**Joint Analysis and
Lessons Learned Centre**

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TO: General Philippe LAVIGNE; Supreme Allied Command Transformation

CC: General Paolo RUGGIERO, Deputy Supreme Allied Commander Transformation; Vice Admiral Guy ROBINSON OBE, Chief of Staff Allied Command Transformation; Major General Guillermo CAVO, Deputy Chief Of Staff Joint Force Development

SUBJECT: NATO LESSONS LEARNED CONFERENCE 2022 FINAL CONFERENCE REPORT

References: SACT; Guidance for the NATO Lessons Learned Conference 2022; 09 December 2021; ACT/DIR/DIV/TT-4852/SER:NU818; NATO UNCLASSIFIED

General,

In accordance with the Guidance referred to above it is with great pleasure that I present to you the final report of the NATO Lessons Learned Conference 2022 (NLLC22).

The purpose of the attached Final Conference Report is to highlight key findings, derived from the conference presentations, discussions, and interactions, in order to inform the implementation of the NATO LL Capability Improvement Roadmap (2021-2025) and to highlight some initial thoughts and considerations to the questions raised by the panel discussions conducted through the NLLC22.

Based on the feedback received by the participants and our own assessment, I am happy to confirm that the event was a great success. Moreover, the aim and objectives of the NLLC22 were achieved through the level of participation (both in-person and online), quality, and relevance of the information shared, followed by the subsequent synthesis, analysis, and reporting of that information.

Finally, I would like to share with you that during the NLLC22—the last for me as the JALLC's Commander—, I observed a high level of dedication, interest, and commitment to working towards an improved NATO LL Capability in support of the Alliance from all of the event participants.

Very respectfully,

Bogdan Cernat
Brigadier General, ROU Army
Commander JALLC

Enclosure - NATO Lessons Learned Conference 2022 Final Conference Report

A Report by NATO's
Joint Analysis and Lessons Learned Centre

NATO Lessons Learned Conference 2022
Final Conference Report

The Customer for this Project is
Supreme Allied Commander Transformation

NATO LESSONS LEARNED CONFERENCE 2022
FINAL CONFERENCE REPORT

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Approved by Commander JALLC on: 09 June 2022

EXECUTIVE SUMMARY

BACKGROUND

The NATO Lessons Learned (LL) Conference (NLLC) is a key event for the NATO and wider LL Community and in 2022 was organized by the Joint Analysis and Lessons Learned Centre (JALLC) on behalf of Supreme Allied Commander Transformation (SACT). The 2022 iteration of the NLLC (NLLC22) was held between 04 and 05 May in a hybrid format with speakers, panel moderators, members, and contributors present at the NLLC22 venue while audience participants took part virtually via the dedicated NLLC22 online platform.

The NLLC22 was the 17th iteration of the NLLC and was intended to discuss success stories and shortfalls of LL from the last two decades and highlight key findings in support of enhancing the development of a more effective LL Capability across NATO.

The purpose of this Final Conference Report is to inform SACT of how the NLLC22 was conducted and to present key takeaways to further inform the implementation of the NATO LL Capability Improvement Roadmap (2021 – 2025)[1] (hereafter referred to as the Roadmap) and beyond.

The theme of the NLLC22 was: A flashback of two decades of learning to gain insights for the next five years and was covered by four panels on the following topics which are discussed in more detail below:

- LL in support of Warfare Development Agenda (WDA);
- Innovation is support of LL;
- Overcoming challenges in learning enduring lessons from Exercises; and
- Overcoming challenges in learning enduring lessons from Operations.

The content of this report is the result of the synthesis and analysis of the NLLC22 briefings, discussions, comments, and remarks, as well as relevant associated reference material. It is intended to inform further efforts within the Roadmap and does not represent any national or organizational position or a JALLC recommended course of action.

NLLC22 ACHIEVEMENTS

Both the aim and objective of NLLC22 were achieved through the level of participation, quality, and relevance of the information shared, and the subsequent synthesis, analysis, and reporting of that information. The feedback on the NLLC22 from the participants was overwhelmingly positive, with 98.5% of participants that provided feedback considering the conference was very well (80.6%) or well (17.9%) prepared and facilitated by the JALLC. Some other notable NLLC22 achievements are as follows:

a. NLLC22 Format, Online Platform, and On-Site Networking: the format of the NLLC22 meant that the wider audience attended online via the NLLC22 platform and panel members (speakers, moderators, and contributors) were present at the NLLC22 venue. This hybrid format facilitated successful event planning and execution, especially in the uncertain context of the COVID-19 pandemic. The conference platform used for the NLLC22 worked well, providing intuitive functionalities and supporting interaction and networking among the participants;

b. Level of Attendance: The NLLC22 counted 317 registered participants representing NATO and national entities across 26 Allied Nations and three Partner Nations (Australia, New Zealand, and Switzerland);

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[1] BI-SC; NATO LL Capability Improvement Roadmap 2021-2025; 31 March 2021; SH/SDP/J7/FPR/LEL/JC/21-004936 ACT/JFD/JDLL/TT-2201/SER:NU 0410; NATO UNCLASSIFIED

c. Agenda and Leadership Engagement: The event was held over two days, for eight hours each day for the participants attending in-person and four hours a day for attendees online. In addition to the interactivity in the NLLC22 platform. The NLLC22 agenda included presentations from speakers from diverse backgrounds and included high profile leadership to subject matter experts who provided their perspectives and insights on the NLLC22 theme and topics that were well received by the audience.

KEY TAKEAWAYS

The key takeaways specific to each of the NLLC22 panels (as mentioned above) have the potential to enhance the development of a more effective LL Capability across NATO and are relevant to inform the further implementation of the Roadmap. These key takeaways are summarized below. It is worth noting *leadership* was identified as a critical factor and recurrent central theme across all four panels and that *leadership engagement* in terms of LL can be achieved by explaining the value of lessons and innovation, demonstrating quick wins, and marketing positive change within the organization.

LL in Support of the Warfare Development Agenda

This panel discussed ideas and insights on how the NATO LL Capability can support/contribute to implementing the WDA as well as how WDA implementation can contribute to the improvement of the NATO LL Capability. Key takeaways include:

a. The potential NATO LL Policy[2] update / review may provide some ground for a strategic alignment and engagement, from the LL perspective, across NATO, with Allies, Partners, and other organizations in line with the Warfare Development Imperatives resulting in improved transfer of knowledge / lessons between Allies and NATO Entities;

b. There is a need to include feedback loops in each WDA Line of Delivery to generate checkpoints that will allow for the capture and sharing of relevant observations, supporting any review and update of the WDA;

c. Careful consideration should be given to *unlearning* lessons already learned in the past or current Alliance operating environment, but which may not be applicable to the future operating environment as envisaged with the WDA; and

d. Further investigation is required of ways, means, roles, and responsibilities for lessons implementation in support of WDA, including JALLC Joint Analysis report(s) looking at WDA implementation.

Innovation in Support of LL

This panel discussed insights from recent innovation efforts of relevance to the development of the NATO LL Toolset (NLLT) and other NATO and national innovation efforts that may contribute to the Roadmap. Key takeaways include:

a. Innovation implies three elements: new technologies, processes, and mindset (as the main driver). However the Alliance also needs people with the right skills, which implies ensuring there will be trained LL experts in data science concepts, to combine the three elements towards effective innovation;

b. LL effectiveness is not only about *quantity* but also about *quality* and organizational changes leading to improvement. Innovative tools are needed to support measuring LL effectiveness; and

c. There are several efforts supporting the development of the innovation framework and mindset in NATO and some of them support the improvement of the NATO LL Capability,

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[2] NATO HQ; NATO LL Policy; 09 September 2011; PO(2011)0293; NATO UNCLASSIFIED

especially the development of the NLLT. Also, lessons coming from projects and use of new technologies within national (e.g. US experience with the next version of their LL system) and multinational collaboration networks (e.g. through the Science and Technology Organization), should be considered during the development of the NLLT.

