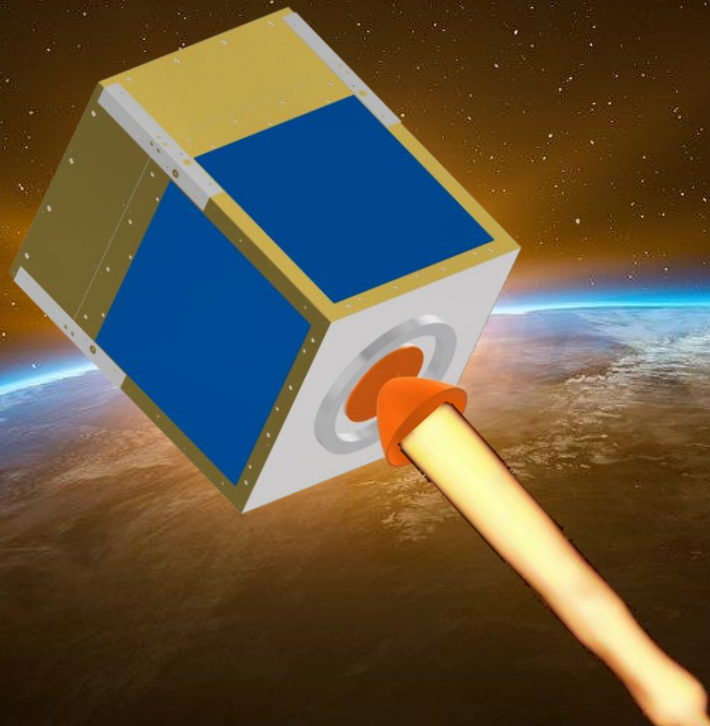


“Hybrid Rockets are a Game-Changing Technology for In-Space Transportation”

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Spec. App. Asst. Prof.
Hokkaido University
kamps@eng.hokudai.ac.jp





