



# Intelligence, Surveillance, and Reconnaissance (ISR) Acquisition: Issues for Congress

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## Summary

Increasing calls for intelligence support and continuing innovations in intelligence technologies combine to create significant challenges for both the executive and legislative branches. Intelligence, surveillance, and reconnaissance (ISR) systems are integral components of both national policymaking and military operations, including counterterrorism operations, but they are costly and complicated and they must be linked in order to provide users with a comprehensive understanding of issues based on information from all sources. Relationships among organizations responsible for designing, acquiring, and operating these systems are also complicated, as are oversight arrangements in Congress. These complications have meant that even though many effective systems have been fielded, there have also been lengthy delays and massive cost overruns. Uncertainties about the long-term acquisition plans for ISR systems persist even as pressures continue for increasing the availability of ISR systems in current and future military operations and for national policymaking.

These challenges have been widely recognized. A number of independent assessments have urged development of “architectures” or roadmaps setting forth agreed-upon plans for requirements and acquisition and deployment schedules. Most observers would agree that such a document would be highly desirable, but there are significant reasons why developing such an architecture and gaining an enduring consensus remain problematic. First, ISR technologies are not static; whereas it is possible to plan for aircraft, ships, or tanks that can be used for decades, it is doubtful that today’s inventory of satellites, unmanned aerial vehicles, and manned aircraft will still be the right mix a few years hence. Some believe that a “cast-in-concrete” plan would inhibit the ability to take advantage of new technologies or techniques as they emerge. Secondly, achieving consensus on such a plan would be greatly affected by the separate priorities of different parts of the intelligence community, the Defense Department, and Washington policymakers. The needs of policymakers and military commanders are different and are usually reconciled only on a case-by-case basis. Furthermore, different congressional oversight committees may also have different perspectives on priorities and some may seek to emphasize funding for specific systems.

The Director of National Intelligence could be given authority to reach across current organizational boundaries to define requirements and priorities. Some propose establishing a position for a separate “ISR Czar” to do this. Few observers believe that ISR programs could be carved out of the intelligence budget and/or the defense budget, and placed under the control of a single officer or lead agency. There is a strong likelihood that separate needs and concerns that affect the current systems will not disappear, even if one official has a new and expansive charter. Similar concerns would exist in regard to the jurisdictions of congressional oversight committees.

A fundamental question is not whether a long-term plan can be agreed upon and implemented, or whether the current disparate bureaucratic arrangements can be transformed, but whether the conflicting priorities and budgetary realities can be at least recognized and addressed in approximately the same timeframe by all responsible officials. ISR systems can be viewed as providing a test case for the interagency cooperation that observers believe will be increasingly important throughout the federal government.

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## Introduction

Intelligence, surveillance, and reconnaissance (ISR) systems are matters of great congressional interest. These systems can provide policymakers with information on the military capabilities of foreign countries, the location of key defense and industrial sites, indications of the presence of weapons of mass destruction, and information on the plans of foreign leaders and terrorist groups. National-level ISR is essential for both defense planning and arms control negotiations. Military commanders rely on intelligence systems for information on enemy positions and activities; tactical ISR has also been essential for precise targeting in counterterrorism operations while minimizing civilian casualties. At the present time major ISR systems—national and tactical—are used by both military commanders and Washington policymakers to follow developments in combat areas in great detail. ISR systems include reconnaissance satellites, some of which have been operational for decades; Unmanned Aerial Systems (UAS)<sup>1</sup> of various sizes; and manned aircraft and other sensor platforms. In practice, some ISR systems acquired for one purpose are regularly used for other missions that may have been unanticipated when the systems were designed.

Acquisition of ISR systems presents particular challenges to the intelligence community, the Department of Defense (DOD), and Congress. Agencies responsible for national systems are usually separate from those that design and acquire tactical systems. The costs and complexity of individual systems, continuing changes in technologies, and the difficulties involved in linking disparate systems together to serve a variety of consumers require different acquisition approaches than those often used for ships, tanks, and manned aircraft. Moreover, since the establishment of the United Launch Alliance in late 2006,<sup>2</sup> ISR satellites rely on launch platforms and other technologies used by non-intelligence satellites; thus, there is a necessity to coordinate intelligence satellite developments and launch schedules with elements of the national space effort that is managed by federal agencies outside DOD and the intelligence community.

UAS have demonstrated that on occasion they can provide data at a fraction of the costs of multi-billion dollar satellites, but UAS acquisition efforts have been anything but simple. There has been a tendency to introduce new and untested capabilities to unmanned platforms, causing production delays and cost growth. Some policymakers would centralize UAS acquisition efforts under an executive agent (an initiative that Congress at one point mandated but then abandoned), but, in practice, the four services have been intent on acquiring different UAS that meet their perceived unique requirements. The result has often been excessive costs required for different systems with duplicative or overlapping capabilities. Other platforms for ISR collection, such as manned aircraft, continue to have important functions, but often they compete for agency funding with non-intelligence aircraft rather than with unmanned intelligence systems, and intelligence requirements may not receive the highest priorities. Acquisition efforts are further complicated by

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<sup>1</sup> According to the Defense Department, Unmanned Aerial Systems (UAS) refer to systems whose components include the necessary equipment, network, and personnel to control an unmanned aircraft. An Unmanned Aerial Vehicle (UAV) refers to a powered aerial vehicle that does not carry a human operation, uses aerodynamic forces to provide vehicle life, can fly autonomously or be piloted remotely, can be expendable or recoverable, and can carry a lethal or nonlethal payload. Thus UAS is a broader term that includes equipment, networks, and personnel in addition to the UAV; in practice the terms UAS and UAV are often used interchangeably. See Department of Defense, Dictionary of Military and Associated Terms, Joint Publication 1-02, 12 April 2001, updated through April 2010.

<sup>2</sup> See <http://www.ulalaunch.com> for information on the cooperative effort by Lockheed Martin and Boeing to provide space launch services to federal agencies.

the fact that Congress addresses ISR programs through a number of committees, principally Armed Services, Intelligence, and Appropriations.

Such factors taken together have often led to piecemeal acquisition efforts, major cost overruns, and an inability to ensure that disparate systems can be linked effectively to yield a comprehensive intelligence picture. There have been production delays and only recently have UAS been available in adequate numbers to support the pace of operations in Iraq and Afghanistan. Observers argue—and a number of key Members of Congress have concurred—that the drawbacks inherent in past and current ISR acquisition efforts are serious enough to indicate that consideration should be given to the preparation of an agreed-upon multi-year plan or “architecture” that provides production schedules for currently planned ISR systems and the introduction of new platforms. If such a plan were agreed upon, advocates argue, it would be possible to restrain cost growth, ensure that all requirements had been considered, and establish the best possible mix of satellites and unmanned and manned systems. On the other hand, skeptics suggest that dynamic technologies and the changing international environment would nevertheless necessarily limit what can be done in terms of multi-year procurement efforts.

## **Evolving Requirements for ISR Systems**

A key consideration underlying efforts to acquire, deploy, and operate ISR systems is the way or ways that they will be used. The need to gain insights into Soviet military capabilities during the Cold War provided the principal impetus for the sizable investments in global signals intelligence and overhead reconnaissance capabilities. These systems were considered “national,” they were acquired primarily to support the President and key Cabinet members. A number of “national” organizations—especially the National Reconnaissance Office (NRO) and the National Security Agency (NSA), along with the Central Intelligence Agency (CIA) were established to gather and analyze information for senior policymakers. The ability of U.S. leaders to gauge the extent of Soviet strategic capabilities was essential to defense planning and arms control negotiations, but there was less capability to support military commanders in ongoing combat operations.

Beginning with Desert Shield in 1991, however, these national-level systems began to be adapted to tactical use in Iraq, Bosnia, Kosovo, Afghanistan, and elsewhere. Wherever U.S. forces have been deployed for combat there have been requirements for intensive intelligence support that called upon national systems that were not originally intended for tactical uses. In peacekeeping/peacemaking/stabilization operations, the overriding need to minimize attacks on civilians has led commanders and national-level leaders to seek ever more precise target data from all available sources of information.

In addition to adapting older systems to the demands of current modes of warfighting, newer ISR systems have also been employed with considerable success. In particular, UAS have proven their value as relatively low-cost systems that can be routinely used by ground commanders to acquire tactical intelligence. In regular use since the early 1990s, UAS range in size and sophistication from very small systems that can be launched by an individual soldier for short-range tactical operations to the high-altitude Global Hawk that can acquire much of the same information as reconnaissance satellites. The potential overlap, or possibility of close coordination between UAS and national satellites has, however, called into question the separate organizational and congressional oversight structures that have been established or have evolved over the past decades.

In spring 2009, Secretary of Defense Robert Gates argued in *Foreign Affairs* that the nature of U.S. strategic planning has unalterably changed. His comments summarize the evolution of defense and intelligence planning that guided the Administration's budget proposals for FY2010:

[F]or far too long there was a belief or a hope that Iraq and Afghanistan were exotic distractions that would be wrapped up relatively soon—the regimes toppled, the insurgencies crushed, the troops brought home. Therefore we should not spend too much or buy too much equipment not already in our long-range procurement plans or turn our bureaucracies and processes upside down.... As a result of these failed assumptions, the capabilities most urgently needed by our warfighters, were for the most part fielded ad hoc and on the fly, developed outside the regular bureaucracy and funded in supplemental legislation that would go away when the wars did—if not sooner.

