

RFI-ACT-SACT-21-08

**Headquarters Supreme Allied Commander Transformation
Norfolk Virginia**



REQUEST FOR INFORMATION RFI-ACT-SACT-21-08

This document contains a Request for Information (RFI) Call for Industry input to NATO's Future Electronic Warfare (EW) Command & Control (C2) Capabilities.

Suppliers wishing to respond to this RFI should read this document carefully and follow the guidance for responding.

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HQ Supreme Allied Commander Transformation RFI 21-08 General Information	
Request For Information No.	21-08
Project Title	Request for industry input to NATO's Future Electronic Warfare (EW) Command & Control (C2) Capability Programme
Due date for submission of requested information	05 March 2021
Contracting Office Address	NATO, HQ Supreme Allied Commander Transformation (SACT) Purchasing & Contracting Suite 100 7857 Blandy Rd, Norfolk, VA, 23511-2490
Contracting Points of Contact	1. Ms Tonya Bonilla e-mail : tonya.bonilla@act.nato.int Tel : +1 757 747 3575 2. Ms Catherine Giglio e-mail : catherine.giglio@act.nato.int Tel :+1 757 747 3856
Technical Points of Contact	1. Amie Johnson, e-mail : amie.johnson@act.nato.int Tel : +1 757 747 3843 2. Damien Dodge, e-mail : damien.dodge@act.nato.int Tel : +1 757 747 3752

1 - INTRODUCTION

1.1 **Summary.** Headquarters Supreme Allied Commander Transformation (HQ SACT) is issuing this Request for Information (RFI) in order to engage with industry. The intention is to establish the art-of-the-possible and state-of-the-art with respect to technologies and products in the area of NATO EW C2 capabilities in order to support NATO Governance decision-making on Common-Funded Capability Development.

1.2. This request for information does not constitute a commitment to issue a future request for proposal (RFP). The purpose of this request is to involve industry through collaboration, in an examination of future capabilities related to the EW C2 with a focus on the technologies and commercial products. HQ SACT has not made a commitment to procure any of the items described herein, and release of this RFI shall not be construed as such a commitment, nor as authorization to incur cost for which reimbursement will be required or sought. Further, respondents are advised that HQ SACT will not pay for any information or administrative costs incurred in responding to this RFI. The costs for responding to this RFI shall be borne solely by the responding party. Not responding to this RFI does not preclude participation in any subsequent RFP if issued in the future.

2 – GENERAL BACKGROUND: ACT Framework for Collaborative Interaction (FFCI)

2.1 ACT has implemented a Framework for Collaborative Interaction (FFCI) to increase opportunities for industry and academia to contribute to ACT capability

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development efforts through collaborative work. Such collaboration enables HQ SACT, and NATO as a whole, to benefit from industry/academia models, advice, capabilities and experience in the course of this work. In addition to the benefits HQ SACT gains from such projects, this collaborative effort will provide industry / academia with an improved understanding of NATO's capability requirements and the associated issues and development challenges to be addressed by HQ SACT. Potential collaborative projects are on specific topics that are of mutual interest to both parties but shall be restricted to collaborations in non-procurement areas. Several mechanisms have been already developed to support the initiation of collaborative projects between industry/academia and ACT ranging from informal information exchanges, workshops, studies or more extensive collaboration on research and experimentation.

2.2 Depending on the level and type of interaction needed for a collaborative project, a specific agreement may be needed between parties. The FFCI agreement for any specific project, if required by either party for the project to proceed, will range from "Non-disclosure Agreements" (NDA) for projects involving exchange of specific information to the more extensive "Declaration of Mutual Collaboration" (DOMC) to address intellectual property and other issues.

2.3 More extensive information on the ACT FFCI initiative can be found on the ACT website being developed to support FFCI projects at <http://www.act.nato.int/ffci>.

2.4 No FFCI agreement is required to respond to this RFI.

3 - DESCRIPTION OF THE PROGRAMME

3.1 Programme Vision

3.1.1 The future Electronic Warfare Command and Control capability's vision is:

Supreme Allied Commander Europe requires that Allied Joint Force and Component Commanders are provided a flexible, interoperable and scalable Electronic Warfare Command and Control capability to provide a recognized electromagnetic picture, a running electronic order of battle, and decision support and information to plan, prepare, direct, monitor and assess electronic warfare activities in military operations at the tactical, operational, and strategic levels.

