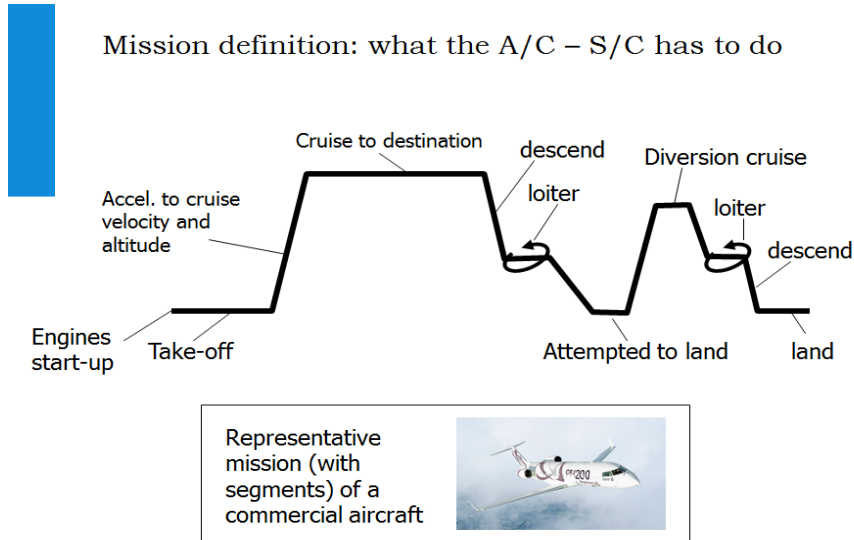


# Mission profile

In order to calculate the fuel fractions of each phase, it is necessary to know the number of phases, or rather the profile of the mission. This is done by using a graph that shows altitude vs. displacement, just like the example shown below:



Obviously, different airplanes will have to fulfill different requirements, which will result in very different mission profiles. It is due to that reason that when designing an aircraft, one must collect all requirements by “stepping into the aircraft (or spacecraft) shoes” .

For further information about the different stages in a mission profile, take a look at: <http://adg.stanford.edu/aa241/performance/cruise.html>

Finally, it is essential to emphasize the importance of putting down all requirements of an aircraft. Usually, the requirements are divided in two parts, the functional and the non-functional requirements.

## Types of requirements. A proposed classification

- A **functional requirement** defines a function of a system and how the system must behave when presented with specific inputs or conditions.  
E.g., Perform passenger transportation, take off from water, Collect Mars soil samples, perform water bombing, take pictures, control temperature, take shuttle crew to the ISS, etc..
- **Non-functional requirements** are requirements that specify criteria that can be used to judge the operation of a system (i.e. how well the system operates), rather than specific behaviors. They often provide **constraints** to the functional requirements  
E.g., speed, range, reliability, availability, cost, safety, life and maintainability, fuel consumption, etc...

Basically, the functional requirements are the basic requirements (what is the purpose of the design?) , while the non-functional requirements are the requirements you are allowed to tweak and play with.