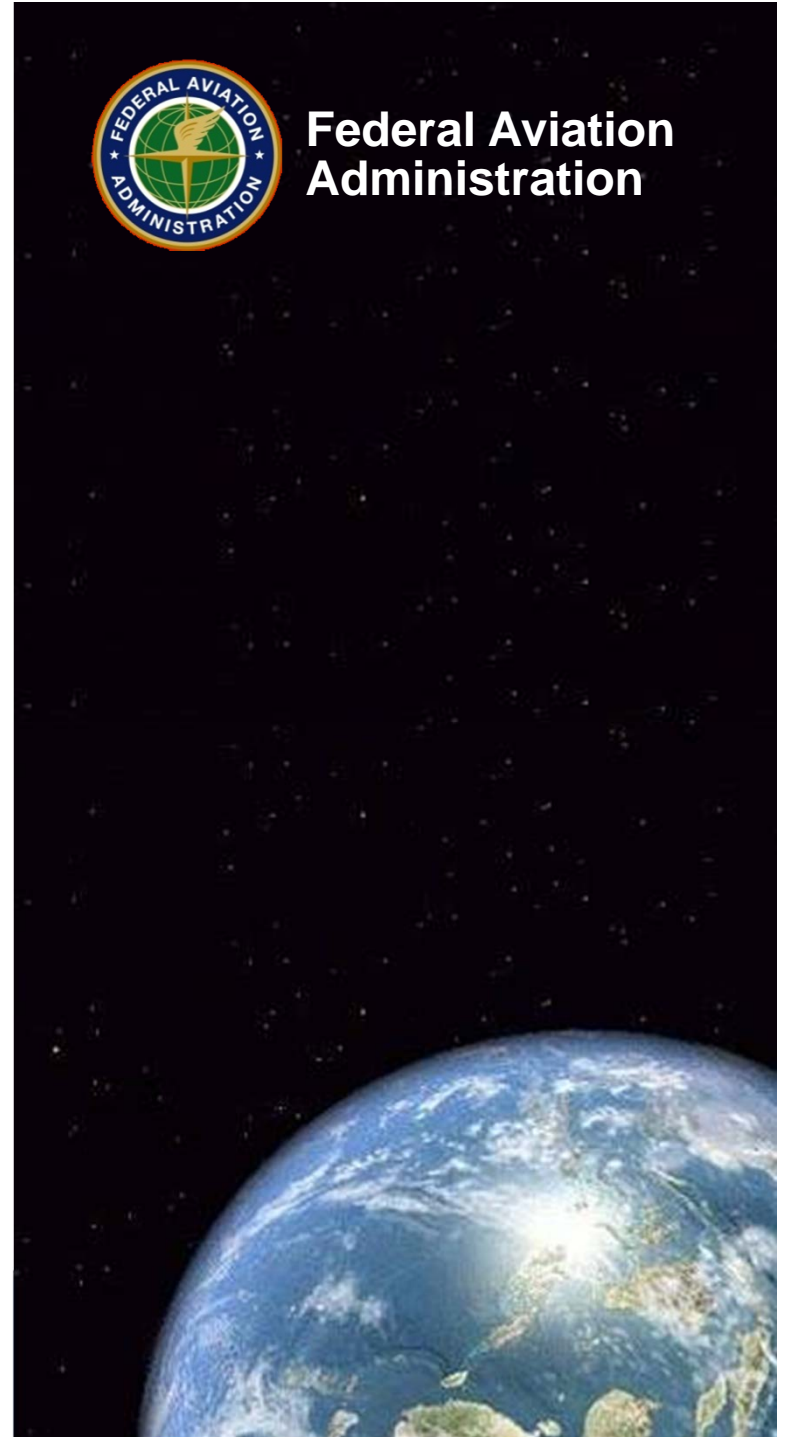


Introduction to the FAA Center of Excellence for Commercial Space Transportation

*November 9, 2011
Ken Davidian
AST Director of Research*



**Federal Aviation
Administration**



AGENDA

- Background
 - AST
 - COE
 - COE CST
- Member Universities
- Management Structure
- Research Areas & Tasks



AST's Dual Mission Goals

Title 51 US Code Subtitle V, Ch. 509

- Regulate the commercial space transportation industry, only to the extent necessary, to ensure compliance with international obligations of the United States and **to protect the public** health and safety, safety of property, and national security and foreign policy interest of the United States
- **Encourage, facilitate, and promote** commercial space launches and re-entries by the private sector

