ASCENT
TECHNOLOGY, INC.

Headquarters
Ascent Technology, Inc.
101 Federal Street, 19th Floor
Boston, MA 02110 USA

Mailing address
Ascent Technology, Inc.
PO Box 51435
Boston, MA 02205-1435 USA

Telephone: +1.617.395.4800
email: sales@ascent.com
www.ascent.com

ARIS/AR® aircraft-routing system

Plan lines of flight and assign aircraft to routes

The ARIS/AR aircraft-routing system contains the ARIS/AR Turn Generator™ product, which enables you to plan lines of flight for seasonal schedules, and the ARIS/AR Display Board™ product, which enables you to assign aircraft to routes and tracks aircraft in real time.

Plan lines of flight for seasonal schedules

The ARIS/AR Turn Generator product builds turns that link scheduled flight legs together. For any flight assigned to a real aircraft or to an aircraft from a virtual line of flight, the ARIS/AR Turn Generator product identifies all subsequent flights that can be assigned to the aircraft for the current schedule and for future schedules under analysis. The product enables you to identify each planned ground stay and station for the aircraft, so you can schedule maintenance checks.

With the ARIS/AR Turn Generator product, you can:

- Forecast spare aircraft use
- Measure aircraft and maintenance-facility utilization
- Publish schedules with turn information that can be used to plan ground operations
- Assign aircraft to lines of flight to avoid cyclical use patterns leading to uneven wear
- Optimize lines of flight for aircraft-routing systems

The ARIS/AR Turn Generator product balances aircraft utilization and positions aircraft in maintenance stations at regular intervals. The ARIS/AR Display Board product automatically loads track information generated by the ARIS/AR Turn Generator product.

Representative features

Automatic schedule loading and turn generation. The ARIS/AR Turn Generator product loads a new unlinked schedule and generates turns automatically, using advanced optimization and search techniques to balance planning requirements. It is aware of the minimum turn time for each aircraft type in each station. The ARIS/AR Turn Generator product improves planner productivity by eliminating manual turn generation.

Manual editing of track information. You can move flights to specific tracks, swap tracks, exchange flights, and de-allocate flights manually. The ARIS/AR Turn Generator product automatically identifies valid swaps, and you can override automatic allocations.

Automatic general alert mechanism. The ARIS/AR Turn Generator product contains a generalized alert mechanism that recognizes difficult problems, such as negative turns, and soft problems, such as insufficient turn times. A graphical alert appears as soon as the condition is introduced and prevents you from introducing illegal conditions. The product identifies errors in the schedule when it cannot remove problem conditions.

Automatic utilization balancing. The ARIS/AR Turn Generator product automatically balances utilization by minimizing differences in cycles, mileage, and flight time among lines of flight throughout the schedule. The system displays total number of cycles, amount of mileage, and amount of flight time for each track. When you edit the track manually, you immediately see how changes affect fleet balance. When aircraft utilization is balanced, the fleet wears out evenly, aircraft are maintained at more regular intervals, and fleet replacement is simplified.

Automatic global alert indicator. Because alerts can have major effects on airline operations, a global alert indicator appears when an error is detected in any track. The indicator pinpoints the source of the problem and automatically scrolls the chart to the problem so you can see it.

Automatic identification of flights that cannot be operated. It may be impossible for the fleet to operate all flight legs in a schedule. The ARIS/AR Turn Generator product automatically detects the condition and highlights flights that cannot be operated, ensuring the fleet meets the demands of the schedule.

Automatic identification of spares. In cases where the entire fleet is not required to operate a schedule, the ARIS/AR Turn Generator product automatically identifies the number of spares available. You can reduce the load on the fleet or position spare aircraft in various stations. Identification and proper handling of spares reduce the risk of delays due to irregular operations.

Introduction of swaps to minimize uneven aircraft use. The ARIS/AR Turn Generator product recognizes repeating cycles in lines of flight and introduces swaps to break the cycles, randomizing the line of flight, to even out wear on the fleet and to rotate aircraft through maintenance stations.

