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A method for IO manning requirements assessments using the N2C2M2 –
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A method for IO manning requirements assessments using the N2C2M2 – or enlightenment through conceptual development

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The doctrinal definition and descriptions of information operations (IO) explicitly state that IO is a coordinating function of information activities, not a capability in its own right. Armed with this understanding, the authors thought they were well prepared when given the task of assessing manning requirements for IO. However, taking the definition seriously led to unforeseen challenges and results.

In order to create a method enabling structured argumentation based on more than arbitrary guesswork, the authors decided to use the North Atlantic Treaty Organization (NATO) Network Enabled Capability (NEC) Command and Control Maturity Model (N2C2M2) as a framework for analysis. Four conceptual elements were identified and concretized: C2 approaches, high-level and abstract IO capabilities, tasks and manning requirements. An analysis dimension with requirements for each C2 approach tied these elements together. The combination of C2 approaches and IO capabilities enabled the authors to establish proof-of-concept levels of ambitions for IO.

The paper describes the aforementioned elements, the thinking behind their selection and combination, some results from the application of the method for the operational level and further conceptual reflections about the IO-C2 relationship. Suggestions for improving the conceptual foundation of IO by using the developmental path of C2 are made.

Section 1 – Introduction

Assessing manning requirements for information operations (IO) is a task that heavily relies on subjective judgment. Despite definitions and descriptions, guidance in doctrine is sparse at best. This makes it important to somehow facilitate discussions on this issue with a higher degree of consistent argumentation and explicit assumptions, rather than pure (or at best informed) guesswork with unclear and implicit assumptions. Our intent with this paper is to put forth some ideas as to how a discussion about manning requirements for IO may be structured and framed with the help of Command and Control (C2) conceptualization and theory, and in the light of this, point to a possible development path which may improve the conceptual foundation for IO.

The main content of the paper is the description of a method that was developed to aid in the understanding of IO manning requirements for the operational level, i.e., the Norwegian Joint Headquarters (NJHQ). A core element was the establishment of levels of ambition, here through the use of the NATO NEC Command and Control Maturity Model (N2C2M2). By linking certain conceptual elements together, it became possible to reflect a chosen level of ambition in the manning requirements. The elements of the method are described based on our first proof-of-concept iteration of the development cycle. There is a subtle difference between the method in itself and our current instantiation of it; other ways of concretizing the elements may be preferred. The adaptability of the method is one of its strengths.

The paper is structured as follows. In Section 2 the necessary background of IO and C2 theory is given. In Section 3 methodological issues are addressed. In Section 4 the conceptual elements in our developed method are described. In Section 5 levels of ambition are defined and the conceptual elements tied together. In Section 6 the method and its larger implications are discussed. Section 7 is the conclusion and Section 8 future work.

Section 2 – Background IO and C2 theory

Information operations is, according to NATO doctrine, a coordinating function of information activities.¹ To a large degree situated at the operational level, IO can have its fingers in a lot of different pies: Psychological operations (PSYOP in NATO or Military Information Support Operations (MISO) in the US), Electronic Warfare (EW), Computer Network Operations (CNO), Military Deception (MILDEC), Operational Security (OPSEC), Presence, Posture and Profile (PPP), Key Leader Engagement (KLE) and not the least kinetic operations. Indeed, the problem of IO or information activities becoming everything, and therefore nothing, has been raised [1, 2]. Various ways of constraining IO has been recommended in literature, for instance by separating the technological from the more human oriented (i.e., systems and content) [2].

Manning requirements describe how many people are needed, and what type of skills and competencies they need. Assessing manning requirements for IO requires a stand on what to include and exclude under the IO umbrella, as this presumably will affect requirements. Our way of handling this is by asserting that while we chose a wide IO definition (i.e., not categorically dividing the technical from the human), our focus is the IO function proper. Underlying capabilities or activity areas as listed above generate a need for staffing, yet this should be covered by the capabilities themselves. The IO function facilitates coordination, and the (chosen) definition or understanding of coordination drives the manning requirements.

When digging deeper into this problem, three necessary criteria emerged:

¹ The whole definition is: “Info Ops is a military function to provide advice and co-ordination of military information activities in order to create desired effects on the will, understanding and capability of adversaries, potential adversaries and other NAC approved parties in support of Alliance mission objectives.” [10]. A newer definition is slightly different, but the 2007 definition was used as it is referenced by current doctrine [6].

- First, it is necessary to choose a level of ambition, as doing what is difficult presumably requires more resources than doing what is easy. A high level of ambition will therefore require more manning than a low level of ambition.
- Second, an explicit method is needed to tie the levels of ambition to the manning requirements. The alternative is reliance on professional judgment alone (otherwise known as making stuff up).
- Third, the method must bridge the internal and external. What you do internally in your organization must be logically linked to external accomplishments (in the operating environment).

In an ideal world, we would be able to get an overview over everything it is possible to do or accomplish, categorize it according to difficulty, link it to the internal operation of the organization and then derive and assess manning requirements. Given our timeframe, however, this was deemed too difficult. An alternative we believe to be valid was identified: using Command and Control theory as a framework for understanding coordination, and by extension, the function of IO.

