



KIOST updates on GOCI-I & II missions

Young-Je Park

Korea Ocean Satellite Research Center (KOSC)

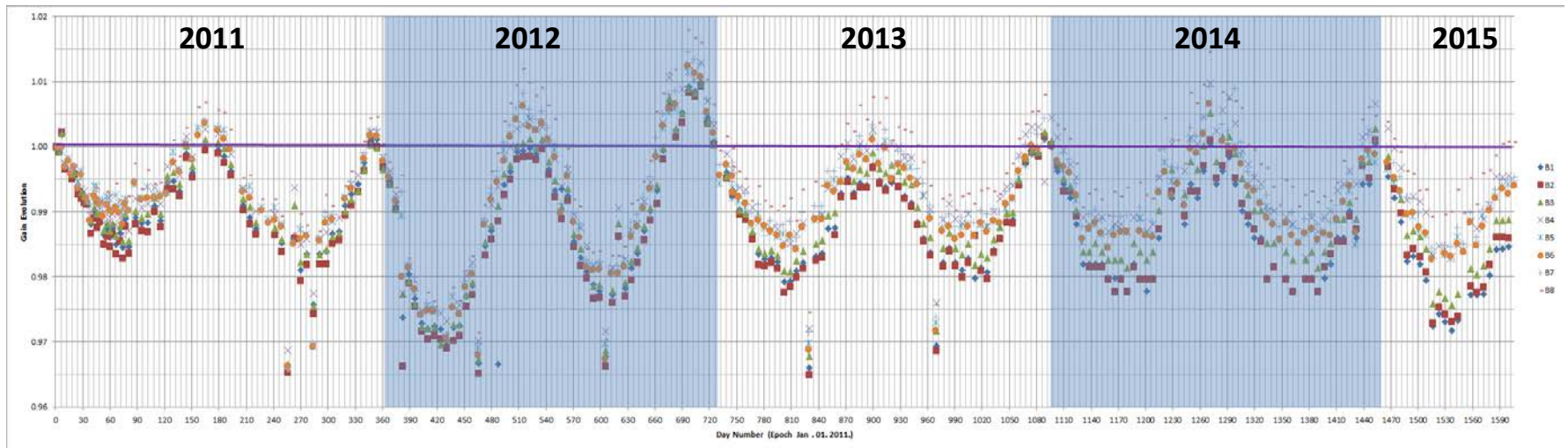
Korea Institute of Ocean Science and Technology (KIOST)



Updates on GOCI-I mission

GOCI calibration with solar diffuser

- ◆ GOCI radiometric gain shows sinusoidal variations (see figure below), which is probably from imperfect model of bidirectional transmittance function for the GOCI diffuser
- ◆ At same Solar incident(azimuth/elevation) angles, the assessed gain evolution from 2011 to 2014 is $\sim 0.45\%$. (0.7% for B1, 0.1% for B4)
-> GOCI is in a quite stable & good status five years after launch



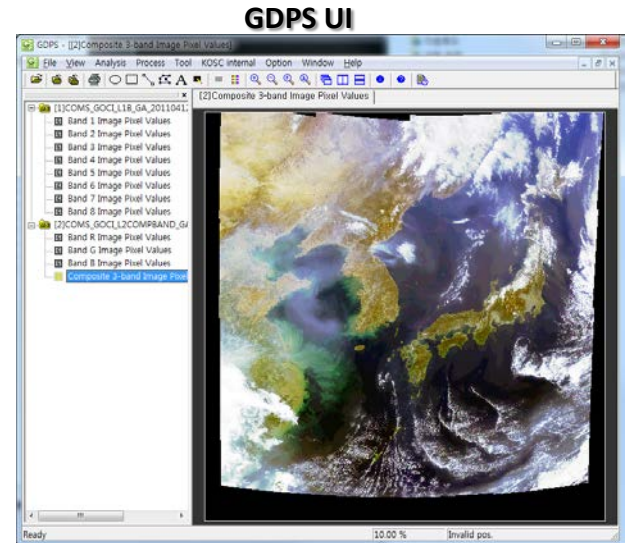
Evolution of GOCI Radiometric Gain

Epoch: 2011/01/01 (yyyy/mm/dd)

