# CEOS WGISS Update: Invited Presentation to LCLUC Science Team

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LCLUC Spring Science Team Meeting
March 31 – April 2, 2009

Committee on Earth Observation Satellites

# WGISS Structure

Martha Maiden, NASA, Chair

Pakorn Apaphant, GISTDA, Vice-Chair

Chuang Liu, NRSCC, Co-User Vice-Chair
Lorant Czaran, UN, Co-User Vice-Chair

**WGISS**

*Interest Groups:*
WGISS Infrastructure – Ken McDonald
Data Utilization – Czaran & Liu

**Technology and Services Subgroup**

Nataliia Kussul, NSAU, Chair

Terence Van Zyl, CSIR, Vice-Chair

*Interest Groups:*
GRID – Shelestov Andrii
Sensor Web – Terence Van Zyl
Web Services – Lyndon Oleson
Data Services Interest Group (proposed)
Standards Liaisons

**Applications Subgroup (External)**

Karen Moe, NASA, Chair

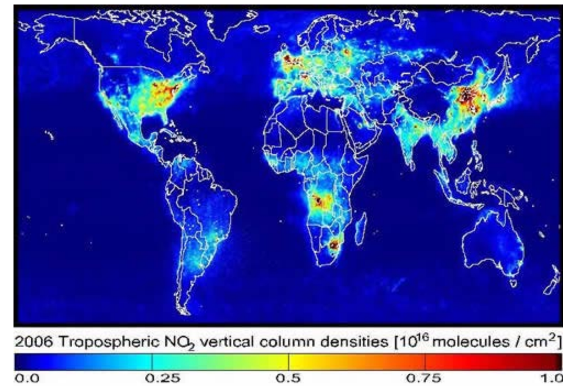
Satoko Miura, JAXA, Vice-Chair

*Interest Groups:*
WGISS Task Force– Various
Global Datasets – Lorant Czaran, Wyn Cudlip
Int'l Directory Network (IDN) – Lola Olsen
Land Surface Imaging – Lyndon Oleson
Atmospheric Composition - Stefan Falke

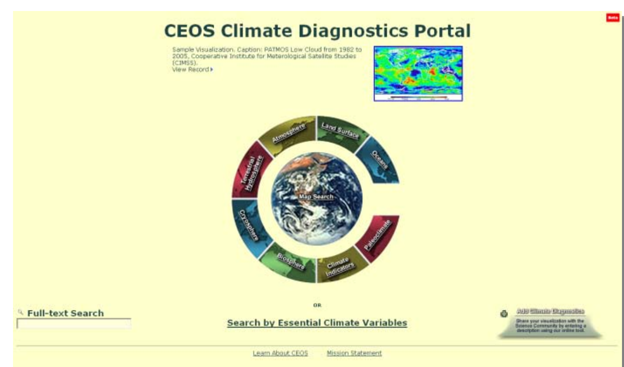
# WGISS Current Focus

## Current Themes

- Provide satellite arm of GEO System of Systems
  - Innovative contributions that will persist, and can be reused
- Work closely with and support CEOS Virtual Constellations
- Work closely with and collaborate as appropriate with WGCV
- Support the CEOS Data Democracy initiative.




(Jim Gleason, USA ; Pepijn Veefkind, KNMI)