3.1.2 NATO's EW C2 capability will mainly support the NATO Command and Force Structures. Therefore, the following fundamental EW activities, which strategic, operational, and tactical commanders must perform are identified as:

- understand the operational electromagnetic environment (EME) to provide situational awareness and enable decision making;
- plan and coordinate electronic warfare activities to produce desired effects;
- direct, coordinate, monitor, and assess electronic warfare activities to produce desired effects;
- synchronize and deconflict friendly force electronic warfare actions electromagnetic spectrum activities within the operational EME to produce desired effects and minimize adverse impacts;

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- exchange information to enable EME understanding and electronic warfare planning and execution;
- facilitate electronic warfare operational support to enable national reprogramming and exchange EW mission data.

3.1.3 The NATO EW C2 programme is currently at the stage to develop a consolidated, comprehensive programme plan that will deliver a required capability as detailed in the Capability Requirements Brief. This plan will direct the necessary actions across the NATO-recognised lines of development including doctrine, organisation, training, materiel (including software), leadership, personnel, facilities and interoperability. This is NATO's capability programme planning stage within the NATO Common-Funded Capability Delivery Governance Model. The NATO Common-Funded Capability Delivery Governance Model includes decision points on the:

- Requirement (via the Operational Requirements Statement) – the programme mandate;
- Viability of a capability-based programme to satisfy the requirement (via the Capability Requirements Brief) – the programme brief and vision; and
- Establishment of a programme to deliver capabilities and to drive the transformational change (via the Capability Programme Plan) – the programme creation.

3.1.4 Amongst other aims, the Capability Programme Plan will determine alternatives through an analytical comparison of the operational effectiveness and life cycle costs of different alternatives under consideration to satisfy the requirements. The Analysis of Alternatives (AoA) also includes consideration of the possibility of "Adopting" a solution (from Nations), "Buying" (acquiring a solution from Industry), or "Creating" (developing a solution bespoke to NATO). The AoA assists decision makers by identifying alternatives that offer the Alliance value for money.

3.1.5 To achieve the aims of the Capability Programme Plan, a Request for Information is necessary to determine relevant technologies and products existing within Commercial market (as part of the consideration of "Buy"). This request intends to identify prospective (sub-) systems or products, for which the team may need to conduct additional in-depth discussions. This is not a formal request for submissions as part of a procurement; it is intended to conduct an additional in-depth survey to determine possible systems or products, which should be identified in the development of the Capability Programme Plan.

3.2 Intent/Objectives.

To support the transformational change of how EW C2 system(s) will be doing business in the future, a Capability Programme Plan needs a robust Analysis of Alternatives across the Adopt, Buy, Create, and hybrid options. This Request for Information is intended to provide industry an opportunity to provide information that would allow NATO to determine potential benefits they might receive from a product or service.

3.3 Expected benefits to respondents

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Industry participants will have the chance to expose NATO EW C2 operators and subject matter experts to state-of-the-art technologies and products.

3.4 Expected input from industry/academia.

Expected input to this RFI is industry perspective on relevant current and future technologies and products.

4 - REQUESTED INFORMATION

4.1 Intent

The information collected with this survey (please see enclosed excel spreadsheet) will be used in support of the AoA for EW C2 capability programme that will be conducted by HQ Supreme Allied Commander Transformation's Analysis of Alternatives Branch. A collaborative question and answer (Q&A) session with the NATO may be offered in late January; information will be provided on the HQ SACT P&C website at: www.act.nato.int/contracting. Industry offering potential solutions for EW C2 could be invited to participate in a virtual workshop to be held on or about 22-26 March 2021 to further understand the solution(s) offered.

4.2 Answers to the RFI.

The answer to this RFI may be submitted by e-mail to the Points of Contact listed above.

4.3 Follow-on.

4.3.1 The data collected in response to this RFI will be used to develop a report to inform the Future EW C2 Capability Programme. Data collected will be used to provide an assessment to support a decision as to whether NATO should pursue an Adopt, Buy, Create, or hybrid approach to EW C2 capabilities.

