

In-Close Approach Change Results

Section C: Special Topic - In-Close Approach Changes



- **Dynamics of approach clearance changes requested by ATC within ten-miles of a destination airport**
- **Sixteen questions relating to:**
 - Pilot execution of requested changes
 - Consequences
- **Questions focus on number of in-close approach change (ICAC) events**
- **Followed by additional questions concerning the last ICAC experienced by pilot**

Number of In-close Approach Changes Requested by ATC of NAOMS Response Pilots



	Approaches Flown	Percentage of Approaches Flown	Extrapolated Annual Events	Comment
Total Approaches Flown	296,165	100.00	8,000,000	Estimated
Total Number of ICAC Requested by ATC	17,943	6.0	484,675	Estimated
Total Number Accepted by Pilots	16,802	5.7	453,855	Estimated
Total Number of ICAC Approaches with Issues	1,083	0.4	29,254	Estimated

NAOMS Estimates of Marginal Probabilities Associated with IN-CLOSE APPROACH CHANGES

Given that an ICAC request was Received . . .

there is a 95% probability that the ICAC request was Accepted.

Given that the ICAC request was Accepted . . .

there is a 6% probability that the ICAC resulted in one or more Undesirable Events.

Given that the ICAC resulted in one or more Undesirable Events . . .

there is a 74% probability that the events included an Unstable Approach.

there is a 59% probability that the events included a Long or Fast Landing.

there is a 27% probability that the events included a Go-Around.

there is a 14% probability that the events included a Wake Turbulence Encounter.

there is a 6% probability that the events included a Ground Conflict.

there is a 4% probability that the events included an Airborne Conflict.

there is a 4% probability that the events included an Out-of-Limit Landing.

there is a 1% probability that the events included a Landing without Clearance.

there is a 0% probability that the events included a Wrong Runway Landing.

there is a 46% probability that the events included an Other Undersirable Event.

NAOMS Estimates of Marginal Probabilities Associated with IN-CLOSE APPROACH CHANGES

Given that an ICAC request was Received and Accepted . . .

there is a 72% probability that the receiving aircraft was Equipped with an FMS.

there is a 61% probability that the receiving aircraft was Equipped with a Multi-Route Capable FMS

Given that the receiving aircraft was Equipped with a Multi-Route Capable FMS . . .

there is a 34% probability that Frequency Changes are made through the Multi-Route FMS.

there is a 41% probability that the FLC attempted to Reprogram the Multi-Route FMS.

there is a 38% probability that the Multi-Route FMS Facilitated ICAC compliance.

Given that the FLC attempted to Reprogram the Multi-Route FMS . . .

there is a 12% probability that the Inputs did Not Load Properly into the Multi-Route FMS.

there is a 9% probability that Other Multi-Route FMS Programming Difficulties were encountered.

there is a 90% probability that it was Possible to Complete programming of the Multi-Route FMS.

Given that it was Possible to Complete programming of the Multi-Route FMS . . .

there is a 81% probability that the Multi-Route FMS programming was Cross-Checked.

NAOMS Estimates of Marginal Probabilities Associated with IN-CLOSE APPROACH CHANGES

Given that an ICAC request was Received and Accepted . . .

there is a 24% probability that the FLC Changed the ATC Frequency.

there is a 59% probability that the FLC Changed the NavAid Frequency in response to the ICAC.

there is a 52% probability that the FLC Revised the Approach Briefing.

there is a 20% probability that the FLC Changed the Aircraft Configuration.

there is a 36% probability that the FLC Disconnected 1 or more Automatics.

Given that the FLC Changed the NavAid Frequency in response to the ICAC . . .

there is a 73% probability that the FLC Confirmed the new NavAid Identity.

Given that an ICAC request was Received and Accepted . . .

there is a 47% probability that a Reason for the ICAC was given by ATC.

NAOMS Estimates of Marginal Probabilities Associated with IN-CLOSE APPROACH CHANGES

Given that a Reason for the ICAC was given by ATC . . .

there is a 85% probability that ATC cited Traffic flow and separation.

there is a 11% probability that ATC cited desire to assign runway Favored by Air Carrier.

there is a 8% probability that ATC cited Change in Active Runway.

there is a 7% probability that ATC cited Wake Turbulence avoidance.

there is a 4% probability that ATC cited Weather or Wind factors.

there is a 1% probability that ATC cited Noise Abatement factors.

there is a 0% probability that ATC cited ATC Equipment Problems.

there is a 10% probability that ATC cited Other factors.

Given that an ICAC request was Received and Accepted . . .

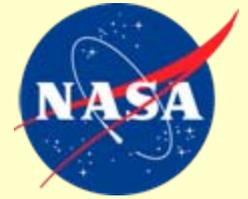
there is a 30% probability that the ICAC Reduced the Quality of FLC Coordination.

there is a 27% probability that the ICAC Compromised Traffic Watch.

there is a 18% probability that the ICAC Reduced FLC Situational Awareness.

there is a 4% probability that the ICAC Compromised Safety In some Other Way.

