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UNITED PERFORMANCE METALS
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Monthly Intelligence for Customers of United Performance Metals

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Airbus Completes Hot Weather Test of A350-1000 Aircraft

Airbus has completed a series of hot weather tests of its A350-1000 aircraft at Al Ain International Airport in the UAE. The MSN065 A350-1000 test aircraft was used to conduct the tests, during which it underwent extreme weather conditions at temperatures higher than 40°C.

The tests were mainly conducted to check aircraft system behavior with a focus on the cabin, including its cooling performance on-ground. The tests have also ensured the aircraft's maturity and readiness to operate in hot weather conditions.

Set to enter into service by the last quarter of this year, the aircraft has already secured 211 confirmed orders from 12 customers worldwide.

Representing the latest addition to Airbus' A350 XWB family, the A360-1000 is a mid-size long-range aircraft and is capable of offering improved operating efficiency, low noise and better long-range capability. Powered by Rolls-Royce Trent XWB-97 engines, the aircraft includes a modified wing trailing-edge, new six-wheel main landing gears. The A350-1000 also features the same fuel-efficiency and cabin comfort to customers flying on long-haul routes. Set to enter into service by the last quarter of this year, the aircraft has already secured 211 confirmed orders from 12 customers worldwide.

In May, the A350-1000 completed its first "Early Long Flight" with 310 passengers on board, including ten Airbus flight test crew members and 13 Virgin Atlantic cabin crew. The 12-hour flight enabled Airbus to assess cabin environment and systems in-flight, as well as optimize cabin procedures. *Source: Aerospace Technology*

Pratt and Whitney Surges U.S. Hiring as Bet on Geared Turbofan Pays Off

The aircraft engine unit of United Technologies is hiring thousands of manufacturing employees in the U.S. as its breakthrough Geared Turbofan technology transforms the global aircraft propulsion market. Pratt & Whitney has brought on 4,500 new employees over the last 18 months at plants in Connecticut, Florida, Georgia, Michigan, New York, Pennsylvania and elsewhere, and says the number of new hires will rise to 25,000 by 2025.

Part of this surge is due to increased demand for high-performance turbofan engines on the tri-service F-35 fighter. Production of that aircraft's engines doubled over the last two years, and will double again by 2020 (to 170 units) as more and more allies buy the stealthy fighter. Pratt engines also will power the Air Force's next-generation bombers and tankers. But the biggest driver of Pratt's hiring spree is the Geared Turbofan (GTF) engine for civil aircraft, which is estimated to have a lifetime revenue value to the company of $500 billion.

It took Pratt & Whitney 20 years and $10 billion to perfect GTF technology, but now the company enjoys a performance advantage over rivals General Electric and Rolls Royce that will likely make it the dominant global provider of jet engines through mid-century. The basic idea behind the GTF design is to introduce 3:1 reduction gears on the shaft between the fan at the front of the engine and rotating elements (compressors and turbines) in the rear so that each component turns at optimum speed. The result is a 16% gain in fuel efficiency, 50% reduction in carbon emissions, and 75% decrease in noise. And that's just the beginning: further refinements to the technology will likely reduce fuel consumption more than 20% compared with conventional turbofans, enabling airlines to slash spending on fuel, fly longer routes, or carry more passengers.

Decreased emissions will minimize the impact of civil aircraft on local air pollution and global climate patterns. The noise reduction associated with using GT engines is so significant that half a million fewer people will hear planes taking off from New York's LaGuardia Airport. Pratt is a contributor to my think tank, so I have been following the company's progress in developing GTF technology for a long time.

Pratt's rivals have begun researching their own geared engine technology. But with Pratt holding numerous patents and enjoying a multi-decade head start, it will likely be first among equals for a long time in the propulsion business. It already has an order backlog of over 8,000 GTF engines, and is investing heavily in plant and equipment to strengthen its lead. The company has spent $451 million upgrading its Columbus, Georgia plant, and its facility in North Berwick, Maine was recently designated a "best plant" by *Industry Week.*

The increased domestic hiring and investment driven by GTF is just one facet of a broader makeover in Pratt & Whitney's operations as the unit strives to stay at the forefront of engine parts in-house. Now it produces only the most challenging components internally, while buying about 80% of parts from a carefully monitored supply chain of small and medium-size companies.

