

Lesson 2

The principles of satellite design needs to take into account the nature and purpose of the mission. The use of concurrent design system engineering allows multiple design elements to occur at the same time.

Goal

Concurrent design allows for the simultaneous and collaborative development of satellite components, identifying the engineering and scientific tasks that need to be developed.

New Information (Flipped Classroom)

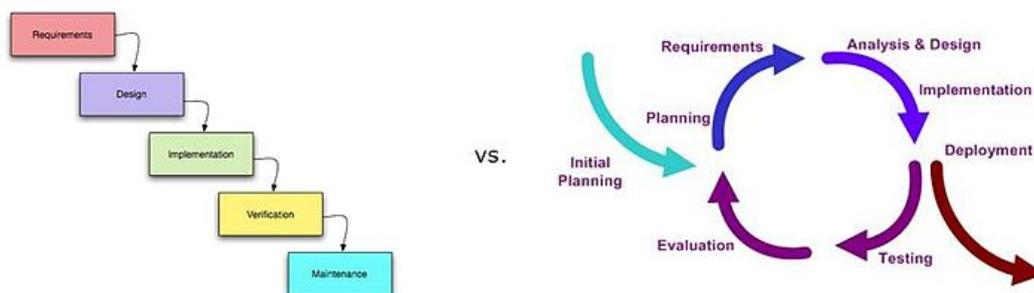
Principles of concurrent design

Students to watch the following clip at home prior to lesson and answer questions

<https://www.youtube.com/watch?v=xQg2ObAxtSI>

Access Prior Knowledge

Diagram of concurrent design vs traditional design process (power point slide)



Briefly discuss advantages and disadvantages.

New Information Presented

Roles of team and sub-team leaders

Potential engineering issues to investigate:

- Weather conditions analysis
- A Safe Flight Path: the investigation of the flight path of the balloon
- Balloon altitude (what affects the maximum altitude) and projected flight time
- The importance of data storage
- Investigation and recommendation of battery types

Potential experimental options to investigate (which need to take into account the potential limitations of the camera orientation):

- Remote Sensing - Investigation of land use under the flight path

- Distance the horizon at different balloon heights
- Atmospheric investigations

Note:

- Outlines to these investigations are found in the Activities Overview.
- This list is not exhaustive. Students may come up with other issues to investigate.
- Depending on teacher preferred group size, not all issues may be able to be investigated by one class. It may be possible for two or three schools to link up and share their investigations.

Information Sources

Video concurrent design

Question sheets

Roles of leaders

Activities Overview

Application Task

Activity

Teacher or students select team leader and sub-team leaders for engineering and experimental areas, which probably should occur before the lesson.

Teacher lead discussion:

- Advantages of using the concurrent design approach in this project
- Initial discussion of the identification of the tasks to be investigated (some clues given in the introductory power point).

Students then break up into groups to with the team leaders and project leader:

- Identify launch and engineering tasks
- Identify potential experimental investigations

Class discussion, led by project and team leaders to list the tasks/investigations

Goal Revisited

Why is it the concurrent approach to the design of your CubeSat more efficient and more effective than the traditional design methods?