ASE Performance Above FL410

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Federal Aviation Administration

Overview

1. Aircraft capabilities above FL410
2. Current flight level utilization above FL410 in the U.S.
3. ASE behavior analysis
4. Implementation challenges

ASE Technical Interchange Meeting

Aircraft Capabilities Above FL410

Commercial aircraft, observed in U.S. airspace, published service ceilings

The altitude at which the aircraft is unable to climb at a rate greater than 100 feet per minute.

Manufacturer	AC Type	Ceiling
Boeing	737-100 to 737-500	37,000
Boeing	737-600 to 737-900	41,000
Boeing	737 Max (all variants)	41,000
Boeing	747-400	44,947
Boeing	747-8	43,100
Boeing	757-200/757-200F/300	42,000
Boeing	767 (all variants)	43,100
Boeing	787-8/787-9	43,100
Boeing	787-10	41,100

Manufacturer	AC Type	Ceiling
Airbus	A319/A320/A321 Classic	39,100 to 41,000
Airbus	A319 neo/A320 neo/ A321 neo	39,800
Airbus	A220	41,000
Airbus	A330	41,100
Airbus	A340	41,450
Airbus	A350-900	43,100
Airbus	A350-1000	41,450

Aircraft Capabilities Above FL410 (cont.)

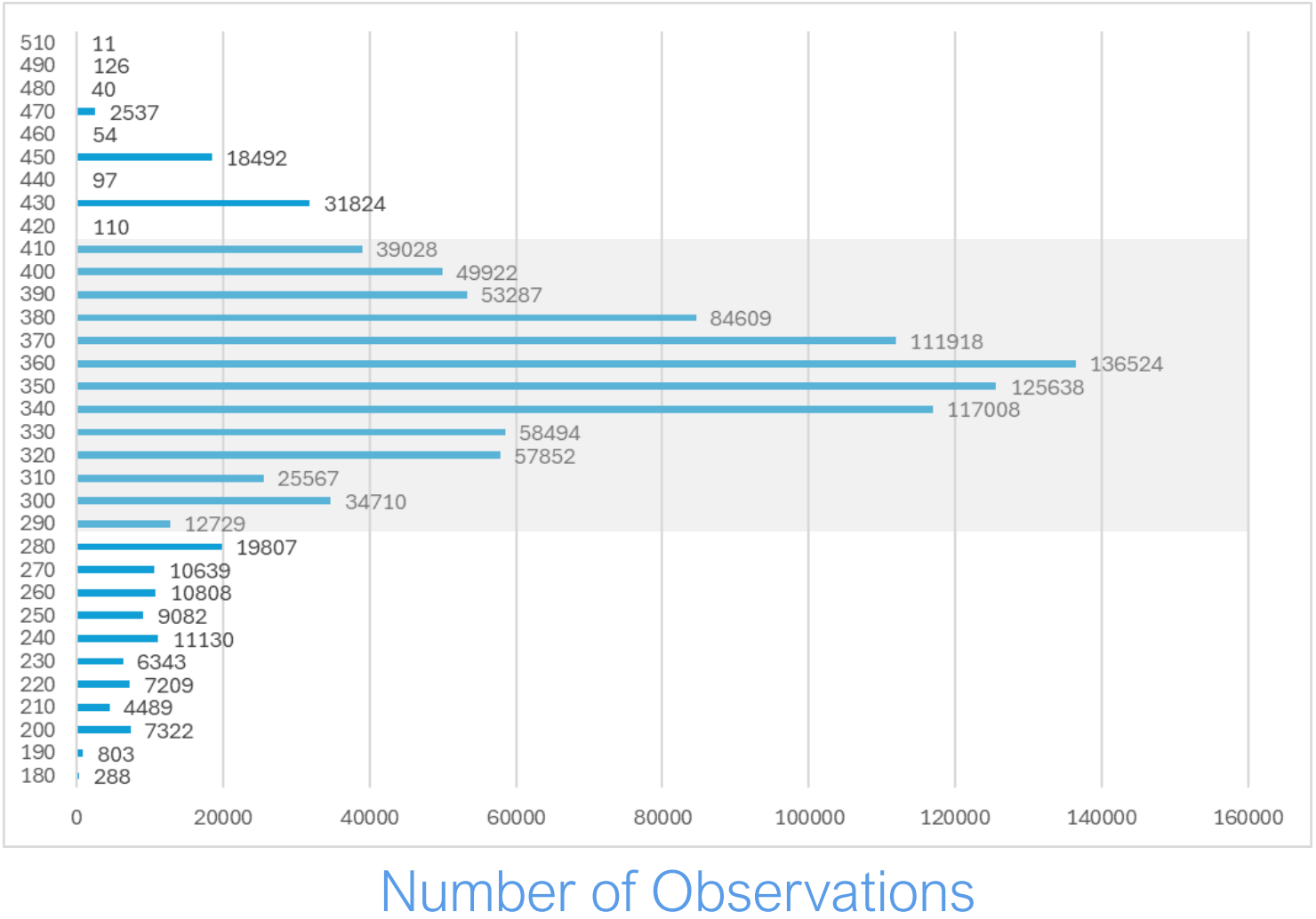
International general aviation (IGA) aircraft published service ceilings

