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Enable CAF Inter-Operable Joint Airspace at the Tactical Level

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ENABLE CAF INTER-OPERABLE JOINT AIRSPACE AT THE TACTICAL LEVEL

AIM

1. This service paper recommends actions to address a gap in Canadian Armed Forces joint doctrine regarding tactical-level joint airspace use to enable permissive use of fires, close air support and remotely piloted aerial systems/unmanned aerial systems (RPAS/UAS). Specifically, it addresses air-land integration between the Canadian Army (CA) and Royal Canadian Airforce Force (RCAF), contrasts allied joint doctrine to Canadian, then recommends publication of joint direction adopting select US tactical airspace publications and tactics/techniques/procedures (TTPs) with appropriate caveats to reconcile differences in Canadian force structures and domestic authorities.

INTRODUCTION

2. Canadian Air-Land Integration Challenge. The pending Pan-Domain Force Employment Concept[1] emphasizes inter-operability and jointness, building on the concepts of Canada's Defense *Strong Secure Engaged*.[2] Moreover, the RCAF's *Command and Control*,[3] the CA's *Close Engagement*[4] and academic writings[5,6] emphasize the importance of decentralized execution to enable agility, speed, and dispersion in future conflicts. All envision the CAF able to employ responsive joint fires and dynamic use of airspace, raising a question: How does the CAF train and equip combat elements to access coalition airpower in training and operations in a joint NATO or coalition context at the brigade tactical level? Post exercise reports from domestic and operational Canadian Army training indicate a lack of cohesive, well-understood framework to enable joint airspace control at the tactical level.[7,8] Generally, Canadian published doctrine lacks sufficient depth and specificity to enable dynamic, informal joint control of airspace in support of ground manoeuvre commanders at the brigade level and below, with Canadian Special Operations Forces Command being an exception.[9] As this gap requires a joint solution, direction from above the RCAF and CA is required. Without a functional framework suitable for use in Canadian led training and operations, the CAF will not consistently produce units and headquarters ready to join or lead within NATO or coalitions. In the *2019 Canadian Army Inter-Operability Directive*, the Army Commander, now Chief of Defense Staff,

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[1] National Defence Canada, 'Pan-Domain Force Employment Concept Prevailing In A Dangerous World (Draft)' (Her Majesty the Queen in Right of Canada, as represented by the Minister of National Defence, 2022).
[2] National Defence Canada, 'Strong, Secure, Engaged: Canada's Defence Strategy', 2017.
[3] National Defence Canada, 'Royal Canadian Airforce (RCAF) Doctrine - Command and Control (B-GA-402-001)' (Her Majesty the Queen as represented by the Minister of National Defence, July 2018).
[4] National Defence Canada, 'Close Engagement-Land Power in an Age of Uncertainty (B-GL-310-001)', 2019.
[5] Allan D. English, Canadian Forces Aerospace Warfare Centre, and Canada. Dept. of National Defence, 'Command & Control of Canadian Aerospace Forces: Conceptual Foundations' (Canadian Forces Aerospace Warfare Centre, 2008).
[6] Marc Raven, 'Artificial Intelligence Tools for Joint Airspace Management', *Canadian Forces College - Service Paper*, 2022, 12.
[7] Canadian Manoeuvre Training Centre Canada, 'Exercise Maple Resolve 22 (Brigade Validation Exercise)-Take Home Package', August 2022, DWAN https://cdacfc-my.sharepoint.com/:u:/r/personal/jeffrey_tebo_cfc_dnd_ca/Documents/ICE 2102 (eFP LATVIA) - Take Home Package.zip?csf=1&web=1&e=kflQt1.
[8] Canadian Manoeuvre Training Centre Canada, 'Integrated Capstone Exercise 2102 (EFP LATVIA) - Take Home Package', September 2021, DWAN https://cdacfc-my.sharepoint.com/:u:/r/personal/jeffrey_tebo_cfc_dnd_ca/Documents/ICE 2102 (eFP LATVIA) - Take Home Package.zip?csf=1&web=1&e=kflQt1.
[9] This L1 does not experience a similar gap due to training and employing their elements to operate at lower echelons under coalition headquarters with dedicated tactical joint airspace frameworks coordinated by trained, allied headquarters. Further, their training regimes are linked to allied credentials and standards.

prioritized inter-operability with the United States.[10] With that in mind, the American visualization of the Army air-ground system and Air Force theater air control system (Figure 1) alongside the Canadian equivalent (Figure 2) highlights the gap and, with correct scaling, an opportunity.

