



ISP Tech

InSpacePropulsion Technologies GmbH



Concepts for controlled de-orbiting

Supported by



UNTERSTÜTZT DURCH DEN IMPULS-
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BUSINESS
INCUBATION
CENTRE

Baden-
Württemberg

Some words about us

Spin-off of the German Aerospace Center (DLR)

Products:

- Thrusters and propulsion systems for spacecraft

Based on more than 10 years of R&D at DLR

Mission:

Bring propulsion systems with non-toxic (so called green) propellants to the space market

Advantages compared to conventional systems:

- Simplified handling
- Significantly reduced cost
- Short development and lead times

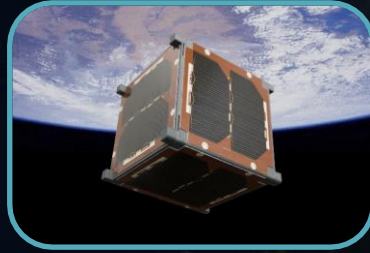


DLR Lampoldshausen
Europe's rocket engine test site
70 km north of Stuttgart

Our two propulsion technologies are suitable for any spacecraft

HyNOx

For small spacecraft
Up to 500 kg



- Bipropellant nitrous oxide and ethane
- Self-pressurized
- Significant lower cost



HIP_11

For large spacecraft
Above 500 kg

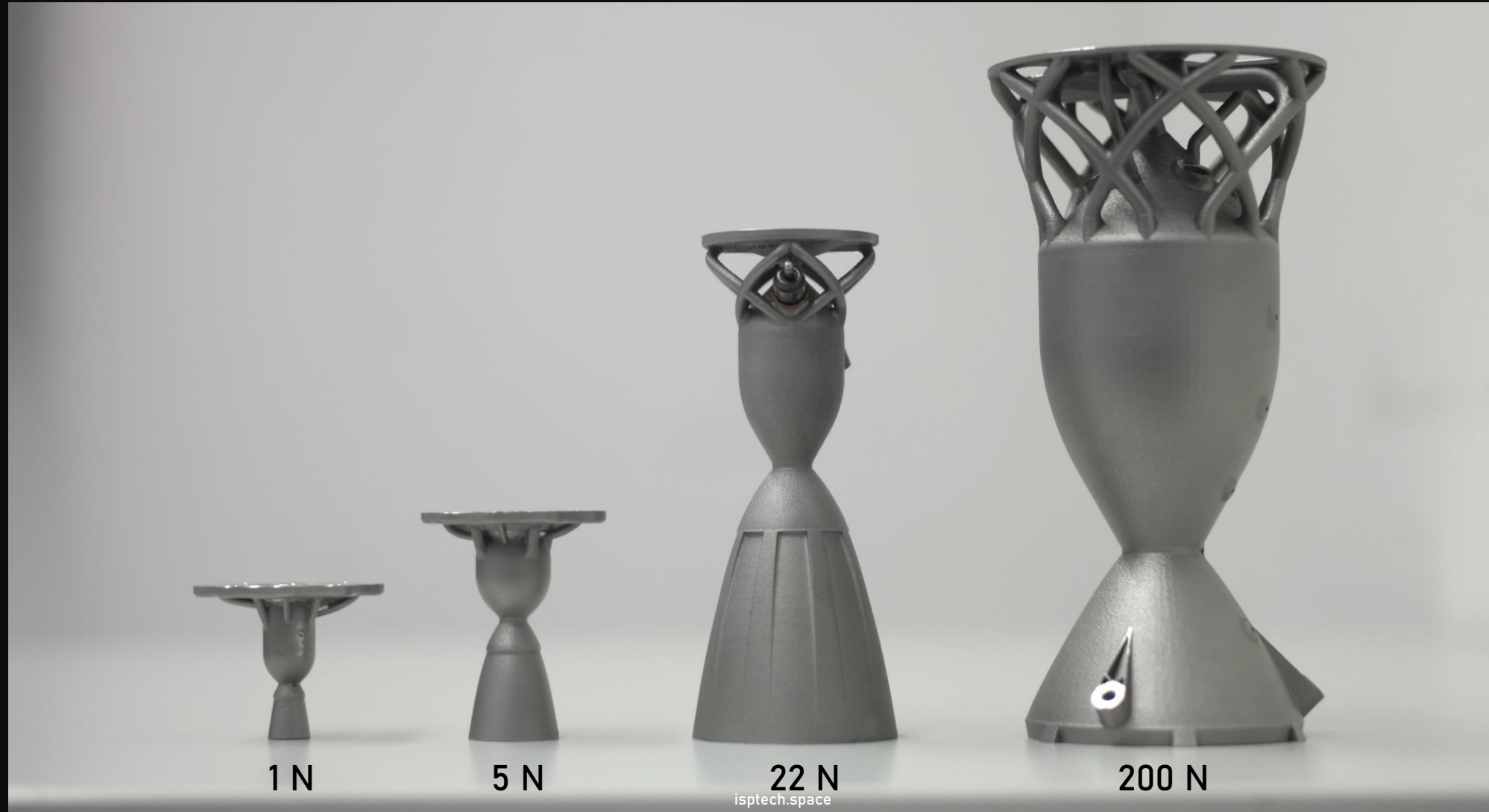


- Hydrogen peroxide and ionic liquid fuel
- Unique hypergolic green propellant
- Low toxic, simple handling



