Case Study:

Obstacle Aeronautical Studies at an Airport

Regional Workshop on GREPECAS Project F1 - Aerodrome Certification Improvements
14 to 18 October 2013

Introduction

Historical Briefing

Macondo International Airport is the only airport in the State, it was built around 1940 on the site that was once considered the most appropriate venue and has operated for over 70 years serving generations of passengers and transporting cargo to different destinations and it is managed by Macondo Inc.

Introduction

Historical Briefing

Macondo Intl Airport moves around three million passengers a year between tourists and businessmen, more than 10 different airlines have daily flights to it and provide connectivity to major regional hubs increasingly positioning itself as an attractive destination for different operators. At the same time, Macondo Intl is an important logistics center with increasing cargo operations.

Introduction

In recent years, the government has detected a need to generate more employments and to attract investment in areas such as tourism, construction and renewable energy. Considering this situation, they have created a government committee known as Advance Corp. in order to promote investment and to assist Macondo City in becoming a financial and regional logistical centre.

Introduction

Considering this situation, Advance Corp has begun to talk with possible investors in different fields and they have started to analyze some concrete proposals; some of these proposals are in the vicinity of the Macondo International Airport, therefore, they have requested the approval of Macondo Inc. as the airport manager. They in turn, forward the request for the opinion of the Civil Aviation Authority (CAA).

Objective

To carry out an obstacle aeronautical study in order to analyze the feasibility of the projects.

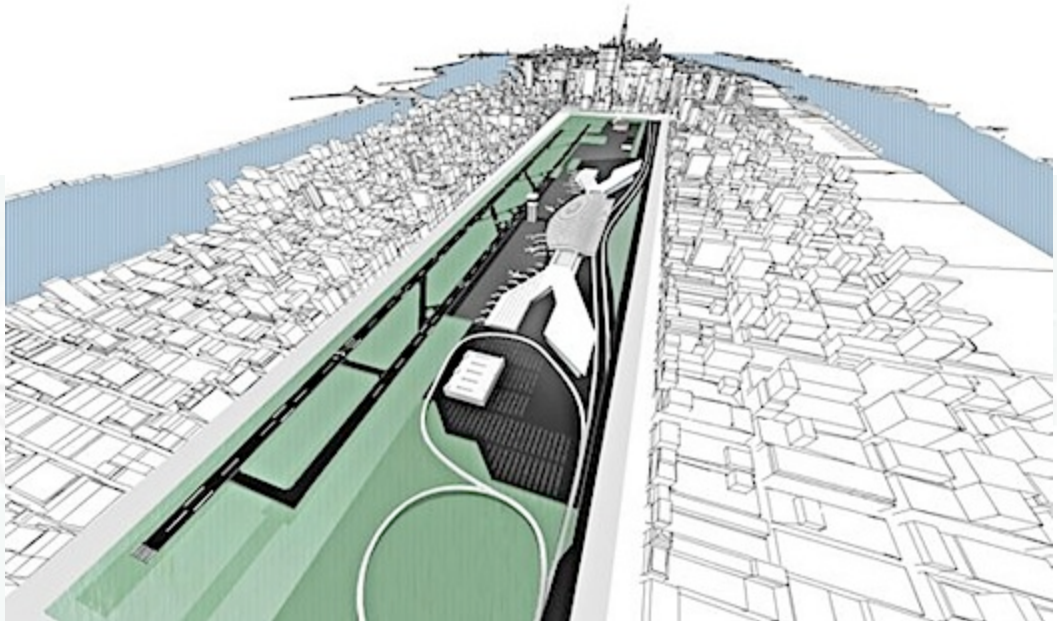
Summary:

To approve or reject the applications submitted

Context

New Tendency - Aerotropolis

Lately, there is a tendency to build all aspects of a city around the airport. The approach has changed to take the airport out of the city by having the government work with the private company to bring offices, stores, apartments and recreational facilities to the airport environment and generate a profit.



Context

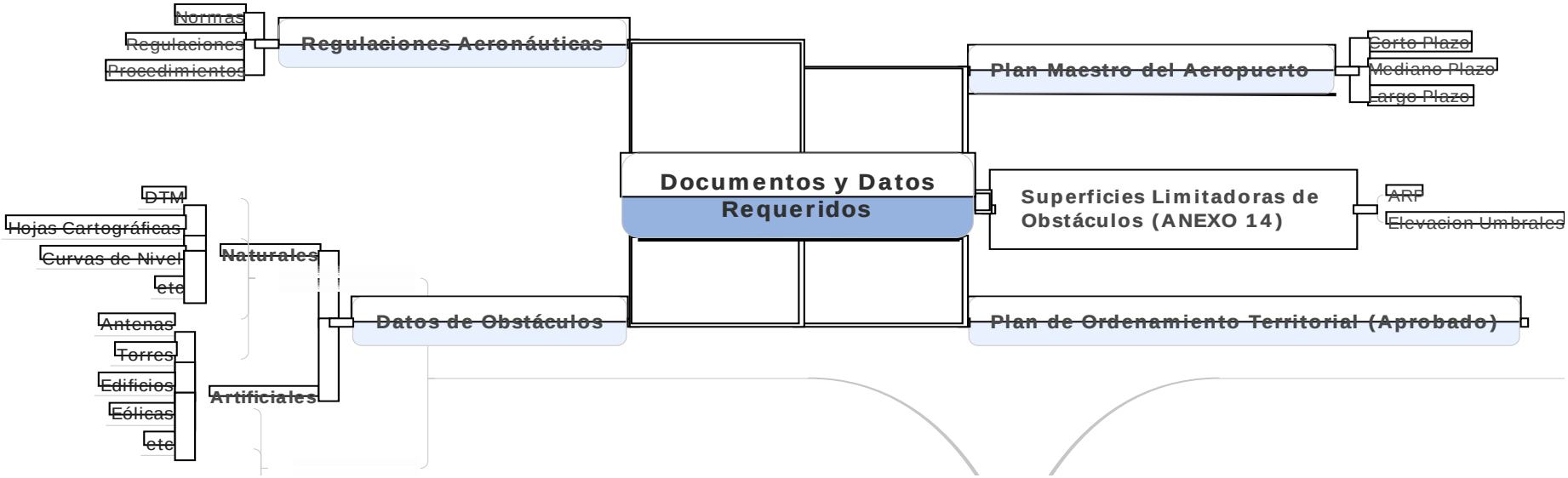
Example: Atlanta Hartsfield, USA

Criteria and Aeronautical Law

Some aeronautical criteria (non extensive list)

