



THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

September 6, 2016

The Honorable John Thune
Chairman, Committee on Commerce,
Science, and Transportation
United States Senate
Washington, DC 20510

Dear Mr. Chairman:

I am pleased to submit the enclosed report on the feasibility of processing Space Situational Awareness (SSA) data and information, as required by Section 110 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90).

The Federal Aviation Administration consulted with the U.S. Department of Defense and other Federal agencies on the enclosed report. The study found that the demand for SSA data has greatly expanded, and it would be feasible for a civil agency to process and release such data.

I have sent a similar letter to the Ranking Member of the Senate Committee on Commerce, Science, and Transportation and to the Chairman and Ranking Member of the House Committee on Science, Space, and Technology. If I can provide further information or assistance, please feel free to call me.

Sincerely,

A handwritten signature in blue ink, appearing to read "Anthony R. Foxx", is positioned above the printed name. The signature is fluid and cursive, with a large loop at the beginning.

Anthony R. Foxx

Enclosure



THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

September 6, 2016

The Honorable Bill Nelson
Ranking Member, Committee on Commerce,
Science and Transportation
United States Senate
Washington, DC 20510

Dear Senator Nelson:

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WASHINGTON, DC 20590

September 6, 2016

The Honorable Lamar Smith
Chairman, Committee on Science,
Space, and Technology
U.S. House of Representatives
Washington, DC 20515

Dear Mr. Chairman:

I am pleased to submit the enclosed report on the feasibility of processing Space Situational Awareness (SSA) data and information, as required by Section 110 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90).

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THE SECRETARY OF TRANSPORTATION
WASHINGTON, DC 20590

September 6, 2016

The Honorable Eddie Bernice Johnson
Ranking Member, Committee on Science,
Space, and Technology
U.S. House of Representatives
Washington, DC 20515

Dear Congresswoman Johnson:

I am pleased to submit the enclosed report on the feasibility of processing Space Situational Awareness (SSA) data and information, as required by Section 110 of the U.S. Commercial Space Launch Competitiveness Act (Public Law 114-90).

The Federal Aviation Administration consulted with the U.S. Department of Defense and other Federal agencies on the enclosed report. The study found that the demand for SSA data has greatly expanded, and it would be feasible for a civil agency to process and release such data.

I have sent a similar letter to the Chairman of the House Committee on Science, Space, and Technology and to the Chairman and Ranking Member of the Senate Committee on Commerce, Science, and Transportation. If I can provide further information or assistance, please feel free to call me.

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Anthony R. Foxx

Enclosure

**REPORT ON PROCESSING AND RELEASING SAFETY-RELATED
SPACE SITUATIONAL AWARENESS DATA**

In reply to

Public Law No. 114-90, "U.S. Commercial Space Launch Competitiveness Act."

Title I, "Spurring Private Aerospace Competitiveness and Entrepreneurship."

Section 110, "Space Surveillance and Situational Awareness Data."

April 2016

***Lead Agency:
Department of Transportation***

***In Concurrence with:
Department of Defense***

***In Consultation with:
National Aeronautics and Space Administration
Department of Commerce
Department of State
Federal Communications Commission
Director of National Intelligence***

Report Requirement

Congress passed, and on November 25, 2015, the President signed into law the U.S. Commercial Space Launch Competitiveness Act (CSLCA). The Act requires the Secretary of Transportation to report on relevant commercial space matters. This report completes the requirement from Section 110, Space Surveillance and Situational Awareness Data, which requires:

Not later than 120 days after the date of enactment of this Act, the Secretary of Transportation, in concurrence with the Secretary of Defense shall—

- (1) in consultation with the heads of other relevant Federal agencies, study the feasibility of processing and releasing **safety-related space situational awareness data and information** to any entity consistent with national security interests and public safety obligations of the United States; and
- (2) submit a report on the feasibility study to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives {emphasis added}.

Safety-related Space Situational Awareness Data and Information

To operate safely in space, operators must know where their systems are located and when their system will approach any of the approximately 18,000¹ other tracked and cataloged objects also on orbit. Safety-related space situational awareness data and information of these tracked objects provides space operators the location and accuracy information necessary to plan operations and mitigate collisions.

