

## **Ken Hodgkins**

***The State Dept. Office of Space and Advanced Technology has a wide and diverse range of responsibilities. Tell us about the international space arena, and describe your role at the U.N. and in bilateral and multilateral relations.***

I represent the U.S. at the United Nations Committee on the Peaceful Uses of Outer Space [COPUOS]. There are now greater opportunities to accomplish things through this committee and its subcommittees, because the Cold War is over and because more and more countries are active in space.

There are over 50 countries and international organizations that now have space assets and a stake in what happens in space. Furthermore, almost all nations have access to space systems such as global navigation satellites, communications satellites, remote sensing satellites, and weather satellites, and incorporate them in their infrastructures.

***What does that mean in terms of the committee's work?***

Nations now tend to approach space more pragmatically and less politically than they did before, because their space assets have matured and they have more to offer. And there is a greater awareness, at the scientific and policy levels, of the utility of space systems and of what they can do. There are still commercial and security issues that we have to be mindful of, but the level of technological capability has risen among a lot of countries. So a lot of the committee's work has become more businesslike than before, with a lot more countries actively participating.

***How much of that work deals with the growing problem of space debris?***

One of the big areas we work on in COPUOS is the whole concept of "best practices in space operations." This is currently being spearheaded by France, and we are very supportive. The committee developed a set of guidelines on

debris mitigation over a period of several years that has been endorsed by the U.N. General Assembly. In a similar manner, it is now considering the development of guidelines that will spell out all the things that constitute responsible behavior in space, including the sharing of information on orbital locations of satellites and debris among all the space operators for space situational awareness, or SSA. We, the U.S., have started a series of discussions with the European Space Agency and European Union about cooperating on SSA.

***China's ASAT test in January 2007 generated a massive amount of space debris. How did it play into all this?***

That test was a big driver of the committee's interest in this subject—safe and sustainable space operations. The atmospheric for the Chinese could not have been worse. They came under a lot of criticism, and within weeks of their test they had to attend a meeting of COPUOS where we were adopting the

debris guidelines that I mentioned. They simply said that the test was an experiment, and that nothing happened to anybody else's space assets as a result.

But the fact is that their test created a huge amount of debris that will remain in space for a long, long time. In the U.N. debris mitigation guidelines, the intentional breakup of objects is allowed as long as the debris isn't long-lived—more than 25 years. The debris from the ASAT test will be up there much longer.

***Back to what you said about sharing information on space situational awareness: How does that work?***

Collecting and exchanging data is the most important element of SSA. The Air Force operates the commercial and foreign entities [CFE] program that gives other spacefaring nations and organizations access to space-tracking data on space objects. The data comes from the U.S. space surveillance network, and management of the CFE program will be transferred in October from the Air

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Force to U.S. Strategic Command.

The CFE is linked to debris mitigation in the overall context of space situational awareness. Space operators use CFE data to maintain their own positioning and make sure that they do not run into each other up there.

### **Can data sharing cause security problems for the U.S.?**

There are security implications, of course. Within our national security community there has been extensive debate about the program and how improved tracking data and other information can and will be provided to foreign and commercial space operators to make their calculations more precise, and about how to sort out and properly prioritize national security, civil, and commercial requirements.

### **What about security in relation to other nations?**

There's now solid consensus in the U.S. government on the need to move beyond a security approach rooted in Cold War paradigms, but changing processes and procedures in a program that's been operating for nearly half a century is challenging. Part of our discussions with the Europeans about SSA is aimed at trying to address the evolving SSA security policy concerns and to give European experts a better appreciation of what goes into our surveillance system and of our need to protect certain types of data for proprietary and security reasons.

### **What are the Europeans doing with regard to SSA?**

They want to develop their own SSA capability, and we need to work with them to make sure the two systems are compatible, and to have a common understanding of what kinds of information should be exchanged.

### **How would you describe Europe's status, its progress, in space?**

For the most part, Europe's investment in space is for commercial and civil applications. They have significant capability in launch, in telecommunications, and in remotely sensing the Earth, as we have. Now they have developed systems that provide them with reconnaissance data that they share. They recognize that their Galileo program—their GPS equivalent—is a major undertaking and a big investment, but they believe it will provide crucial services as their other investments in space have done.

