

/ kja@kari.re.kr, , ,

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NASA(National Aeronautics and Space Administration)  
NOAA(National Oceanic and Atmospheric Administration)

1.

GOES N-Q

1

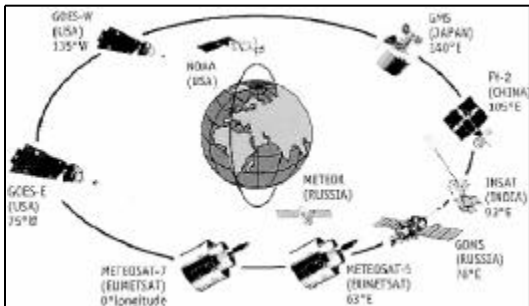
가

가

GOES-R 가

[1]

GOES-R



1.

2. GOES-R

[4]

NOAA

1975

GOES

R

2012

GOES-R

GOES

GOES-R

GOES(Geostationary

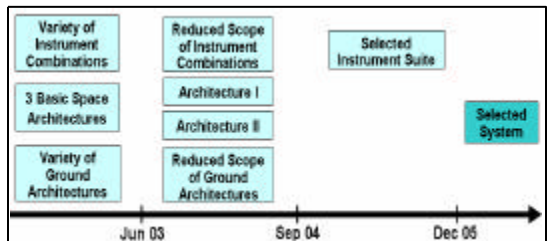
Operational Environmental Satellites)

(Imager)

GOES

(Sounder)

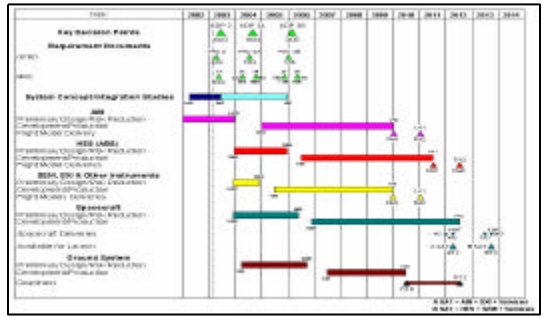
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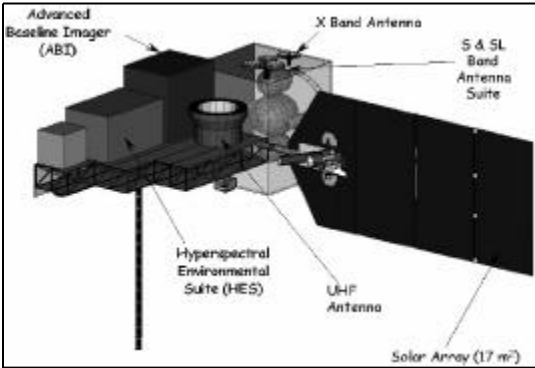
2.GOES-R

(2003)

GOES-R (Architecture) 3가  
 2  
 2가 , 1(Architecture)  
 2 3  
 가 , (75 %)  
 (135 %)



5. GOES-R ( : 2)



3. GOES-R (Architecture) [8]

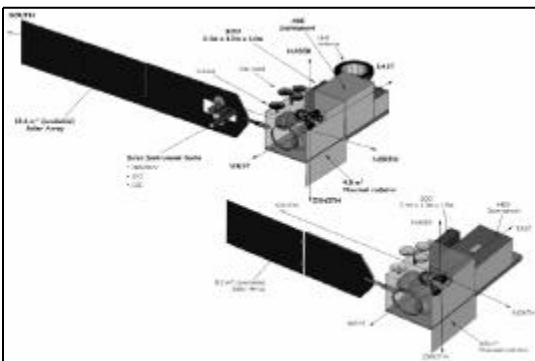
GOES-R

1

1. GOES-R

National Baseline Instruments	
1	Advanced Baseline Imager (ABI) - 16 Channels
2	Hyperspectral Environmental Suite (HES) - Full Disk Sounder (DS) - Severe Weather/Mesoscale (SW/M) Imagery - Coastal Waters (CW)
3	Enhanced Solar X-Ray Imager (ESXI)
4	Space Environment Monitor (SEM) - Magnetometer - EPS/XRS/EUVS
5	Instruments still under consideration to satisfy unmet user needs: - Lightning Mapper - still possible baseline instrument - Passive Microwave Sensor - likely pre-planned - Product Improvement - Coronagraph Solar Imager

