



# Taller sobre Estudios Aeronáuticos para Aeropuertos

*Lima, 1-4 Aut 2011*

## RSARA – Software p/ Análise de Faixa de Pista e RESA

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# Manual del Software

**ACRP 4-08**

*Improved Models for Risk Assessment of  
Runway Safety Areas*



**Runway Safety Area Risk  
Analysis (RSARA)**

**Software User's Guide** (Version 1.0)

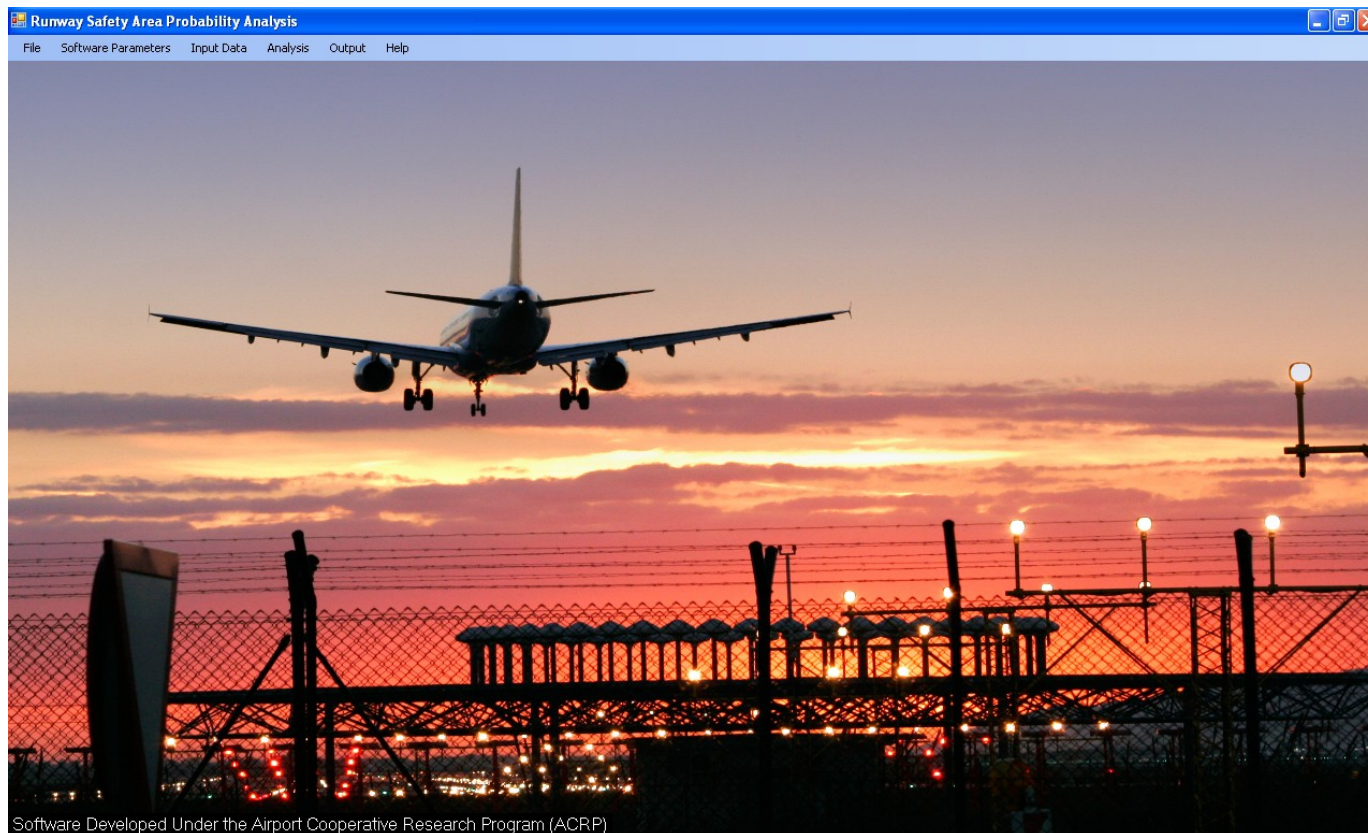
Software developed by Applied Research Associates, Inc.

# Esquema

- Lo que se analiza
- La apertura de un nuevo proyecto
- Preparación de datos
- Caracterización de los obstáculos
- Ejecutando el análisis
- Obtención de los resultados
- Interpretación

