
The Facilitator's Catechism

October 1st, 2020

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A B S T R A C T

This paper discusses the origins and evolution of Operations Orders from antiquity to modern times and the impact of Operations Orders on organizational sensemaking. Perspectives from research on Complexity Science, Organizational Psychology, High Reliability Organizations, Memetics, Logistics, Knowledge Management Systems, and Active Inference are used to consider the historical, contemporary, and future requirements and constraints of Operations Orders. Examples of traditional military Operations Orders and their civilian counterparts are detailed in context with their respective environments and requirements. Key characteristics of survivability, contemporary and future requirements, and current limitations of extant Operations Orders are addressed in order to inform the proposal of a new Operations Order format for use by Process Facilitators of military, intelligence, and civilian teams: the "Facilitator's Catechism".

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Introduction

In this article we begin with a discussion of the origins and histories of Operations Orders. We will then explore a few key factors of high-performance teams that are generalizable to reflexive systems with agency: ongoing recalibration, goal-setting, and sensemaking. We then discuss how the development of the Operations Order through time and space reveals general principles of team organization, situational responsiveness, and adaptation to changes in the environment. Historically, shifts in operational reach, environmental uncertainty, and mission ambiguity have led to major transitions in the functional role and expected format of in-field Operations Orders. This recognition leads to a formulation at the end of this work of a “Facilitator’s Catechism”, a first presentation of a new variant of an Operations Order for military, intelligence, and civilian teams that builds upon previous formats and also catalyzes teams in situations where the mission may be unclear, team composition may be dynamic, and where novel online affordances are available.

Origins and Histories of Operations Orders

Operations Orders (OPORDs) are traditionally described as a formatted, written deliverable that describes explicit instructions for a military unit to enact [1–4]. OPORDs are different from simple requests in that OPORDs are accompanied by expectations regarding execution and tend to have a specified format, use a codified ontology, and convey the scope of the mission or situation. There can be found references to OPORD-like documents in a number of classical works on military theory and history, such as those by Caesar, Livy, Polybius, Tacitus, and Clausewitz, but they are rarely discussed as an object of interest [5–12]. Classical works do not seem to indicate rigorous adherence to a single type of OPORD format as a norm, but the existence of formatted operations orders is often argued to be obvious and in some cases is verified directly [9]. Given that the Roman Army has so often served as the source of ideals for modern militaries to replicate and given its clear status as the common root from which modern military theory springs, it is an obvious first-candidate for an analysis of the origin of OPORDs [9,13,14].

Roman Origins of the OPORD

Analysis of the Roman Army yielded the earliest examples of actual

order formats with clearly defined organizational requirements in both their generation and execution [9]. It should be noted that some of the practices of the Roman Army were “so long employed and so well established that no one could find evidence for [their] beginning” [9,15]. Livy notes the use of the Roman “tessera”, a tablet on which short messages might be passed, which was used to transmit orders as early as Roman conflicts with the Etruscans in 310 B.C.E. [9,10]. Tessera included simple commands to be executed such as “May every man (miles) fortify himself first with breakfast, then with weapons” [9]. Polybius notes the rigid procedures by which passwords and instruction are circulated amongst sentries in Roman camps—protocols built in such a way as to allow commanding officers to detect discrepancies or small errors [9,11]. Given that these rigid processes required literacy and that there is clear evidence that sentries were drawn from the ranks of common soldiers rather than a designated corps, the sentry order has been argued as evidence that most soldiers in the Roman Army were literate [9,12,16]. While, at first glance, the notion of a majority of Roman soldiers being literate may seem surprising, it should be noted that the Spartan Army was formalized long before the Roman Army and was highly literate (despite being described as “uneducated” by the Athenians), and required its soldiers to interact with documentation as a matter of course [9,16–18].

Roman sentry orders demanded rigid format in regards to their informational content, typically including just communication instruction in the form of passwords to be used, whereas general orders passed via tessera within Roman camps seem to have demanded clarity and concision not by order of doctrine but by constraints on the medium (tessera tablets were small and not very easily inscribed) [9–11,15]. Given the limited number of legions to guard such large expanses of frontier, communication via oral instruction and inscribed tablets became nearly synonymous with “operational reach” as defined in modern military literature [1,19,20]. It is clear that consistent and reliable communication of “service orders”, or requests for reinforcements and supplies, were what allowed the Roman Army to maintain operations despite asymmetries between the available soldiers and the size of the frontier as well as the number of incursions and internal rebellions [6,19]. The ability to transport troops was secondary to the ability to inform officers as to where their troops were needed. Efficient and reliable military communication defined the operational reach of the Roman Empire beyond the border-forts and rivers which marked the edges of its territories [19].

Modern Transformations of the OPORD

Operations Orders developed significantly between the time of Rome and the late 19th century. The most substantive developments in OPORD format were likely driven by a renaissance in military theory guided by European and American military academies between the 17th and 19th centuries [21–23]. During this time, European commanders began to cohere to rigid standards for descriptive language in situation reports and OPORDs, such as the phrasing: “From reports received it seems probable that the enemy intends to...” which was common amongst German officers [23]. The convergence upon interoperable and standardized OPORDs during this period was possibly enforced by cultural norms, or “regimes of expectations”, rather than by explicit doctrine [23,24]. However, these cultural norms were subjected to unforgiving environments that did not indulge maladapted behavior or over-imitation [25–27]. For example, the French Armies of the Republic of the 1870s used OPORDs which consisted of multiple pages of minute details, which “accounts of the battles show were not carried out” [23]. In contrast, the march on Paris in 1870 by German troops by General Helmuth von Moltke was specified in only eighteen lines, and accounts suggest that “not a battalion crossed another in its march, went hungry, or [camped in vulnerable positions]” [23].

After adaptation for reliability and survivability in the crucible of centuries of regular, organized European conflict, the common elements of the “field order” form and then conform to such an extent that they are identified and then formalized by U.S. Cavalry General Eben Swift [4,23]. General Swift submits a standardized format for

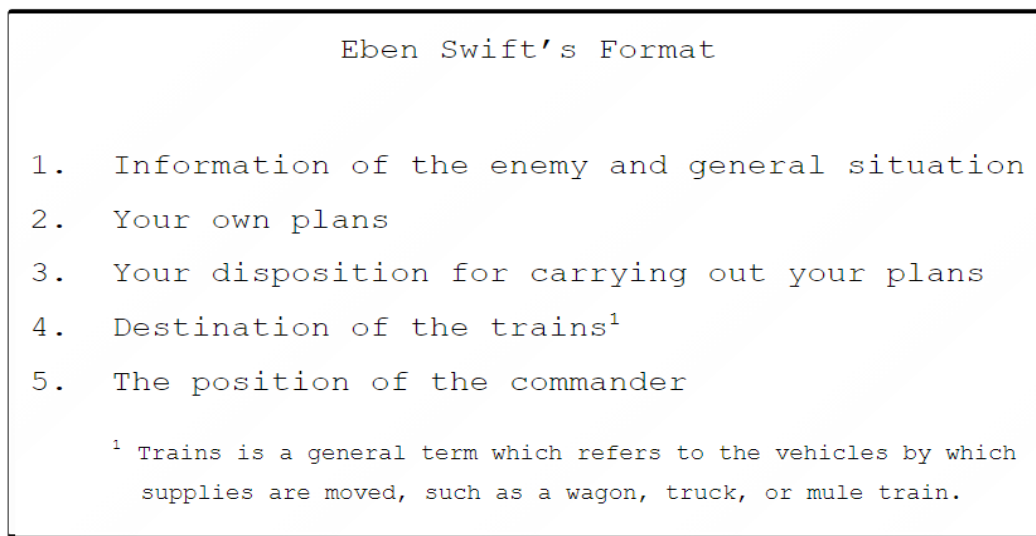


Figure 1. Eben Swift's 1897 OPORD Format, adapted from [23], expanded in Appendix A

OPORDs in 1897 (see Figure 1 and Appendix A) based on his analysis of German “Command and Control” (C2) doctrine which was primarily developed by Generals Moltke and Griepenkerl during the Franco-Prussian War [4,28].

Swift based his OPORD format on the German, mission-oriented OPORDs, arguing that task-orders must be written with very limited jargon, short sentences, legible hand-writing, and with no unnecessary information [3,23]. He specifically noted that apology, conjecture, expectations, and reasoning should be absent and suggests that the German officers corps separated out conjecture, expectation, and reasoning by issuing what was called “Orders of the Day”, which rarely concerned logistical orders regarding the movement of troops; rather the documents of this kind “read like the army column of a newspaper” [3,23]. During the American Civil War, General Meade offered his “Circulars” in a similar fashion [23]. Swift’s innovation, or distillation from German C2 doctrine, was to frame the OPORD as entirely separate from the situation report by making it an action-oriented document that focuses on objective, conveying only the necessary details regarding the context and tactics of the situation [23]. Swift also noted that the specificity of the order is proportionate to the level of command and thus the “information of the general situation” section of a commander’s OPORD may be long and may sometimes read on its own as a “situation report” [3,23]. His basis for arguing the necessity of action-oriented OPORDs was two-fold. First, he suggested that only preventative and recalibrative action can prevent cascading failures across large organizations induced by minor perturbations. Second, he thought that complicated, lengthy documents increase the risk of perturbations and miscommunication rather than lessen it [3,23]. Using modern parlance we can say that military communication is a complex threat surface because it offers many intuitive and unintuitive potential failure modes [3,23,29,30].

Swift’s format was accepted as a valid formalization and incorporated into U.S. Army Field Service Regulations [31,32] and later was modified for its use in World War I by American Expeditionary Forces (see Figure 2 and Appendices B and C) [33,34]. The format became far more compartmentalized and detailed relative to the form originally proposed by Swift. It could be argued that these modifications were the result of a U.S. War Department that had begun to develop a view of war that was becoming increasingly professionalized and mechanistic, developing a view which did not allow for the messiness of small teams exercising agency on the battlefield: all orders would have to be carried out exactly as written with very little room for interpretation [22,35].

Military theorists of the early 20th century imagined apocalyptic battles of tens of thousands of cavalry and hundreds of thousands of men in concerted charges, battles in which single, perfectly orchestrated maneuvers would determine the whole of a war with immediacy [22]. It was argued that operations such as trench warfare would require many rehearsals long in advance with an exact process of executions [3,22,35]. However, the prevention of agency on part of the field officers often led to miserable disaster during the war, examples of such disasters are present in accounts of the infamous Battle of the Somme in which the French and British used some elements of this mechanistic philosophy to plan a joint offensive that eventually succeeded in achieving territorial gains, but did so at extreme cost [22,36].

WWI Suggested Trench-to-Trench Attack Order

Paragraph No. 1. Information of the enemy. Our supporting troops. Our flanking troops. General plan for our forces.

Paragraph No. 2. Mission of the battalion. Zero day and hour. Limit of the zone of operations. Objectives.

