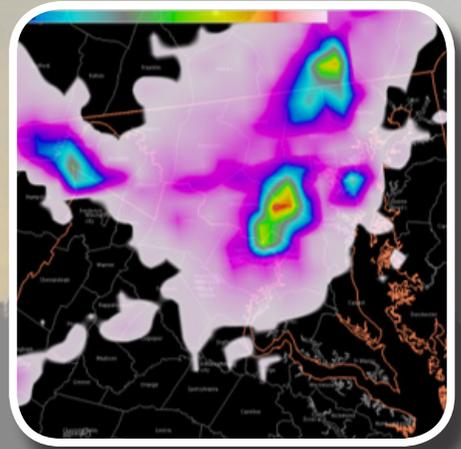


# GOES-R

Geostationary Lightning Mapper (GLM)



*Total lightning detection.  
Increased severe storm warning lead time.  
Earlier warning of ground strike hazards.*

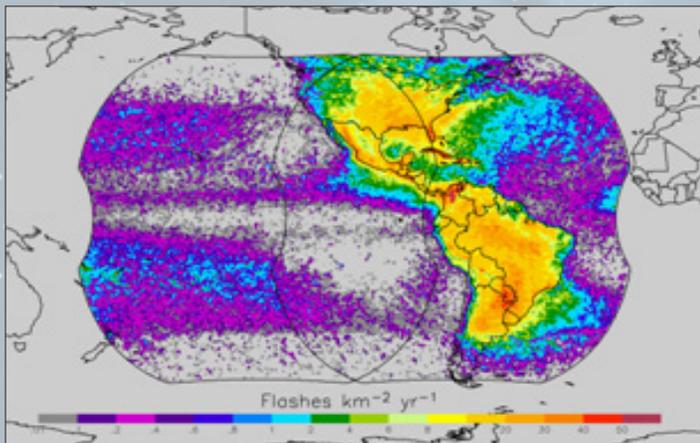


## What is it?

The Geostationary Lightning Mapper (GLM) is an instrument on the Geostationary Operational Environmental Satellite R Series (GOES-R) spacecraft that can detect and map total lightning activity over the Americas and adjacent ocean regions. GLM will enable early predictions of intensifying storms and severe weather events. It will also provide data for long-term climate studies. The instrument will aid in forecasting of weather events that could affect aviation safety and efficiency. GLM is unique both in how it operates and in the information it collects. While ground-based sensors primarily detect cloud-to-ground lightning coverage, GLM will provide nearly-uniform total lightning activity detection with both cloud-to-ground and cloud-to-cloud coverage. GLM will identify growing, active and potentially destructive thunderstorms in areas over both land and oceans.

## How does it work?

GLM is a single-channel, near-infrared optical transient detector that can detect the momentary changes in an optical scene, indicating the presence of lightning. GLM will measure total lightning activity continuously over the Americas and adjacent ocean regions with near-uniform spatial resolution of approximately 10 kilometers. The instrument will collect information such as the frequency and location of lightning events to detect the intensification of potentially severe storms, which are often accompanied by increased lightning activity.



Combined field-of-view of the GLM from the east and west positions.

## What benefits will it provide?

Research and testing has demonstrated the GLM's potential for improvement in tornado warning lead time and false alarm rate reduction. In addition, GLM measurements can provide early warning of lightning ground strike hazards; better detection and short range forecasts of heavy rainfall and flash flooding; improved ability to monitor intensification/decay of storms during radar outages or where radar coverage is poor or scarce, such as in mountainous areas and oceanic regions; improved routing of commercial, military and private aircraft over oceanic regions where observations of thunderstorm intensity are limited; and continuity and refinements of lightning climatology within the GOES field of view. Data from the instrument will also be used to produce a long-term database to track decadal changes in lightning activity. This is important because of potential changes in extreme weather and severe storms under a changing climate and lightning's role in maintaining the global electric current.



The damage done to a tree that was struck by lightning.

- ✓ Increased thunderstorm and tornado warning lead time
- ✓ Early warning of ground strike hazards
- ✓ Better detection of heavy rainfall and flash flooding
- ✓ Improved aviation flight route planning
- ✓ Data for long-term climate variability studies

## Instrument Contractor

**LOCKHEED MARTIN**

Palo Alto, California

## GOES-R Program Office

Code 410

NASA Goddard Space Flight Center

Greenbelt, MD 20771

301.286.1355

nesdis.goesr@noaa.gov

## Learn more

<http://www.goes-r.gov/spacesegment/glm.html>