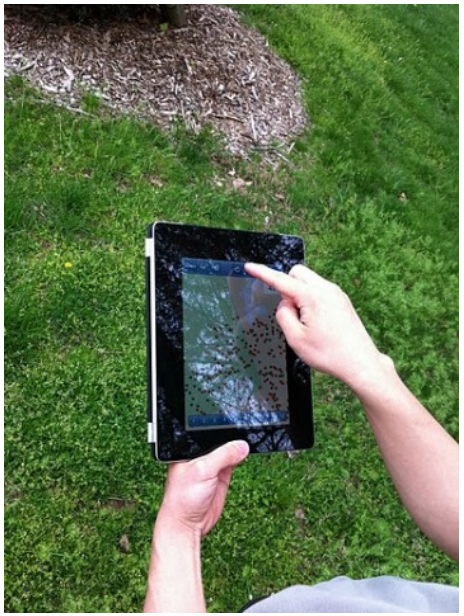
- Annex 14 — Aerodromes
  - Volume I — Aerodrome Design and Operations
- Doc 8168 — OPS — Aircraft Operations
  - Volume II — Construction of Visual and Instrument Flight Procedures
- Doc 9137 — Airport Services Manual
  - Part 6 — Control of Obstacles
  - Part 8 — Airport Operational Services
- Doc 9774 — Manual on Certification of Aerodromes
- Doc 9157 — Aerodrome Design Manual
  - Part 2 — Taxiways, Aprons and Holding Bays
- Doc 4444 — ATM — Air Traffic Management
- Doc 9426 — Air Traffic Services Planning Manual
- Doc 9184 — Airport Planning Manual.
  - Part 1 — Master Planning
- Annex 11 — Air Traffic Services

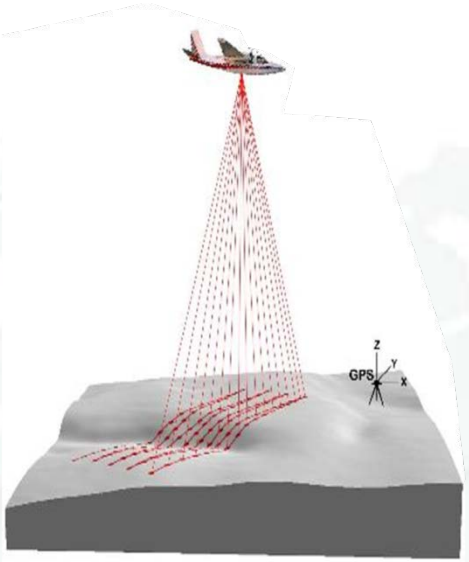
Required Data and Documents

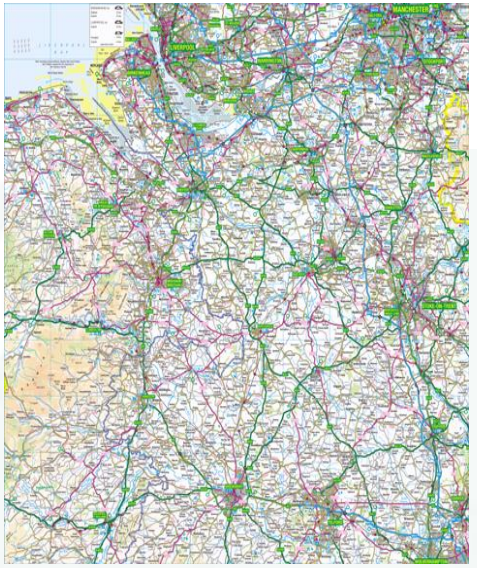


Meeting with the Stakeholders

Data Gathering



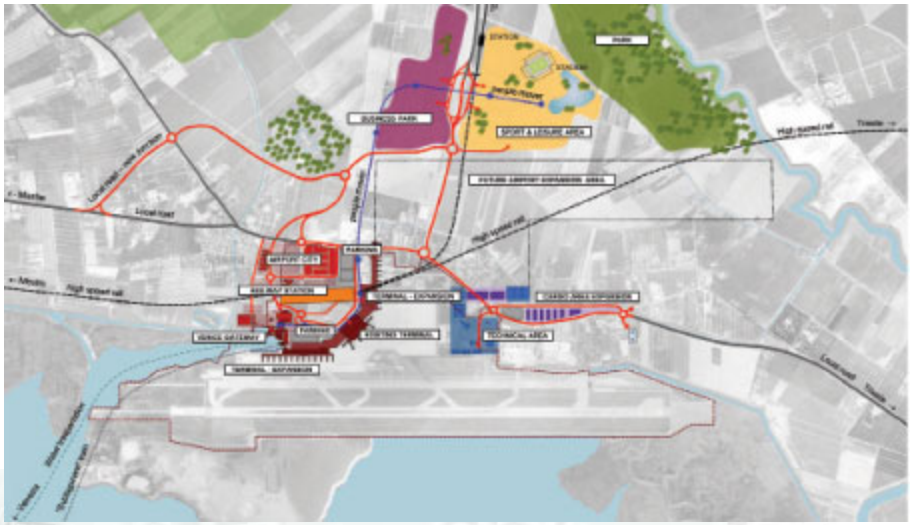




Data Analysis

Master Plan

- The Aerodrome Category, aircraft design, future radio aids installation plan, etc. were determined



(see 1.7.2 to 1.7.4)

