



Zero 2 Infinity Solves for Access to Space

Toulouse April 2019

Photo from Zero 2 Infinity's first flight to Near Space



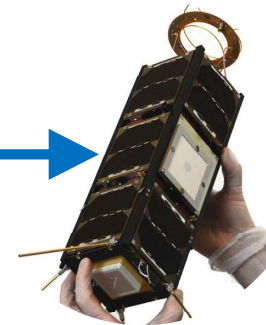
THERE IS A GLOBAL THIRST FOR DATA THAT ONLY SPACE CAN SATISFY

PARADIGM SHIFT: TOWARDS DISTRIBUTED NETWORKS



TRADITIONAL SATELLITE

Avg. Mass >2000kg
Dev. Time 4 years
Cost >€100M



LOW EARTH ORBIT MICROSATELLITES

Avg. Mass 20 kg
Dev. Time <1 year
Cost <€1M



NEAR SPACE BALLOONS

Avg. Mass 20 kg
Dev. Time <1 year
Cost <€0.5M

EXISTING LAUNCH OPTIONS FOR MICROSATELLITES ARE DISMAL

1 Existing launch methods for light payloads

→ **Piggy-back** on big rockets
commissioned for larger Spacecraft



→ **Scaled-down** rockets



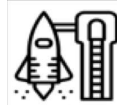
→ Launch from an **airplane**



2 Drawbacks



The useful parts of satellites are limited in size to fit inside a **narrow fairing** protecting from aerodynamic loads and to survive the **stressful vibrations and shocks** of conventional launch



