SATREVOLUTION

SatRevolution S.A.

Providing new perspectives for humanity from space

ESA CubeSat Idnustry Days

SatRevolution’s management team

Founded in 2016, today SatRevolution employs 50+ individuals and is supported by global Partner network.

20+ years of business experience

Grzegorz Zwoliński

Chief Executive Officer
Co-founder & President of the Board

- Member of the Council of the Polish Space Agency (Polska Agencja Kosmiczna, POLSA
- Successfully led through T-bull’s IPO process at Warsaw Stock Exchange (gaming company which reached over 500m users)
- Successful entrepreneur with over 20 years of experience in multiple sectors

20+ years of business experience

Radosław Łapczyński

Chief Technology Officer
Co-founder & VP of the Board

- Co-founder and Chairman of the Supervisory Board at T-Bull listed at Warsaw Stock Exchange
- Entrepreneur, innovator, and patent-owner in physics, chemistry, and analytical algorithms
- Scientific and executive manager in the multiple R&D projects, including cooperation with Polish Academy of Sciences

10+ years of business experience

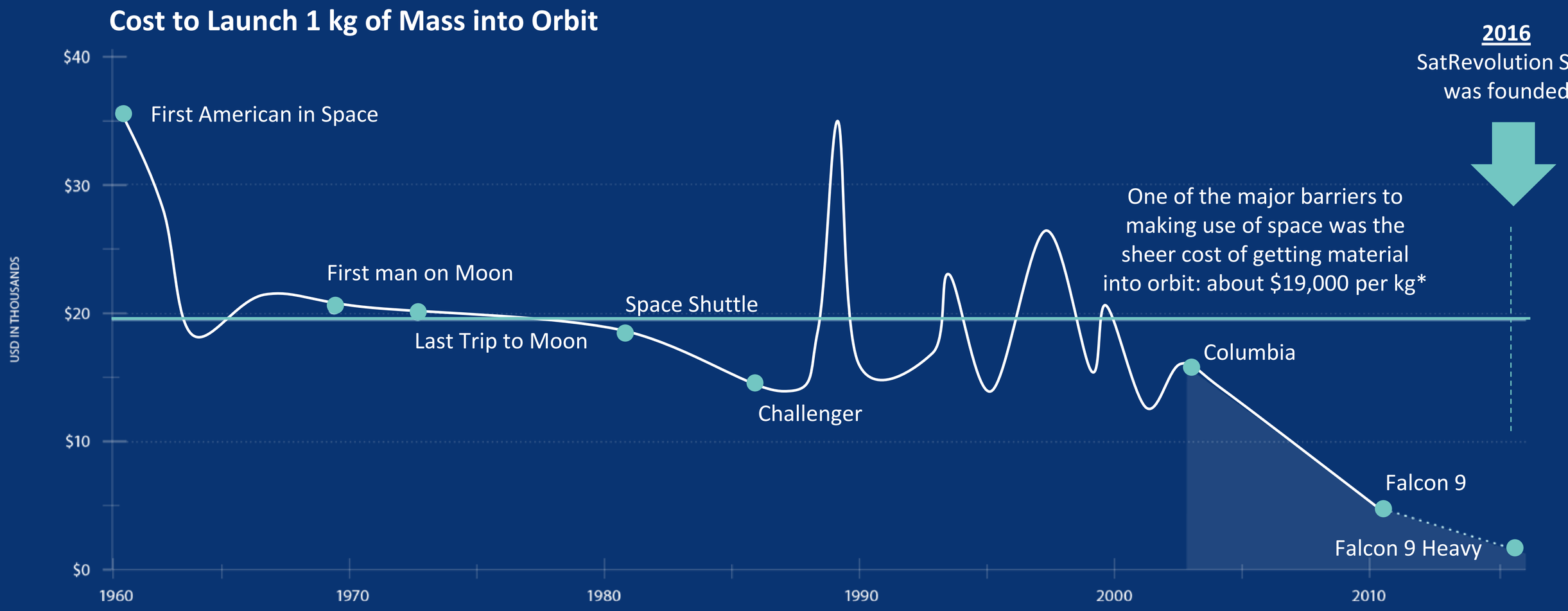
Damian Jamroz

Chief Operating Officer
VP of the Board & Shareholder

- Successfully delivered dozens of strategic projects for the largest P&U groups in CEE, e.g. Eesti Energia, CEZ, PGE, Tauron, Energa, and consulted dozens of SME
- Founding Partner at Collaborator and Project Manager at EY Business Advisory in Warsaw
- M.Eng.,M.A., B.A. from University of Cambridge, Trinity College, with major in Aerospace Engineering

Why now?

New Space companies can launch their space systems cheaper than ever before



* Based on Founders Fund' manifest

Our execution history

Executed Pending

DEVELOPMENT OF SPACE SYSTEMS & HOSTED PAYLOAD MISSIONS – 5 years

2016
Founding and bootstrapping SatRevolution S.A.

R&D Centre set-up

2018
NCBR Bridge Alpha Grant for development and production of nanosatellites

Innovation Grant for improvement of the SR-NANO-BUS satellite platform

PARP Go To Brand Grant for development of exports and promotion

2019
Launch of the first mission for external Client – AGH "KrakSat"

Innovation Grant for bio-nanosatellite with lab-on-chip instruments "LabSat"

2020
Innovation Grant for universal nanosatellite platform for hosted payload missions