Paragraph No. 3. [Fire Support] (a) Artillery support. Time of its opening. Rate of advance of barrage. Where and when barrage will settle... Assignment of a Liaison

Paragraph No. 4. Plan for occupation of captured ground. Orders to each company. Assignment of a Liaison.

Paragraph No. 5. (a) Supply. Individual equipment and supplies. Additional communication trenches to be dug or connections to be made with trench system of old positions. Munitions...

Paragraph No. 6. Position of battalion commander and his headquarters during the advance and in the conquered position...

Figure 2. Suggested WWI Field Order adapted from [34], expanded in Appendix B

Single OPORD issuances affected many sub-organizations with different objectives and methods of execution, this greatly increased the length and detail of the OPORD and required the assignment of a liaison to serve as a bridge between groups [34]. In many cases, the orders were so detailed and took so long to prepare that they would often arrive after they were needed, thus failing to provide guidance at critical moments [3,4]. No one lower than a battalion commander was

allowed to issue a formal field order, and once ordered, they could not change [3]. Orders used during this period ordinarily took six hours to reach a platoon from a division headquarters [3]. Small teams during the Somme were acting asynchronously and were commanded to use an inadequate map of the world built on mechanistic expectations of support and alignment from and with other teams; a quality they could not remedy due to limitations on communications technology and protocol [22,36]. This inflexibility, or fragility, in the context of changing local circumstances lead to unnecessary loss of life.

The adapted OPOD in Figure 2 was used by American Expeditionary Forces in World War I, but was subjected to evolution and adaptation in the field [4,37]. The nature of this adaptation has been suggested to have had a relationship with the proficiency of the units in their operations: the length of OPODs progressively became shorter, less restrictive in terms of coordinating logistical instructions, and more precise as units became more exposed to combat [4,37]. In later analyses, it was shown that the successfully adopted modifications “adhered closely” [4] to Swift’s original proposed format, evidencing its practicality and utility as well as the suggestion that Complex Threat Surfaces do not indulge conformity to and over-imitation of maladaptive behavior [4,37].

The order which results after these adaptations during the war is sometimes said to have remained relatively unchanged through multiple wars, excluding minor details, until the American war in Vietnam (See Appendices D and G) [4]. However, many order formats were experimented with between World War I and the Vietnam War, including many concurrent versions in accepted doctrine for specific use-cases such as “attack, defend, and development” (See Appendices E and F) [3,38]. In these new experimental order formats, we see, especially in mobile units, the highly mission-oriented standards developed by von Moltke and Griepenkerl after the Franco-Prussian War. This reflects an evolution of military thought toward emphasizing the unpredictability and complexity of warfare as well as de-emphasizing mechanistic expectations of subordinate echelons and of the OPOD format itself [3,21,22,39–42]. These “mission-type orders” no longer optimized for detail or technique but instead for mission, narrative clarity, and “minimum time for issuance” [3]. The experimental order formats used between World War I and the Vietnam War, regardless of use-case specific format, all demanded that the following information be provided to subordinate commanders:

1. What the commander issuing the order wanted to accomplish.
2. What limiting or controlling factors must be observed.
3. What resources and support have been allotted.

[3]

Between World War II and Vietnam this use of separate situational and logistical OPORDs ends, and a return is made to a single order that again adheres to the fundamentals of the five-paragraph structure Eben Swift originally suggested [3,4]. This new post-World War II format is essentially the one in use by the U.S. Military today (see Figure 3 and Appendix G) [43].

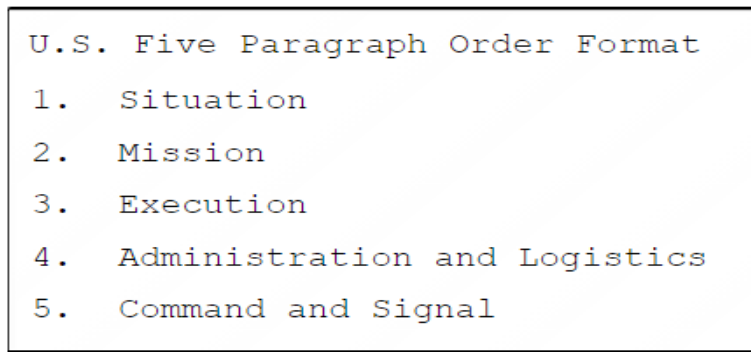


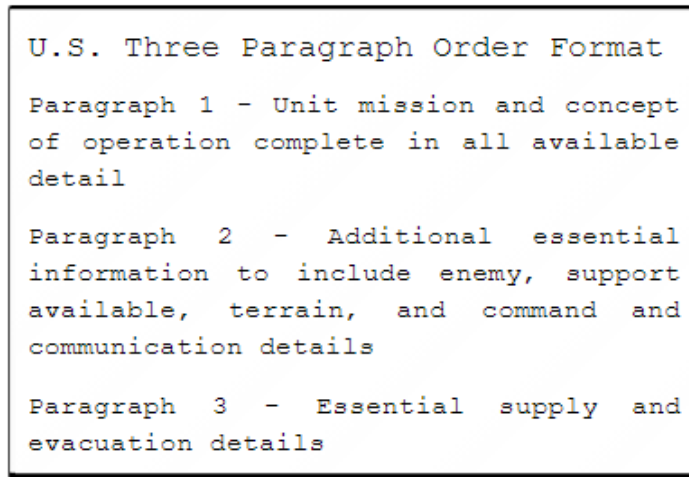
Figure 3. The American Five Paragraph Order [1,43,44], expanded in Appendix G

OPORDs for Operational Art

There was a temporary divergence from the Five Paragraph Order during the American War in Vietnam (1955-1975) [3]. The Vietnam War was characterized by extreme uncertainty given that even sensemaking based on geography was unstable due to extensive tunnel systems [45], hidden insurgencies [45-47], and challenging terrain which could change with the weather [48-50]. While the official OPORD standard in doctrine was unchanged for the whole of the Vietnam war [4], the five-paragraph order was reduced to three paragraphs in field use (See Figure 4 and Appendix H) [3].

In such a chaotic environment, where situational awareness and territorial gains can be illusory [47], evacuation details became far more important than they had been previously or in predictable environs. The field-modified Three Paragraph Order used in Vietnam is unique among all modern OPORDs in its emphasis on an exit plan (see Appendix M). The need to plan amidst fundamental uncertainty in Vietnam appears to have served as a catalyst for several distinct changes within the U.S. Military [47]. First, the

embodied culture around the OPORD took a turn to be much more pragmatic and flexible, for example by allowing for more inclusion of symbols, graphics, and overlays [3]. Second, during this period, unconventional warfare (or 4th Generational War [51,52]) and special operations became commonplace, requiring the joint improvisational capabilities commonly used by small special forces teams in the field. These high performance teams are noted in some works to be “masters of chaos” and, in stark contrast to the mechanistic views on war of the early 20th century, are referred to as “operations artists” [1,53-55]. In other words, the 20th century sees the metaphor of advanced warfare evolve from that of large teams of engineers, to small teams of artists.



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U.S. Three Paragraph Order Format

Paragraph 1 - Unit mission and concept
of operation complete in all available
detail

Paragraph 2 - Additional essential
information to include enemy, support
available, terrain, and command and
communication details

Paragraph 3 - Essential supply and
evacuation details
    
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Figure 4. U.S. Vietnam War Three-Paragraph Order, adapted from [3]

While “Operational Art” is a modern term, this view on flexible, adaptive warfighting as an art-form begins with the earliest and most widely recognized treatise on military philosophy: “The Art of War” by Sun Tzu [56]. Both warfare and art include elements of tradition and heterodoxy, passion and patience, skill sets and teamwork, and preparation and improvisation. Historically, cavalry were typically given very generalized orders and allowed to exercise a great deal of agency in the field [30,57]. Late 19th century analyses of the American Civil War described the leaders of the Confederate Cavalry, such as General John Morgan or General Jeb Stuart, in a way similar to artists [30]. The descriptions of the “artistry” of cavalry in the 19th century indicate that they were performing similar roles as modern operational artists within U.S. special forces: disruption of supply lines and communications, destabilization of fortifications, psychological operations, and reconnaissance all at, or beyond, the edge of their parent army’s operational reach [30,57]. Reconnaissance, and this action at the limits of an army’s operational reach in general, are often referred to as “art” directly as well [57]. General Morgan for example, is characterized to be something of a self-educated savant, who

was highly “improvisational” and adept at bricolage in the field beyond the reach of conventional support [30]. A summary of one of General Morgan’s raids notes that he discovered and captured a telegraph agency while in the process of being cut off from the army and used it to reroute enemy troops and intercept messages about his position [30]. Further confirming his ability to improvise in the field, a field summary of his “first” raid suggests that he leveraged the psychological impact of his success to recruit new soldiers: “He started with 900 men, lost ninety and returned with 1,200, was absent twenty four days, traveled 1,000 miles, captured seventeen towns, destroyed all the government supplies and arms in them, dispersed 1,500 home guards, and paroled 1,200 regulars” [30]. A mechanistic OPORD, such as the one later used by American Expeditionary Forces during World War I [4,22,35], would have denied Morgan and other Civil War cavalry officers such successes by denying agency to act on opportunity. However, it should be noted that Morgan is eventually captured. Morgan’s failure can be attributed to poor situational awareness, an inability to communicate with the main force, poor discipline, and a lack of an evacuation plan [30].

A century later, we find echoes of Morgan’s failure and successes in the deployment of OPORDs used by Israeli Defence Forces. Where many European OPORDs conformed to U.S. standards during the Cold War (with limited variation observed even in the Soviet OPORD, Appendix I), Israel’s OPORD form diverged significantly (see Figure 5 and Appendix J) [3]. Israel’s OPORD formats placed far more emphasis on the commander’s intent, both in the culture and techniques associated with writing the OPORD as well as in the format itself [3,58]. The Israelis, aligned with the views of Moltke, Swift, and Griepenkerl by embracing the agency of small tactical units in the field [3,58] and in doing so, earn a “worldwide recognition for excellence in mobile warfare” [3]. The Israeli Defence Force operated under the presupposition that “a detailed plan is only good until the first bullet is shot” [3] and placed emphasis on a metaphysical doctrine defined by “individual daring (heaza), maintenance of aim (dvekut bamatara) and resourcefulness (tushia)” [58]. Moshe Dayan, former Defense Minister of Israel, noted in his war diary: “To the commander of an Israeli unit I can point on a map to the Suez canal and say: ‘There’s your target and this is your axis of advance. Don’t signal me during the fighting for more men, arms, or vehicles. All that we could allocate you’ve already got, and there isn’t any more. Keep signaling your advances. You must reach Suez in forty-eight hours’” [59].

