
Webster
UNIVERSITY
303.750.6665
MASTER OF SCIENCE
SPACE SYSTEMS OPERATIONS MANAGEMENT

Webster University

Main Campus – Webster Groves, St Louis

- 1915 – Founded by Sisters of Loretto – Denver Order
- 1924 – Changed to Webster College
- 1974 – Opened first Military Campus
- 1978 – Opened first International Campus
- 1983 – Changed to Webster University
- 1987 – Initiated Space Operations Degree

Accreditation/Membership:

- North Central Association (NCA)
- Service Members Opportunity Colleges (SOC)
- American Association for Higher Education (AAHE)
- Association of American Colleges and Universities (AAC&U)
- American Council on Education (ACE)
- Council for Adult and Experiential Learning (CAEL)
- Army FA-40 Program Advanced Credit
- National Space University - Evaluations

Webster University

3,680+ Faculty and Staff

100 Extended Campus locations World-wide
(Geneva, Vienna, Leiden, London, Bangkok, Shanghai, Bermuda)

20,000 Active Students World-wide

University Rankings:

- 1st in number of Graduate Business Students
- 1st in Minority MBA Graduates
- 1st in African-American Graduates
- 1st U.S. University to offer MBA in China
- 6th Highest in number of Hispanic Students
- 84 percent of Undergraduates Receive Financial Aid

Graduate Programs – Management Focused

1987 - MA in Space Systems Management

Average Age 30+

600+ SPSM Graduates


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Webster University
2004
Colorado Springs, Colorado
SPSM 6000 – Team 9
Capstone Research
Application

The Nations Space Priority

Requirement: Air/Space Operations Control

Control Center (NACC)

Colorado's Strategic Plan for the National Aerospace Control Center (NACC)

Webster University
Colorado Springs, Colorado
SPSM 6000 – Team 9

Overview

- Team Members
- Background of NACC
- Business Plan
- Economic Plan
- Legal Issues
- Workforce Benefits
- Other Benefits
- Recommendations

SPSM6000 Team 9 Members

James (JC) Markham

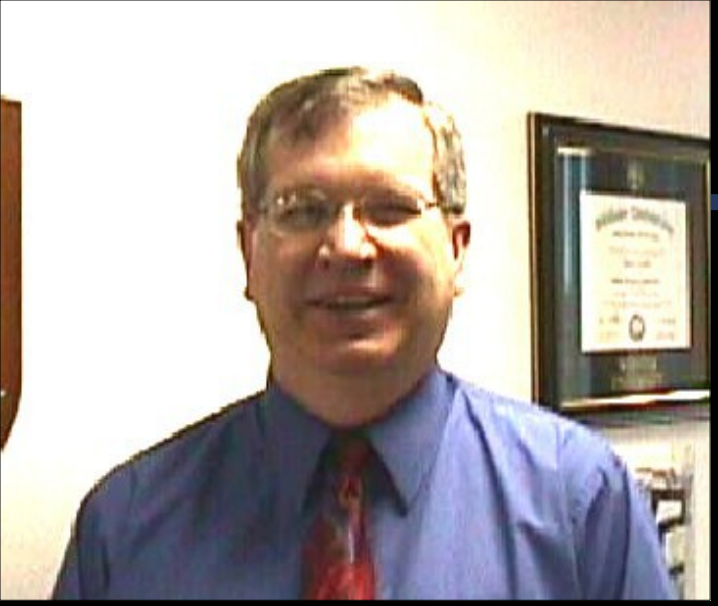
- Bachelor of Science - Management Information Systems - Newman University
- 23 years of USAF operational Command & Control experience - Managed Headquarters/Wing centers for the operational execution of aircraft and weapon systems - 11 stations: 3 countries & 8 states in 21 years - airlift, fighters, SIOP Tankers, and space missions systems
- Master of Science - Space Systems Operational Management, Webster University

William L. Guthrie III

- Bachelor of Science - Computer Science – University of Missouri-Columbia
- 12yrs Space Experience with USAF – Retired after 22 yrs
- Senior Systems Engineer for SI International
- Master of Science - Space Systems Operations Management, Webster University

Fernando Carreon

- Bachelor of Science - Occupational Education, Wayland Baptist University
- 2 SOPS GPS Modernization Analyst - GPS Payload Operations Officer
- 3 years experience in space operations, 12 years flightline operations
- Master of Science - Space Systems Operations Management, Webster University



Daryl Mann

- Bachelor of Science - Mathematics – Northwest Nazarene College
- 7 Years with Air Force – Last stationed Cheyenne Mountain AFB
- Resource Analyst for the NRO Operations Squadron, employed by Lockheed Martin
- Master of Science - Space Systems Operations Management, Webster University