...

[G]iven the types of situations the United States is likely to face ... the time has come to consider whether the specialized, often relatively low-tech equipment well suited for stability and counterinsurgency missions is also needed. It is time to think hard about how to institutionalize the procurement of such capabilities and get them fielded quickly.<sup>3</sup>

Secretary Gates was addressing issues of defense acquisition in general and not ISR systems in particular. It is clear, however, from the text of his speeches and his actions as Defense Secretary that he sees ISR support to warfighters as a major example of the challenge facing policymakers in both the executive branch and Congress. Military operations have increasingly come to depend upon the availability of copious amounts of real-time ISR. As a result of the commitment to Iraq and Afghanistan, requirements for ISR and the actual use of ISR data have grown exponentially in the past decade. The military priorities of both the Bush and Obama Administrations have established priorities for particular kinds of intelligence and thus particular types of intelligence collection systems.

The February 2010 Quadrennial Defense Review (QDR) Report reflected Secretary Gates's earlier statements:

The wars we fighting today and assessments of the future security environment together demand that the United States retain and enhance a whole-of-government capability to succeed in large-scale counterinsurgency (COIN), stability, and counterterrorism (CT) operations in environments ranging from densely populated urban areas and mega-cities, to remote mountains, deserts, jungles, and littoral regions.

Stability operations, large-scale counterinsurgency, and counterterrorism operations are not niche challenges or the responsibility of a single Military Department, but rather require a portfolio of capabilities as well as sufficient capacity from across America's Armed Forces and other departments and agencies. Nor are these types of operations a transitory or anomalous phenomenon in the security landscape. On the contrary, we must expect that for the indefinite future, violent extremist groups, with or without state sponsorship, will continue to foment instability and challenge U.S. and allied interests.<sup>4</sup>

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<sup>3</sup> Robert M. Gates, "A Balanced Strategy: Reprogramming the Pentagon for a New Age," *Foreign Affairs*, January/February 2009, pp. 34-35.

<sup>4</sup> U.S. Department of Defense, Quadrennial Defense Review Report, February 2010, p. 20.

The QDR indicates that DOD has placed special emphasis on “certain capabilities that have been in consistently high demand and have proven to be key enablers of tactical and operational success.”<sup>5</sup> These enablers include unmanned aircraft systems such as the MQ-1 Predator and MQ-9 Reaper UAS<sup>6</sup> and manned aircraft systems such as the MC-12 Project Liberty aircraft.

## **ISR Acquisition Processes**

ISR systems are acquired in very different ways; the process is conducted in classified channels and there is no overall ISR package that is developed by the executive branch and forwarded to Congress for its consideration. Rather, different systems are treated separately and requests come to Congress in different ways. Funds are also authorized and appropriated in different legislative measures. As might be expected, the result can be disjointed, with duplicative coverage in some areas and shortfalls in others. The most important ISR category is the National Intelligence Program (NIP) that includes systems designed for the use of national policymakers—the President and the National Security Council (NSC). Other important ISR systems are designed for and operated by military commanders and are grouped in the Military Intelligence Program (MIP). However, NIP systems can also be used to support tactical operations, and MIP systems can collect information of interest to senior policymakers. Traditionally, satellites are acquired as part of the NIP, but some are now included in the MIP. Most UAS have been MIP systems as have manned aircraft in recent decades. The composition of annual NIP and MIP budget submissions are classified and available only to Members of Congress and appropriate committee staff.

### **“National” Space**

The most expensive ISR system has been surveillance satellites, the development of which is perhaps the greatest accomplishment of U.S. intelligence. For many years the NRO—an agency created in 1961 with no public acknowledgement of its existence for over 30 years—was able to develop and acquire cutting edge reconnaissance systems. Early systems were placed into orbit only after many failures; costs were relatively unconstrained, and work proceeded in secret and with minimal oversight from either DOD or Congress. Reconnaissance satellites, in being able to delineate Soviet capabilities—and the absence thereof—made a major contribution to U.S. defense policies during the Cold War and, most observers would acknowledge, essentially justified their costs. The end of the Cold War reduced the need for satellite reconnaissance of foreign military forces; the “open-checkbook” approach to satellite acquisition ended. A reduction in intelligence budgets in the 1990s coincided with the beginning of the retirements of many in the generation of scientists and engineers that launched the satellite program.<sup>7</sup>

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<sup>5</sup> Ibid., p. 21.

<sup>6</sup> Ibid., p. 22. It is noteworthy that the QDR does not specifically address satellite surveillance systems although it makes reference to the fact that “[f]orces in Iraq, Afghanistan, and elsewhere have developed new and more effective means for rapidly processing, exploiting, and fusing information from a wide array of sources and disseminating this information to operators at the tactical level,” pp. 22-23. The “wide array” undoubtedly includes national satellite systems.

<sup>7</sup> See Joshua Boehm and Craig Baker, “A History of United States National Security Space Management and Organization,” Prepared for the Commission to Assess United States National Security Space Management and Organization [2001].

It is widely acknowledged that there is inherent tension between efforts to acquire new satellite technologies and the need to maintain and/or replace existing capabilities. Acquisition of systems using currently available technologies can yield stability and contained costs, while trying to push the technological envelope to acquire cutting-edge or “exquisite” systems can be more disruptive. In addition, the tendency to prefer large Cold War-era systems has drawbacks. A senior DOD official acknowledged:

we have attempted to buy large monolithic systems that produce a capability that is one size fits all, i.e. a single system that satisfies all customers, without evaluating the full set of alternatives....

This model is a Cold War relic, when space systems were needed to satisfy only the strategic policy decision maker and events unfolded in a fairly static timeline. Today’s reality is that one size does not fit all.<sup>8</sup>

Further, the operational tempos in all of the Areas of Responsibility (AOR) diverge greatly and require different timeliness of access, volume, or fidelity. Developing a system that can satisfy all users all of the time is unsustainable, if not impossible.... deploying architectures with constellations of just a few satellites leave[s] the nation incredibly vulnerable and invites our adversaries to target our systems.”<sup>9</sup>

Satellite acquisition is complicated. First, satellites overlap to some extent with airborne systems in terms of reconnaissance capabilities; there are potential trade-offs. Secondly, the acquisition and operations (especially the launching) of reconnaissance satellites is closely related to other types of satellites used for meteorology and communications that are not intelligence systems. As one report has noted:

The U.S. space sector, in supporting commercial, scientific, and military applications of space, is embedded in our nation’s economy, providing technological leadership and sustainment of the industrial base. To cite one leading example, the global Positioning System (GPS) is the world standard for precision navigation and timing, directly and indirectly affecting numerous aspects of everyday life. But other capabilities such as weather services; space-based data, telephone and video communications; and television broadcasts have also become common, routine services. The Space Foundation’s 2008 Space Report indicates that the U.S. commercial satellite service and space infrastructure sector is today approximately a \$170 billion annual business.<sup>10</sup>

Thus, the potential that high-altitude UAS have for meeting the same requirements as satellites may suggest that funds for satellite programs be shifted to UAS acquisition (leaving aside the issue of whether satellites actually provide better coverage and whether satellites are potentially less vulnerable to attack). On the other hand, if fewer reconnaissance satellites are to be launched, economies of scale among all satellite programs along with the “space intelligence base” might be affected.

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<sup>8</sup> Testimony of Josh Hartman, Senior Advisor to the Under Secretary of Defense (Acquisition, Technology & Logistics) before the House of Representatives, Committee on Armed Services, Subcommittee on Strategic Forces, April 30, 2009.

<sup>9</sup> Ibid.

<sup>10</sup> Institute for Defense Analyses, *Leadership, Management, and Organization for National Security Space: Report to Congress of the Independent Assessment Panel on the Organization and Management of National Security Space*, July 2008, p. 2.



Another program, the Space Based Infrared System (SBIRS) consisting of infrared sensors that can detect incoming missiles, demonstrates the cost risks inherent in satellite acquisition; according to one media account the program exceeded its original \$3 billion cost estimate by some \$7.5 billion. The SBIRS program, centered on a space-based missile warning satellite, “originally pegged at around \$3 billion, is now in the neighborhood of \$10 billion; launch of the first satellite, originally targeted for 2002, is now expected anywhere between late 2010 and spring 2011.”<sup>11</sup>

Satellites have always been costly. In earlier decades their unique ability to peer behind the Iron Curtain justified substantial investments that were known only to a few members of relevant congressional committees. National satellites remain costly, reportedly over \$1 billion for each satellite, not counting considerable associated ground support and analytical efforts. The effort to acquire new technologies or to exploit available cutting-edge technologies results in highly expensive systems. Many observers argue that costs of satellite systems are unnecessarily inflated by too great a commitment to innovative technologies when others are adequate for likely missions; others point to a tendency to add unnecessary requirements (“bells and whistles”) that increase complexity and delay production. Others maintain that opportunities for technological breakthroughs should not be passed up and innovative technologies usually pay for themselves eventually. The growth of program costs, however, is beyond doubt.

Since passage of the Land Remote Sensing Policy Act of 1992 (P.L. 102-555), commercial imaging satellites have been launched, and federal agencies were the first major customers. Arguably, commercial imagery saves the government money since purchases can be limited to meet particular requirements. In large measure, however, imagery companies have become highly dependent on government contracts, and changes in imagery procurement can have great implications for the commercial industry. In many cases, government satellites can produce more detailed information but at higher costs, and the government has to cover both acquisition and operating costs over a multi-year period.

