

# **The Safety and Security of Space Activities**

**G rard Brachet**

**Former president, Acad mie de l'Air et de l'Espace/Air and Space Academy (2009-2012)**

**Former chairman of UN Committee on the Peaceful Uses of Outer Space - COPUOS (2006-2008)**

# **The Safety and Security of Space Activities**

## **Our ability to use outer space in the long-term is not guaranteed**

- **11 nations have acquired a space launch capability**
- **About 70 to 80 satellite launches per year (78 in 2013)**
- **More than 60 nations and regional governmental organizations operate satellites in Earth orbit**
- **An increasing number of private companies operate commercial satellite systems, both in the Geostationary Earth Orbit (mostly telecommunications) and in Low Earth Orbits (telecoms and earth observation)**

# The Safety and Security of Space

## Some numbers :

- **4994 launches**  
from 1957 till end of 2013

- **78 launches in 2013**

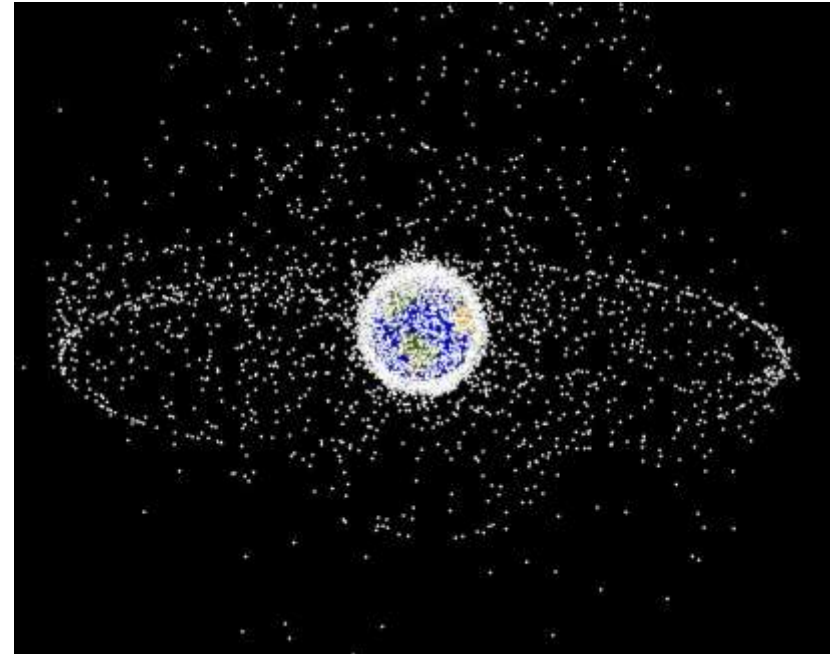
- **240 in orbit break-ups**

- **about 1000 operational satellites, of which half on the GEO ring**

- **17000 objects are**

**tracked and cataloged by the US SSN:**

**22% are satellites, 12% rocket bodies, 10% mission-related objects, 56% fragments (up from 41% before the China ASAT test of Jan. 11, 2007)**



# **The Safety and Security of Space Activities**

- **Increased crowding in low earth orbit as well as in the region around the geostationary ring creates new risks of interference and of physical collisions**
- **Managing the limited orbital and radio spectrum resources is becoming a real challenge**
- **Proliferation of space debris on and around certain orbits is a major concern**
- **New international mechanisms may be needed to ensure a sustainable use of outer space**