Overcoming Challenges in Learning Enduring Lessons from Exercises

This panel discussed challenges, opportunities, ideas, and potential changes that could lead to more effective learning from Exercises. Key takeaways include:

a. The cadence of the execution of exercises in conjunction with the NATO LL Process is demanding and does not always allow individuals to commit adequate time for preparation, often resulting in limited effort being invested in collecting observations to initiate the NATO LL Process;

b. Reviewing the Directive of the Two Strategic Commands (Bi-SC) 075-003 would be a good and timely opportunity to innovate, adapt and apply lessons, so that the exercise design can ensure appropriate prioritization and collection of observations as well as the analysis efforts based on the commander's focus areas; and

c. The current Stage 4 timelines for delivering robust analysis products are somewhat compressed for current and growing exercise complexity, which restrains LL through exercises. Innovative ways to show that LL is an opportunity to improve the way NATO works, rather than an extra reporting burden, may serve to improve the quality of LL in exercise reporting. Additionally, the NLLT may, in the future, may be able to support LL Staff Officers (LLSO) in terms exploiting large datasets generated during exercises, using innovative new technologies in support of effective learning.

Overcoming Challenges in Learning Enduring Lessons from Operations

This panel discussed challenges, opportunities, ideas, and potential changes that could lead to more effective learning from Operations.

a. Compared to the last two decades, during which NATO faced low intensity operations focused on crisis management, the future may expose NATO to multi-domain, complex, intense, and fast operational environments, focused on collective defence. This potential future reality should perhaps result in the need to reconsider the way NATO LL Capability is employed in operations such as: using different versions of the NATO LL Process for different levels (e.g. tactical vs. strategic), and/or continuous collection of observations throughout the duration of the operation and not only during after action reviews;

b. LL information sharing among the Allies and Partners continues to face some limitations. Providing LL training, advertising successful LL stories, standardization, and incorporating new technologies in LL tools appear suitable ways to overcome barriers to LL information sharing relating to mindset, interoperability, and technical issues;

c. In operations, a LL mindset and timely implementation of remedial actions are critical factors for the mission success. Empowering lower ranks to approve lessons sharing as well as placing an LLSO within the operational HQ as an advisory element at the command group level are potential enablers of these critical factors.

WAY AHEAD

This report will be shared with the members of the NATO LL Working Group and of the NATO LL Steering Group for further consideration and decision on potential follow-up actions during the Fall 2022 LL Week. As such, the findings and key takeaways in this report may lead to adjustments or new milestones within the Roadmap to support future improvements of the NATO LL Capability.

CONTENTS

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INTRODUCTION

BACKGROUND

1.   The NATO Lessons Learned (LL) Conference (NLLC) is a key event for the NATO LL Community and is organized by the Joint Analysis and Lessons Learned Centre (JALLC) on behalf of Supreme Allied Commander Transformation (SACT). The 2022 iteration of the NLLC (NLLC22) was tasked in the JALLC's Programme of Work 2022 (Reference A) and conducted from 04 to 05 May 2022 in a hybrid format with speakers, panel moderators, members, and contributors present at the NLLC22 venue in Lisbon, while the audience took part virtually via the dedicated NLLC22 online platform. On 03 May 2022, in the afternoon, a pre-conference session was conducted to ensure the connectivity of the online audience was adequate and to allow some time for the preparation of the NLLC22 panels as further described below.

2.   The NLLC22 was planned and executed according to the NLLC22 Concept (Reference B) which was developed in line with the aim and objective set out in the Direction and Guidance (D&G) received from HQ SACT (Reference C).

3.   The theme for this year's conference was: "*A flashback of two decades of learning to gain insights for the next five years.*" The aim of the NLLC22 was to discuss key success stories and shortfalls of LL from the last two decades and highlight findings to potentially improve the Alliance's organizational learning.

4.   The objective of the NLLC22 was to provide SACT with early findings to inform the implementation of the NATO LL Capability Improvement Roadmap 2021 – 2025 (Reference D) (hereafter referred to as: the Roadmap) in support of enhancing the development of a more effective capability across NATO.

5.   In order to achieve the aim and the objective of the NLLC22, it was the intent to set up a two-day conference that would: facilitate the exchange of views among leadership and LL experts; enable an extended LL network; and involve high-profile speakers from the academic and think-thank environment to allow a more diverse perspective on LL. The speeches, presentations, and discussions were focused on LL in support of the Warfare Development Agenda (WDA), innovation in support of LL, overcoming challenges in learning enduring lessons[3] from Exercises, and overcoming challenges in learning enduring lessons from Operations. These topics formed the basis for the four panels that were held during the NLLC22 as further described below.

PURPOSE AND SCOPE

6.   The purpose of this Final Conference Report is to inform SACT on how the NLLC22 was conducted and to present key takeaways to be further considered in the framework of the Roadmap (Reference D). The content of this report expands upon the NLLC22 First Impression Report (FIR) (Reference E) and is the result of the synthesis and analysis of the NLLC22 briefings, discussions, comments and remarks, as well as from the review of relevant reference material.

7.   Although the findings and takeaways presented in this report are the result of synthesizing and analysing NLLC22 content, other relevant ongoing efforts in NATO have been taken into consideration in developing them. However, the findings and takeaways

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[3] In the context of this report, the generic term *lessons* refers to any Observation, LI, LL, or BP which is under staffing or concluded the staffing within the NATO LL Process.

should be interpreted as a reflection on individual and/or group contributions and discussions during NLLC22. They neither represent a national or organizational position nor a JALLC recommended course of action, but are solely intended to inform further efforts with regard to the topics to which they relate.

METHODOLOGY

8. Data supporting the production of this Final Conference Report was collected from the following sources:

    a. The NLLC22 online platform – Attendify: Participants had the opportunity to ask questions, provide answers to each other's questions, propose ideas, post comments, share their point of view, and receive feedback from other participants. There were approximately 8000 interactions (i.e. views, comments, and information exchanges) on the NLLC22 online platform, of which about 300 relevant data points were collected for further analysis;

    b. Recorded sessions: all NLLC22 sessions that were recorded and made available in the NATO Lessons Learned Portal (NLLP);

    c. Publicly published articles: daily articles (website and social media platforms) were produced by the JALLC's communications team to provide the highlights from each pf the NLLC22 days;

    d. Rapporteur Notes: Notes taken by a team of JALLC rapporteurs with a focus on capturing ideas and discussions relevant to the NLLC22 objective during individual and panel presentations and discussions for the purposes of the analysis presented in this report;

    e. Feedback Survey: the responses to NLLC22 feedback survey completed by 101 participants, representing almost one third of the registered participants; and

    f. Follow-up email exchange: the correspondence that took place after the NLLC22 with participants who provided relevant comments and ideas.

9. All the collected data was synthesized, analysed, and categorized according to its relevance for enhancing the development of a more effective LL Capability across NATO. Additionally, relevant reference material was consulted to validate and/or expand on some of the collected data in order to formulate initial findings and takeaways.

10. Finally, the initial findings were reviewed and mapped against the four panel topics (LL in support of the WDA, innovation in support of LL, overcoming challenges in learning enduring lessons from Exercises, and overcoming challenges in learning enduring lessons from Operations) taking into account relevant Enabling Lines of Effort and associated milestones within the Roadmap (Reference D).

ACHIEVEMENTS

11. As mentioned in the NLLC22 FIR (Reference E), both the aim and objective of the NLLC22 were achieved through the level of participation, quality and relevance of the information shared, and the subsequent analysis and reporting. Presented below are other NLLC22 achievements that relate to the conference format, participation, the NLLC22 platform and networking, the NLLC22 agenda, and leadership engagement. Whenever applicable, aspects that could be improved for future events are also presented.

12. Overall, with regard to the execution of the NLLC22 in general, the feedback from the participants was overwhelmingly positive, with 98.5% of participants that provided feedback considering the conference was very well (80.6%) or well (17.9%) prepared and facilitated by the JALLC.

