

Requirements for Better C2 and Situational Awareness of the Information Environment

For many reasons—including recent operational experiences and Russian information aggression—the information environment (IE) is ascending as a consideration in how U.S. military operations are planned, exercised, and conducted. However, the IE is still not as central to these activities as it should be. Increased technological sophistication and the availability of advanced communication networks have rendered the IE more extensive, complicated, and complex than ever before. And efforts to coordinate and conduct military operations in and through this environment are beset with a “fog-of-war” problem not unlike that experienced in the traditional domains of air, land, and sea.

How can U.S. forces maintain situational awareness of the IE? What exactly does situational awareness mean in the context of the IE? Given the difficulties associated with bounding, comprehending, and meaningfully observing even small portions of the operationally relevant IE, what steps must the U.S. Department of Defense take to effectively assert command and control (C2) and situational awareness over operations in the IE (OIE), including the ability to organize, understand, plan, direct, and monitor these operations?

Once concepts for C2 and situational awareness for the IE are identified, how should they be integrated and implemented at the geographic combatant commands? Which staffs, structures, or organizations should have responsibility for C2 and situational awareness in the IE? At what echelons?

Answering these questions required framing the problem as one both specific to the IE and representative of broader operational challenges and opportunities. The findings discussed here are supported by an extensive literature and document review, which revealed conceptual and practical challenges and opportunities related to the IE, along with case studies across the range of military operations and interviews with stakeholders and subject-matter experts to expand, refine, and validate the initial lists of challenges and requirements.

Possible Visions for Operations in and Through the Information Environment

There are three possible tiers for the future role of information in operations. Each has implications for the C2 and situational awareness requirements of OIE, as shown in the figure on the following page.

Key findings:

- Information and information-related capabilities play a critical role across the spectrum of military operations.
- The IE should be emphasized in training, planning, and operations; integrated into routine staff processes; and effectively visualized and communicated to commanders.
- Existing doctrine and processes can accommodate a greater focus on the IE.
- Situational awareness solutions for the IE are not one-size-fits-all. Solutions should be matched to a command’s context and priorities.

- Tier 1 is the legacy view—the antiquated vision that has dogged military planners in numerous campaigns and operations. Under this vision, OIE are an afterthought. The focus is on physical objectives, physical capabilities, and physical effects. The IE and information-related capabilities are considered only to the extent that they can contribute to or support physical capabilities. The IE is overlooked and ignored at this tier, and when it is considered, it is considered late.
- Tier 2 is a stronger vision, in which OIE are a valuable military undertaking and resourced appropriately. Information and information-related capabilities become just another tool in the commander’s toolbox, seamlessly integrated with other tools used as part of combined arms to accomplish the mission.
- Tier 3 represents a true paradigm shift. It encompasses all the characteristics of tier 2, but how objectives are specified changes. In tier 3, all military objectives are phrased in terms of the desired actions and behaviors of relevant actors; then, all military activities seek to drive, lead, push, herd, cajole, coerce, constrain, persuade, or manipulate relevant actors down perception-cognition-decision-action paths that ultimately lead to those objectives.

Possible Visions for the Role of Information in Operations

Paradigm	Tier 1 Information an afterthought	Tier 2 Information-related capabilities recognized, resourced, and integrated	Tier 3 Operational outcomes in terms of actions of others with IE as the primary determinant of those actions
Approach	Information "sprinkleism"	Full promise of information operations	Blend information and physical power to drive actions of all relevant actors
Description and focus	Focus is on physical activities; OIE at best supporting of, at worst ancillary to, those physical efforts; <i>legacy view</i> .	Using all capabilities in the toolbox to contribute to tactical warfight- ing and operational success; OIE part of <i>combined arms</i> .	Specifying objectives in terms of relevant actor actions, targeted through affecting perception- cognition-decision-action pathways to achieve effects that support the joint force end state, accomplished by blending physical and informational power; <i>new paradigm</i> .