Station maintenance capability tracking. The ARIS/AR Turn Generator uses information stored in the ARIS/SmartBase® database to determine where each aircraft type can be maintained. Facilities are described in terms of the aircraft types they can handle, operating hours, and maintenance activities supported. It identifies stations where it is impossible to perform any type of maintenance. The database also contains the times required to perform each check for each aircraft type. The product identifies where and when maintenance can be performed, ensuring that an aircraft is never more than a given number of flight hours away from a maintenance station.

User-settable turns. You specify turn rules to force the ARIS/AR Turn Generator product to lock in specific turns. Rules can be applied to a particular pair of flights on a particular day in a particular city. Special handling can be applied to international flights that must be cleared through customs. You can specify a turn sequence to meet specific station requirements.

Assign aircraft to routes and track the status of your aircraft in real time. The ARIS/AR Display Board product enables you to track the progress of your flights and to assign aircraft to flight legs during regular and irregular operations automatically in real time. With the ARIS/AR Display Board product, you can:

- Increase the use of your aircraft and, in turn, increase the return on your investment in your fleet
- Reduce the number of expensive ferry flights
- Reduce the need for spare aircraft
- Anticipate maintenance needs so as to avoid costly schedule disruptions
- Reduce the time needed to recover from irregular operations

The ARIS/AR Display Board product monitors all aircraft, flights, and maintenance activities. All information processed by the ARIS/AR Display Board product is stored in the ARIS/SmartBase database, where it is readily accessible to other ARIS products and to external systems. The ARIS/AR Display Board product automatically loads optimized track information created by the ARIS/AR Turn Generator product, and it can load linked schedules prepared by other products.

Representative features

Flight status available is at a glance. The primary display of the ARIS/AR Display Board product consists of a bar chart, which enables you to visualize current flight status, such as flight times and events, as well as future assignments, which may be loaded as many as seven days in advance.

Rapid information display increases user productivity. When you position the pointer over a flight, ground-stay, maintenance, or aircraft-utilization item, a small window at the top of the bar chart displays detailed information about the item and the actions you can perform.

Visual alerts warn about status changes and problems. The ARIS/AR Display Board product detects many kinds of alert conditions automatically and brings them to your attention. By checking every piece of information available, the product relieves you from the tedious, error-prone task of sifting through information to detect problems. You can define time windows for each alert condition. The product provides two severity levels for each alert condition—alert and warning.

What-if scenario support. The ARIS/AR Display Board product enables you to explore the effects of various routing solutions before you commit changes to the database. For example, when an aircraft swap is initiated, the product displays possible new assignments but does not send them to the ARIS/SmartBase database. The product calculates the alerts for the hypothetical situation, and the display reflects the changes. You can explore the ramifications of a series of swaps, filter out aircraft not involved in the swap, and consider alternative solutions without affecting other users. When the solution is satisfactory, you commit the changes to the database.

Collaborative decision-making. The ARIS/AR Display Board product supports team decision-making, ensuring all users share a consistent current view of operations. You can discuss possible solutions with other users before you commit to changes.

External application launch support. The ARIS/AR Display Board product contains a configurable mechanism for launching external applications. For example, you can select a command on a particular flight leg to launch a weight-and-balance program.

Station maintenance-capability tracking. The ARIS/AR Display Board product maintains detailed information about the maintenance capabilities of each station and identifies the best location to perform maintenance.

Information filters. Because large fleets may fill multiple screens, the ARIS/AR Display Board product provides filters to reduce the amount of information displayed. Filters enable you to focus on the set of flights for which you are responsible.

Maintenance tracking. To determine when aircraft should be brought in for maintenance, the ARIS/AR Display Board product automatically tracks aircraft progress and uses flight assignments stored in the ARIS/SmartBase database to compute and display the number of miles, flight hours, and cycles to be completed by each aircraft prior to maintenance. The product ensures that aircraft are maintained at the most cost effective times, avoiding unnecessary maintenance and maintenance at unsupported stations. The ARIS/AR Display Board product displays all pending maintenance items for each aircraft. You can assign each maintenance item to be performed at a specific station on a specific day. The product warns you if the maintenance cannot be performed at the station because, for example, the station does not support the maintenance type.

