Suzaku status

2009年(平成21年) 9月

印刷モード

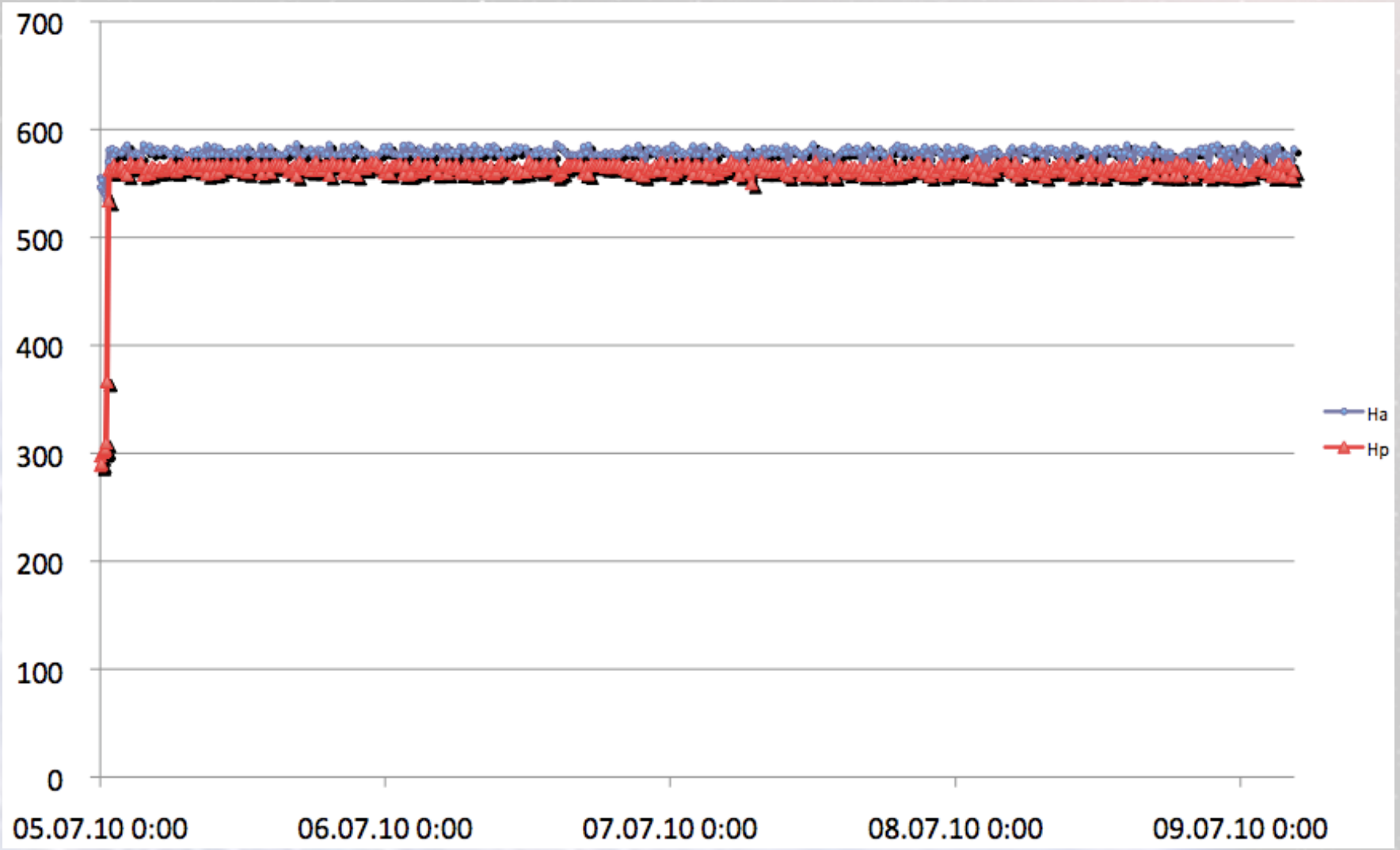
日	月	火	水	木	金	土
30 [追加]	31 [追加]	1 [追加]	2 [追加]	3 [追加]	4 [追加]	5 [追加]
6 [追加]	7 [追加]	8 [追加]	9 [追加]	10 [追加]	11 [追加]	12 [追加]
13 [追加]	14 [追加]	15 [追加]	16 [追加]	17 [追加]	18 [追加]	19 [追加] --/--℃
20 [追加] 20/26℃	21 [追加] 18/25℃ 敬老の日	22 [追加] 18/26℃ 国民の休日	23 [追加] 20/27℃ 秋分の日	24 [追加] 20/26℃	25 [追加] 19/25℃	26 [追加]
27 [追加]	28 [追加]	29 [追加]	30 [追加]	1 [追加]	2 [追加]	3 [追加]

