



Soldiers jump with Finnish, Polish, and Estonian special operations forces from Lockheed C-130 Hercules during airborne operations over Rovaniemi, Finland, as part of Finnish-led Northern Griffin, March 14, 2018 (U.S. Army/Kent Redmond)

Beyond the Gray Zone

Special Operations in Multidomain Battle

By James E. Hayes III

In their quest to alter the post-Cold War world order, revisionist nations such as Russia, China, and Iran are increasing their military capabilities to challenge the traditional U.S. supremacy in arms. These potential adversaries are also linking their growing military power to a willingness to employ it in an integrated fashion with informa-

tional, economic, political, and technological means to achieve their objectives, often while remaining below the threshold of a decisive U.S. response. To counter this new threat paradigm, the U.S. Army and Marine Corps have developed a joint operational approach known as multidomain battle (MDB). Although it remains in the conceptual phase, both Services envision MDB as the combined arms concept for the 21st century based on the assumption that future near-peer adversaries will contest U.S. superiority in all domains:

on land, at sea, in the air, and throughout the electromagnetic spectrum.¹ MDB's animating principle, therefore, is the employment of ground forces to gain temporary windows of advantage against a near-peer foe in order to enable other components of the U.S. joint force.

In their evolution of the MDB concept, Army and Marine senior leaders assume that U.S. special operations forces (SOF) will play a critical, albeit currently undefined, role. This is a valid assumption given the lessons learned from the

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past 15 years of combat in Afghanistan and Iraq, not the least of which is the idea that conventional and SOF formations must operate in an *integrated* and *interdependent* manner in order to ensure success on the modern battlefield. Integration and interdependence lie at the heart of MDB, as the concept envisions SOF conducting activities in support of conventional forces and vice versa. But what specifically should we expect SOF to do within the context of MDB? What unique function could SOF play in assisting the joint force to counter this new threat paradigm?

Current Value

Perhaps the best point of departure for envisioning SOF's potential role in MDB is to examine what they currently offer the joint force. To that end, Joint Publication 3-05, *Special Operations*, provides a comprehensive definition of SOF characteristics:

Special operations require unique modes of employment, tactics, techniques, procedures, and equipment. They are often conducted in hostile, denied, or politically and/or diplomatically sensitive environments, and are characterized by one or more of the following: time sensitivity, clandestine or covert nature, low visibility, work with or through indigenous forces, greater requirements for regional orientation and cultural expertise, and a higher degree of risk. Special operations provide joint force commanders and chiefs of mission with discrete, precise, and scalable options that can be synchronized with activities of other interagency partners to achieve United States Government objectives.²

Thus, SOF are by design organized, trained, and equipped to succeed in environments where the enemy may dominate one or more domains. This idea comports with the popular view of special operations: namely, a small team of highly trained operators conducting missions in enemy-controlled territory. While relevant, this viewpoint does not illustrate the totality of SOF capabilities, nor does it represent the unique character of SOF. Rather, it is SOF's ability to

operate jointly at the tactical level to influence the human domain for strategic and operational effects that truly sets it apart. SOF's broad range of missions dictates the need for small, purpose-built task forces consisting of ground, maritime, and air elements optimized to engage in the irregular, population-centric conflicts occupying the contested space between war and peace. This space, known colloquially as the Gray Zone, has become the focus of SOF's recent efforts against terrorism and insurgency across the globe and has increasingly defined its *raison d'être* when compared to conventional forces.³

U.S. Army Special Operations Command further refines this understanding of SOF's role in Gray Zone conflict with the following value propositions: precision targeting operations, crisis response, indigenous approach, and developing understanding and wielding influence.⁴ While originally crafted to showcase Army SOF's strategic value to the Nation, these propositions can be generally applied to special operations units from the other Services as well. The first two value propositions—precision targeting operations and crisis response—address the more well-known components of SOF such as unilateral direct action and counterterrorism missions that employ exquisitely refined targeting processes and highly trained, rapidly deployable and scalable formations. These capabilities provide options for senior decisionmakers throughout the spectrum of conflict, in addition to buying time and space for longer term Gray Zone activities to gain traction.

