

**THE ECONOMIC IMPACT OF DEFENSE SPENDING
ON HUNTSVILLE/MADISON COUNTY**

For the

**Huntsville/Madison County Chamber of Commerce
Huntsville, Alabama**

By

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Executive Summary

- The defense sector directly employed 25,619 persons in Madison County during 2002 – 13,049 were federal DOD employees and 12,570 private employees who worked on DOD contracts during the year. Defense related employment represented 14.9% of all wage and salary employment in the County in 2002.
- The indirect impact of defense spending was responsible for an additional 25,075 jobs in other sectors of Madison County's economy. Adding these jobs to the number who were directly employed in the defense sector in 2002 gives a grand total of 50,694 jobs dependent on defense spending or 29.4% of all wage and salary jobs in the County.
- The defense sector generated 26.8% of total personal income in Madison County or nearly \$2.3 billion in 2002.
- Adding the indirect income impact to the direct impact gives a total of \$3.4 billion in personal income that defense spending generated in Madison County in 2002. This represented 40.4% of the County's total personal income in that year.
- Employees in the defense sector earned an average of \$61,907 compared to an estimated average of \$51,115 for all wage and salary workers in Madison County in 2002.
- Personal taxes paid to Huntsville, Madison County and the State of Alabama by defense sector workers was estimated to be \$165.5 million in 2002.
- DOD contracts supported 53.3% of Madison County's aerospace industry employees in 2002.
- Forty-six percent of aerospace firms in Madison County had 90% to 100% of their workforce on DOD contracts during 2002. Most of these firms had total employment of less than 200.
- Sixty-one percent of major sub-contractors or suppliers to DOD prime contractors are located in Madison County. These sub-contractors primarily supply parts and accessories or technical services to prime contractors located in the County.
- Fifty-eight percent of DOD contract employees in Madison County work in engineering, science or mathematics disciplines. This is an increase from 47.1% recorded in 1993.

Introduction

The purpose of this report is to document and measure the current economic impact of defense spending on Huntsville and Madison County, Alabama. The direct and indirect employment and personal income impact was estimated using data collected from a survey of aerospace contractors conducted under a contract with the State of Alabama. The results of the Alabama Aerospace Association Survey provide the latest, most complete and most reliable data available for Madison County's defense sector. Surveys were mailed to 400 aerospace companies located across the state in the Spring, 2003. Respondents who did not return the surveys were contacted several times by mail, phone calls and emails. A total of 203 companies reported on their activities during the year 2002. They represented at least 90% of Alabama's aerospace industry employees and included at least 95% of companies with more than 250 employees (1). Additional data were provided by the Army Public Information Office about defense related federal employment at Redstone Arsenal and other locations in Madison County.

The Huntsville Economy and Defense Spending

Since the advent of Army operations in Huntsville in 1942, the city's economy has been affected by three distinct defense spending cycles. The first defense cycle began with the opening of Huntsville Arsenal three months after the attack on Pearl Harbor (2). The new Arsenal manufactured a variety of chemical weapons and ordnance and employed 6,700 civilian personnel at the peak of its operations in May, 1944.

Production at the Huntsville-Redstone Arsenal complex started to wind down in the fall, 1945 and a major reduction-in-force occurred in November. Munitions disassembly and disposal continued until 1948 when the complex was completely deactivated. The shutdown of the Arsenal led to serious economic dislocations in the community and a major lobbying effort began to get it reopened. This effort achieved success when in 1950 Dr. Werner von Braun and his team of German rocket scientists were transferred to Redstone Arsenal from Fort Bliss, Texas. Prior to their arrival, Huntsville's first defense contractors – Thiokol Corporation and Rohm and Haas – had already set up operations on Arsenal property to work on rocket propellants and propulsion systems. Employment in Huntsville's new chemical plants and construction

firms supporting the Army's missile research and development programs soon grew to 1,600 and more than 1,000 persons quickly returned to work at the Arsenal .

Over the next 20 years Huntsville's economy was completely transformed by Army and later NASA operations. Employment increased 70% in Madison County between 1950 and 1960 – four times the U.S. rate over the same period and median family income grew by 283%. The boom accelerated after NASA was created and took over the nation's space exploration programs. At the peak of this cycle, defense and NASA related employment accounted for more than 40% of all wage and salary jobs in Madison County (3).

The second defense spending cycle closed abruptly in 1969 when Marshall Space Flight Center's role in the design, development and fabrication of the Saturn rocket ended and the U.S. began a phased withdrawal from Viet Nam. Federal employment in Madison County declined by 4,000 positions over the next six years and private employment in the aerospace industry fell by 5,000. Many large aerospace contractors, such as GE and IBM, left town completely. During the 1970's employment and income grew at rates below the national average in Madison County and by 1980 the defense and aerospace sector accounted for just 29% of total employment in the County.