# Tipos de Eventos Analizados

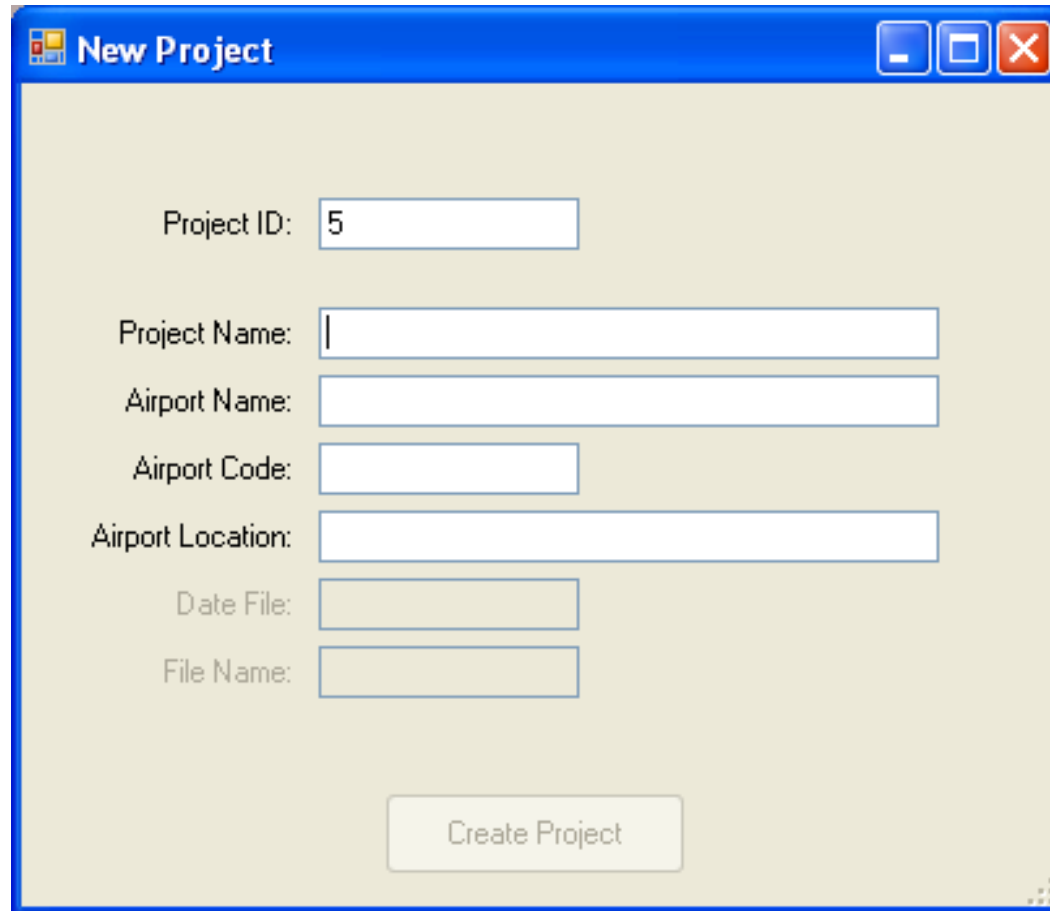
- Salidas de fin de pista en el aterrizaje (LDOR)
- Salidas de fin de pista en el despegue (TOOR)
- Aterrizajes cortos (LDUS)
- Salidas laterales de pista en el aterrizaje (LDVO)
- Salidas laterales de pista en el despegue (TOVO)



## Runway Safety Area Probability Analysis

File   Software Parameters   Input Data   Analysis   Output   Help

# Crear un nuevo proyecto



The image shows a software dialog box titled "New Project". It contains several input fields and a button. The "Project ID" field contains the number "5". The other fields are empty. The "Create Project" button is located at the bottom center of the dialog.

Project ID:	<input type="text" value="5"/>
Project Name:	<input type="text"/>
Airport Name:	<input type="text"/>
Airport Code:	<input type="text"/>
Airport Location:	<input type="text"/>
Date File:	<input type="text"/>
File Name:	<input type="text"/>

# Características del aeropuerto

Field	Description	Example	Meaning
Elevation (ft)	The airport elevation, in feet	1200	The highest point on any of the airport's runways is 1,200 ft relative to sea level
Expected Traffic Growth (%)	The average expected annual growth for aircraft movements	2.5	The average annual growth for future years is expected to be 2.5%
Airport Hub (Yes or No)	If the airport is a hub (large, medium or small), enable the check box	<input checked="" type="checkbox"/>	If the box is checked, the airport is a hub
Target Level of Safety (TLS)	The acceptable level of is expressed in the form of a Target Levels of Safety (TLS) or Criteria.	1.0E-07	In this case, the acceptable level of risk is 1 accident in 10,000,000 movements, or 0.0000001 (or 1.0E-07) accident per aircraft movement
Assume Commuter Ops by Type of Aircraft?	The frequency models use the type of flight (commercial, cargo, taxi/commuter or GA). Sometimes the information on commuter flights is not available and if the check box is marked, the type of aircraft will dictate if the flight is commuter or not	<input checked="" type="checkbox"/>	The program will assume commuter flights for every aircraft typically used for commuter operations. For example, ERJ-45 (Embraer jet airliner)

# Características de las pistas de aterrizaje

Field	Description	Example	Meaning
RWY ID	Enter the runway designation	14R	This is the designation for runway 14R
ASDA (ft)	Accelerate-Stop Distance Available for takeoff, in feet	8300	Runway 14R has an ASDA of 8,300 feet
LDA (ft)	Landing Distance Available, in feet	7900	Runway 14R has an LDA of 7,900 feet
Category	Type of instrument approach available	CAT I	Runway 14R approach category is precision level 1. Other possibilities are: V (visual), NP (non-precision), CAT II and CAT III

