Minutes from FRISK-meeting #9, 12.-13. september 2017 at Kongsberg Group, Kongsberg.

Minutes by: Amund Gjersvik

Attendees:

Day 1: Jøran Moen (UiO), Marianne Tantillo (NSC), Tore Andre Bekkeng (EIDEL), Jan Nordal (EIDEL), Christoffer Stausland (NAROM), Laura Helene Sletbakk (Kongsberg Space and Surveillance), Kolbjørn Blix (ASC), Kjell Bøen (ASC), Ketil Røed (UiO), Amund Gjersvik (NTNU), Åshild Fredriksen (UiT)

Day 2: Ketil Røed, Pål Brekke (NSC), Christoffer Stausland, Jøran Moen, Laura Helene Sletbakk, Kolbjørn Blix, Kjell Bøen, Åshild Fredriksen, Amund Gjersvik

Agenda:

Day 1:

- Presentation of Kongsberg Space and Surveillance
- Presentation of program STARBURST
- Small satellites for technology, research, and development

Day 2:

- Norwegian national rocket program

Minutes:

Day 1:

- Laura H. Sletbakk presented KSS and the space related activities within the Kongsberg Group
    - Q(Jøran): What about Small satellites?
        - A: No concrete activites planned on Small Satellites, though antenna pointing for satellites is one field that could see increased activity.
- Program STARBURST was presented by Laura H. Sletbakk.
    - Industry (Kongsberg) initiated student summer project(s), aiming to integrate COTS systems into a whole communication system to fly on a balloon.
    - Will be used to demonstrate new technology (eventually)
    - Aims to keep some students for more than one year to ensure continuity
    - System project. Students work with a system focus
    - Work packages for students to complete. E-learning packages from NAROM were completed before work began.
    - A lot of work required by (key persons in) the participating companies. More than anticipated.
- Small satellites for technology, research, and development (CaNoRock/CaNoSat by Jøran Moen)
    - CaNoRock started in 2008. Now expanding to Satellites
    - Bilateral collaboration Canada/Norway. Will be used as a part of an international Space Master.
    - Mission based Master program (each mission 2 years).
    - 20 new master students every second year

- Why?
  - Education
  - Internationalization
  - Research (flight opportunities for science payloads from the institutions)
- Students will get multi-skill training (Technical/scientific/professional (management))
  - Also, project experience
- Long term goal to establish a joint degree between UiO and University of Alberta (difficult due to administration. Need to set up a new master's program)
  - Shorter term goal is to offer double degrees, recognized/awarded by two or more of the participating institutions
- What do we share in the ISM (International Space Mission) training?
  - 1-year project 60 ECTS
  - ¼ joint curriculum 15 ECTS
  - ½ year abroad
  - Space mission training
  - (space) project management
  - Extensive team work
  - Industrial reviews
- 2017-2018
  - Develop one joint MsC course
  - Meet mid-October 2017 at Andøya to sign Memorandum of Understanding (MoU)
  - Still only an outline, but financing is getting clearer.
  - Canadian Space Agency has kept funding CaNoRock since 2009 while cutting other programs
- Information from Ketil Røed on the Workshop in Edmonton, end of June 2017
  - Outline of a first course was hashed out.
  - Content/mission of the two (three) first CaNoSats were outlined.
    - Particle physics (upper atmosphere)
    - Particle physics (lower atmosphere)
    - Earth observation (multi-spectral camera)
- Marianne V. Tantillo: Any program like this should exploit the resources available through ESA.
  - Guest lectures
  - Industry visits
- EIDEL (working with, among other things, encryption):
  - Look at the need for encryption
  - If satellite platform development is a desired path for industry, encryption could give an edge compared to other platforms.
  - There could be possibilities for internships
  - Use the industry to exploit their knowledge and experience with Quality Assurance
  - What can the industry contribute directly?
    - Review process (tied to QA + technical/engineering)
- MoU for CaNoSat is valid for 4 years.
  - First satellite in 2020.
  - Could NTNU contribute with a software-defined radio (SDR) for example?

(Opinion (from Amund), not minutes:) The most important question here is whether NTNU should be a part of CaNoSat at all. The resources are to a large extent tied up in AMOS and NUTS. The scientific personnel needed for lectures are doing a lot already. Even if the course work itself is ¼ of a regular course it is still a lot of work. Getting to a joint or dual degree for master students requires quite a lot of work on the administrative side, and the return on the investment is maybe not so high (~5 master students every two years, plus international academic collaboration).

However, if we look at it primarily as a flight opportunity for our payloads, then it makes a lot of sense for NTNU to participate, but maybe more on the platform/instrument side than on the science/student course side. We are already developing payloads as a part of the education at NTNU (for AMOS). Signing the MoU does not legally bind us, but lets us be in the loop from the start. It may be more difficult to join at a later stage. Jøran Moen at UiO knows about NTNU having large projects tying up resources and is open to the idea of only starting contribution at a later stage.

If we sign the Memorandum of Understanding at Andøya, NTNU should be represented at a high enough level. The Canadian universities are represented by deans or above, UiO by a department head, and the Canadian ambassador to Norway will be present.

Day 2:

Norwegian national rocket program

(minutes are somewhat lacking due to unfamiliar subject)

- Status ICI and MXD series rockets
  - Low funding for rocket program
  - Difficult to get the two Norwegian sounding rockets in Grand Challenge launched (funding)
  - Will focus on development of payloads
  - It is possible to launch student-developed payloads on sounding rockets
- How to get a Norwegian rocket program again?
  - Ambition of one rocket pr. year.
  - Counterintuitively, a rocket program could be (is) more expensive than a satellite program since ESA will cover hardware cost for a satellite program, but not for a rocket program.
- ESA-PAC (EASP(?))
  - Norway is contributing to the program, but does not get maximum return since all rockets must be funded from other sources. The other countries have ear marked funding for rocket hardware, which enables them to exploit the agreement better. Should Norway still be a part of the deal considering this? The flip-side is that by highlighting the side effects/synergies it may be easier to get the necessary funding. Each additional activity at ASC will trigger more money back from the money that has already been contributed to the agreement.
  - **Action point:** NRS and ASC must clarify areas of responsibility with regards to the communication with the departments (“kunnskapsdept“ and “nærings-/fiskeridept“)
- **Action point**: UiO and UiT must agree on a meeting for writing an application for “infrastukturmidler”.

Amund Gjersvik 14.09.2017