Summer School Alpbach 2019

Workshop Preparation
Project Phases, Team Building, Team Structuring
P. Falkner (ESA)
16-July 2019
Content

- Objective of the Workshop
- The Workshop & Activities of the four student teams
- Workshop timetable
- The role of Tutors
- Structure of the teams
- Project phases
- Information on the infrastructure available at the Summer School
- Project evaluation by the Jury
- Advices (Lessons learned from previous Summer Schools)
- Post Alpbach
Geophysics From Space Using Nano - or Microsatellite Constellations

The Summer School students will attend lectures on past achievements and current issues, and will be invited to propose ideas for new satellite missions to observe the magnetic and gravitational field of the Earth from space with high resolution in space and time using a mission configuration that goes beyond all missions that have been realized so far.
Objectives of the Workshop

How to design a space mission that will meet the specific goals related to *Geophysics from Space using Micro- or Nano-Satellite Constellations*, by:

- defining the mission objectives and scientific requirements
- designing the spacecraft, payload and ground segment
- learning the details of the **scientific and technical methodology** needed to achieve the stated objectives
- understanding the need of iterations between requirements and solutions
- forming and working in international teams that bring together a range of scientific and technical expertise
- experiencing the pressure of a project with objectives that need to be met within strict constraints of resources and time, with imaginative but realistic cost
- braking the barrier in an integrated team (engineers, scientists, manager)
- to gain a multidisciplinary end-to-end view
Activities of the Four Student Teams

1. **define scientific objectives and rationale** related to the *Geophysics from Space using Micro- or Nano-Satellite Constellations* that can be best achieved by a space mission.

2. **define the technical requirements** that a space mission must fulfil to meet the scientific objectives identified as the goals of the mission.

3. **design a space mission**: spacecraft, payload, mission (launch vehicle, orbits, etc.), operations and ground segment including observation strategies.

4. **assess critical points, development plan & ROM cost** of the mission.

5. prepare a **written report** (10 pages) of the above tasks.

6. prepare and **present the outcome** (1 hour) of the workshop project to the Summer School Jury and all participants.
## Workshop Focused Timetable

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**Lectures**    Lectures    **Optional, but useful**

**WS Dedicated**    Usually Intensive

*Time table for indication purpose only: please refer to the official programme for details*
The Role of Tutors

**Team Tutors**: each team has two dedicated tutors (1 Engineering + 1 Science)

- **Engineering Team Tutor**
  - brings **practical space project expertise** to help with engineering topics
  - helps in **integrating the engineering tasks** fully into the activities of the teams

- **Science Team Tutor**
  - to bring **science expertise** to help with science topics
  - will help in **integrating the science tasks** fully into the activities of the teams

- Team Tutors are **available to their assigned teams** throughout the summer school
- Team Tutors help with organisational tasks

**Roving Tutors**

- provide support to all four teams for end-to-end design, science aspects, mission costing...
- Roving tutors are **available to all teams** of the Summer School

☞ Students are encouraged to **approach ALL tutors, ALL lecturers** and other students with questions
# Tutors

## Head Tutor: Peter Falkner, ESA

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<tr>
<th>ENGINEERING TUTORS:</th>
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<tr>
<td>AT Günter Kargl, Space Research Institute, Graz</td>
<td>E1</td>
<td>15/26</td>
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<tr>
<td>NO Tyler Jones, Norwegian Space Agency</td>
<td>E2</td>
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<td>DE Adriana Elizabeth Nuncio Quiroz, DLR</td>
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<td>FI Jaan Praks, Aalto University</td>
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<td>DE Marcus Hallmann, DLR</td>
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<td>AT Werner Magnes, Space Research Institute Graz</td>
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<td>DE Klaus Schilling, University of Würzburg</td>
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<td>NO Elise Knutsen, Norwegian University of Science and Technology</td>
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<td>ESA Olivier Carraz, ESA</td>
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<td>BE Jerome Loicq, University of Liege</td>
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<td>LU Qiang Chen, Université du Luxembourg</td>
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<td>CH Andrew Jackson, ETH Zürich</td>
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<td>ESA Roger Haagmanns, ESA</td>
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<td>IT Enkelejda Qamili, ESA</td>
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Structure of the Student Teams

Out of the 60 students four teams are formed (red/green/blue/orange)

- Each team has to elect/select one spokesperson(s)/team leader to report daily on progress in the team (can change over time).