The third defense spending cycle began with an array of new initiatives and programs such as national missile defense proposed and funded by the Reagan Administration. Some firms like Boeing, which had cut back in Huntsville after the end of the Apollo Program, expanded during the decade and others, like Teledyne-Brown, McDonnell Douglas and TRW, increased their staffs considerably. Many new home-grown defense contractors got their start during this time under new procurement regulations requiring the use of small business vendors. Employment in Madison County increased 52% between 1980 and 1990. Manufacturing and federal civilian employment grew 34.3% during a time when employment in both of these sectors was falling nationally.

Defense related employment in Madison County reached another peak in 1990 and then declined by approximately 3,000 over the next four years as a result of cutbacks in defense spending at the end of the "Cold War". The downturn in this cycle was milder than in the previous two cycles and did not last as long because several Army operations,

including the Army Aviation Command, were transferred to Redstone Arsenal from other locations.

Madison County defense contractors currently employ 12,388 persons on defense contracts and sub-contracts, about the same number as were employed in 1994 (4). Defense related federal civilian employment stood at 10, 980 at the end of 2001 – somewhat higher than the 1994 figure. The number of military personnel stationed at Redstone Arsenal stood at 2,069.

Size of Madison County’s Defense Sector

The current size of Madison County’s defense sector measured in terms of employment is displayed in Table 1. The federal figure includes employment for all Department of Defense (DOD) operations located in the County as reported in the latest Redstone Installation Manpower Report. All non-DOD employment on the Arsenal such as at Marshall Space Flight Center is excluded from this analysis. The private total in Table 1 includes all the employees of Madison County aerospace contractors who worked on DOD contracts or subcontracts during 2002 and who were reported on the Alabama Aerospace Association Survey. An estimate of the average number of construction workers at various sites on Redstone Arsenal during the year is also included in the total. The defense sector directly employed 14.9% of Madison County’s wage and salary work force in 2002. This amounted to 25,619 workers, which in comparison equaled 85% of the 30,180 workers who were directly employed in Alabama’s automobile industry last year (5).

Table 1 Size of Madison County's Defense Sector		
	Employment	Pct. Of Madison County Total
Federal	13,049	7.6%
Private	12,570	7.3%
Total Defense Sector	25,619	14.9%
Madison County Total	172,385	100.0%

Federal defense spending generates personal income in Madison County from three different channels. Federal employees, both civilian and military, receive wages and salaries; defense contractors receive contracts from the various branches of the DOD and pay workers wages and salaries from these contracts; and military retirees living in Madison County receive pensions. Together these three sources of personal income accounted for 26.8% of total personal income in Madison County. According to the Army Public Information Office, the payroll of federal civilian and military personnel working on and off the Arsenal was \$808.4 million (this figure excludes the payroll at NASA and the Defense Intelligence Agency). Defense contractors reported on the Aerospace Industry survey a payroll of \$777.6 million for their employees working on defense contracts in 2002. Last, the authors estimated DOD retirement transfers to military retirees to be approximately \$680.8 million. This total of \$2,267 million in personal income derived from defense spending in Madison County is 62% more than the \$1,404 million in personal income generated directly by the state's automobile industry last year (5).

Table 2 Madison County Personal Income Derived from Defense Spending		
	Income (in millions of \$)	Pct. Of Madison County Total
Federal Employees	\$808.4	9.5%
Private Employees	\$777.6	9.2%
Military Retirees	\$680.8	8.0%
Total Defense Sector	\$2,267.0	26.8%
Madison County Total	\$8,469.8	100.0%

Total Economic Impact of Defense Spending on Madison County

Defense spending has a much greater impact on Madison County's economy than just the direct impact chronicled in the previous section. Spending by federal employees,

private defense contractors and military retirees generates more jobs and spending in the local economy through the multiplier effect. This indirect impact creates an estimated 25, 075 more jobs for a total employment impact of 50,694. This figure was 29.4% of Madison County’s total wage and salary workforce in 2002. Nearly three out of every ten jobs in Madison County was directly or indirectly dependent on defense spending last year.

