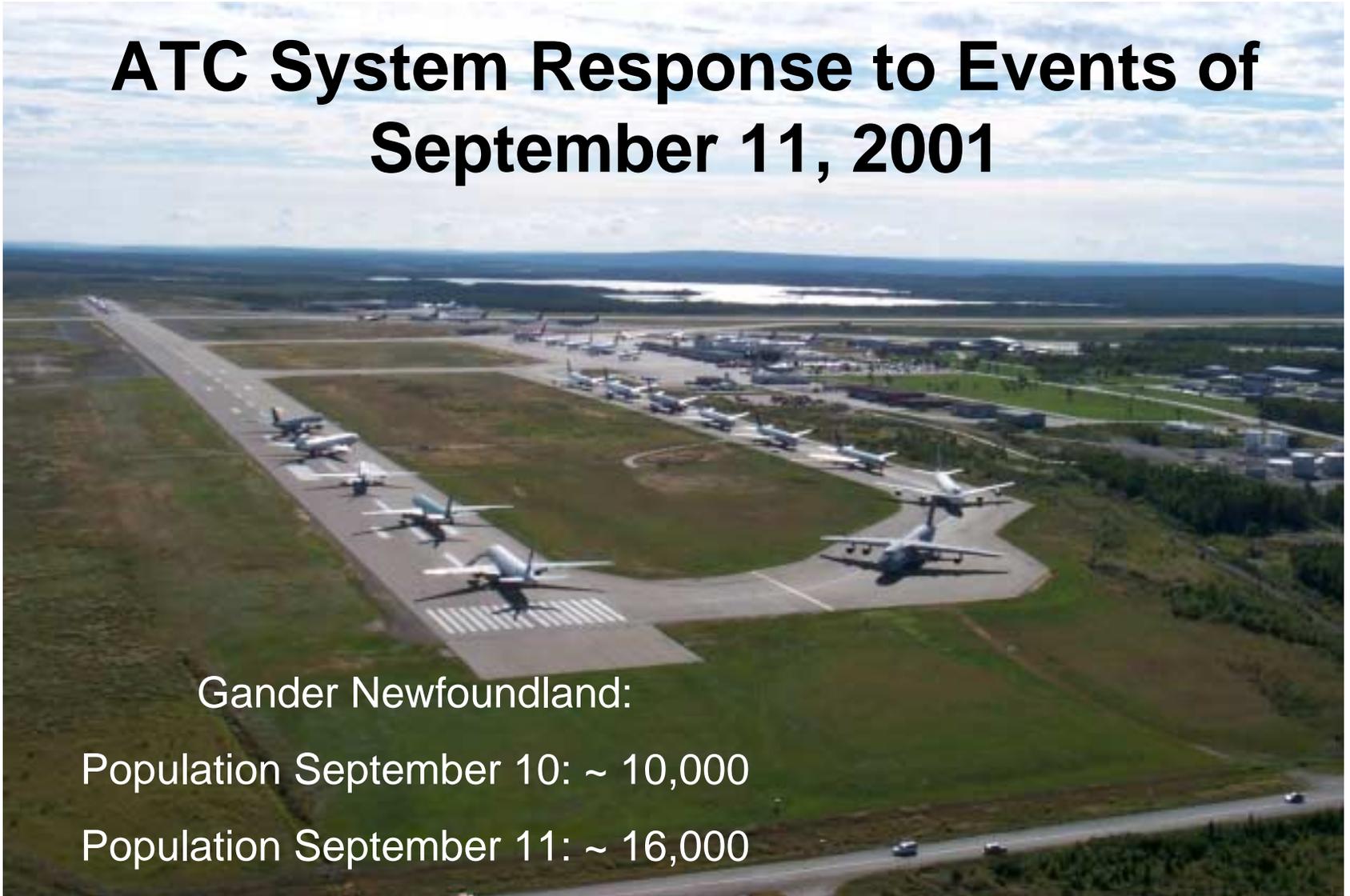




Jonathan Histon & Prof. R. John Hansman

JUP Meeting, October 10, 2001.

