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Title - Sujet TCM and TacC2IS TCM and TacC2IS	
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Q1	There was some confusion on what type of architecture will be used for TCM/TacC2IS project. Will this project be using only type 1 or combination of type 1 and type 3 crypto?	Project decisions on security architecture and associated Type 1 and/or Type 3 cryptographic products are not yet known and will be made during project definition. At this stage, DND is likely leaning towards a mix of both Type 1 and Type 3 solutions but needs to better understand trade-offs including cost considerations through returns from industry on this RFI in order to inform strategic options analysis.
Q2	TCM Resources – What does Canada mean when they say that ad hoc procurement is not working?	From industry day presentation at slide 29, ad-hoc is meant to denote that the current way that Canadian Army fields and supports its C2 resources is not desirable wherein training and support vary by capability and time for each field Division. Furthermore, most procurements are currently funded through Vote 1 (National Procurement) limiting training and sustainment funding. Rather a more holistic approach to fielding and sustaining Land C2 resources is required through the TCM capital project. DND is seeking industry considerations with respect to training and sustaining concepts for TCM/TacC2ISM capabilities through this RFI.
Q3	Could you elaborate on radio nodes as a single point of failure?	From industry day presentation at slide 29, single point of failure is meant to describe an Army Land C2 system in which there is a lack of alternative and contingency tactical communication solutions to transmit/receive voice and data. Currently tactical field units often rely solely on tactical combat net radio (VHF) with no suitable backup means for their signals PACE (Primary, Alternate, Contingency, Emergency) plan representing a dangerous single point of failure. This RFI is seeking information on possible solutions which would compose the catalogue of tactical communication systems.
Q4	What is your take on software defined radios (SDR)?	The projects are seeking industry perspectives on software defined radios to better inform evaluation of trade-offs as part of the strategic options analysis work. This includes projections for SDR solutions in the 2025-2030 timeframe during which the projects will field. Nevertheless, SDRs will most likely form part of the TCM solution set given their purported advantages.

Q5	Please elaborate on “Current Canadian Army TacC2IS capability is fragmented poorly integrated and difficult to support due to its complexity”.	The Canadian Army TacC2IS capability, as part of the current Land Command Support System (LCSS), is largely made up of a patchwork of various capabilities which have been acquired over the past decade of which many components are either obsolete or no longer fit for purpose. This fragmentation results in a capability which is difficult to integrate as part of a system of systems and inefficient to train, sustain and update.
Q6	Any recommendation for the RFI response?	Canada is looking for industry perspectives on current state of the art solutions meeting high level requirements for TCM and TacC2ISM. This will inform project staff work on strategic options and trade-off analysis. Costing data related to capability solutions will also be helpful to provide DND with rough cost estimates for the projects. Project teams are also looking for industry perspectives on open architecture standards and solutions as well as agile methods for fielding and sustaining TCM and TacC2ISM capabilities to ensure capabilities can evolve over time and better enable integration and interoperability within the broader CAF and coalition C4ISR capabilities.
Q7	Are TacC2IS and TCM providing the gear for other projects like LVM?	It is planned that TCM and TacC2ISM would provide the capability solutions for in-service and upcoming Canadian Army platform/vehicle fleets (e.g., LVM) however the precise scale is yet to be determined at this point. Moreover, it is customary that new Canadian Army vehicle projects provide the funding for communication systems and C2IS equipment and integration costs; as such these costs would likely not be captured specifically under TCM or TacC2ISM projects proper.

Q8	Will the in-service support be included in the project cost, or through a separate cost?	Yes, the projects will need to capture costs related to in-service support which will also influence selection of strategic options (high level capability solution). The RFI seeks a better understanding of ISS costs for current market capabilities for TCM and TaC2ISM. It should be noted, per RFI Annex A section 1.5, that project scope at this time includes procurement of initial provisioning of two years spare parts and establishment of In-Service Support contracts. RFI is seeking additional information on ISS state of the art related to TCM and TacC2ISM capabilities and high-level principles which should be considered by the project teams at this stage to inform strategic options.
Q9	What is your advice for the next step to succeed in these programs?	A comprehensive industry response to the RFI is appreciated from Canada and will help the project teams inform high level options. Information and recommendations on current industry technologies and capabilities related to TCM and TacC2ISM as well as high level design and engineering principles which have succeeded in like-programs are also recommended. This information will aid project staff to better inform strategic options analysis and ultimately which high level strategic capability option will be selected by Canada. Industry is encouraged to stay connected with the project teams through the open RFI process as well as through standing LC4ISR industry communities in Canada. Canada also encourages Industry members to respond to the ITB and VP questions for the RF and to stay connected with your regional development agency. Currently, looking at a standard of 15% for ITB policies but Canada wants input from Industry on whether this is good or should be higher or lower.

Q10	Please clarify the difference between the 2 projects - TCM and TacC2IS.	In broad terms, TCM scope is related to tactical communication systems—i.e., the physical devices used to transmit voice and data across the operating environment. TacC2ISM scope is related to the information systems to support command and control. A relevant analogy here is that TCM is focused on the underlying infrastructure of voice/data pipes while TacC2ISM is concerned with how the data will be stored, processed, fused and displayed through those pipes. Further refinements to project boundaries are being investigated by project staff and more explicit boundary specifications will be provided in later stages of the projects. Nevertheless, project teams are open to hearing industry feedback and perspectives on improvements to current project scope boundaries through this RFI.
Q12	What will the relationship be between the support contracts and the acquisition contracts?	This is to be determined during projects' definition phase. Any industry advice or recommendations on these is welcome.
Q13	What is the current timeline for both (TCM and TacC2IS) projects?	Both projects are in Options Analysis phase. Current timelines see both projects moving to definition phase within two years.
Q14	What does 'modernization' entail? Is Canada looking for the revolutionary solution/ complete change to LCSS for these projects (E.g., replacing EPLRS completely with Ultra's radio, similar with TICS project, etc.) or are these projects a step-by-step process? Any insight to this will help industry, especially SMB, on how will they position themselves for the SSE 42 projects (i.e., who to partner with or who will potentially be the prime, etc.). The Industry Day slides are not helping as they are the same slides that were presented 4 years ago.	This is part of the options analysis work that the projects are currently undertaking for which this RFI is a key part. Industry feedback related to current state of the art capabilities and solutions related to TCM and TacC2ISM requirements are crucial. Armed with this industry feedback, the project teams will better develop project options to evaluate trade-offs on the spectrum from (1) modernising piecemeal TCM/TacC2ISM capabilities and taking a more evolutionary approach to (2) undertaking a more transformational approach to modernising (revolutionising) these capabilities (e.g., cloud-based, service oriented, etc.). Current scope is broad enough that all options are viable but require further detail from this RFI such as technological capabilities as they currently are (and are projected to be) and associated costing, training, sustainment considerations.

Q15	Has Canada considered breaking up the requirement into smaller chunks so that SMBs can bid on smaller contracts / requirements?	Both projects are expected to move ahead as they currently stand however each project may indeed break down components into individual capability sets (e.g., specific definition and/or specific implementation cycles for a smaller grouping of TCM or TacC2ISM capabilities). This will be confirmed during project definition period, but industry feedback related to this is appreciated for the project teams to evaluate such an approach as part of the options analysis.
Q16	What is the influence of the joint requirement going to be? Are they going to line up with what FVEY partners are doing or based on what our national headquarters are doing?	First and foremost, the projects need to address the essential requirements of enabling command and control at the tactical level for Canadian Army training and operations. Joint and Coalition interoperability will also be an essential requirement given that Canada will almost always deploy on operations as part of a multinational coalition. Project teams need to evaluate the complexity and trade-offs of enabling such interoperability at the lowest levels of the Canadian Army for which this RFI response will illuminate some of these issues. Moreover, similar modernisation projects undertaken by our FVEY/ABCANZ, and NATO allies are being evaluated by the project teams to inform TCM/TacC2ISM, but industry feedback related to their work on other like-projects are welcome.
Q17	Is Canada going to outline the deployment concept that it will be supporting?	The need is to be able to support several types of operations and be scalable as the need requires. The capabilities being delivered must be scalable and modular in order to meet any mission or operation. From a peace support type operation, to a full warfighting operation in combined, joint, multinational context. The Canadian Army does not have the capacity to support multiple capabilities depending on the operation it must support.

