



## **Minutes of the 16 March 2006 Meeting of the North American SIMMOD Users Group**

### **1. Welcome**

The meeting convened at 9:00am at the offices of Hartsfield-Jackson Atlanta International Airport, College Park, Georgia. Dave Holl welcomed everyone to the meeting. Each participant introduced her- or himself.

### **2. Apologies**

Apologies for absence were received from Tom Burkman (Ricondo & Associates), Kristina Woodward (Ricondo & Associates), and Kalyan Balasubramaniam (HNTB).

### **3. Agenda**

The agenda was approved without changes.

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

The minutes of the September 2005 NASUG meeting were approved.

### **5. Review of the Actions from the Previous Meeting**

**Action: All: To provide a list of studies/airports modeled with SIMMOD to Bob Holladay for inclusion to his articles. Sadly, Bob Holladay passed away on 7 October 2005 and is greatly missed. Dave Holl and Eric Boyajian believe that this action to create articles about SIMMOD in the aviation industry is valuable and should be kept open for action by others in the group.**

John Zinna will take this action and plans in the near future to prepare an article describing Simmod activities.

**New action: John Zinna to prepare an article regarding SIMMOD activities for publication in an aviation-related journal.**

### **6. FAA SIMMOD Status**

John Zinna presented the current status of FAA Tech Center's work on their SIMMOD engine. The current version is 2.6 — available for both the Windows and Linux platforms. There have been five requests for the engine since the last NASUG meeting in September 2005.

Highlights of the changes are as follows:

- Two related to high-speed exits. Ground link restrictions and the runway prohibited exit links inputs were not considered when selecting a high-speed exit. Fixed.

- New ground link restriction type to prevent the taxi planning logic from considering a given ground link for taxi use during specified periods of the day.
- Ground groups can now be used in the runway exits and runway prohibited exit links inputs.
- Corrections have been made to prevent excessive or indefinite holding by the stagger logic.
- Friendlier output messages are now available in cases where an optimal taxi plan cannot be found.
- Additional input data error checking has been implemented.
- The engine no longer crashes when continuing arrival inputs are included with an Emplane event.
- The Arrival and Emplane events may now have multiple lines of input in the SIMU09 file to allow an aircraft to fly multiple city-pair segments.

Future work will include further testing of the new multi-segment Arrival and Emplane enhancement, as well as completing the article on SIMMOD activities as described in the actions of section 5.

## 7. ATAC SIMMOD Status

Eric Boyajian presented the current status of ATAC's SIMMOD-related activities. ATAC released version 7.1 of ATAC's Simmod *PLUS!* / *PRO!* products in July 2005 and patch to version 7.1.1 in October 2005. A further update is expected in May or June 2006.

Changes to the Simmod *PLUS!* include:

- The global variable use\_depq\_hold\_codes value of 3 was previously ignored. The Network Builder now properly writes this to the SIMU07 engine input file. Correspondingly, the QA hold codes are now displayed properly in the Animator and output reports.
- An optional header row has been added to the SIMU26 output reports.
- The efficiencies of a number of algorithms have been improved.

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

- Corresponding engine changes to solve the use\_depq\_hold\_codes problem above.
- A fix was made to properly write the SW and SF codes to SIMU26.
- Corrections have been made to prevent excessive or indefinite holding by the stagger logic.
- The computation of accelerations has been fixed in cases where runway takeoff occupancies have been defined.

Additional work continues on enhancing the metering logic. Currently, unexpected delays occur between the meter and post nodes, and the metering logic allows passing and vector delays on links that prohibit these actions.

Changes made to the FAA version of the engine are subsequently incorporated in the ATAC version.

## **8. Tour of New Runway 10/28**

The meeting attendees enjoyed a tour of the remarkable new runway 10/28. The construction manager, John Cordner, provided a very thorough overview of this project.

The new runway and corresponding taxiway span the Interstate 285 freeway. Construction was undertaken in a way to avoid disruption to the I-285 traffic. The runway construction required adding fill to build up the level of the ground on either side of the freeway and spanning the gap with an immense bridge. The result is that I-285 essentially passes underneath the new runway in a tunnel-like manner.

The need to add a tremendous amount of soil at various points along the new runway was solved by the construction of a conveyor that transported the material from a quarry over five miles away. Consequently, only a small fraction of the material was transported by truck. This reduced not only the cost but also a significant amount of truck emissions.

Additionally, a perimeter taxiway was constructed at western end of the runway. A number of existing structures were removed or relocated.

## **9. Perimeter Taxiway at Dallas/Fort Worth International Airport**

Saty Satyamurti provided a discussion on an investigation of the mitigation of runway incursion at DFW.

Runway incursions are caused by anything on the runway that impedes takeoff and landings: aircraft, vehicles, persons, or objects.

DFW's current layout of 7 runways requires aircraft to perform a number of runway crossings and perimeter taxiways have been proposed at the north and south ends of runways 17R/35L, 17C/35C, 18L/36R, and 18R/36L.

NASA Ames Research Center performed a simulation of a 747 using the taxiway. Controllers felt that communications were reduced, leading to a greater efficiency of operations. There are many human factors considerations involving the airport, airlines, pilots, and air traffic control.