- Manabu Ishida (ISAS/JAXA)
  - on behalf of operation/processing/hardware teams

Outline

- Observatory status
- Status of recent AOs
  - AO-3 Guest observation (Apr.2008-Mar. 2009) status
  - AO-4 Guest observation status
- Suzaku Publications

Suzaku Orbit



- Orbit drop is very limited after 4 years (<10km)
- Remaining orbit life > 10yrs

Major events on Suzaku

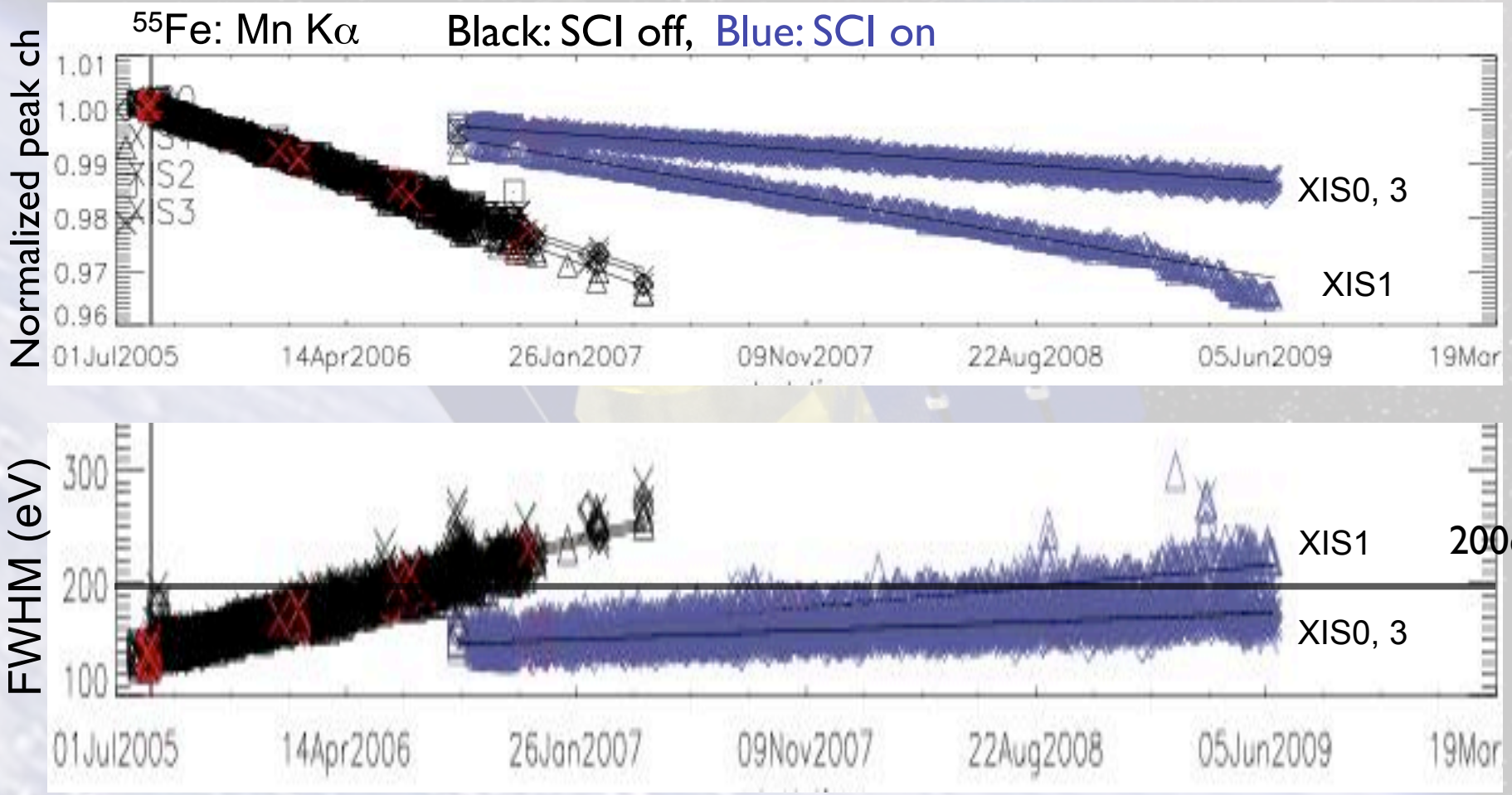
2005/07/10	Launch of Suzaku
2005/07/11	Solar paddle Deployment
2005/07/12	EOB Extension: XRTs are ready for photon collection.
2005/08/08	XRS He lost
2005/08/13	XIS door open: Start of observations
2005/08/19	HXD HV on: Start of observations.
2006/10 ~	Start of regular usage of Spaced-row Charge Injection (SCI).
2006/11/09	Anomaly (μ meteorite?) in XIS2. Most of the imaging area are drown with electric charge. We stopped using XIS2.
2007/12/08	XIS0 pixel processor (PPU) temporary hung-up due to particle event.
2008/01/30	Trouble in a CPU board of the Main Processor Unit (MPU). We switched to the backup board.
2009/06/16 ~	Angular momentum anomaly. Some maneuvering commands are neglected.
2009/06/23	Another μ meteorite hit (?) on XIS0. Only ~1/8 image area is affected.