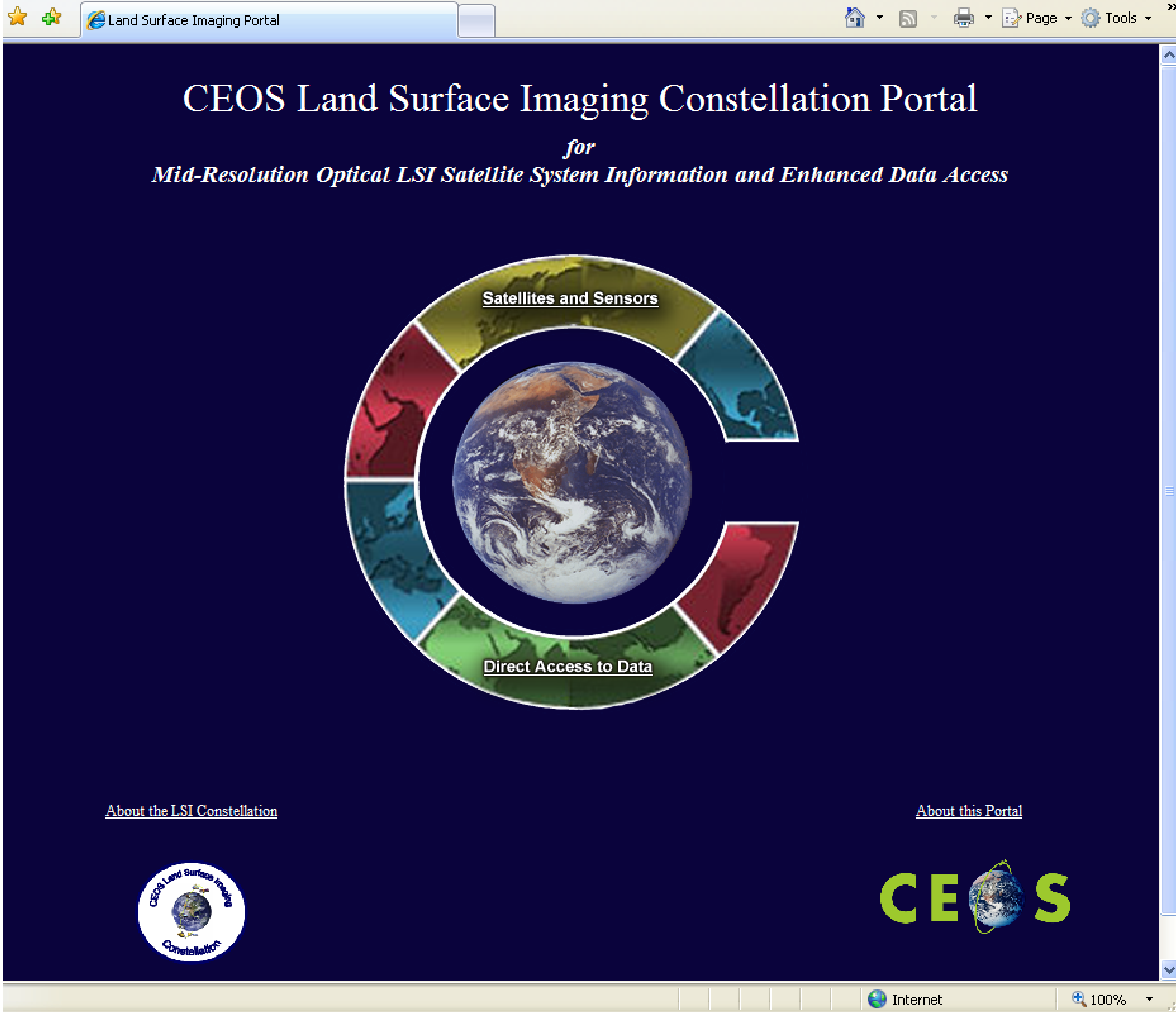

CEOS
Committee on Earth Observation Satellites

# WGISS Accomplishments

- WGISS Task Force - CEOP Project completed successfully at WGISS-26
  - Two “Lessons Learned” documents for GEO, four posted on WGISS website
- GRID Interest Group - multiple projects producing results
  - Flood Model in GRID environment will be used by UN for disasters
- Sensor Web Interest Group - multiple projects underway
  - Contributes to Data Democracy
  - Ability to rapidly respond to events
- Global Datasets Interest Group
  - WGISS Vice Chair Lorant Czaran to head UN-SPIDER office
  - GDIG will support Global DEM, working closely with WGCV, if Plenary endorses Dr. Jan-Peter Muller’s recommendations regarding DA-07-01.
- Web Services Interest Group
  - WGISS-26 held first session of group created at WGISS-25 in Sanya
  - Active group to explore strengths and weaknesses of possible approaches, performance risks, lessons learned of implementing emerging Service Oriented Architecture and Web Services capabilities.

# WGISS Accomplishments, 2

- Land Surface Imaging Interest Group
  - In support of LSI Constellation, LSI Portal in spiral development working with LSI Study Team Lead Bryan Bailey. Initial beta version was demonstrated at GEO Plenary in Bucharest, November 2009.
- ACC - New Interest Group initiated at WGISS-26 led by Stefan Falke
  - Presentation of AIP Air Quality Prototype, can be extended
  - ACC aligned with GEO SBAs, one focus is Air Quality
  - Involvement with 'value-added' AC Portal, working closely with ACC
- Precipitation Constellation - initial session at WGISS-26
  - Initiated liaison approach for WGISS collaboration with PC's GPM Data Working Group (GDaWG)
  - PC contributions of data to WGISS Projects in GRID and Sensor Webs Interest Groups


Land Surface Imaging Portal
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# Focus on CEOS LSI Constellation Portal

CEOS Land Surface Imaging Constellation Portal
For
Mid-Resolution Optical LSI Satellite System Information and Enhanced Data Access

http://wgiss.ceos.org/lsip/

- Currently Provides Access to Land Surface Imaging Constellation:
  - Data: via links to national archives, links to catalogs, and sample imagery via FTP
  - Attributes: science parameters translated into common tables to compare imagery
  - Documentation: linkages to peer reviewed cal and val papers; citation examples

