**Gulfstream Relies On International Supply Chains To Deliver World Class Aircraft**

[*Karen E Thuermer*](javascript:void(0);). [**World Trade**](http://proquest.umi.com/pqdweb?RQT=318&pmid=12639&TS=1292248158&clientId=29440&VInst=PROD&VName=PQD&VType=PQD). Troy: [Nov 2004](http://proquest.umi.com/pqdweb?RQT=572&VType=PQD&VName=PQD&VInst=PROD&pmid=12639&pcid=14547131&SrchMode=3&aid=6). Vol. 17, Iss. 11; pg. 46, 3 pgs

**Abstract (Summary)**

Gulfstream Aerospace is legendary for manufacturing the world's most technologically advanced business jet aircraft. It's not only its products, however, that make Gulfstream distinctive in its industry, it's also the company's supply chain. Throughout its line (which includes snowmobiles, subway cars and military aircraft), Gulfstream is unique in that it works exceptionally close with its suppliers on product development. The Gulfstream G550, for example, was developed and manufactured along with Vought Aircraft Industries of Dallas, Texas and ShinMaywa Industries of Kobe, Japan, which worked on the G550 integrated wing assembly. In directing the effort, Gulfstream provided the leadership, guidance and support to guarantee the wing came up to Gulfstream standards. Gulfstream's Savannah location offers logistics advantages given its central location on the East Coast with convenient air, rail and seaport access. A key component to Gulfstream's supply chain operation is its use of assembled parts in kits.

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| **[Headnote]** |
| State-of-the-art logistics sustains state-of-the-art technology. |

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Gulfstream Aerospace is legendary for manufacturing the world's most technologically advanced business jet aircraft. A two-time recipient of the most prestigious award given by the National Aeronautic Association, Gulfstream is known for safe, sleek airplanes with innovative technology.

Its customer roster reflects top-of-the-line requirements. NetJets, owned by Warren Buffett and his Berkshire Hathaway group, uses Gulfstreams, as does the National Oceanic Atmospheric Administration (NOAA), which purchases GIVs, known for their dispatch reliability in doing things like tracking hurricanes.

Advances continue for this wholly-owned subsidiary of General Dynamics. Last year, it introduced a new large-cabin, long-range business jet and received Federal Aviation Administration certification to produce a model that will fly as high as 51,000 feet at speeds up to Mach .885, and at distances up to 6,750 nautical miles. Sales figures for Gulfstream Aerospace and General Dynamics Aviation Services, which is managed by Gulfstream, totaled $2.9 billion last year, some 18 percent of General Dynamic's total sales.

Distinctive manufacturing

It's not only its products, however, that make Gulfstream distinctive in its industry, it's also the company's supply chain. Throughout its line (which includes snowmobiles, subway cars and military aircraft), Gulfstream is unique in that it works exceptionally close with its suppliers on product development. "We involve suppliers from concept to the end product," says Jim McQueeney, President, Material, Gulfstream Aerospace. "We also have revenue share agreements on large components of the aircrafts."

The Gulfstream G550, for example, was developed and manufactured along with Vought Aircraft Industries of Dallas, Texas and ShinMaywa Industries of Kobe, Japan, which worked on the G550 integrated wing assembly.

"Vought built and designed the first wing for us," McQueeney says. "They invested in the tooling and designed and built what is known as a fully stuffed wing-one that has all the workings and innards such as flaps, control surfaces, cables, and hydraulic lines. We then assembled it onto the aircraft."

In directing the effort, Gulfstream provided the leadership, guidance and support to guarantee the wing came up to Gulfstream standards.

"To do this, we have on-site engineering support during its design," McQueeney explains. "We also occasionally employ people to watch the design processes at the early stage. Then as the wing comes out of production, we will have someone on site to continuously monitor the manufacturing."

"We have set new expectations in the industry for what suppliers are supposed to do," McQueeney remarks. "There is no one else in the industry who would go out and buy or procure or have a revenue sharing partner to the extent we do with a company like Vought, where they would do a fully-stocked, ready-to-install component such as a wing. There are probably some barrel and tail sections that other aerospace manufactures buy or procure, but the wing is a very critical component of the airplane."

Location advantage

Gulfstream's Savannah location offers logistics advantages given its central location on the East Coast with convenient air, rail and seaport access. This is important since the company outsources its major components from around the world. For example, the tails and floors for Gulfstream's G500 and G550 aircraft are made by Fokker in Holland, and the engines for its G350/G450/G500 and G550 aircraft are manufactured by Rolls Royce in Germany.

"We import Rolls Royce engines via Atlanta International Airport then truck them down to our plant in Savannah," says McQueeney.

The Fokker tails are shipped in containers on barges down Holland's canals to the Port of Amsterdam. There they are loaded on ships destined for the Port of Savannah. Once at the U.S. port, the shipments are coordinated as oversize loads and trucked to Gulfstream's plant via truck as oversize loads.

