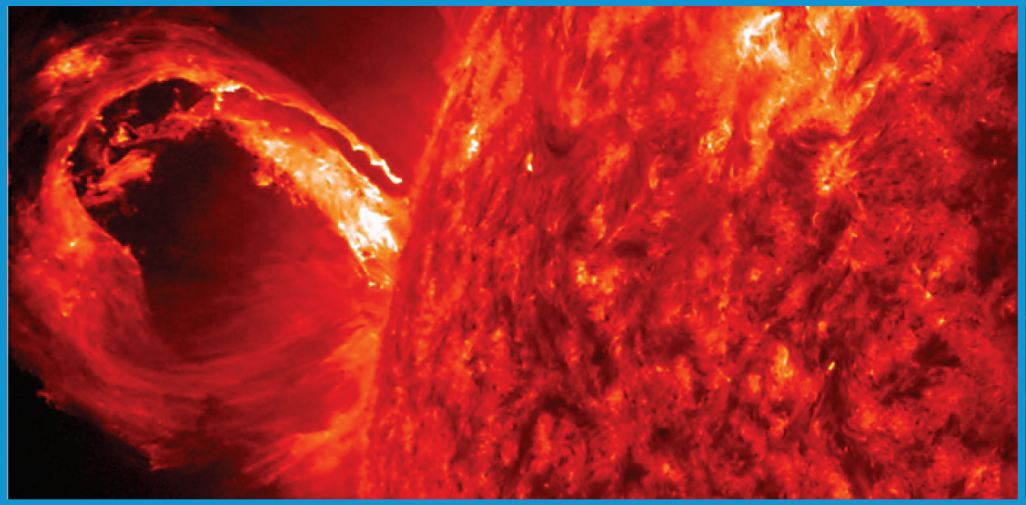
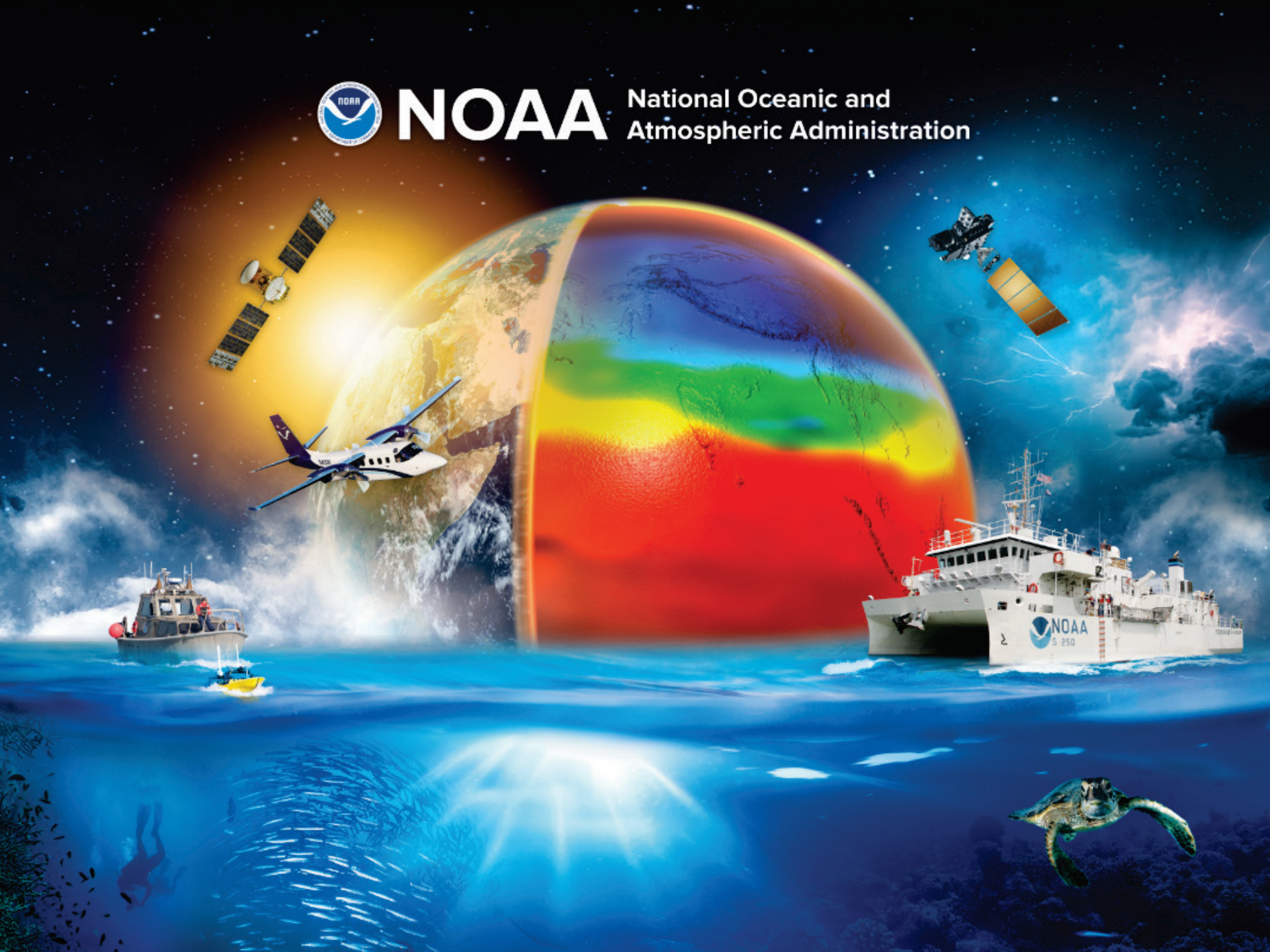
The Space Weather Challenge:
Putting Interest into Action

