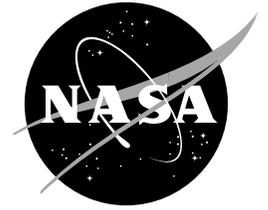


NASA Facts

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NF-1996-07-01-LARC June 1996

An Olympic Challenge over Atlanta

Light aircraft technology rises to 'Highways in Sky' at Games



The ground monitoring system used by air traffic controllers for ASTS is located at Dobbins Air Force Base, GA

The 1996 Summer Olympics in Atlanta offer a rare opportunity to evaluate technologies being developed as part of a nationwide effort to revitalize general aviation - that sector of aviation that includes everything from personal helicopters and fixed-wing aircraft to business, public and commuter aircraft.

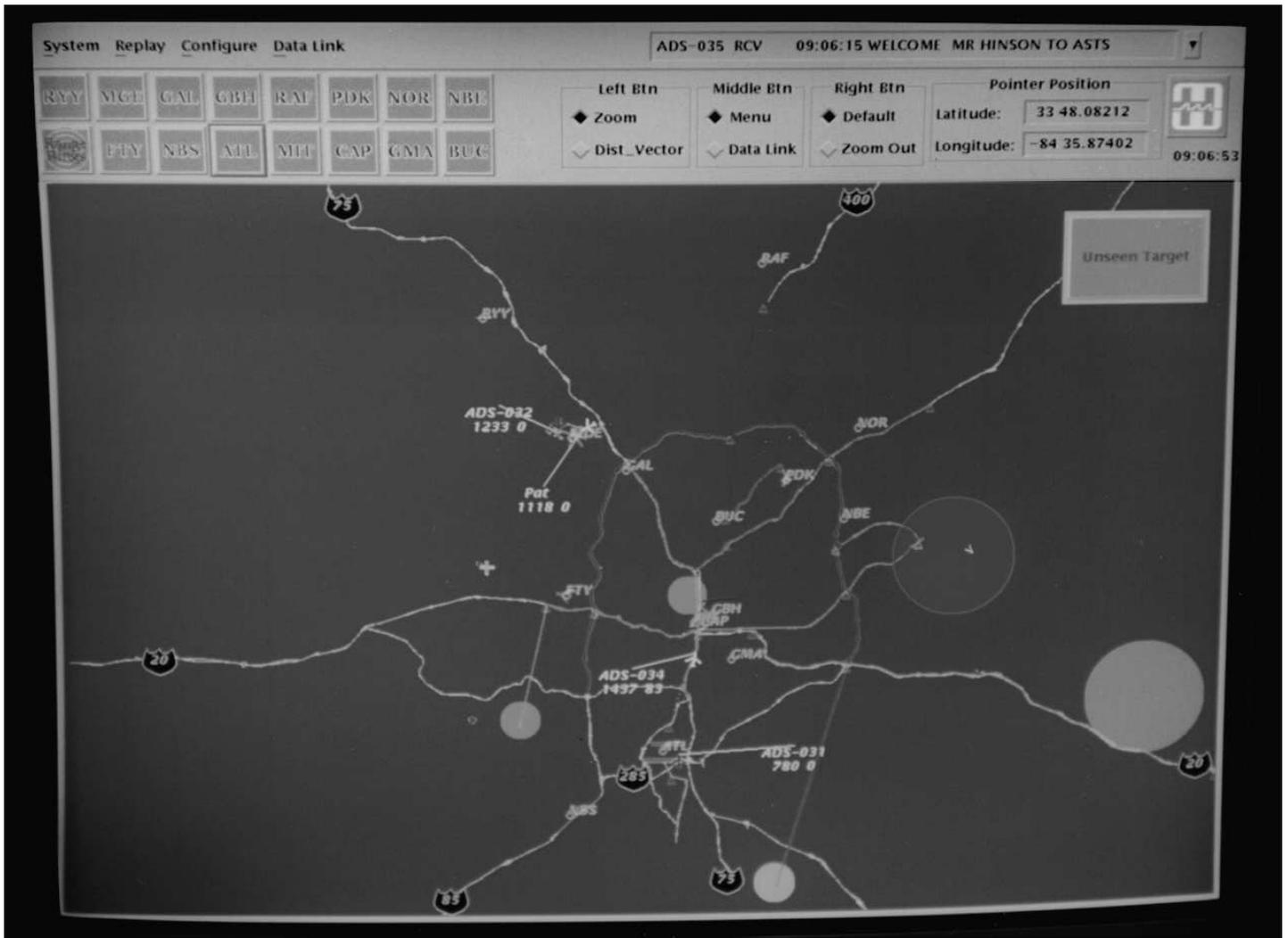
A government-industry consortium, the Advanced General Aviation Transport Experiments (AGATE), is taking advantage of this opportunity and, in the process, helping transport goods and provide public safety services by helicopter during the Olympics, July 19 through August 4.

