UNITED STATES ARMY
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Gray Paper

The Future ODA
2035 - 2050
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"The future is already here. It's just not very evenly distributed." – William Gibson, science fiction author who coined the word cyberspace in 1984.[1]

Purpose

This paper briefly examines a single future ARSOF Unit of Action in the 2030 – 2050 timeframe. It shapes the discussion with the following questions. What is the military problem? What does the Future Operating Environment (FOE) tell us? What will the Operational Detachment Alpha (ODA) look like in 2035 -2050? It concludes with an operational vignette.

The Military Problem.

How will ODAs conduct special operations and maneuver in the physical, cognitive, and virtual realms during a period of exponential technological change characterized by increasing adversary reconnaissance, surveillance, and targeting capabilities in the hands of state and non-state actors in order to provide strategic value to the Nation in the 2035 – 2050 timeframe?

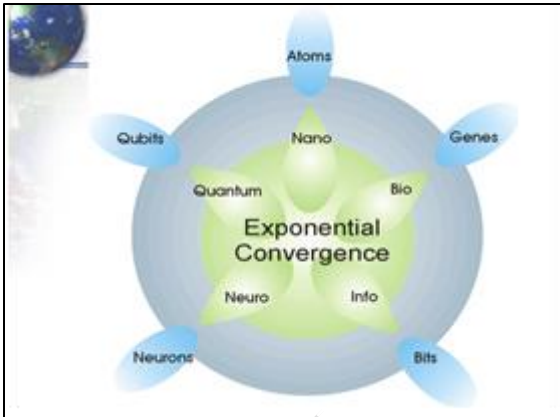## The Future Operating Environment (FOE).

Figure 1. Exponential Convergence - Five converging technologies that will drive the exponential development of increasingly capable Artificial Intelligence.

A survey of the two most commonly available, authoritative sources on the FOE points to an ever-increasing rate of technological change, the growth of mega-cities, and the diffusion of cutting-edge technology into the hands of both state and non-state actors.[2] Over the next ten to twenty years, the world will experience dramatic changes in technology, many of which will affect how ARSOF operates. Dr. James Canton, a noted technologist and futurist, observed that the five emerging technologies noted in Figure 1[3] are driving an exponential growth in AI. This growth rate will approximate that of Moore's Law, doubling in power while dropping in price every two years. Increasingly capable AI will in turn accelerate the development of each of the five converging technologies. Our adversaries will undoubtedly seek to harness those trends to accomplish their ends.

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[1] https://en.wikiquote.org/wiki/William_Gibson, accessed 18 April 2017.

[2] The FOE depicted in this paper is a synthesis of the National Intelligence Council *Global Trends (2035) Paradox of Progress*, National Intelligence Council, Washington DC, January 2017 and the Chairman, Joint Chief of Staff, *Joint Operating Environment 2035, The Joint Force in a Contested and Disordered World*, Joint Staff J7, Washington, DC, 14 July 2016.

[3] Taken from a PowerPoint presentation entitled "*AI Futures*" given by Dr. James Canton at the USASOC Futures Forum, 8 August 2017.

Kevin Kelly, another futurist of note predicts that soon, AI will be both cheap and ubiquitous. He uses electricity as an illustration to describe the future of AI in society. In addition to being cheap and ubiquitous, it will also be diffuse, running many of the processes of society without even being noticed – until it doesn't work. He forecasts, "You'll simply plug into the grid and get AI as if it were electricity. It will enliven inert objects, much as electricity did more than a century past."[4] AI will enable the robotics and autonomous systems (RAS) that will be a significant part of future military operations and warfare. Another factor brought about by increasingly capable reconnaissance and surveillance technologies will be an increase in the lethality of weaponry. What can be seen can be targeted. That which can be targeted can be destroyed. As lethality increases, so does the need for dispersion (Figure 2). Future ARSOF

Figure 2. Relationship of lethality to dispersion.

