European Defence Agency

SIMCLAIRS INNOVATION AND TECHNOLOGY PARTNERSHIP: A SECOND CALL FOR PROPOSALS IS TO BE HELD IN FEBRUARY FOR COMPETED RESEARCH PROGRAMMES STARTING IN JUNE 2011

On 31st March 2009 the European Defence Agency (EDA) signed the contract on the Studies for Integrated Multifunction Compact Lightweight Airborne Radars and Systems (SIMCLAIRS) with a consortium consisting of national industrial companies from three EDA participating Member States: France, Sweden and United Kingdom. The consortium consists of 4 European companies, all of which have already been successfully involved in past and present airborne radar and equipment development in Europe.

The project started in April 2009 and lasts for 48 months; the value of contract is € 21 million (excluding VAT). If the first four-year phase is successful then a second phase is expected.

SELEX GALILEO | SAAB | THALES UK | THALES SYSTEMES AEROPORTES

PROJECT AIMS

The main aim of SIMCLAIRS is to deliver new technology solutions in the field of light and compact Unmanned Aerial Vehicle (UAV) Radio Frequency (RF) payloads with the combination of Synthetic Aperture Radar / Moving Target Indicator (SAR/MTI), Foliage Penetrating (FOPEN), Electronic Support Measures (ESM) and possibly communications. The programme focus is on extending the concept of multifunctionality to encompass into a single system the very wide frequency band required and the very different requirements on power handling capability, linearity and bandwidth. Expected results of the project will be a response to the projected capability needs arising within the time horizon of 2015–2020.

To achieve the best results in terms of the technology solutions available, the project establishes a new mechanism called the Innovation and Technology Partnership (ITP) where a competed part of the project will ensure the capture and exploitation of novel technologies from industry, small and medium-sized enterprises and academia, and provide the free flow of

technology and information across national boundaries between the participating entities. In order to guarantee the best technology knowledge available in Europe two open calls for Research Supplier Proposals are organised by the consortium, without discrimination on grounds of nationality, type of research suppliers and so on. The first call was held in September 2009; the second one will be in February 2011.

The total budget for the competed programme call 2 is € 2,126k.

CALL 2 INITIAL RESEARCH TOPICS

- ***Sensor Systems Objectives & Multi-Platform Sensors***

Requirements for sensor systems, sensor systems analysis, performance objectives, analysis of critical technology

Topic 1: Mixed RF imagery

Techniques which exploit the availability of on-platform wideband band imagery are requested. Two potential examples are 3D SAR capability using mixed high and low band images and studies into the value of dual (e.g. C and X band) or multiple band SAR imagery for target discrimination and/or recognition.

Topic 2: Clock synchronisation across Multiple Vehicles in GNSS denied mode

An experimental demonstration of time synchronisation between at least three moving vehicles is sought. The vehicles will be travelling at up to motorway speeds, and may be spaced up to 10km apart. A timing accuracy sufficient to support Time Difference Of Arrival techniques is required, dependent upon baseline and scenario but of the order of 1ns.

- ***Low, High & Multiband Building Block Level Research Topics***

Topic 3: Linear and Compact RF Power - technology areas

3a. Improvements in (VHF to Ku-band) Power Amplifiers; trade-off study of power efficiency, duty cycle, ability to support signal modulation and overall size and weight are requested.

3b. Lightweight, compact Linear Power Amplifiers for broad band (more than octave bandwidth) arbitrary wave transmissions at VHF and low UHF frequencies.

3c. Nanosecond Power Switching at VHF and low UHF frequencies greater than 10 W power.

Topic 4: High Dynamic Range Reception - technology areas

4a. Interference Cancellation for detection of weak signals in the presence of high power signals. Frequency range from VHF – Ku-band with frequencies in the VHF and UHF bands being the main concern, although high band techniques are also of great interest.

4b. System Identification, Pre-distortion, and Digital Filtering for achieving isolation in Continuous Wave radar exploiting Arbitrary Waveforms. Study and possibly experimentation on candidate designs at VHF and low UHF frequencies.

Topic 5: Highly compact, low cost and mixed signals multilayer PCBs

5a. Improve compactness and weight of multilayer PCB in order to meet the stringent constraints on mass and volume for SIMCLAIRS payloads.

5b. Design of "Multifunction" boards integrating structural thermal and shielding packaging as well as supporting mixed all purpose signals (RF, digital, power supplies)

Topic 6: **Metalised foam for antenna multilayered structures**

Metalisation of multiple surfaces types (2D, 3D) offers interesting prospects in a number of antenna applications like multilayered (for example, by replacing pin connections by via holes) or 3D structures (Vivaldi for example).
Advanced concepts such as EM band gap materials with specific electromagnetic properties related to the periodicity and sizes of metallic inclusions inside a foam core, may also be applicable to High Impedance Surface (HIS) applications.