- Future Editions under discussion to provide access to LSIC:
  - Coordinated Sample Data Collections
  - Attribute search function, via postgreSQL database
  - Plan prototype interface attachment for map searching
  - Access open archives for ‘virtual’ searching

# CEOS Land Surface Imaging Constellation Portal

*for*

*Mid-Resolution Optical LSI Satellite System Information and Enhanced Data Access*



**Overview**

· CEOS Agency Mid-Resolution Optical Satellite Systems

**Satellites**

· Satellites & Sensors

· Status & Launches

· Orbit Information

**Sensors**

· Band Information

· Visible & NIR Bands

· SWIR Bands

· Thermal Bands

· Panchromatic Bands

· Hyperspectral Bands

· Radiometric & Geometric Characteristics

· Geographic Characteristics

**Data**

· Data Access

· Documentation

**Direct Access to Data, via Search Tools**

| Satellites & Sensors | Search Tool |
|---|---|
| ADEOS-1, JERS-1 | Search Service |
| ALI, Hyperion, Landsats, ASTER | GloVis |
| ALOS | AUIG, CROSS |
| CBERS 1-2B | CDSR |
| IMS, IRS 1A-D, IRS P2, IRS P6 | Gateway |
| SAC-C | Catalog |
| SPOT 1-5 | SIRIUS |
| THEOS | Data Services |

# CEOS Land Surface Imaging Constellation Portal

*for*

*Mid-Resolution Optical LSI Satellite System Information and Enhanced Data Access*



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### CEOS Member Agency Operated

## Mid-Resolution Optical Land Surface Imaging Satellite Systems

Mid-resolution optical LSI satellite systems are spaceborne land remote sensing systems that image the Earth's land surface in visible, near-infrared, shortwave infrared, and thermal infrared wavelengths with spatial resolutions between 10 meters and 100 meters. Currently, nine CEOS member space agencies operate such systems: **NASA, USGS, CNES, ISRO, JAXA, INPE, CAST, CONAE**, and **GISTDA**. Since 1972, the land remote sensing systems launched by these agencies have collected an enormous volume of image data that has great potential value to the global society because of the good that can be accomplished from the application of these data to a broad range of scientific, social, and practical problems and issues. The data have been utilized in a variety of government, public, private, and national security applications. Examples include land and water management, global change research, disaster management, oil and mineral exploration, agricultural yield forecasting, pollution monitoring, land surface change detection, cartographic mapping, and countless others.

| | | | |
|---|---|---|---|
| Landsat:USA | SPOT:France | Earth Obs.:Japan | THEOS:Thailand |
| EO-1:USA | IRS:India | CBERS:China & Brazil | SAC-C:Argentina |

**Landsat Satellites – USA**

The first Landsat satellite was launched by the National Aeronautics and Space Administration (NASA) in July, 1972. Known initially as the Earth Resources Technology Satellites (ERTS), the Landsat satellites have been the workhorse for mid-resolution, optical land surface imaging from space. A total of six Landsat satellites have achieved orbit, and they have provided an uninterrupted record of calibrated image data of the global land surface for the past 36 years with unprecedented quality, detail, and coverage. Landsat satellites have carried multiple remote sensor systems and data relay systems along with attitude-control and orbit-adjust subsystems, power supply, receivers for ground station commands, and transmitters to send the data to ground receiving stations. Landsat satellites are now operated by the U.S. Geological Survey (USGS), and data are available to all users at no cost by visiting the Earth Explorer or Glovis.

Landsat 1 carried two imaging instruments: the multispectral scanner (MSS), which had four spectral bands with 80m spatial resolution, and a three-band return bean vidicon (RBV) camera, but data from the RBV were never used widely. Landsats 2 and 3, launched in 1975 and 1978, were configured similarly. In 1984, Landsat 4 was launched with the MSS and a new instrument called the thematic mapper (TM). TM instrument upgrades included improved spatial resolution (30 meters) and three new spectral bands. Landsat 5 was launched in 1984, and it carries the same instrument package as Landsat 4. Landsat 5 continues to collect TM data, some 24 years after launch. Landsat 6, which also carried a TM sensor, failed to achieve orbit in 1993. Landsat 7, equipped with an enhanced thematic mapper, plus (ETM+) that includes a 15m panchromatic band and 60m thermal band was launched in 1999. In 2003, the ETM+ on Landsat 7 suffered a mechanical problem that substantially affects the quality of the data collected, though it does continue to acquire global data on a routine basis. The next Landsat satellite is scheduled for launch in 2011.