Joseph A. DiPentino
Team Leader

- Bachelor of Science - Aviation Technology – Metropolitan State College – Denver, Colorado – ATV1 Commercial, Instrument, ASEL, AMEL, AGI - Professional Pilot and Ground Instructor
- 12 Years Broadband Engineering and Tech. 10 Years Civil service - legal system. Architectural Design, Screen/ Songwriting ©, Carpentry, Electrical, Plumbing, HVAC, Diagnostics and Automotive/Off Road Vehicle Mechanics
- Master of Science - Space Systems Operations Management, Webster University

NACC Mission

To provide and manage safe commercial space travel of all U.S. based commercial space vehicles launched into space or into near space orbit, while meeting all U.S. Federal Aviation Administration's (FAA) and Administrator for Commercial Space Transportation (AST) statutory requirements.

NACC Vision

- **To be the world leader in managing commercial space vehicles**
- **To develop safe processes to ensure safe space travel from the 22 Spaceports**
- **To utilize the abundance of Colorado space industry expertise to support FAA/AST requirements**

NACC Background

The NACC will provide a central commercial control facility to manage space vehicle launches from:

- **5 approved U.S. federal Spaceports**
- **4 approved commercial Spaceports**
- **13 proposed commercial Spaceports**

- **Colorado needs to designation as a Spaceport—only requires Governor signing a proclamation / declaration.**

NACC Background (cont)

- **Current void of control when air/space craft leaving/entering current FAA's area of control**
- **FAA/AST is expecting approximately 691 horizontal and vertical space launches per year by 2010**
- **FAA/AST (April 2004) just issued their first commercial manned license for a sub-orbital space flight.**

NACC Background (cont.)

"Recent Events"

March 2004, FAA/AST published the latest economic impact study on commercial space transportation - expect significant increases in:

- Public Space Travel
- Real-time Remote Sensing Application
- Broadband Data Services

NACC Background (cont.)

"Recent Events"

March 2004, US House of Representatives passed H.R. 3752—The Commercial Space Launch Amendments Act—designed to:

- **Encourage public space travel/tourism**
- **Encourage commercial vehicle development**
  - light-spacecraft to shuttle personnel and equipment

Colorado Strategy

To advocate the NACC to be located in Colorado

Colorado is:

- Centrally located
- Abundance of space industry resources
- Highly educated and experienced space workforce separating from the four military space support facilities (Peterson, Buckley, Schriever, and Cheyenne Mountain Air Force Bases) and university graduates

Business Plan

Recommend Business Strategy:

- Get Colorado on the NASA Spaceport Map
- Lobby the FAA/AST
- Utilize Colorado's space industry
- Develop a tax incentive plan for NACC contractors
- Use Colorado's highly technical space workforce

Business Plan (cont.)

Get Colorado on the NASA Spaceport Map

- Designation by proclamation from Colorado Governor

Lobby the FAA/AST

- Encourage Colorado's Space Industry to develop a consortium to bring business to Colorado

Utilize Colorado's Space Industry

- 90% of space revenues come from 8 companies (Boeing, Raytheon, Lockheed Martine, Northrop Grumman, Ball Aerospace, Echo Star, Computer Sciences Corp., Hughes Space and Communications)

Business Plan (cont.)