Metalised foam technology appears well suited for circuits collective assembling process, and may bring a substantial help in addressing the thermal robustness and mass issues.

Topic 7: **Packaging technologies for compact lightweight structures**

Improve weight and compactness of packaging of all system components in order to meet the stringent constraints on mass and volume for SIMCLAIRS payloads. Includes enclosures, module, sub-module and electronic packaging.
Design must address: environment robustness, thermal issues, and EMI shielding

Topic 8: Miniature Reconfigurable RF Filters

Small, lightweight, low insertion loss and low cost band-pass and band-stop filters able to operate over a wide (VHF to Ku band) frequency range.

Topic 9: Multi-Mode ADCs

Compact hardware under software control to achieve performance circa 5MHz

bandwidth /better than -100dB SFDR to 6GHz bandwidth /-60dB SFDR (mass of a few tens of grams; <<10W power consumption).

Topic 10: Wideband Synthesiser technology for Waveform Generation

Compact hardware able to operate up to high frequencies (Ku band) with low SFDR (better than -100dB) and ultra low phase noise. Includes DACs, direct and indirect frequency synthesis and novel frequency synthesis and waveform generation architectures.

Topic 11: RF and IF Switch Technologies

Low loss switches for antenna (few watts) and/or receiver (<1W) re-configuration with switching speeds in the range ns to µs.

Topic 12: Ultra stable clocks & oscillators

Compact hardware with low mass and low power (10's watts) consumption. Ultra low phase noise master oscillator with optional external disciplining (to GPS, for example).

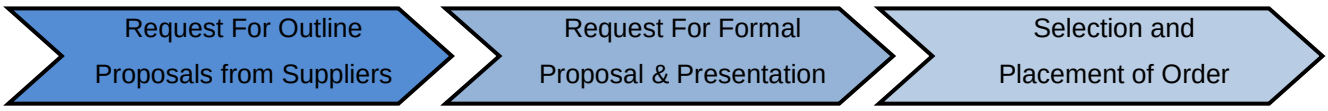
Topic 13: Efficient wideband band power amplifiers

High efficiency wideband and/or multi-band saturating (rather than linear) power amplifiers from 1 to 5 watts covering more than 2 octaves in the S to Ku band region.

- ***Spontaneous proposals***

These are not limited to the above lists and will be considered for every TD, as long as they fulfil the SIMCLAIRS requirements, including the Technical Readiness Level targeted.

THE BIDDING PROCESS FOR THE SECOND CALL



- Bidders' conferences are to be held in February 2011 in Paris, Edinburgh and Stockholm. Potential Research Suppliers have two (2) weeks to submit an outline technical proposal for initial down selection. The bidder conference attendance is not compulsory. All technical questions can be written before the bidder conference, the list of questions and answers will be made available on request.
- A handout will be made available in February conditional on a signed NDA. The fully approved contractual terms and conditions will be provided together with the handout.
- "Short-listed" suppliers will be requested to provide a more detailed technical and commercial proposal (8 pages) for further down selection.
- A run-off presentation can be requested to finalise the selection proposal.

- Following SIMCLAIRS Management Board approval, sub-contracts for successful bids will then be placed through the national competition leaders: Thales in France, SELEX Galileo in the UK and Saab AB in Sweden.
- Project Kick-off will be around June 2011 at the latest with the programmes expected to be of up to 18 month duration.

FURTHER INFORMATION /BIDDERS' CONFERENCES

- **Email Contacts**: To be put on our mailing list and to register your interest in attending one of the bidders' conferences please send an email to one of the consortium companies:
  - **France :**Alexandra.muzotte@fr.thalesgroup.com
  - **UK**: john.a.robertson@selexgalileo.com
  - **Sweden:** birgitta.bohlin@saabgroup.com

- **Webpage**: Further information, nearer the bidder conference dates, will be available via the EDA at: www.eda.europa.eu

- **Bidders' Conference Arrangements**
  - **France**: THALES Research & Technology France Campus Polytechnique, 1 avenue Augustin Fresnel F-91767 Palaiseau cedex on 21st February 2011.
  - **UK**: SELEX Galileo Ltd., Crewe Toll, Edinburgh on 22nd February 2011**.**
  - **Sweden**: Saab AB, Nettovägen 6 Järfälla (Stockholm area) on 24th February 2011.