Q18	Integration is a hard piece for these projects, what standards are you considering?	An outcome-based approach to standards is needed to favour interoperability and integration of capabilities over their lifecycle. Open standards appear more favourable due to their ability to provide better interoperability with allies and reduce the risk of vendor-lock. DND needs to consider everything that industry has to offer but current interoperability standards (e.g., NATO STANAGS) will no doubt play a key role in the solution. Industry feedback on this key issue is needed.
Q19	With respect to integration within LCSS, there are multiple parts that leads to a big challenge. There should be an engineering aspect applied to create a continuous integration of the engineering network. Comments?	The Canadian Army is looking at industry for input on how to better enable integration of new capabilities among various capital projects with existing in-service capabilities. Integration will no doubt be the biggest challenge for successful implementation of projects such as TCM/TacC2ISM. More agile engineering models such as continuous integration/continuous delivery (CI/CD) need to be evaluated and explored for these projects. RFI feedback on this point is needed. Such concepts will be confirmed during project definition phases.
Q20	The lack of continuity due to rotating personnel can impact the success of this project. Is there any thought of putting project control office (PCO) ability on contract to perform / supplement the PCO function in DND?	Indeed, continuity is a challenge and is being addressed internally to DND at present.
Q21	Other than Harris radios that were procured under ISSP, are other radios on the table to be replaced?	Yes, the scope and scale of TCM/TacC2ISM projects includes options for a comprehensive replacement of all in-service tactical radios. RFI feedback related to various radio solutions will help project teams better determine these options.
Q22	Is Canada considering having industry run the program and the competition (i.e., company will run the program, but they will not be allowed to bid)? Similar to FFCP and Future Fighter training program.	DND has not explicitly considered this approach yet but the advantages of such an approach are worthwhile for consideration as part of the RFI feedback.

Q23	How will the projects work with each other, and how will they be released?	Considerations relating to project interdependencies, both from a technical and programmatic perspective, are ongoing and will evolve over the projects' lifecycle. Industry feedback related to project integration and capability release approaches and high-level principles which have benefited industry in other similar modernisation projects of size and scope as TCM/TacC2ISM are needed to inform project staff. At this stage, DND will likely retain the capability pack approach to capability fielding to the in-service system whereby capability sets from various capital projects coalesce together to streamline integration, training and fielding remits. But DND are also open to feedback on this approach and any state-of-the-art approaches recommended by industry in these areas.
Q24	With respect to the larger programs, do you see any conflicts of interest, and will there be a program to avoid them?	It's too early to predict any conflicts of interest however both TCM and TacC2ISM represent a significant priority and importance for Canadian Army modernisation and will be treated as such among other projects within DND as they progress in their lifecycle.
Q25	What will Canadian Content look like moving forward? It's especially challenging for TCM as most of the radios are not manufactured in Canada. There is also minimum radio repair facility in Canada which might be a place for companies to gain direct work considerations with ISED.	At this time, no specific Direct Work/Canadian Content requirements have been set for the TCM or TacC2IS projects. Canada acknowledges the challenges posed in this sector and encourages industry to provide written feedback on the potential to leverage Direct Work/Canadian Content on these projects. Any Direct Work/Canadian Content requirements will be set through consultation with industry and will be provided to industry for comment during the RFI and Draft-RFP stages.
Q26	When it comes to training and simulation, how do you see those contracts being developed?	It's too early to provide any specifics with respect to contracting. Canada is open to early industry feedback on best practices related to training and simulation including contracting considerations but further RFI engagements during project definition will provide more clarity to industry on this.

Q27	How open is the army to rework some of its organizational structure and doctrines?	The Canadian Army is currently undergoing a broader modernisation as part of the Canadian Army Modernisation Strategy (CAMS) which is available to the public. This involves changes to structure and doctrine. These projects represent a key component of CAMS for which current Army doctrine relating to C2IS concepts are subject to change.
Q28	Flattening networks could lead to flat structures, is that being looked at?	Yes, the Canadian Army understands that technological capabilities such as modern C2 networks enabling flat networks can influence organizational structures. Industry feedback related to this point is appreciated. Over time, decisions on Canadian Army structures are made outside the control of the project office but TCM/TacC2ISM will be a key driver to influence such decisions.
Q29	Is Buy and Sell website disappearing?	No. The Buy and Sell website will still be active for the next couple years. Buy and Sell will run parallel with the new Government Electronic Tendering System, CanadaBuys, until the transition is complete. Suppliers are encouraged to register on CanadaBuys. For more information, please visit the following: https://canadabuys.canada.ca/en/contact-support
Q30	What are the next steps and timeline for this RFI / Industry Engagement?	Industry is asked to respond by 4th of April 2022, however, the RFI will remain open until 30 December 2022. There may be additional questions, and sustainment questions for industry in the months between March and December 2022.
Q31	Can we provide a broad solution in response to the RFI?	There are formatted grids in the RFI response for vendors to provide their responses. Canada requests vendors use the grids. However, any feedback outside of the grids is also accepted. Broad solution ideas are also acceptable for review by the project team. At this early stage of the TCM/TacC2ISM projects the project teams are open to feedback to further inform high level strategic options and best pave the way forward for each project as they move ahead into definition stage.

Q32	Can DND provide advice on what they are specifically looking for in the RFI responses from vendors?	DND seeks vendor feedback on current industry capabilities (and projected capabilities in the near-term) to meet the projects' high level requirements including feedback on principles, approaches and other state of the art practices related to TCM/TacC2ISM requirements. Details associated with costing (high-level), integration challenges, training, sustaining and other feedback related to industry capabilities will allow the project teams to further develop high level strategic options for the projects and make recommendations to senior DND leaders on project strategic options to enable projects to move forward into definition. This first RFI is part of an ongoing industry feedback process which will be crucial to the success of these projects.
Q33	Is DND looking for a single contractor for both projects or multiple contracts?	This will be decided during project definition stage. Any industry feedback on this point is welcome.
Q34	Is DND planning on having live vendor demonstrations?	At present, Canada is only doing virtual 1:1 meetings at this stage of the RFI. This RFI will remain until 30 December 2022, and DND welcomes any information that industry may provide. COVID is currently preventing in-person demonstrations. A new round of engagements will be held in the future, which will go into more depth for both projects during which live demonstrations may be possible.
Q35	Will coalition interoperability play a part in the requirements?	Yes, interoperability is a High-Level Mandatory Requirement (HLMR) for both TCM and TacC2ISM and will be a crucial driver for project success. Canada will seek to align itself with interoperability standards including US, ABCANZ (FVEY) and NATO.
Q36	Is Canada participating in CWIX?	Assume this is referring to CWIX (Coalition Warrior Interoperability Exercise) run by NATO. If so, then yes Canada regularly participates with, usually, CJOC (Canadian Joint Operations Command), as lead.

Q37	Paragraph 1.1.2 (page 5/43) talks about potential "synergy" between projects. Is DND's intent to combine these two distinct programs/contracts into one? In our view the synergy should be between TacC2IS and other Land projects that have C2 components such as JDHQSRM, JFM, ISR Mod and GBAD.	Synergy in this case refers to the RFI industry engagement to avoid duplication of effort. Both TCM and TacC2ISM are intended to move ahead independently however it is clear that the interconnected nature of both projects will need to be carefully managed using a tailored approach to governance. DND is working internally through this, but industry feedback and views related to broader project synergies and management approaches is welcome at this stage.
Q38	In the RFI, there seem to be an overlap in the Networking portion between TacC2IS and TCM. Could DND provide some clarifications? TCM and TacC2IS alternatively use "Network" without clearly defining boundaries, which makes it difficult to respond. We seek DND clarification on Network boundaries between the 2 projects. E.g. Appendix II to Annex A (26/43) TacC2IS HW includes servers, switches, network hardware, cables, data terminal, peripherals; Appendix III to Annex A (27/43) TCM includes Communication Network system with displays, network panel, cabling and intercom system. These seem very similar, and we do not believe DND wishes both projects to be cabling the vehicle platform, as an example. Voice or voice service is also mentioned in TCM and TacC2IS.	DND acknowledges some of the confusion around project boundary questions and is seeking industry feedback on recommended delineation points between the projects as they currently stand. For example, current concept sees the tactical vehicle network in mounted platforms (Army vehicles) to be scoped within TCM (including cables, switching) up to and including the end-user device(s) in the platforms. However, there is some overlap in terms of TacC2ISM which would provide the physical user devices (tablets, etc.) and its software to run tactical Battle Management System and other Command and Control Information Systems in the mounted platform. The same blurred boundaries apply to software as it relates to firmware (e.g., software defined radios, waveforms) which would be captured under TCM and more generic operating system and battle management system applications under TacC2ISM. Feedback on such interface points and cut-off points between projects is welcome as DND continues to work through this issue.

Q39	Scale information in the RFI (Annex A, Figure 2,3,4 and para 1.3.2) is described in terms of operational composition and missions to be supported (number of soldiers deployed). Will the fielding concept of TCM and TacC2IS follow these principles (only the deployed assets have the capabilities) or will the fielding concept be based on all existing and future Army platforms (all army vehicles, HQs, dismounted soldiers will receive capability)? If the answer is the latter, would DND provide more information on platform quantities, type, roles? Scale information is important for determining unit cost.	The fielding concept and specifics on scale is intentionally broad at this early stage of the projects but the intent is a comprehensive modernisation of all Canadian Army tactical communication systems and C2IS capabilities to meet its assigned force generation (readiness) remits. Centre of mass for fielding includes three Regular Force Canadian Mechanized Brigade Groups (CMBGs) and the Canadian Combat Support Brigade (6 CCSB). It also includes training units under Canadian Army Doctrine and Training Command (CADTC) to include primarily the Combat Training Centre (CTC) at CFB Gagetown. More details of precise numbers (fleets, units, etc.) will be forthcoming as project teams work through these numbers however it is important that through this RFI response the project teams understand the trade-offs and costs related to increased scale for industry capabilities. DND continues to work through this issue.
Q40	The RFI is silent on Security of these capabilities. This information is important for determining system architecture and associated costs. Can DND expand on the Security posture relating to these 2 projects? Do we assume SECRET System high throughout or will there be two or more security domains? If so, where is the demarcation point between the security domains? Will there be a requirement for High Assurance security or Type-1 encryptions? Will cross-domain solutions be in scope?	The RFI seeks to capture industry feedback on security considerations including trade-offs and costs related to Type 1 and Type 3 products. Specific security implementation details will be promulgated during definition stage of the project however it is likely there will be a mix of various security classifications and solutions including concepts such as zero-trust architectures. Other DND projects under ADM(IM) are ongoing dealing with these issues so the Canadian Army will be a follower in many cases as it relates to DND security requirements and policies. Nonetheless RFI feedback on security approaches and recommendations for TCM/TacC2ISM capabilities are welcome.