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**CEOS Agency Current and Former Mid-Resolution Optical Satellites & Sensors**

| Satellite | Sensors | Agencies |
|---|---|---|
| ADEOS-1 | AVNIR-1 | JAXA |
| ALOS | AVNIR-2 | JAXA |
| CBERS-1 | HRCC, IRMSS | CAST, INPE |
| CBERS-2 | HRCC, IRMSS | CAST, INPE |
| CBERS-2B | HRCC | CAST, INPE |
| EO-1 | ALI, Hyperion | NASA, USGS |
| IMS-1 | MX-T | ISRO |
| IRS-1A | LISS-I, LISS-II | ISRO |
| IRS-1B | LISS-I, LISS-II | ISRO |
| IRS-1C | LISS-IIIA | ISRO |
| IRS-1D | LISS-IIIA | ISRO |
| IRS-P2 | LISS-IIIA | ISRO |
| IRS-P6 | LISS-IIIB, AWiFS | ISRO |
| JERS-1 | OPS | JAXA |
| Landsat 1 | MSS | NASA, USGS |
| Landsat 2 | MSS | NASA, USGS |
| Landsat 3 | MSS-B | NASA, USGS |
| Landsat 4 | MSS, TM | NASA, USGS |
| Landsat 5 | MSS, TM | NASA, USGS |
| Landsat 7 | ETM+ | NASA, USGS |
| SAC-C | HRTC | CONAE |
| SPOT-1 | HRV | CNES |
| SPOT-2 | HRV | CNES |
| SPOT-3 | HRV | CNES |
| SPOT-4 | HRVIR | CNES |
| SPOT-5 | HRG | CNES |
| Terra | ASTER | METI, NASA |
| THEOS | MS | GISTDA |

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## Status and Launch Information

| Satellite | Sensors | Agencies | Launch Date | Status | Launch Site | Launch Vehicle |
|---|---|---|---|---|---|---|
| ADEOS-1 | AVNIR-1 | JAXA | 1996 | retired 1997 | Tanegashima | H-II |
| ALOS | AVNIR-2 | JAXA | 2006 | active | Tanegashima | H-IIA |
| CBERS-1 | HRCC, IRMSS | CAST, INPE | 1999 | retired 2003 | Taiyuan | Long March 4B |
| CBERS-2 | HRCC, IRMSS | CAST, INPE | 2003 | active | Taiyuan | Long March 4B |
| CBERS-2B | HRCC | CAST, INPE | 2007 | active | Taiyuan | Long March 4B |
| EO-1 | ALI, Hyperion | NASA, USGS | 2000 | active | Vandenberg | Delta 7320-10 |
| IMS-1 | MX-T | ISRO | 2008 | active | Sriharikota | PSLV-C9 |
| IRS-1A | LISS-I, LISS-II | ISRO | 1988 | retired 1995 | Baikonur | Vostok |
| IRS-1B | LISS-I, LISS-II | ISRO | 1991 | retired 1999 | Baikonur | Vostok |
| IRS-1C | LISS-IIIA | ISRO | 1995 | retired 2006 | Baikonur | Molniya |
| IRS-1D | LISS-IIIA | ISRO | 1997 | active | Sriharikota | PSLV-C1 |
| IRS-P2 | LISS-IIIA | ISRO | 1994 | retired 1997 | Sriharikota | PSLV-D2 |
| IRS-P6 | LISS-IIIB, AWiFS | ISRO | 2003 | active | Sriharikota | PSLV-C5 |
| JERS-1 | OPS | JAXA | 1992 | retired 1998 | Tanegashima | H-I |
| Landsat 1 | MSS | NASA, USGS | 1972 | retired 1978 | Vandenberg | Delta 900 |
| Landsat 2 | MSS | NASA, USGS | 1975 | retired 1982 | Vandenberg | Delta 2910 |
| Landsat 3 | MSS-B | NASA, USGS | 1978 | retired 1983 | Vandenberg | Delta 2910 |
| Landsat 4 | MSS, TM | NASA, USGS | 1982 | retired 2001 | Vandenberg | Delta 3920 |
| Landsat 5 | MSS, TM | NASA, USGS | 1984 | active | Vandenberg | Delta 3920 |
| Landsat 7 | ETM+ | NASA, USGS | 1999 | active | Vandenberg | Delta II |
| SAC-C | HRTC | CONAE | 2000 | active | Vandenberg | Delta 7320 |
| SPOT-1 | HRV | CNES | 1986 | retired 1990 | Kourou | Ariane 2 |
| SPOT-2 | HRV | CNES | 1990 | active | Kourou | Ariane 2 |
| SPOT-3 | HRV | CNES | 1993 | retired 1996 | Kourou | Ariane 2 |
| SPOT-4 | HRVIR | CNES | 1998 | active | Kourou | Ariane 3 |
| SPOT-5 | HRG | CNES | 2002 | active | Kourou | Ariane 4 |
| Terra | ASTER | METI, NASA | 2000 | active | Vandenberg | Atlas IIAS |
| THEOS | MS | GISTDA | 2008 | active | Yasny | Dnepr |

Notes: **Status** refers to the current operation of the satellite, whether it is actively acquiring imagery (active), or has been decommissioned or is otherwise inactive (retired).

