Integrated Software and Systems Engineering curriculum

Graduate Software Engineering Reference Curriculum (GSwERC)

Workshop 7

Curriculum Author Team (CAT)

August 4th, 5th, 2009
Monmouth University
West Long Branch, NJ, USA

WORKSHOP REPORT
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1. iSSEc Project

Software engineering (SwE) is the acknowledged discipline by which large-scale and complex software is developed. Many universities teach software engineering at the undergraduate level. More than 30 colleges and universities helped create the 2004 model curriculum for undergraduate SwE education that was published by the IEEE and ACM.

Many universities offer a Masters degree in SwE. Yet the only existing reference curriculum for graduate SwE was created in 1991 by the Software Engineering Institute. Since then, technology changes, such as the World Wide Web, have vastly changed how the world communicates, and software being developed today has become enormously more complex. Considering the reliance of the world economy on the quality of SwE professionals, there is a clear need to develop a graduate reference curriculum.

The iSSEc (integrated Software and Systems Engineering curriculum) project is creating a new reference graduate SwE curriculum that reflects new understanding of how to build software, how software engineering depends on systems engineering, and how software engineering education is influenced by individual domains such as telecommunications and defense systems. The proposed reference curriculum will be suitable for university education leading to a Masters Degree in SwE or its equivalent.

As per the initial iSSEc project plan, an Early Start Team (EST) was formed and an organizing workshop was conducted in August 2007 to bring the members together and to jump-start the project activities. Following the workshop, members of the EST began working on an initial version of the reference curriculum. A second workshop was conducted in December 2007 to review the current status and to plan future activities. The EST then prepared and released version 0.25 of the Graduate Software Engineering Reference Curriculum (GSwERC v0.25) in March 2008, which was sent to over 150 reviewers from the world-wide software and systems engineering communities – academia and industry, as suggested by EST members. A third workshop was conducted in April 2008 to discuss the reviews received on GSwERC v0.25. Following this workshop, the EST transitioned into the Curriculum Author Team (CAT), which continued revision of GSwERC v0.25 based, in part, on reviewer comments. The CAT met in July, 2008 in Monterey, California for the fourth workshop to discuss the main outline of GSwERC v0.5 that was released for international review on October 31, 2008. The CAT met in January 2009 in Daytona for the fifth workshop to discuss the review and the way ahead for GSwERC. The international review period closed on March 15, 2009, with 86 reviewers and over 800 comments received. GSwERC Version 1.0 is planned to be released by September 2009.
2. GSwERC Workshop 7

The seventh workshop was held at Monmouth University in West Long Branch, NJ on August 4th, 5th, 2009. (Please see Appendix A for the list of meeting participants.) The workshop’s briefings can be found on the GSwERC website at http://www.asysti.org/august2009.aspx.

The detailed meeting agenda can be found in Appendix B. The objectives of the workshop were to:

1. Review current drafts of Volumes 1, 2, and 3 v1.0 and determine nomenclature for volumes.
2. Finalize adjudication and publication approach for GSwERC 0.5 review.
3. Discuss current status of GSwERC adoption by ACM, IEEE, and INCOSE.
4. Develop publication/release plan for GSwERC v1.0.
5. Begin planning for GSwERC adoption workshops and other roll-out activities.
6. Determine GSwERC website requirements.

The CAT agreed to release GSwERC Volume 1 by September 30th and transfer the stewardship to the IEEE CS and ACM societies when those societies are ready. Volumes 2 and 3 will be released after Volume 1, with an estimated October 31st release date. After discussion, the team agreed on the strategy to improve the contents of Volume 2 and 3, to improve the process of doing the data analysis of the comparisons collected, and to obtain ACM, IEEE, and INCOSE endorsement.

3. Workshop Proceedings

3.1 Current Status of iSSEc/GSwERC

Dr. Art Pyster, principal investigator of the iSSEc Project, opened the meeting with a discussion of the status of GSwERC to date.

3.1.1 Progress to date.

The team leaders presented the progress of each volume and received feedback from the author team. The CAT agreed to name each Volume to adequately reflect the content. Mark Ardis, Distinguished Service Professor-School of Systems & Enterprises (SSE) at Stevens Institute of Technology, was designated as a co-principal investigator of the GSwERC project.

