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Approaches to Operational Art Revisited: Theoretical and Practical Implications of Methodology

Topic 5: Battlespace Understanding and Management

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Abstract

U.S. doctrines have introduced a third approach within Operational Art, called the design approach, which has evoked military professional and academic debate as well as influenced NATO doctrines. Allied Joint Doctrine for Operational-level Planning (AJP 5) states that a Force Commander should choose one out of three approaches when conducting Operational Art and conducting operational planning: a *traditional (causalist)*, a *systemic* or a *design* approach. The difference between the causalist- and the systemic- approach concerns the clash between reductionism and holism, but the difference between the design- and the systemic- approach is methodologically vague. Hence the following question concerning methodology and Operational Art arises:

What methodological implications could constitute an argument for choosing the design approach when conducting Operational Art within a battlespace?

Neither NATO doctrine, planning framework nor previous research offer any explicit methodological argument for choosing, or preferring, the design- over the systemic- approach. This article concludes that one possible argument for preferring a design approach is adherence to value-focused thinking, but this requires that the Force Commander can and is willing to focus on stakeholders' values within the battlespace. This conclusion is implied by two methodological implications identified and discussed in this article. If the design approach is to be a relevant option, then further conceptual development, experimentation and education is required. To conclude, NATO should review the description of their approaches within Operational Art since the argument for preferring one approach over another is lacking and this could hamper the Force Commander's management of the battlespace.

Keywords: Design approach, Methodology, Operational Art, Operations planning, Value-focused thinking, Battlespace management.

1. Introduction: methodology & the military decision-making process

> The fact that problems contain many different worldviews or "lenses" through which the particular problem is perceived, suggests that one must engage with the problem at the fundamental philosophical level in order to understand and accommodate the underlying beliefs and values of these worldviews. [Hector et.al. 2009, p. 694]

How a decision-maker understands and tries to manage a difficult problem is related to the worldview applied when the specific problem is perceived and represented at the start of a decision-making process. The "lenses" used by a military decision-maker trying to understand the contemporary battlespace, e.g. the individual serving as the Joint Force Commander (FC) within NATO, are related not only to beliefs and values but also to NATO's operational-level planning process (OLPP).[1] As the FC conducts NATO's OLPP, with the help of the whole military staff called the Joint Force Command (JFC), this implies conducting a military decision-making process in accordance with NATO's doctrine called the Allied Joint Doctrine for Operational-Level Planning (AJP 5). AJP 5 states that an FC should choose one out of three different approaches when conducting an OLPP: a *traditional*, a *systemic* or a *design* approach. The term approach is used in military doctrines and applied to the performance of a concept called Operational Art, but another term for approach is methodology and these two are seen as synonyms in this article.[2]

Choosing one of these three approaches, or balancing between them, is supposed to help "aid the development and refinement of the FC's operational ideas in order to produce detailed and executable operation plans" (AJP 5, 2013a p. 2-10) and to improve adaptability towards agile adversaries and understanding the battlespace. (AJP 5 2013a, pp. 2-3;2-14) The third and newest approach, the design approach, was introduced within U.S. doctrine in 2010 and it evoked military professional and academic debate.[3] U.S. doctrine has apparently influenced NATO doctrine since the latest AJP 5, published in 2013, describes NATO's view on the design approach. Wolters et. al. (2012), and other scholars, have discussed important topics related to the pros and cons of the design approach, e.g. in what way, if any, the design approach is a

[1]The abbreviation FC (Force Commander) denotes the individual in command at the operational level and the abbreviation JFC (Joint Force Command) denotes the whole operational level staff, in this article.
Battlespace: "The environment, factors, and conditions that must be understood to apply combat power, protect a force or complete a mission successfully" (AJP 5 2013a, p. lex-5).
Operational level: "The level at which campaigns and major operations are planned, conducted and sustained to accomplish strategic objectives within theaters or areas of operations" (AJP 5 2013a, p. lex-14).
The operational-level planning process (OLPP) is described as "developed to support a force commander (FC) and his staff in conducting operational-level planning" (AJP 5 2013a, p.3-1). See NATO 2013a, ch.3.

[2] Methodology, Operational Art and other important terms related to them will be further explained in section 2.

[3] In U.S. doctrines 'design' is defined as "a methodology for applying critical and creative thinking to understand, visualize and describe complex, ill-structured problems and develop approaches to solve them"(U.S. Army 2010, p. 3-1). Research conducted by Wolters et. al. (2012) identified 18 specific issues of improvement and challenges concerning the implementation and usefulness of this approach and these issues will be further addressed in section 3.2. Examples of general issues debated concerns: if the design concept is a philosophy or a planning process/methodology and if, and in what manner, design contributes to effective decision making. (Reilly 2012; Nocks 2010) Examples of U.S. military publications and documents formally introducing design into doctrine are: TRADOC (2008); U.S. Army FM 5-0 – *The Operations Process* (2010); SAMS (2010); U.S. Joint Publications 5-0 (JP 5) – *Joint Operations Planning* (2011) and U.S. Army – *Army design methodology: Commander's resource* (2012). Since the U.S. Army and their School of Advanced Studies (SAMS) have contributed to the development and implementation of this approach, it is sometimes referred to as the *Army Design Methodology*. (Ryan 2011)

more preferable approach than the previous two.[4] But one fundamental question seems to have been neglected: if an FC is supposed to choose one of the three approaches, why and when should an FC prefer one approach over another? The three approaches should be methodologically distinguishable, if an FC is supposed to be able to choose between them. AJP 5 states the following on this topic:

> Design centric approaches also entertain a holistic systemic view towards the crisis or conflict concerned, but they try to overcome the somewhat mechanistical application of the systemic approach by a methodology of critical and creative thinking that enables a JFC to create understanding about a unique situation and to visualize and describe how to generate change. [AJP 5 2013a, pp.2-10;2-11]

Why cannot critical and creative thinking be applied, in order to understand and generate change within the battlespace, when applying any of the other two approaches as well? AJP 5 offers no explicit or compelling methodological argument concerning why, when or how an FC should be able to distinguish the design from the systemic approach. But still, the FC has to choose one approach in the beginning of NATO's OLPP and the choice is important since it affects how Operational Art is conducted and how the whole OLPP is conducted. The methodological argument for preferring the design approach over the other two is vague, or even absent. Hence, the following question concerning methodology and Operational Art requires attention:

> **What methodological implications could constitute an argument for choosing the design approach when conducting Operational Art within the battlespace?**

To answer this question, the design approach requires to be methodologically characterised in order to distinguish it from the other two approaches, especially the systemic approach. As such, our focus is on (meta-)methodology and this article aims to discuss theoretical (epistemic) and practical implications of choosing a design approach. Arguably, these implications actually constitute the methodological argument for choosing a design approach at the beginning of NATO's OLPP.

[4]The history of the design approach is about two decades and started developing in 1996 at the Israeli Operational Theory Research Institute (OTRI) where different concepts from strategy, systems thinking and design were fused in to a methodology called *Systemic Operational Design* (SOD). In 1997 U.S. military doctrinal publications started to describe the nature of war with the help of concepts from complex systems theory and the U.S. Army's School of Advanced Studies (SAMS) started to teach complex systems theory to their military students. Due to the military interventions in Iraq and Afghanistan at the beginning of the 21st century, the Australian Army introduced a planning concept called *Complex Warfighting*. This concept focused on describing and managing the operational environment by the criteria of complexity and was developed in 2006 into a methodology called *Adaptive Campaigning*, which applied complex systems theory to military operational planning. SOD was terminated as an operational methodology by the Israeli Defence Forces (IDF) after the second Lebanon war in 2006. Despite the critique SOD received after that war, SAMS and the US Army continued developing a design approach, partly based on SOD and Adaptive Campaigning, presented in previously mentioned doctrinal publications. (Naveh 1997; Naveh 2009; Australian Army Headquarters 2004, 2006 & 2008; Ryan 2011) For examples of critique of SOD see; Hunderwadel (2007), Farquhar (2009), Kober (2011) and Berman (2012).

The discussions and conclusions stated in this article will be based on reviewing NATO/U.S doctrines (AJP 5 & JP 5), previous research (mostly American) and literature related to war studies and Operations research. The article has the following structure: section 1 introduces the topic and research question; section 2 discusses important terminology describing the three approaches and how they relate to methodology; section 3 focuses on the design approach with the purpose of trying to methodologically characterise the design approach; section 4 discusses one theoretical and one practical implication of the design approach and argues that these constitute a methodological argument for preferring the design approach over the systemic approach; section 5 presents the conclusions and a few thoughts on how NATO could proceed, given that NATO supports the application of a design approach.