HyNOx: Product Overview

Fully 3D printed designs



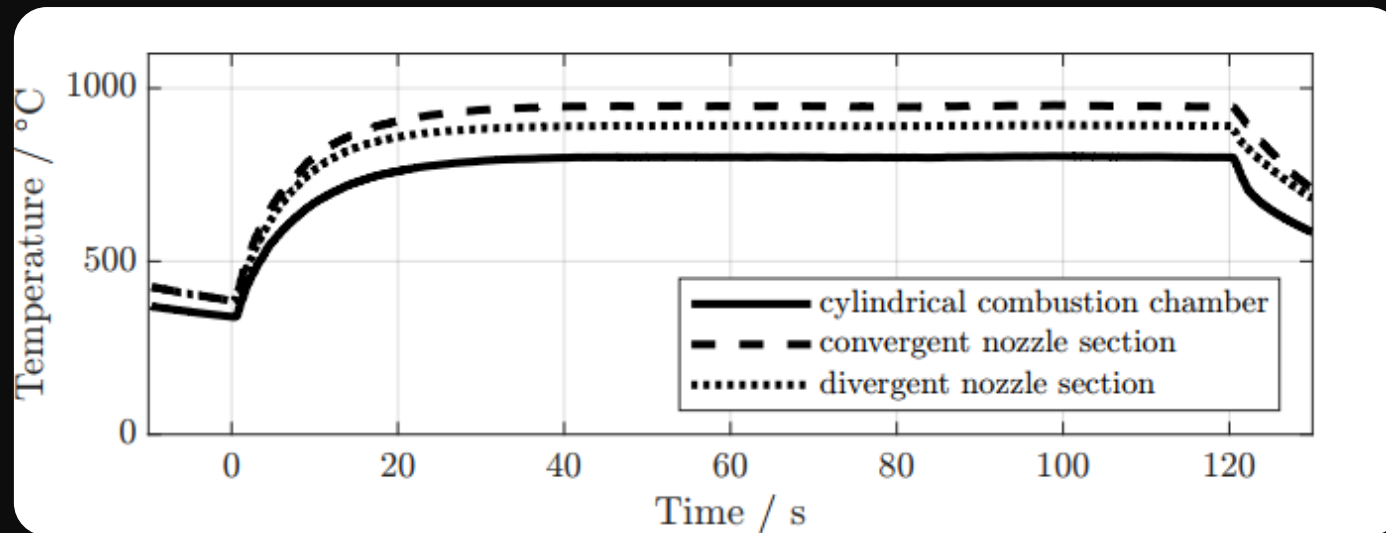
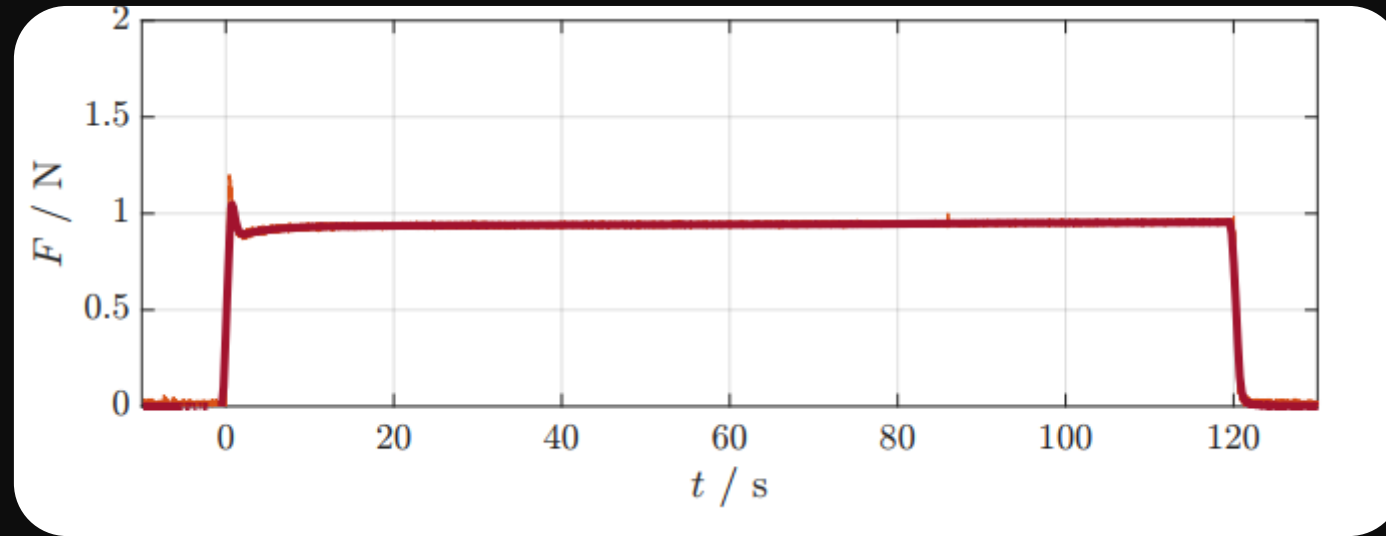
HyNOx-1

