National Aeronautics and Space Administration

NASA

ATD-2 Integrated Arrival, Departure, and Surface (IADS) Operations

OVERHEAD STREAM INSERTION

DOWNSTREAM DEMAND / CAPACITY IMBALANCE

CENTER BOUNDARY

DEPARTURE METER POINTS

CENTER AIRSPACE

ARRIVAL METER POINT

TERMINAL AIRSPACE

TERMINAL AIRSPACE

ATD-2 CONCEPT DEPICTION

The ATD-2 Integrated Arrival, Departure, and Surface (IADS) traffic management system extends integrated traffic sequencing all the way from the gate to the overhead stream and back again for multi-airport, metroplex environments. NASA and the FAA are developing the IADS system in close coordination with industry partners.

Optimized Pushback Times
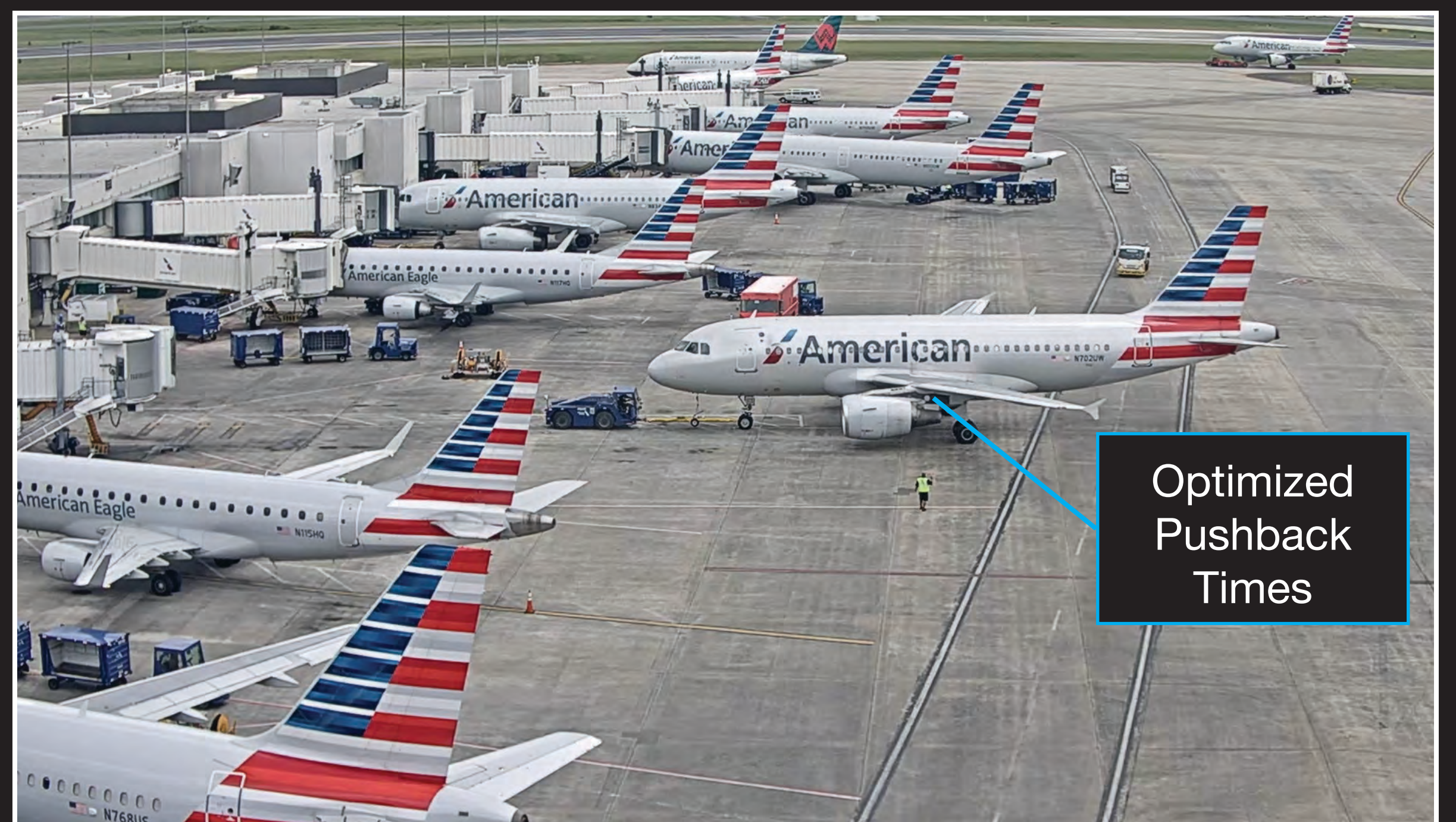
Ramp controller displays and scheduling tools enable surface metering for reduced ramp and taxiway congestion

