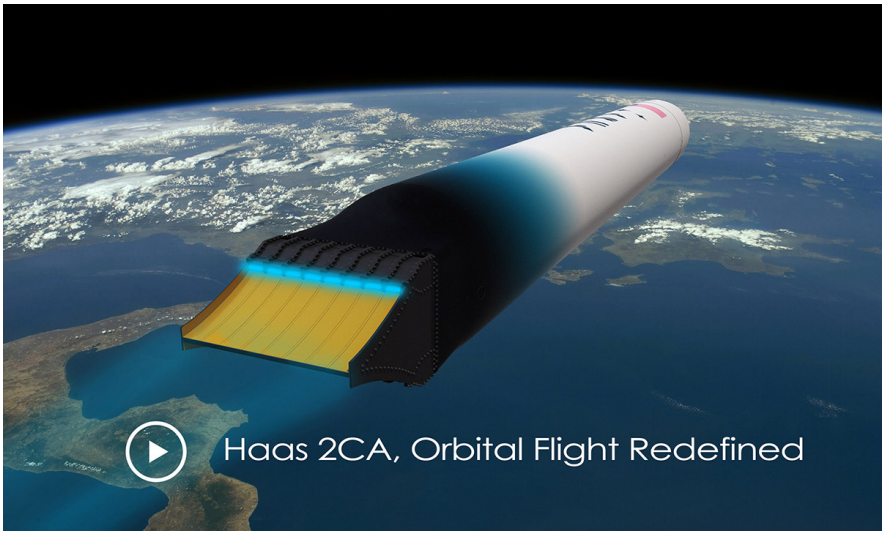
Press Release: March 29th, 2016

Haas 2CA, Orbital Flight Redefined

ARCA Space Corporation is announcing the Haas 2CA, an innovative orbital launcher capable of placing itself, along with its payload, entirely into low Earth orbit without using multiple stages like current space vehicles. This kind of vehicle is known as being Single Stage to Orbit (SSTO). The Haas 2CA, named after Austrian-Romanian medieval rocket pioneer Conrad Haas (1509-1579), uses a linear aerospike engine that is around 30% more fuel efficient than the current rocket engines. It also uses ARCA's highly advanced composite material propellant tanks that were tested by the company in the past 18 years.



https://www.youtube.com/watch?v=30LBEyFdWmE

The rocket is fueled by hydrogen peroxide and kerosene, non-cryogenic, nontoxic propellants. ARCA Space Corporation is collaborating with NASA's Kennedy, Ames, Wallops, Marshall, Stennis, and Johnson Space Centers for the Cooperative Opportunity Program, aiming to increase the flight readiness of the vehicle for the first flight scheduled in 2018 from Wallops Flight Facility. ARCA is also discussing with Spaceport America regarding the possibility to launch the Haas 2CA vehicle from New Mexico. ARCA has also started the FAA licensing process and is currently seeking to secure

partnerships with an US defense agency and various private investors. The Haas 2CA is designed to deliver the following results:
- Payload to LEO: 100kg (220lbs);
- Responsiveness: 24h;
- Cost/launch: $1,000,000;
- Cost/kg (lb): $10,000 ($4,545).

“When the Haas 2CA rocket launches, it will be the first rocket in history to place itself entirely into orbit. This opens new frontiers for exploration of the Solar System as the rocket can be refueled in-orbit and re-utilize its aerospike engine thus eliminating the need for additional upper stages. After the full qualification, the vehicle could be operated from inland spaceports as there are no stages that fall on the ground at burnout. Staged rockets, even though they provide more payload performance for the same takeoff mass, are less reliable because of an increased number of parts due to flight events requested by staging and ignition of the upper stage engine. Also, staged rockets are deemed to be more expensive because they are literally made up of more than one rocket. Manufacturing and assembling more rockets in one launcher requires more, time, money, and personnel. The SSTO technology, once implemented, will increase the space flight responsiveness and lower the cost to values expected by the industry for decades. This rocket will also be the fastest vehicle to reach orbit, taking less than 5 minutes." said Dumitru Popescu, ARCA Space Corporation CEO.

