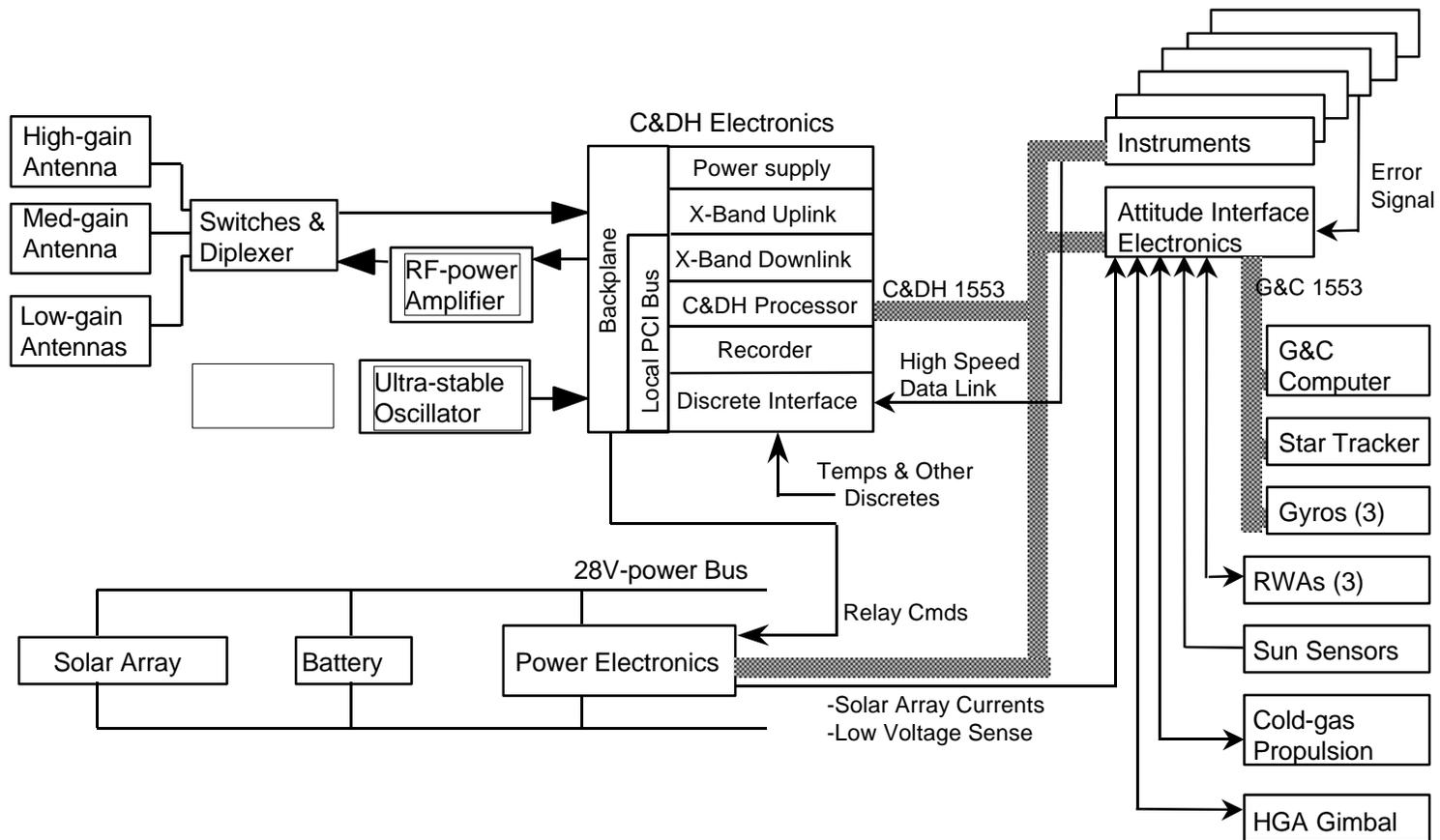


STEREO
Attitude Interface Electronics (AIE)
& Attitude Flight Computer (AFC)
Hardware Description