4.3.2 Provision of data, or lack of, will not prejudice any respondent in the event that there is a competitive bidding process later as part of NATO Common-Funded Capability Development.

4.4 **Handling of Proprietary information.** Proprietary information, if any, should be minimized and clearly marked as such. HQ SACT will treat proprietary information with the same due care as the command treats its own proprietary information, and will exercise due caution to prevent its unauthorized disclosure. Please be advised, all submissions become HQ SACT property and will not be returned.

4.5 **Questions.** Questions of a technical nature about this RFI announcement shall be submitted by e-mail solely to the above-mentioned POCs. Accordingly, questions in an e-mail shall not contain proprietary and/or classified information. Answers will be posted on the HQ SACT P&C website at: www.act.nato.int/contracting.

4.6 **Response Date.** 05 March 2021

4.7 **Summary. This is a RFI only. The purpose of this RFI is to involve industry/academia, through collaboration,** in an examination of current and future capabilities related to the EW C2 with a focus on the technologies and commercial products. HQ SACT has not made a commitment to procure any of the items described

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herein, and release of this RFI shall not be construed as such a commitment, nor as authorization to incur cost for which reimbursement will be required or sought. It is emphasised that this is a RFI, and not a RFP of any kind.

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Purpose. This survey allows Nations to offer potential alternative solutions for consideration to meet the operational requirement for NATO's Future Electronic Warfare Command and Control capability programme (EW C2). The information collected in this survey will be used in support of the Analysis of Alternatives (AoA) for EW C2 conducted by HQ Supreme Allied Commander Transformation's Analysis of Alternatives Branch.

Prioritized Requirements. Electronic Warfare Command and Control programme desired capabilities¹ focusing in this RFI predominantly on materiel, training, and interoperability:

1. The ability to provide a shared, user-defined, recognised electromagnetic picture by:
 - a. Incorporating electronic intelligence, electronic surveillance, and emitter information from the operational electromagnetic environment;
 - b. Incorporating actual or potential electromagnetic spectrum actors (friendly, neutral, adversary, and unidentified; transmitters and receivers), which may have the ability to influence the operational electromagnetic environment;
 - c. Incorporating electronic warfare reports, the electronic order of battle, and user-defined alerts;
 - d. Incorporating environmental, legal/regulatory, and operational factors influencing or expected to influence the operational electromagnetic environment.

2. The ability to create and maintain a shared, user-defined, historical and dynamic near real-time electronic order of battle by:
 - a. Incorporating friendly, neutral, and adversary, electromagnetic-spectrum-dependant/influencing systems, locations, parameters, times-of-operation, status, and user-defined alerts;
 - b. Incorporating unidentified electromagnetic-spectrum-dependant/influencing systems, locations, parameters, times-of-operation, status, and user-defined alerts;
 - c. Facilitating generation of user-defined listings such as emitters of interests, coalition emitter lists, intelligence collection task lists, targeting lists; and reprogramming recommendation lists.

3. The ability to enhance planning of electronic warfare by:
 - a. Developing operational electromagnetic environment planning estimates;
 - b. Enabling consideration of electromagnetic spectrum and electronic warfare factors in mission analysis and course of action development and comparison;
 - c. Enabling operational and tactical modeling and simulation of electromagnetic spectrum and electronic warfare activities to identify

¹ NATO Terms is available to support further understanding of terminology in this enclosure, if needed. NATO Terms is available here: <https://nso.nato.int/natoterm/content/nato/pages/home.html>