The latter propositions—indigenous approach and developing understanding and wielding influence—speak to the indirect side of SOF Gray Zone operations. They emphasize operating among local populations as well as by, with, and through partner forces in order to deliver strategic and operational effects. Accordingly, these propositions require SOF operators who are proficient in not only traditional combat skills but also language and cultural understanding. The mission sets that best exemplify this indirect side of Gray Zone activities

are unconventional warfare and foreign internal defense. Like opposite sides of a coin, unconventional warfare entails the employment of SOF to support an indigenous resistance movement against a hostile power, whereas foreign internal defense calls for SOF operators and conventional forces alike to assist a friendly government in defeating an insurgency or other forms of domestic lawlessness.

As mentioned, both the direct and indirect sides of SOF outlined in the value propositions are important to the conduct of operations in the Gray Zone. However, only those activities focused on the human domain in contested or denied environments are truly unique to SOF and not duplicated by conventional forces. For example, a U.S. Marine Expeditionary Unit possesses the capability to conduct direct action and other crisis response-focused missions and, under certain circumstances, may be better suited to the task than an equivalent SOF formation. On the other hand, only SOF are specifically trained and equipped for joint operations to advise, assist, and employ local resistance fighters and other irregular forces to act in support of U.S. interests. This optimization for operating with indigenous partner forces in the Gray Zone is what makes SOF "special" and consequently offers the greatest potential for contributions to MDB.

SOF and the Physics of MDB

In its description of an approach for fighting a technologically sophisticated near-peer adversary, the Army's MDB white paper identifies multiple emerging enemy capabilities that will negate traditional U.S. strengths in a future conflict. Topping this list are modernized integrated air defenses and long-range precision strike capabilities that provide adversaries with the ability to deny U.S. forces freedom of movement while shielding theirs from preemptive or retaliatory strikes.⁵ This ability to prevent access to a theater of operations and then threaten forces operating there undermines two longstanding tenets of American warfighting: naval and air supremacy. Since the Korean War, U.S. ground forces have been unencumbered



Green Berets assigned to 7th Special Forces Group (Airborne), Operational Detachment-A, prepare to breach entry point during close quarter combat scenario as part of Exercise 2-16 at Marine Corps Air Ground Combat Center, Twentynine Palms, California, February 10, 2016 (U.S. Air Force/Efren Lopez)

by threats emanating from both the sea and air due to the joint force's overwhelming superiority in those domains. Likewise, since the end of the Cold War, U.S. maritime forces have operated with virtual impunity on the seas with no peer navy able to challenge the status quo. Looking forward, U.S. joint force commanders will no longer enjoy these longstanding advantages. U.S. aircraft will fight to remain in, much less, control the sky. Concurrently, American warships will contend with sophisticated threats above, below, and on the surface of the sea and accept losses not seen since World War II in order to protect vital maritime lines of communication.

Adversaries' growing capability to deny U.S. forces' access and freedom of maneuver will also lead to their dominance in the reconnaissance/counter-reconnaissance fight.⁶ Free from U.S. strikes, enemy intelligence, surveillance,

and reconnaissance (ISR) systems will have virtual free reign of the battlespace, affording adversary commanders greater situational awareness while rendering U.S. forces blind. Combined with an aggressive cyber and electronic warfare campaign that degrades command and control systems, enemy formations could paralyze U.S. joint force commanders' ability to understand the operational environment and direct forces to positions of relative advantage.

By applying their experience working in the Gray Zone, SOF can assist in ameliorating these operational challenges by offering other components of the joint force temporary windows of advantage over enemy strengths. For instance, SOF conducting unilateral raids from the land, sea, and air against enemy antiaccess/area-denial (A2/AD) capabilities can support U.S. conventional forces' freedom of maneuver while presenting an adversary

with multiple dilemmas throughout the battlespace.

SOF contributions during the initial phase of Operation *Iraqi Freedom* offer a clear historical example of this employment method and its efficacy. During the outset of the campaign, SOF teams operating under the direction of the U.S.-led Combined Forces Special Operations Component Command (CFSOCC) conducted multiple strikes in all domains to set the conditions for the coalition's conventional land, maritime, and air components. Army special operations aviators fired the first shots of the war to destroy Iraqi border observation posts on the country's western and southern borders, thereby depriving Saddam Hussein of his most reliable early warning net.⁷ This action was soon followed by Rangers and Special Forces infiltrating Iraq's western desert to conduct counter-theater ballistic missile

operations. Backed by coalition airpower, these teams conducted a series of complex direct-action raids that effectively prevented Saddam from threatening Israel and Jordan with Scud missiles while denying his ground forces access to Iraq's western approaches. In the Arabian Gulf, SEALs and their Polish SOF counterparts assaulted key infrastructure along the waterways near Al-Faw Peninsula in order to secure maritime access points for coalition naval vessels.⁸

