

GLM Science Team Meeting Flight Project Update

September 2017

Marc Rafal
GLM Instrument Manager
NASA Goddard Space Flight Center

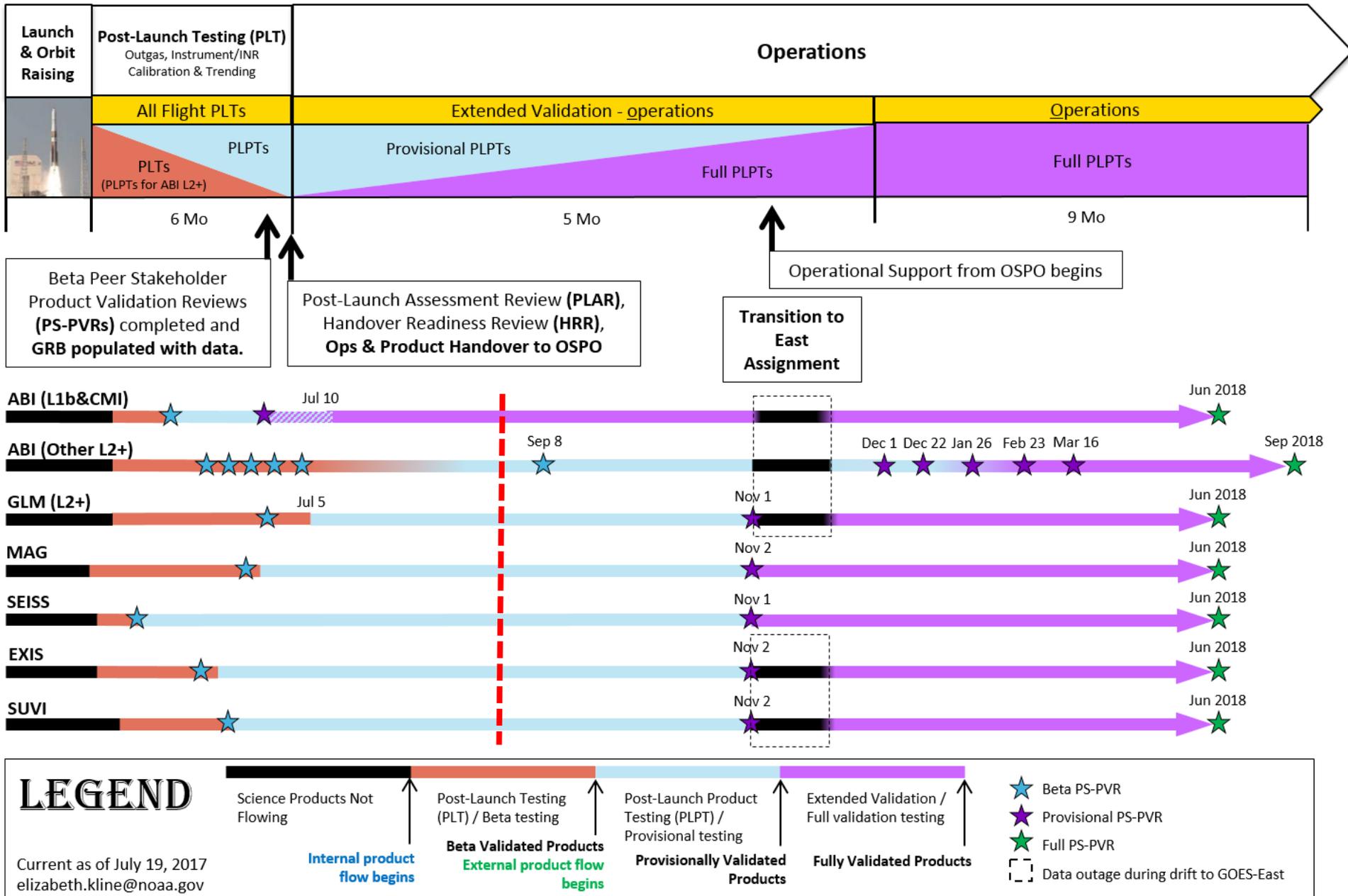




GOES-16

- Launched 297 days ago
- Completed Post Launch Test
 - Satellite operations handed over to NOAA in June
- Identified a few notable operational and performance issues
 - Magnetometer issues prevent meeting 1.7nT accuracy specification
 - Working on flight software and ground algorithm corrections to mitigate
 - SUVI uncorrectable memory errors, causing SUVI to enter Safe mode
 - Adjusted memory read/write timing
 - SC SIU 1553 RTI chip lockup, sending SUVI and EXIS into Safe mode
 - Added autonomous onboard procedure to reset chip in event of recurrence
- Currently in extended product validation phase
- Will relocate to 75.2°W in November to become “GOES-East”

GOES-16 Post-Launch Science Product Validation Schedule





GOES-S

- Completed environmental testing
- Currently resolving issues:
 - SPRU slow power-up anomaly
 - Mag changes (from 16 experience)
 - Grounding/shielding to reduce SUVI & SIU susceptibility (from 16)
 - Misc thermal mods to ABI, SEISS, SUVI, star tracker, panels (from 16)
- After mods completed, will run final functional tests and prep for ship
 - PreShip Review Nov 7-8
 - Ship to launch site Dec 5
- Launch on 1 March 2018
 - Just 170d from today!
 - If all goes as planned, S will become GOES-West in fall 2018





GOES-T and U

- GOES-T
 - ABI, EXIS, SUVI, and SEISS delivered
 - Mag in rework to address 16 issues
 - GLM in final test
 - Preparing for “mate” in Sep 2017
 - Currently working to resolve issue with leaking propulsion module check valves
 - Environmental test begins March 2018