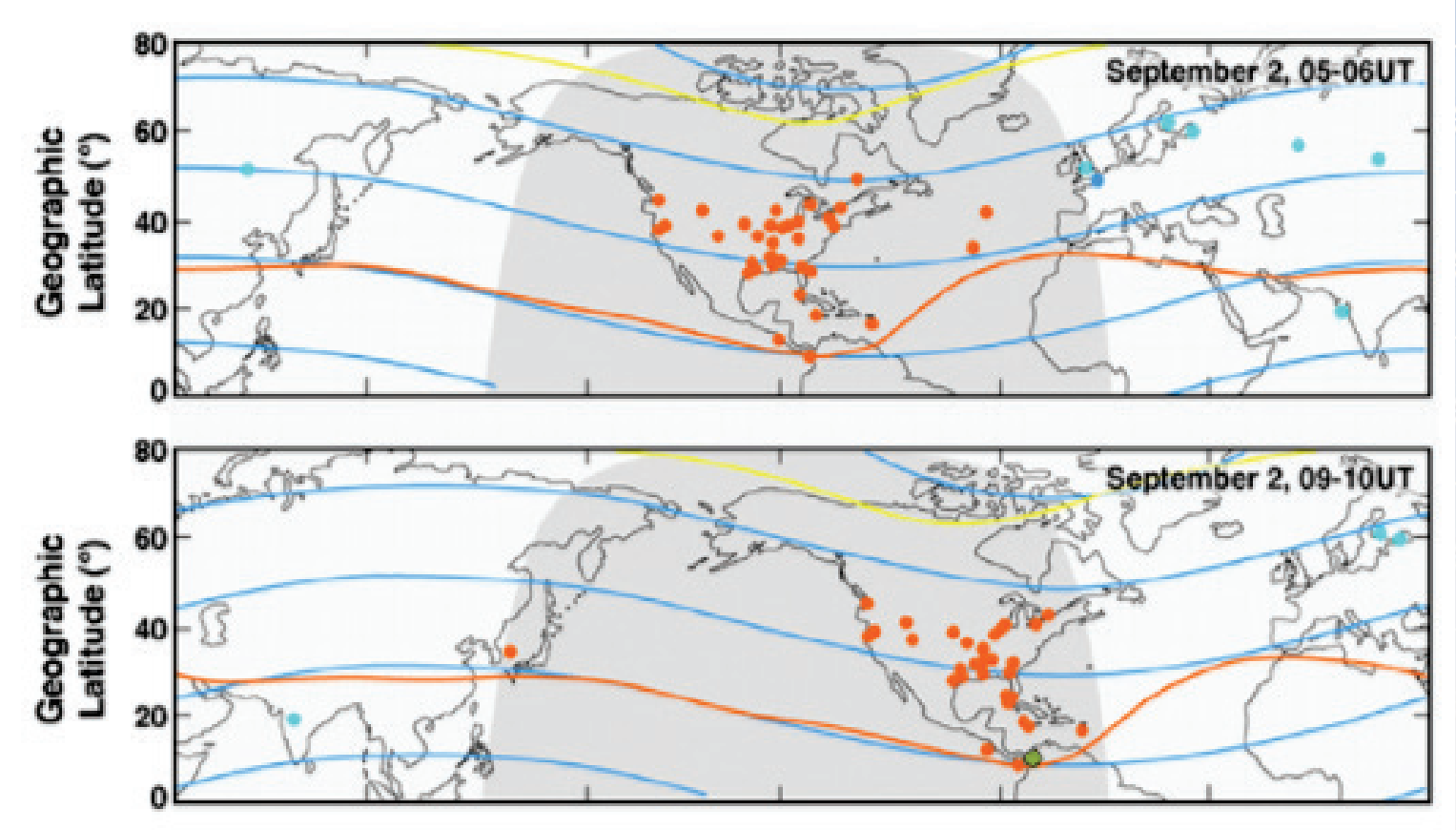


Dr. Stephen Volz, Assistant Administrator
NOAA Satellite and Information Service


NOAA
National Oceanic and
Atmospheric Administration
NOAA

1859 Geomagnetic Storm

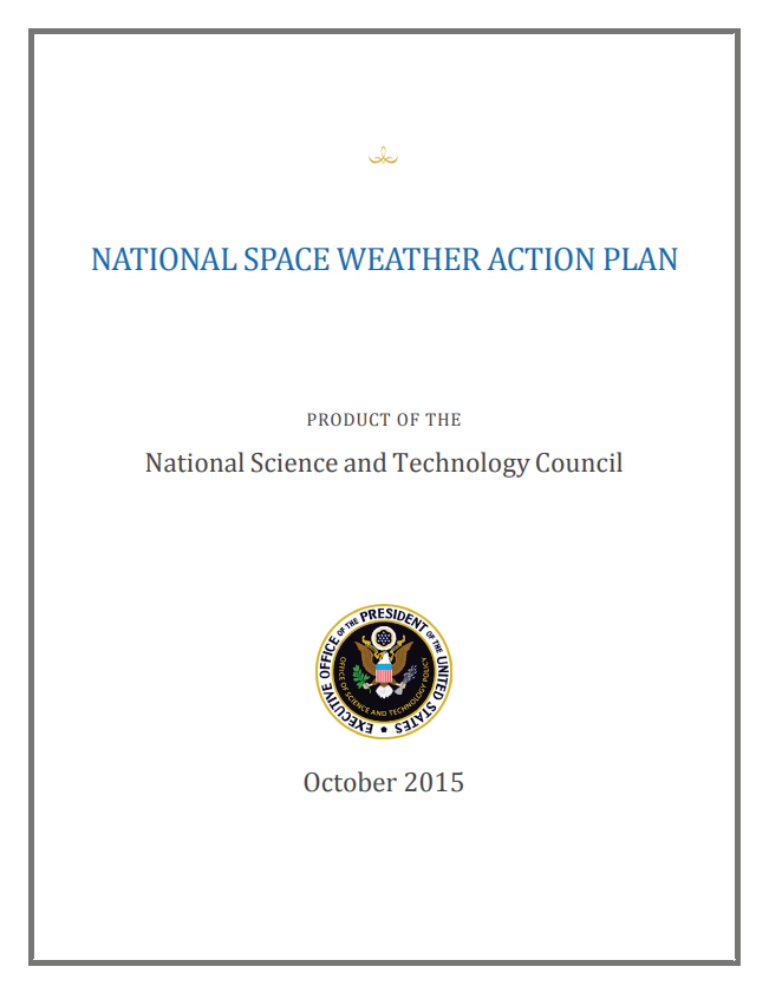
*A low probability event, but the **consequences of such an event occurring today** have generally continued to increase.*



Map of reported aurora sightings; September 2, 1859; Cardenas et al. (2015)

Space Weather Action Plan & SWORM

FRAMEWORK



NATIONAL SPACE WEATHER ACTION PLAN

PRODUCT OF THE

National Science and Technology Council

October 2015

IMPLEMENTATION

National Science and Technology Council

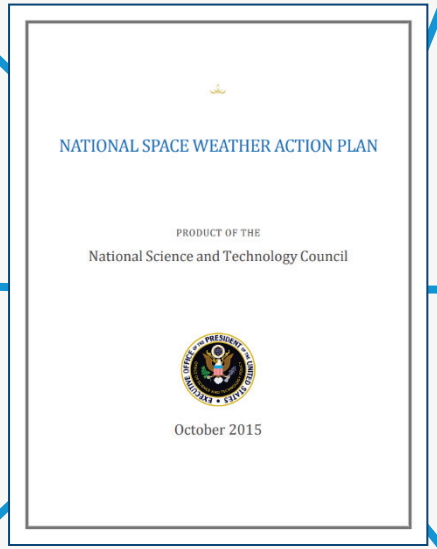
Space Weather Operations, Research, and Mitigation Subcommittee (SWORM)

Space Weather Action Plan Goals

Goal 1: Establish Benchmarks for Space-Weather Events

Goal 2: Enhance Response and Recovery Capabilities

Goal 3: Improve Protection and Mitigation Efforts


NATIONAL SPACE WEATHER ACTION PLAN

PRODUCT OF THE

National Science and Technology Council

October 2015

Goal 6: Increase International Cooperation

Goal 5: Improve Space-Weather Services through Advancing Understanding and Forecasting

Goal 4: Improve Assessment, Modeling, and Prediction of Impacts on Critical Infrastructure

