

ALABAMA

2023 ECONOMIC DEVELOPMENT GUIDE

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INSIDE

Development Incentives
Success Stories
Economic Sectors
International Trade
Business Resources
Statewide &
Regional Economies
Economic
Development Agencies

THE SKY'S THE LIMIT

AIRBUS ADDS THIRD FINAL
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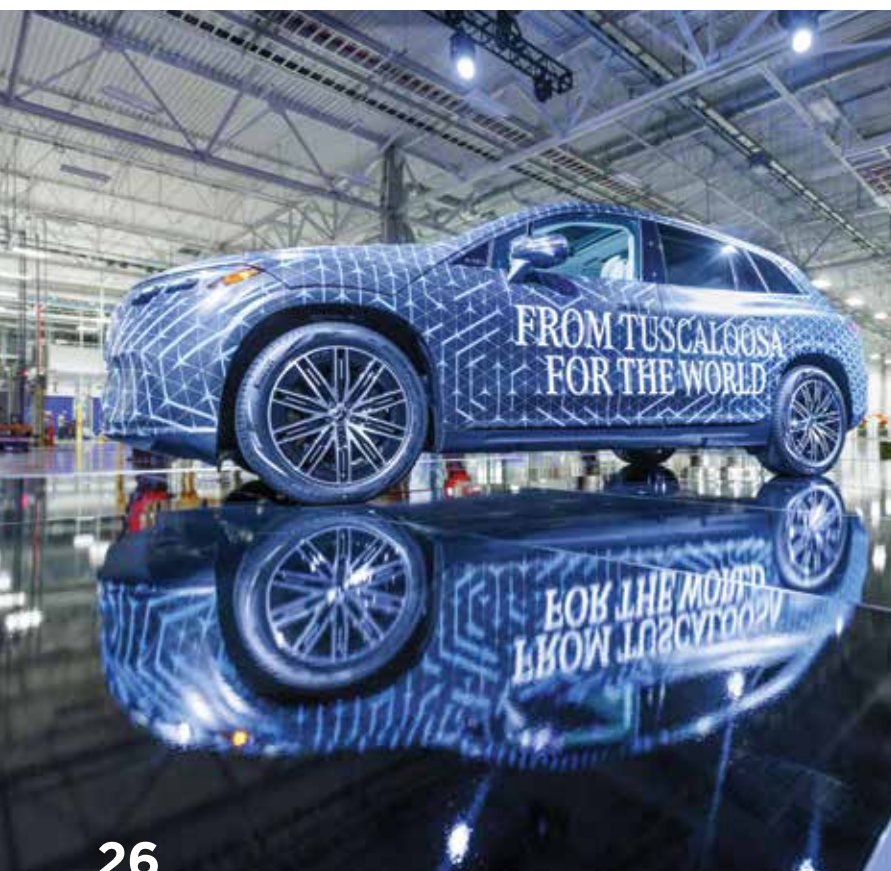
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GOVERNOR'S LETTER



Greetings from the great State of Alabama

I am pleased to introduce the 2023 Alabama Economic Development Guide.

Having once served as the assistant director of the Alabama Development Office, now known as the Alabama Department of Commerce, I have a deep understanding of how important the work of economic development is to our state. Since day one, it's been a top

priority of my administration to build on the successful track record of Alabama's economic development team. Truly, with no stopping point in sight, Alabama's economic momentum is on the rise, as more companies, some world leaders in their industry, decide to call Alabama home.

Alabama is the location of choice for many critical sectors of the economy. Our highly skilled workforce, commitment to infrastructure development and attractive economic development incentives assure industry leaders our great state provides nothing less than business success. Alabama continues to distinguish itself as a world leader in sectors like automotive manufacturing, aerospace, biotechnology and information technology. In the last five years, we've been able to create 65,000 new jobs in economic development projects, bringing almost \$33 billion of new capital investment to the state.

As we elevate the level of collaboration between the public and private sectors, we will continue to create new opportunities for the people that call Alabama home, and we remain more than ready for other top companies to plant their roots here in Alabama.

Companies that choose Alabama know our state is a great place to live and work. They quickly recognize that our hard-working citizens are our greatest asset, and our state's natural beauty truly reflects that of our people. Alabama's unwavering economic success is a great story, and new, successful chapters are being written every day.

Sincerely,

Kay Ivey
Governor

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STATEWIDE ECONOMIC OVERVIEW



United Launch Alliance rendering of a Vulcan Centaur launch.

Alabama's economy is flourishing. A pandemic tried to stop it. Worldwide supply chain problems threatened to tangle it. Raw material shortages and inflation hover menacingly at the horizon.

But Alabama just keeps buzzing forward.

By early 2022, unemployment was back to pre-pandemic levels. In fact, many major firms developed creative ways to attract and train more workers as thousands of jobs came from new and expanding employers.

Even during 2021, Alabama saw \$7.7 billion in new capital investment, second only to the record-breaking year of 2018. Rural counties shared the bounty, seeing \$2.3 billion of that total new investment. Food products company J.M. Smucker led the pack with its announcement of a \$1.1 billion plant near Birmingham.

The announcements just kept on coming during 2022.

Aluminum producer Novelis

topped the list, announcing a \$2.5 billion recycling and rolling plant in Baldwin County. United Launch Alliance, the Boeing-Lockheed Martin joint venture responsible for most of the nation's rocket launches, announced a \$300 million expansion to meet the demands of the Amazon Kuiper Project. Mercedes-Benz opened its much-anticipated battery plant, followed by production of its first electric SUV. Toyota invested \$222 million in its Alabama engine plant to make more combustion and hybrid electric engines. Canadian forest product company Canfor announced plans for a \$210 million mill near Mobile, replacing an older version. European chemical maker Evonik announced a \$175 million expansion; and Niagara Bottling announced plans for a \$112 million facility in Opelika.

Research powerhouse HudsonAlpha Institute for Biotechnology expanded

with a new location in Dothan.

And the Lockheed Martin facility in Troy got a visit from President Joe Biden, just to say thanks to the team making Javelin missiles that are helping Ukraine fend off invasion by Russia.

The state's seaport in Mobile set records for cargo movement.

Up north, aerospace giant Boeing was credited with a \$2.7 billion annual economic impact on Alabama — from rockets to research to national defense.

In less than 30 years, Alabama has moved to the forefront of American automobile manufacturing. Since Mercedes-Benz opted to build its first U.S. plant in Tuscaloosa in the mid-1990s, automotive work has been a highlight of Alabama's economy. The state boasts five major manufacturers — Mercedes, plus Hyundai in Montgomery, Honda in Lincoln, Mazda Toyota in Huntsville and a major Toyota engine plant, also in Huntsville.

Alabama's contribution to the nation's ground transportation doesn't stop at cars and SUVs. We build railroad cars, buses and trucks, too.

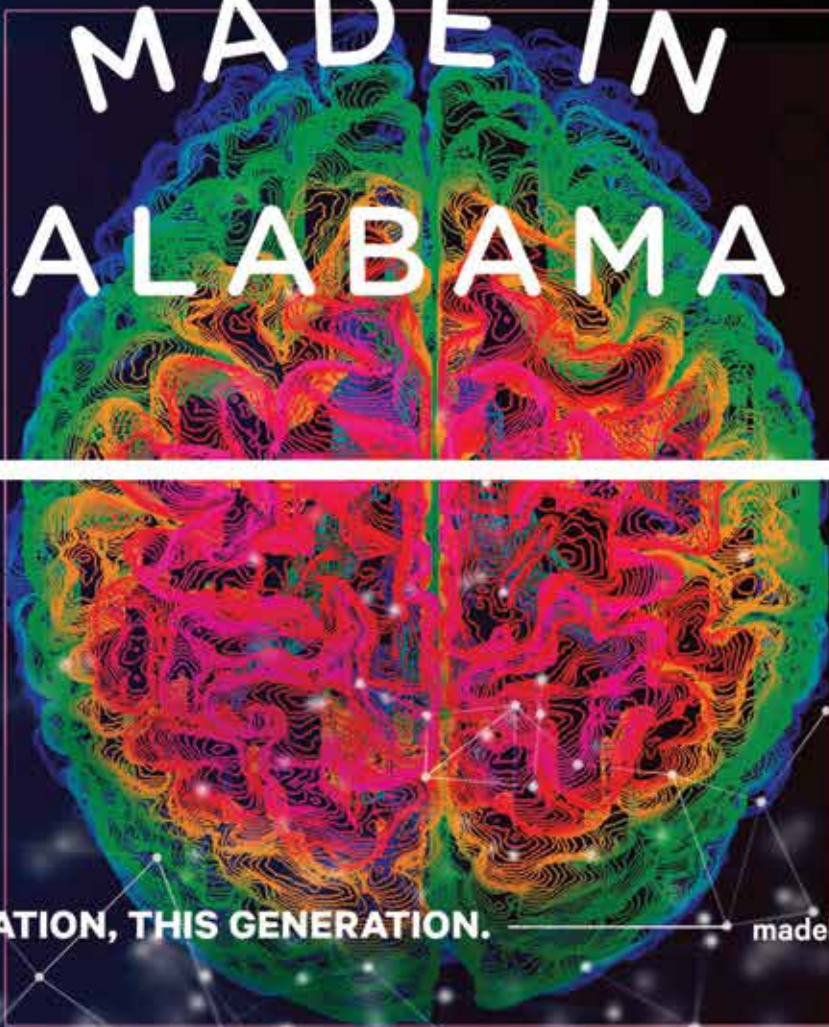
Hankering to move cargo? We build ships, too. Mobile has been a shipbuilding hub for centuries. Today Austal USA dominates the Mobile waterfront, building aluminum-hulled ships for the U.S. Navy and just kicking off new steel ship capabilities. And our Port of Mobile is among the busiest in the nation.

Want to get there faster? We build airplanes, too. Since 2015, Mobile has been home to the only U.S. final assembly line for European aircraft giant Airbus, delivering A320 and A220 family commercial jets. Now the company is adding its third FAL, markedly increasing production and employment.

And if you need to get there really, really fast — think Huntsville and Decatur. That's where we build rockets. The workaday rockets that take most



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ECONOMIC OVERVIEW

of America's payloads to space are crafted at United Launch Alliance in Decatur and the spacecraft of the future at NASA in Huntsville, with key elements coming from an array of the nation's biggest space and defense contractors — Boeing, Lockheed Martin and Raytheon — along with newcomers like Blue Origin, Beyond Gravity and Aerojet Rocketdyne.

Info tech and biotech thrive here, too. Beyond the data centers of Google and Facebook, Gunter Annex at Maxwell Air Force Base is home to that service's information technology experts.

The University of Alabama at Birmingham and its neighbor, Southern Research, have teamed to provide cancer drugs, relief from COVID-19 and more. HudsonAlpha Institute for Biotechnology in Huntsville provides cutting-edge research in genetics and encourages a quick path from research to remedy.

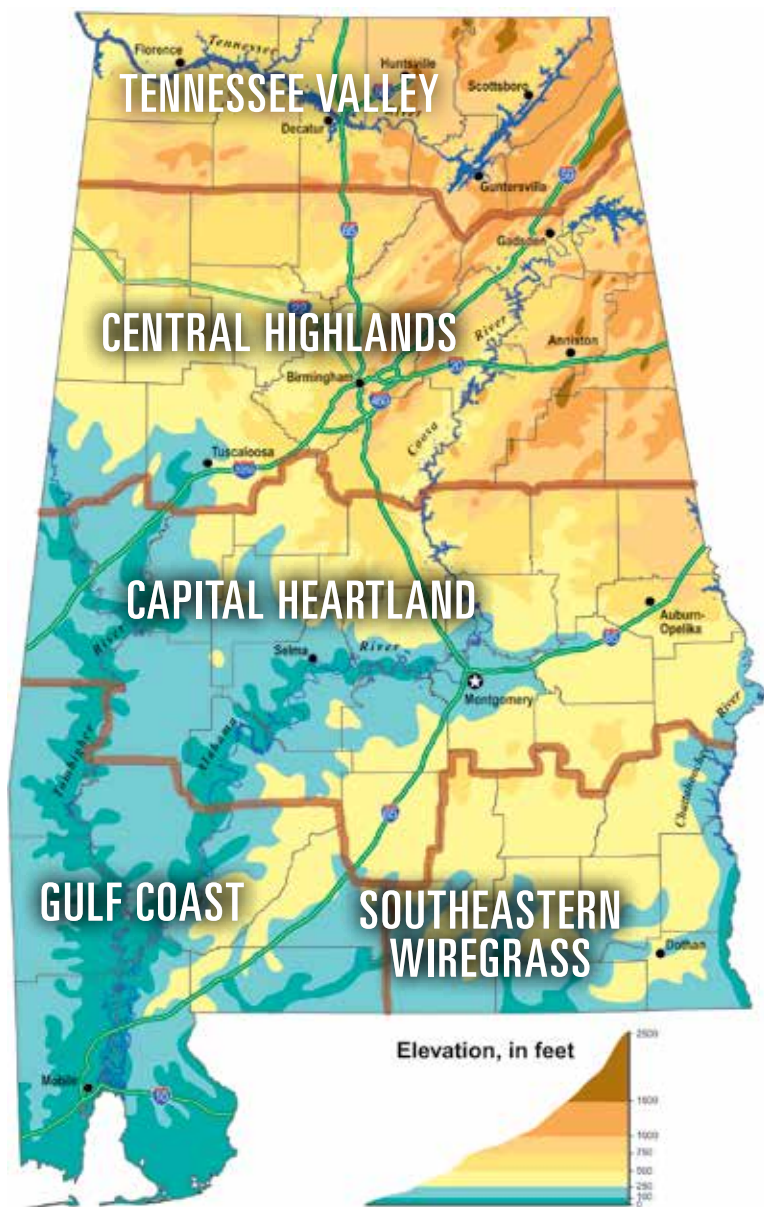
Defense industries flex their muscle in north Alabama, clustered around Redstone Arsenal in Huntsville. The missiles to protect America from threats are designed and built there and in Pike County. Military folks also tend to land vehicles in Anniston and to helicopters in Dothan. The old Fort McClellan in Anniston now trains the nation's first responders for whatever catastrophe may arise — from an Ebola outbreak to an earthquake. And the Coast Guard trains its aviators in Mobile, ready to thwart drug smugglers, protect ports and rescue those stranded on the high seas.

For decades, Alabama's universities have built football legends, but the Alabama university system is much more than sports. Arts, law, medicine, pharmacy, business — all help today's students flourish as tomorrow's leaders. Working in partnership with the state's colleges and universities and with its industrial sector, the Alabama Community College System prepares students to pursue a higher degree or a high-tech industrial career.

For all that Alabamians build, create, blast off, launch or study, the state's roots run deeper still. Crops thrive on farms rich with Black Belt soil; cotton creates a landscape of white; trees soar to the skies. Seafood thrives in the Gulf waters. And Alabama chickens feed millions here and abroad.

Beneath the surface there's coal — Alabama shipped \$2 billion worth of metallurgical coal overseas in 2018, while overall exports topped \$21 billion. Warrior Met Coal recently announced plans for a new \$500 million mine and a \$50 million

REGIONAL OVERVIEW



barge loading facility to take that coal to market. Westwater Resources is taking initial steps to process graphite in Coosa County, anticipating the market created by automotive batteries.

All the while that manufacturing thrums, commerce hums, research expands our horizons and agriculture grows, Alabama continues to attract more and more people who just want to enjoy — staring in awe at the rockets towering overhead at the U.S. Space and Rocket Center, thrilling to the zoom of NASCAR at Talladega, fishing, hunting, hiking, canoeing, watching Shakespeare or just relaxing on the sugar white sand of Alabama's Gulf Coast beaches.



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TENNESSEE VALLEY

Rockets roar, autos roll and North Alabama commerce rocks on

Alabama aims for the stars.

For nearly three-quarters of a century, scientists have worked diligently in Huntsville to convert dreams of space exploration into the realities of rockets, satellites, telescopes and propulsion systems.

In the mid 1950s, the federal government brought a team of former German rocket scientists to the nearly defunct Redstone Arsenal. From that quiet start, the U.S. leaped into the space race — an effort that continues today as NASA and a host of companies big and small work to develop the mighty new Space Launch System. No longer aiming just for the moon but also to the planets beyond, the Space Launch System will be bigger and faster, able once again to carry humankind beyond the known.

Working alongside NASA are firms like Boeing and Lockheed

Martin, who design elements of the Space Launch System in Huntsville.

Even as they work on the newest of rockets in Huntsville, Boeing and Lockheed Martin team in a joint venture called United Launch Alliance in nearby Decatur, building the Atlas and Delta rockets that have long been the mainstays of U.S. spaceflight. ULA plans to double in size to meet the demands of the Amazon Kuiper Project. Blue Origin is newest to the flock, chosen to develop a new engine for those ULA rockets — one that will replace the Russian-made version. Aerojet Rocketdyne has now joined the mix.

Now the region has been tapped as headquarters of the nation's new Space Command.

Always at the cutting edge, Huntsville is also working with Sierra Space as they prepare to land the firm's Dream Chaser space craft on the workaday runways at Huntsville



ABOVE: The Artemis I rocket, first test of the enormously powerful Space Launch System, stands ready for launch. Boeing and many other Huntsville-area firms have played key roles in this massive NASA project. Photo courtesy of NASA.



International Airport — maybe even this year.

As glamorous as its rocketry may be, the northernmost region of Alabama has many more facets. National defense goes hand in hand with Huntsville's space science. Clustered around Redstone Arsenal are firms that design and build missiles to protect the country and simulations to help soldiers learn to make the right decision in an instant. And a major FBI campus is in progress in Huntsville, too.

Cummings Research Park, one of the largest in the nation, and the newer Redstone Gateway are home to an array of defense firms like those that encircle the Pentagon. The synergy of space science and defense engineering has attracted an array of scientific minds to Alabama's northern tier — not limited to those original fields.

In fact, Huntsville and its variety of opportunities have propelled it past Birmingham as Alabama's largest city.

Automaking is a big player here. Toyota has operated a major engine plant here for the better part of 20 years and a newcomer, Mazda Toyota Manufacturing is easing toward full operations, beginning with a new Corolla Cross and Mazda CX-50.

Suppliers continue to flock here to support the OEM firms, newest among them the specialty steel maker Madison Metal Processing, a \$40 million investment.

Facebook, which kicked off a massive data center three years ago, now says its expected \$750 million investment could well reach \$1 billion. Google's data center in Jackson County, at the northeast corner of the state, is now operational.

The Tennessee Valley is also home to some of the state's brightest lights in biotechnology.

HudsonAlpha Institute for Biotechnology focuses on encouraging biomedical researchers and entrepreneurs to work together so that new developments can come efficiently to



LEFT: Spring Park in Tuscumbia.

RIGHT TOP: Muscle Shoals Sound Studio and its booster, Judy Hood. Photo by David Higginbotham.

RIGHT BOTTOM: The Rosenbaum House, the only Frank Lloyd Wright project in Alabama.

the marketplace. The Institute is making a name for itself and for Alabama in the intricate world of genetic research.

The northern tier's other industry is as varied as your imagination. Constellium makes the sheet metal for food and beverage containers in the Shoals and its new furnace can recycle 20 billion aluminum cans a year. Carpenter Technologies has added a

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HudsonAlpha Institute for Biotechnology works to research ideas and bring its results to the marketplace.

\$52 million research center in Athens, where it works on additive manufacturing technology. GE makes appliances and

Ascend Performance Materials makes high tech plastics.

