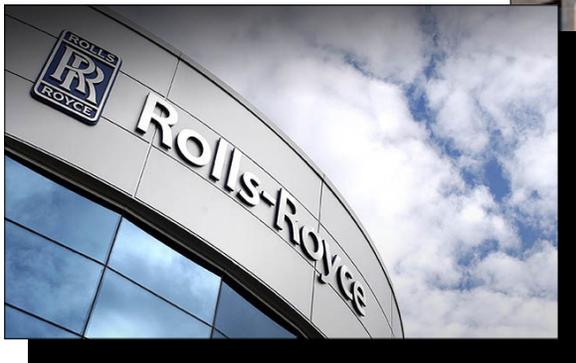


## II: The big guns



# Top 10 call region home

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*The military and NASA have been magnets for the aerospace industry, but there are other reasons companies are drawn to the region...*

**W**hen Northrop Grumman decided in 2005 to establish a production facility for its cutting edge Fire Scout unmanned helicopters in the small Mississippi town of Moss Point, it raised some eyebrows.

Why would the company go to a location that had no track record building aircraft of any type, let alone a high-tech unmanned system? The company knew it was taking a chance, but a lot of factors went into the decision, not the least of which was the reputation of the workers at a shipyard in nearby Pascagoula that was then owned by Northrop Grumman.

What happened ended up making Northrop Grumman look very smart. Not only did the workers manage to do the finishing work on the Fire Scout, but fuselage work on the Global Hawk. And they did so in a shorter learning curve than was expected. As one Northrop Grumman official put it, they knocked their socks off.<sup>1</sup> And a reputation was born.

Northrop Grumman is just one of the top aerospace and defense companies that have chosen to set up operations, some multiple operations, in the Gulf Coast region. And for an area of the country that has made aviation a tar-

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*By David Tortorano*

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## Chapter at a glance

- *Boeing is involved in space and defense activities in the region*
  - *Airbus is continuing to grow its footprint in Mobile, Ala.*
  - *Lockheed Martin makes portions of space vehicles at two locations*
  - *Northrop Grumman builds Fire Scout and Global Hawk in the region*
  - *GE Aviation has new jet engine parts plants in Alabama and Mississippi*
- 

get industry, it's significant that the world's top 10 aerospace companies have operations in the region. They range from large plants like the new \$600 million Airbus final assembly line in Mobile, Ala., to much smaller operations that fall under the radar.

The top 10, Boeing, Airbus, Lockheed Martin, United Technologies, Northrop Grumman, Raytheon, GE Aviation, Finmeccanica, Safran and Rolls-Royce, had combined worldwide revenue of \$365.5 billion, according to September 2014 figures from *Aerospace Top 100*. The study is a collaborative effort by PricewaterhouseCoopers and *Flight International* magazine.

The next 10 companies, Honeywell, BAE Systems, L-3 Communications, General Dynamics, Bombardier, Textron, Mitsubishi, Precision Castparts, Embraer, and Dassault Aviation, have combined revenue of \$86.92 billion, a little more than top-ranked Boeing alone.

The reasons these companies chose to set up operations in the Gulf Coast region varies from company to company. The lower cost of doing business, infrastructure, logistics and available workforce are all factors, as is the right-to-work

## Chapter II: The big guns

status in all four of the states. But there are business reasons that go beyond that.

Some companies, like Lockheed Martin, are in the Gulf Coast I-10 region because of the activities at the military bases. Some, like Boeing, are in the region because of the space activities at two NASA locations. Still another group of companies, like Airbus, are in the region for entirely different business reasons. In the case of Airbus, it could also be attributed in no small measure to relationship developed over time.

But as a group, the presence of these companies help form the foundation for the region's aerospace and defense cluster, one of the most research-intensive, high-tech sectors in the world. Importantly, these companies create jobs ranging from production workers to highly sought engineers and scientists.

### The Boeing Co.

**Corporate HQ:** Chicago

**Revenues:** \$86.6 billion (2013)

**Employees:** 165,000

**I-10 sites:** New Orleans; Fort Walton Beach, Fla.  
boeing.com

Say the name Boeing and jetliners come to mind. And although the nearly 100-year-old company has two operations in the I-10 region of the Gulf Coast, neither is involved the company's commercial aviation sector.

