

Executive Summary

Embedded POSIX/Ada 95 Real-time Test Suite Certification Program

PNUM 6-15

Background: The Institute of Electrical and Electronics (IEEE) has been developing computer standards for Portable Operating System Interfaces (POSIX). These standards have become the foundation for what is referred to as “Open Systems” in the computer industry today. Because of DoD initiatives to reduce costs through reuse of Commercial Off the Shelf (COTS) software products, especially operating systems, it is essential that POSIX standards address both commercial and military operating system requirements. The Open Systems Joint Task Force (OS-JTF) was established by the Office of the Under Secretary of Defense for Acquisition and Technology to sponsor and accelerate the adoption of open systems in weapon systems and subsystems electronics to reduce life-cycle costs and facilitate effective weapon system intra- and interoperability. DISA, as the Executive Agent for Information Technology Standards for Weapon Systems supports the OS-JTF by providing technical expertise to standards related projects. One such project is the development of a POSIX real-time interface test suite for use in the Joint Strike Fighter (JSF) Specification and the Weapon System Annex of the Joint Technical Architecture (JTA). This task extends that work to cover the extension of the Society of Automotive Engineers (SAE) Profile that supports the Army requirements such as fault management.

Scope: A set of validation tests for implementations of the real-time POSIX/Ada bindings will be developed and incorporated into the Ada 95 vendor compiler test suite. This test suite is used to certify that vendors conform the Ada 95 standards. The specifications to be tested are the POSIX 1003.5b specifications for Ada. These correspond to IEEE Standards POSIX 1003.1b and POSIX 1003.1c. The validation tests will focus on functional areas of POSIX that are of interest to the Weapons System Contractors (WSC) for the JSF program and army weapons systems. Priority for testing shall be given to functionality that is expected to be needed for JSF, and which is supported by existing OS implementations being considered by the WSCs. The test development effort includes meetings and communication with the WSCs to establish priorities for the functional areas to be tested, and to obtain feedback on the tests as they are developed. This effort will also include active participation in POSIX standards development work to be sure the test suite is harmonized with emerging standards.

Objectives: Test objectives will be based on the POSIX 1003.5b standard and making use of any relevant test assertions contributed by the OS-JTF. Contributions will be solicited from the WSCs regarding the features of IEEE-Standard 1003.5b-1996 (POSIX 1003.5b) functionality that are likely to be of most importance to them. This information shall be used to prioritize features for test coverage. Efforts will be coordinated with the JSF team and the OS-JTF. Test programs shall be written using the style of the Ada Compiler Validation Capability (ACVC) tests and the existing ACVC test harness, to check that an implementation conforms to the POSIX 1003.5b standard. These tests shall be made available to the WSCs. As tests are developed, communication will be maintained with the WSCs, to obtain evaluative feedback on the tests that have been developed and plans for the next tests to be developed. Any defects in the test programs that are discovered and reported prior to the last quarter of the contract will be corrected.