Space Weather Action Plan Details & Progress

Number of Actions By Lead Agency

Commerce
36 actions

DHS
29 actions

NASA
10 actions

Interior
9 actions

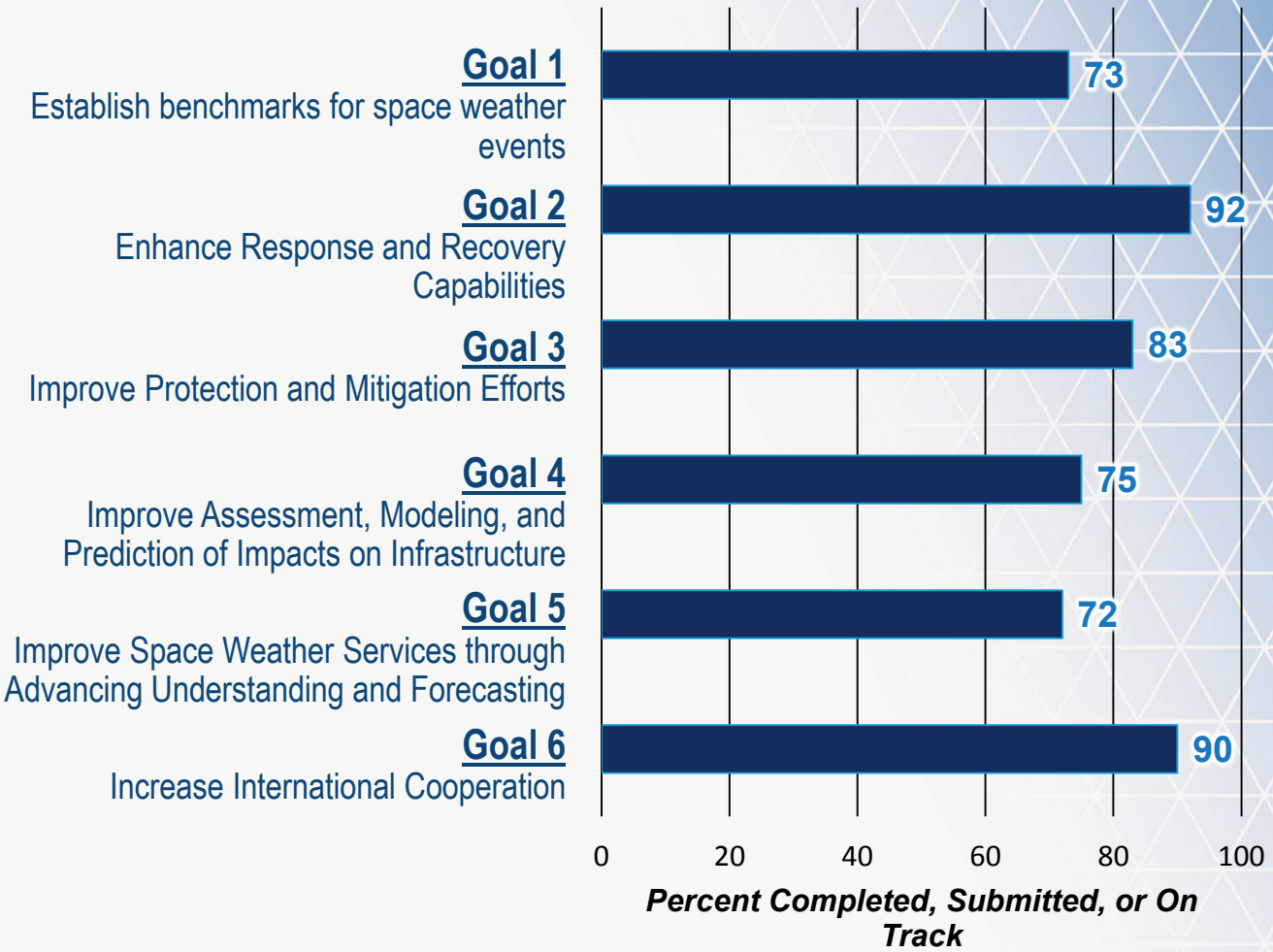
State
8 actions

Energy
2 actions

Transportation
2 actions

DOD, NSF, USPS
1 action each

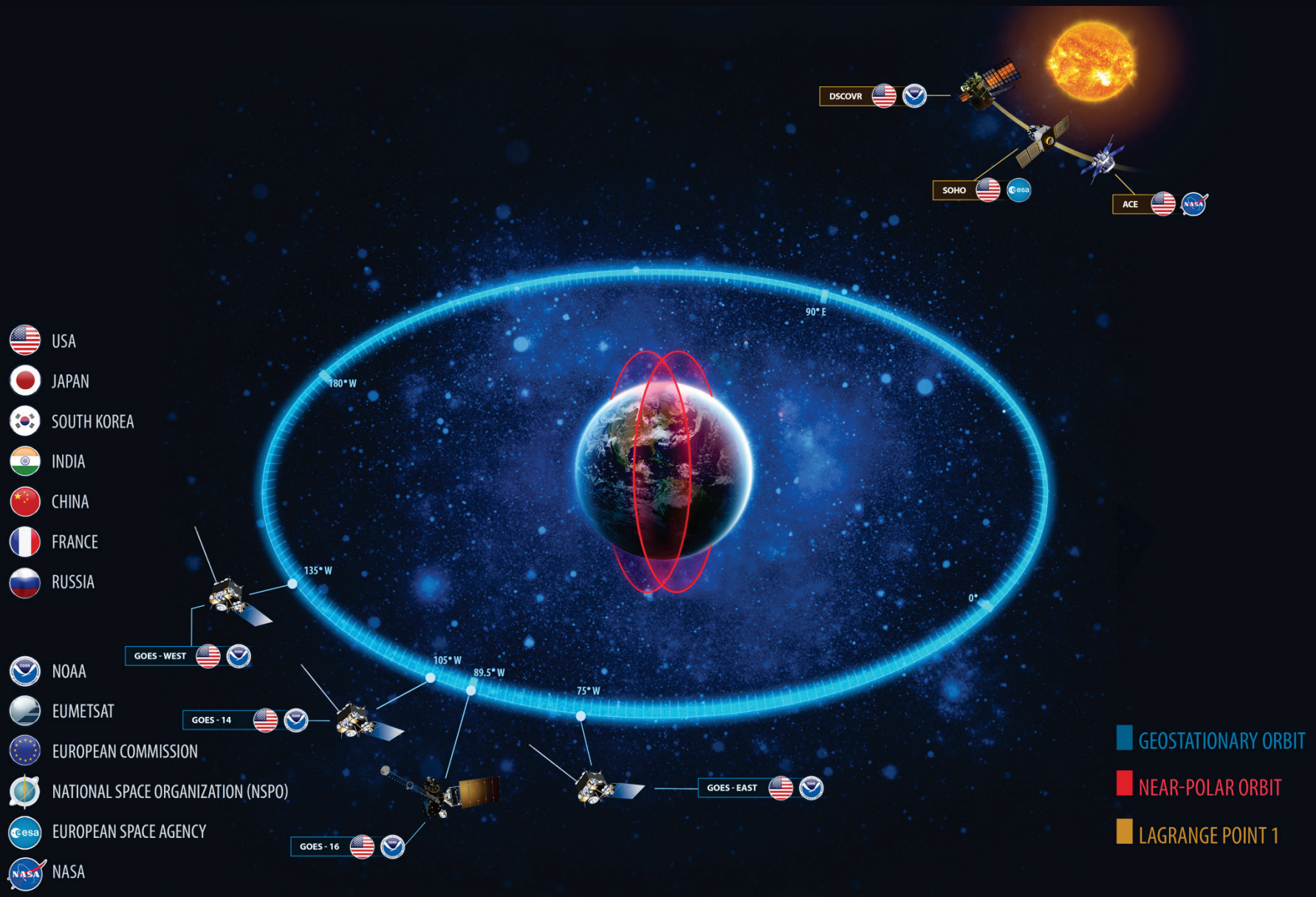
Action Status as of early June 2017



Global Observing System

