TechS News- An Electronic Newsletter

No. 2, January 20

Editorial

Welcome to the 2nd edition of TechS, as 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 2nd number the TP has invited Andor Technology Ltd to present their products and show their technological capabilities.

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, 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? By sending something relevant to *piero.pontelandolfo@unige.ch*, it will appear in a few months' time edition.

Best wishes,

The Technology Platform (TP)

General information about TP

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

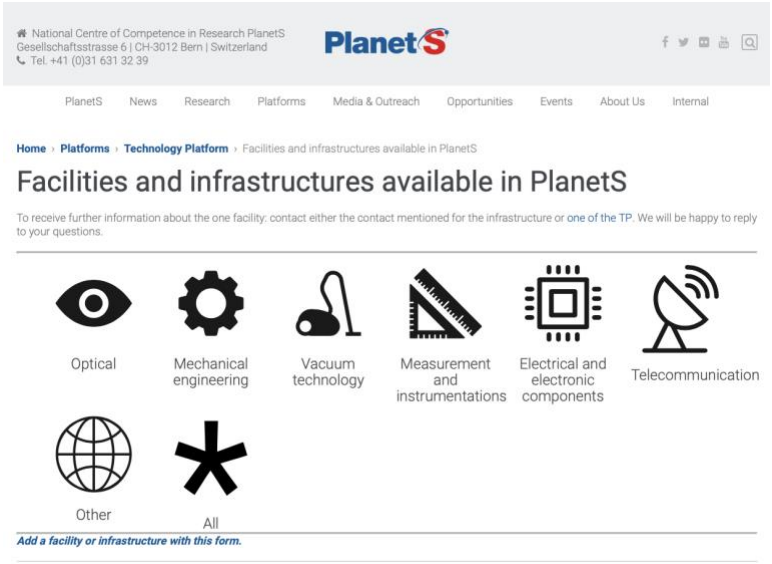
Update of the TP web page

Facilities and infrastructures available in PlanetS

Are you looking for a specific facility or infrastructure for your research and activities? Are you wondering if you can find them within our community and you do not know who you should contact? The TP has created for you a web page called 'Facilities and infrastructures available in PlanetS' (link) in order to rapidly get the following information for each infrastructure:

- The name and a photo of the facility.
- A short description.
- In case exists, the link to its dedicated web page.
- Documentation about the infrastructure.
- The location of the infrastructure.
- Information about the person of contact.

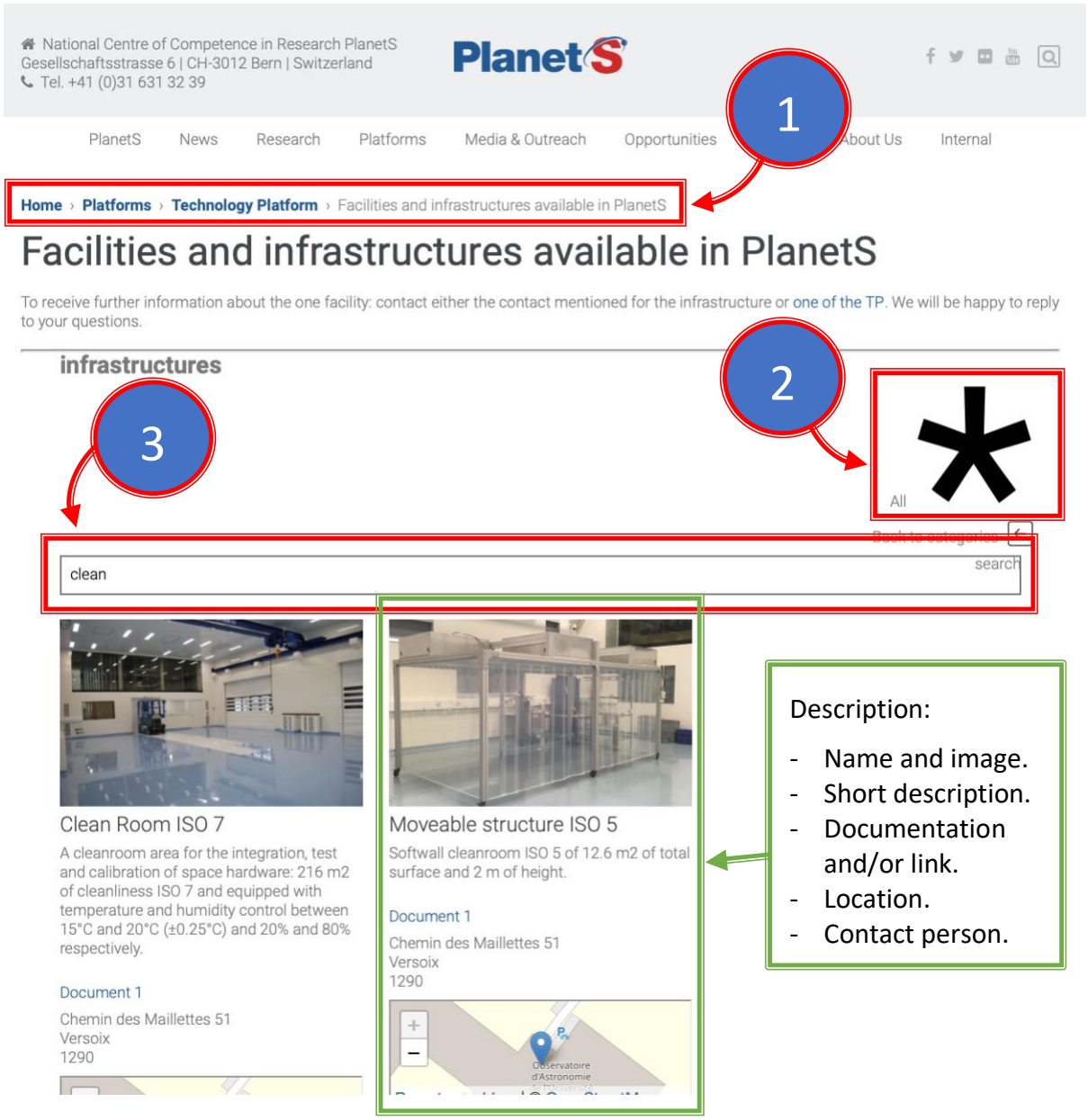
The figure below shows how the webpage looks like:



