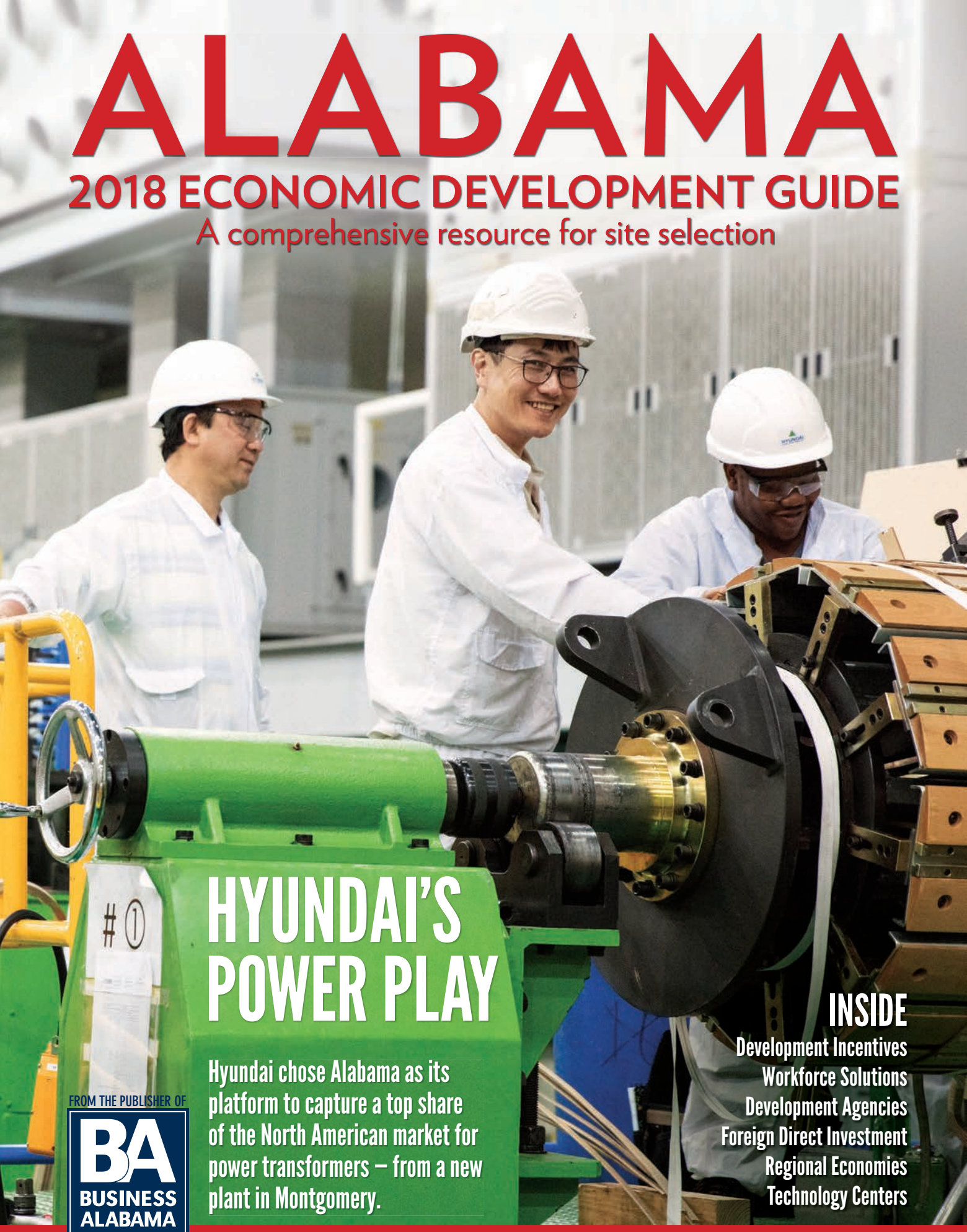
ALABAMA

2018 ECONOMIC DEVELOPMENT GUIDE

A comprehensive resource for site selection



HYUNDAI'S POWER PLAY

Hyundai chose Alabama as its platform to capture a top share of the North American market for power transformers – from a new plant in Montgomery.

INSIDE

FROM THE PUBLISHER OF

BA BUSINESS ALABAMA MAGAZINE

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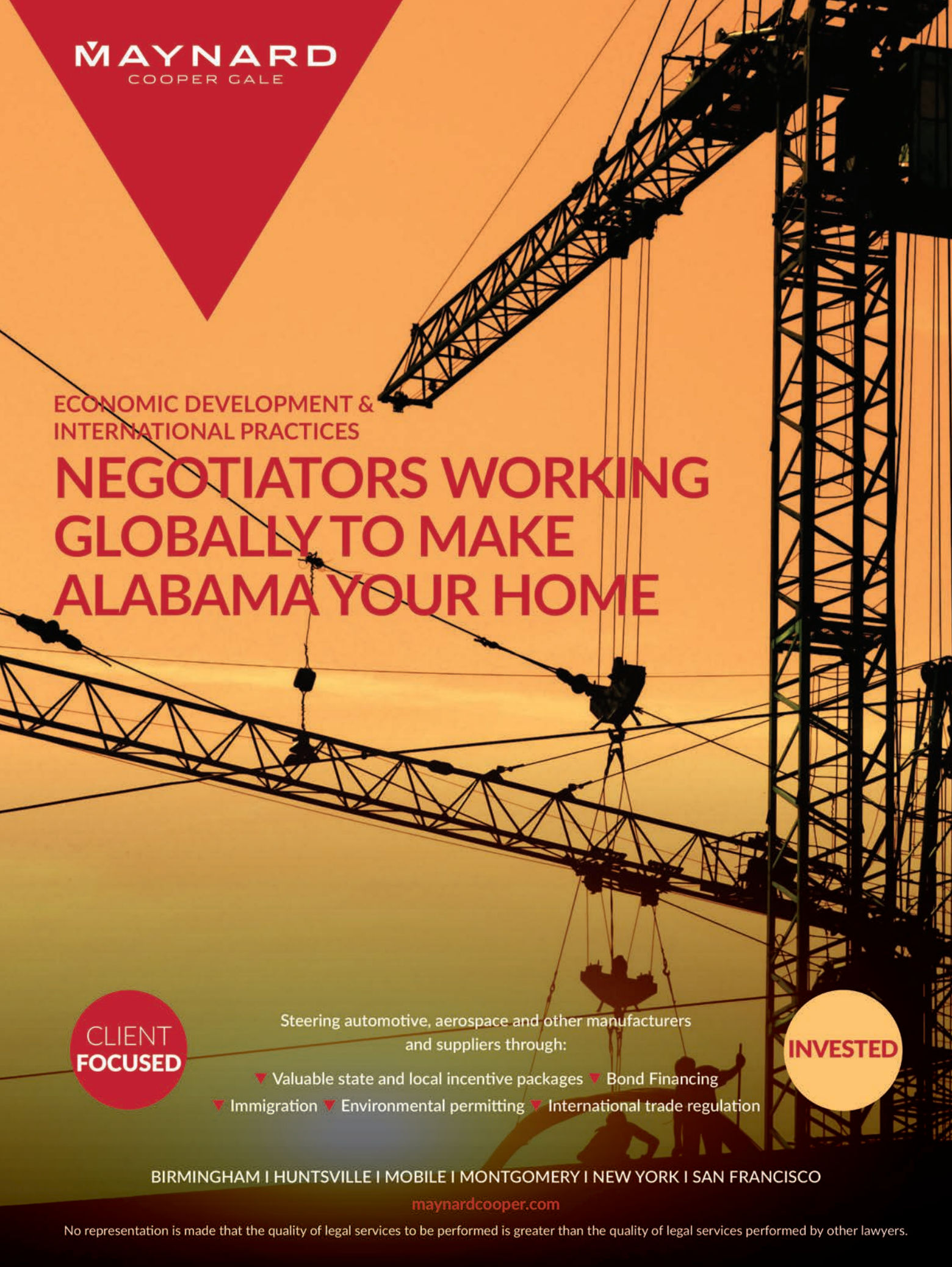
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ON THE COVER: Workers at Hyundai Power Transformers USA, headquartered in Montgomery, wind insulated copper to encircle the core of a massive electric utility transformer. There are only a handful of new plants in the U.S. aiming to fill a rapidly growing need to replace transformers in North America. Each transformer sells for between $1.5 million and $2 million. Hyundai expects its 2017 sales to total $130 million in its sixth year of production and continue growing. Story on page 41. *Photo by Cary Norton*

Opposite page: Production line at Mercedes-Benz U.S. International, in Tuscaloosa. *Photo courtesy of Mercedes-Benz*
Opposite page, right: Alabama pecans produce export demand around the world. *Photo by Elizabeth Gelineau*
Top: The silver hull of one of 13 ferries Horizon Shipbuilding built for New York City, at $4 million each — is one of the jobs that has 350 workers buzzing at the shipyard at Bayou La Batre. *Photo by Todd Douglas*
Above, left: Downtown Birmingham, at Railroad Park
Above, right: A crane lifts the structural test article of the launch vehicle stage adapter (LVSA) after final manufacturing on a 30-foot welding tool at NASA's Marshall Space Flight Center in Huntsville, Alabama. The LVSA will connect two major sections of the upper part of NASA's Space Launch System — the world's most powerful rocket, designed to carry astronauts in NASA's Orion spacecraft on deep-space missions, including the journey to Mars. *Photo courtesy of NASA*

GOVERNOR'S LETTER

Greetings from the great State of Alabama

I would like to introduce the 2018 Alabama Economic Development Guide.

Alabama is the location of choice for all emerging sectors of the economy, specifically automotive manufacture, aerospace, biotechnology and information technology. Companies and industry leaders throughout the world choose Alabama for our infrastructure, workers and worker training. You will be amazed at the many advantages that the great State of Alabama has to offer.

Consistently ranked as one of the top five states for doing business, we have sharpened our focus on high tech and knowledge-based jobs. Partnering with our research universities, Alabama aims to imagine, develop and design products to be competitive around the world. Companies quickly find that our hard-working citizens are our greatest asset. You will not find a more loyal, dedicated and motivated workforce.

Companies that choose Alabama know that our state is a great place to live and work. From the white sandy beaches of Alabama's Gulf Coast to the rustic mountain terrain of Northern Alabama, I encourage you to visit and experience all that our wonderful state has to offer.

Sincerely,

Kay Ivey

Kay Ivey
Governor

ALABAMA
ECONOMIC DEVELOPMENT GUIDE

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At Bradley, we combine legal experience and knowledge with a sophisticated understanding of the industries that drive Alabama. We handle economic development projects across the state and beyond, assisting clients with every aspect of a new project or expansion — including incentives, real estate, tax, governmental, planning and zoning, environmental, permitting, financing, labor and employment, and construction. Bradley's multidisciplinary team leverages a broad range of perspectives to help achieve the results that we expect and our clients demand.

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STATEWIDE ECONOMIC OVERVIEW

From aerospace, automotive and agriculture to ZF Industries, Zkano socks and Zyp Bikeshare, the ABCs of Alabama's economy are broader and more diverse than ever.

While some up north are designing rockets to take us to Mars and beyond, others around the state are busily building cars and trucks and SUVs and commercial jets — not to mention wrought-iron fountains, heavy duty transformers, fishing lures and weather radar.

Alabama automakers produced more than 1 million vehicles again last year, setting a new record for production. With three major manufacturers — Hyundai, Honda and Mercedes-Benz — plus a major Toyota engine factory, the industry has been growing stronger year by year, with supplier firms in virtually every one of the state's counties. In September, Autocar annouced it will join the Alabama OEM lineup, with a $120 million heavy truck plant in Birmingham. In 2016, the state exported nearly $8 billion worth of automobiles. Moreover, the auto industry attracted $1 billion in new investment, with 68 new projects announced.

NASA's new Space Launch System is taking shape at Marshall Space Flight Center in Huntsville. Team members plan the first test flight of this enormous system in 2018 and hope for a flight that takes humans back to space in the next decade.

Airplanes made headlines in the southern part of the state as the Airbus assembly facility in Mobile ramped up to four-a-month deliveries of fresh new aircraft, and even more support businesses moved in near the plant.

Exports of aerospace products jumped 65 percent, to $1.4 billion.

Agriculture is the third A industry that keeps Alabama strong. Farms and forests and ponds grow trees and peanuts, row crops, chickens and catfish. Catfish sales have grown to $120 million; and Wayne Farms has opened a $55 million feed mill. These old standbys have new neighbors. Near Selma they're growing bamboo to turn into an array of household products and, along with others around the state, converting the leftovers of the wood-products industry into compressed pellets that serve as an alternative to coal.

B is for biotech. The University of Alabama at Birmingham and its long-time associate Southern Research have earned a significant reputation for developing drugs and medical devices, spinning off companies that bring their discoveries to the market place. Huntsville's HudsonAlpha Institute for Biotechnology is another major player, with researchers and entrepreneurs collaborating to find healthcare breakthroughs and make them available for those who need them. Farther south, the University of South Alabama Mitchell Cancer Institute provides facilities for cancer caregivers and cancer researchers to work side-by-side for the benefit of current and future patients.

C is for chemicals. Plants from the US and beyond dot the waterways of southern Alabama, and chemicals rank second among all export categories, at $2.2 billion.

D is for defense — another key segment of the state's economy, with every one of the nation's top 10 defense contractors represented in the state. Boeing opened a new research facility in Huntsville just last year; Lockheed Martin makes missiles in Pike County; United Launch Alliance still sends most of the nation's satellites into space, and dozens of smaller companies dream, design and test next technology to support the country's safety at home and abroad. In the past two years, both Aerojet Rocketdyne and Blue Origin have an-

Boeing Co. is one of the principal members of the Space Launch System team for NASA. Boeing is prime contractor for launch vehicle cryogenic stages from design to production, and developer of the avionics suite. *Photo courtesy of Boeing*

WHY HAVE SO MANY COMPANIES MOVED TO ALABAMA?

GROUNDBREAKING COLLABORATION.

In Alabama, economic development is a team sport — and the bench is deep. We work with our allies to bring together resources from the federal, state, and local levels to advance projects for global leaders such as Google, Amazon, Walmart, GE Aviation, and major automakers. This collaborative approach has worked in cities from Huntsville to Mobile, from Auburn to Tuscaloosa, and everywhere between. In fact, over the past two years, Alabama's team has landed projects worth more than $11 billion, with 35,000 jobs. Groundbreaking success always starts with teamwork.

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nounced plans for Alabama's space sector, hoping to build the new rockets to power U.S. satellites into the heavens.

E is for education. The University of Alabama and Auburn University are standard bearers for a proud tradition of higher education. Other state universities, a strong community college system and several highly regarded private universities give students the opportunities for education they need, whether they choose a career in business, the arts, teaching, research or manufacturing.

F is for foreign direct investment. The state attracted $1.57 billion in 2016, mostly to the auto industry, although the two biggest investments came to the wood products and high tech fiber businesses, both to companies based in Austria.

G is for Google, with plans to build a data center in Stevenson in northeast Alabama. Though local officials have been disappointed at a lack of progress on the project, Google still lists the site, noting its pride at converting the outmoded coal-fired TVA generating plant to new high tech data center use.

H is for healthcare — with the University of Alabama at Birmingham as flagship and an array of highly regarded hospitals offering care to Alabamians and residents of nearby states.

I is for information technology — dozens of companies working on projects from electronic medical records to cybersecurity.

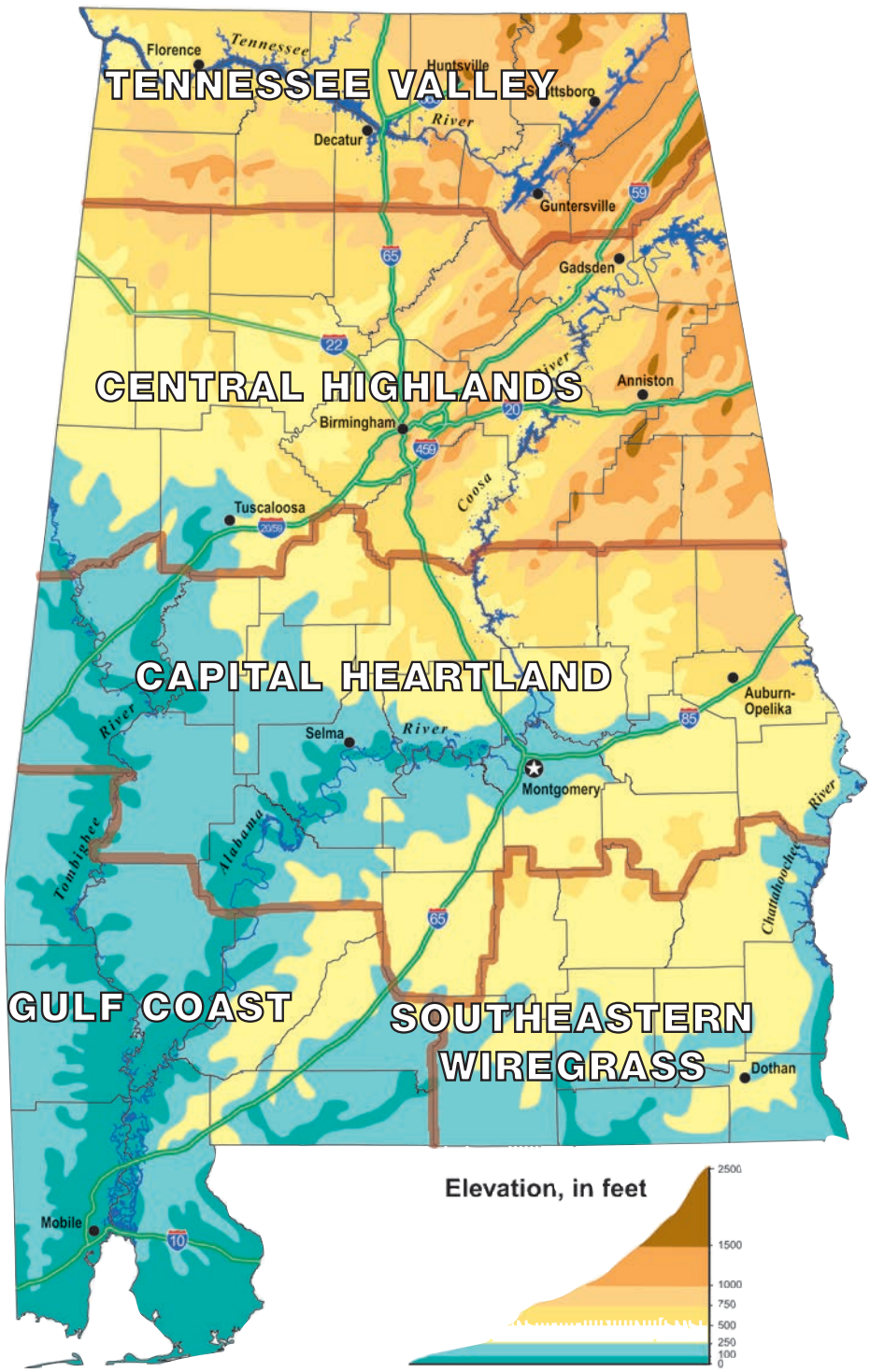
And so on through the alphabet.

W for Warrior Met Coal. The state's newest public company gambled on the metallurgical coal resources of the old Walter Energy and entered the public market in April. Stock prices huddled near the initial offering value, then began climbing to new heights by late summer..

Y for the Yella Fella, Great Southern Wood Preserving owner Jimmy Rane, who now tops the Forbes list as the state's wealthiest person, courtesy of the business he built in treated lumber.

And Z – take your pick from the ZF Chassis Systems supplier firm, the Zilkha black pellets made from biomass and processed to replace coal in coal-fired burners, Birmingham's trendy Zyp Bikeshare or even to Zkano socks – made by a child of Alabama's once thriving textile business who's determined that Alabama still has the savvy to style superb socks.

REGIONAL OVERVIEW



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TENNESSEE VALLEY

The Tennessee Valley is home to one of the fastest growing high-tech economies in the country.

If you're aiming for the heavens, you might want to start in Huntsville. Heart of Alabama's Tennessee Valley region, it's home to NASA's Marshall Space Flight Center. Even now, the enormous new Space Launch System is in progress there — aiming to take human beings beyond the moon.

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, Boeing and a host of smaller companies work to develop the Space Launch System, that will carry more people and more payload farther into space than ever before. Today's space scientists look beyond Earth's moon, working toward travel to Mars and beyond.

In addition to NASA, a coterie of the U.S. defense industry flourishes, too. All of the top 10 defense firms have a presence in Alabama, and most of them are in Huntsville. Firms develop more accurate missiles, create simulations to help military personnel make good decisions in an instant, refine materials and technology for all types of aircraft and more. Aerojet Rocketdyne joined the crowd in 2016, with plans to bring its defense operations headquarters to Huntsville, then promptly donated $1 million to the University of Alabama in Huntsville for a chair in space science.

The U.S. Space and Rocket Center, one of Madison County's destination tourist attractions, is also emblematic of the aerospace industry's pivotal position in the economy of north Alabama.

Cummings Research Park, one of the largest in the nation, is home to dozens of firms engaged in research and development. The newer Redstone Gateway is paving the way for a cluster 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.

