RAVEN

DESIGN AND TESTING OF A STUDENT RESEARCHED AND DEVELOPED HYBRID ROCKET PROPULSION SYSTEM

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ABOUT OUR **PROJECT**

- Students at **LTU** campus, KIRUNA
- we are currently over 40 people from across the globe
- Kiruna’s only student rocket project
- functional for over 5 years

ROAD MAP

THEORETICAL DESIGN

FEBRUARY 2020

SMALL SCALE TESTS

AUGUST 2022

DESIGN IMPROVISATION

AUGUST 2024

FLIGHT READY HARDWARE

EARLY 2026

LAUNCH

SEPTEMBER 2026

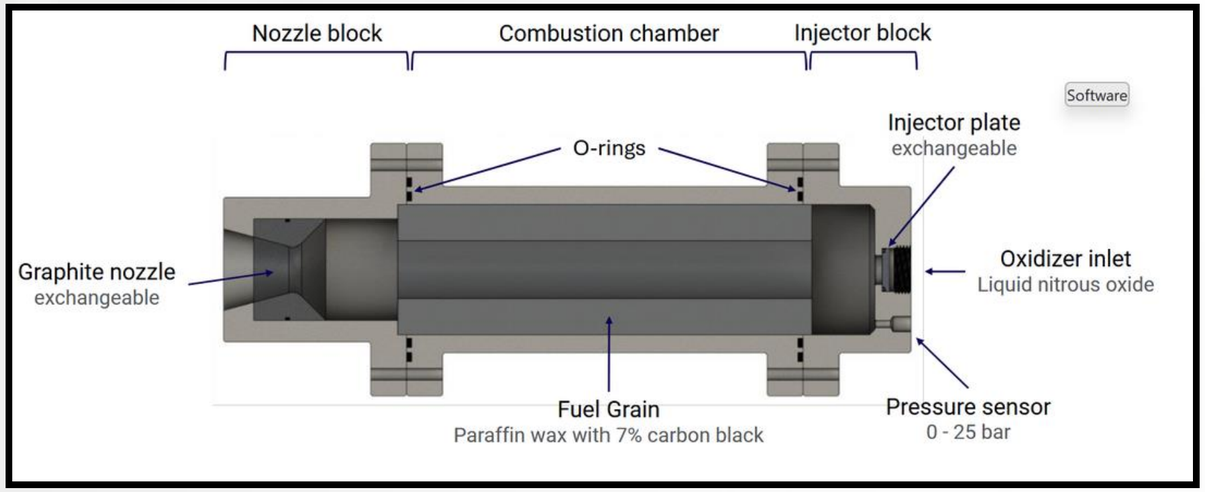
OUR **OBJECTIVES**

Achieve an attitude of **3000 m** and **1 kN** thrust and estimated burn time of **6.5 s**

compete in **EuRoc 2026**

build a foundation for future student rocket projects at Kiruna rymdcampus

OUR ENGINE
URSA-1



1

URSA - 1 is a hybrid rocket engine which uses solid propellant (**paraffin wax**) and **nitrous oxide** as the liquid propellant