For example, if you are looking for an infrastructure (see figure below):

1. You go to the 'Facilities and infrastructures available in PlanetS' web page: http://nccr-planets.ch/platforms/technology-transfer/facilities-and-infrastructures-available-in-planets/
2. You select the category (optical, mechanical engineering, vacuum technology, measurement and instrumentation, electrical and electronic components, telecommunication, other, all).
3. Find the infrastructure.

As example, see figure below if you are looking for a cleanroom:



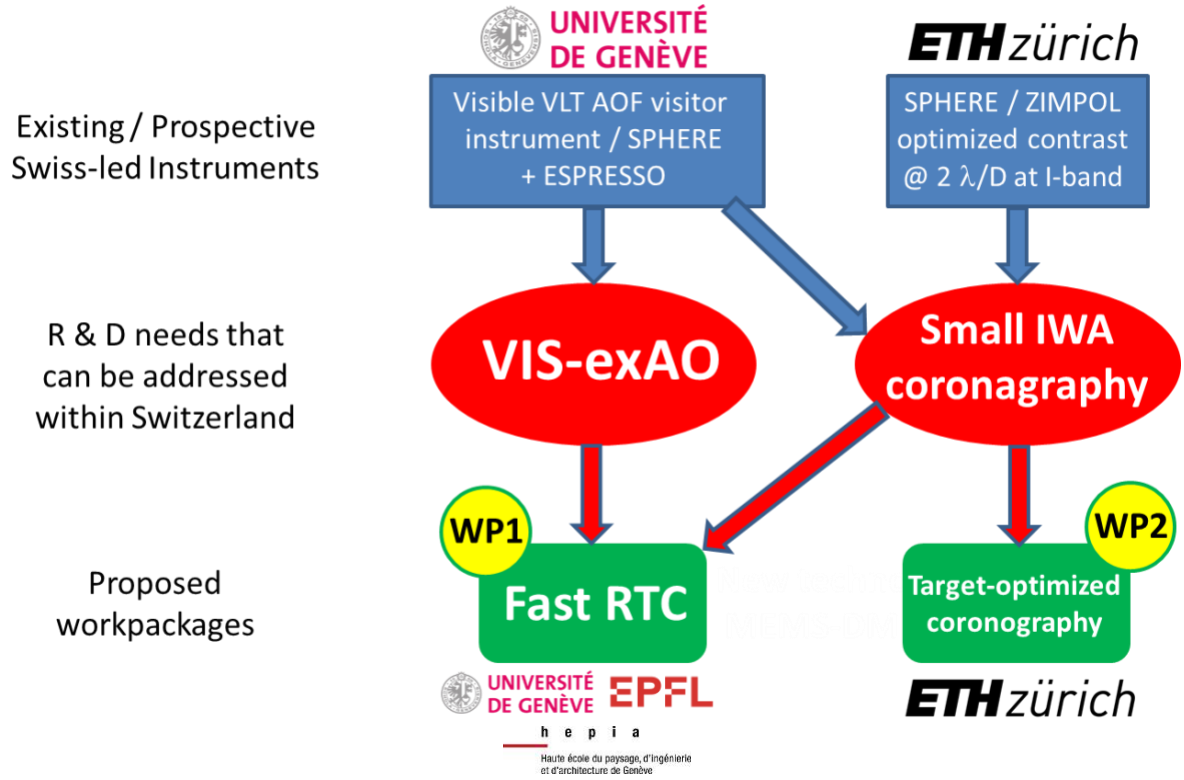
If you are aware about an infrastructure or facility of PlanetS which is not in the list yet, please help us filling out this form or, simply, sending a message to piero.pontelandolfo@unige.ch. Many thanks for your support from the TP!