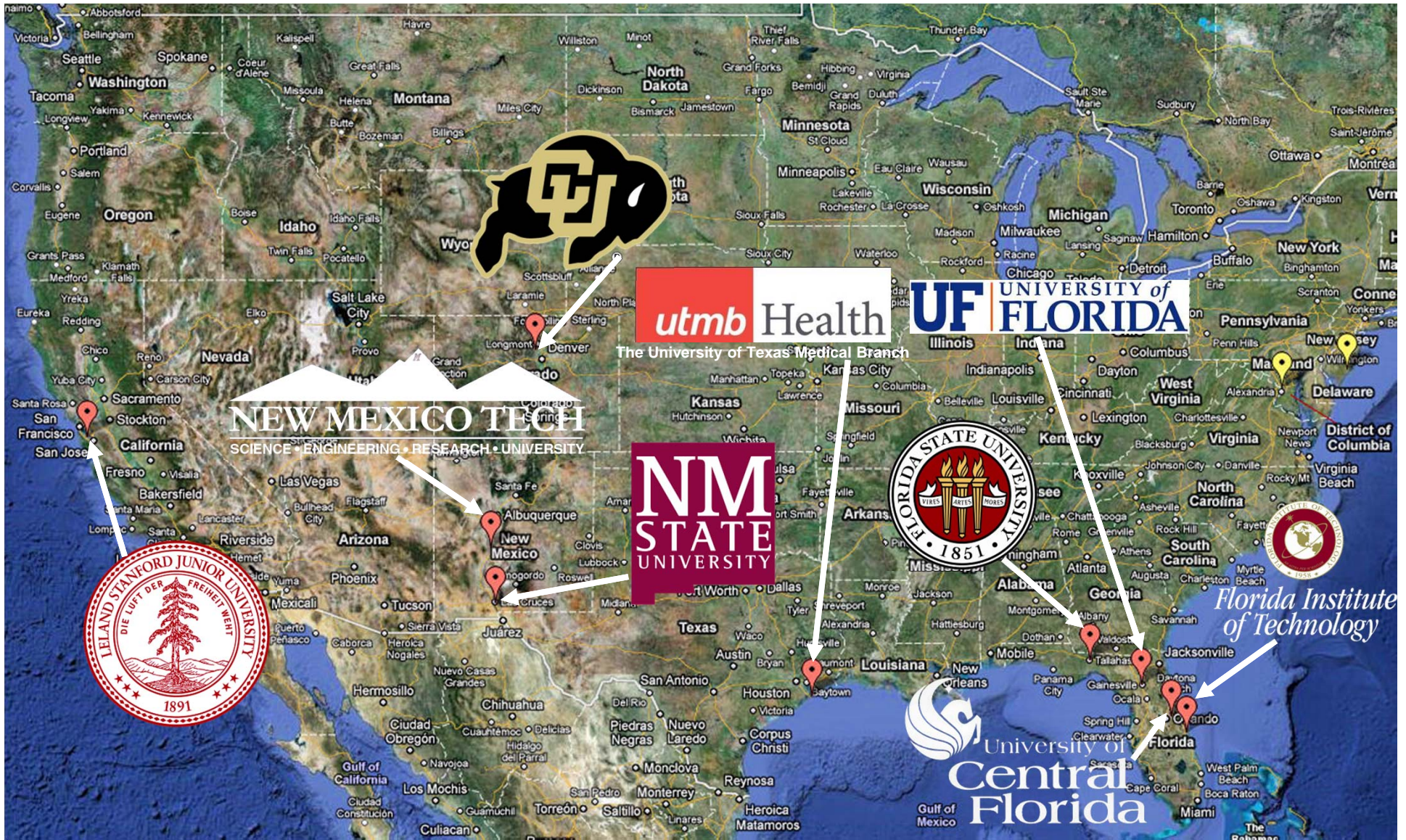


Center of Excellence for Commercial Space Transportation

- **Origins:** Omnibus Budget Reconciliation Act of 1990, Public Law 101-508, Title IX, Aviation Safety and Capacity Expansion Act.
- **What & Why:** A 10-year partnership of academia, industry, and government to create a world-class consortium that will address current and future challenges for commercial space transportation
- **3 Goals:** Research – Training – Outreach
- **1:1 Matching Requirement** – For All USG Funds
- **How Much (FAA Funding):**
 - Year 1, 2: \$2M, \$500K
 - Years 3-10: “Committed” to \$1M



9 COE CST Member Universities



COE CST Presentation at COE CST ATM1
November 9, 2011



Federal Aviation
Administration

Member University Strengths

FIT aerospace & space-related engineering, science, space traffic management & launch operations, vehicle & payload analysis and design, thermal systems & propulsion.

