SWITZERLAND GLOBAL ENTERPRISE

KEY FIGURES

1st place – Global Innovation Index

1st place – World Competitiveness Ranking

1st place – Global Talent Competitiveness Index

1st place – global commercial drone market per capita

Sources: WIPO; INSEAD; IMD, 2021; Drone Industry Insights, 2021

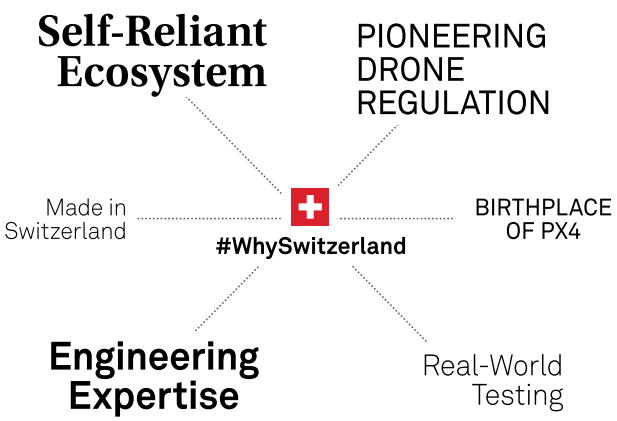
SWITZERLAND – AT THE FOREFRONT OF DRONE TECHNOLOGY

INTRODUCTION

Switzerland continues to have the upper hand in profiting from the fourth industrial revolution. In this mix of globally changing business models and job markets driven by new developments in the technological sector, traditional Swiss strength in software, mechanical engineering and precision manufacturing coupled with its agile regulatory structure and excellent technical universities allowed the nation to build a reputation as the "Home of Drones".

Thanks to Swiss regulators' innovation-friendly and pragmatic approach, Switzerland has been leading the way in shaping the regulatory framework for drones' authorisations. Under its leadership in the Joint Authorities for Rulemaking on Unmanned Systems (JARUS), the SORA (Specific Operation Risk Assessment), a risk-based, non-prescriptive drone regulation, became a truly global standard.

Switzerland has also led the way in Unmanned Traffic Management (UTM). From the early trials in Geneva back in 2017 to the modern implementation of a global-first Network Remote Identification System, the Swiss U-Space Implementation (a public-private partnership between Government and Industry Stakeholders) is renowned globally as the cradle where UTM concepts are converted into real operational systems.



THE ADVANTAGES OF SWITZERLAND

1. Strong Research and Innovation Output

Thanks to its long tradition in watchmaking and mechanical engineering, Switzerland has developed a unique know-how in related fields such as software, robotics, precision manufacturing, and microelectronics. These areas of expertise combined transformed Switzerland into the "Home of Drones."

Why Switzerland:

- Switzerland is the world's leading location for developing core technology for drones and commercial applications. Ranked among the world's best technological universities, the Swiss Federal Institutes of Technology in Lausanne (EPFL) and Zurich (ETH Zurich) and the University of Zurich are at the forefront of flying robotics and uncrewed systems. They work closely with an active industry to bring new products quickly to the market.

- The Autonomous Systems Lab **(ASL) at ETH Zurich** has produced various successful spin-offs over the last twenty years, including global successes such as Wingtra or Auterion.

- The Laboratory of Intelligent Systems **(LIS) at EPFL** is where globally recognised drone companies such as Sensefly and Flyability were born.

- Switzerland is the birthplace of **PX4** (Pixhawk). Developed at ETH Zurich in 2008, it has evolved to become the gold standard for open-source autopilot for drones.

- Since 2010, robotics has been a national research focal point of the Swiss National Research Fund: The National Centre of Competence in Research **(NCCR) Robotics** brings together leading experts from the EPFL, ETH Zurich, University of Zurich, Dalle Molle Institute for Artificial Intelligence Research, and the University of Bern. It supports startups, spin-offs and SMEs in the field of robotics.

2. Pioneering Drone Operations Regulations

Swiss regulators are innovation-friendly, progressive and pragmatic. The country is playing an active role in defining global regulations that will ultimately allow drones to successfully integrate in the airspace.

