NCIA/ACQ/2023/07078
26 July 2023

Market Survey - Request for Information

Project Title: "Advanced SATCOM Network Monitoring and Control (ASNMC)"
Project Serial Number: 2016/0CM03123
Capability Package CP9A0130 "Satellite Communications (SATCOM) Transmission Services"

NCI Agency Reference: MS-422181-ASNMC

NCI Agency is seeking information from Nations and their Industry regarding the availability of providers that are able to meet NATO's requirements related to specific Advanced SATCOM Network Monitoring and Control (ASNMC).

NCI Agency Points of Contact
Principal Contracting Officer (PCO) Mrs. Tiziana Pezzi
Action Officer: Estefania Nunez

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To: Distribution List (Annex A)

Subject: **NCI Agency Market Survey**
            Request for Information MS-422181-ASNMC

1.   NCI Agency requests the assistance of the Nations and their Industry to identify providers that are able to meet NATO's requirements related to services for NATO's Advanced SATCOM Network Monitoring and Control system (ASNMC). This Market Survey is being issued to identify possible service suppliers and to identify any limitations or conditions that may need to be met before potential suppliers are able to submit bids for services in this area.

2.   A summary of the requirements is set forth in the Annex A attached hereto. Respondents are requested to reply via the questionnaire at Annex B. Other supporting information and documentation (technical data sheets, marketing brochures, catalogue price lists, descriptions of existing installations, etc.) are also desired.   .

3.   The NCI Agency reference for this Market Survey Request is **MS-422181-ASNMC**, and all correspondence and submissions concerning this matter should reference this number.

4.   In addition to the firms noted in the Distribution List of this letter (who are current holders of Basic Ordering Agreements (BOA) with the NCI Agency), NCI Agency requests the broadest possible dissemination by Nations of this Market Survey Request to their qualified and   interested   industrial   base.   .

5.   Responses may be issued to the NCI Agency directly from Nations or from their Industry (to the staff indicated at Paragraph 9 of this Market Survey Request). Respondents are invited to carefully review the requirements in Annex A.   .

6.   Responses shall in all cases include the name of the firm, telephone number, e-mail address, designated Point of Contact, and a description of the capability available and its functionalities (not above NATO Unclassified). This shall include any restrictions (e.g. export controls) for direct procurement of the capability by the NCI Agency.

7.   Non-binding product pricing information is also requested as specified in Annex B.

8.   Responses are due back to the NCI Agency no later than **17:00 Brussels time 1 September 2023**.

9.   Please send all responses via email to the following NCI Agency Action Officer:

       To Attention of: Mrs. Estefania Nunez

       E-mail: MS-422181-ASNMC@ncia.nato.int

10.   Product demonstrations or face-to-face briefings/meetings with industry are not foreseen during this initial stage, however technical discussions may take place following the submission of responses, with the purpose of clarifying or further augmenting those responses where required.

11.   Respondents are requested to await further instructions after their submissions and are requested not to contact directly any NCI Agency staff other than the POC identified above in Paragraph 9.   .

12.   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.

13.   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 information only and will not be construed as binding on NATO for any future acquisition.   .

14.   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.

15.   Your assistance in this Market Survey request is greatly appreciated.

FOR THE CHIEF OF ACQUISITION:

Mr. Joseph Vitale
Senior Contracting Officer

Enclosures:
Annex A: Summary of Requirements
Annex B: Questionnaire

ANNEX A
Summary of Requirements
CP9A0130 – Project 2016/0CM03123
**Advanced SATCOM Network Monitoring and Control (ASNMC)**

1. Background

The NATO Communication and Information Agency (NCIA) provides SATCOM services to NATO through a wide variety of SATCOM terminals. These terminals range from fly-aways to static ground stations. The terminals include Radio Frequency (RF) systems (e.g. one or multiple antennas, amplifiers, splitters/combiners, matrix switches, modems), IT infrastructure (e.g. routers, switches, servers), and supporting facilities (e.g. power, heating and cooling, buildings).

To manage the terminals NCIA uses a system called 'Advanced SATCOM Network Monitoring and Control' (ASNMC), which enables operators to control terminals, monitor their operation, and support troubleshooting.