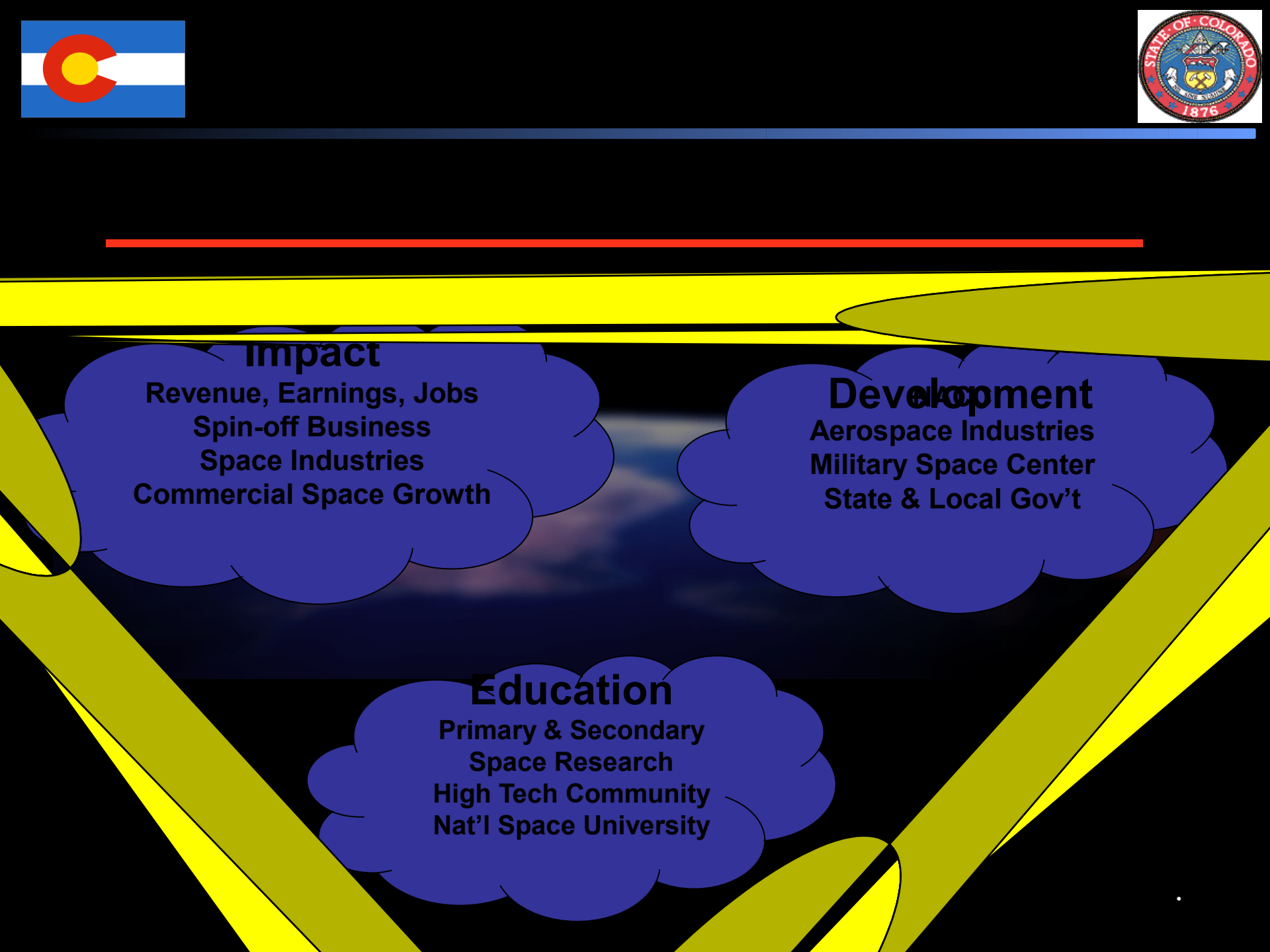
Develop a tax incentives plan for NACC contractors

- Incorporate Colorado's Enterprise- Zones

Use Colorado's highly technical space workforce

- Space programs at 14 universities within the state
- Separating operational space experienced military workforce

Economic Plan


Impact
Revenue, Earnings, Jobs
Spin-off Business
Space Industries
Commercial Space Growth
Development
Aerospace Industries
Military Space Center
State & Local Gov't
Education
Primary & Secondary
Space Research
High Tech Community
Nat'l Space University

Economic Plan (cont.)

- 8th in satellite comm. employ
- 8th in procuring NASA funds
- 10th in aerospace average wages
- 19th in total aerospace

3rd largest Space Economy

Space should be one of our Top 5 Major Industries

Economic Plan (cont.)

Ground Operations

Satellite Services

Launch Vehicles

Satellite Manufacturing

$4 - $5 Billion In Revenues Each Year

Local Goods and Services

- Materials
- Components
- Facilities
- Equipment
- Maintenance

Wages and Salaries

- Housing
- Transportation
- Education
- Arts
- Museums
- Restaurants
- Shopping
- Sports
- Community Service

Profits and Taxes

- Research and Development
- New Business
- Local Government

Photos from Lockheed Martin Photo Gallery

Berry-Helmlinger, Lyn, The Denver Business Journal, Why has Colorado taken the lead in space industry? January 2002. Retrieved 11/2/03 from http://Denver.bizjournals.com/Denver/stories/2002/01/21/focus2.html

Economic Plan (cont.)

Industry Group	*Economic Activity*	*Earnings ($000)*	*Jobs*
Communications	23,904,287	3,587,617	55,465
Electronic & other electronic eqp	19,407,938	4,739,384	79,487
Business Services	6,352,940	2,811,196	73,522
Real Estate	5,722,463	236,329	9,692
Hotel & lodging	3,506,159	1,251,642	38,285
Misc Services	2,380,062	783,694	33,206
Transportation	2,204,847	789,850	21,571
Construction	2,004,413	677,842	18,104
Eating & drinking	1,169,572	404,024	29,500

Economic Plan (cont.)