The Israeli Defence Force used this focus on commander’s intent in order to develop strong narrative alignment [60] between units in the field in a way that strongly resembles the German concept of “Auftragstaktik”, a concept deemed essential to the success of the German Panzer Korps during World

War II [39,58,61,62]. Auftragstaktik translates, roughly, to “Mission-Type tactics”; it is a term representative not of a particular set of maneuvers but instead of an organizational culture which was developed over the course of “three wars: the Danish-Prussian War of 1864, the Austro-Prussian War of 1866 and the Franco-Prussian War of 1870” [61,63]. This organizational culture revolves around taking initiative in the field based on “grundlegende Lageänderung”—fundamental changes to the situation in the area of operations [28]. The formalization of the organizational culture of Auftragstaktik begins with the same General Helmuth von Moltke from which Eben Smith derives his formalization of the Five Paragraph Order [3,64]. Moltke, a disciple of Clausewitz, argues that decentralization, agency, bricolage, asynchronicity, individual and team initiative, and narrative alignment are the basis by which wars will be won in the future [61,64]. Most important to Auftragstaktik is a sense of *Esprit de Corps*, a narrative alignment not just between individuals but between individuals and the “spirit” and collective ideals of an organization as a basis for overcoming limitations on the development of intimate relationships, maintaining trust in the organization and comrades, and prevention of disintegration or route [25,29,60,65–68]. Moltke comes to these conclusions while holding command positions in a Prussian Army which had recently failed to achieve consistent success during the Napoleonic Wars [61,64]. It should be unsurprising that Eben Swift, a cavalry officer who served in the American Indian Wars [69], a series of conflicts which had conditions similar to those Americans faced a century later in Vietnam [22,47,48], would find value in Moltke’s analysis and conclusions [22,47,48].

The first Israeli experiment in extreme agency experienced some failures however. During the 1967 war, “entire battalions became lost in the sand dunes”, as limited control over units acting at the limits of the army’s operational reach resulted in the same sort of “misadventure” [3] that led to General Morgan’s capture [30,58]. Post-1967, the Israelis experiment with an “optional control” system that offered a more pragmatic approach to Auftragstaktik allowed for subordinate leaders to take maximum initiative while allowing for command to intervene [58]. This system experienced failures as well, but these failures have been deemed to be more likely the result of an over-centralization of command structure, lack of planning, and poor intelligence collection, analysis, and distribution [58]. The conclusions regarding the basis and impacts of poor intelligence practice during the Israeli’s 1973 War is consistent with expectations formed by modern research on the impacts of knowledge management systems on organizations [29,58,59,70–72].

Israel also experienced wild successes in their allowance of “operational art”, achieving “lightning fast”, significant victories likened by experts to that of

Germany's capture of France and Napoleon's successful campaigns [73]. In the same 1967 war in which "entire battalions became lost in the sand dunes" [30,58], the IDF was also internationally declared to be a textbook example of the expression of all classical principles of success in warfare: "speed, surprise, concentration, security, information, the offensive, [and] above all training and morale" [3,73,74].

- The Israeli OPORD

 1. Friendly Forces
 - a. Intent or aim of the higher.
 - b. Unit Mission...
 2. Terrain
 3. Enemy
 - a. Intentions
 - b. Deployment and strength...
 4. Commander's intention
 5. Method
 6. Combat Support
 7. Administrative and logistics
 8. Control [and communication]

Figure 5. Israeli OPORD Format, adapted from [3], expanded in Appendix J

Israel's renown for artistry in the sort of highly flexible, mobile operations that were (correctly) expected to be the norm in future warfare made their OPORD (see Figure 5 and Appendix J) the subject of study in the late 1980s on the basis that it might provide insight and inspiration for the basis of a new OPORD for the United States [3]. Instead, the United States Military kept the five paragraph order, but seems to have embraced the concept of "operational art" as it is now contained in many doctrine publications in use across all branches of service of the US Military, in some cases, even in the foreword, as a defining context for doctrine [1,20,75]. A key element of this modern operational art is the notion of being able to rapidly adjust maneuvers around new "centers of gravity" (COGs) in the area of operations, these COGs have similar characteristics to "strange attractors" in dynamical systems theory [1,76,77]. The modern U.S. Military's Five Paragraph Order allows for adjustment of an OPORD to respond to new COGs through the use of a "Fragmentary Order" or FRAGORD [1,78-82]. The FRAGORD has the same format of a Five Paragraph Order but the writer only includes

changes to the OPORD to which it is tied, allowing it to act as an ad hoc overlay over the original [1,78-82].

OPORDs in the Modern Gray Zone

In the late 20th and early 21st century, OPORDs became the subject of plans for development in the interest of making them machine-readable, through research on "Coalition Management Battle Language" [83-88]. This planning is in response to difficulties in all aspects of managing operations composed of units which are embedded in varied hierarchies, such as those coming from different branches of service during special forces operations or those from different nations in peacekeeping or coalition operations [1,70,89]. Despite this planning and the rapid changes in technological affordances, OPORDs have not been subject to any recent significant changes [1,43,44]. This may be misleading however, as this is only the case if we require OPORDs to have purely military purposes. Given our discussion of the origins and histories of OPORDs, it would appear that the key criteria for a document to be classified as an OPORD would be that it intends to communicate a "mission" or task to some object that intends to interpret and execute and is accompanied by expectations of completion informed by a regime of expectations, such as the one provided by a commander-subordinate or other formal relationship. Inclusion of components which confer situational awareness are not criteria for classification as an OPORD, but instead increase the likelihood of successful execution by offering an effective regime of expectations and therefore shape behavioral affordances and collective outcomes [24,60,90]. Given this criteria we suggest that there are civilian counterparts to the military OPORD.

Related to OPORDs in uncertain contexts, there is a long history of non-military operations orders for engineering projects, commerce, and teams. As early as 500 B.C.E. there are written, compartmentalized joint venture agreements in the Levant and North Africa which carry expectations of execution and include components that note what it is that the members of the party shall execute (mission) as well as context (situation) [91]. Machine instructions for operating systems in computer science have been described as commands or collections of commands which a computer can interpret and execute [92]. The modern practices of business and project planning converge on similar OPORD-like documents to communicate mission, expectations for execution, and situational awareness [93-97].

The "Heilmeier Catechism" is an OPORD format which exists in the gray zone between military and civilian application (see Figure 6 and Appendix K), and is used by The Defense Advanced Research Projects Agency (DARPA) in the direction of research activity [98-100]. The chaos of the American war in Vietnam effectively transformed DARPA (originally known

as ARPA) to make it much more focused on supporting the Department of Defense, thereby heightening requirements for reliability [98]. In 1975, an engineer, military history buff, and former Department of Defense Fellow [101] named George Heilmeier became the director of DARPA [98,101]. As director, Heilmeier had to contend with the paradox of managing needs for military efficiency while also allowing for ambitious innovation in the pursuit of the high-risk/high reward research outcomes in short time scales which were required by its mission [98,102]. Heilmeier thought of DARPA as a “mission agency” and sought to align all projects with the mission to support the Department of Defense [98,102]. Heilmeier led DARPA with a “heavy hand”, but didn’t micromanage operations, opting instead to review all DARPA projects to check for clearly articulated objectives and milestones [98]. Heilmeier introduces a set of questions that he described as a “pre-flight checklist” for launching complex research projects [101] which he “preached as a catechism” [98,101,102].

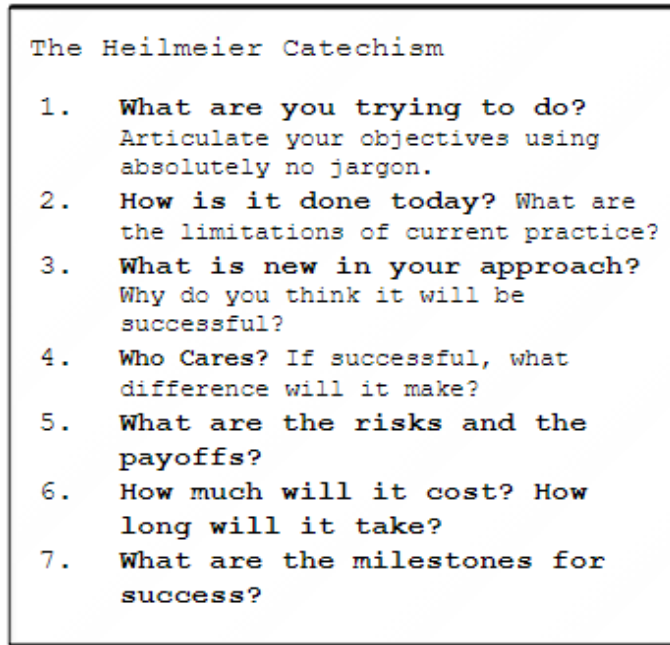


Figure 6. Heilmeier Catechism, adapted from [98]

A catechism is traditionally a set of questions or prompts with defined answers, used as a basis to express or teach spiritual doctrine to rapidly build narrative alignment among members of an organization [60,103]. Where the 17th century “Westminster Catechism” attempts to build narrative alignment between the members and leaders of the Church of Scotland and that of England by asking and answering questions like “What is the chief end of man!” [103], the Heilmeier Catechism (see Figure 6 and Appendix K) is a template to build narrative alignment between members of research teams and the mission of DARPA by asking questions like “What are you trying to do?” and “If successful, what difference will it make?” [3,58,60,61]. The

open question-response format of the catechism elicits participation, inclusion, joint ownership, and innovative team impact (as opposed to an inflexible or memorized creed, which may promote identity or alignment but rarely satisfies as an action plan).

The Heilmeier Catechism is well aligned with the philosophy behind the OPORDs inspired by the organizational culture of Auftragstaktik and especially well aligned with the Israeli OPORD in that it gives a great, almost metaphysical emphasis on unit agency [3,98]. There are many qualities which make the Heilmeier Catechism unique in relation to other OPORDs. First, the Heilmeier Catechism is written by the team which intends to execute the order and presented to DARPA for interpretation and acceptance. This is in contrast with the traditional “top-down” pattern of commanders writing and presenting orders to the subordinate teams. DARPA releases information regarding the nature of their current mission and teams (subordinate) that are interested in supporting that mission create proposals, built using a Heilmeier Catechism (OPORD), for a DARPA program manager (commander) to evaluate [98,102]. Second, OPORDs and OPORD-like documents such as the American Five Paragraph Order or its sibling the “PLANORD” (Planning Order) have require a relatively large amount of supplementary material to ensure that they are prepared properly [1,43,70,75], whereas a Heilmeier compartmentalizes using simple questions—nullifying any need for supplementary material. If the questions within the catechism are successfully interpreted and answered, there is no checklist with which one must comply in order to ensure it’s been prepared correctly. Finally, because of this rearrangement of the OPORD process, the flexibility, and ease of preparation of this format, we posit that the Heilmeier Catechism is an OPORD that allows for emergent remote research teams to practice operational art in civilian settings.

OPORDS for Goal-Setting and OPORDs for Sensemaking

We now turn toward contemporary research on Complexity Science, Active Inference, and High Reliability Organizations, to set a basis for examining the impact of OPORDs on organizational performance. The modern context of online and hybrid remote teams, distributed over large geospatial areas, provides new challenges and affordances for strategy and OPORDS. The modern digital operating theater requires the adequate distillation of the common features of OPORDs in context with the basis for their impact.

