### Hashtags: #earth, #animateyourworld

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### Tags: Data Visualization, Imagery, Model

**Challenge Description**

Unlock the power of NASA’s Earth imagery and build something spectacular! NASA maintains and contributes to a collection of hundreds of terabytes of Earth observation imagery from our numerous satellites, which is available to scientists and the public. The imagery supports applications in air quality, volcanic ash and smoke plumes, drought, dust storms, fires, floods, severe storms, shipping, vegetation, and more. Images from 2012 through today are currently available using NASA’s Global Imagery Browse Service (GIBS) and Worldview browsing tool.

*Build a Cloud-Free Animation* (GIBS): Clouds are one of the biggest challenges in dealing with optical satellite imagery. Satellite imagery allows us to observe changes on Earth’s surface over time, but clouds prevent us from detecting boundaries. This sub-challenge asks you to build cloud-free animations of any location on Earth. You will need a few clear days for the region and time range you select. You can also specify spatial extent and time range interactively through a map interface.

*Share a Satellite Story* (GIBS / Worldview)**:**Satellite imagery when viewed over time is powerful, such as NASA’s [Earth Observatory](http://earthobservatory.nasa.gov/NaturalHazards/view.php?id=82071) “View Image Comparison” option. This sub-challenge asks you to develop a user interface to select an arbitrary geographic region, a set of satellite products, and a set of time steps, which illustrate a change (think tracking hurricanes across the ocean, wildfires spreading, snow melting, deforestation in the tropics). After the user makes their selections, the imagery can be animated on-screen, bringing the story to life. That’s only a preview, though - once the user is happy with their story, they can click a button to upload it to a video sharing site and share it with the world.

*Knock Our Socks Off* (GIBS / Worldview):Using the GIBS API or Worldview open source code, create a capability of your choice using GIBS or Worldview.

**Background**

GIBS is continually updated throughout the day with the latest imagery (often available within four hours of acquisition from the satellites), providing the capability to address time-sensitive problems as well as ones which span many months. Think of GIBS as themap API and Worldview as a map display application. GIBS serves full-resolution NASA imagery to any client that requests it; Worldview is a client that provides an interface to interactively pan and zoom the imagery requested from GIBS. In addition, GIBS/Worldview can view imagery from Arctic and Antarctic perspectives to provide “full Earth” coverage.

**Solution Ideas**

Here are some ways for you to frame this solution:

*Build a Cloud-Free Animation*

· Use the daily MODIS Corrected Reflectance or Surface Reflectance (Terra or Aqua) imagery products served by GIBS.

· Provide the ability for the user to select arbitrary spatial bounds and a time range.

· The output is a series of dates that meet the user’s input criteria.

· Selection of spatial bounds and time range with an interactive mapping client.

· Cloud-free imagery output is played back onscreen as an animation.

· Select the maximum percentage of cloud cover allowable for a given day.

You may be able apply image processing techniques directly to GIBS imagery using the various spectral bands measured by MODIS. See “What do the different band combinations mean” in the [Rapid Response FAQ](https://earthdata.nasa.gov/data/near-real-time-data/faq/rapid-response) (e.g., the MODIS 3-6-7 bands show clouds as white and peach).

*Share a Satellite Story*

User must be able to interactively select an arbitrary geographic region, set of satellite products (Terra and Aqua/MODIS Corrected Reflectance are good starting points), and set of time steps. The user must be able to select non-consecutive time steps which will allow them to pick the imagery that best tells their story.

Once the user makes their selections, the resulting set of time steps can be animated onscreen as a preview. Basic animation controls such as playback speed and looping should be included.

A “Publish” button should be included which publishes the video to a video sharing site. This sub-challenge is inspired by the capabilities pioneered by [Helioviewer.org](http://helioviewer.org/). There are websites that provide advanced movie generation capabilities by being able to pan, zoom, loop, and more.

*Knock Our Socks Off*

Use the [GIBS API](https://earthdata.nasa.gov/gibs) or extend [Worldview](https://earthdata.nasa.gov/worldview) to do something awesome! If you’re feeling particularly adventurous and want to modify the GIBS server or API itself, [the source code is available](https://github.com/nasa-gibs/onearth).

**Sample Resources**

NASA GIBS: <https://earthdata.nasa.gov/gibs>

Sample client 1 using NASA GIBS: <https://github.com/nasa-gibs/gibs-web-examples>

Sample client 2 using NASA GIBS:<https://wiki.earthdata.nasa.gov/display/GIBS/GIBS+Supported+Clients>

NASA Worldview app: <https://earthdata.nasa.gov/worldview>

NASA ECHO (metadata API): <https://earthdata.nasa.gov/echo>

OpenLayers Mapping library: <http://ol3js.org/> and <http://openlayers.org/>

[Global Imagery Browse Services (GIBS)](https://earthdata.nasa.gov/gibs)

GIBS available products (e.g., MODIS Land Surface Temperature):

<https://wiki.earthdata.nasa.gov/display/GIBS/GIBS+Available+Imagery+Products>

GIBS access methods (e.g., WMTS, KML):<https://wiki.earthdata.nasa.gov/display/GIBS/GIBS+Access+Methods>

GIBS supported clients:

<https://wiki.earthdata.nasa.gov/display/GIBS/GIBS+Supported+Clients>

GIBS metadata is scattered across many sites including

[h](https://wiki.earthdata.nasa.gov/display/GIBS/GIBS+Supported+Clients) [ttp://modis-atmos.gsfc.nasa.gov/products.html](http://modis-atmos.gsfc.nasa.gov/products.html)

<http://modis-land.gsfc.nasa.gov/>

Worldview: GIBS client: <https://earthdata.nasa.gov/labs/worldview/>