Defence Materiel Organisation
Ministry of Defence

Request for Information

Counter Improvised Explosive Devices

Unmanned and Unattended Ground Sensors

October, 2016

Version def.

Colophon

Dutch Ministry of Defence

Defence Materiel Organisation (DMO)

Procurement IT

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1 Introduction

The Dutch Ministry of Defence (NLD MOD) is considering procuring an Unmanned and Unattended Ground Sensor (UUGS) system for employment in all mission profiles and invites potential suppliers to respond to this Request for Information (RFI).

The purpose of UUGS is to provide a better and safer 24-hour observation of hot spots, routes, approaches and unobserved areas without the physical presence of personnel at or in the vicinity of the object.

UUGS must be able to detect and map the presence, movements, activities and attributes of individuals and mobile platforms. This provides information to direct targeted actions, which will lead to more effective and safer military operations.

This RFI is part of the market survey. It is not the intention for you to make a detailed proposal at this moment. It is important that you provide us basic, but enough information regarding your possible contribution to the need described in this document. The NLD MOD wants to gather as much information as possible concerning possibilities and restrictions in the vendor market.

Companies that are interested and able to contribute as a prime or subcontractor to this project are invited to respond to this RFI. The market survey could further comprise of company visits, which will encompass demonstrations of (parts of) possible solutions.

DMO has placed a RFI Notice on Tenderned dated the 25the of October 2016. The results of this RFI could lead to a shortlist of suppliers. The suppliers on this shortlist will be invited to participate in the classified tender if one may follow after this RFI. The information about this tender is classified and will not be published. This RFI doesn't contain any classified information.

1.1 Planning

The planning of this RFI is as follow:

	Date and Time	Task	Result
Phase 1	25-10-2016	Publication RFI	RFI (this document)
Phase 2	8-11-2016	Closing date for asking questions before 12:00 PM UTC +1	Questions from potential suppliers are received by the Ministry of Defence
Phase 3	15-11-2016	Questions from interested parties regarding the RFI are answered	Answers will be communicated with the potential suppliers
Phase 4	29-11-2016	Closing date for a final reaction to the RFI before 12:00 PM UTC +1	Answer forms from potential suppliers are received

1.2 Instructions for responding

The DMO requests you to deliver a description of your capabilities and potential solutions regarding the intended services. For delivering your information we kindly request you to use the enclosed question and answer form.

Furthermore al communications will be **exclusively via e-mail.**

The deadline for your reaction to be received by the DMO is the **29th of November 2016**. All electronic documents must either be in the Microsoft Office 2007 suite file formats, or as a PDF or ODF file. Please note that our mailbox is limited and not able to receive messages/attachments that exceed **5MB.** It can be necessary to divide your response in several e-mails.

Responses to this RFI can be send to the following e-mail address:

m.bahnerth@mindef.nl

Your e-mail should be directed to the DMO contact person for this RFI, Ms. M. Bahnerth.

1.3 Restrictions

Regarding this RFI two restrictions apply. If you wish to cooperate with this RFI you have to agree to the following:

Restriction 1.3.a *The NLD MOD does not reimburse any kind of costs that are connected to answering this RFI or related activities.*

Restriction 1.3.b *Depending on the results of this RFI, the NLD MOD has the right to refrain from any further activities regarding this RFI or to choose a different procurement strategy more fitting to the suppliers market.*

2 Current situation

This RFI focusses on the use of Tactical, Urban and Expandable Unmanned & Unattended Ground Sensors (T/U/E **UUGS**) to support the NLD MOD in various operations.

2.1 Background

Due to technological advancements, commanders desire Intelligence, Surveillance and Reconnaissance (ISR) assets to support long range, all weather, reduced footprint, and multi-sensor collections in any environment. Ground reconnaissance forces may be limited in their ability to support ISR missions, whereas UUGS possess several similar features.

The NLD MOD uses UUGS as a way to collect identity information when conducting expeditionary operations. There are three key aspects of this capability:

- Enable forces to rapidly detect, classify and identify unknown individuals or vehicles encountered in the conduct of operations;
- Enable reconnaissance forces to keep their distance from an opponent and thereby be more safe;
- Enable reconnaissance forces to better and safer guide the combat forces.