Source: T.N. Dupuy, The Evolution of Weapons and Warfare (New York: Bobbs-Merrill, 1980), p.288

units of action will tend to operate in an increasingly dispersed fashion, even more so than today. Their operations will tend to pulse, where widely dispersed operators and units mass quickly, act, and then disperse before the adversary can counter them effectively.
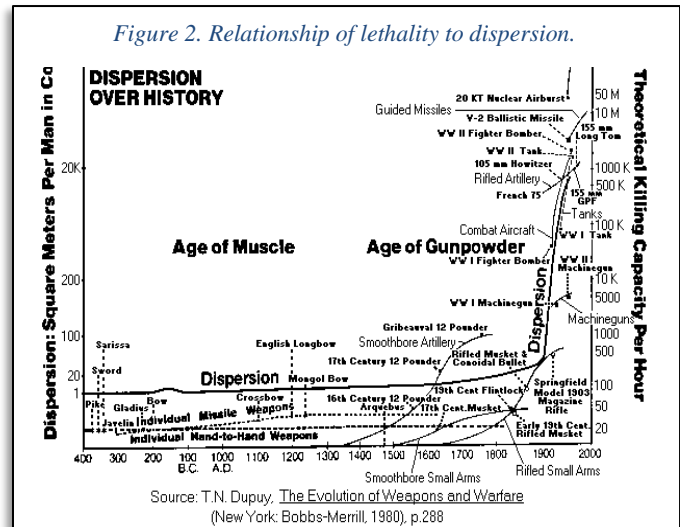
The Future ODA.

The ODA will continue to derive its unique *physical*, *cognitive*, and *virtual* maneuver capabilities from the quality of their ARSOF Operators who will be a blend of Special Forces, Psychological Operations, and Civil Affairs personnel. ***It will also continue to accomplish its missions primarily by working with and through the indigenous population or partner forces***. Unilateral operations will occur, but they will be the exception, not the rule. Often operating in areas where access to technology is limited or non-existent, the ODA will be technology enhanced but not technology driven.

Figure 3. ODAs will conduct physical, cognitive, and virtual operations with and through indigenous populations, partner forces, or unilaterally.

The proposed ODA constitutes a pool of operators with the *physical, cognitive, and virtual* skills required to succeed. Beyond the skill sets currently required of ARSOF, the ODA will require the ability to train and employ RAS and computational devices driven by AI. They will also require the capabilities to sabotage such systems.

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[4] Kelley, Kevin. *The Inevitable, Understanding the 12 Technological Forces That Will Shape Our Future.* New York: Penguin Books (Kindle Edition), 2017, 33.

Where possible and appropriate, the ODA will employ advanced technologies to maneuver in the physical, virtual, and cognitive realms. This will include a full suite of land, water, and aerial RAS capable of reconnaissance, attack, or sustainment. Some advanced technologies that will sustain the ODA include additive manufacturing (3D Printing) and advanced biomedical technology. Quantum communications[5] will enable secure communications with an extremely low signature. Enhanced reality[6] will provide the ability to share experiences as well as information. The purpose of every technology is to enhance the mission effectiveness of the individual Soldier on the ODA.

Figure 4. ODAs will be organized and equipped with an array of technology that will enhance their effectiveness in the physical, cognitive, and virtual realms.

Adversary advanced surveillance and targeting technology will make an ODA which is *physically, cognitively, or virtually* static an easy target. Instead, the ODA will operate in a dynamic, dispersed mode, concentrate only for action, and then disperse before the adversary can react. The ODA will employ a blend of advanced and active support operators. Advanced operators are those are able to make virtual and *physical* contact with the adversary or the indigenous population. They develop understanding and wield influence in an operational area based on traditional means of building trust. Active support operators provide organic and matrixed support by maneuvering across *cognitive* and *virtual* spaces to support the advanced operator or to carry out additional tasks. They can also develop understanding and wield influence, but in a different manner than the advanced operators. Regardless of the operation, there will always be a need for human interface with the indigenous population or partner forces. Technology may reduce the need for human contact *in some cultures*, but there will still be a need for face-to-face communication.

Figure 5. ODAs will operate dispersed and concentrate to accomplish their mission. Some ODA members will accomplish physical tasks, while others accomplish tasks in the cognitive or virtual realms.

