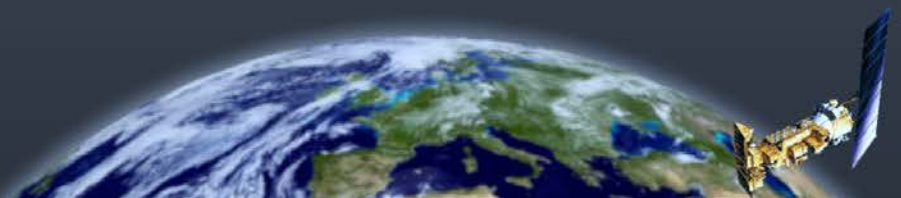
Accessing satellite data
via Apps, Web Map Servers, and the GOES-R Education Proving Ground

Margaret Mooney
CIMSS/SSEC, UW-Madison



CIMSS & SSEC at the UW-Madison

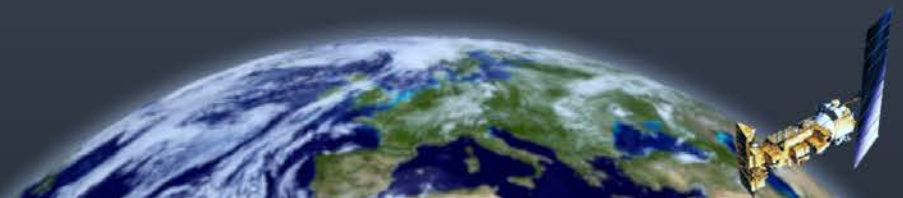
SSEC Data Center Incoming Data

May, 2015

170+ GB/day via Satellite
(C-band. L-band, X-band)

2,300+ GB/day via Internet
(ftp, LDM, ADDE, http)

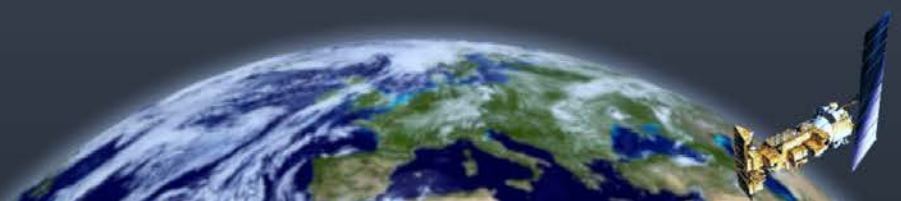
GOES satellites	~96 GB/day
International Geo Satellites	~360 GB/day
NOAA Polar	~27 GB/day
Landsat-8	~50 GB/day
MODIS polar	~150 GB/day
SUOMI NPP (VIIRS CrIS ATMS)	~1,800 GB/day
Miscellaneous	~85 GB/day



WxSat

WxSat (short for Weather Satellite) displays and animates full-resolution, real-time weather satellite data.

WxSat leverages SSEC Data Center holdings to provide global coverage for visible, infrared, and water vapor channels.



CIMSS

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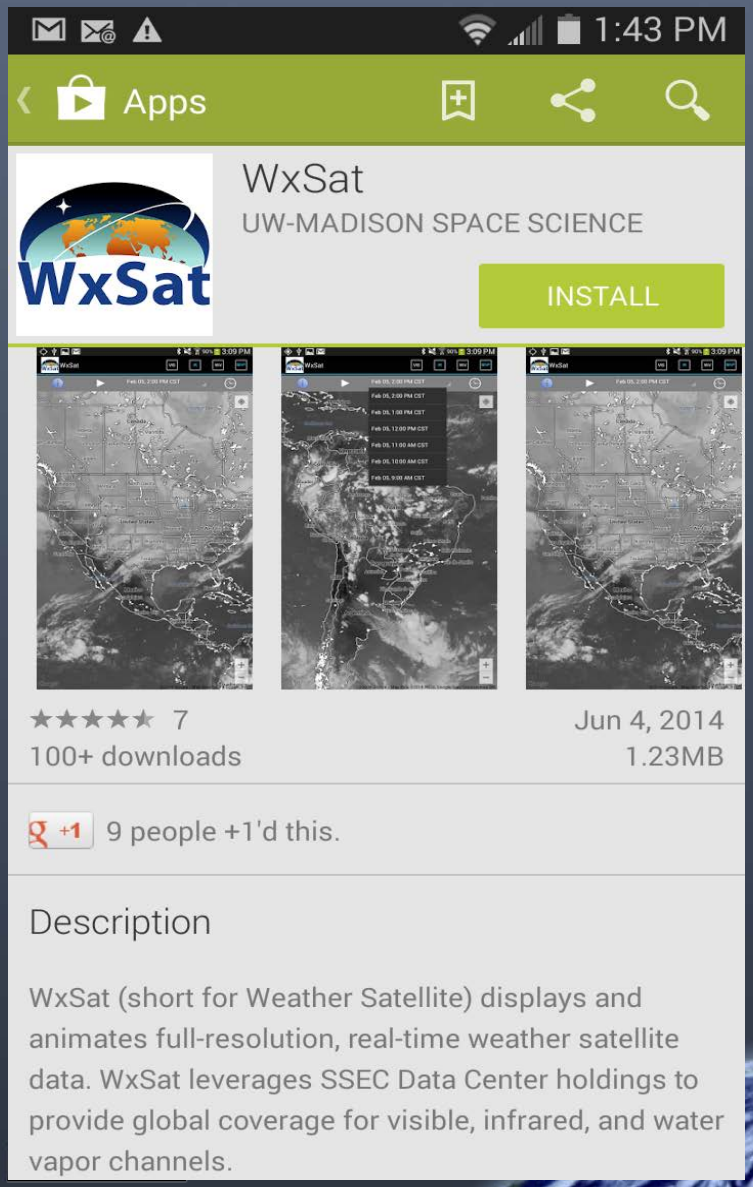
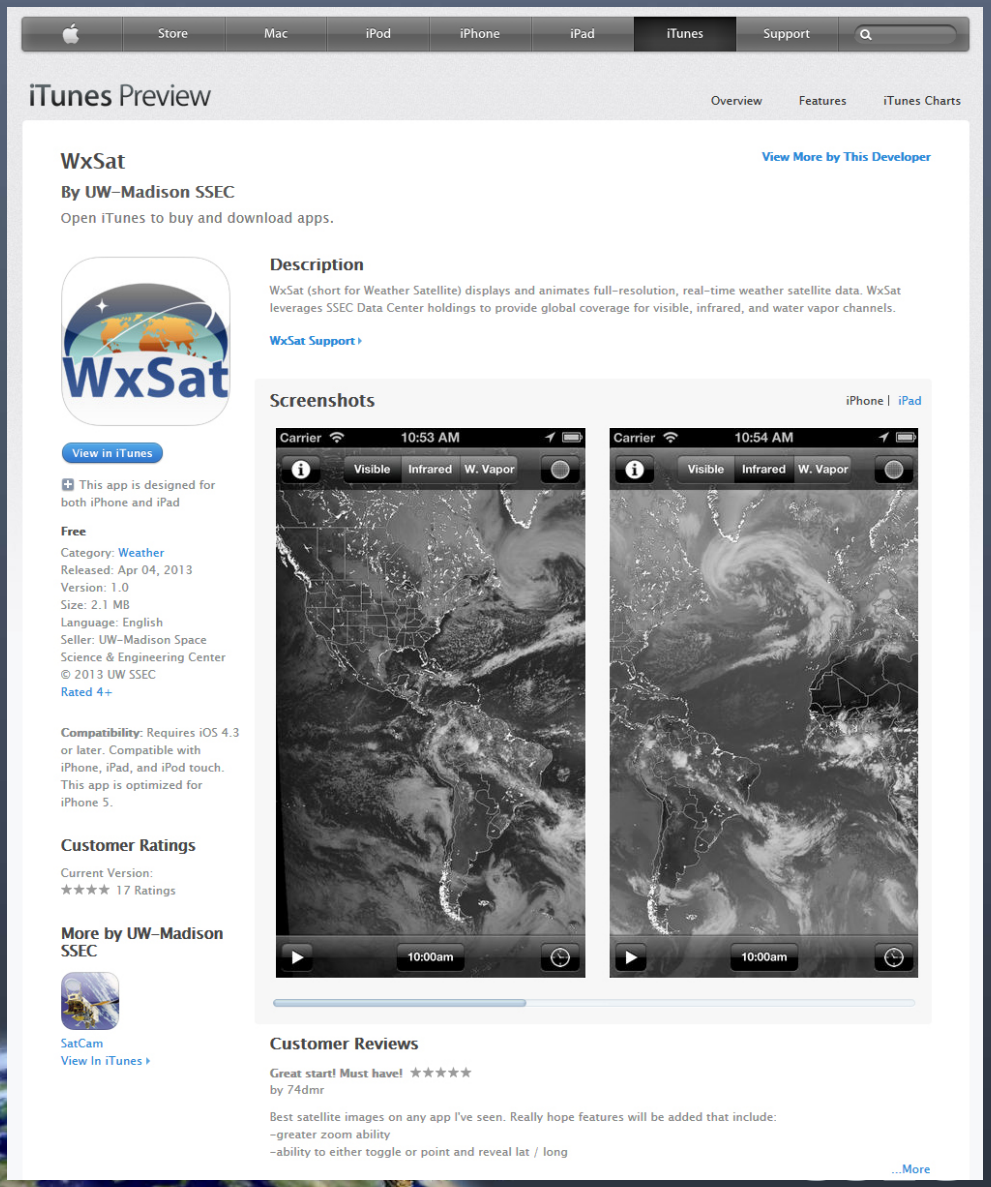
WxSat is FREE for Android & iOS





GLOBAL Visible, IR, & Water Vapor Imagery

animations too

SatCam

SSEC

SatCam lets you capture observations of sky and ground conditions at the same time that an Earth observation satellite is overhead.

When you capture a SatCam observation and submit it to our server, it helps us to check the quality of the cloud products that we create from the satellite data. In return, we send you the satellite image that was captured at your location, anywhere in the world! SatCam supports the Terra, Aqua, and Suomi NPP satellites.

