NCIA/ACQ/2020/12,984
22 December 2020

Market Survey - Request for Information
Project "IP over Radio"
Project Serial Number DCIS SPW014886

Scientific Program of Work (SPOW) 2020

NCI Agency Reference: MS-CO-115336-DCIS

NCI Agency is seeking information to analyse the potential of multi-radio based access node to provide backup links and tactical forces integration.

NCI Agency Points of Contact
Principal Contracting Officer (PCO) Mrs. Tiziana Pezzi
Action Officer: Mr. Ole Hubner

E-mail: ole.hubner@ncia.nato.int

To: Distribution List (Annex A)

NCIA/ACQ/2020/12,984

Subject: **NCI Agency Market Survey**
Request for Information MS-CO-115336-DCIS

1.   NCI Agency requests the assistance of the Nations and their Industry to analyse the potential of multi-radio based access node to provide backup links and tactical forces integration.

2.   The Market Survey is directly linked to Capability Package CP149REV1 "NATO Deployable C2 Assets" and future project "NRF DCIS Augmentation Inc3".

3.   In addition to the firms noted in Annex D of this letter, NCI Agency requests the broadest possible dissemination by Nations of this Request for Information to their qualified and interested industrial base.

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

5.   The NCI Agency reference for this Request for Information is MS-CO-15336-DCIS, and all correspondence and submissions concerning this matter should reference this number.

6.   Responses may be issued to NCI Agency directly from Nations or from their Industry (to the staff indicated at Paragraph 8 of this Request for Information). Respondents are invited to carefully review the requirements in Annex B.

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. Non-binding product pricing information is also requested as called out in Annex C.

8.   Responses are due back to NCI Agency no later than **17:00 Brussels time 15 February 2021**.

9.   Please send all responses via email to the following NCI Agency Point of Contact:

   To Attention of: Mr. Ole Hubner

   Postal address: Acquisition Directorate
   Boulevard Leopold III
   B-1110 Brussels
   Belgium

   E-mail: ole.hubner@ncia.nato.int

10.   Product demonstrations or face-to-face briefings/meetings with industry are not foreseen. At this stage, clarification requests or any further questions are not accepted in return. Respondents are invited, if they wish to do so, to explain both their pricing information and the solution approach in their final responses. Respondents are requested <u>not to contact directly any NCI Agency staff other than the POC identified above in Paragraph 9.</u>

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 Request for Information. 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.

12.   The NCI Agency is not liable for any expenses incurred by firms in conjunction with their responses to this Request for Information and this shall not be regarded as a commitment of any kind concerning future procurement of the items described.

    Your assistance in this Request for Information request is greatly appreciated

FOR THE DIRECTOR OF ACQUISITION:

                                                    Tiziana Pezzi
                                                    Principal Contracting Officer

<u>Enclosures:</u>
Annex A (Distribution List)
Annex B (Request for Information - Summary of Requirements, Project 2018/0CM03301)
Annex C (Request for Information - Questionnaire)
Annex D (Potential Industrial Suppliers, NCI Agency Basic Ordering Agreement (BOA) Holders on Distribution)

ANNEX A
Distribution List for Request for Information
MS-CO-115336-DCIS

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
Montenegro	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):

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
Montenegro	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

Distribution for information (Blind to Potential Industrial Suppliers):

NATO International Staff

NATO Office of Resources
    Management and Implementation Branch
    Attn: Deputy Branch Chief   1
Director, NATO HQ C3 Staff
    Attn: Executive Co-ordinator   1
SACTREPEUR (*as applicable*)
    Attn: Infrastructure Assistant   1

Strategic Commands (*as applicable to funding source*)

SACT	Attn: ACOS C4ISR	1
ACO	Attn: SPT CIS Director	1

NATO Agencies (*as applicable*)
NSPA   Attn: Communication and Calibration Programme

NCI Agency:

NATEXs
All NATEXs   1

ANNEX B
Summary of Requirements
Project ID SPW014886

Introduction

The purpose of this market Survey is to analyze the potential of multi-radio based access node to provide backup links and tactical forces integration. It aims to identify potential extended functionalities to increase resiliency and interoperability of DCIS.

