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CPDLC Flying in Europe

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ARINC participated in this year's big ATC data link success—the Preliminary EUROCONTROL Test of Air/Ground Data Link II (extended) (PETAL IIe) program. In the second quarter of 2001, American Airlines began using CPDLC with controllers at Maastricht Upper Air Control Center, using ARINC's VHF Digital Link Mode 2 (VDLM2) over the Aeronautical Telecommunication Network (ATN). This was the culmination of major testing efforts throughout the first quarter of 2001. It is a significant step forward to the full operational implementation of CPDLC throughout Europe and the United States.

In April 2001, American Airlines installed the Rockwell Collins avionics on a 767-300ER and began final testing for certification. During the certification flight on May 29, 2001, the aircraft conducted CPDLC message exchanges with Maastricht UAC, Netherlands, via the ARINC VDLM2 ground test stations at Dallas/Fort Worth, Texas, and Tulsa, Oklahoma.

Meanwhile, ARINC was installing a six-station (London, Amsterdam, Paris, Hamburg, Berlin, Frankfurt) VDLM2/ATN air/ground network to provide data link coverage for Maastricht airspace. EUROCONTROL began ground-based testing against the ARINC European network in May and in June began air-based testing using a BAC1-11 aircraft equipped with avionics identical to that being used by American Airlines. The EUROCONTROL air-based testing paved the way for American Airlines to begin flights in Maastricht airspace early in July. The PETAL IIe program is scheduled to run through October.

The PETAL IIe program has been an unqualified success. PETAL IIe not only validated the use of CPDLC in an operational environment, but also demonstrated the suitability of VDLM2/ATN for CPDLC. PETAL IIe provided the opportunity to identify technical and operational issues in preparation for the first fully operational implementation of CPDLC in domestic U.S. airspace—the FAA CPDLC Build 1 program. CPDLC Build 1 will be implemented in Miami airspace in 2002 and will use ARINC's VDLM2/ATN network for air/ground communications. American Airlines is also CPDLC Build 1's launch airline.

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Evolving Oceanic Communications

Tom McMahon
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Since the inception of commercial flying, HF radio has been an integral part of the communications equation for both air traffic control and aeronautical operational control communications. That started to change in 1992, when the FAA, United Airlines, and ARINC embarked on an innovative experiment using satellites and data link for communications. Known as "Package A," this communications method began with first position reports and later ATC clearances being exchanged between flight crews and controllers via ARINC radio operators at Honolulu and San Francisco. The bulk of communications with other flights was via HF voice, but the evolution had begun and continues today.

Communications Centers

As increasing numbers of aircraft are being outfitted for data link, HF radio is still being used for oceanic communications because of its long-distance characteristics. The reason controllers don't use it to communicate directly with aircraft is that it is sometimes noisy and labor intensive to use. Universally, ATC uses a third party to relay communications between controllers and flight crews. For several decades, the FAA has used ARINC for this service. Position reports from flights are transcribed verbatim by ARINC radio operators and immediately forwarded to the FAA oceanic center responsible for the flight. Conversely, when ATC desires to change the route or altitude of a flight, the message is passed verbatim by

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INSIDE

CHAIRMAN'S PERSPECTIVE

Jim Pierce
Chairman and
Chief Executive Officer,
ARINC Incorporated

September 11, 2001

On behalf of everyone at ARINC, I want to express our deepest sympathy to the families and friends of all those who died, either in the air or on the ground, in the horrific hijacking and crash of four airliners in a heinous attack on the World Trade Center and the Pentagon.

Those of us privileged to work at ARINC, and many readers of *The Global Link,* have close personal friendships with individuals at both United and American. We extend our sympathy to them for the loss of their dedicated colleagues—the pilots and flight attendants — on board American Airlines 11, United Airlines 175, American Airlines 77, and United Airlines 93.

At the same time, we offer our sincere hopes and best wishes for a rapid and complete recovery to those who were injured as a result of these acts of terrorism. Finally, we give our heartfelt thanks to the thousands of individuals in New York City, in the nation's capital, and in western Pennsylvania for their heroic efforts in responding to this international outrage.

We also recognize the tremendous challenges and difficulties that the entire aviation community is confronting in the wake of this tragedy — including airline schedule cuts and the resulting staff reductions, the drive for increased aircraft and airport security, and the need for financial assistance for even the strongest airlines to survive.

On December 17, 1903, the aviation era began—and the world was forever changed. On September 11, 2001, four U.S. airliners became targets of terrorists and instruments of mass destruction—and the world will never forget. Without question or hesitation, the entire aviation community is uniting with tireless dedication and unwavering resolve to confront and respond to these despicable atrocities. Equally important, the fundamentals underlying the growth of global aviation remain strong. As a result of unconscionable acts of terror, our great industry has been set back—but it will rebound. In overcoming this tragedy, we will change aviation—and we will change it for the better.

