CONCURRENT SESSION 5-A:
GLOBAL SPACE GOVERNANCE OF REMOTE SENSING AND EARTH OBSERVATION

INTRODUCTION

By

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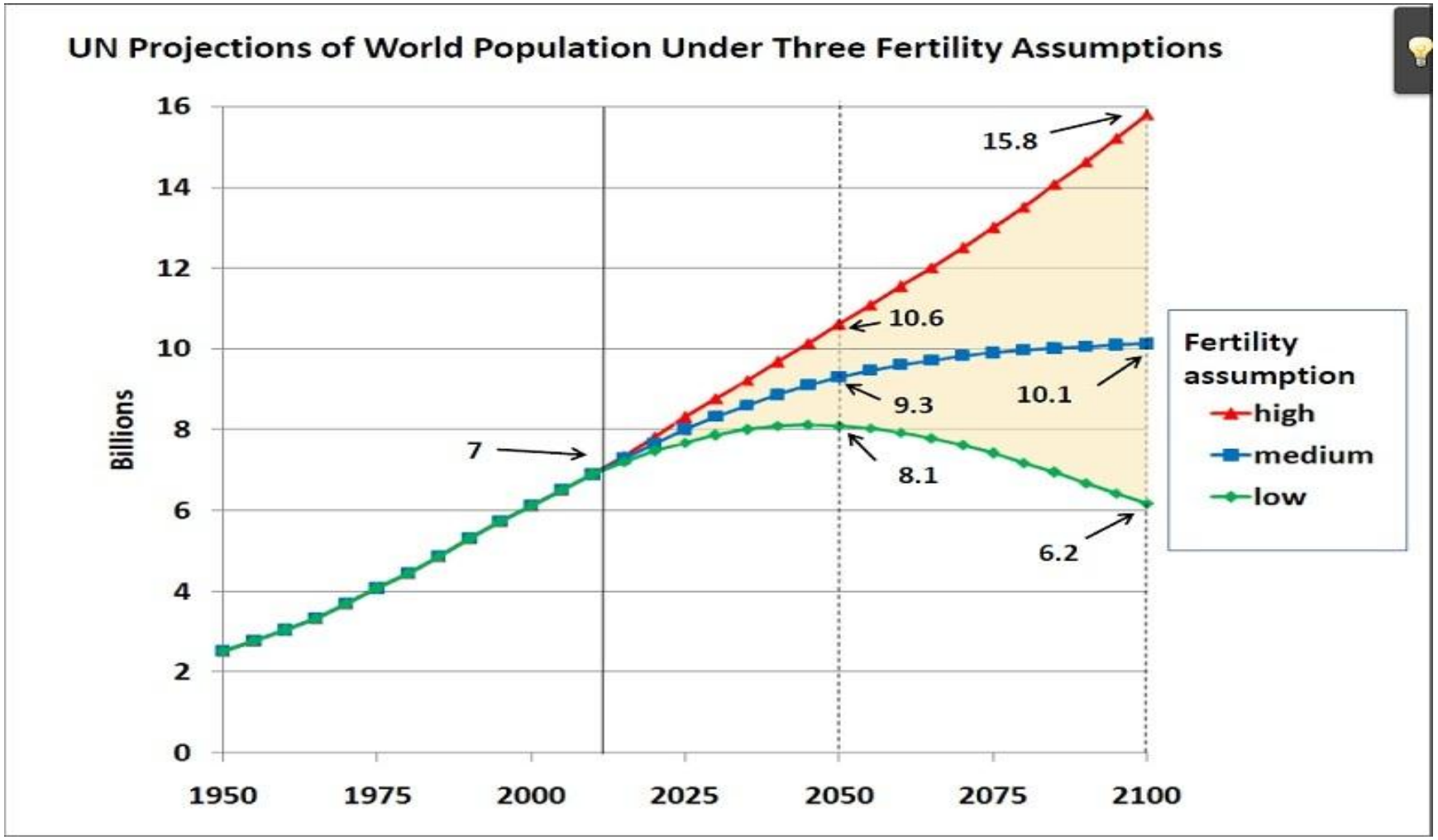
Session Chair

31 May 2014

World population

Human population is expected to increase from 7 billion at present to 10 billion by the year 2100



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Space remote sensing for meeting growing human needs

