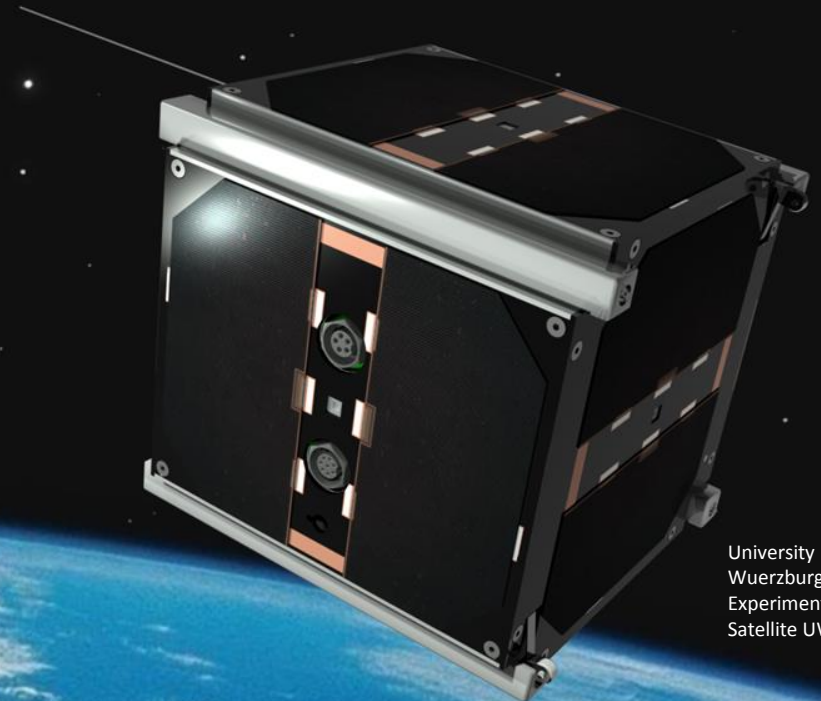




# Group 4: Successfully launching university satellites: From design to orbit

3<sup>rd</sup> UNISEC Global Meeting

July 04, Tokyo, Japan



University  
Wuerzburg  
Experimental  
Satellite UWE-3



# Goals for Discussion

## Results:

- There is a huge variety in the university satellite missions, each struggling with different technologic issues
- Problems related to student participation are similar
  - High fluctuation
  - Students have to complete their courses rather than participate in a long term project such as a CubeSat
  - Sometimes little commitment/responsibility
- Budgetary constraints are inherent
- Launch Delays cannot be avoided but measures to prepare for them
- Even educational satellites face the need for a return of investment



# How to react to high student fluctuation?

- Best practice handbook
- Have a standard system, because then students can keep working continuously on the project
- Small progress reports (every week or month) rather than big documentations to write down the progress
- Education of project managers by UNISEC (like CanSat leader program)
- CubeSat for Dummies. How to build a CubeSat and the relevant test equipment
- Template for Project management?
- Concise documentation but more than Bachelor/Master Thesis



# How to react to budgetary constraints?

- You can rent hardware instead of building several models
- Private companies fund very little, but sometimes it is possible. Most feasible help by private sector are kind contributions.
- Involve other students (law, marketing, finances, ...)
- Can we be funded by military? Very common way of funding in the US...
- Public-private partnership: difficult but worth trying. Inherent conflicts to this concepts though.
- Collaborations for test facilities could decrease costs by a lot!



# How to react to Launch delays

- Take on a new student “to sit and wait” not really possible, therefore: hire the people if possible?
- Design your system to be accessible for the case that there are launch delays. You can work on the software, recruit new students, etc...



# Testing

- Hardware-in-the-loop tests
- Standardize test equipment to exchange it
- Standardize test procedures? Common hardware-in-the-loop protocols/procedures could help



# Cooperation between Universities

- Bundle test equipment
- Bundle ITU, legal issues
- Exchange lessons learned, also informal if possible
- Collaboration vs. competition:
  - “Competition for quality” not for how many satellites have been launched
  - Contradiction if competing for money/funding
  - Collaboration/competition on different topics possible



# Project Planing

- Give small projects to students
- Continuous education <-> defined project timelines
- Cooperation with other universities while there is a shortage in resources (satellite, ground station, ...)
- Start planning the next mission while working on the current
- Plan in money for times after the mission
- Create credibility for long term project
  - Agencies should have two tracks: based on credibility vs. based on innovation
- Sustainable long term programs are necessary





# How to face regulatory issues?

- Special procedures for University programs (ITU)
- No single point of contact to talk on behalf the universities to the ITU -> would be helpful!
- Frequency bands dedicated to university projects
- Those issues can only partially be handled by students because they take too long and need officially be handled (signed)
- Inclusion of other students (e.g. law) could help and also the students could benefit



# How to deal with failures?

- Problem facing the truth and to do correct failure analysis because of funding for the next project would get complicated
- Lessons learned is the most important outcome of an educational project
- Offer informal meetings to discuss failure causes
- Very dependent on cultural and personal tendencies