

Market Survey Request for Information

Deployable Passive Electronic Support Measures (ESM) Tracker (DPET)

NCI Agency Ref: MS-CO-115086-ACCS

The NATO Communications and Information Agency (NCI Agency) is seeking inputs from Nations and their Industry regarding the Development of a **Deployable Passive Electronic Support Measures (ESM) Tracker (DPET)**

Market Survey Point of Contact: Ms. Katharina Schwarz

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To: See Distribution List

Subject: **Request for Vendors for NCI Agency Market Survey Request Deployable Passive Electronic Support Measures (ESM) Tracker (DPET)**

1. The NATO Communications and Information Agency (NCI Agency) is seeking inputs from Nations and their Industry regarding the fabrication of a Deployable Passive Electronic Support Measures (ESM) Tracker (DPET) system that can provide a source of non-cooperative target identification (NCTI), supporting the NATO requirement.
2. The aim of this Market Survey is to determine if the capability to develop, design and manufacture DPET exists within the internal market of the Alliance members.
3. Respondents are requested to reply via the questionnaire at Annex B. Other supporting information and documentation (technical data sheets, non-binding



product pricing, marketing brochures, descriptions of existing installations, etc.) are welcomed.

4. The NCI Agency reference for this Market Survey Request is **MS-CO-115086-ACCS**, and all correspondence and submissions concerning this matter **must** reference this number within the documentation and email or postal subject line.
5. A list of potential firms, already identified, is included at Annex C. In addition to the firms noted, the broadest possible dissemination by Nation of this Market Survey to their qualified and interested industrial base is requested.
6. Responses may be issued to NCI Agency directly from Nations or from their Industry. Respondents are invited to carefully review the Introduction within Annex A and General Presentation at Enclosure 1 to determine interest.
7. Responses shall in all cases include the name of the firm, telephone number, e-mail address, designated Point of Contact, and a NATO UNCLASSIFIED description of the capability available and its functionalities. This shall include any restrictions (e.g. export controls) for direct procurement of the various capabilities by NCI Agency.
8. Responses are due to NCI Agency no later than **22 April 2020**.
9. Please send all responses via email to the following NCI Agency contact:

For Attention of:

Ms Katharina Schwarz
Senior Contracting Officer
Email: Katharina.Schwarz@ncia.nato.int

10. Product demonstrations or face-to-face briefings/meetings with industry are not foreseen during this initial stage. Respondents are requested to await further instructions after their submissions and are requested not to contact any NCI Agency staff directly other than the POC identified above.
11. Any response to this request shall be provided on a voluntary basis. Negative responses shall not prejudice or cause the exclusion of companies from any future procurement that may arise from this Market Survey. Responses to this request, and any information provided within the context of this survey, including but not limited to pricing, quantities, capabilities, functionalities and requirements will be considered as indicative and informational only and will not be construed as binding on NATO for any future acquisition.
12. The NCI Agency is not liable for any expenses incurred by firms in conjunction with their responses to this Market Survey and this Survey shall not be regarded as a commitment of any kind concerning future procurement of the items described.
13. Your assistance/participation in this Market Survey request is appreciated.



FOR THE DIRECTOR OF ACQUISITION:

Katharina Schwarz
Digitally signed by
Katharina Schwarz
Date: 2020.03.20
09:57:55 +01'00'
Katharina Schwarz
Senior Contracting Officer

Annexe(s):

- A. Distribution List.
- B. Deployable Passive Electronic Support Measures (ESM) Tracker (DPET) – Technical Overview.
- C. Questionnaire.
- D. Industrial Recipients.

Enclosure:

- 1. DPET General Presentation.

