User Resources and Support for the ISS LIS Science Data at NASA's Global Hydrology Resource Center (GHRC)

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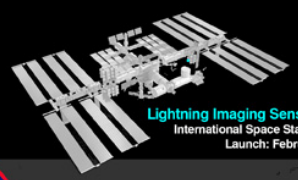
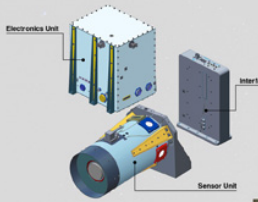


In February 2017, the Lightning Imaging Sensor (LIS) was launched and installed on the International Space Station (ISS). The ISS LIS provides observations of global lightning flashes, including data at higher latitudes than previously possible, allowing for the study of lightning in hazardous weather events over much of the Earth. The ISS LIS P0.2 datasets were recently published at the NASA Global Hydrology Resource Center (GHRC) Distributed Active Archive Center (DAAC) and Near- Real Time (NRT) ISS LIS data were added to NASA LANCE in Summer 2018. This poster introduces the NRT ISS LIS data and available support and resources provided by GHRC. These resources include an overview of the ISS LIS NRT and research quality data, available micro articles and data recipes, and the improved lightning website. ISS LIS NRT lightning data now play a role in providing scientific and social media benefits with respect to severe weather. Examples are shown.

ISS LIS and NRT Capability

MISSION & MEASUREMENT



MISSION
- Fly a space-qualified, flight-spare LIS on ISS to take advantage of unique capabilities provided by the ISS (e.g., high inclination, real time data).
- Integrate LIS as a hosted payload on the DoD Space Test Program-Houston 5 (STP-H5) mission and launch on a Space X rocket in February 2017 for a minimum 2 year mission.

MEASUREMENT
- NASA and its partners developed and demonstrated effectiveness and value of using space-based lightning observations as a remote sensing tool.
- LIS measures total lightning (amount, rate, radiant energy) during both day and night, with storm scale resolution, millisecond timing, and high detection efficiency, with no land-ocean bias.

SENSOR UNIT (legacy hardware)
- Optical Assembly
- 128x128 CCD Focal Plane
- Lightning and Background detection

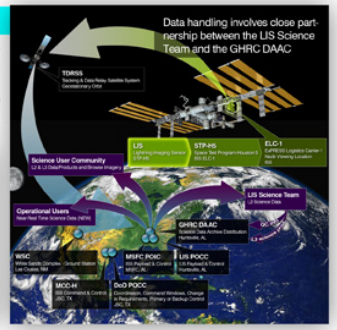
ELECTRONICS UNIT (legacy hardware)
- Real Time Event Processor, Background removal, Data formatting
- Power conversion and control

INTERFACE UNIT (new hardware)
- Power conversion, Timing, Control
- ISS Interface

BENEFIT
- LIS on ISS extends TRMM time series observations, expands latitudinal coverage, provides real time data to operational users, and enables cross-sensor calibration.

ISS LIS Data Handling at GHRC DAAC

Mission operations are managed from the LIS Payload Operations Control Center (LIS POCC). Data handling involves close partnership between the LIS Science Team and the Global Hydrology Resource Center (GHRC) Distributed Active Archive Center (DAAC).



How are NRT ISS LIS Data Being Used?

ISS LIS data are available as NRT via download from GHRC DAAC, via a subscription to the ISS LIS data from GHRC DAAC, or via the NASA LANCE interface. Dr. Michael Peterson, a NRT data user obtains the data to produce NRT social media posts of storm lightning activity.

Michael Peterson's Twitter page
@WeatherArchive

ISS LIS Data Access

Provisional near real-time (NRT) and non-quality-controlled (NQC) standard data products from the ISS LIS are available from the GHRC DAAC. "Provisional" indicates that the algorithm is still under development and may still contain some errors. Researchers are advised to use these data with caution and to consult the GHRC DAAC or the LIS Science Team prior to using the data for research leading to publications or presentations. There are two ISS LIS products, science data and background files. The background data provide surrounding storm structure of lightning events and aid in removing erroneous flashes. Data files are available in both HDF-4 and netCDF-4 formats, with corresponding browse images in GIF format. ISS LIS Quality Controlled (QC) standard data products, which have the extensive processing, quality assurance reviews, and validation necessary for use in scientific research, are expected to be available in 2019.