2. The analytical approaches to Operational Art: methodology & terminology

Despite the amount of doctrine existing within NATO, this article only focuses on AJP 5 and its supporting planning framework called the Comprehensive Operations Planning Directive (COPD). One difference between AJP 5 and the COPD concerns the scope and level of detail as the COPD constitutes a more detailed description of "how to" actually conduct NATO's OLPP. Both documents use an overabundance of military terms and concepts to describe and explain NATO's OLPP. But only a few, considered the most important, will be addressed in this section of the article, namely: *Operational Art*, *Approach*, *Operational Design*, and how these terms relate to *methodology*.

2.1 Operational Art & the military decision-making process

A decision-maker's ability to understand a problem is partly related to the individual cognitive ability of that specific individual. As such, an FC's cognitive ability to understand the battlespace is supposed to help provide sufficient clarity and logic to enable detailed planning, support decision-making and develop orders to subordinated commanders. This deliberation process is a part of, but still distinguishable from, NATO's OLPP as it involves considerations beyond the employment of staff techniques and procedures as described in military doctrines (AJP 5) and planning frameworks (COPD). (COPD 2010, Annex A) Olsen & van Creveld (2011) argue that conducting Operational Art is important when conducting an OLPP.

> From a problem-solving perspective, Operational Art will make it possible to take an unstructured problem and give it sufficient structure to ensure that further planning can lead to useful action. Operational Art will remain essential when recognized as a methodology that enables the effective planning and execution of all operations. At its best, Operational Art can play a pivotal role in military success when skilled leaders apply it in its full dimensions – functioning as true artists to give expression to a nation's strategic vision. [Olsen & van Creveld 2011, p. 224]

Understanding Operational Art as a methodology is helpful when discussing the military decision-making process since FC's can conduct Operational Art as "true artists" in different ways, but still adhering to the same planning framework and OLPP procedure. Hence, it becomes methodologically interesting to discuss why, when and how an FC chooses to conduct Operational Art in one way or another. NATO's doctrinal definition states that Operational Art

is "the employment of forces to attain strategic or operational objectives through the design, organization, integration and conduct of strategies, campaigns, operations and battles" (AJP 5 2013a, p. lex-13), but this is considered too methodologically vague.[5] Operational Art is considered a non-formalised decision-making process reflecting an FC's mission, personality, beliefs and values and is therefore an important part of the military decision-making process. Operational Art thus influences how an FC understands, represents and manages a battlespace, which highlights the importance of understanding the approaches to Operational Art. Understanding why and when one approach should be preferred over another is important since it affects how Operational Art is conducted and therefore also how the FC conducts the OLPP. So, how should one understand the three approaches to Operational Art?

2.2 The three approaches to Operational Art & methodology

The term 'approach' can be explained by discussing three other terms: *method*, *methodology* and *meta-methodology*. A method is considered any tool, technique, heuristic (rule-of-thumb), or model that can be used or facilitated when working on a problem. Methodology concerns determining which method, or methods, is the most appropriate one to use for a specific problem based on arguments or principles, hence methodology is not a term describing only sets of methods. Rather methodology address the arguments for why, when, and how a certain method, or methods, is applicable and the same method can be applied differently within different methodologies. Meta-methodology concerns the nature and use of methodologies, in other words identifying criteria for determining how to conduct methodology. (Jackson 2000, pp. 11-12).

The reason for considering the term 'approach' and the term 'methodology' as connected reflects the fact that AJP 5 describes all three approaches as analytical approaches for analysing military problems and states that their "difference exists in how they address the problem – from reductionistic to holistic – and the proportion of systems thinking within each of the analytical methods" (AJP 5, p. 2-10). As the FC chooses which approach is the most preferable one for managing the specific military problem at hand, at the beginning of an OLPP, the FC is conducting methodology.[6] When the FC, or the JFC, chooses which criteria should be applied for conducting methodology, i.e. to choose planning method/approach, this constitutes conducting methodology.[7]

The methodological difference between the traditional and the systemic approach is apparent as it concerns the classic dispute of managing internal and external relations of the components within a system. The difference relates to the old controversy between reductionism and holism.[8] To distinguish the traditional from the systemic approach in a more intuitive way, the term 'traditional' is exchanged with the term 'causalist' in this article. The reason being that

[5] For other perspectives, opinions and historical accounts of Operational Art, see e.g. Krause & Phillips (2007), Vego (2008) and Olsen & van Creveld (2011).
[6] Some proponents reject describing design as a methodology, but this will not be further discussed in this paper, see e.g. Paparone (2010b).
[7] Examples of methods in the OLPP are COG-analysis, Factor analysis, Risk analysis and so on, i.e. heuristics present in the COPD. For more information and other examples see COPD 2013b.
[8] For an introduction to the disharmony of causal and systemic methods, see e.g. Russo (2010).

one important difference between reductionism and holism concerns the issue of causality and what can and cannot be implied about causal relations. Another of the methodological differences between the causalist approach (i.e. the traditional) and the systemic approach concerns the issue of how to understand and manage mechanisms within a system, e.g. a battlespace. These mechanisms entail methodological properties of internal and external relations of the components constituting the battlespace. The causalist approach implies adhering to reductive analysis and conventional cause-and-effect relations that can be identified and applied when conducting an OLPP. This contradicts the systemic approach since it adheres to methodological properties connected to complexity and to holistic analysis.[9] There is a strict methodological difference between the causalist and the systemic approach, hence the focus on trying methodologically to distinguish the design from the systemic approach (Erdeniz 2016). To distinguish these two approaches, yet another term and heuristic within the OLPP has to be discussed, namely the one called 'Operational design' and its elements.

2.3 Operational design & describing a staff process and a staff product

U.S. General James N. Mattis has stated that "design does not replace planning, but planning is incomplete without design" (Mattis 2009, p.6). The terms 'planning' and 'design' are closely connected, but the following question should be clarified; what is the difference between a staff *process* and a staff *product*, and how do these two relate to the *approaches*? The OLPP is a planning process consisting of different phases and methods to be conducted by the JFC and these phases and methods/heuristics are described in both the AJP 5 and the COPD. When the FC chooses one of the three approaches (causalist/systemic/design) at the beginning of the OLPP, this influences which, and how, specific methods (planning heuristics/techniques /tools) within the OLPP process are conducted. A staff product is the formalised result of one, or many, of the conducted heuristics. One important staff product, that requires the application of Operational Art, is called *Operational design*.[10] The Operational design characterises, represents and supports the FC's decision-making process concerning the military problem, i.e. the battlespace. The Operational design is an expression of an FC's vision of the transformation of unacceptable operational conditions at the start of the operation into a series of acceptable operational conditions by the end of the operation.[11] (COPD 2013b, para. 4-52) Regardless of the choice of approach, the Operational design has the same purpose (i.e. visualisation technique) and consists of the same elements, but the choice affects why, when and how information is gathered and analysed when creating the Operational design.[12] It is important to

[9] "A causalist approach: one can deconstruct a complex military problem into smaller parts, analyse it with a new structure, and identify mechanisms which better explain relations between and behaviours within components of the target system. A systemic approach: one cannot deconstruct a complex military problem into smaller parts, cannot analyse it with a new structure, and cannot identify mechanisms explaining relations between and behaviours within components of the target system." (Erdeniz 2016, p. 249).

[10] Operational design: "The conception and construction of the framework that underpins a campaign or major operation plan and its subsequent execution" (AJP-5 2013a, p. lex-13). This is a staff product.

[11] The term acceptable condition will be further explained in section 4.1.

[12] The importance of the Operational design and its elements will be further explained in section 3.1.

separate the methodology called the design approach and the staff product called Operational design, but both of them are significant when conducting the staff process called the OLPP.[13]

To summarise, the following is essential if one is to discuss the choice of approach within Operational Art and why it is important. *Operational Art* is a non-formalised methodology supporting an FC's ability to conduct parts of the military decision-making process. Operational Art is conducted by choosing one out of three *approaches* (causalist/ systemic /design). The first two have a specific methodological difference but the difference between the design and the systemic approach is methodologically vague or even absent. When conducting the planning *process*, called the OLPP, the choice of approach within Operational Art influences the staff *product* called the Operational design. An FC must understand the implications of the choice of approach within Operational Art before choosing their approach since the choice will influence both how Operational Art is conducted as well as how parts of the OLPP are conducted by the JFC. This kind of non-vicious argument, or reflective equilibria, implies that the FC must understand why and when a specific approach is the most preferred one. This requires precise and consistent criteria for the actual choice and hence is the reason for why the implications of the choice should constitute the methodological argument for the actual choice. Now, the next step is to methodologically describe the design approach in order to be able to characterise the design approach and distinguish it from the systemic approach. So, how should one understand the design approach?