ANNEX B to
NCIA/ACQ/2020/6302
DATED 17 March 2020

**DEPLOYABLE PASSIVE ELECTRONIC SUPPORT MEASURES (ESM) TRACKER
(DPET)**

TECHNICAL OVERVIEW

INTRODUCTION

1. DPET sensors aim to provide long-, medium-, and short-range all altitude surveillance coverage of manned and unmanned fixed wing and rotary wing airborne vehicles (AVs) excluding Tactical Ballistic Missiles. The DPET system provides a source of non-cooperative target identification (NCTI) to the Deployable Air Command and Control Centre (DACCC).
2. As such, NATO assess the DPET capability as a future requirement whilst acknowledging that unlike common active radar systems, passive detection of airborne traffic has limitations which differ from conventional, active, radars.

BACKGROUND

3. DPET must/shall sustain the following three modes of operational deployment:
 - (i) The DPET would normally be allocated to a Deployable ARS¹ (DARS), in support of deployed operations and exercises.
 - (ii) The DPET should also be deployed independent of a DARS unit where Enhanced Volumetric Coverage (EVC) is required without additional Air C2 capability. In this situation, the DPET is interfaced to a static ARS.
 - (iii) The DPET should be provided with autonomous operation capabilities, independent of any Air C2 capability.
4. Detection, tracking and identification works by exploiting Radio Frequency (RF) signals emitted by the AV. A DPET employs Time Difference of Arrival (TDOA) techniques, commonly known as multilateration technique. A DPET system includes a surveillance function that is capable of forming and maintaining a full three-dimensional (3D) air picture with radar-like accuracies. This air picture is presented in real time.
5. A General Description of the DPET concept can be found at **ENCLOSURE 1**

¹ Aircraft Control Centre (ACC), Recognized Air Picture Production Centre (RPC), Sensor Fusion Post (SFP) (ARS)

SUMMARY OF TECHNICAL REQUIREMENTS

TARGET CHARACTERISTICS

6. DPET systems detect and track air assets by processing RF transmissions from the targets.
7. DPET systems detect and track air assets through:
 - (i) Navigation beacons, including Distance Measurement Equipment (DME) and Tactical Air Navigation (TACAN)
 - (ii) Secondary surveillance radar (SSR) transmissions, Modes A, C and S
 - (iii) Identify friend or foe (IFF) transmissions, Modes 1, 2, 3, 4 and 5
 - (iv) Automatic Dependent Surveillance Broadcast (ADS-B) extended squitter on 1090MHz
 - (v) Digital communication signals from 1-18GHz,
 - (vi) Pulsed radar signals (including frequency hopping, modulated pulses, low, medium, high and staggered PRF) from 1-18GHz
 - (vii) Pulsed and deceptive jamming signals from 1-18GHz
8. The following are deemed desirable capabilities:
 - (i) Signals below 1GHz or above 18GHz
 - (ii) Continuous-wave signals with various modulations
 - (iii) Noise-like waveforms
 - (iv) Ultra wideband waveforms
 - (v) Low probability of intercept waveforms
9. The system should have sufficient sensitivity to track targets at operationally relevant ranges.
10. The DPET includes an Electronic Support Measures (ESM) capability, able to extract and quantify key characteristics of radio frequency (RF) emissions, such as frequency, bandwidth, hopping patterns, antenna scan patterns and pulse width - interval -and modulation.
11. The DPET includes a database of known emitters and platforms, and matches the above key characteristics against the database entries in order to identify emitter and platform.
12. The DPET allows the operator to perform in-depth analysis of received signals.

DEPLOYMENT CHARACTERISTICS

Vehicle and Operator Requirements

13. The DPET system should comprise of ≤ 7 Remote Sites (RSs), of which one is designated the Central Site (CS). The CS will comprise a maximum of one vehicle-mounted Operations Shelter (OS) (with receiver electronics, processors and two operator positions) and no more than one antenna trailer (with Uninterruptible Power Supply (UPS) and diesel generator). The antenna should be vehicle borne if

required. Each RS will comprise a single vehicle with UPS, generator and antenna mast.

14. RS should link to the CS using a dedicated microwave point-to-point communications link sharing the mast with the DPET receiver antennas. The system must ensure the deployment and alignment of these point-to-point links within reasonable timeframe, independently of the steer of the DPET antennas.

