NASA Software Working Group(SWG)

Supporting Activities for the
"NASA Initiative for Software Safety and Quality"

Briefing given by John Kelly
NASA Jet Propulsion Laboratory representative to the SWG

Session 6 Panel: Quality Mission Software
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SWG Steering Group: Orlando Figueroa HQ(AE), Lee Holcomb HQ(AO), and Michael Greenfield HQ(Q)

(* primary, ** alternate, & *** ad hoc)

Roles of the
Software Working Group

- Function as an advisory group
- Recommend, draft as requested, review, and promote policies, standards, & best practices
- Recommend and provide technical support for special studies
- Focus, integrate, and promote innovation and the continuous improvement of NASA's software engineering processes

- Support and help guide the establishment of software process improvement programs at each Center
- Facilitate the transfer of software technology
- Coordinate NASA representation within agency, interagency, and international boards
- Provide information to improve communication on software issues
- Ad hoc activities as needed

3

Framework for "NASA's Initiative to Improve Quality and Safety of Software"

Process Improvement
- Headquarters 'Champion'
- Empowered SWG
- Center S/W Eng. Process Groups
- Reuse of Process and Software
- Move Projects to CMM 3 per Criteria
- Training

Software Research
- Establish Focus
- Leverage Strengths of Centers
- Long-term Partnerships
- Transfer Research to Practice

Verification & Validation
- Headquarters 'Champion'
- Inventory Programs for V&V Requirements
- Establish IV&V Facility Role
- Expand Participation

Software Metrics
- Guide S/W Quality Efforts
- Collected by AO/AE
- Required from Each Program or Project

- From Lee Holcomb's presentation to the NASA Senior Management Council, April 12, 2000 4

Initial SWG Support Tasks in the *"NASA Initiative to Improve Quality and Safety of Software"*

1. Draft* NASA Software Guidelines (NPG 2820.1) using IEEE 12207 as a foundation with additional guidance in Verification & Validation, End-to-End Testing, and Metrics
2. Collect meaningful metrics by the Centers and Enterprises for all major software activities
3. Define the criteria for the use of Independent Verification and Validation (IV&V) and software Independent Assessment (IA) on projects
4. Prepare a draft plan for improving the software process at NASA

*By request of the NASA Chief Engineer

5

Draft NASA Software Guidelines (NPG 2820.1) Highlights

- Helps transition NASA software development to a widely accepted industry standard (IEEE 12207)

- Provides additional requirements and guidance only in selected areas that are not adequately covered under existing guidebooks and standards. The selected areas include Verification and Validation, End-to-End Testing, and Metrics

- Emphasis is placed on mission critical software

- Promotes the use of software metrics NASA wide

6

NASA Software Metrics Highlights

- The objective is to improve NASA software products and processes
- Based on Goal Question Metric (GQM) approach
- Designed to be a minimal set of metrics which can be augmented as needed
- The metrics set includes the areas of: 1) Software Characteristics, 2) Software Planning, Tracking, and Oversight, and 3) Delivery and Closeout
- Piloting of metrics set is currently taking place at eight NASA centers with roll out and training planned for late 2001

7

Software Process Improvement

- NASA Plan to move Program, Projects, and Major Contracts to CMM Level 3* per Criteria
  - SWG will draft plan & criteria for consideration by the Agency, which will allow Centers the flexibility to tailor activities to meet their business goals
  - Plan will not be finalized until the Software "Champion" position is filled in the Office of Chief Engineer
- Establish Software Engineering Process Groups (SEPG) at Centers
- Complete NPG 2820.1, obtain approval, and rollout to the Agency
- These efforts need to be managed, staffed, and funded as a major program with long term sustaining engineering requirements

or equivalent

8