

National Aeronautics and Space Administration



Low-Boom Flight Demonstration



Summary of the Quiet SuperSonic Technology (QueSST) Aircraft Preliminary Design and Low-Boom Flight Demonstration (LBFD) Mission

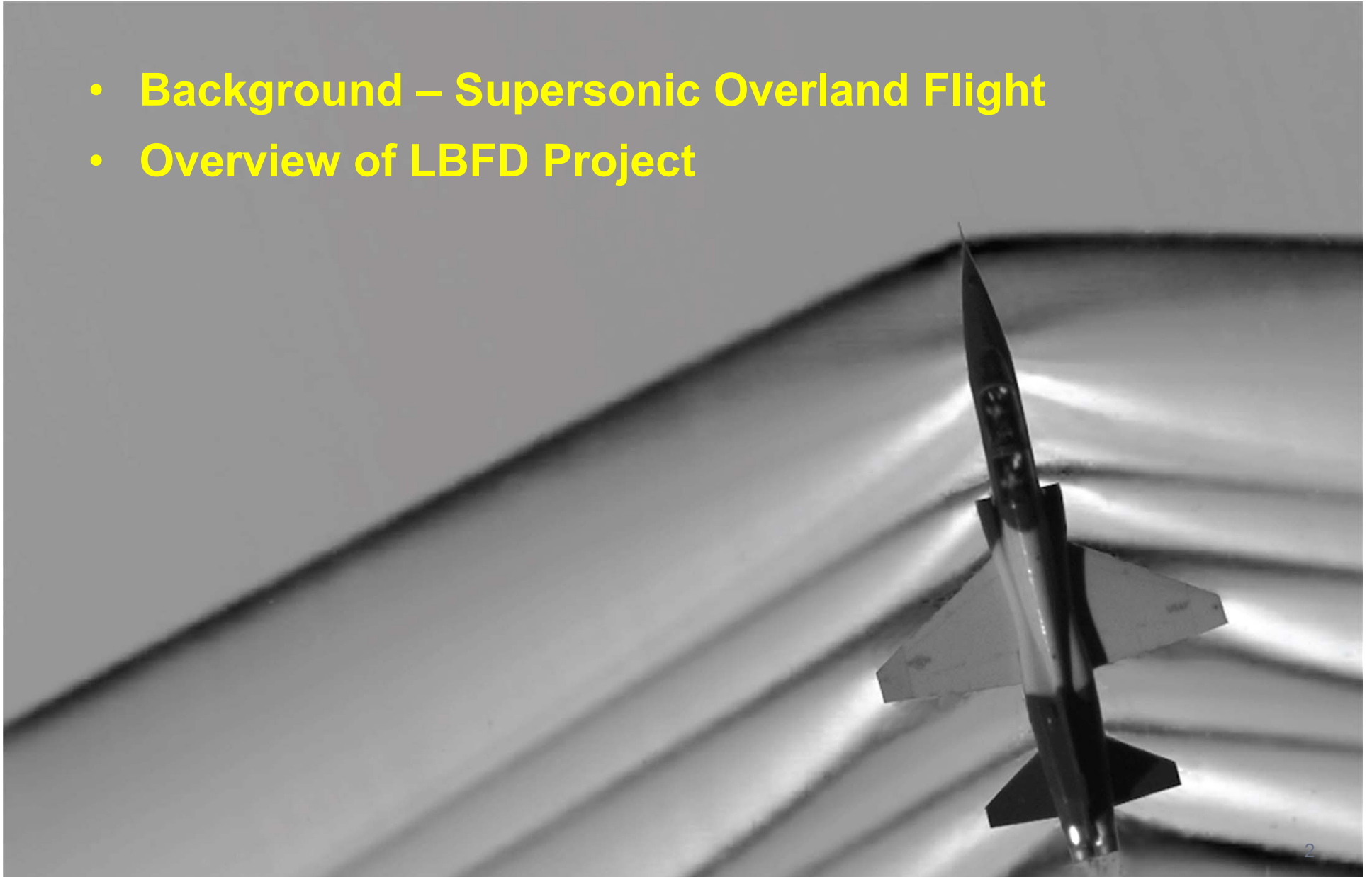
Randall E Bailey and Trey Arthur
18 Sept 2018

