DISPONIBILIDAD DE DATOS DE LANDSAT-8 Y SU PROCESAMIENTO EN ARCGIS

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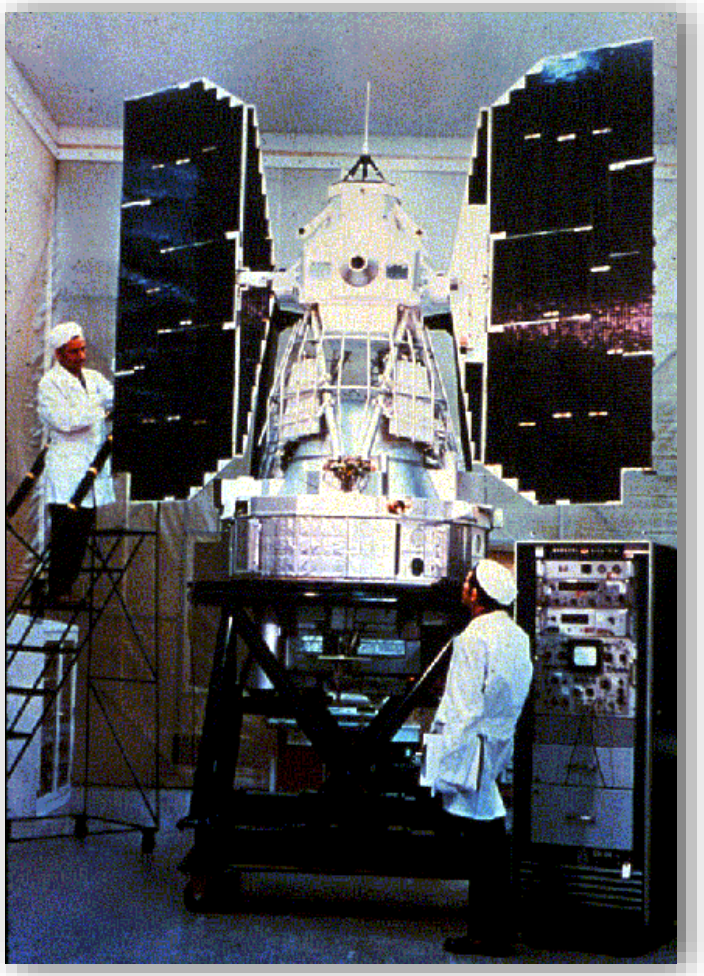
GERS

From ERTS-1 to LANDSAT

- **A finales de la década de los 60 se comenzó la planificación del primer satélite dedicado específicamente a percepción remota multiespectral.**

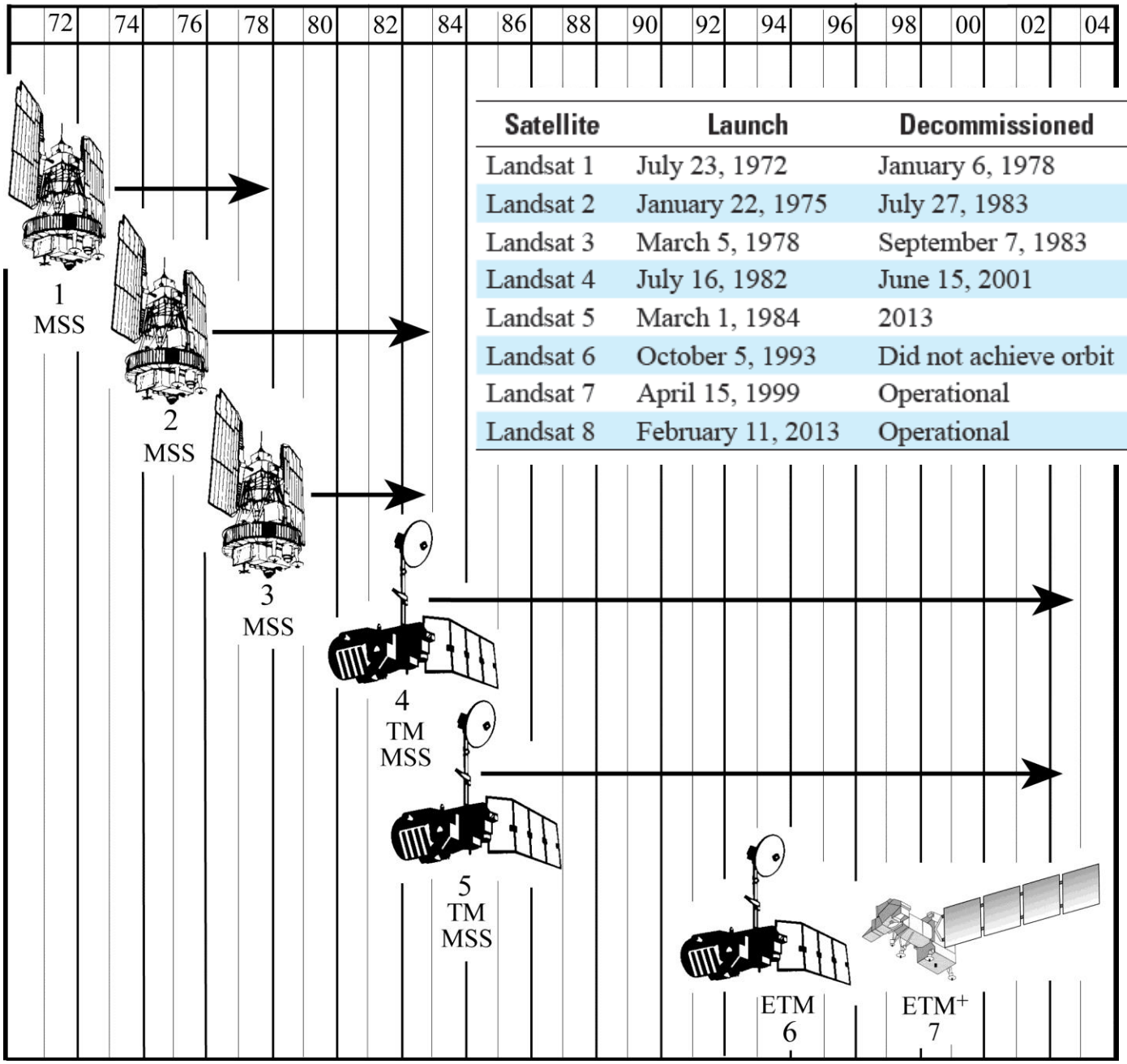
- **Diseñado y construído por NASA. El ERTS-1 (Earth Resources Technology Satellite) fué lanzado el 23 de julio de 1972.**

