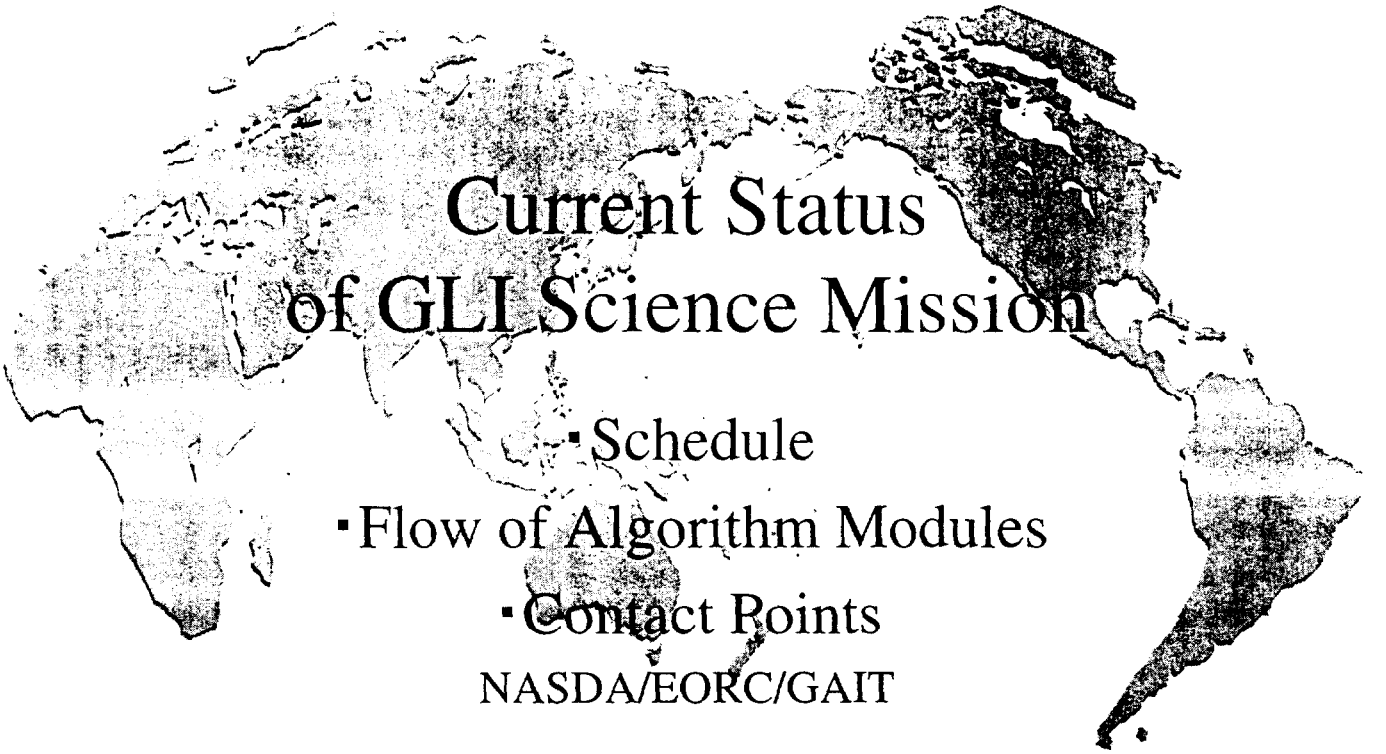


Current Status of GLI Science Mission

- Schedule
- Flow of Algorithm Modules
- Contact Points

NASDA/EORC/GAIT

NASDA

0. About GLI Mission

The GLI is an optical sensor designed to observe the atmosphere, ocean, land, and cryosphre.

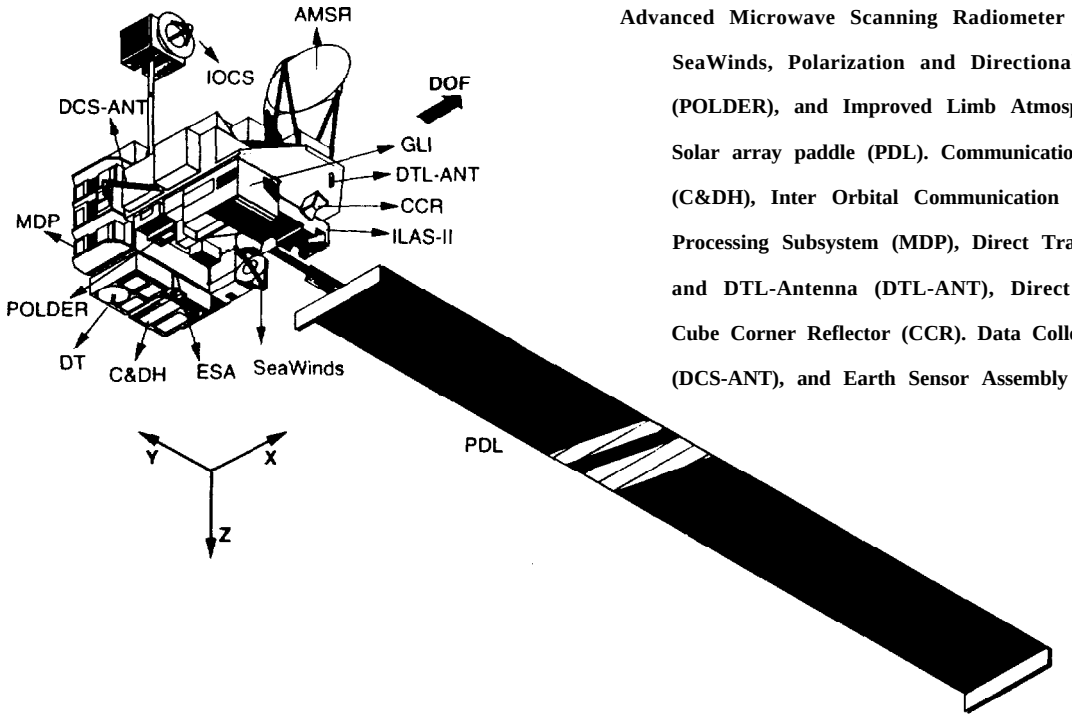
The GLI was first suggested by the Earth Environment Observation Committee (EEOC) of JAPAN in 1990.

NASDA has been developing this since 1993 as a general purpose medium spatial resolution visible-infrared imager to cover atmosphere and land observation as well as ocean color observations.

The GLI will be launched by NASDA H-2 rocket at Tanegashima Space Center in 1999.

NASDA

l-l ADEOS-II Satellite



Advanced Microwave Scanning Radiometer (AMSR), Global lmager (GLI), SeaWinds, Polarization and Directionality of the Earth's Reflectances (POLDER), and Improved Limb Atmospheric Spectrometer II (ILAS-II). Solar array paddle (PDL). Communications and Data Handling Subsystem (C&DH), Inter Orbital Communication Subsystem (IOCS), Mission Data Processing Subsystem (MDP), Direct Transmission for Local users (DTL) and DTL-Antenna (DTL-ANT), Direct Transmission Subsystem (DT), Cube Corner Reflector (CCR). Data Collecting System (DCS) and Antenna (DCS-ANT), and Earth Sensor Assembly (ESA).