Automatic flight-leg assignment. The ARIS/AR Display Board product can allocate aircraft to flights automatically on a daily basis using optimized tracks created by the ARIS/AR Turn Generator product. You can select how many days forward the allocation should cover, and the product automatically assigns flight legs to aircraft for the specified period.

Aircraft reassignment and swap recommendations. During irregular operations, you may need to adjust aircraft flight-leg assignments. Making substitutions without affecting maintenance activities can be difficult. The ARIS/AR Display Board product searches the fleet and makes swap recommendations in seconds, saving precious time during irregular operations. It resolves the difficult problem of routing a specific aircraft to a station by a given time and leaving it there for a specified number of hours by presenting solutions as sets of possible swaps with clear indications about the effects on maintenance activities.

Substitute aircraft identification. To locate substitute aircraft, the ARIS/AR Display Board product searches through the fleet and identifies all other aircraft in the same city at the same time, taking alerts and maintenance items into account.

Identification of flight reassignments to different aircraft types. The ARIS/AR Display Board product identifies flights assigned to aircraft types different from those previously scheduled. Fleet managers can see when an assignment requires additional staffing to accommodate passengers or cargo on a different aircraft type. The product recognizes when flight legs have been assigned to different aircraft and signals the condition graphically, reducing the number of broken flights.

Automatic flight assignment. The ARIS/AR Display Board product automatically assigns all flights well ahead of departure times; you can add new flights and de-assign flights. It tracks new and unassigned flights automatically, reducing the risk of reaching departure time without assigned aircraft.

Web-enabled for cost-effective rapid and wide deployment. You gain access to the ARIS/AR aircraft-routing system through Ascent's From Touchdown to Takeoff® cloud-hosted service, a secure, highly-available, and readily-expandable platform. When you subscribe to the service, you can gain access Ascent's entire suite of products, including the ARIS/AR aircraft-routing system, using a standard browser directly from your network without any need to install, maintain, and support on-premise hardware and software. We can readily adjust available computing power to meet your organization's changing needs, and you can easily expand your solution to accommodate additional users and to manage additional resources, facilities, and locations.

Services to help you maximize the benefits of Ascent solutions

Advisory and consulting services. Ascent provides advice about resource allocation, optimization, planning, scheduling, management, and deployment methodologies; develops cost-benefit analyses; analyzes business processes; and gathers and develops technical requirements and functional specifications.

Project-management services. Ascent's project-management team works closely with you, following time-proven delivery methodologies, and uses face-to-face meetings, teleconferences, web conferences, and email exchanges to keep you informed every step of the way. Ascent believes careful collaborative project management is the key to successful on-time and on-budget deliveries of Ascent's solutions.

Knowledge-engineering services. Knowledge engineering is the process of identifying your business knowledge—the business rules, policies, procedures, preferences, reference information, and requirements that guide the way your organization operates—and then codifying your business knowledge into rules stored in the knowledge base at the heart of the Ascent solutions. Your business knowledge, stored in the knowledge base, determines how the solutions behave. Ascent's knowledge engineers work with you to ensure the solution behaves just as you want it to.

Implementation, integration, and installation services. Ascent's 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. Ascent's implementation team is also responsible for setting up environments, customized to meet your organization's needs, and monitoring its performance, in secure AWS hosting centers.