Manufacturer	AC Type	Ceiling
Beechcraft	BE40	45,000
Bombardier	CL30-35	45,000
Bombardier	GL5T-7T	51,000
Cessna*	C550	43,000
Cessna	C25A-B-C	45,000
Cessna	C560, C56X, C650, C700	45,000
Cessna	C680	47,000
Cessna	C750	51,000
Embraer	E545-550-55P	45,000
Falcon	F2TH	47,000
Falcon	FA50	49,000
Falcon	F900	51,000

Manufacturer	AC Type	Ceiling
Falcon	FA6X-7X	51,000
Global Express	GLEX	51,000
Gulfstream	ASTR	45,000
Gulfstream	G150, G280	45,000
Gulfstream	GALX	45,000
Gulfstream	GLF3-4	45,000
Gulfstream	GLF5-6	45,000
Gulfstream	G650, GA5C-7C-8C	51,000
Hawker	HA4T	45,000
HondaJet*	HDJT	43,000
LearJet	LJ25-31-35-40-45-55-60	51,000
Pilatus	PC24	45,000

*Aircraft cannot fly above FL430

Current Flight Level Utilization in the U.S.



Flight Level Utilization

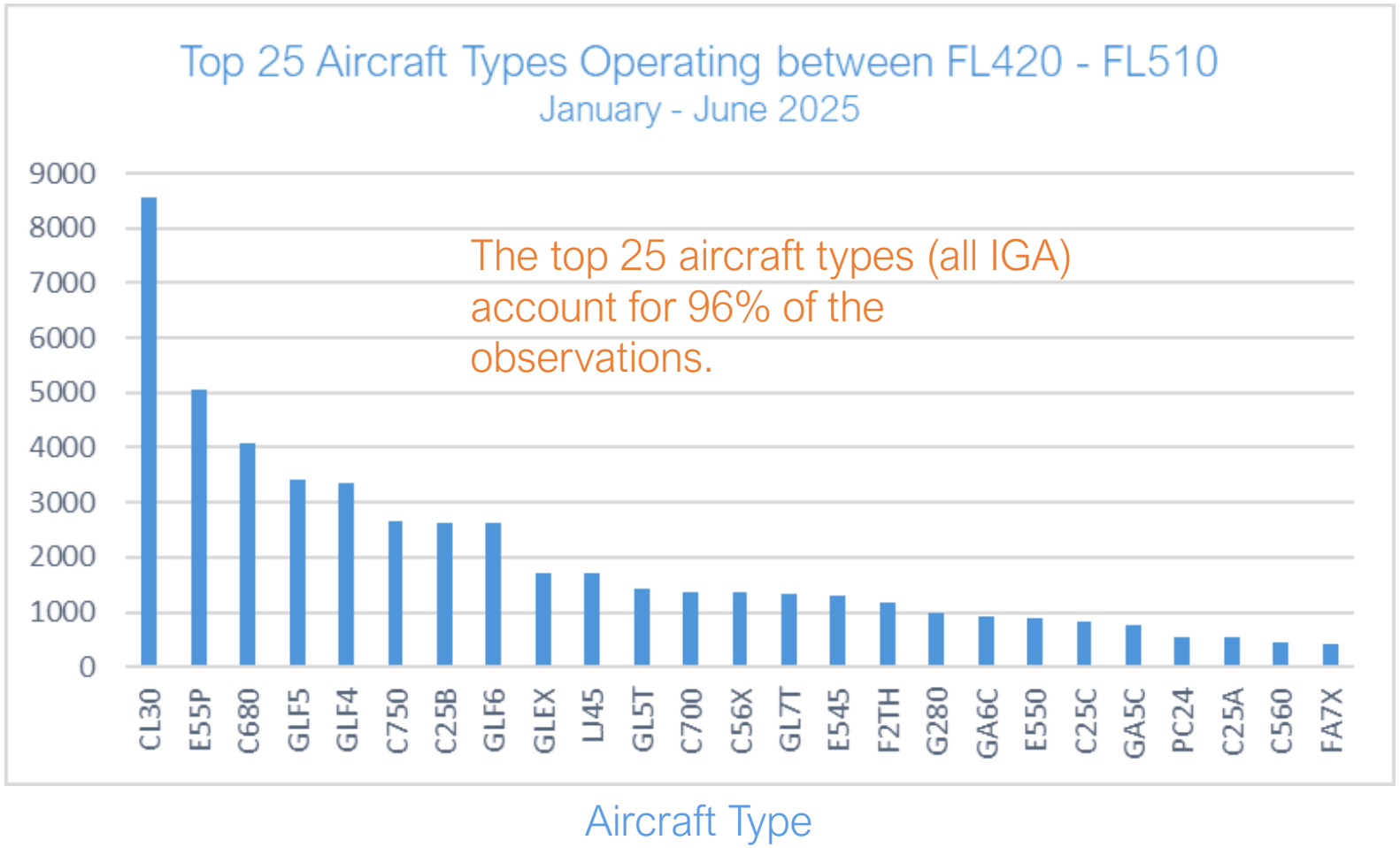
Percentage Above RVSM:

