

Aerospace & Defence

Industry Update Q4 2022

Despite the incredible pressure on deliveries throughout the year it seems that Airbus eased up in the home straight. As a result they missed their delivery targets by a considerable amount; 730 deliveries for the year versus a forecast of 800. It would seem that this significant miss was due to pressures on the supply chain – notably engines and interiors – and the difficulties Airbus have faced in maintaining quality whilst ramping up production. Pressure on deliveries has caused out of sequence work, which in turn has led to quality problems. As a result the planned build rate increases have been pushed out: rate 65 by the end of 2024 or start of 25, rate 75 by the second half of the decade.

The post Covid consolidation of the supply chain is expected, and, in some cases, has started. Whilst the increased efficiencies this should bring will be welcomed, the primes should nevertheless be wary. The production of A320neo and A220neo is significantly hampered by delays in engines from Pratt and Whitney. This over-exposure to Raytheon and the lack of leverage over a relatively small part of such a behemoth can only, in the long run, augur well for GE/Safran and Rolls-Royce. Whilst this will be welcome to a beleaguered Rolls-Royce it remains to be seen whether Airbus and Boeing are really prepared to pay the premium that is required to maintain smaller competitors and optionality across their supply chain. Whilst Rolls-Royce's business jet business continues to perform well off the back of the Pearl engine family and the large civil engine business is seeing the benefits from the end of Chinese lockdown there are still strategic questions that the new CEO will need to ask about capital allocation across the portfolio and where the business can afford to invest in the future. Further down the supply chain the Paradigm-Whitcraft transaction signals the start of the aerospace machining consolidation play at pre-Covid multiples. 2023 will see a buoyant MRO market driving the majority of M&A activity but we certainly expect more consolidation across the forming, machining and finishing supply chains – the efficiencies to be gained are just too large to ignore. Complex components still take 6-8 months traversing the world to have various discrete, specialised coatings and machining operations applied to them - tying up billions in working capital and layering profit upon profit. The decarbonisation of the aerospace market will take decades but it would be an easy win to start with its supply chain.

