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ENGLISH only

Report to the 2010 Review Conference on the Work of the Sensor Working Group

Excellencies, Ladies and Gentlemen: I would like to open this presentation with the Summary. The Sensor Working Group has completed the key decisions necessary to move the Treaty on Open Skies forward into the Digital Future. Or, as you will here several times during this Review Conference, we are about to enter "Next Generation Open Skies".

At the last Review Conference in 2005, Open Skies was functioning with 1960's technology cameras and Black & White film. No State Party had certified an Infrared System nor had any State Party certified a Synthetic Aperture Radar. Digital cameras were poorly defined for Treaty use and our analog and digital recording standards were archaic. We had not established a standard exchange format for digital data at the time of the 2005 Review Conference and the Sensor Working Group had been non-functional for over seven years.

I would like to report now that this has all changed. Over the last five years, the men and women of the Sensor Working Group have met many times in many locations. The standards for sensor selection, sensor operations, resolution targets and recording standards have been carefully updated. We have adopted modern technology and modern international standards and, in doing so, we have made the Treaty on Open Skies "Faster-Better-Cheaper". In one area alone, the recording standards incorporated in the new Decision 17, we have improved cost-efficiencies so that the media costs are over one-thousand times cheaper than the standard in effect in 2005.

We have achieved our goal: with the work completed in the last five years, the Treaty is now Faster-Better-Cheaper.

Now I would like to present a short history of the last five years for those who have not followed the progress of the Sensor Working Group during this period.

The Sensor Working Group was restarted at the time of the last Review Conference in 2005. We were fortunate to have several veterans from the old Sensor Working Group return in February 2005 and bring with them some of the history and files from the last session in 1997. The year 2005 was busy and productive. We embarked to update Decision 14, the Video Decision, Decision 15, the Infrared Decision and Decision 17, the Recording Media Decision. All of these decisions were scheduled to expire at the end of the year (2005) and needed to be rewritten for the evolving technology. Additionally, Open Skies had never established an agreed format for the exchange of digital data. So we added the Open Skies Digital Data Exchange Format (OSDDEF) Decision to our work schedule.

Before the Christmas Break of 2005, we had completed work on Decision 17 and the OSDDEF Decision. With the adoption of these two decisions, we captured great cost savings for the future. OSDDEF was an international imagery exchange standard which made it possible for each of the 34 nations to share mission imagery as easy as passing a DVD from me to you. Decision 17 included DVDs and hard drives as standard media types; therein we achieved significant cost saving by using current commercial technology. Additionally, we began a precedent to hold workshops to test and optimize procedures and protocols before we adopted them into decisions. The German and Turkish delegations were very instrumental in helping set up and run Infrared Workshops and Data Gathering events. These workshops were very effective and set the standard for future sensor efforts. The infrared workshops and data gatherings events set the foundation for jointly working though many procedures, testing protocols, proving target designs, and establishing new cost-effective practices.

Moving into 2006, we focused on Decision 15, the Infrared Decision. By the summer of 2006, we had adopted new target designs and new procedures for Open Skies Infrared data gathering flights and certification protocols. All of these procedures and protocols were tested and found to be effective during various workshops and flight trials in Eskişehir, Turkey, and Decimomonnu on the island of Sardinia.

At this point, I would like to mention the significant contributions of Professor Wieslav Debski from Poland, who passed away this last year. He was one of the most productive members of the Sensor Working Group and brought many innovative insights and ideas into our improved Infrared Decision. It was during a hot afternoon in Turkey, during one of the flight test efforts where the protocol now called the Hot Target methodology was born during a conversation with Professor Debski. This new methodology brought the costs of infrared target down to one-tenth of the cost of the target standard based on the original methodology from 1994. Professor Debski's creativity and expertise will be missed.

Also in 2006, the Sensor Working Group began work on a set of procedures to improve the sharing and review of Open Skies sensor data before certification. We adopted these new protocols in a decision called the Certification Decision. This decision improves transparency and adds procedures to resolve potential conflicts during an Open Skies Certification event.

As the Sensor Working Group entered 2007, we were moving toward completion of Decision 15 (Infrared) and we started to focus on the technologies available in commercial aerial cameras. At this point, it was obvious that Black & White film was moving toward obsolescence; digital cameras had already become the dominant technology for aerial imagery. Open Skies, in order to remain cost effective, would need to transition to digital. The need to transition has become even more obvious since 2007; Kodak has already announced that two of the three film types that they manufacture for Open Skies are no longer available.

As 2007 came to a close, the new Infrared Decision was adopted and we were deep into deliberations on digital aerial cameras systems. Our first meeting during 2008 was quite unique and very productive. We invited seven aerial camera manufacturers from across Europe to present their current commercial product lines. The Sensor Working Group was engaged in dialog with manufacturers in order to understand the current state of technology. After a week with the manufacturers, we established a vision for the type of cameras that should be considered for Open Skies. Additionally, we began discussion of "Digital Processing" or the software procedures necessary to create digital products from modern aerial cameras. This spawned the establishment of the Digital Image Processing Decision (this decision was just adopted last week). Following our precedent of writing decision based on experience, Mr. Dennis Grieshop from the US, was able to contract for several data gathering flights with various digital sensor types to be flown over the Open Skies resolution target at Wright-Paterson Air Force Base. This digital data base, distributed to all members of the Sensor Working Group in December of 2008, became a valuable commodity for future workshops and deliberations over the next 20 months.

As we entered 2009, we were beginning to find consensus on the specification for allowable digital aerial camera systems to be used for Open Skies. We refined protocols for data handling, data erasure and visual analysis. We held a workshop in the Hofburg to practice Visual Analysis procedures with digital imagery. The foundational work from 2009 produced Revision One to Decision 14 which was adopted last month. With this foundational decision, the Treaty on Open Skies shifted into the Digital Age.