Because UUGS are multipurpose sensors they can be used in other operations as well. In general UUGS provides a better 24-hour observation of hot spots, routes, approaches and unobserved areas without the physical presence of personnel at or in the vicinity of the object.

UUGS can detect and map the presence, movements, activities and attributes of individuals and mobile platforms. This provides information to direct targeted actions, which leads to safer military operations. These operations take place in all thinkable climates, seasons and landscapes including build-up areas.

In 2008 the NLD MOD acquired UUGS to detect, classify and identify persons of interest and to be able to see where and if Improvised Explosive Devices were placed. With this equipment the NLD MOD was able to support (part of) the UUGS cycle as shown in Figure 1 below.

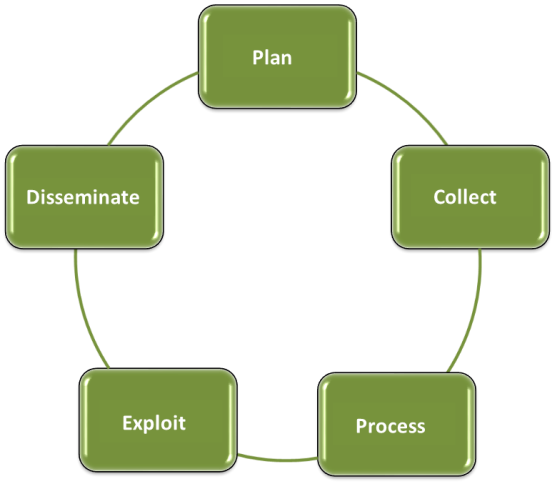

Figure 1: The UUGS Cycle

2.2 Current capabilities

UUGS require several components and systems for proper functioning because a single mission could require a diverse multitude of batteries, cables and connectors, radios and relay devices, monitoring equipment, and computers. The technology associated with UUGS is constantly evolving, as seen with the use of cell phone technology. This rapid technological growth requires a streamlined plan to keep the use of UUGS innovative and adaptive to the soldier's needs. Relative to the existing materials for UUGS in the NLD MOD, there is significant room for growth. The current system in use with the NLD MOD exists of a mix of UUGS which communicate with each other.

Together with the gateways the sensors form a radio network. This so-called "self-healing mesh network" is capable of autonomous linking between the sensors and cameras. When a sensor no longer has a connection with the base-station another sensor will be used as a relay station and communication with the base-station is restored. The reach of a group of sensors can be increased by adding a gateway with more transmitting power.

The NLD MOD has a need for both the new as current UUGS in a method that supports placing the most relevant technology and most advanced capability in the warfighters' hands.

The operating equipment includes the UUGS, the associated employment and monitoring components, as well as the communications equipment (radios and computers).

To maintain flexibility, UUGS have to be proven reliable, rugged, user-friendly, and capable of performing at any time and place. The soldier requires systems that are capable of operating in extreme environments under harsh temperatures, and in rough conditions. Additionally, different types of UUGS with a variety of communications options need fielding to maintain flexibility in mission support.

3 Desired situation

The scope of this RFI is to obtain information regarding:

- A a multi-modal unmanned & unattended ground system of sensor(s) - § 3.1;
- B ways to distribute sensor data to geographically dispersed unit(s) - § 3.2;
- C a way to export sensor & meta data to the NLD MOD (Army) C2 system - § 3.3.

The following figure (2) shows the system-concept as described above:

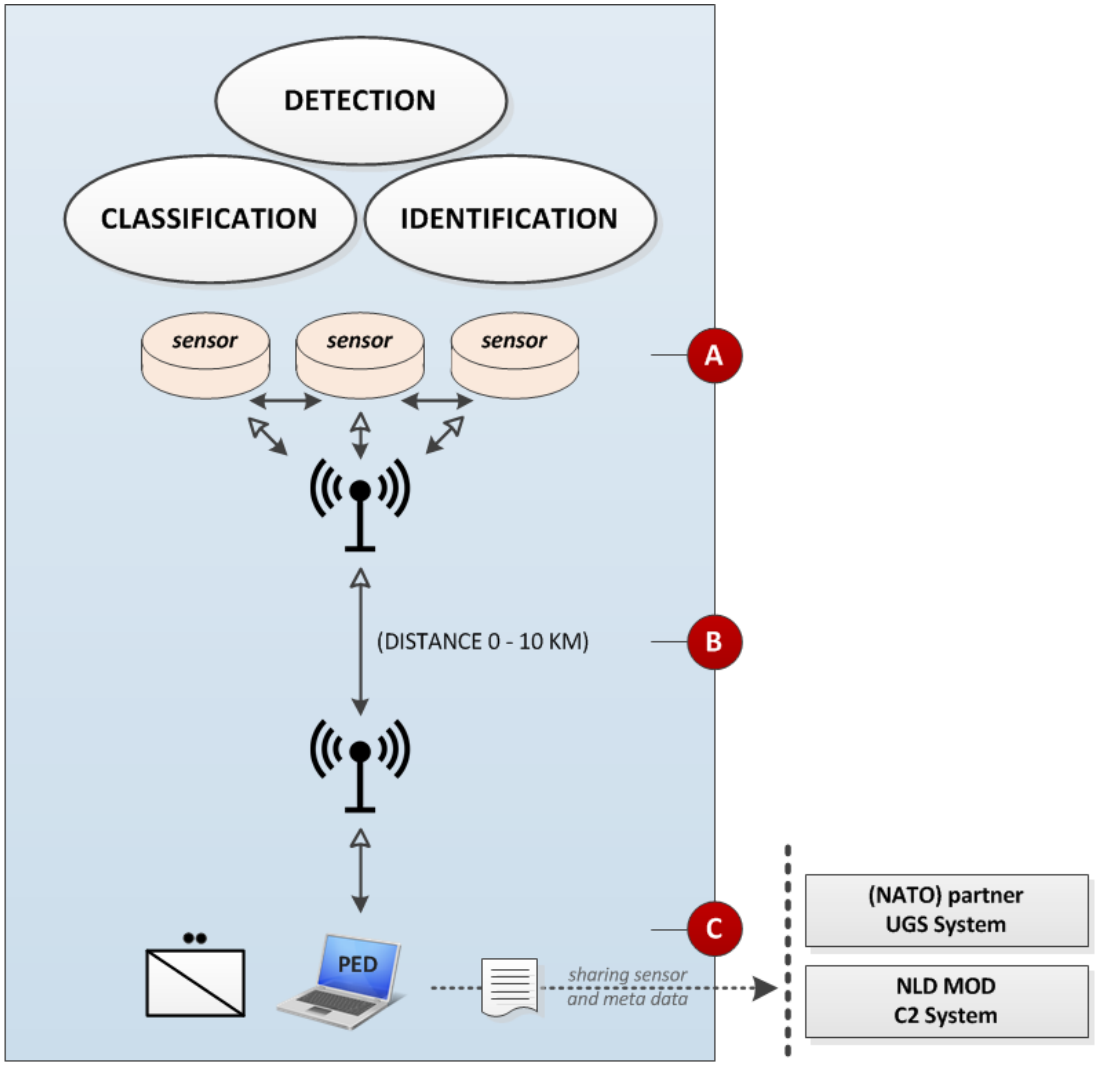

Figure 2: schematic display of system-concept.

This chapter follows the drawing above by first discussing the multi-modal UUGS, then the ways to distribute sensor data to geographically dispersed unit(s) and finally the sharing (interoperability) with the NLD MOD C2 system. At the end of this chapter some miscellaneous topics, including security and (technical) architecture are being discussed.

3.1 General

NLD MOD is interested in a multi-modal unmanned & unattended ground system usable in mobile and semi-static reconnaissance and surveillance. The system allows the operator to use various sensor modalities to automatically detect the presence, activity and attributes of persons, devices or vehicles **(A, par. 3.1)** and transmit (activity-) reports or imagery via radio-frequency (RF) to a remote processing, exploitation, and dissemination (PED) station **(B, par. 3.2).** The system should provide information from this PED (semi-automatically) to the NLD MOD (Army) C2 system **(C, par 3.3)**.

The system should allow the operator for planning UUGS. During the planning the system configuration, sensor modalities, communications and employment are considered. The UUGS planning is supported with automation.

