NASA DATA SETS

Home Planet at Your Fingertips:

- EXAMPLE RESOURCES

- **NASA Earth Data Website**
- **Land, Atmosphere Near real-time Capability for EOS (LANCE)**

LANCE provides 900+ near-real-time NASA datasets (within 3 hours).

- **Image access server (GIBS API)**

NASA provides an API for accessing near-real-time imagery.

- **The Integrated Multi-satellitE Retrievals for GPM (IMERG)**

This is the unified U.S. algorithm that provides multi-satellite, multi-algorithm precipitation products (Early, Late and Final). The link leads to this dataset: GPM IMERG Early Precipitation L3 Half Hourly 0.1 degree x 0.1 degree V06

- **NASA Global Precipitation Measurement (GPM)**
- **NASA Giovanni**

NASA data analysis and visualization without downloading data and software.

- SHAPEFILES

  - https://www.hiu.state.gov/data/
  - https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html
  - http://www.fao.org/geonetwork/srv/en/main.home

- NASA WEB WORLDWIND RESOURCES

  - Worldwindjs
  - Getting Started with NASA WorldWind
  - WorldWind tutorials
  - Web WorldWind documentation
  - https://worldwind.arc.nasa.gov/worldweather/

Web WorldWind supports WMS or WMTS imagery layers. The WorldWeather app visualizes imagery from different public web services hosted by many international institutions, including NASA.

  - https://files.worldwind.arc.nasa.gov/artifactory/apps/web/examples/WMTS.html

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This example shows how to consume layers from a WMTS service with WorldWind.

  - https://github.com/NASAWorldWind/WebWorldWind/blob/develop/examples/WMTS.js

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- **https://files.worldwind.arc.nasa.gov/artifactory/apps/web/examples/WMS.html**

This example shows how to consume layers from a WMS service with WorldWind.

- **https://github.com/NASAWorldWind/WebWorldWind/blob/develop/examples/WMS.js**

This example shows how to consume layers from a WMS service with WorldWind.

- JAXA RESOURCES EXCERPTED FROM HTTP://EARTH.JAXA.JP/EN/

- **JAXA resources**
- **JAXA Himawari Monitor (P-Tree)**

Sea surface temperature, chlorophyll-a concentration, wild fire, etc.

- **JASMES Map Monitor**

Vegetation, snow and sea ice cover, dryness of vegetation (water stress trend), soil moisture, wildfire, land and sea surface temperature, etc.

- **AMSR Earth Environment Viewer**

- **JAXA GLOBAL RAINFALL WATCH (GSMaP)**
- **JAXA 3D RAINFALL WATCH**
- **G-Portal**

JAXA satellite database related to land, sea, atmosphere, snow and sea ice, water cycle and climate fields.

- CSA RESOURCES

- **RADARSAT Constellation Mission**

Some radar sample images products selected by the Canadian Space Agency can upscale your solution!

- **Earth Observation Data Management System**

This system allows access to many data products and even to 36,000 historical RADARSAT-1 satellite images.

- **MOPITT**

The MOPITT Instrument onboard the NASA Terra Satellite is the longest-running air pollution monitor in space today (20 yrs of carbon monoxide data this year!). With its global concentration datasets that not only indicate the total level of CO, but also CO as a function of altitude (atmospheric profiles), the dataset is ready for your use!

- **Government of Canada Open Data Portal**

- ESA RESOURCES

- **Euro Data Cube**

Euro Data Cube is providing seamless access to global archives of Sentinel, Landsat and MODIS datasets, easy to analyze, integrate or run machine learning workflows on.

Scanning for Lifeforms:

- CHALLENGE INTRODUCTION VIDEO

- **Scanning for Lifeforms - Virtual Bootcamp Video and Overview of Key Resources and Tools**

- NASA SATELLITE DATA SOURCES

- **NASA Global Imagery Browse Services (GIBS)**

GIBS provides access to over 400 satellite products.

- **NASA Worldview**

Worldview is an easy way to visualize GIBS data in your browser.

- **NASA Socioeconomic Data and Applications Center (SEDAC)**

SEDAC provides data that focus on human interactions in the environment, integrating socioeconomic and Earth science data.

- **NASA's Earth Science Data Systems Program**

This describes the many sources of Earth science data

- **NASA Earthdata Search**

Earthdata allows you to search, discover, visualize, refine, and access NASA Earth observation data.

