



FOQA Program SKY Airline

RASG-PA Flight Data Analysis Programme seminar (FDAP) | Miami Oct_16



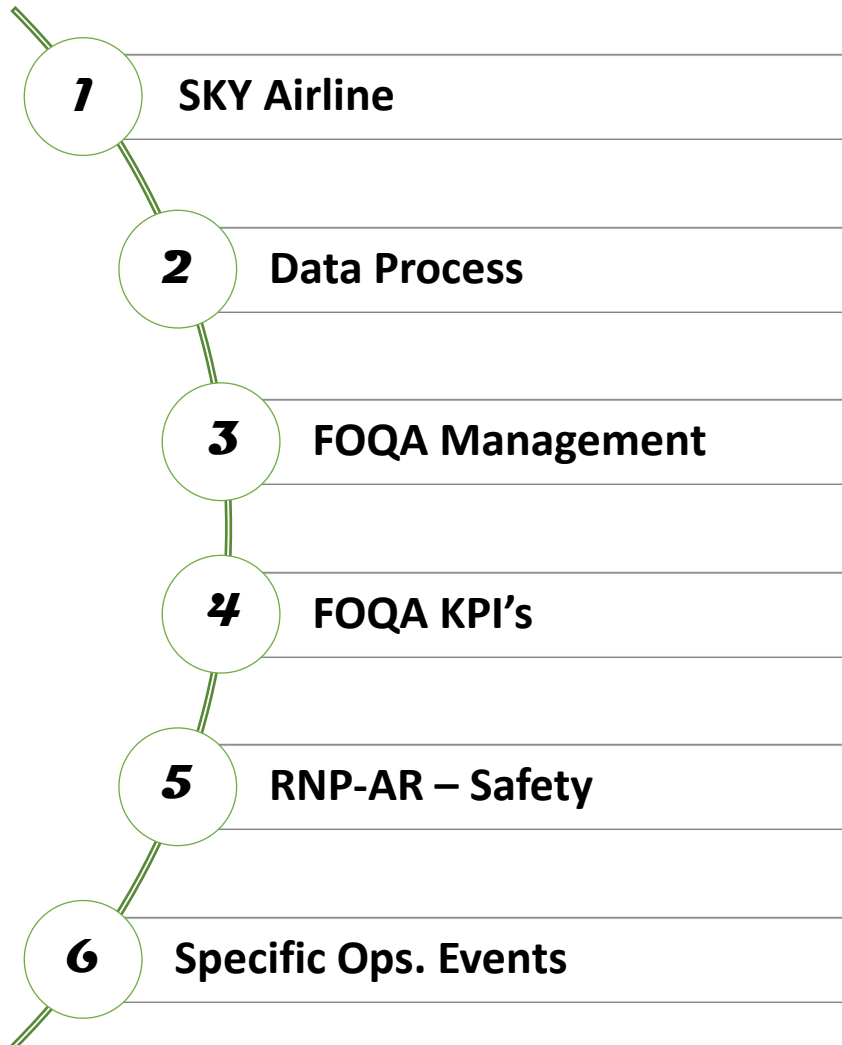
A new experience...



Claudio Tobar J.
Flight Data Monitoring Chief
claudio.tobar@skyairline.com

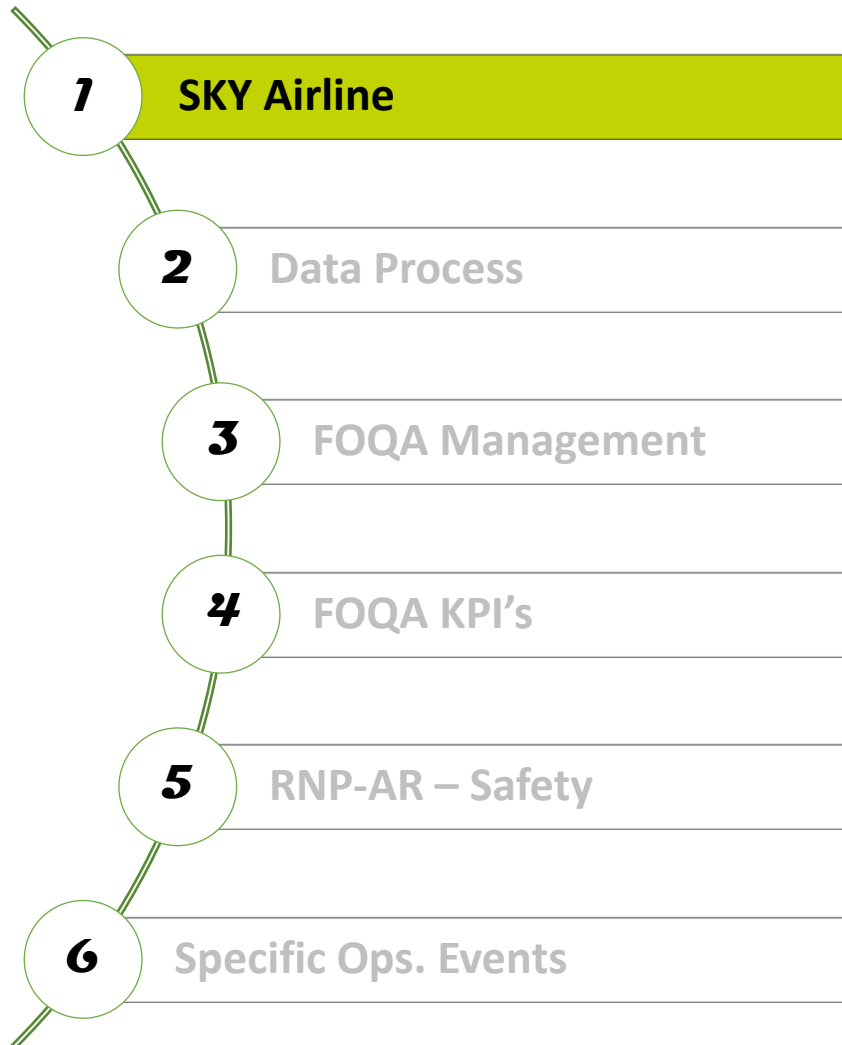


Content





Content





¡Bienvenidos a bordo!