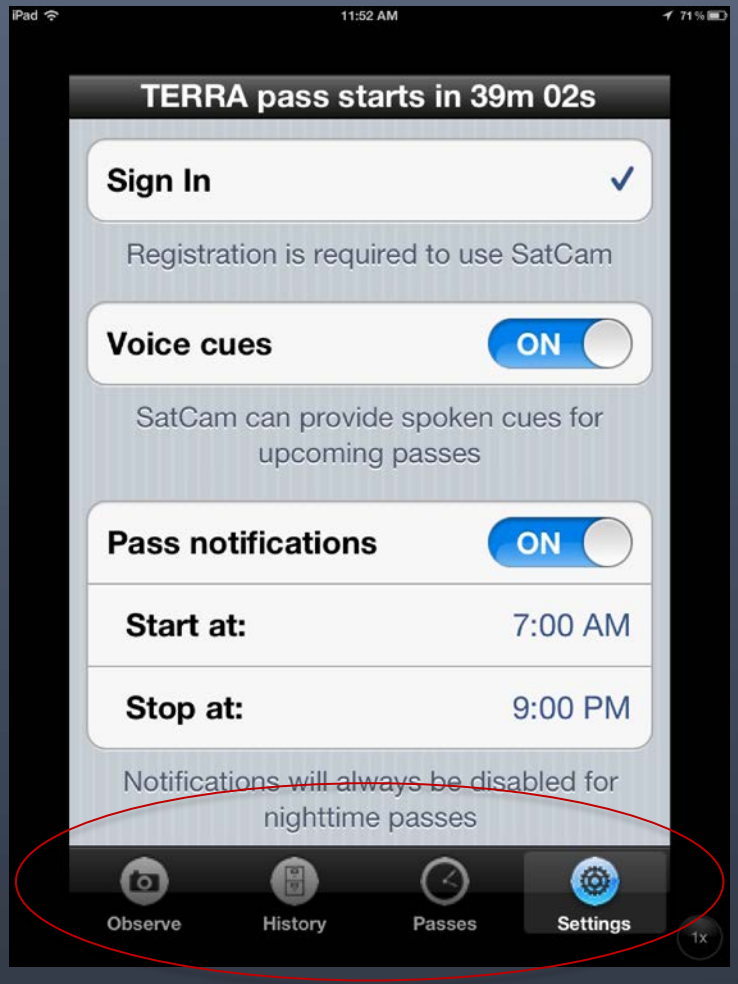
SatCam was developed at the Space Science and Engineering Center, University of Wisconsin-Madison .

Available on the App Store

FREE

http://satcam.ssec.wisc.edu/

Let's walk through the four main SatCam screens

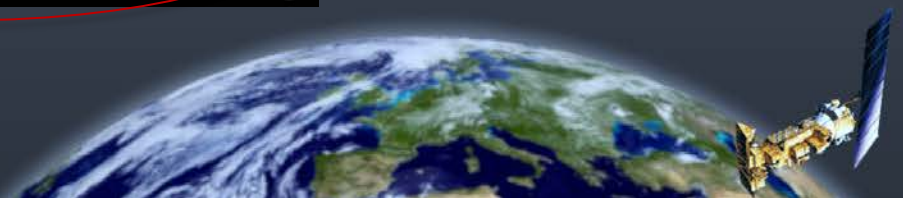


Settings

To start, you'll need to register (sign in) with SSEC

You can turn voice cues on to be notified 10 minutes prior to a satellite overpass

You can also set the start & stop time for voice cues



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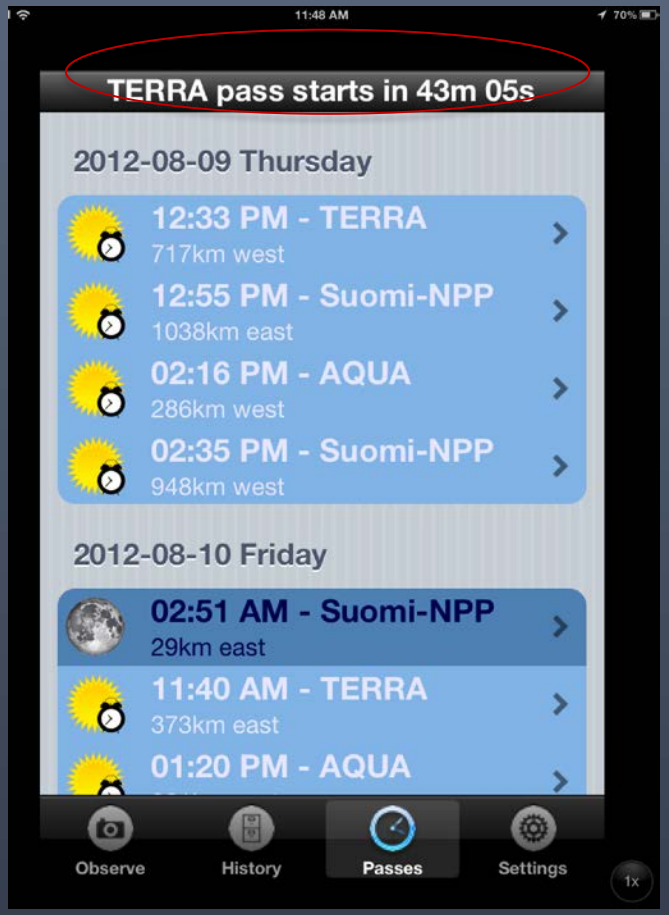
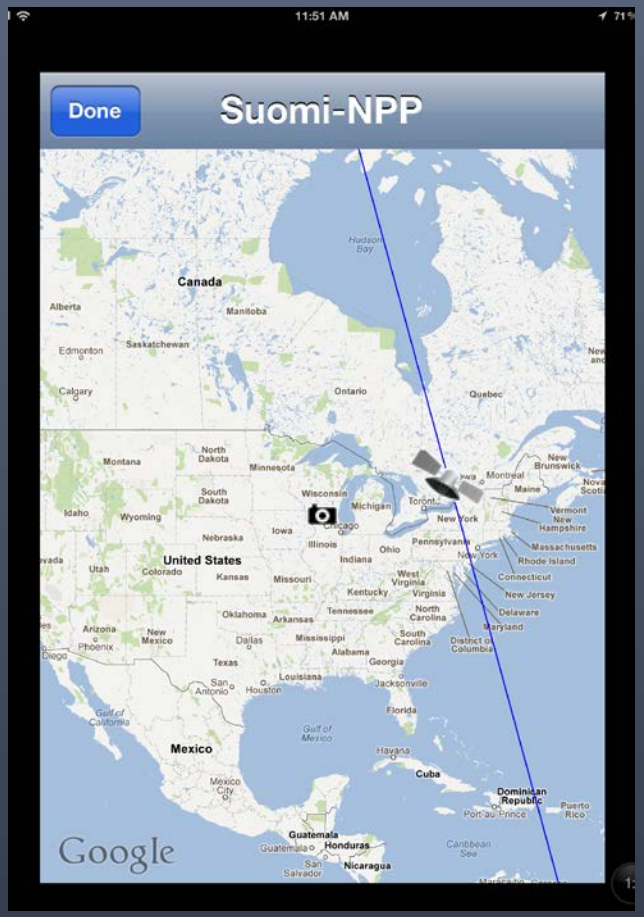


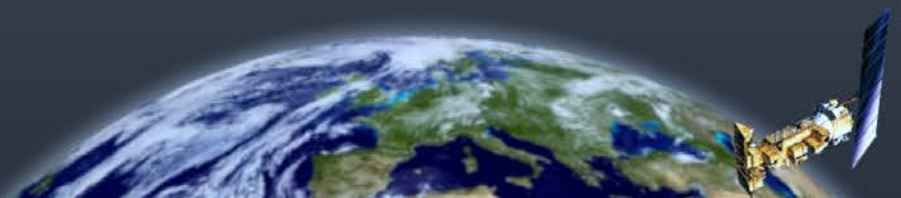
Passes

The top of each screen indicates time remaining until next overpass

If you click on a satellite, you'll get a new screen showing the orbit path!

Sweep your finger on the screen to see passes for the next 7 days





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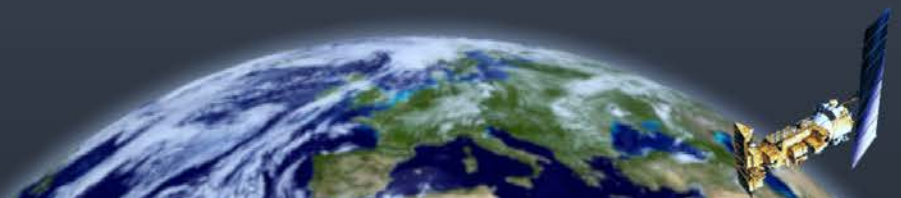
History

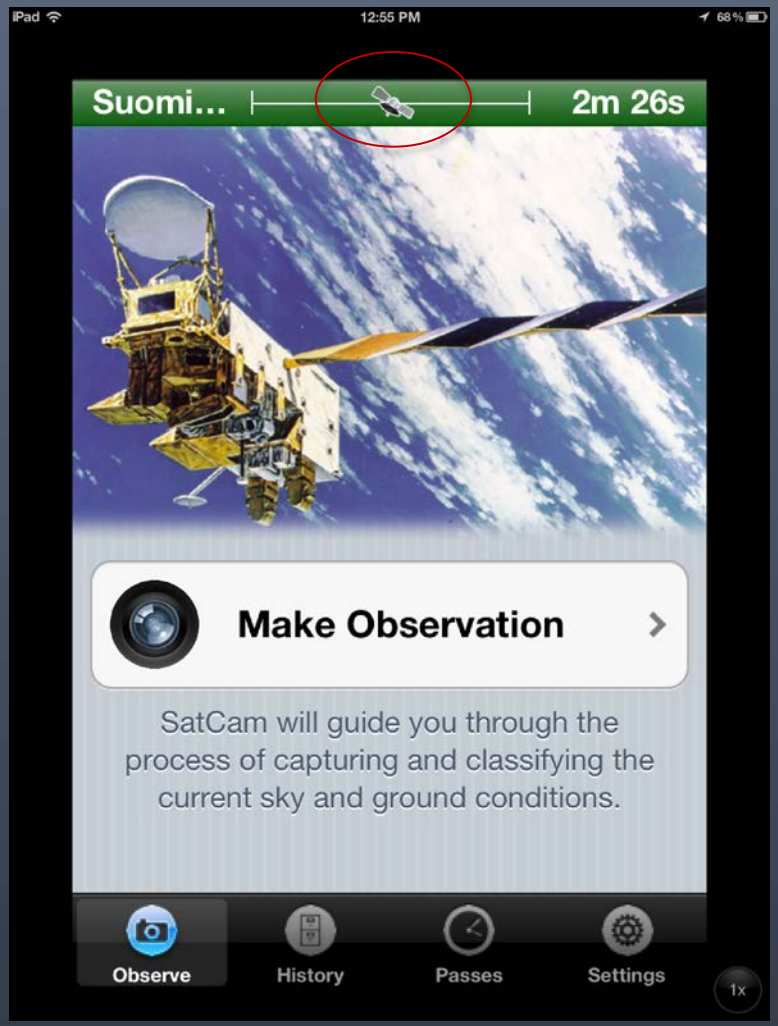
Eventually you will have a record of your observations, each one shaded based on user-classified sky conditions