NLLC22 Format

13.   Given the lack of clarity on the COVID-19 pandemic's evolution, as well as more relaxed travel conditions, the decision to conduct a hybrid format event was made early on in the planning stages and announced and advertised accordingly within the NATO and wider LL Community. From the feedback, it appears that the NLLC22 participants appreciated the hybrid format as it allowed those attending the NLLC22 in person to hold more interactive panel discussions and provided networking opportunities, while the online audience could follow the event live and interact not only with the organizers, but with all participants.

14.   The length of the NLLC22 (two days) was deemed appropriate as was the mix of plenary sessions and panel discussions (held on the last conference day). However, given that participants were located in different time zones, this limited the number of hours for live broadcasting. Further, the number of participants in the panel discussions was higher than expected for certain panels which meant that the interaction was not as effective as expected. Also, several online participants noted that they would prefer to have the option to attend the NLLC in person when possible, and not be restricted to online audience participation only.

15.   Finally, although it is possible to prerecord online events — which can make the planning and execution of these events more simple — the decision to broadcast live (a best practice from the NLLC21) was one of the aspects of the NLLC22 most appreciated by the participants.

Participants

16.   The number and diversity of the NLLC22 participants is another aspect worth highlighting. Some of the key statistics on the NLLC22 participants are as follows:

a. The NLLC22 counted 317 participants, from different entities across 29 Nations, including four Partner Nation participants from Australia, New Zealand, and Switzerland. The NATO entity participants came from: NATO HQ (8); NATO Command Structure (NCS) (98); NATO Force Structure (NFS) (32); NATO Organizations, Agencies, and Centres of Excellences (53); and National Ministries of Defence (122);

b. 79% were military personnel, 21% civilian personnel; and

c. 78 of the total NLLC22 participants had specific roles during the conference (speakers, panel moderators, contributors) and attended in person in Lisbon;

17.   These statistics show that the NLLC22 audience followed the pattern of previous conferences, with a slight decrease of online audience participation compared to NLLC21, but with an increase of total participants compared to pre-COVID-19 pandemic conferences.

NLLC22 Platform and Networking

18.   The online audience either attended the NLLC22 as live viewers or viewed the recorded sessions on the NLLC22 online platform (Attendify) at their convenience during the event. The average number of views (live and recorded) per plenary session was 667 which, when compared to the number of total registered participants (317), strongly suggests that most of the registered NLLC22 participants received the NLLC22 content.

19.   The NLLC22 online platform was well-received by the participants. Deemed to be very intuitive and to enable networking among the participants as well as easy idea-sharing, this commercial platform was chosen based on the experience from the NLLC21 and after looking at a range of possible NATO Enterprise solutions, in respect of which, none was identified. However, despite the many advantages of using this commercial platform during the NLLC22, and although many functionalities were available from NATO or National duty networks, it was not possible for the NLLC22 team to guarantee full accessibility from these

duty networks to live broadcasting. As a consequence, many participants had to attend the NLLC22 from home.

20.   The NLLC22 platform allowed participants to download the recorded sessions. As such, the NLLC22 team made these recordings and presentations available in the NLLP for future and further use by the NATO LL Community and not just the NLLC22 participants.

21.   Finally, the NLLC22 venue and the agenda timings allowed for good networking opportunities among the participants in-person, while the NLLC22 platform supported virtual networking among the online attendees. However, extended breaks were suggested by participants as potentially improving networking opportunities at the NLLC.

Agenda & Leadership Engagement

22.   In support of achieving the conference objective, the NLLC22 agenda included topics of current interest and provided speakers with diverse backgrounds which ensured the quality of the content of the NLLC22. The speakers, all of whom are either leaders in their area or subject matter experts, hold positions in NATO HQ, NCS, NFS, NATO Communications and Information Agency (NCIA), Academia, and Think-Thank organizations. The NLLC22 content was highly appreciated by the participants as it delivered fully on the NLLC22 theme and provided perspectives from both military leadership and the academic world on LL-related matters. The content delivered ranged from high-level overviews on the current status of the NLLC22 topics, to detailed practical explanations and discussions on the LL-related challenges and opportunities relevant for the NATO and wider LL Community. To a great degree, the level of excellence in terms of content and delivery was down to the panel support, moderation, and facilitation provided by representatives from SHAPE; HQ SACT, the Joint Warfare Centre (JWC), and the JALLC.

23.   Another aspect that received positive feedback was the duration of the daily broadcast. Each day, a maximum of four hours was broadcast during a window that would allow for maximum online participation across nine different time zones between GMT-5 and GMT+12. This allowed most NLLC22 participants to attend the sessions live and minimized the need for participants to solely rely on the recorded sessions for the content.

24.   Finally, the level of leadership engagement during the NLLC21 received excellent feedback, with reference in particular to the benefits of leadership engagement during the conference as well as in developing the NLLC22 agenda. As such, this year the high-calibre speakers attending and contributing to the NLLC22, such as the Deputy Supreme Allied Commander Transformation (DSACT); Deputy Chief of Staff (DCOS) Joint Force Development (JFD) / HQ SACT; Deputy Commander (DCOM) NATO Rapid Deployable Corps (NRDC) Spain; DCOS Support / Allied Air Command (AIRCOM); Former SACEUR; Former Deputy SACEUR; and other Flag Officers / General Officers, Colonels, and high level managers in civilian organizations, were highly appreciated by the NLLC22 participants. This leadership engagement was seen by participants as reinforcing the significance of the NLLC and the expectations from the NATO LL Community in this respect.

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FINDINGS RELATING TO NLLC22 TOPICS

INTRODUCTION

25.   The objective of the NLLC22 was to provide SACT with early findings to further inform the implementation of the Roadmap (Reference D) in support of the enhanced development of a more effective capability across NATO.

26.   Analysis of the NLLC22 data within a wider NATO framework and taking relevant ongoing efforts into consideration, led to several pertinent findings which are presented below in the context of the four panel topics: LL in support of the WDA; Innovation in support of LL; overcoming challenges in learning enduring lessons from Exercises; and overcoming challenges in learning enduring lessons from Operations.

FINDINGS RELATING TO LESSONS LEARNED IN SUPPORT OF THE WARFARE DEVELOPMENT AGENDA

Introduction

27.   This section presents the main points discussed during the panel on the above topic which addressed challenges and opportunities with regard to LL in support of the WDA as well as the key takeaways resulting from these discussions.

28.   The purpose of the WDA is to capture, support, and cohere Alliance warfare development activity in connection with the NATO Warfighting Capstone Concept (NWCC). To achieve the Alliance's goal of implementing the WDA, the Allies must work together through the five Warfare Development Imperatives (WDI): Cognitive Superiority, Layered Resilience, Influence and Power Projection, Cross-Domain Command, and Integrated Multi-Domain Defence.

29.   Although LL capture past experiences, whereas the WDA is a forward-looking effort, LL can potentially support attaining certain of the WDIs. Therefore, the panel discussions focused on ideas, insights, and potential ways in which NATO LL Capability can support and contribute to implementing the WDA and, in turn, how the WDA could potentially contribute to the improvement of the NATO LL Capability. Based on questions addressed by the panel's key speaker during the plenary session, the following main points evolved and were addressed during the panel discussions: improved LL collection and sharing; effective LL implementation; unlearning outdated lessons; and managing LL in support of WDA.

Improved LL Collection and Sharing

30.   The discussions regarding this point evolved from the following questions: "*How can we get collectively better at learning the right lessons from our own military activities – or those of others?*" and, "*Is the LL Process fit for purpose?*"

31.   The discussions revealed that Nations and Centres of Excellence (COE) play a very important role in the WDA's implementation, and as such, there is a need to identify the most suitable Nations and COEs that may help accelerate the process of engagement and uptake of the WDA. More specifically, it was pointed out that WDA-relevant lessons are more likely to originate in the Nations that are ahead in terms of WDA implementation and are more able to act as a spearhead for other Nations as they implement the WDA. As such, knowledge transfer among Allies and between Allies and NATO entities is very relevant from a WDA perspective. In this respect, participants recognized that while some Allies can afford more resources that can advance the implementation of the WDA, others do not have the same

capabilities. Those Allies with more resources should be able to provide feedback and observations relating to WDA implementation to other, less well-resourced Nations, while NATO should encourage the consistent use of NATO LL Process and support Allies to share their WDA-relevant experiences.

