



# **The Alabama Aerospace Industry Economic Impact Survey for 2002**



# **The Alabama Aerospace Industry Economic Impact Survey for 2002**

**Prepared for  
Science, Technology and Energy Division  
The Alabama Department of Economic and Community Affairs**

**This study was supported in part by the U.S. Department of Transportation,  
Office of the Secretary,  
Grant No. DTS59-03-G-00008.**

**Prepared by  
Mary S. Spann, Ph.D.  
Office of Economic Development  
University of Alabama in Huntsville**

**September 2003**

**For more information, please contact the Office for Economic Development at UAH:  
William R. Killingsworth, Ph.D.; Director; 256.824.4434, William.Killingsworth@uah.edu  
Greg Harris, P.E.; Deputy Director; 256.824.6060, harrisg@uah.edu  
Laura Lee; Marketing Coordinator; 256.824.4424, leel@uah.edu**

**Visit [www.aaia.to](http://www.aaia.to) for more information on the Alabama Aerospace Industry Association.**

## Office for Economic Development Overview

The mission of the Office for Economic Development at UAH is to create jobs and economic prosperity by building innovative and competitive companies and industries. The Office specializes in corporate and economic development strategies regarding high-tech, automotive, aerospace and logistics industries.

The Office for Economic Development contains the following centers:

- **Alabama Technology Network (ATN)**  
Nationally recognized center for lean manufacturing. Clients include Mercedes, Boeing and many suppliers to the automotive and aerospace industries. The ATN also provides lean and quality implementation and training to manufacturers throughout the state with 500 or fewer employees.
- **Small Business Development Center (SBDC)**  
National leader in government procurement counseling. In 2002, clients were awarded \$680 million in government contracts.
- **Economic Development Strategy, Industry Clusters and Innovation**  
Leader in developing industry cluster maps and working with cities, counties and regions to formulate economic development strategies.
- **Transportation, Infrastructure and Logistics Center**  
Assessing the infrastructure and logistical needs for growing Alabama industry. A leader in supply chain integration and optimization and developing lean logistics.
- **Administration of Industry Associations**  
Alabama Automotive Manufacturers Association (AAMA), [www.aama.to](http://www.aama.to)  
Alabama Aerospace Industry Association (AAIA), [www.aaia.to](http://www.aaia.to)
- **Intellectual Property Management**  
Provides strategies for commercialization of patents and intellectual property.

# **Alabama Aerospace Industry Economic Impact Survey Results**

## **Introduction**

The Alabama Department of Economic and Community Affairs (ADECA) Science, Technology and Energy Division contracted with the Office of Economic Development (OED) at the University of Alabama in Huntsville (UAH) to conduct a survey of Alabama's aerospace industry. The Alabama Technology Network (ATN) and the U.S. Department of Transportation (under grant DTTS59-03-G-00008) also funded this work. The newly formed Alabama Aerospace Industry Association ((AAIA) promoted the survey to its membership. Mary S. Spann, Ph.D. of the OED was principle investigator on the study, and Niles Schoening, Ph.D., a regional economist at UAH, provided assistance with economic analysis of the data.

The purpose of the study was to provide information to support the growth and development of the aerospace industry in Alabama. The intended users of this information are many and include businesses, academic institutions, state and regional economic development offices and all other organizations working to promote growth and economic prosperity in Alabama.

## **Research Methodology**

A list of potential aerospace companies was obtained from the Economic Development Partnership of Alabama (EDPA) and combined with a listing from the AAIA. The combined list yielded approximately 400 company names. During the course of the survey, approximately 50 information technology companies located in Montgomery were added to the list of potential respondents.

Following a letter from Governor Bob Riley endorsing the survey, surveys were mailed to over 400 companies. An online version of the survey was also available. Non-respondents to the initial mailing were contacted several times in a variety of ways including mailing, phone calls and emails.

## **Respondent Companies**

Of completed and returned surveys, 203 were retained for analysis. Companies included in this report indicated that they manufactured aircraft or aerospace vehicle parts; maintained, repaired or overhauled (MRO) aircraft or aircraft parts; manufactured aerospace vehicles; or provided information technology services, engineering services, and/or research and development to the aerospace industry and/or to air- and space-related defense agencies (e.g. Army Aviation, AF, AMCOM, SMDC).

