



Overview of NRA Solicitation

N+3 Pre-Proposal Conference

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L'Enfant Plaza Hotel

Washington, DC

November 29, 2007

National Aeronautics and Space Administration



**NASA AERONAUTICS RESEARCH MISSION DIRECTORATE
FUNDAMENTAL AERONAUTICS PROGRAM
SUBSONIC FIXED WING AND SUPERSONICS PROJECTS
PRE-PROPOSAL CONFERENCE**

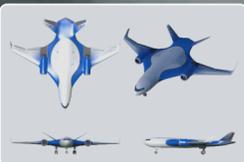
**Advanced Concept Studies for Subsonic and Supersonic
Commercial Transports Entering Service in the 2030-35 Period**

Thursday, November 29, 2007, 1 to 5 pm

**L'Enfant Plaza Hotel
480 L'Enfant Plaza
Washington, D.C.**



With this NRA solicitation, NASA is seeking to stimulate innovation and foster the pursuit of revolutionary conceptual designs for aircraft that could enter into service in the 2030-35 period. The focus is on both subsonic and supersonic transports that can overcome significant performance and environmental challenges for the benefit of the general public. Furthermore, these conceptual studies will identify key technology development needs that will enable such vehicles. Additional details including specific metrics and objectives, vehicle classes, range and scope of technologies of interest, and expectations for proposals will be provided at this meeting.



To register, visit: www.aeronautics.nasa.gov.

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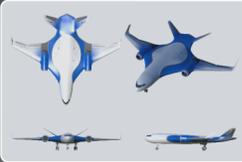
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- **Advanced Concept Studies for Subsonic and Supersonic Commercial Transports Entering Service in the 2030-35 Period**
- N+3 NRA for short
- Stimulate innovation and foster the pursuit of revolutionary conceptual designs for aircraft that could enter service in the 2030-35 time period.
- Overcome significant performance and environmental challenges for the benefit to the public.
- Phase I: 12-Months, Phase II: 18 Months to Two Years, with significant technology experiments

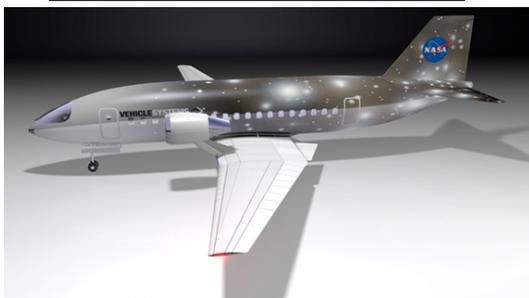
SFW System Level Metrics

.... technology for dramatically improving noise, emissions, & performance

CORNERS OF THE TRADE SPACE	N+1 Generation Conventional Tube & Wing (relative to B737/CFM56) (EIS 2015)	N+2 Generation Unconventional Hybrid Wing Body (relative to B777/GE90) (IOC 2020)	N+3 Generation (relative to B737/CFM56) (EIS 2030-2035)
Noise (cum below Stage 3)	- 42 dB	- 52 dB	better than - 81 dB (55 LDN at average boundary)
LTO NOx Emissions (below CAEP 2)	-70%	-80%	better than -80% plus mitigate formation of contrails
Performance: Aircraft Fuel Burn	-33%	-50%*	better than -70% plus non-fossil fuel sources
Performance: Field Length	-33%	-50%	exploit metro-plex concepts

* Metric under evaluation

N+1 Conventional



N+2 Hybrid Wing/Body



N+3 Generation



Supersonics System Level Metrics

CORNERS OF THE TRADE SPACE	N+1 Supersonic Business Class Aircraft (2015)	N+2 Small Supersonic Airliner (2020)	N+3 Efficient Multi-Mach Aircraft (2030-2035)
Cruise Speed	Mach 1.6-1.8	Mach 1.6-1.8	Mach 2.0 Unrestricted Mach 1.6-2.0 Low Boom
Range (nmi)	4,000	4,000	6,000
Payload	6-20 pax	35-70 pax	100-200 pax
Sonic Boom	65-70 PLdB	65-70 PLdB	65-70 PLdb low boom flight 75-80 PLdB unrestricted flight
Airport Noise (cum below Stage 3)	10 EPNdB	10-20 EPNdB	20-30 EPNdB
Cruise Emissions Cruise Nox EI Other	Equivalent to current subsonic	< 10 ?	< 5 ?
Fuel Efficiency (passenger mpg)	Baseline	15% Improvement	25% Improvement

N+1 “Conventional”



N+2 Small Supersonic Airliner



N+3 Efficient Multi-Mach Aircraft



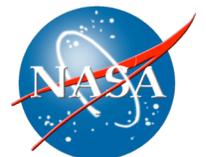
Why N+3? Why Now?

- N+1 concepts are maturing
- N+2 ideas being actively pursued (sometimes for over 10 years)
- N+3 ideas need to be generated now in order to have an impact in the 2030-35 time frame
- The importance of a balanced portfolio: how is NASA investing taxpayer's resources to advance the state of the art in Aeronautics?



Objectives of This Solicitation

- Stimulate thinking to determine potential aircraft solutions to significant problems of the future (performance, environmental, operations)
- Identify key driving technologies (traded at the system level) for fundamental research investments
- Prime the pipeline for future, revolutionary aircraft technology developments



Logistics

- Phase I: Concept studies
 - 12 Months
 - Approximately \$10M of funding available
 - Estimating 5 awards (3 subsonic, 2 supersonic)
- Phase II: 18 -24 months
 - Details will depend on outcome of Phase I
 - Envision some kind of downselect prior to start of Phase II
 - Expanded scope (beyond paper designs) to include significant technology experiments
- Teaming encouraged



Concept Studies

- Conceptual level study
 - Given a balanced set of requirements, identify a preferred system concept that meets those requirements
 - Interested in credible estimates of overall system performance (primary disciplines, S&C, noise, emissions, cost, etc) which may require a mixture of low-, mid-, and high-fidelity tools
- Resulting configurations must be open
- Operation of vehicles in the future airspace can be part of the design if it is well informed
- Not necessarily looking for single point solutions: trades are encouraged to highlight the potential of particular concepts to achieve combinations of targets



Additional Details

- Collaborative efforts strongly suggested
- Technologies that are used in the concept studies must pass the “test of reasonableness”: is there a significant probability that these technologies may be ready to be part of a vehicle in 2030-35?
- Criteria/metrics for proposal evaluation will be described in detail in the final solicitation
- One-on-one discussions following Q&A/Break. Sign-up sheet available



Last Comments

- Thinking “out of the box” encouraged...within constraints of entry into service in 2030-35 period
- These are exploratory studies: some freedom is both allowed and required
- We are looking for your feedback and questions

