

Space



© SES

Did you know...

SES is the only satellite operator in the world offering connectivity from two different orbits, the Geostationary and the Medium Earth Orbit. Thanks to the unique combination of these two fleets, the most remote areas on Earth can be reached.

Space

New frontiers

The creation of SES in 1985 was the starting point of the space sector in Luxembourg. This **audacious move**, both politically and technically, has led to a **tremendous commercial success** and the development of the **entire space industry** in Luxembourg. Our space sector covers a large range of activities: technology development, microsatellite design and integration, ground infrastructure development and support services.

Pioneer in broadcasting and connectivity

Since SES was founded, the company has consistently moved to new horizons. Initially pioneering in TV broadcasting throughout Europe – through ASTRA – the company today is a global leader in connectivity. SES transmits more than 7,000 TV channels, nearly one third of them in high definition (HD), and thus reaches **1.1 billion people** worldwide. The company invests and expands significantly in emerging markets and grows its portfolio and capabilities far beyond video, in the fix and mobile data segments, as well as in defence and security solutions.

Maritime surveillance from space

LuxSpace, a specialist in microsatellite products and niche services, was the first company to demonstrate the commercial potential of utilising ship radio transmissions using low Earth orbit satellites and exploiting the data collected to map the entire route of every large ship in near real-time. In 2011, the European Space Agency commissioned LuxSpace to lead the preliminary design of a fully operational space-based automatic identification system (AIS), which is currently being implemented.

Flying over oceans and deserts

Air traffic controllers cannot maintain contact with airplanes flying over oceans and deserts, seriously impeding rescue attempts in the event of a crash. A new satellite tracking system developed in Luxembourg not only has the potential to eliminate these “black holes” and secure tracking of aircraft in the future but could also cut fuel costs and overcome some of the problems of a growingly overcrowded air space.

This technology is called ADS-B (Automatic Dependent Surveillance – Broadcast). SES began working on the technology in 2009 and quickly joined forces with the German Aerospace Agency (DLR). In 2013, the European Space Agency provided the capability for a trial run in space on-board the Proba-V (LEO) satellite. Between July 2013 and August 2015, the demonstrator captured 193 million pieces of Mode-S traffic data and was able to decode 36 million positions all over the globe. SES confirmed that **the operation has been a success and this proved, for the first time, that the concept of space-based ADS-B was functional and able to process air traffic worldwide.**

Newcomers

LuGovSat – a joint venture between the Luxembourg government and SES – has been created with the objectives of procuring, launching and operating a satellite to support governmental and military innovative communication services.

Telespazio France has chosen Luxembourg for the location of the 2nd EarthLab Centre in Europe. EarthLab Luxembourg is part of the EarthLab Galaxy network monitoring the environment in order to help assess risks for industry, insurance and investment funds.

Deep Space Industries (DSI), a US asteroid mining company, chose Luxembourg for its European subsidiary. DSI aims to change the economics of the space industry by providing technical resources, capabilities and system integration required for prospecting, harvesting, processing, manufacturing and marketing in-space resources.

European Space Agency

Luxembourg has invested strategically in the development of the space sector and became a **member of the European Space Agency in 2005**. Luxembourg is among the top five contributors per capita to ESA.

3 public research organisations are active in the Luxembourg space sector.

30 companies.

700 people employed in the space sector.

99%

With a fleet of more than 50 geostationary satellites, SES has the capacity to reach 99% of the world's population.

7 new satellites under construction and to be launched by 2017.

Trailblazer



IMPROVING THE EFFECTIVENESS OF WORLDWIDE RAPID RESPONSE

When disaster strikes, every minute counts. Luxembourg is helping to provide faster connectivity and improved coordination for a more efficient humanitarian response – all with one goal in mind: saving more lives.

SATELLITE-BASED TELECOMMUNICATIONS

In 2011, Luxembourg launched **emergency.lu**, a public-private partnership that offers a satellite-based telecommunications platform allowing rapid response to natural disasters and humanitarian missions.

Two hours after an alert is given, teams are airborne. Once they are on the ground, it typically takes less than an hour to connect a telecommunications terminal to an inflatable antenna for a satellite connection. Working in close collaboration with the United Nations World Food Programme, emergency.lu draws on the expertise of three Luxembourg-based companies – Hitec Luxembourg, SES and Luxembourg Air Ambulance (LAA). Ericsson Response is also involved in the project and serves as technical partner.

HAITI

Immediately after the January 2010 earthquake, Haitian President Préval was standing in the ravaged streets of Port-au-Prince holding his cell phone, which he was unable to use to call for

help. Effective aid deployment was impossible because all telecommunications were down. Following Haiti, Luxembourg understood that a solution had to be developed to restore telecommunications within several hours of a major natural disaster in order to improve aid coordination and save lives.

