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Letter of Interest in

EDF-2024-LS-DA-SME-NT and EDF-2024-LS-RA-DIS-NT

BHE Bonn Hungary Electronics Limited is looking to join consortia for EDF-2024-LS-DA-SME-NT: Non-thematic development actions by SMEs or/and EDF-2024-LS-RA-DIS-NT: Non-thematic research actions targeting disruptive technologies for defence,

in the following or similar areas:

Space communications related

1. Research and development of chip technology-based K/Ka, Q optionally V-band LNA components. The purpose of the development is to design and manufacture LNA components that can be specially fitted into BHE products, the production of which requires a high level of technology and are at the forefront of the world in terms of their parameters. These customized integrated components can be easily integrated into high-frequency low-noise amplifiers, and also improve the European competitiveness.
2. Research and development of K/Ka, Q optionally V-band power amplifier components. The purpose of the development is the design and production of power-enhancing components that can be specially fitted into BHE products, the production of which requires high-level technology and are at the forefront of the world in terms of their parameters. These customized integrated components can be easily integrated into high-frequency power amplifiers, and also improve the European competitiveness.
3. Linearization of satcom power amplifiers using a cost-effective method. In the case of greater linearity, a lower power amplifier may be sufficient for the same purpose, and this may mean a reduction in the size, consumption, and ultimately costs of amplifiers.
4. Research and development of a digital, spaceborne transmitter architecture. Our product family of transmitter currently features a frequency converter module to shift the signal to RF frequency. This provides excellent spurious characteristics, but also adds to the overall weight and size of our devices. With today's high-speed digital transceivers, it is possible to leave out the converter module and sample and generate

the signal directly. This would result in significant savings in size and weight. Our goal is to develop a space-grade, fully digital transmitter unit that is compliant with ECSS standards.

5. Research and development of fully digital X band transponder. We have developed an X-band transponder with analogue converter technology. Using the experiences from this project, BHE intends to develop a fully digital transponder architecture. Nowadays the RF chips frequency range allows us to synthesize and sample RF signals from X-band (using, for example, the Texas Instruments AFE family). This architecture would result in a compact X-band transponder, which requires less tuning, streamlining the manufacturing process.

Remark: BHE is a member of the NATO DIANA Test Centers Network (in space communications issues).

Counter-UAV related

6. Research and development of a universal hardware platform to support implementation of RF Detector, RADAR, and RF Jammer products. The units to be developed shall be based on RF front-end ICs that allow covering high frequency range (20-12000 MHz) by wide signal bandwidth (~400 MHz) and capable of handling several channels (signal paths) in both reception and transmission. These SDR modules can replace the digital signal processing part of existing multi-channel devices more compactly since frequency converter modules can be left out. The development includes exploration of such RF front-end ICs to optimize the device parameters (frequency band, number of channels, sampled signal bandwidth) for various use cases. Also, the governor FPGA should be sufficient to cope with the high data transfer rate and the emerging signal processing challenges.
7. Research and development of two counter-UAV subsystems. Firstly, a broadband, fast spectrum scanner for use in counter-UAV systems will be studied and designed. This unit should be able to scan a wide frequency band at very high speed for specific RF signals and indicate if a band needs additional examination by more sophisticated sensors. It provides Region of Interest (ROIs) as output to other detection system elements.

Secondly, a drone detection system based on Time Difference of Arrival (TDOA) method will be researched and developed. The sensor nodes provide high precision (nanosecond) timestamps along with the received data and forward them to the central computer where time of arrival is computed. The central computer estimates the position of the drone in based on the received, time-stamped data using TDOA methods.

BHE experiences in EU security and defence projects as consortia member:

- Horizon 2020 SEC-2016-2017 „FOLDOUT"
- PESCO CBRN SaaS –to be closed May 2024
- EDIDP 2021 CBRN-RSS- to be closed May 2024
- EDF-2021-C4ISR-D-COMS: Robust Defence Multi-dimensional Communications, „5G COMPAD"- in progress
- EDF 2023 -LS-RA-SMERONT- Ultra-high frequency communication solution for satellite ground station - A proof-of-concept (WAND) - to be decided by EC June 2024

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