32.   However, it was noted that in different NATO entities the NATO LL Process is still perceived as difficult to implement and, due to information sensitivity concerns, some entities are to some extent reluctant to share information, potentially resulting in a lack of coordination and alignment between the NATO LL Process and the WDA milestones. As such, it would seem logical to ensure that the NATO LL Process is part of the NATO-wide strategic alignment and engagement effort with Allies, Partners, and other organizations, in line with the WDIs. However, it was noted that, where lessons are either (overly) complex or perhaps not relevant for all (or at least multiple) Allies, the applicability of such lessons in the context of the WDA will need to be considered.

33.   Regarding the NATO LL Policy (Reference F), the panel members observed that the NATO LL Process—as described in the NATO LL Policy—is not limited to Exercises and Operations, and could be also applicable to the WDA. However, considering the dynamics of WDA implementation, an abbreviated version of the NATO LL Process may be required to deliver lessons to the WDA the right pace. In this respect, the panel noted that the NATO LL Policy refers to an abbreviated NATO LL Process, but does not further expand upon it. As such there may be inconsistent expectations relating to the availability of lessons coming from the NATO LL Process and the timelines for implementation of the WDA Lines of Delivery (LoD). In order to address these issues (expectations and timeliness), an abbreviated NATO LL Process should be developed. According to the panel, this abbreviated version of the NATO LL Process should not be based on identifying root causes (which can be addressed via the NATO LL Process), but rather focused on the trial and experiment of solving existing problems or repeating the best practices (shortening the learning timeframe).

Effective LL implementation

34.   The discussions regarding this point were triggered by the following question: "*How can we more effectively apply LL to our current and future warfare development efforts, through such mechanisms as the WDA?*"

35.   The panel members emphasized that LL are inherently based on past experiences and, as such, it is difficult to envision how to generate and implement lessons during a process that is still on-going, i.e. not yet a past experience. Therefore, we must (re)consider whether the NATO LL Capability is fit for purpose in the context of the WDA. Potential adjustments to the Roadmap (Reference D) were also discussed in this context, such as including new milestones or defining new Enabling Lines of Effort to properly manage any potential LL contributions to implementation of the WDA.

36.   Following this line of thought on the suitability of the NATO LL Capability, panel members also considered how the NATO LL Process, one of the elements of the NATO LL Capability, is perceived. It was noted that the NATO LL Process, is often wrongly perceived as being linear; i.e. lacking *feedback loops* for the various steps in the process, and therefore not able to support effective LL implementation. Introducing *feedback loops* would enable an iterative process that allows for the possibility to return to and repeat certain steps of the NATO LL Process as a better understanding of the underlying problem and potential solutions is gained. The discussions revealed that the NATO LL Process is considered to be flexible enough to allow for *feedback loops* although they are not explicitly mentioned in the technical conduct of the process via the NLLP. One potential way to change this misperception, is to ensure that the NLLP better reflects iterative nature of the NATO LL Process.

37.   As such, in the longer term, lessons Collection Plans relating to WDA efforts could be developed to contribute feedback into the WDA LoDs. In doing so, items in the Implementation Phase of the NATO LL Process (LIs and PoBP) could also be taken into account during the WDA LoDs' review (i.e. not only LLs and BPs which have completed that phase and the NATO LL Process). Additionally, it was suggested that considering lessons (LLs, BPs or items within the Remedial Action Phase) in a comprehensive way, beyond those resulting from WDA efforts, might result in identifying broader issues that need to be addressed in support of achieving the WDIs.

38.   In terms of immediate LL support to WDA efforts, including incorporating initial LL feedback into revisions of the WDA, the JALLC's analysis capability could provide assistance subject to resource availability and priorities. Additionally, the discussions revealed that Simulation and War gaming activities are suitable opportunities to identify potential lessons that could be considered in the context of the WDA's implementation.

Unlearning outdated LL

39.   The discussions regarding this point were triggered by the following question: "*Should we be 'unlearning' some of the lessons of the past and abandoning some of the processes, procedures, and practices that were effective in the past, but may not be fit for the future?*"

40.   The WDA supports the coherence of NWCC activities which detail how NATO should develop its military instrument of power to maintain its advantage for the next twenty years. Therefore lessons should favour change to support the WDIs as part of the future operating environment for the Alliance.

41.   Along the same line of thought, lessons already learned are not written in stone, especially if they do not (or no longer) work in a future operating environment for the Alliance. Therefore, careful consideration should be given to *unlearning* lessons which were learned in the past (recent or distant) or even in the more current operating environment, but which may not be applicable to the future operating environment as envisaged under the WDA.

42.   However, the discussions showed that before any lessons are unlearned, it would be prudent to conduct a status check of so-called *enduring lessons*[4] to ascertain to what degree these have been learned. Over the past 20 years, a plethora of lessons have been made available by NATO entities and Allies. However, whether these lessons have been actually learned (implemented, exploited, and/or considered even) in the past 20 years is questionable. Therefore, NATO needs to request high quality national lessons that would be relevant to the implementation of the WDA. The panel discussions concluded that HQ SACT would be well placed to conduct this activity as a strategic command, rather than the JALLC which is better placed to support HQ SACT via JALLC analysis.

Managing LL in support of WDA

43.   The discussions regarding this point were triggered by the following question: "*Would there be resistance to review and adapt the WDA if required, and if JALLC Analysis was required to support such review, who would be the customers for the JALLC Analysis Project?*"

44.   To address these challenges, resourcing will be key, and HQ SACT appears to be the main LL gateway to the Military Committee (MC) and Allies in this respect. If it was deemed appropriate to use the JALLC's Analysis Capability to analyse the progress of implementation of the WDA and any potential improvements, then the Warfare Development Team / Strategic Plans & Policy Directorate at HQ SACT could be a suitable customer for a JALLC analysis project. This team is responsible for the WDA assessment process,

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[4] Within the context of this report, *enduring lessons* are long-lasting knowledge that is widely applicable in NATO.

intended to include any changes or fine-tuning to the WDA which would then need to be proposed to the MC, in order to re-task the WDA. Furthermore, the existing mechanism to adapt the LoDs would allow for any required changes to be made, ensuring that relevant lessons could indeed contribute to the improvement of the WDA.

45. Furthermore, it was stated that to improve the uptake of LL by Allies, the risk of not implementing / learning lessons should be evaluated. This evaluation would act as a reinforcing mechanism to ensure that lessons are properly learned. However, while this approach may work more generically, regarding the WDA, it may be necessary to develop a different / stand-alone approach to address the specific challenges relating to incorporating LL into the WDA. The Roadmap (Reference D) may provide an opportunity to address such challenges.

Key takeaways

46. Considering the findings presented above, the following takeaways are presented below:

a. The need for a strategic alignment and engagement across NATO, with Allies, Partners, and other organizations in line with the WDIs was re-emphasized. The potential NATO LL Policy update / review may provide some ground for such an alignment from the LL perspective that could allow for improved transfer of knowledge / lessons between Allies and NATO Entities. Knowledge transfer is very relevant from a WDA perspective; some Allies can afford more resources, and can advance more quickly in terms of WDA implementation. As such they should be able to provide early feedback and observations to be exploited by other Allies;

b. There is a need to include feedback loops in each WDA LoD to generate checkpoints that will allow for the. Currently, Simulation and War-gaming activities appear the most suitable venues with the potential to identify lessons that can be further considered in the WDA's implementation;

c. Careful consideration should be given to *unlearning* lessons already learned in the past or current Alliance's operating environment, but which may not be applicable to the future operating environment as envisaged with the WDA;

d. In these early stages of implementation of the WDA, it appears appropriate to further investigate of ways, means, roles, and responsibilities for lessons implementation in support of the WDA, whereby HQ SACT appears to be the main LL gateway to the MC and Allies and to be a customer for any potential JALLC Analysis Project(s) looking at WDA implementation.

