HIGH SPEED FLIGHT BULLETIN

Quarter 3 - 2023

From the Chairman's Desk and Cockpit:

Dear HSAT Friends and Colleagues:

The third quarter HSAT Bulletin is special as it marks "T-30 days" for the launch of the yearly HSAT Workshop meeting in its 6th Edition. The HSAT highlights that we remark in the Bulletin are aligned with the Workshop thesis. This year our aim is to emerge from the workshop with concrete actions to enrol the Mainstream Public and move from Industry Push to Market Pull. We aim to have our group be an “ice breaker”, clearing the path to OEM’s, innovators, entrepreneurs, and established companies to introduce supersonic, hypersonic, suborbital and orbital platforms to enable high-speed aerospace transportation for all. The world geopolitical dynamics seem to point into the absurd direction of more, rather than less turmoil. One cannot think about where the high-speed flight industry would be today if all the time, effort and money spent on keeping the world safe from trouble had been invested in high-speed flight platforms. Would we be flying at Mach 5 or 8 by now?

Fresh of the press, and right before the publication of this Bulletin, we received the briefing from our partner and dear friend, Dr. George Nield, Chairman of the Global Spaceport Alliance (GSA), that the space point-to-point industry is the focus of the Washington Compact of the Hague Institute of Justice, to evaluate and prepare roadmaps for the global acceptance of orbital point-to-point flight.

This is a very interesting development that we will discuss over HSAT. Just this discussion item alone, is reason enough to attend the workshop as orbital spaceflight is the pinnacle of the aerospace
transportation ecosystem. See the release **here** and stay tuned for more developments at HSAT, and further at the **GSA 2024 January 29th Summit.**

Perfect timing, just as we await the SpaceX Starship next flight out of Boca Chica-SW Texas! Indeed orbital P2P is truly a global affair, and we better prepare for global consensus on commercial operations ahead of the game.

Here are some highlights that will be covered at the HSAT, don't forget to **RSVP**, our room capacity of 125 is almost reached, at the new CEED Center near the Midland Air and Spaceport, in West Texas, the world's only licensed spaceport with scheduled airline service. **REGISTER FOR THE HSAT 6th EDITION HERE!**

We have expanded the Matrix of areas to analyse and develop to include; aeromedical factors research, public acceptance and "pull" and integration of vehicles into the subsonic system or what we call the "aeroderivative", adjacent to the vehicles design and performance, such as life cycle costs, maintainability, financial-residual value and infrastructure ancillary costs to operators, air traffic services providers, insurability, et al.

Certainly, this HSAT will be a productive and challenging one, yet effective and rewarding. See you at HSAT, get ready to roll up your sleeves as it is really a WORK-shop and yields results producing Working Groups.

Photo Credit: The AirportHistory.org Collection

The path to removing supersonic bans over land in the USA and across the world looks ever closer with **NASA's X-59 QueSST program**, and we will work alongside with NASA Program Director Peter Coen on the realities and next steps of the program. Moreover, we will make the West Texas-Easter New Mexico massive airspace-range along with the White Sands Missile Range as possible test grounds for the program. We expect the outcome of the Quesst program to yield the supersonic over land standards that will inform OEM's and industry about the future supersonic and hypersonic aircraft for this and next decade. We remain bullish on the entry into service of Boom's Supersonic airliners by the end of the decade.

It makes a lot of sense to see the BOOM mega factory progress, and we support Blake Scholl and his team along the path to Type Certification (TC) and Production Certification (PC). We welcome **SAE's supersonic and hypersonic aircraft steering group**, led by Judith Ritchie and Robbie Cowart, and a cadre of aerospace experts. We are proud to have ourselves, IFG as new member of this group leading towards performance standards and recommended practices for supersonic and hypersonic aircraft. We are glad that NASA recognizes the need for industry voluntary consensus standards and include SAE, ASTM and others to the Standards Development Organizations (SDO's) that will lead the way.

On the aeromedical factors area, we applaud the FAA Center of Aeromedical Investigation

(CAMI) leadership, Dr. Melchor Antunano for his indefatigable work to ensure the health of the flying public, crews and the public at large. Certainly, supersonic and hypersonic flight will bring new challenges such as super-jet lag, radiation exposure and perhaps other unknown-unknowns worth some preliminary research and at the least, some thought into data monitoring and flight-health-quality assurance as the industry emerges. Always, keeping a balance of the amount of foresight research vs actual flight experience and data. If you allow my opinion, I doubt any aeromedical factors emerging from high-speed flight can be more health- challenging than sitting (and suffering) on a 20 hour ultra-long-haul subsonic airliner today. We will pick up some excellent commercial spaceflight related **research performed by the MITRE** Corporation and the Commercial Spaceflight Federation (CSF) under the leadership of Dr. Michael Marge and Dr. Valiere Gawron.