Volamos en Sudamérica y en Chile desde 2002, conectando y encantando a nuestros pasajeros con el mejor servicio.

Seguridad

Somos la **primera** aerolínea **Low Cost** de Sudamérica en recibir la **certificación internacional de seguridad aérea** y operacional IOSA de la Asociación de Transporte Aéreo Internacional (IATA).



Puntualidad

Somos una de las aerolínea más puntuales del mundo según FlightView y flightStats

N°1 Low cost del mundo (enero y marzo 2016)

N°7 de todas las líneas aéreas (Enero 2016)



Calidad

Elegida por **2 años consecutivos** como la **Mejor Aerolínea Regional de Sudamérica** según SKYtrax, Los principales premios de la aviación comercial en el mundo.



Evolución de la Seguridad Operacional 2013 – 2016

	2013	2014	2015	2016
Nivel Estratégico	Evaluación Total del Sistema	Concepto Integrado Safety, QA & Security	Plan Estratégico Mediano/Largo Plazo	LOW COST
Nivel Táctico	SMS Fase I & II Auditoria IOSA SAMS + AIRFASE	SMS Fase III & IV Diseño de iAMS	Implementación iAMS	Diseño Enterprise Risk Management
		Consultoría Partner IATA		
		Consultoría Airbus		
Resultados		Gerencia de Seguridad Operacional & QA		
		Certificación IOSA + Membresía IATA		
	FDM	FOQA Comité FOQA	MOQA	Comité MOQA
	OTP	 OTP	 7 Estrellas en Seguridad Airline Ratings	LOC-I RASP-GA

Flight Data Monitoring (FDM) – Flight Data Analysis (FDA)

“Proceso para analizar los datos de vuelo registrados a fin de mejorar la seguridad de las operaciones de vuelo.”

Flight Operations Quality Assurance (FOQA)

“Programa orientado a asegurar la calidad de las operaciones de vuelo.”

Simulator Operations Quality Assurance (SOQA)

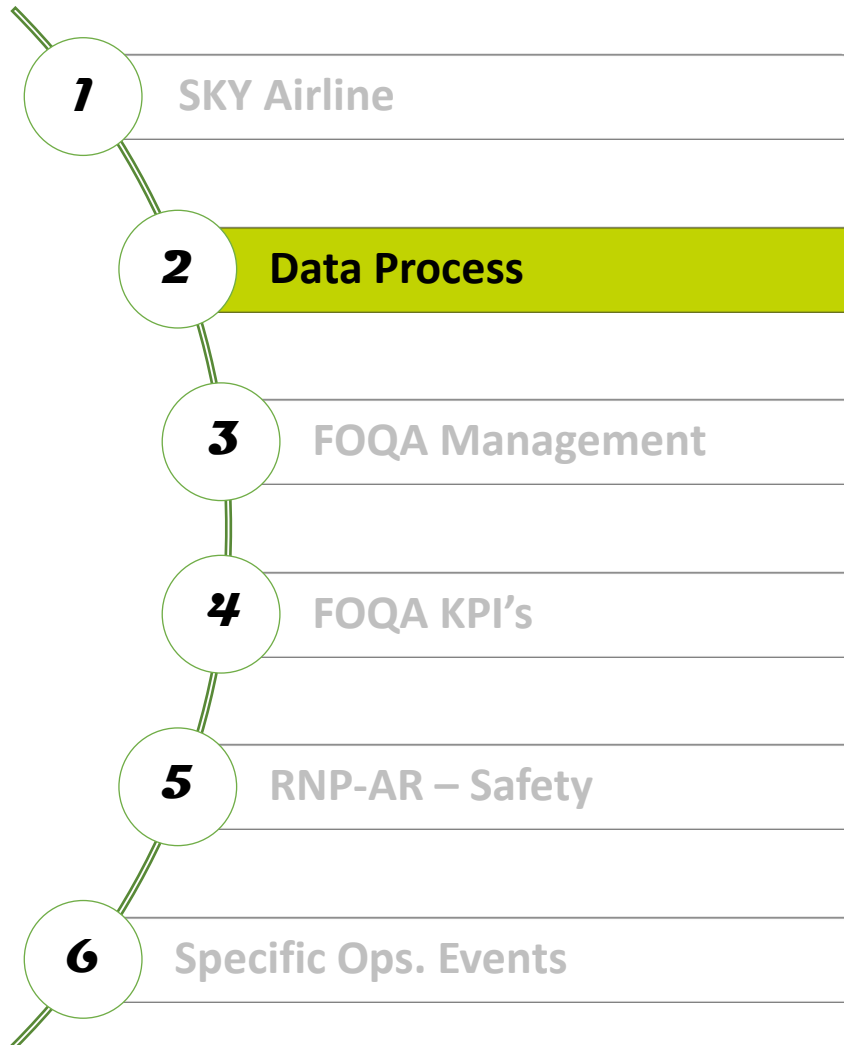
“Programa orientado a asegurar la calidad de las operaciones de vuelo en el simulador.”