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## Orbit Information

| Satellite | Sensors | Orbit | Altitude | Inclination | Eq.Crossing |
|---|---|---|---|---|---|
| ADEOS-1 | AVNIR-1 | near-polar, ss | 789 | 98.6 | 10:30 |
| ALOS | AVNIR-2 | near-polar, ss | 692 | 98.2 | 10:30 |
| CBERS-1 | HRCC, IRMSS | near-polar, ss | 778 | 98.5 | 10:30 |
| CBERS-2 | HRCC, IRMSS | near-polar, ss | 778 | 98.5 | 10:30 |
| CBERS-2B | HRCC | near-polar, ss | 778 | 98.5 | 10:30 |
| EO-1 | ALI, Hyperion | near-polar, ss | 705 | 98.7 | 10:15 |
| IMS-1 | MX-T | near-polar, ss | 635 | 97.9 | 9:30 |
| IRS-1A | LISS-I, LISS-II | near-polar, ss | 904 | 98.8 | 10:25 |
| IRS-1B | LISS-I, LISS-II | near-polar, ss | 904 | 99.1 | 10:25 |
| IRS-1C | LISS-IIIA | near-polar, ss | 817 | 98.7 | 10:30 |
| IRS-1D | LISS-IIIA | near-polar, ss | 817 | 98.7 | 10:30 |
| IRS-P2 | LISS-IIIA | near-polar, ss | 817 | 98.7 | 10:30 |
| IRS-P6 | LISS-IIIB, AWiFS | near-polar, ss | 817 | 98.7 | 10:30 |
| JERS-1 | OPS | near-polar, ss | 568 | 97.7 | 10:30 |
| Landsat 1 | MSS | near-polar, ss | 907 | 99.1 | 9:45 |
| Landsat 2 | MSS | near-polar, ss | 907 | 99.1 | 9:45 |
| Landsat 3 | MSS-B | near-polar, ss | 907 | 99.1 | 9:45 |
| Landsat 4 | MSS, TM | near-polar, ss | 705 | 98.2 | 9:45 |
| Landsat 5 | MSS, TM | near-polar, ss | 705 | 98.2 | 9:45 |
| Landsat 7 | ETM+ | near-polar, ss | 705 | 98.2 | 10:00 |
| SAC-C | HRTC | near-polar, ss | 704 | 98.2 | 10:15 |
| SPOT-1 | HRV | near-polar, ss | 832 | 98.7 | 10:30 |
| SPOT-2 | HRV | near-polar, ss | 832 | 98.7 | 10:30 |
| SPOT-3 | HRV | near-polar, ss | 832 | 98.7 | 10:30 |
| SPOT-4 | HRVIR | near-polar, ss | 832 | 98.8 | 10:30 |
| SPOT-5 | HRG | near-polar, ss | 832 | 98.7 | 10:30 |
| Terra | ASTER | near-polar, ss | 705 | 98.5 | 10:30 |
| THEOS | MS | near-polar, ss | 822 | 98.7 | 10:00 |

Notes: **Orbit** refers to the type of orbit the satellite makes over the Earth. All of these are near-polar, sun-synchronous. **Altitude** refers to the height of the satellite orbit above the Earth's mean sea level, in kilometers. **Inclination** refers to the angle of an orbit compared to the equatorial plane, in degrees. **Eq.Crossing** refers to the time of day a satellite crosses the equator.

