SHARPENING THE TIP OF THE SPEAR:

EVALUATING TECHNOLOGY INTEGRATION IN SPECIAL OPERATIONS FORCES

A THESIS

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By

Sam Lisbonne

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Adviser:
Dr. Amy Zegart
Abstract

US Special Operations Forces (SOF) carry a renowned reputation for excellence as the most sophisticated warfighters on the planet. The common narrative surrounding SOF contends that SOF employ tactical flexibility, highly specialized training, and advanced technological systems to achieve remarkable battlefield successes; this wisdom is well-earned. But high operational tempo and extended deployments during the Global War on Terror (GWOT) may have unintended consequences for SOF technology acquisitions. In interviews with current and former SOF operators, many expressed frustrations with select technologies, which sharply contrasts SOF’s reputation for agile and effective acquisitions. The thesis draws on extensive interviews with operators, USSOCOM officials, and national security experts, as well as data on USSOCOM acquisitions and a case study examination of the RQ-20 Puma drone system. Taken together, the evidence suggests that SOF’s sustained high operational tempos has changed USSOCOM acquisition, slowly moving SOF acquisitions closer to the behaviors of the Services. This surfaces in three early warning indicators. First, USSOCOM Acquisition, Technology, and Logistics (AT&L) has grown, evidencing a greater jurisdiction of the Program of Record system. Second, SOF across USSOCOM have pursued alternative acquisition methods, betraying a growing disconnect between operator needs and AT&L acquisitions. Third, USSOCOM’s sustained acquisition of the RQ-20 indicates an inability to keep pace with commercial alternatives in select technological domains, to the detriment of operators. This thesis concludes with a discussion of considerations for the optimal composition of acquisitions teams, to mitigate the root causes driving SOF acquisitions behavior towards that of the Services.
Acknowledgments

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To the 43 individuals I spoke to about my thesis: I couldn’t have done it without you. While the list is too long to name, each contribution, from each corner of the SOF enterprise, has further developed my nascent understanding of special operations, and I look forward to continuing the conversation in weeks and months to come. You have opened up your world to me, and I dove in. A particular thanks to the former and active duty SOF operators I’ve had the privilege of engaging with. Your sacrifices motivated my research, and certainly made the late night writing seem infinitely more bearable.

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# List of Acronyms

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<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>AT&amp;L</td>
<td>Acquisitions, Technology, and Logistics</td>
</tr>
<tr>
<td>CENTCOM</td>
<td>Central Command</td>
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<tr>
<td>COTS</td>
<td>commercial-off-the-shelf</td>
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<tr>
<td>CSO</td>
<td>commercial solutions opening</td>
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<tr>
<td>DIUx</td>
<td>Defense Innovation Unit Experimental</td>
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<tr>
<td>DoD</td>
<td>Department of Defense</td>
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<tr>
<td>GWOT</td>
<td>Global War on Terror</td>
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<tr>
<td>ISR</td>
<td>intelligence, surveillance, reconnaissance</td>
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<tr>
<td>MFP</td>
<td>Major Force Program</td>
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<tr>
<td>MILSPEC</td>
<td>military standard</td>
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<tr>
<td>OTA</td>
<td>other transaction authority</td>
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<tr>
<td>PEO</td>
<td>Program Executive Offices</td>
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<tr>
<td>POM</td>
<td>Program Objective Memorandum</td>
</tr>
<tr>
<td>NSW</td>
<td>Naval Special Warfare Command (formally NAVSPECWARCOM)</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>research and development</td>
</tr>
<tr>
<td>S&amp;T</td>
<td>Science and Technology</td>
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<tr>
<td>SOF</td>
<td>special operations forces</td>
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<tr>
<td>TALOS</td>
<td>Tactical Assault Light Operator Suit</td>
</tr>
<tr>
<td>UAV</td>
<td>unmanned aerial vehicle</td>
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<tr>
<td>UAS</td>
<td>unmanned aerial system</td>
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<tr>
<td>USSOCOM</td>
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Chapter 1: Introduction

US Special Operations Forces (SOF) carry a renowned reputation for excellence as the most sophisticated warfighters on the planet. The common narrative surrounding SOF contends that SOF employ tactical flexibility, highly specialized training, and advanced technological systems to achieve remarkable battlefield successes; this wisdom is well-earned. In operations everyday, SOF justify their status as the “Tip of the Spear.”

SOF’s stellar reputation also introduces heavy demands on the force. Despite representing only roughly 2% of the Department of Defense’s budget and 2% of its manpower, United States Special Operations Command (USSOCOM) are tasked with major responsibilities in the counter-terrorism fight.¹ Disproportionate demands are offset in part by USSOCOM’s exceptional acquisitions system, which commonly earns plaudits for bringing to bear technological systems at the forefront of innovation. This image is challenged, however, when speaking with former and active-duty operators. Across 21 interviews, SOF operators expressed frustrations with the acquisitions process, and the systems it procures. These diverging narratives give rise to a puzzling question: what accounts for the discrepancy between USSOCOM’s reputation as a vanguard within Defense Department acquisitions and the accounts of SOF operators themselves?

This thesis contends that a high operational tempo sustained by the Global War on Terror (GWOT) has fundamentally changed SOF acquisitions by slowly moving a nimble enterprise towards the bureaucratic behaviors of its Service brethren. Illustrating this change are three early

warning indicators. First, evidence indicates that acquisitions personnel at USSOCOM Acquisitions, Technology, and Logistics (AT&L) have doubled since 2001.\textsuperscript{2} USSOCOM’s stagnant mission set and geographic concentrations suggest that this swell is a product of the expanding jurisdiction of Programs of Record, long-term sustainment programs for select weapon systems, which acts to constrain operator flexibility. Second, recent spikes in the use of alternative acquisitions methods betray a deepening gulf between operator needs and AT&L provisions. Third, this thesis examines USSOCOM’s sustained procurement of the AeroVironment RQ-20 Puma AE unmanned aerial vehicle. Operator testimonials, coupled with a technical comparisons to commercial alternatives, display USSOCOM’s inabilities to adapt in select technological domains. These behaviors, which USSOCOM would not exhibit under the common narrative, demonstrate that USSOCOM acquisitions are changing as a response to high operational tempo — and not for the better.

This thesis begins by scoping the thesis and briefly discussing relevant academic literature, before elucidating a history of SOF and its modern structure. The thesis then covers USSOCOM’s changes in the GWOT and delves into each of the three early warning indicators. The thesis concludes with a discussion of potential root-causes for the issue, centered around the ideal composition of a SOF acquisitions team.

This thesis is bound by select scope conditions. First, due to information accessibility restrictions, analysis is constricted to “white-SOF,” or all USSOCOM units and commands not involved in “national missions,” which are under the purview of Joint Special Operations Command (JSOC). Second, this thesis discusses SOF acquisitions. While the phrase includes

\textsuperscript{2} See Appendix 1.
both requirements generation processes and contracting processes, this thesis focuses on the
latter. This thesis does not evaluate the roles or mechanisms of research and development
(R&D), but instead the acquisition of mature technologies. As a matter of methodology, this
thesis is concerned with acquisition system inputs and outputs. For classification and feasibility
reasons, this thesis does not delve into specific bureaucratic flows, on which open-source
information is highly limited. Lastly, as a disclaimer, all information in this thesis is unclassified,
and the author does not or has not held a clearance of any kind at the time of publication.

An evaluation of SOF acquisitions does not occupy any clear place in academic literature.
Military innovation research constitutes the largest relevant body of work. Discourse radiates
from four distinct camps: the civil military model, which identifies civilians as driving forces for
innovation; the interservice model, which suggests that resource scarcity within militaries
induces innovation; the intraservice model, which points to inner-service rivalries as the principal
motivator, and the cultural model, which ascribes innovation to military culture.\(^3\) This literature
fails to approximate changes in SOF acquisitions for two reasons. First, these theories
predominantly seek explanatory power for changes in doctrine, not acquisitions, although
acquisitions are commonly cited as an exhibition of either positive or negative military
innovation. Second, military innovation research does not seek to address special operations,
SOF, or USSOCOM. With fundamentally distinct operator profiles and cultures, as well as
unique authorities and objectives, SOF do not easily fit the mold of traditional military
innovation research. Literature about the SOF community itself typically falls in two camps:
programatic evaluations of acquisitions, like those conducted by the US Government

Accountability Office (GAO), or assessments of SOF intangibles, like those published through the Joint Special Operations University. This thesis seeks to examine acquisitions outcomes within a modern operational context unique to SOF. In doing so, this thesis looks to explore the connection between operational demands and acquisitions behaviors and performance.

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4 Even then, USSOCOM is rarely the subject of acquisitions scrutiny, because SOF activities are pennies on the Defense Department dollar. As for examples of the two camps, consider these reports:
Chapter 2: A History of US Special Operations Forces

The history of United States Special Operations Forces (SOF) tracks unlike any other service, unit, or division in US history. In wartime and in peacetime, SOF often found themselves on the outskirts of military structure, subjugated to harsh criticism and relegated to the sidelines of combat. But outsized contributions to both the tactical and strategic landscape, combined with a range of capabilities unique in the military, have sustained SOF over the decades. From the early stages of WWII to the terrorist attacks of September 11, SOF’s tumultuous journey has readily transmuted their structures, missions, structure and authorities. Tracing the lineage of US SOF provides crucial context for the change to USSOCOM wrought by the Global War on Terror (GWOT).

Joint Publication 3-05, Special Operations, defines special operations as those which demand “unique modes of employment, tactics, techniques, procedures, and equipment.” They are typically conducted in denied areas, where hostile forces or political circumstance preclude the use of conventional counterparts. According to the Joint Publication, special operations can also be characterized by at least one 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 are defined similarly in the 2015 Special Operations Reference Manual, which describes them as operations

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6 “Joint Publication 3-05: Special Operations.” ix.
which “encompass the use of small units in direct or indirect military actions focused on strategic or operational objectives.”

In the authoritative book on special operations theory, then SEAL Team Three commander William H. McRaven wrote that “all special operations are conducted against fortified positions…[which] reflect situations involving defensive warfare on the part of the enemy.” McRaven, who would go on to be the 9th Commander of Special Operations Command, identified six “principles” of special operations, linking the conduct of operations to the forces who conducted them. His principles - simplicity, security, repetition, surprise, speed, and purpose - form a strong theoretical framework for considering the conduct of special operations and the organization of special operations forces training and resources. As he notes, “the principles of special operations defined above are not merely derivatives of the army’s principles of war. They represent unique elements of warfare that only special operations forces possess and can employ effectively.”

Special Operations Forces, or SOF, are the units charged with conducting special operations. According to the 2015 SOF Reference Manual, “Special operations forces (SOF) are small, specially organized units manned by carefully selected people using modified equipment and trained in unconventional applications of tactics against strategic and operational objectives.” These forces, often referred to as “operators,” are selected based on physical

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9 McRaven, Spec Ops, 23.

prowess, adaptability, tactical innovation, and other parameters deemed critical to SOF mission areas. In the modern context, SOF core activities are broadly defined within a dozen categories: “direct action, special reconnaissance, countering weapons of mass destruction, counterterrorism, unconventional warfare (UW), foreign internal defense, security force assistance, hostage rescue and recovery, counterinsurgency, foreign humanitarian assistance, military information support operations, and civil affairs operations.” These areas of focus, however, are far from a complete picture of SOF activities, nor do they appropriately convey the extent to which mission priorities and SOF competencies have changed over time. As the story of SOF origins in WWII demonstrates, SOF activities frequently mold to fit the military and political contexts in which they deploy.

During World War II, US Special Operations Forces played a prominent role in both the European and Pacific Theaters. In the European theatre, US Army Ranger Battalions and the First Special Service Force, or Forceman, conducted special operations and fought alongside conventional forces across a series of locales spanning the breadth of the theatre. In the Pacific, US Marine Raiders and US Navy Frogmen carved out a legacy amidst the tightly contested firefights of the Pacific Islands. Operating under the banner of intelligence gathering, psychological operations, and coalition training, the Office of Strategic Services (OSS) earned plaudits for work behind both fronts. Each of these outfits, however, met its demise or demotion towards the end of the conflict — an affliction proven to replay itself over decades to follow.

11 “Joint Publication 3-05: Special Operations.” x.
During the spring of 1942, US Army Chief of Staff General George Marshall paid a visit to the British Commando Training Center, where he developed an appreciation for the British Commandos. The Commandos were a byproduct of Churchill’s insistence on developing small raiding weapons for strikes on the German force to complement his aerial and naval superiority. Marshall relayed his desire to involve US forces in Commando training and operations, and the charter eventually fell to a young captain named William Orlando Darby. Soliciting men for a unit named the “1st Ranger Battalion,” Darby collected an amalgam of inspired, if eclectic, volunteers, and commenced training in July of 1942. In short order, the units proved their mettle, and by August, fifty Rangers, interspersed among fellow British Commandos and conventional infantry, saw combat experience during a raid on the port of Dieppe. The Rangers went on to see combat in Algeria, Tunisia, Italy, France, and Germany, with ranks swelling to fit three divisions as their early successes buoyed domestic political support. From 1942 to 1945, Rangers would fight in several notable conflicts: breaking the German “Winter Line,” which exposed Ranger frustrations over the conventional use of specialized forces; sustaining heavy losses at the Italian hamlet of Cisterna, from which two and half Range battalions never returned; capturing Pointe du Hoc in Normandy. In the Pacific, a 6th Ranger battalion stood up by Commander of the US Sixth Army in Australia led a raid on a prison camp in Cabanatuan.

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13 Moyer, Oppose Any Foe, 10.
14 Moyer, Oppose Any Foe, 39.
15 Moyer, Oppose Any Foe, 15.
16 Moyer, Oppose Any Foe, 28.
17 Moyer, Oppose Any Foe., 33..
in the Philippines, rescuing 512 prisoners while inflicting 250 enemy casualties and sustaining minimal losses.¹⁸

Europe’s second US SOF contingent, the First Special Service Force, formed in July 1942 in response to a call for establishing dominance over the domain of snow, which was suggested to be crucial to ground operations across the Continent.¹⁹ Known as the Forceman, they were to be equipped with sophisticated equipment and special winter and snow training, but insurmountable logistical challenges and waning support scrapped the idea in the fall of 1943. After limited operations in Italy, the Forceman never left mainland Italy, and were dissolved in November 1944; most men reassigned to conventional units.²⁰

In the Pacific Theatre, both the United States Marine Corps and United States Navy deployed SOF, to mixed effect. After being extolled of the virtues of SOF by his son, Captain James Roosevelt, President Franklin Roosevelt called for the creation of a Marine Corps unit to conduct special operations in the Pacific.²¹ Despite internal resistance, the 1st and 2nd Raider Battalions were created, with the 2nd Battalion first fighting on the Makin Atoll in August of 1942. In their first combat test, the newfound Raiders bungled both the landing and extraction, and suffered heavy losses — unfortunate ammunition for Marine Corps stalwarts convinced that the Corps would be best served maintaining talent within the existing force structure, rather then congregating it in SOF outfits.²² Throughout the war, Raiders mostly participated in raids and

¹⁸ McRaven, Spec Ops, 273.
¹⁹ Moyer, Oppose Any Foe, 16-17.
²⁰ Moyer, Oppose Any Foe, 17-29.
²¹ Moyer, Oppose Any Foe, 43.
²² Moyer, Oppose Any Foe, 48.
beachfront assaults on many of the islands peppering the Pacific, as well as a protracted raid at Guadalcanal, marching 150 miles over a single month period to attack and disrupt Japanese forces. The resulting publicity stateside prompted the creation of the 3rd and 4th Raider Battalions, but dwindling utility meant that by February 1944 the Raider battalions disappeared into a regular Marine regiment.23

The United States Navy, operating with the clarity of initiative, created SOF units with underwater demolition capability, named the Frogmen. Unlike the Raiders, whose contentious creation was a product of high-profile preferences outranking Marine leadership wishes, the Frogmen represented organic Navy experimentation with a single tactical objective. The first Frogmen trained to become underwater demolitions specialists and underwent rigorous physical tests before first seeing action in Normandy.24 From 1943 to 1945, the Frogmen conducted undersea reconnaissance and obstacle demolitions in the Pacific to support US amphibious activities. The Frogmen retained their personnel through the conclusion of the war — the only SOF outfit to do so — likely because they provided a proven skill and unique capability, a distinction which cannot be ascribed to any other WWII US SOF.25

The Office of Strategic Services, or OSS, was officially designated on June 13, 1942 and placed under the jurisdiction of the Joint Chiefs of Staff. Headed by a former classmate of President Roosevelt, William Donovan, the OSS began operations successfully training local coalitions forces in the China-Burma-India theatre.26 In Europe, OSS operations included

23 Moyer, Oppose Any Foe, 62.
24 Moyer, Oppose Any Foe, 59.
25 Moyer, Oppose Any Foe, 62.
26 Moyer, Oppose Any Foe, 80.
Operational Groups and the Jedburghs, an Anglo-American SOF collaboration, and focused on supporting French resistance movements, among other activities.\textsuperscript{27} Though the OSS had its advocates, President Truman ultimately decided to shutter the organization, with the SOF components eliminated entirely.

WWII established SOF units for the first time in modern American combat, creating forces on which modern SOF are modeled. But the virtual decimation of all SOF at the end of WWII signaled the beginning of a long period of SOF uncertainty. However, with war on the Korean peninsula not far off, it was only a matter of time before SOF returned to the fold.

In America’s “Forgotten War,” Korea, one could be forgiven for overlooking US SOF altogether. In America’s greatest quagmire, Vietnam, SOF growth and visibility brought both accolades and harsh judgement. Tensions between the services and SOF elements, tenuous during WWII, continued to mount across both conflicts, to the detriment of SOF units. Nonetheless, these periods laid a critical foundation of SOF activity for the organization which would follow in the 1980s: United States Special Operations Command.

In October 1950, a newly revived Ranger outfit, the 8th Ranger Company, touched down in Korea. Eventually six Ranger companies would deploy to Korea, although stagnating front lines almost entirely precluded behind-enemy-lines actions for which they were designed and trained, instead leaving Ranger units to complete standard infantry objectives.\textsuperscript{28} Eventually, all Ranger units in Korea were disbanded.