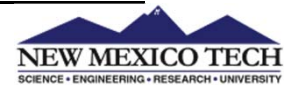


Florida Institute of Technology



FSU thermal management, vehicle aerodynamics & controls, sensors, actuators, system health monitoring, high performance simulations.

NMT structural health management, rocket engine test facility, explosives, induced lightning, fast tracking telescope.



NMSU suborbital investigations, scientific ballooning, nano-satellite development.

SU optimization & autonomous operation of complex systems, strategic research planning.



UCF thermal protection system, cryogenic systems & materials, composites, sensors, actuators, GNC.

CU spacecraft life support & habitat design, human factors engineering analysis, payload experiment integration, space environment, orbital mechanics.

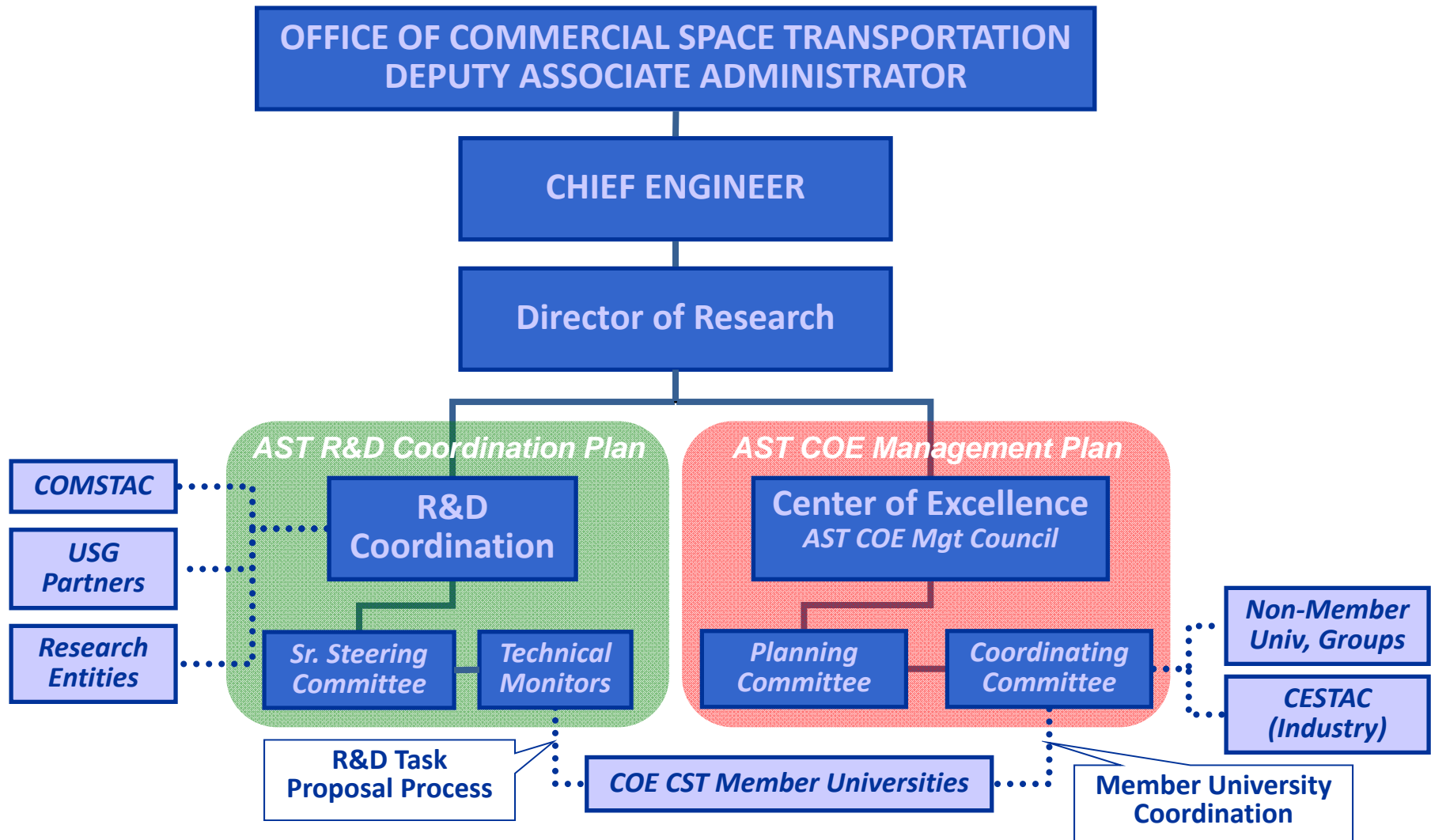


UF research in space systems, MEMS, computational sciences, structural dynamics, controls, gas dynamics, propulsion.

UTMB medical support & human spaceflight physiological research, preparation of passengers & crew for suborbital space flights.