The world's largest aerospace company focuses on space and defense activities in the I-10 region. Its most well-known work is at Michoud Assembly Facility in east New Orleans, where the company is building the 200-foot tall core stage for NASA's Space Launch System, which will be the world's largest rocket.

And it's using an impressive piece of equipment for the work. The ribbon-cutting for the Vertical Weld Center (*photo page 30*) was held in the summer of 2014. It's designed to weld together pieces of the 20-story tall SLS first stage, the massive cylinder that will hold the fuel to propel humans beyond Earth in a more than

321-foot, 5.5 million pound rocket that's slightly taller than the Statue of Liberty and will be more powerful than NASA's legendary Saturn V moon rocket.

NASA has a \$2.8 billion contract with Boeing to design, develop, build and test the core stages and avionics. The contract also includes funding for preliminary studies of a powerful new upper stage needed for downstream exploration missions. The booster will be built at Michoud.

NASA envisions two versions of the rocket, both using the Boeing core stage. The initial version will be capable of lifting 154,000 pounds to low-Earth orbit. It will be powered by four hydrogen-fueled space shuttle main engines and two five-segment shuttle-derived solid-fuel boosters built by ATK.

The more-powerful follow-on version of the rocket will stand 384 feet tall, weigh 6.5 million pounds and be capable of lifting 286,000 pounds to low-Earth orbit using an upper stage equipped with more powerful J-2X engines and advanced strap-on boosters. At launch, the upgraded rocket would generate 9.2 million pounds of thrust.

Work to build the barrel sections and domes that will be assembled into the core stage's huge hydrogen and oxygen tanks is underway at Michoud. The aluminum core stage is 212 feet long and has a 27.6 foot diameter, about the same diameter as the external fuel tanks built at Michoud for the space shuttle program. The barrel section of the SLS core stage will be used for the liquid hydrogen tank.

Once the core stage is fitted and coupled with the cluster of four RS-25 engines, it will be tested on the B-2 Test Stand at NASA's Stennis Space Center, Miss., not far from Michoud.

A far more low profile, defense-related Boeing activity is to the east of Michoud in Northwest Florida. Boeing SOF is at the City of Fort



## Chapter II: The big guns

Walton Beach Commerce and Technology Park. It was established in 1998 to combine the company's resources for special operations forces into a single location.

Boeing SOF performs engineering and software support, including operation of a software integration laboratory, and quick turnaround component repairs. The center brings life-cycle contractor logistics support for special operations aircraft. The two major programs are the gunship and integrated weapons system support program.

### Airbus Group

**Corporate HQ:** Blagnac, France

**U.S. HQ:** Herndon, Va.

**Revenues:** \$78.7 billion (2013)

**Employees:** 138,622 (FY 2014)

**I-10 sites:** Mobile, Ala.; Andalusia, Ala.

airbus-group.com

The world's second largest aircraft maker has been taking significant steps for a number of years to have a larger presence in the United States, and the location where it's making a huge statement is in the Gulf Coast's Mobile, Ala.

It's in Mobile, where it already had an engineering center and an MRO operation, that the company established its only aircraft manufacturing facility in the United States. The plant will roll out its first airliner, a history-making A321 for JetBlue, in 2016. Current plans call for the company to produce four to five jetliners each month once full production kicks in.

When it's all built out, the 116-acre campus will have 10 buildings, including the assembly line, known as Hangar 9. That hangar is 836 feet long with a footprint of 209,917 square feet.

Allan McArtor, chairman of Airbus Americas, has said Mobile will be an epicenter of aerospace activity, and the city and region will be transformed. In addition to 1,000 jobs at the assembly line, another 4,000 or so indirect jobs are expected to be created.

The decision to set up operations in the United States made good business sense to the

European manufacturer. The United States is the largest aerospace market, and even with the growth of other markets, it will remain a place to be for the future. A U.S. operation brings Airbus close to customers, and puts a made in America branding on the jetliners.

