Commercial Space Transportation

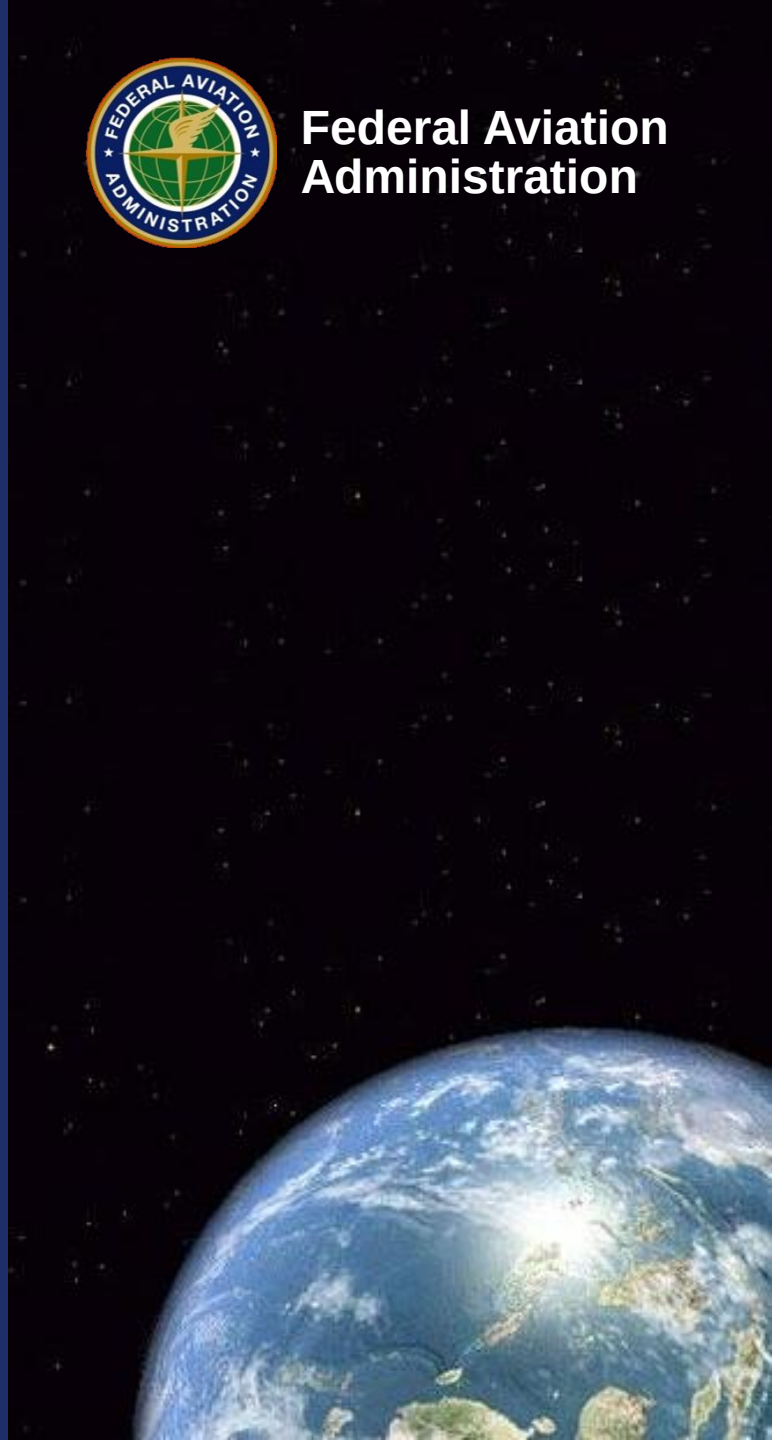
Federal Aviation Administration

COMSTAC-STANDARDS WORKING GROUP (SWG)

APRIL 1ST, 2015

OBSERVATIONS, FINDINGS AND RECOMMENDATIONS (OFR'S)

Chair: Oscar S. Garcia
Vice-Chair: Livingston Holder



Agenda

1. Standards Working Group Intro and Rationale (Observation)
2. Industry Consensus Standards

    1) Process (Finding)
    2) Status Update- First Seven Standards (Finding)
    3) Industry-FAA/AST collaboration (Recommendation)

3. New Business-Next Steps

SWG Intro and Rationale

- Formed at COMSTAC September17th , 2014
- Chair: Oscar Garcia, Vice-Chair: Livingston Holder

- SWG to enable COMSTAC's on-going dialogue with FAA/AST regarding Commercial Spaceflight Industry Consensus Standards (Human spaceflight is main area of focus initially):

1. Prioritization rationale and vetted lists (first 7, Sep 2014)
2. Development, drafting, ratification and adoption processes

- SWG main focus is on US Standards and cross works with ISPWG for international standards issues and opportunities

SWG Intro and Rationale

•SWG industry standards development areas:

1. Human Spaceflight Occupant Safety Standards
2. Spaceports
3. Airspace Integration

• SWG held two working teleconferences (Dec, 2014-Feb, 2015)

• SWG Chair Moderated Industry Standards Panel FAA/AST Conference Feb, 2014

- •Panelists were COMSTAC Members and SWG Participants
- •Industry "bandwidth" to produce new standards is a challenge

