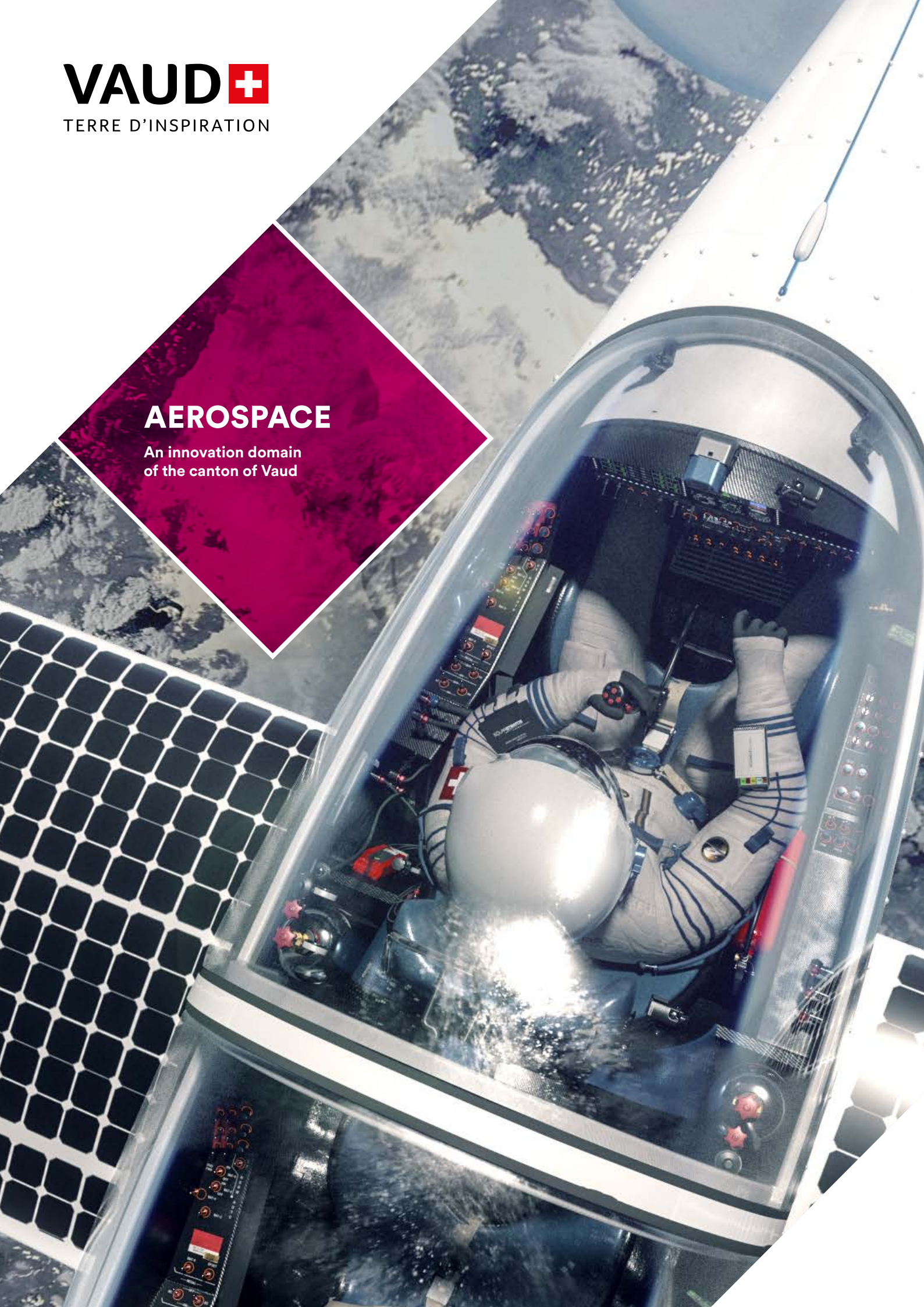
VAUD

TERRE D'INSPIRATION

AEROSPACE

An innovation domain of the canton of Vaud



DEVELOPING THE AEROSPACE APPLICATIONS OF TOMORROW

The canton of Vaud is home to a rich network of aerospace specialists. The technologies and systems they are developing today will drive innovation in the aerospace sector for many years to come.

