JX-ISAS-SUZAKU-MEMO-2014-02
Title: Suzaku Mission Status
Category: Common
Author: K. Mitsuda et al.
Date: 2014-04-01

Suzaku Mission Status (Presentation in the US senior review)

Kazuhisa Mitsuda,

July 4, 2014

Suzaku Mission Status

Prof. K. Mitsuda

Project manager, Suzaku,

Research Director,

ISAS, JAXA

What is Suzaku?

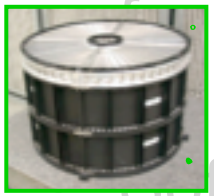
- High-sensitivity wide-band X-ray spectrometer, all in one observatory
- High-sensitive soft X-ray spectrometer for spatially extended emission
- Soft X-ray spectrometer with the best CCD spectral response, in particular, in low energy range (0.4-1 keV)
- Well calibrated, well understood instruments

Unique and Powerful observatory

What is Suzaku?

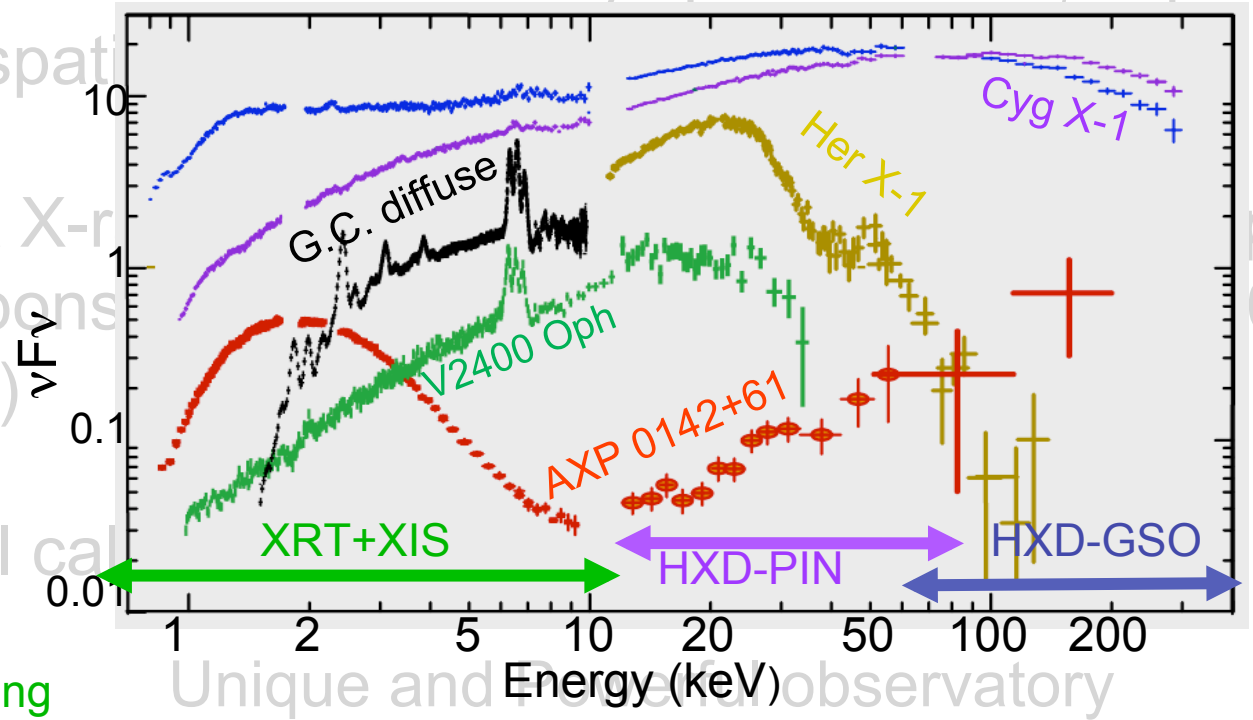
- High-sensitivity wide-band X-ray spectrometer all in one observatory

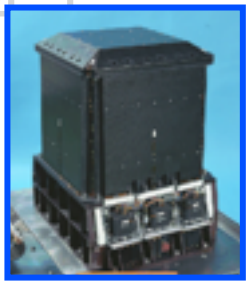
XRT (X-ray Telescope)



XIS (X-ray Imaging Spectrometer)

Wide-band spectroscopy





HXD (Hard X-ray Detector)

What is Suzaku?

