

Instituto de Controle do Espaço Aéreo

SIMMOD_Plus Applications in Brazil

NASUG

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Goal

To present Brazilian's studies using SIMMOD_Plus since its acquisition and the perspectives of further applications of fast time simulation in Brazil.

Summary

- ❑ **When did everything start?;**
- ❑ **How have we been using it?; and**
- ❑ **Further research.**

The beginning!

- **1999 – License Acquisition by CAA (DAC – Civil Aviation Department) ;**
 - **2000 - Basic and Advanced Courses presented by Transolutions, in Rio de Janeiro (Ms. Belinda Hargrove);**
 - **IAC, IPV (ICEA), Atech → 10 experts**
 - **2000 – license granted to ICEA in order to jointly work with ITA (Technical Institute of Aeronautics) on an academic research basis;**
 - **College, master theses and work papers.**
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Performed tasks

- **Period: 2000~2004;**
- **Agents: IAC e ICEA/ITA;**
- **Purposes:**
 - **Fast time simulation validation concept in Brazil;**
 - **Straight persuasive informative work to show authorities the importance of implementing this concept;**
 - **Scientific and academic studies → international meeting.**

Researches

- o **Work focus:**

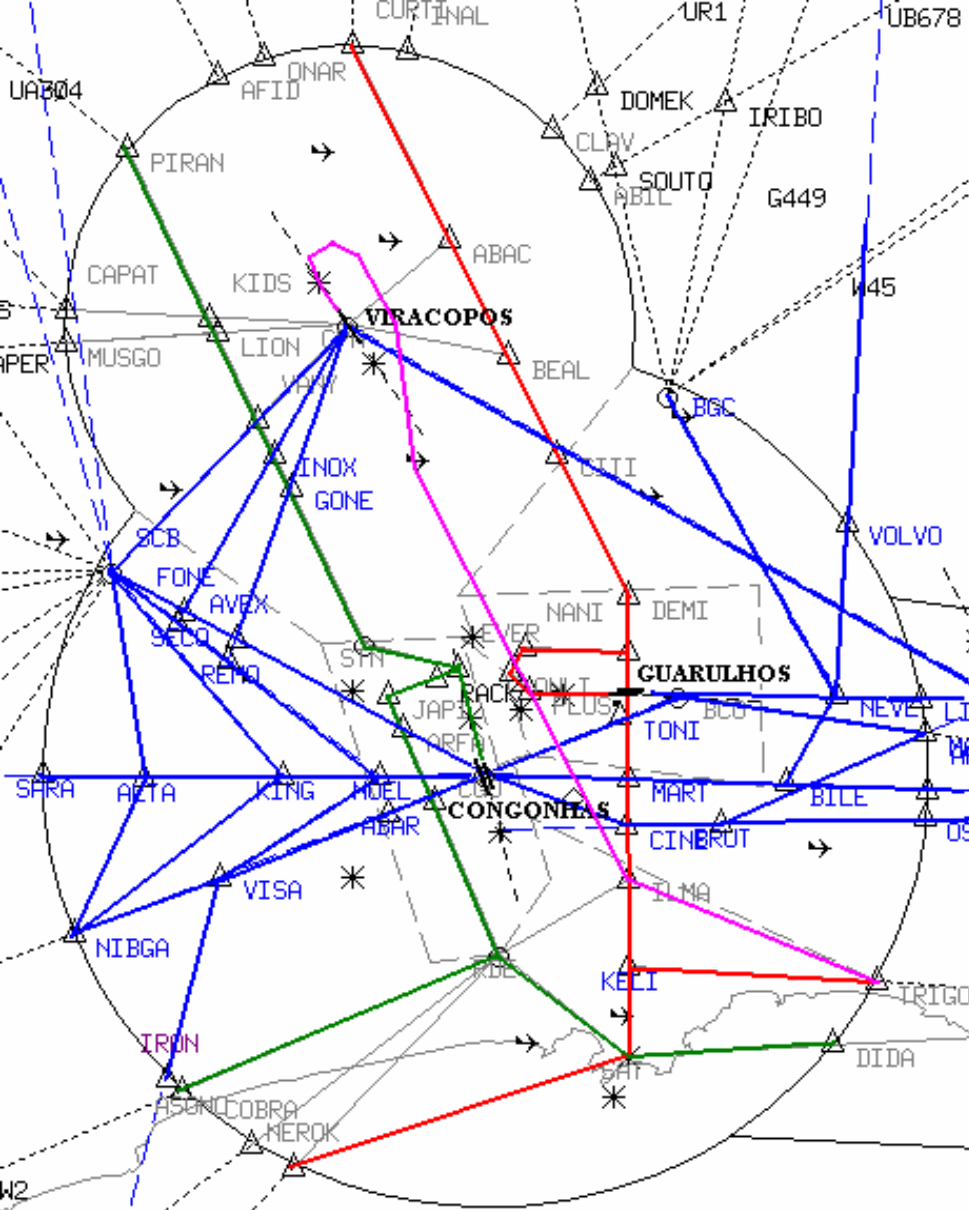
- o **ICEA/ITA e IAC :**

- o **SBKP (Campinas),**

- o **SBSP and SBGR (São Paulo International Airports of Congonhas and Guarulhos);**