Credit: Lockheed Martin Corporation

Outline



- Background – Supersonic Overland Flight
- Overview of LBFD Project



NASA Aeronautics Strategic Vision



3 Mega-Drivers



6 Strategic Thrusts



Safe, Efficient Growth in Global Operations

Enable full NextGen and develop technologies to substantially reduce aircraft safety risks



Innovation in Commercial Supersonic Aircraft

Achieve a low-boom standard



Ultra-Efficient Commercial Vehicles

Pioneer technologies for big leaps in efficiency and environmental performance



Transition to Low-Carbon Propulsion

Characterize drop-in alternative fuels and pioneer low-carbon propulsion technology



Real-Time System-Wide Safety Assurance

Develop an integrated prototype of a real-time safety monitoring and assurance system



Assured Autonomy for Aviation Transformation

Develop high impact aviation autonomy applications

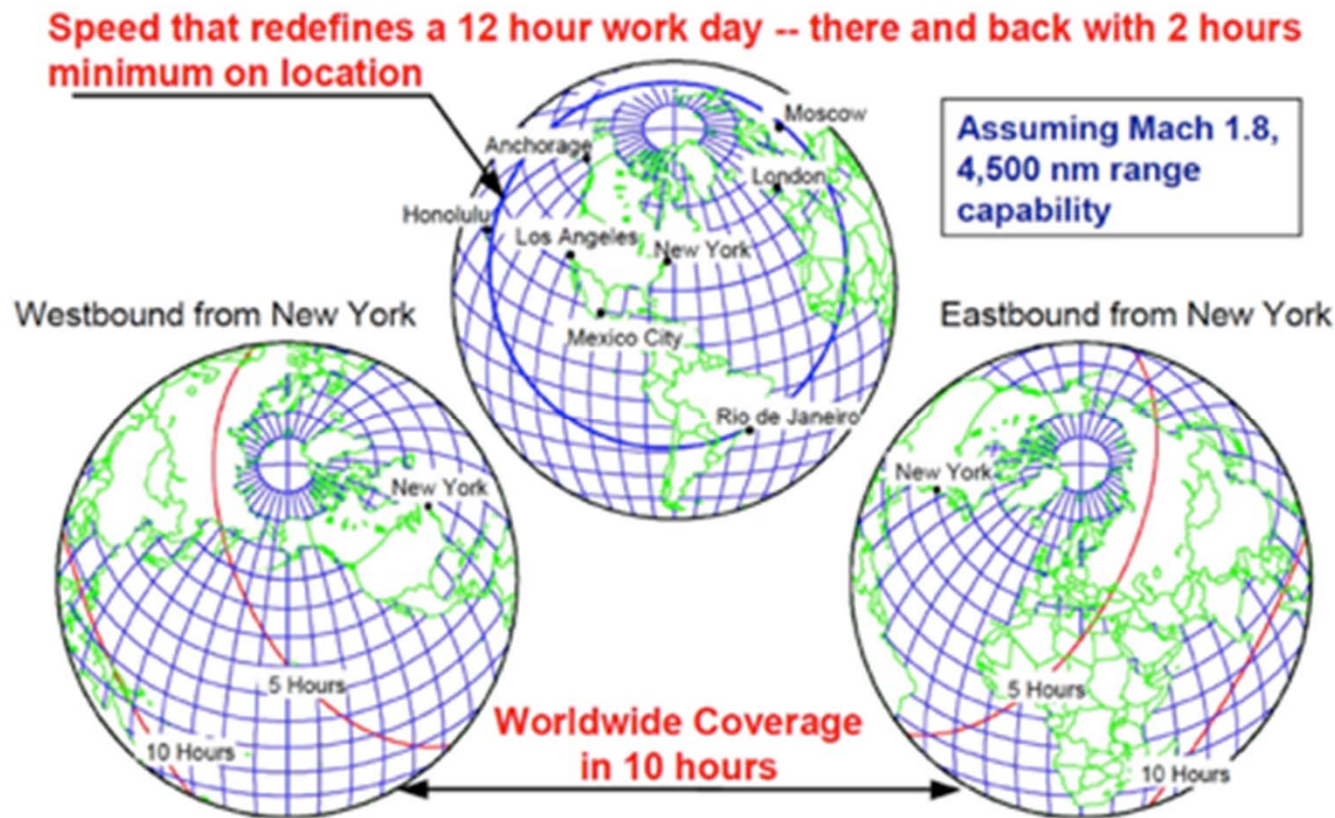
U.S. leadership for a new era of flight

Innovation in Commercial Supersonic Flight



Why?: Commercial supersonic flight represents a potentially large new market for aircraft manufacturers and operators world-wide

- Global demand for air travel is growing, which places a demand on speed



