

A faint, light gray background pattern of a complex electronic circuit board, featuring various traces, pads, and component footprints, covering the entire slide.

skylabs

EDF 2021

Information day for Slovenian stakeholders

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SkyLabs

At a glance

SkyLabs is becoming a leading company specialized in bringing innovative turn key solutions to the New Space & Defence market

Who we are

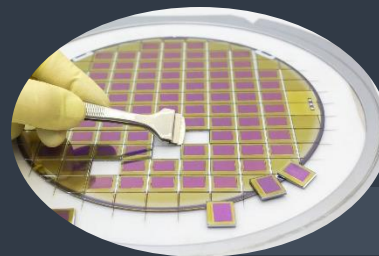
- A team of **26 highly skilled** (+6 trainees) scientists and engineers
 - Dedicated R&D centre for pre-developments
 - Microelectronics & Electronics Development
 - Software and Firmware Development
 - Verification and Qualification
- A company with **exponential revenue growth** rate (last fiscal 83%)

Expertise & Competences

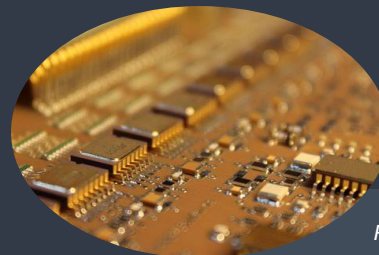
- Awareness of **harsh space radiation environment** effect
- **RT** electronics, **FT** IP cores and ASIC designs,
- Hardware accelerated approach
- Fail safe software development
- RF systems and signal processing
- Mechanical structures and systems

Quality & Future oriented

- Cooperation with University of Maribor (LEIS)
 - Prime of TRISAT and TRIAT-R mission
 - Strong knowledge and technology transfer in Aerospace domain
- ISO 9001:2015 certificated since 2020



*In-house design for novel
Radiation Tolerant ASIC design*



*Development and Manufacturing
Radiation Tolerant S/C equipment*



*Turn-key S/C platform solutions
with comprehensive EGSE support*

SkyLabs

Facilities

**Established complete AIV chain for S/C equipment
Qualification and Acceptance testing**

Internal testing facilities

- High technology R&D laboratory for electronics development and testing (100 m²)
- TVAC – ECSS compliant (for up to 25U S/C form factor)
- Shock testing facility (compliant to perform qualifications for all launchers)

Qualification, Assembly and Testing facilities

- New **cleanroom class ISO 8**, 30m² area (status: in construction) at SkyLabs premises

External testing facilities

- Vibration testing facilities (Random, Sinusoidal),
- EM compatibility, and ESD

Operations

- GS with UHF/VHF and S-Band support @ available at UM
- Operation control room (status: In construction)
- **Two new GSs** with UHF/VHF, S-Band, Ka-Band support (status: In construction)



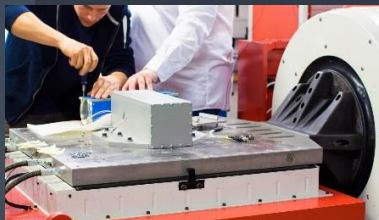
*SkyLabs headquarter
in Maribor (350 m²)*



*SkyLabs R&D branch
in Maribor (200 m²)*



*TVAC testing room
in R&D branch*



*Vibration testing
at External subcontractor*



*GS @ UM
(Primary GS for TRISAT)*



Two new GS in construction



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Portfolio

Proprietary Key technologies

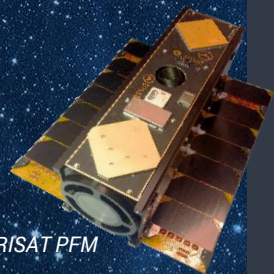
- **PicoSkyFT** processor
- Advanced **LCL** protection
- Robust **analogue MPPT** circuitry

