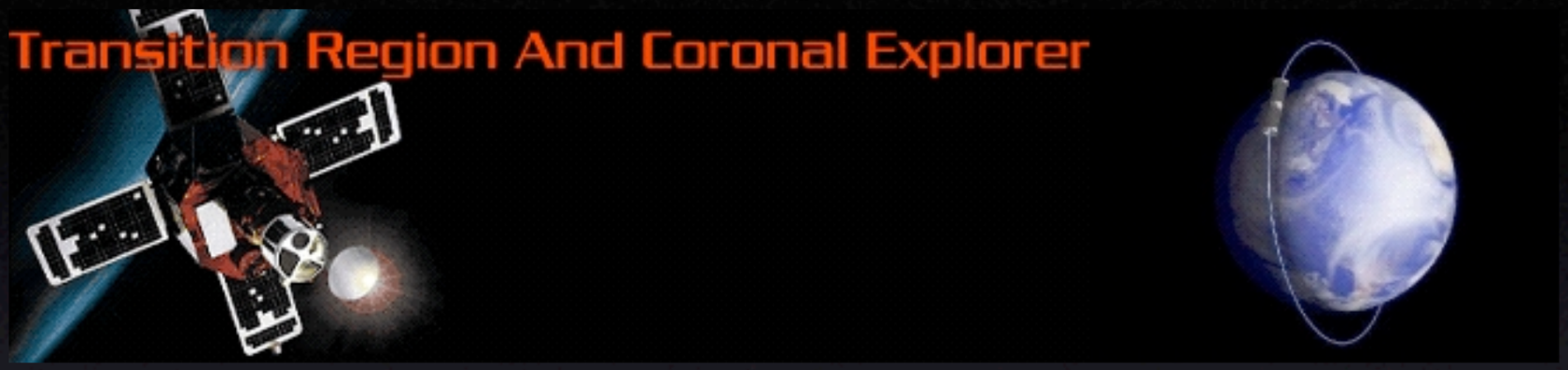


TRACE Experience

N. Hurlburt
Lockheed Martin Solar & Astrophysics Laboratory

SUMMARY

30 cm cassegrain normal incidence

8.5x8.5 arcmin field of view

1 arcsec spatial resolution

0.1 arcsec image stabilization

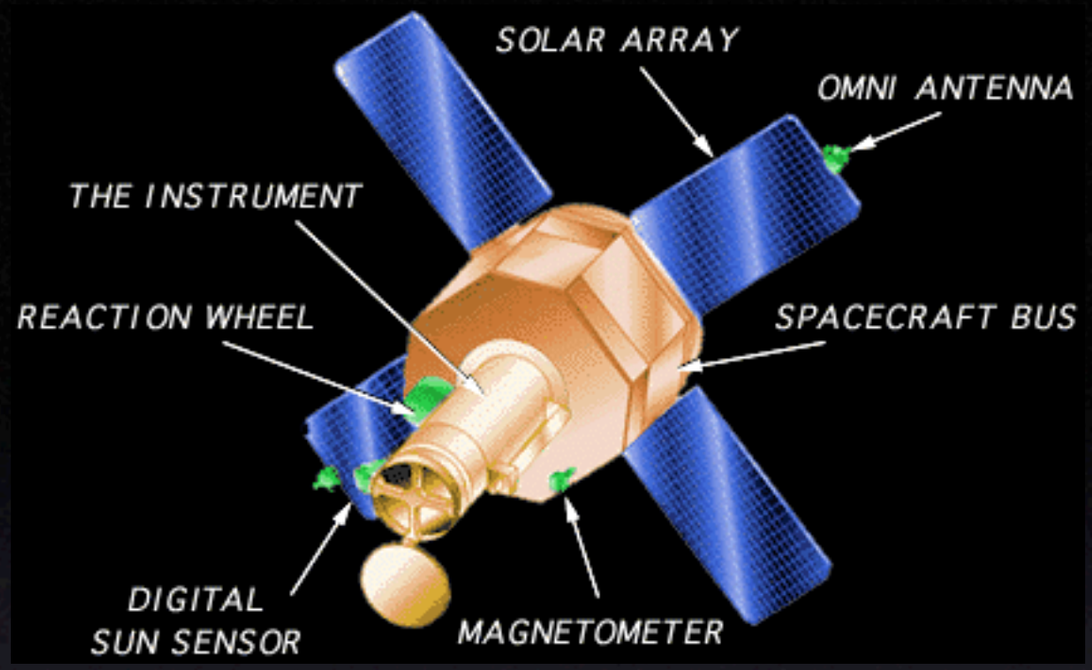
Four quadrants for UV and EUV

Shutter+ filters for wavelength selection

1024x1024 CCD for 0.5 arcsec pixels

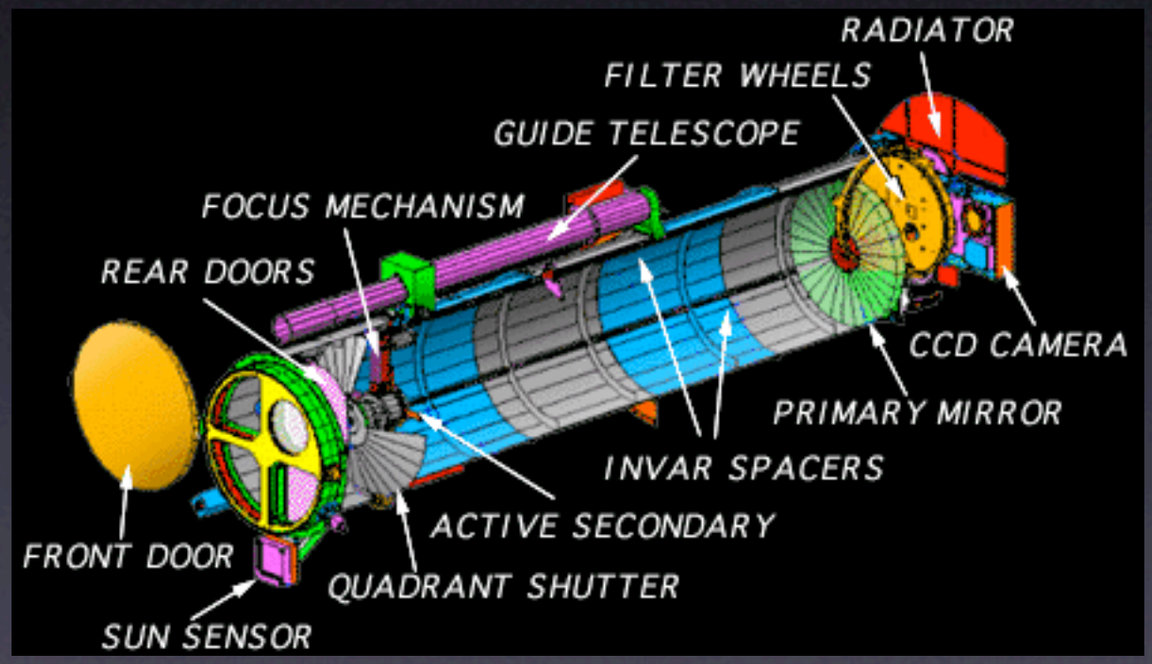
On-board data handling & compression

230 Mbytes on-board storage



TRACE PASSBANDS

Wavelength (Angstrom)	Width (Angstrom)	Observed	Temperature (1000Kelvin)
5000	broad	continuum	4 - 6.4
1700	200	continuum	4 - 10
1600	275	CI, FeII, cnt	4 - 10
1550	20	CIV	60 - 250
1216	84	HI Ly-α	10 - 30
173	6.4	Fe IX	160 - 2000
195	6.5	Fe XII	500 - 2000
284	10.7	Fe XV	1250 - 4000



TRACE Cronology

- 1998 Prime Mission (8 Months)
- 1999-2001 SOHO+
- 2003-2005 RHESSI+
- *2006-2007 “Great Observatory”*
- *2008-2009 AIA Handoff*

