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OPERATIONAL DESIGN AND ISR AND ZOMBIES

-or-

HOW OPERATIONAL DESIGN CAN HELP TO RE-AGGREGATE JOINT ISR AT THE THEATER AND COMPONENT LEVELS

by

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A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

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Maxwell Air Force Base, Alabama

April 2010

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Abstract

Intelligence, Surveillance, and Reconnaissance (ISR) suffers from disaggregation. Disaggregation can cause a lack of coherence and focus in the overall ISR strategy because the challenges of managing a disparate conglomeration of assets and processes can be overwhelming. Operational design, the framework that underpins a joint operations plan, can help to re-aggregate ISR. In doing so, it can aid ISR strategy formulation in five distinct ways. It ties ISR strategy closely to the Combatant Commander's (CCDR's) operational plan, provides focus for all-source intelligence collection, provides a means to communicate more coherent ISR tasking, aids in decentralized execution and mission-type orders (MTO), and helps to determine cost-benefit analysis.

This paper argues that operational design concepts can help to focus and re-aggregate ISR strategy at the combatant command level during the joint operations planning process (JOPP) as well as at the component level. The goal of this paper is to help explain the why and how of operational design in its application to ISR.

The *Theater ISR CONOPS* proposes several ISR-specific operational design principles as well as a new ISR Operational Design Team (ODT) at the combatant command level. In many ways the proposals make great sense and offer an advantage over current ISR strategy formulation. However, a couple of changes to the elements proposed in the *ISR CONOPS* will provide an even more coherent strategy-to-task framework that is nested in and consistent with current operational planning. First, the ISR operational design elements should be further refined and integrated into the JOPP. Second, the ISR ODT should be tied as closely as possible to the JFC's JPG. Finally, these new ISR ideas need to be tested out and then socialized in the joint arena.

Acknowledgments

Many thanks to SSgt Jeffrey Held from IROC at Goodfellow, AFB for providing several key ISR documents and references for this paper.

Thanks also to Lt Col Arnett and Col (Ret) Richard "Kemo" Perry for their helpful comments along the way...and for humoring me by letting the zombies stay in the paper...there is a story, but you had to be there...

Introduction

The most common zombie story line involves a band of survivors [ISR Strategists] working together to make it through another day, to survive another impossible encounter with terrifying masses of the undead [ISR]. In the typical zombie movie, the threat ultimately comes not from zombies, but from within the group of survivors. Death [failure to create a coherent ISR strategy] comes either from betrayal, poor organization, or panic.

-- Todd Kenrick, "Surviving a Zombie Apocalypse"[1]

Intelligence, Surveillance, and Reconnaissance (ISR) suffers from disaggregation. What one unit or one aircraft under one commander used to accomplish is now conducted across a distributed network covering multiple combatant commands, multiple levels of wars, and thousands of miles. The US Air Force's ISR strategy, published in 2008, identifies disaggregation as a problem. "ISR is currently spread out among various commands in various domains—where it is not often a priority—and it will never realize its potential as long as it remains disaggregated."[2] Disaggregation can cause a lack of coherence and focus in the overall ISR strategy because the challenges of managing a disparate conglomeration of assets and processes can be overwhelming.

Operational design, the framework that underpins a joint operations plan, can help to re-aggregate ISR. In doing so, it can aid ISR strategy formulation in five distinct ways. First, operational design can tie ISR strategy closely to the Combatant Commander's (CCDR's) operational plan. Second, it can provide focus for all-source intelligence collection. Third, design principles can help the supported commander for airborne ISR by providing means to communicate more coherent tasking to their forces. Fourth, the principles can aid in more decentralized execution and mission-type orders (MTO) because those executing will understand the big picture effort and how it ties into strategic, operational, and tactical objectives. Finally,

operational design will aid commanders at all levels in cost-benefit analysis and decision-making on ISR assets and tasking, including critical decisions on dynamic retasking of assets.

This paper argues that operational design concepts can help to focus and re-aggregate ISR strategy at the combatant command level during the joint operations planning process (JOPP) as well as at the component level. First, it looks at why operational art and design were developed and draws some parallels with ISR today. This helps to explain why operational design will be helpful in ISR planning. Second, it examines ISR disaggregation, what it means and why it is important. The paper continues with a discussion of operational design elements in the JOPP and the ISR design elements proposed in the 2008 *Theater ISR CONOPS*. The paper will wrap up by providing three recommendations for expanding and revising the current application of operational art and design to ISR strategy.

While the USAF/A2 recognizes the usefulness of operational art and design in ISR strategy, there is very little written about why and how it could be useful in unifying ISR strategy and operations. The goal of this paper is to help explain the why and how of operational design in its application to ISR.

The Advent of the Operational Level of War

The zombie apocalypse refers to the horrifying and very likely scenario of a general uprising of zombies hostile to human life that engages in a general assault on civilization...it is almost certain that the spreading zombie infection would swamp military and law enforcement organizations whom under normal circumstances are ultimately reliant upon the civilian population for supplies, power, support and other resources.

-- Michael and Nick Thomas, *Zompoc*[3]

The Soviets developed the concept of the operational level of war in order to deal with the realities of modern warfare coming out of World War I (WWI). The concept of the operational level of war was unheard of until after WWI. Before then, war was conceptualized purely in strategic and tactical terms. Emerging from WWI and the Russian civil war, the Soviets of the 1920s and 1930s began an in-depth study of modern warfare in an attempt to reconcile its complex new realities. According to Menning, the Soviets identified three changing elements of warfare which helped to explain the "complexities underlying victory and defeat in modern warfare."[4] These changes were underwritten by changes in technology due to the industrial revolution. The first element was the shifting content of military strategy.[5] Soviet military theorists saw that "strategy--more precisely, military strategy--had ballooned to encompass a host of activities, including higher-level planning and preparation, resource orchestration and priority and objective identification, all of which culminated in the direct application of military power for the state's goals."[6] This led to a widening gap between the strategic and tactical levels of war. To bridge the gap, the Soviets envisioned a middle level, the operational level, where operations would be planned and executed. From this, Aleksandr Svechin coined the term operational art. Svechin envisioned operational art as, "the bridge between tactics and strategy, the means by which the senior commander transformed a series of

tactical successes into operational 'bounds' linked together by the commander's intent and plan and contributing to strategic success in a given theater of military actions."[7]

The second element of warfare focused on the evolving nature of operations.[8] Modern wars were not won based on the outcome of a single battle or even a single operation (or set of battles). Rather, the Soviets realized that victory was found in a set of diverse but related operations conducted both simultaneously and successively.[9] One of the main points which came out of the realization of the evolving nature of operations was the importance of logistics. Menning notes that, "as modern conflict drew increasingly on the will and resources of entire populations, notions of strategy also had to take into account linkages between fighting front and deep supporting rear."[10] Understanding the importance of support to modern warfare and linking it to operations is what gave birth to operational art.[11]

The final element was a realization that, since WWI, armies had experienced a "disaggregation of forces."[12] By this, the Soviets meant that technology had driven a diversification of weaponry greater than had ever been experienced before. Menning explains that by the 1930s, aircraft, armor, and long-range artillery added a diversified set of capabilities and effects over a widening battlefield. The armies of the 1930s were more diverse, "but more important, [they were] a force whose qualities and attributes required a new order of thought and preparation before they could be systematically applied to military ends."[13] Planning had become even more complex.

All three elements, as identified by Soviet military theorists and which led to the development of the operational level of war, seem to be relevant to ISR today. First, ISR strategy encompasses an ever-growing set of activities including planning for resource and exploitation management, as well as prioritization at multiple levels and across multiple

Combatant Commands. This leads to the idea that elements of operational art and design should be able to help bridge ISR strategy to tactical employment. Second, the idea of the evolving nature of operations is pertinent to ISR today. Especially the idea of needing to coordinate reach back support between a theater and exploitation and dissemination nodes. Finally, disaggregation of forces is extremely relevant to ISR today and is addressed in some depth below. Just as operational art and design were developed to address the realities of planning and executing modern warfare, they can be used to address ISR today.

The Problem of Disaggregation

As with any other type of combat, undead warfare should never be a solo mission...Not only will going it alone get you killed--it may also create one more zombie. Working together, always together, has shown to be the only successful strategy for annihilating an undead army.

