GLOBAL SPACEPORT ALLIANCE

8th Annual GSA Spaceport Summit

Building the Spaceport Ecosystem

February 20, 2023 | Orlando, FL

SUMMIT REPORT

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EXECUTIVE SUMMARY

The 8th Annual GSA Membership Summit convened at 8:30 AM on Monday, February 20, 2023, at the Orange County Convention Center.

All in all, it was an extraordinary meeting.

We had:

- More people in attendance than at any other GSA meeting: 91 in-person attendees!
- A total of 23 spaceports from around world attended out of the total membership of 28.
- Launched two new initiatives to provide a network of spaceports for ready access to space and the building of the future workforce.
- Excellent spaceport and working group reports.
- Keynotes from FAA and the US Space Force, as well as sessions covering marketing concepts, tax incentives, cluster development, resources, and offshore launch.
- More participation from the membership in all the group discussion sessions!

GSA Report: James Causey, GSA Executive Director, opened the meeting with brief remarks and thanked the Summit sponsors, RS&H, the title sponsor, and BRPH and Merrick & Company as co-sponsors. He highlighted the remarkable growth in total membership from 31 in 2020 to 36 in 2021 and now up to a total of 53, as well as many other accomplishments during the year.

FAA Plans for the future: Kelvin Coleman, the FAA's Associate Administrator for Commercial Space Transportation, spoke about both their accomplishments and their future plans during what has been an incredibly busy time for his office. The fact that there were 79 FAA-licensed launches last year (the most ever) and that we will likely see even more this year is truly amazing. GSA will be able to support their efforts to obtain additional resources. We hope to gain some traction on the proposals to re-institute spaceport infrastructure grants and prepare for point-to-point transportation between spaceports.

Space Force assured access to space: Col. James T. Horne, III, and Lt. General (Ret.) David J. Buck shared fascinating details about the U.S. Space Force and their priorities, including their take on Space Mobility and Logistics. The military is committed to having assured access to space, including through rapid and responsive launch, something that has not previously been feasible. Another critical and strategic capability will be the need to move cargo and personnel anywhere in the world more quickly and efficiently than ever before as a result of point-to-point transportation through space. Interestingly,

these two military capabilities would also offer significant benefits for the civil and commercial space communities. GSA has flagged these topics as focus areas for this year, and we plan to collaborate with the Space Force and other stakeholders to see if we can make significant progress by working together.

Future Workforce Development: Another of GSA's focus areas for the year is the development of the future aerospace workforce, an initiative led by Alice Carruth from Spaceport America. The Pathways Workshop Series will allow students worldwide to participate in webinars this spring addressing Resume Building, Entrepreneurship, Future Careers in Aerospace, and How to Build Relationships with Your Local Spaceport.

The remainder of the Meeting: In addition to hearing short status reports from our Member Spaceports (one of my favorite agenda items!) and updates from our Working Groups, we also had a presentation by Tom Marotta from The Spaceport Company, plus panel sessions on Innovative Cluster Development in the U.K. with Paul Cremin, Melissa Quinn, and Roy Kirk; and on Resources Spaceports Need to Know About, featuring Nate Whigham, Pat Hynes, and Craig Smith. Finally, I think we all enjoyed hearing from Christina Korp, the "Astronaut Wrangler," on how to connect the Space Curious to the Space Serious and having a chance to appreciate Izzy House's recommendations for "Marketing Your Spaceport."

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Building the Spaceport Ecosystem

ATTENDEES

MEMBERS

ABL Space Systems
Todd Lindner, Cape Canaveral Operations Manager
Adaptive Launch Solutions
Jack Rubidoux, Director Site Operations
Robert Atkins, National Security Space Manager
Philip Smith, CEO
Alaska Aerospace Corporation
Milton Keeter, President & Ceo
Alyssa Hodum, License Technical Analyst
Author
Izzy House, Author of Space Marketing
Azores Mission Structure for Space
Ricardo Conde, President, Portuguese Space Agency - Portugal Space
Blue Marble Structures, Llc
Jason Purdy, CEO
Brownsville South Padre Island Intl Airport
Everest Walker, Intern- Student
Stephen Muse, Accountant Iii
Bryant Walker, Airport Administrator
BRPH
Kevin Walsh, Government Relations/Business Development
Chris Miller, Program Manager
Lt. Gen. David Buck, President
Cecil Spaceport
Matt Bocchino, Director, Cecil Airport & Spaceport
Colorado Air & Space Port
Ryan Nalty, Deputy Director
Jeff Kloska, Director
Equatorial Launch Australia
Ben Tett, General Manager Operations And Launch
Briohny Lambert, Launch Portfolio & Project Manager
Esrange - Swedish Space Corporation
Henrik Pettersson, Vice President, Science&Launch Services
FAA Center of Excellence for Commercial Space Transportation
Patricia Hynes, Professor Emerita
Highlands And Islands Enterprise (Sutherland Spaceport)
Peter Guthrie, Snr Project Manager
Roy Kirk, Project Director
Houston Airports/Houston Spaceport
Jimmy Spence, Business Development
Interflight Global Corporation
Oscar Garcia, Chairman & CEO
Italian Trade Agency
Simona Ferrulli , Officer
Patrick Fitzgerald, Aerospace Specialist
Salvatore Grignano, Marketing Officer
Giulia Salmaso, Marketing Officer
Jacobs
Tricia Quinn, Principal
Kevin Kuehn, Manager of Architecture
Kimley-Horn
Mallory Clancy, Civil Engineer
John Martin, Senior Vice President
Jonathan Craig, Aerospace Planner
Maine Space Complex
Emily Dwinnells, Program Manager, Maine Space Complex
Merrick & Company
Jessie Jimenez, Business Development Manager
Sarah Hodge, Business Development
Michigan Aerospace Manufacturers Association
Gavin Brown, Executive Director
Mojave Air & Space Port
Tim Reid, Ceo & General Manager

Oklahoma Space Industry Development Authority
Craig Smith, Executive Director

RS&H
Victoria Mechtly, Aerospace and Federal Market Leader
Andrew Nelson, Vice President of Aerospace
Runways To Space, LLC
Janet Tinoco, Owner/Operator
Space Florida
Dale Ketcham, VP Government & Community Relations
Space Nation
Stephan Reckie, Sales
Kalle Vaha-Jaakkola, Captain & Co-Founder
Space Port Japan Association
Hidetaka Aoki, Director
Spaceport America
Alice Carruth, Business Development
Spaceport Cornwall
Melissa Thorpe, Head Of Spaceport
Spire Global
Hunter Garbacz, Business Development Manager
The Aerospace Corporation
Richard Lamb, Range & Spaceport Systems Director
The Spaceport Company
Tom Marotta, CEO
Titusville-Cocoa Airport Authority
Kevin Daugherty, Director Of Airports
Brad Whitmore, Board Member
Lisa Nicholas, Airport Business Development Manager
U.K. Department For Transport
Paul Cremin, Head, Commercial Spaceflight Policy
Jeremy Ketley, Commercial Spaceflight Policy Team
Marcus Cook, Senior Inspector, Spaceflight Accidents
Justin Doxey, Senior Inspector Of Air Accidents
Annika Bergman, Growth Strategy Dir Americas
Virginia Commercial Space Flight Authority
Glen Liebig, Chief Safety And Quality Officer
Sean Mulligan, Coo & Deputy Executive Director
Lillian Palmbach, Deputy Chief Of External Relations
Roosevelt Mercer, Jr., Ceo & Executive Director
Gil Klinger, Chief Of Strategy & Government Relations
Kimberly West, Executive Assistant To The Ceo
Xarc/Astroport
Samuel Ximenes, CEO

OTHER ATTENDEES

- Gregory Allen, Operations Integration, Branch Chief United States Space Force
- Kelvin Coleman, Associate Administrator, Federal Aviation Administration
- Maria Gutierrez, Global Strategic Concept Generator, The Rendon Group
- Col James T. Horne, III, Deputy Director, Launch and Range Operations, Space Systems Command, Patrick Space Force Base
- Hayato Ishijima, Staff, Shimizu Corporation
- Christina Korp, Founder, SPACE for a Better World
- Shintaro Kubota, Senior Manager, Mitsubishi Corporation
- Todd Lindner, Cape Canaveral Operations Manager, ABL Space Systems
- Robert Long, Commander, Space Launch Delta 30, USSF
- Tadatsugu Matsutani, Senior Vice President, Mitsubishi Corporation
- Kohei Okamura, Business Development Manager, Mitsubishi Corporation (Americas)
- Misuzu Onuki, Executive Vice President, Sparx Innovation For Future Co., Ltd
- Dario Plazas, Force Modernization Analyst, United States Space Force
- Abigail Sutton, Saml Division Chief United States Air Force
- Ian Tanaka, Manager, Cyberspace Assessments, United States Space Force
- Nate Whigham, En Capital

STAFF

- Dr. George C. Nield, GSA Chair & President at Commercial Space Technologies, LLC
- Robert Harar, CEO, National Trade Productions, Inc.
- James Causey, Executive Director, Global Spaceport Alliance
- Steven Wolfe, Deputy Executive Director, Global Spaceport Alliance

8th Annual GSA Spaceport Summit

Building the Spaceport Ecosystem

February 20, 2023

AGENDA

[location of related slides in ADDENDUM A]

8:00 AM	Check-in and Registration Continental Breakfast Sponsored by Merrick & Co.
8:30 AM	*GSA Accomplishments in 2022* [pg. 1, slide 1] **James Causey**, Executive Director, Global Spaceport Alliance **Andrew Nelson,** Vice President of Aerospace, RS&H
8:45 AM	*Chairman Reports: Latest News Impacting the Spaceport Ecosystem* [pg. 2, slide 7] **Dr. George Nield**, Chair, Global Spaceport Alliance
9:15 AM	*FAA's Office of Space Transportation: A Year of Opportunity* [pg. 11, slide 65] **Kelvin Coleman**, Associate Administrator, Federal Aviation Administration
9:45 AM	*US Space Force: Progress Report* [pg. 12, slide 67] **Col. James T. Horne, III**, Deputy Director, Launch and Range Operations, Space Systems Command, Patrick Space Force Base
10:15 AM	*GSA Initiative 1: A Global Rapid Response and Readiness Network for Commercial and Military Space Activities* [pg. 14, slide 84] **Dr. George Nield**, Chair, Global Spaceport Alliance **Col. James T. Horne, III**, Deputy Director, Launch and Range Operations, Space Systems Command, Patrick Space Force Base **Lt. General (Ret.) David J. Buck**, President, BRPH Mission Solutions
11:00 AM	Break Sponsored by RS&H
11:20 AM	*GSA Initiative 2: Building the Future Global Workforce For Aerospace* [pg. 19, slide 112] **Alice Carruth**, Public Information Officer, Spaceport America

11:45 AM	**Member Reports**: Lessons Learned & Operational Updates [pg. 20, slide 116 – for those members that provided slides]
12:30 PM	Lunch Sponsored by BRPH
1:15 PM	*How to Connect the Space Curious To The Space Serious* [pg. 24, slide 140] **Christina Korp**, Founder, SPACE for a Better World
1:30 PM	**Member Reports**: Lessons Learned & Operational Updates (cont.) [pg. 27, slide 160 – for those members that provided slides]
2:00 PM	Working Group Reports [pg. 30, slide 180] *Point to Point:* **Oscar Garcia**, Founder & CEO, InterFlight Global Corp. *Academic Partnerships:* **Alice Carruth**. Public Information Officer, Spaceport America *Policy:* **Matt Anderson**, Senior Advisor of Government Affairs, Air Liquide *Infrastructure Funding:* **Victoria Mechtly**, Business Development Aerospace & Federal, RS&H
2:45 PM	Break Sponsored by RS&H
3.15 PM	*Innovative Cluster Development in the U.K.* [pg. 37, slide 222] **Paul Cremin**, Commercial Spaceflight Regulation & Policy Lead, U.K. Dept. for Transport **Melissa Thorpe**, Head of Spaceport Cornwall, Spaceport Cornwall **Roy Kirk**, Project Director, Highland and Islands Enterprise
3:45 PM	*Resources Spaceports Need to Know About* [pg. 38, slide 223] **Dr. George Nield,** Chairman, Global Spaceport Alliance (Moderator) **Nate Whigham**, President, EN Capital *A Possible Federal Tax Credit Option for Commercial Space Infrastructure* **Patricia Hynes**, Director, New Mexico FAA Center of Excellence for Commercial Space Transportation *An Essential Resource: Spaceports Online Reference Guide* **Craig J. Smith**, Executive Director, Oklahoma Air and Spaceport *Get to Know Your Federal and Local Officials*
4:30 PM	*Offshore Launch Options* [pg. 42, slide 250] **Tom Marotta**, CEO & Founder, The Spaceport Company
4.45 PM	*Marketing Your Spaceport* [pg. 44, slide 261] Facilitator: **Izzy House**, Author, *Spaceport Marketing*
5:15 PM	*Group Discussion on Next Steps for 2023*
5:45 PM	**Group Photograph**
6:00 PM	Adjourn

About the Global Spaceport Alliance

The Global Spaceport Alliance (GSA) was formed in 2015 to develop extensive expertise in people and resources for the growing global commercial spaceport market. GSA provides spaceport stakeholders with the information to develop, fund, build, and operate their facility and to integrate into the developing global spaceport network. GSA is equipped to provide consulting services in all aspects of the spaceport industry. GSA also provides a forum for connecting the spaceport network with other modes of transportation such as rail, air, maritime, and road.

Since November 2015, the GSA has held four Spaceport Summits with more than 20 international spaceports representatives. In addition, there have been at least three conference calls per year of GSA members.

Mission Statement:

The Global Spaceport Alliance's Annual Commercial Spaceport Summit is a conversation among peers of spaceport facility executive managers from around the world. The Summit is a facilitated dialogue on the future commercial potential that a global network of spaceports will help to stimulate. Participants of the Summit identify common challenges and brainstorm what initiatives, activities, and actions can be taken in the next few years to lay the foundation for enabling commerce to flourish across the international network of spaceports.

Strategy:

To accomplish its mission, GSA provides the following services.