\textsuperscript{27} Moyer, Oppose Any Foe, 83.

\textsuperscript{28} Moyer, Oppose Any Foe, 106.
Other SOF units found greater success, including an “Attrition Section” tasked with training North Korean resistance fighters\textsuperscript{29} and early CIA paramilitary forays.\textsuperscript{30} Korea’s most enduring contribution to US SOF, however, came in the form of the 10th Special Forces Group, units aimed to conduct guerrilla warfare and facilitate localized resistance. While growth proved sluggish — Special Forces totaled 2,000 by the late 1950s\textsuperscript{31} — their organization would prove durable in the tough years to follow. Despite these minor successes, SOF were largely dismissed as a failure in Korea.\textsuperscript{32} They would enter Vietnam in a feeble state.

Vietnam’s most remarkable special operation, a raid on the Son Tay prisoner camp in North Vietnam named Operation Kingpin, did not, ironically, come from one of Vietnam’s SOF organizations.\textsuperscript{33} And while that operation was, in the words of former SEAL Team Three Commander William McRaven, “the best modern-day example of a successful special operation and…textbook material for future missions,”\textsuperscript{34} the same could not be said for all Vietnam SOF activity.

President John F. Kennedy, long an admirer of special operations and SOF, initiated an expansion in SOF units to complement broader expansions across the military.\textsuperscript{35} Soon, the Special Forces adopted green berets, the Air Force established the 4400th Combat Crew Training

\begin{itemize}
\item \textsuperscript{29} Moyer, Oppose Any Foe, 108-110.
\item \textsuperscript{30} Moyer, Oppose Any Foe, 111.
\item \textsuperscript{31} Moyer, Oppose Any Foe, 119.
\item \textsuperscript{32} Moyer, Oppose Any Foe, 122.
\item \textsuperscript{33} Instead, the force was a “joint contingency task force,” which recruited personnel and siphoned resources from any organization they fancied. McRaven, \textit{Spec Ops}, 289.
\item \textsuperscript{34} McRaven, \textit{Spec Ops}, 318.
\item \textsuperscript{35} Moyer, Oppose Any Foe, 125.
\end{itemize}
Squadron, and the Navy created Sea, Air, Land (SEAL) teams. Special Forces helmed most SOF activities in Vietnam, creating Civilian Irregular Defense Groups (CIDGs) and staffing Secretary of Defense Robert McNamara's Studies and Observations Group (SOG). These two organizations conducted what amount to modern special operations: reconnaissance and offensive strikes against invading North Vietnamese troops, covert action to observe enemy troop and material movements, and the occasional emboldened pilot-rescue operation, to which SOG’s infamous reputation owes much. But Vietnam’s withdrawal prompted stateside SOF contractions. The CIDG program and SOG were both terminated, and Special Forces numbers dropped from 13,000 to 3,000 in a three-year postwar span. SEAL teams lost half of their members. Even so, things would get worse before they improved for SOF.

Despite a checkered past, by the 1970s US Special Operations Forces had made a habit of rising from the ashes of former SOF units to reconstitute themselves in new organizations, under new titles, or serving new purposes. That revivalist pedigree faced no sterner test than that of April 24 and 25, 1980, a 48-hour period forever etched into the collective ethos of the US’s most elite operators: Operation Eagle Claw.

When the Islamic Revolution in Tehran compromised the US Embassy, and revolutionaries took American hostages, President Jimmy Carter resolved to return the 63

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36 Moyer, Oppose Any Foe, 127.
37 Moyer, Oppose Any Foe, 129.
38 Moyer, Oppose Any Foe, 133-139.
39 The reputation is well deserved. According to internal statistics, SOG operatives managed more than a 100:1 kill to casualty rate. Moyer, Oppose Any Foe, 153.
40 Moyer, Oppose Any Foe, 153.
Americans home through the graces of diplomacy. While his efforts were appreciable, months without a conclusive result gnawed at both an American public entranced by the drama in Persia and a president reluctant, but not wholly unwilling, to deploy force. By the middle of 1980, President Carter resolved to consider military options, and was briefed on Operation Eagle Claw, in which members of the recently founded elite counterterrorism unit Delta Force would enter Iranian airspace and conduct a daring hostage rescue — the exact assignment for which it was founded. Carter’s approval initiated a complex operation involving dozens of vehicles, operators, and support staff. But adverse weather conditions and an insufficient supply of backup assets at the forward staging base, codenamed Desert One, spelled disaster. While trying to maneuver around the base, one of the RH-53 Sea Stallion helicopters collided with a C-130 transport aircraft. The collision and ensuing explosion killed 8 US servicemen and forced the mission to be aborted. The White House announced the news the following day.

Operation Eagle Claw hardened opinions on both sides of the SOF argument, a feud over blame which would have taken months or years to resolve if not for the forceful actions of Secretary of Defense Harold Brown. In a meeting with the Joint Chiefs of Staff, Brown notified the top military officers in the country that he had already settled on a course of action. His decree created the Joint Special Operations Command, or JSOC, tasked with integrating all intelligence, air, and SOF assets into a singular command structure. JSOC immediately

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41 Moyer, Oppose Any Foe, 165.
43 Naylor, Relentless Strike, 5-6.
requisitioned Delta Force, both Army Ranger Battalions, and the Air Force’s 1st Special
Operations Wing. SEAL Team Six, another elite SOF force, was soon to follow.44

The 1980s proved to be hugely consequential for more than just the most elite of US
SOF. Conflict in El Salvador spurned President Reagan to deploy a small number of US Special
Forces in March of 1981, where extended training demonstrably improved Salvadorian armed
forces.45 Two years later, in October 1983, turmoil in Grenada called for new US action, and
SOF deployed to protect American students and quell violence. The high losses in Ranger units
which ensued led JSOC Commander General Richard Scholtes to contend that SOF misuse by
conventional forces was undermining their considerable capabilities.46 His comments were well-
timed. That same year, Senate Armed Services Committee Chair Senator Barry Goldwater began
a two-year review of the Department of Defense. Senators Sam Nunn and William Cohen, both
staunch SOF supporters, began voicing concerns over SOF appropriation and chain of command
and organizational issues just as expansive changes to the entire structure of the Department of
Defense were underway.47 When the results of Goldwater’s study hit the press in October 1985,
change appeared inevitable. Sure enough, within months, one of the seminal documents in
Department of Defense history made its way to the House floor: the Goldwater-Nichols
Department of Defense Reorganization Act of 1986.48 Senators Nunn and Cohen used the

44 Moyer, Oppose Any Foe, 172.
45 Moyer, Oppose Any Foe, 176.
(1986).
opportunity to push new legislation around the structure and use of SOF, culminating in a bill which would forever rewrite the SOF landscape.

The bill, signed into law in October 1986 as an amendment to the Goldwater-Nichols Act, called for a number of critical SOF changes. First, all SOF would be reassigned to a unified combatant command, United States Special Operations Command (USSOCOM), under the jurisdiction of a four-star general and an Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict.49 Second — and most relevant to the discussion of technology acquisitions — USSOCOM was granted a new line of funding through Major Force Program 11 (MFP-11), which would form the foundation for USSOCOM’s new acquisition authorities and modernization efforts. The new command received official approval from President Reagan on April 13, 1987, adopting all SOF elements from the Air Force, Army, and Navy, and later integrating JSOC as a sub-unified command.50 The Marines, however, refused to develop SOF assets, a vacancy which would remain until the creation of MARSOC in 2006.

USSOCOM got its feet wet quickly in Operation Earnest Will (1987-89), a tanker protection operation in the Persian Gulf, but its first substantive test came with Operation Just Cause, an invasion of Panama authorized in December 1989 to depose dictator Manuel Noriega. SOF operators effectively executed on their assigned mission parameters, captured the dictator in a Papal hideout, and otherwise efficiently coordinated with JSOC and conventional partners.51 USSOCOM soon found itself called upon again, with Operations Desert Shield and Desert Storm (1990-91). Units engaged in coalition warfare, combat search and rescue, special reconnaissance,

51 Moyer, Oppose Any Foe, 185.
civilian affairs, psychological operations, and direct action missions, including a JSOC contingent tasked with locating and destroying Scud missile launchers.\textsuperscript{52} Despite constraints imposed by theatre commander General “Stormin” Norman Schwarzkopf, a man with a visceral aversion to SOF, USSOCOM proved a capable (if slightly ineffectual) new member of the Department of Defense combatant commands.\textsuperscript{53} And yet while USSOCOM did conduct other minor operations in the 1990s, notably in the Balkans, Kosovo, and Haiti, it was in East Africa where the defining moment of the decade for SOF would be written: Somalia.

Operation Gothic Serpent sought to translate USSOCOM hostage-rescue capabilities into hostage-taking capabilities by targeting Somali warlord Mohamed Farrah Aidid in downtown Mogadishu, employing a crack team of Delta operators supplemented by Ranger regiments and a Combat Search and Rescue Team. The Battle of Mogadishu, fought from October 3-4 in 1993, quickly spiraled out of control as thousands of Somali troops swarmed the compound targeted by Delta operators and shot down two Blackhawk helicopters. Events in Somalia, immortalized in Mark Bowden’s book “Black Hawk Down,” had dramatic ramifications. In the words of SOF historian Mark Moyar, “for most observers, however, the events of October 3-4, 1993, and the ensuring US withdrawal discredited the idea that special operations forces could decide strategic outcomes.”\textsuperscript{54} USSOCOM would lay low for the next few years, until another traumatic event called them back into action. Another day of infamy. September 11.

Before delving into modern SOF’s role in the GWOT, however, it is important to detail the modern structure and authorities of USSOCOM. In the United States Department of Defense United States Special Operations Command History, 1987-2007.”, 45-53.

\textsuperscript{52} Moyer, Oppose Any Foe, 186.

\textsuperscript{53} Moyer, Oppose Any Foe, 219.
command authority for all Special Operations Forces (SOF) lies within the United States Special Operations Command, or USSOCOM. USSOCOM is a unified functional combatant command, unique among the combatant commands in its authorities and mission. The landmark legislation known as the Goldwater-Nichols Department of Defense Reorganization Act of 1986 centralized military advice in the Chairman of the Joint Chiefs, formerly distributed among the services, and decreed that operational control would be delegated to geographic combatant commands. The main Services would retain obligations to organize, train, and equip their forces, but assets would then be amassed and deployed by the newly minted combatant commands. SOF were not exempt from DOD reform. In Section 212 of the Goldwater-Nichols Act, under the title “Initial Review of Combatant Commands,” the legislation also called for the consideration of a “unified combatant command for special operations missions which would combine the special operations missions, responsibilities, and forces of the armed forces.”

In truth, the consideration was short-lived. Pushed through Congress by prominent SOF advocates, a rider to the 1987 National Defense Authorization Act legislated USSOCOM into existence. Specifically, Section 1311 stipulated that a new Special Operations Command would unite all active duty and reservist SOF under a single unified combatant command with the responsibility to “prepare special operations forces to carry out assigned missions.” Furthermore, USSOCOM would be assigned civilian oversight in the form of new Assistant Secretary of Defense for Special Operations and Low-Intensity Conflict, or ASD(SO/LIC), to monitor policy and resources. Keeping in tune with the 1986 reorganization, operational

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command of SOF would be remain with the geographic combatant commands, just like the Services.

Many of those original tenets remain today. The current DoD structure divides the globe into six geographic unified combatant commands — Northern, Central, European, Pacific, Southern, and African commands — to go along with its four functional commands — USSOCOM, Strategic Command, Transportation Command, and Cyber Command — which are location-independent. USSOCOM itself is codified in the United States Code, Article 10, which outlines the code for all armed forces. USC Title 10 Section 164 assigns the powers and duties of commanders of combatant commands, including the USSOCOM commander. Section 167 is exclusive to USSOCOM. According to the code, “the commander of the special operations command shall be responsible for, and shall have the authority to conduct, all affairs of such command relating to special operations activities.” Notably, however, USSOCOM today have the authority to exercise command of operations itself, instead of unified geographic combatant commands, under direction from the President or Secretary of Defense. As detailed later, the expanding authorities of USSOCOM provide insights into its changing role within the Department of Defense.

The organizational structure of USSOCOM showcases a unique cross-domain expertise via experienced operators from each of the main Services. Led by current command US Army General Raymond A. Thomas III, USSOCOM headquarters numbered 2,500 personnel in 2018, supervising a total command of nearly 70,000 personnel. The J4 Directorate for Logistics,

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57 Unified combatant command for special operations forces, US Code Title 10 § Section 167 (n.d.).
known as Special Operations Forces Acquisition, Technology, and Logistics (USSOCOM AT&L), operates at the USSOCOM command level and coordinates all acquisition activities for SOF. Under USSOCOM exist five sub-commands and Joint Special Operations University, or JSOU. Each sub-command, excluding Joint Special Operations Command (JSOC), is profiled in Table 1 below.

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<th>Table 1: USSOCOM Command Profiles</th>
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<td>Army Special Operations Command (USASOC)</td>
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Data from the USSOCOM 2018 Factbook.
Chapter 3: Modern SOF

Modern Special Operations Forces (SOF) occupy a unique place within the American military establishment. Long a minor contributor to American war efforts, these inherently elite units have been imbued with authorities unbecoming of their original charter. Understanding SOF acquisitions necessitates an exploration of the tectonic shifts below the surface.

Long reserved for high-value, highly specialized missions, modern SOF now play a central role in the counter-terrorism fight. In shifting from a “supporting command” working to augment conventional forces to a “supported command” in charge of counter-terrorism operations, USSOCOM has fundamentally changed SOF’s operational environment. This change has introduced new challenges to the SOF force, just as it has expanded their authorities and increased their freedom. Applying Service-like demands on SOF strains the operator population; USSOCOM has done an admirable job in addressing visible effects on personnel and readiness. What goes unseen, however, is the effect high optempo has on degrading SOF’s acquisitions process.

First, look at high-level strategic guidance. The 1997 National Defense Authorization Act (NDAA) mandated an internal examination of the Department of Defense every four years, entitled the Quadrennial Defense Review (QDR).⁵⁹ Published in September 2001, February 2006, February 2010, and March 2014⁶⁰, the QDR captures strategic thinking as it evolved, and

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⁶⁰ The QDR was also published in 1997, but that edition holds less relevance for modern SOF. The QDR has since been replaced with new strategic documentation. For more, see: Brimley, Shawn. “Getting the Pentagon’s Next National Defense Strategy Right.” War on the Rocks, May 24, 2017. https://warontherocks.com/2017/05/getting-the-pentagons-next-national-defense-strategy-right/.
demonstrates how thinking jumped from considering SOF a tactical novelty item to the DoD’s strategic linchpin.

In 2001, SOF received hardly a passing mention in the QDR. The 73-page document featured few references to SOF, with explicit mentions restricted to their involvement in peacetime deterrence, enhanced C4ISR needs, and participation in a reorientation towards the pursuit of expedient military success. The only citation with tangible impact for SOF came in the form of a vague DoD recommendation to align SOF “to account for new regional emphasis in the defense strategy.” The appendix of current force levels did not include SOF elements at all. But the paucity of SOF guidance is hardly remarkable. The September publication date of 2001’s QDR did not account for the September 11 attacks. SOF remained dormant for much of the 1990’s after tragedy in Mogadishu, and with the enduring conflict in the Middle East not yet precipitated, SOF in 2001 looked primed to reprise a familiar role as highly capable but rarely used precision assets. September 11 changed that.

By 2006, the United States was firmly at war. Then Secretary of Defense Rumsfeld, a notorious champion of special operations, envisioned SOF assuming the mantle of counter-terrorism operations. Following from his influence, the strategic guidance for SOF which followed would irrevocably change USSOCOM itself. The 2006 QDR articulated a bold reformation of SOF, both in organizational character and operational charter. It called for the formation of a Marines special operations force, which led to the foundation of Marines Special

64 “2001 Quadrennial Defense Review.”, 27.
Operations Command (MARSOC), despite protestations from within USSOCOM. It prescribed expansions in the operator population, reaffirmed SOF’s roles in counter-terrorism and Weapons of Mass Destruction (WMD) nonproliferation, and requested increased capabilities to support SOF activities. While the QDR admirably prompted conventional forces to replace SOF as principal purveyors of irregular warfare, freeing SOF to be “more focused on those tasks they are best suited to perform,” it also, paradoxically, extended the reach and duration of special operations. In freeing SOF from existing tasks, the QDR anticipated SOF performing “more demanding and specialized tasks, especially long-duration, indirect and clandestine operations in politically sensitive environments and denied areas.” These calls are well-intentioned. They implore the DoD to exempt SOF from their activities of the early 2000’s, instead shifting the load from taxed operators to conventional forces. But ideal special operations are not long-duration, and the self-acknowledged demanding nature of SOF’s new tasks proved more accurate than intended.

The 2010 QDR did little to lessen SOF’s load, instead recognizing “the need to invest in enabling capabilities commensurate with [SOF] growth.” It called for increased capacity of SOF, supplemented by a growing community of “organic enablers and key support assets” in the

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65 Moyer, Oppose Any Foe, 283.
general purpose forces. In identifying general purpose force enablers as the key support assets, the QDR illustrates USSOCOM’s transition from a supporting command to a supported command. That narrative found only reinforcement in the 2014 QDR. The latest edition summarized SOF’s centrality to the counter-terrorism fight, insisting that more SOF be available to the Combatant Commander’s efforts in the midst of conventional force withdrawals. Again, too, the QDR described “maintaining persistent forward presence,” a decidedly un-special form of operation, including efforts “to prevent crises.” That notion vividly contrasts both the original mission set of SOF, and the early calls for expansion, like the 2006 QDR, which explicitly aspired to replace SOF with conventional forces where appropriate. In providing strategic guidance with persistent SOF presence as a hallmark feature, the DoD in effect placed Service-like demands on SOF’s elite operator population.