Vacuum steady state firing



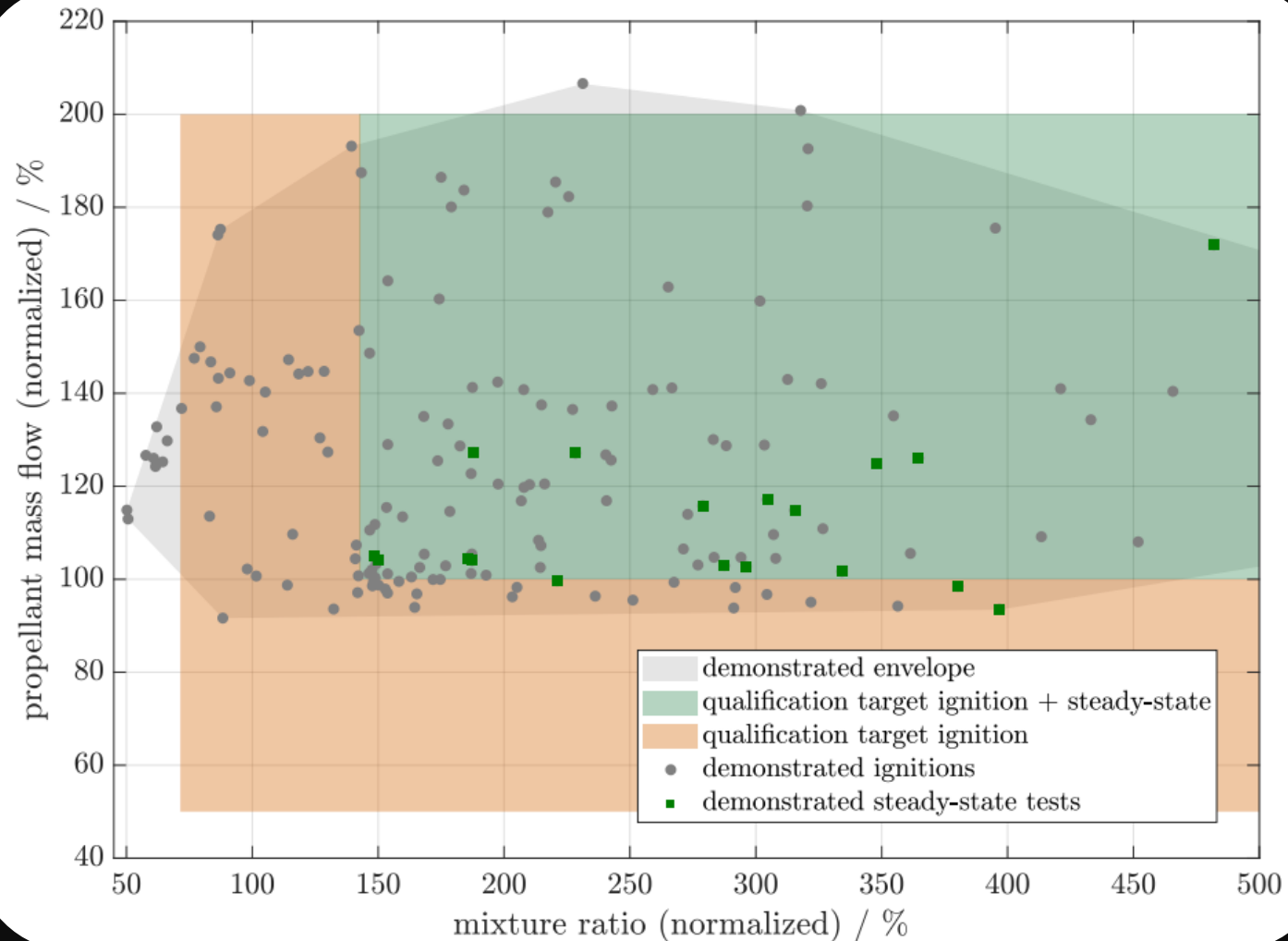
HyNOx-1

Results – Test data



HyNOx-1

Results – Operating conditions



- I_{sp} : up to 280 s
- Continuous on time: 15 min
- Minimum Impulse Bit: <0.05 Ns
- Ignitions: >3000
- Thrust range: 0.75 – 2 N