Table 3 Total Employment Impact on Madison County Derived from Defense Spending		
	Employment	Pct. Of Madison County Total
Direct Employment	25,619	14.9%
Indirect Employment	25,075	14.5%
Total Defense Employment Impact	50,694	29.4%
Madison County Total	172,385	100.0%

The additional personal income earned by the 25,075 workers who were indirectly supported by defense spending last year was estimated to be \$1,158 million, as shown in Table 4. Adding this figure to the direct income impact of \$2,267 million gives a total of \$3,425 million. This was 40.4% of total personal income in Madison County last year. Defense spending directly or indirectly was responsible for generating 40 cents out of each dollar of personal income in Madison County last year. The impact of defense spending on personal income is much larger than the corresponding impact on total employment in the County because of military retirees who contributed an estimated 8% to total personal income. A more detailed breakdown of the employment and income impact of defense spending on Madison County’s economy can be found in Table 1-A in the Appendix.

Table 4 Total Madison County Personal Income Derived from Defense Spending		
	Income (in millions of \$)	Pct. Of Madison County Total
Direct Income	\$2,267.0	26.8%
Indirect Income	\$1,158.0	13.6%
Total Defense Sector	\$3,425.0	40.4%
Madison County Total	\$8,469.8	100.0%

Tax Impact from Defense Spending in Madison County

The following estimate of the tax impact of defense spending includes three main sources of revenue for state and local government – retail sales taxes, the Alabama personal income tax, and state and local property taxes on residences. The estimate leaves out taxes paid by private defense contractors on their own behalf including property taxes on corporate-owned buildings and corporate income taxes. Also, no estimate was made of less important sources of state and local tax revenue such as fuel taxes, franchise taxes, lodging taxes, etc.

The 2002 tax impact from defense spending was calculated for three political jurisdictions – City of Huntsville, Madison County (including the City of Madison), and the State of Alabama. To allocate the tax impact, the authors assumed 20% of federal and private defense workers and military retirees lived outside Madison County (but inside the State of Alabama) and therefore paid sales and property taxes to other local governments.

The 2000 Census population count was used to distribute local taxes between the City of Huntsville and Madison County (including the City of Madison). The appropriate local sales and property tax rates were used to estimate tax collections in each of these jurisdictions.

The authors estimate defense workers and military retirees were directly and indirectly responsible for \$36.4 million in property and sales taxes paid to the City of Huntsville last year and \$7.6 million in property and sales taxes paid to Madison County and the City of Madison. Defense workers and military retirees also generated \$121.3 million in sales, property and personal income tax payments to the State of Alabama. Total personal taxes paid to Huntsville, Madison County and the State of Alabama was estimated to be \$165.5 million for last year. A more detailed breakdown of the tax impact of defense spending on Huntsville, Madison County and the State of Alabama can be found in Table 2-A in the Appendix.

Table 5	
Annual Tax Impact from Defense Spending in Madison County	
	Personal Sales, Property & Income Tax Payments
City of Huntsville	\$36,492,000
Madison County (Including the City of Madison)	\$7,620,000
State of Alabama	\$121,348,000
Total	\$165,460,000

Aerospace Contractor Employment by Source of Work

The Alabama Aerospace Industry Survey identified 136 firms in Madison County that were involved in some type of aerospace activity, such as providing engineering, R&D, and IT services, or manufacturing guided missiles, space vehicles or parts. Together they employed 23,221 workers with 12,388 or 53.3% identified in Table 6 as working on defense contracts or subcontracts last year. Of the remainder, 14.1% worked on contracts with NASA and 3.9% on contracts with other government entities. The sources of work for the remaining 28.9% of aerospace workers were not reported by survey respondents.

Table 6		
Aerospace Contractor Employment		
by Source of Work		
Source of Work:	Total Employment	Percent Distribution
Department of Defense	12,388	53.3%
NASA	3,276	14.1%
Other Federal Agencies	678	2.9%
Other Government	228	1.0%
Not Reported	6,651	28.6%
Grand Total	23,221	100.0%

Size Distribution of Defense Contractors in Madison County

The Alabama Aerospace Industry Survey identified 96 Madison County firms that had defense contracts or subcontracts during 2002. The 7 largest of the 96 firms (those with more than 1,000 employees) employed 51% of all private defense workers. Although more than half of private defense employment is concentrated in the largest firms, 65 of the 96 firms in Table 7 had fewer than 100 employees and the average sized firm in Madison County had just 129 workers. The median sized firm was even smaller with only 56 employees.