2(Architecture )  
 (4 ) 4 2  
 , (75 %)  
 (135 %)



4. GOES-R (Architecture) [8]

GOES-R

ABI

(Advanced Baseline Imager) (Spectrometer)

HES (Hyperspectral Environmental Suite) 가

HES

(Instrument)

ABI 가

(2003 ) 2  
 , 5 GOES-R

(Monitoring)

HES

. HES  
 (Vertical  
 profile),  
 (Imager) (Sounder)  
 HES

, 0.6 $\mu$ m 1km 0.5km , 1.38 $\mu$ m  
 2km , 가 / 1km  
 , ABI  
 (Full disk) 15  
 (CONUS: CONTinental United States) 15  
 3 , 1000km x 1000km  
 ABI 가  
 NOAA 16

3. Advanced Baseline Imager (ABI)<sup>[2]</sup>

ABI 2012 GOES-R  
 GOES  
 , 가  
 GOES (Imager)  
 . ABI GOES  
 ABI  
 (Lifetime) 7  
 (Storage)  
 5  
 ABI (Imager)  
 , 2  
 2. ABI Imager [5]

ABI 가 0.6 $\mu$ m,  
 4 $\mu$ m, 11 $\mu$ m, 12 $\mu$ m window, 6.5 $\mu$ m water vapor  
 5 GOES-8/11  
 (Imager) . 0.47 $\mu$ m, 0.86 $\mu$ m 가  
 1.38 $\mu$ m , 1.6 $\mu$ m 2.26  
 $\mu$ m, 7.0 $\mu$ m, 7.34 $\mu$ m, 8.5 $\mu$ m, 9.6 $\mu$ m 10.35 $\mu$ m, 13.3 $\mu$ m  
 가 가 . 16  
 3 .  
 3. ABI 16

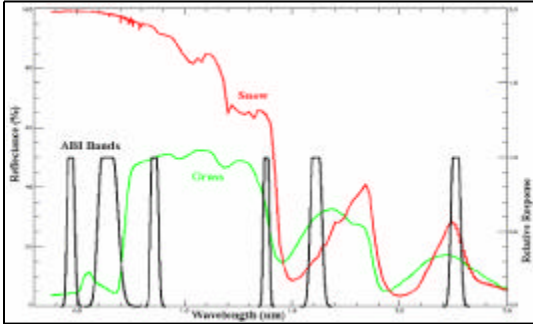
	ABI	Current Imager
Spatial resolution		
0.64 $\mu$ m Visible	0.5km	Approx. 1km
Other Visible	1.0km	
IR Bands (> 2 $\mu$ m)	2.0km	Approx. 4km
Spatial Coverage Full disk CONUS	15minutes 5minutes	30minutes
Spectral Coverage	16bands	5 bands

Future GOES Imager (ABI) Band	Wavelength Range ( $\mu$ m)	Central Wavelength ( $\mu$ m)	Objective
1	0.45-0.49	0.47	Daytime aerosol - over - land, Color imagery
2	0.59-0.69	0.64	Daytime clouds fog, insolation, winds
3	0.84-0.88	0.86	Daytime vegetation & aerosol - over - water, winds
4	1.365-1.395	1.38	Daytime cirrus cloud
5	1.58-1.64	1.61	Daytime cloud water, snow
6	2.235-2.285	2.26	Day and cloud properties, particle size, vegetation
7	3.80-4.00	3.90	cloud/fog at night, fire
8	5.77-6.60	6.19	High-level atmospheric water vapor, winds, rainfall
9	6.75-7.15	6.95	Mid-level atmospheric water vapor, winds, rainfall
10	7.24-7.44	7.34	Lower-level water vapor, winds & SO <sub>2</sub>
11	8.3-8.7	8.5	Total water for stability, cloud phase, dust, SO <sub>2</sub>
12	9.42-9.80	9.61	Total ozone, turbulence, winds
13	10.1-10.6	10.35	Surface & cloud
14	10.8-11.6	11.2	Total water for SST, clouds, rainfall
15	11.8-12.8	12.3	Total water & ash, SST
16	13.0-13.6	13.3	Air temp & cloud heights and amounts