A focus on C2 was deemed appropriate for several reasons. For one, C2 is a major part of the role of the operational level for IO. It is not optional – if IO is to be done, an element of C2 will be present. The conceptual foundation of C2 is well developed, with an extensive and consistent vocabulary as well as mature conceptual models. Note that a focus on C2 does not imply that the capabilities used in the execution of information activities should formally be placed under the command of an IO section; it merely means that C2 models may be used to analyze the implications of an organization or group working with IO in different ways. In particular, we found that the N2C2M2 could provide a foundation for discussing levels of ambitions for IO, which in turn implied different manning requirements.

The N2C2M2 is at its core a three dimensional C2 approach space (a cube).² A group of actors – or in more correct parlance, a collective of entities – who work together will be positioned somewhere in this space. Working together, in this instance, means that they seek related ends without necessarily being under the same command. The collective can be inter- or intra-organizational, and the level of granularity can be adapted to suit your purpose. At one end you can have a small group of people, and on the other a group of large organizations.

A position in the C2 approach space is described by three aggregated variables used as axes:

- Distribution of information (going from none to broad).
- Patterns of interactions (going from tightly constrained to unconstrained).
- Allocation of decision rights (going from none to broad).

² The description of N2C2M2 in this chapter is in whole based on the SAS-065 publication “NATO NEC C2 Maturity Model” [3].

The aggregated nature of these variables means they cannot be measured directly. Rather there is an underlying Conceptual Reference Model (CRM) defining hundreds of variables, whose values determine the actual position in the C2 approach space [3].

While the axes are continuous, five C2 approach regions have been defined: Conflicted C2, De-conflicted C2, Coordinated C2, Collaborative C2 and Edge C2. These C2 approaches have a central role in how we later define levels of ambitions for IO, and they are quite different with regards to information sharing, cooperation and decision making. On one end, Conflicted C2, everybody does what they want to do. There is very little sharing of information and very little interaction between the actors. Everybody decides what to do without regards to what the others are doing. On the other end, Edge C2, there is much information sharing, and much interaction and cooperation between the actors. Decision making has been delegated to the collective as whole.³

For each of these C2 approaches, a certain level of synergy is expected. This can be illustrated by variations of the expression “ $2+2=4$ ”.

- For Conflicted C2, $2+2<4$, due to negative (adverse) cross-impact. The actors in the collective will unintentionally create problems for each other.
- For De-conflicted C2, $2+2=4$: the actors will neither aid nor hinder each other.
- For Coordinated C2, you begin to see some synergy: $2+2>4$. The actors start working together towards related goals. You have some positive cross-impact.
- For Collaborative C2, you see a greater level of synergy: $2+2>>4$. The actors have a common plan.⁴
- For Edge C2, you see a very great level of synergy: $2+2>>>4$, making it possible to achieve the desired result with fewer resources ($1+1>>4$). The common understanding and common intent is so great that self-synchronization is possible.

An obvious question is why a collective would not always seek to operate with Edge C2. The reason is that while Edge C2 provides the highest level of synergy, it also has the highest cost. Indeed, the cost increases as the approach climbs upwards from Conflicted C2 to Edge C2. The “best fit” C2 approach is a function of the mission, the collective, and the operational environment.

³ The delegation of decision making may be done informally without affecting command relationships.

⁴ Note that by definition there is one common plan for a joint force. However this does not mean the joint force automatically operates with Collaborative C2, as doing poorly in some areas can lower the actual C2 approach. The underlying variables in the CRM need to be assessed to see the actual position in the C2 space.

Section 3 – Method

The idea that C2 theory could be used for understanding coordination, and by extension IO, was gained through a flash of insight. Indeed, the entire process, the method for creating the proof-of-concept method, is characterized by unforeseen flashes of insight rather than a series of analytical steps. Knowing our end point (manning requirements) and having decided upon a starting point (C2 approaches), the challenge we faced was essentially bridging the gap: how to create a logical chain from one to the other, with the resulting method fulfilling the criteria from the three realizations (include levels of ambition, avoid relying on professional judgment alone, link the internal and external).

When we bridge the gap, as described in the following sections, there is a number of choices made; choices that can be made differently (e.g., our categories of competencies, the way we describe capabilities or limit the number of levels of ambitions, to mention a few). Some readers may say that our choices are made arbitrarily, or at least are insufficiently supported by scientific argumentation. To a large degree, we agree with this objection. There may be many alternative starting points, and many ways of bridging the gap. We have not validated our method theoretically, nor used empirical data to critique or test it. This has never been an objective, and we do not make such claims. We are merely presenting a way of looking at a problem, and describing some of the insights that resulted from going through a development process. If we claim any sort of validity, it has more to do with achieving internal consistency in argumentation than guaranteeing correctness of results when applying the method.