S/C Equipment

- **NANOhpm-obc** (High Performance Fault Tolerant RISC-V OBC)
- **NANOobc Gen2** (Fault tolerant on-board computer for a mission critical operation)
- **NANOLink Gen2** - Product family (Full duplex CCSDS Communication subsystems in S-band)
- **NANOcomm Gen2** (Full duplex CCSDS Communication subsystem in UHF/VHF)
- **NANOeps Gen2** (Highly integrated EPS with BMM, scalable battery pack and PCDU in a single unit)
- **picoRTU System** – Product family (Miniaturised RTU with build-in intelligent functions)

Nano/Micro satellite platform

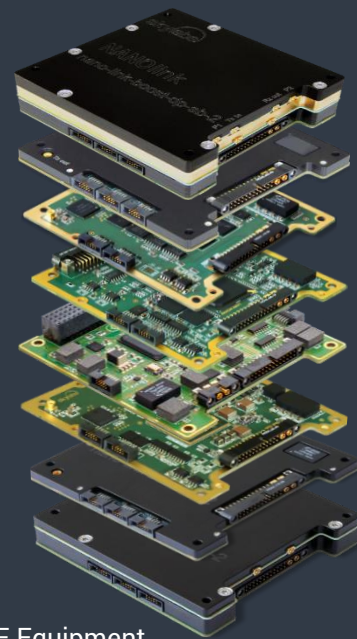
- **NANOskey I**
 - High production rates / cost efficiency / scalability
 - FDIR policy



TRISAT PFM



NANOskey I – 3U platform



S/C & EGSE Equipment

EAGLET-2 satellite mission

Constellation mission for EO applications



EAGLET 2 satellite, Earth Observation 20U satellite with a main optical payload and a secondary AIS payload

Mission and technologies

- Prime OHB Italia
- Constellation 60 satellites (2 satellites for IOD)
- Launch ~2022
- Orbit LEO, ~500 km
- Platform **NANOskey I (2st generation) avionics**
NANOobc, NANOLink-boost-dp, NANOif,
NANOeps 158Wh, NANOeps-

AMPPT

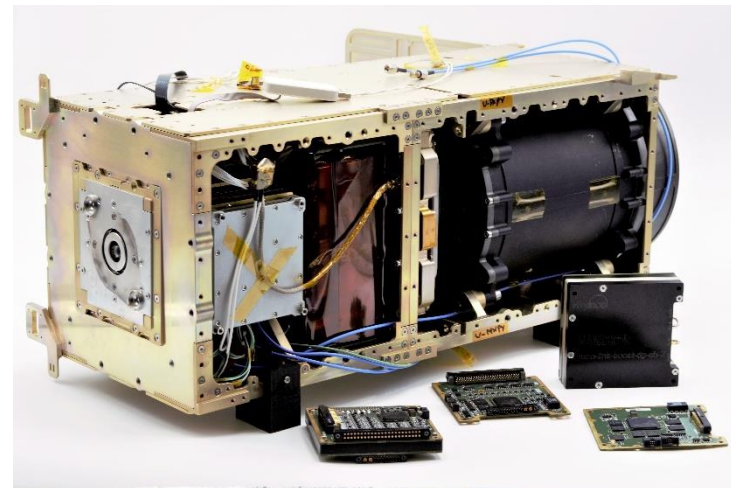
- Status **Qualification phase**

Satellite

- Dimensions Microsatellite, 20U form factor
- Mass 25 kg
- Power 158Wh, deployable solar arrays
- Life-time 3 years in LEO
- Stabilisation AOCS 3-axis stabilized, propulsion
- Communication S-band (TM/TC, OQPSK, 1 Mbps), X-Band (Payload data)

M³ satellite platform

M³ (Multi Mission Microsatellite platform) that is the 8U EAGLET 2 platform eligible to accommodate institutional, scientific and commercial payloads (photo courtesy of OHB-Italia).



