The future of Aviation

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- Small Aircraft Transportation System (SATS)
- The process of design a new airplane
- What Future airplane looks like

Problems in today

- Relies on a few large airports which do not have enough runways
- Average flight delay of 30 minutes
- Air travel will double or triple by 2020

Small Aircraft Transportation System (SATS)

- The goal of National Aeronautics and Space Administration (NASA) is:
- “Reduce door-to-door travel time by half in 10 years and two-thirds in 25 years”
- 98% of Americans live within a 30 minute drive of small airport
- SATS will be an airborne transportation network that will use small aircraft and the nation’s 5000+ small airports

Comparison of travel time from west Chester,PA to Langley Research Center, VA

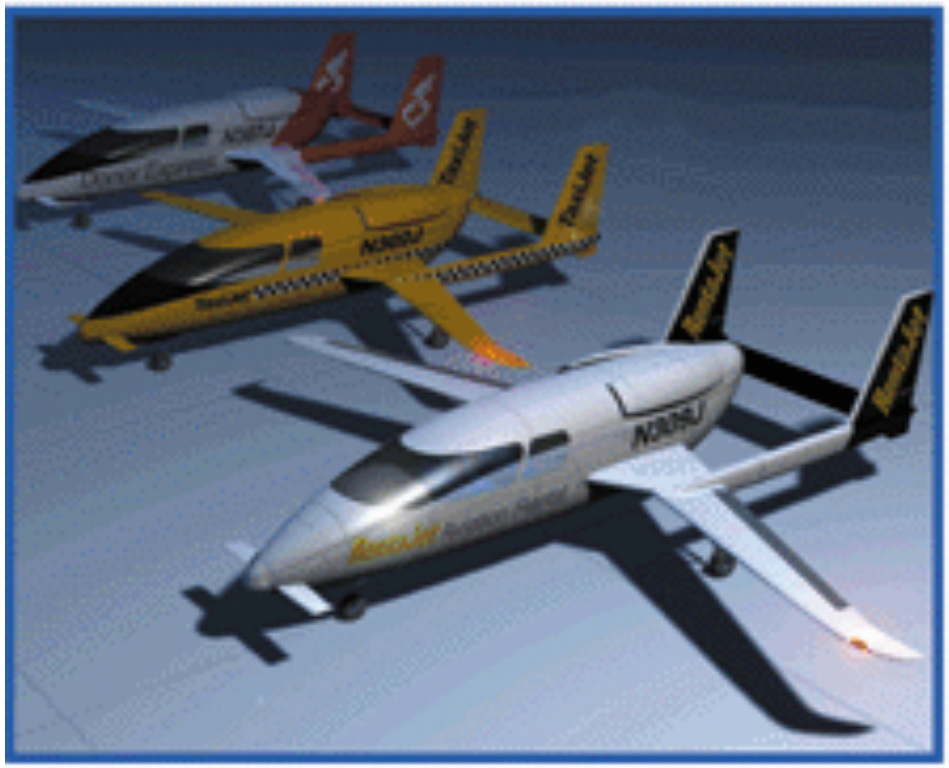
Car (300 mi*)	Airline (200 mi*)	SATS (200 mi*)
6 hour drive	1 hour drive to PHL 1 hour check in 30 min wait on runway 1 hour flight to ORF† ? min holding pattern ? min baggage claim 30 min drive to LARC	10 min drive to N99† 5 min check in 1 hour flight to PHF† 5 min check out 20 min drive to LARC
Time: 6 hours Speed: 50 mph Cost: $35	4 hours 50 mph!* $400	1 hour 40 minutes 120 mph $150?

* The driving distance is 300 miles, the distance by air (as the crow flies) is 200 miles

