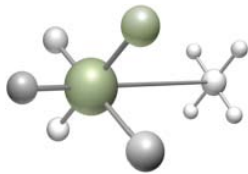


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### Plan, analyze, and manage your resources and capacity

The ARIS/CA capacity analyzer tool enables you to study scenarios about how your airport might operate in the future, analyze how you might operate under the scenarios using alternative flight schedules, and create a resource-allocation plan for each scenario that identifies how to use your resources and capacity to greatest advantage. A companion tool, the ARIS/SA® slot allocator, provides the capability to receive landing and takeoff slot requests and to respond automatically based on resource availability.

With the ARIS/CA capacity analyzer, you can:

- Create capacity-utilization projections that show how you would handle proposed flight schedules given the capacity of your runways, gates, stands, remote parking positions, check-in counters, and baggage belts
- Determine how changing the capacity of your runways, gates, stands, remote parking positions, check-in counters, and baggage belts affects your ability to accommodate flights
- Determine which combinations of flight schedules and resources are possible and which combinations are most advantageous
- Examine your resource capacity for any future date to determine which physical changes to make sooner and which to make later
- Identify physical changes to resources that are most likely to meet customizable goals, such as higher profitability
- Allocate landing and takeoff slots based on the availability of runways, gates, stands, remote parking positions, check-in counters, and baggage belts
- Process landing-slot requests and generate automated responses following the IATA SCR and SMA standards
- Process new SCRs, query existing schedules, query and edit SCRs, and define or change carrier preferences and data
- Prepare, revise, and update slot schedules

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## Who we are

Since our founding 25 years ago by members of the Massachusetts Institute of Technology Artificial Intelligence Laboratory, Ascent Technology has helped organizations deploy costly resources as efficiently, effectively, and economically as possible. Our highly trained and capable team of technologists, problem solvers, and solution designers has broad domain expertise and substantial experience in artificial intelligence, computer science and engineering, system design, mathematical optimization, operations research, and resource optimization, planning, scheduling, and management.

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- Validate an SCR or SMA against the schedule, then process schedule changes automatically
- Ensure slot-request permissions comply with night-flight restrictions, noise restrictions, and other local ordinances
- Route landing-slot requests to slot managers, terminal coordinators, and night-flight managers automatically.

Because it provides both long-range schedule planning and dynamic response to requests by carriers to change their schedules, the ARIS/CA capacity analyzer enables you to plan as you run your airport, and to run your airport as you planned.

Visualize how future flight schedules affect your operations

The ARIS/CA capacity analyzer dynamically constructs detailed resource-allocation plans for an entire schedule period and for the runways, gates, stands, remote parking positions, check-in counters, and baggage belts under management. Unlike planning tools that create plans in batch for a single typical day when the flight schedule changes, the ARIS/CA capacity analyzer modifies the plan dynamically as the flight schedule changes.

Importantly, the ARIS/CA capacity analyzer produces results for the entire schedule period, even when your physical layout changes during the period. The ARIS/CA capacity analyzer displays results in two ways:

- As Gantt charts that show when gates, stands, and parking positions are scheduled to be used or are available to be used, with overlaps and congested periods clearly indicated
- As spreadsheets that show how many runways, gates, stands, remote parking positions, check-in counters, and baggage belts will be used at specified times, such as, for example, in 15 minute intervals or on all Mondays in September 2015.

Every analysis starts with at least one model of your airport. First, you specify the kinds of resources you want to analyze. Next, you specify the capacity of the resources that you create and the rules to follow while the resources are in use. Then, you ask the ARIS/CA capacity analyzer to look at fixed resources that affect your operations. You enter rules about how resources are used, or you link to rules in other ARIS® resource-allocation products you also use. All ARIS products enter and store rules in the same ARIS/SmartBase® database. For example, the ARIS/CA capacity analyzer automatically uses the rules you entered for the ARIS/GM® gate manager, such as a rule that says two wide bodies can never park at adjacent gates.

You can create future schedules by entering start and end dates, airlines, days of operation, arrival and departure times, and so forth. The ARIS/CA capacity analyzer analyzes the effect of the changes and warns you of any overload on a specific type of resource at a precise time in the schedule period. It can even suggest how minor adjustments to the schedule could allow you to resolve your capacity challenges.

## Manage slot allocation for maximum efficiency and profitability

The ARIS/CA capacity analyzer not only helps you make better capacity-management decisions, its companion tool, the ARIS/SA slot allocator, also helps you make better slot-allocation decisions by automating the tedious and error-prone clerical activities associated with processing SCR and SMA messages.