HyNOx CubeSat Propulsion

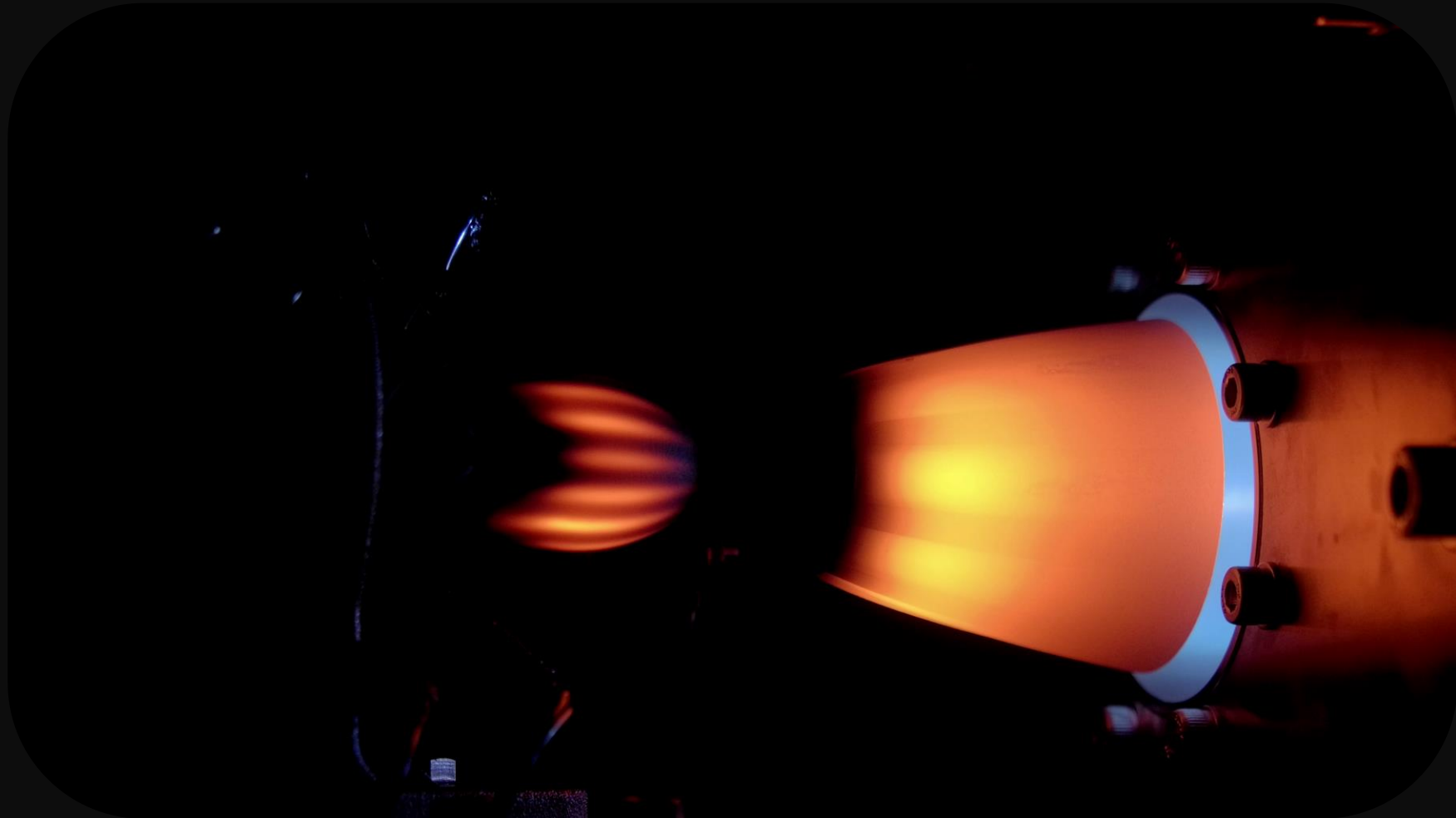
HyNOx-CubeSat 4U



- Main propulsion 1x 1N HyNOx-1
- Attitude control 4 x 100 mN cold gas thrusters, warm gas optional
- Up to 4000 Ns
- Δv of 200 m/s (for 20kg CubeSat)
- First mission in 2025

