



## CONTRACT AWARDING NOTICE

for

**the design and delivery of IAOOS (Ice Atmosphere Arctic Ocean Observing System) autonomous platform for continuous ocean/ice/snow/atmosphere measurements from a drifting ice floe for the Contracting Authority – the Institute of Oceanology, Polish Academy of Sciences in Sopot**

### **Name and address of the Contracting Authority**

Institute of Oceanology Polish Academy of Science

ul. Powstańców Warszawy 55

81-712 Sopot, Poland

Fax (48 58) 551 21 30

Email: [office@iopan.gda.pl](mailto:office@iopan.gda.pl)

### **I. The legal basis**

The legal basis for the procedure is art. 30a of the Act of 30 April 2010 on the Principles of Financing Science (Journal of Laws of 2016, item 2045 as amended) and art. 4d, paragraph 1 point 1 of the Act of 29 January 2004, the Public Procurement Law (Journal of Laws of 2017, item 1579, as amended).

### **II. Description of the subject of contract**

1. The subject of the procedure is **the design and delivery of IAOOS (Ice Atmosphere Arctic Ocean Observing System) autonomous platform for continuous ocean/ice/snow/atmosphere measurements from a drifting ice floe for the Contracting Authority – the Institute of Oceanology, Polish Academy of Sciences in Sopot.**
2. CPV code: 38500000-0 (Checking and testing apparatus), 38400000-9 (Instruments for checking physical characteristics), 38412000-6 (Thermometers), 38636100-3 (Lasers), 32531000-4 (Satellite communications equipment).
3. The technical description and required elements of the platform contains the Appendix no 1 to the Notice.
4. Within the declared bid price the Contractor will provide all elements of the platform and comply with the requirements stipulated above.
5. The price (net value) quoted in the bid shall include all costs associated with the execution of the contract including cost of designing and constructing of the platform, cost of all elements of the platform, cost of documentation, cost of functional tests, cost of packaging and transport to the place of delivery, cost of insurance during delivery to the place of destination, cost of deployment and launch of the platform, as well as cost of travel of the Contractors representatives/employees connected with deployment and launching of the platform.
6. The Contracting Authority allows the bid to be submitted and settled in the following currencies: PLN or EURO.
7. The contract is funded from designated subsidy from Horizon 2020 project INTAROS - Integrated Arctic Observation System, awarded under EU call for Blue Growth.

### **III. Deadline of the implementation of the contract and place of delivery of the subject of contract:**

1. Deadline for execution of the Contract:
  - a) Part I - not later than **April 30<sup>th</sup>, 2018.**
  - b) Part II – not later than **December 31st, 2018.**
2. Place of execution of the contract (place of deployment of the platform): **Delivery to the interior Arctic Ocean (Nansen, Amundsen or Makarov Basin), to the region of the latitude higher than 80°N, covered with sea ice with thickness allowing for optimal operational time of the platform.**



#### IV. Conditions for participation in the procedure

For the award of the contract shall apply the Contractor who meets the following conditions:


- a) the Contractor have the knowledge and experience ensuring the execution of the contract – in form of at least one duly designed and executed device corresponding to the subject of contract, i.e. **autonomous platform for continuous measurements of seawater, ice and atmosphere in polar environment, transferring data in real time, with a gross value of at least 300 000 PLN**, within the last three years prior to the deadline for submission of bid, and if the period of running the business is shorter than within this period;
- b) the Contractor have appropriate technical potential and personnel capable of performing a contract - ensuring the execution of the contract;
- c) the Contractor have the economic and financial standing - ensuring the execution of the contract.