Require inflexible **launch pad and expensive infrastructure**



If piggy-back: **sub-optimal orbit options** and limited launch slots

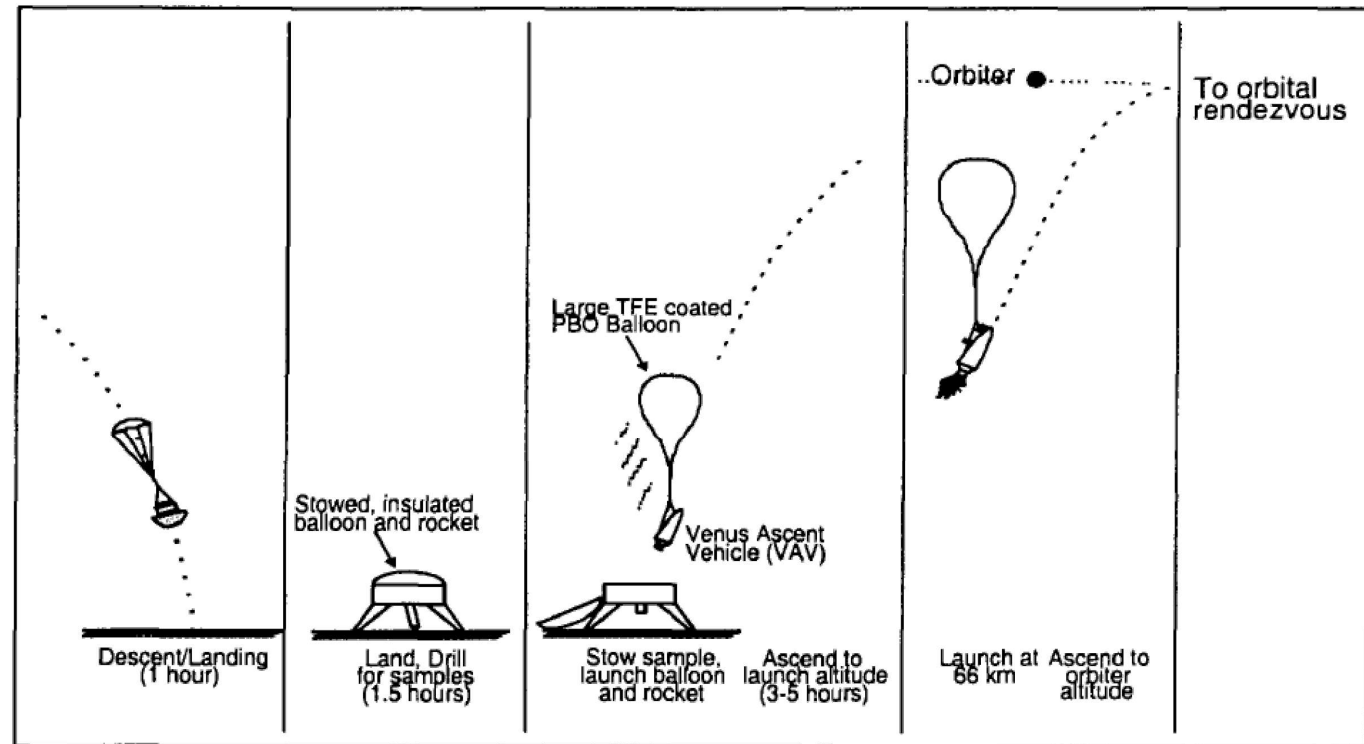


Capital intensive and **expensive**

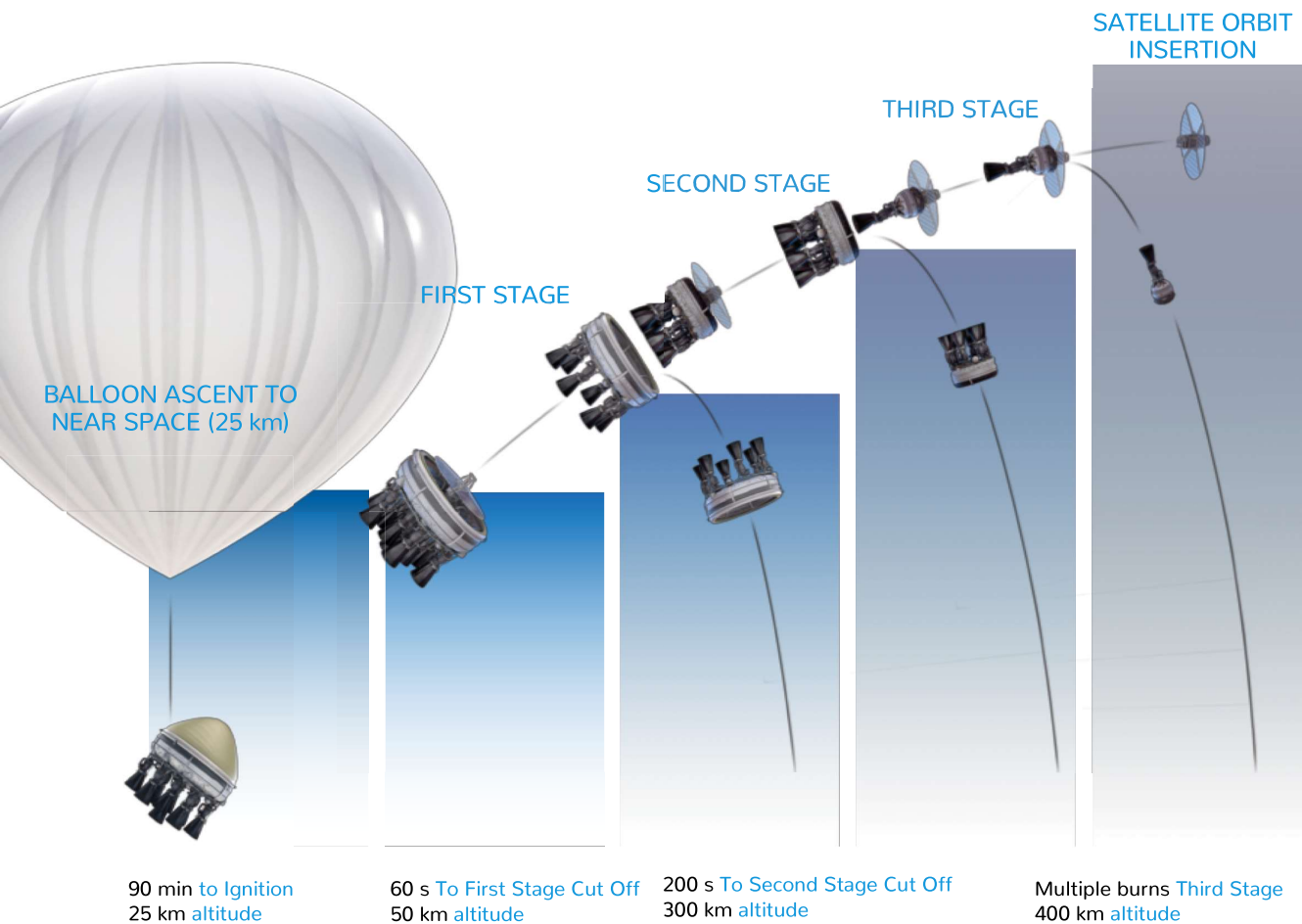
- VSR

One of the most challenging ESA scientific missions under study is the **Venus Sample Return**. It aims to return soil and atmospheric samples from Venus. Two Ariane 5 launchers will be required; one to launch an Orbiter composed of the Venus Orbital Module and Earth Return Module and the other to launch a Venus Lander which will enter the Venus atmosphere and descend using aerodynamic braking and parachute landing systems. For the return to Earth of rock and soil samples the Lander will use a balloon to lift the vehicle off the Venus surface. A multistage solid rocket system will then propel the vehicle to a Venus parking orbit to rendezvous and dock with the Orbiter vehicle. The Earth Return Module will then be propelled back to Earth and will enter the Earth's atmosphere and descend to a soft landing using aerobraking and parachute descent systems. The critical aerothermodynamics issues are:

- Venus aerocapture and aerobraking;
- Venus and Earth atmospheric entry and descent;
- ascent of the balloon;
- ascent of the solid rocket propelled stage.



BLOOSTAR STARTS FROM NEAR SPACE TO IMPROVE LAUNCH ECONOMICS



LAUNCH STEPS

1 – Launch anytime, anywhere
(i.e. from a boat)



2 – Bloostar soars above
99% of the air (25 km)