- Each team has to assign the tasks to small specialist groups in the team to study specific aspects of the selected mission (e.g. spacecraft, payload, science requirements, ...). These specialist groups are fluid/dynamic – students take part in multiple aspects of their team’s mission design.

- Each team has to select/elect their presenter(s) for the final presentation.

- Each team has two dedicated Team Tutors who provide support, scientific and technical advice.
The Four Student Teams

### Blue Team
- Fanny Boutier, Switzerland
- David Byrne, Ireland
- Daniele Calvi, Italy
- Sreemoyee Chakraborty, United Kingdom
- Marie Fayolle-Chambe, Netherlands
- Lida Luque Fernandez, Norway
- Fabian Mueller, Germany
- Samuel Ocana Losada, Spain
- Tatu Peltola, Finland
- Alice Praet, France
- Wolfgang Senoner, Austria
- Panagiotis Trifa, Greece
- Jesus Vilaboa Perez, Belgium
- Sebastian Zieba, Austria

**Team Tutors**: ETT: Adriana Elizabeth Nuncio Quiroz, DLR
STT: Jerome Loicq, University of Liege

### Green Team
- Niklas Anthony, Sweden
- Matthieu Archimbaud, France
- Sarah Beeck, Denmark
- Ingrid Bjorge-Engeland, Norway
- Emmanuel Bogacz, Ireland
- Veronica Campione, Italy
- Vladlen Galetsy, Portugal
- Matthias Noeker, Germany
- Lena Salfenmoser, Germany
- Elena-Andreea Savu, Romania
- Marcel Stefko, Slovakia
- Martin Eizinger, Austria
- Eligius F.M. Weterings, Netherlands
- Jerome Woodwork, United Kingdom
- Reinhard Zelf, Austria

**Team Tutors**: ETT: Jaan Praks, Aalto University
STT: Qiang Chen, Université du Luxembourg

### Orange Team
- Hannah Collier, Ireland
- Simon Deggim, Germany
- Bartosz Drozd, Poland
- Evangelia Gkaravela, Bulgaria
- Elena Lopez-Contreras Gonzalez, Spain
- Riccardo Lasagni Manghi, Italy
- Bjorn Linder, Sweden
- Matteo Manei, Netherlands
- Trym Nielsen, Norway
- Cecille Olesen, Denmark
- Alexander Putz, Austria
- Ilham Said, United Kingdom
- Giovanni Salvia, France
- Tom Syndercombe, United Kingdom
- Adam Vigneron, Germany

**Team Tutors**: ETT: Günter Kargl, IWF Graz
STT: Elise Knutsen, NO U Science & Technology

### Red Team
- Antonius Adler, Germany
- David Apellaniz, Austria
- Christina Bornberg, Austria
- Colin Dandumont, Belgium
- Oceane Dhuicque, France
- Marthe Faber, Luxembourg
- Sotirios Kechagias, Greece
- Serena Lisi, Italy
- Viktor Lundstedt, Sweden
- Martynas Milasevicius, Lithuania
- Ana Pagu, Romania
- Florian Vidal, France
- Lucas Schreiter, Switzerland
- Jacob Smith, United Kingdom
- Sindre Steinsvik, Norway

**Team Tutors**: ETT: Tyler Jones, Norwegian Space Agency
STT: Olivier Carraz, ESA

- Printout of the team allocation is available at the end of my presentation
- Team tutors will hand-out coloured stickers to be applied on both sides of your badge

**Please wear your badge all the time!**
Project Phases - First Week

Tuesday: team partitioning is announced, team get-together

Wednesday: first workshop:
- introductions, preliminary discussion of science topics/goals and target object
- election of team spokesperson (before dinner)

Thursday/Friday: definition of scientific objectives
- outline of requirements,
- preliminary definition of mission scenario,
- identification of specialist needs for the workshop study (people, scientific and technical questions)
- intensive consultations with tutors, lecturers established

