Evolution of Electronic Approval Request Procedures at Charlotte Douglas International Airport

DASC

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Outline

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- Operations
- Data Collection
- Results
- Summary

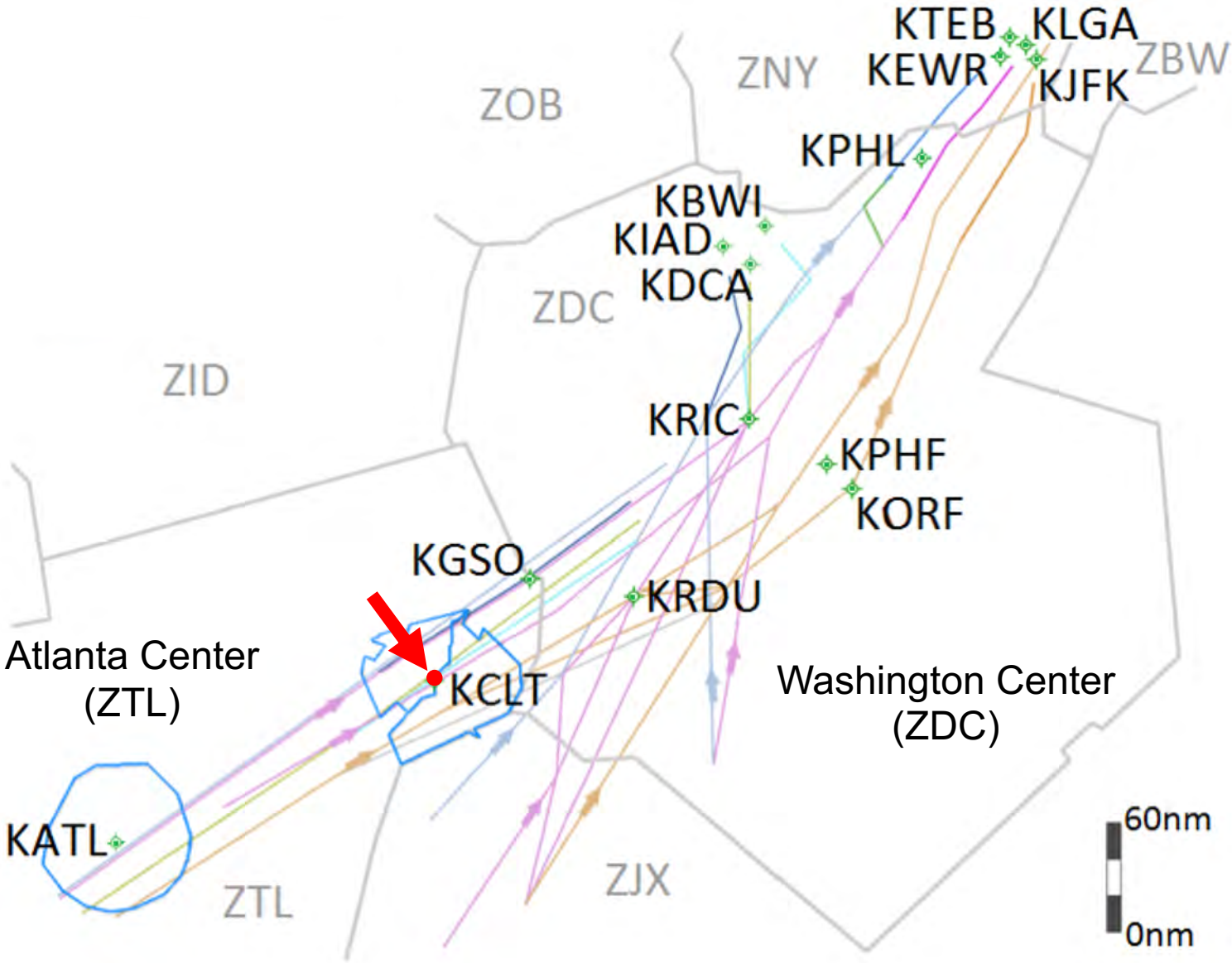
Background

Background

- Air traffic capacity and demand imbalances result in congestion and delays

- Traffic Management Initiatives (TMIs)
  - Used to address capacity/demand imbalances
  - Result in flow control times or controlled take-off times
  - E.g., Approval Request (APREQ) / Call for Release (CFR)