- **NASA Earth Science Data Systems biodiversity pathfinder**
- **Species Distribution Modeling Data**

The Biological Diversity and Ecological Forecasting Data Pathfinder is divided into four parts. See here for details.

- ON-THE-GROUND DATA SOURCES

- **GLOBE Observer App**

The app is downloadable on various mobile devices and platforms. It is not necessary to download the app to complete this challenge, but collecting some data yourself may be helpful.

- **GLOBE Visualization System**

This system displays GLOBE data on a map and allows you to look at detailed information about individual data points. It also allows downloading of data tables of an entire layer or a selected subset of a layer. Photos that are associated with individual data points in the GLOBE data are currently accessible only through this visualization system.

- **GLOBE Advanced Data Access Tool**

This allows you to find and retrieve GLOBE data using several different search parameters. You will be presented a summary of sites that have data available based on your search parameters. From those sites, you can further refine your search and download the data into a CSV file for detailed analysis. A summary CSV file is also available that summarizes the amount of data available for each site.

- **TUTORIALS FOR RETRIEVING AND VISUALIZING YOUR DATA**

  - **https://www.globe.gov/get-trained/using-the-globe-website/retrieve-and-visualize-your-data**

- **JAXA RESOURCES EXCERPTED FROM HTTP://EARTH.JAXA.JP/EN/**

  - **JASMES Portal**

Vegetation, snow and sea ice cover, dryness of vegetation (water stress trend), soil moisture, wildfire, land and sea surface temperature, etc.

  - **JAXA Himawari Monitor (P-Tree)**

Sea surface temperature, chlorophyll-a concentration, wild fire, etc.

  - **JICA-JAXA Forest Early Warning System in the Tropics (JJ-FAST)**

Web-based system using ALOS-2 to monitor tropical forests on a near real-time basis.

- **Global PALSAR-2/PALSAR/JERS-1 Mosaic and Forest/Non-Forest map**
- **G-Portal**

JAXA satellite database related to land, sea, atmosphere, snow and sea ice, water cycle and climate fields.

- CSA RESOURCES

- **Earth Observation Data Management System**

This system allows access to aerial photography, satellite products and value added thematic datasets

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- **RADARSAT Constellation Mission**

Some radar sample images products selected by the Canadian Space Agency can be used to assess biodiversity, map forest and even global changes in vegetation.

- **Canadian Space Agency Open Data Portal**

The Canadian Space Agency makes scientific data available to researchers, students, industry and the public. Come explore!

- **Government of Canada Open Data Portal**
- **Government of Canada Open Maps Portal**

- ESA RESOURCES

- **Euro Data Cube**

Euro Data Cube is providing seamless access to global archives of Sentinel, Landsat and MODIS datasets, easy to analyze, integrate or run machine learning workflows on.

Sleep Shift Scheduling Tool:

- EXAMPLE RESOURCES

- **Virtual Bootcamp Video/Introduction: Sleep Shift Scheduling Tool**
- **How Astronauts Improve Sleep**
- **NASA Research Reveals Biological Clock Misalignment Effects on Sleep for Astronauts**

Orbital Scrap Metal – The Video Game V2.0

- EXAMPLE RESOURCES

- **Orbital Scrap Metal tutorial**
- **Spacebirds code base**
- **WorldWindJS Web App Template**
- **NASA Web WorldWind tutorials**
- **NASA Web WorldWind API documentation**
- **Orbital Scrap Metal-- The Video Game Teams, International Space Apps Challenge 2019**
- **Power Of Power (POP), Orbital Scrap Metal - The Video Game, 2019 International Space Apps Challenge, Osaka, Japan**
- **Potatoheads, Orbital Scrap Metal - The Video Game, 2019 International Space Apps Challenge, Virtual Participation**

- **Fastidious LEO, Orbital Scrap Metal - The Video Game, 2019 International Space Apps Challenge, New York City, NY**

Let's Connect

-
  - **https://www.youtube.com/watch?v=xP4_Q7illb0**

First to get you excited about this challenge, check out this video that describes the motivation for this device.

- **https://exoplanets.nasa.gov/exep/technology/in-space-assembly**

This website provides a lot of great information currently occurring at NASA for in space assembly.

- **https://www.nasa.gov/missions/science/zipnuts.html**

Here is some background on ZipNuts, the prior solution that has been used when humans put things together in space.

