From Chaos to Harmony:
The Future of Airline Disruption Management

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Disruptions cost airlines dearly in terms of passenger dissatisfaction, negative impact to brand image, and by creating uncertainty affecting the larger travel ecosystem. The estimated cost of disruption to airlines (pre-COVID) is approximately 8% of airline revenue, or about $60 billion annually worldwide.

Despite global advances in technology, much needs to be done – and can be done – to enhance the passenger experience during disruptions – often called "irregular operations," or IROPS for short. Airlines need solutions that integrate crew management, flight operations, reservations, departure control, and maintenance in order to optimize the passenger experience – but current solutions do not encompass all areas and are often difficult to fully integrate. The key to this puzzle lies at the confluence of data integration, cloud computing, and machine learning, enabling each airline to create an integrated solution catered to its unique business model.

As the weather around the world becomes more unpredictable, and the complexity of managing fleet availability increases, airline disruption challenges become harder to resolve. Flight delays and cancellations have a cascading effect on flight schedules, but they also cause disruption across things like business finance, crew scheduling, slot availability, and landing and parking charges.

Common causes of airline disruptions:

Adverse Weather:
Fog, Rain, Snow, Hurricanes

Aircraft Mechanical Problems

Crew Logistics

Airport Closures
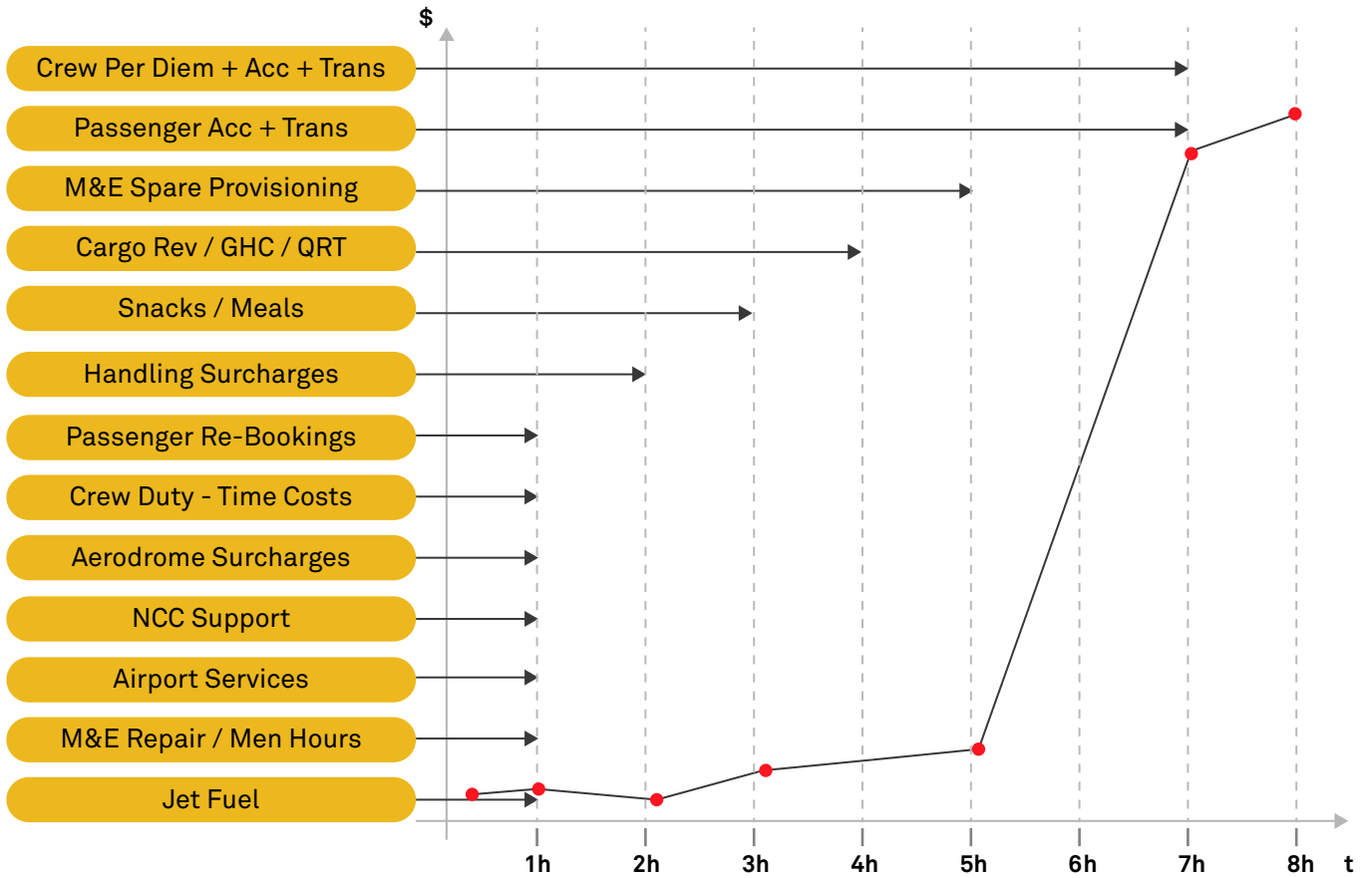
Airport Operations Issues:
Security, Runway Incursion