-- Max Brooks, *The Zombie Survival Guide*[14]

The concept of disaggregation and the gaps and seams it creates really gets at the heart of the problem of planning and executing complex ISR operations in support of a joint campaign. Perhaps more than any other mission area, ISR has the potential to experience the challenges of disaggregation. To disaggregate something means to separate an entity into its component parts, implying that, in the beginning there was a unified whole. This idea of a unified ISR system with accompanying processes forms ISR's ideal type. So, ideally, planning and executing ISR would become much simpler once efforts have been made to unify ISR systems and processes. However, ISR in its ideal type has never existed. It is an enterprise that, from its earliest times, has grown and diversified with the growth of technology. The Soviet concept of disaggregation concerned the diversification of weaponry and its effects in the early 20th century. ISR has likewise experienced a diversification of sensors, platforms, and methods driven by advances in technology. Overhead collection systems, advances in Measures and Signals Intelligence (MASINT), moving target indicator (MTI), and remotely piloted aircraft (RPA) are just a few intelligence collection assets and methods that were added to the ISR repertoire in the past 50 years. However, the Soviet definition was somewhat limited. Disaggregation is more than just a diversification of collection systems and methods, it applies to most areas of ISR.

ISR commanders must coherently manage at least four distinct areas that tend toward disaggregation: organizational, structural, constructive, and systemic/geographic. Because ISR

never existed as its ideal type, this paper does not argue that we need to reorganize or restructure the ISR enterprise to ameliorate these gaps and seams. The best we can and should do on that account is to work at the margins to improve systems and processes. Instead, by recognizing the disaggregation inherent within ISR, this paper hopes to offer some ideas on how to overcome the gaps and seams through focused strategy incorporating operational design techniques.

First, within the military, ISR is organizationally disaggregate. The J2 practices intelligence while surveillance and reconnaissance operations belong to the J3. The J6 community owns the communications networks that are so crucial to conducting ISR. This organizational disaggregation can create problems when attempting to synchronize programming and acquisition as well as operational planning and execution. This is especially evident in the area of airborne ISR when one organization "owns" the sensors and another "owns" the iron. The proliferation of non-traditional ISR (NTISR) platforms, such as the F-22, increases the number of organizations and players in the ISR mix and can exacerbate problems. The military has worked to lessen organizational disaggregation through matrixing J2, J3, and J6 personnel together during planning and execution. The US Air Force has gone even further by making recent moves to join up sensor and platform programs. The USAF ISR Strategy identifies the AF/A2 as ISR's "single focal point to minimize seams between ISR processes and strengthen advocacy for ISR inside the USAF...it will exercise end-to-end leadership of USAF ISR regarding doctrine, personnel, guidance documents, long-range plans, program objective memoranda and supporting analyses & estimates."[15]

Second, intelligence, itself, is structurally disaggregated in at least three important ways. First, it evolved in four separate intelligence disciplines or "INTs": imagery intelligence (IMINT), signals intelligence (SIGINT), MASINT, and human intelligence (HUMINT). The

second structural problem concerns jointness. The INTs are, as pointed out in *The 9/11 Commission Report*, "still organized around the collection disciplines of the home agencies, not the joint mission."[16] This speaks to the difficulties of coordinating the intelligence process across all intelligence agencies, several of which are outside of the DOD. The USAF ISR Strategy addresses some of these concerns when it states that the AF/A2 will act as the service focal point for joint capabilities where it will "promote interdependence, foster interoperability and minimize 'stovepipes.'"[17] Third, the system of classification and dissemination controls can create disaggregation in the process. Again, the *9/11 Commission Report* cites this short coming. "[Intelligence] agencies uphold a 'need-to-know' culture of information protection rather than promoting a 'need-to-share' culture of integration."[18] Since the 9/11 Commission issued its report, the intelligence community has diligently worked to implement changes in order to integrate the entire intelligence process. For example, recent initiatives within the community emphasize "writing for release" which holds analysts accountable for every product they write in order to ensure that products are at the lowest practical classification which, in turn, ensures the widest dissemination possible. However, this is an on-going process.

Third, ISR is constructively disaggregate in means. The phrase "constructively disaggregate in means" describes how some ISR assets are "owned" (tasked, controlled, processed, and/or exploited) at the national level (e.g. imagery satellites), some at the operational level (e.g. airborne ISR platforms), and some at the tactical level (e.g. tactical RPA). At the same time, no intelligence asset is inherently strategic, operational, or tactical. This becomes especially important in the counter-insurgency/long-war environment where ISR results re-aggregate in unexpected ways. Their information can meet requirements at all levels of war.[19] The USAF ISR Strategy addresses this disaggregation. "The Air Force joint ISR vision is an

implementation of the DoD's net-centric information sharing vision in which all ISR assets—space, cyber, air-breathing, and even those organic to small units—could be managed as a single constellation."[20] Taking a holistic view for future ISR architectures will go far in mending this disaggregation, but, as above, it is an on-going process.

Finally, ISR is disaggregated systemically/geographically. A good Air Force illustration of this situation is seen in Operation ALLIED FORCE where, for the first time, "net-centric operations and reachback put a sizable air gap between exploiters and sensors, exploitation units and the [CFACC] (Combined Forces Air Component Commander), and ultimately between exploiters and the supported unit...[creating] an inevitable sense of disconnect from the battlespace."[21] In reality, the ISR process is comprised of several interrelated ISR operations conducted nearly simultaneously in geographically disparate locations. There are many advantages to conducting distributed operations. As described in the USAF ISR Strategy: "it decreases our deployment footprint by accessing analysis and command and control functions far from the fight. The virtual global network also cuts deployment and sustainment requirements, lessens our exposure to casualties (an American strategic center of gravity), makes more personnel available from the first day of any crisis, allows us to task global networks of experts throughout an operation, and gives our people well-exercised and secure links with the rest of the intelligence community."[22] Managing the issues that arise with distributed operations in order to gain these advantages is a continual challenge and where operational design can help.

The disaggregations found within ISR are not inherently "bad." Many of them developed due to and are driven by operational realities. Net-centric operations that allow reachback contribute to geographic disaggregation but also provide a huge cost savings to the services and keep service members out of harm's way. However, they create challenges that consume most of

an ISR commander's time. Figure 1 attempts to illustrate the ISR disaggregations discussed above. While figure 1 is a simplification, it seems that most ISR initiatives and projects are attempts to bridge the gaps created by the disaggregations described above. So, theoretically at least, many of today's initiatives can be located on one or more of the intersections on this diagram. For example, National-Tactical Integration (NTI) seeks to integrate national-level intelligence with intelligence from theater airborne assets (see letter A in the diagram).[23] US Northern Command (NORTHCOM) is working to overcome classification issues inherent to theater airborne intelligence collection (or Incident Awareness and Assessment (IAA) operations as they are known at NORTHCOM) so they can share imagery with domestic first responders during a national disaster (see letter B in the diagram). Combatant Command J2, J3, and J6s have implemented various forms of a matrixed Joint Reconnaissance Center (JRC) to overcome problems in planning ISR (letter C's).