Section 4 – Bridging the gap

Given the starting and end points, bridging the gap becomes an exercise in creativity. A fairly obvious step is adding tasks, as manning requirements consist of a number of people with certain skills and competencies. These people utilize their skills when performing tasks; therefore tasks and manning are logically tied tightly together. The gap between tasks and C2 approaches is still so large, however, that it is difficult to bind these two elements directly together. Our solution is to define a set of high level, abstract IO capabilities, which bridge the last gap.

This gives us four conceptual elements:

- C2 approaches.
- IO capabilities (high-level, abstract).
- Tasks.
- Manning requirements.

C2 approaches

The C2 approaches have been described in section 2 (Conflicted C2, De-conflicted C2, Coordinated C2, Collaborative C2 and Edge C2).

IO Capabilities

Introducing something called IO capabilities may make those with an IO background skeptical. After all, NATO's IO policy is clear: "IO is not a capability". This is not under dispute: when we use the term IO capabilities, we use it in a very particular way and are not referring to force structure elements. Rather, we are affirming that although IO is a staff function, it is introduced because something is to be improved. This improvement may be seen as an improvement of a high level, abstract capability. This capability is a direct result of the combined work done internally in the IO organization⁵ (for instance in the Information Operations Working Group or IOWG), and is revealed through achieved effect externally. The intention behind implementing IO in your organization should be an assumed increase in your ability to do something – if not, the whole exercise seems rather pointless. Consequently, while this step may appear on the surface to be in violation of the IO policy, this is not the case.

Defining IO capabilities enables us to logically link tasks with C2 approaches. An IO capability, we postulate, may function or operate with a certain C2 approach. Through these capabilities we can also start to make explicit what the IO contribution and added value is. We have chosen to define four capabilities, where we distinguish between reactive and proactive on the one hand, and offensive and defensive on the other. In combination this results in the following four IO capabilities:

- Reactive defensive.
- Proactive defensive.
- Reactive offensive.
- Proactive offensive.

We use the terms reactive and proactive to reflect that it is a radical difference between reacting quickly, under time pressure, with a limited decision making foundation available in advance; and preparing for future possible events by doing more in advance. A reactive capability tries to solve a problem or situation as it appears, and it is at that point that the effort is focused; while a proactive capability tries to predict and exercise effort before it happens. A reactive and proactive capability may (by our definition) achieve the same degree of effectiveness, but they presumably will be built in different ways and draw upon resources differently. From the perspective of the operational level, we postulate that reactive and proactive capabilities have the strongest affiliation with the Operations section (J3) and the Planning section (J5) at the Joint level, respectively.

The four capabilities are per definition descriptive, not normative. By this, we mean that the capabilities point to actual capabilities that an organization to a certain degree have or have not, without any recommendations of developing one or the other.

⁵ IO organization in this context is a virtual organization of entities that perform defined IO tasks, considered independently of any overlap with existing organizational elements.

Tasks

The high level, abstract IO capabilities are realized through the tasks done by the IO organization. The newest NATO policy for IO used the words analyze, plan, assess and integrate, which we took as a starting point for specifying IO tasks [4]⁶. It soon became apparent that tasks in peacetime and armed conflict may be different, due to a difference in focus; we therefore defined two separate task category lists.⁷

On the uppermost level, we defined the following tasks categories for peacetime: project management, planning, analysis and assessment, common operational picture for IO (COP-IO), exercises and external analysis. For a time of armed conflict, we defined project management, Chief IOWG, planning, analysis and assessment, force buildup and facilitation, and external analysis. The task category of external analysis was included, since it is a prerequisite for the IO apparatus to work. Various communities will typically conduct their own analyses, upon which the IO organization must perform their own analysis.

The task categories were then further broken down into tasks. See Figure 1 and Figure 2.

- **Task project management**
 - lead, oversee and coordinate IO work at the operational level
 - ensure flow of products
- **Task planning**
 - develop and revise plans for future operations
 - plan IO activities in daily national peacetime operations
 - participate in planning processes at the strategic and tactical levels
 - support national troops abroad
- **Task analysis and assessment (a&a)**
 - a&a of activities, effects
 - a&a of current state, desired state, change strategy
 - IO operational picture
 - consequence assessments (estimates in advance) of traditional actions
- MOP/MOE
- participate in analysis at the strategic and tactical levels
- **Task exercise**
 - establish exercise and training objectives for IO
 - develop injects given the exercise and training objectives for IO
 - integrate IO in exercise planning
 - monitor, control and adjust IO game play (as Exercise Control)
 - lead IO (as players)
- **Task external analysis**
 - our own information infrastructure
 - adversary information infrastructure
 - vulnerabilities
 - the equivalent for «soft» disciplines

Figure 1 Tasks for IO in peacetime

⁶ Now superseded by MC422/5 [11].

⁷ This categorization matches the way the Norwegian Armed Forces operate, with an expanded organization in armed conflict compared to the peacetime organization.