Barriers to Commercial Supersonic Flight: Sonic Boom Noise and Overland Flight Prohibitions



- Planned introduction of supersonic commercial transports in 1970's brought the problem of sonic boom noise to public attention
- Community overflight tests in the US and elsewhere showed sonic boom noise to be unacceptable
- Supersonic overflight restrictions followed
 - US: FAA Regulation (FAR) prohibits supersonic flight over US
 - Worldwide: ICAO Assembly Resolution – “No unacceptable situation for the public due to sonic boom”
- Restriction dramatically limited market potential for supersonic commercial aircraft



- The vision of the Supersonics Community is a future where fast air travel is available for a broad spectrum of the traveling public.
- Future supersonic aircraft must be able to fly overland without creating an “unacceptable situation” and compared to Concorde, be efficient & green
- The creation of overland certification requirements based on acceptable noise levels will enable this vision

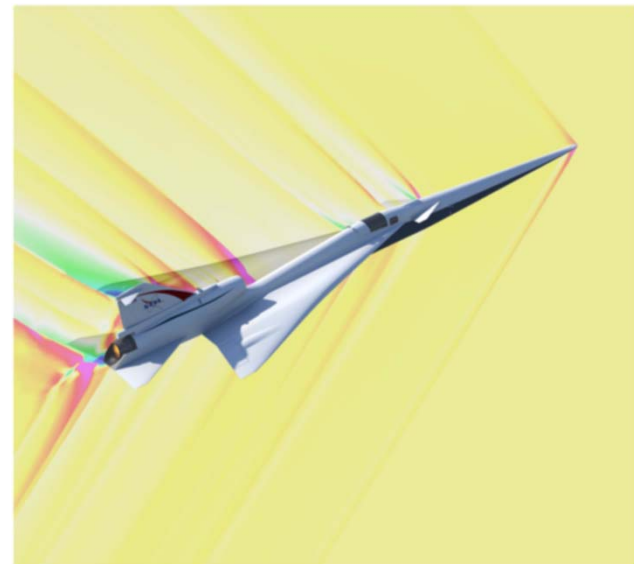
LBFD Background and Overview



Overcome the sonic boom barrier and open the door for development of a new generation of environment-friendly supersonic civil transport aircraft