5%

Percentage in RVSM:

87%

Current Flight Level Utilization Above FL410 in the U.S.



Flight Level usage FL420 – FL510

Number of Observations:

52,376

(Top 25 = 50,096)

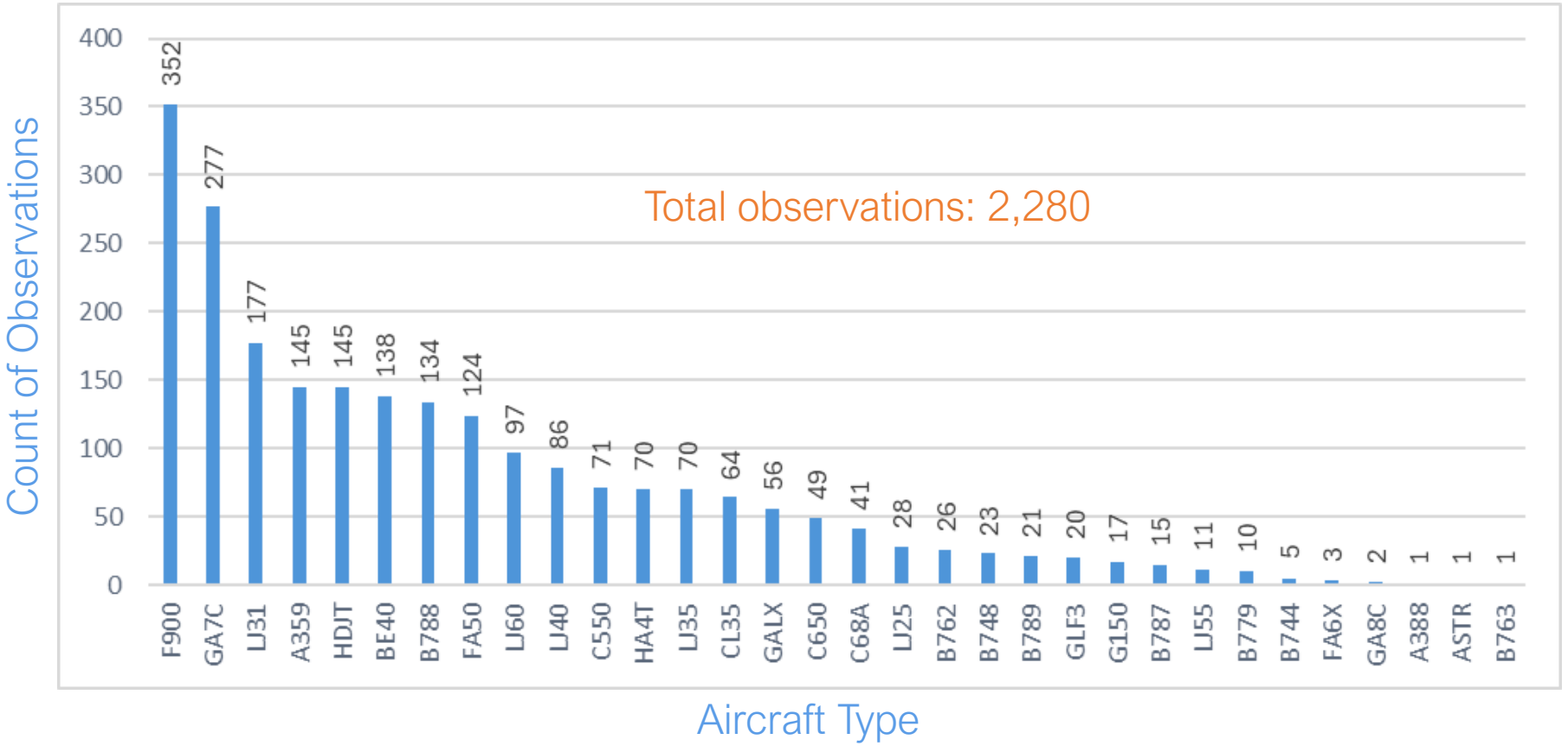
Number of unique aircraft types:

57

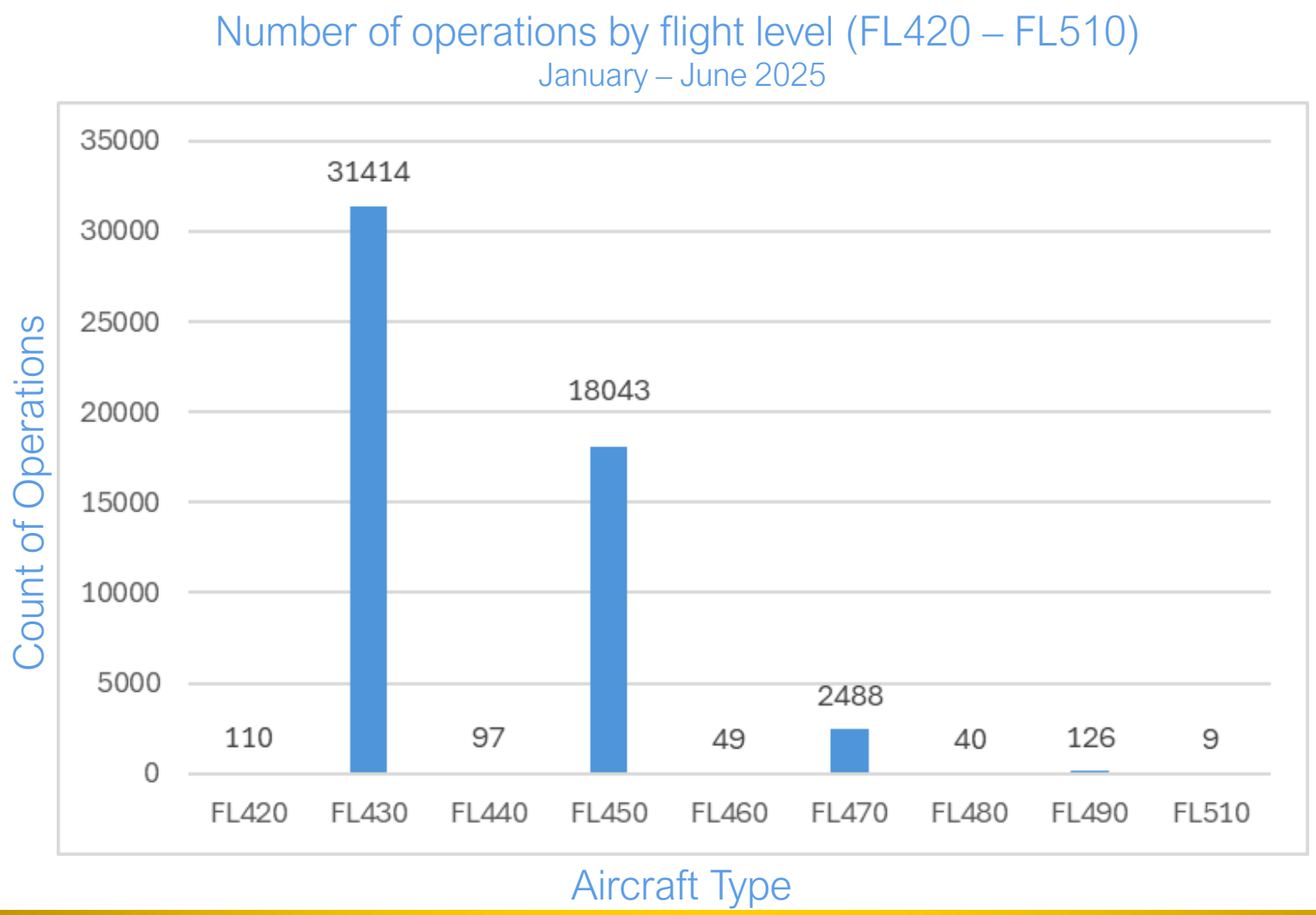
Current Flight Level Utilization Above FL410 in the U.S. (cont.)

