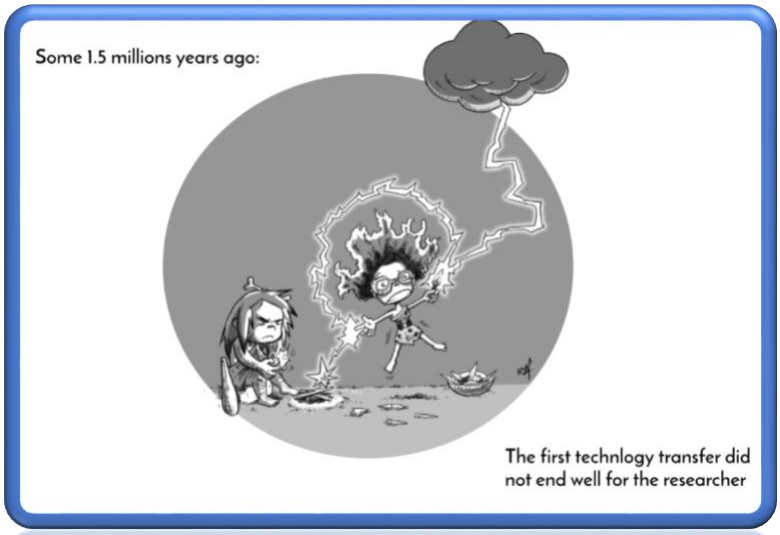
TechS News- An Electronic Newsletter

No. 1, August 19

Editorial

Welcome to the 1st edition of TechS, a new electronic newsletter reporting the information and update on the activities of the Technology Platform of PlanetS.

In order to facilitate the exchange of information, the TP is glad to propose you TechS, where you will be informed on the TP's activities and updates, descriptions of TP's projects, news from industries, and upcoming events and deadlines. For each topic, the TP will select one or more subjects in order to give you some information about them. For example, for the news from industries, this 1st number the TP has invited Almatech SA to present their products and show their technological capability.



To make the newsletter a success we will be relying on you, the subscribers to the newsletter, to send us news and update about whatever you think can be important to share within our community in terms of ***Seed funding, Networking, Training, Participating, Infrastructures*** and ***Competences***.

Therefore, if you want to share information with the other subscribers to the newsletter and facilitate the exchange of information, so just let us know about anything you'd like to see appear in the newsletter, and we'll see what we can do. How can you do that? Just send anything relevant to *piero.pontelandolfo@unige.ch* and it will appear in the next edition in a few months' time.

Best wishes,

The Technology Platform (TP)

General information

General information about the TP activities and news from the us can be found here:

- Webpage of the TP: link.
- To subscribe or unsubscribe the newsletter '*TechS*': link.