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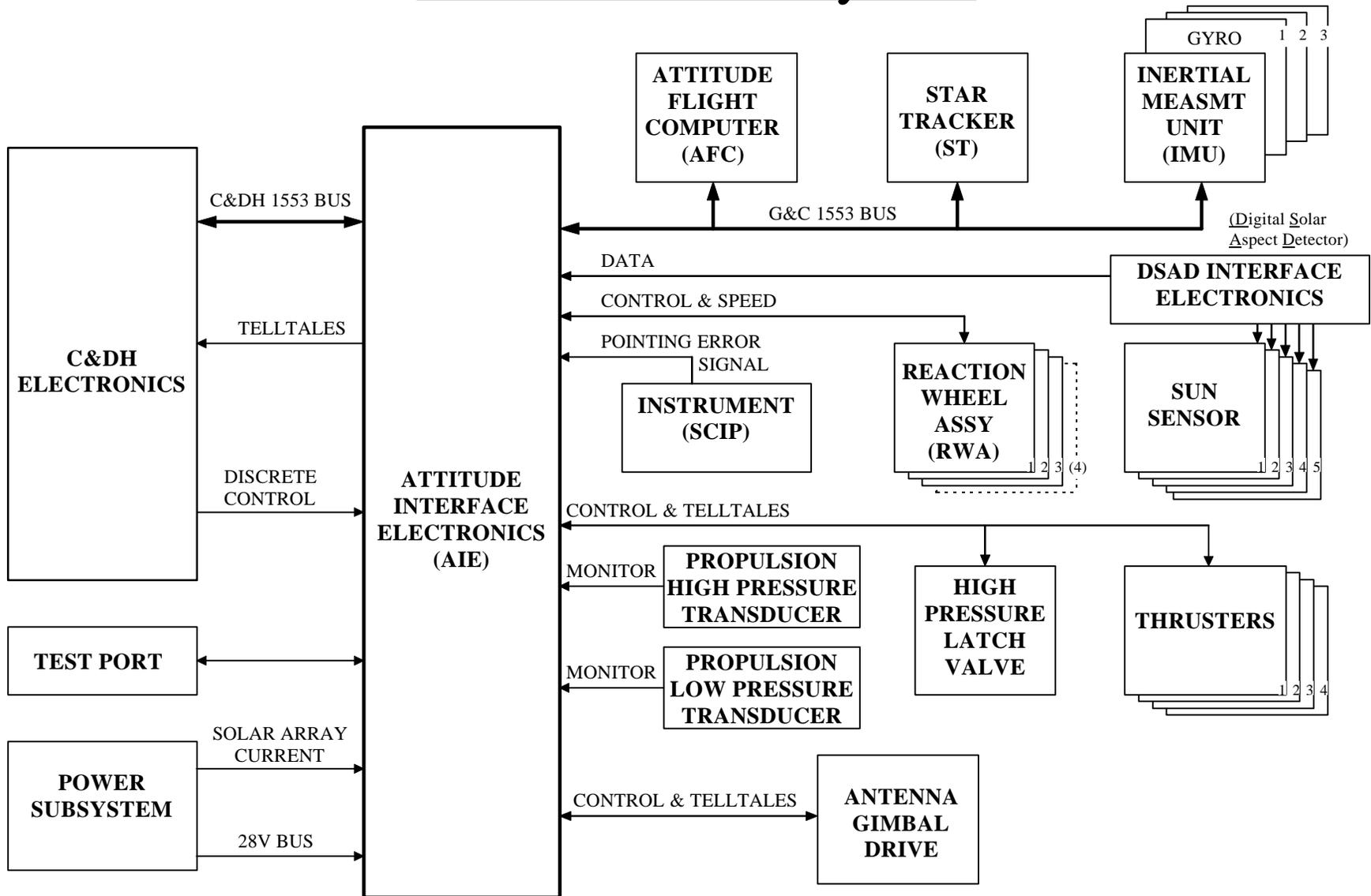
Spacecraft Block Diagram



AIE Hardware Requirements

- Provide the interface between the Guidance and Control System (G&C) and the Command & Data Handling System(C&DH)
- Provide the interface between the G&C system components
- Autonomously execute spacecraft attitude safing operations

G&C Hardware System



AIE Baseline Hardware Implementation

- Single string modified TIMED implementation
 - Four printed circuit board assembly with motherboard:
 - > Processor Card: RTX2010RH @ 12MHz, 64Kwords RAM & EEPROM
 - > 1553 Card: Two MIL-STD-1553 bus ports (C&DH and G&C)
 - > Analog Interface Card: Accommodates subsystem analog interfaces
 - > Digital Card: Accommodates subsystem digital interfaces and relay control functions.
 - Relay Matrix: For IMU (gyro) control, propulsion system control, and antenna gimbal control
 - DC/DC Converter Board: 28V bus primary
- Processor and 1553 cards would be, for the most part, unchanged.
- Analog Interface and Digital cards should be considered as new designs to accommodate new G&C subsystems.

AFC Hardware Requirements & Implementation

- Requirements:
 - CPU: 32-bit architecture
 - Memory: (x)Mbytes SRAM, (y)Mbytes Flash EEPROM
 - I/O: MIL-STD-1553 Bus
- Implementation: Use same processor design as that for the C&DH processor
 - Mongoose-V, @12Mhz, 2MByte SRAM, 4MByte EEPROM, 1MByte console boot ROM, 1553 bus, PCI bus(unused).
 - May need to identify and incorporate alternative SRAM and EEPROM components (parts used on TIMED may no longer be available)
 - Board layout modifications required to accommodate new and/or increased memory requirements.
 - DC/DC Converter and Housing design unchanged from TIMED design.

Mass, Power & Heritage

	<u>Mass</u>	<u>Power</u>	<u>Heritage</u>
<u>AIE</u>	4.5Kg	11W (@28V)	TIMED, but with some new design
<u>AFC</u>	2.5Kg	10W (@28V)	TIMED

Candidate Trade Studies

- AIE Processor Upgrade
 - Hardware upgrade costs versus software development cost
- Attitude Flight Computer: Make versus Buy
 - Significant processor upgrade to possibly eliminate the need for an AIE processor
 - Lowest combined hardware/software development cost option wins
- G&C Configuration Options:
 - Relocate AFC inside the C&DH Integrated Electronics Module (IEM) to save mass and power (single 1553 bus in AIE) and to eliminate the need to fabricate a separate housing.