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Character into Action

How Officers Demonstrate Strengths with Transformational Leadership

Dr. John J. Sosik Dr. Fil J. Arenas Dr. Jae Uk Chun Ziya Ete

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Society today is both bewildered and tarnished by major lapses in character that cause serious moral and psychological harm to people. Every day the news media bombards us with accounts of ethical scandals, distortions of the truth, and tragic failures of humanity to reach its potential for excellence and prosperity. Such accounts include corporate manipulation of financial reports despite legislation and international standards to prevent it, pervasive cultures of sexual harassment (e.g., Harvey Weinstein, 21st Century Fox, the Miss America pageant), child abuse by clergy and university coaches (e.g., Jerry Sandusky at Penn State), racists

seeking to further divide society, inhuman treatment of customers by airlines, distribution of fake news in the media, data breaches at companies such as Equifax, spinning of false narratives by politicians, and an inability of political parties to collaborate for the collective good of the nation. Unfortunately, these examples are not only limited to corporate and political sectors but also extend into the US military with accounts of mismanagement of sexual assault prevention and response at the USAFA in 2017, Army (USA) Maj Gen Joseph Harrington's racy texts sent to the wife of an enlisted soldier, and the sanctioning of more than 500 US military officers for ethical lapses since 2013.¹ Such occurrences mock military honor codes that espouse time-honored core values that are supposed to create ethical climates in military institutions. They also degrade the collective character of the very institutions in which citizens place their trust for the global defense of our civilization.

The US military has taken action to create new opportunities for military leaders to enact core values of their institutions with their innate character strengths and leadership behaviors. For example, the USAF has invested \$1.6 million in providing Green Dot training for Airmen to decrease interpersonal violence in the service. The Green Dot training regimen addresses ethical issues such as sexual assault, abuse, family violence, and suicide. 2 Such initiatives pose new opportunities for military leaders to put their character strengths into action to empower their subordinates so they can successfully achieve their missions in moral and psychologically positive ways. Some leaders, like General Harrington, put the dark side of their character on public display, and in doing so, deface the core values of military institutions and destroy the trust of those in the profession of arms and the citizens they take an oath to protect. Others, like USAF Lt Gen Steven Kwast and USA Maj Gen John Gronski, work hard every day to emphasize, role-model, and teach the aspects of character that reflect Air Force and Army Core Values through their leadership behaviors. In doing so, they strive to develop the full potential of servicemembers who are knowledgeable in the art of war and profession of arms.³ In this article, we show that the full development of military members in ethical ways requires officers to display transformational leadership that demonstrates relevant aspects of character to others while inspiring, modeling ethics, sparking innovation, and developing the talents and strengths of subordinates.

The reported events we present below are based on the results of focus group discussions with 120 officers serving the USAF, other services, DOD civilians, and international allied forces attending a leadership course at Maxwell AFB, Alabama in 2017. These officers provided accounts of how they infuse aspects of their character into their leadership in military functions, including flight operations, acquisitions, logistics, information technology support, financial and legal services, and special investigations. Important leadership development lessons drawn from these events are then provided.

Character Transmission through Leadership Behavior

In recent years, scholars and practitioners have shifted their attention to characterbased leadership processes that describe how leaders can raise the level of moral, psychological, physical, and spiritual development of subordinates, and thus, build strong ethical climates in organizations. The focus of this interest is on character strengths or dispositions "to act, desire, and feel that involve the exercise of judgment and lead to recognizable human excellence or instance of human flourishing." In other words, character strengths represent the absolute best in humanity and reflect the virtues, or moral excellence, that both Eastern and Western philosophers and theologians first advocated centuries ago. For example, the Gallup Organization, a popular management consulting firm, developed an assessment tool to measure a unique set of 34 character strengths sorted into strategic thinking, executing, influencing, and relationship building capabilities.⁵

Scholars have established a more streamlined research-based classification of 24 such character strengths sorted into six virtues: (1) wisdom and knowledge (creativity, curiosity, love of learning, open-mindedness, and perspective); (2) courage (bravery, integrity, persistence, and vitality); (3) humanity (love, kindness, and social intelligence); (4) justice (citizenship, fairness, and leadership); (5) temperance (self-control, prudence, forgiveness, and humility); and (6) transcendence (spirituality, hope, appreciation of beauty and excellence, gratitude, and humor).⁶ Research has determined that each of these character strengths is associated with beneficial psychological, physical, spiritual, and/or organizational outcomes. For example, previous research on corporate executives and middle managers conducted at the Center for Creative Leadership has found the character strengths of integrity, brayery, and social intelligence to predict managerial effectiveness as rated by corporate board members and top executives.8 Other research has found self-control related to enhanced relationships and interpersonal skills, optimal emotional responses to difficult situations, the performance of desired behaviors, and inhibition of undesired behaviors. Bravery, social intelligence, integrity, and self-control also reflect core military values that we now define and describe.

Bravery can be defined as "not shrinking from threat, challenge, difficulty, or pain; speaking up for what is right even if there is opposition; acting on convictions even if unpopular; includes physical bravery but is not limited to it." This definition emphasizes a professional moral courage that extends beyond physical courage and involves standing up for what is right in one's job and personal life. The USA uses the label of "personal courage" to represent bravery in its Seven Army Core Values that highlight the importance of fearlessness and valor for successful mission accomplishment. In terms of the USAF's Core Value of "integrity first," such forms of courage are required to take "necessary personal or professional risks, make decisions that may be unpopular, and admit our mistakes."

Social intelligence can be defined as "being aware of the motives and feelings of other people and oneself; knowing what to do to fit into different social situations; knowing what makes other people tick." Among the Seven Army Core Values is respect for self and other human beings, which entails knowledge and appreciation of the people and cultural differences within the area of operations. The USAF's Core Value of "service before self" alludes to social intelligence in its requirement of "treating others with dignity and valuing them as individuals." Social intelligence allows for a greater understanding of diverse Airmen and their unique personal characteristics gained through more skilled social interactions. The social interactions of the people and characteristics gained through more skilled social interactions.

Integrity can be defined as "speaking the truth but more broadly as presenting oneself in a genuine way; being without pretense; taking responsibility for one's feelings and actions." Integrity entails both authenticity and honesty in one's words and actions. It also refers to the alignment between one's words and actions, and promise-keeping. Being truthful, sincere, and transparent builds the trust that bonds all human relationships. The USA identifies integrity among its Seven Army Core Values, defining it as doing the right thing, even when no one is looking. Similarly, the USAF lists "integrity first" among its core values and requires the honesty of Airmen whose words and reports must be unquestionable and accurate.

Self-control can be defined as "regulating what one feels and does; being disciplined; controlling one's appetites and emotions."19 Scholars have considered selfcontrol to be "the master virtue" that regulates when individuals use or override their natural or predisposed traits, think about or desire certain things, express or recognize emotions in self and others, and behave in certain ways to make a point or enact their values.²⁰ As such, self-control serves a regulatory function regarding who we are (our traits), what we feel (our emotions), what we think (our cognition), and what we do (our behaviors). This self-regulatory function is essential to military leadership as reflected in the Seven Core Army Values, particularly the value of honor that requires living up to the Army values and developing the habit of carrying them out in all aspects of life. 21 Self-control is essential to the demonstration of all three USAF Core Values. Putting "integrity first" requires Airmen to habitually control their impulses and act ethically. Modeling "service before self" requires Airmen to have the discipline to follow regulations and be self-controlled regarding the beliefs, authority, and diversity of others. Enacting "excellence in all we do" requires discipline and commitment to a life of restraint and continual growth.²²

Simply possessing one or more of these character strengths does not ensure that an officer will display character-based leadership. Good leadership, plain and simple, is about influencing subordinates and others in a positive way. What officers say and do are important forms of influence that pique the attention of subordinates. To the extent that "leadership is in the eye of the beholder," this influence process suggests that leaders' character strengths must be transmitted (i.e., manifested) through their behaviors, and these behaviors must be properly recognized and interpreted by subordinates. Just as a radio signal is sent via a transmitter and picked up by a radio receiver, research suggests that leaders signal their character strengths and core values with their words and behaviors that are perceived by subordinates who are influenced by them. Without proper reception or perception by the intended audience, namely radio listeners or subordinates, transmissions cannot have their expected influence on their audience.

More than four decades of research has found transformational leadership to be most effective in influencing the performance and development of subordinates in corporate, military, educational, and religious organizations all over the world. ²⁵ Training and educational programs in transformational leadership have been commonly delivered in military services such as the USA and USAF. Transformational leadership entails four behaviors: *inspirational motivation*—inspiring collective action through the articulation of an evocative vision; *idealized influence*—modeling high levels of ethics and performance; *intellectual stimulation*—challenging thinking

processes through the questioning of assumptions and consideration of different perspectives; and *individualized consideration*—coaching and mentoring subordinates while recognizing and appreciating their unique differences. These behaviors build trust among subordinates, empower them to work effectively on missions that require collective action, and enhance their performance and satisfaction with the leader. For example, Gen Lori J. Robinson's extraordinary influence of United States Northern Command and the North American Aerospace Defense Command has inspired thousands of Airmen. Brig Gen Robin Olds' intrepid actions as a "triple-ace" fighter pilot in World War II and Vietnam motivated many aspiring pilots. Col John R. Boyd's ingenious air combat tactics highly influenced military strategies. Lt Gen William H. Tunner's relentless dedication to reduce deadly accident rates for his military airlift crews saved many lives. Such examples demonstrate the power of these leader behaviors.

Research suggests that the transmission of the character strengths of bravery, social intelligence, integrity, and self-control can be accomplished through the display of the behaviors associated with transformational leadership. Based on this research, we expect bravery to be transmitted through the display of idealized influence and intellectual stimulation behaviors. Bravery enables leaders to act consistently with their core values and beliefs and inspires others to also meet organizational expectations. Bravery gets subordinates to rethink their assumptions about what they stand for and are willing to sacrifice for the good of the organization.²⁸

We expect social intelligence to be transmitted through the display of idealized influence, inspirational motivation, and individualized consideration behaviors. Social intelligence allows leaders to more effectively understand the motives and feelings of subordinates and better identify and develop subordinates' talents. When subordinates see they are being recognized and developed, they become inspired to work harder toward collective goals. A keen understanding of the dynamics of organizational politics can also allow a leader to better model the organizational values and personify high-performance standards that's expected of all organizational members.²⁹

We expect integrity to be transmitted through the display of idealized influence behavior. Integrity involves both honesty and authenticity. Integrity requires the moral imperatives of speaking the truth and holding oneself accountable for one's actions. To the extent that idealized influence reflects the highest moral standards such as being honest and true to oneself and others, leaders' integrity can be manifested to subordinates through the display of idealized influence.³⁰

Finally, we expect self-control to be displayed through the idealized influence and intellectual stimulation behaviors. Self-control involves the accurate interpretation of events and feedback from others, tempered responses to one's impulses, thoughts, and emotions stemming from them, and adjustments to one's behavior to meet societal expectations. Tempered responses to personal characteristics involve cognitive processes of rethinking one's responses and psychological states, often associated with intellectual stimulation. Behavioral adjustments that meet societal expectations are required to maintain one's role model status, which idealized influence strives to achieve.³¹ We now describe a test of our expectations.

Evidence from Operational Experiences

As part of a leadership course at Maxwell AFB, 120 officers from the USAF, other services, DOD civilians, and international allied forces participated in optional guided discussions regarding their display of the character strengths of bravery, social intelligence, integrity and self-control. The officers (grouped in 10 class sections of approximately 12 students) were asked by the section instructor (1) how often they talk about or demonstrate each character strength with their subordinates during military operations, (2) how they do this, and (3) what happens as a result. The instructors responded to each participant's focus group event comment, representing an event for this study, with a brief summary to ensure that they understood the essence of the event but did not conduct "member-checking" per se, which is a limitation of this study. The instructors then recorded the event responses onto written transcripts which were subsequently coded by two graduate students to assess the extent to which the character strength is displayed through idealized influence, inspirational motivation, intellectual stimulation, and/or individualized consideration behavior. Any coding differences were reconciled by the graduate students under the supervision of the first author. The results of these analyses are summarized in tables 1-4, which display the reported events associated with the transformational leadership behaviors of this study's population of 120 officers for the character strengths of bravery, social intelligence, integrity, and self-control, respectively.

The Display of Bravery

Results summarized in table 1 indicate that bravery manifests primarily through officers' display of idealized influence and intellectual stimulation behaviors. As illustrated by events B1 and B3, idealized influence allows officers to act bravely by standing up for high standards of performance and holding discussions about ethics despite potential career risks or current practices that ignore ethical considerations. Idealized influence also allows officers to demonstrate bravery by highlighting important espoused institutional values (ethics) and relating them to actions not currently enacted within the officers' unit, as shown in events B2, B6, and B8. Perhaps most importantly, idealized influence supports the modeling of bravery so that subordinates can learn how to enact bravery by observing it displayed by their commanding officers, as shown in events B5 and B13.

Table 1. Bravery character strength events and manifestation through transformational leadership behavior

	Transformational leadership behavior					
	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration	
B1	An Airman spoke up to commander whose plan seemed to be ineffective and bad for others in unit, despite threat to his career advancement. This created consternation for the duration of the mission.	Standing up for high standards			Shows concern for others	
B2	A pilot refused to stop providing watch over a ground unit. He polled aircrew and then told command and control agency they would not come off of their overwatch mission.	Using personal ethics to decide on mission	Acting decisively with team input and collaboration			
В3	An Airman challenged culture that does not discuss or consider bravery topics except in professional military education. He suggested bringing up such topics in daily briefings.	Standing up for ethical discourse		Questioning of cultural values		
B4	An Airman noted that being tactically brave is easier than being strategically brave by questioning and/or revising strategy models or business models.			Questioning assumptions		
B5	A squadron commander climbs into jet and leads four aircraft on a risky mission inside of a surface-to-air threat.	Modeling of bravery				
B6	A junior officer often talks to janitors in the hallway to demonstrate the recognition of human dignity and respect despite social perception by others.	Highlights important ethical values			Shows concern for others	
B7	In North Atlantic Treaty Organization (NATO) operations or other big exercises, an officer sometimes talks to subordinates about bravery because bravery is expected. Instead, he spends his time talking about safety, humility, and teamwork.	Reinforces core values through team discussions				

Table 1 continued

	Transformational leadership behavior						
	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration		
B8	A NATO maintenance officer talked about being brave by making an informed decision and letting time determine if it was right.	Linked core value to decision- making action		Emphasized rationality for decision- making			
B9	A NATO maintenance officer noted that his organization was not always sure about how their actions would fit in with other agencies in the future so he engaged others to work together.		Consideration of bigger picture and overall mission				
B10	A NATO maintenance officer stated that the ambiguous environment allowed for second guessing at many organizational levels and across unit, which called for bravery.			Questioning assumptions			
B11	A NATO maintenance officer stated impact of their decisions was widely debatable due to timing of the end goal shifting further away. This required making difficult decisions based on the information they had to create a common vision. They needed to be brave enough to open themselves to ridicule and put themselves in a very vulnerable situation.		Common vision inspires team synergy	Emphasized rationality and evidence-based decision- making			
B12	On a weekly basis, a USAF flight instructor verbally connected bravery to students' call to fly rescue helicopters into combat and taught skills necessary to free their mind for the difficult mission conditions by "putting away fear."		Reiteration of mission/vision with bravery discussion	Thinking differently to put away fear			
B13	A USAF instructor demonstrated contextual nature of bravery by making tough decisions, delivering bad news, and assuming risks in ambiguous situations. He noted that "bravery is contagious much like a flame. Bravery inspires others to act in brave ways, even when courage is lacking."	Modeling bravery and spreading it through social learning					
	Event count (percentage)	8 (40%)	4 (20%)	6 (30%)	2 (10%)		

As expected, intellectual stimulation appears to allow officers' bravery to manifest through the questioning of assumptions and cultural values that may no longer be appropriate (e.g., looking out for oneself in a collectivistic culture), as shown in events B3, B4, and B10. Bravery is also demonstrated through intellectual stimulation when officers emphasize rationality and evidence-based decision-making (events B8 and B11) instead of relying on emotions, group consensus, or political considerations. Furthermore, intellectual stimulation helps officers demonstrate bravery to their subordinates by getting them to think differently about the situations they face so that they can put aside fear and take action (event B12). Putting aside fear requires thinking differently about one's preparedness and confidence and reassessing the degree of danger or risk involved in an action. Shifting the focus of one's thoughts from fear to one's training, abilities, and experiences can promote a sense of readiness and allay fear.³²

While not as prevalent as idealized influence and intellectual stimulation, officers commented that inspirational motivation and individualized consideration can also support the manifestation of bravery. Inspirational motivation promotes collective input for making tough decisions (event B2) and visioning processes that motivate subordinates to work toward a common goal (events B9, B11, and B12). Whereas we expected inspirational motivation to be a primary transmission mechanism for bravery, it was not mentioned by officers as frequently as idealized influence. We did not expect individualized consideration to play a role in the manifestation of bravery, but idealized influence appears to sometimes support brave actions that show concern for the best interests and dignity of others despite cultural or social norms that suggest such behaviors are not expedient or often practiced by others (events B1 and B6).

The Display of Social Intelligence

Results summarized in table 2 indicate that social intelligence manifests through a mix of officers' display of idealized influence, inspirational motivation, and intellectual stimulation behaviors. As expected, idealized influence allows officers to set aside personal interests for the good of the unit (event SI3), thus demonstrating a socially intelligent focus on others, an interdependency among team members, and making personal sacrifices that demonstrate the core military value of "service before self." Idealized influence also allows officers to model social intelligence by intervening in conversations that aggravate rather than inspire others (event SI4) and managing subordinate's social infractions by holding them accountable for their words and actions and teaching them how to interact properly with others (events SI5 and SI7).

Table 2. Social intelligence character strength events and manifestation through transformational leadership behavior

	Transformational leadership behavior					
	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration	
SI1	An Airman seeks commitment from members of group when trying to institute cultural change.		Building team consensus			
SI2	A company grade officer interacts with peers in other career fields to get things done without higher levels of command.		Building team consensus	Seeking different perspectives		
SI3	A USAF exchange officer noted that US society is individualistic, "sets up walls," and glorifies "Rambo." In contrast, Eastern cultures are more open to consensus and work like "a group of detectives solving a crime."	Setting aside personal interests for good of the team	Building team consensus	Solving problems from different perspectives		
S14	An instructor at a military institution facilitated a discussion on domestic politics that slipped from respective to abusive attacks on persons instead of positions. He quickly stepped into the conversation to refocus the class on the idea of attacking policies, strategies, theories, or ideas—not the people who hold them. "By intervening, I was attempting to model my expectations of social intelligence as a leader."	Modeling of social intelligence		Encouraging rationality in discussions and thinking at a deeper level via perspective-taking		
SI5	An Airman rarely talks about social skills in his community, but he once overheard a colleague speaking poorly about a politician. He told the colleague "not to talk this way in public" because "military can only talk about politics in a private environment."	Pointing out inconsistency of colleague's action with cultural values				

Table 2 continued

	Transformational leadership behavior							
	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration			
SI6	A NATO maintenance officer created a "shared identity as a maintainer as the common point from which we could then relate the policies, limitations and aspirations of the organization. It gave us a reference point to discuss critical issues from, despite our social and cultural differences."		Building a shared identity for common vision and collective action		Appreciating cultural differences and viewpoints			
SI7	A USAF flight instructor discusses social awareness, tact, trust, and emotional intelligence for pilots' career progression.	Talks about trust and tact			Appreciation of diversity			
SI8	An Airman pulled subordinates aside to say, "Did you see how uncomfortable she appeared when you said 'x'" or "I got the feeling he wasn't understanding your intent"			Provides feedback for rethinking words and actions				
	Event count (percentage)	4 (28%)	4 (28%)	4 (28%)	2 (16%)			

As expected, inspirational motivation can allow officers to showcase their social intelligence by building team consensus in complex situations that involve multiple functional areas of expertise and diverse cultural backgrounds (events SI1, SI2, and SI3). Inspirational motivation also creates a shared collective identity that values all members of the team so that they can take action to achieve a vision they all embrace (event SI6). Socially intelligent leaders work to build such visions in ways that allow them to cooperate well with team members working toward the vision.³³

To the extent that social intelligence helps officers get along with and influence a variety of subordinates, intellectual stimulation provides a means for officers to seek different perspectives from their subordinates and use these perspectives to solve old problems in new ways (events SI2, SI3, and SI4). The questioning of assumptions that intellectual stimulation encourages allowed the Airman, described in event SI8, to provide constructive feedback to her subordinates so that they could rethink their inappropriate words and actions, and learn from their mistakes. Contrary to our expectations, intellectual stimulation was mentioned more often than individualized consideration by officers as the means to manifest social intelligence.

The Display of Integrity

As expected, results summarized in table 3 indicate that integrity manifests primarily through officers' display of idealized influence behaviors. Idealized influence allows officers to discuss with subordinates the importance of ethical values, which

are an integral part of military culture, as illustrated by events I5, I6, I7, and I9. Several other events (I2, I7, I8, and I9) show that idealized influence also allows officers to model integrity for subordinates, so they can learn how this important core military value is practiced. Event I3 illustrates another important form of idealized influence; it allows for the managing of the integrity of others; namely, acting on and enforcing ethical regulations and holding subordinates accountable for their legal and/or ethical breaches.