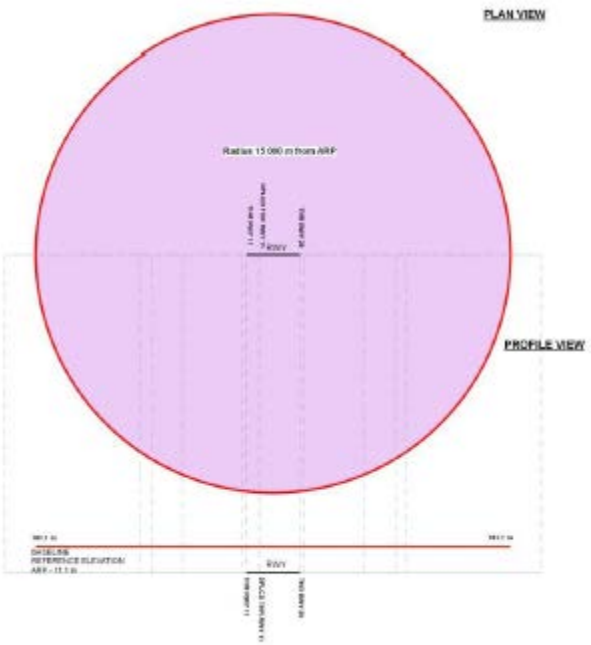
Code element 1		Code element 2		
Code number (1)	Aeroplane reference field length (2)	Code letter (3)	Wingspan (4)	Outer main gear wheel span[1] (5)
1	Less than 800 m	A	Up to but not including 15 m	Up to but not including 4.5 m
2	800 m up to but not including 1 200 m	B	15 m up to but not including 24 m	4.5 m up to but not including 6 m
3	1 200 m up to but not including 1 800 m	C	24 m up to but not including 36 m	6 m up to but not including 9 m

Data Analysis

Use of Geographical Information Systems (GIS)

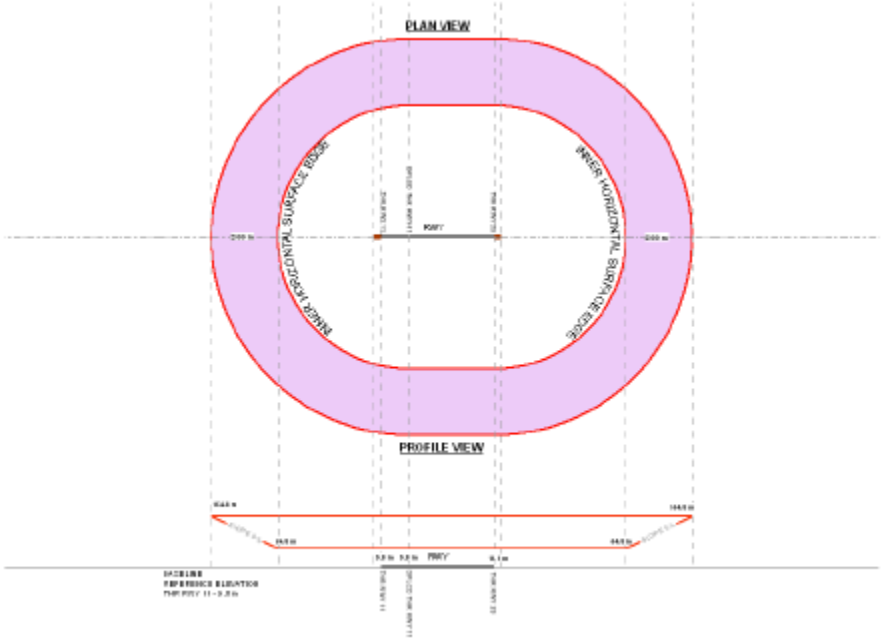
For the purpose of the analysis, a geospatial database was developed on a GIS, this database included all layers of relevant information and the Annex 14 surfaces were developed in 3D to make an obstruction analysis