Regardless of what screen you're on, (or whether your iPad is open) the voice cue will notify you **10 minutes prior to an overpass**

For 5 minutes, a satellite will move along the top of your screen with a countdown clock

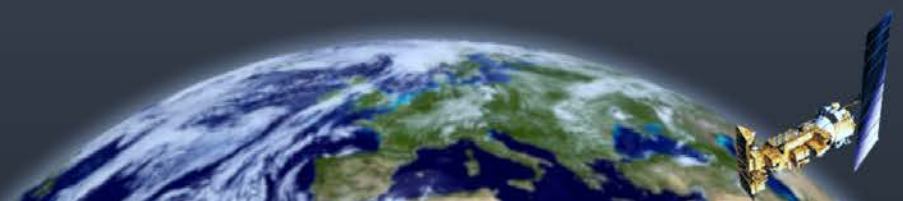


Let's make an observation!



Click on "**Make Observation**" to read the directions on subsequent screens, SatCam will guide you through the process

You can make a manual observation (and take a picture of the sky) or set your unit down and let SatCam take the picture automatically



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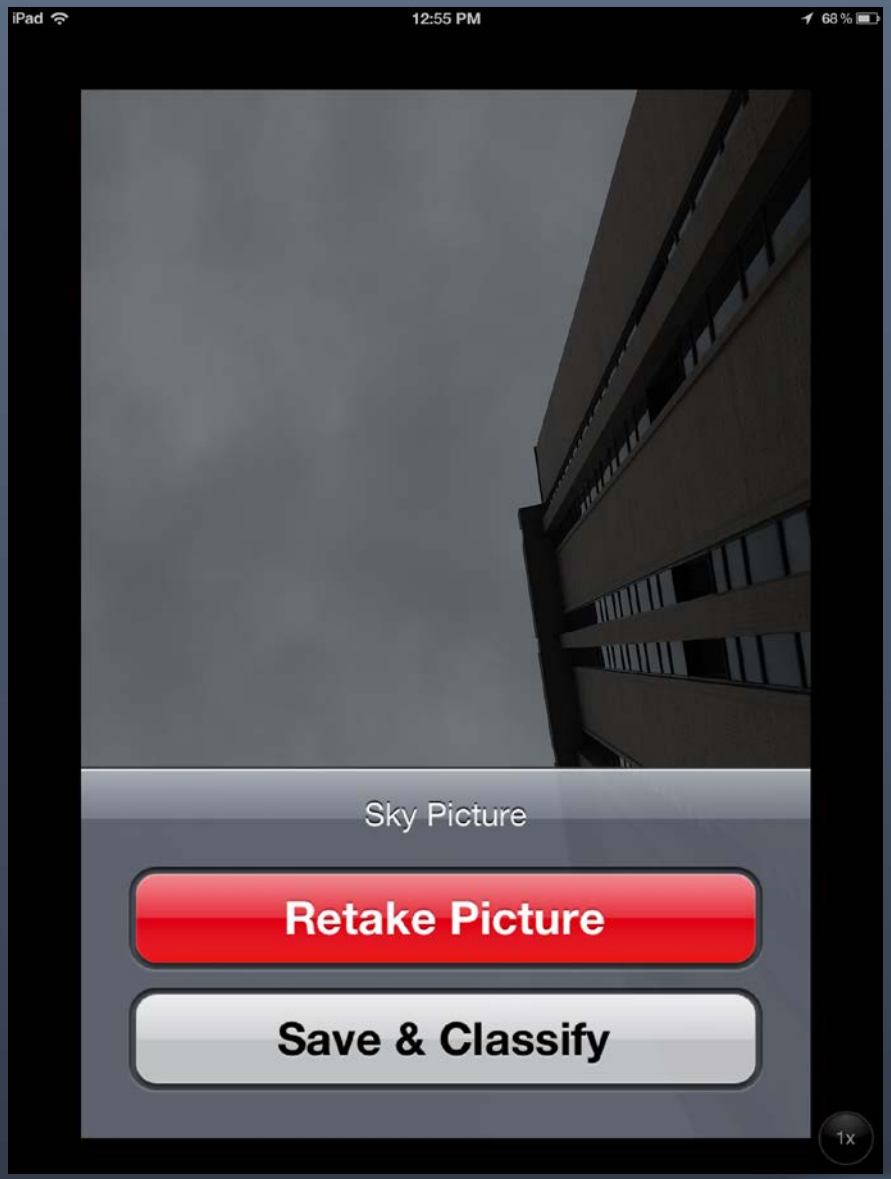

Manual

Point and Click!

Automatic

Set your unit down and let SatCam take the picture

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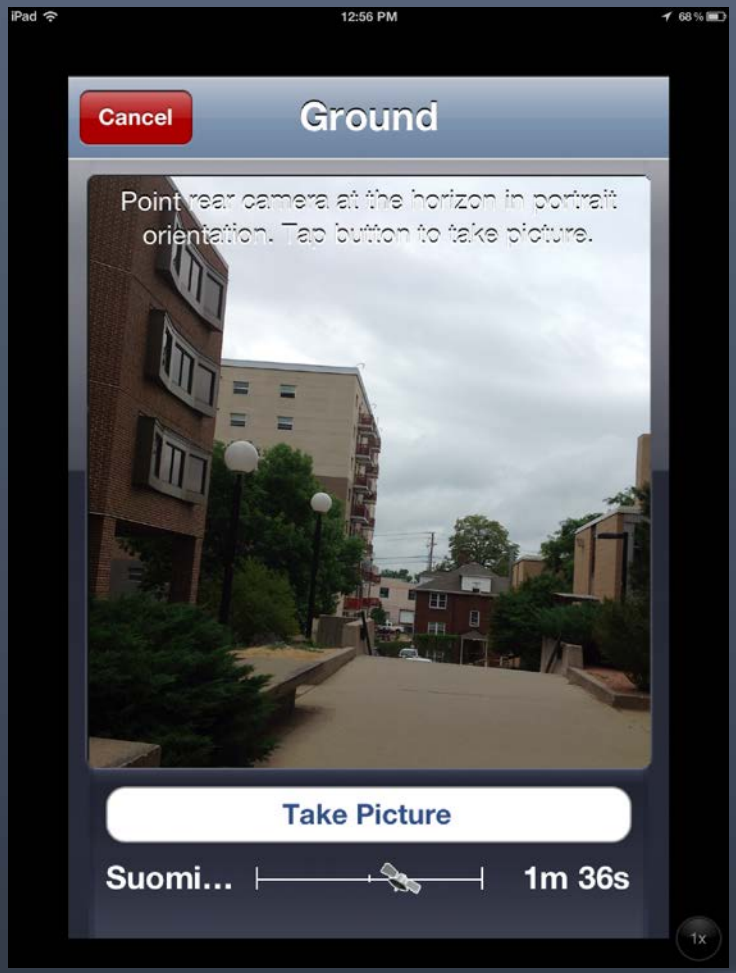
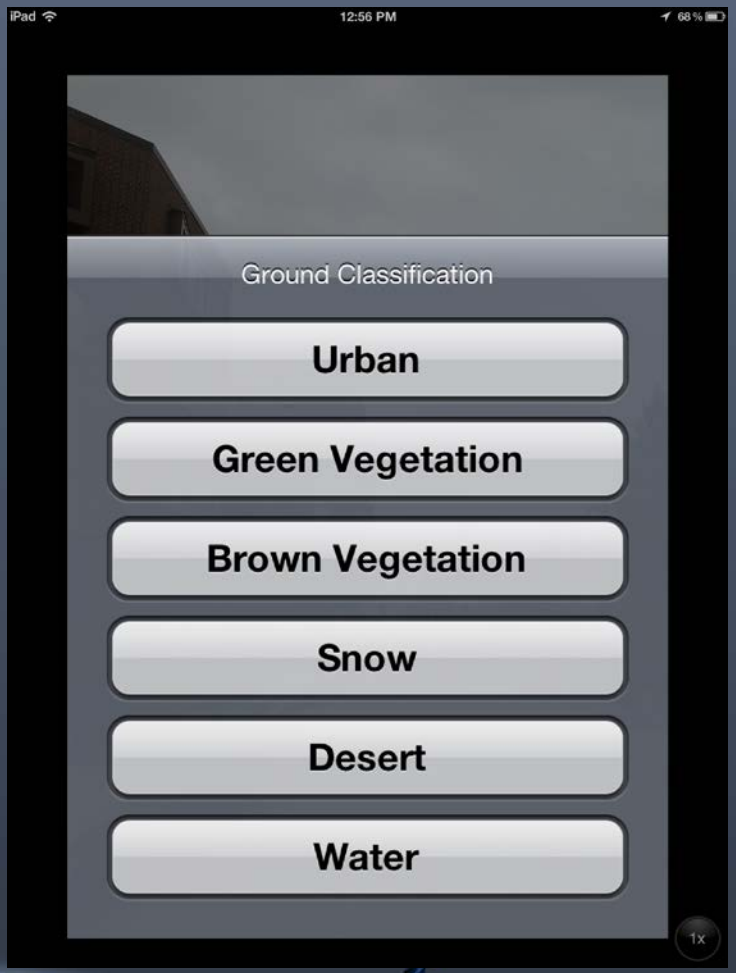
Next, point your iOS device at the horizon to take a picture and classify your surroundings





