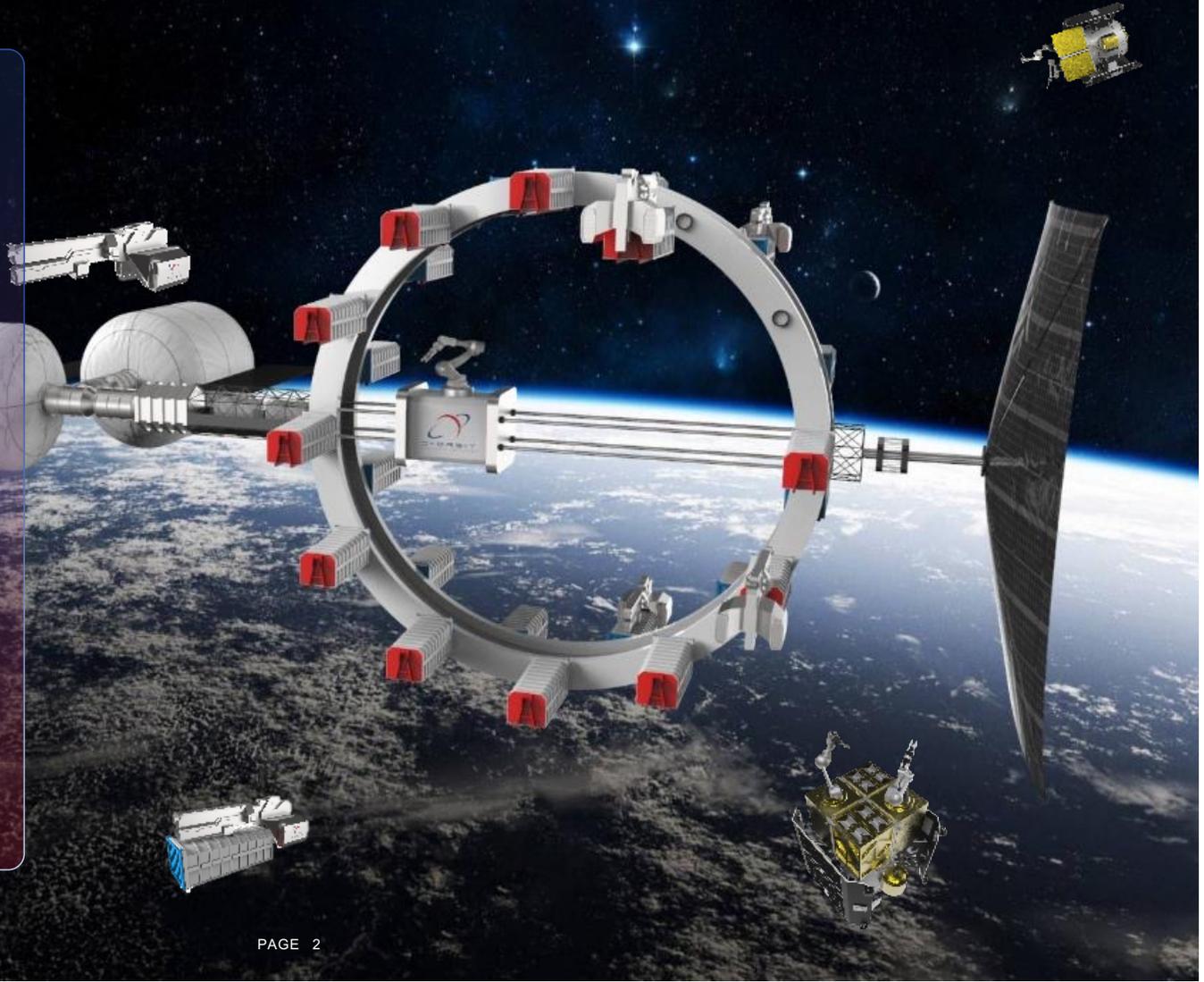# D-ORBIT

NEW SPACE SOLUTIONS

SPACE LOGISTICS & TRANSPORTATION

MATTEO ANDREAS LORENZONI - CDW 2024

Our Vision

Creating the first space
logistics infrastructure to
enable
the trillion dollar
space economy
and human expansion in
sustainable space