# **The Safety and Security of Space Activities**

**The space debris situation is a real concern**

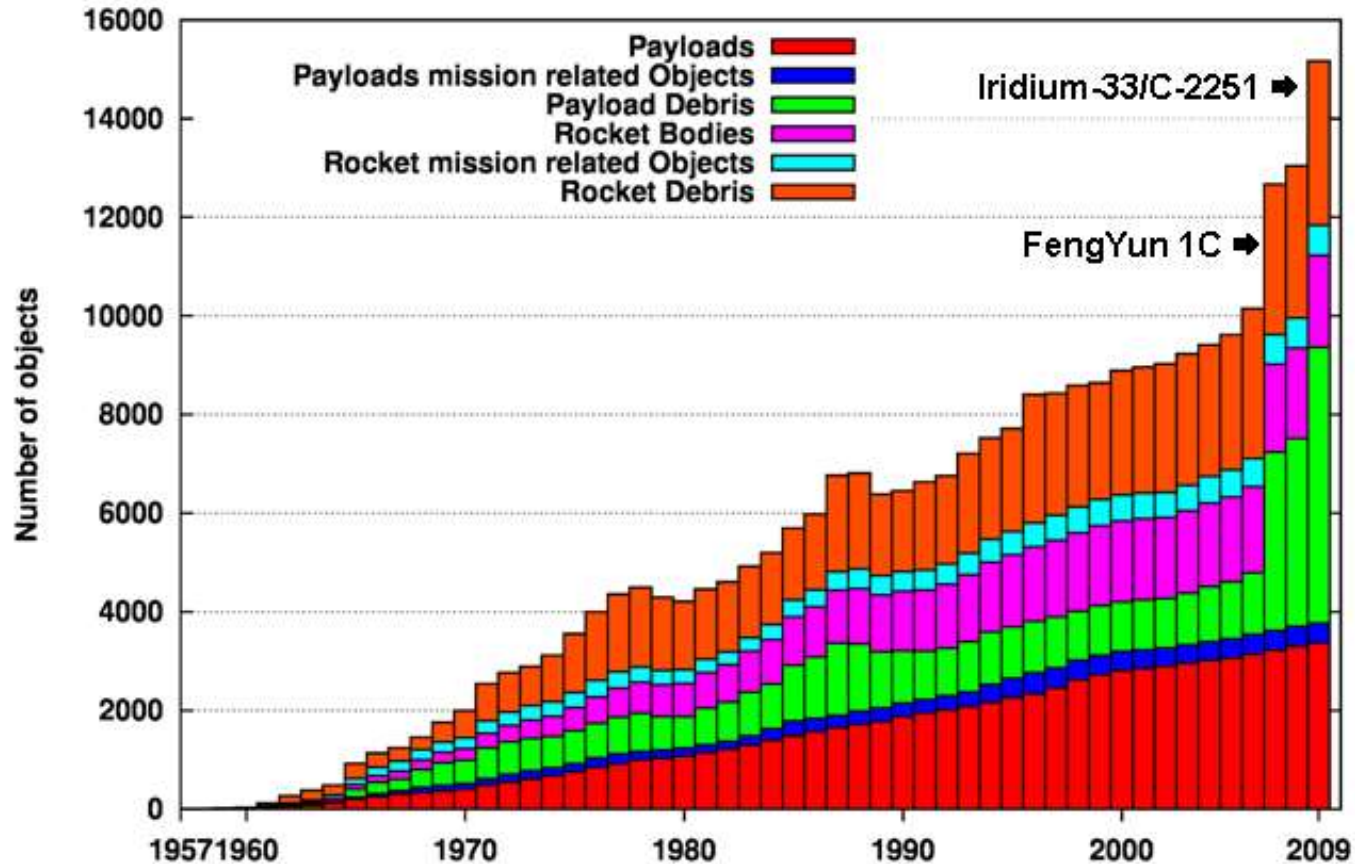
**Recent events have added a sense of urgency:**

- January 11, 2007: Chinese “experimental” ASAT test, 2700 to 3000 additional long lived fragments**
- Feb 10, 2009: collision Iridium 33 - Cosmos 2251, 1500 additional long lived fragments**
- rocket upper stages and spacecraft breakups in LEO**
- some GEO satellites failures**

**Space debris represent an increased threat to safe orbital operations**

# The Safety and Security of Space Activities

Cataloged space objects 1957 – 2009 (source: ESA/ESOC)



# **The Safety and Security of Space Activities**

**The risk of collisions between operational satellites in high inclination low Earth orbits is increasing**

**A concrete example:**

**Conjunctions (i.e. close approaches) between the NASA Terra, Cloudsat and Aura Earth observation satellites and China's Shijian series of satellites occur every month!**

**Very strict procedures have been set in place to minimize the risk of collision**

# **The Safety and Security of Space Activities**

## **What about the risk of outer space becoming a battlefield?**

**- A positive fact: deployment of weapons in outer space has not apparently taken place**

**- A less positive one: ground-based weapons can be used against spacecraft in low Earth orbits**

**If they were activated during a conflict, they would jeopardize the secure use of near-Earth outer space**



# **The Safety and Security of Space Activities**

**The safety and security of space activities are fragile, particularly if one takes a long-term view**

**Responsible use of outer space by all actors is essential to preserve outer space as a safe and secure environment**

# **The Safety and Security of Space Activities**

**The « space debris » work of the Inter Agency Debris Coordination Committee (IADC) and subsequent UNCOPUOS adoption of its Space Debris Mitigation Guidelines (endorsed by UNGA Resolution 62/217 of 21 Dec. 2007) provides a good model of how the international community can make some progress towards a regime of sustainable space operations**

# The Safety and Security of Space Activities

**In June 2007, at its 50<sup>th</sup> session, I proposed to UNCOPUOS delegations that the Committee should tackle the issue of long-term sustainability of outer space activities with a **bottom-up** approach similar to the development of the “Space Debris Mitigations Guidelines”**

# **The Safety and Security of Space Activities**

**In line with this proposal, a first implementation step took place early in 2008:**

**On February 7 & 8, the French Ministry of Foreign Affairs hosted in Paris an informal working meeting of space-faring nations on the topic of « **Long-term sustainability of space activities** »**