- CSA RESOURCES

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Data Discovery for Earth Science

- NASA EARTH OBSERVATORY
    - Natural Events Image of the Day
- SCIENCE DATASETS (VIA EARTHDATA SEARCH)
    - Earthdata search
- NASA EARTH SCIENCE COMMON METADATA REPOSITORY (CMR)
    - Application Programming Interface (API) Documentation
- NASA WORLDVIEW
    - NASA Worldview
- DATASETS FOR DUST
    - MODIS Aerosol Optical Depth
    - OMI Aerosol Index
    - TOMS Aerosol Index
    - PM 2.5
- DATASETS FOR FLOODS
    - IMERG Rainfall
- ESDS DATA PATHFINDERS

- **Wildfires**
- **Water Quality**
- **Disasters**
- **Health and Air Quality**
- **Biological Diversity and Ecological Forecasting**
- **Agriculture and Water Resources**

- JAXA RESOURCES EXCERPTED FROM HTTP://EARTH.JAXA.JP/EN/

- **JAXA for Earth**

Earth Data Collection by JAXA Satellites

- **G-Portal**

JAXA satellite database related to land, Sea, Atmosphere, Snow and sea ice, Water cycle and Climate fields

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- **JAXA Himawari Monitor (P-Tree)**
- **JASMES Map Monitor**
- **AMSR Earth Environment Viewer**
- **JAXA GLOBAL RAINFALL WATCH (GSMaP)**

- CSA RESOURCES

- **MOPITT on NASA's Terra satellite**

From regional air pollution sources (fires, industry, vehicles, etc...), MOPITT carbon monoxide data is available for you to integrate into your solution!

- **SCISAT**

This satellite measures more atmospheric gases than any other in the world. Its dataset contains multiple air pollutants (NO, NO2, SO2, CO, CH4, and CFCs) for you to use, including unique atmospheric profile data for each gas (concentration as a function of altitude). The dataset is ready for your team to study and link to human health, particularly over the Earth's poles (Arctic and Antarctic). Enjoy!

- **OSIRIS**

This dataset is used by Environment Canada to study nitrogen dioxide pollution throughout the atmosphere around the globe. When combined with other NO2 datasets, it can be used to measure NO2 profile concentrations that are closest to the Earth's surface, like nothing else.

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- **Government of Canada Open Data Portal**
- **Government of Canada Open Maps Portal**

- ESA RESOURCES

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Euro Data Cube is providing seamless access to global archives of Sentinel, Landsat and MODIS datasets, easy to analyze, integrate or run machine learning workflows on.

Dust Yourself Off:

- https://www.lpi.usra.edu/decadal/leag/DavidJLoftus.pdf
- SSERVI
- Moon Toolkit
- Moon2Mars

A Flood of Ideas:

-
  - **UNDRR Sendai Framework for Disaster Risk Reduction:**
  - **United States Department of Homeland Security (DHS) Homeland Infrastructure Foundation-Level Dataset (HIFLD)**
  - **https://www.unisdr.org/files/54970_techguidancefdigitalhr.pdf**
  - **NASA Disasters Program Disaster Mapping Portal**
  - **Global Flood Monitoring System (GFMS)**
  - **Group on Earth Observations (GEO) Global Flood Risk Monitoring (GFRM) Community Activity**

- JAXA RESOURCES EXCERPTED FROM HTTP://EARTH.JAXA.JP/EN/

- **JAXA for Earth**

  Earth Data Collection by JAXA Satellites

- **JAXA GLOBAL RAINFALL WATCH (GSMaP)**

  Global Rainfall Status From March 2000 to 4 Hours Ago

- **Today's Earth**

  Result On Simulation of Land Surface/River Water for Disaster Monitoring and Hydrological Research

- **Precise Global Digital 3D Map "ALOS World 3D" (AW3D)**

- CSA RESOURCES

  - **RADARSAT Constellation Mission**

    Some radar sample images products generated in response to the **International Charter "Space and major disasters".**This can definitely help your team in its quest for success!

  - **Earth Observation Data Management System**

    This system allows access to many data products to help you monitor floods and even to 36,000 historical RADARSAT-1 satellite images.

