Subaru Data Analysis on Japanese Virtual Observatory

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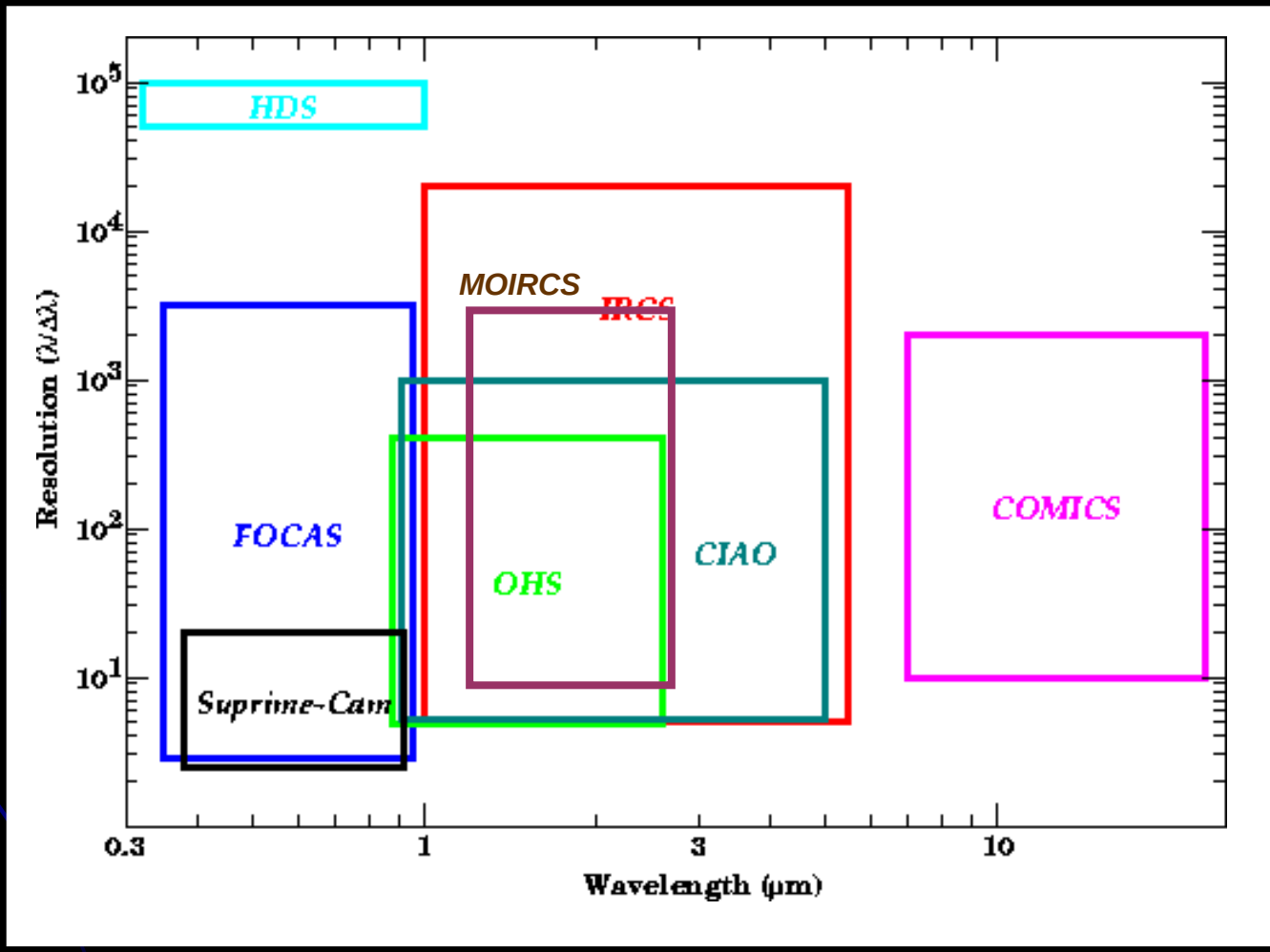
on behalf of the JVO Project team

Subaru Telescope

Subaru Telescope is an optical-infrared 8.2 m telescope at Hawaii, operated by NAOJ.

