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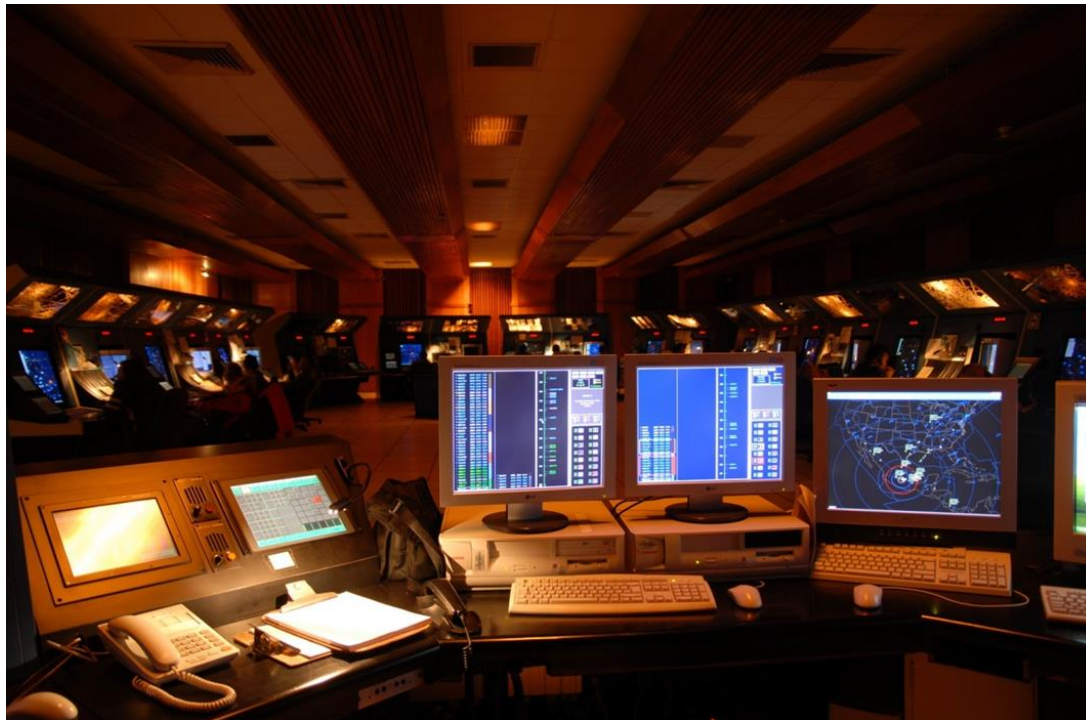


# DEVELOPMENT AND EVOLUTION OF ATFM IN MÉXICO

Since the end of the 90's and the beginning of the 21 century, the aircraft operations in Mexico Air space has experienced a continuous grown. This situation has had a big impact in our air space, the saturation of 3 of the most important airports in our country was the first yellow flag that alert us of this.



**SENEAM** took responsibility of this new situation and in February of 2002 establish a new service named Flow Control. It began operations inside the México's Air Traffic Control Center. His primary function was to provide flow control services to the Mexico's City airport arrivals and to prevent that the arrivals capacity of the airport weren't overflow (AAR Airport Arrival Rate).





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**In order to accomplish this new responsibility we create the PROSAT, which is a homemade software system that aids the supervisors to make a pre-tactical sequence of aircrafts operations in blocks of 15 minutes. This tool in combination with the ETMS and the information provided by the Eurocat X, allows us to organize the arrival sequence to Mexico City Airport**



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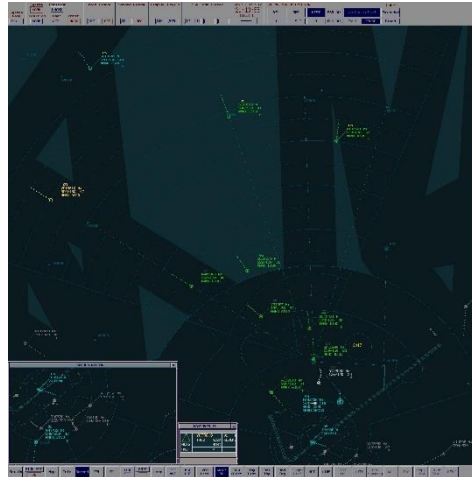