Data Analysis



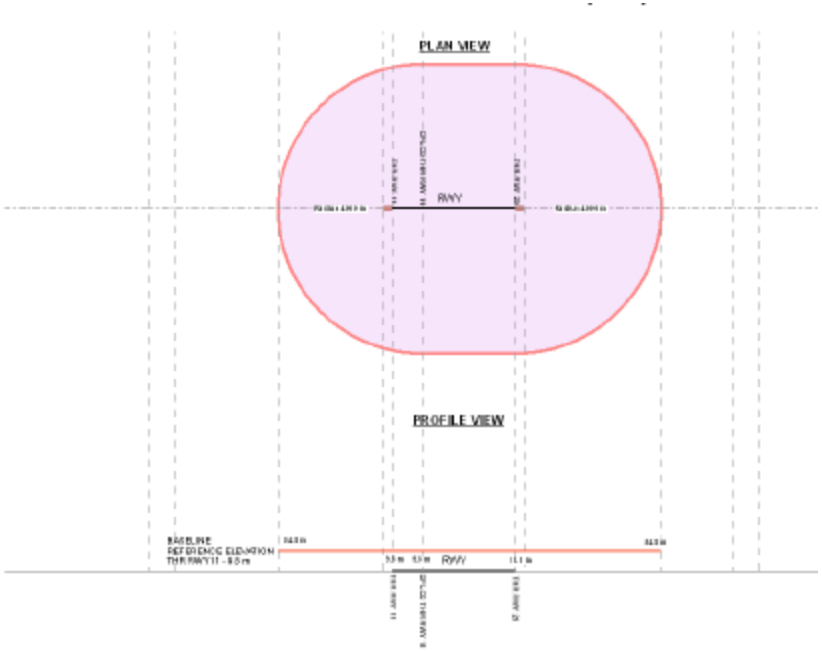
Horizontal Externa

Superficie Conica

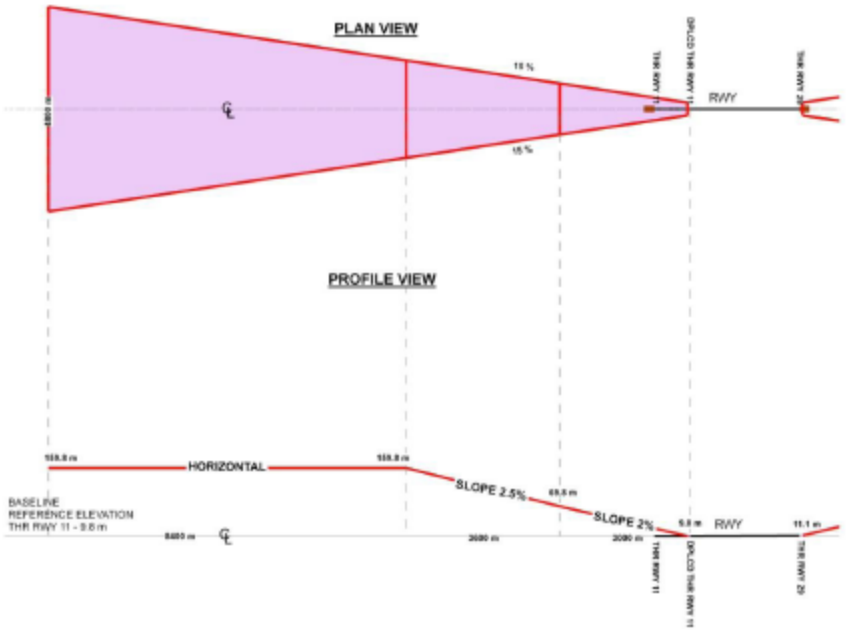


Data Analysis

Horizontal Interna

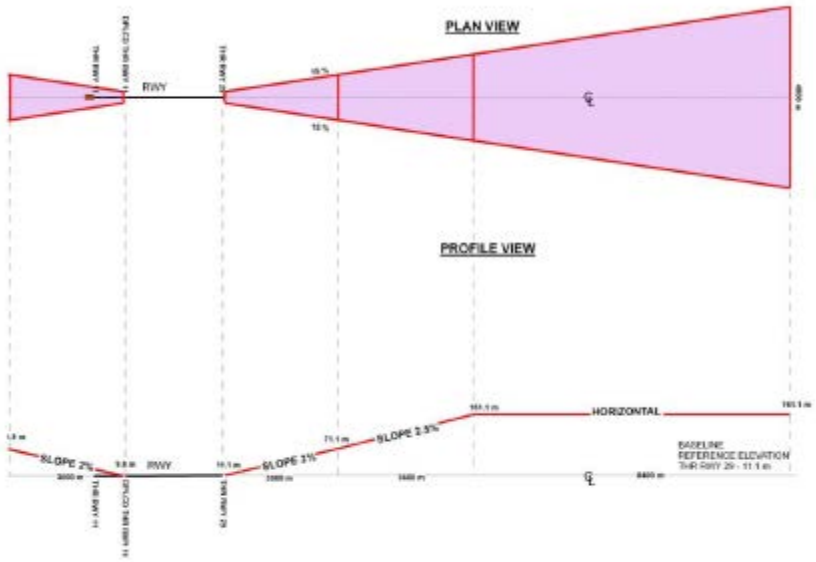


Superficie Aproximacion

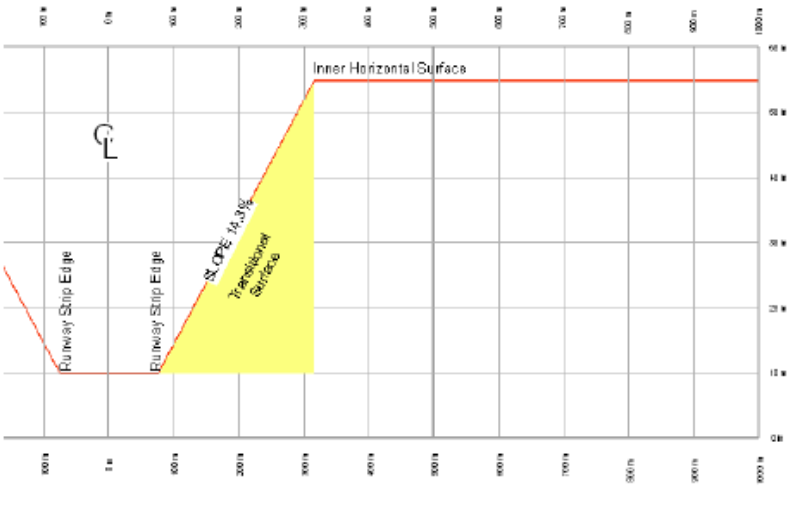


Data Analysis

Superficie Aproximacion

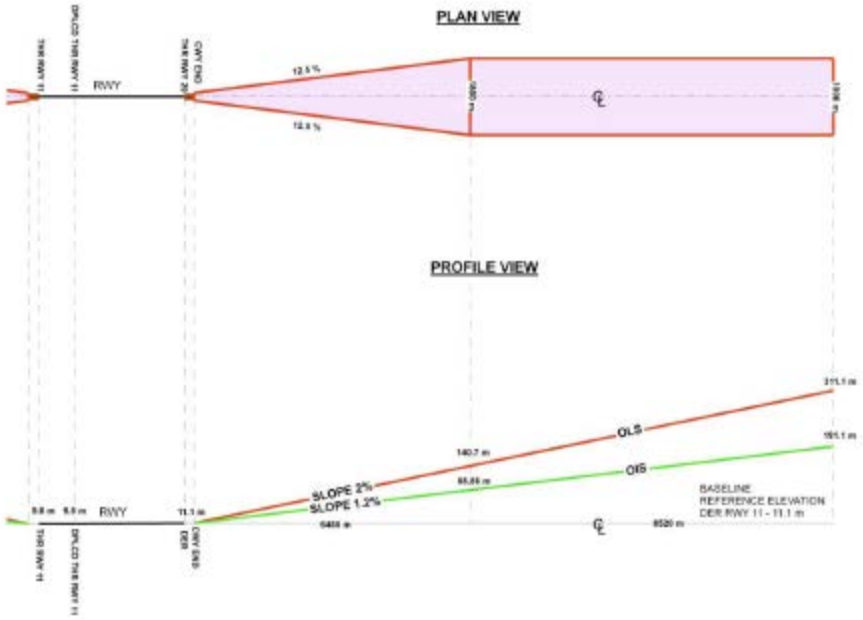


Superficie de Transicion

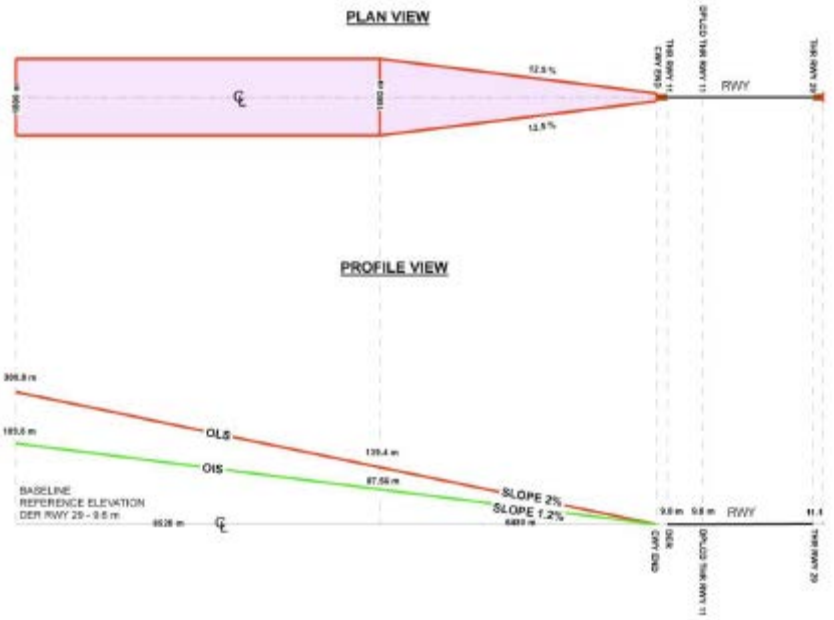


