Gulf Coast Reporters' League

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AEROSPACE NEWSLETTER

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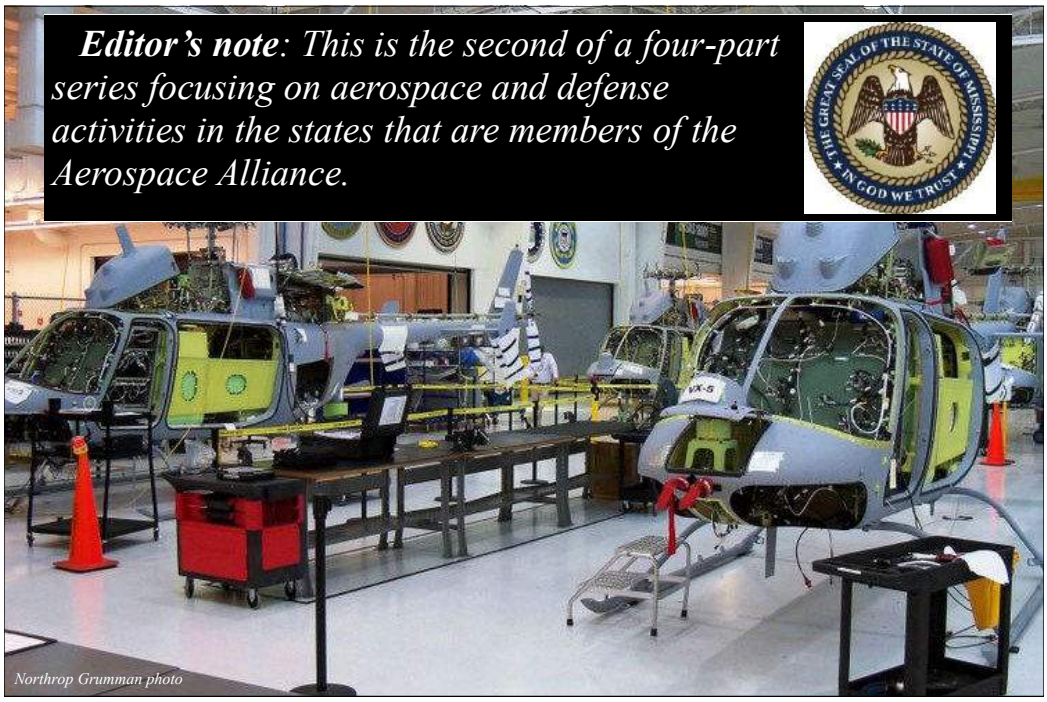


***Editor's note**: This is the second of a four-part series focusing on aerospace and defense activities in the states that are members of the Aerospace Alliance.*

Northrop Grumman photo

MQ-8C Fire Scouts on the assembly line at the Northrop Grumman Unmanned Systems Center in Moss Point, Miss.

Economic development

Mississippi's aerospace footprint

The state with the nation's largest rocket engine test facility is also where unmanned aerial vehicles, radar systems and helicopters are built, and military pilots trained...

Just north of Interstate 10 in Moss Point, Miss., is a manufacturing center that has seen its share of expansion.

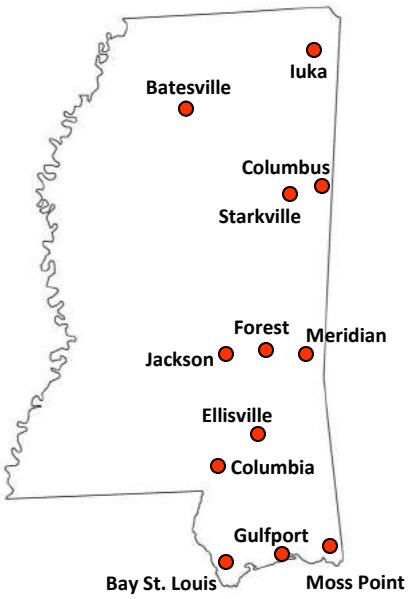
When first announced in 2004, it was to be the final assembly point for the Northrop Grumman Fire Scout unmanned helicopters. Then, before construction began, it was doubled in size to also handle fuselage work for the Global Hawk unmanned surveillance aircraft.

