

Joint Service Specification Guide for Propulsion and Power Systems

A Common Framework for Developing Performance-Based Requirements for Aviation-Related Acquisition

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In the wake of the widespread acquisition reforms and the mass cancellations and conversions of MilSpecs and MilStd's in the mid-1990s, a series of joint service specification guides was conceived. The JSSGs identify generic performance-based requirements for a variety of Navy, Marine Corps, Air Force, and Army aviation roles and missions. These requirements provide a solid starting point for developing a specification and other program documents tailored to a specific aviation-related acquisition. The JSSGs also provide a repository for lessons learned and corporate knowledge across all the military services. The JSSGs are intended for use by both government and industry personnel.

The fundamental objectives of JSSGs are to provide consistent organization and content guidance for describing requirements in terms of meeting operational needs; as performance-based without specifying the design; as measurable during design, development, and verification; and as achievable in terms of performance.

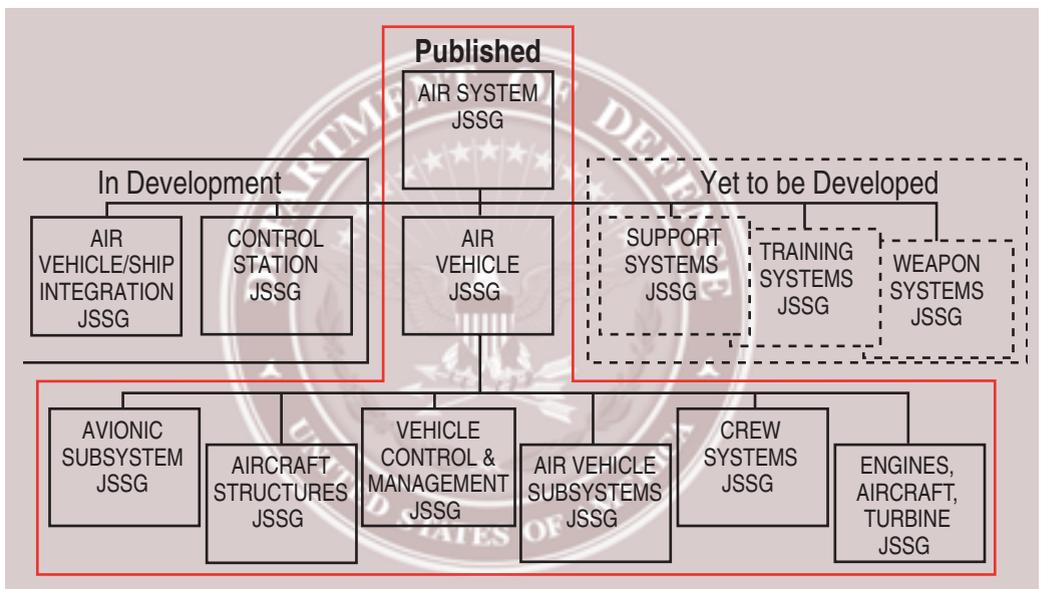
As illustrated in the specification tree graphic, the JSSG suite has been created as a three-tiered framework: Tier I, Air System JSSG; Tier II, Air Vehicle JSSG; and Tier III, aviation subsystems JSSGs (engines, avionics, etc.).

Each lower-tier document represents a flow-down of requirements established at the next higher tier to help ensure that a complete set of requirements can be generated for each program-unique specification. A systems engi-

neering approach is emphasized to ensure a complete, integrated, and balanced solution; it accounts for all inputs and outputs. The up-front integration of requirements helps assure a complete product definition and enables a disciplined top-down flow of requirements to lower-tier specifications.

