

AIAA/ANSI R-013 Revision (P1633) Working Group Meeting
Meeting Minutes

Attendees: Norm Schneidewind, Naval Postgraduate School (chair)
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Dennis Lawrence, Lawrence Livermore Labs (d.lawrence@computer.org)
David Franklin, Boeing Canoga Park (david.l.franklin@boeing.com)
Allen Nikora, Jet Propulsion Laboratory (Allen.P.Nikora@jpl.nasa.gov)

Meeting Dates and Times:

April 2, 2003: Start 8:30AM, adjourn 4:30PM

April 3, 2003: Start 8:30AM, adjourn 2:00PM

Location: Naval Postgraduate School, Monterey, CA

Agenda:

1. Review, discuss, and modify, if necessary, the revision plan. Approve the plan.
2. Review version 2 of the outline for possible changes and improvements. Approve the outline.
3. Identify writing tasks for April – June and make writing assignments.
4. Discuss the mechanics for producing the revision.
5. Time permitting, discuss consolidation of CASRE and SMERFS.
6. Decide on the next meeting time, perhaps the end of June, and the location.

Summary of Discussion:

The attendees named above met for the revision of AIAA/ANSI R-013 met at the Naval Postgraduate School on April 2 and 3, 2003 to discuss the plan for the revision of the R-013 recommended practice. The goals of the revision plan are:

1. Complete the revision in 2004.
2. Accomplish an evolutionary rather than revolutionary revision in order to meet goal 1.
3. The highest priority work is to upgrade of existing models and concepts.
4. The second priority is the addition of new models and concepts.
5. The third priority is to extend, if feasible, the coverage of R-013A over the entire software life cycle.
6. Divide the plan into minimum requirements to accomplish and optional items, which are desirable if we have time.
7. Be sensitive to the clauses in the document that are normative (i.e., conformance required) and informative (i.e., for your information).

During the discussion of the goals, we considered which portions of the development life cycle the revision should address, and concluded that the revised recommended practice should address all phases of the life cycle, including operational use. The current version seems to address only the testing phase, although the current version states in the introduction that it's intended for use in all phases from integration testing through operations.

We agreed with the goals of the revision plan and approved the plan.

In discussing the outline of the revision, we concluded that recommendations for using models should drive the revision. The heart of the revised document should be the models. We should make sure that the material on the models is still correct, and then add in new models that have come along that would be applicable. We approved the proposed outline for the revision, pending clarification of some of the outline (e.g., activity flow table, SRE self-assessment page).

We moved on to a discussion of detailed comments submitted by several working group members on what should be accomplished for the revision. Action items dealing with these issues were assigned to the attendees of this meeting (see below).

Dennis Lawrence is the Editor in charge of the revision. All changes will be coordinated through him. He presented a draft of a configuration identification scheme that will ensure that each new version of the draft is unambiguously identified.

During discussion of the mechanics of producing the revision, we realized that a mechanism for dealing with proposals to include additional models in the revised recommended practice needed to be defined. The following are our conclusions and decisions concerning the criteria for model inclusion:

1. Seven criteria already in the recommended practice for comparing models.
 - a. Predictive Validity.
 - i. Prequential Likelihood Ratio (Accuracy)
 - ii. Bias
 - iii. Bias Trend
 - iv. Noise

None of these criteria were deemed suitable for determining whether a model is suitable for inclusion in the recommended practice – it would be necessary to run the proposed and current models against a sufficient number of failure data sets to make a meaningful comparison, and there are not enough failure data sets available. Furthermore, it is not clear how the comparison would be done.
 - b. Ease of Measuring Parameters – we concluded that this should not be a criterion for deciding whether a model is included in the recommended practice.
 - c. Quality of Assumptions – we concluded that the quality of a model’s assumptions should be considered, but further work is needed in determining how to do so.
 - d. Capability – A model’s capability should be considered in deciding whether to include it in the recommended practice.
 - e. Applicability – We decided that applicability, as defined in the recommended practice, should not be a criterion in deciding whether to include a model in the recommended practice.
 - f. Simplicity – we concluded that simplicity should not be a criterion for inclusion.
 - g. Insensitivity to Noise – we concluded that insensitivity to noise should not be a criterion for inclusion.
2. Experience in real development efforts – this is an important criterion for inclusion, but a more detailed definition of the criterion is required. For instance, we will need to know how to determine how much experience is enough and what type of experience is appropriate.