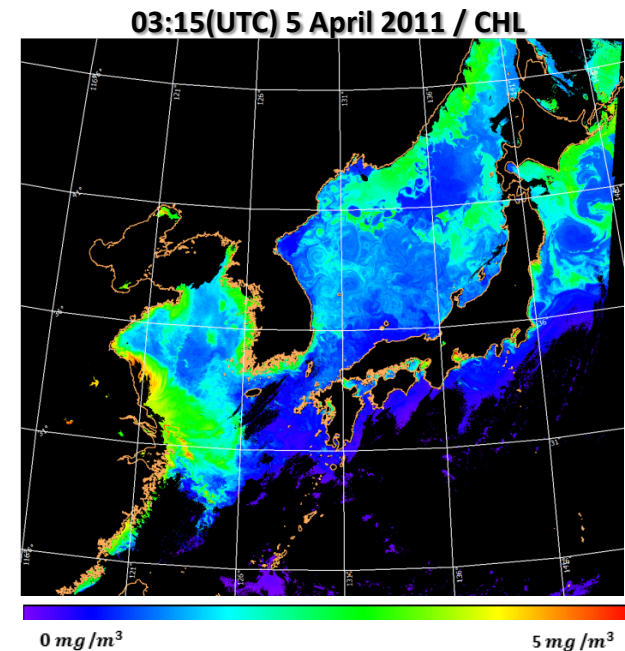
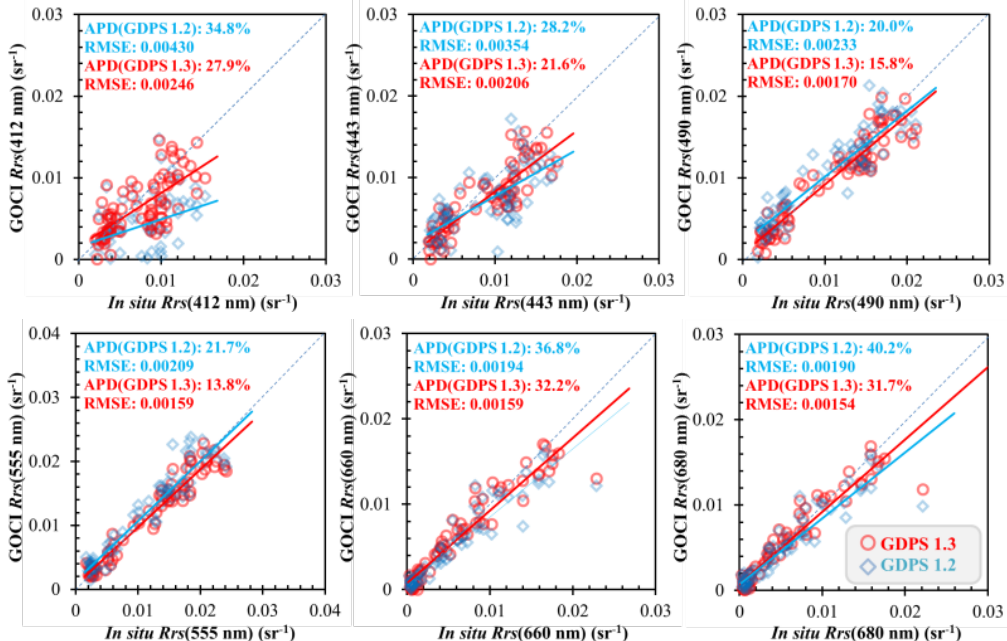
GOCI Data Processing Software(GDPS) is updated

◆ Improvements in GDPS Ver.1.3 (2014)