Charlotte Douglas International Airport (CLT) and Surrounding Airspace



Goal of Project

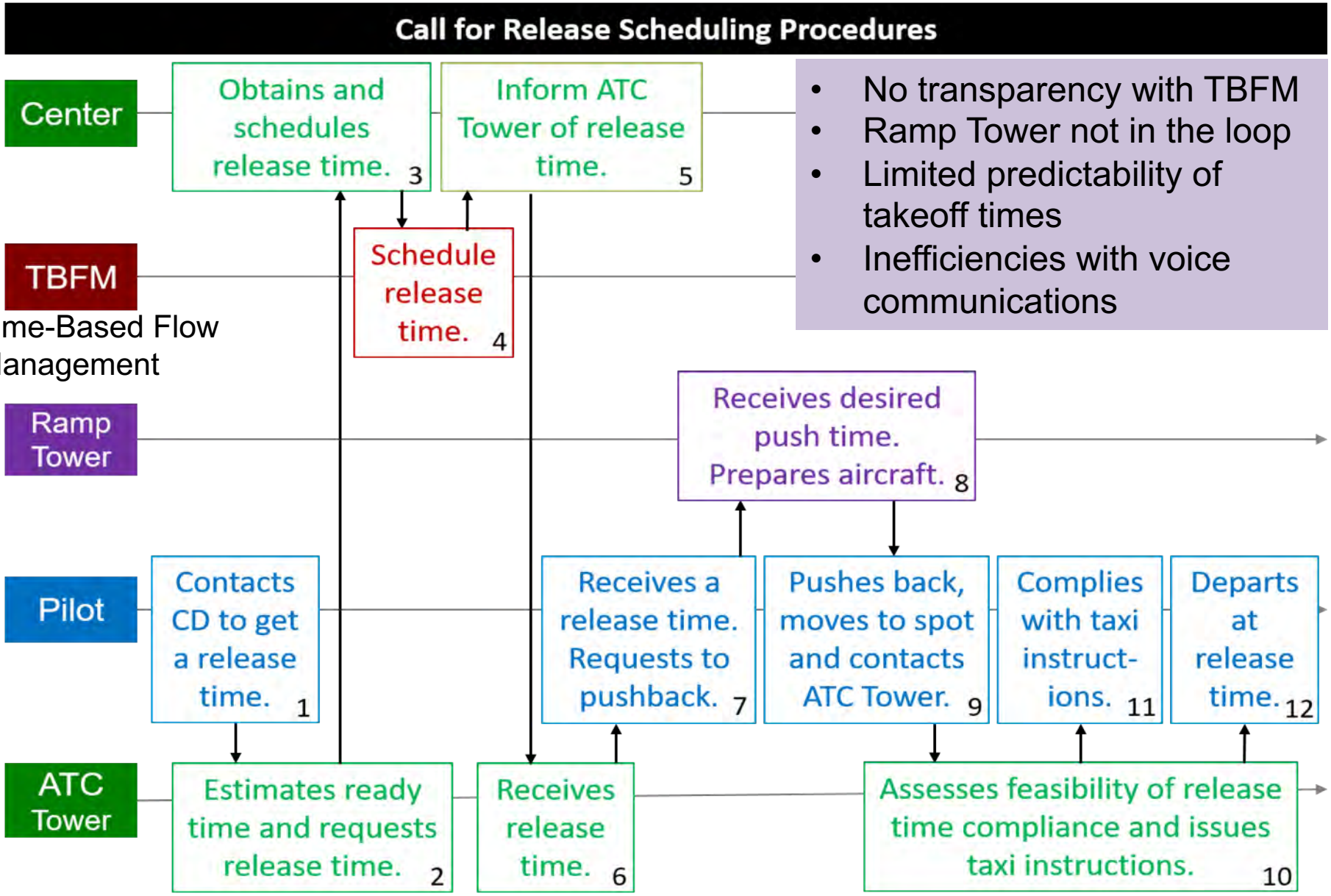
Airspace Technology Demonstration 2 (ATD-2) project

- Providing performance on-par or better than current-day tools and procedures
- Augment operations through improved data integration and sharing