Dec.2006 Kyoto

Dec.2007 Sandiego

Jun-Jul.2009 Otaru

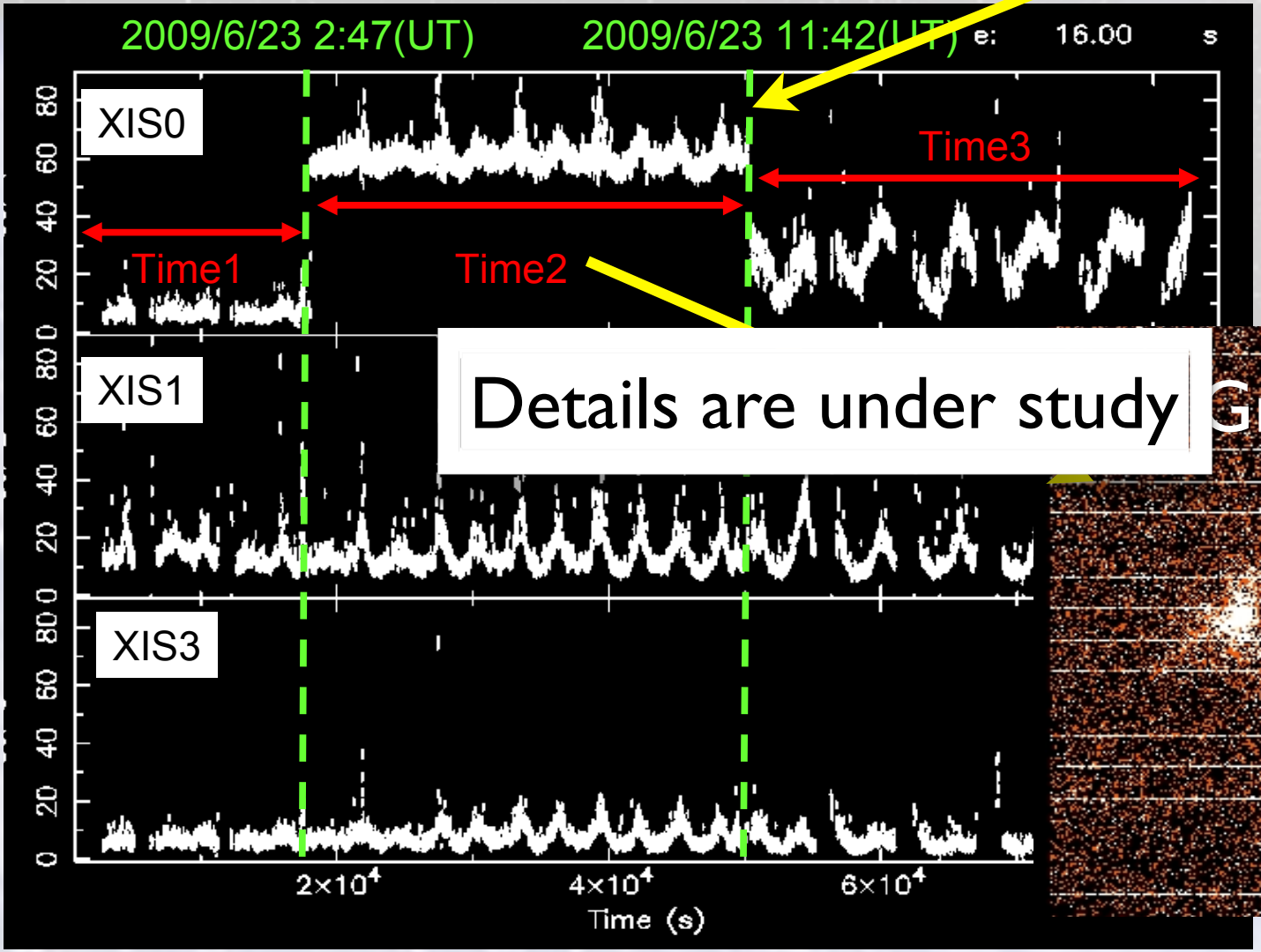
XIS energy resolution



Anomaly of XIS0 in Jun. 23, 2009

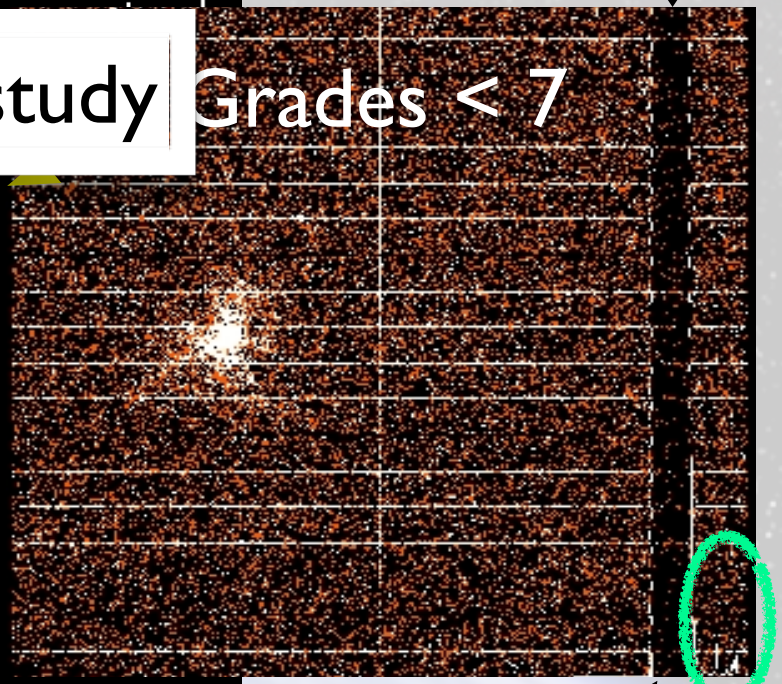
All-grade counting rate

Dark update



Details are under study

no events

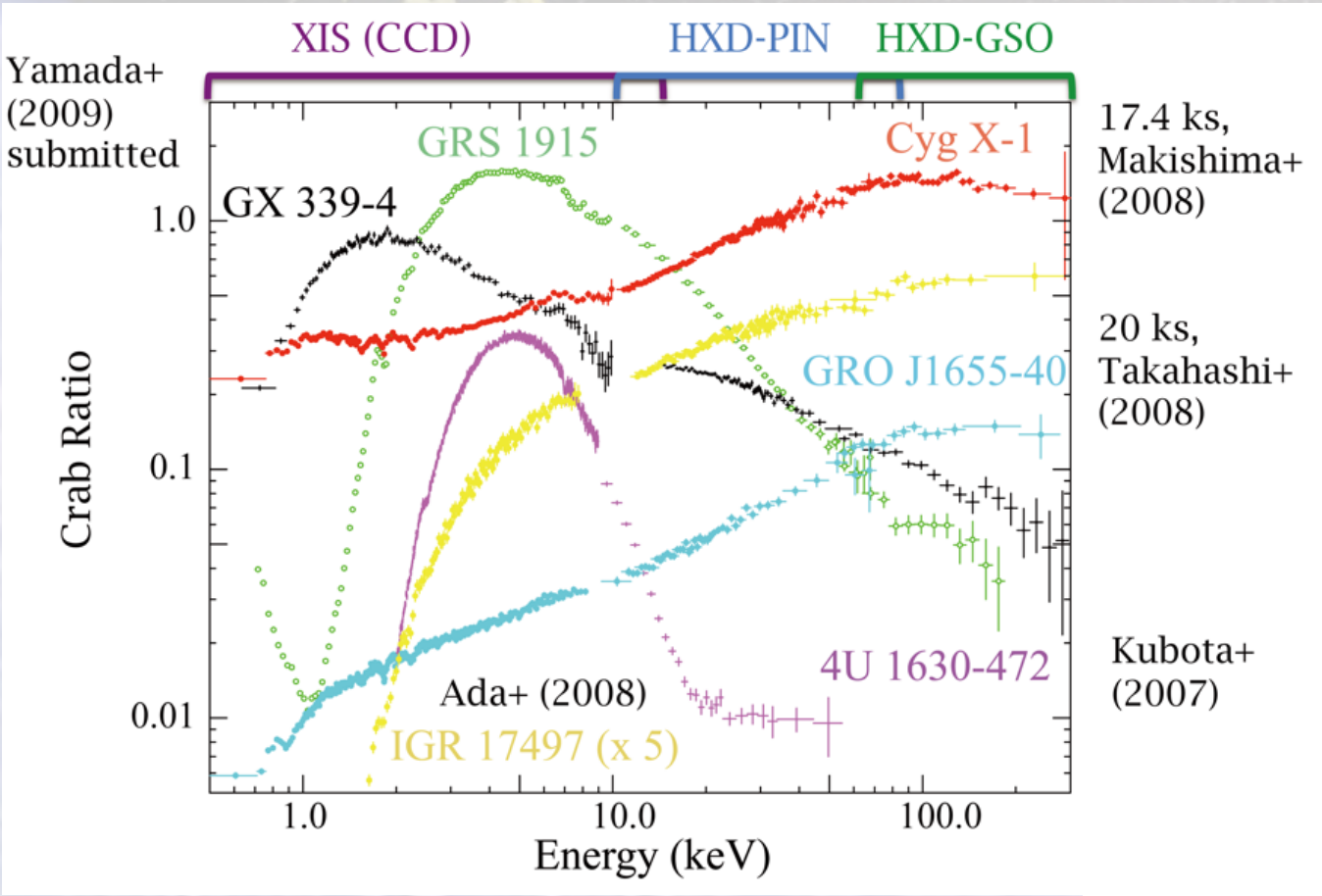


noisy

HXD status

The detector has been operating normally for 4 years

Suzaku wideband spectra with XRT+XIS, HXD-PIN, and HXD-GSO

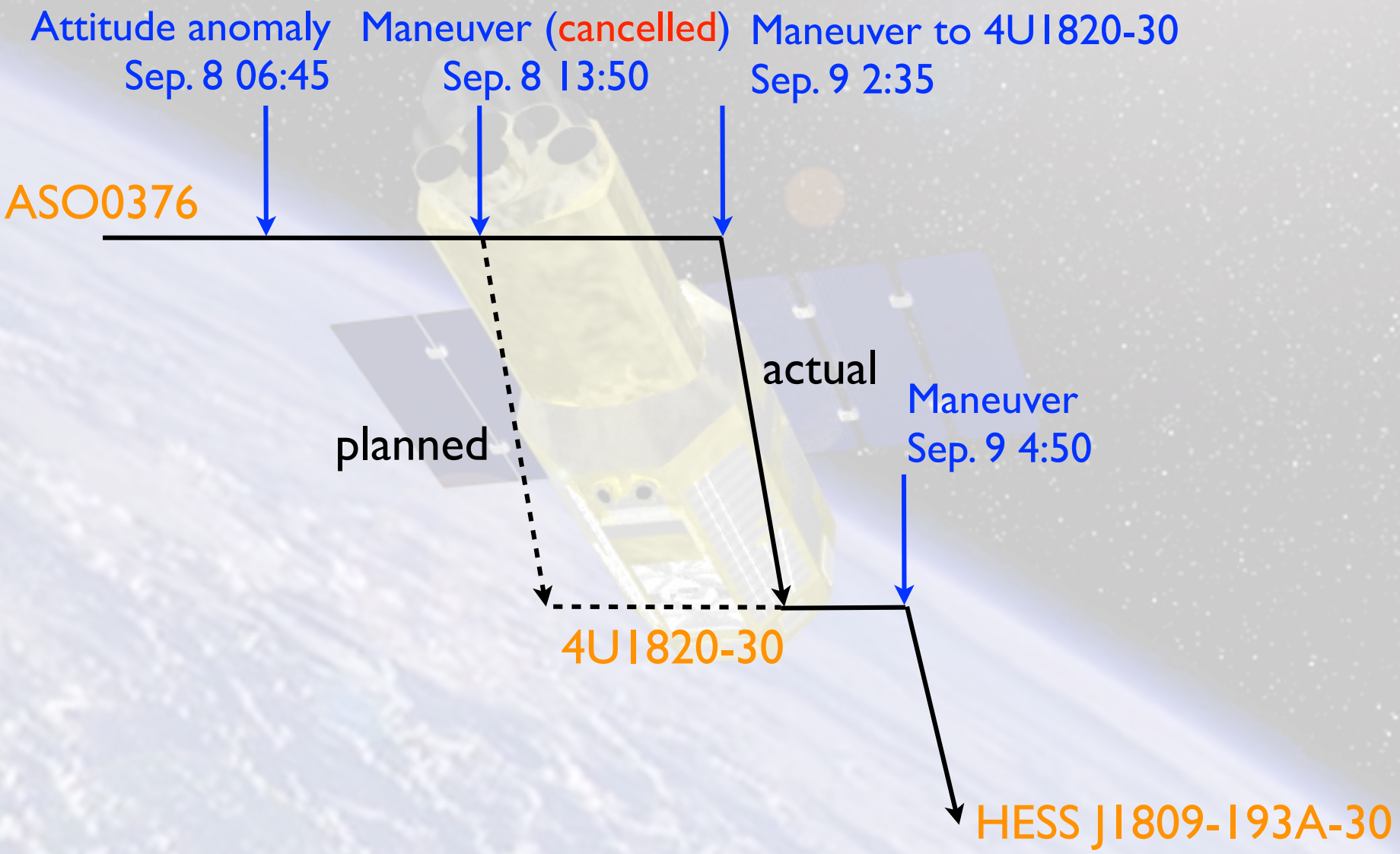


Angular momentum anomaly (2009. 6. 16~)

- Suzaku Attitude & Orbit Controlling System (AOCS) detected unexpectedly large angular momentum change of the spacecraft.
  - Time duration < 0.5 sec
  - The first event occurred on 2009 June 16th.
  - As of 2009 September 17th, seven such events are detected.
- Actions in AOCS
  - Attitude number is set to #0 (normally either one of #1~#20). AOCS moves into an emergency mode.
  - Onboard attitude update using the star trackers (STT) ceases.
    - Attitude is controlled with signals from gyros. Accumulated error is of order ~0.01deg in ~a day.
    - STT data are transferred to satelllite telemetry, so attitude correction on the ground is possilbe.

    ➡ Not fatal as long as onboard attitude update is carried out at least once after maneuvering.
  - Further attitude change (maneuvering) commands are all cencelled.
  - In six cases out of the seven, the data were good enough for science analysis.