- **Task project management**
 - ensure flow of products
 - lead IOWG
- **Task Chief IOWG**
 - Represent IO in higher forums
- **Task planning**
 - participate in battle wheel groups and teams
 - pro-off: assess space of options, plan exploitation, follow up plans
 - pro-def: assess space of options, plan exploitation, follow up plans
 - rea-off: monitor and react
 - rea-def: monitor and react
- **Task analysis and assessment (a&a)**
 - activities, effects
 - current state, desired state, change strategy
- IO operational picture
- consequence assessments (estimates in advance) of traditional actions
- MOP/MOE
- participate in analysis at the strategic and tactical levels
- **Task force buildup (support)**
 - facilitate transition
 - support liaisons
- **Task external analysis**
 - our own information infrastructure
 - adversary information infrastructure
 - vulnerabilities
 - the equivalent for «soft» disciplines

Figure 2 Tasks for IO in armed conflict

The tasks reflect our understanding of IO; other perspectives may result in different yet valid breakdowns of tasks.

Manning requirements

Just as we needed to make the tasks explicit, we also needed to make skills and competencies explicit. First, we recognized that military personnel and civilian personnel have quite different terms of employment. Military personnel (officer grade in Norway) typically change positions every third year, while civilians remain in their positions. This makes it important to separate these two categories, as some types of knowledge and competencies have to be built and developed over a longer period of time. The specialized and knowledge-intensive nature of IO led to a requirement of high academic education, typically five years or more at university level, for the civilian category. This does not hinder an officer that fulfills the academic requirements, and have the option of longer term employment, from being responsible for carrying out the “civilian” tasks; but the division of military from civilian skills and competencies made our analysis easier and reflects current organization fairly well.

The different types of competencies that the two categories may possess are fairly high level and abstract. For officers, we have made a distinction between “general military competency”, and “competency of military planning”. This distinction shows the difference between the general military understanding that all military officers of a certain age, rank and experience are assumed to have (which a civilian typically do not), and the more specific area of military planning (i.e., at the operational level) which requires additional education and training.

For the civilian category (for simplicity’s sake called analysts), we distinguished between three different competencies. The first, operational analysis, is fairly uncontested as an area of competency. The second, technology (i.e., filled by a technologist) may also be an acceptable

area of competency. However, the third competency, “soft”, and its relation to the second is more contentious – indeed, it is in fact slightly embarrassing to put on paper. Dividing competencies or the sciences in hard and soft is a move that many technologists prefer: there are those who understand the nuts and bolts of technology, and then there is everybody else. Such a world view is of course overly simplistic. However, there is so much uncertainty in how the defined tasks should be performed or solved (which in turn impact the competency requirements), that it is difficult to be more specific.⁸ Yet we also believe that at this point in our analysis, it is sufficient to use a broad brush like this to enable the next step in the method. As more experience with performing the actual tasks is gained, this step may be revisited and updated with a higher degree of fidelity.

Section 5 – Establishing possible levels of ambition

A level of ambition, as we use the term, is a possible level of performance or of goal achievement that is clearly defined and which may be used as a measure of a desired standard.⁹ For IO, we want to see what levels of ambition are possible and choose among them to guide development along a desired path. It is not obvious, however, how levels for ambition for IO may be defined, or how they are tied to manning requirements. Our solution is to root them in C2 theory.

In this section we define the theoretical space for levels of ambition, before adding constraints so that we have a more manageable space. This enables us to specify three different levels of ambition, before looking closer at how we in principle use underlying factors and fundamental dimensions to tie the four aforementioned conceptual elements together. Finally, we look at how the three levels of ambition differ with respect to a specific fundamental dimension called the analysis dimension.

The theoretical space

The N2C2M2 defines five C2 approaches, and we postulate that the four IO capabilities may operate with one of these approaches. Given that the C2 approaches are ordered, with an expectation of an increasing degree of efficiency and effectiveness, we get five possible development levels for each capability.

The level for each capability is assumed to be independent of each other. Four capabilities and five C2 approaches give a theoretical space of $5^4 = 625$ combinations. Each combination is a possible level of ambition for C2 of IO: a decision of what individual C2 approach each of the four capabilities should have.

⁸ AJP 3.10 from 2009 (current) has in fact explicit but coarse competency requirements pointing towards an understanding of Systems Theory; these have been removed in a draft of new doctrine [12]. No suggestions have been made instead – we believe this is an indication of the difficulty of linking IO tasks to specific and detailed competency requirements.

⁹ Theoretically, a set value of any type of variable may reflect a level of ambition.

Limiting the theoretical space

It requires too much resources to analyze 625 alternative levels of ambition. We therefore explored ways of reducing the theoretical space. One way is to add constraints which make it possible to ignore most of the alternatives.