“High Reliability Organizations” (HROs) are multiscale systems where, due to the high potential for errors to cause cascading, non-linear

impact, errors must be controlled to an extremely high level of stringency [27,29,104,105]. This high potential for cascading system failure modes is a product of the Complex Threat Surfaces that HROs, such as Aircraft Carrier Crews, Firefighters, and Emergency Medical Treatment Teams, must reliably manage [25,27,29,106]. Complex Threat Surfaces are a key feature of systems in which cause and effect relationships exist, but may be mechanistically complicated (e.g. a body), conditional, or otherwise difficult to quantify and predict [29]. As a consequence, they often cannot be de-risked linearly and the threats which emerge from them can be extraordinarily difficult to predict or model effectively and present the risk of nonlinear failure modes if exploited [29,107]. Systems in nature are adapted to display a tremendous resilience to the kinds of difficult to predict perturbations which are caused by interactions with Complex Threat Surfaces [108–111]. The development of precision instrumentation for the monitoring of Complex Threat Surfaces is challenging due to confounding variables, problems with observability, and the fundamental difficulty of simulating appropriate counterfactuals for multiscale missions [29,41,112,113].

HROs are sometimes noted to be “nearly error-free” [106,114] or characterized by low rate of error, but this may be a misleading designation as it requires a definition of “error” which is synonymous with failure [27,106]. From this: fault detection, real-time diagnosis, tolerance to variability, and similar metrics of resilience can often be more useful metrics than “error-rate” in defining the functional reliability of complicated systems like hardware and complex systems like organizations [27,105,106,115,116]. The basis for creating fault tolerance in hardware is largely determined by good design principles [115,117] whereas reliability in organizations is generally determined by situational awareness, rapid information sharing, and, most importantly, the ability to recover and recalibrate [25,118,119]. In both hardware and sociotechnical systems, engineering toolkits can provide scaffolding and protocols for sensemaking and effective intervention and policy design [60].

Military organizations are tasked, not only with the monitoring and derisking of Complex Threat Surfaces, but also with the creation and exploitation of them, and regularly serve as the subject of case studies on HROs [27,29,104,106,120,121]. From a systems engineering perspective, the OPORD is a tool which is iteratively developed over time to contribute to the factors of team success most dampened by the environment [60]. For example, the late 19th century formalization and inclusion of “situation” in the OPORD appears to be a response to feedback from environments requiring good information about

constraints in the locale, such as those found in the American Indian Wars which rewarded agency in the field by officers and punished inflexibility [22,23,30,57,58]. The inclusion of this section about constraints obviously intends to rapidly communicate situational awareness in uncertain environments. The emphasis on an evacuation section in the American's make-shift Three Paragraph Order during Vietnam (see Figure 4 and Appendix H) intends to heighten the ability to recover from errors in an environment where, due to extreme uncertainty, error was inevitable [3,45–47]. The OPORD, in all its forms, has the potential to enable or enhance information sharing where the environment or situation would make traditional communication via utterance difficult or unfeasible (e.g. communication across long distances, communication of orders from a single commander to hundreds of subordinate organizations) [9,19]. Further, the OPORD may also contribute generally to the ability of organizations to calibrate and recalibrate.

Ongoing recalibration is fundamental to reflexive systems of all scales [106,122–125]. Maintaining coherent activity through time, for an ant colony, body, military or government, requires the system to respond to perceived errors, as well as to the future potential for errors [123,126]. For example, one might find a jacket in their house if they were cold as a response to deviation between current state and ideal state, or if they were planning to go out into the cold soon as a response to a prediction of potential deviation between some future state and its ideal. This continuous self-regulatory or cybernetic perspective applies to biological systems, HROs, and Artificial intelligence algorithms [127]. The process theory of Active Inference (a physics-based framework that describes how goal-oriented systems interact with their surroundings) describes the general relationship between goal-seeking systems and their informational niche [124,128,129]. Active Inference casts the question of system behavior as a relational mapping between internal states (generative models of the world) and external system states (the causal structure of the outside world). External states influence internal states through sensory cues, and updated internal states are differentially likely to engage in different action affordances. Internal generative models provide natural and engineered systems actionable insights from sparse sensory data, by engaging in action-oriented sensemaking [125]. Active Inference may be a relevant framework for developing advanced team education, communication, and performance characteristics [60]. In the Active Inference framework, conformity to policy and regular communicative norms are argued to be strategies to cope with uncertainty [24].

Given that this process of ongoing recalibration is fundamental to reflexive or “intelligent” systems of all scales, there is an opportunity to investigate collective intelligence through the use of dynamical analogy. Dynamical analogy is the creation of analogies to the dynamics and mechanisms of better understood systems in order to reveal avenues of approach for the investigation of those which remain enigmatic [130–132]. Dynamical analogy allows for the discovery of patterns that transcend single levels of analysis, thus expanding the range of possible system framings or intervention approaches in complex systems. Here we will explore the potential for dynamical analogy between individual and collective intelligence, to understand how high performance is achieved in multiscale cognitive systems.

Literature from the human and collective intelligence fields converge on the idea of controlled novelty, or balanced openness, in navigating the explore-exploit tradeoffs intrinsic to organization [133,134]. In the Five-Factor or “Big-Five” personality traits model, there is a factor denoted as “Openness” which is described as being associated with openness to novelty, diversity of thought, creativity, and intellect [135]. While the link between trait openness and crystallized intelligence is sometimes debated [135,136], it would seem that there is, at the least, a relationship between “openness” and the resiliency of crystallized intelligence against aging and trauma [137,138]. The existence of such a relationship forms a stable dynamic analog to collective intelligence, given that there are indications of non-linear relationships between the diversity and tolerance of temporary employees within HROs and the number of innovations produced [99,119] as well as between diversity within spontaneous, endogenous social networks and the survivability and virality of the memes and ideas they generate [139,140]. Further, the adjectives that describe organizations capable of “operational art”, such as intelligence agencies and special forces, are the same adjectives which have high correlations with trait openness [20,70,141,142]. Openness is not the only component of Five-Factor analysis which may offer insight on the personality and intelligence of organizations—as analyses of the organizational equivalents of components such as neuroticism and conscientiousness have been done as well [143,144].

Following this mapping between intelligence of individuals and intelligence of teams, there is a literature on “Goal Setting” which has been used as a dynamical analogy to catalyze the development of Artificial Intelligence [145]. The individual goal-setting should be of use for understanding team function, within the context of the idea of extended multiscale cognition. Literature on goal-setting is primarily concerned with the success of individuals in reaching their end goals

and, consequently, the characteristics of self-perception which enable them to do so [146–149]. The general consensus within literature on goal-setting is that when an individual's confidence in their own skillset maps well to actual competence within a domain and this “self-efficacy” [146,147,150] is paired with team or individual objectives that are clear, consistent, and relevant, progress can be reliably achieved [146,147,149,150]. Self-efficacy might be described as an internal state which coherently maps a regime of expectations or field of affordances with coherent objectives [24,151]. Another perspective on self-efficacy from the Active Inference point of view might be that agents become successful within a niche when their “regime of attention” correctly maps internal causal models of the world to possible agent policies (and affordance) and outcomes in the world [24,123]. There is a strong overlap between the individual-focused conclusions within the literature on goal-setting, narrative-focused conclusions on the impacts of ideal-setting in religious narratives [152–156], the organization-focused conclusions on course of action analysis in joint operations planning [1,20,157], and work-flow focused conclusions in software project management [93,94,158], as well as the more broadly applicable, systems-focused conclusions such as those on policy optimization and divergence minimization in Active Inference [24,125,159]. This overlap is described well by a systems engineering approach [60] wherein a set “goal” can be characterized as a stable, coherent, communicable conception of an ideal from which outcomes might deviate, allowing for recalibration in environments where uncertainty makes expectations and outcomes difficult to reckon or reconcile.

Adaptations of the OPORD and the conditions under which these adaptations occur conform with this analog between individual and collective intelligence. Like organisms existing in ecological niches, information-processing & sensemaking entities must finesse their affordances in order to stay successful amidst uncertainty [24,126]. This goal-drivenness of self-organizing systems is essential for their ability to act and thrive in challenging settings [160,161]. As previously noted, the organizations implementing OPORDs recalibrate the format to better match environmental pressures and demands, thereby recalibrating their own basis for action in response to error and potential for error [3,4,23]. The behavioral engineering of teams is suggested to require Ontologies, Narratives, Formal documentation, and Tools (ONFT) [60]. In this ONFT framework the OPORD can be described as a formal document which incorporates a codified ontology in order to efficiently and reliably convey a narrative. This narrative rapidly aligns an organization with a regime of expectations prior to operations and is used after operations as a basis for reconciling the

difference between expectations and outcomes. Even in very early examples of OPORDs, there is clear intent to use OPORDs as a tool to not just orient action but also to gauge its success. Roman sentry orders were designed to be compared with specific outcomes as a means of detecting impropriety, negligence, or malfeasance [9,11]. Post-war analysis of military history is also generally done with the intent of driving changes in military philosophy, and is achieved using a combination of OPORDs and situation reports as a basis for gauging success and failure [22,23,36].

The U.S. Military has designed processes for managing this process of reconciliation in shorter time-scales, one of which is the “After-Action Review” (AAR) [78]. An AAR is described as an opportunity to turn any event into a training event to “improve individual and collective task-task performances to meet or exceed [standards]” [78]. The AAR is an analysis done immediately after an OPORD directed event in the interest of both reporting failures and successes to stakeholders as well as to help the involved parties better understand the divergence or alignment between the OPORD and the outcomes to adjust future goal-setting and course of action analysis [27,78]. The AAR has clear civilian counterparts as well, such as the “sprint retrospective” in the software development framework SCRUM [162].

A precursor and ongoing constituent of meaningful goal-setting, course of action analysis, and policy-making is sensemaking, which is described as the act of “organizing sense data until the environment becomes sensible or is understood well enough to enable reasonable decisions” [1,118,157,163]. Through the lenses afforded by the Active Inference, sensemaking might be described as the processes by which a system creates useful internal models of the world based upon the organization and integration of sense-data from external sources [164,165]. The quality of the sensemaking is related to the mapping of the external and internal states, as determined by the mapping between predicted and actual outcomes of actions informed by internal states [163]. Organizational sensemaking is the collaborative process by which sense-data about external states is integrated into a coherent, shared model that facilitates collaborative action [60,106,118,166]. Good organizational sensemaking requires that participants have a sense of self-efficacy and mutual trust [25,27,29,118,163]. Thus sensemaking depends on reliable, accessible, manageable information streams and a clear understanding of what resulting decisions intend to accomplish [25,29,106,118,167,168].