Maintenance Operations Quality Assurance (MOQA)

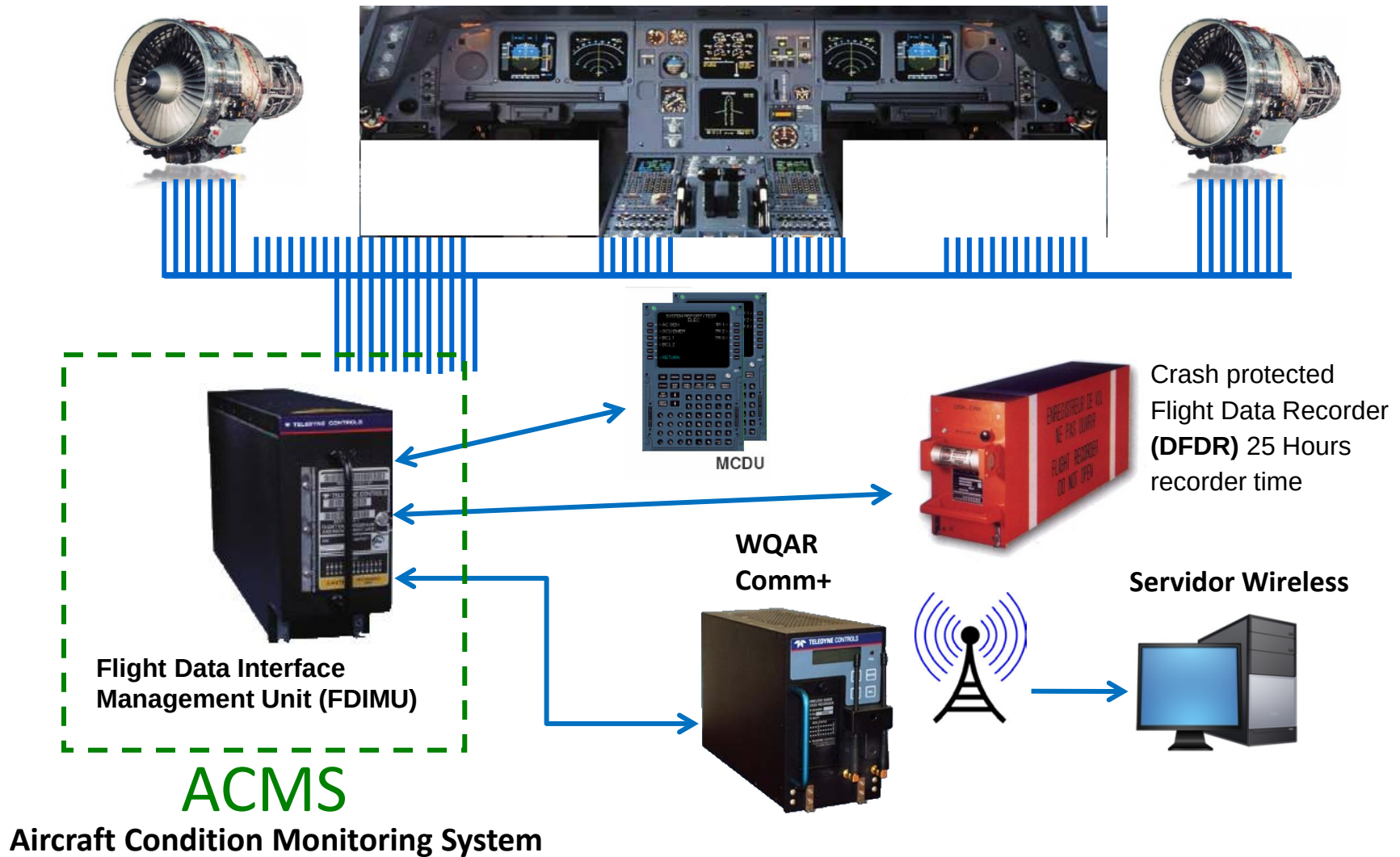
“Programa orientado a analizar los aspectos relativos al mantenimiento.”



Content



Principio de adquisición de datos para MOQA





Data Process

Flight Data Monitoring



Flight Data Interface
Management Unit
(FDIMU)

Computador de
Adquisición de datos.