The end of the life-cycle for the current satellites was foreseen well ahead of time. Although plans for follow-on systems were and remain classified, there has been considerable public commentary about one approach, known as the Future Imagery Architecture (FIA), in which billions were invested only to have funding canceled in 2005 when it became apparent that delivery schedules and budget limitations could not be met. Most observers credit the FIA debacle as a result of choosing an inexperienced contractor, imposing excessively tight deadlines and cost controls without an adequate government oversight mechanism.<sup>12</sup>

In April 2009, Dennis Blair, newly appointed as DNI, announced a plan to modernize the satellite imagery architecture by having the NRO build and operate “satellites” (no number specified) and significantly increasing the acquisition of imagery produced by U.S. commercial providers. He noted that commercial “less-complex satellites, which are based on technologies already in production by U.S. vendors, would be available sooner than the much more capable NRO-developed and acquired systems.”<sup>13</sup> Media accounts indicate that efforts would be made to avoid

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<sup>11</sup> Turner Brinton, “Software Fix Adds \$750M to SBIRS Price Tag,” *Space News*, July 27, 2009, p. A3.

<sup>12</sup> See Philip Taubman, “In Death of Spy Satellite Program, Lofty Plans and Unrealistic Bids,” *New York Times*, November 11, 2007.

<sup>13</sup> Office of the Director of National Intelligence, “DNI Blair Announces Plan for the Next Generation of Electro-Optical Satellites,” ODNI News Release No. 12-09, April 7, 2009.

the problems associated with FIA and that independent cost estimates and tougher assessments of technological maturity would be involved for the new systems that are due to operational before 2020.<sup>14</sup> Some Members, especially Senator Christopher Bond, the vice chairman of the Senate Intelligence Committee, have criticized the plan, arguing that there is an opportunity to take advantage of potential technological breakthroughs and proposing a different, but as yet untested, satellite technology.<sup>15</sup> The Administration proposal would provide a few highly sophisticated satellites that have the advantage of being based on available, proven technologies; Senator Bond's proposal, which was reportedly included in the FY2010 Intelligence Authorization bill, S. 1494, would include larger numbers of smaller, less expensive satellites that are based on cutting edge technologies that have not yet been tested and approved. Media accounts indicate that defense authorization (P.L. 111-84) and defense appropriations measures (P.L. 111-118) for FY2010 included funding for the acquisition of at least one of the larger satellites with funding beginning in FY2011.<sup>16</sup>

Several attempts have been made to provide overall direction to space surveillance acquisition efforts. In 2004 the National Security Space Office (NSSO) was created to develop and coordinate national security space strategies, architectures, plans, programs, and processes on a continuing basis. The NSSO remains, however, essentially an advisory body and has not had the authority to define programs and monitor implementation. According to GAO the NSSO developed a National Security Space Strategy in 2004, but it was never issued.<sup>17</sup> In 2003 an Executive Agent for Space was established with the Secretary of the Air Force designated to fill the position.<sup>18</sup> The Executive Agent would have a wide range of responsibilities for planning and programming DOD's space systems, including Milestone Decision Authority. The persistence of space acquisition problems, however, led to the abandonment of the position in 2005 with procurement responsibilities returning to the office of the Assistant Secretary of Defense for Acquisition, Technology, and Logistics. In 2009, however, the Defense Appropriation Act, P.L. 111-118, provided \$7 million for a Space and Intelligence Office (SIO) within the Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)). The new office is to serve as the DOD space architecture planning office; it is to provide a roadmap to Congress in mid-2010 on how it will be used in future space system architecture planning.

## **"Tactical" Space**

Although considerable efforts have been underway for many years to make information collected available for tactical use, collection priorities for NRO satellites are established by the DNI. Although military commanders may have the opportunity to request coverage of a given target,

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<sup>14</sup> Andrea Shalal-Esa, "U.S. Plans New Government Owned Satellites," *Washington Post*, April 8, 2009.

<sup>15</sup> See Tim Starks, "Senate Intelligence Bill Would Conflict With Wishes of Obama, Other Panels," *CQ Today*, July 14, 2009. Earlier, some observers concluded that differences over satellite acquisitions had doomed efforts to pass an intelligence authorization bill for FY2009. See Tim Starks, "Did a Satellite Dispute Knock Intelligence Bill From Orbit?" *Congressional Quarterly*, March 31, 2009.

<sup>16</sup> See Warren Ferster, "Lawmakers Near Agreement on White House Spy Satellite Plan," *Space News*, October 19, 2009.

<sup>17</sup> See Davi M. D'Agostino, Director, Defense Capabilities and Management, Government Accountability Office to the Hon. Bill Nelson and the Hon. Jeff Sessions, Subcommittee on Strategic Forces, Committee on Armed Services., *Defense Space Activities: National Security Space Strategy Needed to Guide Future DOD Space Efforts*, GAO-08-431R, March 27, 2008, p. 10.

<sup>18</sup> Department of Defense Directive 5101.2 of June 3, 2003.

they cannot be certain that their requirements will be considered more important than those of other agencies. The inability of combatant commanders to obtain what they consider as adequate support from national satellite programs led to efforts for DOD to acquire satellites independently of the NRO for the primary support of the warfighters. Some saw significant advantages to be gained by moving beyond “the sclerotic national programs [that] simply cannot maintain the pace required for future operations.”<sup>19</sup> The goal was to build new, less expensive, less sophisticated satellites that could meet the critical requirements of combat commanders. Under the program, known as Operationally Responsive Space (ORS), military commanders would have access to an inventory of relatively unsophisticated satellites that could be launched when needed to provide information for limited durations. ORS would complement information from national satellites and other collection programs.

Some observers have raised concerns that this program to some extent duplicates or at least overlaps the capabilities of NRO satellites and may have been established simply to avoid the organizational complexities of national satellite procurement and the need to coordinate collection management with Washington agencies.<sup>20</sup> The GAO concluded in 2008 that “the [ORS] concept is in the early stages of development and not commonly understood by all members of the warfighter and national security space communities.” In addition “DOD has not clearly defined key elements of the ORS concept and has not effectively communicated the concept with key stakeholders.” Furthermore, GAO believes that “officials from the intelligence community were concerned about DOD’s lack of consultation and communication with them regarding the ORS concept.” These officials “also raised concerns about the importance of using their current processes and architecture so as not to create unnecessary duplicative processes to get data to the war fighter.”<sup>21</sup>

Other observers maintain, however, that new systems could be built from the bottom up using available technologies, including those used in the commercial sector, and that ORS could provide a useful capability for commanders, whose requirements will always be subject to adjustment or derogation when collection priorities of national systems are established and implemented.<sup>22</sup> ORS provides a just-in-time capability that can be tailored for missions of limited duration. The ORS concept has gained support in the Defense Department, and Congress has funded the ORS in defense authorization and appropriations legislation, albeit not to the extent envisioned by the Air Force. For FY2010 the Administration requested \$112.9 million, an increase over the FY2009 appropriations level of \$83.7 million, but over \$100 million that was originally envisioned by ORS planners was included in an Air Force list of unfunded priorities.<sup>23</sup> The conference report reflected an agreement to provide only the \$112 million requested, but not to provide the additional funds.<sup>24</sup> However, Defense officials believed that further ORS satellites

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<sup>19</sup> Arthur K. Cebrowski and John W. Raymond, “Operationally Responsive Space: A New Defense Business Model,” *Parameters*, Summer 2005, p. 70.

<sup>20</sup> See Turner Brinton, “ORS Office’s Success May Hinge on Its Ability to Skirt the Bureaucracy,” *Space News*, May 11, 2009, p. A6.

<sup>21</sup> *Ibid.*, p. 18; U.S. Government Accountability Office, *Defense Space Activities: DOD Needs to Further Clarify the Operationally Responsive Space Concept and Plan to Integrate and Support Future Satellites*, GAO-08-831, June 2008, p. 4.

<sup>22</sup> See GAO-08-831.

<sup>23</sup> Letter from Norton A. Schwartz, General, USAF, Chief of Staff to the Hon. John M. McHugh, May 18, 2009, available at <http://www.afa.org/grl/pdfs/AirForceFY10UnfundedRequirementsList.pdf>.

<sup>24</sup> U.S. Congress, 111<sup>th</sup> Congress, 1<sup>st</sup> session, House of Representatives, Committee of Conference, *National Defense Authorization Act for Fiscal Year 2010*, October 7, 2009, H.Rept. 111-288, p. 1015.

will be approved if the first one can be built “within the kinds of very aggressive parameters that we’ve set up.”<sup>25</sup> As the Administration requested only \$93 million for the ORS program for FY2011, some observers suggest that the limited funds may ultimately jeopardize the program.<sup>26</sup> Nevertheless, support for ORS remains strong in both chambers; the House version of the FY2011 defense authorization bill (H.R. 5136) would add an additional \$40 million to the Administration request and the Senate Armed Services Committee in its bill (S. 3454) would add an additional \$20 million.

In April 2009, testimony of Josh Hartman, a long-time proponent of ORS, set for the rationale for what he termed “a balanced architecture”:

The solution is a change in our business model that will enable employment of an architecture distributed to multiple nodes and layered to provide right level of capability to the right geographic regions at the right times, while leveraging commercial systems and multiple sensors from different sizes of space craft and non-space platforms.

