

Report on Replacement of the Experiment Displays Systems (EDSs)

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1 Introduction

The current Experiment Display Systems (EDSs) are ending their useful lifetimes. Parts are no longer commercially available. The EDSs have become unreliable and there have been occurrences where all three have been simultaneously down. None of the current EDS stations function any longer at a 100% level. Although maintenance personnel can probably keep their critical functions going for another year or two, money for such high maintenance items is becoming scarce within NASA.

The present EDS and Sigma computer ground system was designed for the IUE spacecraft as it functioned at launch over 13 years ago. The flexibility in this system lay in the Sigma computers, since the original operating system did not require their full capacity. The EDS, on the other hand, has been used at full capacity from its inception. Well written assembler coding has allowed it to do a surprising amount of quick-look analysis and spacecraft commanding given the heart of the system is a PDP 11/35. When the two-gyro/FSS ground system went on-line in 1985, it required all of the non-utilized Sigma computer resources. Since the additions of the two-gyro ground system modifications, and the more recent one-gyro ground system modifications, there has been a slowdown in the speed of Sigma execution time. As a result of this, additions to real-time operations tools in recent years have been installed in an off-line MicroVAX II computer. However, this work-a-round is becoming inefficient and prone to error as the amount of off-line computations increase. It is projected that efficiency will decrease significantly if the one-gyro/FSS mode is used with the current ground system.

2 Replacement of the Experiment Display Systems

During the last year, the Observatory staff has conducted a study on the feasibility of replacement of the current EDSs with modern equipment. The general parameters included using off-the-shelf proven equipment, phase-in so as not to disrupt on-going science operations, and sufficient flexibility to deal not only with the planned one-gyro ground enhancements, but with the inevitable unexpected problems, such as the recent FES scattered light anomaly.

On March 12, 1991, CSC made a presentation and recommendation to NASA Project personnel for the immediate replacement of all present Experiment Display Systems with VAX 3100-38 workstations. It was further recommended that the present MicroVAX II be upgraded to a MicroVAX III. The Project accepted the recommendation and is currently working on methods for emergency procurement. ESA fully concurs both with the need for replacement, and for the equipment which has been recommended. In addition to the equipment replacement, room modifications are to be performed on the current IPC/GO office area to bring it up to modern environmental standards needed to keep the new equipment functioning with a minimum of maintenance and downtime.

3 Current Timetable for Replacement

The exact timetable depends upon the speed with which Project personnel can comply with all pertinent government procurement regulations. Optimally, the first new EDS station could come on-line at IUEOCC in Building 14 by the end of this summer, room modifications in Building 21 could be performed by the end of this year, and the complete new system would be phased in by this time next year. Most of the software is commercially available. The limited amount of new software required is to be developed in parallel with equipment procurement.

4 Cost of Replacement

The total cost for complete EDS replacement has an estimated list price of approximately \$320,000. Although the equipment belongs to Code 500, the Mission Operations and Data Systems Directorate, and Code 500 fully supports the immediate need for equipment replacement, it has no funds with which to perform the replacement. An appeal is being made to NASA headquarters for at least part of the funding. At the present time, Project personnel are proceeding on the assumption that the entire amount may have to come out of IUE Project funds. Nevertheless, given the demonstrated need for immediate equipment

replacement, Project personnel are proceeding with procurement as fast as possible.

5 Near-Term Planned IUE Operations Enhancements

There are, however, some more pleasant aspects to the equipment replacement. Once the TO has performed the standard quick-look analysis for the script, the GO will have her/his own terminal to perform quick-look analysis on images as they come down and will be able to retain a full day's worth of images on the system for comparisons of variable sources. Furthermore, the number of remote IUE observing stations should be able to be dramatically increased. Anyone possessing a compatible workstation and access to SPAN should be able to set up a remote IUE observing station. To date, only stations having expensive dedicated analog video compressors have been eligible for IUE remote observing. As time permits, further enhancements are planned in the future which should speed SIPS processing turn-around time.

6 Concluding Remarks

It is now necessary to replace the existing EDS stations in order to provide the maximum efficiency, flexibility, and spacecraft safety, for the remainder of the IUE operations lifetime. The IUE project will likely be required to provide the majority, if not all of the funding, for this equipment replacement. The replacement will not only guarantee continuation of current capabilities, but should also allow considerable enhancement of current GO services which become possible with modern computer equipment. The staff hopes you will bear with us during the coming year for any temporary inconveniences as we phase-in a new EDS operating system.