FAA Implements CPDLC

The FAA Free Flight Program Office and our partners American Airlines, Rockwell Collins, and ARINC are beginning the implementation of a communications system that could rival the introduction of radar into our air traffic control system. After many years of research and development on both ground and airborne systems, deployment of controller-pilot data link communications has begun.

CPDLC is an important part of the foundation needed to address the growth in air traffic and the accompanying need for effective communications that will allow that growth while maintaining the system safety that we have today. Despite the recent improvements in ATC — new radar scopes, voice switching systems, and advanced automation — today's air traffic controller primarily relies on a single tool to actually separate aircraft: a highly congested voice radio frequency. This single thread between the ground and the cockpit has not changed since the beginning of ATC.

CPDLC simulations in the U.S. and operational trials in Europe have demonstrated CPDLC's ability to reduce frequency congestion by offering a second means of communications between the controller and pilot. Frequency congestion can cause air traffic delays, as controllers often run out of "frequency space" long before they run out of airspace. In our current voice-only environment, the radar controller often expends a large portion of mental resources and time managing a congested voice frequency. CPDLC will allow increased distribution of workload among the sector control team.

CPDLC can also help reduce weather delays. During thunderstorm conditions, traffic is often limited for two reasons: one, there is less airspace available because thunderstorms have blocked all or part of a sector or airport and, two, aircraft weather deviations significantly increase the communications workload of controllers. Higher communications workload means fewer aircraft can be accepted into the sector, leading to reduced efficiency, decreased sector throughput, and delays. While CPDLC can't move thunderstorms, it can help move more aircraft through the impacted sectors by lowering the communications workload.

American Airlines will initially be equipping 28 aircraft with the Rockwell Collins CPDLC avionics suite. ARINC, the service provider for CPDLC Build 1, has begun deployment of the ATN VDLM2 ground stations in southern Florida and the Caribbean.

Air traffic controller training, a four-day course that began in September, combines classroom instruction, computer-based instruction, and hands-on training in the FAA's Dynamic Simulation Lab.

CPDLC hardware and software installation began at Miami Air Route Traffic Control Center (ARTCC) in the third quarter of this year. Integration and testing efforts will continue through the second quarter of 2002, with full end-to-end system testing using ARINC's VDL Mode 2 ATN network, the FAA's ATC ground system, along with American Airlines and FAA aircraft equipped with Rockwell Collins CPDLC avionics.

The FAA and its industry partners are excited to implement this promising new technology into the Miami ARTCC and, within a few years, throughout the en route National Airspace System.

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ARINC IN EUROPE

D-ATIS and ATS Services

Applications are fast becoming the number one priority for data-link-equipped airlines. Providing more and more functionality for our customers through data link is now a major focus for ARINC globally. Enhancements in cockpit procedures, increase in safety, reductions in voice transmissions, ability to use the application out of VHF voice range are all factors that make the Digital Automatic Terminal Information Service (D-ATIS) the number one ATC application today.

D-ATIS is a data link transmission of the ATIS that allows the flight crew to obtain pertinent airport weather and conditions information prior to making the approach to an airfield. With traditional VHF voice ATIS, the flight crew is limited to obtaining this report within VHF voice range and must transcribe this report and advise ATC that they have the current version of the ATIS message. Given that the descent into the airport is typically the busiest time in the cockpit, it is less than ideal to have one of the crew listening to and transcribing an ATIS report. D-ATIS allows the flight deck to request and receive a printed version of the ATIS at any stage of the flight given that they are within VHF, HF, or satellite data link coverage area (depending on aircraft equipage). This provides the flight deck with the ability to plan the approach well ahead of time and assess the airport conditions without dedicating a member of the crew to the VHF ATIS channel during a crucial stage of the flight.

In Europe, ARINC is supporting the various air traffic service providers (ATSPs) by making many of the major international airports D-ATIS capable. As of September 2001, there are 19 locations where D-ATIS is available in Europe, with a further 28 planned. Most recent to become operational was Copenhagen Kastrup; a full ARINC 623 service is now available for use at Copenhagen, which represents a significant amount of coordination and teamwork between ARINC and the Danish air traffic service provider NAVIAIR. Attesting to the popularity of the Copenhagen system is the fact that there were almost 20,000 requests from SAS in August alone.

Many other ATS services have been implemented over data link, including oceanic clearance delivery (OCD) for both the Shanwick and Gander FIRs. ARINC recorded more than 2,500 OCD requests in August with an uplink success rate for the clearances of over 99%. Departure clearance (DCL) is now available at some of the major European airports, including Copenhagen and Paris Charles de Gaulle. D-VOLMET (Meteorological Information for Aircraft in Flight) is also now available at a number of locations, including Austria, the U.K., and Sweden, providing METAR and TAF information for flight regions.