This model would provide for a balanced architecture where a foundational capability would be provided from medium or large systems. At the same time, small and agile, less complex systems would be “layered” to augment in optimized orbits, with additional capability in high demand areas, and niche capability for special operations, irregular needs or crisis situations.” As recommended by the GAO, evolution of capability would be a hallmark and key tenet of this model. Systems would be purposely be designed to live shorter lives to reduce the system complexity, synchronize on-orbit life with developing time, increase industry volume, and take advantage of rapidly advancing technology.<sup>27</sup>

In June 2011, the ORS-1 satellite was the first fully operational spacecraft to be launched as part of the ORS program and featured a modified SYERS-2 sensor, similar to the electro-optical and infrared imagery sensor used on the U-2 Dragon Lady aircraft.<sup>28</sup> On January 3, 2012, the ORS-1 satellite was declared operationally capable by General William Shelton, Air Force Space Command commander. The ORS system was launched 32 months after the idea was conceptualized, and combatant commanders accepted the asset less than 90 days after the launch.<sup>29</sup>

DOD is assessing other satellite systems besides ORS. Some hope to realize significant savings over NRO-led efforts. One media report suggests that one company believes it can deliver a half-meter-resolution imagery satellite for \$6 million-\$7 million a satellite.<sup>30</sup> Efforts to take advantage of new technologies to produce relatively inexpensive satellites to support military commanders

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<sup>25</sup> Testimony of General C. Robert Kehler, Commander, Air Force Space Command, before the Strategic Forces Subcommittee of the House Armed Services Committee, May 21, 2009.

<sup>26</sup> See John T. Bennett, “USAF Surprised OSD by Putting Small Sats on Wish List,” *Defense News*, June 8, 2009, p.6. For additional background on Air Force funding priorities, see James B. Armor, Jr., *The Air Force’s Other Blind Spot*, *Space Review*, September 15, 2008.

<sup>27</sup> Statement of Josh Hartman, Special Advisor to the Under Secretary of Defense (Acquisition, Technology and Logistics) to the House Armed Services Committee, April 30, 2009.

<sup>28</sup> See Michael P. Kleiman, “Operationally Responsive Space-1 satellite declared mission ready,” available at <http://www.kirtland.af.mil/news/story.asp?id=123287795>, January 27, 2012.

<sup>29</sup> See William Graham, “Orbital Minotaur I launches with ORS-1 following eventful count,” available at <http://www.nasaspaceflight.com/2011/06/live-orbital-minotaur-i-launch-ors-1>, June 29, 2011.

<sup>30</sup> Turner Brinton, “Uncertainty Looms Office Amid Declining Budget Projections for 3-year-old ORS,” *Space News*, April 23, 2010.

could usefully supplement intelligence gathered from other sources. At the same time, however, the ORS effort appears to have been undertaken in isolation from the organizations that have been responsible for launching satellites over many years. Observers suggest that the extensive expertise available in the NRO and NGA has not been fully accessed, possibly risking waste and duplication of effort. Alternately, some might argue that long-existing organizational relationships tend to become sclerotic, potentially inhibiting the development of innovative technologies that can serve operating forces at reasonable costs.

## **Unmanned Aerial Systems (UAS)**

UAS have become essential parts of military operations.<sup>31</sup> Although first deployed during the Vietnam conflict, their use was limited until 1990-1991, when they supplied exact locating data during Operations Desert Storm that was used in targeting precision guided munitions (PGMs). Their use expanded during operations in Iraq and Afghanistan, when great emphasis has been placed on avoiding inadvertent attacks on civilians. Increasing availability of UAVs, especially the MQ-1 Predator with a range of 454 miles and the follow-on MQ-9 Reaper with a range of over 3,600 miles and a flight time of over 20 hours, has made them tactical weapons of choice. In addition to the Predators, longer-range Global Hawks, which fly at much higher altitudes, have also been employed in combat operations. Communications have improved to the point where information intercepted by UAVs can be forwarded not only to the local commander but also to intelligence centers at various echelons where it can be combined (or “fused”) with data from other sources to produce a more complete intelligence picture.

The history of UAV acquisition has been complicated. A crucial step was taken during the Reagan Administration by Navy Secretary John Lehman, who, having witnessed Israeli use of the systems over Lebanon, procured commercially built Israeli UAVs for the U.S. Navy. Later, the Defense Airborne Reconnaissance Office (DARO) was established by DOD to manage UAV acquisition throughout the Defense Department; this effort did not, however, endure, and in the FY1998 Defense Authorization Act (P.L. 105-85, §905), Congress directed the transfer of relevant DARO functions to the separate military departments. Since then, some consideration has been given to designating one service as an executive agent for UAV acquisition, but this approach has never been accepted in the face of significant opposition from other services determined to ensure that their unique requirements can be met.

In recent years the use of UAVs has proliferated in Iraq and Afghanistan, where they helped in meeting the objectives of identifying elusive enemies and avoiding civilian casualties. According to DOD, “the number of deployed UAS has increased from approximately 167 aircraft in 2002 to over 6,000 in 2008, while defense investment in UAS capabilities has dramatically grown from \$284 million in Fiscal Year 2000 to \$2.5 billion in Fiscal Year 2008.”<sup>32</sup> The FY2011 request was for \$4.1 billion. Responding to continuing needs for tactical systems, in the first months of the Obama Administration, Secretary of Defense Gates realigned DOD’s budget priorities to emphasize tactical ISR systems including UAVs and manned ISR platforms. During this period, funding was recommended to field and sustain 50 continuous orbits for Predator or Reaper-class UAVs. In March 2012, Secretary of the Air Force Michael Donley, stated the requirement

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<sup>31</sup> UAS, especially the larger platforms such as the Global Hawk, can also have “national” missions.

<sup>32</sup> Department of Defense, *Quadrennial Roles and Missions Review Report*, January 2009, p. 25.

increased to 65 continuous orbits, with the ability to increase them to 85.<sup>33</sup> Manned ISR platforms such as the Air Force's MC-12W Project Liberty and the Army's various turbo-prop aircraft flown by Task Force ODIN, also shared this funding. Although additional funding for ISR systems was included in the FY2009 supplemental, Secretary Gates indicated his intention to ensure that ISR programs are incorporated into base budgets rather than in supplemental appropriations measures. He also indicated plans for more extensive research and development efforts on ISR systems with emphasis on those systems that link warfighters and national systems.<sup>34</sup>

The most commonly used UAV systems, Predators and Reapers, are designed for tactical use. The Predator flies at altitudes up to 25,000 feet; the Reaper 50,000 feet. Both have an endurance of 24 hours. Some UAVs, such as the Global Hawk, have capabilities that rival those of reconnaissance satellites. They can fly higher—over 60,000 feet—and longer—28 hours. There is potential overlap between Global Hawk capabilities and those of reconnaissance satellites. Development costs of UAS have tended to exceed initial estimates by significant amounts. Development costs of the Air Force's Global Hawks grew by 284%; the Reaper by 97%; the Shadow by 80%, and the Predator by 60%.<sup>35</sup> In some cases (especially with the Global Hawk) the increases resulted from immature technologies and fundamental restructurings; in others it was simply a matter of increasing the number of platforms to be acquired.

ISR acquisition requirements extend well beyond satellites and launch vehicles. The increasing use of large numbers of UAS and other mobile ISR systems requires different and more varied communications support. In particular, the commands using such tactical systems may not have access to major DOD communications networks based on fiberoptic cables and must instead rely on communications satellites. According to one assessment the latter are essential for “reach back” from tactical units to intelligence centers at higher echelons or in the United States, where the processing, exploitation, analysis, and dissemination of intelligence products occurs.<sup>36</sup> The increased use of tactical ISR systems increases requirements for the acquisition of communications satellites and for other systems to facilitate tactical communications with an increasing emphasis on Internet-based systems. As the study noted: “While small units may not require large quantities of ISR data, their needs are focused, immediate and critical when engaged with the enemy.”<sup>37</sup>

UAS are procured by the four services, although efforts have been made to encourage shared use. An Air Force initiative in 2007 to be designated as executive agent for medium and high-altitude unmanned aerial vehicles was ultimately not approved, but efforts to make use of technologies developed for another service continue. For instance, the Marine Corps determined that the Army's Shadow system could meet its requirements and by procuring an existing system saved

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<sup>33</sup> Speech by Michael Donley, Secretary of the Air Force, “Air Force Reserve: Integral to the Total Force,” remarks at 2012 Air Force Reserve Senior Leader Conference, March 26-27, also available at <http://www.af.mil/information/speeches/speech.asp?id=702>, March 26, 2012.

<sup>34</sup> U.S., Department of Defense, Defense Budget Recommendation Statement, April 6, 2009.

<sup>35</sup> See U.S. Government Accountability Office, *Defense Acquisitions: Opportunities Exist to Achieve Greater Commonality and Efficiencies among Unmanned Aircraft Systems*, GAO-09-520, July 2009, p. 8.

<sup>36</sup> See U.S. Department of Defense, Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, Report of the Joint Defense Science Board/Intelligence Science Board Task Force, *Integrating Sensor-Collected Intelligence*, November 2008, p. 86.

<sup>37</sup> *Ibid.*, p. 89; the report strongly recommended the Joint Tactical Radio System and the Transformational Satellite System.

the costs of development and obtained systems that could be rapidly be made available to the operating forces.<sup>38</sup> Similarly, the Navy has taken advantage of various components of both Global Hawks and Reapers that were developed for the Air Force in acquiring its Broad Area Maritime Surveillance UAS.