Remaining aircraft types - 4% of observations between FL420 – FL510

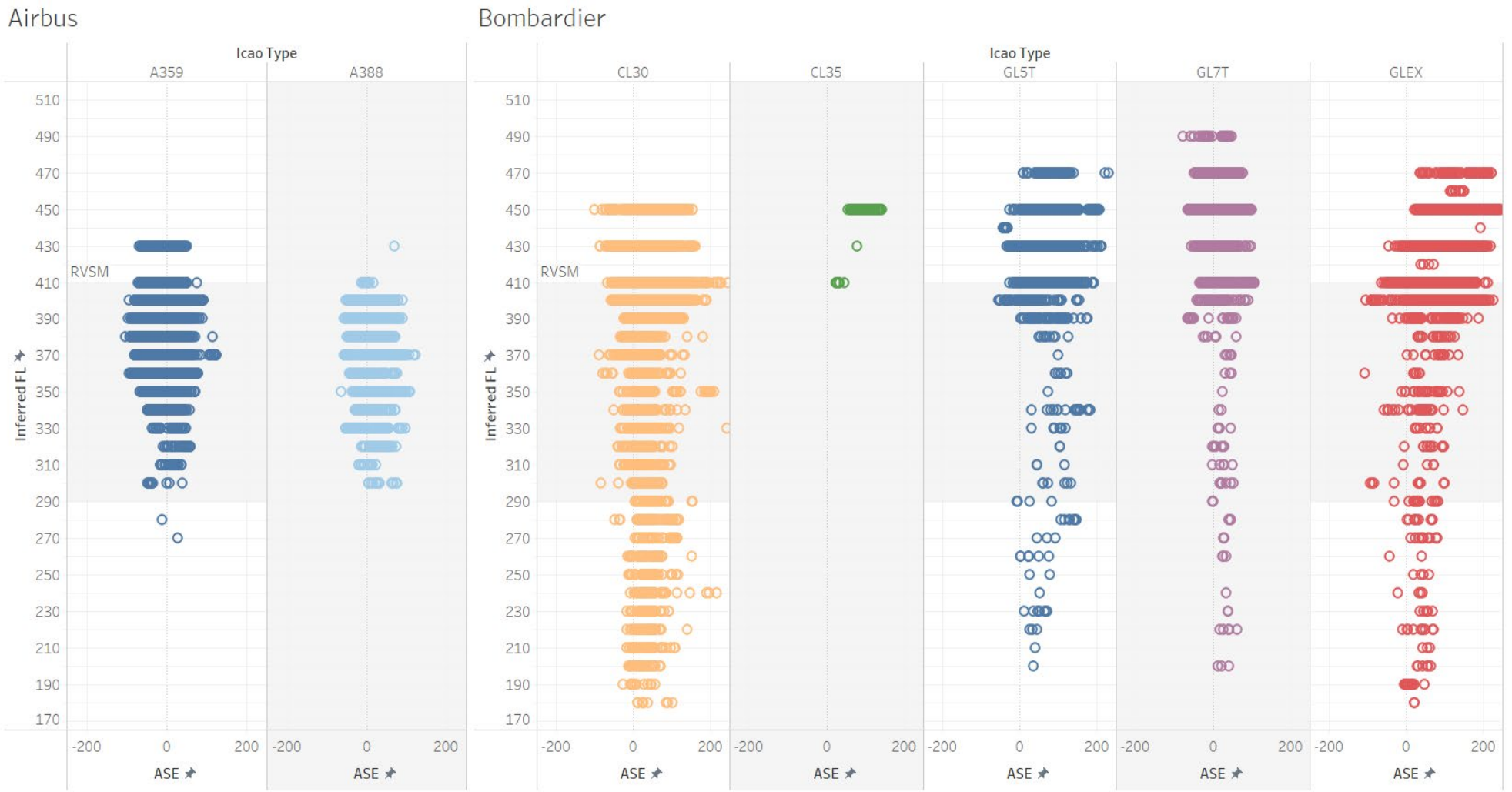