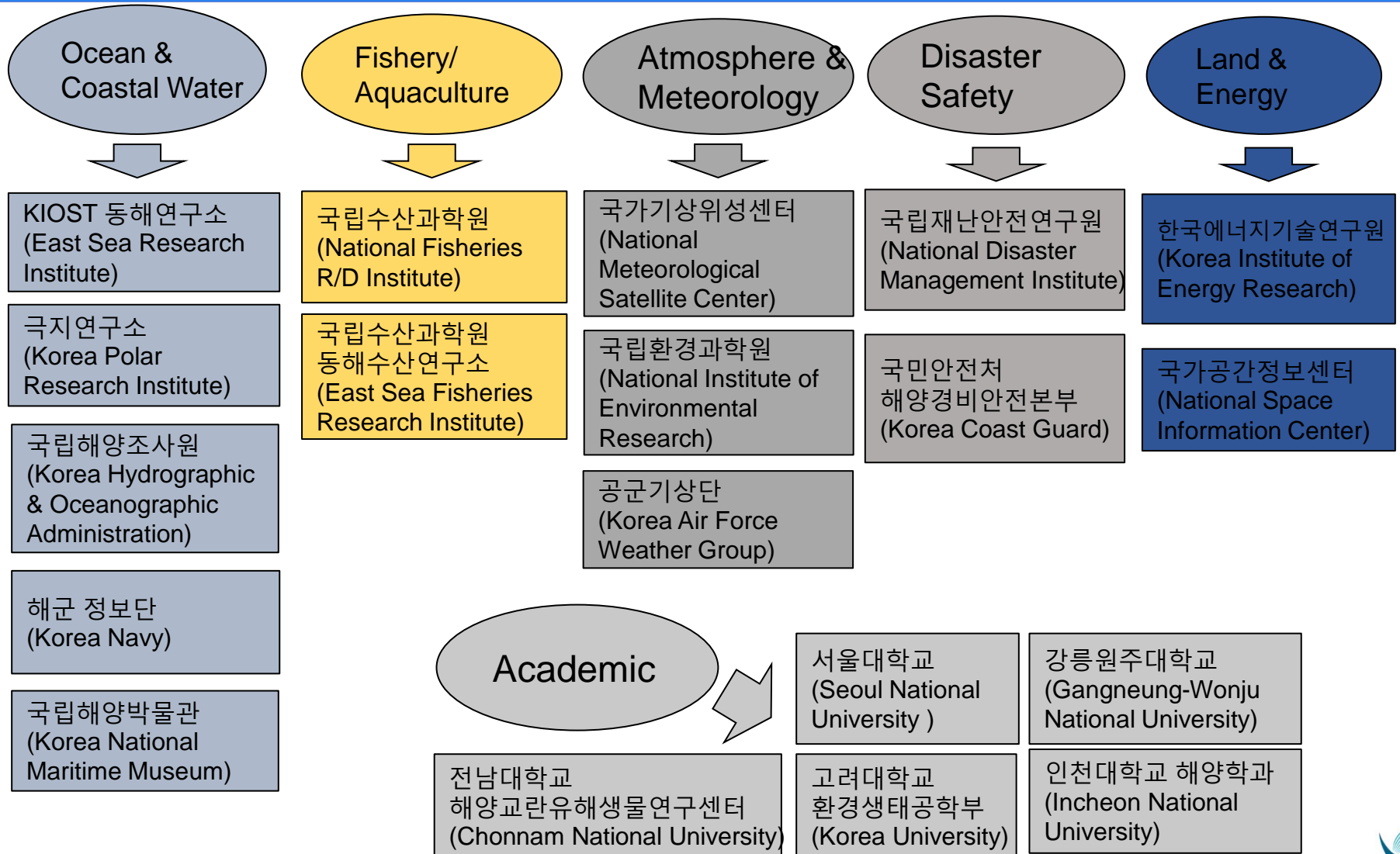
- Atmospheric correction (figure: Rrs validation i
 - Application of vicarious calibration
 - Update of turbid water NIR correction model
 - Incorporating near-real time meteorological data
 - Update of Rayleigh LUT (higher resolution)
 - Providing L2 flag
- Improved products: CHL, TSS etc.
- Available on KOSC website



New GDPS (v.1.3) shows improved results in Rrs matchup comparison.

