GLI Standard Higher Algorithm Implementation Status

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Outline

Topics:

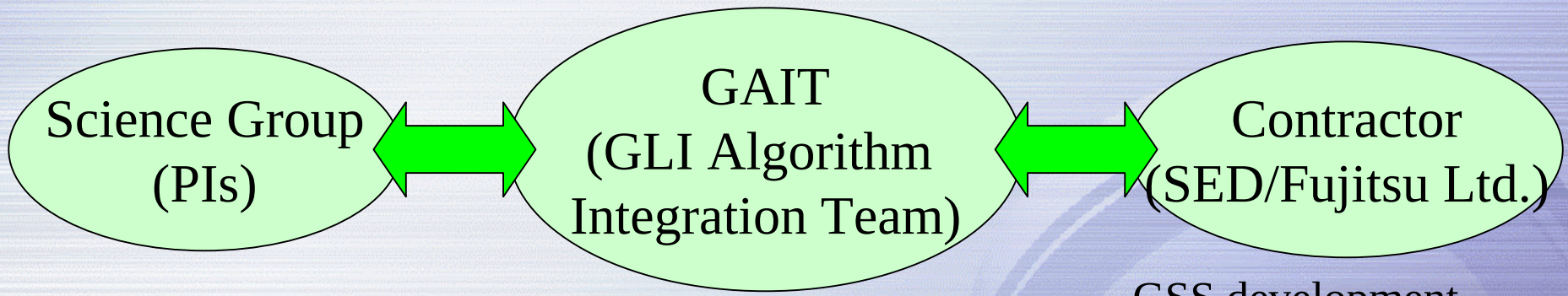
(1) GAIT organization / schedule

(2) Progress of this year (since Kyoto GLI workshop)

(3) Summary of Current Integration Test

(4) Future Plan

GAIT Organization



- Development of algorithms
- Describing ATBD, etc.

GAIT Leader

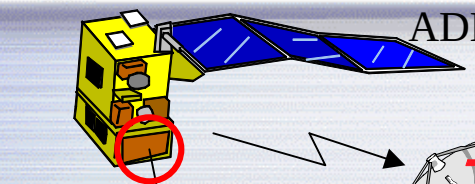
Sub-group Leaders (4)

Invited Researchers (6)

- Conversion to operational software
- Optimizing software
- Describing Product Description, etc.

- GSS development
- Supplying simulation data
- Establishing conversion procedure
- Supplying toolkit
- Providing technical support
- Describing File Specification, etc.

Our Position in NASDA



ADEOS-II

GLI

Oversea Station

EOC

Online

Media

ADEOS-II Data Processing System

Basic Proc.

GLI Level-1 Processing

GLI Higher Processing

Archiving and Ordering

Mission Management

All Product

JMA

JAFIC

General User

Level-1 Product

Revised Higher Level Algorithm Programs

EORC

ADEOS-II Data Processing System (research purpose)

Other Higher Proc.

GLI Higher Proc.

GAIT

Algorithm Implementation

Data Flow

Software Flow

EOC: Earth Observation Center
EORC: Earth Observation Research Center
JMA: Japan Meteorological Agency
JAFIC: Japan Fisheries Information Service Center