# FLOW OF SYSTEMS INFORMATION

ETMS

EUROCAT X

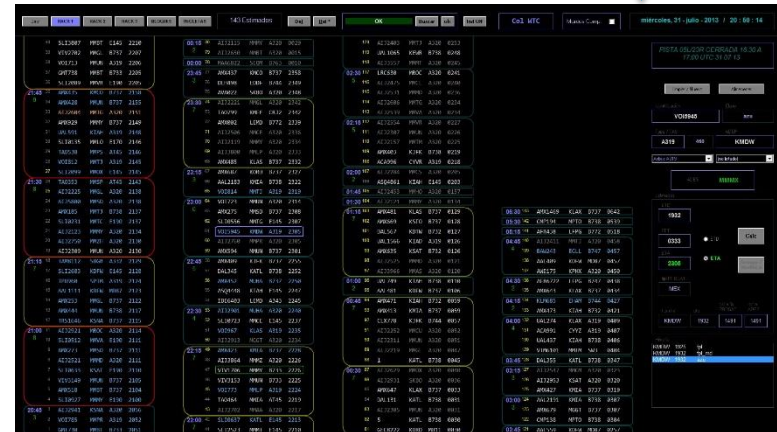
SIAT



ATS Messages from company's

PROSAT

PROSAT



Due to the great success of the implementation of this system in Mexico's airport, the service extended to the Airport of MMSD in November of 2004 and MMUN in October of 2005

