Consortium

HELLENIC AEROSPACE INDUSTRY S.A.

ONERA
THE FRENCH AEROSPACE LAB

NATIONAL OBSERVATORY ATHENS

i-matik

cnit
National Lab RaSS

ISTITUTO NAZIONALE DI GEOFISICA E VULCANOLOGIA

Warsaw University of Technology

Fraunhofer FHR

HELZEL Messtechnik

tms
technisch-mathematische studiengesellschaft mbh

indra

Universidad de Alcalá

BHE

SignalGeneriX
Advanced Signal Solutions

Patria

era

LUP

Project acronym & title	
iFURTHER	
hIgh FreqUency oveR The Horizon sensors' cognitivE netwoRk	

Starting date
01/12/2022

Duration
3 years

EU Grant
10.95 M€

Type of action
European Defence Fund Lump Sum Grants

Consortium
18 partners
from 10 European countries

Topic
EDF-2021-DIS-RDIS-OTHR-2
Research for disruptive technologies for defence applications

GA Number
101103607

Project coordination
Hellenic Aerospace Industry

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iFURTHER

Cognitive Network of HF-Radars

A Revolutionary Enhancement of European Defence
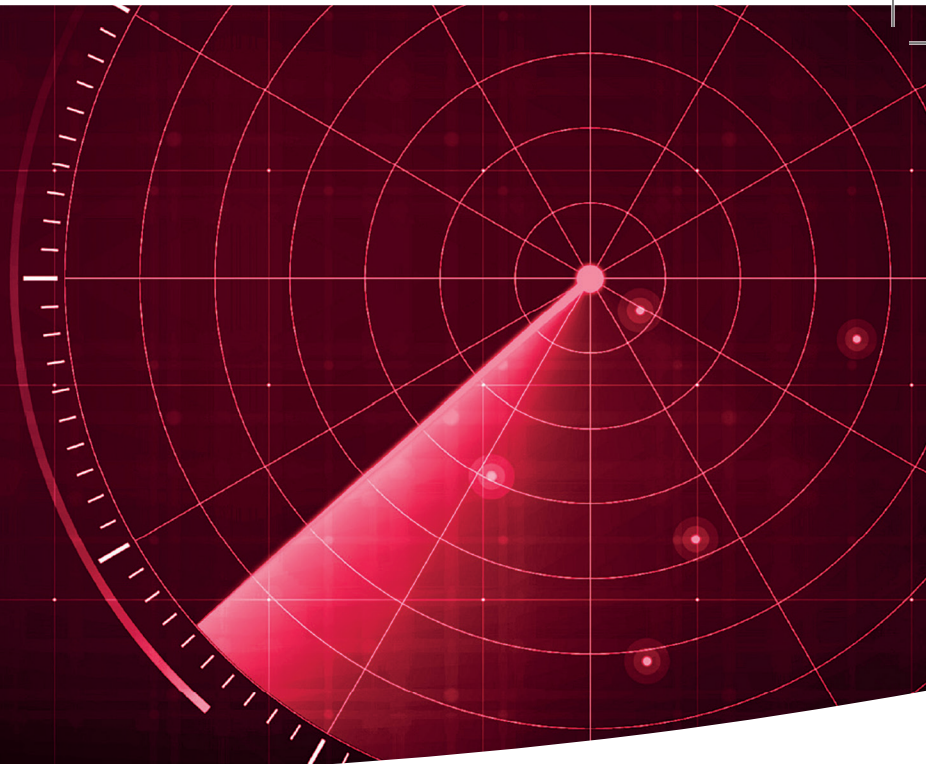
An ambitious 3-year technological project dedicated to **wide area (beyond the horizon) surveillance,** for providing support to the EU against emerging military threats.