But that wasn't all.

In May 2017 it was it announced that the 101,000-square-foot plant would handle more, including sub-assembly work for the F-35 Joint Strike Fighter, the first manned aircraft to be assembled in part in Moss Point. And there's still room to grow. Northrop has an option to expand its footprint should it find the need.

The plant at Jackson County Aviation Technology Park, adjacent to Trent Lott International Airport, currently has about 60 workers and will add another 60 with the additional work. But it's just one of the activities in a state that has become a hotspot for unmanned activities.

North of Moss Point just south of Hattiesburg, Camp Shelby is home of regional flight center for the Army National



Guard's unmanned systems. And even further north in Starkville, Mississippi State University was chosen by the Department of Homeland Security as a center for drone research.

As large as the footprint is in unmanned activities, it's just one of the aerospace segments in the state. It's also involved in space activities in north and South Mississippi, and is a major player in training military pilots. It also has a footprint in commercial aviation through testing jet engines in South Mississippi, producing jet engine parts and coatings at two facilities and making fuel and motion control systems. On top of all that, it's where Airbus builds helicopters for the military.

Space

The best-known aerospace operation in the state of Mississippi is John C. Stennis Space Center (SSC), established in the early days of the nation's space program. It is the largest rocket engine test complex in the nation, and has more than 40 federal, state, academic and private organizations and numerous technology-based companies.

The 13,500-acre test area, called a fee area, is surrounded by a 125,000-acre acoustical buffer zone that allows for rocket engine testing at any time without disturbing surrounding residents.

In addition to testing engines for NASA projects, commercial companies also use the facilities. In 2014, California's SpaceX opened its rocket engine component testing program at SSC. The company does initial testing of its Raptor methane rocket engines at the E-2 test stand. SpaceX upgraded the stand with methane capability, making it one of the most sophisticated high-pressure testing facilities in the world.

In addition, in November 2017 California-based Stratolaunch opted to use SSC to test engines on the E1 stand. SSC is also working with start-up Relativity Space.

In northeast Mississippi's Iuka, Orbital ATK Inc. builds composite rocket structures. Established in 1998, the Large Structure Center of Excellence manufacturing plant has produced Atlas V, Delta II and Delta IV large composite structures for United Launch Alliance space vehicles. The 320,000-square-foot plant houses one of the largest autoclaves in the world, 20 feet in diameter and 83 feet in length.

The ULA Delta IV composite structures made by Orbital ATK include nose cones and aero skirts, fairings, payload attach fittings and diaphragms, interstages, centerbodys and thermal shields. Structures manufactured for ULA Atlas V include heat shields, interstages and boat tails.

In October, it was announced that Orbital ATK would expand its complex in Iuka, investing $10.48 million and creating 50 jobs to the more than 100 already there. The company will begin production of large composite aerospace structures for its Antares, Pegusus and Minotaur launch vehicles and a large aerospace and defense program at the facility.

"This expansion signifies the commitment Orbital ATK has to the employees, community and state of Mississippi to continue bringing high quality manufacturing work into the area," said John Kain, Orbital ATK Aerospace Structures Division's Director of Operations, Iuka.

RS-25 test at SSC. NASA/SSC *photo*

Military aviation

Mississippi plays an essential role in training the nation's military pilots. East central Mississippi is home of Naval Air Station Meridian, one of the Navy's two jet strike pilot training facilities in the nation.

The air station is the home of Training Wing One and training squadrons VT-7 and VT-9, which operate the T-45 Goshawk and T2-C Buckeye, respectively. The air station, which also supports aviation and technical training, is some 8,000 acres and has an additional 4,000 acres at Outlying Field Joe Williams and a target facility.

Mississippi is also home to Columbus Air Force Base, which has trained pilots since World War II. About half of Air Force pilots today went through training at Columbus.