- o **SBRJ (Santos Dumont) and**

- o **SBXP (São Paulo TMA).**



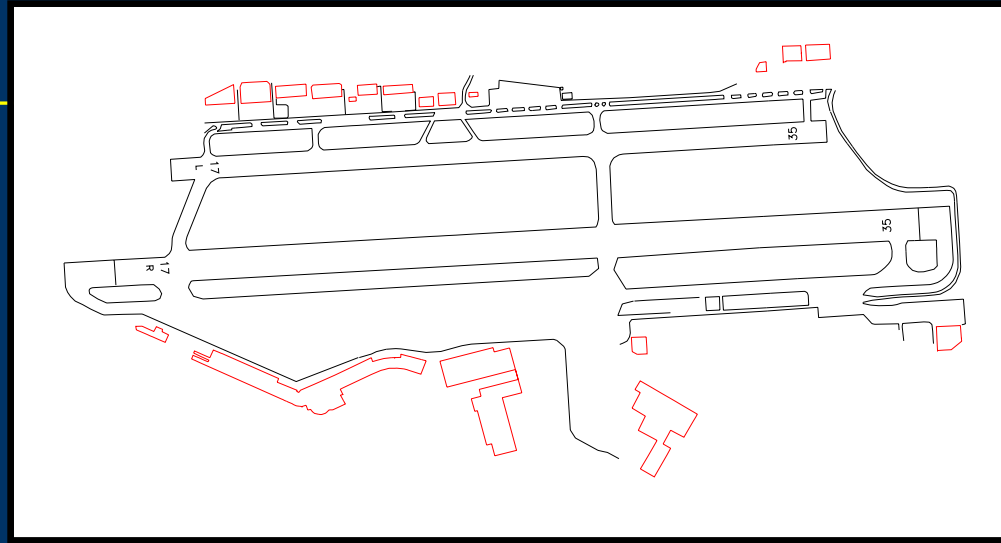
São Paulo Terminal Area

LEGENDA

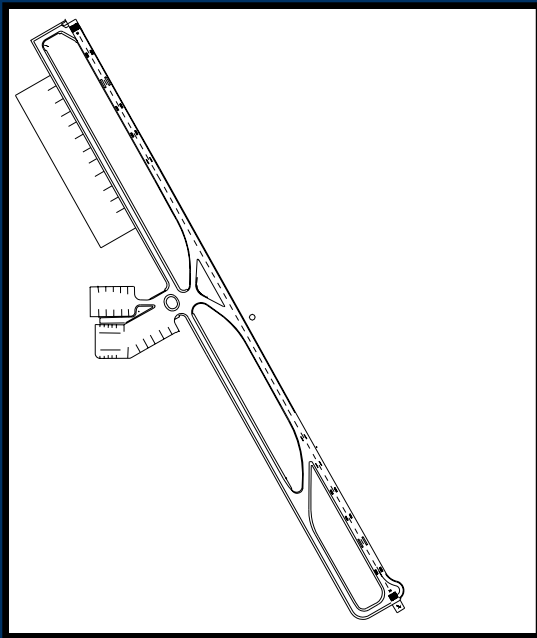
- STAR GUARULHOS
- STAR CONGONHAS
- STAR VIRACOPOS
- SID GUARULHOS, CONGONHAS E VIRACOPOS

