The NASA Software Engineering Initiative

Status at the end of the first year

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The NASA Software Engineering Initiative completes its first year. This initiative, an Agency-wide coordinated effort to improve software engineering capability, is sponsored by NASA’s Office of the Chief Engineer (OCE). NASA’s Chief Information Officer (CIO), the Office of Safety and Mission Assurance (OSMA), the NASA Engineering Training Program, and Institutional Program Offices (IPO) jointly support the Software Engineering Initiative.

Software engineering is a core capability and a key enabling technology necessary for NASA’s success. Ensuring the quality, safety, and reliability of NASA software is of paramount importance in achieving mission success. Through surveys and assessments, many software challenges within the Agency have been identified and documented. Additionally, the exponential growth in the scope, complexity, and importance of software within NASA systems experienced over the years is expected to continue, challenging our ability to manage it effectively. As a result, the NASA Software Engineering Initiative was formed. The NASA Software Engineering Initiative is implemented, in coordination with Center Software Engineering Improvement efforts, as such is a NASA-wide comprehensive approach for improving software engineering to meet the software challenges of NASA.

The goal of Software Engineering Initiative is to advance software engineering practices to effectively meet the scientific and technological objectives of NASA.

This initiative strives to achieve the following through advancing software engineering practices:

- Improved cost and schedule predictability. Accurate schedules and budgets will ensure that software engineers are provided with adequate resources and realistic schedules to develop and maintain NASA products.
- Improved software reliability.
- Improved software quality.
- Reduced software cost.

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1 Reference "Improving the Current State of Software within NASA" developed by the NASA Software Working Group, presented by Pat Schuler to the NASA Chief Information Office, March 2000, URL: http://ip-strategies.jpl.nasa.gov/

2 Reference the "NASA Initiative for Software Safety and Quality" presented by Lee Holcomb to the NASA Senior Management Council, April 12, 2000, for the presentation that introduced this Initiative and for the specific rationale for the Initiative.

3 For the purposes of the Initiative the term "Software Engineering" refers to software development, assurance (i.e., safety, reliability, and quality), and management.
The NASA Software Initiative relies on the Software Working Group as an advisory group who implements Agency & Center level software engineering improvement plans. Assessments using CMM/CMMI* models that identify areas of strength allow infusion of best practices software engineering research and technology. Simply achieving a CMM/CMMI Level rating is not the objective. Software products must effectively meet NASA’s scientific and technological objectives. A key aspect of the initiative is the training, education and information exchange to enhance the Agency’s software engineering knowledge & skills.

“The purpose of the SWG is to develop and oversee the formulation and implementation of an Agency-wide plan to work toward continuous, sustained software engineering process and product improvements in NASA; and to ensure appropriate visibility of software issues within the Agency.”

From the NASA Software Working Group Charter

NASA is taking proactive steps to strengthen its capability in software engineering and management; specifically minimize technical, cost, and schedule issues and increase safety, quality, and reliability. The Initiative addresses these steps in four strategies:

Strategy 1. Implement a continuous software process and product improvement program across NASA and its contract community.

Strategy 2. Improve safety, reliability, and quality of software through the integration of sound software engineering principles and standards.

Strategy 3. Improve NASA’s software engineering practices through research.

Strategy 4. Improve software engineers' knowledge and skills, and attract and retain software engineers.

All 10 NASA Centers have in place active Software Engineering component initiatives. The NASA workforce is significantly more knowledgeable in software engineering than 1 year ago (65+ integrated classes have been held in FY02). Centers provide a foundation for the initiative with their flexibility in setting and achieving software process and product improvement goals has been central to this initiative and by sharing strengths and expertise in software engineering to improve systems across the agency.