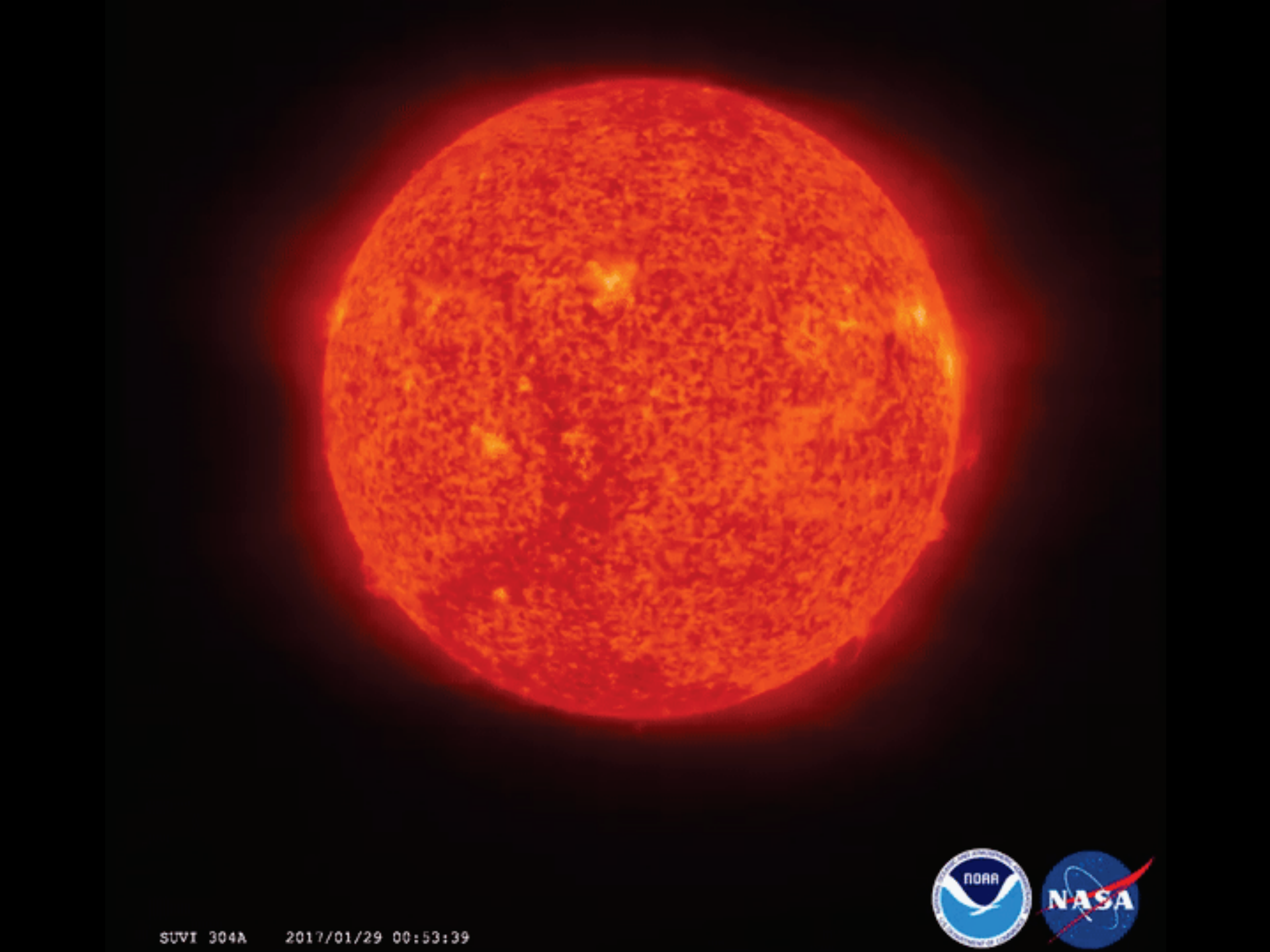
NOAA Observing System

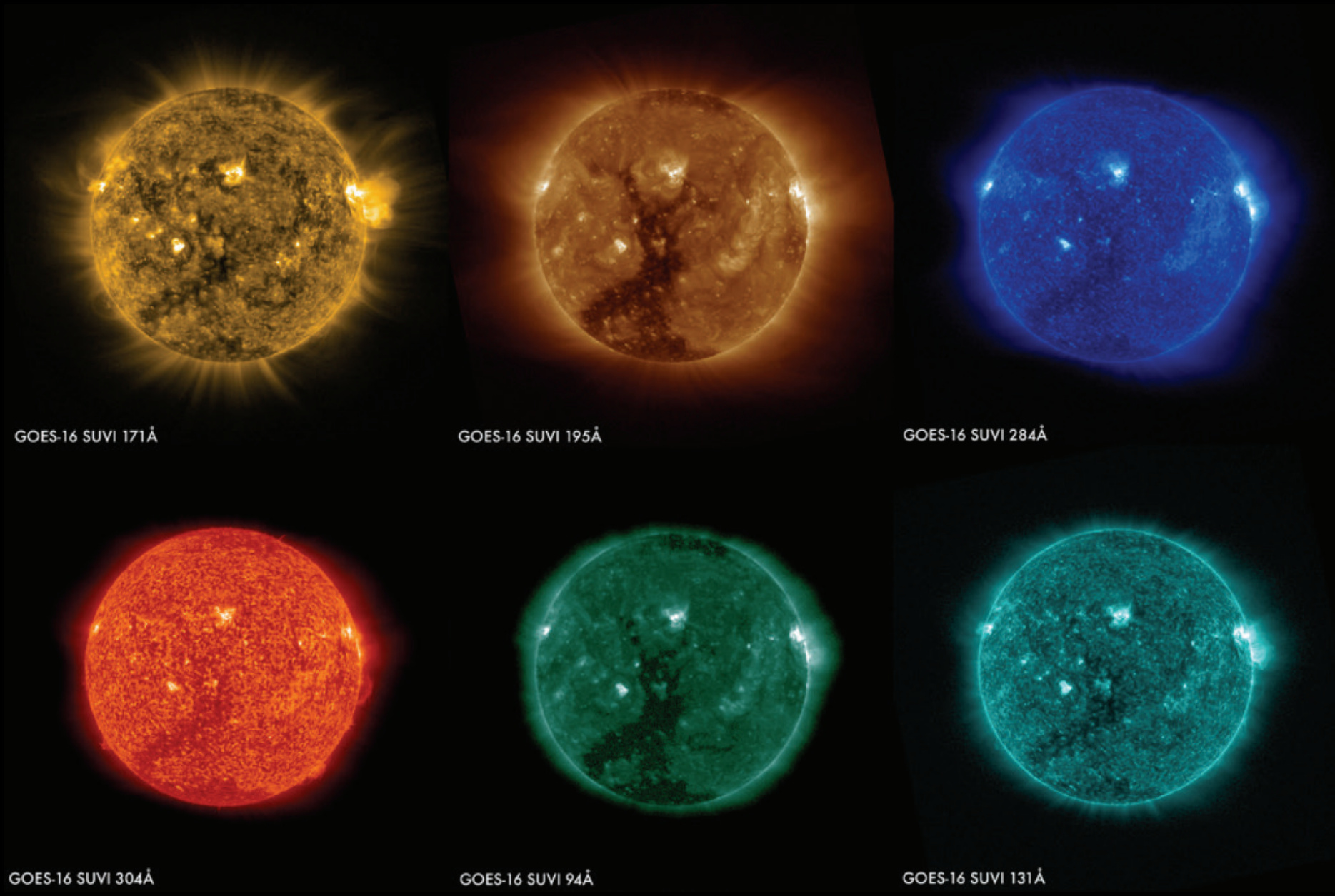
Space Weather Observing System

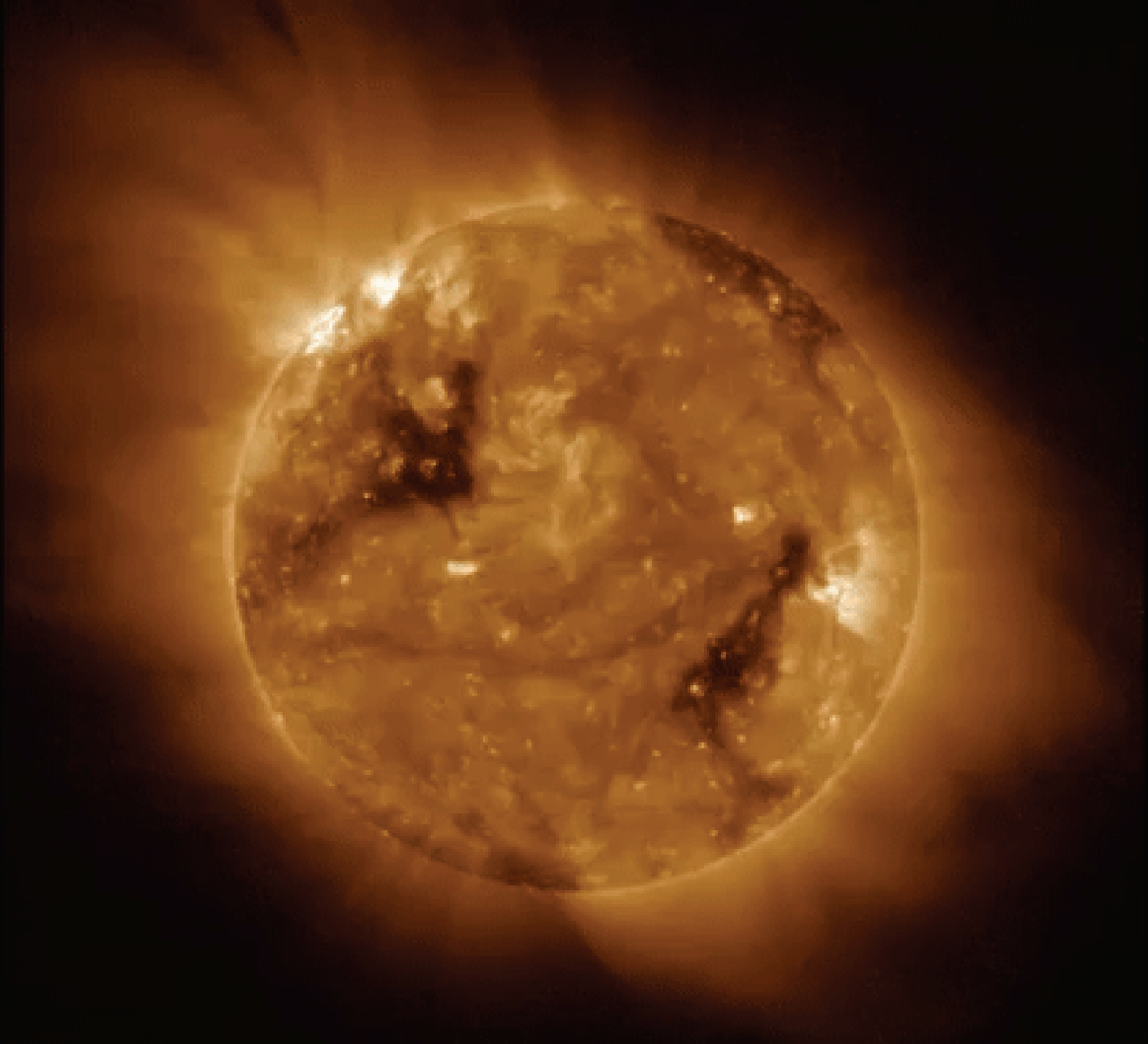


GOES-R Launch: November 19, 2016

Video: United Launch Alliance


SUVI 304A 2017/01/29 00:53:39
NOAA
NASA


GOES-16 SUVI 171Å
GOES-16 SUVI 195Å
GOES-16 SUVI 284Å
GOES-16 SUVI 304Å
GOES-16 SUVI 94Å
GOES-16 SUVI 131Å



Deep Space Observations

- Historically deep space space weather observing missions, have been conducted by research agencies
- Their primary focus on research and developing understanding of solar phenomena
- Many observations have proved essential as well for operational forecasting
- The Future observing system will include a mix of research and operational satellites