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ARINC IN ASIA

Fast-Paced Expansions and Reorganized Resources

Our success in Asia continues. In August 2001, message traffic increased more than 102% from August 2000. ADCC, our partner in China, has continued its fast pace of ground station installations. We have now installed 76 stations in China, with the remaining 4 stations due to be in place in the fourth quarter of this year. We have also completed the installation of the 3 additional CNS/ATM system sites.

AEROTHAI has also continued expanding coverage throughout their region, with a total of 37 stations installed to date. Stations at Kwangju and Taegu in South Korea, plus a station at Narathiwat, Thailand; Dalandzadgad, Mongolia; and Kota Kinabalu, Malaysia, were installed since July. The station at Hat Yai, Thailand, was removed.

We have completed the installation of CNS/ATM workstations at the Bangkok area control center (ACC). This will allow AEROTHAI to become a full provider of CNS/ATM services in its airspace. Training was held in late July, and AEROTHAI is in the process of making CNS/ATM service operational in Thailand.

Applications Expansion

We are starting to focus on increasing the applications of data link in Asia. AEROTHAI has developed an automatic terminal information service (ATIS) end system that they call CATIS for computerized ATIS. They have fielded it at 7 sites in Thailand and will be working with their fellow air traffic service providers throughout southeast Asia to expand the availability of digital ATIS over the GLOBALink/Asia service.

Increased Focus by ARINC on Asia

ARINC has reorganized our resources in Asia to create two groups. The first group, led by Wally Miller, will be responsible for our markets in northern Asia, including Japan, Korea, Taiwan, and China, which is still led by May Zhou reporting to Mr. Miller. The recent hiring of Keun Bae Cho as country director for Korea adds an additional resource, which we also expect to do in Japan. These resources supplement our existing team that includes Sun Jang Pyun in Korea, Amy Xu and Gao Feng in our Beijing, China, office, and Renee Furlong in the Annapolis office.

The second group is led by me and is responsible for southeast Asia, Australia, and New Zealand. Morris Freeman still leads our Bangkok regional office and reports to me. We are adding additional resources in the region to support our airports and networks business areas. These new resources will supplement our existing team that includes Kiki Assawachaichit, Bongkot Danwarawijit, and Shane Assawachaichit in our Bangkok office and Charles Stuart supporting our activities in Australia and New Zealand.

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GLOBALink SERVICES

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GLOBALink/HF

HF data link (HFDL) ATC validation trials are under way in cooperation with NAV CANADA, with other CAAs to follow. Results so far have indicated the need for participating airlines with Rockwell Collins HF data radios to use the most recent version of the system software to ensure optimum performance.

Recent AOC performance tests have also resulted in similar findings. Several flight tests were recently performed with Continental Airlines and China Airlines to compare HF data radio (HFDR) software version 831-3951-117 performance with legacy versions 831-3951-109, -112, -114, and -116. An ARINC onboard observer participated in the trials to assist flight crews with the use of HFDL during the test flights.

Results

- In the month preceding the flight test, the test aircraft with software version -109 recorded an average 40% uplink message success rate.
- During the -117 flight test, the same aircraft recorded a 100% uplink message success rate.
- Since the -117 software version was installed, the average uplink message success rate has been 98% for the same aircraft.

Recommendation

ARINC recommends that customers using the Rockwell Collins HFDL avionics platform work with their vendor representative to plan an expedited upgrade of their HFDR software to version -117. Rockwell Collins Service Bulletin 11 provides information regarding this performance upgrade. As ATC validation trials progress, it is essential that all aircraft be equipped with optimal avionics platforms.

ARINC appreciates the cooperation extended by Continental Airlines and China Airlines during this investigation.

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FYI

The ACARS data link was originally named the ARINC Communications, Addressing and Reporting System. The 'A' was later changed to 'Aircraft' to reflect the universal acceptance of the system and its transformation from an ARINC-proprietary system to a standards-based system, the standards for which are controlled by the Airlines Electronic Engineering Committee (AEEC).

GLOBALink/VHF

GLOBALink/VHF Europe continues to expand its coverage into eastern, southern, and Mediterranean regions. In the southern region, the IAGSs installations for the remainder of 2001 will be in Madrid, Barcelona, Malaga, and Palma de Mallorca in Spain with Lisbon and Faro operational today in Portugal. The additional locations will provide complete GLOBALink/VHF coverage in the Canary Islands, which is crucial to operations for many of our customers. In the east, stations are planned in Poland to accompany the station already operational in Warsaw. Additional stations are also expected in Hungary, Lithuania, and the Czech Republic.