January – June 2025



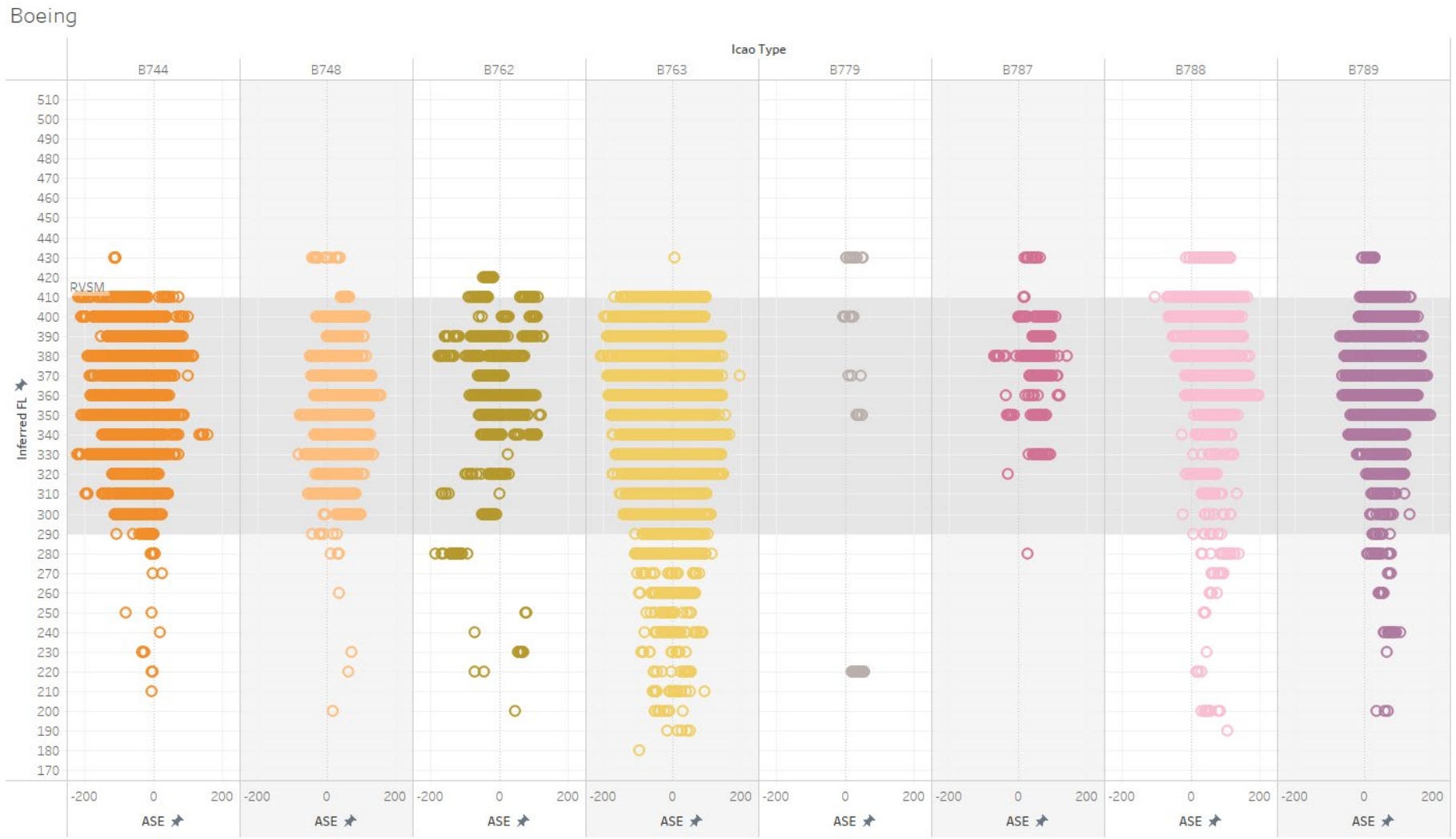
Current Flight Level Utilization Above FL410 in the U.S. (cont.)



