By harmonizing OCC (activities in the air) and HCC (ground operations) activities, airlines can enhance their IT scope and reach. Common Ground: In The Air

Bringing Together OCC And HCC through Common IT Support

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B enefits a pilot can say “we’re ready for takeoff!”; all systems must truly be “go.” Behind that “go” are complex systems that must work together or planes remain on the ground.

An airline’s operations represent a complex and multifaceted process — requiring both collaboration among numerous groups within the carrier’s purview and communication with customers and service providers. Different procedures performed on the day of operations — both in the air and on the ground — are interrelated by complicated relationships. Quite often, their effect on one another can be very difficult to predict.

In addition, weather, special events, security needs, labor actions, catastrophes and other irregular events require continuous refinements to plans. It becomes critical to reevaluate different scenarios and select the best strategy within an extremely short timeframe.

On the day of operations, operational plans are developed in two different environments:

- The airline operations control center (OCC), also referred to as the systems operations control center (SDCOC) or the integrated operations control center (IOCC).
- The hub control center (HCC), also commonly known as the airport control center (ACC) or hub control (HC).

The OCC is responsible for overall network operations and processes as well as people involved in activities in the air. The HCC focuses on ground operations at a station.

A central task for operations from several airports might consider having several HCCs. This may include consolidating operations of a network within a particular airport, and/or a network under one HCC.

There are several organizational and administrative setups for OCCs and HCCs. In all of them, consistency and availability of information for decision-making processes is crucial for organizing efficient operations.

**OCC Responsibility**

The operations control center is responsible for overall network performance and operations management.

There are six primary components of operations management controlled by an OCC:

1. Schedule management tracks flight operations and reacts to disruptions by adjusting arrival and departure times, diverting or canceling flights.
2. Flight management extends schedule management to individual flight planning. It ensures that each flight has an optimal trajectory, complies with airport, airspace and aircraft restrictions, and manages disaster recovery needs.
3. Aircraft management starts with logical lines of flying created by a planning department. It assigns those lines to specific tails, while adhering to operational and maintenance restrictions.
4. Maintenance management keeps track of and updates flying hours, cycles and calendar-day counters for each tail. It also schedules maintenance activities to ensure that all tails are fully eligible to fly their assignments.
5. Crew management controls tactical planning, tracking and recovery procedures for cockpit and cabin crew. It also includes access capabilities that enable two-way interaction between the OCC and crewmembers.
6. Passenger and payload management monitors expected passengers and cargo loads by receiving continuous updates from revenue management or inventory systems. On the day of operations, the OCC interacts with the departure control system, controls critical connections and special-service requests, and interacts with the revenue management system to create new itineraries for disrupted passengers.

All these activities are automated within Sabre® AirCenter™. It includes solution that supports:

- Movement control
- Crew management and services
- Flight operations
- Weight and balance
- Flight tracking
- Maintenance control
- Irregular operations management.

These products provide an integrated environment for decision making and collaboration.

**HCC Functionality**

Operating on a more detailed level than the OCC, the HCC uses the overall operations framework defined by the OCC. HCC implements the framework by managing ground resources required for aircraft turnaround activities, passenger and payload connections, terminal operations, and other processes.

The HCC must also provide feedback to the OCC on decisions that might result in various effects at the network level.

Similar to the OCC, the operational data and decision-making process for HCC operations can benefit significantly from integration. In addition, the IT tools and infrastructure used by the HCC enables two-way communication with multiple parties who support those operations.

Sabre Airline Solutions® offers an integrated hub control decision-support system that includes four management capabilities — schedule management, passenger and payload, aircraft turnaround management and resource management. These products are based on a unique architecture engineered and employ a “same-feel” user interface.

**Schedule Management**

Schedule management is responsible for tracking flight operations during the day and reacting to disruptions by adjusting arrival and departure times and gate assignments. The module interacts with airport, airspace and aircraft restriction and management tools and databases.

**Passenger And Payload**

Passenger and payload management handles passengers, luggage and connections using information from the depart control system and aircraft tracking and movement management solutions. In advance, multiple transfer and recovery options are identified, and information is collected for their accurate evaluation. For example, possible transfer options for passengers might include:

- Regular terminal transfer, including analysis of hard-stall parking that consists of a bus trip from an aircraft to a terminal, transfer within the terminal (or between terminals, as required) and possible transfer from the terminal to an aircraft.
- Fast terminal transfer is similar to regular transfer — except that transfer within a terminal is assisted by allocating designated personnel and equipment. It might also involve going through
Aircraft Turnaround Management

Airplane turnaround management focuses on tasks and processes associated with turning an airplane around and continuing its operations. It identifies tasks that must be completed between checks-on and checks-off, defines relationships among them, and constructs a task network. Time intervals in which each task must be completed. It recognizes “critical tasks” as those that cannot be delayed without causing further disruption.

