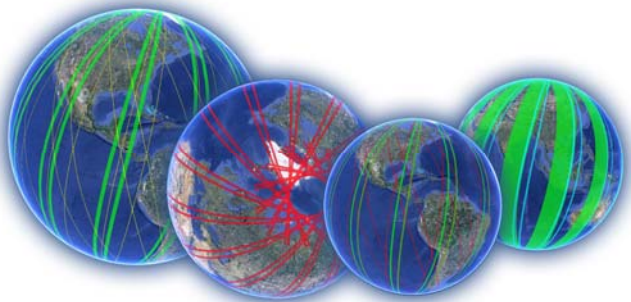


# COVE Status Report and Demo

CEOS IVOS-24 Meeting  
May 8 – 10, 2012

Gyanesh Chander, SGT/USGS EROS  
Brian Killough, NASA, CEOS SEO



# CEOS Visualization Environment (COVE)

www.ceos-cove.org



## CEOS Committee on Earth Observation Satellites

[Home](#) [COVE Tool](#) [Rapid Acquisition Tool](#) [Missions](#) [Analysis Cases](#) [Forum](#) [Help](#)

### Login Form

User Name  
ceos

Password  
\*\*\*\*\*

Remember Me

[Log in](#)

- Forgot your password?
- Forgot your username?
- Create an account

COVE is in Beta. See the list of [New Features](#)

### Welcome to the COVE Portal

The CEOS Visualization Environment (COVE) tool is a browser-based system that leverages Google-Earth to display satellite sensor coverage areas and identify coincidence scene locations. The NASA CEOS System Engineering Office (SEO) worked with the Committee on Earth Observing Satellites (CEOS) Working Group on Calibration and Validation to develop the COVE tool.

CEOS is currently operating and planning hundreds of Earth observation satellites. Standard Calibration and Validation (Cal/Val) exercises to compare near-simultaneous surface observations and identify corresponding image pairs are time-consuming and labor-intensive. The COVE suite of tools has been developed to make such tasks easier.

#### Beta Release

The COVE site has been revised and is currently in Beta. New features include an improved layout and the Rapid Acquisition Tool, which makes it easy to generate a spreadsheet of position acquisitions.

#### Featured Analyses

**Tuz Golu**  
The COVE Tool was used to predict satellite overpasses for satellite calibration at the Tuz Golu salt flat in Turkey. [Read More.](#)

**Namibia**  
The northern provinces of Namibia experienced heavy flooding in March 2011. The COVE Tool helped the Namibia Department of Hydrology plan acquisition requests for satellite images of flooded areas. [Read More.](#)

#### Video Overview

Don't see the video? Install [Adobe Flash Player.](#)

#### Recent Updates

##### Enhancements

External API 01/03/2012

COVE now supports an HTTP-based API, so you can access COVE programmatically. See [www.ceos-cove.org/api/](http://www.ceos-cove.org/api/) for more details.

[Read more...](#)

##### Modeling Assumptions

No changes have been logged yet.

[Read more...](#)

#### SEO SPONSOR

**Brian D. Killough, Ph.D.**  
CEOS Systems Engineering Office (SEO)  
Email: [Brian\\_D.Killough@nasa.gov](mailto:Brian_D.Killough@nasa.gov)  
Phone: 757-864-7047

## New Website !!!

- Recent News and Release Info
- Login for Forum Users
- COVE Tool
- Rapid Acquisition Planning Tool
- Mission Data
- Sample Analysis Cases
- User Forums
- Help and FAQ list

# New COVE Tool Design



- Flexible Joomla-based design
- Improved searches for missions and instruments, bookmarks on main page, and sub-menu design (bottom-right)
- Expanded mission database: **75** missions and **116** mission-instrument combinations.

