnell, A350 chief engineer. The design for those test aircraft had to be locked but the design for the first production aircraft is not, leaving time to make improvements.

McConnell stresses he has “no doubt at all” the weight-mitigation program will be sufficient to meet performance guarantees made to airlines. Detailed
design optimization should yield needed improvements. “We are in reasonably good shape,” McConnell says, with the goal of finalizing that work by year-end.

The centerpiece of Airbus’s latest A350 adjustment is the -1000, which Airbus is using to attack the Boeing 777-300ER. The main feature of the change is increasing the thrust of the Rolls-Royce TrentXWB engine to 97,000 lb., or 4,000 lb. more than forecast (see next story). The change prompts Airbus to offer 400 nm more range at maximum passenger load or 4.5 metric tons on a 6,000-nm route. The change prompts Leahy to boast that the -1000 “does more than the 777-300ER does and it does it with 25% less fuel consumption.”

Boeing has long said it is ready to improve the 777, but has held off on defining the update until Airbus more clearly spells out its plans. That strategy now appears to have worked, giving Boeing more time to continue selling the profitable widebody and figuring out how to respond. Boeing Commercial Airplanes President Jim Albaugh said on June 16 that both smaller and larger improvement packages for the 777 are being considered, depending on what its rival does.

The 18-month delay in rolling out the -1000 is not sitting well with everyone, though. Qatar Airways Chief Executive Akbar Al Baker, a buyer of the type and the biggest A350 customer, says the move “will dent our fleet expansion and replacement program. It is disappointing to us and also we hope the performance they’re talking about is the right information.”

Other changes to the A350 include a 10-metric-ton increase in maximum takeoff weight to 308 metric tons, and the addition of five aft fuselage frames and six front fuselage frames, as well as structural reinforcements, says Bregier. The wing will also be longer, with a longer trailing edge of around 300 mm and new high-lift controls and actuators. The capacity of the air conditioning system also has to be increased.

McConnell says the aircraft may also feature better composite utilization and “a better weighted design.” The electrical structural network could also evolve. Completing the network without adding undue weight on the composite aircraft has been a challenge for Airbus. Eyvard notes that materials are progressing so “we can go further in optimization” of the electrical structural network.

Airbus also is looking to replace titanium door frames with composite ones, which would save weight. Moreover, even though the new engine retains an 118-in.-dia. fan size, the new Rolls-Royce powerplant will be heavier, requiring some structural reinforcement, including of the pylon.

The only big supplier change is for the main landing gear, which Airbus put out for bid and Goodrich won over Messier-Dowty. The main landing gear will feature six wheels rather than four, a change that was already forecast for the -1000.

The price of the aircraft will also increase, with list price going up $8 million from $299.7 million for the -1000 at the 2011 catalogue price. Still unclear are some of the cost implications of the changes, including whether existing -1000 customers would have to pay the new higher price. Etihad has ordered 25 of the aircraft, Qatar and Emirates 20 each, and Asiana 10. Also unclear is if the airlines would be owed delay penalties. Bregier says the cost of the -1000 development program should not be much higher than the $2.4 billion earmarked for the effort.

Meanwhile, the -900 program is moving to the start of final assembly around year-end, with the goal of completing the first flight toward the end of 2012 and first delivery at the end of 2013. The program has inched further to the right, but Airbus so far has managed to avoid a slip of first delivery into 2014, although many industry officials still expect that to happen.

Order intake has slowed for the A350, but the aircraft-maker remains sold out until around 2019.

**Long Haul**

**GE studies GE9X big engine concept as Rolls details plans for growth of Trent XWB**

**GUY NORRIS/LE BOURGET**

While single-aisle engine news stole the limelight at the Paris air show, developments at the top end of the commercial thrust bracket gave the first hints of power battles to come over Boeing’s planned successor to the 777.

To fend off growing threats to the longer-range, GE90-powered variants of Boeing’s big twin, General Electric revealed it is studying plans for a possible next-generation successor to the engine. The plan emerges as Rolls-Royce launches development of a more powerful, 97,000-lb.-thrust Trent XWB for the revamped Airbus A350-1000, which could compete with potential long-term 777 development options discussed by Boeing at Paris. A new threat is also stirring at Pratt & Whitney, which is considering long-term plans for higher thrust geared turbofans.

Boeing’s future 777 development studies are rising in tempo following the recent Airbus decision to make the A350-1000 more competitive with the 777-300ER. Boeing Commercial Airplanes President James Albaugh says,
“We’re taking the -1000 very seriously. The question is when it comes into service and how fast it ramps up in rate.” The outcome of these studies and customer input will determine whether Boeing opts for incremental improvements or more significant derivatives, he continues.

Options range from a package of near-term upgrades grouped under a plan called the 777+ to a more ambitious pair of longer-term advanced derivatives outlined as the 777-8X and 777-9X. Boeing Vice President of Business Development Nicole Piasecki says the 777+ could include avionics, engine and aerodynamic improvements. The -8X and -9X, alternatively, are fundamentally new derivatives incorporating major structural, systems and engine changes.

GE will start tests of an advanced compressor in 2012 aimed at possible application on a concept dubbed the GE9X. The plan will see an improved version of the Genx compressor combined with a second generation of the advanced eCore (engineering core) family at the heart of the CFM Leap and Tech X engine programs. GE Aircraft Engines President David Joyce says, “The next step is Gen 2 of eCore, which is the GE9X.”