# Los códigos de los obstáculos

## Codes for RSA Surface

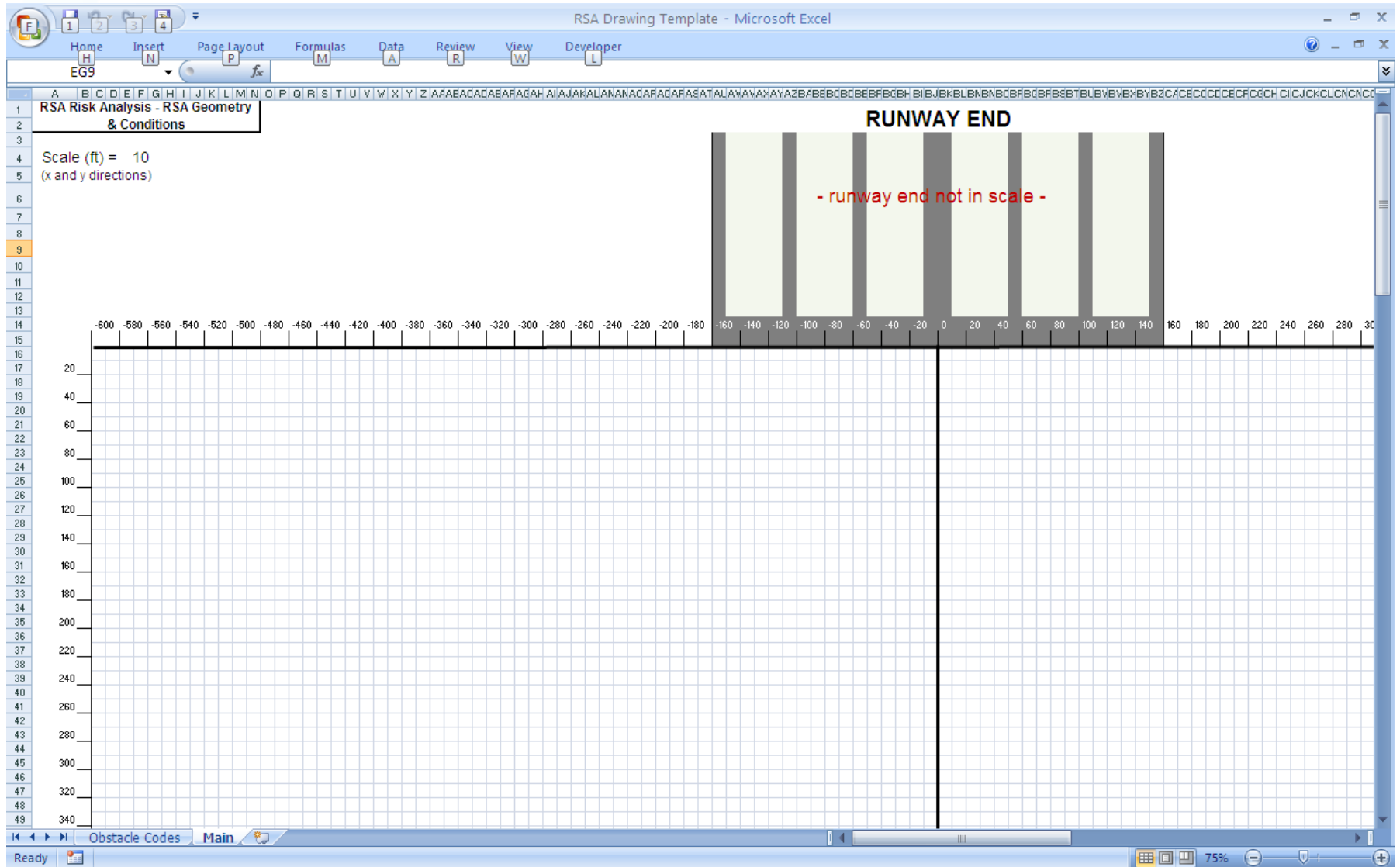
Type of Area	Code
Grass	n
Soil	n
Unpaved area	n
Paved	p
Asphalt	p
Concrete	p
EMAS	e
Cement stabilized	p

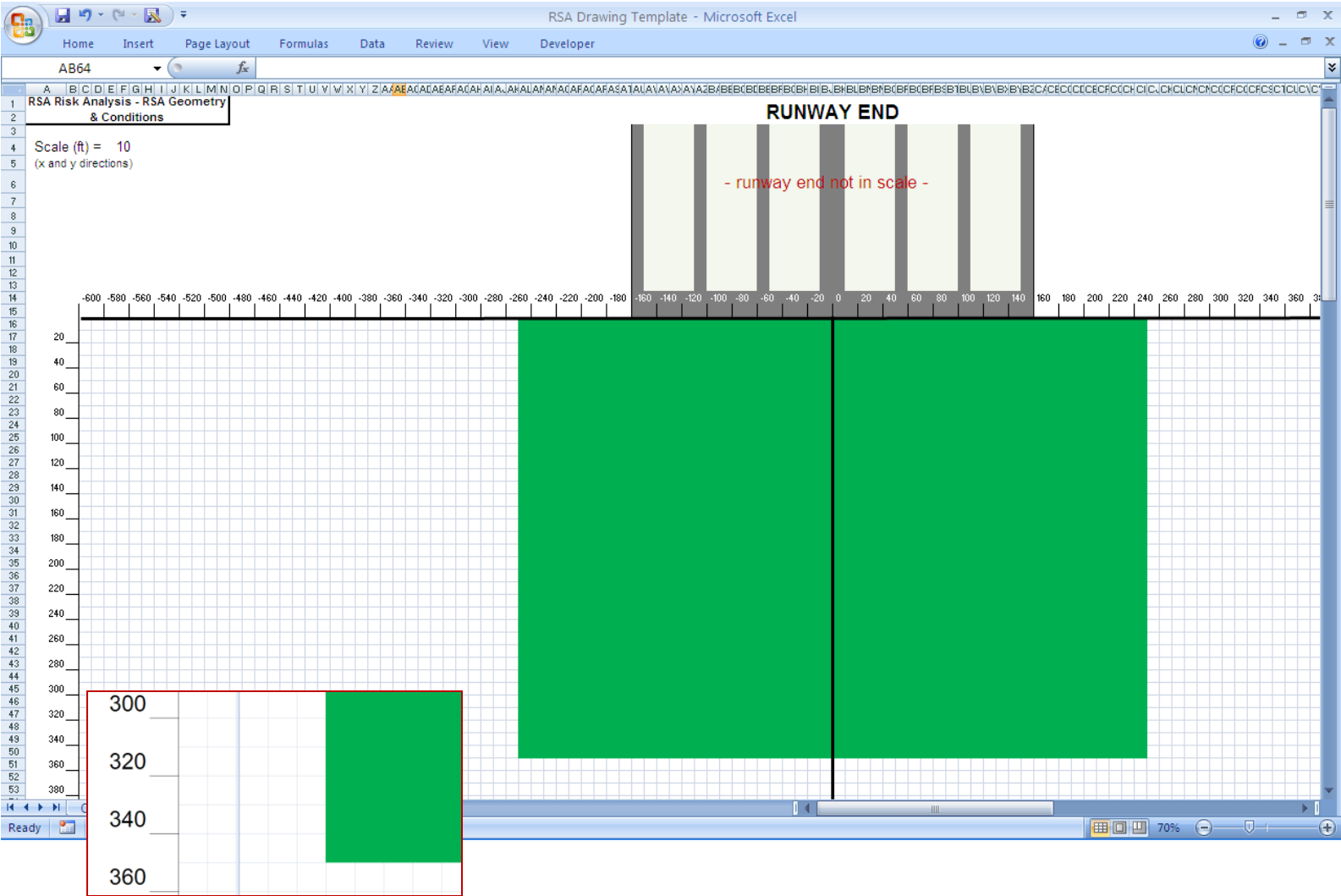
Obstacle Categories	Max Speed
Category 1	nil
Category 2	5 knots
Category 3	20 knots
Category 4	40 knots