Efficient Wheels-up Times

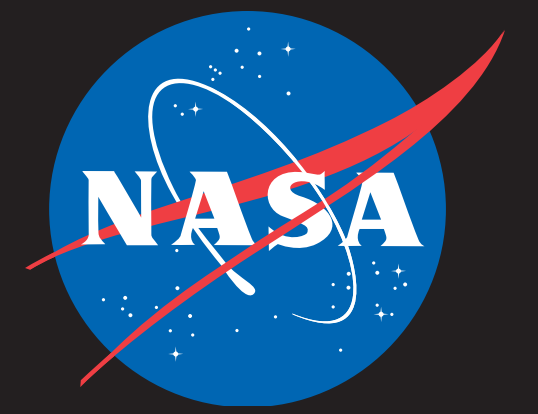Improved Scheduling Enables Efficient Spacing

OPEN SLOT
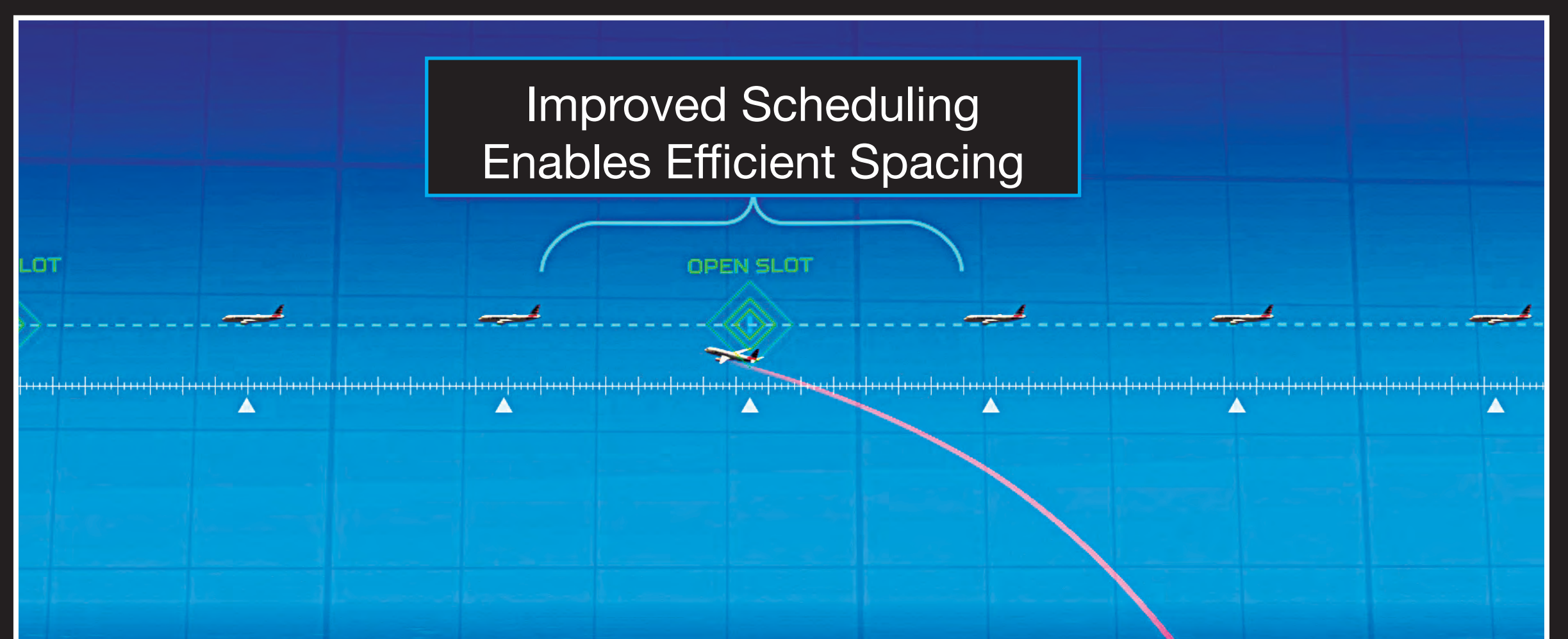
Improved scheduling for wheels-up time and merge into overhead stream

