

**CURRENT STATUS  
OF  
GLOBAL IMAGER  
(GLI)**

# SATELLITES 地球観測衛星計画

現在から2010年までに必要な観測センサを適切な軌道に打上げるための日本の地球観測衛星計画を立案しています。

この地球観測衛星計画を立案する上で、観測センサの

ミッションと研究開発状況とを考慮しました。

今後は、世界各国の地球観測衛星計画と調整を図り、最適な計画にしていく予定です。

We plan a Japanese Earth observation program in which needed sensors will be put into suitable orbits from now to 2010. In order to plan this program, we considered the mission and the status of observation

sensors R & D.

We seek to develop the most suitable which will complement other countries' observation programs.

観測	Observation	1995	2000	2005	2010														
グローバル観測 (太陽同期/中高度) 大型	Global Observation (sun synchronous, /moderate altitude) Large bus		<table border="1"> <tr> <td colspan="3">ADEOS</td> <td colspan="2">ADEOS-II</td> <td colspan="2">ADEOS-III</td> </tr> <tr> <td>OCTS AVNIR</td> <td>IMG ILAS NSCAT</td> <td>RIS TOMS POLDER</td> <td>AMSR GLI</td> <td>ILAS-2 Sea-Winds POLDER-2 (TOMS)</td> <td>AMSR-2 GLI-2</td> <td>TERSE TOMUIS Sea-Winds</td> </tr> </table>	ADEOS			ADEOS-II		ADEOS-III		OCTS AVNIR	IMG ILAS NSCAT	RIS TOMS POLDER	AMSR GLI	ILAS-2 Sea-Winds POLDER-2 (TOMS)	AMSR-2 GLI-2	TERSE TOMUIS Sea-Winds		
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陸域詳細観測 (太陽同期/低高度) 中型	Regional Land Observation (sun synchronous, /low altitude) Medium bus			<table border="1"> <tr> <td colspan="2">HIROS-I</td> <td colspan="2">HIROS-II</td> </tr> <tr> <td colspan="2">AVNIR-2 NSAR</td> <td colspan="2">AVNIR-3 NSAR-2 LALT</td> </tr> </table>	HIROS-I		HIROS-II		AVNIR-2 NSAR		AVNIR-3 NSAR-2 LALT								
HIROS-I		HIROS-II																	
AVNIR-2 NSAR		AVNIR-3 NSAR-2 LALT																	
時局変化観測 (太陽非同期/傾斜/ 低~中高度) 小~中型	Diurnal cycle Observation (low~high inclination /low~moderate altitude) Small~medium bus	赤道~低緯度域 (TRMM IIミッション以降では赤道~ 中緯度域)のエネルギー、水循環観測  Water cycle and energy observation in equator~low latitude(~moderate latitude for TRMM II missions)region	<table border="1"> <tr> <td colspan="2">TRMM</td> <td colspan="2">TRMM-II</td> <td colspan="2">TRMM-III</td> </tr> <tr> <td>PR</td> <td>TMI CERES LIS</td> <td>PR-2 TMI-2</td> <td>VIRS-2 CERES</td> <td colspan="2">CPR(non-scan)</td> </tr> </table>	TRMM		TRMM-II		TRMM-III		PR	TMI CERES LIS	PR-2 TMI-2	VIRS-2 CERES	CPR(non-scan)					
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静止環境観測 (静止軌道) 大型	Geostationary Observation (geostationary orbit) Large bus			<table border="1"> <tr> <td colspan="2">ATMOS-I</td> <td colspan="2">ATMOS-II</td> </tr> <tr> <td>HLAS MILES</td> <td>LIDAR IMG-2</td> <td colspan="2">(CERES)</td> </tr> </table>	ATMOS-I		ATMOS-II		HLAS MILES	LIDAR IMG-2	(CERES)								
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J-1実験観測 小型	J-1 Experimental Observation Small bus		<table border="1"> <tr> <td colspan="2">赤道~中緯度域の 大気循環、大気成分観測</td> <td colspan="2">Atmospheric dynamics and chemistry in equator~ moderate latitude region</td> </tr> </table>	赤道~中緯度域の 大気循環、大気成分観測		Atmospheric dynamics and chemistry in equator~ moderate latitude region		<table border="1"> <tr> <td colspan="2">GEOS-I</td> <td colspan="2">GEOS-II</td> </tr> <tr> <td colspan="2">GEOMER-1 MILIS-1</td> <td colspan="2">GEOMER-2 MILIS-2</td> </tr> </table>	GEOS-I		GEOS-II		GEOMER-1 MILIS-1		GEOMER-2 MILIS-2				
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JEM実験観測 (太陽非同期/低高度)	JEM (low inclination /low altitude)		<table border="1"> <tr> <td colspan="6">J-1実験ミッション J-1 Experimental Mission</td> </tr> <tr> <td>LIDAR</td> <td>MILES</td> <td>TERSE</td> <td>DIAL</td> <td>ADALT</td> <td>JLAWS</td> </tr> </table>	J-1実験ミッション J-1 Experimental Mission						LIDAR	MILES	TERSE	DIAL	ADALT	JLAWS				
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LIDAR	MILES	TERSE	DIAL	ADALT	JLAWS														
その他	Others		<table border="1"> <tr> <td colspan="2">J-1実験ミッション J-1 Experimental Mission</td> <td colspan="2">0°傾斜角/高高度ミッション Zero inclination/high altitude mission</td> </tr> <tr> <td colspan="2">ILAS-2</td> <td colspan="2">GLI</td> </tr> </table>	J-1実験ミッション J-1 Experimental Mission		0°傾斜角/高高度ミッション Zero inclination/high altitude mission		ILAS-2		GLI		<table border="1"> <tr> <td colspan="2">海洋ダイナミクスミッション 太陽非同期/傾斜/高高度 Ocean dynamic mission high inclination/high altitude</td> </tr> <tr> <td colspan="2">ADALT</td> </tr> </table>	海洋ダイナミクスミッション 太陽非同期/傾斜/高高度 Ocean dynamic mission high inclination/high altitude		ADALT				
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ADALT																			

