Introduction

Necessity is the mother of all invention and the demands of war often result in the rapid advancement of tactics, techniques and procedures. While America’s latest decade of armed conflict has shaped its method of warfare, this evolution that played its role in driving the national debt to unprecedented heights may have occurred in too narrow a scope. The United States has clearly made a statement that it plans to shift its attention to the Pacific, a region with a very different set of intelligence challenges than Iraq and Afghanistan. Despite Middle East flare-ups from the ISIS movement and others, America is continuing to make political, economic, and military strides in the Pacific. As tightening military and intelligence budgets demand using available resources to their fullest, significant changes will have to be made in order for the United States to support intelligence operations in future contested areas. The intelligence community must recognize the benefits from the increased integration and synergy of the military services, but also that the current and future adversaries of the United States have different priorities and capabilities than recent ones, and that many of these adversaries have formidable anti-access and area denial systems in place.

Current ISR

Intelligence, surveillance, and reconnaissance (ISR) operations are critical to United States (US) military operations, foreign policy and to secure the nation’s global position. ISR is a broad discipline, part of a broader command architecture known as command, control, communications, computers, intelligence, surveillance, and reconnaissance, or C^4ISR. The US intelligence community (IC) is headed by the Director of National Intelligence (DNI) and currently consists of 17 agencies, both military and
civilians. The IC’s responsibility is divided into several intelligence-gathering disciplines, or “INT’s”, such as human intelligence (HUMINT), signals intelligence (SIGINT), and geospatial intelligence (GEOINT).

The recent decade of conflict has dramatically shaped and altered the way the United States conducts these operations. Despite the advances in ISR tactics, techniques, and procedures (TTPs), Lieutenant General (Lt. Gen.) Larry D. James, the Air Force ISR Chief claims that the current structure is not necessarily the structure needed for the future (Schanz 2013). Anywhere that the US may operate ISR in which the environment is contested will make for a complicated and tough endeavor, unlike what has been seen in the past thirteen years. During the Global War on Terror, ISR had faced high-demand, time-sensitive targets in supporting tactical ground units in complex irregular warfare. Had air defenses been more robust, those operations would have been more difficult and less successful (Haffa and Datla 2014).

Though the concept of knowing your enemy dates back thousands of years to the beginning of warfare itself, the new millennium of American ISR is largely reliant on airborne technical intelligence collection; that is, using aircraft laden with sophisticated equipment for gathering intelligence and flying them within range to detect the information. ISR aircraft are generally very susceptible to interception from ground-based or airborne attack and typically only operate in areas of aerial superiority or air supremacy. These assets, either manned or unmanned, armed or unarmed, were designed to prosecute a set of targets that are both mobile and clandestine (Haffa and Datla 2014). Gathering useful, actionable information to support long-term effects requires “persistent surveillance,” a term that refers to observing a set of targets for many hours over an extended period of time. This work can be quite tedious and involve many man-hours of interaction, thus much of the recent airborne ISR network relies on unmanned aerial vehicles (UAVs) because of their long dwell time, improved sensors, enhanced connectivity, and precision strike capability (Haffa and Datla 2014). Despite the fact that these systems were designed for use in the open skies and thus permissive air-operations environments of Iraq and
Afghanistan, technical intelligence collection assets can also be vitally important in monitoring rogue states like North Korea and Iran, if employed properly. (Howard 2007).

A glimpse of reconnaissance UAV evolution demonstrates how ISR priorities have changed in recent years. The US military’s first modern production reconnaissance UAV was the RQ-1 Predator. This saw its first overseas deployment in 1995 over Bosnia, and again in 1999 over Serbia. These originally operated solely on imagery gathering by the use of electronic sensors to pick up the visible spectrum (termed “electro-optical” or EO) and the infrared (IR) bands of light to provide tactical intelligence to commanders. The Predators provided near-real time (NRT) full-motion video (FMV) streamed back to a base station, which can be viewed like live overhead television. With the experience of live intelligence behind enemy lines, a new requirement was added: the capability to use reconnaissance aircraft to strike high-value and mobile targets as they were identified instead of waiting for strike aircraft to arrive and risk losing the target. Thus Hellfire missiles were added to the Predators and the aircraft became a “multi-role” asset, re-designated as MQ-1 Predator. As the value of UAV NRT intelligence became more in-demand, more systems were developed such as the RQ-4 Global Hawk for high altitude EO/IR and radar imagery, and enhanced attack-capable assets like the MQ-9 Reaper. Simultaneously, advances were being made in SIGINT and other technical collection from airborne assets, often combining these capabilities on a single aircraft to benefit from a synergy of “cross-cueing.” Some advantages of using an airborne “platform” for intelligence gathering rather than ground-based stations include quickly being able to get into enemy territory while staying mobile and safe from attack. Coupling ISR with strike capabilities created a “hunter-killer” concept that became an important US military capability that America evidently intends to carry forward against future adversaries. (Haffa and Datla 2014).