- **Increased need for:**

  - **Food**
  - **Protection against diseases**
  - **Search for natural resources and their management**
  - **Environmental protection**
  - **Civil and military security**
  - **Transportation**
  - **Management of man-made & natural disasters**
  - **Monitoring disarmament agreement**
  - **Monitoring of violation of human rights**

- **Space remote sensing applications play and will play an increasingly important role in meeting human needs in all the above mentioned areas.**

Satellite Remote Sensing Capabilities are Expanding

- **United States, Russian Federation, European Countries, Israel, Japan, China, India, Brazil, Canada, have extensive and advanced earth observation satellite programs**

- **Several developing countries, including Algeria, Egypt, Indonesia, Iran, Malaysia, Nigeria, South Africa, South Korea, Taiwan, Thailand, Turkey, United Arab Emirates, and others have launched or are making serious efforts to build their first civil remote sensing satellites that serve or will serve military intelligence gathering activities.**

Some of the Civil (including commercial) High Resolution Satellite Missions

The CEOS member "agencies are operating or planning 258 individual satellite Earth observation missions in the 2014 - 2029 period"

Country	Mission	Launch	Resolution (m) (panchromatic)	Resolution(m) (Multispectral)	Resolution(m) (SAR)
Brazil & China	CBERS	10.2003		20	
Canada	Radarsat	11/1995			8
Europe	Envisat	03/2001			10
France	SPOT-5	05/2004	2.5	10	
India	IRS-1C, 1D IRS-P6 (Resourcesat) TES	12/1995, 09/1997 10/2003 10/2001	5.8 5.8 1	23.6	
Israel	EROS-1	12/2000	2		
Japan	ALOS	01/2007	2.5	10	
Republic of Korea	KOMPSAT-1 KOMPSAT-2	12/1999 07/2006	6.6 1	 4	
Russia	Resurs-01	07/1999	2	30	
Republic of China (Taiwan)	Formosat-2	05/2004	2	8	
USA	Landsat-7 Ikonos-2 QuickBird-2 Orbview-3 EO-1	04/1999 09/1999 10/2001 06/2003 11/2000	15 0.8-1 0.61 1 10	30 2.44 4 20(9 bands) 30(220bands)	

NOAA Licences for Private Earth Observation Systems

(http://www.nesdis.noaa.gov/CRSRA/licenseHome.html)

- **AMSAT-NA:** Fox-1, CubeSat
- **Cal Poly U:** CP-8
- **Planet Labs, Inc.:**
  - Dove-2
  - Dove 3 & 4
  - Flock 1
- **DigitalGlobe:**
  - IKONOS
  - GeoEye-1
  - GeoEye-2&3
  - QuickBird-II follow-on
  - WorldView
- **Drexel University:** Dragonsat-1
- **GeoMetWatch:** GMW 1-6
- **Kentucky Space:** KySat-2
- **NanoSatisfi:**
  - ArduSat 1
  - ArduSat 2
- **Northrop Grumman:** Trinidad
- **Skybox Imaging:**
  - SkySat-1
  - SkySat-2
- **Southern Stars:** SkyCube
- **Saint Louis University:** Copper
- **Teledyne Brown Engineering, Inc.:** MUSES
- **University Of Alabama, Huntsville:** ChargerSat-1
- **University Of California, Irvine:** UCISAT-1
- **University Of Hawaii:** HawaiiSat-1
- **University of Michigan:**
  - M-Cubed
  - M-Cubed-2

Constantly Improving Satellite Resolution & Data Processing Capabilities

10 M, 5M and 1M

http://www.fas.org/irp/imint/resolve3.htm

- 10-meter resolution imagery is marginally adequate for the detection of larger buildings, but not the detection of vehicles.
- 5-meter resolution imagery permits the recognition but not the identification of buildings, but not the detection of vehicles.
- 1-meter resolution imagery permits the identification of buildings, and the recognition of vehicles.