The Big Picture

AGATE consortium members are contributing to a government-industry initiative known as the Atlanta Short-haul Transportation System (ASTS), (now called Operation Heli-Star). The ASTS program is responsible for fostering both air and ground transportation during the Olympics and integrating the two into one efficient transportation system.

The Experiment

In Atlanta up to 50 helicopters equipped with AGATE-designed avionics will participate in proving



Pilots participating in ASTS will have a cockpit display showing designated “highways in the sky” around Atlanta with Olympic venues marked by the circular areas.

communications, navigation and surveillance concepts - some integrated in flight for the first time. More than 1,400 hours of flight time during the Olympic Games is expected to yield data on operational use and human factors.

Radar-like ground monitoring stations will enable air traffic managers and security personnel to see the precise location of each helicopter, further enhancing ground-related operations like the dispatch of cargo and direction of emergency response teams.

Highways in the Sky

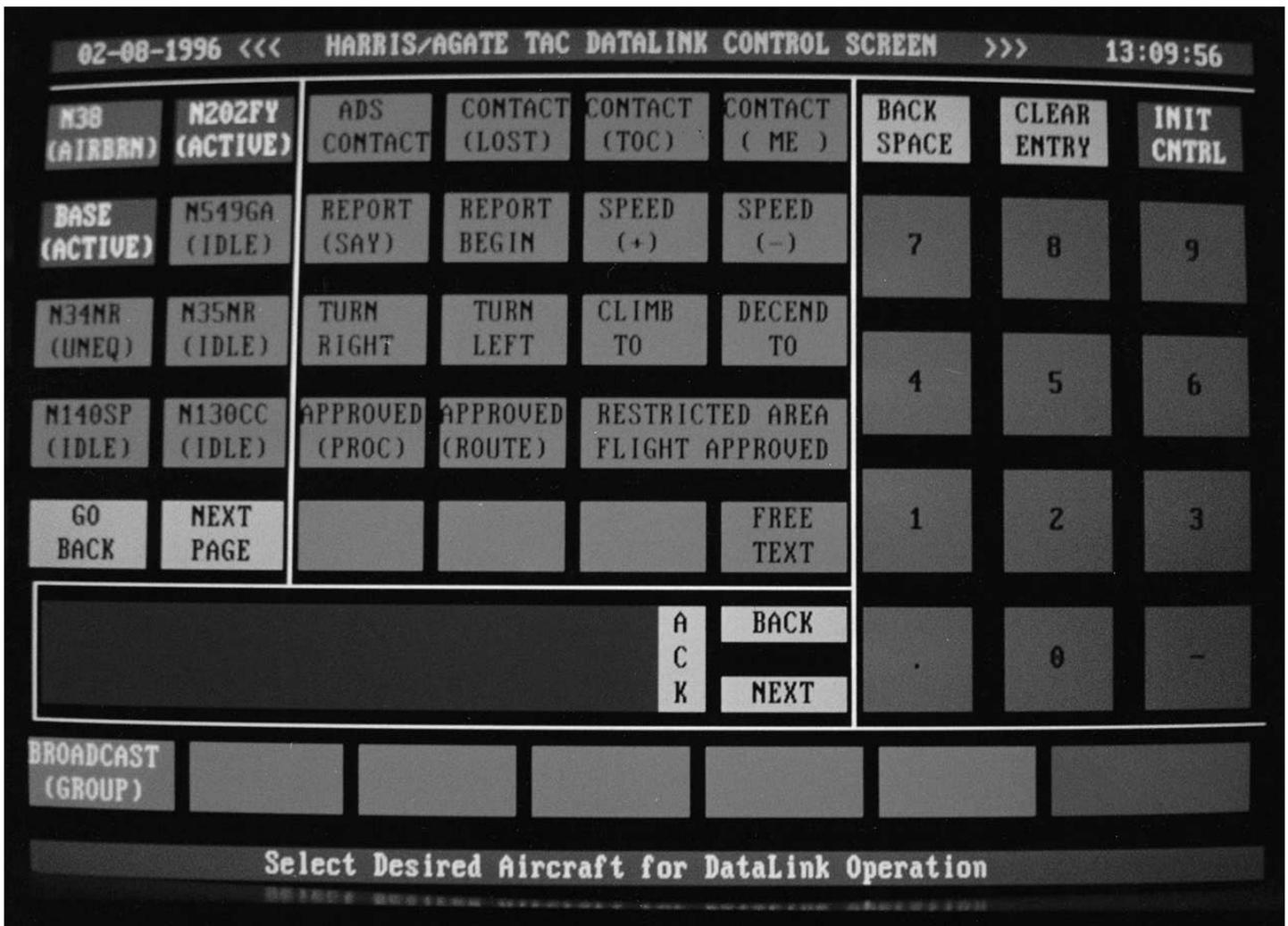
Most of the critical flight operations will be conducted in “uncontrolled” air space outside Atlanta’s radar coverage area close to noise-sensitive communities, hence the need for predetermined flight pathways. While flying over concrete highways on the ground, selected helicopters will fly electronic “highways in the sky,” allowing precision navigation with routes represented on a computerized map of the