The worst case

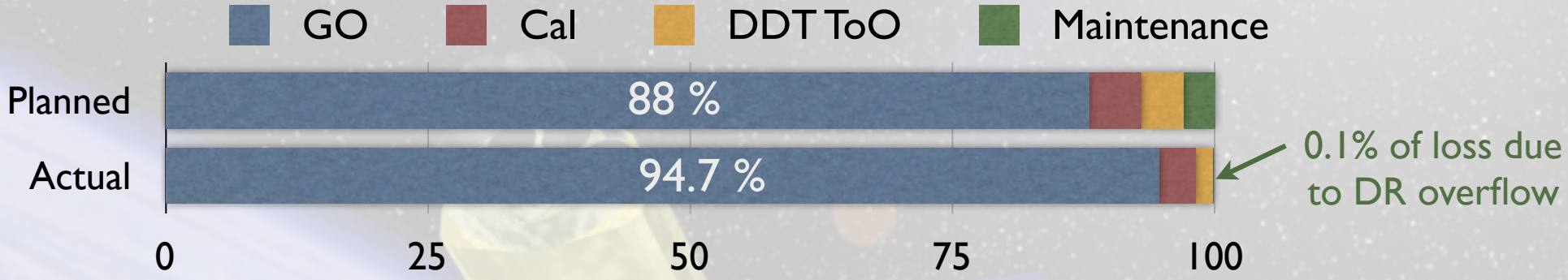


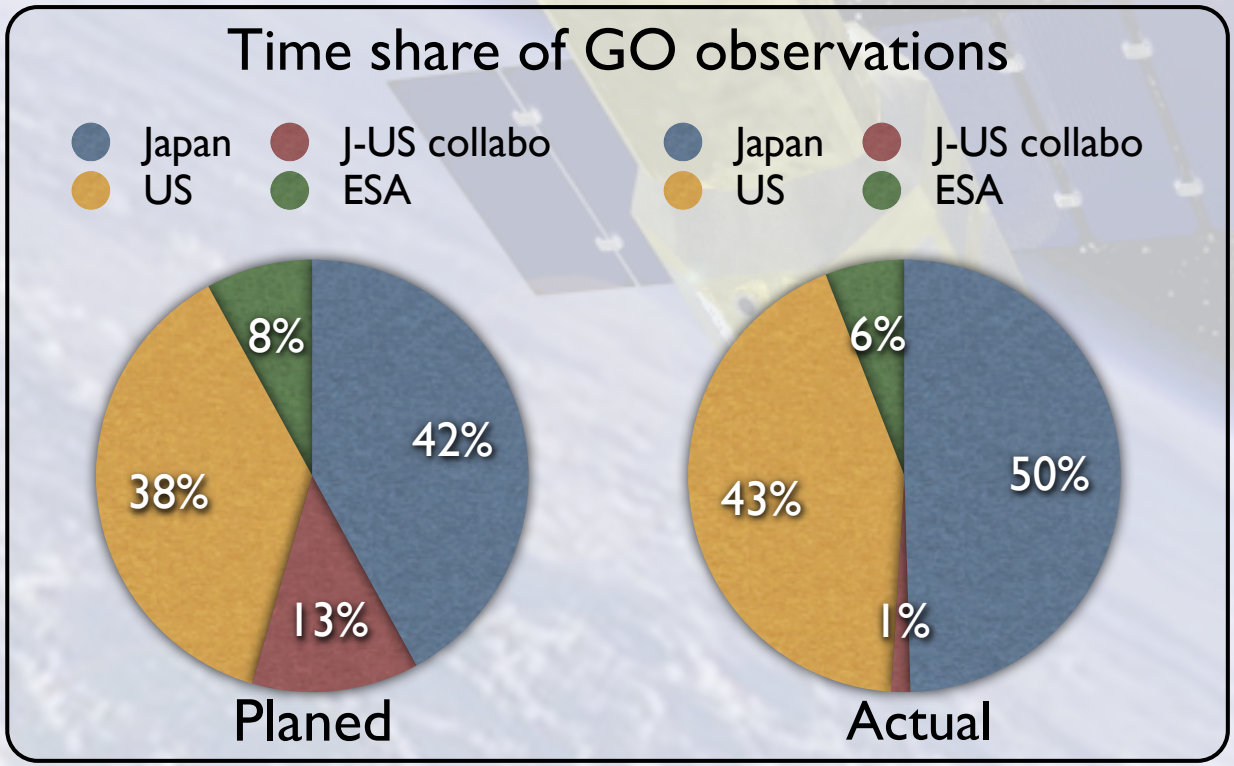
Countermeasure

- Change sequence of maneuvering commands
  - Clear AOCS error before maneuvering to validate maneuvering commands.
  - Add commands to enable STT tracking mode just after meneuvering commands.
- After 90 min from maneuvering; in order to carry out onboard attitude update with STT at least once,
  - Add commands to clear AOCS error.
  - Add commands to enable attitude update with STT.
  - ➡ One observation was already salvaged.
- We need HK data when an anomaly occurs to understand the cause of this event...
  - We increased HK sampling rate during 5 contact orbits (out of 15) per day.

AO-3 observations

April 2008 - March 2009





Japan time includes all non-US & non-ESA countries.

Difference in planned and actual observation times are due to

1. Smaller number of observations which can be merged between J & US,
