

COE CST Research Roadmap 2.0



Task SU-193: Professor Scott Hubbard¹, Jonah Zimmerman¹ and Andrew Ow²

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Charter

Update the original research roadmap and build on it in order to increase its usefulness to the community and to the FAA COE CST.

There are three main components:

- 1. Revisit** the 2011 research roadmap and update as necessary
- 2. Identify and differentiate** short term (1-3 years), medium term (3-6 years) and far term (>6 years) research tasks
- 3. Define** research priorities to the extent possible

Roadmap 1.0 – Previous Roadmapping Effort and Current Motivation

Purpose: Direct the COE's research program towards achieving its goal of identifying solutions for existing and anticipated commercial space transportation problems. These solutions will in turn inform research investment and regulations, increase safety, and facilitate the CST industry.

Methods: Input from 100+ CST stakeholders was captured at two workshops: spring 2011 at Stanford University and fall 2011 at LM Global Vision Center in Washington DC. This was then reformatted into the research roadmap report and presented to the community.

Problems: The bulk of information in the report is now 4 years old, and must be updated to reflect changes in the CST industry landscape. The roadmap would have more utility if it identified timescales associated with research priorities.



Roadmap 2.0 Workshop Format

Number and Length: 5 workshops that focus on single research themes as shown below will be held across the country, each 1 – 2 days long.

Hosts and Participants: Lead Theme PIs were chosen that are domain experts. Participants from non-COE academic, government and industry experts are being recruited.

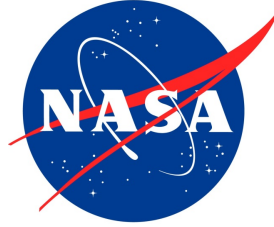
Virtual Collaboration: In order to facilitate collaboration with as many people as possible, videoconferencing technology will be leveraged to allow remote participation at all workshops. We will use the Adobe Connect software package.



Deliverables: The host PIs will compile and distill the input from workshop participants for delivery to the Stanford Research Roadmapping team. A summary report by the overall Roadmap 2.0 lead (Hubbard) will be presented to the FAA by NLT March, 2015.

People and Places

Theme: 1a –
Space Traffic
Management



Lead PI: Juan Alonso

Location: Stanford and NASA Ames

Theme:
1b – Spaceports



Lead PI: Pat Hynes

Location: New Mexico State
University

Theme:
2 – Vehicle
Technology



Lead PI: Farrukh
Alvi

Location: Florida
State University

utmb Health

Theme:
3 – Human Spaceflight

Lead PI: Jim
Vanderploeg

Location: University
of Texas Medical
Branch at Galveston

LOCKHEED MARTIN



Theme:
4 – Industry
Viability



Lead PI: Tristan
Fiedler

Location: Lockheed
Martin Global Vision
Center

Theme 3 Workshop Recap – Broad Participation

Spaceflight Companies

- Virgin Galactic
- SpaceX
- Blue Origin

Spaceflight Support

- Wyle
- SAIC
- NASTAR Center
- QinetiQ

Spaceflight Consultants

- Henry Lupa, MD
- Richard Jennings, MD
- Michael Bungo, MD
- Kevin Fong, MD

COE PIs

- James Vanderploeg, MD
- Tarah Castleberry, DO
- Johnene Vardiman
- David Klaus
- Scott Hubbard
- Farrukh Alvi

Government


- NASA JSC
- FAA AST
- FAA CAMI

Academia

- University of Texas Medical Branch
- Baylor College of Medicine - Center for Space Medicine
- Wright State University
- University of Colorado Boulder
- Mayo Clinic - Rochester and Scottsdale

Theme 3 Workshop Recap – Virtual Experience

Video (4)




UTMB Galveston

Jared Campbell

Bob Haddon

1.AGENDA.pdf



FAA Center of Excellence for Commercial Space Transportation

Human Spaceflight Research Roadmap Workshop

A G E N D A

September 24th 10:00 AM to 4:00 PM Central Daylight Time

Time	Topic	Presenter
10:00 – 10:15 AM	Welcome & Introductions	Jim Vanderploeg
10:15 – 10:30 AM	Overview of Road Map Process	Scott Hubbard
10:30 – 11:00 AM	Review of 2011 Roadmap for Human Space Flight	Jim Vanderploeg
11:00 – 12:00 PM	Progress Made to Date	Presentations by investigators
12:00 – 1:00 PM	Lunch break	
1:00 – 2:30 PM	Future Research Needs and Directions Near Term (1 – 5 years)	Discussion by attendees
2:30 – 3:00	Break	
3:00 – 4:00	Future Research Needs and Directions Far Term (5+ years)	Discussion by attendees
4:00 PM	Adjourn for the day	