- **Más tarde su nombre cambió a LANDSAT**



http://landsat.gsfc.nasa.gov

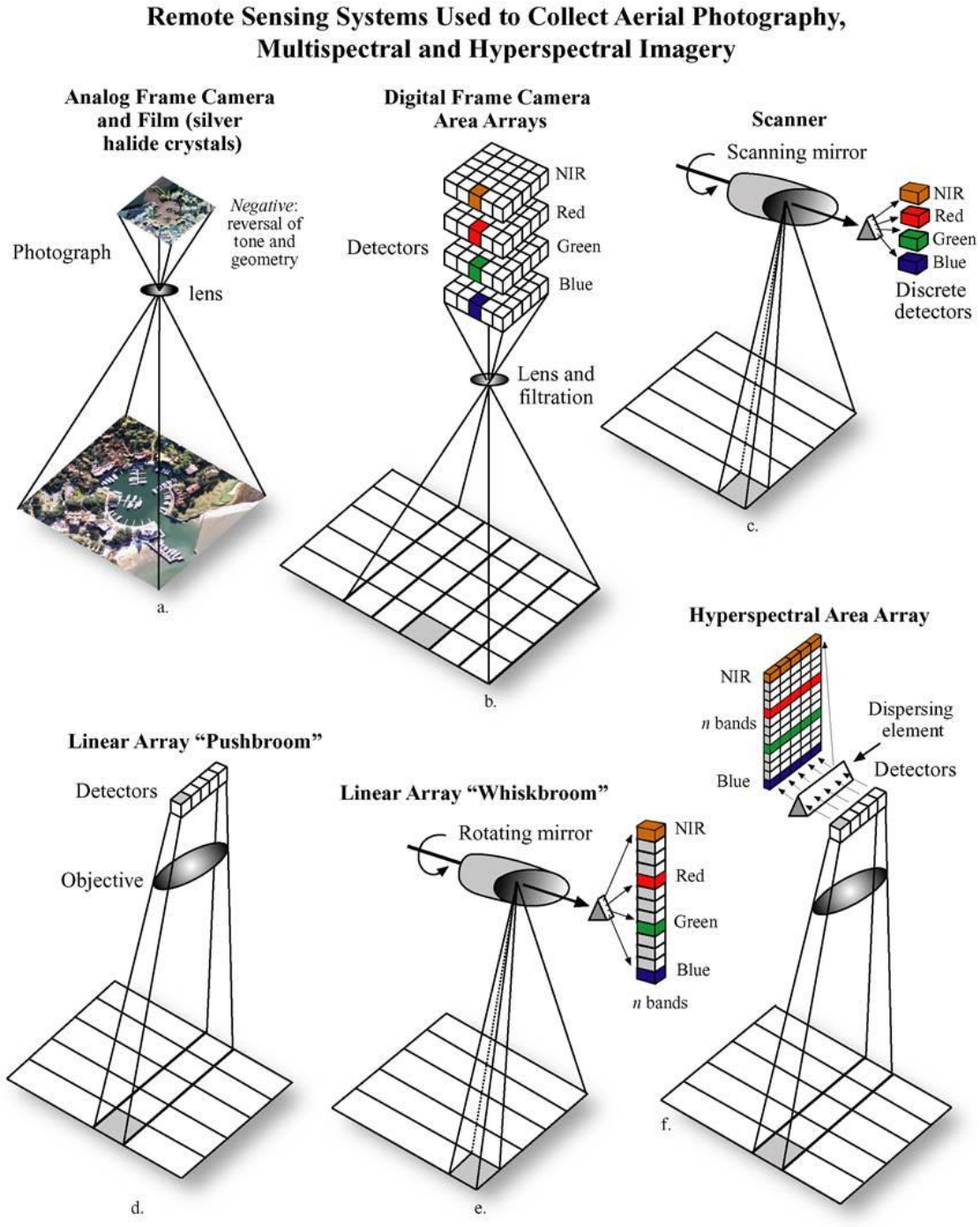
Chronological Launch and Retirement History of the Landsat Satellites



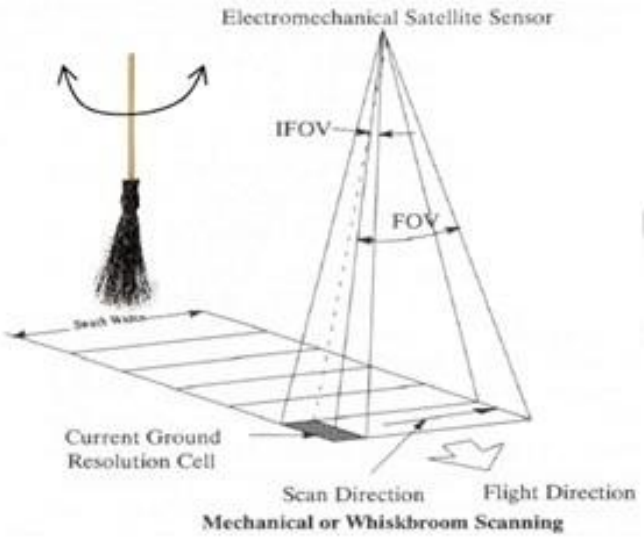
Satellite	Launch	Decommissioned	Sensors
Landsat 1	July 23, 1972	January 6, 1978	MSS/RBV
Landsat 2	January 22, 1975	July 27, 1983	MSS/RBV
Landsat 3	March 5, 1978	September 7, 1983	MSS/RBV
Landsat 4	July 16, 1982	June 15, 2001	MSS/TM
Landsat 5	March 1, 1984	2013	MSS/TM
Landsat 6	October 5, 1993	Did not achieve orbit	ETM
Landsat 7	April 15, 1999	Operational	ETM+
Landsat 8	February 11, 2013	Operational	OLI/TIRS