This Market Survey will support the feasibility analysis of a multi-radio based access node within two scenarios:

- Provide a backup link between FMN Federated Partners in case of denial of the main transmission links focussing on services which could remain and the level of quality that could be expected.
- Provide a standard anchor point for tactical forces integration in a FMN Federated Mission Network focusing on services which could be offered and the level of quality that could be expected.

The output will be a snapshot of products directly available but also those on industry roadmap.

Objective

The main objective of this market survey is to identify state of the art solutions already available as well as emerging technologies to be considered for integration into existing or future capabilities.

The second important goal of this study is to identify what services (Voice, Video, Chat, Emails, …) and in what quantity and quality will be available over these radio-based links.

Where and when possible, it is also the intention to collect lessons learned and best practices the industry has collected over the years to benefit to NATO capabilities.

Third goal of the study is to identify state of the art solutions already available as well as emerging technologies to be considered for Tactical Secure Radio only for Voice transmission. Although this third goal is technologically disengaged from the first two, it makes sense to include it into this market survey as the industrial stakeholders are closely related if not the same. In this area, the Tactical Secure Radio for Voice transmission is focused mainly in the HF domain, but with special interest in modern meshing and situational awareness techniques used in higher frequency domain.

The fourth goal of the study is derived directly from the third one and is related to the encryption technologies for a low bandwidth domain (i.e. HF) in which the overhead traffic has to be kept to the minimum.

As a general concern for any NATO related project, the accreditation process and the cyber security, cyber defense and signal intelligence related aspects are of high interest and will be scrutinized extensively.

Radio integration

Background

NATO holds Deployable Communication and Information System (DCIS) capabilities. These are used by NATO expeditionary forces to create a Deployable Point of Presence (DPOP) providing services to users from Deployable Head Quarters (HQ).

NCIA is currently analyzing the possibilities to integrate Strategic, Operational and Tactical Non-SATCOM Radio Networks (HF, UHF, VHF, Tetra, 4G, 5G …) with static IP-based networks though a Radio Integration Module (possibly containing multiple gateways) in order to:

Benefit from these Radio links or networks as a fallback integrated, automated and transparent transmission mechanism

a. between Deployed Mission Partners; and/or,

b. to be used as reachback to the Static Infrastructure.

Integrate mobile forces with Deployable Head Quarters so these can share services (Voice, Chat, C2, Situation Awareness ...);

Scenario 1 – Transmission fallback

This use case intends to provide a resilience mechanism with an up-front well-known graceful service degradation when switching from one transport mechanism to another, including a feedback mechanism to end-users for awareness.

Feedback mechanism can be a voice message being played when user pick-up the phone or a banner on the screen in the VTC room.
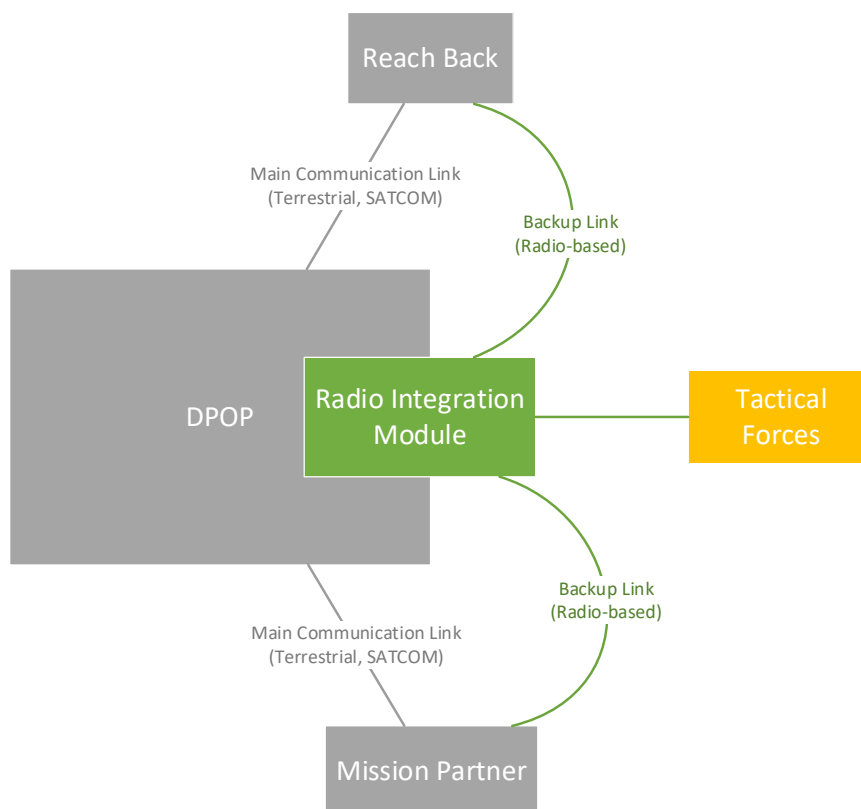
Scenario 2 – Mobile forces integration