Develop Business Plan:

- Highlight Space Industry, High Technical Workforce, Space Consortium, and Tax Incentives
- Model after Denver's proposal for Boeing Headquarters
- Expand and improve the space economy in Colorado
- Space economy is a **key** part to Colorado's growth and future

Political and Legal Issues

Colorado will expect to adopt the necessary state legislation and laws that must conform in the Colorado Revised Statutes (C.R.S.) to those laws and regulations established by treaties and United States Codes (U.S.C.) directly related to the operation of the NACC.

The guidelines set forth by the FAA/AST that directly relate to the NACC main function of air to space launch, flight following, reentry, and traffic coordination management are as follows:

Political and Legal Issues (cont.)

For flights within the new National Airspace System (NAS), the methodology to meet these challenges will incorporate the following process for commercial space flight activity. The main requirements for those seeking access to space and the NAS are:

- U.N. Registration
- License Requirements
- Insurance Requirements

U.N. Registration

- Consultation is the first consideration and requirement of the licensing process
- The FAA/AST will provide guidance and schedule to meet requirements
- Registration takes place with the application and licensing process by the State department and the FAA.

Licensing Process

The Licensing process is handled by the FAA/AST Licensing and Safety division

- Consultation and Registration - FAA/AST
- Policy Review – FAA/AST
- Safety Review – FAA/AST
- Payload Review – AST/Designated U.S. Govt. Agencies – determined by payload
- Financial Review – FAA/AST, DOT
- Environmental and Compliance Monitoring – NEPA, FAA Officers

License Types

Types of licenses that will be required:

- **Launch Specific**
  - One or more launches of same class vehicle
  - Operations from single launch site
  - Expiration date is specified in license
- **Launch Operators License**
  - Single site with specified range of parameters
  - Same class vehicles and specified payloads
  - License is valid for a five year period

Insurance Requirements

Insurance requirements for licensed launch activities in the United States of America are covered by the regulations set forth in the following:

49 U.S.C. 70101–70119; 49 CFR 1.47

Definition:

The legal document that establishes liability for commercial space launch activities

Categories of Reference:

- **TITLE 49: TRANSPORTATION**
- **SUBTITLE: COMMERCIAL SPACE TRANSPORTATION**
- **CHAPTER 701: COMMERCIAL LAUNCH ACTIVITIES**

Insurance Requirements (cont.)

Third Party Casualty:

Not to exceed the lesser of:
$500 Million
Or
Maximum available on world market

Property Damages:

Not to exceed the lesser of:
$100 Million
Or Maximum available on world market

Colorado must address needs to prevent encroachment barriers to establish and meet spaceport criteria. i.e: Runway length minimums, overrun requirements, noise abatement, restrictions, local approach and departures, safety requirements and emergency procedures.

Future Considerations

The future is here and a Colorado NACC can become a reality if we continue to pursue with vigilance and perseverance from this vision to the first mission.

- Establish Spaceport Designation
- Lobby the FAA/AST
- Pursue NACC Funding
- Offer ideas to offset costs
- Tax credits to participants
- Develop liability legislation

Robust Technological Base

- Nation's #1 resource pool for high tech worker concentration as compared to total private sector employees
- Average Aerospace Engineer & Operations Tech Yearly Salary = $52,990 Hr=$25.48
- Ranked #2 in Nation for high tech education
- Significant resource pool of separating military members that hold large amounts of high tech experience and knowledge

-Jenik G. (2003, November 19), http://www.aiaanet.org/Common/Functions/PrintThisDoc.asp?F_id=19308

National Standing

Very competitive amongst nation states

- U.S. Department of Labor, Aerospace Engineers and Operations Technicians, 2002 Data
- Colorado above national average: hourly/annual wages

State	Hourly mean wage	Annual mean wage	Percent of State employment
Arizona	$27.78	$57,790	0.052%
New Mexico	$22.06	$45,880	0.033%
Colorado	*$25.86*	*$53,780*	*0.023%*
Maryland	$24.69	$51,350	0.023%
California	$27.66	$57,530	0.019%

National Standing (cont.)