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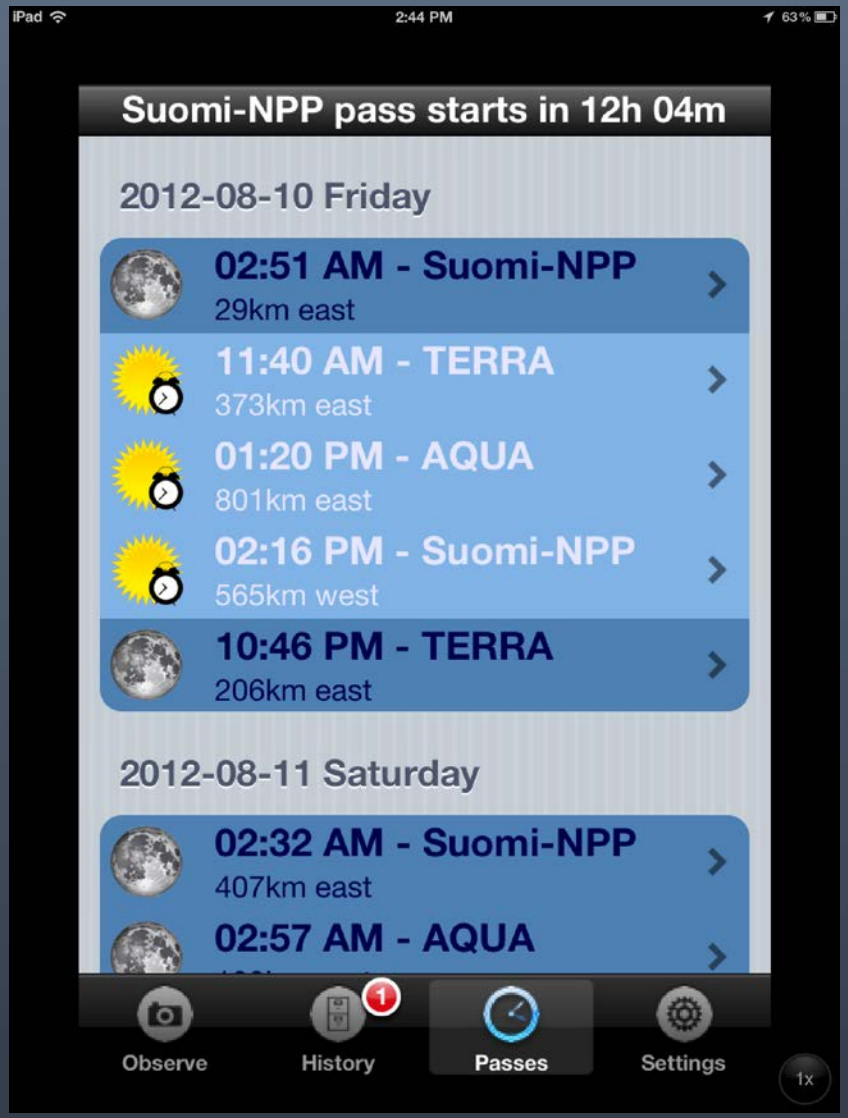
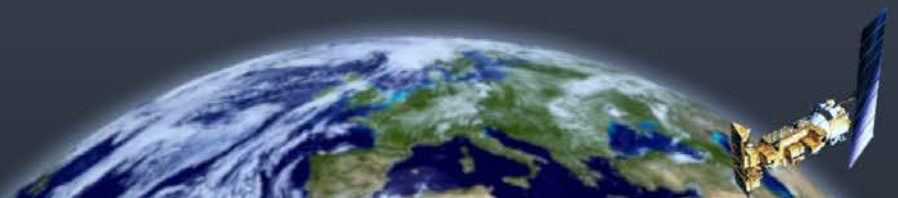


About an hour after you submit your observation,

SSEC will send the corresponding satellite image to you, indicated by a badge (red-bullseye) near the History icon.

The badge will have a small white number inside indicating the number of new satellite images.



You will see

- Your sky observation
- Your ground picture
- Your sky classification
- Your ground classification

AND - the corresponding satellite image!

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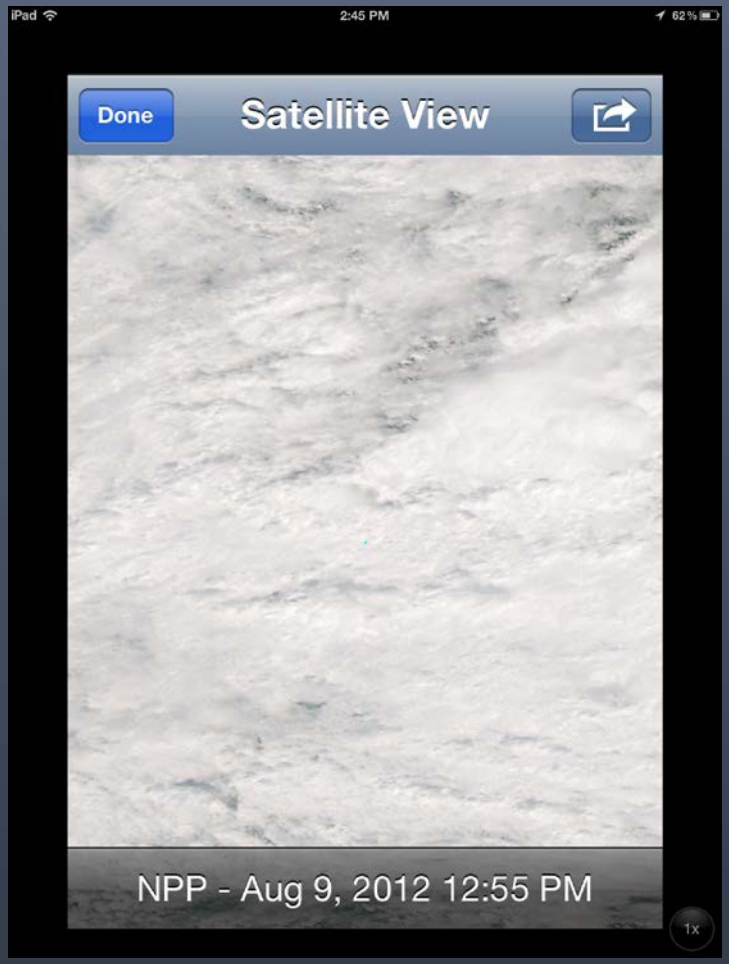
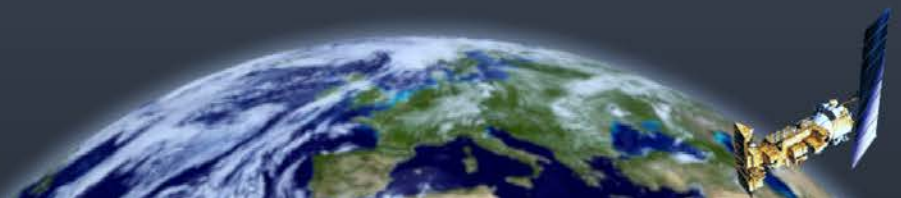
Click on the satellite image to enlarge!





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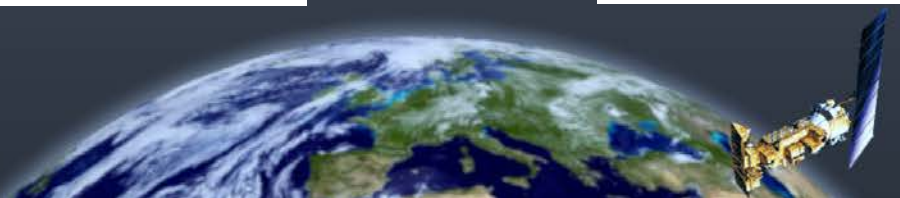
Two of my favorite observations

My yard in Madison Wisconsin!

Philo California Vacation



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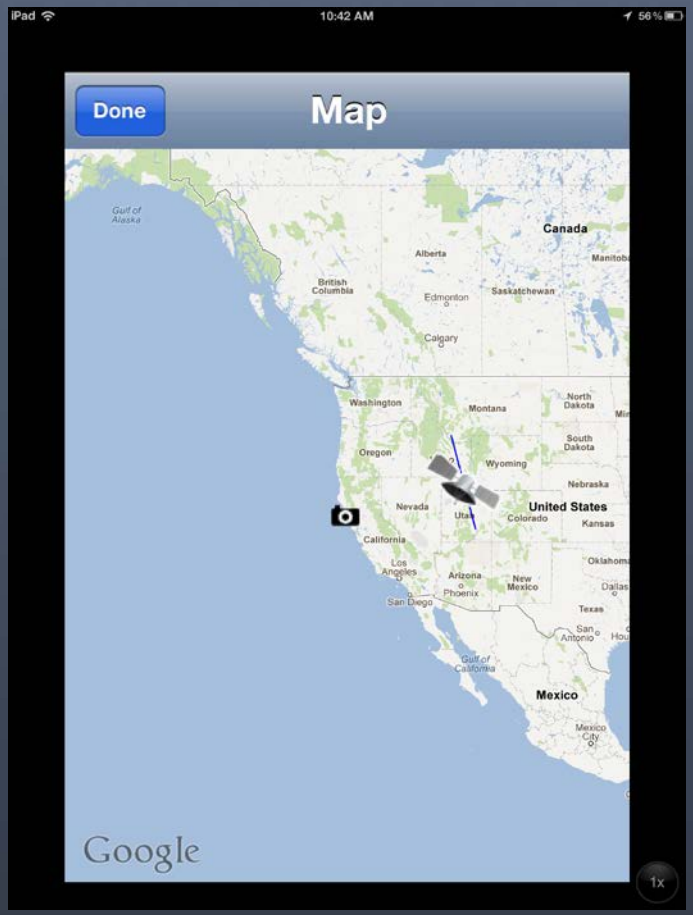
Click on the images to enlarge & learn more