This brochure focuses on space technologies - including only the upstream component of space, which is to facilitate the placement of space infrastructure in orbit. But the canton of Vaud is also home to an entire ecosystem that uses satellite data for applications on land (constituting the "downstream" component of space), which is not part of this document.

Many factors are contributing to the continued growth of the upstream space industry in the region. Academic institutions with dedicated labs, as well as new and established companies, all work feverishly to transform research into real-world applications. Unsurprisingly, the depth of knowledge and expertise established in the canton of Vaud has spawned a raft of successful startups. Meanwhile, public institutions support the development of public-private partnerships capable of designing inventive technological solutions.

The École polytechnique fédérale de Lausanne (EPFL) Innovation Park offers technology-driven companies the opportunity to exploit cutting-edge research conducted by its highly specialized labs, as well as access to a large network of dynamic entrepreneurs and established companies, many of which are EPFL spin-offs.

Space Innovation and Space Engineering Center support academic and industrial access to space mission-related applications, coordinate space education, and develop state-of-the-art nano-satellites.

SPACE4IMPACT
Born in 2019 at EPFL Innovation Park, the Space4Impact initiative aims to maximize the impact of satellite data on Earth by helping New Space startups (the new space economy) to obtain contracts in new markets. The aim is to stimulate the growth of New Space internationally in line with the United Nations' Sustainable Development Goals (SDGs).
space4impact.org

The Institute for Information and Communications Technology (IICT) at the University of Engineering and Management of the canton of Vaud (HEIG-VD) works on low-cost and low-power communications solutions and Internet of Things (IoT) technologies. Meanwhile, the Swiss Center for Electronics and Microtechnology develops high-precision scientific instruments for satellites and telescopes, along with smaller and smarter sensors.

An Aeropole Competence Center in Payerne integrates new high-tech companies in a top-end ecosystem composed of R&D centers, complementary companies and a supportive network of public entities.

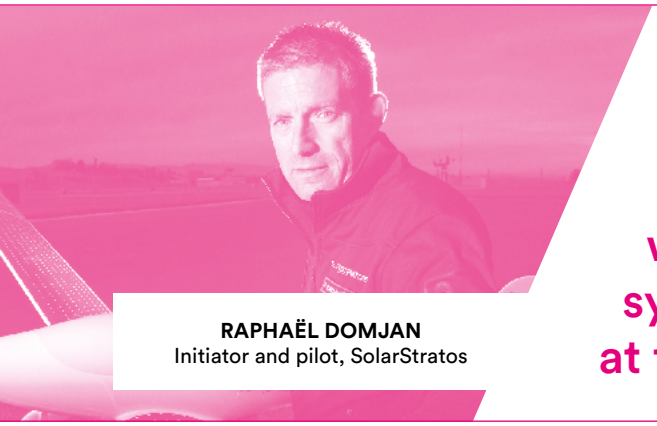
FABIEN JORDAN
CEO of Astrocast

"What SpaceX has been doing for a few years is amazing. This society fascinates us, we follow it for a long time. And behind it is the entire space industry that is progressing. Some companies, like ours, are taking advantage of them. Our approach is disruptive and proves that, contrary to popular belief, space costs are not prohibitive and could even be cheaper than terrestrial solutions."

Source: 24 Heures

BUSINESS OPPORTUNITIES

With established companies applying incremental improvements to proven technologies, and emerging companies exploring cutting-edge solutions to aerospace challenges, the canton of Vaud stimulates and supports emulation, synergies and knowledge-sharing.



RAPHAËL DOMJAN
Initiator and pilot, SolarStratos

"Working with the IICT at HEIG-VD, CSEM and the Swiss Federal Technology Institute, we are developing solar energy systems that will work efficiently at the edge of space."

ESTABLISHED COMPANIES PROVIDE EXPERTISE IN:

- Materials
- Structure and mechanisms for aerospace applications
- Development and manufacturing of micro-electromechanical systems
- Optical products
- Composite materials and materials science
- Connectors and cable assemblies

EMERGING COMPANIES ARE ACTIVE IN SUCH FIELDS AS:

- Nanosatellites that provide global machine-to-machine services
- Radio Frequency antennae
- Waveguide and filter products based on additive manufacturing
- High-precision haptic interface
- Electric motors for aircraft, helicopters and UAV actuation systems

THREE QUESTIONS TO RAPHAEL DOMJAN, INITIATOR AND PILOT OF SOLARSTRATOS

SolarStratos aims to approach space with a solar plane. This is to demonstrate that thanks to the energy of the sun, it is possible to go higher than a plane operating at conventional energies.