#### V. The Contractor with whom the Contracting Authority intends to enter into the agreement

Sorbonne University,  
15, rue de l'Ecole de Médecine,  
75006 Paris

#### VI. Appendices:

1. Required elements of the platform – Appendix no. 1.

  
DIRECTOR  
*Prof. dr hab. Jan Marcin Węślawski*



## Appendix no 1 to the Notice

### REQUIRED ELEMENTS OF THE PLATFORM

Platform should be equipped with following sensor packages:

#### A. Atmospheric package:

- Weather mast equipped with temperature sensor and atmospheric pressure sensor capable to work at low temperatures ranges.
- Microlidar: autonomous lidar system with a high efficiency laser diode based system (central wavelength around 800 nm, bandwidth < 0.6 nm and low energy emission around 2 microjoules per pulse); diameter emission/reception lens of ~70 mm; emission/reception full FOV of ~650  $\mu$ rad; detection filter bandwidth of ~0.6 nm; overlap range (90%) of around 300 m; detection sampling frequency (at a 15 m vertical resolution before averaging) of 10 MHz; vertical resolution (after on board averaging) of 15 m (0-1 km), 30 m (1-3 km), 60 m (3-15 km) and 120 m (15-25 km); background noise (average and standard deviation) of 25 to 30 km; small sensitivity to water absorption; a low temperature operation capability; optical design based on a bi-axial structure; optical fiber based system, satellite modem (for satellites in polar orbits, e.g. Iridium) for data transmission.
- GPS for positioning.
- Accelerometers implemented in the platform to detect the tilt angles.

#### B. Ice/snow package:

Ice mass balance instrument equipped with:

- thermistor chain of 5 m, hanging through air, snow, sea ice and ocean,
- comprising solid-state sensors measuring temperature profiles with 2 cm resolution;
- thermistor measurement chain incorporating temperature sensor device with resolution of 0.0625°C and accuracy of  $\pm 0.5^\circ\text{C}$  in an operating range of 85°C down to -10°C;
- heater elements for heating cycle mode (hot-wire anemometry mode/ a needle-probe thermal conductivity mode) to provide a proxy for thermal diffusivity;
- a single-chip microcontroller (e.g. Microchip PIC) and satellite modem (for satellites in polar orbits, e.g. Iridium) for data transmission.

#### C. Ocean package:

##### 1) Components of the ocean package:

- a surface buoy unit containing a GPS, a processor and the lithium battery which guarantee a supply in energy for 2 years;
- a 800-m long cable attached to the buoy underneath carrying a profiler based on Argo float technology, with inductive NRT data transmission, capable to work in polar environment, equipped with CTD sensors, scanning up and down from surface to 800m depth and up, taking vertical profiles of temperature and salinity once or twice a day (autonomy up to 600 profiles);
- a cable loaded with a 50 kg deadweight at the very end in order to keep the cable as vertical as possible, even during strong sea-ice drift entraining the surface buoy and the 800m-long cable.

##### 2) Sensors specification:

- Ice-tethered profiler based on Argo-float technology, with inductive NRT data transmission, capable to work in polar environment, equipped with conductivity, temperature, pressure and dissolved oxygen sensors;
- CTD system with anti-foul protection, anti-foulant devices, a U-shaped flow path, and a pump delivering 10 ml/sec flow continuously during the profile;
- Temperature sensor initial accuracy of  $\pm 0.002^\circ\text{C}$ , stability 0.0002/year;
- Conductivity sensor initial accuracy of  $\pm 0.002$ , stability 0.001/year;
- Pressure sensor initial accuracy of  $\pm 2$  dbar, stability 0.8/year;
- Optical sensor for measuring the O<sub>2</sub>-concentration using lifetime-based luminescence quenching principle, measurement range of 0-500  $\mu\text{M}$ , resolution < 1  $\mu\text{M}$ , accuracy < 8  $\mu\text{M}$  or 5 %, response time (with standard foil) < 25 sec;
- Inductive data transmission along the cable, inductive cable length 800 m;
- Satellite modem (for satellites in polar orbits, e.g. Iridium) for data transmission and two-way remote control.



**D. Power supply and data transmission:**

- Satellite modem (for satellites in polar orbits, e.g. Iridium modem and antenna) for data transmission; (if not included separately in any of sensor packages).
- Power supply system.