

WV Communications



Flight Control Processors (FCP)

The FTS Control Processor (FCP) is the heart of the system, where the mission configurations generated via the FTS Programming System (FPS) are stored, and where all commands are executed and verified. The FCP interfaces to the various FTS subsystems via an Ethernet interface, while the interface between the FCP and the Flight Termination Panels (FTP) is also via Ethernet or by way of voice channel modems. The FCP does not include Hard Disk, an Operating System or File System. The Embedded code is stored in



FLASH memory and loaded into the on-chip SRAM at startup. This Embedded code consists of a single C program.

The FCP receives button change information from the FTPs, translates them into commands, following the rules set up for the mission and then issues the necessary commands to the transmitter subsystem (CEE, HPA & CVR) to cause the FTS commands to be transmitted. It collects data from the CVR and translates the information back to button verification messages to the FTP. The FCP also collects logging data, determines the health of itself and other FCPs in the system, as well as the health of the FTPs and the transmitter subsystem devices. The FCP monitors the health of all the system components in order to perform failover decisions. The FPS and FSC devices also communicate with the FCP to store logging data, present status information to the user and make operational or configuration changes. .

The FCP also most clearly represents the philosophy of the system architecture. In flight termination systems there is always a struggle between simplicity and features available, between being user-friendly and being robust. A rich user interface requires more hardware, a more complex program and generally a feature-rich operating system. Such a system is generally multi-tasking and multi-threaded in order to efficiently support the interface. However, these take a toll on both reliability and determinism, which make them undesirable for a safety critical system. WV's FTS architecture avoids these problems by separating the rich user interface from the mission critical data path. Most of the need for a feature rich user interface is during mission setup, which is not a mission critical task. The rich user interface is in the FPS (the Linux workstation) and the mission critical data path is in the FCP. Because some FPS functionality is mission critical, the FSC serves as a high reliability backup subset of this functionality.



The FCP is designed to be a high reliability, mission critical component of the system. It is based on a DSTni Ex high performance, high integration 186 CPU with 256 K bytes of on-chip 0 wait state high speed RAM which is used for code and data. The FCP also includes an FPGA to allow custom interfacing. When used with FTPs connected by voice grade lines, the FPGA contains up to 10 USRTS that interoperate with plug-in modem cards. This combination allows different interfaces to be provided where needed. As an option, the FCP can be equipped with a Triple Data Encryption Standard Unit (TDU) slot in order for the FCP to receive a TDU device for processing EFTS commands from a central location.