Aerospace							EV/Revenue Revenue (GBPm) Revenue growth			EV/EBITDA EBITDA (GBPm) EBITDA %			EV/EBIT EBIT (GBPm) EBIT %			2 Year CAGR 2021 2023	
Company	Country	Year End Date	Market Cap (GBPm)	Net Debt / (Cash) (GBPm)	Adj EV (GBPm)	Net debt / EBITDA (2022)	2021	2022	2023	2021	2022	2023	2021	2022	2023	Sales	EBITDA
Airbus SE		Dec-21	77,546	(3,146)	72,925	n/a	1.7x 43,800 (2%)	1.4x 52,582 20%	1.2x 60,597 15%	13.1x 5,587 13%	10.4x 7,039 13%	8.7x 8,335 14%	19.5x 3,733 9%	14.9x 4,905 9%	11.9x 6,112 10%	18%	22%
Boeing Company		Dec-21	94,223	38,555	132,836	n/mf	2.9x 45,999 8%	2.4x 54,874 19%	2.0x 67,662 23%	n/mf 1,076 2%	n/mf (81) (0%)	21.2x 6,272 9%	n/mf (518) (1%)	n/mf (1,909) (3%)	29.7x 4,472 7%	21%	141%
Bombardier Inc.		Dec-21	3,009	4,648	7,968	6.3x	1.8x 4,494 (5%)	1.5x 5,453 21%	1.3x 6,262 15%	29.6x 269 6%	10.8x 736 13%	8.2x 977 16%	55.3x 144 3%	20.3x 393 7%	13.8x 579 9%	18%	91%
Dassault Aviation Société anonyme		Dec-21	11,676	(5,292)	4,342	n/a	0.7x 6,092 24%	0.8x 5,439 (11%)	0.8x 5,185 (5%)	7.5x 577 9%	8.0x 545 10%	7.8x 556 11%	9.6x 451 7%	11.2x 389 7%	11.5x 378 7%	(8%)	(2%)
HEICO Corporation		Oct-22	15,121	211	15,653	0.4x	9.4x 1,673 27%	8.3x 1,881 12%	7.3x 2,148 14%	35.7x 438 26%	31.3x 501 27%	26.9x 581 27%	49.5x 316 19%	37.4x 419 22%	32.0x 489 23%	13%	15%
Howmet Aerospace Inc.		Dec-21	13,532	3,436	17,017	3.2x	4.6x 3,672 (5%)	3.6x 4,664 27%	3.3x 5,113 10%	20.4x 832 23%	16.1x 1,058 23%	14.1x 1,205 24%	26.3x 646 18%	20.8x 818 18%	17.3x 982 19%	18%	20%
MTU Aero Engines AG		Dec-21	9,586	603	10,189	0.7x	2.9x 3,517 (1%)	2.1x 4,816 37%	1.8x 5,732 19%	21.8x 467 13%	12.5x 812 17%	10.7x 956 17%	33.8x 302 9%	18.3x 557 12%	15.0x 678 12%	28%	43%
Rolls-Royce Holdings plc		Dec-21	7,811	5,347	12,722	4.1x	1.1x 11,218 (2%)	1.1x 11,700 4%	1.0x 12,665 8%	10.0x 1,268 11%	9.7x 1,311 11%	8.0x 1,594 13%	27.4x 465 4%	26.3x 484 4%	17.2x 738 6%	6%	12%
Safran SA		Dec-21	44,265	189	43,119	0.1x	3.4x 12,845 (15%)	2.6x 16,804 31%	2.2x 19,706 17%	19.5x 2,206 17%	13.6x 3,170 19%	11.2x 3,865 20%	41.1x 1,049 8%	20.1x 2,149 13%	15.7x 2,752 14%	24%	32%
Senior plc		Dec-21	515	149	661	2.0x	1.0x 659 (10%)	0.8x 818 24%	0.7x 950 16%	11.7x 57 9%	8.9x 74 9%	7.2x 92 10%	64.1x 10 2%	26.4x 25 3%	16.5x 40 4%	20%	27%
Singapore Technologies Engineering Ltd		Dec-21	6,455	3,333	9,660	4.6x	2.3x 4,214 6%	1.8x 5,501 31%	1.6x 5,897 7%	17.3x 559 13%	13.4x 720 13%	11.8x 815 14%	26.9x 359 9%	21.6x 446 8%	18.4x 525 9%	18%	21%
Textron Inc.		Jan-22	12,268	1,896	14,164	1.4x	1.5x 9,511 5%	1.2x 11,475 21%	1.2x 12,093 5%	12.4x 1,146 12%	10.3x 1,381 12%	9.7x 1,455 12%	16.0x 886 9%	13.5x 1,052 9%	12.6x 1,124 9%	13%	13%
Min							0.7x	0.8x	0.7x	7.5x	8.0x	7.2x	9.6x	11.2x	11.5x	(8%)	(2%)
Mean							2.8x	2.3x	2.0x	18.1x	13.2x	12.1x	27.8x	21.0x	17.6x	16%	36%
Median							2.0x	1.6x	1.5x	17.3x	10.8x	10.2x	26.9x	20.3x	16.1x	18%	21%
Max							9.4x	8.3x	7.3x	35.7x	31.3x	26.9x	49.5x	37.4x	32.0x	28%	141%

Source: CapIQ

Note: (a) Multiples are based on enterprise value as of 31-December-2022 and historical and forecast sales, EBITDA and EBIT, calendarised to 31 December. "n/mf": not meaningful; "n/a": not available.

Blood and Iron is a phrase best associated with a 19th Century German Chancellor in his attempts to unify Germany but is equally applicable to the situation faced by Ukraine and its allies. In Ukraine's case its allies will only provide the iron, but for Ukraine to succeed this iron must come in two critical forms. Firstly the heavy, protected mobility platforms that had proven so unfashionable in the previous three decades. The formation of 2 new armoured brigades of 300 tanks is a statement of intent but more vehicles and logistic support will be required (it is notable that requests for attack helicopters – previously deemed critical to battlefield supremacy – have been limited). Secondly the big lumps of metal that go down the barrels. Both the European and the US supply chains have proven totally inadequate to supply the materiel required to sustain a contained, but nevertheless, high intensity conflict. In Europe supply chains for shells and explosives have proven woefully inadequate. So much so that Hungary has ordered a completed explosives and shell manufacturing production line from Rheinmetall – I'm not sure the "Factory as a Service" tagline will catch on – but the supply demand in balance will certainly require more radical initiatives and significant investment to address. Any investment in capacity will have little impact on output for the next 4 years but in the meantime there will be increasing amounts of near term opportunities for European defence businesses to plug urgent gaps in capabilities. As we mark the first anniversary of the conflict it remains to be seen when investors consider such uplifts in earning to be "normal". The sustained demand is putting pressure on under-invested supply chains for artillery ammunition but the increasing complexity of programmes is placing pressure on the human capital resources. Defence primes are consistently citing lack of suitable capability as the biggest constraint on their development programmes and production activities – and they will be able to entice in more talent than those further down the supply chain. Whilst, in the near term, shortages of technical capability will have been alleviated by the downturn in the Tech industry, the need to bring more capability onshore is placing further demands on the limited pool of shop floor and shipyard workers who can be cleared to work on defence programmes. The strains on the US supply chain will mean that increasing numbers of work packages will come across the Atlantic to the UK. Defence electronics in particular should expect significant growth as a result of increases in complexity and threat coupled with the requirement for production in allied nations.