3 – Ignition of Bloostar



4 – Separation of stages



5 – Targeted satellite orbit
insertion



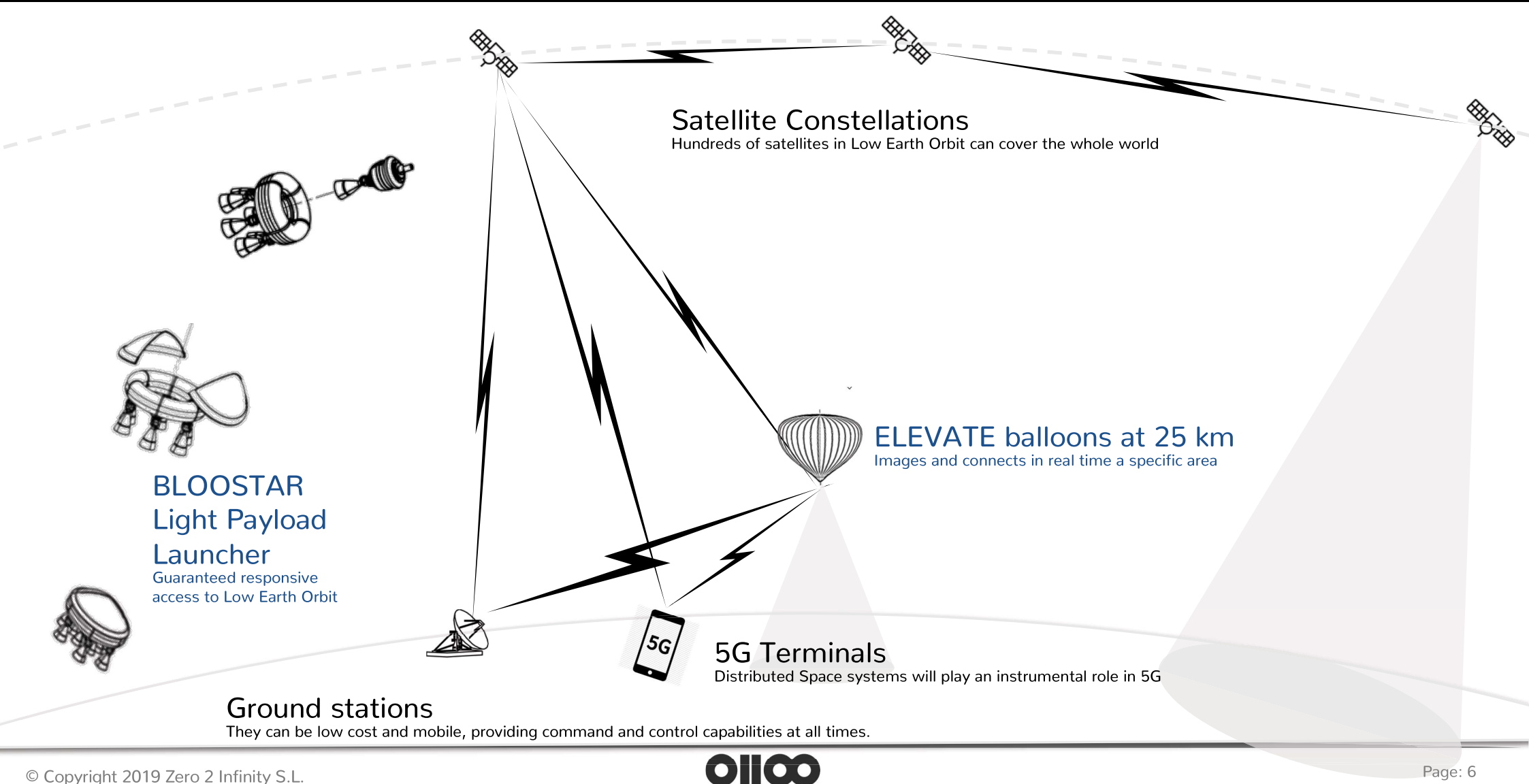
6 – Eventual reuse



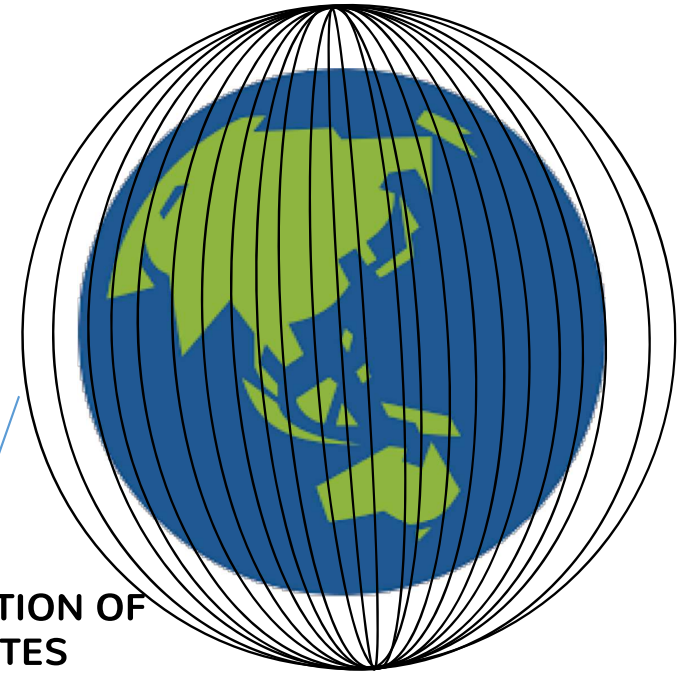
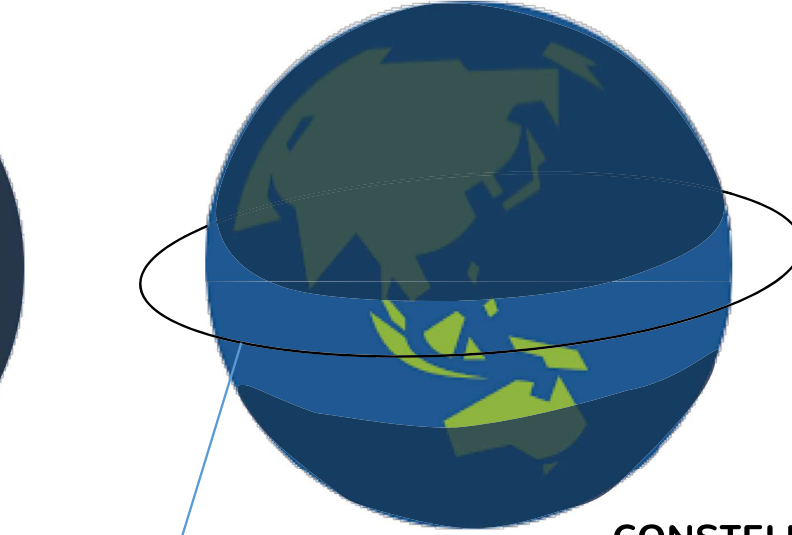
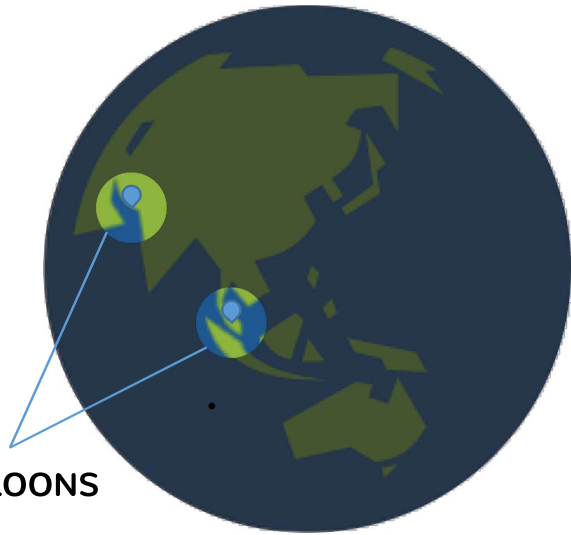
RE-ENTRY

All the stages re-enter the atmosphere.
Plans for future re-usability of the balloon, first and second stages

Z2I ENABLES AN ECOSYSTEM TO CONNECT AND MONITOR THE WORLD



PERSISTENT COVERAGE, FIRST WITH BALLOONS, THEN WITH SATELLITES



TODAY

Local Coverage (i.e. City, Strait)
System of Near Space Balloons
Recurrent Launch of Balloons

