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BC-SIM-TR-016
EDDS Issue
Science Packets replicated

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Document Change Record

Issue	Revision	Date	Affected Pages	Change description



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1 Introduction

1.1 Scope

This document describes the issues encountered with the EDDS system when retrieving the SIMBIO-SYS raw data used as input for the data reduction pipeline.

1.2 Applicable documents

There are no applicable documents.

1.3 Reference Documents

[RD1] BC-SIM-TN-003 – Reports and Notes Layout and Flow (DOI: <http://dx.doi.org/10.20371/INAF/TechRep/36>)

1.4 Acronyms

APID	Application ID.
EDDS	EGOS Data Disposition System.
EGOS	ESA Ground Operation System. Infrastructure SCOS-2000.
ESOC	European Space Operations Centre.
ESA	European Space Agency.
GFTS	Generic File Transfer System.
SIMBIO-SYS	Spectrometers and Imagers for MPO BepiColombo Integrated Observatory SYStem.
SSC	Source Sequence Counter.
STC	STereo imaging Channel.
TC	Telecommand.
UTC	Universal Time Coordinated.
VIHI	VIisible and Hyper-spectral Imaging channel.
XML	eXtensible Markup Language.

1.5 Document Format and Repository

This document is compliant with the SIMBIO-SYS Report and Note Layout and Flow [RD1] and will be archived both on the INAF Open Access repository and the SIMBIO-SYS team Archive.

2 Packets Duplication

2.1 Issue description

In the analysis of the data produced during the instrument CheckOut activities during ICO2, the SIMBIO-SYS team performed the data download using the GFTS system in two different sessions soon after the ICO2 test (2019/12/03) and on 2019/12/11, when all the SIMBIO-SYS data was downloaded from the spacecraft.

The following subsections describe the issues encountered with the three individual channels.

2.1.1 STC

In the last download session, we found a replication of the science packets for STC Science (APID 844) in the specific time interval: 2019-11-27T08:25:00.447786Z ÷ 2019-11-27T08:29:36.076155Z.

Figure 1 shows the values of the SSC with respect to the packet's generation time in UTC.

The sawtooth trend is due to the limit of the SSC (16383).

The slope changes in the time interval affected by the packet duplication, which means that SSC increases after two packages and not after one as usual.