2

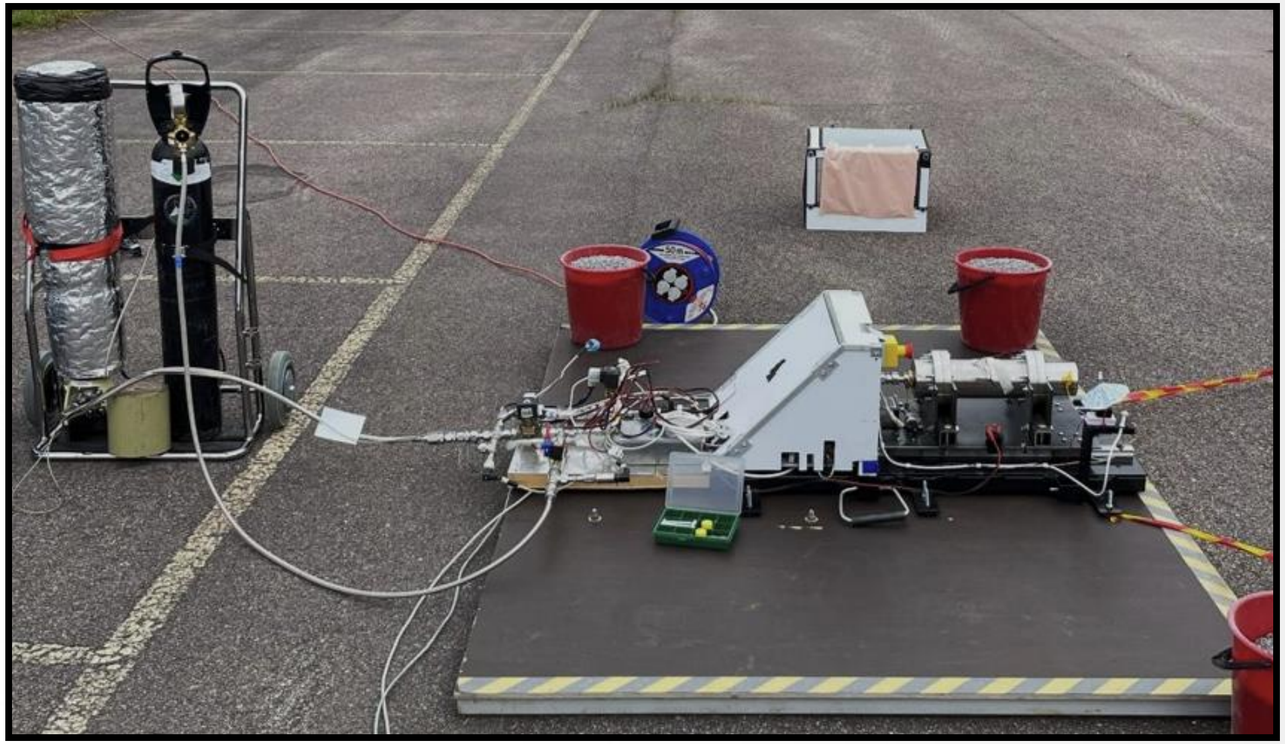
designed to achieve a minimum thrust of **1000 N** and burn time of **6.5** s

3

designed based on the EuRoc requirements

OUR
TEST BENCH

1. arduino mega based control and data acquisition system
2. able to accomodate different engine sizes
3. piping for oxidizer and nitrous oxide



PREVIOUS **TESTS**

5 x igniter tests
12 x cold flow tests
17 x hot fire tests

we conduct tests to improve our design based on the results. Our goal is to find better mass oxidizer flow rate and better characteristic velocity

HOT FIRE TESTS
PERFORMANCE

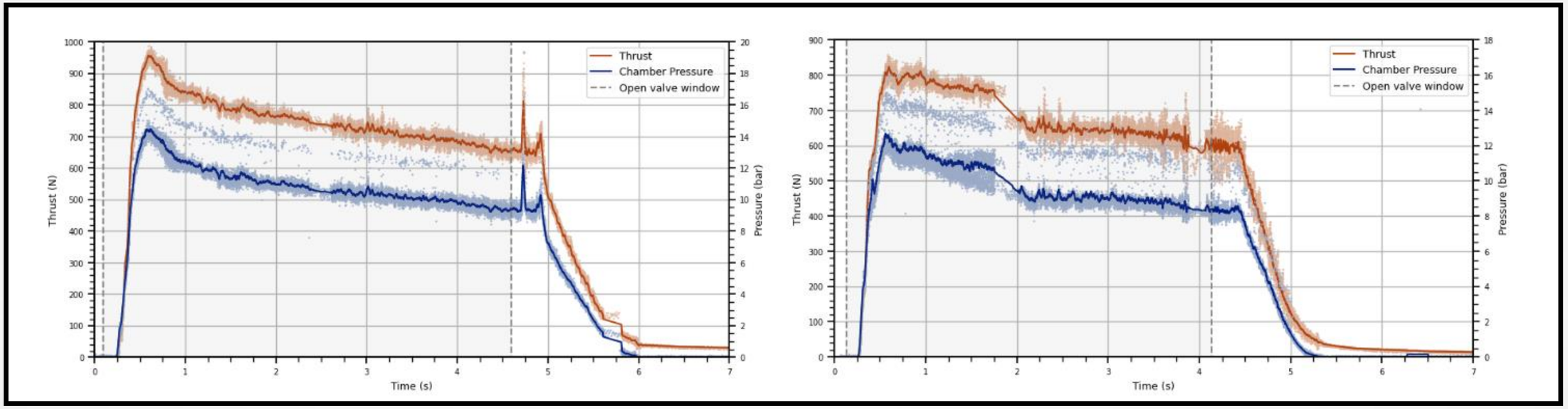
17 tests in total.