COMPARIZON BETWEEN SENSORS

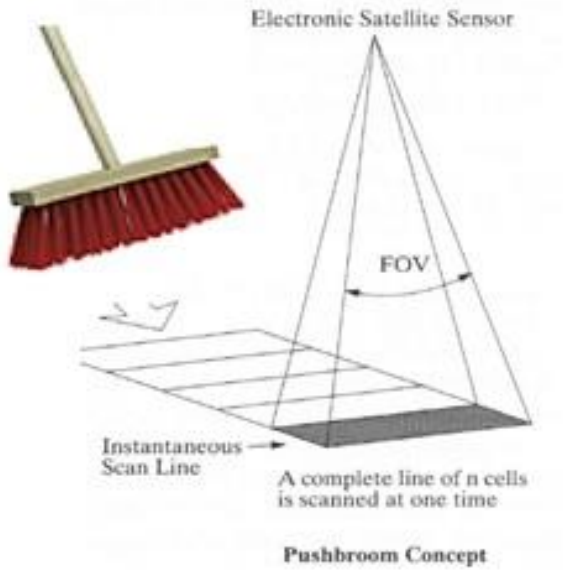
	MSS	TM	ETM+	OLI/TIRS
Sensor type	opto-mechanical	whiskbroom	whiskbroom	pushbroom
Spatial Resolution	80 m	30 m (120 m - thermal)	30 m (120 m - thermal, 15 m pan)	30 m (15 m pan, 100 m thermal)
Spectral Range	0.5 - 1.1 µm	0.45 - 12.5 µm	0.45 - 12.5 µm	0.43 – 12.51 µm
Number of Bands	4 (5 in Landsat 3)	7	8	11 (9 and 2)
Temporal Resolution	18 days (L1-L3) 16 days (L4 & L5)	16 days	16 days	16 days
Image Size	185 km X 185 km	185 km X 172 km	184 km X 185.2 km	185 km X 185 km
Radiometric Resolution	6 bits (64 DN)	8 bits (256 DN)	8 bits (256 DN)	12 bits (4096 DN)
Programmable	No	Yes	Yes	Yes