D-ORBIT AT A GLANCE

WELL POSITIONED TO BENEFIT FROM RAPIDLY GROWING SPACE ECONOMY

World's first to provide
in-space satellite transportation
for paying customers

World's first to demonstrate
satellite-as-a-service
capabilities in space

2021+
TODAY
Last-mile delivery solution for
satellites and advanced
infrastructure services

2023+
TOMORROW
Next-gen in-orbit services
across entire satellite
lifecycle

BEYOND
In-orbit recycling,
manufacturing
& infrastructure

D-ORBIT'S PREMISES

300+ people

D-ORBIT UK
ION Advanced Services
Harwell, UK

D-ORBIT
Headquarters
Production venue, mission control
(2,500m²)

D-ORBIT USA
Commercial subsidiary, Washington DC

D-ORBIT PT
Critical software and AURORA mission control software,
Lisbon, Portugal

SOLUTIONS FOR COMMERCIAL SPACE

Launch Services
Satellite Transportation and Logistics Services with ION
In-Orbit Demonstration/Validation
SaaS, Sat for Rent, Cloud Computing

LAUNCH SERVICE

The first step in the space logistic

Launch Service is a **launch and deployment service** provided in collaboration with third-party launchers.

|			
DPOD-3	1U	2U	3U
DPOD-8	4U 4U	8UL	
DCUBE-12	3U 3U / 3U 3U	6U / 3U 3U	6U / 6U	12U
DCUBE-16	4U 4U / 4U 4U	8UL / 4U 4U	8UL / 8UL	16U

ION SATELLITE CARRIER

- Designed to transport satellites to space and release them into precise, independent orbital slots, enabling to start their space mission quickly and in optimal operational conditions

- ION Cargo Spacecraft is equipped to transport a combination of satellites of any form factor, up to 160 kg mass* in total, including nano- and micro-satellites.

- ION Cargo Spacecraft is a fully redounded satellite up to 500kg in mass at launch including propellant, capable of delivering its payload into multiple orbit. With more than 1km/s Delta-V ION Cargo Spacecraft can deploy its payload into the Lunar Orbit.

- Extra services include mission analysis and design, platform engineering, software development, acceptance testing, and transportation.

* It is possible to increase the payload mass to 200 kg for ION Mk02.

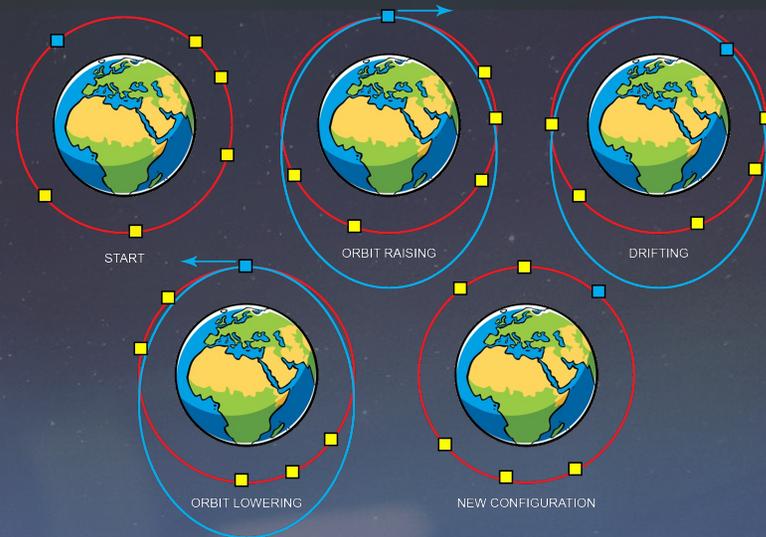# ION TRANSPORTATION SERVICES

CHANGE OF ALTITUDE AND PLANE

Propulsive Module: the propulsive module enables ION Satellite Carrier to change the altitude and correct the inclination, increasing the flexibility of pre-deployment maneuvers. Operators can now send their propulsionless CubeSats to previously inaccessible orbits. Constellation operators can deploy a whole multi-plane constellation using up different ION Satellite Carriers on a single small launcher.