In addition to providing training for new military pilots, Mississippi is also home to one of the nation's four Air National Guard Combat Readiness Training Centers.

The Mississippi Air National Guard's Combat Readiness Training Center (CRTC) is at Gulfport-Biloxi International Airport. Scores of pilots from across the nation hone their combat skills every year at the center, which provides a year-round realistic joint training environment with air space, ranges, facilities and equipment, for units to enhance combat readiness.

With offshore airspace that's fully instrumented for recording air-to-air engagements, it also utilizes air-to-ground ranges at Camp Shelby, near Hattiesburg.

TRAWING 1 T-45s on a carrier. *Navy photo*

The CRTC has two tenant Air National Guard units at the base: the 255th Air Control Squadron and the 209th Civil Engineer Squadron. It's also home to the 1108 Theater Aviation Sustainment Maintenance Group, a full Army aviation maintenance depot facility.

But the military aviation role goes beyond pilot training. Airbus Helicopters in Columbus produces the H125 commercial helicopter and the U.S. Army's UH-72A Lakota helicopters. The Columbus location also produces the assembly and customization of other Airbus Helicopters models and manufactures components for use on new-production helicopters.

In 2013, Raytheon announced the expansion of its Forest, Miss., facility, which produces some of the company's most advanced radars and other electronics.

The $100 million expansion facilitates growth in the electronic warfare and international airborne radar markets. The Forest location builds sophisticated airborne and ground-based radars, electronic warfare technology and communications systems for U.S. and allied forces.

In Columbia, Zodiac Parachute and Protection America makes parachute recovery systems. It began producing military parachutes in 1938 when it was known as Pioneer Aerospace.

Commercial aviation

Mississippi for quite some time now has pointed out that "every commercial airplane in the world has had a least one component made in Mississippi," according to the aerospace section of the Mississippi Development Authority's website.

Eaton Aerospace, then operating as Vickers, opened a facility in Jackson in 1957 to design and manufacture hydraulic pumps. It became part of Eaton in 1999, and today Eaton Corp's 500-employee facility is a part of Eaton Aerospace Group, Fuel and Motion Control Systems Division.

The 270,000-square-foot Jackson facility is home to one of the most advanced aircraft hydraulic test labs in the world. Eaton is a leading supplier of hydraulic, electro-hydraulic pump and generator products and integrated systems, engine and airframe fuel pumps, electric motors, aircraft door actuation, flight and flow controls, fluid, fuel and air delivery products and systems, nose wheel steering systems and more.

Eaton's Jackson facility manufactures and services hydraulic system parts and products for commercial and business jet aircraft and military vehicles which include the following types of products and system applications: Vickers Hydraulic Pumps, Hydraulic Motors, Electric Motorpumps, Power Transfer Units, Pump Packages and Hydraulic Systems.

GE Aviation operates a jet engine component plant in Batesville, which produces advanced composite jet engine components.

GE Aviation partnered with the Mississippi Polymer Institute to support the company's hiring and workforce development needs. In addition to training employees, MPI helps companies in the plastics/polymer industry solve technical challenges and improve their processes and products.

The company initially demonstrated the manufacture of composite components at Mississippi State University's Raspet Flight Research Laboratory before opening the Batesville plant.

In 2016, Praxair Surface Technologies and GE Aviation announced the formal creation of joint venture PG

Eaton Aerospace in Jackson. *Eaton photo*

Technologies in Ellisville. The grand opening was Dec. 1.

Located in the former GE Aviation facility, the joint venture provides the development, support and application of specialized coatings for GE Aviation's and CFM International's current and future engine models, including the GE9X and LEAP engines. CFM International is a 50/50 joint venture company between GE and Safran Aircraft Engines of France.

In addition to the facility in Ellisville, coating operations for PG Technologies are also in Indianapolis, Ind., and Singapore.

GE Aviation delivers jet engine parts from its locations throughout the U.S. to PG Technologies to undergo surface coating through various processes.