Home COVE Tool Rapid Acquisition Tool Missions Analysis Cases Forum Help Beta Release CEOS

Africa | Antarctica | Asia | Australia | Europe | North America | South America

**Missions and Instruments**  
Filter (e.g. "ALOS" or "nasa")  
Alphabetical By Constellation

ALOS  
AVNIR-2 - 1584 km  
PALSAR - 870 km  
ALOS-2 (Notional)  
PALSAR-2 - 1165 km

Aqua  
AMSR-E - 1445 km  
MODIS - 2330 km

Aurora  
TES - 1522 km  
OMI - 2600 km

Beijing-1  
SLIM-6 - 640 km

Time Span  
Start: 01/24/2012  
End: 01/25/2012  
Add Coincidence Add Ground Swath

Cart Clear Cart

JASON-1: Poseidon-2 - 159 km  
Landsat-5: TM - 185 km

Bookmarks  
• Landsat 5 and Jason 1  
• Coincidence on Syncoed Globes  
• Coincidence over South America  
• Envisat: Day and Night Swaths  
• Chandr1  
• Chandr1

Bookmark 1 Add Bookmark

**Getting Started**  
To use the COVE tool,  
1. Click on an instrument in the Missions and Instruments list in the upper left panel. For this example, we'll use AMSR-E, an instrument on the Aqua satellite.  
2. You can change the time span if you like, by modifying the date field, or clicking the icon and selecting a different date. For this example, we will use the default start and end dates.  
3. Click the "Add Ground Swath". After some calculation (usually 5-20 seconds), the ground swath for AMSR-E will appear on the globe. You can rotate this globe by dragging with your mouse and you can zoom in and out with the mouse wheel. If you click on a segment of a ground swath, COVE will display a pop-up bubble with more details.  
4. You can add more ground swaths to the globe at any time

Data SIO, NOAA, U.S. Navy, NGA, GEBCO  
© 2012 Cnes/Spot Image  
Image © 2012 TerraMetrics  
Google earth

Enter a location Go

**Did you know ....**

There are **958** Earth orbiting missions

There are **109** **CEOS missions** in Earth orbit

65 current missions  
10 future missions

# COVE Mission-Instrument List



- ALOS
  - Aqua
  - Aura
  - Beijing-1
  - CALIPSO
  - CBERS-2
  - Cloudsat
  - COSMO SkyMed (1 to 4)
  - CryoSat-2
  - Deimos-1
  - UK-DMC (1 and 2)
  - Envisat
  - NMP-EO1
  - ERS-2
  - FengYun-3A (FY-3A)
  - GeoEye-1 (commercial)
  - GOSAT
  - HAIYANG (HY-1B)
  - HJ (1A and 1B)
  - Ikonos-2 (commercial)
  - Jason (1 and 2=OSTM)
  - KOMPSAT-2
  - Landsat (5 and 7)
  - Meteor-M N1
  - MetOp-A
  - Monitor-E
  - NigeriaSat-1
  - NOAA 15,16,17,18,19
  - OceanSat-2
  - Proba
  - QuickBird-2 – MS (commercial)
  - Radarsat (1 and 2)
  - RapidEye (5 satellites)
  - ResourceSat-1 = IRS-P6
  - ResourceSat-2
  - Resurs-DK-1
  - RISAT-2
  - SAC-C
  - SAOCOM (1A and 1B)
  - SMOS
  - SPOT (4 and 5)
  - TanDEM-X
  - Terra
  - TerraSAR-X
  - THEOS
  - Worldview (1 and 2 - commercial)
- Future (Notional)**
- ALOS-2
  - CBERS-3
  - HJ-1C
  - KOMPSAT-5
  - LDCM
  - RISAT-1
  - Sentinel (1A, 2A, 2B)
  - TRUTHS



# Rapid Acquisition Tool



- Efficient tool for large time periods to produce tabular output of acquisitions or coincidences.
- Avoids plotting all groundtracks on the globe.
- Output data can be previewed on the globe or output as EXCEL.