ATC System Response to Events of September 11, 2001



Gander Newfoundland:

Population September 10: ~ 10,000

Population September 11: ~ 16,000



Timeline of Events

- **September 11, 2001**
 - 8:45 a.m.
 - ◆ AAL 11 strikes North Tower
 - 9:03 a.m.
 - ◆ UAL 175 strikes South Tower
 - 9:17 a.m.
 - ◆ FAA closes all NY Airports
 - **9:40 a.m.**
 - FAA closes all Airspace**



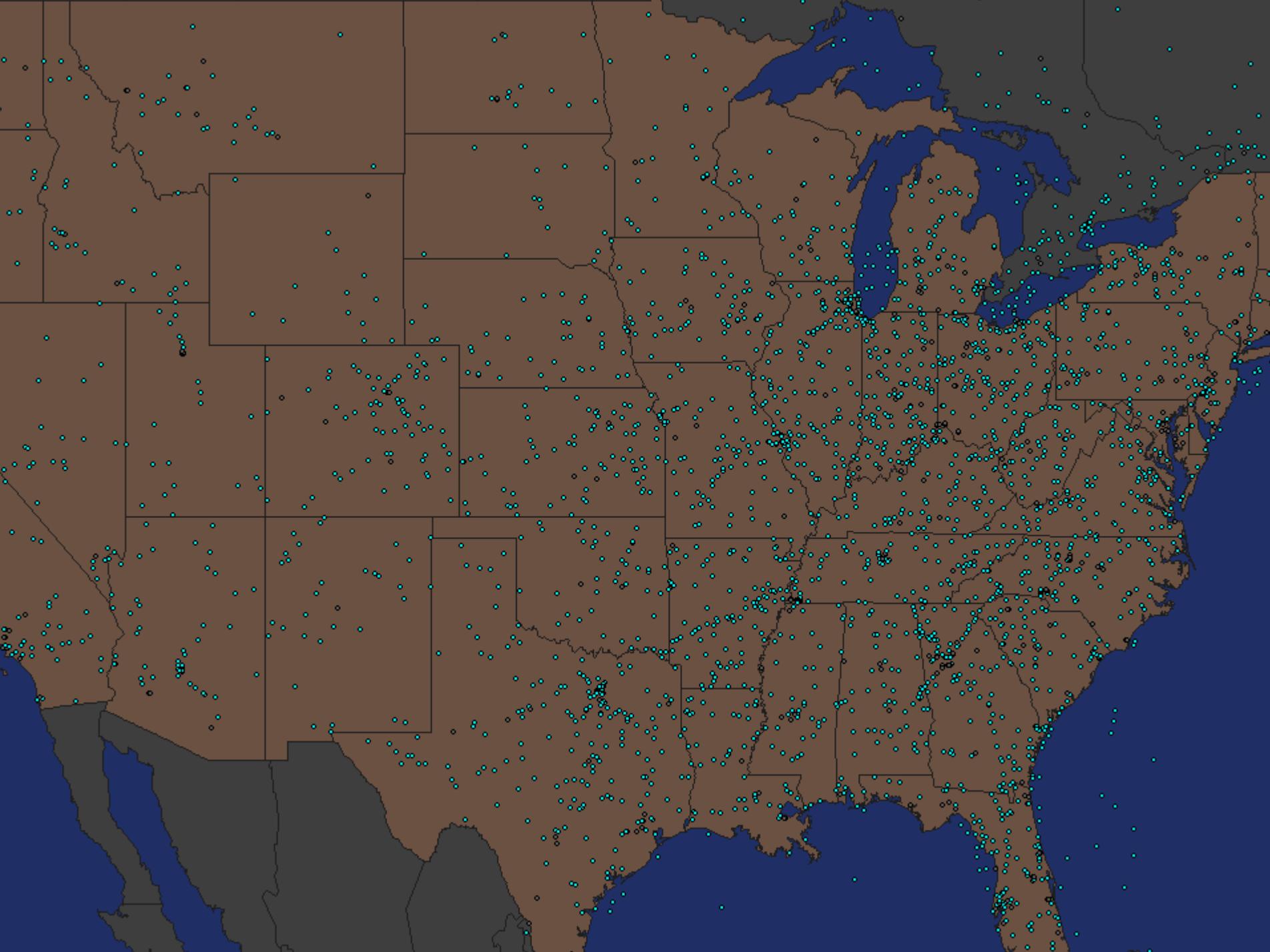
NOTAM

FDC 1/9731 FDC SPECIAL NOTICE - DUE TO EXTRADORDINARY
CIRCUMSTANCES AND FOR REASONS OF SAFETY.

