AAUSAT5
- an evaluation of a student-run cubesat project

1st Symposium on Space Educational Activities

December 9, 2015

Rasmus Gundorff Sæderup & Joakim Bruslund Haurum

Aalborg University
Denmark

AAU STUDENT SPACE

Agenda

AAUSAT5
- Launch and Deployment

AAU Student Space

Problem Based Learning
- The Aalborg PBL Model
- PBL in AAU Student Space

Architecture

Knowledge Sharing

Documentation

Conclusion

Acknowledgements

AAUSAT5

- A 1U cubesat built by students at Aalborg University
- Payload: Track ships using an AIS receiver
- Invitation by the European Space Agency (ESA)
- Andreas Mogensen's IRISS mission
- A pilot project for *Fly your satellite from the ISS!*

AAUSAT5
Launch and Deployment

- Launched to the ISS in August 2015 on board HTV-5
- Deployed October 5th 2015
- Two-way communication has been established
- Expected lifetime: 3-8 months

- Launched to the ISS in August 2015 on board HTV-5
- Deployed October 5th 2015
- Two-way communication has been established
- Expected lifetime: 3-8 months

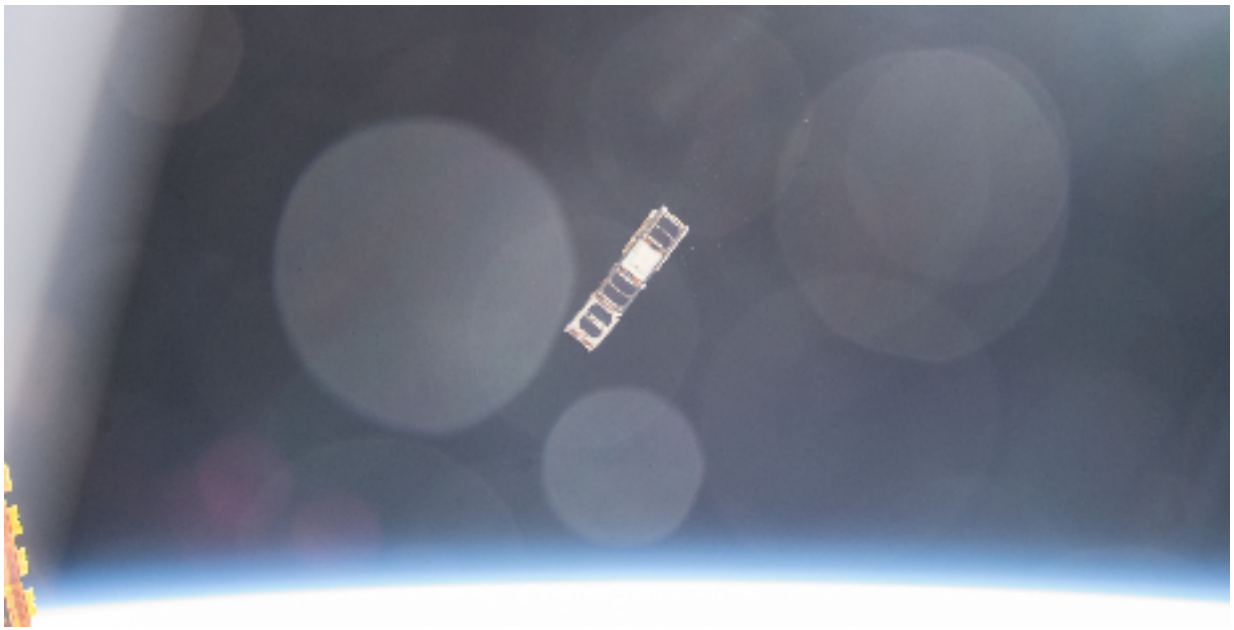


Image credit: NASA

AAU Student Space

- Students design and build satellites
- 100 % voluntary
- Students from multiple study lines and semesters
- Horizontal management structure