Airbus has had ties with U.S. aviation going back to 1978, when Eastern Airlines became the first North American operator of an Airbus aircraft with leased A300B4s. In 1978, Airbus North America opened its first U.S. sales office in New York City.

More than 1,800 Airbus aircraft have been ordered in North America from customers that include Delta Air Lines, FedEx, Frontier Airlines, GECAS, Hawaiian Airlines, ILFC, JetBlue Airways, Spirit Airlines, United Airlines, UPS, US Airways and Virgin America, according to the company.

Workers in more than 40 states help build Airbus aircraft, supporting 245,000 jobs across the U.S. Airbus is the largest export customer for the United States aerospace industry.

Airbus Americas has six main centers of activity in the U.S. and about 1,100 employees. In Virginia, Airbus has its headquarters in Herndon, Va., a spares center in Ashburn and a subsidiary, Metron, in Dulles. It also has a safety and technical affairs office and government relations office in Washington D.C.

In Wichita, Kan., Airbus has an engineering center and in Miami it has a training center. It also owns Vector Aerospace in Andalusia, Ala., a maintenance, repair and overhaul operation. Airbus Group also operates Airbus Helicopter in Columbus, Miss., which makes the Lakota helicopters used by the U.S. Army.

In Mobile, the company has the Airbus Engineering Center at the Mobile Aeroplex and the Airbus Military Service Center at Mobile Regional Airport, which in April 2015 was named the worldwide C212 support center.



## Chapter II: The big guns

The decision to put the assembly line in Mobile was based on an existing aviation infrastructure and transportation logistics. The Mobile Aeroplex, a former military base, is not far from a port, rail and interstates. The company was very familiar with Mobile going back to when Airbus was competing to build aerial tankers for the U.S. Air Force. It lost that fight to Boeing, but the relationship with Mobile continued.

“We have had an exceptionally positive experience in Mobile over the years, the people, business community, local government and community have all been welcoming and supportive of our activities there,” said McArtor.

### Lockheed Martin

**Corporate HQ:** Bethesda, Md.

**Revenues:** \$45.4 billion

**Employees:** 112,000 (February 2015)

**I-10 sites:** New Orleans; Stennis Space Center, Miss.; Fort Walton Beach, Fla.

lockheedmartin.com

Builder of the fifth-generation F-35 and F-22 warplanes, Lockheed Martin has both space and defense activities in the Gulf Coast Interstate 10 region.

The military activities in Northwest Florida brought Lockheed Martin to Fort Walton Beach some 20 years ago. Since then, the operations have grown to almost 1,000 employees. The company provides much of the maintenance and support for the F-35 at Eglin Air Force Base, as well as most of the academic and simulator training.

Lockheed also provides support for other operations at the sprawling Eglin base, including the weapons systems program at the Air Force's 96th Test Wing, and for the Air Force's workhorse, the C-130 transport and gunship program, based largely at Hurlburt Field, the Air Force special operations.

“Our No. 1 focus in the area is supporting the F-35,” said J.R. McDonald, a former fighter pilot and now vice president for corporate domes-

tic business development for Lockheed's Air Force Programs. The company also provides other special operations support, which company officials won't detail.

The corporation's Fort Walton Beach operations also provide maintenance for the F-22 tactical fighter, based at Tyndall Air Force Base in Panama City, Fla., to the east of Eglin.

In addition to the defense work it does in Northwest Florida, Lockheed Martin also has a major site in South Mississippi at NASA's Stennis Space Center. The 226,000 square-foot Lockheed Martin Space & Technology Center opened in 2002 and plays a crucial if little-known role in Lockheed Martin's military satellite programs.

Located at NASA's Stennis Space Center Technology Park, the sprawling building is where Lockheed Martin workers make core satellite propulsion subsystems and multi-layer insulation blankets and integrate them into the A2100 satellites. The award-winning, versatile satellite is used in multiple military satellite programs that go by other names, including the Space-Based Infrared System and Mobile User Objective System.