NASDA

1-4 GLI Channel Specification

VNIR

(1km resolution)

ch1	380(10)	O A C
ch2	400(10)	O
ch3	412(10)	O
ch4p	443(10)	O L A C
ch5p	460(10)	O L A C
ch6	490(10)	O
ch7p	520(10)	O A C
ch8p	545(10)	O A C
ch9	565(10)	O L
ch10	625(10)	O
ch11	666(10)	O
ch12	680(10)	O
ch13	678(10)	L A C
ch14	710(10)	O
ch15	710(10)	L A C
ch16	749(10)	O
ch17	763(8)	L A
ch18	865(20)	O
ch19	865(10)	L A C

(p:piecewise linear)

(250m resolution)

ch20	460(70)	L A C
ch21	545(50)	L A C
ch22	660(60)	L A C
ch23	825(110)	L A C

unit [nm]

SWIR

(1km resolution)

ch24	1050(20)	L A C
ch25	1135(70)	A
ch26	1240(20)	L A C
ch27	1380(40)	A

(250m resolution)

ch28	1640(200)	L A C
ch29	2210(220)	L A C

unit [nm]

MTIR

(1km resolution)

ch30	3.715(0.33)	O A C
ch31	6.700(0.5)	A
ch32	7.300(0.5)	A
ch33	7.500(0.5)	A
ch34	8.600(0.5)	O L A C
ch35	10.80(1.0)	O L A C
ch36	12.00(1.0)	O L A C

unit [μm]

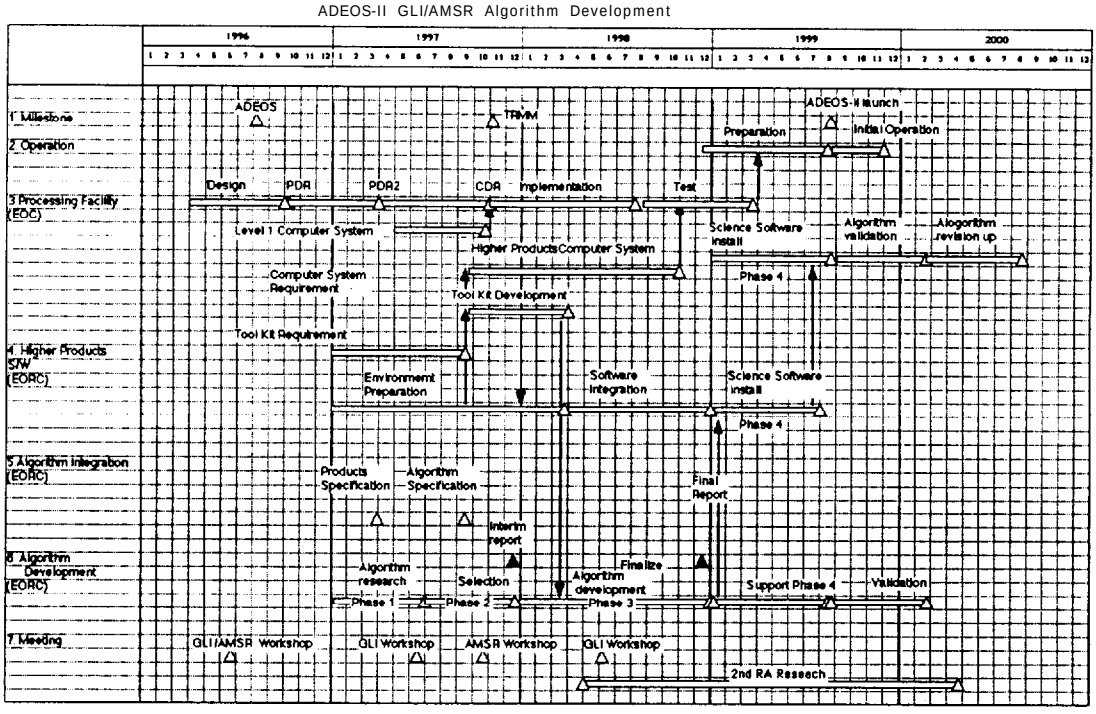
APPLICATION CODE	
O	: OCEAN
L	: LAND
A	:ATMOSPHERE
C	: CRYOSPHERE

Cross tracking scan	
Altitude	:803 km
Inclination	: 98.6 deg.
Swath width	:1600 km
Resolution	: 1 km
(subpoint)	: 250 m
Tilt angle	: 20 deg.
Period	: 101 min.
Recurrent Period	: 4 days
Local time	: 10:30AM
Data rate	:4.1Mbps

NASDA/GLI/GAIT

Earth Observation Research Center

2-2 GLI Project Schedule



Earth Observation Research Center

Categories of Products on GLI Science Mission

. ***Standard products*** (by fixed algorithms)

1. Production by planning

Processing all data,

Using 4-pixel/ line resampling data for Atmosphere and Ocean

Using 16-days composite data for Land and Cryosphere

2. Production by order

Processing only ordered data (10% of all data)

Using Full resolution (1km) data

3. *Research products* (by under research algorithms)

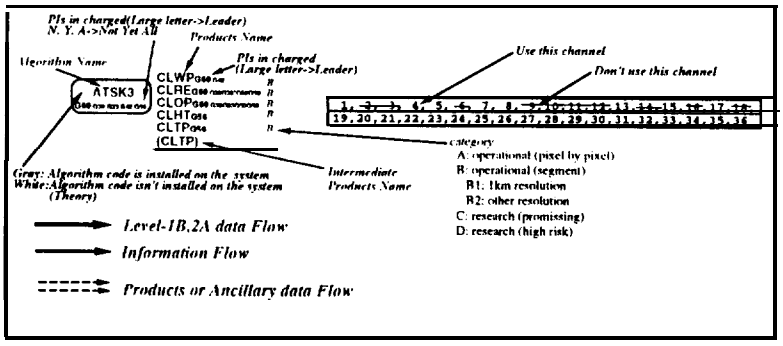
Production by manual operation at EORC

General Flow of Data and Algorithm modules

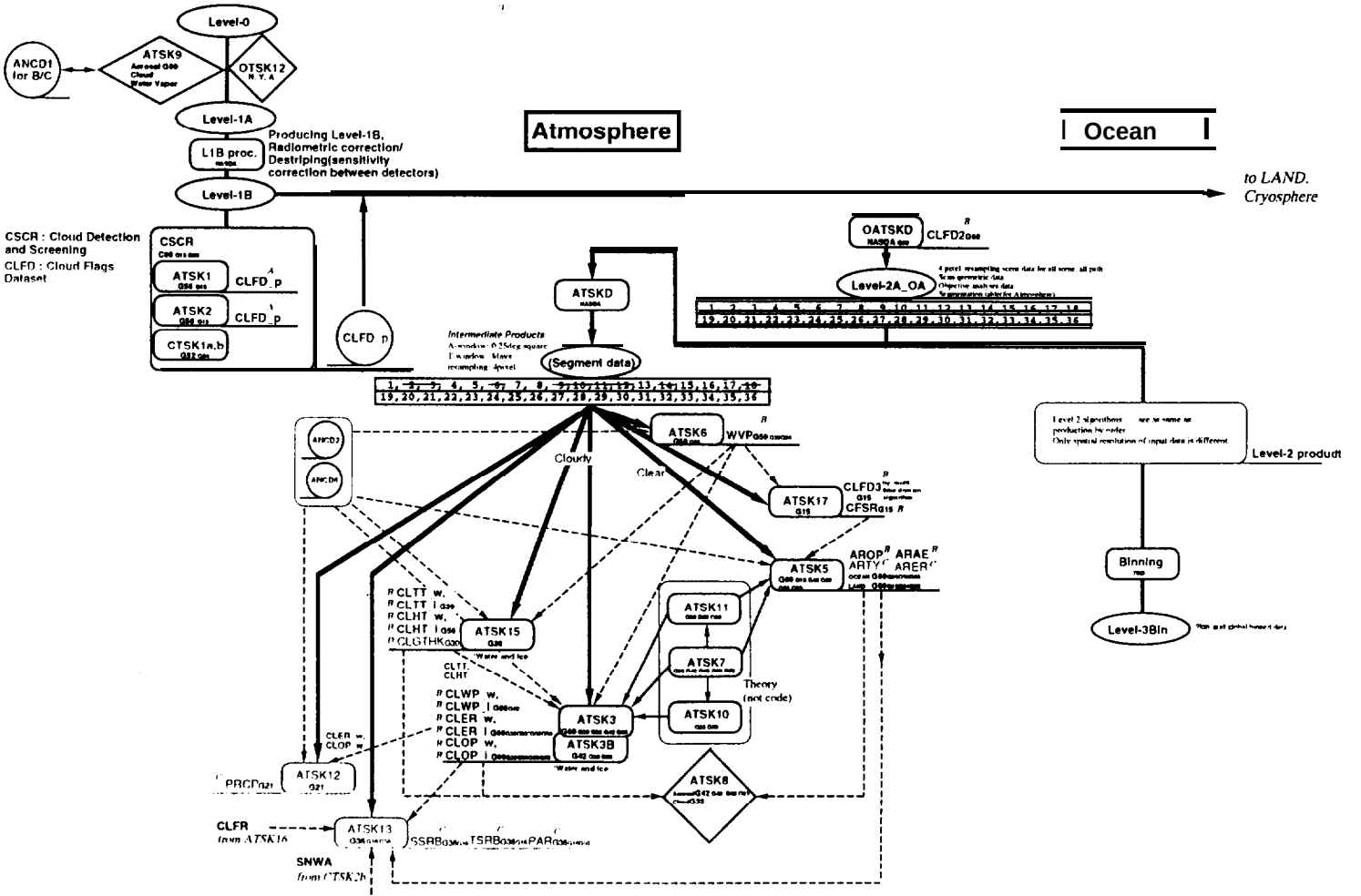
on GLI Science Mission (Ver. 1.8 by GAIT)