Using past data, runway incursions have been categorized as follows:

- A – very serious (5%)
- B – significant (30%)
- C – some risk (34%)
- D – no risk (31%)

Saty showed a video simulation of an incursion event, as well as a number of slides showing aircraft waiting to cross the runway. Given the viewing perspective, lighting conditions, etc., it can sometimes be difficult to tell the distance of the crossing aircraft and whether or not it is on the runway. While systems such as flashing lights can be installed to reduce the likelihood of an incursion at a runway crossing, these systems often increase the controller workload.

With a perimeter taxiway, landing pilots may still perceive that the taxiing aircraft is crossing the runway. The FAA proposes the use of a “blind” or barrier such that landing pilots cannot see the taxiing aircraft and will not be confused into thinking that the runway is fouled.

A perimeter taxiway offers the following benefits:

- Taxi without significant delay
- Continuous takeoffs
- Efficiency of departure queue
- Taxiway movement in one direction, no U-turn
- Increased safety
- Reduced communications

Saty concluded by showing an animation of the proposed perimeter taxiway in operation. He intends to finish his research within the next six months.

## 10. Capacity Analysis

Belinda Hargrove presented a discussion of airport capacity analysis using work recently completed for London Luton Airport.

Low cost carriers and package-holiday charters carrying about 9 million passengers per year generate much of the traffic at Luton. Luton consists of a single runway with no parallel taxiway. Operations in the west flow are not too bad but east flow departures can back up into the ramp area.

The first task was to determine the primary constraint: terminal or runway/taxiway capacity. This would then guide which improvements the airport would undertake first. Runway capacity was examined first since a SIMMOD model could be constructed without gate detail. Then all the gates were modeled using 2010 demand. The runway/taxiway operations proved to be the limiting feature.

With five iterations, SIMMOD showed maximum hourly runway operations at 33.4~33.6 averages. By looking at 10-minute buckets, still see a peak of ~34 operations per hour.

Improvement scenarios include:

- Loop taxiways at runway ends
- Full parallel taxiway
- New south runway and new terminal and abandon the use of the north runway

Hourly capacity was determined under different methods of calculation:

- Sustained
- Maximum (peak)
- Arrivals only
- Departures only
- 2-3 hours of busy traffic followed by a “firebreak”

Usually, the more runway throughput, the greater the delay because of the need to always have a departure or arrival ready to takeoff or land to sustain a high runway throughput. So there is sometimes a question of what is acceptable delay — there is no “official” value. Even some airlines are willing to tolerate more delay at one airport versus another. Helen Monk described how the FAA plots “flow vs. delay” and “demand vs. delay” using RDSIM.

Other issues considered include:

- Experimenting with arrival separations to find the “sweet spot” to maximize throughput.

- Landing rolls may need to be modified when lengthening a runway. How will pilots adjust? Because if the landing rolls do not change, the runway capacity decreases.

## **11. Current Activities at Hartsfield-Jackson Atlanta International Airport (ATL)**

Matt Davis presented an overview of activities at ATL.

Beyond the efforts to complete the new runway 10/28, ATL is working on the development of the new South Gate Complex. Evaluation of concepts is being performed in three phases.

Phase 1 examines the connectivity between the new runway and the existing terminal. Issues examined include:

- Controller and pilot workload
- Taxi times and turns
- Runway safety

Initially, runway 10/28 will be arrivals only but will switch to mixed-use when operations increase.

This involves examining a large number of situations and is carried out through various spreadsheet-types of analyses. Initially, there were 30 taxiway alternatives.

Phase 2 reduces the scenarios identified under phase 1 to those most that generate the best cost/benefit ratio. Twelve alternatives made it to this phase.

Phase 3 includes the use of SIMMOD on the most promising of the alternatives. Four SIMMOD scenarios were created.

Alternative D4 includes taxiways SR, SG/SH, N, and M connector #3. Alternative C4 includes taxiways SR, SG/SH, W/SW, and M connector #3. These scenarios are expected to be completed by mid-April. Alternative A6 and B4 are expected to be completed in late May and late June, respectively.

The majority of the study should be completed by August.

## **13. Other Business**

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

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

Belinda offered to look into the possibility of hosting the next meeting in Dallas. She thought that a Houston venue might also be possible. No date was proposed, although a Thursday or Friday during September would be expected.

**New action: Belinda Hargrove to investigate the possibility of holding the next NASUG meeting in either Dallas or Houston.**

Eric Boyajian  
Secretary, North American SIMMOD Users Group



**List of Attendance at the 16 March 2006 Meeting  
of the North American SIMMOD Users Group**

Mr. Eric Boyajian	ATAC Corporation	Secretary
Mr. Gregory Bradford	AirportTools	Vice Chairman
Mr. Frank Cheung	Landrum & Brown	
Mr. Dick Davis	Prime Engineering	
Mr. Matt Davis	Hartsfield-Jackson Atlanta International Airport	
Ms. Eliane Grayer	Ricondo & Associates	
Ms. Belinda Hargrove	TransSolutions	
Mr. David Holl	ATAC Corporation	Chairman
Dr. Xiang Huang	Shanghai Airport Authority	
Ms. Qianlin Li	Landrum & Brown	
Mr. Huan Luo	Landrum & Brown	
Ms. Helen Monk	FAA Tech Center	
Mr. Ronald Price	Prime Engineering	
Mr. Rob Rau	Hartsfield-Jackson Atlanta International Airport	
Ms. Carmela Rubin	Ricondo & Associates	
Mr. S. D. Satyamurti	University of Texas, Arlington	
Mr. James Terry	Hartsfield-Jackson Atlanta International Airport	
Mr. John Zinna	FAA Tech Center	