As of August 2009, the following progress had been made:

- GSwERC Vol. 1 is into the final stages to be sent to technical editing and released on September, 2009.
- GSwERC Vol. 2 is not quite ready as the comparisons are not as mature as expected.
- GSwERC Vol. 3 needs a little improvement that could be completed in a short period of time.
- The governance process appears to be appropriate, as sponsorship is becoming feasible within the ACM, IEEE Computer Society, and INCOSE.
- The development of the Systems Engineering graduate curriculum and Body of Knowledge project may be funded by OSD.
- The GSwERC website is being revised and it will be updated by the release of the GSwERC version 1.0 document.

3.1.2 Schedule. The release of GSwERC Version 1.0 is scheduled for no later than September 30, 2009 with a target date of September 25, 2009. GSwERC’s 8th Workshop is scheduled for October 7th, 2009 to finalize GSwERC Vol. 2 and Vol. 3 and get the documents ready for the October release.

3.1.3 Endorsements. Both the ACM and the IEEE computer society accepted the request to participate in the GSwERC project and seek sponsorship and stewardship. Dr. Greg Hislop, IEEE Computer society (CS) representative on the CAT, and Dr. Lillian (Boots) Cassel, ACM representative on the CAT, gave a talk on the first day of the workshop to narrate the progress and the following process for sponsorship.

The International Council on Systems Engineering (INCOSE) Board of Directors will consider taking on a supporting role, but not the full-scale sponsorship that the IEEE CS and ACM are considering. Dr. Art Pyster will present the request to the INCOSE Board of Directors during the October board meeting.

3.1.4 Publicity. More publicity is still desired. Greater awareness will increase early adoption and increase the submission of additional comparisons and hypothetical implementations. The CAT agreed to present talks, write more articles, and post information on websites to increase visibility and interest.

3.2 Status of GSwERC Volume 1

GSwERC Volume 1, the primary recommendations document including: guidance, outcomes, entrance requirements, architecture, and Core Body of Knowledge (CBOK), is in the final stages of last editing process. Several virtual meetings had been held, and many updates had been incorporated in Volume 1 prior to the workshop in response to the action items and recommendations from the CAT during the April workshop. GSwERC Vol. 1 will be released by September 30, 2009, with the expectation it will be endorsed by INCOSE, and be sponsored by the IEEE CS, and ACM.
3.2.1 Outcomes and Entrance requirements

Dr. Art Pyster presented the main updates that were incorporated into the outcomes and entrance requirements sections. Names were given to the set of outcomes and more clarity was added to the language in order to clarify experience requirements and outcomes achievements upon graduation.

3.2.2 CBOK

Dr. Thomas Hilburn presented the updates added to the CBOK section as a response to the CAT recommendations from the last workshop. Many updates had been made including:

- Developed an alternative way to represent the KA percentages/weights.
- Added language to emphasize:
  - students may enter a program having already achieved minimum Bloom’s levels (due to previous education and experience)
  - the use of the SWEBOK as a companion document
  - the CBOK only covers 50% of curriculum
  - the relation of the CBOK to the SWEBOK 2010 refresh
- Refined discussion of cross-cutting issues.
- Included additional discussion of software security.
- Included additional discussion of human factors.
- Rick Adcock (along with Dick Fairley, Barry Boehm, and Ricardo Valerdi) reviewed and recommended changes to the System Engineering material in Section 6 and Appendix C.
- The CBOK team studied Dick Thayer’s recommendations for change to the SE Management KA.

The CAT agreed on all the changes and the completion of the CBoK section. A minor change was suggested to modify Figure 4 on KA percentages to emphasize the 50% nature of the CBOK.

3.3 Status of GSWERC Volume 2

Dr. Dennis Frailey presented the general status of GSWERC Volume 2 progress including recommendations at the individual program level, and comparisons of several universities, including non-U.S. institutions, to GSWERC. The main objective of the team was to structure the document in a way that makes it a clear and useful resource for individuals wishing to implement GSWERC in their universities. To facilitate this, the Volume 2 team created a template, a rubric, and instructional process for schools to complete the comparisons. The next steps for Vol. 2 are as follows:
Add more explanation in the text to clarify the comparisons process.
Comparison updates were received from some schools; initial feedback indicated the new template was easier to use.
Review Vol. 2 contents and format.
Determine the most appropriate methods for analysis and information display to provide insight into the current state of SwE graduate education while maintaining the anonymity of the schools.