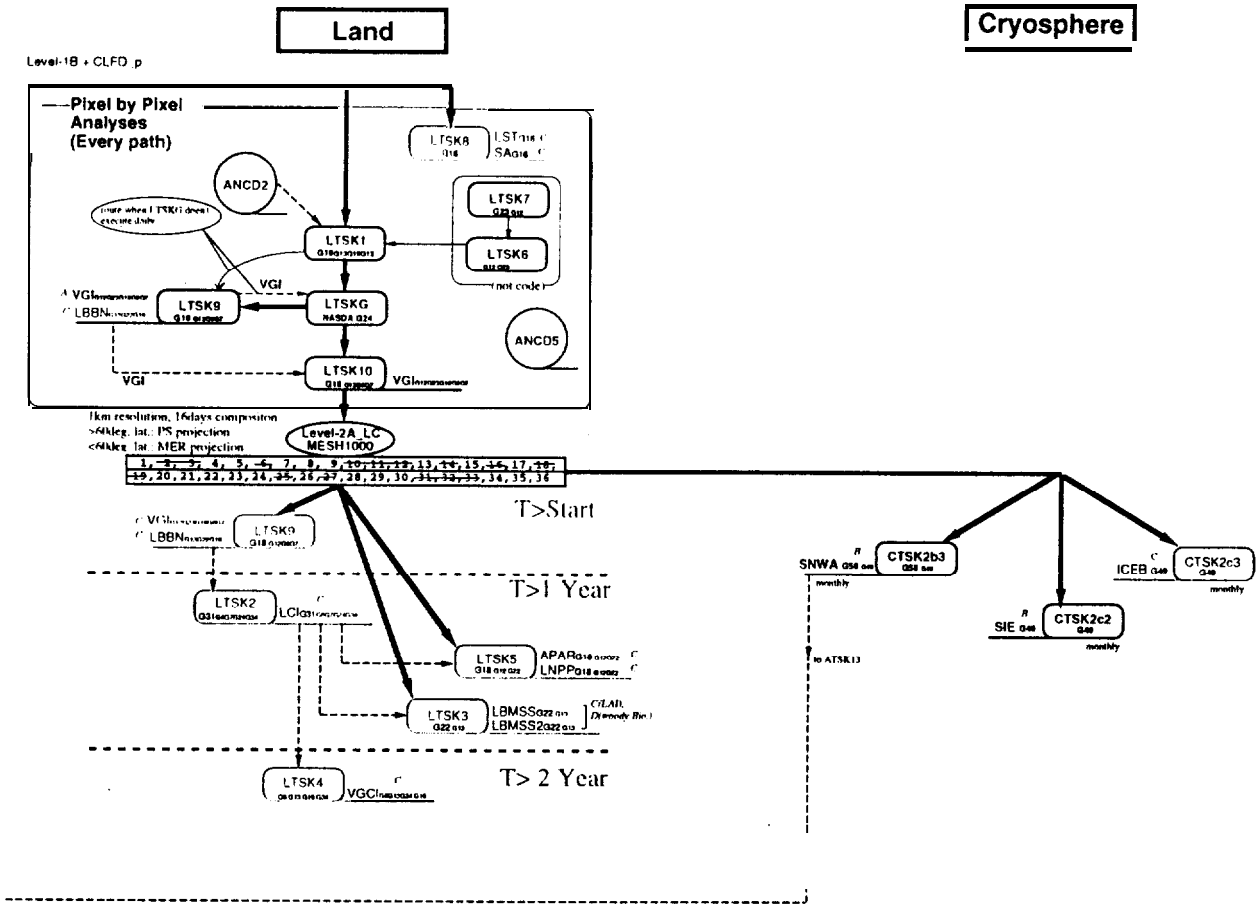
[production by planning)

<16 Sep., 1997>



http://www.eorc.nasda.go.jp/ADEOS-II/GLI/flo




Land
Cryosphere
Level-1B + CLFD .p
Pixel by Pixel Analyses (Every path)
LTSK8
ANCD2
LTSK7
LTSK1
LTSK6
(not code)
VGI
LTSK9
LTSKG
ANC05
LTSK10
VGI
1km resolution, 16days compositon
>64deg. lat.: PS projection
<64deg. lat.: MER projection
Level-2A_LC MESH1000
1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36
T>Start
LTSK9
T>1 Year
LTSK2
LTSK5
LTSK3
LBMSS
T> 2 Year
LTSK4
SNWA
CTSK2b3
monthly
ICEB
CTSK2c3
monthly
SIE
CTSK2c2
monthly
to ATSK13

Atmosphere

(PI Name)

- G15 Vonder
- G16 Prata
- G21 Rosenfeld
- G30 Kuji
- G33 Isaka
- G36 Pinker
- G42 Takamura
- G43 Ohta
- G50 Uchiyama
- G56 King
- G60 Nakajima
- G63 Shi

(Products Code)

ARAE	Aerosol angstrom exponent
ARER	Aerosol effective radius
AROP	Aerosol optical thickness
ARTY	Aerosol type
CFSR	Cloud free shortwave radiation
CLER_w/i	Cloud effective particle radius(_w:water cloud, _i:ice cloud)
CLFD_p	Cloud flags dataset(pixel by pixel)
CLFD2.3	Cloud flags dataset
CLFR_p	Cloud fraction(pixel by pixel)
CLFR	Cloud fraction
CLGTHK	Cloud geometrical thickness
CLHT_w/i	Cloud top height(_w:water cloud, _i:ice cloud)
CLOP_p	Cloud optical thickness(pixel by pixel)
CLOP_w/i	Cloud optical thickness(_w:water cloud, _i:ice cloud)
CLPS	Cloud phase)
CLTT_p	Cloud top temperature(pixel by pixel)
CLTT_w/i	Cloud top temperature(_w:water cloud, _i:ice cloud)
CLTY_p	Cloud type
CLWP_w/i	Cloud liquid/ice water path(_w:water cloud, _i:ice cloud)
PAR	Photosynthetically active radiation(downward and upward flux)
PRCP	Precipitation
SSRB	Surface shortwave radiation budget (downward and upward fluxes)
TSRB	TOA shortwave radiation budget(downward and upward fluxes)
WVP_p	Column water vapor amount(pixel by pixel)
WVP	Column water vapor amount

(Algorithm Code)

ATSK1	Algorithms for identifying clear sky region
ATSK2	Algorithms for identifying cloudy region
ATSK3_p	Retrieval algorithms of cloud parameters(pixel by pixel)
ATSK3	Retrieval algorithms of cloud parameters(segment)
ATSK3B	Correction algorithm for broken clouds
ATSK4_p	Algorithms for identifying the water/ice cloud and phase(pixel by pixel)
ATSK5	Retrieval algorithms of aerosol parameters
ATSK6_p	Retrieval algorithms of water vapor amount(pixel by pixel)
ATSK6	Retrieval algorithms of water vapor amount(segment)
ATSK7	Studies of optical parameters appearing in radiative transfer processes
ATSK8	Ground based measurements of cloud/aerosol parameters
ATSK9	Ground-based support measurements for vicarious calibration
ATSK10	Radiative transfer theory of broken cloud systems
ATSK11	Non-spherical scattering theory
ATSK12	Correlation between ATSK3(or ATSK3B) and Precipiation
ATSK13	ERB(Earth Radiation Budget)
ATSK14_p	Texture analyses
ATSK15	Estimating CLTT,CLHT,CLGTHK(segment)
ATSK15_p	Estimating CLTT(pixel by pixel)
ATSK16	Algorithms for cloud fraction
ATSK17	Multi-time domain cloud screening algorithm
ATSKD	Data segmentation algorithm for atmosphere