Link: *http://nccr-planets.ch/platforms/technology-transfer/facilities-and-infrastructures-available-in-planets/*

Spotlight on a project of the TP

A Swiss Technology R&D Initiative towards the Direct Detection of Nearby Exoplanets

The recent discovery of nearby exoplanets Proxima Cen b and GJ876 b opens the door to a possible detection and spectroscopic characterization in reflected light with ground-based direct imaging. Indeed, assuming a likely planet-to-star contrast of 10^{-6} to 10^{-7} (Lovis et al. 2017) and angular separation of 35-45 mas (2 to 2.5 λ/D at ~700 nm), the VLT can spatially detect these two planets. However, meeting these contrast level requirements at visible wavelengths will impose the use of advanced detection schemes downstream the fastest adaptive optics (AO) systems. Our institutions are already leading two major existing VLT instruments – namely ESPRESSO (Pepe et al. 2013) and SPHERE/ZIMPOL (Schmid et al. 2018) –. Those instruments could play a key contribution in detecting these nearby exoplanets directly in a realistic future. In the near future, we aim to improve our technological capabilities in the two aforementioned major technical areas: WP1 faster AO real-time computing (RTC), and WP2 pupil-plane coronagraphy optimized for known RV-detected targets. WP1 focus on the design and prototyping of a real-time computer (RTC) system able to run at a rate of ~3.5-4.0 kHz in closed loop and it is described in this newsletter here after. WP2 will be presented in next newsletters.



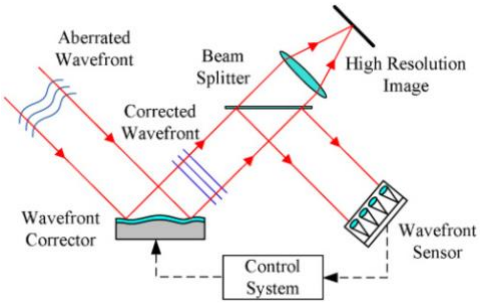
Faster AO Real-Time Computing (RTC)

The RTC work was carried out by the Processor Architecture Laboratory at EPFL and the Numerical Systems Laboratory at Haute Ecole du Paysage, d'Ingénierie et d'Architecture (hepia) in Geneva, in partnership with C. Lovis and F. Wildi from UniGe. At EPFL, the WP was under the responsibility of R. Beuchat, and A. Guerrieri. At HEPIA under the responsibility of R.Beuchat too.

Overview

An Adaptive Optics System is made of the following components:

1. A wavefront sensor (WFS) measures how the atmosphere has distorted the light wave coming from the stellar object.
2. A fast real-time computer processes the image form the WFS and produces a correction command vector.
3. A deformable mirror (DM) receive the command vector. It corrects the distorted wave by hundreds or thousands of actuators moving as many pieces of the mirror.



Schematics of an Adaptive Optics system. The Real-Time computer implements the control system

For the present study, we assumed some realistic hardware choices for the wavefront sensor (WFS) optics, WFS camera, and deformable mirror (DM). Specifically, the Wave Front part is composed of a Pyramid WFS using an OCAM2K CCD in binned 2x2 mode. Boston Micromachines MEMS DM with 500-2000 actuators is the target device controlled by an Aurora interface type to assume a minimum of latency.

RT machine tasks

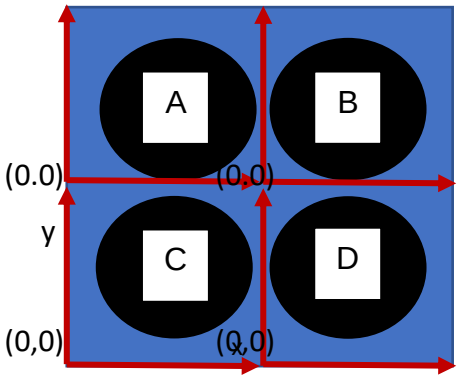
The system designed execute the following operations. The initial constraint was they need to be realized in less than 50µs from the last received information from the camera.

1. Receive info from a single wave front sensor camera
2. Pre-process the pixels to obtain “slopes”
3. Execute the control algorithm
4. Send the new command to the deformable mirror electronics

Wave Front Sensor image (pyramid WFS)

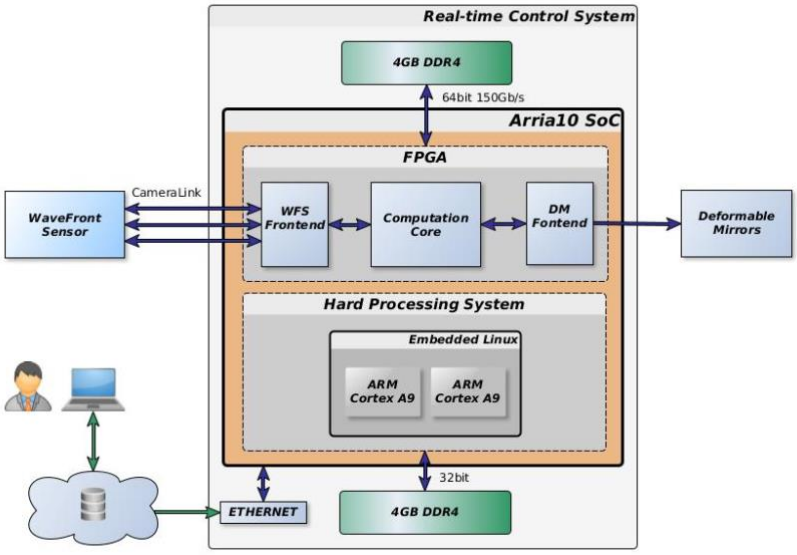
We assume that the WFS camera is a commercial product and that its communication protocol is defined, in our case it’s camera link. The protocol defined by the manufacturer needs to be followed.