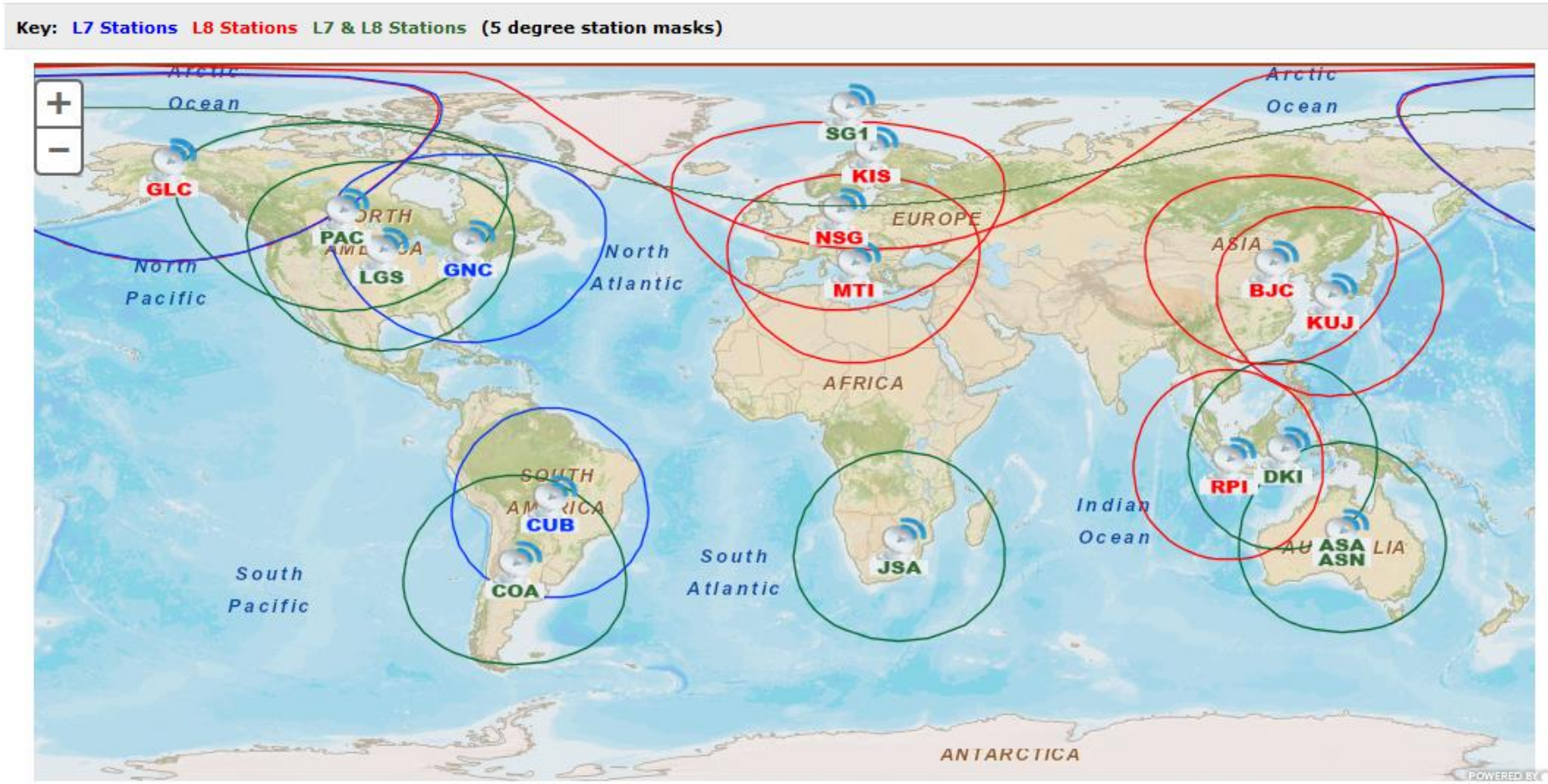
TM and ETM+

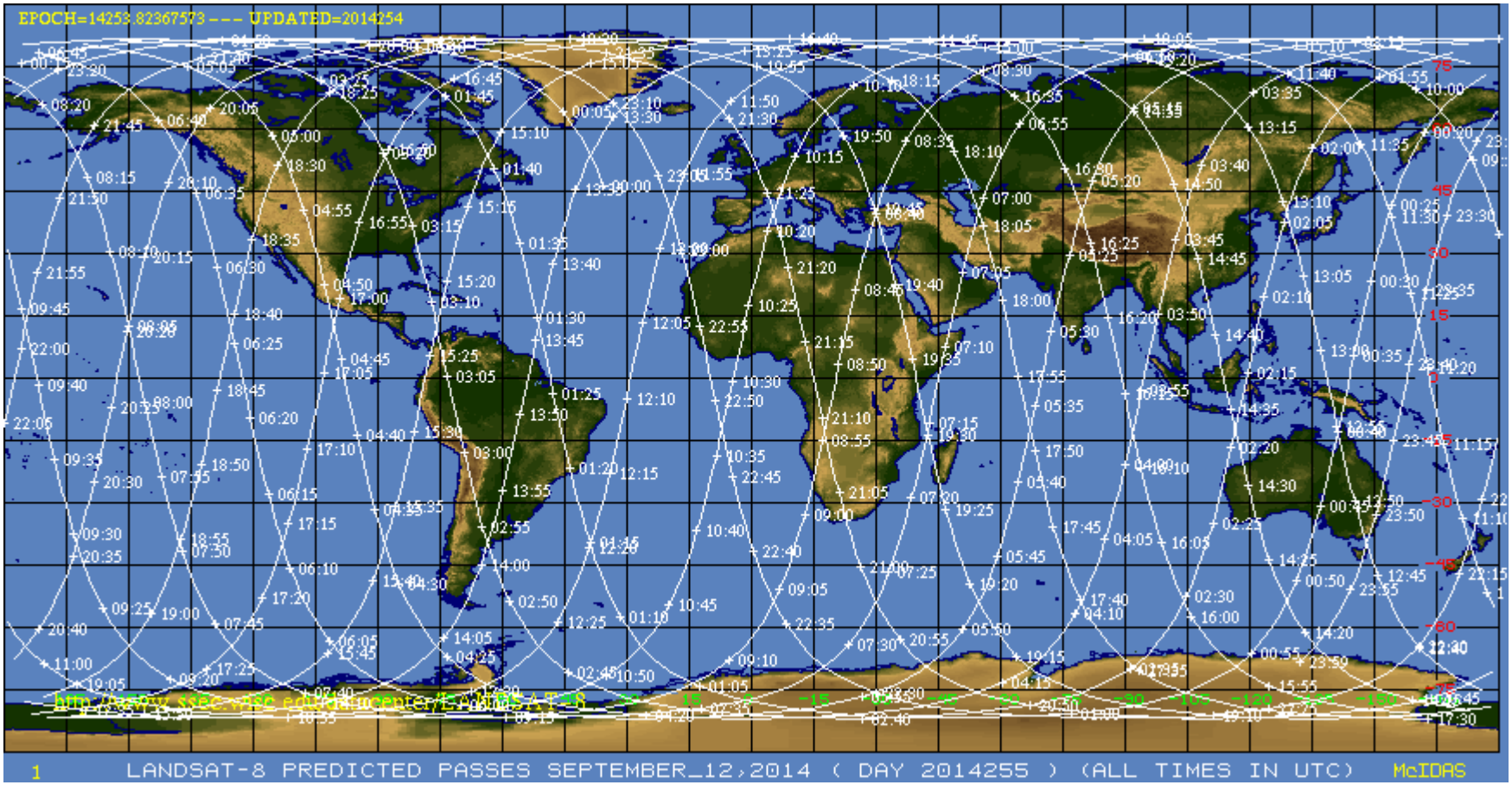


OLI and TIRS



International Ground Station (IGS) Network




EPOCH=14253.82367573 --- UPDATED=2014254
1 LANDSAT-8 PREDICTED PASSES SEPTEMBER_12,2014 (DAY 2014255) (ALL TIMES IN UTC) McIDAS

LANDSAT-8
Launch: February 11, 2013
Operational Land Imager (OLI)
Thermal Infrared Sensor (TIRS)

OLI and TIRS band designations.

Spectral bands	Wavelength (micrometers)	Resolution (meters)	Use
Band 1–coastal/aerosol	0.43–0.45	30	Increased coastal zone observations.
Band 2–blue	0.45–0.51	30	Bathymetric mapping; distinguishes soil from vegetation; deciduous from coniferous vegetation.
Band 3–green	0.53–0.59	30	Emphasizes peak vegetation, which is useful for assessing plant vigor.
Band 4–red	0.64–0.67	30	Emphasizes vegetation slopes.
Band 5–near IR	0.85–0.88	30	Emphasizes vegetation boundary between land and water, and landforms.
Band 6–SWIR 1	1.57–1.65	30	Used in detecting plant drought stress and delineating burnt areas and fire-affected vegetation, and is also sensitive to the thermal radiation emitted by intense fires; can be used to detect active fires, especially during nighttime when the background interference from SWIR in reflected sunlight is absent.
Band 7–SWIR-1	2.11–2.29	30	Used in detecting drought stress, burnt and fire-affected areas, and can be used to detect active fires, especially at nighttime.
Band 8–panchromatic	0.50–0.68	15	Useful in 'sharpening' multispectral images.
Band 9–cirrus	1.36–1.38	30	Useful in detecting cirrus clouds.
Band 10–TIRS 1	10.60–11.19	100	Useful for mapping thermal differences in water currents, monitoring fires and other night studies, and estimating soil moisture.
Band 11–TIRS 2	11.50–12.51	100	Same as band 10.