Table 7			
Size Distribution of Current Defense Contractors and Number and Percentage of Employees on Defense Contracts			
Employment Range	Number of Firms With Defense Contracts	Employees on Defense Contracts	Percent of Employees on Contracts
1,000 or more	7	6,361	62.9%
500-999	5	1,552	44.7%
200-499	12	2,449	48.4%
100-199	7	591	29.4%
50-99	16	650	47.8%
25-49	22	504	68.9%
Less than 25	27	281	59.4%
Total	96	12,388	53.3%

The dependence of Madison County firms on DOD sponsored work is displayed in Table 8. Forty-four of 96 firms or 46% had 90% to 100% of their employees on defense contracts or subcontracts last year. Ten of the 12 largest firms had more than 50%. Some defense contractors appear to have been successful in diversifying their customer base in recent years, but many of the larger more important ones in the County remain heavily dependent of defense contracts.

Employment Range	Total Firms	90% to 100%	70% to 89%	50% to 69%	30% to 49%	29% or Less
1,000 or more	7	1	0	6	0	0
500-999	5	1	1	1	1	1
200-499	12	7	1	1	2	1
100-199	7	2	2	1	2	0
50-99	16	1	6	3	2	4
25-49	22	10	3	3	0	6
Less than 25	27	22	3	2	0	0
Total	96	44	16	17	7	12

Location of Suppliers and Subcontractors to Madison County Defense Firms

According to data from the Alabama Aerospace Industry Survey, most defense contractors in Madison County turn to other firms located in Madison County for subcontracting or to purchase goods and services they need. Of the 61 firms answering this question in the Survey, 37 or 61% indicated their most important supplier or subcontractor was located in Madison County. Only 3 of 61 said their most important supplier or subcontractor was a firm located in another Alabama county.

In 49% of the cases the identified subcontractors or suppliers provided technical services. Next in importance were the provision of parts and accessories. It appears from these data that there are few linkages between Madison County's defense contractors and aerospace contractors found elsewhere in Alabama. Defense contractors located in Madison County usually turn to other firms in the County or to firms located elsewhere in the U.S. when they require manufacturing, R&D, or technical services or parts and accessories.

Table 9					
Location of the Most Important Subcontractors/Suppliers to Madison County Defense Contractors					
Location	Number of Sub-contractors/Suppliers	Service Provided by Subcontractor/Supplier			
		Parts/Accessories	Manufacturing	R&D	Technical Services
Other Madison Co. Firms	37	10	3	3	21
Other Alabama Firms	3	2	0	0	1
Firms Outside Alabama	21	9	3	1	8
Total	61	21	6	4	30
Percent Distribution	100.0%	34.4%	9.8%	6.6%	49.2%

Occupational Makeup of Madison County Aerospace Firms

The change in the occupational makeup of Madison County's aerospace firms between 1993 and 2002 is displayed in Table 10. The data for 1993 come from the Huntsville Defense Industry Survey taken in that year. The percentage of aerospace workers in administrative and managerial positions and in marketing, sales and business development fell from 21.5% in 1993 to 15.3% in 2002. Also declining in importance were clerical positions. The occupational categories increasing in importance over the past nine years were software engineers (from 10.3% to 16.5%); computer scientists (from 4.6% to 8.3%); and scientists and mathematicians (from 1.8% to 5.2%). The proportion of workers who were production workers, operators, technicians, or from engineering disciplines other than software engineering remained about the same over the nine year period. These data appear to indicate Madison County's private aerospace and defense workforce is increasingly oriented toward computer fields and away from more traditional administrative, marketing and engineering occupations.

Occupational Categories	2002 Number of Employees	Percent Distribution	
		2002	1993
Administrative/Managerial Marketing/Sales/Business Development	2,735	13.8%	17.0%
Clerical	297	1.5%	4.5%
Production Workers/ Operators	787	4.0%	7.6%
Software Engineers	2,404	12.2%	12.3%
Other Engineers	3,256	16.5%	10.3%
Computer Scientists	5,559	28.1%	30.4%
Other Scientists/Mathematicians	1,642	8.3%	4.6%
Technicians	1,019	5.2%	1.8%
Subtotal	2,077	10.5%	11.5%
Subtotal	19,776	100.0%	100.0%
Not Reported	3,445	--	--
Total	23,221		

Conclusion

Last year marked the fiftieth anniversary of the start of Huntsville's intense involvement in meeting the needs of our nation's military forces. Much has changed since thousands Huntsville and Madison County residents signed up to work at Huntsville and Redstone Arsenal at the start of World War II, but one thing has not changed – the dedication and effort displayed by the community to provide the best materiel and services to our fighting men and women. Madison County possesses an aggregation of companies and military facilities that are able to meet the increasingly sophisticated and complex requirements of today's military forces. Many of the scientific and engineering resources that have developed in Huntsville and Madison County over the past fifty years are unique and cannot be found anywhere else. The current importance of the defense sector to the economy of Madison County has been estimated in this report. What has not been estimated, but what is far larger and more important, is the benefit our nation's military forces and the military forces of our allies have received from the growth and development of Huntsville and Madison County's defense sector over the past fifty years.