FINDINGS RELATING TO INNOVATION IN SUPPORT OF LESSONS LEARNED

Introduction

47. This section presents the main points discussed during the panel on this topic, addressing challenges and opportunities with regard to innovation in support of LL as well as the key takeaways resulting from these discussions. The panel focused on recent innovation efforts with relevance for the development of the NATO Lessons Learned Toolset (NLLT) as well as other NATO and national innovation efforts that may contribute to the improvement of the NATO LL Capability.

48. The panel discussions started with the key question: "*Why should the Alliance innovate and what does innovation mean for the Alliance?*" The contributions from the panel members and audience showed that innovation has many connotations and should not only be understood as a thought, as an idea, but also as a process. As such, innovation in NATO

does not come down only to technology, but requires a certain mindset—reflecting the right attitude towards technology and innovation—and must follow a correct process—reflecting how we can identify and use suitable technology. Implementing new technology does not necessarily mean innovation, as implementing a new process can be just as innovative as any new technology.

49.   The combination of new technology, the right mindset, and suitable processes, reflects the way NATO will need to innovate in order to adapt, stay ahead of its adversaries, and maintain the Alliance's strategic edge. NATO committed to innovation at the Warsaw Summit, which aimed to identify advanced and emerging technologies, evaluate their applicability in the military domain, and implement them through innovative solutions and efforts through a more efficient use of the common-funded capability delivery process.

50.   Recent efforts such as the Defence Innovation Accelerator of the North Atlantic (DIANA)[5] and the Defence Innovation Fund[6] are proof of the innovation mindset in NATO. In terms of governance, the highest level mechanisms in place to promote innovation in NATO include the Innovation Board (NATO Enterprise) and HQ Innovation Unit & Innovation Task Force which follow specific processes to embed innovation in NATO's activities. These processes are fundamental to usher in innovation, as technology only makes sense when processes are updated and up to speed with changing times and when the right people are able to use the right new technologies. Given these efforts, NATO must continue to gain a better understanding of the impact of new technologies such as artificial intelligence and data mining, together with their defence capabilities, on the Alliance's current and future activities.

51.   The panel discussions touched upon the following main topics: innovation efforts in support of the NLLT; other NATO and national innovation efforts relevant to LL; measuring LL effectiveness; and introducing innovation in the organization. The main points relating to the discussion on these topics are presented in the sub-sections below.

Innovation efforts in support of the NLLT

52.   The innovation efforts with relevance to the NATO LL Capability are focused on the development of the NLLT and were conducted from the NATO perspective with the JALLC in the lead for much of the testing and analysis. These efforts included:

a. Big Data Exploration (Reference G) which tried to answer the questions of whether undocumented lessons could be found in NATO Exercise related data and whether lessons could be enriched from such data;

b. Applying Data Science tools (Reference H) (e.g. IBM Watson Explorer, Power BI/KNIME) and techniques (e.g. sentiment analysis, topic modelling, trend analysis, text classification) on the NLLP content to identify hidden knowledge and patterns from the lessons available;

c. Testing the DUCHESS AI Interview Bot (Reference I) in support of verbal LL data collection.[7] The findings were shared with communities supporting Data Science Track / Technology for Information, Decision and Execution Superiority (TIDE) Sprint and NATO

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[5] DIANA is a NATO ground-breaking initiative to sharpen the Alliance's technological edge and was approved on 07 April 2022. Initial details are available online at https://www.nato.int/cps/th/natohq/news_194587.htm , last accessed on 30 May 2022

[6] The Defense Innovation Fund is multinational Fund that will help NATO to retain its technological edge by enabling investment in dual-use technologies of potential application to defence and security. Initial details are available online at https://www.nato.int/cps/en/natohq/news_187607.htm , last accessed on 30 May 2022

[7] Simply explained: DUCHESS is software that works similarly to a survey and a face-to-face interview in the way it collects data. It can collect relatively large amounts of verbal data that can be transcribed automatically for human use

Exploitation Framework Policy as well as during NATO Digital Workspace Conference 2021 and NATO Operational Research Analysts Conference 2021;

d. The Observation Collection & Analysis Tool (OCAT)[8] to support the analysis phase of the NATO LL Process and is expected to begin testing in the second half of this year; and

e. Development of a NATO LL Ontology,[9] as a potential solution to the persistent problem within NATO of consistently and coherently mapping NATO LL related terminology in order to avoid inaccurate results during searches and other LL related research as well as to allow for a more efficient data gathering and analysis.

53.   Some challenges were highlighted with regard to these innovation efforts, which included: bureaucracy, excessively long financial request processes, NATO risk-avoidance approach, and also the challenge of applying commercial software and tools within NATO and adapting them to the organization's needs and specificities. Such challenges have been overcome with the support of Subject Matter Expert NATO civilians working alongside the military with experience in NATO, which allowed them to navigate the challenges more easily.

Other NATO and National innovation efforts relevant to LL

54.   With regard to NATO efforts, one of the points discussed during the panel session relates to harmonizing National and NATO LL systems and how the Roadmap (Reference D) could support this harmonization by synchronizing all relevant efforts. With regard to harmonizing national LL systems, it was emphasized that the JALLC submitted a proposal for standardization over one year ago, but it is still under staffing in the NATO Standardization Office, pending the NATO LL Policy review before moving ahead on standardization.

55.   Discussions also covered HQ SACT's efforts to develop innovation hubs across Allied Command Transformation (ACT), noting that innovation hubs alone may not be enough unless they can connect with NATO staff outside the ACT Innovation network that can then act as link with staff in other NATO entities. Another innovation effort discussed in this context, relates to NCIA's work using the Google Artificial Intelligence BERT model[10] and its adaptation for NATO purposes. The intention is to use this system to improve search results related to NATO terminology.

With regard to the National perspective when it comes to innovation, the US Joint LL Information System (JLLIS) was brought up as an example of a system that represented a huge step forward in 2008 when it was launched. As a single system with a comprehensive search engine ─ as opposed to multiple systems ─ has facilitated information sharing and improved efficiency and effectiveness in this area (operational benefit). There are also the obvious financial benefits to having a single system in place, able to incorporate the data from all relevant users (Joint Staff, Combatant Commands, Services and Support Agencies,

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[8] OCAT is a module under development within an Innovation Branch / HQ SACT project sponsored by the JALLC. The intent of the project is to develop a Minimum Viable Product addressing some of the user requirements for the new NLLT.

[9] An ontology is a shared way of representing entities, ideas and events, and their interdependent properties and relations in a given field. Development of an NATO LL Ontology will allow the capture of a collective understanding of NATO LL concepts in a form that is both machine- and human-readable.

[10] According to https://blog.google/products/search/search-language-understanding-bert/ , last accessed on 30 May 2022, BERT stands for Bidirectional Encoder Representations from Transformers. BERT model was developed by Google as a Transformer-based machine learning model for Natural Language Processing applications and it is usually pre-trained on a large corpus of text, then fine-tuned for specific tasks.

etc.) rather than financially supporting multiple systems. The JLLIS registers around 8000 active users and includes both structured (nearly 450 000 individual observations) and unstructured (about 400 000 files such as documents and presentations) data.

56.   However, the discussions revealed that the JLLIS is not a perfect system and has become a victim of its own success; the sheer amount of data collected and stored in the system makes it almost impossible to properly analyse it, especially with a very limited number of analysis personnel available. To address this issue, a new system is being developed ─ intended to be implemented by the Autumn of 2022 ─ with an improved user interface that will perform trend analysis and review all available data and then identify anomalies and tag them so that (human) analysts can narrow down search results. Moreover, the new system will have automated meta-tagging with 90-95% expected accuracy.