3. The design approach: methodology & characterisation

This section introduces and discusses the design approach, arguing that an emancipatory perspective seems to distinguish methodologically the design from the systemic approach. As such, understanding and managing stakeholders' values when conducting Operational Art implies one theoretical and one practical implication, which is further discussed in section 4.

3.1 The design approach & Operational design: the problem of representing problems

How to characterise problems has been given considerable attention as contemporary academic planning theory and operational research has developed over the 20th century. Different ways of characterising problems relate to terms like: *Ill-structured* (Simon 1960 & 1973), *Wicked* (Rittel & Webber 1973), *Messes* (Ackoff 1974 & 1979) *Swamps* (Schon 1987) and *Super wicked* (Lazarus 2007). Regardless of which characterisation one applies, and they do have methodological differences, they all share at least one common challenge:

> The initial representation or conceptualization of a problem is so crucial to its subsequent treatment that one is tempted to say that the most important as well as difficult issue underlying the subject of problem solving is precisely `the problem of how to represent problems´. [Mitroff & Featheringham 1974, p.383]

[13] Yet another important perspective on the term design is given by Brehmer (2007;2008;2009 &2010) who argues that design is a science and more specifically a "science of the artificial" based on Simon's (1996) concept. This is also supported and further explained in Jensen (2010).

The problem of representing problems, implying how they are understood and managed, is often interlinked to the term *complexity* which has a plethora of interpretations and one could easily state the truism: understanding complexity is complex. Jackson (2003, p.199) argues that complexity influences the ability of decision makers to understand complex problems and that conducting long-term planning when faced with a complex problem is positively dangerous.[14] Since the choice of approach influences how to understand and manage a complex battlespace, the choice also influences the content and the visualisation of the Operational design. An FC's ability to understand and manage complexity cannot be overstated as one could argue that; if a problem is truly complex then analytical approaches to planning cannot be applied.[15]

The following can be argued against an analytical approach. Analysing and understanding different parts of a problem separately and sequentially will not entail that the problem can be understood as a whole, by restructuring the results of different analysis and their parts or conclusions. Applying an analytical approach can create the illusion of being able to characterise and represent complex problems with the help of sets of laws, governing rules or principles, as well as neglecting the risk of losing relational information between the different parts of the problem during the process of analysis. (Cilliers 1998; Jackson 2000 & 2003; Hector et. al. 2009) A counter-argument, defending an analytical approach, is that complexity actually can be characterised by certain criteria as a way of improving the ability to represent, visualise and analyse complex problems with specific types of methods.[16] But, accepting this counter-argument implies accepting that criteria for characterising complexity can be identified and that these criteria would be methodologically valid.

The importance of the Operational design is obvious, as this staff product represents the FC's, and the whole JFC's, understanding and view on how to manage the battlespace. But, identifying and clearly stating which elements constitute an Operational design is problematic.[17] AJP 5 states that an Operational design should consist of 12 elements and it is described by a heuristic called 4-27 *Operational design* in the COPD.[18] The 12 elements are identified by a synthesis of previously-conducted analyses and heuristics conducted during step 1 (Initiation of the OLPP) and step 2 (Problem and Mission Analysis) of the OLPP, as shown in figure 1 below.[19] Creating an Operational design combines top-down and bottom-up

[14] The OLPP usually has a planning horizon of 6-24 months, i.e. it is considered to be long-term planning.
[15] Hector et.al. (2009) argues that complex problems are derived from conflicts in e.g. values, interests and desires. Therefore critical theory, ethics and reason are required, which cannot be managed by mathematical modelling, computer simulation and traditional scientific and engineering methods. (Hector et. al. 2009, p.696)
[16] Examples of analytical methods addressing complexity and complex problems can e.g. be divided into three main categories; "hard", "soft" and "critical" systems approaches. For more information see e.g. Flood & Jackson 1991; Jackson 2000; Midgely 2000; Mingers 2006 and Mingers 2014.
[17] A description of the elements of an Operational design, as stated by three scholars and three doctrines, are presented in appendix 2, page 23 and concludes that differences between them are apparent. This finding corresponds with Wolters' et. al. (2012) conclusion of inconsistent terminology concerning methodologies for design and they state that "while the change in terminology may be helpful in addressing some existing barriers, it is important to also recognize the potential challenges that may arise with this shift in terminology" (Wolters. et.al. 2012, p.11).
[18] For a generic example of an Operational design see appendix 1, page 22. For more information about heuristic 4-27 (i.e. the Operational design), see Erdeniz (2016).
[19] The Operational design is created at the end of step 2 in the OLPP and consists of an Operational framework and the JFC's initial intent. The JFC's initial intent is a personal vision expressing important perspectives on the

heuristics as a way of dealing with complexity, as the 12 elements are identified by conducting different types of analyses (planning methods/ techniques/tools). To exemplify: 1d) is a top-down heuristic focusing on analysing the End state, strategic and operational objectives as well as effects to be established, and 1b) is a bottom-up heuristic focusing on understanding the operational problem by analysing the nature, scale and scope of the military problem as well as the operational environment. The heuristics are conducted by the JFC and exploit the knowledge of all staff members and subject matter experts, i.e. civilians with specific relevant competence. But when conducting the OLPP the number of worldviews, or "lenses", are limited by the fact that non-military organizations rarely participate in the actual planning of a military campaign or major operation. (COPD 2013b)

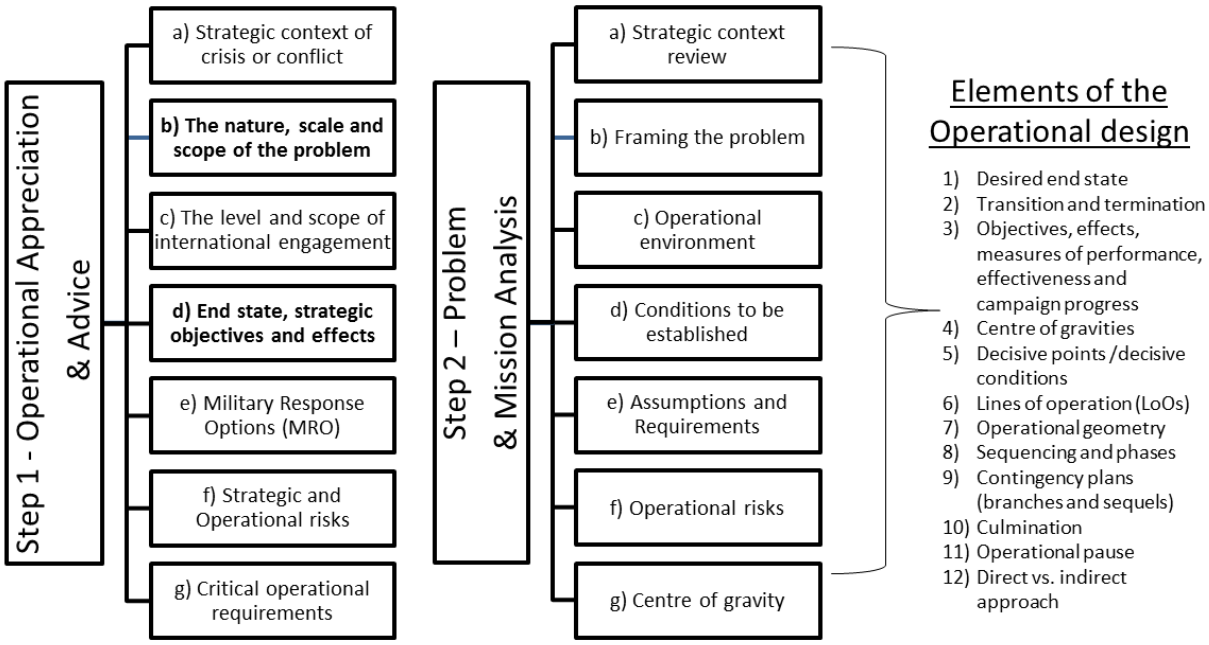

Figure 1: A simplified description of step 1 and 2 of the OLPP and what type of analyses are conducted by the JFC in order to identify the elements of the Operational design.[20] (COPD 2013a, ch.3)

To summarise, regardless of which approach is chosen the Operational design constitutes a representation of the military problem and how an FC aims to manage/solve the problem. To choose the design approach does not affect how or which elements that are required for creating an Operational design, since identifying the elements follows the strict predetermined step-by-step process described by the OLPP. This is considered methodologically inconsistent since the choice of approach should reflect the FC's view on complexity and how to represent the military problem in order to understand and manage the contemporary battlespace.

main operational activities in order to fulfil the objectives. The initial intent will not be addressed in this article, for more information see COPD 2013b. There is a difference between the OLPP described in AJP 5 and the Joint Operations Planning Process (JOPP) described in the planning framework COPD regarding the names of steps and phases but the content is the same. For an example and description of the U.S. JOPP see Marques (2011).