Stennis Space Center also plays a role in commercial aviation. In 2013, Rolls-Royce opened its second jet engine test stand at the company's Outdoor Jet Engine Test Facility. The company performs jet engine testing on the most advanced Rolls-Royce civil aircraft engines. The company opened its first test stand at Stennis Space Center 10 years ago.

Unmanned aerial

One of the most dynamic fields of aerospace is unmanned aerial systems. According to the Teal Group's 2017 market study, the field will more than triple in the next decade. The study estimates that UAV production will increase from the current worldwide UAV production of $4.3 billion annually in 2017 to $10.3 billion in 2026, totaling $80.5 billion in the next ten

ArrowLite UAV. *Stark Aerospace photo*

years. Military UAV research spending would add another $26 billion over the decade.

Drones of every size and shape are becoming ubiquitous, and orders for Fire Scout and Global Hawk are going to come in for years into the future. The Federal Aviation Administration predicts that combined total hobbyist and commercial unmanned aerial system sales will increase from 2.5 million in 2016 to 7 million in 2020.

And several operations in the state make Mississippi a key player in the field. Northeast Mississippi is home of the Raspet Flight Research Laboratory, part of the Bagley College of Engineering at Mississippi State University. Established in 1948, it provides leading-edge research, development and testing of manned and unmanned flight vehicles and composite materials while supporting MSU's goals of teaching. It has also been an incubator for aerospace industries.

The Federal Aviation Administration selected Mississippi State University as the location for its Unmanned Aerial Systems Center of Excellence.

Twenty-three of the world's leading research institutions and a hundred leading industry, government partners comprise the Alliance for System Safety of UAS through Research Excellence, or ASSURE.

ASSURE possesses the expertise, infrastructure and outstanding track record of success that the FAA Center of Excellence for Unmanned Aircraft Systems demands.

In October, Insitu opened its new facility on the campus of Mississippi State University in partnership with the FAA's Center of Excellence for Unmanned Aircraft Systems.

Insitu creates and supports unmanned systems and software technology that deliver end-to-end solutions for collecting, processing and delivering superior information. At MSU, the company supports a combination of engineering, software development and business development/customer service support functions.

The unmanned aerial division produces the ArrowLite small UAS, specially created for U.S. Special Forces, the Army Hunter MQ-5B and the Heron at its production center at the Golden Triangle Regional Airport. The Columbus location is Stark's main UAS production and support facility.

Stark Aerospace's main facility is at Golden Triangle Global Industrial Aerospace Park at the regional airport. It operates divisions for Unmanned Aerial Systems, Sensors, Production Services and Engineering.

In April 2017 the U.S. Department of Homeland Security chose Mississippi as the new base for small drones. The DHS drone demonstration range in Mississippi will use 2,000 square miles of restricted airspace up to an altitude of 60,000 feet, mainly in the southern and coastal regions. Multiple sites will participate, including the National Guard's Camp Shelby, Joint Forces Training Center, NASA's John C. Stennis Space Center buffer zones and Singing River island, a former naval base in the Mississippi Sound.

Northrop Grumman builds portions of two cutting-edge unmanned aircraft systems. The 101,000-square-foot Northrop Grumman Unmanned Systems Center in Moss Point, Miss., does final assembly work on the Fire Scout unmanned helicopter and central fuselage work on the Global Hawk fixed-wing unmanned aerial system.

The first Fire Scout, using a Schweizer airframe, rolled out of the Moss Point plant in December 2006 and went to Naval Air Station Patuxent River, Md., for testing. According to the *Gulf Coast Aerospace Corridor's* June 2017 issue, by early 2017, 33 MQ-8Bs models and 19 of the larger MQ-8C Fire Scouts, which use the larger Bell 407 airframe, have come out of the Moss Point plant. There have also been 23 ground control segments for Fire Scouts produced in Moss Point.

Moss Point also handles the central fuselage work for all variants of Global Hawk, including the Navy's Triton. Although the Mississippi plant was not involved in early versions of the Global Hawk, it's been involved in all variants built after the plant opened. As of early 2017, Moss Point has done central fuselage work on 45 of the high-flying aircraft, according to company officials. It's all a part of a major change for Jackson County.