Operational Vignette.

In 2030-2035, ARSOF operators will need to embody the four ARSOF pillars at the individual level— while also leveraging related capabilities within and across teams. Originally conceived by LTG Tovo in 2016, the four pillars are an Indigenous Approach, Precision Targeting Operations, Developing Understanding and Wielding Influence, and Crisis Response. Planning and conducting highly sensitive and frequently extended duration missions, ARSOF soldiers will operate forward of conventional/coalition force partners, often in areas where local adversaries may significantly reduce U.S. technological advantages. Cultivating local partners to resist adversary aggression, special operators will need to synchronize kinetic and non-kinetic activities, enabling strategic-level decision

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[5] Quantum communications are not subject to interception or detection by any currently known means. Being based upon quantum entanglement, quantum communications emit no RF energy.
[6] Enhanced reality is a term which encompasses Virtual Reality (VR), Mixed Reality (MR), and Augmented Reality (AR).

space by scaling effects to either achieve objectives within gray zone parameters or prepare the ground for large scale conventional deployments. This vignette seeks to link the past and the future, where ARSOF Operators continue to apply their skills against an adversary in ways that adversary finds hard to anticipate or to counter.

In the following vignette, an ARSOF Warrant Officer—Finn—executes unconventional warfare activities in a Western Balkan country, regions of which have been occupied by a foreign adversary. He and his teammates Ray, Travis, Lauren, Charlie, and Captain Russell advise and assist the local resistance, known as the Braća (Brothers). In an environment where the use of technology is both unsecure and degraded, their mission is to incline the leadership of a near-peer regional adversary to negotiate with the U.S. while deterring them from future aggression. Mission success hinges on restraining the Braća from actions which would lead to a major escalation of regional conflict.

We join Finn here in the area of operations, as he proposes a plan enabling Braća *activities targeting the foreign occupation:*

> "Let's see if we can have the effect we want here, without a kinetic strike. I'd suggest that the occupation-controlled oil pipeline's a good target to impact the way they think about things. A few considerations here: Given the adversary's capabilities, we can't risk either an electronic signature or any attribution to our cyber utility belt. Also, we don't want to permanently damage the pipeline. Period. We just need to disrupt the oil flow out of country.

> Pausing to ensure there were no questions, Finn eyed the detachment members surrounding the campfire, gauging each of their reactions in turn as Captain Russell, Ray, Travis, and Charlie scratched their beards. Lauren nodded in agreement, but all remained silent, brows furrowed. The crackling and spitting of the fire echoing the regular *twoo* of dip spit feeding the black Balkan dirt. He went on:

> "After nearly a year in country developing our indigenous networks, we know the Braća, especially those from the occupied parts of the country, have enough skin in the game and scores to settle that we have to limit escalation—or have a plan for exploiting a situation going sideways. For now, our plan is to have an auxiliary member, Brother Matthias, do a bit of simple sabotage. As you know, we recruited him for the sabotage cell because he is a maintenance worker who attends the pumps, SCADA[7] devices, and valves along the pipeline. So, he flips a few switches and turns a few valves during his normal routine. This makes the pumps for the oil line run at top speed without any oil flowing through. In a few minutes, every pump overheats and is off line." Finn smiled, "The reset process is a booger – Matthias assures me it will take at least 24 hours. Job done. Simple, yet effective."

> Initially, Finn had struggled with the lack of kinetic options, but had put serious thought behind his plan, leveraging the understanding he'd gained from a semester at the university in the country's capital. But this was a team, and everyone before him had to buy-in for it to work. He had talked at length with Lauren, the team's PSYOP and cyber expert, and had explored potential downstream effects of his proposal with Charlie, the team's UW[8] economics SME and machine learning expert, whose parents were emigres to the U.S. from the Balkans. Integrating their insights meant the detachment as a whole would likely be able to convince their Braća partners about his plan.