Companies reported on their year 2002 activities. We estimate that the 203 respondent companies represent at least 90% of Alabama's aerospace industry employees and include at least 95% of companies with more than 250 employees.

Information on federal government aerospace employment and payroll in Alabama was obtained from Public Affairs Offices at Redstone Arsenal, Maxwell/Gunter AFB and Fort Rucker.

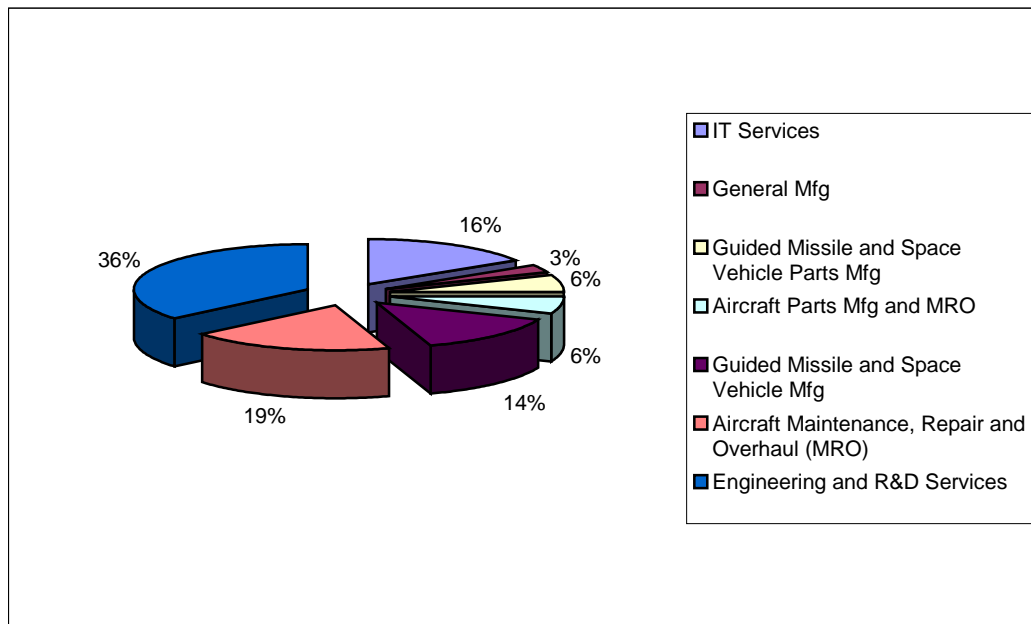
## Industry Overview

Each company was placed in an industry sector based on its basic function, its primary SIC and NAICS code, its product or service description and the type and percentage of employees in various job categories. Table 1 shows the seven industry sectors that resulted from this classification and the number of companies, the number of employees and the percentage of aerospace employees working in each sector. (The number of aerospace employees was calculated by multiplying the number of employees in a company by the percent of the company's total revenues from aerospace customers.)

**Table 1: Industry Sectors**

Sector	Number of Companies	Number of Employees	% Employment
General Manufacturing	30	1,070	3%
Missile & Space Vehicle Parts Manufacturing	18	2,367	6%
Aircraft Parts MRO & Manufacturing	20	2,248	6%
Missile & Space Vehicle Manufacturing	5	5,095	14%
Aircraft MRO	6	6,831	19%
Engineering & R&D Services	86	12,832	36%
Information Technology Services	38	5,808	16%

**Figure 1  
Alabama Aerospace Employment by Industry Sectors**



It is interesting to note that almost half of all aerospace employees worked in companies classified as manufactures. The other half of the aerospace workforce was employed by companies that provide technical services to the industry.

**General Manufacturing:** The 30 general manufacturers supplied fibers, plastic parts, metal workings, tool and dies, and electronic components to the industry. These companies are classified in SIC codes 2823–3999 and NAICS codes 325211-333299. In 2002, the general manufacturing sector employed 1,070 aerospace workers, 64% as production workers and 11% as technicians. Companies in this sector maintained an engineer function; 8% of all workers were engineers. Of the general manufacturers, 97% were small manufacturers, and 67% were very small companies with 50 or fewer employees. 41% of the companies had subcontract with the federal government, primarily with the Army and other DoD agencies.