- **Member website** at globalspaceportalliance.com where members can maintain their up-to-date spaceport information and engage in private or public dialogues with other operators around the world.
- **The Membership Summit:** GSA is the creative and under-writing force behind the Summit, which is held concurrently with SpaceCom, The Space Commerce Conference & Exhibition (spacecomexpo.com. Participation is primarily for spaceport operators or those considering a spaceport in their state or country.
- **Clearinghouse:** GSA has extensive resources that members can access regarding all aspects of the commercial spaceport marketplace. This includes c-level business executives and leaders from NASA and the FAA. These resources are supplemented with consultants and staff familiar with such issues as:
    - Regulatory and Policy Matters
    - Funding Sources and Requirements
    - Diversification
    - Design and Construction
    - Business Plan Development
    - Operations
    - Connecting into Other Transportation Modes

GSA Membership Benefits

GSA is a members-only organization based in Alexandria, Virginia. The details of membership are outlined below.

Basic Global Spaceport Alliance Membership Benefits:

- Attendance at the GSA Membership Caucus for up to 3 people
- Inclusion in all webinar event activities
- Access to the GSA database of all Spaceports
- Subscription to GSA e-Newsletters
- Track U.S. and International public policy/regulations impacting spaceports
- A 25% discount for up to 3 people to the SpaceCom Conference
- Opportunity to serve on a working group or other special projects
- Reports: GSA periodically publishes specialized reports, such as Spaceports: Enabling the Space Economy (in conjunction with Edelman Intelligence) and the GSA National Spaceport Network Development Plan, which will be re-issued in 2021.

GSA Member Organizations

Spaceport Members

1. Azores Mission Structure for Space
2. Brownsville UTRGV's CARA/STARGATE
3. Cecil Spaceport
4. Colorado Air and Space Port
5. Ecuador Spaceport
6. Equatorial Launch Australia
7. Esrange, Spaceport Sweden
8. Houston Spaceport
9. Pacific Spaceport Complex
10. Maritime Launch Services
11. Mid-Atlantic Regional Spaceport
12. Midland International Air & Spaceport
13. Mojave Air & Space Port Center
14. Oklahoma Air and Spaceport
15. SaxeVord Spaceport
16. Southern Launch
17. Space Florida
18. Space Port Japan
19. Spaceport America
20. Spaceport Cornwall
21. Stennis Spaceport
22. Sutherland Spaceport, Scotland
23. The Spaceport Company
24. Titusville Spaceport Commerce Park
25. Waco Spaceport
26. YUMA Spaceport

Associate Members

1. ABL Space Systems
2. Adaptive Launch Solutions
3. Air Liquide
4. Blue Marble Structures
5. BRPH
6. Corgan
7. International Technology and Trade Associates
8. Japan Manned Space Systems Corporation (JAMSS)
9. Jacobs
10. Kimley-Horn
11. Maine Space Grant Consortium
12. Merrick and Company
13. RS&H
14. Runways To Space LLC
15. Spire Global
16. Xarc/Astroport Space Technologies, Inc.

Academic/Nonprofit Organizations

1. Arizona Spaceport Alliance
2. High Speed Flight-Fast Forward Group
3. International Space School Educational Training
4. IQM Research Institute
5. Puerto Rico 5G Zone, Inc
6. REACH
7. Rice Space Institute
8. Space Nation
9. The Aerospace Corporation

Government

1. FAA Center of Excellence for Commercial Space Transportation
2. U.K. Department for Transport

ADDENDUM A

GLOBAL SPACEPORT ALLIANCE

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February 20, 2023 | Orlando, FL

WELCOME

James Causey
Executive Director
Global Spaceport Alliance

SPACECOM PRESENTS

COMMERCIAL SPACE WEEK

GSA Vision

To create a global network of current and proposed spaceports that can serve as focal points and technology hubs to facilitate the growth of the space economy and be available for ready access to space

GSA Member Growth

	2021-2022	2022-2023
Member Spaceports	22	26
Associate Members	8	15
Government & Other Members	6	11
Total	36	52

GSA Impact in 2022

- January 2022 Summit
- 11 E-Newletters
- 7 webinars
- Farnborough 2022 P2P Sessions
- Orion Quest partnership with Academic Working Group
- Policy Working Group infrastructure funding initiative
- Workforce Initiative for 2023
- Responsive Space Initiative for 2023
- Tax Incentives for commercial space activities
- February 2023 Summit!

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Chairman's Message

Dr. George Nield

President

Commercial Space Technologies, LLC

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What's New in the Spaceport Ecosystem?

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Dr. George C. Nield, GSA Chairman

GSA Spaceport Summit

February 20, 2023

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"Accelerate Change or Lose"

Gen Charles Q. Brown, Jr.
Air Force Chief of Staff

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President Reagan Signing Exec Order 12465

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The Vision: A "One-Stop Shop"

"Until today, private industries interested in ELV's have had to deal with 17 Government agencies. From now on, they'll only have to get in touch with the Department of Transportation, and the Department will clear away what Secretary Dole has called 'the thicket of clearances, licenses, and regulations that keep industrial space vehicles tethered to their pads.' "

President Ronald Reagan
February 24, 1984

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The Office of Commercial Space Transportation was Moved from DOT to FAA in 1995

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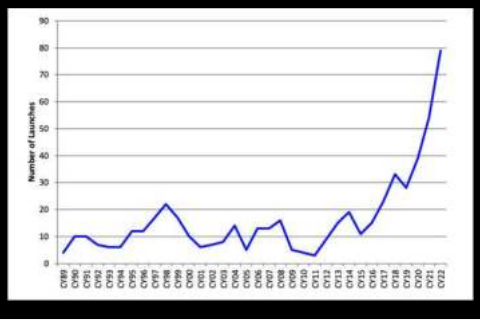
FAA-Licensed Launches per Year



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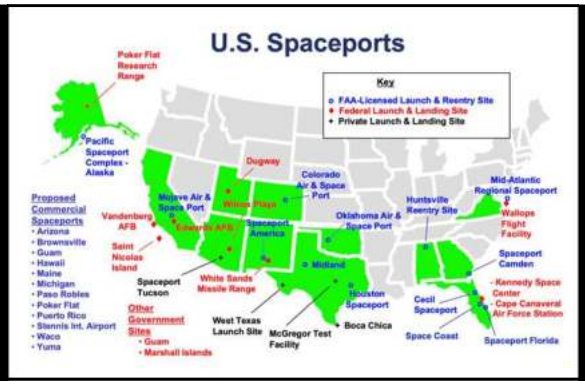

Expectations for Growth of the Space Economy

- UBS
  - In 10 years: $805 Billion
  - In 20 years: $1 Trillion
- Morgan Stanley
  - By 2040: $1.1 Trillion
- Bank of America Merrill Lynch
  - By 2045: $2.7 Trillion

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A Key Challenge for Government:

Keeping Pace with Industry

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Is it Time for a Change?

As part of the FAA, the Office of Commercial Space Transportation has not received the needed:

- Time and Attention from Senior Leadership
- Resources to successfully carry out the mission
- Ability to directly communicate with the White House, Congress, the National Space Council, and other stakeholders (when appropriate)
- Advocacy and support in resolving key issues

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After All, Space is Important!

- National Security
- Technological Leadership
- International Competitiveness
- Scientific Curiosity
- Inspiration for Students

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Space Also Affects Our Daily Lives

- Communication
- Navigation
- Financial Transactions
- Weather Forecasts
- Agriculture
- Entertainment

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Why Might a Change Be Appropriate?

Space and Aviation Are Different!

- The vehicles are different
- The environment is different
- The regulatory framework is different
- The risk level is different, and it is managed differently

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One Potential Solution

- Formally recognize Commercial Spaceflight as an independent mode of transportation by moving the Office of Commercial Space Transportation back to DOT.

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GAO Report on Moving AST to DOT


GAO

FEDERAL AVIATION ADMINISTRATION

Stakeholders' Perspectives on Potentially Moving the Office of Commercial Space Transportation

- Most commercial space launch companies and spaceports favored moving the office; most FAA officials did not.
- Report noted that DOT Secretary can move the office through a delegation of responsibilities, as was done in 1995.

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U.S. Department of Transportation Organizational Structure (Current)

24

U.S. Department of Transportation Organizational Structure (Proposed)

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Potential Benefits

Formally recognizing commercial spaceflight as an independent mode of transportation within the Department of Transportation would have several important benefits:

- The opportunity to establish a one-stop shop that would allow for a streamlined regulatory framework.
- The opportunity for improved communication with stakeholders
- The opportunity to make the case for needed resources
- The opportunity to raise and resolve key issues

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Challenges & Improvement Opportunities

- AST Budget and Staffing Levels
- National Spaceport Policy Report to Congress
- Funding for Spaceport Infrastructure Grants
- Commercial Human Spaceflight Training (Space Support Vehicles)
- Support for Point-to-Point Transportation Activities
- Follow-on to the Commercial Space Transportation Center of Excellence

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AST Budget and Staffing Levels

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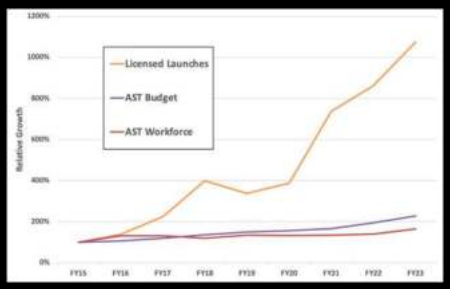
Growth in Licensed Launches vs AST Resources



Note: FY23 Launches Annualized Based on YTD Total

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AST Authorized Funding Levels

[As provided by the FAA Reauthorization Act of 2018]

- FY2018 - $22.5M
- FY2019 - $33.0M
- FY2020 - $43.5M
- FY2021 - $54.9M
- FY2022 - $64.4M
- FY2023 - $75.9M

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FAA Ops Budget - FY 2023

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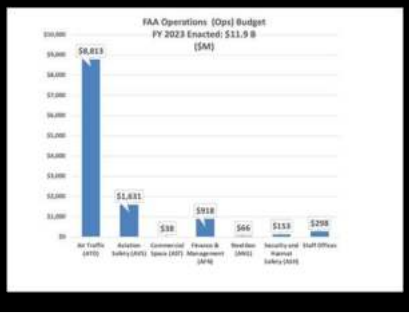
FAA Ops Budget - FY 2023



Note: The Office of Commercial Space Transportation receives 0.32% of the total FAA Ops Budget

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FAA Full-Time Positions - FY 2023

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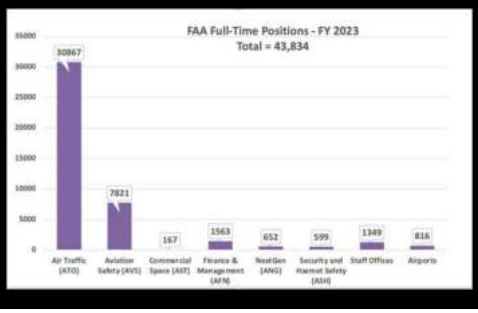
FAA Full-Time Positions - FY 2023



Note: The Office of Commercial Space Transportation has 0.38% of the total number of FAA Full-Time Positions

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National Spaceport Policy

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Congressional Reports

Required by the FAA Reauthorization Act of 2018, which was signed by the President on October 5, 2018:

- Report on National Spaceport Policy
  - Due: October 5, 2019
  - Status: Not yet submitted (more than 3 years overdue)
- Update to Report on National Spaceport Policy
  - Due: October 5, 2021
  - Status: Not yet submitted (more than 1 year overdue)

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National Spaceport Network Development Plan

Contents:

- Proposal for a National Spaceport Policy
- Benefits of a National Spaceport Network
- Options for Providing Spaceport Infrastructure Funding
- Recommendations on Needed Changes to Policies, Laws, and Regulations

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A New Vision for Spaceports

- Spaceports are not just locations from which launches and reentries are conducted.
- They can also serve as focal points and technology hubs to support:
  - Aerospace manufacturing
  - Research and technology efforts
  - Education and training
  - Workforce development
  - Point-to-point transportation

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Current Spaceport Infrastructure is not Robust or Resilient

- Most U.S. launches today take place from launch pads at Cape Canaveral, FL; Wallops Island, VA; or Vandenberg SFB, CA.
- Because of the possibility that a natural disaster (hurricane, tornado, earthquake, or wildfire), a launch pad accident, or a terrorist attack could significantly damage one of those facilities, our nation's access to space is not guaranteed.
- The recovery time could be many months or even years.

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A Need for More Launch Pads?

"One way to make sure the Pentagon can launch anytime, anywhere is by increasing the number of launch providers and pads available to the Defense Department."

Gen B. Chance Saltzman
Chief of Space Operations
United States Space Force

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Proposed National Spaceport Policy

The U.S. Government strongly supports the development and operation of a National Spaceport Network, consisting of commercial, government, and privately-operated launch and reentry sites, that will allow assured access to space for all users, while enabling the United States to:

- Satisfy national security requirements
- Maintain technological leadership
- Enable international competitiveness
- Provide inspiration for students and the development of a robust aerospace workforce

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Executive Order

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Congressional Resolution

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National Space Council/Space Policy Directive

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Infrastructure Funding

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Infrastructure Funding

The federal government has traditionally provided substantial funding to develop, repair, or upgrade all forms of transportation infrastructure. Examples include:

- Roads, bridges, and the interstate highway system
- Railroads
- Seaports
- Airports

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Infrastructure Funding

- Today there is NO comparable federal program to provide funding for space-related infrastructure, such as for spaceports.
- Even the $1.2 trillion Infrastructure Investment and Jobs Act, signed into law on November 15, 2021, did not address space-related projects.

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Existing Options for Direct Funding of Spaceport Infrastructure Projects

- Modify the Airport Improvement Program
- Provide funding through the Space Transportation Infrastructure Matching (STIM) Grants Program
- Allocate funding from DOT Discretionary Grant Programs

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Commercial Human Spaceflight Training

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NASA Astronaut Training

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Potential Commercial Systems

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Space Support Vehicles

- Current statutory definition is limited to launch and reentry vehicles or components thereof.
- Expanding the definition to include high performance or former military aircraft, and allowing their operation in accordance with a license or permit under Title 51, would immediately enable human spaceflight training operations to be conducted at interested commercial spaceports.
- Such operations could be conducted under an "informed consent" regime, just like commercial human spaceflights.