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## Band Information

| Satellites | Sensor | # Bands | Band Range Min | Band Range Max | Vis Bands | IR Bands |
|---|---|---|---|---|---|---|
| ADEOS-1 | AVNIR-1 | 5 | 0.420 | 0.890 | B,G,R, P | N |
| ALOS | AVNIR-2 | 4 | 0.420 | 0.890 | B,G,R | N |
| CBERS-1, 2, 2B | HRCC | 5 | 0.450 | 0.890 | B,G,R, P | N |
| CBERS-1, 2 | IRMSS | 4 | 0.500 | 12.500 | P | S, T |
| EO-1 | ALI | 10 | 0.433 | 2.350 | B,G,R, P | N, S |
| EO-1 | Hyperion | 242 | 0.356 | 2.577 | B,G,R | N, S |
| IMS-1 | MX-T | 4 | 0.450 | 0.860 | B,G,R | N |
| IRS-1A, 1B | LISS-I | 4 | 0.420 | 0.860 | B,G,R | N |
| IRS-1A, 1B | LISS-II | 4 | 0.420 | 0.860 | B,G,R | N |
| IRS-1C, 1D, P2 | LISS-IIIA | 4 | 0.520 | 1.700 | G,R | N, S |
| IRS-P6 | LISS-IIIB | 4 | 0.520 | 1.700 | G,R | N, S |
| IRS-P6 | AWiFS | 4 | 0.520 | 1.700 | G,R | N, S |
| JERS-1 | OPS | 8 | 0.520 | 2.400 | G,R | N, S |
| Landsat 1, 2, 4, 5 | MSS | 4 | 0.500 | 1.100 | G,R | N |
| Landsat 3 | MSS-B | 5 | 0.500 | 12.600 | G,R | N, T |
| Landsat 4, 5 | TM | 7 | 0.450 | 12.500 | B,G,R | N, S, T |
| Landsat 7 | ETM+ | 8 | 0.450 | 12.500 | B,G,R, P | N, S, T |
| SAC-C | HRTC | 1 | 0.400 | 0.900 | P | - |
| SPOT-1, 2, 3 | HRV | 4 | 0.500 | 0.890 | G,R, P | N |
| SPOT-4 | HRVIR | 5 | 0.500 | 1.750 | G,R, P | N, S |
| SPOT-5 | HRG | 4 | 0.500 | 1.750 | G,R, P | N, S |
| Terra | ASTER | 14 | 0.520 | 11.650 | G,R | N, S, T |
| THEOS | MS | 4 | 0.450 | 0.900 | B,G,R | N |

Notes: **Vis Bands** refer to the blue (B), green (G) and red (R) visible bands. The Vis Bands also include reference here to the panchromatic (P) band. **IR Bands** refers to near (N), short wave-length (S) and thermal (T) infrared bands. Hyperion is hyperspectral.

## Band Information - Visible and Near Infrared Bands

| Satellites | Sensor | B Min | B Max | G Min | G Max | R Min | R Max | N Min | N Max | Res | Swath |
|---|---|---|---|---|---|---|---|---|---|---|---|
| ADEOS-1 | AVNIR-1 | 0.42 | 0.50 | 0.52 | 0.60 | 0.61 | 0.69 | 0.76 | 0.89 | 16 | 80 |
| ALOS | AVNIR-2 | 0.42 | 0.50 | 0.52 | 0.60 | 0.61 | 0.69 | 0.76 | 0.89 | 10 | 70 |
| CBERS-1, 2, 2B | HRCC | 0.45 | 0.52 | 0.52 | 0.59 | 0.63 | 0.69 | 0.77 | 0.89 | 20 | 113 |
| CBERS-1, 2 | IRMSS | - | - | - | - | - | - | - | - | N.A. | N.A. |
| EO-1 | ALI | 0.45 | 0.52 | 0.53 | 0.61 | 0.63 | 0.69 | 0.78 | 0.81 | 30 | 37 |
| EO-1 | Hyperion | Hyperion has 140 bands in the VNIR | | | | | | | | 30 | 7.5 |
| IMS-1 | MX-T | 0.45 | 0.52 | 0.52 | 0.59 | 0.62 | 0.68 | 0.77 | 0.86 | 37 | 151 |
| IRS-1A, 1B | LISS-I | 0.42 | 0.52 | 0.52 | 0.59 | 0.62 | 0.68 | 0.77 | 0.86 | 72.5 | 148 |
| IRS-1A, 1B | LISS-II | 0.42 | 0.52 | 0.52 | 0.59 | 0.62 | 0.68 | 0.77 | 0.86 | 36 | 74 |
| IRS-1C, 1D, P2 | LISS-IIIA | - | - | 0.52 | 0.59 | 0.62 | 0.68 | 0.77 | 0.86 | 23.5 | 141 |
| IRS-P6 | LISS-IIIB | - | - | 0.52 | 0.59 | 0.62 | 0.68 | 0.77 | 0.86 | 23.5 | 141 |
| IRS-P6 | AWiFS | - | - | 0.52 | 0.59 | 0.62 | 0.68 | 0.77 | 0.86 | 56 | 740 |
| JERS-1 | OPS | - | - | 0.52 | 0.60 | 0.63 | 0.69 | 0.76 | 0.86 | 24 | 75 |
| Landsat 1, 2, 4, 5 | MSS | - | - | 0.52 | 0.60 | 0.63 | 0.69 | 0.76 | 0.90 | 80 | 185 |
| Landsat 3 | MSS-B | - | - | 0.52 | 0.60 | 0.63 | 0.69 | 0.76 | 0.90 | 80 | 185 |
| Landsat 4, 5 | TM | 0.45 | 0.52 | 0.52 | 0.60 | 0.63 | 0.69 | 0.76 | 0.90 | 30 | 185 |
| Landsat 7 | ETM+ | 0.45 | 0.52 | 0.53 | 0.61 | 0.63 | 0.69 | 0.76 | 0.90 | 30 | 185 |
| SAC-C | HRTC | - | - | - | - | - | - | - | - | N.A. | N.A. |
| SPOT-1, 2, 3 | HRV | - | - | 0.50 | 0.59 | 0.61 | 0.68 | 0.79 | 0.89 | 20 | 60 |
| SPOT-4 | HRVIR | - | - | 0.50 | 0.59 | 0.61 | 0.68 | 0.79 | 0.89 | 20 | 60 |
| SPOT-5 | HRG | - | - | 0.50 | 0.59 | 0.61 | 0.68 | 0.79 | 0.89 | 20 | 60 |
| Terra | ASTER | - | - | 0.52 | 0.60 | 0.63 | 0.69 | 0.76 | 0.86 | 15 | 60 |
| THEOS | MS | 0.45 | 0.52 | 0.53 | 0.60 | 0.62 | 0.69 | 0.77 | 0.90 | 15 | 90 |