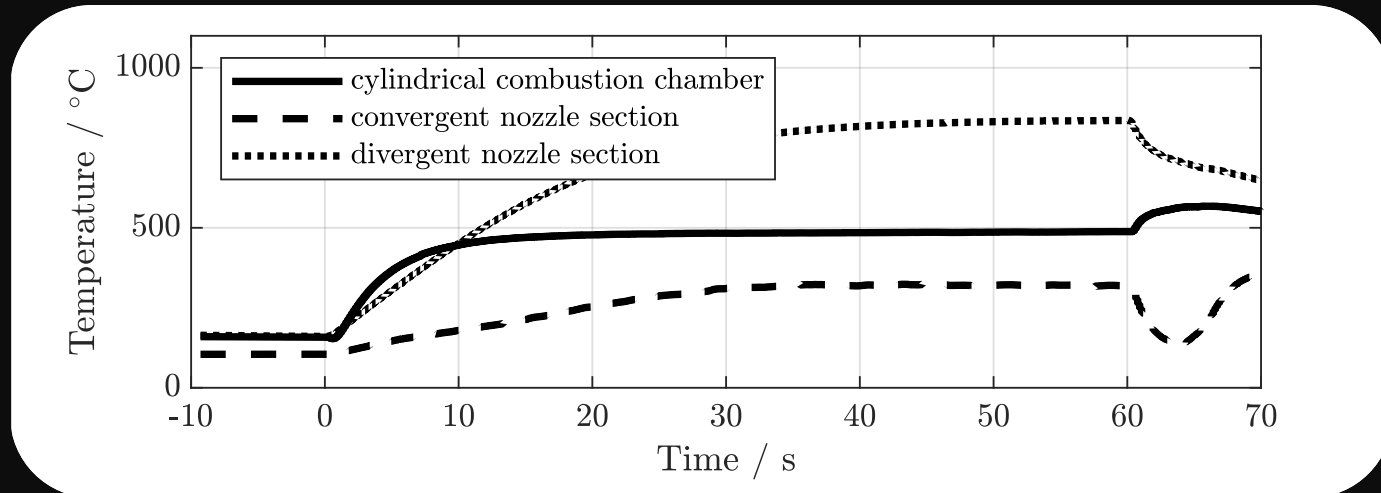
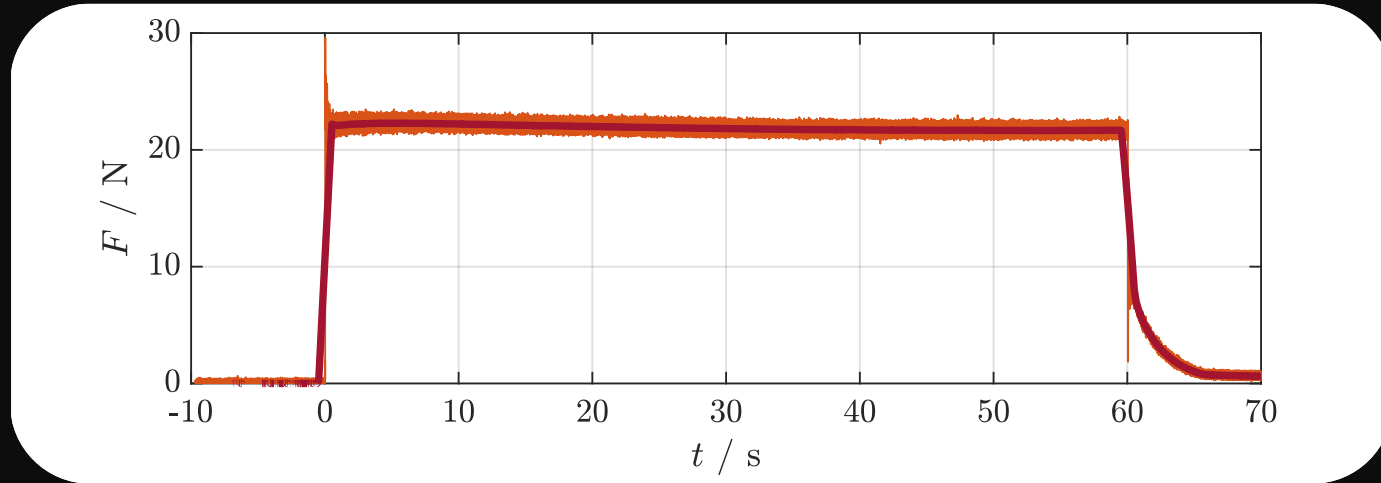
HyNOx-22

