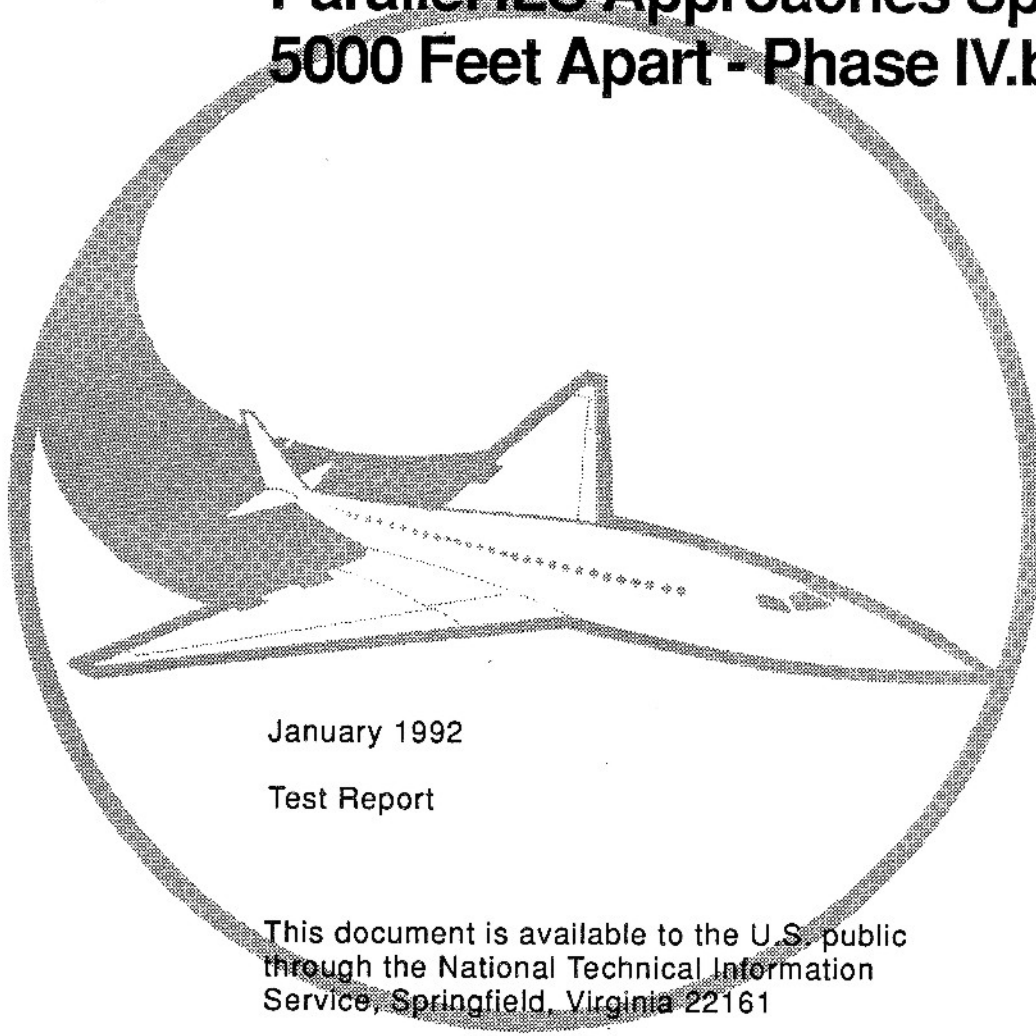
DOT/FAA/CT-91/31

FAA Technical Center
Atlantic City International Airport
N.J. 08405

Evaluation of Triple Simultaneous Parallel ILS Approaches Spaced 5000 Feet Apart - Phase IV.b



January 1992

Test Report

U.S. Department of Transportation
Federal Aviation Administration

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
DOT/FAA/CT-91/31		

4. Title and Subtitle	5. Report Date
Evaluation of Triple Simultaneous Parallel ILS Approaches Spaced 5000 Feet Apart - Phase IV.b	January 1992
	6. Performing Organization Code: ACD-340
7. Author(s): ATC Simulation Team	8. Performing Organization Report No.: DOT/FAA/CT-91/31
9. Performing Organization Name and Address: CTA INCORPORATED, English Creek Center, The Courtyard, Suite 204, McKee City, NJ 08232	10. Work Unit No. (TRAIS)
	11. Contract or Grant No.: DTFA03-89-C-00023
12. Sponsoring Agency Name and Address: U.S. Department of Transportation, Federal Aviation Administration, Future Design Staff, Washington, DC 20591	13. Type of Report and Period Covered: Test Report 9/90 - 11/91
	14. Sponsoring Agency Code: ARD-20

15. Supplementary Notes

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16. Abstract

This study was part of an on-going effort to evaluate plans for increasing air traffic capacity and to evaluate the feasibility of using multiple simultaneous, parallel, Instrument Landing System (ILS) approaches. The objective of this study was to evaluate the ability of experienced controllers to handle approach traffic during Instrument Meteorological Conditions (IMC) to a proposed parallel runway airport configuration, using a real-time, interactive, air traffic control (ATC) simulation. This simulation utilized a current radar system, Airport Surveillance Radar (ASR-9), and a current display system, Automated Radar Terminal System (ARTS) IIIA. The proposed configuration consisted of parallel runways (i.e., 18R, 18C, and 18L), 10,000 feet (ft) long, spaced 5000 ft apart with even thresholds.