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Inspiration4 Crew Training

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Point-to-Point Transportation

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Point-to-Point Transportation

- The ability to conduct high-speed, long-distance transportation, specifically point-to-point transportation through space, will be a major game changer for both national security and economic competitiveness.
- This is an area in which the U.S. needs to lead.

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Farnborough International Airshow

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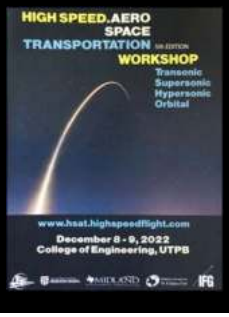
High Speed Aerospace Transportation Workshop



IFG

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Industry is already developing these systems, so what does the Government need to do?

- Update existing policies, laws, and regulations to support both testing and operations
- Encourage collaboration between government, industry, and academia in performing research and technology development
- Consider establishing prizes, contests, and technology demonstrations
- Serve as an anchor customer for transportation services

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Rocket Cargo Program

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Need for a Follow-on to the Commercial Space Transportation Center of Excellence

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Center of Excellence for Commercial Space Transportation

- Established in 2010
- Involved 10 member universities and 36 industry partners
- Funded at approximately $1M per year for 10 years, with requirement for 1:1 match for all federal dollars spent
- Ended in 2022, with no replacement in place to allow academia to engage in commercial space transportation research

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Summary of Recommended Actions

1. Formally recognize Commercial Spaceflight as an independent mode of transportation by moving the Office of Commercial Space Transportation back to DOT.
2. Provide increased budget and staffing levels for the Office of Commercial Space Transportation.
3. Enable federal funding for spaceport infrastructure projects.
4. Update policies to encourage development of a global spaceport network, enable commercial human spaceflight training, facilitate rapid development of point-to-point transportation, and support academic research partnerships.

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Some Final Observations

- Implementing these recommendations will not be easy.
- However, doing so will enable continued progress in commercial space transportation, with significant benefits to government, industry, academia, our international partners, and the general public.
- The Global Spaceport Alliance is committed to working with other stakeholders in meeting this exciting new challenge!

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GLOBAL SPACEPORT ALLIANCE

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FAA Office of Space Transportation: A Year of Opportunity

Kelvin Coleman
Associate Administrator
Federal Aviation Administration

FEDERAL AVIATION ADMINISTRATION

GLOBAL SPACEPORT ALLIANCE

US Space Force Progress Report

Col James T. Horne, III
Deputy Director, Launch and Range Operations
Space Systems Command
Patrick Space Force Base

SPACEPORT ALLIANCE

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Global Power Competition

- US gov't relies on commercial capability for access to space
  - China/Russia all sectors of space activities directly tied to national objectives
  - China and Russia aim to supersede US capacity
- Inconsistent statutory authorities constrict US growth
  - Federal law and regulations limit reimbursable authorities
  - USSF limited to provide industry only capacity & facilities "not needed for public use"
  - Inadequate investment & reimbursements to grow infrastructure to meet demand
- Launch is chokepoint for space warfighting capability
  - ER/WR serviced 95% of launches (CY22); commercial growth requires change
- Adversaries present credible threats to launch/space infrastructure
  - Must be prepared for launch in a degraded environment
  - Fostering robust US/Allied spaceport network mitigates risk

US Space Access Predicated on Commercial Capability

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Why Now?...Trends Driving Space Logistics Growth

TREND AREA	PAST	CURRENT/FUTURE
Launch Customer	Government preponderance	Commercial preponderance
Launch Cadence	10+ per year	100+ per year
Installations	Major Range and Test Facility Base	Spaceport model and charging rules
Spaceport Capacity	Excess capacity	Demand exceeds supply
Assured Access	Government ensures a minimum of 2 commercial providers are available	Multiple commercial launch systems in development and testing
Delivery	Satellites to space	Satellites and material to, through, and from space
On-orbit servicing/refueling	Niche Government ability (Space Station, Hubble)	Multiple commercial investments in refueling, servicing, and movement
Spaceport Availability	Two Government installations	Multiple Government, commercial, and allied spaceports

Multiple changes are driving the USSF from a Launch to a Logistics Model

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Increasing Spaceport Demand Signal

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Maximizing Capacity

- Expansion throttled by location not land
- Investing in creating opportunity

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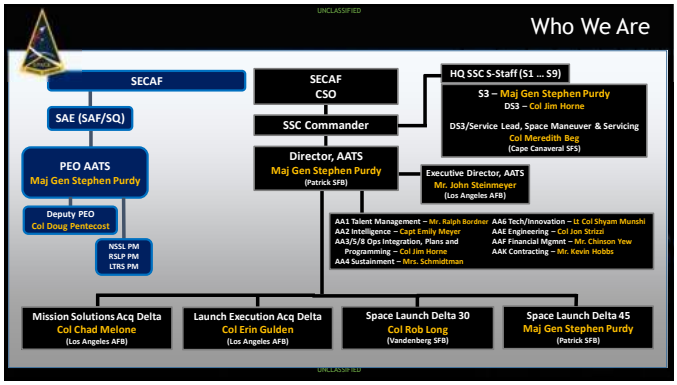
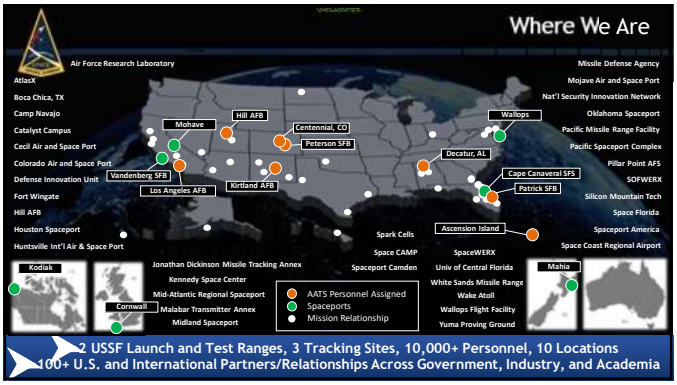
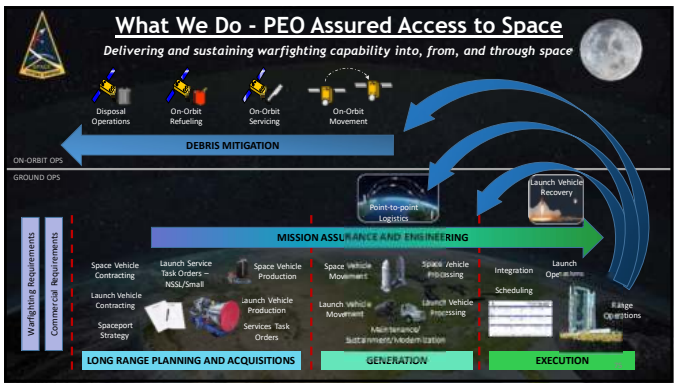
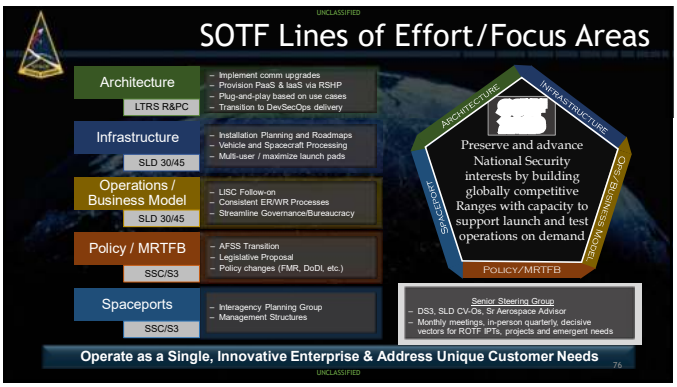
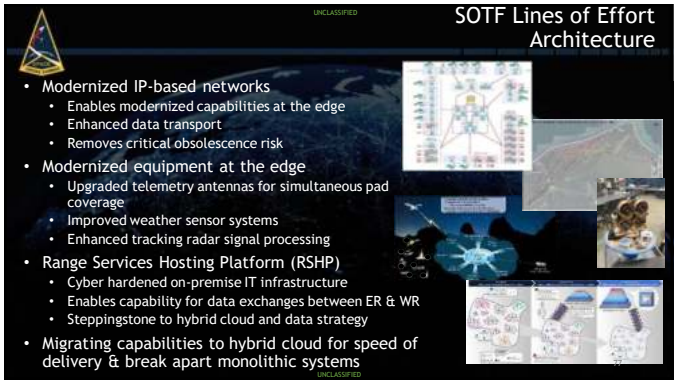

Who We Are
SECAF
SAE (SAF/SQ)
PEO AATS
Maj Gen Stephen Purdy
Deputy PEO
Col Doug Pentecost
NSSL PM
RSLP PM
LTRS PM
SECAF CSO
SSC Commander
Director, AATS
Maj Gen Stephen Purdy
(Patrick SFB)
HQ SSC S-Staff (S1 … S9)
S3 – Maj Gen Stephen Purdy
DS3 – Col Jim Horne
DS3/Service Lead, Space Maneuver & Servicing
Col Meredith Beg
(Cape Canaveral SFS)
Executive Director, AATS
Mr. John Steinmeyer
(Los Angeles AFB)
AA1 Talent Management – Mr. Ralph Bordner
AA2 Intelligence – Capt Emily Meyer
AA3/5/8 Ops Integration, Plans and Programming – Col Jim Horne
AA4 Sustainment – Mrs. Schmidtman
AA6 Tech/Innovation – Lt Col Shyam Munshi
AAE Engineering – Col Jon Strizzi
AAF Financial Mgmt – Mr. Chinson Yew
AAK Contracting – Mr. Kevin Hobbs
Mission Solutions Acq Delta
Col Chad Melone
(Los Angeles AFB)
Launch Execution Acq Delta
Col Erin Gulden
(Los Angeles AFB)
Space Launch Delta 30
Col Rob Long
(Vandenberg SFB)
Space Launch Delta 45
Maj Gen Stephen Purdy
(Patrick SFB)


Where We Are
Air Force Research Laboratory
AtlasX
Boca Chica, TX
Camp Navajo
Catalyst Campus
Cecil Air and Space Port
Colorado Air and Space Port
Defense Innovation Unit
Fort Wingate
Hill AFB
Houston Spaceport
Huntsville Int'l Air & Space Port
Jonathan Dickinson Missile Tracking Annex
Kennedy Space Center
Mid-Atlantic Regional Spaceport
Malabar Transmitter Annex
Midland Spaceport
Spark Cells
Space CAMP
Spaceport Camden
Missile Defense Agency
Mojave Air and Space Port
Nat'l Security Innovation Network
Oklahoma Spaceport
Pacific Missile Range Facility
Pacific Spaceport Complex
Pillar Point AFS
SOFWERX
Silicon Mountain Tech
Space Florida
Spaceport America
Space Coast Regional Airport
SpaceWERX
Univ of Central Florida
White Sands Missile Range
Wake Atoll
Wallops Flight Facility
Yuma Proving Ground
Mohave
Hill AFB
Centennial, CO
Peterson SFB
Vandenberg SFB
Los Angeles AFB
Kirtland AFB
Wallops
Decatur, AL
Cape Canaveral SFS
Patrick SFB
Ascension Island
Kodiak
Cornwall
Mahia
AATS Personnel Assigned
Spaceports
Mission Relationship
2 USSF Launch and Test Ranges, 3 Tracking Sites, 10,000+ Personnel, 10 Locations
100+ U.S. and International Partners/Relationships Across Government, Industry, and Academia


What We Do - PEO Assured Access to Space
Delivering and sustaining warfighting capability into, from, and through space
Disposal Operations
On-Orbit Refueling
On-Orbit Servicing
On-Orbit Movement
DEBRIS MITIGATION
ON-ORBIT OPS
GROUND OPS
Point-to-point Logistics
Launch Vehicle Recovery
MISSION ASSURANCE AND ENGINEERING
Warfighting Requirements
Commercial Requirements
Space Vehicle Contracting
Launch Service Task Orders – NSSL/Small
Space Vehicle Production
Space Vehicle Movement
Space Vehicle Processing
Integration
Launch Operations
Launch Vehicle Contracting
Launch Vehicle Production
Launch Vehicle Movement
Launch Vehicle Processing
Scheduling
Spaceport Strategy
Services Task Orders
Maintenance/ Sustainment/Modernization
Range Operations
LONG RANGE PLANNING AND ACQUISITIONS
GENERATION
EXECUTION


SOTF Lines of Effort/Focus Areas
Architecture
LTRS R&PC
– Implement comm upgrades
– Provision PaaS & IaaS via RSHP
– Plug-and-play based on use cases
– Transition to DevSecOps delivery
Infrastructure
SLD 30/45
– Installation Planning and Roadmaps
– Vehicle and Spacecraft Processing
– Multi-user / maximize launch pads
Operations / Business Model
SLD 30/45
– LISC Follow-on
– Consistent ER/WR Processes
– Streamline Governance/Bureaucracy
Policy / MRTFB
SSC/S3
– AFSS Transition
– Legislative Proposal
– Policy changes (FMR, DoDI, etc.)
Spaceports
SSC/S3
– Interagency Planning Group
– Management Structures
ARCHITECTURE
INFRASTRUCTURE
OPERATIONS
SPACEPORTS
Preserve and advance National Security interests by building globally competitive Ranges with capacity to support launch and test operations on demand
POLICY/MRTFB
Senior Steering Group
– DS3, SLD CV-Os, Sr Aerospace Advisor
– Monthly meetings, in-person quarterly, decisive vectors for ROTF IPTs, projects and emergent needs
Operate as a Single, Innovative Enterprise & Address Unique Customer Needs