Instrument-specific relative spectral response functions may be viewed and compared using the Spectral Viewer tool: *http://landsat.usgs.gov/tools_spectralViewer.php*.

OLI Image of Mayaguez Bay May 1, 2013

Resolutions of OLI:

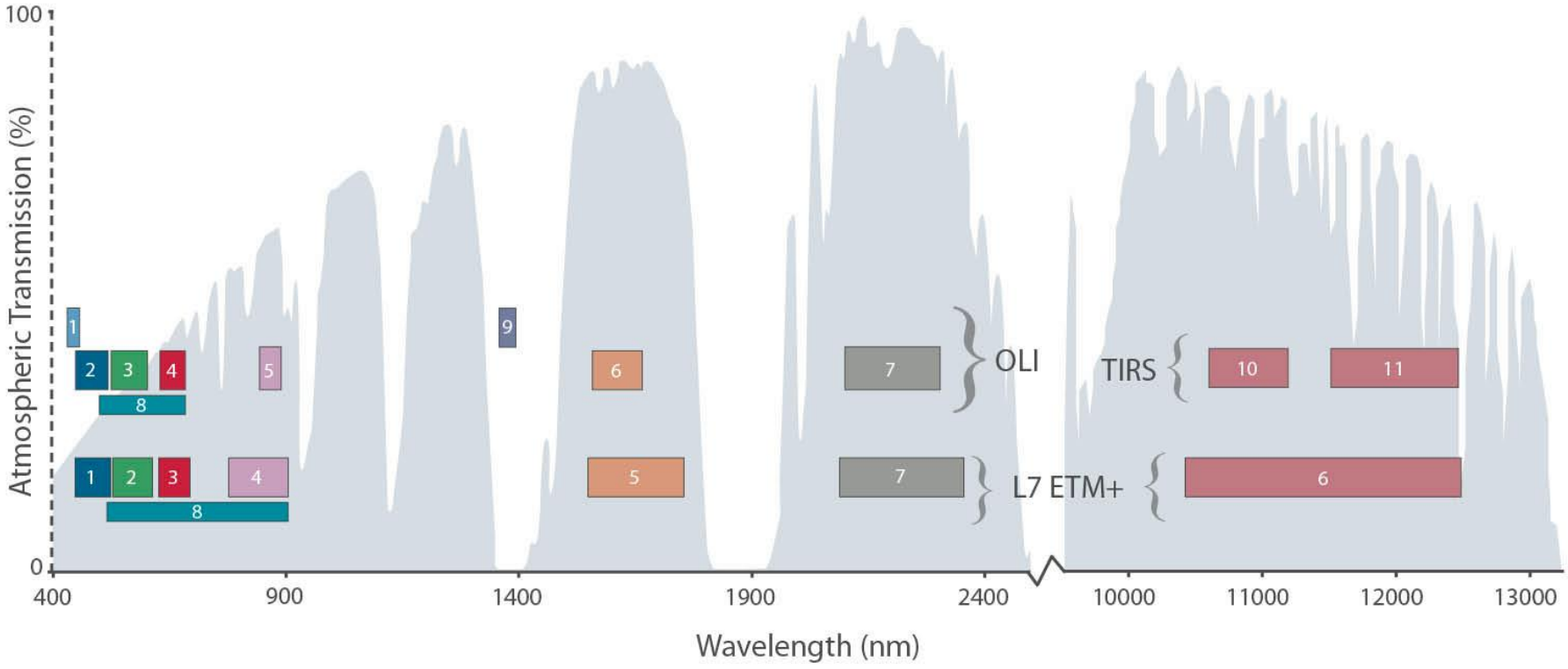
Spatial=
30 m, 15 pan

Spectral=
9 bands

Radiometric=
12 bits

Temporal=
16 days

Bands of Landsat 7 and 8



Bands of Landsat 7 and 8

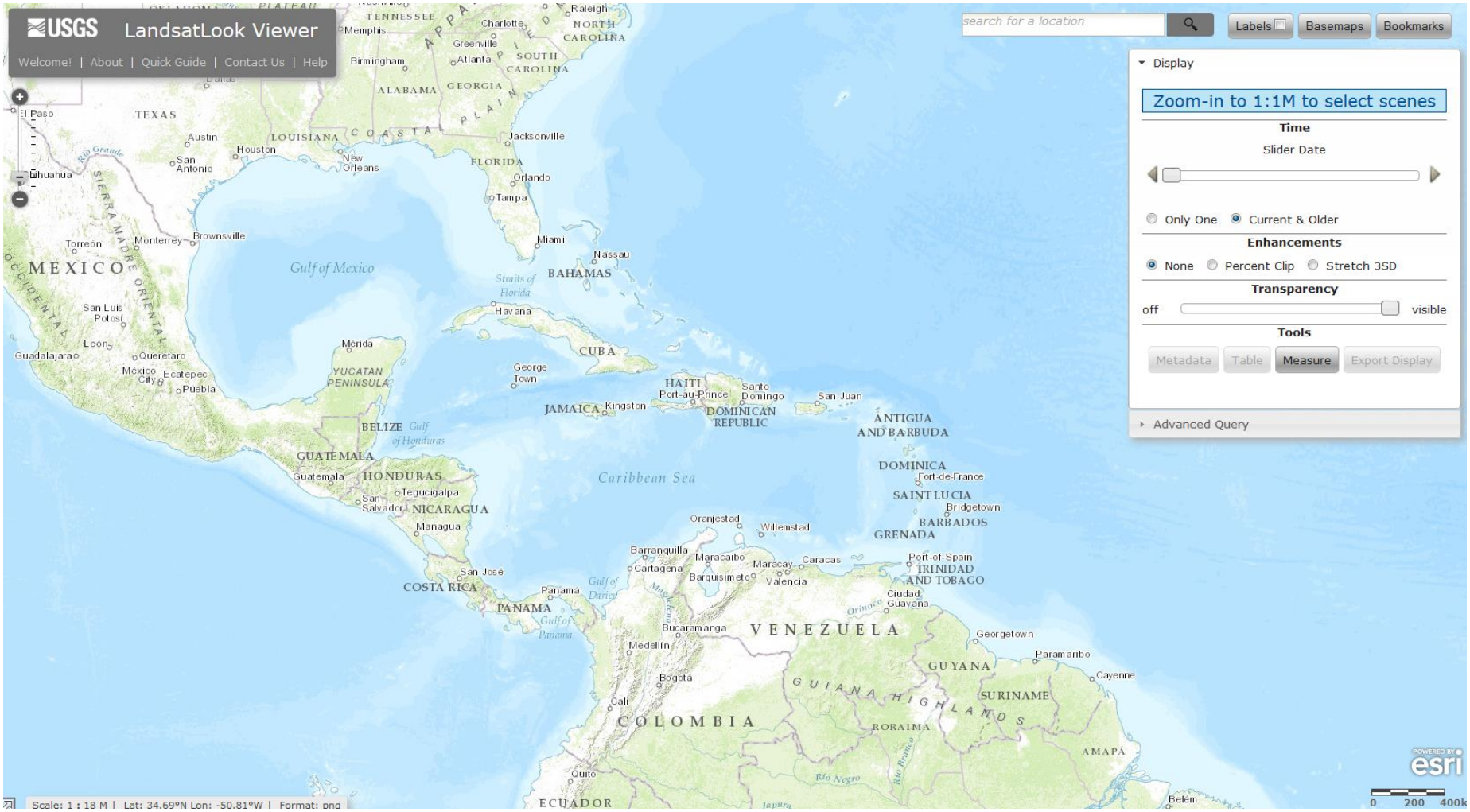
Landsat-7 ETM+ Bands (μm)			Landsat-8 OLI and *TIRS* Bands (μm)		
			30 m Coastal/Aerosol	0.435 - 0.451	Band 1
Band 1	30 m Blue	0.441 - 0.514	30 m Blue	0.452 - 0.512	Band 2
Band 2	30 m Green	0.519 - 0.601	30 m Green	0.533 - 0.590	Band 3