In addition to direct action, SOF employing their Gray Zone expertise in MDB can assist in regaining the initiative in the reconnaissance/counter-reconnaissance fight. SOF ground and maritime reconnaissance teams provide the capability to emplace persistent eyes on enemy targets in order to meet joint force commanders' intelligence requirements, thereby filling a gap left by the loss of ISR platforms due to enemy action, weather, or other adverse battlefield conditions. As necessary, these teams can quickly transition from reconnaissance to other missions as the battlefield situation evolves, and even assist in tipping and queuing airborne ISR platforms once conditions are set for their re-introduction into the fight.

CFSOCC's experience in Iraq also illustrates the value of SOF in the unilateral reconnaissance role. Special forces with attached Air Force combat controllers provided vital information on enemy dispositions at the Karbala Gap and other key chokepoints along the coalition axis of advance and continued their reporting despite sandstorms that grounded other ISR assets.⁹ Like their direct-action brethren, these SOF derived much of their success from previous deployments to the Middle East conducting foreign internal defense and other Gray Zone activities. Their operators possessed a deep, tactile understanding of the operational environment as a result of repeated interactions during this pre-hostilities phase and could therefore exploit that knowledge once combat operations commenced.

Unilateral operations aside, SOF teams working by, with, and through indigenous surrogate forces are also a potent tool to counter adversary

cross-domain threats and, in many instances, provide more enduring effects. Indigenous forces offer SOF and, by extension, the joint force commander a more comprehensive understanding of the operational area and insights on the human domain that can be leveraged against an adversary. SOF teams conducting unconventional warfare, unlike their counterparts tasked with unilateral missions, can mass indigenous forces to destroy enemy air and maritime A2/AD capabilities and then occupy those locations in order to prevent regeneration. Due to their connection with the local populace and ability to threaten enemy lines of communication, SOF—paired with indigenous forces—can also redirect enemy resources from opposing U.S. conventional land forces to conducting a manpower-intensive counterinsurgency effort. Thus, SOF teams working in the human domain offer the joint force commander opportunities to shift battlefield dynamics to U.S. advantage with a minimum investment in personnel and material assets.

History abounds with examples of the cross-domain, force multiplication effects of SOF operating with indigenous forces. Looking back to World War II, the Office of Strategic Services (the forerunner of present day SOF and intelligence organizations) fielded numerous units that assisted resistance movements in Europe and Asia. These organizations and their locally raised counterparts gathered intelligence, rescued downed aircrews, and tied up thousands of enemy troops in counterinsurgency operations, all of which set the stage for conventional Allied offensives against the Axis powers.

The Office of Strategic Services' Detachment 101 offers a powerful example of SOF's cross-domain potential with indigenous partners. Formed in 1942 after the Allied defeat in Burma by the Japanese Imperial Army, Detachment 101 recruited and trained thousands of Burmese Kachin tribesmen for missions deep in enemy-held territory. In addition to earning credit for the highest kill/loss ratio of any unit in U.S. military history (killing or wounding over 15,000 Japanese soldiers while losing fewer

than 400 unit members), Detachment 101 maintained a persistent presence in Japanese-controlled Burma and, in doing so, provided temporary windows of advantage to other components of the Allied joint force operating in the China-Burma-India theater. In support of the Allied air component, Detachment 101 elements designated targets for 75 percent of the 10th U.S. Air Force bombing missions and rescued 425 Allied airmen from capture.¹⁰ Additionally, Detachment 101's fierce Kachin guerrillas raided numerous Japanese airfields, thereby degrading the enemy's air superiority from the ground. Their operations to harass Japanese lines of communication also bought time for the British 14th Army and other conventional Allied ground units to reform and reorganize after their initial setbacks, and then set the conditions for their successful counteroffensives in Burma during the latter stages of the war.