HudsonAlpha Institute for Biotechnology builds on that synergy, but focuses on encouraging biomedical researchers and entrepreneurs to work together so that new developments can come efficiently to the marketplace.

Rocketry thrives in Decatur, in nearby Morgan County. United Launch Alliance, a partnership of Boeing and Lockheed Martin, builds the rockets that send most U.S. payloads into space. If you look for the thrill of the countdown and liftoff, check out the ULA website — ulalaunch.com — where there's nearly always a video of the most recent launch. Now ULA is attracting more companies — Ruag Space actually moved into part of the ULA building in 2017.

And both Aerojet and Blue Origin hope to build the engines to power ULA rockets, to replace the Russian-built engines now in use.

The economy of the state's northern counties is as varied as it is exciting.

Over in the northeastern corner of the state is the site — once a TVA electrical facility — that's earmarked for the newest Google data center.

Back in the center is Huntsville's chunk of the state's burgeoning auto industry — Toyota Motor Manufacturing Alabama, an $850 million, 1 million-square-foot, 1,200-employee facility that's the only Toyota plant to make 4-cylinder, V6 and V8 engines under one roof.

Ground-based transport is the order of the day in the Shoals, too, where Freight Car America and Navistar craft rail cars in a modern, mile-long plant near the Tennessee River.

A pair of recent newcomers have helped diversify the north Alabama economy even more. Polaris Industries has a new plant to make powersport vehicles like the side-by-side Ranger, and Remington Outdoor is crafting sporting rifles and semi-automatic pistols.

Constellium, an international firm, purchased Shoals stalwart Wise Metals a couple of years back, continuing the tradition of making sheet metal for food and beverage containers. The new owners quickly announced a $750 million upgrade to the 750-employee plant. Now with a new recycling furnace, the plant can recycle 20 billion aluminum cans a year.

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.

And 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, there's a chance to snow ski up near Mentone, and fashionistas can enjoy the home-town spaces of designers Billy Reid and Alabama Chanin.

CENTRAL HIGHLANDS

Banking and insurance are mainstays, and Alabama automaking was born here. Commerce ranges from legacy coal and steel giants to rapidly emerging medical research and information technology sectors.

Birmingham, Alabama's largest city, is the heartbeat of the Central Highlands — a leader in banking and insurance, healthcare and education, manufacturing and the arts. The 19 counties that surround it are home to the state's flagship university and two of the automotive plants that revved up Alabama's economy just a quarter century ago.

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

A ladle pours molten steel at American Cast Iron Pipe Co. in Birmingham. Now going by ACIPCO, it's one of the largest manufacturing employers in Alabama. *Photo by Cary Norton*

Fayette - Franklin - Lamar - Marion - Walker - Winston

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A fleet of Alabama-made Mercedes in front of the headquarters of Mercedes-Benz USA, in Tuscaloosa

among the stalwarts of its economy.

Banking now dominates the Birmingham skyline, where the Wells Fargo Tower and Regions-Harbert Plaza are landmarks. Banking also gives Alabama its own homegrown Fortune 500 company — Regions Financial.

Downtown is also home to Infinity Property & Casualty and ProAssurance, as well as the former world headquarters of Protective Life, recently purchased as a U.S. foothold for Dai-Ichi Life of Japan.

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 alongside teams of scientists searching for the causes and cures for ills still hard to treat. New medicines and medical devices are always in development.

Arts, sports, entertainment and an array of eateries show Birmingham for the major city it is — among the largest in the Southeast. Celebrated chefs such as Frank Stitt and Chris Hastings offer fine and casual dining, and you'd be hard pressed to beat the barbecue.

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. More than 20 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 the popular luxury SUVs and sedans.

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 luxury Acura MDX in the city of Lincoln, and since the advent of the new Ridgeline, it's also the light truck leader for Honda.

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 races.

The Central Highlands are also home to the cities of Cullman, Anniston and Gadsden — all big contributors to the Alabama economy.

Gadsden, lying along the Coosa River at the foot of the Appalachians, is home to a major Goodyear Tire & Rubber plant, two large poultry processing plants, and several new automotive suppliers. As the gateway to Alabama's mountains, it's a tourist attraction with a charming riverfront and a popular park that showcases Noccalula Falls.

A pacesetter city, Anniston was the first in Alabama to be wired for electricity, in 1882, and 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, is the training center for the national Department of Homeland Security anti-terrorism activities. 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 but taken to the highways as well. One of the nation's top 60 counties for agricultural income, the county is also home to three relatively new Tier 1 auto suppliers and a host of smaller firms. And looking to the skies, Cullman is home to Axsys Technologies, charged with shaping the lenses for the James Webb Space Telescope, in development to replace the Hubble.

In fact, Cullman County was tops in the state for new industry just a few years back.

Not to be outdone by their bigger neighbors, three counties in the western reaches of the Central Highlands — Lamar, Marion and Fayette — teamed up to create a single economic development agency, the C3 of Northwest Alabama Economic Development Alliance, that is promoting location along new Interstate 22 and bringing new industry to the region. When a Wrangler jeans factory was destroyed by tornadoes in 2011, C3 convinced the company not only to rebuild but to rebuild bigger and better.

While the region works to attract industry and nurture entrepreneurs, the Birmingham area also attracted an unusual business this year. Kansas-based transportation firm Watco opened a national training center for railroad workers in Fairfield — taking advantage of the site's proximity to rail lines to offer hands-on training opportunities.

CAPITAL HEARTLAND

The region that includes the state capital of Montgomery is home to major auto manufacturers alongside R&D enterprise, Auburn University and some of the richest agricultural regions in the state.

From catfish farms to Goat Hill, War Eagle campus to Hyundai plant, Alabama's Capital Heartland is a rich and varied land. The Heartland is both prosperous and forward thinking.

In 2017, Montgomery County topped the state for new jobs, announcing some 1,704 new positions.

And it kicked off the Montgomery Internet Exchange, linking public and private, civilian and military expertise to make the city a leader in data exchange.

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 crops 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.

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.

There's another new product growing here, too — popular Elantra and Sonata sedans and Santa Fe SUVs rolling off the line at Hyundai Motor Manufacturing Alabama. 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 industrial investment and employing another 7,000 workers.

The Heartland just got word of a new type of building product, too — a $220 million Hardie Building Products plant set for Prattville.

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.

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 now offering classes.

The campus region is also home to a variety of high tech businesses, including GE Aviation's new factory, which includes 3D printing to make jet engine components. Six of the top employers are auto suppliers, making components such as wheels, bumpers, springs, axles and drive shafts. Briggs and Stratton continues to make its industry-standard air-cooled gasoline engines that power lawn equipment and more — with word of a planned expansion. Baxter, a medical device maker crafting products like dialyzers, finished a $270 million expansion in Opelika.

Opelika recently made headlines by wiring the entire city with fiber optic cable to provide a city-owned Internet utility.

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

Phenix City, for example, is now home to a world-class whitewater course on the Chattahoochee River. The waterway attracted some 18,000 river runners in its first year, many more than expected, and Phenix City is spiffing up its downtown to give those visitors a good welcome. The whitewater course is a joint endeavor with Columbus, Georgia, on the opposite bank.

Selma, in Dallas County, is home to auto suppliers, newfangled agricultural products and Bush Hog — maker of agricultural and lawn care implements.

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, travelling in the footsteps of the Civil Rights marchers from the Edmund Pettus Bridge to the Capitol steps.


2


3

1. The Amphitheater, in Montgomery, sits on the edge of Riverwalk Park, overlooking the Alabama River. Home to concerts, festivals and other events, the grassy seating can accommodate 6,000 people. *Photo courtesy of Montgomery Area Chamber of Commerce/Bryan Carter*
2. Robots weld with precision at Hyundai Motor Manufacturing Alabama in Montgomery
3. May Myat Noe Lwin researches foods for Southeast Asian fisheries in a lab at Auburn University. *Photo by Cary Norton*

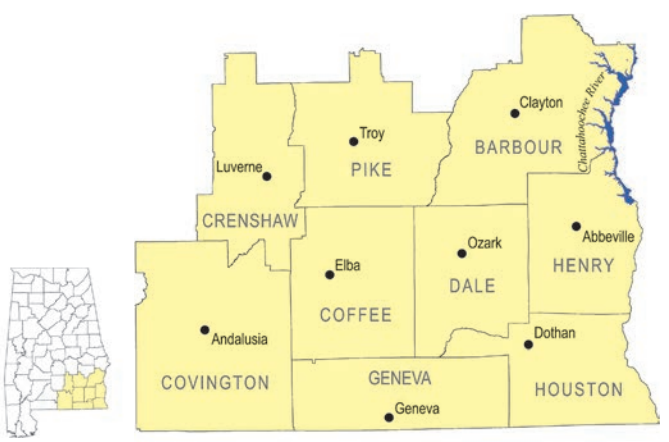
1

SOUTHEASTERN WIREGRASS

The Wiregrass region offers an abundance of enterprise, from agriculture and forest products to missiles, aircraft and medical education.

Agriculture is big business in Alabama's Wiregrass, the southeastern corner of the state, nestled alongside Georgia and just north of the Florida Panhandle.

As the epicenter of the nation's peanut crop, with chickens galore, trees counted as a cash crop and a monument to the insect that forced farmers to think beyond cotton, it's hard to imagine anything could rival agriculture.



But look to the skies. Alabama's Wiregrass is also home to one of the state's aerospace clusters — military and civilian, repair and training — the area is abuzz with aircraft.

Southeast Alabama has long been an agricultural region, providing the state and its neighbors near and far with cotton, row crops and forest products, in addition to the mighty peanut.

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. Wayne Farms opened a $55 million feed mill in Ozark in 2017.

And one more crop defines the agriculture of the Wiregrass — trees. Forests feed the lumber mills and provide the raw materials for a major Georgia-Pacific paper plant in Brewton — just updated

to the tune of $50 million — and an International Paper sheet plant in Dothan.

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

CAE USA won a major Army contract and opened a new facility in 2017, training Army aviators on rotary-wing aircraft.

A major fleet of helicopters at Fort Rucker has attracted its own cluster of supporters. L-3 Army Fleet Support is the largest employer in Coffee and Dale counties, while 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 is moving forward. That allows the region to take full advantage of the Alabama Aviation Center campus in nearby Ozark.

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.

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.

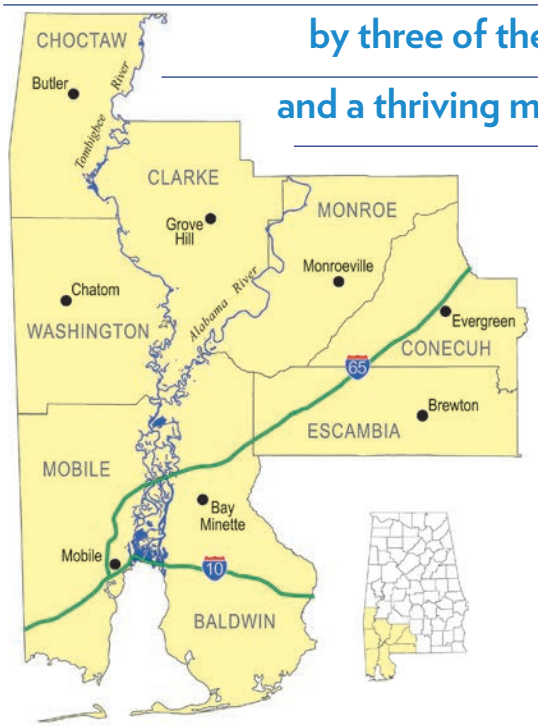
Eufaula is home to Humminbird-Johnson Outdoors, which makes fishfinders, depth sounders, marine radios and GPS systems for anglers, while a neighboring company, Strikezone Lures, makes fishing lures. Also in Eufaula look for Southern Plastics, maker of wiggly plastic fishing worms for some of the nation's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

1. More than half the peanuts grown in the U.S. are grown within 100 miles of Dothan.
2. Skilled technicians keep helicopters properly maintained at Fort Rucker, Sikorsky and other locations.
3. The boll weevil, forever remembered in downtown Enterprise. *Photo by Scott Morgan*
4. Troy University has built a reputation as an international campus.

GULF COAST

The Gulf Coast economy includes the first U.S. assembly plant of European aircraft giant Airbus, a $5 billion steel complex operated by three of the world's largest steel companies, and a thriving multi-national shipbuilding industry.



Mobile and environs along Alabama's Gulf Coast are still sky high over the aviation industry. When Airbus delivered its first U.S.-assembled plane to JetBlue in early 2016, people all over the area stepped outdoors and looked to the skies in hopes of catching a glimpse of its maiden flight. Now the multi-colored tails of airlines near and far brighten the skies.

As the number of planes delivered climbs ever higher, so does the surrounding cluster of Airbus suppliers. Latest to join the cluster is a plant to make and install nacelles.

It's sometimes hard to remember that aviation was big business in Mobile before Airbus came to town some ten years ago.

One of the region's very first 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 three industrial employers.

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, for example, and it just announced another major expansion.

And the air over the city and the Gulf frequently thrums with the sound of Coast Guard helicopters, taking off from their key training facility at Mobile's commercial airport.

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. Hidden farther from the public eye, along the bayous of south Mobile County, smaller shipyards rear above backcountry roads, crafting tugs boats, offshore platform tenders, shrimp boats and more.

Manufacturing is big business in Mobile. While the nation's economy in general lost thousands of manufacturing jobs in a single month, Mobile saw a robust 33 percent increase in jobs — and an 18.5 percent hike in wages — over the last five years.

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.

Steel and 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, and a partnership between the world's largest and second largest steel producers — ArcelorMittal and Sumitomo Metals — had the cold rolled steel mill up and running.

Chemical plants line the riverbanks, winding inland from the Bay — making products from herbicides to sugar substitutes. A Tate & Lyle plant in McIntosh is the only producer of Splenda sweetener.

And now the coast is sorting out a new line of work — an Amazon sortation center set to open this year near a brand new Wal-Mart distribution center.

Cooperation has been key for inland Gulf counties that have formed the Coastal Gateway partnership to recruit business.

But the glory of the Gulf Coast is the beach. Baldwin County thrives on an aviation cluster, established agriculture, suburban living and great schools. When Alabamians think of the sprawling county, however, they're more likely to think of the beach — white sand, clear water, exciting entertainment, sports venues, condos with a view and fabulous seafood. It's Alabama's playground.

1. GulfQuest Maritime Museum overlooks the Port of Mobile.
2. Aircraft cabin delivered for assembly at the Airbus U.S. Manufacturing Facility in Mobile. *Photo courtesy of Airbus*
3. Horizon Shipbuilding. *Photo by Todd Douglas*

AUTOMOTIVE

If any single event can change the face of an entire state's economy, consider this one — the day back in 1993 when Mercedes-Benz announced plans to build its first U.S. plant in Tuscaloosa County.

What started as a $400 million plant to make a line of sport-utility vehicles is now the vibrant hub of a $5.8 billion presence in Alabama, making SUVs and coupes and winning the top ranking among Alabama exporters.

In September 2017, Mercedes announced another $1 billion investment in

1. Gov. Kay Ivey joins Mercedes-Benz U.S. International's Jason Hoff, CEO (left) and Markus Schäfer, head of production, in announcing plant's $1 billion expansion into electric SUVs. *Photo by Christine Prichard, courtesy of Mercedes-Benz*

2. Autocar recently announced a $120 million heavy truck plant in Birmingham.

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AMERICA'S CULTURAL FABRIC

470,100
U.S. JOBS

$23 billion
U.S. INVESTMENT

$700 million
CHARITABLE GIVING

For 60 years, our team members have proudly built cars and trucks all across this great country. We are also driven by a commitment to the communities we call home.

TOYOTA

Toyota proudly operates 10 U.S. manufacturing facilities in nine states.

Alabama California Indiana Kentucky Mississippi Missouri Tennessee Texas West Virginia

its Alabama operations to prepare for the production of its all-electric EQ SUV. The expansion, which will create 600 new jobs, entails the retooling of portions of the existing plant, a new battery production center and a new logistics center. Construction begins in 2018, with full operation beginning after 2020. The Alabama SUV work is part of company-wide efforts to completely electrify each segment of the Mercedes lineup by 2022.

Alabama is one of Mercedes' biggest producers, rolling out more than 310,000 vehicles in 2016. Of that total, the company shipped 136,000 cars and SUVs to international markets, some 45 percent of the plant's production. The plant ships to customers in 135 countries, with its largest markets in China, Canada, Germany and Russia.

What started with a single company and a single plant is now an industry sector that drives the state forward. Joining Mercedes with OEM plants are Hyundai and Honda, and Toyota operates a major engine plant here. And in the fall of 2017, Indiana-based Autocar announced it will build a $120 million plant in Birmingham that will employ 746 workers making heavy-duty trucks.

Alabama's automakers represent the largest export sector in the state's array and make Alabama third in the nation for vehicle exports. The firms produced more than 1 million vehicles in 2016 and shipped $9 billion worth of vehicles and parts to destinations around the world.

The automotive sector now provides jobs for some 57,000 Alabamians.

Each individual OEM has a remarkable effect on the state's economy.

Hyundai Motor Manufacturing Alabama, for example, is credited with a $5 billion impact on Alabama's economy. The $1.7 billion Montgomery plant employs more than 3,000 workers. It has attracted some 35 tier-one supplier firms, located in 17 counties across Alabama, and creating another 7,000 jobs. Hyundai has the capacity to produce nearly 400,000 vehicles a year. The Montgomery plant celebrated production of its 5 millionth engine in 2017.

Honda Manufacturing of Alabama is the company's largest light truck facility. In addition to the new Honda Ridgeline, it

Toyota has the capacity to produce 750,000 engines annually in its 1,200-worker plant in Huntsville.

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makes Odyssey minivans, Pilots and Acura MDX, as well as V6 engines. The $2 billion plant employs more than 4,000 workers and has the capacity to produce 340,000 vehicles and V6 engines annually. Early in 2017, Honda announced plans for an $85 million expansion of the Lincoln plant.

Toyota has the capacity to produce 750,000 engines annually in its 1,200-worker plant in Huntsville. It's the only U.S. Toyota plant with the capability to make 4-cylinder engines for Camry, Highlander, RAV4 and Venza models; V6 for Highlander, Tacoma and Tundra, and V8 for Sequoia and Tundra. And in September 2017 Toyota announced a $106 million investment to equip the plant to build the next generation of engines.

Newest firms starting or expanding in Alabama include Samvardhana Motherson Peguform, building a $180 million plant in Cottondale, near Tuscaloosa, where it will make plastic components like bumpers and dashboards; Spanish firm Grupo Antolin announcing a $10 million plant in Jefferson County; Bolta opening a $49 million plant in Tuscaloosa, and Hanwha Advanced Materials, planning a $20 million expansion in Opelika. Altogether, 68 auto projects brought $1 billion in automotive investment in 2016.

1. The next generation of Honda's Odyssey minivan for 2018, part of the company's Alabama line.
2. Hyundai's $1.7 billion Montgomery plant employs more than 3,000 workers and has attracted 35 tier-one supplier firms.

ECONOMIC INCENTIVES RETOOLED

New incentives freshen Alabama's array of economic development tools

BY CARY ESTES

When Alabama reached into its economic incentive toolbox in the early 1990s, the state pulled out a hammer. On the strength of an incentives package worth nearly $240 million, Alabama surprised most observers by becoming the site of the first Mercedes-Benz automobile assembly plant in the United States.

Two decades later, however, Alabama's incentive toolbox looked largely the same, while many of the neighboring states in the Southeast had come up with bigger and stronger hammers. So after several years of planning, the 2015 state Legislature approved new economic development incentives designed to keep Alabama competitive when it comes to attracting and maintaining businesses.

"For years, Alabama was one of the most competitive states in the country, particularly in the Southeast," says Rick Davis, senior vice president of economic development for the Birmingham Business Alliance. "What's happened is, our sister states haven't been sitting back watching us win without doing something about it. They've gotten more competitive as the years have gone along. So we had to get stronger."

Alabama Commerce Secretary Greg Canfield says his office began evaluating the situation nearly three years ago, and then started working with the Legislature to craft changes to the incentive packages being offered by the state.

"We found there were some shortcomings in our incentives and the structure of those incentives relative to many of our competitors in the Southeast," Canfield says. "So we entered into this process with three goals in mind: to create a set of incentives that were competitive, were sustainable and would help us achieve certain strategic objectives."

The changes passed in the 2015 Legislature primarily involve job credits, investment credits and abatements. For the

Production began on the line at Hyundai Motor Manufacturing Alabama in May 2005.

Mercedes-Benz U.S. International's Tuscaloosa plant began production in January 1997.

most part, this legislation merely updated and improved many of the economic incentives the state has been using for years, Davis says.

"What this law did was tweak those incentives that were already on the books and made them more competitive," Davis says. "It gave us another way to leverage those incentives so we could compete on a more level playing field. It wasn't a significant overhaul of what we already had. It was more of a fine-tuning of some plans that were already good. We just made them better."

Here is a quick look at the new incentives, and what officials hope the changes will accomplish:

JOBS CREDIT

One thing Alabama was missing, says Canfield, was an incentive based strictly on the creation of jobs. Most of the incentives were based upon capital investment, and without that the state was having a hard time offering competitive incentives, even if the project included substantial job creation.