# The Safety and Security of Space Activities

**The purpose of this informal meeting was to set up an « ad hoc » international working group to develop information exchange mechanisms and consensus-based rules of behavior which will contribute to a safer and more secure space environment**

# **The Safety and Security of Space Activities**

## **Participants to the Feb. 2008 meeting were :**

- Representatives from 20 space-faring nations, including some developing countries, as well as from the European Union and the European Space Agency**
- Commercial telecommunication satellite operators (Intelsat, Inmarsat, Eutelsat and SES)**
- Observers from the UN Office for Outer Space Affairs, the International Space Environment Service (ISES) and the World Meteorological Organization (WMO)**

# **The Safety and Security of Space Activities**

## **Main conclusions of the Feb. 2008 informal meeting:**

- A- Brief the delegations at COPUOS on this initiative (session of the COPUOS Scientific and Technical Subcommittee in February and plenary session of the Committee in June)**
- B- Prepare a document presenting the various issues affecting Long-Term Sustainability of Space Activities**
- C- Organize communication channels with delegations involved in the discussions on Prevention of an Arms Race in Outer Space (PAROS) at the Conference on Disarmament. A specific presentation was made to CD delegations on Feb. 20, 2008 and regular presentations were made at the annual UNIDIR conferences on space security**
- D- Brief the Non Government Organizations actively involved in “Space Security” topics and activities on “Safety of Space Systems” and obtain their support and contribution**

# **The Safety and Security of Space Activities**

**The document prepared by the informal working group, finalized at the end of 2009, addressed the following issues:**

- Space debris mitigation and remediation**
- Improving the safety of space operations**
- Managing the radio-electric spectrum**
- Impact of space weather and other natural causes**
- Review of existing international mechanism(s) to improve the safety and sustainability of space activities**

**....and concluded with a set of preliminary recommendations**



# The Safety and Security of Space Activities

- **At its 52nd session, in June 2009, the French delegation to UNCOPUOS formally proposed the topic of “Long-Term Sustainability of Outer Space Activities” as a new agenda item of COPUOS in 2010**
- **COPUOS agreed to include this item as a new agenda item of its Scientific and Technical Sub-Committee in 2010 and beyond**

# The Safety and Security of Space Activities

- **The document prepared by the informal working group serves as a reference document for COPUOS consideration of this new topic**
- **It was distributed to all delegations to the 47<sup>th</sup> session of COPUOS/STSC (8 to 19 February 2010) as a Conference Room Paper\* under the title: “Long-term sustainability of outer space activities, preliminary reflections”**

**\* A/AC.105/C.1/2010/CRP.3,  
available at [www.unoosa.org/oosa/en/COPUOS/stsc/2010/docs.html](http://www.unoosa.org/oosa/en/COPUOS/stsc/2010/docs.html)**

# The Safety and Security of Space Activities

- **The COPUOS/STSC decided to set up a formal Working Group to address this issue, as it had done in 2003 for the space debris issue**
- **Dr. Peter Martinez (South Africa) was elected chairman of this new dedicated Working Group**
- **The first meeting of the Working Group took place in conjunction with the 53<sup>rd</sup> session of COPUOS in Vienna in June 2010**
- **The Terms of Reference of the Working Group were approved during the 48<sup>th</sup> session of COPUOS/STSC in 2011\***

**\* Annex II to A/66/20**

# The Safety and Security of Space Activities

**Four Expert Groups were set up, each addressing different aspects of the sustainability issue:**

- **Expert Group A: Sustainable Space Utilization Supporting Sustainable Development on Earth, chair: Prof. Filipe Duarte Santos (Portugal)**
- **Expert Group B: Space Debris, Space Operations and Tools to Support Collaborative Space Situational Awareness, co-chairs: Claudio Portelli (Italy) and Richard Buenneke (USA)**
- **Expert Group C: Space Weather, chair: Mr Takahiro Obara (Japan)**
- **Expert Group D: Regulatory Regimes and Guidance for Actors in the Space Arena, chair: Prof. Sergio Marchisio (Italy)**

# **The Safety and Security of Space Activities**

**Ensuring an active interaction of the Working Group on Long-Term Sustainability of Outer Space Activities with the community of commercial satellite operators, not formally represented in UNCOPUOS, was essential**

**Ad hoc workshops, such as the one organized in Feb. 2013, achieved this purpose**

# **The Safety and Security of Space Activities**

**The UN COPUOS LTS Working Group is currently finalizing its report and recommendations**

**They include:**

- a set of “Best practice guidelines for space operations”**
  - and recommendations to establish new data exchange mechanisms**
- both aimed at improving the safety of launch and in-orbit operations**