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Japan tsunami and earthquake resources: before & after

http://downloadsquad.switched.com/2011/03/14/google-and-microsoft-offer-japan-tsunami-and-earthquake-resource/

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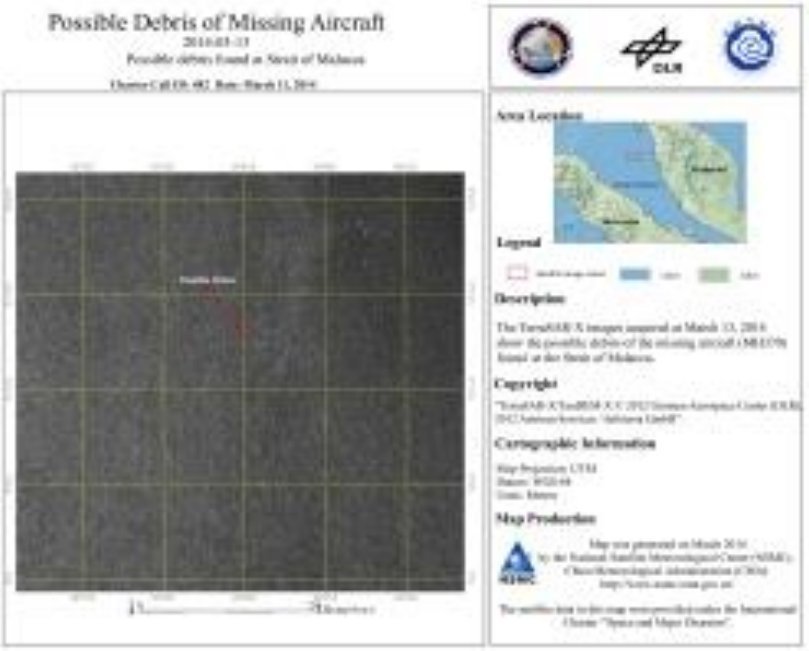
International Charter activated for missing Malaysian airliner

- http://www.disasterscharter.org/web/charter/home
- **The International Charter: Space and Major Disasters was activated on 11 March 2014 following a request from the China Meteorological Administration for satellite imagery to assist in the search for the missing Malaysian airliner MH370.**
- **The International Charter aims to provide satellite data free of charge to assist in disaster response activities. Each of the Charter's fifteen member agencies has made a commitment to this effort for disasters worldwide since the Charter's inception in 2000.**



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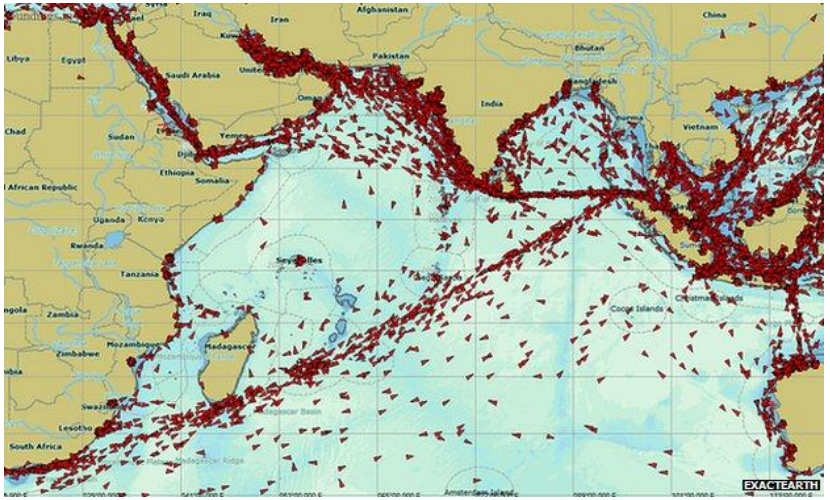
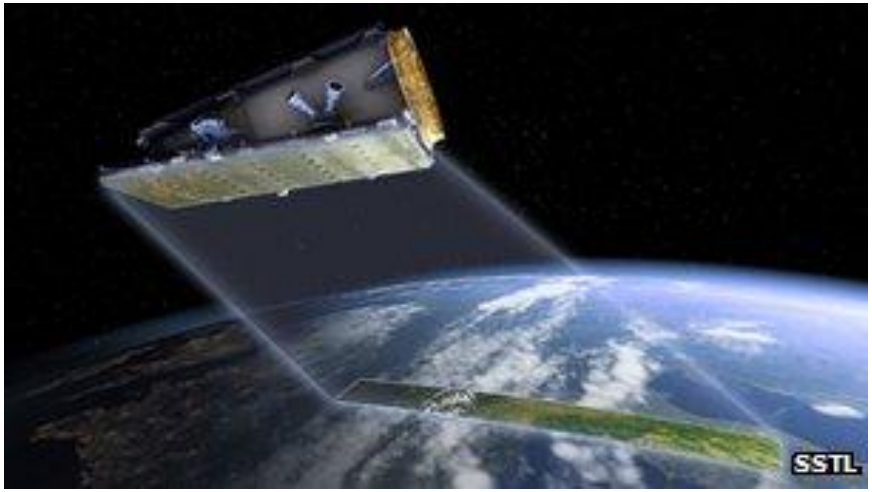
Satellite based Automatic Identification System