SOTF Lines of Effort
Architecture
• Modernized IP-based networks
• Enables modernized capabilities at the edge
• Enhanced data transport
• Removes critical obsolescence risk
• Modernized equipment at the edge
• Upgraded telemetry antennas for simultaneous pad coverage
• Improved weather sensor systems
• Enhanced tracking radar signal processing
• Range Services Hosting Platform (RSHP)
• Cyber hardened on-premise IT infrastructure
• Enables capability for data exchanges between ER & WR
• Steppingstone to hybrid cloud and data strategy
• Migrating capabilities to hybrid cloud for speed of delivery & break apart monolithic systems


SOTF Lines of Effort
Infrastructure
• Infrastructure improvements -- mutually beneficial to government & industry
• Increased launch & landing locations
• Launch Pad Allocation Strategy / Multi-user sites
• Expand land development
• Increased capacity for SV processing facilities
• Power grid/water treatment/road upgrades
• Water transport: dock/harbor development and improvements
• Infrastructure funding:
• Combined ER/WR infrastructure project list FY24-28 → $1.268B
• Provided to OMB and SAC-D, per their request
• Both ranges partnering with state and local authorities
• Mutually beneficial investment opportunities
• Space Florida
• California GoBiz/Reach
AATS is positioning to Leverage Commercial Space-Lift Market Boom

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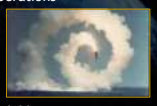
SOTF Lines of Effort
Policy: Automated Flight Safety System (AFSS)

- ER/WR transitioning from manual Flight Termination System (FTS) to AFSS
  - Govt. standard identified (RCC 319); industry develops compliant systems
  - Range Safety and FAA certify commercial systems
  - 1 Oct 2025 implementation deadline set by CSO (Gen Raymond)
- AFSS is a key enabler for spaceport operations
  - Increased throughput; allows parallel pre-launch, launch and test operations
  - Reduces launch-on-time risk and increases flight-paths
  - Provides significant cost savings to range and range users
    - ~50% saving for commercial providers on an AFSS Range
    - Allows divestment of range critical systems and manpower
- SSC/S3 monitoring launch service provider (LSP) progress
  - Industry developing variety of vehicle specific and commercially available systems
  - Current & projected ER/WR LSPs on track to meet mandate; NASA SLS currently at risk



AFSS key to increased range capacity/cadence

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SOTF Lines of Effort
Spaceports

- National Spaceport Interagency Working Group
  - Consists of DoD, DoT, DoC, DoS, & NASA
  - Developing National Spaceport Strategy
    - Promotes network of national launch and reentry spaceports
    - Common standards & processes for launch service providers
- Spaceport Directors Council
  - Includes federal/state vertical spaceports (ER, WR, NASA, MARS, Kodiak)
  - Expanding to include horizontal & international spaceports
  - Roundtable discussions to advance global spaceport shared practices & interests
- Global Spaceport Alliance
  - Forum for commercial/international spaceport operators at all stages of development
  - Provides members with information & networking opportunities supporting spaceport ops
- Commercial Spaceflight Federation - Spaceport Committee
  - Members are space launch stakeholders from commercial, state, local, academia
  - Advances spaceport community issues focused on environmental, infrastructure, regulatory

Diverse & global stakeholders growing a network of launch & reentry spaceports

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Global Spaceport Transition

Port Model Evaluation
- Targeted studies
  - Aerospace assessment (Jan 2021)
  - Arizona State University (Dec 2022)
    - Phase 2 pending
  - BCA underway to inform port model
- Working groups
  - National Spaceport Interagency Working Group
  - Spaceport Directors Council
  - Global Spaceport Alliance
  - Commercial Spaceflight Federation

Infrastructure Planning
- Civil engineering assessments
  - Infrastructure Development Plan
  - Infrastructure Roadmap
  - Conducting supply chain SWOT
- Optimizing property use
  - Launch pad allocation strategy

Infrastructure Execution
- Executing Infrastructure Master Plan
  - Paced/prioritized for resource constraints
  - Roads, bridges, power, commodities
- Defend the mission
  - Identify/mitigate vulnerabilities
  - Launch thru degradation

Architecture Modernization
- Modernize/replace/divest legacy systems
  - IP-based networks
  - Equipment at the Edge
  - Hybrid cloud migration
  - Range Service Hosting platform
  - Transition to Autonomous Flight Safety System

Funding
- ROTF infrastructure funding
  - Submitted prioritized funding requirements at OMB request
- Charging Model Study
  - Spaceport Funding; indirect cost allocation
  - Analysis informs future policy proposals

Policy
- Legislative policy
  - Phased approach
  - Legislative Prop. (409) in interagency coord.
  - Developing FY25 legislative proposal
- Spaceport Governance
  - Informed by trade studies & working groups

DoD Range Model → Port Model

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Key Takeaways

- The time is NOW and the threat is REAL!
- Space Capabilities are critical in ALL warfighting domains…cannot fail mission
- The DoD must develop logisticians that can plan and operate globally, across all domains…including space.
- We need Government experts as well as contractor experts to help develop requirements, solutions, and CONOPS
- PEO Assured Access to Space is growing capability to acquire, command, and control Department of Defense and commercial space-based logistics services

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QUESTIONS?

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Dr. George Nield
Chairman, GSA

Col James T. Horne, III
Space Systems Command
Patrick Space Force Base

Lt. Gen. (Ret.) David J. Buck
President, BRPH Missions Solutions

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GSA Initiative 1:

A Global Rapid Response and Readiness Network for Commercial and Military Space Activities

Dr. George C. Nield
Col James T. Horne, III
Lt Gen (Ret) David J. Buck

GSA Spaceport Summit
February 20, 2023

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One of the Military Spacepower Core Competencies is:

- Space Mobility and Logistics

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What Kinds of Activities Are We Talking About?

- Missions to and from orbit (which may include extended operations in space)
- Point-to-Point Missions on Earth

Both kinds of activities will typically begin from a Spaceport, and will benefit from a healthy aerospace industrial base as part of the global space economy.

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Potential Missions to Orbit

- Replace
- Replenish
- Refuel
- Repair
- Resupply
- Reorient
- Reposition
- Reconnoiter
- Rescue
- Return

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Potential Point-to-Point Missions

- Rapid response to natural disasters
- Rapid response to medical emergencies
- Rapid response to supply chain disruptions
- Rapid response to actual or anticipated military actions
- Making long-distance travel more enjoyable for government, business, and the general public!

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Revolutionizing Long Distance Travel

Revenue opportunity
Space travel vs commercial airlines
CNBC
SOURCE: UBS

Share of flights	Cost $1,500	$2,500	$5,000	$7,500	$10,000
5.0%	$12 Bln	$20 Bln	$41 Bln	$61 Bln	$81 Bln
7.5%	$18 Bln	$31 Bln	$61 Bln	$92 Bln	$122 Bln
10.0%	$24 Bln	$41 Bln	$81 Bln	$122 Bln	$163 Bln
12.5%	$31 Bln	$51 Bln	$102 Bln	$153 Bln	$204 Bln
15.0%	$37 Bln	$61 Bln	$122 Bln	$183 Bln	$244 Bln
17.5%	$43 Bln	$71 Bln	$142 Bln	$214 Bln	$285 Bln
20.0%	$49 Bln	$81 Bln	$163 Bln	$244 Bln	$326 Bln

- There are currently more than 150M passengers each year who take flights lasting more than 10 hours
- Capturing 5% of them at $2,500 each would result in $20B per year in revenues

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Commercial Hypersonic Transportation Market Study

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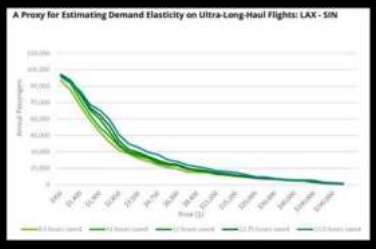
Price Elasticity for Ultra-Long-Haul Flights



- Example: LAX-SIN
- Avg Economy Fare: $700
- Annual Passengers: 125K
- Subsonic Trip Time: 17 hrs
- Time at Mach 5: 4.25 hrs

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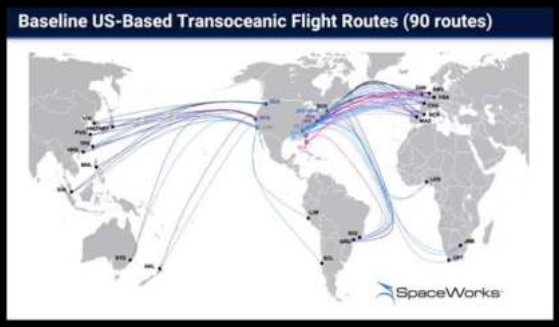

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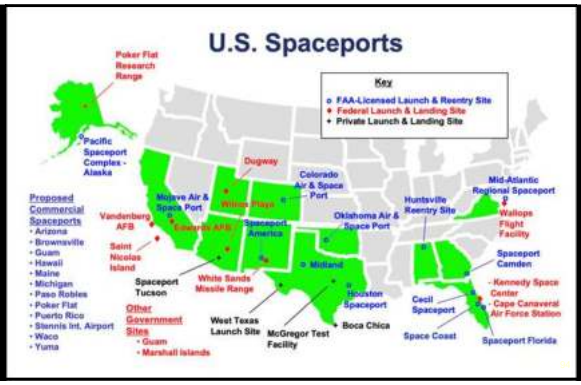

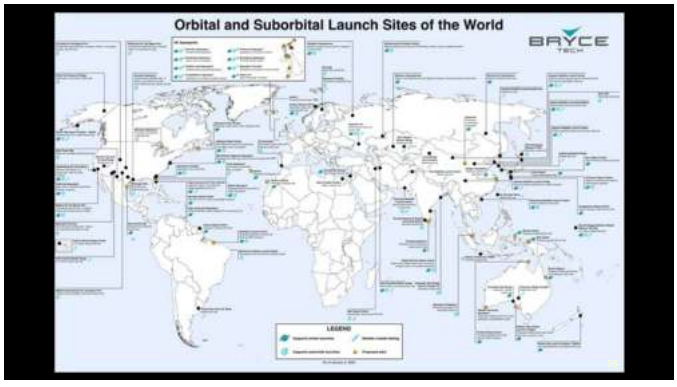

Potential Suborbital Point-to-Point Systems

Vehicle	Takeoff	Landing	Speed
• Hermeus	H	H	M5
• Space Engine Systems	H	H	M5
• Venus Aerospace	H	H	M9
• New Frontier Aerospace	V	V	M10
• Destinus	H	H	M15

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Hermeus

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Space Engine Systems

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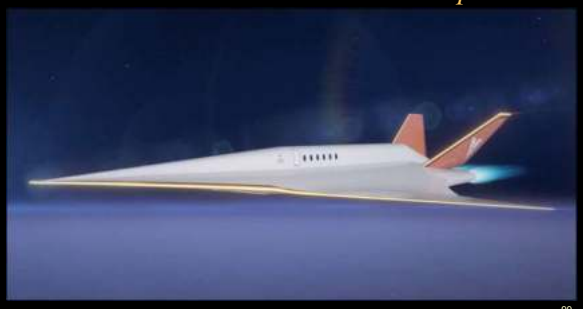
Venus Aerospace



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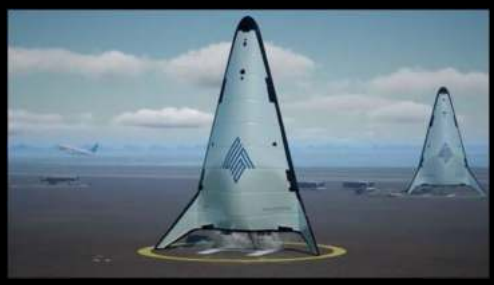
New Frontier Aerospace



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Destinus

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Potential Orbital Point-to-Point Systems

Vehicle	Takeoff	Landing	Speed
• Rocket Lab Neutron	V	V	M25
• Stoke Space	V	V	M25
• Radian Aerospace	H	H	M25
• Sierra Space Dream Chaser	V	H	M25
• Blue Origin New Glenn	V	V	M25
• SpaceX Starship	V	V	M25

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Rocket Lab Neutron

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Stoke Space

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Radian Aerospace

105

Sierra Space Dream Chaser

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Blue Origin New Glenn

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SpaceX Starship

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Starship Used for Point-to-Point Transportation

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SpaceX Starship

Point-to-Point Capabilities

- Can reach most destinations in less than 30 minutes
- Anywhere on Earth in less than 1 hour
- Pressurized volume is greater than an Airbus 380
- Could carry several hundred passengers or 100 metric tons of cargo
- Cost could be as low as $2M per flight (including about $1M for propellant)
- Ticket price: "A little more than economy class; cheaper than first class" [per Gwynne Shotwell]

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Proposed Next Steps

- Organize stakeholder discussions involving U.S. Space Force, FAA, NASA, Global Spaceport Alliance Members, Vehicle Developers, and interested international partners.
- Assess potential barriers to testing and operations.
- Identify needed changes to policies, laws, regulations, and procedures.
- Recommend flight trajectories and/or corridors that could be used for vehicle testing and demonstrations.

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GSA Initiative 2: Building the Future Global Workforce For Aerospace

Alice Carruth
Public Information Officer
Spaceport America

SPACEPORT AMERICA

SPACEPORT GLOBAL ALLIANCE

PATHWAYS WORKSHOP SERIES

Session 1:
March 18, 2023 | 11:00 A.M. EST
Topic: Resume Building

Session 2:
April 1, 2023 | 11:00 A.M. EST
Topic: Entrepreneurship

Session 3:
April 15, 2023 | 11:00 A.M. EST
Topic: Future Careers In Aerospace

Session 4:
April 29, 2023 | 11:00 A.M. EST
Topic: How To Build Relationships With Your Local Spaceport.