Overall Requirement

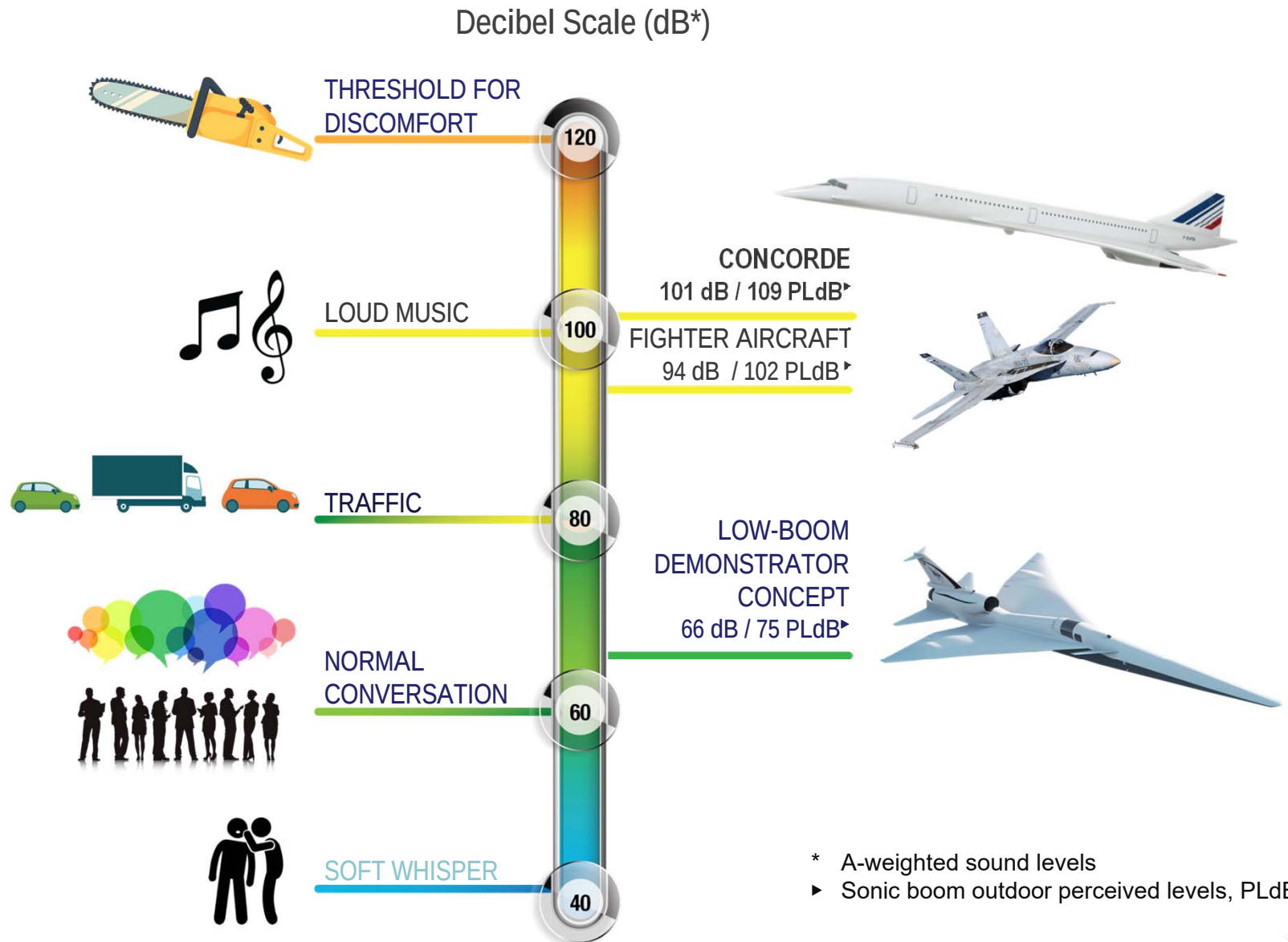
- Demonstrate that noise from sonic booms can be reduced to a level acceptable to the population residing under future supersonic flight paths
- Create a community response database that supports an International effort to develop a noise based rule for supersonic overflight