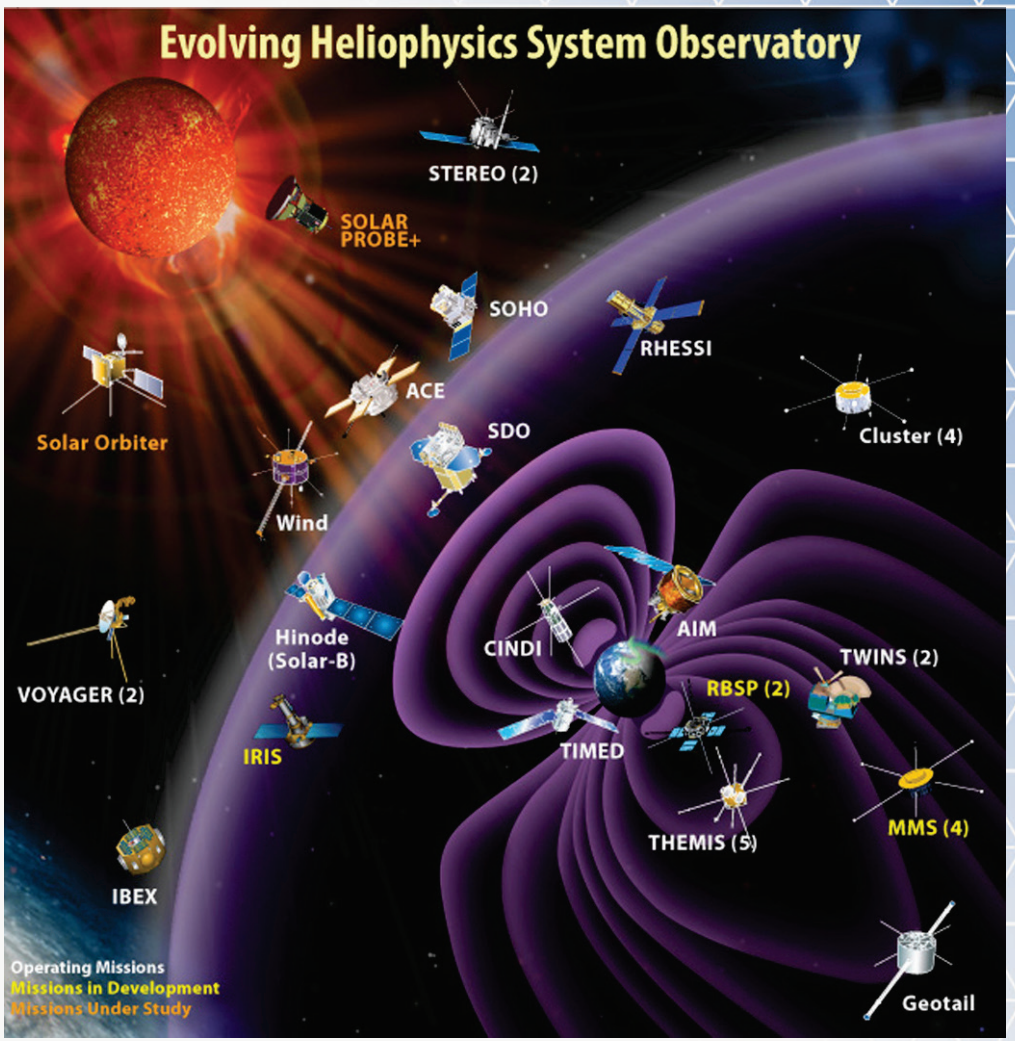
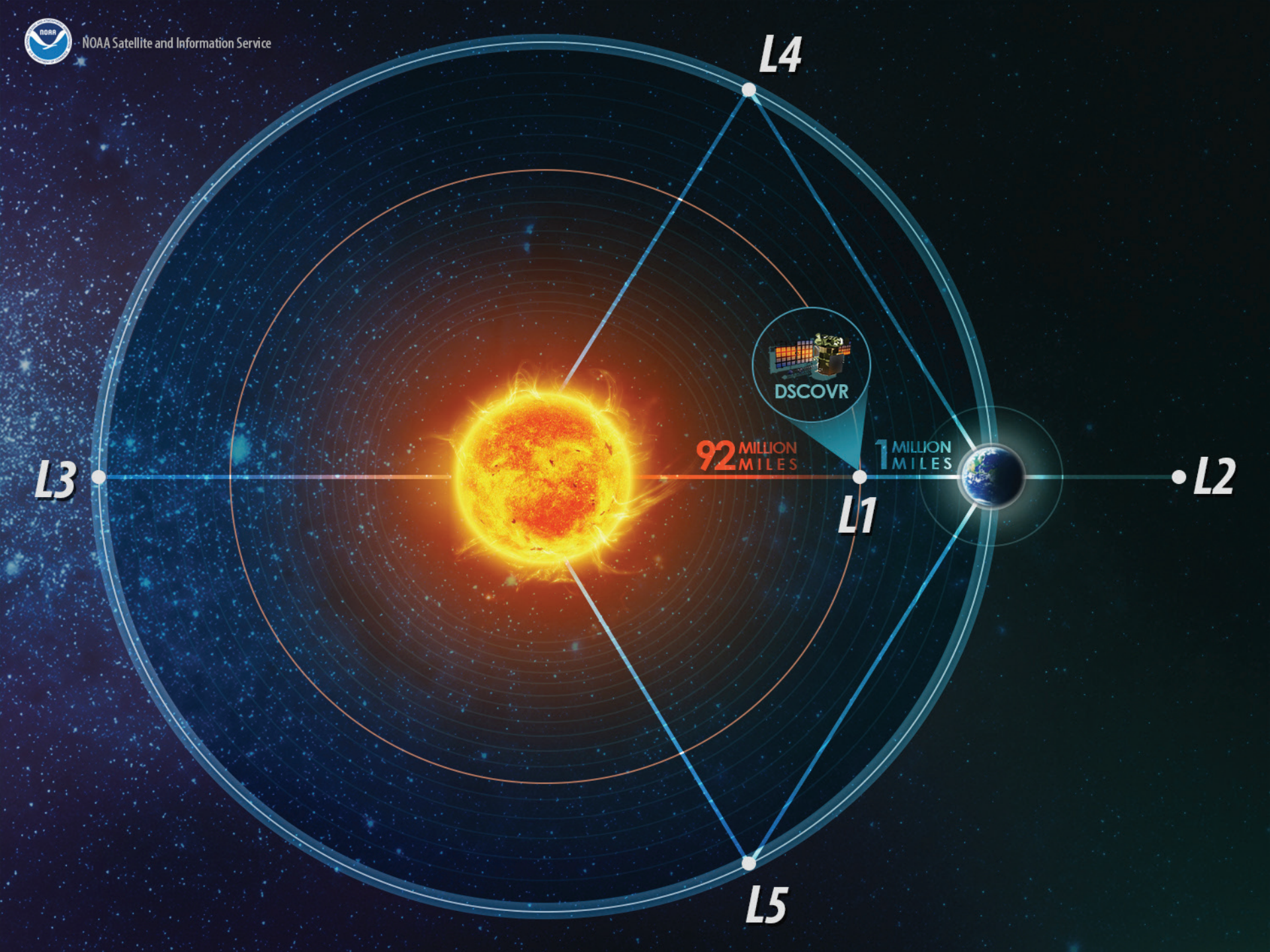