Vacuum steady state firing



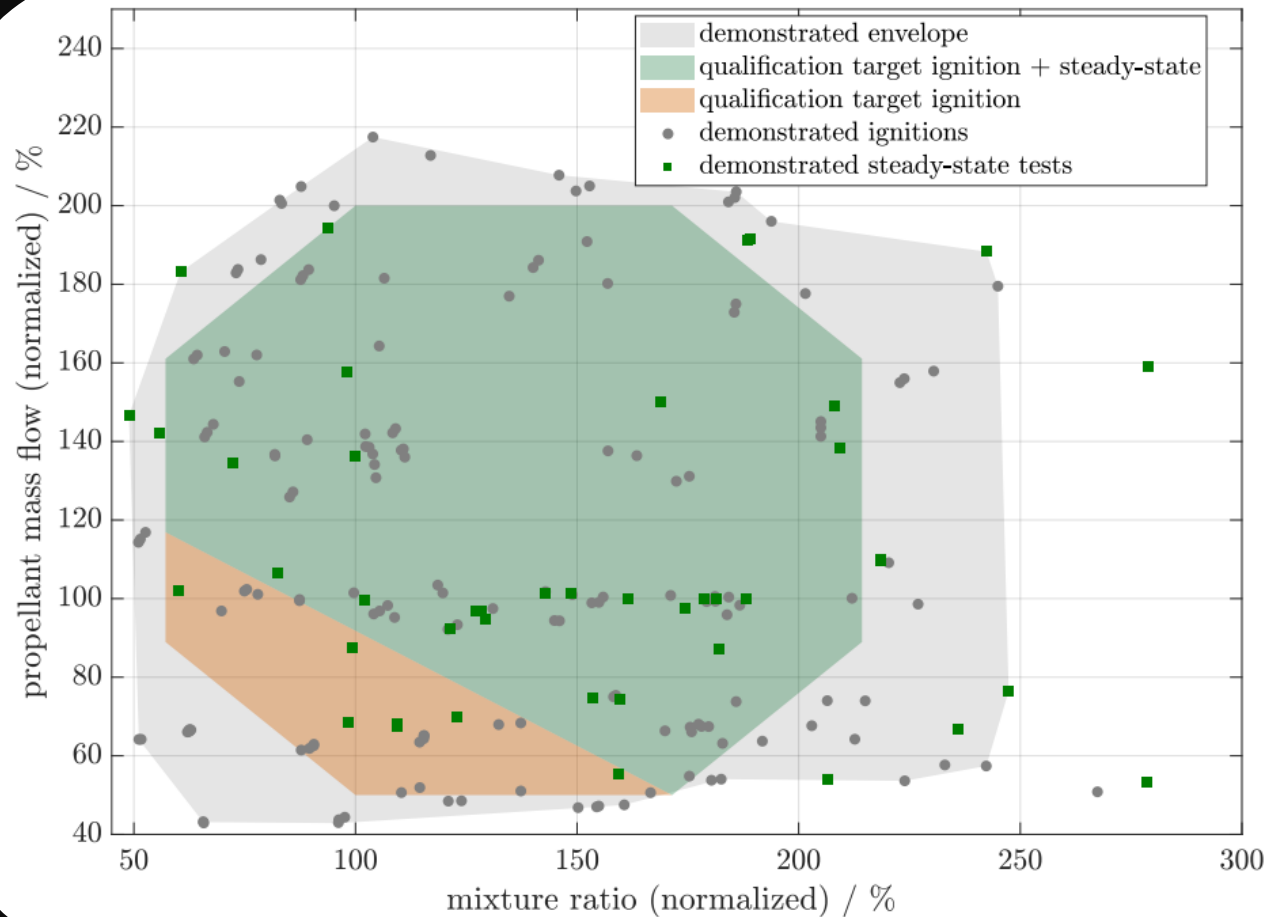
HyNOx-22

Results – Test data



HyNOx-22

Results – Operating conditions

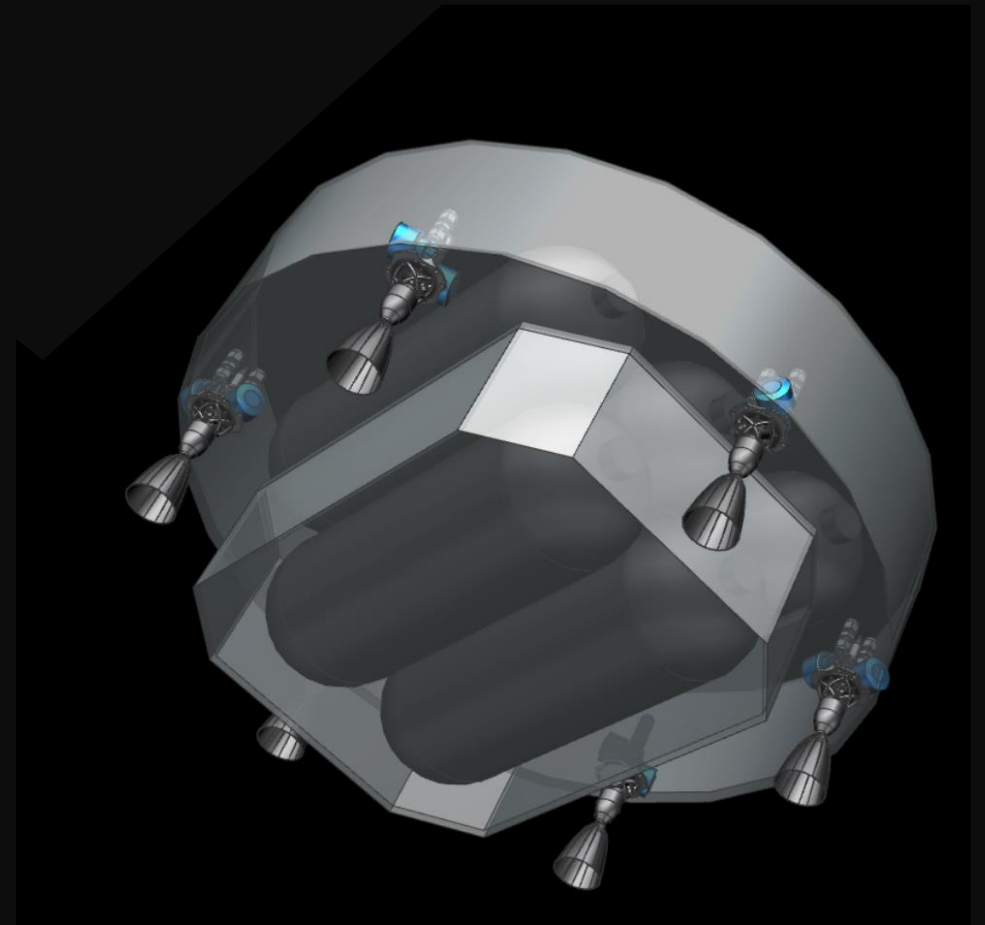
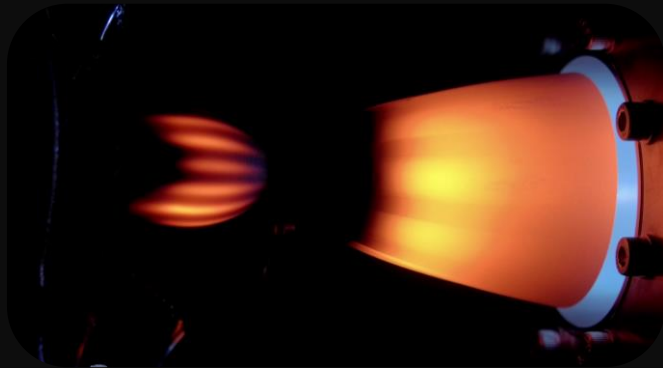