The ARIS/SA slot allocator can receive, analyze, and respond to routine messages without human intervention, streamlining the workflow among the various workers involved with slot allocation and freeing slot coordinators to apply their expertise to more complex slot-allocation decisions.

The ARIS/SA slot allocator enables you to:

- Manage workflow among the workers involved in the slot-allocation process
- Respond to SCRs
- Communicate responses to SCRs to the airlines
- Alleviate Terminal Manager and Traffic Manager concerns about slot-allocation activities
- Comply with night-flight requirements and noise restrictions
- Process general-aviation requests.

## Automated analysis and processing of SCRs for smart slot-allocation decisions

The ARIS/SA slot allocator creates long-range slot-allocation plans that can be used and updated continuously throughout the day as SCRs are received. The ARIS/SA slot allocator makes it easy to see the effect of new slot requests on existing plans. It enables you to improve the precision of slot-allocation decisions for both scheduled airlines and general-aviation customers, and it ensures that slot allocations for night flights comply with noise-abatement restrictions.

Handling SCRs and SMAs in a manner that both satisfies airline needs and makes the best use of airport resources is becoming increasingly complicated. This is especially true during the interval between an IATA slot-coordination conference and the starting date for a new seasonal schedule. Schedule-change requests from airlines during this period frequently conflict with one another. You must respond to each airline's SCRs in a timely manner and resolve any scheduling conflicts with slot assignments that can confidently be supported with available ground resources.

The ARIS/SA slot allocator helps you make smart allocation decisions by working as part of an airport-wide resource-allocation system that provides the components needed for complete and accurate end-to-end processing of slot requests.

The process begins when the ARIS/SA slot allocator receives an SCR electronically and validates that all fields in the message comply with IATA standards. Messages containing clerical errors are often corrected automatically by the ARIS/SA slot allocator. Eliminating the need for manual processing saves time and greatly reduces the chance for errors.

The ARIS/SA slot allocator stores complete details of all currently held slots in the ARIS/SmartBase database. When an SCR for slot modification is received, the ARIS/SA slot allocator automatically validates the status of the slots held by the requestor and creates the appropriate response that includes its effect on runways, gates, stands, parking positions, baggage belts, and check-in counters. The ARIS/SA slot allocator performs the analysis quickly and accurately because the information it needs is stored in the same database used by the ARIS products that allocate and manage resources. When the analysis is completed, the result from the ARIS/SA slot allocator is attached to the SCR for user review.

## **The ARIS/SA slot allocator automatically adapts long-range schedules to day-of-operation requirements**

The ARIS/SA slot allocator makes it possible to manage the effect of slot requests on constrained airport resources on a daily basis. With the help of the ARIS/CA capacity analyzer, it not only verifies daily runway availability for each flight's arrival and departure slot, but also assures the availability of the resources needed to accommodate each flight. Here is an example of steps the ARIS/SA slot allocator would take to process a request for new daily service to be provided by an international carrier with a 767 aircraft, landing at 1710, departing at 2235, for four months:

- Validate the accuracy of the SCR requesting these slots
- Check arrival runways between 1700 and 1800 and between 1700 and 1715 for the requested days
- Check departure runways between 2200 and 2300 and between 2230 and 2245 for the requested days
- Determine if the slots requested comply with airport noise and night operation restrictions
- Determine if the aircraft will remain at the international arrivals facility or require a tow to another terminal area
- Assure that it is possible to park the aircraft at the desired stands for the duration of the schedule
- Verify that a baggage belt is available at approximately 1720 daily
- Verify check-in counter availability at approximately 2030 daily
- Respond to the SCR with either a confirmation or a recommendation for alternative slots.

To ensure a timely response to this slot request, the ARIS/SA slot allocator scans a series of virtual allocation charts for each day of the schedule period. The ARIS/SA slot allocator then analyzes the resource-allocation rules on a day-by-day basis to detect any conflicts from other flights. When necessary, the ARIS/SA slot allocator will recommend daily adjustments to the slot allocation plan to ensure that the airport can accommodate the aircraft in the requested schedule. When approved, the ARIS/SA slot allocator automatically updates the schedule and provides the IATA-compatible reply to the airline.

## Representative features

**Projected capacity utilization available at a glance.** The ARIS/CA capacity analyzer features a mouse-driven, colorful graphical user interface that displays how your resources will handle proposed flight schedules.

