

Press Kit

2022



Overview

Founded in 2018, Rocket Factory Augsburg (RFA) seeks to provide easy, frequent and low cost access to space. To this end, we are developing the most powerful rocket for payloads up to 1,300kg, which also launches at a highly competitive price. To better understand and protect our Earth with data from space. RFA flies into space to get closer to Earth.

Our RFA ONE launch vehicle is unique in the new space market. The propulsion system uses a staged combustion cycle, which provides higher efficiency and performance. This allows us to deliver up to 30% more payload. So far, only established players like SpaceX and Blue Origin have ventured into this technology. We are the first company in the EU to develop and successfully test a staged combustion engine.

Further, our orbital stage is highly innovative, capable of deploying multiple satellites to different orbits with pinpoint accuracy – providing last-mile delivery in space. It employs a propulsion system based on green propellants. It can perform RAAN shifts, inclination changes, altitude raising, as well as active in-plane phasing. Our launch services can also be tailored precisely to our customer's need in terms of launch location and timing.

In addition, our technically superior RFA ONE will be manufactured more efficiently and with near full automation – just like on the assembly line of car manufacturers. We want to achieve the Henry Ford-moment for the space industry. We aim to use existing off-the-shelf parts from the energy, automotive, and oil industries, adapting them to our needs. We do not want to reinvent the wheel, but to use proven but inexpensive technology. Any in house developed component is specifically designed for serial production.

Our Vision

In short, RFA seeks to simplify space access and reduce launch costs. We do this so that more satellites can deliver data from orbit that will help us to better understand and protect our planet.

We want to help understand change on a global scale: climate, urbanization, mobility or agriculture, and to allocate resources more efficiently. For this, humanity needs to get an overview – and the best way to do this is from above. The potential applications of the new billion-dollar "New Space" market rely on faster and cheaper mass production of rockets. It's no longer about complex and expensive over-engineering. It's about getting small and lightweight satellites into LEO and precisely positioning them faster and cheaper than ever before. That's exactly what RFA can offer.

Through our orbital stage we offer a technology platform that can provide all necessary in-orbit propulsion, navigation and power. This lets our customers fully concentrate on developing the technology specific to their application.



Applications

In the future, satellite infrastructure will increasingly be composed of constellations. These swarms of hundreds to thousands of small satellites will deliver a variety of different commercial services from low earth orbits. This shift is already leading to the industrialization of the satellite industry, making the production of satellites cheaper. We will also see this industrialization in small launchers. This is because constellations will have to be constantly supplied with replacement satellites. Small launchers transport satellites to the desired point in near-Earth orbits. RFA can actively target multiple points in orbit with a single launch vehicle, accomplishing multiple missions or deploying entire constellations with just one launch. Services can thus become operational more quickly, saving time and resources and reducing costs.



Automotive

autonomous driving, artificial intelligence, e-mobility



Telecommunications

global internet, faster Internet, laser communication



Insurance

global imaging systems or case review data



Disaster Management

forest fires, early warning systems for tsunamis, floods



Agriculture

determination of crop growth, water and fertilizer management



Research

animal migration, oceans, forests, arctic, atmosphere



Climate protection

monitoring of oceans, tracking of polluters, ecosystem surveillance



Logistics

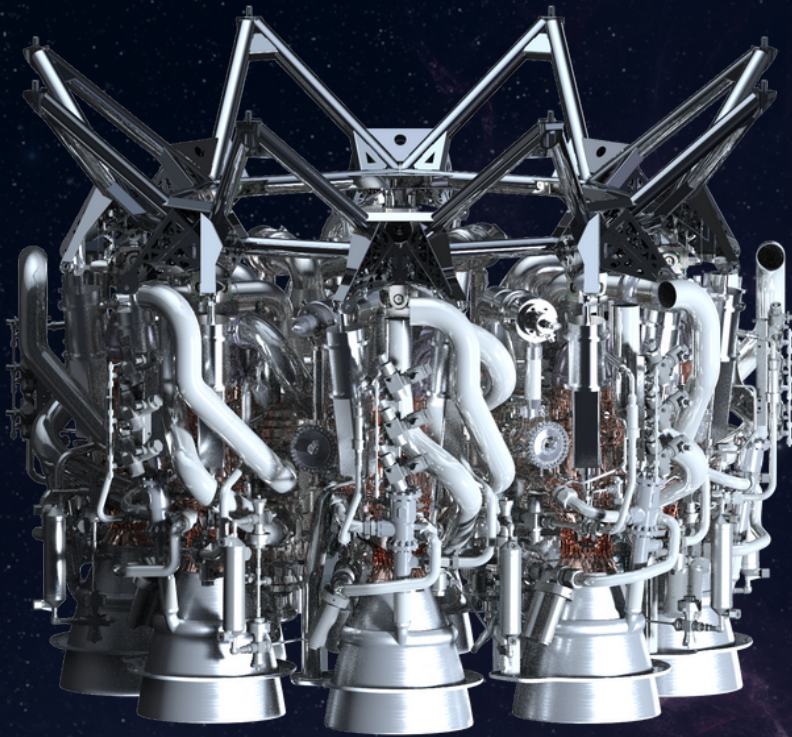
transport, delivery route optimization



In-orbit servicing

station keeping, orbital maneuvers, refueling

Technology



Technical progress within RFA is rapid. Just one year after its inception, RFA hydrostatic pressure tested the upper stage tank. In parallel with the decision to develop a staged combustion engine, the upper stage tank then passed the cryogenic pressure test. Since mid-2020 the main engine test site in Esrange, Sweden, has been built and commissioned and the main engine has been successfully tested in June 2021. During a burn duration of 8 seconds, thermal steady-state was achieved.