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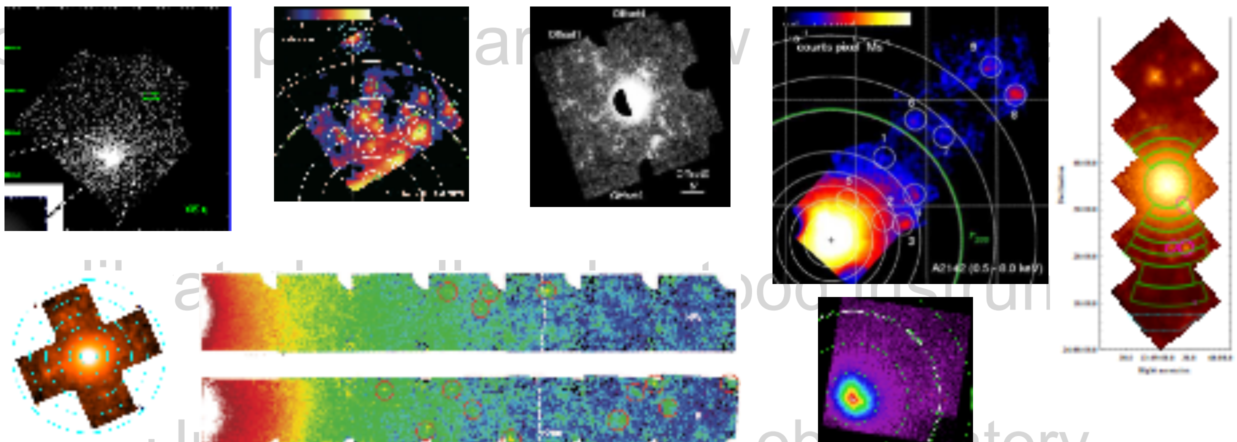
- Soft X-ra… CD spectral resp… ar…).4-1 keV)

