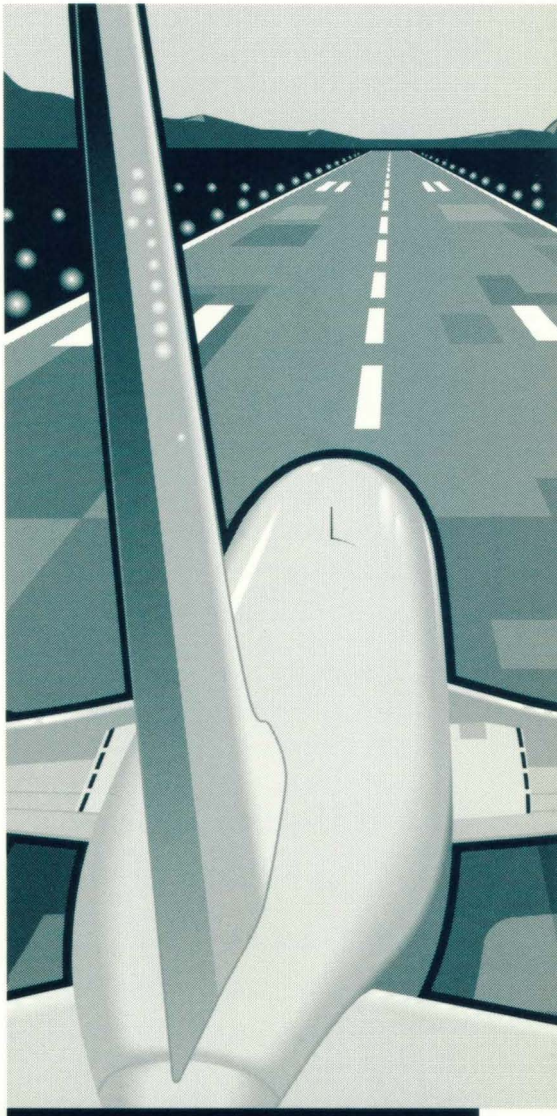
Free Flight

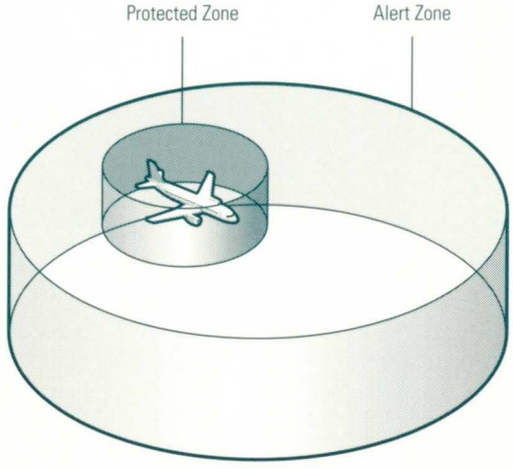
A Concept Whose Time Has Come



U.S. Department of Transportation
Federal Aviation Administration

Concept of Protected Zone and Alert Zone

In the **Free Flight** concept, each aircraft flies a dynamic, optimum flight trajectory, making full use of on-board systems. Briefly, the concept is based on two zones, the alert zone and the protected zone. The smaller zone, called the protected zone, must remain sterile to ensure separation. The protected zones of two aircraft are never to meet. The outer zone, designated the alert zone, is used to indicate a condition where intervention may be necessary.



Air Traffic's Role

Air traffic restrictions are only imposed to:

- ensure separation,
- preclude exceeding airport capacity,
- prevent unauthorized flight through special use airspace and
- ensure safety of flight.

Restrictions are limited in extent and duration to correct any identified problem. Any activity that removes restrictions represents a move toward **Free Flight**.

New Technology

To achieve full **Free Flight,** the FAA is doing more than establishing new procedures. It is working on the development and use of available technologies that will implement air traffic requirements for a safer and more efficient system. Future ground-based systems and airborne communication and navigation systems will evolve and mature to meet the expanding and changing needs.