- operational constraints, limitations, and impacts (*this is not scientific or engineering design/test oriented M&S*);
- d. Enabling user-defined analysis of operationally required electromagnetic spectrum and electronic warfare needed/available/ready capabilities, potential gaps, control measures, anticipated conflicts, impacts, and interference across time, space, and spectrum;
 - e. Developing prioritized intelligence collection and targeting recommendations in support of electronic warfare activities.
4. The ability to obtain and maintain authoritative, discoverable electronic warfare and electromagnetic spectrum information for use in the recognised electromagnetic picture, electronic order of battle, and decision support (*requirements 3 and 6*) by:
- a. Providing a repository of authoritative, discoverable information containing technical descriptions of adversary EMS-dependent/influencing systems;
 - b. Providing a repository of authoritative, discoverable information containing technical descriptions of friendly EMS-dependent/influencing systems;
 - c. Providing a repository of authoritative, discoverable information containing technical descriptions of neutral EMS-dependent/influencing systems;
5. The ability to provide sustainable, survivable, scalable, and interoperable system(s) by:
- a. Providing operator and maintainer training solutions;
 - b. Complying with NATO Interoperability Standards and Profiles² and **Federated Mission Networking**³ requirements;
 - c. Enabling maintenance approaches applicable for air-gapped classified network environments;
 - d. Incorporating cybersecurity best practices and ongoing vulnerability management;
 - e. Incorporating system resilience best practices;
 - f. Incorporating open system architectures;
 - g. Enabling a scalable capability through extensible design and architecture.
6. The ability to enhance directing, monitoring, and assessing electronic warfare by:
- a. Comparing electromagnetic environment planning estimates against real-world situation;
 - b. Identifying and analysing opportunities, conflicts, gaps, interference, readiness, impacts, and available options for exploitation or resolution between planned operations and real-world situation;

² NISP: <https://nhqc3s.hq.nato.int/Apps/Architecture/NISP/>

³ FMN: <https://dnbl.ncia.nato.int/FMNPublic/SitePages/Home.aspx>

- c. Creating and managing electronic warfare operational messages/reports, requests, allocations, assignments, intelligence requests for information, and tasking;
- d. Predicting and analysing gaps and impacts between planned electronic warfare effects/estimates and real world situation/results.

RFI Questions. Answers to these questions will support programme planning, analysis, and assessments:

1. What is the name of your EW C2 approach (please expand acronyms)?
 - a. [a narrative entry is requested]
2. Please give a brief overview of your approach/capability-architecture.
 - a. [a narrative entry is requested]
3. What data sources would your EW C2 approach leverage, what would it be able to render rapidly, and how well does the approach scale?
 - a. [a narrative entry is requested]
4. Describe your approach to apply electromagnetic spectrum Modeling and Simulation expertise to the EW C2 requirements, and your expertise with Electromagnetic Interference (EMI) and Electromagnetic Compatibility (EMC).
 - a. [a narrative entry is requested]
5. Describe your approach to integrate existing tools and provide new capabilities that capture and convey the boundaries of spectrum manoeuvre, including executing command and control of EW and spectrum dependent systems.
 - a. [a narrative entry is requested]
6. Describe how an EW C2 design could identify and resolve spectrum conflicts; could analyze and predict the effectiveness of courses of action (COAs), plans, and explore alternatives; describe how computations support spatial and temporal EW/EMS reuse/deconfliction (i.e., the approach accounts for where and when spectrum is used and does not identify conflict simply because the same frequency has been assigned).
 - a. [a narrative entry is requested]
7. Explain your company's experience and knowledge with related tools and systems⁴ (e.g., Link-11, Link-16, Cooperative Electronic Support Measure Operations (CESMO), Allied Radiofrequency Computer Aided Data Exchange (ARCADE), NATO Common Operational Picture (NCOP or IGeosSIT), NATO Core Geospatial Information System (CoreGIS), Intelligence Functional Service (INTEL FS), Secure Joint Tactical Chat (JCHAT), NATO Crisis Response System (NCRS), Network Interoperable Real-Time Information

⁴ NCIA Service Catalogue:

<https://dnbl.ncia.nato.int/nciaservicecatalogue/Lists/NATO%20Software%20Tools%20List/AllItems.aspx>

Services (NIRIS), Radar EW and Communications Coverage Tool (REACT), Tool For Operations Planning Functional Area Services (TOPFAS), Spectrum XXI, Spectrum Management Information Repository (SMIR Online), NATO Emitter Database (NEDB).