Notes: **B** refers to the blue band; **G** refers to the green band; **R** refers to the red band; **N** refers to the Near Infrared (NIR) band. **Res** refers to the spatial resolution, in meters, for these bands. **Swath** refers to the swath width, in kilometers, for these bands. The EO-1 ALI sensor has an additional blue band at 0.433:0.453 and additional NIR bands at 0.845:0.890 and 1.20:1.30. The Landsat MSS and MSS-B sensors had an additional NIR band at 0.800:1.100. NIR bands on JERS-1 and ASTER are stereo bands. **N.A.** refers to features that are not applicable.

## Band Information - Shortwave Infrared Bands

| Satellites | Sensor | S1 Min | S1 Max | S2 Min | S2 Max | S3 Min | S3 Max | Res | Swath |
|---|---|---|---|---|---|---|---|---|---|
| ADEOS-1 | AVNIR-1 | - | - | - | - | - | - | - | - |
| ALOS | AVNIR-2 | - | - | - | - | - | - | - | - |
| CBERS-1, 2, 2B | HRCC | - | - | - | - | - | - | - | - |
| CBERS-1, 2 | IRMSS | 1.55 | 1.75 | 2.08 | 2.35 | - | - | 80 | 120 |
| EO-1 | ALI | 1.20 | 1.30 | 1.55 | 1.75 | 2.08 | 2.35 | 30 | 37 |
| EO-1 | Hyperion | Hyperion has 102 bands in the SWIR | | | | | | 30 | 7.5 |
| IMS-1 | MX-T | - | - | - | - | - | - | - | - |
| IRS-1A, 1B | LISS-I | - | - | - | - | - | - | - | - |
| IRS-1A, 1B | LISS-II | - | - | - | - | - | - | - | - |
| IRS-1C, 1D, P2 | LISS-IIIA | 1.55 | 1.70 | - | - | - | - | 70.5 | 148 |
| IRS-P6 | LISS-IIIB | 1.55 | 1.70 | - | - | - | - | 23.5 | 141 |
| IRS-P6 | AWiFS | 1.55 | 1.70 | - | - | - | - | 56 | 740 |
| JERS-1 | OPS | 1.60 | 1.71 | 2.01 | 2.12 | 2.13 | 2.25 | 24 | 75 |
| Landsat 1, 2, 4, 5 | MSS | - | - | - | - | - | - | - | - |
| Landsat 3 | MSS-B | - | - | - | - | - | - | - | - |
| Landsat 4, 5 | TM | 1.5 | 1.75 | 2.08 | 2.35 | - | - | 30 | 185 |
| Landsat 7 | ETM+ | 1.55 | 1.75 | 2.08 | 2.35 | - | - | 30 | 185 |
| SAC-C | HRTC | - | - | - | - | - | - | - | - |
| SPOT-1, 2, 3 | HRV | - | - | - | - | - | - | - | - |
| SPOT-4 | HRVIR | 1.580 | 1.750 | - | - | - | - | 20 | 60 |
| SPOT-5 | HRG | 1.580 | 1.750 | - | - | - | - | 20 | 60 |
| Terra | ASTER | 1.600 | 1.700 | 2.145 | 2.185 | 2.185 | 2.225 | 30 | 60 |
| THEOS | MS | - | - | - | - | - | - | - | - |

Notes: **S** refers to short wave-length infrared (SWIR) bands. **Res** refers to the spatial resolution, in meters, of these bands. **Swath** refers to the swath width, in kilometers, of these bands. Also, Terra ASTER has three additional SWIR bands at 2.235:2.285, 2.295:2.365, and 2.360:2.430. JERS OPS had one additional SWIR band at 2.270:2.400.