Current and future technologies that improve conflict identification and resolution, data transmission and display, direct exchange of data among aircraft and controllers, and productivity are key to **Free Flight**. Examples of such technologies include:

- Standard Terminal Automation Replacement System (STARS)
- Advance En Route Automation (AERA)
- Prediction/Resolution Analyses Tool (PRAT)
- Surface Management Advisor (SMA)
- Global Positioning System (GPS)
- Wide Area Augmentation System (WAAS)
- Terminal ATC Automation (TATCA)
- Controller Automated Spacing Aid (CASA)
- Traffic Alert and Collision Avoidance System (TCAS)
- Automatic Dependent Surveillance-Broadcast (ADS-B)
- Aeronautical Telecommunication Network (ATN)

Human Factors

Free Flight involves people (mainly air traffic controllers and pilots), technologies (advanced airborne and ground-based), and new procedures to permit the use of optimum tactical separation. Human factors issues will be examined and resolved as the technology and procedures evolve and the responsibility between the pilot and controller changes.

National Route Program (NRP)

The FAA is looking at the **Free Flight** concept as a long term, evolutionary system which will come to fruition in the 21st Century. The National Route Program expansion is one program that is bringing the benefits of **Free Flight** now. NRP uses procedural changes to allow customers to choose their own flight paths within well-defined constraints.

The National Route Program permits aircraft at or above FL290 to select routes as alternatives to published preferred IFR routes. Expansion of the NRP at FL390 began January 9, 1995. The program was expanded to include aircraft at or above FL350 east of the Mississippi River, and at or above FL330 west of the Mississippi, which began on June 1, 1995. The expansion process is structured to incrementally increase eligibility while simultaneously eliminating static restrictions and program constraints that inhibit user flexibility and routing opportunities.

Who's Involved With Free Flight?

Free Flight is a joint initiative of the aviation industry and the FAA. The FAA and the aviation community are working cooperatively to assure a successful evolution into an even safer and more efficient system than that which we have today.

Vision

Free Flight is an example of the aviation community working together to create a safer more efficient environment using the technology of the 21st century. **Free Flight** is the guiding vision of the FAA. As with any new concept, the full boundaries and dimensions are even now being examined and explored. The **Free Flight** concept is to provide a contact-free environment for the airspace user, with user optimal flight trajectories and increased operational flexibility while maintaining separation.

Definition

Free Flight is a concept that will provide aviation users visual flight rules (VFR) flexibility while maintaining the traditional protection afforded under instrument flight rules (IFR). This goal will be achieved by using integrated advanced airborne and ground-based technologies and new procedures to permit optimum trajectories and tactical separation. **Free Flight** will permit the system users and operators the flexibility to make tactical, real time decisions to optimize flight patterns without compromising safety or efficiency.

Who Will Use It?

Free Flight will accommodate all users, air carrier, air taxi, general aviation and the military.

Principles

Free Flight cannot and will not compromise safety. There will be clear lines of authority and responsibility between the pilot and the controller. Technology will not replace humans or replace their reasoning process, but will allow them to do their job better.

Free Flight will evolve as a function of available technologies, procedural changes, aviation community requirements and increases in airspace system capacity. The requirement for all users to receive benefits from the implementation of **Free Flight** is essential. No additional restrictions are anticipated to be imposed on those who choose not to equip their aircraft. The intent is that **Free Flight** equipage shall be benefits driven, not mandated.

"Imagine Free Flight"

"We must dare to think unthinkable thoughts".

"We must learn to explore all the options and possibilities that confront us in a rapidly changing world. We must learn to welcome and not fear the voices of dissent. We must dare to think about unthinkable things. Because when things become 'unthinkable' thinking stops and actions become mindless".

Senator J. William Fulbright

Improved departure routings at the Detroit Metro Airport have produced an average reduction of 23nm per departure. This is an approximate 10% reduction in average route mileage.

From a major airline carrier report.

By tracking enroute spacing program (ESP) delays taken by flights bound for O'Hare International Airport from 28 cities, comparing 1994 performance to 1993, delays have been reduced by 39% for a total of over 69,000 minutes, or $1.7 million in savings on these flights alone.

From a major airline carrier report.

When the transition is complete, we look forward to near optimum lateral routings between virtually all city pairs served. This change alone will provide significant economic and service benefits to the air transport industry and to our customers.

A quote from a major airline.

For further information contact (202) 488-8844 (**Free Flight** Hotline)
http://www.orlab.faa.gov/homepage.html

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