APREQ/CFR Users

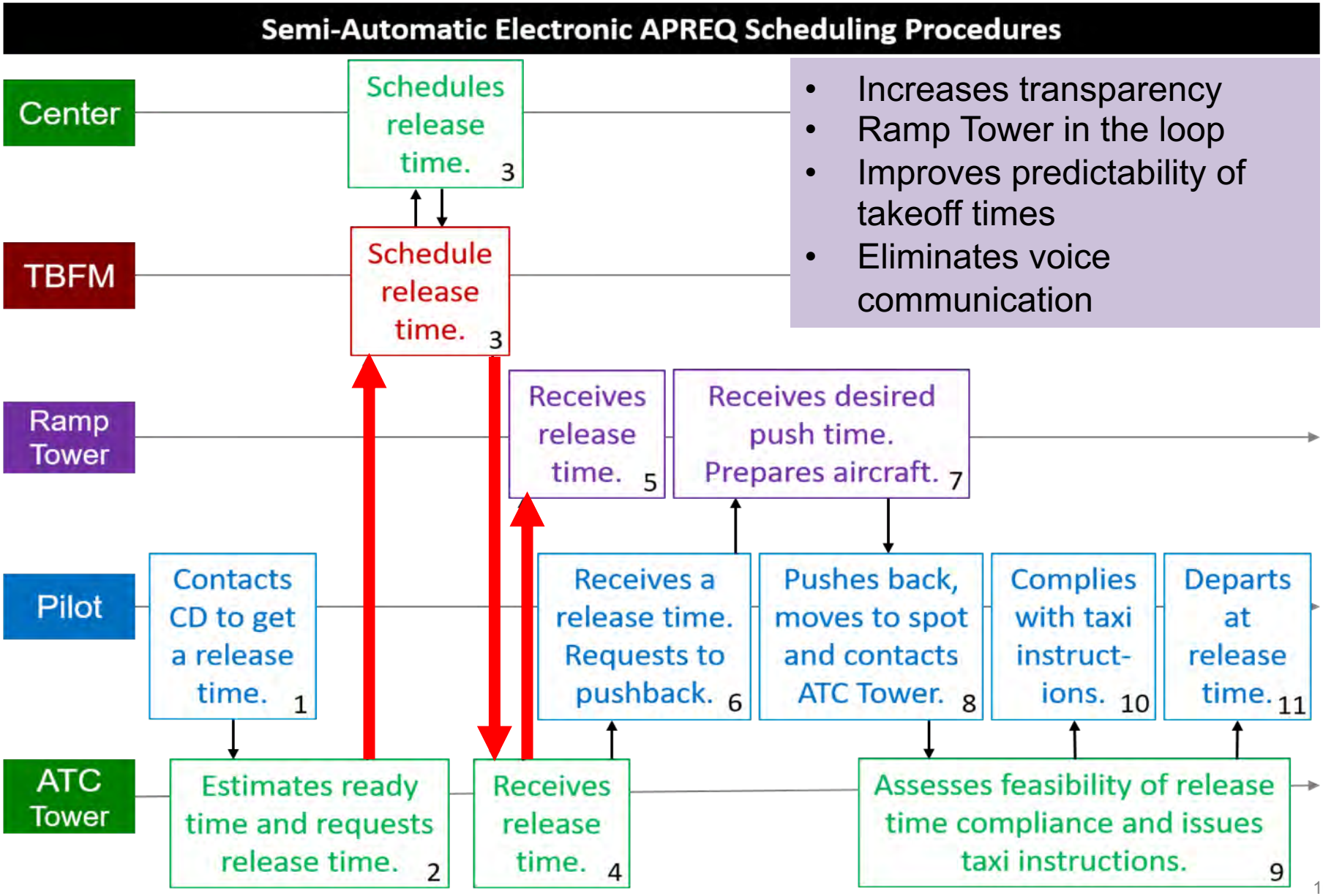
Operations

“Current-Day” APREQ/CFR Procedures

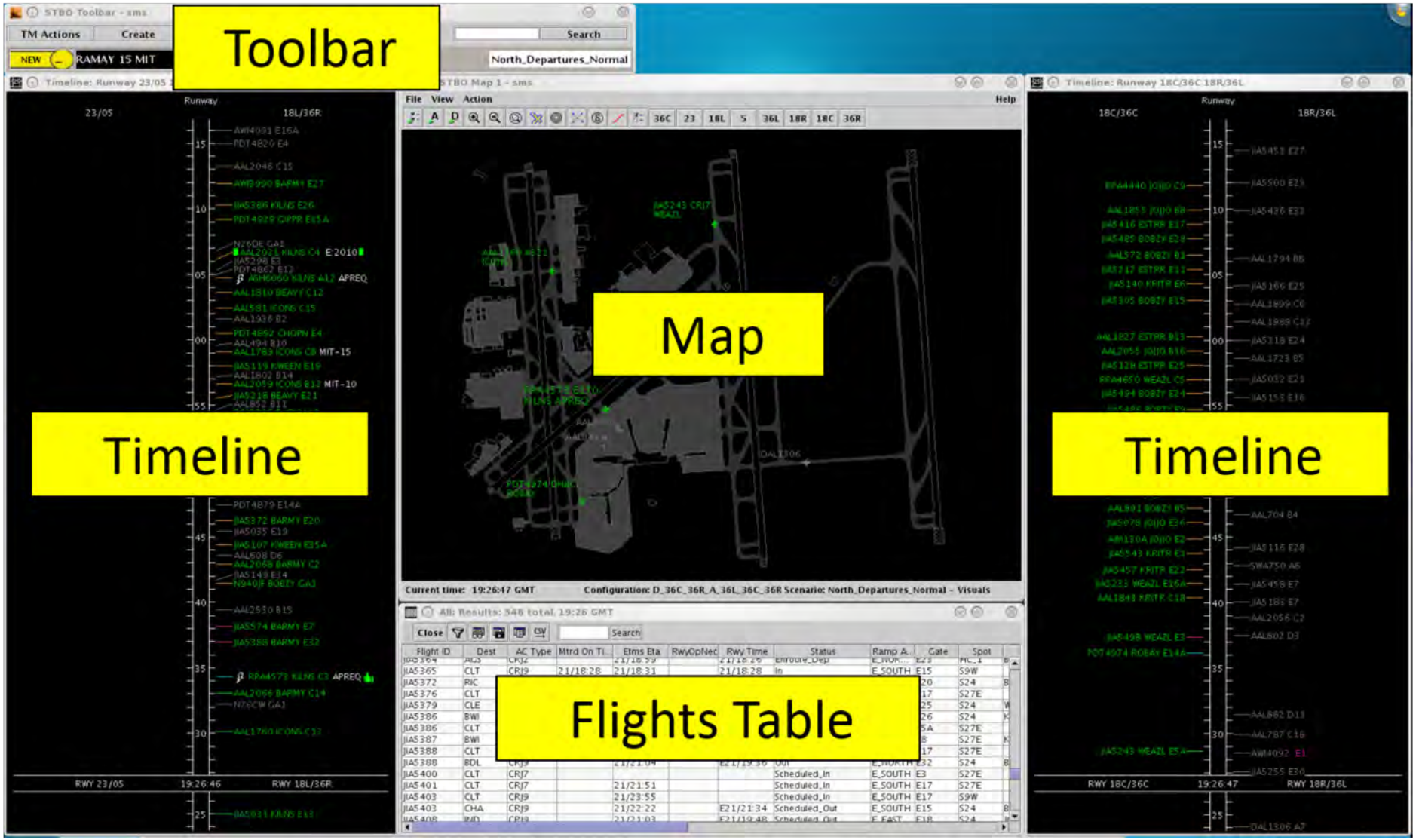


- No transparency with TBFM
- Ramp Tower not in the loop
- Limited predictability of takeoff times
- Inefficiencies with voice communications

APREQ Semi-Automatic Electronic Coordination



Surface Trajectory Based Operations (STBO) Client – ATC Tower



Elements of User Interface Timeline

Verbal Coordination Required

Has APREQ/CFR restriction – needs release time

Unavailable slot in overhead stream

Selected flight datablock