to verify valve and igniter timings

collect data of engine's performance

HFT 12

HFT 13



HOT FIRE TESTS
PERFORMANCE

both tests had 50° impinging angle injector

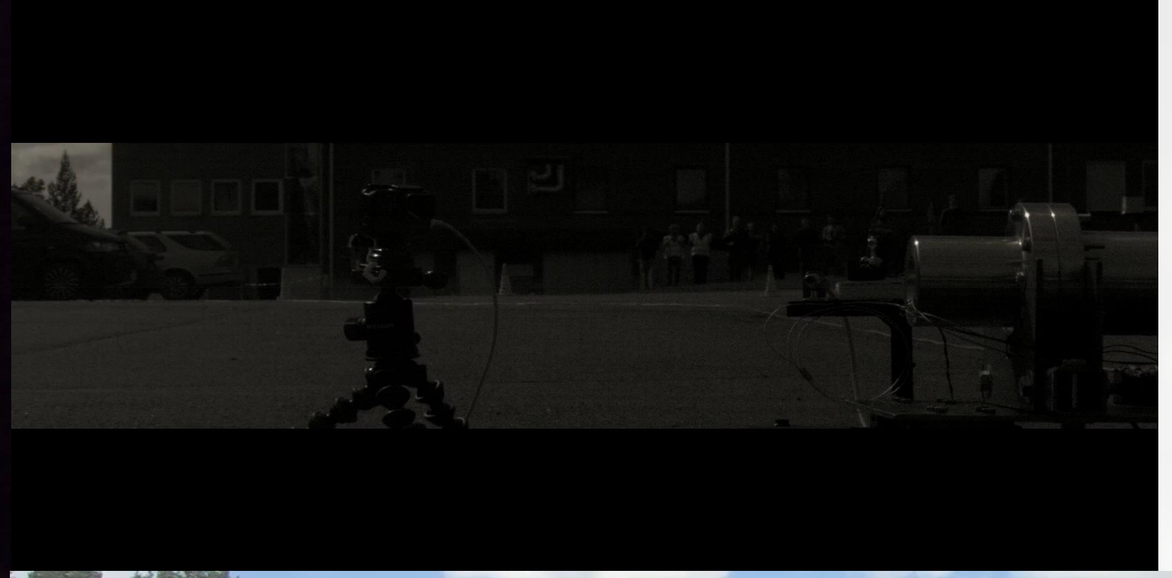
by far the best results

HFT 12

variables	value
characteristic velocity c* (m/s)	1096.3
burn time (s)	4.55
specific impulse Isp (s)	130.5
thrust T (N)	747.2
oxidizer mass flow (g/s)	377

HFT 13

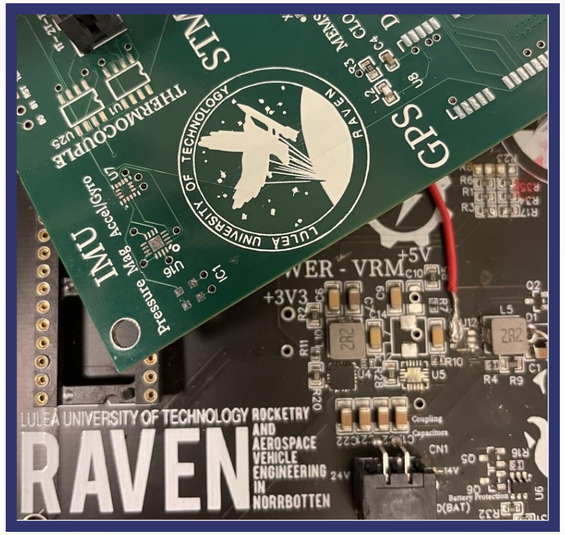
variables	value
characteristic velocity c* (m/s)	1104.8
burn time (s)	4.08
specific impulse Isp (s)	143.5
thrust T (N)	679
oxidizer mass flow (g/s)	319



SOME VIDEOS

FUTURE
OUTLOOK

we are currently on our critical design phase. we continuosly update out design based on the test results and advice from the experts. We are expecting to have our design ready by the **end of 2025**



EARLY 2026 : Start manufacturing the structures and conducting tests

AUGUST 2026: have the full rocket ready for launch in 2026

EUROC
EUROPEAN ROCKETRY CHALLENGE

ACKNOWLEDGEMENTS

THANK YOU

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