"And after all, one of our primary goals

The window sticker can't quite cover everything we've put into it.

Honda Manufacturing of Alabama has built a lot of happiness into the all-new 2018 Odyssey minivan. In fact, we could go on and on about the new Magic Slide Seat,™ CabinWatch and CabinTalk technologies, the built-in vacuum cleaner and a host of safety and comfort features — all designed to keep the whole family happy.

But what's not listed on the window sticker is the pride of our team of 4,500 associates. Because our dedication to delivering only the best for our customers is a standard feature in every vehicle and engine we build in Lincoln, Alabama.

HONDA

Honda Manufacturing of Alabama

HondaAlabama.com	@HondaAlabama

"The package that the state has put together will absolutely help, no question," says Bill Taylor, president of the Economic Development Partnership of Alabama. *Photo by Art Meripol*

is to create jobs in the state of Alabama," Canfield says. "So with the Jobs Credit, we have for the first time an incentive that rewards pure job creation."

Under this incentive, a company that moves or expands into Alabama will receive a cash refund of up to 3 percent of the previous year's gross payroll. This refund can be paid annually for up to 10 years, but only after the company has been doing business in the state for 12 months.

"It's competitive because, while there are other states offering similar types of job-creation tax credits, not all of them are doing so in cash. Some are just tax credits," Canfield says. "And it's sustainable because it is pay as you go. New jobs are created, and we collect and benefit from the economic impact of the payroll for 12 months before we pay that first incentive payment."

In most cases, a project must generate at least 50 new jobs to qualify. Exceptions can be granted to projects in some smaller counties or projects that create net new jobs in specific fields including chemical manufacturing, data centers, metals and machining, engineering, design and research.

INVESTMENT CREDIT

This is a reformulation of an older credit called the Capital Credit. Canfield says that program had so many limitations and regulations that site consultants began to refer to it as "the phantom credit."

"On paper it looked like a company could achieve a very powerful tax credit for their new capital investment in a project," Canfield says. "But in reality there were so many restrictions that most companies were able to recover less than 5 percent over a 20-year period. So it had no real value in making the deal."

The new Investment Credit improves those numbers to 15 percent over 10 years (1.5 percent per year). Credit can be taken against the Alabama income tax liability and/or the utility tax liability.

"We removed all those restrictions that the old Capital Credit had, giving it more value and making us more competitive," Canfield said. "And it's also sustainable, because prior to giving that credit, the company has to make the investment and formulate new capital in the state of Alabama. It allows us to properly [give

incentives to] companies that are making large capital investments in Alabama."

In addition, Canfield says there are extra incentives for a company that moves or expands into a county that has a population of less than 25,000, noting that smaller counties typically have some of the highest unemployment rates in the state. For companies making an investment in one of those counties, the Jobs Credit incentive increases from 3 percent to 4 percent, and the length of the Investment Credit expands from 10 years to 15.

"It's the state's first ever real strategy to craft incentives to help these targeted counties that need more job creation," Canfield says.

REINVESTMENT AND ABATEMENTS ACT

While it is important to attract new business to Alabama, Canfield says the state cannot overlook the companies already here. Those companies need incentives to encourage capital improvements, he says, to prevent existing plants and facilities from becoming obsolete and eventually closing.

The 2015 Jobs Credit rewarded, for the first time, pure job creation.

Under this act, the state will abate the non-educational sales and use taxes on construction materials and equipment used to upgrade an existing facility. In addition, property tax increases associated with the improvement can be abated for up to 20 years. For example, if a company makes a capital investment in an existing facility that increases the property valuation by $10 million, that increase will not be part of the property valuation for 20 years. And any increase in utility taxes can be abated for 10 years.

"This is our first ever opportunity to incentivize existing industry in the state and provide them with an inducement to make new capital investment that is not tied necessarily to job creation," Canfield says. "The goal is to make them more viable in the long term, and reduce the number of plant closures."

Bill Taylor, former president of the Economic Development Partnership of Alabama, says these new incentives are essential for Alabama's ability to offer packages specifically tailored to a company, rather than a one-size-fits-all approach.

"It's much more targeted today than what it was even 10 years ago. You have to match what a corporation is looking for," Taylor says. "This new plan was designed exactly for that, to give us more of a targeted approach to economic development. The package that the state has put together will absolutely help, no question."

For the full story, see February 2016
Business Alabama

1

VIRTUOSO PERFORMANCE IN LINCOLN

Workers at Honda's plant in Lincoln have cycled through an unprecedented four new model changes in the last three years in each of the products they build.

BY GAIL ALLYN SHORT

2

The minivan.

Popular media often portrays the purchase of this vehicle as a car buyer's rite of passage, from freewheeling, young single to practical parent. But in recent years, Honda and its competitors have worked to add a coolness factor to their minivans, with sleeker designs and upgraded technologies.

Honda's Odyssey minivan, for example, has gone through multiple design evolutions, says Mike Oatridge, vice president of the Honda Manufacturing of Alabama (HMA) plant in Lincoln. The 2017 model's features include aerodynamic styling, power tailgate and driver assist technologies. The vehicle also has HondaVac, an in-vehicle vacuum system.

The next generation of the Odyssey minivan for 2018 made its debut at the North American International Auto Show in January.

"Through five generations, the Honda Odyssey has consistently met the evolving needs of American families," says Oatridge. "The most popular minivan with individual American car buyers for six years running, the Odyssey was leading again in 2016. In addition, the Honda Odyssey has been the most popular minivan with under-35-year-old buyers in every year since 2010, and American car buyers have purchased nearly 2.5 million Odyssey minivans since its 1994 debut."

Honda's Lincoln plant began production in 2001. Today, HMA is the exclusive supplier of the Honda Odyssey, the Pilot sport utility vehicle, the Ridgeline pickup truck and the Acura MDX luxury sport utility vehicle.

Preliminary production figures released by HMA show that workers there in 2016 assembled 130,591 Odyssey minivans, 140,053 Pilot SUVs, 34,592 Ridgeline pickup trucks and 64,302 luxury Acura MDX SUVs, in addition to vehicle engines. In September 2016, workers there celebrated the production of the facility's 4 millionth vehicle and engine.

The Lincoln plant has faced the challenge in the last three years of executing four new model changes in each of the

1. The next generation of the Odyssey minivan for 2018 made its debut at the North American International Auto Show in January.
2. Honda's restyled and reengineered 2017 Ridgeline truck sported a dent-resistant bed, 3.5 V6 engine, 280 HP and a towing capacity of 5,000 pounds.

products they build, Oatridge says.

"That's a schedule that is unprecedented among Honda plants," he says. "So, with all those new models, along with new technology and advanced safety features, we've seen the skills to develop, build and test our vehicles become just as advanced."

One notable redesign has been that of the restyled 2017 Acura MDX, which features a diamond pentagon grille, jewel eye LED headlights and chrome dual exhaust.

Moreover, the Japanese automaker restarted production of the Ridgeline pickup truck last May at HMA, after taking the 2014 model out of its dealership showrooms to redesign the vehicle. The newly restyled and reengineered 2017 Ridgeline truck sports a dent-resistant bed, 3.5 V6 engine, 280 HP and a towing capacity of about 5,000 pounds.

And, since opening a $71.4 million automated V-6 engine production facility in 2015, HMA associates today produce about 1,500 V-6 engines each day, with assists from 92 advanced robots. The facility's robotics stations produce about 9,000 pistons daily at a cycle time of six seconds per piston.

"The V6 engine," says Oatridge, "has become more complex with the introduction of direct fuel injection, a technology that was in its infancy when we first started. In fact, almost all of our vehicles now have advanced technology as standard equipment — features such as side curtain airbags, back-up cameras and Bluetooth connectivity.

"Our automated engine assembly line is the most advanced facility of its kind at any Honda operation across the globe," he says. "This facility embodies the tremendous amount of confidence that Honda has in our Alabama team — a team that can now more quickly respond to customer demand for light truck vehicles equipped with some of the most dependable, powerful, fuel efficient and technologically advanced engines in our industry."

1. The all-new 2018 Honda Odyssey getting ready to come off the line at Honda Manufacturing of Alabama.
2. Honda Manufacturing of Alabama associates show their excitement for the all-new 2017 Honda Ridgeline at an event celebrating the start of mass production.

1

TOYOTA ECONOMIC ENGINE FULL BORE

Sixteen years after the announcement of Toyota's engine plant in Alabama, the massively expanded Madison County facility produced its 5 millionth engine in 2017.

Toyota Marks Anniversary, New Era in Leadership

BY GAIL ALLYN SHORT

2

In February, 2017 workers at Toyota Motor Manufacturing Alabama (TMMAL) in Huntsville watched their 5 millionth engine roll off the assembly line. It was a benchmark moment, but only the latest in an accelerating series.

"We hit our 4 millionth last September," says spokesperson Kimberly Ogle. "We ended 2016 with approximately 690,000 engines produced, a 10 percent increase over 2015."

The workers at TMMAL manufacture 4-cylinder, V6 and V8 engines for the Camry sedan, the Sequoia, RAV4 and Highlander sport utility vehicles and the Tacoma and Tundra pickup trucks. It has been the only Toyota engine plant in the world to manufacture all three engine types inside the same facility. Today, the Toyota engine plant employs about 1,500 workers, Ogle says.

"We are basically building about 3,000 engines a day," says Tom Cashin, the administrative affairs manager for TMMAL. "So our increased capacity helps us to achieve those milestones now."

By the time TMMAL produced that 5 millionth engine, David Fernandes had spent a month as the Alabama facility's new president. Fernandes, who took the reins as president on Jan. 3, became the second American to take the top spot at TMMAL since its 2001 groundbreaking. He succeeded the plant's first American president, Jim Bolte, who accepted a new job as vice president of manufacturing efficiency for Toyota Motor North America (TMNA) Inc. Bolte had been the plant's president since 2009.

Fernandes started his career at Toyota in 1998 as a group leader at the company's West Virginia plant. Afterward, he led production engineering at Toyota Motor Engineering and Manufacturing North America and later was general manager at Toyota Kentucky.

1. Toyota employees mark their 5 millionth — five months after their 4 millionth
2. Toyota announced, in In September 2017, a $106 million investment to equip the Alabama plant to build the next generation of engines using Toyota New Global Architecture.
3. Home of Toyota Motor Manufacturing Alabama

Fernandes' and Bolte's promotions were among several executive changes that Toyota Motor North America announced in December, 2016 as part of the company's "One Toyota" plan to "enhance regional autonomy, self-reliance and responsibility" in order, they say, to help speed up decision making and to put the company in a better position for sharing best practices, among other benefits.

"I am grateful and humbled for the opportunity to lead Toyota Alabama as president," Fernandes said in a written statement. "In 2017, we will focus on continuous improvement of daily operations and supporting our team members who are committed to meeting customer demand with the highest quality engines."

Under Bolte's leadership, Toyota expanded the TMMAL facility four times. The latest expansion brought Toyota's investments at the plant to more than $864 million and added a new V6 production line, which, Ogle says, has allowed the plant to build more fuel-efficient engines with reduced emissions and increased performance.

One of the most significant features of the latest expansion, Ogle says, involves the company's environmental efficiency activities in the plant. The effort is part of a nationwide environmental sustainability initiative by Toyota that focuses on promoting biodiversity, manufacturing hybrid models for lower carbon emissions, reducing water usage in its factories and reducing, reusing and recycling nonregulated waste.

"We're continually looking for ways to reduce our environmental footprint, specifically as it relates to the reduction of water use, energy and waste reduction," Ogle says.

The new building, for example, has more LED lighting and solar panels to reduce energy usage, she says. They have also installed a unit to collect rainwater and a pumping station that moves that water to the plant where the water is treated and used in plant operations.

In February, 2016, managers and workers at TMMAL marked the 15th anniversary of the announcement of Toyota's engine plant in Madison County. "We're really proud to call Alabama home," she says, "and very grateful for the continued support."

Highly trained workers assemble every element of a transformer, then test it, then disassemble it for shipment to a customer site, where they reassemble it.

HYUNDAI'S POWER PLAY

Hyundai's $135 million Alabama investment puts it among a handful of U.S. manufacturers of heavy power transformers.

BY CHARLIE INGRAM // PHOTO BY CARY NORTON

This is the Hyundai plant in Alabama that doesn't make cars.

It's Hyundai Power Transformers USA and, as the name suggests, it makes transformers for the power industry. A division of Korea-based Hyundai Heavy Industries, Hyundai Power Transformers (HPT) has been largely out-of-sight and out-of-mind since it began production in Montgomery in 2011. But that's quickly changing.

HPT has grown to 330 employees in six years and expects 2017 sales of $130 million. It plans to double its current level of business in 2019, and there is every reason to think that will happen.

According to the company's website, power transformers have a lifespan of 20 to 30 years, and 60 percent of transformers in service are more than 20 years old. That bodes well for companies like HPT, since many of those transformers already need or will need to be replaced in the coming years.

The Department of Energy has no accurate count of large power transformers but estimates that the number could be in the tens of thousands. Most transformers in service were made overseas, but there is growing demand in North America for transformers made in America. That's because manufacturing them is a long, complicated process, and utilities find it easier to deal with domestic manufacturers to address both pre- and post-purchase questions more quickly.

Hyundai Power Transformers is among a small group of relatively new facilities that make transformers in the U.S. Five years ago, in its first year of production, HPT sold 11 transformers. This year it expects to sell 81 units to customers that include Florida Power and Light, Duke Energy, Bechtel, Calpine, Oklahoma Gas and Electric, First Solar, Cleco and Next Era Energy. Southern Company and Exelon are also on the customer list.

The company expects unit sales to double to 160 transformers in 2019 and 250 by 2021. Each transformer typically sells for between $1.5 million and $2 million, HPT says.

Power transformers regulate the flow of electricity, much the way a water valve increases or decreases the flow of water. A transformer does not generate electricity; rather, it accepts incoming electricity and either increases or decreases the voltage before sending it to the next stop in a power system.

Says Tony Wojciechowski, director of human resources at HPT, "Whatever energy source you have, whether you're making energy by burning coal, nuclear energy, water running over a dam, wind energy, whatever, you have to regulate it. You have to step it up or step it down. If you do too much, you blow out the lines. Do too little, and you have rolling brown outs. Our transformers are regulating the power as it's used by the consumers."

Hyundai Power Transformer units made in Alabama range from 60 tons to 280 tons and stand as much as 30 feet tall. They take 10 to 12 months to build, because of their complex design, precise materials and construction requirements.

In hindsight, the success of Hyundai Power Transformers seems to be a stereotypical case study in planning and executing. At a time when the company had

no work force and no production facility, HPT drew up a five-year plan that began with construction of the plant in Montgomery County a few miles from the Hyundai Motor Manufacturing Alabama facility.

Building the plant was one thing, but finding a work force on a veritable drop of the dime was another. At the time of startup, there were no power transformer laborers in Alabama. For managers, the company recruited some professionals from competitors elsewhere in the U.S. But it relied heavily on AIDT, the state's industrial training unit, to develop its floor production workforce.

"AIDT was very instrumental in helping us develop the work force from a pre-employment standpoint and even from a post-employment standpoint," says Wojciechowski. "We had people go through four weeks of pre-employment training prior to becoming team members. They studied the transformer manufacturing process, math, blueprint reading, precision measurement and problem solving. There was a curriculum that everybody went through for almost the first two years when we were building this team.

"Several in the first group went to Korea and trained 9 to 10 months, and as they returned and we started the plant, AIDT continued to support us for the next year. That was about 90 people and we've got 330 now. So we still had a lot of people to employ, but the training became on-thejob. But AIDT helped us develop those essential skills."

HPT also has worked with the Alabama Technology Network, the Montgomery Chamber of Commerce and others in continuous improvement programs, which has included a near-perfect safety record for lost-time injuries, according to Wojciechowski.

Jung Sung Lee, president and CEO of Hyundai Power Transformers, says the complexity of transformer manufacturing is a constant challenge. "Our company's transformers are very much in demand in North America, but they are very technical to produce," Lee says. "We spend more than $1 million annually in technical training for our team members, and some areas of production require up to five years of on-the-job training. We provide this training continuously, but it is very costly in our process."

The current plant cost $135 million and consists of 282,000 square feet on 36 acres. The company has an additional 64 acres to develop for an expansion that is now in the planning stages. That expansion will make the company's manufacturing capacity 60 percent larger, according to Lee.

The future does indeed look strong for the company, which lost more than $98 million before reaching its breakeven point in 2016. But the company knew it would lose money its first few years, and it started making money according to its five-year plan's timetable.

"December 22, 2016 was the date of our breakeven award banquet," according to Tae Soo Kwon, chief financial officer for Hyundai Power Transformers. "That was a momentous occasion for us. That was our coup de grace to the days of losing money. That's when we basically said 'Thank You' to everyone for achieving our breakeven point."

AEROSPACE AND AVIATION

See the Saturn V rocket looming on the skyline of Huntsville? It's a symbol of an industry that began quietly and now roars to the heavens, reaching ever farther aloft. And while the northern tier of the state reaches for space, the southern tier is home to the more conventional — but very rare — industry of commercial jet building.

Completing the aerospace package that's headlined with NASA and Airbus, the state boasts a host of aerospace firms that search for solutions to complex problems, develop materials to make flight safer, analyze their way to more accurate guidance systems for missiles, train the world's helicopter pilots and keep the nation's aircraft shipshape.

NASA's Marshall Space Flight Center is superintending the new space launch project and counts some 150 Alabama companies as participants in the project. Other major NASA projects in Huntsville include work on the Chandra X-ray Observatory, solar system exploration and the International Space Station.

Alabama's links to the heavens started more than 60 years ago with the post-World War II rocketry of Redstone Arsenal. As the space race developed, along came NASA and its Marshall Space Flight Center. And its Huntsville home began attracting the immense variety of science and engineering firms that support the nation's defense and space programs. Virtually all the biggest names are represented in Huntsville, including all of 2016's top five defense contractors — Boeing, Lockheed Martin, General Dynamics, Raytheon and Northrop Grumman.

The Alabama Department of Commerce counts more than 300 state firms in the aerospace field, with more than 61,000 employees. Alabama aerospace companies garnered $8.4 billion in defense contracts and tallied $1.4 billion in exports.

In nearby Decatur, the Atlas and Delta rockets developed by Boeing and Lockheed Martin are still under construction, built now by United Launch Alliance, which is a joint venture of the two companies. Most of the payloads going to space today are powered by ULA rockets, and each launch gets a video showcase on the ULA website. Now, as pressure is on to replace Russian rocket engines with home-grown versions, companies competing for the engine work are joining ULA in Huntsville and Decatur. Both Aeroject Rocketdyne — new to Huntsville about a year ago — and Blue Origin, welcomed to Huntsville with civic events and promises of incentives, are expected to vie for the work.

Alabama experts do more than build rockets, though. They continue to solve the

It took some wheeling and dealing by local officials, but luring Commercial Jet to the Wiregrass looks like an economy saver. *Photo courtesy of Dothan Area Chamber of Commerce.*

Ruag employees work on rocket parts in Decatur. On lift, Sidney Sparks (left) and Trent Doran; Justin Phillips on ground. *Photo by Tyler Brown*

problems for the next generations of the space program. Boeing recently opened a new research and development facility in the Redstone Gateway center. And it's hard at work on the massive engines that will carry the U.S. space program farther into space — with its sights set on Mars by 2025.

Closer to earth, Airbus began building commercial jets in Mobile in 2015. Since 2012, when it announced plans for its first U.S. assembly line, the firm has built a massive plant, hired hundreds workers, many of whom have trained in Europe alongside the experienced Airbus teams, selected subcontractors, and begun assembling aircraft. The first of its planes have already taken to the skies, sporting the bright colors and logos of JetBlue, American, Delta and Spirit airlines.

Meanwhile, nearly a dozen Airbus suppliers have either started work in Alabama or announced their intention to do so. Most recently, the array broadened to include French firm Safran, already in Mobile but now planning to build and install nacelles.

Lockheed Martin builds missiles in Pike County — the Long Range Strike Systems cruise missile and the Joint Air-to-Surface Standoff Missiles.

Newer aerospace-focused companies include Carpenter Technology, which opened in 2014 near Athens to create premium steel alloys — nearly half of which go into aerospace and defense projects. The Pennsylvania-based company traces its heritage to the early days of flight and space flight, noting that its products were part of the Wright Brothers planes, Charles Lindbergh's Spirit of St. Louis and the rockets that took Neil Armstrong to the moon.

General Electric Aviation is also new to the Alabama mix, opening a $75 million plant in Auburn in 2015 and starting work on a new $200 million facility in Huntsville in 2016. The Auburn plant produces precision, super-alloy engine parts. Early on the firm invested an additional $50 million to begin 3D printing of jet fuel nozzles. The twin Huntsville plants will make silicon carbide materials for jet engines and gas turbines.

The state's MRO cluster — performing maintenance, repair and overhaul for many kinds of planes and helicopters — continues to thrive. VT Mobile Aerospace Engineering, which sparked the south Alabama aerospace cluster, celebrated a quarter century in Mobile in 2015.