Available slot in overhead stream

Electronic Coordination Available

Electronic APREQ Coordination Methods

Menu Options:

- *Request Release Time*
  - automation chooses a release time to request
- *Select Slot on Timeline*
  - user chooses a release time to request

Compliance Indicators

- Inside of compliance window (on time)

- Outside of compliance window and early

- Outside of compliance window and late

Data Collection

Data Collection

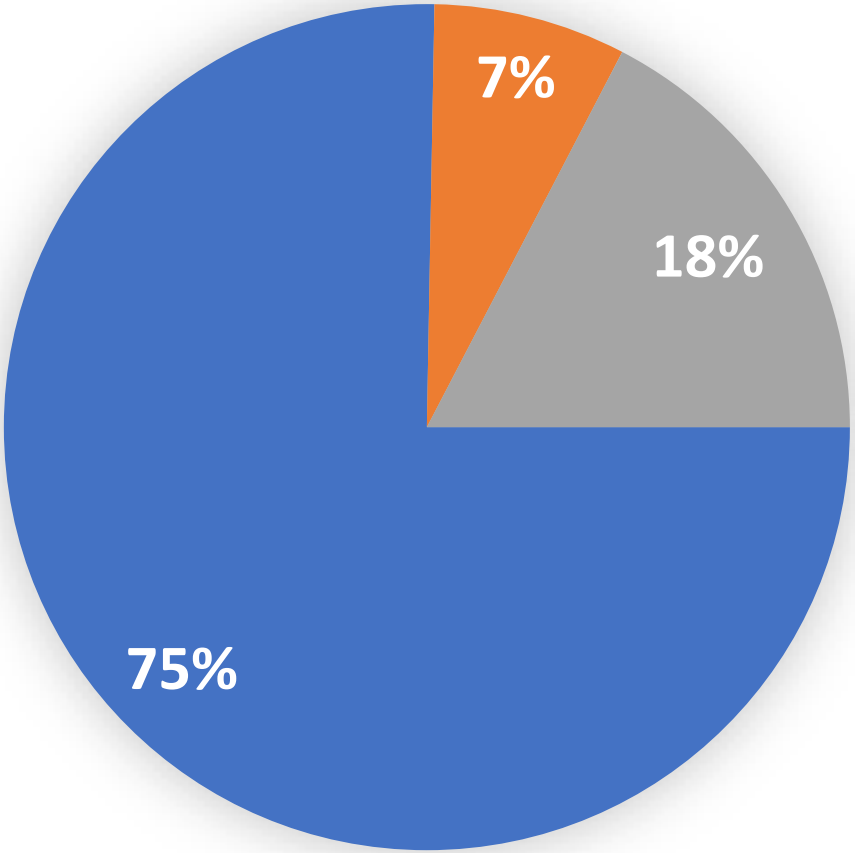
- September 2017: ATD-2 system deployed to CLT
- 2 November 2017: Semi-automatic electronic APREQ coordination began