Higher Product

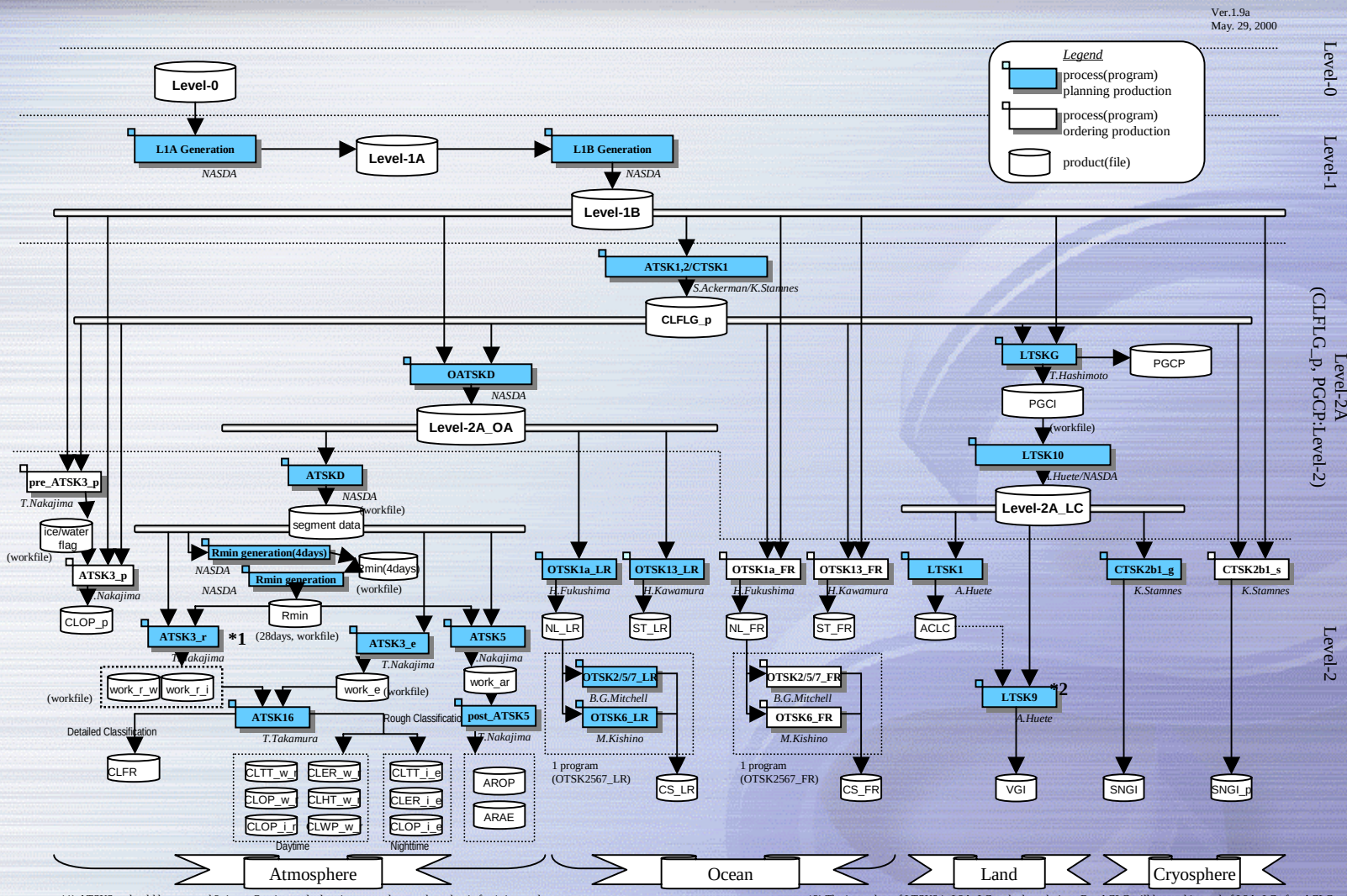
Delivery of Higher Level Algorithms

Science Team (PI, CI, etc.)

GLI Standard Higher Algorithm List

Level	Discipline	Number	Algorithm code
Level-2A	---	4	OASKD, ATSKD, LTSK10 (LTSK10d, LTSK10f)
Level-2	*atmosphere*	10	ATSK1/2/CTSK1, RMIN4, RMIN, ATSK3_r, ATSK3_e, ATSK5, post_ATSK5, ATSK16, pre_ATSK3_p, ATSK3_p
	ocean	6	OTSK1a_LR, OTSK2567_LR, OTSK13_LR, OTSK1a_FR, OTSK2567_FR, OTSK13_FR
	land	3	LTSKG, LTSK1, LTSK9
	cryosphere	2	(CTSK1,) CTSK2b1_g, CTSK2b1_s
Level-2Map	---	5	L2Map_CLFLG, L2Map_CLOP, L2Map_NL, L2Map_CS/ST, L2Map_SNGI
Level-3 Binned	---	6	L3ASBin, L3ATBin, L3OSBin, L3OTBin, L3CSBin, L3CTBin
Level-3 STA Map	---	4	L3ASMap, L3OSMap, L3LSMap, L3CSMap
Total		40	