Data Analysis

Superficie de Despegue



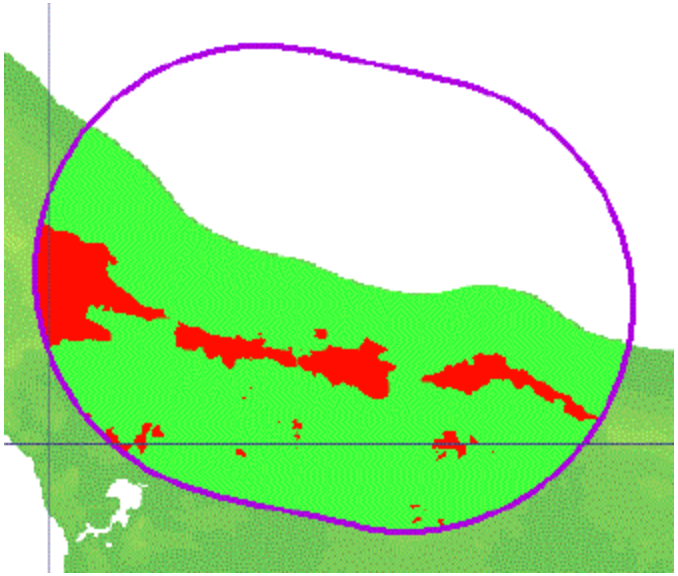
Superficie de Despegue



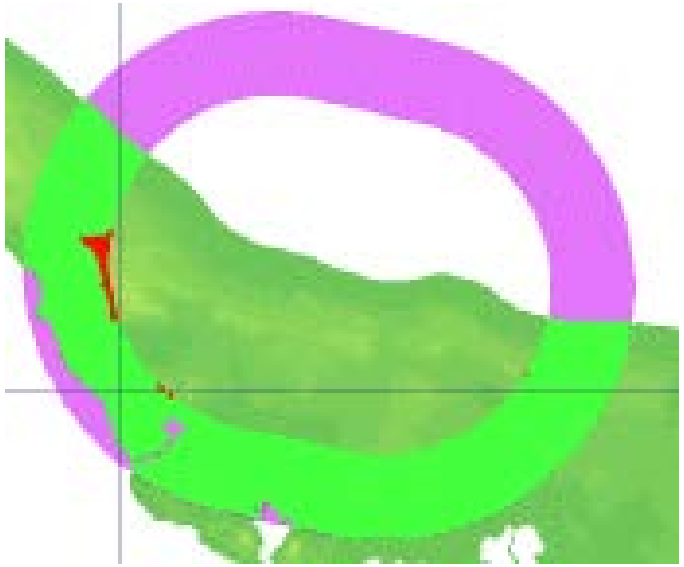
Data Analysis

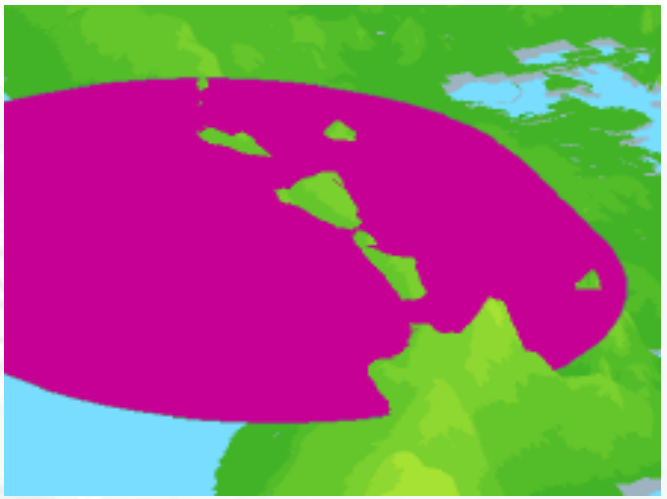
Example: Analysis of Terrain Obstacles

Horizontal Interna



Superficie Conica

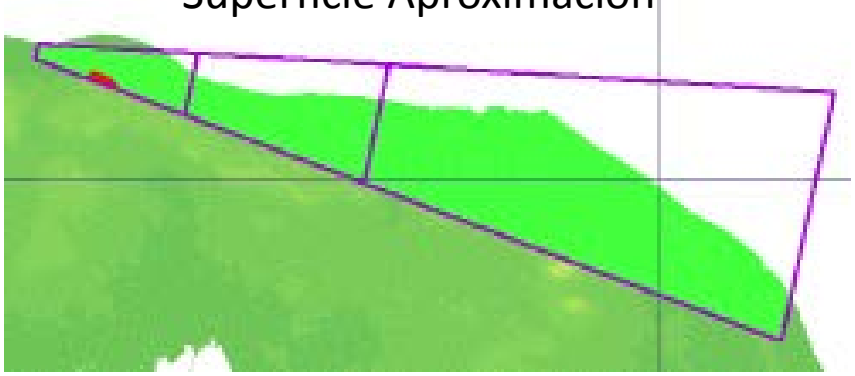




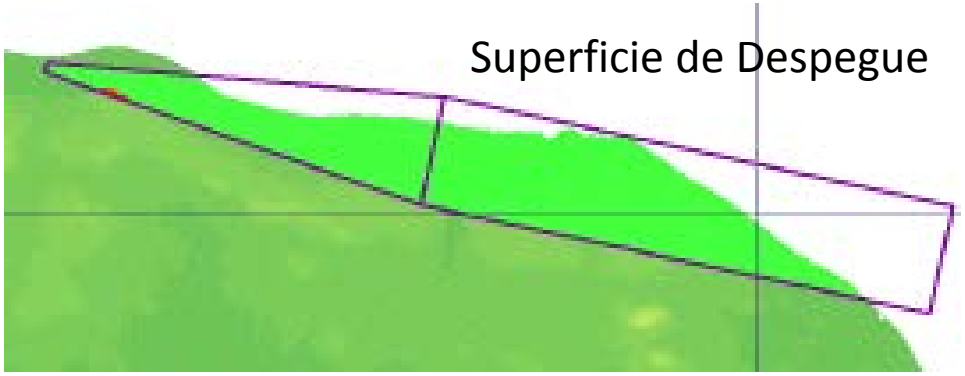
Horizontal Interna
Vista 3D

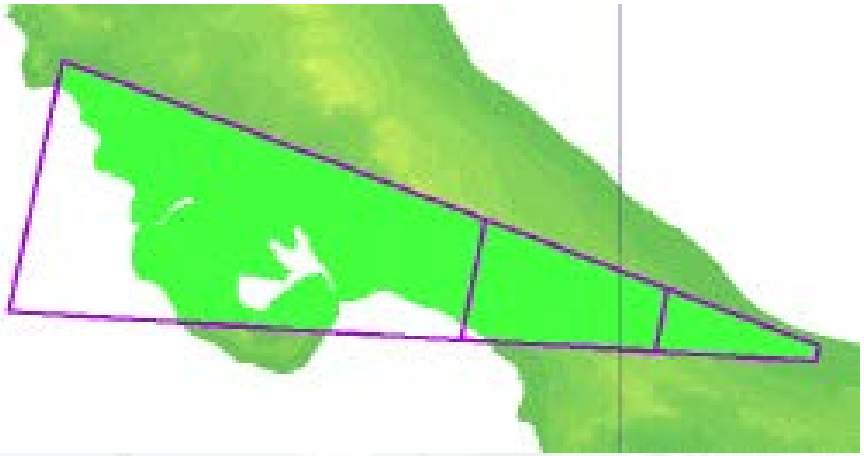