In other words, most of the manufacturing workers who contribute to Geared Turbofan production will likely not be United Technologies employees, but rather employees of smaller concerns scattered across the U.S.—especially the industrial Midwest. Roughly four-fifths of Pratt's supply chain spend currently goes to domestic manufacturers, an amount that will balloon from $600 million annually at present to well over a billion dollars per year in the near future.

Pratt employs hundreds of specialists who monitor performance at these suppliers to assure timely delivery of parts machined to exacting tolerances. The company spends heavily on new technology, both within its own plants and at the facilities of suppliers. However, Pratt management recognizes the limitations of robotics, additive manufacturing, and other innovations. Much of its investment in the Geared Turbofan goes to training skilled workers, and company president Robert Leduc recently expressed doubt it would ever automate its assembly line.

In other words, Pratt & Whitney's success as a domestic manufacturer headquartered in one of the nation's highest-cost states rests on the twin pillars of technology and training. Without the right tools, workers can't stay ahead of emerging competitors around the world. But without skilled and experienced workers, the technology can't be applied to optimum effect. (Continued on page 4)

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Surcharge Totals
May-October 2017

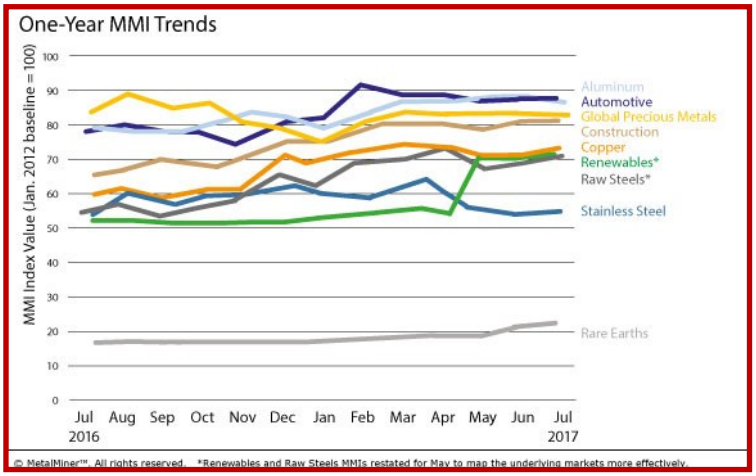
Grades	May	June	July	Aug	Sep	Oct
15-5	0.4673	0.4524	0.3736	0.3811	*	*
15-7	0.6120	0.5774	0.4705	0.4740	*	*
17-4	0.4719	0.4582	0.3750	0.3822	*	*
17-7	0.5286	0.5031	0.4034	0.4142	*	*
201	0.4677	0.4526	0.3632	0.3716	*	*
301 7.0%	0.5355	0.5103	0.4011	0.4116	*	*
302/304/304L	0.5687	0.5403	0.4325	0.4446	*	*
304-8.5%	0.5759	0.5529	0.4443	0.4571	*	*
305	0.6902	0.6476	0.5308	0.5488	*	*
309	0.7366	0.6940	0.5587	0.5767	*	*
310	0.9640	0.8965	0.7395	0.7681	*	*
316/316L	0.7390	0.6921	0.5689	0.5777	*	*
316LS/316LVM	0.8900	0.8200	0.7800	*	*	*
317L	0.8639	0.8075	0.6610	0.6683	*	*
321	0.5839	0.5520	0.4478	0.4613	*	*
347	0.8514	0.8195	0.7153	0.7288	*	*
409/409 Mod	0.2428	0.2428	0.1861	0.1861	*	*
410/410S	0.2530	0.2530	0.1923	0.1923	*	*
430	0.3127	0.3127	0.2282	0.2282	*	*
434	0.3649	0.3606	0.2676	0.2653	*	*
439	0.3256	0.3256	0.2358	0.2358	*	*
440A	0.3127	0.3127	0.2282	0.2282	*	*
2205	0.7574	0.7215	0.5632	0.5622	*	*
263	3.9435	5.0868	6.4771	6.5417	6.3011	6.4416
276	3.3826	3.6396	3.6576	3.5368	3.2610	2.9147
A286	0.9675	1.0519	1.0079	0.9355	0.8605	0.7448
330	1.2000	1.3174	1.2315	1.1241	1.0275	0.8905
400	1.9708	2.2196	2.0685	1.8568	1.6642	1.6041
455	0.5100	0.4900	0.4800	*	*	*
465	0.6100	0.5600	0.5400	*	*	*
600	2.2021	2.4507	2.2798	2.0593	1.8577	1.6881
601	2.0264	2.2298	2.0773	1.8962	1.7311	1.5343
617	2.9397	3.6710	5.0783	5.0335	4.7794	4.6961
625	4.0843	4.3166	4.2492	4.1002	3.8758	3.5821
718	4.1335	4.3175	4.2214	4.0784	3.9151	3.7080
X-750	2.7694	3.0110	2.8433	2.6288	2.4328	2.2612
825	1.6401	1.7838	1.7143	1.6064	1.4758	1.2810
HX	2.2540	2.4689	2.4709	2.3634	2.1712	1.9096
188	11.3900	11.4400	11.9500	*	*	*
CCM	20.1300	20.1100	21.3000	*	*	*
L-605	14.0900	14.1700	14.8600	*	*	*