Getting others to do what one wants is called *influence*, so influence becomes the lingua franca of operational art. Both physical and informational power contribute to influence. Commanders operating under this vision understand that destruction is a powerful form of influence that deprives actors of alternative courses of action. A relevant actor who has been killed has been successfully influenced from performing any undesired behavior ever again. However, short of this most extreme form of influence, there are a host of ways in which physical and informational power can be used collectively to achieve behavioral objectives that (ideally) accumulate to support enduring strategic end states.

Although the Department of Defense has not unambiguously committed to tier 3, this vision holds promise and interest and should remain the goal.

The Current State of C2 and Situational Awareness of the IE

Interviews for this research revealed that when the IE is considered in the context of C2 and situational awareness, the emphasis tends to be on noncombatant populations rather than threat or adversarial actors. IE-related visualizations are rare on the watch floor and in the commander's update briefing. These operations are often crowded out by busy (and faster) physical battle rhythms. C2 and situational awareness of the IE are handled in a piecemeal fashion, and the IE rarely plays much of a role in exercises. As a consequence, most staff have limited or no experience with OIE under even simulated wartime conditions.

Requirements for C2 and Situational Awareness

Requirements for OIE remain a moving target due to ongoing discussions about the future shape of OIE, but the following summary requirements capture the basic foundation needed for effective C2 and situational awareness.

Requirements for effective C2:

- understanding available IE-related capabilities and the inherent informational aspects of operations
- understanding authorities and procedures
- having clear goals in the IE
- knowing what progress toward those goals will look like (assessment)
- having some concept of how you will get there (logic of the effort)
- sufficient capacity to staff OIE
- OIE are considered in all staff sections and processes
- OIE are included/integrated with other operations
- being able to staff OIE as supported or supporting
- commander interest in OIE.

Requirements for effective situational awareness:

- a responsive and capable intelligence, surveillance, and reconnaissance apparatus
- adequate observation and collection of intelligence on the IE
- points of focus
- commander interest.

Provisional Organizational Analysis Findings

Criteria	Alternatives						
	As is	In the staff but more prominent	In the staff, with an element in each directorate	Equivalent of domain component command	Subunified command	JTF	Standing JTF or JIATF
Commander attentive to OIE	?	?	?	√	√	√	√
Sufficient capacity to staff OIE	X	½	½	√	√	√	√
OIE considered in all staff sections and processes	X	½	√	√	√	√	√
OIE included/integrated with other operations	½	√	√	√	½	√	X
Able to staff OIE as supported or supporting operations	X	½	√	√	√	√	X
Able to handle steady-state and contingency operations	X	½	√	√	√	X	X
Able to function in low-demand steady state	√	½	√	X	X	X	X
Understood/accepted place in chain of command/organizational hierarchy	√	√	½	X	½	½	X

NOTE: √ indicates that the organizational alternative wholly or sufficiently satisfy the requirement. X indicates that the organizational alternative is significantly lacking or likely to fail to sufficiently meet the requirement. ½ indicates that the organizational alternative partially satisfies the requirement criteria. ? indicates that the ability to meet the requirement depends on any of a number of factors.

Additional organizational requirements for C2 and situational awareness of the IE:

- the ability to sustain activities under a low-demand steady state
- the ability to handle steady and contingency states and the ability to transition between the two
- understanding of the place of IE-related staffs, structures, and organizations in the chain of command/organizational hierarchy.

Analysis of Seven Organizational Alternatives to C2 in the IE

The requirements that depend on organizational structure pointed to seven potential organizational alternatives for C2 in the IE: “as is” (in the staff); in the staff but more prominent; in the staff but with an element in each directorate; the

equivalent of a domain component command; a subunified command (e.g., theater special operations command); a joint task force (JTF); and a standing JTF or joint interagency task force (JIATF). The table above presents a provisional analysis of these alternatives against the eight explicitly organizational requirements. The symbols in the table (check mark, X, ½, and 0) indicate the extent to which each alternative satisfies each requirement.

