

*IRIS: the Interface Region
Imaging Spectrograph
and IRIS E/PO*

Angela Des Jardins

National Space Grant College and Fellowship Program Fall Meeting

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MSU Physics / SSEL / MSGC



Space Science
and Engineering
Laboratory



Montana
Space Grant
Consortium





Damaging flares

1859: telegraph communication

20th century: power systems, e.g.

March 13, 1989 Quebec failure (9 hrs)

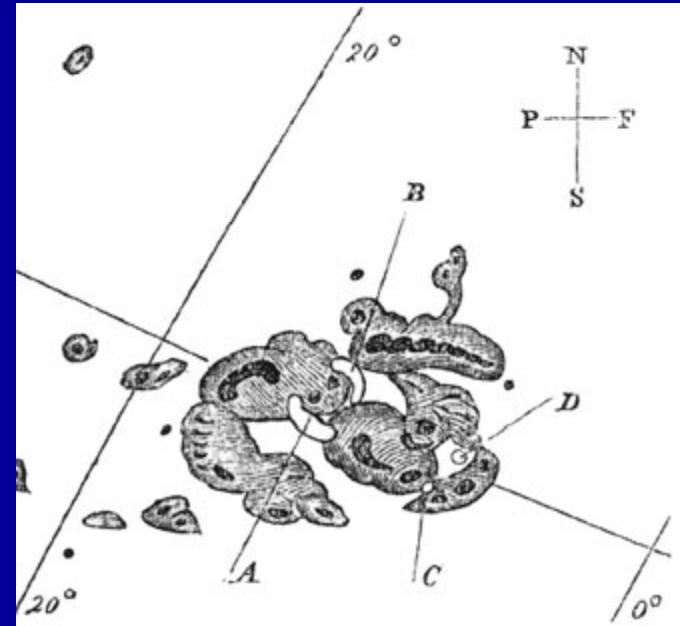
January 20, 2005: ½ sunlit GPS satellites

What would a 1859-size flare mean for today's technology?

NASA commissioned American Academy of Science study

(Is Suzi out of luck?!)

IRIS will help us learn; to make steps to solar flare prediction



Discovery of the solar flare, 1859, 15 years after the invention of the telegraph

In June 2009, NASA announced the selection of two new Small Explorer satellite missions, *GEMS* and *IRIS*.



The *Interface Region Imaging Spectrograph* (*IRIS*), proposed by a team led by Alan Title at LMSAL, is a high resolution UV/FUV imaging spectrograph for unraveling the secrets of the solar chromosphere and transition region.

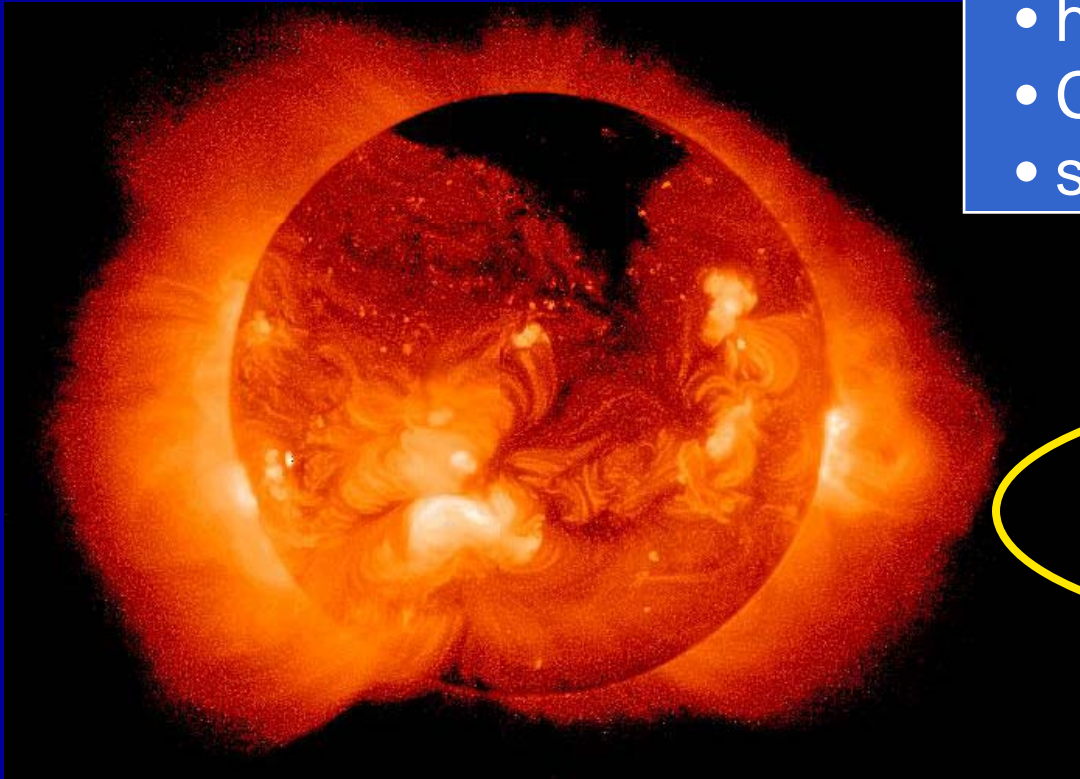
Summary

- NASA SMEX satellite mission
 - Led by Alan Title of LMSAL
 - Launch target: December, 2012
- Solar chromosphere & transition region
- Exciting discovery potential — unprecedented combination of spatial, spectral and temporal resolution.
- UV imaging & spectroscopy
- First MSU / SSEL hardware role in an major satellite mission.

