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Software Engineering
Electronic Handbook

IV&V Annual Workshop
September 2011
What is it?

- Guidance material to help the NASA workforce implement requirements in NPR 7150.2A and promote best practices

- Addresses topics of interest identified by the community of practice (e.g., Acquisition, Model Based Software Development, use of COTS/GOTS/MOTS/OSS, etc.)

- Addresses 132 individual requirements in NPR 7150.2A and 30 topic areas

- Guidance material includes requirement specific guidance, rationale, examples, best practices, lessons learned, references, tools and templates
Why is a Handbook Needed?

- Guidance material provides further explanation of the requirements and the rationale for why they exist.
- Handbook provides relevant and approved information to aid software developers in meeting NPR requirements.
- Best-in-Class examples, templates, and tools are provided to help developers get started quickly and maintain compliance with the NPR.
- Allows developers to easily find and focus on specific information necessary to comply with requirements.
Why Electronic?

- Software workforce prefers electronic access to traditional paper references
- Allows guidance material to be “published” as it is developed vs. when it is all finished
- Allows easy updates and corrections
- Easily searchable, e.g., tagged material
- Delivers targeted material with easy access to reference material
- Integrated into the NEN Software Engineering Community of Practice (CoP)
History

- Inputs regarding Handbook content collected from the software community
- Inputs sorted into “features” and “guidance” and prioritized in January 2010
- Guidance material was further sorted into topics and NPR requirements
- NEN selected as the access point for the Handbook and host for some features such as Ask-an-Expert, or the NASA PAL
## Top 10 Requested Features

<table>
<thead>
<tr>
<th>#</th>
<th>Feature</th>
<th>Location</th>
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<tbody>
<tr>
<td>1</td>
<td>Classification and Safety Critical Assessment Tools</td>
<td>NEN CoP</td>
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<tr>
<td>2</td>
<td>Link requirements to “best in class” examples and templates</td>
<td>Handbook</td>
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<tr>
<td>3</td>
<td>Lifecycle products linked to major milestones, integrated with 7120 and 7123</td>
<td>Handbook</td>
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<tr>
<td>4</td>
<td>Present all requirements associated with a software class and include applicable safety critical and assurance requirements</td>
<td>Handbook</td>
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<tr>
<td>5</td>
<td>Traceability of 7150 requirements to 7120 and 7123 related requirements</td>
<td>Handbook</td>
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<tr>
<td>6</td>
<td>Gateway to agency tools, training, and agency and center experts</td>
<td>NEN CoP</td>
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<tr>
<td>7</td>
<td>Ability to search the NPR from different user perspectives</td>
<td>Handbook</td>
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<tr>
<td>8</td>
<td>Definitions of terms</td>
<td>Handbook</td>
</tr>
<tr>
<td>9</td>
<td>Links to agency and center processes and PALs</td>
<td>NEN CoP</td>
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<tr>
<td>10</td>
<td>Compliance matrices</td>
<td>NEN CoP</td>
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</tbody>
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## Top 10 Guidance Areas Requested

<table>
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<tr>
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<tbody>
<tr>
<td>1</td>
<td>Applying requirements to small projects</td>
<td>Handbook</td>
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<tr>
<td>2</td>
<td>Transitioning to a higher class</td>
<td>Handbook</td>
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<tr>
<td>3</td>
<td>Compliance to requirements</td>
<td>Handbook</td>
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<tr>
<td>4</td>
<td>Tailoring of project assets, with examples</td>
<td>Handbook</td>
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<tr>
<td>5</td>
<td>Use of COTS, GOTS, MOTS and Open Source</td>
<td>Handbook</td>
</tr>
<tr>
<td>6</td>
<td>Acquisition of software</td>
<td>Handbook</td>
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<tr>
<td>7</td>
<td>Flow down of NPR requirements on contracts and to other centers in multi center projects</td>
<td>Handbook</td>
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<tr>
<td>8</td>
<td>Waiver process at center and HQ</td>
<td>Handbook</td>
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<tr>
<td>9</td>
<td>Guidance on P(Center) + SO</td>
<td>Handbook</td>
</tr>
<tr>
<td>10</td>
<td>Qualification of flight software</td>
<td>Handbook</td>
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Credible Guidance

- Guidance material developed by a dedicated team that has topic expertise or has researched the material which includes interviews with experts – including IV&V personnel
- References are provided to related material both inside and outside of NASA
- All material is approved for inclusion in the handbook by the Program Executive for Software Engineering in the HQ OCE
Intended Audience

- SW Developers
- SW Managers
- SEPG/SPI Personnel
- SA Personnel, including IV&V
- Project Managers
- Tech Authority Personnel
- Non-Software Engineers who develop software
- Systems Engineers
Relevance for IV&V

- Better quality project artifacts
- Reference for IV&V personnel
  - Understand Agency intentions and expectations for software engineering requirements
  - Compliance matrices for requirements by software class
  - Product maturity map and lifecycle review entrance and exit criteria
- Opportunity to provide feedback for updates based on experience with projects
Where is it?

nen.nasa.gov/software
Availability

- Prototype now available on NEN Community of Practice
- Most topics and NPR requirements guidance complete
- Wiki structure is functional
- Related features (forums, contact list, etc.) in place on NEN Community of Practice
- Target completion of agency review is March 2012
Available Formats

- One master PDF with all “static” material
- Individual PDFs for each section with informational header page
- All PDFs have embedded links back to web equivalent (for use when viewing PDFs on a PC)
- Website with all dynamic content and majority of “static” content
- Interactive site for extensive collaboration, contribution, and commenting
- Extensive links between NEN CoP and Handbook site
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Questions