3.3.1 Vol. 2 Outline

The Vol. 2 document will contain:

- Introduction
- Characterization of Programs (Demographics)
- Overall Findings
  - General
  - Outcomes
  - Core Requirements

3.3.2 Template and Instruction Changes

The new updated templates contain the following data:

- Additional Demographic Information including number of Program Graduates per Year
- Number of full-time and part-time Graduate Software Engineering Faculty
- Number of full-time and part-time/Adjunct Graduate Software Engineering Faculty
- Specific rubric for outcome assessment including definition of many terms and measures to provide clarity.
- Establish the level of outcome attainment: upon entry to the program, after taking the core, and after completing a track. This will improve consistency of interpretation
- Emphasis on what we are looking for with student examples as they should exemplify different options and backgrounds, and they should be hypothetical, not real students

3.3.3 University Collaboration Process

After sending the template for completion to the university representative, a pre-meeting will be scheduled to provide an initial overview and respond to any questions. Any school completing a comparison can reach out to help from Vol. 2-appointed experts for clarification and assistance. After receiving the completed comparison templates, a
GSwERC team member will review the data with the university rep and go over the comparison process to verify the data collected.

3.3.3 Data analysis

The main approach taken to draft the Vol. 2 content was to emphasize the assessment of overall results and insights gained. The main focus on the data analysis will be on comparing students rather than programs for outcome attainment since a program may have very different results for different students. Schools and programs will be anonymous and no names will be revealed; instead, each school will be characterized according to demographics, focus, etc. The detailed descriptions, currently in appendices, will likely be kept only as a part of the website, with appropriate access controls implemented to maintain data integrity and anonymity of programs.

3.4 Status of GSwERC Volume 3

Dr. Bret Michael presented the main updates added to the implementation considerations document, i.e. Vol. 3. The volume was organized according to the types of issues being addressed as a result of the virtual meetings and discussions held among the team prior to the workshop. The major updates include reorganization of the document, further elaboration on each section of the document, including more recommendations received from the CAT, refining the language to make the GSwERC adoption global, and including more issues such getting help from external resources to help implement the program.

After discussions, the CAT suggested the Vol. 3 team use a FAQ format as the organizing principle for the document to add more insight and details on how the software engineering discipline is positioned in the community and what challenges are encountered, and add more resources as pointers to help the community understand some of the implementation issues. The team also recommended refining the language and doing extensive reviews to ensure that the document has a more positive and constructive tone.

During the second day of the workshop, GSwERC Vol. 3 team members met to discuss their way forward. They agreed on dividing the tasks. Dr. Mark Ardis will make few personnel interviews to seek some help if necessary, and Dr. John Brackett will take the action item to edit the full document when it is ready.

The team also worked on refining the FAQ list that will be categorized into 6 main areas where each category will contain a set of questions adequately. The main categories will include:

1. Planning,
2. Internal Communication,
3. Acquiring Resources,
4. External Communication,
5. Implementation/Execution,
6. Program Evolution

3.5 Appendices of each Volume

Each volume’s team will propose appendices, references, etc. for each Volume. There was an agreement to include an executive summary in each volume to summarize the GSwERC recommendations of Volume 1.

3.6 Endorsement and sponsorship

Dr. Boots Cassel and Dr. Greg Hislop presented the process to follow for GSwERC Version 1.0 to be sponsored by ACM and the IEEE CS. Both of them emphasized the importance of following the right process to achieve sponsorship and ensure stewardship of Vol. 1. Dr. Greg Hislop planned to complete a policy report with the ACM/IEEE CS and submit it for approval by the joint committee and then by the EAB by early September. Conversations will be held with Alan Clements and Andrew McGettrick to define the right process to take to finalize sponsorship.

Dr. Art Pyster planned to request an official endorsement of GSwERC Volume 1 from INCOSE at the October Board meeting.

3.7 NSF proposal

Dr. Joe Urban presented the process to adopt to gain sponsorship from NSF in order to sponsor some workshops for GSwERC adoption. Joe will complete the NSF white paper before the end of August that includes a proposition to hold a series of 1-week workshops to prepare the faculty members to adopt GSwERC; and a ½- to 1-day workshop(s) targeted at the department chair level. The CAT suggested to work in conjunction with other SwE conferences in order to have a larger, more targeted audience.