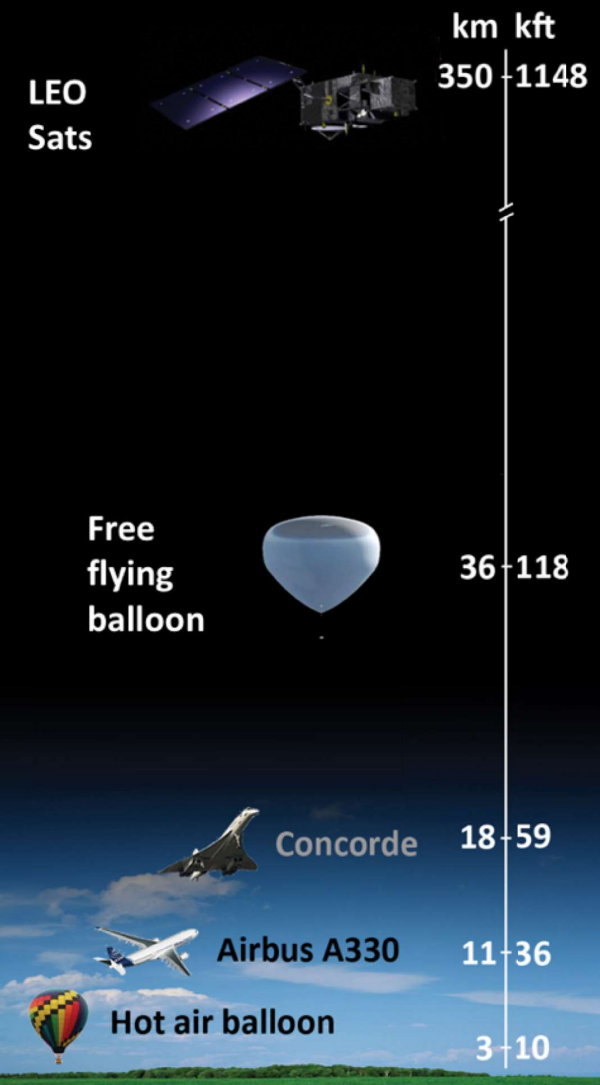
TOMORROW

Regional Coverage
10s of Satellites
Ring Constellation

COMING SOON

Global Coverage
100s of Satellites
Global Constellation

THERE IS A NEW SPACE RACE, THIS TIME IT MEANS BUSINESS



SKIP THE RACE FOR GIGANTISM, BLOOSTAR WILL FLY MORE OFTEN, CHANGING THE RISK PROFILE



Z2I COMBINES STRENGTHS FROM THE SPACE SECTOR AND BEYOND



**JOSÉ MARIANO
LÓPEZ URDIALES**
CEO & Founder



**GUILLAUME
GIRARD**
Partner



**TIM
MUEHLENBACH**
Financial Advisor



**JOSÉ LUÍS
GARCÍA BRAVO**
CTO & Campaign Manager



**MICHAEL
LÓPEZ-ALEGRÍA**
Technical Advisor



**LOÏC
ALLIEZ**
Partner & Board Member



**DIMITRIS
BOUTOLOS**
Partner & Board Member



**JOSEP MARIA
LLADÓ**
Partner & Board Member



McKinsey
& Company



ZERO 2 INFINITY IS MUCH MORE THAN JUST A VISION



Rapid Prototyping

3D Printing Rockets

Satellite Testing

Software Development

Highly Motivated Team

Liquid Propulsion

Autonomous Landing

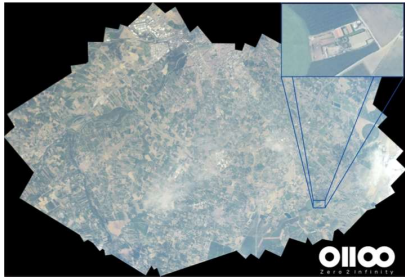
Balloon Operations

"ELEVATE" IS Z2I'S CURRENT BUSINESS LINE, NEXT STEP IS BLOOSTAR

ELEVATE

Lift Payloads to Near-Space

Currently generating revenues



Customers

- Satellite operators
- Scientific & Research Institutions
- Universities
- Marketing Agencies
- Governments and Aerospace companies

Use cases

- **Test components:** (i.e. Telecommunications, Solar Panels, Landers, Cameras, etc.) in Space conditions and atmospheric re-entry
- **Remote sensing:** Imagery, video, IR, SAR, Maritime Surveillance, 24/7 coverage options
- **Research:** Astronomy, atmospheric/climate

ELEVATE provides BLOOSTAR with:

- ✓ Near Space Access
- ✓ Sales Pipeline
- ✓ Launch Experience
- ✓ R&D

BLOOSTAR

Launch Light Payloads to Orbit

Requires funding



Customers

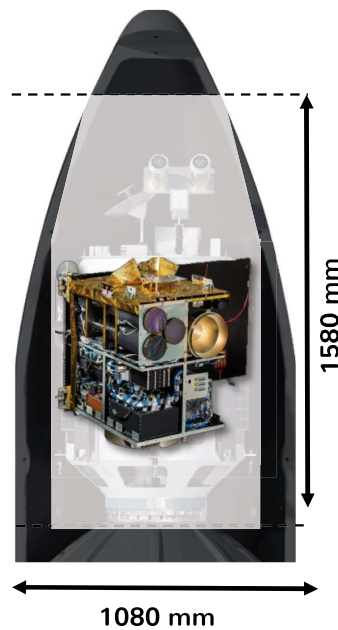
- Satellite operators developing Spacecraft for:
- Communications
 - Remote sensing
 - IoT
 - Smart Cities
 - Research