**Missile & Space Vehicle Parts Manufacturing:** These 18 companies manufactured parts for guided missiles and a wide variety of space vehicles. These companies are classified in SIC codes 3764, 3769, 3795 and NAICS codes 336415, 336419, and 336992. In 2002, this manufacturing sector employed 2,367 aerospace workers; 68% as production workers and 5% as technicians. Although small, companies in this sector had relatively large administrative functions with 10% of all employees classified as administrators. Only 5% of all workers in this sector were engineers. All of these companies were small manufacturers, and half were very small companies with 50 or fewer employees. All of the companies had contracts with the federal government, divided almost equally between prime and subcontracts. The contracts were primarily with the Army and other DoD agencies.

**Aircraft Parts MRO & Manufacturing:** The 20 companies in this sector manufactured, repaired and overhauled aircraft parts including engines. These companies are classified in SIC codes 3724 and 3728 and NAICS codes 336412 and 336413. Of aggregate companies sales in 2002, 96% were to the aerospace industry. This manufacturing sector employed 2,248 aerospace workers in 2002, 45% as production workers and 30% as technicians. Companies in this sector had relatively large administrative functions; 15% of all employees were classified as administrators. Only 4% of all workers in this sector were engineers. 95% these companies were small manufacturers, and 55% were very small companies with 50 or fewer employees. Almost three-fourths of the companies had contracts with the federal government, divided almost equally between prime and subcontracts. The contracts were primarily with the Army, Air Force and other DoD agencies.

**Missile & Space Vehicle Manufacturing:** Five companies in Alabama manufactured a wide variety of guided missiles and space vehicles. These vehicles include drones, unmanned aerospace vehicles and spacecraft. These vehicles tend to be produced in small quantities, as they are prototypes or unique vehicles like the international space station. The companies in this sector are classified in SIC code 3671 and NAICS code 336414. In 2002, these five companies performed work solely for the aerospace industry employing 5,097 workers. As manufacturers of unique, innovative vehicles, these companies employed more engineers than production workers. Forty-five percent of the employees in these five companies were engineers while only 10% were production workers. Another 8% were technicians. The companies were medium to large companies; 60% had 500 or more employees. With companies of this size, that 20% of employees work in administrative roles is not surprising.

All of the companies in this sector had federal contracts with most of those being prime contracts with the Army, Air Force, SMDC and NASA.

**Aircraft MRO:** Six companies with 6,831 employees made up the largest manufacturing sector in the industry. These companies are classified in SIC code 3721 and NAICS code 336411. These six companies performed major maintenance, overhaul and repair services on airplanes and helicopters and performed work exclusively for the aerospace industry. Aircraft MRO companies were the largest in the industry; 50% had over 1000 employees. The vast majority of these employees were production operators (80%). Two percent were technicians, 13% were administrators and less than one percent were engineers. Just 60% of the companies in this sector had contracts with the federal government. Of these contracts, the majority were prime contracts with the Army.

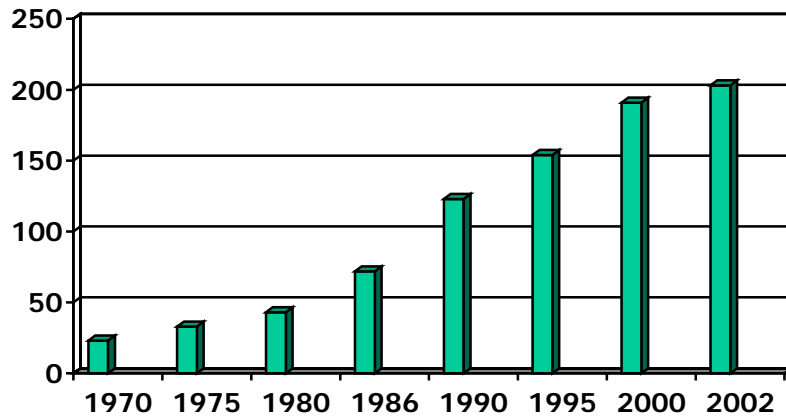
**Engineering & R&D Services:** The 86 companies in this technical services sector of the industry apply engineering principles to and conduct R&D on a wide range of aerospace challenges. These companies are classified in SEC codes 8711 and 8731 and NAICS codes 541330 and 541701. Employing 12,832 individuals, the sector derived 94% of its revenues from the aerospace industry. Employees were primarily degreed technical professionals with 30% classified as engineers, 15% as software engineers, 10% as computer scientists and 9% as mathematicians and scientists. Ninety percent of the companies had contracts with the federal government, the major of which were prime contracts with the Army, NASA, SMDC and the DoD. The industry was comprised of companies of different sizes with 53% having 50 or fewer employees and 8% having more than 500 employees.