\*-2,-3等は、同等、もしくは改良を施した同型後継センサであることを示す Italic: 外国衛星もしくは外国センサ

表中の衛星名、センサ名はテンポラリなものであり今後、国際調整等を踏まえ、決定する

\*-2,-3 etc. Same one or improved Italic: International cooperation

The names of satellites and sensors are temporary

CPR: Cloud Profiling Radar

GEOMER: GEostationary Meteorological and Environmental Radiometer

LALT: Laser ALTimeter

MILIS: MILLimeter Sounder

(参考資料) FY4 地球環境観測委員会報告書  
REFERENCE: '92 Earth Environment Observati

# Outline of ADEOS-II Program



## 2. Characteristics

### NASDA instruments

- **AMSR** (Advanced Microwave Scanning Radiometer)
- **GLI** (Global Imager)
- **DCS** (Data Collection System )

### Other agency instruments (Updated base line)

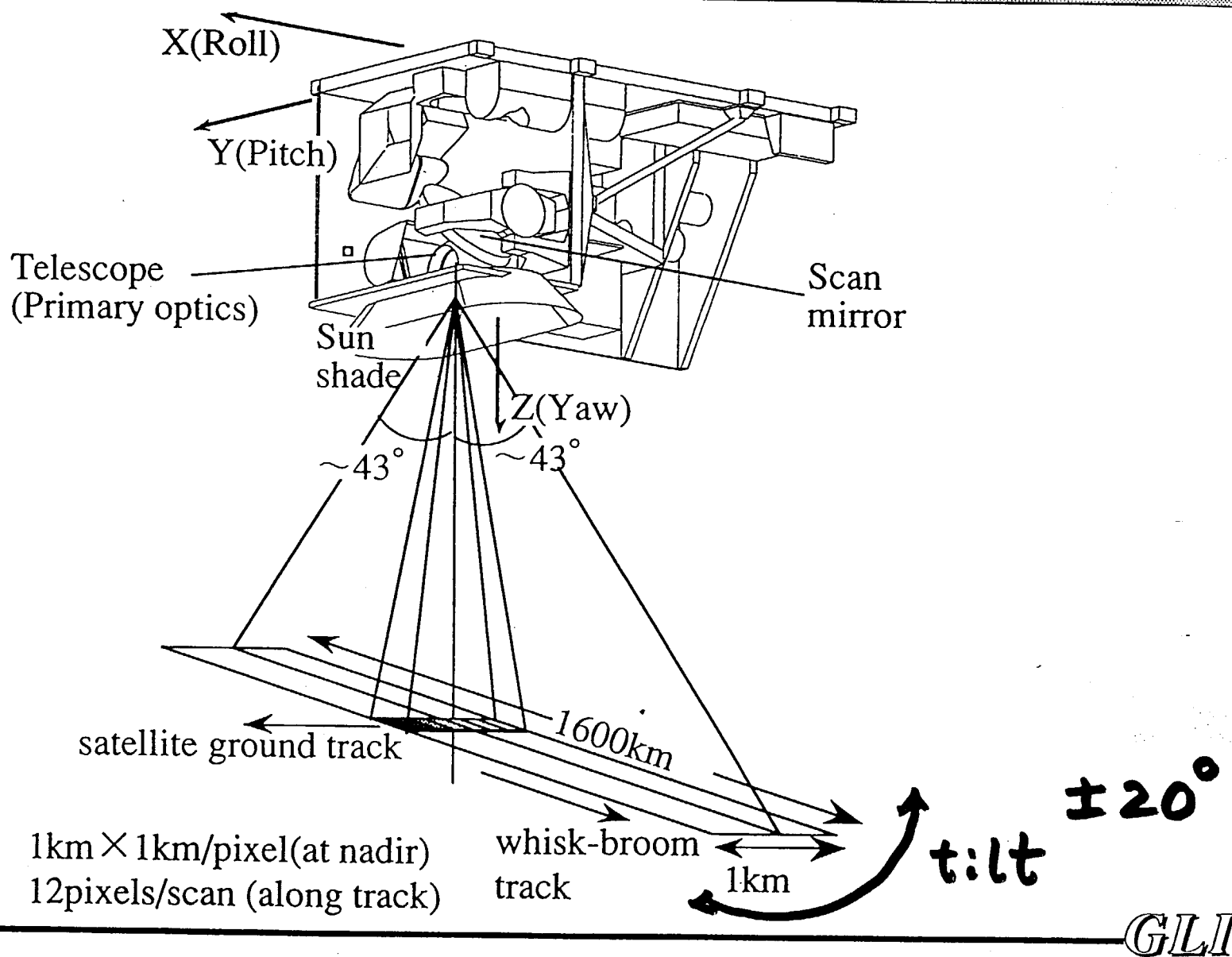
- **ILAS-II** (Improved Limb Atmospheric Spectrometer:JER)
- **SeaWinds** (Modified NSCAT : NASA/JPL)
- **POLDER**  
(Polarization and Directionality of the Earth's Reflectances:CNES)

# Main Characteristics of ADEOS-II S/C (Phase-A<sup>+</sup> Baseline)



Total Weight	Approx. 3.5 ton