The compressor rig will run in 2012 says Joyce, who adds that it will have “a different pressure ratio” than the existing eCore I. The second build of this core, incorporating a two-stage high-pressure turbine, began tests in late May. A third build, scaled up for the Leap engine, will run in 2012. The approach “allows us to constantly look at the evolution of the design, and the GE9X will be a different version,” he notes.

Joyce notes that development of potential competition from Rolls-Royce is not unexpected given GE’s original experience with the GE90 on the 777. “Our business case for the A350 always played into having two engines. We always thought a second generation would be needed for the A350-1000,” he says.

Rolls-Royce is revealing more detail about its more powerful Trent XWB-97 plan, including justification of its decision not to undertake a costly increase of the fan diameter or to go beyond the new 97,000-lb-thrust target. Trent XWB Director Chris Cholerton says, “We’ve gone through extensive studies with Airbus and the answer is 97,000 lb., not more or less.” Instead of growing the fan diameter, the company will scale up the core while at the same time increasing the flow by spinning the fan 6% faster. The base of the blades will also be redesigned with an inflated annulus to help boost the flow capacity around the spinner. The same redesign is also likely to be used in the XWB versions powering the A350-800 and -900.

A good deal of Rolls’ confidence in the redesign is based on the initial performance of the baseline intermediate- and high-pressure compressors. The intermediate (IP) unit features a “rising line” or inner annulus line that increases in radius, thereby raising the tip speed of the aft stages. The high-pressure compressor is derived from the European New Aero Engine Core Concept (Newac) program, and is connected to the IP by a swan-neck duct. Having performed “significantly” better than expected, the company says it may trade off an ample surge margin in the compressor for additional specific fuel consumption (SFC) improvement. The overall goal, with or without this, is to meet the thrust target of the XWB-97 with no impact on SFC.

Other key changes to the engine include upgrading the high-pressure (HP) turbine temperature capability with a variety of next generation CMSX-4 single-crystal materials and anti-oxidation coatings. Rolls-Royce is also moving to a shroudless HP turbine to improve efficiency. Although not used before on the Trent family, the design has been employed in the company’s military engines and the BR725.

Also, in the turbine Rolls-Royce will move to a dual microstructure disc using a powder-met alloy that has different properties at different parts of the disc. Within the same forging, the material will provide greater stress capability towards the center of the hub while at the same time exhibiting better creep resistance toward the tips.

The company has formed a dedicated XWB-97 project team and plans to finalize the configuration by mid-2012. The first engine to test will be in mid-2014, with first flight on the A350-1000 planned in the second quarter of 2016. Entry-into-service will take place in mid-2017.
Head to Head
First flight of PW1500G marks opening rounds in mid-thrust engine war

GUY NORRIS/LE BOURGET

The first salvos in a dramatically intensifying battle for the single-aisle airliner powerplant market were fired here as the first flight of Pratt & Whitney’s PW1500G geared turbofan coincided with a landslide of orders for CFM International’s Leap XIA on the Airbus A320NEO (new engine option).

With both camps in an upbeat mood, and orders flooding in on an unprecedented scale, the timing of the engine’s first flight on June 20 marked a show highlight for Pratt, which conducted the mission on its Boeing 747SP flying testbed. “The engine performed flawlessly during what was an almost 2-hr. flight,” says Pratt & Whitney President David Hess. “These are exciting times for Pratt. This is only the beginning. We are in effect creating the first of a new generation of JT8D and JT9D engines. We like this architecture and it gets better as you go up in thrust levels, and we see other applications,” he says, referring to potential widebody projects.

The PW1524G version will power Bombardier’s CSeries, and is the first of four family members currently in development. Next to fly later this year will be the PW1200G for the Mitsubishi Regional Jet (MRJ). The PW1100G and PW1400G for the Airbus A320NEO and Irkut MS-21, respectively, will begin flight testing in 2012.

The first flight took place from Pratt & Whitney Canada’s Mirabel Aerospace Center in Quebec. This facility will be used for flight testing as well as final production assembly and test for both the PW1524G and its PW800 business jet stakemate. Originally planned for the end of May, the start of tests was delayed by issues with fitting instrumentation through the special strut adapter holding the engine to the wing.

“The engine performed even better than we expected on this first flight,” says Bob Saia, next-generation product family vice president. Initial testing will be focused on low-altitude work and engine calibration before opening up more of the performance envelope during a planned 50-hr. campaign. Although the engine is encased in a production-standard nacelle, it does not yet have the thrust reverser and variable-area fan nozzle. “The first production unit for these will be at the end of the year,” says Saia. “To date, we have conducted nearly 400 hr. of full engine ground testing. We have four engines at test and five engines in the build phase.”

Together with test and endurance runs amassed on other members of the PW1000G family, Pratt plans to have more than 1 million hr. of running time on the engine by the time it enters service on the A320NEO in late 2015. Before then, the CSeries engine is set to enter service at the end of 2013, while the MRJ’s PW1200G is scheduled for service entry in the first quarter of 2014. The follow-on PW1100G for the A320NEO and PW1400G for the Irkut MS-21 are set for engine certification in the second half of 2014, with service entry of the Russian airliner due in late 2016.