UTC, Baldwin County's largest manufacturing employer, specializes in nacelles and other systems and just completed a major expansion, increasing its workforce by a third. Star Aviation adds specialty systems like Wi-Fi and advanced avionics at its site in Mobile, and Commercial Jet just moved to Dothan, where it specializes in modifications.

Newcomers to the mix include the Swiss firm Ruag Space, which is building payload fairing systems at ULA's Decatur plant. Winkelmann Group announced plans for an Auburn plant focused on "high-precision, high-strength, thin-wall roto-symmetrical parts" from many metals and for many industries, including aerospace. The Poarch Band of Creek Indians launched a new business, PCI Aviation, in Huntsville to perform cable and wiring harness fabrication.

And as the industry gears up, so have the state's airports — a completely renovated terminal in Birmingham, a new airline providing commercial flights in the Shoals, terminal expansions in Montgomery, upgraded terminal amenities in Mobile, upgraded amenities and a new hotel in Huntsville, and a variety of upgrades in Dothan from runway and security improvements to upgrades of on-premises industrial sites.

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THE DESIGNERS AND BUILDERS OF SPACE EXPLORATION

A constellation of Alabama's aerospace companies — contracted with NASA's Marshall Space Flight Center — enters the manufacturing stage of creating the Space Launch System that will return the U.S. to human space exploration.

BY NANCY MANN JACKSON

NASA is building the most powerful rocket in the world to fulfill its "Journey to Mars" mission. And the space agency is relying on the people of Alabama to get it done.

The Space Launch System (SLS) rocket is being designed, tested and built at NASA's Marshall Space Flight Center in Huntsville, and a number of companies from throughout the state are playing important roles.

"Exploring space is imperative to addressing the fundamental questions about our place in the universe and the history of our solar system," says Jerry Cook, deputy director of the NASA Space Launch System. "As demonstrated by the numerous inventions created because of America's space exploration efforts, we expand technology and create new industries that make Earth a better place, and SLS is the vehicle that is going to allow us to explore like never before."

BUILDING A BETTER ROCKET

Like the Saturn V rocket that first took humans to the moon and the space shuttle that helped build the International Space Station and inspired generations, the SLS will have strong ties to Huntsville and Alabama. Its technology builds on the engineering and history of those earlier programs and promises a more powerful result that can travel farther than any other space vehicle before it. "From the start, NASA designed SLS to take advantage of five decades of investments in technology, facilities and a skilled workforce," Cook says.

A powerful rocket is needed to send both humans and cargo to deep space destinations such as Mars. For instance, the first human travelers to Mars will need to take many things, such as support equipment, habitats, food, water, tools and experiments. "The SLS design makes it easier to transport astronauts and the necessary equipment and payloads with fewer launches, reducing planetary trip time because of its unprecedented capability," Cook says. "SLS is the only rocket capable of taking humans and the huge payloads required for deep space exploration, and it will carry more than any launch vehicle ever made."

Building such a powerful rocket hasn't been easy. A vehicle traveling through space will encounter harsh environments, and meeting the challenges of designing and building a powerful launch vehicle that can survive the trip is a feat of engineering.

Various components that make up the rocket must be integrated with each other and all function together properly for launch, and harmonizing all those moving parts has been the greatest challenge in building a vehicle for deep space travel, Cook says. To overcome the challenge, NASA has worked to combine new technology and engineering with successful pieces of the past. "While NASA is taking advantage of proven launch vehicle components, such as the RS-25 engines that flew on 135 Space Shuttle missions, we have adapted those engines to the new loads and environments that this bigger, more powerful vehicle will experience, plus added a new controller (computer) to power the engine," Cook says.

During 2017, NASA will integrate those engines into a brand new Core Stage that will hold all the liquid hydrogen and liquid oxygen needed to fuel the engines, as well as the flight computers and most of the avionics that control the rocket's flight. Similarly, there are numerous other components that must be integrated across the entire rocket — and all must ultimately come together to create a new vehicle, ready for its first flight in 2018.

FUNDING THE PROJECT

The SLS and the people and companies working to make it happen have benefited greatly from the support of the U.S. Congress. In 2010, President Barack Obama and Congress established a space exploration plan that "continues to have broad consensus and aligns all of NASA's work in support of the goal to send American astronauts farther into space than ever before," Cook says.

Earlier this year, the U.S. Senate appropriations subcommittee overseeing space flight announced that it would fund NASA's 2017 budget at more than $19 billion, a $21 million increase from the previous year. In addition to allocating funding for the first SLS launch in 2018, Congress has also committed funding for NASA to begin

The forward cone for a test version of the launch vehicle stage adapter (LVSA) — part of NASA's new rocket, the Space Launch System — is lifted out of a weld tool following completion of eight vertical welds on the hardware at the agency's Marshall Space Flight Center in Huntsville.

working toward the more powerful Block 1B version of the rocket, which will fly on the second mission in 2021. That second mission is planned to send the first astronauts farther away from Earth than any humans have ever ventured before.

Congressional funding for SLS allows opportunities for numerous private companies to contribute their skills and expertise to the project. For instance, Huntsville-based businesses Radiance Technologies and Dynetics are partnering to fabricate, assemble and transport the Space Launch System Core Stage Pathfinder Vehicle. When complete, SLS will represent work that is taking place at more than 800 companies in 43 states around the country. "This is truly America's rocket," Cook says.

These companies are providing an array of products and services to support the program, including precision fasteners, engineering and procurement services, developing alloy products for Aerojet's RS-25 rocket engines, designing and qualifying critical components for the Boeing SLS core stage, and manufacturing the Launch Vehicle Stage Adapter pedestals.

"The funding allocated to the SLS rocket is dedicated to building and testing the most powerful, capable launch vehicle ever constructed, and it isn't being used for any other purpose," Cook says. "NASA is partnering with private industry in new and innovative ways, freeing up our resources to focus on our exploration of the Red Planet, all while creating good-paying, high-tech jobs here at home. Thanks to the hard work of thousands of scientists, astronauts and engineers, we are closer to sending humans to Mars than ever before."

STAYING ON SCHEDULE

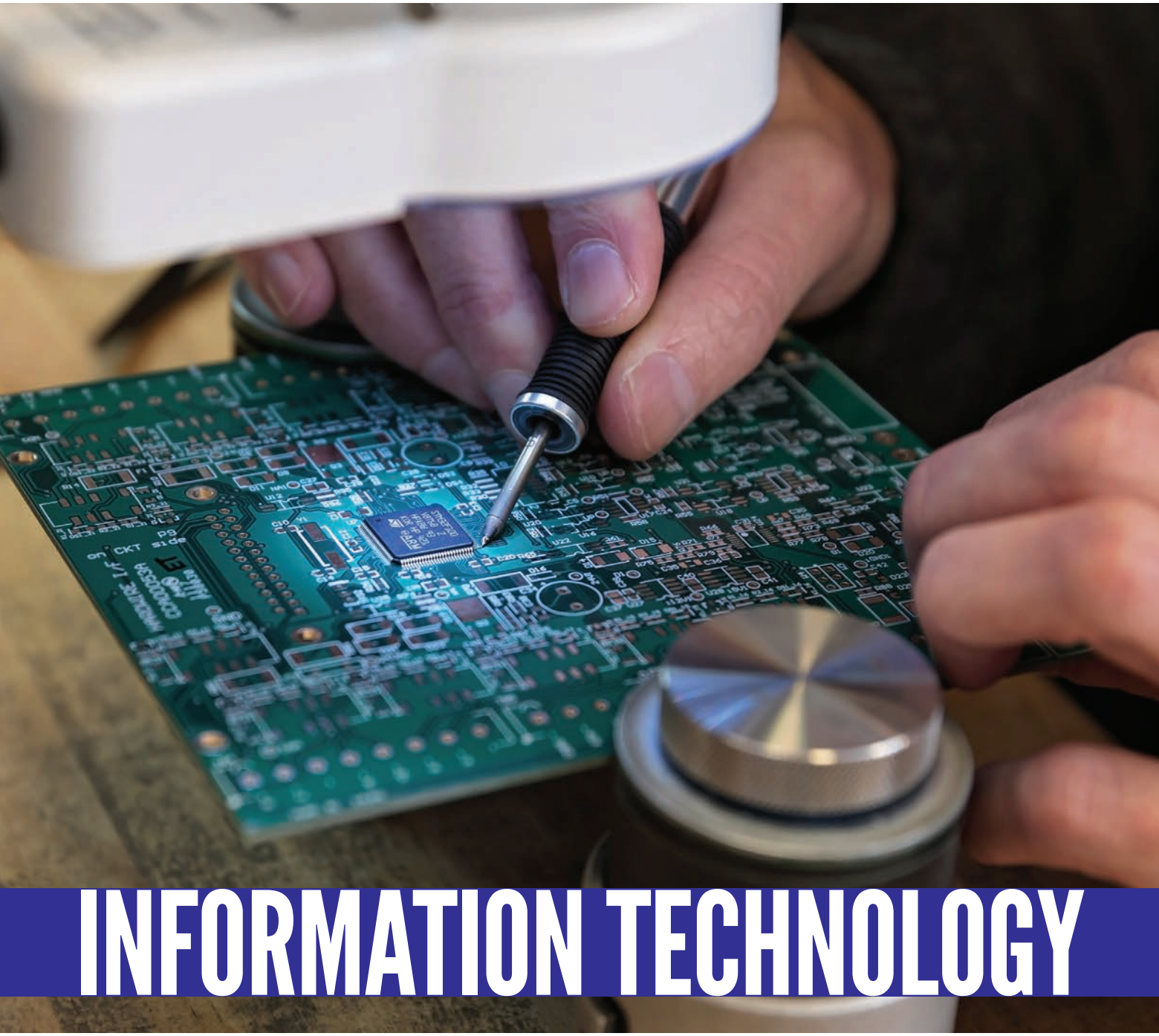
In October 2015, the SLS program completed its Critical Design Review (CDR), marking the first time in almost 40 years that a NASA human-rated rocket has completed all steps needed to clear a critical design review. "This milestone proved the program has a technically and structurally robust vehicle design and is ready for testing and manufacturing," Cook says.

NASA is meeting its schedule commitments and is on track to launch the first integrated mission of SLS and Orion in late 2018. For instance, the program has completed the second booster test at Orbital ATK in Utah and is continuing testing on the RS-25 engine at Stennis Space Center in Mississippi. Currently, there are 16 RS-25 engines in inventory at Stennis Space Center, enough for the first four flights.

At Michoud Assembly Facility in New Orleans, full-scale welding of flight hardware for the SLS Core Stage is under way, with all major welded components scheduled for completion this year. In 2016, Birmingham-based Brasfield & Gorrie completed the new test stands for SLS core stage testing, and testing begins in early 2017.

When the SLS is ready, its maiden SLS flight will not include a crew but will test the launch vehicle, the Orion spacecraft, and technologies, such as navigation and communication systems, necessary for carrying astronauts farther away from Earth than people have ever traveled before. But from the first launch, SLS will help provide information for further research: "Even on its first flight, SLS will carry 13 small satellites that will study everything from the moon to asteroids to radiation in deep space," Cook says. "We are making progress every day on the Space Launch System rocket, Orion spacecraft and modernizing NASA's ground systems at Kennedy Space Center in Florida to support deep space exploration, including NASA's journey to Mars."

A qualification test article for the liquid hydrogen tank on NASA's new rocket, the Space Launch System, is lifted off the Vertical Assembly Center after final welding at Michoud Assembly Facility in New Orleans.



INFORMATION TECHNOLOGY

From hardware to software, from city-operated fiber optics to head-in-the-cloud imagination, from hospital record keeping to military modeling and simulation, from the smallest specialty company to the 2,500 professional staffers at the Air Force's Gunter Complex, information technology is a strong and growing sector in the Alabama economy. And the state boasts, also, a couple of very high-powered teams working to keep all that information safe.

Around the state, the industry attracted 875 new jobs in 2016.

Adtran is the premier IT hardware and software developer in Alabama, one of the state's leading publicly traded companies and a trendsetter in connectivity and in helping bring cloud computing in reach of small businesses as well as big.

Also in Huntsville, Intergraph continues to develop new software that feeds the world market for geospatial data to help keep governments and businesses on target.

In the south, Computer Programs and Systems Inc. has created record-keeping systems targeted at smaller hospitals, helping them keep their data accessible and meet mandates the federal government has placed on all healthcare providers. CPSI is another of the state's publicly traded IT companies.

A host of smaller companies have joined the mix in the past few years, creating software to help doctors and hospitals meet

Prism Systems, based in Mobile, provides systems design and integration services for a variety of industries, including manufacturing, oil and gas and shipbuilding. *Photo by Todd Douglas*

Huntsville's GATR Technologies makes portable satellite communications equipment that can be strategically deployed.
Photo courtesy of GATR Technologies

federal mandates for electronic medical records.

Some areas of the state have taken extraordinary steps to provide high-speed connectivity. Three years ago, Opelika, unable to get the quality of service its citizens wanted from commercial providers, built its own fiber optic network, available to every home and business. Huntsville soon announced plans to join the ranks of "gig" cities, teaming with Google to bring the speeds needed for the city's bevy of tech-rich industries.

Montgomery has created an Internet Exchange that brings together the expertise of municipal, military and academic resources to move it to the forefront of high-speed connectivity. Latest development is a move by global internet service provider Hurricane Electric to catapult the system forward to 100 gig connectivity.

Along the Gulf Coast, Southern Light created a business to provide fiber optic services and has been so successful it has

earned a place on the Inc. 5000 list for rapid growth. After providing fiber optic options even in the far northern end of the state, in Florence, Southern Light was bought by Uniti Group Inc. of Little Rock.

Alabama's military presence also contributes to its IT prowess, both from within the military and from the hundreds of defense contractors nearby.

At Gunter Annex, associated with Maxwell Air Force Base in Montgomery, the Air Force maintains the majority of its professional IT services. Some 2,500 IT professionals are based there. The Business and Enterprise Systems Directorate provides IT services and superintends contracting and acquisition of additional services.

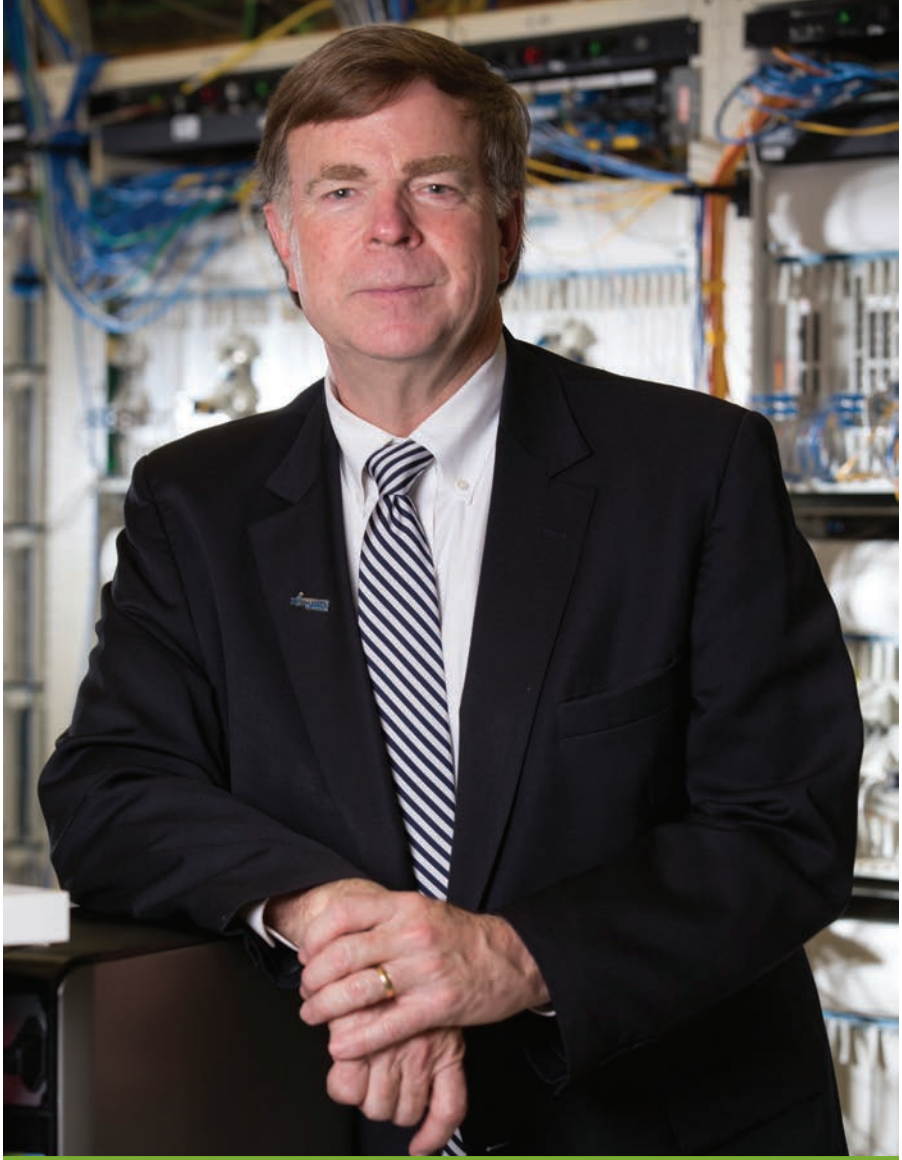
Montgomery's Internet Exchange is poised to provide 100 gig service.

In Huntsville, contractors specializing in modeling and simulation support the nation's defense capabilities. The city's annual modeling & simulation conference, AlaSim, attracts experts and exhibitors from around the world.

Aegis Technologies is one of the modeling & simulation industry leaders, developers of a new program that acts like a video game but helps troops learn to differentiate quickly between friend and foe.

GATR Technologies, which makes satellite communications equipment that can be deployed where needed, announced plans to double its Huntsville workforce over the next couple of years. The company had climbed rapidly on the Inc. 5000 list of fast-growing companies before its $232 million sale to Cubic Corp. in 2016.

Keeping all that data safe is the primary concern for several companies and agencies, and seven of the state's colleges and universities have been designated as centers of excellence for information systems security education.



Huntsville Mayor Tommy Battle at the headquarters of Adtran, a leading U.S. provider of internet networking equipment and software.

ALABAMA GIG CITIES

Cities that want service providers to invest millions in the deployment of fiber optic infrastructure are clearing the path with strategic plans that eliminate barriers and streamline franchise agreements.

BY NANCY MANN JACKSON // PHOTO BY DENNIS KEIM

In early 2016, Huntsville Mayor Tommy Battle announced that Huntsville Utilities would begin constructing a new fiber network to meet the city's growing needs for data and communications. The new network will eventually be used by Google Fiber to bring its high-speed internet service to residents and businesses across the city. In addition to Google Fiber, providers such as Southern Light, Comcast and AT&T also are beginning to provide gigabit internet service to Huntsville area customers.

The next generation of broadband internet service, also known as gigabit internet, is usually delivered over fiber optic lines and provides internet speeds of 1,000 megabits per second.

"A rocket city deserves rocket speed, and that means a network that connects to the internet at one gigabit per second," Battle said in a prepared statement. "Your internet will be 50 to 100 times faster than it is today."

Huntsville isn't the only locale looking to become a "gig city." Municipalities across the state are making strides to beef up their cyber infrastructure.

"We consider high-speed internet access to be a very important part of life, it's evolving into a necessity, really," says Walt Maddox, mayor of Tuscaloosa. "Providing gig access not only improves quality of life in a variety of ways, it impacts our ability to conduct business and has educational applications."

In 2016, Montgomery became one of just four cities in the Southeast, and the first in Alabama, with an Internet Exchange — a hub infrastructure through which internet service providers and content delivery networks (CDNs) exchange internet traffic between their networks. Montgomery's exchange, the MGMix, brings together the investments by the city and data resources of Maxwell Air Force Base, Gunter Air Force Base and the Retirement Systems of Alabama. In 2017 partners in the exchange upgraded the capacity of the exchange to 100 Gigabits per second.

"We cannot overstate the significance of the Montgomery Cyber Connection to expanding industry in the River Region and putting Montgomery on the map..." said Montgomery Mayor Todd Strange. "This partnership and initial investments made by the city, the county, the Chamber and several local business leaders are the first steps to unleashing a wave of economic development that may rival Hyundai."

The demand for extremely fast internet service continues to grow, as each household and business has multiple devices connected to the internet. As increasing numbers of devices become internet-enabled, broader infrastructure is needed to support those devices and transport data and information.

In Huntsville, several local technology companies helped the city craft a request for proposal to attract broadband providers. That document eventually led to decisions by both Google Fiber and AT&T GigaPower to add Huntsville to their upcoming gigabit internet expansion plans. In addition to those companies,

Wow Media (formerly known as Knology), Comcast and Southern Light have announced their intentions to bring more services to the market, Diamond says. "We want competition in the market, because the customer ultimately wins," he adds. "The first customers served for Google Fiber will be summer 2017. AT&T and other incumbents are in the process of bringing on customers as we speak."

As a result of these new services, Huntsville expects to see "more startups and more digital inclusion" in the metropolitan area, Diamond says. Ultra high-speed internet will attract more high-tech companies and entrepreneurs who want to be able to conduct important work from home, offices or anywhere in the area.