Table 3. Integrity character strength events and manifestation through transformational leadership behavior

	Transformational leadership behavior					
	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration	
I 1	A judge advocate general got her community to consider how they are handling ethics through rule enforcement and personal actions. She wanted them to internalize rules and execute them based on their personal and USAF ethics.	Internalization and advocating of ethical values				
12	An officer's superior commanded him to send a colleague to a staff position who didn't meet the criteria. He refused but then referred back to orders given by a higher superior. He then briefed the higher superior who backed him.	Standing by rules and criteria models integrity				
13	A chaplain had to fire a 70-year-old church organist turned thief who worked there for 30 years. The firing caused conflict in the unit because she publicly badmouthed his leadership.	Acted on and enforced ethical values				
14	A fighter pilot noted that integrity is highly ranked in his culture. However, it is difficult to practice due to intense competition among pilots within and between fighter aircraft type units. He communicated with the groups to help them understand each other and maintain squadron integrity.		Set aside competition to foster team synergy and shared vision		Listening to team members' intentions to better understand them	
15	A leadership trainer often refers back to integrity as a core value when mentoring junior officers and enlisted Airmen.	Discussion of ethical values				

Table 3 continued

Table 3 continued							
	Transformational leadership behavior						
	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration		
16	An Airman sometimes talks about integrity and how hard it is to regain once lost for dishonesty. He emphasizes being empathetic regarding those who have made mistakes within the military culture.	Discussion of ethical values			Listening to team members' intentions for more effective understanding		
17	A NATO maintenance officer pointed out cross-cultural difficulties with integrity as individual ethics differ, but many commonalities exist, also. The officer spoke about individual integrity serving the greater good of the entire organization by building a sound and thorough maintenance organization.	Discussion and modeling of ethical values	Emphasis of working together to achieve a common purpose				
18	A flight officer led by example. "I discussed and modeled integrity on every flight There were a few methods, but the most prevalent were adherence to flight rules and standards, taking ownership of general knowledge about the aircraft and associated rules, and, most importantly, I owned my mistakes when I made them."	Modeling of ethical values and taking pride in one's knowledge and competence		Emphasized rationality and analyzing mistakes to learn from them			
19	A leadership instructor noted that integrity is "doing what is right, even when no one is looking. Every day, leaders model integrity in both obvious and not-too-obvious ways. Transparency and honesty are obvious ways to demonstrate integrity, but self-control is also linked to demonstrations of integrity (e.g., a full stop at stop sign when no other cars are around). What I have found in most cases is that people are around and watching even when you think they are not. They see your actions, and as a result, learn how to act in situations."	Discussion and modeling of ethical values and teaching them through social learning					

8 (61%)

2 (16%)

1 (7%)

2 (16%)

Event count (percentage)

While not nearly as prevalent as idealized influence, both inspirational motivation and individualized consideration can be used to showcase integrity. By promoting team synergy, collective action, and a shared vision, officers who use inspirational motivation get subordinates to see integrity as the common-core value that brings team members together and forges collective action (events I4 and I7). By empathizing with team members who have experienced an ethical failure, officers who use individualized consideration are able to listen to subordinates' intentions and better understand them before teaching them how not to repeat their mistakes, as suggested in events I4 and I6.

The Display of Self-Control

Results summarized in table 4 indicate that self-control manifests primarily through officers' display of intellectual stimulation behaviors. As expected, intellectual stimulation allows officers to question their underlying assumptions about what they feel, think about, react to, and how they are predisposed to act, as illustrated in events SC1, SC2, SC4, SC7, and SC8. These events also show that officers' self-control manifested through intellectual stimulation supports cognitive processes that encourage rationality and awareness of how emotions influence thinking, and vice versa. Such self-awareness can bolster future self-regulation of thoughts, emotions, and behaviors.³⁴

Table 4. Self-control character strength events and manifestation through transformational leadership behavior

	Transformational leadership behavior					
	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration	
SC1	An officer's second-in- command put out information that was not in line with his superior's thinking. The officer had to restrain himself from overriding the order due to his assessment of the commander's lack of perspective.			Questioning of assumptions and perspective-taking		
SC2	A leadership instructor considered a popular book on willpower to change his perspective on life. He sent copies of the book to his close colleagues. He also kept snacks stocked and gave them to students to boost glucose levels and promote improved thinking and willpower.		Sharing enthusiasm and positive knowledge with others	Promoted rationality and thinking effectiveness	Shows concern for others	

Table 4 continued

Transformational leadership behavior

	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration
SC3	An Airman recognizes when he is using his willpower forcefully because he believes that pushing his team too hard can break the institution's pacing.				Shows concern for others
SC4	A leadership instructor taps his self-control through stoicism and self-awareness. "A stoic leader is even-keeled; and does not allow the highs or lows to drive impulsive behavior. Impulsive behavior could be an overabundance of caution, or an excessive tolerance of risk. Stoic leaders stay the course. Stoicism is a habit of behavior that is molded through habits of mind. When someone is able to recognize their actions or words are out of line with what they want their character to be," they can act more deliberately. Self-aware leaders recognize the stimulus that caused a response in them. Then they can plan how they will react next time the stimulus is encountered to improve their self-control.	Modeling of aspects of emotional intelligence		Promoted rationality and seeing connection between cognition and emotions	
SC5	An officer felt he typically maintains high self-control because he proactively works to keep things under control. At other times, when he is pressed for time, the result is better if he doesn't react by first impression in a complex situation. "For more self-control, it is better to step back and make better decisions when being relaxed and with more data."			Seeking different perspectives beyond first impressions and evidence- based decision- making	
SC6	A NATO officer used self-control daily to deal with continual delays and changes in mission and priorities with his unit. "Self-regulation became required for the ability to endure It was extremely difficult to maintain professionalism when you were asked to shift attention I had to look people in the eye and ask them to shift their focus in a new direction and shelf the project that had once been so vital At times, self-control created an unemotional scripted message that was transmission of our new marching orders without the belief that they were relevant in anyway. It took on an almost disingenuous tone which was almost as bad as no self-regulation at all."	Consideration of ethical values of authenticity and truthfulness	Shifting team priorities and mission through self-controlled articulation redirects their focus		

Table 4 continued

Transformational leadership behavior

	Event	Idealized influence	Inspirational motivation	Intellectual stimulation	Individualized consideration
SC7	An Airman taps his self-control daily but is challenged by it because of initial negative reactions and emotions. "I use self-reflecting questions to level my emotion and I think about the root causes of my reactions or the situation to get a better response. The result: I still lose my temper, judge things as unfair, complain, my heart races, and I lose time and energy to that process but I also become more aware, slowdown that process, and reduce my anger or frustration."			Rationality shifts emotions from negative to positive and prompts learning from emotional reactions	
SC8	A USAF instructor uses self-control daily to regulate her thoughts, emotions, and strengths. The more she uses it, the easier it is to automatically self-regulate. "It's like a muscle—use it and it gets stronger; don't use it and it atrophies."	Self-control maintains ethical standards for regulating other strengths		Self- regulation fosters questioning of one's behavior	
	Event count (percentage)	3 (23%)	2 (15%)	6 (47%)	2 (15%)

Event SC5 illustrates an important aspect of officers' self-control is displayed through intellectual stimulation. Instead of making rash comments or decisions, self-control appears to allow officers to slow down their decision-making processes and seek different perspectives beyond their first impressions. This slowing down of thinking processes can allow them to make more informed decisions and have more controlled reactions to events.³⁵ The seeking of different perspectives helps officers not to act based on first impressions or thoughts in complex situations. It also slows down the decision-making process so that more information can be gathered and analyzed. Decisions made with more information in a careful and thoughtful manner tend to be more effective than those made based on first impressions or stereotypes.³⁶

Contrary to expectations, idealized influence was not mentioned by officers as frequently as intellectual stimulation as playing a primary role in the manifestation of self-control. However, several events alluded to idealized influence as allowing for the modeling of emotional control and regulation required of military officers (event SC4), considering the ethical values of authenticity and truthfulness (event SC6), and maintaining standards regarding the regulation and control of other character strengths (event SC8). These events provide partial support for idealized influence aiding in the manifestation of self-control.

Recommendations

Based on the results of our analysis of the events provided by military officers, we offer several recommendations for leaders interested in putting their character into action. First, leaders should use idealized influence to project images of bravery, social intelligence, and integrity to their subordinates. Idealized influence, which reflects the moral/ethical component of transformational leadership, was most pervasive among the four transformational leadership behaviors in reflecting the character strengths considered in this article. Its pervasiveness suggests usefulness across the many situations that demand the manifestation of bravery, social intelligence, and integrity in military settings. Learning how to role-model the core values of the institution, encouraging others to consider ethics in their actions and decision-making, enforcing compliance with ethical standards, and holding oneself up to high performance and ethical standards are effective ways to bolster one's idealized influence.³⁷

Second, intellectual stimulation is a useful means for leaders to project images of bravery, social intelligence, and self-control to their subordinates. While idealized influence emphasizes the moral/ethical aspects of transformational leadership, intellectual stimulation focuses on the rational and cognitive aspects of transformational leadership. Military officers and the enlisted are problem-solvers by nature; they are frequently challenged to address ambiguous and complex issues facing them.³⁸ As such, we believe it is natural for them to respond positively to intellectually stimulating behaviors that showcase the character strengths of bravery, social intelligence, and self-control, as illustrated by the events provided in this article. To increase leaders' levels of intellectual stimulation, we advise them first to identify and work to remove roadblocks to intellectual stimulation such as negative attitudes toward creativity and innovation, institutional policies and practices that inhibit the adoption of new technologies, skepticism among subordinates, and selfdoubts about their own creativity. Getting involved in the development and implementation of continuous improvement programs, leading brainstorming sessions, encouraging blue-sky thinking, and completing problem-solving and creativity training courses are also effective ways to enhance one's ability to intellectually stimulate subordinates.³⁹

Third, leaders should not discount the importance of displaying inspirational motivation and individualized consideration since combinations of transformational leadership behaviors can also support the manifestations of the character strengths such as social intelligence. Accounts of officers' experiences suggest that inspirational motivation can help leaders to lessen any egocentric tendencies and better understand the interdependencies among team members and motivate collective action. Social intelligence represents the understanding of such interdependencies and knowing what it takes to motivate a diverse group of people in cultures with tricky organizational politics. ⁴⁰ But through inspirational motivation, leaders can communicate this understanding to team members so they can work together to achieve their mission. Understanding how to motivate a group of people in a socially intelligent manner requires paying attention to their motives and feelings. Such attention to the needs of others can be achieved through individualized consideration.

As theologian and philosopher Fulton J. Sheen once wrote, "detachment from self is always the condition of attachment to others." ⁴¹

For leaders to display higher levels of inspirational motivation, we encourage them to improve their strategic thinking skills through training or mentoring, be more optimistic regarding work projects, and study and practice using the rhetoric of charismatic leaders. Such rhetoric includes emotion-laden words, reference to core values of the institution, repetition of inspirational phrases, and rhythmic and enthusiastic delivery of speech passages. Leaders interested in learning to show more individualized consideration with their subordinates are advised to increase the amount of coaching and mentoring time they spend with their subordinates, pay attention to subordinates' personal situations and career goals, study the results of subordinates' personality and character strength assessments to learn about their unique traits and preferences, and place subordinates in positions where they can use and/or develop their own character strengths. These actions should individualize leader-subordinate relationships, build greater trust between them, increase the amount of information and resources shared between them, and ultimately increase the quality of their relationships and effectiveness.⁴²

Finally, leaders should carefully ponder the idea of philosopher John Locke that "the discipline of desire is the background of character." ⁴³ In other words, leaders need to pay particular attention to their level of self-control over their desires, predispositions, emotions, and actions. Self-control is considered to be the master virtue that regulates when they: (1) use or override their predisposed traits and character strengths, (2) think about or desire certain things, (3) express or recognize emotions in self and others, and (4) behave in certain ways to make a point or express themselves. In a related research study conducted with USAF captains and their subordinates and superiors, we found that the character strengths of integrity, empathy (a form of social intelligence), and professional moral courage (a form of bravery) were associated with leaders' ethical leadership, psychological well-being and performance effectiveness, but only for those leaders with high levels of self-control.⁴⁴ These results are consistent with observations made by an Airman who told us that she considers selfcontrol to be "the moderator of all other character strengths. I have found that the more you practice self-control, the easier it is to automatically self-regulate and use your other strengths." Leaders interested in enhancing their self-control can do so by using it across as many life domains or situations as possible until it becomes habitual. As an Airman explained in event SC8, "It's like a muscle—use it and it gets stronger; don't use it and it atrophies," which is consistent with a large body of research. 45 Additional means to improve self-control include setting and working toward specific personal and professional goals, supplementing glucose intake during the day with snacks and candies, introducing exercise into the daily routine, and getting adequate amounts of sleep.⁴⁶

Conclusion

We hope that our discussion of how character strengths can be transmitted through transformational leadership behaviors helps you to better understand how

to improve leadership effectiveness. The researched events, and lessons drawn from them, can provide a solid foundation for understanding how positive character development relates to the betterment of subordinates and organizational effectiveness. Applying these lessons to most of the situations you will face can guide your quest to put character into action which will help your organization flourish. \bullet

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Multidomain Observing and Orienting

ISR to Meet the Emerging Battlespace

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he complexity and speed of future multidomain operations (MDO) hold deep implications for how military forces conduct John R. Boyd's famous observe, orient, decide, and act (OODA) loop. Increased domain interconnectivity and growing cross-domain interdependence underpin an emerging vision of future warfare that is beginning to take shape. Publications that include the DOD's Joint Operational Access Concept family of documents and the Army's multidomain battle operating concept describe the contextual drivers and outline the idea's central elements. At its core, the MDO concept is a response to a changing competition-space characterized by complex problems that defy current approaches and anti-access/area-denial (A2/AD) challenges that require more fluidly integrated capabilities across all domains to overcome. As Dr. Jeff Reilly, the Air Command and Staff College director of Future Warfare Studies, warns: "historical approaches to achieving

superiority in the air, land, and sea domains may no longer be valid."³ To address this, the nascent multidomain idea aims to make an expansion of jointness within and across domains.⁴ To better understand what this means for how militaries observe and orient (OO), this article first explores the context, defining a domain, a continuum of domains, and their relevant features. Second, given this context, it aims to outline future OO requirements and determine the likely implications for the intelligence, surveillance, and reconnaissance (ISR) enterprise.

Defining an Operational Domain

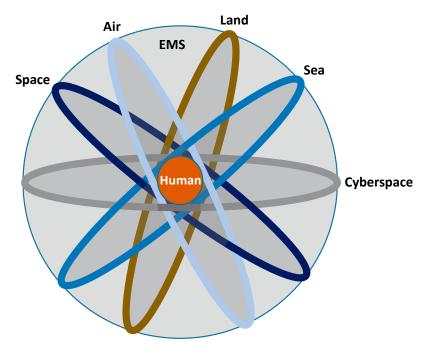
Defining and designating operational domains remains a much-debated topic within the defense community. Since the addition of cyberspace in 2011, the DOD officially recognizes five operational domains: land, air, sea, space, and cyberspace. Still more are under consideration, including the electromagnetic spectrum and the human or cognitive domain. The doctrinal debate on what does or does not make the cut as an operational domain is beyond the purpose of this article. It is, however, important to progress with a common conception, and since this article is concerned with examining the practical implications of MDO, a more flexible definition will serve to enable a fuller conversation on its application. In this article, a domain is simply defined as a characteristically distinct maneuver-space within or through which advantage can be achieved over an adversary.

Operations within a Continuum of Domains

Technological developments have long driven evolutions in the way wars are fought. One of the more profound impacts of these developments is found in the way in which they connect domains. By enabling a projection of power and influence beyond where armies could previously travel, early sea power capabilities provided new ways to gain an advantage on land. Similarly, with the advent of airpower came new ways to connect, maneuver, and gain an advantage over both land and sea forces. More recent advances, particularly but not exclusively in information technology, have created new maneuver spaces, as well as new ways to connect other operational domains, further altering how we perceive domain interdependence. Central to these changes is the emergence of cyberspace and space as increasingly important and contested domains. As recently described in the Air & Space Power Journal, "advances in technology have subtly nudged the entire globe into a realm where all previous notions of the battlespace have been radically altered by domain interdependence."

Increasing domain connectivity and interdependence are pushing the battlespace toward a more fluid continuum of domains. Within this context of increasing cross-domain opportunity, the MDO concept involves the exploitation of asymmetric advantage across multiple domains to achieve the freedom of action and effects required for mission success.¹¹ It is more than simply conducting operations in multiple domains—it is about synchronized maneuver between domains to create asymmetric effects at speeds that ultimately complicate and outpace adversaries'

OODA processes. The core thesis is the complementary, vice merely additive, use of capabilities across domains to create moments of superiority that can be leveraged to achieve mission objectives. 12 Future war fighters will need to be able to gain superiority at the right time, place, and combination of domains to succeed.



Continuum of domains

Not New in Concept but New in Character

Although the idea of conducting operations across domains is as old as antiquity, today's MDO concept has increasing relevance and distinctive features. One of the first recorded examples of an MDO occurred in 1187 BC when a coalition of tribes collectively known as the Sea Peoples threatened Ramses III's Egypt with superior naval forces. 13 Instead of conducting a traditional naval battle as his predecessors had done, Ramses III secretly maneuvered his land-based archers to the Nile shoreline while presenting a weak naval element to draw the enemy within bow range. As his archers began annihilating the Sea People's fleet, the bulk of Ramses' naval forces blocked their retreat, permanently eliminating this threat.¹⁴ Airpower, 3,100 years later, further advanced the concept of MDO, altering the character of war with its ability to conduct a quick strategic attack from afar, as well as meaningfully influence operations on the land and sea domains.

So, if the multidomain idea is a long-standing part of the evolving character of war, what is new about the current MDO concept that requires attention? Beyond the recognition of technological advances and A2/AD challenges, which have been well covered elsewhere, there are distinctive characteristics these produce that demand a more sophisticated MDO approach. Exploring these salient emerging features that define the new MDO provides the foundation necessary to begin to understand how to approach effective multidomain OO.

Focus on Cross-Domain Synergy and Maneuver

At the heart of new multidomain thinking is the idea of cross-domain synergy based on deeper interdomain connectivity. Cross-domain synergy is the synchronization of individual domain activities to establish superiority in or through a combination of domains to achieve mission success. ¹⁵ Commanders, staffs, and operators should be able to think beyond their organization's home domain, equipping and training forces to conduct cross-domain maneuver, pivoting between domains for access and advantage. Just as the *Joint Concept for Entry Operations (JCEO)* highlights, "maneuver capabilities in multiple domains present many potential threats to the adversary, overloading his decision cycle and allowing the joint force to seize and retain the initiative." ¹⁶

Windows of Superiority or Access

Recognizing increasing A2/AD challenges, today's MDO concept is focused on establishing windows of localized superiority, often opportunistically derived and fleeting in duration. The aim is to penetrate enemy defenses with defined areas of domain superiority where joint and partner forces can achieve operational objectives and prevent adversaries from disrupting friendly operations. As the director of the Army Capabilities Integration Center highlights, the military needs to be able to "create and exploit temporary points of advantage." 18

This concept differs significantly from traditional concepts of domain superiority that focus on gaining and maintaining superiority over broad swaths of battlespace for longer periods of time. Just as the Air-Sea Battle team noted, this shift in thinking "acknowledges that a joint or combined force may not be able to achieve either theater-wide domain superiority or an enduring and constant superiority, but that it can achieve operational objectives with control that is limited in time or space." Success in future operations will likely reside in a force's ability to create precision access in one or multiple domains to enable effects and achievement of objectives in others. One of the superiority of the s

Increased Emphasis on Speed

The fleeting and often opportunistic nature of this new environment places increased emphasis on the speed of MDO. The Chief of Staff of the Air Force underscored this point at a recent panel on multidomain battle, stating that speed and multidomain maneuver at a pace the enemy cannot keep up with "is a defining concept for multi-domain operations." Success will likely be found by the force with the ability to create and act on fleeting opportunities the quickest, making the OODA competition between opposing forces even more intense.

Emphasis on Lower-Echelon OODA

The likelihood of disrupted communications in a contested battlespace combined with the focus on creating opportunistic advantage increases emphasis on the OODA cycle at lower echelons of action. MDO expertise, authority, and capability must exist at the component-level and below to enable cross-domain actions that support commanders' intent and schemes of maneuver.²² Jeffrey Reilly again highlights that, "the requirement to think across domains is occurring at increasingly lower levels and will be essential in the future to generating the tempo critical to exploiting fleeting local opportunities for disrupting an enemy system."²³

More Possibilities in More Domains Means Increased Complexity

The emerging battlespace has three key characteristics that create a far more complex operating environment. First, the addition of cyberspace as a new human-constructed and changeable domain offers new possibilities to impact operations within cyberspace as well as in all other cyber-connected domains. Second, advances in technology have created new possibilities for maneuver and action in space as well as throughout the electromagnetic spectrum. Finally, advances in technology are also increasing physical and virtual connection within and between traditional maneuver domains, creating more cross-domain options. Combined, these three characteristics lead to an increasingly complex battlespace with exponentially more combinations of opportunities and risks for war fighters to identify and consider.

Observing and Orienting for MDO

If the multidomain context is, as described above, characterized by increased complexity and speed then, to out-maneuver adversaries, there will be far greater emphasis on warfighters' ability to first out-observe and out-orient them. Further, this calls for a corresponding change in the *way* war fighters observe and orient themselves to the battlespace. As William Dries, an Air Staff strategist working on MDO, notes, "the ability to understand an enemy's activities. . . in multiple domains with speed and agility is the key to all of this."²⁴ The following sections outline the enduring foundations of observing and orienting, as well as the new requirements and implications placed on both to create an advantage in a fast and complex context.

Foundations of Observing and Orienting

Observation is the ability to perceive things and activities that have potential significance. According to Boyd, observation is fed and influenced by unfolding circumstances, outside information, interaction with the environment, and iterative interaction with the orient-decide-act components of the OODA Loop.²⁵ Observation, in turn, feeds the war fighter the information necessary to orient: the interactive process of cross-referencing projections, empathies, correlations, and rejections that is shaped by and shapes the understanding of the battlespace.²⁶ Orienting is, as

Boyd describes, the most important part of the OODA Loop, the Schwerpunkt that "shapes the way we interact with the environment," as well as "the way we observe, the way we decide, and the way we act." Without it, "there is no command and control worthy of the name." ²⁸

Enduring ISR principles further build this foundation. While many experts and organizations have developed exhaustive lists of important principles that apply to ISR, a set of core and enduring principles can be distilled for utility in the MDO discussion. Primary among these are:

- 1. Perspective—the ability to see and understand the competition and battlespace from others' perspectives, including partners, nonplayers, and the adversary,
- 2. Objectivity—recognizing and counteracting biases to remain intellectually transparent and honest,
- 3. Integration—information where and when it is needed,
- 4. Context—aggressive collection and sourcing of information to provide multiple vantage points, enabling the analysis and cross-referencing required to increase breadth and depth of understanding.²⁹

In turning this toward practical application, the Core ISR Tenets described in *ISR* 2023 provide an additional useful piece of this foundation.

