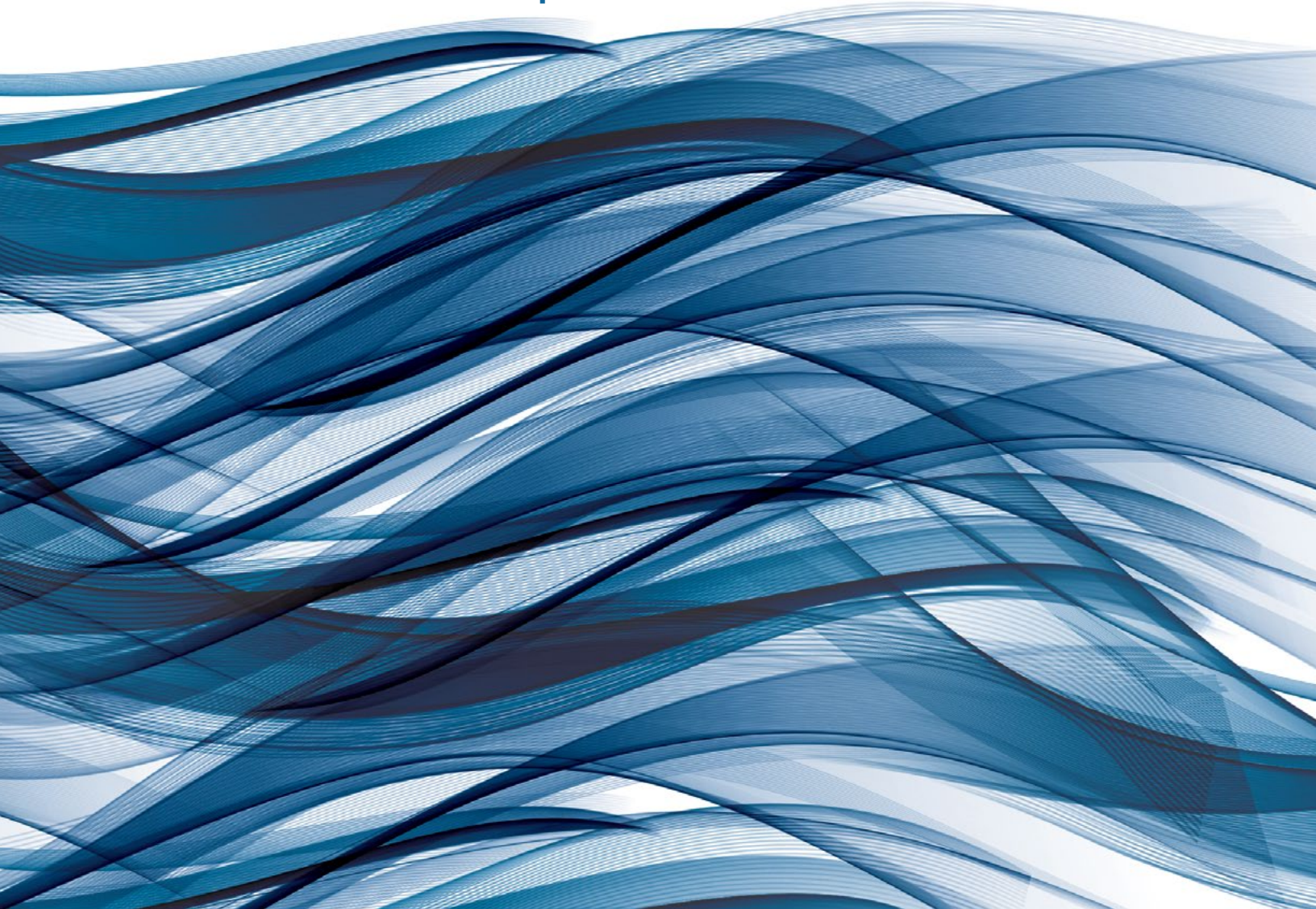




Newsletter #10
August 2019

RANGER

RAdars for lo**NG** distance maritime surveillance**E**
and Search and Rescue ope**R**ations



www.ranger-project.eu

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Dear Readers,

Welcome to the tenth issue of the RANGER newsletter. RANGER is a 42-month European project, co-funded by the European Union’s Horizon 2020 research and innovation programme. The consortium comprises 10 partners from 7 countries: a balanced blend of Radar technology industrial organizations, academic/research institutes, high-tech SMEs, and highly relevant end-user organizations. RANGER combines innovative Radar technologies with novel technological solutions for early warning, in view of delivering a surveillance platform offering detection, recognition, identification and tracking of vessels, beyond current radar systems’ capabilities, thus drastically improving the response and intervention capacity of European Search and Rescue operations.

This issue features an article entitled Smart Borders, Surveillance and Data Protection by Dr. Lilian Mitrou (University of the Aegean), an article about the installation of the MIMO radar by Niko Joram (TUD) and another article about the 2nd RANGER Pilot Demonstration, by the RANGER coordinator Dimitris Katsaros (EXUS). It also includes project news and updates as well as related conferences & events.