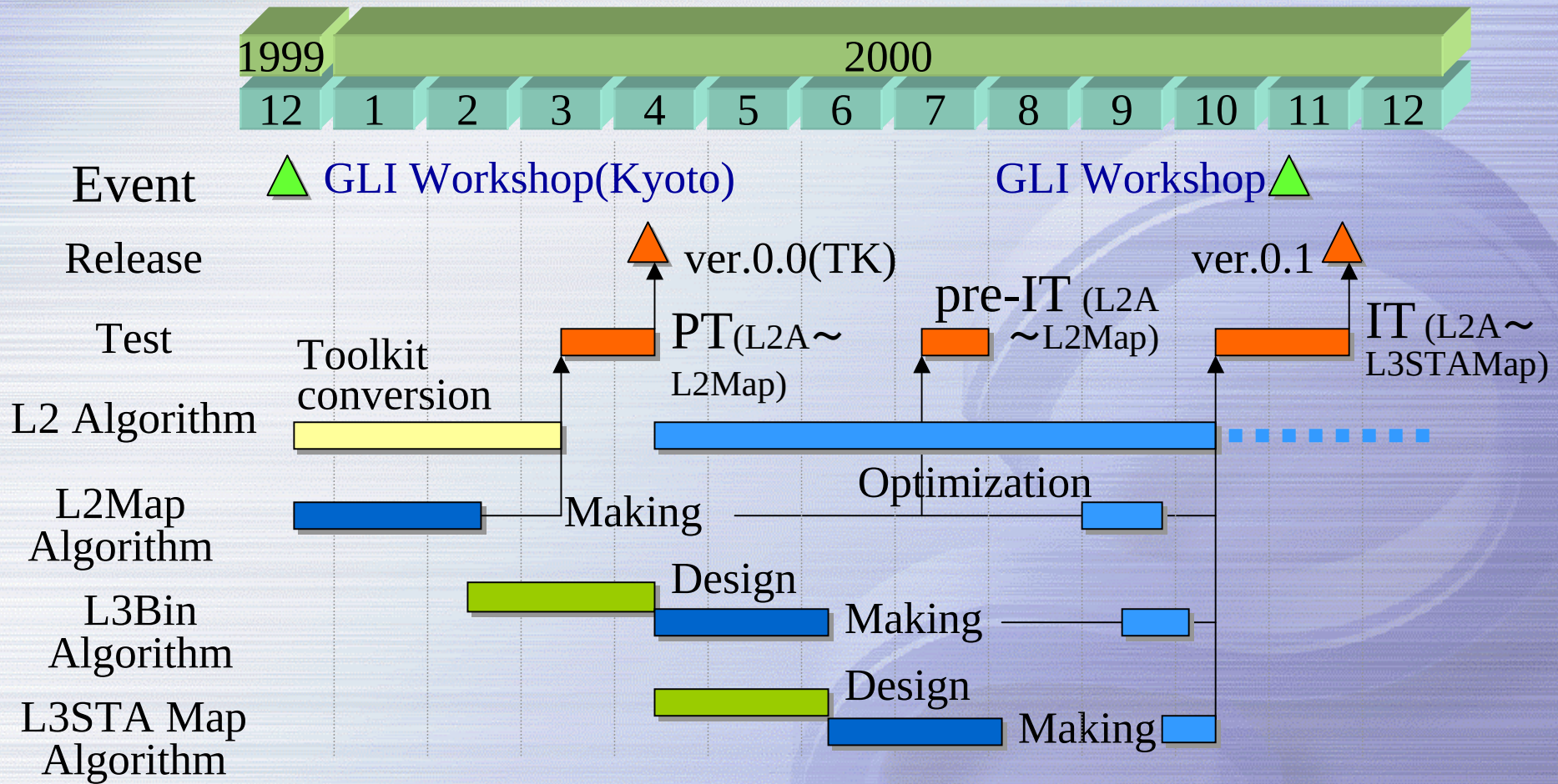
GLI Standard Products Flow (～Level 2)



*1) ATSK3_r should be executed 2 times. One is to calculate *_w_r products and another is for *_i_r products.

*2) The input data of LTSK9 is L2A_LC at the launch time. But ACLC will be used instead of L2A_LC after ACLC validated.

GLI Algorithm Implementation Schedule



PT:Program Individual Test, IT:Integration Test

Progress of this year

(1) Ver.0.0 (TK) was released.

(2) Level-3 Binned algorithms were developed

(3) Level-3 STA Map algorithms were developed.

(4) Level-2 algorithms were optimized.

(5) Ver.0.1 will be released soon.

Ver.0.0(TK) release (Apr., 2000)

First version of operational software
(Level-2A, Level-2, Level-2Map algorithms)

[update point]

- Operation formatted file read/write function is implemented
- System-related functions are added
  (log functions, receiving processing parameters from system software, outputting process result files, etc.)
- Urgent process termination is implemented
- All debug message is deleted

Level-3Binned Algorithm Development

"Level-3Binned Algorithm Specification" was published on Apr. 2000.

Following items were defined

-Bin Grid definition
-Bin duration
-Criteria of valid pixel selection
-Calculation method of statistical value
(spatial binning and temporal binning)
-Level-3 Binned file format

Level-3STA Map Algorithm Development

"Level-3STA Map Algorithm Specification" was published on Jun. 2000.

Following items were defined

- Level-3 STA Map grid
- Calculation method of representative value from Level-3 Binned statistical value
- Map projection / resampling method

Level2 Algorithm Optimization

Two types of GLI Level-1B simulation data are prepared for Level-2 algorithm optimization:

GSD (GLI Synthetic Data)

GSD is computed by using the optical and electrical response characteristics of GLI channels, in taking into consideration the earth surface and the atmospheric conditions. (→ ***GLI Signal Simulator Session***)

MODIS-reformat GLI data

Data conversion program was developed to transform each granule of MODIS level-1b into a scene of GLI level-1b. Combination of channels between both sensors can be selected arbitrarily. (→ ***Data Management Session***)

Ver.0.1 release (Nov., 2000)

Full set of operational higher algorithms
(Level-2A, 2, 2Map, 3 Binned, 3 STA Map algorithms)

**** This release is scheduled on Nov. 21.***

[update point]

- Level-3 algorithms are added
- Quality information is added
- Browse data generation function is implemented
- Other system-related functions are updated
- System-related functions are tested with EORC “System Software”

