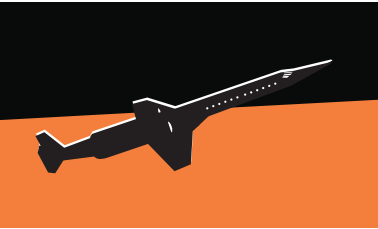




FASTFORWARD PROJECT

OPPORTUNITIES FOR STUDY AND RESEARCH RELATED TO HIGH-SPEED POINT-TO-POINT FLIGHT

SPRING 2010



In our 2009 White Paper entitled, "Getting Faster: A Case For High-Speed Global Point-To-Point Flight as a Logical Transition Between Suborbital Space Tourism and Low-Cost, Reusable Space Access," the FastForward Project identified a number of critical research opportunities related to future ultra high speed point-to-point (PTP) services for passengers and fast packages. Fundamental issues related to market size, legal and policy hurdles, operational issues, and technology challenges must all be well understood before private investors will have confidence to invest in this emerging revolutionary market.

We therefore encourage and promote pre-competitive research in key areas related to the possible emergence of commercial high-speed point-to-point transportation services. For maximum utility to the worldwide community, all research products must be 1) freely distributable, 2) professionally and/or academically rigorous, and 3) executed without bias that would tend to favor a preconceived outcome. The FastForward Project does not advocate for any particular organization to perform this much needed research, but rather encourages all interested government, academic, and private organizations to take an interest in investigating one or more of the following study topics.

Research Area #1: Statistically Valid PTP Market Studies

One of the most critical requirements toward building a viable business case for point-to-point transportation of passengers and/or fast packages is a comprehensive understanding how the existing global transportation markets might react to a very high speed, albeit more expensive, alternative to subsonic aircraft. A series of statistically valid and professional market surveys is needed to understand each of the following potential PTP market sectors.

- ▶ long range business travelers (typically international routes)
- ▶ ultra-fast packages and high priority cargo (perishables, high value items, critical parts)
- ▶ high net worth adventurers (extending today's single-site space tourism experiences)

We envision that these market studies will be supported by one or more unbiased, professional polling and research firms to help collect credible data on price elasticity, examine market robustness, identify attractive city pairs and cargo segments, and perform competitive assessments.

Research Area #2: Identification of Unique Challenges Facing Global Aerospaceports

Survey the emerging global network of aerospaceports and identify the top technical, legal, and financial challenges that face them as it pertains to emerging global PTP services. Suggest strategic solutions toward overcoming those challenges.

Research Area #3: Development of a Strategic Technology Investment Roadmap

Survey the emerging PTP service providers and spaceport operators to identify their technology needs that are both 1) **enabling** to their future operations and 2) **common** across more than one potential spaceport or service provider. Identify investment synergies between the needs of the commercial PTP community and those of ongoing government-funded aerospace projects. Prepare a multi-year technology investment roadmap that maximizes the opportunities for government-to-industry technology transfer relevant to the PTP market.

Research Area #4: Understanding the Ramifications of ITAR with Respect to PTP Services

Investigate international security/defense concerns and implications of existing arms agreements and restrictions as they pertain to operational point-to-point flights. Suggest practical solutions.



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Research Area #5:

Quantify the Value of Additional Flight Speed within the PTP Market

Use analytical models to develop a clear understanding of the economic relationship that exists between flight speed and PTP market viability. How fast is "fast enough"? Does a faster hypersonic service result in a better business case compared to supersonic service? Which PTP market sectors demand the highest speeds (say Mach > 5)? Which market sectors are satisfactorily addressed with supersonic speeds (~Mach 1.6)?

Research Area #6:

Integrating a Future PTP System into International Airspace Operations

Investigate day-to-day operational aspects of a mature high-speed global flight service system requiring international cooperation including airspace management, establishment flight corridors, and coordination with movements of subsonic aircraft. Identify potential barriers and suggest practical solutions.

Research Area #7:

Paths from Current Suborbital Tourism to Orbital Spaceflight via PTP

Investigate the existence of a technically credible and economically compelling evolutionary path from suborbital space tourism to orbital space access by first succeeding in the global PTP market. Are there technical or economic advantages to following a stepping-stone approach to reusable orbital spaceplanes?

Research Area #8:

Summarize Legal and Regulatory Challenges Facing PTP Flight

Specifically identify and summarize those U.S. and international laws and regulations that may limit the emergence of a global network of high-speed (potentially exoatmospheric) vehicles carrying passengers and/or cargo. Examples include limitations on pollutant emissions, supersonic land overflight, runway noise, certification requirements, technology export, overflight of non-participatory countries, airspace management restrictions and operating rules, etc. Suggest viable and practical strategies toward mitigating these barriers.

Research Area #9:

Incentivizing PTP Entrepreneurship through Prizes or Similar Strategies

Suggest specific innovative low cost and near term engagement strategies (e.g. competitive prizes) that could incentivize the PTP community and accelerate advancements in point-to-point solutions.

Research Area #10:

Establishing Supportive Government Policies toward PTP

Identify and/or suggest synergistic U.S. and International government contributions, policies, and partnerships that will help encourage and nurture the growing PTP industry. Consider public-private partnership options for meeting critical needs and solving challenging issues.

The FastForward Project focuses on pre-competitive analysis and assessment of future global high speed point-to-point (PTP) passenger and cargo services. The all-volunteer study group consists of over 20 members and is hosted by SpaceWorks Commercial, 1701 K St. NW, Suite 750, Washington, DC, 20006.



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