



## **Minutes of the 14 September 2006 Meeting of the North American SIMMOD Users Group**

### **1. Welcome**

The meeting convened at 9:30am at the offices of ATAC Corporation in Sunnyvale, California. Dave Holl welcomed everyone to the meeting. Each participant introduced her- or himself

### **2. Apologies**

Apologies for absence were received from Belinda Hargrove (TransSolutions).

### **3. Agenda**

The agenda was approved without changes.

### **4. Minutes of the Previous Meeting**

The minutes of the March 2006 NASUG meeting were approved.

### **5. FAA SIMMOD Status**

John Zinna presented the current status of FAA Tech Center's work on their SIMMOD engine. The current version is 2.7 and will be released next week. There have been four requests for the engine since the last NASUG meeting in March 2006.

Changes to SIMMOD engine include:

- Fixed a bug related to switching taxipaths when airport plan changes
- Enhanced output for staging areas
- Fixed aircraft passing bug on ground links
- Fixed a high-speed exit selection bug
- Enhanced high-speed exit logic to exit on side of runway where gate is located
- New input to mark runway as inactive to support third-party animation software
- Enhanced MULTARR function to be able to define turnaround flights
- Added option to write to file the flights created internally by MULTARR and MULTDEP

Future work:

- DSDPath logic failing under certain circumstances
- MULTDEP gate selection when using the wildcard ("??") option needs to be analyzed
- Allow aircraft to taxi on specific active runways (to be a SET command)

Following the presentation there was discussion regarding a new FAA website that is going to have airport diagrams available in various formats including AutoCAD.

Greg Bradford would like to see design standards developed for airport layout drawings so that an import tool could be developed that would automatically build links, nodes, runways, etc. in SIMMOD.

Discussion followed on FAA vs. ATAC versions of the engine. A lot of concern was expressed over the continuing development path of two engines and the need to revisit the FAA – ATAC relationship.

## 6. ATAC SIMMOD Status

Eric Boyajian presented the current status of ATAC's SIMMOD-related activities. ATAC released version 7.2 of ATAC's Simmod *PLUS!* / *PRO!* products in August 2006.

Changes to Simmod *PLUS!* include:

- SIMMODHOME environment variable has been eliminated
- New country boundaries have been added
- A bug regarding PROC\_AIRSPACE\_AC\_GROUP has been fixed
- AC\_MODEL\_FAA and INM\_ID fields have been eliminated from the AC\_MODEL table
- Added several new tables to enhance ground modeling
- Moved several departure queue related parameters from GLOBAL into the DEPARTURE\_Q\_GROUPS table
- .dbf can no be edited directly in Excel or other programs and the Network Builder will try to correct any errors caused by these programs
- Recompiled SIMMOD in the latest SIMSCRIPT compiler to eliminate internal array limitation of 64k

Changes to the ATAC engine since the last NASUG meeting include the following:

- Correct gate blocking logic
- Eliminated the ten holding stack limit. The limit is now limited to the number of airspace nodes
- Aircraft at a gate now occupy the link used to enter the node
- Aircraft at a tow node that is also a gate will occupy one unit of space at the gate
- Estimated time of arrival at a node for a towed aircraft has been fixed
- Nodes with a control strategy other than FIFO would use FIFO incorrectly under certain conditions
- The logic related to PATTERN and TNGSET was re-implemented correctly
- Two new versions of the metering logic have been implemented and are controlled by a new global variable
- Fixed SIMU14 output concerning runway crossing delay was not correct

Changes to the FAA engine have continued to be incorporated into the ATAC version.

## **7. Joint Strike Fighter Introduction – Eglin AFB**

Vince Ticoulet presented a discussion on the Joint Strike Fighter (JSF) Introduction at Eglin AFB and the simulation analysis performed using the Naval Aviation Simulation Model (NASMOD) to determine any operational issues that may occur.

Vince described the differences between SIMMOD and NASMOD, including how SIMMOD is typically run for a single day whereas NASMOD is run for a 1 – 2 year period to capture the significant variations in flight operations that occur during the military's training cycle.

He presented several slides describing the training airspace and range complex, the airfield, local training patterns and the squadrons that operate at Eglin AFB.

The first step in the analysis process is to develop a Baseline model and calibrate the results against historical records. The goal is to predict the historical results within 5%, but often can match much closer. Charts comparing the following statistics were presented:

- Airfield operations for Eglin AFB and outlying training fields for two different runway flows
- Simulated and actual squadron flight hours for all tenant squadrons
- Simulated and actual squadron sortie counts for all tenant squadrons
- Average flight durations for the tenant squadrons
- The distribution of flight operations into the various training airspace and range areas for each squadron

Once the model was calibrated against current operations, a future scenario representing the operations in the 2018 time period, when the JSF training is fully operational, was developed. The purpose of the scenario was to analyze:

- 2018 JSF Pilot Training (USAF, USMC, USN)
- High-Speed Runway Exits
- Effects of Closing Outlying Airfields
- Analysis of Sub-Area Size in Primary Warning Area
- Based on More Efficient Segmented Design
- ILS Approach Conflict Prediction
- Runway Closure Effects
- Noise Abatement Procedure Effects

## **8. Bechtel's Application of Aviation Simulation Tools**

Farzam Mostoufi presented Bechtel's application of aviation simulation tools. He has been involved with simulation and planning for over 17 years and discussed the process he goes through when an airport project begins.