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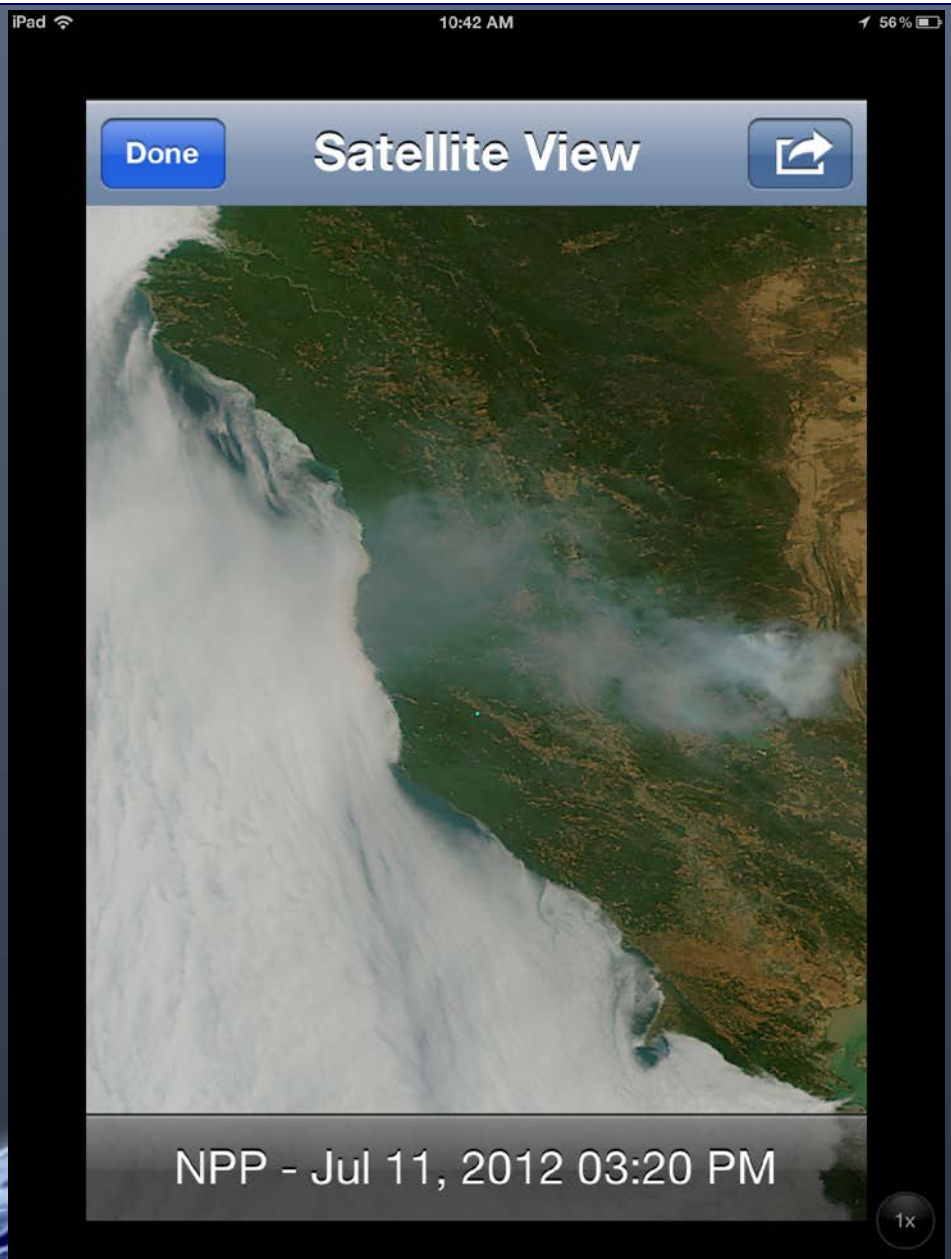
Sunny and clear where I took the observation but smoke to the north & stratocumulous to the west!

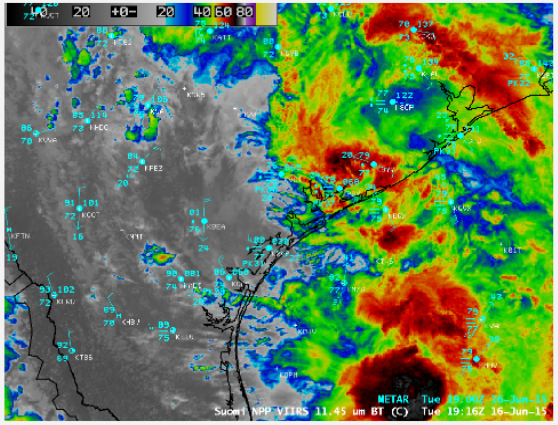


SSEC

SatCam Image Archive (>12,000!)

The long-lasting remnants of Tropical Storm Bill

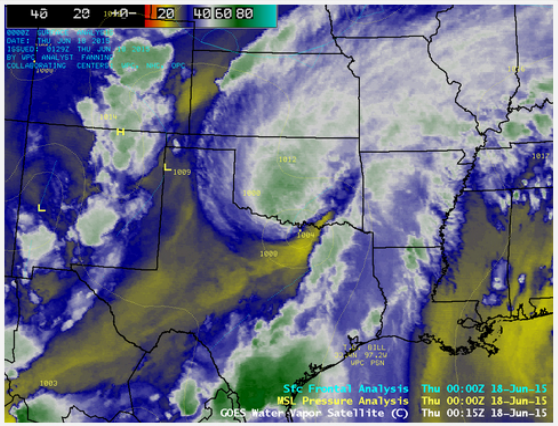
June 21st, 2015



Suomi NPP VIIRS 0.64 µm visible channel and 11.45 µm IR channel images (click to enlarge)

Advisories on **Tropical Storm Bill** were initiated when the system organized and intensified off the coast of Texas at 03 UTC on **16 June 2015** (GOES-13 **IR image animation**). Bill moved inland during the afternoon hours on 16 June, as can be seen in a comparison of Suomi NPP VIIRS 0.64 µm visible channel and 11.45 µm IR channel images at 1916 UTC ***(above)***.

Late in the day on 17 June, the general appearance of downgraded Tropical Depression Bill on GOES-13 6.5 µm water vapor channel imagery ***(below)*** began to suggest that the system might be undergoing an extratropical transition (intrusion of dry air in the southern quadrant, along with a blosominig comma head signature on the northern quadrant) — but Bill maintained sufficient tropical characteristics to continue being named a tropical depression.



GOES-13 6.5 µm water vapor channel images, with surface pressure and frontal analyses (click to play animation)

The circulation of TD Bill maintained its identity on satellite imagery as the storm remained over land for the next 3+ days, curving northeastward and moving across the Ohio River Valley region. Slow-moving TD Bill dropped over 12 inches of rain at some locations in Texas and Oklahoma, with amounts exceeding 8 inches in Missouri and 6 inches in Indiana (**WPC storm**

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» POES/AVHRR in AWIPS
» SatePedia
» Suomi NPP / JPSS Proving Ground
» VISIT / SHyMet Training Topics

June 2015

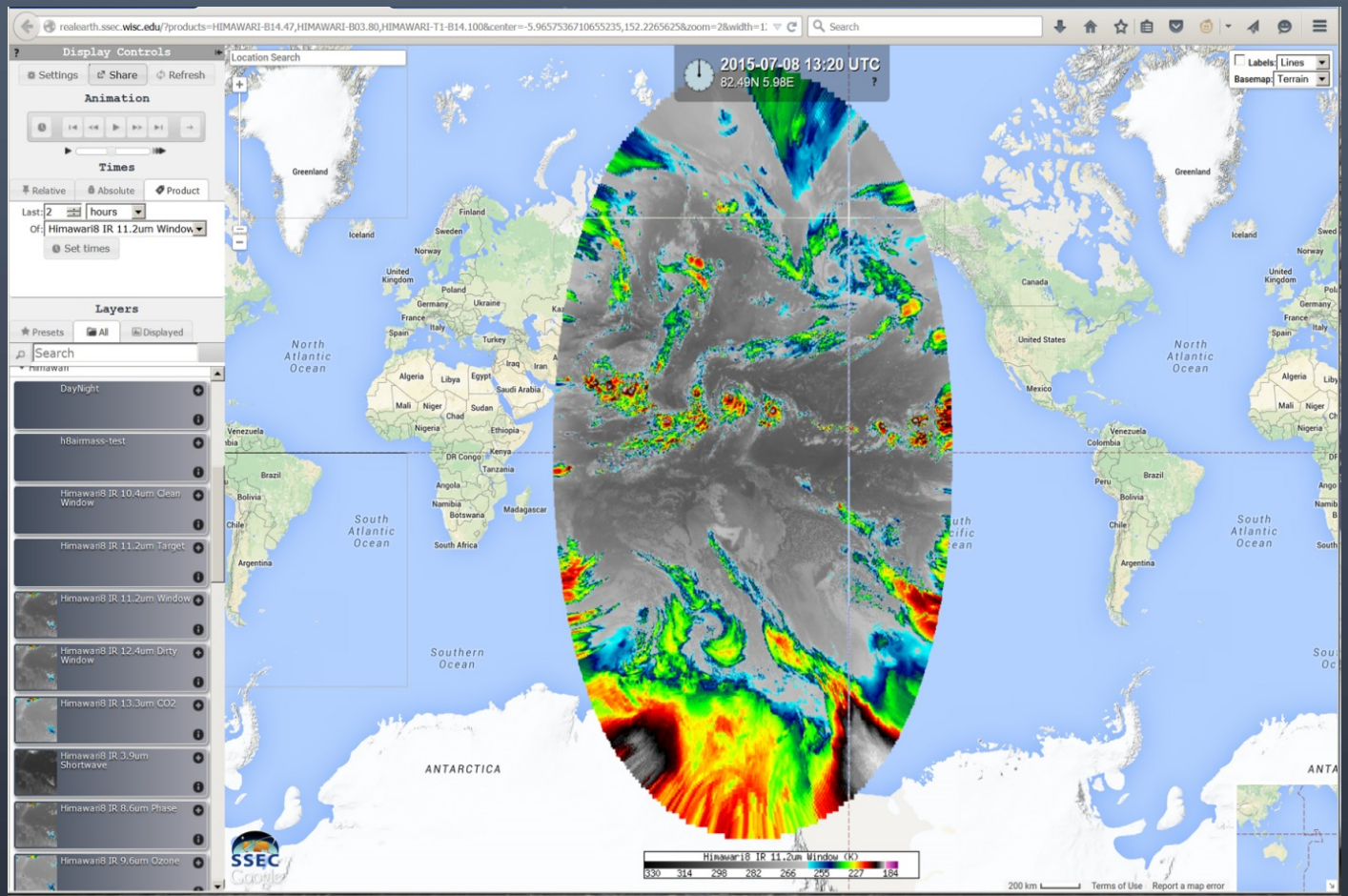
M	T	W	T	F	S	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