ARINC listens to our customers' requirements and tailors the schedule of our IAGSs deployment to the needs they have defined. We are currently in the implementation process for Milan, Rome, Athens, and Heraklion airports, filling our customers' needs in Italy and Greece.

Thus far, 2001 has seen significant work in the licensing and deployment program, the benefits of which we expect to be reflected through 2002 and beyond. By the end of 2002, ARINC should have more than 120 ground stations operational in Europe.

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GLOBALink/InFlight Communications

The following satellite-related activities have occurred since July:

- Aero I/H+ service extended worldwide through Eik station. ARINC offers the most robust aeronautical satellite service, Inmarsat, in the aviation industry.
- Mini-M and Aero-C services are now available, expanding ARINC's portfolio of satellite communications services.
- ARINC has announced support for Inmarsat's Swift64, encompassing high-speed mobile integrated services digital network (ISDN) and packet data services.
- A new aerospace and communications companies' consortium offers broadband passenger connectivity to passengers, as Airbus Industrie, ARINC, Astrium, and Tenzing plan to bring Internet access and real-time television programs to commercial airline customers.

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The Value Added Services (VAS) organization has been divided into Airport Operations Management (AOM) and Air Traffic Services (ATS).

Airport Operations Management

Aircraft ground operations have significantly increased in number and complexity, resulting in major flight delays at our nation's airports. ARINC's DDTC is a fielded, proven decision support tool that uses ARINC's GLOBALink services as a key element to improve ramp coordination and operational efficiencies at airports. ARINC developed enhancements to DDTC and extension solutions to provide airport stakeholders with a variety of products and services to improve gate-to-gate efficiencies. ARINC has also formed a new team, Airport Operations Management, dedicated to and focused on developing and implementing solutions to improve airport operational efficiencies.

Future issues of *The Global Link* will feature solutions on streamlining the management of ground services, deicing operations decision support tools, terminal weather prediction and lightning warning products, and other products and services being developed to provide improved airport operations.

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GLOBALink/ATS

Safety Assessment in Europe-South American Corridor

ARINC has completed a study of the safety impact of reducing lateral and vertical separation for flight operations between 29,000 and 41, 000 feet in the South Atlantic airspace, known as the Europe-South American Corridor. This airspace contains the air traffic routes that carry the growing number of flights between major European and South American cities. The study results, conducted for AENA, the air traffic services provider of Spain, were formally presented at the South Atlantic Track Meeting in Seville, Spain.

China CNS/ATM

In conjunction with ADCC, ARINC has installed CNS/ATM software in three additional sites in China: Beijing, Harbin, and Lhasa. Enhanced software was also deployed to the four current locations in Kunming, Lanzhou, Chengdu, and Urumqi, China.

Graphic/Text Weather Service (G/TWS)

ARINC will add Significant Meteorological Information (SIGMET) and Airman's Meteorological Information (AIRMET) reports to the G/TWS later this year. These near-real-time text weather reports will be available to aircrews via ACARS and will supplement the TAF and METAR information already provided. SIGMETs and Convective SIGMETs advise of weather potentially hazardous to all aircraft, whereas AIRMETs are intended for single-engine and other light aircraft and visual flight rule (VFR) pilots.

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STAYING CONNECTED WITH DATA LINK

TDLS On-Call Support

Dave Torrey
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I have been on call for the Tower Data Link Services (TDLS) since the beginning years of predeparture clearance delivery (PDC), a little more than ten years. In the beginning, I was often called to help determine if problems were genuine software or system faults or were caused by the relative lack of experience of those who used them.

When the system was first deployed as PDC, on-call engineers had the ability to dial into the PDC computers at the FAA air traffic control tower (ATCT) without FAA intervention. The system was considered a "test" system and did not have to conform to the stringent computer security requirements that strictly limit the use of dial-up modems. When PDC transitioned to TDLS, a formal FAA system, the stricter rules applied. TDLS can connect only to a support computer in the ARINC Operations Center (AOC) and only after we request the FAA to initiate a "call SMO" procedure. (SMO [System Management Office] is the previous name for the AOC).

On-call engineers would spend hours on the phone at all times of the day or night trying to get a TDLS user to re-enter configuration data or to assist ARINC field service technicians. One amusing trouble call involved an "Elvis sighting" at the BWI ATCT. BWI was one of the first ATCT towers to have NCD X terminals installed. These 17-inch monitors, dinosaurs compared to today's displays, were state of the art in the early '90s. The BWI controllers called to report that the display had become distorted and there were strange patterns (including an uncanny likeness of Elvis Presley). Since BWI is nearby, I personally swapped the faulty monitor for a good one that day. Later we discovered that the source of the distortions was the magnetic field of a telephone too near the display. The problem was resolved when the FAA moved the telephone away from the display.