MHI / H3

<https://global.jaxa.jp/>



Space X / Falcon 9

<https://spaceflightnow.com/>



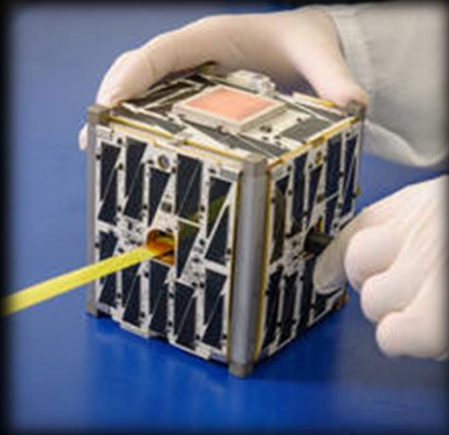
IST / ZERO

<https://asia.nikkei.com/>



Virgin Orbit / Launcher One

<https://japanese.engadget.com/>



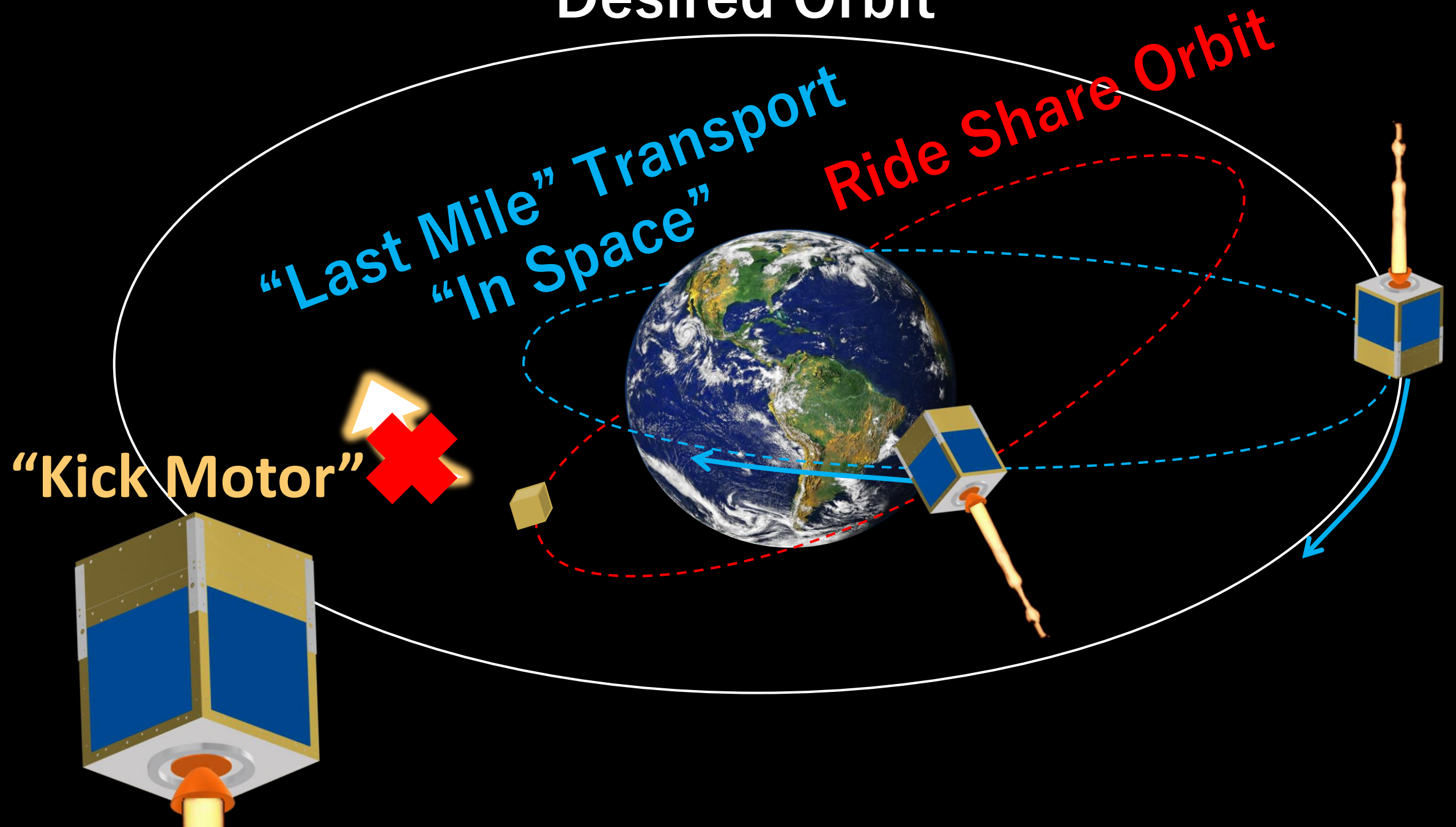
<https://www.nasa.gov/>



Ride Share

<https://spacenews.com/>

Desired Orbit



“Kick Motor” for “Last Mile In Space”

