C-SMARTS

Colorado Students and Mentors Applying Research and Technology in Space

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19th Annual AIAA/USU Conference on Small Satellites

Colorado Space Grant Consortium
Overview:

- Premise
- Concept
- Participants
- Program
- Results
- Future
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Space in Colorado

- $9.7 Billion Industry
- Focused in Denver/Boulder Colorado Springs Area
- 142,500 Coloradoans
- “Graying of the workforce”
- 54% over 45, 1/3 of which may retire in 5 years
Premise

How do we attract students to this industry?

How do we prepare students with real world experience?

How can companies do to help?
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- Connect Colorado college students with engineers and scientists from Colorado aerospace companies
**Concept:**

- Provide a hands-on learning and real-world research experience while providing practical knowledge.
**Program:**

Learn the basics of atmospheric and space sciences, space exploration, spacecraft design, rocketry, and orbits.

- Life Cycle of a Spacecraft Project
- Design and Analysis
- Earth to Mars:
  - Initial Orbit
  - Final Orbit
  - Earth Orbit
  - Mars Orbit
  - Transfer Orbit
- Past Student Experiments:
  - Atmospheric radiation levels
  - Solar cell efficiency
  - Atmospheric soundings
  - Video imaging
  - High altitude effects on roaches
  - Digital sound recording of upper atmosphere
  - Temperature studies
**Program:**

**Hear** about the current research in space through lectures from “real-life” engineers and scientists from aerospace companies and research centers.
Program:

Launch a mini-satellite on a high altitude balloon that is designed and built by a team of students.
Concept:

- Produce qualified engineers and scientists for future employment with these companies
Concept:

- Grant from the Colorado Institute of Technology

- Colorado Students and Mentors Applying Research and Technology in Space (C-SMARTS) was enabled
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Participants:

Engineers and Scientists:
Participants:

Companies:
- Lockheed Martin
- Ball Aerospace
- General Dynamics
- Starsys Research
- MicroSat Systems
- Design_Net Engineering
- Composite Technology Development (CTD)
- Broad Reach Engineering
- Edge of Space Sciences (EOSS)
- IOSTAR
- Instar Engineering and Consulting
- Center for Astrophysics and Space Astronomy (CASA)
- Center for the Study of Earth from Space (CSES)
- Jet Propulsion Lab
Participants:

Students: (all backgrounds allowed)
Participants:

Mesa State College (Grand Junction)

University of Colorado at Boulder

Fort Lewis College (Durango)

Colorado State University Pueblo
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Program:

- High quality and portable course
  > Interactive DVD for each 40 minute lecture

- Handbook & Interactive website

- Local facilitator each campus

- Spring 2005
Program:

- Program clip (DVD)
- Program clip (oops)
Overview:

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Results:

- 126 students participated
- 23 BalloonSats launched to edge of space
- Launch Video
Results:

- Portable course on 43 DVDs

- Website complete
Results:

- Processing student feedback
- Trends
- Students at 3 of the 4 schools had little difficulty with DVD format
Results:

- C-SMARTS effective for students and industry
- Shape the interests of students
- Access to tomorrow’s engineers and scientists today
Overview:

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Future:

- Several new colleges interested
- Several colleges outside Colorado interested
- Several high schools interested
- Second run of C-SMARTS in Spring 2006
- Could be tailored for new employee orientation
Questions?