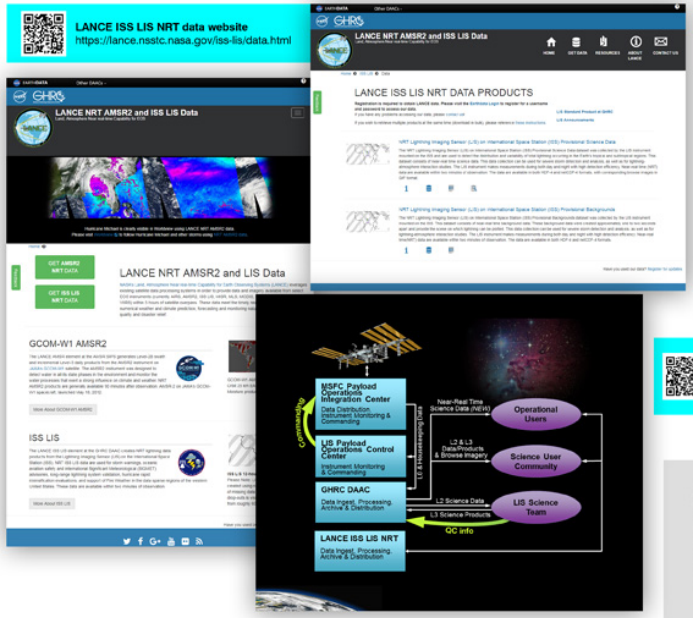
NRT Lightning Imaging Sensor (LIS) on International Space Station (ISS) Provisional Science Data

NRT Lightning Imaging Sensor (LIS) on International Space Station (ISS) Provisional Backgrounds

Putting LIS Data into LANCE

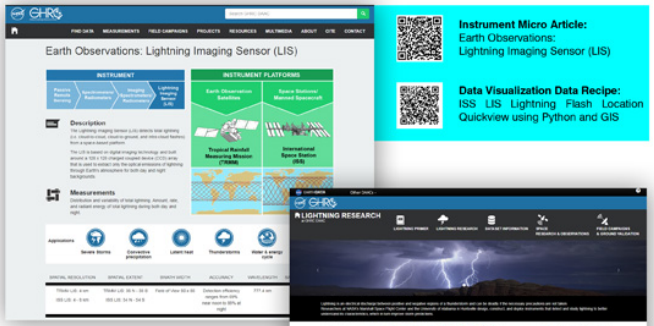
To provide the NRT data to more users, the GHRC worked with NASA this past summer to incorporate ISS LIS into the Land, Atmosphere Near real-time Capability for EOS (LANCE) system. The LANCE ISS LIS NRT data are available rapidly after an observation (generally within two minutes), and are an excellent resource for applications requiring low data latency, such as tracking on-going severe storms or tracking lightning over oceans and other data-sparse regions.

LANCE ISS LIS NRT data website
https://lance.nsstc.nasa.gov/iss-lis/data.html



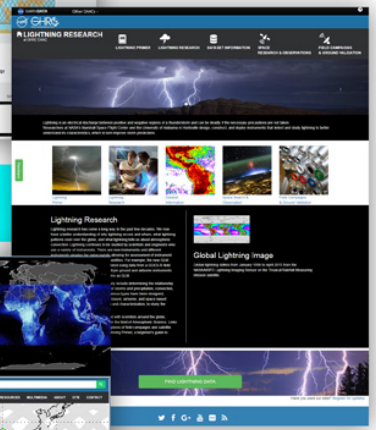
GHRC Support and Resources for Lightning Study

The GHRC outreach and user support team works to help users better access and utilize the ISS LIS data and to bring lightning data to a much broader audience. Examples of various resources are shown below. In addition, GHRC recently updated the existing lightning web site and incorporated it into the GHRC website for consistency and future maintenance. Access to all lightning information is available from **https://ghrc.nsstc.nasa.gov/lightning/**



Instrument Micro Article:
Earth Observations:
Lightning Imaging Sensor (LIS)

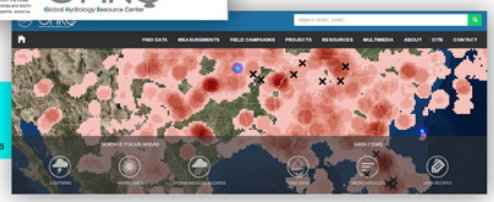
Data Visualization Data Recipe:
ISS LIS Lightning Flash Location Quickview using Python and GIS



Lightning website
https://ghrc.nsstc.nasa.gov/lightning/

NASA Webinars
https://youtu.be/m83cNoaMXUw

GHRC and NASA Earthdata Web Banners (Mastheads)
https://ghrc.nsstc.nasa.gov/home/content/ghrc-mastheads



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