ATTENTION ALL AIRCRAFT OPERATORS, BY ORDER OF THE FEDERAL
AVATION COMMAND CENTER,

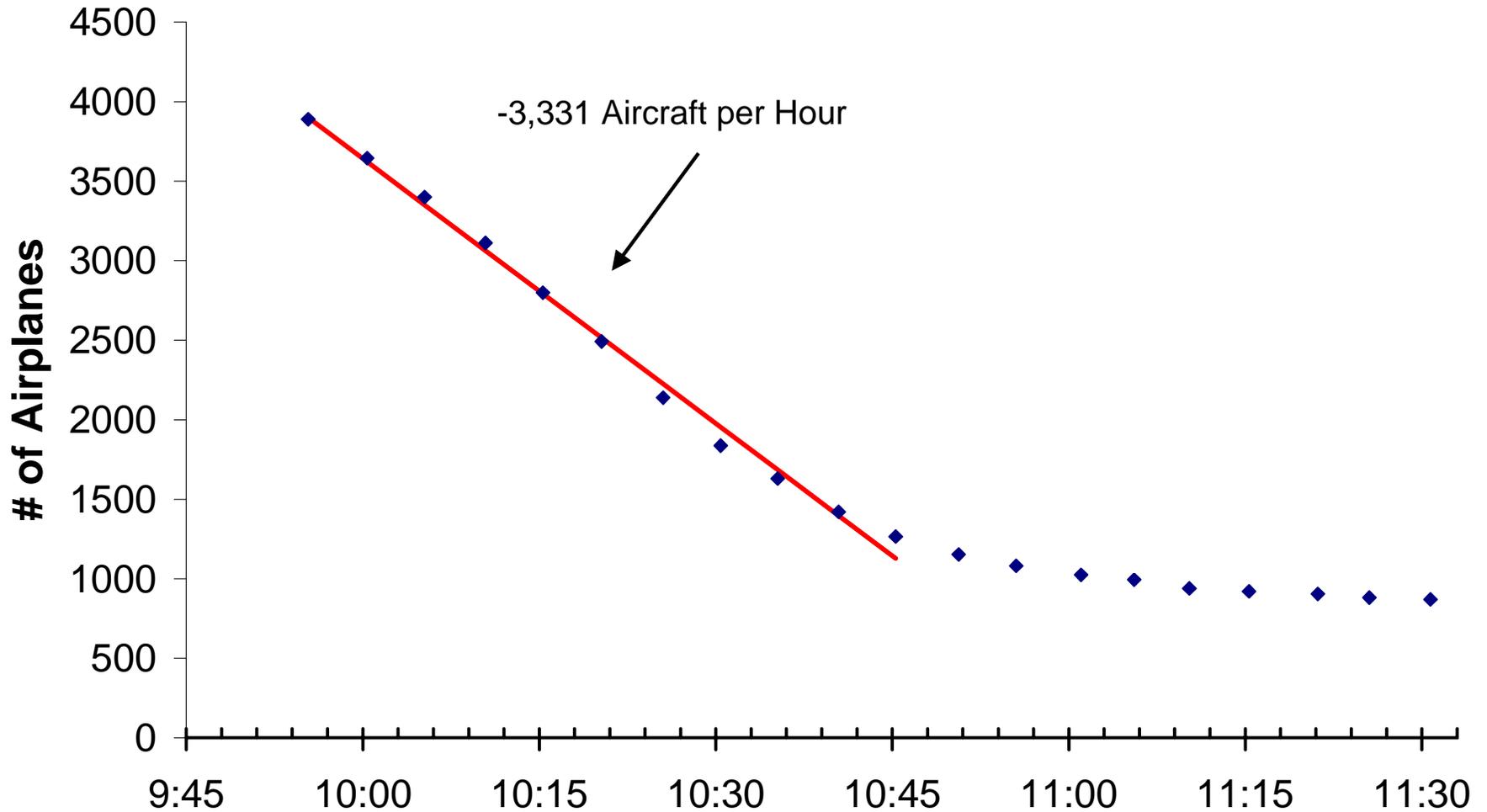
ALL AIRPORTS/AIRDROMES ARE NOT AUTHORIZED
FOR LANDING AND TAKEOFF.

ALL TRAFFIC INCLUDING AIRBORNE AIRCRAFT ARE ENCOURAGE TO LAND
SHORTLY.