## AAR's

### FIRST PHASE

MMM

MMUN

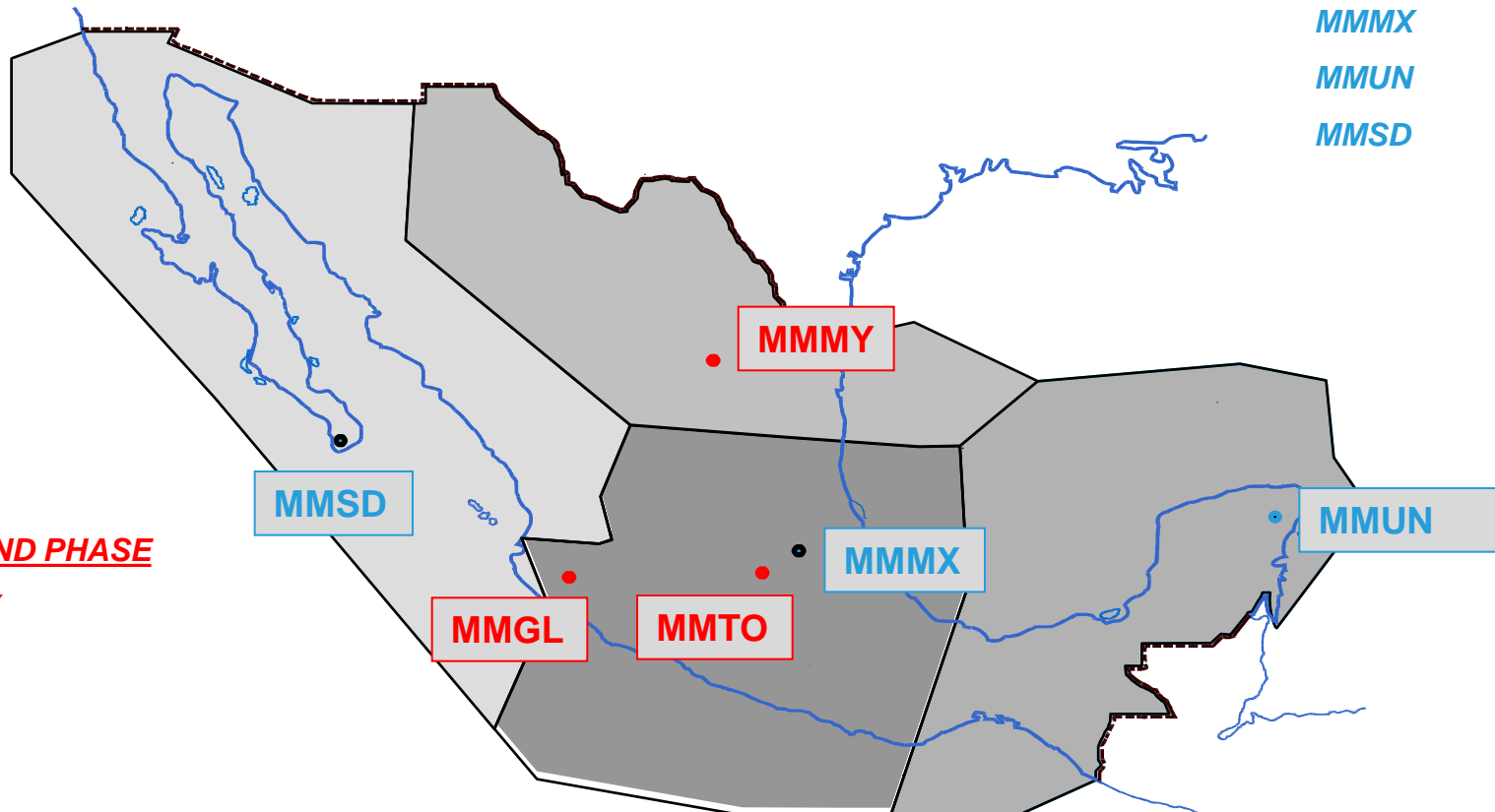
MMSD

### SECOND PHASE

MMMY

MMGL

MMTO





# CCFMEX

## DEVELOPMENT UPDATE

|                      |  |
|----------------------|--|
| <b>March 2005</b>    | •ICAO 1st ATFM NAM/CAR meeting in México City  |
| <b>March 2006</b>    | •ICAO 2nd ATFM NAM/CAR meeting at Tegucigalpa Honduras   |
| <b>June 2006</b>     | •DG & DGATA visited ATCSCC   |
| <b>August 2006</b>   | •1st FAA ETMS Supervisors training<br>•ATFM to MMSD, MMMX & MMUN   |
| <b>November 2006</b> | •México ATFM unit officially named CCFMEX<br>•CCFMEX starts everyday Telcons<br>•North American/ European ATFM Task Force, St Louis, Missouri, USA<br>•ICAO meeting at Lima Perú, México declares the intention of establish a ATFM unit responsable of the Caribbean Area located in México |
| <b>December 2006</b> | •AAR National analysis   |

# CCFMEX DEVELOPMENT UPDATE

The growing of the flow control system has not been possible without the help of the ICAO and FAA authorities, since 2007 we have been in a continuous meetings that have made possible the exchange of ideas and experiences.

|                       |   |
|-----------------------|---|
| <b>March 2007</b>     | • <i>LOA between ATCSCC/CCFMEX</i>  |
| <b>July 2007</b>      | • <i>FAA/SENEAM 1st ATFM meeting at Mérida</i>  |
| <b>August 2007</b>    | • <i>CCFMEX officially in AIP</i>   |
| <b>September 2007</b> | • <i>SCV National analysis</i>  |
| <b>October 2007</b>   | • <i>ATFM information to ACC's Supervisors</i>  |
| <b>November 2007</b>  | • <i>End of Season meeting</i>  |
| <b>December 2007</b>  | • <i>WATRS RNAV routes, Miami meeting</i><br>• <i>ATCSCC telcon training at CCFMEX.</i> |



# CCFMEX

## DEVELOPMENT UPDATE

|                      |  |
|----------------------|--|
| <b>February 2008</b> | <ul style="list-style-type: none"><li>• <i>Telcons conducted by CCFMEX</i></li><li>• <i>Gulf of México RNAV routes analysis by SENEAM</i></li></ul>  |
| <b>March 2008</b>    | <ul style="list-style-type: none"><li>• <i>1st ATCSCC/CCFMEX Flight Plan data exchange telcon</i></li><li>• <b>FAA/SENEAM meeting at Monterrey, México</b>      <b>LOA's of MTY-ZHU, MID-ZHU</b></li><li>• <i>SENEAM Gulf of México RNAV routes data exchange with FAA</i></li></ul> |
| <b>April 2008</b>    | <ul style="list-style-type: none"><li>• <i>GDL &amp; BJX ATFM meeting at GDL</i></li><li>• <i>ETMS training for SENEAM at ATCSCC, POTOMAC TRACON &amp; Dulles TWR</i></li></ul>  |
| <b>May 2008</b>      | <ul style="list-style-type: none"><li>• <i>ICAO NACC/ WG/ 2 at Ocho Ríos, Jamaica</i></li></ul>  |
| <b>June 2008</b>     | <ul style="list-style-type: none"><li>• <i>2nd ATFM meeting NOC/FAA/SENEAM at Mazatlán</i></li><li>• <i>NOC first participation</i></li></ul>  |