57.   With regard to the NLLT, the panel members and audience noted that several elements that are being developed in the context of this new JILLIS/LL system, such as search functionalities, workflow processes, automation, automated tags, content and trend analysis, that are required in support of LL data analysis and exploitation are also user requirements for the NLLT. As such, tracking the deployment of the new JILLIS/LL system and understanding from developers and users the benefits and challenges of the new deployed version could inform the development of the NLLT within the Information Management for Capability Delivery (IMCD) framework.

58.   Another challenge discussed during the panel related to cyber-security and its impact on software development and updates. The current pace of development and updates is deemed too slow (every three months) in light of the pace of cyber threats. As such, to increase NATO's cyber responsiveness increasing the frequency of updates should be considered.

59.   Finally, the discussions touched upon the so called Rhetoric vs Reality Gap model. According to this model, users usually don't know what they actually want from technology and they don't know what technology can offer them. According to some participants, this is the case for many within the NATO LL Community as available new technologies may not (always) form part of their training or immediate interest. Additionally, the lengthy bureaucratic procurement processes, difficulties in using commercial/government products for NATO purposes, and challenges relating to the many different NATO duty networks with access limitations add another level of complexity for staff gaining awareness of new technologies.

Measurement of LL effectiveness

60.   One of the challenges discussed by the panel members and audience relates to measuring how effective the LL process is within an organization and what innovative tools can be used to measure this. These discussions revealed that:

a. Not every lesson reflects the same level of urgency and applicability so that the lesson's relevance should be assessed and promoted from the early stages of the NATO LL Process. A LL Ontology could enable this by supporting the relevant LL system to be trained to assess the lesson's relevance;

b. Tracking a recommendation or remedial action associated with a particular lesson is difficult. An example was provided with regard to recommendations from JALLC reports. Approximately 50% of recommendations in published JALLC reports could not be tracked to confirm their implementation.[11] An innovative tool able to measure LL effectiveness and address this issue would be a tailored computer application with the ability to review

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[11] The findings are part of a JALLC internal research project on tracking the status of recommendations from published JALLC Analysis Reports.

all (or specific) NATO libraries and identify the recommended remedial action of the lesson in question; and

c. The number of observations collected is not a proof of LL effectiveness. While a significant number of observations may reflect the LL mindset in an organization and a well-defined procedure for observation collection, it says nothing about the quality of such observations which is key to true LL effectiveness. This qualitative side of assessing the accuracy and relevance of those observations and documenting the changes resulting from the implementation of remedial actions, is a more complex and challenging activity, certainly within NATO, but it is another way to measure LL effectiveness. However, assessing LL quality will almost certainly always (at least for the foreseeable future) require human analysts / staff to finally process the information generated by any software in order to make this kind of assessment.

Introducing innovation within an organization

61.   In addition to understanding how innovation can support LL, the panel also discussed ways to encourage bringing innovation to all levels of an organization as an essential starting point for innovating in LL. The following suggestions were made by the panel in this respect:

a. Communication and awareness of innovation activities and tangible outputs are key to introducing innovation within an organization;

b. Encourage a more innovation-inclined culture in the organization, involving both leadership and staff;

c. Nominate multiple Points of Contact who stimulate and support innovation inside the organization, keeping in mind that everyone can do innovation. Having an innovation branch or dedicated innovation staff, doesn't mean they do the innovation but rather that they can make innovation easier for other staff to do. This approach is very similar to the LL approach in an organization;

d. People cannot be *trained* to be innovative; a person's mindset is the fundamental driver for innovation in an organization. Sometimes it is enough to allow people who are naturally creative to express their innovative ideas, removing all the negative and cumbersome processes and limitations. Although NATO is a complex organization, the recently developed innovation framework proves that innovation can make its way into an organization. Moreover, national influence on NATO to adopt an innovation mindset is important; Nations seem to be more flexible in promoting and following up good innovative ideas. This positive national experience in innovating could be used for the benefit of NATO LL Community by taking advantage of relevant multi-national projects within professional networks such as those conducted by NATO Science and Technology Organization (STO); and

e. Finally, measuring the success of innovation efforts in an organization is easy in terms of financial pay off, but in the defence sector it is not that straightforward. In industry it's all about the bottom line, so you can trade-off the profit made from one successful innovation against the costs of the 99 unsuccessful innovations it took to reach that one success. A project might fail, but the lessons from that failure might be worth the investment in that *failed project*. But in defence, it is more difficult to measure the impact of the successful innovation in a way that accounts for the money spent and the benefit obtained, especially if we consider that the cost of failed innovation in the military context, may be the lives of soldiers on the ground.

Takeaways

62.   Considering the findings presented above, the following takeaways are presented below:

a. There is a need to bring the innovation into the organization in order for the LL community to benefit as well. It requires the right mindset, as the main driver for innovation, and the involvement of both the staff and leadership;

b. In addition to new technologies, processes, and the right mindset, the Alliance needs the people with right skills in order to be able to combine all these elements into innovation. As such there is a need to train LL experts in data science concepts that, in addition to learning from individual observations / lessons, can help extract tacit knowledge from unstructured data from exercises, operations, and routine activities using a *big data* framework;

c. LL effectiveness is not about *quantity* but about *quality* and organizational changes leading to improvement. Innovative tools should be identified to support the measuring of LL effectiveness;

d. There are several efforts supporting the development of the innovation framework and mindset in NATO. Some of them support the improvement of the NATO LL Capability and the ongoing work to develop the OCAT and NATO LL specialized ontologies and lexicons remains relevant for the development of the NLLT;

e. There are benefits of multi-national collaboration within the Science and Technology Organization network with regard to identifying lessons, projects, and new technologies available in/from nations. Such lessons, projects, and new technologies could be considered in terms of the capability development efforts towards the delivery of the NLLT, as the main effort within the Innovation Line of Effort of the Roadmap (Reference D). Similarly, the experience gained in the US from developing and deploying the next version of the JLLIS as well as the related lessons and best practices, should be considered during the development of the NLLT.

FINDINGS RELATING TO OVERCOMING CHALLENGES IN LEARNING ENDURING LESSONS FROM EXERCISES

Introduction

63.   This section presents the main points discussed during the panel on this topic which addressed challenges and opportunities with regard to learning enduring lessons from Exercises as well as the key takeaways resulting from these discussions.

64.   The scene was set by the key speaker who reminded the audience in the plenary session the rationale behind why NATO conducts Exercises, which includes: deterrence, assurance, preparation for Operations (crisis and war), to improve existing capabilities, enhance interoperability and standardization, and to maintain or increase readiness and responsiveness. However, while the rationale was considered to be correct, the questions raised during the panel discussion refer to whether or not the right things are always exercised. Given the frequency of NATO exercises and their importance to the Alliance and the Allies, the NATO LL Capability should be engaged to support the improvement of the Exercises and potentially contribute to addressing some of the related challenges.

65.   In this respect, based on their NATO, international-, national-, and personal-experiences, the panel members discussed several aspects of learning lessons from Exercises which related mainly to: leadership's role in driving the LL mindset in exercises; lessons collection and prioritization; and constraints of the Exercise Stage 4.

Leadership role in driving the LL Mindset in exercises

66.   The role of leadership and the effect of having the right LL mindset was a key theme in all the points made during the panel discussions. This is equally important for exercises as

for operations and routine work since several organizations are involved and the LL culture and mindset usually differ from one organization to the other.

67.   Examples were given of leadership engagement in Crisis Management Exercises, when the commitment of top NATO leadership led to the involvement of the leadership across the NATO entities and in the Allied Capitals which took part in the exercise. This commitment and engagement, in turn, resulted in the collection of not only relevant, but also significant observations supporting the next exercises. This example serves are proof that if the leadership set the right pace to where the organization wants to go in terms of learning lessons, then learning lessons becomes an elemental aspect of how the Alliance conducts business.