**Flight schedule and resource-utilization optimization.** With the ARIS/CA capacity analyzer, you can determine which combinations of flight schedules and airport resources are possible and which combinations are optimal, based on your business goals.

**A clear view of future operations.** You can look across all resources—runways, gates, stands, remote parking positions, baggage belts, and check-in counters—at any point in the future so that you can understand the impact of everything on everything else and determine which improvements to make earlier and which to make later, even if the airport configuration changes during the schedule period.

**User-definable what-if support.** You can change one schedule variable, or several, and see how all operations are affected so you can be creative in the way you solve problems and generate business opportunities.

**Slot allocation status available at a glance.** The ARIS/SA slot allocator features an easy-to-use, mouse-driven, colorful graphical user interface that displays the status of your slot-allocation activities.

**Integrated slot allocation and resource management.** The ARIS/SA slot allocator automatically coordinates the allocation of landing and takeoff slots with the availability of related airport resources, such as runways, gates, stands, remote parking positions, check-in counters, and baggage belts, so that you can manage your slots and resources efficiently.

**Rapid response.** The ARIS/SA slot allocator enables you to prepare, revise, and update landing slot schedules quickly and efficiently, in accordance with IATA standards.

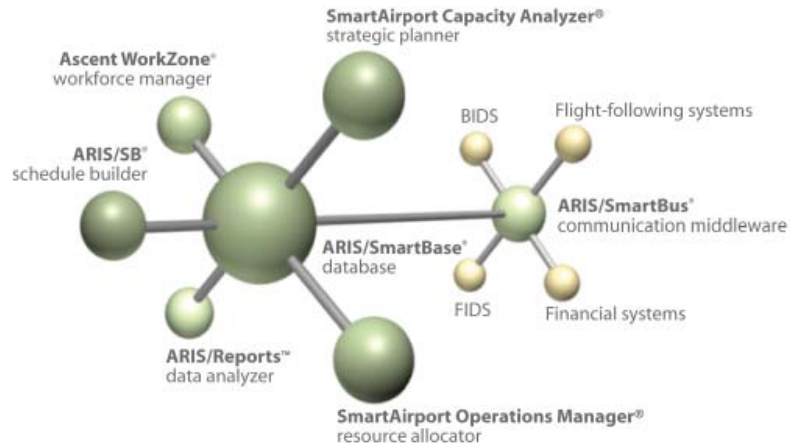
**Automatic validation.** You can validate schedule changes automatically, with no delay, enabling you to increase revenue by deploying canceled slots to unscheduled flights, diversions, and general aviation customers on the day of operation.

**Customizable compliance with local regulations.** You can customize the behavior of the ARIS/SA slot allocator to ensure that all slot assignments comply with night flight requirements, noise restrictions, and other local ordinances.

**Archive of all processed slot requests and transmitted responses.** You can determine if a carrier has requested similar slots before and how you responded.

**Multiple scenario support.** The ARIS/CA capacity analyzer can handle varying sets of rules and airport layouts during a schedule period. Decisions are rendered precisely, even when SCRs and SMAs cross significant operational changes at the airport, such as a new concourse opening halfway through the schedule.





Ascent airport architecture

## More information

To learn more about how the SmartAirline Operations Center or the SmartAirport Operations Center solutions can help you optimize your resources to greatest advantage, send email to [sales@ascent.com](mailto:sales@ascent.com) or call our Sales and Marketing department at +1.617.395.4800.

## Reports

You can print reports containing information about how many resources are needed and how many resources are unavailable to handle the schedule, and you can print Gantt charts that show the allocation of gate, stand, and parking position resources to flights. You can also print schedules or parts of schedules obtained through the ARIS/CA capacity analyzer schedule-query capability as well as reports containing information about SCR activities and reports indicating how slot requests have changed in comparison to a previous schedule.

The ARIS/CA capacity analyzer stores information in the ARIS/SmartBase database, which runs on the Oracle® database. We can create reports for you, and you can create your own reports from a synchronized reporting database using Oracle-compatible report-generator tools, without interfering with the integrity or performance of the ARIS/SmartBase database.

## Ways we can help you

**Advisory and consulting services.** We provide unbiased advice about resource allocation, optimization, planning, scheduling, management, and deployment methodologies; develop cost-benefit analyses; analyze business processes; manage projects; gather and document technical requirements; develop functional specifications; and specify hardware, software, and devices.