As intended, the QDR initiated deep changes to USSOCOM to meet increasingly lofty objectives. A cursory look at expansions in authority, budgets, and force levels provides a clear picture of the effects that Service-like demands affected on SOF.

USSOCOM’s authorities have grown markedly since 2001. In 2003, then Secretary of Defense Rumsfeld declared USSOCOM the lead organization for Global War on Terror (GWOT) operations; in 2004, President Bush charged USSOCOM with “coordinating the entire military's efforts in counterterrorism.” Empowering USSOCOM to take point demanded an increase in force levels, which included growth across the force as well as 2006’s addition of MARSOC. In

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72 “2010 Quadrennial Defense Review.”, x.
October 2008, USSOCOM was also made the DoD front for Security Force Assistance (SFA). While traditionally a core competency of the Special Forces, this further vested counter-terrorism authority in USSOCOM itself. In February 2013, the Secretary of Defense approved a USSOCOM request to transfer combatant command of Theatre Special Operations Commands (TSOCs) to USSOCOM, from Geographic Combatant Commands (GCCs). This granted USSOCOM authority to man, train, and equip TSOCs, although operational control remains with the GCCs. According to one report, “this change is intended to enable USSOCOM to standardize, to the extent possible, TSOC capabilities and manpower requirements.”

Lastly, in 2016, at then Secretary of Defense Ashton Carter’s request, President Obama tasked USSOCOM with coordinating DoD efforts to counter weapons of mass destruction.

While far from a complete picture, this concise timeline illustrates USSOCOM’s swelling authority. Institutional changes, coupled with ever-increasing demands in strategic guidance, both empowered and ensnared USSOCOM in a web of complex tasks outside the traditional purview of special operations. To meet demand, USSOCOM bolstered its operator population with growing coffers.

According to reporting from the Government Accountability Office (GAO), authorized special operations military positions jumped from “approximately 42,800 in fiscal year 2001 to approximately 62,800 in fiscal year 2014,” after which the DoD determined that force strength

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would level off. Congressional reporting suggests that the SOF operator population leapt from 33,000 in 2001 to 70,000 in early 2018, with current budget requests calling for a force 71,000 strong. The change runs contrast to the general purpose forces: in fiscal year 2014 SOF represented 2.9% of total authorized force levels, up from 1.9% in fiscal year 2001. Annual testimonials from USSOCOM commanders concur with the trend. In 2017, current USSOCOM Commander General Raymond Thomas stated that “since 9/11, we expanded the size of our force by almost 75% in order to take on mission-sets that are likely to endure.” An assessment of USSOCOM commissioned by the 2014 NDAA reported the DoD “increasing SOF end-strength levels by more than 80 percent since September 2001.” Emphatic budget expansions have accompanied USSOCOM’s operator and authorization expansions. From fiscal year 2001 to fiscal year 2014, funding for SOF-specific needs increased 213%, from $3.1 billion to $9.8 billion. Both procurement and operation and maintenance (O&M) budgets have contributed to the increase.

USSOCOM’s shifting modern role — scarcely noticed in September of 2001, now the DoD lead on persistent counter-terrorism operations — proffers both enviable and discomforting

80 “GAO 15-571.”, 13.
83 “GAO 15-571”, cover page.
effects on SOF. For one, SOF’s proficiencies are publicized as never before. President Obama referenced special operators in three State of the Union speeches; in 2012, he closely detailed the Bin Laden raid and praised members of the mission for their bravery and mutual trust, and he again referred the raid in 2016. He also closed his 2014 address with a stirring narrative about an Army Ranger he met, whose long recovery from injury inspired a rallying cry for collective progress. President Trump, too, profiled one Navy SEAL’s sacrifice in 2017. But beyond the simple references designed to invoke bipartisan patriotism, senior leaders are quick to extol SOF, frequently adopting familiar terminologies. Take, for example, then Secretary of State Hillary Clinton’s comments at a Special Operations Command Gala Dinner in 2012. According to America’s chief diplomat, “Special Operations Forces exemplify the ethic of smart power – fast and flexible, constantly adapting, learning new languages and cultures, dedicated to forming partnerships where we can work together…This model is delivering results.” Secretary Clinton could not have aligned her speech more with her crowd; the language closely resembles much of the internal USSOCOM literature on SOF culture. Such declarations are themselves explanations for SOF’s high, sustained optempo — when the narrative carried by senior leaders is one of absolute excellence, SOF use becomes a clear and superior choice.

That reputation has permeated into the public conciseness by other means, as well. In recent years, memoirs from former SOF operators have peppered the New York Times

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bestseller’s lists, much to the consternation of USSOCOM’s senior leaders. Special operators have appeared on documentary series, like 60 Minutes, and late talk shows. Movies glamorizing SOF operations, including American Sniper and Lone Survivor, are box-office champions, joined by many smaller-budget television counterparts. And while many military films typically receive advice from the DoD, 2012’s Act of Valor employed active-duty Navy SEALs. That the film regaled tales of bravery and camaraderie is not surprising. But the openness with which SOF are portrayed strikes a tone more akin to the Navy’s efforts with Top Gun than to SOF’s subdued public image of yesteryear. It is a marked turn from the “quiet professionals” moniker frequentlying internal SOF documentation.

Cultivating a broader understanding of SOF’s competencies offers distinct advantages. Accruing substantial political capital affords SOF operational flexibility and relative autonomy, which, coupled with expanded authorities and ballooning budgets, has enabled SOF to assume a more dominant role than ever before. In a conflict which has stripped the dignity of many American military forces, SOF’s reputation has stood tall, largely intact and widely recognized. The modern narrative of SOF is accurate, too. No data depicted above contradicts the obvious and undisputed operational excellence of SOF, nor does it reduce the competencies of operators in any way. The narrative of SOF — and SOF culture — is true, and well-earned. But the influx of demand for SOF has not introduced universally positive effects alone.

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Every year, USSOCOM commanders testify in front of the Senate Armed Services Committee on the status of America’s SOF. And every year, in predicable fashion, they credit Congress with keeping the lights on, formally thank conventional forces for their support of SOF activities, and remind policymakers of their core ethos. Without fail they also reference an enduring issue for SOF in today’s strategic paradigm, one which no amount of public awareness, political capital, or changing operator population has been able to solve: perstempo.

Perstempo is a measure of deployment frequency for an individual warfighter\(^{87}\), and it is a direct reflection of the SOF operational tempo. According to GAO reporting, weekly deployments for SOF personnel “nearly tripled” from fiscal year 2001 to fiscal year 2014, from around 2,900 personnel to 7,200 personnel.\(^{88}\) The numbers rose rapidly right after 2001 before leveling off at high sustainment levels, considering SOF’s small total operator population. These changes are more than enough to get notice. In his 2011 testimony to the Senate Armed Services Committee, then USSOCOM Commander Admiral Eric T. Olson elected not to mince his words, saying “I am concerned about the effects of nine years of focus on combat operations on the well-being of our extended special operations community.”\(^{89}\) And USSOCOM recognizes that operational demands will not see reductions any time soon. As then USSOCOM Commander

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\(^{88}\) “GAO 15-571.”, 23.

Admiral William McRaven stated in 2012, “I fully expect the operational demands placed upon SOF to increase across the next decade, and beyond.”

The tempo has strained operators and families, and adversely affected morale. According to one testimony, “most, if not all, of our SOF operators have lost friends both overseas and at home.” Reducing time with families to instead immerse operators in a physically and mentally exhausting environment is not just bad for morale, though. The high pace of military operations have been linked to poor readiness across the Services. One active duty special operations officer summarizes the effect as "longer deployment, less performance." From fiscal year 2000 to fiscal year 2005, steep inclines in operational deployments cut time for training activities by 50%, depriving the force of necessary time to maintain proficient skills. Even a USSOCOM self-evaluation, part of the NDAA for fiscal year 2014, determined that taking care of SOF (and their families) constitutes a readiness issue for USSOCOM and the DoD at large. Considering SOF’s centrality to the counter-terrorism fight, USSOCOM can little afford to operate below peak output.

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92 “GAO 18-253.”, 1.

93 Interview with active duty special operations officer, n.d.


95 “Review and Assessment of United States Special Operations Forces and United States Special Operations Command.”, 9.
So USSOCOM acted, first, by instituting standards to regulate maximum perstempo for special operators. In August 2005, USSOCOM required active duty personnel to maintain a 1:1 “deployment-to-dwell” ratio. Three years later, USSOCOM affirmed the 1:1 ratio, while aspiring to achieve a 1:2 ratio and setting a long-term goal for a “deployment-to-dwell” ratio of 1:3. In May 2014, USSOCOM reiterated striving for a 1:2 ratio. Furthermore, USSOCOM must receive explicit approval from the Secretary of Defense for any deployment which falls below the 1:1 ratio limit.96

Second, USSOCOM commissioned a study, entitled the Pressure on the Force and Families, to assess the impact of high operational tempo on the force. Following insights from the study — which suggested that unpredictability regarding deployments and training, as well as challenges navigating civilian life back home, caused the most conservation — USSOCOM imitated a “Preservation of the Force and Families Task Force,” to contend with rising readiness issues stemming from the high optempo.97 USSOCOM has also been active in reducing so-called “travel to train,” in which operators must relocate to new military sites for advanced training, in an effort to increase predicability for SOF training. They have called for better measures of perstempo and increased visibility across the force. Further initiatives meet the medical needs, both physical and mental, of warfighters, and extend support to their families.98 All in all,

USSOCOM is actively pursuing creative solutions to the clear readiness, morale, and health issues which high optempo produces.

Documenting USSOCOM’s efforts to address interlinked perstempo and optempo issues is important to the discussion on SOF acquisitions. It shows USSOCOM’s excellence in handling well-documented issues with clear origins and actionable remedies. Time and time again, USSOCOM has linked high operational tempo, and the SOF related expanding authorities which come with that, to perstempo and readiness concerns. Through concerted efforts, USSOCOM is handling what it perceives to be clear negative consequences of the current operational context.

But what if there is another SOF domain impacted by high operational tempo, poorly-documented but no less critical to the successful maintenance of the SOF enterprise? This thesis contends that SOF acquisitions are beginning to change, shifting to adopt more of the behaviors and more closely mirror the acquisitions processes of the Services.

SOF acquisitions is reputed to be nimble and agile: a “vanguard of rapid acquisition within DoD.”\(^9\) But over the course of 21 interviews with former and active duty operators, there exists a surprising frustration with the technologies SOF deploy to the battlefield. In other words, there is a substantive disconnect between the reputation of SOF acquisitions and the realities of operator discontent with systems that SOF acquire. What follows is a series of three early warning indicators, which suggest a narrowing of the gap between SOF acquisitions and Service acquisitions that runs counter to SOF’s principal tenets and acts to the detriment of SOF operators.

\(^9\) Olson, “Posture Statement of Admiral Eric T. Olson, USN, Commander of United States Special Operations Command before the Senate Armed Services Committee.”, 11.
Chapter 4: AT&L Expansion

One of the enduring and alluring reputations for US SOF is one of technological superiority. The creation of USSOCOM in 1987 afforded SOF unique privileges for acquisitions, privileges which today enable a nimble and effective acquisitions system. Commonly recognized as innovation leaders in the Department of Defense, USSOCOM acquisitions reflect the empowered culture of the operators they serve. Over the last 17 years of war, however, USSOCOM acquisitions have expanded, with acquisitions personnel approximately doubling since 2001.\(^\text{100}\) While initial intuition can reason through the expansion, which coincides with parallel expansions in the operator population and budget, a deeper examination of SOF’s roles and technology does not substantiate that claim. Instead, an alternative explanation suggests that additional acquisitions personnel reflect an expanding jurisdiction in the Program of Record system, which supports and maintains weapon system programs over a five year period. And while Programs of Record serve a critical role in the acquisitions infrastructure, their rising prominence threatens operator flexibility in a paradigm of accelerating technological change. This expanding jurisdiction in USSOCOM’s Programs of Record is a first early warning indicator of SOF acquisitions trending towards Service acquisitions behavior.

Appreciating changes in SOF acquisitions necessitates an understanding of the SOF system. Enumerated in its original charter, USSOCOM’s acquisition authorities distinguish it from other combatant commands — a distinction befitting USSOCOM’s unique roles and

\(^{100}\) See Appendix 1.
responsibilities.  

Per US Code Title 10, the commander of USSOCOM is responsible for both the “development and acquisition of special operations-peculiar equipment” and the “acquisition of special operations-peculiar material, supplies, and services.” Authority is subsequently vested in a command acquisition executive, who is responsible for “rapidly delivering acquisition solutions to meet validated special operations-peculiar requirements,” subject to appropriate DoD acquisition oversight and regulations. To facilitate these acquisition efforts, USSOCOM owns a bespoke line of funding, known as Major Force Program 11, or MFP-11. In distributing funds directly into USSOCOM coffers, MFP-11 enables USSOCOM to work at speed and bring solutions to the warfighter in a timely and effective manner. But certain conditions restrict MFP-11 expenditures. In order to differentiate between MFP-11 spending and MFP-2 spending, the funding line for the main Services, every MFP-11 dollar must be spent on “SOF-peculiar” items only. In spirit, this stipulation dictates that USSOCOM exclusively spends MFP-11 dollars on equipment which satisfies needs unique to their operations and for which there is no “service-common” requirement.

In practice, MFP-11 funds are directed into two streams of acquisitions: modifications to existing technologies, to make them SOF-peculiar, and internal developments, which are inherently SOF-peculiar. Modifications themselves are bifurcated into modified “commercial-off-the-shelf,” or COTS, products, and modified equipment from the Services whose original procurement is funded under MFP-2. Internal developments typically fall under the purview of

101 It should be noted that bestowing a functional combatant command with such sweeping acquisitions authorities inspired some early skepticism — and early defenders. For more, see: Sloan, Larry R. “Should the Commander in Chief, United States Special Operations Command Have the Authority to Develop and Acquire Special Operations-Peculiar Equipment, Material, Supplies or Services?” Army War College, Carlisle Barracks, PA, April 19, 1989. http://www.dtic.mil/docs/citations/ADA209781.

102 Unified combatant command for special operations forces, US Code Title 10 § Section 167 (n.d.).
USSOCOM Science and Technology (USSOCOM S&T), a directorate under USSOCOM AT&L which coordinates research and development efforts for SOF-peculiar products and technologies. Furthermore, sub-commands and operational units also have discretionary funding, which provides flexibility for the warfighter when fulfilling critical operational needs. These funds can be directed towards both traditional streams of technology and unmodified COTS, although purchases are subject to specified cost thresholds. Lastly, the Services provide unmodified “service-common,” MFP-2 funded equipment for SOF use, including vehicles, weaponry, and other assorted gear. Provisions from the Services form one half of SOF’s symbiotic relationship with the Services. In exchange for critical MFP-2 goods and services, SOF proliferate advanced technologies and doctrine to the Services, although the reliability of this transfer is unclear, and sometimes piecemeal. Therefore while MFP-11 constrains the use of USSOCOM acquisition dollars to “SOF-peculiar” equipment, materials, supplies, and services, USSOCOM actually weaves together four acquisition streams: pure, or unmodified, COTS, “service-common” items funded by MFP-2, modified systems from either of the aforementioned sources, and USSOCOM-developed systems for SOF themselves.

USSOCOM acquisitions are subject to the same layers of regulation as the other military departments. At the federal level, acquisition is guided by the Federal Acquisition Regulation, or FAR. Stepping into the DoD, USSOCOM acquisitions are further governed by the DoD 5000 series for the Defense Acquisition System, and finally, as with each military department,

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USSOCOM itself institutes its own policies and procedures. At the end of the acquisition phase, products or systems reach the procurement phase itself and are entered into the Program Objectives Memorandum, or POM, which forecasts programmed needs for five years, “the years that are 3 through 7 years in the future.” Constructing the POM involves cooperation across the SOF enterprise, with fiscal austerity focusing efforts on “identifying those capabilities that should be divested or replaced by newer technologies.” Each line item in the POM is said to be a “Program of Record,” which indicates dedicated budgetary allocations and sustainment. These MFP-11 expenditures are then submitted through USSOCOM annually to Congress as part of a President’s Budget Submission. These submissions do not represent the final allocation of dollars to USSOCOM, but past precedent indicates that the difference between budgetary requests and allocations, for USSOCOM, are inconsequential, in large part due to high Congressional support for SOF activities. Unless otherwise stated, all budgetary analysis conducted henceforth will be based on USSOCOM’s portion of the President’s Budget Submission.

Managing USSOCOM’s responsibilities to equip the SOF warfighter falls to USSOCOM Acquisitions, Technology, and Logistics, or USSOCOM AT&L. In addition to supervising MFP-11 budget proposals, USSOCOM AT&L also maintains close working relationships with the military services, the Department of Defense, Congress, defense and national laboratories, and industry partners. USSOCOM AT&L structures its activities around eight Program Executive

105 “GAO 07-620.,” 6.

106 Interview with USSOCOM Acquisitions Executive

107 Interview with USSOCOM Acquisitions Executive

Offices, or PEOs (Command, Control, Communications and Computers; Fixed Wing; Maritime; Rotary Wing; SOF Support Activity; SOF Warrior; Services; Special Reconnaissance, Surveillance, and Exploitation) and five directorates (Comptroller; Logistics/J4; Procurement; Acquisition Agility; Science and Technology). Culturally, the organization draws heavily on the concepts of “velocity” and “agility” — the abilities to move quickly to iterate through products and to be flexible in adapting to changing threats, respectively. A piece by current USSOCOM AT&L PEO for Rotary Wing Col. David Phillips and former PEO for SOF Warrior Col. Joe Capobianco argues that these tenets are supplemented by a handful of other principles. USSOCOM AT&L’s velocity is a product of its use of existing technologies, including “Service-common” MFP-2 funded items from the military Services and commercial-off-the-shelf (COTS) products, as well as the size of its acquisitions efforts. According to one 2007 GAO report, approximately 88% of USSOCOM weapon system programs are “relatively small, have short acquisition cycles, and use modified commercial off-the-shelf and nondevelopmental [sic] items or modify existing service equipment and assets.” In the view of USSOCOM AT&L program officials, developed technologies can also limit the risks of running over budget or out of time. The speed is compounded by a risk tolerant culture more permissive of early failure, made possible by the relatively small scale — and correspondingly low oversight — of their acquisition programs. Velocity permeates into acquisitions objectives as


111 “GAO 07-620.”, cover page.

well. USSOCOM emphasizes the “need for ’80 percent’ solutions that provide improved
capabilities incrementally to the warfighter in reasonable time frames, rather than major
development efforts that require advanced technologies and years of research and
development.” Each program is undertaken with the expressed intent of involving operators at
the tactical level, while synchronizing efforts across a broader range of partners.