Footnotes

- (1) Spann, M., *Alabama's Aerospace Industry 2002 Executive Summary*, 2003, p 1.
- (2) Redstone Arsenal Complex Chronology, Historical Division, U.S. Army Missile Command, Redstone Arsenal, Alabama, 1991, p.6.
- (3) Schoening, N., *Huntsville Alabama: The Sky is Not the Limit*, Economic Case Studies of Appalachian Communities, Riverbend Consulting, Bluff City, TN, Sept. 1998, p.6.
- (4) Schoening, N. and M. Spann, *Results of the Huntsville Defense Industry Study*, Huntsville Economic Diversification Council, College of Administrative Science, University of Alabama in Huntsville, Huntsville, AL. p.4.
- (5) Spann, M. "Tracking the growth of Alabama's Automotive Manufacturing Industry," *Business Alabama*, July 2003, p.74.

Statistical Appendix

Table 1-A Employment and Income Impact of Defense Spending on Madison County				
In The Workforce	Employment	Income	Percent of Total County**:	
			Wage & Salary Employment	Personal Income
Federal Government*				
Civilian	10,980			
Military	2,069			
Total	13,049	\$808,447,000	7.6%	9.5%
Private Sector				
Defense Contractors	12,388	\$767,565,000		
Construction Cont.***	182	\$10,000,000		
Total	12,570	\$777,565,000	7.3%	9.2%
Total Direct	25,619	\$1,586,012,000	14.9%	18.7%
Indirect	22,570	1,076,267,743		
Total Direct and Indirect Workforce Impact	48,189	\$2,662,279,743	28.0%	31.4%
Out of the Workforce	Retirees	Income***		
Military Retirees	13,615	\$680,750,000		
Total Direct	13,615	\$680,750,000		8.0%
Indirect	2,505	\$81,690,000		
Total Direct and Indirect Retiree Impact	16,120	\$762,440,000		9.0%
Grand Total Direct Impact	25,619	\$2,266,762,000	14.9%	26.8%
Grand Total Indirect Impact	25,075	\$1,157,957,743		
Grand Total Direct and Indirect Impact	50,694	\$3,424,719,743	29.4%	40.4%

* Federal employment on and off Redstone Arsenal as of the end of 2001.

Projected federal payroll is for FY 2001-2002.

** 2001 Madison County personal income and employment estimate from the U.S. Bureau of Economic Analysis.

*** Estimated

Table 2-A				
Tax Impact of Defense Spending on Huntsville, Madison County and Alabama				
	Madison County Income	Sales Tax Collections		
		Huntsville	Madison County	State of Alabama
Construction Employees	\$16,044,000	\$157,231	\$32,088	\$256,704
Federal Employees	\$842,078,395	\$8,252,368	\$1,684,157	\$13,473,254
Defense Contractor Employees	\$978,654,600	\$9,590,815	\$1,957,309	\$15,658,474
Military Retirees	\$581,360,500	\$5,697,333	\$1,162,721	\$9,301,768
Total	\$2,418,137,495	\$23,697,747	\$4,836,275	\$38,690,200
	Property Tax Collections			Alabama Personal Income Tax
	Huntsville	Madison County	State of Alabama	
Construction Employees	\$66,569	\$14,484	\$20,495	\$687,600
Federal Employees	\$3,607,337	\$784,893	\$1,110,597	\$36,089,074
Defense Contractor Employees	\$5,526,295	\$1,202,425	\$1,701,390	\$41,942,340
Military Retirees	\$3,593,990	\$781,989	\$1,106,488	----
Total	\$12,794,190	\$2,783,791	\$3,938,969	\$78,719,014
	Total Tax Collections			Grand Total
	Huntsville	Madison County	State of Alabama	
Construction Employees	\$223,800	\$46,572	\$964,799	\$1,235,171
Federal Employees	\$11,859,705	\$2,469,050	\$50,672,925	\$65,001,680
Defense Contractor Employees	\$15,117,110	\$3,159,734	\$59,302,204	\$77,579,047
Military Retirees	\$9,291,323	\$1,944,710	\$10,408,256	\$21,644,288
Total	\$36,491,938	\$7,620,066	\$121,348,183	\$165,460,187

Note: Tax impact was estimated assuming 20% of employees and retirees live outside Madison County, 53% live in Huntsville and the remaining 27% live in the City of Madison or Madison County.