68.   The panel also discussed a significant challenge to learning enduring lessons from exercises resulting from the frequency of staff rotation. Staff rotations often (inadvertently) lead to an organization overlooking the lessons collected and the implementation of remedial actions from one iteration of an exercise to the next (i.e. in a series) or among different exercise series, which can result in reduced situational awareness at the leadership level. Potential ways to address this challenge discussed during the panel included establishing regular meetings with leadership to address key points from exercises and formulate the right lessons. An example along these lines referred to a Commander who, in order to mitigate the impact of lost knowledge due to staff rotation, had regular meetings with relevant leadership HQ and LL staff to assess and prioritize the HQ's lessons. Doing so meant that the Commander remained aware of LL related information despite staff rotations. Moreover, as a result of these types of meetings, the LL efforts in that command were re-energized and became part a routine activities. Also, considering that senior leaders are more interested in insights at the strategic and operational levels rather than technicalities of conducting the NATO LL Process, cross-functional staff involvement in such meetings could provide more diverse insights and ensure common understanding of capacities and limitations of the LL staff. This point highlights the long-held observation that leadership and HQ staff require information and knowledge from and for their particular area of work, not descriptions of the NATO LL Process.

69.   Similarly, the panel noted the significance of senior leadership rotation in NATO Commands in this respect. In order to take the most advantage of their knowledge, a debriefing of lessons / insights that they have experienced during their tour of duty would be beneficial for the incoming leadership as well as for the staff. As such, the personality of the leadership becomes critical in sharing their own experiences and, as a result, driving the LL mindset in the organization as the fundamental for an organizational LL culture.

70.   Finally, starting from the point that lessons are everyone's responsibility and that NATO exercises are complex with cross-functional impact on the force readiness, a need for greater accountability was noted. More accountability would commit staff and leadership to implementing the remedial actions relating to lessons associated to their predecessors or relating to exercises that are not on the respective command's agenda. It is important to note that the idea of accountability for driving lessons along the Implementation Phase of the NATO LL Process was mentioned in previous LL events, especially during the New Technologies Event 2018 (Reference J). All of the above, of course, requires a clear understanding of lesson relevance and progress, and confirmation that both the diagnosed problem and solution are appropriate and achievable.

Lessons collection and prioritization

71.   In order for lessons to be learned effectively from exercises, focus areas or priority topics are required so that the collection and analysis of relevant observations are properly conducted. In this respect, part of the panel discussions focused on the various tools that each NATO entity has for collecting observations from exercises. However, it is worth noting that different panel members mentioned different collection tools and noted the challenges

with accessibility to such tools during the exercise on the respective exercise Wide Area Network. These differences and discrepancies highlight the lack of cohesiveness across NATO in terms of using LL tools to collect observations from NATO exercises. As such, the panel members acknowledged that implementing better cohesion in this respect is even more important when considering the vast amount of observations being collected from NATO exercises. This challenge has been already considered in the Roadmap (Reference D) which presents specific milestones to optimize the collection of observations and exploitation of potential lessons from exercises.

72.   The panel also discussed the quality of lessons and impact of collecting lessons based on a bottom-up or top-down approach. The bottom-up approach is more prevalent, where the individuals collect the observations in Observation, Discussion, Conclusion, Recommendation (ODCR) format and observations of suitable quality make their way to leadership for approval / consideration following the NATO LL Process. The top-down approach involves senior leadership whereby the collection of lessons is focused more on strategic and operational insights in any format suitable to the context. The discussions revealed that both approaches should be followed during lessons collection in exercises: staff collecting observations which will ultimately be uploaded into the NLLP according to internal procedures; dedicated teams, working close with the senior mentors and leaders, to capture insights with more relevance for the leadership, usually by organizing strategic workshops at the Commander level. Moreover, panel members and the audience discussed that, compared to operations where there is a quick implementation of remedial actions, in some cases remedial actions concerning lessons from exercises tend to be treated at a slower pace with a different level of interest, and in the worst cases are not implemented in time (or at all), leading to the recurrent learning of the same lessons.

73.   Participants also discussed that once valuable observations are captured in exercises, it is important to know what the priorities are in order to direct the analysis resources to determine not only remedial actions but also their collective strategic significance. In order to support the LL analysis of data collected, the panel considered that while the ODCR format is suitable for the collection of tactical and operational observations, a more adequate and flexible format should be considered for collecting high level observations and insights with the potential to lead to strategic relevant lessons. As such, in the exercise context, innovative technological solutions with appropriate collection and analysis functionalities should be consider to ensure prioritization of observation collection and to conduct more automated analysis.

Constraints of the Exercise Stage 4

74.   Another significant part of the panel discussions centred on Stage 4 of an Exercise: Exercise Analysis and Reporting. Stage 4 is unique in the sense that it covers the entire Exercise Planning process with the main focus on determining whether the exercise succeeded in achieving the Exercise Aim and Objectives of the Officer Scheduling the Exercises and the Training Objectives of the Officer Conducting the Exercises. This stage also includes the analysis of all observations captured during the previous exercise stages in order to obtain valid LIs/LLs/BPs on both operational and exercise issues. The analysis is conducted on the full dataset collected over the entire exercise, not only during the execution of the exercise.

75.   During the discussions, the panel touched upon several key challenges for learning enduring lessons in Exercises and pointed out some potential solutions to address these challenges:

   a. The cadence of the analysis and reporting that occurs during the 18 to 24 months of the exercise process often does not result in the intended level of organizational learning. The main challenge for this comes from the fact that the analysis is conducted after the event so that it is often perceived as an activity that only takes place after the exercise has

been conducted (i.e. an after action activity) and sometimes is overlooked. The panel discussed the constant learning and sharing of tangible outputs as a potential way to shape the Training Audience's mindset towards effective lessons learning during Stage 4 of an Exercise;

b. Directive 75-003 of the Two Strategic Commands (Bi-SC) (Reference K) imposes very tight time lines, considering the overall HQ battle rhythm and the resources available. After the Wales Summit, the exercise level of ambition increased dramatically but the exercise reporting timelines were maintained (e.g. to deliver the FIR within 15 days). The Subject Matter Experts within the panel and audience recognized that these timelines are very demanding and restrictive for the full perspective from an exercise to be gained. A potential solution to these challenges is to make exercise reporting timelines more flexible, taking in to account the level of ambition, inherent complexity, and the available manpower resources.

Key takeaways

76.   Considering the findings presented above, the following takeaways are presented below:

a. The need for Leadership commitment and engagement to the NATO LL Process is a recurrent theme and central to the discourse of how to harness learning enduring lessons in Exercises. Leadership engagement can be achieved by explaining the value of lessons, demonstrating quick wins, and marketing positive change;

b. Reviewing Bi-SC Directive 075-003 would be a good and timely opportunity to innovate, adapt, and apply lessons, so that the exercise design can ensure appropriate prioritization and collection of observations as well as the analysis efforts based on the commander's focus areas. In order to ensure that Commanders' have the opportunity to discuss their observations and reflections, provide insights from the exercise, and establish priorities, strategic level workshops (post-exercise) may be suitable venues to achieve this;

c. The current exercise Stage 4 timelines for delivering robust analysis products are somewhat compressed for current and growing exercise complexity, which restrains learning lessons through NATO exercises. Awareness needs to be raised among staff that LL is a part of the exercise, rather than an after action activity. Innovative ways to show that LL is an opportunity to improve the way NATO works, rather than an extra reporting burden, may serve to improve the quality of LL in exercise reporting. Additionally, the NLLT may, in the future, may be able to support LLSOs in terms exploiting large datasets generated during exercises, using innovative new technologies in support of effective learning.

FINDINGS RELATING TO OVERCOMING CHALLENGES IN LEARNING ENDURING LESSONS FROM OPERATIONS

Introduction

77.   This section presents the main points discussed during the panel on this topic which addressed challenges, opportunities, ideas, and potential changes with regard to learning enduring lessons from Operations as well as the key takeaways resulting from these discussions. The subjects discussed by the panel touched upon: the changing nature of NATO operations, applying the NATO LL Process in operations, leadership and LL mind-set, and LL information sharing.