### **What is the significance of this from the standpoint of international cooperation and agreements? Will such cooperation become more complex and problematic as more spacefaring nations, such as Iran, get involved?**

Well, sure. That is something that we have to consider. But the importance here is that Europe has come to the realization that we came to many years ago, that space systems are a critical part of their infrastructure and need to be protected from human-induced interference as well as from naturally occurring interference like space weather. Europe has also recognized that all of the actors in space need a common understanding of how we are going to behave up there. That is why defining “best practices in space” is a good idea, so that all of us can agree on measures that should be taken, including debris mitigation guidelines, to make sure that space is sustained for future generations.

### **Is the U.S. leading the way in tackling the space debris problem?**

Yes. The U.S. government is actively working within the U.N. as well as with our European partners to develop guidelines that will enhance international transparency and confidence-building in space operations, and to identify elements that constitute responsible actions in space, such as reducing the amount of

orbital debris and exchanging more information on space situational awareness. Our domestic debris mitigation regulations are equivalent to, or exceed, those that have been endorsed by the U.N.

### **When did this begin?**

Back in the early 1990s, NASA created an informal group called the Inter-Agency Space Debris Coordination Committee [IADC], consisting of all the major spacefaring countries, China included, which was separate from the U.N. The idea was for all of the countries to exchange information on their experiences with space debris, what we know about it, and see if we could come up with guidelines that everybody could use at the international level. What we were already doing in the U.S. was the

**“...all of the actors in space need a common understanding of how we are going to behave up there.”**

point of departure for the guidelines defined by the IADC.

### **When did the U.N. get involved?**

Starting in 1994, we said it is not enough that we are doing this among a small group of countries, because by then there were many more countries and organizations operating in space, and we needed a higher level of guidelines on debris mitigation that would be universally applied. The Scientific and Technical Subcommittee worked for about a decade on examining research and mitigation activities undertaken by the IADC and member states of COP-UOS. On the basis of that work, we—the U.S.—introduced a proposal in the COP-UOS to begin developing debris mitigation guidelines that would be adopted at the governmental level. The U.N. General Assembly adopted those guidelines in 2007, and they track very closely with those of the IADC.

### **What do the guidelines deal with?**

There are two areas. First, there are measures that curtail the generation of potentially harmful space debris in the near term, and second, measures that limit the generation of such debris over a longer term. This means that we try to limit the production of mission-related debris, avoid breakups, and implement end-of-life procedures that remove decommissioned spacecraft and launch vehicle orbital stages from areas populated by operational satellites.

### **How does the U.S. go about mitigating debris from its satellites?**

The Dept. of Defense, NASA, and NOAA have specific policies dealing with debris mitigation in their operations—internal documents that they and their contractors use. When the FCC issues a license to an operator of a communications satellite, it requires the operator to submit a debris mitigation plan for disposing of the satellite at the end of its life. The FAA requires commercial launch providers to show what they will do to mitigate debris generated by their launches. NOAA also requires operators of commercial remote sensing satellites to do the same.

### **Is there opposition to some of the debris mitigation measures?**

There is some reluctance, because debris mitigation costs money. If, for example, you have a communications satellite up there that is generating revenue, you want to run it until the very last minute. Under the guidelines, you can run it only until you have enough fuel to move it, and that costs you money. However, there is a recognition that it is in everyone's self-interest to maintain a safe space environment, and so long as all operators are playing by the same rules, everyone is happy.

### **Can the U.N. enforce its agreements and guidelines?**

Treaties governing space activities are binding, but there are no enforcement mechanisms. They are all based on cooperation and resolving differences through diplomatic means. Subsequent

to the original outer space treaties, we have developed nonbinding principles within the U.N. on such things as the use of nuclear power sources in space, remote sensing of Earth from space, and most recently, the guidelines on debris mitigation. These also do not have enforcement mechanisms, but they are documents that people can point to and say that the international community, through the U.N., has agreed on specific steps that should be taken [by those] engaged in these activities.