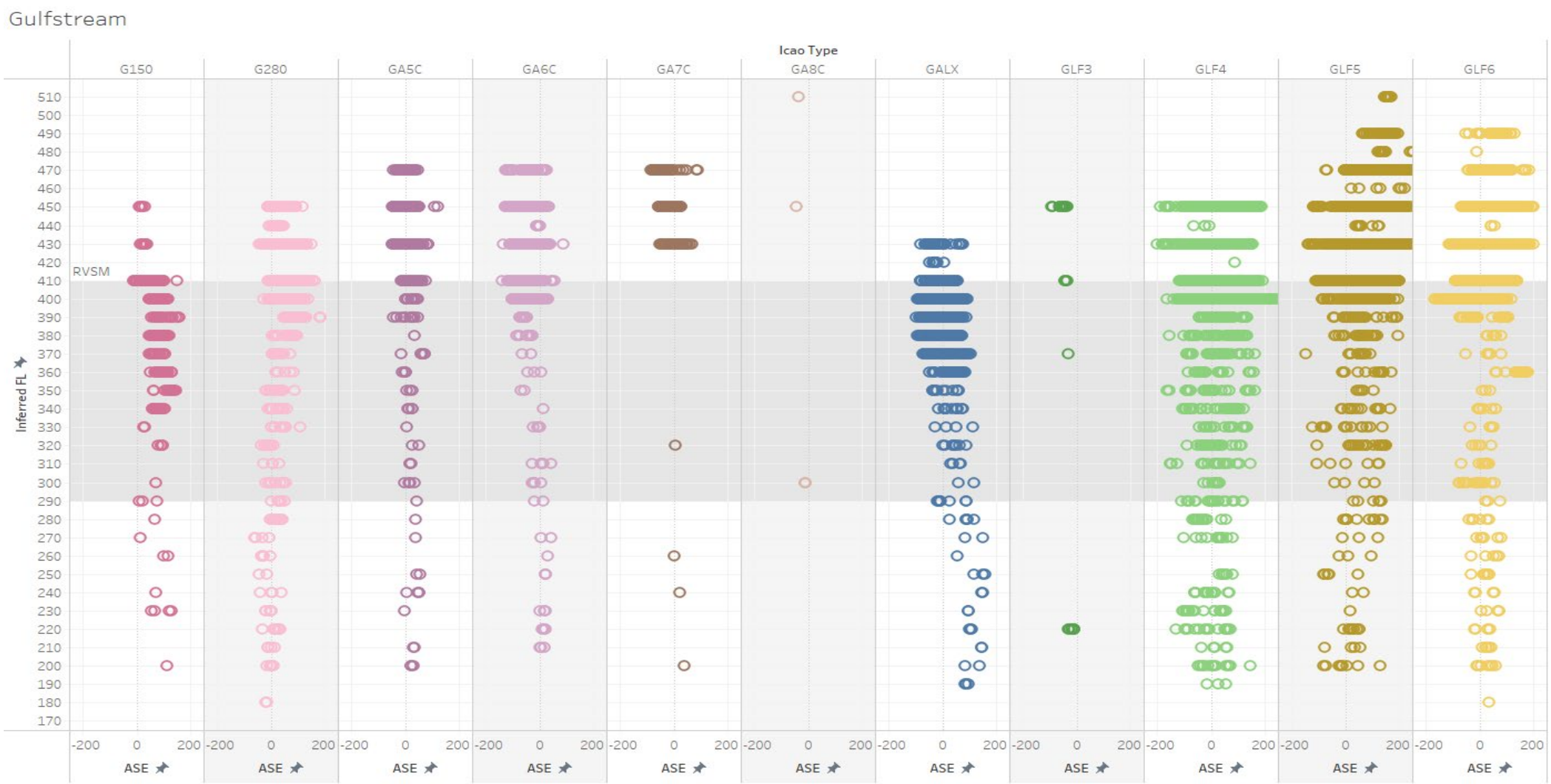
ASE Behavior Analysis - Airbus & Bombardier



ASE Behavior Analysis - Boeing



ASE Behavior Analysis - Gulfstream



Implementation Challenges

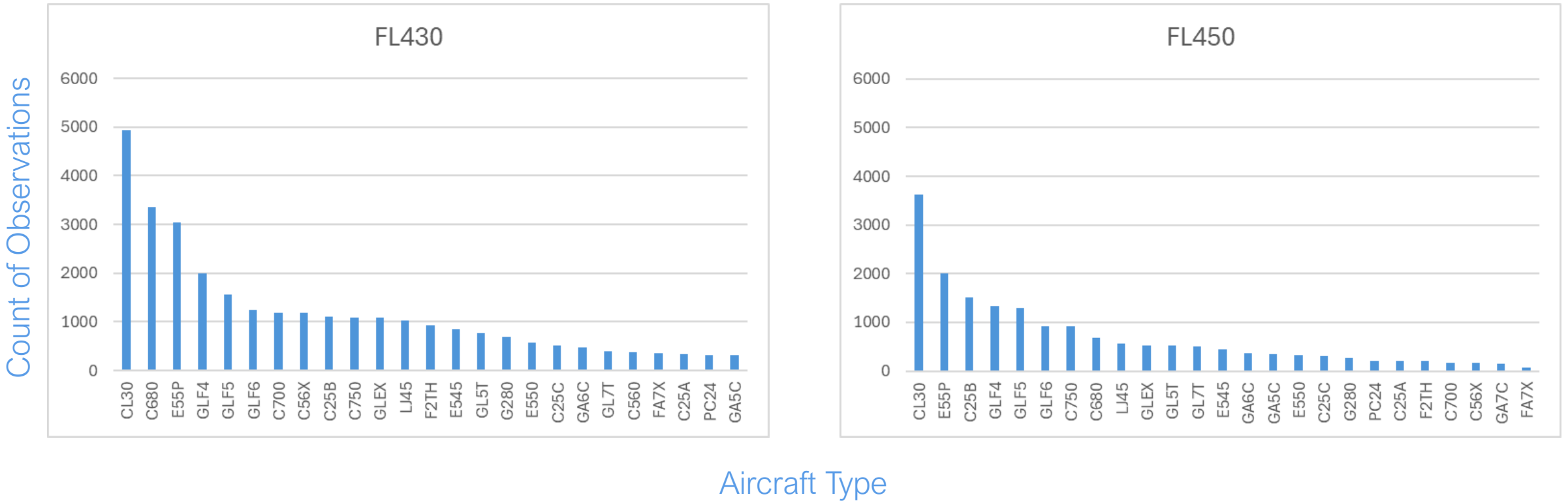
1. Current RVSM Fleet Performance: Some aircraft in the existing RVSM fleet may not meet the required performance standards, raising concerns about compliance.
2. Impact: Expanding the RVSM service area would necessitate accommodating aircraft without RVSM approval that currently have access to these flight levels.
3. Introduction of a New RVSM Filing Code: Provide a new RVSM filing code for aircraft operating above FL410 that do not meet Minimum Aviation System Performance Standards (MASPs).
4. Flight Level Restrictions: Implement restrictions, allowing these aircraft to operate only within flight levels where they meet performance criteria.
5. Aircraft Modifications: Consider modifying aircraft to comply with requirements across expanded ranges, OR
6. Delayed Implementation: Delay the expansion until non-compliant aircraft are phased out.
7. Accuracy of Meteorological Data: Assess whether meteorological data is expected to maintain its accuracy at higher flight levels.