Some 50 miles away from Stennis Space Center in east New Orleans is NASA's massive Michoud Assembly Facility, 43 acres under one roof. It's at Michoud that Lockheed Martin is building the Orion Multi-Purpose Crew Vehicle for NASA's new Space Launch System. The



Apollo-like capsule is designed to take a crew of six deeper into space than ever before.

The final weld of the first space-bound Orion was done at Michoud in June of 2012. In December 2014, the Exploration Flight Test 1 Orion, without a crew, launched from Kennedy Space Center, Fla., and flew to an altitude of 3,600 plus miles, some 15 times farther away

## Chapter II: The big guns

from Earth than the International Space Station. The spacecraft had a picture-perfect landing in the Pacific.

In addition to the government work for the Defense Department and NASA, Lockheed Martin also is involved in work for the commercial space industry at Michoud.

It has a contract to fabricate the composite portions of Sierra Nevada's shuttle-like reusable spaceship, Dream Chaser. Part of NASA's Commercial Crew Program, the spacecraft will carry two to seven people in orbital and suborbital flights. The company plans to build a fleet of Dream Chasers.

### **United Technologies Corp.**

**Corporate HQ:** Hartford, Conn.

**Revenues:** \$33.1 billion (2013)

**Employees:** 211,500 (2014)

**I-10 sites:** Foley, Ala.; Pensacola, Fla.  
utc.com

A few years ago United Technology Corp. was involved in space and defense activities in the Gulf Coast region. But in 2013 that changed and UTC today is involved in commercial aviation and defense.

That happened when UTC decided to divest itself of non-core activities and purchase Charlotte, N.C.-based Goodrich Corp. It was an expensive purchase, \$18.4 billion. In order to help fund the purchase, UTC engine-maker Pratt & Whitney sold Rocketdyne.

The \$550 million sale of Rocketdyne to GenCorp Inc., meant UTC would no longer be involved in assembling and testing rocket engines at Stennis Space Center, Miss. But it did get Goodrich's three aerospace division, including the 800-worker Goodrich Alabama Service Center in Foley, Ala., Baldwin County's largest private employer.

The Foley operation is part of the UTC Aerospace Systems. That UTC segment provides electric power generation, power management, and distribution systems; engine control, elec-

tric, environmental control, propeller, cargo, actuation, landing, intelligence, surveillance, and reconnaissance systems, as well as fire and ice detection and protection systems; engine components; aircraft aero structures, lighting, and seating products; space products and subsystems; air data, and flight sensing and management systems; and aftermarket services.

In addition to the Foley operation, UTC also has a presence in Northwest Florida with its Sikorsky segment. The company's technicians maintain training aircraft for the Navy at Naval Air Station Pensacola and Naval Air Station Whiting Field in Milton.

But how long Sikorsky will remain a part of UTC is up in the air. In the spring of 2015 UTC said it was considering spinning off Sikorsky as a separate company or perhaps selling it. There will be no lack of suitors for Sikorsky, which makes military and commercial helicopters and provides aftermarket helicopter and aircraft parts and services.

UTC's other major aerospace division is Pratt & Whitney. It supplies aircraft engines for commercial, military, business jet, and general aviation markets, and provides aftermarket maintenance, repair, and overhaul, as well as fleet management services. Pratt & Whitney is providing the F135 engine for all variants of the fifth-generation Lockheed Martin F-35 Lightning II.

UTC, founded in 1934, also provides products and services to building systems worldwide through Otis and UTC Climate Controls & Security.

### **Northrop Grumman**

**Corporate HQ:** Falls Church, Va.

**Revenues:** \$24.7 billion (2013)

**Employees:** 64,300 (February 2015)

**I-10 sites:** Moss Point, Miss.  
northropgrumman.com

One of the most cutting-edge aerospace assembly operations in the Gulf Coast I-10 region is the Northrop Grumman Unmanned Systems

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Center in Moss Point, Miss. Opened in 2006, workers at the plant make the center fuselage for all variants of the Global Hawk fixed-wing surveillance aircraft, including the Navy's Triton maritime variant.