**Time Span**  
Start: 02/06/2012 End: 3/6/2012

**Missions and Instruments** Filter (e.g. "ALOS" or ".nasa")  
Alphabetical By Constellation

- Jason-1
  - Poseidon-2 - 159 km
- Jason-2 (OSTM)
  - Poseidon-3 - 159 km
- KOMPSAT-2
  - MSC - 828 km
  - KOMPSAT-5 (Notional)
  - COSI-SAR - 490 km
- Landsat-5
  - TM - 185 km
- Landsat-7
  - ETM - 185 km
- LDCM (Notional)
  - TIRS - 185 km
- Meteor-M
  - BRLK Severyanin-M - 600 km
  - KMSS - 900 km
- MetOp-A
  - AVHRR-3 - 2928 km

Lat, Long:   
Region: Tuz Golu Draw Upload

Image U.S. Geological Survey  
© 2012 Cnes/Spot Image

Enter a location Go  
Hide Swaths Compute Acquisitions

## Acquisition Data

Download All Delete All

Landsat-7 ETM - 185 km over Tuz Golu

WRS: Landsat

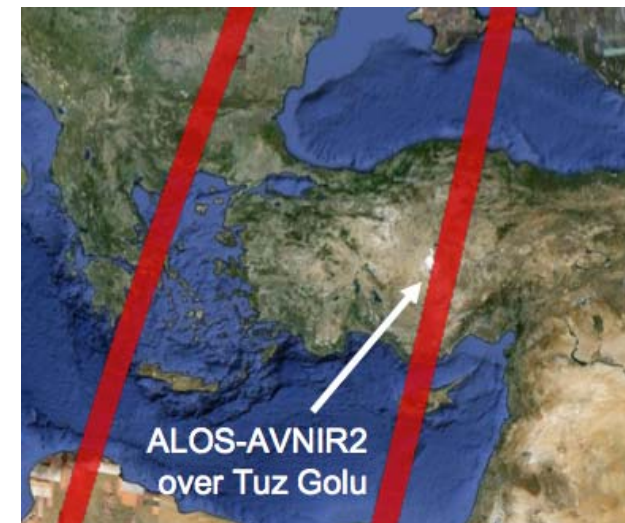
index	mission	time	lat	lon	path	row	solar_zenith	solar_azimuth
1	Landsat_ETM - 185 km (from TLE)	2012-FEB-14 08:15:30.0 (UTC)	39.3	34.5	214	32	57.4	150.5
2	Landsat_ETM - 185 km (from TLE)	2012-FEB-21 08:21:30.0 (UTC)	40.0	33.1	215	31	55.6	149.9
3	Landsat_ETM - 185 km (from TLE)	2012-MAR-01 08:15:30.0 (UTC)	39.3	34.5	214	32	51.9	148.2

**Output table includes ...**  
UTC time, Lat, Long, Path, Row, solar angles, viewing angles, day/night, TLE date.

# Calibration and Validation



- The efforts of the CEOS Working Group on **Calibration and Validation** (Cal-Val) were the initial focus of the COVE tool.
- COVE currently supports two CEOS annual international cal-val campaigns in Turkey and Antarctica
- The need for annual individual satellite forecasts is eliminated and scientists and engineers utilize more satellites and focus on the research.
- **Tuz Golu, Turkey**
  - Dry salt lake with a homogeneous surface
  - Forecasts for 13 missions
- **DOME-C Antarctica**
  - Uniform permanent snow surface
  - Forecasts for 6 missions

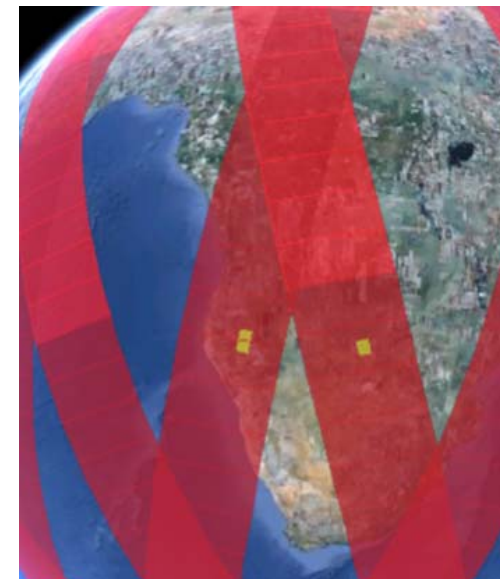


# Disaster Response



## March 2011: **Namibia, Africa Floods**

- Worst flooding in history for Caprivi and Cuvelai regions of Africa.
- International Disaster Charter (10 members, 20+ satellites) was activated to focus data collection efforts.
- The Satellite Disaster Flood Pilot team (NASA) lost the ability to obtain Radarsat-2 data because the charter mechanisms omit research-type activities from acquisition planning.
- COVE supported the NASA team and the Namibia Department of Hydrology by identifying other imaging and radar data over the region to support science and relief efforts.