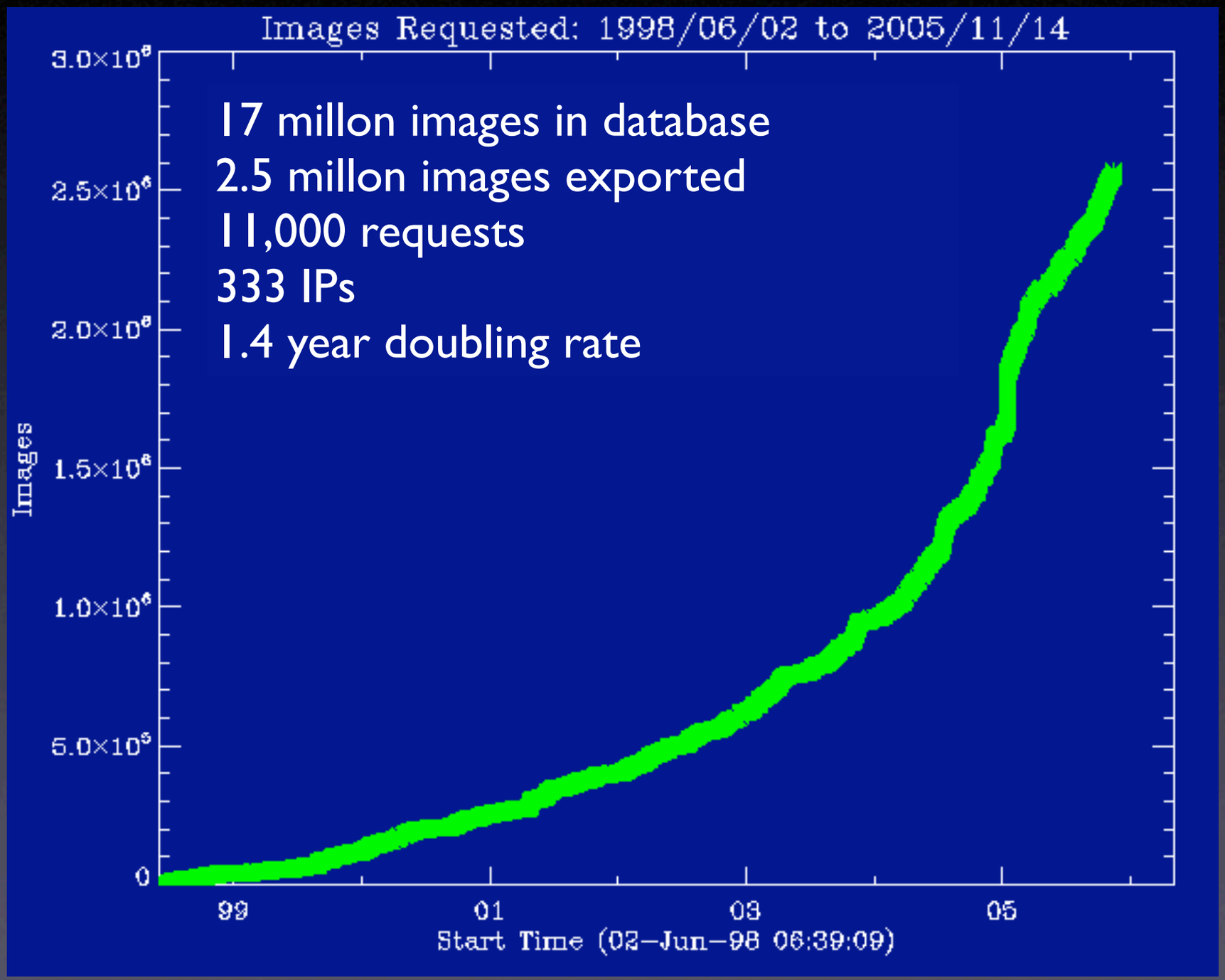
Prime Mission

- First Open Data PI Mission
  - PI team was not funded to do this
  - Data exports with same access and tools as PI team
  - Cavot Emptor: No promises
- Daily Planning set by prime science goals
  - Some coordination with SOHO, Yohkoh, etc.

SOHO/RHESSI Era

- Planning Coordination
  - 70% of SOHO JOPs include TRACE since 2002
  - 80% of major RHESSI flares capture by TRACE
- Analysis Software Divergence
  - PI Team relied on custom tool
    - Direct access to data
    - Customized tools for calibrating & analysis
  - SOHO based on SolarSoft tools
    - Calibration and analysis tools in IDL branch

Data History



Things to Avoid

- PI focus resulted in lack of metadata
  - No systematic data mining or feature ID
    - *When did TRACE observe sunspots, emerging flux...?*
    - *What is the most popular flare?*
  - Ad-hoc event catalogs, but no formal structure
- Non-standard data structures saved disk space, but bothersome
  - Custom compression limited portability

Lessons applied to SOT

- Observation Knowledgebase including
  - Observation Intent
  - Data Annotation
- Standard formats & tools
  - Similar Directory structure to EUVI
  - Standard FITS files