HYPERSONICS

Is a Mach 4 passenger jet possible? NASA and Industry explore the idea. We are proud and glad to be of service to NASA a Boeing research and Technology subcontractor for the Hypersonic Technology Roadmap project 12-month contract. The Boeing team includes GE Aerospace, Georgia Tech Aerospace Systems Design Labs, Roll Royce North American Technologies, Reaction Engines and others. A second team led by Northorp Grumman includes Blue Ridge Research, Boom Supersonic and Rolls Royce North American Technologies. We hope that this study takes us to an X-Airplane that takes flight at the end or shortly into the next decade. Stay tuned!

We are very honored to be a part of the newly formed AIAA-RHV Task Group, led by Drs. Todd Magee and Rodney Bowersox, where a team of hypersonic and high-speed aerospace leaders will work on roadmaps, technology strategies to enable commercial hypersonic reusable platforms that seamlessly integrate into the NAS and subsonic aircraft ecosystems.

Credit: Boeing Concept illustration of a Boeing high-supersonic commercial passenger aircraft

We remain bullish on **Firehawk's hybrid rocket technology** with zero TNT equivalency for hypersonic and space flight. The future of human rated systems is predicated on safety levels equivalent to subsonic turbine systems, and Firehawk's technology meets and exceed the

safety of even kerosene based Jet-A fuels on its throttleable motor operations. Certainly a unicorn in the making Firehawk is developing TRL's and demonstrating firings and soon vertical launch…Fast!

We have been teasing the helicopter and Advance Air Mobility (AAM) markets recently about how vertical lift for the first and last mile is key on journeys that includes high-speed flight on long distance flights. What is the point of Mach 4+ flights across the Atlantic if you are stuck for hours in traffic from Manhatttan to the airport and from Heathrow to London City or Charles the Gaulle to the center of Paris. We are inviting the Helicopters and AAM ecosystems to join the HSAT conversation, and will include this "surprising use of vertical lift for high-speed flight in future calls, and HSAT workshops. Welcome onboard **HAI, NEXA Partners, NBAA AAM** and **AUVSI** et al. Follow us on the AAM-HSAT Conversation on **LinkedIn**.

Credit: Deloitte Insights

SUBORBITAL

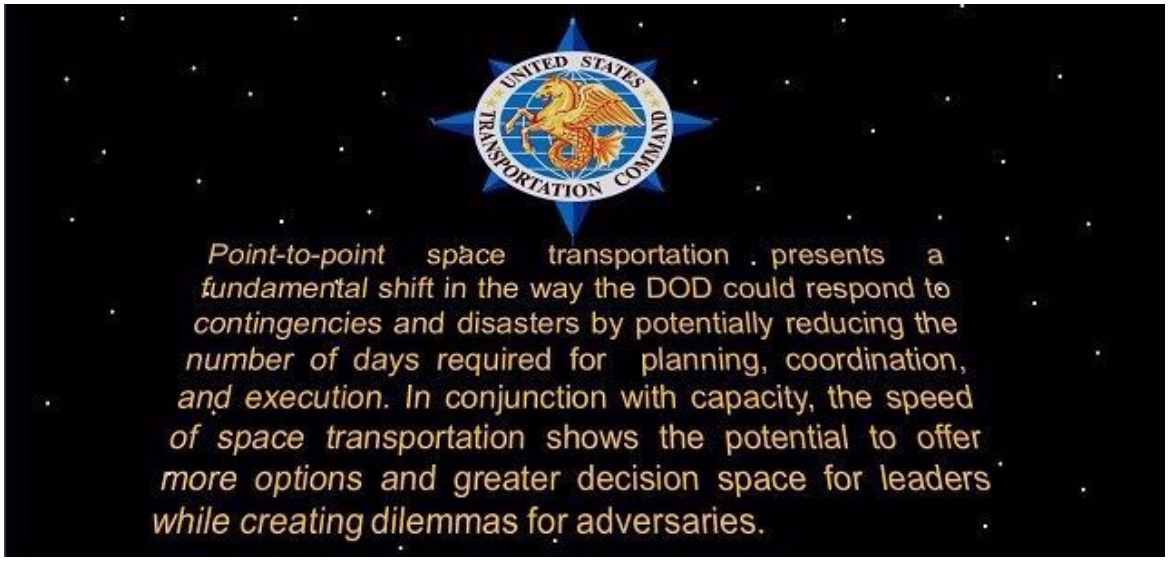
Virgin Galactic's aim for a monthly flight is well on track, and we are monitoring closely the Delta Class Spacecraft, as monthly will become weekly, then daily and then double and triple daily…what comes next, is yes, indeed point to point. Keeping in mind and in memory that VG passed an FAA Mission Concept Review ("MCR") with the FAA center for Emerging Concepts and Innovation to work with VG to obtain a certification framework for a Mach 3 capable commercial transport aircraft about three years ago, makes us optimistic that the suborbital space tourism industry is a great leading indicator and pathfinder for high-speed flight. See **here**.