Instruments for Subaru

- CIAO
- COMICS
- FOCUS
- IRCS
- MOIRCS
- SuprimeCam
- HDS
- AO/CIAO



Suprime-Cam

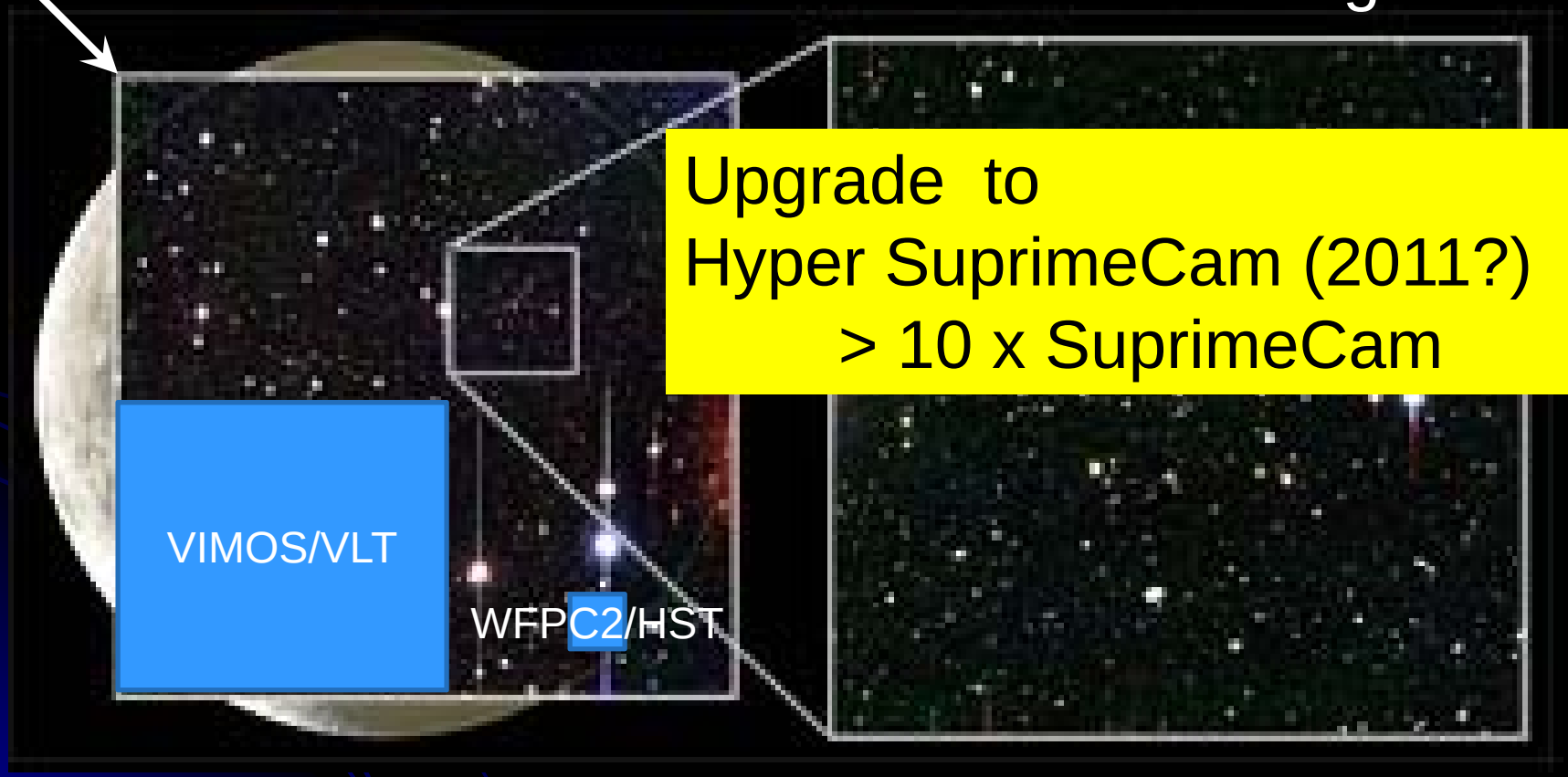
Size: 1035 mm x 960 mmϕ
Weight: 295 kg
Power: 420 W
F: 1.86
FOV: 30' ϕ
CCD: MIT/LL CCID20
Format: 4096x2048 per CCD
# of CCD: 10 (2 x 5)
Filter: B,V,Rc,Ic,g',r',I',z'