In terms of new orders at the show, however, CFM stole much of Pratt’s thunder by announcing a wave of orders for both current-model engines and the Leap. Overall, by the end of the event, CFM expected to have orders for more than 160 CFM56-7Bs for the Boeing 737 family, as well as a staggering 910 Leap engines worth $11 billion for the A320NEO model. In addition, it clinched 258 orders for the CFM56-5 on the current models of the A320 family.

With 681 engine orders worth $6.8 billion already announced by May, CFM International President and CEO Jean-Paul Ebanga says: “It’s already the third best year in terms of backlog, so at the end of the Paris show it will reach a new high for CFM. It is the best market ever anyone could dream up.”

As a result, the company is gearing up for year-on-year record engine production increases to keep pace with planned rate hikes by Airbus and Boeing, and expects to be supplying up to 1,600 CFM56-5/7s per year by 2014.

The rate increases, to more than four engines per day from the combined U.S. and French assembly lines, will see
engine deliveries grow to 1,400 in 2012, 1,500 in 2013 and upward of 1,600 in 2014, compared with 1,260 this year: "This could grow again if Airbus decides to ramp up A320 production to 44 per month," says CFM Executive Vice President Olivier Savin. The uptick keeps pace with projected growth plans at Airbus, which is expanding monthly production to 42 by 2014, from 34 in 2011; and at Boeing, which is raising the 737 rate to 42 from 31.5 during the same time period.

The General Electric-Snecma joint venture’s current production plan, which includes the manufacture of some engines for military applications and spares, only marginally includes the upcoming Leap engine, which does not become a significant factor until 2015 onward.

CFM, meanwhile, is protecting its production capacity and supply chain by locking in the price and delivery of key materials such as titanium up to two years in advance, and by gearing up new production facilities to manufacture advanced composites for the Leap engines. "Today we are quite organized for this, but there are areas where there is still quite a lot of risk related to the cost of raw materials," says Savin. CFM Executive Vice President Chaker Chahrouh adds: "We anticipate there will be some pressure on pricing."

U.S. FAA Part 25 certification of the 737 equipped with the upgraded CFM56-7BE engine is expected in the “next couple of days,” says Chahrouh, and “entry into service is only a few weeks away. We’re starting to ship the first-7BE [production] engines out of the factory today as we speak.” The -7BE, which will be the new production standard for all 737 engines from now on, has 2% better fuel burn than the current -7B and 4% lower maintenance costs. The engine incorporates improvements to the high-pressure compressor and turbine, as well as revisions to the low-pressure turbine.

An upgraded CFM56-5B performance improvement package (PIP) engine for the A320 family will enter service in September. The PIP reduces fuel burn by 0.5% and maintenance costs by 1%. “We’re in the process of certifying kits” for upgrades to both -5 and -7 engines with the upgrades, says Chahrouh.

Fighting On
Upgrades, new applications may mean that rumors of IAE’s demise are premature

With nearly all the attention at Paris focused on the emerging PW1000G and Leap powerplants for the Airbus A320NEO (new engine option), International Aero Engines (IAE) is quietly starting studies of new upgrades as part of long-term plans to help sustain the V2500 family into the next decade and beyond.

The move is designed to help reassure A320 operators that IAE is still a competitive and cohesive force in the market, despite a parting of ways by two of its major shareholders, Pratt & Whitney and Rolls-Royce, over development of the competing PW1000G geared turbofan. Other members of the multinational aircraft engine consortium include the Japanese Aero Engines Corp. (JAEC) and MTU.

Studies of the potential upgrade, which would be the third in the consortium’s “Select” series if sanctioned, come as IAE shareholders agree to extend their collaboration agreement to 2045, and as the V2500 continues to find new business. This includes the engine’s yet-to-be-confirmed selection for the Embraer KC-390 military transport, announcement of which is believed to be imminent.

The developments also come as IAE reaches a peak in annual production, currently making it the world’s second largest maker of civil turbomachinery after archival CFM International. IAE will deliver 420 engines in 2011, with production rising to 460 in 2012. “That’s more than one per day now, and with some 2,000 engines in
the backlog that’s about five years worth of production,” says IAE President and CEO Ian Aitken. While aware of the inevitable market shift to the next-generation PW1000G and Leap alternatives, Aitken says: “Although NEO will be coming, over the next five years there will be 1,000 aircraft waiting for an engine selection, I think. We intend to take a fair share of the market.”

Reflecting on comments by Pratt President David Hess about aims to form a new consortium for the PW1100G geared turbofan for the Airbus A320NEO, Aitken says IAE could still play a part. “Our intent is to remain current and we are available should the shareholders want to market a new engine through us,” he says.

Despite Rolls-Royce not being involved in the geared turbofan, Hess says that, “on NEO, we’re having discussions with the other IAE partners including MTU and JAEC. We hope they’ll partner with us as part of another consortium to offer this engine in the marketplace. I expect you’ll see some announcements on that this year.”

Making an oblique reference to the Brazilian KC-390 transport project, Aitken says: “We anticipate in the near term there will be another application which will take production through 2035. So we will stay match-fit. There’s absolutely no intent that we will drop off the map.” The KC-390 has attracted more than 60 commitments, and Embraer has also announced plans to offer a commercial variant.