Launch of the first hosted payload mission for Grenoble University "AMICal Sat"

Manufacturing and integration of 3 hosted payload missions – "SteamSat", "SW1FT" and "AuroraSat

NASA's classifies SatRevolution's NanoBus Satellite Platform to the 9th Technology Readiness Level

DEVELOPMENT OF OPTICAL PAYLOADS & EARTH OBSERVATION MISSIONS – 2.5 years

2019
Launch of the first Polish EO satellite "Światowid"

Acquisition of the first low resolution imageries from in-orbit operations

Innovation Grant for DeploScope – high resolution modular telescope for nanosatellites

2020
Innovation Grant for development of Real-time Earth Observation Constellation

First Earth Observation Commercial Contract acquired for medium resolution imageries for 1.8 million km2

2021
First venture capital round raised for development of STORK constellation

Development of medium resolution payload & manufacturing of 8 STORKs to be launched with SpaceX & Virgin Orbit

Second Earth Observation Commercial Contract acquired for high resolution imageries

Acquisition of SAR technology for future missions

Successful launch of first 2 STORKs & acquisition of commercial data

STRATEGIC DEVELOPMENT PROJECTS– 1.5 year

2019
Set-up of Polish Consortium for Mars mission

2020
Founding of SatRevolution Ltd in the UK

Submission of 9 proposals for NASA's SIMPLEX missions

Innovation Grant to finance development of 150 kg microsatellite

2021
Innovation grant for satellite constellation for wildfire detection

Contract for 24U satellite bus for hosted payload missions

Innovation grant for manufacturing plant for serial production of satellites

Term Sheet for Joint Venture in the field of 5G satellite network development

Term Sheet for Lunar Mission aimed at mining of Hellium-3 for Oil & Gas Industry

SatRevolution developed State-of-the-Art Technology

NASA/TP—2020–5008734

State-of-the-Art
Small Spacecraft Technology

Small Spacecraft Systems Virtual Institute

Ames Research Center, Moffett Field, California

https://www.nasa.gov/sites/default/files/atoms/files/soa2020_final4.pdf

Table 2-3: Integrated Nanosatellite Platform Specifications

Manufacturer	Product	Vehicle Size (mm)	Payload Mass (kg)	Payload Power (W)	Point Control	Pointing Knowledge	TRL in LEO
SatRevolution *(Poland)*	Uni-Bus	Unk	< 2	50 (Peak)	< 0.2°	Unk	9
	Pre-Uni	Unk	< 2	25 (Peak)	< 0.1°	Unk	7

