



Minutes of the 27 September 2007 Meeting of the North American SIMMOD Users Group

1. Welcome

The meeting convened at 9:00am at the TransSolutions Arlington Office in Arlington, Virginia. Toni Trani welcomed everyone to the meeting, and each participant introduced her- or himself.

2. Agenda

The agenda was reviewed and approved.

3. Minutes of the Previous Meeting

The minutes of the March 2007 NASUG meeting were approved.

4. Review of Previous Actions

Action: Members to identify default values that they consider to be inappropriate.

Belinda Hargrove offered to make a first attempt at creating a set of default values to be used when beginning construction of a new SIMMOD model from scratch.

5. Date and Location of the Next Meeting

Geoff Baskir offered to look into the possibility of Metropolitan Washington Airports Authority hosting the next meeting at Washington Dulles International Airport. March 20 or 27 was tentatively selected as the date.

6. The Impact of Towing Aircraft from Runway Exit to Gates at LAX

David Holl provided a talk on work performed to evaluate the impact of towing arrival aircraft from runway 25L to their gates at Los Angeles International Airport (LAX). This work stemmed from alternatives investigated to reduce the likelihood of runway incursions of 25R, by constructing a perimeter taxiway from the south side of the airport around the departure ends of runways 25L/R.

Since this new taxi routing is much longer, it was proposed that the arrivals exit runway 25L to the left and enter a newly constructed area at which tugs would be attached. The aircraft would then be towed to their gates.

A variety of statistics were generated including tow times and delays, the number of tugs required, and the resulting change in the airport noise contour as a result of this operation. Findings include:

- The towing operation increased the southern extent of the noise contour into the neighboring city of El Segundo.

- Travel times increased significantly due to the lower speed of the tugs.
- Taxi delay times increased for non-towed aircraft, as well.

Toni observed that aircraft manufacturers are proposing nosewheel motors that would allow aircraft to “tow” under their own power. This may be a good solution if the speeds are high enough.

The ensuing discussion diverged with comments that SIMMOD sometimes does not capture all the taxi times or sometimes the delay seems unrealistically low.

6. FAA SIMMOD Status

John Zinna presented the current status of FAA Tech Center’s work on their SIMMOD engine. The current version is 2.9 — available for both the Windows and Linux platforms. There have been seven requests for the engine since the last NASUG meeting in March 2007.

The changes are as follows:

- Modifications to departure staging (DSTAGE) logic. Fixes were made to the following problems:
 - Aircraft were staging even though departure queue was not full. It is no longer necessary to use the TAXICKPT record for staging to work.
 - History codes SW and SF were not written to the SIMU26 file, which was causing an animation error.
- Modifications to departure queue (DEPARTQ) logic. Both the staging and de-icing inputs required a very strict format that was poorly documented. The backwards compatible fix allows a varying number of semicolons.
- Enhancements to the departure queue output table (SIMU10) to accommodate large values.
- Corrected airspace node separation logic. When using the 4 digit code for the option strategy flag, the node departure code was being incorrectly selected for the node arrival code.
- Modifications DSDPath logic. An aircraft that entered a DSDPath was later holding on DSDPath due to groundlink/groundlink blocking.
- Changes to gate blocking logic. Rules are being violated when one or more of a gate’s blocking links are part of a DSDPath. This was occurring when an aircraft is pushing back and another aircraft taxiing on the nearby DSDPath. The solution is to hold the aircraft at the gate until the other aircraft taxis past the gate’s blocking links. There are many situations on how the 2 aircraft interacted had to be handled individually. This saves the user time with no need to input the many gate blocking links in the DSDPath record(s).
- Added a new input for Arrival Runway Occupancy Time. This uses probability distribution entered in the RUNWAY_EXITS_LINKS record and overcomes calibration issues.
- Work in progress: Departure Runway Occupancy Time — that will work like that for the Arrival Runway Occupancy Time.

7. ATAC SIMMOD Status

Eric Boyajian presented the current status of ATAC's SIMMOD-related activities. Version 7.3 of Simmod *PLUS!//PRO!* was recently released:

- Minor changes to the database.
- Improvements to the look-and-feel.
- Improvement to the underlying mechanism of Animator data handling.

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

- Gate logic changes:
 - A new entry has been added to the SETGATE event, which allows the analyst to change the gate capacity.
 - Corrected taxi planning logic in cases where the optional ADistNo or DDistNo of an EMPLANE or ARRIVAL event is missing in the SIMU09 file.
 - In cases where departures wait at gates due to departure queue congestion, departures now pushback in the order in which they began waiting.
- Runway logic changes:
 - Two new fields have been added to the runway inputs (TaxiFlagP and TaxiFlagO) to indicate if taxiing is allowed on the runway when it is active. These replace the global data entries of taxi_on_runway and taxi_on_all_runways.
 - Taxiing aircraft whose taxi plan crosses both end nodes of a runway crossing are no longer automatically subjected to delays imposed on that runway crossing even though the taxi plan does not actually use that crossing.
 - A new entry has been added to the SETRWY event that allows the analyst to change the taxi flag.
 - Corrected internal variables associated with the runway crossing logic that were not re-initialized with each iteration. This error could cause departures in subsequent iterations to hold indefinitely.
- Taxi logic changes:
 - Taxipaths were not properly selected in cases where a plan change is in effect and GATERWY inputs are also defined.