Despite such initiatives GAO has argued that DOD should undertake a “rigorous and comprehensive analysis” of the requirements for UAS to identify commonalities and develop a strategy for making systems and subsystems more common and that the services should demonstrate that they have explored potentials for common platforms and sensors and are taking an “open systems approach” that will permit use of interchangeable sensors.<sup>39</sup> GAO further expressed concerns about cost growth in UAS programs, indicating that “development cost estimates for the 10 [UAV] programs we assessed, collectively, has increased more than \$3.3 billion (37% in 2009 dollars) from initial estimates—with \$2.7 billion attributed to the Air Force’s Global Hawk program.”<sup>40</sup> The GAO underscored the advantages it believes can be gained by designing compatible unmanned systems that are effectively linked together especially using commercially available open sources.<sup>41</sup> On May 18, 2009, the Air Force announced its “Unmanned Aircraft Systems Flight Plan, 2009-2047.” The plan describes a family of UAS ranging from man-portable vehicles to larger, “tanker sized” platforms. The goal is to acquire “a common set of airframes within a family of systems with interoperable, modular ‘plug and play’ payloads, with standard interfaces.”<sup>42</sup>

## **Manned Airborne Systems**

The military services remain committed to the use of manned surveillance aircraft that can be configured for a variety of different missions depending upon specific requirements. Some systems still in use were originally designed for Cold War missions, but they continue to serve as platforms for use in tracking insurgents and improvised explosive devices. Eventually the older systems have to be retired; the Navy is currently acquiring over 100 P-8 Poseidon maritime surveillance aircraft to replace aging P-3s. The Air Force is considering P-8s as a possible replacement for the E-8 JSTARS aircraft, which has played a major role in supporting combat operations in Iraq and Afghanistan, although the E-8s are scheduled to have new engines to extend their service life. The P-8 is a modified Boeing 737-800 aircraft of proven reliability and can be fitted with various sensor systems depending on the particular mission. Its predecessor, the P-3, first entered service in the 1960s; P-8s are also expected to be available for decades. A recent media report indicated that the Army is even considering the development of intelligence-gathering airships.<sup>43</sup>

In comparison to the complex acquisition history of UAS, the process for acquiring manned aircraft, although not without challenges, generally follows well established procedures.

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<sup>38</sup> GAO-09-520, p. 3.

<sup>39</sup> Ibid., p. 4.

<sup>40</sup> Ibid., p. 2. It is noteworthy, however, that per unit costs for the widely deployed Predator have actually declined by 41%; see p. 10.

<sup>41</sup> The limitations of commercial systems were, however, revealed when reports surfaced that enemy fighters were downloading unencrypted information from Predator communications links; see Pauline Jelinek, “Pentagon: Insurgents Intercepted Drone Spy Videos,” *Washington Post*, December 18, 2009.

<sup>42</sup> U.S. Air Force, *United States Air Force Unmanned Aircraft Systems Flight Plan, 2009-2047*, May 2009.

<sup>43</sup> Walter Pincus, “Military Seeks an Intelligence-Gathering Airship,” *Washington Post*, February 16, 2010, p. A11.

Congressional oversight in the House is shared between the Armed Services and Intelligence Committees and in the Senate is primarily the responsibility of the Armed Services Committee with input from the Intelligence Committee.

In April 2008, Secretary of Defense Gates established a Department of Defense-wide task force to identify and recommend solutions for increased ISR to the ground forces stationed in the U.S. Central Command area of responsibility. In his remarks to the Air Force's Air War College in Montgomery, AL, Defense Secretary Gates criticized the services for "not moving aggressively in wartime to provide resources needed now on the battlefield," and stated he had "been wrestling for months to get more intelligence, surveillance, and reconnaissance assets into the theatre." His direction was to find "more innovative and bold ways to help those whose lives are on the line" and stated the "deadlines for the task force's work are very short."<sup>44</sup>

The Air Force's response to the Secretary's demand was called "Project Liberty," a Beechcraft King Air 350 turbo-prop aircraft modified with an imagery and signals intelligence suite. To answer the Secretary's proposed timeline, the Air Force diverted from the well-established procedures of acquisition and purchased the first seven from the private sector, using COTS—"commercial off the shelf"—technology to convert the aircraft to an ISR platform.

By November 2008, the Air Force had signed a \$171 million contract with Hawker Beechcraft Corporation, and four months later the first aircraft was delivered. In June 2009, the first MC-12 squadron at Balad Air Base, Iraq, flew the first combat mission. By December 2009, the entire MC-12 fleet was deemed operational.<sup>45</sup> Within 18 months, the Air Force fielded three expeditionary MC-12 squadrons and the associated processing, exploitation, and dissemination entities to both Iraq and Afghanistan.<sup>46</sup>

Project Liberty was considered the fastest delivery of a Air Force weapons system from "concept to combat" since the P-51 Mustang in World War II.<sup>47</sup> The MC-12 is now considered the most heavily tasked manned airframe in the combat Air Force.

## **Assessments of ISR Acquisition Processes**

ISR acquisition efforts, given their size and cost, have generated significant public controversy, but public discussions are hampered by the absence of relevant information that is unclassified. However, there have been a number of recent outside reviews conducted by properly cleared outsiders. In general, these assessments have faulted organizational arrangements for the acquisition of ISR systems. A 2008 study conducted by the congressionally chartered **Independent Assessment Panel on the Organization and Management of National Security**

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<sup>44</sup> Speech of Secretary William Gates, Secretary of Defense, before the U.S. Air Force War College, Maxwell-Gunter Air Force Base, Ala., April 21, 2008. Available at <http://www.defense.gov/speeches/speech.aspx?speechid=1231>

<sup>45</sup> Due to the record setting acquisition, training, and deployment timeline, Air Force officials nominated the MC-12W Project Liberty team for the Collier Trophy, an elite aviation recognition.

<sup>46</sup> See Renni Thornton, "MC-12 begins mission in southern Afghanistan," available at <http://www.acc.af.mil/news/story.asp?id=123198971>, April 8, 2010.

<sup>47</sup> See Russell Petcoff, "Final MC-12 deployed to USCENTCOM AOR," available at <http://www.af.mil/news/story.asp?id=123213117>, July 12, 2010.



**Space** (sometimes described as the Allard Commission after a key congressional sponsor, former Senator Wayne Allard) described the current organization for space systems used for national (as opposed to tactical) purposes:

“Authorities and responsibilities are spread across numerous organizations, including many within the Office of the Secretary of Defense (OSD) [Under Secretary of Defense (USD/Intelligence), USD/Acquisition, Technology and Logistics; USD/Policy; and the Assistant Secretary of Defense (ASD/Networks & Integration)], USAF, USN, USA, USMC, DARPA [Defense Advanced Research Projects Agency], MDA [Missile Defense Agency], and NRO. Furthermore:

- There is no standing forum or mechanism below the level of the President to coordinate efforts among the agencies responsible for NSS or to adjudicate differences over requirements and resources.
  - The predominant capability providers are NRO and SMC [Space and Missile Systems Center, a component of the Air Force’s Space Command], which today have parallel requirements and funding paths within the IC and DOD.
  - Space capability providers in NOAA [National Oceanic and Atmospheric Administration], NASA [National Aeronautics and Space Administration], and other federal agencies have their own requirements, funding, and reporting chains.
- Within DOD, there is no common authority below the Secretary of Defense to integrate space acquisition programs and resources, or to adjudicate differences
  - There are separate requirements and funding chains within the Pentagon for the Air Force, NRO, DARPA, MDA [Missile Defense Agency], Navy and Army, commercial satellite communications, and commercial imagery.
- A structure for coordinating space operations between DOD and the intelligence community is emerging and is thought to be on target.<sup>48</sup>

The Independent Assessment Panel argued that the President should establish and execute a National Space Strategy and establish a National Security Space Authority who would be jointly responsible to the Secretary of Defense and to the DNI and charged with defining the space budget for DOD and the intelligence community and executing the program with milestone decision authority. There would also be an effort to improve the qualifications of Air Force and NRO acquisition professionals. Most controversially, the panel would create a National Security Space Organization, which would combine several Air Force space offices with the NRO under the National Security Space Authority. Arguably, this official might be perceived as a security space “czar” with a role subordinate to one Cabinet officer and the DNI.<sup>49</sup>

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<sup>48</sup> Institute for Defense Analyses, *Leadership, Management, and Organization for National Security Space: Report to Congress of the Independent Assessment Panel on the Organization and Management of National Security Space*, July 2008, pp. ES-4, 14. Senator Allard endorsed most of these recommendations in a floor speech in which he indicated the need for “a top-to-bottom overhaul to restore the vitality of our space programs.” *Congressional Record*, November 19, 2008, pp. S10636-10637. Similar conclusions were also reached by the Committee for U.S. Space Leadership, a group of industry leaders; see Turner Brinton, “Nonpartisan Group Urges Obama to Tackle Systemic Space Problems,” *Space News*, February 23, 2009, p. 6.

<sup>49</sup> See testimony of Secretary of Defense Gates, Hearing of the House Armed Services Committee, May 13, 2009, Federal New Service Transcript.