The ASNMC, as depicted below, has a distributed architecture with as main systems (in green):

1. The *Local Managers (LMs)* at each terminal, which enable local management of the terminal elements ("equipment"). LMs report the status of their associated terminal to a Central Manager (CM, see below). Conversely, LMs can receive control information from the CM.
2. The *LM Clients*, that provide local operators browser based Graphical User Interface (GUI) access to the LM.
3. The *Central Managers (CMs)*, located at data centres, which provide a global SATCOM status overview including all terminals and links between them. The CMs can, through the LMs, manage terminals and provision links between the terminals.
4. The *CM Clients*, that provide browser based GUI access to the CMs for SATCOM operators at the Network Operations Centres (NOCs) and at static terminals.
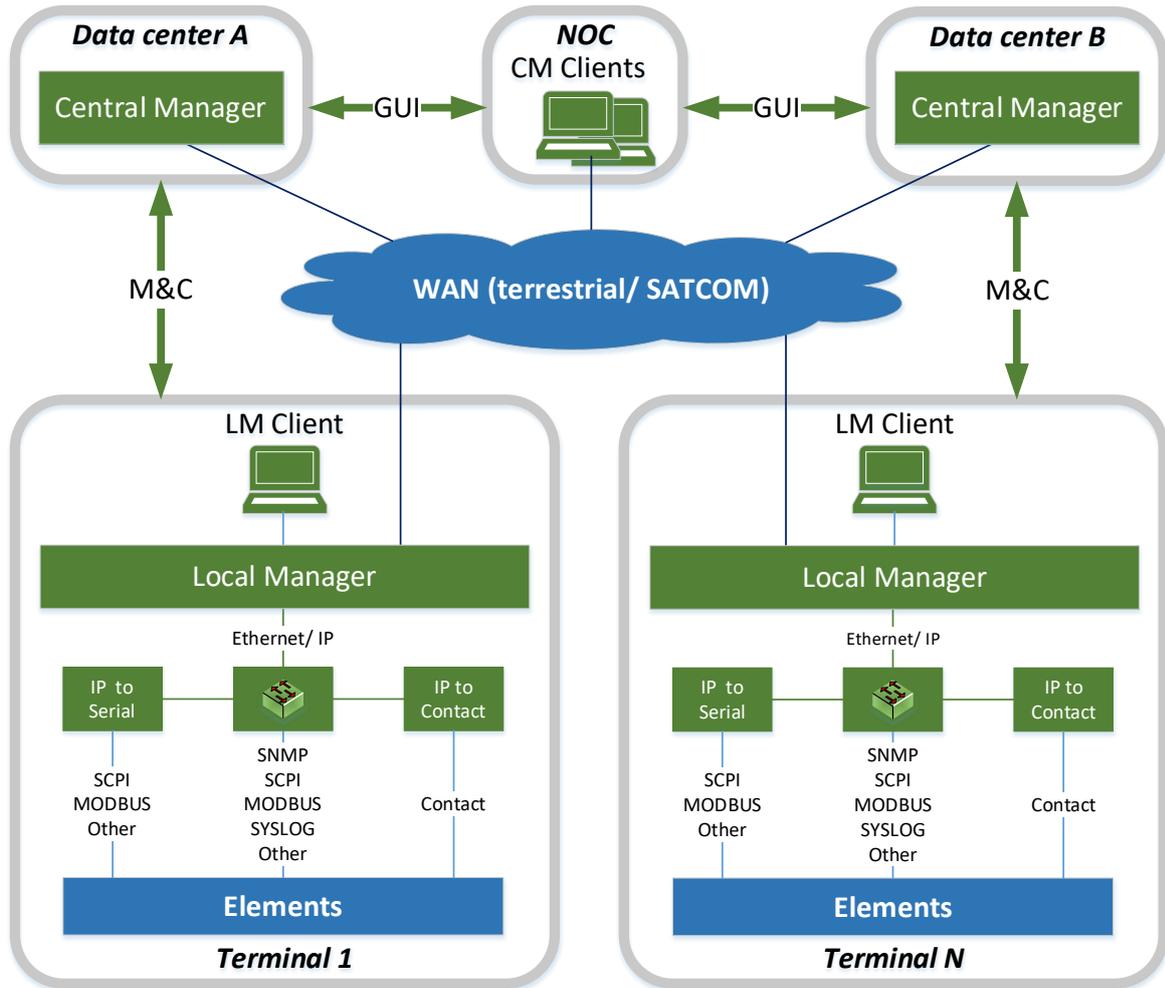
The current ASNMC requires a technology refresh, for which this survey seeks information from industry to determine the availability of solutions in the area of SATCOM management systems.

