### European Defence Fund Lump Sum Grants

<table>
<thead>
<tr>
<th><strong>Project acronym &amp; title</strong></th>
<th>IFURTHER high Frequency over The Horizon sensors' cognitive network</th>
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<tbody>
<tr>
<td><strong>Type of action</strong></td>
<td>European Defence Fund Lump Sum Grants</td>
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<td><strong>Consortium</strong></td>
<td>18 partners from 10 European countries</td>
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<tr>
<td><strong>Starting date</strong></td>
<td>01/12/2022</td>
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<tr>
<td><strong>Duration</strong></td>
<td>3 years</td>
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<tr>
<td><strong>EU Grant</strong></td>
<td>10.95 M€</td>
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<tr>
<td><strong>GA Number</strong></td>
<td>101103607</td>
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<td><strong>Project coordination</strong></td>
<td>Hellenic Aerospace Industry</td>
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Cognitive Network of HF-Radars
A Revolutionary Enhancement of European Defence

An ambitious 3-year technological project dedicated to wide area (beyond the horizon) surveillance, for providing support to the EU against emerging military threats.

Primary addressing wide area air and sea covert surveillance by developing new concepts of over-the-horizon radar to be integrated into a collaborative network of high-frequency sensors.

Ultimately contributing to the development of a persistent and very wide-area EU defence capability to monitor air and sea domains by delivering a concrete and scalable solution.
A study for assessment of core technologies to prepare the future OTH-R

Objectives of iFURTHER

- Detection and tracking of air and sea targets at long range (over the horizon), far beyond currently existing systems, by using the reflections of skywave and surface-wave propagated signals
- Gap filling and extension of the current EU air and sea radar coverage by introducing a multistatic sensor configuration supported by ad-hoc network protocols and an appropriate infrastructure for synchronisation and coordination of sensors
- Implementation of cognitive radar management systems to optimise operational parameters in real time and as a function of environmental conditions (e.g., the state of the ionosphere), based on a design study of robust ionospheric models and sounding protocols
- Implementation of advanced signal processing techniques to improve over-the-horizon detection and track performance as well as target localisation capabilities
- Development of new techniques for passive processing, by utilisation of available non-cooperative illumination and application of cognitive features at network level, for optimized usage of the electromagnetic spectrum

Foreseen applications of the iFURTHER technology

- Long-range surveillance out to and beyond 200nm EEZ territory
- Early detection of high speed targets & reduction of reaction time
- Defence against diverse threats through AI-assisted technologies
- Integration within other defence applications / early warning system

Implementation Roadmap towards an OTH Radar product
iFURTHER’s Approach

Study of OTH-R technologies will be performed in terms of:

- End users’ potential needs and requirements
- High-level system requirements
- Functional analysis for potential system candidates

Candidate systems will be designed to support studies and create a set of experimental setups for proof-of-concept evaluation.

Proof-of-Concept Experimentations are scheduled to be performed in various places over the EU territory.

- Both skywave and surface-wave (hybrid) architectures will be considered
- Representative scenarios will be evaluated and assessed to verify the approaches taken and refine the developed technologies

Experimentation results will be assessed to support design with real data coming from operational scenarios.

- Multistatic Hybrid (Skywave – LOS/Surface-wave) OTH-R system: Concept
- Multistatic Skywave OTH-R system with long baseline: Concept

Envisioned EU-wide surveillance system. Through interconnecting numerous types of HF Transmitters & Receivers placed across the EU territory via a dedicated network, a unique persistent surveillance capability will be achieved.