AST R&D Management Structure



Research Areas & Dependencies

1. Space Traffic Management & Operations

1.1 Orbital

1.2 Suborbital

1.3 NAS Integration

1.4 Spaceport Operations

1.5 Integrated Air/Space
Traffic Management

3. Human Spaceflight

3.1 Aerospace Phys &
Medicine

3.2 Personnel Training

3.3 ECLSS

3.4 Habitability & Human
Factors

3.5 Human Rating

2. Space Transportation Ops, Technologies & Payloads

2.1 Ground System &
Ops Safety Techs

2.2 Vehicle Safety
Analyses

2.3 Vehicle Safety
Systems & Techs

2.4 Payload Safety

2.5 Vehicle Ops Safety

4. Space Transportation Industry Viability

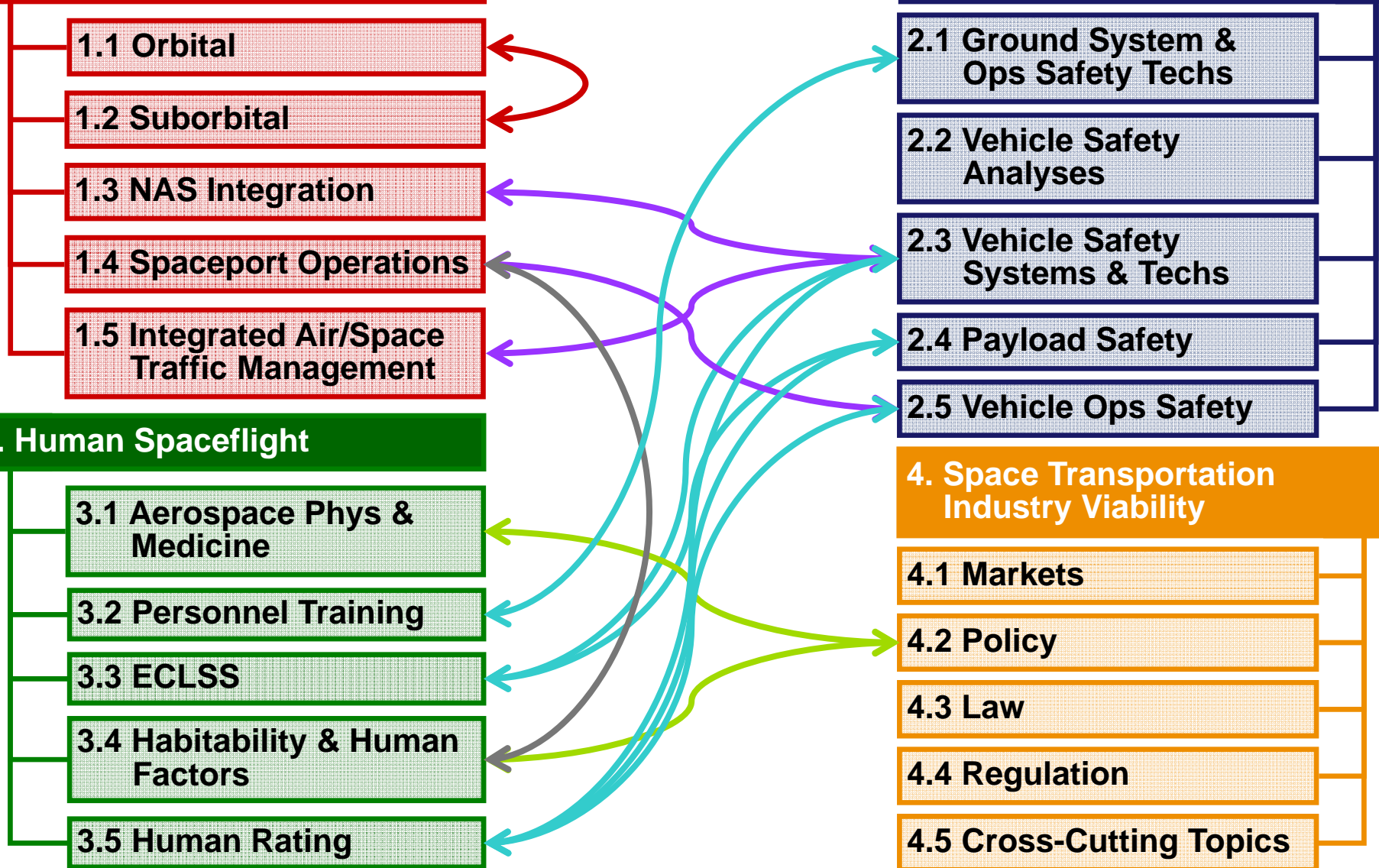
4.1 Markets

4.2 Policy

4.3 Law

4.4 Regulation

4.5 Cross-Cutting Topics



COE CST Research Tasks

| Research Task Name | RA | PI Name (University) | Stud |
|--|-----|---|------|
| Space Environment MMOD Modeling and Prediction | 1.1 | Close (SU), Fuller-Rowell (CU) | 1 |
| Space Situational Awareness | 1.1 | Scheeres (CU) | 1 |
| Unified 4-Dimensional Trajectory Analysis | 1.3 | Alonso (SU) | 1 |
| Space Operational Framework | 1.4 | Hynes (NMSU) | 0 |
| Air and Space Traffic Considerations for CST | 1.5 | Villaire (FIT) | 1 |
| Master's Launch and On-Orbit Operations Laboratory | 2.1 | Born (CU) | 1 |
| Multi-Disciplinary Analysis of Safety Metrics | 2.2 | Alonso (SU) | 1 |
| Flight Software Validation & Verification for Safety | 2.2 | Alonso (SU) | 0 |