We look forward to the Delta Class spacecraft coming into service by 2026, as a catalyzer for high cadence suborbital flight, safe, reliable and profitable. Go VG!

Let me remind all, that the **AIAA Technical Committee on Reusable Launch Vehicles** Is a very effective task group to advance RLV's both orbital and suborbital in multiple areas including adaptive structures, structural dynamics, and multi-disciplinary design optimization that develops policy and whit papers recommendations.

ORBITAL

Following on our Q2 thread, the orbital front, it is very encouraging to see that the US DOD-TRANSCOM Rocket Cargo Point-to-Point (P2P) developments are moving forward quite well, and that Space X is busy preparing a second Starship P2P launch shortly as well as demonstrating Rocket Cargo capabilities to the USAF TRANSCOM. The US Space Force is aligning its own Rocket Cargo ambitions, and we hope to host both at the HSAT Workshop to ensure that their efforts are in sync and avoid duplication and precious SME and human time and effort bandwidth waste. In both cases, the Rocket Cargo P2P efforts aim at Operations Other Than War (OOTW) and to humanitarian and disaster relief missions. Both, just one step away from commercial cargo and in the future passenger Rocket P2P Missions.



We anticipate the HSAT Workshop to open up the Spaceport to Spaceport (S2S) Airspace White Paper, which was focused on the guiding principles of suborbital trajectories. At HSAT, we will advance its contents to enable orbital trajectories as well. In fact, the GSA-HSAT-FF Working Group has found that there are very few changes needed to enable orbital P2P, most changes have to do with the Collision Avoidance Analysis (COLA) required by the FAR 450, for flights above 450,000ft. We are excited to have the MITRE Corporation provide valuable inputs for further development of S2S airspace to include upper Class E airspace management.

Upper Class E is becoming crowded with pseudo satellites, balloons, supersonic and hypersonic operations, in addition to launch and re-entry operations. We are glad and honored to have the **MITRE Corporation** lead the airspace development conversations on our upcoming HSAT. Elizabeth McQueen, who led a team to demonstrate feasibility of Spaceport-to-Spaceport (S2S) corridors from Midland to Spaceport America, and Prakash

Subramanian, Managing Director for Airspace Operations and Services, will be key to enable the airspace for S2S demonstrations very soon.

As Starship is cleared for lift off again, Sierra Space's DreamChaser is advancing towards a first flight in Q1 2024. We await this milestone to add the vehicle to Boeing's X-37 Spaceplane's flawless track record of orbital re entries and glides to horizontal runways. The next steps for DreamChaser will be human flights to and from the ISS and other LEO stations as steps into human orbital launch and re-entries for point-to-point missions. We are fans of winged space vehicles, for multiple reasons including G-forces on re-entry. Which takes us to a new entrant that we have a lot of interest in, knowing the very capable team that leads it, **Radian Aerospace**. It's tagline says it all: *Spaceflight with the ease of Air flight*. Way to go Livingston, Jeff, Richard, et a!!

As always, HSAT Bulletins, calls and interactions will cover the latest in the HSAT state-of-the-art dimensions in the key areas including technology, best practices and standards, regulations and commercial drivers and key performance indicators.

This Bulletin includes two annexes. One is our Thesis as submitted to the Commercial Space Transportation Advisory Committee (COMSTAC) in 2022 and last but not least, my personal thesis and invitation to attend the HSAT Workshop 6th Edition. Enjoy the reading on the next pages.

Enjoy the Q3 Bulletin and as always, Fly Fast, Fly Safe!

Oscar S. Garcia, Chairman
High Speed Flight
www.highspeedflight.com

Register for the HSAT Workshop here!

(Image credit: InterFlight Global)

ANNEX - HSAT THESIS 2023:

A New ERA in High-Speed Aerospace Transportation

HSAT™[1]

From Industry Push to Market Pull

Foreword

We need for the people of the United States and the free World to decidedly ask anyone who would listen, to be able to fly faster, to go anywhere on earth and back, to get tangible goods delivered from anywhere on earth, no matte how far, on the same day, and to do so safely, reliably, sustainably, and economically as well.