While UAVs have played an increasing role in intelligence gathering in recent years, there are still many manned aircraft that provide critical and crucial intelligence to military commanders, aircraft
that continue to risk putting people in harm’s way over unfriendly skies. Manned ISR aircraft include the MC-12 Liberty using multi-INT integration, the RC-135 Rivet Joint (RJ) for SIGINT collection, the E-8C Joint Surveillance Target Attack Radar System (JSTARS) for precision radar data, and the U-2 spy plane for visual imagery (Haffa and Datla 2014). Also to be included is “non-traditional ISR,” which refers to the use of sensor systems such as targeting pods on manned fighter aircraft like the F-15, F-16CJ, and F-18 along with other attack aircraft like the AC-130 gunship (Haffa and Datla 2014). One thing that is evident from all this evolution however is the assumption that the US has control of the skies and can operate a majority of these vulnerable, sophisticated, and expensive aircraft with little fear of being shot down or disabled.

HUMINT has always been one of the most reliable, yet often one of the most difficult sources of intelligence. Retired Brigadier General Russell Howard of the Joint Special Operations University (JSOU) argues that “technical intelligence methods that worked well in a Cold War environment, such as imagery intelligence (IMINT) or signal intelligence (SIGINT), have not proven effective against terrorists, and increased HUMINT capabilities will be crucial in waging an effective campaign against Al Qaeda and like-minded terrorist groups” (Howard 2007, 1). This was certainly the case particularly in Afghanistan where unforgiving geography combined with low-tech methods of operation by US adversaries severely limited the usefulness of highly technical intelligence gathering. In response, HUMINT took a renewed front-seat in the intelligence-gathering arena. During the Cold War, access beyond the “curtains” was particularly difficult for HUMINT gatherers, and to overcome these difficulties the US IC developed more technical means (Howard 2007). This technical reliance proved so useful that much of the United States’ effort shifted away from HUMINT, a discipline that requires a long lead-time and highly specialized training for effective operation.

Howard noted that the United States has continued to rely in large part on the same Cold War paradigm of remote technical collection, appropriate for the Soviet Union, but that transnational
terrorist groups are much more ambiguous and harder to detect (Howard 2007). The primary issue of Afghanistan regarding technical intelligence collection is that the visible and electronic signature of terrorists is much smaller and harder to detect than that of the former Soviet Union or any other state (Howard 2007). Furthermore, Howard makes a very important distinction between HUMINT and technical intelligence in identifying that, “technical collection assets do little to penetrate denied minds [author’s emphasis]” (Howard 2007, 3). Imagery intelligence can only detect things after they have moved, signal intelligence can detect things as they are happening, but effective human intelligence can get into the decision-making process and detect intentions before they happen, or even alter the course of decisions. Afghanistan showed that relying too much on technical intelligence creates an exploitable gap that the many terror organizations in the Afghanistan-Pakistan region benefitted from. Likewise, a future shift to the Pacific Rim or a conflict with another developed state like Iran will highlight another gap in current US intelligence collection: the vulnerability of intelligence operations in denied areas. US assets may not be able to fly through or near the borders of aggressive countries like Russia, China, North Korea, and Iran. The airborne intelligence fleet will be effectively grounded and the lack of recent HUMINT focus only serves to magnify the intelligence “blinding.” Yet despite the advantages and drawbacks of disciplines in different contexts, Lt. Gen. James paves a positive way to the future with “[the US is] not one ‘INT’ focused... Our teams utilize all these domains to create information” (Schanz 2013, 23).