Q41	Throughout the RFI, Interoperability with allies is established as key for delivered capability. However, NATO, FVEY and U.S. do not always align when it comes to adopted and implemented standards for interoperability. What approach will DND use for interoperability? Will DND stipulate mandatory and rated standards? Will DND prioritize interoperability for the initial acquisition with a roadmap to include rated and new standards during implementation? Will DND identify what equipment, system or waveform it needs to be interoperable with, in priority?	It is yet to be determined which approach DND will follow to adhere to interoperability standards. While this is indeed a crucial requirement for the project capabilities, industry feedback on best approaches to aligning with interoperability standards is welcome. This includes industry perspectives on friction points and pitfalls related to interoperability standards which Canada should seek to avoid.
Q42	TacC2ISM / JDHQSRM boundaries: Will TacC2ISM include both tactical and operational C2?	The issue here is that both operational and tactical levels contain blurred boundaries themselves. For simplicity, TacC2ISM will address the Brigade Group level (which for the Canadian Army can be thought of as the 'operational' level) and below while JDHQSRM (outside of this RFI) would address Division level and higher.
Q43	Does CAF accept the need to consider the network holistically for TCM, TacC2IS, ISR, JFM, JDHQ, ECM(FP) etc.	DND supports the concept of a Canadian Army homogeneous tactical network wherein multiple disparate/heterogeneous capabilities are integrated onto a common unified network which itself must be linked back to the broader CAF Joint C4ISR network to enable joint and coalition interoperability.
Q44	During a series of RFI's last year, such as JDHQSRM, the scope of the network view was expanded to include TacC2IS, ADM(IM) (CJOC Operational Networks). What was the thinking in combining in TCM and TacC2IS into a single RFI at this point? What was the thinking behind that with respect to capability, and the common elements that made DLCSPM publish it as one document this time around?	The combined RFI was simply to avoid duplication of effort and exploit commonalities and synergies between both projects at this early stage and first industry engagement on these projects. Going forward each project will likely move ahead independently for future industry engagements.

Q45	Reference Annex A Figure 6 (page 21), Appendix II to Annex A (page 26) - TacC2IS System Breakdown - Does the diagram in Appendix II represent the entire scope or is it a starting point? There appears to be gaps in the mapping of services from Figure 6 to the Software branch in the Appendix II Annex A figure. Are you looking for additions or refinement to the hierarchy?	The system diagrams for both TCM and TacC2ISM included in the RFI package are indeed a starting point to provide industry an indication (or idea) of the project scope and current concepts related to both projects and boundaries. DND is indeed interested to hear industry feedback on these system diagrams, including recommendations on refinements and additions to the current hierarchy, to improve towards a better description of the projects as they progress in their lifecycle.
Q46	Reference 1.2.1.1-b (page 6), Annex A 1.8.1.2.2 (page 21), Appendix II to Annex A (page 26) - The TacC2IS modernization element systems and sub-systems figure in Appendix II to Annex A (page 26) identifies Intelligence Tools within the scope of deliverables under the User Apps and Tools. The yellow highlights on Figure 6 (page 21) indicates that various Intelligence services are provided by "other SSE 42 projects" (assumed to be Land ISR Mod in this case). Are Intelligence Tools to be delivered as elements of the TacC2IS modernization or just integrated as per para 1.2.1.1-b (page 6)? Please clarify.	Intelligence tools in this case refers to generic (i.e., non-specialist) tools which are required as part of the baseline of modern command and control systems and battle management applications delivered under the scope of TacC2ISM. Other projects delivering specialist intelligence tools, such as the Land ISR Modernisation project, will also need to interface these tools to the broader Intelligence and C2IS architecture delivered by TacC2ISM to ensure fusion of intelligence data can be enabled.
Q47	Reference Appendix III to Annex A (page 27) - TCM Vehicular Communication System. What is the scope of the Integration element? Is it to cover the integration of the TCM equipment onto the vehicle as a platform (e.g., antenna placement, connection to vehicle power, EMC/EMI testing, etc.) or to integrate the TCM and TacC2IS with other vehicle and mission systems (e.g., vehicle electronics, weapon system, ISR sensors, vehicle navigation system, etc.)?	At this stage of the project DND is considering the broader integration remit for TCM to provide the middleware to interface between vehicle mission systems through an open vehicular communication architecture. Industry feedback on both points is appreciated to provide project teams with a better indication of cost and complexity associated with such integration challenges.

Q48	Reference Appendix III to Annex A (page 27) - TCM Vehicular Communication System. What is the Network Panel System/Subsystem? Is there an expectation to provide interface panels within the vehicle that have network and power connectors, such described in the NATO GVA AEP-4754 Vol III 5.1.1?	The Network Panel is meant to provide operators with a status of communication network system for the vehicle (e.g., a network dashboard). It is too early to state specifics but alignment with NATO standards is certainly likely.
Q49	What is the intent with a combined RFI for TCM and TacC2IS – is a combination of the programs contemplated?	The combined RFI was simply to avoid duplication of effort and exploit commonalities and synergies between both projects at this early stage and first industry engagement on these projects. Going forward each project will likely move ahead independently for future industry engagements.
Q50	Would it be possible that all hardware elements are captured in TCM, while software are in TacC2IS (for example, next-gen GPS in TCM?)	From a very broad and simplistic point of view it is indeed perhaps attractive to view TCM as providing the 'heavy metal' hardware components (tactical communication systems) while TacC2ISM provides the software to include user interfaces and data architecture. A closer look at both project scopes sees that each will provide hardware and software components, so such a statement and separation is too reductive and not practical in reality. For this question however, yes, a next-gen GPS if contained in scope would be provided by TCM.
Q51	Is there any potential intent to keep existing capabilities (perhaps new soldier radios) and not replacing them under TCM?	Yes, existing capabilities which currently make up part of the broader Canadian Army's Land Command Support System (LCSS) may be retained. Criteria for such decisions will be based mainly on if such capabilities are currently meeting operational requirements. That said, TCM and TacC2ISM do not represent projects of unlimited scope and budget, as such decisions on which existing capabilities are modernised, replaced or divested will need to be made.
Q52	In the TCM mounted domain, is the Army considering the VICTORY network standard?	DND is keen to move towards leveraging open standards and architectures in order to better account for capability integration and evolution over the long term as well as avoid vendor lock. Industry feedback on this standard is appreciated.

Q53	How might TCM prioritize proven/fielded/mature/in-service capability vs. developmental/prototype capability?	While it is too early to comment on evaluation criteria, it is clear that DND would prioritise proven technology which has demonstrated operational advantages. Typically, it is not the technology of the capability which is the challenge for the Canadian Army but rather the fielding, training, sustainment and upgrade of that capability over the long term and at scale.
Q54	How important does Canada see it to have TCM execution and long-term support in Canada as part of our Defence Industrial Base?	From Canada's perspective, engagement with Canadian industry on the TCM project through this RFI and subsequent engagements is desirable as the project progresses. Such engagement will better inform potential opportunities to leverage Canadian industry to achieve successful operational outcomes for project deliveries. Additionally, the TCM project is currently being considered for application of the Industrial and Technological Benefits (ITB) Policy including Value Proposition (VP). The ITB Policy and VP seeks to support the long-term growth of the Canadian Defence Industrial Base through both mandatory and rated criteria. At present, no specific requirements have been set in relation to the ITB Policy. Canada is seeking feedback in regard to application of the ITB Policy, including potential defence sector targets related to the TCM project.
Q55	Terrestrial Transmission Line of Sight (LoS). Can DND define what this will include?	This refers to static (Headquarters-level) communication systems such as High-Capacity Line of Sight (HCLOS) systems.
Q56	Beyond Line of Sight (BLOS) – High Capacity Satcom? Is DND looking to change the entire equipment? Is there a limit to what industry can propose? Industry is trying to scope-out the requirement that already covered by other projects (i.e., JFM, GBAD). This is to ensure that there is no overlap with other projects	This RFI seeks information on all industry capabilities related, per this question, to BLOS capabilities. Current in-service systems may all be modernised based on the requirement. TCM is focused on providing the capability solution at scale for the broad and generic requirements to support tactical C2 for the Canadian Army while other projects may focus more on specialist applications. At this stage it is too early to differentiate with other projects so industry is advised to provide as much information related to their capabilities as possible.