McQueeney finds ocean transport to be a consistent transportation mode. "Fokker has never missed a shipment in its 10 years of service," McQueeney says. "And, Gulfstream has never had an issue with the ports. The ports have been extremely dependable."

Vought moves its wing sections from Grand Prairie, Texas to Savannah via rail. "The problem with using rail is we don't get the attention we would if we were a big customer like General Motors," McQueeney comments. "We ship only one rail car at a time. This shipment has not always been the smoothest, but it's gotten better." In the past, Gulfstream has gone as far as to have a car follow the train and call in the exact location of the shipment en route, although McQueeney points out that Gulfstream has never missed a rail delivery. "Gulfstream receives one rail shipment every five to six days," he says. "And there has never been an issue of damage."

Gulfstream trucks move parts and harnesses back and forth to its maquiladora in El Centro, Mexico, for value-added assembly and placement into kits. The kits are used in Gulfstream's Just-in-Time operations. "Dedicated trucks leave Mexico every Saturday and are [at the plant] by Monday morning," McQueeney says.

Just-in-Time manufacturing

A key component to Gulfstream's supply chain operation is its use of assembled parts in kits. "These arrive in Savannah broken out by days," McQueeney says. "Day 1 through Day 6 arrive on the truck located by box. We put the Day 1 in the Day 1 spot in the warehouse. The assemblers know that as soon as Day 1 is empty on the assembly line, they are to retrieve another Day 1 kit from the warehouse."

"Days are adjusted based on our production cycle of how many airplanes we are going to build in a year," McQueeney explains. "We always have one set of kits in the warehouse and one in transit. This has reduced inventory and helped when we have a problem or find we need a part when we do something wrong. We normally have three sets of materials available: one at the manufacturing site, one in the warehouse, and another in transit. In the old days, we had 25 in stock and 15 more back at the supplier."

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| **[Photograph]** |
| The large cabin, ultra-long range G550 cruises at 51,000 feet and has a range of 6,700 nautical miles. |

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He adds, "Our production cycle is smoother, engineering changes are simplified, and we have fewer parts in inventory. When we are in the process of developing a long term agreement with a supplier, we map out schedule requirements, and build a transportation schedule from that data."

While Gulfstream's assembly process is not as fast as that of the automobile industry, McQueeney cites logistic similarities. Gulfstream employs many of the same logistics tools such as JIT, delivery to point-of-use, kitting of assemblies, et cetera.

"The elementary knowledge of putting the aircraft together in a sequence of events is the same as the automobile," he states. "It's just that the stands are longer. A car might be on a stand for 15 minutes. Our aircraft are on a track of six days."

Like the automotive sector, airplane production is dependent on reliable supply chain processes and suppliers. Transportation issues rarely poise a problem. "Difficulties in this supply chain arise from certification regulatory issues associated with the aerospace industry," McQueeney says. "If one supplier fails to hold up to standards, you can't just put another supplier's equipment on the aircraft."

Suppliers of choice

For this reason, Gulfstream carefully audits each and every supplier quarterly and annually. "We go over all the critical issues," McQueeney explains. "We manage their quality. We understand where their costs are. We feel we have good control over the shape our suppliers are in." By implementing this policy, Gulfstream maintains inherent, calculated risk with its selected carriers.

"This does not mean these manufacturers will be Gulfstream suppliers in the future," McQueeney says. But unlike Boeing, which allows airline customers to select from a host of engine manufacturers, Gulfstream certifies that its aircraft come with a Rolls Royce engine. "This means Rolls Royce is the sole supplier for engines for our G550," he says.

To ensure suppliers remain up to Gulfstream standards, the company has implemented a Customer Advisory Board that examines everything from flight operations to maintenance and flight development. "It meets formally twice a year. If there is a problem with a supplier, not only does Gulfstream tell them, they must answer to the customer." The ultimate goal is to build relationships that are supplier-based by doing the right thing for the customer.

Aircraft maintenance logistics

For interior finishes and aircraft painting, the Gulfstream jets are flown to the company's Completion Centers in Dallas; Brunswick, Georgia; Long Beach, California; and Appleton, Wisconsin. For aircraft service, the company maintains 10 additional centers in North America, five of which are operated by General Dynamics Aviation Services and six that are operated by Gulfstream. The company also has a service center in England at London Luton Airport.

"We have warehouses and distribution centers throughout the world, as do our suppliers," notes company spokesman Robert N. Baugniet. "Suppliers also have warehouses and service centers around the world, so the aircraft does not have to come back to Savannah for mandatory service. When you add our suppliers' distribution and service centers to ours, it is a remarkable global network."

Over the years, Gulfstream has done a good analysis of what parts are needed in what areas in the world. "In our service facility, we do an analysis of what is in stock to support our aircraft based on failures that have been reported in that area," says McQueeney. "Since we also monitor each aircraft's performance and service...we have a good appreciation of the parts required to support our fleet in each country/region, as well as transients."

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| **[Sidebar]** |
| Not only products make Gulfstream distinctive in the industry but also its supply chain. |

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