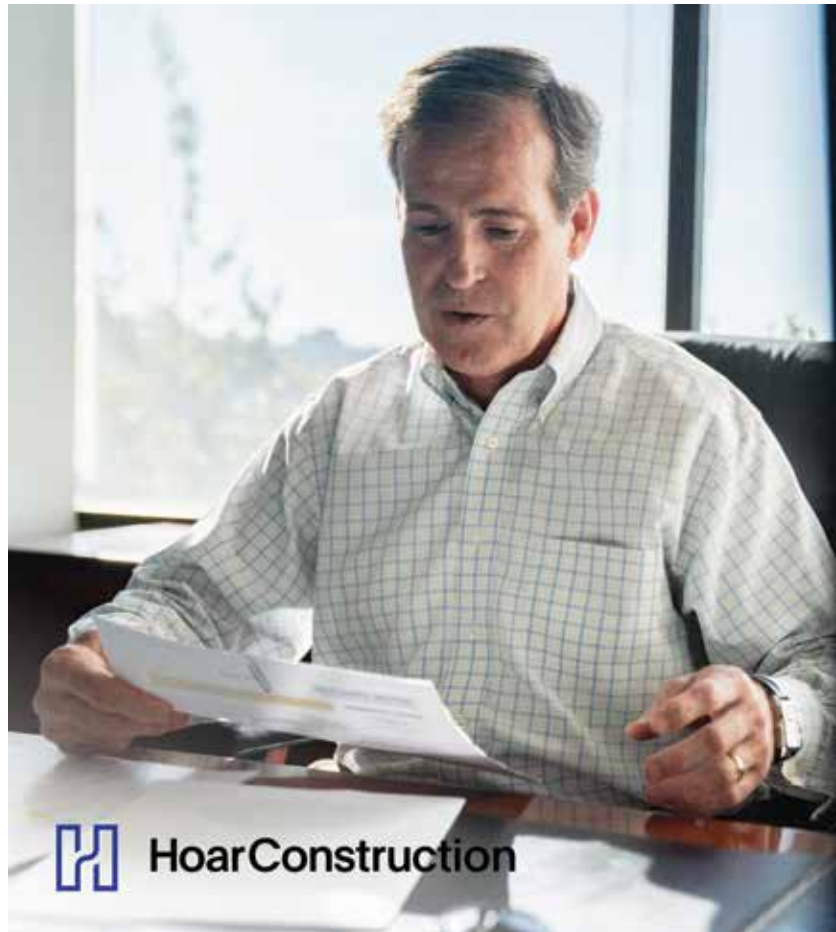
Keeping the workforce up to date, Alabama's new robotics center at Calhoun Community College trains workers in how to operate and maintain the high-tech machines, while offering space

for industry to design and test robotic components.

Agriculture is strong here, too. Marshall County leads the state in poultry processing and ranks second for producing poultry.


The northern counties offer fashion and fun, too — outdoor opportunities abound along the Tennessee River. Music is nearly as fundamental to the Shoals as the water itself. This is the home of Muscle Shoals Sound and FAME Recording Studios, where some of the biggest names in pop music recorded — from Aretha Franklin to the Rolling Stones. A new amphitheater has opened in Huntsville, backed by, among others, Ben Lovett of Mumford & Sons. Fashionistas can enjoy the hometown spaces of designers Billy Reid and Alabama Chanin in the northwest, and every winter brings the opportunity for snow skiing up in Mentone.

And baseball joined the mix when Madison opened its new ballpark, home to the Los Angeles Angels Double-A team, the Rocket City Trash Pandas.



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CENTRAL HIGHLANDS

From coal and steel to the heights of high tech

Alabama's Central Highlands are grounded in coal and steel. From that solid foundation, the region has grown and prospered in a wide-ranging economy including everything from higher education and health care to insurance and banking to biotech and info tech.

Stretching from the foothills of the Appalachians in the east to the University of Alabama in the west, the Central Highlands also boast two of the state's major automakers and the world famous Talladega Superspeedway besides.

As data centers, biotech research and information technology flourish here, Forbes Magazine pondered whether Birmingham may earn a new moniker as "the Southern Silicon Valley."

The updated image is another tribute to the adaptability of Alabama's Central Highlands.

Born in the steel industry, Birmingham still counts major

manufacturers like American Cast Iron Pipe Co., U.S. Pipe and Foundry, McWane Inc. and O'Neal Industries among the stalwarts of its economy. U.S. Steel has fired up a new electric arc furnace at its plant in Fairfield, modernizing this basic industry.

Banking gives Alabama its own homegrown Fortune 500 company — Regions Financial. PNC, which recently completed its \$11.6 billion acquisition of BBVA, plans a regional technology center here. Downtown is also home to Infinity Property

ABOVE LEFT: The headquarters of Regions Financial, the only Fortune 500 company based in Alabama.

ABOVE RIGHT: U.S. Steel rejuvenated its Alabama operations recently with a state-of-the-art electric arc furnace.



REGIONAL PROFILE



& Casualty, now part of Kemper, and to ProAssurance, as well as the U.S. headquarters of Protective Life, recently purchased as a U.S. foothold for Dai-ichi Life of Japan.

Entrepreneur Bill Smith created a grocery delivery service, Shipt, a few years back. It flourished and he sold it to Target — keeping the headquarters in Birmingham — and moved on to his next venture, a service called Landing that helps short-term residents find suitable housing in cities across the country. Now that company, too, is headquartered in Birmingham.

Biotechnology is a major player here, too. Nurtured by the University of Alabama at Birmingham and Southern Research, medical care is offered for those in need today while teams of scientists search for the causes and cures for ills still hard to treat. New medicines and medical devices are always in development. Seven current FDA-approved cancer drugs have been developed at Southern Research, while UAB is launching the state's first proton therapy option for advanced cancer care. Both have been major players in the fight to tame COVID-19.

And, while educating its students and caring for its neighbors' health, UAB also won honors from Forbes as the nation's

best place to work in 2021.

Arts, sports, entertainment and an array of eateries show Birmingham for the major city it is — among the largest in the Southeast. The city boasts seven James Beard award winning chefs and restaurants.

Thirsty? Tea, coffee and soft drinks flourish here. Soft drink firm Buffalo Rock is in the midst of a \$75 million expansion.

Despite echoes of the pandemic, the seven-county Birmingham region saw \$158 million in new and expanded industry in the first half of 2022, bringing more than 1,200 new jobs.

Tuscaloosa is home to the University of Alabama. A highly ranked educational institution, Bama also fields one of the most recognizable football squads in the nation, repeatedly winning national championships while attracting crowds to the university city.

Moreover, the Tuscaloosa County city

of Vance boasts another claim to fame as the wellspring of Alabama's auto making industry. Some 25 years ago, Mercedes-Benz U.S. International announced plans to launch a U.S. plant, and Tuscaloosa beat out all rivals for the honors. MBUSI has grown and expanded repeatedly over the years, building popular luxury SUVs — including the \$160,500 Maybach — and in 2022 introducing its first all-electric vehicle, while making batteries in nearby Bibb County. Mercedes is Alabama's leading exporter, sending vehicles to countries around the world.

Talladega County has a pair of auto-related success stories. Like Tuscaloosa, it's home to one of Alabama's major auto plants. Honda builds the Odyssey minivan, the Pilot SUV, the Ridgeline pickup and the Passport and Passport TrailSport models in Lincoln. And across the county, speed dominates the auto scene at the Talladega Superspeedway, famous for its sizzling speeds and challenging curves. If speed's your thing, don't miss the Barber Motorsports Museum, with hundreds of vintage motorcycles and a great view of the motorcycle and Indy races.

The Central Highlands are also home to the cities of Cullman, Anniston and Gadsden — all big contributors to the Alabama economy. Gadsden, on the Coosa River at the foot of the Appalachians, is Alabama's mountain gateway — a tourist attraction with a charming

ABOVE: University of Alabama students enjoy an outdoor class.

BELOW: A Honda worker puts the finishing touch on a TrailSport at the company's plant in Lincoln.





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riverfront and a popular park that showcases Noccalula Falls.

A pacesetter city, Anniston was first in Alabama to be wired for electricity, in 1882, and it added telephones in 1884. Its major employer is the Anniston Army Depot, the maintenance center for tracked vehicles. Nearby McClellan, a planned community growing on the site of the former Fort McClellan, also hosts the Department of Homeland Security's

Center for Domestic Preparedness, helping first responders from across the nation be prepared, whether they face Ebola or an earthquake. Like its Central Highlands neighbors, Anniston and Calhoun County are also home to automotive supplier firms that have emerged in the past 20 years.

Cullman, not too far north of Birmingham nor too far south of Huntsville along Interstate 65, has kept its agricultural

roots strong. It's one of the nation's top 60 counties for agricultural income. But Cullman has taken to the highways as well. The county is also home to three relatively new Tier 1 auto suppliers and a host of smaller firms.

In St. Clair County, National Cement Co. of Alabama is opening a \$250 million plant expansion, the biggest economic development news in the region.

Over to the west, Warrior Met Coal is starting development of a new long wall mine, tapping Alabama's abundant stores of metallurgical coal that's in demand especially for Asian steel processing. And to move that coal, it's investing \$50 million in a barge-loading facility near Jasper.

And in Walker County, plans are in progress to convert an abandoned mine site into property ready for development.

Smaller counties have had big news, too. Among the project wins is a \$5.5 million, 80-worker steel fabrication plant being opened in Fayette by Birmingham-based O'Neal Manufacturing Services. And Wellborn Cabinet has announced plans for a \$17 million plant in Oxford, adding 415 jobs in the city that bridges Calhoun, Talladega and Cleburne counties.

ACCELERATING OPPORTUNITY

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Close to the bustle of Alabama's largest city, there are still opportunities for outdoor recreation, like paddling on the Locust Fork.



CAPITAL HEARTLAND

Cars, cotton and civil rights create Alabama's Capital Heartland

Cotton and catfish, cars and the Capitol, universities and history — all abound in Alabama's Capital Heartland, a rich and varied land that's both prosperous and forward thinking.

This Alabama heartland lies in the famed Black Belt and once produced cotton to clothe the world. The sounds of agriculture still fill the air, but the fields now sprout products undreamed of when plantation life was at its peak. Today you'll find catfish ponds where the farmers raise \$120 million in fish and harvest

the algae to make biodegradable plastic, and even an inland shrimp farm or two.

Down the road, former cotton fields now produce bamboo, where Resource Fibers plans a harvest of flooring materials and other household products.

Trees grow here, too, for construction and paper and more. And the leftovers — the sawdust and chips and bits and pieces from tree trimming — are processed into pellets that substitute for coal. More traditional forest products thrive here. International Paper recently invested more than \$550 million to boost productivity at its Selma mill. And Ikea Group invested in its first U.S. forest, purchasing 25,000 acres in rural Lowndes County.

Also growing here is one of the most sophisticated cyber networks in the nation, a Montgomery-based partnership among local government, the Air Force internet experts at the Maxwell-Gunter



In its 150 years, Alabama's Capitol Building has witnessed history in the making.

REGIONAL PROFILE

base plus education and industry.

There's another new product growing here, too — popular Elantra and Sonata sedans, Tucson and Santa Fe SUVs and Santa Cruz pickup trucks, rolling off the line at Hyundai Motor Manufacturing Alabama — which celebrated production of its 5 millionth vehicle in 2021. The \$1.7 billion, 2 million-square-foot plant opened in 2006 and today produces nearly 400,000 vehicles a year. The plant has attracted 35 Tier 1 suppliers and another 43 Tier 2, bringing an added \$650 million in industrial investment and employing another 7,000 workers. Hyundai has invested some \$600 million more just in the last few years.

In 2020, Danish firm Mountain Top Industries announced plans for a \$13.3 million plant to make aluminum roll top covers for pickups.

The Heartland is also home to a new type of building product — a \$220 million James Hardie Building Products plant in Prattville.

And new warehouse and distribution centers — led by a \$100 million Amazon investment — are taking advantage of the busy transportation network.

Montgomery is a living mix of history and trendy lifestyle options. The city centers on the Capitol complex and all the myriad offices that handle the public's business. But just down the street one way is Old Alabama Town, showcasing the area's pioneer roots. Down the street another way are the remembrances of the hard times of the civil rights era. Turn yet another way and you find an array of nightspots, restaurants, riverfront parks and loft apartments.

And just for fun, the city and county are building Montgomery Whitewater, a \$40 million water park with a whitewater course and other attractions near the Alabama River. It's slated to open in 2023.

Education is a cornerstone of the Capital Heartland. Auburn University, the state's original land grant university, lies in the eastern edge of the region. Programs in engineering, architecture and veterinary medicine are hallmarks of the school. The state's newest medical school, a branch of the Virginia-based Edward Via College of Osteopathic Medicine, is also in Auburn.

The campus region is also home to a variety of high-tech businesses, from



Auburn University, the state's original land grant university, offers options in pharmacy, veterinary medicine, engineering and business, as well as a highly regarded liberal arts program.

GE Aviation's innovative 3D printing plant that makes jet engine components to SiO2 Materials Science, making the syringes and vials to rush a COVID-19 vaccine to the frontlines.

AUBix LLC, a \$120 million data center adjacent to the university campus, opened in 2022. And nearby Opelika saw a \$130 million expansion at the Hanwha Holdings plant where it makes pressure vessels for gas transport.

Smaller cities in the Capital Heartland are making their own headlines.

Craig Field in Selma was chosen for a high-tech aviation tower that lets air traffic controllers monitor multiple airfields from a single location.

Graphite deposits are attracting activity to Coosa County like iron to a magnet. Westwater Resources began work on a graphite processing plant at Kellyton, a \$602 million project, while Canadian firm South Star Battery Metals took the first steps toward reopening a graphite mine. The draw — graphite is a critical component in the high-performance bat-

teries needed to power electric vehicles.

Bibb County celebrated the opening of Mercedes-Benz' battery plant in 2022. Sumter County is watching progress on a \$175 million biomass plant being built by Maryland firm Enviva at the Port of Epes.

Butler County is home to a new \$86 million solar farm at Greenville. Chambers County has seen two expansions at John Soules Foods in Valley, totaling more than \$60 million.

Macon County has kicked off work on the 683-acre Regional East Alabama Logistics Park.

Phenix City is now home to a world-class whitewater course on the Chattahoochee River, a partnership with Columbus, Georgia, on the opposite bank. Phenix City is spiffing up its downtown to give those visitors a good welcome.

And you can get a close-up look at the history of the civil rights movement by following U.S. Highway 80 from Selma to Montgomery, traveling in the footsteps of the civil rights marchers from the Edmund Pettus Bridge to the Capitol steps.



SOUTHEASTERN WIREGRASS

Crops, choppers and front-porch living

On the ground, in the air and in between, Alabama's Wiregrass is thriving.

On the ground are crops to feed the Southeast and beyond — especially if they're hankering for peanuts or chicken. Pointing skyward are the trees to feed the lumber and paper mills.

In between are new industrial plants, busy participants in the state's economic clusters of aviation, aerospace, automotive and beyond. And in the air are the aircraft — especially missiles and helicopters — that are the new face of the Wiregrass economy.

This southeastern corner of the state, nestled alongside Georgia and just north of the Florida Panhandle, is the epicenter of the nation's peanut crop. More than half the peanuts grown in the U.S. are grown within 100 miles of Dothan, which honors the tasty legume with an annual festival. It's such an important crop that the city of Enterprise has a statue honoring the boll weevil,

which forced farmers to find an alternative to cotton.

Chickens are part of the agricultural mix, too, with several plants that process broilers among the major employers. And one more crop defines the agriculture of the Wiregrass — trees. Forests feed the lumber mills and provide the raw materials for sawmills, paper and wood-products plants big and small. Rex Lumber is among the newest to the Wiregrass, but it moved in in a big way, with a \$110 million investment in a yellow pine sawmill.

Over in Henry County, Abbeville Fiber LLC has invested \$40 million in a new mill to provide wood for Great Southern Wood Preserving Inc. The first logs arrived in 2019, with plans to handle 80 to 90 truckloads of logs a day at full capacity.

Henry County has also seen more than \$10 million in investments in peanut processing operations, a cotton gin and other agricultural improvements.

While farmers and foresters have tended to their crops, a new realm of industry has flown into the Wiregrass in the contrail of Fort Rucker. The Army base opened in 1942 to train troops, but in less than a decade was reimagined as the Army's aviation training facility. It continues to fill that role today, training Army



LEFT: Replica terra-cotta warriors celebrate Troy University's international ties. *Photo by Julie Bennett.*

RIGHT TOP: Ed Lisenby Lake in Ozark offers fishing, walking, birding and more.

RIGHT BOTTOM: Fort Rucker is a hub for military helicopter training and maintenance.

REGIONAL PROFILE

and Air Force helicopter pilots, as well as those from U.S. allies around the world.

CAE USA won a major Army contract and opened a new facility in 2017, training Army aviators. A major fleet of helicopters at Fort Rucker has attracted its own cluster of supporters. Lockheed Martin, Sikorsky and Bell Helicopter all maintain a presence nearby.

Dothan had been nurturing a new MRO sector — companies that perform aircraft maintenance, repair and overhaul — when its major player abruptly moved out. In 2013, local officials lured Commercial Jet into the empty property and the sector continues to move forward.

Yulista Holdings just opened a new facility to maintain both fixed and rotary-wing aircraft in Andalusia. That allows the region to take full advantage of the Alabama Aviation Center campus in nearby Ozark.

Houston County welcomed two big business announcements in 2022 — a \$62 million expansion at SmartLam North America, which makes cross-laminated timber products, and a

\$30 million pellet plant being built by Peak Renewables.

The Wiregrass is an important player in Alabama's higher education scene, too, as home to Troy University. Troy has built a reputation as an international campus, welcoming overseas students and offering Troy classes abroad. Now Dothan is home to one of the state's two new medical schools, the Alabama College of Osteopathic Medicine. The school's first students completed coursework in 2017.

And before long, the region will be serving the state's military in yet one more way. Construction is underway for the state's fifth veterans home in Enterprise.

Along with the staples of agriculture, aircraft, Army and medicine, the Wiregrass is also home to several of Alabama's most unusual businesses.

Lockheed Martin maintains its Pike County facility in Troy, building missiles to protect the world. The defense powerhouse is now doubling the size of its Pike County facility with the goal of nearly doubling its output of missiles. In mid

2022, President Joe Biden stopped at the facility to thank workers for their dedication to producing Javelin missiles that the U.S. is providing to aid Ukraine as it tries to fend off Russian invasion.

Ozark in Dale County got news of a \$25 million Ecore International plant to convert used truck tires into flooring material.

Fishing is big business in Eufaula. The city is home to Humminbird-Johnson Outdoors, which makes fish finders, depth sounders, marine radios and GPS systems for anglers, while a neighboring company, Strikezone Lures, makes fishing lures. Also in Eufaula, look for Southern Plastics, maker of wiggly plastic fishing worms for some of the nation's biggest retailers.

And over in Enterprise you'll find Enterprise Electronics. Lest you expect an appliance store, be assured that this is the home of a remarkable product — the Doppler weather radar used around the world to protect us all from approaching storms.

FUELING ALABAMA'S RENEWABLE ENERGY

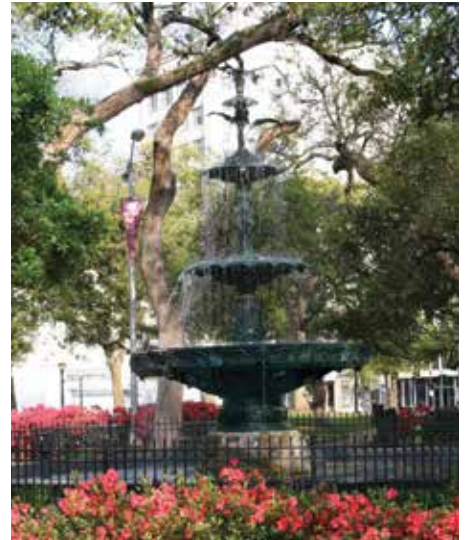
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GULF COAST

Ports, planes, ships and surf



Mobile's deep-water seaport has long been Alabama's connection to the wide world. Shipbuilding and shipping have been mainstays for centuries.

That tradition continues today, but now airships thrive alongside the waterborne variety. On the waterfront are modern variations of the shipbuilding craft that has flourished here for nearly three centuries. Austal USA, making ultramodern aluminum ships for the Navy, dominates the downtown waterfront and is the largest employer by far. Now, with the backing of the U.S. Navy, it is kicking off work on steel ships, too.

Hidden farther from the public eye, along the bayous of south Mobile County, smaller shipyards rear above backcountry roads, crafting tugboats, offshore platform tenders, shrimp boats and more. Master Boat Builders has built the nation's first electric tugboat, destined for the Port of San Diego and is at work on more.