Why Switzerland:

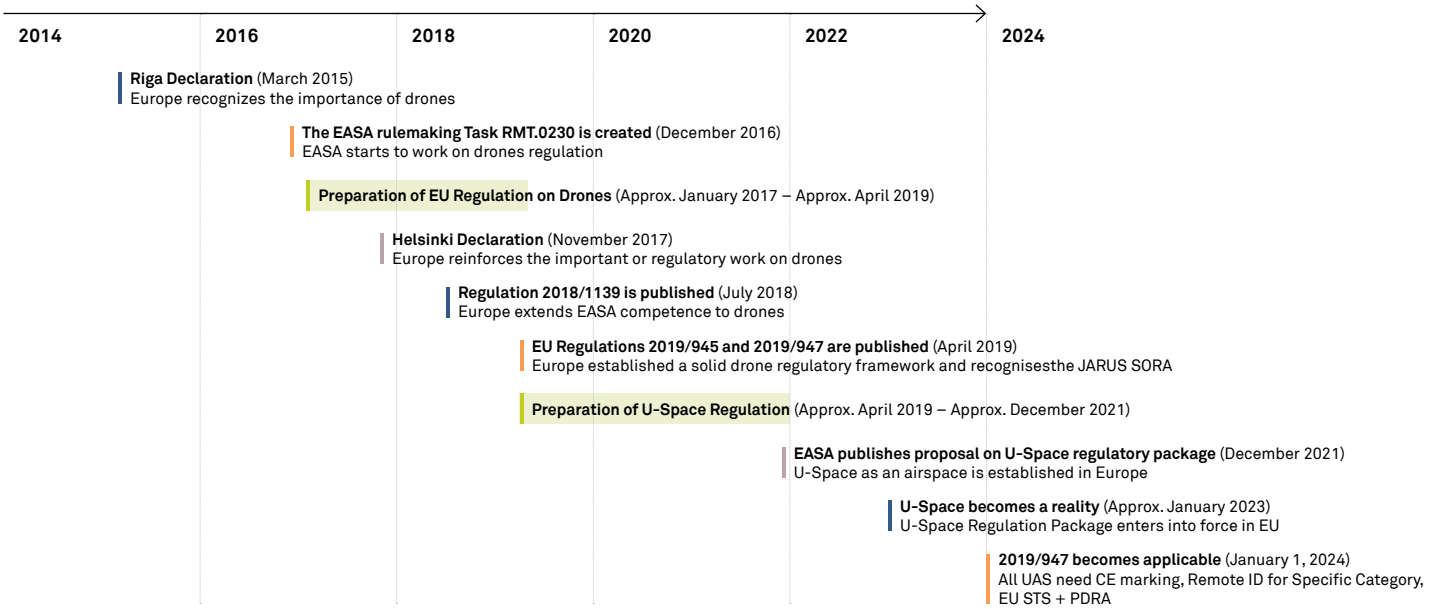
- The Swiss Federal Office of Civil Aviation (FOCA) approach is **pragmatic, risk-based, and non-prescriptive**. It has allowed many startups to enter the market with low cost and high safety standards.

- The Swiss FOCA **led the Joint Authorities for Rulemaking on Unmanned Systems (JARUS)** Working Group on Safety and Risk Management since 2015 and provided crucial input in developing the **Specific Operations Risk Assessment (SORA)**. This methodology for approving drones operations is allowing repeatable and scalable drone technology deployments globally.

- Switzerland is the first country to have implemented one of the foundational services of U-Space, the **Network Remote Identification**. Born within the Swiss U-Space Implementation (SUSI), a public-private partnership between FOCA, the Swiss air navigation service provider skyguide and an extensive array of industry stakeholders, the NET RID is the first building block of a functioning U-Space. This groundbreaking step is helping shape the European U-Space regulation that will enter into force in Europe and Switzerland as of 2023.

- In March 2017, Swiss Post became one of the first companies in the world to operate delivery drones to transport lab samples between two hospitals in Lugano, in conjunction with drone manufacturer Matternet. They received **the world's first authorisation to fly beyond visual line of sight (BVLOS)** over a city and in controlled airspace. This "real-world" testing is unique for Switzerland and has facilitated similar operations' approvals in other countries.

EU Regulation Timeline



Source: Murzilli Consulting

3. Progressive Technology Ecosystem

Switzerland offers a flourishing and self-reliant drone technology eco-system that comprises established companies, startups, suppliers, leading research, an experienced talent pool and a pragmatic regulatory framework.

Why Switzerland:

- Between the two Federal Institutes of Technology ETH Zurich and EPFL, an active ecosystem has emerged, often referred to as "Drone Valley", comprising more than one hundred start-ups. The **collaboration between the local ecosystem, world-class research and progressive regulators is exemplary** and unique in the world. It offers a fertile ground for the foundation of new companies and the development of innovative products.

- Companies can try out their innovations in "**real-world**" settings: on the outskirts of cities, in innovation parks, and on military and civilian airfields. Drone testing sites are offered, for example, by the **swiss aeropole** in Payerne (Canton of Vaud), **Switzerland Innovation Park Zurich** or the **Lodrino** military airfield in the Canton of Ticino. New and improved sites such as the **Schmerlat airfield** in Neunkirch (Canton of Schaffhausen) are emerging and gaining traction. One of the key advantages of those sites is the unique **access to the entire ecosystem** including the federal certification authority.