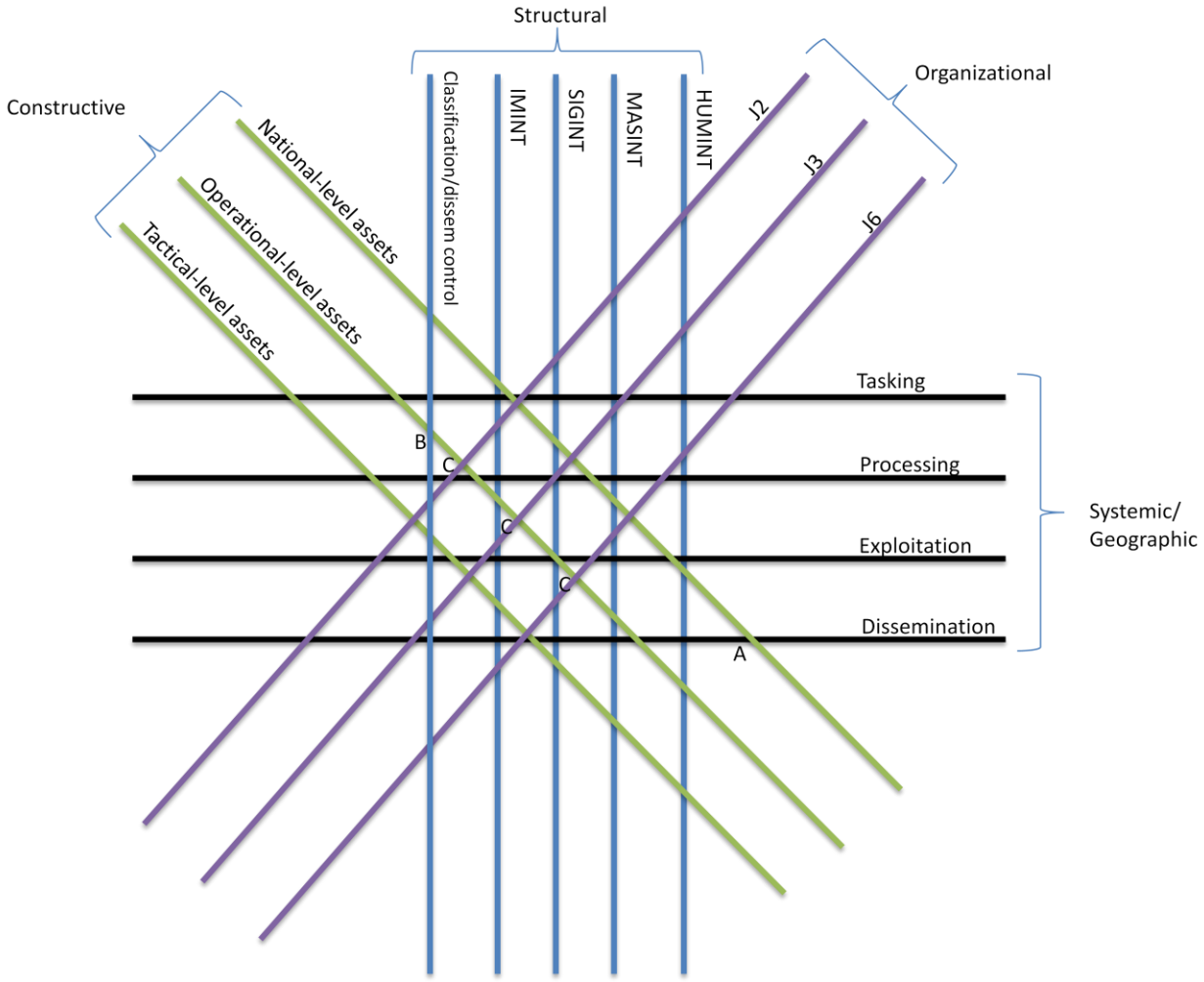

Figure 1: ISR Disaggregation

Operational Design and How it Can Apply to ISR Strategy

What if you discover that your safe haven has been overrun by zombies....? Have back up plans. Alternate vehicles, routes, even a backup safe area that, while it may not be as ideal or prepared as the first, will at least keep you alive long enough to think up a new strategy.
-- Max Brooks, *The Zombie Survival Guide*[24]

I. Discussion of Operational Design Elements

To set the stage for this portion of the paper, it is important to understand where the elements of operational design fit in the overall scheme of operational-level planning. Operational design and operational art elements are somewhat confusing in joint doctrine. Joint Publication (JP) 3-0 outlines seventeen elements of operational design. Dr. Reilly argues in *Operational Design: Shaping Decision Analysis through Cognitive Vision* that it is important to delineate between elements of operational design and operational art.[25] Operational design provides the commander and staff with the ability to impartially frame the problem. Once the problem is framed using operational design, then operational art supports the development of strategy. Unfortunately, current joint publications do not address which elements belong to operational art and which belong to operational design. This lack of clarity muddies the waters during discussions of operational planning. Dr. Reilly shows that introducing operational art concepts during the initial problem framing phases of planning can result in biased courses of action (COAs).[26] Dr. Reilly breaks out eight elements of operational design: end state, objectives, effects, centers of gravity (COGs), decisive points (DPs), lines of operations (LOOs), arrangement of operations, and assumptions. They are used to aid in framing the problem during the initiation and mission analysis steps of the joint operation planning process.

Initiation is the first of seven steps in the JOPP and begins when the President, Secretary of Defense, Chairman of the Joint Chiefs of Staff, or Combatant Commander recognizes a

situation in which there might be a need to use the military instrument of power (IOP). The strategic guidance they provide could be in many forms, including formal documents such as the National Security Strategy or the Guidance for the Employment of Forces (GEF), as well as informal means such as presidential speeches. Once a combatant command's Joint Planning Group (JPG) receives and interprets the strategic guidance it can begin the second JOPP step, mission analysis. The purpose of mission analysis is to frame the problem using elements of operational design. Mission analysis produces the mission statement, commander's intent, initial planning guidance, and the initial commander's critical information requirements (CCIR). CCIR are a combination of priority intelligence requirements (PIR) and friendly forces information requirements (FFIR).

While conducting the mission analysis step, operational design elements provide an iterative and non-prescriptive process. However, each element logically leads from one to another creating a line of accounting from strategy to task. The national strategic end state provides the President's overall vision, utilizing all national IOPs (diplomatic, informational, and economic, as well as military) and describes how a theater or region should look at the end of the operation. The JPG derives the military end state from the national strategic end state. The military end state describes the conditions that determine success or failure of the military IOP. Closely related to military end state is the termination criteria which are standards that help to determine when a military operation is complete. The JPG distills the military objectives from the military end state, taking into account national end state and objectives. The military objectives are clear, decisive, and obtainable goals that are oriented toward achieving the military end state. The JPG then defines effects for each of the objectives. Effects are

conditions that you want to create or avoid. They complement the objectives and help to further define what military forces need to accomplish.

The next step in mission analysis is to determine centers of gravity (COG) for each level of war for both the enemy and blue forces. The COG represents the "hub of all power" and provides the ability or will to fight. The purpose of a COG is to provide focus for military operations. Planner conduct critical factor analysis on each COG to determine what is vulnerable to attack that "will create decisive or significant effects disproportionate to the military resources applies."[27] Critical factors analysis begins with critical capabilities that describe the functions of the COG. These lead to critical requirements, which help to define what the COG needs in order to carry out its functions. Critical vulnerabilities identify which weaknesses we can attack or influence. Critical vulnerabilities can then be grouped into decisive points. Decisive points are geographical, functions, systems or key events that when acted on can give the commander a marked advantage. According to Reilly, planners should then arrange the decisive points on logical lines of operation (LOOs). Kem seems to put it best, the LOOs are "a cognitive operational framework/planning construct used to define the concept of multiple, and often disparate, actions arranged in a framework unified by purpose" that lead to the COGs.[28] Operations are arranged using the doctrinal concept of phasing. Phases are periods of time where the forces are generally focused on the same mission, such as deterrence. The final operational element in mission analysis is assumptions. This is not doctrinal, but Reilly argues that assumptions are key to assessing risk in a plan. Assumptions must be realistic, logical, and essential to the planning process. Each assumption drives the creation of a branch or sequel. In addition to the mission statement, commander's intent, initial planning guidance, and the initial

CCIR, one of the most important products of mission analysis is a cognitive map that helps to illustrate strategy to task from right to left. Please see figure 2 for a sample cognitive map.

Dr. Reilly's delineation of eight elements of operational design (end state, objectives, effects, COGs, DPs, LOOs, arrangement of operations, and assumptions) is extremely helpful in creating an environment conducive to unbiased COA development. Once the JPG finished mission analysis, they can begin to apply elements of operational art, such as balance, anticipation, and synergy, to create COAs.