- I_{sp} : up to 290 s
- Continuous on time: 15 min
- Minimum Impulse Bit: <1 Ns
- Ignitions: >4000
- Thrust range: 11 – 44 N

De-orbit concept SmallSat



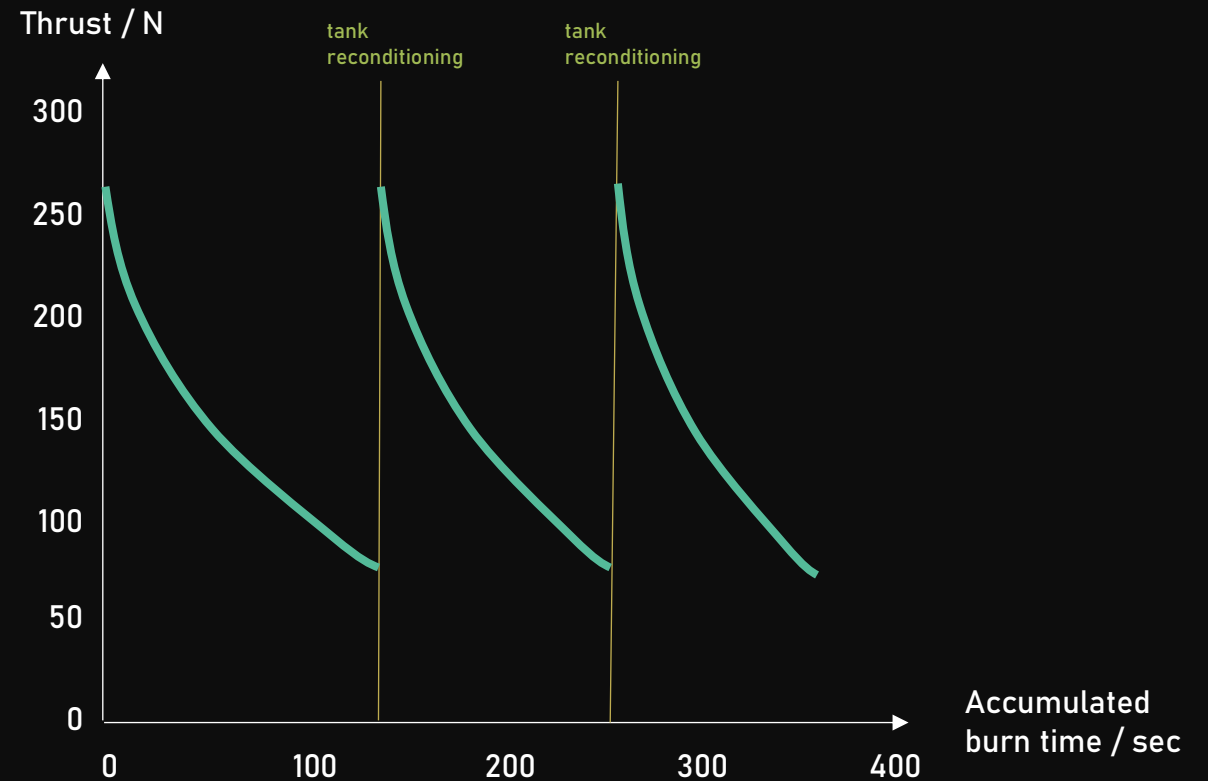
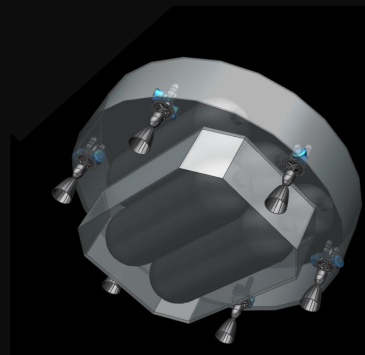
- Small Sat with 300 kg mass
- 6 x HyNOx-22
- $\Delta v > 120$ m/s
- Gaseous propellant feeding