« May

Categories
» Air quality
» Antarctic
» Arctic
» AVHRR
» Aviation
» AWIPS II
» Calibration/Anomalies
» CLAVRX
» Cloud-Top Cooling
» COMS
» Convective Initiation
» DMSP
» Fire detection
» Fog detection
» General interpretation
» GOES sounder
» GOES-10
» GOES-11
» GOES-12
» GOES-13
» GOES-14
» GOES-15
» GOES-7
» GOES-8
» GOES-R
» Google Earth
» Heavy rain / flooding
» Himawari-8
» Historical
» Hydrology
» Landsat
» Lightning
» Marine weather
» McIDAS-V
» Meteosat
» Metop
» MODIS
» MTSAT
» Other Satellites
» POES
» ProbSevere
» ProbSevere
» RealEarth Web Map Server
» Red/Green/Blue (RGB) images
» Satellite winds
» Severe convection
» Suomi NPP
» Synthetic satellite imagery
» Training
» Tropical cyclones

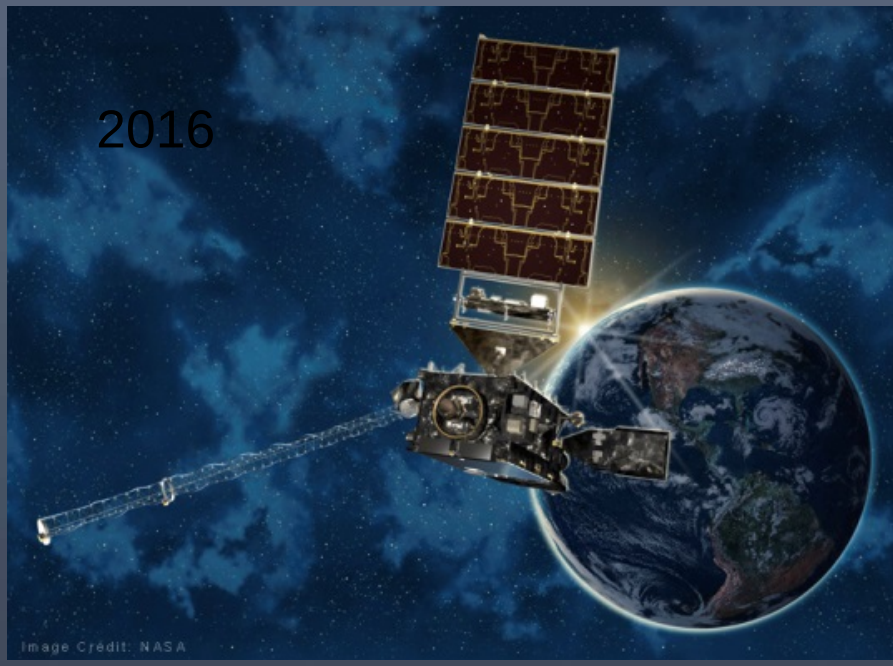
SSEC RealEarth™ Web Map Server

http://re.ssec.wisc.edu/



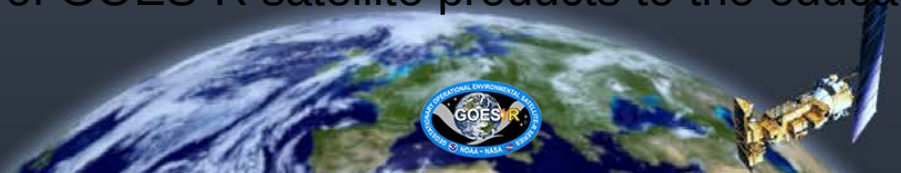
GOES-R Education Proving Ground

The ***GOES-R Education Proving Ground*** *f*eatures the design and development of lesson plans and activities for G6-12 teachers and students in collaboration with NOAA scientists at the Advanced Satellite Products Branch (ASPB) at CIMSS.

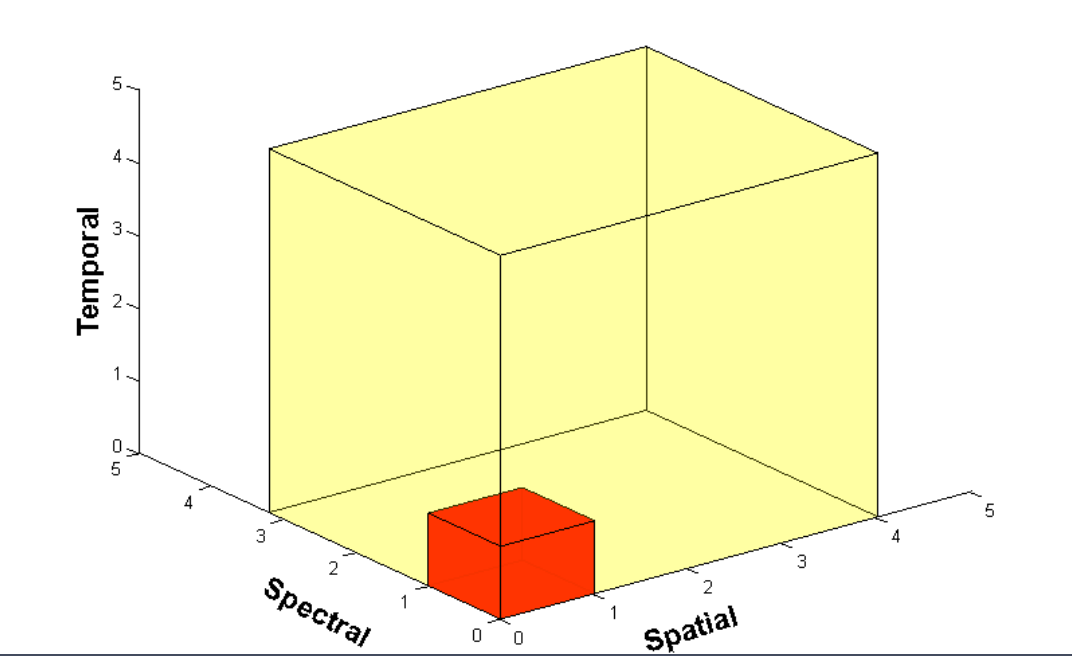


Intended Project Outcomes

- Awareness of NOAA's contributions to satellite remote sensing applications
- Increased utilization of satellite data in science classrooms
- Improvements in science literacy
- Effective transfer of GOES-R satellite products to the educational community



GOES-R Advanced Baseline Imager (ABI)



5X Faster coverage (5-minute full disk vs. 25-minute)

4X Improved spatial resolution (2 km IR vs. 4 km)

3X More spectral bands (16 on ABI vs. 5 on the current imager)

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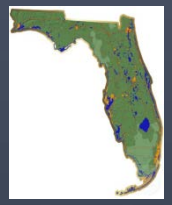
GOES-R Educators

WISCONSIN
Craig Phillips – Baraboo Middle School
Brian Witthun – Baraboo Middle School

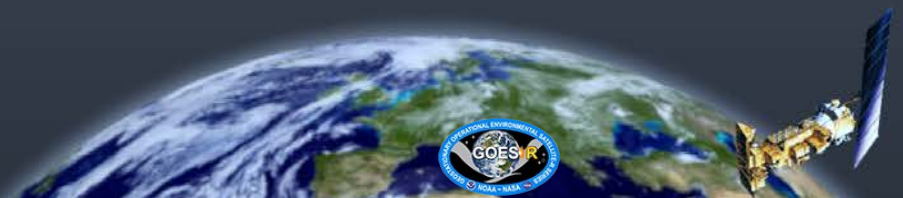
NEW JERSEY
Peter Dorofy - Palmyra Cove Environmental Discovery Center
Vicky Gorman – Medford Memorial Middle School



FLORIDA
Charlotte Besse - New Smyrna Beach High School
Amy Monahan - Volusia County Schools STEM educator

Our goal is to prepare the education community to be ***launch ready*** for imagery and products that will be available in the GOES-R era.

CIMSS



SSEC

The 2014 GOES-R Education Proving Ground Team!

John Moore, Tim Schmit, Margaret Mooney, Vicky Gorman, Peter Dorofy, Craig Phillips, Brian Whittun, Charlotte Besse & Amy Monahan

Lesson Plans *freely downloadable*

GOES-R EDUCATION PROVING GROUND

HOME | ABOUT | EDUCATORS | LESSON PLANS | RELATED RESOURCES

Lesson Plans from Wisconsin

Understanding Satellite Orbits
Related NGSS and Teacher Guide

GOES-R Instruments
Related Teacher Guide

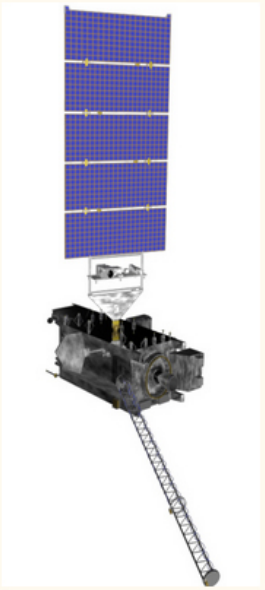
Comparing GOES imagery
Related Teacher Guide

Lesson Plans from Florida

GLM Lesson Plan *and NGSS standards*
GLM Little League weather forecasting activity
Little League Letter
Table Top twitter activity