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[7] Supervisory Control and Data Acquisition (SCADA)
[8] Unconventional Warfare (UW)

Captain Russell, sitting across from Finn dragged one massive paw down his face, pulling at his beard thoughtfully. A large, sandy haired man, he let out a long sigh and put his hands on his knees, shifting his weight as he stared into the fire. After a long silence, he nodded and spoke:

"Guys, this is the right call. Cavalry is not waiting over the next hill. With our comms degraded from the recent EMP[9] we are going to do things the old school way. This is exactly why we train digital and analog. If we hadn't recovered our emergency resupply last week, we'd be toast. For communications with higher we will continue to stick to an OPSKED[10] via HF[11] burst. Internally we will use our established networks. We need to play this smart and quiet." He paused for a moment to be sure everyone was following him. "Lauren and Charlie, accompany a Braća squad and link up with Team Bravo to coordinate our activities; I want to synchronize our operations to ensure we get the occupation's attention without provoking a disproportionate response. Ray, Travis—I want you to have eyes on the pipeline no later than 24 hours prior to execution. Finn—you link up with Matthias and give him the green light. We execute on target in 48 hours. Tracking?" Everyone nodded, so CPT Russell concluded, "I need to head back and link up with the Area Command, so I know what we are up to."

Turning on his heel, CPT Russell gestured to his two resistance escorts and vanished into the darkness as the ring of team members sat in silence. Well, not really silence. The cacophony of natural sounds in the dense forest had seemed to only grow in both pitch and volume in the weeks following the EMP. All SAT- and cyber-based comms had gone out for the team and around the country, except the occupied territories. This was in addition to targeted rolling blackouts, seemingly designed to punish uncooperative populations in areas not affected by the EMP while attempting to blame the blackouts on the Braća. If it weren't for the emergency resupply and their EMP hardened combat-suits equipped with solar-collectors and advanced batteries, Finn and his team would have been in the Industrial Age, like the Brothers themselves.

After the EMP hit, the team immediately retrieved cached generators, MREs, 3D feedstock, and additive manufacturing units (placed a year ago by other US/coalition SOF) but they were like a Snoopy band aid for a bullet-hole. The EMP hadn't just knocked out the power, it had derailed the entire digital infrastructure and economy. It had even fried the SCADA devices on the pipeline, but the adversary had quickly repaired them. Without access to the internet, citizens in unoccupied areas were unable to access their E-wallets or accounts, rewinding the march of progress to pre-Copernican levels. And foreign occupation of the oil-rich territory and seizure of water filtration facilities left the civilian population at the mercy of the adversary backed government. This had brought the country to a rapid boil against the occupying forces.

In the first weeks following their insertion, a number of composite, task-organized ARSOF detachments like Finn's had capitalized on this confusion by helping the resistance to organize. Following their advice, the Braća set up an Area Command, a shadow government, guerilla forces, and auxiliary and an underground. They then began aggressive MISO campaigns and recruiting efforts. The resistance had no trouble getting local men—and women—to join the Braća, but now it was a question of keeping this conflict from boiling over, as simmering agitation threatened to explode into open revolt.

With limited communication with either the government-in-exile or the Coalition Command, both the Area Command and the ARSOF soldiers were largely limited to what information they could pass directly to each other, via HF burst, or through vetted underground human networks. Still, the message came through from higher just the same, as mission type orders whose gist was, "Execute sabotage and subversion with and through the Braća but do not provoke the adversary into a disproportionate response. On order, be prepared to execute unilateral precision targeting operations and guerrilla warfare."

And that was fine by Finn; this was what made his team "special" after all. Years of language and cultural training, both in country and in a virtual environment, and opportunities to develop personal relationships in country over several pre-conflict deployments had prepared them to engage with the Braća effectively. Finn himself had trained the Brothers in sabotage, subversion, and small-unit tactics. He had advised his resistance counterparts as they developed intelligence networks for the resistance and underground, and conducted targeted PSYOP to subvert adversary's effort to annex the occupied regions.

