What is the Aero/Space Economy?

<u>Traditional aerospace industry in North Carolina</u> Employment: 37,971 (20th of 50 states) Jobs per 1000 workers: 10 (34th of 50 states) Average industry wage: \$41,035 (32nd of 50 states) State payroll: \$1.6 Billion

Top aerospace & aviation sectors:

- Air transportation
- Aircraft and parts manufacturing
- Search, detection, navigation

Strong foundation for the emerging commercial Aero/Space Economy

Source: Walker, R, 2002. *Final Report of the Commission on the Future of the United States Aerospace Industry.* Commission on the Future of the United States Aerospace Industry, Arlington, VA

Transition from government-driven aerospace industry to commercial Aero/Space Economy

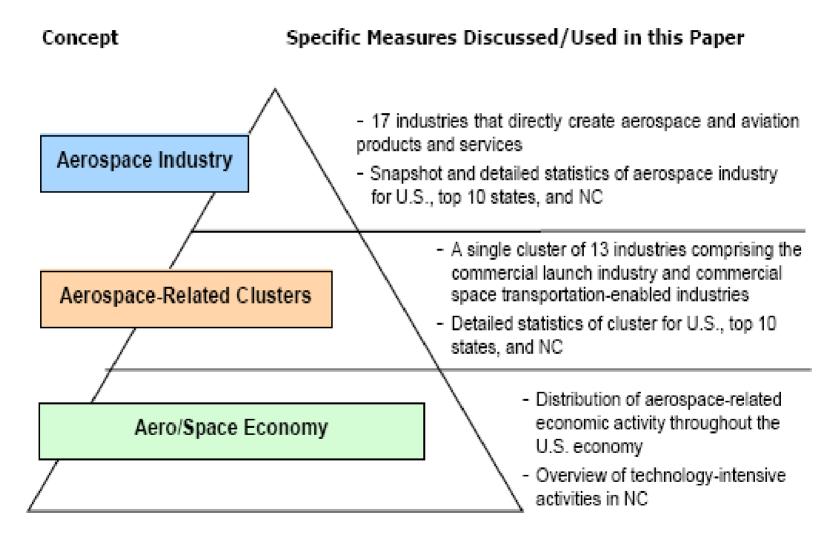


Figure 1. Defining Aero/Space Economy: Industry, Clusters, and Economy

The Aero/Space Economy creates new jobs at non-space companies

"Paragon Space Development Corp., which builds advanced life support systems for undersea divers, is among the small companies positioned to support a real commercial spaceflight industry..."

"The 25-person business has just opened a 16,000-sq.-ft. facility that includes a pressure chamber and other gear for human-rating commercial spacecraft."

Source: Morring, Jr., Frank, Aviation Week & Space Technology, "Crew-Carrying Vehicle Work Started," p. 25, September 4, 2006

The Aero/Space Economy creates new markets for non-space companies

Masten Space Systems non-space business suppliers

- Flometrics (fluid & thermodynamics engineering)
- Summitt Racing (high-performance auto parts)
- Metals Superstore
- Orchard Supply and Hardware
- McMaster & Carr (industrial supplier)
- mfgquote.com ("The Global Manufacturing Marketplace")

Source: Michael Mealling, Vice President for Business Development, Masten Space Systems

Potential for North Carolina

Comparison of NC Technology Clusters with Enabling Technologies for Space Exploration

-matches with-Technology Clusters in NC (1) Space Enabling Technologies (2) Chemicals/plastics Advanced structures Pharm./medical technology **Biomedical risk mitigation** Industrial machinery Planetary in situ resource use Information tech./instruments Autonomous systems and robotics Information tech./instruments Scientific data collection/analysis Communication services/software High bandwidth communications All 17 identified technologies Aerospace

(1) Tracking Innovation: North Carolina Innovation Index 2003. North Carolina Board of Science and Technology

(2) Report of the Commission on Implementation of United States Space Exploration Policy. President's Commission on the Implementation of United States Space Exploration Policy, 2004 (aka, The Aldridge Report)

