IVV 27: Software Development

Pending changes and considerations:

- Ken Rehm: Since we are a GSFC organization should we not follow GSFC tailoring of NPR 7150.2C?
- Ken Rehm: Does the OIT Lead really have institutional authority on all our Class F software projects? Ken Rehm: I would say most of our tools are class D not F.
 - - Examples of Class D software include, but are not limited to:
 - Basic Science and Engineering Design:
 - Engineering design and modeling tools (e.g., computer-aided design and computer-aided manufacturing (CAD /CAM), thermal/structural analysis tools); project assurance databases (e.g., problem reporting, analysis, and corrective action system, requirements management databases); propulsion integrated design tools; integrated build management systems; inventory management tools; probabilistic engineering analysis tools; test stand data analysis tools; test stand engineering support tools; experimental flight displays evaluated in a flight simulator; forecasts and assimilated data products; and tools used to develop design reference missions to support early mission planning.

• Ken Vorndran:

- Puts a lot of stack in pointing workforce who use this slp to slp and developing a stellar sw dev plan. What about the other plans that may be needed, required and or be best practice. Example v&v plan? Where is the org guidance on something like this or coding standards etc etc. as is slp leaves a lot of room for interpretation.
- Seems like oit lead is key player / owner however jstar lead also does development so need to improve roles and responsibilities approach imo.
- Justin Morris:
 - As Vorndran mentioned, this document doesn't list any documentation other than a SDP and none of the other requirements. I would 0 recommend replacing the document with a simple table or something that just have references to existing Greenbelt software development documentation. For software development documentation and process, I think it would make sense for the software we develop to use similar processes. The benefits are it reduces documentation on our end that our organization has to maintain and also familiarizes our workforce with GSFC processes which benefits anyone working on GSFC projects. I believe GSFC has an entire team that just does software process improvement work. We can tailor their processes if something does not make sense
 - Also, the ownership of software development is not clear in the document. OIT lead would be responsible for any OIT software development if there is any within that group. For SWAT development, I assume SWAT lead is ultimately accountable then the IVVO lead. For JSTAR development, JSTAR lead is accountable and then IVVO lead. There should be communications and awareness of OIT lead or somebody such that if commercial or open source tools could be used versus in-house development, then OIT lead would have that insight to make sure we aren't wasting resources on something that has already been developed or is available. But as far as accountability and owners of software development plans and associated documentation, I think that falls within each group and associated lead, etc.
 - Hope this is helpful and just let me know if you want me to take first stab at revising the document.

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Effective Date: November 25, 2020

Document Owner: OIT Lead, Jerry Sims

Note: The official version of this document is maintained in IV&V's internal IV&V Management System Website (https://confluence.ivv.nasa.gov:8445 /display/IMS). This document is uncontrolled when printed.

- Purpose
- Scope
- Process
- Metrics
- Records
- **Definitions and Acronyms**
- Acronyms
- References
- Version History

Purpose

The purpose of this system level procedure (SLP) is to:

- 1. Ensure compliance to NASA NPR 7150.2C.
- 2. Establish local responsibility for compliance.

3. Point to existing assets maintained by NASA and GSFC.

Scope

This SLP applies to all software being developed for the IV&V Program.

Process

Software Development Leads shall "develop, maintain, and execute software plans that cover the entire software life cycle and, as a minimum, address the requirements of this directive (NPR 7150.2C) with approved tailoring. [SWE-013]". These plans may be tailored to their respective development efforts (e. g. JSTAR, SWAT) and NASA NPR 7150.2C software classification, as software may be targeted for many different purposes (internal IV&V application, embedded software development for internal IV&V testing, flight software development for dynamic IV&V simulation testing and/or NASA customer testing purposes, data processing script etc.).

Software plans at a minimum should address areas below from NASA NPR 7150.2C for a specific software development effort. The NASA IV&V Office of Information Technology (OIT) Lead has institutional authority on all Class F software projects and has joint responsibility on the cybersecurity requirements in section 3.11 per the direction in the Appendix C Requirements Mapping Matrix. NASA NPR 7150.2C refers to this role as the local Chief Information Officer (CIO). The OIT Lead will work with IV&V groups performing development of Class F software to appropriately tailor a software development plan according to Section C.3 Tailoring Guidance.

- Identify the target software classification based on the Appendix D 'Software Classifications' defined in NASA NPR 7150.2C and address the key
 areas based upon an appropriate tailoring of the related NASA NPR 7150.2C. System Development Lifecycle (SDLC) processes and best
 practices. It is possible that some of the expectations captured in the NASA NPR 7150.2C standard may be addressed through other applicable
 IV&V center defined processes.
- Software Requirements and Analysis
- Software Design
- Software Implementation
- Software Testing
- Software Configuration Management

Software Quality Assurance

Metrics

Metrics that should be captured will be documented in each Software Development Plan (SDP). The SDP is developed and maintained by the SDL.

Records

Records that should be captured will be documented in each Software Development Plan (SDP).

Definitions and Acronyms

Official NASA IV&V roles and terms are defined in the Quality Manual. Specialized definitions identified in this SLP are defined below.

- Software Development Plan
 - Document that details the overall approach to developing software relative to the NASA NPR 7150.2C software engineering requirements.
 - ° Document is written and maintained by Software Development Lead.
- Software Development Lead
 - Individual responsible for the overall software development effort.

Acronyms

OIT	Office of Information Technology
SDL	Software Development Lead
SDP	Software Development Plan

References

REFERENCES					
Document ID/Link	Title				
NPR 7150.2C	NASA Software Engineering Requirements				
NASA-HDBK-2203	NASA Software Engineering and Assurance Handbook				
https://software.gsfc.nasa.gov/PAL	GSFC Software Engineering Process Asset Library (PAL)				

Version History

VERSION HISTORY						
Version	Description of Change	Rationale for Change	Author	Effective Date		
Basic	Initial Release		Jerry Sims	11/25/2020		