Satrevolution

The Uni-Bus and Pre-Uni-Bus are scalable platforms respectively from 1.5U, 2U, and 3U and 1U, 1.5U, and 2U. The differences between the Uni- and Pre-Uni buses is fundamental; the Uni-Bus is more powerful and advanced with greater communications capability. The Uni-Bus 3U platform has two UHF radios and S-Band transmitter with downlink capability of 9.6 kbps, and has a maximum available payload volume of 2U. The Pre-Uni platforms are equipped with UHF/VHF transceivers. The 3U Uni-Bus platform will be flown on the SW1FT and STORK missions in 2021 with an additional optical payload (25). The 6U and 12U are currently being developed with a S-Band communication system for downlink. Figure 2.14 shows both Pre-Uni and Uni-Bus structures.

Figure 2.14: Pre-Uni-Bus & Uni-Bus. Credit: Satrevolution.

National Aeronautics and Space Administration

AuroraSat-1 is a technology demonstration 1.5U CubeSat that will demonstrate multiple propulsion devices by Aurora Propulsion Technologies. AuroraSat-1 will carry Aurora's smallest version of their Attitude and Orbit Control System (AOCS) (103), figure 4.15, and a demonstration unit of their Plasma Brake Module (PBM). The AOCS integrated in AuroraSat-1 has six resistojet thrusters for full 3-axis attitude control and 70 grams of water propellant, providing a total impulse of 70 Ns. AuroraSat-1 is built by SatRevolution with Aurora providing the payloads. The satellite is anticipated to be launched on a SpaceX Falcon 9 with a Momentus Space Vigoride mission in December 2020 (104). Momentus will deploy AuroraSat-1 into a 550 km sun synchronous orbit (SSO). See section 4.6.3 for discussion of the PBM module.

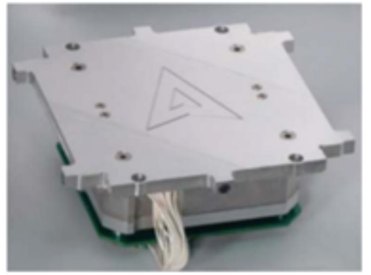
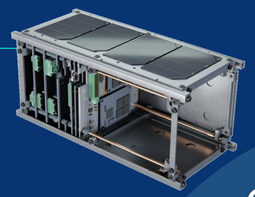


Figure 4.15: ARM-A AOCS module. Credit: Aurora Propulsion Technologies.

SatRevolution’s value proposition

Rapid time to market



- Scalable 3U satellite platform at TRL9, commercially available for clients and used as a background technology
- 3 months from the initial order of data to delivery of operational satellites
- Hosted payload missions can be integrated and launched within 4 weeks thanks to established partnerships

Software-defined satellites

- Designed to maximize computing power to provide on-boarding processing capabilities for Clients
- Possible software updates through S-band uplink and downlink allow rapid software development
- Ability to install Clients’ apps on the satellite to modify mission objectives

TECHNOLOGY

PLATFORM

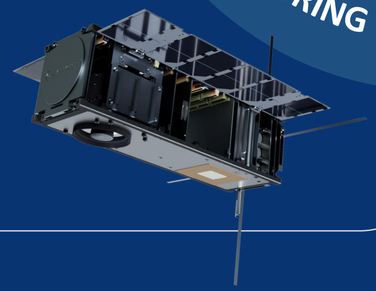
SATREVOLUTION

MANUFACTURING

DATA

Flexible satellite assembly

- Team of 50+ engineers provide complete service for satellite service design & manufacturing
- Currently capable to manufacture 50 nanosatellites per annum (to be scaled to 100 per quarter next year)



Cost-competitive service

- Reduction of cost of EO imageries allow new market use cases+
- Bespoke hosted payload missions allow quick testing of innovative New Space hardware
- On-board processing allows rapid development of analytical solutions for Partners & Clients

Our value proposition

SatRevolution provides an end-to-end solution through a fully integrated value chain

We develop satellites with GEOINT Singularity in mind, i.e. the convergence, and interrelated use, of capabilities in artificial intelligence, satellite-based imagery, and global connectivity, where the general population would have real-time access to ubiquitous intelligence analysis*