15. Once deployed, each remote RS should be capable of unmanned operation from a technical perspective. The CS should include an Operational Shelter (OS) with a two-man crew. One operator to produce the air picture, the other operator for specialised target identification capabilities and emitter database maintenance using the ESM equipment.

16. The system should be capable of local operation without command and control from the DARS. There is no requirement for the system to be operated fully from the DARS. The DPET is deployable and transportable. Further details can be provided upon request.

Communications

17. The primary communication link between the CS and the RS should be via dedicated point-to-point radio frequency links. Additional communication interfaces should be provided to allow the CS and RS to communicate by alternative means (such as wide area networks, serial/modem connections or satellite communications). The system should not rely on a dedicated radio frequency link for operations and should employ a multi messaging protocol (i.e, internet protocol). A mixture of point-to-point radio frequency links and other communication modes, between the CS & RS's, should also be achievable, depending on terrain and range.

DETECTION VOLUME

Azimuth

18. The DPET system will provide three-dimensional omnidirectional detection and tracking of targets emitting IFF and SSR signals.

19. The DPET system will provide three-dimensional detection and tracking of targets in a sector of at least 120 degrees in azimuth for targets emitting all other types of emission other than IFF and SSR.

SECURITY

20. While the RS operate at the NATO unclassified level, the CS shall process with NS data and should as such be compliant with the NATO security directives and must pass the NATO security accreditation process.



ANNEX C to
NCIA/ACQ/2020/6302
DATED 17 March 2020

QUESTIONNAIRE

Organisation Name:

Contact Name & Details:

Guidance Notes

- Please **DO NOT** alter the questions as included herein. Should you believe additional or differing data be of interest to NATO, please add such information on a continuation sheet.
- Please **DO NOT** enter any company marketing or sales material as part of your answers within this market survey. Please submit such material as enclosures with the appropriate references within your replies. If you need additional space, please use a continuation sheet.
- Please **DO** try and answer the relevant questions as comprehensively as possible.
- All questions apply to Commercial or Government respondents as appropriate.
- Cost details required in the questions refer to Rough Order of Magnitude (ROM)
- Procurement & Life Cycle cost, including all assumptions the estimate is based upon:
- Advantages & disadvantages of your product/solution/organisation,
- Any other supporting information you may deem necessary including any assumptions relied upon.

1. Is this equipment type (DPET) already nationally approved for use at the national equivalent level?

2. Could you provide a short description of your company's involvement in the past in Passive Radars specifically?

- **Is the proposed solution:**
 - **An existing capability?**
 - **Modification of an existing capability?**
 - **New manufacture?**

3. Estimated manufacture lead time?



- 4. Anticipated implementation time from concept to delivery?**
- 5. ROM manufacture cost?**
- 6. Does your equipment support any of the following requirements:**
 - Employ Time Difference of Arrival (TDOA) techniques, commonly known as multilateration technique?**
 - Is capable of forming and maintaining a full three-dimensional (3D) air picture with radar-like accuracies? Please specify?**
 - Includes an IFF/SSR and ADS/B capability? If not, what does it include?**
 - Includes and Electronic Support Measures (ESM) capability?**
 - Capability to be fully integrated with the ACCS?**
 - Capability to integrate with G/G and G/A/G?**
 - Capability to operate as a standalone system?**
 - Is fully deployable and air transportable (C130/A400)?**
 - Generator and local AC power capable?**

ENCLOSURE 1

DPET – General Presentation

DPET Overview

The Deployable Passive Electronic Support Measures (ESM) Tracker (DPET) sensor aims to provide long-, medium-, and short-range all altitude surveillance coverage of manned and unmanned fixed wing and rotary wing airborne vehicles (AVs) excluding Tactical Ballistic Missiles. The DPET system provides the principle source of non-cooperative target identification (NCTI) to the deployable ACCS component (DAC).

Detection, tracking and identification is based on exploiting any RF signal emitted by the AV. The DPET system will employ Time Difference of Arrival (TDOA) techniques, commonly known as multilateration technique.