Maintaining a single source of truth (SSoT) for protocol, ontology, objectives, and workflow-related knowledge is a solution used by HROs

to maintain integrity, reliability, and clarity in the information environment [27,60,169–171]. An SSoT may be temporary or interminable, for example the “product backlog” used in the software development framework SCRUM is temporary when tied to the launch of a product but interminable when tied to the maintenance of one [162]. The Military has an interminable SSoT in the form of “Doctrine Publications” [1,20,70,75,82,172]. We argue that the OPORD acts as both a temporary and interminable SSoT: it is a transient SSoT related to the objectives of an organization prior to and during operations, but after operations it serves as an SSoT on what the objectives and goals of the organization were from the time of its issuance to the time of its success or failure. In its capacity as a temporary SSoT, the OPORD, in offering compartmentalized information on what support will be available, what the rules of engagement are, what constraints exist in the locale, and what the organization needs to accomplish, greatly expedites sensemaking by defining a bounded informational niche [24,173]. While the boundaries of this informational niche only remain stable in preparation for operations, positive impacts extend into the theater of operations by contributing to self-efficacy and, as previously noted, by providing a coherent ideal to move toward [27,146,150,154].

Toward a new OPORD

From the examination of the origins and histories of OPORDs and the discussion of organizational sensemaking and the dynamical analogies between (a) intelligence in individuals and collective intelligence and (b) between reflexive recalibration of systems in general and high reliability organizations, we can conclude that the following features are critical to the success of HROs and greatly enhanced by the usage of an appropriately formatted OPORD:

1. Ongoing, feedback-driven reflexive recalibration of process and capability
2. Clear alignment of participants on values, narrative, goals, and identity
3. High quality distributed & multilevel sensemaking

We also find a number of emergent patterns within the discussion of OPORDs consistent with these conclusions. Evidenced by adaptations in both the OPORD and the culture surrounding it in response to increased uncertainty and mobility in battle over the course of the 19th and 20th centuries:

1. The faster that new centers of gravity may emerge in the operating theater, the more flexibility that is required in the OPORD

2. When the nature of warfare undergoes structural changes, and/or there is unprecedented levels of uncertainty in the operating theater, the necessity for a new **OPORD** emerges

Significant changes to the nature of communication and team performance since the late 20th century (e.g. the internet, 4th generation warfare, social media, COVID-19) necessitate a redevelopment of the norms of **OPORDs** as other socio-technical changes have altered the nature of warfare in the past. Specifically, previous iterations of the **OPORD** have characteristics which limit their ability to easily frame key aspects and challenges of a virtual theater of operations. Additionally, pre-online **OPORDs** are generally unable to take advantage of some of the new affordances and strategic possibilities in the modern era, such as versioning, compression, and fluidity in team composition.

The Heilmeier Catechism is currently recommended for use as an **OPORD** by research teams as a result of its success at **DARPA** and because it helps to answer questions that are important to appraising the usefulness of research in general [98,174–176]. The Heilmeier Catechism is the obvious best starting point for work of this kind as it was built to orient exploratory action within uncharted territory. However, the Heilmeier Catechism has limitations for its use in this new operating theater of **IRTs**. Specifically the Heilmeier Catechism assumes organizational alignment prior to issuance as well as a fixed team composition. Both of these implicit assumptions of the Heilmeier Catechism are regularly violated by modern online settings [177]. In online informational and narrative war and wargames the Centers of Gravity are not geospatial but exist in abstract or memetic space, as a consequence, teams must be afforded a great deal of flexibility, and their team agents must operate with skill, agency, and autonomy [177]. Team communication in online teams can run the gamut from constant interfacing to absolute radio silence in wildly uncertain informational environments—yet even one false positive or false negative communication can prevent the team from achieving its mission [29,177]. A new type of **OPORD** is required to address the novel characteristics of online teams, such as the potential absence of command-subordinate relationship, fully programmable communication systems, narrative ambiguity, memetic transfer with adversaries, and dynamic team composition. Such an **OPORD** would need to both synthesize the battle-tested elements of past-**OPORDs** which would invariably contribute to team success in the described environment and introduce elements and processes which allow it to circumvent the described limitations of previous **OPORDs**. Given that no prior **OPORD** found accounted for lack of extant organizational alignment or potential for dynamic and unknown team composition, this appeared to be the most difficult limitation to overcome.

Organizations have three primary means of developing rapid alignment: well codified ontology, intimate trust, and narrative [60]. Some IRTs are unable to rely on intimate trust by merit of their being just recently formed [60,177]. If the IRT lacks prior organizational, professional, or cultural alignment, they cannot rely on codified ontology, they must rely on shared narrative or shared regimes of expectations and affordances [24,60,151,177]. In situations where the scope of possible expectations, affordances, and objectives are very narrow, such as good Samaritans passing a motorist in danger [178-180] or a group of players encountering a shared threat in a virtual game environment, IRTs may form without the presence of systems engineering tools [177], in absence of such narrow scope, behavior can be modified via ONFT in order to increase the likelihood of organization and collaboration [29,60]. In joint operations planning, a common solution to this problem of scope is the assignment of a liaison that has an understanding of the operation or problem being faced and makes regular personal contact to build and maintain mutual understanding, trust, and a unity of purpose and action [34,43]. The private sector has converged on a similar solution, with a common job title being a "Customer Success Manager", whose job is to maintain alignment of the goals of their company's teams with those of their clients [181]. In the Scrum framework for software development, the "Scrum Master" manages a very similar role [182]. However, as the environments in which companies operate become more complex, the role appears to conform more with their military counterparts. The company Palantir is an HRO which helps militaries and other HROs contend with Complex Threat Surfaces by offering tools related to knowledge management and discovery [183]. Due to the nature of the companies with which they work and the complex environments in which those companies operate, single solutions rarely generalize, so every consultation can be expected to be considered non-routine [27,184-186]. Palantir appears to have coined the term Deployment Strategist to describe a liaison position between the company's teams and those of the served organization [184-186].

While each job has its own industry-specific requirements, the abstracted requirements of the liaison, Customer Success Manager, Scrum Master and the Deployment Strategist all find overlap within the requirements of the role of "Process Facilitator" [187]. Process Facilitators are most notably associated with the management of meetings [187], but Process Facilitators can also help to manage collaborative work, problem solving, and research tasks by helping groups align with objectives and process [188-190]. The primary requirement of Process Facilitators, such as Customer Success Managers, liaisons, Deployment Strategists, SCRUM Masters, and meeting facilitators, are to maintain group state attributes which lead to persistent action through successful management of process [27,181,184-190]. Process Facilitators have to practice behaviors, take on roles, and stage interventions

to develop situational awareness, narrative alignment, coordination, and accountability in order to maintain successful communications, workflow, production, and external interaction (see Figure 7) [181,182,186,187].

Given that Process Facilitators have been used as a solution to overcome limitations regarding extant organizational alignment and potential for dynamic and unknown team composition, and because Process Facilitators are already being deployed to handle tasks in the domains in which a new OPORD is needed, we argue that an OPORD built to overcome such limitations and to be applied in these domains should be built for use by Process Facilitators such as Deployment Strategists.

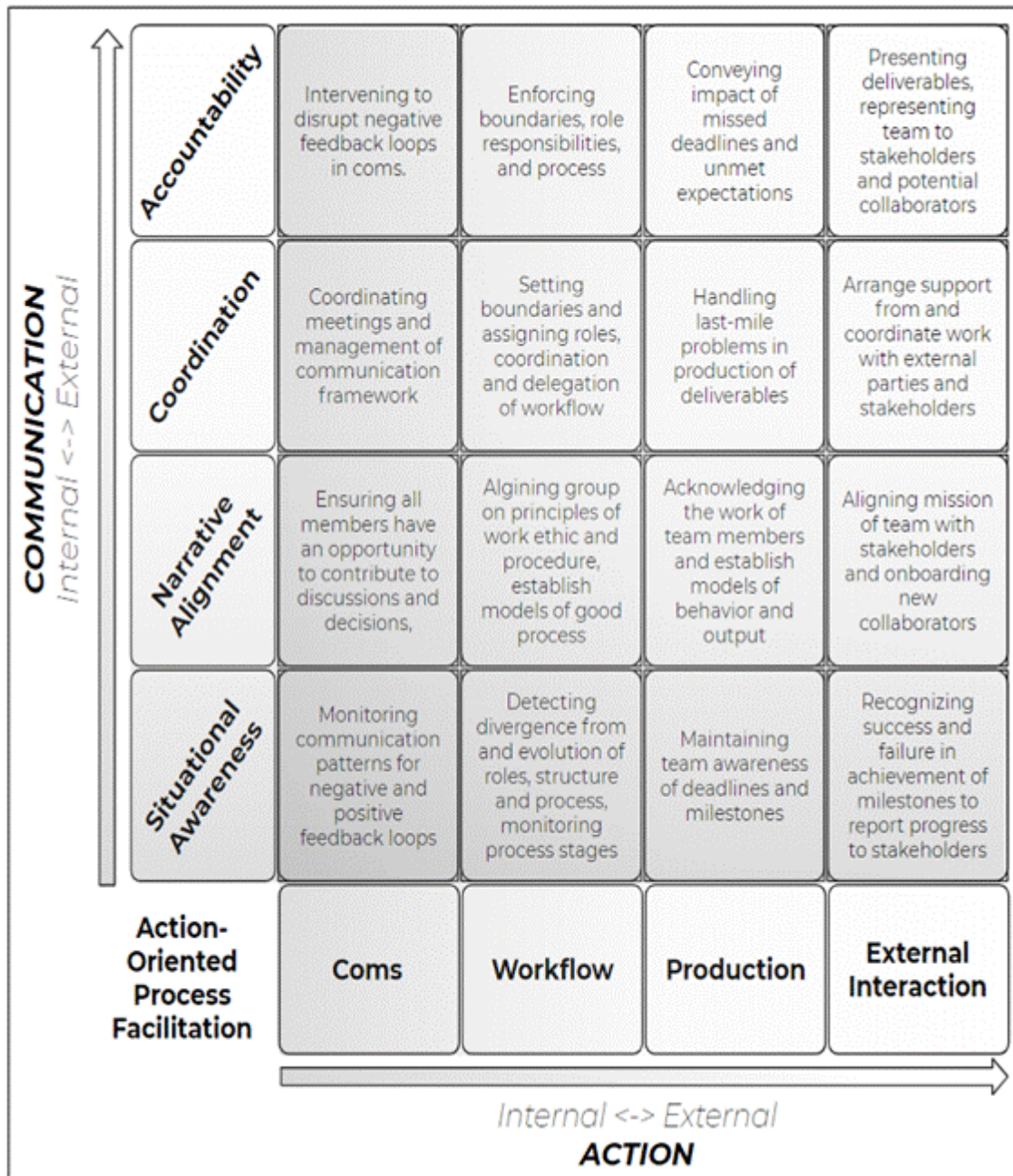


Figure 7. Action-Oriented Process Facilitation [1,27,34,43,181,184-190]

The Facilitator's Catechism

Here we propose the “Facilitator's Catechism”, building on the long developmental history of the OPORD by distilling essential characteristics of military and civilian OPORDs through time and offering novel elements to overcome their limitations. The Facilitator's Catechism contains a Header, Footer, and six sections: (1) Situation, (2) Mission, (3) Potential Avenues of Approach, (4) Milestones, (5) Implications for Outcome, and (6) Administrative, Logistics, and Communications. Building from the success of the Heilmeier Catechism, each section is paired with questions which, if answered with rigor and in good faith, will ensure a format-valid order without the need for supplementary materials. The subtitles facilitate both the reading and the writing of the OPORD, informing the reader of what to expect to be answered in the section and the writer of what they are expected to answer. These questions can be treated as subcompartments and answered directly or the writer of the OPORD may answer them in written paragraphs. The OPORD can also be issued from command to subordinate, from subordinate to command, or in absence of a command-subordinate relationship. It is also built to be versioned but does not implement rigid formatting of text as would be required by coalition battle management language [83–88]. The Facilitator's Catechism is built on ONFT and Systems Engineering approaches to circumvent limitations of prior OPORDs, especially where:

1. Team Composition is not necessarily known prior to writing.
2. Organizational and narrative alignment of members is not necessarily achieved prior to writing.
3. The first task, upon team formation, is course of action analysis on how to approach a complex problem which requires novel solutions, operational art, and bricolage.
4. Due to potential for conflict in the political alignments of members, there is a need for strict boundaries on nature and length of affiliation (such as what was required of workshops between the IEEE and USSR during the Cold War [191,192]).
5. The OPORD itself may need to act as a “call for collaborators” to which potential members may respond in order to join.