In 2008 the **House Permanent Select Committee on Intelligence (HPSCI)** undertook its own assessment of U.S. space capabilities. The resulting report reflected the conclusions of the committee's majority, that the United States is "losing its preeminence in space." The report focused on the need for an "integrated overhead roadmap" or "architecture." By "architecture," HPSCI meant

- a problem-driven approach that is based on securing prioritized, well-defined national security interests;
- a comprehensive solution that balances the financial investment against the overall risk to national security;
- a realistic delivery schedule that meets the defined timeline that in many cases must be flexible and updated against the risk; and
- a plan to migrate from a requirements-based acquisition approach towards a capabilities-based strategy, with the proviso that a purely capabilities-based approach could introduce additional challenges.<sup>50</sup>

Although the report acknowledged that executive branch officials believed they had provided a plan, committee members disagreed, maintaining that "there is no comprehensive space architecture or strategic plan that accommodates current and future national security priorities, DOD and intelligence community capability requirements."<sup>51</sup> The committee suggested that the practice has been for requirements to be added during the acquisition process resulting in added costs and delays and the need to resolve repeatedly the differing priorities of DOD and the intelligence community. When cutting-edge—and not yet available—technologies are chosen, the committee suggests that uncertainty and need for further testing complicate acquisition.

The report alluded to the interest of some to develop space systems solely for operational commanders in isolation from the NRO. Presumably reference was being made to the ORS; HPSCI suggested that "it is not in the best interest of the country to pursue separate national and military space architectures."<sup>52</sup> The House report recommended that R&D be treated as a national security priority and protected against diversion to immediate operational needs.<sup>53</sup>

The HPSCI report raised concerns about programs jointly funded in the National Intelligence Program (NIP) and the Military Intelligence Program (MIP). The NIP is designed to provide intelligence systems that can supply information primarily of interest to national-level policymakers; the MIP supports combatant commanders. Although there is pervasive overlap between the two sets of systems, there is also concern that, in some instances, funds from the NIP have in effect been used by DOD to fund what are essentially MIP projects.

The committee report also addressed use of commercial imagery and statutes and regulations governing space commerce. Members of the committee's minority criticized several aspects of

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<sup>50</sup> U.S. Congress, House Permanent Select Committee on Intelligence, *Report on Challenges and Recommendations for United States Overhead Architecture*, 110<sup>th</sup> Cong., 2<sup>nd</sup> sess., October 3, 2008, H.Rept. 110-914 (Washington: GPO, 2008), p. 8.

<sup>51</sup> *Ibid.*, p. 2.

<sup>52</sup> *Ibid.*, p 9.

<sup>53</sup> *Ibid.*, p 14.

the report and maintained that it failed to “address the importance of integrated ground systems for tasking, processing, exploitation and dissemination.”<sup>54</sup>

In November 2008 a **Joint Defense Science Board and Intelligence Science Board** task force on integrating sensor-collected intelligence produced a report looking at various flaws in current ISR efforts that extend beyond acquisition issues. It argued that ISR efforts can be better improved by integrating data from multiple sensors rather than by improving the design and performance of single sensors. In making this argument the task force pointed to structural issues that complicate such data integration. To accomplish this goal the task force recommended ensuring the inclusion of meta-data (or tags that describe specific data that can in turn be searchable whereas the data itself may not be) that can allow identification of information of specific interest. The task force’s emphasis on better ways to access and analyze data is influenced by the vast expansion in data available and in many cases never exploited. It tended to favor a larger number of less sophisticated systems and achieve increased performance by integrating data from multiple sensors and platforms.<sup>55</sup>

Significant problems derive from limitations on the dissemination of collected data. Currently, meta-data are not consistently applied and tags are not consistent from agency to agency. Military commanders demand much larger quantities and more sophisticated types of intelligence (especially tactical imagery), but in many cases are unaware of and incapable of accessing data available throughout the intelligence community. “The number of images and signal intercepts are well beyond the capacity of the existing analyst community so there are huge backlogs for translators and image interpreters and much of the collected data are never reviewed. Further, decision makers and intelligence analyst have difficulty knowing what information is available.”<sup>56</sup> Although an enormous number of full-motion video missions in support of tactical commanders have been conducted in Iraq and Afghanistan, the task force suggested that surveillance has often been episodic and continuing coverage of a given region had not always been possible.

The task force report emphasized that the ISR concept encompasses more than platforms for collection. It noted that DOD has developed the Global Information Grid, which includes a high-speed communications network of various ground, air, and space components. There is a need, according to the task force, for better ways for tactical commanders to access this information “on the move,” and thus it emphasized the advantages of assured and accessible communications as would be made available by the redundant and complementary communications capabilities—terrestrial fiber, government and civilian communications satellites, networks built and maintained by specific agencies. (The task force advocated the Transformational Satellite System (TSAT) to provide links to the fiber network to mobile and fixed theater commands. TSAT was subsequently killed by DOD because it was considered duplicative.) A key goal should be, according to the task force, to ensure that future communications systems adhere to interoperability standards to ensure that they can support joint and international operations as well as “reach back” to U.S. agencies for analytical support. The essential concern of the task force was to ensure that the ongoing proliferation of platforms and sensors be matched by sufficient

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<sup>54</sup> Ibid., p. 27.

<sup>55</sup> U.S. Department of Defense, Office of the Under Secretary of Defense for Acquisition, Technology, and Logistics, Report of the Joint Defense Science Board/Intelligence Science Board Task Force, *Integrating Sensor-Collected Intelligence*, November 2008, p. 63.

<sup>56</sup> Ibid., p. 65.

communications capabilities to enable their use. Currently, they found that “Our rapidly growing airborne ISR collection capabilities are not in balance with supporting communications.”<sup>57</sup>

Furthermore, the task force noted that even though the Office of the Under Secretary of Defense for Intelligence (USDI) is double-hatted as Director of Defense Intelligence under the DNI, his judgment on space programs is affected by decisions of the Under Secretary of Defense for Acquisition, Technology, and Logistics (AT&L), whose mandate encompasses all DOD programs and is not limited to intelligence programs.

The report reflected a concern that DOD requirements, including to some extent tactical ISR requirements, are being met at the cost of supporting national needs, echoing HPSCI’s concerns. The task force found that there is a perception that intelligence officials may not be empowered to balance national and tactical requirements. The report noted the decline in the number of trained and experienced government program managers who are able to conduct extensive acquisition initiatives over a multi-year period. The report criticized short tours of duty for acquisitions personnel that precluded the development of deep expertise in specific systems and over-reliance on advisory contractors. The lack of expertise was criticized as contributing to delays and costly changes in specifications. More broadly, the report noted declining numbers of students pursuing engineering degrees and a reluctance of some to seek careers in the satellite area, where work can be repetitive and sporadic. The tendency in recent years to focus on satellites that can fulfill current missions may discourage students who are most interested in “cutting-edge” R&D.

The **Government Accountability Office (GAO)** has assessed ongoing space systems acquisitions issues over a number of years. In a May 2009 report it recommended that a formal space plan based on a national security space strategy is essential for managing the acquisition and deployment of space systems. Without a strategy (and a plan to implement it) “the defense and intelligence communities may continue to make independent decisions and use resources that are not necessarily based on national priorities, which could lead to gaps in some areas of space operations and redundancies in others.”<sup>58</sup>

In March 2009 GAO testified to the Senate Armed Services Committee in regard to challenges facing DOD in space acquisitions. Echoing the views of other assessments, GAO found

- on a broad scale, DOD starts more weapon programs than it can afford, creating a competition for funding that encourages low cost estimating, optimistic scheduling, overpromising, suppressing bad news, and, for space programs, forsaking the opportunity to identify and assess potentially more executable alternatives;
- DOD has tended to start its space programs too early, that is, before it has the assurance that the capabilities it is pursuing can be achieved within available resources and time constraints—in part a result of the tendency to favor acquisition programs over efforts to ensure that new technologies are reliable;

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<sup>57</sup> Ibid, p. 26.

<sup>58</sup> U.S. Government Accountability Office, *Defense Space Activities: National Security Space Strategy Needed to Guide Future DOD Space Efforts*, GAO-08-431R, March 27, 2008. See also GAO, *Space Acquisitions: DOD Needs a Departmentwide Strategy for Pursuing Low-Cost, Responsive Tactical Space Capabilities*, GAO-06-449, March 2006.

- DOD has tended to prefer fewer but heavier, larger, and more complex satellites than larger constellations of smaller satellites;
- several more recent space programs began in the late 1990s, when contracts were restructured in ways that reduced government oversight and shifted decision-making responsibilities to contractors, a situation that magnified problems relating to requirements creep and poor contractor performance.<sup>59</sup>

GAO generally recommended a number of best practices of the commercial sector to separate technology discovery from acquisition, follow incremental paths to meet user needs, match resources and requirements at program's start, and use quantifiable data and demonstrable knowledge to decide when to move to a new program phase. GAO acknowledged that DOD was attempting to implement some of these practices and noted legislative initiatives that were later enacted.<sup>60</sup> GAO also went further to underscore the difficulties resulting from the fact that requirements, resource allocation, and acquisition processes are led by different organizations and the need to strengthen coordination of military and intelligence space efforts. As noted above, GAO has been skeptical of the Operationally Responsive Space effort due to its separation from other intelligence space programs even though it envisions smaller satellites built with available, proven technologies.

In January 2010 GAO forwarded another report to the Subcommittee on Air and Land forces of the House Committee on Armed Services that expressed concern about the ability of the services to share information within combat theaters.<sup>61</sup> GAO recommended that DOD establish a concept of operations to provide direction and priorities for sharing intelligence information across the defense intelligence community. GAO also urged the services to develop their own implementation plans and set timelines for sharing data with the rest of DOD.