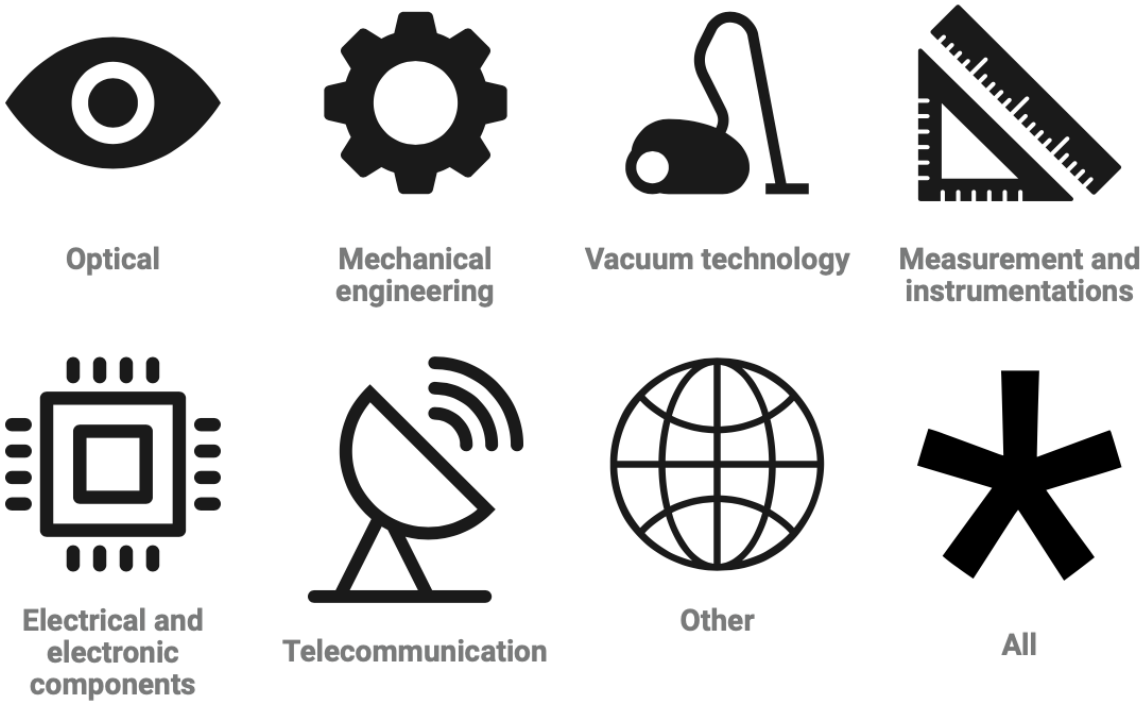
In this edition

- Update of the TP web page: PlanetS' industry list.
- Spotlight on a project of the TP: How the PlanetS TP knowledge exchange program got Daniel Angerhausen into working with NASA and Google.
- Focus on a company: Almatech SA.
- Breaking news: EPSC-DPS Joint Meeting 2019.
- Upcoming events and deadlines: External, Internal and ESO engineering fellowships, studentships and internships.
- Technology transfer funds of the TP: Permanent call for seed funding and Knowledge transfer with a short-term project.

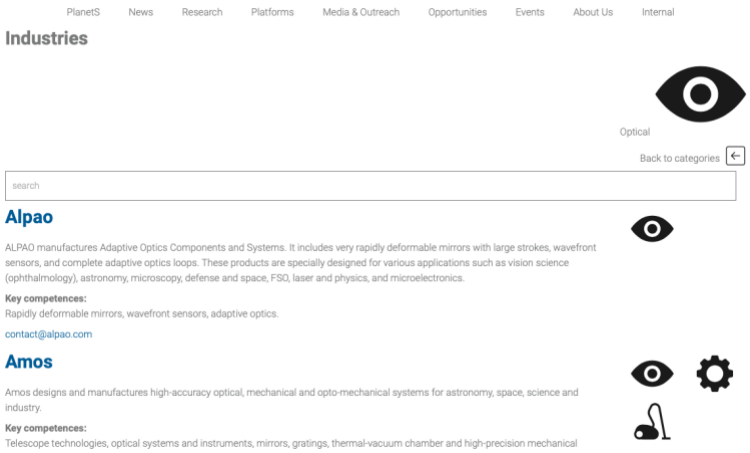
Update of the TP web page

PlanetS' industry list

The PlanetS' industry list wants to provide a source of information about the companies related to technologies used in PlanetS' projects. The information included in the following list aims at supporting the people of PlanetS to find the right expertise at the right place. The figure below shows how the webpage looks like.



You can select a specific domain and find a company activate in that category, as example, see figure below for Optical.



Either if you work in PlanetS and you would like to suggest a company, or if you are a company and you would like to be in the list, please help us providing additional inputs with this form.

Link: http://nccr-planets.ch/platforms/technology-transfer/planets-industry-list/

Spotlight on a project of the TP

How the PlanetS TP knowledge exchange program got Daniel Angerhausen into working with NASA and Google

Daniel Angerhausen is a fellow of the Center for Space and Habitability at Bern University, PlanetS associates and this summer he will be working for the Google Cloud Platform in the context of NASA's Frontier Development Lab (FDL). With support from the PlanetS Technology Platform (TP) Knowledge Exchange program externship, Daniel will spend 3 months working on innovative machine learning solutions in space research leveraging Google Cloud's capabilities.

For the fourth time since 2016 machine learning researchers and space science domain experts will spend the summer in Silicon Valley to work on some of humanity's most important present day challenges. The 8-week long program developed in partnership with NASA's Ames Research Center - NASA frontier development lab (FDL) - at the SETI institute will face problems ranging from predicting solar storms to finding life in space. The program aims to apply AI technologies to challenges in space exploration by pairing machine-learning expertise with space science and exploration researchers from academia and industry. These interdisciplinary teams address tightly defined problems and the format encourages rapid iteration and prototyping to create outputs with meaningful application to the space program and humanity. What makes FDL unique is its close collaboration with industry stakeholders like Google Cloud.