### **Do other nations look to the U.S. as the example to follow in space operations and practices?**

Yes, absolutely, and over the years we have worked very hard within COP-UOS to provide leadership in areas where we think the committee can make a useful and unique contribution in promoting international cooperation in the peaceful uses of outer space. We also seek to use the committee to demonstrate the value of space technologies for promoting the quality of life and advancing economic growth around the world.

On the other hand, we resist in that committee the introduction of measures dealing with the "militarization" and "weaponization" of space. They are not within the committee's mandate. Arms control issues are better suited to the First Committee of the General Assembly, or to the Conference on Disarmament in Geneva.

### **What else does your office do?**

We do many other things that depend heavily on the expertise of NASA, NOAA, DOD, the USGS [U.S. Geological Survey], and the private sector. We handle the application of the treaties that govern space activities, such as the Outer Space Treaty, the Agreement on the Rescue of Astronauts and the Return of Space Objects, the Convention on Liability Caused by Space Objects, and the Convention on Registration of Space Objects.

We led the negotiations of the intergovernmental agreement that established cooperation on the International Space Station. We lead the U.S.-EU

space policy dialogue that began several years ago. The Europeans are trying to develop European-wide space policy, and we thought that having a dialogue with them early would give us an opportunity to influence their policy, give us insights into where they are headed, and have them better understand what the U.S. is doing in the space policy arena. We also lead, with NASA, the U.S./India joint space working group that was undertaken back in 2004 to strengthen our bilateral space cooperation. And then we work closely with other agencies to assist them in implementing their own programs of international cooperation.

### **How does your office interact with U.S. agencies that are involved in space operations?**

We represent the State Dept. in the interagency space policy development and implementation activities—policies on commercial space transportation, remote sensing, space exploration, and space-based positioning, navigation, and timing [GPS] policy, which has become a priority area for the office. We are responsible for leading U.S. engagement with the international community focused on maintaining GPS as a kind of gold standard for worldwide use, and to enhance interoperability and compatibility among all current and future navigation satellite systems.

### **Which nations are involved in all this?**

First, on a bilateral basis, we have an agreement with the European Union and its member states on cooperation in GPS and the EU's Galileo program. There are four working groups that deal with interoperability and compatibility, with security issues, with commercial and trade issues, and with enhancement of future services. We also have joint statements with Japan, India, and Russia on similar cooperation with their programs. And we have a working group that deals with cooperation in satellite search and rescue, involving distress signals received and transmitted by navigation satellites.

### **What do you mean by interoperability**

**among international navigation satellite systems?**

Interoperability simply means that the civil signals will be transmitted at the same frequency, so that the receiver manufacturers can build one unit to receive multiple signals from multiple constellations. We are well on our way to achieving that. We have agreed on two civil signals that will be interoperable on all systems, including the GPS satellite that was launched last month.

**And compatibility?**

Compatibility is a different concept, or actually two concepts. First, it means that the signals provided by each and every navigation satellite system will not create radio frequency interference with others. This is vital to providing useful service to all users worldwide.

Second, it means that there will be spectral separation between the authorized services of all the various systems and all other signals. This is a very important national security consideration for the U.S. We consult with the providers of systems from the EU, Russia, China, India, and Japan to ensure that they understand and pursue this principle of compatibility that protects spectral separation for M-code signals.

**How about on the multilateral agreements side?**

On the multilateral side we strongly supported the creation of the recently established International Committee on Global Navigation Satellite Systems. It currently has about 25 members, associate members, and observers, including nations that are current and future oper-

ators of navigation satellite systems or ground-based networks that utilize these systems for many applications, and major international associations and organizations that represent various users of navigation satellite services.

**What does that committee do?**

Several things. One is promoting the use of global navigation satellite systems around the world, but especially in the developing world, through training and workshops. Another is to foster dialogue between organizations representing users and the nations that provide service to these users.

Finally, the committee includes a providers' forum where current and future navigation satellite system providers discuss topics of mutual interest, such as compatibility and interoperability.



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