- 23 November 2017 – 2 January 2018: 41-day data collection period

- 27,479 CLT departures with:
  - 2,561 (9.3%) subject to APREQ restrictions

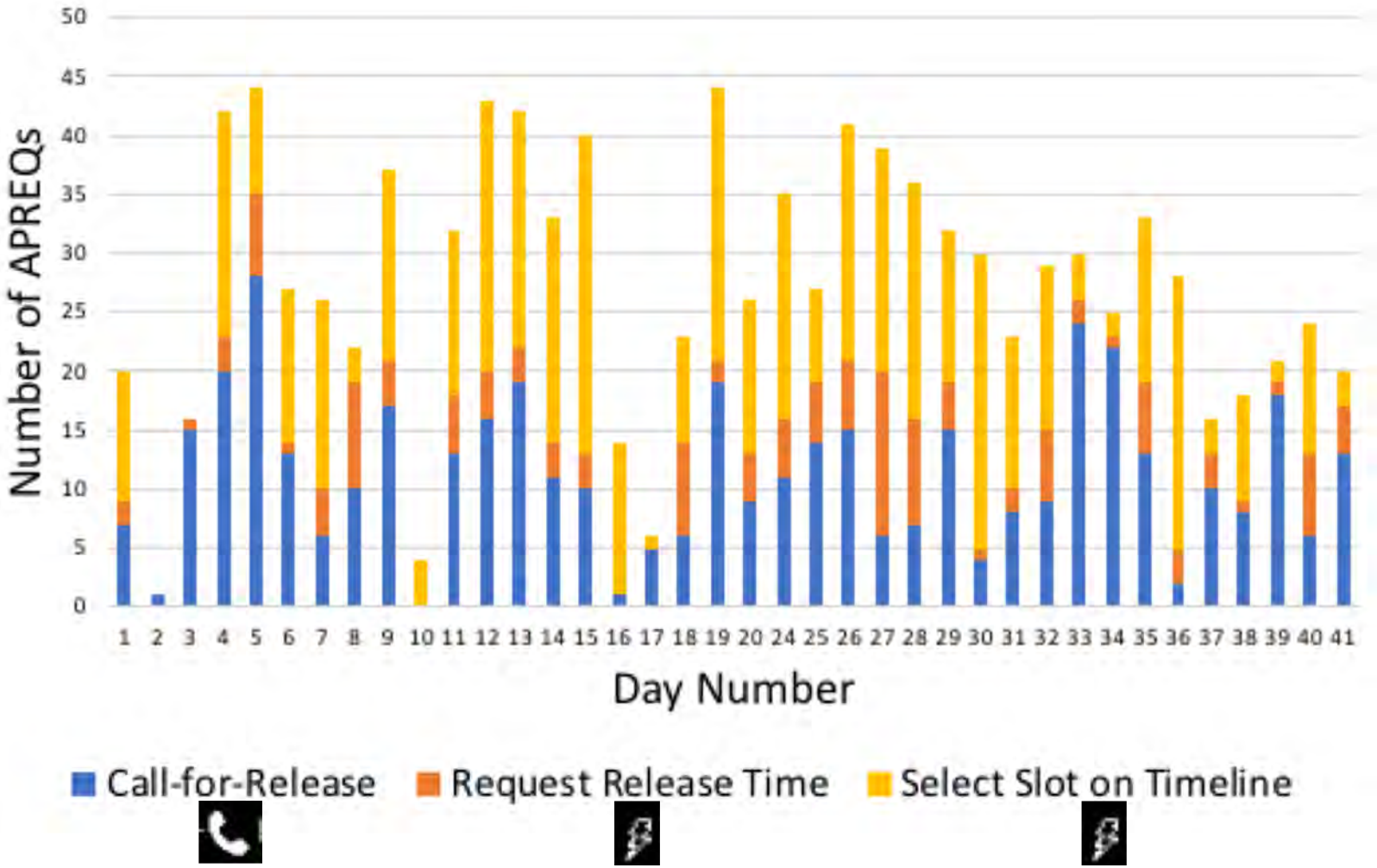
Eligibility for Electronic APREQ Coordination with Washington Center (ZDC)

