In-Close Approach Changes

Tabulation Results from
a NAOMS Section C
Topical Data Collection Effort

Background

- In-Close Approach Changes (ICACs)
  - Amended approach clearance
  - Requested by ATC
  - Within ten-miles of a destination airport
- Typical ICAC Requests
  - Parallel runway sidesteps
  - Airspeed and altitude changes
- Scope of 16 Questions Posed
  - Nature of clearance change
  - Reasons for change
  - Flight crew response to ICAC
  - Role of FMS in ICAC execution
  - Unwanted events resulting from ICAC
  - Overall ICAC effects on flight crew
- High statistical confidence in most NAOMS ICAC findings

Top-Level NAOMS ICAC Data

	Approaches Flown by NAOMS Respondents	
	Number	Percentage of Approaches Flown
Total Approaches Flown	491,061	100.0%
Total Number of ICAC Requested by ATC	30,486	6.2%
Total Number Accepted by Pilots	28,515	5.8%
Total Number of ICAC Approaches with Problems	1,829	0.4%

*ICAC Marginal Probabilities**

NATURE OF CHANGE

- 100% - Last ICAC Flown
  - 71% - Runway Change
    - 86% - Sidestep to parallel runway
  - 36% - Approach Type
    - 34% - Instrument to Visual
    - 2% - Visual to Instrument
  - 32% - Airspeed Assignment
  - 16% - Altitude Assignment

* Each probability shown is a percentage of the next higher level above.

*ICAC Marginal Probabilities**

REASON FOR CHANGE

- 100% - Last ICAC Flown
  - 45% - Reason Given for ICAC
    - 85% - Traffic Flow and Separation
    - 17% - Providing Runway Favorable to Air Carrier Gate
    - 8% - Change in Active Runways
    - 6% - Weather or Wind Factors
    - 5% - Wake Turbulence Avoidance
    - 1% - Noise Abatement Factors
    - 0% - ATC Equipment Problems
    - 10% - Other Factors

* Each probability shown is a percentage of the next higher level above.

*ICAC Marginal Probabilities**

PILOT RESPONSE TO ICAC

- 100% - Last ICAC Flown
  - 61% - Disconnected One or More Automated Systems
  - 58% - Changed the NavAid Frequency
    - 74% - Confirmed the new NavAid identity
  - 50% - Revised the Approach Briefing
  - 23% - Changed the ATC Frequency
  - 19% - Changed the Aircraft Configuration

* Each probability shown is a percentage of the next higher level above.

*ICAC Marginal Probabilities**

ROLE OF FMS

- 100% - Last ICAC flown
  - 73% - Aircraft FMS equipped
    - 21% - On programmed Auto-Coupled approach when ICAC received
    - 86% - FMS Multi-Route capable
      - 36% - Nav and Com Changes made thru FMS
      - 42% - FLC attempted to Reprogram FMS after ICAC request
        - 21% - Inputs were Not Cross-Checked by other crew
        - 10% - Programming Not Completed in time
        - 7% - Inputs did Not Loaded properly
        - 10% - Other Programming Difficulties
      - 39% - Overall, FMS Assisted ICAC compliance

* Each probability shown is a percentage of the next higher level above.

*ICAC Marginal Probabilities**

OVERALL EFFECTS ON FLT CREW

- 100% - Last ICAC Flown
  - 27% - Reduced quality of flight crew Coordination
  - 26% - Compromised Traffic Watch
  - 19% - Reduced Situational Awareness
  - 5% - Compromised Safety in some Other Way

* Each probability shown is a percentage of the next higher level above.