[20] The index is made by the author and the heuristics and analysis do not give a full description of the OLPP.

3.2 The design approach & methodological novelty: the boundaries between the two approaches & the previous debate

As stated in footnote 3, the U.S. design approach is explained in detail in U.S. doctrines and military planning literature. A simplified and visual explanation has been given by Banach & Ryan (2009) as they summarise the design approach with figures.[21] The U.S. design approach applies other methods/heuristics, in comparison with NATO's OLPP, when conducting operations planning, for example *rich pictures*, *affinity diagrams*, and *prototyping*.[22] But even though the six main activities of design (framing, formulating, generating, reflecting, inquiring and facilitating) could be interlinked to the OLPP, proponents of design reject the classical OLPP planning methods/heuristics. They argue that another mind-set is required to address complex military problems and this mind-set should focus on discussing and understanding stakeholders' values and habits concerning the problem at hand. (Ryan 2013)

> The [design approach] mind-set cannot be taught directly. It is only through repeated design experiences that individuals can, through reflection and behaviour modification, choose to enact new values and form new habits. [Ryan 2014, p.5]

The design approach requires time to learn and experience to improve and master. In short, it is a way of thinking about complex problems, i.e. a cognitive decision-making process similar to Operational Art. "By design thinking, we mean a normative, user-centred, iterative approach to innovation that extends the application of design beyond the design of symbols, objects, and interactions" (Ryan 2014, p.3). As such, the important question becomes; why cannot the systemic approach comprehend the same posed advantages as the design approach? Finding explicit methodological arguments for applying a design approach is scarce in military literature related to design. Zweibelson (2013) argues that "complex, adaptive problems demand tailored and novel approaches" (Zweibelson 2013, p. 87), emphasising that design requires education in order to understand and manage complexity. This education should focus on systemic, creative and critical thinking as well as realising that a design approach implies new combinations and fusions of concepts, vocabulary and ideas from different disciplines.[23] In fact, proponents of design reject the thought of explicitly defining design and argue that trying to do so constitutes a contradiction.

> Codifying one narrow interpretation of "how to do design" into doctrine produces a similar output where planners are expected to innovate and be creative, but still have to "follow the rules" as established by the individual service. This is a terrible contradiction, and likely fosters much of the current confusion and frustration with fusing design with military decision-making today between rival services, policy-makers, and other governmental appendages. [Zweibelson 2013, p.100]

[21] By comparing the U.S. design approach with NATO's OLPP, one could argue that all the heuristics and analyses conducted within the OLPP can also be conducted within a design approach and vice versa. See appendix 3, page 23 and compare it with the information in figure 1 above.
[22] The OLPP applies traditional methods for both the causalist and the systemic approach, i.e. factor analysis, center of gravity analysis and risk analysis; see COPD 2013b for more information.
[23] For more information about creative and critical thinking see Zweibelson´s (2011) six-series articles published in the *Small Wars Journal*; SAMS (2010) and Ryan (2013&2014).

Trying to understand and describe the boundaries between the design and the systemic approach is difficult and it is understandable that the implementation of the design approach has caused confusion. In an attempt to clarify issues related to the design approach, Wolters et. al. (2012) conducted a comprehensive overview of pros and cons of applying a design approach within U.S. Forces, see appendix 4 page 25.

One critique concerns whether design is another way of continuing a previous military concept based on achieving effects.[24] Davidson (2008) argues that one important difference between the design approach and the Effects-Based Operations (EBO)/ Effects Based Approach to Operations (EBAO) concept lies in their difference in purpose, since EBO/EBAO tries to disrupt/change nodes and relationships within the operational system while design tries to transform them. This argument is not convincing since the methodological difference between changing and transforming appear vague. Rather, proponents of design are implicitly or explicitly stating that design focuses on learning rather than action, and that this would methodologically distinguish design from previous operational planning concepts. (Davidson, 2008) Design proponents argue that focusing on learning is an improvement from the previous approaches to Operational Art and especially compared with the causalist approach, which they claim focuses too much on determining Centre of Gravity and Lines of Operation. Vego (2009), who opposes design, argues that the design approach is dangerous since it separates design from planning and violates the basic principles of Operational Art. Vego (2009) also opposes the argument that the design approach improves learning since re-evaluating and adapting to changes in the battlespace have always been important.

Design proponents interpret Vegos' (2009) interpretation of design as flawed since proponents argue that design and planning should not be considered as separate.[25] The design approach has been described in multiple ways in different sources and is continuously evolving, with the argument that design improves the cognitive ability of an FC to understand and manage complex military problems. Many of the previously debated issues actually concern the distinction between reductionism and holism, but explicitly stated methodological arguments are rare. In short, the debate usually focuses on issues of critical, creative and systems thinking.[26] (Banach & Ryan 2009; Elkus et.al. 2010; SAMS 2010; Ryan 2011; Grigsby et.al. 2012; Ryan 2014)

To summarise, identifying explicit methodological boundaries between the design and the systemic approach is difficult and might even be contradictive depending on ones' view of design. Giving design a charitable interpretation implies that its methodological novelty

[24]Concerning the similarities of EBO and SOD see McGlade (2006) and difficulties implementing systemic design are discussed by McLamb (2009). The application of a concept called *Effects-based Operations* (EBO) was both implemented and rejected within U.S. doctrines before NATO developed its own version called *Effects-based Approach to Operations* (EBAO), which has evoked a lot of professional and academic debate. For more information about EBO/EBAO and methodology see Erdeniz (2016).

[25] Mangold (2014) concludes that when senior U.S. officers, receiving no comprehensive or specific planning guidance, were faced with a complex, ill-defined problem, they effectively collaborated and used design methodology. Mangold (2014) hence argues that by "adherence to the methodology of design thinking, military planners will be better prepared to solve complex, ill-structured problems" (Mangold 2014, p.142).

[26] For more information on the critique of the implementation of design, see Zweibelson's (2011) six-series articles published in the *Small Wars Journal*.

concerns the ability to collectively comprehend a variety of values, beliefs, perspectives, objectives, behaviours and habits describing a group of stakeholders within the battlespace. Although important pros and cons of the design approach have been previously debated (mostly within American literature) few, if any, concern methodological arguments for preferring the design over the systemic approach. Distinguishing these approaches requires another perspective on methodology since the arguments, i.e. the reasons, for choosing a specific approach within Operational Art are connected to how an FC understands and makes sense of the world (i.e. it relates to epistemology and philosophy of science).

3.3 The design approach & methodological characterisation

As argued in the previous sub-sections, the methodological arguments given to distinguish the design approach from the systemic approach are vague or even absent. Why would this be problematic? A design proponent might argue that it is not problematic since design could be viewed as a practice which requires experience, implying that the choice of approach is a cognitive skill. But this is an irrelevant methodological argument; no better than a coin toss, since a reasonable counter-argument is that an FC should be able to explicitly explain why and when one approach is more preferable than another. Remember, the choice influences Operational Art and how the FC understands and manages the complexity of the contemporary battlespace. This intellectual challenge is described by the following statement within AJP 5:

> Staffs must organize to learn, adapt, and reframe as required while preparing, planning, executing and assessing full spectrum operations. Design can precede planning, may occur at the same time or the need for design may emerge while executing on-going operations. The design approach is an intellectual challenge and may be jeopardized by a lack of human resources and a lack of time, especially when exercised while executing on-going operations. It is a risk to assume that a design will be understood by untrained members of the team and especially, when a design concept crosses boundaries between units, services or MN [Multinational] forces with different cultures and practice of command and control (C2). A variety of the approaches described and others can be separately applied within the different steps and activities of the OLPP to match the problem needing resolution to the extent and depth required. [AJP 5, pp. 2-11;2-12]

Once again, why should properties like learning, adaption, reframing and group collaboration not characterise a systemic approach? If one cannot methodologically distinguish the approaches, based on explicit arguments, then why bother to develop and ask the FC to choose between different approaches? Since the design approach, as well as the two others, have been described and discussed in the literature this question should be have been addressed by proponents of the design approach.[27] In defence of the design approach, neither the AJP 5 nor the COPD offer any valid methodological argument for why or when to apply the causalist or the systemic approach either. Interestingly, the AJP 5 states that the FC has a choice and should choose between the three approaches, but the COPD is completely written to apply a systemic approach. Briefly, NATO should either explicitly methodologically distinguish the design and the systemic approach by characterising them, or remove one of the approaches from the AJP 5. But, the methodological vagueness distinguishing the design approach from the systemic

[27] SAMS (2010) describes design as: applying creative and critical thinking, addressing ill-structured problems, associated with battle command and focusing on problems and solutions. SAMS (2010) also describes the four principle ideas of design: learning, systems, social creation and difference. (SAMS 2010, ch.2)

approach does not necessarily imply that the design approach is invalid. Instead it should be recognised that the two approaches apply and adhere to different methods/heuristics (e.g. rich pictures or factor analysis) and properties (e.g. invariance, emergence or collaboration) which influence how an FC understands and manages a complex battlespace.[28] Both approaches have their own pros and cons but they require to be methodologically characterised if the FC is supposed to make an informed choice. To methodologically characterise the design approach entails discussing methodology in relation to the evolution of science.

