



NASA: The Journey Continues

CAE-Link Corporation
Link Flight Simulation Division



NASA selected Link for the Training Systems Contract — to include Shuttle training upgrades, developing training for Space Station Freedom, and preparing for space training requirements of the next century.

Link Flight Simulation Division of CAE-Link Corporation

The Johnson Space Center training systems require the world's most sophisticated simulation. The Shuttle Mission Simulator, for example, uses 413 million bytes of programs and data (compared with 16 million bytes used by the Shuttle itself during a mission).

Link Flight Simulation has been a key player in the manned exploration of space for three decades, developing all of NASA's mission simulators from Gemini through the Shuttle. Now, under the Training Systems Contract (TSC), Link will continue to support the Johnson Space Center mission to the year 2000 and beyond.

Training Systems Contract

Link's responsibility includes upgrades to the Shuttle Mission Training Facility in Houston, developing training facilities for the Space Station *Freedom*, and evolving the

training system infrastructure to meet space exploration requirements of the 21st century.

The TSC represents an evolutionary step in the manned spaceflight program. Training for past NASA programs such as Gemini and Apollo were essentially single-program, stand-alone sortie operations. The Shuttle, Space Station, and other future endeavors are multi-program, interdependent, and habitation-operations oriented.

Another unique aspect of the Training Systems contract is that Link acts on behalf of NASA to manage acquisition and development of training equipment. As prime contractor, Link conducts open competitions for development of trainer system elements, a function previously performed by NASA.

Link's team members on the TSC include IBM Corporation; Booz, Allen & Hamilton; and Eagle Aerospace.

IBM has responsibility for information systems definition, onboard computer, and data management simulation. Booz, Allen focuses on spaceflight operations engineering and integration. Eagle's role is as competition advocate and design validator.

National Test Bed

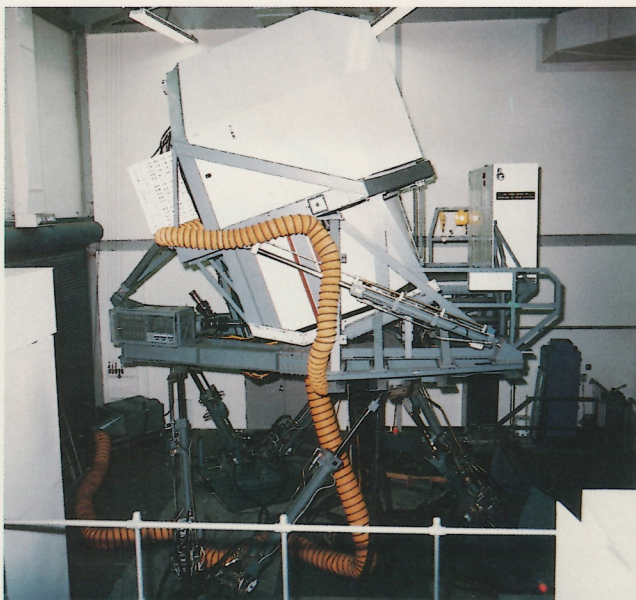
Link is also vitally involved in Strategic Defense Initiative (SDI) simulation as part of the Martin Marietta National Test Bed (NTB) team.

The NTB mission is to provide a comprehensive capability to demonstrate and independently validate alternative SDI battle management/command, control and communications (BMC³) system architectures and key defensive technologies in support of the SDI Technology Verification Strategy. It is unlikely, unless there is an actual ballistic missile attack, that the planned Strategic Defense System will ever be wholly tested; therefore the Test Bed's end-to-end simulations are essential to systems analysis.