Mission Payload	Approx. 1.2 ton
Generate Power	5.0kW at EOL (Approx. 1.2kW for mission instruments)
Life	3 years design ( 5 years fuel )
Orbit	Sun Synchronous Subreccurent
Altitude	Approx. 802.92 km
Inclination	Approx. 98.62 deg
Period	Approx. 101 min
Recurrent Period	4 days
Local time	AM 10:30 $\pm$ 15min

# SCANNING CONCEPT



# MISSION REQUIREMENT (VIS. & NIR)

wave length	$\Delta\lambda$	IFOV	S/N	A/D	wave length	$\Delta\lambda$	IFOV	S/N	A/D	
nm	nm	m			nm	nm	m			
<u>1</u>	<u>380</u>	<u>10</u>	<u>1000</u>	<u>&gt;600</u>	<u>12</u>	<u>625</u>	<u>10</u>	<u>1000</u>	<u>&gt;800</u>	<u>12</u>
2	400	10	1000	>800	12	667	10	1000	>800	12
3	412	10	1000	>800	12	678	10	1000	>800	12
4	443	10	1000	>800	12	710	10	1000	>800	12
5	460	10	1000	>800	12	748	10	1000	>800	12
6	490	10	1000	>800	12	760	10	1000	>800	12
7	500	10	1000	>800	12	865	10	1000	>800	12
8	520	10	1000	>800	12	465	70	250	>200	12
9	545	10	1000	>800	12	550	60	250	>200	12
10	565	10	1000	>800	12	660	60	250	>200	12
11	600	10	1000	>800	12	830	140	250	>200	12