With roughly 4,000 engines in service, IAE is also pushing the business case for its newly announced Select Two upgrade. Described as an option for the earlier V2500 Select One upgrade, Select Two is projected to provide 0.58% fuel-burn savings compared with its predecessor for a 500-nm A320 mission. Unlike the hardware changes in the initial upgrade, Select Two is a software change in the electronic engine control as well as a new data-entry plug.

The upgrade has been chosen by US Airways for 300 engines on its A320 family fleet, as well as by Gulf Air, which selected the engine for six A321s. Aitken says Select Two will also be available from the first quarter of 2013 onward in conjunction with the “Sharklet” winglet upgrade on offer from Airbus. The two improvements will combine to reduce fuel burn by 4%, he says. China Southern, meanwhile, is set to upgrade 65 engines to the Select One standard as part of a long-term engine-maintenance agreement valued at $750 million. The deal brings the total number of V2500-powered China Southern aircraft in service and on order to 177.

“We’re locked and loaded on Select Two, and I’ve asked the engineers to take that as a baseline and tell me what they can do with the machine. We’ll look at performance, maintenance costs and operability. Then they’ll tell me what they’ve got. We’re talking to Airbus about what the requirements are, and to the customers. So once that’s done by early in the first quarter of 2012, we will look at the business case and go out to see what the shareholders think,” says Aitken.

“I’d like [a Select Three] to be retrofittable, and I’d like us to look at the existing fleet and see what else we can do in the future for fuel burn. The bottom line is, improvements will definitely go on, and it’s nice to know Airbus is also working on the retrofit side with the Sharklets. It makes a big difference,” he says.
Pitch for a Pardon
Major F-35 milestones set as Lockheed sees improved financial return and customers hope to start training

Amy Butler, Robert Wall and Guy Norris/Le Bourget and Jen Dimascio/Washington

There is nothing that concentrates the mind like the prospect of a hanging. This quip came to mind for U.S. Deputy Secretary of Defense William Lynn when asked whether the Lockheed Martin F-35B was still on “probation.” Defense Secretary Robert Gates said in January that if performance of the short-takeoff-and-vertical-landing (Stovl) version of the F-35—the most expensive of the three variants—does not improve, he would propose terminating it in two years.

Gates also withheld $864 million in award fee on the development, and the Pentagon has restructured the contract to tie Lockheed Martin’s future earnings to specific milestones, not subjective incentives.

Since then, senior Pentagon officials seem to be softening their rhetoric about the Joint Strike Fighter (JSF), with the top brass and administration officials highlighting a turnaround in the once-lagging flight-test program. The JSF program office and contractor are “paying great attention to achieving milestones,” Lynn said at Le Bourget last week. But Lockheed Martin has by no means earned its way off the gallows yet.

Five milestones—each carrying a financial incentive—are slated to be met in 2011. With the company earning $7 million of $35 million in available award fee in 2010, the pressure is on this year to regain credibility with customers and stockholders. The majority of these events culminate in the fall, USAF Maj. Gen. C.D. Moore, deputy F-35 program manager, tells Aviation Week. They are:

- Conducting F-35B shipboard trials.
- Executing catapult launch and trap landing testing.
- Start of training with the 1B software.

Preparation of the F-35B for shipboard tests is one of five performance metrics for Lockheed Martin this year.

- Release of Block 2 software for flight testing.
- Static-model trials for the F-35C carrier version.

While these items will likely remain open until late in the year, groundwork is being laid now. “This year will be a better return” for the company, says Tom Burbage, executive vice president for JSF, although he describes the development margins as low.

In preparation for training readiness, program managers have set up an unconventional operational utility evaluation (OUE) using six F-35As (AFs 8-13). The outcome of this OUE, conducted by Air Force and Navy flight-test experts, will determine the willingness of the Air Education and Training Command (AETC) to approve the beginning of formal training operations, says Moore.

Service test experts typically conduct formal operational evaluations prior to the production phase. However, Moore says the JSF program office expects feedback on performance, maintenance and reliability during the two-month OUE. Four pilots are slated to participate.

Leading up to the OUE, AF-6 and -7—two production F-35As—will execute a series of “maturity” flights through August. They will operate with the Block 1A software, which includes the basic mission avionics suite.

Though not a “go-to-war” configuration, the 1A software will be used for initial training, says Moore. These maturity flights are crucial to obtaining the first of two flight clearances needed for the OUE.

In the meantime, deliveries of the F-35As to Eglin AFB, Fla., are near. AF-8 and -9 are ready to deliver to Eglin in “days,”
Moore says. AF-10-13 will follow in the next few months. AF-10 and -11 may conduct their first flights this week, AF-12’s is slated for later this month and AF-13 is expected to make its maiden flight in July, Moore says.

For the next roughly two months, while awaiting clearance to enter the OUE, officials at Eglin will be refining and verifying the technical data as well as conducting “day-in-the-life” exercises. This will also be a period for maintaining the aircraft in advance of the OUE.

During the maturity flights for AF-6 and -7, testers at Edwards AFB, Calif., will be “putting them through the training syllabus” that will be taught at the base’s schoolhouse.

In addition, the software path must continue in order for Lockheed Martin to perform financially on the program. The IB package—which will include multi-level security for international partners to participate—is slated for release late this year; it also includes initial, subsonic maneuvering.