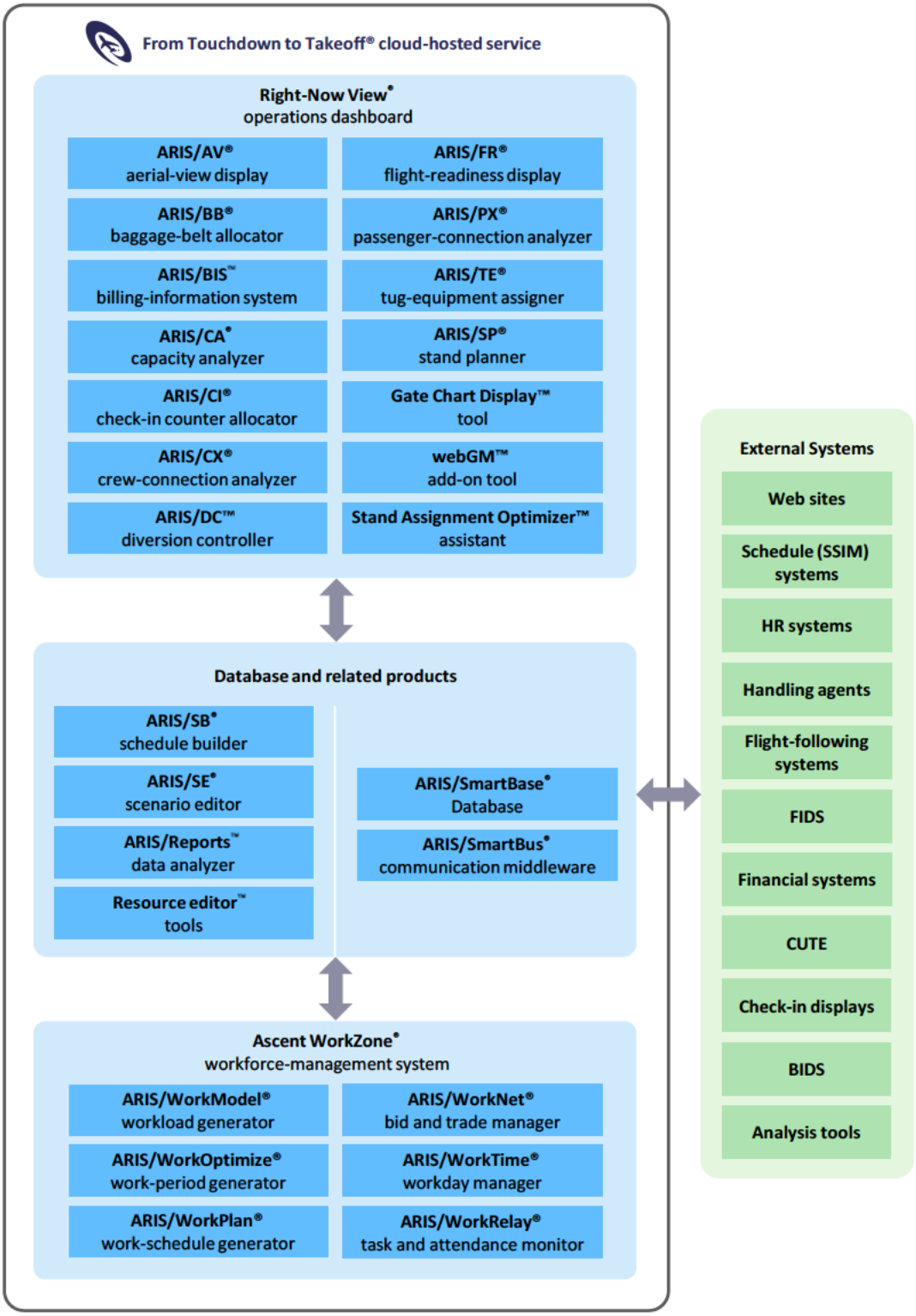
Training services. Ascent offers a wide range of user, administrator, trainer, and refresher training classes at your location, at Ascent's Boston, MA, headquarters, and remotely over the web. Ascent also offers operational training services remotely when you begin to use an Ascent solution in production.

Maintenance and support services. Ascent offers maintenance and support services for Ascent's solutions around the clock. Ascent provides comprehensive remote user support services via telephone, email, web conference, and Internet; software maintenance, such as product updates, patches, and releases; and cloud-hosted environment monitoring, tuning, and switchover. Ascent's ticket system enables you to request service, report problems, and track issues day and night.

Who we are

Since our founding nearly 40 years ago by members of the Massachusetts Institute of Technology Artificial Intelligence Laboratory, Ascent 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. To learn more about how Ascent can help you optimize your resources to greatest advantage, send an email to sales@ascent.com or call our Sales and Marketing team at +1.617.395.4800.