Friday: Objectives and Requirements Review (~16:30h)
Project Phases - Second Week

Monday: **specialist groups in the team work** on all aspects of the mission (scientific case, technical implementation of payload and spacecraft, mission scenario):
- Preliminary Design Review (~16:30h)

Tuesday: **integration of the components of the mission**, iteration with specialists/tutors/lecturers, preliminary discussion of the report and the presentation:
- Final Design Review (16:30h)

Wednesday: writing of report, iterations and preparation of the presentation, test runs, final iterations
- Final Rehearsals (internal)
- submission of the report and presentation (deadline 24:00h)

Thursday: **Presentations** ⇒ nail-biting ⇒ Jury results ⇒ celebrations! (fare well dinner)
Infrastructure at the Summer School

Access to the internet:
- fixed windows laptop allocated to each team, one per classroom (via LAN)
- personal laptops via WiFi network
- PC’s in the computer room

Material centrally available for the use of students:
- Books (library in computer room), reports, internet address lists
- Printer
- Server (e.g. for uploading info material/tools by tutors & lecturers)

Rooms:
- one room per team (incl. 1 key)
- lecture hall (“audimax”)
- computer room
- administration office

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## School Staff

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<tr>
<th>Role</th>
<th>Name</th>
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<tbody>
<tr>
<td><strong>SUMMER SCHOOL DIRECTOR:</strong></td>
<td>Michaela Gitsch, FFG</td>
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<tr>
<td><strong>VICE SUMMER SCHOOL DIRECTOR:</strong></td>
<td>Wolfgang Baumjohann, IWF Graz</td>
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<tr>
<td><strong>HEAD TUTOR:</strong></td>
<td>Peter Falkner, ESA</td>
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<tr>
<td><strong>TECHNICAL MANAGEMENT:</strong></td>
<td>Hans Sünkel, Technical University Graz</td>
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<tr>
<td><strong>PHOTOGRAPHER:</strong></td>
<td>Michel A. Jakob, Austria</td>
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<tr>
<td><strong>SUMMER SCHOOL ADMINISTRATION:</strong></td>
<td>Silvia Wenger, ISSI</td>
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<td><strong>TECHNICAL MANAGEMENT:</strong></td>
<td>Thomas Margreiter, Alpbach</td>
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<td><strong>PHOTOGRAPHER:</strong></td>
<td>Michel A. Jakob, Austria</td>
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Programme Committee

PROGRAMME COMMITTEE MEMBERS:

- Roger Bonnet, ISSI
- Paal Brekke, Norway
- Natacha Callens, ESA
- Peter Falkner, ESA
- Rune Floberghagen, ESA
- Achim Friker, DLR
- Andreas Geisler, FFG
- Andrian Jäggi, University of Berne
- Pekka Janhunen, Finnish Meteorological Institute
- Serge Habraken, Centre Spatial de Liège
- Vassilios Karastathis, Geodynamics, Institute of the National Observatory of Athens
- Arpad Kis, Geodetic and Geophysical Institute of the Research Centre for Astronomy and Earth Sciences, Hungarian Academy of Sciences
- Otto Koudelka, Graz University of Technology
- Dan Alin Nedelcu, Astronomical Institute of the Romanian Academy
- Mioara Mandea, CNES
- Mark McCaughrean, ESA
- Jens Dalsgaard Nielsen, University of Aalborg
- Johannes Ortner, Austria
- Andris Slavinskis, University of Tartu, Estonia
- Jose Carlos del Toro Iniesta, Spain
- Giancarlo Varacalli, ASI
- Tonie M van Dam, University of Luxembourg
Summer School Lecturers