- 1. ISR is indivisible—effects depend on ISR synchronization and integration.
- 2. ISR is domain-neutral—focused on capabilities and effects, not platforms.
- 3. ISR is operations—not solely support to operations.³⁰

Requirements for Multidomain Observing and Orienting

Examining the emerging multidomain context through the lens of the foundation provided above, requirements for future observe and orient activities start to become discernible. Aggressively sourced information that provides perspective and objectivity, integrated at the right time and place must now flex to: feed opportunistic cross-domain maneuver via pockets of domain superiority created and exploited at all echelons, at speeds that outpace adversaries' ability to build awareness and respond. To meet these demands, ISR forces must be able to identify cross-domain opportunities and vulnerabilities, leverage increasingly vast amounts of data to provide clarity in complexity, and provide broader awareness to a more diverse set of actors.

Identify Cross-Domain Opportunities and Vulnerabilities

To feed multidomain maneuver, ISR must be able to identify cross-domain opportunities and vulnerabilities, recognizing and correlating capabilities, connections, and patterns in a more complex and interconnected operational environment. This means observing the battlespace in greater depth and breadth to have enough puzzle pieces to configure and reconfigure to create opportunity or discover vulnerability. If,

as the JCEO describes, future forces will need to "employ opportunistic, unpredictable maneuver, in and across multiple domains," then their OO functions must be able to identify these fleeting cross-domain gaps and opportunities faster than the adversary can discover and close them.³¹

Sense-making in Complexity and Among Voluminous Data

Observing and orienting for success in MDO will require the ability to make sense of a more complex battlespace with vastly growing volume and variety of data. This places an even greater emphasis on orienting in particular and the ability to fully translate increasingly vast data into insight relevant to commanders' vision, intent, and objectives. The JOAC's call for the joint force to be able to "collect, fuse, and share accurate, timely, and detailed intelligence across all domains," barely scratches the surface on the depth of what this requirement really means. It is a demand for a far more sophisticated ability to, as Boyd described, analyze and synthesize "across a variety of domains" to "evolve new repertoires to deal with unfamiliar phenomena or unforeseen change." This means that to create the "mental. . . patterns that match with activity of the world" in this new multidomain context, OO functions must be able to make sense of increased complexity and data volume.

Broaden Awareness at All Decision Levels

To create cross-domain synergy at increased speed and at lower echelons, broader awareness of activities, risks, and opportunities in and between domains becomes a necessity from the joint force commander (JFC) down through components and tactical forces. To maneuver in multiple domains, war fighters must be more fully aware of the interconnected domain space their forces operate in and the opportunities that present themselves or can be created. This awareness needs to be available at the same speeds and fidelity as higher echelons to afford forces the ability to disperse to avoid A2/AD threats and then re-concentrate rapidly to exploit opportunity. With this sort of breadth and depth of access to facilitate multidomain OO, actors at all levels will be able to, as Boyd describes, "exploit lower-level initiative yet realize higher-level intent."

Implications for the ISR Enterprise

The evolving battlespace demands and OO requirements outlined above build toward an inflection point for the ISR enterprise. New multidomain challenges and opportunities are beginning to present themselves, but existing ISR tools, organizations, and concepts are not postured to engage them. The positive news is that new and developing ideas within industry and the ISR community provide a useful foundation to build from. Many of these ideas and tools emerging in pockets of innovation can be refocused and tied together to begin to meet the MDO challenge. Just as early aircraft changed how military forces observed their battlespace, providing awareness far beyond the perspectives of ground and naval forces, these new

concepts and capabilities are putting an ISR paradigm shift in sight, one that can provide a more holistic understanding of the complex multidomain battlespace.³⁷ It is a paradigm shift with, as the Air Force lead for intelligence analysis highlighted, broad implications for "what we collect, how we process it, how we analyze it, and how we connect to the operators, platforms and staffs that need that information."

Rethink the Battlespace

First, it is essential to rethink the battlespace itself, re-conceptualizing it as a layered and interconnected multidomain maneuver-space. This interconnected continuum of domains contains innumerable new maneuver options that are not sufficiently captured through traditional, often stovepipe OO constructs. Within modern military operations exists a tight interdependence between individual domain functions. Being able to discern and visualize the layers, interconnection points, and dependencies will provide the sort of battlespace understanding that enables multidomain action.

Rethink Actors and Activities

To achieve success in a multidomain competition, ISR professionals must also rethink their conception of activities and actors within the battlespace. Instead of focusing on one dimensional targets with narrow activity sets, ISR must hunt targets as multidomain systems with exploitable interconnected surface area. Further, it must have a broad baseline understanding of the multidomain environment to detect anomalies and be able to observe and orient off the series of interconnected activities that relate to a particular behavior or actor. Most current ISR constructs stovepipe their questions and focus, narrowing collection and analysis, resulting in missed opportunities and vulnerabilities.³⁹

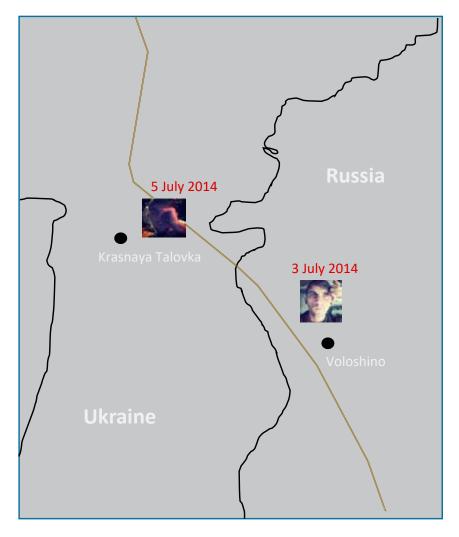
Recent developments in ISR methods and technology provide the practical foundation to realize this necessary perspective shift. The advancement of object-based intelligence (OBI) and activity-based intelligence (ABI) concepts, in which intelligence work is organized around the person, place, or thing being studied along with its associated activities vice any particular organization or collection system, enables the more holistic OO that MDO requires. ⁴⁰ Instead of interpreting a snapshot image to discern a narrow amount of information, an MDO ABI approach would focus on understanding what is happening with the person, place, or thing studied and how that activity and its interconnected elements and environment change over time. ⁴¹ The ISR paradigm shifts from simply identifying enemy capabilities and estimating motivations, to assessing a changing battlespace and its impact on operations. ⁴²

Change How We Observe the Battlespace

Decisions that drive MDO demand new information and awareness that necessitate a corresponding change in how we observe the battlespace. In order to quickly identify and leverage opportunity for cross-domain maneuver and effects, future

ISR operations should involve collecting broader information across all domains. More specifically, MDO requires greater data volume, variety, and velocity derived from more sources.

Increased interconnectivity between domains means actors and activities in one domain are more likely to appear with exploitable surface area in others. For example, during the 2014 Russian seizure of Crimea, the lack of traditional telltale signs of invasion surprised intelligence analysts. ⁴³ While Russian soldiers obfuscated their traditional visual and EMS signatures, where ISR was postured to look, they interestingly began showing up prominently in cyberspace on social media sites including Twitter, Instagram, and the Russian version of Facebook.



Russian soldier Alexander Sotkin's Instagram posts revealing clandestine movement into Ukraine

Of course, this kind of exposure is not limited to Russians in Crimea. Private citizens are publishing volumes of information revealing military activities, from spy ship tracking to missile launch details.⁴⁴



Twitter feeds publishing locational data on military assets and activities

The power of these sources was demonstrated recently when amateur analysts published a minute-by-minute account of the combined US-UK-French strike on Syrian chemical weapons facilities as it was occurring. The details released via Twitter updates included tanker support tracking, strike aircraft routes, and ISR aircraft positions.⁴⁵

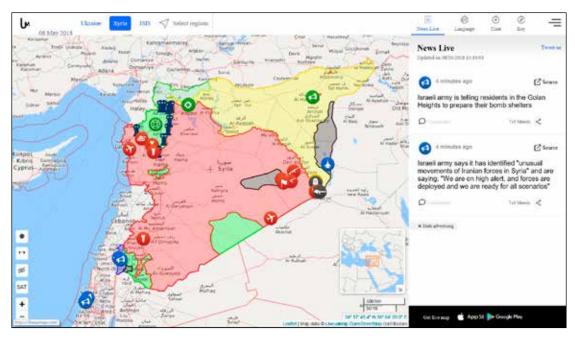
Further, developing the kind of awareness that enables quick multidomain action requires continuous collection that not only feeds characterization of actors and activities but of the multiple environments that make up the multidomain battlespace as well. Continuous sensing across domains enables quicker identification of multifaceted patterns and anomalies that lead to speedier identification of opportunities to exploit and vulnerabilities to address. Additionally, increasing data sources and types provide analysts the ability to correlate and cross-verify, ensuring increased veracity of conclusions. It also enables big data reliant methods such as OBI/ABI to perform better with increased volume and variety. As noted in the *JOAC*, this requirement of broader and continuous collection has implications for "steady state sizing, systemic capacity, and analytic technologies of intelligence forces." ⁴⁶

To accomplish this, the type of sensors employed and even what constitutes an ISR platform must fundamentally change. In contrast to ISR platforms equipped with narrowly focused sensor suites, observing for MDO requires sensor systems capable of collecting broader types of data. It also demands shifting to an "everything a sensor" model in which every asset, regardless of primary purpose, can simultaneously act as sensor platforms. Every friendly point of presence is also an access point into the battlespace that can be leveraged for collection and, if needed,

as a pivot point for potential multidomain maneuver. As Gen Carlton Everhart highlighted during a discussion on air mobility assets, "we need our aircraft to be sensor platforms that can gather and securely communicate information."47

This does not mean scrapping the charge to develop ISR sensors and systems designed to penetrate and survive in high-threat areas.⁴⁸ These are still critical to acquiring data that would be otherwise impossible to reach. The end result will look similar to a multidomain crowd-sensing effort similar to commercial products like Waze. Every platform and point of presence should be an ISR contributor, an element of a larger intelligence collection network composed of interlinked sensors across all domains.

Further, this approach to collection demands a more prominent role for opensource data. As Col Sean Larkin noted in Foreign Affairs, "over the next decade, the market-driven explosion of surveillance sensors and data analytics will bring an unprecedented level of transparency to global affairs. . . offering inexpensive and automated reports on everything from crop yields to military activity."49 Dr. Jon Kimminau describes how "the foundation of knowledge we need. . . can come from Open Source," freeing more exquisite sensors to collect less accessible data.⁵⁰



The openly available LiveUAmap's coverage of conflicts in Syria and Crimea produced information that often rivaled classified sources and methods. (Reprinted from image of map of Syria to illustrate unknown aircraft in News Live, accessed 14 May 2018, https://syria.liveuamap.com.)

Change how we derive understanding from observation

With new demands to understand more detail on more aspects of the battlespace and activities within it, the challenge then becomes deriving understanding from observation that produces vastly increased data velocity, variety, and volume. This challenge is at the heart of multidomain orienting and requires a significant shift in analysis to produce decision-level understanding without proliferating a multitude of systems that only bury users in data.⁵¹ Fortunately, this is another area where intelligence professionals can adapt recent initiatives in data analysis tools, technologies, and concepts.

First, the current DOD and broader intelligence community efforts to adopt a bigdata approach must be redoubled and steered to facilitate multi-domain awareness. Shifting to a big-data construct is ideally suited to the MDO challenge in that it is designed to derive deeper understanding in greater interconnected complexity with vast data volumes and types. As Dr. Kimminau again highlights, increasing data types and volumes should enable cross-domain thinking.⁵² In fact, even with "dirty" or raw unprocessed data, a common concern of many ISR professionals regarding big data, these new analytic approaches are proving able to better discern activities or opportunities that analysts did not know to look for in the first place.⁵³

Second, artificial intelligence (AI) and machine learning must be further invested in and integrated to provide the speed of analysis in complex interconnected environments to out-orient adversaries at the operational and tactical levels. The multidomain battlespace will increasingly overwhelm existing analytic approaches that primarily rely on human and "brute force" computer analysis. At the same time, advances in commercially developed AI, such as IBM's Watson, are capable of leveraging vast data to learn and develop, as James R. Clapper described, "a beautiful intuition" that can identify and even predict the sort of opportunities and vulnerabilities that enable MDO.⁵⁴

Additionally, AI can further accelerate analysis by quickly translating raw or unstructured data into a more useable form. For instance, AI is proving increasingly proficient in deriving data within raw data, structuring it to become useable by follow-on analytics. A recent example that highlights the utility of these advances is found in a Google team's research on Convolutional Neural Networks' ability to learn, identify, and catalogue objects or activities in video and audio data. Cuickly deriving and structuring useful data embedded within other data is critical to maximizing the possibility of finding multidomain opportunities and vulnerabilities, enabling tighter and truer orienting. As the previous Deputy Secretary of Defense noted, "the Department of Defense must integrate artificial intelligence and machine learning more effectively across operations to maintain advantages over increasingly capable adversaries and competitions."

Change How Users Interact with the Observe and Orient System

Changing the OO paradigm and supporting system to enable MDO creates new opportunities for decision makers at all levels in how they engage that system. In particular, the technologically and conceptually complex system described above

requires a new approach to crafting and translating critical intelligence requirements to drive collection and analysis. Further, decision makers at all levels will add to and shape the system in real-time as participants, not just receivers.

For this new system to perform, the ISR enterprise must build the connective tissue between decision makers' information needs and the complex analytic system that supports them. This connective layer must perform dynamic mission data science (DMDS) to translate information requirements into analytic models and algorithms that can adapt to meet the demands of an evolving battlespace, enabling true multidomain awareness and prediction. To achieve this higher-order predictive analysis that tightens the OODA loop in multidomain complexity, there must be people in place who understand the requirements and how to dynamically craft the analytic tools to get there.⁵⁸

Further, the DMDS function must exist broadly across the operational force to enable multidomain action at all levels of decision and execution. The same data and analytic expertise that provides operational-level insight to JFCs can be leveraged to quickly identify or predict opportunities and vulnerabilities at the tactical level. Different algorithms can be crafted and run on the same data to serve different perspectives and needs. As Vice Adm Jan Tighe notes, it is critical to "more rapidly update, modernize, and customize our applications inside their actual environment with the end-user community fully embedded in that journey." To achieve OODA advantage across a continuum of domains at each level, ISR data science functions must be embedded with each of these end user perspectives.

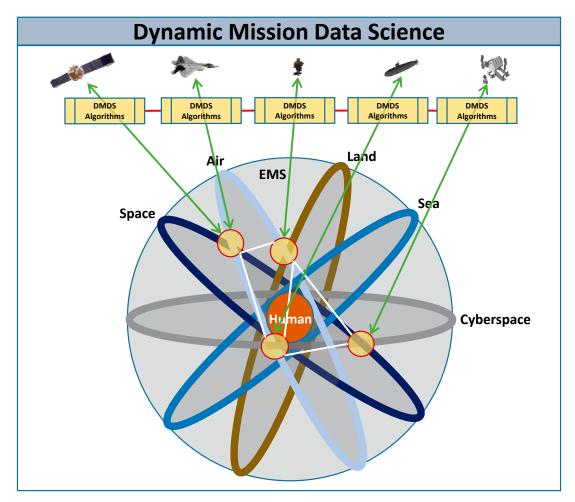
In addition to connecting with the OO system through a DMDS layer, decision makers and operators will also interact directly with the system to further orient and sharpen collection and analysis. In its simplest form, it is similar to how companies like Amazon leverage consumer interaction with their system to generate more data to analyze and determine how to shape what it produces to best fit the user's needs. In this construct, decision makers are more than users of information, they are participants in the data analytics. ⁶⁰

Change How We Architect and Evolve the ISR System

The system that begins to take shape in the descriptions above points toward a change in how the ISR enterprise is designed and, probably more importantly, how it is quickly evolved. The shift toward MDO is largely technology driven and, as such, advantage can be lost just as easily as it is won when adversaries integrate the next technological development that provides it an edge. Because the majority of information technology development is led by private industry, the US must reshape its acquisition model to enable broader and faster partnership with industry. The current infrastructure model and acquisition processes do not allow for the speed required to consistently evolve ahead of threats.

The future ISR infrastructure must be an open architecture system that maximizes interoperability between services and partners, as well as the ability to quickly integrate new capabilities from across industry. It must be based on the same common industry standards that allow the quick evolution and integration of new and

disruptive technology in the commercial world. In a battlespace where speed and broad interoperability translate to significant advantage, proprietary developments by a handful of defense contractors is increasingly a national security liability.



Leveraging Dynamic Mission Data Science to conduct multi-domain maneuver, enabling asymmetric advantage that outpaces adversary observe, orient, decide, and act capabilities

An open architecture platform makes it simple to agilely adapt and leverage new sensor or analytic advances as soon as the industry develops them, keeping the ISR enterprise on the technological edge at less cost. A competitive advantage in a complex multidomain battlespace will be achieved by whomever can first leverage developments that drive faster, more capable OO operations: machine learning, cloud analytics, human-machine teaming interfaces, supporting information infrastructure, and so forth.

Further, an open architecture makes possible the degree of interoperability required for interservice and interpartner effectiveness in a multidomain environment. The current architecture, built over decades of individual service initiatives that created proprietary products, hinders or precludes interoperability between domain operators, and thus the true Joint operational flexibility required for multidomain advantage. As a recent *C4ISR* article describes, "the idea behind an open-systems architecture is to create opportunities where you don't have stovepiped, proprietary systems that don't allow for things to plug in." An open architecture system ensures not only that the ISR enterprise can iterate with industry faster, but that it will more easily interconnect across all domain operators and international partners.

Success in a multidomain environment also depends on the ISR enterprise's ability to eliminate stovepipes. At the very heart of the MDO concept is the need for quick maneuver or action between domains. The supporting OO system cannot have barriers in place that prevent or slow the identification of multidomain opportunities or vulnerabilities. The effectiveness of a big-data approach, for example, relies on its ability to leverage disparate multidomain data to correlate opportunities and build a more holistic awareness.

At the information infrastructure level, this means breaking down stovepipes between services and agencies, as well as the types of collection (signals, human, imagery, open source, and so forth). Currently, every type of intelligence is stovepiped, often with separate information environments, and even within each there exist sub-stovepipes of more specific types of collection. Breaking down these stovepipes is critical to transitioning to become data-focused and will require a reexamination of current classification, access, and data sharing protocols. Access

Change How We Organize to Orient

This re-examination also calls for a change in how the analytic force is organized, moving further toward a sensor agnostic, collaborative, and data science focused force. The goal is to move away from stovepiping thought or data access in a way that limits analysts' ability to identify multidomain opportunity and vulnerability. For the DMDS layer described above to operate effectively, teams composed of analysts, data scientists, and programmers are required at each of the decision-making levels and perspectives. DMDS teams must be present at the unit level to develop and dynamically modify models and tools that feed tactical decisions for ground, air, space, cyber, and maritime operators. These teams must also be present at the JTF and component levels to develop and dynamically modify the models and tools that feed operational decision making. Further, this analytic force arrayed at various levels and perspectives should not be hindered by organizational boundaries to collaborate, enabling an adaptive approach based on a more open organizational construct.⁶⁴

Fortunately, if a cloud-based infrastructure that eliminates stovepipes and enables a true multidomain big-data approach is meaningfully implemented, there will not be a need to expand the ISR workforce. Currently, a majority of the ISR workforce is engaged in time-consuming data-processing functions. Leveraging AI and big-data analytics to increasingly conduct data processing functions potentially

liberates thousands of minds to work on analytics. ⁶⁵ As Vice Admiral Tighe again points out, the Navy's migration to cloud-based architectures, both ashore and afloat, will "enable analytic environments and battle management decision aids that reduce the dependency on our people for tasks that can be automated and free up our analysts to go further, faster in a human-machine teamed environment." ⁶⁶

Conclusion

The development and proliferation of advanced technology are once again changing the battlespace and shifting the character of conflict away from what the US military has prepared for. Still in development, the MDO concept proposes a better integration of capabilities across all maneuver domains to overcome challenges that increasingly defy current operational concepts. Although MDO is not a new idea, its emerging shape places new demands on the joint force that have fundamental implications for how it observes and orients itself. MDO will require re-conceptualizing the battlespace, how we derive understanding, reshaping approaches to constructing and organizing ISR, and new ways of using and interacting with the ISR enterprise.

More than 30 years ago, Boyd expressed the need to simultaneously "generate many different possibilities as well as rapidly implement and shift among them" to outmatch adversaries. The MDO concept is built on the idea that these possibilities are exponentially increasing in number as interconnectivity between domains, both physical and virtual, continues to grow. Without the ability to observe and orient to these new combinations of possibilities, however, MDO will remain out of reach. Just as ISR shapes and drives decisions and actions, ISR professionals are now in a position to develop a multidomain OO construct that shapes and drives multidomain warfare from concept to practice.

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Preparing for Multidomain Warfare

Lessons from Space/Cyber Operations

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merica is under attack. The enemy has jammed signals from the Global Positioning System (GPS), limiting unmanned aerial vehicle support and precision air strikes. Satellites are blinded by ground-based lasers, preventing actionable intelligence on enemy maneuvers within denied areas and degrading threat warning capabilities. At home, cyber intrusion threatens America's critical infrastructure that supports satellite command and control (C2) and cripples in-theater satellite communications, putting deployed naval strike groups at risk. To complicate matters further, news outlets report on the attacks with information that defense officials know not to be true. Yet this misinformation sparks outrage from the American public and encourages hasty decisions by lawmakers. America is under attack, and all this happens without a single kinetic strike.

These events describe a potential scenario in the next Great War. How could America get to this point? For years, we have achieved national objectives through military operations other than war. Such activities were focused on nonstate actors like Al-Qaeda, Islamic State in Iraq and Syria (ISIS), and Al-Shabaab. Yet as war fighters integrate joint capabilities to defeat extremists, nation-states are learning from the success and failures not only of our military activities, but also those actions performed by our enemies. This makes them more capable in challenging American interests, and curtailing our war-fighting advantage.

How do we prepare our military to meet the challenges of this evolved adversary? In a 2017 letter to Airmen, General Goldfein stated that to counter this adversary, we must enhance multidomain C2.¹ He tasked Brig Gen B. Chance Saltzman, a space weapons officer, to lead Air Force efforts toward multidomain solutions. Since then, much progress was made, yet even with progress it is going to take time before we see significant change across the Air Force. To help speed the enhancement of multidomain C2, tactical leaders, such as those at or below squadron levels, should cultivate multidomain thinking in their units. Leaders at the tactical level should consider employing the following steps in shaping their environment for multidomain C2:

- 1. Know your domain, and know it well.
- 2. Identify and collaborate with tactical mission partners in other domains.