Potential for North Carolina

North Carolina Industry Clusters

Table 7. North Carolina Industry Clusters				
	E			
Clusters	% 1998			
Existing General Industry Clusters				
Apparel	207,698			
Fabricated textiles	128,893			
Wood products (incl. furniture)	77,549			
Pharmaceuticals	17,783			
Tobacco products	16,151			
Stone & clay products	13,838	\mathcal{N}		
Emerging General Industry Clusters				
Printing & publishing	279,849			
Hospitals, labs, specialized medical svs.	226,117	\leq		
Transportation, shipping and logistics	18,989			
Construction materials	118,390			
Information technology & instruments	105,796			
Chemicals & plastics	104,367			
Banking & advertising	95,259			
U.S. Technology Clusters, Presence in the State				
Information technology & instruments	104,420			
ommunications services & software	63,660			
Chemicals & plastics	53,923			
Motor vehicle manufacturing	44,277			
Pharmaceuticals & medical technologies	34,629			
Industrial machinery	21,464			
Aerospace	5,545			
Household appliances	1,139			
Source: Feser and Bergman 2000.				

US Econ. Activity, Earnings, Jobs Generated by Comm. Space Tran. & Enabled Industries, 2002 Table 6. Distribution of Economic Activity, Earnings, and Jobs throughout

Table 6. Distribution of Economic Activity, Earnings, and Jobs throughout Major U.S. Industry Sectors Generated by Commercial Space Transportation and Enabled Industries, 2002

	Economic		
Industry Group	Activity (\$Million)	Earnings (\$Million)	Jobs
Communications	23,904.3	3,587.6	55,465
Electronic & other electric equipment	19,407.9	4,739.4	79,487
Business services	6,352.9	2,811.2	73,522
Real estate	5,722.5	236.3	9,692
Wholesale trade	3,999.5	1,304.1	26,986
Hotels & other lodging places, amusement & recreation services & motion pictures	3,506.2	1,251.6	38,285
Depository & nondepository institutions & security & commodity brokers	3,013.8	1,027.4	19,238
Health services	2,847.0	1,330.5	34,061
Retail trade	2,780.2	1,003.0	47,091
Miscellaneous services	2,380.1	783.7	33,206
Transportation	2,204.8	789.8	21,571
Construction	2,004.4	677.8	18,104
Chemicals & allied products & petroleum & coal prod.	1,626.4	261.3	3,171
Food & kindred products & tobacco products	1,559.0	187.0	4,992
Fabricated metal products	1,416.3	438.3	11,611
Insurance	1,286.7	429.1	9,370
Electric, gas & sanitary services	1,252.6	205.3	2,510
Eating & drinking places	1,169.6	404.0	29,500
Printing & publishing	1,140.0	356.5	8,553
Primary metal industries	984.1	183.0	3,646
Industrial machinery & equipment	899.7	215.5	4,163
Rubber & miscellaneous plastic products & leather & leather products	789.5	178.8	4,882
Farm products & agricultural, forestry & fishing svcs.	746.1	195.1	9,906
Paper & allied products	636.5	122.6	2,601
Motor vehicles & equipment	574.4	77.5	1,236
Personal services	492.7	212.2	11,373
Cother transportation equipment	409.8	94.3	1,551
Lumber & wood products & furniture & fixtures	388.6	83.7	2,712
Oil & gas extraction	338.8	47.4	535
Instruments & related products	308.5	83.8	1,292
Apparel & other textile products	205.9	47.5	1,937
Stone, clay & glass products	187.4	46.3	1,040
Textile & mill products	176.9	32.7	1,039
Miscellaneous manufacturing industries	153.5	47.6	1,514
Coal mining	75.2	19.6	235
Metal mining & nonmetallic minerals except fuels	54.2	13.6	273
Forestry & fishing products	29.9	3.3	98
TOTAL	95,025.9	23,528.4	576,448
Source: FAA 2004.			

Potential for Piedmont Triad

Comparison of Piedmont Triad Businesses with Enabling Technologies for Space Exploration

<u>Piedmont Triad Businesses</u> (1) -matches with-Timken Company (ball bearings, specialty steel) Dantherm Filtration Purolater Facet, Inc. QuarTek International (nanotechnology) TransTech Pharma, Inc. <u>Space Enabling Technologies</u> (2) Autonomous systems and robotics Closed-loop life support and habitability Closed-loop life support and habitability Autonomous systems and robotics Biomedical risk mitigation

(1) www.piedmonttriadnc.com/new_expanded_firms.asp

(2) Report of the Commission on Implementation of United States Space Exploration Policy. President's Commission on Implementation of United States Space Exploration Policy, 2004 (aka, The Aldridge Report)

Potential for Piedmont Triad (cont.)