The U.S. Department of Defense (DoD) has consistently been at the forefront of tracking orbital objects for national security and providing safety-of-flight space situational awareness (SSA) data to civil, commercial and foreign operators since 2003. In general, DoD can detect and track objects about 10 cm and larger in low Earth orbit (LEO, the region below 2000 km altitude) and objects about 1 m and larger in the geosynchronous orbit (GEO, the region near 35,786 km altitude). There are many more untrackable debris objects in orbit than the 18,000 cataloged pieces. The DoD's Space Fence currently under construction will allow smaller objects to be detected and tracked but there will still be a size threshold for detectability/trackability. Due to the high velocity of objects in LEO, collision between two orbiting objects could occur at about 10 km/sec – more than 10 times the speed of a bullet. This is an average LEO collision velocity. A head-on collision can occur at 14-15 km/sec. At these speeds even sub-millimeter orbital debris could cause problems for almost all space missions.

¹ As of Jan 2016 Joint Space Operations Center (JSpOC) numbers. The Space Fence, an S-Band radar under development for the DoD, will likely increase the number of tracked objects tenfold. Additionally, the JSpOC maintains a database of approximately 23,000 objects, of which many are not tracked frequently enough to reliably catalog.

Gathering space surveillance data has been accomplished not just by military, but also by civil, academic, and commercial sources. Currently, the National Aeronautics and Space Administration (NASA) and the Massachusetts Institute of Technology's Lincoln Laboratory (MIT/LL) are civil and academic entities conducting SSA-related activities. NASA's orbital debris program offices develop orbital debris modeling, micro-debris measurements, and shielding and vulnerability research. The MIT Lincoln-Laboratory Space Surveillance Complex (LSSC) has been contributing surveillance data to the space surveillance network since 1974. Space surveillance information on tracked objects maintained by DoD in the space catalog of objects and modeling is used to predict trajectories. This data can be considered the core of space track data.

The lack of information on objects large enough to cause damage to space systems, yet too small to reliably track, creates a persistent challenge for space operations. NASA's Orbital Debris Program Office (ODPO) uses ground-based radars and telescopes to statistically sample the orbital debris objects below the tracking threshold of the DoD sensors, for objects as small as several millimeters in LEO and as small as 13 cm in GEO. NASA also collects inspection data on returned space hardware and conducts hypervelocity impact shielding research to assess spacecraft vulnerability from sub-millimeter-sized orbital debris to understand space protection needs, including protecting the International Space Station (ISS). This data is used by NASA to model the distribution of untrackable objects in earth orbit. Using these models, NASA and others, such as federally funded research and development centers, can make probabilistic estimates of the risk of collision with untrackable debris.

Space situational awareness data supports a variety of space and other operations, including satellite overflight warning, launch maneuver and communications window planning, reentry planning, and collision avoidance in outer space. Although the risk of colliding with tracked space debris is still relatively low, space systems do require collision avoidance analysis. For example, the highest density of tracked objects in LEO is approximately 10^{-8} objects per km^3 . The cumulative probability of a collision with a tracked object for a LEO satellite over a 5 year life, based on NASA debris population models, is on the order of 0.01. Nevertheless, the population of debris and active satellites is increasing. Yet, of the 18,000 trackable objects on orbit, only roughly 7 percent of cataloged objects on orbit are functioning payloads.² The remainder of these objects are considered orbital debris. In simple terms, for every operational system on orbit, there are on average 14 debris objects cataloged that are large enough to reliably track and orders of magnitude more objects that are not tracked. As tracking abilities increase, the true scope of orbital congestion will become more apparent.

Current SSA Data Collection

The DoD uses compiled data from dedicated military sensors, collateral missile warning sensors, and contributing non-military sensors (a space surveillance network) to develop space

² As of May 2015 JSpOC numbers.

situational awareness (SSA) information. Space operators also provide trajectory data on planned maneuvers and launches to DoD’s Joint Space Operations Center (JSpOC), a U.S. Strategic Command (USSTRATCOM) unit, to ensure expected orbital changes are considered when evaluating collision risks with tracked objects.