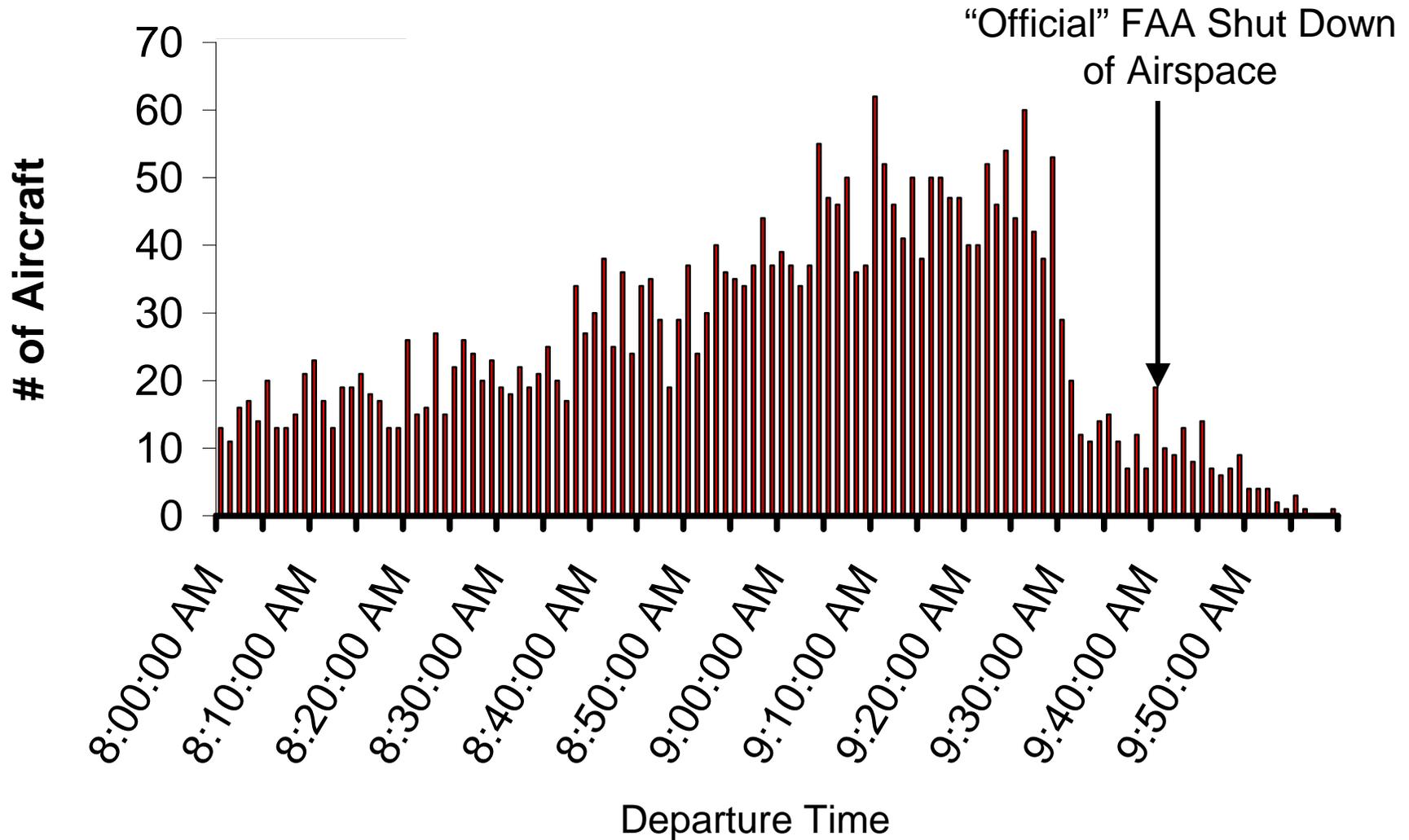


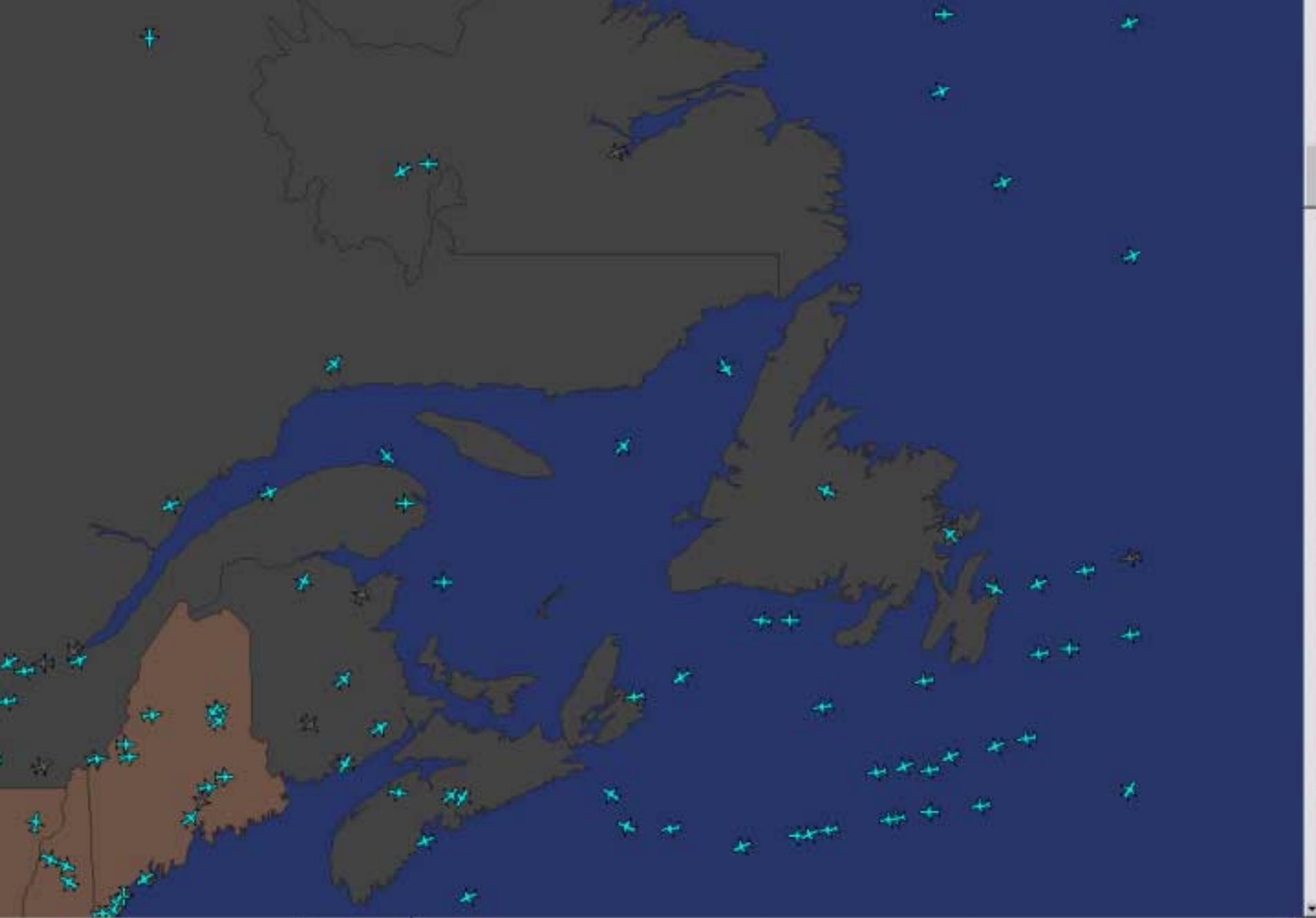


System Shutdown Time



Departure Time Distribution







Halifax

Toronto, Ontario	24
St. John's, Newfoundland	25
Montreal, Quebec	27
Gander, Newfoundland	37
Vancouver, BC	44
Halifax, Nova Scotia	45
Total	270