Atlanta area. This airborne map will be generated onboard the helicopter using a database replicating the image seen on ground consoles. Position updates are based on information from the Global Positioning Satellite (GPS) system transmitted to the ground monitoring stations and other aircraft via digital radio data links. The pilots see their highways in the sky, other traffic on those highways, active and inactive Olympic venues and real time graphical weather.

This technology effort will aid participating pilots in the safe and efficient conduct of their missions - while at the same time aiding ground personnel by indicating the precise location of aircraft. This will facilitate timely deployment of aircraft to satisfy high priority transportation needs and emergency response actions during the Olympics.

The Technologies

The AGATE-equipped helicopters will demonstrate how airborne avionics (called ADS for automatic



This touch screen data entry device will be used for voiceless air-ground communications via digital data-link.

dependent surveillance) and ground monitoring stations can be used to track aircraft, using the GPS navigation system coupled with the air-ground data link, as an alternative to radar. Pre-Olympic flight tests represented the first time that GPS and ADS technology had been combined and publicly demonstrated with multiple aircraft simultaneously.

Use of the new technology will enable the position of nearby aircraft whose flight path may conflict with one's own operation to be displayed in the cockpit. This will further enhance safety of flight. The Atlanta experience will mark one of the first public uses of cockpit display of traffic information with data received directly via GPS/ADS broadcast from another aircraft.

Another function to be demonstrated during the Olympics is the capability of the digital two-way data link. It will provide pilots and ground personnel with a voiceless means of communications - via keyboard or touch screen entry and the multi-function cockpit display. Graphical weather and textual weather messages will be broadcast via data link from the ground



Enhanced navigation systems will enable pilots to see traffic information including other aircraft positions as well as airports and hazards to navigation.

transmitter to the cockpit display. Additionally, two-way data link will allow pilots and cargo dispatchers to communicate complicated messages with ease and reduced errors.

The Players

Primary partners for the ASTS are the FAA; Helicopter Association International; Georgia Emergency Management Agency; the Atlanta Vertical Flight Association, a consortium of Atlanta businesses and municipalities; and AGATE with NASA providing a leadership role. The FAA plays a dual role in the Atlanta Olympics project in that it is also a participating AGATE member.

AGATE is providing the special airborne equipment and ground monitoring stations that will enable the ASTS program to operate safely and efficiently. AGATE's support of the Atlanta Olympics is managed by the AGATE flight systems industry team led by NASA Langley Research Center.

AGATE industry members participating directly in the ASTS program are ARNAV Systems Inc., Harris Corp., PanAm Systems, AvroTec Inc., Digital Equipment Corp., ARINC, Terra Corporation and NavRadio.

Revitalization

AGATE was formed in 1994 to revitalize U.S. general aviation through advanced technology development and deployment. AGATE aims to make single-pilot, light airplanes safer, affordable and more available as a viable part of the nation's transportation system. AGATE targets round trips of 150 to 700 miles - trips that are too long to complete in a day by automobile and too short to efficiently use the commercial airliner system.

Beyond Atlanta

Managers of the 70-plus member AGATE consortium envision a not-too-distant future where AGATE-developed technologies demonstrated during the 1996 Summer Olympics will help enable a nationwide system of highways in the sky. They are striving toward a time when safe, efficient personal air transport will be a viable alternative to ground transportation for longer trips. The Atlanta Olympics serve as an excellent opportunity for testing new technologies and provides AGATE with its first experience with free-flight.

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Broadcasts of graphical weather depicting various levels of precipitation will be transmitted via data link to the cockpit display.



The specially equipped helicopters used in the ASTS program will be capable of self-dispatch in a "free-flight" mode during the Olympic games.