Just a few miles away, Airbus builds commercial jets from the A220 and A320 families, augmenting the fleets of U.S. and overseas carriers for six years now. In mid 2022 came news that the global firm plans a third final assembly line in Mobile — doubling the footprint and workforce and boosting production to help meet a global order backlog.

It's sometimes hard to remember that aviation was big business in Mobile before Airbus came to town a dozen years ago. One of the region's first

LEFT: Baldwin County beaches beckon.

RIGHT TOP: Bienville Square in downtown Mobile.

RIGHT BOTTOM: An Airbus commercial jet, almost ready to test its wings.

REGIONAL PROFILE



international firms was Singapore-based Mobile Aerospace Engineering — now VT MAE — repairing and overhauling planes from the world's fleets. It's still among the region's top five industrial employers. Continental Motors, another face of Mobile's aerospace cluster that predates Airbus, is at work on a \$70 million upgrade.

Baldwin County, across the bay, also boasts a major cluster of aerospace firms — UTC Aerospace, making nacelles and more, is that county's largest industrial employer and growing.

And the air over coastal counties frequently thrums with the sound of Coast Guard helicopters, taking off from their national training facility at Mobile's commercial airport, while also protecting waterborne commerce and keeping all of us safe on the water.

Meanwhile, the Alabama State Port Authority operates Alabama's gateway to the world, where ships laden with coal, steel, chickens, chemicals and wood products head for ports around the world. The port is in the midst of massive improvements — \$366 million worth — deepening the channel and extending docks, while also adding the containers and cold

Top: Austal USA adds a steel shipbuilding facility on the Mobile waterfront.

Bottom: Outokumpu Oyj makes stainless steel in Calvert on the Mobile-Washington County line.

storage and cranes to move ever more goods. And a new roll on/roll off terminal is under construction, hoping to provide a new gateway for Alabama's automotive products, the state's largest export. In 2022, the port set records for cargo.

Steel, chemicals and timber are also big business along the Gulf Coast.

Just a few years ago, German-based ThyssenKrupp built a massive, \$5 billion steel mill at the Mobile-Washington County line. When the steel market nosedived and ThyssenKrupp backed away, the prospects looked bleak. But almost before you could say, "Fire up the furnace," world stainless leader Outokumpu Oyj, a Finnish company, had purchased the stainless mill. Then a partnership between the world's largest and second-largest steel producers — ArcelorMittal and Nippon Steel — had the cold rolled steel mill up and running. AM/NS Calvert, as that mill is called, is now adding an electric arc furnace and

other improvements totaling \$775 million.

Chemical plants line the riverbanks, winding inland from the Bay — making products from herbicides to sugar substitutes.

The Mitchell Cancer Institute at the University of South Alabama is a significant contributor to the state's bioscience sector.

And now the coast is sorting out a new line of work — an Amazon sortation center and a Walmart distribution center opened within a few miles of each other, taking advantage of the interstate, port, air and rail connections. And a new \$350 million logistics park is in progress to help goods get to the port. Grocer Aldi and food service firm Imperial Dade have announced new distribution facilities in Baldwin County across the Bay.

Baldwin County welcomed Novelis Inc. to its industrial mega site. The Georgia-based firm plans to invest \$2.5 billion to create an aluminum plant there, part of its massive global operation recycling aluminum into re-use ready sheets.

In Escambia County, farmers and merchants have teamed on a new peanut processing plant, allowing local growers to increase their share of profits from their first-quality produce.

Clarke County announced plans for \$464 million expansion at the Boise plant in Jackson.

And beyond news of major expansion at Austal — \$109 million as it adds steel ship building — and \$69 million at nearby steel producer SSAB, and addition of a third final assembly line at Airbus, Mobile County also welcomed news of a new \$210 million sawmill investment from Canfor in nearby Axis.

But the glory of the Gulf Coast is the beach. When Alabamians think of sprawling Baldwin County, they could be thinking of pleasant suburbs, timberland, agriculture, aircraft companies and more — but most likely they're thinking of the beach. Condos with stunning views, zoos, amusement parks — including the fabulous Owa built by the Poarch Band of Creek Indians — seafood, sports venues, fishing and fun, all stretching along some of the most beautiful beach in the world. White sand, brilliant sunshine, clear water — it's Alabama's playground.



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Alabama automakers keep on rolling

BY GAIL ALLYN SHORT

Despite more than two years of the COVID-19 pandemic, a worldwide shortage of semiconductor chips and other supply chain challenges, the auto manufacturing industry — and in particular Alabama's auto industry — is rolling right along.

Alabama manufactures 15 different passenger vehicle models. The manufacturing plants run by Mercedes, Honda and Hyundai in Alabama alone have the capacity to produce more than one million vehicles a year with the brand-new Mazda Toyota plant in Huntsville expected to assemble another 300,000 annually at full capacity, according to the state Department of Commerce.

That production capacity places Alabama fifth in the nation for the assembly of cars and light trucks and in striking distance of capturing the number two spot by 2024. This comes as the industry prepares to move from assembling gas

powered passenger cars and SUVs to all electric vehicles.

"The health of the industry in Alabama is very strong," says Ron Davis, president of the Alabama Automotive Manufacturers Association. "You're going to see a transition of a lot of our industry progressing toward electric vehicles. It's not going to be an overnight thing, but all of our OEMs are gearing up for electric vehicles to be a very important part of the future."

And the industry is getting a major boost from recent passage of President Joe Biden's Infrastructure Investment and Jobs Act.

The new law sets aside \$5 billion to build a nationwide charging network. In addition, the legislation also provides another \$2.5 billion to go to communities via a competitive grant program to, among other things, ensure charger deployment reaches rural and disadvantaged communities.

And just recently in Alabama, Gov.

Kay Ivey unveiled the new Drive Electric initiative that aims, through a series of advertisements and events, to influence Alabamians to buy electrified vehicles.

"One thing can be said for certain and that is there is rapid change in both technology and therefore changes within the supply chain that are taking place today," says Alabama Secretary of Commerce Greg Canfield. "As rapidly as technology is changing, the evolution of the automotive sector from combustion engines to electric vehicle platforms are leading that change."

In Vance, Mercedes-Benz U.S. International (MBUSI), thanks to a \$1 billion expansion effort, will produce the all-electric EQE SUV and EQS SUV this year, and has a battery pack assembly plant in Bibb County for those models.

"Suppliers will also have to make a transition," Davis says. "If you have plants that produce engines, then as electric vehicles come on, the volume

of gas-powered engines will clearly go down. Those 100% focused on traditional vehicles, their business models will have to change or they could be in jeopardy for the future if they don't develop or produce products that support the electric vehicle transition."

In other expansion news, Toyota is investing \$288 million at Toyota Motor Manufacturing Alabama in Huntsville for new twin-turbo 4-cylinder and V6 engine lines and to expand the plant's production capacity by an estimated 35%. The plant also produces V8 engines.

Also in Huntsville, Mazda Toyota Manufacturing U.S.A. Inc., a jointly-owned and operated plant, is assembling the all-new 2022 Toyota Corolla Cross and the Mazda CX-50.

Down south in Lincoln, Honda is producing the 2022 Honda Passport and off-road Honda Passport TrailSport, in addition to the Odyssey, Pilot and Ridgeline vehicles, while Hyundai Motor has added the 2022 Hyundai Santa Cruz truck and Tucson SUV to its lineup that includes the Sonata and Elantra sedans



and the Santa Fe SUV.

Today, transportation equipment is Alabama's number one export. In fact, Alabama ranks number four among the states for vehicle exports, according to the state Department of Commerce. China was the number one export market for vehicles produced in Alabama with nearly \$1.7 billion in shipments followed by Germany, Canada, South Korea and

Belgium.

In all, vehicle models produced in Alabama were shipped to 83 countries in 2020.

OPPOSITE: Mercedes-Benz opened its battery plant in Bibb County in 2022.

Photo by Art Meripol.

ABOVE: A Hyundai begins to take shape at Hyundai Motor Manufacturing Alabama in Montgomery.

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HEADLINES

- ▶ Mercedes begins EV production, opens battery plant

AUTOMAKERS

- ▶ Mercedes-Benz
- ▶ Hyundai
- ▶ Honda
- ▶ Toyota
- ▶ Mazda Toyota
- ▶ New Flyer
- ▶ Autocar

BY THE NUMBERS

- ▶ Capacity to produce 1.3 million cars and light trucks each year
- ▶ 1.5 million engines produced at Toyota, Honda and Hyundai
- ▶ 150 Tier 1 and 2 supplier firms
- ▶ 40,000 jobs

EXPORTS

- ▶ Automotive products are Alabama's top export
- ▶ Exports topped \$8.5 billion in 2021
- ▶ Mercedes-Benz is Alabama's top exporter

To support the state's auto industry exports, a new \$60 million roll-on/roll-off terminal is now complete and ready for business at the Port of Mobile. The 57-acre terminal, completed in 2021, is the closest RO/RO port terminal to Alabama's assembly plants. AutoMOBILE International Terminal LLC will operate the RO/RO terminal under an agreement with the Alabama Port Authority.

The terminal has a vehicle storage capacity of more than 7,000 units and an annual throughput capacity of more than 150,000 units. It will also offer multi-modal connectivity with direct access to five class one railroads and direct access to interstates 10 and 65. Moreover, its automotive rail ramp consists of 10 tracks, able to accommodate 60 multi-levels at a time, Leonardo Montenegro, AIT's COO says.



"We're in active discussions with several auto manufacturers and ocean carriers to drive the first cars and RO/RO cargoes through the terminal," Montenegro says.

Auto manufacturers also rely on a host of suppliers to keep assembly lines moving, and Alabama has continued attracting them to the state.

Among the suppliers making the move to Alabama are Li-Cycle Holdings Corp., a Canadian-based company that is planning a new EV battery recycling facility in Tuscaloosa, making it the company's fourth facility in North America.

Li-Cycle announced that it expects to open its Alabama facility later this year and expects to employ 30 workers initially.

"They're moving into the state of Alabama to capitalize on the very important question about using electric battery technology for vehicles and having an environmentally friendly, sustainable approach to human transportation in the future," Canfield says.

Another new supplier is Madison Metal Processing, a joint venture of three companies — Toyota Tsusho America Inc., Southern Mobility Products and SteelSummit Holdings, which is a Sumi-

tomoto Corp. of Americas subsidiary. Madison Metal Processing, a steel processing plant, will supply products to other automotive suppliers and provide steel blanks for vehicles assembled at Mazda Toyota Manufacturing in Huntsville.

MMP's 110,000-square-foot, \$40 million Alabama facility, which is set to reach full capacity this year, promises to bring 40 new jobs to the area.

"I think that they [Mazda Toyota] point to the aspect of how bringing in an automotive OEM creates this satellite universe of surrounding supply chains that come along with it," Canfield says.

In addition, several suppliers expanded their operations in Alabama in 2021.

For example, in Mobile County, ArcelorMittal broke ground on a new \$775 million steel plant as part of a joint venture with the Nippon Steel Corp. The plant will produce steel for Alabama's automotive sector and other automotive companies around the United States, Canfield says. In Cullman, REHAU announced in August its plans to invest

\$50 million, which will include new production equipment and tooling and a “significant rearrangement” inside the plant. “The multimillion-dollar expansion was prompted by a contract win to build exterior polymer-based components for Mercedes-Benz SUV models,” the company said. The REHAU expansion is expected to create 125 new jobs.

But there is no doubt that 2021 was a challenging year for carmakers and suppliers in Alabama and around the country due to the worldwide shortage of semiconductor chips resulting from increased demand.

In vehicles, chips are used to operate everything from the power steering to the sensing.

To cope with the shortage, some auto makers have had to periodically slow or briefly stop production. In fact, the consulting firm and industry watcher AlixPartners last fall estimated that the semi-conductor shortage would end up costing the auto industry globally to lose approximately \$210 billion in revenues in 2021, and that production of about 7.7 million units would be lost that year.

Says Canfield, “We saw interruptions in the automotive sector and in the supply chain. There were specific issues relative to the semiconductor chip issues that really have had some impacts on production levels.”

Then there was the COVID-19 pandemic.

“Like everywhere else around the globe and in all 50 states, Alabama’s automotive industry had to deal with the issues of absenteeism from employees who were coming down with COVID and all of those types of impacts,” Canfield says.

“But at the end of the day, what can be said is that even with all of those challenges, the automotive sector in Alabama has proven itself to be quite resilient,” he says.

Davis says he has high hopes for 2022.

“The industry has learned how to run business in the middle of COVID challenges and is learning some wise things to do for meeting workforce challenges. I’m expecting 2022 to be a much better year.”

This story originally appeared in the March 2022 issue of Business Alabama.

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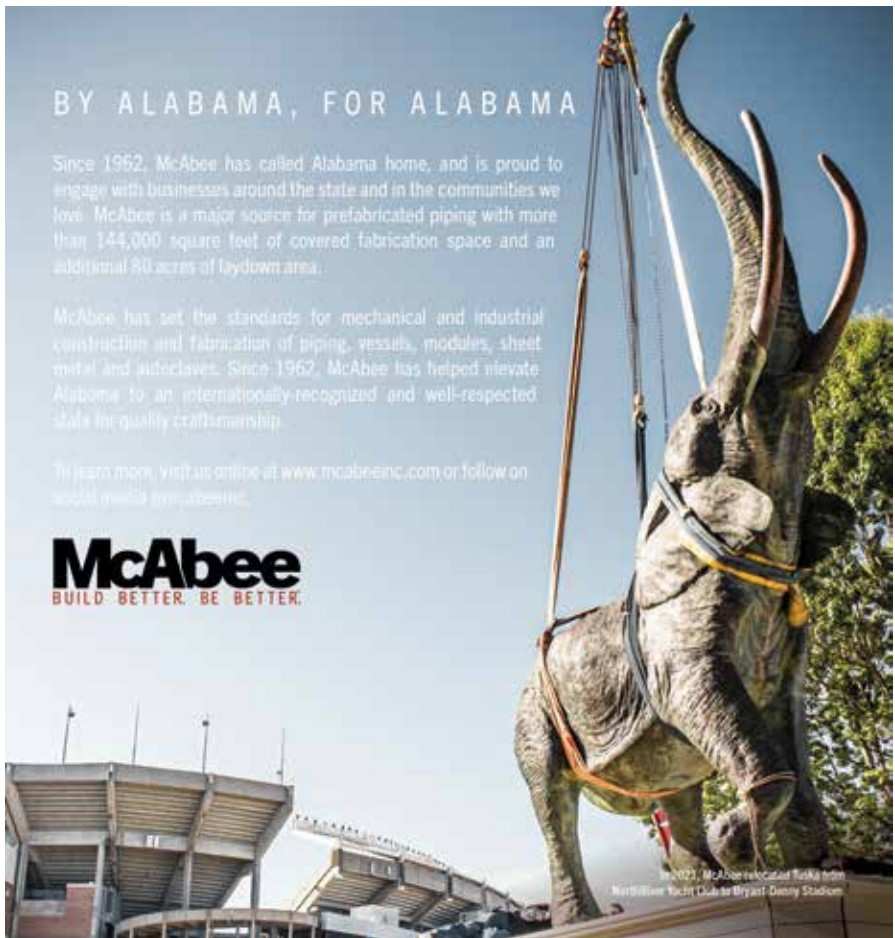
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— Paula Millirons

Chief Scientist and Principal Investigator, GeneCapture



HUDSONALPHA.ORG/INNOVATE

Southern Research expands; works to avert another pandemic

BY BILL GERDES // PHOTOS BY ART MERIPOL



Josh Carpenter, president and CEO of Southern Research.

“The most surprising thing to me about Southern Research is we really do incredible work that no one knows about and part of it is because we actually can’t tell our story,” says Josh Carpenter, who was named president and CEO in 2021.

“For example, a major pharmaceutical company produces an FDA-approved drug to treat COVID-19. We did hundreds of thousands of data points to develop that drug, but we cannot publicize our collaboration because of our research agreement.”

Every day, the Southern Research team works “to translate basic science to market opportunities for products that you and I either ingest in our bodies or through shots in our arms to make us live healthier or to make our nation safer,” he says, but even after 80 years, some of the most exciting collaborations have remained confidential.

Carpenter, an Alabama native whose Ph.D. from Oxford University is in political economy, came to Southern Research after serving as director of Birmingham’s Department of Innova-

tion and Economic Opportunity. He points out that within a 40-block area in downtown Birmingham, UAB Hospital — now third largest in America — plus Children’s of Alabama and St. Vincent’s treat 3.5 million patients a year, many from Alabama.

Southern Research, a 501-C3 company that has a strong affiliation agreement with UAB, sits in the middle of Birmingham’s medical community, he notes. As a translational research institute, it has to have good relationships with the medical community, the Food and Drug Administration, insurance companies and others whose approval is needed.

Moreover, Southern Research works to use its strengths and relationships to “create economic impact through research,” he says. “We’re not just a research institute that occasionally has economic impact. We are an economic development institution, and a vehicle for that economic development is research and development.”

In addition, he says, “Our job is to be the market-oriented commercial arm of UAB. Several peer institutions in Boston and San Francisco have similarly situated relationships with major research institu-

BIOTECH BY THE NUMBERS

- ▶ 780 bioscience companies
- ▶ 54 medical device companies
- ▶ \$7.3 billion annual economic impact
- ▶ \$392 million in NIH funding
- ▶ \$325 million in NIH funding at UAB alone
- ▶ 17,870 bioscience workers
- ▶ 576 bioscience patents awarded in 2016-2019
- ▶ 7 FDA-approved anticancer drugs discovered at Southern Research
- ▶ 16 more drugs in approval pipeline

INFOTECH BY THE NUMBERS

- ▶ 147,000 IT employees statewide
- ▶ \$1 billion in annual revenue
- ▶ 2,500 IT professionals at Maxwell AFB Gunter Complex

KEY CONTRIBUTORS

- ▶ Cummings Research Park is nation’s second largest
- ▶ DHS and the Secret Service operate National Computer Forensics Institute in Hoover
- ▶ HudsonAlpha Institute for Biotechnology is a national leader in genetic research
- ▶ Southern Research is a pacesetter in biotech research
- ▶ Alabama’s universities excel in technological research

TECHNOLOGY



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tions. Our job is to take what is generated in a test tube at UAB and perform all the steps possible to make sure that it's safe for you and me, and then to build market relationships that will ultimately grow jobs in Birmingham and Alabama."

At Southern Research, that may mean "in vitro" research, where work is done in a test tube, and it may mean work with animal models. Almost always it means working in tandem with industry, to ensure that solutions get to market.

Remdesivir, a drug that shortens recovery time for patients hospitalized with COVID-19, "is a classic example of a relationship where scientists at UAB and Southern Research collaborated to help refine the underlying chemistry of Remdesivir through the Alabama Drug Discovery Alliance," Carpenter says.

Early in Carpenter's tenure, he took bold steps, selling the Southern Research facility in Frederick, Maryland, and razing Birmingham's Quinlan Castle to make room for a \$6 million Center for Pandemic Resilience. The new construction is just one of the uses for the \$17.5 million realized from sale of the Mary-

land facility.

Southern Research is working with local and national architects as well as Brasfield & Gorrie, the general contractor, to develop a plan for the new center — with a goal of moving in during late 2023 or 2024.

"We are soliciting support from local and state governments — the city of Birmingham, Jefferson County, the state of Alabama," Carpenter says. "But we are really interested in the American Rescue Plan Act funding. We believe that we are uniquely suited for that funding given the \$35 to \$40 million that we've already performed in COVID-related research."

Carpenter says his previous role as director of Birmingham's Department of Innovation Economic Opportunity serves him well in his current position. "The reason we call that economic opportunity is because we believe fundamentally that talent is distributed equally, but opportunity is not and where we can be in a position to create opportunities for people who don't otherwise have them, we should," he says.

Brasfield & Gorrie shares that value

and looks for subcontractors who do, too. "And that's women, minority and disadvantaged business enterprises. It's a huge priority for us because it's a value for Southern Research," Carpenter says. "But also, the bottom line is this, the greater number of firms that we have that are competitive in the Birmingham area, the better quality of service will be, the more competitive pricing we will have. This is a great opportunity for us to invest in the local ecosystem and we wanted to make sure that we are taking advantage of it."