With the major drawdowns in Iraq and Afghanistan coming to an end, there is an expected dramatic shift in upcoming ISR guidance. In the latest guidance from the US Department of Defense (DoD) “Sustaining US Global Leadership: Priorities for 21st Century Defense,” or known simply as the 2012 Defense Strategic Guidance, the DoD stated that “while the US military will continue to contribute to security globally, we will of necessity rebalance toward the Asia-Pacific region [author’s emphasis]” (United States Department of Defense 2012, 2). Despite other conflicts that arise, it is the stated
intention of the highest authority of the United States to rebalance to Pacific region; contemporary Middle Eastern affairs only delay the intended momentum. Despite or perhaps because of the continual distraction in the Persian Gulf and Levant, the US must continue to evaluate other global threats and not solely focus on a single form of combat. The 2012 Defense Strategic Guidance goes on to state that the force of the near future will have to respond less to the permissive environment of Afghanistan and more to countries sheltered behind formidable anti-access, area-denial systems (Schanz 2013). In a symposium address by US Air Force (USAF) Secretary Michael B. Donley, he stated that the Air Force is rebalancing its priorities to how they might have stood had events like 9/11 not intervened (Schanz 2013). Stacie L. Pettyjohn, a RAND political scientist described global USAF presence as “largely stable in regions where key interests and allies are located. However, it’s worth noting that large Cold War-style garrisons overseas—such as those in Germany and Japan—are ‘anathema’ to many new and prospective partners, who often want lighter, more rotational presence” (Schanz 2013, 26). The priorities declared in the 2012 Defense Strategic Guidance include requirements in stark contrast to present US ISR capabilities, and further warns that adversaries in these denied access areas will present difficult obstacles to US military intervention (Haffa and Datla 2014).

Anti-Access, Area Denial (A2/AD)

As the US foreign focus shifts from a region where there has been a general freedom of access for intelligence gathering assets, leaders must consider that many regions containing near-future threats do not grant US forces the permissive access that they have become accustomed to. Developed nations like Russia, China, North Korea, and Iran are among the locations that the military and State Department once again consider to be top threats. These potential threats simply will not allow foreign powers like the US to have complete freedom of movement and will actively work against attempted US intelligence operations.
Simply put, the act of an adversary to work against the actions of another defines what anti-access or area denial environments are. More formally, the US DoD Joint Operational Access Concept (JOAC) defines these terms: “Anti-access (A2) refers to those actions and capabilities, usually long-range, designed to prevent an opposing force from entering an operational area. Area denial (AD) refers to those actions and capabilities, usually of shorter range, designed not to keep an opposing force out, but to limit its freedom of action within the operational area” (United States Department of Defense 2012, i). This continues to be an ongoing concern for leaders as the 2014 “National Intelligence Strategy of the United States of America” lists among its major objectives that the IC will have develop strategies to operate in denied areas (Office of the Director of National Intelligence 2014). According to the “Air-Sea Battle” concept, the general US solution to the A2/AD issue is to develop a network of integrated forces capable of defeating the enemy across all modern warfighting domains: air, sea, land, space, and cyberspace (United States Department of Defense 2013). This concept recognizes that adversary forces will likely attack without warning and forward friendly forces will be in the A2/AD environment from the outset of hostilities and must provide an immediate and effective response.

While this reflects one view of future complications, A2/AD can be defined in other ways. Howard defines these denied areas as, “regions whose nations are characterized by weak state structures” (Howard 2007, 2). While Howard approaches A2/AD from a HUMINT standpoint, I feel his definition does not necessarily apply to much of the Middle East in a general intelligence perspective, a region characterized by many countries with weak state structure but for the most part presenting little A2/AD against the United States.

Regardless, any state operating effective A2/AD could severely hinder US operations in that area, or even deter the US and coalition partners from responding to aggression in the first place (Krepinevich, Watts and Work 2003). The Center for Strategic and Budgetary Assessments (CSBA) goes further with this reasoning suggesting that America may be the cause of its own A2/AD problems,
stemming from United States’ worldwide power projection and military preeminence (Krepinevich, Watts and Work 2003). This suggests that there may be issues inherent in United States foreign policy or other national ideals. Conversely, some may argue that the “big brother” image of America forces some nations to make significant expenditures in deterrence or self-defense, instead of possibly more offensive actions. I feel America’s current foreign policy action is creating more problems than it is solving. An aggressive and intrusive foreign policy creates more barriers and friction among other nations, seeds more conflict, and translates to increased difficulty, risk, and casualties when conflicts do erupt.

