

Filed by Verizon Airfone on Sep. 21, 2004 as a supplement to its filing of Sep. 7, 2004 regarding satellite competition in the Air-Ground services market.

From ComputerWorld, available at <http://www.computerworld.com/mobiletopics/mobile/story/0%2C10801%2C95982%2C00.html?f=x68> (last visited on Sep. 20, 2004).

Airbus tests in-flight mobile phones

It expects to offer the service on its planes by 2006

News Story by John Blau

SEPTEMBER 16, 2004 ([IDG NEWS SERVICE](#)) - European plane maker Airbus SAS said yesterday that it has successfully completed the first in-flight trial of mobile phones and infrastructure equipment based on Global System for Mobile Communications (GSM) technology.

The trial, which took place aboard an Airbus A320 flight-test plane, culminated a two-year research project supported by the European Commission aimed at testing wireless technology for in-flight mobile phone and computing services.

Airbus, which was tight-lipped about the trial previous to its launch, expects to have the technology installed in its aircraft beginning in 2006. A key objective is to provide service at affordable prices, the company said.

Substantial demand for in-flight mobile phone service exists, according to a survey at London's Heathrow and Gatwick airports by the Norwegian phone company Telenor Satellite Services AS and Arinc Inc. Almost half of the 1,200 business and leisure travelers interviewed for the survey said they would like mobile phone access in flight.

The Airbus tests involved communications to and from several types of GSM mobile phones on the plane to mobile and fixed telephones on the ground, and to another mobile phone onboard, Airbus said. Signals from the mobile phones were received by an onboard base station, then transferred to an onboard server that forwarded them through the Globalstar Telecommunications Ltd. satellite communications network to the ground and finally routed to ground-based phone networks.

Also tested were several wireless computing services, such as third-generation based on Wideband Code Division Multiplex Access technology, wireless LAN using the Wi-Fi standard 802.11 and short-range Bluetooth.

Tested services included GSM telephony, Web browsing, e-mail and connectivity to a virtual private network. An onboard intranet was demonstrated, as were PDAs for crew use.

The Wireless Cabin project is being led by the German Aerospace Center. Partners include Inmarsat Ltd., Siemens AG and LM Ericsson Telephone Co.

From Telenor press release, available at http://presse.telenor.no/PR/200406/949526_5.html (last visited on Sep. 20, 2004).



Press releases

Telenor, 20 june, 2004

Telenor and ARINC Introduce a Breakthrough: Mobile Phone Service for Airline Passengers

(Annapolis, Maryland, USA, and Oslo, Norway June 20, 2004) ARINC Incorporated and Telenor ASA will soon market new technology to allow airline passengers to use personal mobile phones aboard commercial flights. The companies formed an alliance in 2003 and this week revealed their plans at the Inmarsat Conference in Montreal, Canada.

The new technology allows safe and seamless usage of today's popular GSM mobile phones on any commercial aircraft flight.

"Passengers will be able to make and receive mobile phone calls, and send or receive text messages just as they do on the ground," stated Graham Lake, ARINC Vice President and Managing Director, Europe, Middle East and Africa. "It is not a question of whether mobile phones will be used on aircraft. It is merely a question of when."

The new technology initially will leverage the classic Inmarsat SATCOM systems many airlines have already invested in. These systems are already deployed on over 3000 aircraft worldwide. The system is also flexibly designed to accommodate evolving technologies such as the Inmarsat Swift/BGAN and Ku broadband systems such as ARINC's SKYLink™.

Engineers from Telenor, ARINC and representatives of the airline market have worked to expand the area of utilization of GSM-standard mobile phones.

"This is part of our joint strategy to carry out more market oriented research and development," stated Berit Svendsen, Telenor CTO. "We recognize the use of GSM phones on board aircraft is inevitable in the next 12-18 months and have positioned our alliance and technology at the forefront of these developments. We view the ability to literally 'roam' onto an aircraft, and seamlessly use a mobile phone for voice and SMS messaging, as a near-term reality. We will provide a comprehensive Aero-GSM fleet solution without the need for a significant investment in communications infrastructure."