PARTNERSHIP BY:

SPACEPORT AMERICA SPACEPORT GLOBAL ALLIANCE

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2023 GSA Academic Partnership WG Project

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2023 GSA Academic Partnership WG Project

SpaceportAmericaCup.com SoundingRocket.org

GLOBAL SPACEPORT ALLIANCE

GSA MEMBER REPORTS

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Air Liquide

Air Liquide Space Highlights 2022

GSA - Annual Space Summit
Monday Feb 20, 2022

Air Liquide
February 2023
A.Bergman

THIS DOCUMENT IS PUBLIC

Air Liquide - Space Highlights

To meet an increasing demand - Key Upgrades at the largest Spaceports in the world

KSC N2 system - Artemis

Vandenberg N2 System - Delta Heavy

Kouru ELA4 Pad

Quality Metal Fabrication / Manufacturing - Key to Success
Welding Gases, Equipment, Hardgoods and Safety
Welding processes & Optimization
From Tier 1 to Rocket Mfg to Launch pads

N2 Back up at KSC and VSFB

Air Liquide

Air Liquide - Space Highlights

HighTech - "Snapshot"

- **Propellant behavior** and related CFD (O2, H2, He , LCH4)
- **Design & production of cryogenics launchers equipments**
  - lines, tanks, PMD's
- **Material characterization tests** in cryogenic conditions
- **Cryocooling systems for satellites**
  - IR cryocooling systems
  - Gaz management for electric propulsion

MELFI

Herschel

Future - Contribution to The "New Era"

- **In Situ Resources Utilization & Life Support**
  - **Energy Management**
  - **O2/ H2 technologies**
  - **Liquefaction & zero boil off**
- **Earth to Space**
  - **Gas purification techniques**
  - **In orbit cryogenic refueling**

1 | THIS DOCUMENT IS PUBLIC | Name of the presentation | Air Liquide

Cecil

Cecil Spaceport

Global Spaceport Alliance Update – February 20, 2023

[redacted]
Director, Cecil Airport & Spaceport

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Approach Rd. Extension

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Mission Control Center

122

Mission Control Center

123

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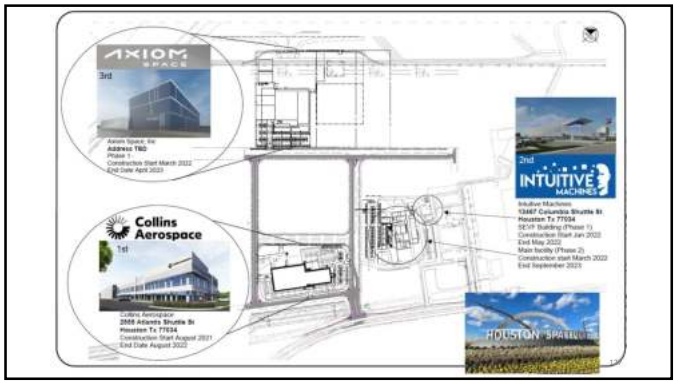
Roy Kirk

North Coast Space Cluster
UK



JACOBS AEROSPACE EXPERIENCE

Jacobs has been involved in the development of **every major U.S. launch complex** since the 1950s. We have experience with all types of launch facilities, including **Federal Launch Sites, Commercial Spaceports**, and **Dual-Use Facilities** (Airport/Spaceport).

RECENT PROJECT WORK

Houston Spaceport
Land Use Plan & Design Standards

Kennedy Space Center
NASA / JACOBS
Artemis SLS Integration

Maine Space Complex
Launch Site Plan & Renderings

OKLAHOMA SPACE INDUSTRY DEVELOPMENT AUTHORITY

February 20, 2023

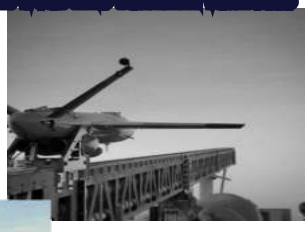
OK AIR & SPACE PORT AT CLINTON-

AIRCRAFT TESTING: BOEING 777-9 AND 737 MAX 10

[redacted]

Kratos is a world leader in autonomous systems:

Air Wolf Tactical Drone System Completes Successful Flight at Oklahoma Air & Space Port at Clinton-Sherman Airport (KCSM)



– and not just simply in the aerospace sector . . .

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FIRST EVER INTERTRIBAL SPACE CONFERENCE

Clinton

2022 Intertribal Space Conference
November 15th – 17th
Clinton, Oklahoma
Now Open for Early Registration
Topics Include:
Tribal Space Sovereignty, Tribal Space Port, Tribal Satellite Constellation, Tribal Data Sovereignty, Space Development and Exploration, Space Law, Cybersecurity, Homeland Security, Geospatial Intelligence and more...

NEW BUSINESS

Premium Aerospace Center (PAC) makes commitment to a multi-million-dollar investment aiming to bring hundreds of jobs to SW OK!

Page 136

OKLAHOMA SPACE INDUSTRY DEVELOPMENT AUTHORITY

Page 137

January 2023 / FY 4rd Quarter Update

Evolving Aerospace | *Business Plan Initiatives FY 23*

Champion: Victoria Mechtly

Business Unit Team Members: Andrew Nelson, Josh Saltsman

Grow the aerospace group clients bases, skill base and utilization within the organization and to other markets.

– Reestablish our position with NASA, returning to their preferred vendor status utilizing many of the capabilities we currently offer. A comprehensive client engagement plan will be developed.

– NASA continues to consult with the team regarding the upgrades to the ML-1 to cover the delayed ML-2.
– NASA has provided a clear picture of what will come out from SERAE. This provides the necessary information to meeting with the Centers.

Task: Reestablish our position with NASA		
Milestone Elements	Completed by	Status
NASA meeting frequency increasing along with relationships	FY 23 Q 3	
Meet with Engineering Directorates at NASA Centers, Holidays will slow down meeting with other centers	FY 23 Q 4	

– Focus our aerospace and equipment team toward growing our position with the well-known and emerging private aerospace companies. A key element of this strategy is to acquire a strategic hire specializing in aerospace sales with existing high-level relationship with traditional aerospace companies (e.g., Boeing) to immediately increase our name recognition and help us develop a comprehensive plan to pursue this market.

– Andrew Nelson integration into the team. Contract signed with a commercial provider and a second one is in the works to provide engineering support.

Task: Grow commercial relationships and identify key hire		
Milestone Elements	Completed by	Status
Hire New Commercial and Spaceport Planning Aerospace Leader	FY 23 Q 3	
Build brand recognition through national platform	FY 23 Q 2	
Increase number of conferences attended by aerospace client managers	FY 23 Q 4	

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January 2023 / FY 4st Quarter Update (continued)

Evolving Aerospace | *Business Plan Initiatives FY 23*

Champion: Victoria Mechtly

Business Unit Team Members: Andrew Nelson, Josh Saltsman

Grow the aerospace group clients bases, skill base and utilization within the organization and to other markets (like industrial-type work).

- Taking advantage of our existing high-end engineering skills to explore and make recommendations to enter the new heavy industrial equipment niche. In addition to a marketing plan, we may determine the need for a future strategic technical hire.
  - This continues to remain on hold till other items are in full motion

Task: Expand to new markets		
Milestone Elements	Completed by	Status
Conduct research on current capabilities	FY 23 Q 4	
Develop report overlaying capabilities with potential market opportunities in a new industry	FY 23 Q 4	
Identify potential Key Hire to pave the way into the new market	FY 23 Q 4	

- Utilize our current engineering skills to support other marketing areas including hydrant fueling and large volume/high pressure fluid and gas storage in aviation; site civil engineering for our infrastructure and buildings markets; and other high-level skill sets for other applications. We will develop a plan, obtain additional research on key service areas, and implement an internal marketing campaign to build awareness with existing client managers across the enterprise.
  - The Team continues to develop stronger connections within the organization to provide our expertise.
  - Civil team continues to be a resource utilized by others within FL

Task: Internal utilization of technical expertise		
Milestone Elements	Completed by	Status
Conduct internal presentation of Aerospace Capabilities to large offices	FY 23 Q 3	
Discuss need for more site civil engineering support and expanding that capability from the aerospace group to support other groups	FY 23 Q 3	

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How to Connect the Space Curious to the Space Serious

Christina Korp

Founder

SPACE for a Better World

SPACE FOR A BETTER WORLD

GLOBAL SPACEPORT ALLIANCE

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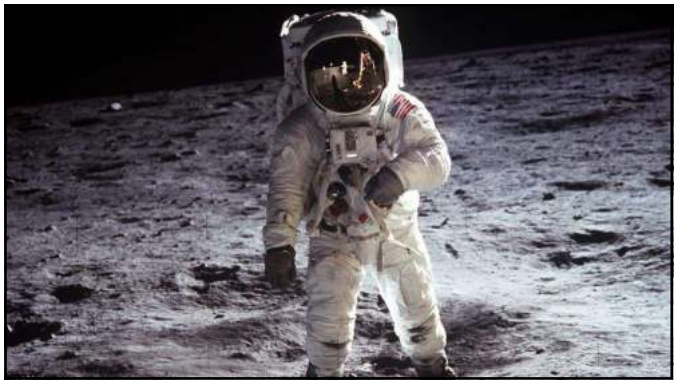

From left: SpaceX Astronaut Dr. Sian Proctor, NASA Astronaut Nicole Stott, Oana Tucker, Poppy Northcutt - 1st Woman to work in NASA's Mission Control, NASA Astronaut Susan Kilrain, South Korea's 1st and only astronaut, Soyeon Yi, Rebecca Puttock, JAXA Astronaut Naoko Yamazaki Center - Christina Korp

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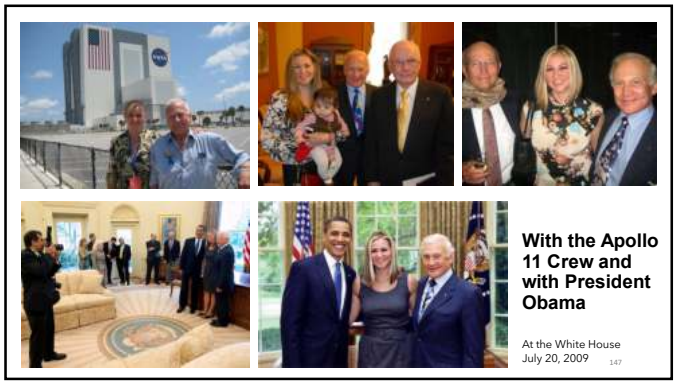

With the Apollo 11 Crew and with President Obama

At the White House
July 20, 2009

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With Stephen Hawking in his office at Cambridge University in 2012 and again at his home in 2017

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These sisters who grew up in Turkey led me to a new purpose – inspiring people to #aimhigher for their dreams using the awe and wonder of space exploration.

This is Sermin and Pervin.

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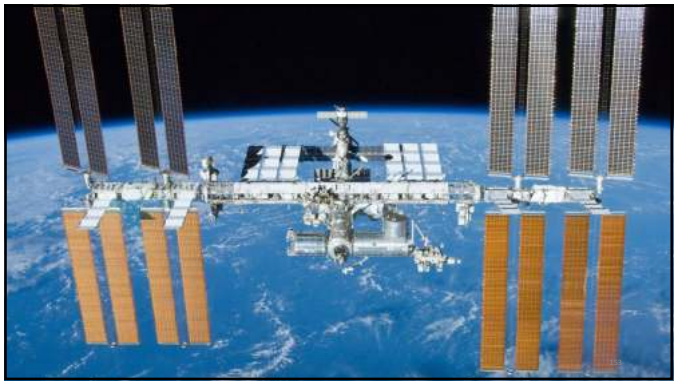
MY NEW MISSION

CONNECTING THE SPACE CURIOUS TO THE SPACE SERIOUS

WHAT DO THESE ITEMS HAVE IN COMMON?



SPACE
FOR A BETTER WORLD

Learn more about me, SPACE for a Better World and my outreach projects at:

PurposeEntertainment.com

SPACEforaBetterWorld.com

Follow on Twitter & IG: @xtina_korp & @spacefabworld

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Space Florida | Be where new ideas take off™

Spaceport Improvement Program

Current call for projects is out, applications due March 15, 2023

Past projects

SpaceX's new processing and Starship manufacturing facility

Cecil Spaceport improvement to its operations control center and payload process to enable commercial launch operations

Blue Origin's new pad at Launch Complex 36

Boeing's Starliner assembly

Airbus OneWeb Satellite facility

United Launch Alliance's improvements to Launch Complex 41 to enhance capabilities for medium/heavy vehicles at Cape Canaveral Spaceport.

Over the past 10 years...