It is important to be aware that not all of the current, emerging, and evolving threats are alike—while developed and modern nation-states have returned to the forefront of attention, there will continue to be the threat of transnational terrorism. Developed countries such as Russia, China, Iran, and North Korea have considerable access to advanced missile and satellite technology permitting even regional rogue states the ability to pre-target US forward bases abroad and monitor deployment activity (Krepinevich, Watts and Work 2003). By contrast, transnational terrorist cells like al-Qaeda, Taliban, and Abu Sayyaf often operate beyond political borders, blend in with the local populations, and maintain a low visibility. As such, this category of threats requires a very different approach than with nation-states.

China is one of the most significant A2/AD threats at this time. China not only deters the United States from deploying into the Western Pacific, but also threatens to disrupt nearby operations such as around Taiwan or the South China Sea (McCarthy 2010). While US advanced fighters and bombers have inherent advantages against China’s defenses, these aircraft are not immune and are very limited in availability. A majority of American fighters, bombers, reconnaissance aircraft, and cruise missiles remain extremely vulnerable. China’s integrated air defense system is virtually impossible to penetrate with current US fourth-generation aircraft (McCarthy 2010). Furthermore, China is expected to increase
its threat range with the development of the S-400 missile system, extending their air defense coverage out to over 200 nautical miles (McCarthy 2010). In 2007, China also demonstrated its ability to target and shoot down orbital satellites when it shot down one of its own. This capability could be easily carried out against US satellites in a conflict, severely degrading the US view into the Chinese interior. The side that can better collect, transmit, and exploit information while denying their enemy the same will be the victor in war, a term called “information dominance,” something that China has demonstrated they are well aware of (Cheng 2013). While their strategic and operational concepts are of concern, China’s tactical dimension focuses on destroying or damaging American capabilities with an array of missiles and submarines (Cheng 2013). Staying out of China’s missile envelope brings questions to the effectiveness of the upcoming F-35 with its relatively short range. Clearly, the Chinese position is one of exclusion and intent on keeping America or other adversaries away with formidable A2/AD.

Iran has a dangerous influence over one of the most important commercial chokepoints in the world: the Straits of Hormuz. Iran also has a significant modern military capability and robust A2/AD network. Should all-out conflict occur with Iran, the United States has no close-in bases to operate fighters from, an important first step in modern warfare (Gunzinger and Dougherty 2011). It would be assumed that in a conflict with Iran, access to the Persian Gulf would be denied and Iran would pressure its neighbors to deny US access. Launching from an airbase in Turkey or a carrier in the Arabian Sea, our closest guaranteed large-scale basing opportunities, provides only partial coverage into Iran. Iran also has a significant defensive advantage which will require detailed intelligence to counter. While their command infrastructure prevents it from combining its air defense systems into a truly integrated network, Iran’s A2/AD capabilities and strategies are considered to be similar to China’s and thus produce a significant threat to all US ISR attempts (Gunzinger and Dougherty 2011).

Non-state actors, such as transnational terrorist organizations, can also pose a threat. Ballistic missile systems and advanced stealth fighters are not the only ways to deter enemies. The cyberspace
domain has become a major front in modern warfare and requires very little technology to be devastating. Cyber-information warfare, distributed denial of service attacks, malicious software, and financial/resource manipulation are only some of the effects that can severely impair a fighting force. Electro-magnetic pulse weapons can be cheaply made and be just as devastating to a modern force as the inexpensive and low-tech explosive-formed penetrators that punched through armored trucks in Iraq. High-power scramblers that disrupt global positioning systems can make UAV guidance ineffective and reduce accuracy of smart-weapons. Man-portable air defense systems are proliferated throughout the world and night-vision optics of increasing capability are reaching the consumer markets. The A2/AD issue is not limited to top-tier nations, and unconventional tactics will have to be considered as well.