Expected Benefits: The ATD-2 IADS system will improve the predictability and efficiency of the air traffic system, while reducing fuel usage and emissions. This will be accomplished by sharing data among pilots, controllers, flight operators, and airport operators to produce a fully coordinated schedule.
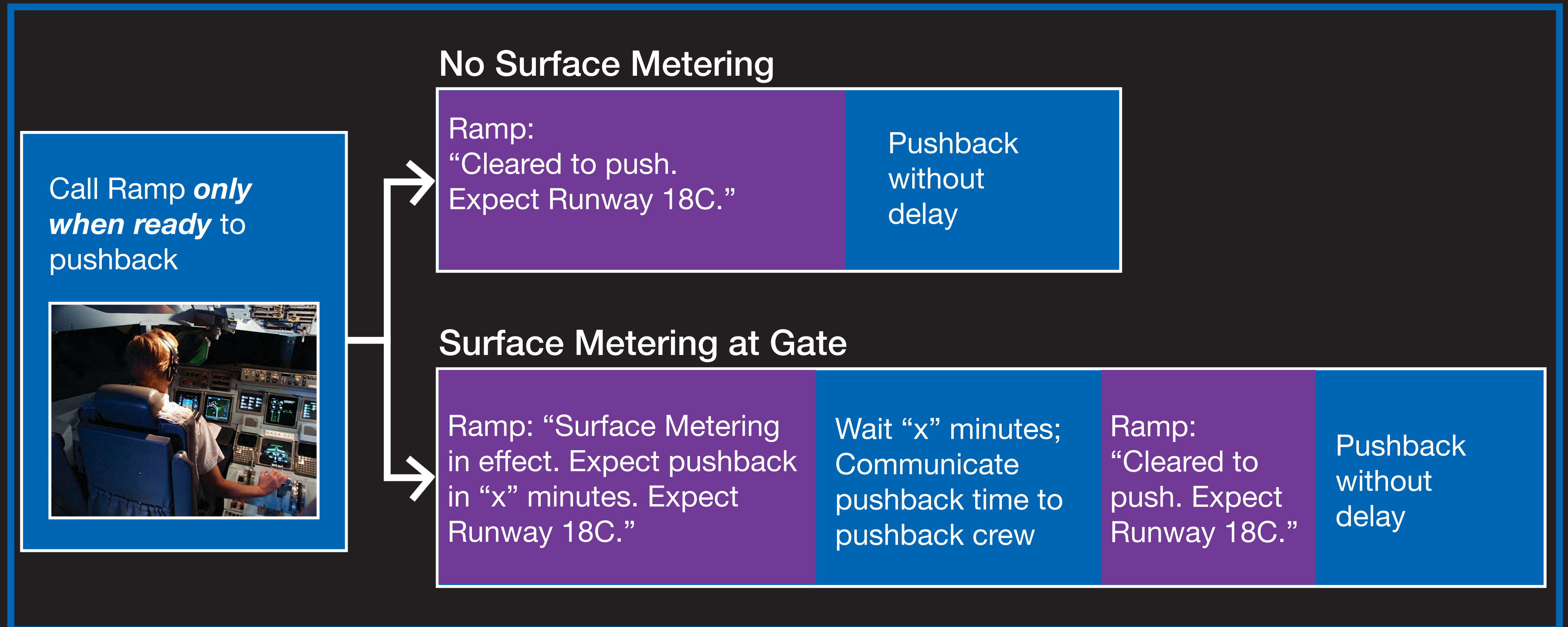
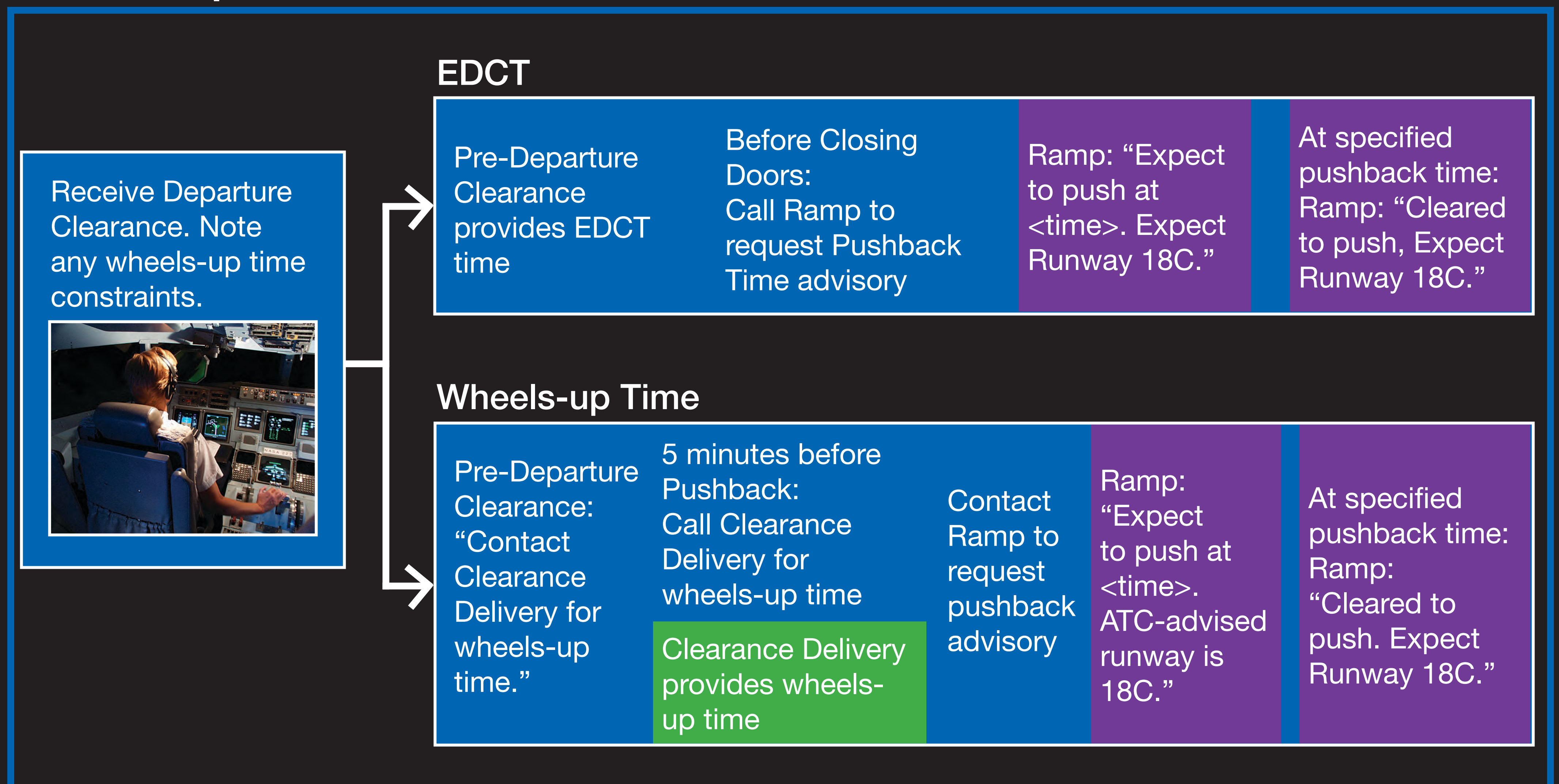View the Airspace Technology Demonstration 2 (ATD-2)/IADS video at: https://tinyurl.com/atd2-animation-v2

