



National Research Council of Italy

Robotic applications in Polar regions

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Antarctic pioneer underwater robot



robot-seal interactions



Antarctic under-ice exploration & monitoring



- Italian National Programme of Research in Antarctica
- MZS, Terra Nova Bay, Ross Sea, Antarctica
 - Romeo ROV
 - Antarctic Benthic Shuttle concept (ABS project)
 - VideoRay mini-ROV
 - Antarctic silverfish eggs & larvae sampler (RAISE project)



Antarctic air-sea interface sampling

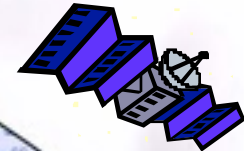


- Italian National Programme of Research in Antarctica
- MZS, Terra Nova Bay, Ross Sea, Antarctica
 - Charlie USV
 - Integral sampling of the sea surface microlayer and immediate sub-surface water with a Harvey-like cylinder (SESAMO project)

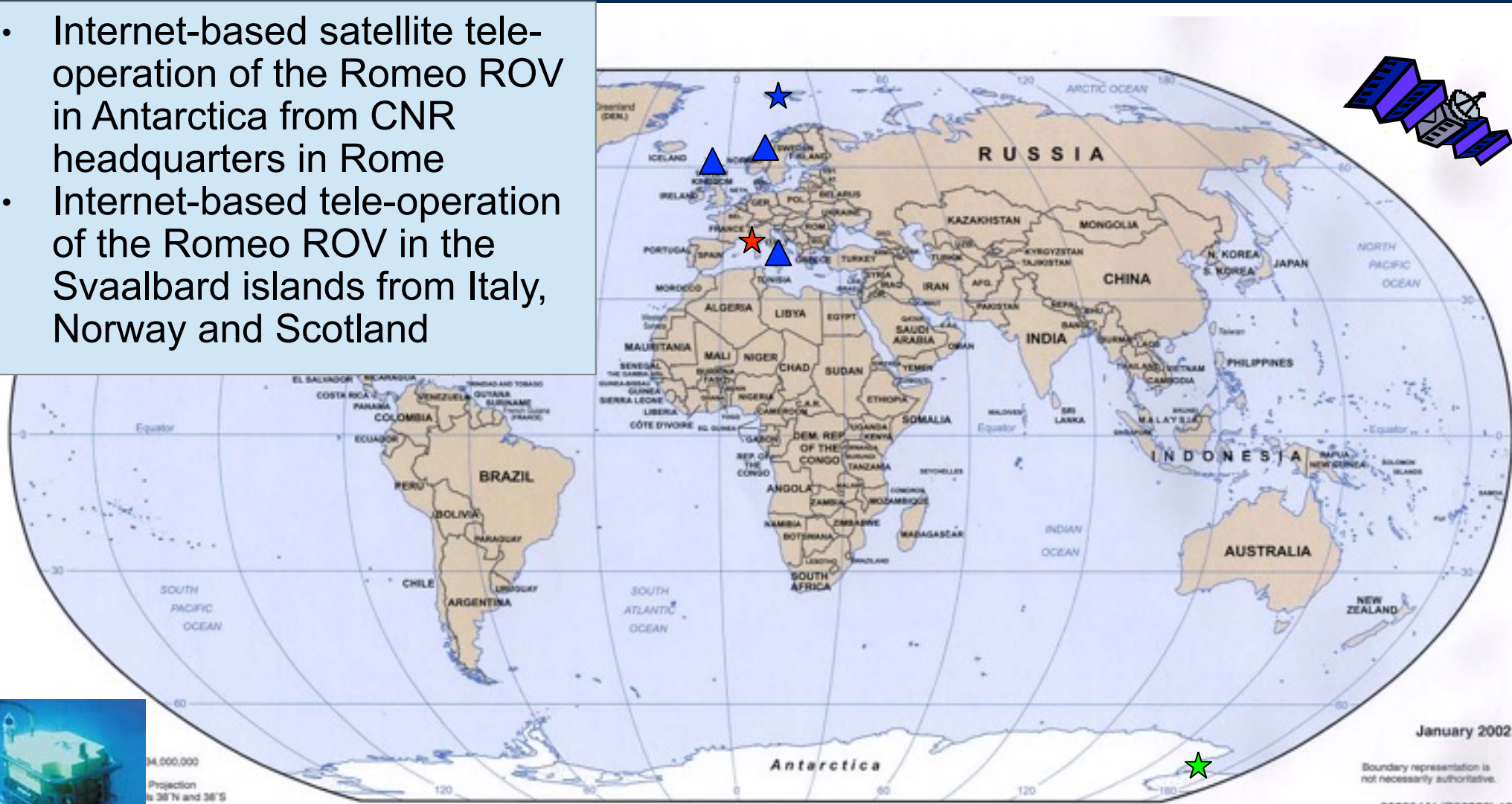
Antarctic air-sea interface sampling



Polar Internet-based tele-operation



- Internet-based satellite tele-operation of the Romeo ROV in Antarctica from CNR headquarters in Rome
- Internet-based tele-operation of the Romeo ROV in the Svaalbard islands from Italy, Norway and Scotland