Data Analysis

Superficie Aproximacion

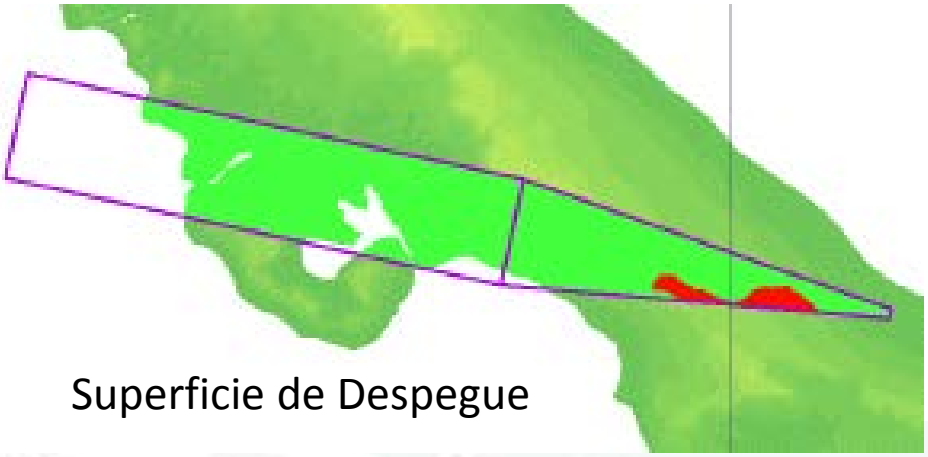


Superficie de Despegue



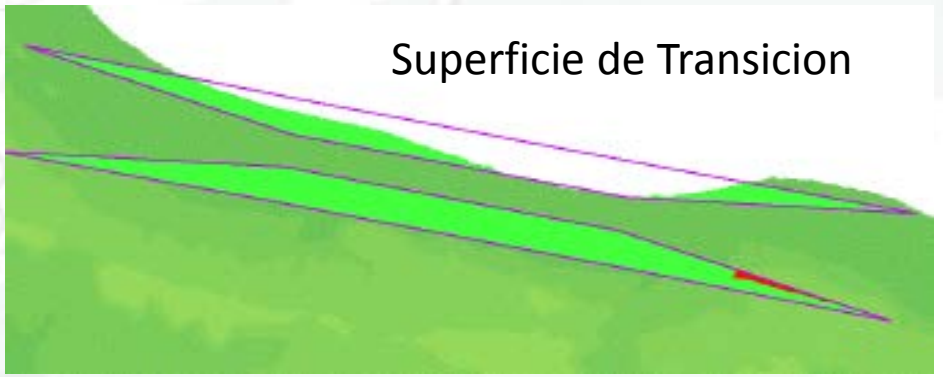


Superficie Aproximacion



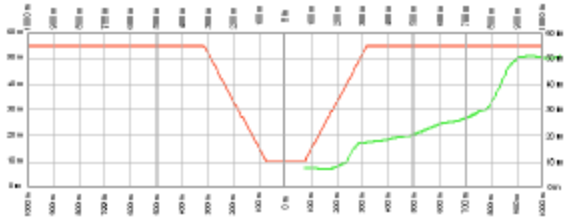
Superficie de Despegue

Superficie de Transicion

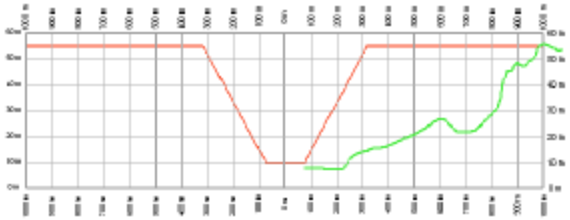


Data Analysis

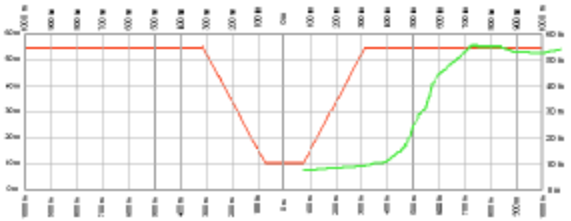
Analisis de Cortes a lo largo del Eje Central de Pista