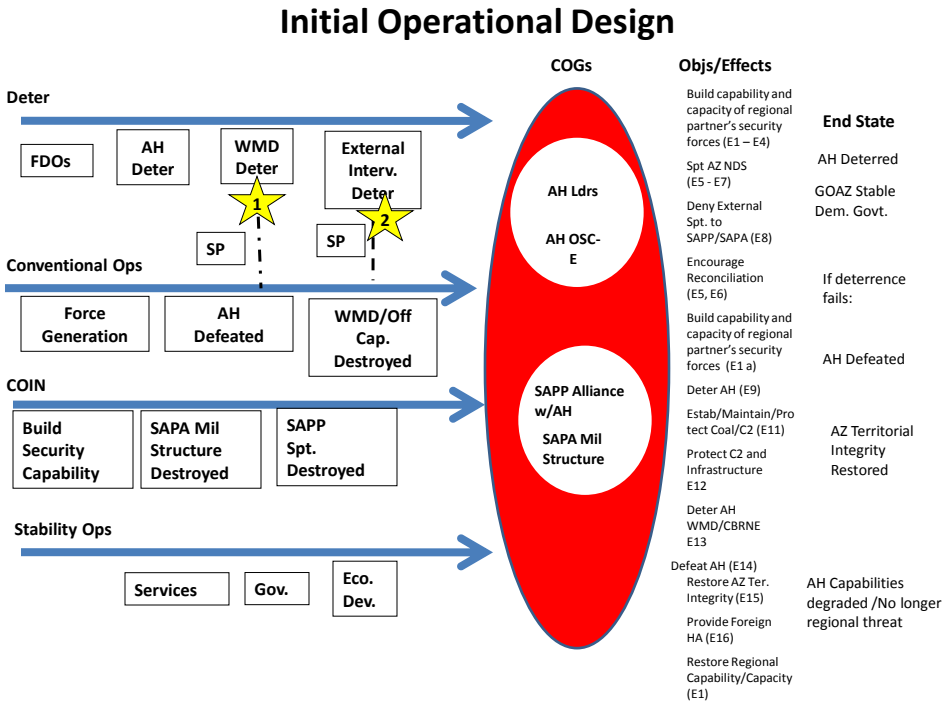

Figure 2: Sample Cognitive Map

II. Discussion of *Theater ISR CONOPS*' ISR Design Elements

HQ USAF/A2 developed the *Theater ISR CONOPS* in response to difficulties ISR has always had in prioritizing competing requirements.[29] As a reference, Annex 1 contains Section III from the *Theater ISR CONOPS* which discusses ISR operational art and design. It proposes using "operational art" as a foundation for unifying ISR operations. Operational art will, in-turn, link ISR operations to the strategic end state. The *Theater ISR CONOPS* describes six unique "operational design" elements that augment the doctrinal operational design elements. The first is Intelligence Problem Sets (IPS) which are derived from the Joint Intelligence Preparation of the Environment (JIPOE) process at the Joint Intelligence Operations Center (JIOC). Intelligence Problem Sets are not in joint doctrine, however they will normally comprise adversary capabilities and target systems.[30] While not specified, it seems that IPSs would probably naturally align with the COGs (or maybe vice versa) as they are identified during the JOPP.

Adversary Integrated Air Defense (IADS)
Adversary army
Weapons of Mass Destruction (WMD)
Terrorist leadership

Table 1: Example IPSs[31]

Priority Intelligence Requirements (PIR) is the second design element. Doctrine is somewhat confusing when it comes to PIR. In one section JP 2-01.3 states that JIPOE forms the basis for PIR, while in another area it states that a commander's decision points form the basis for PIR.[32] The official definition of a PIR is even more vague, stating that a PIR is "an intelligence requirement...that the commander and staff need to understand..."[33] The *Theater ISR CONOPS* thoroughly critiques PIRs as not comprehensive, not closely related to operational objectives, and not able to "provide appropriate language for communicating higher-level

intent."[34] It then proposes eliminating PIR and replacing them with ISR Objectives, discussed below.

The third ISR design element is Joint Force Commander (JFC) Intent for ISR. This is another non-doctrinal design element. The J2 would draft the JFC Intent for ISR for JFC approval. It generally describes how ISR will support accomplishing the objectives and end state through focusing ISR on intelligence functions.[35] It also gives ISR apportionment guidance. Table 2 gives an example of JFC Intent for ISR. Its purpose is to provide guidance to the Joint Collection Management Board (JCMB) on the development of ISR effects and objectives and to provide a foundation for lower level understanding and initiative.[36] JFC Intent for ISR appears to be the first step in creating mission-type orders for ISR.

"The success of this campaign depends heavily on our ability to quickly destroy or capture both WMD and terrorist leadership. We will have to fight our way to these objectives. We will depend heavily on ISR to keep our situational awareness high regarding the reactions and adaptation of our adversary. In this phase of the campaign, ISR shall focus on: 1. Targeting and threat warning of the Coyote IADS 2. Targeting and assessing effects on WMD 3. Targeting and assessing effects on terrorist networks 4. Refining JIPOE of the Coyote army Once air superiority is achieved and I MEF crosses the line of departure, targeting and assessing effects on the Coyote army will take top priority. Besides these focus areas, ISR objectives will support operational objectives. The J2 will develop, prioritize, and weigh ISR effects and objectives. ISR must also maintain situational awareness of terrorists to, from, or within neighboring country Fox. 25 percent of FMV sorties will be dedicated to supporting Task Force X in finding, fixing and tracking terrorist leadership. CFACC will be the supported commander for airborne ISR and will ensure compliance with this intent during planning and execution." [37]

Table 2: Example JFC Intent for ISR[38]

ISR Objectives are the fourth design element proposed in the *Theater ISR CONOPS*. Table 3 provides an example of ISR objectives. ISR objectives appear to be analogous to operational objectives. They are defined as "goals that enable operational objectives."[39] They are derived from military end state, commander's guidance, objectives, PIR, and JFC intent for

ISR.[40] The *CONOPS* states that they "give clarity to operations personnel who are supporting or being supported by ISR operations and offer a mechanism for ISR operations to be prioritized and weighted with other military operations."[41] While the *CONOPS* doesn't specifically state that ISR objectives are aligned directly to operational objectives, the two examples in the *CONOPS'* Appendix 2 show a direct correlation. It seems that there would only be rare cases when an ISR objective did not directly correspond to operational objectives. By doing this, there is a basic line of accounting for all ISR activities. This gives a basis for prioritization of collection during an operation. It also supports centralized command and decentralized execution of ISR.

Operational Objective: Gain and Maintain air supremacy
ISR Objective: Provide timely, accurate, relevant intelligence of adversary integrated air defense system to coalition air forces in order to target IADS components and survive the threat.[42]

Table 3: Example of related Operational and ISR Objectives[43]

ISR Effects are the fifth design element. They "represent the change to one or more elements of the joint force system of systems."[44] ISR effects directly support ISR objectives by defining expectations and the end-user of the intelligence. They help planners to envision the ways and means of ISR operations.[45] Something to note here is that ISR effects represent desired changes to friendly systems, not enemy systems. The example Table 4 illustrates how effects should support ISR objectives. This example relates to the ISR Objective in Table 3.

Effect 1: Coalition aircrews have near-real time intelligence on adversary SAM and fighter activity.
Effect 2: Coalition aircraft and C2 nodes have targeting intelligence of mobile IADS components.
Effect 3: Coalition can determine capability of adversary command and control.

Table 4: Example of ISR Effects from Theater ISR CONOPS[46]

The final ISR design element prescribed in the *Theater ISR CONOPS* is ISR Tasks. ISR tasks are an articulation of the "ways and means by which ISR will achieve desired effects and objectives."[47] The JIOC, components, and end users, in coordination with the organization conducting Collection Operation Management (COM), formulate the ISR Tasks. The ISR Tasks example below corresponds to ISR Effect 1 in Table 4 above.

Task (SIGINT): Provide imminent threat warning to coalition aircrews
Task (IMINT): Image known and suspected SAM hide sites and deployment areas in order to provide C2 with near-real-time targeting intel.

Table 5: Example of ISR Tasks from Theater ISR CONOPS[48]

The *CONOPS* proposes creating a Joint ISR Operational Design Team (ODT) to lead the effort to develop the above ISR design elements under the auspices of the JFC and the J2. The ISR ODT is another new construct not yet captured in joint doctrine. Its main goal is to develop a comprehensive list of ISR effects and objectives.[49] It does this as the J2's lead ISR representatives to the Joint Planning Group (JPG). The team is comprised of 8-12 ISR subject matter experts with an understanding of the full spectrum of ISR capabilities.[50]

Proposals to Improve ISR Strategy at the Combatant Command during the JOPP

"'If only words were capable of beheading a zombie,' she thought, 'I would presently find myself in the company of the world's two greatest warriors.'"
--Miss Elizabeth Bennett, *Pride and Prejudice and Zombies*[51]

ISR strategy, planning, and execution have come a long way in the past ten years. The development of the Joint Collection Management Board (JCMB) concept pioneered in the late-1990s in Korea and further developed during Operation ALLIED FORCE in 1999 is a great example. Many of ISR's greatest advances in thinking have been the direct result of adapting existing processes and concepts. For example, the Joint Targeting Coordination Board (JTCB) served as the model for the JCMB. Also, the Joint Integrated Prioritized Target List (JIPTL) served as the model for the Joint Integrated Prioritized Collection List (JIPCL), one of the JCMB outputs. While conducting ISR operations has many unique aspects, it has more in common than not with other types of military operations. It makes sense then to continue to borrow operational concepts as needed to improve ISR design, execution, and assessment. The *Theater ISR CONOPS* is a solid beginning that will serve to help transform ISR. What follows are three recommendations meant to build upon the baseline concepts introduced the in the *Theater ISR CONOPS.*

Recommendation 1: Refine and Further Integrate ISR Op Design Elements into the JOPP

The danger of mixing operational design concepts with operational art concepts is that it could introduce the "how" of the campaign before the problem set is fully determined. ISR historically suffers from this syndrome. Many times ISR will look at the capabilities it has on hand, or capabilities that can be easily obtained, and throws them at a theater without defining the problem and understanding what intelligence information is really needed by commanders.