- 37 Major Projects
- 2575+ Direct Jobs
- $326M+ State
- $1.18B+ Private
- $1.5B+ Total

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Space Florida | Be where new ideas take off™

Project pipeline

$5.5 Billion	Total value of 2023 project pipeline
149	149 projects in the pipeline; 78 in the leads phase, 61 in the opportunities phase, 10 in the closing phase
26	26 different counties represented, 6 of which are designated rural areas of opportunities

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moonpioneers.spacenation.org
MOON PIONEERS MISSION
space nation
MOON PIONEERS MISSION
space nation
SPACE NATION - Confidential ©2023
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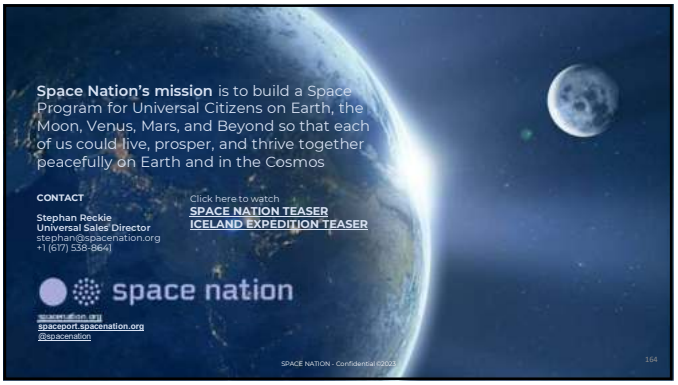
Space Nation's mission is to build a Space Program for Universal Citizens on Earth, the Moon, Venus, Mars, and Beyond so that each of us could live, prosper, and thrive together peacefully on Earth and in the Cosmos
CONTACT
Stephan Reckie
Universal Sales Director
stephan@spacenation.org
+1 (617) 538-8641
Click here to watch
SPACE NATION TEASER
ICELAND EXPEDITION TEASER
space nation
spaceport.spacenation.org
@spacenation
SPACE NATION - Confidential ©2023
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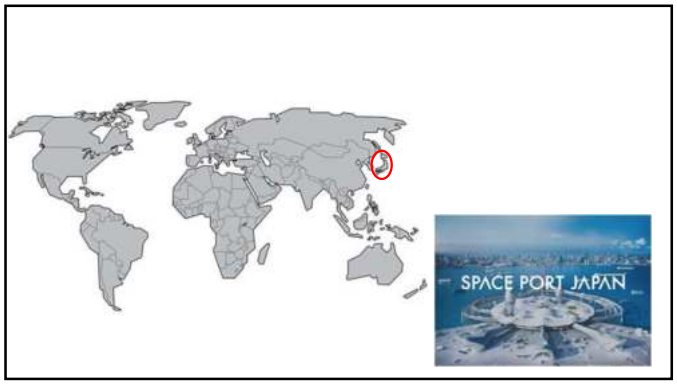
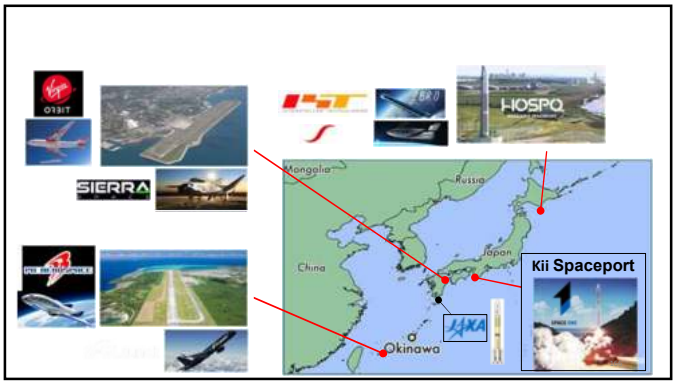

SPACE PORT JAPAN


ORBIT
SIERRA
HOSPO
Mongolia
Russia
China
Japan
Okinawa
Kii Spaceport


SPACEPORT AMERICA- 6 TENANTS
UP Aerospace
AeroVironment
SPACELAUNCH
THE SPACE TO BE...™
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SPACEPORT AMERICA #THESPACETOBE
SpinLaunch has continued high-energy kinetic test fights
USAF Thunderbirds completed 2 ½ weeks of winter training, which included over 90 persons in hotels for over 2 weeks
US Military Academy West Point rocket launched in April
AeroVironment small UAV training and testing
Two HAPS (High Altitude Platform System) customers this fall
STEM Outreach including virtual, site tours/demos etc.
Largest ever Spaceport America Cup was held in June
Virgin Galactic operations Q2 2023
UP Aerospace Rocket Launch planned for spring 2023
PBS and National Geographic documentary recorded
Kinetic launch customer to be on site this spring
Liquid and solid rocket engine testing happened this fall
Suborbital liquid rocket launch in 2023
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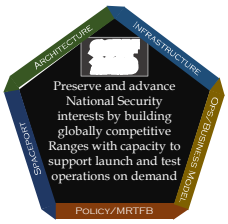
[redacted]

Only FFRDC Exclusively Supporting our Nation's Space Enterprise

- Direct support to Space Systems Command's Director of Assured Access to Space (AATS) in achieving the USSF Chief, Space Operations (CSO) vision for Spaceport of the Future (SOTF) 2028
  - Since 2018, Co-led the Range of the Future (ROTF) Task Force; now supporting the SOTF Senior Steering Group
  - Technical support across the Spaceport of the Future (SOTF) five lines of effort
- Supporting the National Spaceport Interagency Working Group (NSIWG)
  - Assist in the drafting of a National Spaceport Strategy
- Envisioning Spaceport ecosystems needed to support the future "In-Space" economy; specifically, in support of AATS's new space mobility and logistics mission area



FFRDC = Federally Funded Research & Development Center

[redacted]

Enabling a New Space Paradigm: Harnessing Space Mobility and Logistics

Read the Paper Today

- For SM&L capability areas, USSF can adopt one or more of four general acquisition approaches:
  - Participant – Strategic Customer
  - Anchor Tenant – Full Owner
- Aerospace assessed 6 capability areas and assigned commercial viability and application agnosticity to determine appropriate approaches

Company Highlights

Demand for launch pads exceeds supply

To solve this, we are building a new kind of **spaceport infrastructure system**

Signed **$145M in letters of intent** from commercial customers

Signed collaboration agreement with the **Virginia Commercial Spaceflight Authority**

First **demonstration** scheduled for May 2023

FAA and DOD **approved our designs** to operate for our operational system

We can augment your spaceport's capabilities and streamline your operations.

info@thespaceportcompany.com

Global Spaceport Alliance
Membership Update
Exploration Spaceport

FLY SPACE COAST
TITUSVILLE-COCOA AIRPORT AUTHORITY
TIX, COI, X21

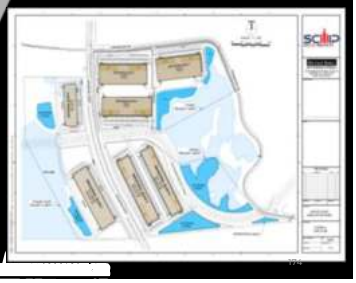
- Official Name Change
- Spaceport Master Plan Update
- Rocket Testing Facility
- Space Coast Innovation Park & Associated Infrastructure

Kevin Daugherty, AAE
Director of Airports
February 20, 2023

[redacted]

Global Spaceport Alliance
Membership Update
Exploration Spaceport

FLY SPACE COAST
TITUSVILLE-COCOA AIRPORT AUTHORITY
TIX, COI, X21



Kevin Daugherty, AAE
Director of Airports
February 20, 2023

[redacted]

GLOBAL SPACEPORT ALLIANCE SUMMIT

UK DEPARTMENT FOR TRANSPORT

We are Virginia Space

- Virginia Commercial Space Flight Authority is a political subdivision of the Commonwealth of Virginia
  - owns and operates the Mid-Atlantic Regional Spaceport (MARS)
- MARS is a spaceport akin to an airport
  - includes three launch pads, Unmanned Aircraft Systems (UAS) Airfield, Payload Processing Facility (PPF), Integration and Control Facility (ICF)
- Virginia Space will soon own the entire launch value chain
  - rocket manufacturing, payload processing, integration, and launch

AA0

We are Virginia Space

- Successfully launched the first Rocket Lab Electron rocket from U.S. soil in January 2023
  - Additional Rocket Lab launches scheduled in the next AA0 AA1 e months.
- The last of Northrop Grumman's Antares 230 series rocket will launch in the Spring 2023
- Educational outreach continues
  - Memorandum of Understanding (MOU) signed between Eastern Shore Community College and Virginia Space in January 2023
  - Formally establishes a long-term professional internship program
- These are exciting times for the Commonwealth as a whole and for the Eastern Shore
  - Virginia Space is honored to be a part of the growth of the aerospace sector and economic development

VIRGINIA SPACE

VIRGINIA COMMERCIAL SPACE FLIGHT AUTHORITY
MARS
Mid-Atlantic Regional Spaceport

XARC
Exploration Architecture Corporation

ASTROPORT
SPACE TECHNOLOGIES

GSA Working Group Reports

Point to Point:
Oscar Garcia, Founder & CEO, InterFlight Global Corp.

Academic Partnerships:
Alice Carruth. Public Information Officer, Spaceport America

Policy:
Matt Anderson, Senior Advisor of Government Affairs, Air Liquide

Infrastructure Funding:
Victoria Mechtly, Business Development Aerospace & Federal, RS&H

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SPACEPORT TO SPACEPORT (S2S) AIRSPACE GUIDING PRINCIPLES

SUBORBITAL FLIGHT FOCUS

2023
GSA ANNUAL SPACEPORT SUMMIT

Oscar S. Garcia, MBA, ATP, Chairman, High Speed Flight
February 20th, 2023

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S2S FLIGHT OPPORTUNITIES

A MULTI $ TRILLION GLOBAL ECONOMY

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Spaceport to Spaceport (S2S) Suborbital Space Flight

- Working Group
- S2S Opportunities
- S2S Challenges
- S2S Solutions
  - S2S Airspace- White Paper
    - Scope and Intent
    - Strategy and Goals
    - Structure and Contents
    - First Release

Conclusions and Next Steps

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Point-to-Point (PTP) is a category of sub-orbital and orbital flight in which a space vehicle provides rapid transport between two locations (i.e., two cities)
FAA CSINAS, May 2020

Spaceport-To-Spaceport is (S2S) is the equivalent to P2P flight operations between two Licensed Spaceports
GSA-HSF-FF Working Group Definition

HIGH SPEED SPACEPORT TO SPACEPORT SPACEFLIGHT

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Introduction to the S2S Working Group

- Sponsors Synergies-Highlights
- FastForward Project (FF) and Global Spaceport Alliance (GSA)

Group/Activity	GSA	HSF-Fast Forward
Infrastructure -Ground	Facilities	Flight Navigation Systems
Infrastructure-Airspace	Spaceport and Terminal Area-	Departure-Enroute-Arrival
Regulations	Spaceports	Vehicles-Licensing, Permitting and Certification
Environmental	Ground	Air
Supply Chain	Facilities	Vehicle Parts
Business Model	Charges Ground	Charges Inflight
Interaction With Aviation (supersonic and hypersonic)	Ground	Air

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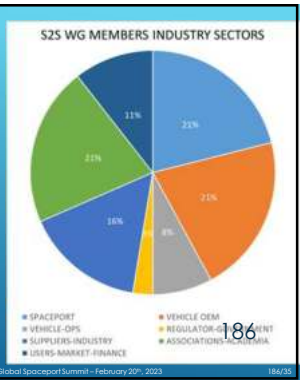
Introduction to the S2S Working Group

- 35+ Members
- Balanced industry wide membership
- Bi-Monthly meetings since June 2020



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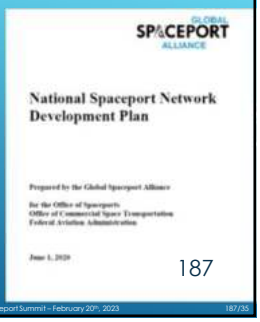
SPACEPORT-TO-SPACEPORT Transportation

- Background:
  - Global Spaceport Alliance- National Spaceport Network Development Plan (June 2020)
    - S2S Programmatic Initiatives

The U.S. Government should establish a goal of leading the world in Point-to-Point transportation through space. Accomplishing this challenging goal will require a partnership between government, industry, and academia, and will involve not only advances in engineering and technology, but also work in policy, law, regulations, missions and security, flight and ground operations, market analysis, and economics.

The government should promote the establishment of a multi-million dollar aerospace prize to advance the state of the art and generate interest and excitement in the media and the general public.



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S2S SUBORBITAL FLIGHT CHALLENGES AIRSPACE

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A DENSE AND GROWING NETWORK OF INTERNATIONAL SPACEPORTS

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A DENSE AND GROWING NETWORK OF US SPACEPORTS

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S2S WORKING GROUP

FOCUSES ON EXISTING S2S CAPABLE VEHICLES:

A VARIETY OF DISTANCES AND USES, CONOPS
- -R&D, T&E
- -DEMOS-POC
- -COMMERCIAL

DOMESTIC US- PHASE I
INTERNATIONAL-PHASE II

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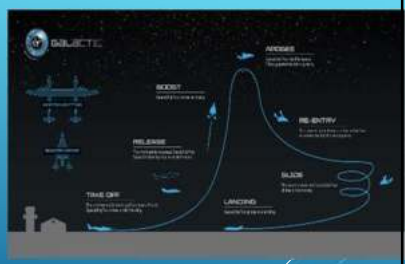
- Launch and Re-entry airspace is well regulated, understood
- Airspace management and standardization is progressing well (i.e., New SLRL FAR 450)
  - Roadmaps for integrating launch and re entry into the NAS
  - Roadmap to reduce airspace segregation and Hazard Areas is in place
  - Tools such as the Space Data Integrator (SDI) are developing rapidly



Credit: TSC

HIGH SPEED SPACEPORT TO SPACEPORT SPACEFLIGHT

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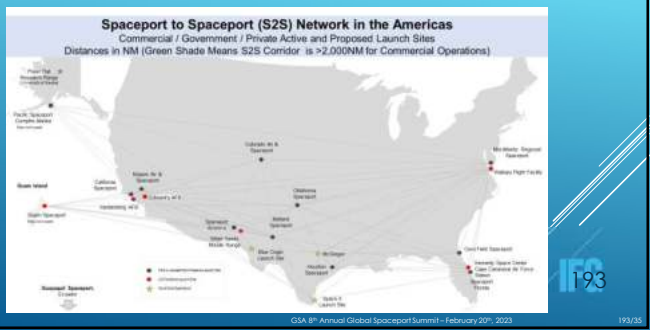
A POSSIBLE US S2S NETWORK-FIRST STEP



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A POSSIBLE US S2S NETWORK-FIRST STEP

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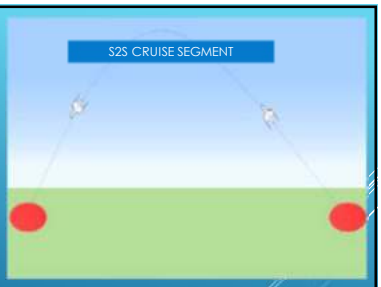
Problem-> licensing for S2S suborbital flight is new to the FAA and Industry

- **Suborbital flight** is flight without orbital insertion, or the intentional flight path of a launch vehicle, reentry vehicle or any portion thereof, whose vacuum instantaneous impact point does not leave the surface of the earth 49 U.S.C. 70102(20)



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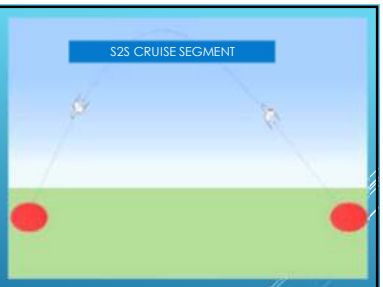
HIGH SPEED SPACEPORT TO SPACEPORT SPACEFLIGHT

