

<b>Project</b>	Solar Orbiter Spacecraft Anomalies	<b>Project ID</b>	SOL_SC	<b>Report Type</b>	SC
<b>Observation</b>	ssmmMgr::forwardTc does not check SCV_TM status for S20 TCs	<b>State</b>	Open	<b>ID</b>	SOL_SC-68
<b>Originator</b>	Daniel Lakey	<b>Criticality</b>	High	<b>Created</b>	2020-11-03 13:45 UTC
<b>Urgency</b>	Low	<b>Reproducibility</b>	Yes	<b>Occurrence Date</b>	2020-11-03
<b>Classification</b>	Space Segment   Platform   Data Handling				

Description	
<b>Description</b>	<p>DOY 2020.308</p> <p>SWA experienced a HB monitor timeout [see SOL_SC-67], and consequently the REC_SpW1 function was called – this performs 2 actions:</p> <ol style="list-style-type: none"> <li>1) Stop S20</li> <li>2) Set SCV_TM=OFF</li> </ol> <p>A short time later, a command to start S20 (already scheduled in the MTL) restarted S20 generation to SWA. It would be expected that because SCV_TM=OFF that this would not be forwarded to the payload. However, this was not the case, which led to sustained SPW_link_Error events over the next minute until REC_SpW2 executed and ran the Power Down function (which again stops S20).</p> <p>A review of the CSW code reveals that the function to check the SCV_TM state for a given payload isPidOkForTcForward(pid) is <b>not</b> called when processing the S20 broadcast loop. Therefore the SCV_TM=FALSE condition does not block all TCs, contrary to expectation.</p> <p>SOL.S.ASTR.TN.00288 i7, Sect 5.1.4.2 :</p> <p>The response to the heartbeat monitor will perform the following actions:</p> <ul style="list-style-type: none"> <li>• Stop S20 – This ensures that, as discussed previously, the instrument transition to a safe state.</li> <li>• Block all further TCs being sent to the instrument – This ensures that any further commands stored on-board for execution at a given time are not sent to the instrument.</li> <li>• Switch off instrument LCL after 60s – This is set as default, however will remain configurable in the recovery action such that should the instrument confirm that they have implemented a safe state which can be maintained without Ground intervention.</li> </ul>
<b>Item Configuration</b>	[Not Specified]
<b>Environment</b>	[Not Specified]
<b>Impacted Services</b>	[Not Specified]
<b>Recommendation</b>	[Not Specified]
<b>Affected Requirement</b>	[Not Specified]
<b>Date of last MRB</b>	[Not Specified]
<b>External Reference</b>	[Not Specified]

Processing	
<b>History</b>	[Configured not to be displayed]
<b>Root Cause (M)</b>	[Not Specified]

Processing	
<b>Risk of Re-occurrence</b>	No
<b>Resolution (M)</b>	[Not Specified]
<b>Link Report</b>	[Not Specified]
<b>Relevant to</b>	none
<b>To be notified</b>	NO

Related Files

There are no files attached.

Actions

There are no actions related to this report.

Related Reports				
Relation	ID	Created	Description	State
Local	SOL_SC-67	2020-11-03 12:56 UTC	SWA HB Timeout & SpW Errors @ switch on DOY 2020.308	Open

<b>Project</b>	Solar Orbiter Spacecraft Anomalies	<b>Project ID</b>	SOL_SC	<b>Report Type</b>	SC
<b>Observation</b>	SWA HB Timeout & SpW Errors @ switch on DOY 2020.308	<b>State</b>	Open	<b>ID</b>	SOL_SC-67
<b>Originator</b>	Daniel Lakey	<b>Criticality</b>	High	<b>Created</b>	2020-11-03 12:56 UTC
<b>Urgency</b>	Low	<b>Reproducibility</b>	Unknown	<b>Occurrence Date</b>	2020-11-03
<b>Classification</b>	Space Segment   Payload   SWA				

Description	
<b>Description</b>	<p>DOY 2020.308</p> <p>At switch on, SWA HB Timeout triggers, leading to REC_SpW1 &amp; REC_SpW2 recovery functions running. During this time, many SpW_link_Error events are observed. These stop when SWA is powered down (REC_SpW2).</p> <p>See attached TM, TC logs for details.</p> <p>Overview:</p> <p>SWA switch on @ 01.17.00</p> <p>SWA HB Monitor enabled @ 01.17.27</p> <p>SWA HB Timeout @ 01.17.52 (25s after HB monitor enabled)</p> <p>—&gt; S20 stopped, SCV_TM flag set to FALSE (confirmed in TM @ 01:18:19)</p> <p>—&gt; P_OFF not yet enabled so doesn't react to SCV_TM flag!</p> <p>SWA S20 started by TC @ 01:18:05 via MTL</p> <p>—&gt; shouldn't have affect because SCV_TM=FALSE but CSW doesn't check for S20. See SOL_SC-68</p> <p>—&gt; SPW_link_Error (EVID 19420) &amp; TC rejected because of IO Error (SWA) (EVID 34057) pairs received at ~8Hz</p> <p>SWA S20 continues until REC_SpW2 switches it off @ 01:18:52</p> <p>—&gt; which stops S20</p> <p>SPICE HB Monitor triggers @ 01:18:14 (10s after S20 re-started &amp;&amp; SPW_link_Error events being)</p> <p>—&gt; it can be seen in the Snapshot events that the HB counters for all PL were increasing at this point.</p> <p>—&gt; SPICE FDIR triggered as a consequence of the SpW errors generated due to SWA TC failures blocking the link</p> <p>—&gt; OK to recover SPICE</p> <p>It looks like two things are going on here:</p> <p>1) SWA does not produce any TM at switch on. I suspect something like SOL-280, whereby the DPU misses the time-sync TC and so doesn't start sending TM. That would trigger the HB monitor.</p> <p>Q to SWA _ why would the DPU not get the time-sync TC?</p> <p>2) S20 is enabled for SWA via the MTL. SWA doesn't accept it and the repeated failures lock up the SpW network, causing other payload to be switched off (SPICE).</p> <p>Q to SWA _ why would the DPU not accept the S20 TCs?</p> <p><b>Item Configuration</b> [Not Specified]</p> <p><b>Environment</b> [Not Specified]</p> <p><b>Impacted Services</b> [Not Specified]</p> <p><b>Recommendation</b> [Not Specified]</p>

Description	
<b>Affected Requirement</b>	[Not Specified]
<b>Date of last MRB</b>	[Not Specified]
<b>External Reference</b>	[Not Specified]

Processing	
<b>History</b>	[Configured not to be displayed]
<b>Root Cause (M)</b>	[Not Specified]
<b>Risk of Re-occurrence</b>	No
<b>Resolution (M)</b>	[Not Specified]
<b>Link Report</b>	[Not Specified]
<b>Relevant to</b>	none
<b>To be notified</b>	NO

Related Files					
Reference	File	Revision	Comment	Size	Status
SOL_SC-DOC-0145	DDMA0013_20201103130256.pdf			10.22 KB	Available
SOL_SC-DOC-0147	On-Board_Events_History_Report_20201103130113.csv			1018.47 KB	Available
SOL_SC-DOC-0148	TC_History_SOL_20201103130810.csv			5.69 KB	Available

Actions
There are no actions related to this report.

Related Reports				
Relation	ID	Created	Description	State
Foreign Relation	SOL-280	2019-05-09 08:35 UTC	[SVT1A Day 3] SWA FDIR triggered at power on	Closed
Local	SOL_SC-68	2020-11-03 13:45 UTC	ssmmMgr::forwardTc does not check SCV_TM status for S20 TCs	Open