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ADVISORY CIRCULAR

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

SUBJECT: LOCAL FLOW TRAFFIC MANAGEMENT

1. PURPOSE. This advisory circular describes new arrival procedures for ATC handling of high performance aircraft. It is designed to familiarize pilots with profile descents and revised arrival and departure procedures so that total effectiveness of the program may be realized. This effort will improve our present "keep-em-high" as well as other programs designed to improve safety, reduce noise, and conserve fuel by minimizing flying time below 10,000 feet.

2. RELATED DOCUMENTS.

   a. Airman's Information Manual, Parts I, III, and IV.

   b. FAA Order 7110.72, Local-Flow Traffic Management.

   c. AC 90-59, Arrival and Departure Handling of High Performance Aircraft.

3. DEFINITIONS.

   a. Profile descent - An uninterrupted descent (except where level flight is required for speed adjustment; e.g., 250 knots at 10,000 feet MSL) from cruising altitude/level to interception of a glide slope or to a minimum altitude specified for the initial or intermediate approach segment of a non-precision instrument approach.

   b. High performance aircraft - For the purpose of this Advisory Circular, all turbojet aircraft and any turboprop weighing more than 12,500 pounds.

4. DISCUSSION. The basic objectives of this program include: Improved safety through reduced low altitude flying time, standardization of high performance aircraft arrival procedures, equitable distribution of arrival delays through metering, an enhanced effort in the reduction

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of noise for airport neighbors, substantial fuel savings, and a more efficient system. In pursuit of fuel conservation, profile descent procedures were evaluated at several locations. The evaluation revealed that the opportunities to use profile descents diminished with an increase in traffic volume. Different descent speeds used by the various operators resulted in one aircraft overtaking another which complicated ATC handling. The evaluation did, however, reveal that substantial fuel savings could be realized using properly designed profile descent procedures. Also, it was determined that an increase in the use of profile descents could be accomplished with an arrival metering system designed to "feed" the terminal facility only those aircraft that could be handled without extended vectors or low altitude holding.

An example of an annual fuel savings can be expressed by using fuel burn data from the Boeing (B-727) Aircraft Operations Manual and applying it to a typical approach from a cruise altitude of FL 290 with a 6-minute ATC imposed delay. Holding at FL 200 versus 5,000 feet for the 6-minute delay required 44 gallons less fuel. An idle or near-idle thrust descent, versus the commonly used delay vector technique with substantial vectoring being accomplished at low altitudes and at speeds less than 210 knots, requires 50 gallons less fuel. Thus, a fuel savings of 94 gallons per flight multiplied by the average number of annual arrivals (5,000,000) produces a savings of 470,000,000 gallons of fuel.

The effects of aircraft noise on people living or working in noise sensitive areas can be reduced if low altitude flying time at less than optimum speeds can be minimized. This reduction in perceived noisiness can be achieved if arrival aircraft remain at higher altitudes in a clean configuration for as long as possible. Use of the profile descent and reduced low altitude flying time does improve on the benefits derived from our present programs.

Near midair collision studies indicate that the mix of controlled and uncontrolled aircraft is more critical in terminal areas at low altitudes than any other area. The profile descent procedure is intended to reduce, as much as possible, the exposure of high performance aircraft to VFR or uncontrolled aircraft operating in the vicinity of an airport at low altitudes.

5. PROCEDURES. All air traffic facilities will review and revise as necessary procedures at all airports where high performance aircraft operate. These new procedures will be designed to:

   a. Reduce flying time at altitudes below 10,000 feet above airport elevation (AAE).

b. Provide for maximum use of profile descents from cruising altitude/level to the final approach. As a minimum, provide for profile descents during all periods of operation from at least 10,000 feet AAE and preclude routing level flight below this altitude.

c. Accomplish holding at or above Flight Level 200, and whenever possible prior to the arrival fix. In any case, holding will be above 10,000 feet AAE except for aircraft that file for lower altitudes as noted below.

d. Avoid requiring abnormal high descent rates close into the airport. Aircraft will be given a distance for descent which is sufficient to permit a stabilized final approach with interception below the glide slope. Normally, descent clearance will be issued based on an altitude loss of 300 feet per flying mile from cruise altitude to the runway at pilot's discretion.

e. Enable departures to climb unrestricted to the extent possible and ensure maximum compatibility with new or revised arrival procedures. Routine altitude restrictions below 5,000 feet above ground level will be avoided.

The minimum altitude for profile descents specified in 5b. will not apply to aircraft that file or request to operate below 10,000 AAE; i.e., "short haul" or tower en route flights. However, procedures will be implemented which will provide these aircraft level flight to a point where descent can be affected in accordance with the altitude loss specified in 5d. Additionally, these aircraft will be included in all metering efforts, as well as all non-high performance aircraft that impact the system.

Metering will be utilized to monitor the arrival flow to determine when the number of aircraft approaches system capacity. Traffic will then be regulated so as not to exceed this capacity. Arrival times will be adjusted to resolve simultaneous demands at the airport and to establish the time that an arrival aircraft will be required to cross the arrival fix.

To assist VFR pilots, FAA facility chiefs will normally issue Facility Bulletins explaining the program and describing local procedures. It will be accompanied by a graphic notice depicting normal arrival and departure routes. These charts are designed to help VFR pilots to identify areas and routes that are normally used by high performance aircraft. Avoiding these areas will result in a higher degree of safety in the terminal area.

6. MISCELLANEOUS.

a. The FAA believes this program enhances safety, affords significant noise relief to our airport neighbors, and saves fuel. Pilots of high performance aircraft, when flying IFR, are urged to cooperate with air traffic control. Profile descent procedures are developed based on an altitude loss of 300 feet per mile for controller planning from cruise altitude in order to provide a timely descent clearance. Actual altitude loss will vary depending on aircraft performance characteristics and the most economical descent for that flight. However, the procedures are also designed to provide noise relief and in order to achieve maximum benefits, pilots should comply with the 300 feet per flying mile descent as closely as possible at lower altitudes.

b. When speed restrictions and crossing altitudes (issued verbally or on a chart) are associated with a fix along the arrival route, pilots are expected to descend first to the crossing altitude and then reduce airspeed. The airspeed reduction should be performed immediately prior to the fix where it is required unless otherwise advised by ATC. Normally, this would be 7 to 10 NM from the fix.

ATC spacing for profile descents is based on descent at cruise mach numbers down to the indicated airspeed crossover point (approximately 23,000 feet) and then descent between 320-350 knots down to the point where the aircraft is slowed to meet the 250-knot restriction.

c. When delays are required, pilots may expect them to be absorbed at higher altitudes, and further from the airport for maximum fuel economy. Traffic will then be metered, or spaced at higher altitudes to accommodate the profile descent.

d. AC 90-59 will remain in effect until the new procedures required by FAA Order 7110.72 and outlined in this Advisory Circular are implemented at all specified airports.

e. Prior to the development of a national program, the concept was evaluated at several locations throughout the country. These new procedures will be evaluated first in Denver beginning in February 1977. Implementation at all airports where high performance aircraft operate is scheduled no later than the middle of 1978.

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