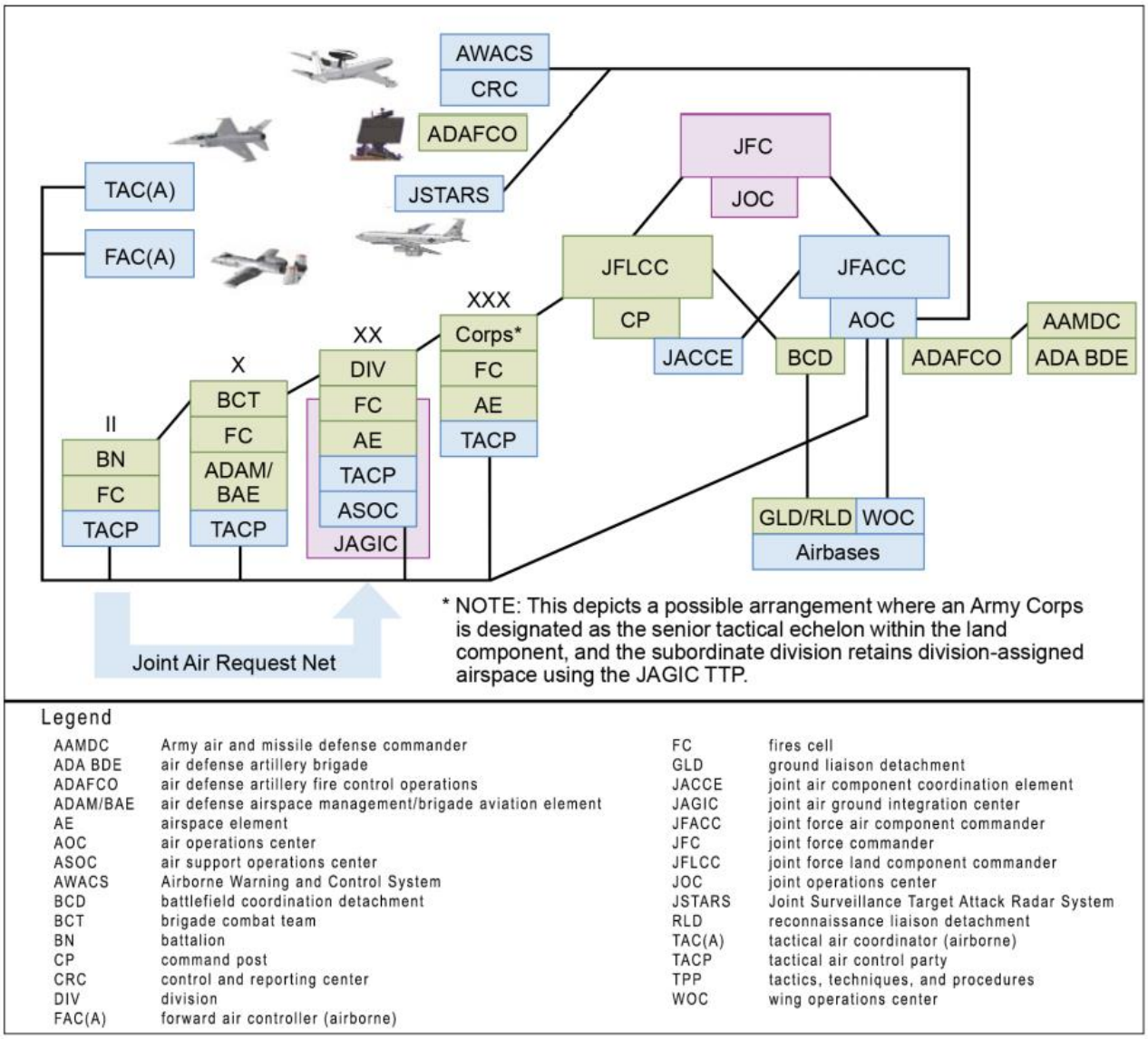

Figure 1: American Visualization of the Army air-ground system and Air Force theater air control system, noting the Joint Air Ground Integration Center (JAGIC) at Division level[11]