- 3. Train and exercise multidomain approaches.
- 4. Document lessons learned.
- 5. Apply multidomain lessons in agreements, plans, and tactics.

These transferable steps have helped enhance multidomain C2 at the tactical level. But before this discussion dives right into the five steps, I want to add context to their usefulness and review why multidomain C2 is the solution for preparing our nation for the next Great War.



Courtesy of Wayne Clark

Gen David L. Goldfein, USAF chief of staff, speaks at the February 2018 Air Warfare Symposium.

A Smarter Adversary Requires an Improved War-fighting Approach

President Donald J. Trump's first *National Security Strategy* reminds us that America "faces an extraordinarily dangerous world, filled with a wide range of threats that have intensified in recent years." Whether a nation-state, an extremist group, or even a lone wolf, the enemy of today is smarter than ever before. As American national power evolves, our adversaries continue to challenge us in each of the diplomatic, informational, military, and economic sources. For example, on the economic front, extremists have learned that sustained threats against a nation can deter investors and disrupt productivity. On the diplomatic and information fronts, noticeably absent from accords on cybersecurity and intellectual property rights, are those countries that are active in cybercrime and cyber espionage against the US. On the military front, years of budget cuts and fiscal uncertainty have compli-

cated and impeded military solutions to these evolved threats.⁵ Russia is using false information to influence elections around the world, hacking into American information systems, and violent extremists are using social media to promote their causes.⁶ If we want to be successful in keeping the peace and be ready for the next Great War, our operational art must confront this smarter adversary using multidomain approaches.



Courtesy: Scott Ash

Gen John W. Raymond, Air Force Space Command (AFSPC) commander, testifies with the Secretary of the Air Force and Chief of Staff before the Senate Armed Services Subcommittee on 17 May 2017.

Multidomain approaches at the tactical level involves the lowest warfighting echelon taking advantage of secondary domains—land, sea, air, space, or cyber—to deliver effects more effectively across their primary domain. At the operational level of warfare, they will help provide a greater level of synergy, bolstering solutions to complex matters such as antiaccess and area-denial problems presented by Russian and Chinese military capabilities.⁷ The Army called warfare that uses this approach "multi-domain battle," and suggests it enables the projection of "combat power from land, and into other domains to enable joint force freedom of action." The Marine Corps also highlights the necessity of exploiting all domains, as doing so increases maneuvering capabilities and combat effects. In concert, the Navy is exploring inno-

vative ways for employing land forces from other military branches to secure access to shared domains—particularly those within the Pacific area of responsibility.¹⁰

For Airmen, multidomain operations are by no means new to Air Force culture. Our service was born from airpower's promise of combat effects that could enable more effective maneuvers on battlefields ashore and combat areas at sea. Over the years, Airmen have studied ways to employ airpower in ways that it drives desired effects in other domains. Before World War II, Airmen at the Air Corps Tactical School developed theories for employing airpower that were key to defeating Hitler. A little more than 40 years after we became an independent combat force, the Air Force developed an evolved operational strategy drawn from years of airpower experience, and employed a new strategic attack strategy during the first Gulf War. Much of that strategy was a result of the theories offered by Col John Warden, who advocated an approach that visualized the enemy as a system, where simultaneous offensive fires (by combined arms) on various components delivered synergistic effects across the entire social and military system.



Courtesy of USAF

Air Force fighter aircraft fly over oil fields during Operation Desert Storm.

With this new strategy, the Gulf War became a watershed moment for airpower advocates. Not only did the air campaign validate the efficacy of modernized strategic attack, it is considered the first major conflict in which space played a vital role. Under the leadership of Lt Gen Thomas S. Moorman Jr., AFSPC commander

at the time, space war fighters around the world proved that they knew their domain and delivered effects from space that made the success of strategic attack possible. During a 1991 presentation at an Air Force Association chapter in Minnesota, General Moorman proudly acknowledged that in Desert Storm, "space owned the battlefield. We had a robust on-orbit constellation and the inherent spacecraft flexibility to alter our operations to support specific needs of the terrestrial warfighter." Although we demonstrated how multidomain employment of airpower can achieve strategic objectives in the first Gulf War, the Air Force continued to improve its ability to operate using multidomain approaches, driving even more operational successes as seen later in Operation Inherent Resolve. ¹⁵

As the conflicts in Iraq and Afghanistan evolved, America's grand strategy pivoted toward Asia. Russia, China, North Korea, and others were keen observers of US military engagement in the Middle East and did not want to suffer the same fate. Their efforts to counter American military effectiveness seemed deceptively simple: deny America's ability to project power to the battlefield. However, we did not sit idly by and allow the adversary to prevail with such antiaccess/area denial strategies. When the Air Force and Navy experimented with air-sea battle, it improved our ability to employ airpower using multidomain approaches. Yet its inherent weakness was in the fact that the concept focused primarily on combat operations across the air and sea domains, rather than across air, space, cyber, land, and sea domains. Nevertheless, experimenting with air-sea battle helped the services relearn the value of joint force integration, resulting in a "Joint Concept for Access and Maneuvering in the Global Common."

As a service with significant responsibilities in three war-fighting domains (air, space, and cyber), Airmen play a vital role in this joint concept. However, we should not consider such concepts at just the operational and strategic levels, we must also consider them at tactical levels. To evolve airpower thinking toward multidomain solutions more effectively, Airmen should observe the lessons from natural multidomain packages, like those found in the space and cyber mission areas. After all, America's increasingly integrated joint fighting force relies heavily on the decision advantages and deep reach provided by the multidomain effects delivered through space and cyber capabilities. Almost 20 years ago Colonel Warden predicted, "Information will become a prominent, if not predominant, part of war to the extent that whole wars may well revolve around seizing or manipulating the enemy's datasphere." As a key architect for the airpower strategy in the Gulf War, he also predicted that although information was not a prominent part of warfare at that time, it would be. He was right.

Today, space and cyber capabilities support every US military operation, providing significant combat and combat support effects that secure American interests around the world. Space and cyberspace capabilities are so integrated that they function as a multidomain package unseen and unappreciated by many until something interrupts the advantages they provide. The next Great War will likely involve extensive cyber campaigns and will likely extend into, or even start, in space. To be prepared, we should learn from space and cyber operations and use those lessons to shape the environment for multidomain C2.

Observations and Lessons from Space/Cyber Operations



General Goldfein receives a GPS mission brief from the 2nd Space Operations Squadron.

Tactical space operators enable multidomain solutions and help to assure joint operations worldwide. Tactical space operators located around the world command and control their assets in a way that enables the free flow of effects from their space systems. During Operation Iraqi Freedom, effects from communication satellites, such as the Mobile User Objective System, the Wideband Global Satellite Communications System, and the Military Strategic and Tactical Relay, were essential for effective military maneuvers on land, at sea, in the air, and provided the secure communications needed to coordinate synchronized tactical multidomain fires. Missile warning satellites, such as the Defense Support Program and the Space-Based Infrared System, offered a unique awareness of key areas. This afforded more time and space for decisions by commanders at all levels, and helped to counter Iraqi dictator Saddam Hussein's ability to conduct surprise movements. Even today, GPS helps guide American ships, aircraft, and troops to their objectives, and put the "smart" in smart munitions, enabling them to hit targets requiring high levels of precision. Data from signals intelligence and imagery satellites have the reach to fill critical intelligence gaps in denied areas that other air, sea, and land assets cannot observe without significant risk of interdiction or destruction.

Modern warfare has shown that a space capability, such as a satellite communications asset, can support tactical air control parties, provide links for armed unmanned aerial systems, facilitate in-flight retargeting of cruise missiles, enable rescue forces to talk to isolated personnel, and transmit sustainment instructions back to the US—all at the same time. In short, a small crew of space operators on watch commanding and controlling a single space capability have simultaneously brought both combat and noncombat support effects to a range of military operations around the world. These war fighters have proven their operational prowess again and again. From delivering space effects against enemies during the first Gulf War to using space in the fight against the Islamic State, Airmen operating space assets continue to drive operational success in all war-fighting domains. As such, any enemy that wishes to defeat American's military might would likely target space capabilities.

Adversaries are aggressively seeking counterspace capabilities to limit US war-fighting advantage. America's adversaries see space as a key enabler of combat action and thus have invested in counterspace weapons to seize the initiative seemingly at an increasingly faster pace. 20 One does not have to look far for examples of this. China is expanding its intelligence, surveillance, and reconnaissance capabilities while concurrently developing systems that could be employed to curb such advantages.²¹ In early 2017, a Chinese researcher was reportedly awarded a national prize for his work in high-power microwave technology, which could potentially be employed toward a wide range of enemy multidomain fires.²² Russia's development of laser weapons and kinetic kill capabilities is also threatening, as such weapons may possibly be used to blind imagery satellites or destroy them altogether.²³ As long as space remains a key enabler for combat effects across multiple domains, our adversaries will continue to look for ways to counter our space capabilities. In the next Great War, one could assume that the enemy will attempt to disrupt America's war-fighting advantage through offensive cyberspace campaigns on systems that enable space operations.

Like tactical space operators, tactical cyberspace operators provide and enable vital effects that shape the nature of military activities in all domains. Tactical cyberspace operators deliver combat and combat support effects by leveraging physical or logical computer networks, or by leveraging cyber personas. In physical networks, cyber operators can target information technology (IT) components that make up the network. IT hardware stored on aircraft, ships, satellites and data processing centers, or in the palm of a Soldier's hand, can be key physical network targets that can be exploited through various technical means.²⁴ Within logical networks such as websites, SharePoint, or the "Cloud," cyber operators can maneuver across domains to deliver fires on selected targets. Offensive actions conducted in the logical network could render systems inaccessible, denying war planners and operators access to essential mission data and communications. Access points in the logical network can also be leveraged to target physical network systems, bringing down IT hardware and leaving a technology-dependent unit nonmission capable. Virtual identities, or cyber personas, can be targeted to gain access to the physical or logical IT layers. A stolen virtual identity can give an adversary access to

personal computer systems and personal information, or even to the target's physical work spaces.

With enemies poised to use cyberspace as the means to attack America, or challenge American interests, tactical cyber operators remain combat-ready. Although rarely discussed in the open, these war fighters have employed options to achieve national security objectives. They have monitored the cyber environment as Russia asserted aggression against Ukraine, and are working with other US government entities to defend the US homeland against cyber attacks from Russia, China, and other entities capable of malicious cyberspace behavior. ²⁵



Source: Defense Visual Information Distribution Service

Cyber Airmen in the 175th Cyberspace Operations Group

Adversaries see cyberspace as an effective means to challenge American interests. As cyber attacks on America become more frequent, one could wonder if the enemy is actually conducting live fire training events in preparation for attacks on more sensitive targets. For instance, when North Korea executed offensive cyber campaigns against Sony in 2014, it compromised more than 3,000 computers, 800 servers, and a huge amount of data, including the personal information of employees. In another attack in May of 2017, the ransomware known as WannaCry infected hundreds of thousands of Microsoft Windows operating systems in more than 150 countries. This particular attack targeted files, encrypted them, and held them hostage for money. In essence, this was a cyber equivalent of a worldwide

hostage crisis. Imagine if these attacks were on military capabilities or on the critical infrastructure of allied nations engaged as a coalition in armed conflict. Each offensive action reveals not just the civilian, but also the military threat, underscoring vulnerabilities of an IT-dependent interconnected society.

The nature in which cyber assures the space mission helps to highlight the efficacy of multidomain operations. In a February 2018 statement to the Senate Intelligence Committee, the director of national intelligence, Daniel Coats, confirmed that Russia and China are reforming military capabilities in a way to enable multidomain fires against US space systems.²⁸ With this, one could infer that Russia and China are considering offensive cyber tactics to disrupt space capabilities. This is a serious threat because although cyber attacks can threaten operations in all domains and in practically all aspects of society, the space domain is uniquely vulnerable to adverse effects on its cyber dependencies.²⁹ For instance, Soldiers, Sailors, Marines, and Airmen, once employed, have engaged in combat without the use of cyber capabilities. However, space operators have always leveraged cyber effects to deliver military success in, through, and from space. Satellites are useless without the cyberspace link that allows for the flow of data to and from them, or the processors that transform that data into meaningful information. Attacks on cyber systems could easily exploit the vulnerabilities of space activities, and could cause cascading events that limit the delivery of space effects, and reduce America's ability to meet its national security objectives.

We have seen evidence of this already. Between 2007–08, government officials suspected Chinese actors in hacking and taking control of two imagery satellites (National Aeronautics and Space Administration's Landsat-7 and Terra AM-1). During a congressional testimony, Dean Cheng stated that this incident, among others, suggests that the Chinese "are actively exploring vulnerabilities in space information systems." Chinese actors are also suspected in hacking the National Oceanic and Atmospheric Administration's weather satellite in September 2014. These are just a few of many incidents, and space and cyber Airmen are working hard to mitigate the apparent threat to defense systems.

Together, space and cyber operators provide vital advantages toward national security objectives. They make up an advantageous multidomain package and the enemy knows it. Actions by our adversaries suggest attempts to curb this advantage by challenging not only our space superiority, but our cyberspace superiority as well. The 2018 National Defense Strategy says it best: "today every domain is contested—air, land, sea, space, and cyberspace." As the enemy vigorously develops new capabilities to challenge US interests, their perceived emphases on being able to deliver multidomain fires illustrate America's need for strengthening multidomain C2.

Shaping the Environment for Multidomain Command and Control

Enhancing multidomain C2 requires deliberate action at the tactical level. At this level, planners and operators of one domain must have not only the skills to perform their own missions, but they must also understand how planners and operators of other domains assure or even challenge their mission accomplishment.

Building this knowledge at the lower levels can help enhance multidomain C2 at operational and strategic levels. Leaders at the tactical level should consider the following steps when shaping their environment for multidomain C2:

1. Know your domain, and know it well. To shape tactical environments for multidomain C2, we have to first know our domain and know it well. In any case, before one can consider synchronized tactical actions from multiple domains, we must first be experts in our primary domain. But this knowledge goes far beyond just job acumen. We have to recognize how our piece of the mission fits into the bigger fight. At the tactical level, we must understand how our actions enable operational objectives, and leaders must effectively communicate this understanding to those they lead. This helps Airmen be mentally ready to support units that operate in other domains.



Maj Hanif Flood talks with Air University (AU) about his experience in integrating space and cyber at the Space Symposium in Colorado Springs, Colorado, 18 April 2018.

For tactical space and cyber operators, they master their domain not only through local opportunities, but also through advanced education and training opportunities offered by the DOD, intelligence community, and various commercial vendors. For instance, within both the Advanced Space Operations School and the National Security Space Institute at Peterson AFB, Colorado, space operators learn how to better operate in their domain.³³ They also explore challenges and approaches toward space integration into joint operations at not just the tactical, but also at the operational and strategic levels. Within the Center for Cyberspace Research, cyber Airmen enhance their ability to, among other things, "plan, direct, and execute offensive and defensive cyberspace operations."³⁴ At AU, an increased focus on space, cyber, and multidomain C2 provides valuable training that is available to all Airmen, bolstering cross domain learning, and inquiry.³⁵

2. Identify and collaborate with tactical mission partners in other domains. Tactical leaders should identify units with missions in opposite domains, and then collaborate to ascertain possible cross-domain synergies that may contribute toward multidomain mission success. At times, this may be evident as the mission of some tactical units is to provide support to another. However when evaluating cross-domain synergies, leaders should meticulously understand how actions in one domain have the potential to impact the mission of a unit operating in another, positively or negatively. Then, those leaders should develop mission assurance tactics that improve the probability of operational success. With these tactics in place, leaders will help underpin the building blocks for multidomain C2, extending options available to the operational or strategic-level commander's battle management responsibilities.

Tactical space and cyber units continue to evolve, with many now presented to combatant commanders in a way that better enables collaborative partnerships with tactical mission partners from other domains. Some partnerships have been improved, in part, due to the establishment of the Space and Cyber Mission Force. The 2012 establishment of the Cyber Mission Force (CMF) by United States Cyber Command (USCYBERCOM) was designed to improve the organization of cyber forces, and better address cyber threats to US interests.³⁶ Air Force efforts, such as the Cyber Squadron Initiative, complements CMF concepts, building tactical cyber mission defense teams to better protect and defend the delivery of air and space power.³⁷ On the one hand, the Space Mission Force (SMF), introduced by AFSPC in 2016, focuses on advanced training that better prepares space operators to execute space war-fighting missions.³⁸ The SMF also adjusts the presentation of space forces to combatant commanders, enabling improved integration of tactical space capabilities into joint war-fighting campaigns.³⁹

Efforts within Joint Task Force Ares, a USCYBERCOM operation against the ISIS, can serve as excellent examples for how tactical units within the CMF use multidomain partnerships to enhance solutions at operational and strategic levels. ⁴⁰ Like fires from other domains, cyber fires must be coordinated with not just stakeholders at the strategic and operational levels but with tactical mission partners as well. ⁴¹ After all, we do not want to conduct offensive cyber operations on enemy networks if friendly forces are using those networks to achieve desired effects.

Multidomain partnerships leveraged by tactical space forces have also enhanced solutions at operational and strategic levels. At Schriever AFB, Colorado, unique partnerships between space, cyber, and ground support units have improved space mission assurance, directly contributing toward combat, and noncombat support effects in theater. These partnerships ensure that when deployed war planners reach back to the SMF, they receive tactical support from space experts ready to deliver space capabilities. For example, while US Central Command was planning air strikes against Syria after Bashar al-Assad once again deployed chemical weapons against his own citizens, war planners leveraged data provided by the SMF to develop space effects specifically designed to support the 14 April 2018 air strikes. This example, along with efforts within the CMF, highlight the value of tactical multidomain collaboration and their impact on contributing toward strategic and operational successes.

3. Train and exercise multidomain approaches. Tactical leaders should conduct joint training and exercises to strengthen multidomain options. When conducting such activities, leaders must be careful not to focus solely on refining tactics that work. Some of the best lessons can be learned when we stress our ability to operate when the probability of mission failure is high or even certain. Quality exercises evaluate the most likely and most dangerous enemy courses of action that can complicate efforts to achieve the objective. In other words, tactical leaders must exercise their ability to fight through the adversary's multidomain fires and win.

Training and exercising multidomain approaches can be challenging. A notional enemy during an exercise can declare victory early in the scenario if it successfully conducts offensive cyberspace operations or offensive space control against key blue force capabilities. Imagine an air campaign without the precision, navigation, or timing from GPS satellites, the vital intelligence delivered by space capabilities, or without capabilities we take for granted, like our desktop computers, phones, and yes, even the lights. Yet those are the type of scenarios we need in our exercises. Fortunately, we are making progress with exercising multidomain approaches. For instance, space and cyber incorporation into Red Flag, marking a significant milestone in 2016 when then Col DeAnna Burt was the first nonrated wing commander (50th Space Wing) to be deployed for the exercise.⁴⁴



Courtesy: David Salanitri

An Airman attempts to troubleshoot space systems on his F-16 Fighting Falcon during an exercise.

4. Document lessons learned. Building multidomain solutions to national security challenges takes careful observation, analysis, and then documentation of lessons learned. Yet documenting lessons from training and exercises are not enough; planners and operators must also learn from anomalies that drive maintenance actions or even maintenance actions that unfortunately drive anomalies. Sometimes the effects from those anomalies can mirror effects derived from adversary fires. Anomalies like this during peacetime operations can produce significant lessons that planners and operators can leverage for multidomain approaches during war.

Space and cyber units today are collaborating to better conduct multidomain operations. During my six years assigned at the National Reconnaissance Office (NRO), I witnessed the evolution of tactical space/cyber integration and had the honor of helping our airmen become better multidomain warriors. In a speech at the 34th Space Symposium, NRO Director Ms. Betty Sapp highlighted how partnerships with the Air Force allow touch points and opportunities like never before. She echoed comments by General Goldfein and General Raymond by mentioning that our adversary is evolving, and we have to move fast and learn fast. The increased focus on partnerships between tactical space and cyber units at the NRO and across AFSPC have produced valuable lessons that allow better employment of air and space power.

5. Apply multidomain lessons in agreements, plans, and tactics. Leaders at the tactical level should apply multidomain lessons by codifying them into their local agreements, plans, and tactics. This is probably the most challenging step, as current operational needs tend to out-prioritize administrative functions, and typically the momentum for change has a short lifespan. However if we do not apply these lessons, we may jeopardize progress toward better tactical multidomain operations. We have to overcome the tendency to underprioritize this step, as application of such lessons can drive immediate improvements in multidomain efforts while the unit drives toward their mission.

Due in part to the fruitful collaboration between tactical space and cyber units across the NRO and AFSPC, these two space organizations have codified a series of strategic-level concepts of operations to better deliver on their respective missions in the national security space enterprise. Those concepts, born from multidomain partnerships, exercises, wargames, and experiments involving tactical units, help shape environments for multidomain C2. With the Air Force driving toward multidomain concepts, Airmen, like those in AFSPC and those assigned to the NRO, have stepped up to validate the efficacy of multidomain operations, contributing extensively toward the projection of multidomain airpower.

For years, effects from both space and cyber have been recognized as force multipliers; now they are considered war-fighting domains on their own. The enemy understands that America's military success depend on both space and cyber capabilities and have taken steps to curb the advantages those capabilities provide. With these five steps, tactical leaders closest to the fight can cultivate a multidomain mindset within their unit and help speed the enhancement of multidomain C2.

Concluding Thoughts and Recommendations

Multidomain operations are the solution to maintaining America's war-fighting advantage, and enhancing the multidomain approach at the tactical level will help prepare military forces for the next Great War. The space/cyber package is a natural multidomain option, but to offset the enemy's attempts to curb America's military advantage, Airmen at the tactical level must cultivate multidomain C2 in their own environment. Yet effective multidomain C2 goes far beyond just delivering effects across the military domains. It includes exploiting the capabilities of all government, commercial, and foreign entities willing to support America's national security objectives.