Ocean

(PI Name)

- G03 Barton
- G11 Taguchi
- G14 Abbott
- G15 Vonder
- G20 Michell
- G35 Frouin
- G56 King
- G59 Kishino
- G62 Cota
- G65 Fukushima
- G68 Kawamura

(Products Code)

AP	Absorption coefficient of suspended particles
APH	Absorption coefficient of phytoplankton
CAROT	Carotinoid
CDOM	Absorption of colored dissolved organic matter
CHLA	Chlorophyll-a(including CZCS-like pigment)
COCCO	Coccolithophoridae
FLUO	Fluorescence intensity
K490	Attenuation coefficient at 490nm
NWLR	Normalized water-leaving radiance(12bands and aerosol radiances(5bands), 0.670(NIL), i.e. at 865nm)
ONPP	Primary production by chlorophyll-a method
PAR	Photosynthetically active radiation
PHYCO	Phycobilin
QF_OC	Quality flag for ocean color
QF_ST	Quality flag for SST
SS	Suspended solid weight
SST_s	Skin Sea surface temperature
SST_b	Bulk Sea surface temperature
TRICO	Tricodesmium

(Algorithm Code)

OTSK1	Atmospheric correction algorithm
OTSK2	Chlorophyll-a algorithm
OTSK3	Accessory pigment algorithm
OTSK4a	Ecosystem model algorithm
OTSK4b	Primary production algorithm (Natural fluorescence method)
OTSK5	K490 algorithm
OTSK6	Suspended solid algorithm
OTSK7	Colored dissolved organic matter algorithm
OTSK8	In-water optical measurements
OTSK9	Study of in-water optical parameters
OTSK10	Measurements for atmospheric correction
OTSK11	In situ SST measurements
OTSK12	Vicarious calibration measurements
OTSK13	SST(bulk) Algorithm
OTSK14	Algorithms for estimating PAR
OTSK15	··· (unified to OTSK13)
OTSK16	SST(surface) Algorithm
OTSK17	TRICHO Algorithm
OTSK18	COCCO Algorithm
OSTK19	AP and APH Algorithm
OATSKD	Data processing for Level-2A_OA(resampling, etc)

Land

(PI Name)

- G06 Fujiwara
- G07 Duong
- G12 Verstraete
- G13 Hock
- G16 Prata
- G18 Huete
- G19 Trotter
- G22 Awaya
- G23 Kajiwara
- G24 Honda
- G31 Tateishi
- G34 Yasuoka
- G36 Pinker

(Products Code)

APAR	: Absorbed photosynthetically active radiation
LBBN	: Biomass burning index
LBMSS	: Biomass carbon amount
LBMSS2	: Precise biomass
LCI	: Land cover type
LNPP	: Net primary production
LST	: Land surface temperature-1km? Research?
MSH1000	: 1km meshed data
SA	: Spectral albedo
VGCI	: Vegetation change index
VGI	: Vegetation index

(Algorithm Code)

- LTSK1 Algorithms for atmospheric correction and reflectance
- LTSK2 Algorithms for classification of vegetation and land cover
- LTSK3 Algorithms for estimation of biomass and carbon amount
- LTSK4 Algorithms for detection of vegetation changes
- LTSK5 Algorithms for estimating APAR, primary production, and improved monthly vegetation biomass
- LTSK6 Measurements of BDRF of vegetation
- LTSK7 Development of standard spectral vegetation reflectance measurement methods
- LTSK8 Land surface temperature algorithm
- LTSK9 Vegetation Index Algorithm
- LTSK10 Mosaicing Algorithm
- LTSK0 Precise geographical position

Cryosphere

(PI Name)

- G49 Oishi
- G52 Stammes
- G54 Zege
- G58 Aoki
- G67 Schneider

(Products Code)

AMCD	AMSA combined data
AOS	: Aerosol properties over snow and ice
COS	: Cloud properties over snow and ice
ICEB	: Iceberg monitoring
ICES	: Icesheet monitoring
PAC	: Spectrally-Integrated planetary albedo
PAR	: Photosynthetic active radiation
SAC	: Spectrally-Integrated surface albedo
SIC	: Sea ice classification
SIE	: Sea ice edge monitoring
SNWA	: Snow covered area
SNWG	: Snow grain size
SNWI	: Snow impurities
SPA	: Spectral planetary albedo
SRB	: Solar Radiation Budget at TOA and St
SSA	: Spectral surface albedo
STC	: Surface temperature in cryosphere

(Algorithm Code)

CTSK1	: Cloud detection algorithm (1a cloud/snow discriminator,1b snow/ice discriminator)
CTSK2a1	: Algorithm for Spectrally-Integrated Surface albedo
CTSK2a2	: Algorithm for Spectral surface albedo
CTSK2a3	: Algorithm for Spectrally-Integrated planetary albedo
CTSK2a4	: Algorithm for Spectral planetary albedo
CTSK2b1	: Algorithm for snow grain size
CTSK2b2	: Algorithm for snow impurities
CTSK2b3	: Algorithm for Snow covered area
CTSK2c1	: Algorithm for Sea ice classification
CTSK2c2	: Algorithm for ice covered area
CTSK2c3	: Algorithm for Iceberg monitoring
CTSK2c4	: Algorithm for Icesheet monitoring
CTSK2d	: Algorithm for Surface temperature in cryosphere
CTSK2e	: Algorithm for Aerosol properties over snow and ice
CTSK2f	: Algorithm for Photosynthetic active radiation
CTSK3	: Algorithm for cloud properties over snow and ice
CTSK4	: Algorithm for Solar Radiation Budget at TOA and Surface
CTSK5	: Algorithm for AMSR combined data