USSOCOM AT&L also benefits from a flat organizational structure which, at 450
personnel strong, is leaner than any of its military service counterparts. This size works as an
acquisitions Goldilocks: USSOCOM AT&L is small enough to outmaneuver bureaucracy
endemic in most defense buyers, but large enough to warrant vendor attention. As DIUx
Pathways Manager Major David Rothzeid says, “because their community is so tightly
interwoven, they’re able to communicate more effectively about the intent of the acquisition.”

Lastly, the organization is dominated by a “can-do” attitude, perhaps best exemplified by
several of the maxims of former USSOCOM AT&L Executive James “Hondo” Guerts:
“unconventional thinking is an enabler,” “competition can be done quickly,” “risk must be
managed not avoided.” These principles mirror the cultural emphasis of SOF themselves —
both a display of USSOCOM AT&L’s commitment to its operators and a reflection of AT&L’s
personnel composition, which includes former operators in large numbers.

113 “GAO 07-620.,” 8.
115 Sabin, Jacob D., and Mark K. Zakner. “Analysis of Expedited Defense Contracting Methods in the Acquisition of
www.dtic.mil/docs/citations/AD1031503.
116 Interview with Major David Rothzeid, n.d.
117 Guerts, Mr James “Hondo.” “SPECIAL OPERATIONS RESEARCH, DEVELOPMENT, & ACQUISITION
CENTER.” n.d.
USSOCOM’s bespoke acquisitions system, replete with a “SOF-peculiar” line of funding and motivated by a culture ostensibly reflecting that of the operators they serve, is often cited as an exemplar within the Department of Defense. Acquisitions literature commonly invokes USSOCOM as a model for acquisitions activities; the adulation is especially pronounced in literature published at military educational institutions. USSOCOM earns plaudits as one of the few DoD organizations capable of overcoming acquisitions bureaucracy. The command “provides a superb example of how requirements, acquisition personnel, and experienced operators work together to rapidly deliver new capabilities,” according to Center for New American Security CEO Michèle A. Flournoy and CNAS Senior Military Fellow US Air Force Lt Col Robert P. Lyons III. AT&L’s ability to rapidly innovate, whether by deliberate or accelerated processes, earns even greater praise. Scholars call for the USSOCOM urgent needs process to be “the benchmark,” a success model predicated on solving their “no-fail mission” by “failing forward and failing fast” towards results. Those results get attention too. The


successful acquisition of SOF-peculiar systems, like the Mark V Special Operations Craft, further elevate USSOCOM AT&L’s reputation in academia.\textsuperscript{123}

Within the Department of Defense, USSOCOM acquisition efforts do not go unnoticed, or unrecognized. USSOCOM AT&L pursuits have earned the David Packard Excellence in Acquisitions award seven times since 2001 — six more times than the US Marine Corps.\textsuperscript{124} USSOCOM AT&L is routinely recognized by the Office of the Secretary of Defense for Acquisitions, Technology, and Logistics (OSD(AT&L)) for achievements in acquisitions\textsuperscript{125}, and earned top places in the small organization category of the Defense Acquisition Workforce Achievement and Development Innovation Awards in both 2015 and 2016, the first two years of the award.\textsuperscript{126} These awards underline deep respect and admiration for the USSOCOM acquisitions system. It is telling that former USSOCOM Acquisition Executive James “Hondo” Guerts left his post to manage Navy acquisitions as the Assistant Secretary of the Navy for Research, Development, and Acquisition.\textsuperscript{127} As LT Carl Governale of the NSW Innovation


Directorate notes, “leadership changes are indicative of Services going with the SOF model,” or trying to.\textsuperscript{128} As the old adage goes, imitation is the sincerest form of flattery.

USSOCOM praises its own acquisitions culture, too. Former USSOCOM commanders applaud their acquisitions velocity, describing internal processing as having “delivered critical capabilities to the battlefield, in weeks and months, instead of years.”\textsuperscript{129} Statements extol USSOCOM as “a vanguard of rapid acquisition within DoD,”\textsuperscript{130} with AT&L as an "acquisition enterprise…at the forefront of DoD.”\textsuperscript{131} The narrative also flows from AT&L itself. Former USSOCOM Acquisition Executive Hondo Guerts did not mince words in saying: “the sustained excellence by [Special Operations Research, Development and Acquisition Center] SORDAC is second to none within the Department.”\textsuperscript{132}

These plaudits wash out occasional blips in USSOCOM’s acquisitions record. According to a recent report, “despite SOF AT&L’s innovative approaches, it still finds itself leaving SOF operators potentially at a strategic disadvantage.”\textsuperscript{133} USSOCOM AT&L programs are not universally successful; according to a 2007 report from the Government Accountability Office (GAO), 40% of USSOCOM projects experienced “modest to significant” cost increases and

\textsuperscript{128} Interview with Lt. Carl Governale, n.d.


\textsuperscript{132} Lawrence, “SORDAC Nets DoD’s Highest Award for Excellence in Acquisition.”

delays.\textsuperscript{134} Some cancelled programs also squandered significant investments in time and energy.\textsuperscript{135} Other GAO reporting questioned select USSOCOM data quality practices for acquisitions activities.\textsuperscript{136} However, while it is no panacea, USSOCOM AT&L more than deserves its reputation.

The 17 years of war on terror have changed USSOCOM immeasurably, transforming it from a “supporting” command to a “supported” command. Interestingly, they have also significantly expanded USSOCOM AT&L. In the 43 interviews conducted for this thesis, it was undisputed that USSOCOM AT&L’s personnel count has risen sharply over the course of the Global War on Terror (GWOT). However, despite asking high-level officials at USSOCOM AT&L, reviewing external reports, and examining procurement data, there appears to be no tabulated data on the size of the acquisition workforce over time.\textsuperscript{137} Even current USSOCOM AT&L Executive James Smith stated that doesn’t “know a source for size of the SOF AT&L workforce” in a personal correspondence.\textsuperscript{138} This dearth of quantifiable data is troubling. USSOCOM cannot evaluate or manage what it does not track. For all the literature on operator population increases, complete with clear documentation on the change in SOF force strength, no equivalent exists for SOF acquisitions. Appendix 1 details a comprehensive collection of sources which testify to acquisition size changes over time, and while the numbers are not perfectly

\textsuperscript{134} “GAO 07-620.”, cover page.

\textsuperscript{135} “GAO 07-620.”, 20.

\textsuperscript{136} “GAO 15-188.”, 9.

\textsuperscript{137} No data which is unclassified, that is.

\textsuperscript{138} Interview with James Smith, n.d.
aligned, it can be reasonably concluded that USSOCOM AT&L has approximately doubled in workforce since 2001. For an ostensibly lean, flexible, and fast acquisitions organization, that change is significant, and it demands closer inspection.

Immediate intuition suggests that the growth at USSOCOM AT&L is logical within the context of a sustained high operational tempo. Two conditions support this argument. First, operator populations have increased significantly — from 33,000 in 2001 to 70,000 in early 2018. More operators explains more acquisitions personnel, the argument follows, because more operators necessitate more orders for their equipment. A larger force requires a larger equipping and sustaining infrastructure, and that requires more people to manage it. As the organization charged with equipping SOF, USSOCOM AT&L is right to expand alongside its tactical elements. And while the USSOCOM AT&L personnel expansion is roughly commensurate with that of operators, the change is dwarfed by the expansion in USSOCOM AT&L’s procurement budget, which ballooned from $606 million in fiscal year 2001 to $2.588 billion in fiscal year 2019, excluding overseas contingency funding. The second condition is technological change amidst the financial expansion. Flush with Congressional cash and tasked with increased responsibilities, SOF are now afforded resources for fully developing “SOF-peculiar” technologies to equip the force. Increasingly advanced technologies, the argument goes, precipitate more “SOF-peculiar” acquisitions, because more systems are justifiably unique.

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for the SOF warfighter. If SOF are deploying with more unique gear, which requires more
acquisitions programs to acquire and sustain it, the rise in acquisitions professionals is wholly
understandable.

But consider the following: USSOCOM’s operations and geographic concentrations have
remained largely unchanged in the GWOT, which means battlefield technologies are largely the
same as well. With similar technologies, more operators would require simply changing the
number of items purchased for a given system — hardly a change which demands doubling
AT&L folks. And fast-moving technology, irrespective of its effects on “SOF-peculiar” kit,
should lead to less Programs of Record, not more.

In 2000, only 20% of SOF deployments were to Central Command (CENTCOM), under
whose jurisdiction most modern counter-terrorism operations transpire. By 2005, deployments in
CENTCOM accounted for 85% of all SOF deployments.141 The concentration of deployments
has remained relatively steady, with CENTCOM deployments accounting for 85%, 81%, and
69% of all SOF deployments in 2006, 2010, and 2014, respectively.142 According to USSOCOM
Command Admiral Eric T. Olson’s 2011 testimony to the Senate Armed Services Committee,
about 85% of SOF were “directly engaged in Operations New Dawn and Enduring Freedom,”
both CENTCOM operations.143 Furthermore, SOF’s mission within the CENTCOM region is
largely unchanged from 2001. Each expansion in SOF authority, from USSOCOM’s designation
as the lead on counter-terrorism in 2003 to USSOCOM’s assumption of control over Theatre

141 “Several Human Capital Challenges Must Be Addressed to Meet Expanded Role.” U.S. Government

142 “Opportunities Exist to Improve Transparency of Funding and Assess Potential to Lessen Some Deployments.”

143 Olson, “Posture Statement of Admiral Eric T. Olson, USN, Commander of United States Special Operations
Command before the Senate Armed Services Committee.”, 4.
Special Operations Commands in 2013, served to further develop SOF capabilities in the counter-terrorism domain. Taken together, this suggests relatively little fluctuation in doctrine or mission for SOF during the last 17 years of war. If USSOCOM’s role in unchanged, acquisitions would be expected to remain relatively steady, reflecting the mostly stagnant needs of operators. And more operators cannot entirely explain the change in acquisitions personnel, either. While some additions do help support a larger operator population, with constant tactical needs, acquisitions should mostly just be buying more widgets for a given system. Changing the bottom line quantities on existing procurement contracts and budgets does not necessitate doubling USSOCOM AT&L personnel. Lastly, the changing face of technology is an interesting point. But a technological arena where change is accelerating calls for less Programs of Record, not more. Even if new technologies are “SOF-peculiar,” the iterative cycle of these new developments is incompatible with an acquisitions framework that locks USSOCOM into specific programs and systems for years at a time. These are the programs and systems USSOCOM AT&L professionals support. Irrespective of whether technological change distances SOF from Service-common technologies, or narrows the gap, its acceleration warrants fewer Programs of Record and less oversight. The expansion in USSOCOM AT&L runs counter to this trend.

USSOCOM AT&L’s increased size produces an alternative explanation: an expanding jurisdiction in Programs of Record. Anecdotal evidence from former and current SOF operators suggests that restrictions on decentralized technology acquisition, which follow from existing Programs of Record, are increasing. These restrictions threaten to constrain the operator flexibility which has long divided SOF and Service acquisitions.
Obtaining hard evidence on expanding Program of Record jurisdiction is difficult. Procurement budgets frequently amalgamate programs into categorized line items which change year to year, complicating efforts to track individual systems. Documented rules on what operators can and cannot spend discretionary funds on are also difficult to find, especially in an unclassified environment.

Programs of Record, it must be noted, serve a critical role in the acquisitions enterprise, and their use is often for good reason. For one, more “SOF-peculiar” equipment advantages operators, who can bring to bear weapon systems designed specifically for their use cases. There are advantages to Programs of Record locking funds into longer-term sustainment tails with existing justifications. As DIUx Pathways Manager Major David Rothzeid explains, “if you have a Program of Record, then you have an established program element line which gets recurring funding year over year.” This eases the process of defending a budget to Congress. And Programs of Record do not need be restrictive, or cover all operator needs. Programs of Record are commonly mistaken for dictating the purchase of a specific weapon system, but in fact, they articulate a set of requirements and directly fund the acquisition of any system which meets those requirements. While the process of writing and evaluating requirements is problematic, as discussed briefly in the policy implications chapter, this distinction does mean that Programs of Record which support well-written, flexible requirements can integrate innovative technological developments. Lastly, Programs of Record are not intended to acquire all systems under any circumstance. A host of tiered discretionary funds, supplied to commanders, can be used for

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144 Interview with Major David Rothzeid, n.d.
145 Interview with retired senior USSOCOM commander, n.d.
fulfilling operational needs as they arise. Funds are made available, per one operator, both “over the course of our workup…and on your deployment…[for] the mission set that you are doing.” These resources enable responses to emergent requirements at the commander level. Taking care of immediate needs is not solely AT&L’s job. Programs of Record, then, appear perfectly appropriate for USSOCOM AT&L’s role, and their rise not problematic.

This narrative, however, rests on the assumption that Programs of Record do not preclude operator choice or constrain their ability to spend discretionary funds on commercial-off-the-shelf (COTS) equipment they deem superior to AT&L-supplied equipment. Operators indicate otherwise.

According to one special operations officer, if any USSOCOM officer with financial clout could point to a Program of Record, operators were prevented from spending unit dollars on a COTS alternative. The officer described recent changes as introducing “much more restriction…I’m confident in saying it has gotten worse.” When asked about the possibility of an increasing jurisdiction of Programs of Record, he “absolutely” agreed. Former Ranger Battalion commander and veteran of the Panama and Grenada invasions David Barno added that his instinctual supposition is that USSOCOM is adding people to the acquisitions process, describing the modern acquisitions system as “calcified.” Such restrictions contrast his experiences as a Ranger in the 1980s. He said his sense was that USSOCOM had a “lean amount of acquisition bureaucracy” at the time. Asked to cite personal instances in which Programs of Record precluded COTS acquisitions, he stated “I don't recall anything I wanted that I couldn't

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146 Interview with active duty special operations officer, n.d.
147 Interview with retired senior USSOCOM commander, n.d.
148 Interview with special operations officer, n.d.
get.”

Discussing restrictions imposed on modern SOF — from basic equipment to more advanced personal technologies, like GPS devices or unmanned aerial vehicles (UAVs) — surfaced frequently across the 21 interviews with former and active-duty SOF operators. And these restriction fostered an aversion to Programs of Record. Former US Army Infantry officer and Green Beret Alex Pruden concisely voiced this concern by saying “I think you need to pare back the existing Program of Record program, I think just in general the existing number of Programs of Record need to be reduced.” For operators, Programs of Record link directly to dwindling flexibility in the systems they can deploy downrange.

Operator opposition to Programs of Record is not new, nor does it alone indicate problematic changes. But operator anecdotes testifying to diminishing flexibility in discretionary spending tell a concerning tale for USSOCOM acquisitions. From 2001 to present, USSOCOM AT&L personnel have doubled. While this change would initially appear a logical response to swelling operator populations and ballooning procurement budgets, USSOCOM’s relatively constant missions and deployment locations challenge this argument. Instead, an alternative explanation suggests that the doubling in AT&L positions reflects an expanding jurisdiction in the Program of Record system, which, while offering some benefits, ultimately acts as an undue constraint on operator flexibility.

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149 Interview with David Barno, n.d.
150 Interview with Alex Pruden, n.d.
151 The following chapter delves deeper into the natural tensions between USSOCOM AT&L acquisitions professionals and SOF operators.
If changes caused by USSOCOM’s high operational tempo included an expansion in the jurisdiction of Programs of Record, operators frustrated with increasingly inflexible acquisitions would likely pursue alternative acquisitions methods. Research indicates they have.
Chapter 4: Alternative Acquisitions Methods

Documenting the expanding size of USSOCOM’s acquisition workforce over the course of the Global War on Terror (GWOT) is necessary but insufficient evidence of a changing acquisitions culture in SOF. If the traditional SOF acquisitions system is bureaucratizing to look more like the general Services, SOF would also be expected to seek approaches which circumvent organizational inhibitors impeding innovation. By examining SOF usage of alternative acquisition methods, like Other Transaction Authorities (OTAs), it is clear that the burgeoning Program of Record system is forcing operators and commands to employ workarounds to the traditional acquisition system. OTAs deployed by USSOCOM AT&L substantiate the claim that SOF acquisitions are agile and fast-moving, constantly latching on to new capabilities as they arise. But OTA use at lower command levels — which occurs in direct opposition to the standard hierarchy of USSOCOM acquisitions — indicates dissatisfaction with the traditional acquisitions process. Alternative acquisitions pursuits by a wide swath of the SOF community are a second early warning indicator of shifting acquisitions in USSOCOM.

While USSOCOM acquisitions are held to both federal standards and Defense Department standards, the Federal Acquisition Regulation (FAR) and DoD 5000 series, respectively, USSOCOM is still afforded a suite of acquisition processes, which fall into three categories: contracts, financial assistance, and cooperation research and development agreements.152 This thesis is concerned with only the contracting phase of acquisition, but contracting alone offers a multitude of options for acquisitions professionals. Alternative

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methods ostensibly fill gaps created by the FAR acquisition process. The Bayh-Dole Act of 1980 set up the Patent License Agreement (PLA) and allowed non-governmental organizations to pursue and obtain ownership over federally-funded projects.\(^{153}\) The Small Business Innovation Development Act of 1982 set up SBIR, which facilitates federal research and development with high commercial upside in small businesses. The Department of Defense is one of many SBIR partners.\(^{154}\) In 1986, the Federal Technology Transfer Act created CRADAs, which “enable industry to collaborate with DoD labs to jointly research and develop technologies having both commercial and military applications.”\(^{155}\) Partnership Intermediary Agreements (PIAs) catalyze federal technology transfer.\(^{156}\) And in 1994, the Defense Department obtained full access to Other Transaction Authorities, or OTAs, which enable rapid prototyping contracts to deliver quick research and development results. These methods are among the litany of contracting options for USSOCOM, which often overlap or receive funding from more than one source.\(^{157}\) There are also methods for getting warfighter what they need in urgent situations. USSOCOM’s rapid acquisitions process is the Special Operations Forces Capabilities Integration and Development System-Urgent (SOFCIDS-U),\(^{158}\) which aims to field solutions “within 180 days”


\(^{154}\) “About SBIR.” [SBIR.gov](https://www.sbir.gov/about/about-sbir).  