3.8 GSwERC new Web Site

Nicole Hutchison presented a first draft of the new GSwERC website outline that will be hosted by Stevens Institute of Technology. She urged the CAT to send her more recommendations and needs that will help build the website according to each Volume’s requirements. An administrator may be needed for certain functions, such as discussion forums, data submission and storage of the document. The CAT suggested that Stevens provide a few prototypes by the end of August for their review.

Some other suggestions discussed are as follow:
- Add FAQ sections (in addition to the one for Vol. 3).
- Possibility of using IEEE/ACM URL to point to Vol. 1.
- Create a resources page for each volume which points to publications by the CAT on GSwERC as well as other generally-accepted resources on specific topics (e.g. faculty recruitment).
- A list of GSwERC experts as resources to help on different areas, such as comparison of current programs to GSwERC.
- Create a hard copy version of the documents and a web-based one.
- Add a list of the conferences where there will be GSwERC presentations, workshops, etc to the website.

### 3.4 Upcoming Conferences

The CAT discussed the following conferences at which it may be appropriate to distribute information on GSwERC and make presentations to enhance its exposure and attract more reviewers. The conferences discussed, and potential CAT representatives, included:

- INCOSE (July 20-23, Singapore) Rick Adcock, Art Pyster, and Ricardo Valerdi. *Presentation on GSwERC completed.*
- IFIPS WCCE 09 (July 27-31, Brazil) – accepted for publicity session – Barrie Thompson & Guilherm Travassos (presentation) – *Presentation on GSwERC completed.*
- ITSMF 09 (September 17-18, Dallas) – adding presentations for GSwERC – Bill Hefly & Dick Fairley. *Planned*
- NDIA 09 (Oct 26-29, San Diego) - Art Pyster, Ken Nidiffer, Rich Turner
- FIE 09 (Oct 18-21, San Antonio) – IEEE Academic Forum (Dennis Frailey, and Tom Hilburn,)
- APSEC 09 (Dec 9-12, Malaysia)
- SIGCSE 10 (March 10-13, Milwaukee) – Tom Hilburn, Mark Ardis
- AFCEA for a presentation – Ken Nidiffer (identify the right events)
- CSEET 10 (March, Pittsburgh)
- ICSE 10 (May 1-8, Cape Town) – Art Pyster, John Brackett
- ITiCSE 10 (Jun 28-30, Ankara)
- INCOSE IS 10 (July 12-15, Chicago)

The CAT agreed to look for other conferences in other application domains such as finance, medical, etc. The purpose is to target multiple audiences, including faculty (implementers), industry (demand), and potential students. Some of the CAT members proposed finding places in industry journals to publicize papers and give GSwERC more exposure in the industrial sector.
3.5 GSwERC 1.0 Publication and Beyond

After Version 1.0 is published by September 30, 2009, the CAT expects to transfer stewardship from itself to professional societies. It is proposed that the IEEE CS and the ACM become sponsors of GSwERC Volume 1, with an advisory role for INCOSE. The three professional societies will most likely become stewards of Volume I only, as they do not typically endorse the types of material that will be in Volumes 2 and 3. A different governance model for Volumes II and III may be necessary.

Key publications on GSwERC will be sought in major journals of the IEEE CS, ACM, and INCOSE. Dr. Art Pyster proposed publishing papers on GSwERC coauthored with some CAT members and having joint articles with IEEE/ACM coordinated through the editors for the beginning of 2010. Dr. Pyster will put the paper together with coauthors.

Funding from the National Science Foundation (NSF) will be sought for summer faculty workshops in 2010-2011. Dr. Joe Urban will explore whether it is possible for the Office of Naval Research (ONR) to provide funding for adoption workshops outside the U.S.

4. Way Ahead

In the near-term, the owner of each volume will continue to lead the sub-team updates of each volume. The CAT will work on having more additional comparisons and implementations. GSwERC Vol. 1 will be published by September 30th, 2009 with the expectation that the ACM and IEEE CS will become GSwERC sponsors by the end of 2009. A draft update for Vol. 2, & 3 will be completed by October 4th, 2009 for discussion at the next CAT workshop, which will be held on October 7th 2009.
Appendix A: Workshop Participants