In Tuscaloosa, the city's fiber optic master plan "is in its infancy," Maddox says. While there's no concrete timeline, the city recently granted franchise agreements to Southern Light and is "very willing" to do the same for other interested providers, he says.

Currently, there are two projects in the pipeline in Tuscaloosa, West Tuscaloosa Connect and Digital Districts. First, West Tuscaloosa Connect will provide high-speed internet access to the western area of the city. "One of my guiding beliefs is that western Tuscaloosa and other parts of our city that have not benefited from the economic prosperity of Tuscaloosa will again thrive both residentially and commercially," Maddox says. "By providing high-speed wi-fi in western Tuscaloosa, individuals and businesses can connect to people and opportunities globally."

Also, by creating Digital Districts within the city, starting in disadvantaged areas, the city hopes to connect people and attract businesses to those high-speed digital districts.

As other cities try to get in on the action, they are taking steps to attract broadband providers to their areas — and one important step is to create a business-friendly environment for those providers. "This includes efficiently granting fair franchise agreements, providing information about and allowing access to existing infrastructure and implementing efficient permitting processes," says Southern Light's Hanes. "Cities that want companies to invest millions of private dollars in the deployment of fiber optic infrastructure need to eliminate barriers to entry and make the process as inviting and efficient as possible. Municipalities are competing for fiber optic providers, and we are definitely swayed by the path of least resistance."

In Troy, the local cable provider partnered with Adtran to provide gigabit service to its customers. And some municipalities have taken strides without the assistance of outside providers. For instance, when Opelika was unable to attract new broadband providers, the city-owned Opelika Power Service opted to build its own fiber network, which offers high-speed access to 100 percent of the city's residents.

As demand grows, more cities look to become locations where residents and businesses can expect gigabit internet service — and local governments and providers must find ways to work together to provide that.

"High-speed internet is required to do almost everything in our society today," says Tuscaloosa's Maddox. "It's the way the world does business."

THE TRANSFORMATION OF ADTRAN

IT powerhouse Adtran has reinvented itself as a software solutions provider.

BY JESSICA ARMSTRONG
PHOTO BY DENNIS KEIM

Founded in 1985, Adtran Inc. (Nasdaq: ADTN) is one of the oldest and largest of Alabama's technology companies, though it largely goes unnoticed — like all those boxed widgets in data banks that make the internet work.

Adtran makes the networking equipment used by internet service providers to run their information highways. It's a highly competitive business, and to have stayed among the front of the pack for over three decades would be no small achievement, if Wall Street investors gave credit for endurance.

In the middle of 2017, Adtran's stock is selling at about $20 a share, about its median price in the last 15 years. In the highly volatile tech sector, Huntsville-based ADTN has held its own.

And to do so, it has had to do some fancy footwork, especially in the last few years.

"Wait too long to make the shift and you are too late, out of business like Blockbuster Video. Too early and you have much more work to do as a trailblazer," says Kurt Raaflaub, who leads Adtran's strategic solutions marketing. "But being first has rewards. This is why we made the early move, to lead."

Raaflaub says that during the last five years Adtran has moved toward becoming much more of a software and services company.

"What we recognized a few years back — really because it was in our face as we viewed other transformed industries — was that the approach to services has changed; the world is changing. We are moving to a sharing economy of user-driven services. Operator networks must have the flexibility, bandwidth and scale to meet this challenge."

In response to the emerging broadband boom, Adtran announced its pledge to ensure that access networks are open, programmable and affordable as carriers look to construct the foundation for 5G, which will make network connectivity 10 to 100 times faster than 4G networks. 5G is expected to be available in 2020.

The platform Adtran has been creating to do this entails a cloud-based, open software architecture branded "Mosaic."

"We have gone out to create the change agent, which is Mosaic," says Raaflaub.

The Mosaic Cloud Platform and Mosaic OS are Adtran's claim to a leadership position in the rapidly emerging internet enterprise known as in Software Defined Access (SD-Access).

Mosaic allows service providers to accelerate their path to SD-Access architecture, enabling them to catch up with the unceasing innovations of their "over-the-top" (OTT) competitors — companies like Apple and Google.

Value of the networking hardware Adtran manufactures won't disappear, says Raaflaub, but it will become a smaller portion. Network functionality and value will move from residing mostly on the hardware to residing within cloud platforms such as Adtran's Mosaic. For some time, there will remain a more specialized and higher value hardware that the outside equipment manufacturers, also called white box vendors, do not have the expertise to develop, he says.

Individual network and consumer apps launched from cloud platforms — used to help drive down the cost of running a net-

Kurt Raaflaub, head of strategic marketing solutions for Huntsville's Adtran, says the company's Mosaic platform is the "change agent" that allows cloud-based, open-software solutions.

work, as well as developing and delivering services — will be a key component of the new value stream, says Raaflaub.

"Anchoring it all will be integration services, offered to the service provider to help put these open, multi-vendor pieces together in a robust and reliable fashion. Larger operators like AT&T will do so themselves, but the hundreds of smaller communications services providers will look to their suppliers, such as Adtran, to provide this integration."

The new architecture will provide more flexibility in adding functions and services, much like the apps and the "internet of things" — the interconnection via the internet of computing devices embedded in everyday objects, enabling them to send and receive data.

"This is the key reason we are making this fundamental shift in building networks. So that telco [telecommunications] and cable companies can compete at web-scale. The companies with the highest value, those with the highest priced share value or market capitalization, are no longer GE, Exxon or Citi. Ten years later only Microsoft remains in the top five."

Raaflaub points out that today the top five companies with the highest value are web-scale companies such as Apple, Google and Facebook.

The warp speed in which telecommunications technology is changing can make it a challenge to foresee every development. That's why Adtran's shift to more user-driven, more software-centric and programmable networks is critical, notes Raaflaub. The Software-Defined Access architecture combines modern web-scale technology with open source platforms to facilitate rapid innovation in multi-technology and multi-vendor environments.

"The entire industry built and deployed closed proprietary telecom and datacom systems, which held back long-term network and services innovation," he says. "Open, multi-vendor, multi-domain operating models greatly improves the long-term agility in which a network operator can move much more at web-scale."

Adtran employs about 2,200 people and about 1,700 of them work in Huntsville. The roughly 500 remaining employees work in sales and research and development offices worldwide.

Adtran Chairman and CEO Tom Stanton observes: "We experienced substantial global growth and customer diversification following our acquisition of Nokia Siemens Networks Broadband Access Business in 2010. Adtran now has customers in over 60 countries."

Adtran will continue to excel in optics and access innovations and its drive toward SD-Access, adds Raaflaub. Its acquisition of the Commscope Fiber Access portfolio has helped accelerate the company into the cable and MSO (Multiple Systems Operators) markets with EPON and R-FOG solutions.

"And you'll see Adtran leverage our SDN (Software Defined Networking) expertise to help transform the MSO industry into an open disaggregated architecture. As the industry moves into 5G, Adtran leadership in NG-PON2 will help drive the high capacity deep-fiber infrastructure that will support these mission-critical, latency-sensitive applications such as autonomous vehicles and tactile internet."

BIOTECHNOLOGY

Cancer research, plant genetics, medical devices, drug discovery and a myriad of variations on those themes make up the fabric of a strong bioscience sector throughout Alabama.

Industry association BioAlabama counts some 660 bioscience firms and centers around the state, "spanning all sub-sectors of the biotech industry including agriculture, pharmaceuticals, medical devices, hospitals, research testing & medical labs."

Those companies employ more than 13,000 people and are recognized for a host of achievements — including those at Southern Research, credited with discovery of seven cancer-fighting drugs in use today and six more in advanced testing.

Just since 2009, Alabama companies in the industry have been awarded more than 600 patents.

Researchers at the state's universities, specialty labs, the massive Cummings Research Park and premier research centers — the HudsonAlpha Institute and Southern Research particularly — continue to pursue some of the most advanced medical research in the world.

The University of Alabama at Birmingham is the state's premier biomedical research facility, winning more than $270 million in funding from the National Institutes of Health, plus more from other sources.

Founded in 1941, Southern Research

specializes in a wide spectrum of biomedical research in its own right, and it partners with the University of Alabama at Birmingham to research new drugs and bring medical devices to market. Among its most recent biomedical projects is a major effort to fight the Zika virus.

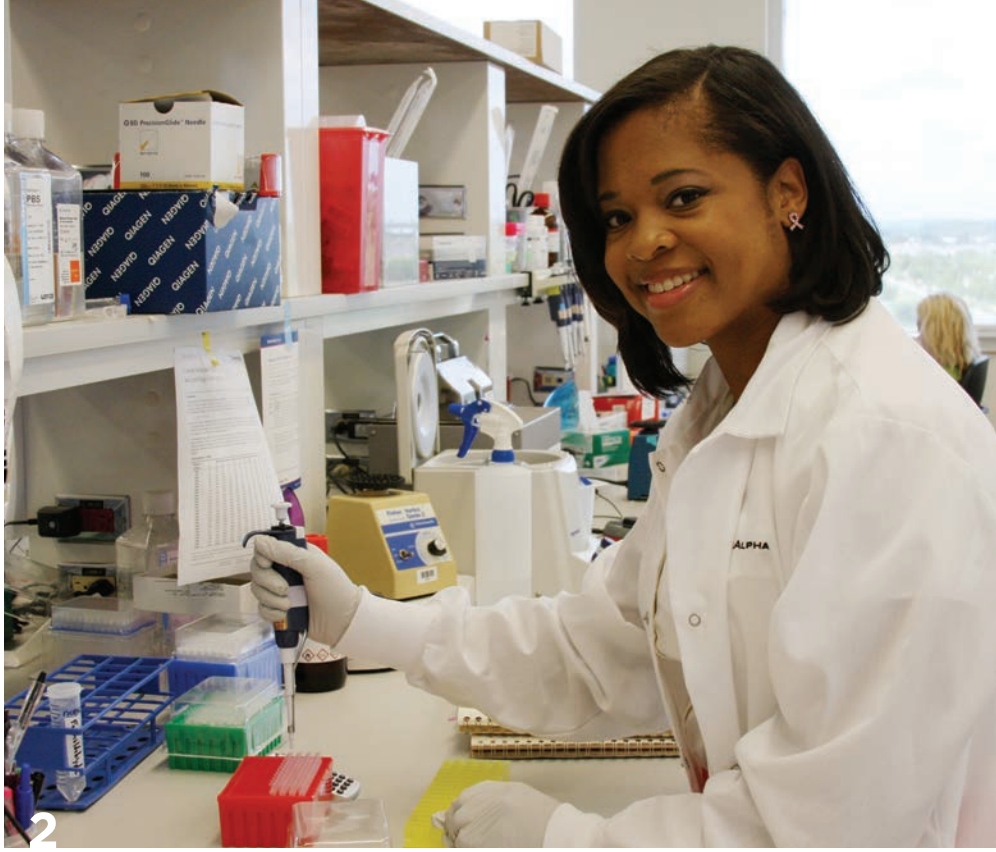
HudsonAlpha Institute, in Huntsville, is actively working on genomic research related to "cancer, neurological and psychological disorders, childhood genetics disorders, immunogenomics, and agriculture and bioenergy." Founded in 2008, the nonprofit Institute fosters research and education, individual research and collaboration, academia and business. Researchers work on esoteric problems and practical solutions, applying the science of genetics to personalized, gene-based treatment of human disease, as well as developing crop plants that are stronger and more useful. From the inception, the institute has sought to not only study problems but also bring solutions to the marketplace.

Other top news in the sector included NIH funding for researchers at the University of South Alabama's Mitchell Cancer Institute, working to prevent skin cancer. Scientists there also work to uncover the ways to detect ovarian and pancreatic cancers earlier, while they are easier to treat.

Baxter, which makes dialyzers and other medical equipment at its plant in Opelika, has completed a $270 million expansion there.

Evonik Corp. is creating a new research and development facility in Birmingham that will focus on medical devices and technology. It's the German firm's first R&D facility in the U.S.

BioGX, a Birmimgham firm, introduced four testing products for the European market, designed to uncover infectious diseases.



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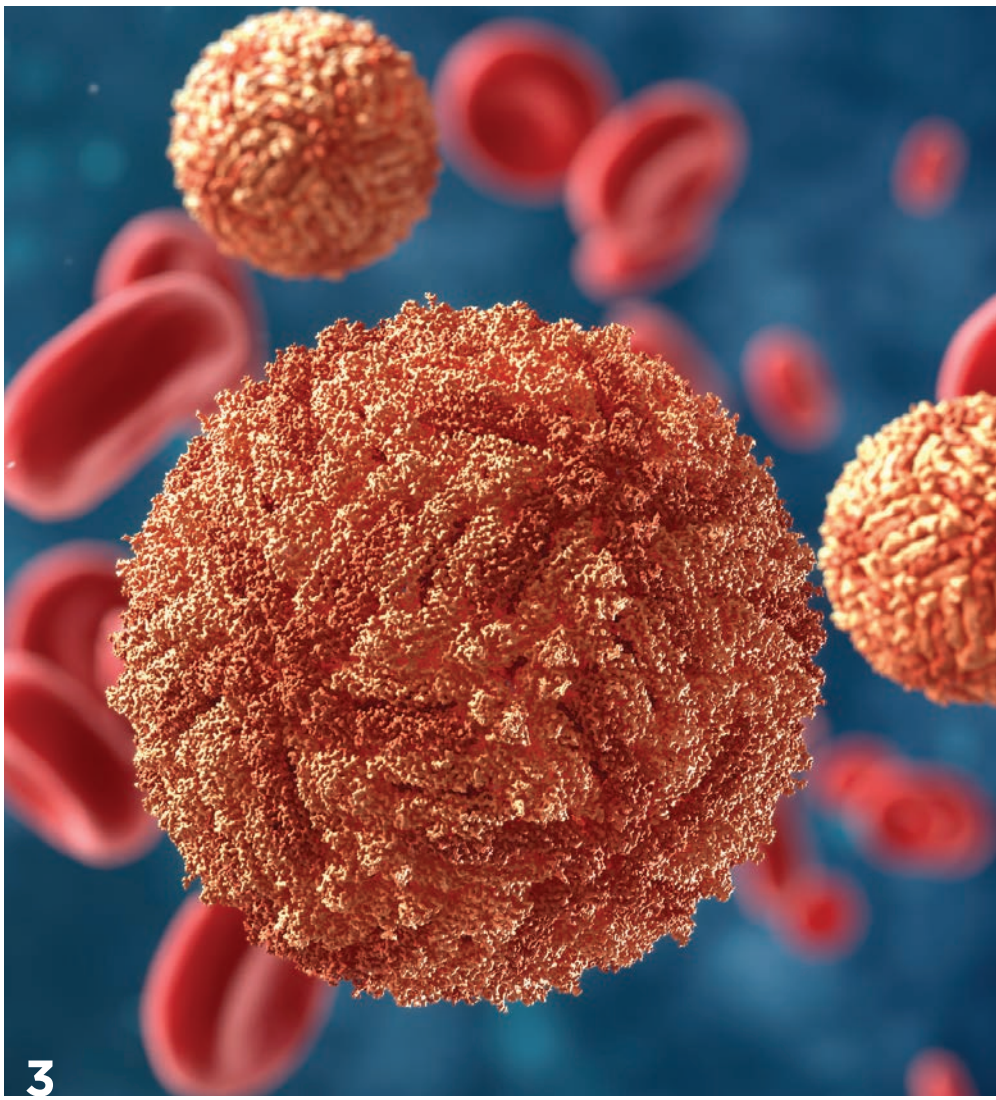
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1: Electron microscopic imagery from research at the University of South Alabama Mitchell Cancer Institute. *Photo courtesy of University of South Alabama Mitchell Cancer Institute.*
2: Joy Agee McDaniel, a researcher at HudsonAlpha Institute of Biotechnology, helped discover a gene signature that could lead to new therapies for early treatment of one of the most aggressive forms of breast cancer.
3: Images from virus research at the University of Alabama at Birmingham.

Left: Dr. David Bick, chief medical officer
Top right: Shawn Levy, director of the Genomic Services Laboratory
Bottom right: Liz Worthey, director of software development and informatics

THE KEYS TO PERSONAL GENOMIC MEDICINE

Researchers at the HudsonAlpha Institute for Biotechnology use whole genome sequencing to read an individual's entire DNA — the key to diagnosis and treatment.

BY NANCY MANN JACKSON // PHOTO BY DENNIS KEIM

From 1990 to 2003, researchers around the world — including some in Alabama — completed the Human Genome Project (HGP), an international, government-funded effort to identify and map all the genes that are included in human DNA. While the groundbreaking project successfully identified the locations and functions of each human gene, it was just the beginning of genomic medicine, a way of customizing medical care to a person's unique genetic makeup.

Since the completion of the HGP, researchers have continued to study how a person's genes affect his or her health. A great deal of groundbreaking work in that area is happening here in Alabama, led by the team at Huntsville's HudsonAlpha Institute for Biotechnology.

The HGP research showed that any two humans are identical in more than 99 percent of their genes. While humans have many more similarities with each other than differences, those slight variations in DNA can have a major impact on whether a person develops a particular disease, how he responds to an infection and which drugs are most effective, says Howard Jacob, Ph.D., HudsonAlpha's executive vice president for medical genomics. At HudsonAlpha, scientists have developed cutting-edge technology for DNA sequencing, the process of "reading somebody's entire DNA," Jacob says.

"Lots of people read little pieces of DNA, but we read the entire genome, which gives us all the information that shows what makes that person that person," Jacob says. "Imagine building a house with a partial blueprint versus a full blueprint. By doing whole genome sequencing, we have all the information we may ever need to help in diagnosing or treating illnesses for that person."

Whole genome sequencing is used in other places, but HudsonAlpha — with partners at the University of Alabama in Huntsville, the University of Alabama at Birmingham, the University of Alabama, the Auburn University School of Veterinary Medicine, the University of South Alabama's Mitchell Cancer Institute and Children's Hospital of Alabama — has developed technologies and methods for doing it for about the same costs as partial genome sequencing. And in Alabama, researchers and clinicians are using whole genome sequencing to make life-changing differences for current patients and the future of health care.

"For the first time in history, we are able to read nearly all the DNA bases that provide the blueprint of life," says Shawn Levy, Ph.D., faculty investigator and founding director of the Genomic Services Laboratory at HudsonAlpha. "Every single living thing is based on the same

fundamental building blocks, and the variations in size and content on their genomes creates the diversity of life. We now have the ability to read and compare those genomes and to bring those capabilities to improve human health care."

HudsonAlpha-based scientists continue to discover new genetic markers associated with specific health conditions. In 2017, researchers there discovered a new gene signature associated with triple negative breast cancer last year, which could lead to more targeted treatment for a devastating form of the disease.

In addition to new genetic discoveries, HudsonAlpha has made strides in developing software that can process and decipher reams of genetic information, as well as hardware that can securely store and catalog libraries of human genetic data. To that end, HudsonAlpha has assembled, in addition to genetic and clinical experts, a team of experts in accompanying fields, such as software development, informatics and information technology.

"When you sequence a genome, you derive a terabyte of information from each person," says Liz Worthey, Ph.D., faculty investigator and director of software development and informatics at HudsonAlpha. "The challenge is to take all that data and make it useful."

Worthey and her team have developed software that takes that data, aligning billions of pieces of an individual's genome with reference data, and identifying all the places where that person is different from the standard.

"Most people have about 6 billion variances in their DNA, but many of those variances aren't associated with disease; they just determine things like hair color and eye color," Worthey says. The process of determining which variances could be associated with disease took about nine months, just a few years ago. Today, with the software Worthey has developed, the process takes about 90 minutes, and then the data is ready to be studied by a human expert.

"HudsonAlpha has the most advanced sequencing instrument available in the world, the HiSEQX, which was a remarkable resource for the group of us in Wisconsin," says David Bick, M.D., chief medical officer at HudsonAlpha and medical director of the Institute's Smith Family Clinic for Genomic Medicine, which opened in 2015. "HudsonAlpha had the sequencing technology, and we brought the informatics and the clinical knowledge to apply to that sequencing."

Bick spent 13 years as a professor at the Medical College of Wisconsin, where he also led a pediatric genetics clinic and a genomics lab, becoming a nationally recognized leader in the field of genomic medicine, because they saw a great opportunity to use whole genomic sequencing to make a positive impact on the health of more patients.

At the Smith Family Clinic, Bick and his team focus on using genome sequencing to diagnose diseases, especially in children, that have not been diagnosed through traditional avenues. Up to 10 percent of Americans have undiagnosed diseases, according to Jacob. Children may suffer from seizures, delayed development, intellectual disabilities or autism with no clear diagnosis.

"New gene-disease connections are being discovered all the time," Bick says. "And once we have your genome, we continue to check against new research to find an answer. So if we don't have a diagnosis this year, we may have one next year."

As the whole genome sequencing center for the Undiagnosed Diseases Network, funded by the National Institutes of Health, HudsonAlpha receives cases from across the country. And HudsonAlpha has delivered diagnoses in more than 100 Alabama cases in the past few years, Levy says. For the families who receive concrete diagnoses, the sequencing work done here is life changing. While there may not be a cure for the genetic disease that is diagnosed, "there are strategies that can help," Cooper says. "Many people experience improved medical management once they have a correct diagnosis."