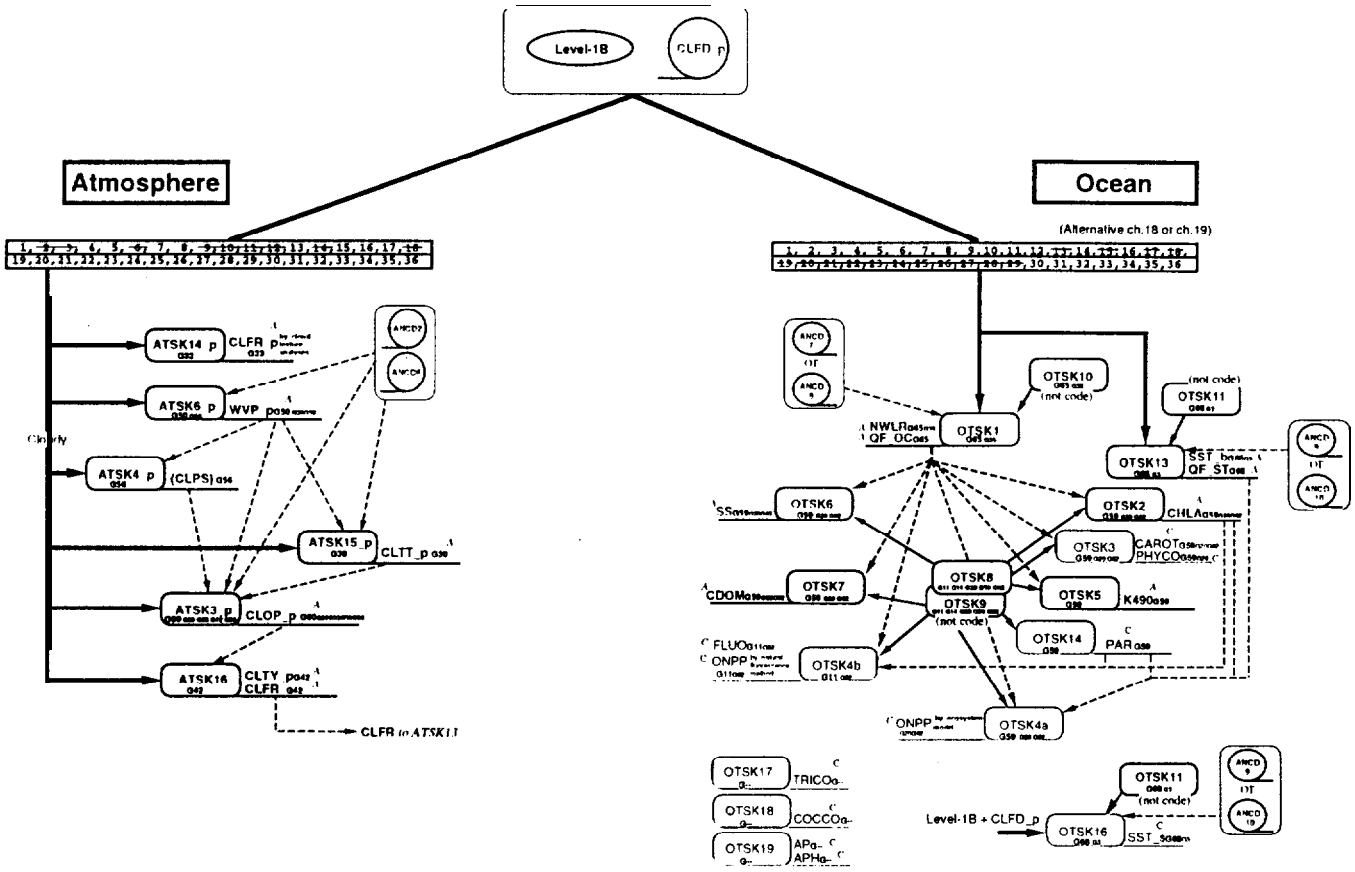
(Ancillary Data)

- ANCD1 Ancillary Data for vicarious calibration
- ANCD2 Ancillary Data
  - (T(0), T(7)) from the Objective Analyses
- ANCD3 Ancillary Data
  - AMSR data
- ANCD4 ····
- ANCD5 Ancillary Data
  - Digital Elevation Data
- ANCD6 Ancillary Data
  - O3 from TOMS
- ANCD7 Ancillary Data
  - total ozon, sea surface pressure/wind/temperature, air temperature from Objective Analyses
- ANCD8 Ancillary Data
  - total ozon, sea surface pressure/wind/temperature, air temperature from TOMS, SeaWinds, etc.
- ANCD9 Ancillary Data
  - sea surface wind from Objective Analyses
- ANCD10 Ancillary Data
  - sea surface wind from SeaWinds
- CLFD Cloud Flags Dataset

General Flow of Data and Algorithm modules on GLI Science Mission (Ver1.8 by GAIT)

[production by order]

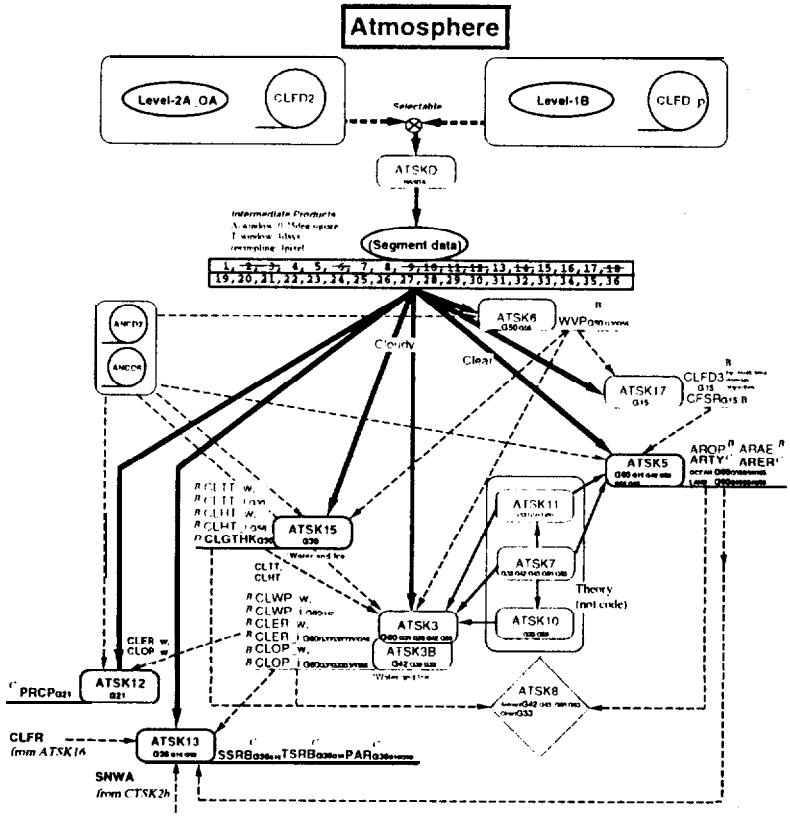
<16 Sep., 1997>

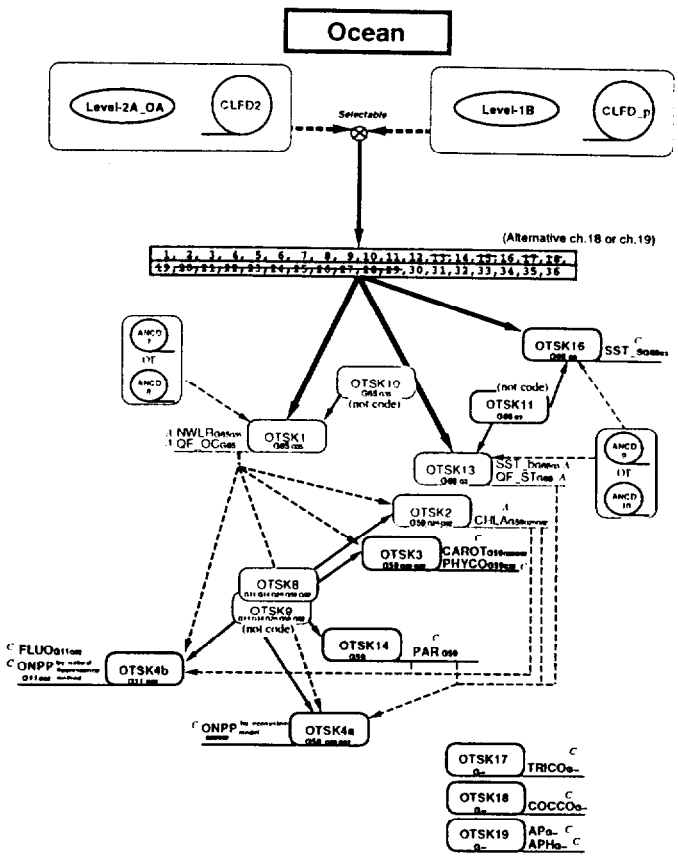


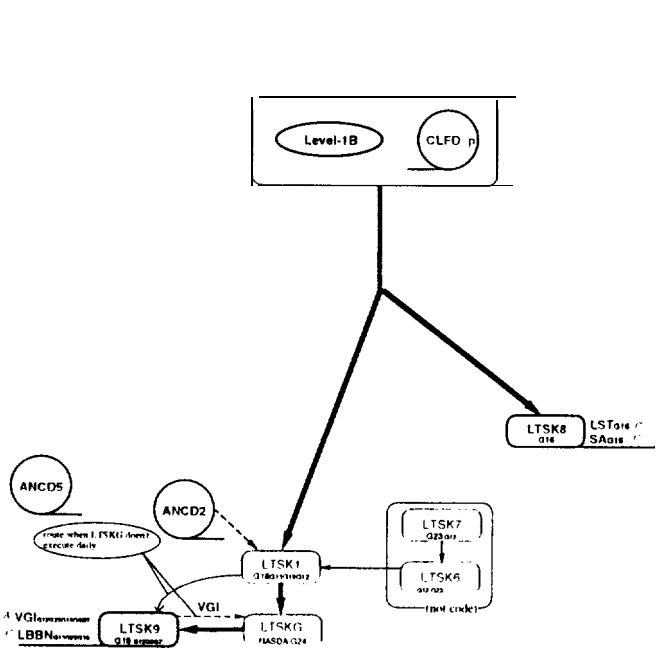
General Flow of Data and Algorithm modules on GLI Science Mission (Ver. 1.8 by GAIT)

