

**GAINING THE BENEFITS OF SATELLITE
TECHNOLOGIES FOR AVIATION IN ASIA
PACIFIC**

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The logo for ATRF 96, featuring a stylized map of New Zealand with the text "ATRF 96" overlaid.

ATRF 96

SHAPING THE FUTURE

One of the most significant changes in civil aviation in the last fifty years is the transition from a ground-based air navigation system with its inherent limitations to a satellite based system.

Satellites have been in use for several years and have been used in diverse applications such as telecommunications, search and rescue and marine. More recently their use has been expanded in the fields of surveying, rail and surface transportation.

The use of satellite technology in civil aviation has been discussed for several years but for various reasons, mainly a lack of leadership, plans never came to fruition.

However, in the early 1980s under the leadership of the International Civil Aviation Organisation and the resolve of its Member States, a comprehensive plan was devised to exploit this technology. The participating Member States recognised that the benefits of this technology far exceeded the cost of procurement of the requisite air traffic control system compared to the life cycle costs of a ground based system.

South West Pacific Commitment

In December 1993 at the Los Angeles meeting of the Directors General of Civil Aviation of the Asia Pacific Region, our customers - the international airlines, their association - IATA, and the Boeing Aircraft Corporation requested that air traffic service providers accelerate the purchase and operation of oceanic control systems that would rely on data from satellites for navigation, communications and surveillance. They requested that these systems be operational by April 1 1995. A very aggressive schedule when one considers that very little work had been done in the elaboration of an operational specification. Nevertheless this challenging proposal was accepted by the air traffic service providers in New Zealand, Fiji, Tahiti, Australia and the United States.

Work on these challenges began promptly and. I am happy to report, some 15 months later we in New Zealand commissioned the first operational oceanic control system. It is indeed extremely rare, if it has ever happened, that air traffic control systems have been operational prior to the airborne system being available.

Benefits to airlines

One could ask why the airlines are in such a hurry to exploit satellite technology for their operation. In my view, for three major reasons: Efficiency, safety, and because of significant systems improvements inherent in satellites.

In the area of efficiency, the major benefits are substantially reduced operating costs due to:

- optimal routings and altitudes thus reducing the need for contingency fuel;
- world-wide availability of navigation and communications where none existed previously or were rudimentary;
- reduced separation minima which will enable more aircraft to operate on or closer to optimal routes, altitudes and speeds;
- increased and improved weather information.

A major international airline operating in the Asia-Pacific Region estimates the life cycle benefits of oceanic improvements and reduction in separation minima to be US\$500k per aircraft, per year.

A recent study undertaken by Martin Marietta and SAIC Group estimated these life cycle benefits through to the year 2015 to exceed \$13B US dollars. Over 55% of these benefits would be realised on the Pacific routes

The eventual use of satellites for domestic air navigation services will also substantially increase these life cost savings and allow the systematic dismantling of most of the ground infrastructure.

Safety will be increased through the introduction of automatic dependant surveillance (ADS) which will allow aircraft to transmit their position automatically and other flight plan information thus allowing for display of this data on a pseudo radar display.

The other system improvements that an oceanic control system can provide are:

- simplification of the controller's work;
- automatic calculations of flight times for all flight operations both on and off fixed routes;
- aircraft-to-aircraft conflict detection;
- aircraft-to-airspace conflict detection;
- flight path to flight plan conformance monitoring and a number of other features that will make the air traffic control more responsive to requests for changes to route and altitude

Technology means we can and should look at the whole system afresh as all the benefits of satellite-based oceanic control systems cannot be realised unless all the air navigation service providers in the Asia Pacific Region is appropriately equipped with compatible systems and procedures

The Asia Pacific Regional CNS/ATM Plan has been developed. Implementation of this Plan requires active participation and multinational cooperation. Today the Asia/Pacific economies lead the aviation world in implementing the satellite based air

traffic control systems. The formal and informal regional working structures and process are well established in some areas and some sub-regional implementation plans have been agreed and are being implemented. Within the total APEC Region there is strong commitment from airline users, some air traffic service providers and individual civil aviation administrations. However we can do better. Current initiatives and experiences must be shared and expanded within the Region.

Conclusion

To accelerate the transition to these existing, affordable and available systems and keep the Asian Pacific Region in the vanguard of exploiting new technology for the benefit of our customers and the national development of our mutual economies strong Ministerial support is needed to reinforce the progress so far and promote even greater regional co-operation.

Air transportation demand in the Asia Pacific Region is growing faster than any other area in the world. The benefits soon to be delivered to airlines and providers in the south of the Region must be quickly extended into the central and northern areas. We must work together to shape the future and ensure our continued success. We at Airways Corporation of New Zealand are ready to actively participate in these activities and prepared to assist other economies in the development and implementation of the future system.

Thank you