C2 approach	Reactive defensive	Proactive defensive	Reactive offensive	Proactive offensive
Edge C2	5	5	5	5
Collaborative C2	4	4	4	4
Coordinated C2	3	3	3	3
De-Conflicted C2	2	2	2	2
Conflicted C2	1	1	1	1

Figure 3 Matrix of possible levels of ambition

Figure 3 is a visualization of the theoretical space. The four IO capabilities have one column each, and the five C2 approaches have one row each. The possible development levels for the capabilities are ordered from 5 (Edge C2) to 1 (Conflicted C2), top down. The constraints we apply to this space are as follows:

- Edge C2 is utopian, consequently all combinations with 5 are utopian.
- Conflicted C2 is dystopian, consequently all combinations with 1 are dystopian.
- Collaborative C2 was deemed too hard to analyze within our available timeframe, as it presumably would require too many changes in how the NJHQ actually work. Consequently, all combinations with 4 are excluded from this analysis.

With these constraints, we are left with $2^4 = 16$ combinations, where we can choose between 3’s and 2’s (Coordinated C2 and De-conflicted C2).

Choosing three levels of ambition

We want three possible levels of ambition that are attainable within reasonable time. The highest possible – Coordinated C2, or just 3’s – and the lowest possible – De-Conflicted C2, or just 2’s – are obvious choices for high and low, respectively. An intermediate solution must be a combination of 3’s and 2’s.

To find this intermediate solution, we add a hypothesis saying it is easier to attain 3’s (Coordinated C2) with a defensive capability than with an offensive capability, given the same resources. The basis for this claim is that we know ourselves better than we know our adversary, and that it is easier to find and gain access to information about ourselves. We also assume that it is somewhat easier, analytically, to assess the probable effect of defensive IO

on our own systems and largely internal audiences, rather than the effect of offensive measures which to a larger degree involve external systems and audiences.¹⁰

Consequently, the three levels of ambition are:

- 3-3-3-3, Coordinated C2 (high)
- 3-3-2-2, intermediate solution with stronger defensive capability (medium)
- 2-2-2-2, De-Conflicted C2 (low)

Underlying factors and fundamental dimensions

In order to describe the IO capabilities for each level of ambition, we look closer at the underlying factors that enable the capabilities to function at the different levels. We have chosen to designate these fundamental dimensions. These dimensions are examined in order to answer questions like “what is our reactive capability for defensive IO”, or “what is necessary to attain an offensive capability at the high level of ambition.” This approach is somewhat analogous to the work of SAS-065, as they have the CRM with underlying variables that are measured when the higher level factors are assessed.

Finding underlying factors and fundamental dimensions systematically is a difficult task, which we deemed too large for our development work. For our proof-of-concept realization of the method, we decided to limit ourselves to one dimension which we have some experience with: the analysis dimension. As we consider analyses supporting decision making to be critical for good IO, we feel such a focus is proper.

Note that the levels of ambition comprise the capabilities in their entirety, with an associated hypothesis about effectiveness in their external impact. Equal levels of ambition do not imply that the capabilities have the same values or the same balance in their underlying factors or fundamental dimensions. A proactive capability may have a greater requirement for analysis than a reactive ability, but this does not necessarily imply a lower level of ambition for the reactive capability. Our approach may favor the analysis dimension for proactive capabilities, but this may be compensated for by emphasizing other dimensions or types of analysis for the reactive capabilities, which have yet to be explored.

Other factors that may give a more complete picture have been tentatively identified, for instance span of control. The number of “underlying” capabilities (EW, CNO, PSYOP, etc.) and the size of their management element may affect the amount of work that the IO function must perform, yet it is not completely clear what the impact is. It may be argued that larger and an increased number of underlying capabilities may lead to a more extensive management task for IO, but also the opposite: more of the management task may be delegated to the underlying capabilities. Due to issues of this kind, our work has been limited to the analysis dimension.

¹⁰ This is, of course, a simplification given the interdependency of systems and the flow of information amongst various audiences.

Concretizing the analysis dimension

To concretize the analysis dimension for the five C2 approaches, we based our thinking on the idea of positive and negative cross-impact. The objective of avoiding negative cross-impact between actors by partitioning into areas of responsibilities is already emphasized for De-Conflicted C2 [3].

For IO, however, we believe that the flow of effects and consequences from actions and activities does not constrain itself to easily bounded spheres. The consequence of this is that to avoid negative cross-impact, it is necessary with analyses in advance of operations that look at all activity areas simultaneously – from the use of technology and infrastructure oriented capabilities, to human oriented capabilities – and at the possibility for cross-wise flows of effects. It is not enough to de-conflict activities.

An example may be clarifying. De-confliction of EW and PSYOP is recognized as desirable, because you don't want EW to jam frequencies that PSYOP is using to spread messages. However, we consider that to be de-confliction on the action level. De-conflicting on the effect level raises other questions: Can the PSYOP-message affect any of the assumptions or conditions in the analyses of the other disciplines? Or vice versa? If so, how? For instance (though not limited to):

- The fact that we are now jamming certain frequencies, how will people react to that? Can the jamming itself be perceived as a message? How will that be interpreted by different audiences? What types of behaviours and actions may that trigger?
- Can someone twist the fact that we are jamming, or present that in such a way that it conflicts with the message we are communicating through PSYOP? What will then happen with the effect of the PSYOP message? Will the effect be greater or smaller? By how much? What is the probability of someone trying this? Is it something we should be prepared for? Or can we just ignore it?
- Can the PSYOP message lead to behaviour and actions that remove the reason for jamming, or make the jamming work against the intention? ...