Focus remains on current geo-political flashpoints in Eastern Europe and South East Asia but the number of space related transactions in Q4 (L3 Harris - Rocketdyne, Safran - Syrlinks, Redwire - Qinetiq Space and Veritas - CAES Space Systems) indicates the importance of space. Whilst the first Cold War was, arguably, contested under the oceans, it is likely that space will be the backdrop if there is a second one. So on the one hand we expect continued investment in high technology components that support the US's ability to project its power outside the earth's orbit on the other we expect investment in capacity to produce more of the heavy bits of metal that have been critical to terrestrial conflict since the industrial revolution.

Defence			EV/Revenue				EV/EBITDA			EV/EBIT			2 Year CAGR			
			Revenue (GBPm)			EBITDA (GBPm)			EBIT (GBPm)			2021 2023				
			Revenue growth			EBITDA %			EBIT %							
			Net debt / EBITDA													
Company	Country	Year End Date	Market Cap (GBPm)	Net Debt / (Cash)	Adj EV (GBPm)	2021	2022	2023	2021	2022	2023	2021	2022	2023	Sales	EBITDA
BAE Systems plc		Dec-21	24,456	4,875	28,920	1.5x	1.3x	1.2x	11.9x	9.5x	8.8x	15.7x	12.0x	11.1x	11%	16%
						19,521	22,660	23,877	2,438	3,058	3,275	1,844	2,412	2,596		
						1%	16%	5%	12%	13%	14%	9%	11%	11%		
Elbit Systems Ltd.		Dec-21	7,556	1,036	8,454	2.0x	2.2x	1.7x	21.0x	16.3x	14.4x	28.6x	21.9x	18.3x	16%	21%
						3,898	4,933	5,278	403	520	587	296	387	462		
						14%	27%	7%	10%	11%	11%	8%	8%	9%		
General Dynamics Corporation		Dec-21	52,117	9,101	61,219	2.0x	2.2x	1.7x	15.7x	13.3x	11.9x	18.5x	16.0x	14.1x	16%	15%
						28,410	35,387	38,012	3,893	4,619	5,126	3,303	3,826	4,331		
						2%	25%	7%	14%	13%	13%	12%	11%	11%		
Kratos Defense & Security Solutions, Inc.		Dec-21	1,148	205	1,359	2.7x	2.2x	1.7x	32.7x	18.2x	14.3x	60.3x	90.4x	30.2x	22%	51%
						606	815	901	42	75	95	23	15	45		
						10%	34%	11%	7%	9%	11%	4%	2%	5%		
L3Harris Technologies, Inc.		Dec-21	35,690	6,136	41,913	1.8x	3.2x	2.7x	15.6x	12.5x	11.8x	20.8x	14.3x	13.7x	11%	15%
						13,156	15,563	16,354	2,686	3,340	3,555	2,013	2,921	3,068		
						(1%)	18%	5%	20%	21%	22%	15%	19%	19%		
Leidos Holdings, Inc.		Dec-21	10,718	4,534	15,296	3.5x	1.5x	1.2x	13.9x	11.7x	11.0x	17.4x	15.4x	13.9x	15%	12%
						10,145	12,791	13,412	1,099	1,312	1,390	877	990	1,099		
						13%	26%	5%	11%	10%	10%	9%	8%	8%		
Leonardo S.p.a.		Dec-21	3,682	4,183	7,888	2.8x	0.7x	0.6x	6.5x	5.3x	4.8x	9.1x	7.6x	6.6x	7%	17%
						11,872	13,094	13,703	1,207	1,492	1,644	867	1,045	1,189		
						(1%)	10%	5%	10%	11%	12%	7%	8%	9%		
Lockheed Martin Corporation		Dec-21	91,920	8,030	99,950	0.9x	2.0x	1.7x	15.0x	11.4x	10.8x	17.0x	13.2x	12.8x	10%	18%
						49,513	58,663	60,209	6,654	8,771	9,214	5,896	7,547	7,838		
						3%	18%	3%	13%	15%	15%	12%	13%	13%		
Northrop Grumman Corporation		Dec-21	65,301	10,684	75,985	2.4x	2.9x	2.3x	11.8x	17.2x	16.3x	13.4x	23.2x	21.5x	14%	(15%)
						26,341	32,611	34,225	6,450	4,415	4,653	5,650	3,281	3,536		
						(2%)	24%	5%	24%	14%	14%	21%	10%	10%		
Raytheon Technologies Corporation		Dec-21	108,121	23,239	132,666	2.1x	2.8x	2.2x	15.8x	12.1x	10.6x	25.8x	18.1x	15.3x	18%	23%
						47,552	60,790	65,983	8,400	10,952	12,648	5,139	7,336	8,680		
						15%	28%	9%	18%	19%	19%	11%	12%	13%		
Rheinmetall AG		Dec-21	6,025	648	6,537	0.7x	1.4x	1.1x	9.0x	7.5x	6.2x	12.4x	10.4x	8.3x	19%	20%
						4,752	5,735	6,748	726	866	1,047	526	629	788		
						(2%)	21%	18%	15%	15%	16%	11%	11%	12%		
Saab AB (publ)		Dec-21	3,713	(135)	3,572	n/a	1.1x	1.1x	10.2x	8.4x	7.4x	15.3x	13.5x	11.3x	7%	18%
							3,198	3,359	350	425	484	233	265	316		
							1%	5%	11%	13%	13%	7%	8%	9%		
Thales S.A.		Dec-21	21,054	768	20,777	0.3x	1.5x	1.4x	11.0x	8.7x	7.8x	20.3x	12.2x	10.8x	10%	19%
							13,600	15,310	1,895	2,385	2,665	1,022	1,698	1,923		
							(1%)	13%	14%	16%	16%	8%	11%	12%		
Min						0.7x	0.6x	0.6x	6.5x	5.3x	4.8x	9.1x	7.6x	6.6x	7%	(15%)
Mean						1.9x	1.6x	1.5x	14.6x	11.7x	10.5x	17.9x	14.8x	14.5x	14%	18%
Median						2.0x	1.7x	1.5x	13.9x	11.7x	10.8x	17.2x	13.9x	13.7x	14%	18%
Max						3.2x	2.7x	2.6x	32.7x	18.2x	16.3x	28.6x	23.2x	30.2x	22%	51%

