Goddard Space Flight Center IVS Technology Development Center

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Abstract

The GSFC IVS Technology Developemt Center (TDC) develops station software including the Field System (FS), scheduling software (SKED), hardware including tools for station timing and meteorlogy, scheduling algoritnhms, operational procedures, and provides a pool of individuals to assist with station implementation, check-out, upgrades, and traning.

1. Introduction

The GSFC IVS Technology Developemt Center (TDC) develops hardware, software, algorithms, and operational procedures. It provides manpower for station visits for training and upgrades. There are other techology development areas at GSFC covered by other IVS components such as the GSFC Analysis Center.

The current staff of the GSFC TDC consists of Tom Clark, Nancy Vandenberg, Ed Himwich, Chuck Kodak, Raymond Gonzalez, and Willam Wildes.

The remainder of this report covers the status of the main areas of development that are currently being pursued.

2. Field System

Several major ehancements for the Field System (FS) are planned for this year. These will include: mode independent parity checks, Y2K compliance, sequential dual recorder support, automated Tsys, an SEFD analysis tool for antenna calibration, and user interface enhancements.

The most significant of these changes is the Y2K upgrade. In addition to making the FS operate in year 2000 and beyond several other small improvements were undertaken at the same time. The resulting changes are fairly substantial. These changes include: 4-digit year and punctuation in log file time tags, correct operation across year boundaries, use of punctuation in timed wait commands, and upgrades to all post processing software ("logex", "logpl", "xtrac", "pdlpt") to support new and old log formats.

Mode independent parity checks will remove the need to change parity procedures depending on the mode and recording speed.

Sequential dual recorder support is intended to allow longer periods of unattended operation at stations with two recorders. In this approach one recorder would have its tape filled, then the operation would switch over to the other tape drive. The tape can then be changed on the first drive whenever is convenient, perhaps just before the second tape is filled.

Automated Tsys is similar to mode indepedent parity checks in that it will free the operator from having to adjust the Tsys measurement procedures depending on the recording mode. In this case DRUDG will emit mode specific procedures for "preob" and "midob".

A new analysis tool will be developed for examining SEFD data from ONOFF to estimate gain curves and other performance information.

The user interface will be improved. This will include an improved log display window with better scrolling capability. A more sophisticated window manager may be used as well.

3. Hardware

The development of Totally Accurate Clock (TAC) systems continues. The new 8-channel units show RMS precision compared to USNO at the 30 nanosecond level or better. TACs are now readily available commercially. The new control software is Windows 95/98/NT based and very robust.

To replace the antique FTS8400 GPS timing receivers, NASA has adopted the TAC plus an HP53131A counter plus Windows-based software to control the TAC and make routine data logs of timing data. These are being implemented now at several VLBI and SLR stations.

A new meterological sensor package is being developed. The pressure, temperature, and humidity sensor is the same as used in many GPS installations and for SLR2000. The new wind-speed sensor has no moving parts.

4. Site Visits

GSFC will provide personnel for several site visits this year. The visits will include some combination of upgrades, training, and troubleshooting. The exact mix will be depend on the station's needs. Station that will probably be visited this year include: Fairbanks, Goldstone, Kashima34, Kokee Park, Noto, Shanghai, Tsukuba, and Urumqi.

5. SKED and DRUDG

The GSFC Technology Development Center is responsible for development, maintenance, and documentation of the SKED and DRUDG programs. These two programs operate as a pair for preparation of the detailed observing schedule for a VLBI session and its proper execution in the field. The normal flow is that first SKED is run at Operation Centers to make the .skd file that contains the full network observing schedule. Then the stations use the .skd file as input to DRUDG for making the control files and procedures for their station.

A major upgrade to SKED in 1997 was the ability to schedule continuous tape motion. This feature is used only for RDV sessions; it is not generally available because it still has some quirks.

We will add the ability to write a VEX output file to SKED just in time for use by the Mark IV correlator. We also plan to add the ability to schedule K4 and S2 experiments using their native tape characteristics instead of faking the footages assuming Mark III/IV tapes.

DRUDG is distributed with Field System updates. SKED is distributed via anonymous ftp to the Goddard server. A new release of the SKED software is planned for fall 1999. The release will also include updated documentation.

6. VEX

GSFC works in collaboration with Haystack and JIVE to develop the VEX scheduling language. This year a new release, 1.6, is planned. This will add some significant new features, but which ones have not be finalized at this point. In addition to added new features, some of the changes

will be oriented toward helping smooth operation of the system when VEX schedules are used. We also hope to begin implementing VEX observation logs and tables of ancillary data, such as cable and sysystem temperature, this year.

A library of VEX writing utilities will be developed this year. This will complement the existing VEX reading utilities.