

Executive Summary by Range International on the Future Application of Aerial Refuelling within Commercial Air Transport

We propose to introduce into commercial aviation the proven technology and aerial refuelling techniques employed by “Air Force One” (a B747 used by the President of the USA) and other large military aircraft.

The key benefits are:

- **To lower the costs and environmental impact of long range flights by avoiding tech stops and reducing the**
- **To extend the range, allow greater payloads and increase the efficiency of existing and future passenger and freight transport aircraft.**

Aerial refuelling is extremely safe. We can find no evidence of hull loss or indeed damage to any transport aircraft as a result of aerial refuelling over a period of 60(?) years. As a technique, it is considerably safer than auto-landing, a proven and accepted commercial aviation practice.

The operating philosophy is for Multi Role Tanker Transport Aircraft (MRTT) operating routes with own payloads to deliver fuel in the cruise to other airliners. The receiver aircraft can therefore plan to depart with less fuel, suffers little fuel uplift penalty, uses less power to take off, climbs quickly to optimum altitude and still enjoys a greater range than possible using its own maximum fuel capacity.

The rendezvous procedure is achieved using techniques proven over 50 years, and is aided by radar, TCAS and ATC, which makes it easy and safe. The receiver aircraft closes to the pre contact position, approximately 30 feet behind the tanker and slightly below. This is a basic form of formation flying which is easy to maintain. Once in position the boom operator extends a boom nozzle into a universal receptacle on the receiver. The transfer occurs at between 3 and 4 tonnes per minute depending on equipment, which means that a typical offload of 25 tonnes would take less than 10 minutes. The rendezvous procedure is carried out in the upper troposphere, which means that there is little penalty from cruise efficiency.

The rendezvous system takes advantage of the existing patterns of commercial flights. For example, in the early hours of the morning aircraft arrive from America into Europe via the North Atlantic Track System. At the same time flights from Asia arrive in Europe via routes through Russian Airspace, often just south of Moscow and then on over the Baltic States. This means that tanker aircraft could offload fuel very efficiently in certain locations. Similar commercial patterns of activity exist all over the world and tanking activity could be coordinated to maximise environmental and commercial benefits.

In the US, most commercial pilots are current...? because of their National Guard commitments, which means that very little training would need to be undertaken. In Europe many commercial pilots have experience of aerial refuelling gained from time spent in military forces. Modern, sophisticated simulator training would offer the majority of training time required and allow conversion to civil aircraft types.

A small number of existing civilian aircraft types have been converted by manufacturers for use as Multi Role Tanker Transports. Examples include the Airbus A310, A330 (KC30), DC10 and the Boeing 767. Emphasis on B747?

An American company, Omega Air, was granted certification of a B707 tanker for civil use by the FAA some years ago but it has only been used for military training.

We believe that that commercial certification is both achievable and desirable.