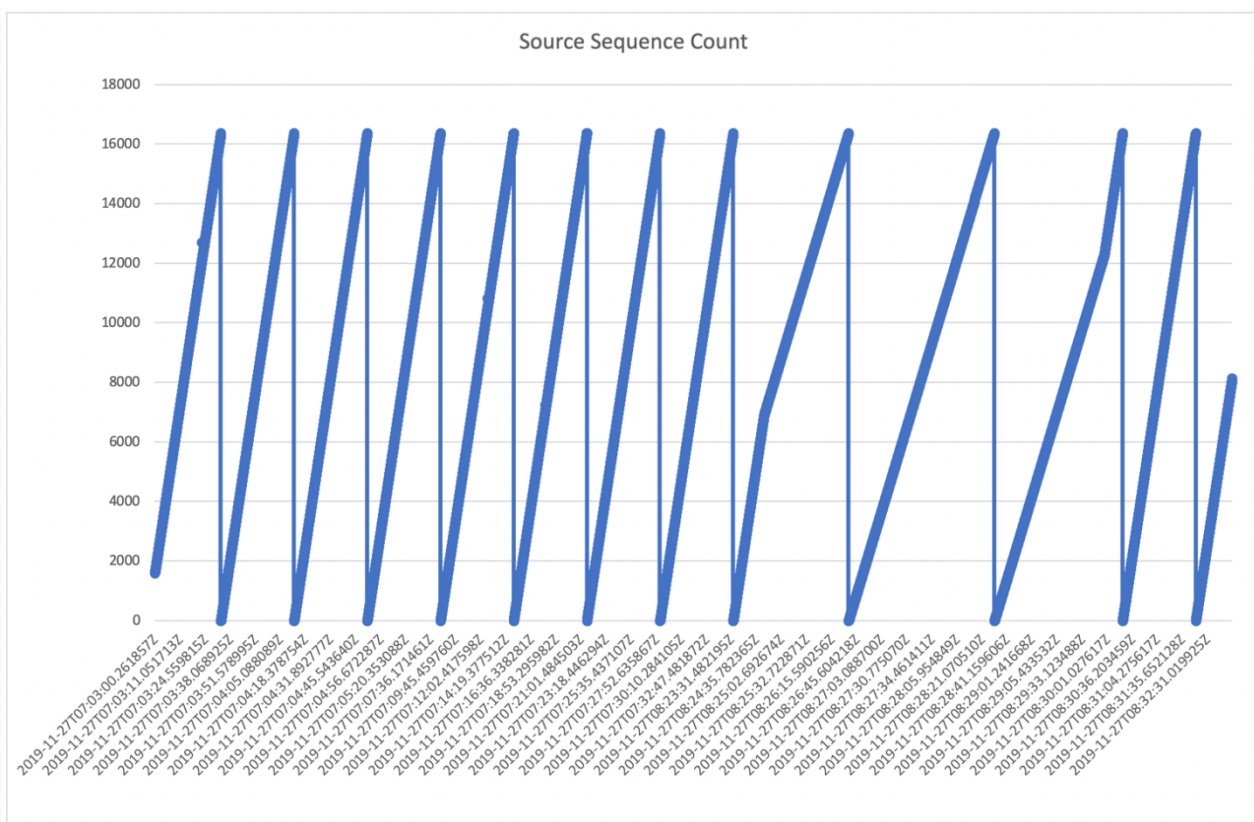


Figure 1: SSC vs. Packets generation Time (UTC)



Figure 2 reports an extract from the software's output used for the packet analysis inside the time range of interest, in which the packets duplication is evident: packets are coupled two by two with the same SSC but with different XMLPacketIDs (first column in Figure 2).

XMLPacketID	PID	PCAT	Source Sequence Count	SCET	UTC
150225	52	12	12316	639563132,0481720	2019-11-27T08:25:33.512147Z
150226	52	12	12316	639563132,0481720	2019-11-27T08:25:33.512147Z
150227	52	12	12317	639563132,0489200	2019-11-27T08:25:33.512895Z
150228	52	12	12317	639563132,0489200	2019-11-27T08:25:33.512895Z
150229	52	12	12318	639563132,0496670	2019-11-27T08:25:33.513642Z
150230	52	12	12318	639563132,0496670	2019-11-27T08:25:33.513642Z
150231	52	12	12319	639563132,0504150	2019-11-27T08:25:33.514390Z
150232	52	12	12319	639563132,0504150	2019-11-27T08:25:33.514390Z
150233	52	12	12320	639563132,0512240	2019-11-27T08:25:33.515199Z
150234	52	12	12320	639563132,0512240	2019-11-27T08:25:33.515199Z
150235	52	12	12321	639563132,0519710	2019-11-27T08:25:33.515947Z
150236	52	12	12321	639563132,0519710	2019-11-27T08:25:33.515947Z
150237	52	12	12322	639563132,0527190	2019-11-27T08:25:33.516694Z
150238	52	12	12322	639563132,0527190	2019-11-27T08:25:33.516694Z
150239	52	12	12323	639563132,0534670	2019-11-27T08:25:33.517442Z
150240	52	12	12323	639563132,0534670	2019-11-27T08:25:33.517442Z

Figure 2: Extract of the output of the software used for the packet analysis.

The data request (attached) was performed again on 2019/12/16, and the team obtained the same results.

2.1.2 HRIC

The same results are obtained with the HRIC data (see Figure 3) but in a different time range.