Reference Slides

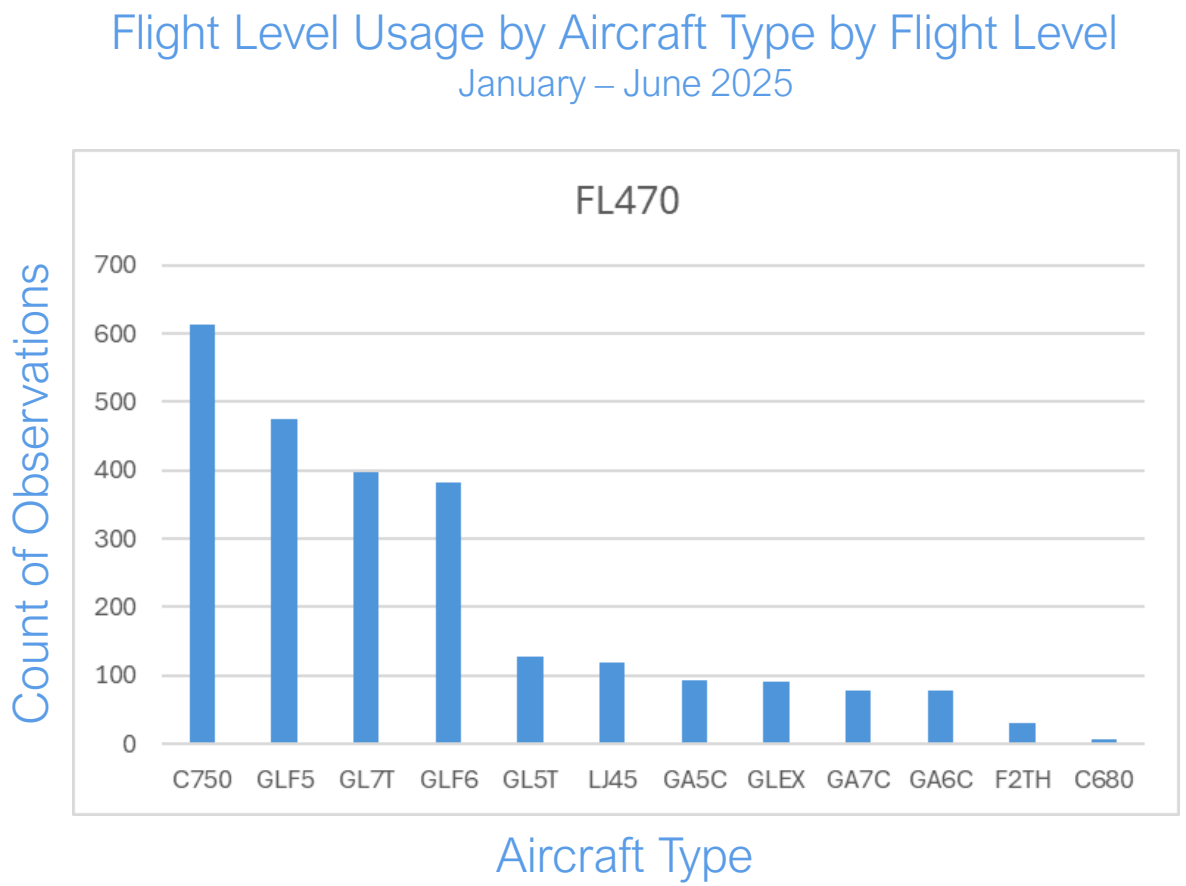
Current Flight Level Utilization Above FL410 in the U.S. (cont.)

Flight Level Usage by Aircraft Type by Flight Level – Top 25

January – June 2025



Current Flight Level Utilization Above FL410 in the U.S. (cont.)



Current Flight Level Utilization Above FL410 in the U.S. (cont.)