

SPACE TRAFFIC MANAGEMENT: ROADMAP TO THE STARS



NextGen Test Bed Integrating STM into the Domestic/International Airspace
Wade Lester, Florida NextGen Test Bed



STM and Surface Transportation: Operating Concepts for Commercial Spaceports
Jim Ball, Spaceport Strategies



Integration of Aerospace Operations into the Global Air Traffic Management System
Martin Griffin, Eurocontrol



Future Commercial Scheduling and Resource Allocations at Cape Canaveral Spaceport
Linsley Pietsch, ERAU Alumna, Space Florida



Integrating Reusable Vehicles and Transportation Services into the Florida Spaceport System
Nicholas Carlstron, ERAU



Challenges and Opportunities Related to Landing the Dream Chaser® Reusable Space Vehicle at a Public-Use Airport • *Christopher Allison, Sierra Nevada Corp. Space Systems; Brian Gulliver, Spaceport Development*



Kennedy Space Center Transformed and Transforming
Scott Colleredo, NASA KSC



Commercial Space Transportation and Air Traffic Insertion – SESAR Requirements and European Perspective • *Dirk-Roger Schmitt, DLR*



Challenges for a South Texas Spaceport
Edward Ellegood, FLORIDA SPACErPORT; and Wayne Eleazer



Flight Test of Communications on-board Suborbital RLV and High Altitude Balloon
M. Brian Barnett, Satwest



Chicken in Space: Developing Standards for Right-of-Way in Orbit
Nathan Johnson, University of Nebraska College of Law



Patch or Rebuild: Multi-Agency Regime vs. Single-Agency Regime within US Domestic STM Regulation • *Susan Wilshire, McGill Universtiy*



Where is Space?
Bhayva Lai & Emily Nightingale, Science & Technology Policy Institute



International Regime for STM – How to Fix the Current International Regulations
Yu Takeuchi, McGill University/JAXA



International Civil Aviation Organization Role in STM
Lt. Col. Stephen Hunter



Current Icing Potential (CIP) Product to Predict Observed Lightning in the Vicinity of U.S. Spaceports • *Robert Haley, ERAU*



Weather Delays on Space Launch Operations and Impact on Launch Site Capacity
Michael Maier, PAEin



Launch from Cape Canaveral Air Force Station and NASA Kennedy Space Center
William Roeder, 45th Weather Squadron, USAF; Lisa Huddleston, KSC; William H. Bauman III, Applied Meteorology Unit, ENSCO, Inc.; and Kelly Doser, 45th Weather Squadron, USAF



Challenges Associated with Space Weather Analysis and Prediction
John Lanicci, ERAU



Extreme Rainfall Frequencies over Kennedy Space Center Complex
Adam Schnapp and John Lanicci, ERAU



The History of Space Debris
Loretta Hall, Author



Small Satellites and Liability
George Anthony Long, Legal Parallax LLC



U.S. Private On-orbit Space Situational Awareness Systems and Services
Michael Mineiro, Science & Technology Policy Institute



Orbital Debris Research and Management
Marshall Kaplan, Center for Orbital Debris Education and Research (CODER)

Air & Space Traffic Integration: Operational Perspective

Moderator: **Mr. Dan Murray**, FAA

Air & Space Traffic Integration: Initiatives

Moderator: **Mr. Oscar Garcia**, Interflight Global

Air & Space Traffic Integration: Legal & Policy Considerations

Moderator: **Dr. Michael Mineiro**, Science & Technology Policy Institute

Space Weather

Moderator: **Dr. John Olivero**, Embry-Riddle Aeronautical University

Space Situational Awareness

Moderator: **Dr. Thomas Lovell**, USAF Astrodynamics/GN&C Team

IMMEDIATE

- 60,000 ft. – LEO?
 - Who
 - What
 - When
- ABV FL600 needs to be resolved
- “Regulatory traffic lanes”
 - Where does jurisdiction originate for controlling all the various transportation conflicts?
 - i.e. maritime, highway, train
- Continue development of aircraft hazard analysis GAPS

IMMEDIATE

- How do we develop/encourage global SWIM capability?
- ABV FL600 needs to be resolved
- International operations of missions
- Is there a community of practice for spaceports?
 - Should there be?

IMMEDIATE

- Incorporate Lieutenant Colonel Hunter’s last 2 slides in Graphical Road Map
- Who needs/wants clearer definitions?!
- Presentation on space definitions!
- Make the decision to “get on with it”
- Clearer terms
- Can we leverage insurance companies to assist industry in establishing clear definitions?

IMMEDIATE

- None

IMMEDIATE

- Collaboration with a (research) university
 - Overlap debris
 - STM

MODERATE

- Include air transport “known: technology into spaceflight
- ERAU-CSO curriculum to incorporate more training activities
 - Centrifuge, Waypoint 2 Space, NASTAR

MODERATE

- Encourage FAA/AST equivalents worldwide
- Include air transport associations and lobby groups in dialogue
- Provide lessons learned from Vandenberg scheduled de-confliction
- Refine technologies
- Keep track of space weather at spaceports

MODERATE

- Where is:
 - Space
 - Air space
 - Interstitial zone space
- Better definitions and rules of “right of way”

MODERATE

- None

MODERATE

- Is there a business case for space debris cleanup?!
- Better collision predictors
- Catalog of debris and charge the transferee to put name on debris

LONG-TERM

- Invite industry, federal and state agencies to conference
- Invite legislators and their staff to all presentations and discussions
- Space vehicle or UAV? Definitions!!

LONG-TERM

- Distinguish:
 - Space exploration of deep space
 - LEO/GEO
 - Suborbital

LONG-TERM

- Need for international management structure
- What happens if the bingo field is outside the country of take off?
- United States on orbit conundrum

LONG-TERM

- What is the engineering cost to protect against weather?
- Does insurance care to broadcast weather for missions?
- Space weather services for “horizontal launch” spaceport needs addressing!

LONG-TERM

- Responsible government going for its own pieces
- Active debris removal?!
- Vacate debris field
- Space traffic management of “security” is paramount!
 - It deserves a panel!