Band 3	30 m Red	0.631 - 0.692	30 m Red	0.636 - 0.673	Band 4
Band 4	30 m NIR	0.772 - 0.898	30 m NIR	0.851 - 0.879	Band 5
Band 5	30 m SWIR-1	1.547 - 1.749	30 m SWIR-1	1.566 - 1.651	Band 6
Band 6	60 m TIR	10.31 - 12.36	*100 m TIR-1*	*10.60 – 11.19*	Band 10
			100 m TIR-2	*11.50 – 12.51*	Band 11
Band 7	30 m SWIR-2	2.064 - 2.345	30 m SWIR-2	2.107 - 2.294	Band 7
Band 8	15 m Pan	0.515 - 0.896	15 m Pan	0.503 - 0.676	Band 8
			30 m Cirrus	1.363 - 1.384	Band 9

Processing parameters for Landsat 8 standard data products

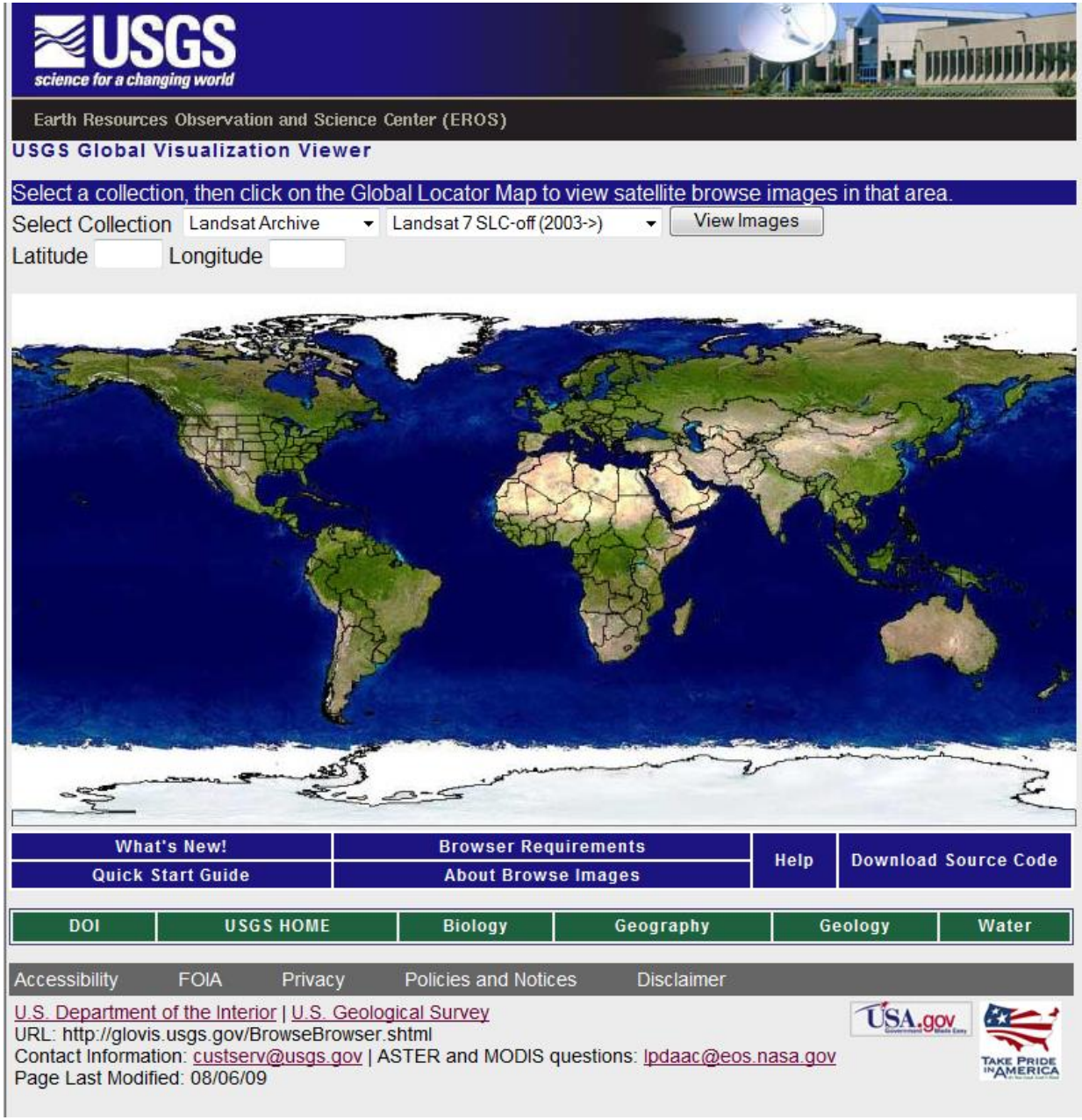
[UTM, Universal Transverse Mecator; WGS, World Geodetic System; OLI, Operational Land Imager; TIRS, Thermal Infrared Sensor]