Although enhancing multidomain C2 starts at the tactical level, we still need to innovate and look for ways to improve multidomain thinking and application at the operational and strategic levels. If we want our Airmen to be successful in conducting multidomain operations, then we also need to develop multidomain capability areas that better organize, train, and equip tactical leaders for a multidomain conflict. For example, within AFSPC, space warriors are advancing toward a Space Enterprise Vision, which seeks to exploit such capabilities to succeed in multidomain warfare. As key enablers, cyber warriors are contributing to that vision. AFSPC is certainly contributing toward developing multidomain Airmen, and according to their vision, we can only expect that contribution to increase. However, we can always benefit from additional efforts that contribute toward the multidomain vision of future air and space power. Tactical leaders at or below the squadron level are key to making that happen.

Lastly, although there is an increased focus by senior leaders on space and cyber-space superiority, including breaking off space into a separate service and the evolution of cyber squadrons, we cannot lose focus on challenges that may threaten progress toward enhancing multidomain C2. Shortages in the pilot, space, cyber, and other key communities are concerning, as this doesn't just mean there are less Airmen to sustain their career field, but it also limits opportunities to evolve into a multidomain war-fighting force. After all, Airmen will continue to play a vital role in the CMF, and if directed, could also help shape a new military service for the space mission. Secretary of the Air Force Heather Wilson and General Goldfein are certainly the Airman's champions for these difficult issues, as evident in their many presentations to Congress. However, we need our national leaders to act on their call and provide the vital resources air, space, and cyber forces will need to be a dominant multidomain war-fighting package.

While the adversary explores ways to conduct multidomain fires to undercut our war-fighting advantage, we must explore ways to enhance multidomain capabilities. Without this, America will be at risk of strategic paralysis when confronted with widespread conflict. The five steps indicated above can help tactical leaders build a multidomain mindset to bolster multidomain C2, and help ensure America is prepared for the next Great War. \bullet

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An Ethical Decision-Making Tool for Offensive Cyberspace Operations

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Although international cyberspace espionage has been around for decades, offensive cyberspace operations (OCO) designed to create wartime effects are relatively nascent. The USAF added cyberspace as a domain in which it would "fly, fight, and win" to its mission statement in 2005, but the development of a sizable military OCO force in the US did not begin in earnest until the establishment of US Cyber Command (USCYBERCOM) in 2010. Meanwhile, only a few international examples of successful OCO integration into military operations have yet been made public. For example, OCO suppressed Syrian air defenses during the 2007 Israeli air strikes and coordinated OCO bolstered the 2008 Russian invasion of Georgia.¹ As USCYBERCOM reaches full operational capability, it is imperative that it conduct OCO, not only in accordance with international law, but also in an ethically responsible manner.

The most comprehensive study to date on the applicability of international law to cyberspace conflict is the *Tallinn Manual 2.0 on the International Law Applicable to Cyber Operations*, in which 19 legal experts under the direction of Professor Michael Schmitt derived 154 black-letter rules from existing law.² The legal experts reached a consensus on 108 of these rules, including some straightforward applications of the Law of Armed Conflict (LOAC) to civilian protections. Legal opinions were divided on the remaining 46 rules, 9 of which had significant aspects relevant to OCO but also eluded a majority opinion. This article recommends an ethical decision-making tool for OCO and uses those contentious nine legal rules from the *Tallinn Manual 2.0* as example cases to consider ethical and sustainable norms in cyberspace.

Ethical and Legal Norms for Offensive Cyberspace Operations

The first ethical analysis of OCO by a moral philosopher was by philosophy professor Dr. Randall Dipert in 2010.³ In his work, Dipert articulated three of the most challenging aspects of OCO: operations can be nonattributable, defenses are expensive and failure-prone, and there are no rare or exotic components in OCO weapons

that could inhibit their proliferation. Dipert also argued that existing international law and Just War Theory do not straightforwardly apply to OCO. Militaries can dramatically weaken opponent forces using OCO without necessarily causing death or permanent property damage, and thus circumvent the *casus belli* of traditional Just War Theory. Most importantly, Dipert predicted a long period to come of "low-level, multilateral cyberwarfare, a Cyber Cold War, as a game-theoretic equilibrium is sought."⁴

Dr. Brian Mazanec, a defense and strategic studies professor, came to a similarly bleak conclusion in his rebuttal to optimism about international cooperation and order in cyberspace: "norm evolution theory for emerging-technology weapons leads one to conclude that constraining forms for cyberwarfare. . . may never successfully emerge." The principal actors for OCO include the US, China, and Russia, none of which consider the emergence of constraining norms that would curtail sovereign options to be in their self-interest.

Russia and the US appear to be trending toward a consensus that OCO: (1) should never deliberately harm civilians and civilian infrastructure, (2) should be directed at legitimate military targets with the aim of minimizing collateral damage, (3) are equivalent to kinetic attacks of equal harm, and (4) is constrained by the principle of economy of force. Unsurprisingly, these rules also appear in the *Tallinn Manual* 2.0 with substantial legal expert consensus.

Perhaps no legal area concerning OCO is more contested than that of jus ad bellum (right to war), or what OCO actions could trigger armed conflict. While China and the US have officially agreed to "pursue efforts to further identify and promote appropriate norms of state behavior in cyberspace," a significant divide exists between the Chinese and US positions on OCO use of force.8 For example, the Chinese position is a strict positivist reading of the United Nations (UN) Charter's prohibition on the use of force, and in March 2017 the first official Chinese cyber strategy called on all states to avoid cyberspace militarization. 9 Conversely, the US position is that the "inherent right of self-defense potentially applies against any illegal use of force" (emphasis added). 10 The perspective of the Tallinn Manual 2.0 falls between the Chinese and US extremes concerning the use of force; the Tallinn Manual 2.0 reflects the position in the 1986 International Court of Justice case of Nicaragua v. United States that there is a difference between "use of force" as used in Article 2(4) of the UN Charter and "armed attack" that justifies self-defense under Article 51. 11 China, thus, rejects the Tallinn Manual 2.0 perspective as too permissive, and the US rejects the same perspective as too restrictive.

A compelling solution to the challenge of normalizing international OCO without imposing stipulations is to follow the successful example of how the 2009 *Montreux Document on Pertinent International Legal Obligations and Good Practices for States Related to Operations of Private Military and Security Companies during Armed Conflict addressed private security companies.*¹² The *Montreux Document* underscored best practices that developed from the failure of existing laws and regulations rather than assert policies and restrictions on state operations. Events such as the 2007 Nisour Square incident in Baghdad, when US military contractors killed 17 civilians while escorting an embassy convoy, fostered international resolve to clarify "what the role for [private military and security companies] in armed conflicts is and should be."¹³ The first half of the *Montreux Document* outlined pertinent legal obligations, and the

second half outlined good practices for states to follow that were not legally binding. The *Montreux Document* stated early on that it was not the final word on the matter, but that this was also never the intention. ¹⁴ Cyberspace is a domain different from all others in that the US is no longer the single dominant state for force projection; the multipolar nature of power and influence in cyberspace means that norms can only emerge from the shared objectives of all principal actors involved.

Original Position and Ethical Offensive Cyberspace Operations

Moral and political philosopher John Rawls introduced the *original position* as a central feature of his landmark book, *A Theory of Justice*, in 1971.¹⁵ In this book, Rawls described a thought experiment, in which parties select principles of the society they will live in, but behind a "veil of ignorance" as to their individual ethnicity, social status, gender, and lifestyle. The idea behind the original position is that parties are forced to select societal principals that will be rational and fair since the parties do not know their ultimate position in the society undergoing design. Rawls understood that human nature is essentially self-centered, so the determination of what is fair must be made without consideration of personal privilege.

In cyberspace, there is no singularly dominant state, and OCO is largely nonattributable. None of the principal actors, therefore, have a privileged role to play in formalizing international norms. The situation closely mirrors that of the original position described by Rawls; the future balance of power in cyberspace is unknowable. The US, China, and Russia should leverage original-position thought experiments to determine what guidelines for OCO would be considered fair and sustainable to the international community as a whole.

Nine Test Cases for Ethical Offensive Cyberspace Operations

This section examines nine of the rules applicable to cyberspace operations for which expert opinion was thoroughly divided based on current law. Using the principal of the original position as an ethical decision-making tool for responsible state behavior, this section proposes behaviors with respect to each rule that will contribute to a fair, sustainable, and responsible normalization of cyberspace.

Rule 4: Violation of Sovereignty

According to international law, a state must not conduct cyberspace operations that violate the sovereignty of another state. On this point, the international group of experts was divided on whether a cyberspace operation that "results in neither physical damage nor the loss of functionality" amounts to a violation under this rule. 16

A widely underappreciated fact about OCO is that detailed intelligence collection of the cyberspace environment is a fundamental prerequisite to force projection in the domain. Intelligence collection in cyberspace, just like its predecessors—human intelligence, imagery intelligence, and signals intelligence operations—is instrumental to collective international security. Thus, all of the primary actors presently execute invasive, yet nonharmful intrusions, into adversary cyberspace to perform

reconnaissance, gather intelligence, and to prepare OCO options for senior leadership in the event of armed conflict. As Simon Chesterman, the dean and law professor at the National University of Singapore Faculty of Law, succinctly put it, the "collection of intelligence is more than tolerated, and may actually be encouraged." The universality of intelligence collection operations into adversary cyberspace occur with tacit international acceptance, in part, because accurate intelligence can help mitigate collateral damage and political miscalculations. From the original position, such maneuvers in cyberspace are apparent as an ethical necessity of the domain.

Rule 9: Territorial Jurisdiction

A state may exercise territorial jurisdiction over cyberspace infrastructure and persons engaged in cyberspace activities on its territory; cyberspace activities originating in, or completed on, its territory; or cyberspace activities having a substantial effect in its territory. Under this rule, the international group of experts could not determine whether a state may exercise jurisdiction over data that simply traverses its territory *en route* to the intended destination.

A point not specifically addressed within the discussion regarding Rule 9 is that sensitive data in transit is frequently encrypted and is almost certainly encrypted when in support of OCO. In any event, the states through which the associated data passes are both arbitrary and temporally dynamic as a result of network best-effort routing. The transited states are furthermore unaware of the specific content of encrypted messages passing through their territorial cyberspace infrastructure. Pragmatically, the opportunities and motivations of transited states to seek jurisdiction will be relatively rare, and thus can be ethically addressed on a case-by-case basis, in "a reasonable fashion and with due regard for the interests of other states," as proposed by the international group of experts. ¹⁹ From the original position, it is clear that the primary actors would not select to relinquish jurisdiction to other states based on arbitrary or constantly changing data traversal of state network infrastructure.

Rule 22: Limitations on Countermeasures

Countermeasures conducted in cyberspace, as in other domains, must not violate fundamental human rights, amount to belligerent reprisals, violate peremptory norms, or violate diplomatic or consular inviolability. While the bulk of the limitations on countermeasures discussion is unambiguous, the international team of experts could not reach a consensus on the applicability of the right to privacy as a fundamental human right, and therefore a limit on legal countermeasures. The *Tallinn Manual 2.0* points out that "whether or how human rights apply extraterritorially is unsettled and controversial." ²¹

Despite the efforts of privacy advocates globally, the principal actors in cyber-space currently do not interpret privacy rights as applying extraterritorially, with the exception of reciprocal protections codified by treaty. States such as China and Russia do not appear to value privacy as even fundamental human right of their own citizens. Any attempt by a state to unilaterally impose extraterritorial privacy rights on international cyberspace would be futile for the foreseeable future, a fact that is evident from the original position. The ethical and responsible norm is,

therefore, for a state to select the most effective countermeasures available, while fully respecting widely-accepted human rights and also respecting privacy rights to the extent obligated by treaty and domestic law.

Rule 34: Applicability

Simply stated, international human rights law applies to cyberspace activities.²² Here, the international group of experts was split as to whether international human rights treaties that do not explicitly address extraterritoriality nevertheless impose such obligations on the signatories.

From the perspective of any principal actor in the original position, it is difficult to fathom a decision to surrender sovereign options based on restrictions to which they did not expressly agree. The ethical norm acceptable to every state is to operate within the confines of treaty obligations and international law but to also seek additional international frameworks to defend human rights where practicable.

Rule 39: Inviolability of Premises in Which Cyberspace Infrastructure is Located

The international group of experts concluded that cyberspace infrastructure within embassies and consular posts is protected by the inviolability that applies to such diplomatic locations.²³ What was not entirely clear was whether states have an international obligation to respect the inviolability of diplomatic missions or consular posts in *other* states, since the establishment of embassies and the like are primarily based on a bilateral relationship between host and hosted state.²⁴

As the anecdote goes, Willie Sutton responded to the question as to why he robbed banks: "That's where the money is." Similarly, diplomatic missions are treasure troves of important information regarding state activity and intent. It is no wonder that Soviet intelligence services positioned electromechanical keyloggers in US embassy typewriters, within Soviet territory no less, during the late 1970s. ²⁵ While the physical inviolability of diplomatic premises is an established international norm, cyberspace inviolability is clearly not consistent with state practice by the primary actors. Any state in the original position would appreciate the utility of non-destructive cyberspace operations within embassies and consular posts to gather intelligence on hosted state motives, activities, and capabilities. Nevertheless, victim states also retain the right to protest whenever such activity is exposed. Ethical cyberspace operations can reasonably include maneuvers within diplomatic premises when carried out without causing damage.

Rule 46: The Right to Visit and Cyberspace Operations

International law establishes that all states have the right to board a vessel on the high seas or in an exclusive economic zone without flag state consent if the vessel is suspected of piracy, slave trading, unauthorized broadcasting, is without nationality, or is of the nationality of the visiting vessel. ²⁶ An interesting, yet unresolved, legal question, is whether a right of visit can be carried out through OCO from the visiting warship. ²⁷

OCO-enabled virtual visits have some potential to be less invasive than physical searches and pose less physical risk to both crews. On the other hand, a virtual visit is not consistent with the plain text of the law and could actually be more informationally invasive than a physical boarding, since OCO could easily retrieve personal, commercial, and financial files completely irrelevant to determining vessel nationality or confirming maritime criminal activity. While physical maritime visits are both announced and clearly visible, virtual visits could be announced or unannounced. Moreover, any ship threatened in advance of a virtual visit via OCO could naturally take countermeasures, such as powering off noncritical systems. If OCO was successful despite specific countermeasures, that fact, too, could be revealed, making future virtual visits ever more challenging. OCO-savvy states may even be incentivized to operate honeypot vessels designed to incite virtual visits from other states to discover and proliferate novel OCO techniques.

This rule, in particular, highlights the value of the original position in deducing ethical OCO behavior. The specter of military vessels hacking into foreign private and commercial vessels on the high seas under the auspices of right to visit is one that none of the primary actors would find acceptable and is thus unethical.

Rule 122: Perfidy

Perfidy is the use of treacherous deception to kill, injure, or capture an adversary by falsely claiming protected status, and it is prohibited for OCO.²⁸ The prohibition on perfidy is codified in customary international law for both international and noninternational armed conflict and also appears in Article 23(b) of the Hague Conventions.²⁹ However, the international group of experts was split as to whether the perfidious act must actually result in adversarial death or injury to be prohibited. ICRC commentary asserts that "it seems evident that the attempted or unsuccessful act also falls under the scope of this prohibition" based on the 1977 Protocol I supplement to the Geneva Conventions.³⁰ Adding to the complexity of the perfidy issue is that the US is not a signatory to the Protocol I, although China and Russia (and more than 50 other states) are. The contrasting legal viewpoint is that the plain text of the Hague Conventions and Protocol I explicitly describe death, injury, and capture as consequences of prohibited perfidy. Given the inherent deception and secrecy required by all forms of OCO, it is not surprising that scholars have struggled to determine what constitutes perfidy in the cyberspace domain.

USCYBERCOM cannot conduct OCO from publicly-known Internet Protocol addresses at the Pentagon directly against its targets and expect to have any success at all; OCO necessitates masquerading and maneuvering through the "gray space" between friendly "blue" and adversarial "red" cyberspace terrain. Cybersecurity researcher Heather Roff took an uncommon stance on these facts, arguing that OCO erodes the minimal trust necessary between belligerents and that "any use of a cyberweapon that results in the killing, wounding, or capture of an adversary is impermissible." Naval Postgraduate School professor Neil C. Rowe also argued that many forms of OCO involve perfidy. Regarding covert action, under which many OCO may be categorized, former National Intelligence Council chairman Gregory Treverton

wondered how "covert action, even if justifiable. . . can be reconciled with democratic principles," and political theorist Charles Beitz lamented whether "the capacity to conduct covert operations in peacetime should properly belong to the executive branch at all." ³³

Alternatively, many other experts, including Dipert, argue that the OCO makes frequent use of *ruses* rather than *perfidy*, and ruses are permitted under international law. The *Tallinn Manual 2.0* identifies the following examples of OCO ruses: (1) the creation of simulated forces, (2) the transmission of false information to lead the adversary that operations are about to occur, (3) the use of false computer identifiers such as network addresses, (4) feigned OCO not intended to induce terror, (5) bogus orders, (6) psychological operations, (7) transmitting false intelligence, and (8) the use of enemy codes, signals, and passwords.³⁴ Importantly, the international group of experts reached a consensus on this latter interpretation of ruse versus perfidy in the cyberspace domain, and thus it carries significant weight.

International law, thus, allows for the extensive use of deception and ruses within OCO, but the question remains as to whether or not cyberspace-enabled perfidy that does not kill, injure, or capture is ethically permissible. Here, again, the use of the original-position thought experiment is illuminating; perfidy is prohibited because treachery undermines the value and trust in acts of good faith, such as the raising of a white flag of surrender. No state would endorse perfidy from the original position, lest it be permitted against themselves. Regardless of how tactically advantageous it may be to use OCO to broadcast a false report of a cease-fire to confuse an adversary during an intense armed conflict, such actions, whether they ultimately result in death, injury, or capture, are definitively unethical.

Rules 124-125: Improper Use of the Protective Indicators and UN Emblem

It is prohibited to make improper use of protective indicators that are set forth under the LOAC, such as the American Red Cross and Red Crescent. Likewise, the unauthorized use of the UN emblem is prohibited. The international team of experts approached the application of these rules in cyberspace in two ways. Some experts interpreted the text of the law to narrowly apply to protective indicators such as graphics, while the other experts followed a teleological interpretation that broadly included Internet domain names and text indicators as well. An example described in the *Tallinn Manual 2.0* is that of a phishing email spoofed to appear from the ICRC website to evade adversary email filters; falsified use of the Red Cross domain name in an OCO would be unlawful based on the second legal approach but not to the first.

Under the Rome Statute of the International Criminal Court, intentional attacks against humanitarian assistance personnel are war crimes.³⁷ Humanitarian relief to civilian populations is essential—both during and after armed conflict—to prevent starvation and provide treatment to the wounded and sick. The ICRC's respected impartiality allowed it to provide 2,100 tons of assistance to thousands of displaced civilians in Crimea throughout 2017.³⁸ Any operations that undermine trust in the protected nature of humanitarian organizations or the UN fundamentally jeopardize

humanitarian assistance and peacekeeping activities and, therefore, would be considered unethical from the original position by any of the primary actors. The improper use of protective indicators and the UN emblem must be avoided within OCO.

Although not directly related to Rules 124 and 125, the US *Department of Defense Law of War Manual* states that the false use of journalist credentials to feign civilian status to facilitate spying or sabotage is not technically prohibited.³⁹ The US has not announced any intent to make use of such deceptions in cyberspace, but the perspective of the original position can give leaders insight into the ethical soundness of such deception during the joint planning process. After all, journalists are permitted under international law to obtain identity cards that verify their default status as noncombatants.⁴⁰ Would it be ethical to undermine journalist protections under Additional Protocol I, to which the US is not a party, but for which the official US position is that it supports and respects this important principle?⁴¹

Conclusion

Current military OCO mission planning courses gloss over the LOAC as if it applied perfectly to cyberspace and had resolved all potential ethical quandaries in store for USCYBERCOM. As this article has shown, the legal landscape is more porous than generally appreciated, and the need for ethically-minded leadership is essential in this legal gray zone. Military judge advocate generals tasked to "find a way to yes" for their commanders do so with the privilege of a contemporary—if tenuous—US supremacy in the physical domains of air, land, sea, and space as they provide guidance on legal force projection. Cyberspace is different. In cyberspace, the US is simply one of several principal actors, and additional states are rapidly growing their forces to join the fray. Every experiment sets a precedent as the international norms of behavior codify. The focus should be toward reflective rather than assertive thinking, following the example set forth by the Montreux Document. Senior leaders must use ethical reasoning in addition to their legal guidance in the years ahead to ensure that force projection through OCO is made responsibly and sustainably. To these ends, the use of the original-position thought experiment can be a valuable ethical decision-making tool. •

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The Other Side of the COIN

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Since 11 September 2001, airpower has helped liberate thousands from the iron grasp of Saddam Hussein, the Taliban, and the Islamic State. The prevailing narrative of airpower's role in the Global War on Terror (GWOT) focuses on its core competencies of air and space superiority, intelligence, surveillance and reconnaissance, rapid global mobility, global strike, and command and control. However, throughout these past 17 years, a quiet, frequently unnoticed story emerged. For the first time in Air Force history, Airmen from across Air Force Specialty Codes (AFSC), have equally shared the burden of combat with their aircrew brethren. Indeed, these nontraditional Airmen have seen as much, if not more, combat than their rated counterparts. General Purpose Force (GPF) Airmen have tackled a wide variety of positions in Iraq and Afghanistan: from leading provincial reconstruction teams to rebuilding the Iraqi and Afghan Air Forces and numerous jobs in between. In fact, these Airmen provide the Air Force with its most experienced counterinsurgency (COIN) cadre in its short history.

This expertise, however, could quickly atrophy as the DOD refocuses on the "reemergence of long-term, strategic competition" against Russia and China.¹ Although terrorism will continue to be one of the top priorities for the DOD, if history is any guide, the Air Force may easily dispose of its hard-fought experience as it embraces its historical focus on conventional conflicts. Moreover, the Air Force is likely to be involved in irregular warfare (IW) environments in future near-peer battlefields, like in western Ukraine and in Syria versus Russia's "little green men," and, thus the need for GPF Airmen will endure past fights against terrorists. Accordingly, the Air Force should heed the advice of its most talented officers, who have filled Air University's Muir S. Fairchild Research Information Center with scores of papers on COIN and IW that focus on air advising, the need for a COIN doctrine, and a host of other issues, to ensure that history does not repeat itself.²

Firstly, the Air Force must write a COIN doctrine. Although the Air Force has recently updated its IW and foreign internal defense (FID) doctrine, the USAF needs a COIN-specific doctrine to help train and guide future Airmen, who remain in Iraq and Afghanistan, assisting host nation forces repel a resilient insurgent force. Secondly, the Air Force should leverage its crop of air advisors by finally expanding its air advising mission. Lastly, the Air Force must begin to celebrate its small war heroes and legends, like Lt Col John Loftis and Maj Gen Edward Lansdale, respectively. These stories will educate Airmen on their service's proud COIN heritage,

while also reminding senior leaders that their service is filled with Airmen who fought side-by-side with their Army and Marine Corps brothers-in-arms in some of the most dangerous battlefields in Iraq and Afghanistan.