CFSOCC's activities during the opening phase of Operation *Iraqi Freedom* in April of 2003 delivers a more recent example of SOF paired with indigenous forces for strategic and operational effects. In contrast to the unilateral operations of its southern and western task forces, CFSOCC's Joint Special Operations Task Force-North (JSOTF-N) enlisted the assistance of thousands of Kurdish Peshmerga fighters to achieve its objectives. JSOTF-N, while originally envisioned as the supporting effort to a conventional land assault from Turkey into northern Iraq, soon became the only force able to take the fight to Saddam's forces in the north once the Turkish government refused to grant the Army's Fourth Infantry Division permission to conduct operations from Turkish soil.¹¹ Undaunted, JSOTF-N's Special Forces infiltrated via Air Force special operations aircraft, linked up with their Peshmerga counterparts, and then facilitated a follow-on parachute drop of the Army's 173rd Airborne Brigade into northern Iraq. With the 173rd placed under the operational control of JSOTF-N, the combined U.S.-Kurdish team quickly defeated a unit of the terrorist group Ansar al-Islam before turning



Special forces launch surface-to-air missiles during training mission on Eglin Air Force Base, Florida, June 11, 2014 (U.S. Air Force/Tyler Woodward)

their attention to Saddam's forces fixed on the Green Line separating Iraq from the semi-autonomous Kurdish region. During the ensuing battles, JSOTF-N and their 60,000-strong Kurdish partner force attacked and defeated four Iraqi divisions, thereby preventing Saddam from repositioning significant forces to counter the coalition's main thrust against Baghdad.¹²

Upon closer examination, one discovers that JSOTF-N's victories in northern Iraq can be attributed in large part to the relationships established between SOF and Kurdish partners during pre-hostilities activities. In fact, many of JSOTF-N's senior officers and noncommissioned officers had participated in Operation *Provide Comfort* in 1991, during which SOF provided humanitarian relief to Kurdish refugees fleeing Saddam's reprisals after his defeat in the first Gulf War.¹³ Consequently, these SOF leaders leveraged the trust established over a decade earlier to produce an indigenous force that opened a

second front against Saddam's forces. Like their predecessors in Detachment 101, JSOTF-N demonstrated the effectiveness of massed indigenous forces striking in the enemy's rear areas. As what's past is prologue, today's SOF aligned with willing partners can generate these same effects in support of other joint force components conducting MDB.

Engaging in the Nonkinetic Fight

Carl von Clausewitz opined about the distinctions between the moral and physical factors in war and, in doing so, emphasized the importance of the moral over the physical.¹⁴ Recent events in Ukraine, Syria, and the South China Sea illustrate that potential adversaries recognize the importance of winning the psychological battle and are willing to devote considerable resources to that end. By using a combination of political subversion, information operations, and cyber activity, adversary nations proffer

a veneer of legitimacy for their objectives, foment unrest in target populations, and sow distrust and discord in Western institutions such as NATO and the European Union.

Accordingly, adversary nations will employ nonkinetic, psychological effects to enhance their more traditional military capabilities, employing them in tandem with conventional ground, maritime, and air forces or as the vanguard of aggressive military action against U.S. interests. Much like their physical A2/AD systems, potential enemies will manipulate the information sphere to stymie the U.S. joint force's ability to understand and shape the operational environment.

SOF's continuous presence conducting Gray Zone activities in over 80 countries in a given year provides the joint force a significant psychological deterrent against potential adversaries and can assist in regaining the initiative in the cognitive realm.¹⁵ Prior to hostilities, SOF teams conduct foreign internal defense

missions to enhance the combat skills and professionalism of partner-nation military and paramilitary forces. As a result, partner forces' increased capability to provide security raises the confidence of the local populace, rendering them less susceptible to the effects of adversary propaganda and information operations. Concurrently, SOF teams training with foreign partners gain valuable insights on the operational environment with respect to the human domain that can be exploited by the joint force during subsequent combat operations against a near-peer adversary.

SOF military information support operations (MISO) teams are yet another nonkinetic tool to apply against adversary efforts to dominate the cognitive realm. Trained and organized specifically to influence both enemy and friendly audiences, MISO teams employ a wide array of outlets (radio, television, social media) to counter enemy propaganda and misinformation. MISO teams work with U.S. country teams, partner security forces, and other stakeholders to help win the battle of ideas and prevent adversaries from exploiting political, societal, and economic fault lines that can lead to conflict escalation.