The 101,000 square-foot Moss Point plant also does finishing electronics work on the MQ-8B and MQ-8C Fire Scout unmanned helicopter. The first version, the B model, was originally built for the Navy and Army, but the Army opted



to drop the program. The Navy's variant, however, proved a valuable asset for the Navy after testing both onboard ships and on land. It liked it enough to move forward on a larger version, the C model, based on a Bell 407 helicopter.

The company has said in the past that it sees the potential to expand the work it does at the Moss Point plant, which is the first tenant of the Jackson County Aviation Technology Park and sits next to the general aviation Trent Lott International Airport.

The Moss Point plant is part of Northrop Grumman's Aerospace Systems sector. That segment designs, develops, integrates, and produces manned aircraft, unmanned systems, spacecraft, high-energy laser systems, microelectronics, and other systems and subsystems. The products are used for ISR (intelligence, surveillance, and reconnaissance), communications, battle management, space exploration and more.

The company, founded in 1939, has three other business sectors: Electronic Systems (radar, sensors, chemical detection, countermeasure systems); Information Systems (C4ISR, or command, control, communications, computers, intelligence, surveillance, reconnaissance); and Technical Services (systems support, training and simulation).

The federal government is responsible for most of Northrop Grumman's sales. The com-

pany at one point was involved in shipbuilding and owned, among other properties, Ingalls Shipbuilding in Pascagoula, Miss., not far from Moss Point.

### **Raytheon Co.**

**Corporate HQ:** Waltham, Mass.

**Revenues:** \$23.7 billion (2013)

**Employees:** 63,000 (March 2014)

**I-10 sites:** Pensacola, Fla.; Hurlburt Field, Fla.; Shalimar, Fla.

raytheon.com

One of the companies that seems to fly under the radar in the Gulf Coast region is electronics powerhouse Raytheon Co. Founded in 1922, the company is one of the world's largest producers of guided missiles, as well as a huge provider of radar systems.

Nearly all of the company's revenues are obtained through military contracts.

In this region, it would be surprising if Raytheon did not have an operation here. Eglin Air Force Base, Fla., is responsible for the development of all Air Force aerial weapons systems, and it manages many of the missiles systems developed by Raytheon.

The company has an office in Shalimar, just outside Eglin, and there are also listings for the company in Pensacola and Hurlburt Field. But calls and emails to the press office at corporate headquarters were not returned.

Raytheon, the name means light of the gods, is a developer and manufacturer of radars, electro-optical sensors, and other advanced electronics systems for airborne, naval and ground based military applications.

Raytheon's manufacturing concentration is in weapons and military and commercial electronics. It operates in four segments: Integrated Defense Systems; Intelligence, Information, and Services; Missile Systems; and Space and Airborne Systems.

Among Raytheon's products are the APG-63/APG-70 radars for the F-15 Eagle, and the

## Chapter II: The big guns

APG-77 radar, jointly developed with Northrop Grumman, for the F-22 Raptor.

The company also has a long list of missiles, including the AGM-65 Maverick, AIM-120 AM-RAAM, AGM-88 HARM and more. It also produces the MIM-104 Patriot and BGM-109 Tomahawk

### **GE Aviation**

**Corporate HQ:** Cincinnati, Ohio

**Revenues:** \$21.9 billion

**Employees:** 40,000

**I-10 sites:** Hattiesburg, Miss.; Auburn, Ala.  
geaviation.com

GE Aviation is one of the world's largest providers of jet engines and services for commercial, military, business and general aviation. A business segment of General Electric, GE Aviation produces large and small jet, turboprop, and turbo shaft propulsion systems.

GE Aviation also offers replacement parts, as well as maintenance, repair, and overhaul (MRO) services for customers.

The GE Aviation segment is a relative newcomer to the Gulf Coast region, where it has engine parts production facilities near Hattiesburg, Miss., and in Auburn, Ala. While both are just outside the I-10 region, their presence adds to the considerable propulsion systems work done in this region at Stennis Space Center, Miss.

Some of the GE Aviation engines are produced and marketed through CFM International and Engine Alliance, jointly owned by GE and Pratt & Whitney. Newer engines are also being designed and marketed in joint ventures with Rolls-Royce and Honda Aero.