A2/AD creates a new set of intelligence priorities different than what has been faced in the last decade. Future A2/AD priorities require some new considerations. According to a CSBA analyst, a “blinding campaign” or “scouting battle” will be the first and most important military move in an A2/AD confrontation (Haffa and Datla 2014). A significant change is that ISR assets, or “platforms” as they are often called, must adapt their sensing capability toward detecting A2/AD forces and networks in order to survive in these environments (Haffa and Datla 2014). Additionally, the requirement for high-definition FMV with its attendant bandwidth, which has been so important over the last decade, may take a backseat to large, strategic UAVs with long-range radar, SIGINT, and EO/IR sensors and multifunction radio-frequency sensor payloads (Haffa and Datla 2014). Near the beginning of the Iraq and Afghanistan wars, the US was fielding as few as four UAV “orbits” in theater; in the years that followed, this peaked to over 60 UAV orbits. The high demand of these types of assets also created a high demand of bandwidth to transmit and process the data gathered. The centralized authority, including structures and technologies, employed in this type of intelligence gathering for the US “processes more than 1.3 petabytes of data a month—equivalent to 1,000 hours a day of full-motion
video—and better sensor technology will only add to these figures” (Schanz 2013, 24). Data management and movement are vital to operations where control of air, sea, and space is contested, according to USAF leaders (Schanz 2013).

In addition to traditional ISR aircraft, America’s most modern fighter aircraft, the F-22 and F-35, will also have to assume ISR roles well beyond the non-traditional role (Haffa and Datla 2014). Older fighter and attack aircraft operators learned the value of using targeting pods for ISR, a process called non-traditional ISR (NTISR). In the development of the newest generation of aircraft, ISR capabilities were included in the capabilities of these multi-role aircraft, with ISR collection being a dedicated role rather than an ancillary or additional one. To continue to be able to outthink our adversaries, operators will have to push these new capabilities well beyond the old NTISR TTPs into new realms to defeat and circumvent A2/AD systems.

Airborne platforms are not the only way to move ISR assets over enemy territory quickly and safely. Space-based systems have been in use by the United States for over half a century. The Corona program began in 1959 and since then the US has deployed vast constellations of reconnaissance satellites into orbit. While satellite reconnaissance was considered critical during the Cold War, it has not been considered a major player in recent years in the pursuit of high-value, mobile, tactical targets. However, space-based radar and IR collection will prove to be particularly significant for defeating A2/AD (Haffa and Datla 2014). Similar to the airborne fleet of ISR, satellite sensors and platforms require robust space-based communication networks and bandwidth in order to provide essential ISR integration (Haffa and Datla 2014). All these different assets are operated under different command structures within the IC: military service commands, civilian agencies like the Central Intelligence Agency, National Security Agency, National Reconnaissance Office, and National Geospatial-Intelligence Agency, and other contracted, partnered, or multinational forces. Whether using UAVs, manned aircraft, or orbital satellites, in working against A2/AD, the United States must pay greater attention not
only to joint interoperability in the processing, exploitation, and dissemination (PED) process but also to their security (Haffa and Datla 2014).

With all these new priorities, it is reasonable to ask how the current US systems measure up to new requirements. In an A2/AD environment, quickly projecting military power may hinge on the fighting forces’ ability to eliminate A2 and AD systems in the span of a few hours or days. There are considerable risks in doing so, particularly in the absence of long-range, penetrating surveillance (Krepinevich, Watts and Work 2003). High-altitude, long-endurance UAVs will play a role, but depending on the enemy’s airstrike and air-defense capability, will have to be operated carefully and be equipped with self-defense capabilities (Haffa and Datla 2014). The purpose-built ISR capabilities of the F-22 and F-35, combined with their low observability, could make them primary ISR collectors in contested airspace (Haffa and Datla 2014). Despite the changing environment, Lt. Gen. James said that the USAF’s force structure for ISR will not see significant change in the near term, and many of the assets used in US Central Command (Middle East region) will also see a great deal of use in the Asia-Pacific region (Schanz 2013). This ignores or glosses over the fact that the joint force has yet to come to grips with the challenges and range of possible options to employ ISR platforms in contested airspace (Haffa and Datla 2014)

**Facing Resistance to Change**

While some elements can continue to operate in the new environment, other elements will face inherent hurdles. Many of the current US systems and their architectures face some limitations in denied-area operations. As the robust ISR network of today took shape, much of the command and control of assets became “stovepiped” from the ISR asset, or “platform,” to the specific user (Haffa and Datla 2014). This has severely hampered joint connectivity and interoperability toward a unified effort. Nonetheless, according to Lt. Gen. James, “connectivity lies at the core of USAF’s global ISR superiority.
It is important to remember fielding an asset is far different than networking one—and this capability sets the USAF apart from the rest of the world” (Schanz 2013, 27). Yet in the end, and strikingly, the US IC response to the A2/AD challenge lacks a truly joint approach (Krepinevich, Watts and Work 2003). Fortunately, some systems are less affected than others such as the fifth-generation fighter aircraft, specifically the F-22 and F-35. The key will be figuring out how to best use these platforms’ ISR capabilities to their fullest since they will initially be the only assets able to fly in contested space (Schanz 2013).