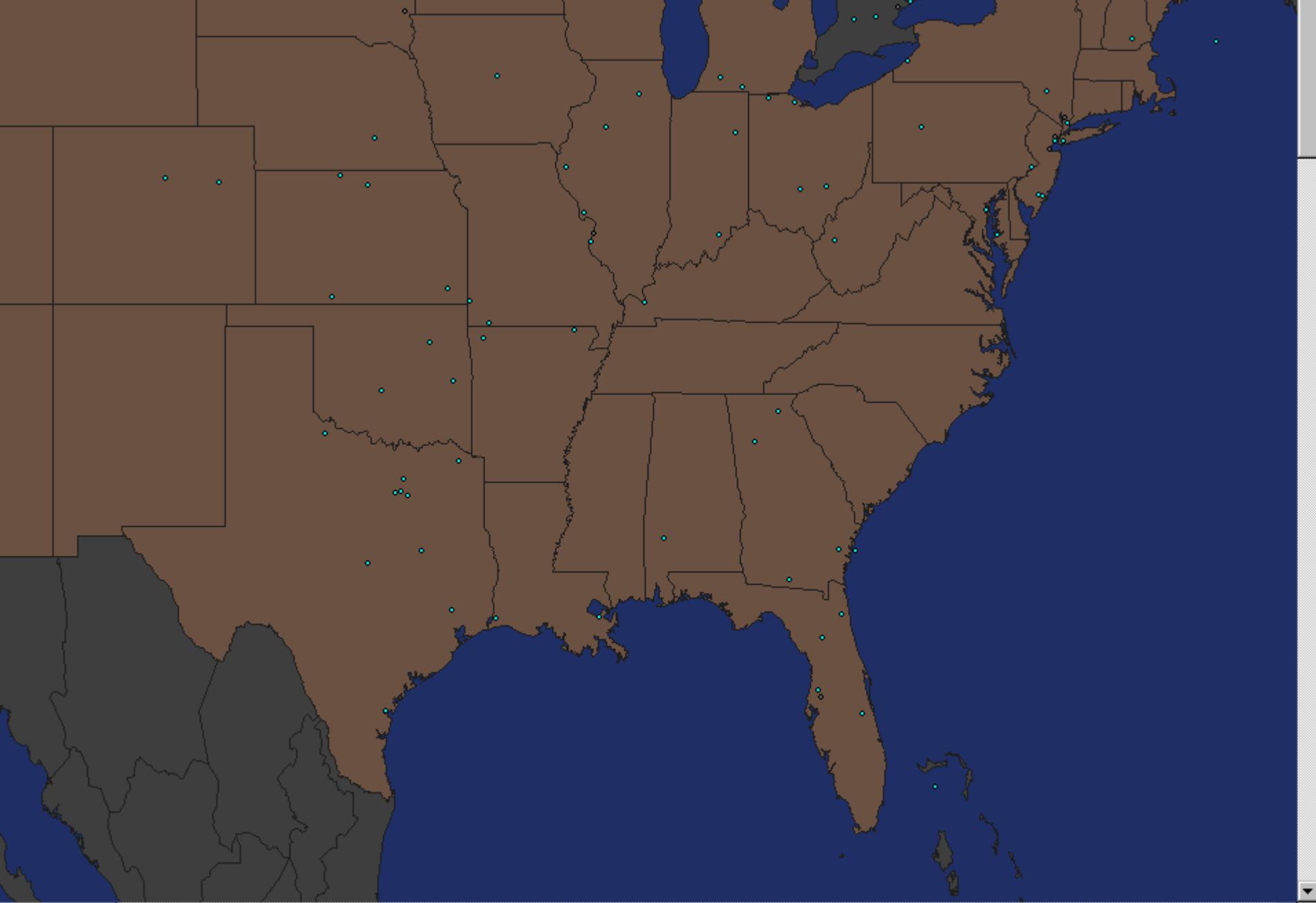




Timeline of Events (2)

- **Start-up**

- September 12**
 - ◆ Diverted flights completed.
 - ◆ Repositioning flights allowed.
- September 13**
 - ◆ Airspace re-opened to commercial traffic (11:00 am)
- September 14**
 - ◆ General Aviation IFR Operations approved
 - ◆ Parcel deliveries resume (UPS, FedEx)
- September 15**
 - ◆ Airspace re-opened to foreign aircraft.
- September 16**
 - ◆ Mail, parcels, other cargo allowed on commercial flights.