In recent years, TDLS on-call engineers have become like the old Maytag repairman, getting very few, if any, calls for help. That changed one weekend when the root password had to be quickly changed on all 114 TDLS computers. A routine computer security audit by the FAA found that a contractor (not ARINC!) had posted a document on the Internet with the old TDLS password. Although there was really no risk that someone would gain access to the TDLS system, FAA computer security protocols required ARINC to change the password immediately.

TDLS has had a long run as an ARINC service. The FAA is currently working on a replacement TDLS system that they will maintain. And soon the phone will stop ringing for TDLS on-call engineers.

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The Value of CNS/ATM Technology

Alex Schust
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Technology insertion in aviation for operational enhancement is tempered by the cost of change. The fundamental question that needs to be examined is: Does the aviation community fully evaluate the benefits of change from a total industry perspective? Benefit-to-cost ratios are more than net present value dollars and cents. The true value of technology insertion must consider the opportunities for tangential benefits as well as direct benefits. The benefits of an enabling technology such as data link are both real in dollars and cents and incalculable in tangential benefits as a forcing function of operational enhancements.

FANS operations, which were initiated in 1995, are the major forcing function for the global growth of CNS/ATM. With growth there is controversy as to which is the best way to proceed from a FANS and ATN perspective. Regardless of the technical issues among the different ICAO regions, FANS continues to be implemented as the only viable near-term CNS/ATM solution for surveillance and communications through the FANS functional elements of ADS and CPDLC. An increasing number of aviation authorities are recognizing this fact. The North Atlantic service provider States of Canada, United Kingdom, Iceland, and Portugal will soon be operational in all North Atlantic oceanic flight information regions with centralized ADS based on FANS. The Asia-Pacific region continues its march toward total FANS coverage.

In the past six years, FANS has moved from the South Pacific to global application. It is being rapidly implemented in developing countries, remote regions, and oceanic airspace. Many airline operators, ATC personnel, and technologists looked at FANS as an opportunity for improved operating procedures in oceanic regions. However, a far greater number of aviation personnel look at FANS functions as offering a unique opportunity for new routes through mountainous regions such as the Himalayas and cross-polar routes between Canada and Russia and as an opportunity for surveillance in South America and Africa.

The aviation industry must look at FANS in the broader CNS/ATM context rather then concerning itself with the perceived nonbenefits of operational airspace separation reduction in the South Pacific. The benefits of FANS is not FANS itself, but the demonstration and acceptance by ATC of the functional elements of ADS, CPDLC, and the most important element of all — the acceptance of data link for ATC purposes in the dynamic en route environment.

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ACRONYMS

ACARS – Aircraft Communications Addressing and Reporting System

ADCC – Aviation Data Communication Corporation

ADS – Automatic Dependent Surveillance

AEEC – Airlines Electronic Engineering Committee

AOC – Aeronautical Operational Control

ATC – Air Traffic Control

ATM – Air Traffic Management

ATN – Aeronautical Telecommunication Network

ATS – Air Traffic Services

CAA – Civil Aviation Authority

CADS – Centralized Automatic Dependent Surveillance

CNS – Communications, Navigation, and Surveillance

CPDLC – Controller-Pilot Data Link Communications

D-ATIS – Digital Automatic Terminal Information Service

DDTC – Data Link Delivery of Expected Taxi Clearances

FAA – Federal Aviation Administration

FANS – Future Air Navigation System

FIR – Flight Information Region

GES – Ground Earth Station

GPS – Global Positioning System

HFDL – High Frequency Data Link

IAGS – Integrated ARINC Ground Station

IT – Information Technology

METAR – Meteorological Aviation Routine Weather Report

NAS – National Airspace System

SARPs – Standards and Recommended Practices (ICAO)

SATCOM – Satellite Communication

TAF – Terminal Area Forecast

VDL – Very High Frequency Digital Link

VDLM2 – VDL Mode 2

VHF – Very High Frequency

TECHNOTALK

ATC Data Link Certification

Doug Blythe
Technical Director,
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Business Team

The FAA has awarded a Supplemental Type Certificate (STC) to American Airlines for the B767-300 equipped with Rockwell Collins ATN / CPDLC / VDLM2-capable avionics, which includes a new VHF data radio (VDR) and a communications management unit (CMU). This first certification is an important and critical step in the implementation of VDLM2.

