

THEME
LEVEL I
LEVEL II
Level III

Revolutionize Aviation
Vehicle Systems
Propulsion and Power
Aeropropulsion and Power (A&P) URETI

OBJECTIVE

The objective of the Aeropropulsion and Power (A&P) URETI Project are 1) to develop revolutionary aeropropulsion and power technologies and design methods, in a systems-oriented integration environment, 2) to enable NASA and industry to close technology gaps that prevent deployment of high performance, intelligent, safe and environmentally compatible systems, and 3) to implement the integrated and multidisciplinary education programs that will prepare students graduates and NASA/industry engineers to develop the revolutionary engine systems that will be needed to ensure pre-eminence of the U.S. aerospace industry.

KEY DELIVERABLES

1	Initial assessment of promising advanced aeropropulsion and power technologies	9/05
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IMPACT

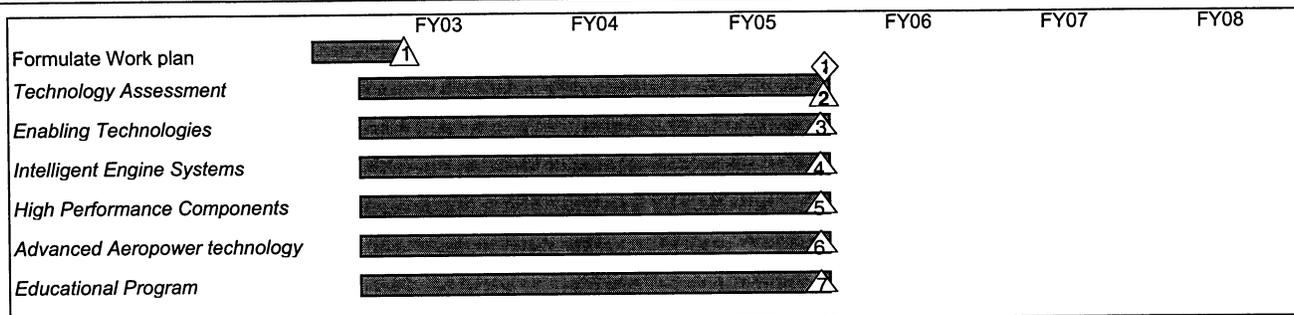
The project will develop a wide range of innovative propulsion and power technologies that will enable NASA/industry to produce systems that meet highly restrictive local environmental (emissions and noise) regulations, burn less fuel to reduce global warming, improve safety beyond current levels, and exhibit lower acquisition and operating costs. Developing these capabilities will enable NASA to attain its 10 and 25 year Aerospace Enterprise goals.

TECHNICAL APPROACH

The research portfolio consists of five major thrusts involving interdisciplinary teams from a team of four universities - Georgia Institute of Technology (GT), Ohio State University (OSU), Florida A&M University (FAMU) and Case Western Reserve University (CWRU). The research areas include 1) system level engineering analysis and technology integration methods (e.g., creation of a virtual stochastic system and technology assessment environment), 2) enabling technologies that are applicable to a number of engine components and systems (e.g., advanced materials, MEMS and nanotechnology based devices, and fluidic actuators), 3) intelligence engine components and systems (e.g., active combustor emissions control, actively cooled turbine blades), 4) high performance components (e.g., highly loaded compressor blades, flameless combustors), and 5) advanced power technologies (e.g., light weight fuel cells, superconducting motors).

The benefits of the developed technologies in existing and new engine concepts will be evaluated and optimized using advanced design, system integration, and optimization approaches that incorporate uncertainty analysis. These results will subsequently be mapped against the Enterprise goals for a variety of conventional and revolutionary vehicle concepts.

SCHEDULE



MILESTONES

1	L3 - Formulate Work plan	12/02
2	L2 - Technologies Assessment	9/05
3	L3 - Enabling Technologies: Formulation and Proof of Concepts	9/05
4	L3 - Intelligent Engine Systems: Proof of Concepts and Models Development	9/05
5	L3 - High Performance Components: Models Development	9/05
6	L3 - Advanced Aeropower technology: Formulation and Proof of Concepts	9/05
7	L3 - Educational Program - Develop and Conduct New Undergrad, Grad, and Short Courses	9/05

MANAGEMENT

The Aeropropulsion and Power URETI Project is a Level III project at the Glenn Research Center. Level I Manager is Richard Wlezien at HQ. Level II Manager is Dr. Gary Seng at the Glenn Research Center. Level III Manager (acting) is Kim Pham at the Glenn Research Center. This project is in full compliance with NPG7120.5B.

RESOURCES

	FY03	FY04	FY05	FY06	FY07	FY08
Funding (M\$)	2.000	2.000	2.000			
Workforce (WY)	1.1	3.0	3.0			

KEY FACILITIES

	FY03	FY04	FY05	FY06	FY07	FY08
None at GRC						

AGREEMENTS

Partner	Agreement Title	Number
GT, OSU, FAMU, and CWRU	URETI for an integrated systems approach to revolutionary aer propulsion and power technologies	NCC3-982
DoD	Memorandum of Agreement for Cooperation in URETI's	signed, 8/22/02; number pending

ACQUISITION STRATEGY

The primary acquisition instrument for this project was the NASA Cooperative Agreement Notice (CAN 01-OAT-01), an open and competitive procurement led by OAT. The GTI led team proposal was selected as the winner for the Aer propulsion and Power URETI, and awarded the cooperation agreement (NCC3-982).

RISK MANAGEMENT (optional)

Risk	Mitigation Strategy
Cost Risk - costs growth from current estimations of \$2.0M per year - due to increasing costs of institutions, facilities, human resources, inflation, and uncertainty of estimations.	1) Manage and monitor 2) Identify opportunities for resources optimization, leveraging, and new funding sources. Actionee: URETI Project Manager and URETI Management Team.
Schedule Risk - facilities, expertise, tools, and/or funding not available at time needed.	1) Plan ahead for needs, 2) Manage, monitor, and communicate schedule changes. Actionee: URETI Management Team and Lead PIs.
Technical Risk - scientific and technologically unknowns and challenges in aer propulsion and power research areas.	1) Accept, 2) Monitor, communicate, and manage technical challenges. Actionee: URETI Management Team and Lead PIs.

TECHNOLOGY TRANSFER

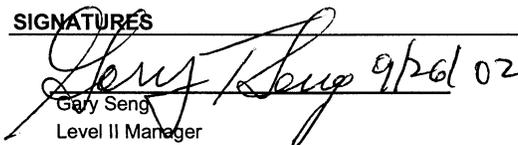
Optional

EDUCATION OUTREACH

The Aer propulsion and Power URETI will develop integrated, multidisciplinary, education programs to prepare future graduates, NASA engineers, and industry engineers to handle the challenges associated with the development of revolutionary propulsion systems via the following three-part approach:

1. Training of future engineers in advanced air-breathing propulsion at the undergraduate and graduate levels
2. Providing continuing education for government and industry engineers
3. Improving existing propulsion and power educational programs by involving government and industry personnel in teaching activities through classroom, seminar, and research participation, as well as providing opportunities for students to intern at NASA GRC and engine companies.

SIGNATURES

 9/26/02
 Gary Seng
 Level II Manager

 9/26/02
 Kimlan Pham
 Level III Manager