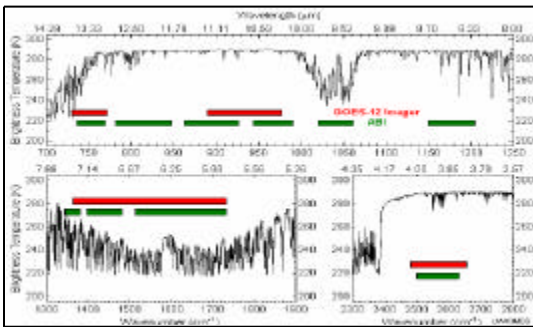
ABI , ABI  
 (IR) 4km 2km

6 6 가 / (Snow)  
 (Grass)  
 가 (Visibility),  
 (Vegetation),

7 10  
(SRFs:Spectral Response  
Functions)



6.6 가 /



7.10

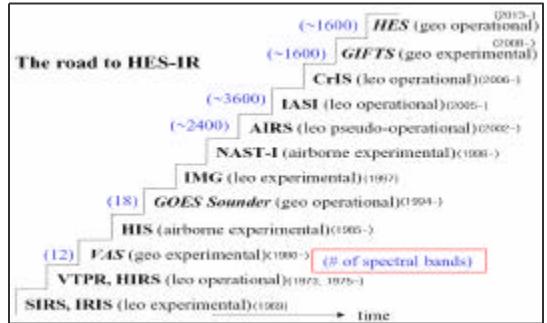
GOES-R ABI  
ABI GOSE-R HES

### 4. Hyperspectral Environmental Suite (HES)<sup>[6]</sup>

HES 2013  
 , NOAA  
 HES ABS(Advanced Baseline  
 Sounder) , ABS  
 HES  
 (Coastal waters)

가  
HES가  
(Sounder)

8



8. HES [3]

HES (Tasks)  
HES 가

(Goal) Threshold

HES Threshold  
 (DS : Disk Sounding),  
 (SW/M : Severe  
 Weather /Mesoscale),  
 (CW : Coastal Waters)

? ABS , NOAA  
 (DS,SW/M)  
 ?  
 (SW/M)  
 ? /  
 (DS,SW/M)  
 ?

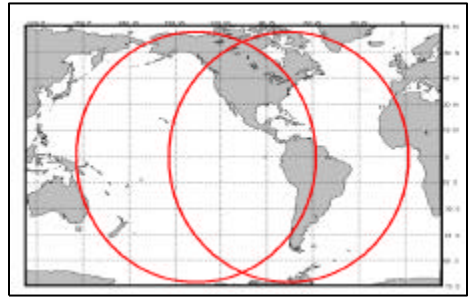
( , ) 가 가  
 (Valuablecoverage) .(CW)  
 ? GOES-R ABI  
 .(DS,SW/M,CW)  
 (OO :  
 Open Ocean imaging), (L : Land imaging),  
 ABI  
 가  
 ?  
 ? .(OO)  
 ? .(L)  
 ? GOES-R ABI 가  
 , GOES-O  
 .(DS,SW/M,CW)  
 HES  
 (Sounder) 4

4.HES Sounder [3]

	HES Requirement	Current Sounder
CoverageRate	Sounding Disk/hr	CONUS/hr
HorizontalResolution SamplingDistance IndividualSounding	10 km 10 km	10 km 30 - 50 km
VerticalResolution VerticalTemperature VericalWaterVapor(RH)	1 km 2 km	~ 3 km ~ 3 km
Accuracy Temperature RelativeHumidity	1 deg. K 10%	2 deg. K 20%

HES (Lifetime) 10  
 (Storage)  
 5  
 HES Threshold  
 (DS) , 62 LZA(Local  
 Zenith Angle) , (CONUS: CONTinental  
 United States) /  
 (SW/M) ,  
 (CW)  
 9~12 . 10 ,  
 / (SW/M)

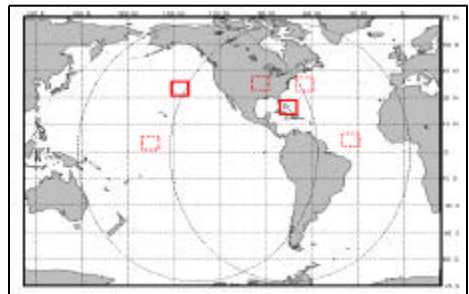
(DS)



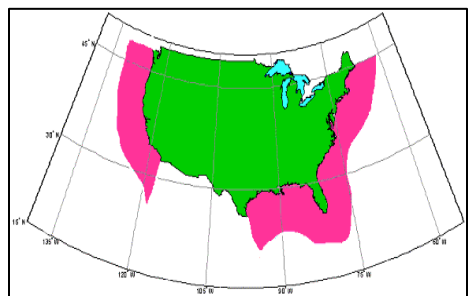
9. (DS)