SuprimeCam Field of View

SuprimeCam FOV

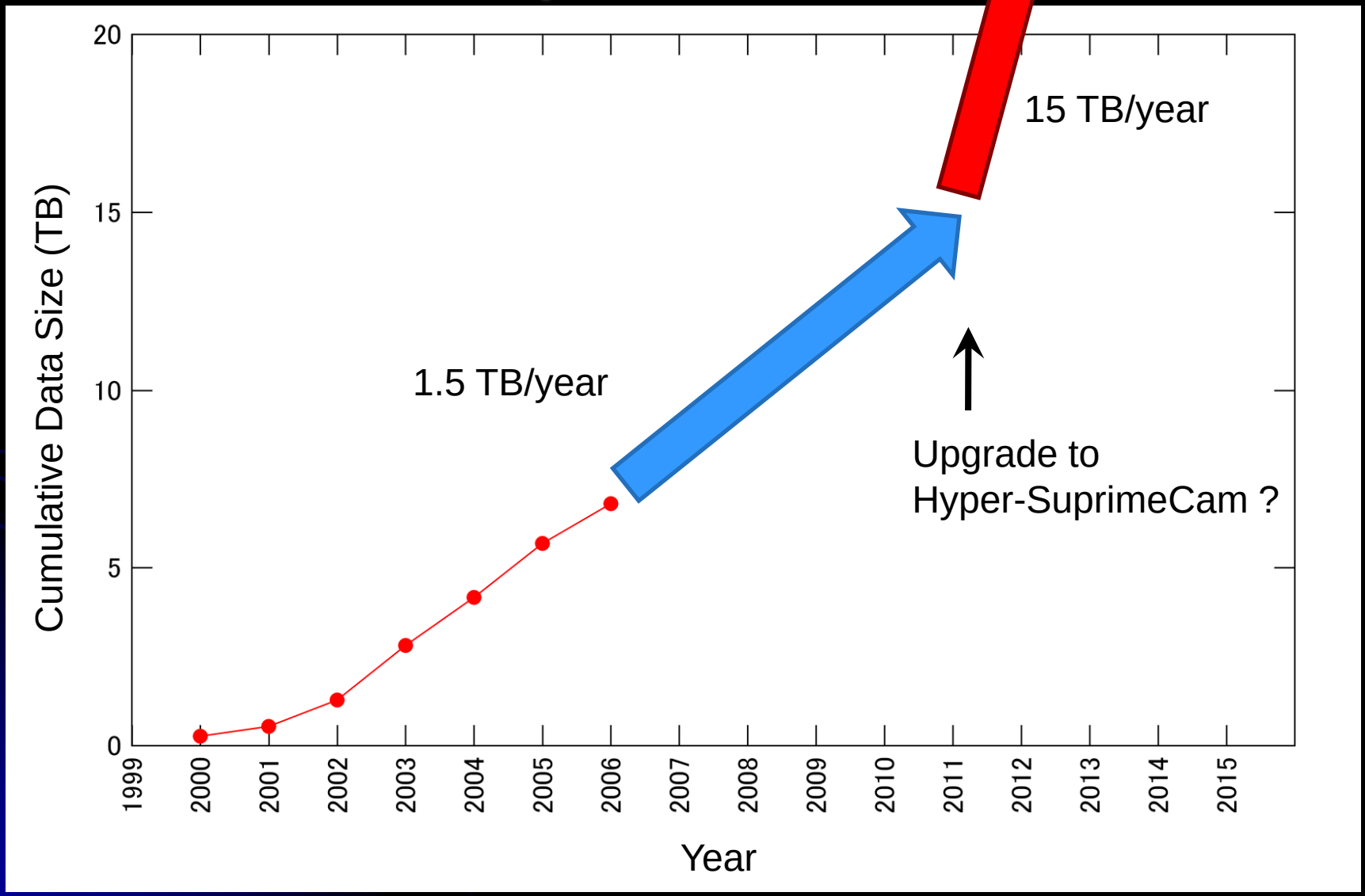
0.2”/pix

160MB/shot
~ tens GB/night

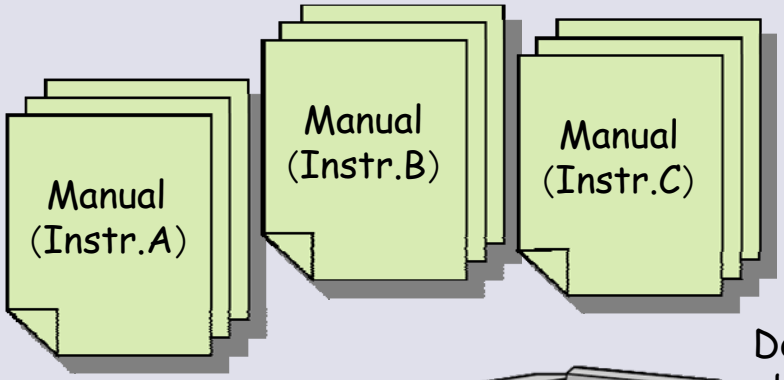


Upgrade to
Hyper SuprimeCam (2011?)
> 10 x SuprimeCam

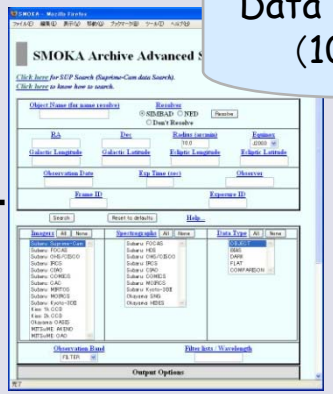
Cumulative Data Volume of SuprimeCam



Current situation in astronomy



Subaru Telescope
Data Archive
(10TB)