Header

The header of the Facilitator's Catechism is included as the first item in the document and contains a full title of the project followed by seven items:

1. Unique Project Callsign
2. Team Name
3. Facilitator

4. Facilitator Contact Information
5. Date of Announcement
6. Call for Collaboration End Date
7. Intended Date of Completion

The requirement for a short Unique Project Callsign (UPC) and Team Name was selected in the interest of giving the project an easily searchable identifier (TeamName-UPC) if the OPORD and related materials and deliverables are digitized, much in the same way written DARPA presentations and research deliverables can be searched for through the use of a Broad Agency Announcement (BAA) number contained both in the announcement of interest and in the resulting written deliverables [193]. Even if the OPORD is being used to facilitate an IRT or to make a call for collaborators, giving the team a name creates a symbol around which culture and esprit de corps may be developed [60,66,154,156,194], it also allows for the option to keep the team intact after project completion. The Facilitator and Contact Information are listed so that stakeholders, potential collaborators, and interested parties are aware of who is responsible for execution and how to contact them. A Date of Announcement, Call for Collaboration, and Intended Date of Completion allow potential collaborators to get a sense for how long the project has been active, how long they have to submit a request to collaborate, and how long they should expect to be working on the project.

Footer

The footer is included at the bottom of each page in the document and contains three items:

1. The current version of the Facilitator's Catechism format in use, preferably with an embedded hyperlink to the repository where the version specification is held.
2. The current version of the project's Facilitator's Catechism, preferably with an embedded hyperlink to where other versions are held.
3. The Page Number of the document

The footer is an essential component of the Facilitator's Catechism, as it ensures that the reader can ascertain the current version as well as find and compare updated versions.

Situation

Building on the battle-tested success of the Five Paragraph Order, “Situation” is the first paragraph of the OPORD, and should be used to develop a narrative that conveys a situation, problem, or threat to a potential collaborator, stakeholder, or interested party. Adapting Eben Swift’s notion of the length and detail of this section being proportionate to the level of command [3,23], we suggest that the length of this section be commensurate with the complexity and nuance of the situation requiring the assembly of a team. It is subtitled with a set of questions to be answered:

1. What is the nature of the situation or problem the team is being formed to address?
2. If there are traditional methods which would normally be used to address the situation or problem, what are their limitations and why are they inadequate?
3. What makes the situation novel?
4. What will happen if this situation is not resolved or addressed?

Mission

Following the format of many modern OPORDs [3,4], “Mission” is included as the second section of the Facilitator’s Catechism. Using situation and mission in order follows key principles of necessary scene-setting prior to the identification of an ideal as a basis for narrative construction and survivability [152-154,177]. Mission asks only one question:

“Given the situation, what are the team’s explicit objectives?”

The answer to this question should incorporate the principles of military staff writing: brevity, clear emphasis, mechanical accuracy, readability, simplicity, and coherence [43]. If there is more than one explicit objective, the objectives are recommended to be compartmented and clearly separated. Mission is heavily emphasized in accordance with our conclusions regarding goal-setting and the success of mission-focused OPORDs. This question is resilient to future changes in group personnel or even the inclusion of adversarial team members—as long as the objective is maintained and achieved.

Potential Avenues of Approach

The third section of the Facilitator’s Catechism is drawn from the “Course of Action Analysis” found within literature on joint operations planning [80]. From the point of view of ecological psychology or Active Inference, the Course of Action analysis is equivalent to the assessment of a “field of affordances” and evaluation of the team’s preference over this field

[151,173]. Course of Action analysis is generally done when situational awareness of potential resources (such as the skill sets and knowledge of potential collaborators) is limited and there may be many paths toward solving a problem or achieving a mission [80]. However, instead of using the Course of Action Analysis methods provided by military literature on joint operations planning, which require a great deal of check-lists and supplementary material to create a format-valid deliverable, the Potential Avenues of Approach section of the Facilitator's Catechism asks a series of questions which, if answered with rigor, will provide a deliverable which is fairly similar to that of traditional Course of Action Analysis methods. Additionally, for all-human teams or mixed human-computer teams, the Course of Action Analysis of the future may include specific reference to action-oriented machine learning models. To prompt meaningful engagement with the challenging area of Course of Action Analysis, the Facilitator's Catechism asks:

1. Given the situation and the mission, what are the potential avenues for approach?
2. For each approach:
 - a. What tools, techniques, or expertise alone or in combination are required?
 - b. What are the risks?
 - c. What are the potential limitations?

The Potential Avenues of Approach section allows the writer to develop necessary structure for project execution without assuming resource availability. The Potential Avenues of Approach section of the Facilitator's Catechism is unique among OPORDs because it assumes digitization and versioning (previous OPORD formats were simply innovated in a time before widespread file-versioning tools such as Git and Wiki). Once a team has been assembled and an avenue of approach has been decided, the section is renamed to "Approach" and the potential avenues of approach are replaced with the chosen approach. The state of this section in context with other sections and the header provides potential collaborators with valuable information, allowing them to identify what stage of development the team is in, the likelihood of success, and the length of time the project will likely take.

Milestones

The Milestones section of the Facilitator's Catechism is inspired by the "Milestones for Success" section of the Heilmeyer Catechism. Like the section on Mission, the Milestones section asks only one question:

“Given the situation, mission, and the avenues of approach, what are the milestones that would best indicate the mission's progress?”

This area is left flexible as the standards for what constitutes a milestone and how they should be written are substantially varied by domain [1,80,95,98]. If the avenues of approach in the previous section are widely varied in terms of their deliverables, methods, and progression, it is recommended that their milestones be separated and labeled with their respective approaches. It should also be noted that, like some spatial missions, the milestones in online missions might be reached in a different order than the one listed in the initial OPORD. Considering our earlier conclusions regarding the importance of achievability in goal-setting and that process facilitation can apply to very long term projects, the Milestones section affords the team opportunities to identify and rally around successes and calibrate in the short-term. As milestones are completed, they may be marked as completed on the document to inform potential collaborators of the progress and status of the project. If used in conjunction with a change-tracking tool such as Git, these changes can be labeled and used to produce after-action reports without the need for any additional reporting requirements.

Implications of Outcome

The fifth paragraph of the Facilitator's Catechism, “Implications of Outcome”, is drawn from the highly unique “Who Cares?” section of the Heilmeier Catechism, which presents an opportunity to clarify what the impact of a successful mission might be. The “Who Cares?” question is considered critical to the success of projects in DARPA, given that if it cannot be answered directly or communicated clearly, it is likely the case that the project isn't relevant or helpful [98]. The Implications of Outcome sections asks:

If all or some of the milestones were achieved:

1. What does the success mean to the stakeholders, situation, and team?
2. What else might be affected?
3. What work will come next?

This section helps potential collaborators align on the impact and importance of the mission and provides a stable attractor for meaning of action in context of the project and team. It is a powerful motivator to ground a project in terms of its long-term implications, and how they will specifically impact the lives of stakeholders [154].

Administration, Logistics, and Communications

Following the battle-tested standard set by most modern OPORDs, the last section of the Facilitator's Catechism is Administration, Logistics, and Communications. This section provides a single area in which all of the supporting details necessary to the coordination and management of the project may go. It asks the following questions:

1. Who is the facilitator responsible for the project's completion?
2. Who, if anyone, is the team accountable to?
3. What resources and support elements are required?
4. What resources are already available and how can they be accessed?
5. What are the requirements for participation?
6. How will the group communicate?
7. Where and how will the work be done?
8. Under what circumstances will the project close and the group disintegrate?

For various kinds of IRTs and online projects, Administrative, Logistical, and Communications details, such as technical requirements, tools, and affordances, are essential specifications that, much like the previously noted standards for milestones, will vary substantially across domains [1,80,95,98]. Questions are thus left fairly flexible, allowing the writer to use them as a foundation from which they might ask themselves domain-appropriate questions like:

1. What projects has the facilitator run in the past?
2. Who is the client and project manager?
3. How much money will be required?
4. How do users access the document library?
5. What kind of clearance is required for project participation?
6. What contact escalation schemes will be used to manage bringing engineers or other specialists onto a call?
7. What chat platform will be used?
8. How long do we have before a proposal must be submitted?

Discussion

To conclude, the Facilitator's Catechism is intended to serve as a tool for the systems engineering of action-oriented organizational behavior by structuring the formation, communication, function, narrative, and strategy of online teams [60]. This tool's design incorporates the battle-tested elements found within the discussion of the origins and histories of OPORDs from antiquity to 2020 and presents novel ones in context with the cultural influences of various militaries and conclusions from analysis of modern research on

topics like Collective intelligence, Organizational Sensemaking, Active Inference, and the Systems Engineering of organizational behavior. In accordance with the clear pattern of technology-driven, structural changes in the expression of warfare driving the generation and adaptation of OPORDs, this OPORD is designed to overcome the limitations of its predecessors (see Appendix M) to meet the requirements of modern military, intelligence, and civilian IRTs and small teams [29,60,177] in an environment which has undergone significant structural changes due to factors including, but not limited to, the emergence of new Complex Threat Surfaces related to terrorism [29], availability and adoption of new technology, and the 2019 Novel Coronavirus (COVID-19) [195-199].