**Project management services.** Our project management team works closely with you, following our time-proven delivery methodology, and uses face-to-face meetings, teleconferences, web conferences, and email exchanges to keep you informed every step of the way. We believe careful project management is the key to successful on-time and on-budget deliveries of SmartAirline Operations Center and SmartAirport Operations Center products, services, and solutions.

**Knowledge engineering services.** Knowledge engineering is the process of identifying your business knowledge—the business rules, policies, procedures, preferences, and requirements that guide the way your organization operates—and then codifying your business knowledge in the knowledge base at the heart of SmartAirline Operations Center and SmartAirport Operations Center solutions. The business knowledge in the knowledge base determines how the solutions behave. Our knowledge engineers work with you to gather and enter the business knowledge that enables the solution to behave exactly the way you want it to.

**Implementation, integration, and installation services.** Our implementation team provides system integration and testing services; develops product extensions, enhancements, and connectivity software for importing data to and exporting data from external systems; and creates reports. The team also configures, installs, and tests hardware, software, and equipment for you when you choose to integrate the SmartAirline Operations Center or SmartAirport Operations Center solutions in your IT environment, and quickly sets up an environment in our hosting center for you when you choose to gain access to the solutions over the web.

**Training services.** We provide a wide range of user, administrator, trainer, and refresher training classes in person at your location, at our Cambridge, MA, headquarters, and remotely over the web. We also provide operational training services in person and remotely when you begin to use the SmartAirline Operations Center or SmartAirport Operations Center solutions in production.

**Maintenance and support services.** We offer Standard Support Services Monday through Friday during our normal office hours in Cambridge, MA, and Premium Support Services around the clock. Both provide comprehensive remote user support services via telephone, email, and Internet, as well as software maintenance, such as product updates, patches, and releases. We provide a web-enabled support portal that enables you to ask questions and receive responses, request service, report problems, and track issues.

ARIS, ARIS/AR, ARIS/AV, ARIS/BB, ARIS/CI, ARIS/CX, ARIS/FW, ARIS/GateView, ARIS/GM, ARIS/IQ, ARIS/LegGen, ARIS/PX, ARIS/SA, ARIS/SB, ARIS/SE, ARIS/SmartBase, ARIS/SmartBus, ARIS/SP, ARIS/Tow Panel, ARIS/WorkModel, ARIS/WorkNet, ARIS/WorkOptimize, ARIS/WorkPlan, ARIS/WorkRelay, ARIS/WorkTime, Ascent Technology, Inc. (stylized), Ascent WorkZone, Ascent WorkZone (stylized), GateKeeper, SmartAirline, SmartAirline Capacity Analyzer (stylized), SmartAirline Operations Manager (stylized), SmartAirline WorkZone, SmartAirline WorkZone (stylized), SmartAirport, Smartairport.com, SmartAirport Capacity Analyzer, SmartAirport Capacity Analyzer (stylized), SmartAirport Information Manager, SmartAirport Information Manager (stylized), SmartAirport Operations, SmartAirport Operations Center, SmartAirport Operations Manager, SmartAirport Operations Manager (stylized), SmartAirport WorkZone, and SmartAirport WorkZone (stylized) are registered trademarks of Ascent Technology, Inc. ARIS/AR Display Board, ARIS/AR Turn Generator, ARIS/CA, ARIS/Reports, ARIS/SCR, Location editor, Reference editor, Resource editor, Rule editor, SmartAirline Capacity Analyzer, SmartAirline Operations Center, SmartAirline Operations Manager, User editor, Work schedule editor, and Worker editor are trademarks of Ascent Technology, Inc. This is not a complete list of all registered trademarks, trademarks, and service marks owned by Ascent Technology, Inc. Other company, product, and service names may be registered trademarks, trademarks, or service marks owned by other parties. Revised 01/2012.

## Technology platform

You can gain access to the SmartAirline Operations Center or SmartAirport Operations Center solutions in two ways: you can integrate the solution into your own IT environment, or you can gain access over the Internet to the solution running in our IT environment in our hosting center.

**Database server:** A server that supports Oracle® Database Standard Edition  
**Compute and/or connectivity server:** A server running Microsoft Windows Server® operating system or Linux® operating system; if virtualized, our solutions are certified to run on VMware® server virtualization products

**Desktop:** A PC running Microsoft Windows Vista®, Microsoft® Windows XP, or Microsoft® Windows 7 operating system; or some versions of the Linux operating system

