



NATO C2COE CONTRIBUTION OPERATOR FIRST

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The comparatively young NATO Command and Control Centre of Excellence, our third lustrum approaching, hereby congratulates all involved with the milestone you achieved; producing a professional magazine for the (Dutch army) signal officer for more than fifty years now.

As a multi-national knowledge Centre on Command and Control working for NATO, we have strong established bonds with your audience. Not only did the Centre in 2007 partly sprout of the former C2 Support Centre in Ede, officers from the Netherlands Army signals branch served and still serve within our ranks. And there is another, more inspirational aspect: we both aim not only to 'signal' but especially to connect, maybe better expressed by the Dutch term 'verbinden'.

In our case the connection appeals to the interoperability challenge, not only between national services but especially in and between NATO formations at the operational level. Here the campaigns and major operations are planned, conducted and sustained to accomplish strategic objectives within theatres or areas of operations. The main portion of NATO forces are, sometimes per mission, made available to NATO by the nations. Interoperability between these national contributions, sometimes small-sized, is key. Over 70 years now NATO is working to achieve and maintain this ability to act together coherently, effectively and efficiently. The final aim is a coherent and interwoven package of people, processes and technology. At the operational level, the remaining gaps and issues regarding interoperability in NATO become apparent.

For our topic, Command and Control, these relate to:

- the interrelated aspects planning, synchronization, battle rhythms and battle space management in a HQ;
- information management (overload, access) between and across multiple layers;
- cultural approaches (working in a multinational environment);
- civil-military interaction (whole-of-government approach);
- understanding doctrine and terminology (including 'jointness', C2 relationships and authorities);
- education and training (on processes, tooling) and
- networks (including service management), connectivity (standards).

Based on the joint and multinational manning and individual backgrounds, the very modest-sized NATO C2COE focuses its contributions on three areas. The currently eight subject matter experts deal with staff processes and procedures, information and knowledge management and human factors including leadership.

The work package is annually assigned by the sponsoring nations and mainly fed by the Allied Command Transformation divisions' requirements. It also includes own C2 studies



which the Centre as an advisory body deems necessary. In its total package the NATO C2COE tries to steer and achieve a balance between conceptual and practical work. In the Centre's strive for applicable C2 knowledge, it tries to bridge the two. Our SMEs therefore actively engage on C2 with the training audiences in the major NATO exercises. Also they discuss with students and their course support during education. Finally they confront academia with 'the operator's reality' during working groups and writing sessions (for example in NATO Science and Technology Organisation initiatives).

As the field of C2 is very broad, the Intercom magazine editions will always cover some aspects of Command and Control. But in many definitions and common speech C2 is seen as identical to communication and information systems (CIS). While CIS is an important enabler, it is not the only element. C2 is a typical socio-technological endeavor and hits all aspects of inter-

operability, which is as stated before, the capability to operate together.

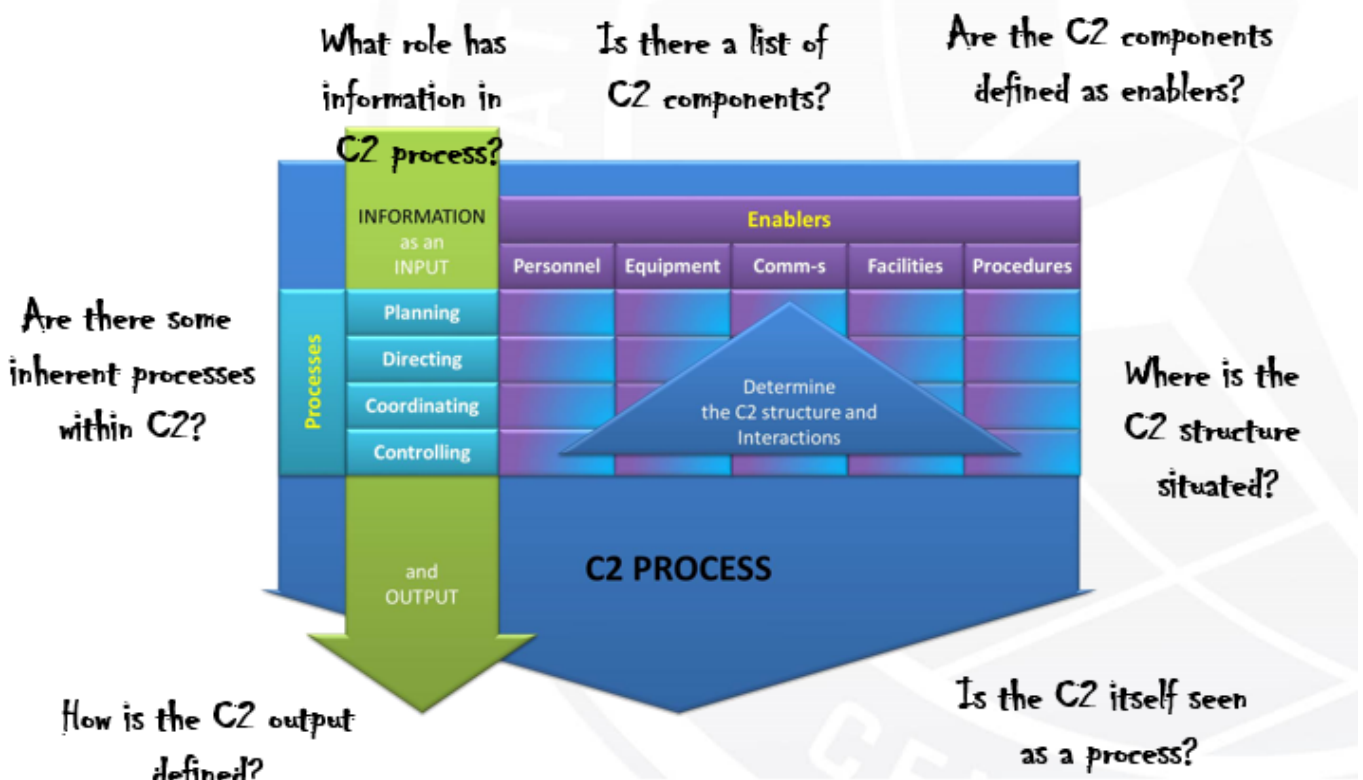
Besides specific articles within the focus areas, such as the 2014 'C2 in de wereld van morgen' (C2 in tomorrow's war) article or the articles regarding the Federated Mission Networking (FMN) initiative, the Centre carefully reads the Intercom as it contains other valuable content. Many articles thoroughly explain technical developments for CIS 'dummies'. These readers get a better understanding of and maybe grip on the potential impact of technology on operations. As 'C2 is in everything' (immediately add 'but not everything is C2'), these articles enrich the insights on the potential benefits of available, new technology for commanders and their staffs.