"Shipbuilding and petrochemicals is our heritage, and will always be the backbone of our economy," said George Freeland, head of the Jackson County Economic Development Foundation. And as the county pushes to diversify its economy, "the unmanned systems center is the absolute centerpiece of that plan."

"In context, we just resolved to make a significant run into the aerospace arena 16 years ago. That's not very long in the economic development continuum," he said. But in that time frame Northrop has expanded and is now about the double in size. The company also has an option on 30 additional acres contiguous and north of its current 20-acre site.

Importantly, both the drone and F-35 program are projects with a long life many years into the future.

"There's no question, given the scope and the future of these programs, both the manned and the unmanned, Northrop Grumman is going to have so many a compelling reasons to maintain a presence in this community for many, many, many years to come," Freeland said.

- David Tortorano

Corporate

Airbus in Mobile has impressive quarter

The surprise announcement that Bombardier CSeries planes would be built in Mobile was followed by more orders for Mobile-built jetliners...

Mobile, Ala.

To put it mildly, it's been a noteworthy quarter for the Airbus U.S. Manufacturing Facility at the Mobile Aeroplex. There were more orders for Mobile-built jetliners, and on top of that there's a possibility Mobile will get a second assembly line.

The news over three months:

- In October Canada's Bombardier announced it would build CSeries jetliners in Mobile in a teaming arrangement with Airbus.
- In November a record order for A320 and A321 jets was announced by Indigo Partners. Mobile will build planes for Indigo participant Frontier.
- In December Delta Air Lines said it was ordering 100 A321neo jets, which will be built in Mobile.

Mobile quickly followed that December order with the delivery of its 50th plane, this one to Delta Air Lines. At the same time, it said it reached its goal of four aircraft per month.

"We've met all our commitments. We're still very pleased to be here in Mobile and on the Gulf Coast. It's been everything we hoped it would be," said spokeswoman Kristi Tucker.

The plant at the Mobile Aeroplex at Brookley employs about 400 people directly and more than 225 indirectly, officials said.

Record purchase

At the recent Dubai Airshow, Airbus announced that Indigo Partners wanted 430 planes, 273 of them A320neos and another 157 A321neos. At current prices, it's a $49.5 billion deal. Among the airlines involved is Frontier, which was already scheduled to receive Mobile-made jetliners in 2018.

CSeries jetliners will be built in Mobile, according to current plans. *Bombardier photo*

Although Airbus doesn't release exactly how many planes are made where, expect Mobile to be turning out a good number of them. At capacity, Tucker said, Mobile's assembly plant can't fulfill all of the company's U.S.-based orders. On the other hand, "with a few minor tweaks" it can increase its production rate from four a month to eight per month, she said.

"Any A320 order anywhere in the world for any airline is good for Airbus, because it shores up our backlog, our order book, which then is good for Mobile because we are part of the worldwide global production network," Tucker said.

"You can always celebrate any A320 order, but we're certainly happy when there is one for a U.S.-based airline because that ups the opportunity for those aircraft to come here."

Not long after the Indigo order, another order came in that was clearly a win for Mobile: Atlanta-based Delta Air Lines ordered 100 A321neos.

Airbus Chief Executive Officer Tom Enders said it is "good news for our employees in Mobile, Ala., where most of the Delta planes will be manufactured."

Chris Curry has been executive director of the Mobile Airport Authority for less than two months, coming from Tallahassee where he was aviation director. He's counting airplane orders and studying the available space at Brookley for a possible second assembly line.

"I think the combination of the two is a significant economic impact to the community for, it appears to me, at least a couple of decades," Curry said.

Second line?

In no small part because of the extended tanker competition with Boeing - a contest Boeing ultimately won - Airbus' interest in locating a final assembly line at Brookley was known for years in Mobile. News of a possible

second assembly line came seemingly out of nowhere, when Airbus announced in October that it would take – not purchase -- a majority stake of Bombardier's CSeries aircraft.