- Peter Falkner, ESA
- Olivier Carraz, ESA
- Eberhard Gill, TU Delft Space Institute
- Karl Heinz Glassmeier, Technical University Braunschweig
- Roger Haagmans, ESA
- Marcus Hallmann, DLR
- Andrew Jackson, ETH Zürich
- Tyler Jones, Norwegian Space Agency
- Michele Lavagna, Politecnico di Milano
- André Laurens, CNES
- Jean-Yves LeGall, CNES
- Werner Magnes, Space Research Institute, Graz
- Torsten Mayer-Gürr, Graz University of Technology
- Luca Massotti, ESA
- Enkelejda Qamili, ESA
- Reiner Rummel, Technical University of Munich
- Klaus Schilling, University of Würzburg

See list for availability
Summer School Jury

**JURY CHAIRMAN:** Roger Bonnet, ISSI

**JURY Members:**
- Roger Bonnet, ISSI
- Karl Heinz Glassmeier, TU Braunschweig
- Hugo Maree, ESA
- Hans Sünkel, Graz University of Technology
- Franco Ongaro, ESA
- Stephan Ulamec, DLR

**Observing Members:**
- Peter Falkner, ESA, Head Tutor
- Andreas Geisler, FFG

**SUMMER SCHOOL OSCARS ARE AWARDED FOR THE BEST PROJECTS IN THE CATEGORIES**
- The Science Case for the Mission
- The Technical Case for the Mission
- The Competitiveness of the Mission
- The Quality of Presentation
The team projects will be evaluated by the Jury according to the following criteria:

A. The case for the mission:
   - The overall importance of the mission topic and its objectives in the context of this year's school topic
   - Statement of the mission requirements to meet the stated objectives
   - How much the expected results from the proposed mission advances the field

B. The technical case for the mission
   - The suitability of the proposed payload as a whole and of the individual instruments to meet the stated goals (matching of payload and instruments to the requirements and mission goals)
   - The technical feasibility of the proposed payload, including accommodation and other spacecraft resource requirements such as mass, power and telemetry
   - The feasibility of the whole mission concept, including launch and orbit requirements and launcher constraints
   - Feasibility of the operational concept and its matching to the mission goals, identification of enabling technologies

⇒ important to be considered by the teams during preparation!
Project evaluation guidelines for the Jury 2/2

C. The competitiveness of the mission
- How well the mission goals compete with, or complement those of other missions in the field of Geophysics from Space using Micro- or Nano-Satellite Constellations approved or planned (complementarity – innovation) including ground based observations
- The value for money of the mission; the quality and breadth of the contribution compared with the expected cost category of the mission
- The identification of de-scoping options and their impacts on the scientific capability of the mission

D. Quality of
- Presentation
- Final report
- Answers to questions

⇒ important to be considered by the teams during preparation!
Advice 1 (lessons learned)

- **Plan the work sensibly**, identify decision to be taken and various tasks to be done

- **Identify as early as possible the main questions and problem areas** related to the selected mission concept and start gathering information, solutions from the tutors, lectures and the internet

- **Establish the project essentials** (scientific objective, target object, mission scope), as soon as possible

- **Prepare all reviews on time** and use these as milestones in the scheduling of all the tasks

- **Involve the whole team** – everyone can contribute & everyone is needed to complete the tasks in the given time

- Once decisions are taken **get behind the chosen course of action**, even if it was not your choice

- **Be a good team worker** (share, listen, be helpful, understand, ...)
  - Do not hide behind your expertise but explain to colleagues with a different background
  - Do your assigned work within agreed time & come to the joint working sessions
  - Be active
Advice – 2 (lessons learned)

- **Iterate frequently within the whole team**, so that completion of tasks can be monitored, progress and status reviewed, unproductive paths abandoned.

- **Everyone in the team needs to know the baseline**, otherwise useful contributions are nearly impossible.

- Use all the resources of the Summer School: ask tutors and lecturers for advice and help — that’s why they are here!

- Remember that the report and presentation take time to prepare, start early on the organisation of this part of the activity, preferably at the start of the second week of the Summer School.

- Listen to provided feedback (particularly from reviews) - don’t be advice resistant, but consider it.

- Work hard and serious, but do not forget to enjoy, relax and have fun!