The need for avoiding negative cross-impact leads us to postulate that one of the fundamental prerequisites for attaining De-Conflicted C2, is a joint analysis and decision making foundation for IO where causality, measures, effects and consequences are analyzed across activity areas in advance of operations.

Based on this we define the following criteria for the different levels within the analysis dimension:¹¹

¹¹ Implicit in these criteria, as inherited from the C2 approaches, is the assumption that it is easier to identify and negate negative cross-impact for IO, than to identify and attain positive cross-impact.

- For Conflicted C2, each individual discipline falling under IO does its own individual analyses, and there are no attempts at looking at them jointly. Resources potentially work against each other, and effectiveness is lost ($2+2<4$). This is the starting point.
- For De-Conflicted C2, there is an attempt at a cross-disciplinary¹² analysis with consequence and effect assessments (estimates) across individual disciplines. The intent is to avoid the most obvious negative cross-impacts, so that a level of synergy where $2+2=4$ may be attained. Some positive cross-impact may be identified by chance, but not in a predictable or structured way.
- For Coordinated C2, there is an analysis with consequence and effects assessments (estimates) based on an analytical, traceable, re-testable methodology across all disciplines. The intent is to not only avoid negative cross-impact, but to explore the possibility for positive cross-impact ($2+2>4$).

An overview of the four conceptual elements and how they are tied together by the analysis dimension is given in Figure 4:

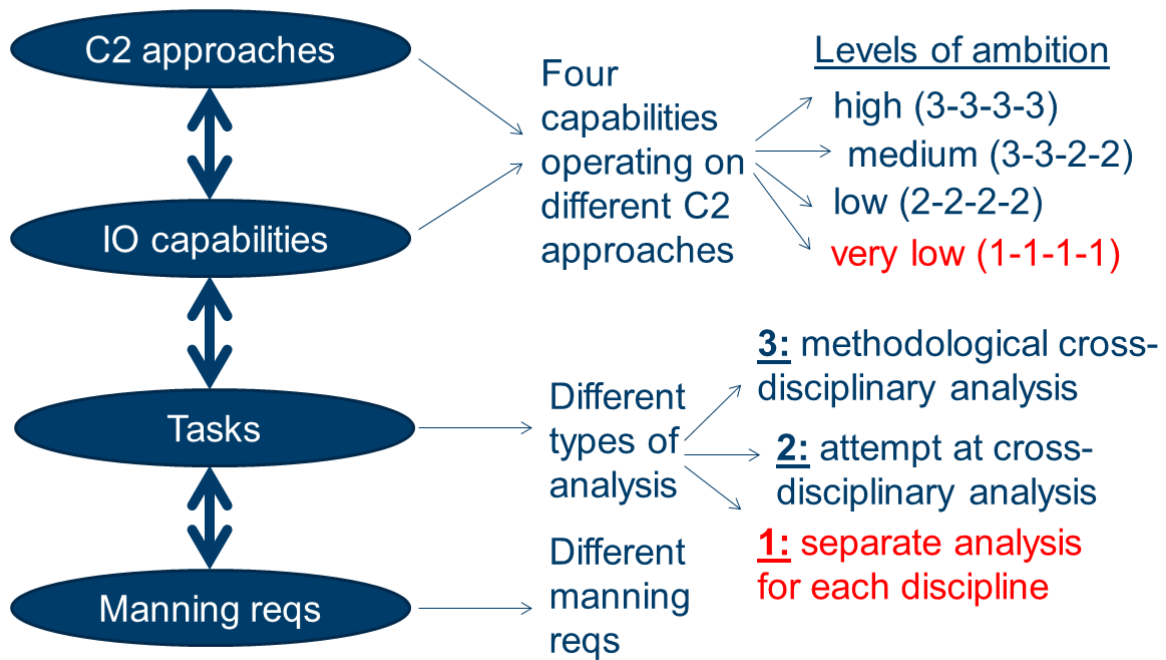


Figure 4 The four conceptual elements and the analysis dimension

¹² The word “cross-disciplinary” in this context refers in principle to the IO disciplines, not academic disciplines. Given the range of IO disciplines, however, there may be similarities with academic cross-disciplinarity.

Section 6 – Discussion

The developed method delivers fairly well on the three criteria defined in section 2:

- There are explicit levels of ambition, which can be used to assess our current way of operating or help us reach our desired state.
- The conceptual elements guide us in our assessments, not leaving everything to subjective judgment.
- By using the C2 approaches from the N2C2M2, there is a link between internal operation and external effect: the expectation of different synergy levels enables us to create an argument chain connecting what we do to what we can expect to achieve.

The method does not, however, relieve us completely of subjective judgments or “leaps of faith”. There will always be a point where a possibly flawed assessment performed by a human-in-the-loop must be done; and there may be multiple combinations of the number of people and skills and competencies that may be used to solve a given task. The subjective element is present, but guided by a framework.

