

CASE STUDY: ARINC Engineering Services



Summary

ARINC Engineering Services, LLC, worked with WITNESS simulation software to support the firm's strategic decision-making process as it planned to expand their Aircraft Modification and Operations Center located at Will Rogers World Airport in Oklahoma City, OK.

Background

ARINC Engineering Services, LLC, (AES) handles a wide variety of integration, modification, maintenance and upgrades on military and commercial aircraft at its Aircraft Modification and Operations Center (AMOC) located in Oklahoma City, OK. The company works with branches of the U.S. Military, U.S. Government, foreign governments, aircraft manufacturers and handles sub contract work for prime contractors. In order to maintain AES's competitive edge in an active marketplace, where demand for avionics upgrades and scheduled depot maintenance is growing, AES proposed to expand the AMOC's facilities to add a new hangar and a ramp expansion.

The new ramp and anticipated 62,000 square foot addition to the AMOC would more than double the facility's capacity for aircraft servicing which includes a 50,000 square foot commercial hangar—already the largest in the area— and 30,000 feet of shops and administrative offices.

AES selected Lanner Group experts and its flagship WITNESS software system to model the current performance of the AMOC and to validate the business

case for the expansion plans with the firm's board of directors.

The WITNESS Solution

Lanner Group consultants were responsible for developing a flexible simulation model to support performance analysis of the AMOC's existing layout. The model also evaluated changes to the scheduled work pipeline to allow for an informed decision on work allocation and a feasibility study to increase the site area. This provided a benchmark for comparison against the proposed expansion plans. In addition to this, any new hangar design could be tested to include predicted future volumes of traffic.

The WITNESS model devised simulated the variables that could affect the operation of the facility. These included the cause and effect of delays and congestion, and the impact of proposed changes. Furthermore, WITNESS allowed detailed testing of the system under conditions that reflected the predicted increase in demand. By understanding future performance and risk before implementing prospective modifications, this allowed planners to effectively 'de-risk' the project entirely.

Key metrics such as the percentage of space used, cost per square foot, aircraft footprint, type of work and delays from the schedule were taken into account. The WITNESS model used the metrics to compare different scenarios to find the best solution and mitigate risk resulting from program change. All data feeding the model was configured through a Microsoft Excel interface. This allowed users to easily update any of the input data, and make scenario changes through the interface.

Main data items included work schedules, hangar and ramp time required, availability, expected revenue, aircraft type, dimensions, effective area, and running costs. Complex data like type of work also influenced the model, encompassing both light and heavy modifications, and interior or exterior work.

Lanner Group worked with AES to validate each model, using industry standards of their physical attributes, supplemented with observed timings and work flow quantities within the existing hangar facilities.

“Our decision to work with Lanner Group was influenced by the level of experience available to support the project, value for money, and importantly, ease of use,” says Marvin Bonta, Director of Proposals, ARINC Engineering Services, LLC.

“WITNESS software’s interface with Microsoft Excel allows operators to run multiple scenarios simply. This enabled our users to work with dynamic models identifying the optimum combination of hangar and ramp space for current and projected aircraft revenue streams quickly and effectively.”

Supporting the business case for a proposed hangar addition

ARINC recently acquired contracts for avionics upgrades on two Air Force KC-135 Stratotanker aircraft, two US Government OC-135 Open Skies aircraft. In addition, ARINC has received multiple contracts for Programmed Depot Maintenance on a C-130 Hercules transport, and contracts to modify four more large military transport category aircraft.

The company’s existing hangar could house three such planes under one roof, and the proposed new hangar would be capable of handling three to four more, dependent on an aircraft’s footprint, which depends on the work needed on an asset as well as its size. The impact of the expansion plans necessitated some modifications to the existing operation - which were modeled in WITNESS to test capability.

The WITNESS model replicated the arrival of different Aircraft into ARINC’s facilities, for a range modification tasks. The hangar and ramp space were configured to allow different combinations of space to be simulated.

Aircraft were allocated space either in a hangar or on a ramp, depending on the available space. The scenario simulated the aircraft being worked on, then leaving upon completion of the job. When there was not sufficient space to operate, aircraft queued until either a space became available, or the contract would become unfulfilled, and the aircraft would be rejected. This allowed AES to proactively investigate what changes would be necessary to avoid a rejection and maximize space utilization, revenue and margin. Modeling the layout in this way allowed multiple

scenarios to be run to identify the optimum combination of hangar and ramp space for current and projected aircraft revenue streams.

As a result of process modeling the current AES facility, WITNESS showed that the AMOC’s existing layout led to increased delays and revenue loss. The impact of this, and the results of other key measures of performance, provided compelling evidence that the hangar facilities would not be capable of meeting the predicted rise in demand.



Results

Utilizing data drawn from WITNESS process simulation models, the business case for the hangar addition was successfully presented to the firm’s board of directors in 2010. The software’s graphical demonstration proved influential in conveying the commercial advantages of expanding the Oklahoma City AMOC, so gaining the expansion project’s validation by senior AES executives.

In December 2010, AES announced plans to build its new 62,000 square foot hangar to increase capacity for aircraft servicing at the AMOC. Groundbreaking took place in January 2011, with the new hangar and ramp space scheduled to be operational by the summer 2011.

As a result of the expansion and increased work capacity at its FAA-certified Part 145 Repair Station AMOC, senior ARINC executives say that between 150 and 200 new jobs will be created in the local economy over the next few years.

Conclusion

AES's experience demonstrates how flexible WITNESS simulation can be, and in particular the faith with which major companies entrust simulation modeling as a means of planning major strategic initiatives that can make or break a company's competitiveness. Marvin Bonta comments,

"ARINC Engineering Services found using simulation-modeling invaluable for informing its process improvement and strategic decision making. Using process simulation allowed planners to experience the proposed facility changes and optimize proposals before validating the business case for expansion with senior executives."

"The project was delivered on time and within budget, and the Lanner Group consultants assigned to the project were deeply knowledgeable, fast to respond, and courteous to deal with."

"We now routinely use this model to support our bid /no-bid decision when a new opportunity is first explored."

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