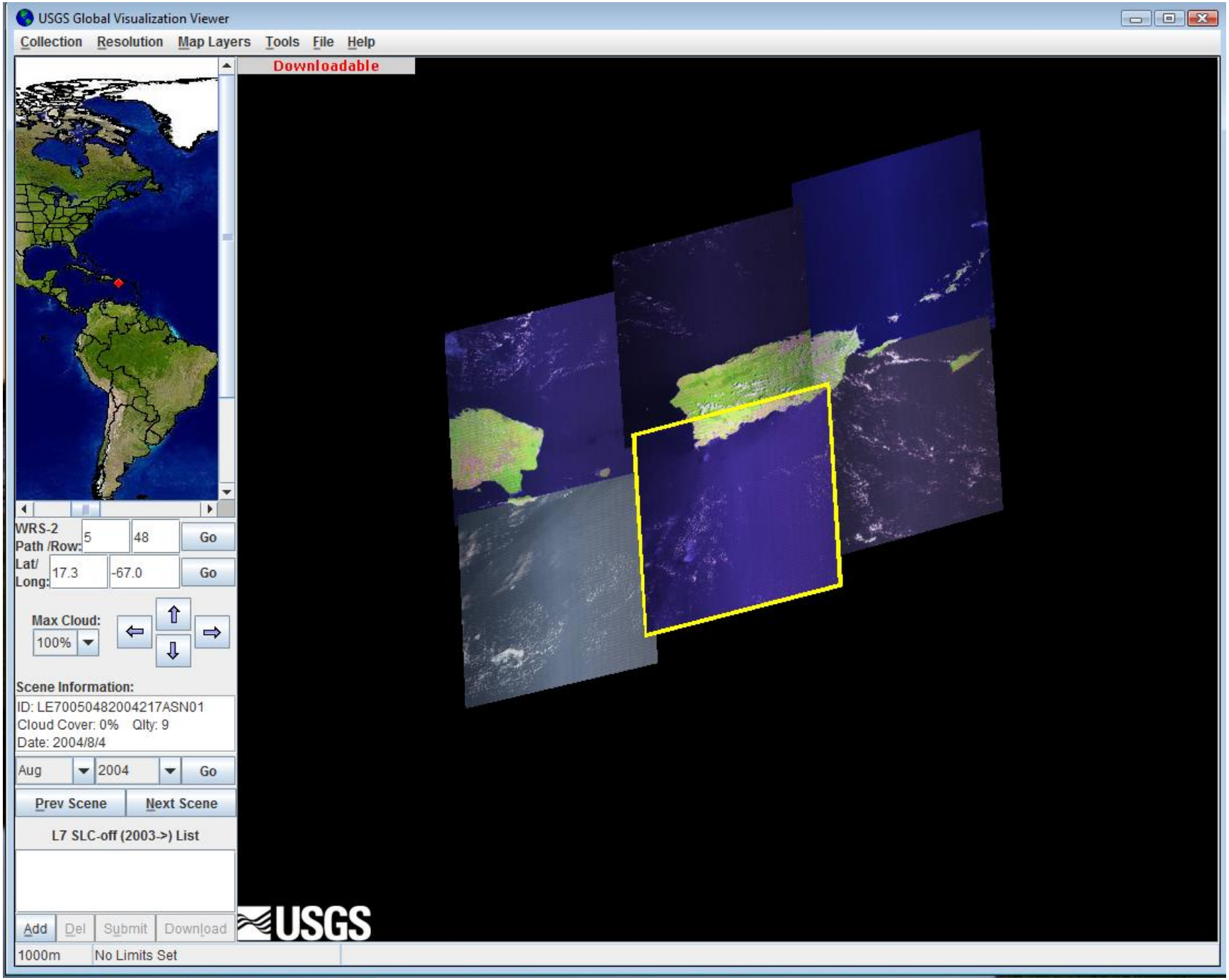
Product Type	Level 1T (terrain corrected)
Data type	16-bit unsigned integer
Output format	GeoTIFF
Pixel size	15 meters/30 meters/100 meters (panchromatic/multispectral/thermal)
Map projection	UTM (Polar Stereographic for Antarctica)
Datum	WGS 84
Orientation	North-up (map)
Resampling	Cubic convolution
Accuracy	OLI: 12 meters circular error, 90 percent confidence TIRS: 41 meters circular error, 90 percent confidence