Moreover, he hopes Southern Research will "create solutions that are consequential to Alabama's health."

"We don't need to look to Boston or to the Bay Area for our pharmaceutical solutions because we have a lot of that potential here in Birmingham and in Alabama. And our hope is that we will become the type of drug discovery institute, with UAB, that will make Alabama proud, and that is what we are asking for in this building."

This story originally appeared in the April 2022 issue of Business Alabama.



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THE JAMES WEBB SPACE TELESCOPE CAN COUNT ALABAMA AMONG ITS STRONGEST ROOTS

BY ALEC HARVEY

In the hours following NASA's July release of five stunning first images from the James Webb Space Telescope, reaction was swift from awe-struck viewers from all walks of life:

"Some days we take baby steps in exploration, some days we take leaps," NASA astronaut Anne McClain wrote on Twitter. "This is a leap. A vivid, beautiful, fantastic leap."

"It's hard to overstate what impact #JWST is going to have on science, astronomy & our understanding of the universe," British astronaut Tim Peake tweeted. "Incredible images."

"I've never seen something so beautiful," said a tweeter named Saif.

Patrick Reardon was also watching, but as the director of the Center for Applied

Optics at the University of Alabama in Huntsville, he was watching with a different eye than most of the rest of the world.

"My first thought was relief that it was working," says Reardon, whose UAH team contributed to the research and development of the telescope.

And then he, too, just took it all in.

"I'm simply amazed by the images coming out," Reardon says. "They are stunning. And it's such an honor to be a part of the worldwide team that has made the James Webb Space Telescope a success."

Alabama acumen

From the moment initial design of the telescope began, more than 300 companies from around the world had a hand

in creating the largest optical telescope in space.

Among those are a number of Alabama entities. In addition to UAH, NASA lists among its partners and contributors to the telescope the Marshall Space Flight Center in Huntsville, NeXolve Corp. in Huntsville, General Dynamics in Cullman and Southern Research in Birmingham.

The companies worked in a number of areas during the research and development phases of the telescope.

Birmingham-based Southern Research's engineering division, which was later sold to Kratos, was on the team that helped TRW (sold to Northrop Grumman in 2002) win the prime contract for the James Webb Space Telescope.

"The project was called DOTA –

Deployable Optical Test Article,” says Jim Tucker, director, advanced technology development, for Kratos. “The point was to prove that a large structure that could hold a telescope mirror could be deployed in space at extremely cold temperatures with the requisite accuracy. Southern Research provided instrumentation and test setup support on the DOTA both at Space Park in Redondo Beach, California, and at the X-ray and Cryogenic Facility at Marshall Space Flight Center in Huntsville.”

Through that work, Southern Research led a team that developed a “revolutionary” thermal expansion test, Tucker says. That test eventually was used to test every piece of the telescope’s mirror and support structure, about 7,000 samples, according to Tucker.

At UAH, Reardon and his team were involved with the cryogenic testing of the primary mirror segments for the telescope.

“Because the primary mirror was so large, and weight is critical in any space project, NASA needed sufficiently light mirrors that would perform at cryogenic temperatures, temperatures at which it was expected the James Webb Space Telescope would be operating,” Reardon says.

UAH’s testing, which included temperatures of -400 Fahrenheit, found that beryllium mirrors would be best for the telescope. And who manufactured substrates for these mirrors? A Cullman company called Axsys Technologies, which is now part of General Dynamics.

General Dynamics’ Precision Structures & Optics team, which is based in Cullman, had been working on the telescope since 1998, including the 21 primary mirror segments made of beryllium, two secondary mirrors, 21 delta frames and 10 various optical components, according to the company.

The Webb telescope’s mirrors were also the focus of work done at Marshall Space Flight Center.

Marshall’s involvement in the project dates back to 1989, before it was named the James Webb Space Telescope. Instead, Marshall was working on something referred to as the Next Generation Space Telescope.

Eventually, the Marshall team provided technical oversight of the Webb mirrors

“Our team was all together in our conference room watching the images as they were revealed to the world. The images are absolutely beautiful and can be appreciated on that fact alone. I can only guess at the new findings and improved understanding of the universe that will be derived from these images.”

— Jim Moore, president and CEO of NeXolve

and Marshall’s X-ray and Cryogenic Facility was running cryo tests of the latch system, flight mirrors, actuator systems and flight hardware.

“Marshall is very proud of its role in making the Webb Space Telescope a reality,” says Dr. H. Philip Stahl, Marshall’s senior optical physicist. “The center has a 60-plus-year history of helping to design, build, test, fly and operate all of NASA’s great observatories — Compton, Hubble, Chandra and Spitzer — as well as other missions.... We look forward to having a significant role on future missions to find and characterize Earth-like planets around other suns.”

While others were helping develop the James Webb Space Telescope’s all-important mirrors, NeXolve, a Huntsville company, was looking at protecting those mirrors from the heat of the sun. What they came up with was the Sunshield Membrane Assembly, described by the company as “a tennis court-size, five-layer thin polymer film structure that prevents the sun’s heat from reaching Webb’s telescope mirrors.”

“The sunshade is a critical part of the telescope,” says Jim Moore, president and CEO of NeXolve. “The sunshield blocks the heat from the sun, allowing the telescope to reach near absolute zero temperature, which enables it to see the faintest most distant objects in the universe.”

Sit back and enjoy

The payoff came July 12, when folks at these Alabama companies, like millions of others in the world, watched as the first five images from the James Webb Space Telescope showed us parts of space we’d never seen before.

“Our team was all together in our conference room watching the images as they were revealed to the world,” says Moore of NeXolve. “The images are absolutely beautiful and can be appreciated on that fact alone. I can only guess at the new findings and improved understanding of the universe that will be derived from these images.”

Tucker, who worked on the James Webb Space Telescope for more than two decades, said he and others he talked to “had mixed emotions” when President Joe Biden revealed the first images from the telescope.

“It was a lot like sending your kid off to college,” he says. “It’s the proudest day of your life, but your child is going away. The telescope is built, tested and calibrated. It’s time for the engineers and physicists who constructed it to be done and hand it over to the scientists to use it for the reason it was made. It’s up to the astronomers to discover new things about our universe and those who brought the James Webb Space Telescope to life will move on to other projects. Now, it’s time to sit back and enjoy the beautiful pictures just like everyone else, but maybe with a little more pride.”

It’s still hard to let go, Moore says.

“Everything was designed to provide a life of at least five years, and there is a potential to operate for up to 10 years,” he says. “Of course, (the telescope) is very complex and operating in a very hostile environment. I don’t think I will relax until we have at least a few years of observations in the archive.”

This story originally appeared in the October 2022 issue of Business Alabama.



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Airbus grows and grows

GLOBAL AIRCRAFT MAKER IS ADDING A THIRD FINAL ASSEMBLY LINE, INCREASING PRODUCTION, DOUBLING ITS FOOTPRINT AND ITS WORKFORCE IN MOBILE — ALL TO MEET A WORLDWIDE DEMAND

BY NEDRA BLOOM // PHOTOS BY MIKE KITTRELL

There are only three basic concerns at Airbus in Mobile these days beyond making the popular A320/321 and A220 jets it's known for — build additional facilities that more than double the company's footprint here; equip them with all the required jigs and tools for a major

manufacturing program; and find another 1,200 or more employees when the state's at nearly full employment.

All in a time of snarled supply chains and inflationary increases to costs.

But Daryl Taylor is upbeat about it.

"We are blessed to have certainly the most successful commercial aircraft in history," says Taylor, who is vice president

and general manager of Airbus' Final Assembly Line USA.

The worldwide company has an order backlog for more than 6,000 of the single-aisle A320/321 aircraft. Glob-

Daryl Taylor, vice president and general manager of Airbus' Final Assembly Line USA.

ally, the company has been producing 64 aircraft a month. In an earnings call with investors in April, CEO Guillaume Faury announced plans to increase the rate to 75 a month by 2025 or 2026.

And that meant changes at the company's facilities.

In Mobile, it means new paint shops, new final phase flight line hangars, and a third final assembly line — big projects for a rapidly growing presence in Mobile.

Just 10 years ago, Airbus officials announced plans to have any plane-making presence in Mobile. There had been an engineering facility here for a while and a helicopter support center. But joining the ranks of cities actually making com-

mercial jets was such big news that city officials threw a party at the Convention Center.

Since the April word from global headquarters, the Mobile facility has already appointed a project manager — HPM, which superintended the first two FAL projects. Contracts have been awarded for the paint shops and hangars. Ground is being turned and a construction village is taking shape. Workshops have been offered for local companies that might like to be considered for various elements of the project.

"We will almost double the footprint of what we have in Mobile today to accommodate the growth," Taylor says.

The first pieces should be done next year, with the FAL opening in 2025.

While supply chain issues could disrupt plans, Taylor says the aircraft maker was aware of problems when it set schedules.

"From a construction point of view, we're seeing the strain on the system — delays in the steel market and in the mechanical equipment — but we're not seeing that we can't get them," says Taylor. "We've accommodated that in our timeline. That's why we've started building as quickly as we have. What might have taken us 12 months to build a building previously, it's going to be more like 15 months this time. And we've accommodated that in our detailed planning from Day 1."

Jigs and tools — the equipment needed to assemble an aircraft — are in the same situation. "The good news — most of this has been built before. We're not designing anything significantly new," Taylor says. "We're in the middle of finalizing a new FAL in our Toulouse facility so we're able to take lessons learned there. We recognize that the timeline to build some of these new tools is longer than it was before, so all of that is built into the project timeline."

"In a company the scale of Airbus, while we might not always be putting new jigs and tools into Mobile, we are putting them into Hamburg, Toulouse, Tianjin, our facilities in Canada, Germany — we have a pretty mature organization that's capable of doing this; we have a very mature supply chain."

People are the final element needed. Right now, the company employs just more than 1,400 workers. By the time the third FAL opens, it will need another 1,000, perhaps as many as 1,300.

Three new programs have been instituted to attract more workers.

First is an apprenticeship program in partnership with Bishop State Community College. Taylor, who started his career with an apprenticeship at the Airbus wing facility in Broughton in the UK, is a firm believer in the power of apprenticeship to develop workers. The



An A320 begins its journey on the original Airbus Final Assembly Line in Mobile.

45 students in the program that started this year spend several months in Bishop State classes learning the basics in a program called Flight Path 9, then spend three months in classes developed for Airbus by the state's AIDT program, and then 12 months on the shop floor rotating through a variety of workstations.

The firm has also created a new program, Airbus On Board, which offers people with five years of work experience in any field a chance to be retrained for aerospace work. The first class of 50 is in progress now, with plans to offer the program twice a year going forward.

Finally, Airbus has created Airbus Global Graduate Program, bringing new college graduates to the team. The first cohort has four people, but plans call for increasing it to 20 or 30.

"We're trying to create a mix of developing our own talent and hiring," says Taylor. Hiring 1,200 people simply by tapping the market would not be feasible, he says. But if Airbus can find two thirds of its needed personnel through its own training programs and connections with nearby universities, the task becomes



Though its headquarters is in the European Union, Airbus and its U.S. customers like the idea of planes built on home ground.

more manageable.

With all the need for growth, why Mobile?

U.S. customers like the option of U.S.-built planes, he says. Delta, American, Frontier, Spirit and United (which is waiting for the A321XLR) all appreciate

the convenience of picking up new planes here rather than in Europe.

Since opening in 2015, Airbus Mobile has delivered 300 A320/321 aircraft. The demand is also growing for the A220 craft, made in Mobile and in Mirabel, Canada. Delta, JetBlue, Air France and KLM have been adding the smaller jet to their fleets and startup Breeze Airways has built its entire business plan around the A220. The excellent Bombardier design coupled with Airbus expertise supporting commercial aircraft are leading to an exponential growth in sales, Taylor says.

More than that, Mobile has offered Airbus an unusual degree of support. City, county and state officials have stood alongside business leaders to welcome Airbus, support its plans nationally and help it succeed.

That alignment for support, says Taylor: "That's the magic source that happens in Alabama that doesn't happen elsewhere."

This story originally appeared in the October 2022 issue of Business Alabama.

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HIGH-TECH WONDER

CONSTRUCTION COMPANY USES VR TECHNOLOGY TO EXPAND CLIENTS' VISION

BY GAIL ALLYN SHORT // PHOTO BY CARY NORTON

When Murphy McMillan, principal at LMS Investment Management, and his team wanted an early walkthrough of the Birmingham Building Trades Tower that they are restoring in the Five Points South neighborhood, they toured the facility, virtually.

Instead of an in-person visit, McMillan says the team donned specialized headsets that gave them the sensation of walking through finished apartment units, with every detail in place, from the light fixtures to the flooring.

"We thought it was great," says McMillan, who is overseeing the 12-story restoration project that is set for completion in 2022. "We were able to get a sense of proportions, finishes, colors, everything. We thought [virtual reality] was a killer idea, and it really turned out to be helpful."

Robins & Morton, the contractor on the project, organized the walkthrough and is one of a growing number of construction companies that have turned to virtual reality (VR) to enhance their planning and building processes.

McMillan says that unlike traditional architectural drawings on paper, VR technology made it easier for him to envision how the apartment units will actually look once completed.

"Having the virtual reality was a great way to help me understand exactly what we are doing, to see it with my own eyes and feel comfortable with it," McMillan says.

VR is hardly new. The technology has been around for a couple of decades. But the applications for VR are expanding all the time across industries, and the construction industry is no exception.

Robins & Morton is now using virtual reality for construction site walkthroughs, training and more.

Virtual reality uses powerful computer modeling and simulation to create a 3D environment, so that participants wearing specialized headgear get the sensation that they are standing, moving and interacting within that environment.

The images that VR technology generates can be so realistic that — beyond gaming and entertainment — VR today is being used to train pilots, design aircraft and even plan surgeries and train

Steve Moore demonstrates the VR system he manages at Robins & Morton.

medical students.

"We've been using virtual reality off and on for probably a decade at this point, but not to the level we're using it now," says Steve Moore, manager of innovation at Robins & Morton.

In the past, he says, Robins & Morton relied on a simple, plug-and-play, consumer-ready version of VR technology. But today, they are using more advanced computers that can present far more realistic simulations and images.

In fact, Robins & Morton has its own innovation lab where Moore experiments with new technologies and processes.

"Now we're going for much higher fidelity, more powerful hardware and even custom development and software," he says. "It's to the point where if you walk up to an electrical outlet on the wall, you'll see the smudge marks or imperfections. This gives a hyper-realistic experience."

For Robins & Morton, the benefits of VR technology are many. The technology, for example, helps managers and supervisors collaborate remotely, as well as conduct virtual walkthroughs with trade partners.

"We have multiple VR headsets that we can plug in, and we can all go on a walk in a building together and look at all

the pipes and the electrical and see how it all fits together as though we're walking in a real building," Moore says.

The technology also enhances their clients' ability to envision architectural plans, Moore says.

"When you're looking at two-dimensional drawings, it's like looking at a picture on the wall," Moore explains.

But with VR technology, says Moore, the experience of looking at renderings is more like physically stepping into a picture, and thus, taking the guesswork out of building an image in one's mind of what a space will eventually look like.

VR technology also makes creating mockups easier and faster, Moore says.

"One of the beautiful things about building in a virtual world is that it's a whole lot faster than building in the physical world. So, when it comes to building, testing and iterating, we're able to do that over a shorter span of time," Moore says. "For example, when we talk about mockups for a building. It takes a long time to get ahold of a lot of the materials. Even getting ahold of a specific tile or certain floor finishing is a big process. VR allows us to just skip through all that because we can render it virtually a whole lot faster."

Another advantage of virtual reality is that it lets Robins & Morton obtain feedback from clients earlier in the construction process, he says, which reduces rework. And reducing rework saves money and helps keep a construction project on schedule, Moore says.

"Virtual reality takes all the guesswork out of building that image in your mind. It brings everyone on the same page and gives us feedback from the client a lot faster, but also better feedback from the client because they can fully understand the vision," Moore says.

In the case of the Birmingham Building Trades Towers, McMillan says the VR technology helped his team spot potential problems right away.

"We saw that the showerheads in the bathrooms were very low and, with virtual reality, we could actually go into the shower and stand there and look at the height of the shower heads. So, we were able to identify that immediately and make that change before construction started," McMillan says.

Moore says, "Clients are able to give

us feedback that we've never gotten before, and that dramatically reduces our rework. It also helps us to order all the correct materials the first time."

Early feedback from clients is especially important when it comes to more complex endeavors like hospital construction projects.

In Roanoke, Virginia, Robins & Morton is part of the construction team for a more than \$300 million, 500,000-square-foot expansion of Carilion Roanoke Memorial Hospital. The expansion, which is set for completion in 2025, will include a new 10-floor cardiac patient tower and a renovated emergency department.

For the project, Robins & Morton created "hyper-realistic" VR mockups that could immerse visitors into true-to-life hospital spaces.

"Virtual reality has really been a game changer," says Marguerite Underwood, senior director of the Carilion Clinic's Cardiovascular Institute. "That's because typically in a project like this, you have the department leaders come together and pore over drawings with the architect, the design teams and the equipment vendors, and you come up with a plan and then go back to the boots-on-the-ground staff and say, 'This is what we're doing.' But they can't conceptualize that."

She says Robins & Morton's VR technology has allowed medical staffers to see how the spaces will flow and function in real life.

"What's wonderful about virtual reality is that we can see the rooms, the actual equipment, and the beds, furniture and everything, exactly the way it will be in the tower, down to the color of the room," Underwood says.

"We were able to bring, for example, our physicians, scrub techs and all of the staff in to get their feedback, and any feedback they gave us was taken into consideration and changed accordingly if appropriate," she says.

"Our nurses, for example, were able to go through and say, 'That bedside monitor is too high. We won't be able to see it. It needs to be a little lower or move it to the right,' and 'This showerhead is too low.' So the staff are truly a part of the design team and VR allows them to be part of the decision-making process,



VR technology allows builders and buyers to envision the finished product. Photo courtesy of Robins & Morton.

and it gets buy in. It's great for employee engagement," Underwood says.

Charlotte Tyson, vice president of hospital operations at Carilion, says she was pleasantly surprised by the technology as well.

"I really view the VR technology as a great, cost effective and timely approach to gathering input from the end users," Tyson says. "When it's incorporated early in the design phase, it allows for changes and enhancements to be made that are critical to workflow, patient satisfaction, staff satisfaction, patient safety, and, ultimately, a more positive patient experience."

But besides assisting clients, VR technology in the construction industry is useful for training construction workers, too, Moore says. For example, Robins & Morton's safety department uses virtual reality in their safety training program.

"We've actually built our first virtual reality safety application for fall protection training," says Moore. "We're able to put our workers in seemingly perilous situations virtually while they're learning to think without actually facing these dangers."

Moore says the big takeaway is to never be afraid to try and test new technologies.

"When it comes to VR, this has already been a very big win with proven benefits."

This story originally appeared in the February 2022 issue of Business Alabama.

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Auburn University is the state's original land grant insti-

tution, now offering particular expertise in pharmacy, veterinary medicine, engineering and more.

The state also has major public universities in Florence, Athens, Huntsville, Jacksonville, Normal, Livingston, Troy, Montgomery and Mobile, and a specialty university in Montevallo known for its small-college feel.