# CCFMEX

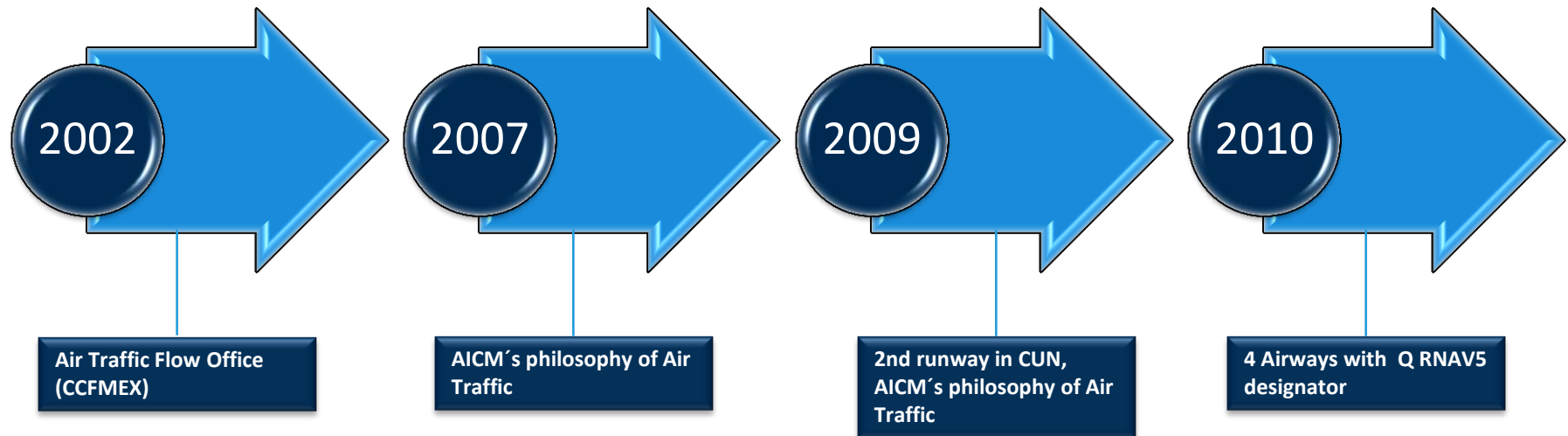
## DEVELOPMENT UPDATE

|                      |  |
|----------------------|--|
| <b>July 2008</b>     | <ul style="list-style-type: none"><li>• ICAO ATM/CNS/SG/6 meeting Sto. Domingo, D.R.</li><li>• SCV analysis for Colombia, Cuba &amp; CENAMER</li><li>• Exchange of Flight Plan Information between ATCSCC &amp; CCFMEX</li></ul>   |
| <b>August 2008</b>   | <ul style="list-style-type: none"><li>• <b>LOA's between MZT-LAX, MZT-ABQ, MTY-ABQ, TIJ-SOCAL</b></li><li>• ETMS in MZT, MTY, MID, CUN &amp; SJD</li><li>• CCFMEX new location</li><li>• <b>ATFM Concepts Seminar in SENEAM (Colombia, COCESNA, Panamá, Cuba, FAA, IATA, DGAC)</b></li></ul> |
| <b>October 2008</b>  | <ul style="list-style-type: none"><li>• GREPECAS 15th at Río de Janeiro, Brasil</li><li>• 3rd Annual SENEAM ATS Vice Manager's meeting in Chihuahua, Chih.</li><li>• Every year revision of LOA between ATCSCC &amp; CCFMEX</li></ul>  |
| <b>November 2008</b> | <ul style="list-style-type: none"><li>• ATFM meeting at Lima, Perú</li><li>• EOS 2008</li><li>• <b>LOA between ATCSCC &amp; CCFMEX</b></li><li>• <b>LOA's between Habana-MID, CENAMER-MID</b></li></ul>  |

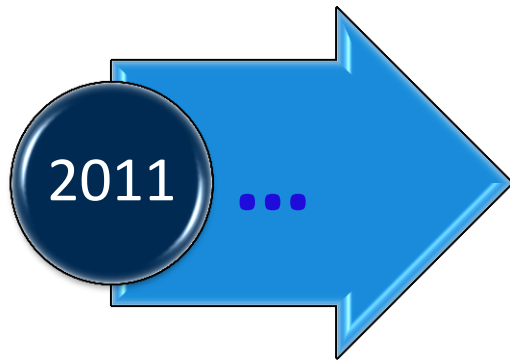
# CCFMEX DEVELOPMENT UPDATE

|                      |   |
|----------------------|---|
| <b>January 2009</b>  | <i>•New location for CCFMEX and start to provide ATFM to MMTO, MMTY, MMGL, MMSD, MMUN &amp; MMMX.</i> |
| <b>February 2009</b> | <i>•Stakeholders at CCFMEX</i>  |
| <b>March 2009</b>    | <i>•March 2009 ATFM work-shop at Armenia, Colombia</i>  |
| <b>July 2009</b>     | <i>•3rd ATFM meeting NOC/FAA/SENEAM at GDL</i>  |
| <b>2009</b>          | <i>•Other meetings</i>  |