Use cases

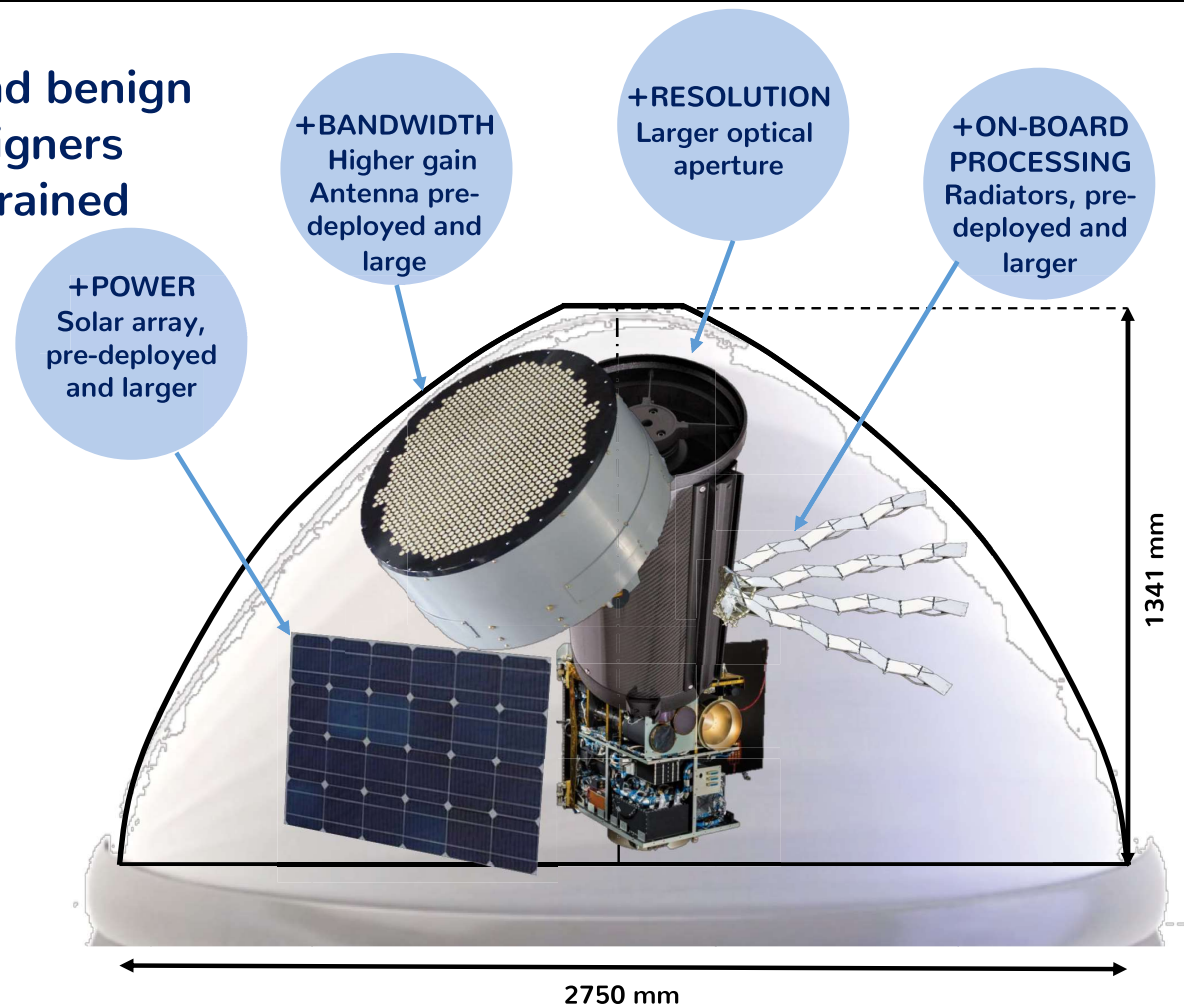
- **Dedicated Launch of Primary Payloads**
- **Building Constellations**
- **Constellation Replenishment**
- **Satellites of masses up to 350 kg or altitudes above 1200 km**

BETTER SURFACE/MASS MEANS BETTER PERFORMANCE/MASS FOR SATELLITES

Thanks to Bloostar's wide fairing and benign vibration environment, satellite designers can optimize In-Space Life, unconstrained by the launch phase.