 - Launch planned June 2020
- GOES-U
 - ABI, EXIS, SUVI in storage
 - Mag in rework to address 16 issues
 - GLM and SEISS in I&T
 - Majority of spacecraft components delivered
 - I&T planned over 2018-2021
 - Ready to enter storage May 2021
 - Launch planned April 2024





Upcoming Events

	Sun	Mon	Tue	Wed	Thu	Fri	Sat	
SEPTEMBER	3	4 Labor Day	5	6 Summit at College Park/Crab Feast	7	8	9	
	10	11	12 GOES-T SIR	13	14	15	16	
	17	18 GOES-T Mate	19	20	21	22	23	
	24	25	26	27	28	29	30	
OCTOBER	1	2	3	4	5	6 Prog Status Rev	7	
	8	9 Columbus Day	10	11 GOES-S PSR DR#1	12	13	14	
				SUVI PMSR	GLM PMSR			
	15	16	17 GOES-S GOR	18	19	20	21	
			GOES-T KDP-D	SC PMSR		GOES-S ORR DR#1		
	22	23	24 GOES-S PSR DR#2	25	26	27	28	
	29	30	31	1	2	3	4	
	GOES-East OTRR	GOES-S ORR DR#2	GOES-16 DriftStart		GOES-S ETE-3b	Prog Status Rev		
NOVEMBER	5	6	7	8	9	10	11	
			GOES-S PreShip			JPSS-1 Launch		
							Vets Day (Obsrvd)	Veterans Day
	12	13	14	15 GOES-S ORR	16	17	18	
			GOES-16 Drift Stop	SC GSE @ ASO				
	19	20 16 = GOES-East	21	22	23	24	25	
				Thanksgiving				
26	27	28	29	30	1	2		



Upcoming Events

	3	4	5	6	7	8	9	
DECEMBER			SC Ship to ASO					
			SC PMSR			Prog Status Rev		
	10	11	12	13	14	15	16	
				4thSUVI Ceremony				GOES-S ETE-4
				SUVI PMSR	GLM PMSR			
	17	18	19	20	21	22	23	
	24	25	26	27	28	29	30	
		Christmas						
JANUARY	31	1	2	3	4	5	6	
		New Year's Day					CRT3	
	7	8	9	10	11	12	13	
		CRT3						
			Mission Rehearsal 3					
	14	15	16	17	18	19	20	
		MLK Day						
	21	22	23	24	25	26	27	
		GOES-S KDP-E						
28	29	30	31	1	2	3		
FEBRUARY	4	5	6	7	8	9	10	
		Mission Rehearsal 4						
	11	12	13	14	15	16	17	
						SC Mate to LV		
	18	19	20	21	22	23	24	
	Presidents Day							
25	26	27	28	1	2	3		
			ROLL to PAD	GOES-S LAUNCH!				



