

Information Technology and Software

Spot and Runway Departure Advisor (SARDA)

A time-based metering advisories for aircraft

Improving the efficiency of airport surface operations is the focus of NASA's surface optimization research. In current operations, there are two main sources of inefficiencies. One is peak traffic due to multiple aircraft that push back from their gates at around the same time causing long runway queues and congestion on taxiways. The second occurs when relevant planning information is not shared between various airport surface stakeholders such as controllers in the ramp and air traffic control towers (ATCT). The Spot and Runway Departure Advisor, or SARDA, is the centerpiece of a partnership among NASA, airlines, airports, and air traffic controllers to improve operations at the nations busiest airports. SARDA uses time-based metering of aircraft to reduce the congestion on the airport surface and both assumes and facilitates a collaboration amongst the various airport surface stakeholders for obtaining better situational awareness of flight operations information.

BENEFITS

- Manage airport surface traffic more efficiently
- Improve stakeholders situational awareness with shared planning information
- Improve aircraft movement predictability
- Reduce traffic buildup and delays on taxiways and runways
- Reduce unnecessary fuel burn and emissions
- Maximize runway throughput

technology solution

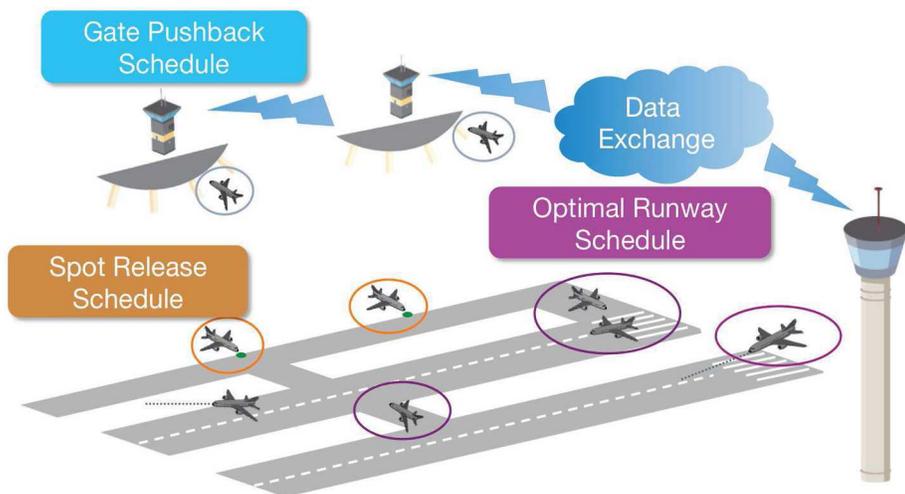


NASA Technology Transfer Program

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THE TECHNOLOGY

For each aircraft, SARDA provides metering advisories at three main locations: gate, spot, and runway. By controlling the release of aircraft from the gates and the spots, SARDA effectively shifts the delays from the taxiways and runways to the gates. By incurring delays at the gates, with aircraft engines off, fuel and emissions are reduced. Metering of aircraft at the gates also reduces the number of aircraft on the movement area at any time, increasing predictability. The main algorithm for SARDA operates in two-stages to generate metering advisories. The first stage provides an optimal sequence and times for runway usage (takeoff times for departures and runway crossing times for arrivals). The second stage determines times to release aircraft from gates or spots. Dynamic surface conditions are detected and mitigated by executing the algorithm periodically to generate updated optimized solutions.



SARDA creates metering advisories for runway usage, spot release into taxiways, and gate pushbacks.

APPLICATIONS

The technology has several potential applications:

- Airport surface operations

PUBLICATIONS

National Aeronautics and Space Administration

Technology Partnerships Office

Ames Research Center

MS 202A-3

Moffett Field, CA 94035

855-627-2249

ARC-TechTransfer@mail.nasa.gov

<http://technology.nasa.gov/>

www.nasa.gov

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