This use case covers as well IP over Radio as Radio over IP type of technologies where the underlying transport mechanism becomes irrelevant for the user to reach the far end.

IP over Radio has to be understood as the transport of IP-network originated traffic over a radio network. This can be achieved (but not limited to) by providing IP layer connectivity directly at network layer but also through gateways (e.g. S5066 CFTP email gateway or VoIP to Radio Voice gateways).

Radio over IP has to be understood a providing Radio service transported over an IP-network. This covers (but is not limited to) providing Radio Voice (Push To Talk based) service to the operator desk (e.g. with or without voice detection to simulate PTT behavior or using a

console) but also the transport of RF signals over IP networks (when transmission/reception sites are not collocated with radio stacks).

Mobile forces integration has to be understood as deployed, on foot or in vehicle, soldiers on the field (using typically military radios) as well as a local, deployed HQ-centered, wireless communication bubble (Wifi, Tetra, 4G, 5G based,…).

It is important to stress that this market survey is radio network agnostic but still radio network aware.

Radio-agnostic has to be understood as it does not matter how the radio network is implemented (highly depending from one manufacturer to another), what features (waveform, TRANSEC, COMSEC, ...) are offered or the underlying technologies.

Radio-aware, on the other hand, has to be understood as it is well known that a HF Point-To-Point link does not offer the same capabilities as a 200 nodes UHF based radio network.

The Radio Integration Module is a logical block acting as a translator between the radio network and the IP network with the objective that services consumed by end-users are automatically adapted.

Scenario 1 – Transmission fallback

This use case intends to provide a resilience mechanism with an up-front well-known graceful service degradation when switching from one transport mechanism to another, including a feedback mechanism to end-users for awareness.

Feedback mechanism can be a voice message being played when user pick-up the phone or a banner on the screen in the VTC room.

Scenario 2 – Mobile forces integration

This use case covers as well IP over Radio as Radio over IP type of technologies where the underlying transport mechanism becomes irrelevant for the user to reach the far end.

IP over Radio has to be understood as the transport of IP-network originated traffic over a radio network. This can be achieved (but not limited to) by providing IP layer connectivity directly at network layer but also through gateways (e.g. S5066 CFTP email gateway or VoIP to Radio Voice gateways).

Radio over IP has to be understood a providing Radio service transported over an IP-network. This covers (but is not limited to) providing Radio Voice (Push To Talk based) service to the operator desk (e.g. with or without voice detection to simulate PTT behavior or using a console) but also the transport of RF signals over IP networks (when transmission/reception sites are not collocated with radio stacks).

Mobile forces integration has to be understood as deployed, on foot or in vehicle, soldiers on the field (using typically military radios) as well as a local, deployed HQ-centered, wireless communication bubble (Wifi, Tetra, 4G, 5G based,…).