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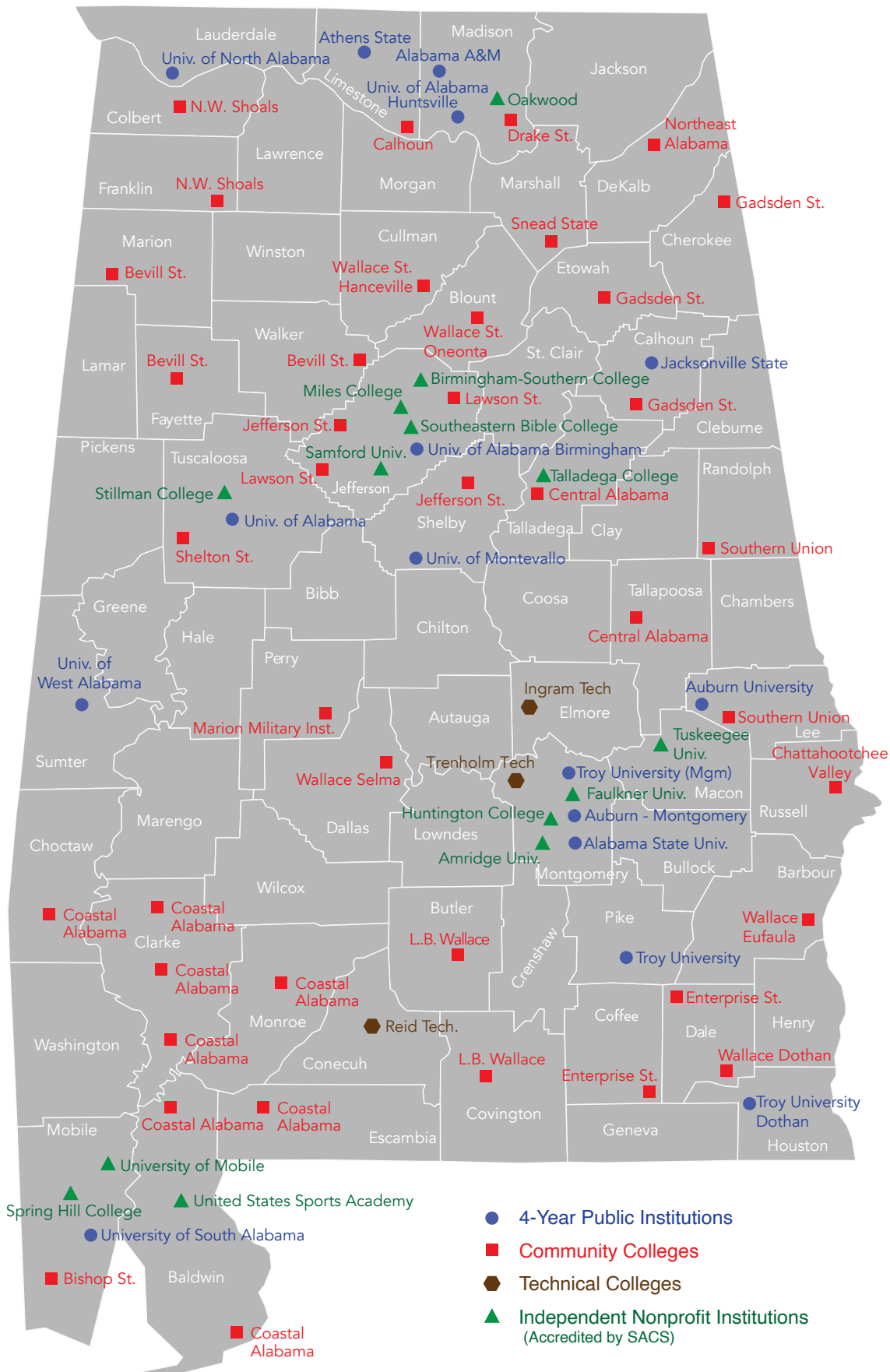
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WHERE EAGLES SOAR

AUBURN FLIGHT SCHOOL TRAINING PILOTS SINCE 1941

BY ALEC HARVEY



June 16 was not the best day for flying in Tallahassee, Florida, with clouds rolling in late afternoon, followed by thunderstorms.

Pilot Maggie Hearn and copilot Elizabeth Moorman had taken off from Auburn earlier that day, stopping to refuel in Tallahassee before taking off to beat the storms. Hearn, a senior in Auburn University's professional flight program, and Moorman, a recent graduate of the program, were on their way to Lakeland, Florida, for the 2022 Air Race Classic.

About 15 minutes into the flight, after

flying through clouds and leveling off at 5,000 feet, a low

oil pressure message made the two turn around and head back to the airport in their single-engine Cessna Skyhawk.

"A couple of minutes after that we ended up losing full power in our engine," Hearn says. "The plane was shaking a lot. ... We were probably 10-15 miles from the airport, so we knew we weren't going to be able to make it there."

And that, she says, is when their training in Auburn's School of Aviation — the only one like it in the state — kicked in.

Bumpy ride

"We're a very applied major," says James Birdsong, Delta Air Lines assistant professor and coordinator of Auburn's

aviation program. "It's not all just theory."

That's been the case since 1941, when Auburn's flight program sprang out of World War II.

"We've had a program ever since then, though the health of the program has reflected the health of the industry," says Birdsong.

The darkest time, to hear him tell it, was about 2007 to 2012.

"After the recession, nobody was hiring pilots," he says. "They raised the retirement age of pilots from 60 to 65 in 2007, so from 2007 until 2014, there essentially were no young pilots hired. It was a bleak time."

Elizabeth Moorman, left, and Maggie Hearn landed their Cessna Skyhawk in a field after losing engine power near Tallahassee, Florida, in June.



The Delta Air Lines Aviation Education Building opened in 2018.

So bleak, Birdsong says, that when he retired from the military and began teaching at Auburn in 2014, the admin-

istration was looking at closing the program, which was then part of the College of Business.

Eight years later, and part of the College of Liberal Arts since 2017, Auburn's aviation program is flying high. "I've seen it grow from less than a hundred students

in 2014 to about 700 this fall," Birdsong says. "It's grown a lot."

Aviators teaching aviators

Birdsong says there are a number of reasons for that, beginning with the people teaching in the program and the "real-world" training the program's students receive.

The program maintains a close affiliation with Auburn's airport, run by Bill Hutto, who

also teaches in Auburn's program. That affiliation between university and airport means more pilots are involved in Auburn's program than before.

"You have people with aviation backgrounds now running the department," says Jim Witte, another retired military pilot who is director of the School of Aviation and Delta Air Lines professor.

Auburn's flight students can join the program and expect to fly their first semester. "We're advocates of students coming into the program with a private pilot's license, because it shows us you are familiar with the basics and you're committed," Witte says. "It basically cuts a year off the program."

Using a fleet of 40 aircraft purchased by the university and housed at the airport, students typically graduate with about 350 flight hours. A job as a regional airline pilot usually requires 1,000 hours, so the rest come the year after graduation, with recent graduates, like Moorman, working as flight instructors.

"All the planes flying around Auburn are typically 22, 23-year-olds teaching 18-year-olds to fly," Birdsong says. "They already have jobs in hand. They just have to build their hours."

Partnering with Delta

Those "jobs in hand" are the other critical piece of the success puzzle, borne of important and strategic relationships through the airline industry.

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Education Building opened in late 2018 next door to the airport terminal. The 23,000-square-foot building houses classrooms, debriefing rooms and world-class flight simulators, which students can use to “fly” around the world.

In addition, Delta selected Auburn to take part in its Propel Pilot Career Path Program. Students selected for that program are offered jobs before they graduate.

“Delta was the point on the spear, definitely the pioneer,” Witte says. “United has come on board, very actively, and the others are following. The idea of a flight school associated with industry is absolutely critical to the product we produce. That doesn’t necessarily make us unique, but it certainly makes us good.”

Blue skies

Witte is now overseeing an aviation school that is more than surviving. It’s thriving.

The program has already outgrown the Delta building, intended for 300 students,



“All the planes flying around Auburn are typically 22, 23-year-olds teaching 18-year-olds to fly. They already have jobs in hand. They just have to build their hours.”

— James Birdsong, Delta Air Lines assistant professor and coordinator of Auburn’s aviation program

and administrators are now making plans for Delta Phase II. That addition to the current building would provide more space, including room for a second simulator, possibly for a Boeing 737 aircraft,

Witte says.

A partnership with nearby Southern Union State Community College allows graduates from that school with an airline mechanics certificate to join



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Auburn's aviation management program.

Auburn's School of Aviation is also in the process of launching a master's degree program in aviation management. Currently, the school offers undergraduate degrees in professional flight and aviation management, with a certificate available in aviation hospitality management.

In May, the university's War Eagle Flying Team won its first-ever Loening

Trophy, college aviation's oldest and rarest award. It was first awarded in 1929 by a judging panel that included Charles Lindbergh and Amelia Earhart.

"It's a big, big deal in aviation," Witte says. "The original trophy is in the Smithsonian."

In just a few years, the Auburn flight has soared to be recognized as one of the top collegiate flight programs in

the country — and the only one in the Southeastern Conference.

"We were hanging on by our fingernails," Witte says. "But now we have 700 students expected in the fall and agreements with all of the major airlines, which means very few of our graduates leave here unemployed. We're healthy and growing, with new buildings planned. It's just a complete reversal of what we had a few years ago."

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'Field. There's a field.'

Caught in the skies over Tallahassee with no engine and no airport close by, Hearn and Moorman put their hours of on-the-job training at Auburn to good use.

"There's no way to completely replicate it, but we trained in this scenario all throughout our training," Hearn says.

With Hearn at the helm and Moorman co-piloting, the two started scanning the ground for a place to land.

"My partner pointed across me and said, 'Field,'" Hearn recalls. "There's a field to land in."

So that's exactly what they did.

"We landed in a government-owned field with a big tower in the middle of it, so we had to avoid that," she says. "There were some parts of the field where there were some crops growing, so I knew that wouldn't be ideal. But there was one spot with just short grass, and that's the spot I picked. It was a little bumpy, but not too bad."

Hearn doesn't remember a lot of the immediate aftermath.

"I just hugged Elizabeth," she says. "We were so happy to be on the ground and alive. I do remember that."

And soon after, they were on the phone with then Auburn President Steven Leath, telling him they needed another plane pronto, so they could get back into the sky and get to Lakeland for the competition the next day.

"He thought we were crazy, but they sent another plane," Hearn says.

And off the duo flew to Lakeland and the Air Race Classic, where they finished second in the country among college teams.

This story originally appeared in the October 2022 issue of Business Alabama.



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Data Driven

PILOT PROGRAM IN BIRMINGHAM AIMS TO ATTRACT STUDENTS TO DATA SCIENCE FIELDS

BY GAIL ALLYN SHORT

Organizations in Alabama, and around the world for that matter, collect and generate staggering amounts of data every day from an amazing array of sources — smartphones, online activities, social networking sites, logistics tracking systems, even government reports and consumer surveys.

And it is the job of data scientists to collect, analyze and interpret that data to help organizations spot trends, patterns and problems so stakeholders can develop solutions, forecast consumer demand or come up with new products or services.

Now a new initiative in Birmingham called the Magic City Data Collective aims to attract more students to the field of data science.

“Data science is about making sense of data in the world around us where we’re awash in data,” says Lauren Rast, Ph.D., an assistant professor in the University of Alabama at Birmingham’s College of Arts and Sciences and the MCDC learning manager.

Rast and UAB Director of External Affairs Emily Wykle are co-project managers of MCDC, which is a pilot public-private partnership among UAB, the Birmingham Business Alliance and the Birmingham Education Foundation.

Through MCDC, undergraduate and graduate students take on paid internships with local employers in business, tech, education and philanthropy to work on real-world projects that require them to use their data analytical skills. MCDC is supported with a grant from the Association of Public and Land-grant Universities.

Wykle says they came up with the idea after learning that companies and organizations around Birmingham were struggling to hire employees skilled in data analysis.

“At UAB, we were hearing again and

again from employer partners that it was critical that students come out of undergraduate and graduate degree programs with the skillset to synthesize a whole bunch of information, draw conclusions and navigate that process,” she says.

Data scientists use a wide variety of computational techniques ranging from simple statistical methods to more complex and sophisticated machine learning techniques, Rast says.

“Data is embedded in almost every aspect of our modern society,” says Rast, “and, increasingly, people think of data as a commodity. So, if we think of data as this valuable commodity, then it’s really important that we have a diverse set of people with the skills to do data analytics so we can make sense out of data and derive knowledge from it.”

The fact is, data scientists are in great demand these days. According to the U.S. Bureau of Labor Statistics, the need for computer and information research scientists is projected to grow 22% by 2030.

“Anecdotally we’ve seen a huge uptick over the past couple of years in demand amongst employers,” says Emily Jenkins Hall, a managing partner with the Birmingham Business Alliance.

In the Birmingham area alone, demand for data scientists has increased 45% over the past five years, Hall says.

“Not only are these jobs and skills in demand, they also pay well,” Hall says, noting that in-demand jobs requiring data skills pay 65% more — around \$26,000 more — than the average job in Birmingham, according to BBA’s analysis of Burning Glass Technologies data.

MCDC launched its first cohort of data science student fellows earlier this summer, and organizers say they made sure the group included students from both racially and academically diverse backgrounds with participants majoring in subjects such as computer science, physics and digital marketing.

UAB senior Darryl McIntosh, 23, of Bessemer, a computer science major, says he first heard about MCDC after getting an email invitation to attend an information session about the program.

“I hadn’t really considered data before, but it was something new that I wanted to try. So, I decided to try it out,” he says.

In MCDC, McIntosh and the other fellows took a physics course called “Understanding the World Through Data.” The course introduced students to using data and modeling, as well as Python computer coding and techniques for analyzing results.

In addition to the coursework, the UAB students split into teams, and, with assistance from industry professionals at local companies and organizations — including an IT auditor, data integrity specialist, community engagement manager, data analyst and others — worked on specific projects for those organizations.

McIntosh and his team worked for the Birmingham Education Foundation, an organization dedicated to helping Birmingham City School students become college and career ready. McIntosh says they worked on creating an online dashboard that would give parents a single source to research how different Birmingham City schools are performing instead of having to search out information from multiple sources.

McIntosh says he spent the summer analyzing data from the Alabama State Department of Education Report Card website, including the average grades of each school and the attendance rates among various populations of students.

“The coding wasn’t that difficult because I had taken a class the year before in the same coding language,” says McIntosh, “but learning about the different data structures and things like that was completely new to me. So, it took me a little while to learn them. But once I started to learn more about it, it was really interesting, and I really liked it.”

Fellow classmate Faiza Mawani, 20, a sophomore political science and history major from Hoover, also worked with the Birmingham Education Foundation.

Mawani says she hopes to one day earn a law degree and use her data science skills to advocate for educational equality.

Learning to code in Python, however, was a new experience for her, she says.

"I'd never been in a situation where I had to do coding. It was something very new, but Dr. Rast was very encouraging," Mawani says.

"The class structure itself made it easy for me to understand and comprehend what was going on," she says. "And even though I still can't code for my life, I learned essential and basic foundations and my data analysis skills became stronger through the class."

For the project, Mawani says she pulled data from parent surveys to spot and analyze trends.

"I learned so much," Mawani says. "In the past I researched general topics, but doing something so specific and so real, knowing that it would make an impact on the lives of so many Birmingham students was very rewarding."

Other students worked with the Protective Life Foundation, the philanthropic arm of the company whose services include life insurance.

The UAB students, with some guidance from a Protective employee, examined the Foundation's work since its beginning in 1994. They obtained

aggregated data about total funding in key areas of giving that includes arts and culture, education, human services and the environment, and categorized the information, Foundation Executive Director Eva Robertson says.

"It's a nice thing to be able to look at the work we've been doing for a long time and answer the question, 'Are we hitting the mark?'" she says.

Cori Fain, vice president of social impact at Landing, a membership network of furnished apartments, says a team of MCDC fellows helped her company by researching Birmingham's tech talent density and diversity to create a user-friendly tech talent dashboard.

"We wanted to have a say in how it's developed because we wanted to make sure this project would help guide our investments in the tech ecosystem," Fain says.

At the end of the semester, MCDC held a "Demo Day" where all of the teams presented the results of their individual projects.

"We're very proud of everything they did," says Fain. "The tech talent dash-

board they built was a great first version of the product."

In fact, she says Landing plans to participate again right away.

"We're so happy with it that we're investing in a second year with MCDC to build out the dashboard and hopefully drive toward the public launch of this product, so that it can be made available for the community. We hope the dashboard will help public, private and nonprofit leaders make smart, targeted investments in the tech talent pipeline and ultimately support a coordinated effort to grow Birmingham's tech ecosystem," she says.

Meanwhile, Robertson gives the program high praise, too.

"I would absolutely do this again," says Robertson. "We like the program because it's about inspiring a group of diverse students to love data analytics work. That's fabulous, because we hire people like that."

This story originally appeared in the February 2022 issue of Business Alabama.



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AUSTAL STEELS THE SHIP

MOBILE SHIPBUILDER, LONG A PROVIDER OF ALUMINUM SHIPS FOR THE U.S. NAVY AND COAST GUARD, OPENS SECOND STEEL LINE

BY NEDRA BLOOM // PHOTOS BY MIKE KITTRELL

In late April, Austal USA opened a steel manufacturing line right next door to the aluminum shipbuilding lines it has operated for more than 20 years.

“In some ways it’s a seismic shift; in some ways it’s just a logical progression,” says Larry Ryder, vice president for business development and external affairs.

The addition makes Austal “the only yard in the U.S. that can build full-blown warfighter ships in aluminum or steel,” said Austal USA President Rusty Murdaugh at the opening ceremonies for the new line.

Opening in 1999 with about 100 employees, the company has grown to about 2,700 employees now, waxing and waning with government contracts but always

among Mobile County’s largest industrial employers.

Its aluminum manufacturing facilities have grown from the 90x60 assembly bay to four final assembly bays, a 700,000-square-foot Module Manufacturing Facility and support structures on 165 acres on the Mobile River, just across the water from downtown.

In the last 20 years, it has delivered 27 ships to the Navy.

Now a steel line hums beside the others.

“It’s a really significant change for the company,” Ryder says. “It gives us new markets. But in some ways, it’s just continuing what we’ve been doing — building quality ships on time and on budget.”

When Austal, subsidiary of Australian firm Austal Ltd., first dipped its toes in

Austal’s new steel line includes updated automation elements.

the U.S. Navy marketplace, the Navy wanted aluminum-hulled ships, which are faster and, because of their shallower draft, able to function in shallower water.

Now the Navy is prioritizing qualities best found in steel ships, enough so that Austal received \$50 million in Department of Defense funding to add the new capability.

“It’s not a transition,” Ryder adds. “It’s an addition.”

And the Navy has responded warmly, sending senior officials to the opening ceremonies for the new steel line.

Already a Towing, Salvage and Rescue

Ship is under contract and the firm is competing on several more contracts including a frigate class option.

Adding an entirely new capability would not be easy, says Mike Bell, senior vice president of operations, except that “Austal was really, really smart in the way it laid out the campus, setting it up to be a lean manufacturing facility.”

Says Bell, “Other yards build a ship; we manufacture a ship.”

The distinction is the adherence to lean manufacturing technics. Workspace and tools are organized just so. Individual workers check their own work and carry responsibility for its quality. “And the product itself flows in a way that gives us flexibility to build a lot of different things.”

“To go from aluminum to steel, we had to add a steel line,” says Bell. “But all other processes are the same with only minor changes.” For electricians and machinists, for example, the work is the same.

Welding steel is easier than welding aluminum, he says, so it’s easy for welders to transition. All the aluminum welders were specially trained by Austal and AIDT. But all are capable of transitioning to steel if need be.

Early work on steel ships will be much more automated than the present aluminum line, with plates cut, bent and initial welding done through robotics.

Next, pieces move to the Modular Manufacturing Facility, where they are transformed into a module; then more welding, piping, electrical, machinery, fit outs, insulation and painting. And then out of the MMF for final assembly.

With the new capabilities, says Bell, “We’ll be able to bid on anything but submarines or aircraft carriers.”

In fact, Austal is working on elevators for aircraft carriers — support work for the enormous shipbuilders who have chosen to build the enormous carrier craft.

How does the new capability affect business prospects?

“Manufacturing is always feast or famine,” says Bell. But the firm is actively bidding multiple contracts in steel and just was awarded another aluminum ship contract.

He expects employment to head back to the high 3,000s.

“Our training program is really robust,”

Bell says. “We take people who’ve never done manufacturing — we were taking people from McDonald’s and lawn care — and 12 weeks later they were welding.... Our workforce is very young, but they are by far the best shipbuilders in the nation.”

Over the last 40 plus years, he has watched the number of master craftsmen dwindle as everyone seemed to prefer a college-based career. But that has been swinging back. “Now we have master craftsmen in every line.”

Steel to feed the new line will be coming less than 25 miles from the SSAB plant in Axis, just upriver from Mobile. “It wasn’t hard to find a supplier,” Bell says, “but we’re not like a traditional yard with acres and acres of space. We only cut about two days’ worth of material.” So, it relies on just-in-time delivery, which suited SSAB just fine.