Starting from reductionism and the natural sciences, expanding to holism and the social sciences, understanding and managing different kinds of systems has always been an important and highly debated topic. Jackson (2000) discusses the development of the systems' movement and how different factions have caused paradigmatic wars since a plethora of concepts and inconsistent terminologies have entailed academic confusion. As a result, four main perspectives within the systems' movement can be methodologically distinguished: functionalist, interpretative, emancipatory and postmodern. These perspectives all have their pros and cons but the development from "hard"-systems thinking (a functionalist approach), via "soft"-systems thinking (an interpretive approach) to "critical"-systems thinking (combining a functionalist, interpretative and an emancipatory perspective) has evolved over more than 70 years and can briefly be explained as:

> [Critical systems thinkers] want to put hard, organizations-as-systems and cybernetic methodologies to work to support the technical interest, soft methodologies to work to assist the practical interest and emancipatory methodologies to work to aid the emancipatory interest. [Jackson 2003, p. 363]

NATO's systemic approach should be characterised as adhering to hard-/soft-systems thinking and the design approach as adhering to critical-systems thinking, implying adherence to methodological pluralism and hence being a multi-methodology. Giving the design approach a charitable interpretation implies that the methodological difference between the two approaches concerns the application of an emancipatory perspective. The reason for arguing that this approach is, and should be, methodologically characterised by the emancipatory perspective is based on the following.[29] The design approach, and its proponents, adheres to addressing stakeholders' values and different worldviews (lenses) within the system (the battlespace) as a way of improving the ethical awareness of the FC. This argument can be exemplified by a few quotes from different proponents of a design approach:

> Designerly methods are human-centred, collaborative, and synthetic [and] highly technical [systemic] methods can have an intimidating effect on stakeholders, marginalising or excluding them from the conversation. [Ryan 2014, p.10]

> Warfare is a decidedly human endeavour, and as humans are unlike any other system in the world, we cannot afford to treat organized human conflict as simply another model to configure and control. [Zweibelson 2016, p. 83]

[28] For a discussion on methodological properties such as invariance and emergence see Erdeniz (2016).
[29] Whether there are other ways of methodologically characterizing the design approach, and distinguishing it from the systemic approach, is an important question but it will not be further discussed in this paper.

> Design is about inquiry, asking insightful questions, and considering multiple frames of reference. Design is not a reductionist method of finding a best frame; it is about considering as many as possible, that is a continuous call for multiple views. [Paparone 2010c, p. 9]

These scholars are expressing the same view but with different words, i.e. that addressing complex military problems requires an approach (the design approach) which goes beyond just reflecting upon military values, beliefs and worldviews. An FC trying to understand and manage a complex battlespace must engage with non-military stakeholders' (e.g. non-governmental organisations or international organisations) and their values and worldviews (lenses). In brief, it is an emancipatory perspective, i.e. focusing on stakeholders' values, that methodologically distinguishes the design approach from the systemic approach. As such, it is the requirement of an emancipatory perspective that constitutes the methodological argument for choosing the design approach. But what could be the implications concerning the conduct of Operational Art, of choosing a design approach?

Addressing such a question requires discussing the emancipatory perspective in greater detail, i.e. to go beyond the contemporary description of the design approach. But before doing that, which will be done in section 4, it should be mentioned that NATO has chosen another solution. The COPD only focuses on the systemic approach and this methodological choice is taken without stating any proper methodological argument. This is considered an "easy way out" and methodologically unfair to the design approach, since no compelling arguments are stated as to why the systemic approach should enjoy such a methodological hegemony that it does, neither in the AJP 5 nor in the COPD. Since scholars have spent considerable amount of time, money and effort on the design approach, as well as the fact that both the AJP 5 and U.S. doctrines perceive the design approach as a valid option, continuing to discuss meta-methodology and potential implications of the design approach is relevant. As such, it will be assumed that the design approach actually offers some kind of methodological advantage, hence the question of its possible implication on conducting Operational Art.

To summarise, the design approach is methodologically distinguishable from the systemic approach by the application of an emancipatory perspective, i.e. to focus on stakeholders' values within the battlespace in order to improve an FC's ethical awareness.

4. The methodological implications: theoretical & practical implications of choosing the design approach

This section discusses two methodological implications, one theoretical and one practical, constituting the argument for choosing the design approach instead of the systemic approach. An FC should choose the most suitable approach for the military problem at hand and these two implications should be considered when faced with this meta-methodological situation.

4.1 A theoretical implication: applying design implies applying value-focused thinking

Acceptable Conditions (AC) are statements aimed at describing the preferred operational situation at the end of an operation, hence describing what is called *the solution space* within the design approach. AC's are derived from the understanding of the military problem and are pivotal for managing the battlespace. (COPD 2013b) If a group of stakeholders are to identify, state, and try to reach consensus about AC's within the battlespace, then understanding and having a common view of the following terms is important: *objectives*, *goals*, *desires*, *intentions*, and *values*.[30]

Objectives and goals are seen as synonyms within military terminology, i.e. they entail action, coordination, and inter-temporal and inter-personal deliberation within the battlespace.[31] Inter-temporality allows analysis of alternatives over time and inter-personality allows agents within or between different organisations to work in accordance with the predetermined objective or goal. Edvardsson & Hansson (2005) argue that objectives can be viewed as being both "achievement-inducing" and "conduct-controlling" since they are stated with the purpose of being achieved and they restrict alternatives. This perspective is appropriate for describing the purpose of stating military objectives as these objectives and sub-objectives imply which effects (achievement-inducing) and actions (conduct-controlling) should be achieved and conducted during a campaign or major operation.

Objectives and desires are distinguishable based on the difference of commitment from the stakeholder, i.e. stating an objective implies a stronger commitment to a specific alternative than stating a desire. In short, a stakeholder stating an objective has a stronger commitment to taking action in comparison with only stating a desire. The term 'intention' can be viewed as the link between, but also further distinguishes, a desire from an objective. If a stakeholder has both a desire and an intention then an objective can be stated, hence without intentions no objectives. Explicating these terms concerns the ability to conduct a common analysis of the AC's (i.e. the conditions to be established within the battlespace) and objectives within a group of stakeholders who are active within the battlespace. The terminology related to the AC's during an operation can be confusing. In other words, the FC should reflect upon these terms since analysing different types of objectives is supposed to improve the creation

[30] 'Stakeholders' means here all other actors in the military area of operations except those considered as hostiles or enemies. 'Stakeholders' could be e.g. other military actors, non-military organizations, other international organizations and the local population. A method for identifying which stakeholders should be considered the relevant ones, although an important question, is outside the scope of this article.