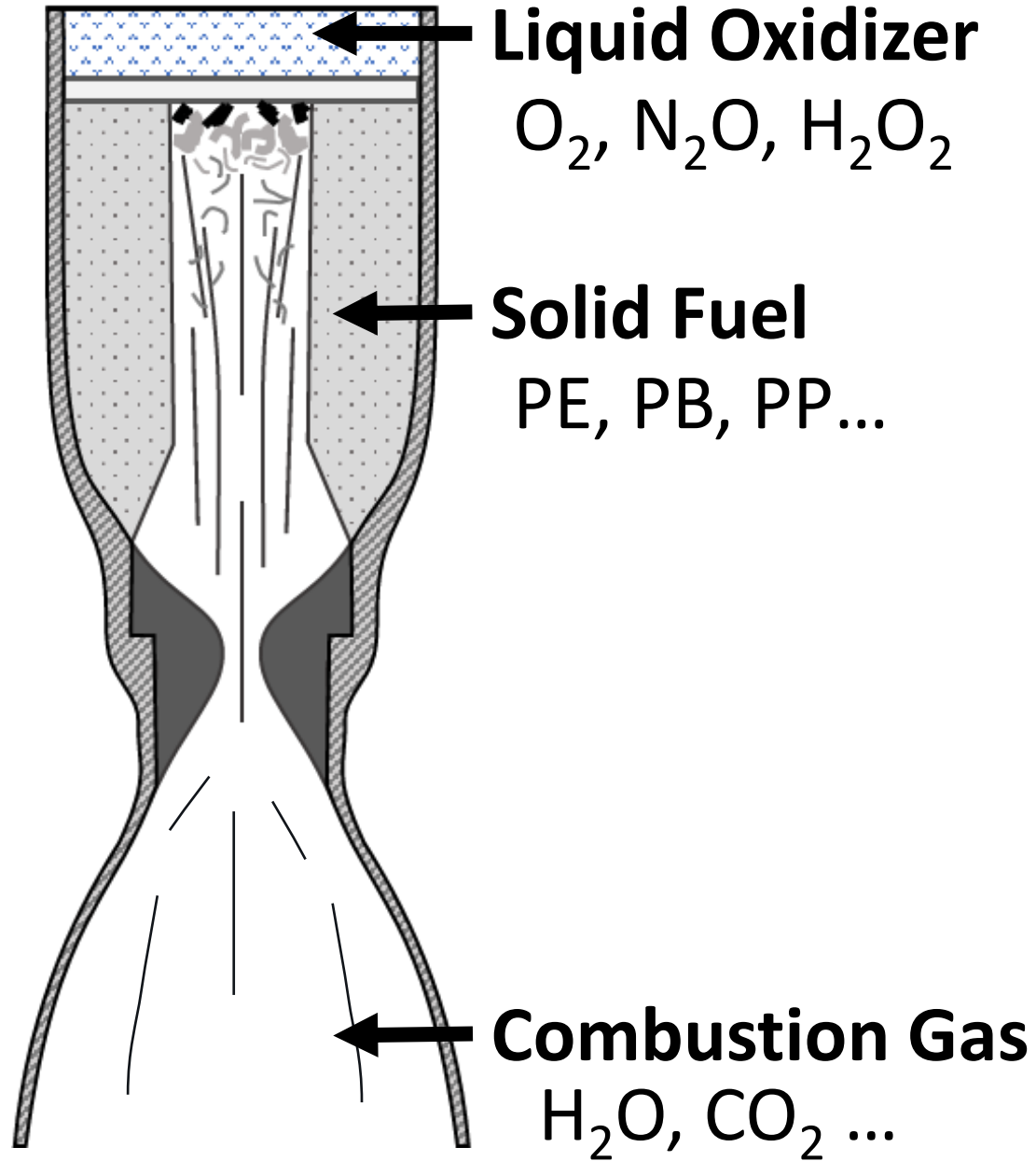
	Ion	Gas	Liquid	Solid	Hybrid
Non-hazardous	●	●	✗	✗	●
Low cost	✗	●	✗	▲	●
Powerful	✗	✗	●	●	●
Controllable	●	●	●	✗	●
Commercially Available	✗	●	✗	✗	●

SpaceShipTwo (2018)

[businessinsider.com](https://www.businessinsider.com)