Airports

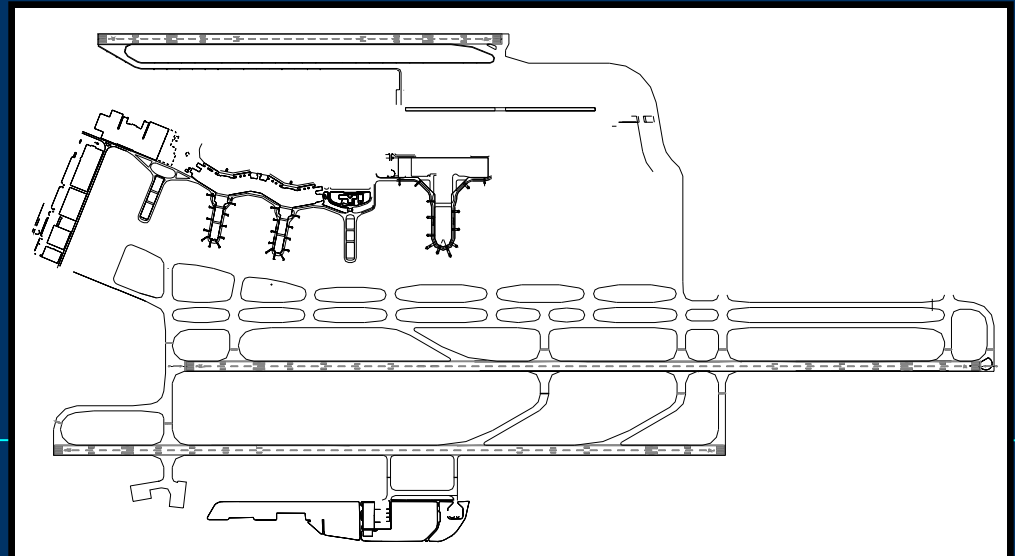
Congonhas



Campinas



Guarulhos



ICEA/ITA

- o **Campinas International Airport Airside Capacity Analysis using SIMMOD (Tiago, 2000):**
 - o **increase in demand of domestic aircraft and cargo flow to evaluate the consequent bottlenecks**

ICEA/ITA

- o **Brazilian Airport Infrastructure Capacity Study: New Technologies Simulation Usage Analysis (Coscarelli, 2001):**
 - o **a comprehensive approach of Sao Paulo International airport airside study based on Simmod_Plus Simulation Tool**

ICEA/ITA

- o **New Operational Scenarios Analysis to São Paulo/Guarulhos International Airport (Santana, 2002):**
 - o **presentation of an airside planning methodology based on simulation models for new facilities. Analysis of the relation between the new runway and/or the new passenger terminal building and the increased demand.**

ICEA

- **It was presented on the following international meetings:**
 - **12th Panamerican Transit and Transport Engineering Congress, Quito, 2002;**
 - **7th Air Transport Research Society World Conference, Toulouse, 2003 .**

ICEA/ITA

- **São Paulo Approach Control Area (TMA-SP) Fast-Time Simulation Analysis (Hupalo, 2003).**
 - analyses of changes caused by the implementation of STAR in Congonhas , Campinas and Guarulhos Airports due to a new operational environment at TMA-SP:
 - Flight Schedule modified from SP to GR with a increased demand of 10, 20 and 30%.
 - participation in the 8th Air Transport Research Society World Conference, Istanbul, 2004.

IAC

- **Santos Dummont Airport – Rio de Janeiro:**
 - **current capacity analyses (2000), measuring the saturation point of ground delays. Also, on a second scenario, traffic was increased to 20% to evaluate operational environment under this new conditions.**
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IAC

- o **Santos Dummont Airport – Rio de Janeiro (cont.):**
 - o **Comparative analyses of 3 different scenarios. First the current operational one (2001), plus two others, with a new taxilane on parking area and a new parallel taxiway (the current one and in case of an increase of 40% in demand distributed along the day). Proven reductions in arrival and departure delays, in the operational airline costs and an increase in the system capacity.**

IAC

- **São Paulo International Airport – Congonhas:**
 - **Comparative analyses of seven different scenarios proposing traffic relocation by evaluating the operational efficiency of parking and runway area systems.**
 - **Analyses of different traffic demands considering total traffic along the day and average delay**
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IAC

- **São Paulo International Airport – Congonhas e Guarulhos :**
 - **Comparative analyses of different proposals of traffic relocation of TMA-SP airports, by evaluating different types, and traffic demand, considering total daily and average delay of each airport**

Others Experience on FTS

- **Acquisition of TAAM License:**
 - **Participation in Mitre Studies related to São Paulo Terminal Area and its main airports**
 - **Intensive work until 2001;**
 - **Work group was discontinued;**
 - **Few studies and research into the maintenance of models and a better understanding of the tool;**

Others Experience on FTS

- **Simmod will be resumed, alone or along with others FTS Tools (e.g. RAMS_Plus);**
- **Exchange program with Technical University of Berlin for applying acquired knowledge on CNS/ATM area.**

Recent experience on FTS

- o **Contact with DLR and ESUG – introduction of tools and SIMMOD applications;**
- o **Contributed to Airport Tools (Mr. Gregory Bradford) using settings and data related to São Paulo Airport Model to JSIMMOD, in cooperated task of Rodrigo Moser, from Sao Paulo University.**

Perspectives of FTS in Brazil

- **Acquisition, this year, of a new SIMMOD_Plus License, and resume studies in main Brazilian Airports, such as São Paulo, Rio de Janeiro, Brasília, Porto Alegre and Belo Horizonte.**
- **Start researches using Simmod Engine to supply studies with a greater amount of operational data**

FTS perspectives in Brazil

- **To increase the specialized team to work directly with users, on airport and airspace models, to attend to demands requested by DECEA;**
 - **Work closely with research institutions like ITA on M Sc and PhD studies, supporting models to validate this kind of work**
 - **Open to new challenges...**
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Summary

- ❑ **When did everything start?;**
 - ❑ **We had a slow but good start!**
- ❑ **How have we been using it?; and**
 - ❑ **Working hard on researches and technical papers!**
- ❑ **What do we intend to?**
 - ❑ **Improve operational application with more practical and direct use on current problems.**

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