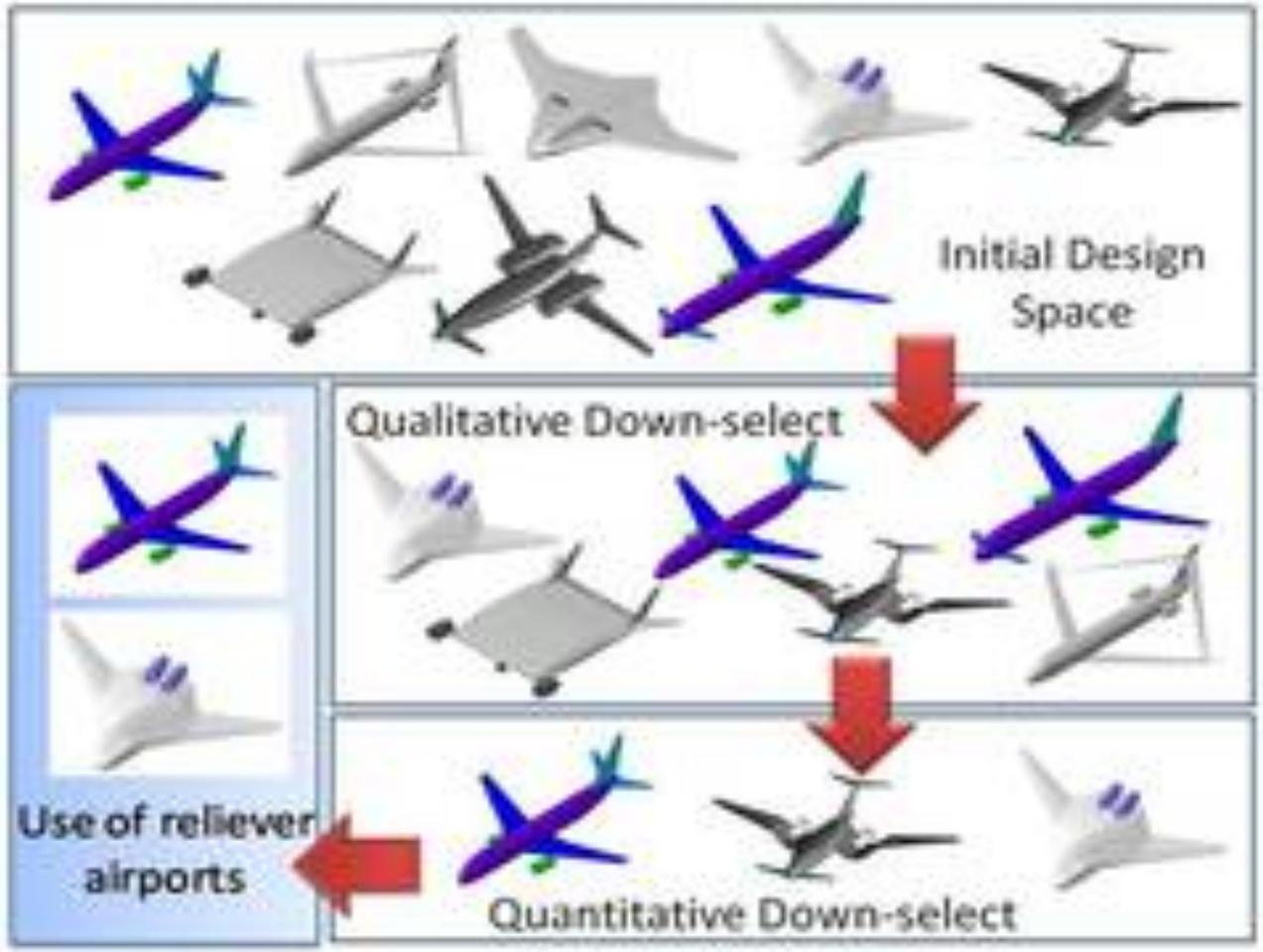
† ORF = Norfolk International, N99 = Brandywine Airport, PHF = Newport News/Williamsburg International

SATS:

- Stronger and lighter weight materials
  - Composites material
- Smaller, more efficient and more reliable engines
  - Williams EJ22 Turbojet
- Better safety
  - Ballistic airframe parachutes



The process of starting with many possible solutions and narrowing it down to just a few…



What Future Airplane looks like?

These are NASA's coolest and strangest airplanes of the future

- *This updated future aircraft design concept from NASA research partner Lockheed Martin shows a few changes from another concept seen eight images earlier in this gallery.*

- *This concept of an aircraft that could fly at supersonic speeds over land is being used by researchers, especially at NASA's Langley Research Center, to continue to test ideas on ways to reduce the level of sonic booms. Its technologies – the F-100-like propulsion system, a tail blister, and the overall shape – are combined to achieve a lower target perceived decibel level.*

- *This idea for a possible future aircraft is called a "hybrid wing body" or sometimes a blended wing body. In this design, the wing blends seamlessly into the body of the aircraft, which makes it extremely aerodynamic and holds great promise for dramatic reductions in fuel consumption, noise and emissions.*