After sixty years of ever safer, cleaner, and more efficient subsonic air transportation, we are all moving into a renewed era of high-Speed Aerospace Transportation or HSAT™. The public demand to “shrink the planet” anywhere to anywhere in one-business-day, is to be the future new normal, it is an unstoppable movement and a must-have human capability, which will align the digital and physical worlds and greatly improve the quality and way-of-life of all on earth.

The first vehicles will be supersonics Mach 2-3evolutions of existing high-speed transonic (Mach .935 business jets). Then hypersonic Mach 3-10, vehicles will prelude the most ambitious of HSAT programs: rocket-based and/or boost-glide profiles, which will blur the lines between atmospheric and orbital point-to-point flight profiles. Depending on flight distance, the vehicles optimal flight paths may be endo or exo atmospheric. Thus, aircraft and spacecraft regulations will apply, and in some cases, a possible new hybrid realm of regulations and standards might emerge.

HSAT success will need a multi-dimensional sustained push in various areas, including decisive and sustained capital investments, synergies of academic-practical and “genius” knowledge sharing from not only the aerospace industries, but peripheral industries such as travel-hospitality, air transportation energy, A.I., quantum computing and others. Then,

capital formation and investments will increase exponentially, reducing the time to market, years, rather than decades. Investment areas including public demand for HSAT, integration into the subsonic system, aerospace flight research, air space frames, powerplant and propellants development, flight guidance systems, and importantly, phased demonstrations-test-evaluations, for safe, reliable, and scalable entry into service and subsequent maturity in commercial operations.

The return on such investment, and the direct indirect and induced economic impact to the world, will be an order of magnitude higher than the investment, well into the high single digit trillions by 2050 .

READ THE REST OF THE THESIS HERE

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[1] IFG coined the term HSAT and expanded it through a series of industry workshops, trade marking the term HSAT ™ www.highspeedflight.com

REGISTER FOR HSAT HERE!

ANNEX - CHAIRMAN'S INVITATION TO HSAT WORKSHOP 2023:

High Speed Aerospace Transportation (HSAT) Workshop 2023
6th Edition

Thursday, November 16th Full-Day -Friday, November 17th Half-Day

Advancing the *High-Speed Aerospace Transportation* Industry

Enrolling the General Public-From Industry Push to Market Pull

Hosted by:

Midland Development Corporation (MDC)
Midland International Air & Space Port
University of Texas Permian Basin (UTPB)

Collaborators, Memberships, Supporters and Partners

Global Spaceport Alliance (GSA)
Commercial Spaceflight Federation (CSF)
FAA Office of Commercial Space Transportation (AST)
FAA Center of Excellence for Commercial Space Transportation
United States Space Force Association (SFA)
The MITRE Corporation
ASTM International-SAE
Foundation for the Future (F4F)
AIAA
The Aerospace Corporation
Joint Hypersonics Defense Office - University Consortium for Applied Hypersonics (JHTO-UCAH)
United States Transportation Command (USTRANSCOM)
Defense Innovation Unit (DIU)

Organizers reserve the right to change and modify this program as needed

WORKSHOP OUTLINE AND WELCOME MESSAGE FROM THE CHAIRMAN:

"Welcome to the 6th edition of the High-Speed Aerospace Transportation Workshop (HSAT). This unique event is action packed, interactive and results producing. It is laser focused on the High-Speed Point to Point (P2P) aerospace transportation industry and it is unique as it covers missions **across all high-speed flight regimes: transonic, supersonic, hypersonic, and orbital**.

The HSAT workshop delivers solutions to the most wicked and stubborn barriers and problems that have kept humanity under what I call, the tyranny of Mach 1, that has lasted for over six decades, except for the small relief provided by three decades of Concorde limited commercial service (1973-2003).

I am honored to welcome you onboard, either for the first time, or again, and I am proud and excited, to collaborate with you on this unique in the world hands-on group meeting focused exclusively on enabling the world to fly faster and to do so safely, reliably, and profitably at all speed realms close to and faster than Mach 1.

The HSAT 6th Edition will host over one hundred influential stakeholders, thought-leaders, opinion makers, market makers, early adopters and the best experts, innovators, operators and leaders in the high-speed flight industry in all its key disciplines.

This HSAT yearly workshop will deliver actionable insights to enable solutions to the most pressing, stubborn and demanding challenges that will enable the multi trillion-dollar high-speed flight industry in the years and decades to come.