EAGLET-2 satellite with NANOskey I 2nd Gen avionics platform (photo courtesy of OHB-Italia)



HERMES satellite constellation

A new paradigm for multi-messenger astrophysics with Cubesats



Scientific goal accurate and prompt localisation of bright hard X-ray/soft γ -ray transients such as γ -ray bursts (GRBs) – INAF

Fast high energy transients are among the likely electromagnetic counter parts of:

- Gravitational wave events(GWE)
- Fast Radio Burst

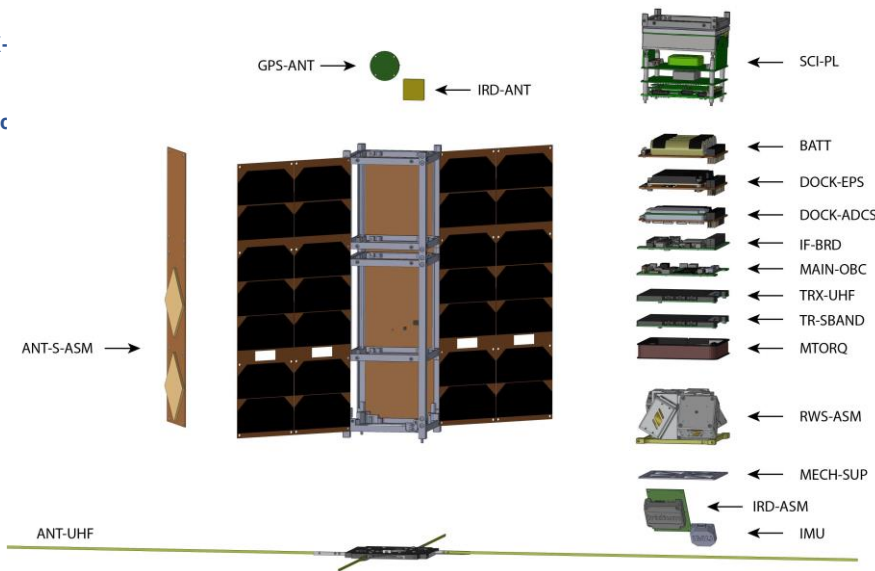
H.E.R.M.E.S. High Energy Rapid Modular Ensemble of Satellites
Distributed detectors network nanosats constellation -

Mission and technologies

- Prime INAF (Project and Scientific Payload)
PoliMI (Satellite bus), 16 other partners
- Constellation 52 CubeSat's (7 satellites for IOD: Hermes-TP, Hermes-SP and SPIRIT)
Future – Moon orbit
- Launch ~2023
- Orbit LEO, ~500 km, equatorial orbit
- Platform **NANOsky I (2st generation)**
NANOobc, NANOcomm, NANOLink, S-Band antennas, custom IF board,...
- Primary payload **HERMES – Gamma ray burst detector (INAF)**
- Status **CDR phase**

Satellite

- Dimensions Nanosatellite, standard 3U form factor
- Mass 6.6 kg
- Stabilisation AOCS 3-axis stabilized
- Communication VHF/UHF (GFSK) and S-band (OQPSK, 4 Mbps UL/DL)



HERMES-SP satellite with NANOsky I 2nd Gen avionics platform (photo courtesy of PoliMi)