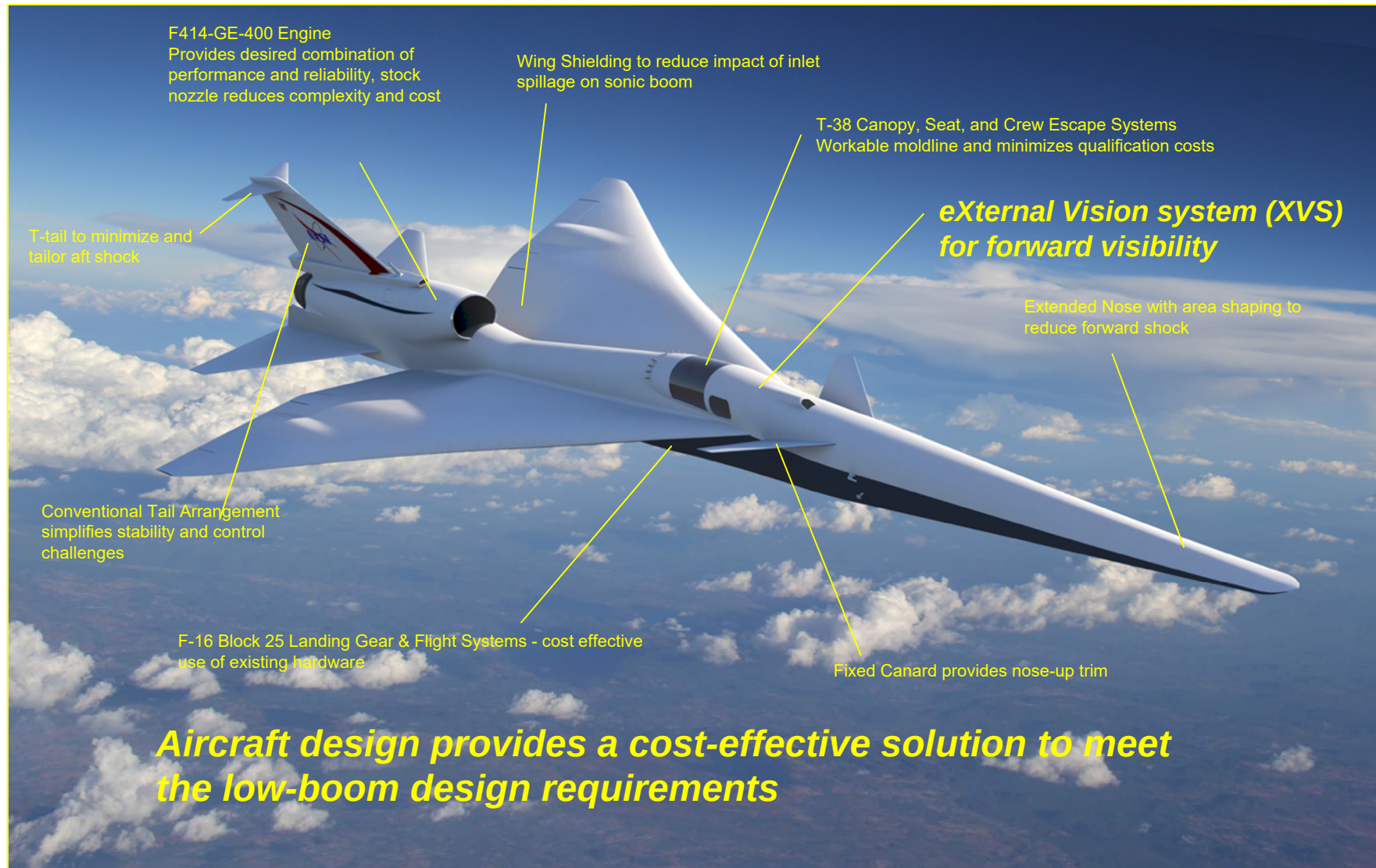
Approach

- Partner with regulatory agencies and communities to create a roadmap for community response study and rule development – with Commercial Supersonic Technology (CST) Project in Phase 2 and 3
- Revitalize the excitement of manned X-Planes using a focused and cost-effective approach to design and operate a low boom research aircraft
- Partner with industry and OGAs to formulate, obtain approval and execute