Observation KB

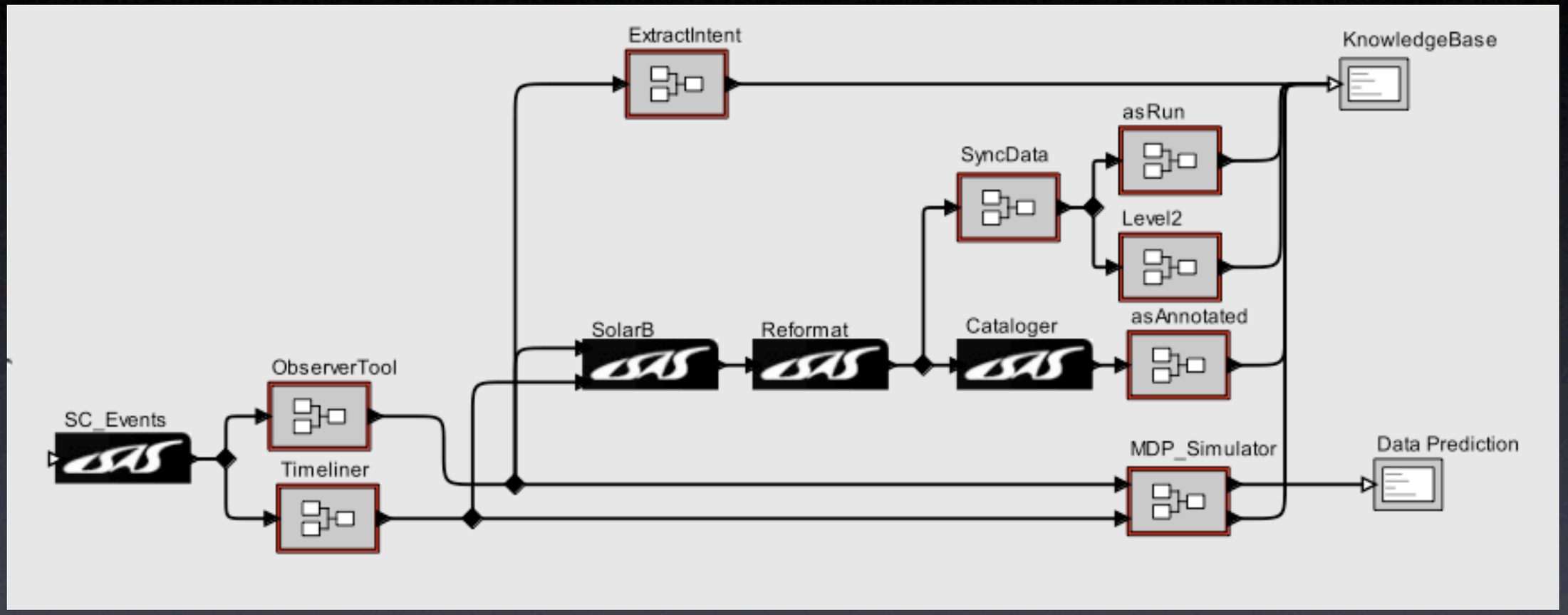
- Observation Intent [Extracted from OBSERVATION Table]
  - OBSTITLE
  - TARGET (A
  - SCI_OBJ (fr
  - OBS_DESC
  - JOIN_SB (E
  - OBS_ID (Ide
  - JOP_ID (Ide
  - NOAA_NUM
  - OBSERVER
  - PLANNER (
  - TOHBANS (
  - ORIGIN (of
  - INSTRUME
- Observation As-
- Observation As-
- Observation Ev

- Observation Intent [Extracted from OBSERVATION Table]
- Observation As-planned [from MDP SIMULATOR]
  - MDPPRGVR
  - MDPSEQVR
  - MDPPRMVR
  - MDPPRGNO
  - MDPXRTAE
  - MDPXRTAR
  - MDPXRTFLI
  - MDPXRTFLT
  - MDPXRTMV
  - Observation P
  - Observation P
  - Predicted Hel
  - Predicted Hel
  - TR_MODE (t
  - List of predict
  - Tracking softv
  - FOV for main
  - FOV context
  - Predicted cade
  - Predicted Data
- Observation As-r
- Observation Eve

- Observation Intent [Extracted from OBSERVATION Table]
- Observation As-planned [from MDP SIMULATOR]
- Observation As-run [from CATALOGER]
  - MDPPRGVR
  - MDPSEQVR
  - MDPPRMVR
  - MDPPRGNO
  - MDPXRTAEC
  - MDPXRTARS
  - MDPXRTFLD
  - MDPXRTFLT
  - MDPXRTMVB
  - Actual start tim
  - Actual end time
  - Heliographic C
  - Heliographic Coordinates at end (need a KEYWORD)
  - List of SC pointings during observation
  - List of observables in observing program
    - cadence for each type
    - number of images of each type
    - some measure of average image quality for each type (TBD)
    - FOV for each type
- Observation Event [from ANNOTATION TOOL]

