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Document history

The original issue (rev.0.0) of this document was prepared during 1985 in a number of meetings of the SAX Ground Segment Working Group, and issued on January 31, 1986 with the signature of the SAX Program Scientist G.Spada and the SAX Program Manager G. Manarini. The document was the basis for the SAX Ground Segment activities during Phase B1.

The present issue (rev.2.0) follows the rev.1.0 prepared at the beginning of Phase B2. It is intended as an update, in order to correspond with the "SAX Payload Requirements" (issue) document in the current status at the beginning of the Bridging Phase.

The document have been compiled by L.Chiappetti, G.Di Cocco, M.Trifoglio and examined in plenary sessions of the SAX Ground Segment Working Group.

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In addition, the establishment of the SAX Computer System (SCS) is planned in order to provide the dedicated computing facilities required by the CPS and the Italian Payload Institutes to support the SAX Mission.

1.2 Purpose and Scope Of The Document

This document presents the general scientific requirements posed by the Scientific Mission on the Ground Segment.

The requirements relative to the Space Segment are given in the "SAX PAYLOAD REQUIREMENTS, issue 2 for the SAX phase in completion"

1 INTRODUCTION

1.1 Scenario

The SAX Mission will require the implementation of three dedicated major components : the SAX Satellite, the SAX Ground Segment and the SAX Scientific Data Centre.

SAX is an astronomical satellite intended for systematic observations of celestial x-ray sources. The payload complement is a combination of narrow-field and wide-field instruments, and consequently the operational programme will involve pointed observation measurements with the capability of operating all instruments simultaneously.

The SAX Ground Segment comprises:

- an equatorial S-band ground station, hereinafter named "Ground Station", which assures the data link with the satellite;
- the Operations Control Centre (OCC) located in Italy;.
- a permanent data link, via relay satellite, between the Ground Station and the OCC; the data link shall send to the OCC all the satellite data with a maximum delay of one orbit allowing the spacecraft and mission control to be performed in Italy.

The Scientific Data Centre (CDS) in the form envisaged so far will perform, at least, the following functions:

- implementation and updating of a comprehensive software system for the analysis of the data from the entire SAX payload;
- support to the definition and implementation of the observing program;
- off-line data analysis (e.g. evaluation of calibration parameters for scientific data analysis);
- distribution to Scientific Institutes involved in the SAX Program (Payload Institutes) of data concerning observations under their responsibility;
- support to Guest Observers;
- permanent maintenance of data archives.

In addition, the establishment of the SAX Computer System (SCS) is planned in order to provide the dedicated computing facilities required by the CDS and the Italian Payload Institutes to support the SAX Mission.

1.2 Purpose And Scope Of The Document

This document presents the general scientific requirements posed by the Scientific Mission on the Ground Segment.

The requirements relative to the Space Segment are given in the "SAX PAYLOAD REQUIREMENTS, issue 2 for the SAX phase to completion"

information shall be transmitted to the CDS:

- the observing plan and its intermediate and short terms updates;
- the log of the observations performed, comprising synthetic statements on performance and results of the quick-look analysis;
- the historical files containing routine calibrations and instrumental trends.

On a regular basis and on a physical support, the following items shall be transferred to the CDS:

- a) FOT. The FOT's shall be produced in one copy on magnetic tape at the OCC. To each "observing period" shall correspond one or a set of tapes, containing the results obtained with one or more instruments. The FOT shall be produced (as soon as possible) with a maximum lag of about 2 weeks after the observation has been performed, and the FOT shall then be immediately transferred, on a daily basis, to the CDS along with the relevant administrative information.
- b) RRD and supplementary information. The permanent archive shall be placed and managed within the CDS. Hence the Reformatted Raw Data, along with the attitude and orbital data, shall be transferred to the CDS together with the relevant administrative information. The transfer shall occur as soon as the data, after the production of the FOT and the performance of the long trend analysis, are no longer needed at the OCC. The medium on which the RRD is recorded must be direct access, high capacity and easily transportable.

4.1.4.6.4 S/W For FOT Production -

This S/W is routinely used and will be possibly updated at the OCC. It is however expected that the identical S/W be used at the CDS to reextract FOT's when needed (in order not to keep indefinitely in the archive also one of the two copies of the FOT's). This S/W therefore shall be available to the CDS along with the relevant documentation, and any update shall be communicated as soon as implemented and successfully tested.

4.1.4.6.5 Compatibility And Link -

From the above it appears that the H/W and S/W for handling and processing the relevant information at the OCC and the CDS should be highly compatible, if not identical. Concerning the physical link, the type and amount of