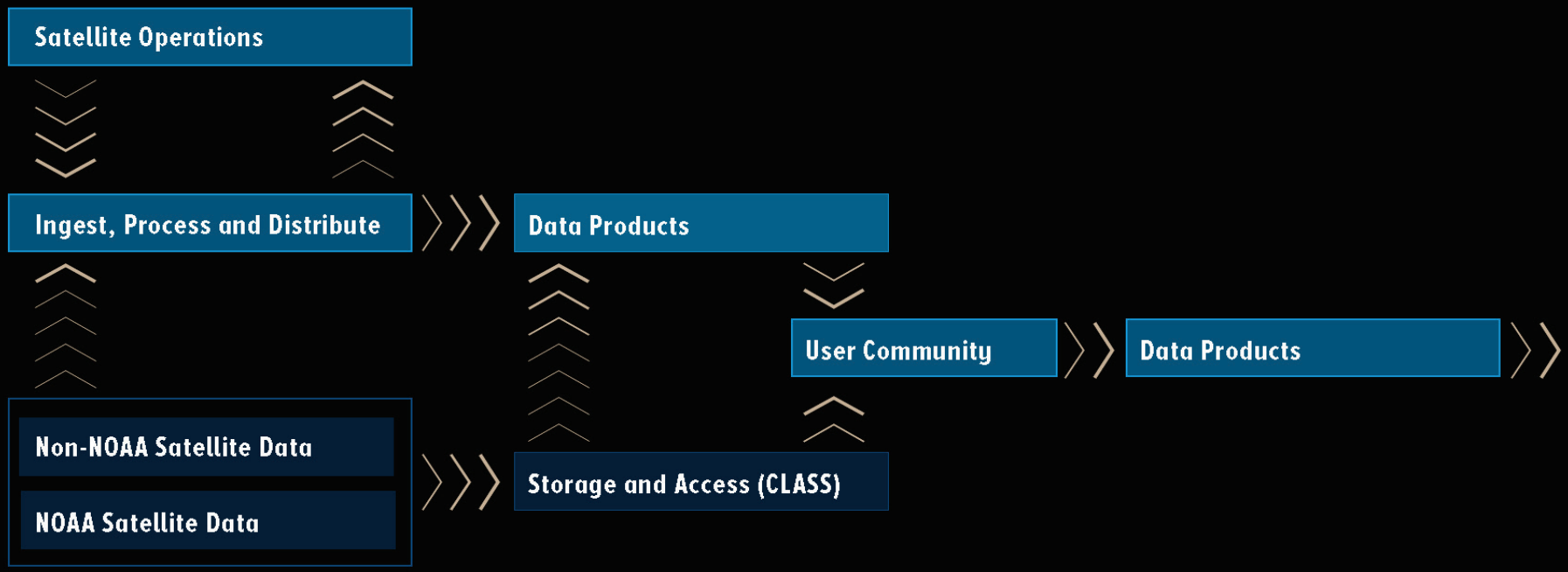
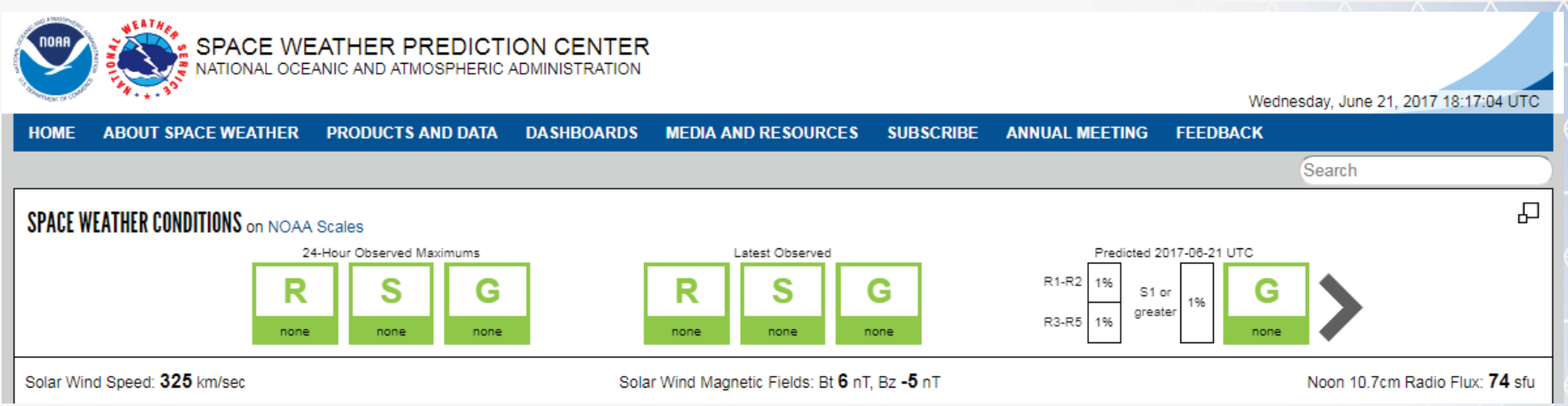