Ref. nr.	Question
001	*What sensor modalities can you offer? Are the products you offer Military off-the-shelf and to which extend (percentage) do you need to develop your products to meet the requirements? Please elaborate.*
002	*Which features of persons, devices or vehicles can your solution detect and register?*
003	*Describe (if any) the differences between the sensors and system components used in mobile and semi-static reconnaissance and surveillance.*
004	*Please describe your (product) roadmap, for example identify current or future solutions that;* *a) reduce sensors and system components size and weight,* *b) reduce detection, classification and identification time. Methods may include, but are not limited to, faster processing, rapid sequential imaging and the simultaneous processing of multiple sensor samples,* *c) increase detection distance and/or classification quality. This capability supports covert collections and collections of moving individuals,* *d) capture additional attributes. The operator should be able to detect electronic devices and collect data that may be used in future operations. Additional attributes include, but are not limited to, mobile communications,* *e) increase ruggedization. For current solutions, identify the standards and subsections against which they have been tested. The sensors and any peripherals should be able to survive in an operational environment,* *f) increase stand-alone operation time (i.e., battery life),* *g) increase usability in various operational environments (i.e., field, urbanized terrain, megacities).*
005	*What is your vision upon the current or future way your product(s) facilitates integration of new sensor modalities. Describe in which way your (technical) architecture guarantees the future use of additional modalities within your system, even when these modalities are introduced by other*

	vendors.
006	*In what way do your product(s) support the possibility of adding exotic data, for instance by using a drone for standoff reconnaissance and surveillance. Which standards would apply?*
007	*Do you support bi-directional communication between sensor and base-station, for instance for adjusting sensor settings while the sensor is deployed? Please elaborate.*

Future (visionary) functionalities

UUGS develop rapidly and will keep on developing in the future. This paragraph addresses a miscellaneous set of current and perhaps future developments in the field of UUGS.

- Electronic information: The detection, determination, locating and monitoring of mobile communications for military and/or supporting law enforcement missions.

- System Integration: Integration of UUGS into large network of sensors (body worn, UAV payload, vehicle mounted) for detection and precision geolocation.

- Documentation: The operator is able to present and match any imagery from sensors to a reference data set in order to match collection results with an image library (f.e. using third-party facial recognition software).

- Expendable Unattended Ground Sensors: The operator is alerted by E-UUGS and cues alternative assets fly to cue, automatically launching a Micro UAV to the GPS location to capture full-motion video and otherwise classify and track the target.

- Indoor Use of UUGS: UUGS sensors and system components use as a surveillance tool during (urban) building clearing operations, and in caves, sewers, tunnels, and other confined spaces.

Ref. nr.	**Question**
008	*Which of the above can you realize with your product(s) and in which way?*
009	*Does your product offer any other functionalities besides those described above which seem useful in the described conduct in operations?*
010	*In what way do you support the possibility of using your solution on a (Military or Commercial off-the-shelf) device which is not part of your product line, for instance to combine your solution with other military devices used when dismounted.*
011	*Which (military) standards apply on your products?*

3.2 Storage, processing, exploitation, and dissemination

Sensor information is stored in a PED-facility. The stored information is processed by an operator for further exploitation. The UUGS operational results are disseminated to customers in the operational and intelligence domain.

- Storage: All UUGS data is locally stored and should be readily available to the operator in a database for further processing. Data integrity and quality is assured.

- Processing: The operator interfaces with a database. The operator is supported with analysis tools and algorithms to retrieve, process, match, and respond to stored sensor data.

- Exploitation: The operator assesses the results and makes informed decisions on tactical response and/or forwarding information to users.

- Dissemination: The ability to share imagery, FMV and electronic data with military users and JIMP partners remains a key element of coalition operations. This sharing is facilitated by the system through reporting generation.

Ref. nr.	Question
012	*Please describe your solution(s) for the above storage & PED needs.*
013	*Please describe your future possibilities in concern to this topic.*
014	*How will your solution support the processing, exploitation, and dissemination stored information? Please describe at least the tools, algorithms etc.*
015	*What solutions can you offer for exporting data into an alien application?*

3.3 Interoperability

The effectiveness of applying UUGS in support of operations is dependent on data interchange. This requires sharing arrangements with partners and technical support of such data sharing. Sensor information collected, raw and analyzed – from a multiplicity of sources – maximizes the ability to establish patterns of life, patterns of normality, track and trace and to classify and identify threat objects and subjects.