What was once Block 2 software has been broken into two increments. Block 2A is for “advanced training” and includes initial legacy data link operations, countermeasures and off-board data fusion; it is needed for the Wasp ship activities, says Lockheed Martin officials.

The Marine Corps hopes to declare initial operational capability with the next increment, 2B, in late 2014 or early 2015. It includes full operation of the legacy data link and the new advanced data link, subsonic ship deployment activities and limited use of some internal weapons.

Block 3 is also broken into two increments. The first, 3BI (for initial), will support international activities, “austere site” capabilities and initial shipboard Navy operations as well as the full suite of internal weapons. With the 3I, the aircraft can travel outside the U.S., says Burbage. The “advanced warfighting” Block 3 includes improved sensor fusion, embedded training, the external gun and automated countermeasures, as well as full ship and Navy operations.

The Block 3 software sensors fusion was tested in a virtual environment onboard the BAC-111 surrogate platform during recent Northern Edge exercises in Alaska, Moore says. He characterizes the performance as “good,” although work on the software is in its early stages. The tests included the use of the electro-optical/infra-red capability and the distributed aperture system that provides the pilot with a 360-deg. view around the aircraft.

Before beginning the OUE, ground personnel at Eglin will be refining and verifying the technical data and procedures.

Pratt & Whitney, meanwhile, is working on fixes to Stovl thermal management problems; these were among the issues that prompted Gates to declare a probationary period for the variant.

The final low-rate initial-production (LRIP) Lot 4 aircraft will receive an interim fix to lengthen the lift-fan driveshaft, says Bennett Crosswell, president of Pratt & Whitney Military Engines. A new bellows coupling is needed to accommodate variations in length resulting from build tolerances, thermal and pressure growth, and maneuver deflection. Interim shims are being fitted to the shafts. The next lot will have a new production shaft with redesigned couplings. Mission tests begin this summer, says Crosswell. Deliveries are set for the second quarter of 2012.

Lockheed Martin is also adding extra insulation around the roll-post nozzle actuators for thermal management owing to leaky seals heating the actuator. Until this fix is on the aircraft, Stovl flight time is limited. The long-term fix will involve developing a redesigned actuator, which will be in production in 2012, says Crosswell.

Pratt is also addressing clutch drag and heating that occurs outside the Stovl envelope. Development of a clutch temperature sensor and passive cooling circuit will provide cooling air to the clutch in up-and-away flight when the forced-cooling fan used in Stovl mode is switched off. As a result, the temperature limit and baseline for flight tests will be increased by roughly 100°F, or roughly 20%, says Crosswell, although the clutch temperature sensor remains a long-term solution.

Lt. Gen. Terry Robling, aviation commandant for the U.S. Marine Corps—the first customer—emphasizes that the test program is on track and a once-disjointed production approach is improving. “We are getting there,” he tells Aviation Week. “This [probation] is a time for us to get these fixes done.”

Despite its troubles, Burbage says, “we expect to complete that contract with a profit.” Last year, Lockheed Martin pushed hard against implementing a fixed-price contract in LRIP 4. Under the agreement, the Pentagon and Lockheed share the cost of an overrun up to 120% of the target price.

Lawmakers, meanwhile, are aggressively targeting the F-35’s cost with two measures offered last week to limit the Pentagon’s financial exposure. John McCain (R-Ariz.), the top Republican on the Senate Armed Services Committee, proposed imposing a probation on the program if LRIP 4 overruns target more than 10%. Under his plan, if overruns continue to the end of 2012, funding would be dedicated only to cancelation costs. His language was narrowly defeated in the committee.

In contrast, the panel endorsed language offered by Chairman Sen. Carl Levin (D-Mich.) that makes Lockheed Martin responsible for 100% of any overruns in LRIP 5, which has yet to be negotiated.

It is against this backdrop that Vice Adm. David Venlet, the Pentagon’s F-35 program manager, and Lockheed Martin are negotiating Lot 5. A major issue of contention is how to account for the Pentagon’s decision to cut F-35B builds to three from 17 in Lot 5.

Burbage argues that although many components are unique among the three F-35 variants, long-lead items for “B unique” parts have been bought and the line has been prepared for the higher rate. “The Pentagon looks at this, as it is our problem to deal with,” Burbage says, adding that the company is renegotiating with suppliers to minimize the financial impact.

The JSF program office, however, has little tolerance for a price increase. “LRIP 5 will be challenging in that we have . . . clear expectations of reduced cost,” says Moore. “We have a long ways ahead of us to negotiate.”

This spring, reports surfaced that Lockheed Martin’s initial LRIP 5 exceeded the price of LRIP 4, sparking consternation in government circles. “Whether it was higher or lower than the settlement on LRIP 4 is really immaterial, because the real issue is where do we settle on LRIP 5,” Burbage declares.
Filling A Gap
Interest rises in high-speed premium air travel aircraft

ROBERT WALL and GUY NORRIS/LE BOURGET

The demise of the Concorde a decade ago has left a notable hole in the premium commercial airline business. EADS is now exploring how to address that gap, but wants to go after the high-speed market niche with a far more capable system without the environmental baggage of the fuel-guzzling supersonic transport.