# **The Safety and Security of Space Activities**

**These guidelines or recommendations should then be endorsed by COPUOS during its plenary session and be included in its report to the UN General Assembly**

**Although it is yet to be debated, a specific resolution of the UNGA endorsing the COPUOS report on Long-Term Sustainability of Outer Space Activities would be appropriate**

# **The Safety and Security of Space Activities**

## **The EU proposed International Code of Conduct (1)**

- **In parallel to the COPUOS activities on Long-Term Sustainability of Outer Space Activities, the discussions on the Prevention of an Arms Race in Outer Space (PAROS) at the Conference on Disarmament in Geneva were not making any progress because the CD could not agree on a work plan**
- **As a consequence, the Council of the European Union had taken in 2007 an initiative to propose an “International Code of Conduct” for Outer Space Activities**
- **A first version of the EU proposed Code of Conduct was approved by the EU Council in Dec. 2008 and widely circulated**



# **The Safety and Security of Space Activities**

## **The EU proposed International Code of Conduct (2)**

- **Bilateral consultations with major space-faring nations were conducted by the EU in 2009 – 2010, leading to a new version of the EU draft Code of Conduct circulated in September 2010**
- **A first multilateral meeting took place on June 5, 2012 in Vienna, where an updated version of the draft Code was presented by the EU External Action Service**
- **A second multilateral meeting took place in Kiev, Ukraine, in May 2013 and a third one in Bangkok, Thailand, in November**

# **The Safety and Security of Space Activities**

## **The EU proposed International Code of Conduct (3)**

- **The EU plans to organize a final consultation meeting in 2014 to finalize the text of the Code**
- **The next step will be to convey a Diplomatic Conference of adhesion to sign this “International Code of Conduct”**

# **The Safety and Security of Space Activities**

## **The GGE on Outer Space TCBMs (1)**

- **In parallel, the 1<sup>st</sup> Committee of the UN General Assembly had adopted in 2010 Resolution 65/68 on Transparency and Confidence Building Measures (TCBMs) in outer space activities**
- **This resolution requested the UN Secretary General to set up a Governmental Group of Experts to conduct a study on outer space transparency and confidence measures and report to the UNGA by end of 2013**

# **The Safety and Security of Space Activities**

## **The GGE on Outer Space TCBMs (2)**

**The Group of Governmental Experts included representatives from 15 countries:**

**Brazil**

**Chile**

**China**

**France**

**Italy**

**Kazakhstan**

**Nigeria**

**Romania**

**Russian Federation (Chair)**

**Rep. of Korea**

**South Africa**

**Sri Lanka**

**Ukraine**

**United Kingdom**

**United States**

# **The Safety and Security of Space Activities**

## **The GGE on Outer Space TCBMs (3)**

- **The GGE had been formally set up in the Spring of 2012 and held its first session in New York in July. Its work plan was adopted and a clear schedule for preparation of its report was agreed**
- **It held two more sessions in 2013: one in April in Geneva and a final one in July in New York**
- **The GGE finalized its report during the July session in New York and transmitted it to the UN Secretary General**
- **It was made available in the six languages of the United Nations in September 2013**

# **The Safety and Security of Space Activities**

## **The GGE on Outer Space TCBMs (4)**

- **The GGE members considered from the beginning that a consensus report would give it more strength**
- **Even though there were some disagreements on substantive issues, an excellent spirit of cooperation was present in order to achieve this objective**

# **The Safety and Security of Space Activities**

## **The GGE on Outer Space TCBMs (5)**

**The report was presented to the 1<sup>st</sup> Committee of the UN General Assembly in October 2013 and was adopted without dissent**

- A draft UNGA resolution welcoming the GGE report and endorsing its content was submitted by China, Russia and the United States**
- It was adopted as Resolution 68/50 by a unanimous vote at the 1st Committee and on 10 December 2013 by the General Assembly. It represented a diplomatic breakthrough since the US had never before voted in favor of the annual TCBMs Resolution**

# **The Safety and Security of Space Activities**

**Over the next 12 months, the challenge will be to progress in a consistent manner within these three parallel and complementary efforts:**

- the finalization of the report of the Long-Term Sustainability WG of COPUOS**
- the adoption of an International Code of Conduct**
- the implementation of the recommendations from the report of the GGE on Outer Space TCBMs**

**The first of these is technical, the other two are more politically driven**



# The Safety and Security of Space Activities

## Conclusion

- **Ensuring secured and sustainable access to, and use of outer space is a major issue for all, national governments and commercial operators**
- **The number of initiatives towards a sustainable use of outer space that were started at the international level is encouraging**
- **However, political considerations will make it very challenging to reach a consensus on implementation rules**

# **The Safety and Security of Space Activities**

**Thank you for your attention  
Questions?**