•Observation : "FAA AST Conference Standards Panel was helpful and valuable to industry stakeholders"

SWG Intro and Rationale

Finding: “FAA AST Conference Standards Panel was helpful and valuable to industry stakeholders”

Industry Consensus Standards Process

Industry prioritization rationale: **safety first, then,** functionality, innovation and relevance to industry's realities, experience and maturity

- Industry-CSF Consensus Standards Process:

1.	PRIORITIZE-LIST	**INDUSTRY- FAA/AST COLLABORATION TBD**
2.	APPROVE	CSF
3.	DEVELOP-DRAFT	**CSF, AIAA, SAE (TBD: AIA, ASTM), FAA/ASTTBD**
4.	RATIFY	CSF
5.	ADOPT	**CSF- FAA/AST COLLABORATION TBD**

Industry Consensus Standards Process

- **Finding “Industry benefits from rigorous prioritization and subsequent selection and adoption of consensus standards**

Industry Consensus Standards Status

- **Finding: SWG reports the status of industry's first 7 prioritized standards as follows:**

1. Risk Communications- Completed-Ratification May 2015
2. Propellant Handling- Completed
3. Hazardous Test Notification- Completed
4. Crew Imparted Loads- Development-Draft
5. Occupants Restraints and Acceleration Support- Draft
6. Breathable Atmosphere-Prioritized-Listed (FAA/AST/CAMI?)
7. Landing Gear-Prioritized-Listed

Industry Consensus Standards Status

- **Detailed Status first 7 prioritized standards as follows (handout):**

STANDARD	DOMAIN	FAA/AST -COE REC PRACTICES	DEVELPER-DRAFT	STATUS	EST COMPLETION
1. RISK COMMJNICATION	HUMAN SAFETY (ORBITAL AND SUBORBITAL)	AS PER FAA/AST 460	CSF	4 DRAFTED-PENDING CSF MEMBERS RATIFICTION	MAY, 2015
2. PROPELLANT HANDLING	SPACEPORTS	AIRFIELD AND OPERATIONS GROUND SERVICES	CSF	3 DEVELOPMENT-DRAFT	2015
3. HAZARDOUS TEST NOTIFICATION	SPACEPORTS (MIXED USE)	AIRFIELD AND OPERATIONS EMERGENCY RESPONSE	CSF	3 DEVELOPMENT-DRAFT	2015
4. CREW IMPARTED LOADS	HUMAN SAFETY (SUBORBITAL)	1.4 HUMAN VEHICLE INTEGRATION 1.4.1 PHYSICAL CONSIDERATIONS	CSF/AIAA	3 DEVELOPMENT-DRAFT	TBD
5. OCCUPANT RESTRAINT AND ACCELERATION SUPPORT	HUMAN SAFETY (SUBORBITAL)	HUMAN VEHICLE INTEGRATION 1.4.1 PHYSICAL CONSIDERATIONS	CSF/SAE	2 APPROVAL	TBD
6. LANDING GEAR	HUMAN SAFETY (SUBORBITAL)	N/A	CSF	1 PRIORITIZED-LISTED	TBD
7. BREATHABLE ATMOSPHERE	HUMAN SAFETY (ORBITAL AND SUBORBITAL)	1.0 DESIGN 1.1. HUMAN NEEDS AND ACCOMODATION 1.1.1 ATMOSPHERIC CONDITIONS	CSF/FAA CAMI-AST COLLABORATION TBD	1 PRIORITIZED-LISTED	TBD

Industry Consensus Standards Collaboration

- **Recommendation: " Industry and SWG recommends to COMSTAC to meet from time to time with FAA/AST to jointly discuss standards prioritization, selection, rationale, drafting, timing and adoption. Consensus standards benefit industry-wide activities including but not limited to, the recommended practice areas for human space flight occupant safety"**

- Possible frequency is 2 SWG/FAA/AST meetings/conf calls between COMSTAC's (i.e. June and December)

Industry Consensus Standards Collaboration

- Industry and FAA/AST possible collaboration:
  - Specific Prioritized Standards Development:
    - Breathable Atmosphere- As per status chart item 7
      - Industry/CSF-FAA/AST-CAMI collaboration

  - Standards inventories and maps **to populate recommended practices** (i.e. human occupant safety future versions
    - Possible AST-COE support (drafting phase)

Industry Consensus Standards Collaboration

- Jointly prioritize, search for and identify required standards:
  - Existing "as is" — AS9000 Series
  - Existing with modifications — NASA human rating
  - New standards — CSF List (7)
- Explore FAA successful industry consensus standardization models:
  - ASTM-GAMA and FAA LSA Aircraft
  - Flight Training and Testing (FITS)

Industry Consensus Standards Collaboration

- Explore CSF as FAA/AST partnership as consensus standardization “hub” (outside of COMSTAC)
  - Hub, to use expert organizations (AIA, AIAA, SAE, ASTM, AST/COE, etc) to draft, catalogue and publish standards
- Industry and FAA/AST to jointly **define recommended practices** by “grouping” joint consensus standards in prioritized areas, such as:
    - Medical Limits for participants
    - Ionizing radiations
    - Integration of Occupant and Public Safety
    - Manufacturing

New Business- Next Steps

- TBD at COMSTAC