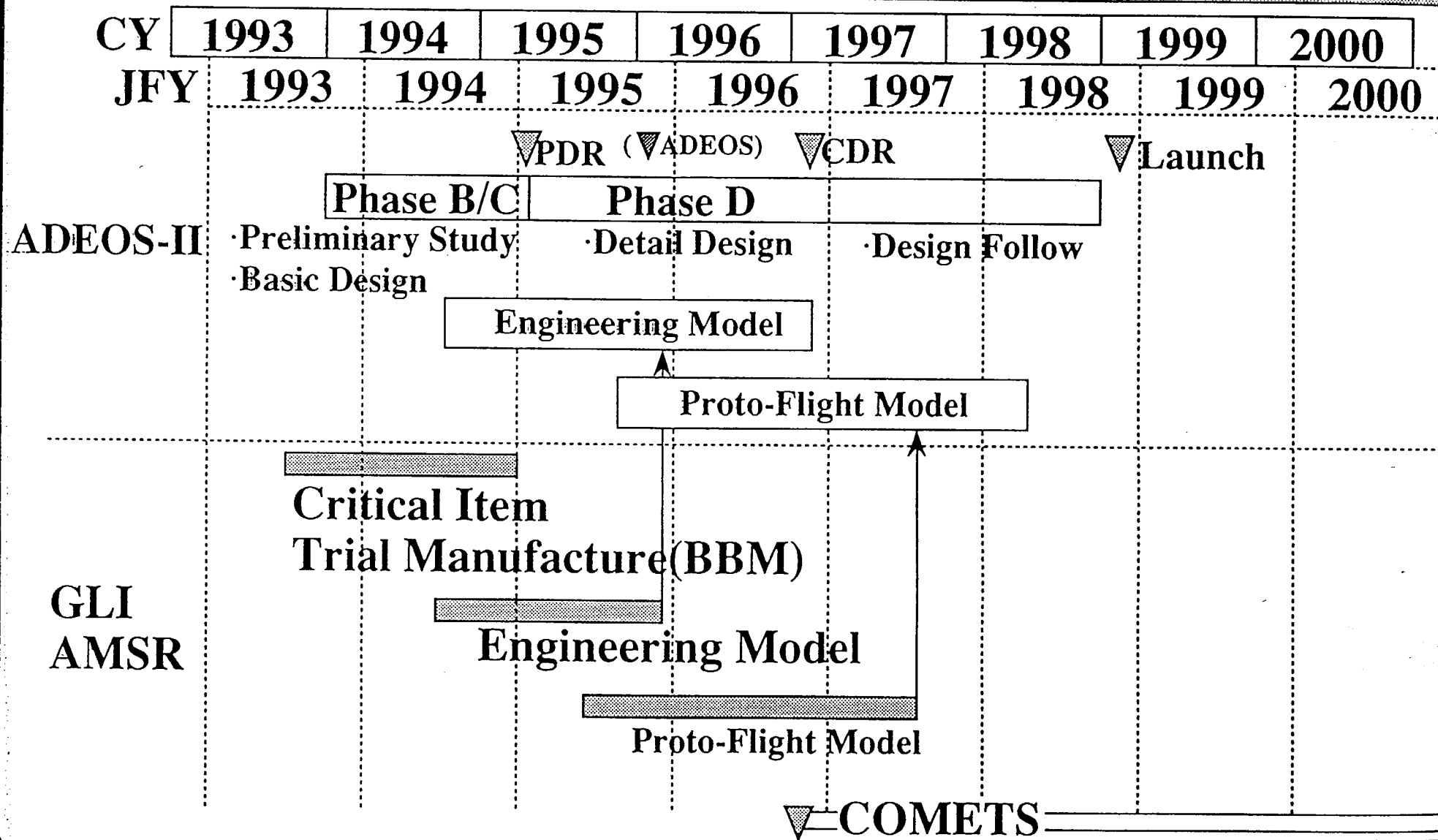
\* underline: piecewise linear

# MISSION REQUIREMENT (SWIR & MTIR)



wave length	$\Delta\lambda$	IFOV	S/N	A/D	wave length	$\Delta\lambda$	IFOV	NE $\Delta$ T	A/D		
nm	nm	m			$\mu$ m	$\mu$ m	m	K			
23	1050	20	1000	>TBD	12	28	3.715	0.33	1000	<0.1	12
24	1240	20	1000	>74	12	29	6.7	0.5	1000	<0.1	12
25	1400	50	1000	>TBD	12	30	7.0	0.5	1000	<0.1	12
26	1650	200	250	>109	12	31	7.3	0.5	1000	<0.1	12
27	2215	270	250	>105	12	32	8.3	0.5	1000	<0.1	12
						33	10.85	1.1	1000	<0.1	12
						34	11.95	1.1	1000	<0.1	12