GOES East Transition Sequence of Events (1 of 2)

Date	Activity
10/11/2017	<ul style="list-style-type: none">• GOES-16 drift notification message sent to satellite operator community.• Drift plan screened for potential conjunctions through JSPOCC and SDA
10/16/2017	<ul style="list-style-type: none">• GOES-16 relocation (start and stop) script reviews
10/18/2017 & 10/19/2017	<ul style="list-style-type: none">• GOES-16 simulation – Relocation Start (10/18)• GOES-16 simulation – Relocation Stop (10/19)
10/30/2017	<ul style="list-style-type: none">• Conduct GOES-16/East Transition Operations Readiness Review (OTRR)• OSPO-led review to cover the following:<ul style="list-style-type: none">• GOES-16 and GOES-13 relocation plans and procedure readiness• GOES-16 satellite, ground system, and product readiness for operations• User readiness / coordination for GOES-16 transition• Critical weather day constraints/impacts to the GOES-East transition• Go/No-Go to initiate the GOES-16 drift operation
11/1/2017	<ul style="list-style-type: none">• Terminate GOES-16 imaging and product generation (instruments remain ON)• Turn off GOES-16 raw data link and auxiliary COMM services• Start GOES-16 eastward drift from 89.3°W to 75.2°W (1.17 deg/day)

Preliminary



GOES East Transition Sequence of Events (2 of 2)

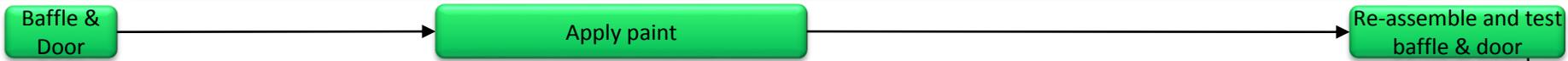
Date*	Activity
11/12/2017	<ul style="list-style-type: none">GOES-16 drifts to ~77.0°WNear 77°W, drop the GOES-16 CDAS uplink, bring up GOES-16 ORTT&C uplink<ul style="list-style-type: none">Prevents uplink interference between GOES-16 and GOES-13
11/14/2017	<ul style="list-style-type: none">Stop GOES-16 drift at 75.2°WActivate GOES-16 Raw Data (X-Band) LinkReturn GOES-16 instruments to imaging operationsNo GRB available
11/16/2017	<ul style="list-style-type: none">Perform GOES-16 magnetometer calibration maneuvers
11/17/2017	<ul style="list-style-type: none">Activate GOES-16 GRB via terrestrial link to AWIPS (no broadcast)
11/20/2017	<ul style="list-style-type: none">Conduct Go/No-Go for GOES East TransitionActivate GOES-16 GRB / Relay GOES-13 GVAR through GOES-14Activate GOES-16 Aux COMM; Disable GOES-13 Aux COMMGOES-16 officially becomes GOES-East
12/5/2017	<ul style="list-style-type: none">Start GOES-13 eastward drift from 75°W toward 60°W<ul style="list-style-type: none">Drift rate 1.0 deg/day (TBD)May re-start GVAR / INR operations after 12/11/17, if desired (TBD)
12/20/2017	<ul style="list-style-type: none">Stop GOES-13 drift at 60°W

