



Graphic demonstrating how the orbits of Iridium 33 and Cosmos 2251 intersected at the time of collision. **Courtesy: Analytical Graphics, Inc. (AGI).**

While investigations continue regarding the events leading up to the collision of the two spacecraft, the implications of the incident are in need of immediate discussion.

**Data warning**

“Unfortunately, it appears that there was data warning about the possibility of this collision beforehand,” noted [Brian Weeden](#), Technical Consultant for [Secure World Foundation](#) (SWF). “However, it must be stressed that close approaches between satellites somewhere in Earth orbit occurs on almost a weekly basis...and until this event, have never before resulted in an actual collision.” Weeden noted that in every case it is impossible to give a definite answer on whether or not two objects will actually collide, only probabilities and potential risks.

“Getting the right information to the right authorities in time to make the right avoidance maneuver decision is a very complicated process that doesn’t entirely exist yet,” Weeden said. “Secure World Foundation is working with many other organizations around the world to try and develop this process.” That process involves the creation of a space traffic control system.

**Increasingly congested environment**

“This collision underscores in a dramatic way the importance of instituting an [international civil space situational awareness \(SSA\) system](#) as soon as possible,” said [Dr. Ray Williamson](#), SWF Executive Director.

Williamson said that such a civil SSA system could have been used to warn the Iridium operations managers of the danger of collision and allow them to take evasive action. “In the absence of reliable ways to clear debris from orbit, it will be increasingly important to follow all active satellites to prevent future preventable collisions.”

Williamson said that the satellite collision was spotlighted in a statement by the United States, delivered during the [46th Session of the Scientific and Technical Subcommittee](#) of the [United Nations Committee on the Peaceful Uses of Outer Space](#) (COPUOS) being held in [Vienna, Austria](#).

That COPUOS statement explains: “Since space is becoming an increasingly congested environment, heightened space situational awareness as well as international cooperation between governments and industry is critical.”

**Satellite Collision:  
Need for Better SSA  
Highlighted**

The [collision](#) earlier this month involving an active U.S. commercial [Iridium](#) satellite and an inactive Russian Cosmos 2251 satellite in low Earth orbit has demonstrated an urgent need to establish a civil space traffic control system. As of February 27, the [U.S. Air Force’s Space Surveillance Network](#) is tracking over 274 pieces from the Cosmos satellite and 128 pieces from the Iridium satellite distributed in two separate debris clouds.

February 28, 2009

**The Month Ahead**

**March 4 (Boulder, Colorado)**  
[University of Colorado Aerospace Engineering Department](#) panel on aerospace engineering career options in non-profit and policy sectors. **Phil Smith** will be a panel member.

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**March 12 (Ottawa, Canada)**  
Canada Space Roundtable, organized by the [Rideau Institute](#) and SWF. SWF Executive Director **Dr. Ray Williamson** and **Brian Weeden** will be in attendance.

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**March 15-18 (Paris, France)**  
[International Astronautical Federation](#) (IAF) meeting. Subject will be on preparing for [October International Astronautical Congress](#) (IAC) in Daejeon, Republic of Korea. **Dr. Ray Williamson** and **Agnieszka Lukaszczyk** will be in attendance.

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**March 19-20 (Washington, DC)**  
Space Deterrence Workshop in Washington, DC. Invitation-only event co-sponsored by SWF, [Naval Postgraduate School](#), the [National Space Studies Center](#) and [The George Washington University](#). **Dr. Ray Williamson**, **Brian Weeden** and **Ben Baseley-Walker** will be in attendance.

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**March 22-28 (Houston, Texas)**  
Lunar and Planetary Science Conference in Houston, Texas. **Leonard David** and **Barbara David** will be in attendance.

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## SWF attends 46<sup>th</sup> Session of UN COPUOS Scientific and Technical Subcommittee

The recent collision of a U.S.-operated Iridium satellite and a Russian spacecraft has spotlighted the need to get SSA data to satellite owner-operators. One method is an international civil SSA system, a concept introduced by Brian Weeden of SWF during the 46<sup>th</sup> session of the COPUOS Scientific and Technical Subcommittee on February 17, 2009 in Vienna, Austria.

Brian Weeden, who attended the session, noted the February 10 collision of the two satellites resulted in the generation of space junk that now circles Earth and threatens spacecraft from a host of nations. Weeden told the subcommittee, "This collision is yet another example of the potential fragility of Earth orbit and the need for increased awareness."

### Root cause of last week's collision

Weeden used the example of driving a car with the windows blacked out. Even with a GPS device to display the car's position on the road, there is no information available about the locations or actions of other cars. "This environment of limited information is the same in which many of the satellites in Earth orbit are operated today," Weeden said. "The owner or operator of a particular satellite usually has excellent knowledge about the position of that satellite in space, but little to no information about the locations of other objects around them," he added. "This problem was the root cause behind last week's collision of a U.S. commercial satellite and a Russian spacecraft—the owner of the satellite which could have maneuvered did not know about the impending close approach," Weeden explained.

Weeden advised the subcommittee that, unfortunately, most actors in space do not have the resources or capacity to provide the critical space situational awareness information necessary to make safe and secure decisions regarding actions in space. "The few States that do have the resources to provide this information," Weeden said, "are often limited by national security or military restrictions from sharing it with other actors."