Download
by hand

Software for instr. A

Software for instr. B

Software for instr. C

Subaru Data Analysis and Virtual Observatory

User disk space

Subaru Telescope
Data Archive
(10TB)

4. Retrieve
reduced data

3. Save the
reduced data

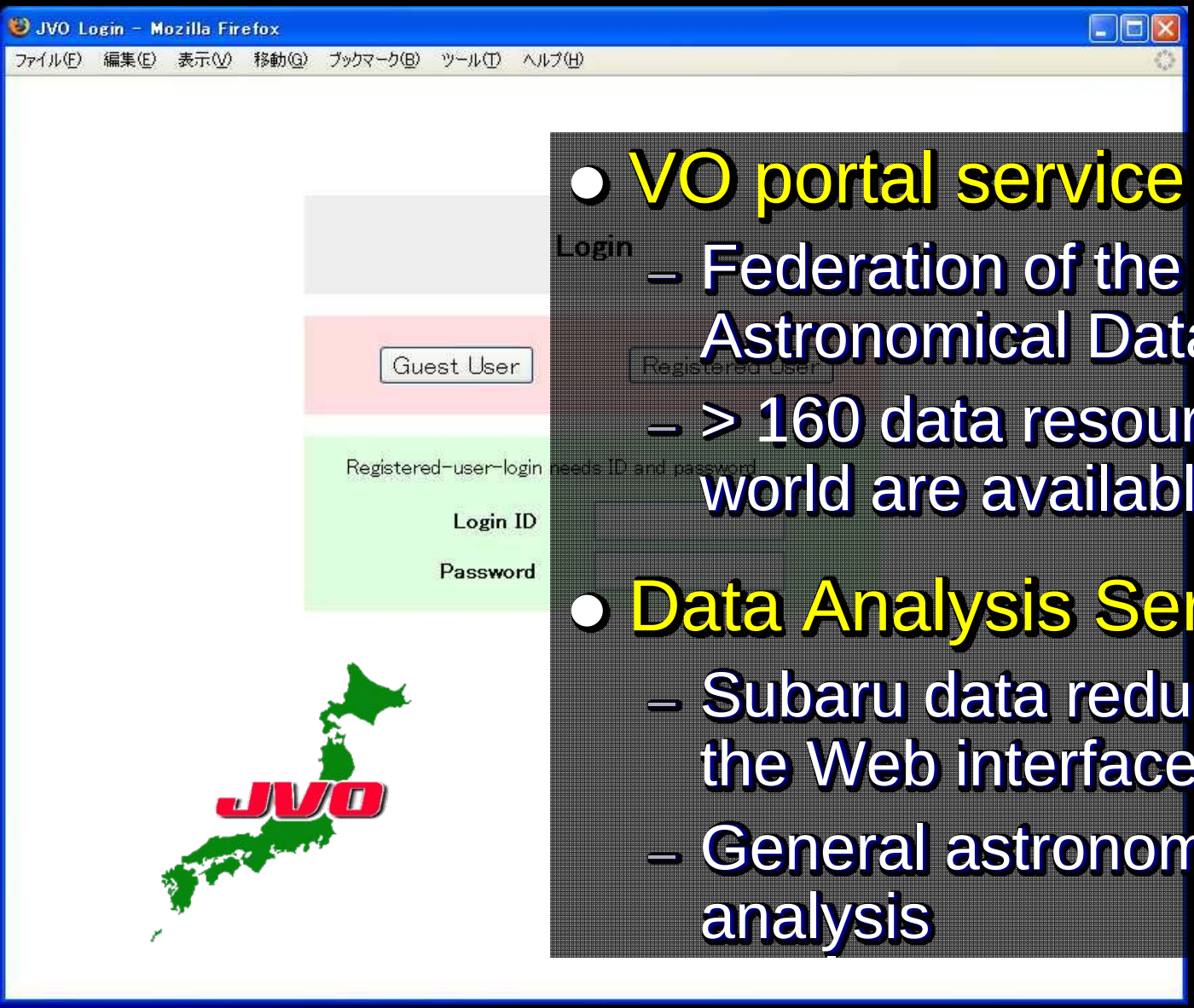
1. Request Data

JVO Portal Service

2. Reduce
raw data

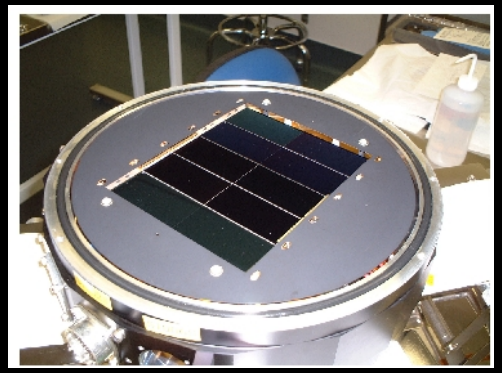
Japanese Virtual Observatory (JVO)

http://jvo.nao.ac.jp/portal



- **VO portal service**
  - Federation of the Distributed Astronomical Databases
  - > 160 data resources from the world are available
- **Data Analysis Service**
  - Subaru data reduction through the Web interface
  - General astronomical data analysis