[10] Canadian Army Canada, 'Canadian Army Interoperability Directive', November 2019, DWAN https://acims.mil.ca/org/6517/Documents/191005_U_CA Interoperability Directive_Consolidated_EN-FR.docx.
[11] Joint Chiefs of Staff United States, 'Joint Publication 3-09.3 Close Air Support', 2019, DWAN https://collaboration-airforce.forces.mil.ca/sites/1wing/hq/a7/a7standards/A7StdsPubs/JP 3-09.3 Close Air Support (Jun 2019).pdf?csf=1&e=1h91QW.

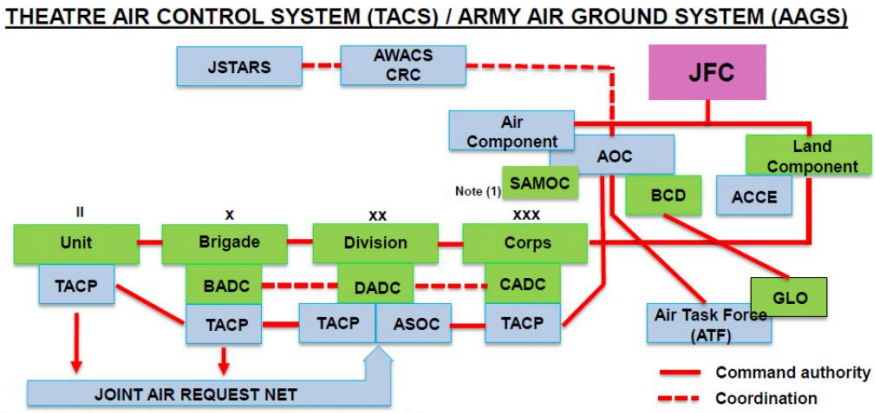

Figure 3-1: Theatre Air Control System / Army Air Ground System
Note (1). SAMOC is a NATO term, however the RCAF and the US Army use "Air Defence Artillery Fire Control Operations (ADAFCO)".

Figure 2: Canadian Visualization of Army Air-ground System (AAGS) and Theater Air Control System (TACS)[12]

3. Comparing the visualizations, Canada's structure derives from the American, but lacks a JAGIC equivalent – where the land and air components have a joint element with delegated airspace control authorities (ACAs) linked to an Airspace Control Plan (ACP) to enable pragmatic and time-appropriate airspace control. From the joint American Army / Airforce TTP, the JAGIC "co-locates decision making authorities from the land and air component to support the supported maneuver commander's objectives and intent" and "facilitates effective mission execution while managing the level of risk."[13] Acknowledging Canadian authorities and personnel density preclude adoption of the American structure, the discussion below will outline three groups of factors supporting inclusion of a joint airspace element within Canadian doctrine and adoption of affiliated American tactics, techniques, and procedures.

DISCUSSION

Framing Joint Airspace at the Tactical Level

4. The Joint Airspace Team at the Tactical Headquarters. Introduced as the American JAGIC in this paper, the Canadian Army has used the terms Joint Fires Coordination Center (JFCC) in Latvia[14] or Airspace Coordination Center (ASCC)[15] to denote a similar node. Moreover, NATO uses the term Joint Fires Support Element (JFSE). Both terms cause confusion regarding function in the joint environment, notably the use of the term 'airspace' to name an element comprised of army personnel. For this paper, JAGIC will be employed.

5. Making TTPs Joint – The American Approach. Realizing centralized control and decentralized execution demanded common TTPs for joint fires, the United States Joint Chiefs of Staff with the

[12] Canadian Army Canada, 'Ground Based Air Defence (B-GL-372-001)' (Her Majesty the Queen as represented by the Minister of National Defence, August 2021).
[13] Department of the Army United States, 'The Joint Air Ground Integration Center (ATP 3-91.1 & AFTTP3-2.86)', April 2019, 1–1, https://armypubs.army.mil/epubs/DR_pubs/DR_a/pdf/web/ARN16449_ATP%203-91x1%20FINAL%20WEB.pdf.
[14] Canadian Joint Operations Command Canadian Armed Forces, 'Canada Enhanced Forward Presence Battle Group Latvia - Standing Operating Procedures', accessed 27 February 2023, DWAN https://collaboration-cjoc.forces.mil.ca/sites/efp_bg_lva/SitePages/Home.aspx.
[15] Canada, 'Ground Based Air Defence (B-GL-372-001)'.