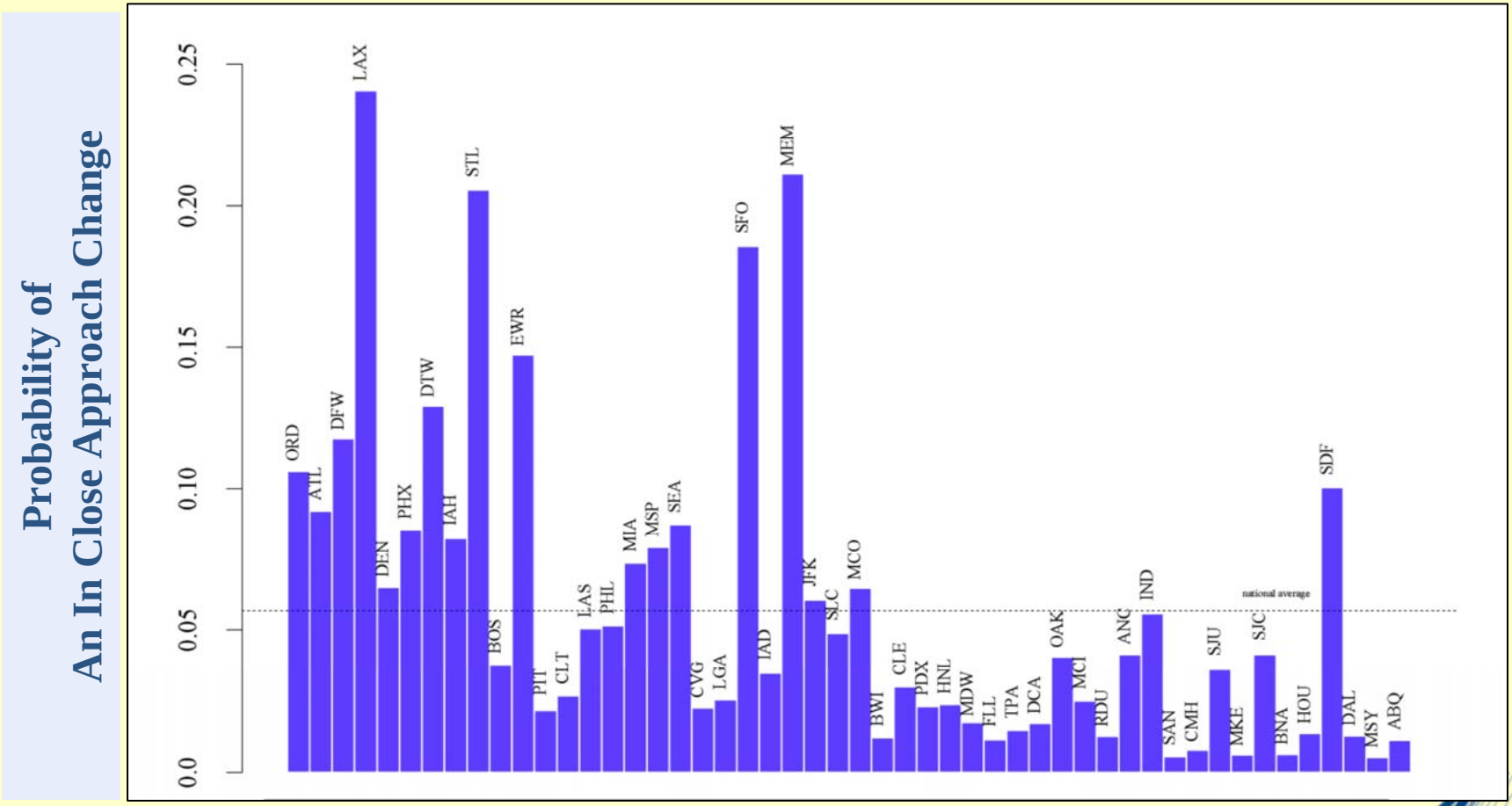
*ICAC Marginal Probabilities**

DOWNSTREAM PROBLEMS

- 100% - Approaches Flown
  - 6% - ICACs Received
    - 94% - ICACs Accepted
      - 7% - Problems Resulted
        - 72% - Unstabilized Approaches
        - 61% - Landing Long or Fast
        - 23% - Go-Around or Missed Approach
        - 20% - Wake Turbulence Encounter
        - 5% - Airborne Conflicts
        - 5% - Ground Conflicts
        - 3% - Landing with Out-of-Limit Winds
        - 1% - Landing without Clearance
        - 0% - Wrong Runway Landing
        - 38% - Other Undesirable Event

* Each probability shown is a percentage of the next higher level above.

In-Close Approach Change Probability for the 50 Busiest US Airport



Highest Number of Airport Operations ⟷ **Lowest Number of Airport Operations**