# So far our evolution since 2002..



**All the actions implemented since 2002 made possible the reduction of holding patterns and excessing vectoring in a 90%**

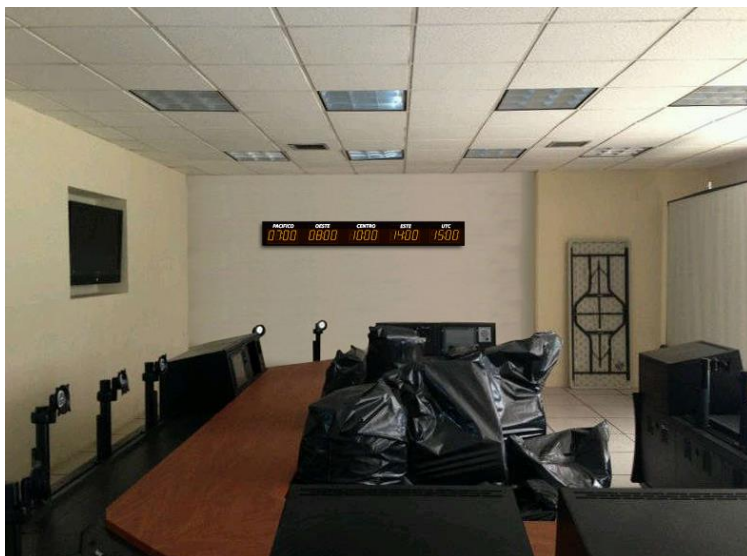


- **PBN and RNP procedures for TLC Airport.**
- **A most useful advantage of the new navigation capabilities (PBN / RNP)**
- **TMA planning operations (Arrivals and Departures)**
- **GOMEX Project. Multinational project of implementation for RNP10 airways to improve flights over the Gulf of Mexico**
- **Transition of the CCF MEX to SMART (Monitoring system, administration and regulation of air traffic)**

In January of 2013 began the First Phase in the transition of the Flow Control CCFMEX (formerly located inside the Mexico's ACC) to its new location in the building as the Command Center Unit SMART (Sistema de Monitoreo Administración y Regulación de Tránsito Aéreo by its acronym in Spanish) Monitoring, Administration and Regulation of Air Traffic Control System.



There was much work to do, so we divide the tasks into 5 teams, Telecommunication Engineers, System Engineers, Administration people, Civil Engineers and Air Traffic Controllers. Each team have several tasks to be performed and all the activities had a deadline. To keep track on all the actions, we held meetings every week. These in turn were supervised by the directors of the company and the CEO.



**Upgrade the current systems and install the equipment and tools proven to work in others Command Centers, was a priority task.**





Although there was planning in the development of this unit we had some problems...

**Technical:** The update of some of the systems, install more phone lines, screen acquisition and adaptation of the new consoles.

**Operative:** Culture change has been the slowest part in this project, and the adequacy of circulars, letters of agreement is still an ongoing process



One of the main concerns of air traffic management is to regulate traffic in the various sectors of the Control Centers. Mexico has made several studies, however we have not found a precise method, and the way that we have deal with this is through experience and a method that basically consists in dividing the average flight time in the sector, between the total time taken to perform the control functions.

$$C = \frac{TPS}{TFC}$$

**C** - Capacity

**TPS** - Average flight time in sector

**TFC** - Average time used in development of air traffic control actions (Acceptance, action of control, transfers of control, communication).

The implementation of this new unit has helped us in several contingency such as hurricanes, flooding's etc. as well as political events like the visit's of a foreign president's or massive event's throughout the country.



# The last reported event was the Storm Manuel and Hurricane Ingrid contingency.





**Thanks to the experiences obtain in all these years by the controllers that works in the SMART and to the continuous communication with the aeronautical authorities such as the ones in the AICM, the airlines, Acapulco´s airport stakeholders and personnel from the army in Mexico City and Pie De La Cuesta military airport.**

Within a few hours a well organized CDM was implemented were the continuous communication of each part, the knowledge of the necessities as well as the strengths of all the people involve give as a result a continuous flow of help to those in need, reaching the maximum capabilities of the airports in the affected zone and reducing to the minimum the affectation to the rest of the aircraft's flying in the sector involve.