- a. [a narrative entry is requested]
 - b. In your approach, articulate how existing tools could be enhanced and integrated into an EW C2 design.
 - i. [a narrative entry is requested]
8. Can your EW C2 capability be adopted by NATO in an operation? Are there any legal and commercial considerations that must be accounted for?
 - a. Are there any legal and commercial considerations (e.g. Intellectual Property Rights (IPR) availability considerations?
 - i. [a narrative entry is requested]
 - b. Are there any export controls preventing or modifying its use in NATO?
 - i. [a narrative entry is requested]
 - c. Are there any national regulations preventing or modifying its use in NATO?
 - i. [a narrative entry is requested]
 - d. Are there any licensing restrictions preventing or modifying its use in NATO?
 - i. [a narrative entry is requested]
9. At what level of warfare is your EW C2 capability predominantly used (e.g. strategic, operational, or tactical)?
 - a. [selection of a provided entry is requested; comments can also be provided]
 - i. Strategic
 - ii. Operational
 - iii. Tactical
10. What is your capability technology readiness level?
 - a. [selection of a provided entry is requested; comments can also be provided]
 - i. Level-9, where the actual system is proven through successful mission operations.
 - ii. Level-8, where the actual system is completed and qualified through test and demonstration.
 - iii. Level-7, where the system prototype was demonstrated in an operational environment.
 - iv. Level-6, where the system/subsystem model or prototype was demonstrated in a relevant environment.
 - v. Below level-6.
11. What is your capability integration readiness level?
 - a. [selection of a provided entry is requested; comments can also be provided]

- i. Level-9, where actual integration completed and mission qualified through test and demonstration in the system environment.
- ii. Level-8, where functionality of integration technology has been demonstrated in prototype modifications.
- iii. Level-7, where technology integration has been verified and validated with sufficient detail to be actionable.
- iv. Level-6, where integration element baseline is established.
- v. Level-5, where major integrating technology functions were demonstrated with prototypes, engineering models or in laboratories.
- vi. Below level-5.

12. What are your capability dependencies?

- a. Is there embedded/required third-party commercial technology (e.g. operating systems, licenced applications, commercial databases, etc.)?
 - i. [selection of a provided entry is requested; comments can also be provided]
 - 1. Yes.
 - 2. No.
- b. What is/are the embedded/required commercial technology?
 - i. [a narrative entry is requested]
- c. Does your system(s) require integration with other capabilities/systems to derive maximum benefit? (e.g. system-of-systems technologies, other Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance (C4ISR) systems, etc.)
 - i. [selection of a provided entry is requested; comments can also be provided]
 - 1. Yes.
 - 2. No.
- d. If co-dependent integration is required, what are these capabilities/systems?
 - i. [a narrative entry is requested]
- e. What information standards/formats are used in your capability (e.g. STANAG 6009/4658/5642, MIL-STD, USMTF, ELINT-specific, Standard Spectrum Resource Format (SSRF), etc.)⁵ ?
 - i. [a narrative entry is requested]
- f. For each information standard/format used in your capability please specify if it is a NATO, Open, National, International, or Commercial standard/format.
 - i. [a narrative entry is requested]
- g. Does your capability require specialize/high-end/highly-configured hardware due to significant hardware/software integration?
 - i. [selection of a provided entry is requested; comments can also be provided]
 - 1. Yes, specialized hardware is required.

⁵ STANAG: <https://nso.nato.int/protected/nsdd/ListPromulg.html>

2. No, specialized hardware is not required.
- h. What level of capability/system maintenance (logistic support) must be performed by your organization?
 - i. [selection of a provided entry is requested; comments can also be provided]
 1. None.
 2. Minor – the majority of capability/system maintenance knowledge/materiel can be trained/procured and only the most complex and rare issues require proprietary knowledge/materiel.
 3. Medium – some capability/system maintenance knowledge/materiel can be trained/procured and various complicated and occasionally reoccurring issues require proprietary knowledge/materiel.
 4. Major – a small portion of capability/system maintenance knowledge/materiel can be trained/procured and regular, periodic issues require proprietary knowledge/materiel.
13. Is your capability/system highly integrated or is the underlying code-base and system design open and modular?
 - i. [selection of a provided entry is requested; comments can also be provided]
 1. Highly integrated. Any capability modification would require major underlying software develop work.
 2. Moderately integrated. Specific capability elements are tightly integrated while others are not, thus depending on the desired modification it could require a range from minor to major underlying software develop work.
 3. Modular design. The majority of capability elements are loosely coupled enabling for a greater degree of capability modification with minor underlying software develop work.
 4. Highly open and modular design. All capability elements are loosely coupled enabling for a significant degree of capability modification with nearly no underlying software develop work.
14. ACT seeks non-binding rough order of magnitude (ROM) price estimates for the sole purpose of conducting analysis of alternative comparisons. Provision of data, or lack of, will not prejudice any respondent in the event that there is a competitive bidding process later as part of NATO Common-Funded Capability Development. As such, if your capability requires **specific hardware** please describe this and available options for your capability with associated non-binding ROM price estimates? Possible fielding scenarios might include network-enabled viewers (viewer-defined read-only information for shared awareness) and system users (system interaction, manipulation, and input/output): (A) 200 viewers and 50 users; (B) 500 viewers and 60 users; (C) 1000 viewers and 100 users; (D) 2000 viewers and 200 users.