Politics will also play a significant role alongside the A2/AD issue. The United States must continue to be prepared to utilize host-nation and partner force facilities, as it is not possible to maintain a garrison is every corner of the globe (Krepinevich, Watts and Work 2003). The US must be prepared for the political consequences of these dealings, such as when in 2009 the Kyrgyzstan Parliament tripled the rent for use of its base, a major transit hub for US forces in and out of Afghanistan, or the many cases in which countries have refused basing rights or not allowed American aircraft at bases to fly in certain operations. Budget cutbacks, sequestration, and personnel cutbacks have further complicated matters. The 2011 Budget Control Act and resulting sequestration threatened to slash hundreds of billions of dollars from future Department of Defense budgets and make the strategic guidance nearly unworkable, yet there must continue to be some consideration for the development of future systems (Schanz 2013). In fact, ISR platforms of the future will need all of the characteristics that have proven effective over the last decade with one significant additional requirement: survivability in hostile airspace (Haffa and Datla 2014). In developing new systems, there are the issues of new budget requirements, time requirements to develop, test, and field the systems, and training time for crews to use the system. In the shift of ISR priorities, there must also be a consideration of retraining of existing personnel for the new requirements of the current systems as well as the addition or reduction of manning to support these changes.
The United States’ declared shift to rebalance to the Asia-Pacific region, as mentioned in the 2012 *Defense Strategic Guidance*, has not been without hurdles. While the DoD document identifies the importance of the region’s stability for trade and economy as well as supporting US interests in the region, the Obama administration has been criticized for letting focus on the Pacific slip in lieu of Middle Eastern concerns. International disputes in Ukraine and Crimea as well as the ISIS movement in Iraq and Syria have diverted American attention away from the Pacific. In March of 2013, National Security Advisor Tom Donilon described the strategic pivot as a rebalance of the projection and focus of US power. Further, that all elements of US power, military, political, trade and investment, development and values, will be harnessed in the shift. He continued that sixty percent of the US naval fleet will be based in the Pacific by 2020, and the focus will shift to submarines, fifth-generation fighter jets, and reconnaissance platforms. Donlion did acknowledge that difficult fiscal times have made some question the sustainability of the rebalance (Lyle 2013).

President Obama commented on other issues of the Pacific pivot in May of 2014 saying, “We can’t try to resolve problems in the South China Sea when we have refused to make sure that the Law of the Sea Convention is ratified by the United States Senate” (Avni 2014). Others still question the power-balancing involved of the shift in naval assets. With cuts in defense budgeting, some argue that the rebalance may mean only shrinking in the Atlantic while not growing in the Pacific (Avni 2014). As the US shift to the Pacific continues to go unnoticed by many nations in the region, Russia has made its own pivot by signing a $400 billion deal with China (Avni 2014).

Still, the “whole-of-government” approach to rebalancing likely will not diminish despite months of airstrikes in Iraq and Syria, defense experts say. These experts do express some concern as to whether or not the new US commitment in the Middle East will stunt the military rebalance (Olson 2014). Iraq and Ukraine aside, the United States is still projecting national power into the Pacific region economically, diplomatically, and militarily, and US investments will need to be protected by preparing
for conflict contingencies (Olson 2014). The United States must recognize and plan for the challenges that may be faced against dominant powers in the Asia-Pacific region, including increased future intelligence operations.