Ahoy! Your ship is being tracked from orbit
http://www.bbc.com/news/science-environment-18889594

Ship-tracker satellite went into orbit in July 2012 for Canada's ExactEarth company





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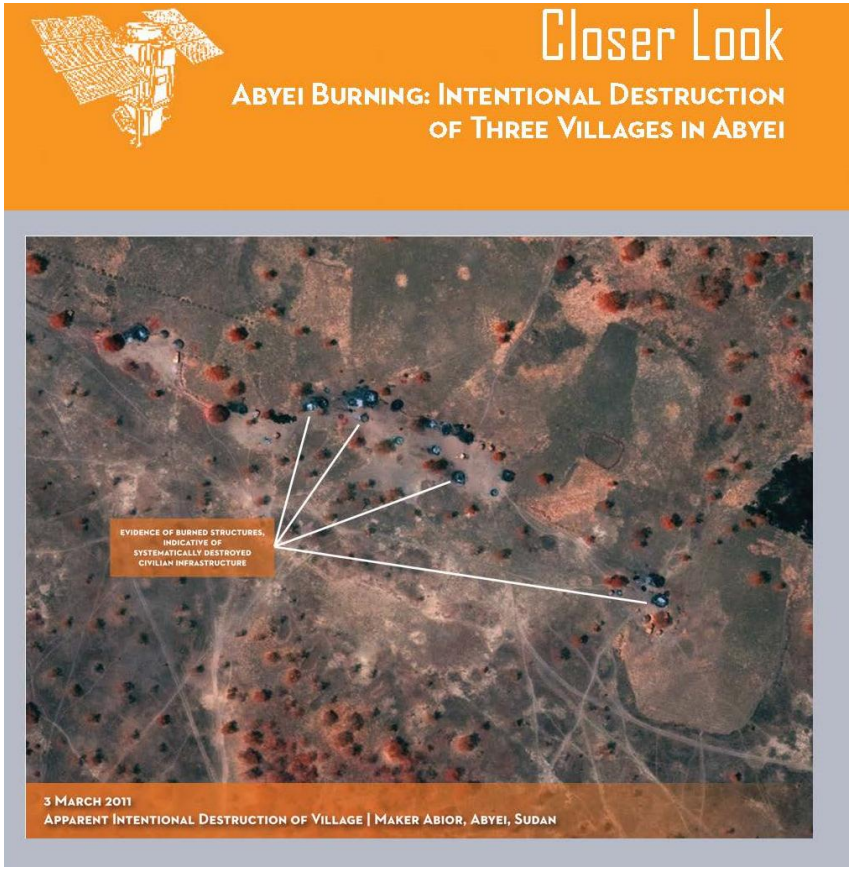
Satellite for monitoring war crimes - genocide

http://hhi.harvard.edu/programs-and-research/crisis-mapping-and-early-warning/satellite-sentinel-project

- **Satellite Sentinel Project combined satellite imagery, on-the-ground field reporting, and crisis mapping systems into a unified monitoring platform to detect, deter, and document threats to vulnerable populations**