# WGISS Outreach

- Co-Data Conference:  Vice Chair for Users Liu Chuang
  - Chaired Special Session, Topic GRID activities in WGISS
  - 6 presentations were made
  - Large event
- UN-SPIDER Workshop: Vice Chair for Users Lorant Czaran
  - GRID activities highlighted by NASU, Ukraine WGISS delegates
  - WGISS Sensor Web activities by NASA WGISS delegates
- The XXI ISPRS Congress, Beijing, China: Vice-Chair Pakorn Apaphant
  - Organize and chair the session on Spatial Data Infrastructure and Spatial Information Grid
- UNGAID: Vice Chair for Users Liu Chuang
  - Presentation to introduce WGISS/CEOS to the forum –Vice Chair: Pakorn Apaphant

# WGISS Way Forward - 2009

- GRID
  - New Project “Grid Technologies for Multi-Source Data Integration” started 2008
  - Grid can be used as technical base for EO data democracy, and for disaster EO data aid action
  - New Grid research focus on on-demand processing capability
- Web Services Interest Group
  - Established after WGISS-25 in recognition that Web Services are a part of the future
  - Initiating investigations into performance mitigation approaches and solutions
- AC Portal to be led by WGISS/NASA (Falke) and AC/DLR (Loyola)
- Global Datasets to present status of DEM Interoperability requirements and recommend actions at WGISS 27
- Security Session to be organized for WGISS-27, broadly applicable

# WGISS Way Forward – 2009, 2

- Disaster SBA Support for GEO – Currently being formulated
  - Motivation: WGISS successes during recent years in supporting individual disaster events (e.g. China earthquake 2008) brings “Best Practices”
  - Multiple technologies and services can be brought to bear
  - Vice Chair for Users Lorant Czaran (UN) became Director of UN-SPIDER, fall 2008.
  - Will start by working under two CEOS-led and contributing DI Tasks in GEO 2009-2011 WP, and would enlarge their scope.
  - Pakorn Apaphant GISTDA/WGISS to work with Guy Seguin CSA/Disaster SBA Lead

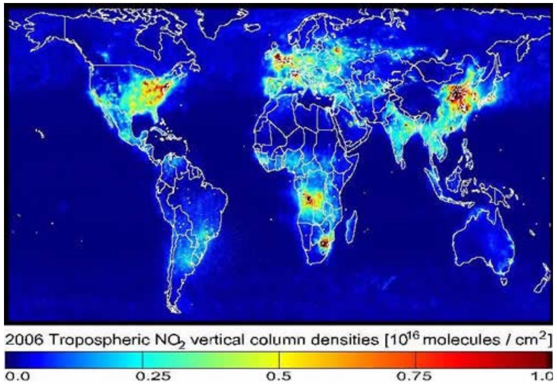
- New Data Services IG proposed for 2009. Vision is to be service-oriented, concentrating on how to provide long term or sustainable data services. Call for CEOS agencies’ participation and ideas to lay out its objectives and activities.
  - Data Quality information cooperation with WGCV falls in this scope.
  - Would naturally support new GEO Task DA-09-01-b “Data, Metadata, and Products Harmonization”, led by CEOS and USGS.

- ***WGISS Challenge: New Projects to include plans for sustaining successful prototypes beyond demonstration***

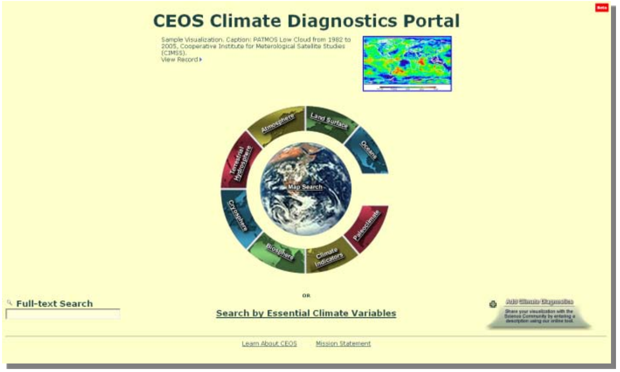
# WGISS Summary

**Current Themes**

- Provide satellite arm of GEO System of Systems
  - Innovative contributions that will persist, and can be reused
- Work closely with and support Virtual Constellations
- Work closely with collaborate with WGCV
- Support the Data Democracy initiative.




(Jim Gleason, USA ; Pepijn Veefkind, KNMI)




**Status**

- GEOSS contributions Climate Diagnostics Portal, LSI Portal, Flood Monitoring for Disasters
- Constellations support for LSI, ACC, and engaged PC
- Areas of interest, cooperation with WGCV: Global Datasets, Data Quality
- Contribution to Data Democracy emphasized in all Projects

CEOS
Committee on Earth Observation Satellites

WGISS

# WGISS-27 Boulder,CO September 2008