Thanks to emergency.lu, aid workers can now register their phones and laptops on the system to communicate and improve the delivery of critical services.

TRANSPORTATION DURING EBOLA OUTBREAK

Luxembourg Air Ambulance is a non-profit founded in 1998 that operates **rescue helicopters and ambulance aircraft** worldwide, saving human lives and preserving people's health. In 2015, LAA put new medical equipment for the transportation of patients with highly infectious diseases into operation. This medical evacuation module can be used to transport Ebola patients safely, while ensuring that the crew and the airplane don't come into contact with the pathogen. The development of this special isolation ward for the Learjet 45 XR took several months and covered all medical and aeronautical requirements. Pilots, medical staff and ground handling staff were also required to take a special training course in cooperation with Doctors Without Borders. Cargolux operated several flights to Monrovia during the Ebola crisis and provided medical supplies during critical times. ●

emergency.lu

The entire service chain – including air transport, satellite infrastructure, terminals and related services – is funded by Luxembourg and provides:



FAST TRACK DIAGNOSTICS

Fast Track Diagnostics (FTD) is one of the leading global suppliers of real-time PCR multiplex **testing for infectious disease detection**. Rare infections such as Ebola can quickly spread and become a general health hazard. The FTD test is simple to use and minimises uncertainty in the diagnosis. ●

ADVANCED MATERIALS TO PREVENT CONTAMINATION

DuPont Tyvek® protective clothing – produced by DuPont de Nemours Luxembourg – is designed to keep wearers safe by repelling liquids and aerosols while remaining permeable to both air and water vapour.

Due to its outstanding qualities, it was the **personal protective equipment chosen for the workers dealing with the aftermath of the nuclear disaster in Fukushima, Japan**. Healthcare workers and

other involved in fighting the deadly Ebola virus rely on **Tychem®**, another DuPont brand that includes an entire line of **protective garments and accessories that helps prevent contamination**. ●

Trailblazer



BIG DATA – CAR DATA

The connected car industry is expected to be worth €40 billion worldwide by 2018, up from €10 billion in 2012, according to forecasts by the automotive research firm SDB. Connected car technologies cover a wide range of applications, from intelligent infrastructures supporting automated driving, to advanced traffic management and smart routing, aiming at a better utilisation of infrastructures, less congestion, reduced fuel consumption and lower emissions.

DRIVING CONNECTED CAR SERVICES

Luxembourg's innovation friendly environment is fostering the emergence of a budding start-up eco-system, with highlights in this sector such as Motion-S (fleet management, driving efficiency) and Soundytics (adaptive music selection). Moreover, established Luxembourg-based companies, both automotive and non-automotive, have identified this market as being important for their future growth. Here are some examples.

- Post Telecom is extending its machine-to-machine (M2M) communication services for the automotive sector.
- Post Telecom is partnering with major international players to offer complete solutions in automotive telematics. French carmaker PSA and Luxembourg's Post Telecom signed a partnership agreement in 2009 to increase the development of PSA's telematics services in Europe. Post Telecom has already equipped more than 1 million Peugeot and Citroën vehicles with its SIM cards. In addition to this, as of 2018, all new vehicles registered in Europe will be equipped with SIM cards in order to activate eCall, an automatic call service, in case of accidents.
- Hitec Luxembourg provides expertise in satellite communication and traffic management systems.
- IEE has been developing innovative sensors and sensing systems for the automotive industry – leading the way for the safer cars of today. Autonomous driving and connected cars are no longer science fiction, and sensing technologies have an essential role to play in these new functionalities. ●

A NEW GENERATION OF SERVICES

Post Telecom and Hitec Luxembourg are collaborating on the following projects in the domain of vehicular connectivity with an emphasis on emergency services and European safety guidelines.

HeERO 2 The Luxembourg HeERO consortium tests and validates the **common European eCall standards** defined and approved by European Standardisation bodies in real conditions using Post Telecom's networks.

CoMoSeF is designed to provide assistance in the area of cooperative traffic management through connected car networks to help develop and deploy advanced and cost-effective vehicle and roadside data collection solutions in order to **gather valuable traffic information and provide weather and incident data to road users.**

DG-TRAC is underwritten by the European Space Agency and addresses the **tracking and tracing of dangerous goods in the medical sector** integrating and using existing space technologies with GSM/UMTS and the internet. ●

1 million

Luxembourg connects 1 million Peugeot and Citroën vehicles with SIM cards.