CHANGE OF ALTITUDE
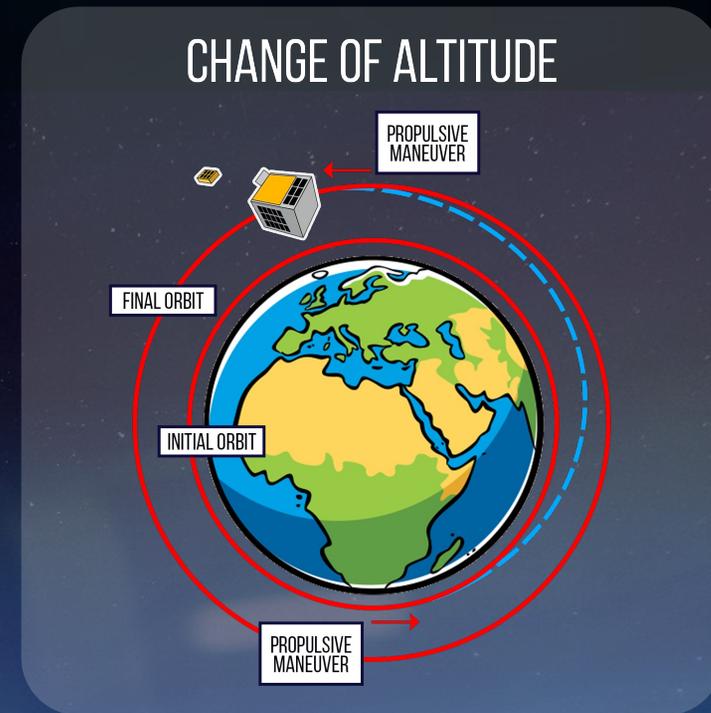
ION TRANSPORTATION SERVICES

Using its internal propulsion, ION Satellite Carrier can modify its relative position with respect to other satellites within an orbit. With an orbit-rising maneuver, ION moves itself into a higher, slower orbit, and then drift for a few days or weeks, until it is aligned with the new orbital slot. An orbit-lowering maneuver, circularizes the orbit, placing ION into the desired new configuration.

START

ORBIT RAISING

DRIFTING

ORBIT LOWERING

NEW CONFIGURATION

ION TRANSPORTATION SERVICES

ION Satellite Carrier can change the right ascension of ascending node (RAAN) of its orbit thanks to its propulsion module. The procedure exploits the Earth's oblateness (J2 effect), which torques a satellite orbit. A change in altitude or inclination induces a differential precession of the phasing orbit with respect to the initial trajectory. Once achieved the required RAAN separation, the vehicle performs a counter-maneuver to inject itself into the desired orbital slot.
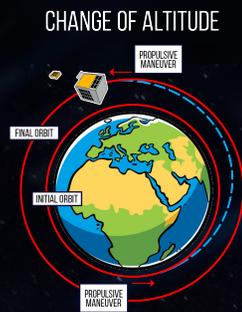
For more information on ION Launch Service watch:
https://youtu.be/Uz5W8lgtwhk

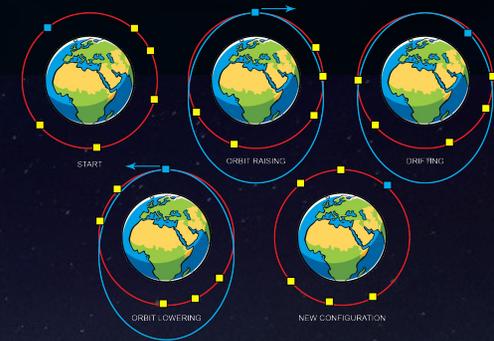■ Original Orbit   ■ RAAN Drifting Orbit   ■ New Orbit