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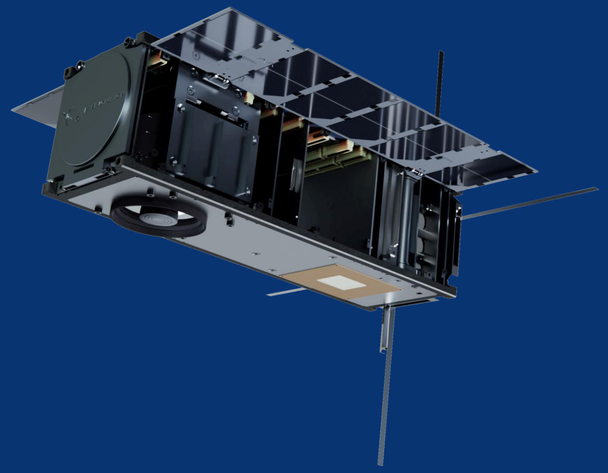
UPSTREAM

WHAT DO WE DO?

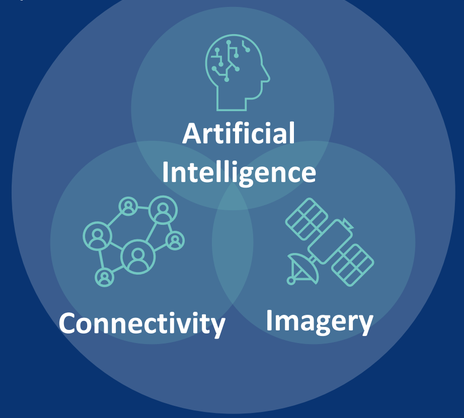
MANUFACTURE STATE-OF-THE-ART HARDWARE & TECHNOLOGY



MIDSTREAM

WHAT DO CLIENTS PAY FOR?

ACCESS TO ONE STOP SOLUTION (EXCLUSIVE OR SHARED MISSIONS)



DOWNSTREAM

WHAT DO CLIENTS GET?

STRUCTURED DATA ACCESS

Storage & distribution

DIFFERENT LEVELS OF DATA PRODUCTS

Level 0
Raw EO data

Level 1
Corrected EO imageries

Level 2
Derivative EO products

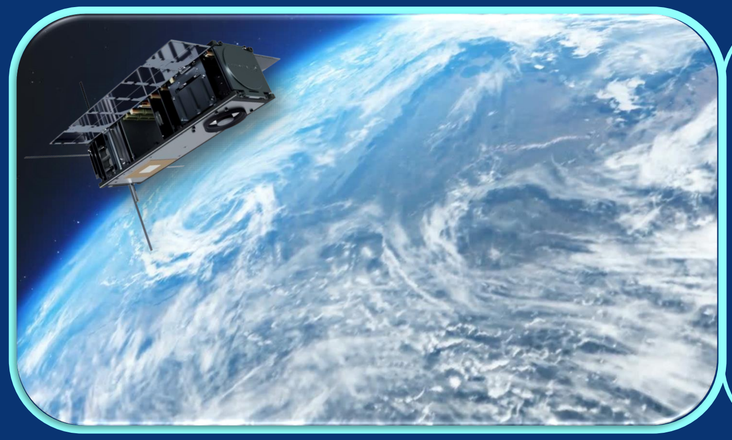
**The Aerospace Corporation, The future of ubiquitous, realtime intelligence: a GeoInt Singularity, 2019*

STORK Hosted Payload Mission

SatRevolution offers Hosted Payload Mission on the STORK 3U platform. Launch schedule covers:

- December 2021,
- every quarter of 2022

Each of our STORK satellites has up to 0,75U volume (+Tuna Can)
to provide Hosted Payload Mission for our customers.