But, as his resistance science professor had reminded him, ARSOF engagement, during what the Braća knew as "Wartime," eventually would lead them to become impatient, eager to take the fight to the occupation forces. He mused, "*I've already had to persuade Dino to abort an assassination attempt on a local occupation-backed police chief. But there is no guarantee I can restrain him from his next attempt.*" He sighed. "*That is the problem in UW. You work with and through the resistance but it is still their show.*" The resistance needed to act but to confine most of their actions to simple sabotage and subversion. Finn hoped that their coordinated, non-kinetic actions would be enough to occasion dialogue between POTUS and the adversary leadership, and scratch the Braća itch for action—so they, in turn could remain credible with their countrymen.

Twenty-four hours later, as Ray, Travis and Braća partners surveil the pipeline:

"0400: 2-man patrol team approaching from the SW facility to relieve the 2-man team currently on duty. Second observed shift change in the 12-hour period, suggests regular 6-hour shifts consistent with HUMINT reporting. Waiting to confirm reports that guards conduct random checks of civilian IDs. Logged."

From their overlook position, Ray, Travis, and four Braća had eyes on the targeted section of pipeline and the surrounding terrain. As it was an aboveground oil pipeline, they were out in the middle of nowhere, with nothing around for miles except farmland, a set of long abandoned Soviet-era tracks, and a local path, no more than worn dirt, which ran parallel to the pipeline and connected the neighboring villages. After 28 hours on target, the six-man team was tired but pleased; everything had gone smoothly. The quiet, agile hoverbikes had allowed them to quietly cover the sweeping forest terrain with ease, without sacrificing weapons or supplies for speed of movement. The Braća's local area knowledge and the two ARSOF NCOs' land-nav skills more than made up for the inability to use the GPS tracking system.

Travis would have preferred to operate the "Brilliant Grasshopper" UAS network to sniff out any emplaced sensors around the exposed pipeline but couldn't risk the small signature in the EMP affected boonies. It would have lit up the occupation sensors like the Fourth of July. The upside of the situation was that, post-EMP, pipeline workers had taken to walking the small footpath from the villages to the oil plant, granting Matthias natural access to his targets – the SCADA device and

valves along the exposed pipeline. With rising oil prices and demand at an all-time high, even the slightest disruption in oil leaving the country for the adversary's homeland would raise a red flag.

While he would normally sight in his scope on the faces of the occupation soldiers and run their images immediately through the integrated WOG-IC[12] database to ascertain their identities, the EMP necessitated he do it the old-fashioned way. Wanting to be certain he understood his Braća teammates, he activated the translation chip in his helmet before asking the closest Braća member if they recognized the new guards. The guards were wearing unmarked uniforms and Travis wanted to know if they were adversary or local muscle. After sighting in on their faces, the Braća operator replied and inside Travis' helmet he heard the clipped, robotic voice say, "These are not the occupiers. These are local dogs." He made a note to tell CPT Russell and Finn that patrols now included local support, suggesting the occupation forces were either spread thin or were conducting Counter Insurgency Operations of their own, seconded by the locals. Regardless, Travis saw no reason to abort the planned operation and dispatched Ray and two Braća to rendezvous with the rest of the team.

At the Braća camp, Finn completes planning:

With Lauren and Charlie having confirmed that Team Bravo would synchronize its neutralizing of adversary HUMINT sources with Finn's oil-line operation, all there was left to do was to square-away the details with Brother Matthias. Finn had only met Matthias in person once before and was unsure of the younger man's mettle. His cousin Dino had been one of the stand-out Braća during Finn's small unit tactics instruction but Matthias had remained outside the active resistance and on the peripheries of the auxiliary, choosing to keep his head down—and his job. Finn could not fault the man for his decision but he needed to assess the man's commitment to the operation before he staked his own men's and Braća lives on it.

Their interaction had been a "success," with Matthias agreeing to short out the SCADA device controlling the pumps and turn the appropriate valves as well. Finn had tried to calm Matthias' fears by explaining that several Braća would distract the local patrol team by offering them some food and a bit of slivovitz. Still, Finn's cortical implant had registered abnormal pupil dilation and speech patterns. This was not out of the ordinary; the man was in a stressful situation and was rightfully afraid of what he had (or his cousin) had signed him up for. But it did not sit well with Finn.