Considering that the impact and adoption of this order is difficult to predict, a consequence of the complexity of organizations and the difficulty of prediction in complex systems in general [112,176,200-202], it is not assumed that the Facilitator’s Catechism presented here will be the final version. The Facilitator’s Catechism presented here will be housed in a Github repository¹ with an Attribution-ShareAlike 4.0 International License [203], from which new versions and variants may be produced and distributed. In addition to the difficulty in predicting the impact, the impact may also be difficult to study and measure for the same reasons as well problems of comparability and collection of samples. In terms of comparability, productivity across domains in general is challenging and is especially challenging in domains where the work is knowledge intensive or dealing with innovation [204]. In high reliability and research organizations in which the Facilitator’s Catechism might be most useful, comparability of performance between even individual tasks within the same organization may be difficult to attain given that these are organizations which are characterized by their engagements with novelty and generators of novelty such as Complex Threat Surfaces [29]. Even if comparability of performance were achieved there would be problems attaining the number of samples necessary to glean meaningful insights. IRTs and small remote teams may be formed instantaneously or rapidly but perform over longer periods that may be as short as minutes or as long as years [29,177]. In a future where ONFT and Business, Operational, Legal, Technical, and Social use-case reasonable data standards become commonplace, we argue that the challenges of sample size and comparability in measuring performance may be greatly reduced.

In the absence of such standardizations, we recommend the use of Serious Games applied through tools like collaborative case-management software and events like hackathons [177] as a basis for overcoming challenges of sample size and comparability. Serious Games narrow scopes such that state

¹ <https://github.com/COGSEC/FacilitatorsCatechism>

and outcome can be made comparable while also reducing the time-scales of performance to allow for collection of a larger number of samples [177,205]. From a pedagogical and developmental perspective, serious games can also offer a variety of real-world benefits to participants such as skill training and real-world impact which offer incentives for participation [206–211] while also providing an opportunity to develop authentic and impactful communities of practice.

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Appendices

Appendix A

Eben Swift's 1897 Format [3,23]

THE BODY OF SWIFT'S FORMAT

1. Information of the enemy and general situation.
 - This paragraph included information on the enemy's location and what the higher commander thought the enemy's intentions were.
 - In absences of information it was the higher commander's best guess or idea.
2. Your own plans.
 - This paragraph contains an intimation of the end in view.
 - It gave only so much of the general plan as would enable the subordinates to carry out the operations in hand.
3. Your dispositions.
 - This paragraph described the manner in which troops were distributed and assigned tasks to the various fractions of command.
 - It established the method of enumerating troops apart from the text, in the left margin, in a column headed "Distribution of Troops."
 - Most important distribution of troops is stated first to better impress themselves upon the memory.
 - Designates a start point and time.
4. Destination of trains.
 - Addresses the need to separate light and heavy baggage.
 - Contains all the orders needed for the trains, ammunition columns and sanitary troop.
5. Position of the commander.
 - Gives position of commander.
 - Gives hour for staff officers to report for orders.

Appendix B

WWI Suggested Trench-to-Trench Attack OPORD [34]

SUGGESTED FORM AND HEADINGS FOR A BATTALION TRENCH-TO-TRENCH ATTACK ORDER.

Title.....

Place.....

Date and Hour.....

Field Order No.....
(Reference to Map Used).

Paragraph No. 1.—Information of the enemy.
Our supporting troops.
Our flanking troops.
General plan for our forces.

Paragraph No. 2.—Mission of the battalion.
Zero day and hour.
Limit of the zone of operations.
Objectives.

Paragraph No. 3.—(a) Artillery support.
Time of its opening.
Rate of advance of barrage.
Where and when barrage will settle.
(b) Orders to each company, as to sector or direction of
advance, information, objective, distance, and intervals.
(c) Cleaning up parties.—Composition, mission of each.
Disposition of prisoners. Mission after cleaning up.
(d) Machine guns.
Position.
Objectives.
Mission.
(e) One-pounder gun or 37 mm. gun or 3" Stokes mortar.
Position in the advance.
Mission.
Objectives.
Position and duties in occupation.
(f) Outlining of front.
1. On request of Aeroplanes.
2. Hour each line will signal lights.
(g) Liaison.
With the artillery.
Within the battalion.

Paragraph No. 4.—Plan for occupation of captured ground.
Order to each company as to:
(a) 1. Organization of ground to be held.
2. Reconnaissance.
Contact with the enemy.
Further objectives.
Patrols.
Outposts.
3. Liaison.
Within the battalion.
With neighboring troops.
With colonel.
With artillery.
(b) Machine guns.
Mission.
Sites.
(c) One-pounder guns or 37 mm. guns or 3" Stokes mortar.
Sites.
Objectives.
(d) Service of observation.
Enemy's line.
Observation posts.
(e) Reports.
Munition.
Materiel.
To whom sent and hour.

Paragraph No. 5.—(a) Supply.—Individual equipment and
supplies. Additional communication trenches to be dug or
connections to be made with trench system of old positions.
Munitions.—Depots to be established in jumping-off trench
and by whom.

Designate carrying parties.
Materiels.—Point where depot will be established and the
materiels to be assembled.
Carrying parties and command.
Ration and water.—Amounts other than that carried by
the individual soldier. For use preceding the advance and to
be subsequently carried forward.
Carrying parties.
(b) Circulation.—Designating of communicating trenches
for "forward" and "rear" traffic.
For evacuation of wounded.
(c) First aid stations.—Location of.

Paragraph No. 6.—Position of battalion commander and his
headquarters during the advance and in the conquered position.
Name and rank of the Battalion Commander.
How and to whom issued.

Appendix C

WWI Battalion OPORD [3]

WWI BATTALION ORDER FORMAT

1. Information of the Enemy.
2. Mission of the Regiment. Attack formations.
Phases and objectives. Commander's intent.
3. Limits of the Front.
4. Mission of Each Company.
5. Attack Formation of the Battalion.
6. Formation Prior to the Assault.
7. Cleaning up. Positions. Mission.
8. Advance. How it will take place, the barrages
use of signals.
9. Machine gun company. Mission, route of advance,
position, the objectives.
10. One-pounder guns/mortars. Positions; route of advance and
objectives.
11. Divisional Group of Machine Guns.
12. Tanks. Missions.
13. Liaison. with the battalion, neighbors, with
artillery.
14. Marking out the Front. Arrangements for indicating the
front when halted or on the request of an aviator.
15. Organization of the Captured Ground.
16. Dress, Equipment, Pack of the Men.
17. Supplies. Organization, location of depots,
munitions and fire-works. Rations, water, other
materiel (tools, barbed wire, sand bags).
18. Medical Services. Locations of first-aid stations.
19. Prisoners. Measures to be taken.

Appendix D

1940 U.S. OPORD [4]

APPENDIX G, 1940 OPERATIONS ORDER FORMAT*	
Form 5	
GENERAL FORM FOR A COMPLETE WRITTEN FIELD ORDER (1) (2) (3)	
Issuing unit Place of issue Date and hour of issue	
FO _____	
Maps: (Those needed for an understanding of the order.)	
1. INFORMATION.--Include appropriate information covering-- a. <i>Enemy</i> .--Composition, disposition, location, movements, strength; identifications; capabilities. Refer to intelligence summary or report when issued. b. <i>Friendly forces</i> .--Missions or operations, and locations of next higher and adjacent units; same for covering forces or elements of the command in contact; support to be provided by other forces.	
2. DECISION OR MISSION. (1) --Decision or mission; details of the plan applicable to the command as a whole and necessary for coordination.	
TROOPS	
(Composition of tactical components of the command, if appropriate)	
3. TACTICAL MISSIONS FOR SUBORDINATE UNITS. (1) --Specific tasks assigned to each element of the command charged with the execution of tactical duties, which are not matters of routine or covered by standing operating procedures. A separate lettered subparagraph for each element to which instructions are given. x. Instructions applicable to two or more units or elements or to the entire command, which are necessary for coordination but do not properly belong in another subparagraph.	
4. ADMINISTRATIVE MATTERS.--Instructions to tactical units concerning supply, evacuation, and traffic details which are required for the operation (unless covered by standing operating procedure or administrative orders; in the latter case, reference will be made to the administrative order).	
5. SIGNAL COMMUNICATION. a. <i>Orders for employment</i> of means of signal communication not covered in standing operating procedure. Refer to signal annex or signal operation instructions, if issued. b. <i>Command posts and axes of signal communication</i> .--Initial locations for unit and next subordinate units; time of opening, tentative subsequent locations when appropriate. Other places to which messages may be sent.	
----- Commander.	

Appendix E

U.S. WWII Battalion Attack OPORD [3]

BATTALION ATTACK ORDER

1. (a) Information relative to the enemy.
(b) Situation and missions of friendly troops; adjacent units; supporting artillery, tanks, and aviation; covering troops.
 2. Battalion plan of action, objectives, zone of action, line of departure, direction of attack, hour of attack.
 3. Tactical missions for subordinate units.
(a) Base of fire: general position area of heavy weapons; target areas or sectors of fire.
(b) Assignment of rifle companies to attacking echelon and reserve; objectives and missions.
(c) Antitank measures; mission of antitank units.
 4. Administrative matters.
(a) Supply: disposition of company carriers and unit trains; establishment of initial ammunition point; method of distribution of ammunition and other combat supplies.
(b) Initial location of aid station; distribution of medical section.
 5. Communications; initial command and observation posts and message center; telephone and radio; light wire local systems; panel stations and dropping grounds; signal light conventions.
- ps291/21A

Appendix F

U.S. WWII Battalion Defend OPORD [3]

BATTALION DEFEND ORDER

1. Information relative to the enemy and friendly troops including the mission of the regiment, units on the flanks of the battalion, covering forces, artillery, antitank and aviation support.
2. General plan of defense; boundaries of battalion defense area; exact course of the main line of resistance; distribution of rifle units to combat echelon, reserve and where necessary, the combat outpost; any attachments to rifle companies.
3. Defensive areas (boundaries) of rifle companies of the combat echelon; mission and location of reserve; departure positions for counterattack; positions for flank defense.
4. Missions and distribution of heavy machine guns; emplacements and target areas of battalion mortars; emplacements and sectors of fire of antitank weapons.
5. Security elements; location and mission of combat outposts and advance detachments.
6. Supply: location of battalion ammunition point; aid station; arrangements for ammunition distribution, including amount to be dumped on the position if required; disposition of carriers and unit trains.
7. Communications: location of battalion command and observation posts and message center; telephone and radio, light wire local systems, panel stations and dropping grounds, signal light connections.

Appendix G

U.S. Modern Five Paragraph Order [43]

Operation Order (Type and serial number) (Note 1)

Reference: List any map, chart, or other document required to understand the order. Reference to a map will include the country or geographical area and/or map series number, edition (if required), scale, and map sheet name or number.

Time zone: (The zone applicable to the operation; if not required for clarity, omit).

Task Organization: Where the organization for combat of the command is long or complicated, list here the task subdivisions or tactical components comprising the command with the names and ranks of the commanders if appropriate. This listing constitutes attachment unless qualified by such terms as "SPT" or "DS" indicating a support or direct support role for the unit commander. When the task organization is not shown, this information is included in paragraph 3 or in an annex.

1. **SITUATION.** Information of the overall situation essential to understand the current situation. This paragraph is divided into three subparagraphs as follows.