In addition to helping achieve difficult diagnoses, genomic medicine has made great strides in pharmacogenomics, which is the analysis of key genes that dictate how a person metabolizes drugs.

In fact, up to 18 percent of drugs being taken today are being taken by people who can't process them correctly, Jacob says. In his own case, Jacob's genetic assay shows that "there are 50 common drugs I can't process correctly," he says.

Understanding how a person's genetics affect his or her ability to process medicines can affect anesthesia and all types of

treatments for various conditions. While a pharmacogenomics analysis, often referred to as PGX, is widely available for physician use, such tests are not yet widely used, Levy says. HudsonAlpha's Smith Family Clinic now offers Insight Genome testing, which sequences the genomes of healthy people, allowing participants to learn about how (and whether) their body will respond to various drugs, and whether they are susceptible to contracting various genetic-related diseases. The Institute also adds each participant's genome into its research program.

As the field of genetics continues to provide new knowledge and informed practice to the field of medicine, scientists and practitioners in Alabama remain on the cutting edge. And the people of Alabama, with access to the latest studies and care, will continue to benefit.

To learn more about the business advantages of HudsonAlpha and locating your bioscience company in Huntsville, Alabama, visit **www.hudsonalpha.org/innovate**

WORK SKILLS MAXIMIZED

Alabama's workforce development system gets a streamlining that communicates clearly in its newly branded voice, AlabamaWorks.

BY GAIL ALLYN SHORT

In 2015, the Alabama Workforce Council and its partners unveiled a new statewide initiative aiming to offer a more unified way for companies and skilled job seekers to connect and for students to locate available education and training opportunities.

The initiative, called AlabamaWorks, is a rebranding of Alabama's workforce system, and a major part of the program is a new website, alabamaworks.com. The website features employer services to help companies post job openings, search resumes, connect with job seekers and link to the nearest AlabamaWorks regional council in their area.

For job seekers, the AlabamaWorks website has information on how to post resumes online, details about which companies are hiring and where to find training opportunities at places like community colleges and technical schools. The website also showcases an array of career guides aimed at students. The guides feature descriptions of the various high-demand jobs and professions, the education and training required to get those jobs and how much a worker could earn in those professions.

The idea is to help job seekers, students and companies quickly find the helpful resources they need in one location, says Ed Castile, deputy secretary of the state Department of Commerce and executive director of AIDT.

"States that are going to be successful recruiting businesses and keeping them are going to have to have solutions," says Castile. "So we've redesigned our systems from top to bottom at the recommendation and direction of the governor and the Legislature. And so this branding and marketing program that we've put together is our effort to show the world what we're doing."

The new AlabamaWorks system, says Castile, allows workforce development partners, like AIDT and community colleges, to leverage their resources, work more closely together and prevent duplication of programs.

"We want to ensure that as a person moves through our system that we have it aligned, that people know what the pathways are and that a person is able to go from one step to the next and get the same information at every step," says Castile.

Besides the website, AlabamaWorks has also taken a more localized approach to workforce development by strategically dividing the state into seven regions — down from 10 under the old system — effective October 1, 2016. Each region has an employer-led workforce council consisting of representatives from local industries and businesses.

The regrouping of the regions is based

The AlabamaWorks website serves job seekers with information on what companies are hiring and where to obtain the necessary skills in classes such as this, at Shelton State Community College. *Photo by Shelton State Community College/ Porfirio Solorzano*

on factors such as the population of the counties, the location of industry and business clusters and the commute patterns of citizens within the regions, says Castile. Moreover, each regional AlabamaWorks council will now have a full-time executive director who can lead efforts to address the specific economic development needs in their communities.

"Our goal is to have these councils be the local, boots-on-the-ground information [source] we need so we can have all of our system sources, like colleges and AIDT, respond based on exactly what that local need is," Castile says.

In Tuscaloosa, Donny Jones, the COO of the West Alabama Chamber of Commerce, is also the executive director of Region 3 West AlabamaWorks.

"In our region alone we have over 2,000-plus jobs that we need to fill in the next 18 months in the automotive industry, health care industry, not to mention in the jobs with the expansion of our manufacturing," Jones says.

The region had several programs in place prior to the AlabamaWorks debut, Jones says, including the annual Worlds of Work expo. The event took place most recently last October at Shelton State Community College. More than 4,500 eighth graders from nine counties gathered on the campus to learn, through interactive presentations and hands-on activities, about various high-demand, high-wage jobs that are available in the region.

AlabamaWorks delineates career pathways for workers and listens to industry at the local level.

Shelton State has also had an ongoing partnership with Mercedes-Benz U.S. International in Vance and with AIDT to offer the Mercedes-Benz Automotive Technician and Mechatronics programs to train students for automotive manufacturing careers.

Besides Tuscaloosa, Region 3 also includes rural counties like Bibb, Fayette, Greene, Hale, Lamar and Pickens, along with two newly added counties, Sumter and Marengo. With the addition of Sumter and Marengo, they have also added new members to their council who work for companies like the paper and packaging company WestRock and the Cemex USA cement plant, both in Demopolis; McElroy Truck Lines Inc., in Cuba, Sumter County, and Prystup Packaging Products in Livingston.

"We're also excited that AlabamaWorks is reaching out into rural Alabama," says Jones, "and so more people can find out about the services that we have and take advantage of all of the great resources that are here in the state that many people don't know about."


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GRADUATING BUSINESSES

An evolving mission of universities across Alabama is to offer infrastructure for entrepreneurship. University-based business incubators are their building sites.

BY JESSICA ARMSTRONG // PHOTO BY JULIE LOWRY

Once upon a time, young entrepreneurs — like any other college students — sat through four years of classes, then donned a cap and gown. With diploma in hand, they were sent on their way to start a business.

Business-minded students no longer need to leave college to start their own companies. Today they can develop innovative products and services right on campus.

Academic incubators offer an alternative to the traditional classroom environment. Depending on their mission, they typically provide office space, labs, mentors and networking opportunities that might not be available outside the academic setting.

Increasingly, universities are creating academic incubators to nurture entrepreneurial students, faculty and researchers, while building alliances between industry and academia.

AUBURN UNIVERSITY: AUBURN BUSINESS INCUBATOR

Key Client: Tennibot

Launched in 2011, the Auburn Business Incubator is a full-service, mixed-use business incubator to assist startup and early-stage companies by linking them to a network of services from university and community sources, explains Phil Dunlap, assistant director of the Auburn Research and Technology Foundation, which manages the effort.

The Auburn Business Incubator is currently providing services to 16 companies, 13 faculty-based companies and three parttime clients. Incubator clients represent a variety of business sectors, such as energy efficiency, civil and mechanical engineering, social media, biomedical and website development. There have been eight graduates from the Auburn Business Incubator in the areas of natural gas, medical device, marketing/advertising, software engineering and investment.

Founder and CEO Haitham Eletrabi of Tennibot — a robotic tennis ball collector that eliminates the need to collect balls — won a competition that awarded him six months free in the Auburn Business Incubator. With the help of the incubator staff, he found an investor and has now become

Tennibot's CEO and Founder Haitham Eletrabi (right) with robotics developer Xianglin "Lincoln" Wang.

an actual Auburn Business Incubator client.

"The Auburn Business Incubator was extremely helpful for us as a tech startup and provided space, connections, legal and accounting experience and key introductions," says Eletrabi. "For an early stage startup, those connections and services are vital and crucial for our success."

Tennibot received "The People's Choice Award" in the 2015 Alabama Launchpad competition. And Dunlap says the company has garnered a lot of attention in the past two years at the Consumer Electronics Show held annually in Las Vegas.

"It's only a matter of time before he just explodes with this type of product," Dunlap predicts.

New to the Auburn Research and Technology Foundation is the Tiger Cage Accelerator, a collaborative, co-working space that provides students with guidance from Auburn University's College of Business staff, university faculty and professionals in the community.

UNIVERSITY OF ALABAMA AT BIRMINGHAM: INNOVATION DEPOT

Key clients: many and more to come

University-based business incubators are thriving across Alabama, including Innovation Depot, which operates in partnership with the University of Alabama at Birmingham.

The nonprofit organization was founded in 1987 and rebranded as Innovation Depot in 2007 and has since evolved to serve as the region's epicenter for technology startups and entrepreneurs, says CEO Devon Laney.

"While Innovation Depot is industry agnostic, its regional focus is on technology startups in the financial, health care and service industries," Laney says. "Innovation Depot's focus is in tandem with Birmingham's resources. UAB, one of Innovation Depot's major partners, is now Alabama's largest employer and has spurred significant growth in the healthcare and technology sectors."

Laney says the most recent five-year economic impact of Innovation Depot on the Birmingham region is $1.38 billion. In 2015 alone, 104 member companies produced 809 jobs, 141 startups applied to enter Innovation Depot (17 were accepted) and 12 graduated out of Innovation Depot. Member companies raised $27.7 million in funding in 2015.

Services offered include Velocity Accelerator, which Laney says is Alabama's first full-time premier seed accelerator program. Each year, up to 10 high growth potential technology startups are selected from an international pool of applicants. Velocity teams are paired with successful startup founders and entrepreneurs who serve as mentors.

UNIVERSITY OF SOUTH ALABAMA: COASTAL INNOVATION HUB

Key Client: Travers Consulting

Founded in 2013, the Mobile-based Coastal Innovation Hub is a joint project between the University of South Alabama's Office of Research and Economic Development and the Melton Center for Entrepreneurship and Innovation at USA's Mitchell College of Business.

Coastal Innovation Hub incubated a variety of companies from health care software development to biomedical startups,

which has become its fastest growing sector thanks to the Hub's recently expanded Coastal Innovation Labs.

"This new expansion has given us the opportunity to better accommodate more biomedical startups with proper laboratory settings to facilitate their research," says Harry Brislin, director of USA Properties & USA Technology & Research Park. "Since our expansion earlier this year to include these labs, we have already leased up to four of the six available wet labs of the Hub."

The Coastal Innovation Hub offers furnished office space and wet laboratories with access to common spaces for meetings, conferences and break rooms. Opportunities are available for university collaboration and mentorship from fellow Hub tenants. These include the USA Small Business Development Center and other organizations that Brislin says are able to "assist up-and-coming startup companies as they make their way through the fledgling stages of starting a business."

Founded in 2012 by Steven Travers, Travers Consulting offers services for health care application platforms and provides outsourcing services for information technology service/help desk operations. Travers says a key benefit to being a Hub tenant is the option to rent on a monthly basis and being able to leverage contacts with fellow tenants, some of whom are in similar businesses. Travers plans to move his business into a large space in USA's Technology Park.

UNIVERSITY OF ALABAMA INNOVATION AND MENTORING OF ENTREPRENEURS CENTER

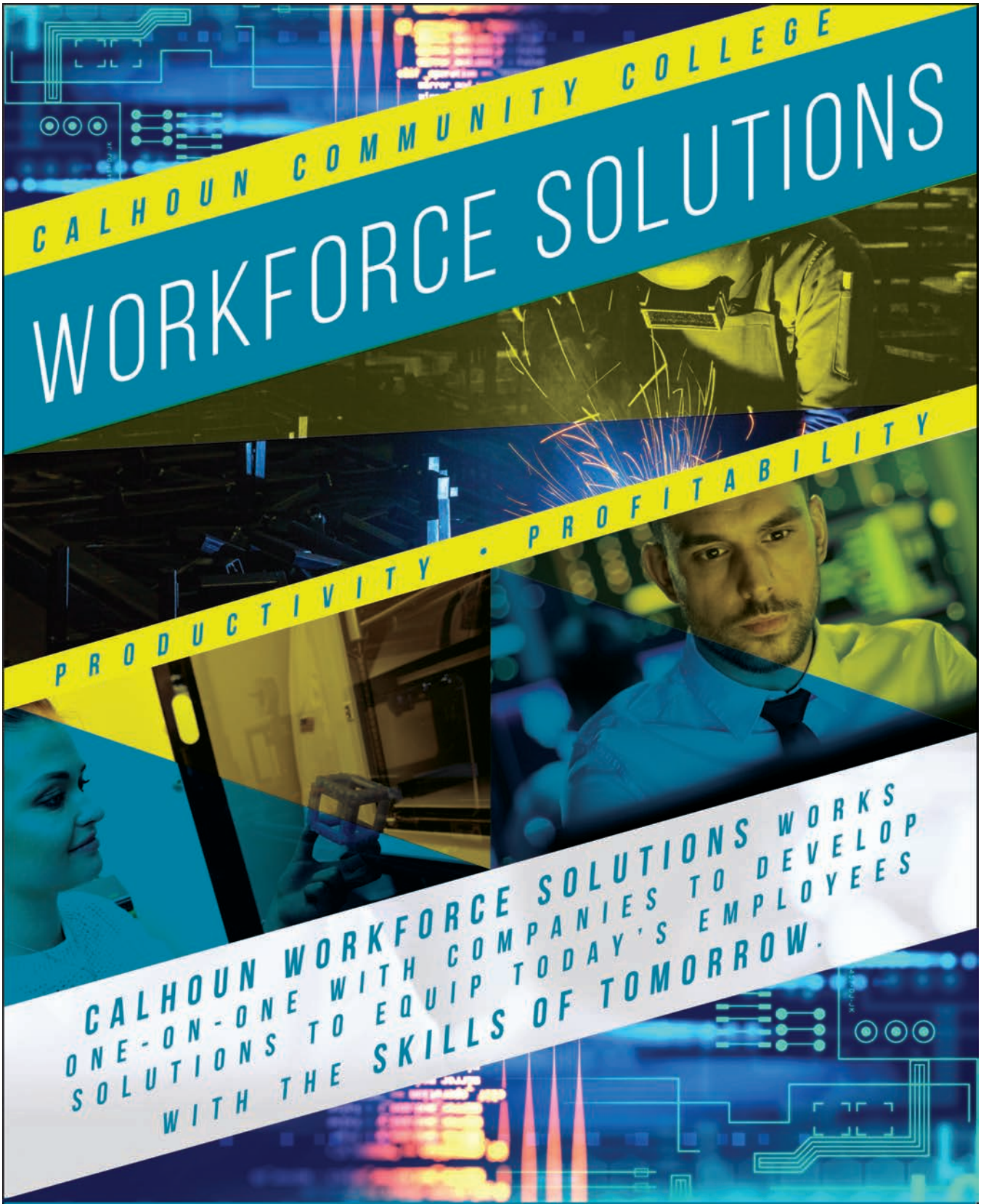
Key Client: Inventure Renewables

The Alabama Innovation and Mentoring of Entrepreneurs Center in Tuscaloosa helps the University of Alabama faculty, staff and students make their ideas, inventions and innovations commercially successful. Part of the center is the Bama Technology Incubator Incubator, which nurtures high-growth, high-tech businesses.

"Many of our incubators are start-up companies that are varied and range from tutoring to chemistry to biology. We currently have eight companies incubating," says AIME Director Dan Daly. "AIME offers many services including actual physical space. We also mentor and help find investors for the companies. We also help the companies obtain grants."

Since it was founded in 2006, three companies have gone through AIME's incubator to become stand-alone companies. One is Inventure Renewables, a Tuscaloosa company that develops enabling process technology for the production of sugar from biomass, which is used to produce green chemicals, synthetic jet fuel, biodiesel and green gasoline.

Inventure Renewable's Chief Scientific Officer Rusty Sutterlin moved into the AIME building in 2008 by himself and by 2012 the company was occupying much of AIME's laboratory space. Later that year, the company relocated a few miles off campus into a 35,000-squarefoot facility with 30 employees. Sutterlin credits much of the company's success to the incubating experience at AIME.



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EXCELLENCE IN NURSING EDUCATION

Alabama community colleges earn top marks for health professions graduates

BY GAIL ALLYN SHORT // PHOTO BY CARY NORTON

When it comes to nursing and radiologic technology education, several of Alabama's community colleges are making the grade with a high number of students passing licensure exams on the first try.

Nursing programs at Lawson State, Coastal Alabama and Wallace State community colleges have 100 percent pass rates on the National Council Licensure Examination (NCLEX) for nursing, according to reports by the Alabama Board of Nursing.

Jefferson State Community College's radiologic technology students have achieved a 100 percent pass rate on the national registry exam of the American Registry of Radiologic Technologists (ARRT).

The U.S. Bureau of Labor Statistics says employment for both licensed practical nurses and registered nurses will climb 16 percent by 2024, while employment for radiology technicians will rise by nine percent during the same period.

GRADUATING RADIOLOGY TECHNICIANS

Students who enroll in Jefferson State Community College's radiologic technology program can earn their associate's degree to become X-ray professionals, able to operate CT scanners and other high-tech imaging equipment used for patient examinations in hospitals, emergency clinics and doctors' offices.

Christie Bolton directs the program that Jefferson State offers at its Shelby County- Hoover campus on Valleydale Road. The radiologic technology program graduates have a 100 percent passage rate on the National Registry exam administered by the credentialing agency known as the American Registry of Radiologic Technologists (ARRT).

Gaining admittance into the radiologic technology program, however, is not easy, says Bolton. The program accepts only 35 students each fall.

"It's very competitive," says Bolton. "We typically have about 150 applicants for those 35 slots."

To enter the program, students must have an ACT score of at least 18. Grades in math, biology and English are also considered.

"We have a great mixture of students," she says. They come straight from high school, from college or another career. "Although the field is predominately female, we are seeing more men."

Students in the program study subjects such as anatomy and physiology, radiographic procedures, exposure principles, radiation protection, image evaluation and pathology. Later on, they learn how to position patients for diagnostic imaging and radiation therapy.

"We've recently installed a state-of-the-art digital radiography room," she says. "We have portable radiography equipment.

Christie Bolton, who directs the radiologic technology program at Jefferson State's Shelby County-Hoover campus, instructs student Daniel Guest.

We also have the capabilities of doing analog or film screening."

Students practice their radiography skills using full- and partial-body "phantoms" or mannequins where they can rehearse moving and positioning patients and taking images. They also learn how to take blood pressure and temperatures, as well as other tasks within the scope of the radiology technician's job, she says.

Once students earn their Associate in Applied Science degree, they can then use the credits toward a four-year degree at a university if they choose to further their education.

Radiology students, however, must pass the ARRT exam to practice. Bolton says instructors at Jefferson State take care to teach the information that students will need on the certification exam. "This allows students to be able to apply the principles they've learned to all of the variables on the exam," she says.

TOPPING THE NURSING PROGRAM LIST

According to the Alabama Board of Nursing, the school formerly known as Faulkner State Community College, based in Bay Minette, has had NCLEX pass rates of 100 percent for its licensed practical nursing (LPN) program, as well as its registered nursing (RN) program for the last three academic years. In fact, RegisteredNursing. org ranks its RN program as number one in Alabama.

Today, Faulkner State has a new name, Coastal Alabama Community College, following Faulkner's merger with Alabama Southern Community College and Jefferson Davis Community College in 2016. With the merger, students can take nursing classes in Bay Minette, Fairhope, Brewton, Monroeville or Thomasville.

Coastal Alabama's Director of Nursing and Allied Health Jean Graham says the nursing curriculum's design is based on current trends in nursing education.

"There has been a big push for nurses to graduate knowing how to care for the elderly with the growing population of older baby boomers," says Graham, "and for nursing education to be more interactive, in which lectures are coupled with more in-class discussions and team exercises."

For hands-on training, the nursing program has two skills labs with static mannequins, where students can learn the skills required for nursing care, she says.

The school also has a simulation lab with a wireless device called iStan. The device is a mannequin that is engineered to mimic symptoms and bodily functions, so nursing students can practice CPR and other maneuvers under realistic scenarios.

At the end of their third semester, students can choose to take the NCLEX exam to work as LPNs. LPNs work under the supervision of RNs and physicians.

NURSING PROGRAMS GET HIGH MARKS

Lawson State Community College, a historically black school in Jefferson County, has one of the top-rated nursing programs in Alabama.

RegisteredNursing.org ranked Lawson State's associate's degree RN program at number two out of 43 RN programs in Alabama on its "Best RN Programs in Al-

abama" list, which includes both two- and four-year colleges and universities. PracticalNursing.org ranked Lawson's practical nursing (PN) program at number three out of 19 on its "2017 Best LPN Programs in Alabama."

In addition, Lawson State has had NCLEX-RN and LPN pass rates of 100 percent for the last two academic years, according to the Alabama Board of Nursing.

Admission to Lawson's nursing program is competitive with, on average, 150 applicants accepted each year. The school's nursing advisory committee selects applicants based on grade point averages, prerequisite courses, ACT scores and grades in biology classes.

"We plan to admit up to a total of 225 students each year," says Shelia Marable, Lawson State's associate dean of health professions.

Lawson State has two campuses. Its instructors teach RN courses at the Birmingham campus and LPN classes at the Bessemer campus.

Katrina Swain, chair of Lawson State's practical nursing program, says the school's small class sizes are an advantage for students.

"You get more one-on-one attention," says Swain. "We do call the roll. You can speak with your teachers after class. We also have a tutor for the students."

Practice labs offer students the chance to hone their skills on high-tech patient simulators and using virtual simulations online on computers, Swain says.