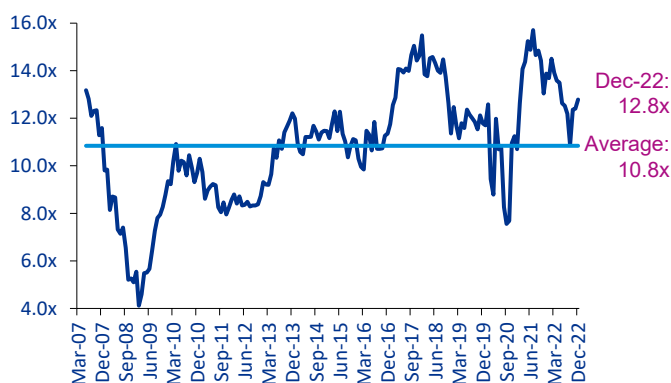
Source: CapIQ

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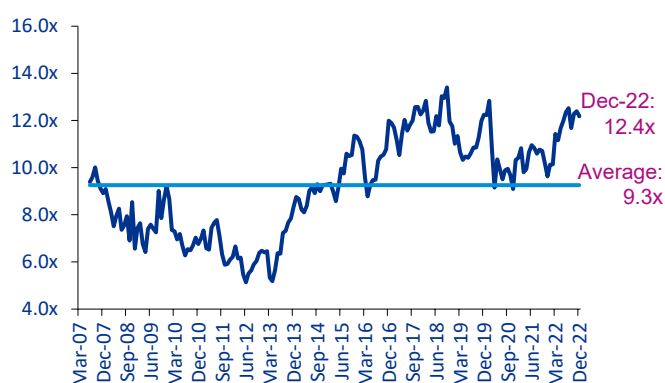
Public company valuations – through the cycle (EV/LTM EBITDA)