# CURRENT SCHEDULE OF ADEOS-II & GLI



# ADEOS-II SATELLITE PROJECT ORGANIZATION



Earth Observation Satellite Dept.  
**SHIGEO YAMADA**

PROJECT MANAGER  
**TAKAO ANZAI**

SENIOR ENGINEER (BUDGET & CONTRACT)  
**TAKASHI OTSUKA**

INSTRUMENTS INTERFACES MANAGER  
**YASUYUKI ITO**  
*SeaWinds  
POLDER  
ILAS-II*

SENIOR ENGINEER (SPACECRAFT SYSTEM)  
**SHIN-ICHIRO ICHIKAWA**

AMSR INSTRUMENT MANAGER  
**YASUYUKI ITO**

GLI INSTRUMENT MANAGER  
**MASAKATSU NAKAJIMA**

DCS INSTRUMENT MANAGER  
**YASUYUKI ITO**

PLATFORM SYSTEM MANAGER  
**TAKASHI TAMURA**

INSTRUMENT ENGINEER  
**HIRONORI MAEJIMA**

INSTRUMENT ENGINEER  
**YASUSHI KOJIMA**

INSTRUMENT ENGINEER  
**YASUSHI KOJIMA**

PLATFORM SYSTEM ENGINEER  
**MASAHIRO KASUYA  
HIRONORI MAEJIMA  
NOBUTAKA TASHIRO  
KAZUNORI FUKUYAMA**



**Earth Environment Observation Committee** → **NASDA**  
**Advisory Board**

**ADEOS II Mission Team**  
**Akimasa Sumi**

**GLI Sensor Team**  
**Teruyuki Nakajima**

**AMSR Sensor Team**  
**Akira Shibata**

**DCS Sensor Team**

**Validation Team**  
**Toshio Koike**

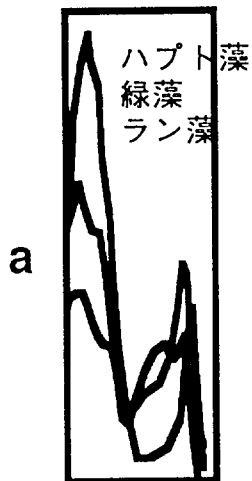
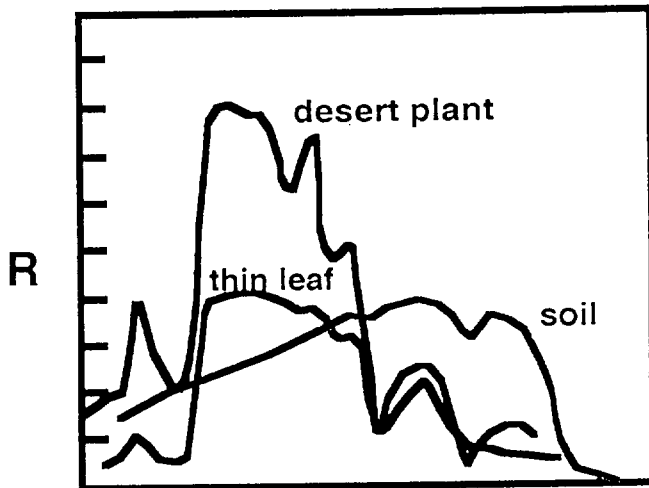
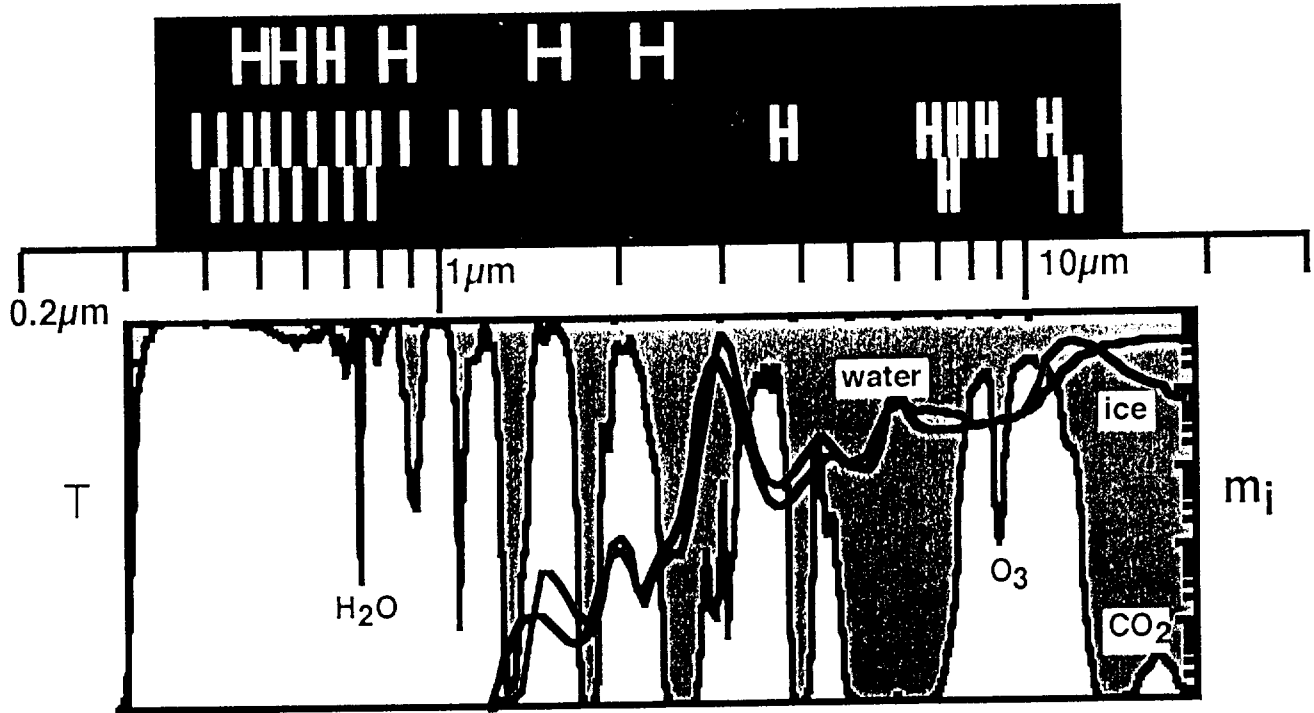
**Atmosphere Subteam**  
**Akihiro Uchiyama**