Airline/Airport/Crew Union Strikes

Passenger/Crew Health

Every hour of delay is directly correlated with revenue outflow

Labels (top to bottom):
- Crew Per Diem + Acc + Trans
- Passenger Acc + Trans
- M&E Spare Provisioning
- Cargo Rev / GHC / QRT
- Snacks / Meals
- Handling Surcharges
- Passenger Re-Bookings
- Crew Duty - Time Costs
- Aerodrome Surcharges
- NCC Support
- Airport Services
- M&E Repair / Men Hours
- Jet Fuel

Time axis: 1h, 2h, 3h, 4h, 5h, 6h, 7h, 8h, t

Today's approach to IROPs

Currently, most airlines handle disruptions manually by coordinating with various stakeholders (see graphic).

A typical priority scenario focuses on, in order of importance, aircraft, crew, and passengers.

- Crew Operations
- Network Planning
- Airline Operations
- Baggage / Cargo
- Fueling
- Engineerings / Maintenance
- Boarding / De-Boarding
- Catering

Operations Control Center

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It's helpful to understand the primary domino effects of airline disruptions: the impact on the direct flight schedule, the impact on associated connecting flights, and the impact on partnered (code-shared) carriers.

Airline disruption management is an ongoing process. It's critical to have access to reliable real-time information to help revise the original schedule. Due to the dynamic environment, handling disruptions in airline operation is extremely complex. Monitoring the extent, scope, and effect of each irregular operation is the primary role of the Operations Control Center (OCC).

The OCC leverages different methods to deal with problems (e.g., flight delays, flight cancellations, aircraft swaps, utilizing spare aircraft, ferry flights) and aircraft diversions (e.g., getting passengers where they need to be with the least possible disruption). Using spare aircraft or ferry aircraft is expensive and requires exceptional circumstances. In the majority of situations, flight delays and cancellations are feasible solutions to recover from disruption, with minimal impact on passengers and, preferably, with lower operational cost.

Parameters for IROPs decision-making

- Do we have an aircraft?
- Do we have pilots and cabin crew?
- How many passengers could be affected?
- Are there any special circumstances?
- Do we have alternatives (fuel vs. time vs. delay cost)?
- How much does it cost?
- How long will this decision impact the airline?

The recovery time can span from the time the disruption occurs up to the time the airline gets back to its original schedule.

Roadblocks to disruption solutions

Disruption management solutions focus on two overarching goals:

Inform: Make the constraints at play and the consequences of decisions visible and available to controllers in the OCC.

Communicate: Enable communication among all relevant parties: the OCC, customer service, passengers, reservation systems, ultimately, back into flight operations.

Enabling good disruption management solutions requires various stakeholders to share their expertise, data, and recommendation for resolving situations.