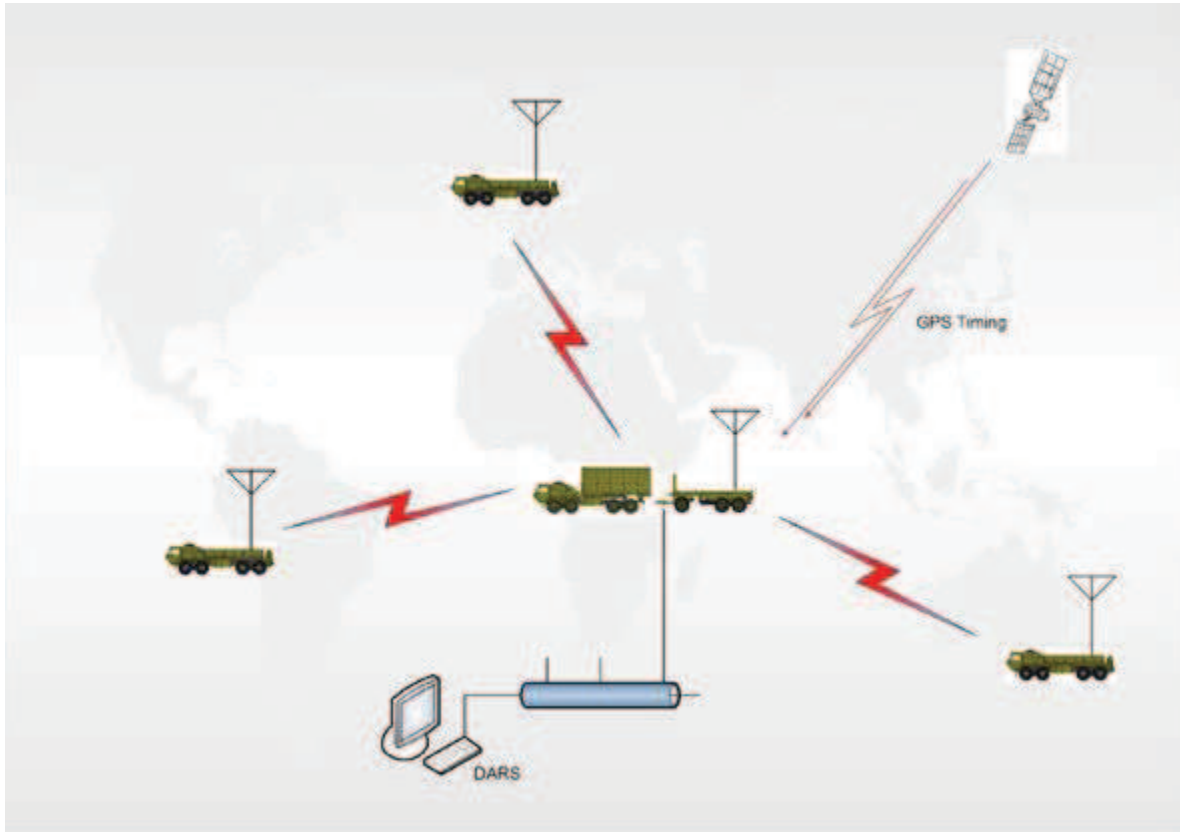
The DPET system includes a surveillance function that is capable of forming and maintaining a full three-dimensional (3D) air picture with radar-like accuracies. This air picture is typically refreshed in its entirety every few seconds

The DPET system includes an IFF/SSR and ADS/B capability which decodes IFF/SSR and ADS-B messages from aircraft that respond to auxiliary IFF/SSR interrogators.

The DPET will be used as an integrated part of the DARS or attached to Static ARS. It will have the capability to be fully integrated with the ACCS entities and with all the G/G and G/A/G or to operate as a standalone entity. The system is operated from the central site, either with or without command and control from the DARS.

The DPET is able to be deployed anywhere, is C130 transportable and terrain independent. It is fully autonomous including transportation and power source and is a ruggedized system designed to operate during stringent environmental conditions.