Researchers at the European aerospace giant envision development of a hypersonic commercial aircraft able to transport 50-100 people between Paris and Tokyo in 2.5 hr. The so-called Zero Emission Hypersonic Transportation (Zehst) notionally should fill the high-end market niche left by the retirement of Concorde, says Jean Botti, chief technical officer at EADS.

The technology underpinning Zehst would require some time to mature, with a commercial offering not expected to emerge until around 2040. But Botti says an unmanned technology demonstrator could already be flying in about 10 years to help validate the concept. EADS officials are not now pushing a military application, but acknowledge that may be possible.

Zehst would use three different propulsion systems. The aircraft would take off powered by two turbofans and climb steeply, reaching around Mach 0.8. At this point rocket boosters would kick in to propel it through the transonic region to Mach 2.5. Underwing ramjets would then take over to reach speeds above Mach 4. Cruising altitude would be just above the atmosphere. The aircraft would glide during descent, with the turbofans powering up again in the final stage of flight.

Despite its three propulsion systems, Botti argues Zehst will not be cost-prohibitive. “I am not sure that this equation will be that expensive,” he says, noting that does not mean it would be cheap, either. One reason is that the rocket motors are relatively small, merely aimed at giving the aircraft a boost, rather than lifting the entire vehicle from a standing start. The maximum acceleration passengers would be exposed to is about 1.2g.

EADS is talking to Japan about a cooperative effort, and also is working with French aerospace research agency Onera. Program success would require resolving the environmental issues. Botti says the system will have low emissions, in part because the cruise stage of flight will be outside the atmosphere. Furthermore, the sonic boom from the aircraft would be very limited and directed to minimize the impact on the ground.

Another high-speed project unveiled at the Paris air show is the HyperMach Europe Aeronautics SonicStar, a concept for a supersonic 10-20 seat business jet, designed to mitigate sonic booms. It would use all-electric Supersonic Magnetic Advanced Generation Jet Electric Turbine engines.

The 160,000-lb.-maximum-takeoff-weight SonicStar, measuring 226 ft. in length with a 74-ft. wingspan, will be powered by the 54,700-lb.-thrust engines that can supercruise at 62,000 ft. The engine design uses a superconducting ring motor-driven fan, compressor and turbines, and a combustion chamber that converts air into plasma.

As air enters the engine, it is accelerated in the first stage of a dual counterrotating bypass fan section, where it enters an eight-stage counter-rotating statorless compressor. The compressed air reaches about 2,250°F, and then is forced into an ion plasma fuel combustor and ignited by an array of electric and magnetic-field-generating fuel injectors. The air is converted into plasma within the combustor before exiting to drive a five-stage counter-rotating gas turbine and integrated superconducting electric generator.

The turbine consists of high-, medium- and low-pressure turbine stages that are magnetically levitated as a complete system to reduce drag and turbine-vane swirl. A counter-rotating bypass fan, single stage diffuser and the statorless compressor are also magnetically levitated.

But the advanced concept focus is not just on high speed. EADS also is using the Paris air show to showcase a second technology concept, the Voltair electric transport. The electric aircraft is designed to carry 50-70 people over short ranges. It would feature a morphing, laminar flow wing, with a superconducting, electric-motor driven counter-rotating propeller providing thrust.

Although Zehst uses three different propulsion systems, EADS officials still believe it could be affordable.
Expanded Umbrella

Israel plans faster deployment of Iron Dome and David’s Sling to counter missile buildup

ALON BEN-DAVID/LE BOURGET

The Israeli government is moving to expand a rocket protection shield across the entire country after months of heated discussion about how to proceed.

“In two and a half years, the whole of Israel will be covered with an Iron Dome, protecting it from rocket attacks,” Israeli Defense Minister Ehud Barak declared during a visit to the Paris air show here.

Designed to protect against rockets ranging 4-70 km (2.5-44 mi.), the Iron Dome system demonstrated the world’s first combat interception of a short-range rocket in April. Despite the operational success, Israel has been slow to fund procurement beyond the two batteries already deployed. Instead, Israel was relying on the U.S., which committed $205 million in aid this year, to cover the purchase of another four Iron Dome batteries.

The Israel Defense Forces (IDF) estimate that 15 batteries will be required to protect the whole country against rockets from Lebanon, Syria and the Gaza Strip. With each battery estimated at $50 million, such a plan could not be sustained within Israel’s existing defense budget.

“Whether it’s 13, 14 or 15 batteries, we will find the required resources for it,” Barak tells Aviation Week. He may be counting on more U.S. funding, after the Pentagon’s Missile Defense Agency director, Lt. Gen. Patrick O’Reilly, stated that the Iron Dome will also protect U.S. forces deployed in the Middle East.

To further reduce costs, Rafael Advanced Defense Systems, developer and manufacturer of the Iron Dome, is mounting a growing effort to market the system to international customers. Singapore has already procured and deployed the Iron Dome; other likely costumers are South Korea and the U.S.

The second part of Barak’s plan calls for deploying the David’s Sling system, a higher-end capability to defend against artillery rockets and missiles with a range of 70-300 km; it also can counter cruise missiles. “Ambitiously, it could be done in four years,” he says.