Not Your Father's Air Force Anymore

The Air Force has always been a technologically-focused service that overwhelmingly concentrates on conventional conflicts. RAND analyst Carl Builder famously quipped that the service worships "at the altar of technology." Although other services rely on the technology, the Air Force often promotes the idea that technology can transform warfare, leading some to label the service as "Technology R Us." During the last 17 years, the service ushered in a new era of airpower when a MQ-1 Predator conducted its first combat sortie that narrowly missed killing former Taliban emir, Mullah Omar, on 7 October 2001. Indeed, the Air Force often makes news when deploying new weapons, like the recent use of the GBU-43/B, the "mother of all bombs," against an Islamic State underground network in Eastern Afghanistan.

However, a different era quietly began in 2003 when the Joint Staff tasked the Air Force to send Airmen to Iraq to assist the Army in convoy duties. This initial "inlieu-of" task of approximately 300 Airmen mushroomed to almost 8,000 Airmen annually, who filled a wide array of billets, ranging from detainee operations to combat medics attached to Army maneuver units. In 2008, the Air Force began calling these billets *joint expeditionary taskings* (JET) to characterize the combat nature of these joint assignments. These Airmen went through intense predeployment training, where Airmen qualified on crew-serve weapons, completed cultural and language training, and learned how to spot improvised explosive devices. Although these Airmen were under administrative control and operational control to Air Force commanders, Army commanders exercised tactical control of these unconventional Airmen. Thus, JET Airmen not only had to adapt to working with their Afghan and Iraqi allies, but also had to adjust to an Army culture that was radically different than their own. And while not all of these JET Airmen conducted missions "outside-the-wire," thousands did.⁹

In the last 17 years, the Air Force witnessed the birth of its longest advisory mission. On January 2004, the Coalition Military Assistance Training Team (CMATT), stood up a small air cell, subsequently, known as CMATT-A, in Baghdad. This CMATT-A gave way to the Coalition Air Force Transition Team (CAFTT) that began the gargantuan task of rebuilding the dilapidated Iraqi Air Force in earnest. ¹⁰ Similar efforts in Afghanistan began in 2006, when US Air Forces Central Command, set up a similar CAFTT-like organization to stand up the Afghan Air Force (AAF). ¹¹ Since these efforts began, thousands of GPF Airmen have deployed to rebuild two war-ravaged nations' air forces. The mission continues today as air advisors in Afghanistan under Train and Advise Command—Air (TAAC-A) assist on improving the AAF's effectiveness on numerous platforms. In Iraq, air advisors under the newly established Coalition Aviation Advisory and Training Team have boosted their counterparts' proficiency in operations that devastated the Islamic State. ¹²

The need for air advisors in Iraq and Afghanistan was the partial impetus behind the creation of the Air Advising Academy (AAA), in March 2007. The AAA, which is officially under the Air Force Expeditionary Center, became fully functional in early January 2013 and can train 1,500 Airmen annually. Although air advising is often synonymous with combat aviation advising, more than 75 percent of Airmen who attended AAA come from nonaircrew career fields, underscoring the fact that air advising isn't synonymous with combat aviation. The creation of the 571st and 818th Mobility Support Advisory Squadrons highlights the necessity for advising in career fields outside of aviation. These two squadrons, who are under the 621st Contingency Response Wing at Joint Base McGuire–Dix–Lakehurst, New Jersey (the same location as AAA), have 300 air advisors with 30 different skill sets with a mission focus on Latin America and Africa, respectively. 14

Separately, in April 2006, as the service became engulfed in two raging insurgencies, the Air Force Culture and Language Center (AFCLC) was created at Air University (AU) to boost Airmen's cross-cultural competence. In a little more than a year, the AFCLC was charged with culture and language training across the Air Force, resulting in the creation of the Language Enabled Airmen Program (LEAP) in 2009. More than 2,400 Airmen are currently enrolled in the program that educates and trains Airmen in more than 90 different languages. "LEAPsters" (the moniker for the Airmen enrolled in LEAP) participate in language intensive training events for up to six weeks in various countries designed to hone their language and cultural competency skills. They are often prime candidates for such units like the 571st and 818th MSAS and the 6th Special Operations Squadron (6th SOS), as well as the Air Force's foreign air officer program. While AFCLC and LEAP were not designed explicitly for COIN, their creation was born from such conflicts, and underscores how far the service has come in developing these nontraditional skill sets.

The abovementioned vignettes are a mere sampling of the Air Force's newfound COIN prowess. There are other units across the Air Force with similar experience with stories yet to be written. Regardless, these Airmen, and the institutions that helped educate and train them, provide the Air Force with a deep reservoir of COIN expertise that it must properly harness.

An Often (Intentionally?) Neglected Skill Set

Although the Air Force has made great strides in the past 17 years, it has a long history of consistently sidelining its small war expertise. The Air Force boasts a proud, small war heritage that dates back to the use of the 1st Aero Squadron to help Gen John J. Pershing disperse rebel forces under Francisco "Pancho" Villa. Although the strategic bombing campaigns in Europe and the Pacific are some of the most cherished moments in American airpower history, World War II also marked the birth of airpower in support of special operation force (SOF) operations. The 1st Air Commando Group focused on "air drops, short field landings, evacuations, resupply and strike missions" in the Pacific theater. Unfortunately, budget cuts following World War II reduced the unit to only three wings. Following the Korean War, only two squadrons remained focused on unconventional warfare, and by the beginning of Vietnam, the USAF did not possess a single unit specifically dedicated to fighting small wars.

The Vietnam War saw a significant increase in USAF's irregular war expertise, although this, too, would decrease as senior leaders—vet again—turned their attention back to the conventional fight after the war's ignominious end. President John F. Kennedy was the impetus behind the creation of the 440th Combat Crew Training Squadron ("Jungle Jim") in 1961, as the president insisted that the DOD better prepare for fighting communist revolutionaries. Jungle Jim was expanded to become the 1st ACG and the following year the Air Force created the Special Air Warfare Center at Eglin AFB, Florida. Legendary Airman Col Harry "Henie" Aderholt aptly led these renegades out of Nakhom Phanom Royal Tahi Air Base, Thailand during the Vietnam War. His belief in the utility of low-technology platforms in COIN ran counter to Seventh Air Force commander Gen William Momyer, who successfully sidelined Colonel Aderholt. Despite Colonel Aderholt's and his Air Commandos' accomplishments, Air Force SOF was deactivated in 1974, as the Air Force and the entire DOD began to cleanse itself of Vietnam—a move that many inside the defense community clamor for today after decades spent in Iraq and Afghanistan.¹⁸ Although Air Force SOF had a rebirth in the 1980s, the Air Force has consistently sidelined and marginalized its COIN Airmen to its detriment. Time and again, the Air Force has had to reinvent its COIN prowess despite having a rich history in these conflicts. Although Air Force Special Operations Command is now a permanent fixture, conventional Air Force units and the service's burgeoning cyber and space units receive the vast majority of resources.

Despite the Air Force's penchant for sidelining this skill set, there's reason to hope that the service will now begin to harness its recent experience. Although the USAF sacrificed mightily in Vietnam and watched the rise of protracted revolutionary warfare after World War II, only a smattering of Air Force officers wrote about airpower's role in COIN. Most Airmen were focused on nuclear weapons and conventional airpower to blunt the mighty red menace, the Soviet Union. 19 However, this is no longer the case. Although most officers remained focused on traditional aspects of airpower, students at Air Command and Staff College, the School of Advanced Air and Space Studies, and Air War College have written hundreds of papers on their experiences in COIN. From leveraging airpower for airbase defense in COIN to branding security forces as the USAF's COIN force, USAF officers have written eloquently and passionately about their experiences in an attempt to nudge the Air Force into a more proactive stance. 20 Unfortunately, many of these ideas remain lost in the library. However, two topics in particular—the need for an USAFspecific COIN doctrine and for an expansion of the 6th SOS' footprint-deserve to be removed from the shelf, re-explored, and harnessed to cement the last 17 years of experience.

The Missing Doctrine

Although the voices from Maxwell AFB offered a wide array of ideas, the plea for an Air Force COIN doctrine is a repeated line found in many papers. ²¹ Indeed, an article in the Spring 2006 edition of *Air & Space Journal* made a convincing argument for an Air Force COIN doctrine. ²² Unfortunately, the Air Force has long side-stepped addressing these conflicts. Air Force doctrine in the 1950s was mute on low-intensity conflict or guerrilla warfare. ²³ In 1967, however, with the service heavily involved in

Vietnam, the Air Force published Air Force Manual 2-5, addressing Special Air Warfare. Unfortunately, this new manual was not the start of a new trend, and by the end of the 1970s, COIN had disappeared from doctrine. The Air Force would remain virtually silent on COIN until 1992 when it published its first doctrine on FID that addressed many aspects of COIN. This FID doctrine addressed operational COIN issues, like the use of airpower for mobility and intelligence, which was not a standard subject in airpower doctrine. The Manual 2-5, addressing Special Air Warfare 1940.

The Air Force, however, has recently made significant strides in addressing this void in doctrine. In 2007, it published Air Force Doctrine Document (AFDD) 2-3, *Irregular Warfare*, to address airpower's role in Iraq and Afghanistan.²⁷ In the introduction, this operational level doctrine explicitly states, "irregular warfare is not a lesser form of traditional warfare," marking a significant change in the service's view of such conflicts.²⁸ AFDD 2-3 spends time discussing COIN and its 10-page appendix, "Understanding Insurgencies," adequately introduces Airmen to the complex subject of insurgency and counterinsurgency. However, it fails to distinguish between COIN, FID, UW, terrorism, and counterterrorism. In fact, Airmen would be excused if they thought these terms were interchangeable.

Also in 2007, FID doctrine received a significant boost with a notably revised edition of AFDD 2-3.1, *Foreign Internal Defense*.²⁹ AFDD 2.3-1 replaced a 2004 version that the initial air advisors in Iraq found lacking. These advisors struggled mightily without adequate doctrine and largely succeeded through trial and error, initially.³⁰ Regardless, this revised version focuses on the importance of a light footprint approach, the utility of GPF Airmen, and the broad range of missions air advisors can play. Moreover, it acknowledged the significant role that FID was playing in both Iraq and Afghanistan and in the wider GWOT.³¹

Both FID and IW receive prominent attention in current doctrine. Annex 3-2 *Irregular Warfare* (2016) does a better job than its predecessor in distinguishing between the various aspects of IW. In fact, it cautions practitioners that each "IW engagement is unique" and thus a thorough examination is needed "before developing a strategy." The almost 40-page document covers a wide range of topics, ranging from IW fundamentals to C2 in IW campaigns. Similarly, Annex 3-22, *Foreign Internal Defense*, includes a variety of FID issues, and—like its predecessor—AFDD 2-3. The annex also covers relevant topics in COIN, like Mao's three-phase insurgent strategy.³³

Despite these impressive steps to fix a gaping hole in doctrine, the USAF still needs to write its own COIN specific doctrine. It should be titled Annex 3-24, *Counterinsurgency*, to mirror both joint and Army doctrinal publications of the same numerical titles.³⁴ There are numerous reasons to have a stand-alone COIN doctrine. Firstly, with a COIN-specific doctrine, the Air Force would send a clear signal to its Airmen and sister services that it is serious about COIN, despite its penchant for technology and conventional conflict. While the service has also conducted other forms of IW, it has spent almost two decades mired in COIN and has the lessons learned to address COIN specific problems. Secondly, it will prepare future Airmen for COIN, as well as those already embroiled in these conflicts. As mentioned above, air advisors remain in both Iraq and Afghanistan and will be for the foreseeable future to assist our allies in extinguishing a resilient insurgent force.³⁵ A COIN doctrine will help future Airmen in Iraq and Afghanistan and their commanders

understand the "right way to organize, train, equip, and sustain forces" in a COIN fight, while also providing a blueprint for how to shape the AAF and Iraqi Air Force's (IqAF) mission focus too.³⁶ Lastly, a broad range of AFSCs play a prominent role in COIN. This is different than other forms of IW, like CT and UW that tend to be more SOF-specific. Thus, a COIN doctrine, unlike other forms of IW, will be more beneficial for more AFSCs.

More importantly, there are still holes in Air Force IW/FID doctrine, Joint Publication (JP) 3-24, and Field Manual 3-24 that could be filled. For example, "culture" is mentioned less than ten times in Annex 3-2 and Annex 3-22 combined. Although "the role of culture" receives more prominent attention in basic doctrine, the importance of it must be underscored, especially in a COIN-specific doctrine. The Air Force should leverage the AFCLC's recent AU Language, Regional Expertise and Culture Symposium's focus on the concept of "cultural agility" and its importance for *Air Force Future Operating Concept 2035*, which focuses on operational agility. As the US pivots to focus on Russia and China, it will be imperative that its Airmen are able to be "flexible and adaptable in inter-cultural interactions" with partners and allies so as to act as a bulwark against both adversaries' expanding influence. In short, being cognizant of culture is important, being able to operate in culturally unique landscapes that require flexibility is paramount.

Separately, the benefits and pitfalls of airpower in COIN need further exploration. JP 3-24 focuses a little more than two pages on air operations in COIN.⁴⁰ A COIN-specific doctrine should leverage little known case studies, like the successful use of American airpower in assisting the El Salvadorian Air Force during its 11-year COIN campaign, to highlight successful COIN operations.⁴¹ This little known campaign receives a short, 30-word vignette in current IW doctrine.⁴² A new COIN-specific doctrine must delve deeper by focusing on the tendency of counterinsurgents to utilize airpower that are "inordinately physical in their approach to a predominantly non-physical phenomenon," hindering the "goal of gaining and maintaining popular allegiance and legitimacy (to the government)."⁴³

This new doctrine must also address the various jobs Airmen can fill in COIN. While airpower is undoubtedly tied to the skies, Airmen have also contributed to the joint ground fight. If the Air Force has learned anything these past 17 years, it is that Airmen can adapt to new battlefields and tough jobs traditionally outside their scope. For example, the new doctrine should explore the role that security forces have in COIN, specifically in support of offensive ground operations, like the 2005 Operation Desert Safeside in Balad Air Base, Iraq. 44 This brief offensive operations against insurgent forces who were peppering Balad AB with indirect fire, underscores the utility of leveraging GPF Airmen for jobs traditionally given to the Army. Moreover, the use of airpower to defend bases will continue to be an attractive option, as the recent fight between Russian mercenaries and the US underscores. 45 If, as Gen Billy Mitchell believed, that only Airmen can truly understand airpower, then it is likely that only Airmen can truly understand air base defense.

The Air Force has made some initial steps to harness some of its COIN experience. Buoyed by an experienced cadre of rated and nonrated Airmen who spent almost their entire careers in COIN, AU is overflowing with papers and proposals on how to make the USAF more adept in COIN and IW. The new doctrine codifying

the importance of IW and FID is a nod to the work Airmen have accomplished since 11 September 2001. However, there is more work to be done. While many voices have asked for a COIN doctrine, even more have argued for an expanded air advisory mission.⁴⁶

Expanding the Air Advising Mission

The Air Force has spent almost two decades helping rebuild the IqAF and AAF. Despite this recent experience, the USAF still only has three squadrons out of almost 3,000 dedicated to training and advising foreign air forces. Thus, approximately 300 Airmen out of 320,000 on active duty—less than 1 percent of the total force—are dedicated to this incredibly important mission. The 6th SOS is the only unit who is focused on combat aviation advising, while the two new MSAS squadrons focus on support roles. Although the 6th SOS began operations in 1994, its lineage traces back to Jungle Jim and the 6th Fighter Group, who supported British guerrilla forces in Burma. The unit, like other similar units in Air Force history, was quickly disbanded after World War II.⁴⁷

The 6th SOS may be the premier combat aviation advisory force, but, shockingly, it was not the first unit called to stand up the IqAF.⁴⁸ Although attempts to stand up the IqAF began with the creation of the CMATT in January 2004, it was not until 22 February 2005, that two 6th SOS training teams arrived to start training the IqAF.⁴⁹ It took almost two years after the invasion of Iraq for the USAF's premier combat aviation advising unit to begin one of the most challenging FID missions in USAF history!⁵⁰

The 6th SOS, while a supremely capable unit staffed with highly trained Airmen who have volunteered to conduct an often-neglected mission, is too small to accomplish its mandate. Squadron personnel interviewed by RAND estimated that they turn down at least 56 percent of all requests for support due to the lack of manpower. The fact that the 6th SOS was not the primary unit tasked to stand up the AAF from scratch is unfortunate. However, one squadron is far too small an organization to tackle such a long-term task. Yet, there have been repeated calls to expand the 6th SOS into a wing (or even a group) to help address such tasks. In 2005, RAND Project Air Force conducted a yearlong study entitled "The USAF's Role in Countering Insurgencies" and recommended expanding the 6th SOS into a wing in the hopes of boosting the Air Force's role in countering insurgencies "without sacrificing the Air Force's edge in major combat operations." **

An expanded 6th SOS could help mitigate some issues inside the AAF. A January 2018 DOD Inspector General report on the AAF found numerous issues with the long-term advising mission, stating that air advisors "were not fully prepared to perform their AAF specific advising mission" because they did not receive adequate training "on the AAF and its relationship to the Afghan National Army" or about the "Afghan military staffing processes and terminology peculiar to Afghanistan." Some of these issues were born because creating an AAF was never a pressing priority in the early years of Operation Enduring Freedom. However, the lack of institutional memory also hindered this long-term effort. New advisors need time to learn a complex mission in a foreign culture while simultaneously rebuilding a new force from scratch in the midst of an industrial strength insurgency in an often-

opaque culture. Asking them to do all of that while having a more nuanced understanding of the AAF's bureaucratic process is a load too heavy for brand new advisors to carry. An expanded 6th SOS could have dedicated specific squadrons (or an entire group) to this mission. These experienced advisors could have rotated back to the same AAF units in subsequent deployments. During their time back stateside, these advisors could back brief senior leaders on the feasibility of current efforts and also improve training for future air advisors.

Finding qualified Airmen for this assignment is difficult. The 6th SOS has Airmen from across 37 AFSCs, ranging from fixed and rotary wing advisors to health specialists. Airmen must be experts in their AFSCs and have the ability to instruct host nation security forces in austere conditions. During this four-year controlled special duty tour, Airmen must undergo a rigorous training cycle. These Airmen undergo a 12–18 month, four-phase training program that focuses on advanced tactical field craft, advisor tradecraft, culture and language training, and AFSC-specific training. These Airmen must also maintain their language competency throughout their tours. The Air Force could sidestep some of the initial costs and time in expanding the 6th SOS by harvesting its crop of unconventional Airmen. Thousands of Airmen have trained their Iraqi and Afghan brethren in all aspects of the 6th SOS' mission: Indirect Support (e.g., joint exercises), noncombat direct support (e.g., logistics and communication), and combat operations (embedded combat aviation).

The Air Force could leverage its special experience identifiers (SEI) to help identify potential candidates to enlarge this unit. SEIs are numerical codes on Airmen's personnel records that can help flag those with unique skill sets. Currently, the Air Force has SEIs for Airmen who have completed Army Combat Skills Training, graduated from AAA, and were deployed as air advisors, and a LEAP SEI. The Air Force recently created a new SEI intended to identify Airmen with regional expertise and have spent considerable time in these important geographic areas. Airmen with these SEIs would be attractive candidates to fill an expanded 6th SOS, especially if they've shown an aptitude for advising in previous tours overseas.

The Air Force should also study the Army's new efforts in standing up their recently deployed Security Force Assistance Brigades (SFABs), who are currently advising the Afghan National Army. Although SFABs are in their infancy, the Army's force management director, Brig Gen Brian Mennes, recently stated that the Army would likely create two security force assistance divisions and possibly a corps. SFABs are designed to improve host-nation war-fighting capacity at the lowest tactical level, the same purpose as the 6th SOS' purpose. Their proposed headquarters would likely be tasked with managing, recruiting, and equipping the new SFABs, much like a future air advising wing.⁵⁸

It will also be imperative that the Air Force properly incentivize an expanded advising unit, as assignments with the 6th SOS are "still considered a poor career choice" by many in the Air Force.⁵⁹ In 2016, Chairman of Joint Chief of Staff Gen John Dunford urged the Air Force to address this problem during a visit to Afghanistan, after he visited some air advisors. General Dunford called the training of foreign allies a "core mission" for the Air Force and urged the service to devote more time and resources to this effort.⁶⁰ The Air Force could help mitigate this perception

by creating specialized paths toward in-residence professional military education, as it did to help mitigate the same perception with the AFPAK Hands program.⁶¹

Luckily, the Air Force has the manpower and institutional framework to enlarge their advising footprint. Utilizing SEIs will help identify potential air advisors to fill an expanded 6th SOS. Moreover, with programs like LEAP and institutions like the AAA and AFCLC, the Air Force can create a training pipeline that targets young Airmen with cultural competency and language acumen to expand its advising mission. However, to fill such units with eager Airmen, the Air Force must make a concerted effort in extolling their COIN legends and heroes, so the next generation of Airmen are aware of the service's rich COIN heritage.

Extolling the Air Force's COIN Heritage

Most Airmen are likely unaware that one of America's most legendary military advisors is not a bearded Army special forces officer but is an Air Force intelligence officer. General Lansdale, who also worked for the Central Intelligence Agency and its predecessor, the Office of Strategic Service, was a pioneering figure in guerrilla warfare and played a significant role in assisting the Filipino government defeat the Hukbalahap insurgency. General Lansdale became one of Philippine President Ramon Magsaysay's most trusted advisors and crafted the theoretical underpinning for civic–action programs, a staple program in COIN. Lansdale had less success in his efforts in Vietnam but did play a significant role in ensuring South Vietnam's victory in the 1955 Battle of Saigon, although he could never replicate his success in the Philippines for numerous reasons. Eggardless, this remarkable Airman has been lost in Air Force lore. This is inexplicable and underscores the Air Force's proclivity to forget its COIN heritage.

