

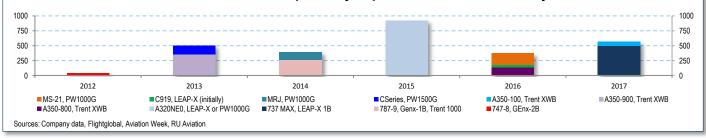
## **Boeing and Airbus Continue to Dominate the Narrow Body Segment**

The narrow body segment has gained increasing attention in recent years as competitors have crowded into the market. Mitsubishi (Japan), Comac (China), Irkut (Russia) and Bombardier (Canada) have all launched single aisle offerings in recent years. In response to industry demand, and perhaps as a hedge against new entrants, both Airbus and Boeing have introduced modernized versions of their offerings in the segment. In the months since their introduction, the Boeing 737 MAX and the Airbus 320NEO have won an overwhelming majority of the market share for the next generation of narrow body planes (see chart). In the longer term these new entrants may pose a challenge for the big two. There are compelling reasons to argue both for and against the future success of newcomers in the industry.

There are significant barriers to entry in the global commercial aircraft industry. High fixed costs, a high degree of risk (that translates into expensive financing) and a steep learning curve in development make it costly for a new company to establish itself. It will take time for new entrants to establish reputations for reliability, something that is valued by carriers. However, if initial efforts to enter the commercial market are successful, they could contribute to momentum in the long term.

Entrants are supported by a number of factors. In countries like China and Russia, where governments have a stake in domestic companies, local carriers may favor national brands. Of course other considerations will play a role in purchase decisions. For example, the domestic Russian fleet is quite old and a large portion of currently operational airplanes will need to be replaced over the next two decades. In total, as many as 620 aircraft will be needed in the next twenty years, and it will be difficult for a Russian or Chinese firm to meet that level of output. Also working in favor of new entrants are various political and industrial synergies that are associated with aircraft production. Domestic aircraft production and the capability to produce military aircraft domestically are fundamentally tied. This makes governments more willing to subsidize domestic producers. Furthermore, the aerospace supply chain now has a global reach, more than 35% of Boeing 787 components are made by Japanese companies, and this provides infrastructure and technology that can be used to produce other aircraft domestically.

### Commercial Aircraft Pipeline by Expected Year of First Delivery



## **Trends in Aerospace Products and Parts**

Finding and retaining skilled labor has traditionally been a challenge in the U.S. aerospace parts and manufacturing industry. Workers tend to be more highly skilled than in other manufacturing sectors. Employment in the industry saw positive growth in the first half of 2011 after shedding workers in 2009 and 2010.

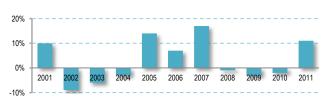
Utilization rates in the aerospace and defense industry are sitting at around 74% as of May 2011, up from the 2008 low of 68%. These numbers are expected to continue to rise through 2012 as manufacturers continue to increase production to meet production targets for commercial aircraft.

Aerospace products parts manufacturing has traditionally been highly concentrated: 20% of companies account for around 90% of revenues. United Technologies' \$18.4 billion agreement to acquire Goodrich is expected to mark a new phase of consolidation, especially in the supply chain, for aerospace and defense.

# **Employment Growth in Aerospace Products and Parts**

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# Index of Industrial Production in Aerospace Products and Parts



## F-35 Development Timeline and Cost Setbacks

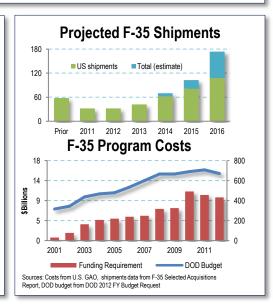
According to a Government Accountability Office report published in April 2011, the F-35's development and procurement timeline has slipped almost five years from its original baseline. In total, the Department of Defense (DOD) has reduced planned production output by 246 aircraft through 2016. Pratt & Whitney reports that restructuring is expected to keep F-35 engine production levels flat at around four per month until 2014. It further expects to ramp up output sometime between 2014 and 2015 to a level of 80 engines per year. Currently, the engine maker is delivering a batch of 32 engines under phase three of the low rate initial production (LRIP) and will begin production on the 37 engines it plans to deliver under LRIP IV (16). Production is expected to reach full capacity levels in 2016, when completed F-35s are planned to be leaving the assembly line at a rate of approximately one aircraft per day.