1,400 total APREQ flights coordinated with ZDC



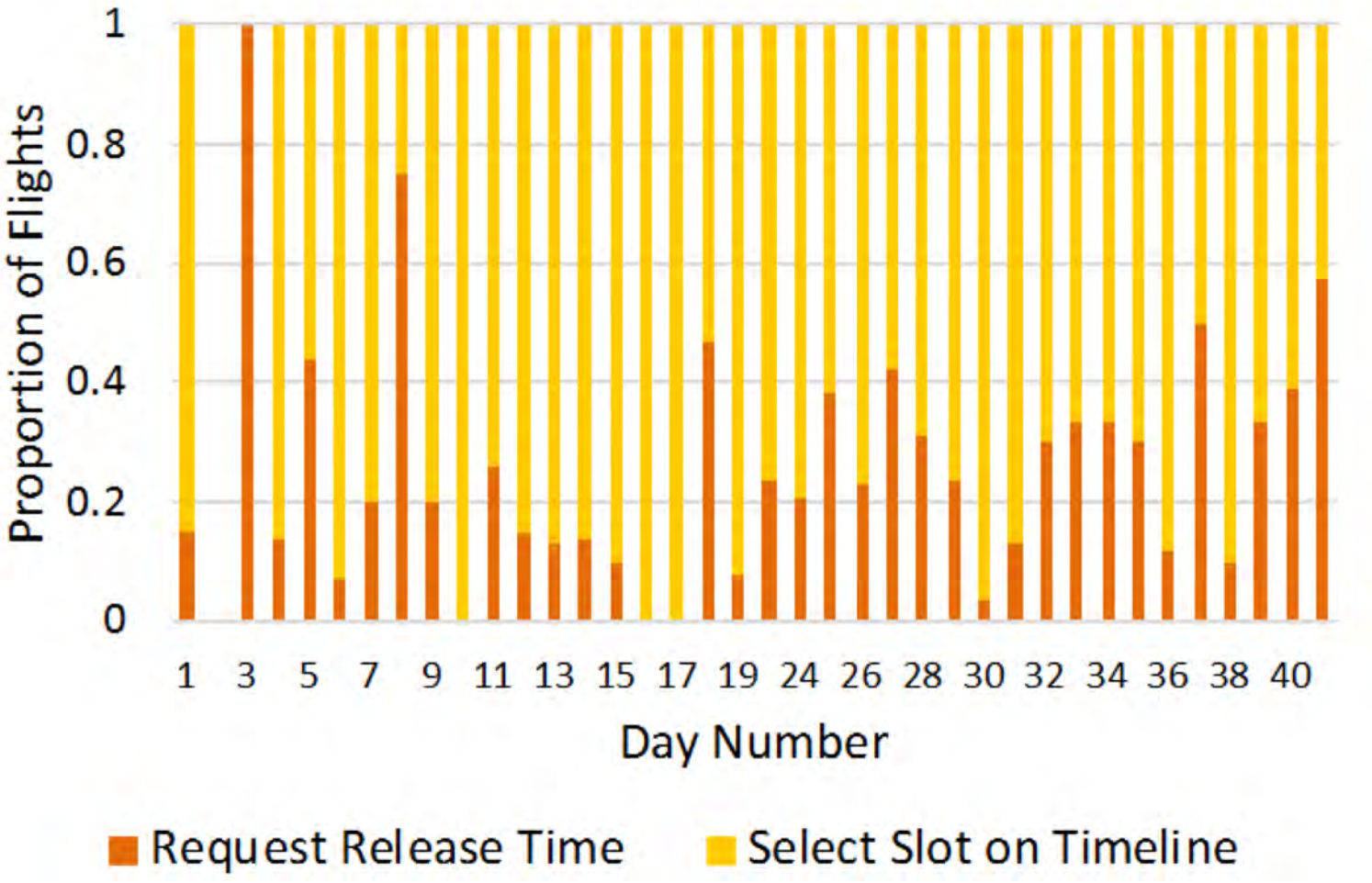
Results

CLT Usage of Electronic APREQ Coordination for Electronic Eligible Flights



Overall, 618 (58.9%) of APREQs were coordinated electronically out of 1,049 eligible flights.

Proportion of Use for Different Electronic APREQ Coordination Methods



No effect of time passage on proportion of “Request Release Time” usage. Continued to engage with automation.

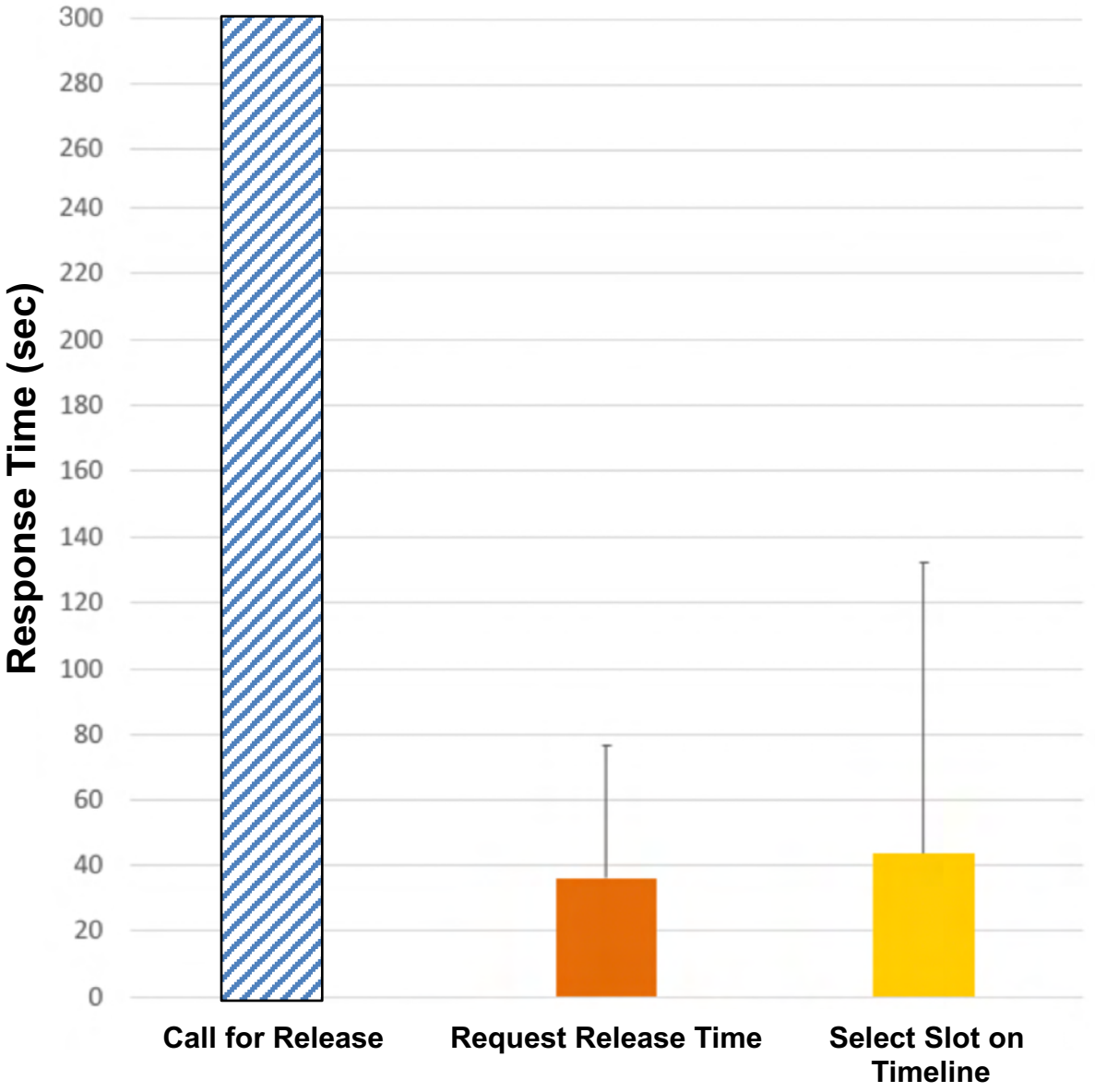
Rescheduling APREQ Release Times Electronically for Electronically Eligible Flights