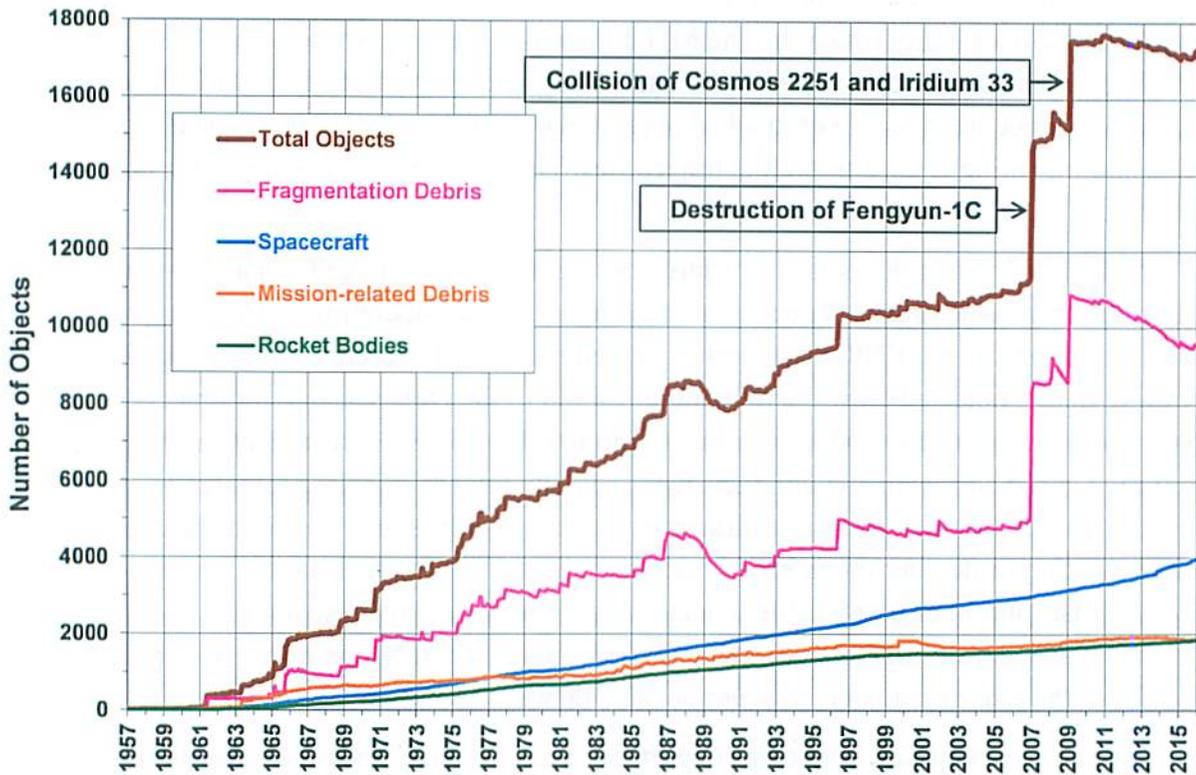


Figure 1. Growth of the Cataloged Populations

The JSpOC detects, tracks, and identifies trackable³ artificial satellites and debris from artificial satellites orbiting the Earth and maintains the orbits of objects with known origins in the U.S. Satellite Catalog (Figure 1). Using radars and telescopes, the Space Surveillance Network collects observational data which is sent to the JSpOC. This data may contain the time, elevation, azimuth, range, brightness, and the rate of change in range of the tracked object. Radar systems also record radar return strength (radar cross section) and optical systems record brightness (visual magnitude). This basic observational information is used to develop an orbital element set that describes the orbital trajectory of space objects. The compilation of orbital element sets make up the satellite catalog. When observations of orbital objects can be correlated with objects already recorded in the satellite catalog, the catalog is updated with the new or corrected orbital element data. When observations cannot be correlated to existing objects, a new object is added to the catalog. Table 1 contains a logical progression of SSA data and information.

³ Trackable objects vary in size depending upon the object’s altitude. Traditionally, 10 cm is the lower threshold of trackable objects in low Earth orbit.