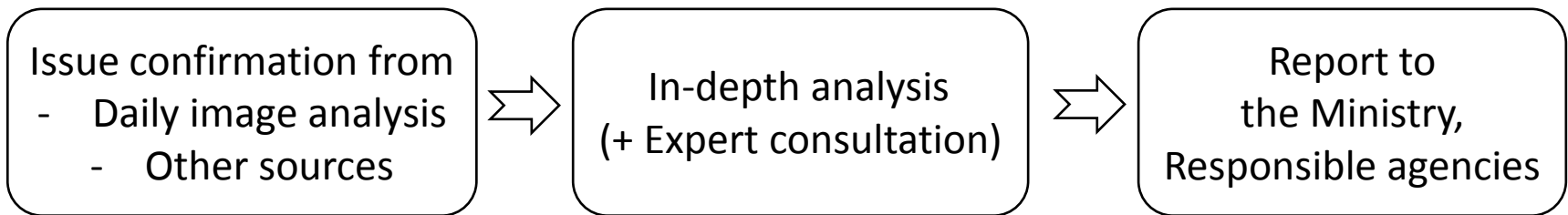


Near real-time service to over 20 organizations



Response to issues @KOSC

□ Procedure



□ Issues

Harmful Algal Bloom, Floating green algae,
Floating brown algae, River discharge (low-salinity)
water, Upwelling cold water,
Dredging/dumping activities, **Yellow dust**, Fine dust,
Sea ice, Sea fog,
Typhoon, snowfall, fire, volcano eruption, Tsunami

Massive HAB detected in GOCI imagery

Massive outbreak of harmful algae (*C. polykrikoides*) occurred in the south coast of Korea (red-color patches in GOCI image) and was expanded to eastern coastal waters in Aug-Sep, 2014. GOCI image was useful to identify the spatial coverage of the HAB event, which was difficult with *in situ* observations

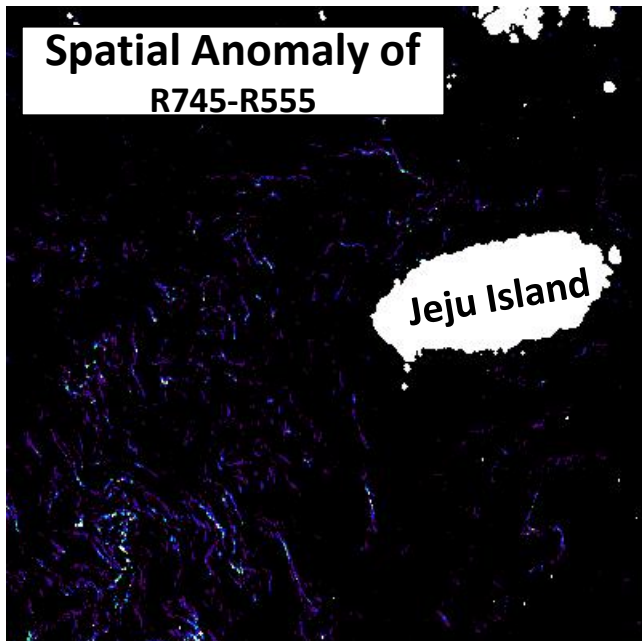


Korean Media reporting that satellite captured a huge red-tide patch in the south coast of Korea in 2014.

Floating algae (Sargassum horneri) detected by GOCI

In Jan-Feb 2015, accumulated patches of 'Sargassum horneri' were found in coastal areas of Jeju island and southwest of Korea. GOCI image (bottom-left image) revealed that the floating algae patches were widely spread in the northern East China Sea.

Spectral signature of Sargassum patch is weak and barely visible using contrast in 745nm before atmospheric correction.)



Updates on GOCI-II mission

Major User Requirements

◆ Comparison to GOCI

	GOCI	GOCI-II
Bands	8(VIS/NIR)	12(VIS/NIR)+1 wideband
Ground Sampling Distance	500m (Local Area Mode)	250-300m (Local Area Mode) 1km (Full Disk Mode)
Coverage	North-East Asian Sea around Korea	North-East Asian Sea + Event Area Full Disk
S/N	~1000	~ 1000
Observation interval	An hour (8 times/day)	An hour (10 times/day)