## Codes for Obstacles

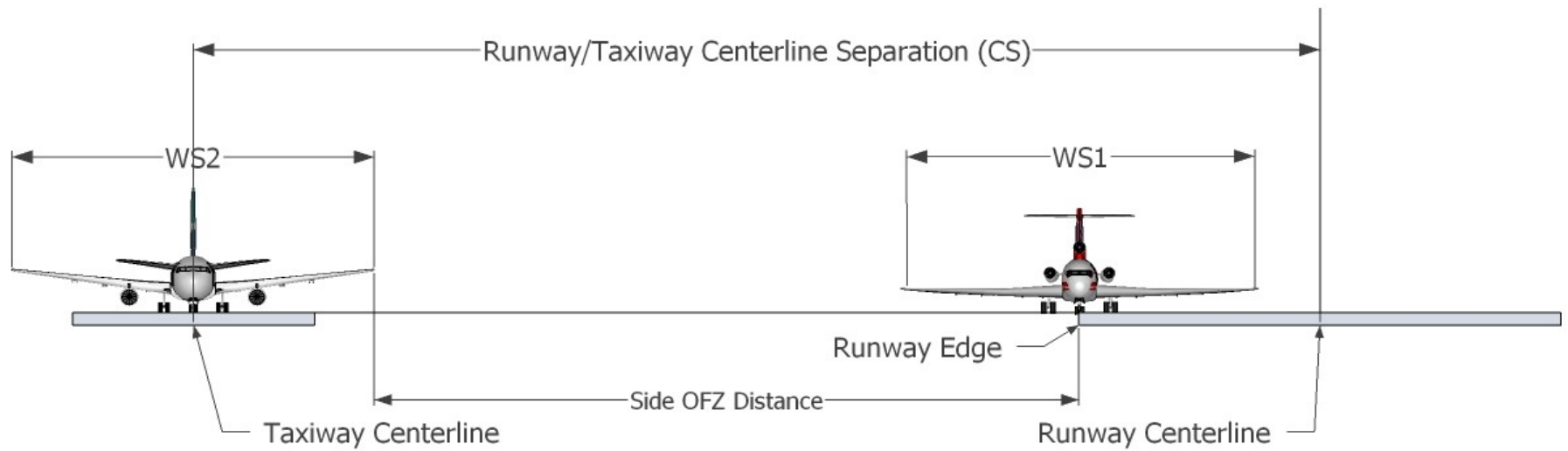
Type of Obstacle	Code
Concrete buildings	1
Concrete walls	1
Cliffs	1
Large holes	1
Body of water (undershoot)	1
Stockpiles	1
Highways	1
Flammable material pipeline	1
Gas station	1
Body of water (overrun)	2
Brick wall	2
Non frangible blast fences	2
Large ditches	2
Small ditches	3
Fences	3
Irregular terrain	3
Small depressions	3
Large frangible structures	4
Localizer	4
ALS	4
Frangible blast fences	4
Non prepared areas	4
Lights	no code
Signs (frangible)	no code

# Caracterizando la área de seguridad





# Side OFA



# Operaciones

**Input Historical Operations**

Existing Historical Operations in the Database

HOD ID	DATE&TIME	RUNWAY	BOUND	FAA_Code	FLIGHT_Categr
1	1/10/2006 12:03 AM	15	A	A319	AIR
2	1/10/2006 12:14 AM	33	A	MD83	AIR
3	1/10/2006 12:17 AM	33	A	B752	AIR
4	1/10/2006 12:19 AM	15	A	A320	AIR
5	1/10/2006 12:21 AM	33	A	B752	AIR
6	1/10/2006 12:26 AM	33	D	A319	AIR
7	1/10/2006 12:27 AM	33	D	B744	AIR
8	1/10/2006 12:30 AM	33	D	B744	AIR

