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GUIDANCE AND CONTROL INTEGRATION AND TEST HARDWARE

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G&C Integration and Test Hardware

- **TIMED Attitude System Test and Integration Equipment – TASTIE**

- **G&C Integration and Test roles/configurations for TASTIE:**
  - **AIU Hardware Test**
  - **G&C Subsystem Test**
  - **TIMED Integration**

- **Other applications for TASTIE:**
  - **G&C Software Development**
  - **TIMED Operations Simulation**

- **TASTIE facilitates G&C Integration and Test by establishing the necessary operational, control and monitoring environment for G&C subsystem components:**

  - **Emulation of subsystem functions (Flight Computer, IRU, Star Tracker etc.)**
  - **Synthesis of subsystem interfaces, both functionally and physically (electrical loads/stimuli), to the greatest practical extent.**
  - **Computer control and display of all functional and interface data**

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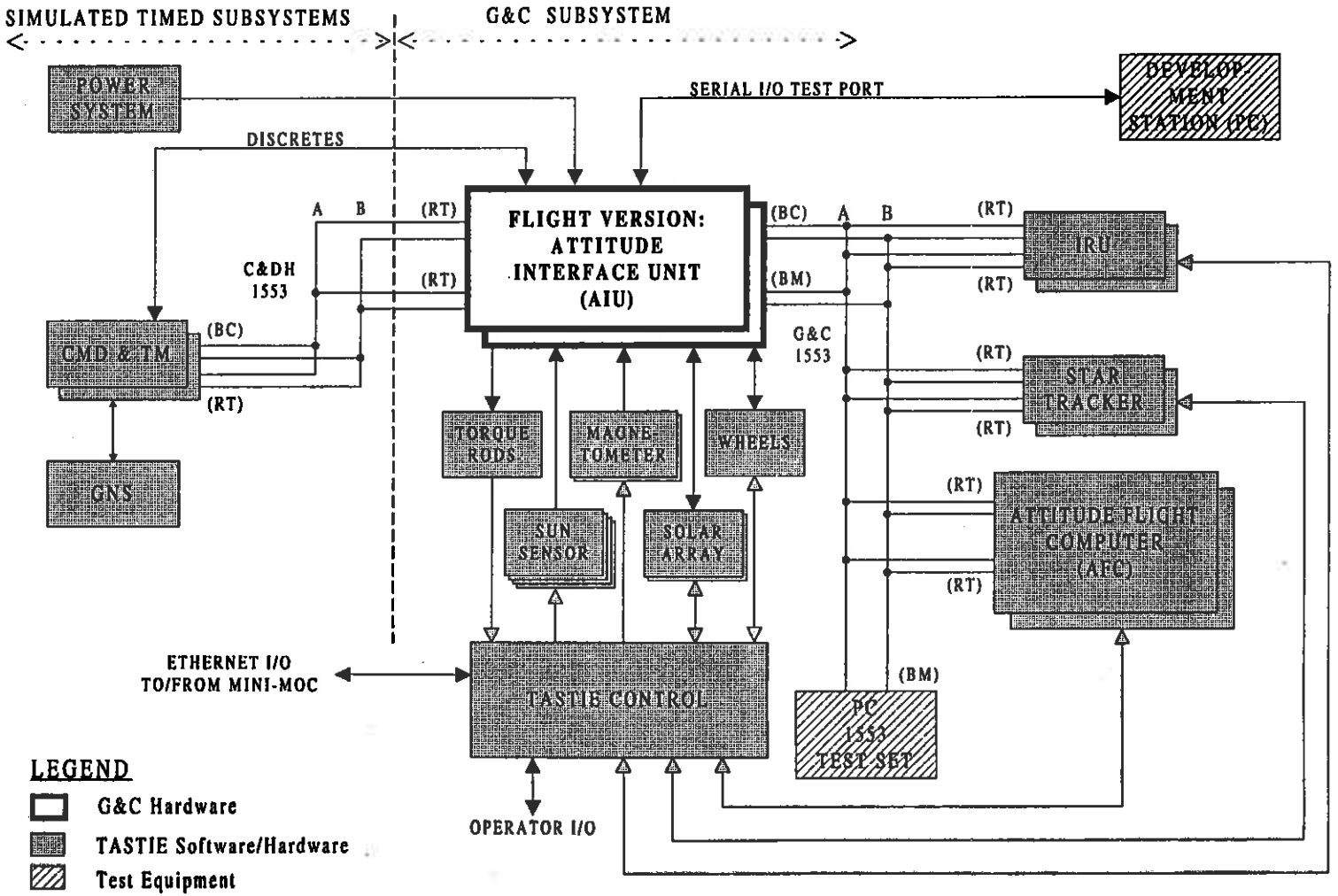
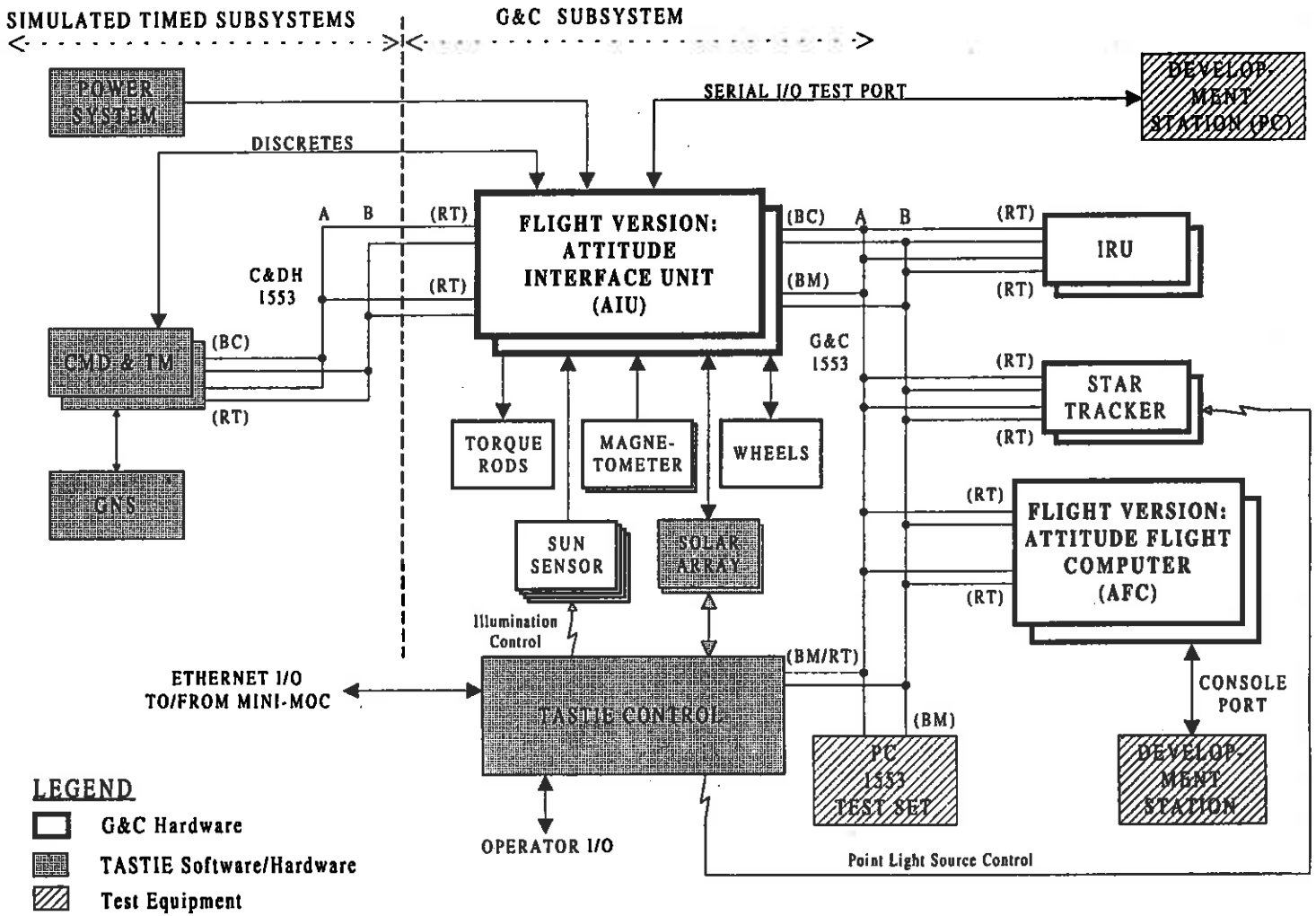
AIU HARDWARE TEST