\(^{156}\) Swearingen and Dennis, “US Department of Defense Technology Transfer.”, 277.


\(^{158}\) Schaefer, “Getting the Warfighter What They Need and When They Need It.”, 9.
of the submittal of a Combat Mission Needs Statement (CMNS).\textsuperscript{159} Taken together, “flexible contracting tools have the potential to attract additional suppliers and broader market segments than afforded through traditional methods alone.”\textsuperscript{160} Effectively developing competencies for many different acquisitions tools is the key to agile acquisitions.\textsuperscript{161}

An inclusive evaluation of the myriad processes to which USSOCOM is privy merits another thesis altogether. Instead, this thesis focuses on the applications of two aforementioned contracting mechanisms: Partnership Intermediary Agreements (PIAs) and Other Transaction Authorities (OTAs). Both of these mechanisms are at the heart of USSOCOM’s latest acquisitions developments. In 2015, USSOCOM used a PIA to set up SOFWERX, a technology hub for the SOF community. And USSOCOM AT&L has recently employed OTAs for their own prototyping activities. OTA implementation has also proliferated across the SOF enterprise since its expansions in 2015 and 2017. The recent commencement of these initiatives justifies focusing on PIA and OTA mechanisms.

One of USSOCOM’s latest acquisitions ventures is SOFWERX. Part tech scout and part incubator, USSOCOM stood up SOFWERX in late 2015 to improve the innovation ecosystem within SOF. As then USSOCOM Acquisition Executive James “Hondo” Guerts described it, “SOFWERX [exists] to create venues for ‘returns on collisions’,”\textsuperscript{162} or, put simply, to provide a common space for mutually beneficial interactions between members of the SOF enterprise and

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\textsuperscript{159} Schaefer, “Getting the Warfighter What They Need and When They Need It.”, 10.
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\textsuperscript{160} Sabin and Zakner, “Analysis of Expedited Defense Contracting Methods in the Acquisition of Emerging Technology.”, 51.
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\textsuperscript{161} Interview with James Smith, n.d.
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“hundreds of non-traditional partners.” The small team based in Tampa, Florida is afforded flexibility because SOFWERX is the product of a PIA between USSOCOM and the Doolittle Institute, a non-profit chartered with improving military innovation. Despite modest resources, SOFWERX conducts a wide array of activities. They host Silicon Valley-esque hackathons in their Bay Area-styled facility. They run a fabrication crash course for SOF at a former auto-body shop, nicknamed “DIRTYWERX”, to teach operators about 3D printing and machining. But their lessons don’t just stay in the classroom. SOFWERX have also fielded “Mobile Technology and Repair Centers” to encourage more organic fabrication downrange. SOFWERX prototypes projects, solicits ideas through an initiative called TeamWERX, and publishes a newsletter called TechWatch for the SOF community. Frequent networking events and site tours vie for what calendar space remains.

But the depth of their engagement is an open question. SOFWERX shows that partnership intermediary agreements are “still in their theoretical phase,” according to one source. The multipolarity of its ventures can be seen as distracting from focused acquisitions innovation. Their combination of R&D and incubator activity is also largely outside the purview of this thesis, which focuses on bringing mature commercial technologies to the warfighter.

SOFWERX is worth mentioning because it is well publicized, although that is itself


167 Interview with Lt. Carl Governale, n.d.
disconcerting. It can be difficult to shake the feeling that SOFWERX, at least today, is more bark than bite, a shop set up to advertise USSOCOM more than develop for it. USSOCOM’s pursuit of alternative acquisition systems, then, is not best represented by the PIA arrangement. Their use of OTAs is far more telling.

Other Transaction Agreements, or OTAs, are not new. Most of the aforementioned alternative methods were legislated into existence towards the end of the 20th century. In contrast, the National Aeronautics and Space Administration (NASA) became the first agency endowed with other transaction authority, in 1958. The Department of Defense received the authority in 1989, with initial use dedicated to research efforts from the Defense Advanced Research Projects Agency, or DARPA. By 1994, Congress authorized the whole of DoD to use OTAs for prototyping projects. Today, DoD organizations are entitled to the use of OTA contracting methods, albeit under specific conditions. USSOCOM, alongside the military departments, can use OTAs for prototyping activities of any kind. OTAs hold a reputation for being immensely flexible contracting vehicle, in large part because they are not bound by the terms of the FAR. Devoid of bureaucratic precedent or impositions, OTAs are increasingly of interest in the DoD.

Two recent pieces of legislation have loosened the reins on OTAs, and these expansions help contextualize USSOCOM’s use of other transaction authorities. OTA prototyping previously accommodated only weapons or weapon systems — certainly applicable for USSOCOM, but

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168 The nomenclature here is complicated. Other Transaction Agreements (OTAs) refer to the agreements signed via authorities vested in government bodies, authorities sometimes known as Other Transaction Authorities, also abbreviated to OTAs. These agreements are alternatively called simply Other Transactions (OTs). The thesis adopts the acronym OTA to indicate Other Transaction Agreements.

169 “GAO 16-209.”
narrowly limited in scope. No longer. Amendments in the fiscal year 2016 National Defense Authorization Act (NDAA) expanded OTAs, permitting DoD entities to “carry out prototype projects that are directly relevant to enhancing the mission effectiveness of military personnel and the supporting platforms, systems, components, or materials proposed to be acquired or developed by the Department of Defense, or to improvement of platforms, systems, components, or materials in use by the armed forces.” Supplementing the expansive new language, one new provision also authorizes follow-on production contracts, which, in a major step, can avoid competitive bidding in the production contract phase should competitive procedures exist in the prototyping phase, and the prototype project be successfully completed. These changes widen the aperture of OTAs to include a broader array of potential prototypes, in a process more amenable to non-traditional partners. Congress furthered OTA development with the fiscal year 2018 NDAA. In total, the legislation donates eight full sections to OTA expansion. Changes include additional contracting authorities for the advanced development of prototypes, expanding methods for entering research agreements, developing new educational and training programs, increasing the fiscal caps on certain prototyping projects, and awarding select preferences to OTAs for prototyping activities.

SOF acquisitions have responded to the expanded authorities. Leveraging new capabilities, USSOCOM AT&L has signed OTAs with a number of commercial partners, largely

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170 See Section 815 of Title VIII, Subtitle B
172 See Sections 861 to 868 of Title VII, Subtitle G
as part of the larger effort on the Tactical Assault Light Operator Suit (TALOS) project. While complete data on the quantity, frequency, funding level, and content of AT&L OTAs is difficult to obtain, sources at USSOCOM AT&L have provided some information, compiled in Appendix 2. Their data indicate that USSOCOM AT&L employs OTAs for technologies in a number of engineering disciplines, with contracts on the order of hundreds of thousands of dollars. Projects include testing equipment for chemical and biological weapons, robotic devices to augment human mobility, upgraded ballistics protection, and polymer-cased ammunition.

There is a good rationale for using OTAs. Exempt from the FAR, OTAs can engage non-traditional partners and cut down on the delivery time of prototyped systems. These attributes align not just with SOF, but the DoD as a whole. According the 2018 National Defense Strategy, “the [Defense] Department will also continue to explore streamlined, non traditional pathways to bring critical skills into service, expanding access to outside expertise, and devising new public-private partnerships to work with small companies, start-ups, and universities.” OTA champions frequently cite its flexibility as a key attribute; OTAs can liberate contracting officers from the FAR’s more stringent guidelines. OTA provisions mandate that prototyping either feature at least one non-traditional partners or source at least one third of the funding from participating entities other than the Federal Government. However, there are concerns, including within USSOCOM AT&L, about using an uncommon contracting process.

Acquisitions professionals are wary of contracting with OTAs because there is little precedent,

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173 USSOCOM’s TALOS project is controversial, with questions over its technical feasibility, developmental costs, and applicability to operator needs. This thesis does not cover TALOS in any depth, but TALOS is considered by many in USSOCOM AT&L to be emblematic of positive alternative acquisitions methods. Certainly, USSOCOM AT&L’s use of OTAs cannot be discussed without mentioning TALOS.


and therefore higher professional risks. Contracting with the FAR is a safer, if slower, process — a valuable consideration for understandably risk-averse acquisitions professionals. But USSOCOM AT&L’s recent record with OTAs demonstrates that they confer more benefits than dangers.

USSOCOM AT&L’s usage of OTAs is not problematic. On the contrary, their use is precisely the expected behavior. Here, an agile and empowered acquisitions organization notorious for finding optimal routes to its objectives has leveraged newfound opportunities for innovation. Proponents would suggest that AT&L is an auto-correcting system, identifying and then solving deficiencies in its own process to remain flexible. According to one retired senior USSOCOM commander, USSOCOM’s use of OTAs shows the “system adapting to what needs to be done.”

No one can or should fault AT&L for pursuing every avenue available to them. Innovation has no allegiances. If the existing system is too slow, or cannot deliver on a particular demand, AT&L has a responsibility to make full use of its faculties. And they do. DIUx Pathways Manager David Rothzeid notes that “USSOCOM is able to, based on precedent, integrate different acquisition authorities.” DIUx officials noted that USSOCOM was the first DoD entity to leverage DIUx’s unique OTA process.

But this logic rides on a critical assumption — that USSOCOM AT&L is the only member of the SOF community employing OTAs. OTA use below the AT&L level would indicate that AT&L is unable to wholly satisfy the acquisitions needs of its operators. If AT&L is

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176 Interview with retired senior USSOCOM commander, n.d.
177 Interview with Major David Rothzeid, n.d.
178 Personal Correspondence with DIUx Officials, n.d.
Indeed the agile acquisitions system it is often reputed to be, there would be no need for operators or officers to pursue OTAs. Technology should trickle down from the top.

Evidence suggests otherwise. Data from the Defense Innovation Unit Experimental (DIUx) and testimonies from USSOCOM officials detail OTA use at lower command levels, from the sub-command headquarters down to tactical team levels. As the principal Defense Department organization executing on OTAs, DIUx hosts most SOF OTA projects. According to internal data published at their discretion, DIUx “supports customers from tactical end users to large program offices across all of the uniformed services.”

DIUx projects often engage at the operational unit levels, “which provides a very tactical understanding around the application of technology,” with interest concentrating in the human systems and autonomy portfolios. By employing OTAs directly, SOF operators unwittingly demonstrate a clear disconnect between acquisition needs, as articulated by operators, and acquisitions activities, as conducted by USSOCOM AT&L. And contracts between DIUx partners and USSOCOM customers range in value from $500,000 to $2 million; this places them on the same order of magnitude as USSOCOM AT&L OTAs in dollar amount.

The data also showcases OTA appeal. The average prototype timeline, from DIUx’s initial Commercial Solutions Opening (CSO) to product delivery, is 60-90 days for USSOCOM customers. As a reminder, USSOCOM’s urgent need process, SOFCIDS-U, aims “to field the

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179 Personal Correspondence with DIUx Officials, n.d.

180 Interview with Major David Rothzeid, n.d.

181 Interview with Major David Rothzeid, n.d.

182 Personal Correspondence with DIUx Officials, n.d.
solution within 180 days of CMNS submittal.” DIUx also interfaces with a broad range of industries, which is reflected in their USSOCOM-oriented projects. According to their website, DIUx has partnered USSOCOM with commercial entities including ShieldAI, a company building drones which can map interior environments, Halo Neuroscience, whose equipment trains and improves motor skills, and Quid, which makes strategic data visualization products. The narrative for operators, therefore, is clear: we can obtain technologies at lower cost, faster, and with wider commercial participation and collaboration, than we are getting from USSOCOM AT&L. Major Rothzeid pointed out that “a lot of the discussion around other transaction authority and its application have been pushed by the user community, as a way to get the things they need faster.” As a “middle man,” DIUx simply eases that process.

DIUx may facilitate SOF OTAs, but lower levels of command within USSOCOM pursue OTAs independently as well. As DIUx autonomy portfolio lead Jameson Darby notes, “everyone in SOF understands the value of flexible funding for innovation and R&D,” and DIUx facilitates across the SOF enterprise. Take the poignant example of OTA use at NSW. According to LT Carl Governale, an Operations Officer at the NSW Innovation Directorate, NSW have employed a single-digit number of OTAs, most of which run through DIUx. LT Governale expressed frustrations with the requirements system, which he characterized as reactionary and slow. He views OTAs as a means of technological exploration. Prototypes can calibrate requirements to be

183 Schaefer, “Getting the Warfighter What They Need and When They Need It.”, 10.
185 Interview with Major David Rothzeid, n.d.
186 Interview with Jameson Darby, n.d.
187 Interview with Lt. Carl Governale, n.d.
more attuned to commercial innovation, and accommodate more flexibility in development.\textsuperscript{188} LT Governale’s rationale matters less, however, than the pursuits themselves. If NSW were satisfied with AT&L’s efforts, OTA prototyping would hold little to no value. OTA use at more tactical levels, per operator testimonials, is aimed at prototyping for more immediate technology needs downrange — much like the needs SOFCIDS-U is intended to fulfill.

The SOF acquisitions system is not designed this way. Full authority to equip SOF warfighters is vested in USSOCOM AT&L with the understanding that AT&L shall cover needs from the individual operator level through to USSOCOM command itself.\textsuperscript{189} This hierarchy is supplemented by tiers of discretionary funding, which provide commanders with a stipend for buying commercial-off-the-shelf (COTS) products to fulfill urgent needs. OTA use at the AT&L level does nothing to upset this balance. In fact, evidence of that activity alone would suggest that AT&L operates at peak velocity. But OTA use at lower command levels betrays a disconnect between operators and AT&L, with the former seeking out alternative acquisition methods to navigate around AT&L’s FAR-based process. OTAs provide an excellent antidote to acquisitions inertia because they are exempt from the FAR, and therefore accessible at the tactical and sub-command level. Operators cite similar accessibility for COTS systems. One former SEAL recalled "we weren’t allowed to go outside the programatic MILSPEC\textsuperscript{190} and buy our own things, but truth of the matter is everyone does, because there is better technology that you could

\textsuperscript{188} Interview with Lt. Carl Governale, n.d.  
\textsuperscript{189} Interview with James Smith, n.d.  
\textsuperscript{190} MILSPEC refers to military-grade hardware products, which undergo ruggedized DoD testing prior to acquisition.
buy for $500 at Walmart than you are going to get issued."191 OTA usage follows a similar reasoning.

True, OTAs can be construed as just a tool in the acquisitions toolbox,192 dedicated to specific prototyping projects but unable to perform the tasks of many FAR-based acquisitions processes. Their purview is indeed more limited — as USSOCOM Acquisition Executive James Smith describes it, “OTA’s are not a panacea for all government contracts.”193 No one reasonably suggests that helicopter upgrades or underwater dive vehicles be the product of six-digit prototyping contracts. In fact, “OTAs in conjunction with the FAR are extremely complementary,”194 not competitive. Furthermore, critics would rightly point out, expectations about AT&L agility not only apply to operators, but are derived from operator culture. Would we not expect operators to pursue OTAs if they provided more angles for innovation?

This expectation is well-founded. But what is notable about OTAs is that their time tracks with parallel expansions in OTA authority. SOF using OTAs is a new phenomenon, seemingly borne of frustrations with an acquisition system perceived to be bureaucratizing and constraining individual choices. The recent expansions, furthermore, are not themselves the products of any “self-correcting” USSOCOM system. USSOCOM AT&L did not develop new OTA authorities, or lead the charge for their legislation. They simply employed new workarounds as they became available. Logically, strengthening workarounds is symptomatic of greater issues with the normal acquisitions process. DoD wide, OTAs are an admission that the FAR is unable to fill select

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191 Interview with former Navy SEAL, n.d.
192 Interview with James Smith, n.d.
193 Interview with James Smith, n.d.
194 Interview with Major David Rothzeid, n.d.
acquisitions roles. USSOCOM AT&L’s use of OTAs shows it needs the help — an indicator which runs counter to the agile reputation for SOF acquisitions. Sure, the Services are expected to benefit from OTA developments, given their renown for sluggish acquisitions processes. But SOF were traditionally considered exempt from such issues. If the USSOCOM acquisitions system were operating as its reputation indicates, expanding OTA authorities would bear little relevance to SOF. AT&L would rightly be expected to adopt the more flexible practices, but satisfied operators would have no reason to pursue OTAs themselves. That they are is a telling sign for SOF acquisitions.

Tension in acquisitions relationships is healthy. Besides, tension needs to exist, “because if everyone gets everything they want all the time, the budget will balloon 4X and systems won’t work together.” But fiercely independent operators accustomed to tactical independence are, unsurprisingly, resistant to any acquisitions organization dictating what they can and cannot field. SOF are prone to grumble about their equipment, and AT&L is an easy scapegoat for frustrations. Solutions can sometimes be found in creative maneuvers at lower command levels, including wiser discretionary funding purchases, absolving AT&L of responsibility for the issues altogether. Operators and components can do better to sync demands, identify platforms of choice, and “present a more unified approach.” And operators will always ask for more technology, particularly in a SOF era known for having few constraints on its spending. “Of course every operator would like to pick their perfect platform,” a retired senior USSOCOM

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195 Interview with retired senior USSOCOM commander, n.d.