Q57	Reference 1.2.1.1.c (page 6) - Training - Is Training to be embedded in the TacC2IS applications or provided as separate tools? Are you looking for a Training Mode or the ability to use a "Live Mode" in a simulated or stimulated training environment?	Industry should provide information on the full gamut of training modalities they offer to better inform project options and trade-offs. No strict decisions about training delivery have been made at this stage however a “Live Mode” type training environment is compelling.
Q58	Reference Appendix II to Annex A (page 26) - TacC2IS Mod. What is the difference between the Training and System Simulation elements under User Apps and Tools (blue boxes) and the Training Simulation Software element (green box)?	Training Simulation (green box) refers to the overall Canadian Army training simulation infrastructure and back-end hardware/software/networking creating the synthetic environment for individual and collective training simulation, whereas ‘training’ (blue box) under ‘user apps and tools’ would refer to the specific software applications to run individual and collective training.
Q59	Will legacy simulation systems be integrated into a new system (federation of simulation)? Will DND provide Infrastructure for the simulation system? If DND intends to reduce the legacy simulation system, will it be replaced completely or partially?	Decisions on modernising existing simulation infrastructure or replacing it with a new system will be evaluated as part of RFI returns to better assess trade-offs and costs. Such questions will be answered in later stages of the project, but feedback is needed to better inform project staff on technical complexity and costs of the various options.
Q60	Would Canada see value in breaking up TCM to accelerate more urgent operational requirements?	Both projects are expected to move ahead as they currently stand however each project may indeed break down components into individual capability sets (e.g., specific definition and/or specific implementation cycles for a smaller grouping of TCM or TacC2ISM capabilities). Sequencing would be influenced by operational urgency and interdependencies with other capabilities. The approach will be confirmed during project definition period, but industry feedback related to incremental delivery models is appreciated for the project teams to evaluate such an approach as part of the options analysis.
Q61	How is the Authority addressing scalability to meet the pan-Domain Force Employment concept?	Scalability will be an important factor when evaluating the various trade-offs between capabilities. While TCM and TacC2ISM are not the only capability solutions contributing to Pan-Domain concepts, they will play a crucial role. Industry information regarding current challenges associated with scalability are needed with this RFI to better inform project options going forward.

Q62	Reference Annex A 1.8.2.2-a' Annex A 1.8.2.2-c' (pages 22-23) - Are you looking for industry to propose a different split between TCM and TacC2IS based around an integrated network including the mechanisms to integrate disparate bearers for the upper and lower TI?	The reference refers to the TCM concept for an integrated holistic system for seamless connectivity between both upper and lower tactical communication. The project teams welcome any industry feedback on concepts for logically splitting TCM and TacC2ISM however DND is not looking to depart radically from what has been communicated at Annex A in the RFI unless the rationale is evident.
Q63	Are looking for an evolution of the current Land C4ISR solution? Is any re-use of current equipment, software and training to be considered?	Both an evolution of the current system and a transformation to a completely new paradigm are part of the options being studied by the project teams. Industry feedback will be crucial to inform the trade-offs around these options. Re-use of current capabilities may be a possibility given that TCM and TacC2ISM do not represent unlimited scope and scale.
Q64	Is there a need for backwards compatibility between units equipped with the modernized TCM/TacC2IS system and units equipped with the legacy land C4ISR system? For example, during the transition years when there will be a mixed fleet where some units will have been modernized and some have not.	An evaluation of costs and return on investment to account for backward compatibility with legacy systems will need to be determined and informed by this RFI return. As it stands, the protracted length of time for fielding and implementing of new C4IS capabilities within the Canadian Army indicates backward compatibility would likely be desirable.

Q65	Reference - Annex A Figure 6 (page 21), Appendix II to Annex A (page 26) Appendix III to Annex A (page 27) - GPS appears in the system breakdowns for both the TacC2IS and TCM (as GPS anti-jamming for the vehicular communication system). What is the expectation for the Dismounted Communication System? Will SAASM or M-code GPS receivers be provided as GFE? It is noted on Figure 6 (page 21) that there is a Position, Navigation, Time service included in the TacC2IS. Is there a requirement for an Assured Position Navigation Time (PNT) solution using non-GPS position sources in addition to GPS (e.g., vehicle navigation system)?	GPS/PNT capability plays a key role in modern C4IS systems. Industry feedback related to state of the art for these capabilities is required to inform project options and ascertain costs trade-offs. It is possible that current GPS/PNT systems are retained, modernised or replaced wholesale but such decisions will be made during project definition.
Q66	Geo services are currently not listed as part of the element of TacC2IS mod element systems and sub-systems. However, Geo Services should be part of common services. What is DND view of this?	Indeed, geo services plays a crucial part for modern C2IS systems. Industry feedback on current geo service technologies is needed to inform potential options as well as how such systems would support tactical (edge) operations in a disadvantaged environment. The TacC2ISM sub-system diagram within Annex A of the RFI should include geo-services and will be updated for the next industry release.
Q67	Which Project will be responsible to have the Global Architecture View (TCM or TacC2ISM)?	This depends on what we mean by “Global Architecture View”. The current concept sees TacC2ISM providing the data architecture while TCM would be responsible for the vehicle communication system architecture. As such both projects have architectural remits.

Q68	Will a vetronics system, enabling collaborative combat, be part of TacC2ISM? Is TacC2IS willing to include interface with vetronics components? Or vetronics will be part of JDHQSRM? In Europe and Middle East, vetronics are used in a specific program outside Radio program. Typically, BMS uses vetronics.	While Canada does not employ the 'collaborative combat' term, we are keen to understand how other countries have responded to similar tactical problem sets. TacC2ISM would be the project to incorporate 'vetronics' data into a tactical battle management system but this would be fed by TCM components such as the vehicle communication network (vehicle LAN). So, both projects would have a role to play. Canada is willing to listen to industry recommendations on this point however.
Q69	What is the impact of Integrated Soldier System Project (ISSP) to dismounted and mounted communications? Will ISSP be kept or will be replaced in 2025-2026?	ISSP is not likely to be replaced immediately as an urgent operational requirement given its recent fielding however TCM/TacC2ISM are looking for feedback on innovative soldier system solutions which may be fielded as part of later project deliveries. Costs and trade-offs need to be better understood, through this RFI process, to inform project options. Comments on ISSP capabilities are outside the scope of this RFI response.
Q70	Dismounted communications modernization – is this all the way down to soldier level or will it only cover the upper level (Brigade, Platoon, etc.)?	Dismounted communications refers to soldier systems for employment, mainly, in a light force role. Within the Canadian Army, light forces play an important role on operations and can be employed up to the Battalion level. Currently, each Regular Force Mechanized Brigade within the Canadian Army contains one light force battalion. This may be subject to change between now and project delivery, however light force communication systems will play a crucial role in TCM/TacC2ISM.
Q71	Is there anything industry needs to know on the capabilities that Canada will be divesting (e.g., EPLRS, SODOM)? Or will they be layered on top of the others?	Too early at this stage to indicate which in-service and upcoming C4IS capabilities will be retained or divested. Some layering of existing capabilities may be needed. Industry feedback on this topic is welcome to inform project options. Note: SODOM should read SOTM (Satellite On The Move)

Q72	How are these 2 projects related to the other projects (JFM, GBAD, Land ISR Mod, etc.)? Is there possibility to merge the projects as a program? Plan for future industry engagement?	Both TCM and TacC2ISM are intended to move ahead independently along with all the other Land C4ISR modernising projects (i.e., no formal programme approach to these projects is anticipated) however it is clear that the interconnected nature of all projects will need to be carefully managed using a tailored approach to governance. DND is working internally through this, but industry feedback and views related to broader project synergies and management approaches is welcome at this stage.
Q73	Schedule - How does the TCM schedule align with other SSE42 projects?	Both the TCM and TacC2ISM schedules are loosely aligned with other SSE42 projects and will be carefully managed to account for various project interdependencies.
Q74	Schedule - What potential might there be that TCM would be split and/or (some components) advanced or delayed?	This is a possibility in terms of decomposing both TCM and TacC2ISM into smaller components (or capability sets) to address urgent operational requirements and interdependencies with other projects. Such an incremental approach is desirable for many reasons however industry feedback would be beneficial to better understand pitfalls and evaluate criteria for how capabilities would be decomposed for grouping.
Q75	What might the schedule be for future RFI and/or draft RFP?	The projects are expected to enter definition phase within two years during which time a series of further industry engagements would be conducted including such elements as draft RFP.
Q76	According to the government current plan, earliest equipment delivery will be 2028 with contract awards in 2025-2026. Given these dates and the speed of innovation, what Technical Readiness Level (TRL) levels are expected by 2025 on any of the proposed technologies? Is it okay to propose immature solution considering 2028 first delivery?	It is understandable, given the time frames, that state of the art technologies that may be delivered to the projects in the future, will currently be immature. However, it is strongly desirable that the technologies being proposed to Canada will likely be adopted and proven by allies prior to any future delivery to Canada.
Q77	Future Milestones - What are the milestones (updates, close date?) for the current RFI?	Currently the deadline for industry response is 4th April 2022. The RFI will be open until Dec 2022. PSPC may issue amendments to the RFI to ask more questions to Industry. Quality of industry feedback in this RFI will be important to better inform and accelerate the project timeline.