Each JSSG has six sections: scope, applicable documents, performance requirements, verification criteria, packaging, and notes. The individual requirements are written as generic templates and may contain blanks, tables, and figures in lieu of numerical requirements, along with rationale and guidance to help tailor each requirement to program-specific needs. If a particular JSSG requirement is outside the scope of a program's needs, it can simply be omitted from the program specification. In an effort to capture the vast reservoir of experience gained from past DoD acquisition programs, each JSSG requirement contains both positive and negative lessons learned that apply to that particular requirement. In addition, sample

JSSG Specification Tree



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verification methods and lessons learned during previous verifications of similar requirements are included for reference, along with final verification criteria to help ensure that the requirement has been fulfilled. This verification information is not intended to limit new practices, processes, methods, or tools, but rather to serve as a starting point for a program team when determining the technical maturity of a requirement.

JSSGs are tools not only for developing a program-unique specification, but also for facilitating communication between government and industry engineering communities. Where feasible, common terms and methods have been used, and Service-unique language has been minimized.

The JSSGs are intended for common use among the Services, and each has been developed through a concerted joint Navy, Air Force, and Army effort. Industry, under the auspices of the Aerospace Industries Association (AIA), has also participated. The involvement of a wide variety of people has resulted in not only a set of requirements that covers all three Services, but also a means to facilitate joint programs by providing a single face to industry for common requirements. (Existing JSSGs can be found on the Acquisition Streamlining and Standardization Information SysTem (ASSIST) Web site at <http://assist.daps.dla.mil/>.)

Throughout the initial creation and update of the JSSGs, absolutely the most active and dedicated work so far has come from the team that compiled the Aircraft Turbine Engines JSSG (JSSG-2007). Over the past eight years, a hard-working and highly focused group of government and industry technical experts has put together a thorough and comprehensive set of propulsion-related requirements. In addition to Navy, Air Force, and Army participants, the team has included AIA representation from Bell Helicopter, Boeing, GE, Lockheed Martin, Pratt & Whitney, and Rolls Royce. JSSG-2007 has three parts:

- **Part 1** is the main document. It provides a set of design and verification requirements, in template format, for developing a program-unique performance specification.

- **Appendix A** is a handbook that provides the rationale, guidance, and lessons learned relative to each statement in Part 1.
- **Appendix B** is a handbook that provides rationale, guidance, and lessons learned to help establish an engine model specification for the production phase of the engine program.

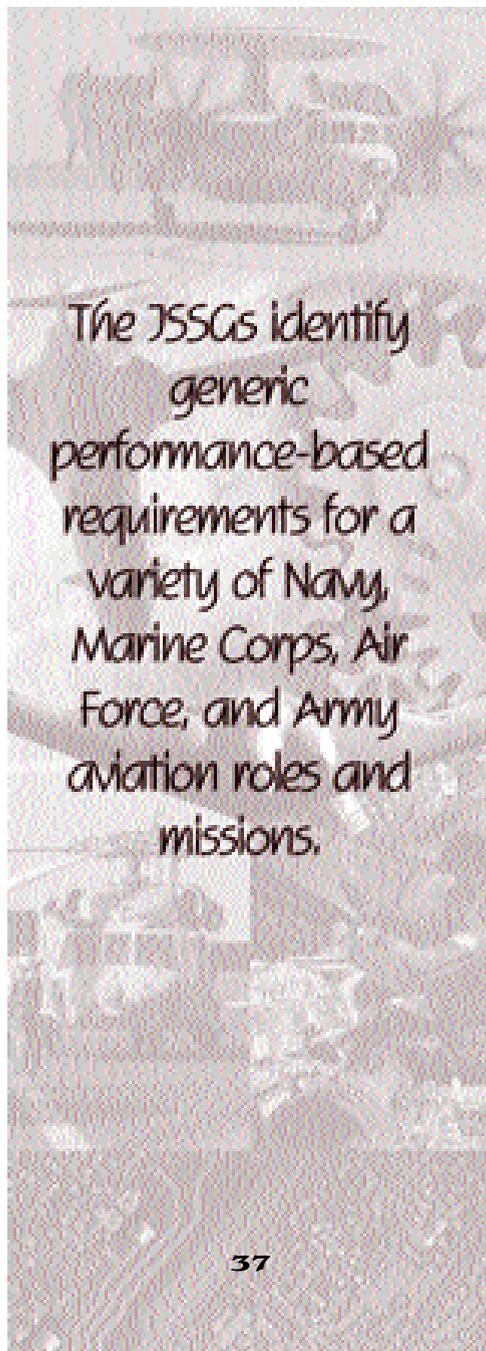
For each requirement, guidance is provided to help the specification developer tailor a verification that reflects an understanding of the design solution, the identified program milestones, the associated level of maturity expected at those milestones, and the specific approach to be used in the design and verification of the required products and processes.