ARINC and Telenor will offer the airlines a comprehensive, one-stop implementation package. The technology will address the airspace as a virtual GSM country, simplifying the mobile addressing and connectivity during flight. Current terrestrial GSM roaming charges are being used for end-user pricing models.

With headquarters in Oslo, Norway, Telenor is an international provider of high quality telecommunications, data, and media services, with expanding operations in international mobile and satellite communications. Telenor is one of Norway's largest companies with 2003 revenues of approximately NOK 53.1 billion (approximately U.S. \$7.6 billion) and a

workforce of 19,450 located in Norway and abroad. Telenor is listed on the Oslo Stock Exchange (TEL) and the NASDAQ in New York (TELN). For more information, visit the Telenor web site at www.telenor.com.

ARINC Incorporated is the world leader in transportation communications and systems engineering. The company develops and operates communications and information processing systems and provides systems engineering and integration solutions to five key industries: airports, aviation, defense, government, and surface transportation. Founded to provide reliable and efficient radio communications for the airlines, ARINC is headquartered in Annapolis, Maryland, and operates key regional offices in London and Singapore, with over 3,000 employees worldwide. ARINC is ISO 9001:2001 Certified. For more information, visit the ARINC web site at www.arinc.com.

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From ARINC press release, available at <http://www.workunplugged.com/news/2004/06-17-04.html> (last visited Sep. 20, 2004).



ARINC and Telenor Introduce a Breakthrough: Cell Phone Service for Airline Passengers

June 17, 2004

Annapolis, Maryland, USA, and Oslo, Norway—ARINC Incorporated and Telenor ASA will soon market new technology to allow airline passengers to use personal mobile phones aboard commercial flights. The companies formed an alliance in 2003 and this week revealed their plans at the Inmarsat Conference in Montreal, Canada.

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From ARINC press release, available at <http://www.arinc.com/news/2004/09-13-04.html> (last visited Sep. 20, 2004).



International Passengers Want Mobile Phones in Flight, Research by ARINC and Telenor Shows



September 13, 2004

Annapolis, Maryland, USA—Nearly half of all international business fliers would prefer to travel on airlines that allow the use of mobile phones in flight. That is the emphatic conclusion from a survey of 1,200 international business and leisure travelers at two of the world’s busiest airports—London Heathrow and Gatwick. The research was conducted for Telenor and ARINC Incorporated.

The companies are marketing an inflight GSM mobile phone service for passengers—ARINC-Telenor Mobile Connectivity™. They plan to demonstrate their system at the World Airline Entertainment Association (WAEA) in Seattle, WA, Sept. 21-24.

“Our research shows a pent-up passenger demand for in-flight mobile service,” stated Graham Lake, ARINC Vice President and Managing Director, Europe, Middle East and Africa. “Fully 83% of business fliers now carry their mobile phones in flight, while about half carry a laptop computer. The world today has more than 1.5 billion mobile phone subscribers, with almost 75% using GSM technology.”

Many planes could be readily equipped with the ARINC-Telenor service because more than 1,900 already have the classic Inmarsat hardware needed. ARINC and Telenor are offering airlines a comprehensive, one-stop implementation package.

The technology allows passengers to use personal GSM mobile phones in flight just as on the ground—and without any enrollments, sign-ups, credit cards, or dialing of extra digits. The system treats the world’s airspace just like calling another country. Passengers are charged a reasonable fee, similar to international roaming rates on the ground. Calls are transparently billed to passengers’ mobile accounts by their own cellular providers.

“Passengers can roam onto this system as easily as visiting a new country. They can make calls, accept incoming calls, and send or receive text messages,” said Berit Svendsen, chief technical officer for Telenor. “Close to a third of business passengers found this concept very appealing, and as much as 28% of all passengers were willing to pay as much as three to six dollars per minute for inflight mobile service. More than half of all respondents would send and receive text messages as well.”