Daniel is an FDL science committee member and has in previous years served as mentor for various challenges. In the 2018 FDL 3.0 edition for example, he served as mentor for the Astrobiology and Exoplanet teams for the 8 weeks at the SETI institute and at NASA Ames. Industry partner for these teams was Google Cloud lead by Dr. Massimo Mascaro, who will be my host for this summer. For his 3 months project he will be acting as liaison, facilitator and communicator between Google and the FDL teams, help to prepare and document the program, with a particular focus on improving Google Cloud Platform (GCP) products in the academic context.

There are several reasons why Google and FDL decided to host Daniel for this externship. As a Frontier Development Lab "veteran", he already brings two years of experience on the research and communication side for FDL. As an FDL Science Committee member, he contributed significantly to the "Big Think" events and the Challenge definition in general. As an "in situ" mentor and facilitator at FDL 2.0 and 3.0, he has the hands-on experience of the 8-week program, embedded in the teams.

His work package will be to function as liaison at the interface of Google Cloud and the NASA FDL participants. Daniel will act as mentor for most teams at FDL 4.0 at the SETI institute (topics will e.g. be stellar activity, Moon surface reconnaissance, climate and atmosphere or disaster prediction). Daniel will also support the education, public outreach and marketing side of program as experienced science communicator.

Daniel says: *"I already want to thank the PlanetS Technology Platform for supporting this idea right from conception and allowing me to go this path. I hope that this will inspire other young PlanetS researchers to make use of this scheme in the future and to use the connections with Google AI and Google Cloud in the future. We are currently looking into a fall workshop for PlanetS affiliates with Google in Zurich. So stayed tuned."*

Kick-off talk at Google Zürich. In his externship, his focus will be on supporting the implementation of machine learning, artificial intelligence and general cloud computing solutions provided by the Google Cloud Platform.

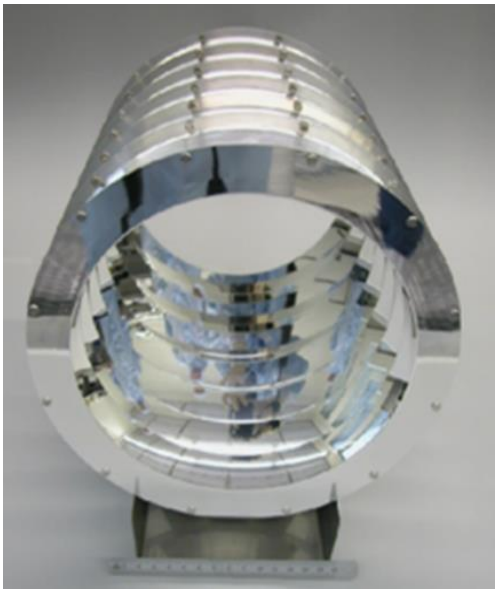
More details about the program: http://nccr-planets.ch/platforms/technology-transfer/funding-of-a-short-term-project/

Focus on a company

As every month, this section wants to present an overview of a selected company which is active in domains related to the PlanetS' activities. This month we want to present the company Almatech SA, which is located in Innovation park of EPFL, in Lausanne.

Almatech SA

Created in 2009 by passionate engineers with more than 15 years of experience in the Space sector, Almatech is now celebrating 10 years of major contributions to Space Instruments!

