

Assignment A1 – Team Formation, Definitions, Stakeholder Analysis, CONOPS

Summary

In this first assignment you will form your teams, grapple with some of the definitions underlying Systems Engineering, and do an initial analysis of the Stakeholders and Concept of Operations (CONOPS) for the 2016 Cansat Competition.

This assignment is worth 1/8 (12.5%) of your final grade.

The final deliverable must be uploaded as a single PDF file with the name:
A1_Team#_2015.pdf.

In addition to your team number and name, all team members who contributed must be clearly identified by name and email address on the first page of your submission.

1. Team Formation

Form or join a team with exactly five students in it. No team can have more than five members in it. It is possible for a team to have fewer students, but only once all other teams have filled up.

Students at MIT and EPFL should join with other students *from their own school*. Mixed teams, while perhaps interesting, are generally discouraged due to the additional overhead associated with time difference and other complications. If, however, a mixed team emerges we will consider approving it with special approval from the instructor.

Discuss and write a team charter. The charter should be one page long (about 300 words) and contain a description of your “identity” and goals as a team. For example you should discuss whether you are serious about competing at the 2016 Cansat competition, or simply want to do a good job and meet the requirements of the class.

Both positions are fine. In the charter you should also identify the special skills, knowledge that each person brings to the team and how you plan to leverage those skills.

2. Definitions

As a team discuss, converge on and write down a definition for the following items. These definitions should be *original*. This means you should not look them up in a book or on the internet, but come up with them yourselves based on your past experience, what you've learned in the class so far and discussions amongst the team. If you cannot converge on a particular definition, you should say so and why and provide the alternate definition(s). The process you follow to try and reach consensus is up to you.

- ... System
- ... Engineering
- ... Systems Engineering
- ... Systems Engineer¹
- ... Stakeholder
- ... Milestone
- ... Need

Warning: This seems like an easy task at first, but it is not.

3. Stakeholder Analysis

Carefully read the 2016 Cansat Competition guide. You are also free to browse other data sources (including the internet) to read about the history of the competition and any other relevant information about this or similar competitions.

- ... Carefully *identify the stakeholders* involved with the 2016 Cansat Competition. Provide a brief description of each stakeholder in a few sentences. Focus on their role, needs and objectives.
- ... Create a *table*, where for each stakeholder you identified above you list their *inputs and outputs in terms of value flows*. To find the inputs you ask what do they each need to receive from other stakeholders in order to meet their role. Examples of value flows are information, money, approvals, physical goods, services etc.... be as specific as you can.

¹ Describe what you think Systems Engineers do in typical product or system development projects.

Outputs are things provided by a stakeholder for one or more other stakeholders. An example of such a table is shown in Lecture 1 (see slide 51²).

- ... Create two versions of a *stakeholder network map*. First, create a classic “hub-and-spoke” model where your team is the focal organization in the center. This means only the inputs/outputs involving your team *directly* from the above table will show up. Second, create a full Stakeholder Value Network (SVN) map that includes all the inputs/outputs in the table and will probably also include indirect relationships that do not involve your team. Use colored arrows to create the SVN map (see Lecture 1, slide 45 for an example).
- ... Comment on what insights you were able to gain from this stakeholder analysis of the Cansat Competition, if any.

4. Concept of Operations (CONOPS)

- ... Analyze the CONOPS provided in the 2016 Cansat documentation (guide and environmental testing requirements). This is primarily referring to the separation phase described in the “ConSat CONOPS description” diagram in Lecture 1. Is this CONOPS well described? Does the CONOPS conform with the way the NASA SE Handbook [1a] defines what a CONOPS is? How would you improve this CONOPS, if at all.
- ... Create and describe/visualize your own version of a CONOPS for the 2016 Cansat Competition for your team. This CONOPS should probably be a bit broader than the one discussed above. Comment on what were the main challenges in defining a detailed CONOPS at this stage.³

Grading Rubric and Time Commitment

1. Team Formation	max 20 Points
2. Definitions	max 20 Points
3. Stakeholder Analysis	max 30 Points
<u>4. CONOPS</u>	<u>max 30 Points</u>
Total	max 100 Points

There are 2 weeks to do this assignment. You should each plan on spending about 4 hrs/week on assignments (incl. background reading). With a team size of five this means that the *total number of person-hours available to do this assignment is about (2x5x4=) 40 hrs*. It is up to you how you split up and reintegrate the work as long as everybody contributes to the overall submission. Don't be perfectionists. Work smart. Learn fast. A master solution will be posted after the due date.

² We do not ask you to carry out any interviews or surveys with these stakeholders, therefore there will be no quantitative numbers such as WSO or WVFO. The last two columns of the table on slide 51 can therefore be omitted.

³ Remember that we have not analyzed the requirements in detail yet (we will in Assignment 2) and have not started designing yet. The CONOPS should not unnecessarily constrain the design space.

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