Wireless GroundLink®
(WGL) System

Computador grabador y
Transmisor de datos



Local Cell Tower



Internet



Server Data
Analysis



AirFASE® -
Aircraft Flight
Analysis &
Safety Explorer



Data Analysis



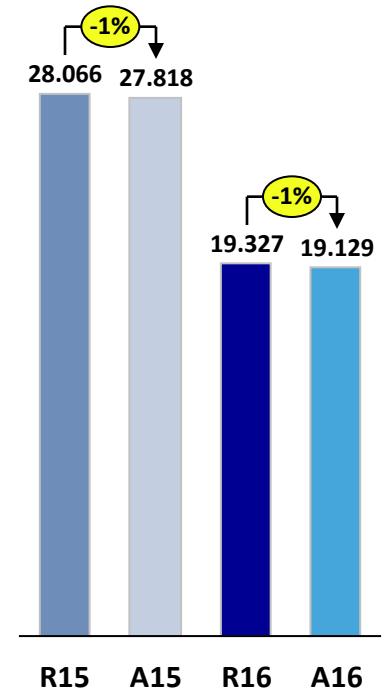
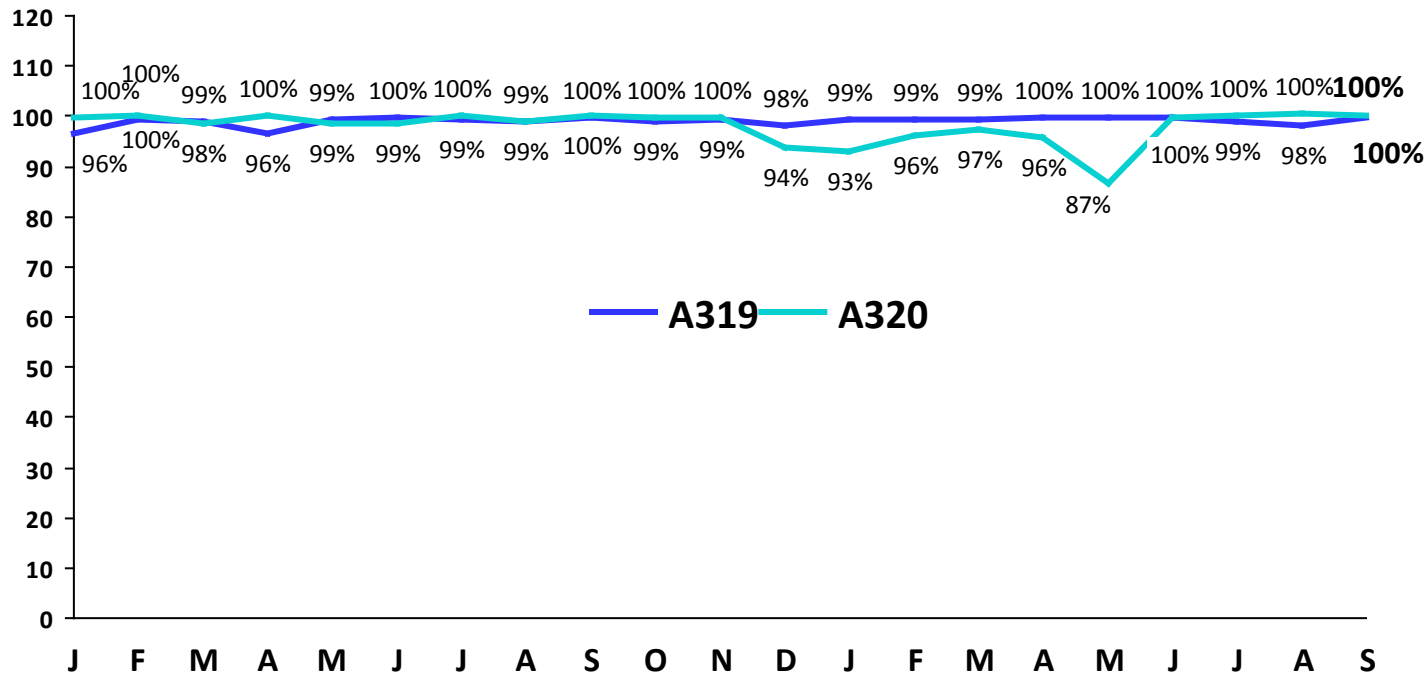
Operations



Maintenance &
Engineering

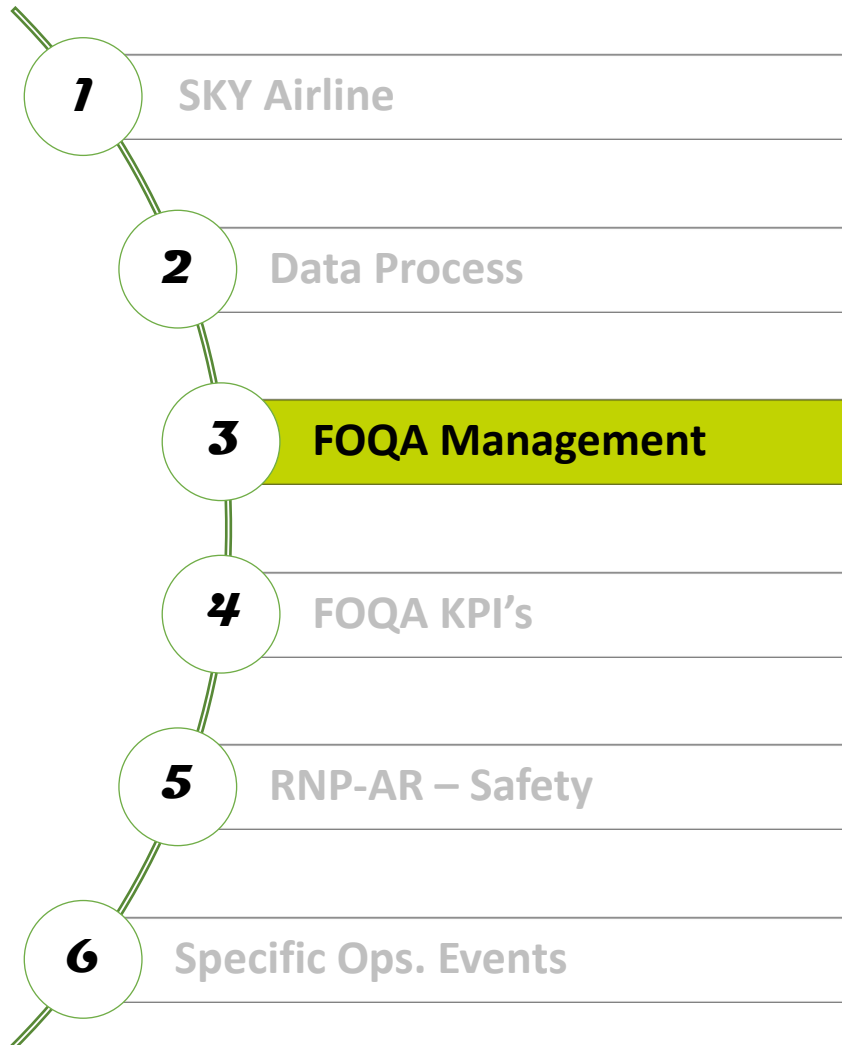
Flight Data (2015 – 2016)

% x Fleet x Month

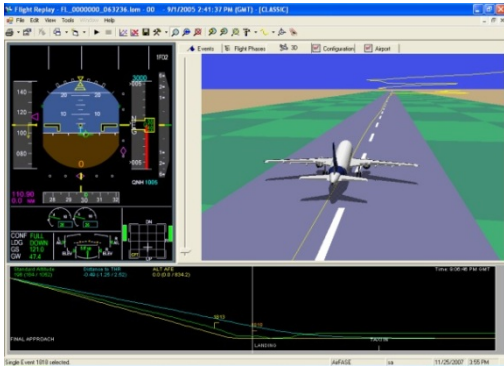




Content



Flight Data Análisis (AirFASE)



LOSA



Inspecciones



Sistema Reportes



Reporte Incidente

Auditorías



Investigación en casa



Beneficios del Flight Data Monitoring



- Reducción del riesgo de incidentes o accidentes aéreos.



