Ariel Provides Onboard Network Access For In-Flight Internet Service

Flying along at 40,000 feet and 500 mph no longer means that a passenger's business has to come to a stop. Air Canada has launched a new passenger service that delivers in-flight access to "Best of the Web" content and email. Services include in-flight email, global roaming capabilities, extensive web content, a business-focused Web portal, targeted e-commerce services, and content updates throughout the traveler's experience.

Tenzing Communications, Inc. will provide the Internet access system required to deliver these services. The system, utilizing a compact, highly reliable on-board network and access server developed by Miltope Corporation (Boulder, CO), provides simultaneous Internet access for up to 30 passengers. Ariel will supply the 56K/ISDN remote access cards required for the server.

Onboard System

Tenzing's in-flight access system uses an E1 local area network to link the access server with passenger seat groups, each of which contains one or more phone terminals. To access the on-board Intranet, the World Wide Web, or send email, passengers simply plug their modem-equipped notebook computers or Personal Digital Assistants (PDAs) into the phone jack and place a call to their existing email address.

When passengers connect to the network, Miltope's E-server answers each call and forwards it to the aircraft's central telephone unit (CTU). The CTU, in turn, uses an ARINC 429 compliant RF up/down link to connect passengers to the North American Telephone System (NATS). The system will eventually utilize satellite links to provide Internet access during transatlantic and transpacific flights.

The Tenzing system is compatible with PCs, Macs, and PDAs, and supports Windows 98, Windows NT, Apple Macintosh, Windows CE, and Palm Pilot platforms. Passengers can connect to the system with any SMTP, POP3, HTTP, and IMAP compliant clients including Microsoft, Netscape, Eudora, and other well-known email programs.

The E-Server runs in conjunction with an Apache web server to deliver cached web content. This content, provided by a large number of tier one Internet hosts, includes current editions of popular daily newspapers, market and financial news, favorite shopping sites, and more. Each airline can customize and regionalize the server content to meet their particular communication objectives. Because it meets ARINC standards, the E-Server design allows airlines to host additional applications. These might include a program that cabin attendants would use to take drink and meal orders instead of the present scrawl on the back of a napkin, for example.

Tenzing has developed custom software to handle all network functions associated with email and to meet the specialized needs of in-flight service. The software bundles and compresses both outbound and inbound messages, takes care of DNS and authentication functions, and tracks where during a transmission any drop out in communications occurs.

When the passenger reconnects to the system following a drop out, the software picks up the transmission where it left off without having to retransmit all messages or the entire attachment. For attachments, the intelligent software notifies the passenger if an arriving email contains a significant attachment. It also notifies the passenger of the service fees that may apply to upload/download attachments and the time needed for that transaction. Optionally, the passenger may opt to wait until the plane is at the gate to minimize transmission time.

Miltope Access Server

As a maker of ruggedized command and control networks, work stations, and high-reliability systems for mission critical applications for the Department of Defense, Miltope was familiar with the application's need for high reliability in a compact form factor. To meet these requirements, the Miltope design team had to package it's E-server (the commercial equivalent of which would be housed in a PC "Tower" case), to fit within a 4 MCU chassis about the size of a ladies' shoe box. Miltope, in turn, called on Ariel to repackage its PCI-based RS2000 network access card using an EBX form factor that could be incorporated within this compact chassis.

Miltope's extensive experience with EBX – based systems produced the conclusion that this approach was the lowest – risk solution. EBX is a compact, ruggedized form factor (8 in. x 5 _ in.) that was originally developed for harsh, space-constrained, embedded systems applications. The form factor's support for vertical air flow makes it ideal for building ARINC- (Aeronautical Radio, INC.) compliant aircraft network access systems. Similarly, its high density open architecture makes the EBX form factor ideal for building scaleable, long-life equipment that can be readily upgraded to support new features and higher data rates.

Ariel's EBX network access card provides the 56K modems and E1 interface needed to connect passenger seat groups with the E-server. Combining a pair of T1/E1 network interfaces with 30 56K modems, the card can simultaneously connect up to 30 passengers with the servers. An E-Server equipped with a pair of Ariel cards can provide simultaneous connectivity for up to 60 passengers.

The E-Server and the Ariel card run on the Linux operating system, but both support Windows NT as well. Besides the telephony interface provided by the Ariel card, the E-Server includes the processor and all storage. The hard drives are hermetically sealed for high altitudes, assuring ongoing performance at the aircraft's cruising altitude. Miltope is recognized as the industry leader in mass storage and provides vital components to many Inflight Entertainment (IFE) suppliers for applications such as Video-On-Demand

(VOD), etc. Additionally, the E-Server is also connected to the aircraft's avionics system which continually updates the server regarding the aircraft's status throughout the flight. For instance, the avionics system will advise the E-Server of the aircraft's tail number or phase of flight. This real-time update allows e-mail and messaging to be delivered to the on-board customer without incurring unwanted network delays. Or the event signaled from the avionics system may trigger a communications link to update web content.

Current and Future Service

Air Canada will bring in-flight email and Internet content to the Air Canada North American fleet in a trial test that has already begun. In-flight service will also include global roaming and a frequent traveler services program. In-flight service complements the airline's high-tech services already available to passengers in their Maple Leaf lounges. The airline plans to deploy the onboard email and Internet services across its entire fleet eventually. Initial service will be for North American flights only.

Tenzing has already announced that it will be introducing the in-flight system with other airline partners during the first quarter of 2001, including another leading international airline. The company will be expanding the service offering to eventually include Internet access from airport lounges, worldwide Internet access, itemized paperless monthly billing, and a Frequent Business Traveler portal. Additional future services will include in-flight telephone and fax functions via Internet.