There are easy solutions available to remedy this problem. The CSAF Professional Reading List is a good place to start. In the past, it has urged Airmen to read such COIN classics as David Galula's *Counterinsurgency Warfare*, Alistair Horne's *A Savage War of Peace: Algeria 1954–1962*, and David Kilcullen's *Accidental Guerrilla*. Missing from these lists, however, are any books specifically on Airmen who participated in COIN or IW. This is partly because so few books exist. Regardless, adding Warrant Trest's *Air Commando One* about General Aderholt and James Corum's *Airpower in Small Wars* would be a good start. The list must also include Max Boot's recent 600-page tome *The Road Not Taken: Edward Lansdale and the American Tragedy in Vietnam*. These books will help educate the wider force on an often forgotten chapter of its history while hopefully inspiring a new generation of Airmen to follow in their footsteps.

Further, the Air Force must do more to highlight our COIN heroes, like Lt Col John Loftis, an AFPAK Hand who was tragically killed in a Green on Blue attack at the Afghan Ministry of Interior in 2012.⁶³ Colonel Lofits' story was recently highlighted in Steven Coll's new book, *Directorate S: The C.I.A. and America's Wars in Afghanistan and Pakistan*. The former AFPAK Hand was also an Afghanistan regional affairs specialist, who had already completed a tour in Afghanistan on a PRT in Zabul, when he returned to Afghanistan to help advise Ministry of Interior officials.⁶⁴ Before his time as an AFPAK Hand, Colonel Loftis taught Afghan-bound Airmen the

basics of Afghan culture at the USAF Special Operations School, which dedicated an auditorium in his memory. The former Peace Corps volunteer cared for his Afghan counterparts and put the needs and interests of his allies often above his own safety. His name should be etched with other Air Force heroes who fell in combat, too.

AU should also continue to encourage its officers to write about their own COIN experience. Recent books like George Cully's *Adapt or Fail: The USAF's Role in Reconstituting the Iraqi Air Force* portend to a rich, yet largely untapped, area for publication and research. Air War College and Air Command and Staff College students, who earned their chops in the desert, would be an excellent source for primary research. As mentioned earlier, there has been an explosion of research papers dedicated to COIN by AU students. Airpower historians have the opportunity to tap into a largely unexplored field, by chronicling the Air Force's most experienced COIN force in its history.⁶⁵

Cementing Our Hard-Fought Experience

Almost 17 years after the traumatic events of 9/11, the USAF remains engaged in COIN. All too often, "the Air Force, in particular, has tended to ignore and downplay air operations in small wars and in its education and doctrine." The Air Force must focus on its core competencies against near peer competitors because airpower plays a critical role in existential conflicts. Nevertheless, the Air Force can still focus on its conventional mission while simultaneously harnessing its COIN expertise. Expanding its advisory effort, writing a new COIN doctrine, and extolling its COIN experience would not decrease the USAF's focus on state-on-state conflicts. The Air Force could focus on its core competencies and still allow a small but growing COIN force, which is guided by proper doctrine and inspired by their predecessors, to stamp out brushfire wars before they explode into thornier issues that would require more of the service's limited assets.

The Air Force has the most experienced, battle-tested COIN force in its history. However, this will not last forever, as these Airmen will inevitably retire or separate from the service. This large reservoir of experience will begin to dry up and force the USAF to start from scratch in future nonconventional conflicts. Making a relatively modest investment in cementing the past 17 years of hard-fought experience will ensure future Airmen are prepared for forthcoming conflicts. \bullet

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Air Advising in Afghanistan

Building an Organization in Flight

Col Matthew A. Douglas, USAF Dr. Jonathan Ritschel

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Background

It is well-known that since 9/11, the US military and its coalition partners have worked with the Afghan government and its military forces to battle an insurgency. At the end of 2014, the majority of US and coalition military forces left Afghanistan. What may be less known is that, for the last several years, a small contingent of American and coalition air advisors have been helping the Afghans rebuild their air force from the ground up. These advisors work daily with Afghanistan Air Force (AAF) leaders to help them build and implement effective organizations, capabilities, technologies, programs, and processes.

Challenges Soar

During the past four years, US and coalition personnel have largely transitioned from "doing" the mission to "training, advising, and assisting" the mission. Air advisors are responsible for helping Afghan leaders develop the AAF into a professional, capable, and sustainable organization. Advisors are working to stabilize an AAF that was pushed to the forefront of the conflict at a time when its leaders, air platforms, and infrastructure were ill-equipped to take on full responsibility for the future of a quickly growing and changing organization.

Given this situation, the air advisor role can be highly complex and dynamic. Advisor duties are akin to building an aircraft in flight while it's getting shot at. Constantly changing mission requirements, an influx of new technologies, and the potential severity of failure drive the requirement for constant management "innovation." In many areas, advisors must encourage the type of innovation that alters organizational structure, policy, and processes to adapt to ever-changing conditions and improve AAF performance.



Courtesy of Nathan Lipscomb

An Afghan maintenance technician marshals an A-29 Super Tucano. The AAF received 12 A-29s since 2016 and is scheduled to receive 8 more by the end of 2018.

However, in this environment management innovation can sometimes seem like a far-fetched objective. Many AAF leaders, particularly in fleet sustainment areas, such as aviation maintenance and logistics, were trained under the Soviet (and later, Russian) system and are not used to or necessarily accepting of Western management and sustainment concepts. Challenges to the status quo are not common in this environment. Therefore, typical innovation diffusion approaches that rely on grass roots initiative and implementation, as encouraged in Western cultures, are often infeasible. Consider other challenges such as a language barrier, vast cultural differences, undeveloped leadership skills, corruption, a paucity of human capital, and a lack of a clear mission end state, and one begins to understand the situation air advisors face in helping the AAF develop and implement new programs and processes in their organization.

From Dependence to Empowerment

Actions by US and coalition personnel and advisors in the last 16-plus years created dependence. Essentially, the Afghans are wholly reliant on outside entities for resources (money, equipment, training, logistics, and so forth), and likely will be for the foreseeable future. All of this "giving" behavior has been well-intentioned. However, future efforts need to focus on helping the Afghans develop critical sustainment capabilities so they can eventually succeed of their own accord.

Advising efforts inherently create the impetus for management innovation, as advisors try to encourage their counterparts to resist the status quo to improve performance. However, as is standard in any context, management innovation efforts often fail. During our time in-country, we identified a typical cycle that often led to failure. First, advisors encourage an initiative, and often fall short of convincing their counterparts to implement the initiative. Their AAF counterparts often tacitly resist because they don't have the capabilities/resources to implement the initiative on their own, or they don't have the desire to implement a new initiative (that is, they have their own-perhaps more lucrative-way of doing business). The innovation implementation process languishes, usually causing other issues that need to be resolved. Normally, in the advisors' eyes, the issues need to be resolved urgently. Frustration ensues, and the advisors employ what we commonly refer to as coalition override. That is, advisors "fix" the issues themselves, with little input or buy-in from their Afghan counterparts. The override often results in a quick (not enduring) solution, and it further encourages the counterparts' dependence on outside resources and solutions. Little learning occurs, and the process usually ends up back at step one with little to no performance improvement.

This outcome often leaves many advisors wondering, "How can we break this cycle?" In our experience, successful advisors often relied on a few principles to help AAF leaders implement initiatives and, as a result, become more empowered in the process. These success factors are nested under the umbrella of commitment. Unequivocal commitment by the advisor to the counterpart's initiative and success is necessary for any innovation to occur, and endure.

Persistence

Setbacks are frequent. Misunderstandings are constant. New ideas often die on the vine. The successful implementation of a new practice or process is often the result of persistent teaching, mentorship, and adaptation. We saw advisors achieve counterpart independence in certain areas through persistence. Advisors in the successful cases persistently increased their counterpart's understanding of the initiative itself and focused on the positive results (both potential and realized) of the initiative. Ultimately, their Afghan counterparts took responsibility for task completion and achieved incremental performance improvement. For example, the successful implementation of a new budgeting process necessitated persistence. Initial implementation attempts were characterized by misunderstanding, errors, duplications, and omissions, which required significant advisor intervention. However, persistent mentorship, adaptation, and a deliberate, staged, goal-focused approach to transition responsibility to the AAF counterparts eventually resulted in a more self-sufficient process that is consistent with the competencies of our AAF counterparts.



Courtesy of Dr. Jonathan Ritschel

An AAF officer teaches fellow officers about the requirements development and budgeting process.

Patience

Related to persistence is advisor patience. Constant failure can take its toll on an advisor's psyche, but successful advisors patiently persist until eventually, they break the negative cycle. On that note, advisors tend to want to make their counterparts look good (which, in turn, makes the advisor look good). It's human nature. However, in that light, one of the most difficult challenges for advisors is to have the patience to let their AAF counterparts come up with their initiatives. At least two issues arise here: time and quality. As previously mentioned, advisors want things fixed "now," and they want high-quality solutions (often to advisor standards). When their counterparts are learning, advisors shouldn't expect the highest level of quality in an initiative or solution. Moreover, advisors shouldn't expect their counterparts to get things done as quickly as expected. We learned that an advisor's lack of patience, followed by an "I'll just do it myself" attitude, hurts more than it helps.

Success that isn't advisor-dependent can build counterpart confidence and lead to empowerment. Aviation maintenance provides a cogent example. For instance, the transition of aviation maintenance responsibilities from civilian contractors to AAF maintenance personnel at one operating location resulted in an initial decrease of operational performance. Advisors were patient and resisted the initial urge to intervene and employ "coalition override" to improve mission performance at a faster pace. Afghan-initiated improvements slowly multiplied, and AAF personnel began to take more ownership of aviation maintenance planning and tasks. Eventually, mission performance began to improve, albeit incrementally.

Proximity

In this context, green-on-blue incidents have impacted trust and resulted in enhanced security measures for advisors. Barriers to close working relationships, both literal and figurative, exist. Advisors are required to keep their body armor and weapons close when participating in advising sessions, training, and meetings while in noncoalition-secured areas.

Our assessment is that advisors and counterparts who can overcome this lack of trust thrive. Physical and temporal proximity are large factors in overcoming a lack of trust. When advisors and their counterparts work in close physical proximity to one another, they see more frequent innovation and progress in applying new practices, processes, and procedures. Moreover, when advisors are in direct contact more frequently with their counterparts, they see more frequent success. These assertions seem obvious, but many advisors fall into the "FOB" mentality, rarely leaving the forward operating base, and achieving little progress toward initiatives. Advisors must make a deliberate effort not to let the barriers get in the way of their efforts to make a difference. Together, physical and temporal proximity can improve the advisor-counterpart relationship and increase the chance for success. Such was the case in the previous aviation maintenance example and is a big factor behind the successes achieved in aircrew training and combat capability.



Courtesy of Dr. Jonathan Ritschel

Coalition and their AAF counterparts pose for a photo after sharing a meal at a cultural awareness event designed to strengthen relationships and understanding.



Courtesy of TSgt Robert Cloys

Afghan maintenance technicians tow a Mi-17 into the hangar for inspection. AAF personnel are largely autonomous in performing many flight-line and inspections tasks for their Mi-17 fleet.

Air Advising: Success is Hard Fought

We're not naïve to the conditions and history in trying to push Afghan autonomy over the years. We acknowledge we still have a lot of work to do. Given the typical air advisor only has 6 or 12 months to make a positive impact on the AAF, it is imperative that we learn from experiences and impart that wisdom to future advisors. Thus, we argue advisors can, and should, encourage initiatives even when counterparts aren't necessarily open to change and improvement. The principles above—persistence, patience, and proximity—can help advisors as they encourage initiatives, particularly while dealing with the complex cross-cultural and contextual issues that exist in Afghanistan. If nothing else, the principles may provide some perspective and make an advisor's time in country a little more satisfying. By developing and encouraging initiatives with persistence and patience, while gaining trust through close and frequent proximity to counterparts, advisors may be able to encourage innovation and achieve enduring *Afghan* solutions. Ultimately, the implementation of initiatives that aren't advisor-dependent can lead to empowerment and, hopefully, one day, to a more professional, capable, and sustainable AAF. •



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Colonel Douglas (BS, Angelo State University; MS, Air Force Institute of Technology (AFIT); PhD, University of North Texas) is the dean of students, AFIT Graduate School of Engineering and Management. He is directly responsible for student services, registrar, and admissions functions in support of more than 600 US and international students enrolled in graduate engineering and management education programs. He is a career aircraft maintenance officer, with assignments in flight-line and back-shop maintenance, air mobility operations, and executive administration. He has led deployed aircraft maintenance, air mobility, and mission support teams in support of multiple joint/multinational contingency operations and exercises. During his last deployment, Colonel Douglas served as an air advisor and director of maintenance for Train, Advise, Assist Command–Air (TAAC–Air), Kabul, Afghanistan, responsible for advising Afghanistan Air Force leaders on the aviation maintenance enterprise, sustainment, and related training.



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Distribution A: Approved for public release; distribution unlimited. http://www.airuniversity.af.mil/ASPJ/

Artificial Intelligence

Myths and Realities

Maj William Giannetti, USAFR

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he Air Force's love affair with technology dates to its formative years in the early twentieth century. The romance quickly became an obsession when its first pilot gripped the yoke of his SPAD (*Société de Production des Aéroplanes Deperdussin*) biplane and took off into the skies. After 70 years, our service is still involved in the ultimate marriage between human and machine, and Airmen have relied on technology to take them to the farthest reaches of space, or to launch satellites that enable the precise application of airpower wherever and whenever America demands it. The Global Positioning System (GPS), for example, not only guides our fifth-generation fighters, such as the F-35 Lightning II, and remotely piloted aircraft, like the MQ-9 Reaper and RQ-4 Global Hawk, it is also the premier means of command and control for all of America's armed services. With GPS' help, combined with the MQ-9 and RQ-4, the USAF has become the undisputed leader of automation in flight today. So it stands to reason that in this century, Airmen and their machine partners are probably as close as two teammates can get.

In reality, Airmen are "in the loop," that is, the US's satellites and aircraft, both manned and unmanned, are firmly in their hands and under their command. This power dynamic is balanced cautiously in favor of the human side, and endowing computers with artificial intelligence (AI) might upend it. Noah Shachtman, an American journalist who was interviewed by P. W. Singer for his classic book Wired for War, explained that this view of the human-machine relationship is understandable. "It helps keep people calm that this isn't the Terminators." He continued, "The core competency of the military is essentially shooting and blowing up things. So, no one is eager to say, 'Outsource that to a bunch of machines.' "1 Sensing that AI's development was at a critical point, billionaire financier Elon Musk, along with 109 scientists and scholars, called upon politicians to gain control before it was too late. In an open letter to the United Nations last year, the group dramatically announced AI "poses a fundamental risk to civilization" and could cause armed conflict "to be fought at a scale greater than ever, and at time scales faster than humans can comprehend."² Many Airmen, especially those in the intelligence career field, think AI will take precious human factors, such as emotion or experience, out of the decisionmaking equation. Others believe that if AI is too involved in intelligence, piloting, or even medicine or manufacturing, human beings will be out of work and obsolete.

The fear of technology's novelty or the myths that surround it is nothing new. The most famous example can be traced to the nineteenth century when English textile workers known as the Luddites smashed their weaving machines to save their jobs. Even so, as the Luddites were grappling with their new reality, US textile weavers were optimizing their labor processes. According to *The Economist*, the introduction of machine laborers caused US textile output to increase 50 times, but the amount of work necessary to create so much cloth decreased by 98 percent.³ Cloth became cheaper, and as demand increased, the requirement for textile machine operators between 1830–1900 quadrupled. The old weaver's job elimination sparked a revolution, but more importantly, it brought about the demand for new technical and managerial expertise that liberated future workers' time to manage multiple machines, analyze their output, and refine schedules to maximize production.

Out with the Old

If it breaks through the myths that surround AI, the Air Force could undergo a similar revolution. Artificially intelligent devices that work in tandem with their human operators could replace jobs that are dangerous, dirty, or just plain dull. "Just as in the civilian economy, automation will likely have a big impact on military organizations in logistics and manufacturing," said Michael Horowitz, a University of Pennsylvania professor and an expert on robots built for warfare. "The U.S. military is very likely to pursue forms of automation that reduce 'back-office' costs over time, as well as remove soldiers from deployments where they might face risk from adversaries on fluid battlefields, such as in transportation."4 Robots guided by master technicians could delicately inventory and handle ordnance storage. Convoys of driverless vehicles led by a human driver could deliver supplies to frontline Airmen. According to a recent RAND Corporation study, autonomous vehicles' use might result in fewer crashes, reductions in travel time, and the exploration of alternative energy sources.⁵ The DOD's newest arm, the Defense Innovation Unit-Experimental (DIUx), is attempting to attract Silicon Valley's investment in cutting-edge knowhow.⁶ Sometime in the not-so-distant future, a human F-35 pilot will use selective, real-time intelligence to command three semiautonomous wingmen and carry out preprogrammed, or dynamic missions, from his cockpit. Tanker and logistical aircraft that refuel fighters and bombers and resupply troops across the globe are also ripe candidates for AI and automation. Much like the RQ-4 with its extended loiter time, these aircraft could conceivably stay in the air 12 hours or more and still be available for operations far longer than most pilots might like. The tedium alone that comes with mission administration or writing postmission reports also faces elimination. From the Washington Post to the Associated Press, AI is already writing sports stories and financial news items that are virtually indistinguishable from reports written by human beings.8

With advances in supercomputing, Airmen are leading the development of advanced algorithms that seek out enemy activity from the air—or from space—with

relatively minimal risk and at bargain prices. Human analysts are awash in a sea of data and, in an April 2018 Google-sponsored think-tank event that discussed AI. USAF Vice Chief of Staff Gen. Stephen W. Wilson said, "An intelligence analyst gets it right 75 percent of the time." In a \$10 million initiative called Project Maven, computers are fed images of North Korean mobile missile launchers-taken at every angle—from various sources like satellite imagery and parade footage. 10 A computer builds the very fundamentals of its AI as humans teach it to recognize these vehicles and their exact measurements. With increasing speed, computers will also be able to statistically determine normal versus abnormal activity as launchers are geolocated and labeled so that their movements from home garrison to launch pad can be mapped. Hours of searching for targets on the move will be a thing of the past. Someday Airmen might routinely program computers to recognize missile launchers as they are instantly captured by space-based sensors and seek a response from their human operators if the activities are outside predicted norms. Apply this concept to other intelligence disciplines, and it could determine an adversary's intent and eliminate much of the guesswork. The long hours Airmen spend observing these vehicles and assembling patterns of life could be eliminated. Humans who correctly teach their computers to seek out abnormalities could program them to reprioritize their work and even cue other airborne observers to either investigate the activity or ignore it.

USAF leaders will likely accept a substantial risk before undertaking a serious AI initiative, and Musk and company's dire warning illustrates the point. Old career fields might wither and die, but new work for algorithm-programming Airmen is yet to come. The techniques these career fields use to process information derived from unmanned reconnaissance assets alone-all the raw full-motion video and geospatial intelligence they produce—is woefully out of date because they lack some means of computerized sense-making. Presently, it's up to the individual Airman to interpret and collate data into a coherent picture, and the pace of today's style of warfare demands improvement. In the end, it is difficult to predict where AI might lead the Air Force. In the near-term, the organization will probably internally struggle with relinquishing more control to computers and managing the gap between those who want to develop new skills versus those who simply don't. At the very least, the Air Force should consider an aggressive public relations campaign that promotes the benefits of AI. Full-fledged partnerships with DIUx and Silicon Valley might even lead to a full-on AI culture shift for the Air Force and a more versatile human-machine team—for better or worse. ❖

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Kiffin Rockwell, the Lafayette Escadrille and the Birth of the United States Air Force by T. B. Murphy. McFarland and Company, Inc. (https://www.mcfarlandbooks.com), Box 611, Jefferson, North Carolina 28640, 2016, 200 pages, \$35 (softcover), ISBN 978-1-4766-6401-9.

With Kiffin Rockwell, the Lafayette Escadrille and the Birth of the United States Air Force, T. B. Murphy—a fighter pilot himself—reminds readers of the US Air Force's (USAF) long legacy dating back to the American pilots who flew in the French Air Service with the Lafayette Escadrille during World War I.

The book is primarily a biography of Kiffin Rockwell, an American who fought in the trenches with the French Foreign Legion before he transferred to aviation and became one of the key personalities and leaders of the Lafayette Escadrille. The most engaging part of the book, especially for readers not as familiar with the early culture and traditions of the Air Force, will be Murphy's examination of Rockwell, who he identifies as the soul of the Lafayette Escadrille. The author directly traces the early American fighter pilot's desire to control the skies and achieve air superiority to the modern Air Force's "fighting spirit" (p. 4–5). His argument that this abstract concept of spirit dates to Rockwell and is present across the USAF today is both a debatable and difficult-to-prove point as many other factors certainly influenced the modern traditions of the service.

Murphy gives his reader a sense of Rockwell's early life by focusing on the surrounding political events of the late nineteenth and twentieth centuries, the impact of the legacy of the Civil War on a young man from the south, and the idealism of the fighter pilot and likeminded young men (including his brother, Paul Rockwell, and poet, Alan Seeger) who felt compelled by strong moral principle to enlist in the French Foreign Legion at the outbreak of war. The second part of Murphy's work focuses on Rockwell's pilot training and time in the Lafayette Escadrille, where he became the first American to score an aerial victory during the war before he perished in aerial combat.

The author takes special care not to glorify the experiences of the battle-hardened veterans of the trenches while placing special emphasis on the development of the American aviators' "fighting spirit" as they score victories against the Germans in the skies. The reader will be struck by the clear contrast he makes between trench and air warfare. Although life as an infantryman or as an aviator could be famously short during World War I, the nature of flying seemed to make the sacrifice of a pilot much nobler in comparison to being killed in the trenches.