Problem-> licensing for S2S suborbital flight is new to the FAA and Industry

- **Licensing for a S2S mission with a "cruise" or "coast" segment requires attention by industry and the FAA**
  - **Licensing assumes launch ends at "apogee"** and reentry commences immediately thereafter (FAR 450.3 (iii)
    - **No Provision for cruising at "apogee altitude"**



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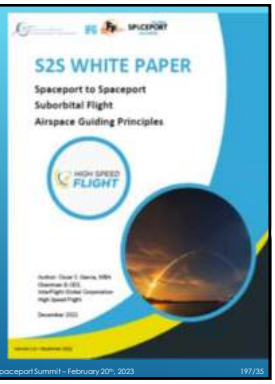
HIGH SPEED SPACEPORT TO SPACEPORT SPACEFLIGHT

S2S AIRSPACE SOLUTION GUIDING PRINCIPLES WHITE PAPER

SUBORBITAL FOCUS NATIONAL S2S NETWORK



SPACEPORT-TO-SPACEPORT Airspace Corridors White Paper

- **Scope**
  - Characterize and list the initial taxonomies, feasibilities, barriers, opportunities and preliminary design considerations of S2S airspace corridors or "spaceways"
- **Strategic Goal**
  - Produce a foundational document to guide future S2S airspace corridors and "spaceways" efforts aligned with the industry development and progress

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S2S WORKING GROUP AREAS OF INTEREST 2021:

- **Airspace S2S White Paper-Guiding Principles as** first step
- **S2S Corridor Design- R&D (~100+NM) vs Transportation (2,000+NM)**
- Vehicle performance at Spaceports of origin and destination (takeoff-vs launch, Landing vs. Reentry)
- Environmental considerations: Noise, emissions and vibration for frequent S2S operations
- US vs International Ops- UN Treaties and agencies

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

- **Expectations:**
  - **To trigger the commercial space industry and spaceflight stakeholders' early interest** and "buy-in" to design and enable safe and seamless Spaceport to Spaceport airspace corridors or "Spaceways"
  - **Establish the GSA and HSF-FF and their WG's as thought leaders in the S2S airspace corridors guidance**
  - **Informing and being informed by S2S airspace stakeholders,** to avoid duplication of efforts and achieve
  - **Industry consensus for standards and best practices**

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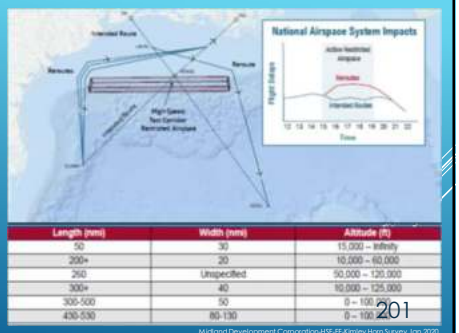
GAP ANALYSIS:

INITIAL AIRSPACE TAXONOMIES, DEFINITIONS,

FEASIBILITY AND DESIGN ANALYSIS TOOLS

GUIDED BY SURVEYS RESPONSES AND INDUSTRY DATA



Length (nmi)	Width (nmi)	Altitude (ft)
50	30	15,000 – Infinity
200+	20	10,000 – 60,000
250	Unspecified	50,000 – 120,000
300+	40	10,000 – 125,000
300-500	50	0 – 100,000
430-530	80-130	0 – 100,000

Midland Development Corporation-HSF-FF-Kimley Horn Survey Jan 2020

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INITIAL AIRSPACE TAXONOMIES, DEFINITIONS, FEASIBILITY AND DESIGN ANALYSIS TOOLS

GUIDED BY CASE STUDIES: I.E., MIDLAND-SPACEPORT AMERICA CORRIDOR

Midland Development Corporation-HSF-FF-Kimley Horn Survey Jan 2020

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INDUSTRY INPUT TO WG

SURVEYS 2020-2021:

TO IDENTIFY, LIST AND CHARACTERIZE RELEVANT AREAS OF INTEREST FOR THE BENEFICIAL USE OF STAKEHOLDERS PARTICIPATING IN THE HIGH-SPEED S2S AEROSPACE TRANSPORTATION INDUSTRY IN THE **NEAR AND MID-TERM FUTURE**

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Spaceports:

- **Licensed Launch Sites and Spaceports in the USA supporting S2S flight operations should compete and collaborate at the same time. Such activity is known as "Coopetition"** and enables a network of S2S airspace routes or corridors supporting the safe, efficient and scalable transportation of goods and people on suborbital spaceflight vehicles.
  - Suborbital S2S missions will require both origin and destination spaceport co-preparation of the required flight corridor to accommodate the flight profile as per FAR 450
- **Spaceports and Launch Site Operators supporting suborbital flights should ensure CFR 14 FAR 420 License to Operate a Launch Site regulations are relevant and support S2S commercial flights for the transportation of payloads and people**. Particularly as related to Appendix A- and Appendix B Methods for Defining a Flight Corridor

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Spaceports:

- **S2S Flight corridors will include portions of Upper-Class E airspace. Upper Class E airspace is becoming more congested with time. Spaceports must preempt and manage the portions of S2S airspace crossing Upper Class E Airspace** in close collaboration with the relevant air traffic managers and operators
- **Spaceports and related launch and reentry sites should plan for adequate S2S corridors dimensions**
  - S2S Corridors with lengths up to and exceeding 2,000NM separation between spaceports-launch and reentry sites are suitable for R&D and T&E suborbital missions
  - S2S Corridors with lengths' more than 2,000NM separation between spaceports-launch and reentry points are suitable for commercial flights carrying cargo and people onboard

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Airspace:

- **S2S airspace needs to integrate seamlessly and with minimal changes into the National Airspace System rules and regulations (i.e., Visual flight Rules (VFR) and Instrument Flight rules (IFR)**
- **S2S airspace volumes to emerge as "one-off" segregated airspace for R&D, T&E** and demonstrations and evolve into on-demand standardized corridors **and eventually into charted or "published" airspace**
- **The S2S Suborbital Transit or "cruise" phase of flight must be defined by CFR 14 FAR 450.1 and included in Subpart C-Safety Requirements and CFR 14Suborbital Mission Analysis**
- **S2S Airspace Corridors development technical approach include Air Traffic-National Airspace System (NAS) Simulation Models** (i.e., Terminal Area Route Generation Evaluation and Traffic Simulation (TARGETS)) and Dynamic ATMC research Technology (DARTS) and with current air traffic routes, including airspace and weather considerations for the launch, "cruise" and reentry phases of a S2S suborbital mission. **Key performance indicators to include, delays, rerouting and other traffic flow considerations for Enroute and Terminal Departure/Arrival ATC centers.**

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Airspace:

- **Corridors Dimensions (GSA-HSF-FF Surveys as of 12/2022 ~75 responses)**
  - https://surveys.benchmarkemail.com/Survey/Start?id=1395206&s=696900

S2S CORRIDOR PURPOSE	LENGTH	WIDTH	HEIGHT
R&D, T&E	0-ANTIPODAL MAXIMUM ~12,500 NM	40-130 NM	GROUND-UNLIMITED
COMMERCIAL OPS	2,000-MAXIMUM ANTIPODAL 12,500 NM	20-130 NM	FL 600-UNLIMITED

- S2S Suborbital Airspace Corridors Design Is Most Effective Based on Real Flight Experience and Data
  - Data collection, analysis and databasing of all "flown" Suborbital flight trajectories regardless of their flown cross range is key to enable future S2S flight operations with expanding cruise segments
  - Dimensions and Characteristics of S2S corridors informed by stakeholders involved in suborbital spaceflight activities (ground and air ops) via surveys and data analytics
  - S2S corridors development ideally always aligned with FAA AVS-AST, SDO's and other government agencies DOD, DOC (for Suborbital transit or cruise stage), NASA, et al

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Airspace:

- **S2S Suborbital Airspace Corridors Seamlessly Integrated with existing endo-atmospheric (i.e., Aviation) CFR 14 FAR 91, 135, 121, et al airspace Rules, Standards, Practices and Regulations**
  - S2S corridors users to seek equitable access with other users of airspace, atmospheric and space
- **S2S Suborbital Airspace Corridors to Seamlessly Integrate with existing CFR 14 FAR 450 Launch and Reentry Rules, FAR 420 Launch and Reentry Site Operators, and related Standards, Practices and Regulations**
  - S2S corridors development ideally always aligned with FAA AVS-AST, SDO's and other government agencies DOD, DOC (for Suborbital transit or cruise stage), NASA, et al

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Airspace:

- **S2S Suborbital Airspace Corridors Safety Focus on "cruise" phase collision avoidance to meet or exceed orbital separation and probability of collision standards**
  - If the maximum altitude of a S2S flight is 150Km or higher, a collision avoidance analysis must be performed according to FAR 450.169
  - If below 150Km, novel definitions and dimensioning of S2S corridors is necessary
    - Most US S2S missions linking licenses Spaceports are forecast to be flown at altitudes below 150Km.
  - S2S Corridors are to meet and exceed separation and probabilities of collision requirements for suborbital flights above 150Km.
- **Launch and Launch window, Reentry a Reentry window should be time and position "gates" in the planned trajectory of a suborbital S2S flight mission**
  - Definitions should be included in both the FAA 450 and US DOC Office of Space Commerce (OSC) definitions

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Airspace:

- **Suborbital S2S Vehicles exceeding an apogee of 150Km are subject to Collision analysis and separation criteria as per FAR 450.169**
  - For S2S flights with apogees less than 150Km, separation criteria needs to be defined for instance, as industry voluntary consensus standards
- **Suborbital S2S Operations should coordinate the "cruise" orbital transit phase with:**
  - The US DOC (new regulation, standards or practices required) and the Launch and Reentry Spaceports as required by FAR 450.181
  - The FAA as the Suborbital S2S "cruise" phase is defined as the orbital parameters for Collision Analysis (FAR 450 Appendix A)

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

- **Vehicles:**

- **For the purposes of S2S suborbital spaceflight missions, a Suborbital Vehicle is defined as a licensed launch vehicle or Space Support Vehicle (SSV) that is designed to achieve trajectories not completing a full orbit of the earth.**
- **Spaceflight vehicles operational performance should comply with CFR 14 FAR's aviation and space flight regulations for the following flight phases:**
  - Departure and arrival to/from spaceports
  - Launch and reentry to/from launch and reentry sites, and
  - Suborbital transit or cruise phase between the launch and reentry points

- ASTM F47 Commercial Spaceflight Committee F3377-20 Standard Terminology Relating to Commercial Spaceflight
- CFR 51 USC 50902(22) space support vehicle (22) "space support vehicle" means a vehicle that is— (A) a launch vehicle; (B) a reentry vehicle; or (C) a component of a launch or reentry vehicle.

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SPACEPORT-TO-SPACEPORT S2S GUIDING PRINCIPLES

Vehicles:

- **Suborbital spaceflight vehicles on S2S missions should complete sonic boom, environmental reviews and flight safety analysis as per applicable CFR 14's.**
- **Suborbital spaceflight vehicles' performance should be compatible with other airspace users in Upper Class E airspace (FL 600 and above) and with CFR14 FAR 91 Instrument and Visual Flight Rules (IFR/VFR) below Flight Level 600, and particularly in the terminal Spaceport area.**
  This consideration would enable the reduction and eventual elimination of "segregated" airspace for S2S suborbital flight missions.

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SPACEPORT-TO-SPACEPORT Airspace Corridors White Paper

- **Next Steps-Forecasts**
  - **Forecast industry Concepts of Operations (CONOPS)** to be used as "baselines" for airspace design and integration with other users (i.e., aviation)
  - **Forecast timelines for the industry need** to use S2S airspace corridors; proof of concept, entry into service and growth stages.
  - **Estimate the required lead-times** to enable the legislation, regulation and other S2S airspace enablers
  - **Forecast market demand, business case and economic impact metrics** of S2S airspace corridors, and their derived route networks
  - **Forecast best practices and standardization** areas needed to safely, economically effectively implement and operate the corridors connecting Spaceports located both in the United States and in foreign countries worldwide

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Comments:

- Please keep adding responses to S2S Corridors Design Inputs Survey on this link

https://surveys.benchmarkemail.com/Survey/Start?id=1395206&s=696900

- Join the S2S WG and, or to be part of the White Paper editorial team
- Goal is to publish WP V2.0 in Q4 2023

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S2S AIRSPACE CORRIDORS WORKING GROUP

THANK YOU

Oscar S. Garcia, MBA, ATP, Chairman, FastForward Project
Dr. George C. Nield, Chairman, Global Spaceport Alliance

Co-Chairs
SPACEPORT-TO-SPACEPORT Working Group

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GSA Working Group Reports

Point to Point:
Oscar Garcia, Founder & CEO, InterFlight Global Corp.

Academic Partnerships:
Alice Carruth. Public Information Officer, Spaceport America

Policy:
Matt Anderson, Senior Advisor of Government Affairs, Air Liquide

Infrastructure Funding:
Victoria Mechtly, Business Development Aerospace & Federal, RS&H

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GSA Academic Partnership WG Achievements in 2022

1. Supported local school groups through Orion's Quest ISS related project
2. Directed spaceport focused content creation at a local science institution
3. Curated on-line STEM content and provide on-line "clearinghouse" for teachers
4. Guided and supported local educators for the Teachers-in-Space program held in New Mexico
5. Provided global connection for school groups to spaceports represented by the Working Group

GLOBAL SPACEPORT ALLIANCE Academic Partnerships Working Group 2022/23

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Teachers-in-Space Workshop held in June 2022

- Educators from New Mexico and outside of the state participated
- Held at Challenger Learning Center in Las Cruces
- Educators invited to Firefly mission in September

Teachers in Space

Challenger Learning Center Las Cruces, NM

GSA Working Group Reports

Point to Point:
Oscar Garcia, Founder & CEO, InterFlight Global Corp.

Academic Partnerships:
Alice Carruth. Public Information Officer, Spaceport America

Policy:
Matt Anderson, Senior Advisor of Government Affairs, Air Liquide

Infrastructure Funding:
Victoria Mechtly, Business Development Aerospace & Federal, RS&H

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Innovative Cluster Development in the U.K.