<u>ANNEX C</u>
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 B.
- All questions apply to Commercial or Government respondees as appropriate to their Commercial off the Shelf (COTS) or Government off the Shelf (GOTS) product.
- 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. How have you, or would you, integrate multiple radios (with multiple networks) in an IP network with automated routing but also end-point reachability awareness? The end-point reachability awareness is important as it will avoid traffic to be sent over scare resource links if the destination end-point in not reachable (e.g. out of range).
2. How have you, or would you, implement a feedback mechanism to the user to inform that their services are being provided over a limited transmission system (Voice message when phone is picked up, email server notification to email clients, ...)?
3. How are you or would you implement the graceful service degradation? based on what priorities and information? How is it integrated with network and IS components?
4. Would you consider any SD-WAN (Software Defined WAN) technology compatibility?
5. What radio brands and models have you integrated with before?
6. Have you already delivered similar solutions to NATO organizations, nations or partners? Can you put us in contact?
7. What lessons have you learned from your previous experiences related to this subject?
8. Do you have standard (e.g. STANAG 5066) or proprietary solution in your portfolio to serve as a gateway between an IP-based network and an HF-Bearer?
   a. Have you performed such solution delivery in the past? If yes, please provide a description of the context and the solution(s) delivered.
   b. What services (Voice, Chat, Emails...) have been supported over this solution? Please describe the performance the solution achieved (throughput, concurrent calls, voice quality, emails with/without attachments...).
9. Could you provide a link-distance vs throughput model for the different bands / radios?
10. Could you describe the Voice capability of the radio (analog, digital, RoIP)?
11. What kind of encryption / SIGINT are you using and implementing? What certification level (NATO or national standards) have you achieved?
12. Have you already integrated IP-crypto based solutions over radio transport newtworks? IP-crypto based has to be understood that the IP traffic presented to the module is already encrypted by an inline-encryption device.
13. For IP capabilities, what OSI-layer are you supporting and how?
14. What kind of radio links / topologies does your solution support? P2P, P2M, Mesh, MANET,…
15. How does your solution implement QoS continuity through the radio network? Is it integrated with the access mechanism to pre-empt access to the radio channel?
16. In case of relaying being supported in the radio network, how efficient needs the routing algorithm to be to ensure delay and jitter are within service boundaries? How hops quantities are affecting or influencing the routing algorithm in considering the service provision possible (in line with reachability definition)? What hops count should be considered as a maximum? Could you explain the metrics of the calculation of the efficiency?
17. What other wireless technologies have you gatewayed?
18. Can you provide a cost estimation for the solutions you describe?

19. Is (are) the solution (solutions) that you are presenting using any STANAG or other standard defined waveform?
20. What kind of interoperability with other NATO, national or proprietary systems does the proposed solution implement? Is this a full interoperability or implemented only partially?

Continuation Sheet
Please feel free to add any information you may think that may be of value to NCI Agency in the space provided below. Should you need additional space, please copy this page and continue with the appropriate page numbers.