**Oceanosphere Subteam**  
**Motoaki Kishino**

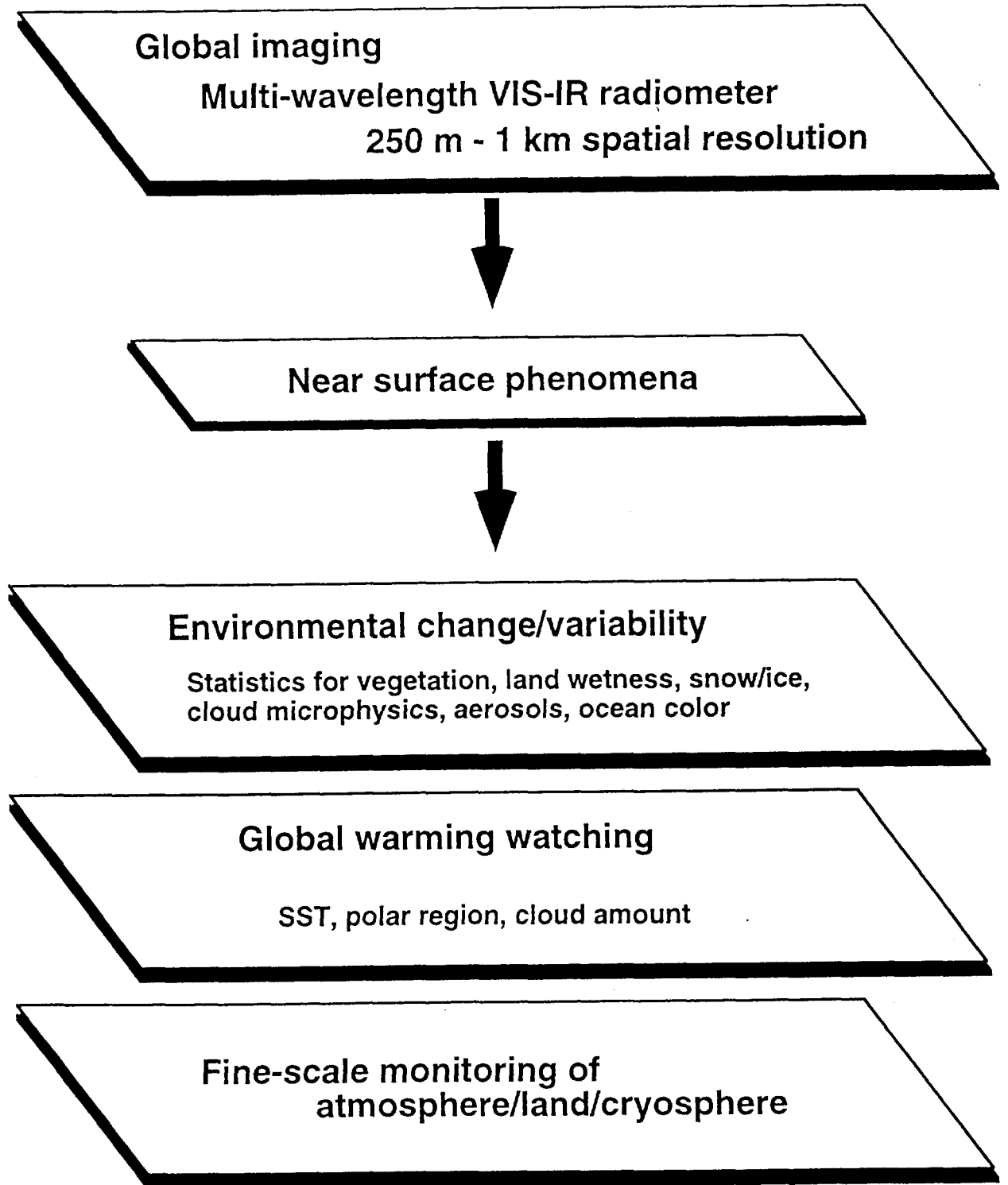
**Landsphere Subteam**  
**Genya Saito**