Preliminary

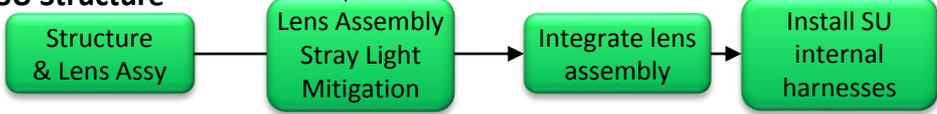


FM3 Instrument Status

Baffle & Door

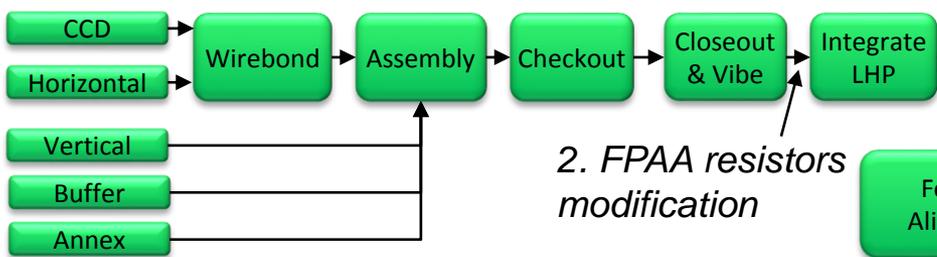


SU Structure



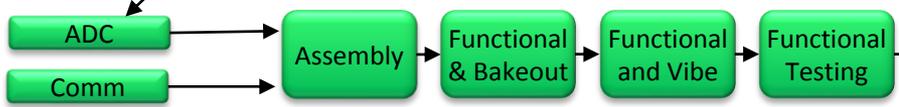
1. Stray Light mitigation completed

FPAA



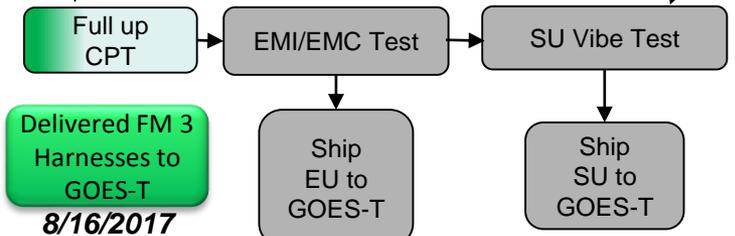
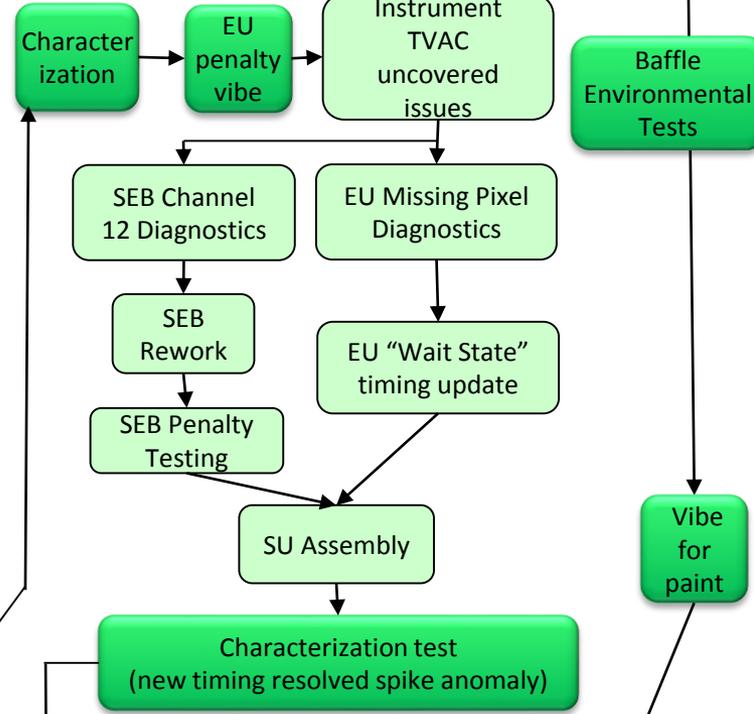
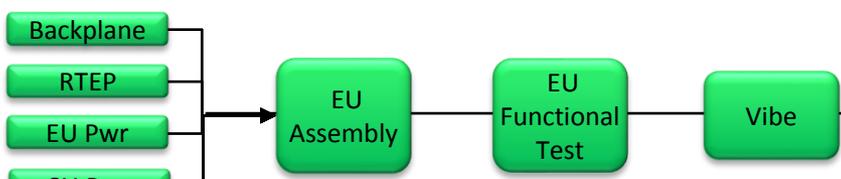
2. FPAA resistors modification