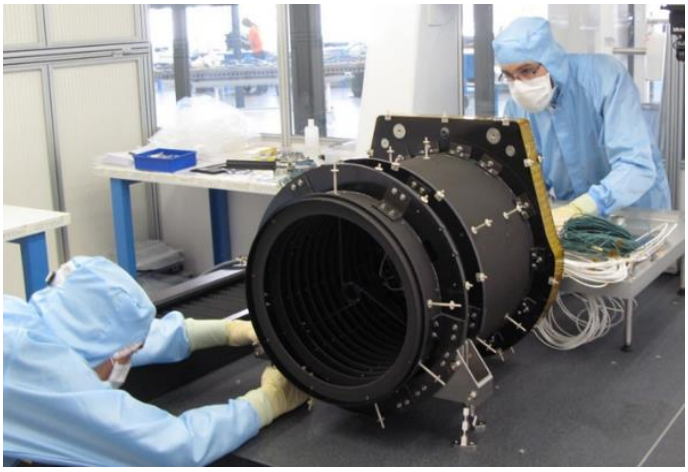


Reflective Baffle Unit
Bepi-Colombo Laser Altimeter

With a significant experience in system engineering and particular expertise in the fields of opto-mechanical & thermal systems, Almatech originated its space activities with the development of the Reflective Baffle Unit of the Bepi-Colombo Laser Altimeter for the University of Bern. Based on a Stavroudis-type reflective baffle design, the technical challenge of manufacturing the succession of different hyperbolas and ellipses with optical tolerances was realized directly through diamond machining of the different stages with a surface roughness lower than 8 nm. This without any additional surface treatments/coatings to meet the thermo-optical requirements.

Based on Almatech complementary development activities in the Naval sector, in particular on the stability of the composite structure of the Hydroptère, the world-record winning speed boat, Almatech has been selected for the development of several Carbon Fibber (CFRP) based ultrastable telescope developments.

One of the major developments in ultrastable structures was the lightweight CFRP structure of the CHEOPS telescope for the University of Bern with sub-micron stability requirements between M1 and M2 mirrors. This fast-paced and fully successful project required the development of new simulations methods down to carbon fiber layer level with its validation on an extensive characterization of layup samples between -80°C to 80°C. All ultrastable requirements were successfully validated on a flight model with sub-micron stability tests performed using laser interferometry at TNO in the Netherlands.



CHEOPS Telescope Structure

MXT Telescope – SVOM Mission

The expertise of Almatech gained in lightweight ultrastable structures for space instrument led to the current developments of the Telescope structure of the MXT (Micro-channel X-ray Telescope) instrument of the SVOM mission (Space based multi-band astronomical Variable Objects Monitor) for CNES (F); the manufacturing design, assembly, integration and testing of the Optical Structure and Radiators (IOMSR) of SENTINEL-5 and the development of the strut assembly of the PLATO instrument for RUAG Space Switzerland.

Almatech has additionally a major heritage in the development of high-precision mechanisms for Space Instruments, combining the design complexity of opto-mechanical systems with high-precision positioning systems under stringent cleanliness and contamination control. This later implies a full mastering of all assembly, integration and test activities through contamination budgets that are considered from the mechanism's initial conceptual design all the way to the delivery of the flight hardware.

Uncoated SPICE Slit Change Mechanism

Almatech expertise and innovation in compliant mechanism design allows to response to stringent cleanliness, high precision and reliability needs in a very effective way.

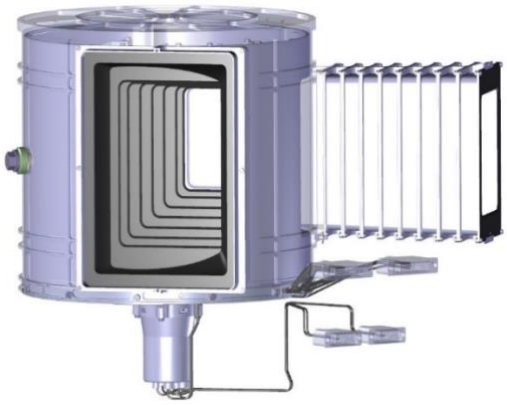
The Slit Change Mechanism of the SPICE Instrument developed by Almatech for PMOD in Davos and RAL (UK), is based on this ingenious design approach: In order to guaranty stringent optical cleanliness while fulfilling micron-range positioning accuracies of four different slits in the optical path of the spectrograph, a linear guiding system based on a double flexible blade arrangement has been designed. A metallic below allows to fully separate the compliant guiding system placed in the optical cavity from the contamination sources of the actuation mechanism placed outside the optical cavity.

This development has been subject to a publication at NASA Goddard Space Flight Center (US).

Almatech, amongst other projects, is currently developing the Calibration Unit of the FLORIS high-resolution imaging spectrometer of the FLEX mission for Leonardo (I).