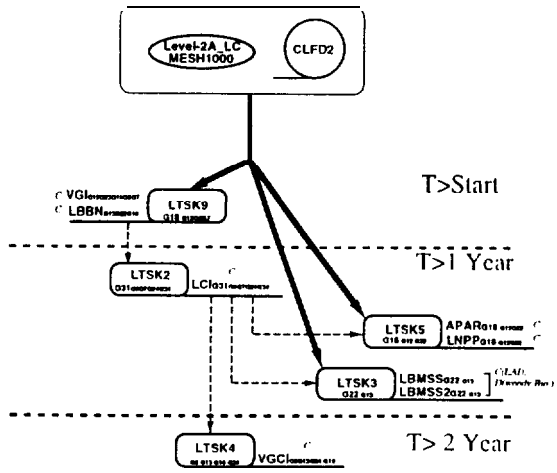
[Flow in EORC (Research products)]

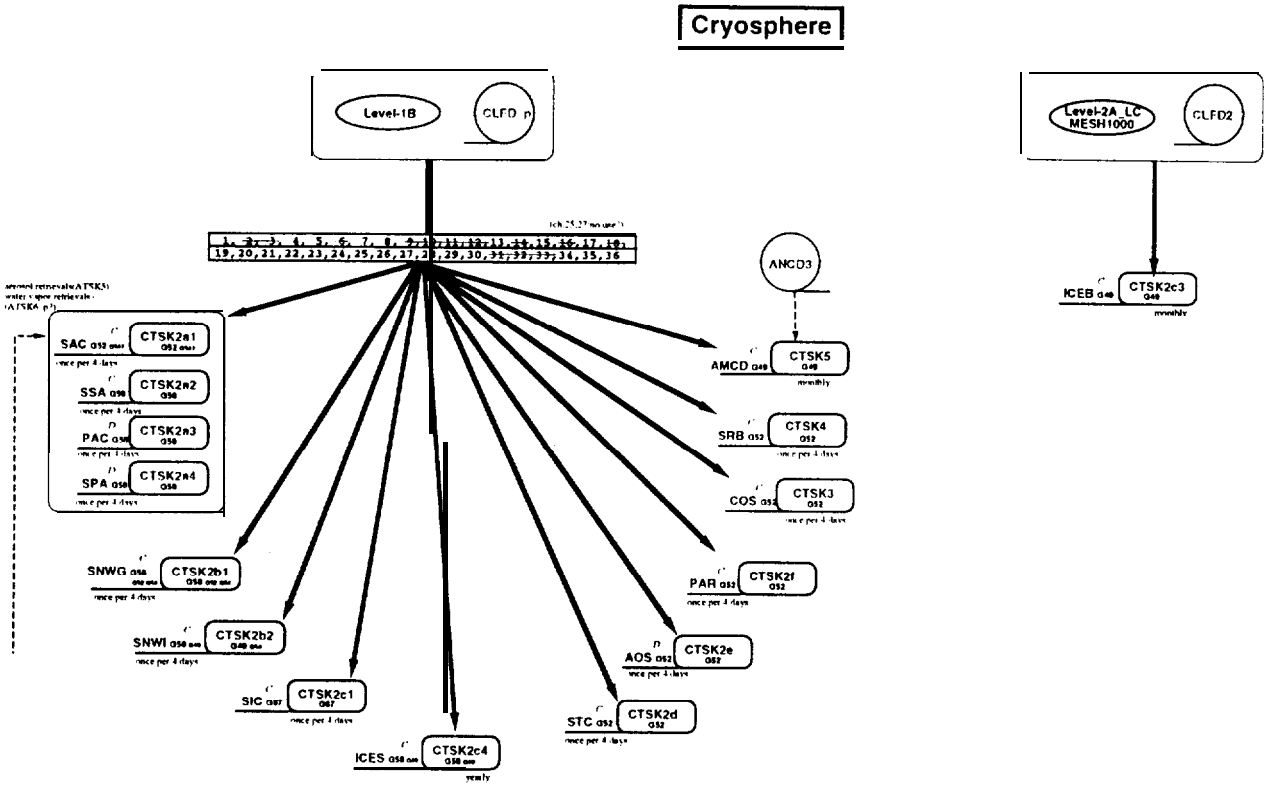
<16 Sep.,1997>





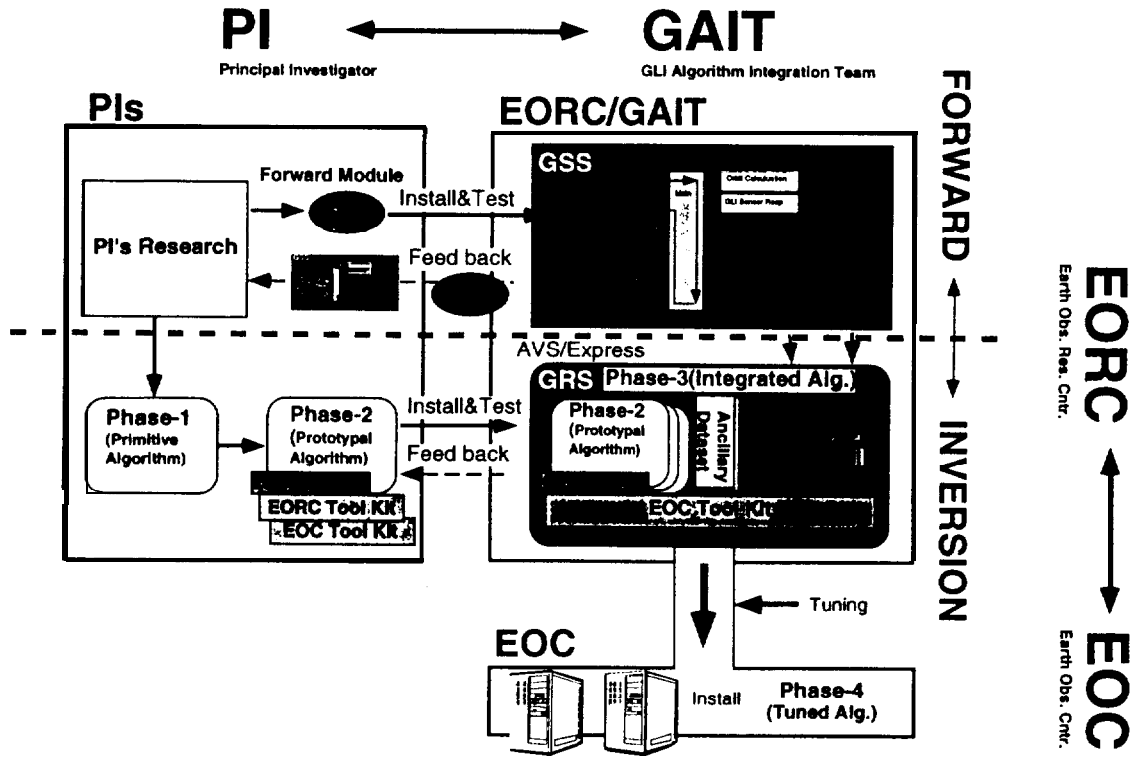




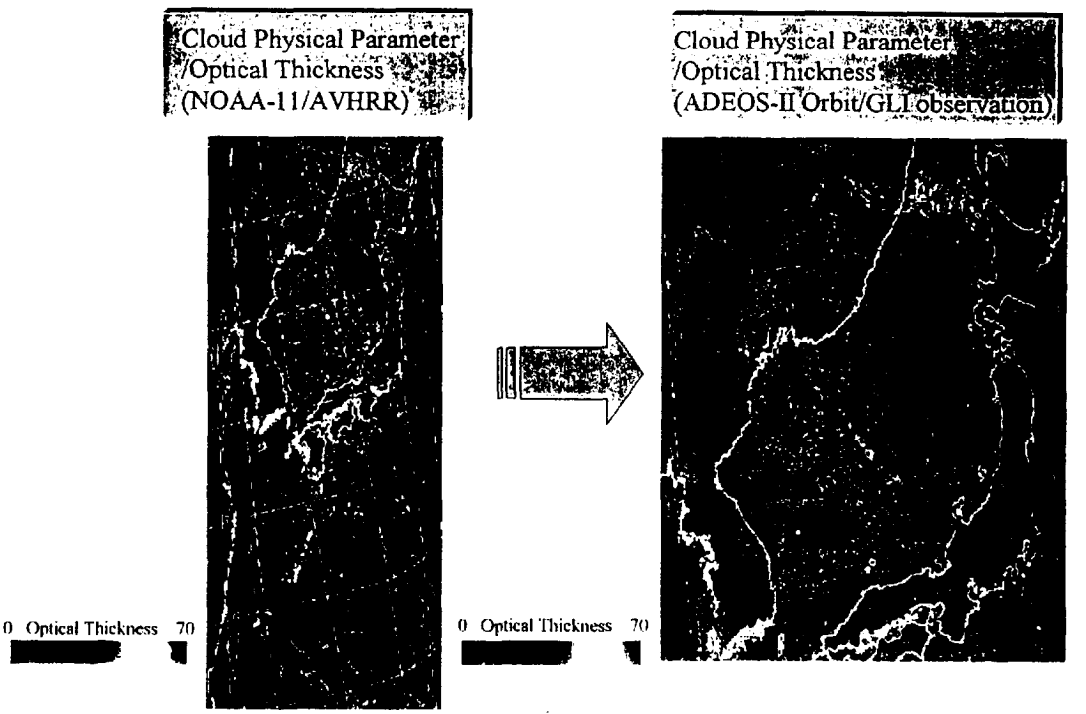


NASDA

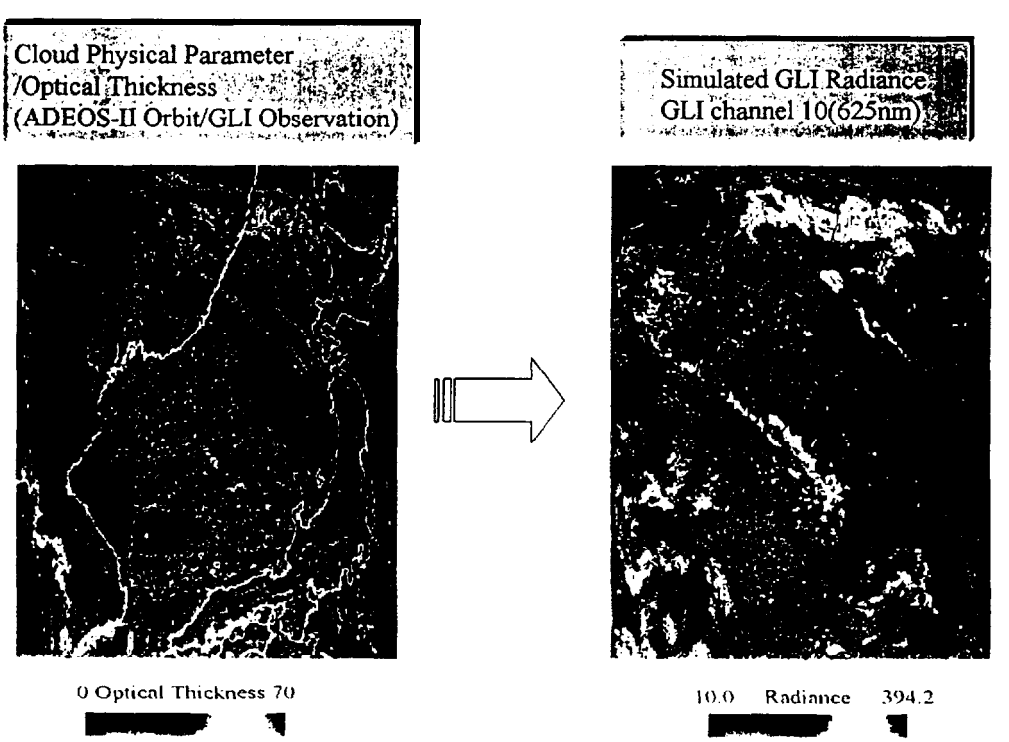