heads of their Navy, Army, Air Force and Special Operations Forces created the *JFIRE - Multi-Service Tactics, Techniques, and Procedures for Joint Application of Firepower* [16] published as a baseline TTP within each domain's doctrine hierarchy. All elements must sign off on changes to this document and it is the defector TTPs in use by all NATO and coalition fire support elements conducting joint operations. The TTPs and terminology agreed to in this document for the backbone of common understanding at all echelons conducting joint fires and the affiliated joint airspace coordination.

6. Trust. Joint airspace at the tactical level involves collaboration between no-fail organizations that, due to the extreme impact of failure, have developed highly proficient cultures of professional tradecraft that come into conflict procedurally and professionally when required to operate as a team in a joint capacity, notably the tension between air manoeuvre flight safety and air manoeuvre; ground force manoeuvre and indirect fire support; sense and protection operations conducted by RPAS/UAS; air defense; air medical evacuation; and the various command and control nodes affiliated with these functions. Without trust, an aviation element, rightly, will not commit a crewed aircraft into airspace where CA UAS may be operating. Without trust, risk aversion generally leads to coordination by time or very large vertical/horizontal distances – over-restricting the airspace and leading to ineffective use of the joint team which must execute concurrent activities at Brigade level to win. The solution as devised by coalition partners joint command of airspace. Commonality in terminology and defined, inter-connected procedures across joint airspace affiliated elements forms the foundation for leaders to establish this trust. Canada's joint doctrine mentions this only in principle in the 2011 *Canadian Force Joint Publication 3.0 - Operations*[17] with subsequent direction either being specific to operations or executing by non-joint centers of excellence – resulting in personal initiative and teamwork forming an episodic foundation for successful trust establishment.

7. NATO and Coalition Doctrine. Based on training and operational experience, most Canadian personnel have gained joint experience serving in NATO or coalition environments aligned with NATO Allied Joint Publications or American Joint Publication doctrines, typically defaulting to the American series for currency and prevalence within kinetic operations.[18] For domestic collective training, the ACP uses elements of these doctrinal standards within military airspace for joint training while the RCAF Flight Operations Manual and DND Airspace Arrangements provide the link to NAV Canada regulations and baseline for Canadian operations.[19]

8. ACA. Canada does not possess a mechanism to name a combined joint force commander during domestic training. ACA flow from the Commander Air Task Force with planning of the ACP residing with the appointed Senior Airspace Planner (SAP) – often disconnected from the supported ground manoeuvre element due to a limited command relationship until execution. As a result, the ATF Comd and SAP typically do not interact closely with the supported ground force until training commences, limiting the permissiveness for the ACP and ability for air force Tactical Air Control Parties (TACPs, explored later in this discussion) to exercise informal control at the tempo of ground combat elements. The JAGIC concept, staffed and connected the SAP can provide the link to shape the

[16] Joint Chiefs of Staff United States, 'JFIRE - Multi-Service Tactics, Techniques, and Procedures for Joint Application of Firepower', 2019, DWAN https://collaboration-airforce.forces.mil.ca/sites/1wing/hq/a7/a7standards/A7StdsPubs/JFIRE (OCT 2019)_REL FVEY, NATO, AU, FIN, SWE, ROK, JPN, ISR.pdf.
[17] Canadian Forces Warfare Centre Canada, 'Canadian Forces Joint Publication 3-0 Operations (B-GJ-005-300)', September 2011, 1–6.
[18] Canada, 'Integrated Capstone Exercise 2102 (EFP LATVIA) - Take Home Package'.
[19] For examples see the Op IRON GUARDIAN – Airspace Control Plan V1.3 and the affiliated and DND-A-038-2020 for Ex MR22

ACP to support the ground force to the maximum extent within the boundaries of the environment.[20]

9. Canadian Army (CA) Coordination Centers. When operating outside a joint context, CA units, through a range control officer, use assigned airspace to execute ground direct fire, indirect fire and tactical UAS operations. Exclusive training in these environments can develop a culture where each coordination center believes they control the airspace and clear all airspace activities. While true for non-joint training, and generally true when executing activities in assigned airspace, when nested into a larger ACP at brigade level or higher, the need to subordinate under the appropriate ACA and TACP can cause personal, procedural, and planning frictions. Again, the JAGIC eliminates tensions by providing an empowered, joint element with the credentialed personnel and access to appropriate commanders to coordinate the various elements vying for airspace allocations.