You did an amazing trip in 2012. What are the next steps?
Our targets are: in 2018, we fly at 33,000 feet; in 2019 we reach the stratosphere; and in 2020 we go to 75,000 feet.

What guides you through this journey?
Our key drivers are innovation, renewables, optimism and ecology.

How did you achieve the funding of SolarStratos?
We have received financial and in-kind assistance from the canton of Vaud, the cities of Yverdon-les-Bains and Payerne, and the region of la Broye to set up our operational base at the Aeropole in Payerne and our administrative center at Y-PARC. We also work with international partners and the excellent logistics in Western Switzerland make coming and going easy.

LINKING SWITZERLAND AND THE WORLD

The canton of Vaud isn't just a hub for Swiss aerospace – its reach is global. The region and the companies provide some cutting-edge applications to the world actors.

The region combines development of new technologies and know-how for avionic, space and stratospheric domains and usage of space technology for terrestrial applications. It also offers a unique multicultural and multidisciplinary aerospace ecosystem, ideally located in the center of Europe.

Swiss aerospace stakeholders have expertise and experience that can be leveraged by investors, entrepreneurs or established industry leaders looking to hire talent already adapted to this fast-developing domain.

Swiss products and services are universally associated with quality, reliability and exclusivity. The excellent reputation they enjoy is a clear competitive advantage for manufacturers and service providers who can position their Swiss-made products and services at higher price points.

Switzerland has turned its small domestic market into a strength, because from day-one its companies understand the need to focus on international business opportunities.

Photo: Atrocast

INCENTIVES AND SUPPORT

The canton of Vaud and the Federal Government have carefully planned fiscal, financial, infrastructural, academic and informational measures to support excellence in its aerospace ecosystem.

Depending on your organization's project and its potential for adding value – for example, through job creation – you may be granted financial assistance or tax relief.

The region has a proud history of supporting ambitious tech projects. Companies operating in industry, production-related services and leading-edge technologies have access to direct financial incentives designed to support their most innovative projects.

At national level, grants are available through Innosuisse, the federal agency responsible for promoting innovation, to support applied R&D projects involving collaborations between firms and universities.

At the cantonal level the Foundation for Technological Innovation (FIT) provides support to many startups. Innovaud, which promotes innovation at cantonal level, has launched Scale-Up Vaud, an initiative that supports companies as they develop their businesses.

Vaud's Office for Economic Affairs (SPECo) provides direct financial incentives for specific business projects to support the creation and establishment of enterprizes, as well as the development of Vaud-based small and medium-sized enterprizes (SMEs) and startups looking to innovate, or expand.

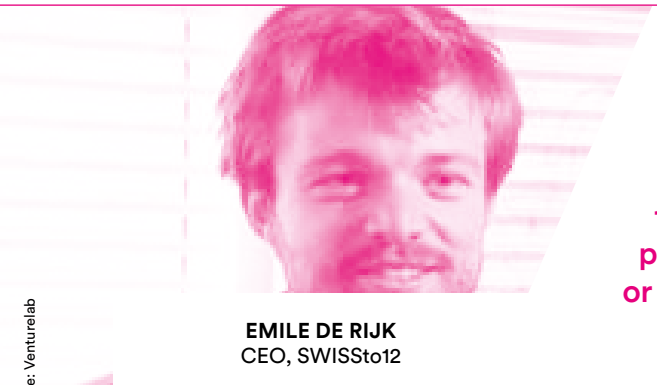
The city of Lausanne is a key player in aerospace and also a big contributor of the ESA Bic (located in Zurich). This Business Incubator Center collaborates directly with AP-Swiss and Space Innovation, located at EPFL Lausanne and ETH Zürich.