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ATD-2 Integrated Arrival, Departure, and Surface (IADS) Operations – Flight Deck Coordination
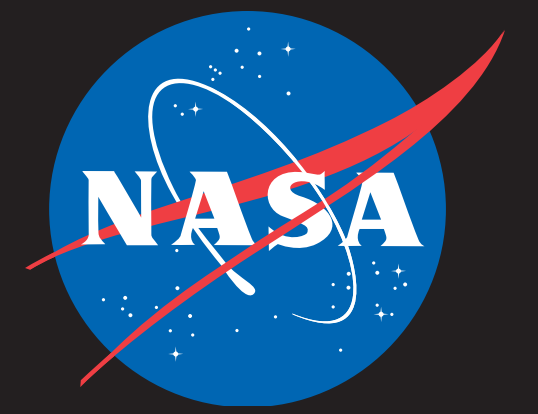
Typical Pushback Procedures

Call Ramp *only when ready* to pushback

No Surface Metering

| Ramp: "Cleared to push. Expect Runway 18C." | Pushback without delay |

Surface Metering at Gate

| Ramp: "Surface Metering in effect. Expect pushback in "x" minutes. Expect Runway 18C." | Wait "x" minutes; Communicate pushback time to pushback crew | Ramp: "Cleared to push. Expect Runway 18C." | Pushback without delay |

Wheels-up Time Procedures

Receive Departure Clearance. Note any wheels-up time constraints.