SuprimeCam CCD

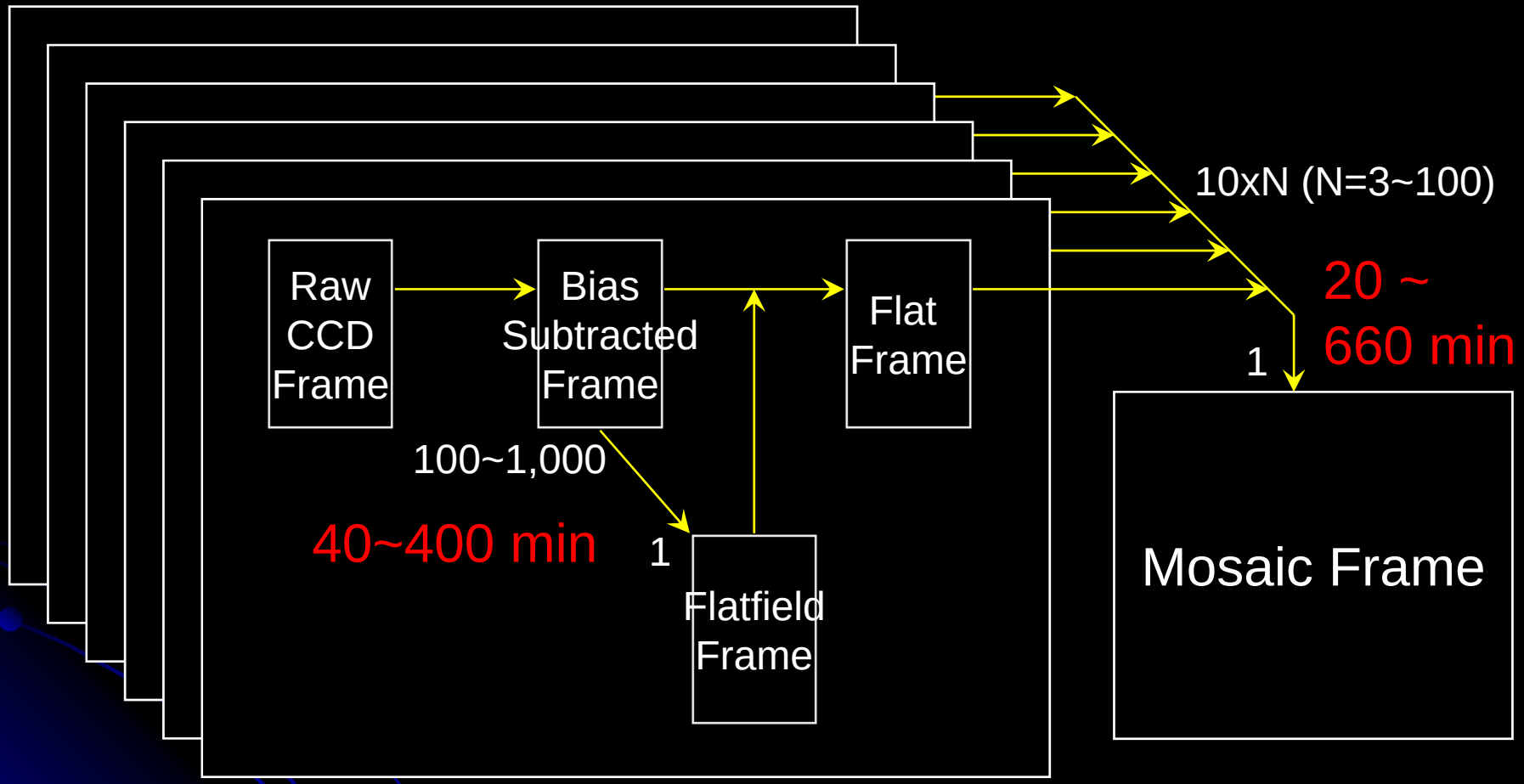


CCD gap

Bad pixel /
Cosmic Ray

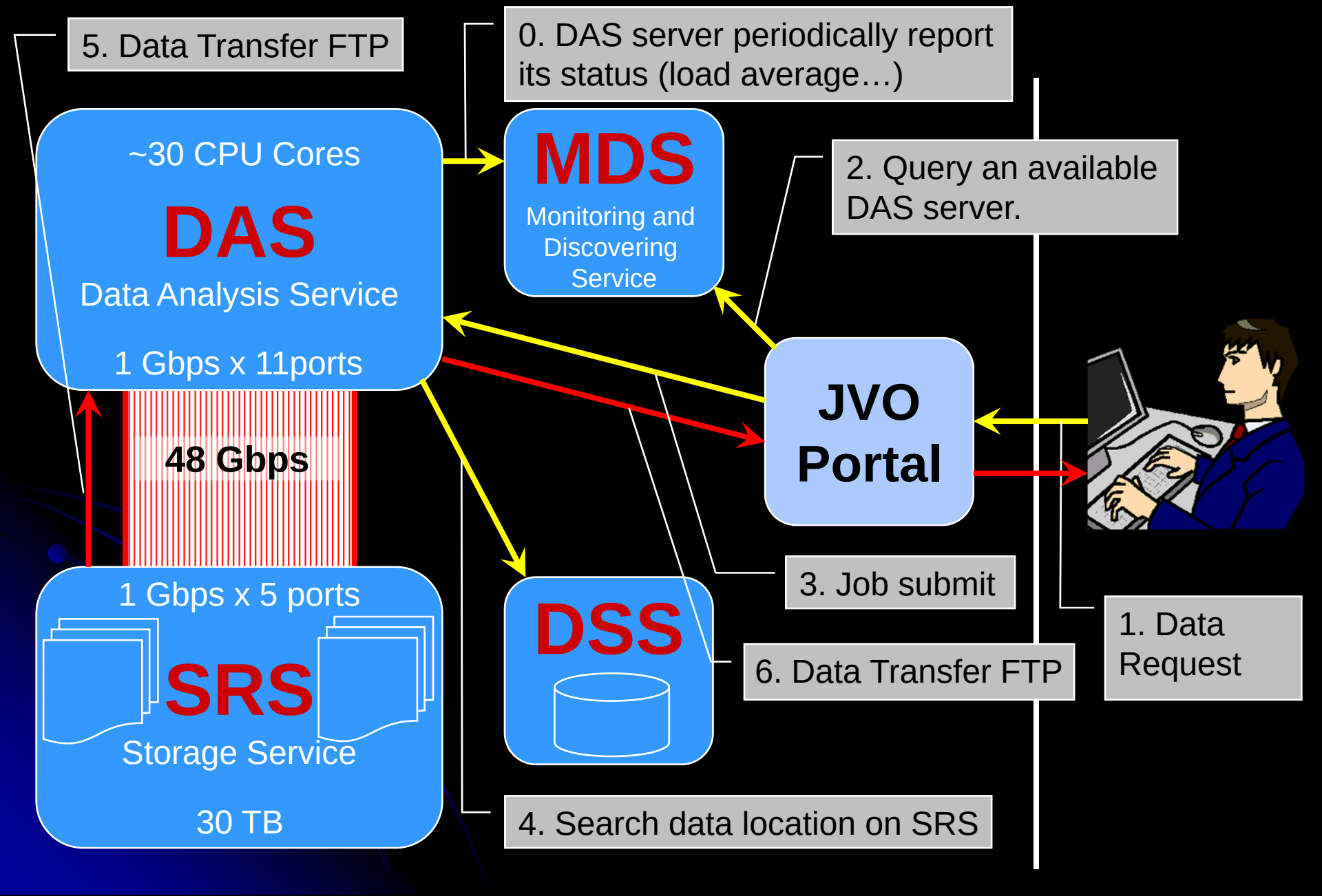
Non-uniformity

CCD Image Reduction