One of the main objectives of the F-35 program was to design an advanced aircraft that could be built affordably. Several stages of cost overruns, many of which have occurred in the last two years, have contributed to acquisitions costs that are exceeding baseline estimates. The U.S. Air Force currently estimates the cost per aircraft at \$132.8 million, which is substantially higher than the 2006 estimate of \$81.8 million per aircraft. Additionally, a report by the Canadian government estimates that the F-35's production costs have risen by 54% between 2001 and 2009 while R&D costs are up by 40% during that same period. The complexity of the F-35 project and program restructuring efforts continue to make predicting procurement costs a difficult exercise.

Lawmakers have been working to pass legislation that would limit the government's exposure to future cost overruns involved in the F-35's development. A recent armed services committee panel agreed to language that makes Lockheed responsible for 100% of any cost overruns that occur during the LRIP V production phase. This is in contrast to an agreement already in place under which the government will share cost overruns, up to 120% of expected costs, during the LRIP IV phase.

The DOD has softened its stance on the F-35B in recent weeks. This shift may be tied to Lockheed Martin's progress in meeting a series of goals set for 2011. During the first quarter of 2011, the DOD made a series of strong remarks about the F-35 program. Uncertainty surrounding the F-35 program remains as the final quarter of 2011 promises to be an eventful period. Meanwhile the debate in Congress over solutions to the federal government's fiscal woes will once again come to a head this fall as the budgeting process begins for the next fiscal year.

#### Timeline: The Department of Defense and the F-35 Air Force undersecretary Erin Conaton made statements indicating Panetta gives his both the rising importance of the Air Force's new bomber program endorsement for the F-35 and a declining favor for the F-35 program. Conaton responded to project as an investment questions about the vulnerability of the program, indicating it will be the U.S. "ought to regularly reevaluated in search of additional cost saving efficiencies. maintain for the future. Jan - '11 Jul - '11 May - '11 Sep - '11 Leon Panetta confirmation Defense Secretary Robert Gates Defense Secretary Robert hearing as the next U.S. Gates cautions that and the Chairman of the Joint Secretary of Defense. During Chiefs of Staff Michael Mullen will continued cost overruns and timeline setbacks the hearing Panetta promises both be stepping down at the end to carefully review the project. would not be tolerated. of this month.



#### **Expected Foreign Acquisitions** Israel Canada Denmark Norway Australia Turkey Netherlands Italy U.K. RAF/RN 0 40 80 120 160 Sources: Lockheed Martin F-35 Fast Facts and Aviation Week

## **Current and Future F-35 Partners**

**The United Kingdom's** recent decision to switch from procurement of the F-35B to the F-35C has been met with criticism. These criticisms are tied to large, poorly understood costs associated with the development of air-to-air refueling capabilities.

**Australia's** acquisition of the F-35 has been plagued by timing overruns. The Royal Australian Air Force was forced to purchase F/A-18s as a stopgap measure in 2010. Recent delays that have pushed the expected operational readiness date back to 2018 are prompting concerns that a second stopgap purchase will be necessary.

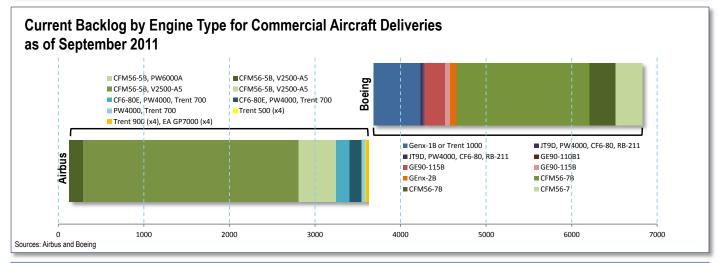
**South Korea** is considering using the F-35 as its next generation aircraft. A final decision will come sometime next year. Also **Japan** has been exploring the idea of buying the F-35. Both countries are concerned with technology transfer and issues of timing.

## **Labor Disputes at Boeing**

On September 22, 2011, the U.S. House of Representatives passed legislation that could stop the National Labor Relations Board (NLRB) from continuing its efforts to block production at Boeing's new plant in South Carolina. In mid-April 2011 the NLRB filed suit against Boeing after labor negotiations collapsed over the new assembly facility. The case accuses Boeing of discriminating in the hiring of employees, making coercive threats to employees engaging in union activities, and retaliating against strikes by moving production to a second assembly line. Supporters of the action point to statements made by Boeing Chief Executive Officer James McNerney. Those statements, which detailed reasons for the new plant, asserted that "strikes happen every three to four years in Puget Sound" and that "Boeing cannot afford" to have that many work stoppages.

In June 2011 President Obama spoke publicly about the court battle saying that "we can't afford to have labor and management fighting all the time" and that "companies need to have the right to relocate." He also asserted that the commercial airplane industry "is an area where we still have a huge advantage" and that he believes it is important for America to keep that advantage. However, the Obama administration made statements in July 2011 opposing the recently passed legislation citing concerns that it would undermine the government's ability to enforce labor laws. Similarly, U.S. Senate majority leader Harry Reid has called out Republicans accusing them of seeking to intimidate the agency.

