

9 startups that reconcile space and the environment

A nascent environmentalism is taking root in the space sector. Whilst legacy space companies like Blue Origin operate under the fatalistic assumption that 'the Earth is finite' - turning space into an exploitable resource - a new wave of startups are looking into how best space technologies can assist sustainable development back on earth.

The space sector is a very fast-growing market, with almost \$469B of investment in 2021, representing a 9% growth compared to 2020. These figures include public investments as well as investments in startups, which reached \$15B in 2021 (*Bryce Tech Report 2022: Start Up space*).

In fact, the space sector is experiencing a new paradigm in which traditional players are less risk-averse, favouring the emergence of startups. The latter are evolving around big groups such as NASA or Airbus, either through spin-offs or partnerships. This is the case, for example, of Geoflex, which has co-developed a hyper-geolocation solution with the CNES. Another example is the "Creating startups with NASA technology" programme, which transfers NASA technologies to startups.

However, a significant amount of the investments are being received by the

largest startups on the market, such as SpaceX, Blue Origin, OneWeb and Virgin Galactic, which have received 33% of the \$15B invested. Among these new players, there is also a growing number of startups in the Green Space market, developing more eco-friendly space solutions or using space data for the environment.

Below are 9 Green Space startups that aim to reconcile space tech with environmental issues. *Early Metrics*, the startups rating and research agency, provided the list.

VORTEX IO

Creation year: 2019

Country: France

Fundraising: Undisclosed

Description: Vortex offers a hydrological observation solution for waterways. The startup's product is based on the miniaturisation of space altimeters via a microstation equipped with a Lidar sensor and a laser sensor. This station can be installed under a bridge, for example, in the direction of the water flow.

Key strength: The Vortex station does not have to be immersed in water and provides centimetre-level accuracy in the monitoring of various factors, such as water height and speed. This data is then combined with satellite data in order to anticipate and warn populations of natural risks such as flooding and drought.

[Discover Vortex](#)

VILLAGE DATA ANALYTICS

Creation year: 2018

Country: Germany

Fundraising: Undisclosed

Description: VIDA has developed a platform that combines data from earth observations by the European Copernicus satellite, big data, and its own artificial intelligence algorithms to calculate proxies of the economical and agricultural health of various regions on Earth.

Key strength: The solution helps give meaning to images, by taking into account the economy of the observed region (agricultural, tertiary, etc.), demographic data, as well as its access to water or to a road network. As a result, VIDA can determine an economic/social health score for each village.

The startup's solutions help governments develop better electrification plans, and better identify the most appropriate locations for healthcare services.

Discover Village Data Analytics

CONSTELLR

Creation year: 2020

Country: Germany

Fundraising: \$10M by Lakestar and VSquared (November 2022)

Description: Constellr develops microsatellites using thermal infrared technology to monitor the Earth's surface temperature and chemical composition. Its technology can reliably determine water needs and availability in all regions of the world on a daily basis.

Key strength: Unlike other satellites that use visual imagery, Constellr's microsatellites can identify symptoms of stress before crops are damaged and thus enable precise action, such as targeted irrigation. As a result, Constellr estimates that its solution can help save up to 40% of water, reduce the risk of crop loss, and save 60 billion tonnes of water within five years, avoiding 14 megatonnes of CO2 emissions and generating billions of euros in gross profits for farmers.

Discover Constellr

PANGAEA AEROSPACE

Creation year: 2018

Country: Spain

Fundraising: €3M (June 2021) with Inveready, Primospace, Dozen Investments, E2MC, CDTI (a total of €6M with crowdfunding)

Description: Pangea develops an aerospike engine for rockets. This type of engine offers greater aerodynamics in the different layers of the earth's altitude than a conventional engine. It is made in 3D and will use biomethane instead of paraffin.

Key strength: The use of this biomethane fuel engine has a double advantage. Firstly, it will emit up to 15% less CO₂ than conventional launchers. Secondly, it will also allow the engine to have up to 10 uses instead of a single use, thus allowing for significant savings.

Discover Pangea

ZEPHALTO

Creation year: 2016

Country: France

Fundraising : N/A

Description: Zephalto develops a 20m² pressurised gondola, supported by a large stratospheric balloon, to reach an altitude of 25km in space and offer a 1,400 km panorama of the Earth. These developments are possible thanks to a technology transfer from CNES for the balloon's sail.

Key strength: Zephalto's vehicle encourages space tourism, without being detrimental to the planet like SpaceX or Virgin Galactic's solutions. Indeed, although the balloon is inflated with 150k m³ of helium, no CO₂ is emitted during the journey. In addition, the balloon will be designed with robust materials, so that it can be reused for up to 60 flights a year.

EXPLORATION SPACE

Creation year: 2021

Country: Germany

Fundraising : \$11.6M dollars in 2021 with Promus Ventures, Vsquared and Cherry Ventures

Description: Exploration Space develops Nyx, a modular and reusable orbital vehicle that can be refuelled in orbit. Nyx can carry out various missions, such as earth observation for periods of 3 to 6 months, or moon observation.

Key strength: Nyx's strength lies in its ability to carry up to 4,000 kilograms into orbit in a reusable capsule. It is an alternative to SpaceX's vehicles, which will reduce the consumption of space vehicles.

Discover Exploration Space

ORBIT FAB

Creation year: 2018

Country: United States

Fundraising: N/A

Description: Orbit Fab develops a satellite refuelling service in geostationary orbit. This station will allow for "self-service" docking and refuelling of spacecrafts. Orbit Fab is also developing space vehicles that could deliver fuel directly to satellites and other space vehicles when equipped with an interface developed by the startup.

Key strength: This satellite fuel station could allow other space vehicles to extend their time in orbit and thus their lifespan. It would therefore make it possible to limit the pollution caused by launches, as well as the amount of space waste left in orbit. The first stations are expected to supply 100kg of

hydrazine, at a cost of \$20M.

Discover Orbit Fab

SLINGSHOT

Creation year: 2017

Country: United States

Fundraising: \$25M (March 2022) with Draper Associates and ATX Venture Partners in lead, in addition to Edison Partners, Embedded Ventures, Valor Equity Partners and Lockheed Martin Ventures (\$42M in total)

Description: The company has developed Slingshot Beacon, a platform for collaboration and communication between satellite operators, to reduce the risk of collisions and allow operators to save time in their operations.

Key strength: The company synthesises data streams from different sources such as satellites and other ground sensors to provide a digital space map in real time, enabling space operators to better manage and protect their assets. The solution reduces space accidents and thus space pollution from satellites.

Discover Slingshot

SHAREMYSPEACE

Creation year: 2017

Country: France

Fundraising: N/A

Description: Sharemyspace develops a system to map space waste and space vehicles in real time. The company uses an observation station composed of four telescopes that can detect, track and identify all types of objects.

Key strength: This solution allows satellite operators to anticipate any collision

and thus reduce the risk of accidents. In turn, it preserves the integrity of the satellites and extends their life. Unlike Slingshot, the company can identify any space element, and not just other satellites.

Discover Sharemyspace

Early Metrics produces startup ratings and research to empower a changing economy. They have developed a scientific methodology to reliably evaluate startups and SMEs thanks to both qualitative and quantitative metrics.

Able to identify emerging tech trends across multiple industries they provide the right open innovation tools for decision-makers from funds and corporates to discover, qualify and engage with the best innovative startups.

Since 2014 they have rated over 4000 European and international startups for over 300 clients including CAC40 and FTSE100 companies.

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