Changing nature of NATO Operations

78.   As the NLLC22 sought to provide a flashback of two decades of learning to gain insights for the next five years, the panel engaged in a discussion of how NATO operations have evolved during this period to lower intensity conflicts with a focus on crisis management and cooperative security core tasks. Consequently, most lessons relate to these types of operations and led to relevant changes in the policies, doctrine, and capabilities relating to these two core tasks.

79.   However, the fast evolving global security environment and the challenges it poses show that the future Alliance's operating environment will drive the nature of future NATO operations which will likely involve multi-domain, complex, intense, and fast operational environments with more focus on collective defence. As such, the NATO LL Capability will need to adapt accordingly and consider in more depth the relevant archived lessons and new lessons coming from exercises to ensure the Alliance is fully prepared for the new nature of operations.

Applying the NATO LL Process in Operations

80.   One of the key challenges discussed by the panel refers to how to embed lessons in operations planning activities. In order to ensure that lessons are part of the planning process, LL priorities and guidance should be included in both strategic and operational level plans, and LL repositories (starting with the NLLP and continuing with national repositories) should be consulted to identify topical lessons before an operation.

81.   Another challenge pointed out by the panel was the exploitation of lessons in operations at the speed of relevance to ensure availability of the right capabilities and successful operational conduct. Therefore, the operational commander needs to ensure the observations are collected *during* operations and submitted within the NATO LL Process and not afterwards.[12] As such, the LL battle rhythm should allow for LL decision making and resource commitment to ensure that the NATO LL Process leads to the implementation of tactical, operational, and strategic remedial actions in a timely manner. Increased frequency of the review of observations and LL reporting as well as the delegation of authority to lower ranks to decide on certain remedial actions was seen by the panel as potential ways to support learning lessons at the speed of relevance in operations. Additionally, consideration should be given whether a single NATO LL Process is appropriate for all levels of activities (tactical, operational and strategic) or if this process could/should be tailored differently for each level.

82.   Finally, similarly to other panels, staff rotation was identified as a serious challenge in this context, especially given that the staff deployed to operations rotates usually every six months (rather than every three years as for a regular NATO tour of duty). Those assigned to the LL structure in an operation will often have limited (NATO) LL experience and, most of the time, LL is their secondary responsibility in theatre. This makes it difficult for them to consistently apply the NATO LL Process and gain sufficient knowledge and experience to ensure effective learning in operations.

Leadership and LL Mindset

83.   The panel members noted that the importance of NATO LL Capability as an enabler of successful operational conduct is not always recognized by leadership at the strategic level. Consequently, a lack of leadership interest and prioritization of LL activities may result in the lower levels incorrectly underestimating the importance of LL. This misperception of the

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[12] In this respect, the Roadmap (Reference D) includes a specific Milestone to address the issue of information exchange between Mission Classified and NATO Classified networks in order to allow appropriate information exchange through Information Knowledge Management systems operations and the NATO LL Portal.

importance of LL in operations may then impact the general ability to maintain or build the appropriate LL mindset. Additionally, given the organizational structure and the position of the LL staff within this structure ─ which rarely report directly to the command group ─, leadership may not have direct access to LL insights that could influence their decision making, risking that LL activities are consider as a low priority. A potential way to mitigate this risk is to consider the introduction of an LL Advisor to the Commander with the intent of bringing key lessons from the operation to the Commander's attention in a timely manner which could help to reinforce a LL mindset across the organization.

84.   The panel members also discussed situations in which leadership may be reluctant to implement remedial actions or changes resulting from the NATO LL Process because oftentimes their focus is on the current operation and they may perceive such changes or remedial action as a risk to mission success (e.g. a new procedure may be perceived to be more risky than a well-known, tried and tested procedure). However, failing to learn lessons could reduce effectiveness/performance and ultimately jeopardize mission success.

LL information sharing

85.   The panel members recognized that LL information sharing remains a challenge in operations. The panel noted that there may be a reluctance to raise observed issues internally and/or share lessons externally due to the organizational culture, security classification, and technical constraints. Additionally, national information security restrictions for the national contingents deployed in operations and the availability of lessons in languages other than English, are potential barriers to appropriate and timely LL information sharing.

86.   LL information sharing becomes even more challenging when dealing with Partners (e.g. International and Governmental Organizations; Partner Nations) who are likely to use different LL processes or who may not be willing to share due the national culture or sensitivity/security classification of the information. Additionally, the systems and formats used in national LL processes may not be interoperable with NATO's systems and formats, making the transfer of LL information difficult. However, the panel recognized that both during and after operations, Partner Nations are inclined to share valuable LL information and feedback supporting improved interoperability and working together in theatres of operations.

87.   The panel also discussed potential ways to support improving LL information sharing in operations. Tailored LL training and showcasing successful stories could be ways to encourage the LL sharing mindset among the staff and trigger Leadership's attention to the benefits of their engagement in this respect. Also, using functionalities of new technologies (e.g. one-stop-shop for LL, translation functionalities, etc.) could enable better lessons sharing while a standardized approach to LL sharing could encourage increased transfer of LL information from national systems to the NLLP.

Key takeaways

88.   Considering the findings presented above, the following takeaways are presented below:

a. Compared to the last two decades, during which NATO faced low intensity operations focused on crisis management, the future may expose NATO to multi-domain, complex, intense, and fast operational environments, focused on collective defence. In order to be prepared for this potential future reality, NATO may need to reconsider the way NATO LL Capability is employed in operations;

b. Changes in the operating environment and the speed of relevance required for implementing remedial actions may lead to the need to consider different versions of the NATO LL Process for different levels (e.g. tactical vs. strategic) and continuous collection

of observations throughout the duration of the operation and not only during after action reviews;

c. Leadership engagement is critical for the proper functioning of the NATO LL Capability in operations. Empowering lower ranks to approve lessons sharing as well as placing a LLSO within the operational HQ as an advisory element at command group level are potential ways to encourage a LL mindset and enable effective implementation of the remedial actions;

d. LL information sharing among the Allies and Partners continues to face some limitations. Providing LL training, advertising successful LL stories, standardization, and incorporating new technologies in LL tools, may be suitable ways to overcome barriers to LL information sharing relating to mindset, interoperability, classification, and technical issues.

WAY AHEAD

89.   The findings and the key takeaways presented in this report reflect a series of challenges and potential ways to address them in support of effective and innovative learning from exercises, operations, and routine activities. This report will be shared with the members of the NATO LL Working Group and of the NATO LL Steering Group for further consideration and decision on potential follow-up actions during the Fall 2022 LL Week. As such, the findings and key takeaways in this report may lead to adjustments or new milestones within the Roadmap (Reference D) to support future improvements of the NATO LL Capability.

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Annex A
GLOSSARY OF ACRONYMS

ACT	Allied Command Transformation
AIRCOM	Allied Air Command
Bi-SC	Of the two NATO Strategic Commands
CoE	Centre of Excellence
D&G	Directions and Guidance
DCOM	Deputy Commander
DCOS	Deputy Chief of Staff
DIANA	Defence Innovation Accelerator of the North Atlantic
FIR	First Impression Report
IMCD	Information Management for Capability Delivery
JALLC	Joint Analysis and Lessons Learned Centre
JFD	Joint Force Development
JWC	Joint Warfare Centre
LL	Lessons Learned
LoD	Line of Delivery
NCIA	NATO Communications and Information Agency
NCS	NATO Command Structure
NFS	NATO Force Structure
NLLC	NATO Lessons Learned Conference
NLLC22	2022 iteration of the NATO Lessons Learned Conference
NLLP	NATO Lessons Learned Portal
NLLT	NATO Lessons Learned Toolset
NWCC	NATO Warfighting Capstone Concept
OCAT	Observation Collection & Analysis Tool
SACT	Supreme Allied Commander Transformation
STO	Science and Technology Organization
TIDE	Technology for Information, Decision and Execution Superiority
WDA	Warfare Development Agenda
WDI	Warfare Development Imperatives