De-orbit concept SmallSat



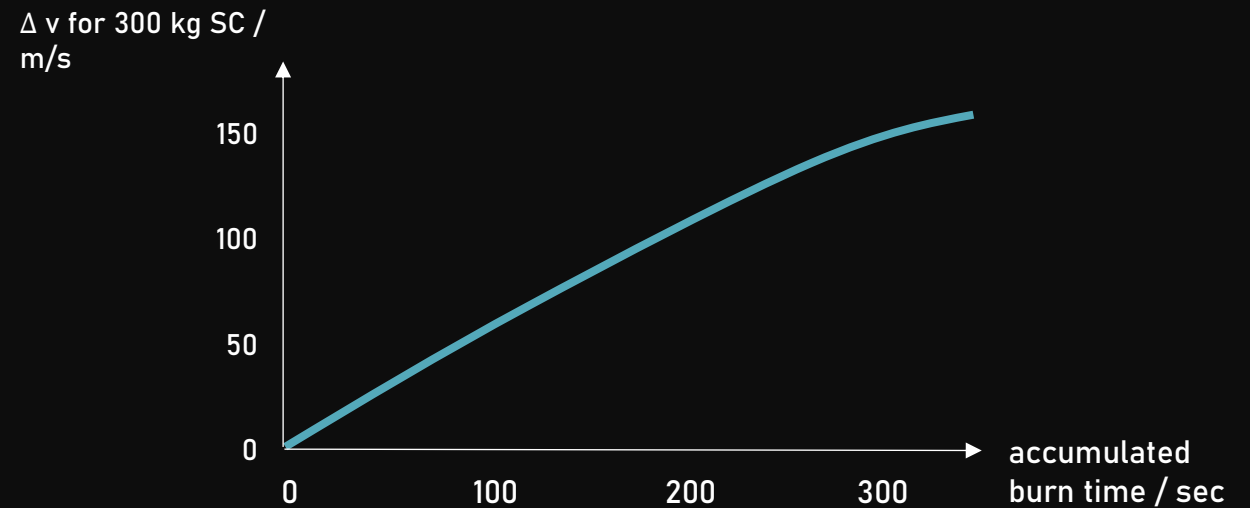
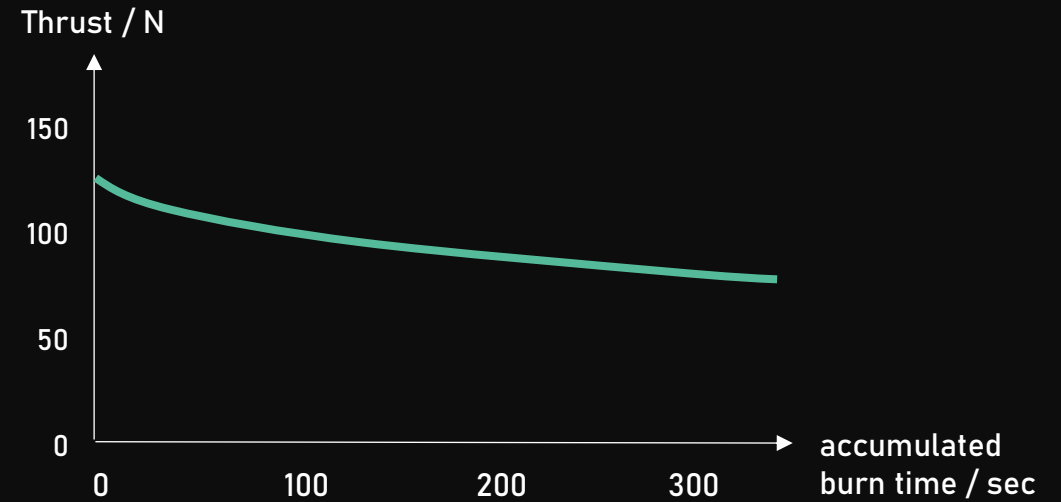
- Small Sat with 300 kg mass
- 6 x HyNOx-22
- $\Delta v > 120$ m/s
- Gaseous propellant feeding
 - several reconditioning phases necessary
 - Heating ~ 1 kWh



De-orbit concept SmallSat



- Liquid propellant feeding
- Small Sat with 300 kg mass
- 6 x HyNOx 22
- $\Delta v > 120$ m/s
- ~~Heating ~ 1 kWh~~



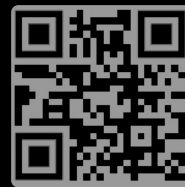
Get in contact !



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