Summary of Current Integration Test

(1) Our test stages
(2) Test Data used in each test
(3) Outline of System Software
(4) Outline of Integration Test
(5) Test environment
(6) Progress of Test
(7) Sample Image
(8) Performance Result

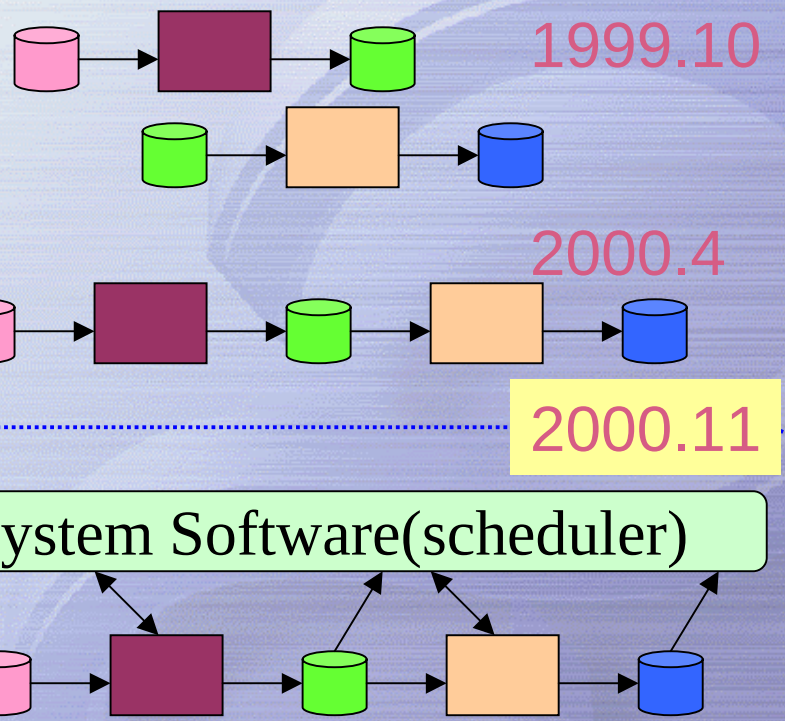
Our Test Stages

We are planning 3 test stages in EORC

Individual test

Interface test(TK ver.)

Integration test



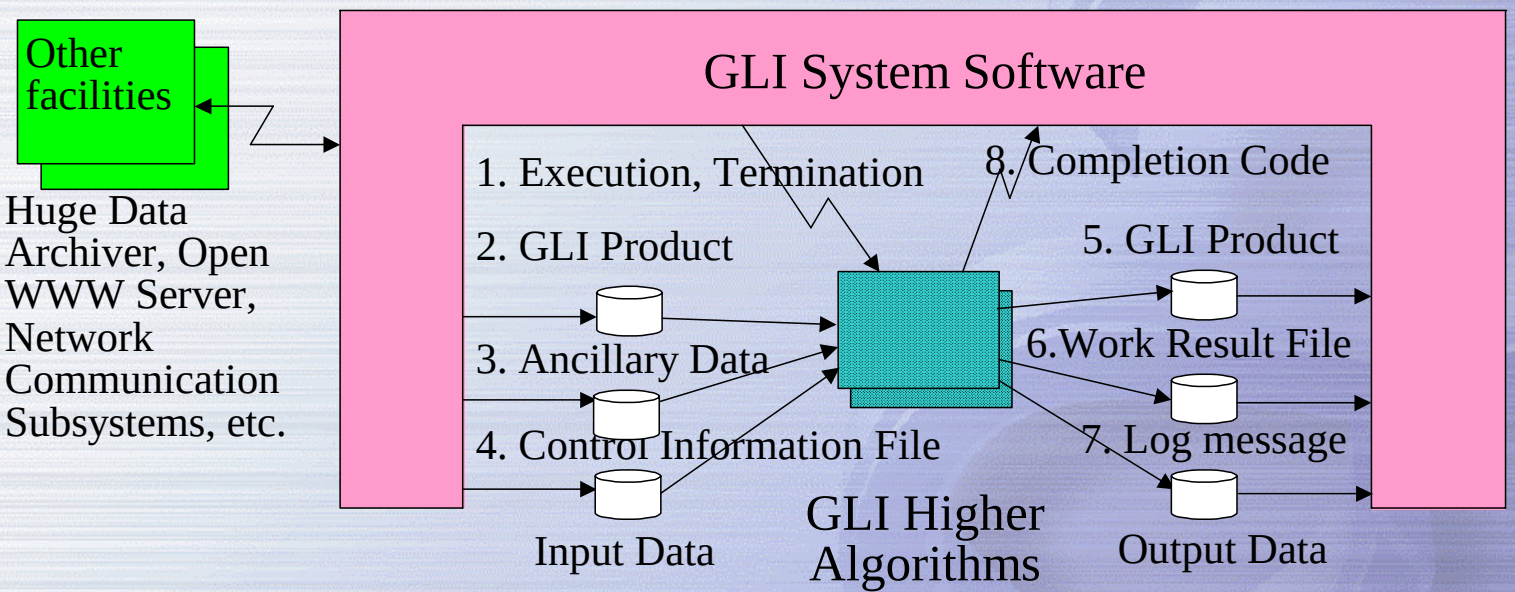
Test Data used in each test

Individual test	**- PI's data** **- Level-1B data** **(artificial patterned image)**
Interface test (TK ver.)	**- GSD L1B** **(3paths, 78scenes)**
Integration test	**- GSD L1B** **(4days, 57paths, 1500scenes)**