0 + 000
CROSS
SECTION



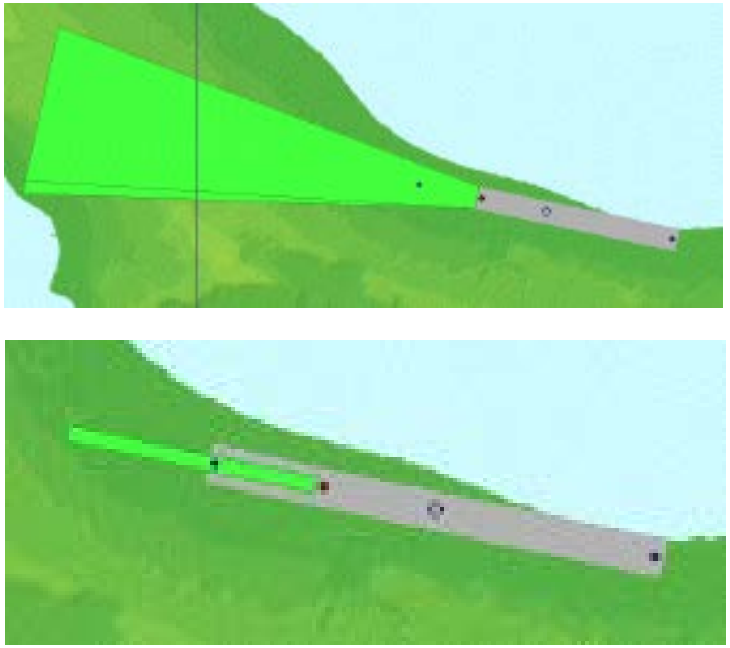
1 + 000
CROSS
SECTION



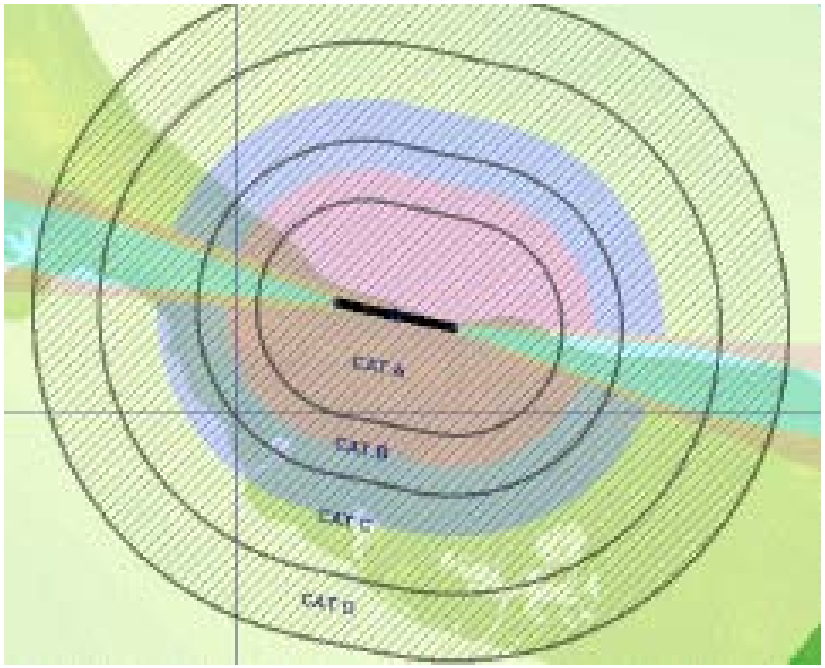
2 + 000
CROSS
SECTION

Data Analysis

Analisis VSS



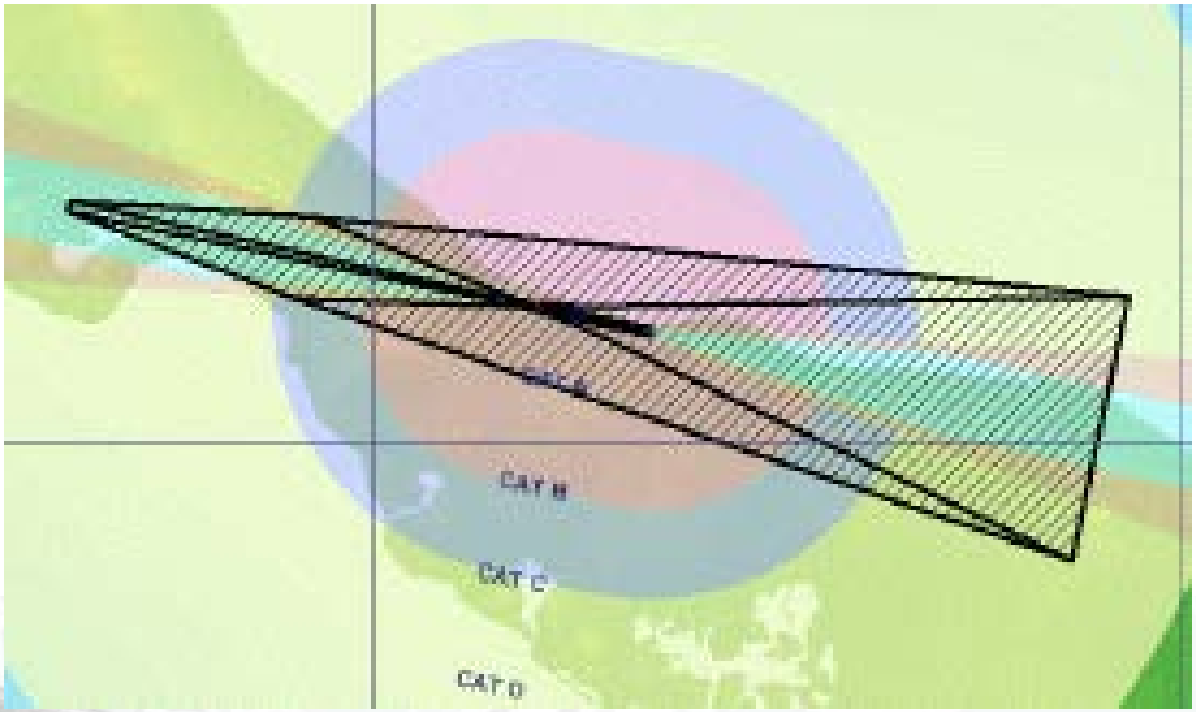
Analisis VSS



Analisis Aproximacion
Visual en Circuito

Data Analysis

OAS ILS



Analysis of Particular Obstacle

It was decided to build in an airport zone; however, the control tower has notified that this hangar could obstruct the line vision (LOS)