196 Interview with retired senior USSOCOM commander, n.d.
Commander comments. But on the AT&L side, “the acquisition system has to account for all requirements.” Their responsibilities to equip the force and ensure interoperability induce risk-aversion. While sub-commands might prefer individual fiscal jurisdiction over their unique budgets, USSOCOM AT&L’s role is to “[say] ‘hold on there cowboy, we need to make sure that we’re accountable and we’re synchronizing across the force’, so there is that inherent tension.”

Giving everyone what they ask for, every time, is both impractical and antithetical to a force dedicated to joint operations. No centralized acquisitions approach can fully close the gap between AT&L and operator risk assessments. One tempting option, then, is to fully decentralize acquisitions, returning most purchasing authorities to individual teams or commands. But that approach introduces obvious concerns about operators misappropriating funds, purchasing technology with a narrowly focused lens rather than long-term perspective, and acquiring diverse systems which are unable to function in joint tactical or strategic environments. A centralized acquisitions body precludes these issues, and USSOCOM AT&L strives to integrate operator feedback to better respond to needs. SOF and AT&L will never be perfectly in sync, and they shouldn’t be expected to.

Inherent tensions would appear to explain away recent OTA use and its implications for SOF acquisitions. But the gulf appears to be widening. While the tensions themselves are longstanding, OTAs challenging the traditional acquisition hierarchy are a modern phenomenon. As the previous chapter demonstrated, the AT&L acquisitions process appears to be calcifying as a response to expanded operational duties, which apply Service-like pressures on SOF. OTA use

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197 Interview with retired senior USSOCOM commander, n.d.

198 Interview with former Navy SEAL, n.d.
may be a well-intentioned pursuit, but acquisitions are not designed to function with divergent acquisitions activity up and down the force. This trend is a second early warning indicator about changes in SOF acquisitions culture.
Chapter 6: Case Study of the RQ-20

Shifts in USSOCOM acquisitions culture only bear relevance to the SOF enterprise if they demonstrably disadvantage operators. SOF’s first truth is that “humans are more important than hardware.”\textsuperscript{199} Without specificity, sweeping claims about either AT&L’s organizational changes or efforts to employ alternative acquisitions methods are difficult to grasp. The third early warning indicator of SOF acquisitions moving towards the Services model revolves around a poignant example of AT&L inertia: the AeroVironment RQ-20 Puma. Initially built for USSOCOM in 2008, the Puma presents a clear case in which SOF acquisitions were hopelessly outpaced by a rapidly innovating commercial sector. USSOCOM is reputedly an innovative military organization, renowned for deploying advanced systems. If one expects USSOCOM to be good in any technological area, it would be drones. And if anyone could get COTS systems, it would be SOF.\textsuperscript{200} By placing the Puma into a Program of Record, USSOCOM AT&L sentenced its systems to obsolescence. The story of the RQ-20 also informs discourse around interoperability and military-spec hardware, and produces a compelling case for the limited decentralization of acquisitions down to operators using COTS products.

First, a bit of vernacular is in order. While the term “drone” is sufficient in general audiences, military systems require more nuanced language. An Unmanned Aerial Vehicle, or UAV, refers to an unmanned aerial platform. These range from insect-sized devices developed by advanced research laboratories to aircraft the size of small commercial airliners, like the well-known MQ-1 Predator. An Unmanned Aerial System, or UAS, describes a system of systems at


\textsuperscript{200} Interview with Nora Bensahel, n.d.
the service of one or several UAVs, including launch and control stations, charging equipment, and communications platforms. SOF employ UAS with a diverse set of capabilities. Some UAS are kinetic, like AeroVironment’s Switchblade, which can pursue targets before detonating a small onboard ordinance package to eliminate targets with minimal collateral damage. Other kinetic UAS fire from distance, like the Predator’s armed cousin, the MQ-9 Reaper. Most UAS, however, are “ISR” assets — an abbreviation of intelligence, surveillance, and reconnaissance. These systems collect actionable intelligence to inform operators about battlefield developments.

USSOCOM further brackets UAS assets into three categories: theater or operational assets, tactical assets, and focused assets. Focused assets provide immediate assistance on the battlefield, like scouting ahead to locate and identify enemy combatants. Tactical assets conduct ISR for SOF tactical commanders. Strategic assets collect broader intel for mission planning purposes, with a minimal impact on immediate ground conditions. These functionalities overlap, and assets are frequently redistributed based on needs. But the differentiation does help define system design objectives. The Puma is a “Group 1 UAS,” which USSOCOM defines by weight class. Group 1 UAS are the smallest UAS in the SOF arsenal, limited to less than 20 pounds in weight. These systems are tactically deployed as “focused” assets, performing forward reconnaissance, peering into buildings, or maintaining a security perimeter. They help fill ever-increasing operator ISR needs.

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204 Interview with Alex Pruden, n.d.
In 2008, USSOCOM solicited bids for a new UAS with the title All Environment Capable Variant, or AECV, to fulfill a requirement for hand-launched UAS. By July, USSOCOM chose defense contractor AeroVironment’s Puma All-Environment (AE) as its preferred solution. According to a 2008 press release, the Puma AE “lands near-vertically on both land and water and is equipped with a day- and night-capable, waterproof sensor package that provides image tracking, image stabilization and high-image quality.” The Puma AE employed the same “Ground Control Unit” as two other AeroVironment UAS, each themselves in existing Programs of Record in the DoD. Since then, USSOCOM has acquired 41 Puma AECV systems, at anywhere from $414,000 to $544,000 per unit. Starting in fiscal year 2017, USSOCOM acquired approximately 45 Puma II systems, at $384,000 to $450,000 per unit. These purchases do not include SOF-unique ancillary equipment and payloads, which further drive up acquisitions costs. But USSOCOM keeps buying, including two Puma systems in fiscal year 2019.

Unfortunately, acquisitions professionals seem to appraise the Puma in far rosier terms than the operators they serve. In over 43 interviews, including 21 with former and active duty SOF personnel, the Puma was routinely critiqued. Operators feel it is outdated — and have since 2012, according to one former Navy SEAL. In the words of one active duty special operations officer, “it’s still clunky, its sensors are weak, the setup, depending on where you are, to mount it

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206 “AeroVironment Awarded U.S. Special Operations Command All Environment Capable Variant Small UAS Contract.”

207 “Department of Defense Fiscal Year (FY) 2019 Budget Estimates.”

208 Interview with former Navy SEAL, n.d.
on a vehicle or to put it in some sort of hide site or whatever, those are limitations to work the control system.”

Other frustrations stemmed from its fixed-wing design and unreliability. As former Green Beret Alex Pruden notes, the Puma couldn’t give you the granularity of seeing around corners or in buildings or in compounds.

In examining the UAS space, DIUx Autonomy portfolio lead Jameson Darby said “there are now a number of much cheaper, more intuitive commercially available consumer drones that can provide similar or better capabilities.”

Operators do not love AeroVironment’s RQ-20 Puma. But, as some would point out, critiques are familiar. Individual frustrations are often products of a confluence of factors not exclusive to the weapon system in question. To objectively demonstrate the issues with the RQ-20 Puma, it is worth considering unmodified commercial-off-the-shelf alternatives, or “pure COTS.” While select SOF technologies develop in the absence of such alternatives — like a SEAL Delivery Vehicle or AC-130J Ghostrider gunship — small UAS do not. Buoyed by engineering advancements and easing FAA restrictions, drones in the consumer and commercial markets are taking to the skies, with applications for agriculture, construction, real estate, and public safety, as well as consumer entertainment.

Data on the emergent drone industry is difficult to ascertain because reticent private companies rarely clarify their annual sales. But

209 Interview with active duty special operations officer, n.d.

210 Interview with Alex Pruden, n.d.

211 Interview with Jameson Darby, n.d.


most reports concur that the industry is poised for a massive market disruption. According to a 2017 report from Gartner, annual revenue in the drone market was estimated to reach $6 billion, with three million units shipped.

The largest player in the commercial drone sector is SZ DJI Technology Co. (DJI), a Chinese manufacturer. A prominent report in 2017 estimated DJI’s market share at 72% of the global marketplace and 62% in North America, across all price points. DJI protects its domination with a product line which spans the commercial drone price spectrum. And it contends with little industry competition. Berkley-based 3DR Robotics, once a promising domestic rival, shuttered drone hardware production after failing to match DJI’s quick iterative cycle for hardware products. GoPro, famous for their rugged action cameras, enjoyed only a brief foray into the drone market before succumbing to similar competitive forces. The company could not match DJI’s vertically integrated manufacturing either. Other firms, including the French company Parrot and San Francisco’s Lily Robotics, have slashed employees or closed completely, respectively.


218 Murphy, Mike. “America’s Top Drone Company Couldn’t Beat China’s DJI, so Now They’re Partners.” Quartz, August 1, 2017. [Link](https://qz.com/1042831/americas-top-drone-company-couldnt-beat-chinas-dji-so-now-theyre-partners/).


DJI’s success hinges on rapid innovation. They were among the first to offer compact quadcopters with the Phantom in 2013, foldable systems with the Mavic Pro in 2016, and small hardware, powerful software systems (which can fly via hand gestures and use facial recognition) with the Spark in 2017. As the dominant commercial manufacturer, and boasting a reputation for expedient iterations, DJI represents the high water mark for COTS alternatives to the Puma. Furthermore, according to a US Army memo in 2017, DJI UAS are the most common commercial systems employed by the US Army. Both military units and consumers find value in DJI’s offerings; this makes DJI products excellent candidates for comparing COTS alternatives to the Puma.

One issue with DJI remains, however. In 2017, the US Army Research Laboratory and US Navy concluded that DJI systems posed an operational risk due to “increased awareness of cyber vulnerabilities associated with DJI products.” The New York Times reported that DJI is contesting claims that its UAS may be “sending sensitive information about American infrastructure back to China.” Even SOFWERX, the USSOCOM technology incubator discussed previously, hosted a “DJI Phantom Exploits” challenge as part of its OPENWERX initiatives. Teams were rewarded for locating and exploring vulnerabilities in the Phantom systems. Doubts about hardware security are serious concerns, and should not be dismissed.

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out of hand. Nonetheless, two arguments justify using DJI systems in a case study comparison. First, DJI reached over 70% market share for good reason. Their products illustrate the current maximum capabilities of inexpensive commercial UAS. If USSOCOM truly brings to bear the latest and greatest in battlefield technologies, their UAS must match or exceed commercial alternatives. Second, DJI systems populate modern battlefields. As the US Army memo indicates, US conventional forces used DJI systems prior to the discovery of vulnerabilities. And enemy combatants engaging SOF frequently deploy commercial drone systems, including the DJI, for ISR tasks or to drop ordinance on American forces. USSOCOM’s acquisition ethos strives not only to exceed commercial systems, but enemy systems as well. USSOCOM’s RQ-20 Puma must best DJI’s basic consumer products.

As DJI’s midrange consumer offering, the Mavic is an excellent candidate for a technical comparison with the Puma. DJI offers three variants, the Mavic Air, Pro, and Pro Platinum, each one an incremental step above the former. Considering the marginal difference in price, the Mavic Pro Platinum is well-suited for comparison. As for the Puma, specifications on the SOF variant of the RQ-20 are difficult to obtain; AeroVironment refused to discuss differences between the Service-common and SOF-peculiar Pumas, citing security concerns, in a personal correspondence. AeroVironment has published a 2017 data sheet for the RQ-20B Puma AE with valuable technical specification. Interestingly, USSOCOM’s Presidential Budget Submission for fiscal year 2018 said SOF’s “current fixed-wing material solution is the RQ-20A Puma.”

While USSOCOM does procure SOF-unique kits, payloads, enhancements, and modifications,

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227 “Department of Defense Fiscal Year (FY) 2018 Budget Estimates.”
this suggests that USSOCOM does not even acquire the best of AeroVironment’s Pumas.

Without better information, however, the RQ-20B data sheet suffices as an approximation for USSOCOM’s Puma UAS. According to NSW Innovation Directorate officer LT Carl Governale, SOF Pumas differ from stock Pumas in their sensor packages, with modular updates replacing a standard suite of sensors. Upgrades in modularity notwithstanding, AeroVironment’s stock RQ-20B Puma is sufficiently similar to SOF’s Pumas to justify a comparison against the DJI Mavic. Capabilities are tabulated side-to-side in Table 2.

<table>
<thead>
<tr>
<th>Table 2: Technical comparison of USSOCOM, commercial UAS systems</th>
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</thead>
<tbody>
<tr>
<td>AeroVironment Puma AE RQ-20B</td>
</tr>
<tr>
<td>Cost per unit, USD</td>
</tr>
<tr>
<td>Dimensions</td>
</tr>
<tr>
<td>Weight</td>
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<tr>
<td>Speed</td>
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<td>Operating Range</td>
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<td>Endurance</td>
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<tr>
<td>Launch Method</td>
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<tr>
<td>Ground Control Station (GCS)</td>
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</tbody>
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228 Interview with Lt. Carl Governale, n.d.
<table>
<thead>
<tr>
<th><strong>Payload</strong></th>
<th><strong>Gimbaled payload, 360 degree continuous pan, +10 to -90 degrees tilt, stabilized EO, IR camera, and IR Illuminator</strong></th>
<th><strong>3-axis stabilized gimbal camera, +30 to -90 degrees tilt, 4k 30 fps or 1080p 120 fps slow motion video capture, 12MP stills</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Additional Capabilities</strong></td>
<td><strong>Autonomous or manual deep-stall landing</strong></td>
<td><strong>Autonomous obstacle avoidance</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Precision navigation system with secondary GPS</strong></td>
<td><strong>Autonomous landing with original launch location memory</strong></td>
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<td></td>
<td><strong>(USSOCOM also procures “SOF-unique mission kits, mission payloads, air vehicle enhancements, and modifications on UAS and related ground control stations.” The capabilities of such modifications are not made public.)</strong></td>
<td><strong>Precision hover using vision sensors</strong></td>
</tr>
<tr>
<td></td>
<td><strong>ActiveTrack object follow with three modes (Trace, Profile, Spotlight)</strong></td>
<td><strong>Gesture Mode for gesture recognition controls</strong></td>
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<tr>
<td></td>
<td><strong>Tripod Mode for finely tuned flight control</strong></td>
<td><strong>TapFly location-set autonomous flight with obstacle avoidance</strong></td>
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<tr>
<td></td>
<td><strong>Real-time battery checks</strong></td>
<td><strong>Terrain Follow to maintain constant height above the ground</strong></td>
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</tbody>
</table>

*According to the FY2018 Base Budget Request for USSOCOM*

**This payload description refers to AeroVironment’s stock RQ-20B, and not the USSOCOM variant. Some upgrades to capability and modularity are expected**
Several differences are immediately apparent. While both the Puma and Mavic are Group 1 UAS, USSOCOM’s choice costs approximately 400 times as much as the commercial counterpart. That cost differential is not offset by re-usability, either. USSOCOM procurement documentation explicitly defines the line item for the RQ-20 as an “expendable” UAS.\textsuperscript{229} Potential SOF use cases for the Mavic would appear to fit this description as well. The Mavic is competitive with the Puma in speed, and boasts impressive range, offering a 7 kilometer control range with live video transmission.\textsuperscript{230} Flight time does heavily favor the Puma. But the Mavic’s superior weight and size more than offset battery capacity. And true, Mavic’s ISR capabilities are limited to electro-optical imagery, at least in the pure COTS system. But Mavic’s object tracking and autonomous obstacle-avoidance flight capabilities make it an attractive choice for operators, and frequent software updates augment the Mavic’s capabilities regularly.

More concerning are fundamental design decisions which, in a modern context, are difficult to reconcile with Puma’s tactical objectives. Puma is fixed-wing, much like other, larger UAS assets in the SOF arsenal. This design confers considerable advantages in loiter time and range, and can be quieter. For a given group of UAS, fixed-wing systems also offer greater payload capacity. Furthermore, when the Puma entered service in 2008, alternative designs, like the now common quadcopter, were not technologically feasible. But tactical ISR assets must consider operator needs. For many operators, Group 1 UAS should be capable of peering around corners or surveilling interior spaces. These tasks are simple with quadcopters and nigh impossible with fixed-wing assets. Former Green Beret Pruden’s frustrations with the Puma’s

\textsuperscript{229} “Department of Defense Fiscal Year (FY) 2018 Budget Estimates.”

inability to provide granular situational awareness, especially in urban contexts, evidence where real operator needs lie. As he recounts, the way a similar AeroVironment product, the RQ-11 Raven, was designed, “it wasn’t suitable for the conditions we were in and we didn’t find it useful.”

Finally, in accordance with earlier concerns over Programs of Record, USSOCOM’s ownership of a Puma Program of Record constrains operator flexibility by precluding the acquisition of alternative systems. Operators aware of commercial alternatives are often unable to spend discretionary funds on systems like the Mavic. That operators are interested in acquiring similar UAS with somewhat duplicative competencies suggests deep frustrations with the Puma UAS.

USSOCOM’s continued sustainment of the Puma Program of Record, which appears to disregard operator feedback and neglect commercial alternatives, should itself provide ample means for frustration. More gallingly, however, USSOCOM contended with inadequate small UAS in 2015. An audit of USSOCOM’s validation of requirements for SOF-peculiar systems, conducted by the Inspector General of the Department of Defense, elected to review the All Environment Capable Variant (AECV) Program of Record, which Puma acquisitions served to fill. According to the report, USSOCOM acquired AECVs which “did not meet primary performance attributes during operational testing.” Testing resulted in failures on both launch

231 Interview with Alex Pruden, n.d.

232 Or other commercial systems with fewer hardware vulnerabilities.

and recovery and weight/size attributes. The USSOCOM AECVs failed landing accuracy in 11 of 25 flights and averaged a distance from the target which exceeded acceptable limits. Furthermore, the supplied foam housing for AECVs broke during testing for one operator, and proved cumbersome for another. When follow-up tests incorporated better casings, the combined weight more than doubled the weight limit of 50 pounds. Nonetheless, “USSOCOM officials erroneously concluded that the system passed test and evaluation,” a misstep which USSOCOM concurred with. The Department of Defense Inspector General further concluded that USSOCOM acquired 41 AECVs which could not be validated as mission-capable. Strikingly, operator feedback on the AECV mirrored comments in interviews conducted for this research, with test operators lamenting the weight, size, durability, and infrared camera resolution.