# Data Acquisition Planning



- CEOS is utilizing COVE to support multiple GEO projects for Data Acquisition Planning
  - Joint Experiment for Crop Assessment and Monitoring (JECAM) and GEO Global Agriculture Monitoring (GEO-GLAM) - Canada
  - Forest Carbon Tracking (FCT) and Global Forest Observation Initiative (GFOI) - Australia
  - Geohazard Supersites – NASA and ESA (Earthquakes and Volcanos)
- CEOS has initiated a new Satellite Data Coordination Group (SDCG) that will have its first meeting in March 2012 focused on GFOI.
- International space agency data providers have shown an interest in using COVE to support their internal data planning and ordering
  - TerraSAR-X mission from DLR (Germany)
  - DMC-2 mission from UKSA (United Kingdom)

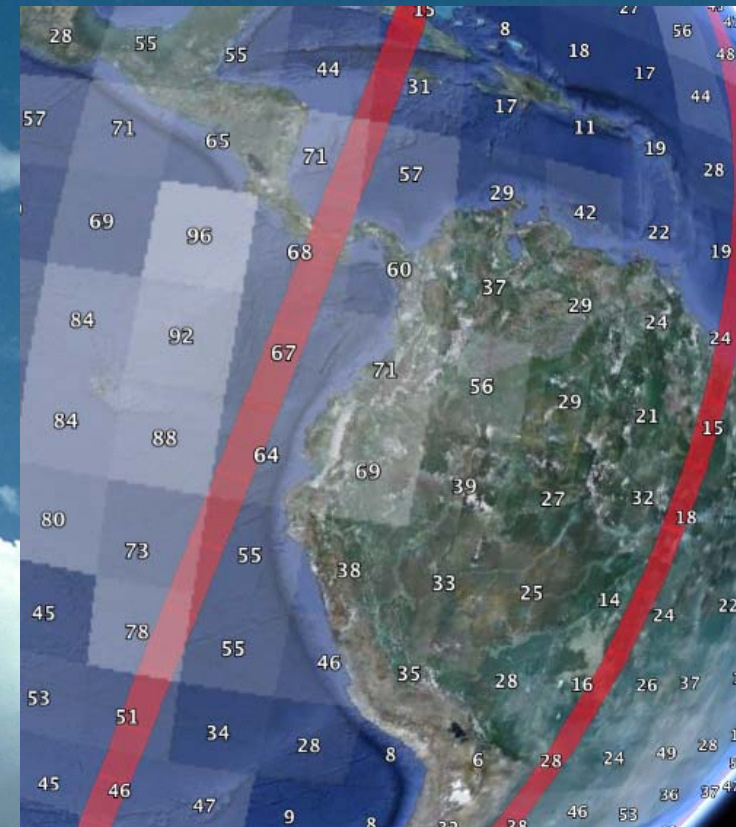




# A new idea for Cloud data ...



- Clouds have a significant impact on data acquisition planning for optical instrumentation.
- The COVE team is considering adding cloud data for improved planning.
- Utilize International Satellite Cloud Climatology Project (ISCCP) dataset.
- Create a dedicated cloud link in COVE to display monthly average daytime cloud coverage for land (5-degree grid) and ocean (10-degree grid).
- The coverage data represents the fraction of sky-hemisphere covered by clouds.
- Add cloud coverage data to pop-up windows in COVE groundtrack plots and to tabular data in the Rapid Acquisition Planning tool.



**EXAMPLE ....** A specific location and time is reported as 67% cloudy. On average, it would take 3 passes over the region to obtain 1 cloud-free optical image.

# Questions and Feedback



- Are there any other campaigns that could benefit from COVE ?
- Are there any additional mission-instrument combinations that IVOS would like to see in COVE ?
- Are there any desired features that IVOS would like to see in COVE ?

