Edge AI on a satellite for near real-time marine plastic detection and monitoring

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The Partners

Project Coordinator, French SME based in Toulouse. Created in 2018 part of the **Agenium Group**.
Expertise: AI solutions for space

The Partners
Remote Sensing Lab of NTU Athens

Expertise: ML techniques associated in remote sensing.
EU-funded project, Marine Debris Archive (MARIDA). Benchmark dataset for developing & evaluating ML algorithms for Marine Debris.
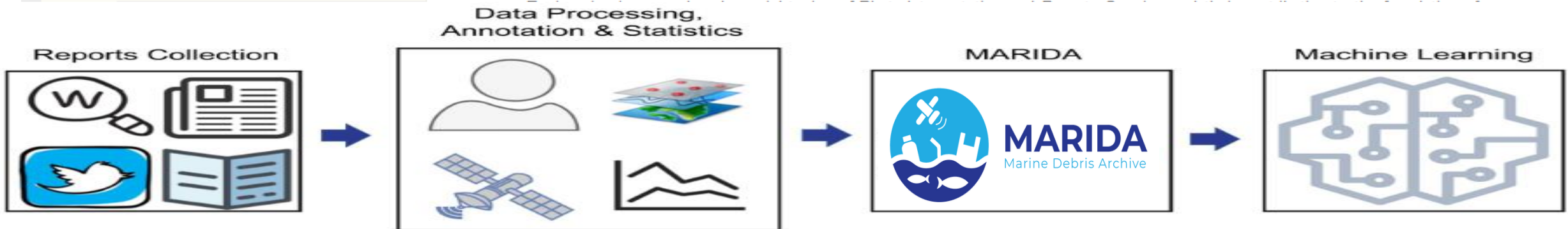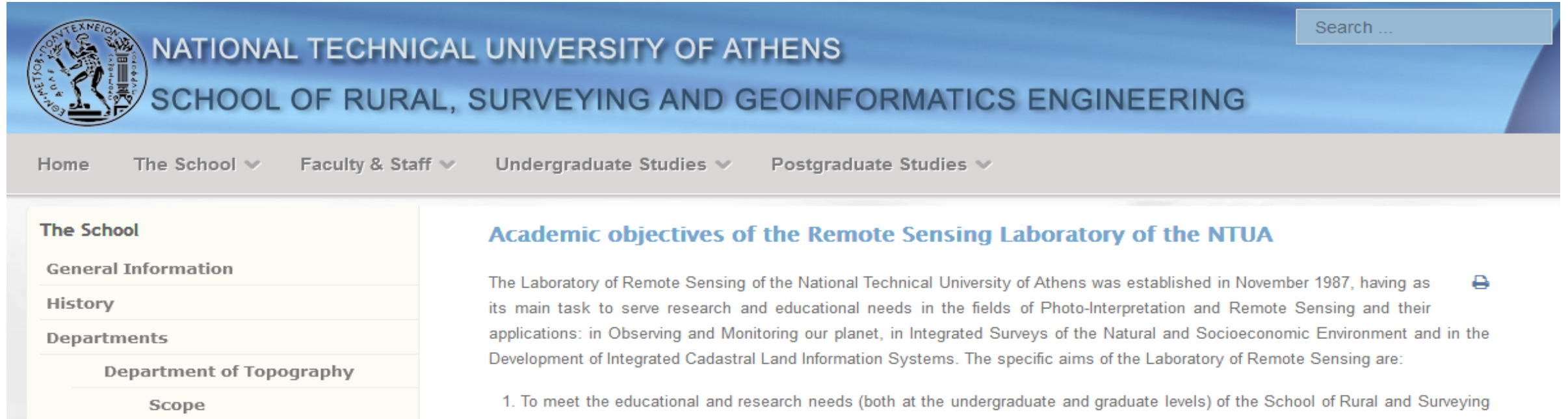