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.**

iFURTHER

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

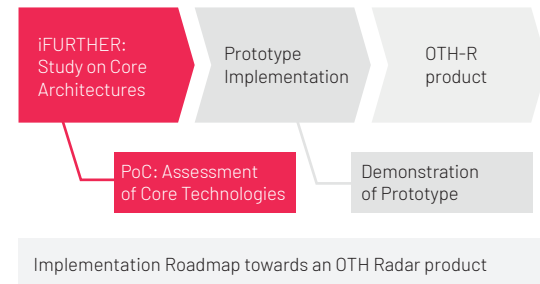**Long-range surveillance** out to and beyond 200nm EEZ territory

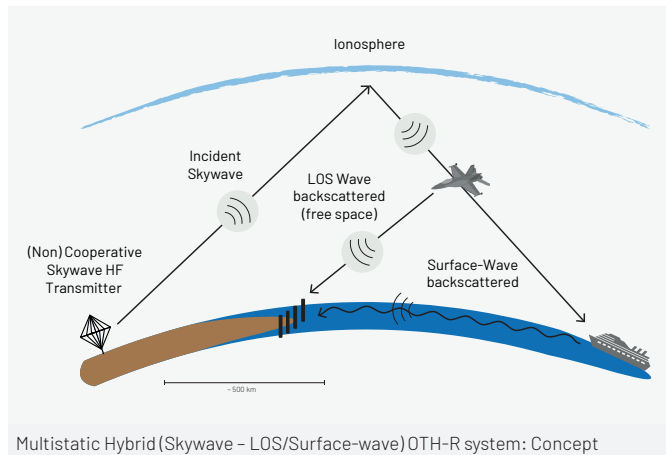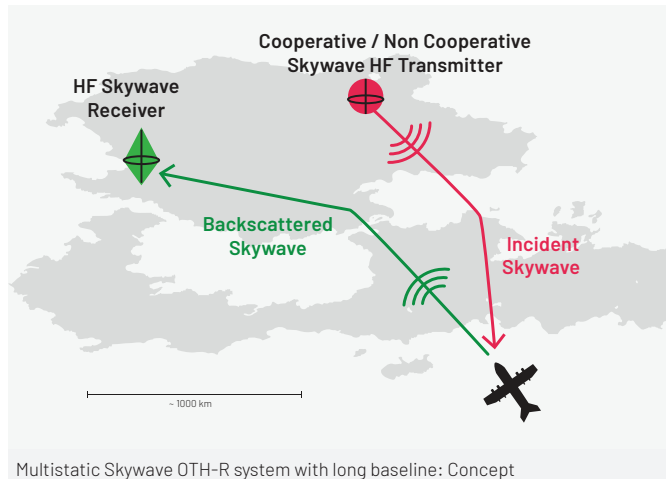**Early detection** of high speed targets & **reduction of reaction time**

Defence against diverse threats through AI-assisted technologies

Integration within other defence applications / early warning system

iFURTHER:
Study on Core Architectures

Prototype Implementation

OTH-R product

PoC: Assessment of Core Technologies

Demonstration of Prototype

Implementation Roadmap towards an OTH Radar product

Multistatic Skywave OTH-R system with long baseline: Concept

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

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

Study of OTH-R technologies → Design & Test Proof of Concept Units → Assessment of Experimentation results
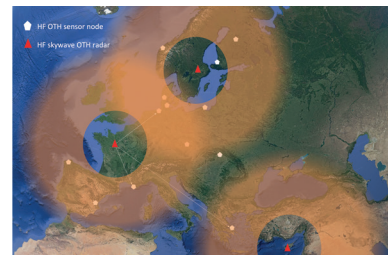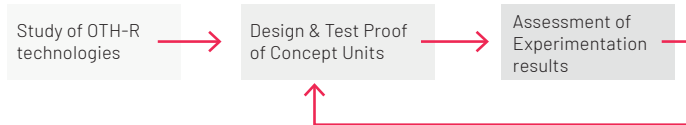
Envisioned EU-wide surveillance system. Through interconnecting numerous types of HF Transmitters & Receivers placed across the EU territory via a dedicated network, **a unique persistent surveillance capability will be achieved.**

Envisioned EU-wide surveillance system