Like Ryder, Bell believes that addition of steel is just a logical step, taking advantage of the flexibility that lean manufacturing allows.

“Henry Ford revolutionized manufacturing by setting up the assembly line,” Bell says. He could build Model Ts quickly, but every vehicle was the same.

“Lean manufacturing takes what Ford did and changes it to give you the flexibility to get low production costs with the flexibility you need to do whatever you have to do.”

Buzz around the plant is entirely positive, he says.

“My team is looking forward to cutting that first piece [slated for late June or early July] and getting that first steel ship in the water.”

This story originally appeared in the June 2022 issue of Business Alabama.



ABOVE: Austal’s senior VP of operations, Mike Bell, guides Gov. Kay Ivey on a tour of the new steel line.



RIGHT: A first look at the new facilities, decked out for opening day.

HOME BASE HUNTSVILLE

AFTER WINNING FAA APPROVAL TO LAND COMMERCIAL SPACECRAFT, HUNTSVILLE INTERNATIONAL AIRPORT PREPARES TO WELCOME THE SIERRA SPACE DREAM CHASER

BY KATHERINE MACGILVRAY

A Sierra Space Dream Chaser comes in for an Earth landing. Photo courtesy of Sierra Space.



In May, the Federal Aviation Administration (FAA) issued a license that made Huntsville International Airport (HSV) the first commercial service airport in the country authorized to operate as a reentry site for commercial spacecraft, specifically Sierra Space's Dream Chaser, a reusable reentry vehicle capable of carrying payloads to and from low Earth orbit.

The long-awaited announcement marked one of the final steps of an initiative that began in 2014 when a group of public and private partners began a preliminary assessment to determine whether the airport was a contender as a commercial space reentry site. In addition to HSV and Sierra Space, the 2014 partnership consisted of representatives from Teledyne Brown Engineering; Reynolds, Smith and Hills (RS&H), an architecture, engineering and consulting firm based in Jacksonville, Florida; the Huntsville/Madison County Chamber of Commerce; the cities of Huntsville and Madison; Madison County; the State of Alabama; the University of Alabama in

Huntsville; and the Military Stability Foundation.

"We had all of these parts coming together, and they knew this project was going to be the wave of the future," says Mary Swanstrom, public relations manager for the Huntsville

International Airport. "And they wanted to have it here in the Rocket City, of course."

The following year, the coalition was able to announce that the first phase of its feasibility study — examining the spacecraft's compatibility with the airport's existing commercial runway and taxiway infrastructure — was a success. The Dream Chaser is able to land on runways that can accommodate a Boeing 737 or Airbus 320. Instead of a front wheel, however, the spacecraft uses a front skid. Morell Engineering of Athens conducted tests to determine whether the vehicle's deployed front skid plate would damage the asphalt runway. Results concluded any potential damage would be negligible. The Dream Chaser will land on the airport's east runway, 18L/36R.

The project's next step was applying to the Federal Aviation Administration (FAA) for a specific Reentry Site Operator License, which is guided by strict requirements. "This process can, and did, take several years for the application, environmental review and subsequent ap-

proval," says Ryan Gardner, senior manager of airport operations in Huntsville. Key issues considered by the FAA, notes Gardner, are public safety and environmental impact considerations, including air space, noise, historical preservation, wildlife, and waterways within the vehicle's anticipated reentry trajectory.

"Throughout the application process the prospective reentry site must demonstrate that a vehicle can safely land at the facility with an acceptable level of risk to the surrounding population," Gardner explains. Additionally, the FAA is required to comply with the procedures and policies of the National Environmental Policy Act and other environmental laws before issuing a license, and applicants must demonstrate they are in compliance with such laws as well. The airport submitted its reentry license application in November 2021, and the FAA released a draft of the environmental assessment for public review and comment. The FAA also held a public meeting to solicit comments on Dec. 9, 2021. The license, issued on May 13, 2022, will expire in 2027.

Currently, the airport is not pursuing permissions to land other spacecraft, which would require any additional reentry vehicle operators to obtain their own vehicle operator license from the FAA and would also require modification of the airport's Reentry Site Operator License. "HSV welcomes other interested vehicle operators," says Gardner. "However, if their operation differs significantly from what Dream Chaser provides, HSV's Reentry Site Operator License would require amendment to include this new vehicle."

NASA has awarded Sierra Space six missions to resupply the International Space Station using uncrewed vehicles.

The Dream Chaser vehicle will be carried as payload on the vertically-launched United Launch Alliance Atlas V rocket, made in Decatur. Since the Huntsville airport does not support vertical space vehicle launches, launch activities will take place at another site, such as Cape Canaveral.

According to proposed operations on the FAA website, the Dream Chaser's reentry trajectories from orbit will be mission-specific and defined prior to launch. During the reentry sequence, the vehicle will have set timeframes to begin its descent into the Earth's atmosphere in accordance with the designated reentry trajectory. The vehicle will reenter from the south on an ascending trajectory, with high atmospheric overflight of the southwestern U.S. or Central American countries, before landing at the Huntsville airport.

"Landing the Dream Chaser at Huntsville International Airport is one of the three pillars of our commercial space strategy," says Lucia Cape, senior vice president of economic development for

the Chamber. "The Payload Operations Center at NASA's Marshall Space Flight Center in Huntsville has been the headquarters for all scientific payloads on the International Space Station since 2001. As NASA moves to decommission the ISS and encourage commercial on-orbit platforms, we want to continue Huntsville's legacy of expertise."

The Huntsville/Madison County Chamber of Commerce has been working with the Dream Chaser team since 2015 to garner support for the initiative, build market demand and promote Huntsville as a smart place for space science operations. The Chamber has sponsored two competitions with the European Space Agency to identify commercial applications for the vehicle and hosted three workshops for industry and academic partners. They have exhibited at the National Space Symposium and Space Tech Expo Europe. In March, the Chamber hosted a panel on research and development in microgravity at the South by Southwest (SXSW) conference in Austin.

"The panel at SXSW was a great way to explain the benefits of research and development in microgravity to a new audience," says Cape. "With our partners at Rhodium Scientific, BIO Alabama and the Alabama Department of Commerce, we are working on an initiative that would provide proof of concept for products that could only be made in space. That's what it will take to make a LEO economy a commercial reality."

With the airport's license to operate as a reentry site in hand and Sierra Space pursuing its Reentry Vehicle License, Dream Chaser's first Huntsville landing is anticipated in 2023.

"We're ready," says Swanstrom. "The airport is ready. We've done everything we needed to do."

The next step, says Swanstrom, is putting a plan in place for the community and visitors to be able to watch these landings safely. "We're excited, and we want to invite the public in."

This story originally appeared in the October 2022 issue of Business Alabama.

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Alabama port in Mobile sets cargo record

SUPPLY CHAIN SNARLS CAUSED LESS HAVOC IN MOBILE
THAN AT SOME OTHER PORTS

BY NEDRA BLOOM



APM Terminals manages container cargo shipments at the Port of Mobile. The firm has invested some \$550 million with plans to invest \$72 million more and increase capacity by 50%. *Photo courtesy of APM Terminals.*

container sector over 2021.

“The port’s container intermodal transfer facility posted 112.6% growth in April compared to April 2021 volumes handled,” the port reported in May, “and refrigerated cargo also maintained its double-digit growth, posting a 57.9% gain over April 2021 volumes. This report follows eight straight months of container volume growth at the Port of Mobile.”

And yes, Driscoll notes, increases are calculated by percentage, but still, “We have been the fastest growing container port in the U.S. for six years.”

The secret is what Driscoll calls “fluidity,” adding, “that comes through partnerships. We’re a landlord.” And the tenants provide services that draw customers.

The terminal services, provided by APM Terminals, a subsidiary of A.P. Moller-Maersk, has done a great job of handling cargo surges, Driscoll says. The firm has invested some \$550 million and just finalized a fourth phase — a \$72 million project increasing capacity by 50%.

More than enough?

“We’re trying to keep ahead of the curve,” says Driscoll, “because if you don’t...”

Also key to growth is intermodal rail capability. Though the port is served by five Class 1 railroads — as many as any seaport in the U.S. — it lags in intermodal options. The solution? A new intermodal facility in the works in Montgomery in partnership with CSX. “It’s the first volley for us into intermodal,” says Driscoll. Right now, that cargo goes by truck up a sometimes-congested Interstate 65. “This will take some of those containers off I-65 and onto rail,” he says.

“It extends what we have here on the water to Montgomery,” with plans to extend on to Birmingham and beyond.

Intermodal plans allow the port to build more on one of its biggest advantages — of the nation’s seven Class 1 railroads, five touch the Port of Mobile. “But currently only one offers intermodal through this gateway. Their business is booming — up 38% year over year.

“We see that we have a huge capacity to handle interstate intermodal business,” Driscoll says.

Federal funds have been awarded to boost those intermodal capabilities with \$58 million earmarked for the Montgomery project and another \$38 million tagged for an interterminal

Since the onset of the pandemic, we’ve all experienced the cargo woes — shortages of toilet paper or hand sanitizer or masks or food; a vast absence of computer chips leaving smart cars with short-term memory loss; images of container ships offshore just waiting.

But — knock wood, a key commodity in South Alabama — it hasn’t been like that at the Port of Mobile.

“Even through the pandemic, we had very little of the vessel delays ... of getting cargo in and out,” says John Driscoll, director and CEO of the Alabama State Port Authority. “We were impacted, but not like Southern California and the East Coast.”

While the port has seen its share of blips, “it never came to anything like gridlock here,” says Driscoll, who came to Alabama from the Port of Oakland, California in 2020, just in time for the pandemic.

Even at its worst, a year or so ago, problems at the port were “relatively minor compared to what others were experiencing,” he says.

The port took advantage of its ability to handle incremental volumes and actually saw some cargoes shift here from other ports to take advantage of Mobile’s access to destinations like Memphis.

The result — a record-setting year, with 39.7% growth in the

bridge connecting the marine terminal, intermodal rail and logistics park plus related work.

All the expansion builds on improvements financed through federal funding enabled by Sen. Richard Shelby's commitment to the port, Driscoll says. Some \$366 million has been dedicated to deepening and widening the channel from the Gulf of Mexico to the port, a project that should be complete by the first quarter of 2025.

What difference does a deeper and wider channel make?

Containers, steel and coal are well served by longer and deeper vessels, which cut costs for shippers — and all three cargoes are important in Mobile.

But while coal remains a mainstay, even that is changing, Driscoll says.

For several decades, Mobile exported metallurgical coal to fire steel furnaces abroad and imported thermal coal to power electric plants here. To accommodate that, the port built a two-way coal transport system at McDuffie Island with conveyors that went ship to shore and shore to ship. Now, though, most of the electric plants have converted to natural gas. Yet another project is underway at the port to convert coal handling capabilities from an import/export mix to 100% export. And that will, once again, improve the port's fluidity, Driscoll says.

Despite the changes, he expects a record year for coal.

The main docks, which handle lumber, kraft liner board, wood pulp and such, have strong volumes both inbound and outbound. During the pandemic, outbound lumber shipping dropped as Americans jumped on do-it-yourself projects that had been waiting for the doers to have time. As the pandemic wanes, however, export lumber is back to normal, he says, and import has increased.

The port also handles parts for Airbus — another item seeing an increase. And GE is importing wind turbines for western Florida, not the blades but all the rest.

Rail ferry service — ships that allow loaded rail cars to roll on and off — is now served by bigger faster ships. They're 20% larger and three times faster, says Driscoll, so trade with Veracruz, Mexico, has increased.

And the new roll on/roll off terminal,

designed especially for auto makers and finished just last year, is likely to have a customer shortly, Driscoll predicts. Automakers are coming back to normal and their multi-year contracts through other ports are coming up for renegotiation. And Driscoll hopes that leads to automotive RO/RO business by year's end. That facility represents yet another port partnership. Terminal Zarate S.A., a Grupo Murchison company headquartered in Buenos Aires, Argentina, and Neltume Ports, headquartered in Santiago, Chile,

manage the operations.

And the main docks — “they’re chockablock,” he says. “We need more warehouse space.”

But as the port continues to attract federal funds and the cargo numbers bring good business news, he's confident the port can continue its good service. “People want to work with us,” he says.

This story originally appeared in the June 2022 issue of Business Alabama.



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Huntsville has historically been the hub of Alabama aerospace enterprise — the builders of spacecraft — but Huntsville also sets the pace for using aircraft to get things and people from one place to the other in record time. Now these two will share a common horizon as Huntsville International Airport has become the first commercial airport in the United States to receive an FAA license to land a commercial space vehicle. Working with Sierra Nevada Space, HSV anticipates that the company's Dream Chaser spacecraft could be the first space vehicle to land at a commercial airport, and that could happen right here in Alabama.

HSV celebrated 55 years of operation in 2022. However, Huntsville International Airport is not content to rest on the laurels of reaching that milestone; HSV is proactively looking to the future as innovators and visionaries. Since its inception in 1967, the airport has grown to more than 8,000 acres, making it one of the largest commercial airports in the Southeast United States. The Port of Huntsville has three key units — the Huntsville International Airport (HSV), International Intermodal Center and Jetplex Industrial Park — and is unique among airports and cargo ports in the U.S. for this convergence of passengers, cargo and business.

Passenger service is provided by six commercial airlines: American, Delta, United, Frontier, Silver and Breeze Airways. HSV has more than 54 commercial passenger flights per day to 14 nonstop destinations. More than 1.2 million customers are served annually.

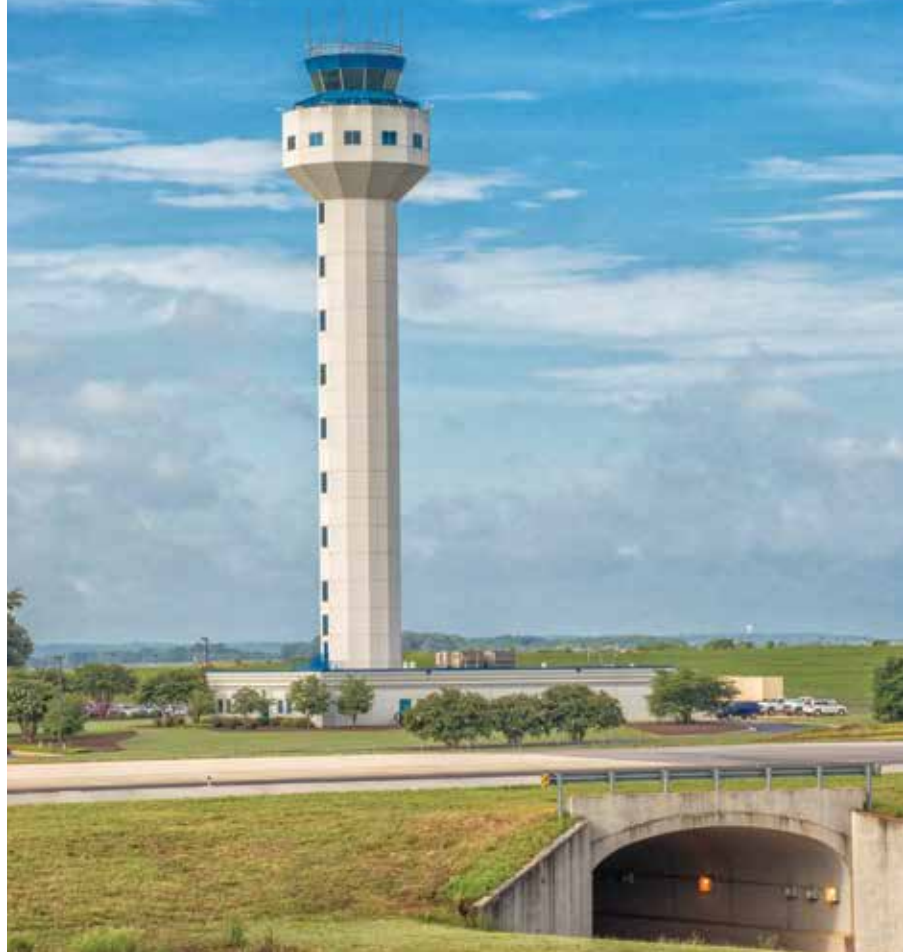
The airport features two parallel runways — 12,600 feet, which is the second-longest runway in the Southeast U.S., and 10,000 feet. HSV also has 2.3 million square feet of air cargo ramp space.

As of 2021, HSV ranked as the 21st largest international air cargo airport in the continental United States. Cargo

carriers located at HSV are Atlas Air, Cargolux Airlines, Federal Express, DSV, UPS and Kerry Logistics Network. This high-tech air cargo market is served by domestic and international all-cargo carriers. HSV has weekly international cargo service to/from Europe, Mexico, Hong Kong, China, Cambodia and Sao Paulo, Brazil.

The Port of Huntsville combines passenger, air cargo, rail and interstate access into a major intermodal hub for the Southeast.

PORT OF HUNTSVILLE



The Huntsville-Madison County Airport Authority began promoting its cargo capacities in the early 1980s with an air cargo ramp providing 50,000 square feet of cargo space. Those efforts culminated in a rail intermodal facility in 1986. The International Intermodal Center celebrated 36 years of serving the region in April and today provides a single-hub location that delivers world-class, multimodal (rail, air and highway) services and facilities. Intermodal rail service is provided by Norfolk Southern, connecting Huntsville to both East and West coast seaports.

HSV currently owns three air cargo buildings totaling close to 300,000 square feet of warehouse and office space, adjacent to 2.1 million square feet of ramp area. In 2018, HSV completed construc-



tion on an 18,750-square-foot cold chain logistics solutions facility. Combined with two existing cold-storage units of 5,250 square feet and 11,000 square feet, HSV now has 35,000 square feet of cold storage space. To date, Huntsville International Airport's investment for air cargo growth is \$212 million, with \$52 million planned in future expansion. This brings investment to a total of \$264 million toward air cargo growth.

DSV operates the only nonstop 747-8 freighter international air cargo service in the State of Alabama to Europe, Asia and South America. These markets are currently served with seven to 10 flights weekly.

DSV also provides fully integrated and customizable supply-chain solutions at its U.S. branch in Huntsville. DSV serves many of the company's largest high-tech customers in health care and the chemicals industries with temperature-controlled storage and transport capabilities. Advanced warehouse services, customizable IT enhancements and direct access to its road feeder service in Huntsville allow DSV to also provide last-minute solutions for needs of all customers.

Kerry Logistics Network established trans-Pacific air freight service connecting multiple Asian locations to the USA by locating its Americas hub at HSV in

2021. Kerry began service in September with flights originating in Hong Kong and Cambodia. Future Kerry plans include direct flights from Vietnam and mainland China.

The Port of Huntsville completed upgrades that make it operational for Group VI aircraft. Both the 12,600-foot west runway and 10,000-foot east runway meet requirements set for the 747-8s. While the 747-8 has a payload increase of 16% over the 747-400 model, it has substantial reductions in fuel burn, noise and CO2 emissions. This Group VI aircraft boasts a 224-foot, 7-inch wingspan and measures 250 feet, 2 inches from nose to tail. The new model is 18.3 feet longer and 13 feet wider than the earlier 747 models.

"Huntsville International Airport is part of a small group of U.S. airports that have been FAA-certified to support these 747-8s," said Dr. Carl Gessler Jr., Huntsville-Madison County Airport Authority board member. "We share this distinction with cities like Miami, New York, LA and Chicago. Considering the size of our community as compared to the others on the list, this truly is an accomplishment for our region."

For more information, visit the HSV's website at flyhuntsville.com.



HSV is the nation's 19th-largest international air cargo port, with six carriers.

ALABAMA STATE PORT AUTHORITY

Alabama's deep-water seaport at the Port of Mobile is located just 32 miles from the Gulf of Mexico and handled more than 54 million tons of cargo in 2020, making it one of the largest U.S. seaports in total trade, according to the U.S. Army Corps of Engineers Waterborne Commerce Statistics. The full-service public seaport terminals are owned by the Alabama State Port Authority and are served by major ocean carriers transiting today's global trade lanes. The Journal of Commerce in its North American top rankings recognized the port in both growth and port productivity.

