Report of the 3rd meeting of the international Scientific Advisory Board (SAB)
17th of June 2020 via Video-conference

1 - Presentation of the final scientific report of the phase 1 for a two deep-sea ROVs scenario by the Scientific Working Group (SWG) leaders

The SAB was very satisfied with the comprehensive overview given during the presentation by Valérie Chavagnac and Pierre-Marie Sarradin about the work done by the SWG over the past 12 months and for having considered the SAB's recommendations after the intermediate review. The SAB appreciated the work done in close collaboration between the Scientific WG and the Fleet technology teams to define the scientific needs and essential specifications for the technological developments needed to build a new generation ROV. According to the presentation the working atmosphere between scientists and the engineering staff is very positive and constructive. The SAB also appreciated the SWG's focus on the technological solutions to be developed to ensure a smooth transition from manned to remotely operated deep-sea intervention vehicles, for example to develop imagery solutions to reproduce as far as possible the direct vision and human perception otherwise obtained by manned vehicles.

The final report gives the scientific priorities to increase the potential of scientific experiments and data acquisition in deep-sea environments using a deep-sea fleet of remotely operated and autonomous vehicles (new ROV+, modernized VICTOR 6000 and the AUV Coral 6000). The SAB is satisfied by the vision of the SWG to build scenarios using one or more vehicles together in a complementary approach and with breakthrough functionalities to achieve cutting-edge science.

The SAB also appreciated the SWG approach to propose technological developments of a new ROV combined with the modernization of the ROV "VICTOR 6000", both vehicles benefiting of increased capacity in terms of acoustic and video imagery and payload for scientific tools and sample acquisition.

The SAB appreciated the definition and prioritization of the scientific specifications by the SWG for the upgrading of the ROV "VICTOR 6000" and for the new ROV+ using a scale of importance (priority, important and moderate scientific specifications). The SAB agreed with the approach of considering several scenarios of ROV use at different spatial scales for exploration needs, deployment for small scale investigations and at

deep-sea observatories taking into account the constraint and operational performance to design the new ROV.

For the modernization of the ROV “VICTOR 6000”, the SAB agreed with the proposed steps of improved optical and acoustic imagery for 3D reconstruction of the seafloor and for increasing its carrying and sampling capacity with a permanent routine sensor package with possibility of adding modular sensors depending on the cruise respective scientific objectives.

For the development of the new ROV, additional breakthrough functionalities are needed to achieve cutting-edge science. The SAB agreed that the new ROV must have an all oceans capacity with deployment capacity down to 6000m. The SAB agreed also with the SWG hierarchization of priorities for the given scientific specifications. It is noteworthy that the SAB members did not feel competent as an advisory board to justify the scientific specifications. However, the board was convinced that the composition of the SWG represents the majority of French marine research institutes. The priorities therefore likely represent the needs and major interests of French marine scientists and their international collaborators.

After the presentation of the final results of the phase 1 for a two deep-sea ROVs scenario the SAB was convinced that the further development of a modern shuttle system from the sea surface to the deep-sea floor will be a crucial element and the complementary link between any given research vessel and deep-sea vehicle for rapid recovery of freshly collected samples, sending and swapping scientific tools and new instruments to the seafloor without time-consuming resurfacing and subsequent maintenance of the respective vehicle. Using a shuttle will give also the possibility to extend the ROV diving time and efficiency. The SAB concluded that the shuttle development is an important and integral part of the project. However, the shuttle system should be as simple as possible in operation and maintenance. The actual used system may have its limitations but the SAB would like to emphasize to simplify any envisaged modification.

The SAB consider the limiting of the environmental pollution by avoiding littering of any human-derived litter (including disposable). Ballast has to be mandatory in the development of the new ROV and shuttle.

Furthermore, the SAB emphasizes that the new ROV development has to include the potential deployment from other European research vessels and to make it interoperable within the OFEG consortium[1]. The SAB also suggests intensified international collaboration and negotiations with relevant partner institutions to ensure access to the Arctic and Antarctic on existing European or other icebreakers.
The SAB recognizes that the work done by the Scientific WG is very satisfying and must be continued by technical studies to design the system architectures according to the scientific needs and priorities. The SAB recommends that the project must be continued to achieve the modernization of the ROV “VICTOR 6000” and to design a new ROV+ and shuttle with breakthrough capacities to give the opportunity to the scientific community to carry out cutting edge deep-sea research at an unprecedented level. The SAB is convinced that these developments will increase the attractiveness of the French oceanographic fleet and will provide great opportunities to intensify international collaborations. The Board is very much interested in this important project and eager to support the project with advices and recommendations whenever necessary. For this purpose, it seems sensible that the project managers should send short assessment reports to the advisory board every six months so that the SAB can react promptly to any difficulties that may arise.

The SAB noted that maintaining the operational status of "Nautile" is becoming increasingly difficult. Maintaining the technical competence of the employees is problematic. However, the Advisory Board would like to emphasize that it is very important for French deep-sea researchers and their international colleagues that there is a smooth transition between the commissioning of the new ROV+ and the decommissioning of “Nautile”. If the commissioning of the new ROV+ is delayed, which may happen with such a complex system, the SAB strongly recommends that the availability of "Nautile" must be ensured.

[1] http://www.ofeg.org/np4/home.html

2 - Fleet Equipment of Excellence (Equipex) Proposal: New scientific equipment for the Deep-Sea ROV

The SAB was impressed about this proposal. The application is very good structured, the requested instrumentation funds justified and reasonable. The members of the international SAB were fully in favor of submitting a letter of support for this excellent application.