Spectral Bands Requirements

◆ Spectral Bands Requirements

- Equipped with 13 Bands compared to 8 bands in GOCI

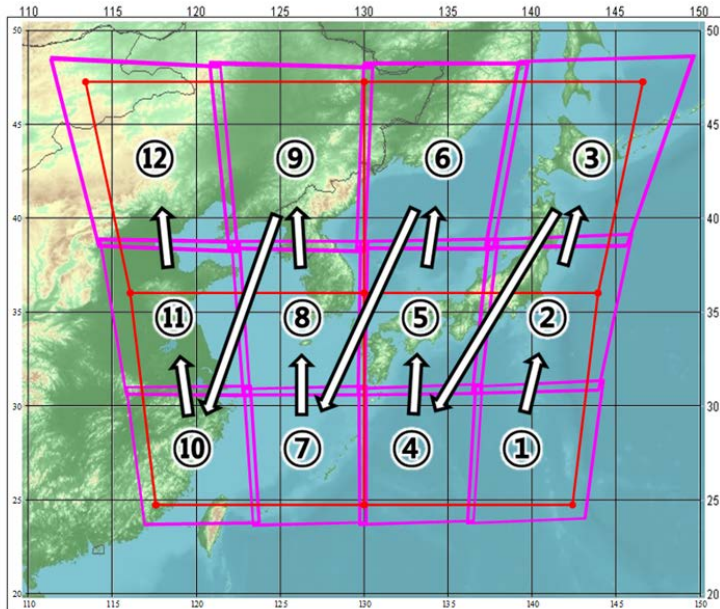
Will improve atmospheric correction, PFT identification, and HAB algorithm

Radiance : W/m²/μm/sr

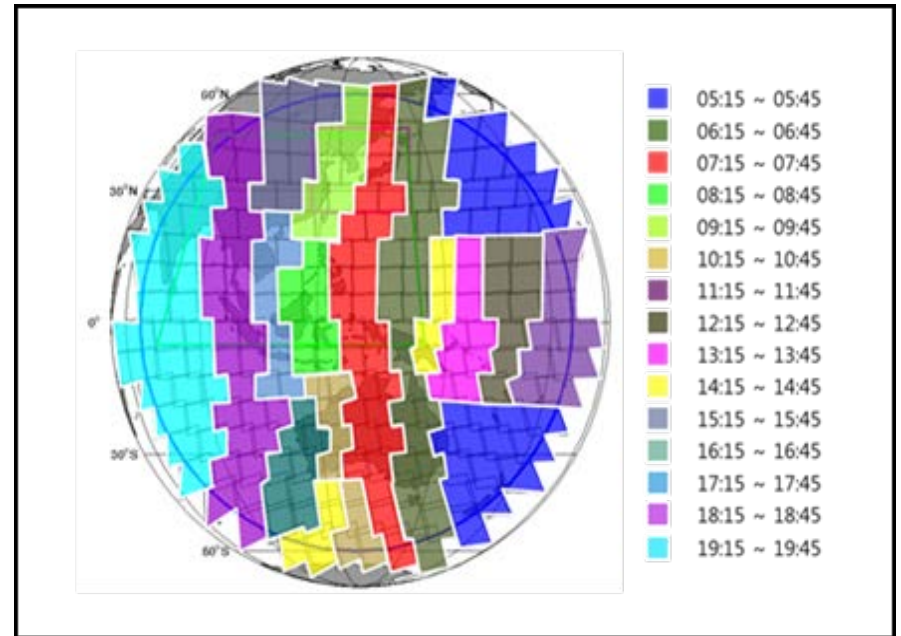
GOCI Band	GOCI-II Band	Band center	Bandwidth	Nominal Radiance	Maximum Ocean radiance	Threshold Radiance	Maximum Cloud Radiance	NEdL	SNR @ Nominal radiance
-	1	380 nm	20 nm	93	139.5	143.1	634.4	0.093	998
1	2	412 nm	20 nm	100	150	152	601.6	0.095	1050
2	3	443 nm	20 nm	92.5	145.8	148	679.1	0.081	1145
3	4	490 nm	20 nm	72.2	115.5	116	682.1	0.059	1128
-	5	510 nm	20 nm	64.9	108.5	122	665.3	0.055	1180
4	6	555 nm	20 nm	55.3	85.2	87	649.7	0.049	1124
-	7	620 nm	20 nm	53.3	64.1	65.5	629.5	0.048	1102
5	8	660 nm	20 nm	32	58.3	61	589	0.03	1060
6	9	680 nm	10 nm	27.1	46.2	47	549.3	0.03	914
-	10	709 nm	10 nm	27.7	50.6	51.5	450	0.03	914
7	11	745 nm	20 nm	17.7	33	33	429.8	0.02	903
8	12	865 nm	40 nm	12	23.4	24	343.8	0.015	788
-	13	643.5 nm	483 nm	-	-	-	-	-	-