Ascent Resource Information System® solutions



Touchdown to Takeoff® cloud-hosted service

Solutions for airline and airport resource optimization, planning, scheduling, and management

A standard web browser, such as the Google Chrome™ browser or the Microsoft Edge™ browser, enables access to Ascent Technology's cloud-hosted solutions. The From Touchdown to Takeoff service requires a minimum resolution of full HD (FHD).

Airport Operational Database (AODB)	Central database
ARIS/SmartBase® database Includes one or more of the following tools:	Integrates, coordinates, disseminates, and maintains planning, operations, and historical information for resource and workforce management
• Location Editor™ tool	Manages the location hierarchy and records used to plan, schedule, and manage workload, workers, and tasks
• Planning Control™ tool	Manages work-schedule planning
• Profile Editor™ tool	Manages passenger-arrival profiles for departure flights
• Reference Editor™ tool	Manages reference-information records that determine how the Ascent Technology products, applications, and tools behave
• Rule Editor™ tool	Manages scenarios, rule groups, and rules for workforce management
• Template Worker Editor™ tool	Manages template worker records used to plan workload
• Update Control™ tool	Manages settings that block external systems from updating information in specified database fields
• User Editor™ tool	Manages user access to the products, applications, and tools
• User Group Editor™ tool	Manages user-group access to pre-set configurations and automated distribution of email and messages
• Worker Editor™ tool	Manages worker-related information and records
ARIS/Reports™ data analyzer	Produces reports based on plan, actual, and historic information
ARIS/SB® schedule builder (with ARIS/LegGen® flight-leg generator and ARIS/SL® schedule loader)	Creates, manages, and distributes flight-schedule and day-of-operation flight information; creates flight legs; and loads and stores SSIM flight data
ARIS/SE® scenario editor	Specifies and manages airport-resource rules and scenarios
ARIS/SmartBus® communication middleware	Enables information exchange between the ARIS/SmartBase database and external systems

Ascent WorkZone® workforce manager	Workforce optimization and management for mission-critical environments
ARIS/WorkModel® workload generator	Forecasts workload based on expected demand
ARIS/WorkNet® bid and trade manager	Worker self-service tool for managing work schedules
ARIS/WorkOptimize® work-period generator	Determines how many workers are needed and when they are needed
ARIS/WorkPlan® work-schedule generator	Creates work lines for full-time and part-time workers
ARIS/WorkRelay® task and attendance monitor	Provides task-assignment information to workers in real time
ARIS/WorkTime® workday manager	Assigns work, breaks, and locations to workers dynamically in real time

Right-Now View® operations dashboard	Dashboard to plan, schedule, and manage airline and airport resources and operations
ARIS/AV® aerial-view display	Displays real-time aircraft parking-assignment information on an airport aerial view
ARIS/BB® baggage-belt allocator	Plans and allocates baggage make-up and reclaim belts
ARIS/BIS™ billing-information system	Tracks usage-based ground fees
ARIS/CA® capacity analyzer	Plans, analyzes, and manages airport capacity and resources
ARIS/CI® check-in counter allocator (with ARIS/IQ® queue manager)	Plans, assigns, and manages ticket counters and kiosks
ARIS/CX® crew-connection analyzer	Shows how flight delays and cancellations affect connecting flight crews
ARIS/DC™ diversion controller	Tracks system-wide flight diversions, providing real-time status of diverted flights to diversion stations
ARIS/FR® flight-readiness display	Provides status of tasks and activities related to arrivals and departures
ARIS/PX® passenger-connection analyzer	Shows how flight delays and cancellations affect connecting passengers
ARIS/TE® tug-equipment assigner	Manages aircraft tows, assigns tugs to tows, and displays tow status
ARIS/SP® stand planner	Plans parking-position assignments for schedule periods
Gate Chart Display™ tool	Manages day-of-operation parking assignments with manual entry using basic scenarios and rules
Gate Chart Display with webGM™ add-on tool	Plans and manages day-of-operation parking assignments with automated assistance using business rules and intelligent scenarios
Gate Chart Display with webGM tool and Stand Assignment Optimizer™ assistant	Plans and manages day-of-operation parking assignments with automated assistance using business rules and intelligent scenarios, and resolves future parking-assignment problems caused by delays, swaps, and cancellations in compliance with business rules