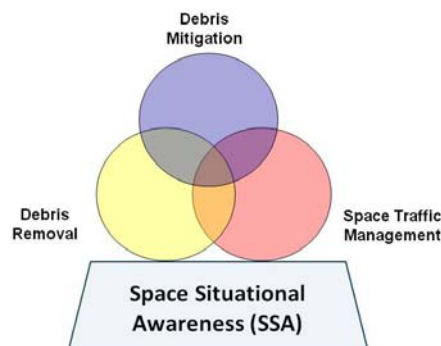
### Tools needed

SWF believes that the solution to this problem is the creation of an International Civil SSA system. The goal of this system would be to provide all space actors access to the tools needed for safe and sustainable activity in Earth orbit. Two key tools this system would provide are sensor data and analytical capacity to utilize that data in decision-making processes. The concept of SSA is not new—it has been an important part of military space activities for several years. But like many other types of information, there is also a need for SSA in the civil world.

The fundamental difference between the international civil SSA system SWF is advocating and that used by the military is in the types of information provided. Civil SSA only needs to focus on the location of an object in Earth orbit and a point of contact for that object, along with information about space weather. The additional military requirements of determining function, intent, and capabilities and limitations are not intended to be part of a civil SSA system.

### Global sensor coverage

The Foundation believes that such a system needs to be international in both its creation and operations, Weeden advised the subcommittee. Accurate tracking of all objects in Earth orbit requires a geographically distributed network of both radar and optical telescopes. "Such a network is very expensive to create and maintain,



According to a 2007 ISU study on space traffic management, space sustainability consists of space traffic management, debris mitigation and debris removal. All of these depend on a foundation of SSA. **Courtesy: SWF/ISU.**

**March 23-24 (Washington, DC)**  
"Improving our Vision III," at Intelsat headquarters. Co-sponsored by Intelsat and SWF. Third in a series dealing with the need for space situational awareness. **Dr. Ray Williamson** and **Brian Weeden** will be in attendance.

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**March 23-April 3 (Vienna, Austria)**  
48<sup>th</sup> Session of the Legal Subcommittee of the United Nations Committee on the Peaceful Uses of Outer Space, in Vienna, Austria. **Agnieszka Lukaszczyk** will be in attendance.

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**March 30-April 2 (Colorado Springs, Colorado)**  
National Space Symposium in Colorado Springs. **Phil Smith** will be presenting.

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**March 30-April 2 (Darmstadt, Germany)**  
5th European Space Debris Conference. **Brian Weeden** will be presenting.

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and only the United States has thus far developed one,” Weeden pointed out. “And while the United States’ space surveillance network does provide the most complete SSA data in the world, it still has significant limitations due to the lack of coverage in areas where the U.S. does not have a presence.”

In addition to global sensor coverage, an international civil SSA system must include data from commercial satellite owner-operators: these entities have data on the locations of their satellites more accurate than any ground-based sensor obtains. “The key to making such a system work is in the data sharing model,” Weeden said.



United States Air Force Integrated Space Command and Control (ISC2).  
Photo: Lockheed Martin.

#### Central clearing house

One potential model would have each participant in the system choosing what data they provide to a central clearing house. Each participant would have access to shared data in the clearing house, enabling them to do their own independent analysis. All participants would also have access to analytical support from the central data clearing house to offset the lack of indigenous capability.

“Many States, working together in a voluntary partnership with commercial partners, could provide the necessary data to all actors,” Weeden said. “This information could not only mitigate future collisions but enhance cooperation, transparency and future space governance issues.”

### SWF attends International Space University’s 2009 Symposium

Issues of military space power and Earth security in the 21<sup>st</sup> century were addressed at “Space for a Safe and Secure World” – the theme for the 13<sup>th</sup> [International Space University \(ISU\) Annual International Symposium](#) held February 18-20 in Strasbourg, France. The symposium featured a wide ranging number of sessions, from “International Goals and Perspectives on Security” to “Civil Security and Military Space and Dual Use.”

SWF is a proud sponsor of the ISU symposium, with several staff taking part in the three day program. ISU organizes a three-day symposium as an interdisciplinary, international forum to help both the users and the providers of space-related systems move forward from discussion of problems to formulation of solutions.



Smith

#### Rules of the road

At a time when more nations make use of space, the stakes also become higher. It is clear that a new era of using space for the benefit of all has dawned. “This means that rules of the road are required to manage traffic, prevent misunderstandings, mitigate production of orbital debris, and generally avoid destructive behavior,” said [Phil Smith](#), SWF Communications Director. Smith added: “At the same time, our use of space to monitor the Earth and support disaster management has become quite sophisticated, making it possible to address how to more effectively share Earth observation data globally.”

Learning to use space more effectively through cooperative relationships will likely have a reciprocal effect when it comes to certain challenges on Earth, Smith explained. “Sometimes, an enormously complex and challenging opportunity teaches us about the fundamentals...in this case the use of space teaches us about how to live better on our planet.”

Smith was to present “[Space: A Reintroduction](#),” co-developed with [Dr. Suzanne Metlay](#), SWF’s Operations Director. Dr. Ray Williamson made the presentation on his behalf. In addition, Brian Weeden presented “[The Case for International Civil Space Situational Awareness](#),” with contributions from Dr. Williamson and [Ben Baseley-Walker](#), SWF Legal and Policy Consultant.