Operational design concepts will help to focus ISR strategy, in turn driving ISR operations that are supportive of operational objectives. Below are four suggestions for clarifying ISR Operational Design Elements and integrating them into the JOPP.

First, the *Theater ISR CONOP* should consider deleting PIRs as a design concept. PIRs are a product (as part of CCIRs) of the JOPP's mission analysis step, and not an operational design element in itself--therefore, PIRs shouldn't be included as an ISR design element. The CONOPS iteself thouroughly critics PIRs as non-comprehesive and says that ISR Objectives will replace PIRs. ISR Objectives seem flexible enough to encompass changing realities during all phases of a plan while tying ISR to a plan's end state. Dr. Reilly argues that PIR/CCIRs should be derived directly from decision criteria found in the decision support matrix (an output of the COA analysis and wargaming step of the JOPP).[52] So, what is the linkage between ISR Objectives and decision criteria? It seems that by scoping down PIRs to include only information needed to meet a commander's decision criteria, then not only do PIRs become more meaningful and manageable, but they easily fit into the USAF's new scheme of ISR Objectives. Since PIRs are an accepted joint concept, the relationship between them and the *CONOPS*' new ISR concepts needs to be further socialized within the joint community.

Second, JFC Intent for ISR does not appear to be a design element but rather, like PIR, a product of the planning process. While it is new and currently non-doctrinal, it seems to make sense that the ISR ODT would draft the ISR Intent during the JOPP. Then they would, with J2 approval, present it to the JFC for approval at the end of the JOPP's mission analysis step. The second recommendation discusses more on proposed timing for ISR ODT activities and products.

Third, the ISR design elements should include ISR Assumptions. Assumptions help to define risk in the plan and are important element that is currently missing. The ISR ODT should draft ISR assumptions for J2 and JFC approval during the mission analysis step. These could be anything from availability of assets, comms, and exploitation to possible competing priorities, geography, enemy capabilities affecting ISR, or weather. Like in the JOPP, assumptions drive branch plans. The ISR assumptions should drive ISR branch plans. Besides addressing risk inherent in the ISR plan, assumptions also provide a helpful clarifying function, improving communication of the ISR strategy up and down the chain.

Finally, it might be interesting to experiment with ISR Lines of Operation (ISR LOO) and ISR decisive points. This idea is put forward in the spirit that ISR can benefit from using tried and true planning methods from other areas. The ISR LOO could be overlaid on the operational LOOs that are developed during mission analysis. This seems like it might be helpful especially if a logical LOO scheme is used by the JPG. Some additional ISR LOOs may also be needed that are independent of operational LOOs. ISR decisive points might work best by illustrating how ISR will support the decisive points in the overall operational design. Both ISR LOOs and ISR decisive points can be used as a source for ISR tasks. Since the JFC is used to visualizing a campaign in terms of LOOs and decisive points on a cognitive map, it could facilitate communication and understanding of the ISR strategy. It could also help to illustrate how ISR is supporting the main lines of effort, the decisive points, and ultimately, the decision points.

Recommendation 2: Tie the ISR Operations Design Team (ODT) even closer to the JPG

The *Theater ISR CONOPS* is vague on exactly how the joint ODT ties into the JPG and the timing of various ODT activities and products within the JOPP. It seems that the *CONOPS* calls for the ODT to develop the ISR Objectives and ISR Effects after COA selection. The ODT then takes the ISR objectives and ISR effects to the JCMB where the JCMB helps to develop the ISR tasks. This would probably work well and be a better process than is currently practiced. However, there may be even more benefit in placing the ODT as an integral part of the JPG. By participating in JPG activities beginning at initiation, the ISR ODT will have a detailed understanding of the mission as well as be able to develop ties and trust within the JPG. The ODT will be able to bring the ISR perspective to planning from the beginning. During mission analysis the ISR ODT would be a very educated consumer of the JIPOE and be able to help interpret and incorporate COGs and IPSs. They can also draft the JFC Intent for ISR for J2 and JFC approval as an output of the mission analysis step. During COA development, the ISR ODT could split up into smaller teams to work each COA proposal, if different COAs are being worked simultaneously. This would ensure each COA accounts for ISR and that each COA incorporates draft ISR objectives and ISR effects. ISR is integral to wargaming, and having the ISR ODT test out their ISR LOOs during the reaction and counter-action moves would provide even more integrity to the COA selection process. Once the COA is selected and approved, the ISR ODT comes back together to refine ISR objectives and ISR effects, incorporating relevant ideas from the COAs that were not chosen. The ISR ODT then should meet with the JCMB to discuss the plan and develop ISR tasks.

Recommendation 3: Future work on ISR operational design

Future work on ISR operational design and how it can apply to ISR should include exploring ISR operational art elements. Operational art elements include doctrinal concepts such as operational reach, depth, and balance. Designating ISR operational art elements will help ISR strategists apply their "creative imagination" and experience to ISR strategy. Also, ISR operational design concepts should be tested out and refined during a small scale planning exercise. An exercise would help to demonstrate the strengths and advantages of using operational design in creating an ISR strategy. Finally, the concepts proposed in the Theater ISR CONOPs are not currently accepted joint concepts. The Air Force will need to socialize their ideas in order to bring them into the joint arena since these ideas affect more than just component operations.

Conclusion

During the 1920s and 1930s, the Soviets developed operational art and design as an intellectual framework in order to better organize and execute campaigns that were suddenly so much more complex than they had been before the dawn of the industrial age. As we move into the 21st century, joint planners continue to develop and use operational design in campaign planning. The problems of modern warfare, as conceptualized by the Soviets, in many ways revolved around disaggregation. There are many parallels between the problems the Soviets identified and ISR today. ISR commanders must coherently manage at least four distinct areas that tend toward disaggregation: organizational, structural, constructive, and systemic/geographic.

The planning framework provided by operational design can help ameliorate ISR disaggregations. In doing so, it aids ISR strategy formulation five distinct ways. First, operational design ensures ISR strategy is closely tied to the Combatant Commander's operational plan. Second, it helps focus all-source intelligence collection. Third, design principles help the supported commander for airborne ISR by providing more coherent guidance/command and a way to communicate that to their forces. Fourth, the principles aid in more decentralized execution and mission-type orders because those executing will understand the big picture effort and how it ties into strategic, operational, and tactical objectives. Finally, it aids commanders at all levels in risk analysis and decision-making on ISR assets and tasking, including dynamic retasking.

The *Theater ISR CONOPS* proposes several ISR-specific operational art principles as well as a new ISR strategy group called the Joint ISR Operational Design Team at the combatant command level. In many ways the ISR operational design elements and ODT make great sense

and offer an advantage over current ISR strategy formulation. However, a couple of changes to the elements proposed in the *ISR CONOPS* will provide an even more coherent strategy-to-task framework that is nested in and consistent with current operational planning. First the ISR operational design elements should be further refined and integrated into the JOPP. What the *CONOPS* discusses is operational design; those elements that will ensure that the ISR strategy is as unbiased as possible. Second, the ISR ODT should be tied as closely as possible to the JFC's JPG. This will ensure that ISR capabilities and limitations are considered throughout planning, resulting in a better overall campaign plan. Finally, these new ISR ideas need to be tested out and then socialized in the joint arena.