(simulated image, calibration mode is considered)

Outline of System Software (1/3)

"System Software" is a data processing facility constructed in EORC. Though EOC system is designed to manufacture GLI products based on predefined procedure, "System Software" is designed to test or research new higher algorithms.



Outline of System Software (2/3)

[Purpose]

- Test all GLI higher algorithms in advance of a release to EOC
- Operate research algorithms that are not operated in EOC

[Requirement]

- Little Function but Easy Operation
  - Easy algorithm handling (install/update)
  - Easy algorithm execution and termination
  - No redundancy of system , etc.

Outline of System Software (3/3)

[Main Function]

- Scheduling execution sequence of GLI higher algorithms
- Preparing necessity data for higher algorithms
  (L1B product, ancillary data, etc.)
- Executing algorithms
- Monitoring computer load/disk space
- Terminating algorithms when operator requires

Outline of Integration Test

Purpose

Interface check between GLI System Software and GLI higher algorithms

Place EORC

Date Oct. 23 – Nov. 20, 2000

Subject All GLI higher algorithms (from Level-2A to Level-3 STA Map)

Test Environment

Machine:	SGI Origin2000
CPU:	MIPS R10000 Processor Chip Revision: 3.4 250MHz×16
Main memory size:	512 Mbytes for each CPU
Disk size:	2048 Gbytes (RAID3)
OS:	IRIX6.5
Compilers: C ***Fortran***	MIPSpro Compilers: Version 7.3 MIPSpro Compilers: Version 7.3
MIPS Application Binary Interface(ABI):	-64 (*1)
Used software:	NCSA HDF library 4.1r1 SDP Toolkit ver5.2.1 EOC Toolkit ver1.3 EORC Common Library ver1.4 LSF ver3.2

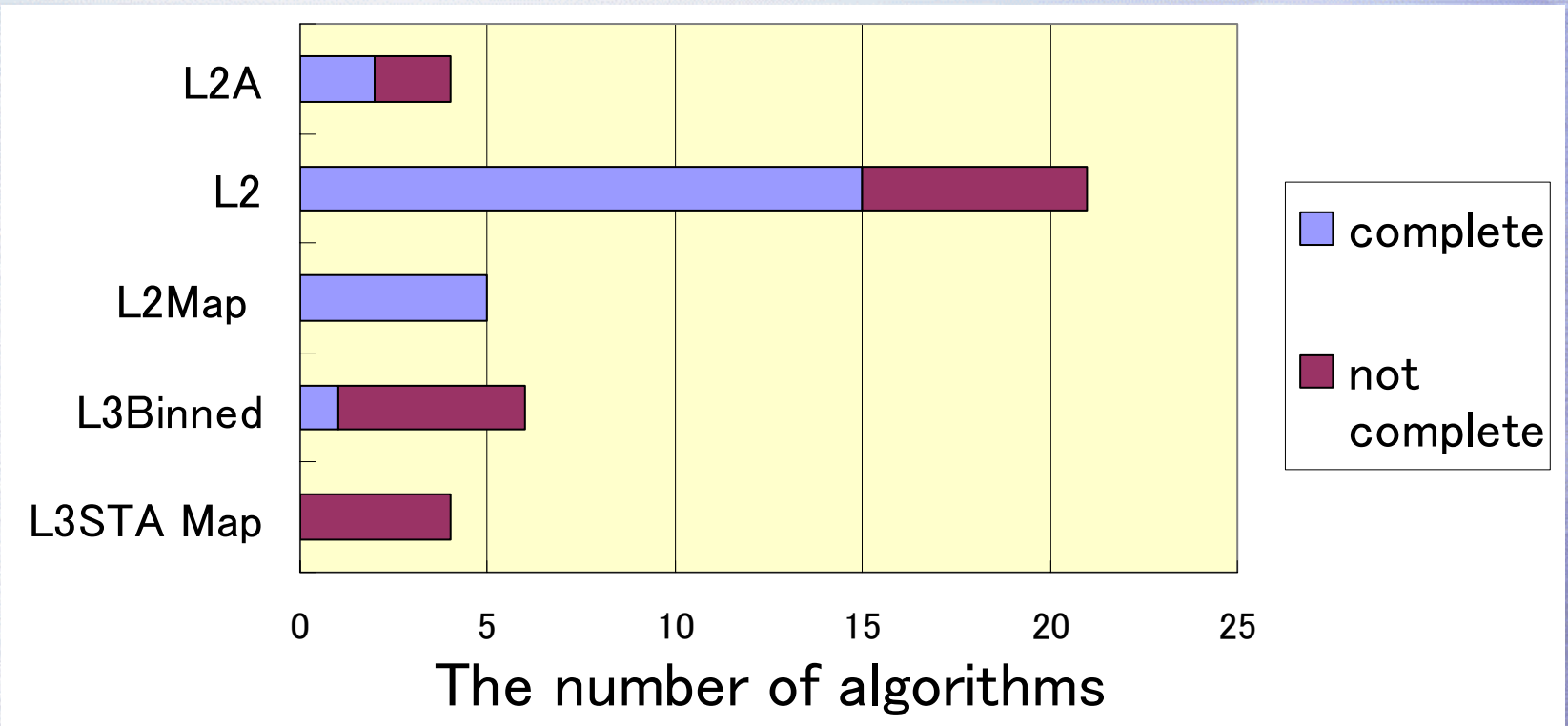
*1) “-64” means generating 64bit mode application software.