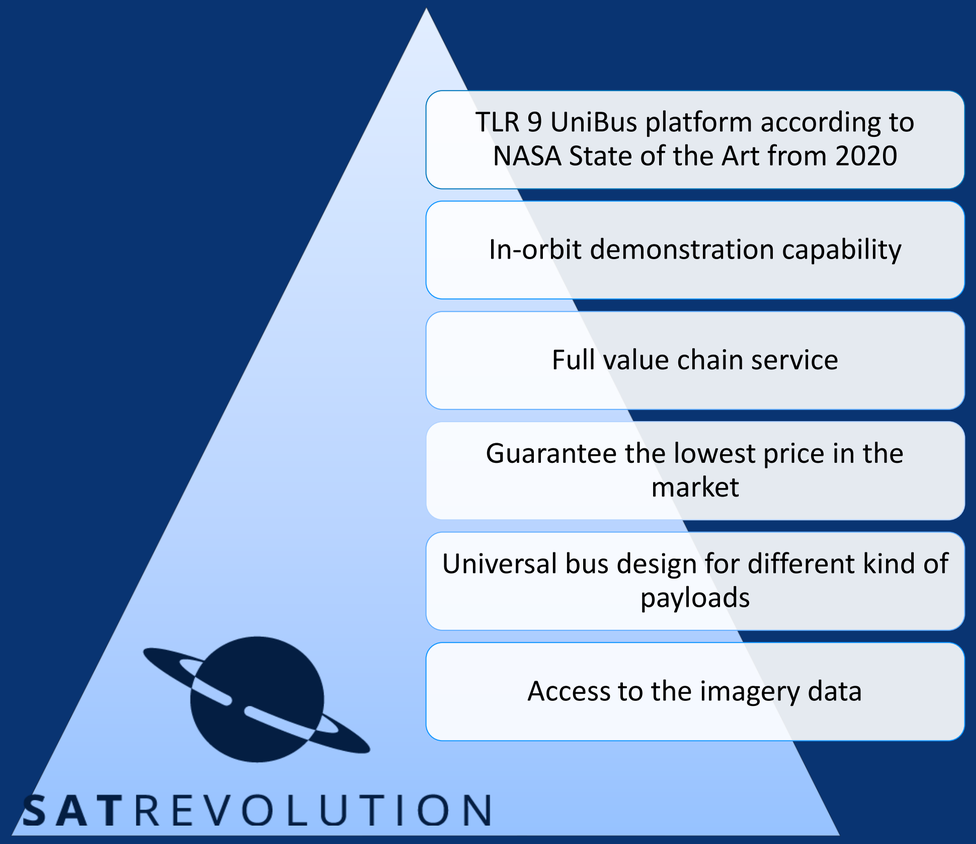


Typical payloads:

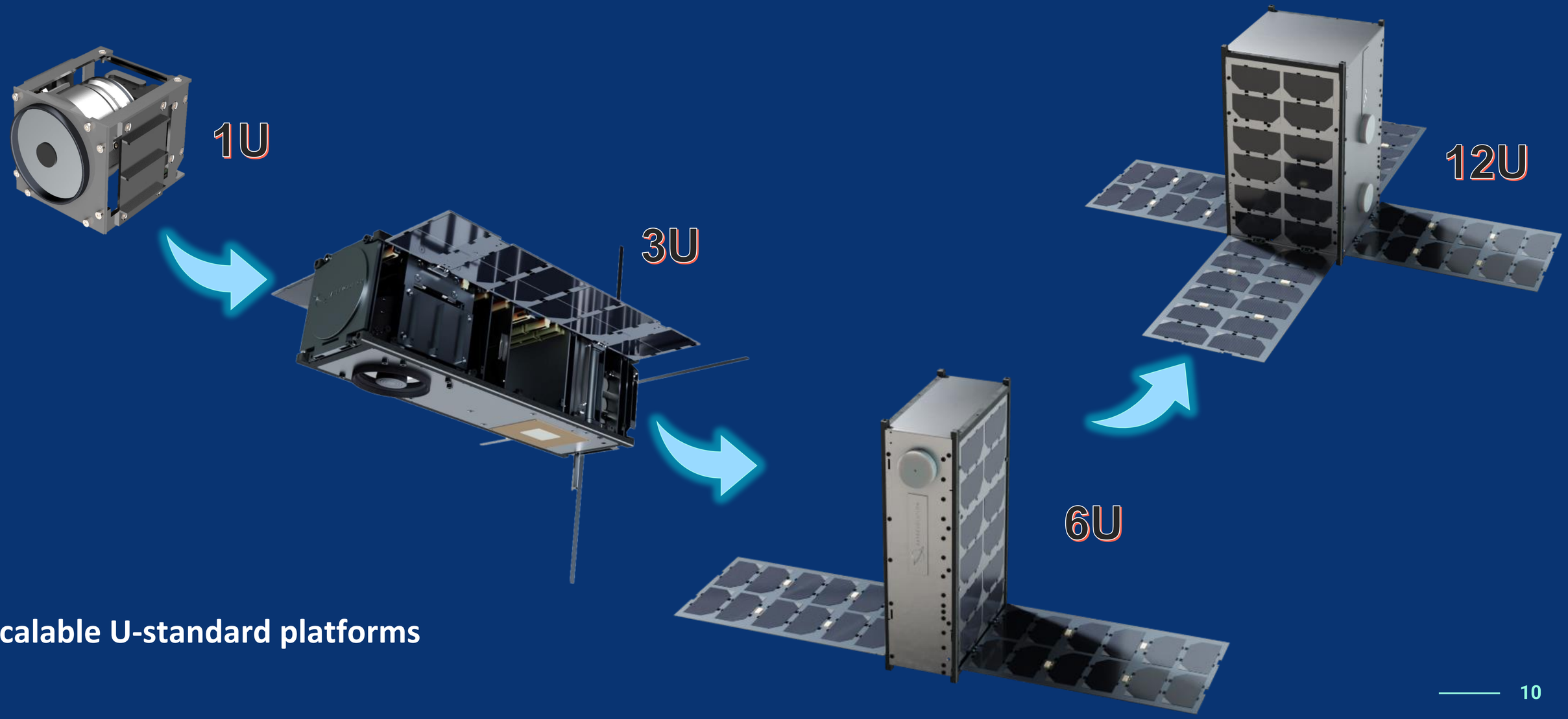
- Edge computing
- Antennas
- Propulsion units
- ADCS
- Deployable structures
- Bio experiments
- Other subsystems and experiments

STORK Hosted Payload Mission

SatRevolution provides a full value chain for the customers



SatRevolution’s In-Orbit Demonstration Missions

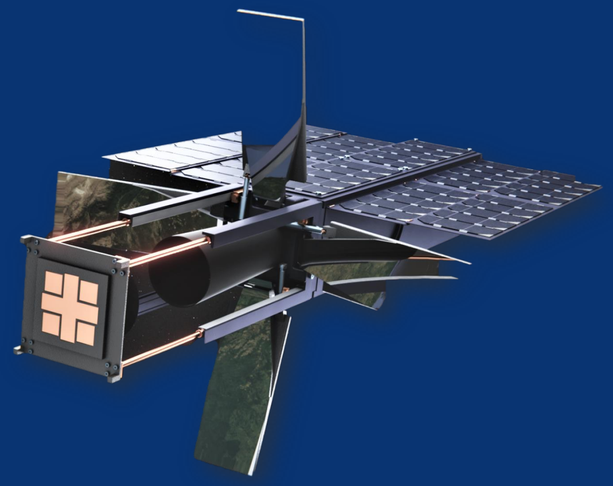


Scalable U-standard platforms

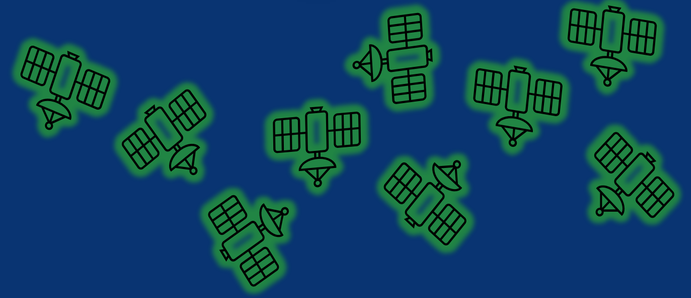
SatRevolution’s In-Orbit Demonstration Mission