Page

__ Of __
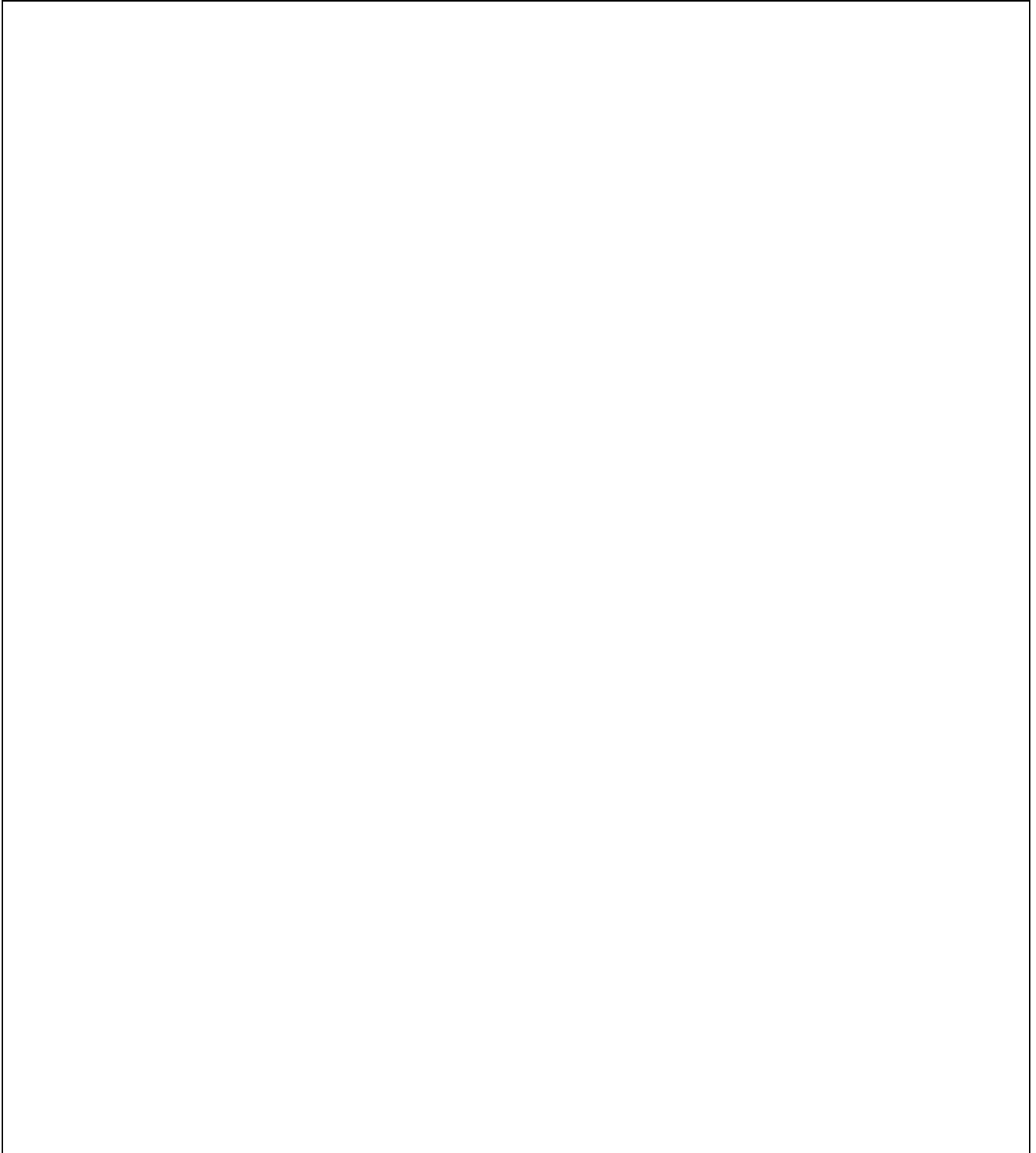
ANNEX D
Potential Industrial Suppliers
Distribution
MS-CO-115336-DCIS

ALBANIA
TCN shpk

BELGIUM
ATOS
Akacio - Louis & Associates s.a.r.l
Brevco Services S.C.S.
Clark MastsTeksam NV
Colt telecom
Computer Sciences Corporation
Cypros C
Damovo Belgium NV/SA
Gillam-FEI
GTT
NextiraOne
Nokia Bell NV
Orange
Telindus NV
SAIT
Selex Communications S.p.A.
Sprint Nextel
Thales S.A.
UNIFY COMMUNICATIONS

BULGARIA
Electron Progress EAD
KRISTANEA LTD.

CANADA
EMS Technologies Canada Ltd
General Dynamics Canada Ltd.
Network Innovations Inc.
Norsat International Inc.

CROATIA
CROATEL
CROZ d.o.o. za informaticku djelatnost

CZECH REPUBLIC
LTI DataCom
SITEL, spol. s r.o.
TTC Telekomunikace, s.r.o.

Techniserv, s.r.o.

DENMARK
Ebicon ApS
SAAB Danmark A/S

FRANCE
ADW Network
Airbus Defence and Space SAS
Altran technologies_ASD Paris
ETELM ELECTRONIQUE TELEMATIQUE
INEO Defense
MARLINK SAS
METRACOM
S.I.T. SA
Société Réseau Informaique et Gestion

GERMANY
CESTRON International GmbH
Deutsche Telekom
FREQUENTIS Deutschland GmbH
IABG mbH
KB Impuls Service GmbH
Lambda-Space GmbH
Media Broadcast
Motorola Solutions Germany GmbH
ND SatCom GmbH
OHB-System AG
Pan Dacom Direkt GmbH
Rohde & Schwarz GmbH & Co. KG
Selex Communications GmbH
T-Systems International GmbH
Telefunken Racoms GmbH & Co. KG
Thales Electronic Systems GmbH
Vertex Antennentechnik GmbH
XORTEC GmbH

GREECE
INTRACOM TELECOM S.A.
Space Hellas

HUNGARY
Fercom Ltd.
Honvédelmi Minisztérium Elektronikai,Logisztikai és Vagyonkezelo zrt.