Image: NASA


NOAA Satellite and Information Service
L4
DSCOVR
92 MILLION MILES
1 MILLION MILES
L3
L1
L2
L5


Satellite Operations
Ingest, Process and Distribute
Data Products
User Community
Data Products
Non-NOAA Satellite Data
NOAA Satellite Data
Storage and Access (CLASS)

Space Weather Prediction Center (SWPC)



Located in **Boulder, Colorado**
Website: **www.swpc.noaa.gov**

SWPC Customer Growth

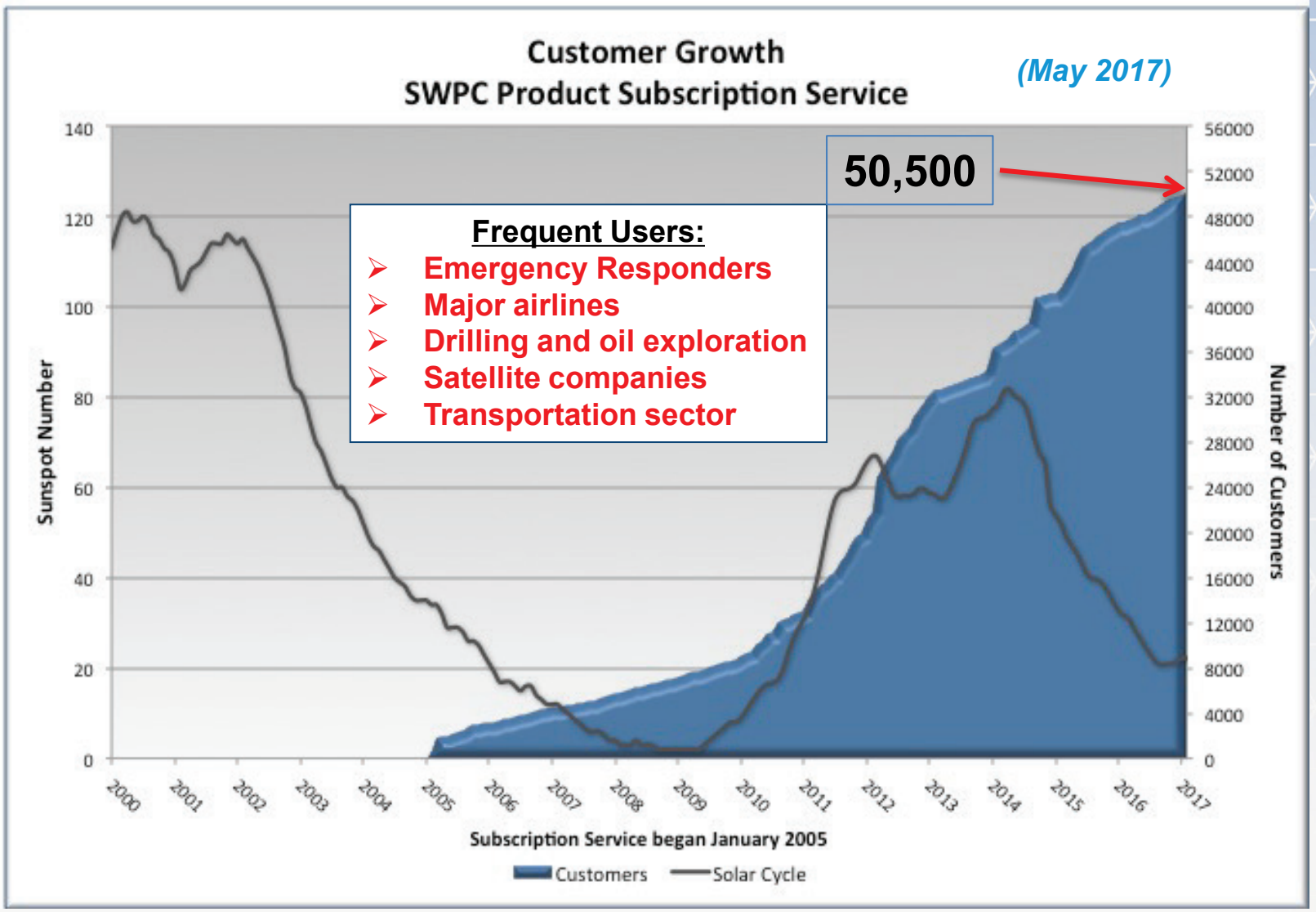
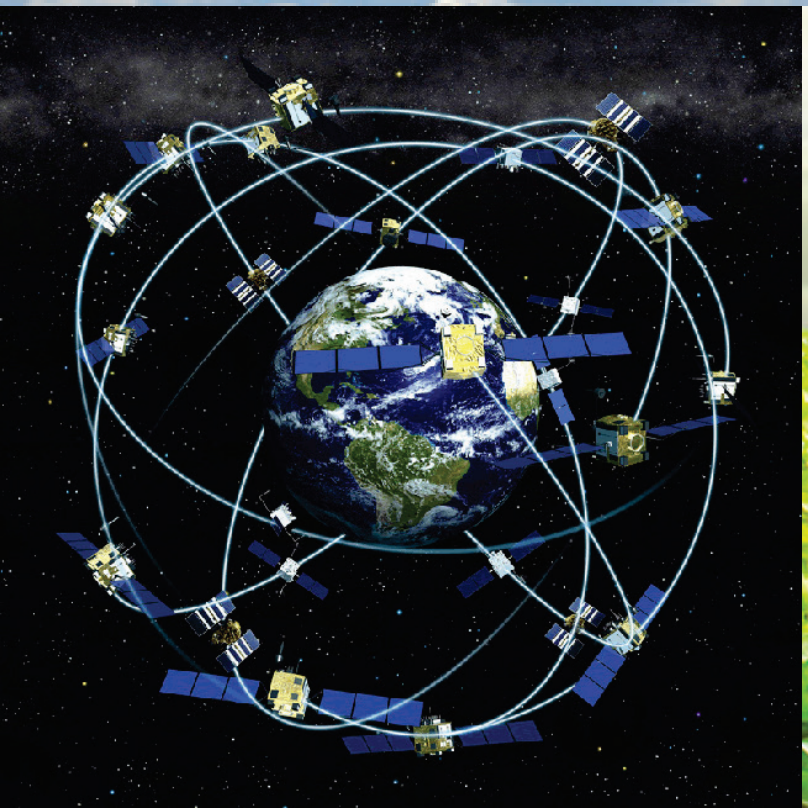
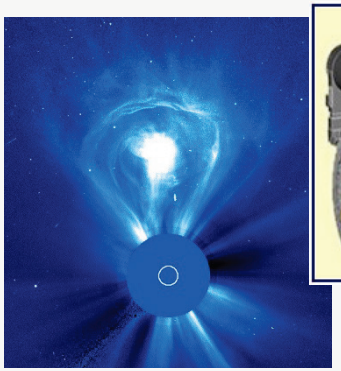


Photo: Kent Wien, Flickr,
Creative Commons Free to Share

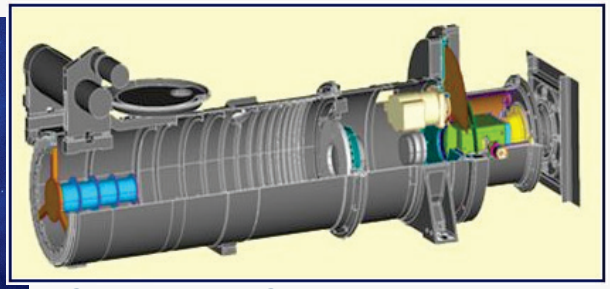


Space Weather R2O Examples

CORONAGRAPHS

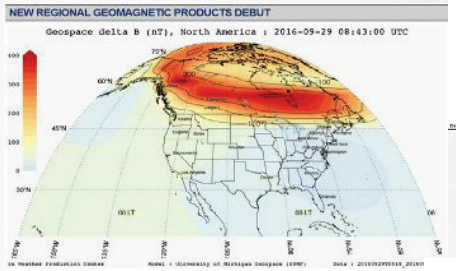


LASCO on SOHO

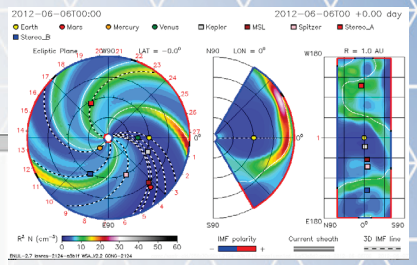


Compact Coronagraph on TBD Mission

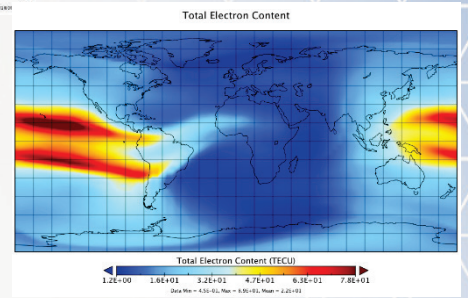
MODELING



Geospace Model

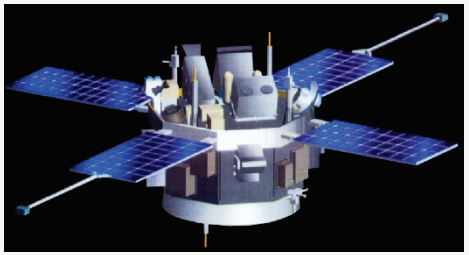


WSA-ENLIL (CME impacts)

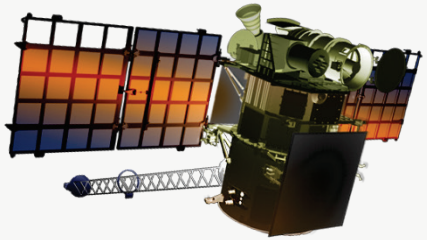


WAM/IPE (Ionosphere)

IN-SITU L1 OBSERVATIONS



ACE



DSCOVR

Planned NOAA Missions

Will we be ready?