- a. [a narrative entry is requested]
15. ACT seeks non-binding rough order of magnitude (ROM) price estimates for the sole purpose of conducting analysis of alternative comparisons. Provision of data, or lack of, will not prejudice any respondent in the event that there is a competitive bidding process later as part of NATO Common-Funded Capability Development. As such, what is your organization's **user licensing model**? Please describe this and available options for your capability with associated non-binding ROM price estimates? Possible fielding scenarios might include network-enabled viewers (viewer-defined read-only information for shared awareness) and system users (system interaction, manipulation, and input/output): (A) 200 viewers and 50 users; (B) 500 viewers and 60 users; (C) 1000 viewers and 100 users; (D) 2000 viewers and 200 users.
- a. [a narrative entry is requested]
16. ACT seeks non-binding rough order of magnitude (ROM) price estimates for the sole purpose of conducting analysis of alternative comparisons. Provision of data, or lack of, will not prejudice any respondent in the event that there is a competitive bidding process later as part of NATO Common-Funded Capability Development. As such, what is your organization's **service model** for logistics/maintenance support? Please describe this and available options for your capability with associated non-binding ROM price estimates. Possible fielding scenarios might include network-enabled viewers (viewer-defined read-only information for shared awareness) and system users (system interaction, manipulation, and input/output): (A) 200 viewers and 50 users; (B) 500 viewers and 60 users; (C) 1000 viewers and 100 users; (D) 2000 viewers and 200 users.
- a. [a narrative entry is requested]
17. Is your capability compliant with applicable NATO Interoperability Standards and Profiles⁶ ?
- a. [selection of a provided entry is requested; comments can also be provided]
- i. Yes.
 - ii. No.
 - iii. Don't Know.
18. Is your capability compliant with applicable Federated Mission Network (FMN)⁷ ? If so, which FMN spiral?
- a. [selection of a provided entry is requested; comments can also be provided]
- i. Yes.
 - ii. No.
 - iii. Don't Know.

⁶ NISP: <https://nhqc3s.hq.nato.int/Apps/Architecture/NISP/>

⁷ FMN: <https://dnbl.ncia.nato.int/FMNPublic/SitePages/Home.aspx>

19. If your capability is adopted, can you provide the integration into NATO enterprise information systems environment?
- a. [selection of a provided entry is requested; comments can also be provided]
 - i. Yes, our organization has integrated similar technology into NATO enterprise IT environments before.
 - ii. Yes, our organization has integrated similar technology into a variety of enterprise IT environments.
 - iii. Maybe, our organization provides capabilities and services associated with sustainment of those capabilities, but have limited experience with integration into enterprise IT environments.
 - iv. No, our organization provides capabilities and services associated with sustainment of those capabilities, but does not perform integration into enterprise IT environments.
20. If we have follow on questions, who do we direct them to (please provide email and telephone number)?
- a. [a narrative entry is requested]
21. Requirements Self-Assessment. Select an option, which best describes how the capability meets each aforementioned requirement (1.a through 6.d). Add any comments where necessary.
- a. Today, we assess that our capability:
 - i. [selection of a provided entry is requested; comments can also be provided]
 1. Currently Meets Requirement
 2. Partially Meets Requirement
 3. Does not meet requirement
 4. Do not know
 - b. We assess that for our capability's next Increment/Delivery/Version (estimated delivery date: mm/yy):
 - i. [selection of a provided entry is requested; comments can also be provided]
 1. Will meet the requirement
 2. Could meet the requirement through customization or configuration
 3. Unlikely to be able to meet the requirement
 4. Do not know