2. Trigger probability of reserved ToO targets,
3. Priority-C targets.

AO-3 ToO & TC observations

- GO (Reserved) ToO

  4 targets were actually observed using 460 ks

- DDT (Realtime) ToO

V2491 CYGNI	20 ks
SGR 0501+4516	40 ks
V2491 CYGNI	20 ks
SAX J1808.4-3658	40 ks
H1743-322	30 ks
V1647 ORI	40 ks
1E1547-5048	40 ks
TOTAL	230 ks

- Time Critical

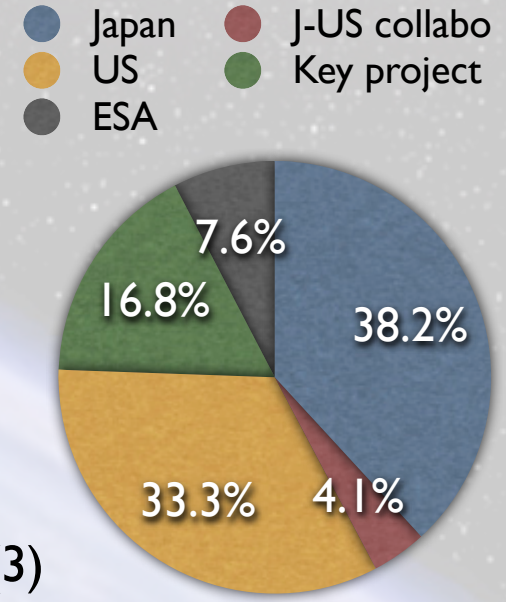
  45 observations, 1875 ks

  FYI: total observation time is 13680 ks

AO-4 Guest observation program

- Key Project was initiated
  - Comprehensive observing programs sampling a number of objects of a particular class, or surveying a large region of the sky, in order to take maximal advantage of the unique attributes of Suzaku to address important astrophysical problems.
  - Total observation time is <2Ms /AO.
  - A Key Project can be extended more than a year.
  - All Key Project data flow directly into the Suzaku public archive.