Level	Description
1 – Observation	Location of a space object at a point in time relative to a sensor
2 – Element Set	Set of variables (function) describing an object's orbital trajectory
3 – Covariance	A mathematical assessment of the positional error of orbiting objects
4 – Analysis Product	Information that is the result of an analysis based on element sets and covariance (such as de-orbit prediction time, or collision avoidance warning)

Table 1. SSA Data and Information

In addition to compiled element sets, variation or error in positional data is required to determine the probability of collisions in orbit. The analysis products used for orbital safety range from the simple positional information in an element set to detailed services including conjunction assessments, collision avoidance support, and emergency close approach notification. Safety-related SSA data and information include element sets, positional variation or covariance, and analytical products. Re-entry predictions are also provided to national and international partners to advise when an object decays (naturally) or is de-orbited (intentionally) back into Earth’s atmosphere. These reports include the predicted re-entry time/location and details of the object to support analysis of whether or not parts of the object may survive re-entry and require follow-up actions such as emergency response or payload recovery.

Overview of past and current release activity

By the late 1950s, the U.S. government had started to systematically assemble SSA information, including element sets, Satellite Catalog (SATCAT), and satellite decay dates gathered by DoD. Using the authority of the Space Act of 1958, NASA began providing that information to commercial and foreign entities via the U.S. mail.⁴ This arrangement continued until the early 1990’s when NASA’s Goddard Space Flight Center (GSFC) developed the Orbital Information Group (OIG) website as a modern means for mission partners to download SSA data and products.

By 1995, the total number of tracked objects on orbit was estimated at slightly more than 9,000 objects, with only 450 of those objects being operational satellites. A DoD Space Surveillance Task Force review during the late 1990s identified three issues⁵ regarding the provision of space surveillance support to commercial and foreign entities (CFE). Specifically:

⁴ “Commercial and Foreign Entities (CFE) Pilot Program Status Update and Way Ahead,” Lt Col Charles Spillar, USAF HQ AFSPC/A3CN, and Maj Mike Pirtle, USAF, HQ AFSPC/A3CN.

⁵ October 31, 2000 Memo, Memo from ASD(C3I) (Arthur Money) to Secretaries of the Military Departments, OSD/GC, NASA Administrator, USCINCSpace, D/NRO, DJS; SUBJECT: Option Analysis for Space Surveillance Support to Commercial and Foreign Entities (CFE) (U).

- The DoD needed to accurately assess and determine the current and future CFE demand for space surveillance data and the impact on DoD [then U.S. Space Command] operations (resources, manpower, etc.)
- The legal authority for providing space surveillance support to the CFE by DoD needed to be thoroughly researched and clearly established.
- The security implications of providing space surveillance data to CFE customers needed to be fully understood.

As a direct result of the Task Force's analysis, Congress authorized support to CFE customers through section 913 of the National Defense Authorization Act for Fiscal Year 2003 (Public Law 108-136),⁶ which authorized the Secretary of Defense to "carry out a pilot program to determine the feasibility and desirability of providing to non-U.S. Government entities space surveillance data support." DoD, through the U.S. Air Force, implemented the pilot program by establishing the CFE program, under which DoD provided continuous SSA support through a web-based service at www.space-track.org. The pilot program was originally set to last for only 3 years, but authority for it was twice extended by statute (Public Law 109-364, section 912; Public Law 110-417, section 911). Subsequent statutory changes removed the characterization of the program as a "pilot program" and continued the authorization indefinitely for the Secretary of Defense to provide SSA information to commercial and foreign government entities pursuant to SSA agreements. In 2009, the mission to support commercial and foreign entities was transferred from the U.S. Air Force to USSTRATCOM which continues to provide space surveillance information to registered users via the Space-Track.org website. Space-Track.org is routinely updated with U.S. SSA information on over eighteen thousand objects orbiting the Earth.

USSTRATCOM has focused on providing specific information to partners and the public. Recognizing the need to adapt to the dynamic space environment, in the summer of 2014, USSTRATCOM adopted a new SSA Sharing Strategy. The tenets of this strategy include better protecting space surveillance sources, methods, priorities and capabilities/limitations; extending distribution of spaceflight safety information; improving sharing relationships; and enhancing combined space operations. Under this strategy, USSTRATCOM and its Joint Functional Component Command for Space (JFCC-Space) aim to promote an interactive, exchange-based relationship with satellite owners and operators where all parties gain. The strategy calls for an expansion in some information provided to the public while enhancing the protection of sensitive data as well as expanded information exchanges with satellite operators regarding spacecraft position and radio frequency interference events. This current SSA sharing strategy also supports U.S. and allied efforts to detect, identify, and attribute actions in space that are contrary to the responsible use and long-term sustainability of the space environment.