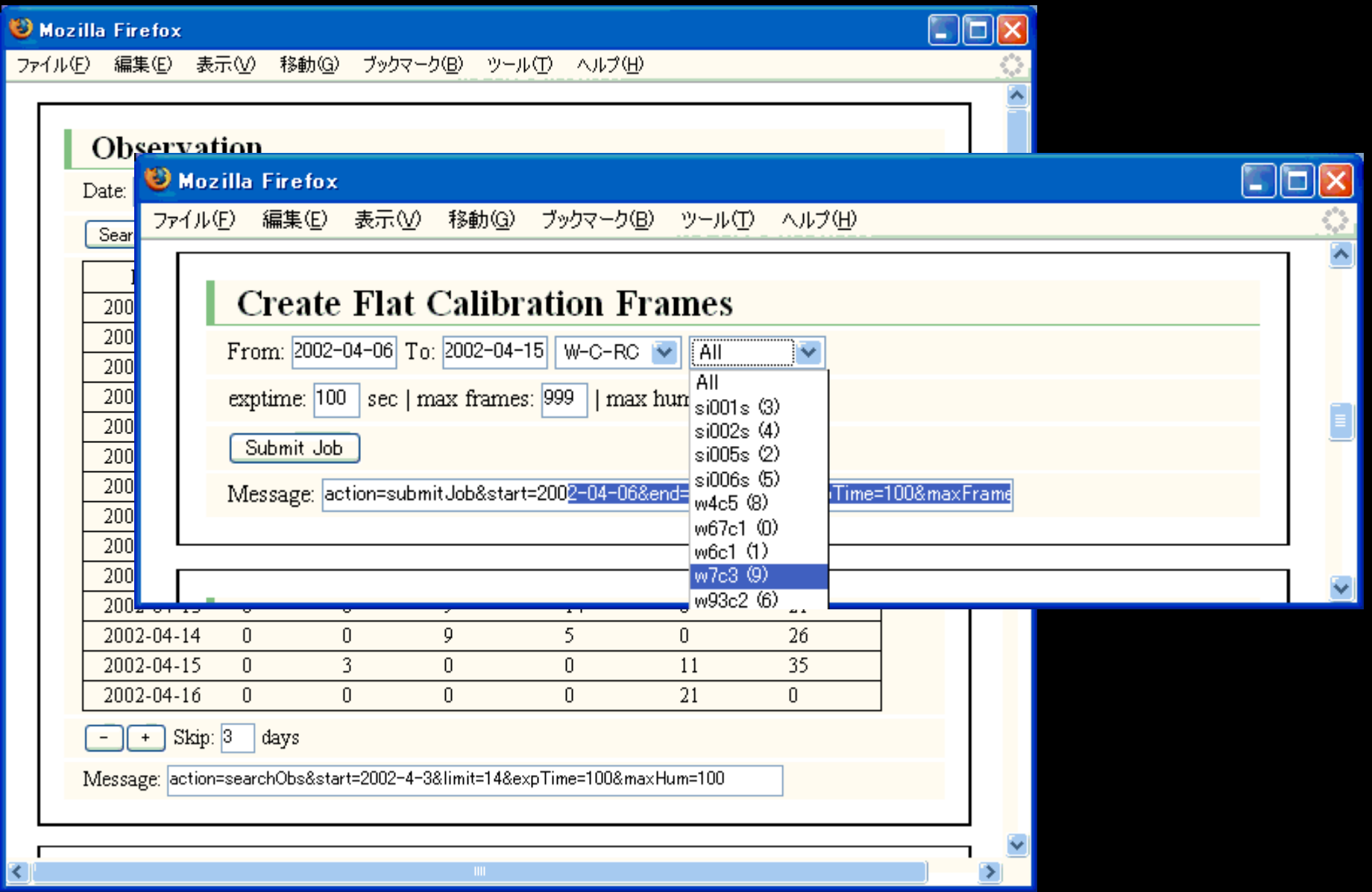


One day for each observation night

Subaru Data Analysis GRID system



Flat-field frame calculation GUI



Data Analysis - Mozilla Firefox

SuprimeCam Mosaic Service

Status | Registry | Search | Workflow | Result | QSO | DataViewer | Tools | SubaruAnalysis | VOSpace | MDS | Usage | Logout