Lesson Plans from New Jersey

Spatial Relations in Satellite Imagery



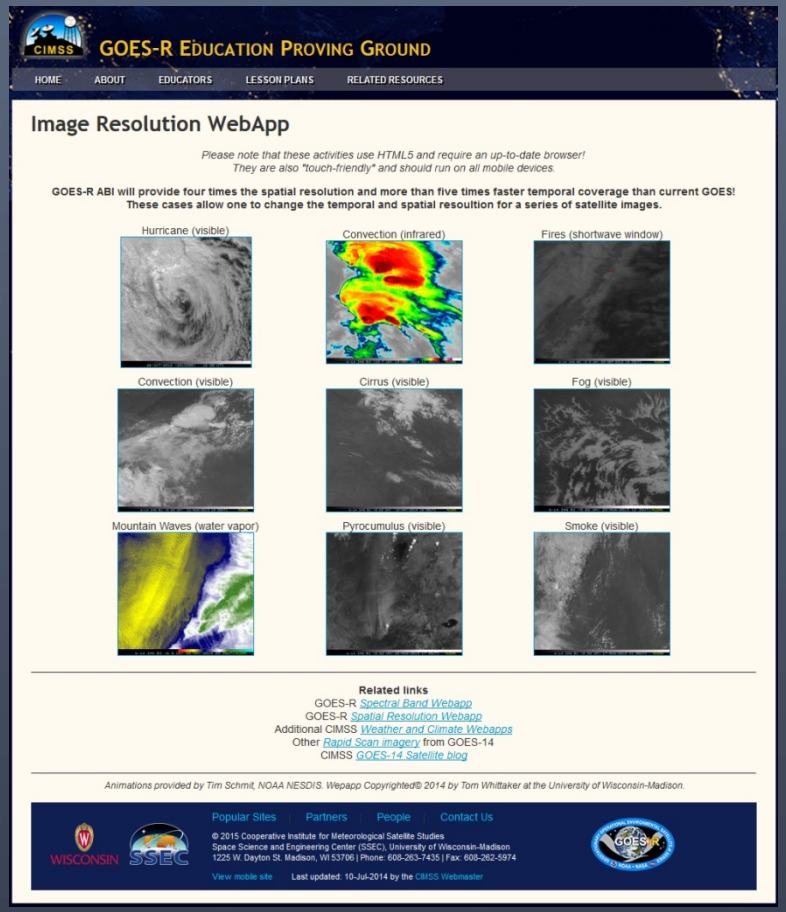
NOTE Powerpoint presentations with more detail can be found on the Satellites & Education XXVII agenda.

Popular Sites | Partners | People | Contact Us

Space Science and Engineering Center (SSEC), University of Wisconsin-Madison
1225 W. Dayton St. Madison, WI 53706 | Phone: 608-263-7435 | Fax: 608-262-5974

View mobile site Last updated: 10-Jul-2014 by the CIMSS Webmaster

Three New WebApps!



http://cimss.ssec.wisc.edu/education/goesr/

CIMSS

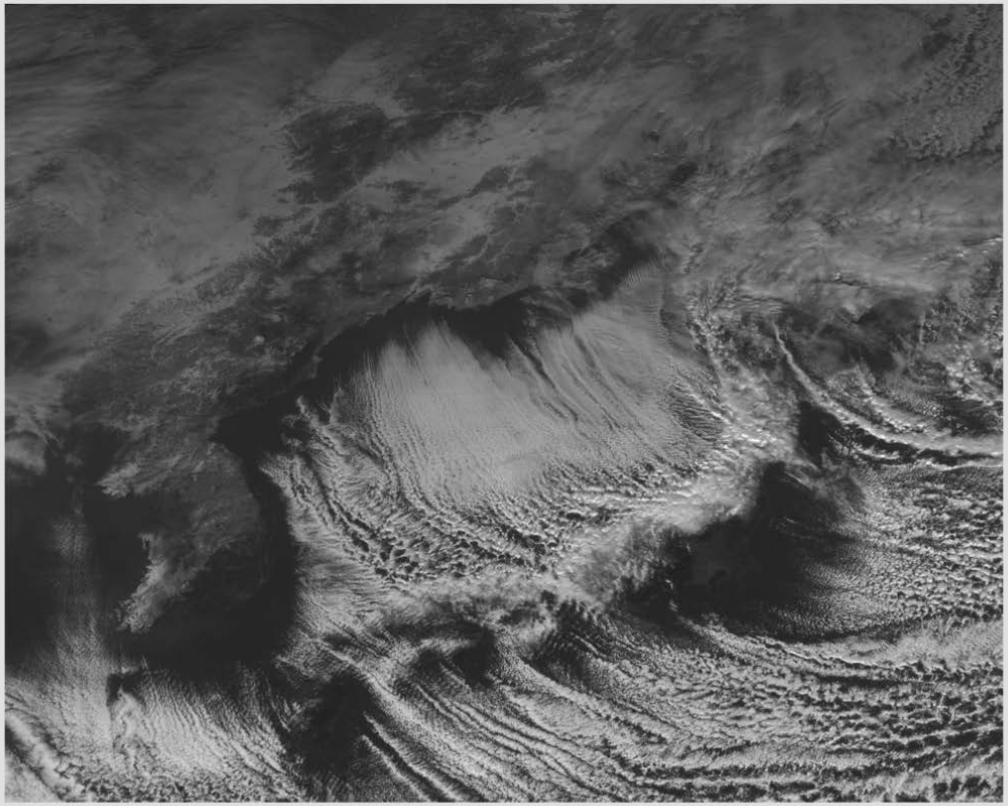
Spectral Bands WebApp

Band 1 (0.47 μm)

First Light: JMA's AHI

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Visible (0.47 μm): 'Blue' band, Cloud and surface features during the day, smoke, etc.