Disk Utilization

Disk No.	Size	Storage data
disk1	250GB	Algorithm (including LUT or local files), System software
disk2	250GB	L1B product for 4 days, planning production
disk3	250GB	L2A, L2, L3Bin, L3STAMap product for 1 month, planning production
disk4	250GB	L1B, L2 product for NRT (near real time) production L1B, L2, L2Map product for ordering production L1B product for 4 days for reprocessing
disk5	250GB	L2A, L2, L3Bin, L3STAMap product for 1 month, for reprocessing
disk6	750GB	Ancillary data (climatology data, ozone data) Work file, Intermediate product

Progress of Test

23 algorithms of 40 were passed this test.



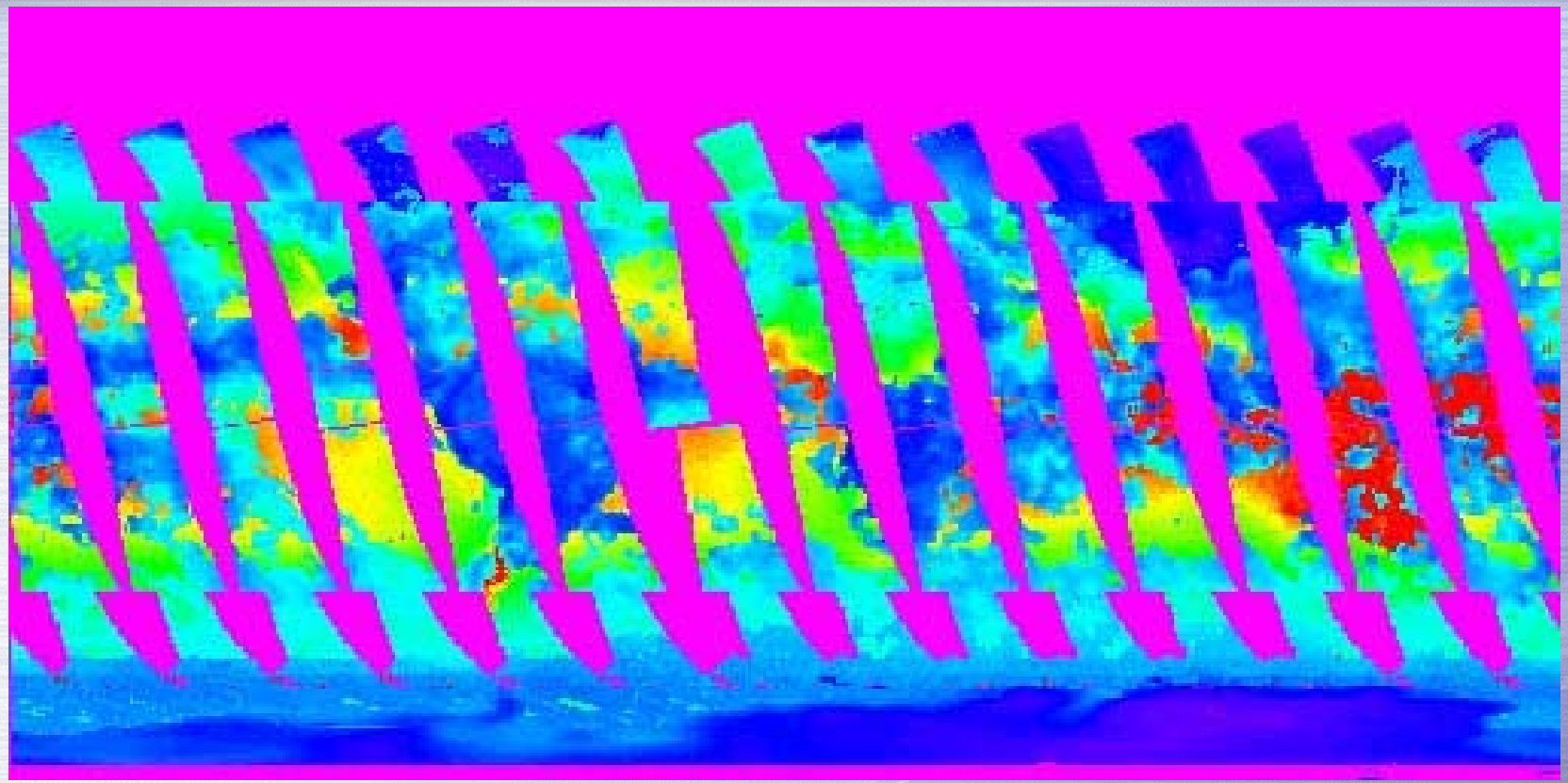
Progress of Test (problems)