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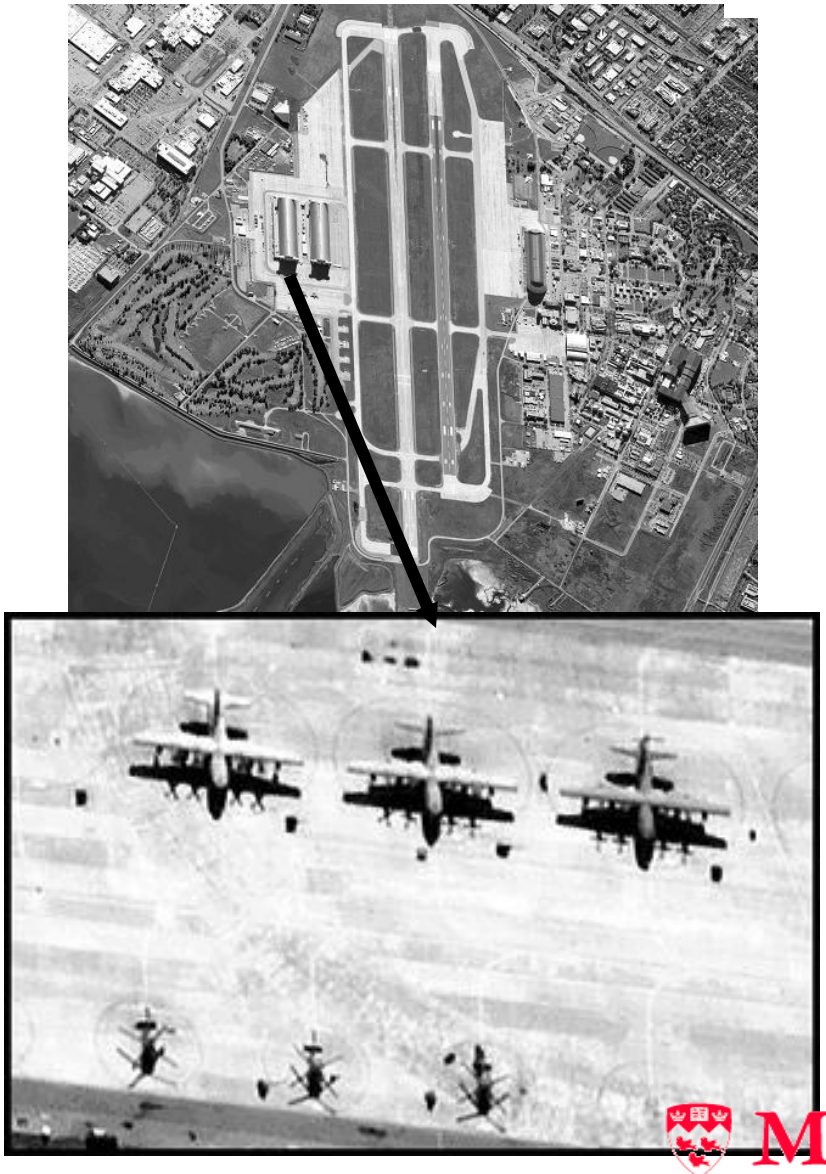
Commercial earth observation satellites for military intelligence gathering

- Capabilities of defence related reconnaissance satellites are not officially declared but they can detect objects 10cm from an altitude of between 150km and 250km

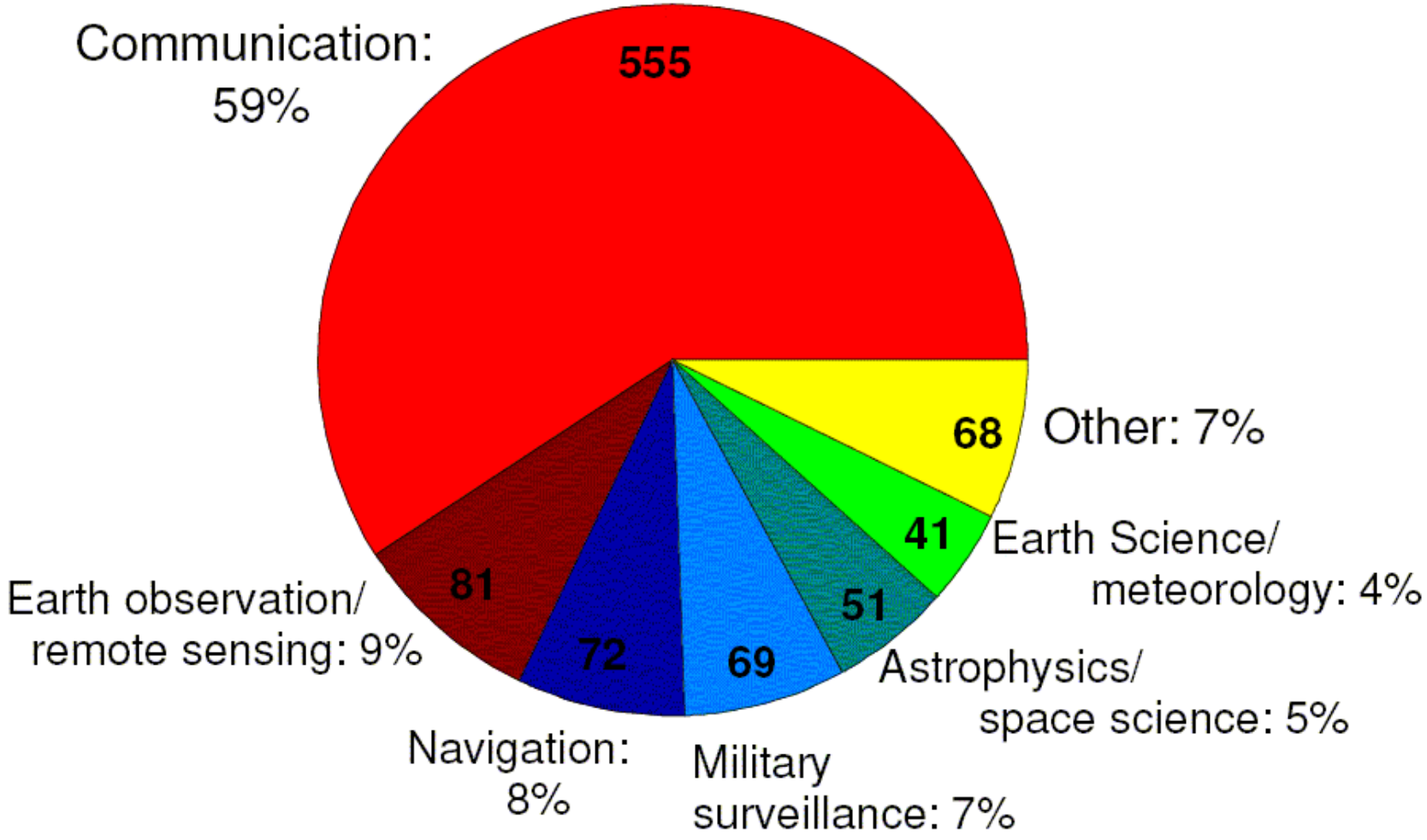
- On the other hand commercial remote sensing satellites have improved considerably since 1972 so that they can detect objects of about 60cm from an altitude of 400km