(Hybrid) Rocket Motor

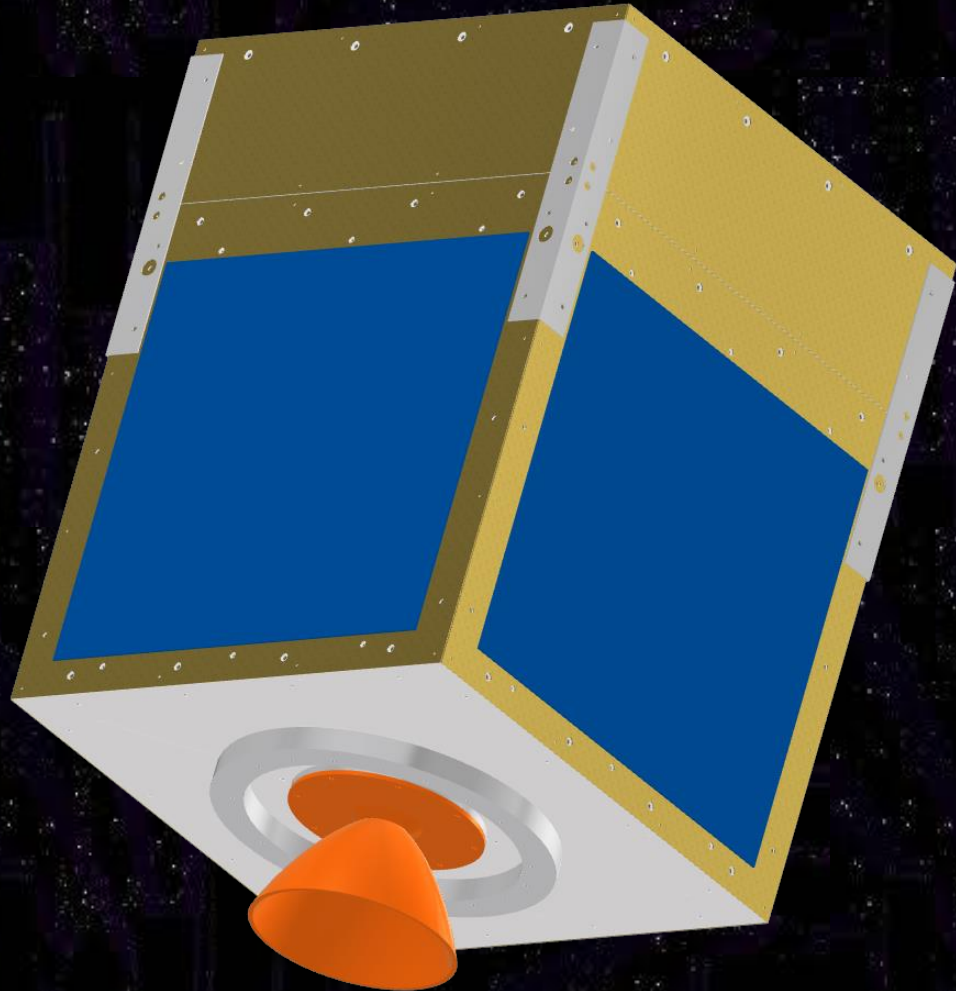


N₂O/PE Attributes:

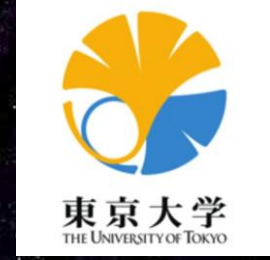
Isp: 320 s
HDPE Density: 950 kg/m³
N₂O Density: 900 kg/m³
Ideal O/F: 7
Vapor Pressure: 4-5 MPa
Non-corrosive | Non-toxic
Widely available | CAM (HDPE)