The information on the wave front sensor camera is 4 images of the pupil. If the actuator density is N actuators across the pupil, on the **D**eformable **M**irror (DM) we assume to have ***N*** pixels across the image of the pupil on the wave front sensor. And we have 4 images and we will refer to them by the letters A, B, C and D. Pixel $p_A(x,y)$ is a pixel of image A at the coordinates x and y, with $x \in [0 .. N-1]$, $y \in [0 … N-1]$.



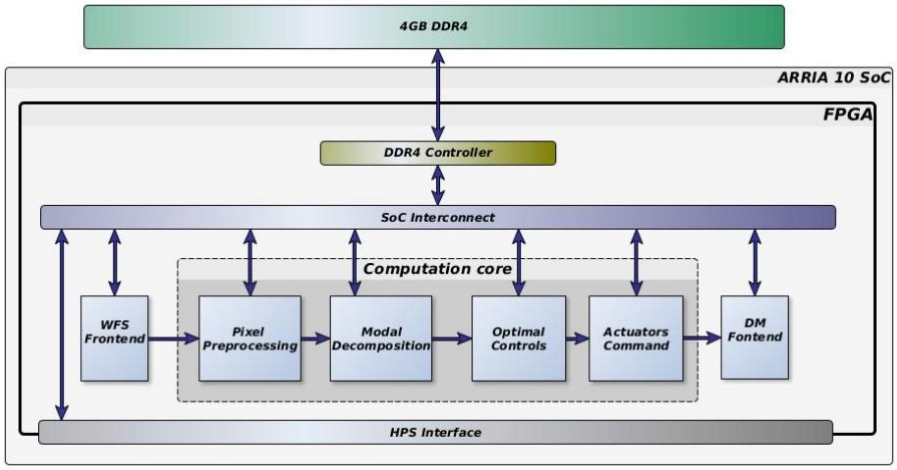
Architecture Definition

In order to perform the control algorithm and to meet the real-time constraints, it is required to design a custom computer machine with high parallel-computation capacity. This very high timing constraints part is realized by an FPGA module. The FPGA selected for this design is the Intel Arria10SX, a SoC (System on Chip) with a dual-core ARM Cortex-A9 HPS (Hard Processing System) surrounded by high-performance FPGA fabric. Arria10 was the industry's only hard floating-point DSPs blocks with speed up to 1.5 tera floating-point operations per second (TFLOPS) available when starting the project. The architecture partitions non-critical task on the HPS, and the hard real-time task to the FPGA side. Figure here below shows an overview of high-level architecture.



RTC High-level Architecture

On the HPS Armstrong Linux is running, a lightweight version of embedded Linux cross-compiled for ARM processors. A software application controls the operations of the adaptive optics. Furthermore, the system is remotely controlled by a Web Server through Ethernet interface. On the FPGA, the time-critical tasks of the RTC is integrated, as well as the interfaces to communicate with the WFS and the DM. Every module can run independently for testability or pipelined for the maximum of performance.



Computation Core

Real-Time Computer Prototype

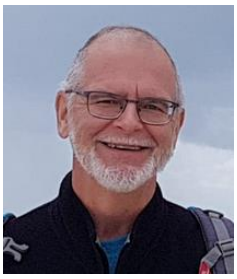
The design has been prototyped on the iWave board Rainbow-G24D. Special boards have been designed to interface with Camera link and Optical fiber (Aurora) link. The total resource utilization of the system is approximately 55% (around 900) of DSP blocks to perform the floating-point operations required for the correction algorithm. We compared the execution on the software model on a traditional CPU with the system implemented. In software, the total execution time is approximately 4ms. Executing the control algorithm on the developed RTC takes approximately 37us, with a speedup >108 X. The FPGA system runs at 250MHz. The processor at 1GHz. Those results are for a four pupils camera of 21x21 pixels each and a DM of 20x20, the expected resolution available for real experiments.

Conclusion

This project demonstrates the feasibility of this kind of algorithm with many matrix operations. The objective of less than 50µs latency to realize the algorithm is reach. A future enhancement could be achieved with the new generation Stratix 10 FPGA with around 15'000 DSP floating-point units. 60x60 pupils and a DM of 60x60 could result in a **less than 40µs** latency for bigger images and mirrors. This technology is very encouraging. The drawback is the need of specialist in this field of competences. New improvements in design methodology allows to design this kind of architecture easier. Multiprocessors capabilities of those components as four 64 bits microprocessors embedded on the same component allows to split part of the architecture between specialized hardware and software.

About the Authors

Andrea Guerrieri received his M.Sc. degree in Electronic Engineering from Politecnico di Torino, Italy, in 2015. Since 2006 he works on industry high-performance and low power embedded systems, where he became Principal Engineer responsible for the development of the company's flagship products. In 2017 he joined the Processor Architecture Laboratory at EPFL, where he leads research projects in collaboration with industry. Recent projects involve reconfigurable SoCs exploiting dynamic partial reconfiguration of FPGAs for future space missions and planet observation.