The research was conducted in June-July 2004 by IMDC (Inflight Management Development Centre), an independent UK-based company that specializes in management support services for the in-flight business sector.

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From ARINC press release, available at <http://www.arinc.com/news/2004/08-24-04.html> (last visited Sep. 20, 2004).



ARINC Will Show New Broadband Internet Solution for Commercial Aircraft at WAEA

August 24, 2004

Annapolis, Maryland, USA—Building on its successful [SKYLinkSM](#) satellite broadband solution for business aircraft, ARINC Incorporated today announced it will roll out a high-capacity satellite broadband system for commercial airlines. ARINC plans to demonstrate its new Commercial SKYLinkSM system for attendees at the World Airline Entertainment Association (WAEA) conference in Seattle, September 21-24.

ARINC is holding active discussions on SKYLink with several potential customers. “Four domestic airlines have already expressed interest, and we’re in a second round of talks with three of them,” stated Robert Thompson, Senior Director, ARINC Satellite Services. Details and preliminary pricing of the system will be available at WAEA.

“SKYLink for commercial aircraft will be smaller, cheaper, lighter and more capable than currently available broadband systems,” stated Thompson.

ARINC pioneered Ku-band satellite broadband for business jets in 2003 with a 35-pound SKYLink avionics and antenna package. SKYLink satellite coverage went live over North America in April 2004, and SKYLink-equipped business jets now have 2-way broadband connectivity from coast to coast.

The commercial airline SKYLink system uses a larger, fuselage-mounted antenna to meet the bandwidth requirements of expected passenger applications such as live TV and high-speed Internet. ARINC will offer a range of configuration options including wireless 802.11a/b/g for the passenger cabin. SKYLink broadband also has the potential to deliver many enhanced types of services for the flight deck.

“Carriers thinking about broadband can keep all their options open with SKYLink,” said Thompson. “We have optimized the design for retrofit, and unlike rigid OEM approaches we have kept SKYLink a highly configurable system to meet any foreseeable fleet requirements. We can even deliver the SKYLink business jet solution for low-cost carriers who want to minimize the cost and footprint of broadband.”

Commercial SKYLink offers a bandwidth of 5 Mbps to the aircraft, and 256 Kbps off-aircraft. The business jet version is rated at about half of that. Both systems use the SES Americom™ Ku-band satellite constellation, the same system currently providing SKYLink coverage of North America. A coverage expansion is planned in 2005 to

include the North Atlantic routes, Europe, and the Middle East.

ARINC plans to conduct flight testing and to pursue the required Supplementary Type Certificates (STCs) with selected carriers in the next 14 months. The first Commercial SKYLink operational installations are anticipated in late 2005.

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Release: 04-125a

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From ARINC web site, available at http://www.arinc.com/products/business_aviation_services/skylink.html (last visited Sep. 20, 2004).

SKYLinkSM by ARINC DirectSM

SKYLinkSM by ARINC DirectSM is the latest in-flight broadband satellite service for business aircraft passengers.

SKYLink allows business aviation passengers to stay connected even at 47,000 feet. At speeds in excess of 3 megabits per second (Mbps), it's about 6 times faster than a high-speed cable modem.

Designed with business aircraft users in mind, SKYLink is faster, smaller, lighter, more efficient, and less costly than other airborne satellite systems. And it's easy to use. Just plug a network cable from your laptop into a jack on the plane and log on to the network. The process becomes even simpler if you have a wireless connection or a preconfigured server.



SKYLink Specifications

The SKYLink antenna is tail-mounted and fits on larger business aircraft including, GIV, GIV-SP, G400, GV, G500, G550, Citation X, Falcon 900, and Global Express.

The SKYLink equipment is compact and lightweight. The tail-mounted dish antenna measures less than 12 in. in diameter. The satellite terminal, including antenna, weighs less than 40 lbs. ARINC Direct is currently working with original equipment manufacturers (OEMs) to make SKYLink a standard option on any new aircraft, but will also retrofit the necessary equipment to existing aircraft.

