

Mobility and Other Automotive-related Areas of Work

Contract No. DAAE07-00-C-L036

Scope of Work

C.3. Propulsion Engineering

C.3.1 The Contractor shall provide engineering supplies and services to support both military and commercial ground, water, rail and air propulsion systems and supporting components. Propulsion system and components include, but are not limited to, all types of engines (e.g., diesel, gas turbine, rotary and compound cycles), drive trains (e.g., hydrokinetic, hydromechanical, mechanical, friction drive, electro-mechanical or electric), final drives, air cleaners, cooling systems, intake and exhaust systems, control systems, propulsion electrical systems, axles, gearboxes, braking systems, steering systems, auxiliary power units, propeller shafts, couplings (e.g., fluid couplings, universal joints, CV joints, slip joints, differentials, torque converters, fuel cells, batteries, electric motors, generators and electric drive system controls. The propulsion systems and components include both Government and commercial items with output power up to 6,000 horsepower.

C.3.1.1 The Contractor shall design and redesign in accordance with the guidance provided in the Work Directive; provide feasibility and trade-off studies.

C.3.2 The Contractor shall prepare new drawings, or make changes to existing drawings, and submit layout, outline, and installation drawings of the propulsion systems and components identified in paragraph C.3.1 above. The Contractor shall prepare all drawings, either existing or new, required to define the installation, the space claim, the interface points, and assembly, using Computer Aided Design (CAD). The Contractor shall submit deliverables electronically, according to the CDRL schedule.

C.3.2.1 The Contractor shall deliver two-dimensional (2D) drawings in one of three formats, which the CDRL will specify: (i) the international Graphics Exchange Specification (IGES), (ii) Engineering drawings in Continuous Acquisition Lifecycle Support (CAL S), Raster Images Type I, Consultative Committee International Telegraph Telephony (CCITT) Group 4, or (iii) AutocadDXF. The Contractor shall configure the output options, when available, such that no data is lost when TACOM imports digital CAD drawings using its CAD system, (i.e., hardcopy drawings are identical, whether generated at TACOM or the Contractor site). The number of digital drawings used for the acceptance phase shall be representative of the more complex drawings for each type of drawing required.

C.3.2.2 The Contractor shall develop two-dimensional (2D) and three-dimensional (3D) CAD models as required by the Work Directive. The 3D models are required in one of the following formats: (i) ISO Standard 10303, the Standard for the Exchange of Product (STEP) model data, (ii) the International Graphics Exchange Specification, or (iii) Virtual Reality Modeling Language (VRML) version 2.0. The Contractor shall configure output options, when available, such that no surface data is lost or surface voids exist when CAD models are imported using TACOM's CAD system. The preferred Native format for both 2D drawings and 3D CAD models as a deliverable to TACOM/TARDEC is Pro/E version 20.0.

C.3.3 To support any engineering, analysis, evaluation, testing, recommendations or management performed under this contract, the Contractor shall fabricate, procure, install, or otherwise provide, on a limited basis, hardware (prototypes, developmental, or off-the-shelf), components, kits and assemblies that may be required to support Work Directive activity, product or engineering evaluations, quick field fixes, manufacturing problems, or testing scenarios within the scope of this Contract.

C.4 Analysis

C.4.1 The Contractor shall conduct analytic assessments and evaluations, in accordance with the guidance provided in the Work Directive; provide feasibility and trade-off analyses, perform market research and surveys.

C.4.2 Analyze fuel consumption, oil consumption, air and oil filtrations systems performance, cooling system performance, total system performance, and mobility performance functions given the actual or proposed end-item parameters. "Mobility Performance Functions" means fulfilling all of the requirements of the end-item performance requirements.

C.4.3 Conduct analytical and/or experimental investigations or surveys of propulsion components and systems given real or proposed end-item performance requirements.

C.4.4 Conduct analyses of engine cycles, combustion processes, exhaust emissions shock and vibration and materials technology. If existing computer analysis models are not adequate, the Contractor shall develop appropriate software/analytical tools.

C.4.5 Conduct technical evaluation of designs, reports, and suggestions.

C.4.6 Conduct reverse engineering analyses, stress analysis, and computational fluid dynamic analysis.

C.5 Testing

C.5.1 The Contractor shall perform structural, mechanical, and performance testing on complete assemblies, subassemblies and components. The Contractor shall perform evaluation and testing to verify performance, environmental, Electro Magnetic Interference (EMI) / Electro Magnetic Compatibility (EMC), reliability, Nuclear Biological Chemical (NBC), interchangeability and maintainability. Capability relationships, external and internal interfaces, flexibility and expansion testing shall be performed. The Contractor shall develop test procedures and plans outlining verification methods which may include test, demonstration, evaluation, assessment, or analysis. If testing is to be conducted at other than the Contractor's facility, the location of the test will be identified in the Work Directive.

C.5.2 Conduct dynamometer and end-item tests in components and/or systems. Such tests include the 400-hour NATO, 600-hour mission profile, and other qualification tests that will be run at a specified cyclic test sequence of time, load, speed, and power. The Contractor shall develop performance and durability tests of electric drive trains based on prescribed mission profiles similar to the 600-hour mission profile test.

C.5.3 Conduct cold start and full load cooling tests on Government- and Contractor-furnished equipment per the individual end-item performance requirements.

C.5.4 Design, fabricate, and provide experimental propulsion system parts and special test instrumentation.

C.5.5 Develop battery testing, including cycling the batteries for hybrid applications at different temperature settings.

C.5.6 Conduct research and development laboratory tests on propulsion equipment.

C.5.7 Conduct emission testing in conformance with Environmental Protection Agency (EPA) or other regulatory requirements, including any requirements specified in the Work Directive.

C.6 Evaluation

The Contractor shall evaluate materials (e.g., metals, plastics, and composites) or products (e.g., engine, transmission, electric motors, batteries, power electronics, controllers, and components),

both domestic and foreign. Reverse engineering of such items may be required, to include drawings and manufacture of replacement hardware items.

C.7 Recommendations

The Contractor shall prepare and make recommendations, records, and reports to support any engineering, analysis, evaluation, and/or testing. Documentation augmenting the recommendations, records, or reports may be in the form of briefing materials such as viewgraphs, photographs, illustrations, technical data, pamphlets, or brochures. When directed by Work Directive, the Contractor shall design and provide camera-ready drawings and line art for use in presentations and reports.