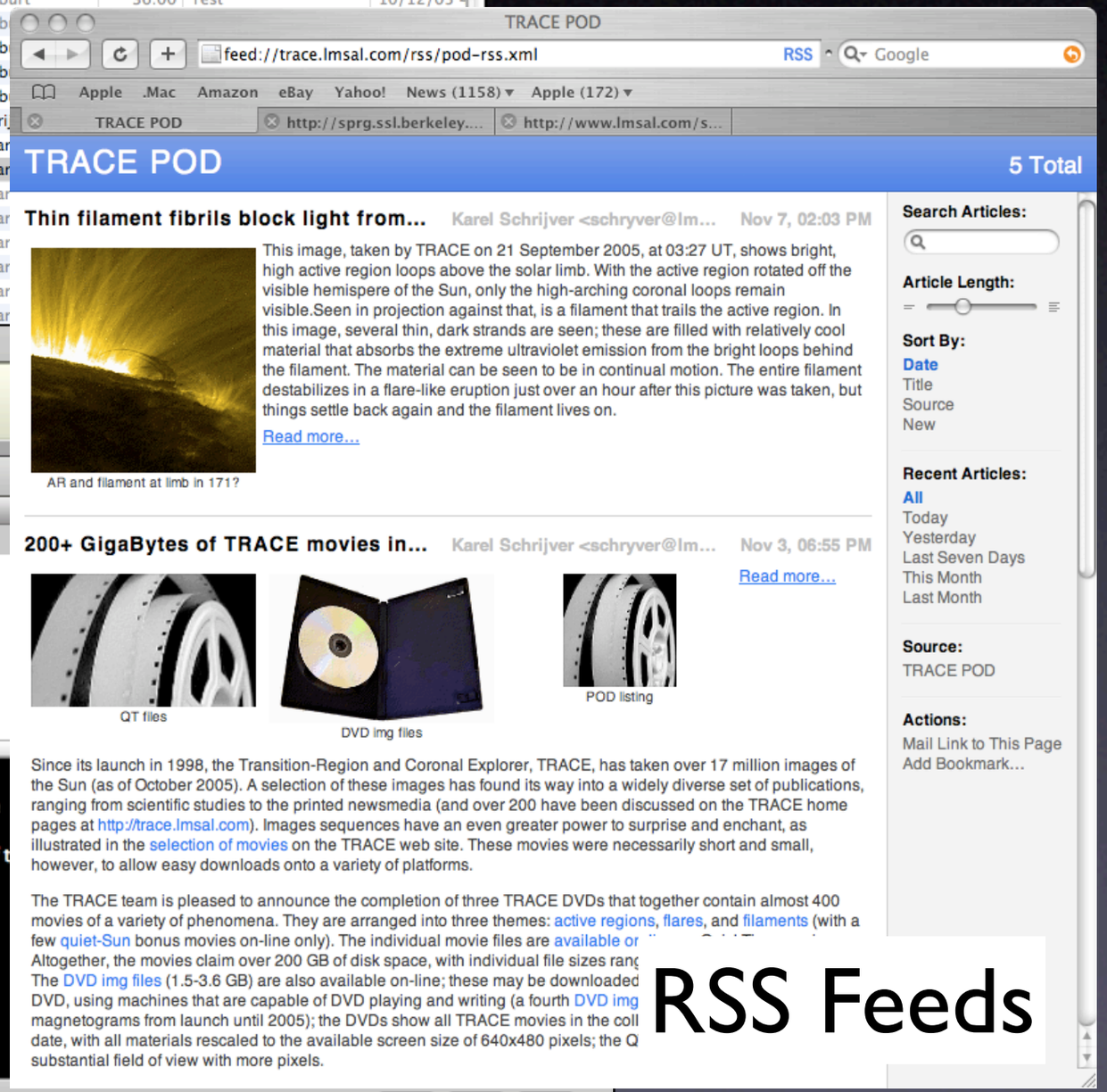
- Observation Intent [Extracted from OBSERVATION Table]
- Observation As-planned [from MDP SIMULATOR]
- Observation As-run [from CATALOGER]
- Observation Event [from ANNOTATION TOOL]
  - Related data products
  - Event Type {Flare, Jet, Filament Eruption... Bad, etc.}
  - Description
  - Heliographic Location
  - Start time
  - End time
  - Flare flag

SOT/FPP Data Flow



TRACE 2.0

PodCasts



VODCasts

RSS Feeds

ATMOSPHERIC IMAGING ASSEMBLY

AIA Handoff

- Once SDO/AIA is operational TRACE will
  - Cross-calibrate images
  - Used this final calibration to
    - Produce final, calibrated images
    - Reprocess entire archive into standard format with metadata
    - Fold dataset into AIA archive
    - Retire