EDCT

| Pre-Departure Clearance provides EDCT time | Before Closing Doors: Call Ramp to request Pushback Time advisory | Ramp: "Expect to push at <time>. Expect Runway 18C." | At specified pushback time: Ramp: "Cleared to push, Expect Runway 18C." |

Wheels-up Time

| Pre-Departure Clearance: "Contact Clearance Delivery for wheels-up time." | 5 minutes before Pushback: Call Clearance Delivery for wheels-up time / Clearance Delivery provides wheels-up time | Contact Ramp to request pushback advisory | Ramp: "Expect to push at <time>. ATC-advised runway is 18C." | At specified pushback time: Ramp: "Cleared to push. Expect Runway 18C." |

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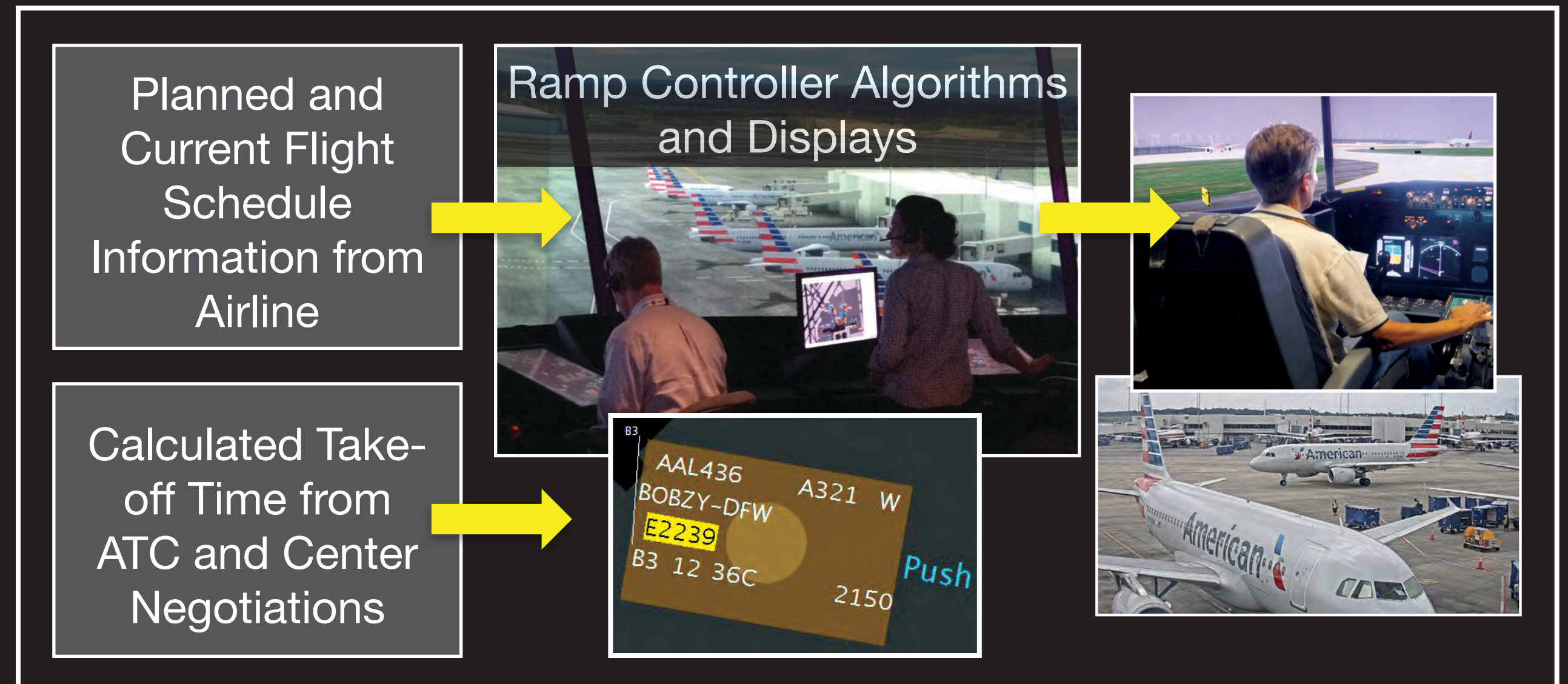National Aeronautics and Space Administration