Date	Test Name	The Number of Problems
2000.4	Program Test	60
2000.7	pre Integration Test	33
2000.11	Integration Test	54 (tentative)

Example of problem (all of following was already solved)

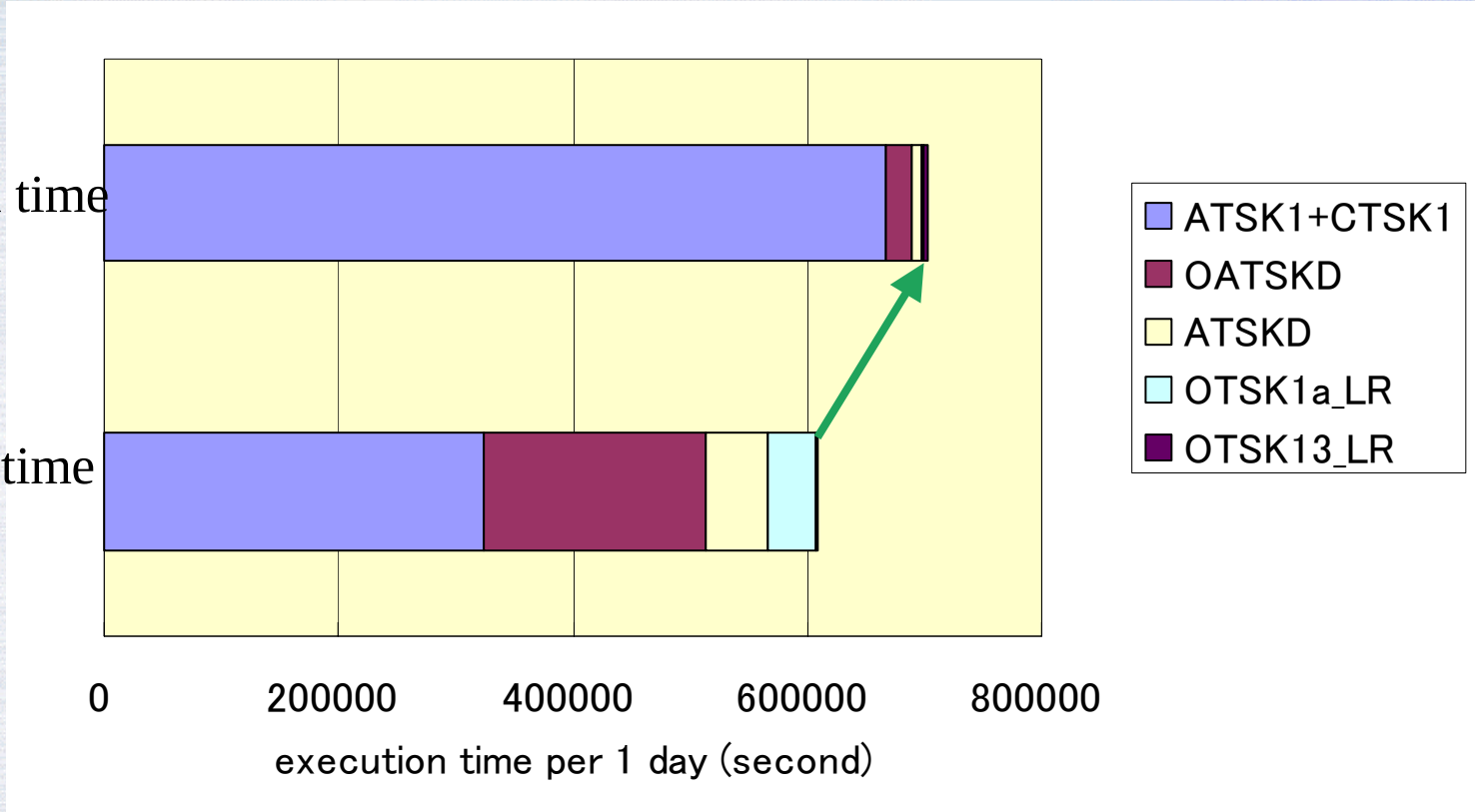
(1) Parameter name was different between system software and higher algorithm.
(2) Log function didn't work well after OS updating.
(3) Temporary file was left when algorithm was terminated by system software. (Temporary file should be deleted before termination)
(4) In some scene, algorithm illegally stopped.
etc.