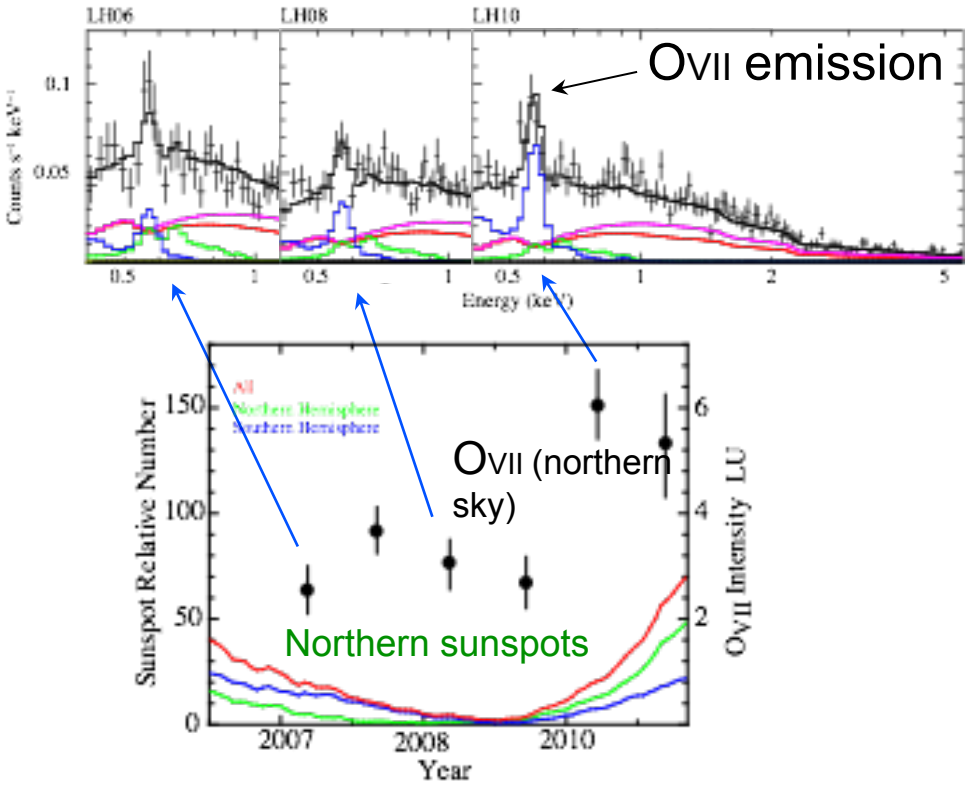
- Well … a…

Beyond the virial radius of clusters



Unique and Powerful observatory

Long-term variability of X-ray background



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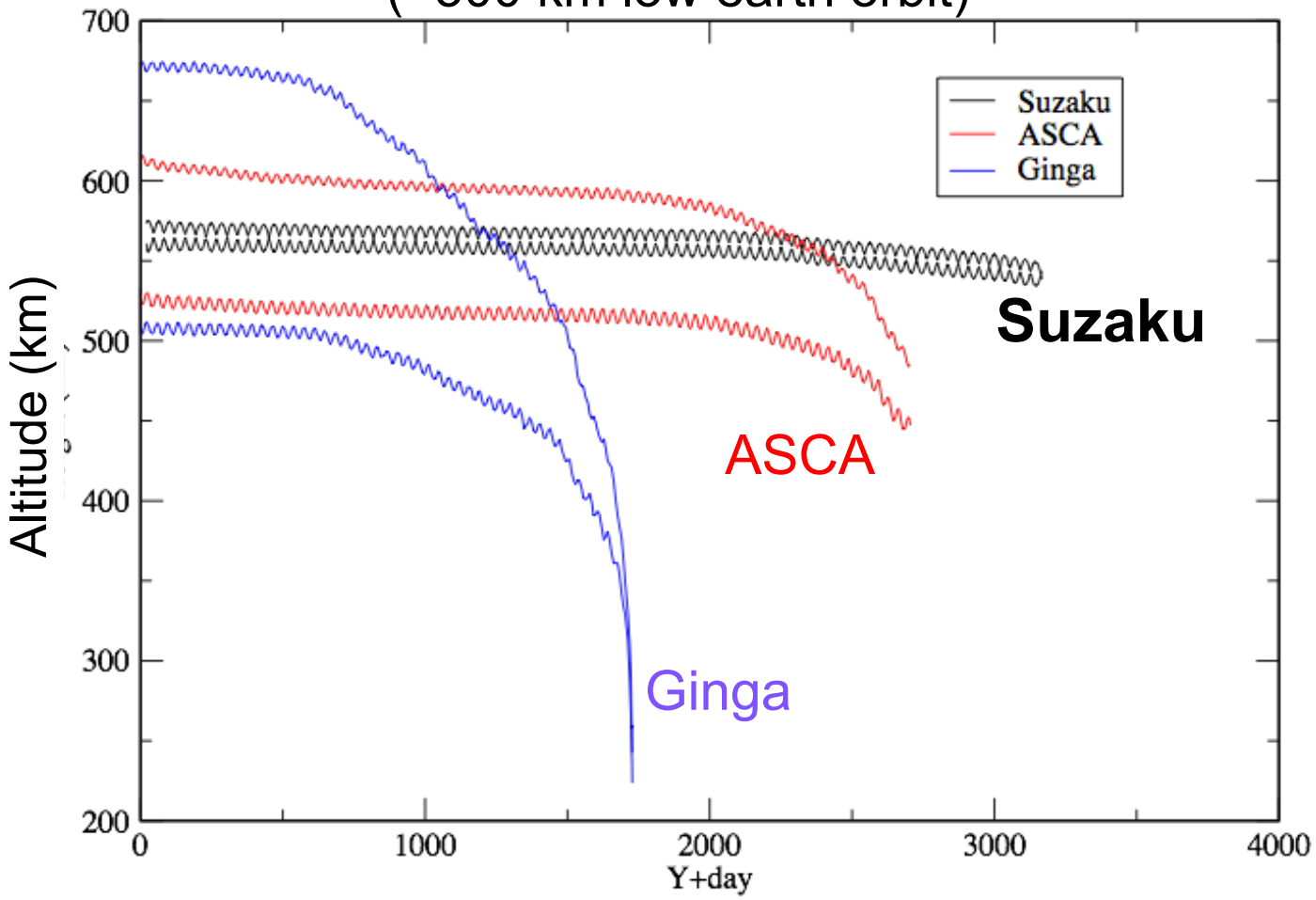
Unique and Powerful observatory

Spacecraft status

- Orbit
  - Prigee > 530km; 3more years till it reaches < 500km
- Attitude control system
  - Four gyros out of five are healthy. One is noisy, but usable
- Power system
  - A rapid degradation of –200W/year was observed in 2011-2012, but it returned steady degradation of –30W/year now. Reduction of power generation was mitigated by reducing power consumption by e.g. stopping cryocooler technical demonstration.
  - Degradation in one side of battery is being mitigated by heater operation. (more details are shown later)
- Program status in Japan
  - The steering committee of space science recommended ISAS to support Suzaku operation at least until July 2015. We will submit a new proposal next year and expect approval for continuing the mission.(because Suzaku is highly rated in the recent annual review of ISAS)
  - We plan to continue GO program as far as a pointing observation with a single XIS sensor is possible.