Current civil-commercial satellites by application (use)

According to the Union of Concerned Scientists : 270 military satellites; 937 civilian-commercial

http://www.ucsusa.org/nuclear_weapons_and_global_security/solutions/space-weapons/ucs-satellite-database.html



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Current Global Governance of Satellite Remote Sensing and Earth Observations

- Convention on Remote Sensing (1978)
- UN Principles relating to Remote Sensing (1986)
- International Charter on "Space and Major Disasters" (2000) and UN-SPIDER

- UNCOPUOS Scientific and Technical Subcommittee (Matters relating to remote sensing, applications for developing countries and monitoring of the Earth's environment)
- Committee on Earth Observation Satellites (CEOS) Coordination Activities
- Group of Earth Observation (GEO) coordinating efforts to build a Global Earth Observation System of Systems (GEOSS).

In Brief:

- More governments are acquiring remote sensing capabilities
- More private (commercial) remote sensing satellites are being operated
- More advanced and high resolution imagery is being used
- More remote sensing applications are being developed
- More availability of satellite imagery at affordable costs
- More uses of commercial satellite imagery for military purposes

- These developments have significant implications for and challenges to the contemporary international Space Law

- KEY BROAD QUESTIONS: Will in the near future the currently applicable global governance system for remote sensing be sufficient for enhancing the benefits of this space activity to the whole mankind ? If not, what kind of global governance system should be adopted?

Key Specific Questions to be addressed by the Session on *"Global Space Governance Of Remote Sensing & Earth Observation"*

- **Access to geo-spatial data: Are the 1986 UN Remote Sensing Principles sufficient, or is a new/enhanced governance framework needed to facilitate access to geo-spatial data?**

- **What are the global governance implications of Earth observation initiatives, such as the Global Earth Observation System of Systems (GEOSS)?**

- **Does the Charter on Disaster Management provide a good model for certain aspects of enhancing global space governance?**

Panelists

CHAIR:

- **Ram JAKHU** *(Associate Professor, Institute of Air and Space Law, Faculty of Law, McGill University - CANADA)*

SPEAKERS:

1. **Prof. Bin LI** *(Associate Director, Institute of Space Law, Beihang University School of Law, CHINA)*
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3. **Mr. Michael S. DODGE** *(Research Counsel & Instructor, University of Mississippi School of Law, USA)*
4. **Prof. Sa'id MOSTESHAR,** *(Director, London Institute of Space Policy and Law, UNITED KINGDOM)*

THANK YOU FOR YOUR ATTENTION