SWISS AEROPOLE COMPETENCE CENTER IN NUMBERS

- 40 hectares total surface area – land can be divided or tailored to your needs
- 2.8 km runway
- 6,500 m² of hangar surface
- 3,300 m² of office space
- 190,000 m² of available land
- more than 500 employees of the Swiss Air Force
- more than 30 specialists trained annually in polymechanics and electronics
- 1h15 from Geneva airport

CURRENT COMPETENCIES AT SWISS AEROPOLE INCLUDE

- Aviation and space industry
- Digital aircraft
- Propulsion, energy and green energy industry
- Autonomous vehicles industry
- ICT solutions (data analysis, environment, topography, traffic management)



EMILE DE RIJK
CEO, SWISSto12

"In the long run, our objective is to become an actor of reference in the domain of antennas for satellite telecommunications, in space and on ground. Our potential clients are called Airbus, Boeing, Space X or Thales Alenia Space."

Photo: Astrocast | Source: Venturelab

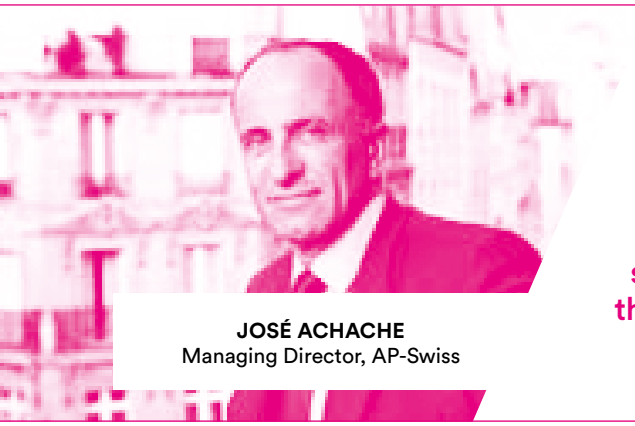
A strong push within academia (EPFL, HEIG-VD, CSEM) fosters the development of new startups and provides support for new initiatives within existing companies.

The region offers the whole spectrum of public and private capabilities necessary to develop aerospace applications. Capabilities currently include avionics, sensors, material sciences, low-power communications, flight and orbiter mechanics, low weight materials and structures, and optics, to name but a few.

Proximity to worldwide top-ranked Swiss research and teaching institutions allows businesses to benefit from one of the best scientific and academic environments in the world.

EPFL AT A GLANCE

- Over 10,000 students of 120 different nationalities
- Over 350 specialized laboratories
- CHF 997 million of annual expenses
- 121 invention disclosure in 2020
- 75 priority patents filed in 2020
- 229 startups established between 2010 and 2020
- Space Innovation on site



JOSÉ ACHACHE
Managing Director, AP-Swiss

"Through the ESA, we have the possibility to invest up to CHF 3-4 million to help develop an idea, as soon as it is destined to become a real commercial service. Beyond that, there are investors in this country who see the added value of these startups and support their development."

Source: Bilan

MAIN ACTORS OF AEROSPACE ECOSYSTEM

Industry drivers	Applications	Key actors
R&D		**CSEM** **EPFL** **HEIG-VD** **SWI**
Avionics		**Rigitech** **Solar Impulse** **SolarStratos** **Yasava Solutions**
Space		**Astrocast** **ClearSpace** **Coactum** **Destinus** **Viasat**
Technologies	Sensors	**LN Industries** **PIEMACS** **Safran Colibrys**
	Materials	**CompPair** **Décision** **Fischer Connectors** **LEMO** **NTPT** **SCHOTT**
	Techno Various	**Almatech** **APCO** **Confectronics** **Cysec** **EnviroScopY** **Force Dimension** **Inergio** **Insolight** **KOMP-ACT** **LD-Switzerland** **LIGENTEC** **MicroR systems** **Minwave** **Miraex** **Quality Control** **RUAG Space** **SoHHytech** **SWISSto12**
Cantonal and federal ecosystem		**swiss aeropole** **AP-Swiss** **ESA BIC** **Innovaud** **Micronarc** **SERI Space** **Space4Impact** **Space Innovation** **Swiss Airtainer** **Swissmem**