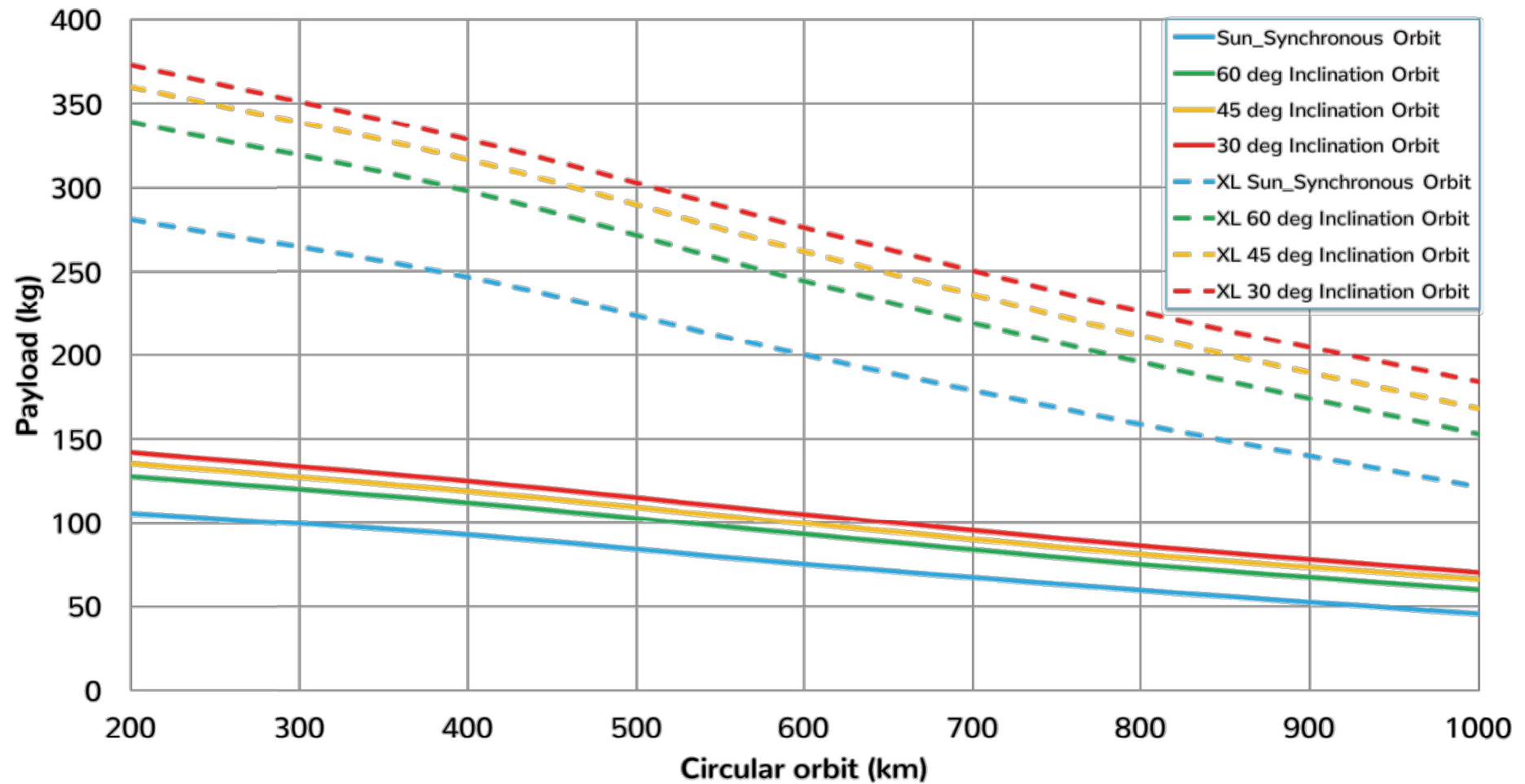


Electron

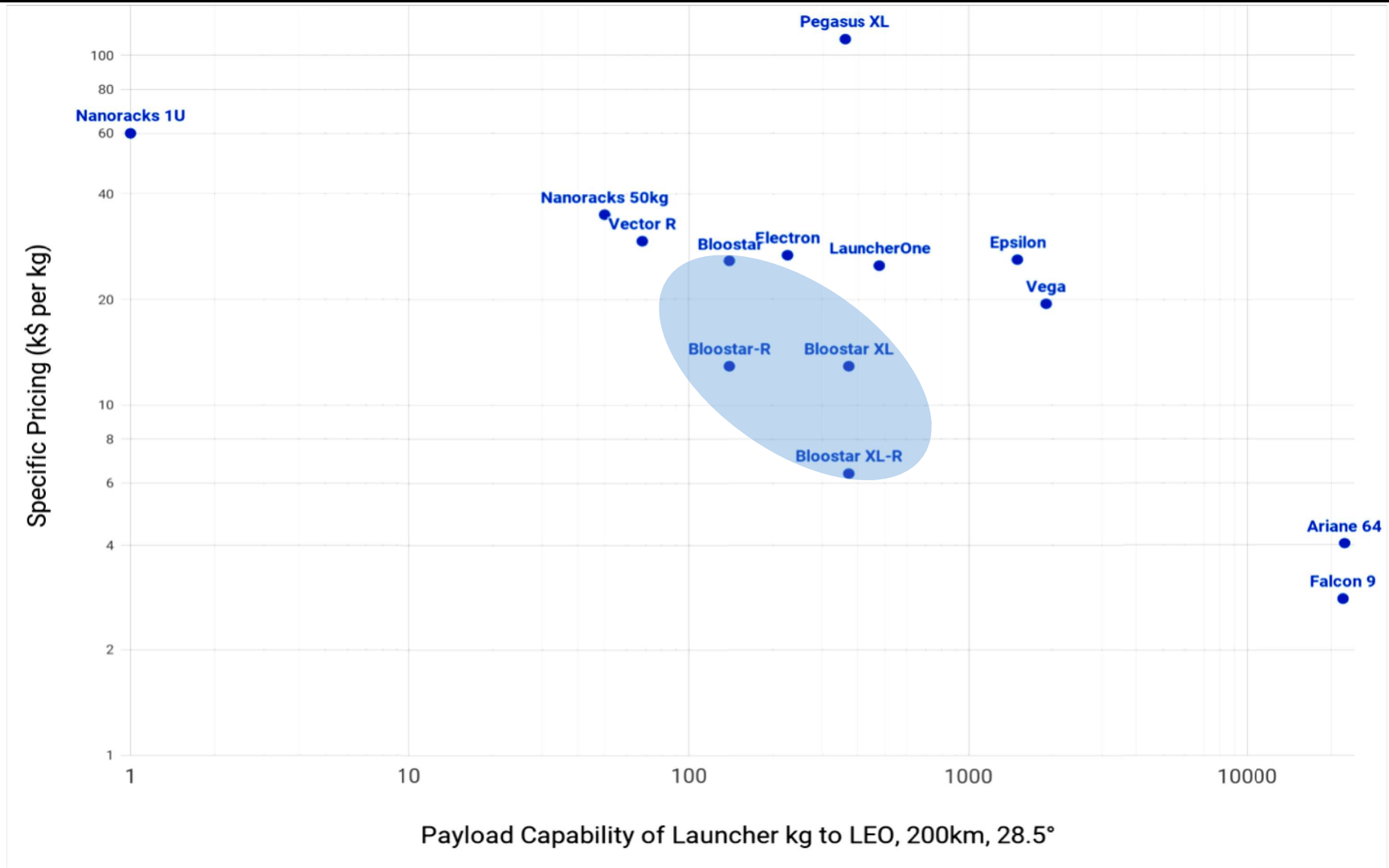


Bloostar

BLOOSTAR AND ITS FUTURE XL VERSION CAN FULFILL ALL MICROSAT MISSIONS



THE BLOOSTAR FAMILY IS THE LOWEST COST SOLUTION FOR LIGHT LAUNCH



Z2I'S BLOOSTAR HAS UNPARALLELED ADVANTAGES OVER OTHER LAUNCHERS

COST & RISK ADVANTAGES



- Both capital and cost efficient
- Highly competitive pricing
- Intrinsically reusable design



Greatly reduced risk of:

- Delays
- Satellite damage
- Interface issues
- Third party liability

OPERATIONAL FLEXIBILITY



Flexible orbit selection



Simple infrastructure and high cadence of launches



Freedom to launch anytime, anywhere



Confidentiality

UNLOCKING THE POTENTIAL OF NEW SPACE

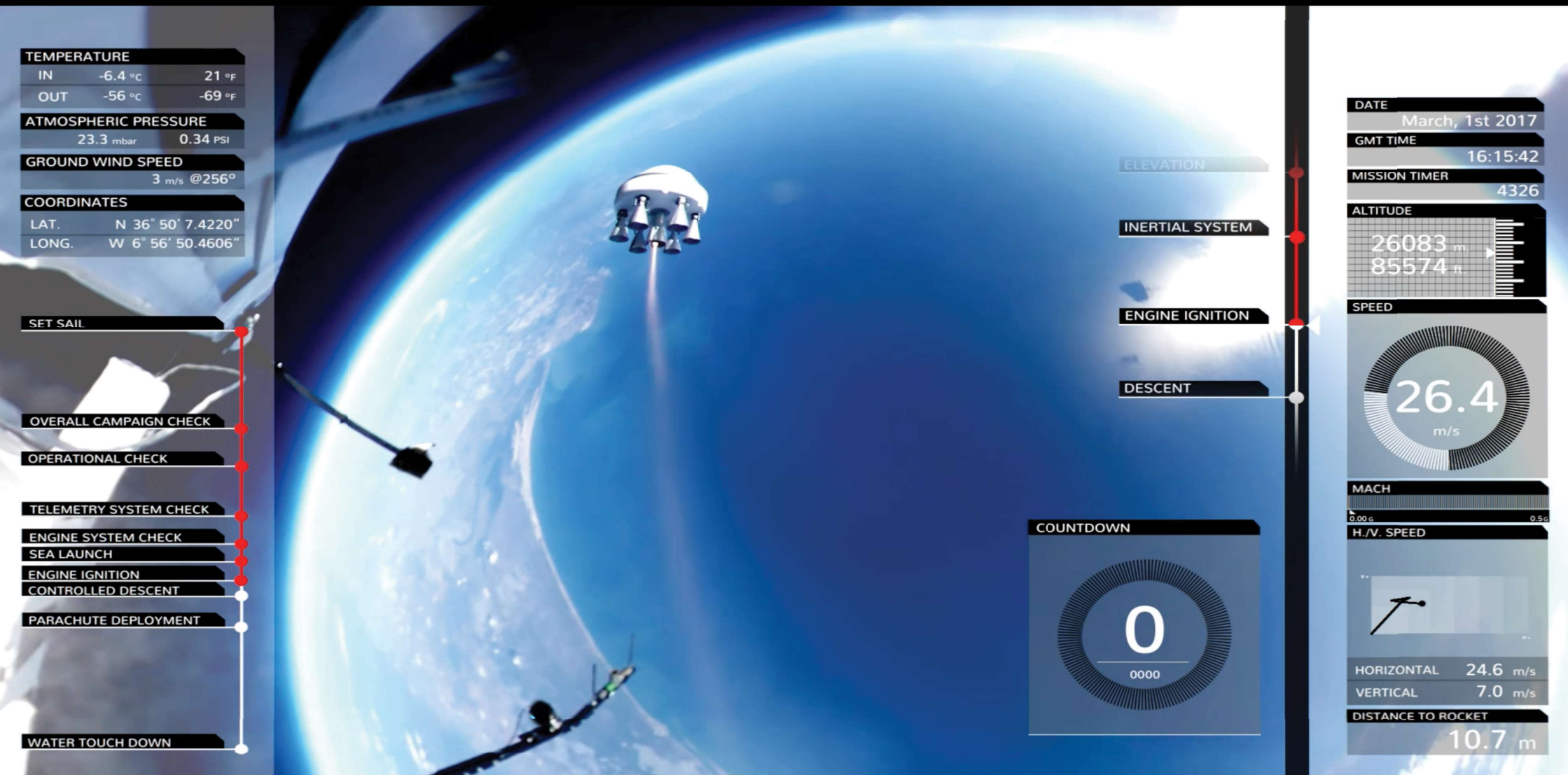
LAUNCHER

First 75 seconds of a launch = 75% of cost of a conventional launch vehicle

SATELLITE

50% of the mass of a satellite is just there to withstand the stresses of a conventional launch

SCALED DEMONSTRATOR PROVED: SEA LAUNCH, ATC COORDINATION, INSURANCE, OPS...



March 1, 2017

FIRST BLOOSTAR DEMO FLIGHT

Rocket ignited at 25 Km / 82,000 ft


B L O O S T A R

oii∞
Zero 2 Infinity

Gulf of Cadiz - Spain



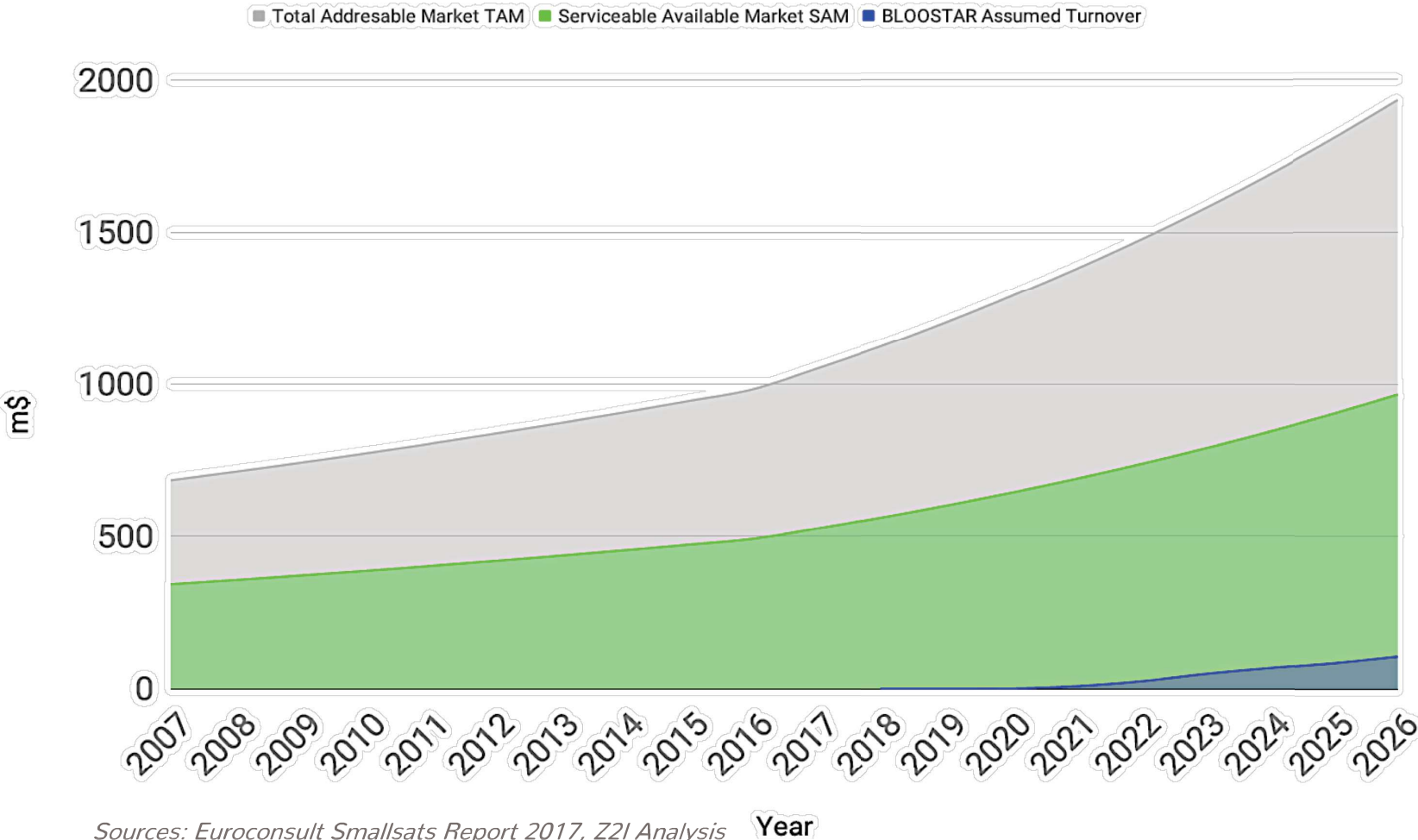
<https://www.youtube.com/watch?v=DMYR-15EVOI>