Last but not least the value of the sometimes mind teasing contributions of the columnists should be mentioned. This all makes that the Intercom reaches and should continue to reach out to a bigger audience than just the Netherlands Army signals officer.



Congratulations and keep on doing your good work

The previous part described the connection between Centre and the Intercom magazine. It concluded that we are partly reaching out to the same audience. Both the magazine and the NATO C2COE contribute to the warfighting capabilities (using the word of the day). This next part shares some general C2



C2 model used to discuss and describe the C2 characteristics



observations and provides a few elaborations on topics of common interest the Centre is dealing with.

A first remark is that the Intercom presents many promising, often national/bi-national initiatives which support the C2 process. However our strong impression is that these cover the requirements of specific customers and are not always linked to a high-level architecture, or organizationally supported. In many countries, as within NATO itself, the formal procurement processes are outpaced by technology development in the commercial industry, which might lead to implementing yesterday's solutions in the military. In our opinion all efforts should be directed with cooperation with others and especially integration in NATO formations in mind. NATO itself has as well many stove-piped tools which cover the requirements of the joint functions but do not facilitate easy cross-functional information exchange. This all implies the need for an overarching architectural approach and doctrinal coherence. Both the Intercom and the Centre support solving NATO's interoperability challenge. In our opinion the main driver at the moment for providing solutions on people, processes and technology is the Federated Mission Networking initiative (FMN).

FMN is meant as the vehicle to achieve optimal C2 in multinational formations from day one. Since its assessment of its predecessor, the Afghan Mission Network (AMN) in 2012, the NATO C2COE is monitoring FMN development. Therefore the Centre is involved in the Operational Coordination Working Group, which should act as the operators' voice for requirements and their fulfillment. Based on own experiences, it can be stated that as a participant it is very difficult to track developments, substantially contribute and keep up the speed. Understanding the terms (jargon), procedures, the responsibilities of the organisational structures and their relationships and absorbing the huge piles of information and making sense of it, is a difficult task to master. This even more applies to the national representatives, often not dedicated to this sole topic and frequently rotating, who represent the too busy warfighter. The latter is totally unaware of these structured efforts to better support him and just longs for working solutions, using his totally networked civilian/home environment as the

reference. He might even not be aware of the improvements already brought upon him by the successive FMN implementations (called Spirals). The existing FMN communication strategy to highlight these achievements stays pale.

Generally speaking, it can be stated that FMN currently is a huge, continuous synchronization effort regarding processes, technology and systems, the ability to share. However, the mental/cultural aspects of FMN, the willingness to share, are hardly ever mentioned. And there is another aspect to this; successful communication depends ultimately on the ability what is meant rather than what is said. Achieving the goal, FMN Ready Forces (at Day One) instead of arranging interoperability in the mission 'on the fly', requires bridging the gap between the operators, planners, the budget officials and the technical developers. Ambitions with regard to the pace of progress have to be realistic and the internal organisational process, the management of the required change in nations requires attention. Finding the balance between the identified need and the possibility to incorporate the available solution, is a difficult one. For overcoming blockades by procurement (timeliness), an approach to consider the implementation of next FMN-Spirals as exploitation of network capabilities instead of investments in new technologies.

