

# What to expect for the Research Paper

## ❑ FORMAT:

- Microsoft Word (or equivalent)-- PDF of WORD File is acceptable

## ❑ LENGTH:

- Paper should be approximately 15-to-20 pages (excluding references, appendices, and cover page), single-spaced, in 12-point type (Times New Roman font), single column with standard margins (1" top and bottom, 1.25" left and right)
  - This is just a suggestion– you will not lose points for using a different font or different margins; we will CONVERT your paper to this format to evaluate your paper's content!

## ❑ DELIVERY:

- Paper must be submitted via Desire to Learn (D2L) system no later than **December 6 2018, Midnight Pacific Time**
- Links for submitting the assignments will be available under the "Assignment" section of D2L (<http://courses.uscdcn.net>)

## ❑ GRADING:

- A good paper grade requires writing a paper that is instructive or of general interest to system architects and engineers, including those who may not be necessarily interested in the particular topic you analyze
  - To obtain a high grade, your paper must be of quality suitable for publication in a Journal or in Conference Proceedings

## Content

- ❑ **Describe and analyze the resilient engineering aspects of the architecting process and the resulting architecture of your selected system in terms of any or all of the class concepts presented in lectures**
  - **Description must include system (or SoS) level Architecture Diagram(s)**
- ❑ **Analysis to include discussion how the Resilient Engineering architecting process led to a resilient architecture**
- ❑ **The analysis should specifically address what were/are the Goals and what was Achieved for:**
  - 1) Application of Resilient System (or SoS) Concepts and General Approach(es)
  - 2) Characteristics of Affordably Adaptable and Effective Systems (or SoS)
  - 3) Complexities in the Resilient/Adaptable System (or SoS)
  - 4) Specific Approach(es) used in architecting the Resilient/Adaptable System (or SoS)
- ❑ **Focus on the Architecture and the Resilient Engineering processes, not just the design and components of the system**
  - Not required, but it's OK to show the design/components to help in describing the architecture and the architecting process

# SAE 546 Research Paper

## Process Specifics

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**To obtain full credit, you must provide at least one detailed page for each of the 4 major categories**

- 1) Application of Resilient System (or SoS) Concepts and General Approach(es) from Lectures #1, #2, and #3, e.g. as applicable:**
  - **What was/is the range of operations and what alternatives (or operational flexibility) were/are considered to meet future needs? And should have been considered in these (either lessons-learned or in your opinion)?**
  - **What were/are the goals for and was/is the resulting Hardware? Software? Networks? Cyber-Physical-Human integration? Required People and their required Processes? Expected Emergent Behavior (desirable/undesirable)?**
  - **What were/are the goals for and was/is the handling of Disruptions in these?**
  - **What other Failure Sources were considered in these? And should have been considered in these (either lessons-learned or in your opinion)?**
  - **In what ways was/is the resulting System (or SoS) Brittle?**
  - **What unexpected Emergent Behavior was/is demonstrated by the System (or SoS)?**
  - **What should be (or could be) done to promote Desirable Emergent Behavior and manage Undesirable Emergent Behavior in the System (or SoS)?**

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## Process Specifics

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### **2) Characteristics of Affordably Adaptable and Effective Systems (or SoS) from Lecture #4, e.g. as applicable:**

- What were/are the goals for Affordability? Adaptability? Flexibility? Effectiveness? Other goals/topics from Lecture #4?
- How were those goals achieved? How well were they achieved, in the opinion of key stakeholders? What more must be (or could be or should be) done (in your opinion)?

### **3) Complexities in the Resilient/Adaptable System (or SoS) from Lecture #5, e.g. as applicable:**

- What were/are the goals for managing Complexity in the resulting System (or SoS)? Other goals/topics from Lecture #5?
- How were those goals achieved? How well were they achieved, in the opinion of key stakeholders? What more must be (or could be or should be) done (in your opinion)?

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## **4) Any Specific Approach(es) used in architecting the Resilient/Adaptable System (or SoS) from Lectures #6 and #7, e.g. as applicable:**

- Was a Model-Based approach either considered, or actually used, or else recommended by you in hind-sight based on class concepts?
- Was a Flexible Contracts approach either considered, or actually used, or else recommended by you in hind-sight based on class concepts?
- Were any other specific approaches considered? Used? Or else recommended by you in hind-sight based on class concepts?

# SAE 546 Research Paper References and Citations

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- ❑ A list of references is essential
- ❑ Make sure you properly and appropriately cite lecture notes and course readers
- ❑ Your paper must be based on the references you have read and not your personal ideas
- ❑ All the text that you turn in that comes from somewhere else must be marked as quotation (*including from other papers that you wrote!*)
- ❑ All the ideas that you turn in that come from someone else must be cited
- ❑ Do NOT speculate; have enough references to present clear and valid statements
- ❑ Do NOT use uncontrolled websites or blogs as a reference
- ❑ Do NOT quote excessive amount of text from other references
- ❑ Do NOT write your paper based on one reference

# Cautions Regarding Your SAE 546 Research Paper

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- ❑ There have been previous attempts of students to copy someone else's text into their papers or homework!
  - Never copy text in to your file without marking it with a citation
  - Never attempt to copy text into your file and then “edit it into your own words”
- ❑ The default punishment for plagiarism by a graduate student is failing the course, and expulsion is possible
- ❑ Final paper will be checked via automated similarity scanning software
  - The system will compare your paper with its database and all internet sources and will compute a similarity percentage
  - High similarity percentage (above 25%) will have major negative impact on your paper grade
  - The system *will discover* any attempt to copy from other sources!
- ❑ Final Paper submission after the deadline (**September 6 2018, Midnight Pacific Time**) gets an automatic F on the final paper grade

# Questions Regarding the Research Paper?

- ❑ If you have any question regarding the Research Paper:
  - **DO NOT call or e-mail questions!**
  - **Please use the Research Paper Discussion Board BEFORE the Due Date**
  - **Remember that all questions and all answers will be visible to all students, so please be sure to review the Research Paper Discussion Board before submitting your final paper!**
    - We will attempt to answer questions in a timely manner but you will likely NOT receive a quick answer!
  - **Please do not ask for instructor or student review of outlines, partial drafts, or final papers**