When the U.S. Congress formed the FAA, it gave that organization the responsibility for ensuring safety of aircraft. An aircraft must be "certified" by the FAA before it can operate in the National Airspace System. Over the years, the certification process has changed to address new challenges and to enable as much freedom as possible. For example, hang gliders, general aviation aircraft, and passenger-carrying airlines have widely different requirements. Permitting freedom while ensuring safety is one of the most difficult tasks in a democracy. The FAA allows industry to do virtually anything as long as it can be shown to be safe. Past practices and accident analyses are used to constantly refine the process. For example, after the recent crash of the Concorde, analysts remarked that the Concorde design would not be approved by today's standards. Before returning to service, the Concorde underwent design changes and a new safety review.

When a new aircraft such as the Boeing 777 is developed, it is extensively reviewed, analyzed, and tested before being certified for service. Every item and aspect is considered, from the pilot controls to the flammability of the seats to the entertainment systems (will they affect the airplane electrical system). Once an aircraft has been initially approved and entered into service, changes occur. The changes are approved in a Supplemental Type Certificate (STC). Each type of aircraft must be considered and potentially approved in a separate analysis, although results from previous type approvals are considered.

As systems have evolved, the effects of ground systems have become increasingly important. Distributed systems, such as CPDLC and the subsystems upon which they depend, including VHF data link, consider all aspects of both the airborne and ground components. Could the message be corrupted in transit and lead to a crash? Could a lost message result in a loss of separation? Will the pilot be distracted by messages and lose perspective of the aircraft situation? A tremendous amount of work is done to anticipate all possible situations and to mitigate any possible consequences. Each item in the communications chain, including the VDR, the CMU, and VDLM2, is considered.

So the news that the B767-300 has been awarded an STC is great news. It marks a major milestone in the implementation of VHF data link in the aviation fleet. Additional STCs will be needed for other aircraft types, other avionics, and applications other than CPDLC. So the process is not finished, but substantial progress has been made.

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FYI

In the 1930s, the only government air traffic control consisted of ground taxi control at major airports. The Civil Aviation Authority (CAA) (and its predecessor, the Bureau of Air Commerce) placed visual beacons around the country beginning in 1932 to guide aircraft traveling across the country. These beacons, some fixed and some rotating, delineated the government-specified airways and the radio frequencies to be monitored along these airways. The radio frequencies were licensed to ARINC, and the radio stations, owned and operated by individual airlines, were coordinated by ARINC. The radio stations at the airports provided approach and airport communications, and the stations along the way provided en route position-fixing and local weather to the aircraft. Once the aircraft launched, they were on their own. The airspace was so sparsely populated that mid-airs were not much of a risk; but lost aircraft were a major problem.

CPDLC Extends FANS Benefits

Elaine Anthony
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ARINC's Centralized Automatic Dependent Surveillance (CADS) service lets air traffic service providers (ATSPs) who may not have CNS / ATM end systems receive reports from FANS 1 / A-equipped aircraft. Existing ATC systems can receive ADS reports via HF, VHF, or satellite data link from FANS-equipped aircraft. CADS translates and transfers:

- ADS-generated position reports
- Meteorological (MET) reports
- Emergency (EMG) reports

ATSPs participating in CADS include NAV CANADA, UK NATS, NAV Portugal, and Iceland. The Icelandic CAA implemented the service on June 7, 2001, and NAV Portugal, on August 30, 2001. In July of this year, CADS delivered more than 40,000 messages to the CAAs from 25 participating airlines.

How It Works

The CADS server uses the ADS message formats, as defined in the ARINC 745-2 Characteristic, and transmits messages to controllers at the area control centers (ACCs) via the Aeronautical Fixed Telecommunications Network (AFTN). Aircraft can also send periodic MET reports to the CADS server to translate into the appropriate format and then send that report to the proper MET authorities via the AFTN.

The CADS server also receives, translates, and forwards any ADS-generated emergency messages. The CADS service architecture allows the ADS messages to be transported over any data link service provider (DSP) infrastructure.

AEEC Data Link Users Forum

Peter Wright Implementation Manager, GLOBALink

ARINC displayed a strong partnership with the airlines at the July AEEC Data Link Users Forum in Boston. The forum was preceded by a two-day data link workshop on July 22-23 to provide people new to data link with a solid background in avionics, network, and host applications. Presenters for the workshop included Steve Leger, Pete Wright, Barbara Carlsson, and Dan Pendergast. The workshop was well received, both by airlines that are considering ACARS and those that are looking to expand their use of data link into more applications. Additional workshops are planned for future meetings to continue these beneficial information exchanges.

The full session of the Users Forum began on Wednesday, July 24, with an award to JAL Aviation Consulting's Seiichi Takanohashi for his many years of service to the AEEC Data Link Users Forum. Mr. Takanohashi and ARINC have worked closely together over the years, and we look forward to continuing our relationship with him.