Curriculum Author Team

Present

Mark Ardis, Stevens Institute of Technology
John Brackett, Boston University
Lillian (Boots) Cassel, Villanova and ACM Representative
Dick Fairley, Colorado Technical University
Dennis Frailey, Southern Methodist University & Raytheon
Thomas Hilburn, Embry-Riddle Aeronautical University
Greg Hislop, Drexel University and IEEE CS representative
Phillip Laplante, Penn State University
Scott Lucero, Department of Defense
Jim McDonald, Monmouth University
Bret Michael, Naval Postgraduate School
Art Pyster, Stevens Institute of Technology
Massood Towhidnejad, Embry-Riddle Aeronautical University
Guilherme Travassos, Brazilian Computer Society
Joe Urban, Texas Technical University
Mary Jane Willshire, Colorado Technical University
Nicole Hutchison, Stevens Institute of Technology
Kahina Lasfer, Stevens Institute of Technology

Joining via WebEx

Larry Bernstein, Stevens Institute of Technology
Barrie Thompson, University of Sunderland
Mary Shaw, Carnegie Mellon University
Appendix B: Workshop Agenda

Day 1: August 4th, 2009

8:00a  Continental breakfast
8:30a  Current status of iSSEc project & GSwERC adoption discussions - Art Pyster
9:00a  Review of GSwERC 1.0 Volume 1 document - Art Pyster, Jim McDonald, and Tom Hilburn
10:15a Break
10:30a  Review GSwERC 1.0 Volume 2: Comparison of Current Programs to GSwERC – Dennis Frailey
12:00p Lunch
1:00p  Review GSwERC 1.0 Volume 3: Hypothetical GSwERC Implementation – Bret Michael
2:30p  Break
3:15p  Discussion of publication plan and roll-out activities
5:00p  Adjourn for the day
5:30p  Dinner

Day 2: August 5th, 2009

7:30a  Continental breakfast
8:00a  Recap and completion of previous day’s discussions
9:30a  Break
9:45a  Discussion of future GSwERC website – Art Pyster
10:00a Discussion on GSwERC end game
12:00p Working Lunch
1:00p  Review of action items/way ahead
2:00p  Adjourn
## Appendix C: Follow-On Action Items

<table>
<thead>
<tr>
<th>Task</th>
<th>Action Officer</th>
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<tbody>
<tr>
<td><strong>GSwERC Volume 1</strong></td>
<td></td>
</tr>
<tr>
<td>Write the executive summary</td>
<td>Art Pyster</td>
</tr>
<tr>
<td>Update the KA coverage figure to show the other 50%</td>
<td>Thomas Hilburn</td>
</tr>
<tr>
<td>Appendices refinements</td>
<td>Thomas Hilburn</td>
</tr>
<tr>
<td>Formatting, Glossary, References, and Index table refinements</td>
<td>Kahina Lasfer</td>
</tr>
<tr>
<td>Final edit of the document</td>
<td>Tech. editor</td>
</tr>
<tr>
<td>Finish Volume 1 including all tech editing and final CAT review by 25 September to present at ACM EC.</td>
<td>Art Pyster, and CAT</td>
</tr>
</tbody>
</table>

| **GSwERC Volume 2**                                                 |                                     |
| Coordinate terminology with Vol 3                                   | Dennis Frailey                      |
| Ensure Vol 1 updates are reflected (e.g. Outcome labels, not numbers) | Dennis Frailey                      |
| Verify the ACM/IEEE CS report written on the description of the different MS programs and make suggestions of characteristics that may be collected for Vol 2 | Boots Cassel                       |
| Define a process on how to handle the data to maintain anonymity—what rules we need to follow for disclosure | Mark Ardis                       |
| 1. Getting data from 7 universities in the next two weeks (Monmouth, SMU, TTU, NPS, ERU, UFRJ, Sunderland) | Jim McDonald, Dennis Frailey, Joe Urban, Bret Michael, Massood Towhidnejad, Guilherme Travassos, Barrie Thompson |
| Analyze the data and write the report.                              | Vol. II team members                |
| Outreach to non-U.S. schools for comparisons                        | CAT                                 |