RESEARCH AND DEVELOPMENT

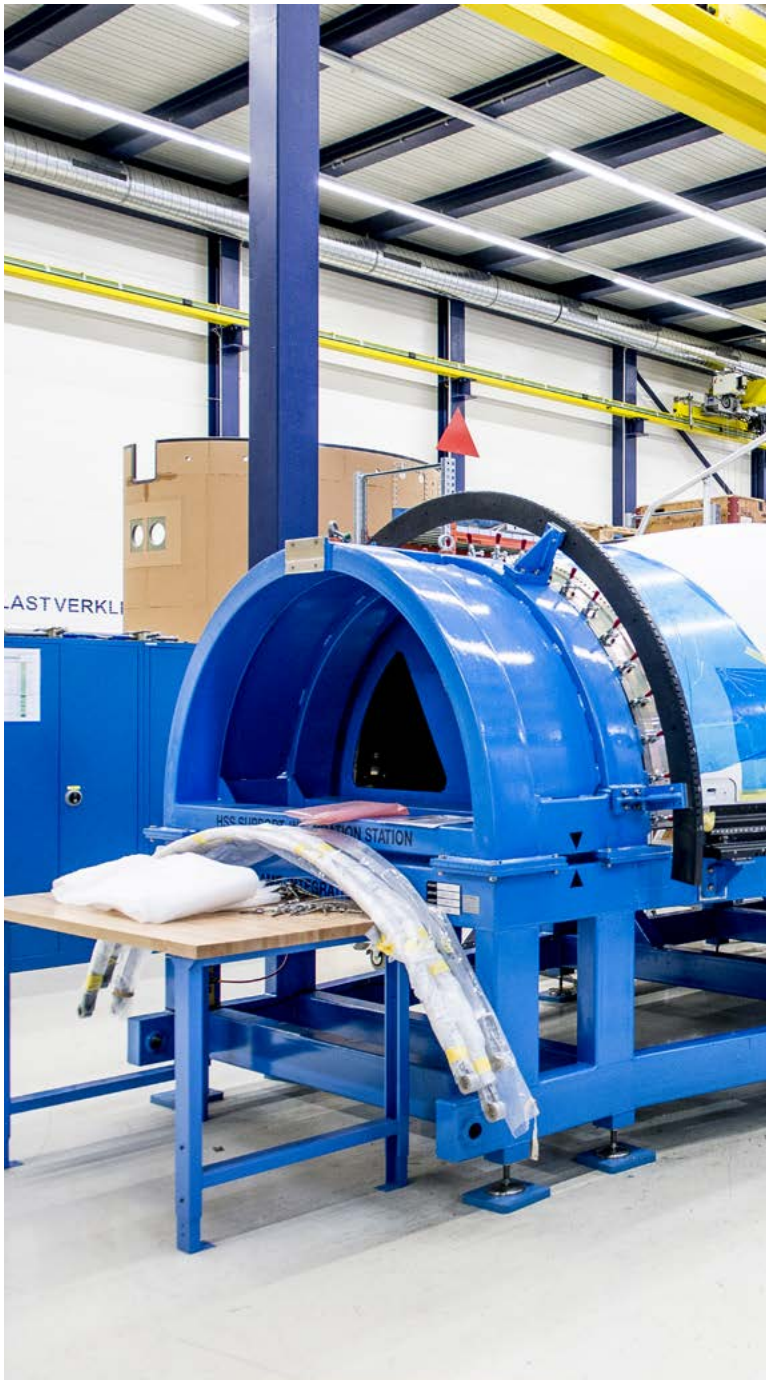
CSEM Aeronautics & Transportation
Develops technologies – including low-weight materials and structures, and smaller, smarter sensors – that help achieve emission-reducing aerodynamic improvements, all while maintaining and even increasing safety levels.
csem.ch/Aeronautics

CSEM Space and Astrophysics
Provides highly precise mechanisms and scientific instrumentation for satellites and telescopes. Their development of compliant mechanisms for use in space exploration has led to quantum leaps in performance and results.
csem.ch/Space