This ability to fight the psychological battle passively (SOF teams working with partner security forces) and actively (MISO elements conducting influence operations) offers significant benefits to a joint force commander conducting MDB, particularly in an environment where other components are struggling to get into the fight. For example, SOF-trained security forces paired with effective MISO can prevent adversaries from fomenting civil unrest at partner-nation ports and airfields, thereby facilitating conventional U.S. ground and air element deployment into the theater of operations.

SOF's recent experience conducting Gray Zone activities against terrorists in the southern Philippines offers a glimpse of MISO's potential contributions to MDB. Deployed in 2002 to assist the Armed Forces of the Philippines in defeating the outlaw Islamist Abu Sayyaf Group (ASG), Joint Task Force-510

(JTF-510)—later renamed Joint Special Operations Task Force-Philippines—focused on working with the U.S. country team and its local Philippine partners in a comprehensive civil-military effort.¹⁶ In contrast to the more kinetically focused SOF campaigns in Iraq and Afghanistan, JTF-510 took the opposite approach due in large part to historical Philippine sensitivities to American troops conducting operations on the archipelago.¹⁷

Targeting the main ASG stronghold on the island of Basilan, JTF-510 MISO teams established a robust information operations cell with a combined team of Philippine military, U.S. Embassy public affairs, and host-nation media outlets. By employing carefully designed radio, print, and television messages that legitimized the Philippine government and security forces, MISO operators working in the information operations cell complemented JTF-510's other lines of effort directed at foreign internal defense and conducting civil works projects with local communities on Basilan.¹⁸ As a result, JTF-510 and its Philippine counterparts effectively isolated the ASG from the populace and secured Basilan from Islamist extremism.

Although JTF-510's success on Basilan was in many respects a product of the Philippines' longstanding ties to the United States and other unique circumstances, it does illustrate the power of a deftly crafted SOF information operations campaign influencing the human domain for outsized effects. When placed against the MDB template, we can envision such an effort influencing friendly audiences to resist the aggressive actions of a near-peer adversary in his homeland and consequently buying time and space for other components of the U.S. joint force to effectively respond.

Countering Russia's highly developed unconventional warfare capability is one potential use of SOF's expertise in the informational realm. As evidenced by the recent deployments to Crimea and Ukraine's Donbas region with its shadowy paramilitary fighters known as "Little Green Men," Russia seeks to undermine U.S. and Western interests through a sophisticated combination

of diplomatic, informational, military, and economic activities. The Russian government's ability to manipulate the information sphere is particularly significant, as its use of propaganda, misinformation, social media, and deception all combine to create a sense of chaos and uncertainty that helps attain Russian strategic objectives while remaining below the threshold of a conventional Western military response.¹⁹ Accordingly, MISO teams are well suited to respond to this threat. By modifying tactics, techniques, and procedures developed in the Gray Zone in order to legitimize the actions of alliance partners in the Baltics and other regions threatened by Russia, information warriors can fight effectively against the aggressive designs of this near-peer competitor. Like their Russian adversaries, SOF MISO teams thrive in the "left of boom" pre-hostilities space. Their asymmetric advantage, however, comes in the form of integration with U.S. interagency community and partner-nation capabilities to deliver meaningful effects against threat messaging.

A Multidomain Tool, Not a Panacea

The demands of the future battlefield—characterized by increased lethality, complexity, and the loss of traditional U.S. supremacy in all domains—will certainly test the tactical skill and strategic acumen of SOF operators. To maximize SOF's effectiveness in this future fight, commanders must be willing to accept a greater level of risk to the force than has been customary during recent operations. We can safely assume that SOF teams conducting unconventional warfare and other dangerous tasks against a capable and determined near-peer adversary will not have the same protections afforded to their predecessors in Afghanistan and Iraq. Rather, SOF will most likely operate without the benefits of routine medical evacuation and fire support, as these assets may be degraded by enemy action, allocated against higher priority missions, or possess insufficient operating range to assist deployed teams. Therefore, like their conventional ground, maritime,



U.S. special operation forces operator fast ropes near Tallinn, Estonia, December 11, 2017 (U.S. Army/Matt Britton)

and air compatriots, SOF must persevere in spite of losses suffered in a brutal and unforgiving operational environment to prevail in MDB.