Requreid Parameters

Object Name: Filter: W-J-B Execute Plot CCD Frame List

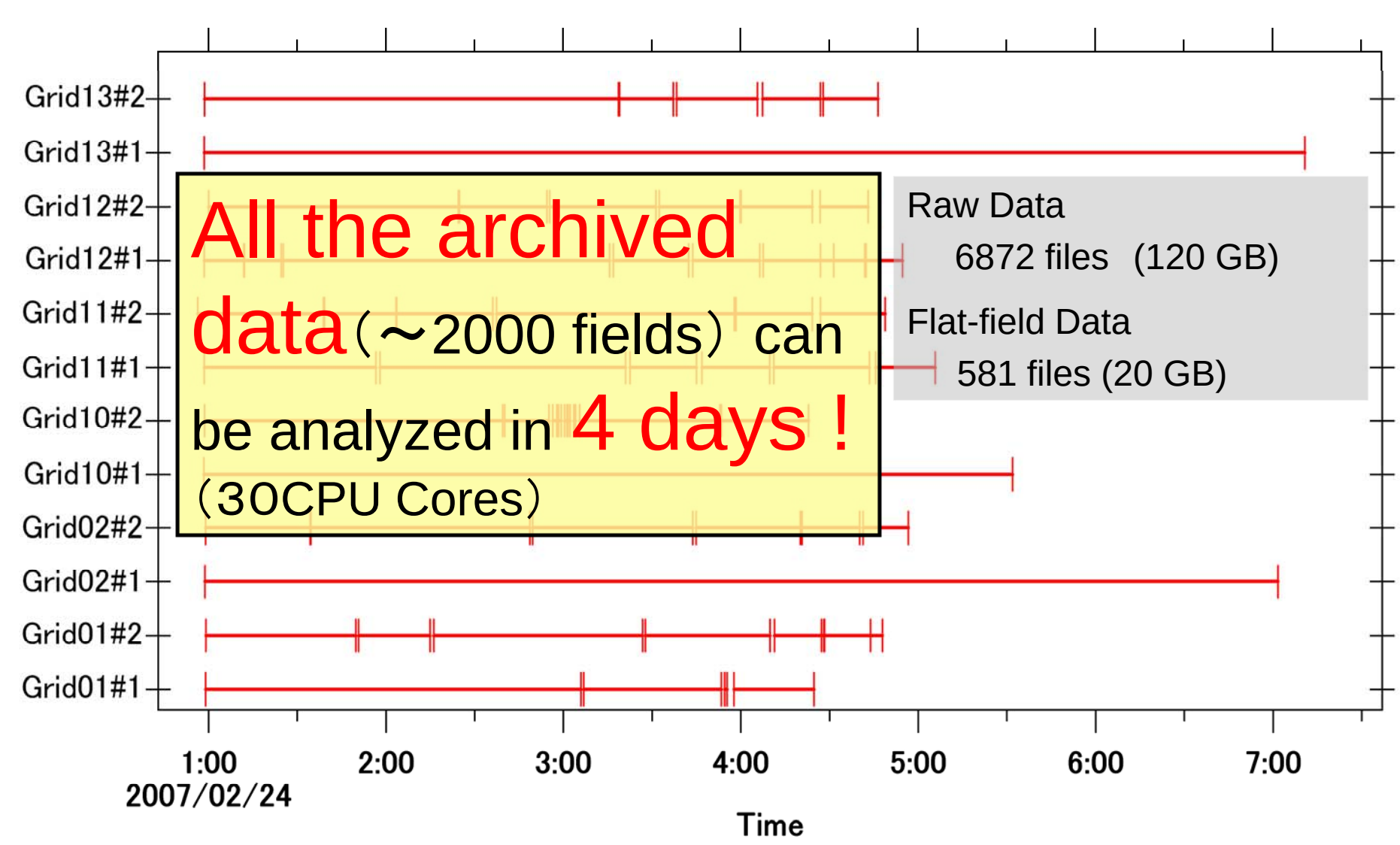
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

Submit From List

Object	W-J-B	W-J-V	W-C-RC	W-C-IC	W-S-I+	W-S-Z+
XRF030723	0	0	0	830	0	0
XMM_deep	0	208	100	0	0	220
XRF040916	0	0	0	80	0	0
XRF040924	0	0	50	0	0	0
XRF040912	0	0	40	0	0	0
XMM_1	0	0	32	0	0	0
XMM_c1	0	12	30	0	24	0
XMM_c2	0	0	16	0	24	0
XMM_c3	0	0	4	0	24	0
XMM_c4	0	0	2	0	24	2
XMM_c5	0	0	18	0	24	1

完了

Experiment (58mosaic/12CPU Core)



Summary

- We developed GRID computing system for Subaru data analysis
  - One night observation

    One day (1CPU) → One hour
  - All the archived data (6 years)

    More than one year (1CPU) → One week
  - Accessible from Web browser.
- Operation System will be completed next year.
- Experimental use of NAREGI Grid middleware is underway