Bombardier is headquartered in Montreal and the CSeries final assembly line is in Quebec. The plane itself is a single-aisle configuration with 100 to 150 seats, compared with the Airbus A320neo capacity of 164 to 189. The second final assembly line in Mobile would serve U.S. customers, according to a joint news release.

But the details, including state or local incentives, if any, have not been worked out completely. It's not known, for instance, if the CSeries parts would be shipped by water, air or railroad. And the outcome of a trade complaint filed by Boeing could mean the second line won't happen at all.

But Bombardier in November said it would spend $300 million on its CSeries assembly facility in Mobile, creating as many as 400 to 500 direct jobs and 550 to 700 indirect jobs at supplier and support companies. The forecast was part of a regulatory filing, according to the *Montreal Gazette* and *Wichita Business Journal*.

The announcement about the Airbus/Bombardier deal was a bombshell.

"Color me very surprised," said Richard Aboulafia, an industry analyst and vice present of The Teal Group. "Wow, I didn't see that one coming. Not only didn't I see it coming, I didn't see Bombardier being willing to surrender the program for $1."

Bombardier was known to be having financial problems with the CSeries. Aboulafia said he thinks the company was running out of money.

"They just don't have the global critical mass that Airbus does," he said. "They had always bitten off more than they could chew with the CSeries. That was clear."

But the future of the CSeries in Mobile depends on the outcome of a trade dispute between Bombardier and Boeing. Boeing claims that a deal between Bombardier and Delta for 75 planes undermines the American manufacturer because Bombardier allegedly set unreasonably low prices. The administration wants to slap a 300 percent tariff on the planes.

The 50th jetliner built in Mobile was delivered to Delta Dec. 15, 2017. *Airbus photo*

Planes built in Mobile, however, could be considered American-made. Bloomberg.com quotes a U.S. government fact sheet as saying the tariffs apply to planes entering the country "partially assembled." That issue also must be resolved.

The International Trade Commission will make the final determination of whether the Delta deal actually harmed Boeing, Aboulafia said. The final hearing was scheduled to begin Dec. 18.

"They can determine the damages, and then if the ITC says, 'Yeah, but they weren't hurt,' those damages vanish," Aboulafia said. "Everything goes away. There are no tariffs, and there's no reason for that second line."

The partnership must jump through various regulatory hoops as well.

"We've announced our intent to put an assembly line here for the CSeries aircraft in Mobile," said Tucker. "But the caveat is the deal is not done. The deal has to be approved, to go through all kinds of regulatory approvals, which we don't expect until towards the end of next year."

Aboulafia predicts the second line won't be as large an operation as the original $600 million plant because the CSeries program isn't as big as the A320 series. But the CSeries "is still a very good jet," and Airbus can make money on it despite Bombardier's financial problems.

As for the airport authority, which would lease additional land to Airbus if needed, Curry is making plans.

"We believe that it certainly will require additional land for expansion," Curry said. "Once the announcement was made we started looking and talking with representatives of Airbus to determine how much land and where it should be located. That process will continue over the next maybe eight months, as far as the planning."

Curry adds, "The impact is significant, both directly and indirectly. Certainly the opportunity to add additional jobs in this community, but also with the amount of traffic and businesses associated with their expansion, we hope that it would also lead to additional air service opportunities."

- Jane Nicholes

Analysis

NASA eyes research park outside SSC

New Orleans, La.

It's always a relatively small turnout at the annual Aerospace Alliance Summit, but participants are some of the key aerospace players in the region, so the value of the event goes far beyond the numbers.

This year's summit drew more than 120 to the Renaissance Arts Hotel in the warehouse district of New Orleans. I attend because I know there will be something noteworthy. And there was.

I missed the first evening, the welcome reception at the National World War II Museum's Boeing Pavilion. The dinner keynote speaker was John Shannon, Boeing's program manager for NASA's Space Launch System.