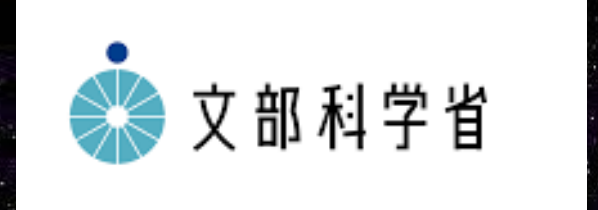
N2O/HDPE Hybrid Rocket Kick Motor



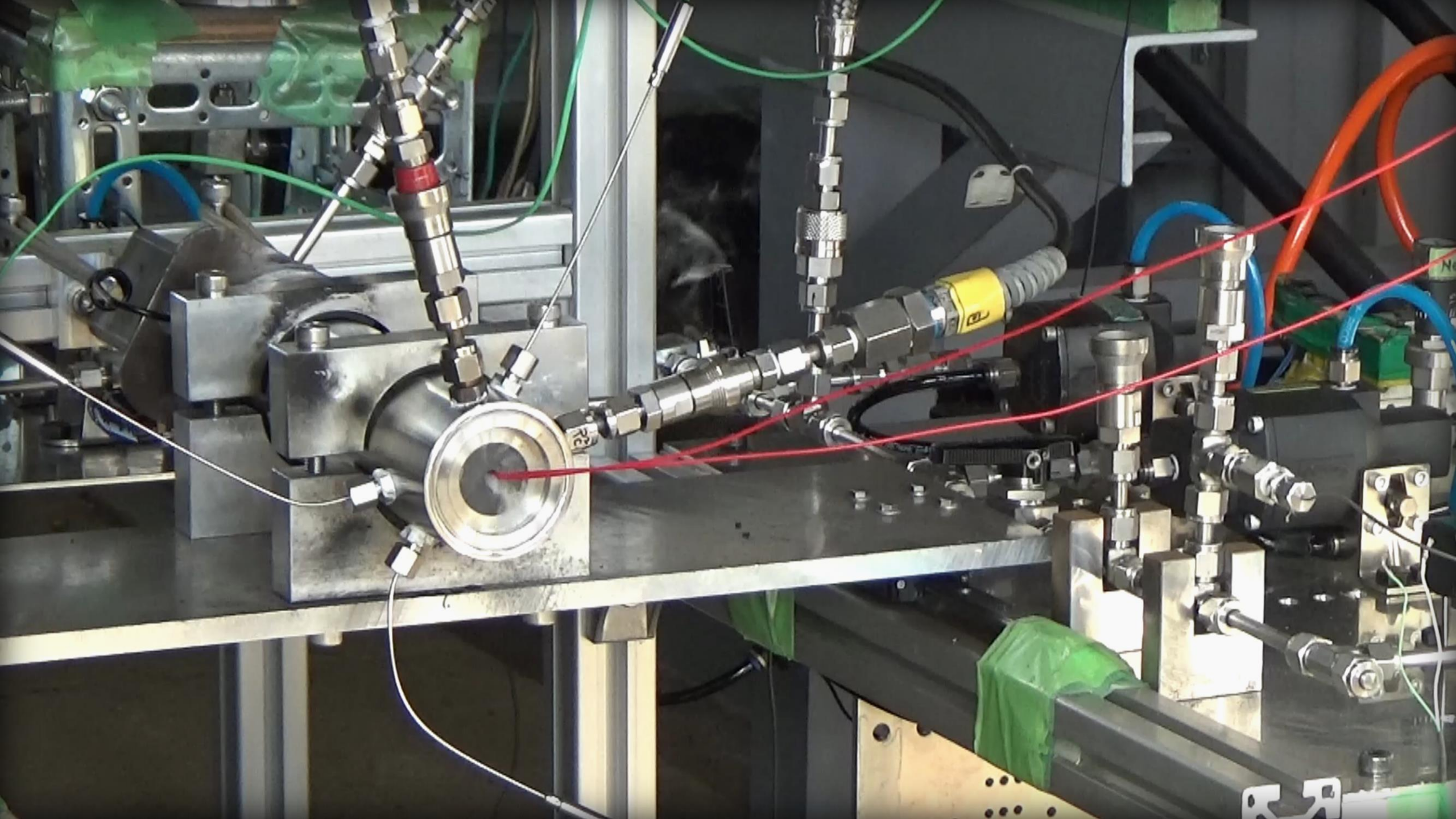
Researched By