Issues Associated with In-Close Approach Changes

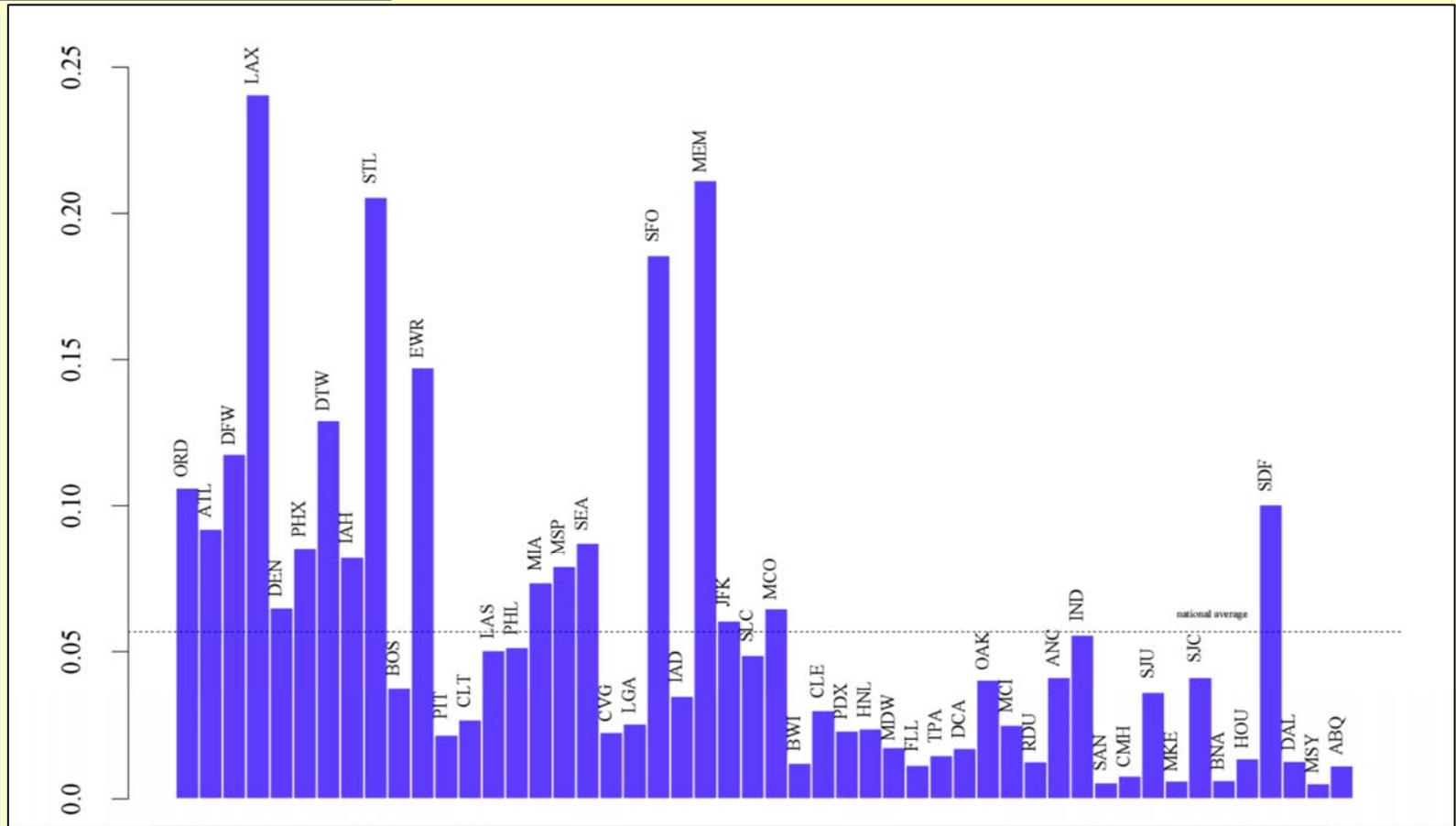


Type of ICAC Problem	Number Reported	Percentage of Itemized Problems	Extrapolated Annual Events
Unstabilized Approach	631	3.76	17,045
Long/Fast Landing	561	3.52	15,964
Wake Turbulence	213	1.27	5,754
Missed Approach	211	1.26	5,700
Ground Conflict	52	0.31	1,405
Airborne Conflict	50	0.30	1,350
Out of Limit Winds	33	0.20	891
Landing without Clearance	7	0.04	189
Other	479	2.85	12,939

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



Probability of
An In Close Approach Change



Highest Number of
Airport Operations



Lowest Number of
Airport Operations