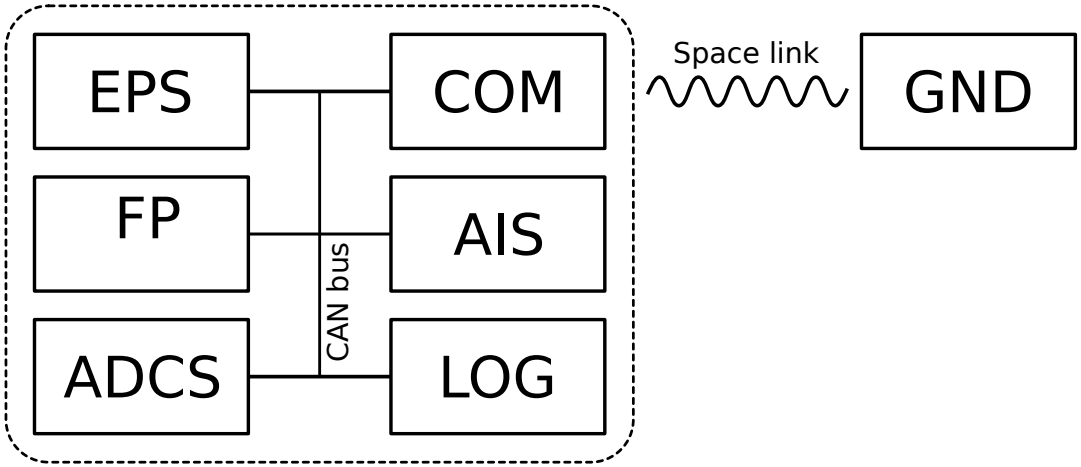
The Aalborg PBL Model

- A problem forms the basis for the semester project
- The problem is analyzed and (hopefully) solved
- Group of 2-7 students on each project
- Students are responsible for their own learning
- Students are free to manage their own project work
- Prepares the students for a job after graduating

PBL in AAU Student Space

- Structure similar to semester projects
- More complicated due to larger scale and longer duration
- Sub-teams for each subsystem
- Flexible working schedule with weekly status meeting
- Cubesat-related semester-projects

A Distributed Achitecture



- Allows for parallel work
- Less vulnerable to hardware failures
- Interface specification is important

Knowledge Sharing

- Information will get lost over time
- Central hub needed for keeping information
- Version Control System for schematics and software
- Wiki for documentation
- Group message system should be used for discussions

Documentation

- Lack of documentation on previous satellites
- Can be time-consuming to write
- FYS introduced good documentation principles
- A compromise is suggested

Conclusion

Recommendations for future student-run cubesat teams

1. Utilize an AAU PBL-based methodology

Conclusion

Recommendations for future student-run cubesat teams

1. Utilize an AAU PBL-based methodology
2. Have several groups working on the satellite in parallel

Conclusion

Recommendations for future student-run cubesat teams

1. Utilize an AAU PBL-based methodology
2. Have several groups working on the satellite in parallel
3. Plan ahead and expect setbacks

Conclusion

Recommendations for future student-run cubesat teams

1. Utilize an AAU PBL-based methodology
2. Have several groups working on the satellite in parallel
3. Plan ahead and expect setbacks
4. Keep a centralized hub for all documentation

Conclusion

Recommendations for future student-run cubesat teams

1. Utilize an AAU PBL-based methodology
2. Have several groups working on the satellite in parallel
3. Plan ahead and expect setbacks
4. Keep a centralized hub for all documentation
5. Make the documentation process as effortless as possible

Conclusion

Recommendations for future student-run cubesat teams

1. Utilize an AAU PBL-based methodology
2. Have several groups working on the satellite in parallel
3. Plan ahead and expect setbacks
4. Keep a centralized hub for all documentation
5. Make the documentation process as effortless as possible
6. Make tests automated and standardized

Conclusion

Recommendations for future student-run cubesat teams

1. Utilize an AAU PBL-based methodology
2. Have several groups working on the satellite in parallel
3. Plan ahead and expect setbacks
4. Keep a centralized hub for all documentation
5. Make the documentation process as effortless as possible
6. Make tests automated and standardized
7. Have fun and enjoy the experience! :-)

Acknowledgements

The authors would like to thank:

ESA Education & the FYS team for their great help with AAUSAT4 and AAUSAT5.

The radio amateurs who have helped with receiving signals, especially OE3HMW and DK3WN.

ESA and the Study Board of Electronics and IT at Aalborg University for sponsoring the trip.

The entire AAU Student Space team and team managers Jesper Abildgaard Larsen and Jens Dalsgaard Nielsen.

Questions?

AAU STUDENT SPACE

Thank you for your time!

AAU STUDENT SPACE