Terminology Disambiguation

10. General differences in terminology between air force and army, NATO and coalition and domestic agencies. Notable friction points include the following.

11. Formal verse Informal Airspace Coordination Measures (ACMs). Formal ACMs are published in an ACP or Airspace Control Order (ACO) and have strict submission timelines, generally 96 hours, to ensure correct review, concurrence, and dissemination. Informal ACMs can be established at the tactical level in accordance with the governing ACP/ACO at a much faster tempo – such as dynamic use airspace within a High-Density Airspace Coordination Zone (HIDACZ) by a TACP or JTAC to coordinate multiple users from the joint team. In Large Scale Combat Operations ground manoeuvre areas take on the form of multiple nested HIDACZ controlled by affiliated TACPs.[21] In the case of TACP control of informal ACMs, they can be disseminated via tactical chat or included within a Bde or BG order. When written, there is a tendency to conflate them as 'formal' and erroneously commence a formal ACM request which is fundamentally incompatible ground combat unit tempo which demands reaction within minutes and hours, not days. The solution is a flexible ACP/ACO informed by the JAGIC and well communicated through the chain of command.

12. Consumable / Non-Consumable RPAS/UAS. American drone doctrine permits the JFC to define some assets as consumable – indicating they may fly into airspace with active munitions. This permits mini/mirco drones to provide the SENSE function for ground manoeuvre elements in proximity to the target without blocking fires. The risk is accepted due to the increased functionality and the low cost of potentially losing these in-expensive, unmanned drones. NATO countries operate consumable UAS in tandem with mortars at the company level within the Canadian enhanced Forward Presence Battlegroup in Latvia. Define the concept of consumable and non-consumable UAS/RPAS within the appropriate operational and training references to obtain compatibility with JFIRE doctrine. Specifically, enable commanders at appropriate levels to declare mini and micro UAS/RPAS as consumable – indicating the acceptance of the risk to the system when flying through airspace in which indirect fires are authorized. This permits co-use of the airspace; enables UAS spotting for indirect fire assets; is standard doctrine of many NATO partners, including members of the Canadian led NATO enhanced Forward Presence Battlegroup Latvia (eFP BG(LVA)); and does not present risk to any crewed aircraft.[22]

13. RPAS/UAS Launched Inside the Battle Space. Employment of mini and micro UAS launched within the tactical airspace present great opportunities for the land force and major coordination

[20] Joint Chiefs of Staff United States, 'Joint Publication 3-52 - Joint Airspace Control', November 2014, DWAN https://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_52.pdf.
[21] Ibid.
[22] Canada, 'Integrated Capstone Exercise 2102 (EFP LATVIA) - Take Home Package'.

challenges for airspace control due to degraded field communications; organizational distance from tactical user to TACP node; dispersed nature of elements; the high density of mini and micro system; and the in-extremis, on-call nature of use. Keys to success for integrating these elements into the airspace include permissive ACMs and launch/recovery procedures within the ACP are required to facilitate pragmatic use and professional UAS operators and supervisors fully inculcated into the ACP and held to appropriate credentialing and procedural discipline standards to operate in joint airspace.

14. Flight Safety vs Training for Combat. Flight safety takes priority in training, but training must also prepare forces for combat situations. In combat conditions, forward elements employing mini RPAS/UAS would likely not have guaranteed communications and would rely on assigned airspace coordinated by the TACP node to guide their usage. With access to a trunked radio system, the Ex MR22 TACP node was able to assign airspace, but also required users to call direct on their guaranteed comms for launch authority and recovery declaration without relaying through various C2 levels. This "sustain" enabled permissive use of UAS across many organizations. Participants must note the extra comms layer and have risk accepting contingencies in mind when executing real-lift combat operations without guaranteed radio/data link to all airspace users.