The system is considered a keystone in Israel’s defense strategy and is aimed primarily to protect against the enormous deployment of heavy rockets and missiles in Lebanon and Syria. The constantly improving accuracy of missiles such as the Syrian M-600, with a range of 300 km and a warhead of 560 kg (1,235 lb.), is perceived as a dramatic threat to Israel’s strategic assets.

Developed by Rafael and Raytheon, the David’s Sling (also called the Magic Wand) has undergone several fly-out tests and will perform a first interception attempt early next year. “If funding of the program continues to be unharmed, we could reach initial operational capability in late 2012,” an industry official says. The long operational range of the David’s Sling interceptor will enable just three systems to protect the whole of Israel.

Beyond the budgetary challenge, procurement of the Iron Dome and David’s Sling will require a large shift of personnel to the air defense corps, which is expected to triple its size. Another difficulty will be managing the airspace in a time of conflict to avoid collisions between the multiple interceptors and friendly aircraft.

Rafael has developed a unified air and missile defense control system that can receive information from any existing sensor—whether ground or aerial, radar or optical—and fuse it into an integrated picture. Dubbed MIC4AD (Modular, Integrated C4I Air Defense), the system presented here can monitor an endless number of targets and assets and divide the airspace between missile and air defense systems as well as air-to-air operations.

MIC4AD was designed to meet IDF requirements for a system that can oversee all missile and air defense layers, but the IDF have not made the decision to obtain it yet.

Israel will be buying more Iron Dome systems to extend its anti-rocket shield over the whole of the country.
Fast Forward

Bullish outlook has AgustaWestland and Eurocopter bolstering their portfolios

ROBERT WALL and ANDY NATIVI/LE BOURGET

Europe is seeking to cement its commercial rotorcraft edge over the U.S. Toward this end, AgustaWestland and Eurocopter are taking steps to ensure that their market dominance will persist beyond this decade.

The higher-speed commercial passenger transport is a particular market segment attracting increased attention, with rotorcraft manufacturers seeing the potential to capture capacity from regional aircraft. The logic holds that vertical lift would be able to add capacity without requiring more airport infrastructure, which is almost impossible to generate in Europe. Rotorcraft also could supplant fast trains, which require extensive capital spending to build new tracks.

Eurocopter intends to build on its X3 (pronounced X-cubed) hybrid high-speed helicopter concept (see cover) to try to address that need. In the 2020s, there will be a “strong market” for vertical lift to replace smaller turboprops and regional jets, argues Lutz Bertling, Eurocopter CEO. By the early 2020s, he hopes Eurocopter will offer a system that can carry 30-50 passengers using the underlying technology demonstrated in the past year during X3 flight trials.

While the X3 may not be as fast as other systems, such as Sikorsky’s X-2, Bertling argues it offers better operating economics and less complexity. The X-2-derived follow-ons will be effective as smaller helicopters, but the coaxial rotor system, he argues, does not scale up well for bigger systems. Bertling says a precursor to the 30-50-pasenger hybrid helicopter may be a 12-19-pasenger model, with the advantage that at that smaller size, operators do not have to provide a flight attendant.

The market potential of a higher-speed offering also is behind AgustaWestland’s two-year quest to acquire full control of the BA609 tiltrotor, by buying out Bell Helicopter Textron. The parties did not disclose the financial terms of the deal, but it includes what AgustaWestland says will be a “moderate” cash payment. Bell will also receive money through royalties on the AW609, as the tiltrotor is being renamed.

The U.S. manufacturer will remain a supplier on the AW609 and retains intellectual property on some key technologies, says AgustaWestland CEO Bruno Spagnolini.

AgustaWestland will still have to make significant investment to see the AW609 achieve U.S. certification around 2015. The long-existing design also needs to be updated to deal with obsolescence issues, says Finmeccanica CEO Giuseppe Orsi. AgustaWestland will establish an operating base in Arlington, Texas, to conduct testing and FAA certification. One of the four prototypes is to be based there, with the other three located at the Cameri facility in Italy. A single integrated development team will be established this fall.

AgustaWestland forecasts worldwide sales of 350-450 tiltrotors within 20 years, including commercial and government variants. An armed concept of the tiltrotor has been ditched, however, but the Italian defense ministry could still be interested in the AW609 to meet a range of requirements. These include search-and-rescue missions for the coast guard and internal security roles, such as supporting the counter-terrorism teams that need to be deployed quickly in crises; the teams currently rely on a combination of helicopters and tactical transport aircraft.

At one point, Eurocopter also explored the tiltrotor concepts, but Bertling believes the acquisition and support costs of such as system will remain prohibitive, at least until more electric rotorcraft are developed to simplify their architecture.

Both of Europe’s helicopter makers, which control more than 70% of the commercial and parapublic marketplace, also have ambitious designs for more traditional rotorcraft.

AgustaWestland last week unveiled the AW189, a more than 8-metric-ton-class commercial helicopter building on technologies of the military AW149 and aimed squarely at Eurocopter’s EC175. The new helicopter is slated to fly in November and is due to be certified by the end of 2013, with deliveries starting soon after.

The AW189 is being promoted primarily for the lucrative offshore oil and gas market as well as for long-range search-and-rescue and medical evacuation roles.