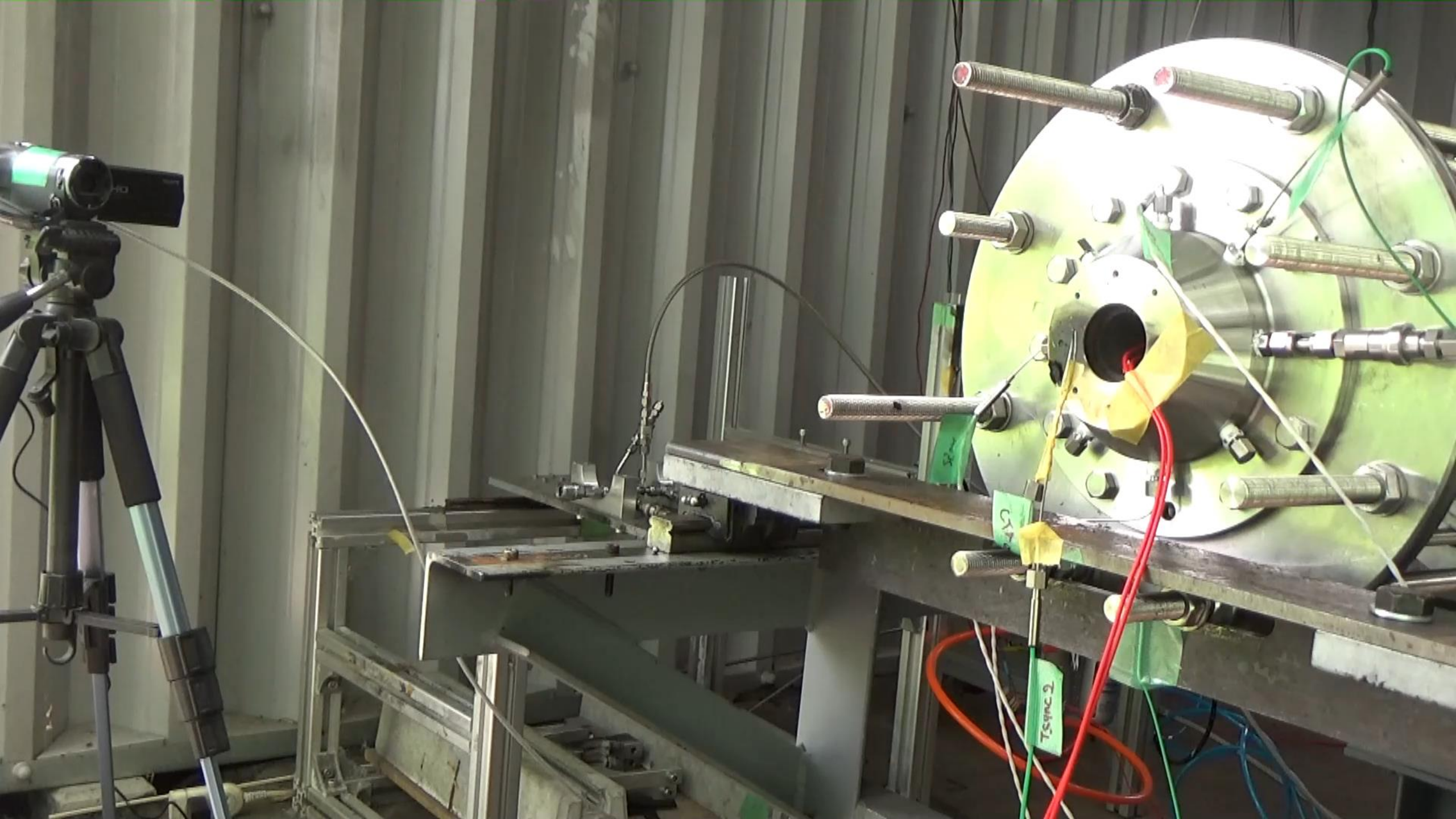


Supported By



We are aiming for
commercialization







61718

on off on off -

N20 ~~10~~ MPa