[31] The COPD offers the following definition of an objective: "a clearly defined and attainable goal to be achieved". (COPD 2013b, p. L-4).

and management of the AC's within the battlespace. The last term to address is 'value' and Keeney (1992) states that values are principles used to evaluate consequences of action, and inaction, of proposed objectives, alternatives and decisions. To analyse different types of objectives based on values is related to a methodology called value-focused thinking (VFT) and its common counterpart is alternative-focused thinking (AFT).[32]

> Typically, the decision-maker concentrates first on alternatives and only afterwards addresses the objectives or criteria to evaluate the alternatives. This standard mode of thinking is backwards, because it puts identifying alternatives before articulating values. [Keeney 1996, p.537]

Values can only be identified by comprehensive deliberation (i.e. hard thinking) and when they are stated, they become value judgments. If value judgments are to be useful in a decision-making process, they have to be stated as precisely as possible. That entails thinking about objectives, desires, and intentions. By reflecting on value judgements, the purpose of identifying, stating and analysing different types of objectives relates to the emancipatory perspective, given that the FC adheres to the design approach. Instead of stating solutions within a complex battlespace, the focus should be on identifying decision opportunities based on relevant stakeholder's values. Phrased differently, instead of analysing and determining a hierarchy of objectives, effects and actions to be established at the end of an operation, creating the solution space should start with identifying and analysing stakeholders' values. Applying a design approach implies that these values cannot, and should not, only be the ones of the FC and the military organisation, as previously argued in section 3.3. (Keeney 1992 & 1996; Edvardsson & Hansson 2005; Edvardsson Björnberg 2008)

Keeney (1992) argues that "controlling what decision situations you face may have a greater influence on the achievement of your objectives than controlling the alternatives selected for those decisions" (Keeney 1992, p.18). In any given decision situation, values are fundamentally important and alternatives are only means to achieve those values. Now, why is this important for an FC? The purpose of step 1 and step 2 of the OLPP is to create an operational estimate, which "combines objective, rational analysis with the power of intuition (a combination of experience and intelligence) and its output is a decision about a course of action" (COPD 2013b, p. 4-32). This is done by conducting a multitude of heuristics and two of them are called *Endstate, strategic objectives and effects* and *Conditions to be established* (see figure 1, p. 9). Both these two heuristics analyse the End-state via strategic objectives to operational objectives and decisive conditions, but from different perspectives. Hence a fundamental objective is given by the political leadership within NATOs North Atlantic Council (NAC), which is operationalised via the strategic-level planning staff, and then analysed and reviewed by the JFC in step 1 and 2 of the OLPP. These heuristics are not conducted based on analysing values.[33] The stated hierarchy of objectives is analysed in order to identify what should be achieved, implying that the FC's operational estimate is an example of alternative-focused thinking, not value-focused thinking. This contradicts the fact that the

[32] León (1999) argues that VFT is superior to AFT when it comes to generating objectives.

[33] The Mission Response Options (MRO) analysis conducted in phase 2 of the JOPP is partly a review of the strategic operationalisation of the endstate, but does not address the issue of values. For examples describing an analysis of the strategic environment, see heuristics 4-14,4-15,4-18 and 4-19. (COPD 2013b)

design approach requires stakeholders' values. Creating a solution space requires information about stakeholder's values; not having them infers the risk of focusing on irrelevant or "wrong" objectives. An FC's ability to understand and manage the battlespace depends on the content of the solution space. (Ryan 2014) This argument can be exemplified by two quotes from the US and the NATO doctrinal documents (i.e. the JP 5 and the AJP 5).

> Successful development of the [design] approach requires continuous analysis, learning, dialogue, and collaboration between commander and staff, as well as other subject matter experts. The challenge is even greater when the joint operation involves other agencies and multinational partners (which is typically the case), whose unique considerations can complicate the problem. From this understanding of the operational environment and definition of the problem, commanders develop their broad operational approach for transforming current conditions [Objectives and Acceptable conditions] into desired conditions at endstate [i.e. the solution space]. [US 2011, JP 5, p.III-6]

> Future operations will, in terms of planning and execution, require an increasingly joint multilateral and comprehensive approach. Not only will there be a greater coordination between all components of the joint force, but also greater involvement of IOs, national GOs and NGOs in a multilateral effort. Effects on the local population and on reconstruction and development are being factored into military planning. From an operational level perspective, the military contribution to a comprehensive approach must be founded not only on shared situational understanding, but also on sound planning of both supporting and supported relationships with non-military actors. A military plan is most likely to succeed [fulfilling the identified solution space] in building the basis for the efficient conduct of the campaign or major operation when it considers all military as well as non-military actors, forces and means throughout the design, conceptual and plan production steps of the OLPP. [AJP 5 2013a, AJP 5, p. 2-44]

Obviously, both U.S. and NATO doctrine acknowledges the fact that when conducting Operational Art and conducting the OLPP, non-military perspectives have to be taken into account when creating the solution space. Phrased differently, the emancipatory perspective, i.e. addressing all relevant stakeholders' values, is pivotal when applying the design approach and what NATO denotes as "the comprehensive approach".[34]

To conclude, choosing a design approach, i.e. adhering to the emancipatory perspective, implies that VFT can be considered a theoretical (epistemic) implication of such a choice. If the FC believes that the military problem cannot be managed without engaging with the values of other stakeholders, then that constitutes a methodological argument for choosing the design approach and hence conducting VFT as a way of creating an appropriate solution space. Therefore the theoretical implication of choosing a design approach, and hence conducting VFT, actually constitutes the argument for choosing the design approach at the beginning of the OLPP. If an emancipatory perspective characterises the design approach and if the values

[34] NATO describes the Comprehensive Approach (CA) as "enhancing integrated civilian-military planning and development of process and structures for effective co-ordination and co-operation with other actors, to allow each to complement and mutually reinforce the others' efforts, ideally within an overall strategy agreed by the international community and legitimate local authorities" (COPD 2013b, p.1-1). For more information about CA and its development within NATO see Smith-Windsor (2008).

of the relevant stakeholders' cannot be required, why choose the design approach? In brief, creating the solution space requires stakeholders' values; hence applying the design approach implies applying VFT.

4.2 A practical implication: value-focused thinking requires explicit statements of stakeholders' values

An adversary to the design approach might question how stakeholders, and their values, should be identified; which stakeholders are the relevant ones? The answer depends on one's view and understanding of the design approach. Some proponents would probably argue that describing design as an approach in a doctrine is in itself a kind of anti-design perspective. As such, there can be no distinct and absolute answer concerning how and which stakeholders that should be identified. Since the design approach focuses on learning and collaboration, the FC will have to adapt accordingly. Continuing, proponents could argue that the FC should apply creative and critical thinking and continuously analyse which stakeholders might be the relevant ones within the battlespace. Going even further, some proponents claim that conducting an OLPP, in its present state, is methodologically flawed from the beginning since it represents a reductionist approach to problem-solving.[35] These kinds of arguments are not addressed by either the AJP 5 or the COPD and the latter only adheres to the systemic approach. An FC within NATO has weak doctrinal support and few, if any, methods/heuristics available to apply the design approach, and this entails a practical implication.

Returning to how objectives are analysed, the set of political/military objectives that are operationalised, i.e. divided into sub-levels of goals, can be viewed as a system (of systems) of objectives. This system consists of the instrumental (political endstate) objective and multiple means (MSO/OO/DC) objectives.[36] Analysing the hierarchy of objectives by applying VFT implies another focus when conducting the actual analysis. VFT stresses that if one is to understand the meaning of an objective, this requires understanding more than the particular words used to state that specific objective. The meaning of a specific objective relates to all other objectives that either support or are being supported from that specific objective, as well as all the values of the supporting/supported objectives. This implies a practical implication if an FC applies a design approach since one could argue the following. Different planning groups, within the same OLPP and within the same military organisation, could state the same objectives (using nearly identical language) but still understand those objectives differently. The reason being that the objectives, although stated the same can be supporting or be supported by very different other objectives.[37] (Edvardsson & Hansson 2005; Edvardsson Björnberg 2008; Edvardsson Björnberg 2009; Eden & Ackermann 2013) But, collaboration, understanding and creating a common solution space, based on stakeholders' values within a battlespace, with many non-military actors is a practical challenge, regardless of which

[35] For more arguments on design as a non-doctrinal issue and how design has to be understood and applied as a professional practice by officers understanding the philosophical underpinnings, see e.g.; Paparone (2010a-d; 2011), and Martin (2011 & 2012).
[36] See appendix 1 page 22 if the abbreviations are unknown.
[37] Eden & Ackermann (2013) exemplifies how two different planning groups of the same organisation express the same apparent objective, but the two groups concludes different meanings in terms of actions and outcomes. (Eden & Ackermann 2013, p.15).

approach to Operational Art is chosen by the FC. To exemplify the practical implication, i.e. the ability to practically create a solution space within a complex battlespace, the following two quotes are appropriate. They describe both a military and a non-military perspective on the practical challenge of applying a design approach.