The initiative is, as the (rather) easy fixes were implemented, in our opinion reaching a critical phase. The 'going with the flow' for the participating nations and organisations is over; real commitment to implement and decide on standards without room for deviation, is required. It can already be observed that the complaining by nations about the previous processes and its management has started. Where were you brother?¹

This statement might sound a little provoking but the position of COEs working for but not being part of NATO, allows them to look at the organisation from some distance, to explore, to reflect and to provide an independent opinion.

The NATO C2COE hopes that the Intercom in the same spirit will continue to provide its broad audience with valuable information and food for thought for professional development.

Keep doing your good work! For the operator!

As stated before interoperability consists of three interrelated aspects: people, processes and technology.

The Centre is aware that many signal officers tend to focus on technology. For the NATO C2COE, based on its manning, most attention is paid to people and processes. Based on the advisory role the Centre works with annual themes, aspects of C2 that the members explore. In 2018 the topic was the Future of the Command Post. The study was divided into two parts with their own focus. In accordance with previous NATO C2COE's studies, the future operational level HQ is expected to host similar joint functions as is currently done, but the way these functions are supported will differ by the implementation of new technologies.

Over the last decade, everybody saw revolutionary technological developments. This technology will continue to evolve and impact the operating environment. NATO needs to embrace the solutions technology provide for its C2 processes, be it in hardware or data driven analytics and predictive analysis in order to counter the challenges and threats in multiple domains, both physical, cyber as societal.

Our studies foresee a future HQ with the following characteristics in order to conduct C2 more efficient and effective:

- Distributed information and dispersed physical locations;
- Increased use of (already present day) technology for a commander and staff;
- Incorporated AI-enabled tools for some of the key C2 processes within the decision cycle (e.g. situational awareness and decision-making support) and
- Support by non-human intelligent collaborators (NIC).

Currently we see that HQs at NATO' operational level, are not in a position to structural think about the future, state

their requirements and incorporate adequate solutions.

Their decision-making support systems are based on their daily routine and multiple stove-piped. Senior leadership is well aware of the advances of new technology and willing to use automated supporting systems. Despite this they also firmly state that decision-making remains the Commander's prerogative. All interviewees stated that trust is required for AI-human teaming as all are aware of inherent risks.

As a next step to help HQs in formulating their requirements the NATO C2COE built in 2020 and widely showcased, cautiously dealing with COVID, the so-called MDOC2 Demonstrator². This concept integrated existing intelligent solutions, providing Commanders customized, real-time high-level information on demand.

Last year quite some effort was spent to develop the MDO term³. In our opinion MDO reflects the awareness that conflict is ongoing on a daily basis in our societies, below the threshold of reaction. The Russian action in the Ukraine and Krim led to stressing the capital M of Military but should have led to reconsidering our decision-making in the Alliance and the orchestrated use of the other means/instruments of community power. In our opinion MDO, achieving effects not only in the traditional military domains but throughout societies, therefore is not a Joint Force Commander's responsibility but needs to be addressed by statesmen who have to (re-) learn to think strategically. And isn't the Gerasimov-doctrine, a Russian reflection on their biggest nightmare (as experienced with the Orange-revolution)?

This might at a first glance not fully appeal to signalers, but is besides the term 'warfighting' (where do we as military prepare for?), a hot topic all military have to be aware of. The NATO C2COE already followed the trend by adding the term to its C2 Demonstrator. Following NATO you easily get the impression that the Alliance is a master in changing organisations, launching concepts and related terms, without always a thorough deepening and/or continuation. Who still remembers NNEC or CFI? In the annual 2015 C2 seminar participants already concluded that even the rather general term 'joint'/'jointness' is not clear and that clarity how to best implement it in organisations such as JTF HQs originating from the NATO Force Structure was lacking. The identification of this gap led to drafting of the NFS JTF HQ Handbook in a cooperate effort by JALLC, JWC and the NATO C2COE⁴.

It might seem that the text is deviating but in the end modern C2 is about how to plan, direct synchronise, balance and assess the effects of the available means in the nations' toolbox. Where to start if you are not able or willing to communicate? The task is to create a culture in society that is flexible and innovative and where individuals connect and take responsibility for results; moving away from their own organizational bureaucracies where formulaic approaches dominate. Signalers with their 'natural' curiosity in technology, awareness of military processes and related information requirements, knowledge of applicable tooling and attention for information management are ideal to enable to connect; personality though might be their biggest skill.

¹ More information on NATO C2COE opinions on FMN can be found in especially our 2019 Annual Overview available on our site www.c2coe.org and podcast on FMN (C2 and beyond series on YouTube and Spotify)

² See the whitepaper on our site www.c2coe.org

³ A white-paper was delivered to ACT in April 2021; the 2020 webinar including pre-reads focused on the topic; all material including a podcast and the webinar review report are on the website

⁴ NR classified; available on NSWAN