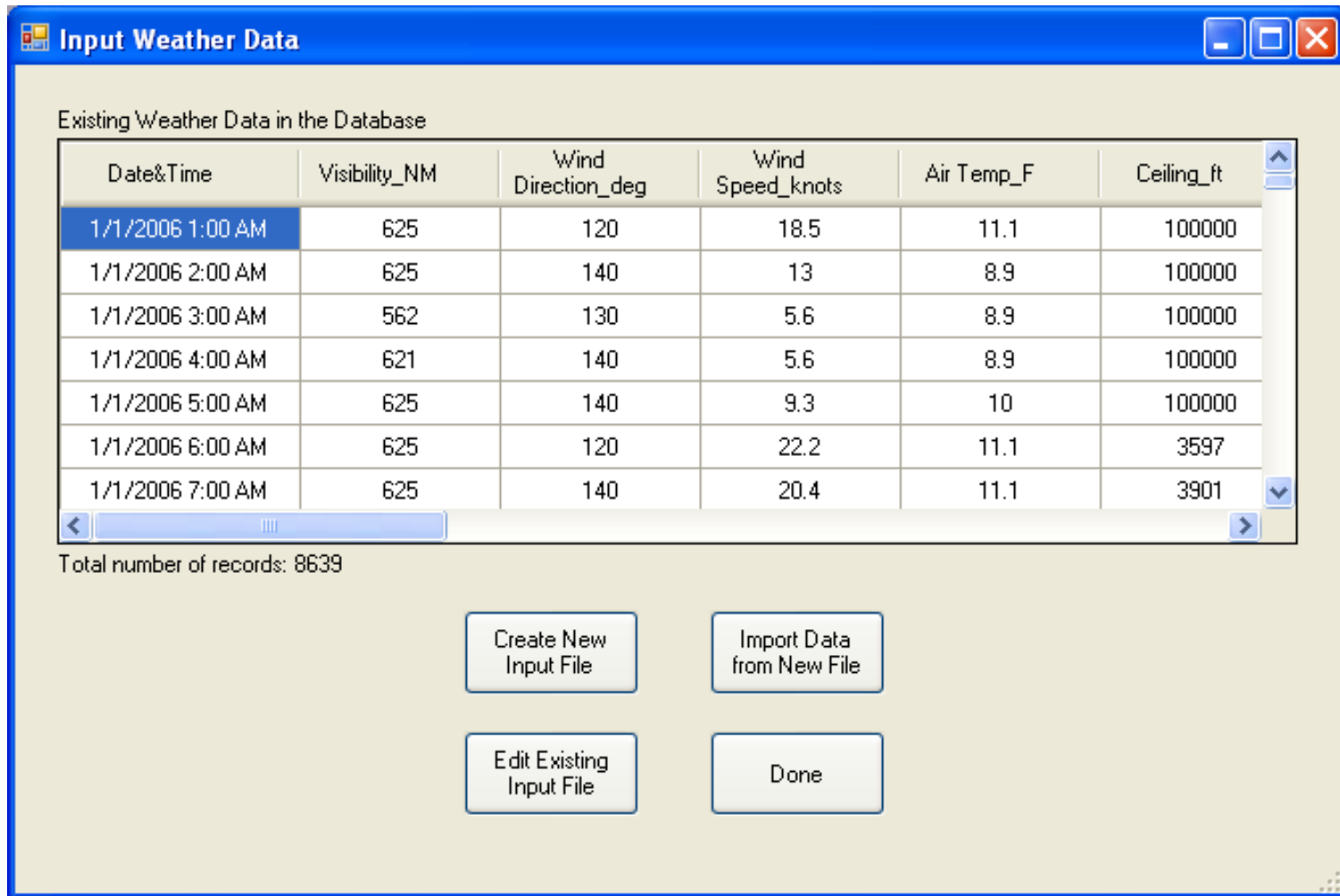
Total number of records: 2000

Create New Input File      Import Data from New File

Edit Existing Input File      Done

Field	Description	Format
<b>HOD_ID</b>	This is an ID for the record and any reference may be used by the person creating the database. We suggest to enter a number, starting from 1 to the last record number, as shown in the example below.	Any format may be used. <u>This information is not used by the program</u> and is intended only to be a reference for the user.
<b>DATE&amp;TIME</b>	This is the date and time when the aircraft movement took place	The format includes date and time, and is already set in the template provided with the program. Please see example below.
<b>RWY_DESIGNATION</b>	This is the runway designation where the movement took place.	The runway number and letter should be included (e.g. 14R or 23).
<b>BOUND</b>	If the movement is an arrival or departure.	Use <b>A</b> for arrival and <b>D</b> for departure
<b>FLIGHT#</b>	The flight number for the movement.	Any format can be used (e.g. AAL622). This information is <u>for user reference only</u> and does not need to be filled in because the program does not require it.
<b>FAA_CODE</b>	This is the code used by the FAA to characterize the aircraft type and model.	The code must match those available in the aircraft database. For example B733 is used for the Boeing 737-300 aircraft. When running the analysis, the program will attempt to match this code to one of the codes in the aircraft library. If the program is unable to match to an existing aircraft code, the record will be saved in a file for missing data and later the user can insert the new aircraft in the database and rerun the analysis for missing data records.
<b>FLIGHT_CATEGORY</b>	This field is used to characterize the type of flight: commercial, cargo, commuter/taxi or general aviation (GA)	Use <b>AIR</b> for commercial, <b>CAR</b> for cargo, <b>COM</b> for commuter/taxi and <b>GA</b> for general aviation
<b>FLIGHT_TYPE</b>	This is a code used to characterize if the flight is arriving from or departing to an international destination	Use <b>D</b> for domestic and <b>I</b> for international

# Meteorología



The screenshot shows a software window titled "Input Weather Data" with a blue title bar. Below the title bar, the text "Existing Weather Data in the Database" is displayed. A table with six columns and seven rows of data is shown. The columns are labeled "Date&Time", "Visibility\_NM", "Wind Direction\_deg", "Wind Speed\_knots", "Air Temp\_F", and "Ceiling\_ft". The first row is highlighted in blue. Below the table, the text "Total number of records: 8639" is displayed. At the bottom of the window, there are four buttons: "Create New Input File", "Import Data from New File", "Edit Existing Input File", and "Done".

