

The Economic Importance of High Technology Industry in Arizona

Prepared for Northeastern Pinal
Economic Partnership
By William P. Patton, PhD

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Importance of High Tech Industry to the Arizona Economy

- Major Source of Employment and Income
- High Wage Jobs
- Global Competition
- Company Spin-offs
- Source of New Jobs and New Products
- Engine for future economic growth and development

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Arizona's High Tech Position

- Milken Institute classifies Arizona as:
 - a “second tier” state for high tech activity
 - the 17th ranked of 50 states
- According to Milken Institute,
“the new engine of regional prosperity is based on how successful a given location is in attracting and expanding technology and science assets and leveraging them for economic development.”

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Research Questions

- What is high tech industry?
- How important is high tech industry in the Arizona Economy?
- How do high tech wages compare to other sectors of the economy?
- Which high tech sectors are growing fastest?
- Does Arizona have a high concentration in any industries?
- What major companies comprise the Aerospace, Semiconductor and Instruments sectors?

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What is high tech industry?

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Definition of High Tech Industries

- Concentration of technology-oriented workers
- High proportion of R&D employment
- Use of high tech production methods & processes
- Manufacture advanced technology products
- BLS Definition used in this study

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BLS High Tech Occupations

- Computer and Mathematical Scientists
- Engineers
- Drafters, Engineering and Mapping Technicians
- Life Scientists
- Physical Scientists
- Life, Physical and Social Science Technicians
- Computer and Information Systems Managers
- Engineering Managers
- Natural Sciences Managers

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BLS High Tech Industry Definition

- BLS defines an industry as high tech if,
"employment in technology-oriented occupations accounts for a proportion of the industry's total employment that is **at least twice the 4.9% average for all industries.**"

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BLS High Tech Industry Levels

- **Level 1** – industries with intensities greater than 5 times the average (14 industries)
- **Level 2** - industries with intensities between 3.0 and 4.9 times the average (12 industries)
- **Level 3** - industries with intensities between 2.0 and 2.9 times the average (20 industries)

How important is high tech industry in the Arizona Economy?

High Tech Firms Constitute a Significant Share of Arizona Firms

AZ High Tech Firms

Industry	Establishments 2007	% of AZ Firms
Total, all industries	149,918	100%
Total, high tech industries	15,996	11%
Total, all manufacturing	5,096	3%
Total high tech mfg.	913	1%

High Tech Firms Constitute a Significant Share of Arizona Jobs

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AZ High Tech Jobs

Industry	# Employees 2007	% of AZ Employment
Total, all industries	2,647,101	100%
Total, high tech industries	278,703	11%
Total, all manufacturing	182,158	7%
Total high tech mfg.	79,502	3%

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Which high tech industries have the highest employment levels?

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AZ High Tech Industries with Highest Employment

Industry	Employees 2007
Aerospace manufacturing	27,421
Semiconductor & electronics mfg.	27,146
Management of companies and enterprises	26,947
Navigation, measuring, electro med, & control instr. mfg.	12,767

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Which high tech industries have the fastest employment growth?

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AZ High Tech Industries with Fastest Employment Growth

Industry	Employment Growth Rate 2001-2007
Other telecommunications	75%
Resin, rubber, synthetic fibers and filaments mfg.	30%
Satellite telecommunications	26%
Internet publishing and broadcasting	22%

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High Tech Firms Pay a Large Share of Arizona Total Wages

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AZ High Tech Payrolls

Industry	Payroll (\$Billion) 2007	% of AZ Payroll
Total, all industries	\$110.0	100%
Total, high tech industries	\$20.3	18%
Total, all manufacturing	\$10.6	10%
Total, high tech mfg.	\$6.4	6%

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How do high tech wages compare to other sectors of the economy?

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High Tech Firms Pay Extremely High Wages

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AZ High Tech Payroll/Employee

Industry	Payroll per Employee 2007	% of US PPE
Total, all industries	\$41,555	93%
Total, high tech industries	\$72,699	91%
Total, all manufacturing	\$58,402	112%
Total high tech mfg.	\$80,059	103%

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Which High Tech Industries Offer the Highest Wages?

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AZ High Tech Industries with Highest Wages

Industry	Payroll per Employee 2007
Satellite telecommunications	\$101,957
Professional & communications equipment & supplies, wholesalers	\$92,061
Electric power	\$91,004
Semiconductor & electronics mfg	\$88,990
Aerospace manufacturing	\$82,472
Navigational, measuring, & control instrument mfg.	\$81,302

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Does Arizona have a high concentration in any industries?