> However necessary and noble the idea of greater military-civilian interface may be, when placed in a NATO context core elements of the institutional makeup of the contemporary international order have been, and are, inevitably drawn into question. Gone are the clearer Cold War days of the calculable standoff between two opposing military pacts. [Smith-Windsor 2008, p. 5]

> The line separating humanitarian and military action is one that by definition under International Humanitarian Law cannot be bridged. While humanitarian organizations such as MSF [Médecins Sans Frontiéres] may share the same area of operations with military forces, our purpose [i.e. values] is not the same. Neutrality, independence, and impartiality are obviously not as critical for building roads and schools or for promoting the rule of law, as they are for an emergency room where wounded civilians and non-combatants from different factions may seek lifesaving medical care. [Hofman & Delaunay 2010, pp. 5-6]

In short, an FC has a practical challenge implied by choosing a design approach as there are organisations, e.g. MSF, that are uninterested in collaboration since they do not share the same values and objectives as NATO. It is difficult to collaborate with someone who refuses. As such, parts of the OLPP, as described in the AJP 5 and the COPD, require rewriting or updating if a design approach is to be applicable by an FC and the JFC. All heuristics used for understanding and analysing objectives and stakeholders' values, regardless if they are instrumental or not, should begin with stating and analysing all the previously stated stakeholders' values related to each objective. If no explicit values have been stated, or if important stakeholders' cannot agree upon critical values, this must be requested and managed from the higher organisational levels (strategic or political). This implies that the political level has to explicitly state the values governing each military campaign/operation. By stating values and objectives, explicitly stating what supports or is supporting, heuristics analysing objectives should focus more on creative and critical discussions about content instead of strict phrasing and procedural issues. Rethinking parts of the OLPP could reduce the risk of falling into the trap of focusing on alternative-focused thinking instead of value-focused thinking. Applying VFT also implies that the identification and visualization of the Operational design, which the first two steps of the OLPP aim to identify, needs to be rethought and updated.[38]

To conclude, new heuristics for identifying, stating and analysing objectives, values as well as acceptable conditions, incorporating politicians' and all other relevant policy stakeholders' values governing the campaign/operation, have to be developed. If not, the design approach is not applicable. The FC requires the mandate, as well as all stakeholders participating within the OLPP, to creatively and critically explore the instrumental values as well as the operationalisation of the objectives set by the military strategic and political level. Such an exploration of the instrumental values entails that the graphical visualization of the Operational design requires rethinking and updating, with for example rich pictures, causal loop diagrams,

[38] One example could be to start using rich pictures or GIGA-mapping, see e.g. SAMS (2010) or Ryan (2014).

affinity diagrams or GIGA-mapping. In brief, if a design approach is to be a valid option then parts of both the AJP 5 and the COPD required methodological and practical rethinking and updating.

5. Conclusions

If the design approach is to improve an FC's ability to manage a multi-dimensional battlespace, then the following question requires to be further explained within the AJP 5 and the COPD:

> **What methodological implications could constitute an argument for choosing the design approach when conducting Operational Art within the battlespace?**

Two methodological implications have been identified by reviewing: NATO/U.S. doctrines (AJP 5 & JP 5), previous research (mostly American) and literature related to operations planning (e.g. the COPD) and operations research. Methodologically distinguishing the design from the systemic approach is difficult but the following is concluded in sections 2 & 3:

- Operational Art is a non-formalised methodology supporting the military decision-making process and is conducted by choosing one out of three approaches (causalist/systemic/design). The choice is important since it influences how Operational Art is conducted, the creation of the Operational design as well as how parts of NATO's OLPP is conducted.
- The AJP 5 offers no compelling methodological argument for distinguishing the design from the systemic approach and, although the AJP 5 offers some doctrinal support for a design approach, the COPD is written and adapted to planning in accordance with the systemic approach.
- NATO's OLPP, using a step-by-step method, contradicts the design approach concerning how to address complex military problems. Methodologically distinguishing the design from the systemic approach relates to different perspectives of systems thinking. The design approach is considered a multi-methodology focusing on the emancipatory perspective, i.e. addressing stakeholders' values.

These conclusions imply two methodological implications, discussed in section 4:

- Theoretical implication: applying a design approach implies applying value-focused thinking,
- Practical implication: value-focused thinking requires explicit statements of stakeholders' values.

The theoretical implication entails that if an FC chooses to conduct Operational Art in accordance with the design approach, applying value-focused thinking within the battlespace is required. If addressing stakeholders' values is not preferable or possible within the battlespace, regardless of reason, preferring a design approach seems methodologically inconsistent. In other words, if stakeholders' values are required but cannot be obtained, then Operational Art should not be conducted with a design approach. Hence, these two implications have to be considered by the FC before the actual choice of approach and are therefore viewed as methodological arguments for actually choosing the design approach, or not. The practical implication entails that NATO should review parts of the AJP 5 and the COPD since the explanation and description of the design approach is methodologically vague. The design approach should be explicitly connected to value-focused thinking. The conclusions within this article do not imply that the design approach is either necessarily flawed nor without methodological upshots for the ability of an FC to understand and manage a contemporary

battlespace. Rather, if NATO strives to implement the design approach, studying the U.S. lessons-learned is of course advisable; this implies further conceptual development, experimentation and education. One practical suggestion would be to develop a "handbook of methodology" explaining why and when one approach is preferable over the other two approaches.

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Appendix 1: An example of a generic Operational design

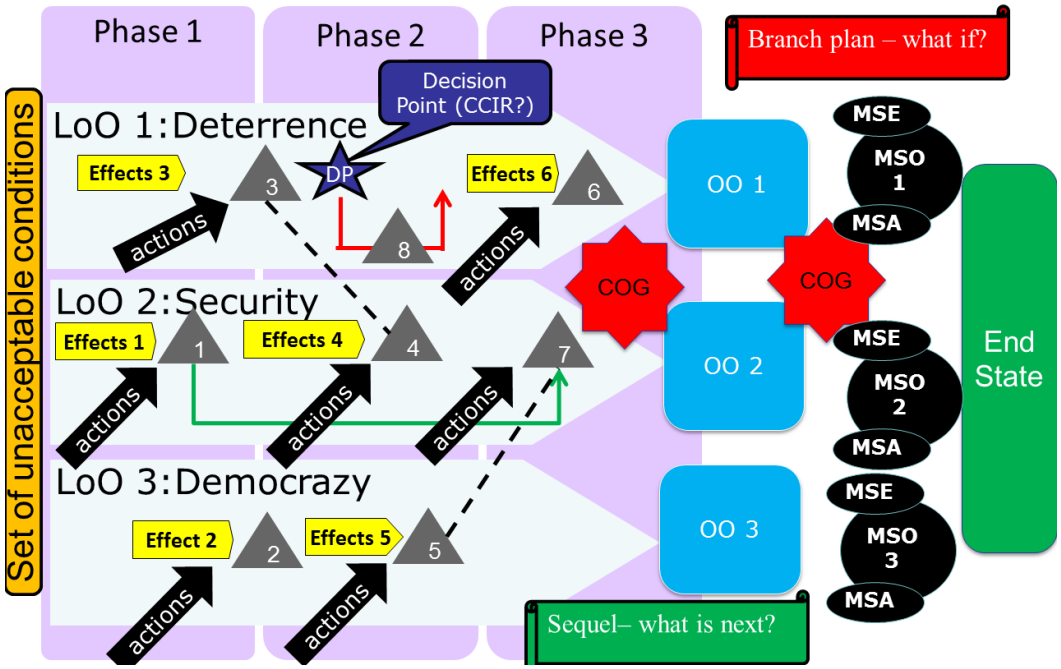

Figure 2: An example of a generic Operational design and its 12 elements.

Figure 2 describes 8 out of the 12 elements of an Operational design, the four elements not visualised are **bolded** in the list below.