Sample Image



Atmospheric Segment Data (1-day night scene composition, 0.25deg grid)
ch.30 (3.7μm) Radiance value
Used Data: GSD, Date: 2, Jun., 2000

Performance Result (tentative)

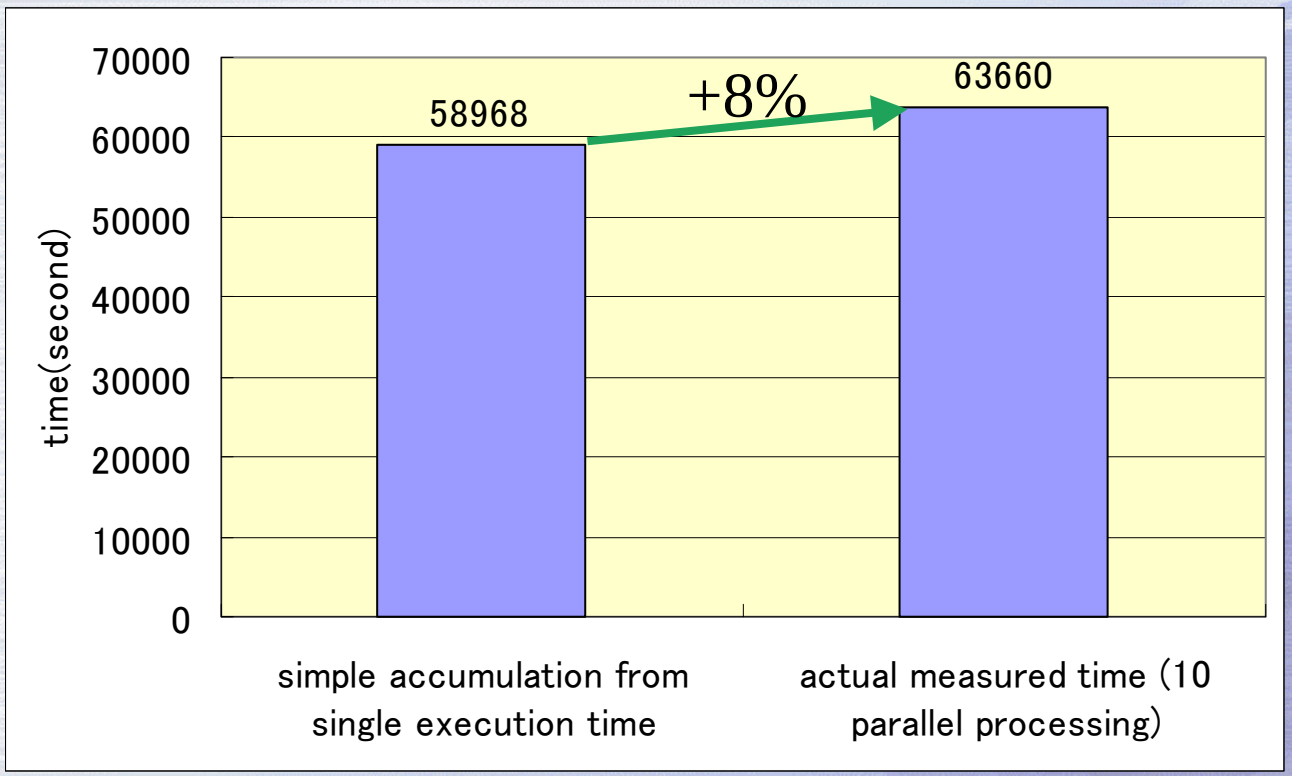


Total processing time becomes a little longer so far.
But we cannot judge it until all test is completed.

Multi-cpu processing evaluation (tentative)

[Condition]

10 ATSK1(cloud detection algorithm, scene by scene processing) were executed in parallel on same machine. It took 17hour 41min. for 1 day data.



It is getting worse only 8%

Good result, lower than our expectation

Future Plan (1/2)

a. Integration Tested TK version will be delivered soon.

b. Long-term Test (1 month or more) will be performed.

c. Various satellite operating pattern will be tested. (Tilt mode, Observation mode, Calibration mode, etc.)

Future Plan (2/2)

d. Various system operating pattern will be tested. (NRT / Planning processing / Ordering Processing / Reprocessing)

e. System test and Operational test will be done.

Conclusion

a. Level-2 and Level-2Map algorithms were successfully released on Apr. 2000.

b. All GLI higher algorithms were implemented to operational software.

c. Level-2 algorithms were optimized with GSD or MODIS data. We analyzed MODIS data and obtained some products.

d. Integration test are currently performed successfully. Tentative results were shown.

Contact Point

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