There were several presentations from airlines discussing their uses of data link. These presentations included long-time data link users such as United Airlines and British Airways, as well as those beginning their programs such as Air Nova. Mitre and the Air Force provided updates on their program, including a demonstration of the ARINC-developed Milcom Messenger gateway, on which ARINC is also coding Fortezza encryption for ACARS messages. Encryption was a major topic for commercial aviation as airlines raised concerns over data security. Honeywell presented the status of their work on the dual-use military/commercial program to develop encryption algorithms suitable for commercial avionics.

The meeting continued with VDLM2 status reports on deployment, avionics development and certification, and airline equipage plans. The increased use of data link for ATC purposes is moving along well with the current PETAL IIe trials and the upcoming FAA CPDLC trials next year.

A series of presentations on the ARINC 623 standards and applications ended the meeting. The AEEC has agreed on how the specifications for these applications (such as digital ATIS and predeparture clearance) will be coordinated by Eurocae and the AEEC. A full report of the meeting is available on the arinc.com web site under Industry Committees/AEEC.

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Roy T. Oishi Named AEEC Chairman

Roy T. Oishi was appointed Chairman of the Airlines Electronic Engineering Committee (AEEC) effective August 1, 2001. Roy is a long-term ARINC employee, and he was recently named an ARINC Fellow — a distinct honor limited to a select few of the company's technical leaders. He is internationally recognized for his contributions to advanced aviation technology, and he has extensive experience facilitating and chairing aviation industry technology and standardization activities.

He brings a wealth of systems engineering, systems architecture, and international aviation standards expertise to his new position. Furthermore, based on his experience in ICAO, RTCA, and related aviation industry forums, he brings a broad perspective and in-depth understanding of major aviation technology initiatives and their relationship to emerging operational concepts.

Joining Roy on the AEEC executive staff are two other ARINC employees, Michael P. Russo, AEEC Vice Chairman, and Michael D. Rockwell, AEEC Secretary. In addition to his technical expertise, Mike Russo brings to his new position as AEEC Vice Chairman a valuable historical perspective resulting from his many years as AEEC Secretary. Mike Rockwell, appointed to succeed Russo as AEEC Secretary, has more than ten years' experience directly supporting the AEEC in a number of key avionics systems areas, and he has also served as secretary of other industry groups.

ATSPs who use ARINC's CADS service first specify a "region of interest." Usually this region of interest includes the flight information region (FIR) for which a particular ATSP has responsibility for managing the airspace. The CADS service message flow begins when the aircraft enters the FIR and initiates a FANS logon, a data link message enabling the CADS server to establish a FANS contract through a contract advisory with the aircraft. All further communications between the aircraft avionics and the CADS server are automatic. Aircraft then transmit the position, meteorological, and emergency reports to the CADS server, which forwards these reports to the appropriate ATSP based on the position of the aircraft.

Benefits

In addition to the benefits always associated with data link—such as clear and unambiguous communications and reduced errors and workload, the CADS service provides ATSPs with the potential for the following efficiencies:

- Cost-effective implementation of CNS/ATM technology without a CNS/ATM ground end system
- Ability to "see" aircraft in a nonradar environment
- Transfer of routine voice communications to data link
- Increased availability of HF frequencies for exceptions and nonroutine communications that may require immediate contact
- Incorporation of existing ATC procedures through:
  - Use of existing ground connectivity to the ATC system
  - Use of existing controller formats for the voice position reports from the aircraft

Participating in CADS

To participate in CADs, operators must be in possession of the appropriate approval(s) issued by the State of Registry or the State of the Operator. Contact the FANS Central Monitoring Agency at fcma@navcanada.ca, or visit the North Atlantic Programme Co-ordination Office at http://www.nat-pco.org for further information and guidance.

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IMPORTANT UPCOMING CONFERENCES

In the next few months, ARINC will be actively participating in a number of important conferences. Please drop by our booth.

ATCA 2001
November 4 – 8
Washington, DC
See us in booth 420

AOPA 2001
November 8 – 10
Ft. Lauderdale, FL
See us in booth 405

Spotlight on the FAA IBT

Establishing and maintaining good working relationships with our various FAA customers is vital to the success of ARINC's services. Key services that ARINC provides to the FAA are often critical not only to FAA operations, but also to the airlines. To integrate all aspects of the work that ARINC does with the FAA, we have initiated the FAA Integrated Business Team (IBT).

Customer satisfaction is the IBT's major goal. By integrating the account management, program management, contracts, finance, business development, and quality management functions, ARINC can better focus on our FAA customers' needs. This team environment fosters open communication with the FAA and within ARINC in support of our FAA customers.

Although we have a significant amount of business within the FAA, we also have many services for which the FAA is not a direct customer, but in which it has a major interest. For instance, the FAA is not currently a customer for VDLM2, but VDLM2 is critical to the FAA's movement toward ATC data link. It is imperative that ARINC regularly communicate our plans for VDL. It is just as important for ARINC to know and understand the plans of the FAA and how they relate to our short- and long-term goals. The FAA IBT is essential to these lines of communication.