1) Desired end state
2) Transition and termination
3) Objectives, effects, measures of performance, effectiveness and campaign progress
4) Centers of gravity
5) Decisive points /decisive conditions
6) Lines of operation (LoOs)
7) **Operational geometry**
8) Sequencing and phases
9) Contingency plans (branches and sequels)
10) **Culmination**
11) **Operational pause**
12) **Direct vs. indirect approach**

MSO: Military Strategic Objective

MSE: Military Strategic Effect

MSA: Military Strategic Action

COG: Centre of Gravity

OO: Operational Objective

Numbers 1-8 in figure 2 = DCs: Decisive Conditions

Appendix 2: Different opinions on the elements constituting an Operational design

Author/year	Elements that should be identified during the OLPP
Vego / 2007	1) Desired strategic endstate 2) Ultimate and intermediate (strategic) objective 3) Intermediate (operational) objectives 4) Operational sustainment 5) Balancing operational factors vs. strategic objective 6) Identification of critical factors an enemy/friendly strategic center of gravity 7) Strategic/operational direction/axis 8) Operational idea (scheme) 9) Initial geostrategic position 10) Requirements for sources of military and nonmilitary power
Banach & Ryan / 2009	1) Understanding the operational environment 2) Setting the problem 3) Creating a theory of action 4) Working the problem 5) Developing a design concept 6) Assessment and reframing
Reilly / 2012	1) Endstate 2) Objectives 3) Effects 4) Center of gravity 5) Decisive points 6) Lines of operations 7) Arrangement of operations 8) Assumptions
US / 2011	1) Termination 2) Military endstate 3) Objectives 4) Effects 5) Center of Gravity 6) Decisive points 7) Lines of operation and lines of effort 8) Direct and indirect approach 9) Anticipation 10) Culmination 11) Arranging operations 12) Forces and functions
UK / 2013	1) Campaign end-state 2) Center of Gravity 3) Campaign objective 4) Decisive conditions 5) Supporting effects 6) Lines or groupings of operation 7) Sequencing and synchronisation 8) Phases 9) Contingency plans (branches and sequels) 10) Campaign fulcrum 11) Culminating point 12) Operational pause
NATO / 2013	1) Desired endstate 2) Transition and termination 3) Objectives, effects, measures of performance, effectiveness and campaign progress 4) Centers of gravity 5) Decisive points /decisive conditions 6) Lines of operation (LoOs) 7) Operational geometry 8) Sequencing and phases 9) Contingency plans (branches and sequels) 10) Culmination 11) Operational pause 12) Direct vs. indirect approach

Table 1: A description of academic and doctrinal views on the elements constituting an Operational design.

Appendix 3: A simplified description of the U.S. design approach with figures

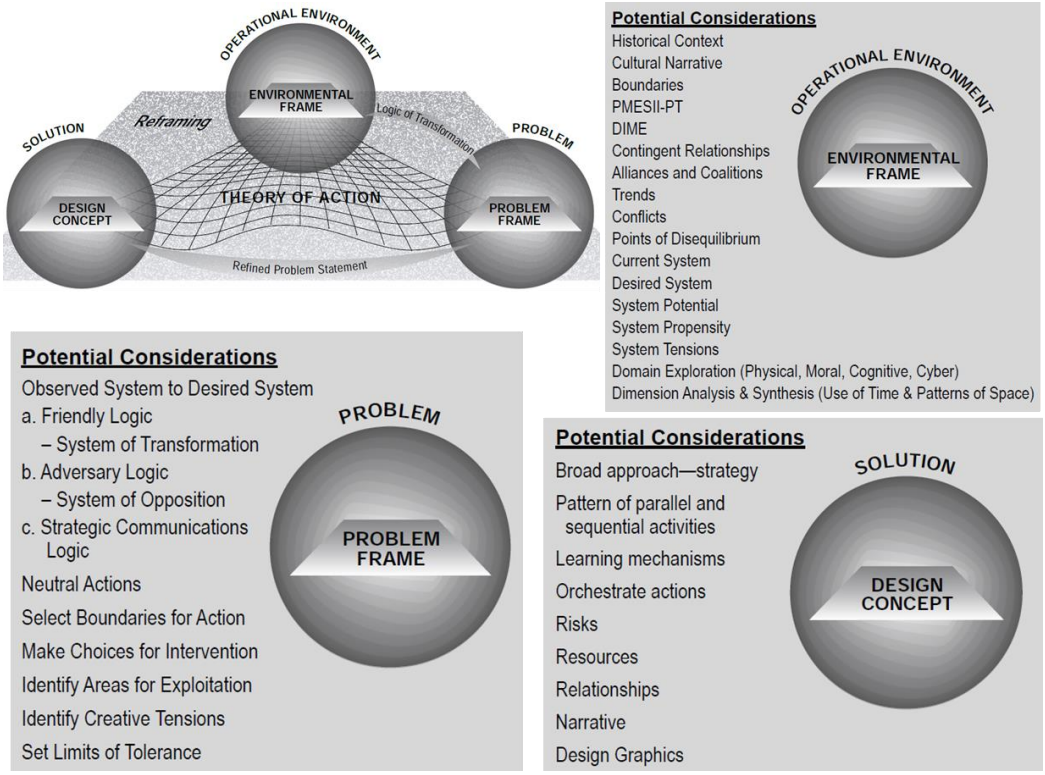

Figure 3: Four figures describing the design methodology by Banach & Ryan (2009).

Figure 3 describes the design approach with three design "spaces" as well as all the elements/heuristics needed to conduct the design approach, as described by Banach & Ryan (2011). Figure 4 describes the six main activities (framing, formulating, generating, reflecting, inquiring and facilitating) when applying a design approach as stated by Ryan (2014).

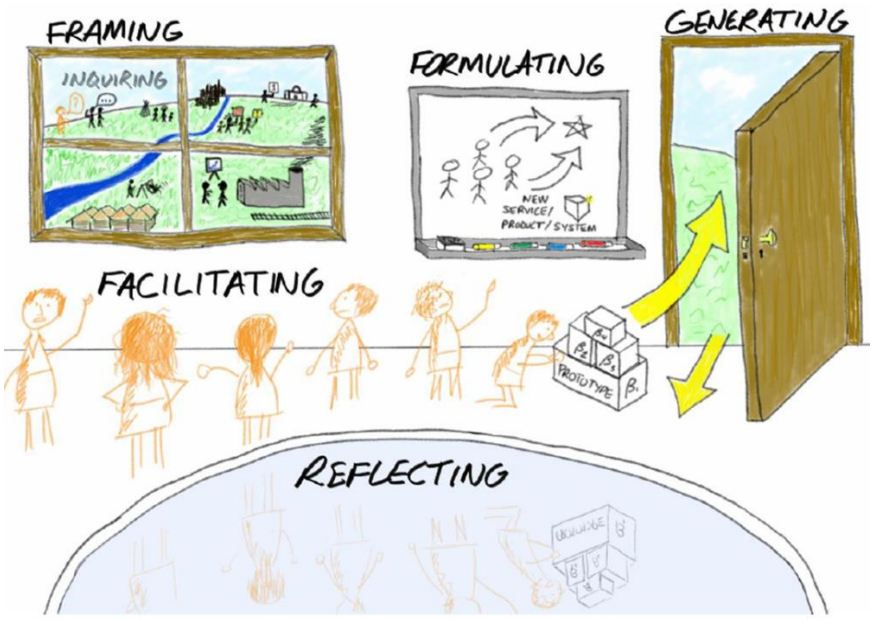

Figure 4: The six main activities when conducting design as described by Ryan (2014, p.8).

Appendix 4: Research findings of Wolters et.al. (2012)

Barriers to Integrating Design into Army Operations	
Terminology and Language Barriers	• Perception that Design lexicon is over-complicated, dense, and elitist • Lack of consistent terminology; the lexicon continues to evolve • Language has fostered a sense of divisiveness and an 'us vs. them' mentality
Conceptual Barriers	• Inconsistent definition and description of Design • Lack of agreement as to whether Design is new vs. mission analysis by a new name • Insufficient description of the gap Design is intended to fill • Inconsistent views on the operational level at which Design is appropriate • Lack of clarity on how Design connects to other planning activities, specifically to the Military Decision Making Process (MDMP)
Organizational Culture Barriers	• Strong cultural tradition of reductionist-analytic thinking • Culture of deference and obedience to authority • Incentive systems that do not encourage thought processes that are characteristic of Design
Command-level Barriers	• Insufficient Commander involvement in Design • Competing demands for Commanders' time and attention • Limited understanding of when to use Design and the benefits it offers • Mismatch between personality/leadership styles of typical commanders and those needed for Design
Application Barriers	• Disagreement over whether (and to what extent) Design should be proceduralized vs. remain more conceptual in nature • Lack of examples and evidence of utility • Practical challenges of applying Design in the real world, such as recognizing situations for which it is appropriate, building the Design team, and facilitating discourse

Table 2: 18 issues concerning integration of design, identified by Wolters et.al. (2012).

The 18 discrete issues, categorized into five main areas, described by Wolters et.al. (2012) has been partly used to identify the theoretical and practical implications discussed in this article. Regardless if one is a proponent or opponent of the application of the design approach, it is important to discuss and debate these issues as the chosen approach influences a JFCs ability to understand and manage the battlespace; Wolters et. al. (2012) argues that:

> … the codification of Design in [U.S.] doctrine nonetheless represents a significant organizational change for the Army. Organizational change efforts are often met with resistance, and the intended benefits of the change may go unrealized. Introducing an innovation, even when it is arguably an improvement over current practice, does not assure successful adoption of the innovation. A host of challenges that are often unrelated to the technical merits of new ideas can undermine successful implementation. [Wolters et.al. 2012, p.v]

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