The aircraft turnaround management solution uses an event-tracking mechanism that reevaluates task status each time external factors result in the addition, deletion, or delay of a task that affects other tasks. Leaders that are essential and an integrated optimisation process that identifies the most efficient sequence and duration of activities. It leverages the mobile environment to enable a two-way communication between planning and execution teams.

Resource Management

The resource management capability is an extension of staff and gate planning systems. It works in a hub-control environment so multiple tasks can be automatically generated for resources. These include passenger busses, bag tags, baggage carousels, terminal personnel and fast-transfer equipment.

Data and process integration significantly improves decision making and minimizes the effects of operational disruptions. For further efficiencies, a system can be programmed to interact with airport security and third-party service providers including catering and fuelling.

OCC/HCC Integration

Neither OCC nor HCC — in isolation — can successfully recover from a complex disruption. That is why integrating data and decision-making processes is considered to be a priority for any future airline operations decision-support systems.

Aircraft does not have access to detailed status information for ground processes and availability of airport resources. Even with all available data processed, the high speed at which decisions must be made at an airport level does not allow waiting for an optimal solution for the entire network.

On the other hand, if the HCC makes decisions without accounting for a network effect, it might cause even more problems at down-line stations.

From an OCC perspective, for example, a flight delayed at a hub should usually be delayed to the minimal route. But even a short delay might cause passengers to miss their connections. The cost to reaccommodate those passengers might be much higher than if they were delayed from a “network” perspective and modified to a different route with the same destination.

Complexity of airline operations between them does not allow the OCC and HCC decision-making processes to be combined in one automated system. Yet, critical interdependencies of the operations will not permit these processes to be completely separated.

To help solve this problem, Sabre Airline Solutions offers two decision-support systems that focus on the separate areas of airline operations. They continuously update status information and account for each other’s objectives, restrictions and priorities. An essential prerequisite for establishing a truly integrated business process between the OCC and the HCC is data integration.

Both entities must have instantaneous access to all relevant information. This data may come from multiple internal systems, such as:

- Departure control
- Revenue management
- Ground resource management
- Load planning
- Aircraft movement management

In addition, data from external sources, such as the airport management system, catering and fuelling providers, is required. This information must be consolidated, verified for consistency and transferred into a format it usable by automated systems that support airline operations.

To fulfill this requirement, Sabre Airline Solutions developed interfaces that use an enterprise-service, business integration platform for multiple sources and providers. Such integration enables airlines to process a large volume of transactions and quickly manage errors. This is especially critical in situations in which data quality may often vary from one source to another.

Once all necessary data has been verified and made available, an integrated framework for decision-making processes in the OCC and the HCC can be established.

To provide a structural approach for recovery operations, Sabre Airline Solutions has introduced a two-level procedure: “local” recovery and “global” recovery. Prior to the day of operations, the OCC must develop a set of regularity buffers that are defined on two levels: “hard” and “soft.” A hard buffer cannot be violated without OCC intervention. A soft buffer can be violated by the HCC but only if the OCC agrees with the HCC in advance and must reflect the cost of a delay spread throughout the airline’s network.

The OCC, for example, may predict that a 15-minute delay for a departing flight would not cause any ripple effects and, therefore, sets it as a soft buffer. Any delay between 15 minutes and 30 minutes can be recovered by increasing the flight speed. Therefore, 30 minutes might be set as a hard buffer, and the cost of reaccommodating a flight delay should be assessed as a penalty.

If an irregular operation originates outside of an airport, the OCC initiates a global-recovery procedure and acts as the leader. The OCC might also request the HCC to analyze the possibilities of recovering within the HCC’s scope. If such recovery is possible, the procedure is downgraded to local-recovery status, and the HCC assumes control.

Integration of numerous processes that support operations, such as aircraft movement management, requires automated solutions and expertise. Sabre Airline Solutions can help airlines enhance their end-to-end and operations with integrated systems and strategies that bring together OCC and HCC activities. As a result, airlines will save money and customers will have a better travel experience.

This concept will be validated and tested within one of the SESAR projects led by Sabre Airline Solutions. This project defines requirements related to commercial airline operations in the air and on the ground. The engagement allows Sabre Airline Solutions to align the design of operations solutions with industry standards and ensure that product functionality is consistent with best practices that are critical for airports and airlines.

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