Boeing received final approval for the Dreamliner in late August 2011from the FAA and the EASA. The approval means Boeing should be able to begin shipping the 787 later this month. While it seems unlikely that the NLRB's actions will prevent Boeing from continuing production of the Dreamliner, the dispute will remain a source of uncertainty for investors.



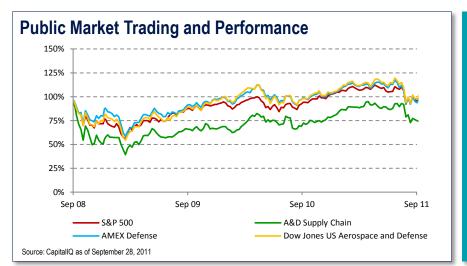
## **Challenges and Opportunities at Rolls Royce**

Rolls Royce's Trent engine line is recovering from a difficult year. Engineers and regulators have been hard at work since November 2010 when a Trent-900 engine experienced an uncontained failure during a commercial flight. It was determined that a fatigue crack in an oil feed pipe initiated the chain of events that led to the engine's failure. Investigations have revealed that the oil feed pipe was not manufactured to specifications. Also of concern was the revelation that Rolls did not have measurement records available for many of the parts in question. In the end, one fourth of all engines were found to be affected by the error. Investigations have reportedly depleted the spares pool for the A380, so the supply chain may face added demands on its outputs. Adding to Rolls problems, the earthquake in Japan disrupted Rolls supply chain. The engine manufacturer reports that a new turbine blade supplier is being brought in to help fill gaps created in its supply chain.

In April 2011 Rolls was hit with news that the alternate engine program for the F-35 would be terminated. This engine was being developed jointly by General Electric and Rolls. At the end of that same month, Rolls offered to spend its own money to continue development of the engine. Although development has halted, the DOD continues to keep the alternate engine program alive. In May 2011 the U.S. House of Representatives passed a defense spending bill that keeps open the possibility that development could resume. No actual funding was allocated.

Rolls remains optimistic about its XWB line, which will be the only engine offered on the A350. Rolls is expected to ramp up production to a rate of one engine per day within six years of starting production on the engine. In-flight testing of the Trent XWB will begin soon, first using the A380 as a test aircraft. Testing via the A350 is expected to begin in late 2012. Eight engines will be produced for testing before deliveries of the A350 begin in 2013. The preproduction line is expected to be used for a full year until 2012 at which point in-service production will begin.

Meanwhile, Rolls is making plans for the future. The company recently unveiled its intention to add a new member to the XWB line, the XWB-97. A final plan for the engine is expected in mid-2012 with testing starting in the mid-2014 and entry into service on the A350-1000 around 2017. This is the latest step in Rolls' continued investment in its long range capabilities. In particular, the company appears well positioned to compete for a spot on Boeing's planned successor to the 777.



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# Public Company Valuation and Performance – Aerospace and Defense Supply Chain

	Stock Price	% of 5	2-week	Market I	Enterprise		EV / Revenue			EV / EBITDA				P/E Ratio			
Company Name	9/28/2011	High	Low	Сар	Value	Cash	LTM	LQA	CY2011 E	Y2012 E	LTM	LQA	CY2011 EC	Y2012 E	LTM	CY2011 E	Y2012 E
Ducommun Inc.	\$14.86	57.0 %	98.5 %	\$157	\$519	\$31	1.3 x	1.2 x	0.9 x	0.6 x	13.8 x	11.7 x	8.8 x	6.1 x	16.1 x	8.6 x	6.0 x
Heroux-Devtek Inc.	7.32	81.5	132.7	223	287	39	0.8	0.8	NM	0.7	5.1	4.9	NM	4.7	10.9	NA	9.0
Magellan Aerospace Corp.	3.07	56.0	121.2	56	278	29	0.4	0.4	0.4	0.4	3.6	3.8	3.1	2.9	5.9	5.6	5.1
LMI Aerospace Inc.	16.88	67.5	125.0	201	193	8	0.8	0.8	0.7	0.7	6.9	5.7	5.2	4.5	14.2	10.7	9.1
Hampson Industries plc	0.15	23.5	101.6	42	188	19	0.6	0.6	NA	NA	NA	NA	NA	NA	NA	NA	NA
Northstar Aerospace Inc.	1.32	51.9	108.0	40	101	0	0.5	0.5	0.5	0.5	3.9	5.0	4.9	3.8	6.6	11.7	5.4
SIFCO Industries Inc.	17.23	86.3	158.5	91	87	7	0.9	0.8	NM	NM	6.6	5.6	NM	NM	13.9	NA	NA
CPI Aerostructures Inc.	9.68	61.6	110.2	67	76	1	1.4	1.1	1.0	0.8	36.1	8.3	6.6	3.9	49.1	9.7	6.0
Sypris Solutions Inc.	2.90	46.8	104.7	58	66	14	0.2	0.2	0.2	0.2	4.8	4.1	3.8	2.8	NM	NM	9.7
Edac Technologies Corp.	7.75	82.3	261.8	38	59	1	0.7	0.7	NM	NM	9.8	6.0	NM	NM	25.8	NA	NA
Avcorp Industries Inc.	0.04	21.4	112.5	9	33	0	0.4	0.4	NM	NM	16.4	NM	NM	NM	NM	NA	NA
Tel-Instrument Electronics	7.99	84.6	133.2	21	23	1	1.5	1.4	NM	NM	22.8	21.2	NM	NM	66.2	NA	NA
	Mean		130.7 %				0.8 x	0.7 x		0.5 x	11.8 x	7.6 x		4.1 x	23.2 x		7.2 x
	Median	59.3	116.8				0.8	0.7	0.6	0.6	6.9	5.7	5.0	3.9	14.2	9.7	6.0