**Rewards of Adaptation**

There are several benefits to finding the best method of transition. By appropriately identifying requirements and the best support for those requirements, significant expenditures can be saved. For instance, using current systems that can fill requirements before specialized systems are developed can facilitate rapid transition. When reconnaissance aircraft were unable to fly certain missions due to unavailability or hostile threat, NTISR was developed to fill the gap. The evolution of the Predator from a single-INT collector, to an attack-capable platform, to a multi-INT, multirole system makes the most of an available asset while recognizing the synergy of cross-cueing and joint intelligence efforts. American adversaries are constantly developing new tactics and technologies to defeat US systems. The budget-constrained United States cannot expect to be competitive without making advances, but by choosing the right systems to develop to defend its primary interests against likely threats should take priority. Leaders must also continue to break down “stovepipes” in order to foster a more joint atmosphere, sharing in the abilities and information across the services and community. Single-purpose systems are not cost effective, and by building on the synergy of crossing service boundaries, current systems can be dramatically more effective. Whether using an existing system, augmenting a current one, or developing a new one to fill a gap, knowing what to plan for can maximize the effect of ISR operations.

**The Way Ahead**

Experts have offered a number of solutions, courses of action, and alternatives. One advisor stated that, “we need to fundamentally change ISR so we never look at a single sensor again; we look at
how it contributes to all other sensors,” (Schanz 2013, 25) while Lt. Gen. James agrees that the Air Force “must find a way to bring unconventional and open source assets into its ISR enterprise” (Schanz 2013, 25). In dealing with areas in which access is not permitted, the US will have to improve operations from standoff distances, such as U-2s flying outside the range of ground-based surface-to-air missiles and other threats (Schanz 2013). Aside from the technical collection, a reexamination of HUMINT collection can also be performed. Howard proposes several alternatives in gathering HUMINT information such as using criminals and criminal cartels, or using non-governmental organizations in cooperation with intelligence services for mutually beneficial reasons (Howard 2007). An important point made by the CSBA is that “a joint approach to the prospective A2 and AD capabilities of future US adversaries is crucial if the various risks are to be mitigated or hedged against to any serious degree” (Krepinevich, Watts and Work 2003, iv).

There are numerous projects underway to push the edge of ISR collection. One project that is already in service to attempt to defeat A2/AD is the RQ-170 Sentinel. This is a stealth UAV operated by the Central Intelligence Agency designed to penetrate enemy detection systems and is assumed to be fitted with reconnaissance equipment. However, even this system is not without vulnerabilities: in 2011 while flying over Iran, an RQ-170 was downed and captured by Iran. Other systems in development include the Unmanned Carrier-Launched Airborne Surveillance and Strike (UCLASS) system. This project is designed to provide a strike-capable remotely-piloted vehicle to the navy. The X-47B has shown promise to fill this role and testing and development continue to push closer to implementation. Other developments in reconnaissance include pushing the edge of high-altitude long-endurance unmanned aircraft. Boeing has been developing the Phantom Eye capable of staying aloft over 100 hours at altitudes up 65,000 feet, and plans to develop further versions to remain airborne up to a week while carrying payloads of up to 2,000 pounds (Botwick n.d.). Another impressive development is the QinetiQ Zephyr, though relatively small and not capable of carrying weapons, it has the endurance record of 336
hours (14 days) and capable of flying over 70,000 feet (Botwick n.d.). Other developments include the SR-72 hypersonic strategic reconnaissance aircraft. The SR-72 is a proposed successor to the SR-71 Blackbird and is intended to be an optionally-piloted aircraft designed to fill the gap between surveillance satellites, subsonic manned aircraft, and UAVs for ISR.

While the F-22 and F-35 can assume roles of ISR and may be able to defeat some A2/AD systems, budget reduction has severely limited the availability of these aircraft. The last production F-22 was delivered in 2012 capping the fleet to only 187 operational aircraft. Additionally, The F-35 continues to be plagued with development problems and extreme cost overruns. It is expected to begin operational status between 2016 and 2018 for the United States. The US has stated it plans to build a fleet of 2,443 aircraft; however delivery of this massive number to the US military is scheduled to take until 2037. Progressive budget cutbacks could certainly see the final number of F-35s reduced similar to how F-22s were cut from an initial vision of 750 aircraft to a meager 187. Certainly more systems are under development or perhaps already in service and kept secret from public eye. I feel it is important that development in technology or tactics continue in order to find a necessary breakthrough to change the course of ISR, and more importantly funding needs to continue to make the research possible.

