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Next steps in the development of a Modular Design Hydrophone Mooring Prototype for the next generation of CTBT International Monitoring System (IMS) Hydroacoustic (HA) Stations

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All six of the HA hydrophone stations in the IMS network are now certified and operational. The IMS HA network is the first of the four CTBT monitoring technologies to be completed. With this goal achieved, the focus of the Engineering and Development effort now moves towards sustainability and future recapitalization of these stations, as several HA stations approach the nominal 20-year design life. In this context, the multi-year effort in the IMS division on the Next Generation of Modular HA cabled hydrophone stations has moved from technology watch and high level concept studies to a phase of design concept down-selection and prototype requirements specifications. The medium term goal is to arrive at a Modular Design Hydrophone Mooring Prototype which:
(i) improves HA station sustainability by reducing the impact of events that may negatively affect data availability,
(ii) facilitates reparability through modular designs which employ wet-mateable connectors (WMC), and
(iii) allows for options to connect non-interfering instrumentation capable of adding to the scientific value of IMS hydroacoustic data.
It is a recognised pre-requisite that all proposed prototypes must fulfill all CTBT operational manual specifications and also satisfy the minimum 20-year system design life criteria.
The key components for facilitating reparability and hence improving station sustainability are WMC's. However, since Remotely Operated Vehicles (ROV) are required for any intervention (disconnection or connection) involving a WMC, their use in a hydrophone mooring design must be balanced with the risks inherent to ROV operations. To address this issue, a risk based investigation is being conducted to assess the trade-offs of ROV use for the various Modular Design Options vis-a-vis (a) the Weather and Operational risks at the six remote ocean locations where HA hydrophone stations are installed, and (b) the specifications for a Cable Ship, or other Vessel of Opportunity equipped with Dynamic Positioning capabilities, to minimise operational risk. The results of this risk analysis will be used to support down-selection of Modular Design hydrophone mooring prototypes which minimize reliance on an ROV for the installation and repair interventions. The Modular Design hydrophone mooring prototype and Next Generation HA station concepts on which the study is focusing are presented.