Source: CapitalIQ as of September 28, 2011. Amounts in millions of US dollars, except per share data

# Selected M&A Activity in the Aerospace and Defense Supply Chain

			Enterprise			EV /		
Date	Target	Acquirer	Value	Revenue	<b>EBITDA</b>	Revenue	EBITDA	Description
Sep 11 A	Goodrich Corp.	United Technologies Corp.	\$18,123	\$7,452	\$1,421	2.4 x	12.8 x	Aerospace components
Aug 11	Anixter International Inc.	Greenbriar Equity Group LLC	\$185	-	-	-	-	Aerospace hardware division
Aug 11	Dearborn Precision Tubular Products, Inc.	Hunting plc	\$84	\$45	\$9	1.9 x	9.2 x	Precision metal components
Aug 11	Primus International, Inc.	Precision Castparts Corp.	\$900	-	-	-	-	Aircraft products OEM supplier
Jul 11	Triumph Precision Castings Company	Torque Capital Group LLC	\$4	-	-	-	-	Hot gas components
Jun 11	Vector Aerospace Corporation	Eurocopter Holding SA	\$619	\$545	\$65	1.1 x	9.6 x	Aviation MRO
May 11	Ladish Co. Inc. (nka:ATI Ladish Co., Inc.)	Allegheny Technologies Inc.	\$937	\$418	\$69	2.2 x	13.5 x	Aerospace metal components
Apr 11	HTL/Kin-Tech and OECO	Meggitt plc	\$685	\$378	\$79	1.8 x	8.7 x	Aircraft components and avionics
Apr 11	W Industries Inc.	Tower International, Inc.	\$21	\$65	-	0.3 x	-	Metal fabrication services
Mar 11 A	Firan Technology Group Corp.	Oakwest Corporation Limited	\$13	\$53	\$4	0.3 x	3.4 x	A&D electronic products
Mar 11	Herley Industries, Inc.	Kratos Defense & Security, Inc.	\$261	\$193	\$33	1.3 x	7.8 x	Microwave technology solutions
Mar 11	Damar Machine Company	Senior plc	-	-	-	-	-	Systems integration
Feb 11 A	Emivest Aerospace Corporation	Metalcraft Technologies, Inc.	-	-	-	-	-	Aircraft design and production
Jan 11	Trident Space & Defense, LLC	TeleCommunication Systems Inc.	\$29	-	-	-	-	Microelectronic products
Jan 11	ALEXCO, LLC	Kaiser Aluminum Corporation	\$84	-	-	-	-	Hard alloy aluminum extrusions
Dec 10	Southern California Braiding Company, Inc.	IEC Electronics Corp.	\$26	\$18	\$2	1.4 x	14.0 x	Custom cables and wire harnesses
Dec 10	M7 Aerospace L.P.	Elbit Systems Of America, LLC	\$85	-	-	-	-	Aviation and support services
Dec 10 A	CAMtech Precision Manufacturing, Inc.	Jaws Capital Investment Inc.	\$8	-	-	-	-	Precision parts and assemblies
Dec 10	Global Aerosystems, LLC	Kaman Aerospace Group, Inc.	\$15	-	-	-	-	Aerospace engineering
		Mean for deals				1.4 x	9.9 x	4
		Media	n for deals			1.4 x	9.4 x	d

Source: CapitalIQ as of September 28, 2011. Amounts in millions of US dollars

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