G&C SUBSYSTEM TEST



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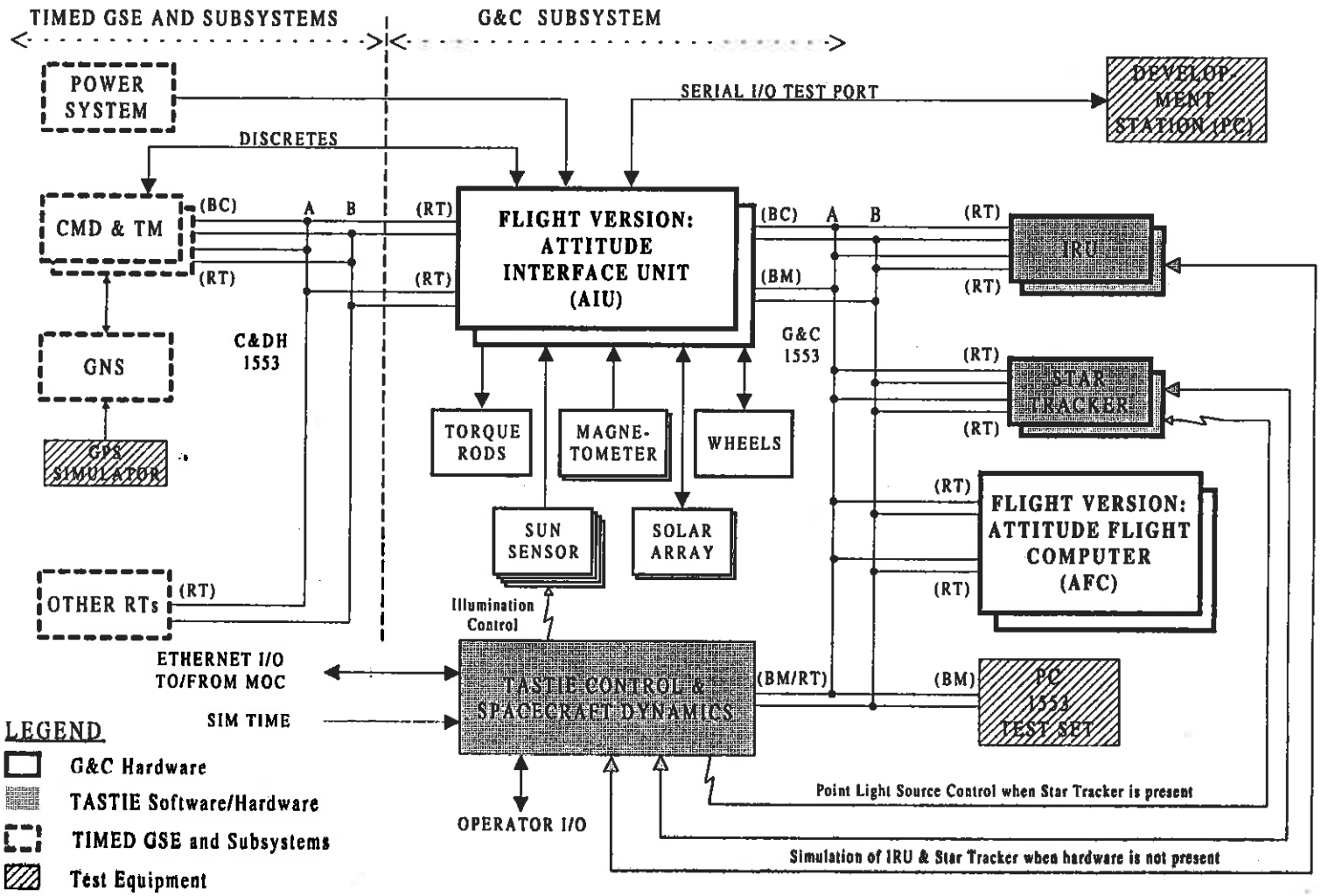
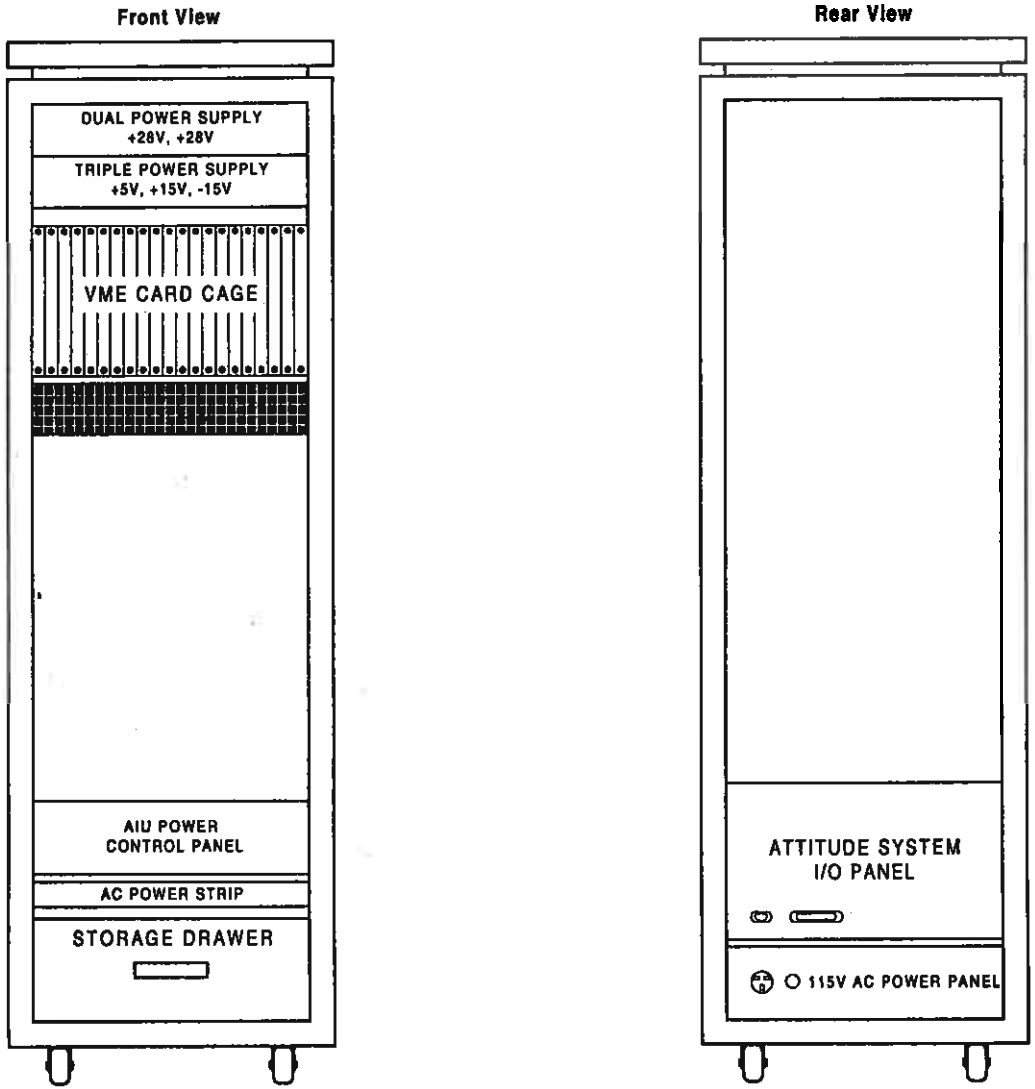
TIMED INTEGRATION