SEB



3. ADC de-bond repair completed

EU



Delivered FM 3 Harnesses to GOES-T
8/16/2017

Ship EU to GOES-T
Estimate Mid-October

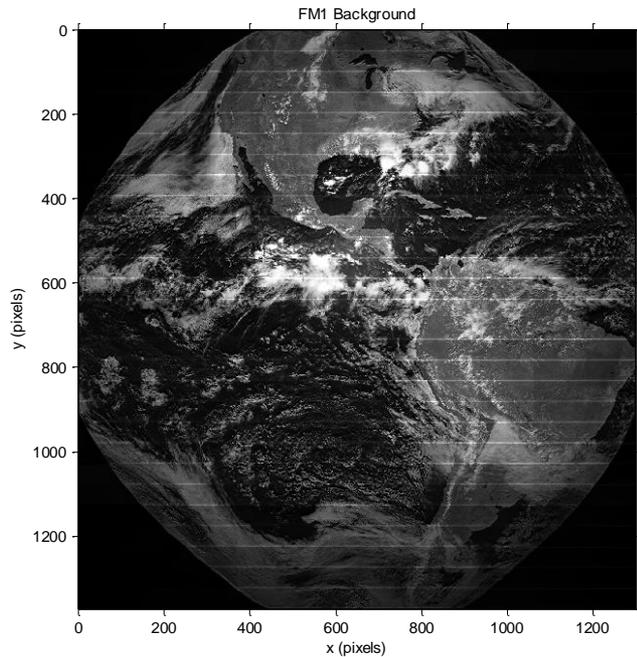
Ship SU to GOES-T
Estimate Mid-December

SEB completed rework, penalty tests and characterization tests after successfully resolving anomalies uncovered in FM3 TVAC and is now back in I&T flow

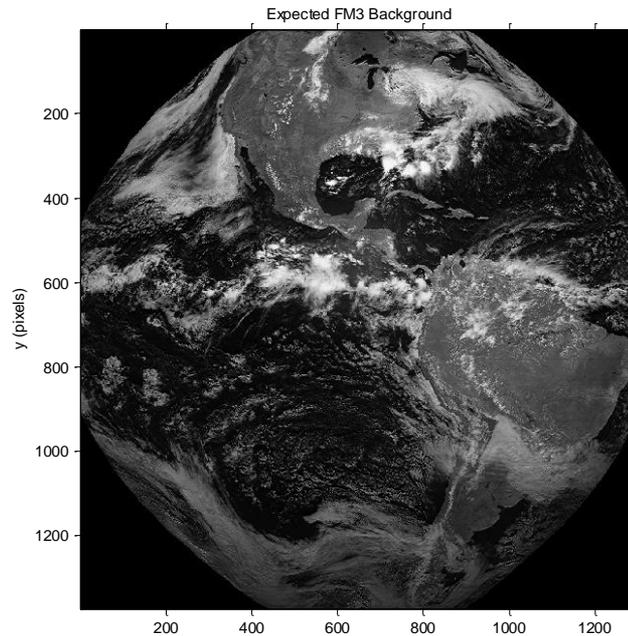


GLM FM3 Design Changes (from FM2)

- Mitigated stray light during eclipse
- Reduced instrument gain
- Flight software version 1.3 to be uploaded to FM2, FM3 and FM4 (available to FM1 if there is a future reason to update).
- Readout electronics modifications significantly reduce overshoot



FM1 background image with overshoot



Expected FM3 background
– no overshoot