And other products

- Advanced optical payload



- EO and customers constellations



- In-orbit service provision

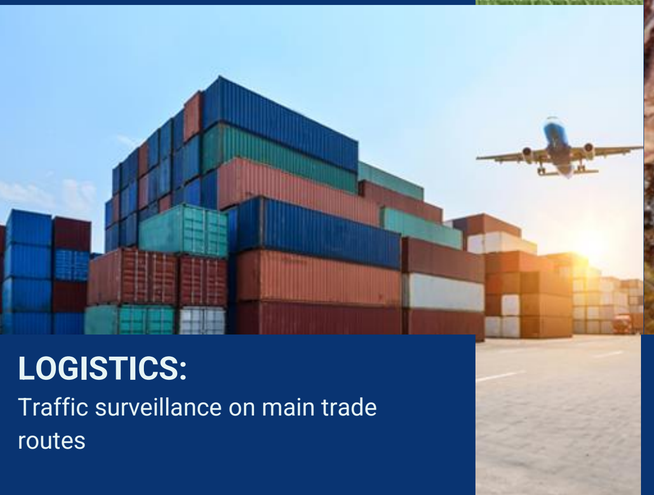
Market presents endless opportunities

PRECISION AGRICULTURE:
Real-time control of crops vegetation

INSURANCE:
Crisis response and inspection of damage caused by natural disasters or natural change

INFRASTRUCTURE:
Daily monitoring of state of infrastructure and analysis of terrain changes impacting infrastructure

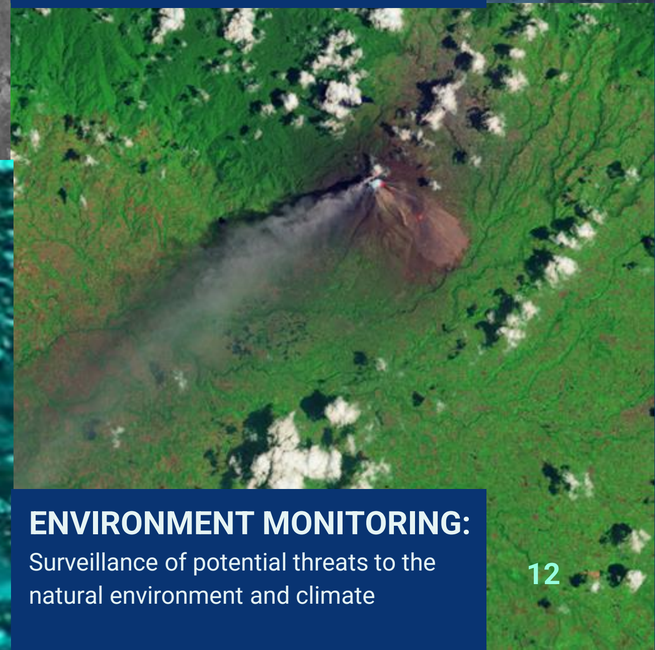
DEFENSE:
Hourly monitoring of potential threats to national security



LOGISTICS:
Traffic surveillance on main trade routes

NATURAL RESOURCES:
Analysis of natural resource deposits and control of resources exploitation