ATD-2 Integrated Arrival, Departure, and Surface (IADS) Operations – Flight Deck Coordination

ATD-2/IADS Information Flow

The ATD-2 Integrated Arrival, Departure, and Surface (IADS) traffic management system integrates schedule and current flight information from flight operators, ATC and Center to allow Ramp and Air Traffic Controllers to efficiently manage pushback, taxi and runway usage.

Planned and Current Flight Schedule Information from Airline

Calculated Take-off Time from ATC and Center Negotiations

Pilot Procedures

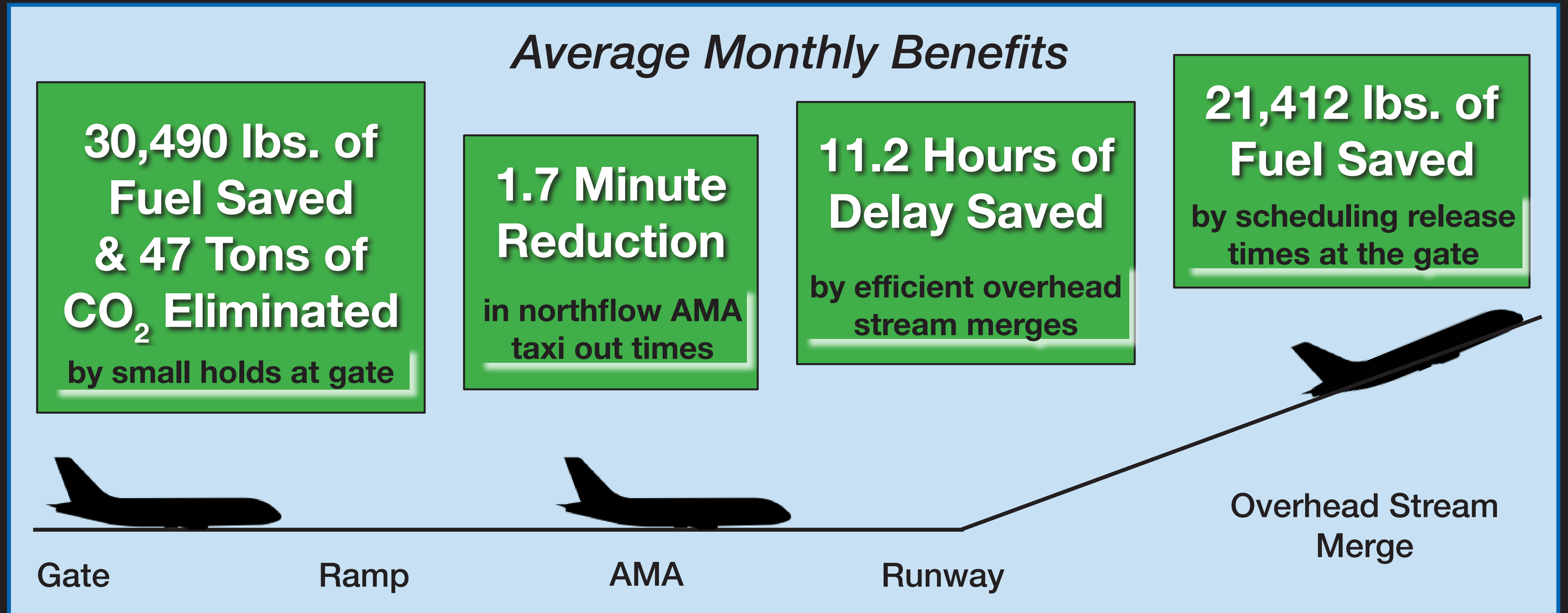|	Call for Pushback (All Departing Flights)	Surface Metering	Wheels-Up Time	Departure Fix Closures	Gate Conflict
What's new?	The IADS system relies on early and accurate information sharing between pilots and ramp control.	When in effect, about 50% of flights will experience gate holds with durations similar to current ops. This does not add flight delay, but allows aircraft to remain at gate longer to reduce fuel/emissions.	Ramp will be aware of wheels-up times and will schedule pushback to meet that time. Meeting wheels-up times is important for overall system efficiency.	When Departure Fixes are closed, Ramp will inform you of the closure.	If there is a gate conflict, and you are moved to a hardstand or holding area, Ramp will coordinate hardstand release to meet the schedule.
What to do?	1. Call Ramp when ready to push. *Do NOT* call before you are ready; this will increase delay. 2. Ramp will provide ATC-advised runway assignment. ***Special cases:*** 1. If a specific runway is required for operational necessity, contact Ramp as soon as known. 2. If pushback delay is anticipated, contact Ramp as soon as known. 3. If APU INOP, coordinate with ramp and ground crew for timely air start to meet pushback time.	1. Call Ramp when ready to pushback as per current ops. 2. Ramp may clear you to push immediately OR provide an expected pushback time. 3. Communicate expected pushback time to pushback crew. 4. Monitor Ramp. Expect Ramp to contact you at the specified time with pushback clearance. 5. Be prepared to push without delay at specified time.	1. Check PDC to see if EDCT or Flow Control Wheels-Up Time applies to flight. **EDCT:** 1. Contact Ramp prior to pushback to receive updated pushback time. **Wheels-Up Time for Tactical Flow Control:** 1. Contact Clearance Delivery 5 min before pushback to request wheels-up time. 2. After receiving wheels-up time, contact Ramp for new pushback time.	1. If instructed by Ramp control, contact Clearance Delivery for new departure route. 2. After receiving new departure route, contact Ramp for pushback.	1. Move to hardstand as directed. 2. When available, Ramp will provide a 'Ready time' which is the time when you can expect to be released. 3. Monitor Ramp Control frequency. 4. Be prepared to taxi at assigned 'ready time'.