**SMART Phase 1 has been completed successfully.**

**In Phase 2 we will focus on restructuring national and international letters of agreement, make the necessary changes in our manuals and circulars for optimum performance of this unit, integrated flow control systems tested and used in other countries, install monitoring systems at national levels that indicate the status of each of the airports.**

**Phase 3 is intended to fully integrate all aviation authorities, service providers, airport managers into a complete AFTM.**



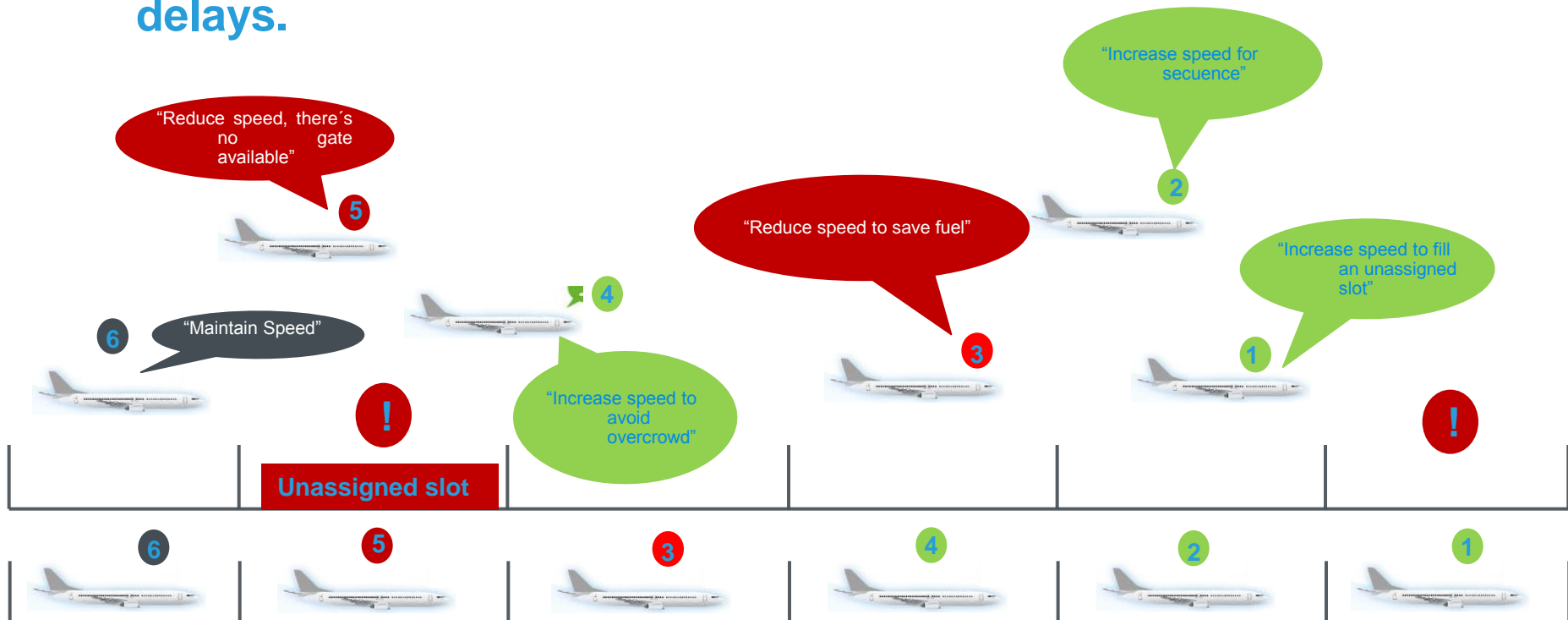
## Operational benefits

- Improves the safety of the ATM system.
- Maximize the operational efficiency of the system through a collaborative decision making process.
- Effective administration of the capacity and demand through analysis and planning.
- Improves the situational awareness among all the parties involved in the air industry, making possible a better planning that allows to make the best of all the resources available.
- Reduce operational fees and fuel consume.
- Allows an effective administration of the special operations such as emergencies, military operations or any operation that may require a special treatment, reducing the affectation to regular operations.



## Economical benefits

- Improves the quality of the air transport.
- Increase the economical development of the country by reducing the air transportation costs.
- Prevents a high production of pollution by reducing the fuel consume of aircrafts due to the optimization of the airspace.
- Minimizes the passengers discomfort due to a reduction on delays.



# Benefits





# SMART





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**Thank You**

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