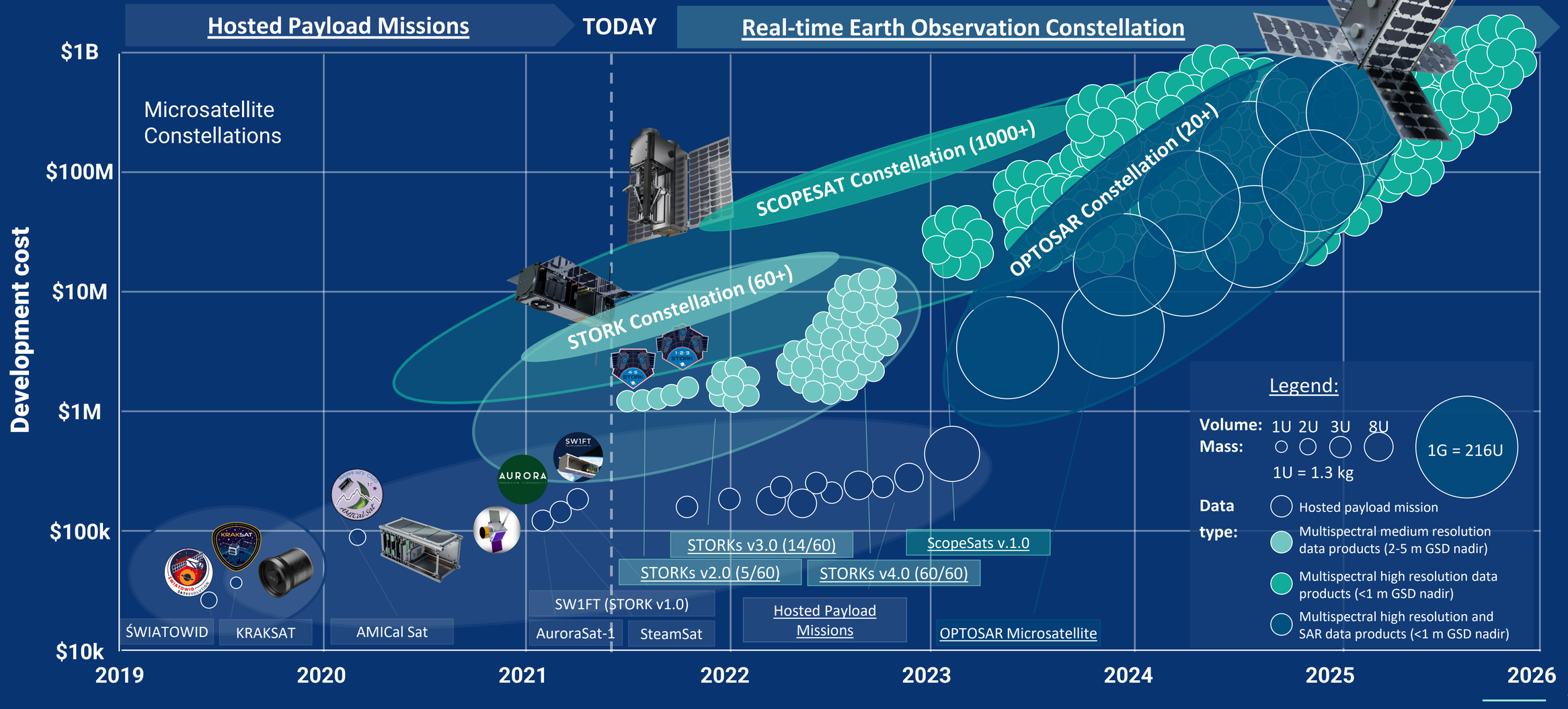
THE ECONOMY OF SHADOWS:
Business intelligence mining based on analysis of shadows cast by various facilities and points of interest



ENVIRONMENT MONITORING:
Surveillance of potential threats to the natural environment and climate

SatRevolution’s EO Constellation roadmap

One Constellation for optical, SAR and IOT data services



Quo vadis SatRevolution?

Missions order:	3.	1.	2.	4.	3.
Mission objective:	**LIFE EXPLORATION**	**EARTH OBSERVATION**	**HELLIUM-3 MINING**	**RESEARCH & DEVELOPMENT**	**SOLAR SYSTEM EXPLORATION**
Target system:	**VENUS** (2024)	**EARTH** (2019)	**MOON** (2023)	**ASTEROIDS** (2026)	**MARS** (2024)
					
Mission Integrator:			SATREVOLUTION		
Payload provider:	MIT	SATREVOLUTION	SOLAR SYSTEM RESOURCES CORPORATION	NASA	NASA JPL

Thank You

COME AND OBSERVE THE EARTH WITH US !

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