Date&Time	Visibility_NM	Wind Direction_deg	Wind Speed_knots	Air Temp_F	Ceiling_ft
1/1/2006 1:00 AM	625	120	18.5	11.1	100000
1/1/2006 2:00 AM	625	140	13	8.9	100000
1/1/2006 3:00 AM	562	130	5.6	8.9	100000
1/1/2006 4:00 AM	621	140	5.6	8.9	100000
1/1/2006 5:00 AM	625	140	9.3	10	100000
1/1/2006 6:00 AM	625	120	22.2	11.1	3597
1/1/2006 7:00 AM	625	140	20.4	11.1	3901

Total number of records: 8639

Buttons: Create New Input File, Import Data from New File, Edit Existing Input File, Done

Field	Description	Format
<b>Date&amp;Time</b>	This is the date and time when the weather measures were taken	The format includes date and time, and is already set in the template provided with the program.
<b>Visibility_NM</b>	The distance at which a given standard object can be seen and identified with the unaided eye	Nautical Miles (NM)
<b>Wind Direction_deg</b>	The true direction from which the wind is blowing at a given location (i.e., wind blowing from the north to the south is a north wind). A wind direction of 0 degrees is only used when wind is calm.	In degrees clockwise through 360 degrees. North is 360 degrees.
<b>Wind Speed_knots</b>	The rate at which air is moving horizontally past a given point. It may be a 2-minute average speed (reported as wind speed) or an instantaneous speed (reported as a peak wind speed, wind gust, or squall).	Knots (kts)
<b>Air Temp_F</b>	The ambient temperature indicated by a thermometer exposed to the air but sheltered from direct solar radiation.	Degrees Fahrenheit (F)
<b>Ceiling_ft</b>	The height of the cloud base for the lowest broken or overcast cloud layer.	Feet (ft)
<b>Thunderstorm</b>	A local storm produced by a cumulonimbus cloud and accompanied by lightning and thunder	Presence (TRUE) or not (FALSE)
<b>Rain</b>	Precipitation that falls to earth in drops more than 0.5 mm in diameter.	Presence (TRUE) or not (FALSE)
<b>Rain Showers</b>	A brief period of rain	Presence (TRUE) or not (FALSE)
<b>Freezing Rain</b>	Rain that falls as a liquid but freezes into glaze upon contact with the ground.	Presence (TRUE) or not (FALSE)
<b>Freezing Drizzle</b>	A drizzle that falls as a liquid but freezes into glaze or rime upon contact with the cold ground or surface structures.	Presence (TRUE) or not (FALSE)
<b>Snow</b>	Precipitation in the form of ice crystals, often agglomerated into snowflakes, formed directly from the freezing [deposition] of the water vapor in the air.	Presence (TRUE) or not (FALSE)
<b>Snow Pellets</b>	Precipitation, usually of brief duration, consisting of crisp, white, opaque ice particles, round or conical in shape and about 2 to 5 mm in diameter. Same as graupel or small hail.	Presence (TRUE) or not (FALSE)
<b>Ice Crystals</b>	A barely visible crystalline form of ice that has the shape of needles, columns or plates. Ice crystals are so small that they seem to be suspended in air. Ice crystals occur at very low temperatures in a stable atmosphere.	Presence (TRUE) or not (FALSE)
<b>Snow Showers</b>	Short duration of moderate snowfall. Some accumulation is possible.	Presence (TRUE) or not (FALSE)
<b>Ice Pellets</b>	Same as Sleet; defined as pellets of ice composed of frozen or mostly frozen raindrops or refrozen partially melted snowflakes. These pellets of ice usually bounce after hitting the ground or other hard surfaces. Heavy sleet is a relatively rare event defined as an accumulation of ice pellets covering the ground to a depth of ½" or more.	Presence (TRUE) or not (FALSE)
<b>Ice Pellet Showers</b>	Short duration of ice pellet precipitation.	Presence (TRUE) or not (FALSE)
<b>Fog</b>	Fog is water droplets suspended in the air at the Earth's surface. Fog often degrades the visibility.	Presence (TRUE) or not (FALSE)
<b>Gusts</b>	A rapid fluctuation of wind speed with variations of 10 knots or more between peaks and	Presence (TRUE) or not (FALSE)



Aircraft Database

1 of 253

Check to Allow Update/Add Record.

ID	Aircraft_name	ICAO_Code	Manufacturer
1	Fokker 100	F100	Fokker
2	Airbus 300-600	A306	Airbus
3	Airbus 310	A310	Airbus
4	Airbus 318	A318	Airbus
5	Airbus 319	A319	Airbus

ID:

Aircraft name:

ICAO Code:  Wingspan (ft):

IATA Code:  Dist Btw Gears Center (ft):

Manufacturer:  Length (ft):

Type code:  Height (ft):

MTOW (lb):  Landing Gear:

Take Off Dist (ft):  V2:

Landing Dist (ft):  Approach Speed (kts):

Commuter:  Seating:

# Base de datos de aviones

**Run Analysis**

**Probability of Incident-Frequency**

Run All Runways  
 Run Individual Runway

Select RWY to Perform Calculations: 15

Check to rerun only operations previously missing aircraft or weather data.