APM Terminals' and the authority's continued investments support traditional markets and new emerging growth markets, including retail distribution, refrigerated products and advanced manufacturing in automotive, aviation and energy. Fueled by double-digit growth in the marine terminal and triple-digit growth in the intermodal rail facility, the Port Authority and its partners announced in 2022 approximately \$166 million would be invested in the intermodal assets. Starting in January, the Port Authority and CSX Transportation (CSXT) announced that approximately \$54 million would be invested in an inland intermodal rail transfer facility (ICTF) in Montgomery, Alabama. In March, the Port Authority was awarded a \$38 million U.S. Department of Transportation grant to construct an inter-terminal connector bridge to deliver on-dock intermodal rail and logistics park services to containerized cargo shippers. In May, the Port Authority and APM Terminals, announced its fourth expansion of the terminal, adding 32 acres and two ship-to-shore super post-Panamax cranes. When fully completed by early 2025, the \$74 million expansion will



deliver an annual throughput capacity of one million Twenty-Foot Equivalent Units (TEU).

With more than \$1.4 billion invested to date in public port facilities, the Port of Mobile ranks as the second-largest steel and third-largest coal port in the nation.

Alabama's metallurgical coal exports are surging to support global steel production. New mine investments top \$500 million over the next five years, driving nearly \$45 million in phased enhancements at one of the nation's largest coal handling facilities. Automotive production and consumer markets spurred additional investment to support North American automotive original equipment manufacturers (OEMs). The Authority's new \$61 million finished automobile and automotive logistics terminal provides a world-class RO/RO processing and handling facility to import/export/domestic shippers. A joint venture between Terminal Zarate S.A., a Grupo Murchison company headquartered in Buenos Aires, Argentina, and Neltume Ports, headquartered in Santiago, Chile, will operate

APM Terminals provides container cargo service for the Port of Mobile.

the new AutoMOBILE International Terminal. Terminal Zarate S.A. is one of the largest finished automobile terminal operators in the Americas.

The U.S. Army Corps of Engineers and the Alabama State Port Authority signed the Mobile Harbor project agreement to deepen the port to -50 feet. The project also includes a channel widener to provide for vessel transit efficiencies in and out of the port. In 2020, the Corps began its multi-phase construction on the harbor modernization, which will be completed by Q1 2025.

Roads

The public seaport terminals are connected to two interstate systems, I-10 and I-65, and U.S. Highways, including U.S. 90, U.S. 98, U.S. 43 and U.S. 45. This highway network supports 8-hour freight transit times into the U.S. mid-west and southeast markets.



Looking south along Port facilities.

Waterways

Extending from the deep-water port terminals are more than 1,200 miles of navigable waterways in Alabama, among the most of any state in the nation, with lock and dam structures along the Tennessee-Tombigbee Waterway, Black Warrior, Coosa-Alabama and Tennessee and Ohio valleys and the Great Lakes. The Port of Mobile is also accessible to the Gulf Intracoastal Waterway, providing coastal connections from Texas to Florida.

Rail and Air

Five Class I railroads access the port — Burlington Northern/Santa Fe/Alabama & Gulf Coast Railroad, CSX Transportation, Canadian National/Alabama Export Railroad, Norfolk Southern and Kansas City Southern. Port linkage is provided by the Alabama State Port Authority's Terminal Railway. The CG Railway offers a unique service that provides railed cargo via ship to and from Mexico's Veracruz region. The seaport is located approximately four miles from the Mobile Aeroplex at Brookley, which is home to Airbus's assembly lines for its A320 and A220 aircraft. Mobile Aeroplex also serves as the region's air cargo terminal, with three times daily service between Mobile and Memphis, Tennessee, via

FedEx. The FedEx domestic ground operation market covers Mobile, Alabama; Gulfport, Mississippi; and Pensacola and Fort Walton Beach, Florida.

General Cargo

The Alabama State Port Authority offers 31 general cargo berths, with approximately 2.4 million square feet of open yards adjacent to piers and railroad tracks, and more than 2.6 million square feet under roof. The general cargo facilities also feature heavy-lift terminals, along with a heavy-lift crane capable of lifting cargo up to 400 tons from ship to barge, rail, truck or specialized carrier. Other facilities include a freezer terminal, a cement terminal, a grain terminal and three RO/RO berths, all of which can accommodate vessels up to 40-foot draft.

Steel

Investments in the Authority's steel-handling facilities contributed to Alabama's rapid growth in the steel market. The automated Pinto Terminal applies innovation and technology to meet its 5 million-ton annual throughput capacity. The terminal has a 45-foot draft, a 1,050-foot-long ship berth, an automated barge-handling system and a slab storage yard. Pinto Terminal is equipped with three post-Panamax gantry cranes, which are the first in North America to use magnet technology in a ship-to-shore cargo handling operation. At the port, stainless and carbon steel coils are handled through a multi-modal steel coil handling facility. Alabama Steel Terminals includes a 173,280-square-foot warehouse equipped with four 50-ton bridge cranes, an adjacent 168,000-square-foot open yard, supported by integrated technology that provides shippers real time cargo data and tracking. The Pier C North yard handles both inbound and outbound carbon articles.

Coal

The McDuffie Coal Terminal is the most versatile facility in the nation, with import/export handling capability to ship, barge and rail transportation. The terminal has 3 Newcastle Max capable

berths, 3 barge loaders, 3 barge unloaders, 1 rail loader, and 2 rail unloaders to service ship, barge and rail movements. The Port Authority is launching a multiphase, \$45 million capacity enhancement and efficiency program to support growing export demand and to provide operational improvements.

APM Terminals/ Container Intermodal

The container intermodal assets deliver shore-side Super Post-Panamax infrastructure alongside a -45 foot (-50 foot by 2025) channel and berths. Ocean carriage services have been upgraded, providing 8,500+ TEU capacity vessels in both Asia and Northern Europe trade lanes. Maersk, China Shipping (CSCL), CMA CGM, COSCO, Evergreen, Mediterranean Shipping Co. (MSC), OOCL and ZIM provide weekly ocean carrier services on most trade lanes. The container terminal is part of the Authority's 380-acre Choctaw Point container intermodal project, which includes an intermodal rail transfer facility and development land for logistics. The Mobile ICTF is accessible to five Class I railroads serving markets across North America. When the Montgomery ICTF is completed in 2024, CSX Transportation Intermodal will join the Canadian National in providing intermodal service for their customers to and from the Mobile ICTF. The Port Authority also has planning underway to develop a logistics park on 125 acres adjacent to the container terminal and intermodal rail facility. One such logistics project opened in 2021 just outside the container terminal gates. Lineage Logistics operates a state-of-the-art, temperature-controlled, international distribution center providing shippers with 12 million cubic feet and 40,000 racked pallet positions for handling refrigerated cargoes. The facility offers a comprehensive suite of services, including blast freezing, port drayage and LTL Consolidation.

Rail Ferry Terminal

The Authority's Terminal Railway (TASD) operates a rail ferry terminal that provides rail shippers twice weekly sailings into the Veracruz region of Mexico via the GC Railway, a joint venture of

Genesee & Wyoming Inc. and SEACOR Holdings Inc. CG Railway recently placed into service two new vessels, the Cherokee and the Mayan, which feature a twin-deck design for quicker loading. The ships can haul 135 rail cars per voyage without loading and unloading cargo, shaving nearly two weeks off the typical rail services into Mexico. The service provides a three-day rail service between the Ports of Mobile and Coatzacoalcos (Veracruz), Mexico.

Terminal Railway (TASD)

The Port Authority's Terminal Railway (TASD) is one of the nation's largest port authority-owned railroads, providing switching service for eight railroads serving the port authority's terminals. It handles more than 164,000 revenue-producing rail cars annually and maintains more than 75 miles of track and eight locomotives. The Terminal Railway serves the general cargo and over-dimension cargo berths, McDuffie Terminal and the Intermodal Container Transfer Facility.

Inland Port Facilities

To take full advantage of Alabama's waterway system, which comprises nearly 1,500 navigable inland barge miles, the Alabama State Port Authority owns 8 inland dock facilities that can be served by either barge or rail. The facilities are located throughout the state's river systems — at Bridgeport, on the Tennessee River; Demopolis and Cordova on the Warrior River; Selma and Montgomery on the Coosa Alabama River; Columbia and Eufaula on the Chattahoochee River; and at Axis on the Mobile River.

PORT FACTS ALABAMA PORT AUTHORITY TERMINALS ONLY

Calendar Year ending December 31, 2021

- ▶ **Acreage:** 4,000
- ▶ **Number of Berths:** 41
- ▶ **Channel Depth:**
 - 45 feet in the lower harbor (-50 feet by 2025)
 - 40 feet in the upper harbor
- ▶ **Warehousing and Open Yards:** 4.8 million square feet
- ▶ **Number of vessel calls:** 1,503
- ▶ **Tonnage:** 24.5 million
- ▶ **Containers:** 503,730 TEUS
- ▶ **Imports:** heavy lift and oversized cargo, containerized cargoes, thermal coal, aluminum, iron, steel, copper, pig iron, wood pulp, plywood, fence posts, veneers, automotive components, frozen fish, furniture components, wind energy components, aviation components, retail goods, cement, aggregates and chemicals.
- ▶ **Exports:** metallurgical coal, heavy lift and oversized cargo, containerized cargoes, iron, carbon and stainless steel, automotive components, lumber, plywood, wood pulp, OSB, laminate, flooring, roll and cut paper, frozen poultry, grain and chemicals.



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We Help Small Businesses Sell in Foreign Markets

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FOREIGN TRADE ZONES

Foreign Trade Zones offer businesses a place for international trade without the encumbrance of tariffs — a level playing field with international competitors.

The U.S. Department of Commerce designates FTZs, mostly near ports and major industrial sites. The designation allows companies within the zones to import foreign goods without paying any duty, store them, mix them with domestic parts and convert them into new products for sale here or abroad.

Until goods leave the FTZ, they technically have not been imported into the United States.

As trade wars escalate and new tariffs abound, U.S. manufacturers have looked more than usual to the potential benefits of FTZs, trade consultants say.

The National Association of Foreign Trade Zones calculates that the country

has some 3,400 companies working in the nation's FTZs, employing more than 478,000 workers. Exports from FTZs totaled \$94.2 billion in 2020 and \$624.9 billion in total receipts.

Five of Alabama's major cities — Mobile, Huntsville, Birmingham, Montgomery and Dothan — have an FTZ. State economic development officials estimate that 12,000 workers are employed in FTZ companies, making \$1 billion worth of products that are later sold overseas. Autos, ships, oil and chemicals are among the key products.

Recent additions include sites for Airbus Americas in Mobile, MH Wirth Inc. in Theodore, Toyota Motor Manufacturing Alabama in Huntsville and Outokumpu Stainless in Calvert.

Hyundai Motor Manufacturing Alabama benefits from its location in a Foreign Trade Zone.

Quick facts about Alabama's five major FTZs

Mobile: Administered by the City of Mobile, the southernmost FTZ covers 9,848 acres in several locations. Several international firms are located within the FTZ, while Evonik Degussa, Austal USA and Airbus Americas have specific zones. The Mobile zone also has four sites in Baldwin County.

Huntsville: FTZ facilities, administered by the Huntsville-Madison County Airport Authority, are clustered on 1,700 acres around the intermodal center, plus another 1,000-acre complex at Mallard Fox Creek Industrial Park and the Port of Decatur. DaimlerChrysler has its own subzone in the Huntsville group, as do VF Jeanswear, General Electric and Toyota Motor Manufacturing Alabama. The FTZ has applied to cover other sites in Alabama's Tennessee Valley.

Birmingham: Birmingham's FTZ is scattered over seven sites, including parts of Airport North/Northeast Industrial Park, ACIPCO industrial area, Shaw Warehouse facilities, Oxmoor Industrial Park, Birmingham International Airport's air cargo facility and Munger/Valley East. Industrial giant Mercedes-Benz has its own subzone in Vance, as do ZF Industries, JVC America and NACCO Materials Handling Group Inc. Mercedes has recently applied to produce electric vehicles and batteries in addition to passenger motor vehicles.

Montgomery: Montgomery has more than 5,000 acres in four sites — near the airport and I-65, along the northern and eastern bypass, at the Airport Industrial Commercial Park and at Montgomery County Technology Park. Montgomery also has subzones for Hyundai Motor Manufacturing Alabama and Quantegy Inc.

Dothan: Dothan has six sites in its FTZ, with no industry-specific subzones. Dothan's international commerce is handled by the airport and the port of Panama City, Florida.

Alabama Economic Development Incentives

“Alabama has one of the most competitive business climates in the nation,” says the Alabama Department of Commerce. And the fact that tax incentives are statutory — part of the state’s Constitution and Codes — “gives industry a stable framework for long-term investment.”

Citing Alabama’s tax burden as among the lowest in the nation, the Economic Development Partnership of Alabama says, “Alabama is one of a small number of states that allow a full deduction of federal taxes paid from state income tax liability.”

That provision drops an actual 6.5% corporate tax rate to an effective rate of 4.5%, lower even than any of the state’s Southern neighbors.

Here’s a quick look at major tax incentives and credits:

Jobs Act Incentives

► **Jobs Credit.** Annual cash refund up to 3% of the previous year’s gross payroll for up to 10 years, with enhanced benefits for companies employing veterans, locating in a targeted or jumpstart county, qualifying as a technology company or underrepresented company, or engaging in pharmaceutical, biomedical, or medical supplies or R&D activities.

► **Investment Credit.** Credit of up to 1.5% of the qualified capital investment costs for up to 10 years. Credit can be taken against the Alabama income tax, financial institution excise tax, insurance premium tax, utility tax and/or utility license tax liability.

Credit is available for up to 15 years for companies locating in a targeted or jumpstart county or qualifying as an underrepresented company.

Alabama Reinvestment and Abatements Act

► New Facility and Expansion.

1. Abatement of non-educational portion of sales and use taxes on construction materials, and

2. Abatement of non-educational portion of property tax for up to 20 years.

► Existing Facility: Refurbishments, Upgrades or Placed Back in Service.

1. Abatement of non-educational sales and use taxes on construction materials and equipment

2. Abatement of non-educational property taxes for up to 20 years of the incremental property tax increases

3. Exemption from taxes for increased utility services for up to 10 years, and

4. AIDT worker training.

► **Property Tax Abatement.** New and expanding businesses can abate all of the state and local non-educational portion of the property taxes on all real and personal property incorporated into a qualifying project, for up to 20 years. Data processing center projects can receive an extended abatement up to 30 years, contingent on total capital investment in a project.

► Sales and Use Tax Abatements.

Companies can abate all state and the local non-educational portion of the sales and use taxes on the acquisition, construction and equipping of a qualifying project. Data processing center projects can receive an extended abatement associated with constructing and equipping a project, including refresh, for up to 30 years, contingent on total capital investment in a project.

► **Full Employment Act Credit.** Employers with fewer than 50 employees are eligible for a \$1,000 nonrefundable income tax or financial institution excise tax credit for each qualifying job created.

► **Heroes for Hire Credit.** Employers may also be eligible for an additional \$1,000 nonrefundable income tax or financial institution excise tax credit if the employee is a qualifying veteran.

► Net Operating Loss Carryforward.

Companies may carry forward any operating losses for up to 15 years.

► Alabama Enterprise Zone Credit.

Credits and exemptions based on numbers of employees for businesses locating in depressed areas of the state.

► **Income Tax Education Credit.** Allows an employer to take a tax credit for 20% of the cost of an employer-sponsored program to improve basic skills though high school level.

Here’s a look at financing incentives:

► **Industrial Development Grants.** Local governments and authorities can receive state grants to help businesses with the cost of site preparation. These grants are available to industrial, warehousing and research firms or headquarters facilities for other types of firms.

► **Industrial Revenue Bonds.** Tax-exempt bonds up to \$10 million can be issued covering all or part of the cost of land and building acquisition, construction, furnishings and some soft costs.

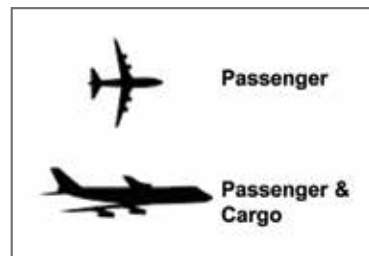
► **Alabama Infrastructure Grant Program.** Helps finance water, sewer and road facilities.

► **Alabama Industrial Access Road and Bridge Program.** Helps finance the roads and bridges needed to connect public roads to industrial projects.

► **Certified Capital Company Program.** Provides financing for projects considered to be too risky for conventional financing options.



ALABAMA COMMERCIAL AIRPORTS



MAJOR ALABAMA HIGHWAYS



Source: Center for Business and Economic Research,
The University of Alabama

Fly Birmingham

Airports are powerful economic engines of growth for communities across the country. At the Birmingham-Shuttlesworth International Airport, we're committed to being a good neighbor and doing our part to build a stronger economy for our community and helping our region rise to all new heights. It's good business for our city and state when you fly Birmingham. Learn more about our impact and see our nonstop destinations at flybirmingham.com.



flybirmingham.com



ALABAMA MAJOR RAIL SERVICE



Alabama offers
4,728 miles ~ 7,608 kilometers
of railroad track serviced by
five Class I railroads

- Federal Interstate Highway System
- Burlington Northern
- CSX Transportation
- Kansas City Southern
- Norfolk Southern
- Canadian National



ALABAMA WATERWAY SYSTEM

● Ports
— locks

Source: Alabama State Data Center, Center for Business and Economic Research, The University of Alabama.

ALABAMA DEPARTMENT OF COMMERCE

Commerce takes lead in Alabama's economic development efforts

Despite stiff challenges in recent years, Alabama's overarching economic development goals remain constant, with a strategic focus on creating jobs that provide meaningful opportunities for citizens and attracting investment that injects vitality into communities around the state.

The Alabama Department of Commerce spearheads this effort by supporting the comprehensive efforts of its economic development allies and community partners to secure high-impact business growth projects. Under the direction of Secretary Greg Canfield, Commerce's project managers maintain a global outlook as they build business relationships and pursue strategic opportunities that will enhance Alabama's prosperity. Commerce also plays a crucial role in the state's workforce development efforts, which ensure that businesses operating in Alabama have the highly motivated, skilled workers they require for long-term success.

Commerce and the Alabama economic development team have built a consistent track record of winning game-changing projects that introduce important new dimensions to the state's evolving economy. As a result, Alabama's economic development team has received numerous awards, and site-selection consultants routinely recognize Alabama as a top state for doing business. In recent years, the Alabama team has worked with an expansive roster of industry leaders, including Boeing, Airbus, Lockheed Martin, Facebook, Google, Amazon and global automakers such as the Mazda-Toyota partnership.

In 2021 alone, economic development activity in Alabama generated over \$7 billion in new capital investment as



Alabama Secretary of Commerce Greg Canfield speaks at the ceremony announcing that aluminum producer Novelis Inc. has selected the Baldwin County Mega Site for its new \$2.5 billion aluminum recycling and rolling plant.

a steady stream of projects has flowed across a range of industries. The momentum continued into 2022, which is poised to exceed the results from the prior year.

Alabama's strategic economic development growth plan, called Accelerate Alabama, established clear target industries for recruitment and remains the playbook for the state's economic development team. The updated 2.0 version of Accelerate elevated the priority of recruiting knowledge-based jobs in activities such as R&D, engineering and design, as well as establishing a tighter alignment with the state's seven research universities. By outlining an identified set of objectives, Accelerate Alabama created a framework for strategic economic development when it was launched in 2012. Since then, Alabama has recorded a high level of significant economic development activity, with companies announcing projects involving roughly 145,000 jobs and over \$55 billion in new capital investment.

In addition, Commerce is closely aligned with the state's primary non-educational workforce development initiatives, which serve to streamline the process for prospects. AIDT, the state's highly regarded job-training agency, remains the central pillar of Commerce's Workforce Development Division. AIDT and other state workforce programs work to provide a comprehensive channel for worker recruitment and training as well as apprenticeships.

A critical Commerce objective is to identify prospects for partnerships that can broaden Alabama's economic base and create jobs for its citizens. Other objectives are to attract domestic and foreign investment, expand international trade and Alabama exports, facilitate small business growth and attract film and entertainment projects. Commerce has also strengthened its commitment to facilitating economic growth in rural communities, including new incentives.