Q78	Future Milestones - What might the schedule be for future RFI and/or draft RFP?	The projects are expected to enter definition phase within two years during which time a series of further industry engagements would be conducted including such elements as draft RFP.
Q79	Reference Appendix IV to Annex A Annex E2, Question 3c - Appendix IV to Annex A shows 4-6 security domains without caveats for the Tier 2 Upper Tactical Intranet (UTI). What is the Security Posture for the Tier 3 tactical/mobile networks in the Lower Tactical Intranet (LTI)? These are known to have different security postures in the current Land C4ISR system, and maintaining this separation has implications on possible solutions, sustainability and cost. Is a mix of different security domains required, or will there be some hybrid "Tactical SECRET" posture, and how will that be formally addressed? Is Commercial Solutions for Classified (CSfC) a viable approach for the CAF?	Specific requirements relating to security domains will be forthcoming during project definition, however, at this stage of the projects and this RFI it is important for the project teams to better understand industry solutions to the various security requirements which could make up the TCM and TacC2ISM requirements as well as industry perspectives on security interoperability and concepts such as zero-trust architectures. As for Canadian Army decisions on security domains and classifications, this is not something which it can typically control and will abide by DND and Government of Canada security policies. However, the size and scope of TCM/TacC2ISM make them good candidates to influence DND and GoC security policies as they relate to tactical employment for land operations so it will be important for requirements to remain adaptable to the policy environment. Nevertheless, at this early stage of the projects it is important for the project staff to better understand trade-offs between security options to better inform possible courses of action. Industry feedback on these points is critical.
Q80	Security Architecture - What is the latest policy thoughts on the use of the SBU security domain in Tac Comms, and what are the perceived benefits and drawbacks?	The use of Sensitive But Unclassified (SBU) and Commercial Solutions for Classified (CSfC) are compelling. Industry feedback related to such solutions and industry perspectives are needed to better inform the issue and possible trade-offs in costs. It is too early to be categorical about SBU inclusion into these projects, however, it is highly likely that it will make up part of the solution set.
Q81	Please confirm if Type 1 communications will be used for Brigade Group Headquarters and above supporting Command & Control, Fires, Air, etc. while non-Type 1 communications will be located at Brigade Headquarters and below?	It is too early to be categorical about such statements, however, industry feedback and recommendations on such a differentiation are welcome based on experience and solutions that may be proven elsewhere.

Q82	Please confirm if Type 1 communications will be employed below Brigade Group Headquarters for selected Mounted and Dismounted Communications including Fire and Air?	It is too early in the project lifecycle to be categorical about such statements, however, this is a highly likely possibility. Such requirements will be specified during project definition. Industry feedback on such approaches is welcome at this early stage to better inform the issue for DND.
Q83	Under current arrangements, Canada has procured Type 1 radios, such as the AN/PRC-117G and AN/PRC-152A, under a separate contract and manages their distribution, supplying some for testing as GFE. Is this the procurement model that will be used for any Type 1 radios, or other controlled technology such as Inline network encryption, that are to be procured under the Tactical Comms Modernization project?	Ideally, all equipment that is required for the Tactical Comms Modernization system will be a deliverable of the TCM procurement process. However, given the challenges associated with the procurement of Type 1 radios (or other controlled technology), Canada may choose to adopt a procurement model that is similar in nature to the process currently being used for procurement of controlled goods.
Q84	The reference paragraph states the following: “Because the Brigade is most likely to exist within an international construct, interoperability is required at all levels.” Could DND confirm intent? At what level would DND expect mixed (coalition and Canadian) level of operations (company, platoon, section)?	While it is not practical to delineate at what level interoperability must occur, it is clear that interoperability increases in importance the higher level one goes within the Canadian Army. As such it would be desirable for interoperability to exist at all levels (especially given recent experience with Canadian Army participating in coalition operations at the Company and below levels).
Q85	Will the system provider be obligated to be FVEYS and NATO compliant?	It is still too early to determine that at the moment. While interoperability with allies is a key driver for the projects, industry feedback on trade-offs related to interoperability standards and other concepts such as open standards and open architectures are needed to better inform project options and way forward. No doubt that there will be a requirement for some compliance with allied interoperability standards (US, ABCANZ, NATO).

Q86	Reference Appendix 1 to Annex A Figure 7 (page 24) - In Figure 7 there is a SATCOM link that terminates in a 'red' Mech Inf group. Should this be terminated in the NATO/FVEY battle group at the back of the figure, indicating that interoperability is required over a SATCOM link? Or, was it intended to terminate at an in-depth special operations group within the 'red' area but not shown on the figure? (or do we have an agent in the red force?)	This is an error in the figure. The SOTM link in this instance should terminate at the NATO/MN Divisional HQ.
Q87	At what echelon is coalition interoperability most valued? What exact sources of information is being exchanged (IP traffic type)? How will DND handle the exchange of information especially the security aspect of it?	While it is not practical to delineate at what level interoperability must occur, it is clear that interoperability increases in importance the higher level one goes within the Canadian Army. As such it would be desirable for interoperability to exist at all levels (especially given recent experience with Canadian Army participating in coalition operations at the Company and below levels). As such coalition interoperability for what is being described as the upper tactical network (HQ) is highly desirable and most likely handled through information systems and gateways while interoperability at the lower tactical network is desirable through interoperable waveforms and like-security solutions (e.g., common crypto for voice nets). More details and specificity will be provided once projects achieve definition stage but industry feedback on interoperability perspectives are welcome to better inform project options and trade-offs at this stage.
Q88	What interest or involvement will the Canadian Forces have with the important Project Converge 2022 (focused on coalition interoperability data sharing) exercise planned in fall 2022 in the USA (with de-risking in APG in February)?	Canadian Army participation at PC22 is to be determined outside the scope and staff of these projects, however, these types of engagements will become increasingly important as projects such as TCM/TacC2ISM develop to ensure C4ISR interoperability with key allies such as the US Army.
Q89	Does Canada have fund budgeted to test different interoperability standards (prototyping) to see how this will impact DevSecOps?	This is a possibility and likelihood to de-risk eventual TCM/TacC2ISM solutions; however, such funds and capacity will only be unlocked once projects are in their definition phase.

Q90	What will be the interoperability standards applied? Is there a list of current/allied systems to interoperate with?	It is still too early to categorically state which interoperability standards will be applied, however, industry feedback related to open standards and architectures as well as current perspectives on the various C4ISR interoperability standards developed by US, ABCANZ and NATO as part of this RFI will better inform project options and potential trade-offs as more specific interoperability requirements are developed. Such requirements will also be influenced by CAF Joint interoperability standards and DND policies as these evolve.
Q91	Incremental Modernization. Industry believes that there are potential parallels with efforts in the UK. What does DND see as the most urgent issues to address? a. Mounted to Dismounted Interoperability? b. SAVILLE Sunset and Crypto Modernization for continued Joint / Multinational Interoperability? c. Resilient communications to persist in DDIL environments?	It is outside the scope the TCM/TacC2ISM to prioritise current operational gaps and requirements, however, an incremental approach to project delivery is being considered to address urgent requirements. Industry feedback related to UK experience or other like-modernisation programs of TCM/TacC2ISM scope is welcome to inform project options and pitfalls.
Q92	Reference Annex A 1.3.2-2 (page 14) - What are the NORAD commitments with respect to the TCM and TacC2IS?	It is still too early to determine specific requirements with respect to NORAD and continental defence remits as they relate to TCM/TacC2ISM, however, there is ongoing work on NORAD modernisation which could impact these projects from an interoperability point of view. The project will provide more information on this as part of future RFI packages as it becomes available.
Q93	What knowledge or understanding do you have with PEO C3T and the US Army use of the TRILOS Program Of Record (2019) ORION radio Canada also uses?	The project teams are aware and connected with the PEO C3T of the US Army and looking to increase engagements to better understand how lessons learned could be applied to TCM/TacC2ISM. The ORION radio is indeed part of the in-service capability within the Canadian Army; project staff are tracking this capability as it is employed and sustained. Any industry feedback related to this capability is welcome to provide industry perspective on issues that Canadian Army or ADM(Mat) stakeholders may not be informed on as it relates to TCM/TacC2ISM project requirements.