The nursing students gain clinical experiences at area hospitals and clinics like the Birmingham VA Medical Center. They also participate in a two-day disaster training drill in Anniston at the Center for Domestic Preparedness to learn procedures for dealing with patients exposed to chemical, biological or nuclear accidents or injured due to explosions.

PN students take classes for three semesters before sitting for the NCLEXPN exam. The RN program, on the other hand, is five semesters. Upon completing the coursework, those students take the NCLEX-RN exam. LPN graduates who return to school within two years can enter Lawson's "LPN to RN Mobility Program" and start the third semester of the RN program.

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ALABAMA'S EXPORTS ARE GROWING; FOREIGN DIRECT INVESTMENT STAYS STRONG

With a major deep-water seaport plus planes, trains, barges and trucks, Alabama has long enjoyed strong trade connections with the world.

Vehicles led the parade of exports from Alabama again in 2016. Alabama-made vehicles and parts accounted for some $9 billion in exports, and aerospace took a big jump to $1.4 billion.

Total state exports jumped to $20 billion, a new record for the state. In addition to autos and aero equipment, the state ships chemicals, chickens, paper, plastics and forest products.

"Alabama's dynamic manufacturing base turns out a wide range of great products that consumers in markets around the world want to own, which creates jobs and opportunity here at home," says Greg Canfield, secretary of the Alabama Department of Commerce.

Much of that commerce moves through the Port of Mobile, long the state's link to the world. And as international shipping changes, so does the Port. When the Panama Canal opened to newer, bigger ships this year, the port was already upgraded to handle the new post-Panamax ships. Massive new cranes joined the waterfront array in 2017.

The port connects to inland waterways criss-crossing the state and offering connections to the Midwest and beyond. Interstate highways serve the trucking industry. And international freight forwarder Panalpina makes direct connections to the world from Huntsville.

Where does it all go?

More than 189 countries take shipment of Alabama goods. Canada tops the list at $4.1 billion in goods, followed by China at $3.4 billion, Germany at $3.2 billion, Mexico at $2.6 billion and the United Kingdom at $559 million. Germany's figure was up 29 percent from 2015.

To bolster international trade, the Department of Commerce sponsored trade missions, taking state officials and business owners abroad for face-to-face business exchanges. This year the state took part in the Paris Air Show, and state businesses announced numerous successes there.

Top: New cranes for APM Terminals make their way up the Mobile ship channel. *Photo by Brad McPherson*
Above: Before the addition, the container terminal cranes already handled 10,000 TEU ships.

FOREIGN DIRECT INVESTMENT

Alabama is also home to multitudes of international firms or foreign direct investment, with $1.57 billion in 2016.

"The success of the companies operating in Alabama is a story that's being told around the world," says Greg Canfield, secretary of the Alabama Department of Commerce. "Here at home, that's meant significant new investments and lucrative jobs for communities across the state."

Austria topped the list of investors with expansions at two major plants. Lenzing AG announced plans for a $293 expansion at its Mobile County botanic fiber plant, and Kronospan launched a $362 million expansion of its wood-based panel plant in Calhoun County. Yet another Austrian firm, auto parts suppliers Voestalpine, announced plans for a new $11 million plant in Jefferson County.

Other companies whose firms announced big investments are Germany at $213 million; South Korea at $155 million, Canada at $145 million and Spain at $131 million. Germany led the list for new jobs created, with German firms announcing 1,187 new positions.

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NATIVE ALABAMA AGRICULTURE GOES GLOBAL

BY CHARLIE INGRAM // PHOTO BY ELIZABETH GELINEAU

PECANS

Roughly 40 percent of Alabama-grown pecans are exported, and the outlook for overseas market growth is optimistic. Demand is growing, prices are good and China is one of several nations shelling out money for American pecans.

South Alabama pecan grower Gary Underwood retails about half the pecans he grows on 192 acres, selling his remaining crop to wholesalers who in turn export to China and a growing number of other countries. U.S. pecan prices increased 17 percent last year, according to the USDA, and Underwood is bullish on the idea of future exports.

"We can't grow enough pecans right now to meet the demand," says Underwood, known nationally for his work growing and marketing pecans. "We've got a great product, especially if you compare us with the other nuts. And we're just getting this started."

"It's not just China," he says. "Turkey, Dubai, India, Europe, Canada, Israel — we sell pecans all over the world."

BEEF

Through June, the value of U.S. beef exports for the year stood at $3.4 billion, up 15 percent from the first half of 2016. The picture got even better when China agreed to begin accepting American beef imports again for the first time since 2003.

Garrett Henry is part of the herd of Alabama cattlemen benefitting from a jump in beef exports. "We're seeing strong demand in countries like China and Japan," says Henry, owner of H3 Cattle in the Hope Hull/Pintlala area south of Montgomery. "And the middle countries, developing countries, they're getting a taste of U.S. beef, and they demand it. They want more of it.

Henry says anywhere from 12 to 20 percent of the meat produced in the U.S. gets exported. "It's a pretty big number when you think about it," he says. "Exports over the past year have really grown, and if they had not, well, the prices are not great right now, but they wouldn't be good at all if it weren't for exports."

POULTRY

The USDA ranks Alabama fourth nationally for the value of broilers produced — $2.9 billion last year, trailing only Arkansas, Georgia and North Carolina. The state's position in that pecking order presents definite opportunities for exporting more chicken meat from Alabama, which produces about 21 million broilers a week.

Ray Hilburn would remind you that most of the world lives off beans and rice. But as developing countries continue becoming more affluent, they want the things we take for granted.

That includes poultry meat, says Hilburn, associate director of the Alabama Poultry and Egg Association. Seven million tons of poultry, for example, is exported each month to Cuba alone. Although it would be hard to pinpoint how much of that is grown in Alabama, it's safe to say the state is exporting its share, although exports have lagged in recent years.

PEANUTS

The number crunching shows that U.S. peanut exports have grown steadily the past five years, increasing by 58 percent in 2016. That's good news for Alabama growers, who account for more than 10 percent of those exports.

The numbers have been good for U.S. peanut exports. Shelled peanut exports totaled 262 metric tons in 2012, and tonnage in subsequent years has been 509, 440, 424 before a sharp jump to 672 tons last year. Such increases are not expected to continue in the short term, but that's OK with Coffee County farmer Carl Sanders, who grows peanuts on 300 acres, along with 1,000 acres of row crops.

Although Georgia grows almost half the nation's peanut crop, Alabama is among the leading states for peanut production and usually exports 10-12 percent of its production. Leading markets include Canada, Mexico and the European Union. China and Japan import American peanuts, "But they're erratic," Sanders says.

Alabama averages about 400 million pounds of peanut harvests annually grown on 200,000 acres in southern Alabama. Peanuts have an impact of more than $100 million each year to the Alabama economy.

Pecan farmers are having trouble keeping up with demand, says grower Gary Underwood.

PORT OF HUNTSVILLE

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 meet, with Huntsville International Airport announcing in mid-2017 that they have begun the process of applying for licensing to land Sierra Nevada Corp.'s Dream Chaser spacecraft on one of their commercial runways. This would make the first commercial airport to land a vehicle from space be right here in Alabama.

2017 also marks the 50th Anniversary of the airport in its current location. However, Huntsville International Airport is not content to rest on the laurels of reaching this milestone, but rather is proactively looking to the future as innovators and visionaries. Since its inception in 1967, the airport has grown to more than 7,300 acres, which makes 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

Huntsville International Airport is the U.S. hub of Swiss-based international cargo carrier Panalpina. Since the arrival of Panalpina in Huntsville in 1990, the Port of Huntsville has invested $146 million in infrastructure that directly relates to cargo operations.

Intermodal Center and Jetplex Industrial Park.

The airport features two parallel runways — 12,600 feet, which is the second-longest runway in the Southeast U.S., and 10,000 feet. They also have 2.3 million square feet of air cargo ramp space. HSV is the 17th largest international air cargo airport in the United States.

Passenger service is provided by three commercial airlines, with more than 65 flights per day and nine nonstop destinations. More than 1.1 million customers are served annually.

The Huntsville Airport Authority began promoting its cargo capacities in the early 1980s, with an air cargo ramp that had 50,000 square feet of cargo space. Those efforts culminated in a rail intermodal facility in 1986. The International Intermodal Center celebrated 30 years of serving the region this past April with an event that recognized all of the individuals who saw the vision of the IIC and in turn ensured that the multi-modal complex would become a reality. The International Intermodal Center provides a single-hub location that delivers world-class, multimodal (rail, air and highway) services and facilities. Nationwide rail service is provided by Norfolk Southern.

In 1990, Swiss-based international carrier Panalpina opened operations in Huntsville with one 747 flight a week, gradually adding flights over the years. Panalpina celebrated their 25th anniversary at the Port of Huntsville in 2015. There was plenty to celebrate, since they have the only non-stop 747-8 freighter international air cargo service in the State of Alabama to Europe, Mexico, Asia and South America. These markets are currently served with 7 to 10 flights weekly.

Panalpina also provides fully integrated and customizable supply chain solutions at its U.S. hub in Huntsville. Panalpina's Huntsville Logistics Center serves many of the company's largest hi-tech customers in healthcare 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 Panalpina to also provide last-minute solutions for needs of all customers.

In recent years, 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 percent over the 747-400 model, it has substantial reductions in fuel burn, noise and CO2 emissions. This Group VI aircraft boasts a 224-foot, seven-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, L.A. 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 port's website at www.flyhuntsville.com.

FOREIGN TRADE ZONES

Like an airport duty-free shop, 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.

The National Association of Foreign Trade Zones estimates in its 2016-2017 annual report that some $84 billion worth of goods were exported from FTZs in 2015, despite a drop caused by volatility in the oil market. Automotive exports — an Alabama strength — helped keep exports as strong as possible.

"On the import side, FTZs have also continued to grow in their importance for U.S. production and distribution operations that rely on global supply chains to remain competitive. Foreign-status inputs to FTZs totaled $288.3 billion in 2014, accounting for 12.1 percent of all foreign goods imported to the United States. FTZ imports have tripled as a share of U.S. imports over the past two decades," according to the NAFTZ annual report.

"Foreign-trade zones continue to be hubs of manufacturing activity where domestic and foreign-sourced inputs are combined by American workers on U.S. soil to produce value-added final products for export and domestic consumption," says Daniel Griswold, president of NAFTZ until 2016.

Each of Alabama's major cities — Mobile, Huntsville, Birmingham, Montgomery and Dothan — has 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.

Several additional FTZs were added in 2015, including sites for Airbus Americas in Mobile, MH Wirth Inc. in Theodore, Toyota Motor Manufacturing Alabama in Huntsville and Outokumpu Stainless in Calvert.

Mercedes-Benz U.S. International's site in Vance is highlighted in the NAFTZ annual report, noting that: "The plant produces the M-Class, R-Class, GL-Class, C-Class and the GLE Coupe vehicles for 135 worldwide export markets. The FTZ operation employs 3,200 people producing approximately 232,000 vehicles in 2014. More than half the vehicles manufactured at the plant are exported to markets outside the United States, Canada, and Mexico."

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 Shell all benefit from smaller business-based subzones. The Mobile zone also has four sites in Baldwin County.

Huntsville: FTZ facilities 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.

Birmingham: Birmingham's FTZ is scattered over seven sites including parts of AirportNorth/ Northeast Industrial Park, Shaw Warehouse facilities, ACIPCO industrial area, 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.

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 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.

Freight is unloaded from a Panalpina cargo plane at the 1,700-acre foreign trade zone at the intermodal center of the Huntsville International Airport. *Photo by Tyler Brown*

ALABAMA STATE PORT AUTHORITY

Two new Post-Panamax ship-to-shore cranes bring the Port's container terminal capacity to 500,000 TEUs. *Photo by Brad McPherson*

Alabama's deepwater seaport, at the Port of Mobile, is located just 32 miles from the Gulf of Mexico and handled more than 56 million tons of cargo in 2015, making it the 10th largest U.S. seaport in total trade (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. In 2017, the Journal of Commerce named the Port of Mobile the fastest growing container port in North America, owing primarily to 19 percent growth in 2016. The container terminal is on track to repeat that growth in 2017, following the completion of the container terminal's Phase 2 expansion, the addition of new carrier services calling on both Asian and European ports, and the completion of a new container intermodal rail facility. These assets and services provide capacity and expand market reach for shippers.

With over $850 million invested to date in public port facilities, the Port of Mobile ranks as the second largest steel port in the nation, while maintaining a large market position in export of metallurgical coal and forest products.

Investment and expansion continue as the Port Authority plans an Automotive Logistics (RO/RO) Terminal that will serve a growing Southeast U.S. automotive industry. Other projects include a container dock extension to compliment two new Super Post-Panamax ship-to-shore cranes and berth two Post-Panamax ships at one time. These new cranes are among the largest container gantry cranes in the world, capable of handling the larger container ships transiting the new Panama Canal. The Port Authority is also developing a logistics park at the container intermodal complex to serve value-added, distribution and light manufacturing projects dependent upon first-class container intermodal investments.

In late 2014, the U.S. Army Corps of Engineers and the Port Authority launched a four-year, environmental and economic feasibility study to deepen and widen the Port of Mobile ship channel. The project study seeks to identify a cost efficient, engineered, and environmentally compliant channel expansion project that will provide shippers with the economies of scale that today's larger ships provide.

ROADS

The public terminals are connected to two interstate systems (I-10 and I-65) and U.S. Highways, including US90, US98, US43, and US45.

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 rivers that provide access to not only Alabama's heartland but also to the 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, AIR AND HIGHWAY ACCESS

Five Class 1 railroads access the port — Burlington Northern/Santa Fe/Alabama & Gulf Coast Railroad, CSX Transportation, Canadian National, Norfolk Southern and Kansas City Southern. Port linkage is provided by the Alabama State Port Authority's Terminal Railway. The Port is also served by the Alabama & Gulf Coast Railroad (AGR) and the CG Railway. The CG Railway's unique service provides shippers railed cargo via ship to Mexico's Veracruz region. The seaport is located approximately 4 miles from the Mobile Aeroplex at Brookley, which is home to Airbus's assembly plant for its family of A319, A320 and A321 aircraft. Mobile Aeroplex also serves as the region's air cargo terminal, with daily service provided by UPS and FedEx.

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 are 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 are contributing 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 state-of-the-art, multi-modal steel coil handling facility. The assets include a 178,200-square-foot warehouse equipped with four 50-ton bridge cranes, an adjacent 168,000-square-foot open yard and supported by integrated technology that provides shippers real time cargo data and tracking. Another key steel terminal investment includes an $18 million modernized Pier C North terminal to handle both inbound and outbound carbon and stainless steel 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. More than $135 million has been invested in new ship and yard equipment, automation and new rail facilities to increase export throughput to 16 million tons annually. Overall investments at McDuffie have generated annual import and export throughput capacity to 30 million tons.

APM TERMINALS MOBILE / CONTAINER INTERMODAL INVESTMENTS

Phase 2 added an additional twenty acres and two new Super Post-Panamax ship-to-shore gantry cranes, bringing the terminal's capacity to 500,000 TEUs (20-foot equivalent units). Weekly ocean carrier services on most trade lanes are provided by Maersk, China Shipping (CSCL), CMA CGM, COSCO, Evergreen, Hapag Lloyd, K-Line, Mediterranean Shipping Company (MSC), MOL, NYK, OOCL, UASC, Yang Ming and ZIM. 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 new $36 million container transfer facility (ICTF) is served by the Canadian National and is accessible to all five Class I railroads serving the Port of Mobile.

RAIL FERRY TERMINAL

The Authority's Terminal Railway operates a rail ferry terminal that provides rail shippers twice weekly sailings into the Veracruz region of Mexico. The CG Rail Terminal is the first of its kind, with a twin-deck design for quicker loading. The ships can haul 120 standard rail cars per voyage without loading and unloading cargo, shaving nearly two weeks off the typical rail services into Mexico. The service provides four-day rail service between Mobile and Coatzacoalcos, Mexico.

TERMINAL RAILWAY

The Port Authority's Terminal Railway (TASD) is the largest port authority-owned railroad. The Terminal Railway provides switching service between the five Class 1 railroads serving Mobile and the port authority's terminals. It handles more than 150,000 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 private industries located as far north as the Port of Chickasaw and as far south as the Alabama State Port Authority's Intermodal Container Transfer Facility (ICTF).

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 10 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, Tuscaloosa/Northport and Cordova on the Warrior River; Selma and Montgomery on the Coosa Alabama River; Columbia, Eufaula and Phenix City on the Chattahoochee River, and at Axis on the Mobile River.

PORT FACTS - 2017*

(Fiscal Year ending September 30, Extrapolated Volumes)

Acreage: 4,000
Number of Berths: 41
Channel Depth: 45 Feet on the lower harbor; 40 Feet in the upper river harbor
Warehousing and Open Yards: 4.8 million square feet
Number of vessel calls: 1,594
Tonnage: 24 million
Containers: 315,972 TEUs
Imports: heavy lift and oversized cargo, containerized cargoes, coal, aluminum, iron, steel, copper, lumber, woodpulp, plywood, fence posts, veneers, roll and cut paper, automotive components, furniture components, retail goods, cement and chemicals
Exports: heavy lift and oversized cargo, containerized cargoes, coal, automotive components, lumber, plywood, woodpulp, OSB, laminate, flooring, roll and cut paper, iron, steel, frozen poultry, soybeans and chemicals

ECONOMIC IMPACT
Sweet as our Tea.

THE PORT
Alabama State Port Authority
www.asdd.com

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 percent corporate tax rate to an effective rate of 4.5 percent, lower even than any of its 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.

• **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 liability and/or utility tax liability. Credit is available for up to 15 years for companies in targeted counties selling their output nearby.

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. May also qualify for Jobs Act Incentives.

• **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. May not apply for Jobs Act Incentives.

• **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 less 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 meeting the requirements for the Full Employment Act are 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 percent of the cost of an employer-sponsored program to improve basic skills though high school level.

Here's a look at financing incentives:

In late 2017, Georgia-Pacific announced plans to construct a $100 million lumber production facility in Talladega that will employ more than 100 full-time employees and generate an annual payroll estimated at $5 million.

• **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.

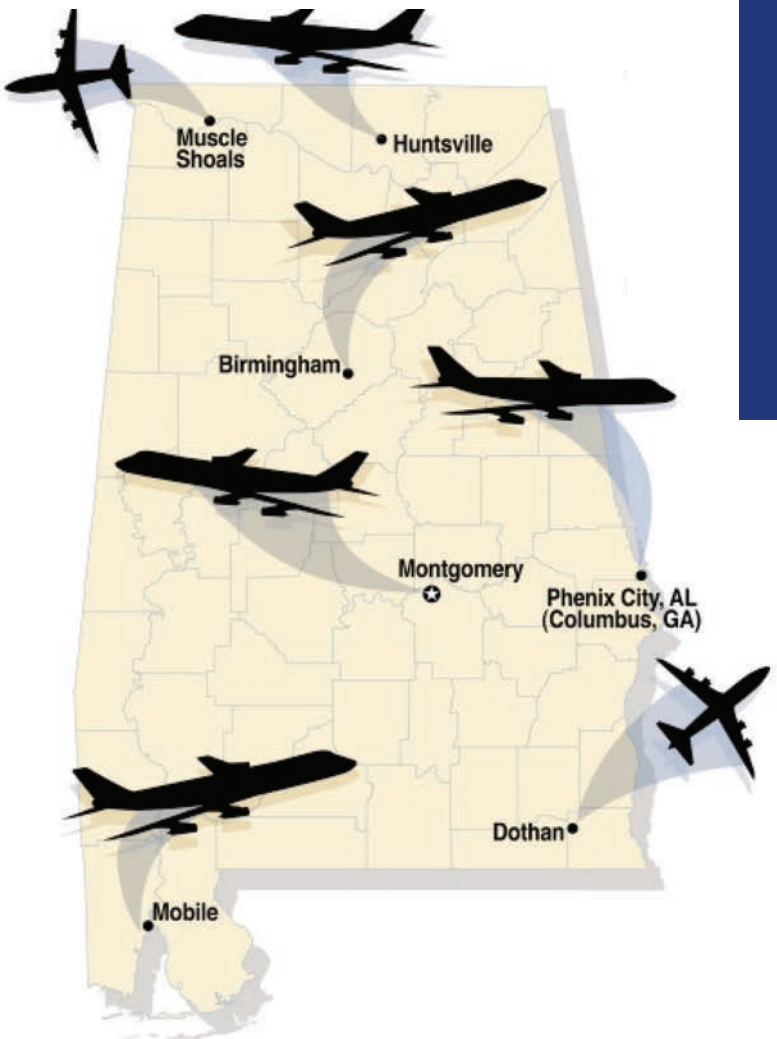
• **Alabama Infrastructure Grant Program.** Helps finance water, sewer and road facilities.

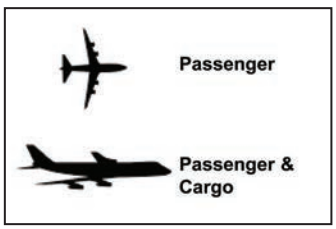
• **Alabama Industrial Access Road and Bridge Program.** Helps finance the roads and bridges needed to connect public roads to industrial projects.