He rarely relied solely on his cortical implant's outward-directed biometric sensor or his combat suit's neurolinguistics sensors, but this time they reinforced the uneasiness he felt in his gut. He wished that he could communicate with the other ARSOF teams and with command and postpone operations. But he could not afford to wait. The Area Command's plan required several activities to converge in time: Team Bravo's string of neutralizing targeting occupation counterintelligence agents, Team Charlie's snap-protest outside the adversary's embassy 50 kilometers away, and Team Alpha's disruption of the oil pipeline. All of these events, a detailed physical, cognitive and virtual maneuver, had to occur simultaneously, without public attribution of U.S. involvement, in order to facilitate the POTUS communication, thus allowing the two powers to off-ramp the escalating crisis.

He sighed to himself. *You fight with the army you have*. He whispered a quiet prayer as he kitted up and prepared the rest of the team for that night's operation.

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[12] Whole of Government – Intelligence Community (WOG-IC)

At the pipeline, events take their own course:

Brother Matthias executed his end of the plan flawlessly, in spite of his nervousness. The distraction had gone according to plan with the on-duty guards subsiding into an alcoholic stupor. Unfortunately, during exfiltration, the team had encountered an unanticipated two-man adversary security patrol. A brief close-range firefight ensued in which both of the enemy soldiers died in a hail of suppressed weapons fire. The single shot they fired had hit Dino in the leg, severing his femoral artery.

Dino quickly fainted, from the combination of blood loss, shock, and pain. Ray sprayed bandages on to the wound to stop the bleeding, the foam substance hardening as the blood clotted, his HUD providing him with Dino's vital signs. Based on the readings, he had jabbed a medi-tube into Dino's leg above the wound, stabilizing the area as best he could to transport him back to the Braća camp. As bad as the wound was, Ray knew that with the new medical technology he would be able to save Dino. Even a few years before, that would not have been the case.

"*Great,*" Finn thought. "*Now I've got a wounded man to carry and two occupation force bodies to dispose of. We are way too close to the pipeline to just leave the bodies.*" Acting quickly, they stripped the dead men of their weapons, gear, and clothing. After covering the bodies with forest debris, Finn dispatched a Braća to get some Auxiliary members to bring a cart and dispose of the bodies.

As he watched, Ray worked on Dino's leg. Finn sensed the Braća and their adversaries would quickly move the conflict farther along the kinetic spectrum. He and the team needed to support the Braća in the kinetic domain as well, while restraining them from provoking overwhelming adversary reprisals and avoid backing U.S. leaders into a decision corner.

Under the culminating conditions in this vignette, an ARSOF operator would need to think, make decisions, and act on three levels simultaneously—geopolitically, operationally, and tactically. An operator would also need to consider indigenous dynamics at every step while nesting actions across quickly telescoping time. While these actions make extraordinary demands, they are typical of what ARSOF Operators do every day and will continue to do in the future.

Finn—and his counterparts across the other ARSOF teams in country—would need to act independently and in concert with Braća to enable Joint and allied forces' entry into theater, by tearing holes in parts of the occupation A2/AD fabric and disabling critical adversary sustainment and C2 nodes. Preparing the Braća to support conventional forces would also include significant cognitive and virtual maneuver with joint and coalition SOF to bring the local population firmly into the Braća camp.

Exploiting the physical as well as electromagnetic/cyber domains, Finn's counterparts in country and beyond would act to demoralize occupation forces as well as critical population sectors on the adversary's own soil. Conversely, as the ARSOF teams prepared to integrate and ensure interoperability with a potential invasion force, they would in the meantime need to remain intact, coherent elements in the face of heavy adversary mechanized and air mobile forces operating in the offensive mode, and employing growing numbers of air- and ground-based unmanned mobile sensor and weapons systems.

ARSOF activities in country would therefore need to preserve their clandestine nature while generating adequate cascading effects to provide U.S. leaders with decisive advantage in the geopolitical realm. Frequently, ARSOF elements would need also to ensure covertness—enabling deniability for the U.S., and thus an off-ramp for adversaries.

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