Paul Cremin
Commercial Spaceflight Regulation & Policy Lead
U.K. Dept. for Transport

Melissa Quinn
Head
Spaceport Cornwall

Roy Kirk
Project Director, Highland and Islands Enterprise
Space Hub Sutherland

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Panelists Spaceports Need to Know About

Nate Whigham
President
EN Capital

Patricia Hynes
Director
New Mexico FAA Center of Excellence for Commercial Space Transportation

Craig J. Smith
Executive Director
Oklahoma Air and Spaceport

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Space Infrastructure Tax Credit

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Tax Credits

- Direct Credit to Tax Liability Issued by Taxation Authority
- Mechanism to Incentivize the Private Sector to Do Certain Things
- Many Flavors/Types
- Typically Finance a Portion of Total Project Cost (IE. ITC = 30%)
- Generally Used for Projects that are Privately Owned but Serve the Public Good and/or have Positive Externalities
  - Renewable Energy Development
  - Renovation of Historic Assets
  - Funding Projects in Economically Distressed Areas

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Why Tax Credits

- Total Amount of Federal Tax Liability was $4T in 2022
  - Huge Market
- Indirect Way for Government to Subsidize Certain Activities
- Different Ways to Monetize Tax Credits
  - Transferable
  - Co-Invest (Tax Equity Investment Partner)
- Large and Robust Secondary Market for Tax Credits
- Since Credits can be (Mostly) Monetized Quickly they can Fund Projects that are Not Cashflowing Yet
- Efficient (Mostly) Private Sector Monetization Mechanisms

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Examples

US
- Investment Tax Credit for Renewable Energy (ITC)
  - Directly Responsible for the Rapid Growth of Solar Industry in US
- Historic Tax Credits (HTC)
  - Administered by the Park Service for some Reason
- New Markets Tax Credits (NMTC)
  - Used to Develop Infrastructure and Businesses that Create Jobs (ex. Hotel) in Economically Distressed Areas
- Low Income Housing Tax Credits (LIHTC)

Canada
- R&D Tax Credits (Actually a Refund)

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Space Infrastructure Tax Credit (SITC)

- Federal Tax Credit for the Development of Space Infrastructure
  - Terrestrial
    - Spaceport
    - Ground Stations
    - Retrieval Sites
  - In-Space
    - Communications Infrastructure
    - Space Stations
    - In-Space Power Generation

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Space Infrastructure Tax Credit (SITC)

- Most Infrastructure Being Developed for Space Applications has Direct and Indirect National Security Benefits
  - Spaceports Allow Access to Space for Gov and Commercial Actors
  - Communications Infrastructure Maintains Military Operational Capabilities
  - Remote Sensing and Imaging Constellations Provide Critical Intelligence for Nat Sec
  - Space Stations Will Provide Operating Locations/Platforms for Space Force
- Conflict in Space = Space Force Will Appropriate Any Usef Infrastructure

GRAVITY CAPITAL PARTNERS

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Space Infrastructure Tax Credit (SITC)

- Space is Hard, Slow and Expensive to Develop
- US has a National Security Interest in Both Public & Private Infrastructure Being Developed in Space
- Tax Credits would Accelerate the Development of the Space Industry by Improving Access to Capital at Earlier Project Stages
  - Not a Panacea – Still Need Private Sector Investment to Fully Capitalize Projects

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Space Infrastructure Tax Credit (SITC)

We Propose that ANY Infrastructure Being Developed for Space Activity that Has a Direct or Indirect National Security Benefit or Has a High Probability of Being Appropriated by the Space Force in the Event of a Future Conflict should be eligible for a Space Infrastructure Tax Credit

More Conversations To Come…

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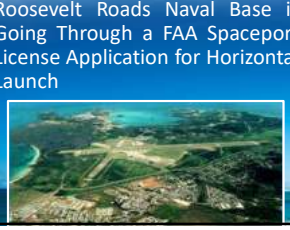
Puerto Rico Spaceport RFP

The Airport at the Former Roosevelt Roads Naval Base is Going Through a FAA Spaceport License Application for Horizontal Launch



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Puerto Rico Spaceport RFP

The Ports Authority Will be Issuing a Request for Proposals for a Spaceport Developer/Operator Very Soon

Puerto Rico is the Best Location in the US for a Launch Facility

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CONTACT INFO

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BIO

GRAVITY CAPITAL PARTNERS

Nathan Whigham has been placing debt and equity since 2006 and has been involved in over $1B of transactions up and down the capital stack. He is the Founder and President of EN Capital, a capital advisory firm based in San Juan, Puerto Rico. Prior to founding EN Capital he held positions at CleanFund Commercial PACE Capital & Nebo Capital, a boutique commercial real estate capital advisory firm. Nathan has also been a renewable energy developer and entrepreneur. He holds a graduate certificate in Space Law through the Law School at the University of Mississippi, an MBA from the Marshall School of Business at the University of Southern California, a BS in Systems Engineering from the University of Arizona along with a California Real Estate Broker's License.

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Space Finance White Paper

Download Link

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MOSS ADAMS

Appendix - Examples of Incentive Opportunities

FEDERAL	COLORADO	FLORIDA	OKLAHOMA	TEXAS	NEW MEXICO	CALIFORNIA
• Research & development tax credits • Solar and battery tax credits through the Inflation Reduction Act (IRA) • Semiconductor manufacturing incentives through the CHIPS Act • New Markets Tax Credit • Employee Retention Credit (ERC) • Aerospace Accounting Method Changes • Cost Segregation Studies	• Spaceport Trust Fund for infrastructure development • Colorado Aviation Development Zone Tax Credit • Enterprise Zone Program • Enterprise Zone R&D Tax Credit • Colorado Strategic Fund • Skill Advance Job Training Grant • Strategic Fund Growth Incentive • Job Growth Incentive Tax Credit (JGITC) • Location Neutral Employment (LONE) • Advanced Industries Programs	• Spaceflight property sales tax exemption • Sales tax exemption for M&E • Space launch vehicle fuels tax exemption • Space laboratory and cargo systems tax exemption • Government contracting tax exemptions • Research & development tax credits	• Aerospace industry engineer workforce tax credits • Capital expenditures in rural areas eligible for Rural Fund financing • Business expansion incentive program for job creation and/or facility or M&E investments	• Spaceport Trust Fund for infrastructure development • Texas Enterprise Fund grants for job creation and capital investments • Texas Enterprise Zone Program for investments in economically distressed areas • Research & development credits sales and franchise taxes	• Sales tax/gross receipts tax deduction for spaceport-related activities (i.e., launching, operating, recovering space vehicles/payloads) • High wage jobs tax credit for employees paid more than $40K • Investment tax credit equal to over 5% of qualified equipment when employment criteria met • Technology jobs and R&D tax credit for qualified research between 5-10%, subject to employment criteria	• California Competes Tax credit for expansion and/or relocation of operations within California, or companies considering leaving California • Partial sales tax exemption for purchases of machinery • CAEATFA sales/use tax exclusion for purchases related to alternative energy sources, advanced transportation technologies, and advanced manufacturing

An Essential Resource

U.S. Spaceports

Online Reference Guide

Https://contentdm.nmsu.edu

Patricia C. Hynes, Ph.D.

FAA COE-CST / New Mexico State University

Presented at the 8th Annual GSA Spaceport Summit
February 20, 2023
Orlando, Fl

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Overview

- Why people and organizations use this collection?
- What's in it?
- How do I use it:
- How do I get to it? Is it free?
- Isn't the FAA Office of Spaceports all I need?

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2023 FAA Spaceports Map

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U.S. SPACEPORT ONLINE REFERENCE GUIDE

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Your Card

Resource for industry researchers, air & spaceport executives, proposal preparation, emerging spaceports , federal/state government officials & universities

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New Category 13 – Spaceport Emergence Database

[redacted]

People who created and are still in the industry;
Topics - Finance; Governance; Jobs/Workforce; BD. Market Creation. Industry growth & Getting started.

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Spaceport Emergence Research Methodology

Interviewed: 19 current & past U.S Spaceport CEOs, BD Executives, Builders & State Officials. 450 pages of transcripts added.

Tracked Down: 300+ cited documents & added to the data base.

11 Spaceport Emergence Data Base Categories

Variables known to influence innovation in large systems

Legitimization; Finance; Governance; Market Creation; Workforce; Science & Technology R&D; Tech Development & Functions; Tech Standards, Innovation Network & Resource Channels; Spaceport Germination.

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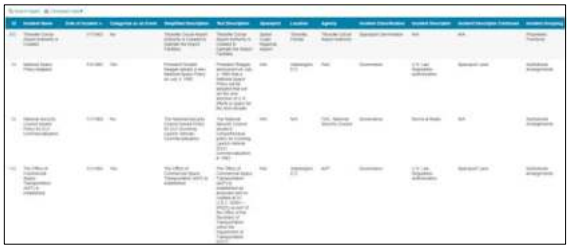
Typical Search Results in Category 13

Spaceport Emergence Database



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How to Operate and Navigate the Spaceport Emergence Data base instructions.

- See Instruction on Front Page of Category 13

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Acknowledgements

Thanks to Ken Davidian, Ph.D. & the FAA AST for having the foresight to support this research.

Thanks to George Nield, Ph.D for advocating to establish the FAA COE CST when he was the FAA AST AA

Congratulations to Kelvin Coleman: FAA AST AA

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GLOBAL SPACEPORT ALLIANCE

8th Annual GSA Spaceport Summit

Building the Spaceport Ecosystem

February 20, 2023 | Orlando, FL

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Offshore Launch Options

Tom Marotta
CEO

THE SPACEPORT COMPANY

SPACEPORT GLOBAL ALLIANCE

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What we've done

FAA-specific accomplishments

- Achieved the first Part 450 license
- Wrote the FAA launch forecasts and created the FAA forecast methodology
- Helped write portions of Part 450
- Secured licensing and range approvals for multiple launch companies
  - Federal and non-Federal, orbital and suborbital

Coast Guard-specific accomplishments

- Achieved the first "design basis approval" for launches from U.S. waters
- Only company approved to carry lox in bulk in U.S. waters

Demonstrated track record of successfully overcoming regulatory hurdles

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We can help

Market Reality Check

Part 420/433

Forecasting

Augment Existing Capacity

253

We are practitioners

We are building a spaceport infrastructure system on sea-based platforms to solve the problem of launch site congestion, support responsive, high-cadence operations, and enable point-to-point rocket travel.

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Demand is growing

Supply is limited

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How it Works

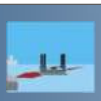
The rocket with fuel and payload are loaded onto the liftboat at the port. Fuel is in separate tanks on board the vessel.

Liftboat moves to launch point at sea. Extends legs, raises platform. Crew preps LV for launch, and then falls back to a nearby support boat.

Safety zones activated to protect public. Rocket is fueled from onboard tanks and launched remotely.

Crew returns and sails liftboat back to port for refurbishment for next launch. Potential turnaround time as little as 1 week.



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It's been done before.


Boeing


China


SpaceX


South Korea

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Our Partners

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We can help

Augment Existing Capacity

Market Reality Check

Part 420/433

Forecasting

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THE SPACEPORT COMPANY

info@thespaceportcompany.com

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Marketing Your Spaceport

Izzy House

Author

SPACEPORT GLOBAL ALLIANCE

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What is marketing?

The American Marketing Association's official definition is:

"Marketing is the activity, set of institutions, & processes for creating, communicating, delivering, & exchanging offerings that have value for customers, clients, partners, & society at large."

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It is EVERYTHING.

It is everything that is seen, heard, and experienced.

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Tale of two spaceports

SPACEPORT CORNWALL

Photos Courtesy: Virgin Orbit and Spaceport Cornwall

SPACEPORT CAMDEN

Photos Courtesy: SpaceX, Blue Origin, Vector, SpaceWorks Enterprises, and Camden County Board of Commissioners.

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Florian Martin / Houston Public Media

Houston Spaceport

"But, they have NASA."

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Space Port Japan Association https://nozarchitects.com/en/archives/works/space-port

What is a spaceport?

Hub for ***INSPIRATION, EDUCATION***, and ***TRANSPORTATION***

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Image credit: S.E.E. from https://variety.com/2022/film/news/filmstudio-space-1235157521/

1

Determine what is and what could it be

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www.spaceperspective.com

What a spaceport could be…

Space hub for growth of a local economy:

- **Innovation and production centers**
- **Research development**
  medical advances, pharmaceutical advances, etc.
- **Satellites**
  communications, internet, Earth monitoring of atmospheric conditions (storms, pollution, forestry, etc.
- **Hub for new manufacturing in space**
  pharmaceutical manufacturing, fiber optics, etc.
- **Tourism and hospitality**
- **Education**
  education initiatives, astronaut training, STEM, etc.

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https://boomsupersonic.com/partners

What a spaceport could be…

- **Vertical launch**
- **Non-Vertical launch**
  - **Spaceplane**
  - **Airplane with rocket**
  - **Balloon**
  - **Gliders**
- **Suborbital Supersonic aircraft**
- **Vertiports**

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2

Understand your AUDIENCE

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3

Develop your MESSAGE

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4

Deploy your MESSAGE

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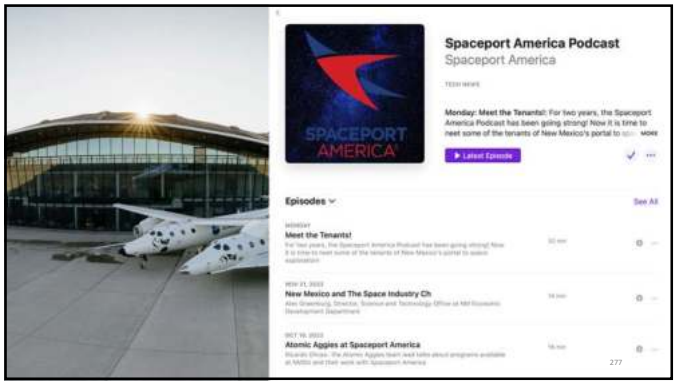
Spaceport America Podcast
Spaceport America
Episodes
See All
Meet the Tenants!
New Mexico and The Space Industry Ch
Atomic Aggies at Spaceport America
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