Joint force commanders must also understand the limitations of SOF. Their numbers are few and should be allocated only against those strategic and operational targets offering the most potential benefit to the joint force. Additionally, SOF units lack many of the command and control, fires, and logistical capabilities required to conduct sustained operations and therefore remain dependent on conventional forces to provide this support. As mentioned, SOF operations focused on the human domain can provide windows of opportunity for other components of the joint force; however, these windows are temporary and subject to the fog and friction of war. SOF can set the conditions, but only conventional land, maritime, and air formations can provide decisive victory.

Indeed, SOF are uniquely positioned to support the joint force in MDB. Hardened by over a decade of counterterrorism operations and possessing a legacy

of delivering strategic and operational effects both unilaterally and by, with, and through indigenous forces, joint SOF teams are purpose-built to leverage the human domain in service to other components of the joint force on tomorrow's high-intensity battlefields. The time has come for SOF to take a step out of the Gray Zone without abandoning the lessons learned there and fully embrace their role in this future conflict. JFQ

Notes

¹ *Multidomain Battle: Combined Arms for the 21st Century* (Washington, DC: Headquarters Department of the Army, February 24, 2017), 1, available at <www.tradoc.army.mil/MultiDomainBattle/docs/MDB_WhitePaper.pdf>.

² Joint Publication 3-05, *Special Operations* (Washington, DC: The Joint Staff, July 16, 2014), I-1, available at <www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_05.pdf>.

³ Joseph L. Votel et al., "Unconventional Warfare in the Gray Zone," *Joint Force Quarterly* 80 (1st Quarter 2016), available at <http://ndupress.ndu.edu/Portals/68/Documents/jfq/jfq-80/jfq-80_101-109_Votel-et-al.pdf>.

⁴ *ARSOF Value Propositions* (Fort Bragg, NC: U.S. Army Special Operations Command, March 12, 2016), 1.

⁵ *Multidomain Battle*, 2.

⁶ *Ibid.*

⁷ Leigh Neville, *Special Operations Forces in Iraq* (New York: Osprey Publishing, 2008), 10.

⁸ *Ibid.*, 24.

⁹ Gregory Fontenot, E.J. Degen, and David Tohn, *On Point: The United States Army in Operation Iraqi Freedom* (Fort Leavenworth, KS: Combat Studies Institute Press, 2004), 54.

¹⁰ William R. Peers and Dean Breilis, *Behind the Burma Road* (Boston: Little, Brown, and Company, 1963), 24.

¹¹ Fontenot, Degen, and Tohn, *On Point*, 78.

¹² *Ibid.*, 90.

¹³ Gordon Rudd, *Humanitarian Intervention: Assisting the Iraqi Kurds in Operation Provide Comfort, 1991* (Washington, DC: U.S. Army Center of Military History, 2004), 64, available at <https://history.army.mil/html/books/humanitarian_intervention/CMH_70-78.pdf>.

¹⁴ Carl von Clausewitz, *On War*, ed. and trans. Michael Howard and Peter Paret (Princeton: Princeton University Press, 1976), 270.

¹⁵ *Statement of General Joseph L. Votel, USA, Commander, U.S. Special Operations Command, Before the House Armed Services Committee, Subcommittee on Emerging Threats and Capabilities, March 18, 2015*, 1, available at <<https://docs.house.gov/meetings/AS/AS26/20150318/103157/HMTG-114-AS26-Wstate-VotelUSAJ-20150318.pdf>>.

¹⁶ C.H. Briscoe, "Balikatan Exercise Spearheaded ARSOF Operations in the Philippines," *Special Warfare* 17, no. 1 (September 2004), 21.

¹⁷ While it should be noted that Joint Task Force-510's military information support operations elements constituted only one part of a holistic special warfare campaign that included Special Forces, SEALs, civil affairs, and conventional forces, influencing the local populace to reject the Abu Sayyaf Group through low-signature, indirect means constituted the central focus of JTF-510's mission in the Philippines.

¹⁸ Briscoe, 22.

¹⁹ *Little Green Men: A Primer on Modern Russian Unconventional Warfare, Ukraine 2013-2014* (Fort Bragg, NC: U.S. Army Special Operations Command and Johns Hopkins University Applied Physics Laboratory, June 15, 2016), 17, available at <www.jhuapl.edu/ourwork/nsa/papers/ARIS_LittleGreenMen.pdf>.