2. **Summary of System Needs**

2.1 Essential Needs

It is essential that:
1) The ASNMC implements LM, CM and Client functions as described above in the background section.
2) The ASNMC provides:
    a) Monitoring of the SATCOM terminals and links with:
        i) Event creation, i.e. detecting that elements, networks and SATCOM links operate outside (configurable) normal operation conditions, and determining the anomaly/alarm severity of such an event.
        ii) Event correlation (filtering, aggregation, masking, and root cause analysis based on element and dynamic terminal topologies and dependencies), classification and prioritisation.
        iii) Logging of key performance parameters and events.
        iv) Operator interaction, including graphical presentation of status and performance, and alerting and tracking of relevant events.
    b) Control of the SATCOM terminals and links with:
        i) Configuration of terminal elements by operators at LM and CM.
        ii) A sequence of predefined control actions ("scripts") on one or multiple elements, which can be triggered through scheduling, operation action, or by monitoring events.
3) Communication between the LMs, CMs and Clients is implemented such that:
    a) LMs can interoperate with the CMs over constrained SATCOM links.
    b) LMs can be operated locally without connectivity to CMs.
    c) CMs operate in a redundant configuration, in which the information between CMs is synchronised (over the NATO terrestrial WAN), so all CMs provide the same status to NOC operators.
4) The LM supports management of elements via:
    a) Industry standard protocols and interfaces:
        i) All SNMP v1, v2c and v3 functionalities.
        ii) SCPI and MODBUS over IP, RS485, and RS422 interfaces.
        iii) Dry contacts.
        iv) Syslog.
    b) Element specific and proprietary Monitoring & Control (M&C) protocols, through software (SW) modules implementing APIs/ drivers for these elements. For this purpose, LMs must be able to host such modules and support information exchange with the LM. Interface Control Documents will be provided by NCIA.
5) The ASNMC offers a GUI at LM and CM, which:
    a) Is accessible through a browser.
    b) Provides a uniform presentation of elements with similar functionality (e.g. modems, amplifiers, test instruments…) but different implementations (e.g. different manufacturers or versions).
    c) Can represent the following topologies of each terminal dynamically (i.e. with actual states/ connectivity of switches as obtained through M&C data or entered by the operator for passive switches and patch panels):
        i) RF (including IF).
        ii) Power (AC, DC).
        iii) Serial and Ethernet circuits between the data ports of the modems and the terminating network devices (i.e. non-SATCOM routers or switches).
        iv) The ASNMC itself (switches, servers, routers etc.).

d) Enables at LMs a presentation in which elements can be grouped into sub-systems, and combinations of subsystems (and be displayed as subsystem, rather than displaying numerous elements in one screen).

e) Enables at CMs a presentation in which terminals and links can be grouped according to criteria such as geographical area, user group, and technology.

f) Can present in graphs and tables, and can export, logged performance data with user configurable filters including time frame, terminals, type of data etc.

g) Can provide statistics for SATCOM links (SLA monitoring).

6) The ASNMC can be customised by the operator independent of the ASNMC vendor, through graphical interfaces and without requiring programming skills, to address changes in:

a) Terminal topology (connectivity between elements, and the type and number of elements in a terminal).

b) The number of terminals.

c) The types of elements (e.g. new modems) with industry standard interfaces.

d) The GUI as described at item 5) above.

7) The LMs and CMs provide open and industry standard interfaces for the exchange of management information with external applications.

8) The ASNMC includes the tools for the administration of the ASNMC itself, including:

a) Mechanisms for provisioning of new and spare LM and CM.

b) Configuration management database, detailing which SW versions are applied to which LM and CM.

c) Mechanisms to distribute SW updates.

d) Backup and restore.

9) The ASNMC meets the security requirements for processing classified data (notice that for secure communication between sites a VPN solution outside the scope of this survey may be assumed), including:

a) The Operating System is approved (Red Hat Enterprise Linux, Microsoft Windows).

b) Application(s) pass penetration testing.

c) Applications following a defined Secure Software Development Life Cycle process.

d) OS and applications are hardened (OS guidance is provided by NCIA)

e) Applications:

   i) Are supported with security patches.

   ii) Do not require an obsolete version of OS, libraries or dependencies to function.

f) Security relevant events and account activity are logged.

g) Users have the minimum set of permissions to accomplish their work tasks.

h) NATO approved anti-malware and Data Loss Prevention solutions are used (see www.ia.nato.int/niapc/).

10) The ASNMC, in relation to the SATCOM M&C functionality, provides access control which for each individual user of the system defines:

a) Its role(s) (e.g. IT (ASNMC) administrator, SATCOM administrator, SATCOM operator, NOC operator) with associated rights (e.g. manage ASNMC, view and/ or configure terminals, acknowledge alarms).

b) Which resources the user can access, based on attributes (properties) of that resource (e.g. terminals or elements within a specific mission or of specific type).