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AZ High Tech Industries with Highest Location Quotients

Industry	Location Quotient 2007
Semiconductor & electronics mfg.	3.1
Aerospace manufacturing	2.9
Navigation, measuring, electro-med & control instrument mfg.	1.5
Facilities support services	1.5

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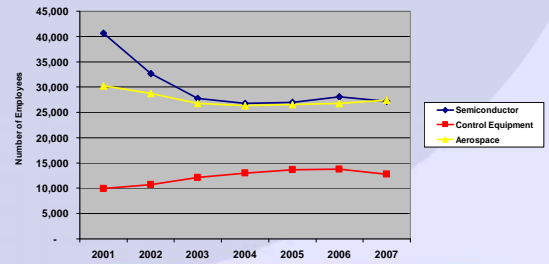
How Fast are High Tech Industries with the Highest Concentration Growing?

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Highest Concentration Industries Growth Rates

Industry	Location Quotient	Growth Rate 2001-2007
Semiconductor & elect. mfg	3.1	-6.5%
Aerospace manufacturing	2.9	-1.6%
Navigation control instrument mfg.	1.5	+4.3%
Facilities support svc.	1.5	+5.1%

Employment for Aerospace, Semiconductor and Control Manufacturing 2001-2007



What major companies comprise the Aerospace, Semiconductor and Instruments sectors?

Major Aerospace Companies

- Raytheon Missile Systems
- Honeywell Aerospace
- Boeing
- Northrop Grumman
- Sargent Controls and Aerospace

Major Semiconductor Companies

- Intel
- Motorola
- Texas Instruments
- Freescale Semiconductor
- Microchip Technology
- On Semiconductor

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Major Instruments Manufacturing Companies

- Honeywell
- General Dynamics
- Medtronic Microelectronic Center
- Universal Avionics Systems

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What is Needed to Promote the Attraction, Expansion, Retention & Creation of AZ High Industry?

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Economic Development Implications of Arizona High Tech Industry Strategy

- **Highly educated and skilled workforce**
- **Need access to venture capital**
- **Develop entrepreneurial presence**
- **Research university presence**
- **R&D presence**
- **Technology transfer opportunities**
- **Commercialization**
- **Infrastructure development**
 - Industrial and office space
 - Clean rooms and wet labs
 - Telecommunications

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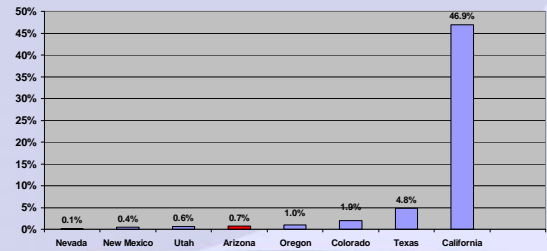
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Arizona K-12 Education

- 4th and 8th grade students underperform on standardized math and science exams
- Arizona is 49th of 50 states on spending per student

Venture Capital: Percent of U.S. Investment by Selected States



What Major Investments in High Tech Development will Affect Arizona's Economic Future?

Recent AZ Science & Technology Investments

- Proposition 301
- Translational Genomics (TGen)
- Arizona Bioscience Roadmap
- ASU Bidesign Institute
- Critical Path Institute
- UA BIO5
- NAU Strategic alliance for Bioscience Research and Education
- MCC bond for bioscience and healthcare training
- Mayo Clinic new research partnerships
- Science Foundation Arizona
- UA Medical School Phoenix Campus
- Legislature passed angel investor tax credit

What High Tech Industries are Likely to Have a Significant Economic Impact in the Future?

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Future AZ High Tech Industries

- Existing Industries
 - Electronics
 - Aerospace
- Emerging Industries
 - Bioindustries
 - Optics
 - Nanotechnologies
 - Environmental/Renewable/Sustainable Technologies

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Summary & Conclusion

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High Tech Industry is a Major Economic Driver in Arizona

- Major source of jobs
- Major generator state payrolls
- Offers high wages
- Offers potential employment growth opportunities
- Fosters global competitiveness

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Challenges for Arizona

- Arizona must make investments to compete with other states
 - Quality education and high skilled workforce
 - Facilities (science & technology parks, labs, clean rooms, wet rooms)
 - High tech incubators
 - Venture capital funds
 - University R&D / tech transfer / commercialization
 - Allow university equity position in high tech ventures