TASTIE Rack Configuration



TASTIE Hardware Design

- **Architecture and implementation based on NEAR mission NASTIE**
- **Host computer (PC) for operator interface, test scenario control and data display**
- **Movable 19-inch rack with 63-inch high equipment aperture**
  - **VME card cage (21-slot, 6U card form-factor, Integral Power Supply)**
    - **Motorola MVME177-013 Computer Card (M68060 CPU, 60MHz, 16Mbyte RAM) OS-9 operating system**
    - **Provision for second MVME177-013 card and 1Mbyte Dual-Port RAM card**
    - **Motorola MVM712M Transition Module and P2 Adapter Board providing Ethernet interface to PC Host, miscellaneous serial and parallel ports**
    - **ACTTECHNICO 2 Gbyte Hard Disk, 1.44 Mbyte Floppy Disk Module Mass Storage Unit**
    - **Two Excalibur MIL-STD-1553 Bus A/Bus B Interface Cards (C&DH, G&C)**
    - **~Eleven PEP Modular Computers I/O Carrier Cards hosting PEP off-the shelf I/O 'ModPack' plug-in cards (D/A, A/D etc.), APL-designed custom plug-in cards for Attitude System interfaces**

TASTIE Hardware Design

- **Programmable Protected Power Supplies**
  - **Overvoltage/overcurrent protection for Flight Hardware (interfaces)**
  - **Dual (+28V, +28V) unit for AIUs , Triple (+5V, +15V, -15V) unit for interface cards**

- **AIU Power Control Panel**
  - **Manual Control of AIU +28V supplies**
  - **Test-points for AIU-supplied test signals (internal +5V, +15V, -15V)**
  - **Tray for subsystem current-sense resistors, (buffer card), Torque Rods, IRU, Solar Array load resistors**

- **Attitude System Interface Panel**
  - **G&C, C&DH 1553 Bus Stub Couplers, Attitude System I/O interface connectors**

- **Rack Power Panel**
  - **115VAC, 60Hz supply input**
  - **Manual first-trip-reset breaker for equipment protection during multiple power interrupts**

TASTIE Application

- **Two TASTIE units:**
  - **Support all three G&C Integration and Test requirement configurations, G&C Software Development and TIMED Operations Simulation as necessary**
- **Attitude System Test Unit (ASTU):**
  - **Support TIMED Integration and Test activities**
  - **Essentially a TASTIE unit without G&C subsystem interface emulation cards**
  - **Perform field tests and simulations for pre-launch checkout at the spacecraft level**

Status and Issues Summary

- **Design:**
  - **Detail interface definition**
    - **Solar Array Drive details (Direction, Step, Enable signals control)**
    - **Solar Array Position potentiometer value**
    - **Sun Sensor Face current range values, integral I→V load resistor value**
- **Procurement:**
  - **All major hardware for the two major TASTIE units procured**
  - **Hardware components on order for Attitude System Test Unit**
- **Fabrication:**
  - **Concurrent build of main hardware for all units**
  - **Focus on interface card design and implementation to support software development and drive the TASTIE interconnect and cabling requirements**