http://landsatlook.usgs.gov/



http://glovis.usgs.gov




USGS Global Visualization Viewer
Collection
Resolution
Map Layers
Tools
File
Help
Downloadable
WRS-2 Path /Row:
5
48
Go
Lat/ Long:
17.3
-67.0
Go
Max Cloud:
100%
Scene Information:
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Cloud Cover: 0%
Qlty: 9
Date: 2004/8/4
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Go
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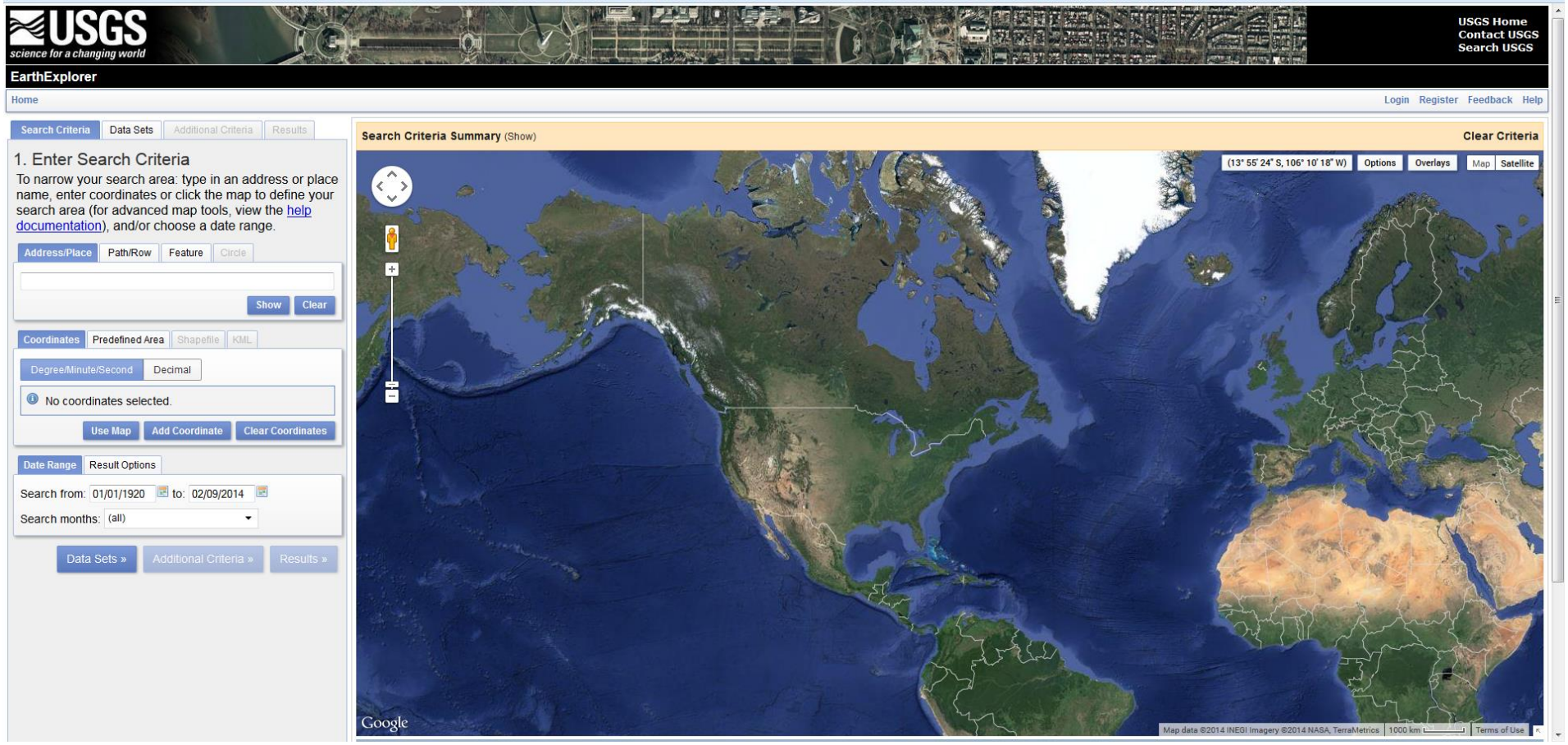
http://earthexplorer.usgs.gov/



Taller: Análisis de Imágenes de Landsat8 usando ArcGIS Desktop

PRYSIG 2014

En este taller se aprenderá como hacer búsquedas temporales y espaciales de los datos de Landsat 8 y obtener las imágenes crudas (sin procesamiento) de OLI y TIRS. Además, se utilizará la plataforma de ArcGIS Desktop para procesamiento y extracción de información de este tipo de imágenes para Puerto Rico. Se utilizarán herramientas para mejorar la visualización, combinación de bandas y se obtendrán productos de las imágenes tales como NDVI, y mapas de cobertura de terreno mediante clasificaciones.

Añadir Datos de Landsat 8

1. Usando archivo extensión .MTL
2. Bandas individuales

Image Analysis window

- Selección
  - Seleccionar/Deseleccionar imagen
  - Layer Properties
- Display
  - Contrast, Brigthness, Gamma,
  - Swipe tool
- Processing
  - Clip
  - Mask
  - Functions
  - Export

Proceso:

1. Anadir bandas individuales, crear Composites
   a. Natural Color (432)
   b. False Color (543)
   c. Landcover 1 (541
   d. Landcover 2 (415)
   e. Bathymetry (321)
2. NDVI
3. Filter
4. Mosaic
5. Pan-sharpening
   a. Anadir banda de mejor resolución (15m) banda 8.

6. Image Classification
   a. Training samples
   b. Classification
      i. Máximum likelihood