Q94	Will National Security Agency (NSA) certification be a hard requirement?	It is too early to categorically state this as a hard requirement, but such a requirement will likely be part of the solution set (i.e., some capabilities as part of the TCM and TacC2ISM project may require this as a requirement), especially to account for backward compatibility with legacy systems.
Q95	Could you elaborate what DND means by iterative experiment model?	DND is looking for proven technologies, with the intention to avoid evaluating technologies based on a written submission but rather through demonstrations and competitions. Iterative experiments also apply to agile methodologies in terms of incrementing a solution based on user requirement feedback in a continuous integration and development cycle. Such concepts are compelling to DND in order to leverage future technologies and keep capabilities aligned to evolving requirements.
Q96	How might TCM implement long-term In-Service Support, balanced with the planned Land C4ISR ISS contracts?	Specifics relating to ISS will be communicated by the project in the future, however, industry feedback on these perspectives is useful to inform DND. The current work on Land C4ISR ISS contracts themselves are separate from this TCM/TacC2ISM RFI; industry questions relating to LC4ISR should be addressed under that separate RFI process. The LC4ISR RFI and draft RFP can be found on the BuyandSell website as follows: W8486-200731/B – RFI (https://buyandsell.gc.ca/procurement-data/tender-notice/PW-RA-055-28295) W8486-200731/C - SoS E&I (https://buyandsell.gc.ca/procurement-data/tender-notice/PW-RA-005-28482) W8486-200731/D - Core Network (https://buyandsell.gc.ca/procurement-data/tender-notice/PW-RA-059-28518) W8486-200731/E – ISTAR (https://buyandsell.gc.ca/procurement-data/tender-notice/PW-RA-055-28525) W8486-200731/F – Applications (https://buyandsell.gc.ca/procurement-data/tender-notice/PW-RA-005-28529)

Q97	Future of Combat Net Radio Enhanced (CNRE) - Is there an interest in maintaining backwards compatibility from new TCM equipment to CNRE, as TCM fielding progresses over a period of years?	The use of CNRE will still be a part of the in-service capability landscape when TCM is fielded. An evaluation of costs and return on investment to account for backward compatibility with legacy systems such as CNRE will need to be determined and informed by this RFI return. As it stands, the protracted length of time for fielding and implementing of new C4IS capabilities within the Canadian Army indicates backward compatibility would likely be desirable.
Q98	CNRE - Does DND see any feasibility in maintaining the CNRE radios past TCM fielding, perhaps for 'B' fleet or non-operational use?	Long term sustainment and employment considerations of the CNRE capability generally falls outside the scope of this TCM/TacC2ISM RFI.
Q99	Will LC4ISR System of Systems (SoS) In-Service Support (ISS) be the means to perform the integration of these programs?	Yes, it is currently envisioned that the LC4ISR System of Systems (SoS) In-Service Support infrastructure will be the means to perform the integration of these projects. It should be noted that Canada is currently going through a renewal process for its ISS model.
Q100	Is Canada entertaining the idea of visit/demo/etc. for Industry capabilities?	At present, Canada is only doing virtual 1:1 meeting at this stage of the RFI. This RFI will remain until 30 December 2022, and DND welcomes any information that industry may provide. COVID is currently preventing in-person demonstrations. A new round of engagements will be held in the future, which will go into more depth for both projects during which live demonstrations may be possible.

Q101	Is there any program budget or usable funding program to support capability demonstrations to help de-risk this ambitious project in the coming 1-3 years? Notwithstanding the availability of budget or not, would you be interested in receiving proposals to demonstrate solutions that are relevant to the project operational scenarios and objectives? Who Industry should talk to (i.e., GOC Department or Agency) to give suggestion about creating funding program to help de-risking the project as big as TCM? Is DND considering having field trial for the proposed solution in one of the phases of this project?	Indeed, such de-risking activities are compelling and will need to be further explored by the project teams. Once TCM/TacC2ISM are in definition stage they have been granted expenditure authority at which point funds to support such de-risking activities would be unlocked. Industry feedback on such an approach is welcome to better inform the projects' way forward.
Q102	Can we support commercial option analysis with an industrial perspective?	Yes, Canada is open to receiving industry feedback on all perspectives to better illuminate potential project options and trade-offs.
Q103	Is 'Network-as-a-Service' an option to assess?	DND are keen to better understand all service-oriented approaches to fulfill TCM/TacC2ISM requirements. Industry feedback on this as it relates to tactical C2IS modalities is needed to better inform project options, costs and trade-offs.
Q104	Reference - Annex A 1.8.1.2.4-e (page 22) - How often does the Bde HQ need to move to be considered Tactically Mobile? How many staff at the Bde HQ? Will they all be accommodated in mobile CP vehicles (e.g., Armoured Command Support Vehicle CP)? What are the required set-up and tear-down times for static operation and operation at-the-quick-halt? Similarly for a Battle Group HQ.	While such lay-downs and requirements will change with the situation, a typical Canadian Army Brigade HQ can include up to 150 staff/personnel with the need for up to 100 client workstations to access the upper tactical (HQ) network, all from a relatively static but austere position. Brigade HQs are generally transportable but may not be as mobile as they require to move less often. Only a few key commanders, staff and advisers might need to be accommodated within a mobile tactical CP vehicle at the Brigade HQ level. At one level down at the Battle Group HQ, there could be up to 50 staff/persons working within-it, with a requirement for 50 client workstations. The Battle Group HQ should be mobile and austere, with equipment that can be quickly and effectively moved, and have a small Size Weight and Power footprint.

Q105	In support of the subject RFI, vendor requests provide higher resolution images of **Figure 7 – Warfighting Scenario** (page 24 of the RFI) and **Figure 8 – Peace Support/Asymmetric Operations Scenario** (page 25 of the RFI) respectively? Are there Figures where the text can be easily read? If Canada could provide higher resolution figures, that would be very much appreciated.	Unfortunately, these images are the best resolution that is available at this time.
Q106	Do you think that future RFIs for TCM and TacC2IS will remain as one document? And what would be the respective procurement roadmaps for these respective projects by way of scheduling?	This combined RFI was simply to avoid duplication of effort and exploit commonalities and synergies between both projects at this early stage and first industry engagement on these projects. Going forward each project will likely move ahead independently with separate industry engagements in the future.
Q107	Reference Annex A Section 1.4.4.2 Figure 3 (page 18) - Given DLCI's recognized Information Services Technologist (IST) manpower shortage, what is the concept of operation for the deployment of information technology services within Canada and the operational theatre? What conclusions have been drawn from the lessons learned by TF HERMES?	TF HERMES outcomes are outside the remit of this RFI, however, TCM/TacC2ISM project staff are closely monitoring results, and these will inform project requirements and future industry information packages on these projects. Nevertheless, it is clear that due to ongoing human resource shortages for Canadian Army signalers, creative solutions will need to be explored for both TCM and TacC2ISM to reduce burden on sustaining the capability. Options relating to service-oriented approaches and centralization of services are likely to be desirable due to these human resource challenges and other circumstances.

Q108	Reference Annex A Figure 6 (page 21), Appendix III to Annex A (page 27) - TCM Tactical Communication System Tools. In addition to Radio Management Tools, are you also looking for communication system management tools that cover: planning (spectrum management, networks, channel/pre-sets, addressing, etc.); monitoring and control; and user administration (naming, etc.)? It is noted on Figure 6 (page 21) that there are various network and system administration services highlighted in green (covered by TacC2IS), but there is a Communications service/application that is within the blue box (No project ongoing). Please clarify.	The system diagrams for TCM/TacC2ISM in the annex are not meant to be exhaustive but rather a starting point to indicate likely scope for each project. Industry feedback can contain recommendations on additions or removals to these diagrams provided the rationale. In this case the project staff agree that communication system management tools such as spectrum management (SM) and other system management tools should be represented in the TCM system diagram. SM tools represent a crucial component to ensuring the system can be properly trained, configured and sustained by operators over time.
Q109	Can we respond to TCM sections only to this RFI (since we do not intend to be prime)?	Yes, vendors are free to respond to only the TCM (or TacC2IS) sections of the RFI.
Q11	Is DND looking at a continual upgradeable systems?	Yes, upgradability is a high-level mandatory requirement for both projects.
Q110	Would you value an alternative and/or redundant path to Link 16 data and/or better ground distribution and sharing of TDL type data? Missile Defence/GBAD cell type data? This is currently not done within FVEYS.	Industry is free to propose any feedback in this RFI return provided the rationale. In the case of Link 16, TCM and TacC2ISM are exploring this capability, but it will likely not make up a large component of either project given the difficulty of using such technologies to support tactical land operations. Such specialist communication systems would be acquired by the projects themselves (e.g., GBAD).