HSAT, is a "hands-on" interactive event, meant to elicit candid exchanges of expert opinions, insights and technical-scientific know-how. The work yields tangible and committed actions by working and task groups to achieve practical solutions, such as White Papers, regulatory-legislative level Observations-Findings and Recommendations (OFR's). We seek to find consensus for sound initiatives that appeal to the markets, users, etc, that are financially and economically sound for all stakeholders in the short, medium and long runs.

Technically, we will cover the most relevant areas of vehicle, powerplants, airspace and infrastructure development. We will use an effective HSAT Matrix that allows us to analyze barriers and opportunities across all high-speed realms avoiding repetition and duplication of efforts. HSAT always emphasizes the practices and methods to achieve levels of safety and sustainability equivalent to those of subsonic aviation, the development and use of voluntary consensus standards and practices required for the industry to be scalable and interoperable globally.

The Matrix addresses the HSAT industry key conditions, public responses to surveys, military-defense as well as related humanitarian and relief operations, regulatory and compliance frameworks, challenges, opportunities, and markets including ground and air infrastructure con-ops, design and engineering, economic, regulatory, and operational feasibility for commercial, military, government, and NGO's use.

The 6th edition will leverage the workshop previous editions' achievements to yield effective and decisive actions. This year, we will focus on creating the conditions necessary to enroll, galvanize and engage the "mainstream" public to "demand politely," yet assertively, the advent of high-speed flight for all.

We will identify tools and channels for the public to clamor for and to "shout politely" to enable high speed flights for all, to make the world smaller, more accessible, with the aim of being able to travel anywhere on Earth and back, within a business day.

What we call the "one day world," "a smaller world." A World that we believe will be better-connected, with fast, safe both, dependable and environmentally friendly flight through the atmosphere and as well as through space.

We will work on translating high-speed flight industry language into colloquial main street friendly language that makes sense of the basic and applied sciences and technologies required to evolve ideas and concepts of operations into viable, safe, and sustainable modes of high-speed aerospace transportation for a better world.

The current state of affairs of the aerospace transportation industry, we believe favor the demonstration of supersonic, hypersonic and orbital point to point high speed flight.

Business, leisure, government, military and humanitarian-relief missions are ready for high-speed flight with synergies leveraging the budgets, financial returns and economic development gains for the **commercial/civil and military/defense** industrial complexes. And importantly, relieving the general public of torturous commercial long and ultra long flight times that sometimes exceed twenty hours aloft to cover 7-8,000 miles nonstop.

As in previous editions, our track leaders will be subject matter experts who will facilitate, expose, define and frame the barriers, challenges and opportunities facing each high-speed flight speed segment. They will do so highlighting practical experience (attempts, successes and failures), relevant case studies of real markets, sciences, technologies, products and services to make HSAT a scalable reality.

We look forward to you participation, to being a part of our work-task groups and to adding to the HSAT Issues-Work-Matrix that we have compiled in the preceding five editions.

Moreover, we are proud that all of our efforts and gains at the workshop will be augmented by the ongoing and future collaboration between the High-Speed Flight-FastForward group with:

- The Global Spaceport Alliance (GSA) as a member of its Point-to-Point Transportation Working Group
- The Commercial Spaceflight Federation (CSF), as a Research and Education Member
- The US DOD Space Force Association (SFA) and related stakeholders
- The Joint Hypersonics Office-University Consortium of Applied Hypersonics (JHTO-UCAH)
- ASTM F 47 Commercial SpaceFlight Standards Committee
- SAE Supersonic and Hypersonic Aircraft Steering Committee
- AIAA Hypersonic and Reusable Launch Vehicles Working Groups
- TRB Committees including the New Entrants in the NAS Working Group

The HSAT's 6th Edition promises to be extremely relevant, useful, and effective gathering to unleash, at this critical moment in time, exponential growth for the high-speed flight industry's users, producers, markets and their multi trillion dollars forecast economic impacts.

The ultimate objective is to "move" the markets and public to decisively ask their airlines, regulators, politicians and technologists to enable safe, efficient, profitable, and scalable high-speed aerospace transportation for the benefit of all.

Again, it is my honor to Chair this event together with such a distinguished, diverse, talented and forward-looking High Speed Aerospace Transportation industry leaders.

Oscar S. Garcia, Chairman & CEO
InterFlight Global Corporation
High Speed Flight-Fast Forward Group

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Committee F47 on
Commercial Spaceflight

NASTAR CENTER

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GLOBAL SPACEPORT ALLIANCE

INNER SPACE TRAINING

IGNITE YOUR MISSION -TRAIN LIKE AN ASTRONAUT

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