BENEFIT FROM USING ION

CHANGE OF ALTITUDE

Not dependent on the rideshare launcher final altitude

Reach different orbits within one single launch rather than more

Time to constellation operational state reduced of 80%

FAST DISPERSION vs. STANDARD DEPLOYMENT

OUR FIRST DEPLOYMENT FROM ION

PHOTOGRAPH OF CUSTOMER'S SATELLITE DEPLOYED BY ION-MK01, LAUNCHED IN 2020

SECOND LIFE OF ION
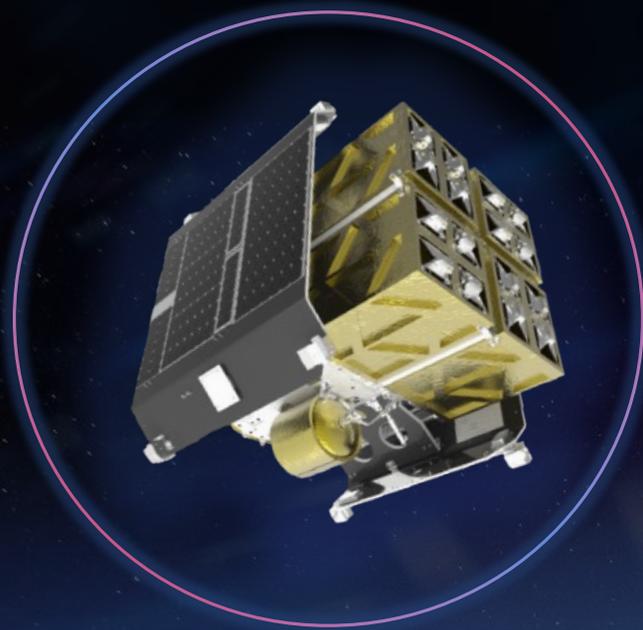
D-Orbit is a sustainable company (certified B-Corp) and is against wastes.

SHALL WE DEORBIT SUCH A PEFORMANT BEAUTY AFTER ALL THE SATELLITES HAVE BEEN RELEASED?

D-ORBIT IOD/IOV SERVICE

ION is a shared platform, not only a transportation vehicle, and therefore he has all the capabilities to operate payloads which can access the ION resources such as power, downlink, uplink, memory.

Cameras and sensors

Radio and Antennas

Propulsion units

Subsystems and components

Processing units and boards

Your payload

Time from desk to TRL9: < 6 months

IMAGES FROM OUR IOD/IOV – DRAGO-2

OTHER LIVES OF ION

SATELLITE-AS-A-SERVICE

- Customers buy operation or data generation by an IONs with a specific purposes

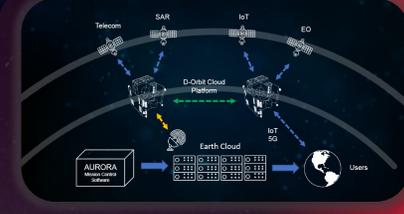- With ~15 ION units already in orbit by 2023, constellations can be offered 'as-a-service'

SATELLITE FOR RENT

- Customers rent slot on IONs to place sensors that will generate data

- D-Orbit operates IONs and delivers the data to the customers via Aurora

SPACE CLOUD COMPUTING

- In-orbit edge computing, data storage & processing

- Next paradigm for space data collection and analysis

Leveraging on an existing constellation infrastructure

Note: Services are tested in prior missions or expected to be tested in future missions already scheduled
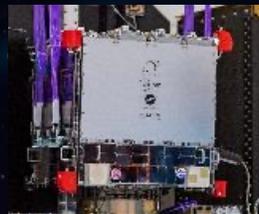
OUR HERITAGE

THE BUSINESS OF SPACE LOGISTICS

2013
1st SPACE MISSION

2017
1st SATELLITE IN SPACE
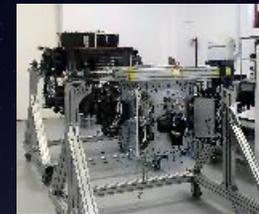
2020
ION Mk01 MISSION 1*

2021
ION Mk02 MISSION 2**

2021
ION Mk02 MISSION 3***

2022
ION Mk02 MISSION 4
ION Mk02 MISSION 5
ION Mk02 MISSION 6

2023
ION Mk02 MISSION 7
ION Mk02 MISSION 8
ION Mk02 MISSION 9
ION Mk02 MISSION 10****

AIMING TO 12 MISSIONS PER YEAR – SEVERAL OPPORTUNITIES FOR LAUNCHING AND HOSTED PAYLOADS FOR UNIVERSITY AND RESEARCH ENTITIES

D-ORBIT
NEW SPACE SOLUTIONS

THANK YOU

MATTTEO.LORENZONI@DORBIT.SPACE