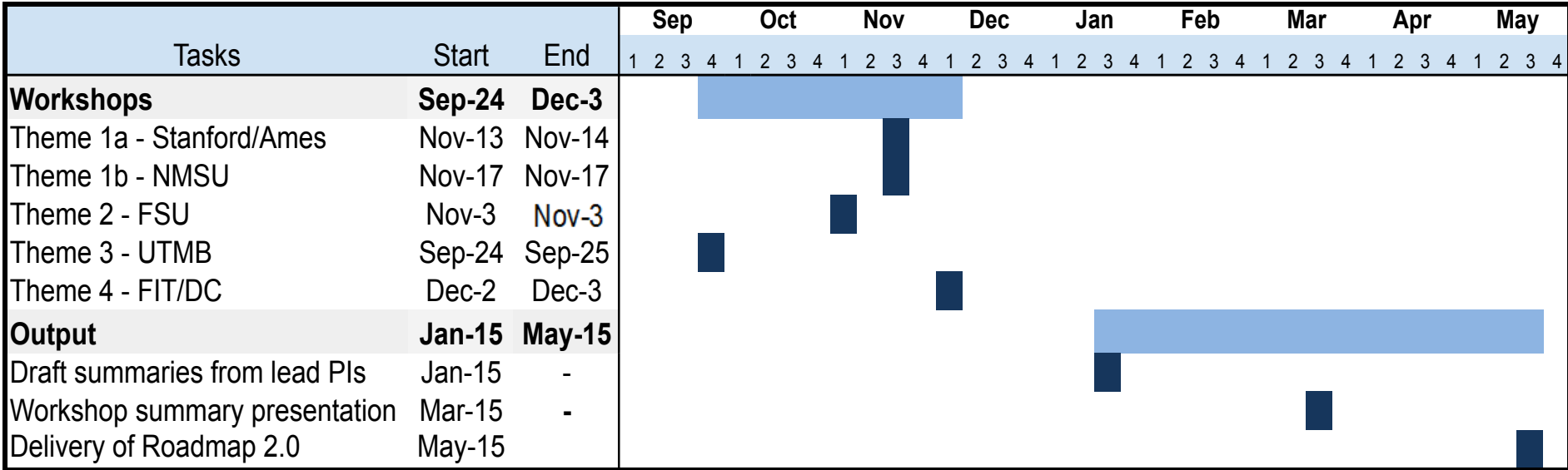
Attendees (10)

- Melchor Antunano
- Hosts (1)
 - Jared Campbell
- Presenters (1)
 - UTMB Galveston
- Participants (8)
 - Andrew Ow
 - Bob Haddon, Mayo Cli...
 - David Klaus
 - Greg Rasnake - FAA/ ...
 - Henry Lupa
 - Jan Stepanek
 - Jon Clark
 - Melchor Antunano

Chat (Everyone)

The chat history has been cleared

Schedule



Task 193: ROLE OF COE CST IN ENCOURAGE, FACILITATE AND PROMOTE (Research Roadmap 2.0)



PROJECT AT-A-GLANCE

- UNIVERSITY: Stanford University
- PRINCIPAL INVESTIGATOR: Prof. Scott Hubbard
- STUDENTS: Andrew Ow, Jonah Zimmerman








RELEVANCE TO COMMERCIAL SPACE INDUSTRY

- The COE-CST Research Roadmap directs the COE's research program towards achieving its goal of identifying solutions for existing and anticipated commercial space transportation problems. These solutions will in turn inform research investment and regulations, increase safety, and facilitate the CST industry.

STATEMENT OF WORK

- Goals:
 - Revisit the 2011 research roadmap and update as necessary
 - Identify and differentiate near term (1-3 years), medium term (3-6 years), and far term (>6 years) research tasks
 - Define research priorities to the extent possible
- Methods:
 - 5 workshops (1-2 days) hosted by theme PIs who are domain experts
 - Distribute workshops across the country
 - Leverage virtual collaboration software to increase participation
 - Compile and distill input from the workshops into Roadmap 2.0

Workshop Lead PIs and Locations

Theme: 1a – Space Traffic Management	 	Theme: 1b – Spaceports	
Lead PI: Juan Alonso		Lead PI: Pat Hynes	
Location: Stanford and NASA Ames		Location: New Mexico State University	
Theme: 2 – Vehicle Technology			
Lead PI: Farrukh Alvi		Theme: 3 – Human Spaceflight	
Location: Florida State University		Lead PI: Jim Vanderploeg	
		Location: University of Texas Medical Branch at Galveston	Theme: 4 – Industry Viability
			Lead PI: Tristan Fiedler
			Location: Lockheed Martin Global Vision Center

STATUS

- Theme 3 workshop held on 9/24-9/25
- Planning underway for other workshops

FUTURE WORK

- Upcoming workshops:
 - Theme 1a – 11/13-11/14
 - Theme 1b – 11/17
 - Theme 2 – 11/3-11/4
 - Theme 4 – 12/2-12/3
- Obtain summaries from lead PIs – 1/15/14
- Presentation summarizing workshop output – 3/15/14
- Delivery of Roadmap 2.0 – 5/15/14