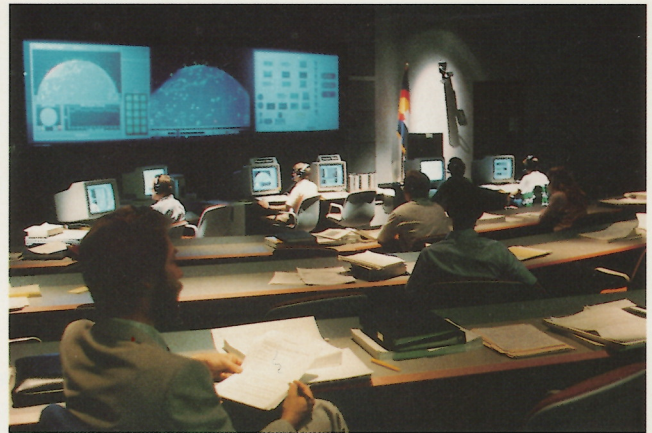
Link's role on the NTB team is twofold: (1) prototyping, demonstration, and subsequent formal development of simulation software providing capabilities in the areas of man-machine interface (MMI), initialization and control, interactive gaming and assessment, plus data recording, playback, monitoring and reduction; (2) support planning and implementation of simulations and experiments to be hosted in the NTB, with focus on satisfying the unique MMI, control and data collection requirements.

Link Spacecraft Simulators

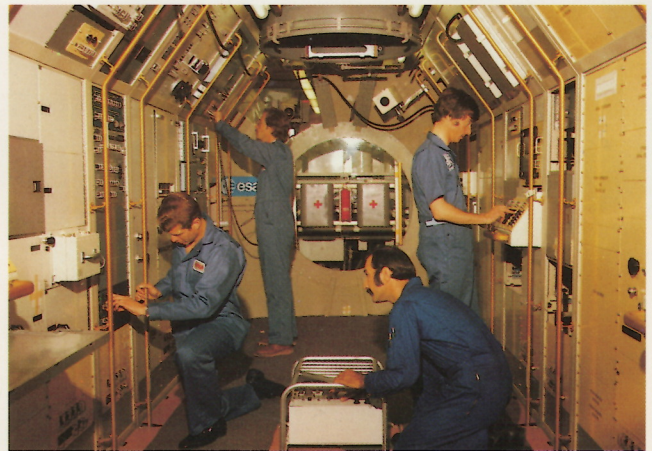
Link applied simulation technology to help train astronauts in 1962 for pioneering Gemini flights. Link space simulators were also developed for the Apollo Command



Shuttle Mission Simulator (SMS) motion-based crew station. The SMS provides full mission training for Shuttle crews, including launch, orbital insertion, orbital operations, re-entry and landing, as well as integrated training with the Mission Control Center. The SMS, which also incorporates a fixed-base crew station, has been regularly upgraded to remain concurrent with the Shuttle program's expanding technology.



The National Test Bed has been called "one of the most elaborate computer simulation networks ever developed."



The Spacelab Simulator trains astronauts and mission specialists to operate the European Space Agency (ESA) Spacelab module during Shuttle orbit. The Spacelab Simulator is networked with the Shuttle Mission Simulator.

Module and the Lunar Module — teaching man to land on the Moon — and Skylab. And since the maiden flight of *Columbia* in 1981, Link's Shuttle Mission Simulator (SMS) and later the Spacelab Simulator have been serving NASA's crew and integrated mission control training needs.

The indispensability of such spacecraft simulators was dramatically demonstrated during the flight of Apollo 13 when an explosion in the service module severely depleted Apollo's power systems. Emergency measures were first thoroughly tested in the simulator before being relayed to the crew for implementation, resulting in a safe return to Earth and the rescue of three courageous astronauts.

Six Decades of Simulation

The Link name has been synonymous with simulation and training for six decades, ever since Edwin A. Link patented the first ground-based pilot training device in 1929.

The focus at CAE-Link Corporation today is the design, development and integration of total training systems for flight, naval, tactical, command/control, space, and maintenance training applications. They are produced primarily for the U.S. military market, international users of U.S. weapons platforms, and NASA.

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