- Mejora en los procedimientos Operacionales.



- Mejora en Consumo de Combustible.



- Mejora en el programa de entrenamiento de Pilotos.



- Reducción de Mantenimiento innecesario y reparaciones.

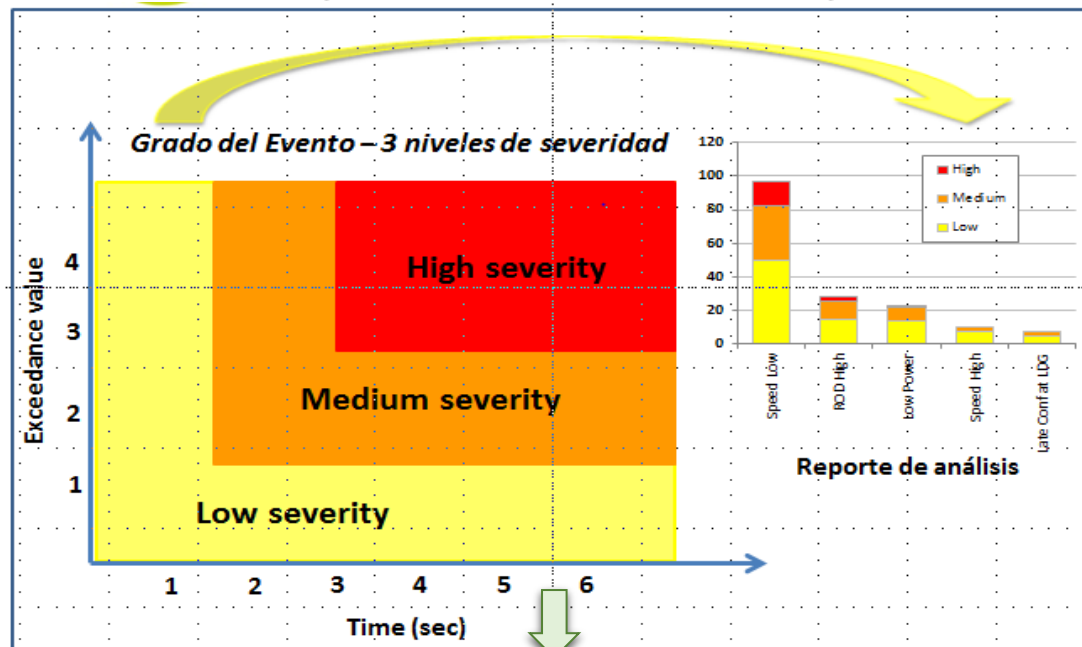


- Reducción en los costos de seguro.



- Mayor disponibilidad de aviones.