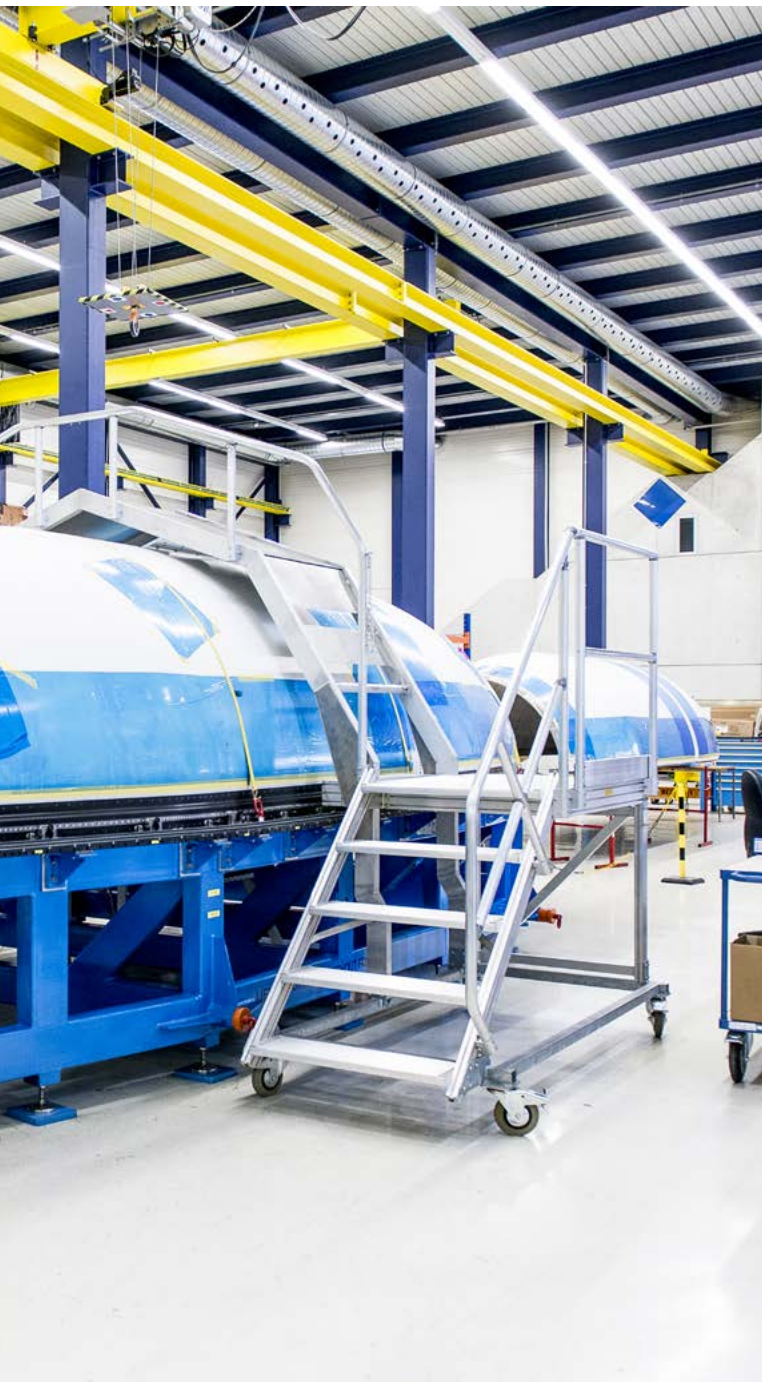
EPFL – Interdisciplinary Aerodynamics Group IAG
IAG is involved in a wide range of basic and applied research in computational and experimental science and engineering with an emphasis on aerospace and aeronautics, including: Hypersonic Aerothermodynamics, Flight and Orbital Mechanics, Fluid Particle Interactions, Plasma Aerodynamics, System Engineering, CFD Tools.
iag.epfl.ch

EPFL – Space Engineering Center ESPACE
EPFL's Space Engineering Center is an interdisciplinary unit responsible for federating the School's space and drone activities. Specifically, eSpace coordinates space education at EPFL, develops state-of-the-art nanosatellites, and fosters space and drone research on campus.
espace.epfl.ch

EPFL – SUPAERO
A unique higher education and research institute with expertise in the fields of aeronautics and aviation.
sti.epfl.ch/page-1609-fr.html



Source: Venturelab | Photo: Ruag



Institute for Information and Communication Technologies (IICT) at HEIG-VD

Conception and development of low-cost and low-power communications solutions. Their activities include the conception, development and testing of a variety of technologies with implications for applied electromagnetism, RF communications, and IoT technologies.

iict.heig-vd.ch

Space Innovation

Space Innovation aims to create and support innovative projects and the development of space technologies in Switzerland and among its network of more than 40 institutions (universities, industries and research and technology organizations). Space Innovation also wants to strengthen Switzerland's position and enable space technologies to contribute to sustainable development through its established network and access to cutting-edge technologies.

space-innovation.ch

Swiss Welding Institute (SWI)

SWI is a training and certification center. The Institute delivers:

- IIW/EWF recognized theoretical and practical training
- International welding certifications – ISO 9606, ISO 13585, EN 1418, etc.
- International IPC certifications in electronic soldering

SWI can also provide consultancy services on request.

iag.epfl.ch

45 million

The amount of the investment made by Astrocast after its IPO (Euronext Growth Oslo) in 2021 (CHF).