4-6 Forward and Inversion Modules



4-8 GLI Synthetic Data(AVHRR to GLI)

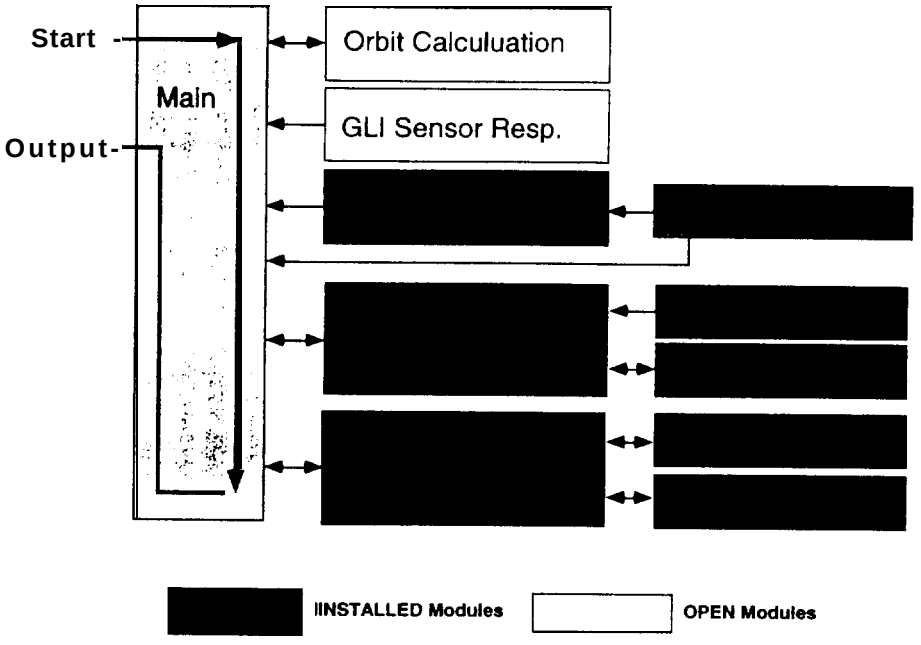


4-8 GLI Synthetic Data(C.P. to Radiance)



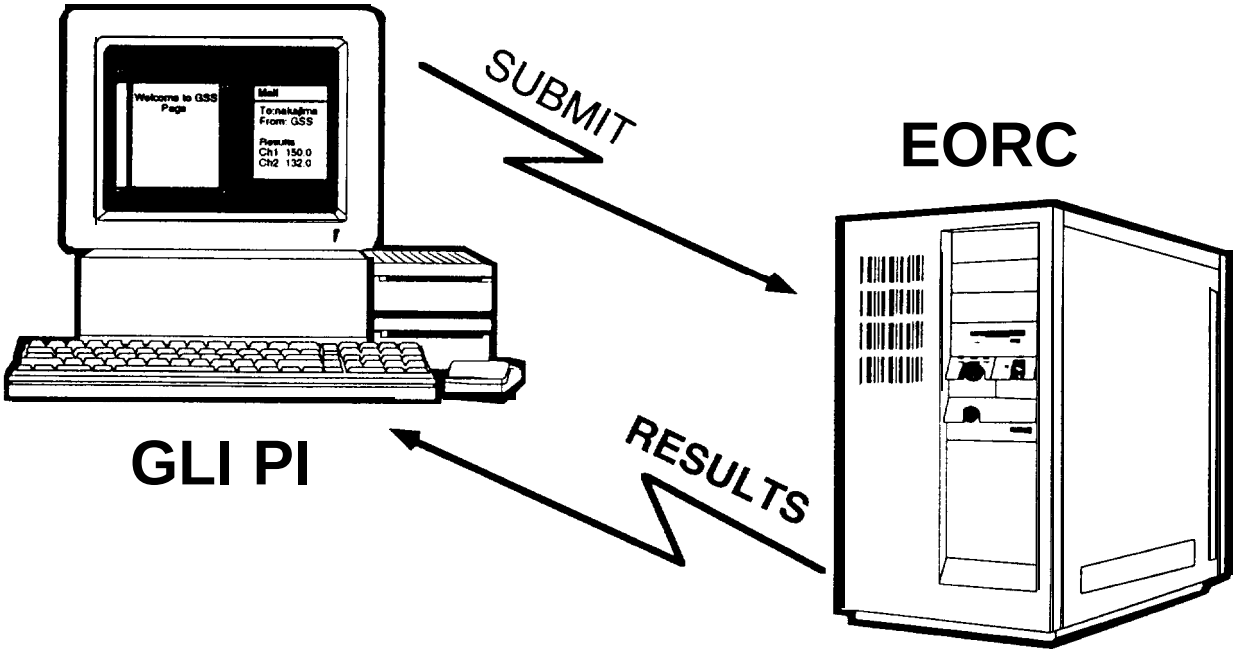
4-4 GLI Signal Simulator (GSS)