Initial Scheduling Method	Rescheduling Method		Total
	Electronic Coordination	Call-for-Release	
Electronic Coordination	37	85	122
Call-for-Release	8	307	315
Total	45	392	437

- Users explored the capabilities of the technology and found novel uses that exceeded training.
  - Users were *not* trained that electronic APREQ rescheduling was available.
- Electronic coordination reduces the need for rescheduling release times.

Center Response Times

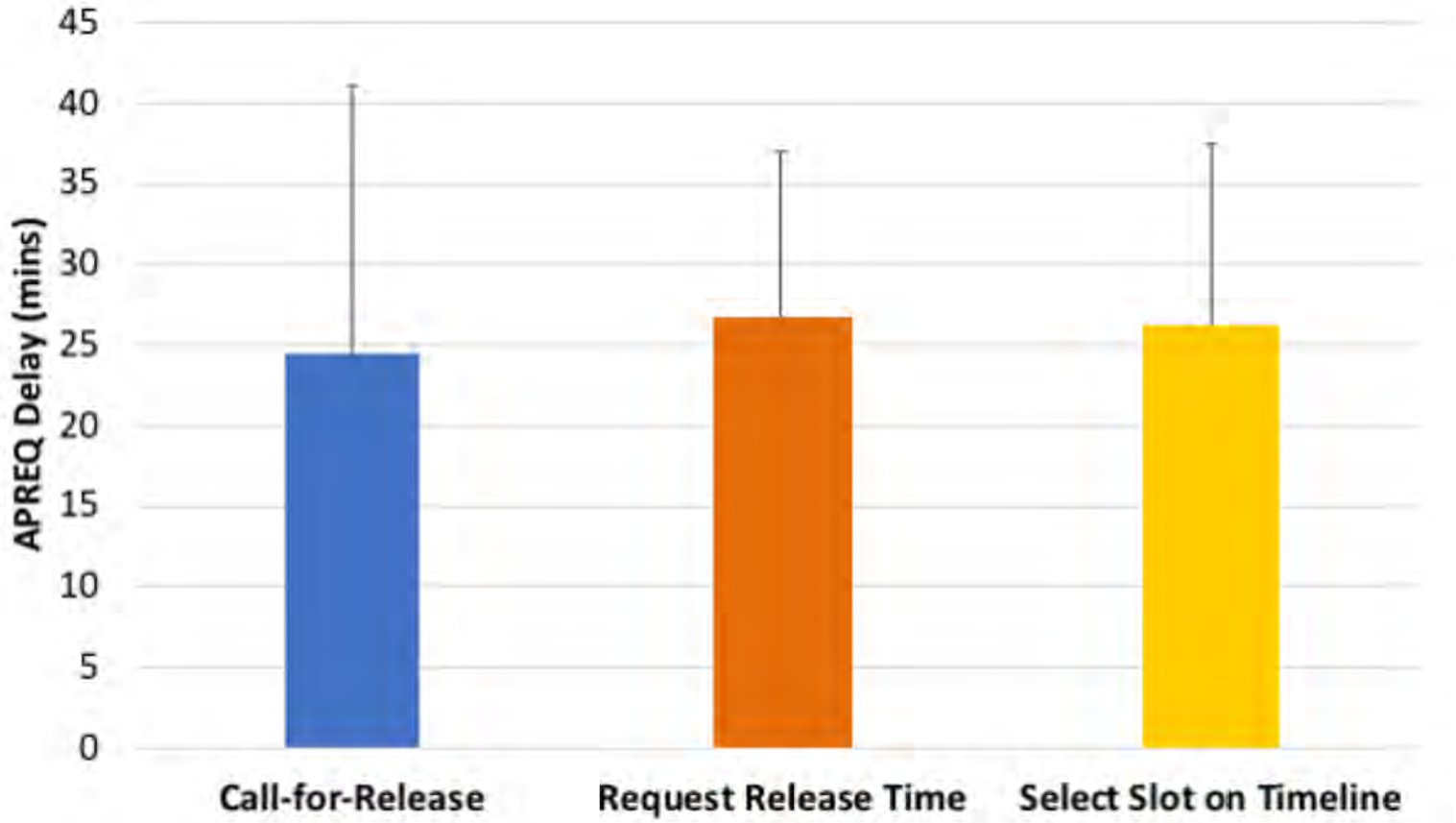
- No data available for "Call for Release"
- Subject matter expert feedback: CFR could take up to 3-5 min



Response times from ZDC using electronic coordination rarely exceeded 1 minute.