Different program applications require different levels of requirements. Manned systems will often include additional requirements having to do

with aircrew safety and survivability, whereas an unmanned system will not. Likewise, rotary-wing systems have unique components and subsystems not found on fixed-wing applications. Wide-body systems (cargo, tanker, transport) usually have more benign missions than fighters. Through careful tailoring of requirements and associated verifications, JSSG-2007A can be used to develop a comprehensive, performance-based engine specification for any air system application. With increased DoD emphasis on the development of unmanned air vehicle and unmanned combat air vehicle weapon systems, the propulsion requirements contained in JSSG-2007A can be tailored for high-value UAVs (such as Global Hawk) and UCAVs.

The requirements in JSSG-2007 are closely associated with the requirements found in JSSG-2009, Air Vehicle Subsystems, and should be considered in tandem with any engine requirements.

Since the initial publication of JSSG-2007 on Oct. 30, 1998, the team has conducted an extensive update to keep the document current in regard to aviation propulsion methods and developments. The newest version of the Engine JSSG (JSSG-2007A) was released to the ASSIST on Jan. 29, 2004. Updates include the latest



DoD Instruction 5000.2 policy for spiral development as applied to incremental verification. The JSSG team also added qualification guidance based on the latest Federal Aviation Administration regulations and advisory circulars and Joint Aviation Authorities Joint Aviation Regulations, including international requirements for UAVs and for military qualification of commercial applications. The Services and industry can use this table to develop the verification matrix for all the design requirements in the JSSG-2007A for a specific application. Verification methods recommended for individual requirements may include analyses, modeling and simulations, component development tests, ground-level engine tests, flight tests, inspections, demonstrations, etc.

The JSSGs are maintained by the Services, with data calls to propulsion and power department engineers requesting them to provide program-specific lessons learned (for example, about technical advancements in instrumentation, verification tech-



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niques, technology, and so on) to maintain a useful reference for retaining corporate knowledge and training new engineers. Integrated program teams throughout government and industry provide a vital link in the JSSG update and maintenance process by providing rationale, guidance, and lessons learned for new requirements, and by maintaining the existing guidance for use by future engineers.

Development of the JSSG suite continues. Current documents are being updated to ensure that a complete set of potential requirements is represented in light of changing user needs and that lessons learned are being added to reflect relevant experiences. In addition, two new JSSGs are being worked on, and others are being considered.

The authors welcome comments and questions and can be contacted at john.fisher@wpafb.af.mil and mary.zidzik@navy.mil.

Bush Taps Krieg for Defense Under Secretary Position

American Forces Press Service

WASHINGTON, April 5, 2005—President Bush plans to nominate Kenneth J. Krieg for the Defense Department's top acquisition, technology and logistics position, the White House press office announced April 1. If confirmed by the Senate, he would take the reins from Michael W. Wynne, the current under secretary.

Krieg is currently director for program analysis and evaluation in the Office of the Secretary of Defense. In that position, he's been a proponent of DoD's transformation efforts, which, Krieg said, involves reshaping the department to address 21st-century challenges such as terrorism and to prepare for how war will likely be fought decades from now.

PA&E's role in transformation is "to push at the system, push at the Services, push at the combatant commanders" in order to effect necessary department-wide change, he said in a recent interview for the Pentagon Channel documentary "Facing the Future."

In the private sector, Krieg was vice president and general manager of International Paper in Purchase, N.Y., and Memphis, Tenn.

Earlier in his career, he served as executive assistant to the deputy secretary in the Office of the Secretary of Defense. He earned his bachelor's degree from Davidson College and his master's degree from Harvard University's Kennedy School of Government.