**Information Technology Services:** The information Technology sector of the industry provides computer programming, systems design, networking, and other computer related services to the aerospace industry. Thirty-eight companies with 5,808 employees employed primarily software engineers (41%), computer scientists (20%), technicians (13%) and engineers (11%). Ninety-one percent of sales from these companies were to the aerospace industry. The companies in the sample tended to be small companies with 63% having 50 or fewer employees. Eighty-nine percent (89%) had contracts with the federal government; the majority of these contracts were prime contracts with the Army, Air Force, NASA, SMDC and the DoD.

### **Employment in the Aerospace Industry**

Alabama's aerospace industry employs a highly skilled and well-educated workforce. Eighty-one percent of companies reported on the job classifications of their workers. Table 2 summarizes the data. Of the total workforce, 23 were employed as production workers and another 34% were degreed professional in science and engineering fields.

**Figure 2**  
**Development of Alabama's Aerospace Industry**



**Table 2**  
**Job Categories**

<b>Job Category</b>	<b>Number of Jobs</b>	<b>Percent of Total</b>
Production	8,435	23%
Engineer	5,896	16%
Administration	3,835	11%
Software Engineer	3,518	10%
Technician	3,057	8%
Computer Scientist	1,799	5%
Clerical	1,161	3%
Scientist or Mathematician	1,065	3%
Sales	419	1%
Unreported	7,068	19%

### Five Major Aerospace Regions

Fourteen Alabama counties employed 100 or more aerospace workers. Ninety-nine percent of all aerospace jobs in 2002 were in these 14 counties. Figure 3 below show a map of the 14 counties. Taken together, the 14 counties constitute five aerospace regions. Region 1 is located in the northern part of the state and is made up of Madison, Morgan and Cullman counties. Of all the private sector aerospace jobs in the state, 66.7% were in region 1. Region 2 is located in the north central part of the state and is made up of Calhoun, Jefferson and Talladega counties. Region 2 accounted for 5.7% of private sector aerospace jobs. Region 3 is in the south central part of the state and is made up of Dallas and Montgomery counties and had 8% of the state's private sector aerospace jobs. Region 4 is located in the southeastern part of the state and is made up of Dale, Pike, Coffee, and Houston counties. 12.3% of private sector aerospace jobs were in Region 4. Region 5 is comprised of Baldwin and Mobile counties, which had 6.7% of the state's private sector aerospace jobs.