After having achieved thermal steady-state, it makes no difference whether the engine runs for 8, 100 or 10,000 seconds – you just need more fuel. The space industry considers an 8 second hot fire test as proof that the engine is fully functional. RFA is thus the first European company and only one of three commercial players in the world to successfully develop and test the technology of staged combustion.

RFA ONE is a three-stage launch vehicle capable of deploying up to 1,200 kg to a 700km polar orbit. It is 30m tall and 2m in diameter. The maiden flight will be from Andøya, Norway.

RFA is in consistent talks with all European launch sites e.g. Kourou, French Guiana, and the North Sea Launch platform planned in the German North Sea. With access to several different launch sites, RFA can provide all orbits to its customers.





In a rocket engine, high-pressure fuels are fed into the combustion chamber by means of a turbopump. In conventional open cycle engines, the turbopump is operated by a gas generator. Its exhaust gases are released into the atmosphere in the same way as in a normal car exhaust.

In our staged combustion engine, an oxygen-rich precombustion chamber is used to operate a turbopump whose exhaust gases are fed into the main combustion chamber. Therefore, exhaust gases are reused and almost completely combusted. The result is a more efficient combustion which increases the engine's performance and allows 30% more payload and higher orbits. The fact that critical parts of the engine can be produced using commercial 3D printers also significantly reduces costs and production time and allows scaling and automation of the production.

In addition to the highly innovative engine, RFA is also breaking new ground in terms of structures. While composite structures were often used in the past, RFA is building its first and second stage from stainless steel. This becomes very tough when filled with cryogenic liquid oxygen. We can therefore make the tank walls much thinner and

thus reduce the vehicle's mass, which allows us to carry heavier payloads. Furthermore, compared to composites, stainless steel is significantly cheaper while being easier and faster to process and refurbish. It is therefore perfect for series production and for building up a fleet of reusable first stages.

Another highly innovative feature is our orbital stage, which can deploy several satellites with pinpoint accuracy into different orbits – a last-mile delivery in space. After delivering the payload, our orbital stage can actively de-orbit. Even more, as it has orbital maneuvering capability, it can perform the deployment of satellites and then remove space debris before de-orbiting itself. Thus RFA ONE is the only launch vehicle in the world with a negative space debris balance.



Background



Rocket Factory was founded in 2018 as an independent start-up. Our strategic investors are OHB SE and venture capital firm Apollo Capital Partners.

RFA thus combines the best of both worlds: The freedom and working methods of an agile start-up with a New Space philosophy, with the opportunity to draw on the enormous experience and technological know-how of the 1 billion Euro space group OHB SE and its 3,000 employees.

From the outset, a dedicated team of highly experienced space engineers with a proven track record in development and commercialization within the space, satellite and launch vehicle industries has been built. Expertise in all areas of the vehicle systems (structure, propulsion and avionics) and launch preparation and execution is thus assured. All technical areas from system development, design and analysis to production and test are covered within RFA. Core team members have worked at established New Space companies, as well as established space industry companies.

CURRENT STATUS AND NEXT STEPS

In July 2021, we had a successful 8-second hot fire test of our staged combustion engine. During this critical test we operated the engine in thermal steady-state. This is a huge milestone for us and for European spaceflight! You can find a video [here](#).

In August, we completed a cryogenic pressure test of our first stage. We achieved our test goals and gathered lots of data that will be integrated into our next first stage. You can find a video [here](#).

We are moving ahead on the engine test campaign to longer duration burns. Simultaneously we are preparing the stage level test, where all the stage systems, including the engine, are tested together as a complete unit

For more information, please visit: www.rfa.space

Follow us also on our social media channels:



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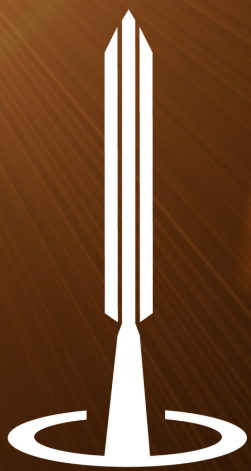
Chairman of the Supervisory Board: Jean-Jacques Dordain

Board of Directors: Stefan T, Stefan Brieschenk, Jörn Spurmann

Seat of the company: Augsburg

Registry Court: AG Augsburg, HRB 34251

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