Lastly, not everything has to be done on the backs and by the dollars of Americans. The US can reach out to partner forces and allies for support. Several countries have proven quite capable in acquiring and assessing intelligence. Australia has an impressive HUMINT network that has been in operation for years and can fill the gap that the United State has been neglecting. In the Pacific region, Japan has a very capable force and prime operating location for the Asia-Pacific region. Israel has a very effective and rapid weapons development plan that can be utilized. Other countries are very skilled at specific types of warfare as well. The US should look more into integrating partner force technologies and systems into our own to reduce the burden and cost of development. These countries and other allies abroad in Europe, Asia, Africa, and even the Americas can certainly ease the burden on the United
States for future overseas operations. Secretary of the Air Force Michael Donley noted that “cooperation activities with Australia and Japan are vital to maintaining USAF global vigilance” (Schanz 2013, 26).

**Conclusion**

In order for the United States to secure its global position, ISR must continue to adapt to the changing political climate. US leadership has signaled for a change in focus away from the Middle East and towards the Pacific region. While Middle East conflicts and budget cutbacks are delaying and limiting the rebalancing, America must secure important political and economic interests in the Asia-Pacific region. This will require a re-examination of how intelligence operations are conducted as adversaries in this region have robust A2/AD networks and pose a different threat than Iraq and Afghanistan. The possibility of armed conflict with major states such as Russia, China, or North Korea must be considered; one must not get trapped into mirror-imaging, thinking one’s adversary will act the same as himself. As some now consider China to be an unlikely real threat, the Kennedy administration considered Cuba to be impossible. Failing to plan for unexpected variations nearly led to worldwide disaster during the Cuban Missile Crisis in 1962.

Throughout history, there have been points where the character of warfare had to make significant changes. During the American Revolution, land war was faced with a dramatic shift as the Napoleonic-style of marching dense masses across battlefields to blindly shoot each other in a war of attrition gave way to guerrilla-style tactics and asymmetric skirmish warfare which developed into modern land strategy. In World War I, the introduction of the airplane forever changed the paradigm of war. Initially a reconnaissance vehicle, the airplane was repurposed as a bomber and through years of development air strategy became a major element of warfare. In World War II, the battleship evolved to be the capital ship and naval warfare shifted dramatically to adapt to its capabilities. All these
domains are constantly reaching boundaries and breaking through them in unexpected ways: land war evolved again after World War I as technology and strategy made major breakthroughs. US naval warfare shifted its capital fleet from battleships, to aircraft carrier groups, and in the future submarines are expected to lead the fleet. Intelligence “warfare” has reached a similar inflection point. Operations and counter-operations have evolved to a point where a new type of thinking will be required to overcome the current barriers. While significant advances have been made in recent years, the threats of the future may pose a dramatically different challenge. The intelligence community must work together to find new solutions to novel situations, to make the most of the current systems, and allowances in the budget must be made to develop future systems to meet the coming threats.

List of Acronyms and Abbreviations

A2  Anti-Access
AD  Area Denial
C^ISR Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance
CSBA Center for Strategic and Budgetary Assessments
DNI Director of National Intelligence
DoD Department of Defense
EO Electro-Optical
FMV Full-Motion Video
GEOINT Geospatial Intelligence
HUMINT Human Intelligence
IC Intelligence Community
IMINT Imagery Intelligence
INT Intelligence (discipline)
IR Infrared
ISIS Islamic State of Iraq and Syria
ISR Intelligence, Surveillance and Reconnaissance
JOAC Joint Operational Access Concept
JSOU Joint Special Operations University
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>JSTARS</td>
<td>Joint Surveillance Target Attack Radar System</td>
</tr>
<tr>
<td>Lt. Gen.</td>
<td>Lieutenant General</td>
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<tr>
<td>NRT</td>
<td>Near-Real Time</td>
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<tr>
<td>NTISR</td>
<td>Non-Traditional Intelligence, Surveillance, and Reconnaissance</td>
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<tr>
<td>PED</td>
<td>Processing, Exploitation, and Dissemination</td>
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<tr>
<td>RJ</td>
<td>Rivet Joint</td>
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<tr>
<td>SIGINT</td>
<td>Signals Intelligence</td>
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<tr>
<td>TTP</td>
<td>Tactics, Techniques and Procedures</td>
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<tr>
<td>UAV</td>
<td>Unmanned Aerial Vehicle</td>
</tr>
<tr>
<td>UCLASS</td>
<td>Unmanned Carrier-Launched Airborne Surveillance and Strike</td>
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<tr>
<td>US</td>
<td>United States</td>
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<td>USAF</td>
<td>United States Air Force</td>
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References