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

More Information: Alabama Department of Revenue, Alabama Department of Commerce and other state agencies.

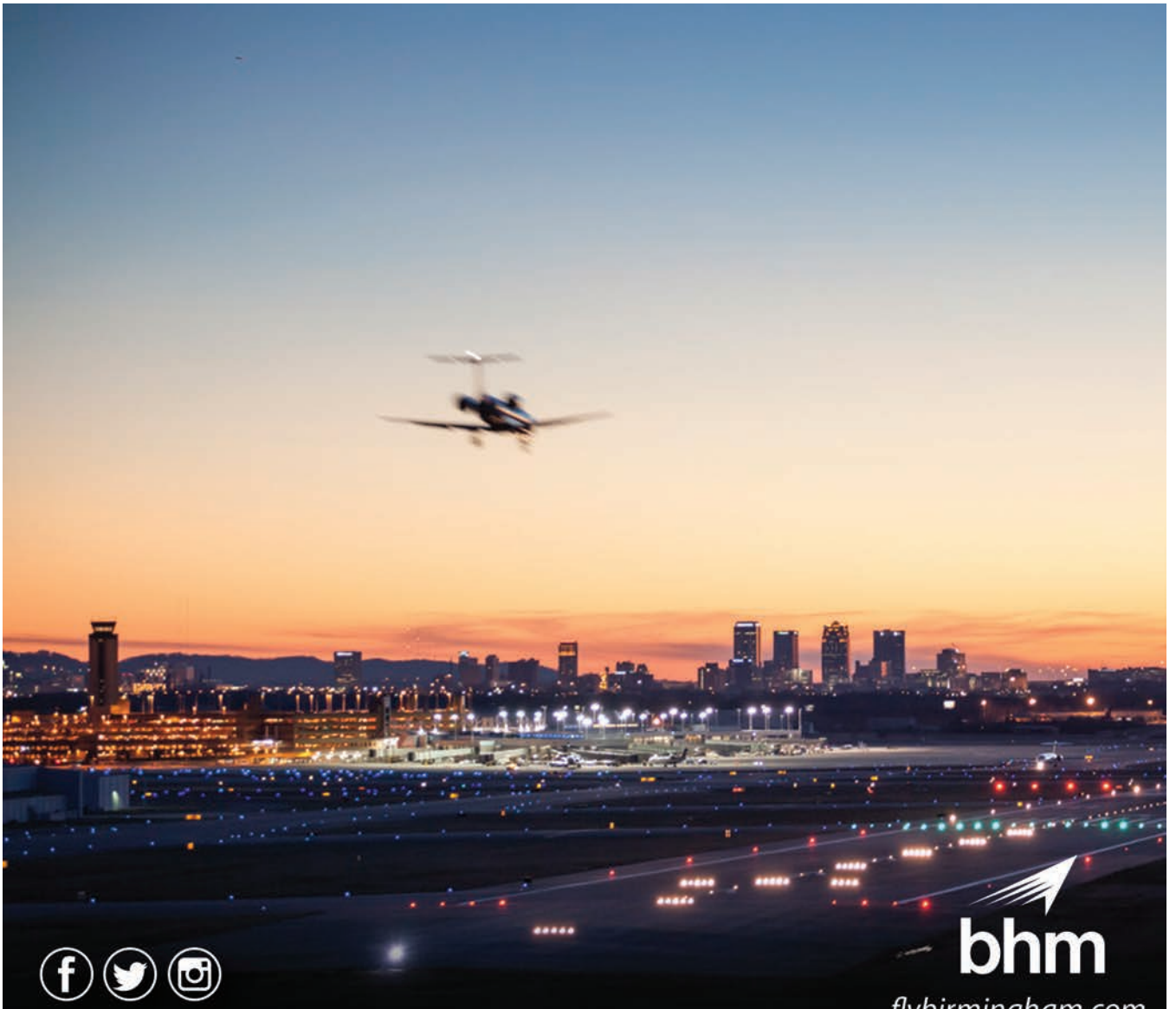
ALABAMA COMMERCIAL AIRPORTS





MAJOR ALABAMA HIGHWAYS

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



$1,000,000,000 in Annual Economic Impact

It's good business for our city when you fly Birmingham.

Cities Served Nonstop

Atlanta ATL
Baltimore-Washington BWI
Charlotte CLT
Chicago Midway MDW
Chicago O'Hare ORD
Dallas Love Field DAL
Dallas/Fort Worth DFW
Denver DEN
Detroit DTW
Houston Hobby HOU
Houston Intercontinental IAH
Las Vegas McCarran LAS
Miami MIA
New York LaGuardia LGA
Orlando MCO
Philadelphia PHL
Tampa TPA
Washington National DCA

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'S WATERWAY SYSTEM

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

ALABAMA DEPARTMENT OF COMMERCE

Alabama's lead economic development agency

In Alabama, economic development focuses on creating 21th Century jobs that provide meaningful opportunities for citizens across the state. Leading this effort is the Alabama Department of Commerce, which coordinates and supports the strategic efforts of its partners and allies across the state to secure new investment and jobs. Under the direction of Secretary Greg Canfield, Commerce's project managers share a global outlook as they build relationships and pursue economic development projects that can make a difference to families and communities across Alabama. Commerce also plays a key role in the state's workforce development efforts, which ensure that businesses operating in Alabama have the skilled workers they need to succeed.

Commerce and the Alabama economic development team have a long track record of winning game-changing projects that add important new dimensions to the state's economy. In recent years, this team has worked with an expansive roster of industry leaders, including Google, Amazon, Airbus, Boeing, GE Aviation, Blue Origin, Aerojet Rocketdyne, and global automakers, among others. In the past two years alone, economic development activity in Alabama has attracted more than $11 billion in new capital investment and 33,000 anticipated jobs. During this time frame, Alabama's economic development team has won numerous awards, and site-selection consultants have recognized Alabama as a top state for doing business. In addition, a 2016 Gallup survey found that Alabama has the highest percentage of highly enthusiastic workers in the nation.

Alabama's strategic economic development growth plan, called Accelerate Alabama, received an update in 2016 to reflect a more robust focus on recruiting knowledge-based jobs in activities such as R&D, engineering and design, as well as a greater alignment with the state's research universities. Accelerate Alabama 2.0 identifies seven key industry target sectors whose growth prospects make them appropriate targets for economic development efforts. These are aerospace/aviation, automotive, agricultural/food products, chemicals, forest products, primary metals/advanced materials, and bioscience. Important foundational aspects of business operations, such as cybersecurity, distribution, and R&D, remain a target for the state's economic development team.

Gov. Kay Ivey presents Robert Meyerson, president of Blue Origin, with a state seal after the company announced plans to assemble its BE-4 rocket engines in Huntsville.

By setting out a clear set of objectives, Accelerate Alabama introduced a framework for economic development when it was launched in 2012. Since then, Alabama has seen a high level of economic development activity, with companies announcing projects with nearly 90,000 jobs and more than $24 billion in new capital investment. A significant portion of that activity stemmed from foreign-based companies.

In addition, Commerce is tightly aligned with the state's primary non-educational workforce development initiatives, which serves to streamline the process for prospects. AIDT, the state's highly regarded job-training agency, remains at the core of Commerce's Workforce Development Division. Other state workforce programs are also part of the division, whose goal is to act as a comprehensive and convenient conduit for worker recruitment and training needs.

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 entertainment projects to the state.

KEY CONTACT

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BBA BIRMINGHAM BUSINESS ALLIANCE

The Birmingham Business Alliance is the lead economic development agency for the state's largest city and seven surrounding counties.

Alabama Governor Kay Ivey, center, celebrating the announcement of Autocar LLC's new $120 million production plant in Birmingham, where it will build its heavy duty, cab-over-engine trucks. From left to right, Dr. Ray Watts, 2017 Birmingham Business Alliance Chairman; Commissioner David Carrington; Center Point Mayor Tom Henderson; Autocar President Jim Johnston; Governor Kay Ivey; Autocar Chairman Andrew Taitz; Birmingham Mayor William Bell, and Brian Hilson of the Birmingham Business Alliance.

Birmingham has one of the most diverse economies in the state of Alabama, building upon unmatched manufacturing, technology, entrepreneurship and health care resources. The region has a $62 billion GDP value and represents over a quarter of Alabama's total employment.

With economic growth as its primary focus, the Birmingham Business Alliance (BBA) is the leading economic development agency for the Birmingham seven-county region, including Bibb, Blount, Chilton, Jefferson, St. Clair, Shelby and Walker counties. The BBA works to increase job growth and increase capital investment within the region, attracting and retaining top talent from around the world.

The BBA leverages Birmingham's greatest assets, including innovation engines Southern Research and the University of Alabama at Birmingham (UAB). Southern Research is a contract research organization with nearly 500 scientists and engineers that focuses on drug discovery and drug development. Seven FDA-approved cancer drugs currently on the market were developed at Southern Research. UAB is the state's largest employer, with 23,000 employees, 19,000 students, a $5 billion impact on the community and more than $500 million in funding for medical research.

Birmingham is a destination for entrepreneurs looking to grow their business in a welcoming environment. The region boasts more than 700 technology-based businesses and the Southeast's largest and globally recognized technology incubator, Innovation Depot. The 140,000-square-foot incubator houses more than 100 startups that employ approximately 900 people.

Birmingham has a vibrant downtown, with nearly $1 billion in investment in recently completed, proposed or under construction city center projects, including apartments, condos, hotels, retail and office space, entertainment venues, museums, a brewery, a new parking deck and new facilities at UAB.

Based in Birmingham are Alabama's only Fortune 500 company, Regions Financial Corp.; construction aggregates company Vulcan Materials Co.; national retailers Hibbett Sporting Goods and Books-A-Million; mining giant Drummond Co. Inc.; Blue Cross Blue Shield of Alabama; global life insurance provider Protective Life Corp., and many others. There are 75 international-based companies located throughout the region, and most of the workforce for two of the premier automotive assembly plants in North America — Mercedes-Benz in Vance and Honda in Lincoln — as well as a growing base of automotive suppliers, live in the area.

If you are considering relocating to or expanding your company within Birmingham, visit www.birminghambusinessalliance.com or contact the Birmingham Business Alliance.

KEY CONTACT

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ADECA ALABAMA DEPARTMENT OF ECONOMIC AND COMMUNITY AFFAIRS

Managing economic incentives and community development grants

The Alabama Department of Economic and Community Affairs (ADECA) was created by the Alabama Legislature in 1983. Under the leadership of former Enterprise Mayor Kenneth W. Boswell, ADECA distributes hundreds of millions of dollars each year 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, assistance to low-income families and more. Community development leads to economic development, and all of ADECA's investments support the agency's mission to "Build Better Alabama Communities."

There are five ADECA divisions and numerous programs that focus all available resources to address a variety of local challenges.

Three ADECA grant programs are often used to help Alabama communities with economic development projects:

• 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 communities and provide jobs. In 2016, ADECA received a total of 108 competitive applications from small cities, large cities, counties and planning organizations across Alabama, and the agency awarded a total of 54 projects totaling $17.5 million. Over the program's 35-year history, the State of Alabama has received more than $1 billion for local governments to address critical infrastructure needs.

ADECA awarded an $87,000 Community Development Block Grant to extend public water and sewer to the Air Performance plant in Hartford — facilitating a $1 million expansion at the plant, which makes commercial louvers, sunshades and specialized aluminum products for the construction industry. Gov. Kay Ivey led the groundbreaking in August, 2017.

• 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 2016, $5 million was invested in ARC counties.

• 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 2016, ADECA partnered with DRA to fund 13 projects totaling $1.08 million. Governor Kay Ivey serves as the DRA States' Co-Chairman, and she has worked with ADECA to highlight needs and opportunities for the region.

Two recreational programs are managed by ADECA, the Land and Water Conservation Fund and the Recreational Trails Program (RTP), to fund parks and recreational facilities that attract tourists who boost local economies by patronizing hotels, restaurants and shops. Eleven projects were funded in 2016 with the Land and Water Conservation Fund, representing $1.34 million in investment. The RTP invested $1.6 million for 12 projects in Alabama.

The agency administers the State Small Business Credit Initiative program, designed to increase access to capital for small businesses at more than 60 financial institutions participating in the program. Businesses with up to 500 employees are eligible to participate. The program has serviced more than 700 loans, creating 2,965 new jobs and retaining more than 5,200 jobs. Many businesses have taken advantage of the program to help finance projects ranging from a coal mining operation to a coin-operated laundry.

Other ADECA programs support state and local law enforcement, traffic safety, juvenile justice, victim services, home weatherization and energy conservation. The department also helps manage the state's water resources and distributes state and federal surplus property.

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AIDT ALABAMA'S WORKFORCE TRAINING AGENCY

Workforce development provided by AIDT is among the strongest incentives for businesses choosing to locate or expand in Alabama.

Alabama has one of the strongest workforce training programs in the world, in support of Alabama'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 more than 700,000 job seekers. AIDT training typically 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.

From automotive to aerospace and logistics and warehousing to 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 uniquely customized to each company.

In a continued effort to meet the needs of industry, Alabama has embarked on an aggressive plan to open regionalized Workforce Centers of Excellence, managed and operated by AIDT. The Alabama Workforce Training Center in Birmingham is designed to meet the growing needs of companies engaged in the manufacturing and construction industries in north and central Alabama. And the Montgomery Regional Workforce Training Center provides entry-level training, employee upgrade training, two-year technical college level training, and K-12 career training to adequately supply businesses with a trained workforce for the Montgomery region.

AIDT Robotics Technology Park in Tanner *Photo Courtesy of Goodwyn, Mills and Cawood Inc. Photo by Edward Badham*

AIDT SERVICES INCLUDE:

• Identification of needed employee skills and knowledge, training criteria and curricula content definition, and required behavior and performance criteria the company expects of employees.

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

• Provides program development, instructors, equipment, consumable supplies, and training aids such as manuals, workbooks and videos. All AIDT services are provided at no cost to trainees or employers.

• Job seekers who meet the selection criteria designed by AIDT and the employer are enrolled in job specific, pre-employment 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 assessment and industrial safety assessment. 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 of equipment and processes.

KEY CONTACT

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ATN ALABAMA TECHNOLOGY NETWORK

Experts in technical assistance and innovation work directly with Alabama's existing industry to increase productivity, profitability and competitiveness.

The Alabama Technology Network provides the most innovative technical assistance and training to continually improve Alabama's businesses and industries.

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 you 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. As the state's MEP, in FY2016 ATN served over 432 Alabama companies with economic impacts reported by these companies:

- Created and Retained Jobs: 2,131
- Increased/Retained Sales: $130,786,627
- Saved Manufacturers: $15,737,065
- Workforce Investments: $28,974,677
- Clients Served: 432
- Total Impact: $192,921,372
- Federal ROI: $108.38 per dollar federal

In addition to its training services, ATN partners in presenting the Alabama Manufacturer of the Year awards. These awards recognize the state's top manufacturers, in three size categories, for their accomplishments.

KEY CONTACT

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EDAA ECONOMIC DEVELOPMENT ASSOCIATION OF ALABAMA

An association of professionals committed to Alabama's economic development

Blast furnace at Nucor Steel in Tuscaloosa. The business-friendly atmosphere and availability of a well-trained workforce have attracted many steel companies to Alabama.

Economic development can have a multitude of meanings, but at its core, it is a collaborative effort between 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 located here. EDAA provides a forum for discussion of specific issues affecting economic development and provides programs, training and expertise to create successful development programs.

The EDAA membership of 475 consists of 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 and educators, municipal and county officials.

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. Additionally, 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.

EDAA is diligent in addressing state and federal legislation 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, adequate funding for state recruitment efforts and worker training programs and to defeat legislation that would pose a threat to Alabama's economic development effort.

EDAA actively seeks innovative solutions to challenges that could negatively impact the state's economic development efforts. EDAA holds multiple networking opportunities, provides members with a quarterly Economic Development Journal, publishes a membership directory, conducts two major conferences each year, and holds quarterly workshops. EDAA is also a partner with Auburn University's Government and Economic Development Institute (GEDI) in conducting the Economic Development Leadership Institute.

Additionally, EDAA has partnered with the University of Alabama's Economic Development Academy to offer an Applied Economic Development Honors program. This program is specifically aimed at increasing the skills and abilities for those new to the profession.

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

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EDPA ECONOMIC DEVELOPMENT PARTNERSHIP OF ALABAMA

A private, non-profit organization, EDPA works with companies looking to locate or expand within the state and assists companies and communities within the state to improve their competitiveness.

For more than 20 years, the Economic Development Partnership of Alabama has been a catalyst for economic growth in the state. During that time, the Partnership has been involved in Alabama's greatest economic development successes. A totally private, non-profit organization, EDPA is uniquely positioned to partner with state, local and private entities involved in Alabama's economic development efforts.

In 1993, EDPA assisted in the effort to attract Mercedes-Benz. EDPA provides services to businesses looking to locate in the state, encourages emerging business development and assists companies and communities that want to improve their competitive edge.

EDPA is supported by more than 60 leading companies from various sectors that are committed to the state's long-term economic growth. The organization's board of directors is comprised of top business leaders in Alabama.

By aligning its resources with the Governor's Office, the Alabama Department of Commerce and key state agencies and institutions of higher learning, EDPA works to market Alabama and to provide prospective companies a smooth site selection process and tools for a sustainable operation in Alabama.

EDPA actively assists companies searching for a location. Equally as important, EDPA works to provide resources and networks for existing industries and communities in Alabama.

To encourage innovation, commercialization and emerging business development, EDPA works closely with institutions of higher learning in the state. The Partnership joined with state research universities to create Alabama Launchpad, which hosts competitions to fuel the development of high-growth companies in Alabama and an annual event that celebrates the achievements of innovation and entrepreneurship in the state.

Steve Spencer, president of the Economic Development Partnership of Alabama. *Photo by Gary Tramontina*

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.

In April 2016, after a successful 37-year career with Alabama Power Company, Steve R. Spencer became the new president of EDPA.

KEY CONTACT

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NAIDA NORTH ALABAMA INDUSTRIAL DEVELOPMENT ASSOCIATION

The North Alabama Industrial Development Association (NAIDA) is a 66-year-old regional economic development organization formed to assist in the creation of quality jobs in the thirteen counties that are served by the distributors of TVA electric power.

The North Alabama region has a highly diversified industrial economy. Since the 1950s when chemical companies began to locate in North Alabama to the 1960s when the Saturn V rocket was designed, built, managed and tested here, the region has continued to grow with more and more advanced manufacturing. The North Alabama region now has over 2,000 manufacturing companies from various industry sectors. Of course, chemicals and aerospace/defense continue to be strong in the region. Over 70 chemical companies include 3M, Ascend, Daikin, Hexcel, OCI, Occidental Chemical and Toray. The aerospace companies include Boeing, Lockheed Martin, Raytheon, Northrop Grumman, Ruag and ULA (United Launch Alliance). ULA continues the tradition of building rockets in North Alabama with the Delta II and IV, the Atlas V and soon, the new Vulcan rocket platform.

The automotive sector is strong in North Alabama, with over 100 automotive companies centrally located to the Southern OEMs. Rehau, a Mercedes supplier, has recently opened an R&D facility here, their first outside of Germany. Toyota Motor Manufacturing produces almost 3,000 engines per day and has surpassed the 6 million engine mark. This is the only Toyota facility in the world producing four-cylinder, V6 and V8 engines under one roof. TS Tech has completed a 125,000-square-foot expansion.

Polaris is now in production, manufacturing their popular Ranger side-by-side and their radical new 3-wheeled Slingshot.

Alloys/Metalworking companies such as Carpenter Technology, Constellium, Freight-Car America, Nucor Steel, and Progress Rail also find success in North Alabama.

The HudsonAlpha Institute for Biotechnology and its 33 associate companies are the shining stars for the Life Sciences sector.

Other new additions to our diverse economy include a $600 million Google datacenter and a $200 million GE investment producing unique SiC and CMC materials for the aviation industry.

Some of the reasons companies in North Alabama flourish include

- Twelve institutions of higher education (5 four-year, 7 technical/community colleges).
- World-class automation training offered at no charge to Alabama industries.
- North Alabama is served by the robust TVA electric power system. Rates are lower than 69 percent of the top 100 utilities in America. Since 2000, the TVA system has delivered 99.999 percent transmission reliability.
- Two commercial airports. Huntsville International provides direct flights to major cities and air cargo to international destinations and offers an intermodal facility. US Customs and Border Patrol are located on site, in addition to FTZ #83.

With product offerings that include a McCallum Sweeney-Certified Megasite, over 3,000 acres designated as AdvantageSites, four Primary Data Center Sites, seven speculative buildings from 21,600SF to 252,000SF along with other available sites and buildings, North Alabama is prepared for your company's growth.

For site location assistance, please call 256.353.9450 or visit www.naida.com.

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JOHNNY WEATHERFORD
CPA
THE BUSINESS BUILDER
Johnny has spent his career working with commercial contractors. His hands-on experience includes equipment acquisition analysis, continuity planning, licensing and prequalification, and multi-state strategies. Jackson Thornton's comprehensive services support a strong financial structure.

RENEE HUBBARD
CPA
TAX LEVELER
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