



Ultra-Efficient Engine Technology Program

Technical Accomplishment



Preliminary Technology Benefits Assessment

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UEET Project: Propulsion Systems Integration and Assessment

Relevant Level 1 Milestone: **Preliminary Technology Benefits Assessment: Assess all UEET technologies impact on meeting program goals, September 2000**

Shown: The first chart shows the 8 UEET baseline vehicles; the 4 commercial classes being those used in this assessment. The second chart indicates the improvements in CO₂ Emission reductions and the relative contributions to that improvement from each of the UEET Technologies for four different vehicle classes, as well as the level of LTO NO_x emissions expressed in terms of percent below the 1996 ICAO regulation. The UEET Goal level is also indicated on these two figures.

Accomplishment / Relation to Milestone and ETO: A series of parametric design-space trades were performed for each of 4 commercial vehicle classes which demonstrate the impact of the UEET Program technologies toward peak CO₂ reduction, peak LTO NO_x reduction, and the balanced CO₂/NO_x technology combination which meet the overall Program goals. Using these CO₂/NO_x trades, a UEET baseline engine cycle was selected for these 4 vehicles. The final assessment performed substantiates not only the aggressive nature of the program goals but the impact of the revolutionary UEET technologies in meeting those goals. The assessment results further demonstrate the UEET program's considerable contribution toward meeting the Enterprise's emission reduction objective.

Future Plans: More detailed examination of the baseline UEET engines, with regard to specific technology trades, will be performed to ensure optimal implementation of each UEET project technology. Additional figures of merit such as noise and cost will also be examined, as well preliminary evaluations performed on potential additional technologies for possible inclusion in the UEET Program. Four additional non-commercial vehicle classes will be explored which further demonstrate the far-reaching impact of the UEET technologies. These vehicles include a General Aviation aircraft, an Unmanned Aerial Vehicle, an Advanced Tactical Fighter, and an Access-to-Space airbreathing vehicle.



Baseline Vehicles for UEETP Technologies Application

Commercial Vehicles

Subsonic

300 PAX

Large Subsonic Transport



50 PAX

Regional Jet Transport



Supersonic

300 PAX

Supersonic Civil Transport (HSCT)



10 PAX

Supersonic Business Jet (SBJ)



Hypersonic

Non-Commercial Vehicles

4 PAX

General Aviation Aircraft



Advanced Tactical Fighter



Unmanned Aerial Vehicle



Access-to-Space/High Mach Platform





Results of Preliminary Technology Benefits Assessment