- Multinationals, SMEs and startups appreciate the vast pool of experienced and highly qualified talent they find here thanks to world-leading research institutes in the field of robotics and drones. Furthermore, companies profit from graduates from several universities of applied sciences who are renowned for their practical orientation and strength in training engineers.

- Switzerland is a **global innovation leader** that provides a competitive environment to do business and develop new products in. It has consistently been ranked in first place with regard to innovative force (Global Innovation Index, WIPO 2021), ability to recruit and retain talent (Global Talent Competitiveness Ranking, INSEAD 2021) as well as overall competitiveness (World Competitiveness Ranking, IMD 2021).

- The Swiss legal system, being both stable and liberal, offers significant protection for intellectual property and a high degree of investment security for R&D activities.

"From Lucerne, with our ability to attract and retain talent, we can apply our expertise to serve clients globally, and we can quickly advance projects from concept to reality."

SONIA BERUBE-RAY
CEO Aurora Swiss Aerospace GmbH

"The Swiss FOCA has been working relentlessly to influence regulatory frameworks worldwide. Swiss companies know that any activity performed in Switzerland will see global recognition. This is the secret ingredient behind the Swiss success."

LORENZO MURZILLI
Former Head of the Swiss FOCA Innovation & Digitilisation Unit,
Founder & CEO of Murzilli Consulting

Swiss Digital Aviation Industry Map

Source: Drone Industry Association Switzerland, 2022

Case Studies

- Zürich based **Auterion**, the largest open-source drone software company, recently expanded their operations in the US. Their story began with the revolutionary PX4 software that was developed at ETH Zurich. PX4 is now the most widely used open-source drone autopilot operating system and the core of a global community of thousands of active developers. The 2021 summit reported stunning numbers confirming the health of the drone autopilot born in Switzerland.

- **senseFly** is the flagship of the Swiss drone industry. The company was created in 2009 at the Swiss Federal Institute of Technology (EPFL) in Lausanne and employs over one hundred people. Its ultra-light drones have been successfully used in the Zanzibar Mapping Initiative, the most ambitious drone-driven mapping project in the world. senseFly has recently been acquired by AgEagle, an industry-leading provider of drones, sensors and software-based in Wichita, Kansas, USA for 23 million US dollars.

- **Skypull** is an autonomous tethered drone that climbs to high altitudes. By reaching higher altitudes and by avoiding heavy and cumbersome infrastructure, Skypull is less costly and more easily deployable than current wind energy technologies. Its development started in 2013 in Lugano, in the Canton of Ticino. The core team set up a partnership network with multiple companies and suppliers in order to successfully manufacture and bring Skypull to the market.

- **Matternet** is a pioneer of medical drone delivery services. Headquartered in California, the company has deployed drone technologies with a strong focus on medical and urgent deliveries globally. Since 2018, they have established their EMEA subsidiary in Switzerland building on the success of their collaboration with the Swiss Post.

- **Flyability** is a global leader when it comes to indoor drone inspections. Leveraging a niche market where aviation regulation is not fully applicable, the company has built a collision resilient drone solution that can be sent to dangerous and otherwise inaccessible places. The company is headquartered in Switzerland with offices in the US and China.

- **Sunflower Labs** is a drone-in-a-box solution provider. The drone operates regular, automated security tasks over various sites and promises state-of-the-art monitoring and protection services with minimal oversight or human input. The company was set up in 2016, and the entire operation is based in Zurich. Sunflower has major industry partners like US security group ADT Inc, stowage company Federal Self Storage, Swiss Federal Railways, and the Gerald R. Ford International Airport in Grand Rapids, Michigan.

CONTACTS AND FURTHER INFORMATION

Authorities and Regulators
Federal Office of Civil Aviation FOCA
bazl.admin.ch

Swiss U-Space Implementation SUSI
susi.swiss

Swiss Air Navigation Services
skyguide.ch

Innosuisse – Swiss Innovation Agency
innosuisse.ch

Associations and Networks
droneindustry.ch
gutma.org
homeofdrones.org
swiss-aerospace-cluster.ch
swissroboticsindustry.ch

Innovation and Startup Promotion
asl.etzh.ch
cybathlon.ethz.ch
epfl-innovationpark.ch
fhgr.ch/photonics-lab
grstiftung.ch
idsia.ch
ifj.ch
investiere.ch
lis.epfl.ch
nccr-robotics.ch
rewired.com
sipbb.ch
swissaeropole.com
swissparks.ch
switzerland-innovation.com
venturekick.ch
venturelab.ch

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