FOQA - MOQA



Data Sharing
FDX

Data Sharing
Airbus

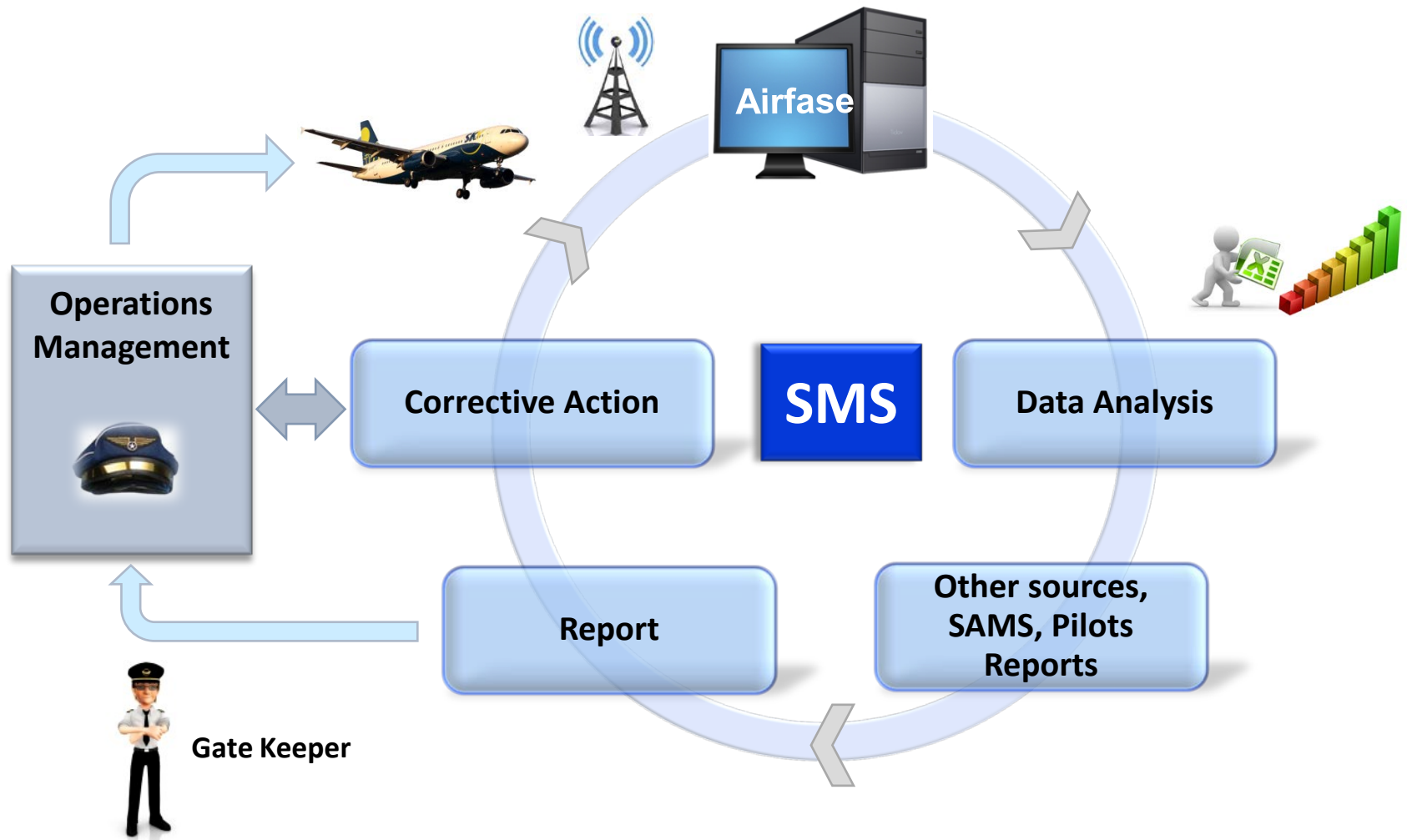
Operational
Events

Maintenance
Events

Gate Keeper

Just Culture

FOQA/MOQA Committee



Gatekeeper functions

- ✓ Protect the de-identified data.
- ✓ Evaluate high severity events, and determine whether it is an error or a violation
- ✓ Contact crews with significant high severity events.
- ✓ Analyzing flight data and perform root cause analysis.
- ✓ Participate in the FOQA & Just Culture committees
- ✓ Participate in LOSA program.





FDM Promotion (Newsletter)

Flight Data Monitoring



Newsletter FOQA N° 1 | Agosto 2016



FOQA

Flight Data Monitoring
(FDM)





Newsletter MOQA N° 1 | Agosto 2016



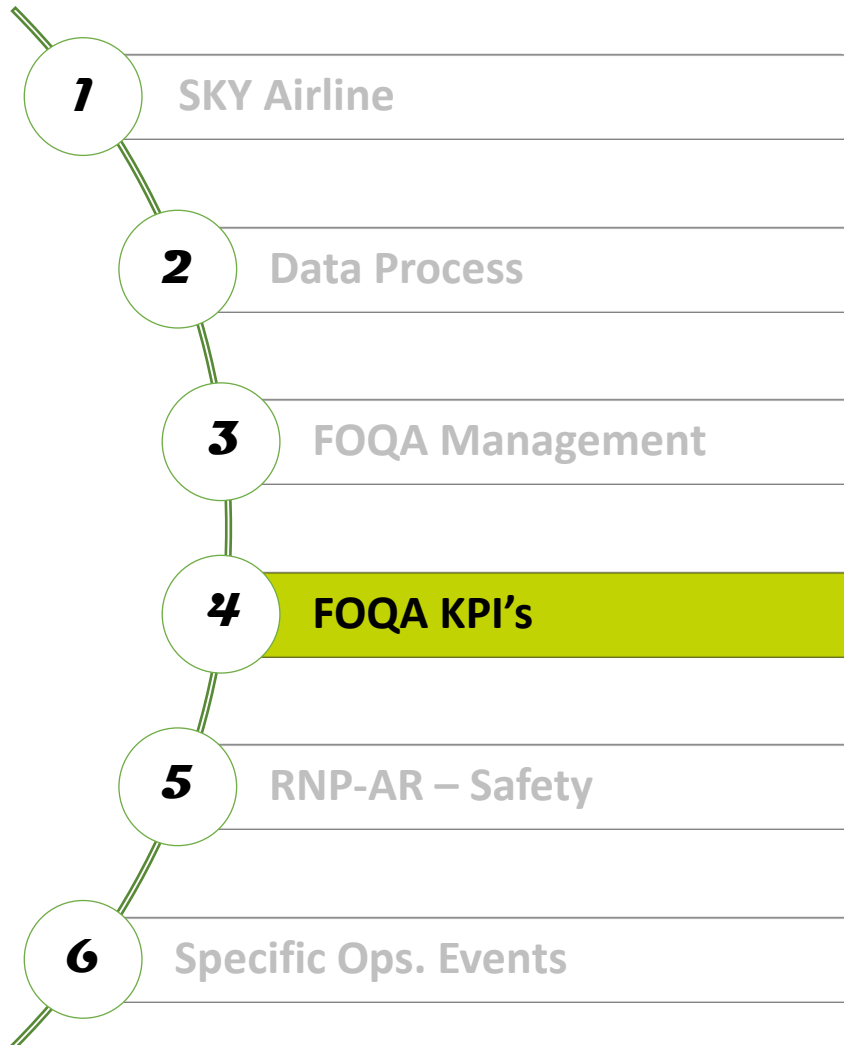
MOQA

Flight Data Monitoring
(FDM)