11) The Hardware (HW) implementation is:

a) Non-proprietary COTS for computing resources (e.g. server or workstation running the LM, CM and client applications). Serial protocol adapters and dry contact adapters as part of the solution may be proprietary, but must provide open and industry standard interfaces towards the LM computing resources.

b) Scalable in performance through adding HW resources to CMs at data centres and to LMs at static ground stations (which host hundreds of elements). At these locations, rack space and power are sufficiently available.

12) The Software (SW) implementation is:

a) Modular, non-monolithic, following a Service Oriented Architecture or Micro services Architecture, in which:
   i) Main functions, including element specific APIs, are separate SW modules.
   ii) SW modules can be maintained independent of each other, minimizing the need for regression testing of the complete ASNMC if updates to SW modules are made.
   iii) Updates to the ASNMC SW can be applied gradually to the LMs and CMs (one by one rather than a big bang approach), and different versions of SW can co-exist.
   iv) Instabilities in one SW module do not create instabilities in other SW modules and the ASNMC.
   v) Modules are small in size, can hence lower the maintenance costs and can be updated over low bandwidth links.
b) Resource efficient, such that for deployable terminals (which are the terminals with the lowest amount of elements) the LM function can be hosted on compact low power servers (e.g. single processor, 8 core, 32 GB RAM, SSD, 250W max. power consumption, 50% spare capacity), under the following example:
   i) 50 elements, 20 variables to monitor (poll) per element, polling frequency for each property 5 seconds, SNMPv3 based.
   ii) One active operator session per LM, LM connected to CM over WAN.
   iii) Occasional alarms and configuration actions.
   iv) Implementation and use of the essential and desirable functionalities.

2.2 Desirable Needs

It is desirable that the ASNMC:
1) Provides Trend Analysis and Anomaly Detection.
2) Provides templates for the provisioning of the LMs for similar terminals (i.e. topologies, type of elements, parameters to monitor etc).
3) Can make changes to the terminal topology definition through both LM level and CM, with synchronisation in both directions.
4) Can reuse/copy configurations from an LM in one terminal to an LM in another terminal.
5) Provides a hierarchical ASNMC configuration, in which the LM M&C settings (e.g. which information to collect, collection frequency, nominal conditions, etc.) at parent-level are inherited at child-level. For example, a parent level could be all transportable terminals and child-level could be all transportable terminals of a specific generation. The parent-level M&C settings are applied inherited at child-level, and at child-level M&C settings specific to that generation can be made. Another parent level would be elements of a specific type.
6) Verifies consistency between input and output of the terminals (i.e. does the actual total antenna output power match with the output level as can be calculated from the terminal's topology and element settings).
7) Supports the implementation and monitoring of links, i.e. the end-to-end connectivity at baseband level (Ethernet, serial) between terminals (or in terminals, i.e. loopback), by combining information from each end of the link. Such link information would be presented at the CMs and ideally at the involved LMs too.
8) Supports, can be developed to support, or provides the interfaces to support, the provisioning of links through the import of link parameters (in XML format) from an external system.
9) Can store elements settings (configurations), and detect and log changes in the element settings
10) Can log control actions that the ASNMC applied to elements (i.e. changing the settings or status).
11) Provides and integrates a Configuration Management Database, which stores (and can ideally retrieve) element properties such as location, IP address, SW version, hardware revision etc.

12) Supports exclusive element control, or a lockout-tagout function, which avoids that multiple operators (or the ASNMC itself through scheduled actions) can simultaneously take control of an element. Such exclusive control is a safety feature to avoid for example that a transmitter is activated or an antenna is rotated while an operator is working on this equipment.

13) Provides tools to support the workflow from internal or external link budget calculation to the actual provisioning of that link. For example:
   a) Translating the link parameters into modem specific settings and applying those to these modems, adjusting the monitoring parameters accordingly etc.
   b) Request fulfilment tracking.

14) In communication between the CMs and LMs over impaired links, the ASNMC prioritizes the most critical commands and monitoring information over less critical information (e.g. device failure alerts over links performance logs), and adapts granularity of information.

ANNEX B
Questionnaire

Organisation name:

Contact name & details within organisation:

Notes

- Please **DO NOT** alter the formatting. If you need additional space to complete your text then please use the 'Continuation Sheet' at the end of this Annex and reference the question to which the text relates to.
- Please feel free to make assumptions, *HOWEVER* you must list your assumptions in the spaces provided.
- Please **DO NOT** enter any company marketing or sales material as part of your answers within this market survey. But please submit such material as enclosures with the appropriate references within your replies. If you need additional space, please use the sheet at the end of this Annex.
- Please **DO** try and answer the relevant questions as comprehensively as possible.
- All questions within this document should be answered in conjunction with the summary of requirements in Annex A.
- All questions apply to Commercial or Government respondees as appropriate to their Commercial off the Shelf (COTS) or Government off the Shelf (GOTS) products.
- 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.

