

Topic #22: Efficient Powertrain Technologies (7 to 9 ton vehicle version)

OBJECTIVE:

As efforts to reduce reliance on fossil fuels come to fruition, there is a need to develop more efficient powertrains. The US Army is launching a four year program to advance the state of the art by developing new powertrain technologies which will improve overall efficiency by reducing fuel consumption, providing exportable electrical power, reducing noise, and by developing powertrains which consume a wide range of fuels. Under this topic, the Government invites proposals for basic and applied research and that part of development not related to the development of a specific system or hardware procurement. Specifically, under this topic, the Government invites proposals regarding an electronically controlled powertrain, consisting of a diesel engine, a longitudinal transmission, and a high output optimized electrical generator device, which reduces fuel consumption, provides exportable electrical power, reduces noise, and is able to operate on a variety of fuel combinations and mixtures.

DESCRIPTION:

1. The Contractor shall develop an electronically controlled, integrated powertrain, which shall be properly sized in terms of power and ratio to meet the functional requirements of a 7 to 9 ton vehicle. The developed powertrain shall incorporate the following metrics:

7 to 9 ton weight class	Metric
Engine	
Thermal Efficiency	44% or greater
Heat rejection	.6 kW/kW or less
Emissions	No Aftertreatment nor EGR; must conform to 1998 emissions standards
Power	150 to 300 Hp
Fuel Compatibility	DF-2, ULSD, JP-8, JP-5, Jet-A, and mixture
Transmission	
Configuration	Automatic Longitudinal
Ratio spread	Greater than 10.0
Transmission Efficiency	90% or greater
Generator	
Electrical Power Generation	85kW continuous
Generator Output Voltage	350 – 600 Volts DC
Electronic Controller	Open source compatible buss capable of accepting prognostics and diagnostics in future

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2. The developed powertrain shall be capable of operating on the following fuels: (1) DF-2, (2) ULSD, (3) JP-8, (4) JP-5, (5) Jet-A, and every combination and mixture of the five. The engine and its control system shall be modified such that its output will remain unchanged no matter which combination or mixture of the five fuel types the engine is operating on. The engine will adapt to a change of fuel type, combination, and/or mixture without any intervention by an operator or maintainer within 5 minutes of engine operation.
3. The developed powertrain shall contain a longitudinal transmission with a ratio spread of no less than 10. The transmission shall maintain 90% or greater efficiency over the entire operating range in all gear ratios. It shall be controlled by an electronic controller, capable of adapting the controls logic as necessary to maintain powertrain system efficiency and operation.
4. The developed powertrain shall be capable of generating at least 70kW of electrical power at high voltage (350-600VDC) at a tactical idle speed (equal to or below 1,800 RPM).
5. The contractor shall conduct a trade study of available technologies that reduce powertrain noise while operating under the conditions of paragraph 4. The study shall investigate and compare various powertrain noise reduction technologies, their effect on engine power, fuel economy, and their effect on the overall weight.
6. (Paragraph 6 deleted from this topic requirement per amendment 0049).
7. The contractor shall conduct a Powertrain Energy Analysis, through simulation of the developed powertrain, indentifying all areas of energy consumption and loss.
8. The contractor shall provide all technical data, efficiency data, modeling information, and calibrations to the government, of testing, analysis, and simulation, on a monthly basis. The powertrain will be demonstrated on multiple fuels and will complete a 50hr NATO test. After demonstration by the contractor, the contractor will deliver two developed powertrains for further government dynamometer testing.

PROPOSALS THAT REFLECT A “PARTIAL SOLUTION” TO THE TECHNICAL OBJECTIVE AND DESCRIPTION ARE NOT ACCEPTABLE. THE GOVERNMENT WILL CONSIDER ONLY THOSE PROPOSED PROJECTS THAT ADDRESS ALL ELEMENTS OF THE OBJECTIVE AND DESCRIPTION

PROJECT DURATION AND ESTIMATED MAXIMUM FUNDING AVAILABLE:

1. **Period of Performance:** The scope of this effort is such that we anticipate a potential duration of 48 months (fiscal year 2010 to 2013).
2. **Funding:** Maximum government funding available in Fiscal Years 2010 through 2013 is \$7.0M. Subparts A through D below describe the estimated maximum funding available for each fiscal year of the project. Funds which are not expended in a given fiscal year are available in the subsequent years of the project, subject to fund type restrictions. Estimated funding includes:
 - A. \$1.32M in FY10
 - B. \$1.92M in FY11
 - C. \$1.75M in FY12
 - D. \$2.01M in FY13
3. **Cost ceiling/cost share:** Proposed projects involving costs exceeding those in item 2 immediately above, and its subparts A-D, will be unaffordable. The contractor may propose costs in excess of the Government funded cost ceilings only if the excess costs are to be funded by a cost sharing arrangement. Please note that a cost sharing arrangement is not a consideration for award; therefore, no evaluation preference will be given if a cost share is proposed.
4. **Single Award:** The government anticipates only one contract will be awarded as a result of this topic.

DESIRED AWARD DATE: March 1st, 2010.

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MILESTONE SCHEDULE:

1. Informal talks timeframe: August 3rd through September 2nd, 2009.
2. Electronic copies of proposals due: September 3rd through October 2nd, 2009 (by 3PM local time, Warren, MI).*

*NOTE: In accordance with FAR 15.208(a), offerors are responsible for submitting proposals so as to reach the Government office designated in the solicitation by the time specified. Any proposal received at the designated Government office after the exact time specified is "late" and will not be considered unless one of the exceptions is met at FAR 15.208(b). There is no "expected" or "target" length of time for proposal submission; size and content may be factors. Therefore offerors are strongly cautioned to submit their proposals allowing adequate time for submission.

SPECIAL PROPOSAL INSTRUCTIONS:

After 13 February 2009, all proposals must be submitted using the ASFI Bid Response System (BRS), which may be accessed at <https://acquisition.army.mil/asfi/default.cfm>.

You will find Topic 22 for proposal submission by searching Contracting Opportunities for "TARBAATOPIC22." As reflected by the results of this search, proposals for Topic 22 may be uploaded via the ASFI BRS at the following URL:

https://acquisition.army.mil/asfi/solicitation_view.cfm?psolicitationnbr=TARBAATOPIC22

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