But I was there for the second day of the summit, where the keynote address was given by Greg Wyler, CEO of One Web. If you don't know of Wyler, you should. He's a man of vision, and he knows how to get things done. He discussed his company's program to enable affordable internet access for all. OneWeb plans to build up to 800 satellites at Exploration Park, just outside Kennedy Space Center, Fla.

But it was the panel of experts from three NASA centers - two of them from the Gulf Coast region - that piqued my interest. They discussed the roles their centers play, including the impact on the surrounding area and expectations for growth.

It was during this panel discussion that Dr. Richard Gilbrech, director at Stennis Space Center (SSC), Miss., since 2012, caught me by surprise. He said SSC was looking at creating a "near-site research park," and that SSC was on the verge of releasing the notice of availability.

Less than two months after that comment, it happened. An official Notice of Availability was posted at FedBizOpps Dec. 4. It says NASA is searching for a non-federal partner to lead the development of Enterprise Park, a 1,100-acre technology corridor on the north side of the complex. Responses are due on Jan. 12, 2018.

More on that later.

David Tortorano

Gilbrech was one of three panelists during the second day of the summit. The other panelists were Todd May, director of Marshall Space Flight Center in Huntsville, Ala., since 2016, and Keith Hefner, director of Michoud Assembly Facility in east New Orleans since January 2017.

Before that panel discussion, Don Pierson of Louisiana Economic Development, set the tone when he pointed out that the four states in the alliance share a unique bond thanks to NASA and its space programs, including the current Space Launch System that will bring astronauts into deep space.

"In Huntsville they design it, in Louisiana we build it, in Mississippi they test it, and in Florida they launch it," he said.

Then to the podium came Frank DiBello of Space Florida. He's another can-do guy, so much so that *Florida Trend* last year named him Floridian of the year because of the impact he's had diversifying Florida's space activities from a NASA launch site to a major player in commercial space.

"The mandate that we have is to take aerospace, aviation and space and make sure that Florida has the infrastructure to succeed in those marketplaces, whether that's roads and bridges, or launch pads or manufacturing facilities," he said.

His vision is expansive.

"We hope to grow the space launch capabilities in Florida where today the cape is the busiest space port in the world with about 30 launches, to a level where we're somewhere between 100 and 200 launches, and that's a year. And that's not inconceivable."

May of MSFC said he has been working on the Space Launch System for about six years. He pointed out that there are 42 states that have contracts for the rocket alone, and of the companies with contract, about 800 are small businesses.

All the major pieces of SLS are now complete, and NASA is involved in outfitting and structural testing of the hardware.

"Deep space is uniquely challenging, and that means it's going to take a lot of innovation to pull off," said May. "Building a rocket is actually fairly easy. Building a rocket the size of the Statue of Liberty that's more powerful than 31 747s and can take 12 double-decker buses into space in one launch is uniquely challenging."

The challenge spawns innovation.

"By doing what we do we really create innovation and create the market. And that's just on the technological challenges that we have in front of us. The technological challenges when you're pushing the envelope of the performance capabilities drives innovation. And all these companies get the benefit of that technological edge and then they go out and turn into other markets," May said.

May pointed out that NASA was the technological engine that propelled Huntsville into being one of the leading innovation/technology centers in the United States, with a high concentration of Ph.Ds.

He said Huntsville is working with the state of Alabama to have companies like Blue Origin build their engines in Huntsville. Blue Origin is currently building a plant near Kennedy Space Center where it will build the rockets.

May said Huntsville is also working to bring Sierra Nevada to Huntsville.

"So we are doing our part."

Hefner said Michoud was originally created by federal government to build cargo planes for WWII. 1961, NASA acquired the facility so it could work on the massive Saturn V. Between 1981 and 2011, Michoud built all 135 space shuttle tanks.

He said Michoud has 832 acres of prime real estate available, along with 2.2 million square feet of manufacturing space. It has more than 20 tenants, which has helped reduced NASA's operating cost. Michoud, home of the National Center for Advanced Manufacturing, is where the SLS core stage and Orion space capsule are built.