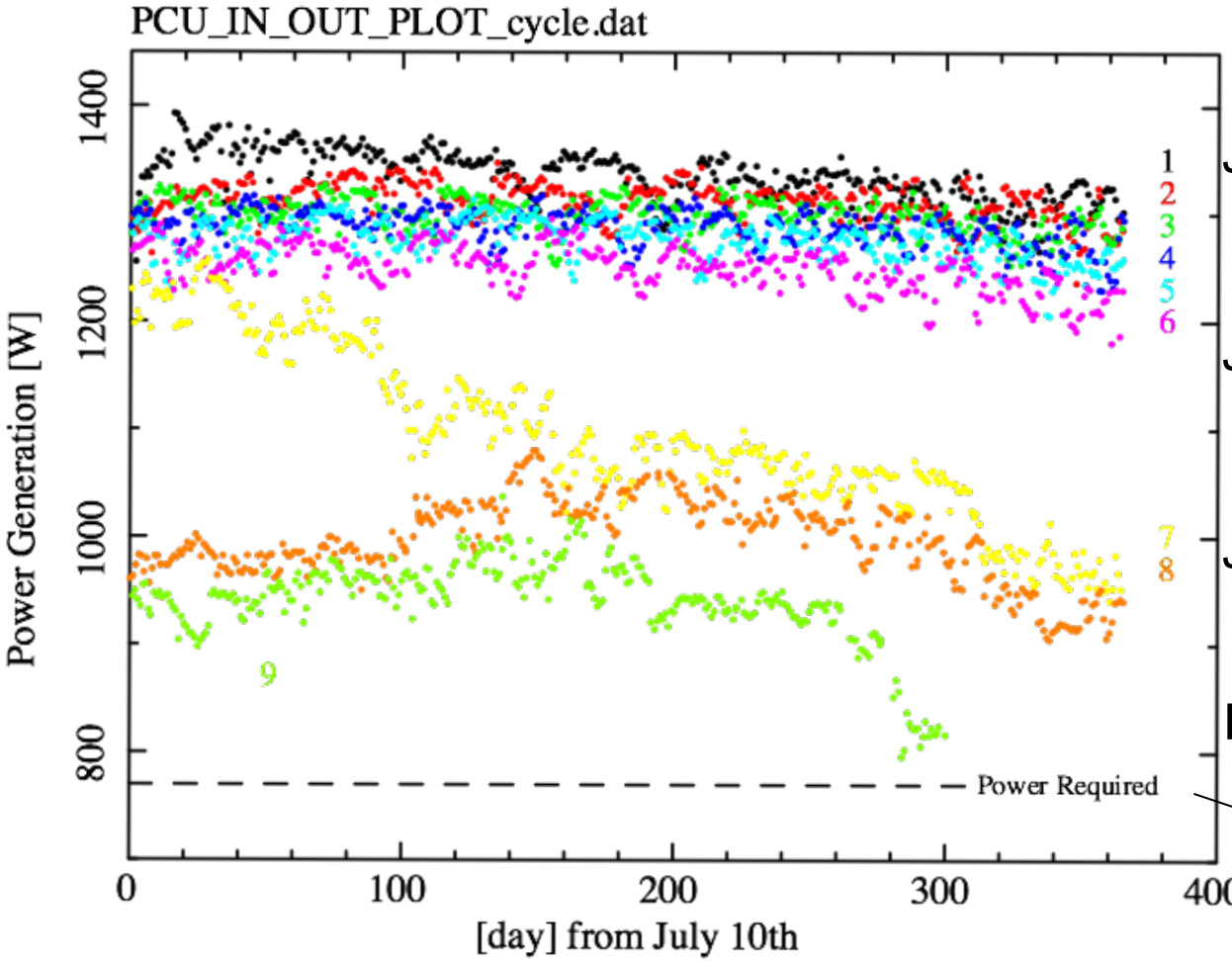
Longest lifetime among 5 Japanese X-ray astronomy satellites

(~500 km low earth orbit)



