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BUSINESS | Updated February 6, 2013, 8:45 p.m. ET

GE Brings Engine Work Back

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By KATE LINEBAUGH

As [Boeing Co.](#) BA -1.12% pays a price for having farmed out crucial parts on its new Dreamliner, [General Electric Co.](#)'s GE +0.09% aviation division is busy bringing work on its engines back in-house.

In late December, GE Aviation agreed to buy Italian parts supplier Avio for \$4.4 billion. That comes alongside the acquisition of a three-dimensional printing company, a joint-venture with a component casting company in Montana and another venture to secure access to a key raw material—silicon carbide, which is used to make high-tech ceramic parts.

This year, GE plans to open a pair of parts factories in Mississippi and Alabama and soon will announce the location of a third.



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Associated Press

GE hopes to protect its engine technology and speed development by doing more work itself. Above, a Boeing 787 airplane with a GE engine.

The strategy is aimed at safeguarding a key source of the industrial conglomerate's sales. Aircraft engines account for about half of GE's \$211 billion order backlog, and the company can't afford missteps as it gets ready to roll out new designs to power the next generation of commercial jetliners.

By doing more of the work itself, GE hopes to protect its technology, speed up development and secure supplies of needed components. The move is a

turnabout for a company that helped pioneer soup-to-nuts U.S. manufacturing and then switched gears to help pioneer industrial outsourcing.

GE now plans to replicate its new vertically integrated approach across its businesses from gas turbines to medical imaging devices to subsea oil wells.

"We want more under our control," said Colleen Athans, who runs supply chain management for GE Aviation. "Rather than pay a supplier to do it, we would like to protect our intellectual property."

Late last year, Ms. Athans gave GE's board of directors a presentation on the moves undertaken by the aerospace unit as a model for GE's other divisions.

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Over the decades, big companies have cycled through different approaches on how much manufacturing to do themselves—sometimes bulking up on acquisitions to own everything from raw materials to final product, and other times slimming down by disposing of anything seen as outside the core.

The trend shifted toward bringing work back in-house in recent years and gained steam after events like flooding in Thailand and the tsunami in Japan made clear that multinational companies' supply lines had grown too long and fragile.

Boeing learned a tough lesson when developing its 787 Dreamliner. To pare costs, the aerospace company relied heavily on outside suppliers for crucial components including wings and parts of the fuselage. But as cost overruns and delays dogged the project, Boeing partly reversed course, purchasing several struggling suppliers that make parts for the aircraft, including major portions of the 787's fuselage. The fleet has been grounded following concerns about overheating and a fire in lithium-ion batteries made by an outside supplier, though safety officials have yet to find a cause.

Boeing says it has learned lessons from its 787 sourcing strategy but the current electronic troubles are unrelated. "We've always acquired batteries through our supply chain," a spokesman said in an email.

GE makes everything from power turbines to oil-well equipment to business loans. But these days, few of its products are more important than aircraft engines. The company has orders to deliver 15,000 new engines to customers between now and 2020. That compares with the 25,000 GE engines currently in use.

The market is extremely competitive, with [United Technologies Corp.](#) [[UTX +0.16%](#)] unit Pratt & Whitney and [Rolls-Royce](#) [[RR.LN +0.10%](#)] PLC battling for positions on new aircraft with promises of better fuel savings with more power and thrust.

GE will be delivering more than 4,000 engines a year over the next two years amid swelling orders for its GE90 and GENx, as well as the CFM56 engine that it makes with France's [Safran](#) [[SAF.FR +0.46%](#)] SA.

By 2016, it will be delivering its newest Leap engine, which is offered on Boeing's next-generation 737 and Airbus' upgraded A320neo—more fuel-efficient versions of the world's workhorse jets.

The new engines come with new engineering problems. To reduce fuel consumption, GE is seeking to run the engines hotter so less cooling air is required. That led GE to redesign the high-pressure turbine blade used in the area of the engine where the temperatures are so hot that metals would melt.

Nowadays, GE relies on [Precision Castparts Corp.](#) [[PCP +1.95%](#)] and a unit of [Alcoa Inc.](#) [[AA +0.45%](#)] to produce the high-pressure turbine blades in its current engine lineup. But for the Leap engine, GE also plans to cast the parts itself at its facility in Dayton, Ohio.

"Keeping that turbine blade cool is definitely a competitive advantage. We would like to keep that in-house," said Ms. Athans. "If we invest in helping to teach a supplier, we lose our flexibility to compete against them and get it somewhere else."

Precision Castparts wouldn't comment on its customer's activities. Alcoa said it is under contract with GE to supply the parts.

Last year, GE Aviation bought Morris Technologies, an additive manufacturing company outside Cincinnati. GE will use Morris's 3-D printing machines to make the guts of the fuel nozzle on its Leap engines. The equivalent part used in existing engines is made by an outside supplier that brazes together 21 tiny pieces.

GE is also bringing more work in-house for its existing engines. In January, GE announced a joint-venture with supplier SeaCast Inc. of Butte, Mont., to boost its ability to produce tubes, ducts and small structural castings for engines.



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The deal to acquire Italian supplier Avio represents the biggest move GE has made yet to bring a supplier under its hood. Two-thirds of Avio's aviation business is with GE making components for the GE90 and GENx engines, as well as for helicopters and other products.

Write to Kate Linebaugh at kate.linebaugh@wsj.com

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