<p>| <strong>GSwERC Volume 3</strong>                                                 |                                     |
| Coordinate terminology with Vol 2                                   | Bret Michael                        |
| Start the document with a check list or FAQ and use this as the organizing principle for the document | Vol. III team.                     |
| Add more insight and detail on how the SwE discipline is positioned in the community and what challenges are encountered by the SwE community. | Bret Michael                       |
| Conduct some interviews to seek help from other key members.        | Mark Ardis                          |
| Include journal papers and additional references                   | Bret Michael                        |
| Increase the variety of options discussed within GSwERC, and the pros/cons associated (e.g. implement in SwE program, as a track in CS, or an individual program) | Vol. III members |</p>
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<tr>
<td>Input needed from international CAT.</td>
<td>Barrie Thompson, Rick Adcock, Guilherme Travessos.</td>
</tr>
<tr>
<td>Add more ressources to be cited to help people get more information.</td>
<td>Vol. III team members</td>
</tr>
<tr>
<td>Final edit of Vol. 3 document to ensure that the document has a positive/constructive tone.</td>
<td>John Brackett</td>
</tr>
<tr>
<td>Clarification of copyright ownership in preparation for transition</td>
<td>Art Pyster, Scott Lucero</td>
</tr>
<tr>
<td>Completion of the policy report with the ACM/IEEE CS and submission for approval by the joint committee and then by the EAB and EC by early September.</td>
<td>Greg Hislop</td>
</tr>
<tr>
<td>Prepare a presentation for Vancouver ACM board meeting that contains information on the development process; statistics on participation, outreach, and review; and the final document content</td>
<td>Art Pyster</td>
</tr>
<tr>
<td>Submit GSwERC Volume 1 officially at end of September or early October to EAB.</td>
<td>Art Pyster, Thomas Hilburn, Dennis Frailey, Greg Hislop.</td>
</tr>
<tr>
<td>Define the right process to take to finalize the endorsement</td>
<td>Boots Cassel, Greg Hislop</td>
</tr>
<tr>
<td>Request official endorsement of GSwERC Volume 1 from INCOSE at October Board meeting.</td>
<td>Art Pyster</td>
</tr>
<tr>
<td>Modify the NSF white paper before the end of August; updates including a series of 1 week workshops to prepare the faculty members and programs chairs to adopt GSwERC</td>
<td>Joe Urban</td>
</tr>
<tr>
<td>• <strong>Vol 1</strong>—Stevens (structure); CAT teams (content update); Guidance/Outcomes, architecture, and CBOK - troika to be stewards</td>
<td>Volume Owner: Art Pyster, Content Leads: Art Pyster, Tom Hilburn, Jim McDonald</td>
</tr>
<tr>
<td>• <strong>Vol 2</strong> -- Comparisons and sample implementations; including organization specific to a single program</td>
<td>Volume Owner: Dennis Frailey</td>
</tr>
<tr>
<td>• <strong>Vol 3</strong>—capture “lessons learned” and “best practices” for specific implementation issues</td>
<td>Volume Owner: Bret Michaels</td>
</tr>
<tr>
<td>• Summary Volume—Executive Summary of Vols I-III to be included in each volume.</td>
<td>Richard Turner</td>
</tr>
<tr>
<td>• Formatting, Glossary, Index, etc. for all volumes</td>
<td>Kahina Lasfer: Vol I &amp; III</td>
</tr>
<tr>
<td>Update GSwERC website, and rename/update the domain name for a better visibility and access to the information.</td>
<td>Nicole Hutchison: Vol II</td>
</tr>
<tr>
<td>• Publication plan</td>
<td>Nicole Hutchison, &amp; Kahina Lasfer</td>
</tr>
<tr>
<td>• Publications via ACM and IEEE and INCOSE</td>
<td>Art Pyster (CAT members to author)</td>
</tr>
<tr>
<td>• ID appropriate venues/topics</td>
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<tr>
<td>• Paper development/submittal</td>
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**Conferences outreach**

• iSMF 09(September 17-18, Dallas) – adding presentations for GSwERC — accepted. | Bill Hefly & Dennis Frailey |
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<td>TBD</td>
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<tr>
<td>INCOSE IS 10 (July 12-15, Chicago)</td>
<td>Art Pyster</td>
</tr>
<tr>
<td>Write a white paper proposal to NFS</td>
<td>Joe Urban</td>
</tr>
<tr>
<td>Identify speaking opportunities</td>
<td>Each CAT member</td>
</tr>
<tr>
<td>Local computer/ professional societies</td>
<td></td>
</tr>
<tr>
<td>Update outline for GSwERC Website</td>
<td>Nicole Hutchison, Stevens</td>
</tr>
<tr>
<td>Build prototype website for CAT review</td>
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</tr>
<tr>
<td>Provide additional information/recommendations for website structure/content</td>
<td>Content Leads (Art Pyster, Jim McDonald, Tom Hilburn, Dennis Frailey, Bret Michael)</td>
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