Power system

(1) Solar cells



July 2005

~20 W/year

July 2011

~200W/year

July 2012

~30W/year

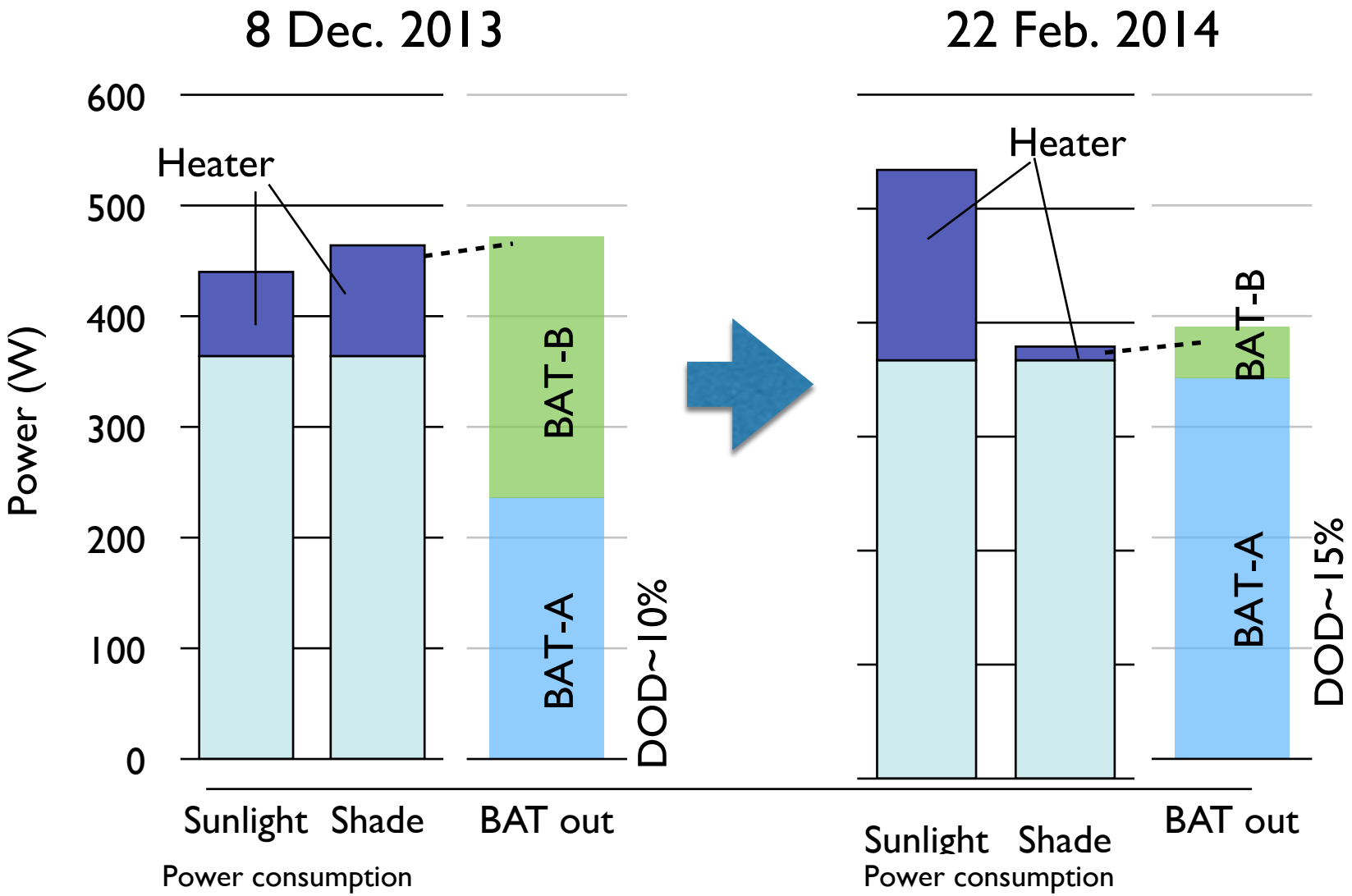
March 2014

~3 years till we need to turn off a part of science instruments.

