



ABLE SERIES PAYLOADS

Pioneer V is the third payload in the advanced Able series of space probe vehicles developed by Space Technology Laboratories, Inc. for the Air Force's Ballistic Missile Division and the National Aeronautics and Space Administration.

Prior Able payloads were the Explorer VI "paddlewheel" satellite and Atlas-Able IV. Each was instrumented to carry out a large variety of space experiments concurrently.

The three payloads are considered to be by far the most advanced developed in the history of space flight.

Among significant developments which have been incorporated in their design are the following:

1. Telebit, which is the most advanced telemetric system to date.

Designed to transmit information over interplanetary distances upward of fifty million miles, the unit, unlike its analog predecessors, stores and calculates the data collected by payload experiments before transmitting the totalled information earthward via radio signal.

Telebit is a vital advance in the state of the art in deep space communications. It answers the immediate needs of America's current space exploration programs while anticipating the requirements of future deep space probes.

2. Energy from the sun was used to supply all of the electrical power necessary to operate the Able payloads' array of instrumentation. Mounted on four large paddles extended from the payloads' shells, the cells were designed to harness about 8 percent of the sun's energy impinging at each cell and convert it to electricity to be stored in batteries located within the payload for use when necessary. The complete power system weighed between 25 and 30 pounds with a minimum lifetime of one year.

3. Toy-like propellers were spotted on the outside of Atlas-Able IV's spun aluminum shell to maintain temperature control in its instrumentation compartments.

The stubby, four-bladed propellers were newly designed to regulate the internal temperature of space vehicles as they are exposed to the heating sunlight and cooling shadows encountered in space travel.

Relying on the absorption and reflection qualities of black and white surfaces, they were designed to operate when preset high and

low temperature extremes were encountered.

4. Instrumented to conduct a series of sophisticated experiments concurrently, the Able series payloads were designed to provide the most valuable and comprehensive space data collected to date.

Because experiments in such important areas as radiation, magnetic fields and propagation could be conducted simultaneously, the interactions of these phenomena and their effects on one another could be recorded and studied for the first time.

5. For the first time in the history of the nation's space program, a United States space probe payload, Atlas-Able IV, contained an advanced propulsion system of its own, capable of six starts on command from the ground for speed adjustment and orbit injection.

The system offered the advantages of making precise trajectory adjustments during flight and added "muscle" to the space guidance system.

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