ITALY
General Dynamics Mission Systems Italy
IES - S.r.L.

ITEL SRL
ItaltelITALY
NA.EL. SRL
Telecom Italia
TELSY S.p.A.
TESEO S.p.A
Telegi S.r.l.
Valtellina Spa
Vitrociset S.p.A.
Belss Ltd

LATVIA
DATI Group, LLC

LITHUANIA
JSC FIMA (UAB)

LUXEMBOURG
NTT Communications
SES ASTRA S.A.
SNOWBALL TECHNOLOGY SARL

NETHERLANDS
Carrier to Carrier Telecom B.V.
CenturyLink
Divitel B.V.
Eurotempest BV
Gannexion B.V.
National Aerospace Laboratory (NLR)
Rohill Technologies B.V.
ROHDE & SCHWARZ BENELUX BV
SurCom International BV
Symbolise
UNI Business Centre BV
WBC Innovations BV

NORWAY
3D perception AS
Airbus Defence and Space AS
Ceragon Networks AS (ex Nera Networks)

POLAND
Consortia Sp. z o.o.
DGT Spólka z o.o.
Enamor Sp. z.o.o
KenBIT Koenig i Wspolnicy Sp. j.
Newind sp. z o.o.
Siltec Sp. z.o.o.

Zbar Phu Mariusz Popenda

PORTUGAL
  EID
  VIATEL - TECNOLOGIA DE COMUNICAÇÕES S.A

ROMANIA
  ATOS Convergence Creators SRL
  SC Mira Telecom SRL
  UTI Grup S.A.

SLOVAKIA
  Aliter Technologies a.s

SPAIN
  IBETOR s.l.
  Indra Sistemas S.A.
  KRC ESPAÑOLA, S.A.

TURKEY
  ASELSAN Elk. San ve Tic. A.S.
  C TECH Bilisim Tek. San ve Tic A.S.
  E+M Elektrik Sistem Hizmetleri Ltd. Sti.
  HAVELSAN Hava Elektronik San. Ve Tic A.S.
  Kuanta Insaat Taahhut Elektronik Turizm
  Suta Insaat ve Muhendislik Sirketi

UNITED KINGDOM
  Anubis Associates Ltd
  Audax
  Avanti Communications Group plc
  CDW Limited
  Elbit Systems UK
  Isode
  Leonardo S.p.A
  Northrop Grumman Mission Systems Europe Ltd.
  Rockwell Collins (UK) Ltd.
  Shape Services Ltd. (Shape Telecom)
  Spectra Group (UK) Ltd
  Steatite Limited
  Storm Technologies Ltd
  Systemware Europe Ltd
  Telia Carrier
  TRICIS LIMITED
  Thales UK Limited
  Total IA Ltd
  Ultra Electronics CIS Ltd.

Verizon Business

UNITED STATES
ALTIMA GROUP INTERNATIONAL, INC. (AGI)
AS GLOBAL
Affigent, LLC
AT&T Government Solutions
BAE Systems Information Solutions Inc.
Cogent Communications
ITT Corporation Communications Systems
DTECH Labs
DRS Technical Services, Inc.
DataPath Inc
Diversified Technology, Inc.
EMW, Inc.
Forward Slope, Inc
Harris Corporation - RF CommunicationsDivision
Honeywell Technology Solutions Inc.
Information Assurance Specialists (IAS)
Intelligent Waves LLC
Intelsat General Corporation
K3 Enterprises, Inc.
KLAS Telecom
ManTech International Corporation
Masergy
Mutual Telecom Services Inc.
PacStar
Pegasus Professional Services LLC
Persistent Systems
Polaris Alpha
Raytheon CompanyNetwork Centric Systems
Romeo Six
Spacenet Integrated Government Solutions
Sunair
Tactical & Survival Specialties Inc.
Trimble Inc
URS Federal Services International Inc
US International Development Consortium
UXB Defense, Inc
Ultisat dba Speedcast Government
ViaSat, Inc.
Vykin Corporation
World Wide Technology Inc.