**Cryosphere Subteam**  
**Takeshi Sato**

# ADEOSII/Global Imager



# FEATURES OF GLE MISSION



## **Sciences in the GLI Mission**

### **Science Objectives:**

- 1. Understanding of Energy/Water Circulation**
- 2. Understanding of Carbon Cycle and Biomass Production**
- 3. Global Change Watching**

### **Related International Projects:**

**WCRP/GEWEX, CLIVAR, ACSYS; IGBP/JGOFS**

### **Issues for High Level Products:**

- 1. Global Scale Land/Ocean Biomass, Primary Production  
Annual Variability**
- 2. Potential Land Biomass**
- 3. Anthropogenic Pollution Effects on Cloud and Aerosol Fields**
- 4. Water Vapor Field and Poleward Energy Transportation**
- 5. Detection of Climate Change due to Greenhouse Gas increase**

## **Sciences in the GLE MISSION - continued**

### **Issues for Products:**

#### **(A) Atmosphere**

- 1. Cloud Optical Thickness, Cloud Water, Effective Radius**
- 2. Cloud Base Height, Multi-layer Structure**
- 3. Column Water Vapor Amount**
- 4. Water Vapor Profile**
- 5. Aerosol Amount, Effective Radius**
- 6. PAR, SRB**
- 7. Precipitation**

#### **(B) Oceanosphere**

- 1. Pigment Concentration**
- 2. Seston Concentration**
- 3. Dissolved Organic Matter Concentration**
- 4. Fluorescence**
- 5. Photo-synthetic Activity, Primary Production**
- 6. SST**
- 7. Water Flow/Sea Ice Tracing by Ocean Color/SST**

#### **(C) Landsphere**

- 1. Vegetation Classification**
- 2. Land Use Classification**
- 3. Biomass, Primary Production**
- 4. Biomass Burning and Slashing**
- 5. Deforestation, Change in Land Use**
- 6. Chlorophyll Concentration**
- 7. Plant Water Content, Plant Activity**
- 8. Soil Organic Matter, Soil Iron Content**
- 9. Land Surface Temperature**
- 10. Methane Emission from swamps**
- 11. Monitoring of Agricultural Production**

#### **(D) Cryosphere**

- 1. Snow/Ice Area**
- 2. Age, Contamination, Water Content**
- 3. Sea Ice Watching**
- 4. Watching of Snow-Vegetation Mixed Area**
- 5. Watching of Permafrost Area**
- 6. Snow/Ice Surface Temperature**
- 7. Snow/Ice Albedo**

# Global Environment Studies in the GLE mission