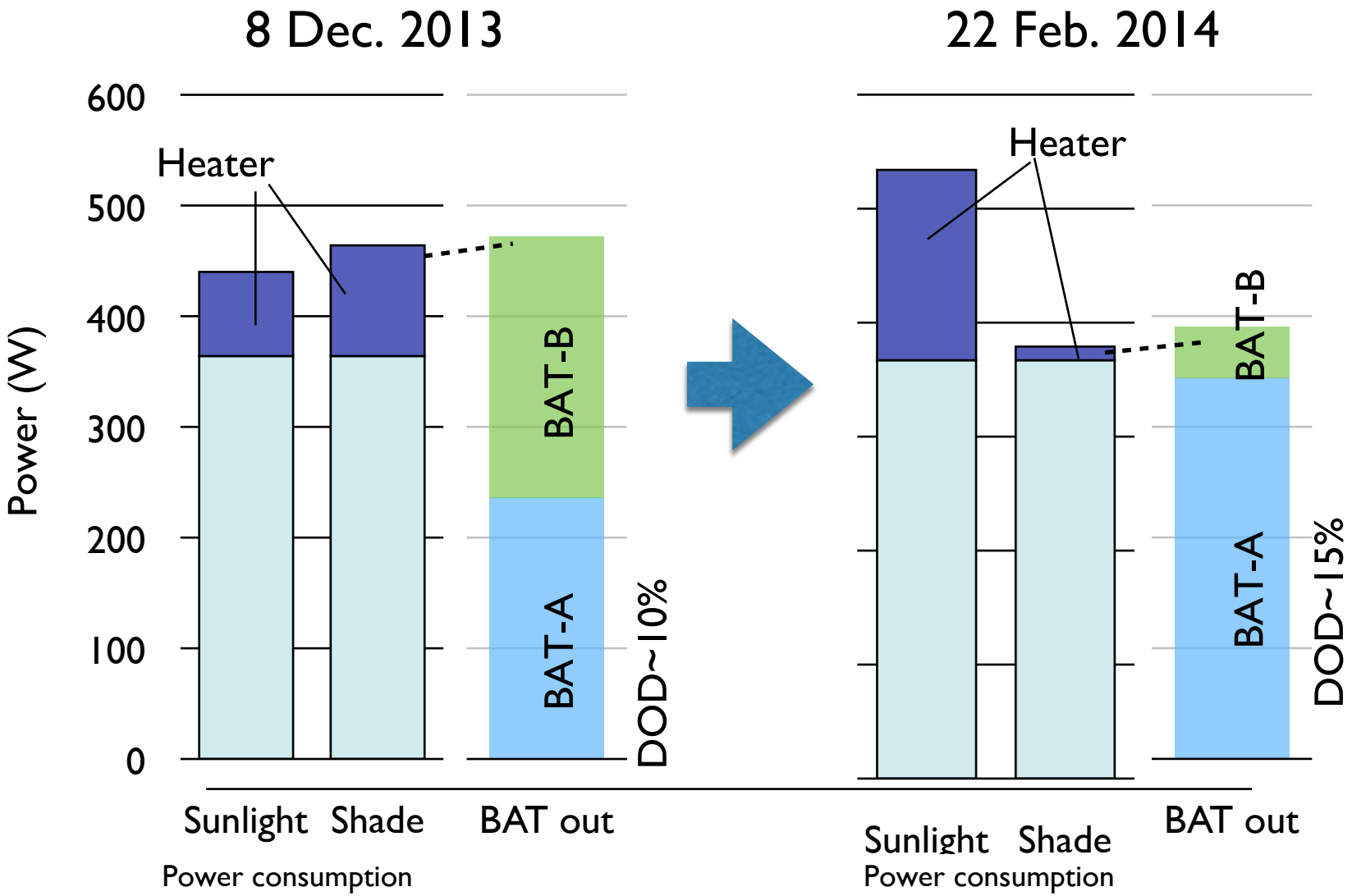
Power system
(2) Batteries -1

- Suzaku carries two independent sets of batteries, BAT-A and B. They are not redundant in design; we supposed to use both to fully operate the satellite.
- Capacity of BAT-B reduced significantly around January 12, 2014. We suspect semi-shortage of some of battery cells of BAT-B. (Please notice that Suzaku in LEO, and batteries experienced ~48,000 charge/discharge cycles.) Only ~1/10 of power can be taken out from BAT-B.
- The spacecraft turned into the safe-hold mode because of power shortage.
- We reduced the power in sun shade by turning off most of heaters. Instead we warm up the spacecraft in sun light by larger heater power. It is like charging energy in a form of heat instead of electricity.
- It took more than a month to establish this new power mode.
- The spacecraft recovered from the safe-hold mode and restarted ordinary GO observation resumed on February 19, 2014.
- Degree of discharge of BAT-A increased, although the present value,15%, is the nominal designed value. We are carefully monitoring the charge/ discharge behavior of BAT-A.