## **The Obama Administration's Approach**

Although outlines of the Obama Administration's overall approach to longer-term ISR acquisition issues have not been publicly detailed, the Administration has taken an initial approach based on acquiring additional reconnaissance platforms that are based on currently available technologies. In April 2008, Defense Secretary Gates, having been frustrated by reports from the field regarding inadequate numbers of UAVs, established an ISR Task Force that eventually made a number of recommendations to maximize the availability of systems in the inventory and to acquire adequate numbers of additional systems.<sup>62</sup>

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<sup>59</sup> U.S. Government Accountability Office, *Space Acquisitions: DOD Faces Substantial Challenges in Developing New Space Systems*, GAO-09-705T, May 20, 2009, pp. 8-9. The last point has also been made by Scott F. Large, the Director of the NRO, "National Security Space Collaboration as a National Defense Imperative," *High Frontier*, August 2008, p. 4.

<sup>60</sup> These initiatives included P.L. 111-23, the Weapons Systems Acquisition Reform Act of 2009.

<sup>61</sup> U.S. Government Accountability Office, *Intelligence, Surveillance, and Reconnaissance: Establishing Guidance, Timelines, and Accountability for Integrating Intelligence Data Would Improve Information Sharing*, GAO-10-265NI, January 2010. In May 2010 the House Armed Services Committee endorsed GAO's recommendations and asked for a report from DOD indicating implementation plans. U.S. Congress, 111<sup>th</sup> Congress, 2d session, House of Representatives, Committee on Armed Services, *National Defense Authorization Act for Fiscal Year 2011*, H.Rept. 111-491, May 21, 2010, p. 339-340.

<sup>62</sup> The ISR Task Force was not designed to be permanent but a congressional requirement was established (in S.Rept. (continued...))

Based on these findings, in April 2009, Secretary Gates forwarded the Administration's plans for ISR programs in the FY2010 budget based on his determination to "to rebalance this department's programs in order to institutionalize and enhance our capabilities to fight the wars we are in and the scenarios we are most likely to face in the years ahead, while at the same time providing a hedge against other risks and contingencies."<sup>63</sup>

"First, we will increase intelligence, surveillance and reconnaissance (ISR) support for the warfighter in the base budget by some \$2 billion. This will include

- Fielding and sustaining 65 continuous RPA orbits with the ability to increase them to 85 and maximizing their production.<sup>64</sup> This capability, which has been in such high demand in both Iraq and Afghanistan, will not be permanently funded in the base budget. It will represent a 62% increase in capability over the current level and 127% from over a year ago.
- Increasing manned ISR capabilities such as the turbo-prop aircraft deployed so successfully as part of 'Task Force Odin' in Iraq.
- Maintaining the Air Force's MC-12 Project Liberty aircraft.
- Initiating research and development on a number of ISR enhancements and experimental platforms optimized for today's battlefield."<sup>65</sup>

The Administration proposal apparently does not include efforts to acquire "exquisite" satellite technologies that are at best still in the research and development stage. Congress essentially endorsed this approach in FY2010 defense appropriations and authorization legislation (P.L. 111-118 and P.L. 111-84).

Media reports indicate that the Obama Administration ordered a thorough review of existing national space policy, including national intelligence assets, originally intended for completion by October 2009, but which has not been made public.<sup>66</sup>

In May 2009 Defense Secretary Gates indicated that he and the DNI had agreed that a new charter for the National Reconnaissance Office (NRO) is needed given that the original one is decades old. A committee headed by retired Air Force General Trey Obering was asked to look at the NRO's roles and missions, and reportedly recommended that the NRO structure should not be altered. In March 2010 the DNI and the Secretary of Defense endorsed a set of organizing principles for the NRO that is intended to serve as a foundation for a revised NRO charter.<sup>67</sup>

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(...continued)

111-20) for DOD to report on the strategy chosen to transition its responsibilities by October 1, 2009. This deadline was apparently not met. (See explanatory statement accompanying the Defense Appropriations Act, *Congressional Record*, December 16, 2009, p. H15043.)

<sup>63</sup> Robert M. Gates, Defense Budget Recommendation Statement (Arlington, VA), April 6, 2009

<sup>64</sup> Speech by Michael Donley, Secretary of the Air Force, "Air Force Reserve: Integral to the Total Force," remarks at 2012 Air Force Reserve Senior Leader Conference, March 26-27, also available at <http://www.af.mil/information/speeches/speech.asp?id=702>, March 26, 2012.

<sup>65</sup> Ibid. For background to Gates decision making, see Greg Jaffe, "A Single-Minded focus on Dual Wars," *Washington Post*, May 15, 2009.

<sup>66</sup> Amy Klamper, "President Orders Sweeping U.S. Space Policy Review," *Space News*, July 6, 2009, p. 6.

<sup>67</sup> Statement for the Record, Betty Sapp, Principal Deputy Director, National Reconnaissance Office, before the House (continued...)

On September 21, 2010, the Director of National Intelligence Jim Clapper and Secretary of Defense Bill Gates officially signed the newest NRO charter, also referred to as a memorandum of agreement. The first signed since 1965, this agreement formalizes the role of the NRO Director as responsible for managing and operating NRO programs, serving as the principal advisor on overhead systems to the Secretary of Defense and the DNI. The new charter also grants direct access to the NRO Director to both the Defense Secretary and the DNI.<sup>68</sup>

Information on the ISR component of the Administration's FY2011 budget request is mostly classified, but DOD did state that an additional \$2.6 billion was added for contingency operations in Afghanistan and Iraq at the recommendation of DOD's ISR Task Force, including nearly doubling procurement of the MQ-9 Reapers.<sup>69</sup> ISR funding requested for ongoing combat operations rose from \$5.9 billion in FY2010 to \$7.0 in FY2011.

## Congressional Initiatives

Congressional oversight of the acquisition of surveillance systems has its own challenges. ISR systems are overseen by the armed services, intelligence, and appropriations committees. Most aspects of the ISR program are necessarily secret. Historically, the "national" systems were overseen by the intelligence committees, whereas the tactical systems were usually overseen by the armed services committees (although the House Intelligence Committee had jurisdiction over both tactical and national systems). Public statements by some Members indicate, however, that important differences among committees exist in regard to current plans for satellite programs, and there have been considerable differences in regard to UAS programs, as well. There is widespread frustration about cost growth of ISR systems, unnecessary duplication of effort, and the possibility of inadequate collection.

A significant factor has been the absence of intelligence authorization legislation for over five years. This suggests that the congressional role has been primarily exercised by the appropriations and armed services committees. Some observers believe that these committees may tend to focus on ISR systems as components of larger defense programs whereas the intelligence committees might have focused more on support to national policymakers.

In addition to authorizing and appropriating funds for specific ISR systems, Congress has repeatedly emphasized the need for a more comprehensive approach to ISR as a whole. The October 2008 report by the House Permanent Select Committee on Intelligence noted that "members of Congress have repeatedly expressed their disappointment that no architectural plan exists, and have repeatedly asked the Administration for the plan. The lack of an integrated architecture was one of the first issues to face the DNI after the office was established in 2005. The frustration has continued to this day, and many believe that the nation is no closer to having a clearly defined plan than it was three years ago."<sup>70</sup> The HPSCI majority recommended that the

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(...continued)

Armed Services Committee, Subcommittee on Strategic Services, April 21, 2010.

<sup>68</sup> See Dr. Bruce Berkowitz, "The National Reconnaissance Office at 50 Years: A Brief History," Center for the Study of National Reconnaissance, also available at [http://www.nro.gov/history/csnr/programs/NRO\\_Brief\\_History.pdf](http://www.nro.gov/history/csnr/programs/NRO_Brief_History.pdf), September 2011.

<sup>69</sup> Department of Defense, Overview—FY 2011 Defense Budget, March 2010, pp. 4-2.

<sup>70</sup> *Challenges and Recommendations for United States Overhead Architecture*, H.Rept. 110-914, p. 8.

DNI and the Secretary of Defense “should develop a common architecture for all space-related systems (imagery, signals, communications, etc.) that supports prioritized national and military needs and takes into consideration budgetary constraints. Organizations proposing new satellites should demonstrate how their proposals fit into the architecture.” The committee further recommended that the Office of Management and Budget “carefully consider what space programs it recommends for funding until both the DNI and [the Secretary of Defense] agree on an architecture.”<sup>71</sup> Some observers suggest the goal of a “dynamic architecture” that will permit judicious investment in existing technologies to acquire adequate numbers of systems for current needs while intentionally providing windows of opportunity for the introduction of new technologies and adaptations to new military or diplomatic requirements.

The Duncan Hunter Defense Authorization Act for FY2009 (P.L. 110-417), enacted on October 14, 2008, directed that the Secretary of Defense and the DNI jointly conduct a comprehensive review of U.S. space policy, including space-based intelligence and surveillance and reconnaissance from space. The review was to describe current and planned space acquisition programs.

This policy review by DOD was to have been undertaken in conjunction with the national-level review of space policy. When the overall space policy review is complete DOD’s Space Posture Review will be issued. At one point there were plans to issue an interim report that would detail current posture and programs.<sup>72</sup>

The FY2009 Defense Authorization Act, Section 144, also required

the Secretary of Defense in consultation with the Chairman of the Joint Chiefs of Staff establish a policy and an acquisition strategy for intelligence, surveillance, and reconnaissance payloads and ground stations for manned and unmanned aerial vehicle systems. The policy and acquisition strategy shall be applicable throughout the Department of Defense and shall achieve integrated research, development, test, and evaluation, and procurement commonality.