*Surcharge currently not available

US Employers Add 222K Jobs

The U. S. economy drummed up a better-than-expected 222,000 new jobs last month, according to a new report published Friday by the Bureau of Labor and Statistics. And revisions to prior months' data tacked on 47,000 previously unreported gains. Motor vehicle and parts manufacturers, however, saw payrolls drop by 1,300 for the sector's third straight month of losses. And information employers shed 4,000 jobs for a ninth straight month of decline. The unemployment rate ticked up slightly to 4.4%, and the labor force participation rate edged up to 62.8%. Average hourly earnings were up about 2.5% over the year.

"Overall, this was a solid payroll that reinforces the notion that the U.S. labor market remains a bright spot for the U.S. economic expansion," Scott Anderson, executive vice president and chief economist at Bank of the West, wrote in a research note Friday. "This upbeat report on the labor market caught analysts and the market a bit by surprise this morning, as many had been bracing for a worse-than-expected job print given the below consensus ADP report for June earlier in the week." June has historically been a strong month for job gains, but additions north of 220,000 largely caught spectators off guard. Still, the lack of meaningful wage growth in the report-with hourly earnings up only 2.5% over the year-isn't particularly encouraging. Economists have theorized that wages should rise as the labor market pushed further into full employment, as companies will have a more difficult time attracting and retaining workers with fewer folks on the sidelines. Friday's report suggests those pay increases haven't quite played out yet. *Source: Andrew Soergel, US News& World Report*



The July MMI report is in the books, and it paints a more positive picture than the June report. (provided by *MetalMinor)* Last month, four sub-indexes posted no movement. This month? Just one. On top of that, the number of job indexes posting upward movement increased from four to six. It was an especially good month for the Raw Steels MMI, which shot up 4.4%.

The Stainless Steel MMI—stainless is also part of the Section 232 investigation—also rose, while the other 232 investigation subject, aluminum, fell by a point.

The Department of Commerce is expected to announce the results of the Section 232 steel investigation in the near term. Will the Trump administration opt for tariffs, quotas, or a combination of the two, to combat excess capacity from China? Will China make good on talk of cutting production, particularly in light of what was a record June for Chinese steel and aluminum production? Once the first 232 domino drops, the metal markets will feel the ripple effects—it's only a matter of when. *Source: Fouad Egbaria for MetalMinor*

Pratt & Whitney Surges, *Continued*

So one facet of Pratt's cultural makeover has been greater empowerment of employees, a shift that presumably helps explain why workforce attrition has fallen to a mere 2% annually.

With nearly 17,000 U.S. employees of Pratt already engaged—and many thousands more in the supply chain—the Geared Turbofan engine is shaping up to be a major success for American manufacturing. It is a success that can be repeated many times over if Washington continues investing in cutting-edge research while minimizing regulations that impede bringing innovations to market.

Pratt & Whitney traces its origins to 1860, when partners from a Connecticut iron works found success producing parts that would go into guns used by Union soldiers in the Civil War. In 1925, the company was reborn as a maker of aircraft engines. Its survival across the political and economic upheavals of the intervening years was due mainly to the foresight, discipline and skill of its employees. But the record shows that it was more likely to thrive when government was sympathetic to the needs of business, and that dynamic persists today. *Source: Loren Thompson, Forbes*