Connection Speed

SKYLink has an aircraft-to-ground (return) data rate of 128 kilobits per second (kbps) and a ground-to-aircraft (forward) data rate varying between 512 kbps and 3.5 Mbps. A test site is also available so that users can test the SKYLink system performance and verify their connection speed.

Coverage

The [SKYLink coverage area](#) includes the continental United States. Operating on a Ku-band satellite constellation, SKYLink coverage begins when the system is turned on and continuously operates during taxi, takeoff, flight, and landing. System performance on the ground can be affected if buildings or severe weather block the aircraft's view of the satellite.

Future expansion of the system is likely to offer end-to-end connectivity to any region in the world—including Latin America, Europe, and Asia, where business aircraft travel is rapidly expanding.

If you would like to receive additional information about ARINC Direct Business Aviation Services, please complete our [information request form](#).

From ARINC web site, available at http://aero.inmarsat.com/services/swift_64.aspx?top_level_id=3&sub_level_id=1 (last visited Sep. 20, 2004).



Swift64

Swift64 is Inmarsat's latest service offering for airlines, business aviation and government users. In its basic form it provides enough data bandwidth for applications such as high-quality voice, e-mail, Internet and intranet access, and videoconferencing.

Techniques such as channel bonding and data acceleration can boost the effective data rate to beyond 0.5Mbit/sec, and the service is fully compatible with future developments that would produce broadband performance.

Other advantages include the ability of Swift64 avionics to work through the high-gain antennas already fitted on most long-range airline and business aircraft and large numbers of government aircraft.

Two types of data service - Mobile ISDN and IP-based Mobile Packet Data Service (MPDS) - are globally available through Swift64. Each method has its own advantages - the high quality and speed of ISDN, the cost-effectiveness and flexibility of IP - and the choice depends on what the user is aiming to achieve.

Mobile ISDN provides full-time use of a high-capacity channel capable of carrying a constant data stream. Typical applications include the downloading of large files of material such as compressed video or graphics, which occupy all the available bandwidth for significant amounts of time, or any in which speed is paramount, such as the transmission of surveillance video.

The service provides direct and efficient error-free connection with terrestrial ISDN-compatible circuits and systems, allowing airborne local-area networks to be readily integrated into ground-based private networks.

MPDS slices each file into small IP data packets, addresses them and sends them in bursts on a channel being shared by other users. On delivery, the packets are reassembled to form the original file. Applications include e-mail and Internet and intranet access, which involve brief bursts of communication followed by periods of inactivity.

Mobile ISDN and MPDS compared

	Mobile ISDN	MPDS
Typical applications	Large file transfer (audio, graphics, photographs, video clips), videoconferencing, video streaming, store-and-forward video	E-mail, secure access to private networks, Web access, database queries, small/medium-size file transfer
Charging	User pays per minute of connection time	User pays for the amount of data that

		passes over the link; connection can be "always on" at no extra charge
Main service features	Two-way 64kbit/s ISDN	Full Internet Protocol (IP) connectivity, with "always-on" option
Other service features	Optionally, a 64kbit/s Unrestricted Digital Information (UDI) channel. STU-III and other security add-ons	STU-III and other security add-ons, including "secure tunnelling" using the L2TP protocol to create a virtual private network (VPN)

Avionics for use with Swift64 are compatible with the proven Inmarsat high-gain antennas and onboard infrastructure already installed on most of the world's long-haul airliners, as well as a large part of the corporate jet fleet.

Swift64 terminals now offer up to four 64kbit/s channels that can be bonded to produce a 256kbit/s data rate. Application of compression and acceleration techniques can boost the effective rate to beyond half a megabit per second.

Swift64 avionics, usually packaged in a single 2MCU box, can be obtained from a number of different suppliers. The equipment can plug in alongside an existing Inmarsat Aero H installation, making use of its high-gain antenna, or can be installed along with its own antenna for standalone operation. Inmarsat high-gain antennas are already installed in thousands of commercial, corporate and government aircraft and can be obtained from suppliers worldwide.

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