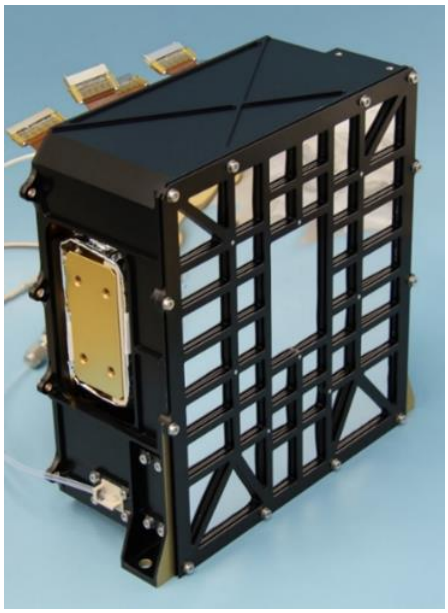
This development, is based on a rotating carrousel design with a Spectralon® diffuser for Sun calibration, a black target for dark calibration and a Nadir Baffle for Earth Observation. The compact design proposed by Almatech allowed a full protection of the Sun and Nadir Ports such that no protection covers are required for contamination control of the instrument during launch. Based on the use of a single duplex bearing, the design combines a lightweight

design with ease of access to the rotating optical sub-systems through the removal of a Cover or through additional inspection ports. In the frame of this project, Almatech has developed a high-precision contactless sensor system that allows discrete indexing with micron range repeatability in a very cost-effective way.



FLORIS Instrument Calibration Unit

On behalf of FHNW Brugg-Windisch, Almatech has developed two critical sub-systems of the STIX X-Ray Telescope: the Detector Electronic Module, heart of the instrument, and the X-Ray transparent Windows, a mission critical hardware involving the development of new high-temperature (> 500°C) Si-Ox thermo-optical coatings on large pure Beryllium substrates.



STIX Detector Electronic Module

The development of the Detector Electronic Module involved multidisciplinary design challenges to be achieved in a very compact configuration for the accommodation of sensitive Cadmium Telluride sensors, an attenuator mechanism and all control, data processing and power electronics. A highly optimized thermal design allowed to divide the needed active cooling to keep the detectors at -20°C by a factor of three! Almatech also designed an innovative tri-stable X-RAY Attenuator Mechanism used in case of very high photon flux to reduce pile-up and detector dead time, that has been subject to a publication.

Through the last decade, Almatech has gained an extensive heritage in the development of instrument sub-systems using its team's multi-disciplinary competences and collaborative mindset to engineer these developments into successes!

More details about products and activities on: http://www.almatech.ch/

almatech
Engineering Your Instrument

EPFL Innovation Park D

CH – 1015 Lausanne

Contact: Dr. F. Rottmeier

fabrice.rottmeier@almatech.ch

Breaking news

EPSC-DPS Joint Meeting 2019

The EPSC-DPS Joint Meeting 2019 covers a broad area of science topics related to planetary science and planetary missions. The event falls from 15 and 20 of September 2019 and it is a joint meeting of the European Planetary Science Congress and the Division for Planetary Sciences of the American Astronomical Society. All information here.

The programme of the congress will contain oral and poster sessions, and it will emphasize workshops and panel discussions in order to have a strong interaction between the participants.

More than 1800 attendees from the fields of astronomy, space and physics of particles are expected and the major actors from Europe and the United States in the fields related to the conference will be invited as exhibitors as well. Outreach and communication activities are also planned for the congress (media notifications, press briefings, local press, public & school events, etc).

The TP supported the conference inviting industries and research laboratories to present their products and research projects. You will find the following exhibitors who are active in planetary science and planetary missions at the conference:

- Space Telescope Science Institute, stand Nº1.
  The Space Telescope Science Institute (STScI) is expanding the frontiers of space astronomy with advanced space telescopes and ever-growing data archives. STScI is the science operations center of the Hubble Space Telescope, the science and operations center for the James Webb Space Telescope, and the future Wide Field Infrared Survey Telescope (WFIRST). STScI also houses the Mikulski Archive for Space Telescopes (MAST) that supports a variety of astronomical data archives.
- CSEM SA, stand Nº2.
  CSEM, founded in 1984, is a Swiss research and development center specializing in microtechnology, nanotechnology, microelectronics, system engineering, photovoltaics, and communications technologies. Around 450 highly qualified specialists from various scientific and technical disciplines work for CSEM in Neuchâtel, Zurich, Muttenz, Alpnach, and Landquart.
- HES-SO, stand Nº3.
  The University of Applied Sciences and Arts Western Switzerland (HES-SO) is the second largest high educational institution in the country. HES-SO is organized in 6 faculties, among them, Engineering and Architecture supports the development of space technologies related to Advanced materials, Communication systems, Micro- and nano-technology, Fluid mechanics, Optics, Robotics, Software, and System Engineering. HES-SO is anchored into the regional economy, and collaborates closely with SMEs, industries and research institutes.
- Blue Skies Space Ltd, stand Nº4.