- a. **Enemy Forces.** Factual information concerning the enemy. Often a reference to a published intelligence document, overlay, or annex will be sufficient. (Note 2.)
- b. **Friendly Forces.** Information concerning higher, adjacent, supporting, or reinforcing units. Information should be limited to that which the subordinate commanders need to know to accomplish their assigned missions.
- c. **Attachments and Detachments.** List the units attached to or detached from the headquarters issuing the order together with the effective time. If these units are indicated in the task organization, an appropriate reference is entered. In the case of a unit which has been attached for some period of time, the term "remains attached" may be used.

2. **MISSION.** A clear concise statement of the task to be accomplished by the command and its purpose. This normally requires the inclusion of the WHO, WHAT, WHEN, and WHY of the commander's decision. The WHERE of the decision may be included if needed for clarity. The HOW (unit(s) making the main attack, and other amplifications), more properly belong in paragraph 3a, "Concept of operation." The mission is stated in full, even if shown on the operation overlay. There are no subparagraphs in paragraph 2.

3. **EXECUTION.**

- a. In the first subparagraph give the concept of operation. This is a statement of the commander's visualization of the conduct of the overall operation. The concept clarifies the purpose of the operation and is stated in sufficient detail to ensure appropriate action by subordinates in the absence of additional specific instructions. The concept usually includes the development and phasing of the operation, use of nuclear fires, unit making the main attack (in those operations where appropriate), the formation to be employed (the HOW), whether or not a preparation is to be fired, and the duration prior to M-hour.
- b. In subsequent separate lettered subparagraphs give the specific tasks to be accomplished by each element of the command charged with the execution of tactical missions. These elements are listed in the order:
 - (1) Combined arms commands in numerical or alphabetical order.
 - (2) Infantry elements.
 - (3) Armor elements.
 - (4) Artillery.

-
- (5) Combat support elements (e.g. armored carrier units, engineer units, as applicable).
 - (6) Reserves.
 - c. If a task organization is not used, the organization for combat is shown under those units to and from which attachments and detachments are made. Units attached for operational control may also be indicated.
 - d. Combat arms units are listed in numerical sequence by parent regimental (or div) number.
 - e. The artillery subparagraph is divided into two numbered subparagraphs; the first covers field artillery, the second air defense artillery. As a minimum the artillery subparagraph indicates the artillery organization for combat (when not already indicated in a task organization).
 - f. Tactical support elements are listed in alphabetical sequence by branch. Normal service missions are not included. It is not necessary to list all the units in the command nor is it required to give instructions for the total employment of a particular unit. For example, instructions to an engineer unit concern only the tactical support portion of the unit's mission.
 - g. Instructions to the reserve appear in the next to the last subparagraph of paragraph 3 entitled "Reserve." In the case of a unit totally in reserve at the time the order becomes effective, this is the only subparagraph where such a unit will appear. Units not in reserve at the time of the order but designated as reserve at some future time are listed with a qualifying phrase as to when or under what conditions the unit will be in reserve. The listing of two or more units in this subparagraph does not in itself indicate an attachment.
 - h. The last subparagraph of paragraph 3 is entitled "Coordinating instructions," and contains details of coordination and control applicable to two or more elements of the command. Troop safety measures appropriate to the nuclear battlefield may be shown here. Restrictions on use of nuclear weapons may be included. If instructions relative to a preparation are not included in the concept of operation they are shown here.
 - 4. ADMINISTRATION AND LOGISTICS. A statement of pertinent administrative instructions and the way administrative support is to be provided for the operation to include the allocation of critical supply of items such as nuclear weapons. If an administrative order is in effect, or is being issued separately, or if an administrative annex is being issued make reference thereto. Paragraph 4 contains such subparagraphs as are required and follows the sequence of the administrative order.
 - 5. COMMAND AND SIGNAL. Instructions relative to command and the operation of signal communications. This paragraph may have as many subparagraphs as are required. Normally three subheadings are listed: Signal, Command, and Axis of Command Post displacement. (Normally the main echelon of the headquarters unless otherwise specified.) Signal Instructions may refer to an annex, but as a minimum, should list the index and issue number of the signal operations instructions (SOI) which is in effect. Command instructions include command post location of subordinate and higher units. Designation of alternate command post and succession of command will be entered in this subparagraph if not adequately covered in SOP or annex. The axis of CP displacement consists of one or more future locations.
- Acknowledgement instructions. These are a part of the ending and must be included here. Normally the single word "acknowledge" is sufficient. This indicates that the receiver will, by use of the message reference number in the heading, acknowledge that he has received and understands the order.

(Commander) (Note 3)

Appendix H

U.S. Vietnam War Three Paragraph Order [3]

- * The unit mission and the concept of operation complete in all available detail.
- * Additional essential information to include enemy, support available, terrain, and command and communication details.
- * Essential supply and evacuation details.

Appendix I

Soviet OPORD as of 1988 [3]

THE CURRENT SOVIET FORMAT

1. Assessing the enemy.
 - to his front.
 - to adjacent unit's front.
 - information varies with mission assigned.
2. Unit's mission assigned by senior commander.
3. Senior commander's employment of weapons within units zone.
4. Unit commander concept of operation.
 - which enemy to rout and in what sequence.
 - main effort sector.
 - enemy targets to destroy by weapons.
 - combat formation and nature of maneuver.
5. Task to subordinate units.
 - varies offense/defense.
 - the "I order" paragraph listing tasks for subordinate units.
6. Readiness time for action.
7. Command posts.
 - place and time for deployment of CP's.
8. Chain of command.
 - names deputy commander.
 - who assumes control in event the commander is put out of action.

Appendix J

Israeli OPOD as of 1988 [3]

THE CURRENT ISRAELI FORMAT

1. Friendly forces.
 - (a) Intent or aim of the higher.
 - (b) Unit's mission.
 - (c) Adjacent forces missions.
 - (d) Additional forces missions.
 - 1) Engineers.
 - 2) Artillery.
 - 3) Direct support.
 - 4) General support.
2. Terrain.
 - (a) General description.
 - (b) Axis.
 - (c) Main obstacles.
 - (d) Trafficability/deployment areas.
 - (e) Key terrain and vital terrain.
 - (f) Summary of effects of terrain on friendly plan.
3. Enemy.
 - (a) Intentions.
 - (b) Deployment and strength.
 - (c) Most probable course of action.
4. Commander's intention (when, what, and why).
5. Method.
 - (a) Scheme of maneuver and fire support.
 - (b) Time phasing and objectives.
6. Forces and tasks.
7. Combat support (general).
8. Administrative and logistics (general).
9. Control.
 - (a) Location of CP's by stages.
 - (b) Radio procedures.

Appendix K

Heilmeier Catechism [98]

- What are you trying to do? Articulate your objectives using absolutely no jargon.
- How is it done today, and what are the limits of current practice?
- What's new in your approach and why do you think it will be successful?
- Who cares?
- If you're successful, what difference will it make?
- What are the risks and the payoffs?
- How much will it cost?
- How long will it take?
- What are the midterm and final "exams" to check for success?

Appendix L

Facilitator's Catechism

Full Title of Project

Project Callsign	xxx
Team Name	xxx
Facilitator	xxx
Contact Information	xxx
Date of Announcement	mm-dd-yyyy
Call for Collaboration Ends	mm-dd-yyyy / When Completed
Intended Date of Completion	mm-dd-yyyy / Not Yet Known

Situation

What is the nature of the situation or problem the team is being formed to address? If there are traditional methods which would normally be used to address the situation or problem, what are their limitations and why are they inadequate? What makes the problem novel? What will happen if this situation is not resolved or addressed?

Mission

Given the situation, what are the team's explicit objectives?

Potential Avenues of Approach

Given the situation and mission, what are the potential avenues of approach?

For each potential approach: What tools, techniques, or expertise, alone or in combination, may provide opportunities for an approach to the situation? What are the risks? What are the potential limitations?

Milestones

Given the situation, mission, and the avenues of approach, what are the milestones that would best indicate the mission's progress?

Implications of Outcome

If all or some milestones were achieved what does the success mean to stakeholders, the situation, and to team members? What else might be affected? What work will come next?

Administration, Logistics, and Communications

Who is the facilitator responsible for the project's completion? Who, if anyone, is the team accountable to? What resources and support elements are required? What resources are already available and how can they be accessed? What are the requirements for participation? How will the group communicate? Where and how will the work be done? Under what circumstances will the project close and the group disintegrate?

Appendix M

Comparisons of OPORDs

		Traditional Field Order	Roman Sentry Order	Swift's 1897 OPORD	US WWI OPORD	US 1940 OPORD	US 8N. Attack OPORD	US 8N. Defend OPORD	US Adapted Vietnam OPORD	1988 Soviet OPORD	IDF OPORD	US Modern SPO	Heilmeyer Catechism	Facilitator's Catechism
Items Included in Format	Mission (0-5)													
	Mission (Desired Outcome)	3	0	3	3	4	4	0	5	5	4	5	5	5
	Milestones for Gauging Success	0	0	0	0	0	0	0	0	0	0	0	5	5
	Purpose of Mission (Impact of Outcome)	0	0	0	0	0	0	0	0	5	0	4	5	5
	Exit Strategy	0	0	0	2	3	1	0	5	1	1	1	0	3
	Affordances (0-5)													
	Situation Details	1	0	4	4	4	4	4	4	4	4	4	5	5
	Logistics Details	0	0	2	5	4	4	4	3	3	3	4	4	2
	Available Operations Support Details	0	0	1	5	3	4	4	2	4	4	4	0	3
	Administrative and Command Details	0	0	4	5	4	4	4	3	4	4	4	0	4
	Communication Instruction (Signal)	1	5	2	5	4	4	4	3	4	3	4	0	4
Attributes of Format	Delegation (0-5)													
	Dictates Execution and Method	4	5	2	5	4	4	4	1	2	4	4	5	2
	Attributes (0-3)													
	Lends Itself to Post-Operation Review	0	3	1	1	1	1	1	1	1	1	2	1	3
	Formalized via Doctrine or Publication	1	2	3	3	3	3	3	0	3	3	3	0	3
	Assumes Organizational Alignment at Issuance	3	3	3	3	3	3	3	3	3	3	3	3	0
REF	Versioning Compatible	0	0	0	0	0	0	0	0	0	0	2	0	3
	Assumes Team Composition at Issuance	3	2	3	3	3	3	3	3	3	3	3	2	0
	Citation	[3]	[9, 11]	[3, 23]	[3, 34]	[4]	[3]	[3]	[3]	[3]	[3]	[1, 43]	[98]	n/a
	Appendix section	n/a	n/a	A	C	D	E	F	H	J	I	G	K	L
Comparisons of OPORDs		<p>Items Included in Format</p> <p>0 not included</p> <p>1 not generally included, not included as part of doctrine</p> <p>2 generally included but as subcompartment or unemphasized</p> <p>3 generally included</p> <p>4 strictly included</p> <p>5 strictly included and emphasized</p>												
		<p>Attributes of Format</p> <p>0 format does not have attribute</p> <p>1 format does not lend itself to gaining attribute</p> <p>2 format has attribute to some degree</p> <p>3 clear indication attribute was desired during design</p>												