Appendix - Excerpt from the 2008 *Theater ISR CONOPS*

SECTION III – ISR OPERATIONAL ART AND DESIGN

3.A. ISR OPERATIONAL ART

This CONOPS adopts operational art as its foundation in designing, planning, executing, and assessing ISR operations. By applying operational art, the joint force creates an ISR system that:

- Clearly links ISR actions to commander's objectives and, ultimately, the end state
- Provides a clear understanding of priorities, weight of effort, and intended goals; thus enabling lower-level initiative and flexibility
- Is transparent and creates trust amongst joint players
- Handles complexity while providing understandable processes to practitioners
- Provides the appropriate unity of effort and command without over-centralization
- Balances between "deep" and "close" (direct support) operations
- Provides focus, enables mission-type orders (MTO), and reduces friction
- Establishes the basis for ISR assessment

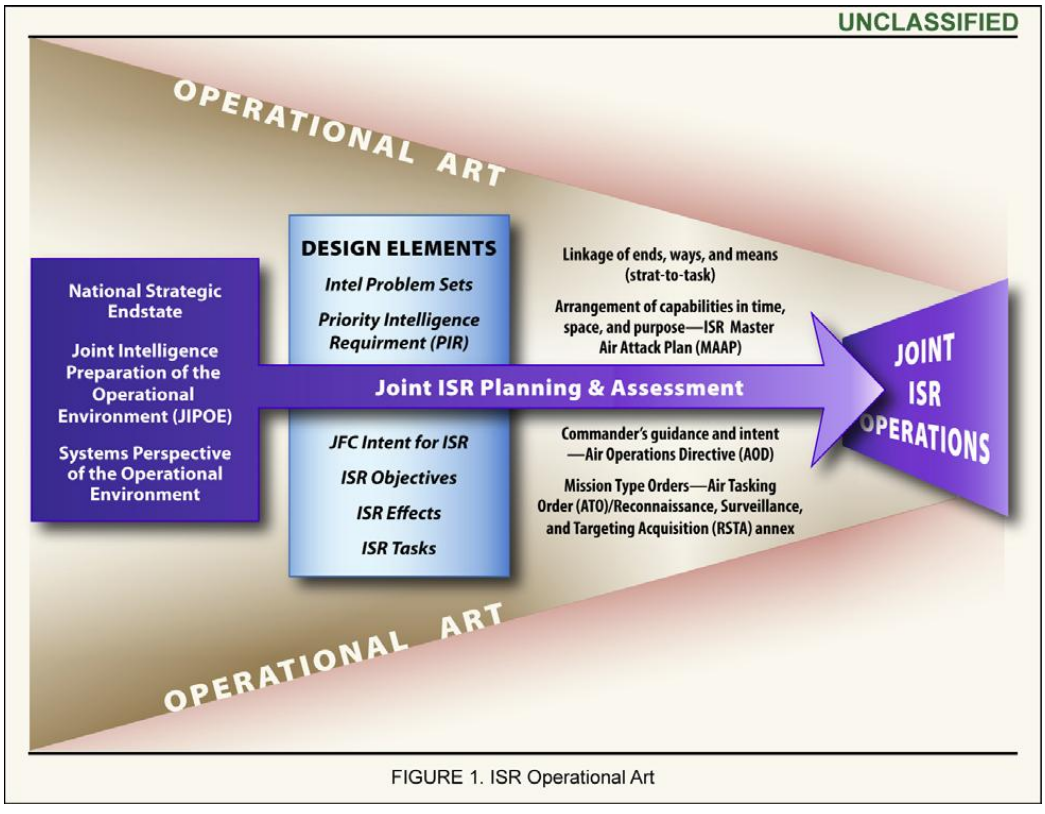

FIGURE 1. ISR Operational Art

Figure 1 is a graphical representation of the ISR operational art concept. It represents the idea of taking the broad concepts on the left side of the graphic (National Strategic Endstate, the JIPOE, and Systems Perspective of the Operational Environment) and channeling them into specific joint ISR operations. The graphic shows the interim phase of operational design and the most critical ISR elements required in guiding this process. These lead to the key fusion processes for tasking and

planning. Examples of these processes for airborne ISR are shown, including the ISR MAAP, strat-to-task, commander's guidance through the AOD, and MTO through the air tasking order and RSTA annex, which guide the execution of joint ISR operations. Other forms of ISR may have different planning and tasking processes that achieve the same purpose. Throughout the evolution of operational art, joint ISR planning and assessment are continuous processes.

3.B. DESIGNING ISR OPERATIONS

Operational design is the development of an overall concept that guides planning and execution. This concept is the result of a creative process that takes strategic guidance and an understanding of the adversary and develops supporting effects and objectives. ISR operational design tackles the complex problem of determining how the ISR enterprise should support a theater campaign or steady-state operations.

Designing ISR operations begins during the development of the JFC's military end state and operational objectives. The military end state acts as the unifying vehicle for the development of all effects and objectives by the joint force. ISR supports decision making to achieve operational objectives (and ultimately the desired military end state), which guide the development of the design elements for ISR operations.

ISR operational design should occur in conjunction with the operational design of a campaign. Each process must be mutually supportive and initially conducted in parallel. Re-design may be more frequent for ISR operations than for the overall campaign. Appropriate ISR language must be inserted into the operational design elements of a campaign, including operational effects and objectives. However, this should not be the end of the ISR operational design process. ISR is a unique form of military operations that requires a dedicated effort to develop distinctive ends, ways, and means that help achieve the operational objectives and desired end state. ISR operations acquire the right intelligence to increase understanding of the adversary and the joint operating environment. The priority of things we need to know may not fall completely in line with things we need to do. Therefore, joint ISR operational design, much like joint air operations planning, must be a distinct, supportive process. The process takes the ISR language and direction developed in the operational design elements of the campaign and then fleshes out the detailed ISR purpose and method.

Joint ISR operational design applies to all capabilities across the ISR enterprise and includes all methods of intelligence collection—human, ground, maritime, airborne, space, and cyberspace.

3.C. DESIGN ELEMENTS

JP 5-0 chapter IV describes design elements, most of which are applicable to ISR operations. The following are new design elements that are specific to ISR operations. For an example of a practical application of ISR operational design, see appendix 2: Example ISR Strategy-to-Task Model.

3.C.1. Intelligence Problem Sets (IPS)

During JIPOE, several categories of adversary capabilities and target systems will emerge as focus areas for ISR operations. By identifying adversary capabilities and target systems, ISR planners can frame the ISR problem, initiate planning, and establish categories for collection nominations. Problem sets are not static and, therefore, are continually generated and/or refined during mission and center of gravity analyses. New problem sets may be generated during a conflict as new adversary systems emerge. Examples of IPS include an integrated air defense system (IADS), ground forces, improvised explosive device (IED) network, insurgent leadership, and weapons of mass destruction (WMD). The theater Joint Intelligence Operations Center (JIOC) will be responsible for creating and updating IPS.

3.C.2. Priority Intelligence Requirements (PIR)

PIR and subordinate intelligence requirements (IR) are questions the JFC and lower-level commanders need to have answered in order to make decisions. PIR play a critical role in developing collection target nominations and ISR objectives. Because PIR do not adequately synthesize the entire theater ISR mission, provide a clear, enduring linkage to operational objectives, or provide the appropriate language for communicating higher-level intent, ISR objectives will replace PIR as the foundation for collection management and ISR planning at the operational level.

3.C.3. JFC Intent for ISR

The JFC intent for ISR generally describes how ISR operations will support accomplishment of the desired military end state and operational objectives. It holistically focuses ISR operations on specific intelligence functions, such as JIPOE, targeting, threat warning or assessment. The intent provides general guidance on dispersal and concentration of ISR assets, as well as apportionment guidance for ISR assets currently in theater. It provides direction for the Joint Collections Management Board (JCMB) and the development of ISR effects and objectives and establishes the foundation for lower-level understanding and initiative. The JFC intent for ISR is developed by the J2 for JFC approval.

3.C.4. ISR Objectives

ISR objectives are goals that enable operational objectives. ISR objectives are a synthesis of the ISR mission derived from the military end state, commander's guidance, objectives, PIR, and the JFC intent for ISR. They are the foundation for collection management and ISR planning at the operational level. ISR objectives are centrally planned and de-centrally executed to achieve JFC operational objectives.

Establishing objectives for ISR offers several advantages. They provide a clear understanding of intended goals in order to direct ISR operations. Objectives provide a harmonizing agent that enables a common outlook among all ISR players, promoting synergy and adaptability. They enable decentralized execution, which shrinks OODA loops and reduces friction. Finally, ISR objectives provide an understanding of the *what* and *why* for ISR *and* operations personnel. They give clarity to operations personnel who are supporting or being supported by ISR operations and offer a mechanism for ISR operations to be prioritized and weighted with other military operations.

3.C.5. ISR Effects

ISR effects represent the change to one or more elements of the joint force system of systems. They are subordinate to and directly support ISR objectives. They are much more specific than ISR objectives on the type of intelligence and the supported end user. Ultimately, ISR effects enable planners to envision ways and means, but do not prescribe tasks and actions.

3.C.6. ISR Tasks

ISR tasks direct ISR actions and are the articulation of the ways and means by which ISR will achieve desired effects and objectives. Tasks provide direction on how specific intelligence disciplines or assets will support the achievement of effects and objectives. The organization conducting COM is primarily responsible for developing tasks due to its inherent understanding of ways and means. Task development, however, is accomplished in coordination with the JIOC, components, and end users.