Probability of Incident-Frequency

Status:

**Probability of Incident Location and Total Probability**

Run All Runways  
 Run Individual Runway

Select RWY to Perform Calculations: 15

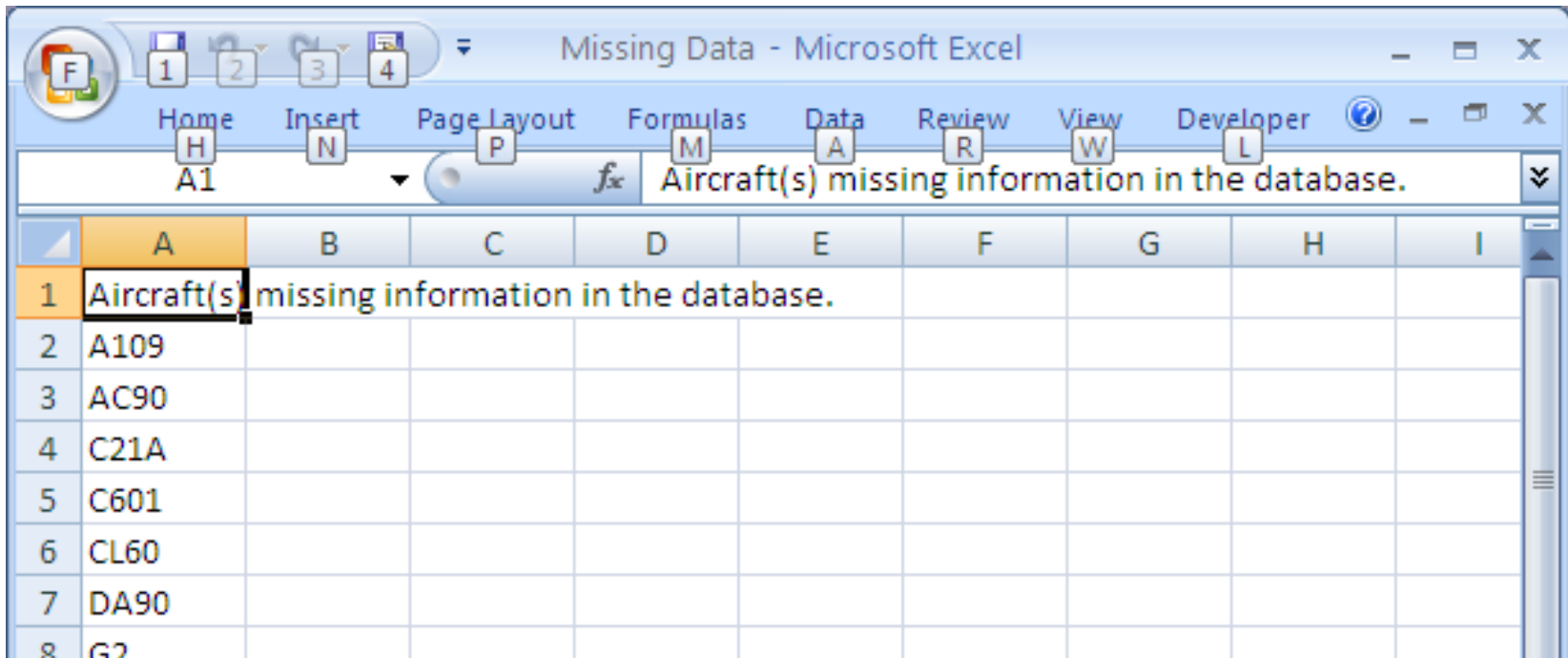
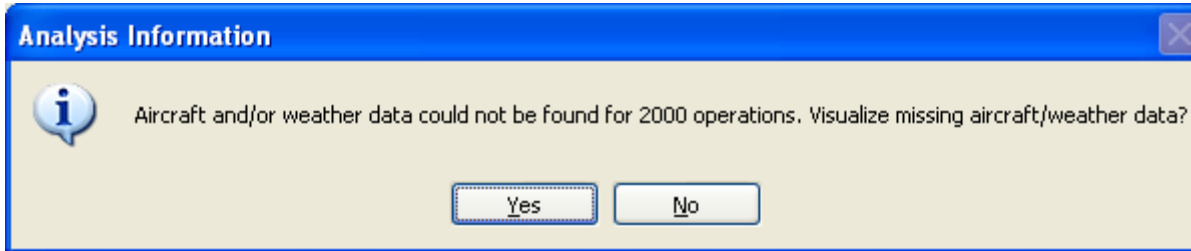
Probability of Incident Off RSA

Risk Analysis (If Obstacles Are Present)