Blue Skies Space provides cost-effective, rapidly-delivered space facilities for users worldwide through a service-based model. We employ a commercial approach to create new opportunities for cutting-edge science. The Twinkle Space Mission is Blue Skies Space's flagship mission conceived to deliver space based spectroscopy of exoplanets, solar system bodies, stars and disks in the visible and near-infrared wavelengths.

- Andor Technologies, an Oxford Instruments Company, stand Nº5.
  Andor's a global leader in the pioneering and manufacturing of high performance scientific cameras for research and OEM markets. Andor's product portfolio incorporates a range of high performance detector solutions for Astronomy, from fast time resolution EMCCDs and sCMOS cameras to the slow scan, very large area CCDs. Crucially, Andor's unparalleled commitment to superb quality and ease of maintenance is designed to maximize observing time and minimize cost of ownership.
- AAS Publishing, stand Nº6.
  AAS Publishing's journals and ebooks programme help to support the AAS mission to enhance and share humanity's scientific understanding of the universe. Through thier publications, including The Astronomical Journal (AJ), The Astrophysical Journal (ApJ), The Astrophysical Journal Supplement Series (ApJS), The Astrophysical Journal Letters (ApJL), and Research Notes of the AAS (RNAAS) you can disseminate your research to interested readers across the globe.
- NASA Infrared Telescope Facility, stand Nº9.
  The NASA Infrared Telescope Facility (IRTF) is located near the summit of Maunakea on the island of Hawai'i. The observatory is operated and managed for NASA by the Institute for Astronomy at the University of Hawai'i. The primary mission of the IRTF is to provide ground-based observations that support NASA Solar System programs, including planetary spacecraft missions, the characterization of near-Earth objects, and fundamental planetary research.
- Planetary Data System (PDS), stand Nº10/11.
  The Planetary Data System (PDS) archives electronic data products from NASA planetary missions. PDS actively manages the archive to maximize its usefulness. All PDS-curated products, more than 1.6 PB, are stored in a well-defined format, peer reviewed, fully documented, and available online at https://pds.nasa.gov to scientists and to the public at no charge. The PDS is a member of the International Planetary Data Alliance (IPDA).
- LPG-PLANMAP, stand Nº12.
  The research activities of the "Laboratoire de Planétologie et Géodynamique (LPG)" focus on four main topics: Marine Systems in Transition, Earth, Diversity of the Icy Worlds and Terrestrials Planets.
  These activities extend from the Earth to the other solid bodies of the solar system and to the exoplanets. The technical platforms of the laboratory are devoted to observations, analysis and experiments over all scales, from spatial observations to field studies.
- VR2Planets – Virtual reality for Geosciences, stand Nº13.
  VR2Planets is a spinoff of the Planetology Laboratory of Nantes (CNRS/Univ. Nantes). The goal of VR2Planets is to create virtual reality applications for research and education in geosciences. We have a strong background in data integration coming from space exploration. The scientific background of VR2Planets engineers is a key

strength to produce high fidelity and realistic virtual environments from the complete archives of images taken by robotic spacecraft.

- Elsevier, stand Nº14.
  Elsevier is a global information analytics business, serving the research needs, of educators, researchers & students worldwide. Visit our booth # 15 to discover our range of Planetary & Space Sciences journals, including Icarus which is devoted to Solar System studies and endorsed by the Division for Planetary Sciences of the American Astronomical Society.
- NASA Exoplanet Science Institute, stand Nº18.
  The NASA Exoplanet Science Institute (NExScI) is a science operations and analysis service organization for NASA Exoplanet Exploration Program projects. NExScI facilitates the timely and successful execution of exoplanet science by providing software infrastructure, science operations, and consulting to the NASA Exoplanet Exploration Program projects and their user communities. NExScI is part of IPAC, located on the campus of the California Institute of Technology.
- ESA, stand Nº19/20.
  Explore the Solar System and beyond with ESA's fleet of space science satellites and discover hidden treasures in their vast data archives. Meet the scientists behind the spacecraft and hear more about how to use the rich datasets of our current and legacy missions. Find out what exciting missions we are launching next and collect a range of outreach material. We look forward to meeting you at the ESA stand!