| Magneto-Elastic Sensing for Struct Health Monitoring | 2.3 | Zagrai & Ostergren (NMT) | 1 |
| High Temperature Pressure Transducers | 2.3 | Sheplak (UF), Oats (FSU) | 2 |
| Autonomous Rendezvous and Docking | 2.3 | Fitz-Coy (UF), Collins (FSU), Rock (SU), Axelrad (CU) | 4 |
| Ultra High Temperature Composites | 2.3 | Gou & Kapat (UCF) | 2 |
| Wearable Biomedical Monitoring Equipment | 3.1 | Jennings (UTMB) | 1 |
| Physiological DB Definition and Design | 3.1 | Vanderploeg (UTMB) | 1 |
| Comm'l Suborbital & Orbital Design Ref Missions | 3.1 | Vanderploeg (UTMB) | 1 |
| Additional NASTAR Centrifuge Testing | 3.3 | Vanderploeg (UTMB) | 1 |
| Human Rating of Commercial Spacecraft | 3.4 | Klaus (CU) | 1 |
| Crew and HSP Medical Stds | 3.5 | Jennings (UTMB) | 1 |
| Role of COE CST in EFP | 4.5 | Hubbard (SU), Born (CU) | 1 |



FAQ: How Does One Get Involved?

A: Talk to a COE CST POC.

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| Jim Vanderploeg | 409-747-5357 | jmvander@utmb.edu |



Conclusion

- COE CST Year 1 Milestones – Coming Soon...
 - Year 1 Annual Report
 - Year 1 Evaluation
- Recent and Coming COE CST Events
 - 26-27 October 2011: ESIL-01 Workshop, Boulder, CO.
 - 26-27 March 2012: ESIL-02, Greenbelt MD.
 - April 2012: COE CST Year 2 Mtg 1, Tallahassee, FL.
- Next Steps
- For more information...

www.coe-cst.org