### **Finmeccanica**

**Corporate HQ:** Rome

**U.S. HQ:** Arlington, Va.

**Revenues:** \$19.4 billion

**Employees:** 54,380

**I-10 sites:** Stennis Space Center, Miss.; Fort Walton Beach, Fla.  
finmeccanica.com

Finmeccanica is the leading industrial group in the Italy's high-technology sector and one of the main global players in aerospace, defense and security. It operates in seven sectors: aeronautics, helicopters, space, electronics, defense systems, transportation and construction.

The government of Italy holds about 30 percent of Finmeccanica, which was established in 1948. The Italian conglomerate has been a part of the Gulf Coast region for quite a few years.

It purchased DRS Technologies for \$5.2 billion in 2008, which has had an operation in Fort Walton Beach, Fla., since 1957. DRS Training and Control Systems works on cutting-edge electronics. It's in Fort Walton Beach because of Eglin Air Force Base, a center for aerial weapons development. In recent years it's been involved in work on the F-35. It has about 300 workers. One project is working with Cubic on the P5 Combat Training System.

Finmeccanica also has a Selex Galileo operation just outside Stennis Space Center, Miss., at Stennis International Airport in the small town of Kiln. Selex Galileo is a U.S. subsidiary of Selex ES. It focuses on airborne mission-critical systems for situational awareness, self-protection and surveillance.

### **Safran**

**Corporate HQ:** Paris

**U.S. HQ:** Arlington, Va.

**Revenues:** \$17.5 billion

**Employees:** 68,945 (March 2015)

**I-10 sites:** Mobile, Ala.  
safran-group.com

Safran S.A. is a French multi-national aircraft engine, rocket engine, aerospace component and security company. It was formed by the 2005 merger between the aircraft and rocket engine and aerospace component manufacturer

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SNECMA, founded in 1945, and the security company SAGEM, founded in 1924.

It was the day of the formal groundbreaking ceremony for the Airbus assembly facility in Mobile, Ala., that Safran announced it also would establish an operation at the Mobile Aeroplex. Safran Engineering Services became the first Airbus supplier in close proximity to Airbus' first U.S. jetliner plant. It employ 50.

Safran has its roots in aerospace and now has three divisions: aerospace manufacturers aircraft, rocket, space engines and propulsion systems for fixed wing and rotorcraft; defense develops and builds navigation systems, drones, and optronics; and security offers biometric identification and access control systems.

In June 2014, Arianespace CEO Stephane Israel announced that European efforts to remain competitive in response to SpaceX' successes prompted the creation of a joint venture company from Arianespace's two largest shareholders: the launch-vehicle producer Airbus Group and engine-producer Safran.

### Rolls-Royce

**Corporate HQ:** London

**U.S. HQ:** Reston, Va.

**Revenues:** \$14.4 billion

**Employees:** 54,100 (2014)

**I-10 sites:** Stennis Space Center, Miss.; Pascagoula, Miss.  
rolls-royce.com

It was a major coup for South Mississippi in 2007 when Rolls-Royce, maker of some of the most widely-used commercial aircraft engines in the world, said it would establish an outdoor engine test facility at NASA's Stennis Space Center. It was a natural fit, since the center is also used by NASA and commercial space companies to test huge rocket engines.

A few years later, Rolls-Royce was apparently happy enough with its Outdoor Jet Engine Test Facility that it decided to expand and invest another \$50 million in a second test facility at Stennis Space Center.

Rolls-Royce -- a separate company from the one with the same name that produces expensive motor cars -- designs, develops, manufactures and services power systems for use in the air, on land and at sea. One of the leading producers of engines for large civil aircraft and corporate jets, it's also the second largest provider of defense aircraft engines.

Rolls-Royce was not a newcomer to South Mississippi when it decided to open the jet engine test facility. It bought a propeller foundry in Pascagoula, Miss., not far from Stennis Space Center, in 1999.

Its engine test facility is very active.