Questions

1. Can you provide an overview of your solution, indicating which functionality is COTS, needs to be customised or developed?

2. Can you please indicate which requirements/needs, in Section 2 from Annex A above, your solution (which may consist of a combination of systems and/or application(s)) meets, and how?

3. Does your solution have other beneficial functionality for SATCOM management, not mentioned at the requirements in Section 2 from Annex A above, and how would NCIA benefit from it?

4. Can your system be enhanced through the addition of Open Source Software for example, or software development? Which APIs does your solution provide, how can it be expanded and interfaced with third party software? Which open interfaces does your system provide to interface with for example Enterprise management systems?

5. Are there any system/software engineering standards and/or methodologies applied during the development? If yes, please specify them. Are there related artefacts being audited by a certified third party? Will NCIA be able to access to these artefacts?

6. Can you provide examples of where your solution is currently used?

7. Which elements (equipment) are supported "out of the box" by your solution? Do you have arrangements with equipment manufacturers to include their products in your solution?

8. How does the system minimise the bandwidth consumption for communication between LM and CM?

9. How does the system minimise the need, and bandwidth consumption, for OS and application updates (i.e. patches)?

10. How does your system minimise the amount of maintenance on the ASNMC itself, and how does it minimise the effort of the operators maintain the NATO SATCOM capability?

11. Does your solution include and integrate a Link Budget calculation tool, of which outcomes (elements settings like frequencies, Modulation & Coding (MODCOD), power etc.) can be applied to elements?

12. Can you provide any datasheets, manuals and training material?

13. How do you ensure long-term support of your product?

14. Please state the Rough Order of Magnitude (ROM) procurement cost of the ASNMC system as defined in Section 2 from Annex A. Include all assumptions that the estimate is based upon as well as what is included and excluded from the estimate.

Continuation Sheet	Page
Please feel free to add any information you may think that may be of value to NCIA in the space provided below. Should you need additional space, please copy this page and continue with the appropriate page numbers. Please reference the question to which the text relates to.	__ of __

**Distribution List Market Survey
MS-422181-ASNMC**

Potential Industrial Suppliers (NCI Agency BOA Holders)	1

NATO Delegations (Attn: Investment Adviser):

Albania	1
Belgium	1
Bulgaria	1
Canada	1
Croatia	1
Czech Republic	1
Denmark	1
Estonia	1
France	1
Germany	1
Greece	1
Hungary	1
Iceland	1
Italy	1
Latvia	1
Lithuania	1
Luxembourg	1
Netherlands	1
Norway	1
Poland	1
Portugal	1
Romania	1
Slovakia	1
Slovenia	1
Spain	1
Turkey	1
The United Kingdom	1
The United States of America	1

Belgian Ministry of Economic Affairs	1

Embassies in Brussels (Attn: Commercial Attaché):

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Belgium	1
Bulgaria	1
Canada	1
Croatia	1
Czech Republic	1

Denmark	1
Estonia	1
France	1
Germany	1
Greece	1
Hungary	1
Iceland	1
Italy	1
Latvia	1
Lithuania	1
Luxembourg	1
Netherlands	1
Norway	1
Poland	1
Portugal	1
Romania	1
Slovakia	1
Slovenia	1
Spain	1
Turkey	1
The United Kingdom	1
The United States of America	1

Potential Industrial Suppliers (NCI Agency BOA Holders):
MS-422181-ASNMC

Supplier	NATO Nation
Skyline	BEL
BLACK BOX NETWORK SERVICES NV	BEL
Magnobel BVBA	BEL
BT Global Services Belgium bvba	BEL
MDOS Consulting Inc.	CAN
ND-SATCOM	DEU
Aware7 GmbH	DEU
European Space Imaging GmbH	DEU
INTEC Industrie-Technik GmbH & Co KG	DEU
Netmetrix Solutions S.L	ESP
Global Tradecraft Intelligence	ESP
Hisdesat Servicios Estrategicos	ESP
Integrasys	ESP
TTinorte	ESP
Actia	FR
Kratos	FR
SatService GmbH	GER
Scytalys S.A	GRC
Span d.d	HRV
KING ICT d.o.o	HRV
Croatel d.o.o.	HRV
INSig2 d.o.o.	HRV
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Business Integra Technology Solutions	USA
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Leidos, Inc.	USA
EMW, Inc.	USA
OMNI Consulting Solutions	USA
Accelera Solutions, Inc	USA
Rockwell Collins	USA