The example he used for the briefing was Doha Airport, which is scheduled to open in 2009. Farzam presented numerous flow charts of the planning and forecasting process and the tools that he uses to do these.

He has developed a terminal planning model that focuses on Level of Service. It computes the number of check-in counters, service screening, etc. He developed this in-house because he determined that no other programs can do this. The program provides an animation of

passengers checking-in to a waiting area. He also presented charts showing the analysis of numbers of x-ray screening stations required for the desired LOS.

He showed a SIMMOD animation of San Jose, Costa Rica, and the problems they have with their single runway operations. The primary investigations were the impact of adding a taxiway loop to avoid having to make a u-turn on the runway.

## **9. Modeling Environment Benefits of Continuous Descent Arrivals**

Eric Dinges presented an overview of modeling the environmental impacts of continuous descent arrivals (CDA). He started the presentation describing what CDA are and where they are currently being performed:

- SDF Louisville 3 UPS
- LAX new CIVET STAR
- SAC
- Nottingham
- ATL

Some of the complexities with modeling CDAs are that the approaches vary not only by aircraft type, but by approach route. Radar data provides an excellent source for determining approach profiles, however, there is no information available to directly determine thrust levels, which have a significant impact on noise and emission levels.

He has been able to estimate the weight using landing roll distance as observed in the radar data.

Typical approach routes to an airport have a significant amount of dispersion. CDA procedures would enforce very specific routes and separations at the top of descent. Because of this, CDA implementation will probably be tied to traffic levels. There is not always a benefit associated with CDAs however. Using LAX as an example, there is an increase in noise in some places because of the reduction in dispersion of flight tracks over the ground. Flights are being concentrated over specific paths which results in an increase in noise. However, there are noticeable improvements in fuel burn and emissions with CDA.

Some of the limitations with analyzing the implementation of CDA procedures include:

- Lack of good CDA definitions
- Unknown implementation issues
- Limited aircraft performance data
- Limited use of wind data

Discussions after the briefing included Jay Wang noting that some CDA work has been done in Australia. Qinlin Li has done some similar kinds of analysis of taking simulation output and feeding a post-processor NEARS that can generate dispersion. The use of emissions modeling using EDMS was also discussed.

## **10. Application of Simulation Tools to Airside Planning**

Qinlin Li presented a discussion on application of simulation to airside planning. She is currently working on projects in China, and particularly, Shanghai Pudong (PVG) airport.

Shanghai Hongqiao (SHA) airport will get the first closed-spaced parallel runway in China.

They have experienced large increases in passenger movements in recent years.

Landrum & Brown revised master plan with a goal to serve 80 million passengers per year.

Analysis performed for the Phase II expansion at the airport used SIMMOD to show that a dual taxiway for only part of the cul-de-sac around the terminal is sufficient. They also evaluated the gates and taxiways in the South Terminal Area.

## **11. Other Business**

In an effort to maintain the visibility of SIMMOD to the current and potential user community John Zinna proposed writing an article titled something like “Why SIMMOD?”.

Dave Holl and Eric Boyajian agreed to continue their roles as Chairman and Secretary, respectively, for one more NASUG meeting.

## **12. Date and Location of the Next Meeting**

Possible locations for the next meeting were discussed including the benefits of having the meeting in Washington D.C. area. No dates were proposed, although a Thursday or Friday during March is anticipated.

**New action: Prepare a list of airports where SIMMOD is used.**

Eric Boyajian  
Secretary, North American SIMMOD Users Group





**List of Attendance at the 14 September 2006 Meeting  
of the North American SIMMOD Users Group**

|                          |                         |               |
|--------------------------|-------------------------|---------------|
| Mr. Dave Holl            | ATAC Corporation        | Chairman      |
| Mr. Eric Boyajian        | ATAC Corporation        | Secretary     |
| Mr. Gregory Bradford     | AirportTools            | Vice Chairman |
| Ms. Thomas Burkman       | Ricondo & Associates    |               |
| Mr. Eric Dinges          | ATAC Corporation        |               |
| Mr. Don Guffey           | FAA – ATO-P             |               |
| Ms. Jennifer Morris      | FAA – ATO-P Tech Center |               |
| Ms. Carmela Rubin        | Ricondo & Associates    |               |
| Ms. Qianlin Li           | Landrum & Brown         |               |
| Mr. Farzam Mostoufi      | Bechtel                 |               |
| Mr. Vince Ticoulet       | ATAC Corporation        |               |
| Mr. Jianzhong (Jay) Wang | Landrum & Brown         |               |
| Mr. John Zinna           | FAA Tech Center         |               |