

# GSFC IVS Technology Development Center Report

*Ed Himwich, Nancy R. Vandenberg, Raymond Gonzalez*

## Abstract

This report summarizes the activities of the GSFC IVS Technology Development Center for 2002. The report forecasts activities planned for the year 2003. The GSFC IVS Technology Development Center (TDC) develops station software including the Field System (FS), scheduling software (SKED), hardware including tools for station timing and meteorology, scheduling algorithms, operational procedures, and provides a pool of individuals to assist with station implementation, check-out, upgrades, and training.

## 1. Technology Center Activities

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

The current staff of the GSFC TDC consists of 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

During this period some new features were released in FS version 9.5:

1. support for Mark 5P recorders,
2. support for barrel rolling recorded tracks for Mark IV formatters,
3. improved Tsys measurements with frequency and polarization dependent noise diode temperatures, gain curves, and periodic TPI/gain measurements,
4. onsource flagging,
5. a new gain calibration system, including a new utility program called gnplt for analyzing and plotting gain measurements and noise diode values,
6. dual head recording for Mark IV and VLBA4 recorders, and
7. support for new Mark IV formatter firmware.

In the next FS releases, several other improvements are expected. Among these are: (1) full support for Mark 5A recorders, (2) integration of LBA DAS support, (3) integration of S2 DAS support, (4) an updated Linux system, (5) support for the new met sensors, (6) improved Totally Accurate Clock support. These releases are expected in early to mid 2003.

### 3. 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. In the normal data flow for geodetic scheduling, 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.

During 2002 SKED was maintained with bug fixes but no new development was made. Planned development in 2003 includes the ability to schedule Mark 5 disk-based recorders.

### 4. Meteorological Sensors

The recommended new standard meteorological sensor is the Parascientific MET3 (pressure, temperature, and humidity) which is specially designed for GPS applications and is widely used by the IGS.

The MET3 contains temperature and humidity sensors as well as the Digiquartz barometric pressure transducer. The system is currently installed at GGAO MV-3 and at Kokee Park. A unit is also planned for Gilmore Creek.

Barometric pressure resolution is better than 1 microbar with total accuracy of 0.01% of reading. Temperature resolution is 0.01C with total accuracy of 0.5C and relative humidity performance is better than 2%. The measurement suite may be interfaced with computer systems, GPS receivers, and data loggers which has been done at the two NASA VLBI sites.

A microprocessor-based electronics provides fully compensated and linearized outputs via a two-way RS-232 interface. Software is provided by the Field System for the user to retrieve individual data parameters or a complete data word containing all measurement parameters for logging. If a need should arise, hooks have been built in to the Field System software to use the serial bus which allows complete remote configuration and control of all operating parameters including resolution, sample rate, choice of engineering units, integration time, and sampling commands. Information on the MET3 pricing and installation diagrams are provided at <http://lupus.gsfc.nasa.gov/fs>.