



RS-IIC test 2023-Dec, EUI report

Succes **V** , problems **X** and lessons learned **LL**

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Service20 echo packets retrieved by EUI

EUI has the ability to 'echo' all the onboard Service20 packets to the ground that normally stay onboard. This unusual mode requires EUI to be particularly configured with high verbosity high.

- ✓ • This failed in the first RS-IIC (configuration not totally right) but succeeded in the 2023-Dec RS-IIC test. The format/content seems globally as expected.
- ✗ • Unexpectedly, the EUI columns remain empty (except during the fake event).
- LL • This is a newly discovered bug in the EUI Flight Software, will be corrected in the next update.

EUI fake event

EUI has the ability to insert fake events. Up till now we could not confirm this functionality over S20.

- ✓ • The fake event was produced according to commanding in part 1 of the test and reported in the S0 stream.
- ✗ • The fake event was not produced in part 2 of the test as foreseen in TN-0039. Last minute planning mistake.
- LL • The planning mistake will be avoided next time.

FSI304 imaging

FSI304 imaging @ 1 min cadence during the test was foreseen to a) onboard identify flares to trigger on , and b) debug on the ground the flare triggering.

- FSI304 imaging at 1 min is unusual and therefore requires an unusual filter wheel cycle. This filter wheel cycle repeatedly failed to confirm successful completion which led to an FDIR switch-off of the FSI camera. As a consequence, subsequent commanding failed. We tried to recover with a PDOR before the end of the IIC test (thanks MOC!) but it immediately happened again.

V • FSI images were only taken from 10:10 till 10:39 and from 15:00 (?) till 15:19.

X • No FSI images (and triggering) during the rest of the test. No images came to the ground

LL • Avoid the particular FW transition (pos 1-> pos18) that caused this problem. Configure the FDIR differently(?)

LL • Extra images need to be taken to be brought to the ground for monitoring.

EUI trigger

- ✓ • During the limited time that FSI was imaging, we got confirmation that the trigger algorithm was working with low thresholds.
- ✗ • Yet EUI did not trigger. There was a small C-flare in the decay phase at 10:10 on which we should have triggered. (<https://www.sidc.be/solardemon/flares.php?fid=16456&science=0>)
- LL • We have found a misconfiguration (ALU2 bit 8 should have been on: enable thumbnails) that impeded flare triggering.
- LL • Action was taken that this will not slip through our internal checking procedure again.

STIX S20

Why did EUI not react to the STIX triggers?

- EUI was configured to react to STIX if:
 - STIX spectral index at least 3 (moderate event)
 - flare location was within 17 arcmin from disc center.
 - STIX Flare Duration > 3300s
- X** • EUI did not trigger
- LL** • Next time we should
 - set location limit well beyond the limb
 - make the limit on flare duration much shorter (600s)?

STIX S20

HEART BEAT

LOCATION

“1 byte signed char”
FLARE DURATION

time	s20stix191	s20stix192	s20stix193	s20stix194	s20stix195	s20stix196	s20stix197	s20stix198	s20stix199	s20stix200	s20stix201	s20s
2023-12-12 13:41:51.603 +	208	35	0	240	0	0	1	68				
2023-12-12 13:41:52.603 +	209	35	0	240	0	0	1	69				
2023-12-12 13:41:53.603 +	210	35	0	240	0	0	1	70				
2023-12-12 13:41:54.603 +	211	3	0	0	0	0	1	71				
2023-12-12 13:41:55.603 +	212	67	0	238	0	0	1	72				
2023-12-12 13:41:56.603 +	213	67	0	238	0	0	1	73				
2023-12-12 13:41:57.603 +	214	67	0	238	0	0	1	74				
2023-12-12 13:41:58.603 +	215	3	0	0	0	0	1	75				
2023-12-12 13:41:59.603 +	216	35	0	238	0	0	1	76				
2023-12-12 13:42:00.602 +	217	35	0	238	0	0	1	77				

3=moderate event
no location

67=3+64
3 = moderate event
64 = new location

time	s20stix191	s20stix192	s20stix193	s20stix194	s20stix195	s20stix196	s20stix197	s20stix198	s20stix199	s20stix200	s20stix201	s20s
2023-12-12 13:56:44.605 +	45	11	34	77	1	0	0	0	0	4	193	
2023-12-12 13:56:45.605 +	45	11	34	79	1	0	0	0	0	4	195	
2023-12-12 13:56:46.605 +	45	11	34	80	33	0	0	0	0	4	196	
2023-12-12 13:56:47.605 +	45	11	34	81	33	0	0	0	0	4	197	
2023-12-12 13:56:48.605 +	45	11	34	82	33	0	0	0	0	4	198	
2023-12-12 13:56:49.605 +	45	11	34	83	1	0	0	0	0	4	199	
2023-12-12 13:56:50.605 +	45	11	34	84	0	0	0	0	0	0	0	
2023-12-12 13:56:51.604 +	45	11	34	85	0	0	0	0	0	0	0	
2023-12-12 13:56:52.605 +	45	11	34	86	0	0	0	0	0	0	0	
2023-12-12 13:56:53.605 +	45	11	34	86	0	0	0	0	0	0	0	
2023-12-12 13:56:54.604 +	45	11	34	87	0	0	0	0	0	0	0	

238 -> -18 arcmin?
off-limb?

total flare duration = 4*255+199= 1219

Conclusion

- Problems here and there, but we learned and improved!
- Lets repeat asap and until we got this under control