GOCI-II Imaging Mode: Local Area and Full Disk

- Reference Local Area (RLA), 10 images a day
- Full Disk (FD), once a day



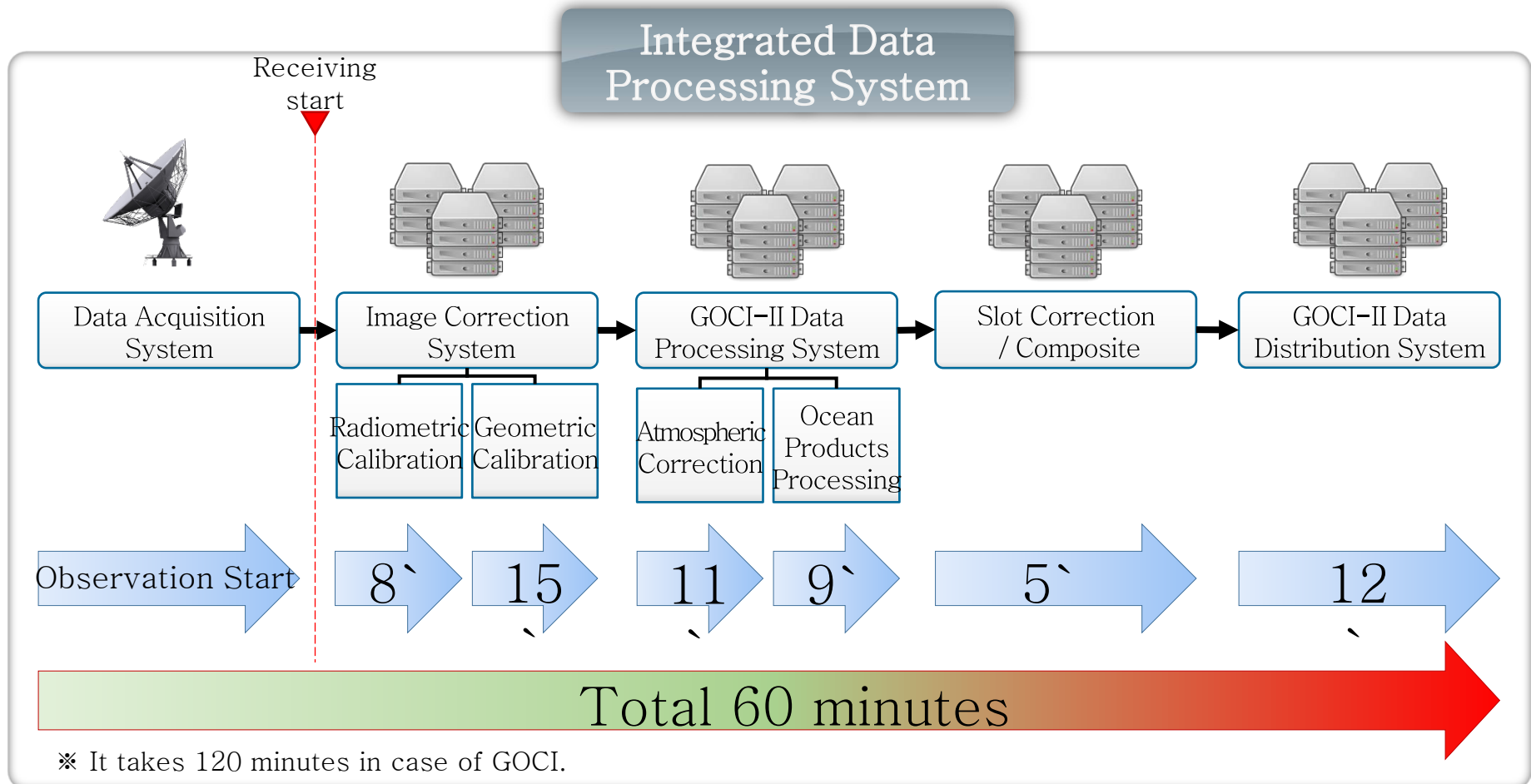
GOCI-II Reference Local Area coverage by 12 slots