Aerospace



Source: Capital IQ

Defence



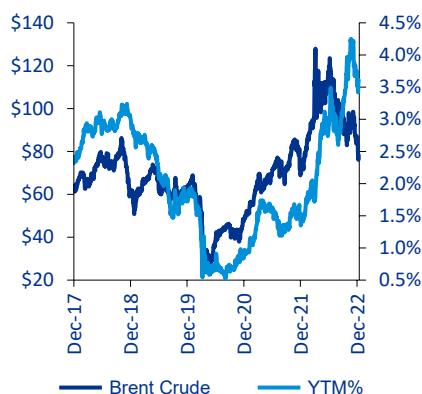
Source: Capital IQ

Selected M&A highlights

- Dec-22: **L3Harris Technologies**, the US based communications and information technology company, is to acquire **Aerojet Rocketdyne**, the US-based manufacturer of propulsion systems for defence and space applications, subject to regulatory approvals and clearances
- Dec-22: **QinetiQ Group plc**, the UK-based provider of technology and engineering solutions, has acquired **Air Affairs Pty Ltd**, the Australia based provider of specialised airborne and engineering services to defence forces
- Nov-22: **Clayton, Dubilier & Rice** and **Greenbriar Equity Group** have agreed to facilitate the merger of **Paradigm Precision**, a global independent provider of complex machining, fabrications and assemblies for engine manufacturers previously a portfolio of **Carlyle Group**, and **Whitcraft Group**, the manufacturer of precision formed, machined, and fabricated flight-critical aerospace components
- Nov-22: **Aciturri Aeronautica**, a leading Spanish aerostructures supplier and engine components manufacturer, has agreed to acquire **Malichaud Atlantique**, the France-base manufacturer of high-precision turbine guide vanes and blades from **Chromalloy**, a portfolio company of **Veritas Capital Fund Management**
- Nov-22: **Curtiss-Wright Corp**, the US-based manufacturer of product for motion control and flow control applications has acquired **Keronite Group**, the UK-based provider of surface treatment applications for aerospace and defence markets
- Nov-22 **Safran**, the France based manufacturer of aeronautic and space propulsion systems has agreed to acquire **Syrlinks**, the France-based developer of embedded communication systems for the defence and space sectors.
- Nov-22: **Redwire Corp**, the US based provider of high reliability components for the space industry, has acquired **QinetiQ Space NV**, the Belgium based commercial space business providing design and integration of critical space infrastructure from **QinetiQ Group plc**
- Oct-22: **Veritas Capital Fund Management** agreed to acquired **CAES Space Systems**, the space unit of **Cobham Limited**, a portfolio company of **Advent International**

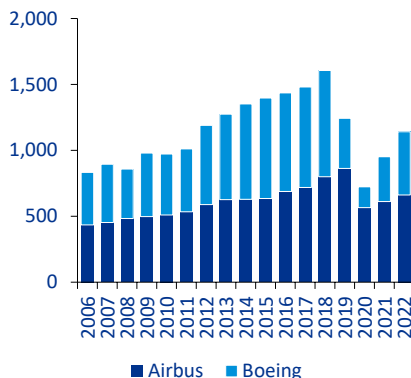
Economic Indicators

Brent Crude (\$) vs. US 10 Yr Treasuries



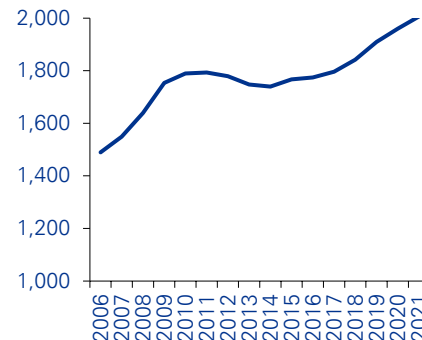
Source: Capital IQ

Delivered Commercial Aircraft (Units)



Source: Airbus, Boeing reports

Global Defence Spend (\$bn)



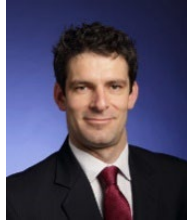
Source: SIPRI Military Expenditure Database

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