René Beuchat is Professor at HEPIA in the InIT institute, CoRES group and is Research Associate at LAP/EPFL (Laboratoire d'architecture des Processeurs), with Prof. Paolo Ienne. He received an Engineering diploma from EIG (now HEPIA) and a M.Sc. at EPFL in Electrical Engineering in 1981. Since 1985 he shares his time between EPFL and hepia(previously EIG) as teacher and researcher. As a fellow lecturer and teacher, he taught and teaches the bases of the microprocessors, logical systems, programmable logic (FPGA), computer equipment, complex interfaces, embedded systems, and real time embedded systems. As an engineer, he participated in development and monitoring of many projects and industrial collaborations.

References

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More details about the program: http://nccr-planets.ch/platforms/technology-transfer/technology-platform-call-for-ideas/

Focus on a company

Andor Technology Ltd

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 present the company Andor Technology Ltd, which is located in Belfast.

Andor is a global leader in the development and manufacture of high-performance scientific cameras for academic, industrial and government applications. Through continuous dialogue with our customers and strong teamwork we continue to innovate ground-breaking products, improving the world in which we live.

Andor Technology Ltd (Andor) is based in Belfast, Northern Ireland and operates at the high-value end of the global scientific digital camera market. Andor was setup in 1989 out of Queen's University in Belfast.

The founders of Andor, working in the Physics department of QUB, identified that the cameras available were inadequate for their demanding applications. Thus, they developed their own. After using them for a variety of imaging and spectroscopic applications, their cameras were being requested by researchers in various departments at Queen's and other Universities. To take advantage of these requirements and needs, Andor was formed in 1989. Since then, the company has grown organically and today, is one of the fastest growing companies manufacturing high performance scientific cameras. Andor employs over 400 people in 16 worldwide offices and distributes its products to 10,000 customers in 55 countries.

In January 2014, Oxford Instruments, a leading provider of high-technology tools for industry and research, announced the acquisition of Andor Technology. As a result of this acquisition, Andor continues to focus on growing their existing core markets and it will spearhead Oxford Instruments strategic expansion into the Nano-Bio arena.

As portrayed in our mission statement, the principal business of Andor is the development and manufacture of high-performance scientific cameras for Life Sciences, Physical Sciences and Astronomical applications. Further, we look to share our expertise to develop the best solutions for light measuring problems, distributing our products to a customer base encompassing both the scientific research and industrial communities.

Andor for Observational Astronomy

Andor's product portfolio incorporates a range of high-performance detector solutions for Astronomy, from high frame rate sCMOS and EMCCD cameras to slow-scan CCDs. Across each technology category, low noise floor and back-illuminated QE options are common, as are very large area sensor solutions for maximum sky coverage.

Crucially, Andor's unparalleled commitment to superb quality, vacuum innovation (i.e., permanent vacuum enclosure of sensors) and ease of maintenance is instilled throughout the portfolio, intended to maximize your observing time and to minimize cost of ownership.

Camera solutions for Astronomy

sCMOS camera series

Up to 16.9 Megapixel offering large FOV at high resolution, front- and back-illuminated (>90% QE) camera options, very high-speed readout while maintaining ultra-low noise levels, no mechanical shutter (Rolling and True Global shutter modes). Ideal for, e.g., Solar Astronomy, Exoplanet studies, NEO observations, Occultations, SLR tracking.

iXon EMCCD series

Offers single photon sensitivity, back-illuminated sensors with > 90% QE, high frame rates, no mechanical shutter (frame transfer structure), low read and dark noise. Ideal for, e.g., Adaptive Optics applications, as Guiding/Tracking cameras, Lucky and Speckle imaging, Exoplanet observations.

iKon CCD series

Up to 16.8 Megapixel back-illuminated CCDs, including NIR optimized sensor options, low read noise and low dark current with -100 °C TE cooling. Ideal for, e.g., Exoplanet studies (transit and RV), large sky surveys, spectroscopy, photometric applications requiring long exposure times.

Featured: Balor sCMOS

Balor is Andor's game-changing, very large area 4K x 4K sCMOS camera platform for Astronomy, the ideal solution for large sky surveys that measure photometric and astrometric variability across timescales ranging from milliseconds to tens of seconds.

- **16.9 Megapixel** – wide field surveys with 70mm sensor diagonal and 12 microns pixel size
- **54 fps full frame** – fast solar dynamics/fast moving objects
- **18.5ms readout** – 2500x faster readout than similar sized CCD
- **Low ~2.9e- readout noise** – very low noise even at max frame rate to detect weak signals
- **Extended Dynamic Range** – across range of object brightness/sizes
- **Minimal down time -** vacuum longevity and quality: sensor protection

Find out more about the Balor here - https://andor.oxinst.com/products/scmos-camera-series/balor-scmos

Watch Balor's introduction video - https://andor.oxinst.com/balor-scmos

Watch Balor sCMOS Launch Webinar - https://andor.oxinst.com/learning/view/article/balor-scmos-launch-webinar

For further questions, please feel free to contact Andor's Astronomy Application Specialist Dr. Ines Juvan-Beaulieu (e-mail: i.juvan-beaulieu@andor.com)

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Breaking news

European space research & innovation and Euresearch

What is European research and innovation? And why is it relevant to Switzerland?

The European Union invests a significant part of its budget in research and innovation, the largest and most comprehensive programme being Horizon 2020, which runs from 2014 to 2020 with a €70.2 billion budget.