8. Techniques for Modeling Runway Backtaxi and Departures from a Turnaround Loop

Eric Boyajian provided an ad-hoc presentation on techniques for modeling the backtaxi movement of aircraft to a turnaround loop for airports that do not have a taxiway parallel to the runway. The trick is to create a ground link that lies alongside the runway. This extra ground link must share precisely one node with the runway. Then the user can create a runway crossing that includes this new link.

The runway crossing logic will automatically ensure that the taxiing aircraft must be able to transit the entire length of the new link, cross the runway node, and reach the turnaround loop before an arrival crosses the threshold or a departure begins its takeoff roll.

This technique can be further refined through the use of groundlink/groundlink blocking and/or DSDPaths to limit the number of aircraft that are permitted to perform this backtaxi in cases where there is a limited area for aircraft to wait in the turnaround loop.

9. Evaluating Terminal Ramp Layouts

Belinda Hargrove gave a presentation on work to evaluate the proposed/new concourse A taxiway at Fort Lauderdale International Airport. West flow operations, which occur only 30% of the time, causes congestion for the new concourse.

Belinda showed a number of slides depicting the flow, the number of operations, and delay. She used the average-day-peak-month, which was March 2005. She also assumed that the schedule “grows” by 100 flights (50 departures and 50 arrivals).

This analysis presented a number of modeling questions. The problem is how to model positive ramp control in SIMMOD? Taxi out times were too low compared to reality. What was going on and what could be done to get it to match better?

This led to a wider ranging discussion on how to get SIMMOD to mimic very detailed ground movements that are observed. What are the controllers doing? How to measure controller workload? Kalyan Balasubramaniam noted that an increase in runway crossings was used as a metric in a study of Louisville International Airport.

Considerable discussion focused on departure operations, and in particular, to understand the air traffic control tower interpretation of “taxi into position and hold” (TIPH) versus an intersection departure.

Action: Jennifer Morris and Scott Simcox offered to look into this.

10. Simulation to Evaluate Airport Terminal Benefits using Data Communications

Toni Trani presented an overview of using simulation to evaluate the benefits of data communications.

Objectives:

- To identify benefits
- Derive capacity and delay metrics

Potential benefits:

- Increased airport capacity
- More efficient ATC operations
- For users (not related to capacity)
 - Lower fuel burn
 - Reduced departure queues
 - Reduced block times
 - Other

Outputs of the Study:

- Airport capacity benefits and Pareto diagram using two models — system wide modeler and LMINet
- TRACON arrival and departure rates

- ATC–Pilot benefits
- User benefits (to airlines)

The conceptual framework involved building and calibrating the model, evaluating the scenarios of future demand and procedures, and then using the results of this as a feedback into the modeling.

11. Open Discussion

Geoff asked about efforts to link airspace and passenger/terminal models. This evolved into a general discussion regarding the difficulties of doing this and the issues involved.

Eric Boyajian
Secretary, North American SIMMOD Users Group



**List of Attendance at the 27 September 2007 Meeting
of the North American SIMMOD Users Group**

This list is incomplete. The sign-in sheet was not available at the time that this was compiled. Attendees not known to Secretary but who are believed to have attended are noted at the end.

Mr. Kalyan Balasubramaniam	HNTB Corporation	
Mr. Geoff Baskir	Parsons Brinckerhoff Quade & Douglas, Inc.	
Mr. Eric Boyajian	ATAC Corporation	Secretary
Mr. Jim Byers	FAA Airports	
Ms. Belinda Hargrove	TransSolutions	
Mr. David Holl	ATAC Corporation	
Mr. Ashraf Jan	FAA Airports	
Ms. Jennifer Morris	FAA – ATO-P Tech Center	
Ms. Lori Pagnanelli	FAA – Planning and Environment	
Mr. Fariborz Shahzamani	HNTB Corporation	
Mr. Scott Simcox	ATAC Corporation	
Ms. Lisa Spencer	TransSolutions	
Prof. Toni Trani	Virginia Tech	Chairman
Mr. John Zinna	FAA Tech Center	
<i>Mr. Frank Cirillo</i>	<i>Metropolitan Washington Airports Authority</i>	
Mr. Paul ???	FAA Airports	
Ms. Emily Gutierrez	FAA Tech Center	
Mr. Daniel Petrich (spelling?)		