Propulsion for the Future II

Topic: Aviation
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Reduced Mission Energy Consumption

- Lower fuel consumption
- Lower drag
- Lower mass

*Future propulsion systems* should enable to design new aircraft architectures

- Tube and wing configuration + Boudary Layer Ingestion (BLI)
- Double bubble fuselage + BLI and distributed propulsion
- Blended wing body + BLI and distributed propulsion
FUTURE PROPULSION SYSTEMS

- More efficient turbine engines (higher PR, lower noise, lower emission)
- Alternative fuels (lower emission, reduced operating cost?)
- Distributed propulsion (allows to increase propulsion efficiency and ingest more boundary layer)
- Boundary Layer Ingestion (allows to increase propulsion efficiency and reduce drag)

a key enabler to introduce distributed propulsion, boundary layer ingestion and other new aircraft architectures would be **Hybrid / Electric Propulsion Systems**
FUTURE PROPULSION SYSTEMS

COMMERCIAL (and military subsonic)
- Alternative fuels
- Hybrid / electric propulsion systems (as an enabler for other architectures)

SUPERSONIC
- Alternative fuels
- Variable cycle engines (adaptive cycle)
- Alternative cycles
FUTURE PROPULSION SYSTEMS main challenges

Hybrid / Electric Propulsion Systems
- High power density electric devices
- Electric energy storage means
- High power distribution
- Propulsion system – airframe integration
- Certification

Alternative fuels
- Certification
- Airport infrastructure
- Cost
Summary

- There is no one solution that fits for all segments and all missions: distance, cargo, military…
- Society will accept to go slow knowing they save nature: social data shows 10-20% time increase if 50% gasses reduction… they are also ready to get rid of 99 euro flights or accept 20% ticket price increase. (People of age 16-36).
- Infrastructure and logistic integration is necessary: aircraft (hybrid propulsion integrated with airframe), airports (longer runways, fuel inst.), airlines - missions and fleet management, synthetic fuels - liquid.
- Last not least - safety always should go first: we need to educate politics and some professors if needed - no doubt about global warming but we need to be a voice of sense.