EDA - AHWG Space

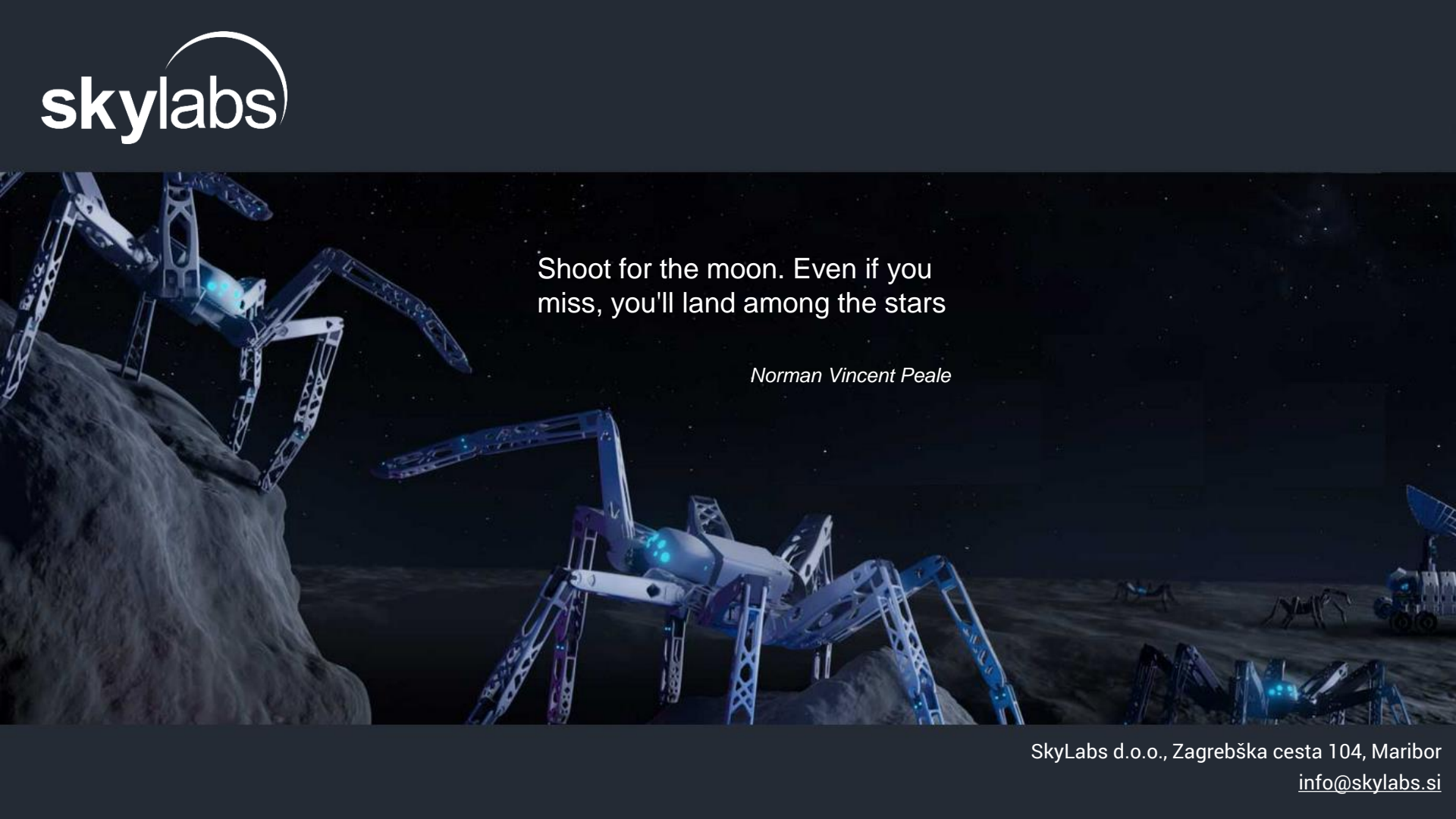
- Space is recognised as a distinct warfighting domain
- Need for EU autonomy

Capability needs

- Space-based information and communication services (Earth observation, Positioning, Navigation and Timing, Space Situational Awareness, Satellite communication)
- Information superiority (Radio spectrum management, Tactical communications and information systems, information management, and ISR capabilities)
- Air Superiority (BM defence)
- Cyber defence (including in space)

Technological domains for Space R&T

- TD1: Architecture & Interoperability
- TD2: Sensors & supporting mechanisms
- TD3: Imaging, Radar and supporting technologies
- TD4: Space based PNT
- TD5: AI aided decision making & information management
- TBB08: Recognized Space Picture (CapTech Simu Space)
- TBB09: Defence Satellite Reconnaissance (CapTech Simu Space)

The background of the slide is a dark, starry space scene. In the foreground and midground, several large, multi-legged robots constructed from white and blue LEGO Technic beams are positioned on a grey, cratered lunar surface. One robot is climbing a steep, rocky cliff on the left. Another is in the center, facing forward with its glowing blue eyes. To the right, more robots are visible, some near a satellite dish. The overall atmosphere is one of ambitious space exploration.

Shoot for the moon. Even if you
miss, you'll land among the stars

Norman Vincent Peale

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