As I approach the conclusion of my presentation, I would like to thank the many men and women of the Sensor Working Group who have spent so much time and brought so many ideas forward to make the success we speak of today REAL. The creative and steadfast inputs from many members resulted in a truly remarkable successful set of new decisions that will transition us into "Next Generation Open Skies". I would like to call out special recognition to two stalwarts of the Sensor Working group. The first is the ever present, General Alexander Peresypkin from Russia. He is perhaps the most well known personality within the Treaty on Open Skies and the longest serving member of the Sensor Working Group. His experience goes back to the earliest days where sensor trials occurred in Brindisi Italy. He has steadfastly attended Sensor Working Group meeting across at the last 18 years and he has been a guide to many in the process. He has always kept the working group focused on the spirit and intent of the treaty, always with a pragmatic aviator's wisdom, always with a common sense approach to many complex scientific deliberations. I therefore call out a special Thanks to General Peresypkin.

Finally, I would like to recognize the other stalwart of the Sensor Working Group, Dr. Jeff Nicoll. Jeff has been seated on my right hand for the last five and one-half years and has served at the right hand of the last three chairman of the Sensor Working Group. He has written more decisions than any member of any working group. He serves as Chief Scientist of the Sensor Working Group and Manager of Draft Decisions. He ensures all protocols and procedures are based on sound science & that the equations for calculating Hmin are correct. Like General Peresypkin, Dr. Nicoll has been a guide star to keep us on track. I therefore call out a special Thanks to Dr. Nicoll.

General Peresypkin and Dr Nicoll are truly pillars of, not only the Sensor Working Group, but also the entire Treaty on Open Skies. Their diligence, tenacity and brilliant minds have made our efforts successful and resulted in procedures that will make this Treaty operate "Faster-Better-Cheaper".

Since I already presented the Summary at the beginning of my talk, I would like to conclude with a simple but very pertinent phrase: "Ladies and Gentlemen: Welcome to Next Generation Open Skies."

Open Skies:

Sensor Working Group Report

Mr. Scott Simmons

07 June 2010

Report

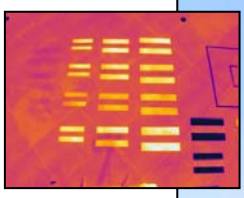
All Digital Decisions have been Completed

2005 Conference Review

- **Functioning with 1960's technology**
  - Black and white film
- **No certified Infrared System or Synthetic Aperture radar**
- **Digital camera use was not defined.**
- **Analog and digital recording standards were archaic**
- **Standard exchange format for digital data was not established**

Faster, Better, Cheaper

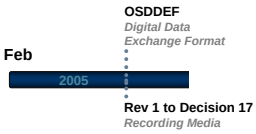
- **Standards have been established**
  - Sensor selection
  - Sensor operations
  - Resolution targets
  - Recording
- **Adopted modern technology and international standards**
- **Media cost is more than *one thousand* times cheaper**



Goal Achieved

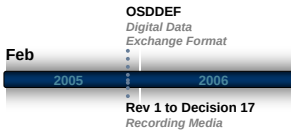
"Faster – Better – Cheaper"

History – 2005

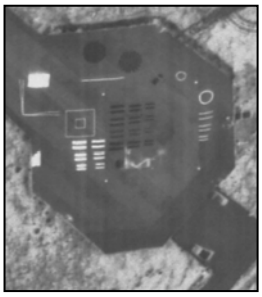


- **Began work to update Decision 14, 15 and 17**
- **Added Open Skies Digital Data Exchange Format (OSDDEF)**
- **Adopted Revision 2 to Decision 17 and OSDDEF Decision**

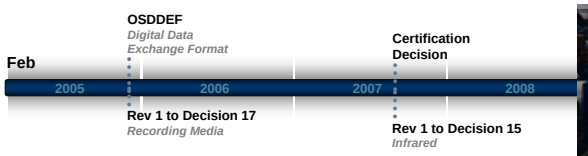
History – 2006



- **Adopted new target designs and new procedures for IR data gathering flights and certification protocols**
  - Proved to be effective
- **New Target Designs**

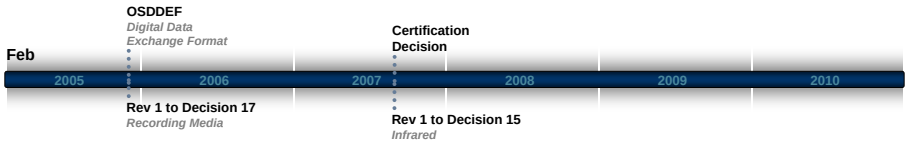


History – 2007



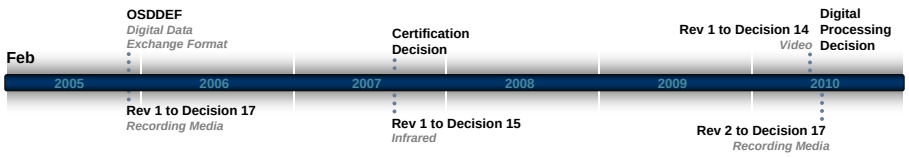
- **Transition to digital cameras**

History – 2008



Birth of the Digital Image Processing Decision

History – 2009 and Beyond



- **Refined protocols for data handling, data erasure and visual analysis**
- **Held workshop in Hofburg to practice visual analysis procedures**
- **Completed Rev 1 to Decision 14, Rev 2 to Decision 17 and the Digital Image Processing Decision**

Entry into the Digital Age

Sensor Working Group 2008

Report to the 2010 Review Conference

- all Digital Decisions are complete
- the Treaty is now ***Faster-Better-Cheaper***

Welcome to

Next Generation Open Skies