Piedmont Triad Business Clusters (1)	Economic		
	Industry Group	Activity (\$Million)	Earnings (\$Million)
Timken Company	Communications	23,904.3	3,587.6
	Electronic & other electric equipment	19,407.9	4,739.4
Dantherm Filtration	Business services	6,352.9	2,811.2
	Real estate	5,722.5	236.3
QuarTek International	Wholesale trade	3,999.5	1,304.1
TransTech Pharma, Inc.	Hotels & other lodging places, amusement & recreation services & motion pictures	3,506.2	1,251.6
Linwood Furniture	Depository & nondepository institutions & security & commodity brokers	3,013.8	1,027.4
	Health services Retail trade	2,847.0	1,330.5
Hubbell Industrial Controls	Retail trade Miscellaneous services	2,780.2 2,380.1	1,003.0 783.7
Hubben mausural controls	Transportation	2,204.8	789.8
CK Technologies, LLC	Construction	2,004.4	677.8
CK recimologies, LLC	Chemicals & allied products & petroleum & coal prod.	1,626.4	261.3
Amcan Fibers, Inc.	Food & kindred products & tobacco products	1,559.0	187.0
Amedia i loeis, me.	Fabricated metal products	1,416.3	438.3
Gerard's Bakery	Insurance	1,286.7	429.1
Gerard's Dakery	Electric, gas & sanitary services Eating & drinking places	1,252.6 1,169.6	205.3 404.0
Transportation Systems Solutions	Printing & publishing	1,140.0	356.5
	Primary metal industries	984.1	183.0
Imaflex, Inc.	Industrial machinery & equipment	899.7	215.5
RFMID	Rubber & miscellane s plastic products & leather & leather products	789.5	178.8
KI MID	Farm products & agricultural, forestry & fishing svcs.	746.1	195.1
	Paper & allied products	636.5	122.6
	Motor vehicles & equipment Personal services	574.4 492.7	77.5
	Other transportation equipment	492.7	212.2 94.3
	Lumber & wood products & furniture & fixtures	388.6	83.7
	Oil & gas extraction	338.8	47.4
	Instruments & related products	308.5	83.8
	Apparel & other textile products	205.9	47.5
	Stone, clay & glass products	187.4	46.3
	Textile & mill products	176.9	32.7
www.piedmonttriadnc.com/new_expanded_firms.asp	Miscellaneous manufacturing industries Coal mining	153.5 75.2	47.6 19.6
	Coal mining Metal mining & nonmetallic minerals except fuels	75.2 54.2	19.6
	rietar mining a nonmetanie minerais except fuels	34.2	10.0

Table 6. Distribution of Economic Activity, Earnings, and Jobs throughout Major U.S. Industry Sectors Generated by Commercial Space Transportation and Enabled Industries, 2002

Jobs

55,465

79,487 73,522

9,692

26,986

38,285

19,238

34,061

47,091

33,206

21,571

18,104

3,171

4,992

11,611 9,370

2,510

29,500

8,553

3,646

4,163

4,882

9,906

2,601

1,236

11,373

1,551

2,712

1,292

1,937

1,040

1,039

1,514

235 273

98

576,448

535

23,528.4

3.3

29.9

95,025.9

Forestry & fishing products

Source: FAA 2004.

TOTAL

Piedmont Triad Opportunities New and Expanding Firms

Imagine...

- "Comair Inc. ... will serve as a maintenance base for Comair sub-orbital rocket jets."
- "PGT Industries, one of the nation's leading manufactureres of custom windows, doors and sunrooms announced... *it will provide these products for the nation's new space theme parks and coffee houses.*"
- "Kayser-Roth... manufactures and distributes branded, licenses and private-label legwear... and recently concluded a deal to create branded spaceware for customers of RocketplaneKistler and Virgin Galactic, who will begin flying into space in 2008-2009."

All text except that in *italics* from www.piedmonttriadnc.com/new_expanded_firms.asp