An aerospike engine exhaust jet ideally expands from sea level up to space, ensuring superior efficiency at all flight levels. A "classic" bell-shaped nozzle works efficiently at only one flight level, usually at sea level. After that point, the engine isn't properly taking advantage of the atmospheric pressure decrease as the gases are contained by the nozzle. An aerospike nozzle allows virtually unlimited expansion ratios, thus significantly increasing the specific impulse of the engine at high altitude. An interesting comparison between one of the most advanced rocket engines available to date, the Merlin 1D that offers 311s of specific impulse in vacuum at almost 100 bars of chamber pressure using LOX and RP-1, and the Executor Aerospike that offers 314s of specific impulse in vacuum at 16 bars using less energetic propellants, is emphasizing the advantages of the aerospike configuration.

The thrust vectoring control is achieved by throttling the 16 combustion chambers, changing the individual chambers mixture ratio. This eliminates the heavy and complex gimbaling system for the engine.
The team decided to also build the whole vehicle from composite materials that offer low construction costs and very low weight. The extremely light composite tanks for hydrogen peroxide and RP-1 were extensively tested at ARCA since the beginning of 2002. Not even a single rocket vehicle built by ARCA with this technology ever failed.

The Haas 2CA will operate on the nano/micro satellites market, which is based on a SpaceWorks forecast indicating 3,000 satellites between 1- 50kg will require a launch between 2016-2022. The total market value is estimated to be $5.3 billion in the next decade. At $1,000,000/launch, the Haas 2CA perfectly fits into this market seeking economical solutions.

Beside the governmental agreements, ARCA Space Corporation is also open to private investments for the Haas 2CA rocket.

	Imperial	Metric
Length	53 ft	16 m
Diameter	4.95 ft	1.5 m
Empty mass	1,210 lbs	550 kg
Launch mass	35,887 lbs	16,290 kg
Payload mass	220 lbs	100 kg
Engine feed	Pressure fed	Pressure fed
Engine type	Linear aerospike	Linear aerospike
Number of chambers	16	16
Nozzle expansion ratio	80	80
Cooling type	Ablative + RP-1 film	Ablative + RP-1 film
Propellants	Hydrogen Peroxide + RP-1	Hydrogen Peroxide+ RP-1
Burning time	272 s	272 s
Total thrust at sea level	50,500 lbf	22,920 kgf
Total thrust in vacuum	73,800 lbf	33,500 kgf
Sea level impulse	230 s	230 s
Vacuum impulse	314 s	314 s
Total propellant flow rate	220 lbs/s	100 kg/s
Propellant tanks pressure	300 psig	20 barg
Chamber pressure	235 psig	16 barg

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About ARCA

ARCA Space is an aerospace company from Las Cruces, New Mexico, whose main objective is the exploration of space as well as the development of commercial high technology products.

ARCA Space achievements:
2004 - During the $10 million, Ansari X Prize Competition, ARCA launched the first rocket, Demonstrator 2B.
2006 - ARCA built the world's largest solar balloon that lifted the crew capsule of Stabilo, a manned suborbital vehicle created after the end of Ansari X Prize Competition, into the stratosphere.
2007 - The Stabilo program continued, this time with an even larger solar balloon lifting the complete Stabilo vehicle into the stratosphere.
2008 - ARCA joined the $30 million Google Lunar X Prize Competition.
2010 - Helen rocket was launched at 120,000 ft, representing the first powered flight in the Google Lunar X Prize Competition. The rocket was transported into the stratosphere with the help of a helium balloon.
2012 - Haas rocket series was introduced, consisting of Haas 2B and 2C.
2013 - The European Space Agency (ESA) awarded ARCA with a contract to test the parachutes system for the ExoMars spacecraft that would be launched to Mars in 2016.
2014 - AirStrato "The most amazing air robot in the world" UAV performed the first flights.
2015 – ARCA presented the ArcaBoard, the first truly personal flying machine commercially available.

To learn more about ARCA Space and specifications of the Haas 2CA, please visit:

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