34,000,000
Projection
to 38°N and 38°S

Polar Internet-based tele-operation



Sampling below Arctic glacier





1 year under ice observation

- Persistent observation of polar environment





Monitoring with mini-robot

- Adaptation of a commercial VideoRay mini-ROV for operating through small holes in the pack ice



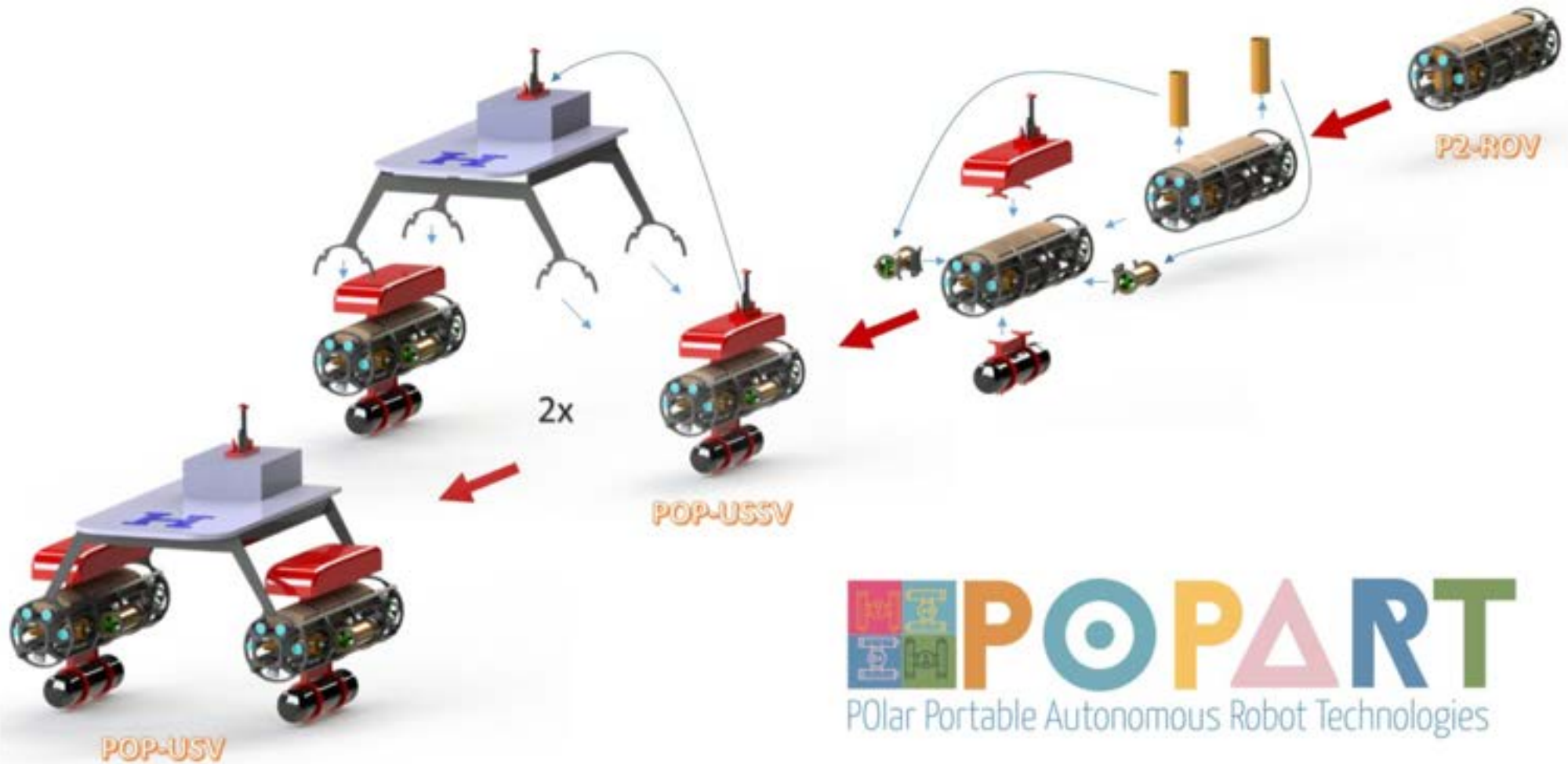
Lesson learnt

Need of portable & modular ROVs, USSVs & USV

Challenge

- Design and develop a family of Unmanned Marine Vehicles based on robotic bricks that can be combined at field to configure different systems

The POP-ART concept



POPART
POLAR PORTABLE AUTONOMOUS ROBOT TECHNOLOGIES

The POP-ART concept

POLE project —> P2-ROV (Portable/Polar-ROV)

POP-USSV: POLar Portable Unmanned Semi-Submersible Vehicle

POP-USV: POLar Portable Unmanned Surface



issiacnr

POLar Portable ROV

- P2-ROV – Portable/Polar ROV

- Length: 1.4 m Diameter: 35 cm
- weight in air: 40 Kg
- Max depth: 200 m
- 2 surge thrusters, 2 vertical thrusters, 1 bow thruster
- AHRS + GPS, CTD, echo-sounder
- tether with dual fiber optic link and power supply



POLar Portable ROV



Preliminary trials



what's going on...



Antarctic habitat