Q111	What transmission bandwidths are being contemplated at what echelons or are these bandwidth requirements (i.e., range and throughput) still under consideration (for both war fighting and Peace support/asymmetrical scenarios)?	Bandwidth and range requirements will not be specified (at least not quantitatively) until definition. Industry should provide feedback on both narrowband and wideband communication technologies to support tactical communication systems to pass voice and data including industry capabilities to retransmit communications. In a typical scenario, Battle Groups making up a Brigade Group could be asked to operate within a non-linear area of operations of 100km x 50km, with units or combat teams deployed up to 20-30km from each other. Units can include 45 armoured vehicles, excluding echelons. Unit echelon can account for up to 35 vehicles, with about 20 that are armoured. Each Battle Group contains three combat teams. These numbers do not include dismounted troops.
Q112	Has Canada yet considered an evaluation strategy that might see risk reduction events prior to the formal TCM program, and/or pre-qualification and down select of industry teams, as with some other major capital programs?	The approach will be specified during project definition, however, industry feedback on best practices is welcome at this stage of the RFI. Canada is indeed interested in de-risking activities and working collaboratively with industry partners to through a possible pre-qualification (invitation to qualify) process. More on this will be confirmed at later stages of the project.
Q113	Will Canada utilize definition funding for experimentation and de-risking integration of these programs?	If Canada were to fund de-risking or experimentation activities for these projects, then yes, these funds would come out of project definition once projects achieve Project Approval (Definition) and expenditure authority. Industry should provide feedback on such de-risking models to better inform project options.
Q114	Would Canada be interested in seeing costing information for such a scenario, complete with in-country sustainment and support? Would DND be interested in a Centre of Excellence?	Industry is free to provide feedback on costing information for de-risking activities and ISS concept as well as proposing what is meant by a Centre of Excellence concept.

Q115	In the Value Proposition, will Key Industrial Capabilities include more than just Cyber resilience? What is the definition of Cyber resilience?	Currently, Canada has identified Cyber Resilience and Defence Systems Integration as applicable KICs to the TCM and TacC2IS projects. A complete definition of both KICs can be found within the RFI under Annex C. A definition of all sixteen KICs can be found on ISED's website: https://www.ic.gc.ca/eic/site/086.nsf/eng/h_00175.html Industry is encouraged to provide feedback on the applicability of the identified KICs and is welcome to recommend other KICs they believe is relevant to the projects.
Q116	Will ISED consider adding Cyber Resilience, AI machine learning, training and simulation as part of KIC?	Canada will apply relevant KICs that can be best leveraged through the TCM and TacC2IS projects to maximize benefits to the Canadian economy. Industry is encouraged to provide feedback on the applicability of the identified KICs and is welcome to recommend other KICs they believe is relevant to the projects. Industry's feedback will be considered in determining the VP requirements for these projects.
Q117	On the subject of incremental modernization, would Canada see value in breaking up and perhaps accelerating a portion of TCM to deliver more urgent capabilities and fulfill current or near-term operational requirements?	This is potential in terms of decomposing both TCM and TacC2ISM into smaller components (or capability sets) to address urgent operational requirements and interdependencies with other projects. Such an incremental approach is desirable for many reasons; however, industry feedback would be beneficial to better understand pitfalls and evaluate criteria for how capabilities would be decomposed for grouping.

Q118	If TCM can be broken up, can Canada provide specifics on what is perceived to be of most urgency? For example: a. Dismounted to mounted secure voice and data interoperability? b. Joint, FVEY and NATO / Coalition interoperability within the lower tactical bearers? c. Obtaining a resilient RF capability within the upper and lower tactical intranet that can survive in the Denied, Degraded, Intermittent and Low-Bandwidth (D-DIL) environments? d. Enhancing Information Assurance within the lower tactical bearers?	Canada will not provide comment on priority of requirements at this early stage of the projects. Industry feedback on proposed solutions to these requirements and comments on which to prioritise first based on complexity and sequencing will, however, help project teams inform project options and way forward for the projects.
Q119	*Slide 15:* *Document Reference: Canada (PSPC - DND - ISED) is open to further discussion and technical demonstrations on a case-by-case basis (depending on availability and schedule) – and arranged thru PSPC.* Question: Will the TacC2ISM/TCM and DND users be able to attend Eurosatory and the Chiron Demonstration from 6-10 Jun 2022?	Industry is free to invite project staff to demonstrations through the project PSPC representative. At this time, however, travel in-person for project staff is unlikely due to the COVID situation but virtual attendance could be entertained.
Q120	*Slide 36:* *Document Reference: Lack of a digital battle management system at the lower tactical levels;* Question: What is the current tactical BMS in use and is it in need of replacement. Could you specify if the BMS will be adapted, obsolete or inexistent?	At the lower tactical level in the mountain (mobile) domain the current battle management system which is to be fielded as part of capability pack Topaz is the Tactical Battle Management System (TBMS). This system is intended to be fielded to a subset of the Canadian Army armoured vehicle fleet over the next five years and will likely still be in use by the time TCM/TacC2ISM projects deliver. The system may be adapted or modernised by the projects however industry feedback and project options will further illuminate the likely course of action during project definition.

Q121	*Slide 39:* *Document Reference: Deliver digital command and control information systems interoperable with other CAF elements and coalition allies* Question: In order to cost interface, could you provide a complete list of legacy systems and allied systems to interoperate with? Or do you have a specific standard to respect (ie FMN with APP11, ADAPT3, …)	Canada will not provide an exhaustive list of interoperability standards or requirements at this time, however, there is a strong likelihood that TCM/TacC2ISM will adhere to modern open standards being employed by US/ABCANZ/NATO allies to favour data interoperability and integration. Industry feedback in the area of interoperability approaches is welcome to better inform project options, trade-offs and costs.
Q122	*Slide 42:* *Document Reference: In the PBS there is a mention of NetWork* We are trying to understand if the vehicle network is part of the TacC2ISM scope? If so, what does this network look like (number of controllers, ancillaries, etc.)? Our current understanding is that we can include the required vehicle network components in the TacC2ISM solution.	No, the tactical vehicle network is currently scoped within the TCM project. Appendix III to Annex A in the RFI (TCM System Diagram) illustrates this under the Vehicular Commu~~n~~ication System sub-system.
Q123	*Slide 44:* *Document Reference: Simulation* Question: Please could you specify the interface and type of existing simulators? Will the legacy simulation system be integrated into the new system	Interface specifications to in-service simulation system including joint systems will be provided at a later stage of the project. Industry feedback on high level option of modernising or re-using legacy simulation system or replacing this wholesale is needed to inform project options, costs and trade-offs.
Q124	*Slide 45:* *Document Reference: JDHQSRM* Question: The TACC2IS program should provide a HQ solution for Command and control, could we consider some mutualization in terms of technical solution with JDHQSRM which will provide some HQ infrastructures and applications?	While JDHQSRM is outside the scope of this RFI, there is an expectation from DND that TCM and TacC2ISM capability solutions could be used to meet JDHQSRM requirements (and vice-versa) given the commonalities of C2 requirements at the operational level.

Q125	*Section: §1.1.1 & §1.1.2* *Document Reference: Global* Question: Will the integration of these programs be completed through the Land C4ISR SoS Sustainment contracts where DND maintains TSR? Or will the program prime contractors be responsible for this integration?	It is currently envisioned that the LC4ISR System of Systems (SoS) In-Service Support infrastructure will be the means to perform the integration of these projects. It should be noted that Canada is currently going through a renewal process for its ISS model. TSR (Total System Responsibility) will likely remain a DND responsibility under AMD(Mat).
Q126	*Section: Annex A-1.8.2.5* *Annex A - 1.4.4.1* *Document Reference: It will also leverage existing training infrastructures to support force generation and validation.* Question: What is the existing infra welcoming training and/or simulation? How many? Which localisation?	Command Support Training Centres (CSTC) support Canadian Army training and force generation by enabling simulation exercises/training. Each Army Regular Force Brigade Group (CFB Petawawa, CFB Edmonton, CFB Valcartier) contain a CSTC as well as major training bases such as CFB Gagetown and CFB Kingston. More information on current state of Canadian Army simulation infrastructure (physical and virtual) will be provided in later stages of the project.
Q127	*Section: Annex A-1.8.2.6 g)* *Document Reference: The ability to provide virtual training regardless of infrastructure constraints at Regular and Reserve Force bases across Canada;* Question: Did we correctly understand or interpret the need ?: Use of training resources (equipment and simulator) in standard premises as office type without specific requirements on the premises but power supply, lighting ...	The TCM/TacC2ISM projects are not currently scoped to deliver any significant new physical infrastructure. Solutions will need to adapt to current and evolving physical infrastructure situation in the Canadian Army.

Q128A	*Section: §1.5 - Annex A* *Document Reference: Scope of both project TCM & TacC2IS* Question: To achieve the objective of both projects some capabilities need to have a common view of the global architecture, for example "An intuitive Planning and system tools to manage the system". Some part of the solution will come from TacC2IS (Taks Order management, Resource allocation, connectivity needs in accordance with the mission) and some others will come from TCM (network configuration, IP allocation, Crypto Mission data ...). How do you plan to manage this issue? Which project is in charge to have global view?	It is too simplistic to state that either of the projects will have responsibility for the global view. Rather, such integration and System of Systems (SoS) perspective will be handled by the SoS integration element which is currently in use and is evolving towards these projects. As such the SoS Integration approach would not only be responsible for the 'global view' of TCM/TacC2ISM but also the other C4ISR modernisation projects being delivered in addition to in-service system capabilities. Industry feedback on this approach is welcome.
Q128B	*Section: §1.5 - Annex A* *Document Reference: Scope of both project TCM & TacC2IS* Question: The RFI doesn't speak about Vehicle Integration. How will theses activities be managed? In another project dedicated for each vehicle manufacturers. These activities have an important impact on the global operational capabilities delivered to the users. What are the native capabilities provided by the vehicles, for example for navigation purpose, Observation capabilities, or interface for HUMS advanced functions. We strongly believe this is an important part of the project?	The TCM project is intended to be responsible for communication system integration onto the vehicle platforms and possible interfacing with ve~~h~~tronics. Each vehicle platform within the Canadian Army possesses a different set of capabilities. Such specifications would be provided at later stages of the project. Industry feedback on current state of the art approaches for C2IS integration with Army vehicle platforms is welcome to inform project options, costs and trade-offs.