10. 62 LZA



11. (SW/M)



12. / (CW) ( 400km )

5.HES

[5]

(CW)

Coverage Region	Coverage Area (km <sup>2</sup> )	Task	GSR (Hz)	GSD (km)	Coverage Time
FullDisk	10 <sup>8</sup>	DS	300	10	1hr32.6min
62-degree LZA	7.0 x 10 <sup>7</sup>	DS	300	10	0hr59.8min
CONUS	1.5 x 10 <sup>7</sup>	DS	300	10	0hr 9.3min
Mesoscale	1,000,000	SW/M	300	4	0hr 4.3min
Coastal Waters	2.4 x 10 <sup>6</sup>	CW	7400	0.3	0hr60.0min

7

7. (CW)

HES Band No.	BAND	Spectral Range (μm)	Band Continuity	Requirements
5	Reflected solar < 1μm	0.4 - 1.0	Non-Contiguous	Threshold
	Reflected solar < 1μm	0.40 - 1.0	Contiguous	GOAL
6	Reflected solar > 1μm	1.0 - 2.285	Contiguous	GOAL
7	LWIR	11.2 - 12.3	Non-Contiguous	GOAL

HES (DS) / (SW/M)

13

(IR)

(ABS

HES

(GSR: Ground Sample Rate)

ABS')

Rate)

가

(Detector)

(Focal plane)

(GSD : Ground Sample Distance)

가

HES

HES

(GSR)

(GSD)

6

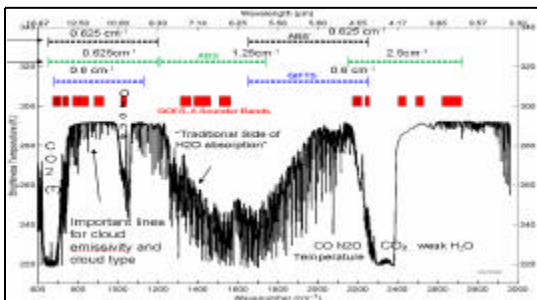
8

6. (DS,SW/M)

8.HES GSR GSD

HES Band No.	BAND	Spectral Range (μm)	Band Continuity	Requirements
1	LWIR	15.38 - 8.33	Contiguous	Threshold
2	MWIR (Option1)	6.06 - 4.65	Contiguous	Threshold
	MWIR (Option2)	8.26 - 5.74	Contiguous	Threshold
3	SWIR	4.65 - 4.44	Contiguous	Threshold
	SWIR	4.65 - 3.68	Contiguous	GOAL
4	VIS	0.52 - 0.70	Contiguous	Threshold

HES Band No.	BAND/Task	GSR (Hz) Threshold	GSD (km) Threshold	GSD (km) GOAL
1	LWIR - DS	195	10	2
1	LWIR - SW/M	240	4	2
2	MWIR - DS	195	10	2
2	MWIR - SW/M	240	4	2
3	SWIR - SW/M	195	4	2
3	SWIR - DS	240	10	2
4	VIS - DS	19,500	1	0.5
4	VIS - SW/M	3,840	1	0.5
5	Reflected solar < 1μm : CW	7,400 (TBR)	0.3 (TBR)	0.15 (TBR)
6	Reflected solar > 1μm : CW	464 (TBR)	1.2 (TBR)	0.9 (TBR)
7	LWIR: CW	170 (TBR)	2	1



13. (DS,SW/M)

IR

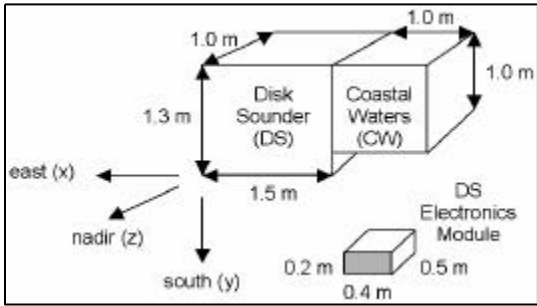
[5]

HES

, GOES-R

HES

14



14. HES [7]

HES ,

가

, ABI

5.

, GOES

GOES-R

ABI HES

(Imager)

(Sounder) , ABI HES가

가

ABI , HES

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