Summary of Outcomes: New Collaborations for Low-Cost Technology Development

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Executive Summary

The discussion underscored widespread unmet needs in affordable marine sensing, spanning molecular, nearshore, surface, benthic and autonomous platform technologies. Addressing these requires improved data integration, calibration access, innovation pathways and equitable global partnerships. While a formal alliance is unnecessary, POGO can play an important enabling role by coordinating efforts across networks, advocating for accessible technologies and tariffs policy, supporting open science and citizen science, and facilitating commercialisation and visibility of emerging low-cost solutions.

Part 1: Gaps and Needs in Affordable Marine Technologies

Participants identified major gaps in both measurement capability and system-level support for affordable marine observing technologies.

Key Needs

- **Low-cost molecular sensors** for citizen science, with strong links to open databasing systems (e.g., OBON).
- **Nearshore sampling tools** for estuaries and organic pollutants, supported by optimised sampling design using DITTO or AI.
- **Data system integration** for emerging networks (e.g., surface autonomous platforms), with connections to ERDDAP-based portals like EMODnet.
- **Surface skin and air–sea exchange measurements** aligned with existing EOVs, supporting SST, BGC, biological observations and plastics.
- **Affordable benthic sampling systems**, including camera tools and taxonomic sampling, with AI to process large volumes of imagery; continued need for vessels for deeper sampling.
- **Regional calibration hubs** offering lower-cost calibration for sensitive sensors such as oxygen and carbonate systems.
- **Megafauna as mobile samplers**, supporting networks like AniBOS and enabling cross-disciplinary observations.
- **Modular, reproducible payloads** for USVs and other autonomous platforms.
- **Lower barriers to innovation**, including easy commercialisation of prototypes, open-access manufacturing (e.g., 3D-printable designs), accessible workshops, twinning projects, and improved data portals to store and use low-cost sensor outputs.

Part 2: Procurement and Maintenance Challenges, especially in the Global South

The discussion highlighted systemic barriers that limit access to marine technologies in developing countries.

Key Issues

- **Tariff-related uncertainty** disrupts access to instruments and increases costs for Global South institutions.
- **DIY Oceanography** may help address accessibility gaps where local supply chains are weak.
- **Calibration challenges** reinforce the need for regional calibration hubs and manufacturer-led training.
- **Equity in scientific collaborations:** Concern about "parachute science" and misperceptions that a lack of published observations implies no observations exist. Joint campaigns should be equitable and inclusive.
- **Data quality and metadata standards** are essential for ensuring stable, reliable datasets from diverse technologies.
- **Market development and procurement support:** A POGO endorsement system could encourage trust in emerging low-cost technologies and diversify suppliers.
- **Policy advocacy:** Potential role for POGO in promoting tariff-free scientific equipment through bilateral/multilateral agreements.
- **Open science and citizen science** should be strengthened to democratise data access and participation.
- **High data transmission costs** from autonomous platforms remain a major barrier needing collective solutions.

Part 3: Exploring Solutions and the Role of POGO

The group evaluated whether a formal POGO-led alliance is needed and outlined potential actions.

Key Conclusions

- A formal **low-cost technology Alliance** is *not* required at this stage.
- Instead, POGO could catalyse progress by:
    - Defining what "low-cost" and "accessible" technologies mean for the community.
    - Sharing materials widely via social media, workshops and conferences.
    - Collaborating with existing active networks (FVON, GOA-ON, COLaB and others).
    - Supporting citizen science initiatives.

- Engaging with industry to accelerate sensor commercialisation.
- Developing a **portal or visualisation tool** to map and showcase ongoing low-cost technology efforts.