The Master Monitor for the Green Bank Telescope's Active Surface

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⇒Initial design and coding done by Richard J. Lacasse

Active Surface Hardware



Active Surface Software

Bus Granter Task
LVDT Temperature Task
Actuator Time Logger Task
RPC Task
Dispatch Task
Master Monitor Task

How Does the Master Monitor Fit in to the GBT Project?

- The Green Bank Telescope
- Active Surface
- Active Surface Monitoring Points
 - Actuators, IIOPs, Control Modules, Master Oscillator, SIB, RPC, Power Supplies, Airflow in the Actuator Room, Actuator Room
 Temperature, Tool Box in the Actuator Room, Watchdogs, Emergency Stop, Emergency Stop
 Bypass

How Does the Master Monitor Work?

Gathers Information

Updates State Transition Diagrams

- Examines gathered information and determines the state transition
- Updates the current state, generates appropriate messages and sets "to do" list flags
- Updates the Global Status and the Actuator Status

✓ Master Monitor Vs. Global/Actuator Status

Review: What is a State Diagram?

A state transition diagram is a pictorial representation of a finite state machine. Usually, the states are represented as circles and the transitions are represented as directed line segments.

A finite state machine is a function which maps an ordered sequence of input events into a corresponding sequence of (sets of) output events*.

* http://wombat.doc.ic.ac.uk/foldoc/foldoc.cgi?finite+state+machine

Example of a State Diagram



Another State Diagram





Implementation of a State Diagram in C++

The Master Monitor uses switch statements to call appropriate methods.

- ✓ Current state
- ✓ Transitions

Methods may execute one or more actions associated with the transition and update the current state.

```
void MasterMonitor::toolStowTest
    testValue = setToolStowTestValue();
                                         // Criterion for switching st
    switch (toolStowTestState)
                                          // State table implementa
       case MasterMonitor::AS_O
            switch (testValue
                case MasterMonitor::ASV_C
                    break
                case MasterMonitor::ASV_EF
                    toolStow_OK_ERR(
                    break
                default
                    defaultErrMsg(
                    break
            break
        case MasterMonitor::AS_WAR
            switch (testValue
                case MasterMonitor::ASV_C
                    toolStow_WARN_OK(
                    break
                case MasterMonitor::ASV EF
                    toolStow_WARN_ERR(
                    break
                default
                    defaultErrMsg(
                    break
            break
        case MasterMonitor::AS FAI
            switch (testValue
                case MasterMonitor::ASV_C
                    toolStow_FAIL_OK(
                    break
                case MasterMonitor::ASV_EF
                    break
                default
                    defaultErrMsg(
                    break
            break
        default
            defaultErrMsg()
            break
    }
```

Questions?