Gilbrecht said Stennis Space Center was created to provide NASA with a location to test powerful rocket engines. The requirement was a sparsely populated area with rail, roads and water access, close enough to population centers from which to draw a workforce. SSC is a 140,000 acre site with a 15-mile circle around the center.

"Imagine trying to recreate that in today's litigious world," he said.

SSC has test stands that are able to hold down a rocket with a thrust of 7.5 million pounds. It tested all the stages that sent astronauts to the moon and avoided closure after the Apollo program by diversifying at becoming the home of more than 40 tenant agencies, including the Navy, which was the first and now the largest tenant.

SSC has 15 RS-25 engines in its inventory, enough for four SLS flight sets before NASA would have to restart production of RS-25s, he said. With a combined 2.2 million pounds of thrust from the four RS-25 engines that will be tested in 2019, "it will probably give the stand a little bit of a workout. … My goal is not to become a launch site."

The upcoming test of all four RS-25s attached to the first stage core will be a major workout for the stand.

"We put about $250 million into our B-2 test stand getting ready for the big test that we hope will happen sometime around maybe March of 2019. I actually have never seen a stage test in my 25 years at NASA. I've been very close to those programs, but I've never actually gotten to feel that much power rattle the windows around here," Gilbrech said.

SSC has a workforce of 5,000, with 2,000 supporting NASA mission, 2,000 supporting the Navy and the other 1,000 in various commercial entities and other agencies. It has 5 million square feet of useable space, and it's 88 percent occupied.

"We also work in the commercial space arena as well," said Gilbrecht, who pointed out that since 2000 it has worked with Aerojet Rocketdyne on the RS-68 for the Air Force's rocket program. "It's purely a commercial venture between us and them."

It has also worked with Orbital ATK, Blue Origin and SpaceX. It is also working with startup companies, including Relativity Space, which is working to create 3D-printed rockets and testing engines at SSC.

Gilbrech said he's getting more into non-traditional roles as the head of SSC, including the airspace arena. The military works a lot in the unmanned aerial systems field, and SSC now has a restricted airspace over the whole 50-mile circle of the buffer zone.

"The military was a major driver of that," he said, but it can also be used by academia and industry.

As for economic development, he thinks the SSC role is key and expansive. He has looked at what other areas NASA sites have done, including Space Florida and Huntsville, Ala., with its Redstone Gateway, a nearly 500-acre mixed use park outside Marshall Space Flight Center.

For SSC, the 15-mile buffer zone and security has been positive for many of the companies that have come to SSC. They like the privacy, but it also causes of type of void. Companies that want to be close by but don't want to go through the security procedure have to be seven or eight miles away from where the action is.

That's what prompted the idea of the "near-site research park," that would "fill the niche and really poise us toward growth in the future."

The objective is to find a private or public entity to enter into a partnership with NASA to lead in the multi-phased development and long-term operation of the park at the nation's largest rocket engine test facility. The park would be designed to attract private sector participation in space exploration and space transportation activities.

Recent master planning efforts identified a need for a technology park area at SSC, and the first phase of the Enterprise Park focuses on 1,100 acres identified as the most development-ready. The property is located on the northern edge of the 13,800-acre secured area and includes sites both inside and outside the security perimeter.

While there were a lot of takeaways from the summit, the prospect of creating a research park in and around SSC was a real highlight.

I've lived near California's Silicon Valley, and I've also lived near Huntsville's Cummings Research Park. I've seen what can result when a space is created that attracts innovative, research-intensive companies big and small, whether it's designed to work with NASA, the military or other federal agencies.

A research park at SSC could attract not only space-related companies, but those involved in advanced materials and geospatial technologies. A key to success is bringing in research universities. On top of that, if efforts to create an advanced manufacturing tech park near Michoud comes to fruition, it will have a major impact for future generations.

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***Page 1 mast**: The Air Force in late November picked Tyndall Air Force Base, Fla., to host an MQ-9 Reaper Wing. Air Force photo*