"Ever since the grand opening we've had one or two engines running pretty much nonstop," said Anthony

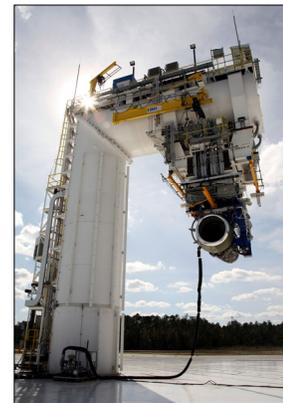
Woodard, the facility's general manager. Engine tests run 24 hours, five to seven days a week, according to the Feb. 21, 2014 issue of *Mississippi Business Journal*.

The tests provide engineers with performance information by simulating every step of a flight, from the aircraft pulling out of the hangar to takeoff, cruising and landing. "The whole idea is to keep the engines running as long as we can so we can improve our product," he told the *Journal*.

The engines are made in the United Kingdom, Germany and at other Rolls Royce sites. When tests at SSC are done, the engines are sent back for deeper inspections or they are repurposed.

Airbus, Boeing and other customers send officials and engineers to observe the testing that's done at Stennis. Woodard said there's a lot of customer involvement at the site.

What seems particularly significant from an economic development standpoint is that Rolls-Royce's decision to put a test facility at Stennis Space Center was just the first of what has since



## Chapter II: The big guns

been a trend of jet engine makers to set up shop in the Gulf Coast region. GE Aviation later established an engine parts plant at Ellisville, near Hattiesburg. It also has an engine parts plant in Batesville, in north Mississippi. GE Aviation also established an engine parts plant in Auburn, Ala., which has since been named the center to produce 3D fuel nozzles (*see page. 28*). Those jet engine operations, coupled with rocket engine activities at Stennis Space Center, gives the Gulf

Coast I-10 region a major propulsion systems cluster.

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<sup>1</sup> “Knocking their socks off,” pages 1-3, Alliance Insight, April 2008, David Tortorano.

<sup>2</sup> “New Horizons for Aerospace Suppliers,” Aviation Week and Space Technology, Feb 2014, Kevin Michaels.

<sup>3</sup> Ibid, Michaels.

<sup>4</sup> “Aerospace Manufacturing Takes Off in Southern States,” Stateline, April 2, 2014, Pamela Prah.

### Other top aerospace/defense companies

#### Honeywell

Corporate HQ: Morristown, N.J.  
Revenues: \$12.0 billion  
Employees: 131,00 (2013)  
honeywell.com

#### BAE Systems

Corporate HQ: London  
U.S. HQ: Arlington, Va.  
Revenues: \$10.6 billion  
Employees: 84,600 (2015)  
baesystems.com

#### L-3 Communications

Corporate HQ: New York, N.Y.  
Revenues: \$10.2 billion  
Employees: 45,000  
l-3com.com

#### General Dynamics

Corporate HQ: Falls Church, Va.  
Revenues: \$10.0 billion  
Employees: 92,200 (2012)  
generaldynamics.com

#### Bombardier

Corporate: Montreal, Canada  
Revenues: \$9.4 billion  
Employees: 65,698 (2011)  
bombardier.com

#### Textron

Corporate: Providence, R.I.  
Revenues: \$8.96 billion  
Employees: 32,000 (2013)  
textron.com

#### Mitsubishi

Corporate HQ: Tokyo  
Revenues: \$6.86 billion  
Employees: 63,500  
mhi-global.com

#### Precision Castparts

Corporate: Portland, Oregon  
Revenues: \$6.56 billion  
Employees: 29,085 (FY 2014)  
precast.com

#### Embraer

Corporate HQ: Sao Paulo, Brazil  
Revenues: \$6.24 billion  
Employees: 19,116  
embraer.com

#### Dassault Aviation

Corporate HQ: Paris, France  
Revenues: \$6.10 billion  
Employees: 11,745 (2014)  
dassault-aviation.com

### Suggested reading

**Books:** Part I (2011); Ch 1 (2012); Ch II (2013); Ch I (2014); Ch II (2014)

**Newsletters:** Thriving in the shadow of a giant (December 2013); Eglin's F-35 wingman: Lockheed FWB (August 2014); Mobile poised for historic cargo (February 2015); At 57, company still on cutting edge (February 2015)