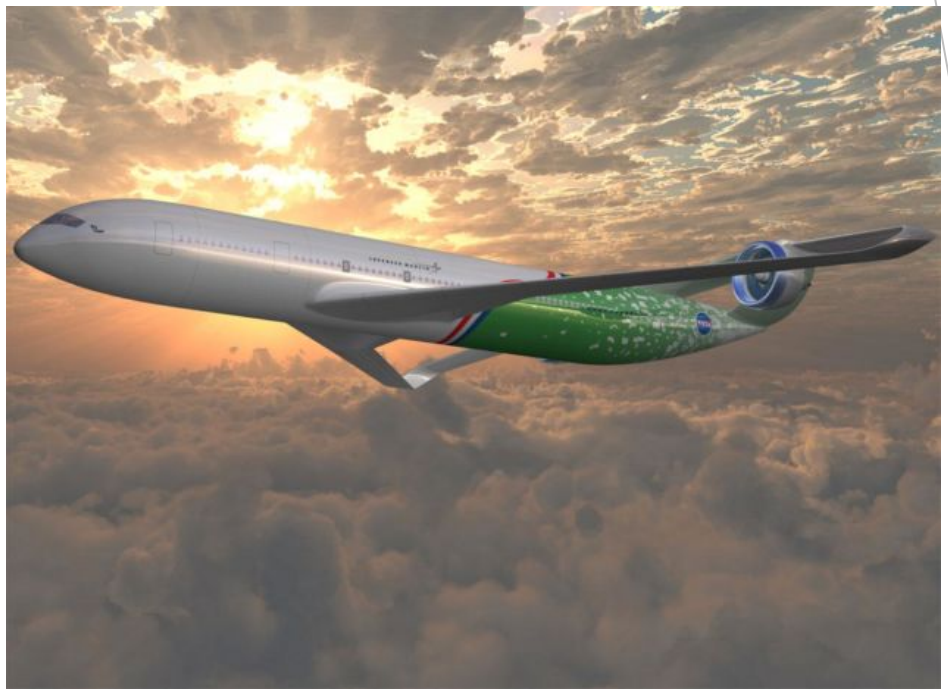
- *This computer-generated image shows a possible future "flying wing" aircraft, very efficiently and quietly in flight over populated areas. This kind of design, produced by Northrop Grumman, would most likely carry cargo at first and then also carry passengers.*

- *Lockheed Martin's advanced vehicle concept proposes a box wing design, which is now feasible thanks to modern lightweight composite (nonmetallic) materials, landing gear technologies and other advancements. Its Rolls Royce Liberty Works Ultra Fan Engine achieves a bypass ratio (flow of air around engine compared to through the engine) nearly five times greater than current engines, pushing the limits of turbofan technology to maximize efficiency.*

- *Northrop Grumman's concept is based on the extremely aerodynamic "flying wing" design. The four Rolls Royce engines are embedded in the upper surface of the wing to achieve maximum noise shielding. The company used its expertise in building military planes without a stabilizing tail to propose this design for the commercial aviation market.*

- *Our ability to fly at supersonic speeds over land in civil aircraft depends on our ability to reduce the level of sonic booms. NASA has been exploring a variety of options for quieting the boom, starting with design concepts and moving through wind tunnel tests to flight tests of new technologies. This rendering of a possible future civil supersonic transport shows a vehicle that is shaped to reduce the sonic shockwave signature and also to reduce drag.*

- *This artist's concept shows a possible future subsonic aircraft using a boxed- or joined-wing configuration to reduce drag and increase fuel efficiency. This design of an aircraft that could enter service in the 2020 timeframe is one of a number of designs being explored by NASA with teams of researchers from industry and universities.*



- *This future aircraft design concept for supersonic flight over land comes from the team led by the Lockheed Martin Corporation.*

- *The team used simulation tools to show it was possible to achieve over-land flight by dramatically lowering the level of sonic booms through the use of an "inverted-V" engine-under wing configuration. Other revolutionary technologies help achieve range, payload and environmental goals.*

- *The "Icon-II" future aircraft design concept for supersonic flight over land comes from the team led by The Boeing Company.*

- *A design that achieves fuel burn reduction and airport noise goals, it also achieves large reductions in sonic boom noise levels that will meet the target level required to make supersonic flight over land possible.*

- A 20-passenger commercial aircraft design concept.
- ***GE Aviation***

- The "double bubble" D8 design concept.
- ***MIT / Aurora Flight Sciences***

- The Subsonic Ultra Green Aircraft Research, or SUGAR, Volt design concept.

- ***The Boeing Company***

More about the future airplane From the video:

- http://videos.airbus.com/video/iLyROoafza66.html

Link:

SATS:

http://www.nasa.gov/centers/langley/news/factsheets/SATS.html

http://edition.cnn.com/2013/11/24/opinion/schaefer-airplane-of-the-future/index.html?eref=edition

Process:

http://www.nasa.gov/topics/aeronautics/features/future_airplanes.html

Coolest and Strangest airplane:

http://sploid.gizmodo.com/these-are-nasas-coolest-and-strangest-airplanes-of-the-1668497751

Future plane:

http://motherboard.vice.com/read/windowless-airplanes-future

Video:

From airbus video gallery

Thank you~