3.D. DESIGN METHOD

3.D.1. Joint ISR Operational Design Team (ODT)

The purpose of the joint ISR ODT is to conduct ISR operational design under the guidance of the JFC and J2. The ODT will perform two functions. First, the team will assist joint designers and planners in integrating ISR into the operational art of the campaign. Second, the team will take the resulting design elements and synthesize them into ISR effects and objectives. Figure 2 shows that the ISR ODT influences, but does not lead, the development of key design elements on the left, then uses these elements to construct ISR effects and objectives.

The joint ISR ODT is led by a member of the J2 staff and will consist of representatives from each component and organization conducting top-level COM for capabilities across the ISR enterprise, which will require representatives for national-level collection sources. Consequently, the ODT brings together the full-spectrum of national and joint capabilities and perspectives to develop a truly comprehensive design for theater ISR operations. To ensure ODT members have the right knowledge and experience, they will be field-grade officers (or civilian equivalents) who have a firm grasp of service and joint doctrine. Ideally, the ODT has no more than 8-12 personnel and is physically located with the J2 at the JIOC. However, operational requirements may dictate an alternate location (such as a joint task force (JTF) or component headquarters) or that the ODT meets "virtually." Most importantly, members of the ODT should be the lead ISR representatives to the JFC's operational design and/or planning team.

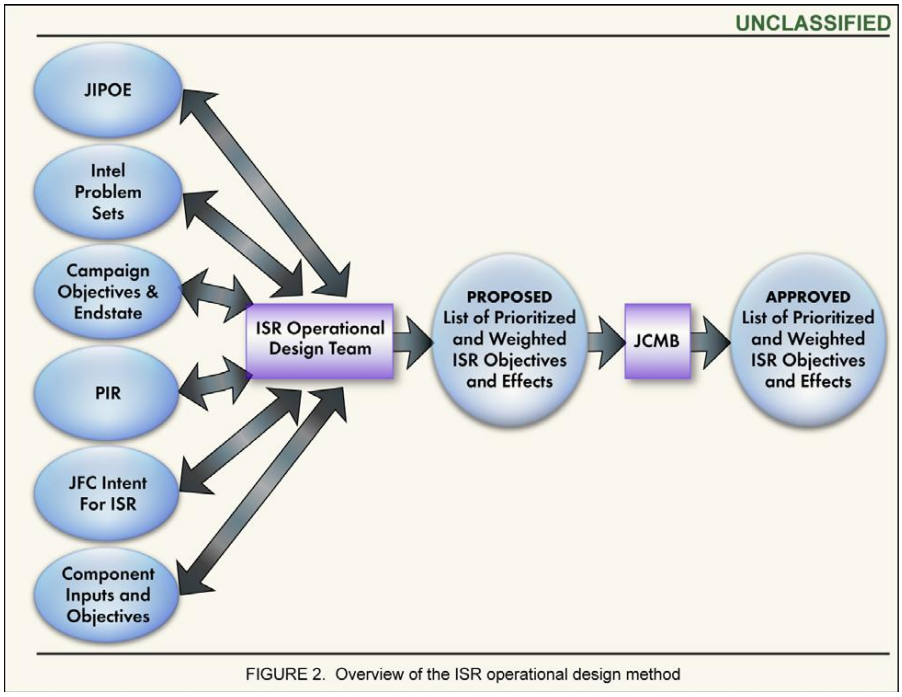

FIGURE 2. Overview of the ISR operational design method

For a single campaign, the ODT will avoid tackling issues that are too broad, such as global ISR allocation, or too focused, such as collection management. However, the team will work and/or collaborate with ISR personnel at all levels in order to practically design ISR operations. This will facilitate trust and understanding among the components and the joint staff and will significantly streamline the JCMB.

3.D.2. Developing ISR Effects and objectives

The goal of the ISR ODT is to develop a comprehensive list of ISR effects and objectives. When developing these design elements, the ODT considers the full range of national and component ISR capabilities. The ODT also incorporates lower-level ISR objectives, effects, and/or PIR necessary to support component operational objectives.

ISR effects and objectives require precise language to effectively communicate what ISR must accomplish and the intent behind it. Using carefully chosen action verbs and the phrase "in order to" will clearly communicate the desired intent. By providing the intent in effects and objectives, designers ensure lower levels can flex to unique circumstances if specific tasks are overcome by events. Integration with operations must be at the forefront of a designer's mind when authoring effects and objectives. Designers must consider how achieving objectives or effects can best result in instant operations and attempt to codify this idea into the language.

The ISR ODT will recommend a priority and apportionment for ISR effects and objectives using the JFC intent for ISR and the current operational design of the campaign. Priority will be based primarily on the operational objectives of the JFC. ISR objective priority may not always match up with operational objective priorities, because the requirement for ISR support to each objective may vary. For example, in a counterinsurgency campaign, finding and targeting the adversary's leadership network may be a top ISR objective, but a lower priority operational objective behind security and infrastructure development. Also, the operational design and planning of a campaign will undoubtedly generate "implied tasks" for ISR. These may include support for force protection or surveillance of neighboring hostile states. Separate ISR objectives may be necessary for these ISR operations to be prioritized appropriately.

Apportionment for ISR will be expressed by a weight of effort (WOE) for ISR effects and objectives. WOE provides planners with a percentage of sensor time and available PED capability of each intelligence discipline (i.e., IMINT, SIGINT, FMV, etc.) toward a specific effect and objective. WOE should generally be provided in high, medium, and low terms, each having a defined range of percentages. An objective could have a high priority, but a low weight of effort. For example, if an IADS has been sufficiently destroyed and air superiority is achieved, an ISR objective related to collecting intelligence on the IADS may be a high priority, but the WOE would be low. WOE can also give planners an idea of how much risk should be taken for collection. This is discussed further in section V. WOE will aid planners in tasking platforms or sensors, and will assist collection managers in determining the ratio of collection nominations, which is discussed further in section IV.

As an extension of the JFC's campaign design and/or planning team, the ISR ODT will continuously coordinate with any other component planning team to ensure ISR priorities and apportionment accurately reflect the commander's intent. As the priority for operational objectives change, the ISR ODT will make the necessary adjustments in the ISR effects and objectives in collaboration with the functional components. The ISR ODT will also establish measures of effectiveness (MOE) for ISR effects and objectives. This is described in detail in section VII.

3.D.3. Joint Collection Management Board

The JCMB will perform several important functions of ISR operational art. It will clarify or update guidance in the JFC intent for ISR, including ISR apportionment. The JCMB will approve and/or modify the list of prioritized and weighted ISR effects and objectives submitted by the ISR ODT. This allows the JCMB to focus on the holistic guidance of ISR operations toward joint force objectives instead of centrally allocating ISR missions or prioritizing individual collection requirements long before execution.

Determining how ISR effects and objectives will be achieved begins with general discussions at the ODT and JCMB. During ISR operational design, COM and component representatives on the ODT will continuously discuss options to achieve effects and objectives with their parent organizations. Once a general concept is conceived, the ODT will propose a general design to

achieve effects and objectives to the JCMB for approval. The JIOC will then work with components and national agencies to synchronize and deconflict ISR tasks across the ISR enterprise.

3.D.4. Task Development

Each organization conducting COM will develop tasks in coordination with the JIOC and component end users. Tasks can be developed for specific ISR disciplines or platforms. In either case, tasks apply to all ISR units responsible for the TCPED process of a particular sensor or ISR discipline. Throughout this CONOPS, the term "ISR unit" will apply to any "front-end" operations or "back-end" intelligence units conducting ISR operations. Tasks are synthesized into MTO for specific ISR units. Tasks can specify types of intelligence, targets, supported end users, locations, and timelines, but should avoid dictating specific actions. MTO and actions are further defined in section V. Figure 3 (next page) displays the process for developing tasks and subsequent MTO and actions.