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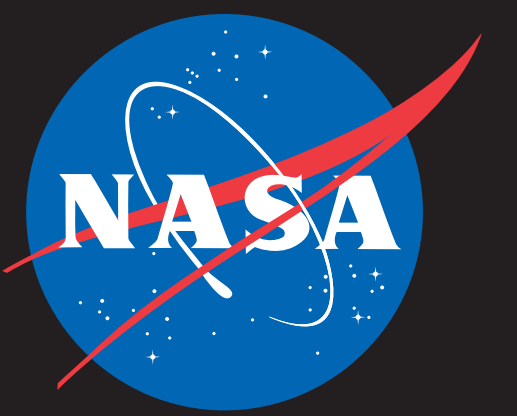
ATD-2 Integrated Arrival, Departure, and Surface (IADS) Operations – Initial Benefits and Flight Deck Reminders

IADS at KCLT is Working!

Average Monthly Benefits

30,490 lbs. of Fuel Saved & 47 Tons of CO_2 Eliminated
by small holds at gate

1.7 Minute Reduction
in northflow AMA taxi out times

11.2 Hours of Delay Saved
by efficient overhead stream merges

21,412 lbs. of Fuel Saved
by scheduling release times at the gate

Gate   Ramp   AMA   Runway

Overhead Stream Merge

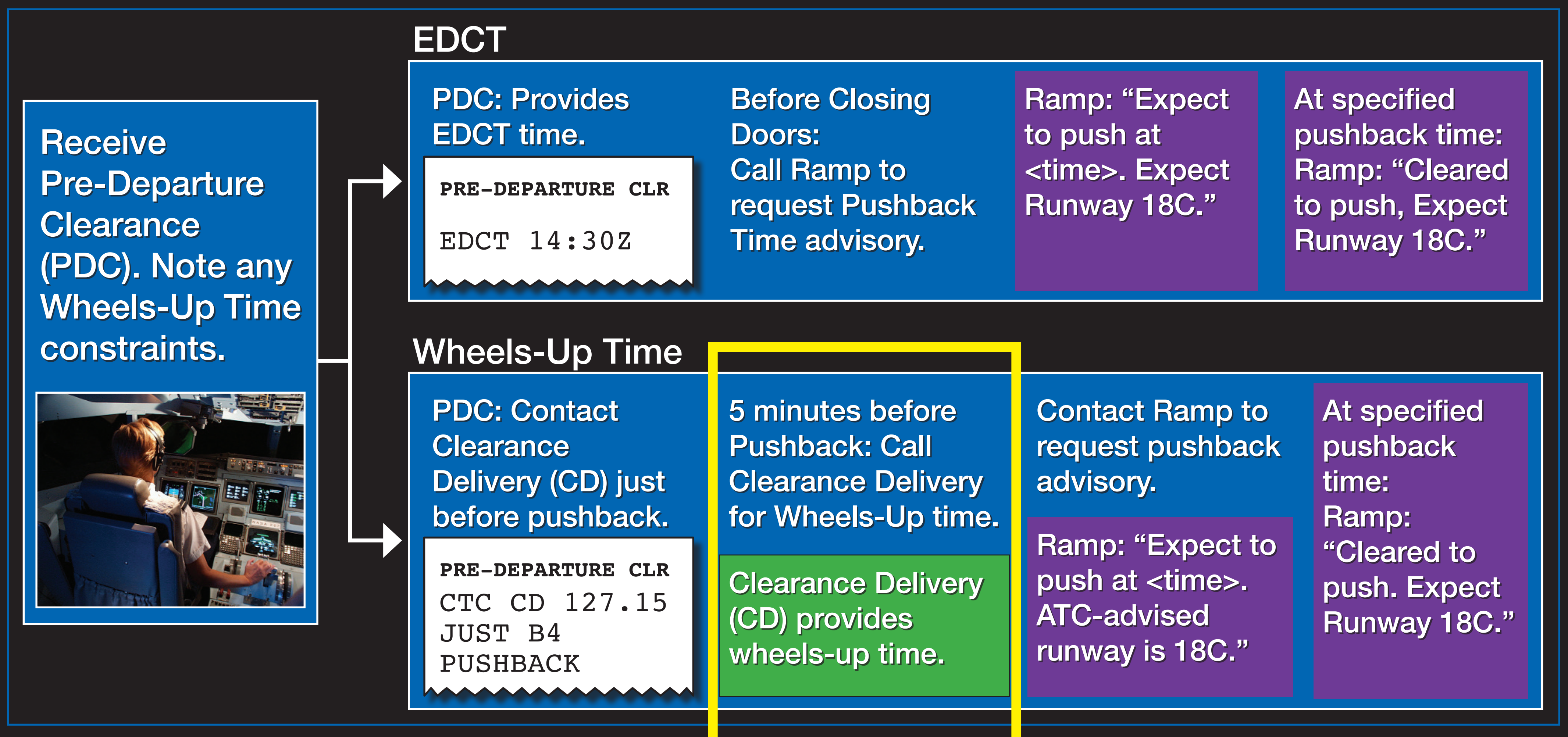## Pilot Procedures Reminder: Wheels-Up Time

In order to see system benefits from Surface Metering at KCLT, pilots are reminded to call Clearance Delivery (CD) for their Wheels-Up Time PRIOR to calling for pushback. Please check the PDC for instructions to contact Clearance Delivery (CD).

When a flight is assigned a Wheels-Up Time, the PDC will state:

"CTC CD 127.15 JUST B4 PUSHBACK"

Prior to pushback, pilots should contact Clearance Delivery (CD), and then contact Ramp to request pushback advisory.

Wheels-Up Time Procedures

Receive Pre-Departure Clearance (PDC). Note any Wheels-Up Time constraints.

EDCT

PDC: Provides EDCT time.

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PRE-DEPARTURE CLR
EDCT 14:30Z
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Before Closing Doors: Call Ramp to request Pushback Time advisory.

Ramp: "Expect to push at <time>. Expect Runway 18C."

At specified pushback time: Ramp: "Cleared to push, Expect Runway 18C."

Wheels-Up Time

PDC: Contact Clearance Delivery (CD) just before pushback.

```
PRE-DEPARTURE CLR
CTC CD 127.15
JUST B4
PUSHBACK
```

5 minutes before Pushback: Call Clearance Delivery for Wheels-Up time.

Clearance Delivery (CD) provides wheels-up time.

Contact Ramp to request pushback advisory.

Ramp: "Expect to push at <time>. ATC-advised runway is 18C."

At specified pushback time: Ramp: "Cleared to push. Expect Runway 18C."

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