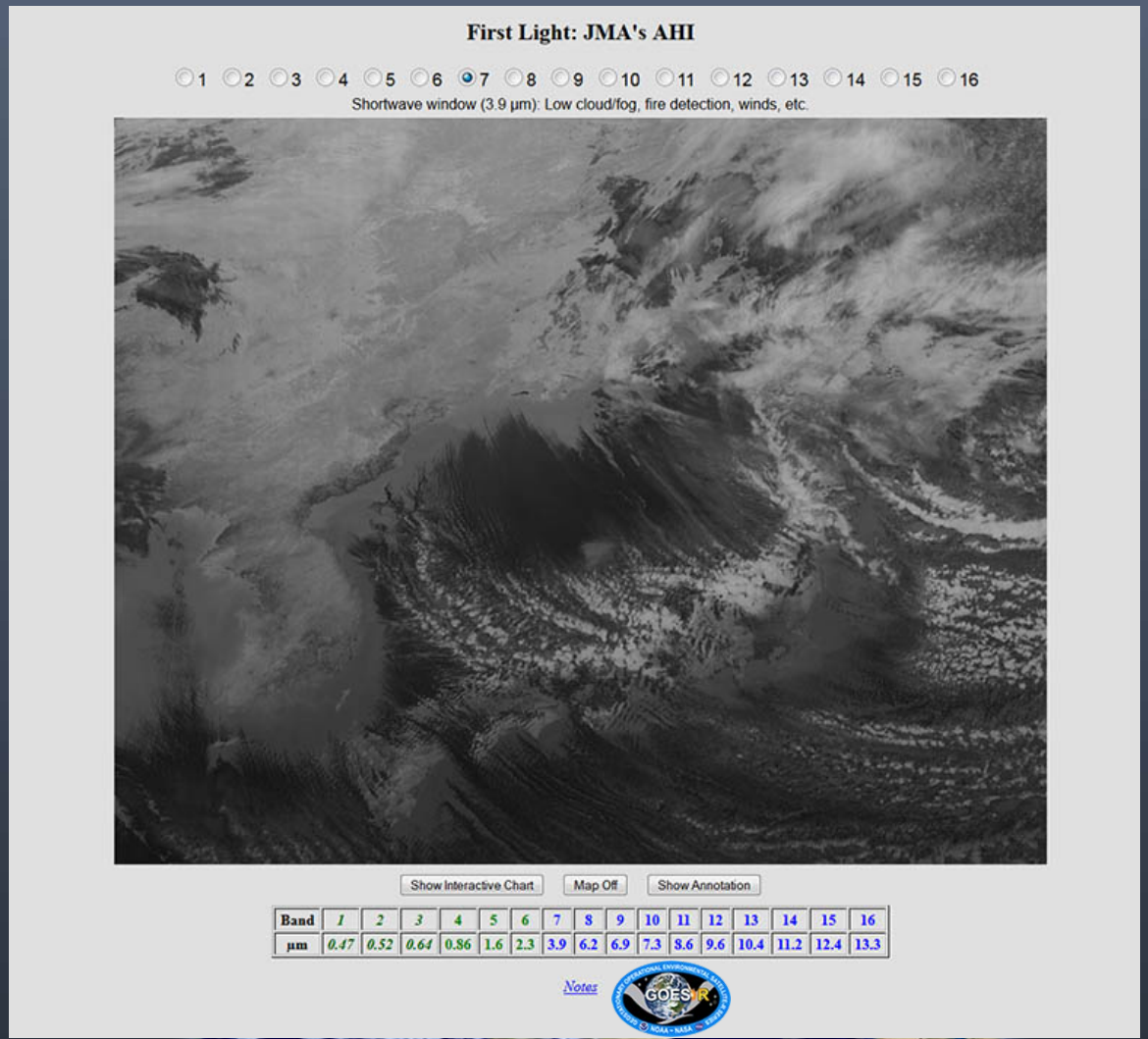


Show Interactive Chart | Map Off | Show Annotation

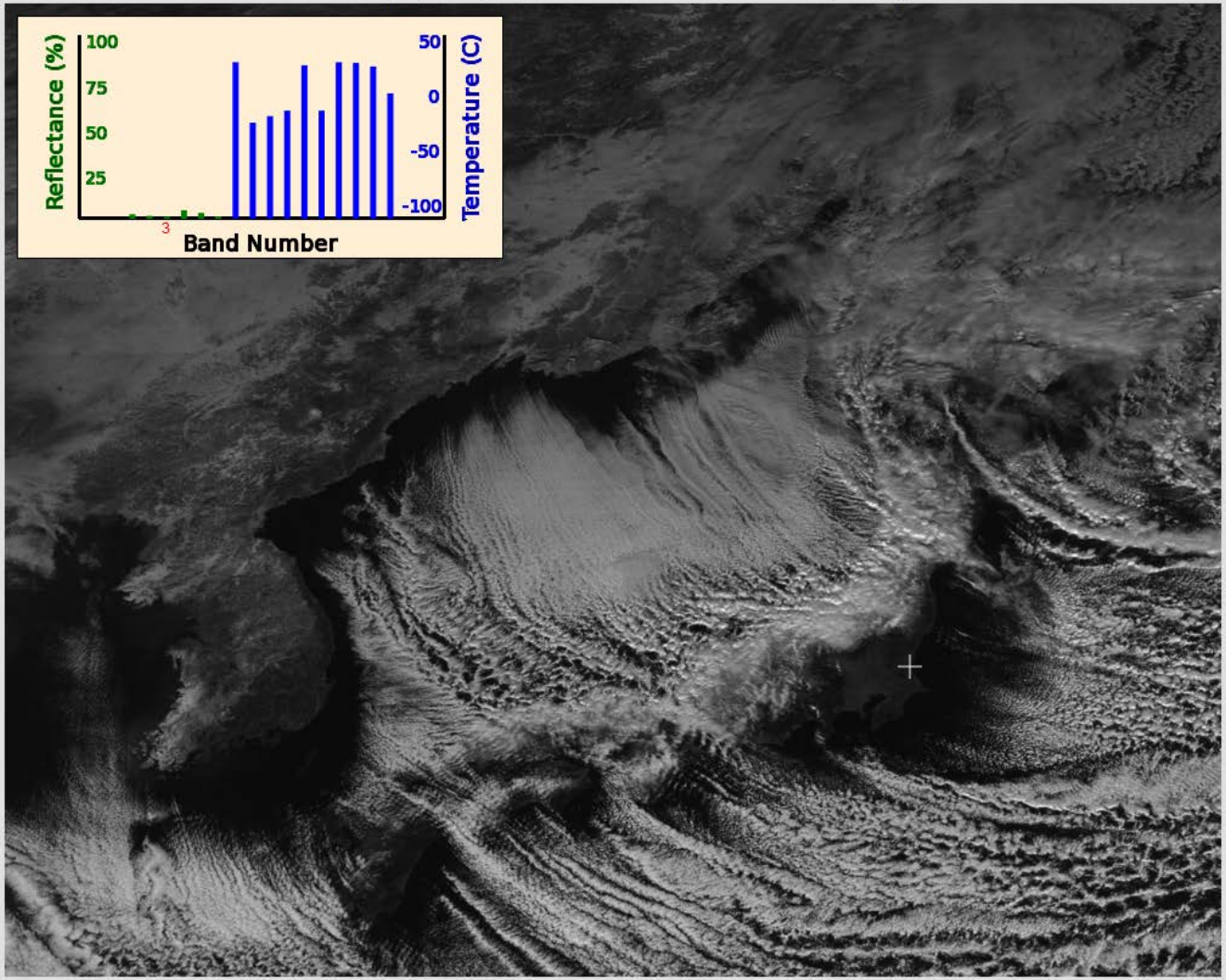
Band	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
μm	0.47	0.52	0.64	0.86	1.6	2.3	3.9	6.2	6.9	7.3	8.6	9.6	10.4	11.2	12.4	13.3

Spectral Bands WebApp

Band 7 (3.9 μm)



Mouse over anywhere in the image to get an interactive pop-up chart that provides data (reflectance & temperature) for each band at that location!



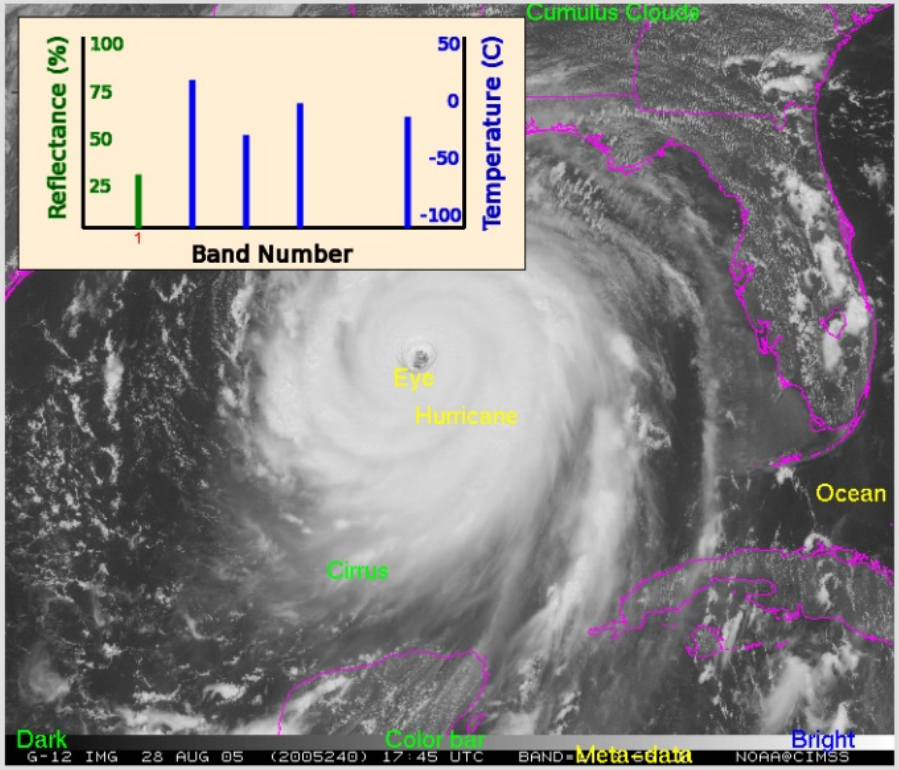
CIMSS

There are also several case studies using current GOES imagery (5 spectral bands) with the option to add descriptive annotations, or add map outlines.

GOES Imager Bands

1 2 3 4 6

Visible band (0.63 µm): Cloud cover and surface features during the day, smoke, etc.



Hide Interactive Chart | Map Off | Hide Annotation

Band	1	2	3	4	5	6
µm	0.63	3.9	6.5	10.7	N/A	13.3

Notes

Controls:

- To step through the **bands** click on the image, click one of the radio buttons, or use the arrow keys
- To **activate** the Interactive Chart: click the show button
- To **move** the Interactive Chart: drag to other positions within or touching the main image

Band=val at x=15, y=70 1=138/29 2=92/11 3=152/-34 4=130/-8 6=152/-19

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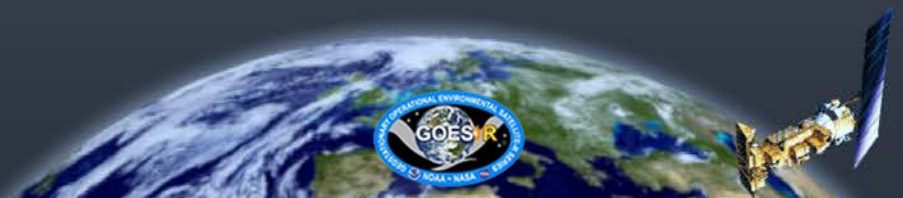
Next Steps

Count down to June 2016 launch! (& beyond)

- Expanding teachers from 6 to 26
- Planning 4 educational webinars (February, March, April & May 2016)
- Teacher Workshop at the launch in June
- Additional workshops in 2017 & 2018 co-located with ESIP summer meetings



GOES-R Education Proving Ground

HOME ABOUT EDUCATORS LESSON PLANS RELATED RESOURCES

The **GOES-R Education Proving Ground** features the design and development of pre-and post-launch lesson plans and activities for G6-12 teachers and students. A key element of this effort is a core group of educators working with CIMSS EPO in close coordination NOAA scientists at the Advanced Satellite Products Branch (ASPB) stationed at the Cooperative Institute of Meteorological Satellite Studies (CIMSS).

Our goal is to prepare the education community to be ***launch ready*** for new satellite imagery and improved products that will be available in the upcoming GOES-R era.

Here are two of the many exciting improvements ...

Advanced Baseline Imager (ABI)
The GOES-R ABI will have 16 spectral bands, (compared to 5 on the current GOES Imager), resulting in three times more spectral information and four times the spatial resolution. The frequency of images, or temporal coverage, will be more than five times faster than the current GOES!

Geostationary Lightning Mapper (GLM)
The all new GLM on GOES-R will measure total lightning activity continuously over the Americas and adjacent oceans with spatial resolution of approximately 10 km!

New GOES-R WebApps

Scientists from ASPB have teamed up with CIMSS researchers to develop several Next-Generation WebApps that enable exploration of temporal, spatial and spectral resolutions on satellite image interpretation. Examples include simulated GOES-R ABI, the current GOES imager, and "first light" images from the Japan Meteorological Agency Advanced Himawari Imager (AHI) as well as several case studies featuring special high-time resolution Geostationary Operational Environmental Satellite (GOES-14) imager data operated in a mode to emulate the improved temporal resolution possible on the ABI instrument scheduled to fly on the GOES-R satellite.

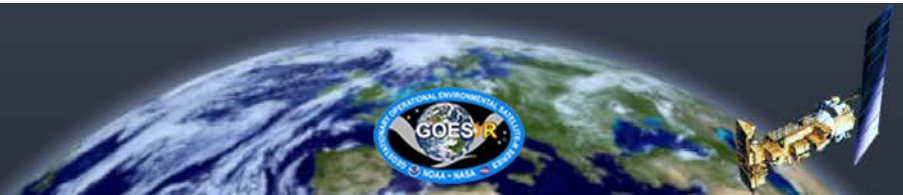
Try the new Webapps!
GOES-R *Spectral Band Webapp*
GOES-R *Spatial Resolution Webapp*
GOES-R *Image Resolution Webapp*

Join the GOES-R Proving Ground!
Click here to apply

Next Steps

Count down to June 2016 launch! (& beyond)

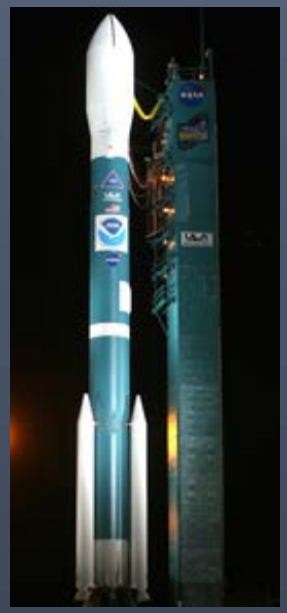
- Expanding teachers from 6 to 26
- Planning 4 educational webinars (February, March, April & May 2016)
- Teacher Workshop at the launch in June
- Additional workshops in 2017 & 2018 co-located with ESIP summer meetings



GOES-R Education Proving Ground

JOIN US!

- Test a lesson plan
- Try the WebApps
- Attend the Launch Workshop
- Share the excitement!



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