- Don’t forget to recharge YOUR battery (not only that of the smart-phone)
Delivery of Final Report and Final Presentation

Deliverables (latest delivery on Wednesday 24-Jul-2019, 24:00h)

• 1 USB stick with
  • Final Presentation in Adobe-pdf
  • Final Report in Adobe-pdf
  ⇒ For the Jury to read

• 1 Notebook (your choice) with
  • Final Presentation installed with all needed material and verified to show/play all material (slides, animations, videos, sound, ....)
  ⇒ Verify that the presentation with the beamer in the Audimax
  ⇒ to secure smooth presentation next day
  ⇒ the Notebook will be locked in the administration office over night

Final Report: limited to 10 pages (including all references) – hard limit (!)
Final Presentation: targeting exactly 1 hour (plus 30 min Q&A)
Final Presentation Day  (Thursday 25/07/2019)

- Each team presents for 1 hour, followed by 30 min Q&A (questions mainly from Jury)
- Team presentation sequence by drawing of lots ("lucky drawing box") – one by one
- Head Tutor is chairing the final presentation with strict timekeeping
- ~2-3 presenters per team (all team members have to join for the Q&A)
- ⇒ non presenting team members should be active at Q&A (part of evaluation)
- After last presentation
  - Jury will decide on Oscars per criterion
  - Teams clean up their class rooms & return the key
- Jury announcement at joint farewell dinner ⇒ handover of Oscars and certificates
- ⇒ Summer School 2019 end
Post Alpbach
date: 25-29 Nov. 2019
Post Alpbach: Concept

- **ALL** Alpbach Summer School 2019 students are invited to apply
- Some of the Alpbach tutors will participate in the Post Alpbach Summer School Event 2019
- 24 students will be selected to attend the Post Alpbach Summer School Event 2019
- Selected students will carry on with one of the Alpbach missions which was found best suited by the Jury
- Result: scientific paper for presentation at a congress and/or in a scientific journal
- Financial support from ESA via FFG for travel expenses, accommodation including meals and local transport
- The event will be organised at ESA Academy’s Training and Learning Facility at ESEC-Galaxia, Transinne, Belgium
- Students will be offered the opportunity to use the Educational Concurrent Design Facility (CDF)
Post Alpbach: Logistics

**When:** 25-29 November 2019

**Where:**
ESA Academy Training and Learning Facility
ESEC-Galaxia, Transinne, Belgium
(New facility!)
Post Alpbach: Logistics

- **Accommodation & dinners**: Hotel Le Val de Poix, Poix Saint Hubert, Belgium
Post Alpbach: Logistics

**Travel dates:** Sunday 24/11 afternoon - Friday 29/11 afternoon

**How:**
- **To/from hotel**
  airplane + train, train or car to the hotel
- **To/from ESEC-Galaxia**
  by bus

**Who:**
- 20 students from among the Alpbach 2019 teams
- 2 -3 experts from among the Alpbach 2019 tutors
- 2 ESA (CDF) system engineers
- 1 ESA Education Office coordinator
Post Alpbach: Procedure

- **ALL** Alpbach students are invited to apply by 6. September 2019 by sending an e-mail to michaela.gitsch@ffg.at

- Admissions committee will select 24 students from among the applicants by 27 September 2019

- ESA invitation for selected 24 students will be extended by 4 October 2019 via FFG

- Students will be offered to follow a short introduction course to OCDT via Webex a few weeks before the event

- Application form [https://esaeducation.wufoo.com/forms/m19noysu0yswxup/](https://esaeducation.wufoo.com/forms/m19noysu0yswxup/)
Alpbach Workshop preparation: Conclusion

• Team partitioning ⇒ printouts
• Once you found your team ⇒ put a colour sticker on your badge
• You will get the stickers from your team tutors

Please wear your badge

Server Access for lectures & reference material

windows: \10.0.0.20\public\nMAC: smb://10.0.0.20/public/
User: student password: abc123

For your team server access: ask me or your team tutors or Thomas Margreiter

Questions?

next 19:00 Joint Dinner at Böglerhof
The Four Student Teams

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<th>Last Name</th>
<th>Nationality</th>
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Printout of the team allocation is available at the front desk in the lecture room
Team tutors will hand-out coloured stickers to be applied on both sides of your badge
Please wear your badge all the time!