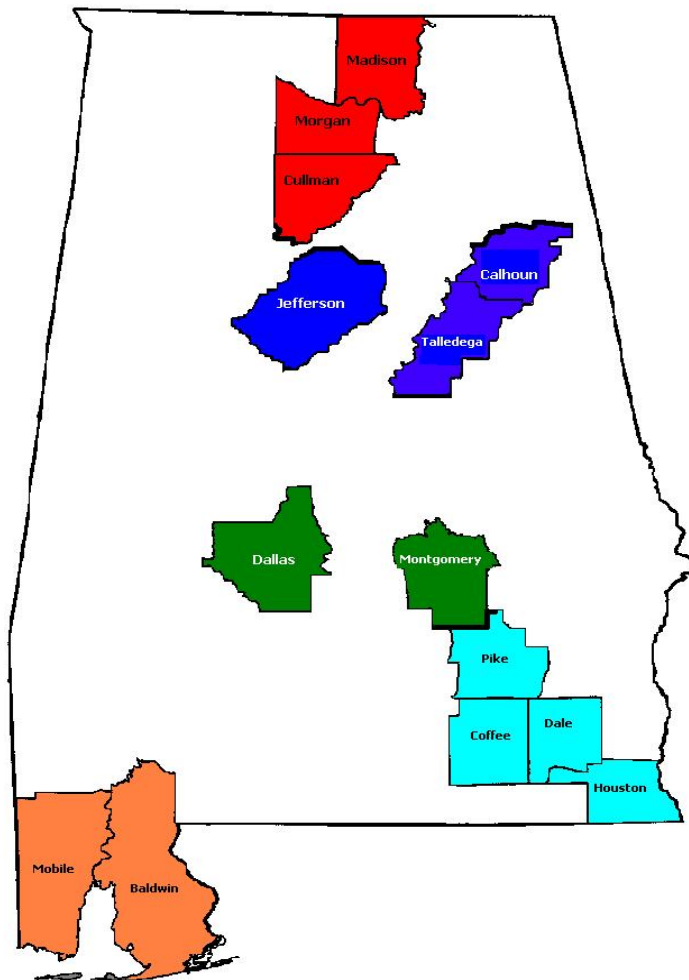


Figure 3  
Five Aerospace Regions

**Table 3**  
**Private and Federal Sector Employment**  
**Direct Jobs**

	<b>Counties</b>	<b>Private Sector Jobs</b>	<b>Federal Aerospace</b>	<b>Federal Jobs</b>	<b>Total Direct Jobs</b>
	Madison, Morgan, Cullman	24,182	Redstone Arsenal	15,789	39,971
<b>Region 2</b>	Calhoun, Jefferson, Talladega	2,070			2,070
<b>Region 3</b>	Montgomery, Dallas	2,905	Maxwell/ Gunter AFB	9,190	12,095
<b>Region 4</b>	Pike, Henry, Dale, Houston	4,456	Fort Rucker	11,800	16,256
<b>Region 5</b>	Mobile, Baldwin	2,343			2,343
<b>Rest of State</b>		297			297
<b>Total Direct Jobs</b>		<b>36,253</b>		<b>36,799</b>	<b>73,032</b>

Table 3 shows direct aerospace employment in both the private and federal sectors by region. Private sector employment totaled 36,253 matched almost equally by 36,799 in the federal sector for a total of 73,032 aerospace industry workers in Alabama. The presence of Redstone Arsenal in Region 1 has had and continues to have a big impact on the development of the industry in that region. Region 1 accounted for 54.7% of all aerospace jobs in the state. Fort Rucker in Region 4 helped make that region the second largest aerospace region in the state with 22% of the state aerospace workers.

**Table 4  
Jobs by Region and Industry Sector**

	<b>Region #1</b>	<b>Region #2</b>	<b>Region #3</b>	<b>Region #4</b>	<b>Region #5</b>
General Mfg.	597	176			
Missile & Space Vehicle Parts	2,217	150			
Missiles & Space Vehicles	4,707		132	258	
Aircraft Parts	654	394	140	217	843
Aircraft MRO		1,350		3,981	1,500
Eng Services	12,832				
IT Services	3,175		2,633		

Table 4 illustrates that several aerospace regions had concentrations of industry sector jobs. Region 1 had workers in all aerospace sectors with the exception of aircraft MRO. Regions 2, 4 and 5 had concentrations of workers in the two aircraft sectors, aircraft parts and the aircraft MRO. Region 3 had a strong concentration of workers in the information technology sector.

**The Multiplier Effect**

Jobs create more jobs. Multiplier (or indirect) jobs are those jobs created in the rest of the economy as a result of purchases of goods and services by companies and employees in a given industry. The total number of jobs created by an industry is the sum of the direct jobs in that industry plus multiplier jobs. Table 5 displays total aerospace jobs in the private and federal sectors by region. The aerospace industry in Alabama accounted for 139,601 direct and multiplier jobs in 2002.

**Table 5  
Private and Federal Sector Aerospace Total Jobs**

	<b>Counties</b>	<b>Private Sector Jobs</b>	<b>Federal Aerospace</b>	<b>Federal Jobs</b>	<b>Totals</b>
<b>Region 1</b>	Madison, Morgan, Cullman	51,734	Redstone Arsenal	24,094	75,468
<b>Region 2</b>	Calhoun, Jefferson, Talladega	6,125			6,125
<b>Region 3</b>	Montgomery, Dallas	4,981	Maxwell/Gunter AFB	14,024	19,005
<b>Region 4</b>	Pike, Henry, Dale, Houston	13,185	Fort Rucker	18,007	31,192
<b>Region 5</b>	Mobile, Baldwin	6,933			6,933
<b>Rest of State</b>		879			879
<b>Totals</b>		<b>83,476</b>		<b>56,125</b>	<b>139,601</b>

## Aerospace Payroll

Table 6 displays direct payroll for private and federal sector aerospace jobs by region and presents totals for the state. Total direct payroll for Alabama's aerospace private sector workers amounted to \$1.98 billion in 2002, while federal sector aerospace workers earned a total of \$1.68 billion. The aerospace payroll for the state in 2002 amounted to \$3.66 billion. Region 1 accounted for 68% of the total payroll for the industry in the state.