Supersonic Aircraft – Loudness Comparison



QueSST Aircraft Preliminary Design Overview

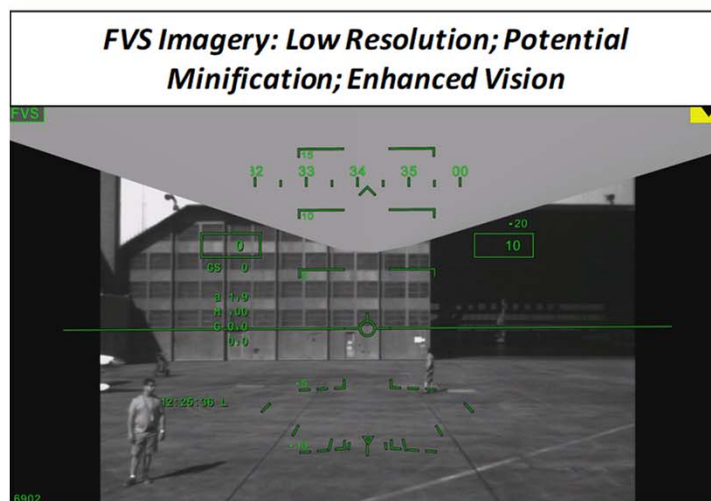
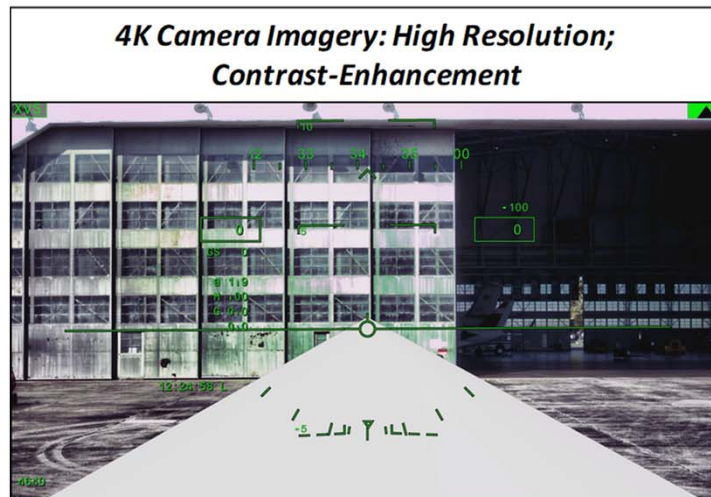


eXternal Vision System (XVS)

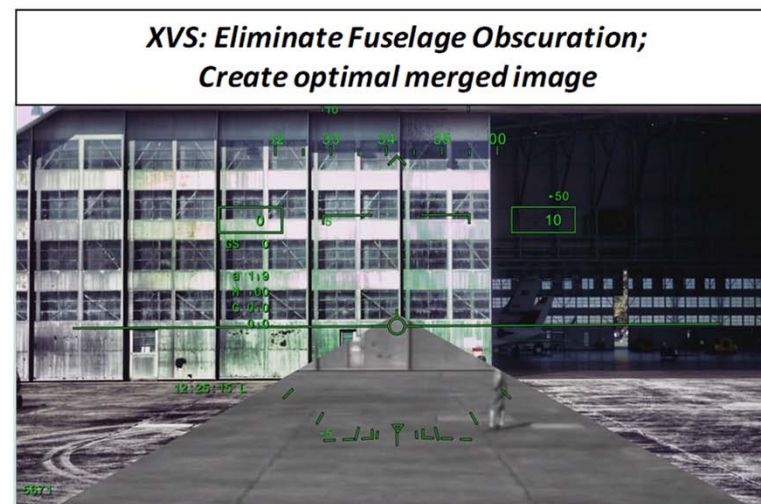


Forebody design for shaped pressure distribution negates practical forward-facing windows

XVS: An electronic means for forward visibility for the pilot / crew



FVS: Forward Vision System





Any Questions?



Credit: Lockheed Martin Corporation