Fig 1. Schematic diagram representing the different steps for the construction of Marine Debris Archive-MARIDA.
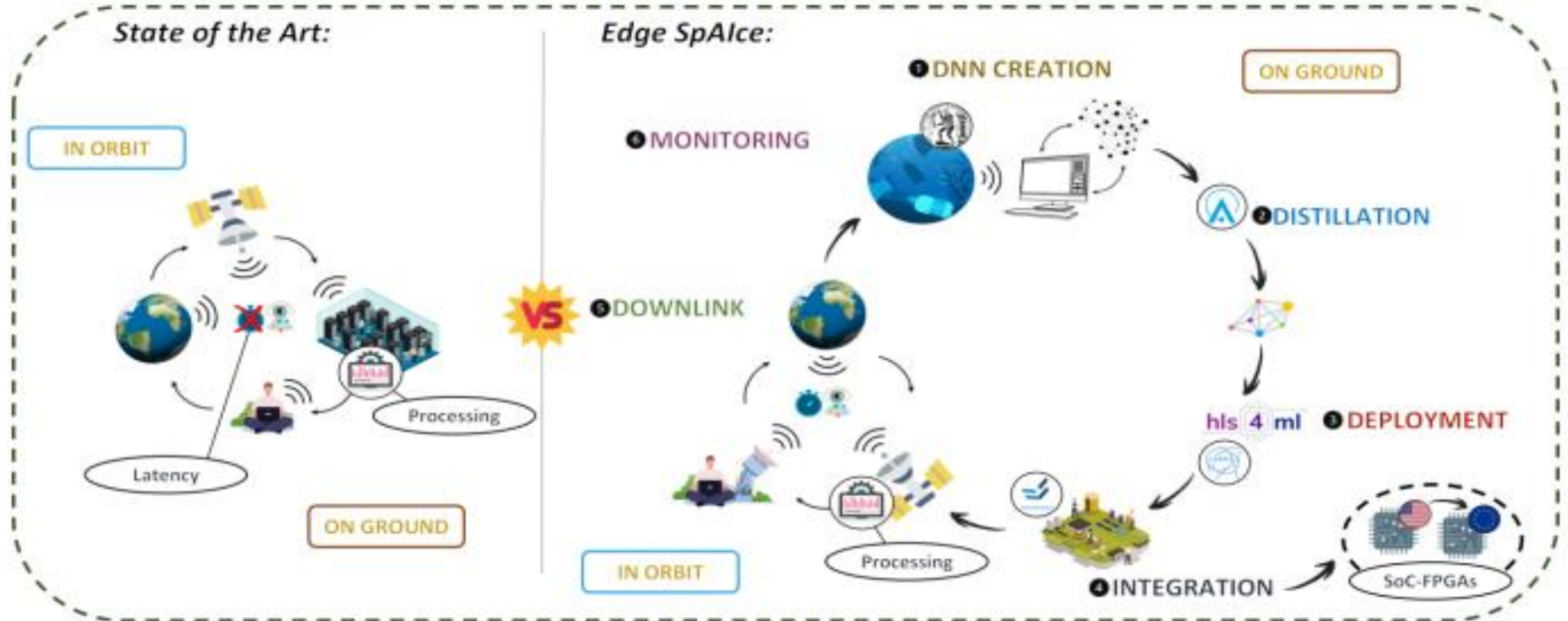
The Partners

EnduroSat

SME based in Sofia, Bulgaria.
Expertise: Plan, Build & Operate Satellite Services
Software-driven satellite architecture

The Project

A novel Edge-AI system for accurate and near real-time plastic detection and monitoring in marine environment

- Latency due to downlink data volumes
- Bottlenecks at the data center

- Massive reduction of downlink data volumes. Bandwidth allows for (almost) RT monitoring
- Reduced cost & environmental impact - no heavy earth-based processing needed.

The Project

- EU HORIZON-CL4-2023-SPACE-01 EU Call –RIA, lump sum grant.

- Fully funded, 2.5m €, 3 yr project, started in January 2024.

- TRL sought 6. Allow for commercial development of services.

- CERN Tech & expertise: hls4ml OS sw & DNN optimization. From CMS trigger to EO services.

- Why FPGAs ? Latency and power consumption (~ 10W available on board)

- Development of backend implementation to target NanoXPlore European Space Grade FPGA

The Project
The wider picture: Novel Earth Observation (EO) services

- Application areas: Government, public and emergency services, Agriculture, Electricity & utilities, Supply chain monitoring, insurance & sustainable finance etc

- Our approach: Autonomous, re-configurable on demand (in-orbit updates) service, depending on application.

- 400% increase in # of EO satellites 2014 – 2021. Number expected to almost triple in the coming decade.

- WEF Study: the potential value-added from Earth data is estimated to reach $700 billion in 2030. Cumulative $3.8 trillion contribution to global GDP between 2023-2030.

Thank you

Edge SpAIce

Space AI monitoring marine plastic litter