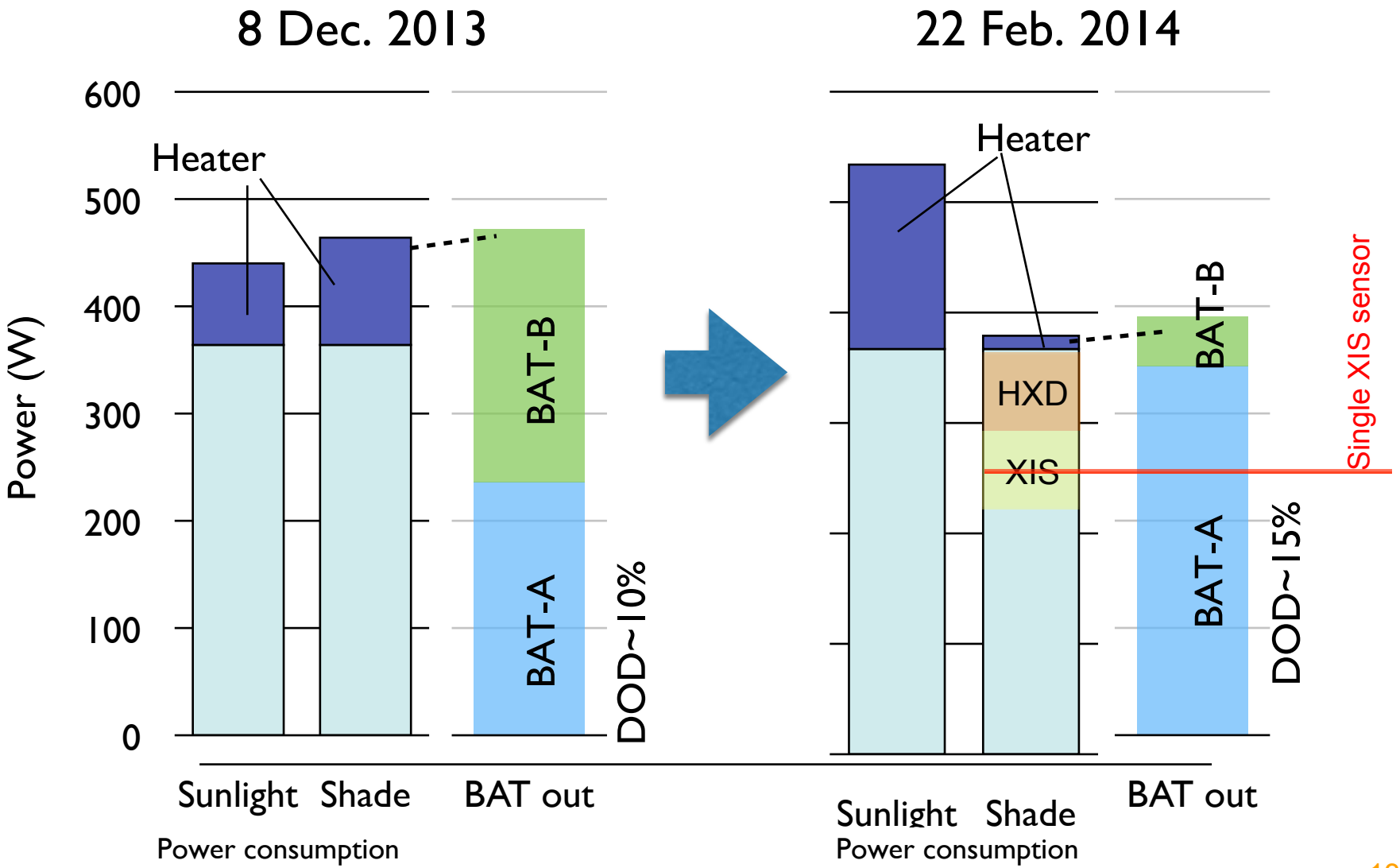
Power system
(2) Batteries -2



Power system
(2) Batteries -2

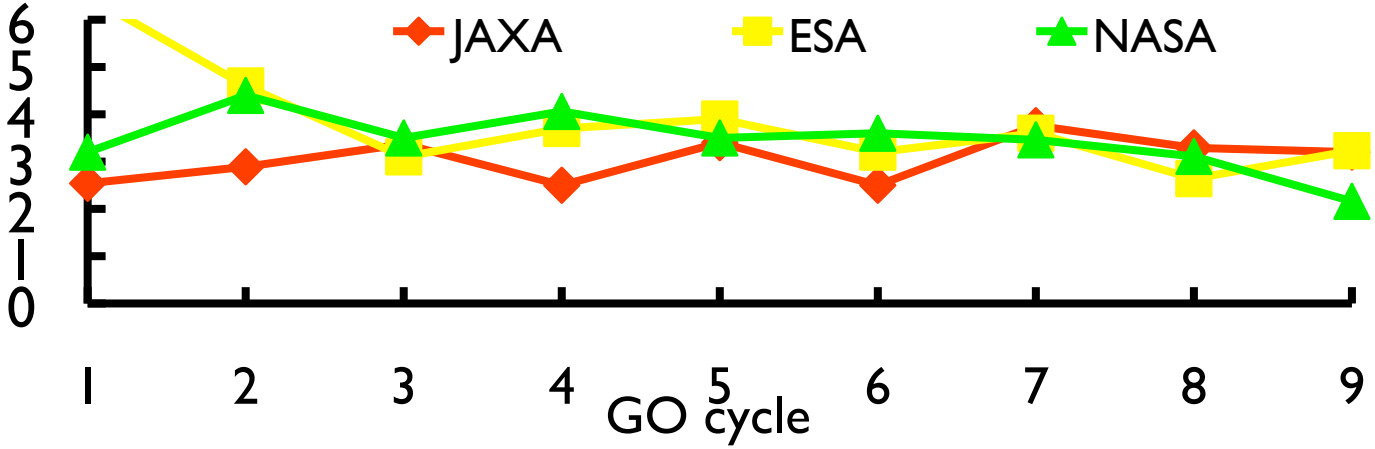


Power system
(2) Batteries -3

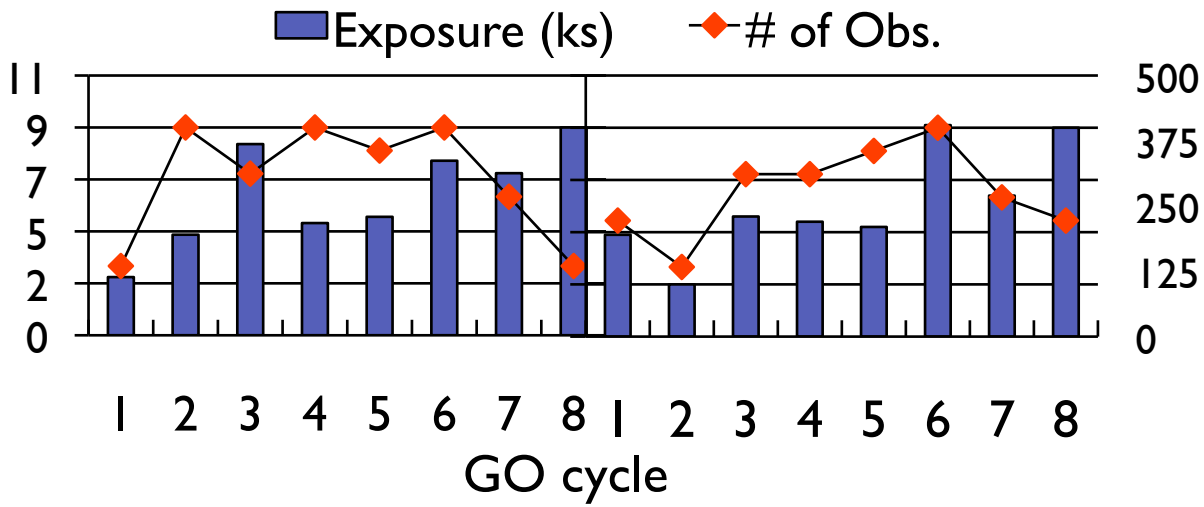


Status of observation program

GO regular proposal over-subscription rate



Reserved ToO (GO) Real-time ToO (DDT)