As previously mentioned, the method has been applied for the operational level, i.e., the NJHQ. Applied in this context means using the tasks described earlier, and assessing the number of people and competencies required for attaining the three levels of ambition. The result is an overview of an organization, with manning requirements for a peacetime organization and for armed conflict. The exact details of our assessments remain classified; however there are two clear trends:

- First, analysis drives the level of ambition. A high or low ability to do analysis either enables or hinders you from reaching a certain level of ambition. The planning side can be highly developed, but good analysis must still be fed into it. Increasing the numbers of military planners will not improve overall IO capability beyond a certain point. Even a low level of ambition has, relatively speaking, a greater need for analysis than we suspected. If analysis is only done separately for each discipline, by definition even the low level of ambition (De-conflicted) will be beyond reach.
- Second, the manning requirements increase when the level of ambition increases, even when people start working more and better together. This may appear to be counterintuitive, given our use of the N2C2M2 with increasing levels of synergy. The reason is the increasing complexity of the analysis task, driving manning requirements upwards. We believe it to be so great that the demand for more analytical effort actually trumps possible reductions in manning requirements due to improved forms of working.

There are certain issues that we have not explored in this first instantiation of the method. An example is the relationship between proactive and reactive capabilities. Are they complementary, in that some issues are best handled by one or the other, or are they

competing, in that usage overlaps? Our hypothesis is the former, but this is in truth an untested assumption. Another example is the unknown effect of introducing other concepts like agility [5] into the mix. A rethink may become necessary, for instance does agility have consequences for our interpretations of what it means to be proactive or reactive? There is also the possibility of the coordinating IO function itself being affected by the C2 approach in unforeseen ways, for instance by changing (modifying, adding, or removing) the defined tasks. These are all issues we have identified, but not explored in any depth.

That said, a fruitful way of looking at the method and discussing its broader implications, is through the lens of C2 conceptualization and C2 theory. We believe the conceptual challenges of IO to be of a similar nature as those for C2. In the NATO SAS groups, C2 is interpreted broadly and encompasses information gathering, management, sharing, exploitation and supporting individual and collective decision making [3]. Likewise, we see that IO encompasses analyses, assessments, exploitation of information and support to decision making. If the conceptual challenges are similar enough, it might be advantageous to utilize some of the approaches used for C2 conceptualization, in the development of a conceptual foundation for IO.

The idea of a CRM is an excellent case in point. In the current instantiation of our method, we use only a single fundamental dimension to tie the four conceptual elements together – the analysis dimension. Ideally, there would be a link in the form of a dimension or factors for each task that is defined for IO, with clear specifications of how those factors are affected by the different levels of ambition. This is done for the analysis task, but not for the other tasks. A CRM for IO, mapping out relevant variables and the relationships between them, may be necessary. It is worth noting that the CRM for C2 preceded and laid the foundation for the higher level abstract thinking of the N2C2M2.

However, in order to facilitate the creation of a CRM and other conceptual development, it is necessary to address what we find to be a major issue in the field of IO: that the rationale for IO, and how this bounds the concept and shapes the implementation, is poorly linked and described. In doctrine, some generic trends and challenges are mentioned [6], but how implementing IO will aid in addressing these remain – at least to us – very unclear. The idea of a cross-disciplinary analysis, which we mean follows naturally from the definition of IO, is not discussed in doctrine at all.¹³ In literature, the problem is the opposite: there are many different (non-doctrinal) rationales and motivations tied to the term IO. A somewhat arbitrary selection is soft power [7] and behavioural change [8]. A contributing factor to this proliferation may be that doctrine is too generic and unclear, while individuals are too quick to interpret IO in light of their own personal background and experience [9].

This issue affected the design of our method. An astute reader will have noticed that we have not taken any explicit stance on what IO is or is not beyond “a wide interpretation” and restricting us to “the IO function proper”, as described in section 2. Rather, it is what is fed

¹³ The closest one comes is perhaps the nod to Systems Theory in current IO doctrine [6] (which is removed in the new draft), and the notion of a system-of-system analysis based on complex adaptive systems theory in the NATO planning directive [13]. However, these approaches are not truly cross-disciplinary as we have defined it.

into analysis that *de facto* bounds IO. If human factors, technological factors and kinetic activity are all fed into the analysis, IO becomes broad; if there is no analysis, there is no IO. This is in many ways a cop out, but one we found necessary at the time. Unfortunately, this in turn made the four IO capabilities described very generic and coarse. This is perhaps the greatest weakness of the current instantiation of the method, because the coarseness greatly limits the type of guidance provided. What, exactly, does a proactive or reactive IO capability help us achieve in the operating environment beyond synergy?