KEY CONTACT

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AIDT ALABAMA'S WORKFORCE TRAINING AGENCY

Workforce expertise from AIDT is a major incentive for businesses locating or expanding in Alabama

Alabama has one of the strongest workforce training programs in the world in support of the state's commitment to new and expanding industries.

AIDT has long been recognized among the nation's top workforce training programs by industry observers. AIDT's pre-employment training program holds an ISO 9001:2015 certification for quality and continuous improvement.

AIDT has assisted new and expanding companies in recruiting, selecting and training over one million job seekers over the last 50-plus years. AIDT training produces a workforce that employers recognize for high performance achievement — a result of both the technical assessment and training AIDT trainees receive and the process by which they are selected.

AIDT stays at the forefront of workforce development through its innovative approaches to common issues and its ability to partner with education and industry leaders, as well as other state agencies. This includes the continuous evolution of training techniques such as e-learning through modules and webinars, virtual reality training and more traditional hands-on learning.

From automotive to aerospace, logistics, warehousing and biomedical, AIDT researches and identifies the needs of each company served and uses that information to develop a full range of technical pre-employment selection programs customized to each company.

AIDT SERVICES INCLUDE:

- Identification of needed employee skills and knowledge, training criteria and curricula content definition, and required



AIDT programs are tailored to the needs of specific industries, from complex wiring to the elements of today's smart factory.

behavior and performance criteria the company expects of employees.

- Recruitment of trainee candidates for potential employment. AIDT interviews and enrolls applicants in training programs that are acceptable to the company.

- Program development, instructors, equipment, consumable supplies and training aids such as manuals, workbooks and videos are provided at no cost to trainees or employers.

- Pre-employment training. Job seekers who meet the selection criteria designed by AIDT and the employer are enrolled in job-specific training for detailed assessment of attitude, character, work ethic, literacy, teamwork and technical learning ability.

A division of the Alabama Department

of Commerce, AIDT also provides leadership development, on-the-job training, industrial maintenance assessments and industrial safety assessments. Leadership development conducted by AIDT is designed to develop and retain quality leaders, improve retention and create loyal and dedicated employees. Industrial maintenance and safety assessment services help identify candidates best qualified for effective and efficient operations through corrective and preventive maintenance.



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ATN ALABAMA TECHNOLOGY NETWORK

Technical experts work directly with Alabama industries to increase productivity, profitability and competitiveness



ATN sends experts into training facilities and workplaces to help businesses solve technical problems and advance competitiveness.

Focused on Alabama manufacturers, the Alabama Technology Network provides the most extensive workforce training, technical assistance and engineering services designed to improve Alabama business and industry. Experts in technical assistance and innovation work directly with Alabama's existing industry to increase productivity, profitability and competitiveness.

As part of the Alabama Community College System, the network's 19 sites are located at 15 community colleges and the state's three research universities — Auburn University, the University of Alabama and the University of Alabama in Huntsville. ATN's team of experts helps solve the needs of industry and

business through innovative, sustainable, cost-effective solutions. ATN can conduct detailed needs assessments, outline potential solutions based on the results and then provide technical assistance to help companies solve those problems or identify those who can. Services include lean enterprise, quality services training, continual improvement methods, environmental health and safety training, industrial maintenance training, sustainability in manufacturing and innovation engineering.

ATN is an affiliate of the National Institute of Standards and Technology's Manufacturing Extension Partnership, which provides hands-on assistance and training to smaller manufacturers. Since

2015 through 2021, the following are client reported economic impacts:

- ▶ 1,047 independent client surveys completed
- ▶ 2,820 new jobs
- ▶ 12,257 retained jobs
- ▶ \$1.9B increased & retained sales
- ▶ \$402M in new client investments
- ▶ \$776M in cost savings

Totals

- ▶ 15,077 Jobs
- ▶ \$3.1B Client impacts

In addition to its training services, ATN partners in presenting the Alabama Manufacturer of the Year awards.

KEY CONTACT

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ADECA ALABAMA DEPARTMENT OF ECONOMIC AND COMMUNITY AFFAIRS

ADECA connects communities with funding opportunities

The Alabama Department of Economic and Community Affairs (ADECA) distributes hundreds of millions of dollars annually to Alabama cities, counties, non-profit organizations and others to support economic development projects, infrastructure improvements, job training, energy conservation, law enforcement, traffic safety, recreational development, high-speed broadband expansion and electric vehicle infrastructure.

Since coming on board in 2017 at the beginning of Governor Kay Ivey's administration, Director Kenneth Boswell has emphasized the importance of forming partnerships to improve Alabama communities and carry out Ivey's desire to improve commerce and create job opportunities for Alabamians.

ADECA houses numerous programs that focus available resources to address a variety of local challenges.

Several ADECA grant programs help Alabama communities with economic development projects and enhance commerce either directly or indirectly:

► **Community Development Block Grants** are funded through the U.S. Department of Housing and Urban Development and support local efforts to attract and prepare for new or expanding industries, rehabilitate neighborhoods, provide water and sewer services or fund other infrastructure improvements that support business development or enhance the quality of life. Many of the funds are awarded annually on a competitive basis, but a portion of the allocation is kept in reserve for economic development projects that help industries and businesses locate and expand in Alabama.

In 2021, ADECA received 97 competitive applications from small cities, large cities, counties and planning organizations across Alabama, and the agency

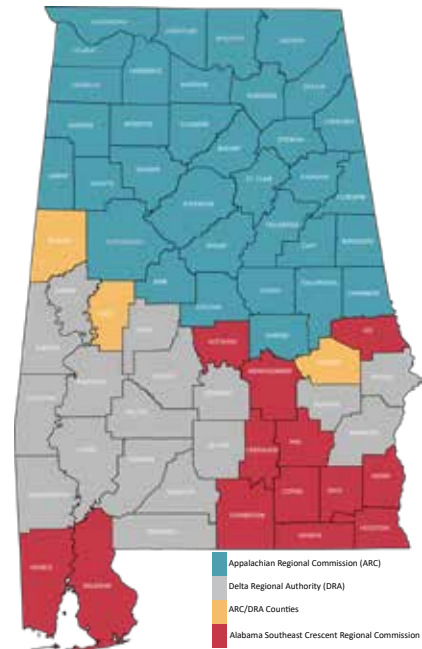
awarded a total of 53 projects totaling \$18.1 million enabling local governments to address critical infrastructure needs. Nine grants, amounting to nearly \$3.6 million, were awarded through ADECA's economic development CDBG program. Those funds are used to supply infrastructure for new businesses and industries.

► Grants from the **Appalachian Regional Commission (ARC)** are awarded to encourage economic development and improve the quality of life of Alabamians living within 37 north Alabama counties considered part of the Appalachian Region. Projects that develop and improve infrastructure and support education, workforce development and community development are funded through the program. In 2021, almost \$10 million was invested in 41 projects in ARC counties helping to create or retain 405 jobs and provide job training for 3,280 people.

► **Delta Regional Authority (DRA)** is another state-federal partnership that encourages the development of new jobs and helps with basic community improvements in a rural region that includes 20 counties primarily in the Black Belt region of Alabama. In 2021, ADECA partnered with DRA to fund 13 projects totaling \$3.4 million — creating or retaining 1,091 jobs and preparing 200 people for jobs in new and demanding fields.

► Also coming on board to ADECA is the new **Southeast Crescent Regional Commission**. The commission will provide economic development and workforce training in 13 Alabama counties, including Montgomery and Mobile, that are not part of ARC or DRA.

► Two recreational programs are managed by ADECA, the **Land and Water Conservation Fund** and the **Recreational Trails Program**, to fund parks and recreational facilities. Many of those projects



The creation of the Southern Crescent Regional Commission will put much of southeast and coastal Alabama on course to receive economic development grants as do areas covered by ARC and DRA programs.

help attract tourists, aid local economies and improve quality of life.

► The **Alabama Broadband Accessibility Fund** has awarded 100 grants totaling \$64 million since 2018 to help internet providers expand broadband service to rural areas that were previously unserved.

► A newer program, the **Electric Vehicle Charging Infrastructure Program**, helps provide electric vehicle charging stations along Alabama interstate and major highways — helping motorists and supporting Alabama industries that build electric vehicles.

ADECA also helps manage the state's water resources, supports law enforcement and traffic safety efforts, and distributes state and federal surplus property.

KEY CONTACT

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NAIDA NORTH ALABAMA INDUSTRIAL DEVELOPMENT ASSOCIATION

One of the first industrial development organizations in the U.S., NAIDA was formed in 1949 to assist in creating quality jobs for the 13 North Alabama counties served by TVA power

The North Alabama region is home to companies that build some of the most outstanding, complicated, and widely known products in the world – and they continue to experience great success as a result of what the area has to offer.

KEYS TO SUCCESS

Many reasons companies in North Alabama flourish include:

- ▶ Institutions of higher education in 20 locations.
- ▶ State-of-the-art, world-class automation and employee training provided by AIDT and the Robotics Technology Park (RTP).
- ▶ A strong, reliable and competitive electric system powered by TVA and its distributors.
- ▶ Transportation access — North Alabama offers various means of transportation via water, rail, highway and air to meet speed-to-market requirements. Huntsville International Airport provides direct flights to major cities and also provides air cargo service to international destinations along with on-site U.S. Customs & Border Patrol and FTZ #83.
- ▶ Over 3,000 acres of available land designated as Advantage Sites and over 5 million square feet of available buildings ranging from 5,000 to 2 million square feet, are available in the region.

STRONG ECONOMIC SECTORS

The North Alabama automotive sector continues to grow with companies such as Mazda Toyota Manufacturing (MTM), Toyota Motor Manufacturing, Navistar and Tiffin Motor Homes. The supplier base has more than 100 automotive-related companies. Toyota

Boshoku, YKTA, Daikyo Nishikawa, Vuteq and others have established facilities on or near the MTM site. BOCAR and DURA

have located new facilities in the region to supply other automotive assembly plants throughout Alabama. NAIDA hosts a micro-website, found at AutomotiveSites.us, which features sites and buildings pre-selected by each of the region's counties as readily available for development.

The aerospace and defense sectors featuring companies such as Boeing, Raytheon, Northrop Grumman, Lockheed Martin, Beyond Gravity and ULA continue to grow year after year. ULA continues the tradition of building rockets in North Alabama for the Vulcan Rocket program. Locally manufactured rocket engines produced by Blue Origin and hypersonic development and integration taking place by Lockheed Martin are key to national space and defense, as is GE, producing state-of-the-art SiC and CMC materials.

Alloys/Metalworking companies such as Carpenter Technology, Constellium, Nucor and Progress Rail are located in North Alabama.

More than 70 chemical companies operate in the region, including 3M, Daikin, Hexcel, OCI, Occidental Chemical, Toray, Ascend Performance



NAIDA created this map of potential industrial sites in the 13 counties of Northern Alabama. View it interactively at: automotivesites.us

Materials and Polyplex.

The HudsonAlpha Institute for Biotechnology and its 50 associate companies are operating in the cutting edge of the life sciences sector.

Other additions to the area's high-tech economy include world class datacenters by META, Google and DC Blox.

Currently, twice as many individuals are employed in manufacturing occupations in this region compared to the national average. This current industrialization owes its roots to the 1950s, when industry began locating along the Tennessee River, and the development of the rockets that took man to the moon began taking shape in the region.

NAIDA offers confidential services to companies seeking a new or expansion site. It also offers assistance in finding suppliers and services to meet company needs. This online tool can be accessed at IndustrialServices.naida.com.

KEY CONTACTS

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EDAA ECONOMIC DEVELOPMENT ASSOCIATION OF ALABAMA

EDAA unites professionals committed to Alabama's economic development



Mazda Toyota Manufacturing in Huntsville is among the state's newest manufacturing plants, producing both the Corolla Cross and the Mazda CX-50.

Economic development can have a multitude of meanings, but at its core, it is a collaborative effort among businesses, communities, organizations and government agencies. Since 1968, the Economic Development Association of Alabama (EDAA) has facilitated that collaboration in an effort to both attract new investment to the state and work to expand those companies that are already located here. EDAA provides a forum for discussion of specific issues affecting economic development and provides programming and training to cultivate expertise in

Alabama's economic developers.

The EDAA membership consists of 500 individuals involved in economic development from many different areas and disciplines. EDAA members are economic development professionals, attorneys, engineers, architects, state agency personnel, utility employees, bankers, contractors, real estate agents, educators and municipal and county officials.

SERVICES

A voluntary member association, EDAA conducts workshops and seminars covering the ideas, principles, practices and ethics of economic development. Most of the EDAA educational programs focus on enhancing the skills of economic development professionals by providing them with new tools to address the challenge of remaining one of the nation's top states in economic development. EDAA holds multiple networking opportunities, publishes a membership directory, conducts two major conferences each year and holds quarterly workshops.

EDAA is diligent in addressing state and federal legislative and regulatory issues impacting economic development in Alabama. With a full-time lobbying presence when the Alabama Legislature is in session, EDAA is a leader in forming economic development policy and legislation for its members. Legislative efforts on the state level in recent years have seen EDAA lobby for competitive and sustainable economic development incentives and adequate funding for state recruitment efforts and worker training programs. In addition to its legislative efforts in support of positive economic development policies, EDAA endeavors to defeat legislation that would pose a threat to Alabama's economic development effort and actively seeks innovative solutions to challenges that could negatively impact the state's business climate.

PARTNERSHIPS

In addition, EDAA works with other organizations in the state to improve Alabama's economic development environment. Strategic alliances with the Alabama Department of Commerce, Alabama Department of Economic and Community Affairs and the Economic Development Partnership of Alabama enable EDAA to provide its membership with substantive skills and resources. EDAA is also a partner with Auburn University's Government and Economic Development Institute (GEDI) in conducting the Economic Development Leadership Institute.

The EDAA Leadership Institute represents a partnership between EDAA and GEDI to educate and engage elected officials, ED board members and other community leaders about key issues in economic and community development. For more information contact: EDAA (334) 676-2085

KEY CONTACT

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EDPA ECONOMIC DEVELOPMENT PARTNERSHIP OF ALABAMA

A private, nonprofit organization, EDPA works to attract new investment, support existing business expansion, encourage innovative startups and facilitate talent retention and attraction



The startup Croux, which helps restaurants meet their staffing needs via an app, won the concept-stage prize in the EDPA-sponsored Alabama Launchpad competition.

For more than 30 years, the Economic Development Partnership of Alabama (EDPA) has been a catalyst for economic growth in the state. A private, nonprofit organization supported by Alabama's leading businesses, EDPA is uniquely positioned to partner with state, local and private allies to drive the state's economic development efforts.

EDPA'S FIVE PILLARS

EDPA's program of work today is focused on five pillars:

- 1. Lead Generation:** Identify and target leading companies that are good prospects to bring quality jobs and investment to the state.
- 2. Innovation and Entrepreneurship:** Provide resources and support to startup companies that have high-growth potential.
- 3. Talent Attraction and Retention:** Work to attract and retain the talent needed to support economic growth.
- 4. Business Intelligence and Economic Development Analytics:** Support both lead generation and business attraction efforts through business intelligence, data and analytics.
- 5. Statewide Economic Development Policy:** Promote existing policies and shape future policies key to Alabama's economic success.

ADVANTAGESITES

AdvantageSite, which is managed by EDPA, is a joint effort between the private sector and state and local organizations to prepare industrial sites for review by business prospects. AdvantageSite was created to make the state more competitive for companies considering a location or expansion in Alabama. Since the program's start in 2008, 49 economic development projects have located on AdvantageSites across the state, investing \$1.9 billion and creating 7,200 new jobs.

ALABAMA LAUNCHPAD

EDPA has also been a statewide leader in encouraging innovation, commercialization and entrepreneurship. The mission of EDPA's Alabama Launchpad program is to help high-growth companies start, stay and grow in Alabama through its business pitch competition.

Alabama Launchpad is the state's most active, early-seed investor and drives innovation and job growth through three startup competitions annually, offering non-dilutive funding along with mentoring and other services. Since it started in 2006, Alabama Launchpad has awarded \$5.9+ million to 110 Alabama companies, which have created over 1,120 jobs.

TALENT

With private sector engagement and strong public sector ties, EDPA leverages its relationships across industries to facilitate talent retention efforts in

conjunction with local and state government, colleges and universities and companies. This collaborative effort, called Fuel Alabama, focuses on making sure Alabama has the competitive talent necessary for continued growth. In its first year, EDPA hosted statewide conference, conducted research alongside the Alabama Commission on Higher Education, and exposed students to various communities across the state through a summer program called the FuelAL Fellowship. Each of these components of Fuel Alabama connected communities, employers, and talent — the pivotal intersection that could change our state's ability to both retain and attract the talent the state needs.

EDPA also launched ALEX: The Alabama Experience — a mobile, digital outreach initiative showcasing Alabama career, education and lifestyle opportunities to residents and visitors — to pop-up throughout various communities, workforce and organizations across Alabama.

BUSINESS INTELLIGENCE

EDPA serves as the clearinghouse for data collection and distribution for public officials, local and corporate economic developers, and companies interested in doing business in the state, through the Alabama Business Intelligence Center. EDPA uses data to spot trends and provide analytics to complement its own lead generation and policy efforts and provide a service to public officials, local developers, and corporate economic developers.

By participating in collaborative efforts in Alabama, EDPA works to foster a cooperative spirit among the diverse organizations involved in the many areas that affect the state's growth.

KEY CONTACT

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BBA BIRMINGHAM BUSINESS ALLIANCE

The Birmingham Business Alliance helps businesses start, stay and succeed in Birmingham



Birmingham is the largest metro in Alabama and a major driver of the state's economy, and the work of the Birmingham Business Alliance (BBA) helps keep the seven-county region moving forward.

As the regional economic development agency for the Greater Birmingham Region and the local chamber of commerce for the city of Birmingham, BBA serves as the first stop destination for businesses currently operating or considering an operation in the area. Through its economic and workforce development, business retention and expansion, public policy, research, regional marketing, and other work, the BBA fosters a climate where business can flourish in Bibb, Blount, Chilton, Jefferson, Shelby, St. Clair and Walker counties.

A GROWING ECONOMY

BBA is responsible for growing quality jobs and capital investment in the region. Year-to-date in 2022, BBA's economic development team has supported

projects bringing 1,252 jobs and \$159 million in capital investment. Notable successes include the recruitment of national grocer Kroger to Birmingham through a new delivery service, the retention and expansion of Southern Research's engineering division with a sale to defense contractor Kratos and the recruitment of tech company Fetch Rewards, who expanded their operations from Wisconsin to Alabama.

BIRMINGHAM HAS MORE

BBA works to present Birmingham's strong message and to shift perceptions of the region through positive experiences.

During the summer's historic World Games, BBA hosted seven of the nation's leading site selection consultants for a multi-day visit, sharing the city's advantages and visiting local companies like Automatic Seafood & Oysters, home to Birmingham's latest James Beard-award winning chef, Adam Evans.

By the end of the trip, the consultants admitted that their perception had shift-

ed from seeing Birmingham as an older industrial city to seeing Birmingham as a viable market for small to mid-sized tech, life science and office operations.

In the months ahead, BBA will be deploying a campaign for "Birmingham Has More," a message that complements a new brand for the Greater Birmingham Region. Thanks to support from community partners like the Jefferson County Commission, the brand will come to life through a full website launching in early 2023.

INCLUSIVE ECONOMIC GROWTH

Forged from its past, Birmingham is moving forward with a commitment to become a champion community for inclusive economic growth. Thanks to the leadership of Mayor Randall Woodfin, Birmingham's economic development community has convened regularly over the past year to develop a shared agenda to support the creation of equitable job opportunities for all residents. The group has been developing a cohesive strategy for five core areas: tech, life sciences, logistics, manufacturing and neighborhood businesses.

In partnership with Prosper and Jefferson County Commission, BBA launched its Business Advisory Services programs in 2021. The first cohort included 21 businesses, meeting for mentorship and tips on procuring more contracts.

Additionally, BBA works to better foster connectivity between small and large businesses through its Inclusive Procurement Council.

KEY CONTACT

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