By coupling research and innovation, Horizon 2020 is helping to achieve 1) a smart, sustainable and inclusive growth and 2) jobs, with its emphasis on excellent science, industrial leadership and tackling societal challenges. The goal is to ensure Europe produces world-class science, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering innovation.

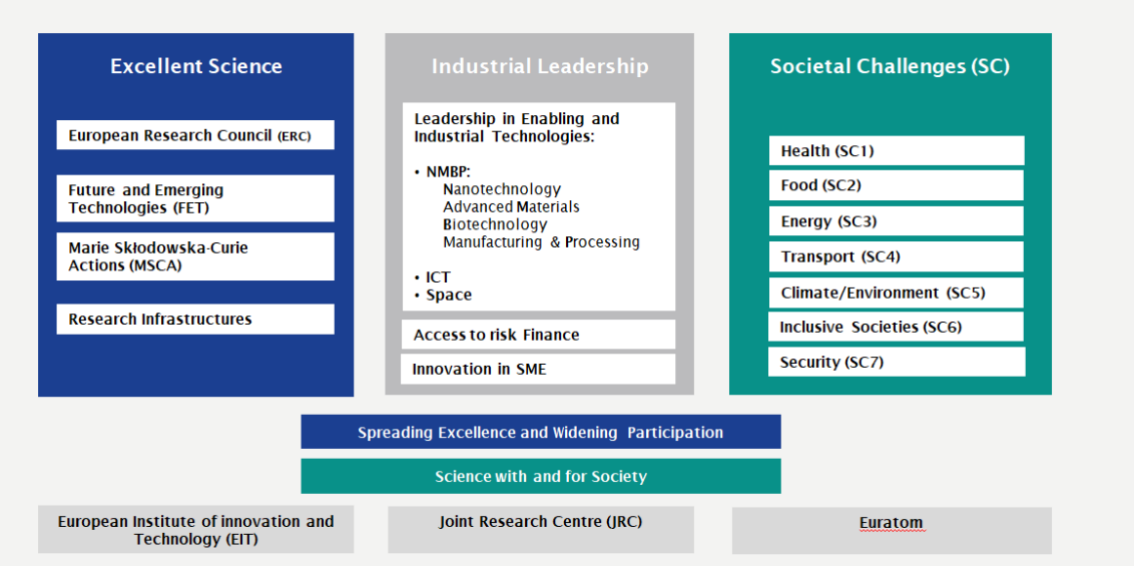
Horizon 2020 is open to everyone, with a simple structure that reduces red tape and time so participants can focus on what is really important. This approach makes sure new projects get off the ground quickly – and achieve results faster.

While Switzerland is not a member state of the European Union, it has a full associated country status, which means that it can participate in most Horizon 2020 opportunities and has the same rights as a member state.

So, what is there for Space?

Space is one specific area covered by Horizon 2020.

Space-related research and innovation can be carried out under many of the different Horizon 2020 funding opportunities. The figure below shows the 3-pillar structure of Horizon 2020.



Excellent Science

In the pillar "Excellent Science", funding for Space-related research and innovation is available under:

- European Research Council (ERC). The ERC funds ground-breaking frontier research projects across all fields of science (no pre-defined topics) to support European leadership in world-class research. Support is given to outstanding Individual Principal Investigators of any nationality based on the scientific excellence of their project proposal. ERC projects are normally based on high-risk/high-gain research that crosses traditional disciplinary boarders and/or applies innovative approaches.
- Future and Emerging Technologies (FET). FET supports collaborative research (consortium of 3 or more entities is needed) in order to extend Europe's capacity for advanced and paradigm-changing innovation. It fosters scientific collaboration across disciplines on radically new, high-risk ideas and accelerates development of the most promising emerging areas of science and technology. Topics are not pre-defined and the scheme requires a consortium of at least 3 entities.
- Marie Skłodowska-Curie Actions (MSCA). This programme aims to support researchers at different stages of their career. MSCA are open to all domains of research and innovation, from basic research to market take-up and innovation services. Mobility is a key requirement for the different actions. Calls are open to individual researchers and innovation staff, as well as to universities, research institutions, businesses (SMEs and large industry) and other socio-economic players from all countries.
- Research Infrastructures. The objective of this programme is to ensure European researchers access to world-class research infrastructures. The European Commission considers not only major scientific equipment to be research infrastructure but also includes sets of instruments, knowledge-based resources such as archives, databases, etc. and enabling ICT infrastructures (e-Infrastructures) such as grids, computing, software and communication infrastructure. Support is given to existing as well as to new research infrastructures.

