

## NASA's Collaborative Digital Departure Rerouting (CDDR) Technology Reduces Flight Delays and Fuel Burn

NASA's Digital Information Platform is creating a digital information ecosystem to exchange services and provide access to airspace information to enable fuel efficient operations. This system allows providers to make their services more accessible and consumers to access information and services they need to optimize their operations. In this video we will focus on the Collaborative Digital Departure Rerouting service, which provides airlines with routing options similar to how drivers navigate using cellphone apps.

Even though you know how to get home, the traffic conditions on the roads can change which route is the quickest and most efficient. The app will then recommend new routes that are faster and more efficient, even if they are a little longer in distance.

In the sky, flight plans filed by flight operators may experience delays due to weather or increased demand for the same route. Alternate routes may exist that could reduce potential delays of a restricted route, even though they too may be a little longer.

NASA has developed the Collaborative Digital Departure Rerouting, or CDDR, service to identify these routes and evaluate their predicted departure delay savings for airlines.

Departures enter enroute airspace through exit points located on the boundary of the terminal area. Under normal conditions, the capacity of the exit points meets the demand of the traffic while still maintaining safe separation, much like multiple lanes on a road for cars.

However, when demand is above capacity, due to high traffic volume or weather, departures are delayed on the surface of the airport.

When this happens, passengers will be notified of a delay before they are cleared for take off, which could last up to 30 minutes after they have boarded and left the gate.

CDDR continuously monitors potential departure delays and evaluates alternate routes to minimize potential delay on the ground. While the alternate routes are usually longer than the filed route, a reroute is often beneficial when considering both delay and fuel savings.

Once an airline is notified of a delay saving route, they can efficiently submit a reroute request digitally to the FAA via the CDDR user interface.

The air traffic control tower is then notified of the request. The Tower specialists can approve the reroute request and digitally send the new route to the flight crew so they can make the necessary changes.

While the benefits are easily seen for a single flight, one aircraft's delay savings will also help subsequent flights as well. As one flight is removed from the queue for another exit point, all

following flights move up one spot in the queue and delay savings are achieved for more aircraft.

The delay savings from one airport will also benefit flights at adjacent airports within the same terminal area because they are all using the same exit points.

The benefits of CDDR have been shown in the field with airlines. Working alongside the FAA and airlines, NASA deployed CDDR from January 1 through September 16 of 2022 in the Dallas/Fort Worth airspace and generated delay, fuel, emissions, and cost savings to the airlines. This technology is addressing the goals of NASA's Sustainable Flight National Partnership today. Through the Sustainable Flight National Partnership, NASA is engaging with industry, academia, and other agencies to reduce the environmental impact of aviation by improving operations and developing sustainable fuels and new aircraft technologies. NASA is working with the FAA to introduce new technology to improve the public flying experience while reducing delays and emissions from aviation.