Supergen ORE Hub - Early Career Researcher Research Fund
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The funded activity consisted in a 2-weeks industrial secondment at INEA in Ljubljana, Slovenia. INEA is a prominent company in the field of manufacturing informatics, system integration, automation and automated process control. The main objective of the proposed activity was to learn about industry standards and best practices in the condition monitoring and sensing of industrial machines, in order to verify how this knowledge can be transferred to the ORE sector. More in detail, the scope of the investigation was to find out how the information on the health of the components, provided as additional inputs to the computational models developed by the applicant, could be exploited to support the strategic O&M planning of an ORE farm.

In order to achieve these goals, the secondment was divided in two main kind of activities, which were alternated throughout the 2-weeks period.

On one hand, a first series of activities consisted in familiarising with INEA's solutions for monitoring and control of industrial machines, intelligent energy information systems, energy management and automation. As a result, INEA's personnel organized a series of 1-to-1 meetings and visits to their facilities, during which examples of their past and current projects were shown and discussed. These included:
- the development and application of their software solutions: *inEIS,* for the monitoring of factories' electric consumption, and *KIBERnet*, for the smart management and peak demand reduction of industrial plants;
- the design and implementation of a Supervisory Control And Data Acquisition (SCADA) and Programming Logic Controllers (PLCs) for a catalysts manufacturer; and
- the design, production and installation of automated production lines for the assembly of LCD dashboards in the automotive industry.
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On the other hand, a second series of activities consisted in a thorough review of the state of the art in condition monitoring and condition-based maintenance for industrial machines. Findings were discussed daily with INEA's team in order to assess potential benefits and limitations of their application in ORE devices, with major emphasis on the floating wind sector due to its novelty and promising future. As a result, several reference documents were identified and critically reviewed, and the applicant's knowledge in this O&M-related topic extended. This will lead to the creation of a review paper on the condition-based maintenance of ORE devices, including a database on typical monitoring solutions for floating wind technologies. Besides, a suitable degradation model is now being implemented in order to improve the capabilities of the computational O&M tools previously developed by the applicant.

Finally, a further kind of activities consisted in presenting the work of the applicant through a couple of seminars. One of them was held at INEA's premises, while the other at the Jožef Stefan Institute, the largest research institute in Slovenia. The intended aim of these outreach talks was to enable potential collaborations with the Slovenian scientific audience, as well as to raise awareness of the ORE sector in order to promote investments and future works.