The Sun in 90 seconds

Big mysteries:

- heating of the corona
- CMEs & Flares
- solar wind acceleration



Corona, 3×10^6 K

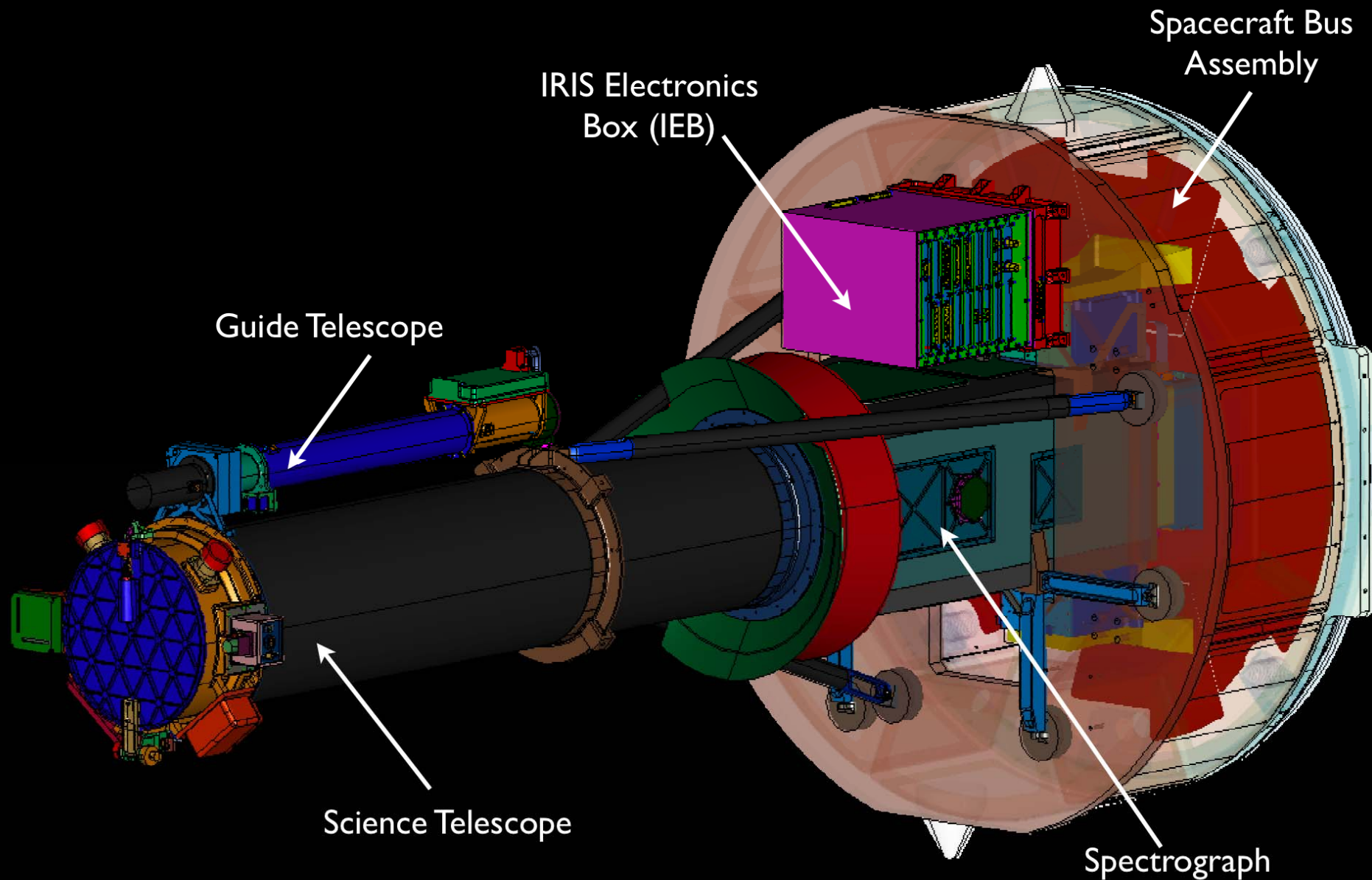
Transition region, 10^5 K

Chromosphere, 2×10^4 K

Photosphere, 6000 K

IRIS will observe the chromosphere and TR.