The IBT works to ensure that ARINC executes FAA contracts within contractual requirements, technical scope, funding levels, and schedule. Ron Martin is the Senior Director of the IBT. Henry Smith is responsible for the program management of the Tower Data Link Services/Contractor Maintenance, Logistic Service (TDLS/CMLS). Al Homans is responsible for the implementation of our National Aeronautics and Space Administration (NASA) aviation business. John Burks provides critical support to the FAA's CPDLC program and works directly with the VDLM2 team. Doug Blythe, IBT technical director, supports a variety of efforts within ARINC. Lawrence Branch supports many of the business development efforts.

The IBT works from an office in Washington, DC, two blocks from FAA headquarters. This allows team members to work closely with the FAA to meet its needs and to support customer meetings on short notice. The office is also near other industry partners, such as the RTCA, Air Transport Association, and National Business Aviation Association.

The IBT implemented a program this year to hold regular customer focus forums—one-day meetings to exchange information on a specific subject. The first forum, held in July, focused on VDLM2. ARINC provided information about the development, deployment, and operations of VDLM2. The meeting resulted in an interchange of information among ARINC and various sections of the FAA, including the NEXCOM Product Team, Air Traffic Services, Spectrum Policy and Management, Airways Facilities, and the Free Flight Office.

The IBT goals for the future are to assist the FAA in meeting the timelines of its Operational Evolution Plan (OEP). ARINC will concentrate on areas in which we have core competency that matches the FAA requirements. The FAA IBT has met its goals for 2001 and has increased its responsibilities significantly over plan. As our relationship with the FAA continues to improve, we look forward to new and exciting opportunities in 2002.

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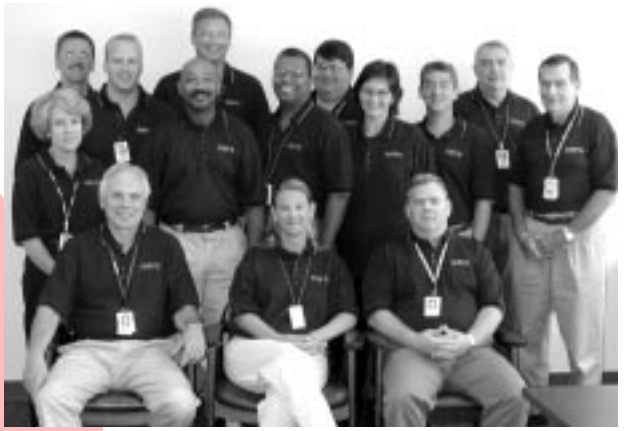

FAA Integrated Business Team

Left to right
Row 1: *Al Homans, Kim Matthews, Mike LaFond*
Row 2: *Jan Kessel, Lawrence Branch, Henry Smith, Barbara Biebl, John Burks, Ted Lawson*
Row 3: *John Metzger, Ron McGowan, Ron Martin, Doug Blythe, John Logan*
(Bruce Quade was absent.)

Evolving Oceanic Communications (continued)

ARINC. This is a simplistic view of the services performed by radio operators at the two ARINC communications centers, which are located at Long Island, New York, and Livermore, California. They also provide extensive AOC communications involving medical emergencies, single-party and conference-call phone patches, and routine message exchange. The directors of these centers are Marty Cernese and Pete Henschke. Each has more than 50 radio operators for oceanic communications, several managers, and other administrative and support staff to accomplish their jobs. The Livermore center (known as "San Francisco") has additional radio operators that operate the air/ground domestic service that provides Federal Aviation Regulations (FAR) Part 121.99 operational control communications for U.S. airlines.

Transition—Voice Holding Its Own

Package A was phased out in May 1999 when the Oakland Air Route Traffic Control Center (ARTCC) implemented oceanic data link in all sectors. At that time, its controllers began communicating directly with FANS-equipped flights. CPDLC now constitutes about 25% of the traffic in the Anchorage and Oakland FIRs. The remaining 75% of the traffic still uses HF voice. For a while, HF voice traffic declined in the Pacific; but, as the world economy improved, it began to rebound and is now greater than it was in 1997 when the Honolulu and San Francisco Communications Centers were combined. In the Atlantic, CPDLC has not been activated by the New York ARTCC, but the capability exists. When implemented, some voice traffic will migrate to data link, but a recent study determined that North Atlantic voice traffic will remain fairly constant until 2005. Our recent national tragedy will undoubtedly impact some of the planning, but for the time being both data link and HF voice are here to stay, the mix evolving slowly throughout this decade.

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