ESTABLISHED BUSINESSES AND STARTUPS

Almatech
Almatech specializes in the conception, engineering, manufacturing, assembly and testing of mechanisms and structures for the space industry.
almatech.ch

Astrocast
A network of nanosatellites providing global machine-tomachine services (M2M) to global businesses at the lowest industry cost. The platform can connect, manage and track the remote assets.
astrocast.com

APCO Technologies
APCO Technologies specializes in the design and manufacturing of high-quality equipment for the space industry.
apco-technologies.eu

ClearSpace
ClearSpace develops services and a technology for the disposal of end-of-life satellites and space debris in low earth orbit.
clearspace.today

Coactum
Coactum aims to revolutionize cargo transportation in space, allowing rapid access to hard-to-reach orbits.
coactum.ch

CompPair
CompPair has created a new self-repairing and highly recyclable material to be used both on earth and in space.
comppair.ch

Confectronics
The company offers experience in the field of cable assembly, wiring devices and in the Macromelt molding.
confectronic.ch

Cysec
Cysec provides a flexible cybersecurity solution capable of storing sensitive data and running critical software in a trusted environment.
cysec.systems

Décision
Décision produces innovative structures that take advantage of the extraordinary properties of composite materials.
decision.ch

Destinus
Destinus is developing hybrid aircraft-rocket vehicles and suborbital infrastructure that will power world's fastest transport network.
destinus.ch

EnviroScopY
Consulting, installation, training, and technical and scientific assistance to purchase scientific equipment such as Lidar.
enviroscopy.com

Fimutens Suisse
Fimutens is specialized in the manufacturing of aircrafts and space vehicles.
fimutens.com

Fischer Connectors
Fischer Connectors manufactures high-performance, push-pull circular connectors and cable assemblies.
fischerconnectors.ch

Force Dimension
Force Dimension has earned international recognition for designing and manufacturing high-precision haptic interfaces for operating industrial and medical robotic systems.
forcedimension.com

Inergio
Inergio offers clean, light and efficient energy sources through miniature fuel cells.
inergio.chfr

Insolight
Insolight is developing next-generation solar panels based on miniature, high-efficiency cells traditionally used in space.
insolight.ch

KOMP-ACT
KOMP-ACT aims to develop breakthrough electric motors for aircrafts, helicopters and UAVs actuation systems, as well as for electric aircrafts propulsion systems.
komp-act.com

LD-Switzerland
LD-Switzerland specializes in the development, manufacturing and marketing of helmets for the aviation sector.
ld-switzerland.com

LEMO
The leader in the design and manufacture of precision connection and cable solutions. LEMO's high quality connectors are found in a variety of environments.
lemo.com

LIGENTEC
LIGENTEC offers its proprietary platform based on the Photonic Damascene Process, targeted at applications using integrated photonic chips from visible to mid-IR.
ligentec.com

LN Industries
Specialists in precision tubes, profiles, electrodes and sensors for various markets, including aerospace.
swiss-tube.com

MicroR systems
MicroR systems provides ultra-pure colour lasers for precision applications ranging from telecommunications to LIDAR.
microrsystems.com

MinWave
MinWave has developed a new way to miniaturize next-generation microwave devices for satellite communication, radar systems and 5G infrastructures.
minwave.ch

Miraex
Miraex conceives photonic and quantum full-stack solutions for next-generation sensing, networking and computing.
miraex.com

North Thin Ply Technology (NTPT)
Revolutionizing the world of laminate composites with significantly improved mechanical properties.
thinplytechnology.com

PIEMACS
PIEMACS provides innovative approaches to piezoelectric MEMS engineering services through short- and long-term contracts centered on excellent scientific consulting and fast engineering prototyping.
piemacs.ch