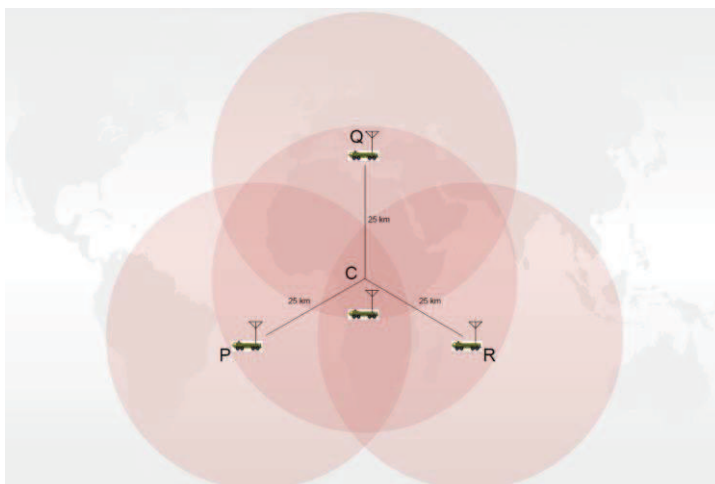
As depicted in figure below, the DPET system consist of 4 key elements, 3 Remote Sites and 1 Central Site. The Remote Sites (RSs) are connected to the Central Site (CS) through a Short Range Line Of Sight (SRLOS) microwave links or by interconnection through direct dedicated fibre optic link.



Deployment geometry

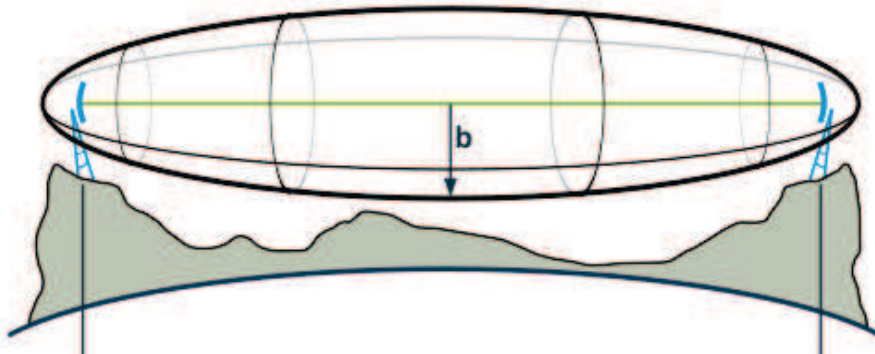
The optimum deployment for a DPET system is the Mercedes-Benz star geometry (Figure below) with the three Remote Sites located at a distance of 25 km from the Central Site and spaced at 120 degrees in bearing. However, the RS deployment ranges from the CS lie within 10 – 50km and with different geometry. The Deployment on the DPET is based upon the topology of the region and of the area of interest. A Pre-Deployment Tool will be delivered together with the system to prepare the mission, assess the coverage and the feasibility of the LOS between the DPET components.

Mercedes-Benz Star Optimal Geometry



Inter-site Communication

The SRLOS communication is realised by duplex SRLOS. The link between two sites should be free of obstacle and a communication profile as depicted below shall ensure direct link is possible.



Security Requirements

Remote Sites and Central Site components shall be installed in a protected area. The DPET Central Site processes, stores and transmits NS data and is hence designed to be operated in a Zone 2 area as described in SDIP-29/10.

Power requirement

While the CS and RS are delivered with generators, it is recommended using local AC power (230VAC, 16A) when available. Using the local AC power will prevent refuelling the generators, will extend the lifetime of those equipment and will also considerably reduce the acoustic noise level. Local AC power is obviously less expensive than fuel for the generator but cost liability may be an issue for the Host Nation.

Data Connectivity

The DPET could be connected to the (D)ARS or an Air Traffic Control entity via a Fiber Optic cable (100m, Single Mode, Stratos 900 bulkhead connector) or copper cable (25m, G.703 E1).

END OF DOCUMENT