Project 37
CLEEN II
(Continuous Lower Energy, Emissions, and Noise)
System Level Assessment

Motivation and Objectives

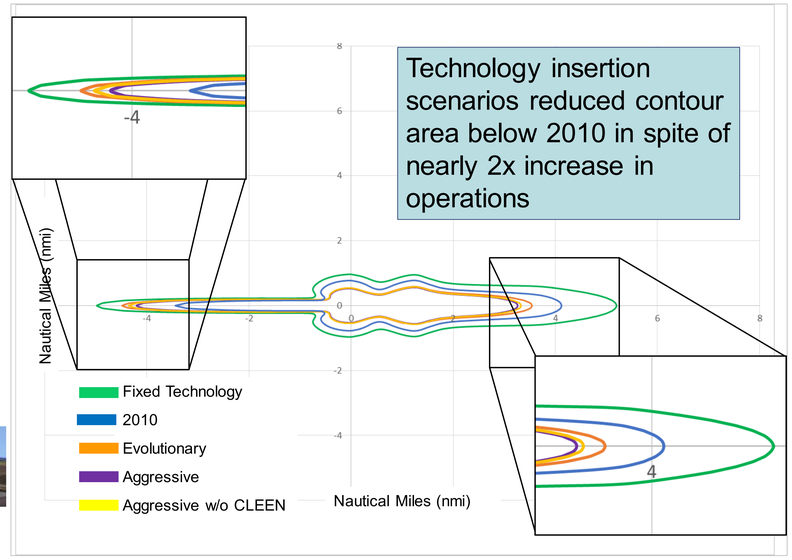
Develop and demonstrate (TRL 6-7) certifiable aircraft technology

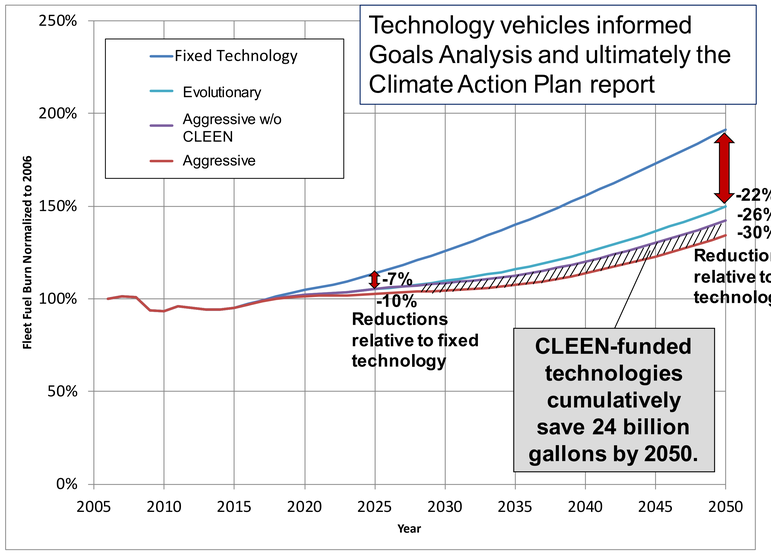
	CLEEN I	CLEEN II	
Noise (cum below Stage 4)	-32 dB	-32 dB	and/or reduces the noise contour area in absolute terms
LTO NOx Emissions (below CAEP 6)	-60%	-75% (-70% vs. CAEP/8)	and/or reduces absolute NOx production over the aircraft's mission
Aircraft Fuel Burn	-33%	-40%	and/or supports the FAA's goal to achieve a net reduction in climate impact from aviation

Advance use of "drop-in" renewable alternative fuels

Bio feedstock →  Fuel Production →  Jet fuel

Outcomes & Practical Applications



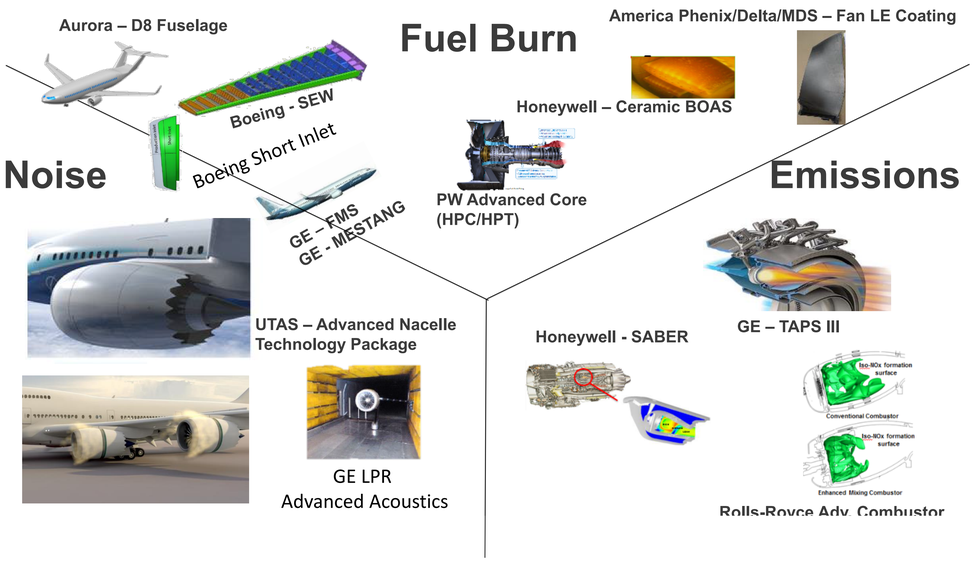


Evaluated Scenarios

- Before defining specific technology packages GT & FAA developed three scenarios
- Each scenario subdivided into N+1 and N+2
- Aggressive w/o CLEEN can be compared to Aggressive to identify CLEEN contribution

Scenario	Description
Evolutionary	'Normal' technology evolution TAPS II only CLEEN technology included in N+1
Aggressive	Represents higher rate of technology development Includes all CLEEN Techs in N+1
Aggressive w/o CLEEN	Identical to aggressive with all CLEEN technologies removed and PW GTF cycle constrained to current technology level

CLEEN II Technologies



Progress & Next Steps

- Completed modeling:
  - Aurora D8
  - Boeing Compact Nacelle
  - Delta/MDS advanced fan coating
  - GE MESTANG
  - GE FMS
- Modeling work underway:
  - Boeing Structurally Efficient Wing
  - GE TAPS III
  - Honeywell BOAS
  - UTAS Nacelle
- Modeling Remaining:
  - Honeywell Combustor
  - P&W Advanced Core
  - Rolls-Royce Combustor
  - GE LPR Advanced Acoustics

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