Please click on this link if you would like to have more information about the registration to the next EPSC-DPS and, then, gain access to the exhibitor area.

Reference post: http://nccr-planets.ch/blog/2019/05/03/epsc-dps-joint-meeting-2019/

Upcoming events and deadlines

External

- **Roadshow ETH**, 4 September, 2019, ETH Zurich Hönggerberg, Room HPH G2, Switzerland: Are you keen to implement an innovation project or launch your company and looking for support? Innosuisse can help you. One of the discussion topics will be support for innovation projects carried out jointly by research partners and SMEs. The programme will also include an overview of the funding opportunities for start-ups, with a special focus on coaching vouchers. *https://www.innosuisse.ch/inno/de/home/ueber-uns/nsb-news_list/Roadshow-ETH.html*
- **swiTT Academy: 2019 TTO Open Day - EPFL**, 24 September 2019, EPFL campus: P resent, meet, exchange ideas & experiences on technology transfer. *https://switt.ch/epfl-open-house-registration-open*
- **ESA BIC CH Demo Day**, 26 September 2019, Zurich, Switzerland: the biggest and most important yearly event for partners, start-ups and stakeholders of ESA BIC Switzerland. *https://www.esabic.ch/portfolio_page/30-01-2019-esa-bic-ch-demo-day-26-09-2019/*
- **swiTT Academy: Prepare Negotiations and Perform Deals ("Canning Course")**, November 11 & 12 (course 1), 2019 and November 13 & 14 (course 2), 2019, Bern: The aims of the course are to: give you a structured approach to prepare negotiations and perform deals efficiently, strengthen your negotiating style, enable you to negotiate effectively in different environments and with different cultures. https://switt.ch/prepare-negotiations-and-perform-deals-canning-course-1-save-date
- **Libérez vos idées**, from 18 to 22 November 2019, Geneva, Switzerland: a week to make students aware of the opportunities offered by entrepreneurship and to provide them with tools and practical advice that enable them to realize an idea. *https://liberezvosidees.ch/*.
- **Funding Opportunities for Your Industry 4.0 Research and Development**, 22 October 2019, Bern, Switzerland: an overview on European Commission funded Industry 4.0 topics under Horizon 2020, for which Switzerland is fully eligible. The half day event is targeting researchers from industry and academia working on new and innovative technologies in areas like factories of the future, digitising industry and cybersecurity. *https://www.euresearch.ch/index.php?id=443&tx_seminars_pi1%5BshowUid%5D=975&no_cache=1&user_id=52564&job_id=4263*

Internal

Workshop to foster the interaction between PlanetS and:

- **Agie Charmilles SA, GF Machining Solutions**, data to be scheduled, Versoix, Switzerland.

The agenda for both workshops is not already finalized and it will cover the following main subjects: an introduction of the technical capabilities and interest of the industry, discussion about possible subject to enable collaboration, overview of possible technologies that could be of potential interest to be transferred.

Would you like to participate and receive information about workshop? Send us an email!

ESO engineering fellowships, studentships and internships

Vacancies that opened recently for studentship, fellowship and internship (deadline on September!):

- Fellowships and Studentships at ESO: link.
- PhD Thesis Topics offered by ESO Faculty Members: link.
- Vacancies (deadline on September and October): link.

Technology transfer funds of the TP

Permanent call for seed funding

The TP proposes a permanent call for seed funding called “Call for Ideas”. The call promotes activities and strategies that aim at strengthen the knowledge and technology transfer between PlanetS Members, industry, technical universities and other research laboratories.

The call is open to every company, institute or research laboratory, and the rules have been kept as simple and flexible as possible.

Would you like to know more about the call? Have a look here.

Knowledge transfer with a short-term project

The TP proposes program for PlanetS Member or Associate (PhD-student, postdoc or engineer) who developed competences or ideas that maybe applied to areas outside your specific research activities. The PlanetS TP provides support with up to 3 months of financial support (salary compensation) in order to pursue your project. Would you like to know more about the opportunity? Have a look here.

If you are the industry or the research laboratory which would like to propose a project, let us know about your interest and fill out the following: proposal of a short-term project with for the external partner.