**Table 6**  
**Private and Federal Sector**  
**Aerospace Direct Payroll**

	<b>Counties</b>	<b>Private Sector Payroll</b>	<b>Federal Aerospace</b>	<b>Federal Payroll</b>	<b>Total Direct Payroll</b>
<b>Region 1</b>	Madison, Morgan, Cullman	\$ 1.45 B	Redstone Arsenal	\$ 1.05 B	\$ 2.5 B
<b>Region 2</b>	Calhoun, Jefferson, Talladega	\$ 0.09 B			\$ 0.09 B
<b>Region 3</b>	Montgomery, Dallas	\$ 0.12 B	Maxwell/ Gunter AFB	\$ 0.31 B	\$ 0.43 B
<b>Region 4</b>	Pike, Henry, Dale, Houston	\$ 0.21 B	Fort Rucker	\$ 0.32 B	\$ 0.53 B
<b>Region 5</b>	Mobile, Baldwin	\$ 0.11 B			\$ 0.11 B
<b>Rest of State</b>		\$ 0.009 B			\$ 0.009 B
<b>Total Direct Payroll</b>		<b>\$ 1.98 B</b>		<b>\$ 1.68 B</b>	<b>\$ 3.66 B</b>

The aggregate of wages and salaries from multiplier jobs constitutes multiplier (or indirect payroll) payroll. Total payroll is the sum of the payroll from direct and multiplier jobs. Table 7 shows total payroll for the private and federal sectors by region and totals for the state. The aerospace industry created a total payroll of \$6.16 billion in Alabama in 2002 with \$3.58 billion in the private sector and \$2.58 billion in the federal sector.

**Table 7**  
**Private and Federal Sector**  
**Aerospace Total Payroll**

	<b>Counties</b>	<b>Private Sector Payroll</b>	<b>Federal Aerospace</b>	<b>Federal Payroll</b>	<b>Total Direct Payroll</b>
<b>Region 1</b>	Madison, Morgan, Cullman	\$ 2.52 B	Redstone Arsenal	\$ 1.64 B	\$ 4.16 B
<b>Region 2</b>	Calhoun, Jefferson, Talladega	\$ 0.18 B			\$ 0.18 B
<b>Region 3</b>	Montgomery, Dallas	\$ 0.18 B	Maxwell/ Gunter AFB	\$ 0.46 B	\$ 0.64 B
<b>Region 4</b>	Pike, Henry, Dale, Houston	\$ 0.44 B	Fort Rucker	\$ 0.48 B	\$ 0.92 B
<b>Region 5</b>	Mobile, Baldwin	\$ 0.24 B			\$ 0.24 B
<b>Rest of State</b>		\$ 0.02 B			\$ 0.02 B
<b>Total Direct Payroll</b>		<b>\$ 3.58 B</b>		<b>\$ 2.58 B</b>	<b>\$ 6.16 B</b>

### **Conclusions**

Alabama's aerospace industry is a diverse industry with seven distinct sectors, five manufacturing sectors and two technical services sectors. The industry embraces the manufacturing and technical support of a wide variety of aviation and space vehicles.

Alabama's aerospace companies are overwhelmingly small businesses with 90% of the sample companies had 500 or fewer employees. 54% of the survey companies had 50 or fewer employees.

Alabama's aerospace workers are highly skilled and well educated. 23% are production workers and 34% are degreed technical professionals.

Alabama's aerospace industry is concentrated in five regions of the state. The five distinct regions are dispersed across the state.

The aerospace industry is a large and critical component of the Alabama economy. The industry provides 73,032 well paying jobs to Alabama citizens and creates another 66,569 jobs in other sectors of the economy.

The aerospace industry pumps billions of dollars into the state economy. Aerospace employees earned \$3.66 billion in 2002 and created an additional payroll of \$2.49 billion for workers in the rest of Alabama's economy.

At a time when jobs are being lost in apparel, textiles, pulp and paper, plastics and chemicals, the aerospace industry is a bright spot with substantial growth opportunities for the future.