## **The 111<sup>th</sup> Congress**

In the explanatory statement accompanying the FY2010 Defense Appropriations Act (P.L. 111-118), DOD was directed to provide a classified report that describes the deployment of additional ISR capabilities, particularly tactical signals intelligence and full motion video, to support combat operations in Afghanistan “[and] address the adequacy of these capabilities to support troop commitments to Afghanistan as well as the plans to correct any shortfalls.”<sup>73</sup>

In 2009 the House Appropriations Committee (whose annual bill includes the great bulk of intelligence funding) directed that DOD and the DNI prepare a long-range plan for space system investment, including research, development, test and evaluation as well as procurement, including schedule and funding profiles, for all national security space systems for the next 30

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<sup>71</sup> Ibid., p. 9.

<sup>72</sup> U.S. Department of Defense, DOD News Briefing with Undersecretary Flournoy and Vice Adm. Stanley, February 1, 2010.

<sup>73</sup> *Congressional Record*, December 16, 2009, p. H15043.



years. The report is to include estimated levels of annual funding to carry out the programs.<sup>74</sup> The bill, H.R. 3326, was eventually enacted as P.L. 111-118; it mandated that DOD deliver a 15-Year Space System Investment Strategy by May 2010.

There are indications that ORS funding issues have led to broader questions about efforts to use space platforms to support national security goals. In its October 2008 report on the need for a space architecture, the House Intelligence Committee recommended that DOD and the DNI “develop a common architecture for all space-related systems” and urged that “[o]rganizations proposing new satellites should demonstrate how their proposals fit into the architecture.”<sup>75</sup> In May 2009 the Senate Appropriations Committee reported the defense appropriations act for FY2010 with an expression of concern that

the committee is concerned about the tendency of temporary, single-issue acquisition initiatives to grow into persistent, stovepiped bureaucracies with increasingly ambiguous mandates. This tendency is often the result of deficiencies in the acquisitions process, in which urgent joint requirements are too often not effectively addressed.<sup>76</sup>

Section 911 of the FY2011 Defense Authorization bill, P.L. 111-383, signed by the President on January 7, 2011, requires that the Secretary of Defense and the DNI “shall develop an integrated process for national security space architecture planning, development, coordination, and analysis.” The effort is to include both defense and intelligence efforts, to provide mid-term to long-term recommendations to guide acquisitions, and is independent of but coordinated with efforts by the military departments and intelligence agencies. The accompanying report to an earlier version of the legislation (H.R. 5136) by the House Armed Services Committee indicates a determination to provide a clear mandate to conduct integrated space architecture planning in order to avoid isolated, stove-piped, efforts by the services and intelligence agencies. The committee added, nevertheless, that, “This section would not be intended to limit rapid acquisition efforts such as Operationally Responsive Space (ORS); however, the committee does endorse efforts that expand user access to ORS capabilities and data.”<sup>77</sup>

The various reviews requested are likely to be forward in classified channels and it is not known if summaries will be publicly available. Nor is it known how consistent the studies will be with budgetary requests, but they will clearly provide benchmarks for Congress as consideration of annual legislation proceeds.

## **The 112<sup>th</sup> Congress**

Congress continues to indicate concern about ISR issues, especially those relating to expensive space systems. The House version of the FY2012 defense appropriations bill, H.R. 2219, included

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<sup>74</sup> U.S. Congress, 111<sup>th</sup> Congress, 1<sup>st</sup> session, House Committee on Appropriations, *Department of Defense Appropriations Bill, 2010*, to accompany H.R. 3326, July 24, 2009, H.Rept. 111-230, pp. 278-279.

<sup>75</sup> *Ibid.*, p. 3.

<sup>76</sup> U.S. Congress, 111<sup>th</sup> Congress, 1<sup>st</sup> session, Senate Committee on Appropriations, *Making Supplemental Appropriations for the Fiscal Year Ending September 30, 2009, and for Other Purposes*, Report to accompany S. 1054, S. Rept. 111-20, May 14, 2009, p. 15.

<sup>77</sup> U.S. Congress, 111<sup>th</sup> Congress, 2<sup>d</sup> session, House of Representatives, Committee on Armed Services, *National Defense Authorization Act for Fiscal Year 2011*, H.Rept. 111-491, May 21, 2010, p. 342-343.

a provision (§8089) that would mandate the establishment of a major program category for space in future defense programs. The accompanying report noted:

Over the past decade, various attempts for alternative systems have been suggested and in some cases funded. Several of those attempts included the parallel development of alternative systems or technologies. These systems were advertised as being less expensive, more capable, and less risky. In each case, these alternative systems were terminated due to cost or complexity.<sup>78</sup>

Although the requirement for making space a major program category was not included in the enacted version, H.R. 2055, the conference report, H.Rept. 112-331, indicated congressional approval of block buys of satellites that evolved from previous designs (as opposed to reliance on wholly new technologies). The conferees also noted disappointment that it took DOD over two years to develop a 15-year space strategic plan. The report directed that the next 15-year plan be delivered with the FY2014 budget submission.<sup>79</sup>

Concern about the possibility of a sequestration of defense spending arose at the end of 2011 with the inability of the Joint Select Committee on Deficit Reduction to reach an agreement. In November 2011 Secretary of Defense Leon Panetta indicated in a letter to Senators John McCain and Lindsey Graham the longer-term effects of sequestration could include the delay or termination of major space initiatives, including space protection, communications satellites, and ISR systems.<sup>80</sup>

## Conclusion

Many consider the desirability of a long-range plan or architecture for the deployment of surveillance assets is a given, but suspect it is almost unobtainable. Future intelligence requirements may change from those recently indicated by Secretary Gates. The policies and military capabilities of sophisticated nation states may again become the highest collection priorities of the intelligence community, rather than terrorist groups that are currently the chief concern. Similarly, there are no indications that technological capabilities of ISR systems have reached a stable plateau, and basing future plans on current technologies may prove to be shortsighted. There are inherent challenges involved in establishing plans for acquisitions over a multi-year span, even if they are arguably outweighed by the limitations of annual planning cycles.

Ultimately, most recognize that there are limitations on what Congress can do to shape the international environment or the emergence of new technologies. Congress can, however, alter the roles and missions of the organizations involved in ISR programs acquisition, as well as authorize and appropriate funds for ISR systems acquisition. Some observers have suggested a number of steps internal to Congress that might improve the acquisition process for ISR systems. The 9/11 Commission, for instance, recommended that the intelligence committees be provided

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<sup>78</sup> U.S. Congress, 112<sup>th</sup> Congress, 1<sup>st</sup> session, House of Representatives, *Department of Defense Appropriations Bill, 2012*, H.Rept. 112-110, June 16, 2011, p. 185.

<sup>79</sup> U.S. Congress, 112<sup>th</sup> Congress, 1<sup>st</sup> session, Committee of Conference, *Military Construction and Veterans Affairs and Related Agencies Appropriations Act, 2012*, H.Rept. 112-331, December 15, 2011, p. 657.

<sup>80</sup> <http://defensenews.com/projects/pdfs/mccain-graham-letter.pdf>.

with responsibilities for both authorization and appropriations.<sup>81</sup> Others have recommended a separate annual intelligence appropriations act and subcommittees for intelligence within the two appropriations committees. Such initiatives would allow greater concentration on intelligence programs as separate and distinct from defense programs. On the other hand, such separation could complicate the close linkages and desirable duplication between some intelligence and defense programs. Congress could also set up special panels to look at ISR programs with representatives from current intelligence, armed services, homeland security, and appropriations committees.

Nevertheless, many of the complications involving ISR systems derive from the organization of the executive branch and current policies. The ability of the ODNI and DOD (including both the USD(I) or the USD (AT&L)) to establish an agreed-upon acquisition plan is inevitably a key factor. The role of the staffs of the National Security Council and the Office of Management and Budget in overseeing and monitoring acquisition plans and their implementation is also important.

Some observers conclude that, ultimately, there must be some form of an overhead surveillance architecture, even if it cannot be set “in concrete” for a multi-year period. In this view, it must include not only the collection platforms, but also associated communications, and data processing and analysis systems. In ongoing legislative dialogue, the executive and legislative branches will be challenged to design and fund systems that maximize adaptability to new missions while accepting reasonable cost constraints. Such a goal will require not only careful interagency and inter-branch coordination, but also a willingness by all involved to accept decisions that do not fully meet the goals of each and every agency. Observers suggest a key role for congressional committees in minimizing the role of initiatives launched by “special interests” that ultimately could add significant unnecessary costs, and do not deliver maximum collection contributions. The unique perspectives of the armed services, intelligence, and appropriations committees, if considered together, arguably could provide the comprehensive oversight that has occasionally eluded the executive branch.

ISR has revolutionized military operations in the past half-century; it is today an essential component of national security planning and operations. At the same time, experience shows that not all the billions of dollars that have been invested have resulted in useful systems. Acquiring and using ISR systems is likely to remain a substantial challenge for the U.S. government in coming decades and one that will depend on effective cooperation among the intelligence community, the Defense Department, and Congress.

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<sup>81</sup> National Commission on Terrorist Attacks Upon the United States, Final Report, Washington: GPO, 2004, p. 420.