Current Structure of the GSS on WWW

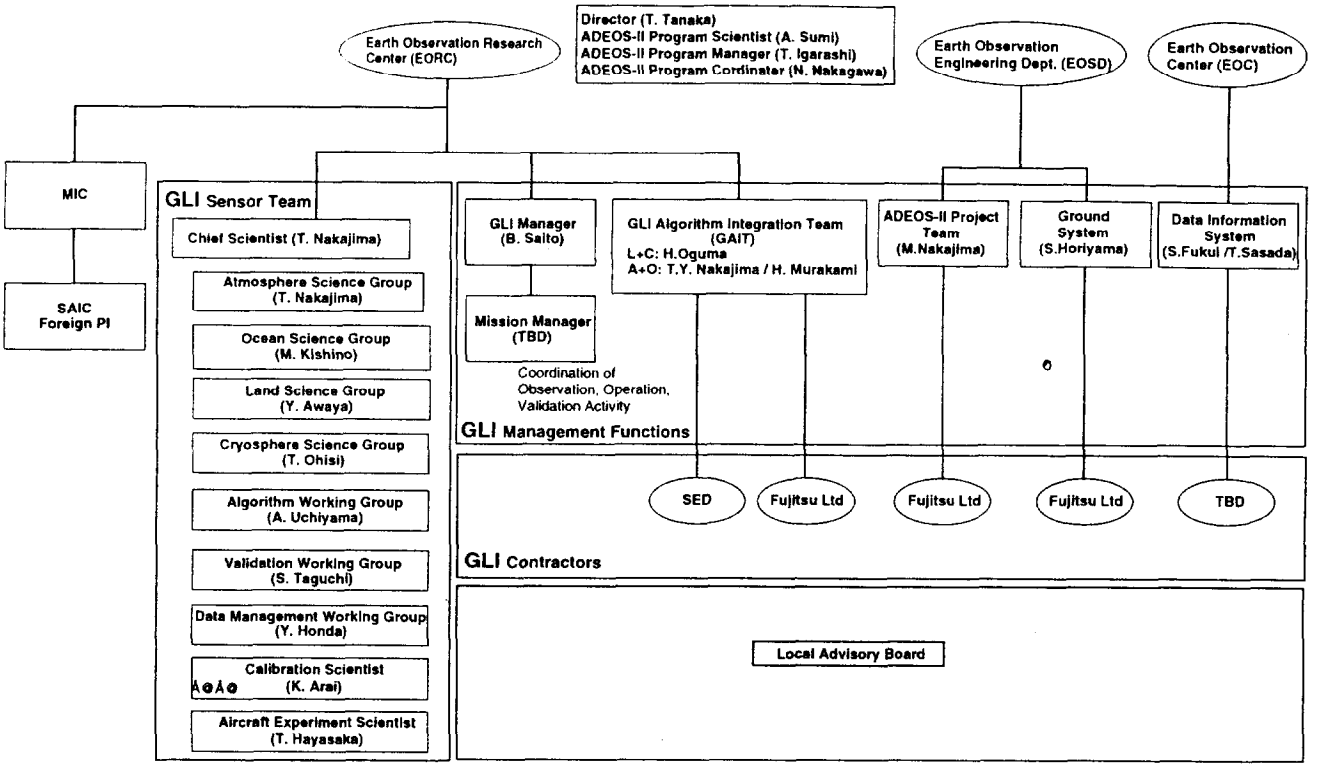
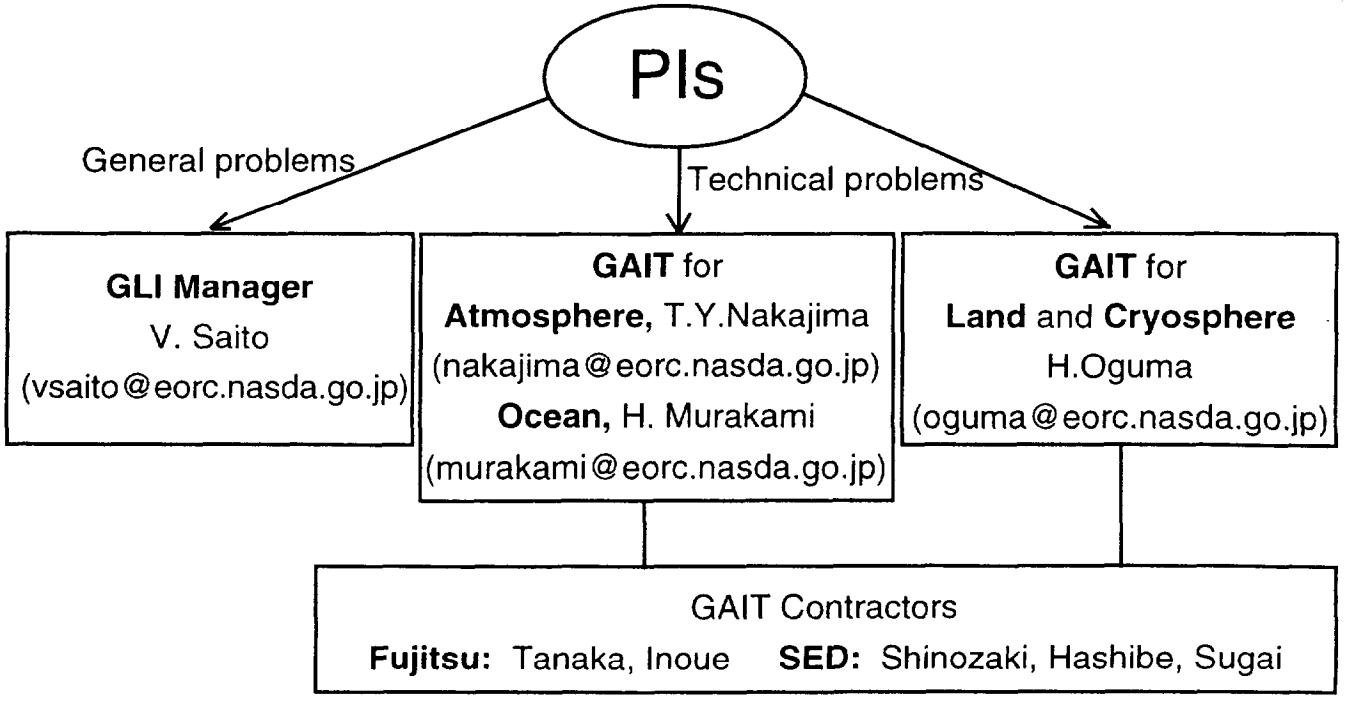


4-5 GSS on Web Page

http://www.eorc.nasda.go.jp/ADEOS-II/GLI/gli.html



2-l GLI Project Organization



2-3 Contact Persons in NASDA EORC