- Number of proposals submitted
  - Key project:
    - proposed: JAXA 5(including 1 from Italy)+NASA 2
      accepted: JAXA 2 + NASA 2 (1920 ks)
  - Ordinary proposals:
    JAXA 117* (x 3.2 oversubsctription), ESA 31(x 3.7), NASA 96 (x4.1)
    * JAXA proposals include those from Canada (1), Chinese Taipei (4), Turkey (1), Mexico (2), and China (3)



AO-4 ToO & TC observations

- GO (Reserved) ToO

  1 target out of 25 (in total 950 ks) was observed using 45 ks.

- DDT (Realtime) ToO

GRB090709A	40 ks
V2672 Oph	20 ks
V2672 Oph	20 ks
TOTAL	80 ks

- Time Critical

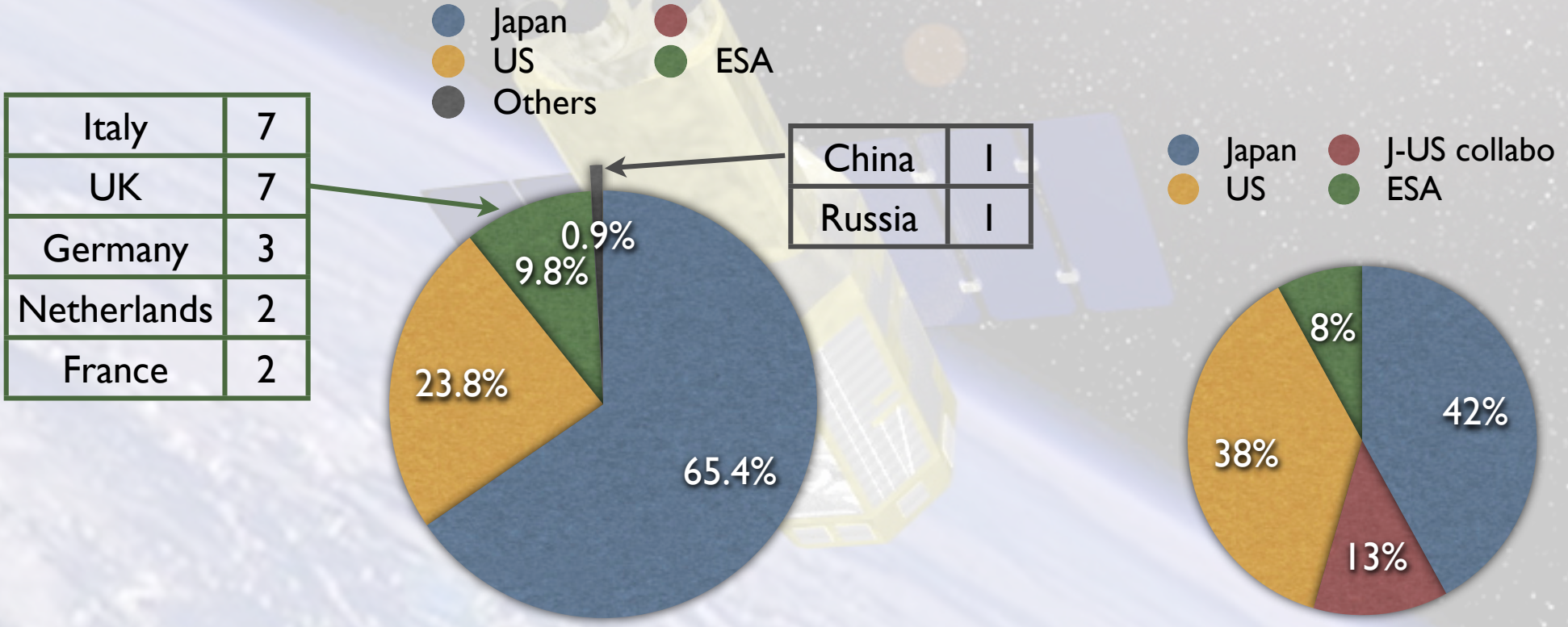
  Science: 38 observations, 1210 ks

  Calibration: 19 observations, 450 ks

  FYI: total observation time is 13680 ks

Suzaku Publications

- ~280 scientific papers appeared in refereed Journals by ~Aug. 2009 (according to ISI web of science & ADS)



Summary

- Suzaku has operated successfully for four years. Remaining orbit life is more than 10 years.
- In spite of some problems which could be due to μ meteorites (?), three XIS sensors are working properly and keeping good energy resolution by charge injection.
- HXD is working properly, though there are noise/gain changes due to radiation damage.
- Suzaku is producing significant scientific outcome. We would like to encourage US GOs to write more paper with Suzaku data.