Industrial Leadership

In the pillar "Industrial Leadership", funding for Space-related research and innovation is available under:

- The "Space" thematic area, where the calls for funding are "top-down" (topic has been defined by the European Commission) and collaborative. For the currently open funding opportunities, which have a deadline of 5th March 2020, the overall budget is €223 million. On average, an individual project receives a budget of €2-3 million, which is then split amongst the consortium members and distributed over the whole duration of the project (generally 3-4 years). More in detail, the areas covered are:
    - Space technologies, science and exploration, overall budget of €65 million, including:
        - Data exploitation of European missions and instruments, in conjunction, when relevant, with international missions
        - Robotics
        - Satellite communications
        - Electric propulsion
    - Earth Observation (Copernicus): €43 million
    - Navigation (Galileo): €20 million
    - Safe and Secure Environment (space weather, space traffic management, space surveillance and tracking (SST), Near Earth Objects (NEOs)): €67 million
- The "Innovation in SME" area, which comprises the "EIC Accelerator Pilot" scheme. This funding scheme aims at boosting high-risk, high-potential small- and medium-sized innovation enterprises willing to develop and commercialise new products, services and business models that could drive economic growth and shape new markets or disrupt existing markets in Europe and globally. The scheme is mono-beneficiary (no consortium needed) and there are no pre-defined topics.
- The "Fast-Track-to-Innovation" funding scheme. This is a funding programme dedicated to consortia with three to five entities. Close-to-market projects are required, industry must participate and interdisciplinary approaches are encouraged.

Are there any examples of past projects / success stories?

For top-down collaborative projects (the three examples below involve Swiss organisations):

- MiARD - Multi-instrument Analysis of Rosetta Data. This project carried out research to provide an integrated description of the physical and chemical properties of the nucleus of comet 67P/Churyumov- Gerasimenko using date from the Rosetta orbiter and lander (a mission conducted by the European Space Agency). The project, led by the University of Bern, was successfully completed in summer 2018.
- EGSIEM – European Gravity Service for Improved Emergency Management. The aim of this project was to demonstrate that mass redistribution products deliver fundamental insights into the global water cycle and therefore open the door for innovative approaches to flood and drought monitoring and forecast.
- VERTIGO - VERy high Throughput Satellite-Ground Optical Link. This running project, led by Thales Alenia Space, focuses on optical feeder links for satellite communication systems. Specifically, it aims to develop systems for ground and on-board technologies, providing increased throughput with higher spectral and power efficiency.

For European Research Council (ERC):

- ExoAI - Deciphering super-Earths using Artificial Intelligence. This project, which is still running, moves away from the status quo of treating individual exoplanets as case-studies and analysing data 'by hand'. This is done through a globally encompassing, self-consistent and self-calibrating approach utilising state-of-the-art neural networks and Bayesian atmospheric retrieval algorithms applied to big-data. Given all available data of an instrument, ExoAI will autonomously learn the best calibration strategy, intelligently recognise spectral features and provide a full quantitative atmospheric model for every planet observed.

For the "Innovation in SME" - "EIC Accelerator Pilot" area:

- ICEYE - Microsatellite radar network for fast update Arctic ice surveillance. This project, which was concluded in February 2018, set up an information service that offers a 2-hour image refresh rate for tracking ice features using a constellation of 6 microsatellites with Synthetic Aperture Radar (SAR) imaging. The ICEYE solution provided customers up to 25% increase in operational efficiency, reducing fleet sizes and greatly lowering the risk of tanker accidents in the Arctic. See also the corresponding press release.

For Research Infrastructures:

- RadioNet - Advanced Radio Astronomy in Europe. RadioNet is a consortium of 27 institutions in Europe, Republic of Korea and South Africa, integrating at European level world-class infrastructures for research in radio astronomy. These include radio telescopes, telescope arrays, data archives and the globally operating European Network for Very Long Baseline Interferometry (EVN). RadioNet is de facto widely regarded to represent the interests of radio astronomy in Europe.

So, what is Euresearch and how can it help me?

Euresearch is a non-profit association, with offices in all the Swiss regions and a Network Office in Bern, whose objective is to facilitate a high Swiss participation in the EU Framework Programmes for Research and Innovation by informing, advising and connecting researchers based in, or coming to, Switzerland.

Euresearch helps perspective applicants by:

- Offering an overview of European research and innovation programmes, of current and upcoming funding opportunities and of participation and funding rules. This is done through events, factsheets, newsletter and other tools.
- Identifying the best funding opportunity for a specific applicant, through workshops and/or individual face-to-face meetings.
- Helping the applicant in finding or forming a consortium, by using partnering platforms as well as networking and brokerage events.
- Supporting the applicant during the preparation of the project proposal, all the way to the proposal submission.

Euresearch is supported by the Swiss federal government. Its services are free of charge.

EURESEARCH
Swiss guide to European research & innovation

I'd like to know more!

Euresearch is there to help you! Your options:

- Browse our website for funding opportunities (refer to the "Open Calls" section)
- Subscribe to our newsletter and e-alert service
- Get in touch directly for specific advice: for Space, matthew.whellens@euresearch.ch

Looking forward to hearing from you soon!

Bench2biz workshop

Are you wondering if your invention/research is commercialisable? Do you need to get a clear picture on how to pursue your business idea? Would you benefit from personalised guidance from experts? Bench2biz workshop for aspiring entrepreneurs in science & technology is launching a call for applications to all idea champions.

Designed for high-technology domains ideas, the programme is addressed to budding entrepreneurs and offers:

- A two-and-a-half-day workshop including fast-paced modules which tests each time the marketability of the selected high-tech ideas.
- An effective and efficient methodology to determine if high-tech or scientific inventions have commercial value and could serve as the basis for new start-ups companies.
- Practical tools to transform an idea into a concept.
- The presence of business and industry experts with real-life entrepreneurship or corporate experience. over the entire workshop which are brought together around each participating idea into carefully designed team.