Enjoy reading and don’t forget to visit our [website](#) for more information!

The Project Coordinator



For more Information

Please visit the RANGER website
www.ranger-project.eu

You can also keep up with more
of what is happening at RANGER
project by following us on:



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Project News & Events

RANGER publication

14 May 2019

Our RANGER partners from NATO CMRE had a paper published in the [IEEE Transactions on Signal Processing \(TSP\)](#) journal. The paper is entitled “[Self-Tuning Algorithms for Multisensor-Multitarget Tracking Using Belief Propagation](#)”.

RANGER @ ICASSP 2019

12-17 May 2019 | Brighton, UK

RANGER partners from NATO CMRE attended the [International Conference on Acoustics, Speech, and Signal Processing 2019](#) which was held on 12-17 May 2019 in Brighton, UK. Moreover, they presented the paper “[Heterogeneous Information Fusion for Multitarget Tracking Using the Sum-product Algorithm](#)”.



European Maritime Day

16-17 May 2019 | Lisbon, Portugal





RANGER project participated in [European Maritime Day 2019](#), an annual two-day event during which Europe's maritime community meet to network, discuss and forge joint action. It targets maritime professionals, entrepreneurs and ocean leaders. The event was held in Lisboa, Portugal in 16-17 May 2019.

Our project was hosted at the exhibition area in the booth No 55 which was visited by hundreds of people as well as the Commissioner for Environment Maritime Affairs & Fisheries of the European Commission, Karmenu Vella.



RANGER @ 2nd MARISA Workshop

21 May 2019 | Madrid, Spain

Our project coordinator Mr. Dimitris Katsaros from EXUS took a great chance for collaborating not only with [MARISA](#) but also with [Sauron Project](#) by participating in the 2nd MARISA Workshop in Madrid, Spain on 21st May 2019 where he presented an overview of RANGER.





GERMAN MICROWAVE CONFERENCE

March 25–27, Stuttgart, Germany

„U drive microwaves“

GeMiC 2019

RANGER @ GeMiC 2019

25-27 March 2019 | Stuttgart, Germany

A paper entitled [“An Ultra-Wideband 3-23 GHz VCO Array with high continuous tuning range for FMCW Radar application”](#) was presented by the RANGER partners from Technische Universität Dresden (TUD) at the [2019 12th German Microwave Conference \(GeMiC\) on 25-27 March 2019](#).

RANGER @ PIERS 2019 & SIE 2019 meetings

18 June & 26 June 2019 | Rome, Italy

During the [41st Progress In Electromagnetics Research Symposium \(PIERS\)](#) which was held on 17-20th June 2019 and the [Associazione Società Italiana di Elettronica \(SIE\)](#) that took place on 26-28th June 2019 both in Rome, Italy, our RANGER partners LEONARDO (LDO) represented RANGER with a booth related to the project.



RANGER @ PRIME 2019

15-18 July 2019 | Lausanne, Switzerland

Our partners from Technische Universität Dresden TUD attended the [15th Conference on PhD Research in Microelectronics and Electronics \(PRIME 2019\)](#) which took place in Lausanne, Switzerland, from 15th to 18th July 2019. They presented two scientific papers. The first entitled ‘Design Approach for a Broadband Class-D Power Amplifier for Bluetooth Low Energy Application in a 28 nm Digital CMOS Technology’ and the second ‘A 6-15 GHz ultra-wideband signal generator with 82 % continuous tuning range for FMCW radar’.

2nd French Pilot Demonstration

by the RANGER coordinator, Dimitris Katsaros, EXUS

The 2nd RANGER Pilot was held in France on 16th May 2019, in the marine area between Marseille and Port-Vendre. In this pilot RANGER consortium tested the OTH radar and the PE-MIMO radar (which was installed in Cap Bear) and the backend system having as inputs the AIS, the French legacy radars and as targets 3 different vessels (a tug vessel of 35 m – a SAR of 17 m and a SAR of 14 m), provided by the Directorate of Maritime Affairs (DMA). The vessels followed predefined routes, in

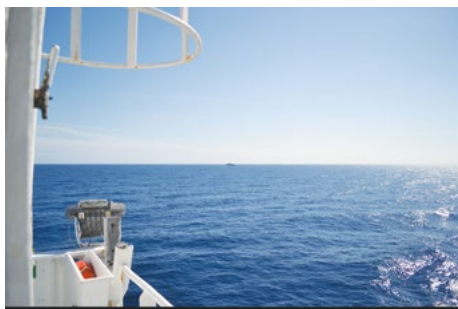
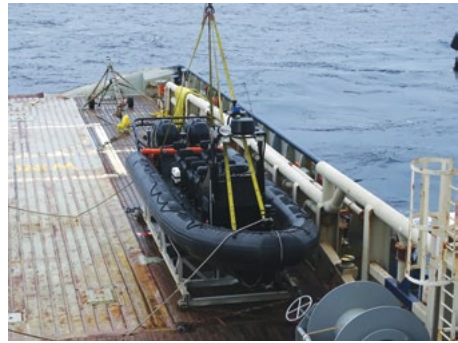




order to test different capabilities of the platform like detection and continuous tracking, data fusion, violation of specific rules, early warning alerts, and visualization of the tracks.

