A summary of expected funding opportunities enabled by the RoboFish Project:

"Autonomous Biomimetic Robot-fish for Offshore Wind Farm Inspection"

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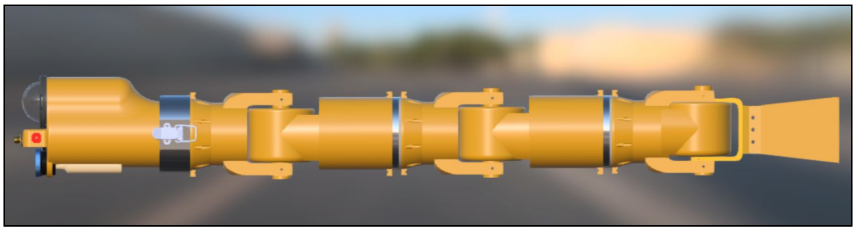

This is a brief summary aiming at demonstrating the further funding opportunities that the project "Autonomous Biomimetic Robot-fish for Offshore Wind Farm Inspection" made possible with the initial investment from the Flex Fund programme from by the Supergen Renewable Energy Hub. The project has forged a very strong collaboration between the consortium members: The University of York, The University of Strathclyde, PicSea Inc, EC-OG Ltd, the ORE Catapult, and members of the Supergen ORE Hub itself. Dr Mark Post and the consortium members have successfully obtained a White Rose Collaboration Fund Grant under the project title "Innovating the Future of Bio-Inspired Autonomous Robots for Offshore Renewable Energy Inspection". This fund, which will now be used in 2021, will support publication of conference and journal papers, enable a week of field testing at the ORE Catapult facility in Blyth in a drydock with an actual turbine monopole for inspection, and facilitate connections and conferences between the Yorkshire Universities of Leeds, Sheffield, and York and the RoboFish project partners. The aim of this is further collaboration and development of new enabling technologies, and also the creation of follow-on proposals and new research based on successes with RoboFish. One proposal has already arisen from this collaboration with the University of Leeds and Wessex Water, and focuses on development of smaller RoboFish that can autonomously inspect the insides of water and sewer mains in city infrastructure. Our eventful consortium Skype channel has created a think tank that has stimulated numerous useful ideas that helped some of our partners in securing further funding. For example, by being an effective member in the consortium, Andrew Durrant has found the outcomes of this project very useful and assisted him in securing new industrial funding for his company to build a small fleet of autonomous vehicles that will include some hardware and software technology from RoboFish. Two research funding applications were also submitted by our partners at Strathclyde in relation to this project. They are Bionic Adaptive Stretchable Materials for WEC (BASM-WEC)", EPSRC Marine Wave Energy and Simulation-based design and manufacturing of a novel underwater soft robot H2020-MSCA-IF 2020. To continue the impact and knowledge exchange from RoboFish into 2021, an EPSRC Impace Accelerator Account application has been made at the University of York, which will allow further field trials and industrial engagement sessions with current and new partners. The use of modular electronics and actuation, the networking architecture, the 3D printing approach, and most of all the magnetic joint design are novel contributions to the state of the art that will enable new opportunities and future

research projects. This unique electronic design system represents an opportunity for more publications addressing the autonomy of RoboFish and increasing the likelihoods of further funding. Also, the use of ZeroMQ messaging system between the RoboFish segments has helped us successfully propose it as a communication solution between AI system components in a separate project involving connectivity of industrial AI systems. Industrial engagement with the PipeBots project at the universities of Sheffield and Leeds has indicated that there are many opportunities in other water inspection applications. Future versions of a smaller size RoboFish, with particular focus on the modularity of the body design and easy connect/disconnect magnetic joints, can provide a flexible platform for numerical data validation and experimental investigation increasing the likelihood of new proposals. Other applications to be investigated with industrial partners include the use of RoboFish as general low-cost inspection tools for undersea monitoring. Aquaculture beds and particularly scallop farming would benefit greatly from autonomous monitoring systems. Environmental research and conservation efforts can make use of RoboFish as minimally-invasive agents that by their design are more agile in complex environments and have less environmental impact on underwater life than conventional large ROVs with thrusters. Industrial and municipal water systems can be patrolled by autonomous or semi-autonomous RoboFish, and hazardous environments such as decommissioned nuclear reactors can be explored with RoboFish that are hardened to radiation but able to pass through small gaps like aquatic snake robots. EPSRC and InnovateUK funding sources such as SMART grants will be sought by partners to explore the use of RoboFish in these applications, as well as opportunities such as the Sellafield Game Changers nuclear innovation calls that often focus on inspection.

More information and a full impact case study can be obtained by contacting Dr Wael Gorma (wael.gorma@york.ac.uk) or Dr Mark Post (mark.post@york.ac.uk) or by visiting the RoboFish Website (https://www.york.ac.uk/robot-lab/robofish/).