The author devotes his last few chapters to the origins of the US Air Service, the dawn of American airpower, and the forgotten legacy of the Lafayette Escadrille. These chapters are less organized than the previous chapters and read as if they are targeted to a reader with an elementary grasp of American airpower theory and the history of the USAF. Murphy uses these pages to discuss the lives and achievements of Rockwell's immediate successors, notably Raul Lufbery, Eddie Rickenbaker, and Billy Mitchell, drawing a direct line from these early aviators and to the famed World War II and Vietnam fighter pilot, Robin Olds. Olds' father, Robert, was also a fighter pilot, a good friend of Rickenbaker, and aide to Mitchell. These pages tying Rockwell to the modern Air Force through Olds represent the evidence for Murphy's main argument that the present-day "fighting spirit" of the Air Force can be traced back to Rockwell. Although Murphy makes a strong argument for this, the reader is

left wondering how else Rockwell's legacy might have been transmitted to the modern-day Air Force. Surely, many other later pilots were influenced by Rockwell and the Lafayette Escadrille, not only by the legacy of this abstract fighting spirit, but by the tactics developed by the early American pilots as well.

Although Murphy mentions concepts of airpower throughout the book (i.e., air superiority and strategic bombing), he never enters a full discussion of these ideas. He leaves the nonexpert reader guessing at how exactly does an air force gain air superiority, how does it maintain it, and what advantage does it provide? The book would have benefitted greatly from a more thorough discussion of the development of early airpower theory and how the members of the Lafayette Escadrille understood that theory with regards to the unit's missions. Indeed, a discussion of the development of air tactics during World War I and how they subsequently evolved over time could have provided the book with a stronger overall argument relating to Rockwell's enduring legacy. Additionally, Murphy mentions several famed airpower theorists, notably Giulio Douhet and Hugh Trenchard, but does not greatly elaborate on their contributions to early aviation. Many readers will undoubtedly be familiar with these individuals, but a brief summary of their achievements in the chapter notes would have been helpful for those who are not.

Murphy's sources for his book are a mixture of English-language primary and secondary sources. He relies heavily on his subject's war letters to his friends and family, as well as the memoirs of many of Rockwell's fellow soldiers, pilots, and contemporaries to illustrate the surrounding environment that his subject encountered at home, in the trenches of the Western Front, and in the skies. Lastly, the book may have benefitted from archival research and an examination of French sources, especially if such research could have provided a fresh look at Rockwell's legacy 100 years after World War I.

At 200 pages, the book is a quick read as the author's enthusiasm for the culture and traditions of the Air Force is ever apparent. The book will particularly appeal to individuals who have some familiarity with Air Force history and traditions. The shortcomings of the book are of minor concern and may prompt readers to engage in further reading on early American aviation history and the men of the Lafayette Escadrille.

Capt Herman B. Reinhold, USAF
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Airpower Reborn: The Strategic Concepts of John Warden and John Boyd, edited by John Andreas Olsen. Naval Institute Press (https://www.usni.org/navalinstitutepress), 291 Wood Road, Annapolis, Maryland 21402–5034, 2015, 256 pages, \$49.95 (hardcover), ISBN 978-1-61251-804-6.

In *Airpower Reborn*, John Andreas Olsen brings together six leading airpower theorists and attempts to reshape the narrative regarding the modern application of airpower. Olsen, the editor and first of the six authors, introduces the book by highlighting a perceived disparity between the traditional, ground-centric view of airpower and its strategic potential before outlining the reader's journey through airpower's history and future. The remaining theorists then seek to expand and refine airpower theory through an analysis of its history, its main proponents, and role in the current conflict. By shifting the paradigm away from ground-focused, tactical fighting and toward strategic effects, these airpower advocates hope to destroy the old approach to airpower and ignite a renaissance of thought regarding its true capability.

Olsen successfully recruits a team of authors with a clear understanding of the foundations of airpower history and theory and an ardent desire for reinvigorating the concepts of John Boyd and John Warden. As the book progresses from airpower's emergence out of the land-centric armies of the early twentieth century, it methodically and diligently outlines the struggle for a unique identity not entrenched in or limited by the view from the ground.

As a wholly air-focused approach to combat, Olsen's book is effective at re-establishing and furthering the airpower discussion. However, as the title seems to suggest, the aim of *Airpower Reborn* is to accomplish more than just add to the narrative regarding airpower's role in warfare. This aim seems justifiable, especially given the increasingly complex challenges modern militaries must face and the persistent need for a "powerful and flexible instrument for the pursuit of political objectives" (p. 1).

The book is organized into three sections: the history of airpower theory and strategy, the ideas and principles of Boyd and Warden, and a commentary on the "current concepts of operations and enduring principles of airpower" (p. 5). The first section takes on the monumental task of distilling a century's worth of airpower theory into 36 pages. The result is a dense, yet relevant, analysis of airpower's history, albeit one that may require further study by those not familiar with the subject.

As part two examines the key tenets of strategy developed by Boyd and Warden and their relevance to modern theory, the reader gains critical insight into arguably the most significant shift in airpower thought in recent history. Admittedly, the authors of these chapters betray an affinity toward these two Air Force fighter pilots (with one author being Warden himself) in their writing. This does not, however, undermine the relevance and importance of their views, such as the need to see the enemy as a complex adaptive system or the value of effects-based operations.

The final piece of Olsen's compilation endeavors to stand on the historic foundation of airpower theory and strategy to carry the conversation forward. The authors argue for a pivot away from a focus on large, terrestrial conflict that characterizes "first-generation strategy" toward the comparative advantage that airpower (and its associated general theory) brings to the modern fight (p. 130). While the authors end on solid ground on the merits of airpower, some of the arguments that lead them to these conclusions, such as the significance of Soviet pilots in World War II, do seem tenuous at best (p. 145). Yet despite these seemingly unsubstantiated assertions, they make a solid case for the need to rethink airpower strategy in light of the significant technological, cultural, and political changes that have reshaped modern policy.

Airpower Reborn is a valuable tool in the effort to bring airpower to the table of strategic thought and rebalance the power dynamic among the proponents of land, air, and sea. It neatly joins a significant number of authors, ideas, and opinions into a single, coherent case for airpower. Alas, despite its virtues, Olsen's book may not be pioneering enough for those who already see the value of airpower while not compelling enough for those with their feet firmly planted on the ground. Nevertheless, it is most assuredly a worthwhile read for anyone seeking an air-centric perspective on contemporary warfare.

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Radio Failure: An Airpower Conspiracy by Lee Downer, CreateSpace Independent Publishing Platform (https://www.createspace.com), 4900 LaCross Road, North Charleston, South Carolina 29406, 2016, 532 pages, \$15.95 (softcover), ISBN 978-1534-75103-3.

Radio Failure is a fictional work based partially on a historical event. In this sense, the book might be referred to as the literary equivalent of a cinematic docudrama. The docu-

drama, as presented in both film and print, is a difficult genre to perfect as it requires the viewer, or in this case the reader, to depart from a historical storyline to follow one that unfolds in its shadow or in some cases, changes the event altogether. This genre is especially difficult for readers well acquainted with the subject matter. As the book centers on Gen Billy Mitchell and his historic battle to create a viable national air force, Gen Lee Downer's intended audience is already likely to be well-read on the subject.

Having said this, I found the book both interesting and entertaining. General Downer effectively mixes actual and fictional people and events to provide the basis for the book's various subplots and colorful characters. The excerpts detailed in the book engage the reader, blurring the lines between fiction and nonfiction. On more than one occasion, I found myself searching for additional information on a character, event, or technical capability. While most were fictional, the thread of reality woven through the story facilitated a higher level of visualization for me as the reader.

His description of the flying equipment, aviation infrastructure, and flight operations of the period enhances the story well. The general effectively describes a landscape of open cockpit aircraft, perilous flying conditions, and rudimentary infrastructure, with pilots taking days to fly the distance now covered in mere hours.

The highly detailed back stories for his characters inject life into the fictional and nonfictional plot and subplots. The detailed descriptions of the characters, their origins, ambitions, virtues, and imperfections were well done. In some cases, however, the author's descriptions were almost too good. Throughout the book, some less important characters caught my attention because of their interesting back stories. When they didn't re-emerge or were mentioned only in passing by main characters, I found myself wishing for a bit more. The presence of such highly developed but minimally impactful characters seemed more confusing than illuminating.

The battle between the US Navy and the US Army over control of the air battle is especially interesting. Having minimal knowledge of the era, I once again found myself looking for information on dirigibles including the ill-fated USS *Akron* and USS *Macon*, as well as descriptions of early versions of the voice radios we take for granted today.

As a story, the book starts rather slow. The author spends a great deal of time describing the details surrounding the aftermath of Col Jimmy Doolittle's successful airpower demonstration, the sinking of the German battleship *Ostfriesland*.

Because the story revolves around General Mitchell's battle to create a national air force, General Downer begins the book by describing in great detail the sociopolitical issues facing the fledgling air service and its many adversaries including conniving politicians, narrow-minded generals, ambitious admirals, and corrupt defense industrialists. Throughout the book, the author routinely references General Mitchell's original task. However, the battle for the air force is not the primary plot.

The detailed accounting of the general's task and the sociopolitical environment is understandable as the basis for the primary plot—international espionage. Unfortunately, the reader doesn't see this plot emerge until much later in the book. The beginning of the book provides some clues but not enough to make the connection between the protagonists and the primary reason for their nefarious activities. As a result, the first several chapters of *Radio Failure* seem more like a history book than the thriller it is described as.

Once the characters and the environment are finally described, the story shifts from its history book format to that of a technological thriller, much in the same vein as Tom Clancy or Larry Bond. At this point, the pace of the story picks up significantly. With lots of twists and turns coupled with excellent and realistic descriptions of the environment, the book becomes difficult to put the book down.

The format of the book was also somewhat confusing. The story transitions from one vignette to another with little warning. In some cases, I had to go back four to eight pages to review characters and events I had previously read about. As a techno-thriller citing fictional and nonfictional military operations, I believe a Clancy-style format would have provided a more effective transition from one location and event to another. Simply titling the paragraphs with the location and date of the subject matter would provide the reader with a more coherent understanding of the "what" and the "where," thereby clarifying the story and its progression.

Radio Failure was self-published by General Downer. This is laudable, and for many authors, the only option for publication of their work. I would caution, however, that self-publishing authors should engage a professional editor and proofreader. While the book was well written with few errors, on the whole, there were some oddities that were obvious enough to notice. For example, the author liberally used both block and indented paragraphs. In some cases, the paragraphs were indented more deeply than others, leading the reader to think they are reading dialogue. This was not always the case. Further, the spaces between paragraphs were inconsistent, as was the use of italics.

As a military techno-thriller, *Radio Failure* mines the interwar era, which heretofore has primarily been represented by books focused on gangsters, prohibition, and the Great Depression. By leveraging the rapid evolution of aviation during this period, General Downer created an interesting and believable story as well as a realistic landscape. His extensive research on the era is also evident in his realistic description of the operational environment of the day. The reader can easily imagine flying an open cockpit aircraft across the nation, stopping at one outlying field after another.

The general does an admirable job weaving his fictional story with documented historical events. As previously noted, this is a difficult task as the targeted readership is already primed to be critical of any historical errors presented in the story.

Despite a slow start and some confusing formatting, the book effectively holds the reader's attention, especially once the primary plot emerges and the chase begins. As a result, the book is both entertaining and interesting, especially since it addresses a well-documented era of aviation that I feel is underrepresented in the techno-thriller genre.

NATO Communications and Information Agency The Hague, Netherlands

Bill Lambert: World War I Flying Ace by Samuel J. Wilson. McFarland and Company, Inc. (http://www.mcfarlandpub.com), Box 611, Jefferson, North Carolina 28640, 2016, 276 pages, \$39.95 (softcover), ISBN 978-1-4766-6467-5.

William Lambert, from Ironton, Ohio, a recipient of the Distinguished Flying Cross, was America's second leading ace behind the famous Eddie Rickenbacker. Like Rickenbacker, Lambert patrolled the dangerous skies over France during the "Great War," delivering justice to the Iron Cross as a member of Britain's Royal Flying Corps, No. 24 Squadron. The author explains that it was his love for aviation that drew him to service via Canada where he championed flight training and proved himself combat-ready.

The book entitled *Bill Lambert: World War I Flying Ace*, includes a brief summary of the Wright Brothers' struggle to make aviation possible. Readers unfamiliar with aviation terminology, such as air foil, wing warping, rudder, elevator control, and ailerons may find it difficult to follow the progress and accomplishments of early American aviation. However, the

author, Samuel J. Wilson, does an exquisite job chronicling the life and times of this decorated fighter pilot of the First World War, who largely lived in the shadows of the more vocal aviators in early aviation.

Wilson is a history professor at the University of Rio Grande in Ohio. He is careful to cite the professional work and memoirs of Lambert who kept a daily log during the war and published his book, *Combat Report*. As Lambert's timeline advances through 1918, the author provides current events and strategy of the Allies to generate a more complete and muchneeded battlefield picture. Though the citations can become a bit distracting, they provide comfort to the reader that this man's story and his conquests are true and accurate. He also provides corroborating support by examining available squadron historical records. The stories are vivid accounts of contact with the enemy, the perils of an inattentive pilot and the successes of No. 24 Squadron. Pilots faced many challenges flying in an open cockpit and dealing with incessant system failures that plagued operations and degraded the spirits of eager fighter pilots such as Lambert.

Sadly, Lambert's involvement in the "Great War" ended abruptly and prematurely. He suffered from combat stress or "shell-shock" as it was diagnosed at the time. It is now termed post-traumatic stress disorder (PTSD). The chapter dedicated to his diagnosis, and the condition is mind-opening and impactful for anyone who has experienced similar symptoms or knows someone who has struggled with this very real disease. PTSD impacted Lambert for the rest of his life of 87 years, and his character because the way in which he dealt with his problems were less than popular in the court of public opinion. The author is brutally honest in telling Lambert's personal side, his promiscuous behavior during his barnstorming days after the war, and his stubbornness and crotchety demeanor later in life that only worked to push friends and acquaintances away.

This book can spawn a greater interest in World War I aviation and America's first fighter pilots. The early machines may lack the appeal of modern-day airpower with all of the bells and whistles of advanced technology, precision-guided munitions, and stealth technology. However, these dogfights—told from an ace's perspective—are real, engaging, and leave the reader in suspense. It is hard to put the book down as each encounter with the enemy keeps the pages turning highlighting Lambert's 22 confirmed victories. It has the underpinnings of being a Hollywood production as Lambert advances to the edge of greatness, departing the Great War as America's leading ace only to be outdone by a fellow countryman and equally excellent pilot who is not fully covered in this publication. It is a must read for historians and aviation enthusiasts.

SMSgt Christopher Wlodarczyk, USAF Creech AFB, Nevada

Cyberspace in Peace and War by Martin C. Libicki. Naval Institute Press (https://www.usni.org/navalinstitutepress), 291 Wood Road, Annapolis, Maryland 21402, 2016, 496 pages, \$55 (hardcover), ISBN 978-16824-7032-9.

Today's threat environment has become more complex than ever. With never-ending attacks from terror groups like the Islamic State of Iraq and Syria (ISIS) and rogue states causing trouble on the world stage, it is easy to forget about what is behind the scenes during these conflicts. Behind the scenes in today's environment is a gray area of shadows and ghosts—where everything isn't what it seems to be, and attacks are carried out by proxies and people with no faces or from countries of unknown origins. Welcome to the complex world of cyberspace.

Cyberspace is nothing new to the United States and its allies. However it proves to be the most hassling, and by all news accounts, the least talked about. Operating in cyberspace is by far one of the most important spheres that the United States can be involved with as cyberspace touches almost everything we use today. In some form or fashion, our home computers, cell phones, tablets, and even coffee makers are connected to the Internet and cyberspace. On a national scale our power grid, nuclear power plants, and other critical infrastructure resources are connected to cyberspace. These assets, if targeted by a massive cyberattack, can set the nation back to the 1800s, thus severely limiting the nation's capability to insert its dominance on a global scale. In *Cyberspace in Peace and War*, Martin Libicki details what the United States can do to prevent such an attack. His approach in this text brings together many aspects of how cyberspace is used during peace and war and combines them into a well-constructed, analytical and detail-oriented format on various cyber-related topics.

This text is broken down into five separate parts that discuss various aspects of technology, operations, policy, and strategy. After reading this book, the reader will come away with an in-depth and detailed understanding of all those areas and how they relate to US policy and the potential outcomes in cyberspace because of those policies. Libicki offers numerous "what if?" scenarios, backed by case examples of incidents involving cyberspace from countries around the world. One of the most intriguing aspects of the text—that those involved in any national security studies course or position will find valuable—is a chapter on a cyberattack in a nuclear confrontation. Nuclear weapons seem to be only discussed, as of late, when dealing with countries like Iran or North Korea. However, cyberspace introduces new concepts on how to fight a nuclear war, and Mr. Libicki clearly focuses on these concepts. The strategic level of thinking on display during this particular chapter will give any reader an appreciation of the amount of research the author has conducted to write this text.

The thought-provoking questions posed and arguments provided within the text offer countless ways to look at various problems, policies, and strategies in the cyberspace arena. These questions and arguments will only aid in the further development of US cyberspace policy in peace and war. Lastly, this book is recommended for those who want a basic understanding of cyberspace to those who currently hold a position within the realm of national security and everyone in-between. This book is truly a modern classic on the topic of cyberspace.

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Air Power: A Global History by Jeremy Black. Rowman and Littlefield Publishers (https://rowman.com), 4501 Forbes Boulevard, Ste. 200, Lanham, Maryland 20706, 2016, 386 pages, \$38 (hardcover), ISBN 978-1-4422-5096-3.

To call Jeremy Black a prolific writer is an understatement. In the same year that he published *Air Power*, he also wrote a comprehensive history of counterinsurgency (COIN) operations entitled *Insurgency and Counterinsurgency:* A *Global History*. Both texts attempt to offer the total history of the subject matter without insinuating that the future of either type of warfare is stable; as with COIN doctrine, airpower doctrine is constantly evolving with new elements, including the use of drones in warfare.

For a history, *Air Power* is rapidly paced; in just the last century, the aircraft has evolved from a single-man reconnaissance craft to a global power projection platform. The author relates the humble beginnings of travel by air, from the Zeppelin to the Wright Brothers, through propeller-based fighters and bombers, to the B-2, F-35, and drones of the modern battlefield.

Black reminds the reader that, in addition to consisting of a country's collected aircraft and missile systems, an air force is a visible reminder of a nation-state's power and prestige.

Black grants equal discussion to naval aviation and missile programs. He points out that some combatants grouped all air assets together under one service regardless of their projection platform. Just as an air force possesses the long-range aircraft and weapons to wreak devastation on a global scale, carrier groups and submarines carry the fighters and missiles capable of equal devastation. Rotary wing aviation, airborne, and air assault operations are also given attention.

The author clearly demonstrates that air doctrine continues to evolve due to countermeasures and advancement in technology. Fighters function as escorts to bombers, which began to carry guns due to attacks from fighters, and so forth. Radar evolved as a means of tracking aircraft but resulted in stealth technology. This evolution of measures and countermeasures also extends to the domains of cyber and space; to maintain space and cyber superiority on the hybrid battlefield, the war fighter must employ defensive measures in both domains.

Black poses some ethical dilemmas that result from the use of airpower as combatant commanders and the civilian leaders who maintain control of the military face situations of mass casualties and the possibility of the destruction of entire areas of countries. The author refers to the appearance that the proponents of air doctrine seem less concerned with the societal impacts of the use of airpower than in the past. In discussing the future, Black considers the efficiency of the A-10 for close air support, contrasting it with the US Air Force's desire to use bigger, more modern platforms like the B-1B for that role. Even this idea raises further ethical considerations of proportionality.

The book concludes with more questions pertaining to the use of airpower on the modern battlefield. How should airpower be utilized in COIN operations? Is the use of drones to eliminate enemy command and control cells ethical? In the larger scheme of air operations, should force be deployed from space? The final questions posed by the author pertain to the cost of maintaining the edge in airpower—while the United States and its North Atlantic Treaty Organization allies increasingly face calls for lower military budgets, rising powers like India and China "continue to invest in cutting edge aircraft." (p. 321)

Like *Insurgency and Counterinsurgency*, Black's *Air Power* is essential reading for anyone interested in joint doctrine and the evolution of the armed forces. Concise, light, and fast-paced, yet thoroughly dense with research and understanding of the subject matter, Black's work deserves a place on the bookshelf of the air leader or the joint war fighter.

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Marked for Death: The First War in the Air by James Hamilton-Paterson. Pegasus Books (http://pegasusbooks.com), 148 W. 37th Street, 13th Floor, New York, NY 10018, 2016, 356 pages, \$27.95 (hardcover), ISBN 978-1-68177-158-8.

World War I aviation typically conjures visions of biplane dogfights, silk scarves, and mess halls filled with drunken ballads dedicated to fallen comrades. *Marked for Death*, James Hamilton-Paterson's work, explores these stereotypical aspects of the "Great War" alongside entertaining vignettes of fear and boredom on the front, hypoxia in the air, and the finer points of machine gun interrupter gears. In the process, he sheds light on aspects of early military aviation often lacking from general aviation histories.

The work takes a nonstandard approach by exploring various topics revolving around the war, as opposed to a chronological account of battles, campaigns, and specific aircraft descriptions. The author instead explores everything from the construction and capabilities of the earliest warplanes (both were considerably lacking) to contemporary understanding of aerospace physiology, to the training and daily life of aircrew on the western front.

The information is primarily from the British point of view, including chapters discussing the difficulties in aircraft production due to British politics and interservice rivalries, but the author does a decent job of offering views from French, German, and American veterans as well. Each topic is well-researched and could serve as a stand-alone essay. Hamilton-Paterson dispels several myths along the way, including the memory of the valiant "knights of the air" and replaces time-honored images with more historically accurate understanding.

The writing is clear and typically enjoyable, but American readers may find themselves bogged down in overly British-centric topics. The good news is that since each chapter works on its own, the reader should feel free to "fly over" various chapters and focus only on the rich aviation history that catches their interest. Pilots like me will find great pleasure in the chapters discussing early airplanes and training and may even enjoy the analysis of World War I thinking on high-altitude flying and the impact on human physiology. We may consider their decisions ludicrous when compared to modern science, but here the author excels at making the reader understand the World War I aviator's thought process. The reader will be left with a grudging respect for those pioneers' decisions and the difficulties they faced.

Pilots, aircrew, and history buffs alike will appreciate this book. Although not worth putting on a professional reading list, it will help flesh out aspects of early aviation not often considered. For those looking to understand what it was like for the men who braved the skies during the "War to End all Wars," *Marked for Death* is an interesting read.

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