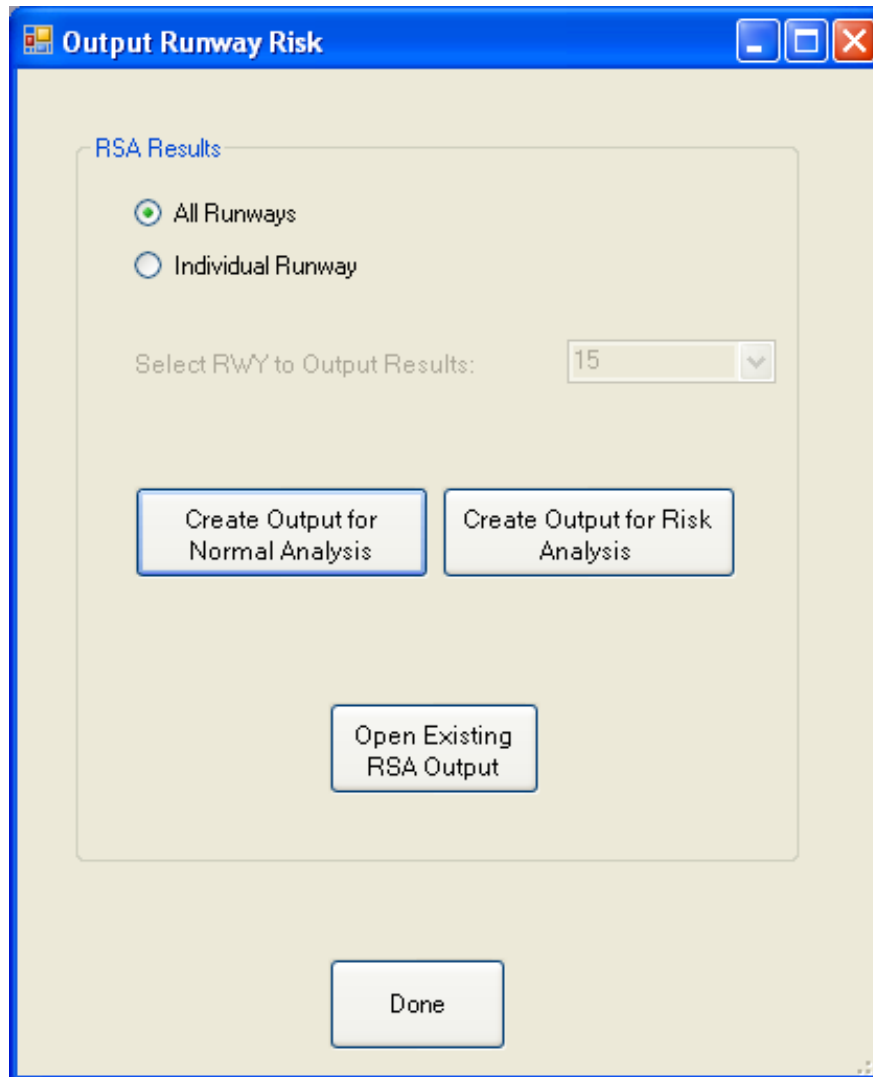
Status:

Done

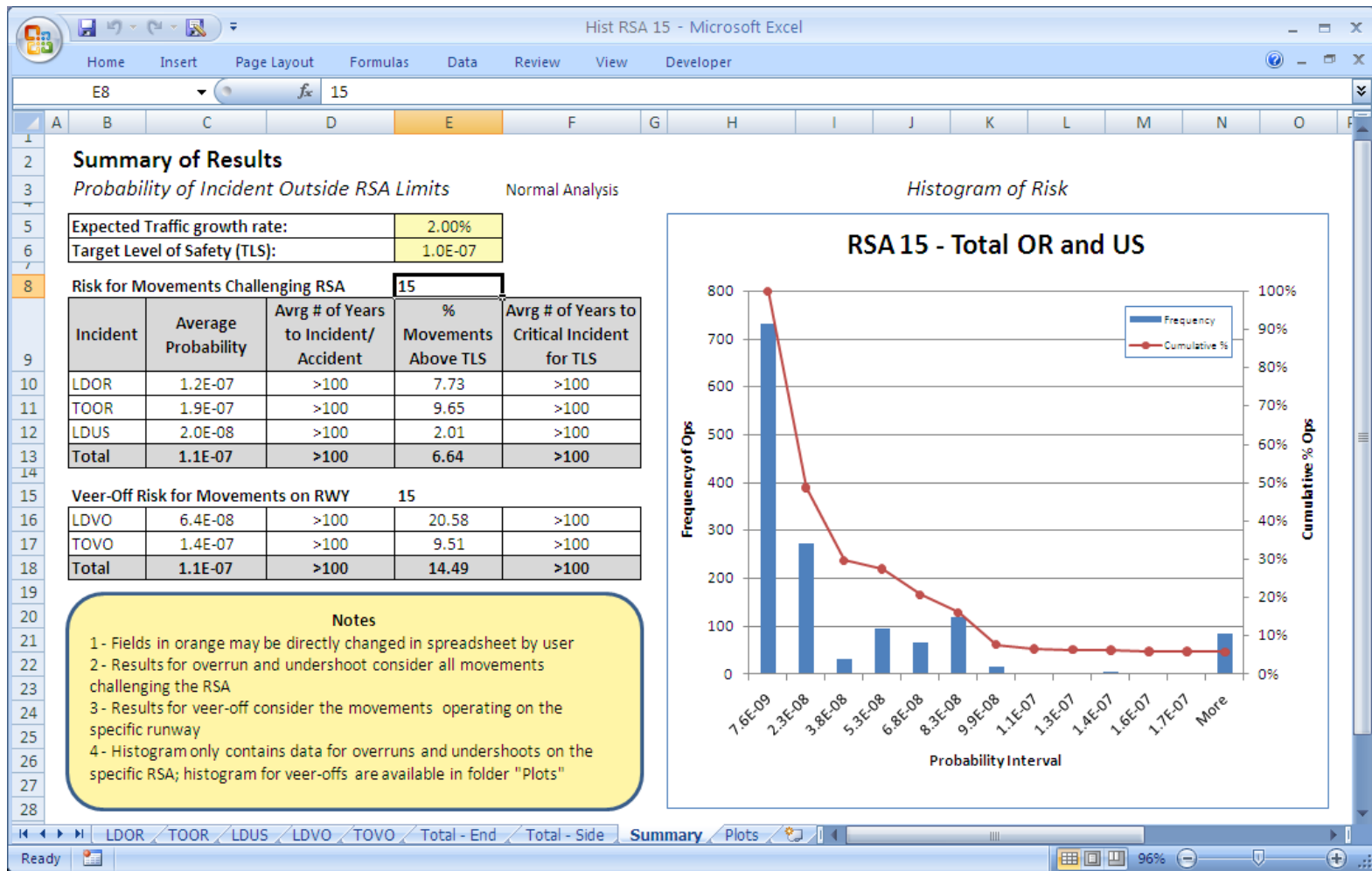
# Falta de información



# Resultados



# Resultados



# Resultados