Content





SKY Safety Concerns Monitoring

LOC_I



CFIT

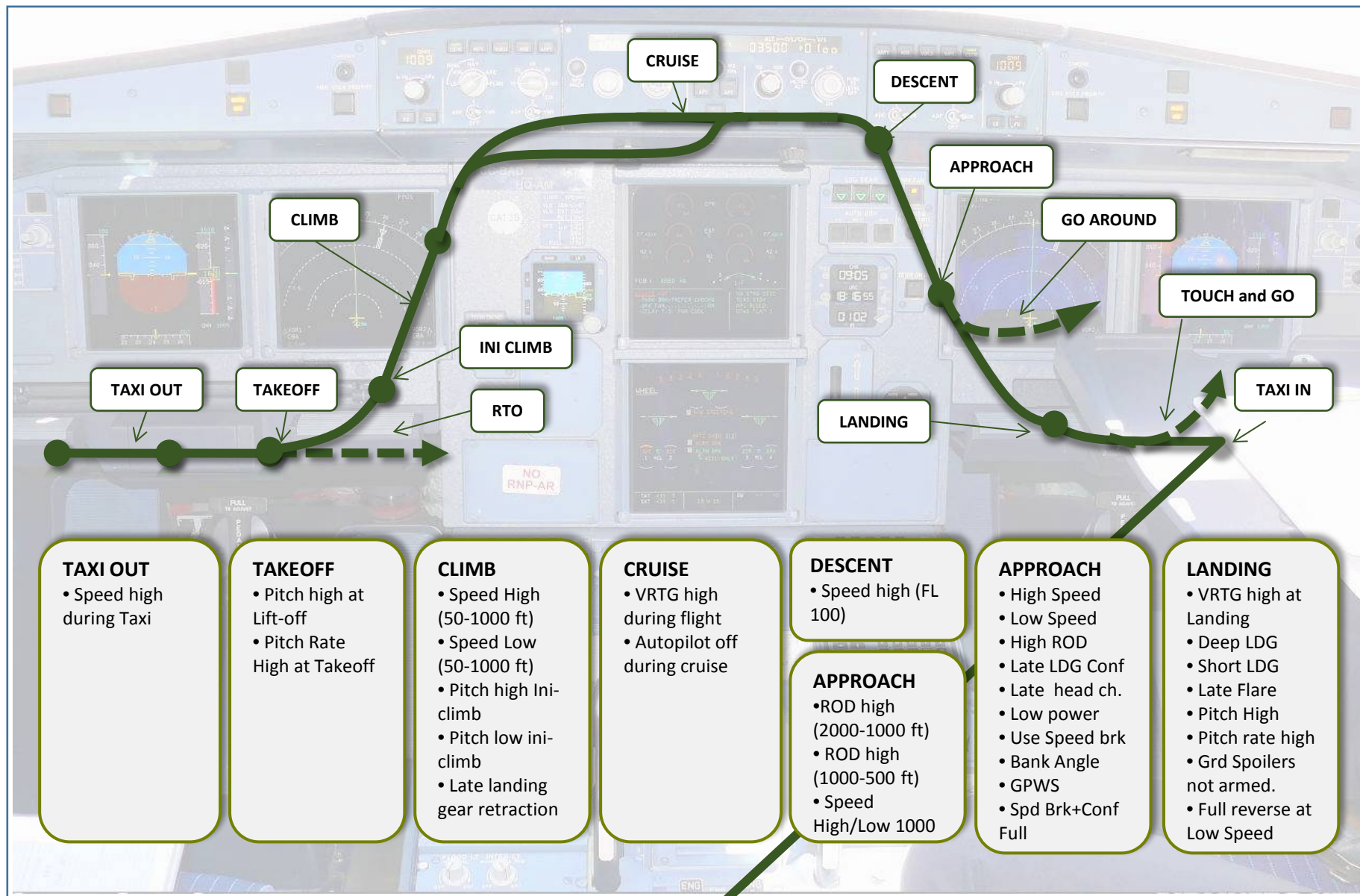


RE



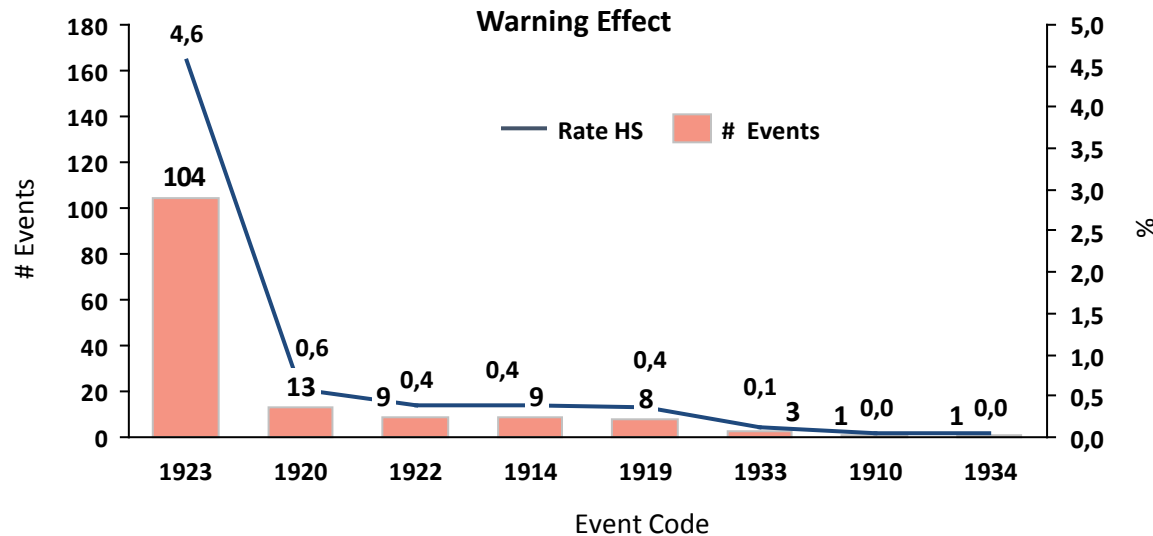
MAC





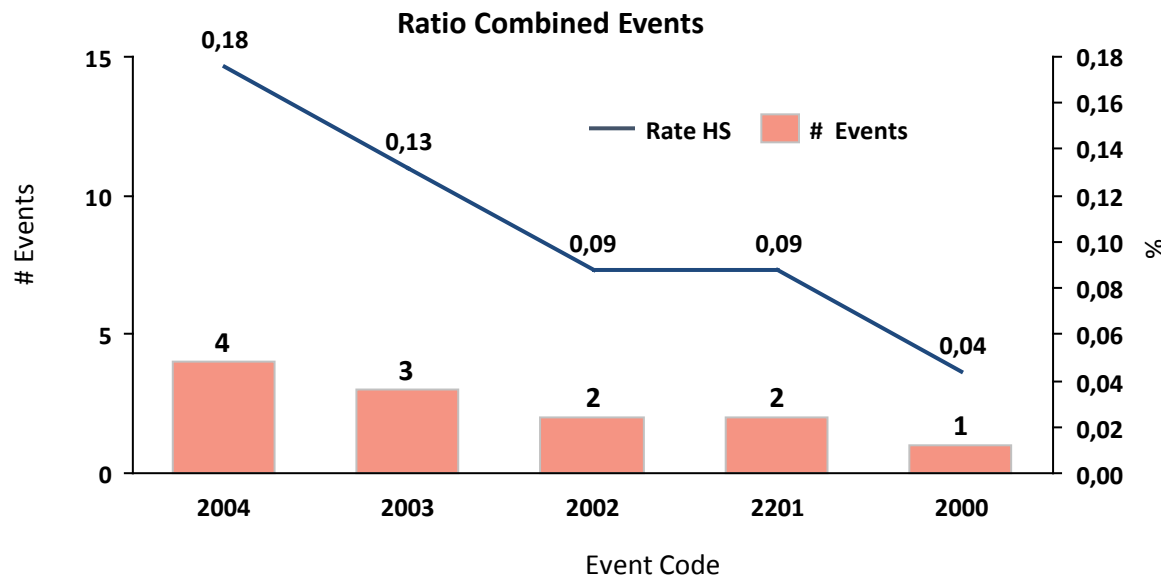


- TCAS RA Warning
- Gear Retraction above VLO
- Max Landing Gear Extend Speed VLE
- Exceedance of Flaps / Slat Limit Speed
- Rejected Takeoff
- High Acceleration at Touch down
- Excess EGT at Take Off or Go Around
- Overweight Landing
- Engine In-flight Shutdown
- Smoke Warning