Triple simultaneous parallel ILS approaches were simulated with controllers monitoring traffic on the approach localizers. To challenge the system, blunders were introduced, according to predetermined scenarios, by having some of the simulated aircraft deviate from the localizer by either 10, 20, or 30 degrees. Furthermore, half of the blundering aircraft also simulated a total loss of radio communication (NORDO) with the controllers.

The results indicated that controllers were able to resolve 99 percent of the blunders initiated in the simulation. Of the 484 blunders simulated, only 3 blunders resulted in aircraft violating the criterion miss distance of 500 ft. The Multiple Parallel Technical Work Group (TWG), based on their observations during the simulation and their understanding of the contingencies that must be accounted for in such an operation, determined that triple simultaneous parallel ILS approach operations spaced at 5000 ft are acceptable using the ASR-9 radar and the ARTS IIIA displays.

17. Key Words	18. Distribution Statement
Simultaneous Parallel ILS, ILS Approaches, Real-Time Simulation, Air Traffic Control	This document is available to Public through the National Technical Information Service, Springfield, VA 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	71	

Form DOT F 1700.7 (8-72)

This study is part of an on-going effort to evaluate plans for increasing air traffic capacity and to evaluate multiple parallel approaches. The objective of this study was to evaluate the ability of controllers to handle traffic during Instrument Meteorological Conditions (IMC) for the proposed triple parallel airport configuration, using a real-time air traffic control (ATC) simulation. The proposed runway configuration consisted of three parallel runways 10,000 feet (ft) long and spaced 5000 ft apart with even thresholds. All aircraft were assigned speeds of approximately 170 knots.

Triple simultaneous parallel Instrument Landing System (ILS) approaches were simulated with controllers monitoring traffic on the approach localizers. Blunders were introduced, according to predetermined scenarios, by having simulated aircraft deviate off the localizer at 10, 20, or 30 degree angles. Some of the blundering aircraft also simulated a loss of radio communication with the controllers.

The central issue in the study was the ability of the controllers to maintain distance between the blundering aircraft and aircraft on adjacent approaches. With this in mind, two questions were to be answered:

1. Can the controllers maintain the test criterion miss distance of 500 ft or greater between aircraft in response to blunders for the proposed triple approach configuration?

2. Do flight standards, aviation standards, and air traffic representatives agree that the operation of the proposed triple simultaneous parallel ILS approaches is acceptable, achievable, and safe?

Analysis of the data from the simulation indicated that controllers were able to maintain aircraft miss distances of 500 ft or greater in approximately 99 percent of the blunders. The controllers concluded that triple simultaneous ILS approaches with runway centerlines spaced 5000 ft apart would be a "safe and viable operation" using current technology radar systems and procedures. The Multiple Parallel Technical Work Group (TWG), composed of individuals from the Office of System Capacity and Requirements, Air Traffic Control, Flight Standards, Aviation Standards and Operations personnel, participated in the simulation and evaluated the simulation findings. *Based upon their understanding of daily operations, the knowledge and skills of controllers, and the contingencies which must be accounted for in such an operation, the TWG determined that the triple simultaneous parallel ILS approach operation spaced at 5000 ft is acceptable using the Airport Surveillance Radar (ASR)-9 and the Automated Radar Terminal System*

(ARTS) IIIA displays. In addition, the TWG made the following recommendations:

1. There shall be one monitor controller for each runway. Personnel and equipment shall be provided to support the procedure.

2. All monitor positions shall be located together and near their respective arrival positions.

3. The Implementation Strategy used prior to any airport conducting triple approaches with runways spaced 5000 ft apart shall consist of a graduated, sliding scale weather minimums criteria. This strategy will facilitate a smooth transition period to permit adequate training and to develop requisite competency. The recommended required meteorological conditions to be satisfied are categorized as follows:

a. Basic VFR - Ceiling greater than 3000 ft and visibility greater than 5 miles.

b. MVFR (Marginal VFR) - Ceiling 1000 to 3000 ft and visibility 3 to 5 miles inclusive.

c. IFR - Ceiling 500 to less than 1000 ft and visibility 1 to less than 3 miles.

d. LIFR (Low IFR) - Ceiling less than 500 ft and visibility less than 1 mile down to the lowest minimums authorized for the approach.

In addition, facilities must develop experience levels of 1000 approaches or 60 days, whichever occurs first, in conducting operations in each weather category. Once the required experience level has been acquired, they will be authorized to conduct approaches during conditions in the next, more restrictive weather minimums.