Advance early-stage research performed by each team to be translated into real business opportunities.

The bench2biz workshop has a long history of successful events leading today to 19 start-ups empowered. The workshop specifically targets very early to early high-technology entrepreneurial ideas from all fields and from all over Switzerland. Over a condensed two-and-a-half-day, the workshop prepares participants for the entry into the existing Swiss start-up promotion ecosystem. Individuals or teams can submit an application form with no admission fees. The workshop is free of charge for all accepted idea teams. The high-technology business idea may or may not have been recently patented, or applicants may have a high-tech business idea but are still wondering about the next steps to take.

Champion participants benefit from fast-paced sessions, guidance specifically adapted to their project, support from recognised industry experts from various backgrounds and networking opportunities. At the end of the workshop, participants leave with the business elements of their new venture well structured.

In 2020 the location chosen for the workshop is Zurich. Next year the location will be different, then start thinking about your idea to apply for the next call!

More info about the bench2biz workshop: https://bench2biz.ch/ or follow it on LinkedIn.

Organisers: NCCR RNA and Disease, NCCR TransCure, NCCR PlanetS and NCCR Chemical Biology which constitute the bench2biz consortium (the event is also generously funded by the Innosuisse and the IPI).

Post: http://nccr-planets.ch/blog/2019/10/02/bench2biz-workshop-call-for-application/

SPIE 2020

In 2020, the biennial SPIE international conference on Astronomy Telescopes and Instruments will be held between June 14th and 19th in Yokohama (Japan), link. The last 2018 edition was held in Austin (USA) gathering 2500 visitors and 125 exhibitor companies.

For the 2020 edition the Swiss astronomer consortium NCCR PlanetS and the Swiss ILO (Industry Liaison Office) Office join forces to organize a common "Swiss cluster booth" open to all Swiss suppliers interested in this market.

While participating in the Swiss cluster booth, you have the opportunity to present your technology and meet business leads, industrial partners or other visiting delegations in a discreet and well identifiable zone.

This event is also supported by the Swiss Global Enterprise (SGE) Hub in Tokyo.

There are offer several levels of participation:

- Companies have their own exhibition surface, but are part of the cluster booth (requires separate funding)
- Companies use the common Swiss ILO zone in the cluster (18 m^2)

Because of travelling distance and associated costs, we offer as well the service of promoting Swiss technology without your presence at SPIE:

- Companies present their products or paper marketing material. Display case-tables are foreseen. Shipment costs are carried out by the companies.

If you are interested to participate in one of the ways described, please let TP know until the end of January.

Upcoming events and deadlines

External

- **swiTT Annual conference 2020**, Friday, January 24th and Saturday, January 25th 2020, Neuchâtel: swiTT members and interested persons from academia or industry with a professional role in knowledge and technology transfer.
  https://switt.ch/switt-annual-conference-2020-save-date
- The **5-Day Innosuisse Startup** Trainings in Business Creation and Business Growth for projects in ICT, Engineering or MedTech. These hands-on and interactive trainings give the necessary toolbox to launch and scale a tech start-up in Switzerland. Next training starts end of January in Lausanne.
  https://innosuisse.venturelab.ch/2020
- **Innovation: De l'Espace à la Terre**, February 4th 2020, form 13:30 to 19:00, Payerne: event sponsored by the Canton of Vaud which will address to enterprises and the main goal is to show the importance of development of space related technology, and their impact on other technological fields. The event will be held at the SwissAerepole which aims at being the first business and technology park in Switzerland for companies in aerospace and related industries.
  https://heig-vd.ch/actualites#/2019/12/05/espacealaterre

Look regularly at the TP's web page where you can find the upcoming events (events).

Internal

A project management workshop for the people of PlanetS will be organised this year in Geneva and/or Bern. During this 3-day course, participants will learn the basic project management (PM) methods that can be immediately applied in their own research project(s).

This workshop is targeted at Postdocs and/or PhD students, regardless of their field (professors are also welcome). No prior knowledge of project management is required, but experience in research is necessary (at least 3 months).

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.

Short projects are available for PlanetS people:

- With Micro-Cameras & Space Exploration SA, MCSE (link).
  MCSE develops specific systems in the field of scientific instrumentation for space exploration.
  - Project 1 (2018): JUICE monitoring camera calibration. The proposed project concerns the characterization and calibration of a colour camera that is currently being developed for the JUICE mission to Jupiter.
  - Project 2 (2018): BRDF data collection. A full straylight analysis requires data of bidirectional reflection function (BDRF) measurements for the respective materials and surfaces used in an optical system. The goal of the project is to define a BRDF database for typical materials and coatings.
- With Sercalo Microtechnolgy (link).
  Sercalo Microtechnolgy supplies customers with high quality and top performance MOEMS (Micro-Opto-Electro-Mechanical Systems) components.
  - Project 1 (2019): Sercalo is moving into autonomous vehicle market supplying micromirrors for beam steering in LIDAR. This market has high reliability standards (shock, vibrations, humidity, temperature...). Sercalo needs to further develop and automatize its testing equipment. The person who will be selected for the programme will interface with the automotive norm, micromirror production, test equipment to provide an automatized testing equipment.

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.