The platform is powered by two General Electric CT7-2E1s delivering 2,000 shp to propel the rotorcraft to a cruise speed of 145-150 kt. The system sports a full four-axis digital autopilot, can be optionally equipped with a forward-looking infrared sensor to ease operations in adverse weather conditions. Rockwell Collins will supply the digital glass cockpit with four 8 x 10-in. displays.

The helicopter is designed to carry up to 18 passengers; with 16 passengers it has a range of 140 nm, with return fuel, and 30 min. of reserve. With 12 passengers, the radius increases to 200 nm, thereby meeting the requirement of the oil industry, which is moving to operate rigs farther from shore.

Meanwhile, Eurocopter plans to deliver in 2016 the first iteration of its Dauphin helicopter replacement, now in development under the X-4 moniker. The French government is investing roughly €550 million ($792 million) in the country’s rotorcraft sector—the money is going to Eurocopter, Safran, Thales and others—to help create a new generation of rotorcraft. Bertling says the first iteration is based on technology already proven in test rigs or flying; a further evolution would emerge in 2020 with even more advanced technologies. ☎
Cooperative Kerfuffle
Europe seeking common policy to harmonize international space exploration activities

AMY SVITAK/LE BOURGET

Despite its status as a shining example of international cooperation, the International Space Station has a harsh lesson to teach five-member global partnership that built it: Unilateral decision-making can lead to chaos.

Since NASA decided to end its aging cargo- and crew-carrying space shuttle program—a 2005 decision slated to take effect this summer—international partners contributing to the orbiting space complex, including NASA, have devised their own means of accessing the ISS. The result, according to European Space Agency (ESA) chief Jean-Jacques Dordain, is a crazy-quilt of smaller, less-capable cargo-hauling vehicles supplied by Europe, Japan, Russia and eventually the United States. Even worse, in the wake of the shuttle’s retirement, space station astronauts will have to rely solely on Russian Soyuz capsules to reach the orbiting outpost for the foreseeable future.

“The most important lesson we can draw from the ISS program is precisely the lack of a common transportation policy, which means today we are in a not very comfortable situation,” Dordain said June 20 at the Paris air show. While unilateral decisions to develop unique space transportation systems were justifiable, in hindsight, Dordain says, Canada, Europe, Japan, Russia and the U.S. could have done more to reach common ground.

“It was anarchy, let’s be clear about it,” he said.

In addition to Europe’s Ariane 5-launched Automated Transfer Vehicle (ATV), Japan’s H-2 Transfer Vehicle and Russia’s Progress cargo hauler, NASA is backing development of privately built space freighters, including the Dragon capsule, built by Hawthorne, Calif.-based SpaceX, and the Cygnus cargo module, from Dulles, Va.-based Orbital Sciences Corp.

“Do we really need all of these?” Dordain asks. “This is a situation that results from a lack of consistency and consultation in the area of transportation.”

Looking forward, Dordain hopes space-faring nations can avoid making a similar mistake as they embark on plans to build new rockets and spacecraft capable of sending humans beyond low Earth orbit.

“My concern is that we should discuss and debate a common transportation policy with our partners,” he says. “We have to talk about common interfaces, what redundancies we need in the systems and once we have defined common needs, we’ll have to see who can do what on the basis of common interests being developed.”

Dordain says ESA has already initiated talks with U.S. partners for potential future collaboration in the area of manned spaceflight. Since May, he notes, ESA and NASA have been talking about a plan to build a joint U.S.-European spacecraft based on existing designs that could ferry astronauts to the space station and on missions to the Moon and beyond.

NASA Administrator Charles Bolden says Europe has much to offer the U.S. space agency, which expects to rely increasingly on international partners as looming federal deficits put downward pressure on federal discretionary spending. As NASA finalizes designs for a Multipurpose Crew Vehicle (MPCV) and a new heavy-lift rocket capable of sending humans beyond low Earth orbit, Bolden has encouraged U.S. companies to team with European firms.

“It is my hope that we’ll be able to have Europeans in the critical path somewhere in the exploration initiative,” Bolden told Aviation Week, shortly before he attended a meeting with Dordain. The ESA director general raised the potential for a joint manned exploration initiative to combine the service module of the EADS Astrium-built ATV with NASA’s crew-capable MPCV, a space capsule based on the Orion Crew Exploration Vehicle in development by Lockheed Martin Space Systems for the past six years. “If you look at what ATVs capability is, what has been demonstrated, you can see where that has potential for use as a service module, for example,” Bolden says. “There’s all kinds of opportunities that exist based on demonstrated capability from our European partners.”

Dordain, adding that Europe has no plans to develop its own manned spaceflight capability, says a joint U.S.-European program would afford ESA member states an opportunity to capitalize on their investment in the ATV while exploring ways to cover Europe’s share of common operations costs associated with the space station.

Currently ESA expects to have no money available for ATV modifications beyond what it pays NASA for Europe’s share of the station’s operating costs through 2020. That figure is estimated at about $100 million. Dordain says the two sides are shooting for a rough outline of the joint vehicle concept and its development costs by fall, allowing ample time for ESA member states to evaluate the proposal ahead of their budget-setting ministerial council at the end of 2012.

“We should converge towards the fall of this year toward possibly not even one single vehicle but at least toward one module that would make it possible to then have some derivatives in the future with one vehicle dedicated to the U.S., for instance, and one that Europeans could use in other circumstances,” he says. ☛