We suggest that an improved way of defining IO capabilities is through an IO Capability Breakdown. To understand what we mean by this, look to the following scenario:

Imagine two instantiations of a military (blue) organization, A and B. Both A and B have all the capabilities and executes activities in the areas we normally place under the IO umbrella: EW, PSYOP, CNO, KLE, PPP, and so on. They are completely identical, except for one difference: organization B has implemented IO structures and processes. If we define that organization A has overall capability X, and organization B has overall capability Y, then we can state:

$$Y = X + \delta, \text{ where } \delta \text{ is the added capability or gain that IO provides org. B}$$

Based on this we can make two assertions: First, if δ is empty or null, then IO is pointless. There must be some sort of advantage gained by implementing IO in an organization, or the whole thing becomes meaningless. Second, if we are unable to describe δ in terms of added capability, then we are doing something wrong analytically and we need to reconceptualize IO.

To repeat the argumentation put forth in an earlier section, this is not in conflict with the definition of IO as a function, not a capability. It merely reflects the fact that introducing IO in an organization should lead to added capability at an overall level, and that it should be possible to describe that – the δ – in an analytically meaningful way. That analytically meaningful description of the IO added δ , we suggest may be achieved through an IO Capability Breakdown. The need for such a breakdown was a central insight gained during the development of the method.¹⁴ A breakdown, as we define it, would be a hierarchical structure of capabilities including both internal and external operation (or at least addressing the issue of linking the internal and external). It might be debated whether “IO” is the correct term: the breakdown would probably cross doctrinal boundaries, for instance into C2, Agility, Strategic Communication and Network Centric Warfare/Network Enabled Capability, as few of these terms have been conceptually de-conflicted. We suggest letting the naming debate rest until the work actually has been done, as defining the capability hierarchy in a consistent and exhaustive manner is difficult enough.

The development of a capability breakdown, together with a CRM, may be a good step forward for improving the conceptual foundation of IO. The conceptual development path of C2 may be very useful as a baseline for such development, given the greater maturity of C2

¹⁴ There are clear parallels to Christopher Paul’s description of the “crawl, walk, run” stages of Strategic Communication [14], although we imagine a different set of capabilities and other ways of describing them.

conceptual thinking. Before this, however, it is probably necessary to become more explicit and clear about the underlying rationale for implementing IO in your organization, as different rationales may imply different research and development paths. Therefore, making a conscious choice about what you want to achieve by implementing IO and sticking to it – despite a conflagration of loud and conflicting opinions – may be the first and most important step.

Section 7 – Conclusion

We have developed a method for defining different levels of ambition for IO, and linking these with their manning requirements. The method utilizes a logical chain from C2 approaches, through IO capabilities and fundamental dimensions, to tasks and at last the number of people, skills and competencies required. The framework provided by the N2C2M2 was crucial in enabling this logical chain, and the use of the model was considered a success.

However, while a logical chain has been established in the method, there are some clear weaknesses in the current realization of it. Some issues are identified but remain unexplored, while resolutions are suggested for others. Most notable is the need for doing an IO Capability Breakdown and developing a CRM, to improve both the developed method and the conceptual foundation for IO in general. A prerequisite for success may be an explicit and clear rationale for implementing IO in an organization, as different rationales may imply different research and development paths. The conceptual development path of C2 may be very useful as a baseline for such development, given the greater maturity of C2 conceptual thinking.

Section 8 – Future work

The method, and conceptual thinking of IO in general, would be greatly enhanced by an IO Capability Breakdown. Such a breakdown would presumably go hand in hand with the development of a CRM for IO. An exploration of alternative rationales for implementing IO in an organization, or at a minimum a conscious choice about what you want IO in your organization to achieve, may be a necessary prerequisite.

References

- [1] L. Armistead, Joint Forces Staff College and United States National Security Agency/Central Security Service, *Information Operations : Warfare and the Hard Reality of Soft Power*. Washington, D.C.: Brassey's, 2004.
- [2] C. Paul, *Information Operations: Doctrine and Practice*. Praeger Security International, 2008.
- [3] D. S. Alberts, R. K. Huber and J. Moffat. NATO NEC C2 maturity model. 2010.
- [4] NATO Secretary General, "NATO Military Policy on Information Operations MC422/4," 2012.

[5] NATO STO Task Group 085. C2 agility. final report. 2014.

[6] NATO Standardization Agency, "AJP-3.10 Allied Joint Doctrine for Information Operations," 2009.

[7] L. Armistead, *Information Operations Matters : Best Practices*. Washington, D.C.: Potomac Books, 2010.

[8] S. Tatham. US governmental information operations and strategic communications: A discredited tool or user failure? implications for future conflict. 2013.

[9] P. D. Allen. *Information Operations Planning* 2007.

[10] NATO Secretary General, "NATO Military Policy on Information Operations MC422/3," 2007.

[11] NATO Secretary General, "NATO Military Policy on Information Operations MC422/5," 2014.

[12] NATO Standardization Agency, "AJP-3.10 Allied Joint Doctrine for Information Operations (study draft 2)," 2014.

[13] NATO SHAPE, "Allied Command Operations Comprehensive Operations Planning Directive (COPD) V2.0," 2013.

[14] C. Paul, *Strategic Communication : Origins, Concepts, and Current Debates*. Santa Barbara, Calif.: Praeger, 2011.