Each of the seven organizational alternatives has different strengths and weaknesses. This provisional analysis does not unambiguously endorse any of the alternatives as the obvious solution for every geographic combatant command, but it does provide useful support for decisions about how to organize for C2 for OIE.

Additional Insights from the Research

Doctrine Can Support Improved Practice

There is a gap between emerging concepts for OIE and current practice. However, many existing processes (such as the joint operation planning process) could easily accommodate a greater focus on the IE. For example, although numerous stakeholders reported that intelligence support for OIE is inadequate, this may be due to practice—habit and priorities—rather than a lack of opportunity in doctrine.

C2 and Situational Awareness of the IE Face Huge Seams

Both C2 and situational awareness of the IE face significant seams—areas that either overlap with or fail to cover the roles and responsibilities of those tasked with conducting OIE. There is the issue of whether C2 and situational awareness are functionally aligned to support operations exclusively in the IE and as part of broader (and more kinetic) operations. There is also a substantial difference between steady-state operations and crisis or contingency operations and between integrating the IE into deliberate planning and rapid-reaction planning. C2 and situational awareness of the IE need flexibility across a range of scenarios and actors. As the world moves further into the information age, so will the capabilities of both state and nonstate actors to operate in and through the IE. Finally, there is a need to operate seamlessly with partners.

Situational Awareness Solutions Are Not One-Size-Fits-All

A command cannot know everything about the IE. There is simply too much that could be known. Any plan for situational awareness that aspires to track and present everything about the IE will collapse under its own weight. Instead, command staffs must identify the elements of the IE that are relevant to their missions and responsibilities, then tailor presentations and visualizations (and supporting data collection and analyses) accordingly.

Recommendations

This research highlighted several recommendations for those involved in developing joint force doctrine and guidance and those responsible for planning, exercising, and executing all types of military operations.

Emphasize the Importance of the IE Across Operations

Changes to doctrine, processes, education and training, and tactics, techniques, and procedures should emphasize the importance of OIE and the role of those efforts as part of combined arms and in multidomain operations.

Make OIE a Consistent and Integral Part of Staffing and Broader Operations

Existing doctrine and practice include *opportunities* to consider the IE. There may be a need for changes to doctrine and processes that make consideration of the IE and articulation of problems and objectives in terms of relevant actor behavior *compulsory*.

Choose C2 Structures That Align with Priorities in Specific Context

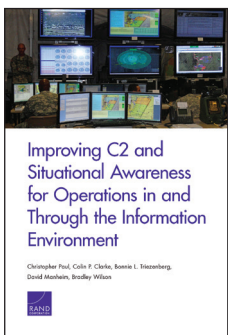
When preparing presentations or visualizations of the IE, match visualizations to specific situations or operations and specific commanders. Do not expect one-size-fits-all situational awareness or presentational solutions for the IE; it is too complex, diverse, and extensive.

Take Advantage of Available Visualization Tools

These tools offer a host of default options; at least one will meet any given contextual need. Where possible, display and visualization designers should offer numerous customizable layouts so that end users do not have to start from scratch and can easily customize the available options.

Refocus and Develop Capabilities to Better Observe the IE

New ways of operating and a new emphasis on operating in and through the IE require a new understanding of the operational context.



This brief describes work done in the RAND National Defense Research Institute and documented in *Improving C2 and Situational Awareness for Operations in and Through the Information Environment*, by Christopher Paul, Colin P. Clarke, Bonnie L. Triesenberg, David Manheim, and Bradley Wilson, RR-2489-OSD (available at www.rand.org/t/RR2489), 2018. To view this brief online, visit www.rand.org/t/RB10032. The RAND Corporation is a research organization that develops solutions to public policy challenges to help make communities throughout the world safer and more secure, healthier and more prosperous. RAND is nonprofit, nonpartisan, and committed to the public interest. RAND's publications do not necessarily reflect the opinions of its research clients and sponsors. RAND® is a registered trademark.

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