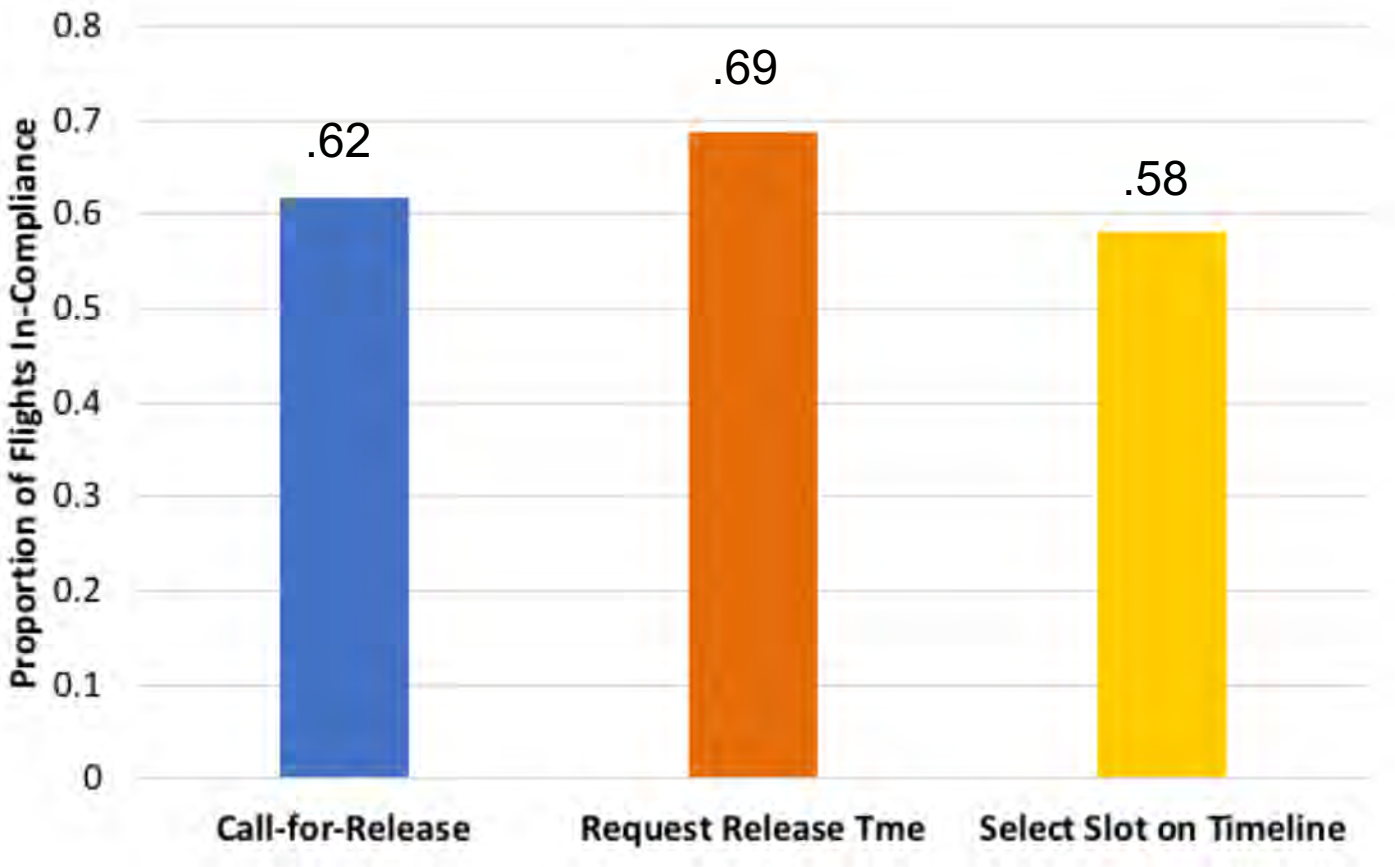
APREQ Delay

APREQ delay = Final APREQ Time – Expected Departure Time



No difference in delay across APREQ release time scheduling methods.

APREQ Compliance



Largest proportion of flights in compliance with APREQ release time were scheduled using automation.

Summary

Summary

- Performance with ATD-2 electronic APREQ coordination met or exceeded Call-for-Release (“current-day”) procedures
- Users continued to engage with the automation and find innovative ways to interact with the ATD-2 technology
- Experienced ZDC and CLT TMCs stated that response times were greatly reduced
- Electronic coordination reduced the need for rescheduling APREQ release times

Future Direction

New features to support electronic negotiation are continually being released at CLT

- Training for electronic rescheduling
- Swapping APREQ release times for flights with same destinations
- Electronic coordination with Atlanta Center (ZTL)
- Data exchange with ATC Tower electronic flight strips/data
- Fully automatic APREQ release time coordination

Thanks for your attention!

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