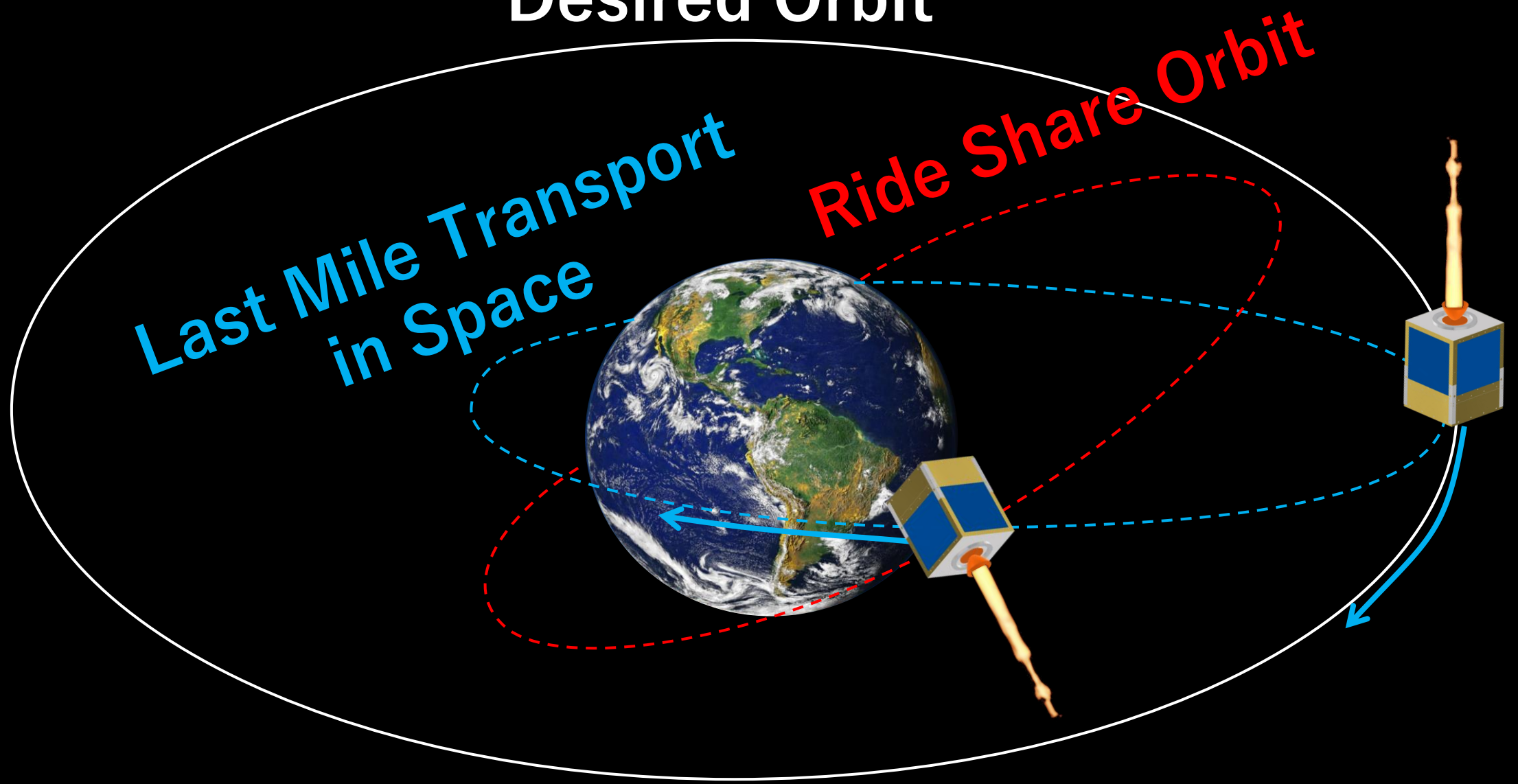
Orifice 0.8 mm

Slidac 25 V

18th June 2020

2020

Desired Orbit

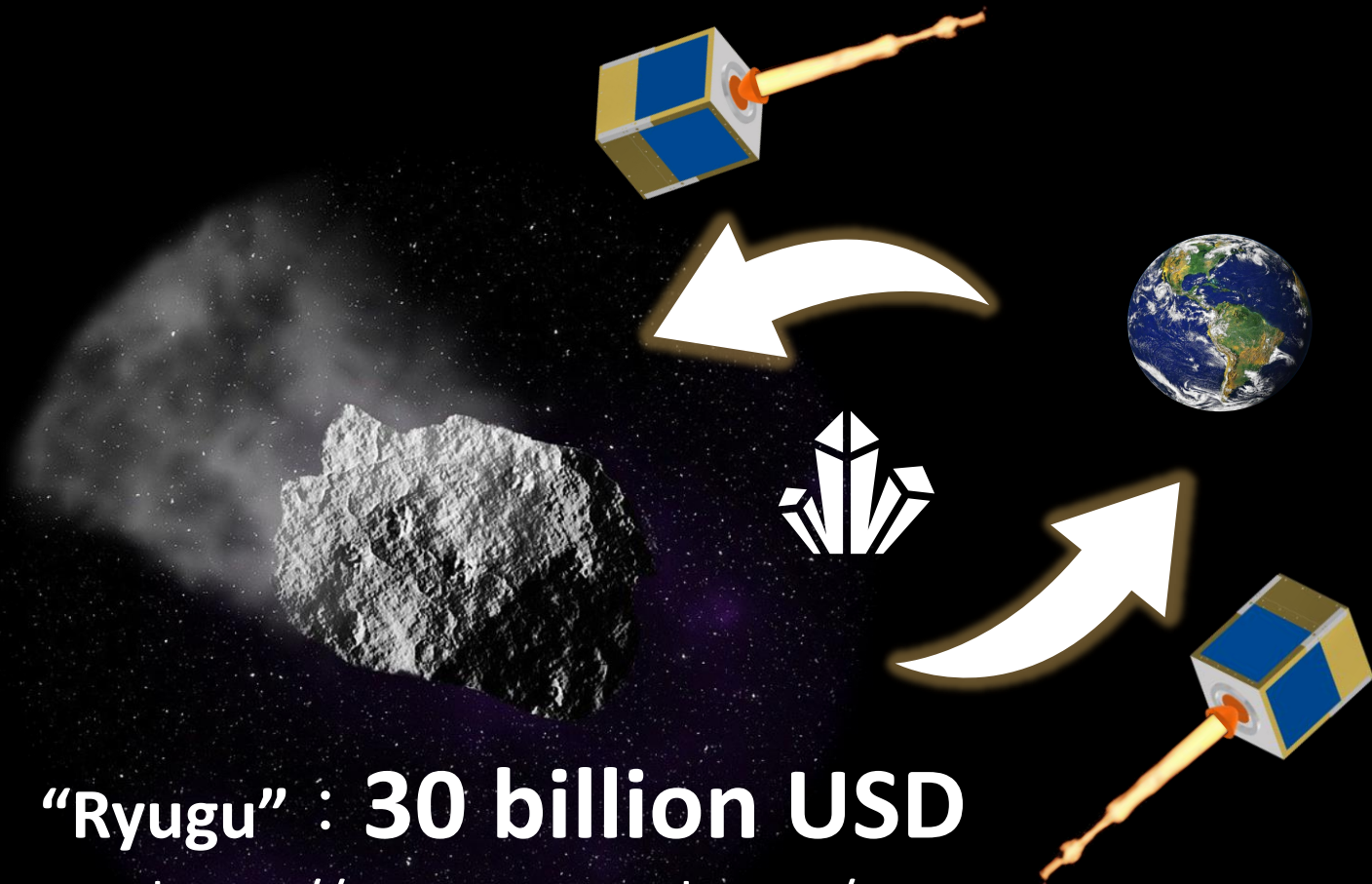




<https://www.dailymail.co.uk/>



Hayabusa 2



“Ryugu” : 30 billion USD

<https://www.asterank.com/>

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