The Space Environments Testbed (SET) is a flight controller data system for the Common Carrier Assembly. The SET-1 flight software provides the command, telemetry, and experiment control to ground operators for the SET-1 mission.

Modes of operation (see diagram) include:
- **Boot Mode** that is initiated at application of power to the processor card, and runs memory diagnostics. It may be entered via ground command or autonomously based upon fault detection.
- **Maintenance Mode** that allows for limited carrier health monitoring, including power telemetry monitoring on a non-interference basis.
- **Safe Mode** is a predefined, minimum power safehold configuration with power to experiments removed and carrier functionality minimized. It is used to troubleshoot problems that occur during flight.
- **Operations Mode** is used for normal experiment carrier operations. It may be entered only via ground command from Safe Mode.

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**Mode State Diagram**

- **Boot**
  - Initiated at application of power to the Processor Card in CCA
  - Initializes h/w and s/w upon power on or reset
  - Runs memory diagnostics
  - During boot mode, carrier FSW is loaded to SRAM from EEPROM
  - FSW autonomously transitions the carrier from Boot mode to Safe mode upon successful Boot mode completion; transitions to Maintenance mode if errors are detected
  - Boot mode may be entered via ground command or autonomously based upon fault detection
  - Only CCA is on

- **Safe**
  - Predefined, minimum power safehold configuration with power to experiments removed and carrier functionality minimized
  - Transitional mode between boot and operational mode;
  - Used to troubleshoot problems that occur during flight
  - Carrier can still communicate with the spacecraft, maintain critical parameters and functions, perform health and diagnostics tests, recover to other modes and maintain survival heater power
  - Individual experiments may be activated during safe mode, if required, for troubleshooting

- **Operation**
  - Used for normal experiment and carrier operations
  - Default operating parameters, including FSW table changes, may be modified by command during Operational Mode.
  - May only be entered via ground command from Safe Mode
  - Experiments are ON, in Normal, Standby, or Off Modes
  - Limit checking of experiment and carrier telemetry is enabled
  - Event triggering off of CEM/experiment data is enabled

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**High-Performance 3D Articulated Robot Display**

NASA’s Jet Propulsion Laboratory, Pasadena, California

In the domain of telerobotic operations, the primary challenge facing the operator is to understand the state of the robotic platform. One key aspect of understanding the state is to visualize the physical location and configuration of the platform. As there is a wide variety of mobile robots, the requirements for visualizing their configurations vary diversely across different platforms. There can also be diversity in the mechanical mobility, such as wheeled, tracked, or legged mobility over surfaces.

Adaptable 3D articulated robot visualization software can accommodate a wide variety of robotic platforms and environments. The visualization has been used...