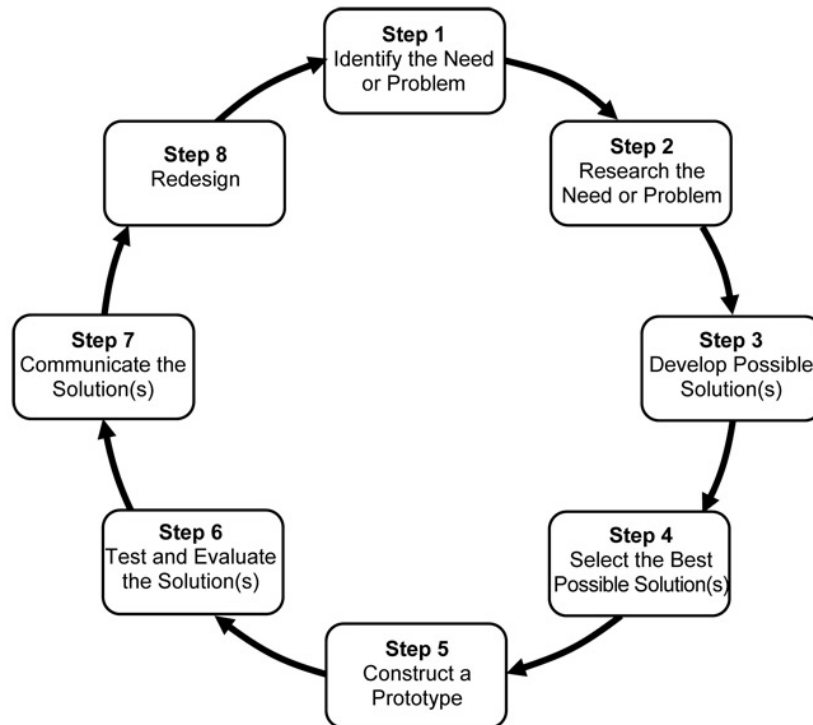


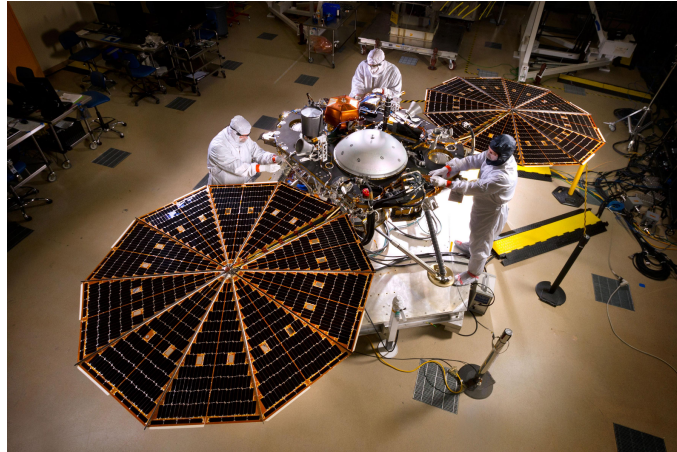
Engineering 11/12  
Lesson #2  
Engineering Design Process

1. Engineers use a design process to arrive at solutions that satisfy a problem or need. The visual below illustrates a typical engineering design process that has 8 steps. There are other design processes that have a different number of steps but this course will use the design process illustrated below.
2. The design process is widely used in many disciplines to develop solutions and organize complex thought processes into manageable steps. Students have seen similar processes in other courses but these were called cycles of inquiry.



3. The steps involved in the engineering design process are listed below:
  1. Identify the need or the problem.
  2. Research the need or the problem.
  3. Develop possible solution(s).
  4. Select the best possible solution(s).
  5. Construct a prototype.
  6. Test and evaluate the solution(s).
  7. Communicate the results.
  8. Redesign.

4. **The first step** in the engineering design process is to identify the need or problem. **A well defined problem often presents its own solution that is obvious and straightforward. Not knowing the problem and what is being asked** of the engineering team, can lead to hours of frustration and wasted time developing solutions that do not meet the original specifications.



5. **The second step** in the engineering design process is to **research the problem or need**. Knowing or having background knowledge about a topic is important and can lead to a quick resolution. In addition, **background research can reveal previous solutions that require a slight change resulting in a new and unique solution** to the current problem.



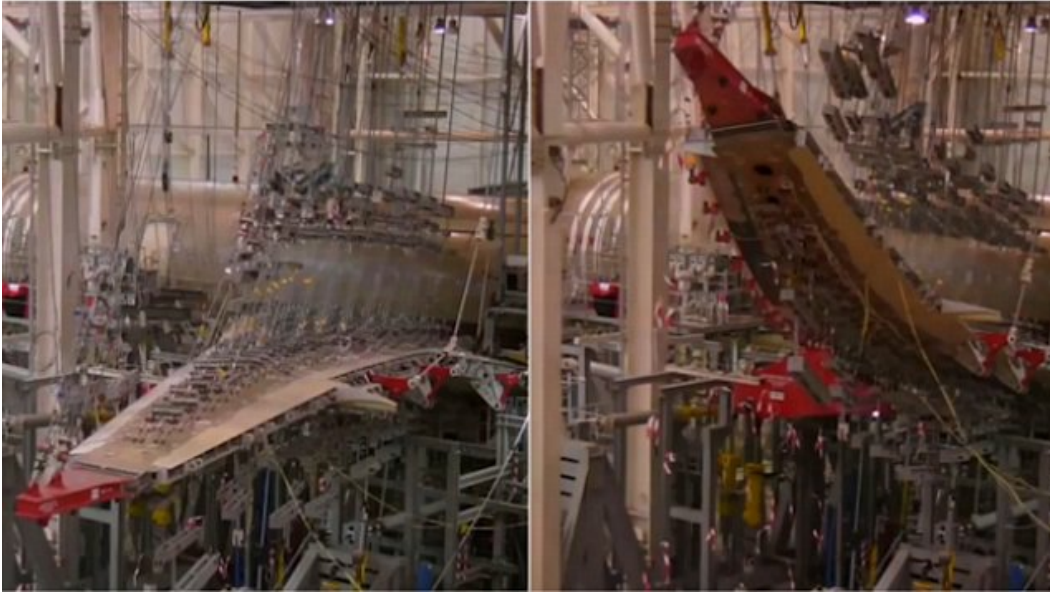
6. The third step in the engineering design process is the development of possible solutions. There may be many solutions to the problem. **The tried and true method of “brainstorming” solutions usually produces multiple solutions. This step requires that the first two steps have been done to a satisfactory level** otherwise the solutions that are thought of may not meet the requirements.



7. **Selecting the best solution requires a thorough understanding of the design criteria.** Designs will have external limitations that need to be considered before the best solution is selected. The best selected solution may need to be revised once it is prototyped and selected.
8. Once the decision is made then the solution needs to be prototyped. The prototype can be made as a model to reduce cost. **Models can help designers make changes before the full scale solution goes into production.**



9. Once the prototype is made it can now be evaluated against its designed purpose and specifications. **The results can now be communicated to the client or supervisor.**



10. If the evaluation of the prototype and presentation of results to the audience is successful then the prototyped solution should be put into production. If the presentation is not successful then a redesign may need to be done. It should be noted that prototypes undergo many iterations before they are put into production.