USSOCOM responded to the report by notifying the Inspector General that no further AECVs will be acquired with the failing configuration, and new systems will be tested in January 2015. This response specifically cites a “Puma II” as replacing existing systems with “numerous obsolesce issues.”

Yes, USSOCOM upgraded to Puma II systems from fiscal year 2017 onwards — to the tune of $384,000 per unit. But it is telling that USSOCOM dismissed primary performance attribute failures and acquired AECVs with known deficiencies before the audit was conducted.

USSOCOM procurement documentation from fiscal year 2018 identifying the “current fixed-

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wing material solution” as the “RQ-20A Puma” and not the second-generation RQ-20B is not reassuring either.238 This behavior suggests poor infrastructure for technological refreshments. While issues with technological currency plague the Services, USSOCOM acquisitions are often considered exempt from acquisitions malaise. These issues are understandable on larger acquisitions programs; USSOCOM acquisitions are not exclusively under budget and on time.239 But UAS should not suffer from poor iterative cycles, particularly given the dynamism of commercial alternatives.

Consider the following analogy. Small UAS share many of the same hardware components as another rapidly evolving class of products: smartphones. Both industries focus on imbuing a similar network of processors, sensors, transmitters, receivers, and cameras with increasing capabilities, all while shrinking the hardware itself.240 By all accounts, the Puma was not a poor system when it was acquired in 2008. The fixed-wing design matched industry standards then. But the Puma is no longer a commercially competitive product, nor did it meet USSOCOM’s validated requirements in 2015. USSOCOM’s modular payloads may mitigate some issues with technological refresh. But no operator would deploy with a smartphone from 2008, even with upgraded guts. That USSOCOM’s Group 1 UAS hails from the iPhone 3G era spells trouble for an organization ostensibly operating at the cutting-edge.

238 “Department of Defense Fiscal Year (FY) 2018 Budget Estimates.”
239 “GAO 07-620.”
240 This analogy is courtesy of Lt. Colonel Mark Jacobsen. Interview with Lt. Colonel Mark Jacobsen, n.d.
The curious case of the RQ-20 can also inform discourse surrounding the twin issues of interoperability and MIL-SPEC hardware. Interoperability refers to the ability of systems to communicate and interact with operators, other systems, and communications networks. MIL-SPEC hardware is colloquially defined as hardware which has undergone rigorous testing to withstand criterion set by the Department of Defense. These requirements apply to specific weapon systems and are typically a prerequisite for the acquisition of COTS, modified-COTS, or internally developed products. Acquiring commercial UAS introduces obvious concerns on both axis.

Interoperability issues with commercial UAS surface in three distinct ways. First, commercial UAS may be unable to link into SOF’s secure communications networks. For both SOF and supporting conventional forces, UAS disrupt the battlefield, whether they are friendly, allied, or enemy systems.\textsuperscript{241} One former operator suggested a particular scenario as indicative of the interoperability concerns which ensue: operators using organic assets, like individually acquired commercial UAS, introduce “undeconflicted” aircraft “into the stack.” These UAS threaten to hit either helicopters coming to to infill or exfill operators, or other SOF air assets, like the ScanEagle UAS. If the commercial UAS is being operated independently, obvious problems with reconciling assets and safely operating on the battlefield would follow.\textsuperscript{242} Second, proliferating commercial systems may require operators to learn new control systems in new tactical environments. USSOCOM’s Puma fulfills all Group 1 UAS needs; consequently, all operators trained to conduct UAS-based ISR tasks rely on the same training. The Puma also

\textsuperscript{241} Interview with Jameson Darby, n.d.

\textsuperscript{242} Interview with former Navy SEAL, n.d.
shares a Ground Control Station with other AeroVironment UAS, including those acquired by USSOCOM. Given SOF’s propensity to deploy in joint teams, syncing knowledge and training needs across the force prevents the need to learn and relearn new systems, as would be the case with diverse commercial systems. The less synchronization, the more resources must be diverted to support additional training for the same tasks, an unwelcome change. Third, sufficiently decentralized acquisition can lead to one-off purchases with limited applications outside the specific tactical needs for which the system is acquired. Should operators be given complete authority to acquire UAS, these behaviors could ensue, with operators pursuing systems that do not meet broader requirements. USSOCOM would do best to avoid UAS-driven profligacy.

The Puma case also underlines impending challenges to the traditional interoperability argument, however. With rapidly innovating technologies, Program of Record systems may fare no better than commercial alternatives. Long sustainment tails, compounded by challenges with updating systems, may diminish the interoperability of classically acquired UAS or other systems. Furthermore, commercial incentives encourage interoperability among private sector firms. Common file formats expedite the editing and sharing of content on a host of software systems. DJI’s Mavic operating application is compatible with most iOS and Android devices, to maximize their pool of prospective consumers. As one active duty special operations officer said, “I think the private sector has worked out the kind of the plug-and-play interoperability of stuff.” Strides in the commercial sector defy changing technologies which can otherwise be

243 Interview with Alex Pruden, n.d.
244 Interview with active duty special operations officer, n.d.
245 Interview with active duty special operations officer, n.d.
more difficult to integrate.\textsuperscript{246} Taken together, these trends indicate a future picture of interoperability less tolerant of stagnating development, and increasingly solved by commercial interests. For the military, perfect interoperability may be a thing of the past. Soon it will all be “held together by a few smart people.”\textsuperscript{247} But for SOF, that is not necessarily “an unsolvable problem.”\textsuperscript{248} SOF’s culture of DIY and decentralized tactical decision making conditions it well for an uncertain interoperable landscape.

The Puma and Mavic also exemplify changing demands for MIL-SPEC hardware, a concern with implications for SOF and beyond. MIL-SPEC criterion are well-founded. Acquisitions professionals should verify the capacity of prospective systems to operate in harsh environments; SOF’s uniquely demanding operations are no different. The design parameters for the Mavic likely do little to consider conditions common in the demanding operating environments in which SOF UAS fly. Durability and survivability testing can expose flaws before they occur in tactical environments, where lives are on the line. Furthermore, DJI’s Mavic presents a clear case in which hardware security concerns threaten the viability of the system for military applications. As one expert noted, “you need COTS but you need some level of assurance on security.”\textsuperscript{249} And moving to COTS solutions, particularly those from non-traditional partners, can happen too quickly. High profile mishaps, like that of cloud computing provider

\textsuperscript{246} Interview with Nora Bensahel, n.d.
\textsuperscript{247} Interview with Lt. Colonel Mark Jacobsen, n.d.
\textsuperscript{248} Interview with active duty special operations officer, n.d.
\textsuperscript{249} Interview with Lt. Colonel Mark Jacobsen, n.d.
Rean LLC, rightly caution against relying too heavily on COTS solutions without appropriately assessing their suitability for military applications.\textsuperscript{250}

At the same time, SOF operators interviewed for this thesis routinely cited their iPhone as one of the most reliable pieces of their kit, ahead of other thoroughly tested, Defense Department-approved equipment. As one special operations officer stated, “for a lot of newer issued Program of Record personal gear… I personally believe that the COTS that our team bought was better quality.”\textsuperscript{251} Pruden cited mountain-specific combat boots as an example where the Program of Record vastly underperformed commercial alternatives in rugged environments.\textsuperscript{252} Former Ranger Battalion commander David Barno attested to a similar issue during his time with the Rangers. Small boats, formerly MILSPEC, were slated for a refresh. To replace them, Rangers opted for COTS boats from manufacturer Zodiac, which were better quality than Program of Record alternatives.\textsuperscript{253} Even with UAS, market pressures often hold COTS systems to higher standards.\textsuperscript{254} And as one former operator stated simply: “innovators are the ones getting shot at.”\textsuperscript{255} Operators placed in the greatest risk are most incentivized to learn what works in battlefield conditions, and what doesn’t, and best practices also spread quickly, especially in a tightly-woven SOF community. Most problematic, however, are the potentially negative implications of deploying MIL-SPEC hardware. Pruden recalled some operations

\begin{thebibliography}{9}
\footnotesize
\bibitem{Interview1} Interview with special operations officer, n.d.
\bibitem{Interview2} Interview with Alex Pruden, n.d.
\bibitem{Interview3} Interview with David Barno, n.d.
\bibitem{Interview4} Interview with Lt. Colonel Mark Jacobsen, n.d.
\bibitem{Interview5} Interview with Jameson Darby, n.d.
\end{thebibliography}
requiring an exercise known as “Raven Recovery,” named after another AeroVironment product, the RQ-11 Raven. Due to the sensitivity of its MIL-SPEC hardware, Raven’s downed by enemy fire or technical failures required extraction. “It would crash on top of a mountain, we’d have to climb our asses up there and get the damn thing. And then climb down.” This endangered operators and discouraged use.\textsuperscript{256} In contrast, commercial quadcopters like the Mavic are “cheap, they don’t have any sensitive technology on them.”\textsuperscript{257} COTS crashes are inexpensive and inconsequential, lowering the costs of use and ensuring operators do not threaten themselves or the mission with “Raven Recovery” distractions.

Why does USSOCOM’s continued acquisition of the AeroVironment RQ-20 Puma AE matter? There are, after all, strong reasons for the sustained acquisition of RQ-20 systems, and USSOCOM is heavily investing now in UAS technologies. But the Puma is not a party of one. While its initial acquisition in 2008 should not inspire buyers remorse, the provision of funds for additional RQ-20 UAS in fiscal year 2019 betrays an inability to correct acquisitions mistakes. The incapacity for more iterative tech development, particularly set against the rapidly innovating commercial sector, presents a third early warning indicator of SOF acquisitions exhibiting Service acquisitions behaviors.

Several reasons account for USSOCOM’s maintenance of the RQ-20 program. First, bureaucratic costs. As discussed in previous chapters, Programs of Record articulate a set of requirements, not a specific product. A new small UAS would not need to go through the entire

\textsuperscript{256} Interview with Alex Pruden, n.d.

\textsuperscript{257} Interview with Alex Pruden, n.d.
acquisitions process again, instead being used as an alternative to the existing program line. But it “takes active energy to move to a different platform” within the Program of Record system, according to a retired senior USSOCOM commander. Both searching for alternatives and implementing changes impose organizational costs, which disincentivize change. Second, the Puma is now a Service-common item, which allows USSOCOM to receive stock Puma UAS funded by MFP-2 from the Services, and only foot the bill for SOF-peculiar modifications and upgrades. In theory, funds which would otherwise dedicated to MFP-11 UAS are instead available for additional acquisitions or R&D. In practice, USSOCOM still spends millions on SOF-peculiar modifications. Transitioning to COTS systems, even if funded entirely by MFP-11, would extricate even greater capital for alternative USSOCOM activities.

Within the UAS domain, recent USSOCOM efforts should be commended for proactively tackling SOF issues. In May of 2017, then USSOCOM AT&L Executive James “Hondo” Guerts announced the “DRONEWERX” initiative, a derivative of SOFWERX in both title and objectives. Based on rapid technical experimentation, the program aims to understand “swarming” technologies and “look to learn from and employ commercial drone technology.” Affiliated USSOCOM AT&L acquisitions professionals are explicitly aiming to modify inexpensive commercial UAS for SOF activities, with a particular focus on commercial

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258 Interview with retired senior USSOCOM commander, n.d.
259 Interview with retired senior USSOCOM commander, n.d.
quadcopters. SOFWERX itself led three collaborative Rapid Prototyping Events in the UAS space, under the moniker “ThunderDrone,” to understand UAS innovations in a SOF context. USSOCOM’s latest procurement budget evidences substantial diversification, with acquisitions including 50 quadcopters in the Group 1 category, and a host of other systems in a new category, the Expeditionary Organic Tactical AISR Capability Set, which spans both Group 1 and Group 2 size classes. True, the new quadcopters cost $20,00 each, compared to the Mavic’s $1099 price tag. But these efforts show great promise.

However, the Puma matters because it is not a case of one. As a technology, UAS demonstrate an emerging frontier in which commercial capabilities can reasonably fulfill SOF requirements while adapting and improving in far shorter iterative cycles. As one active duty special operations officer says, “for the Puma, I don’t think there is anything that it provides that you couldn’t get COTS.” According to DIUx Program Manager Lt. Colonel Mark Jacobsen, “some COTS systems now outperform their military counterparts at a lower price.” Earlier chapters contended that an expanding jurisdiction in the Program of Record system constrains operator flexibility, and examples surrounding the Puma abound. These lead to strange paradoxes, such as having operators supplying COTS drones to partner forces being unable to


264 Interview with active duty special operations officer, n.d.

265 Interview with Lt. Colonel Mark Jacobsen, n.d.
acquire the same systems themselves.\footnote{Interview with active duty special operations officer, n.d.} DIUx Autonomy portfolio lead Jameson Darby is more blunt. “ISIS can use drones the Army can’t. And they are often better drones.”\footnote{Interview with Jameson Darby, n.d.}

The Puma appears symptomatic of an acquisitions system increasingly exhibiting Service-like behaviors. The case of the RQ-20 depicts restrictive and stagnant Programs of Record, and operator frustrations with the system they acquire. It showcases an inability to correct mistakes when better alternatives are available.\footnote{Interview with former Navy SEAL, n.d.} Barno contests that this is a new phenomenon. “I could have bought drones up the wazoo” had they been commercially available then like they are today, he claims.\footnote{Interview with David Barno, n.d.} Certain technologies are not logical candidates for Programs of Record. By the time they go through the full acquisitions process, they will be obsolete.\footnote{Interview with Captain Dana Gingrich, n.d.} These technologies look like the RQ-20: advanced hardware imbued with powerful software in a co-dependent relationship. The Puma is not a case of one because these types of systems will only grow in prevalence as technology development accelerates. USSOCOM’s inability to correct mistakes and maintain pace with the commercial sector in this domains is a third early warning indicator of SOF acquisitions sliding towards Service acquisitions.

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\footnote{266 Interview with active duty special operations officer, n.d.}
\footnote{267 Interview with Jameson Darby, n.d.}
\footnote{268 Interview with former Navy SEAL, n.d.}
\footnote{269 Interview with David Barno, n.d.}
\footnote{270 Interview with Captain Dana Gingrich, n.d.}
Chapter 7: Policy Implications and Conclusion

USSOCOM’s high operational tempo bears responsibility for fundamental changes in the SOF enterprise. Well-documented effects include swells in the operator population and budgets, unprecedented political capital, and unwelcome upticks in perstempo. There may, however, be a less well-understood effect on SOF acquisitions. This thesis identifies three observables which indicate USSOCOM AT&L’s shift towards behaviors associated with Service acquisition — an “incontrovertible” change, according to one expert. First, USSOCOM AT&L personnel have doubled from 2001 to now, which suggests an expanding jurisdiction in the Program of Record system. Second, SOF have pursued alternative acquisitions methods across USSOCOM, which betrays an increasing dissonance between operators and AT&L acquisitions professionals. Third, USSOCOM has sustained acquisition of the RQ-20 Puma, which displays USSOCOM’s inability to keep pace with commercial alternatives in select technological domains. These early warning indicators suggest that sustained high operational tempo endangers SOF’s well-founded reputation for acquisitions agility and velocity.

In ascribing policy implications to these findings, it is worth noting that these three observables follow a “black-box” analytical approach. This thesis primarily concerns itself with inputs, including demands on the force, external pressures and reputations, and an accelerating pace of technological development, and outputs, including organizational changes, acquisitions behaviors, and the acquisition of specific systems. Delving into the root causes for these outcomes should form the basis for avenues of future analysis. This thesis focuses on one root cause central to SOF: the composition of acquisitions teams.

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271 Interview with Lt. Carl Governale, n.d.
Ask any member of the SOF enterprise how best to compose an acquisitions team, and they advocate for the population they represent. While calls for more operator involvement are unanimous, the appropriate proportion, involvement, and responsibilities of operators are all unknowns. Acquisitions composition extends beyond the reach of the operator, however. Military innovation research indicates that creativity and innovation prosper when organizations incorporate “diverse, relevant domain knowledge and expertise,” both within and outside the organization.\textsuperscript{272} In truth, USSOCOM’s acquisitions should strive to develop cross-domain teams with representation from three distinct camps: private sector technologists, who understand the commercial landscape of innovation; acquisitions professionals, who understand how to implement appropriate acquisitions tools for a desired end state; and former or active operators, who understand tactical needs and effective implementation methods for SOF. At present, these three camps enjoy little professional overlap. Some USSOCOM initiatives, like SOFWERX, aim to promote engagement between operator, acquisitions, and private sector elements at Rapid Prototyping Events, among other activities. The TALOS Joint Acquisitions Task Force (JATF) has incorporated operators, engineers, and acquisitions professionals during the development cycle.\textsuperscript{273} But USSOCOM acquisitions should consider more foundational ways of systemically forcing cross-domain engagement.

Understandably, much discourse centers around operator involvement in the acquisitions process. For one, SOF operators contribute relevant tactical experience, which improves the


\textsuperscript{273} Guerts, “Special Operations Forces: Acquisition, Technology, & Logistics.”
articulation of SOF requirements. With a penchant for innovative solutions and general risk-tolerance, some operators can also serve as links between prototyping activities and systems testing downrange. Within USSOCOM, former operators are sometimes known as “fire and forget hires,” referencing the assumption that former operators will produce good work and otherwise contribute meaningfully to the acquisitions process. Outside AT&L offices, USSOCOM is already facilitating operator testing; the TALOS program uses “lead user feedback to frame capability challenges that are then socialized with industry.”274 Some operators, however, doubt the penetration of such initiatives, with one active duty special operations officer questioning whether pilot programs are something “your average guy or platoon” would have situational awareness of.”275 Nonetheless, USSOCOM works to involve operators. And operators want to get involved. Some feel AT&L suffers from too few end-users and too many civilians276, even though “some of the acquisition positions at USSOCOM require unique special operations experience.”277 Per one special operations officer, limited channels for dialogue between operators and AT&L are “a huge source of frustration for the operators.”278 But while boosting operator representation in USSOCOM AT&L is universally applauded, it does introduce challenges.