Canadian TACP

15. The TACP Management Order (TMO) was issued by Comd RCAF in Feb 2022 and formalizes TACP employment, specifically the policies and standards pertaining to the management of TACP operations.[23] Responsibility excerpts include the following:

16. Officer Commanding Tactical Air Control Party. OC TACP are accountable to the SO TACP for the efficient operation of their 1 CAD HQ TACP Detachment. Responsibilities include but are not limited to: Maintaining currency in an operational position; the formulation and publication of orders; the oversight of operational training, continuation training and on-the-job training for all subordinate personnel; and provide operational, planning and technical advice/support to their supported commander.

17. Tactical Air Control Party Air Officer (TACP AO). Personnel assigned to TACP AO duties are responsible for the planning and execution of aerospace control in a land environment including control of aircraft. Responsibilities include but are not limited to: Maintaining certification as a TACP AO; mission planning with internal / external agencies; and providing aerospace control with adherence to airspace limits and Airspace Control Orders.

18. Tactical Air Control Party Systems Operator (TACP SYSOP). Personnel assigned to TACP SysOp duties are responsible for the planning and execution of aerospace operations in a land environment. Responsibilities include but are not limited to: Maintaining currency as a TACP SysOp; mission planning with internal / external agencies; and ensuring mission equipment is serviceable and ready for operations.

19. Brigade TACP Integration. Integrated into the Brigade headquarters with suitable ACP and ACAs, a TACP in this configuration, linked to the Brigade headquarters can form an on demand Canadian JAGIC equivalent. A rudimentary form of this occurred with modest success during 2022 on a domestic exercise depicted below in Figure 3.

[23] Royal Canadian Air Force Canada, 'Tactical Air Control Party Management Orders (B-GA-003-000_AG-001)', February 2022, https://acims.mil.ca/sp/CADTC_HQ_G5/ALIC/TACP/Shared Documents/Publications/B-GA-003-000_AG-001 Tactical Air Control Party Management Orders.pdf#search=B%2DGA%2D003%2D000.

Figure 3: Ex MR22 JAGIC/JFSE[24]

CONCLUSION

20. By officially adopting in-use joint fires TTPs and adapting in-use joint airspace TTPs along with a JAGIC like concept, the CAF can institutionalize established best practices into our collective training to ensure consistency and credibility when joining NATO or coalition operations. Moreover, in large scale combat operations, pragmatic and professional decentralization of joint tactical airspace control will ensure Canada is an agile force able to access coalition air power in concert with the ever-increasing capabilities of RPAS/UAS technologies.

RECOMMENDATIONS

Adopt of Multi-National Doctrine and Procedures for Tactical//CAS Joint Airspace Control

21. Issue a Canadian Joint Publication or joint direction to adopt JFIRE - Multi-Service Tactics, Techniques, and Procedures for Joint Application of Firepower for all CAF joint fires. Order all joint fires affiliated centers of excellence and command and staff training programs to adapt their doctrine and courseware to interface with these TTPs.

22. Issue a Canadian Joint Publication to recognize the American JP 3-52 series and publish an equivalent Canadian Forces Joint Publication 3.0 series to link to the JFIRE TTPs.

Designate the Minimum Requirements for Canadian Equivalent JAGIC

23. TACP Manning. Consider a minimum force for TACP personnel for continuous operations as 1x OC TACP, 2x TACP AO and 2x TACP SYSO. To cover prolonged deployment, would be 1x OC TACP, 3x TACP AO (1x senior enough to assume OC duties) and 3x TACP SYSO.

24. JAGIC. Due to Canada's force structure, this element must be capable of supporting below Division level. At Brigade or Battle Group level the operations officer runs the HQ and could oversee the integration of the JAGIC into operations, guided by the commander, TACP SO and senior ground fire support officer. Formalized guidance on duties and responsibilities at this critical junction, developed collaboratively, would permit ad-hoc re-organization and aid commanders and their staff in making sufficient personnel choices when augmented by a TACP to form a JAGIC equivalent within their HQ.

[24] Canada, 'Exercise Maple Resolve 22 (Brigade Validation Exercise)- Take Home Package'.

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