Metropolitan Profile

- Tied for 2nd in Nation for Concentration of Percent Employed

High Tech Workforce

Military Retirees/Separating Members exposure to Space Systems & Results

- **Schriever AFB, Colorado Springs**
  - Space Operations: GPS, Command & Control, Warning, Surveillance, etc.
  - Estimated Annual Dollars Value of Jobs Created--$62,077,155
- **Buckley AFB, Aurora**
  - Estimated Annual Dollars to Value of Jobs Created--$587,000,000

High Tech Workforce (cont.)

Military Retirees/Separating Members exposure to Space Systems & Results

- **Peterson Complex:** Estimated Annual Dollars Value of Jobs Created--$140,677,740
  - **Peterson AFB, Colorado Springs**
    - Missile Warning & Space Control, Aviation
  - **Cheyenne Mountain AFS, Colorado Springs**
    - North American Air Defense, Aerospace Operations

High Tech Workforce (cont.)

Military Construction Appropriations for Fiscal Year 2003		

High Tech Workforce (cont.)

Aerospace Commission's View

- **Visit/Assessed Local and Abroad facilities**
- **Findings:**
  - Consolidations, Reduced Research and Development Investments by Industry & Gov., Record losses by Commercial Air Carriers, Heightened Foreign Competition have eroded Aerospace Industry to sustain record Achievements
- **Conclusion:**
  - U.S. Govt must invest into aerospace research
  - It must increase investment in math and science education
  - Webster is focusing efforts to secure scholarship $ for minorities and K-12 teacher education

High Tech Education

- **National Standing**
  - #2 in Nation for High Tech Education
  - Study based on science and engineering graduate degrees, --*Milken Institute*
- **High Tech Schools**
  - Directory of Higher Education Schools in Colorado
    - Higher Education Directory, Colorado Commission on Higher Education, March 25, 2004

High Tech Education (cont.)

Network, Information & Space Security Center (NISSC) of University of Colorado, Colorado Springs (UCCS)

- Awarded $2M for Homeland Security Center by DOD
- NISSC will work in collaboration with Industry, Gov. and other academic entities to share information
- Can be utilized to support NACC security issues

-Fitz F. (2003, April 10), ttp://newmedia.colorado.edu/silverandgold/messages/1778.html

Quality of Life Incentives

National Policy Research Council in their "America's Best Cities and States: The Annual Gold Guide to Leading Rankings" issued in 2003, for 11 different categories

- 1st Denver
- 2nd Colorado

Quality of Life Rankings

Morgan Quitno's *State Rankings 2003*

- 2nd lowest per capita energy expenditures
- 2nd in number of households with computers
- 4th most taxpayer friendly state (Taxpayer Foundation)
- 6th in percentage of sunny days
- 9th in per capita income
- 11th highest median household income

Other Rankings

- 2nd in population with college degree
  - according to 2003 U.S. Census Bureau statistics
- 2nd most educated work force
  - according to Progressive Policy Institute's State New Economy Index dated 2003
- 30th nationally in crimes per 100,000 population
  - according to Morgan Quitno's State Rankings 2002
- 40th in per capita energy consumption
  - according to Colorado Office of Economic Development and International Trade dated Sept. 2003

Culture

Cultural center of the Rocky Mountains

- Denver Performing Arts Complex
  - Seven theatres and concert hall seats 9,300 people
- Boettcher Concert Hall
  - Home of Colorado Symphony
- Music festivals in Vail, Telluride, Aspen, Breckenridge
- Denver Art Museum
- Colorado Springs Fine Arts Center
- Sangre de Christo Fine Arts Center in Pueblo

Outdoor Activities

National Parks and Monuments

- Rocky Mountain National Park
- Mesa Verde National Park
- The Great Sand Dunes National Monument
- Florissant Fossil Beds National Monument

Other Outdoor Recreation Opportunities

- Rock and Ice Climbing
- Hunting & Fishing
- Wildlife & Nature Viewing
- Mountain Biking and 4-Wheeling
- Equestrian Activities
- Hang gliding, Golf and Tennis

Benefits to Colorado

Hypothetically, if $50 million contracted

- Colorado will see $100 – 150 million in economic revenue.

Benefits to Colorado (cont.)

Spending in form of:

- Direct
  - Construction costs
  - Operations jobs and supplies
  - Maintenance workers and facilities
- Indirect
  - Subsidiaries companies
  - Spending of Workers in construction, operations and Maintenance
  - Taxes of all workers
- Induced
  - Entertainment
  - Businesses which support workers
  - Taxes of all businesses involved with supporting workers

Recommendations

- **Designate Colorado as a Spaceport State**
- **Develop a Space Business Plan**
- **Lobby FAA/AST and Federal Government**
- **Develop Space Industry Consortium**

References

References: Microsoft Word Document