The new SSA Sharing Strategy established three categories of users for SSA information, placing increased focus on the needs of partners, as follows:

⁶ 10 U.S.C § 2274

- **Public** – Today, Space-Track.org serves as the main source of satellite positional and spaceflight safety information for academic, research and development, and amateur observers. This service is a key element of the U.S. Government's commitment to providing SSA information for spaceflight safety and provides transparency and support to fundamental research.

- **SSA Sharing Agreement Holders** – Commercial, government, and intergovernmental owners/operators who have a signed SSA Sharing Agreement with USSTRATCOM receive the advanced spaceflight safety services currently afforded by the agreement, and also have access to higher quality, more timely information on more objects.

- **U.S. National Security Partners** – Allied and partner nations, and organizations that directly contribute to coalition/combined space operations, have access to specialized satellite data, thereby enhancing the accomplishment of military missions.

Most close approach notifications and associated analysis are provided directly by the JSpOC to the spacecraft owner-operator. In the case of China and Russia, close approach notifications are sent by JSpOC to points of contact designated as a result of diplomatic exchanges.

As of January 2016, USSTRATCOM has negotiated and signed SSA information sharing agreements and arrangements with 10 countries (Australia, Japan, Italy, Canada, France, South Korea, United Kingdom, Germany, Israel and Spain) and two Intergovernmental Organizations (the European Organization for the Exploitation of Meteorological Satellites (EUMETSAT) and the European Space Agency (ESA)), and has negotiated 51 commercial agreements with companies from 14 Nations.

All SSA sharing under the auspices of the SSA Agreements is unclassified. Depending upon the national security need, U.S. national security partners may augment SSA Agreements with classified agreements to enhance military missions.

NASA continues to estimate the distribution of debris objects below the tracking threshold of the Space Surveillance Network and shares the information via the Orbital Debris Engineering Model (ORDEM) with the user community. There are no plans to change NASA's role in developing the ORDEM model, and its responsibilities for small object detection and modeling are not included in the discussion on the feasibility of civil agency release of SSA information, as these responsibilities are already addressed by a civil agency.

Feasibility of civil space agency release of safety-related SSA data and information

It is feasible for a civil agency⁷, specifically the Department of Transportation (DOT) acting through the Federal Aviation Administration (FAA) Office of Commercial Space Transportation, to release safety-related SSA data and information on tracked objects with due consideration for the issues outlined in this section. It is important to define the conditions under which such an activity could occur. Both the National Space Policy of the United States (2010) and the National Security Space Strategy (2011) articulate and provide principles for a whole-of-government approach outlining the framework and feasibility of processing and releasing safety-related SSA data and information: (1) “The Secretary of Defense and the Director of National Intelligence, in consultation with other appropriate heads of departments and agencies, shall: ... Maintain and integrate space surveillance, intelligence, and other information to develop accurate and timely SSA. SSA information shall be used to support national and homeland security, civil space agencies, particularly human space flight activities, and commercial and foreign space operations.” And (2), “Departments and Agencies shall make their capabilities and expertise available to each other to strengthen our ability to achieve national goals, identify desired outcomes, leverage U.S. capabilities, and develop implementation and response strategies. Through the partnerships described in these national policies, a civil agency could provide effective orbital safety support to space operators; DoD would continue to focus on national security challenges.

Currently the U.S. government, through DoD, provides orbital safety services to a wide range of commercial, civil, and foreign operators. However, supporting commercial, civil, and foreign operators is not necessarily an inherently military mission. The use of both classified and unclassified data is necessary to best understand the space environment. Notionally, a civil agency could utilize both government and commercially-provided information to support the safe operation of space operators while retaining the security of national security space activities through interagency partnerships. The civil agency could partner with DoD to both receive SSA information and validate data gathered through non-cooperative means (e.g. optical telescopes and radars).

The following section provides a more detailed discussion on the individual aspects of providing SSA services and information.