Weather: none

Planes: 546 / 546

Current: 10:29:34a

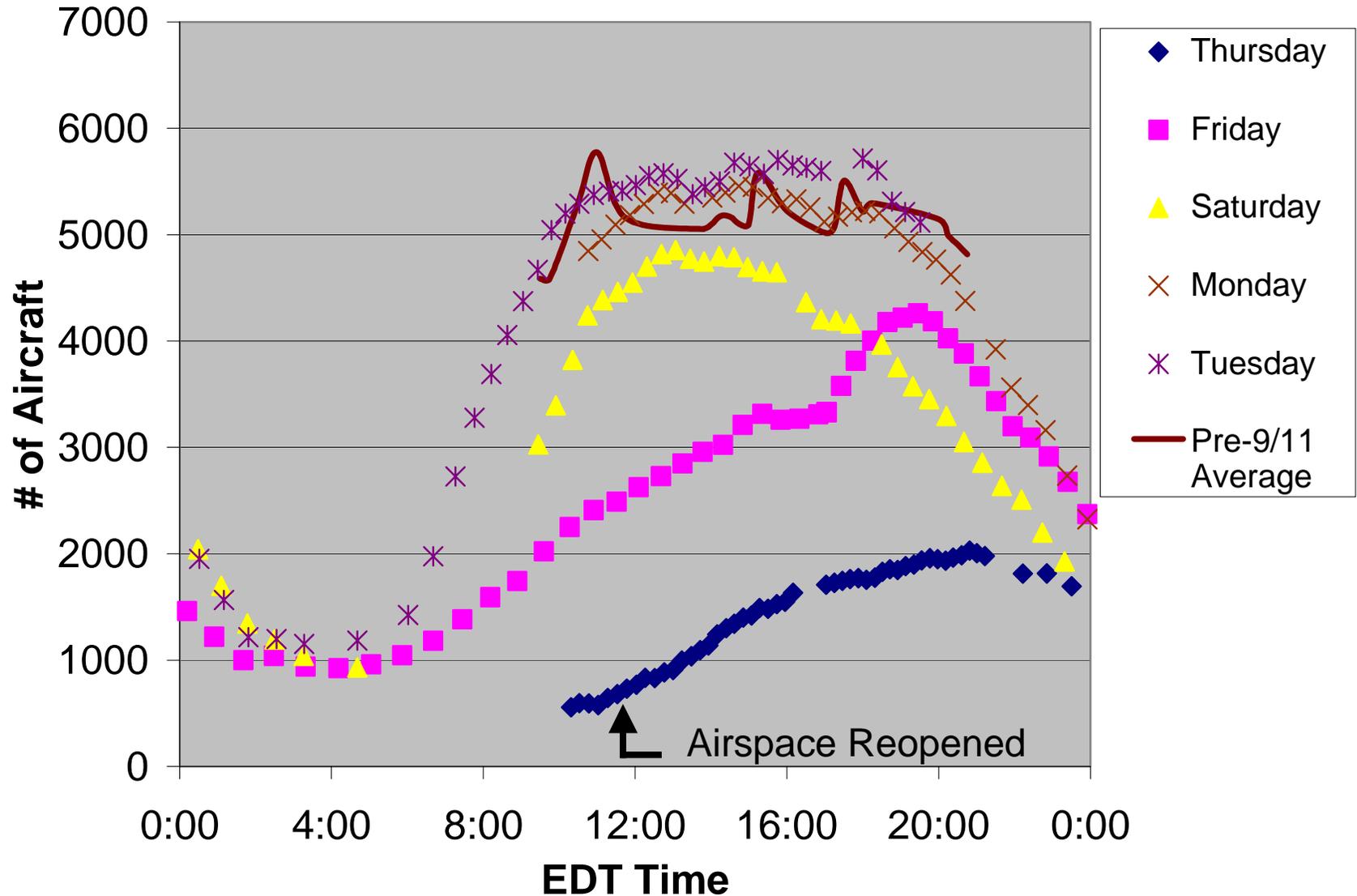
Last update: 10:30:15a

recorder - ...

Camtasia - Unregistered Version (www.techsmith.com) Explorer...

System tray icons including volume, network, and system clock showing 7:34 PM.

Gradual System Response





Summary

- **U.S. Airspace emptied in ~ 1 – 1.5 hours**
 - Rate of 3300 aircraft / hour.
- **Aircraft airborne counts reached previous levels in 6 days**
 - Large Jets still ~ 85% of all traffic.
 - Traffic counts are inconsistent with some other data sources
 - ◆ OPSNET, ASPM report operations down 17-18%
- **Further research opportunities**
 - Ability to explore “undelayed” flight times.



Complexity Metrics Update

- **Project:**
 - Develop understanding of cognitive complexity.
- **Recent development:**
 - Capability to capture real traffic flows relative to sector shapes:
- **Example**
 - Boston ARTCC, Utica Sector
 - ◆ Westbound flows from New England to Cleveland ARTCC
 - ◆ Controls FL180+
 - Sample Data
 - ◆ October 5, 2001
 - ◆ 4 p.m. → 8 p.m.



Complexity Metrics Update

Traffic flow through "Utica" Sector (Friday October, 5th 4 p.m. → 8 p.m.)