  - **Canadian Space Agency Open Data Portal**

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- ESA RESOURCES

- **Euro Data Cube**

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Make Sense Out of Mars:

- Mars missions and research
- Earth-based remote sensing
- Earth-based sensor monitoring

Fly-by-Wireless:

- Fly-by-Wireless
- Fly-by-Wireless 2007
- Fly-by-Wireless Update (2012)
- WAIC Systems
- Backscatter Systems for WAIC
- NASA Armstrong Patent

- NASA Trade Study
-

1D, 2D, 3D, Go!:

- NASA Developer Resources
- NASA APIs
- NASA Open Data
- NASA Open Earth Exchange (OpenNEX)
- Keyhole Markup Language (KML) data sets
- GeoJSON data sets
- NASA Web Worldwide Tutorials
- Application Programming Interface documentation
- NASA's General Mission Analysis Tool (GMAT)

Don’t Forget the Can Opener!:

- https://images.nasa.gov/
- https://svs.gsfc.nasa.gov/
- https://appliedsciences.nasa.gov/programs/disasters-program
- https://www.nasa.gov/mission_pages/neowise/main/index.html
- https://www.earthdata.nasa.gov

Mission to the Moon!

- moon.nasa.gov
- Eyes on the Solar System App
- JPL Moonkit
- NASA Science Lunar Resources
- Lunar Reconnaissance Orbiter Website
- American Museum of Natural History | Science Mission Directorate

VIRTUAL PLANETARY EXPLORATION:

- EXAMPLE RESOURCES
  - **Virtual Planetary Exploration V2.0 Challenge Video**
  - **Apollo 16 Press Kit**
  - **Apollo 17 Press Kit**
  - **Apollo Geology Tool Catalog (nasa.gov)**
  - **NASA's Recommendations to Space-Faring Entities: How To Protect and Preserve the Historic and Scientific Value of U.S. Government Lunar Artifacts**
  - **Naids, Adam, Artemis Geology Tools, EVA Exploration Workshop, February 2020**
  - **Educational Guide**
  - **NASA 3D Models**
  - **DIY: Exploration Moon Trek**

    This article provides an overview of the Moon Trek web app.

- **Moon Trek**

  Extract 3D models of the lunar surface.

- **Mars Trek**

  Extract 3D models of the surface of Mars.

- **NASA Desert RATS**
- **Desert RATS Operational Test: Insights from geologists**
- **Desert RATS Research and Technology Studies**
- **How NASA Goddard Tests Tools Astronauts Will Use to Explore Distant Worlds -- This article provides overviews of a Laser scanning surface mapping, a handheld X-ray fluorescence spectrometer, and a Laser-induced breakdown spectroscopy instrument**
- **Planetary Image Locator Tool (PILOT) - a database with thousands of images from the planets and moons in our solar system. These images could be part of a virtual display of resources.**

Warming Planet, Cool Ideas:

- https://climate.nasa.gov/vital-signs/global-temperature/
- https://data.giss.nasa.gov/gistemp/
- https://climate.nasa.gov/climate_resources/139/graphic-global-warming-from-1880-to-2018/
- https://www.gfdl.noaa.gov/global-warming-and-hurricanes/
- https://svs.gsfc.nasa.gov/1067
- https://science.nasa.gov/my-nasa-data-hurricane-frequency-and-intensity

- https://www.ospo.noaa.gov/Products/ocean/sst.html
- https://www.globalchange.gov/browse/indicators/
- https://svs.gsfc.nasa.gov/11056
- https://earthdata.nasa.gov/new-sea-surface-temperature-sst-product
- https://earthobservatory.nasa.gov/global-maps/MYD28M
- https://neo.sci.gsfc.nasa.gov/view.php?datasetId=MYD28M
- https://www.nasa.gov/sites/default/files/
- https://sites.wff.nasa.gov/code810/news/story193.html
- https://nasa-at-work.nasa.gov/a/campaign-home/209
- https://ntrs.nasa.gov/archive/nasa/

Where the Tall Things Are Found

- ICESat-2 data are served through the National Snow and Ice Data Center (NSIDC) Distributed Active Archive Center

Internet on the Ocean:

- NASA Taking First Steps Toward High-speed Space 'Internet'
- Space Internet Architectures and Technologies for NASA Enterprises
- Disruption Tolerant Networking

- Antarctic Selfie’s Journey to Space via Disruption Tolerant Networking
- Disruption Tolerant Networking to Demonstrate Internet in Space

1UP for NASA Earth:

- Global Imagery Browse Services (GIBS)
- NASA Worldview
- NASA’s Earth Science Data Systems Program
- NASA Earthdata Search
- GLOBE Observer App
- GLOBE Visualization System
- GLOBE Advanced Data Access Tool
- Tutorials for retrieving and visualizing your data