BLOOSTAR TICKS ALL BOXES TO BE A WORLD-LEADING LAUNCH VEHICLE

| VALUE PROPOSITION | BLOOSTAR | VIRGIN | ROCKETLAB | SPACE X |
|---|----------|--------|-----------|---------|
| FREE FROM RESTRICTIVE US REGULATIONS (ITAR) | ✓ | ✗ | ✗ | ✗ |
| ACCOMMODATING OVERSIZED PAYLOADS | ✓ | ✗ | ✗ | ✗ |
| LOW MISSION COST | ✓ | ✗ | ✗ | ✗ |
| SMOOTH RIDE | ✓ | ✗ | ✗ | ✗ |
| DEPENDABLE ASSURED ACCESS TO SPACE | ✓ | ✗ | ✗ | ✗ |
| ZERO EMISSIONS | ✓ | ✗ | ✗ | ✗ |
| RESPONSIVE | ✓ | ✓ | ✓ | ✗ |
| TIME & DATE SELECTION | ✓ | ✓ | ✓ | ✗ |
| ORBIT SELECTION | ✓ | ✓ | ✓ | ✗ |
| HUMANS AWAY FROM THE BLAST RADIUS | ✓ | ✗ | ✓ | ✓ |

WITH BLOOSTAR, ZERO 2 INFINITY IS UNLOCKING THE MICRO SATELLITE ECONOMY

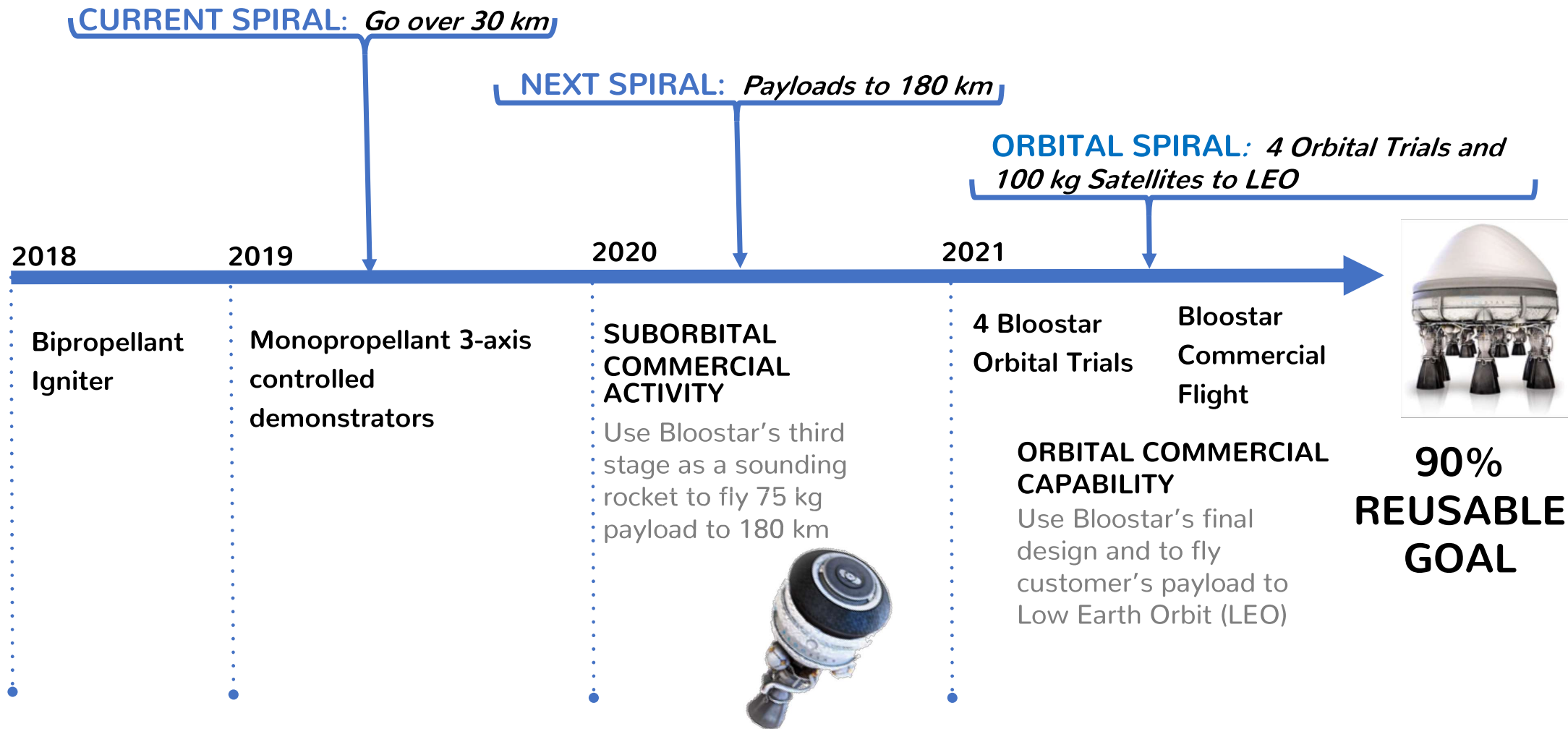
Market Size Evolution for Light (<500kg) Payload Launch Services



Sources: Euroconsult Smallsats Report 2017, Z2I Analysis

- “Launch remains the single most significant bottleneck to smallsat market expansion” – Carolyn Belle, NSR Senior
- The current market for satellite launchers is \$5B yearly, of which \$1b is for light payloads.
- The market is expected to grow 76% over the previous decade.
- Assumes BLOOSTAR captures only 12% of the SAM
- Taking a bottom up approach, Assumed Turnover figures are backed up by existing pipeline of €1B LOIs
- Z2I will be able to tap into larger markets as it increases the value of satellites by enabling architectures other companies cannot launch

SPIRAL DEVELOPMENT: FIRST SUBORBITAL, 4 ORBITAL TRIALS



Z2I HAS GROWING MOMENTUM WITH CUSTOMERS AND PARTNERS

REVENUE GENERATING CUSTOMERS (>€1M)



VALUE ADDED PARTNERS (>€5M)



LOI SIGNATORIES (>€1B)



<https://www.youtube.com/watch?v=d-lw18x9-H4>

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Photo from Zero 2 Infinity's first flight to Near Space