275 Interview with active duty special operations officer, n.d.
276 Interview with special operations officer, n.d.
278 Interview with special operations officer, n.d.
At the end-user level, “most operators are not going to be good tech scouts.” Operator education about the possibilities of technologies is limited. “In the numbered teams I don’t think we have as much awareness at the platoon level what exactly is going on [with commercial technology], as much as just being frustrated about what we do and don’t get” said one active duty special operations officer. With limited technological exposure, operators “don’t know to request” certain types of advanced systems. Even the capabilities of commercial UAS technology, like the DJI Mavic, are sometimes out of mind for end-users. As one senior SOF leader recalled, “I asked for commercial solutions that I know would probably exist, but I didn’t ask for commercial solutions that I didn’t know existed.” Without a full grasp of technological capabilities, end-users too often doctor requirements to prescribe a solution, rather than precisely describing their needs. That senior military officers and their staff frequently do not understand COTS capabilities either does little to inspire confidence in the prospects of effective requirements generation.

This suggests devoting intense efforts to technology education for operators. Not necessarily. Operators already contend with “a saturated cognitive load.” Asking them to become technologists may distract them from refining core competencies. An ideal education system, then, would expose operators to effective acquisitions mechanisms and map the technological

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279 Interview with former Navy SEAL, n.d.
280 Interview with active duty special operations officer, n.d.
281 Interview with Alex Pruden, n.d.
282 Interview with active duty special operations officer, n.d.
283 Interview with senior SOF leader, n.d.
284 Interview with Jameson Darby, n.d.
285 Interview with former Navy SEAL, n.d.
landscape without imposing additional responsibilities on the operator’s main tasks. This is not to say that operators should abstain from USSOCOM’s pilot testing programs, or that their feedback on systems is unhelpful. But as one retired senior USSOCOM commander points out, he’s “not sure [he] would want to burden [operators] with the bureaucratic vagaries of the acquisition process.”

And even if USSOCOM promoted deep operator education, “lacking both the drivers and resources of the civilian sector, USSOCOM may find that after devoting 3-5 years developing cutting-edge civilian expertise in an active duty SOF member…the member’s knowledge of his chosen civilian field with respect to his former civilian associates may be nearly obsolete in less than half that time.”

One popular suggestion involves standing up innovation cells or units at the sub-command level. Situated between AT&L, parent commands, and operational teams, these organizations aim to act as intermediaries, translating operator needs into acquisitions requirements with specialized personnel schooled in modern commercial capabilities. This concept of a “curated team” holds clear appeal among operators, who view such efforts as USSOCOM bureaucracy getting closer to understanding operator needs. Former Green Beret Alex Pruden supported his advocacy for "having a specific unit that’s dedicated to specifically finding new technologies” by advocating for the unit to “be composed of people who are, frankly, senior NCOs who have spend the most time in tactical situations.”

This intermediary solution may improve cross-pollination among the three acquisitions camps and deepen operator

286 Interview with retired senior USSOCOM commander, n.d.


288 Interview with former Navy SEAL, n.d.

289 Interview with Alex Pruden, n.d.
connections to acquisitions. Even then, on the topic of innovation cell personnel, one senior SOF leader said “I don’t know how much insight they have into the technology sector, frankly.”

Without doubt, developing a successful framework for the composition of sub-command innovation cells deserves further research.

In the acquisitions camp, improving engagement with operators and private sector representatives follows from an organization’s acquisitions culture. As such, USSOCOM is uniquely well-positioned. Nonetheless, two inhibitors warrant discussion. First, acquisitions education could benefit from a shift from a “checklist oriented” approach to one which is “more inclusive of the operator.” USSOCOM AT&L’s pursuit of alternative acquisitions methods, including OTAs, is a positive first step. These methods liberate acquisitions professionals from FAR restrictions, incentivize engagement with non-traditional partners, and develop more pathways for operator participation. Deepening expertise in newly developed acquisitions mechanisms can expedite their future employment, to the benefit of all three acquisitions communities. Second, acquisitions professionals should retool Programs of Record to improve flexibility. While Programs of Record fund requirements and do not directly acquire systems, requirements are often written to specific, unchanging standards, which impede technical development. As LT Carl Governale of the NSW Innovation Directorate suggests, iterative capacity can be built into the “trade space between thresholds and objectives.” Dynamic requirements can better accommodate technological change, and consistent reevaluations

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290 Interview with senior SOF leader, n.d.

291 Interview with Major David Rothzeid, n.d.
incentivize greater cooperation between AT&L and the private sector. Otherwise, LT Governale says, “if the threshold equals the objective, you end up with the Puma.”

Lastly, USSOCOM AT&L should continue to advance partnerships between commercial entities and acquisitions personnel. Barriers to entry for Defense Department business are well-documented. By advancing the use of flexible contracting methods, USSOCOM can appeal to technologists. Initiatives like SOFWERX open AT&L to the broader public and precipitate strong relationships. USSOCOM should focus on solutions which encourage innovative firms with dual use technologies to work with AT&L. Too often private firms with dual use are either unaware or unwilling to develop the defense use of their product, according to one senior SOF leader. Successfully matching commercial innovation stride for stride hinges on changing this dynamic.

Constructing effective acquisitions teams can help address root issues in the SOF acquisitions process. Ultimately, however, USSOCOM must balance the centralization and decentralization of SOF acquisitions. Currently, explains Captain Dana Gingrich, an infantry officer with special operations experience, “its either bottom-up, where the soldier feels the pain point and you’re assuming he...knows of a solution to that pain point, or top-down, someone is aware of a new technology and pushes it down but isn’t necessarily think through how is that going to affect the individual soldier’s development.” Completely decentralized acquisitions cannot sustain the SOF enterprise. But as USSOCOM AT&L exhibits Service-like acquisitions

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292 Interview with Lt. Carl Governale, n.d.


294 Interview with senior SOF leader, n.d.

295 Interview with Captain Dana Gingrich, n.d.
behaviors, USSOCOM should consider where to set the needle. Operators, acquisitions professionals, and officers alike yearn for empowered SOF who can responsibly make independent decisions and quickly respond to changing conditions — in other words, to delegate acquisitions authorities and tactical authorities equally. As one former Navy SEAL notes, "one of the key principles that we operate under is decentralizing command and pushing it down to the lowest common denominator, but we don’t do that with acquisitions." The case study of the RQ-20 illustrates a situation in which decentralized acquisitions could support COTS purchases that meet SOF requirements without involving Programs of Record. Of course, that decentralization is unsustainable across all of USSOCOM AT&L’s acquisition activities. USSOCOM should adopt a dynamic view of centralization, based on the technology and its commercial alternatives, and drive acquisitions through a balanced acquisitions team employing a broad range of acquisitions methods.

In a strange sense, USSOCOM may be a victim of its own success. SOF’s high operational tempo remains steady, year on year, because of SOF’s extraordinary operational wins. To date, USSOCOM has successfully scaled the SOF enterprise, adding operators, managing a larger budget, and assuming greater authorities. But few consider the concurrent organizational changes to SOF acquisitions. This thesis contends that three early warning indicators suggest a subtle shift in USSOCOM’s acquisitions culture, away from its reputation as a bastion of agility and velocity and towards the endemic bureaucratization of Service acquisitions. To be sure, USSOCOM still vastly outperforms its Service counterparts. And these

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296 Interview with former Navy SEAL, n.d.
297 Interview with former Navy SEAL, n.d.
early warning indicators are precisely that — indicators. If anyone can reverse a trend towards stagnation, USSOCOM can.

And yet, would an increasingly bureaucratized USSOCOM be a surprising outcome? History is littered with small, innovative organizations slowly succumbing to the viscosities of expansion. The extent to which USSOCOM can confront and stifle bureaucratic forces will offer insights into not just acquisitions reform, but the long-term viability of USSOCOM’s dual roles as a supported and supporting command. USSOCOM’s modern responsibilities do not look likely to decrease, nor will operational demands on the force. These realities should inspire action on behalf of USSOCOM AT&L to address root causes now. USSOCOM, by virtue of high competence and bespoke authorities, is uniquely well-placed to fend off the bureaucratization induced by a high operational tempo. Their success may well serve as a warning, or inspiration, to the rest of the Department of Defense.
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Interview with Captain Dana Gingrich, n.d.

Interview with David Barno, n.d.

Interview with former Navy SEAL, n.d. Interview with former Navy SEAL, n.d.

Interview with James Smith, n.d.

Interview with Jameson Darby, n.d.
Interview with Lt. Carl Governale, n.d.

Interview with Lt. Colonel Mark Jacobsen, n.d.

Interview with Major David Rothzeid, n.d.

Interview with Nora Bensahel, n.d.

Interview with retired senior USSOCOM commander, n.d.

Interview with senior SOF leader, n.d.

Interview with special operations officer, n.d.


Personal Correspondence with DIUx Officials, n.d.


Unified combatant command for special operations forces, US Code Title 10 § Section 167 (n.d.).


## Appendix 1: Assorted Data on USSOCOM AT&L Expansion

<table>
<thead>
<tr>
<th>Source</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>GAO 07-620, “An Analysis of the Special Operations Command's Management of Weapon System Programs”, June 28, 2007.</td>
<td>“USSOCOM plans to expand the size of its acquisition workforce by about 75 percent” In 2007, USSOCOM employed 185 civilian and military acquisitions employees. USSOCOM plans to expand this workforce to 300 employees</td>
</tr>
<tr>
<td>GAO 15-571, “Opportunities Exist to Improve Transparency of Funding and Assess Potential to Lessen Some Deployments”, July 16, 2015</td>
<td>“USSOCOM’s headquarters organizations grew even more substantially than growth in overall special operations military positions.” USSOCOM headquarter positions grew from 1,885 in fiscal year 2004 to 4,093 in fiscal year 2013, “partly attributable to increases in authorized positions at the Special Operations Research, Development, and Acquisition Center”</td>
</tr>
<tr>
<td>GAO 06-812, “Several Human Capital Challenges Must Be Addressed to Meet Expanded Role”, August 30, 2006</td>
<td>“According to currently approved plans, DOD will increase the number of military and civilian positions for the Special Operations Command headquarters by more than 75 percent between fiscal years 2007 and 2011.”</td>
</tr>
<tr>
<td>Interview with James Smith, n.d.</td>
<td>“SOF AT&amp;L has a little more than doubled in government workforce size in the past 20 years.”</td>
</tr>
</tbody>
</table>
## Appendix 2: Selection of OTAs from USSOCOM AT&L

<table>
<thead>
<tr>
<th>Acquisition Identifier</th>
<th>Total Value</th>
<th>Objective</th>
<th>Proposal</th>
</tr>
</thead>
<tbody>
<tr>
<td>H92222-13-9-0001</td>
<td>$615,535.63</td>
<td>Chemical and biological weapons (CBW) are significant threats to the safety and security of civilian and military personnel. There is still a significant need for portable technologies that can be carried by the warfighter, for the detection of these threats, in part because current technologies are bulky, slow to execute and often lack the ability to determine the exact identity of the analyte. The Self-Assembled Monolayers with Matrix-Assisted Laser Desorption Ionization (SAMDI) technology provides a potential solution that can provide fast, accurate detection of a broad range of CBW for potential targets. The Performer shall use SAMDI to address these threats by demonstrating prototype active and passive sensors for representative chemical analytes.</td>
<td>This effort is a U.S. Special Operations Command (USSOCOM), Small Business Innovation Research (SBIR) Phase II with SAMDI Tech, Incorporated based on its submission of a proposal in response to the National Science Foundation’s (NSF), Topic NSF-10-607, titled “Life Sciences Research Tools.” SAMDI received a competitive grant from NSF for Phase I. SAMDI holds the exclusive license to the Self-Assembled Monolayers with Matrix-Assisted Laser Desorption Ionization (SAMDI) technology. Under this proposed Phase II SBIR agreement, SAMDI Tech shall deliver two (2) active and six (6) passive sensor prototypes.</td>
</tr>
<tr>
<td>H92222-14-9-0001</td>
<td>$995,691.00</td>
<td>This project will develop a novel device that will reduce the physical burden on the user’s musculoskeletal system due to load. This device will represent the first load assistance option sufficiently light and agile to augment the load carrying abilities of the soldier rather than encumber them.</td>
<td>This effort is a U.S. Special Operations Command (USSOCOM), Small Business Innovation Research (SBIR) Phase II with Ekso Bionics, Incorporated based on its submission of a proposal in response to Defense Advanced Research Projects Agency (DARPA), Topic SB103-001, titled “Low Noise, High Efficiency Hydraulics for Mobile Robots.” Ekso Bionics will develop a lightweight lower extremity exoskeleton prototype for load carriage assistance at a Technology Readiness Level (TRL) 6. The device will weigh less than 25 lbs, be able to carry more than 100 lbs, include no active power elements, and be tailored fit the operator. Furthermore, Ekso Bionics will provide integrated attachments for customized armor so that the exoskeleton will optimally carry the armor weight. By pursing an integrated approach, Ekso Bionics will insure that the armor is both well positioned and well supported.</td>
</tr>
</tbody>
</table>
### Appendix 2: Selection of OTAs from USSOCOM AT&L

<table>
<thead>
<tr>
<th>H92222-15-9-0002</th>
<th>$63,875.00</th>
<th>Under this agreement to increase effectiveness and mobility, USSOCOM seeks to develop unique robotic prototypes to augment human strength, endurance, and mobility. Application of technology and engineering will help people rethink current physical limitations and achieve the remarkable by designing and creating some of the more forward-thinking and innovative solutions to augment human mobility. The development of robotic prototypes is the first step in providing a fully augmented protective suit.</th>
</tr>
</thead>
<tbody>
<tr>
<td>H92222-14-9-0003</td>
<td>$493,297.00</td>
<td>The U.S. Special Operations Command (USSOCOM) seeks next generation ballistic protection. This agreement will support the development of a lighter, unique, rapidly formed ballistic armor (capable of defeating 7.62 mm Armor Piercing (AP) rounds) that will be applied to the exoskeleton of the Tactical Assault Light Operator Suit (TALOS) project.</td>
</tr>
</tbody>
</table>

The intent is to accelerate the delivery of these innovative capabilities to the warfighter. Prior studies and analysis have determined a number of technical challenges exist for SOF equipment that require improvements for missions into the future. This agreement stipulates that Career Technical Education foundation (CTEF), Inc. will coordinate an opportunity for seven (7) Florida FIRST Robotics and/or Project Lead the Way (PLTW) teams to participate in developing independent TALOS robotics prototypes. Teams are comprised of high school students mentored by engineering professionals and teachers. These teams have access to a lab, tools, and have a robotics skillset including mechanical, electrical and software background. Students have a fundamental knowledge of hydraulics systems which have been a component of FIRST competition robots and/or PLTW Course Curriculum built by the students.

The intent is to accelerate the delivery of these innovative capabilities to the warfighter. Prior studies and analysis have determined a number of technical challenges exist for Special Operations Forces (SOF) equipment that require improvements for missions into the future. This agreement stipulates that Angel Armor, LLC will research new materials for the development of formed and molded 7.62 mm AP defeating armor. Angel Armor, LLC will also design and build tooling and equipment to support this development. The prototyping will be the femoral artery region on the left and right legs to cover the medial and lateral upper leg. Angel Armor will work to fully customize its ballistic solutions into a uniquely tailored application for the TALOS project. At the completion of the OT Angel Armor will deliver the molded armor test results as well as two sets of femoral artery region prototype plates.
Current technologies such as polymer cased ammunition have shown documented accuracy enhancements over brass cases. Recent evaluations have determined that new industry partners have overcome the obstacles previously associated with polymer cased ammunition and can now produce highly reliable ammunition products that allow for the full realization of the technology. Conventional cartridge cases for small caliber ammunition have historically been manufactured from brass. The process to manufacture brass cartridge cases start with a thick walled cup. The cup is formed, drawn, tapered, trimmed, and annealed in a series of operations and is not easily adjustable for achieving optimal ballistic performances with different bullet types. The lightweight moldable polymer cartridge case has shown that the internal volume can be tailored to specific requirements to maximize ballistic performance and consistent bullet release is achieved with uniform cartridge case neck dimensions. Implementing these alterations to a cartridge case should demonstrate improved ballistic performances (accuracy).

This effort is a Small Business Innovation Research (SBIR) Program, Topic Number USSOCOM13-0006, .50 Caliber Light Weight Precision Ammunition. PCP received a SBIR Phase I contract in 2013 for the initial portion of this research and development effort. The objective is to manufacturer and deliver a .50 caliber round that is at least 30% or lighter than the current .50 caliber ammunition that users of MK-15 and M107 weapons must carry. The ammunition must also improve the accuracy over the current brass cased Department of Defense Identification Code A606 round using the MK-211 projectile. The Producer is also tasked with producing a ballistically matched non-dud producing training round that allows personnel to improve their sniper skills on scored ranges while reducing overall procurement and sustainment costs. The culmination of this effort will also substantially reduce logistics costs given the weight reduction of the rounds.

Body armor is a critical component for the SOF warfighter, but it is also one of many items that competes for the maximum payload that the warfighter can bear. As such, SOT AT&L-ST has been investigating improvements in the performance of armor, i.e. improving ballistic performance while reducing aerial density.

This Agreement seeks to advance the understanding of the additive manufacturing process, specifically Selective Laser Melting (SLM), for the Titanium alloy Ti-6Al-4V in relation to specific applications for lightweight body armor. The SLM process has the highest potential of the additive manufacturing technologies to introduce very fine features embedded within customized body armor protective material. Each warfighter has a unique body shape and the additive manufacturing technology can scan and replicate an exact fit for their respective body features. Within these customized armor protective coverings, the SLM process can embed features that are designed to disrupt and re-orient ballistic impacts and subsequent crack propagation to further protect the warfighter. Prototype ballistic panels will be produced to verify the ballistic performance and aerial density and will enhance the mission effectiveness of the SOF warfighter.