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FIBER OPTIC
DATA TRANSMISSION

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Fiber optics (the transmission of light through glass fibers along the inside of plastic tubes) is a relatively new technology in avionics engineering. Present day avionics require sending ever increasing amounts of data through smaller spaces with less interference. Fiber optics appears to be the answer to this demand due to numerous advantages over traditional copper wire communications.

One of the most important advantages of fiber optics to the avionics industry is the weight savings when compared to copper cable. Glass weighs much less than copper, and considering the small size of individual fibers, the weight savings can be significant.

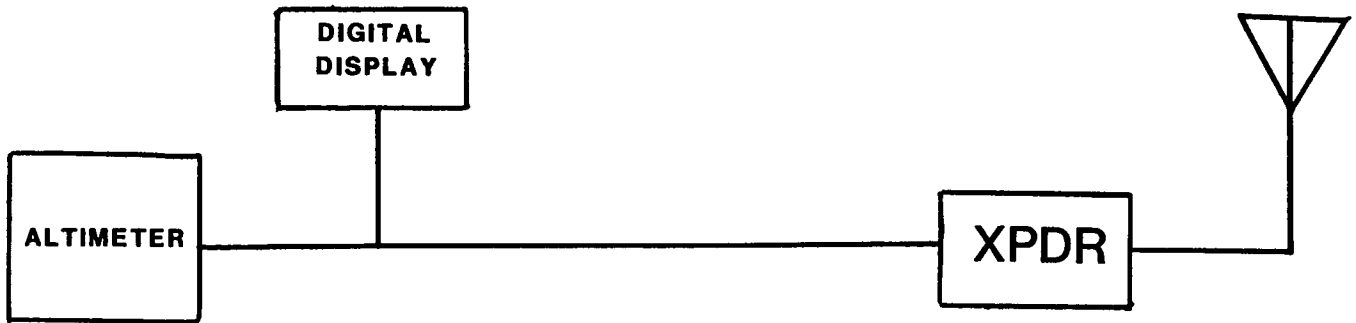
Optical fibers have lower attenuation (the loss of signal intensity as it travels the length of the fiber) than do coaxial cables. The fibers also do not emit energy, thus eliminating the need for shielding.

Greater bandwidth is an important advantage of fiber optic communications. The transmission frequencies of light are several orders of magnitude above those in common cables, allowing greater transfer of information.

With the above facts in mind, the Ohio University Avionics Engineering Center is currently developing a fiber optic data bus transmission and reception system that could eventually replace copper cable connections in airplanes. The original form of the system will transmit information from an encoder to a transponder via a fiber optic cable. An altimeter and an altitude display are connected to a fiber optic transmitter by copper cable (bottom figure). The transmitter converts the altimetry data from nine bit parallel to serial form and sends these data through a fiber optic cable to a receiver. The receiver converts the data using a cable similar to that used between the altimeter and display. The transmitting and receiving ends also include a display readout. After completion and ground testing of the data bus, the system will be tested in an airborne environment.

Thus far, the project has encountered no major problems. The fiber optic link was built from a kit produced by Advanced Fiber Optic Corporation. It has been tested and performed well. Three connectors have been chosen to be used in the circuit. The data modem is near completion and will be tested with the fiber optic link, connectors, and individual components when complete.

EXISTING DATA BUS DESIGN



INITIAL FIBER OPTIC DESIGN