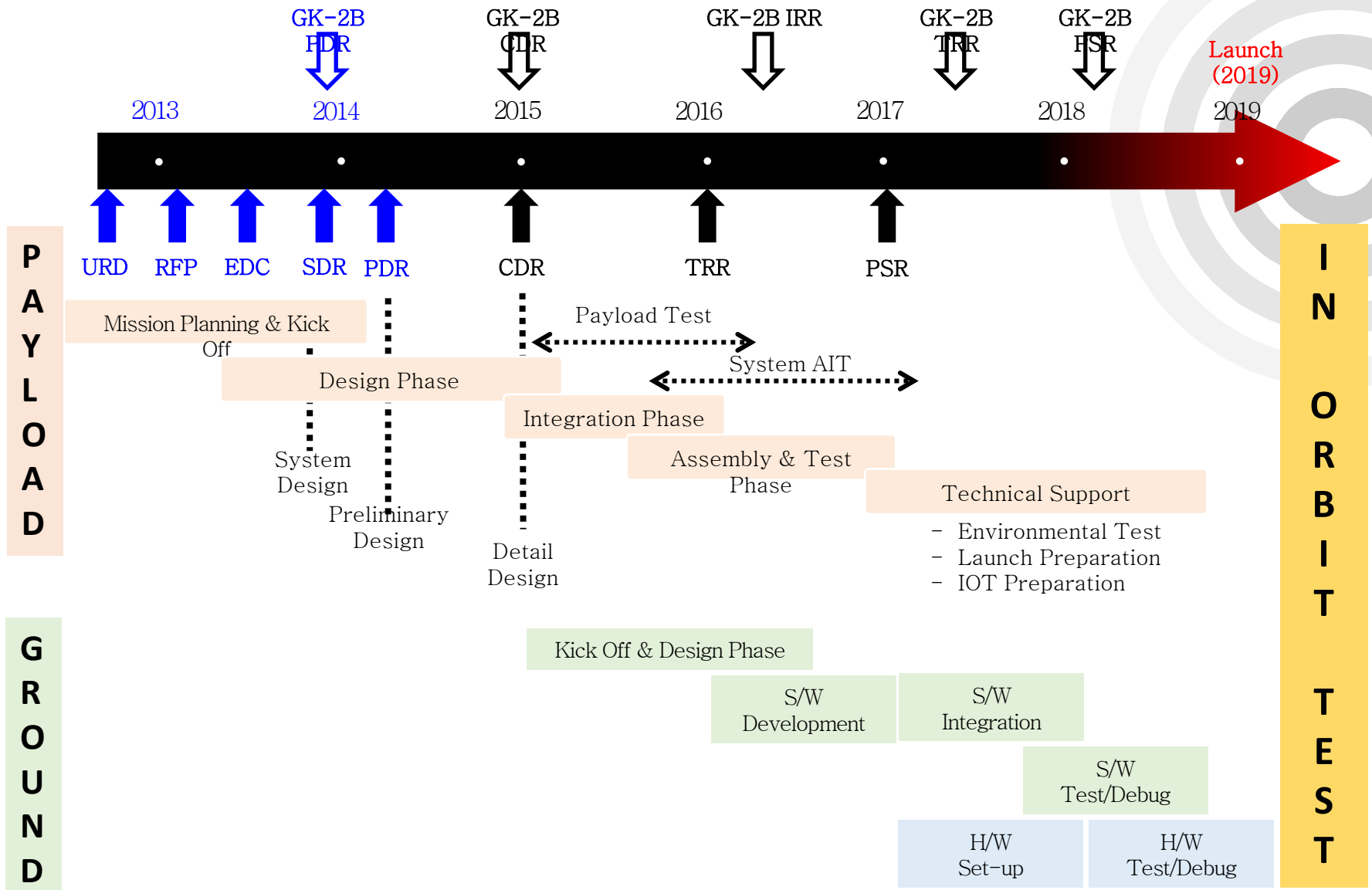
GOCI-II Data Processing System project launched

◆ System development goal

- Development of "Integrated Data Processing System" to complete the whole process, `satellite data reception-correction-processing-distribution`, within 60 minutes



Development Milestone



Thank you

Contact: youngjepark@kiost.ac