Q129	*Section: 1.2.2* *Document Reference "….the forecasted data exchange requirement of the Army of tomorrow exceeds current capabilities. There is lack of both bandwidth and range to fulfill the needs to provide key enablers to achieve mission success…."* Question: What is the "forecasted data exchange requirement"? For example, required minimum data throughput, required data interface (Ethernet, USB, or/and Optical etc.), required voice interface (if PBX analog voice required).	The current situation at the lower tactical levels sees an almost total absence of any data exchange capability for various reasons (technology, fielding and sustainment challenges, integration complexity and backwards compatibility of system with legacy systems). While voice will remain, the primary means of command and control at the lower tactical levels, data exchange and interoperability are increasingly an essential requirement to support Canadian Army training and operational requirements. It is too early in the projects for Canada to provide any metrics on data throughput, interface standards, or other requirements. However, industry feedback on current capabilities and trends in these areas will inform project options, trade-offs and costs.
Q130	*Section 1.2.2* *Document Reference: "….the forecasted data exchange requirement of the Army of tomorrow exceeds current capabilities. There is lack of both bandwidth and range to fulfill the needs to provide key enablers to achieve mission success…."* Question: What is the forecasted "bandwidth" and "range"?	It is too early in the projects to provide specific metrics on bandwidth and range requirements; however, industry should review Annex A of the RFI to get a better qualitative sense of the operational requirements. Canada will use industry feedback from this RFI to inform project requirements in these areas (i.e., what the current and expected industry capabilities are capable of in both bandwidth and range) along with associated trade-offs, costs and risks.
Q131	*Document Excerpt: Capability of interoperability with CAF partners (RCAF, RCN, CANSOF) and coalition allies (FVEYS & NATO) is required.* Question: What is current data/voice interface with CAF partners (RCAF, RCN, CANSOF)?	Interface requirements would be specified at a later stage of the project inline with project requirements. At this stage, the high-level requirement for interoperability with joint (CAF) partners is desirable, however, the implementation details and standards are yet to be worked out including evaluation of trade-offs as they relate to complexity, pervasiveness (penetration) of interoperability (i.e., to what tactical level). Industry feedback on current standards and approaches to open data standards is appreciated to better inform project options at this stage.

Q132	Is additional tactical equipment required for Tactical Equipment Replicas of TCM Training/Simulation? If so, what is Tier 3 (Tactical/Mobile) network size required for TCM Simulation (Tactical Equipment Replicas)? For example, number of network nodes, voice group member size, and number of voice group.	Additional tactical equipment to support training/simulation may be required but such specifications on network size/nodes would only be provided at later stages of the project. For now, industry is to provide feedback based on information contained in the RFI package to better inform high level project options and costs.
Q133	Is the updated TCM system required to be backward -compatible with the current TCM system?	See answer given to Question 134 below.
Q134	If the TCM system is backward-compatible, then what is the operation voice/data waveform for the current tactical communication channel?	While it is too simplistic to state that TCM wholesale will be backward compatible with legacy system, the intention is that some components/capabilities delivered with TCM/TacC2ISM will require backwards compatibility with legacy in-service systems. Such determinations will be made in project definition; however, it is clear that if current capabilities meet the requirement these may not be modernised or replaced by TCM/TacC2ISM given the need to manage scope and costs. In any case, industry feedback related to backwards compatibility approaches and high-level considerations will help inform project options and costs.
Q135	If the TCM system is backward-compatible, then what is the encryption/decryption algorithm for the current tactical communication secure channel system?	These specification details would only be provided to vendors at a later stage of the project.
Q136	If the TCM system is backward-compatible, then what is the user interface for the current tactical communication system?	These specification details would only be provided to vendors at a later stage of the project.
Q137	What is the current SATCOM Gateway and Remote infrastructure that is being considered for modernization?	Details on the current in-service SATCOM capabilities supporting the Canadian Army's Land Command Support System would only be provided at a later stage of the project should these be selected to modernisation or integration into a new capability. Industry feedback related to SATCOM for this RFI should assume a new replacement capability along with associated considerations and costs to inform project options.

Q138	Is the program planning to replace/modernize the hub side infrastructure as well as remote side?	Both hub and remote portions of the in-service SATCOM capability may be subject to modernisation by the TCM project.
Q139	How many SATCOM terminals are being considered for replacement and/or purchasing through the life of the program?	These specification details would only be provided to vendors at a later stage of the project based on industry returns from this current RFI on high level costs on current industry capabilities and selected high level project options going forward.
Q140	What SATCOM sizes might be required or desired?	These specification details would only be provided to vendors at a later stage of the project. Industry feedback in this RFI on current and near-term capabilities will be used by project staff to define such specifications.
Q141	Regarding band of operation, would it be single band antennas or tri-band, etc?	These specification details would only be provided to vendors at a later stage of the project based on industry returns from this current RFI related to current practices and state of the art for tactical SATCOM capabilities in the land domain as they relate to number of bands. Industry perspective on trade-offs, complexity and costs related to these options is needed by project staff to inform strategic options and preliminary specifications.
Q142	Has a SATCOM modem technology preference been established?	Such specifications would only be communicated at later stages of the project. Industry feedback on SATCOM modem technologies may help inform and influence project options in this space however.
Q143	As part of the overall program, will there be an industry day to showcase capabilities?	This RFI will remain until 30 December 2022, and DND welcomes any information that industry may provide. COVID is currently preventing in-person demonstrations. A new round of engagements will be held in the future, which will go into more depth for both projects during which live demonstrations may be possible.
Q144	Are Low Earth Orbit (LEO), Medium Earth Orbit (MEO) and Geostationary Equatorial Orbit (GEO) all being considered? Is there a preference?	Such specifications would only be communicated at later stages of the project. Industry feedback on the various trade-offs and costs between LEO, MEO and GEO SATCOM as they relate to operations in the land environment as described in Annex A of the RFI will help inform project options.

Q145	Is there/ will there be a SATCOM size and weight requirement?	Such specifications would only be communicated at later stages of the project. Industry feedback on the various trade-offs and costs between various SATCOM size/weight/power considerations will help further inform project options.
Q146	Is there/ will there be a manual point or auto acquire requirement for SATCOM systems?	Such specifications would only be communicated at later stages of the project. Industry feedback on the various trade-offs and costs between manual and auto acquire technologies will better inform project options and future specifications.
Q147	Is there/ will there be a pack out requirement for SATCOM systems? * Weight per case * Number of cases	Such specifications would only be communicated at later stages of the project.
Q148	What is the proposed split for Type 1 vs Type 3 Crypto? (i.e., Brigade and above Type 1, BG and above.) What select elements may require Type 1 below this level)?	Project decisions on security architecture and requirements associated with Type 1 and/or Type 3 cryptographic products are not yet known and will only be made during project definition. At this stage, DND is likely leaning towards a mix of both Type 1 and Type 3 solutions but needs to better understand trade-offs including cost considerations through returns from industry on this RFI in order to inform strategic options analysis.

Q149	What are the vehicle quantities and dismounted radio quantity requirements for TCM?	While no firm quantities can be specified at this stage of the projects, vendors should review Annex A of the RFI for a better appreciation of the size/scale of the Canadian Army. Using a very crude illustration, typically a Brigade Group contains three Battle Groups, with each Battle Group composed of three Combat Teams. A typical Combat Team can include approximately 45 armoured vehicles in the fighting echelon and another 35 vehicles in the support echelons. The Canadian Army possesses three Mechanized Brigade Groups in addition to a number of dismounted elements within each Mechanized Brigade Group (i.e., 1x Light Infantry Battalion per Mechanized Brigade Group). The quantities of vehicle and dismounted communication systems will vary based on the technology and the scaling complexities. Based on industry returns related to high level costs, the project options will be better informed on scale/quantities achievable within current funding constraints.
Q150	What intelligence tools is Canada looking to have included in TacC2ISM? In the Project Breakdown Structure (PBS) found in the Industry Day Presentation Slide 42 it is stated intelligence tools, but in the RFI SOW *Figure 6 Current Land, Command, Control, Communications, Computers, Information, Surveillance and Reconnaissance Service View* it was unclear what intelligence tools Canada is looking to acquire via TacC2ISM.	Specific requirements related to intelligence tools will be forthcoming during project definition. The concept for TacC2ISM is to provide the broad and high-level software tools to enable basic intelligence functions whereas specialist applications related to intelligence would be delivered by other projects. TacC2ISM would however be responsible for the higher data integration of intelligence data as part of the overall data architecture including injected data from higher and flanking networks (either Canadian or coalition).