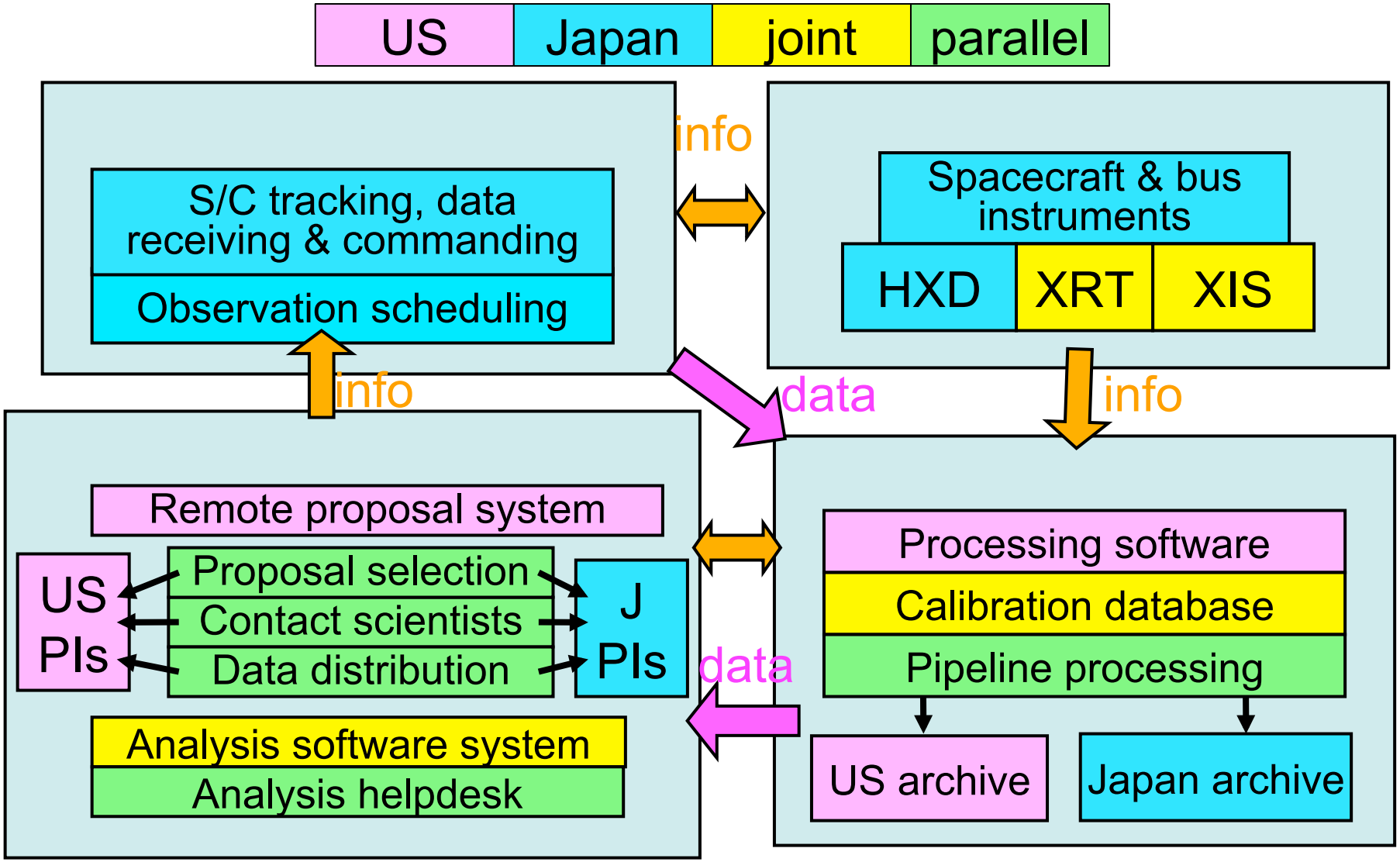
Key project: from cycle 4

Collaboration with other observatories

from	with
cycle 4	Chandra (GO)
cycle 5	MAXI (DDT)
cycle 6	Fermi (GO)
cycle 7	Nu-star (Cal)

Japan-US Interdependence

Since October 2011



Plans for next upcoming years

- Best use of “final” two years of Suzaku.
  - Observations which strengthen or complete excellent previous Suzaku results
  - Observations which optimize the Astro-H program
- Continue GO observations as far as pointing observations with ≥1 XIS sensor(s) are possible.
- Continue Key projects, though their scientific purpose must be fulfilled within single GO cycle (1 year).

ASTRO-H, scheduled for launch in 2015 (JFY).