Mission Design: IRIS Observatory



MSU / MSGC Role

Spectrograph & Slit Jaw Imager

- Breadboard prototype (Phase A, complete)
- Test custom flight optics
- Support design, integration, test, calibration
- Science / data analysis

Education and Public Outreach

PI: Charles Kankelborg
Larry Springer
Ehson Mosleh
Joseph Shaw
Nathan Pust
David Klumpar
Angela Des Jardins
Randy Larimer

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Space Grant National Science and Engineering Solar Spectrograph Competition

- Similar to an engineering senior design competition, but open to all classes of undergraduates
- Fulfills the workforce development focus of the NASA Small Explorer Announcement of Opportunity
- Team tasks
 - design and build a working solar spectrograph
 - demonstrate the capabilities of the spectrograph by making pre-defined observations of the solar spectrum (e.g., identify absorption lines, measure line profiles).
- Teams can win in 4 categories: Design/Build, Science, Presentation, and Progress

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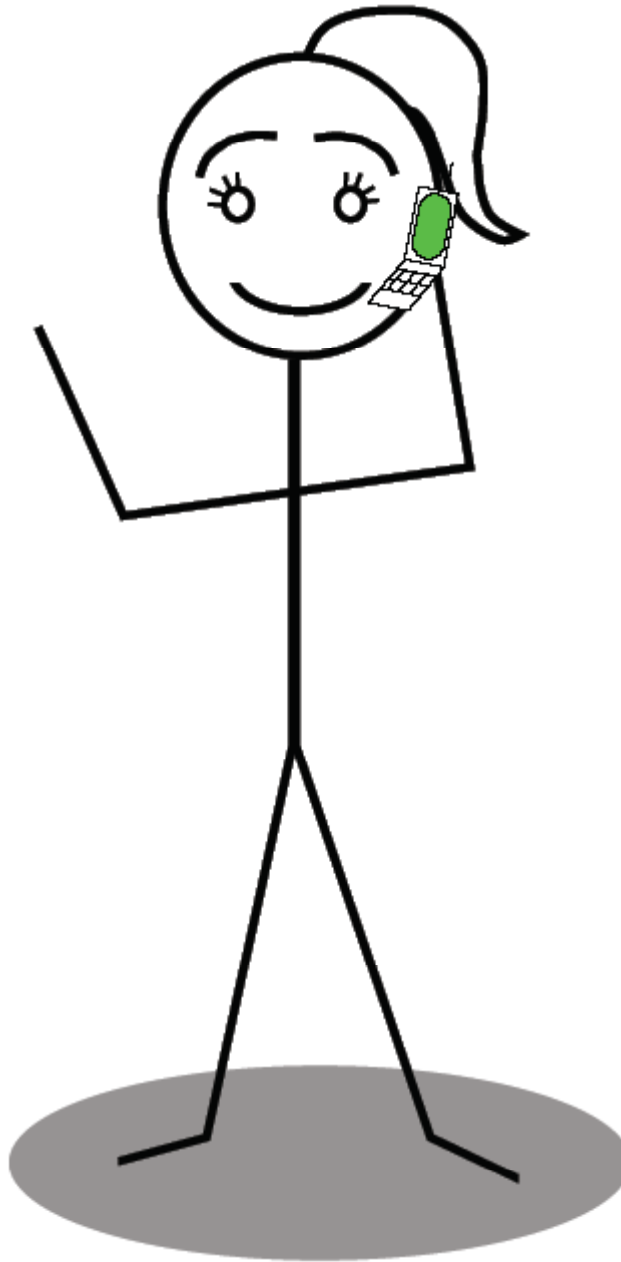
- Two separate sets of build awards and competitions for academic years 2011-12 and 2012-13, with scholarships to follow in 2012-13 and 2013-14.
- Build funds for 20 build teams/year at \$2,500/team, plus \$300 solar telescope for 20 home institutions
- Student travel for 4 winning teams per year, 4 students per team - 54 travel awards (i.e. to IRIS launch)
- Scholarships for 4 winning teams per year, 4 students per team at \$4,000/student - a total of \$128,000 in scholarships
- Priority for build funds will be given to MSIs and institutions with less aerospace activity (e.g. not MIT)

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How to get involved



- Get the word out to your affiliates next year (the application for build awards will be simple)
- Sponsor a team – this is a great way to partner with an MSI if you don't have MSIs in your state!
- Have experience in the area? Get involved in the trial run now through AY 2010-2011
- Timeline
 - Advertise to SG institutions in Fall 2010
 - Proposals for 1st round build awards due in Spring 2011
 - 1st build awards distributed in June, 2011
 - 1st competition in April 2012
 - 1st travel awards and scholarships in 2012
 - Repeat for 2nd year – through 2013



Suzi cartoon created by:
Dr. Tyson Littenberg,
MSGC fellowship recipient