Ref. nr.	Question
016	*Please describe your solution(s) for exchanging sensor information with alien UUGS.*
017	*Please describe your solution(s) for exchanging sensor information with the NLD MOD C2 System.*
018	*Please suggest in which way NLD MOD can validate the quality of the used sharing algorithm or protocol (if any).*
019	*Please describe your vision upon maintenance of during interoperability operations. What are your experiences and where do you see the risks? (max. 40lines)*

3.4 Miscellaneous topics

This paragraph describes several miscellaneous topics, including (technical) architecture and security.

3.4.1 Architecture

Ref. nr.	Question
020	*Please elaborate on what kind of platforms and/or environments your solution is already installed with other customers?*
021	*In what way are you able to re-use available equipment (such as ruggedized laptops) to minimize the variation of equipment in an expeditionary situation?*

3.4.2 Security

The General Security Requirements Defence for Defense Contracts (ABDO) apply on any future (procurement) procedures. This is a set of implementing requirements based on the level of security. The Security Authority of the NLD MOD will examine if the potential supplier meets the requirements.

The highest level of security should be granted to the operator during employment of UUGS. This means security in a broader ICT and physical sense.

Ref. nr.	Question
022	*Please describe your standard security solution as part of your solution? Please consider tampering, detection etc.*
023	*Please describe the connections and ways your solution connects to other devices for receiving and processing data?*
024	*In which way does your system guarantee flexibility, for example when it is required to introduce additional (technical) measures to meet the security standards of NLD MoD?*
025	*In what way could Electronic Warfare affect your solution?*
026	*Will you allow the NLD MOD to perform security tests (e.g. manipulation and penetration) on your devices during a Proof of Concept period?*

3.4.3 Miscellaneous

We would like to see an estimate of the costs and effort for realization and maintenance of the system.

Ref. nr.	Question
027	*What is your position on participating in a Proof of Concept, before contract award as part of a possible Request For Quotation?*
028	*What are approximately the initial and annual costs for the purchase, construction, warranties and maintenance (8 years) of your solution based upon a hypothetical order of equipment needed for simultaneous use in ten (10) reconnaissance platoons on various expeditionary locations.*
029	*Can you explain what these costs consist of and can you explain the variables that may have influence on price fluctuations? (price breakdown & cost drivers)*
030	*The NLD MOD considers asking for an eight (8) year maintenance contract with the above mentioned scope. What do you recommend as the most suitable maintenance solution? Please take in account; how and where we use the products, that we want to be flexible in adding new and/or more system (components) and that it has to have value for money.*
031	*Can you explain what these costs consist of and can you explain the variables that may have influence on price fluctuations?*
032	*Are there any (other) cost drivers in our scope as described in the paragraphs above?*

033	*Please indicate if realization end 2017 is a realistic option for you and the estimate time line to realize this need.*

4 In conclusion

The authors of this RFI have tried to inform you as good as possible regarding the wishes of the NLD MOD. In case you still have some questions or if you have found some deficiencies, we kindly request you to contact Ms. Bahnerth.

m.bahnerth@mindef.nl

and

ML.d.Vries@mindef.nl

We inform you that any acquisition activities regarding this RFI are not appreciated.

Written questions that are submitted before **12.00 PM UTC +1 on the 8th of November 2016** by e-mail will be answered anonymously on **the 15th of November 2016** and will be send to all parties that have downloaded the RFI.

In conclusion the NLD MOD would like to thank you in advance for your time and effort by answering our questions.

Annex A: Abbreviations

- C2 system– Command & Control system
- COTS – Commercial Off The Shelf
- DMO – Defence Materiel Organisation
- C-IED – Counter Improvised Explosive Device
- FMV - Full Motion Video
- ISR - Intelligence Surveillance and Reconnaissance
- JIMP - Joint Interagency Multinational and Public partners
- JIVC – Joint IT Command
- JTF C-IED – Joint Task Force Counter Improvised Explosive Devices
- NLD MOD – Dutch Ministry of Defence
- MOTS – Military Off the Shelf
- PED - Processing, Exploitation, and Dissemination
- RFI – Request for Information
- TED - Tenders Electronic Daily
- UUGS – Unmanned and Unattended Ground Sensor