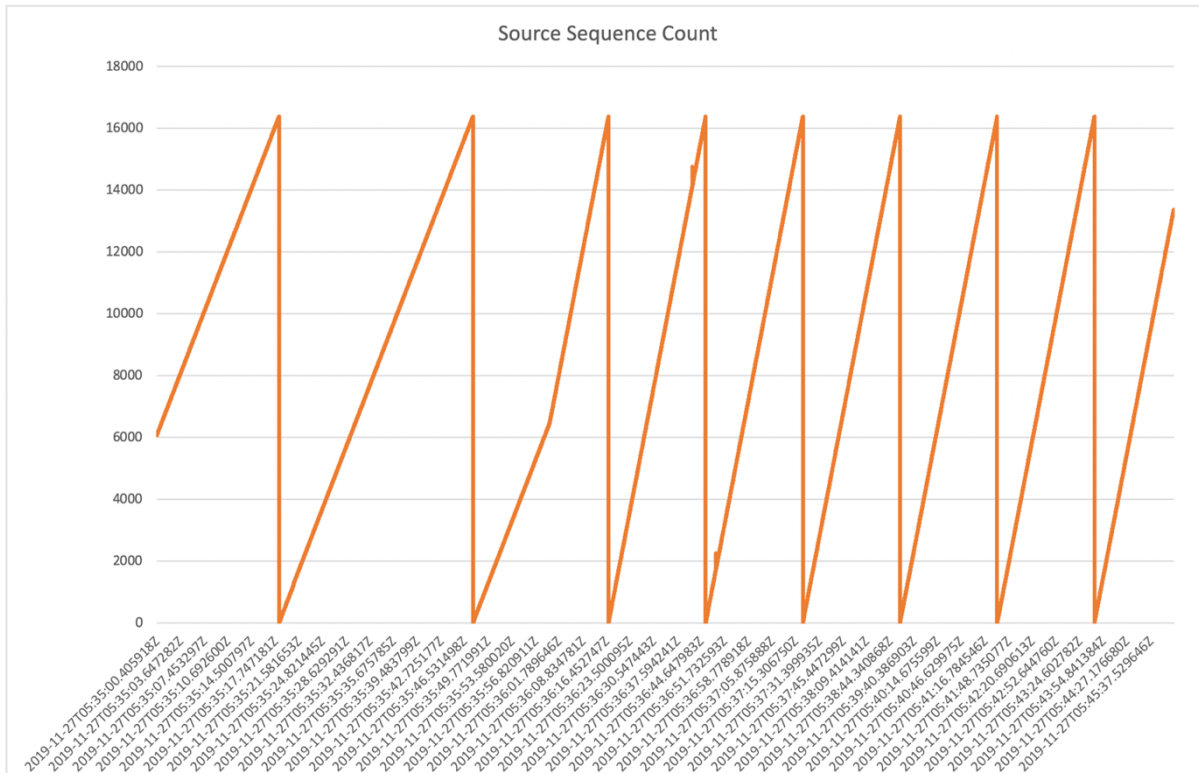


Figure 3: SSC vs. UTC for the HRIC Performance test

2.1.3 VIHI

VIHI is not affected by the problem.

2.2 Packet Analysis

The first two packets reported in Figure 2 were uploaded to the ESA TM Packet Analyzer available on the Cosmos site (<https://www.cosmos.esa.int/web/bepicolombo/sciops>).

packetId	Instrument	spid	apid	type	subtype	filingTime	radioFrequencyBand	groundStation	packetSize	timestampPolicy	streamId	mcsSequenceCounter	sourceSequenceCount	ccsdsPacketLength	ccsdsSpacecraftTime
150225	SIMBIO_SYS	40101	844	21	3	2019-11-27 08:25:33	X band	New norcia	4188	2	1002	75228	12316	4112	0639563132.03157
150226	SIMBIO_SYS	40101	844	21	3	2019-11-27 08:25:33	X band	Cebreros	4188	2	1002	141864	12316	4112	0639563132.03157

Figure 4: TM Packet Analyzer output.

The output is in Figure 4, and it is visible that the SSC and the time are the same for the two packets; they were received by two different ground stations and had different mcsSequenceCounter. Specifically, the same packet, identified by the APID, SSC, and generation time, was received by two different ground stations, New Norcia and Cebreros in this case, with a different mcsSequenceCounter.

We contacted ESA about this issue, and we confirmed that the ESOC procedures do not include a filter for this kind of event.



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3 Conclusions

The presence of duplicated packets coming from different ground stations requires a pipeline module to remove the possible duplicated packet in the preprocessing phase.