Interagency collaboration is required

To provide space safety services, collaboration is necessary between the major Federal space agencies. Since DoD operates the majority of the dedicated contributing and collateral space surveillance sensors and maintains the space catalog of on orbit objects, which would be

⁷ The National Space Policy breaks United States space activities into three distinct sectors, commercial, civil, and national security. The term civil agency, in this report, is consistent with the National Space Policy and refers to federal agencies with non-military missions, such as the FAA, NASA, NOAA, and USGS.

the core of data used by a civil agency, a strong partnership with DoD is critical to providing safety services. Furthermore, some tools, like space-track.org, currently serve a dual purpose in supporting national security partners and non-military operators, researchers, and developers. Where appropriate, the joint use of tools could ensure a common awareness of orbital activity, provide avenues for continued exchange of information, and enhance both missions. There is common support in both DoD and DOT/FAA to collaborate in the development of civil agency capabilities and processes for sharing SSA data and information for safety purposes.

SSA information and services from non-DoD and commercial sources

In addition to DoD-provided services, space safety services have previously been provided by non-DoD and, recently, also by commercial sources. Comprehensive support of space safety, however, is best achieved through the integration of data gathered from Federal space surveillance systems maintained by DoD.

Non-government providers currently provide limited support the safe space operations of commercial and foreign entities. The Space Data Association (SDA) is a non-profit association of commercial and civil government satellite operators that shares data provided by SDA members and data provided by the JSpOC – amongst its members in support of the safe operation of satellite systems. This effort is focused primarily in support of GEO systems, though several entities operating LEO satellites are also members, and is beneficial for improved management of the RF spectrum, in addition to its contributions to ensuring the physical safety of satellites.

Recently, selected space safety services have begun to be offered as a commercial service. Many space operators are assessing how to leverage commercial space safety services to complement the existing service provided by the U.S. Government for free. Still other space operators choose to operate with only the existing free U.S. support provided from the JSpOC.

Increasing commercial on-orbit presence

The number of commercial on-orbit spacecraft has increased and surpassed the number of national security systems. Furthermore, a number of commercial satellite operators have announced plans for the development of very large constellations. OneWeb plans to build a 650-satellite constellation, and SpaceX announced a 4,000-satellite constellation. Internationally, a number of countries have submitted filings to the International Telecommunication Union, signaling interest in building out constellations with hundreds or thousands of satellites. Compared to today's roughly 1,300 active satellites, these new systems could increase the number of active satellites by as much as an order of magnitude. While it is not realistic to expect every one of these constellations to be launched, even a doubling of the number of active satellites would be significant. Today, roughly 70 percent of all close approaches of active

systems involve commercial systems.⁸ It is likely that routine operational support for these systems will complicate the national security mission.

International Engagement

The sharing of SSA data also contributes to broader U.S. efforts to enhance the security and long-term sustainability of outer space activities. U.S. notifications of potential collision hazards constitute transparency and confidence building measures to enhance stability in outer space. The timely delivery of safety-related SSA data provides foreign operators with time to evaluate warnings and perform mitigation actions if needed.

USSTRATCOM has pioneered a number of agreements and arrangements with space operators, including foreign national space programs. In consultation with the Department of State, a thorough legal review would be necessary to determine whether individual agreements would need to be re-negotiated for a civil agency to provide safety-related SSA data and information to foreign entities. The DoD may wish to retain some of these agreements because of their national security implications. USSTRATCOM considers SSA to be critical to defending U.S and allied space assets in the event of a conflict extending into space.

SSA capabilities for national security

The National Space Policy directs the Secretary of Defense and the Director of National Intelligence to develop accurate and timely SSA, which, in turn, is shared with other Federal departments and agencies in support of their assigned missions. The DoD will continue to operate and maintain SSA capabilities and gather SSA data as needed to fulfill the U.S. national security mission. As discussed above, the DoD has legal authority to share space situational awareness data and information with non-USG entities, to partner with and support national security allies. This authority should continue to exist in its current form. Authorizing a civil agency, such as DOT, to release safety-related SSA data in a similar fashion would allow DoD to focus on its national security missions while DOT, through the FAA Office of Commercial Space Transportation, could focus on advancing the development of commercial and civil orbital space safety services.