The key obstacle to automated disruption solutions is successfully integrating all parts of the airline, both at a data and UI level. Challenges include:

Workload spike: When a large volume of passenger rebooking requests come in, the workload spikes, demanding management of a complex set of dynamic preferences. The logic of how passengers are to be re-booked will be based on various human and business priorities and cannot be defined as a static rule.

Integrating legacy and modern systems: Disruption management solutions require a large amount of computing power, which may not (or "is not"?) be available in legacy systems. Modern systems offer the requisite power, and the question becomes how to integrated legacy apps with modern ones.

Optimizing the Impossible: Disruption is generally an optimization problem, with different variables having different units of measurement. This makes resolving the equation impossible at times. Flight operations application vendors haven't built recovery solutions, and recovery solution vendors haven't built flight operations applications. Having these two entities interact meaningfully becomes a challenge.

Communication complexity: The task of communication between the airline (and all its departments and functions) and passengers is extremely complex, critically important, and needs to be managed effectively.

From disruption to harmony

An effective disruption recovery solution is one that is able to help the airline navigate through these obstacles and provide a seamless visual experience to controllers, customer service agents, and passengers. An example of a cohesive solution is one that tries to resolve each dimension by prioritizing the order of significance.

This might entail swapping the aircraft with one from a later flight, or calling a reserve crew, or even creating new itineraries for every disrupted passenger.
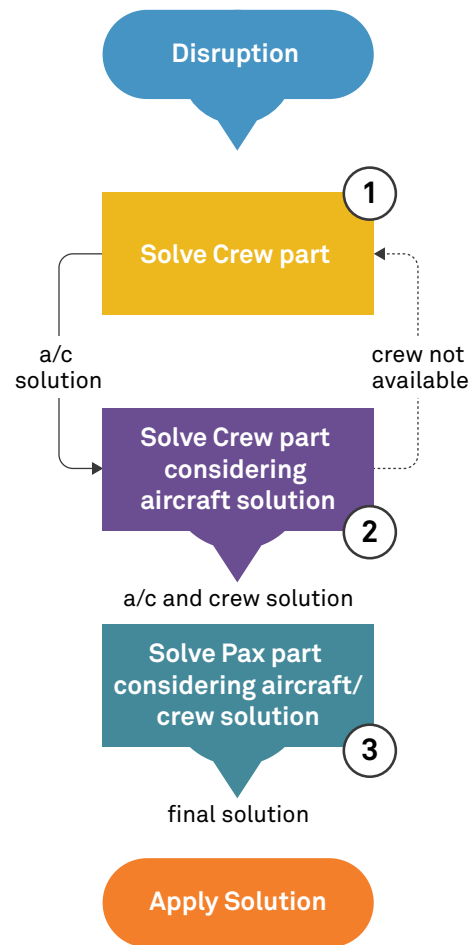
Integrated IROPs recovery benefits

For airlines that can create truly integrated recovery solutions, the benefits are substantial:

• Improved airline productivity
• Improved quality of life for crew
• Improved passenger satisfaction
• Reduced direct operating cost

In the airlines business, service disruptions are a fact of life – no system will eliminate them entirely. But an integrated airline disruption recovery solution can do a lot to minimize the costs and the inconvenience associated with disruptions.

About the authors

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Atul is a domain expert with over 20 years of hands on experience of supporting Airlines implement change in areas of Flight Operations, MRO, Commercial BI and Disruption Management. Has led complex, large scale process changes with focus on Revenue and Bottom line. Atul brings expertise of transformation, gleaned by, supporting Large National Carriers, LCC and Full-Service operators. In addition, brings retail IT support transformation experience. Also, transformed sales organization for Global Shipping company.

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Darshan is a domain consultant with over 14 years of experience in Airline Operations focusing on Fleet, Crew, Passenger Departure Control, Message Handling, Crew Fatigue and Disruption Management. Darshan is the Product Owner for Wipro's TOPS CREW Management solution suite. With extensive experience in the airline industry, he brings cross-function exposure and has led several large-scale business transformation projects across Asia-Pacific, Middle East and Europe; helping Airlines to improve their business process.

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