Data Analysis

First, the team analyzed if the location and height of the Control Tower was adequate

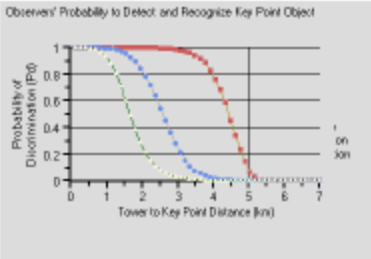


Figure 3 Observer Probability to Detect and Recognize Key Point Object

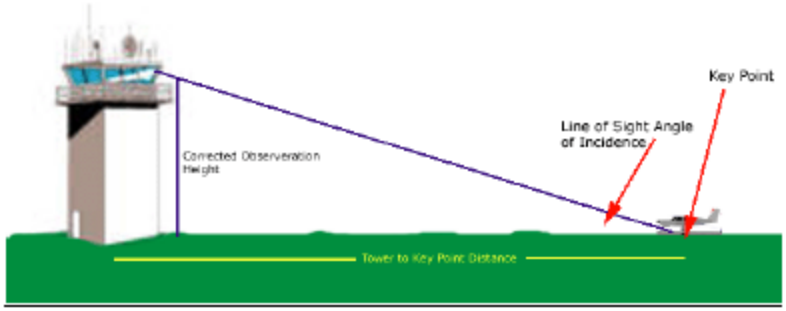


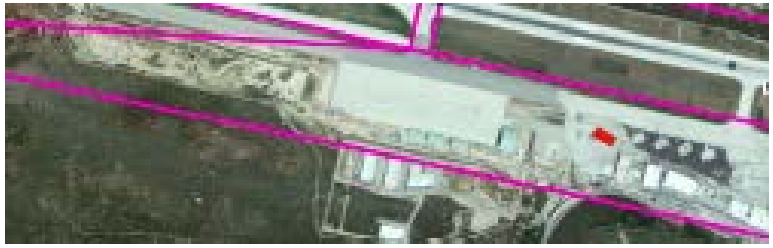
Figure 4 Representation of Tower to Key Point Distance

Data Analysis

Secondly, the team analyzed the distance from the runway centreline

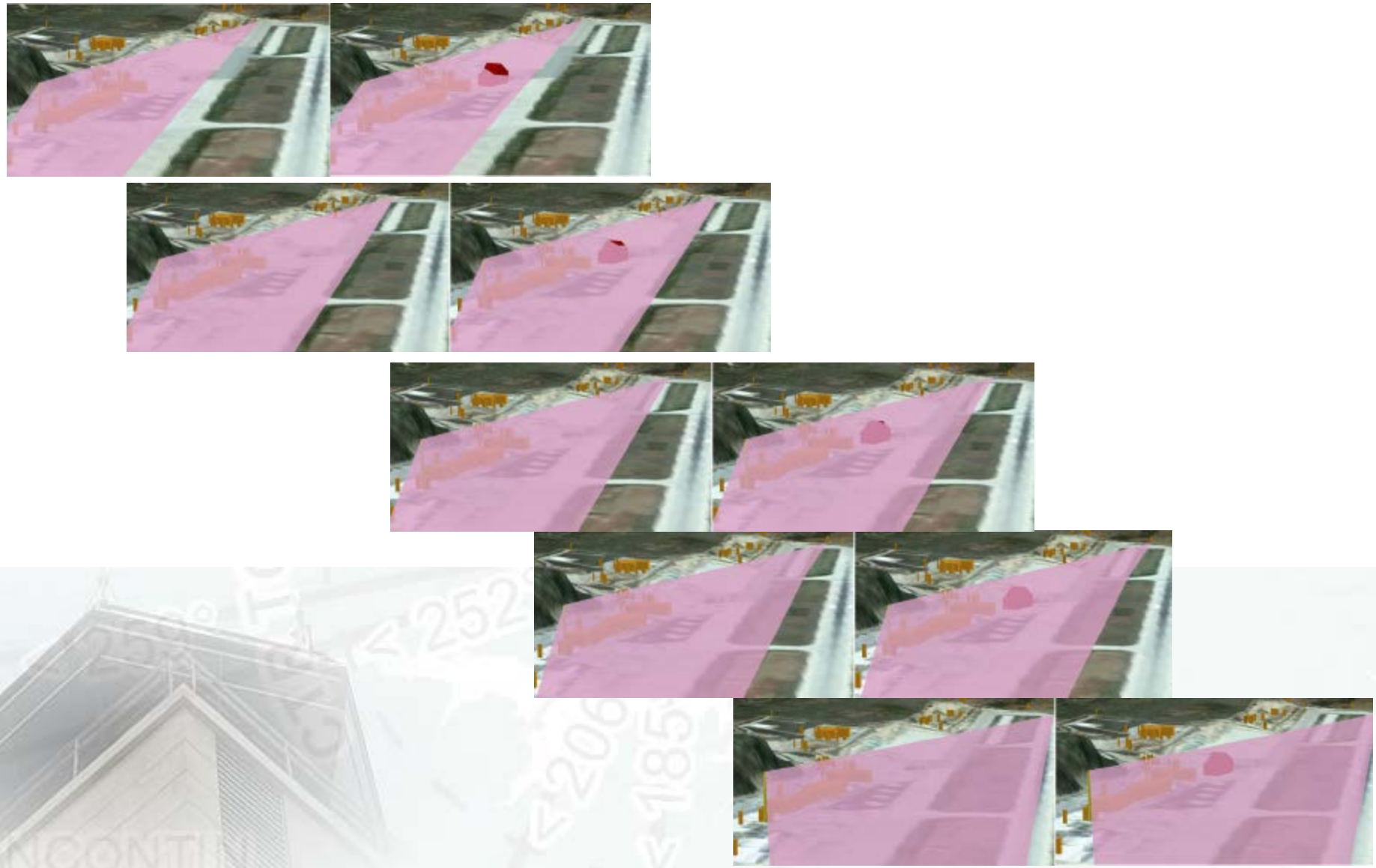
Data Analysis

Third, the team reviewed if the Annex 14 OLS were complied with



Data Analysis

Fourth, the line of vision (LOS) from the Control Tower was analyzed



Data Analysis

Fifth, the line of vision (LOS) from the Control Tower was analyzed