Quality Control
Promotes quality and security through material science and mechanical engineering.
qualitycontrol.ch

Rigitech
RigiTech is a logistics company connecting hospitals and diagnostics laboratories through automated inter-city drone delivery links.
rigi.tech

RUAG Space
Ruag possesses outstanding technological capabilities in aerospace as well as security and defense.
ruag.com

Safran Colibrys
Development and manufacturing of high precision Micro-Electro-Mechanical-Systems.
colibrys.com

SCHOTT
From customized glass development to high-precision optical product finishing and metrology, SCHOTT develops solutions for applications in optics, astronomy, architecture, and research.
schott.comadvanced_optics

SoHHytec
SoHHytec provides a renewable system for the production of hydrogen, oxygen, electricity and heat at the same time and place.
sohhytec.com

Solar Impulse
Flying 5 consecutive days and nights with no fuel, Solar Impulse was the first solar airplane to accomplish an oceanic crossing.
solarimpulse.com

SolarStratos
The company made the first round-the-world trip powered by solar energy and demonstrated the possibility of using renewable energy in this type of autonomous travel.
solarstratos.com

SWISSto12
SWISSto12 is an innovative technology company pioneering the development and commercialization of Radio Frequency (RF) antenna, waveguide and filter products based on additive manufacturing.
swissto12.ch

Viasat
Viasat is on a mission to connect the world by making the internet accessible, affordable and secure to everyone.
viasat.com

Yasava Solutions
Solutions for interior aircraft design by using cutting-edge engineering, advanced ergonomics and socio-cultural parameters.
yasava.com

NETWORK OF SUPPORTING PARTNERS

AP-Swiss
AP-Swiss is the Ambassador Platform of the European Space Agency's ARTES Applications programs in Switzerland. It is a partnership between the European Space Agency (ESA) and SERI. P-Swiss is part of the ESA Business Incubation Center ESA BIC Switzerland.
ap-swiss.ch

ESA BIC
ESA BIC Switzerland is the place for entrepreneurs with a link to space technologies to realize their innovative ideas and transfer space technologies to other areas of the economy.
esabic.ch

Innovaud
Innovaud combines the promotion of foreign investments and the promotion of innovation in order to target the needs of the Vaud ecosystem as well as those of companies. The structure targets companies wishing to establish themselves in Vaud, new start-ups that are just starting up or SMEs that are innovating and developing in promising fields such as foodtech, clean-tech, ICT and digital, life sciences and health, drones or aerospace, to name but a few. Innovaud works closely with the SPEI.
innovaud.ch

CLUSTER Micronarc
The Micronarc communication platform brings together all the cantons of Western Switzerland. Its aim is to develop and promote the micro- and nanotechnology cluster common to this region, from a scientific, technical and economic point of view. It thus highlights the infrastructures for training, R&D, technology transfer and hosting, as well as the companies located there.
micronarc.ch

Office for Economic Affairs and Innovation (SPEI)
The SPEI supports companies established in the canton of Vaud, and more specifically those active in the sectors of industry and advanced technologies. SPEI advises and informs entrepreneurs, particularly by putting them in touch with the appropriate organizations according to their specific needs. SPEI can also provide direct financial support.
invest-vaud.swiss

State Secretariat for Education, Research and Innovation (SERI) – Space
Switzerland actively pursues endeavors in the space sector, focusing on the development of space applications to improve the quality of life for citizens, long-term commitment to space exploration for the progress of innovation and significant scientific and industrial contributions to make the country a competitive and reliable partner.
sbfi.admin.ch/sbfi/fr/home/themes/affaires-spatiales.html

swiss aeropole
Aeropole aims to play a significant role in the aeronautics, aerospace and autonomous solution sector. It is a birthplace of the solar-powered aircraft Solar Impulse, and now Solar-Stratos has chosen to settle down in Payerne. From project setup, to growth stage, passing through creation on the way, swiss aeropole gears up to welcome new high-tech companies.
swissaeropole.com

Technopôle Ste-Croix
National Center of Excellence in microwelding and point of reference for additive manufacturing.
technopole1450.ch

Swissmem Romandie
Swissmem is the leading association for SMEs and large companies in Switzerland's mechanical and electrical engineering (MEM) industries and related technology-oriented sectors.
swissmem.ch

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