The DOT would need to develop a data policy consistent with existing policies, in coordination with the national security and intelligence communities, that specifies what DoD-provided data could be made available to satellite operators, what data could be made public, and how uncorrelated tracks (UCTs) from non-Space Surveillance Network (SSN) sources would be handled. The current DoD policy provides a solid foundation for the initial DOT data policy.

Given that DoD would remain the central hub for national security SSA data, DOT/FAA would work with DoD to develop a process for routing SSA and safety-related processing or services back to DoD, where it could be accessed securely by other national security entities to

⁸ Commercial on commercial – 20%, one commercial system – 50%, and Non-commercial on non-commercial – 30%, generated with Jan 2015 JSpOC numbers.

enhance the safety of their operations. This SSA data would require validation like other data sources used by DoD to assure consistency if generated on different systems or through different analysis processes. Civil space operators such as NASA currently receive different data and other products from DoD than commercial and foreign entities; a civil space agency assuming the role of data provider must be able to provide the same level of data and other products at a comparable cost, or DoD must continue to meet those specialized needs instead.

Necessary authorizations

Authorization would be needed to expand the mission of a civil agency. The DoD recognized a need for legislative authority when it accepted the mission of supporting commercial and foreign entities from NASA. Just as 10 U.S.C. Section 2274 authorizes DoD to provide SSA services, DOT/FAA Office of Commercial Space Transportation would require authorization in order to provide SSA services.

DoD's authorities in 10 U.S.C. Section 2274 address governmental immunity and liability, for services that provide space situational awareness information. This protection is a key element in the overall authorization provided to DOD. A civil agency will require similar immunity to provide space situational awareness information to operators.

Resource requirements

Additional resources would be necessary for a civil agency, such as DOT/FAA, to support an orbital safety mission through the release of SSA data and information. Fortunately, there are factors that help to limit the overall cost. The DoD operates and maintains the space surveillance network, which provides the bulk of SSA data, and processing capabilities are available through both commercial entities and existing government systems. The use of both DoD processing systems, including standardized astrodynamics algorithms and the non-Battle Management portion of the JSpOC Mission System (JMS), and commercial systems could provide a robust system tailorable to support commercial and non-traditional space operations. Because the DOT/FAA are not currently assigned with the responsibility to release SSA data and information, no formal budget requests have been validate or processed. The DOT/FAA estimated an initial investment of roughly \$20 million would be necessary for the acquisition of commercial analysis systems and the integration efforts necessary to partner with DoD. This number should be considered an estimate for scope. A detailed budget request would be submitted through standard budget processes, which include overall agency and departmental priorities and needs, if assigned the responsibility. The cost would depend heavily upon the implementation strategy and timing. Factors under consideration are costs for equipment, training, and security. Recurring costs would be needed to cover an operational/technical staff, and provide funding for contract support, data delivery, and traditional operational costs. When compared with DoD's investment in the space surveillance network and the JMS, providing safety-related SSA data is a modest investment in support of the continued safety of the satellite industry. Such an investment could allow a civil agency to provide commercial operators with

tailored safety information, promoting the space industry and the long-term sustainability of space operations.

Conclusions

The demand for SSA data has greatly expanded. DoD has existing legal authority to provide data consistent with the national security interests of the United States. DOT/FAA, as a civil agency, would require specific legal authority.

As identified in this report:

- It is feasible that a civil agency, such as DOT acting through the FAA Office of Commercial Space Transportation, with additional legislative authority in Title 51, U.S.C., could provide SSA data and information to commercial, civil, and foreign entities when such support is not inherently military in nature.
- Statutory authority would be required to authorize a civil agency to process and release safety-related space situational awareness data and information to any entity consistent with the national security and public safety interests of the United States.
- Extensive reviews of existing individual support agreements would be necessary to determine which agreements are appropriate for a civil agency to assume and would therefore require amendments or new agreements to be negotiated.
- The DoD will continue to maintain capabilities, collect data, and maintain a master object catalog as well as conduct any operations necessary to maintain national security.
- Pursuant to the 2010 National Space Policy, all departments and agencies will share their capabilities, specifically SSA data and expertise as available, to assist each other in the accomplishment of the space safety mission.
- A civil agency would require immunity from lawsuits similar to the DoD immunity provision in 10 U.S.C. § 2274.
- Additional resources would be necessary to perform an orbital safety mission through the release of SSA data and information.