We are also proud to announce that RANGER project is the 1st EU funded project that shared successfully data with the Greek CISE node offered by the Hellenic Ministry of Defense (HMOD). In this pilot, we had participants from the Italian Navy, Portuguese navy, HMOD, French Navy and an external ethics expert group that they validated our platform and provided us with useful feedback, which will lead to further required improvements and refinements.

The 3rd RANGER pilot will be held in September in a completely different maritime environment. Stay tuned...



MIMO radar

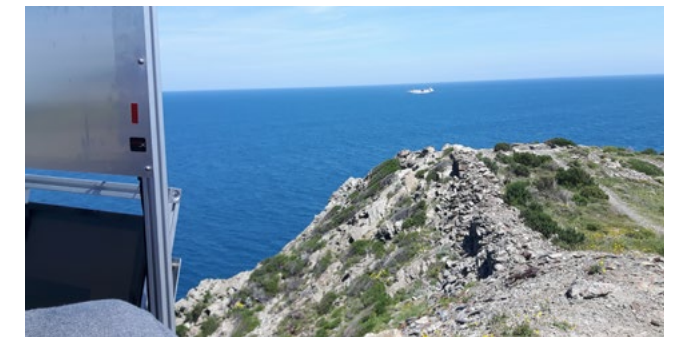
Article by Niko Joram, TUD

During the second pilot in Cap Bear, a MIMO (multiple input multiple output) FMCW (frequency modulated continuous wave) radar system was successfully installed and operated. Having 3 transmit and 5 receive antennas, the system can detect smaller boats and larger ships up to a few kilometers of range with an angular resolution of better than 12 degrees. With its efficient system architecture, high update rates of the radar image in the range of 20 Hz are possible, allowing for a real-time observation of the area in front of the radar. Consequently, the system can react quickly to moving targets and changes in the environment. This mobile version of a full MIMO FMCW radar is flexibly deployable in different locations and allows rapid prototyping and evaluation, due to its ease of use and assembly.

An advanced user interface allows easy configuration of the system parameters like signal parameters, range, detection thresholds etc., even remotely over



a network connection or the internet. The radar image and detected targets are displayed in a natural way that is intuitive to understand.



SAR boat passing and closing at approx. 400m

Connectivity to the RANGER backend ensures the distribution of target data for fusion and tracking of ships and boats.

“Smart Borders, Surveillance and Data Protection

by Prof. Lilian Mitrou, University of the Aegean

RANGER's goals, design and deployment reflects the increasing technological surveillance that forms an inherent characteristic of the enhanced security and safety of the EU's external maritime borders. By combining novel and ground-breaking radar technologies with technological solutions that enable early warning such systems increase operational capabilities, thus contributing to the multifold objectives of reducing the death toll at sea by enabling effective search and rescue (SAR) activities and combating cross border crime (such as smuggling and trafficking).

The use of surveillance mechanisms to detect, recognize and identify/ intercept vessels at sea as a part of smart borders control are a significant pillar serving vital interests of persons at risk (in case of SAR) and support the border protection needs. All the work and solutions pay specific attention to the protection of privacy and personal data of persons involved.

Data collected through the RANGER systems may amount to personal data as it may lead to the direct or indirect identification of a natural person.

In order to face these risks and struck a lawful and fair balance between security objectives and protection of people fundamental rights, appropriate data protection safeguard have been established, including strictly defined conditions for personal data disclosure

and transfers, establishment of supervision instruments and accountability/ transparency tools. Based on data protection impact assessment such a system has been designed and implemented. RANGER is designed so to comply with the data protection principles (purpose limitation, fairness, limitation of storage) and mainly this of data minimization, i.e. processing personal data that is adequate, relevant and limited to what is necessary in relation to the purposes for which they are processed. In more general terms, all smart border activities have to be carried out in full respect of fundamental rights as enshrined in the Charter, including the right to protection of personal data (Article 8) and the respective legislation.



European Microwave Week

29 September- 4 October 2019, Paris, France

<https://www.eumweek.com/>



International Symposium on Antennas and Propagation ISAP 2019

27-30 October 2019, Xi'an, China

<http://www.em-conf.com/isap2019>



2019 IEEE BiCMOS and Compound Semiconductor Integrated Circuits and Technology Symposium (BCICTS)

3-6 November 2019, Nashville, USA

<https://bcicts.org/>



2020 International Solid-State Circuits Conference

16-20 February 2019, San Francisco, USA

<http://isscc.org/>



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For more Information

Please visit the RANGER website

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You can also keep up with more of what is happening at RANGER project by following us on:



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