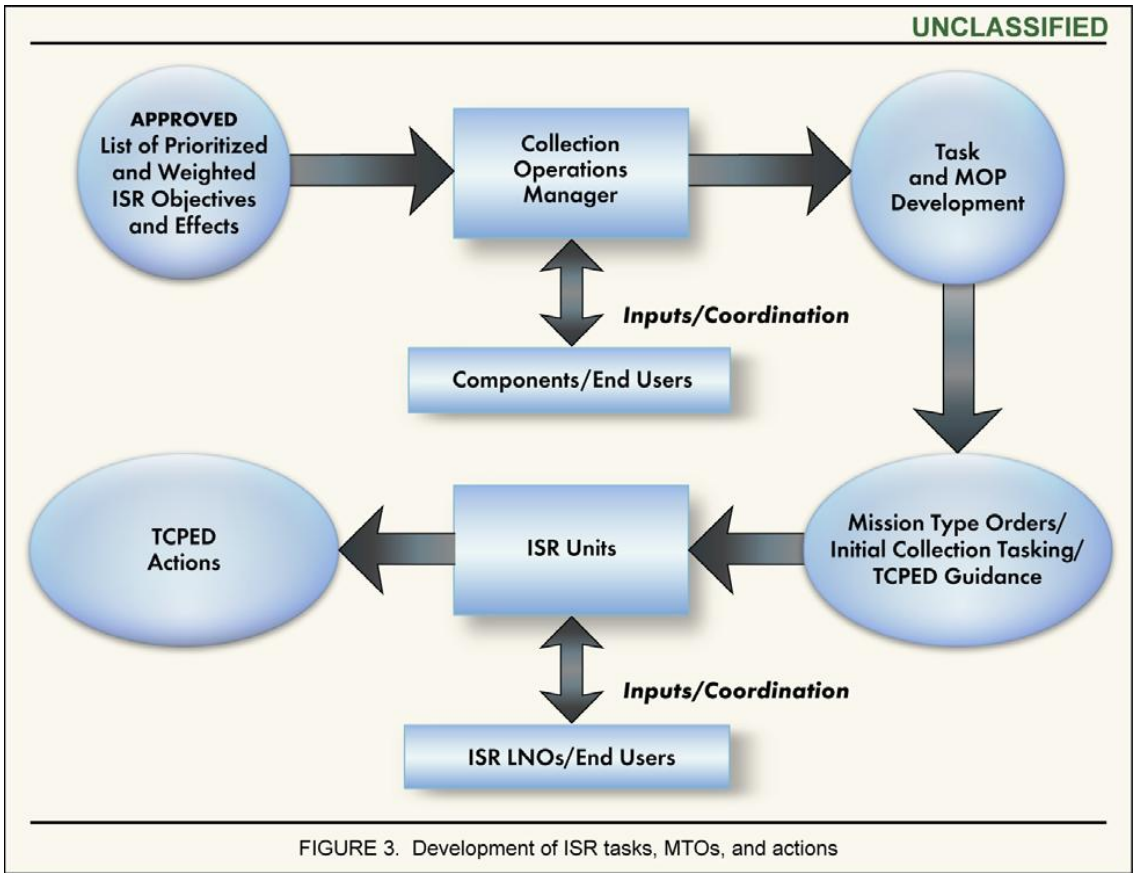

FIGURE 3. Development of ISR tasks, MTOs, and actions

Acronyms

A2	Intelligence directorate of an air component or air staff
AOD	Air Operations Directive
ATO	Air Tasking Order
C2	Command and Control
CCDR	Combatant Commander
CCIR	Commander's Critical Information Requirements
CFACC	Combined Force Air Component Commander
COA	Course of Action
COG	Center of Gravity
COM	Collection Operation Management
CONOPS	Concept of Operations
DoD	Department of Defense
DP	Decisive Points
FFIR	Friendly Forces Information Requirements
FMV	Full Motion Video
GEF	Guidance for the Employment of Forces
HUMINT	human intelligence
IAA	Incident Awareness and Assessment
IADS	Integrated Air Defense
IED	Improvised Explosive Device
IMINT	imagery intelligence
INT	intelligence discipline
IOP	Instrument of Power
IPS	Intelligence Problem Set
ISR	Intelligence, Surveillance, and Reconnaissance
IR	Intelligence Requirement
J2	Intelligence directorate of a joint staff
J3	Operations directorate of a joint staff
J6	Communications directorate of a joint staff
JCMB	Joint Collection Management Board
JFC	Joint Force Commander
JIOC	Joint Intelligence Operations Center
JIPOE	Joint Intelligence Preparation of the Environment
JIPCL	Joint Integrated Prioritized Collection List
JIPTL	Joint Integrated Prioritized Target List
JOPP	Joint Operations Planning Process
JP	Joint Publication
JPG	Joint Planning Group
JRC	Joint Reconnaissance Center
JTCB	Joint Targeting Coordination Board
JTF	Joint Task Force
LNO	Liaison Officer
LOO	Line of Operation

MAAP	Master Air Attack Plan
MASINT	Measures and Signals Intelligence
MEF	Marine Expeditionary Force
MOE	Measure of Effectiveness
MTI	Moving Target Indicator
MTO	Mission Type Order
NAI	Named Area of Interest
NORTHCOM	US Northern Command
NTI	National-Tactical Integration
NTISR	Non-traditional Intelligence, Surveillance, and Reconnaissance
ODT	Operational Design Team
OODA	Observe, Orient, Decide, Act
PED	Processing, Exploitation, and Dissemination
PIR	Priority Intelligence Requirements
RPA	Remotely Piloted Aircraft
RSTA	Reconnaissance, Surveillance, and Targeting Acquisition
SAM	Surface to Air Missile
SIGINT	signals intelligence
TCPED	Tasking, Collection, Processing, Exploitation, and Dissemination
US	United States
USAF	United States Air Force
WMD	Weapons of Mass Destruction
WOE	Weight of Effort
WWI	World War I

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Definitions

Collection Management Authority. Constitutes the authority to establish, prioritize and validate theater collection requirements, establish sensor tasking guidance, and develop theater collection plans. Also called CMA. (JP 1-02)

Collection Operations Management. The authoritative direction, scheduling, and control of specific collection operations and associated processing, exploitation, and reporting resources. Also called COM. (JP 1-02) The 2008 *Theater ISR CONOPS* uses "collection operations manager" to describe an organization conducting COM.

Essential Elements of Information. The most critical information requirements regarding the adversary and the environment needed by the commander by a particular time to relate with other available information and intelligence in order to assist in reaching a logical decision. Also called **EEI.** (JP 2-01) The 2008 *Theater ISR CONOPS* requires EEI to include PED and end user information in order to ensure ISR timeliness and relevance.

Intelligence Problem Set.* An adversary capability or target system that is used to frame the ISR problem, initiate planning, and establish categories for collection targets. Also called IPS.

ISR Effect.* A cognitive change to the state of the friendly, not adversary, system which supports the achievement of an ISR objective.

ISR Objective.* A cognitive goal toward which ISR operations are directed, enabling the achievement of an operational objective.

ISR Task.* A specific mission given to an intelligence discipline or collector which will support the accomplishment of desired effects and objectives.

ISR unit.* An organization whose mission involves any portion of the TCPED of ISR.

Mission Type Order. 1. An order issued to a lower unit that includes the accomplishment of the total mission assigned to the higher headquarters. 2. An order to a unit to perform a mission without specifying how it is to be accomplished. (JP 3-50) Also called MTO.

Operational Art. The application of creative imagination by commanders and staffs — supported by their skill, knowledge, and experience — to design strategies, campaigns, and major operations and organize and employ military forces. Operational art integrates ends, ways, and means across the levels of war. (JP 3-0) The 2008 *Theater ISR CONOPS* uses "ISR operational art" to reflect the application of this definition to ISR operations.

Operational Design — The conception and construction of the framework that underpins a campaign or major operation plan and its subsequent execution. (JP 3-0) The 2008 *Theater ISR CONOPS* uses "ISR operational design" to reflect the application of this definition to ISR operations.

Priority Intelligence Requirement. Those intelligence requirements for which a commander has an anticipated and stated priority in the task of planning and decision making. Also called PIRs. (JP 1-02)

* denotes a new term defined in the 2008 *Theater ISR CONOPS*.

End Notes

[1] Todd Kenreck, "Surviving a zombie apocalypse," http://www.msnbc.msn.com/id/27770863/
[2] HQ USAF, *Lead Turning the Future: The 2008 Strategy for United States Air Force Intelligence, Surveillance and Reconnaissance*, 14.
[3] Michael and Nick Thomas, *Zompoc: How to Survive a Zombie Apocalypse*, 15
[4] Bruce W. Menning, "Operational Art's Origins," 33.
[5] Ibid., 36.
[6] Ibid.
[7] Jacob W. Kipp, "The Origins of Soviet Operational Art 1917-1936," 214.
[8] Bruce W. Menning, "Operational Art's Origins," 37.
[9] Ibid., 38.
[10] Ibid., 34.
[11] Ibid., 38.
[12] Ibid.
[13] Ibid.
[14] Max Brooks, *The Zombie Survival Guide*, 125.
[15] HQ USAF, *Lead Turning the Future: The 2008 Strategy for United States Air Force Intelligence, Surveillance and Reconnaissance*, 13.
[16] *The 9/11 Commission Report*, 408.
[17] HQ USAF, *Lead Turning the Future: The 2008 Strategy for United States Air Force Intelligence, Surveillance and Reconnaissance*, 12.
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