3. Published in a peer-reviewed publication – this is an important criterion for inclusion, but a more detailed definition of the criterion is required.
4. Implemented in a publicly-available tool – we concluded that this should not be a criterion for inclusion. If a model is implemented in a publicly-available tool, the recommended practice should identify the tool, but should not in any way favor or disfavor the tool.

Further work is needed to clarify these criteria. This will be accomplished by July 1, 2003, at which point the working group chair will distribute them to the rest of the working group for consideration.

In discussing additional material that might appear in the revised recommended practice, we discussed inserting a description of the corrective process used for the Space Shuttle flight software. Not only do developers repair the faults associated with a given failure, they look for the root cause of the failure and investigate the rest of the software to look for and remove other faults of that type. Lastly, they examine the process to eliminate the weakness that allowed the faults to be inserted in the code (e.g., inadequate inspections). We felt this to be a practical technique for promoting software reliability that could be adopted by other development organizations.

There was no time to address the consolidation of CASRE and SMERFS.

It was decided to hold the next meeting either at the end of June, 2003, or the beginning of July, 2003, taking care to avoid the July 4 weekend. The proposed location for the meeting is the Naval Postgraduate School in Monterey, CA. The working group chair will contact the other members with the final details.

At the conclusion of the meeting, we developed the following list of action items to be accomplished by the next meeting of the working group:

1. Dennis – develop outline that would satisfy IEEE’s requirements for recommended practice – due 1 July, 2003
2. Norm, David, Allen – develop technical material to populate outline – due 1 July, 2003.
3. Norm, Allen – look into merging IEEE P1633 and IEEE 982.1 format for model descriptions – due 1 July, 2003.
4. Dennis will undertake an investigation of how the document relates to other standards (per George Stark comments on the introduction) - due 1 July, 2003.
5. All - Develop candidate set of criteria for accepting new models into the document and send to the members of the working group – Norm will send out the draft criteria. Due 1 July, 2003.
6. Model solicitation:
 - a. Norm – contact Marty Shooman about his networking work to consider for inclusion in the revision. Due 1 July, 2003.
 - b. Allen – investigate Kishor Trivedi’s work to see if any of it applies to networks, wireless systems, etc. – look at ISSRE2001 papers. Due 1 July, 2003
 - c. Allen – investigate Hany Ammar’s work in architecture-based software reliability modeling for possible inclusion into the revision. Due 1 July, 2003.

- d. Allen – investigate Katerina Goseva-Popstojanova’s work on the sensitivity of models to changes in operational profile for possible inclusion into the revision. Due 1 July, 2003.
 - e. Suggest Norm’s students develop a straw man recommended practice, from the user’s perspective, during his Software Reliability and Metrics course during the summer quarter.
7. All – find failure data sets that can be used to compare different models. Due 1 July, 2003.
 - a. Norm has data published in the Vol. 19, No. 11, November 1993, pp. 1095-1104, 1992 Transactions on Software Engineering.
 - b. Allen has failure data sets that come with CASRE.
 - c. Perhaps the Nortel and Siemens fault data Taghi has published might be applicable – Allen will check.
8. Dennis - look at IEEE 1219 to find out what an activity table is in order to address one of George Stark’s detailed comments. Due 1 July, 2003.
9. Allen, David – find material on SW FMECA that could be included in response to one of Sam Keene’s comments. Due 1 July, 2003.
10. Allen – talk with Pat Carnes about his organization’s use of requirements volatility, complexity growth, and CMM rating to make early determinations of software reliability. Determine if there’s sufficient experience to make a useful writeup for the revision. Due 1 July, 2003.
11. David – write a couple of paragraphs on limitations on the expectations you can have for model results, and software reliability in the context of systems made of hardware and software components. Due 1 July, 2003.
12. David – write a few paragraphs on the fault correction process. Due 1 July, 2003.