- Takeoff Warning
- In Flight Turn Back
- Tail Strike Risk at Landing
- Tail Strike Risk at Take Off
- Wing Strike Risk at Landing



Event #	Event Description
1923	Autoland Warning
1920	GPWS warning above 1000ft AFE
1922	GPWS warning below 500ft AFE
1914	Overweight landing
1919	Level Bust
1933	Smoke Warning
1910	Alternate law
1934	Takeoff Warning

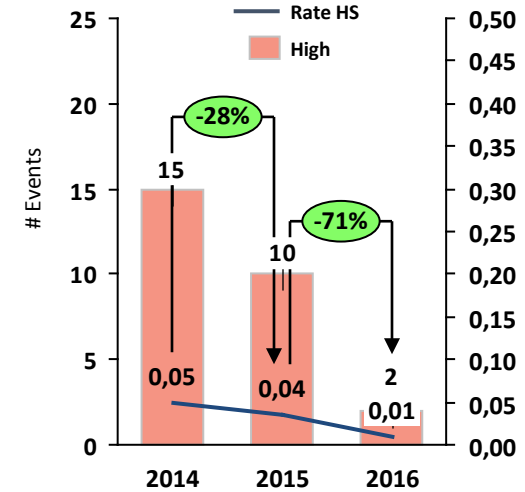
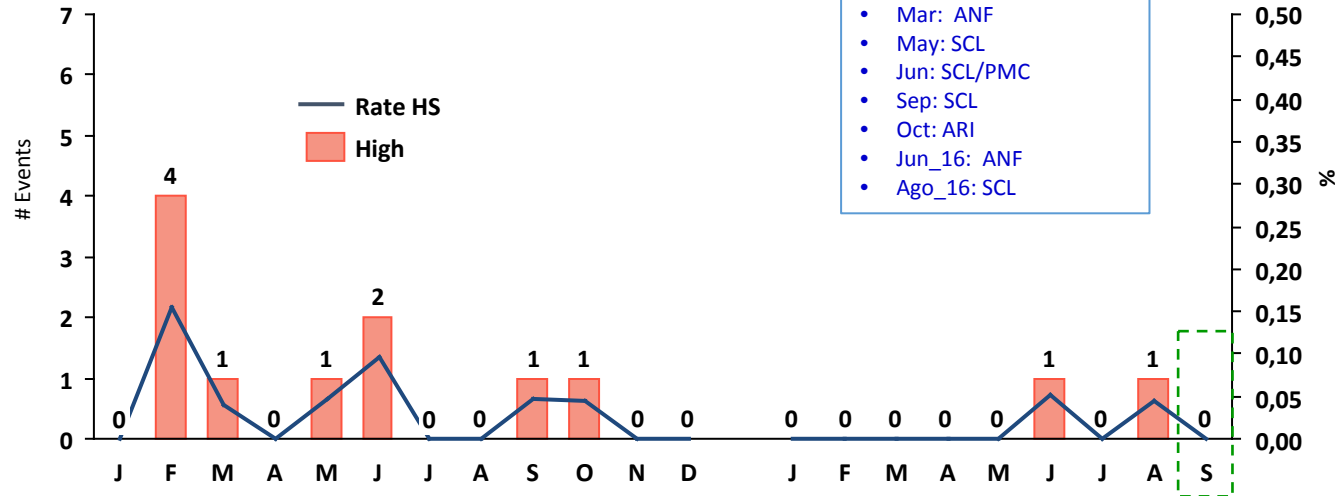
Considera todos los eventos High Severity.



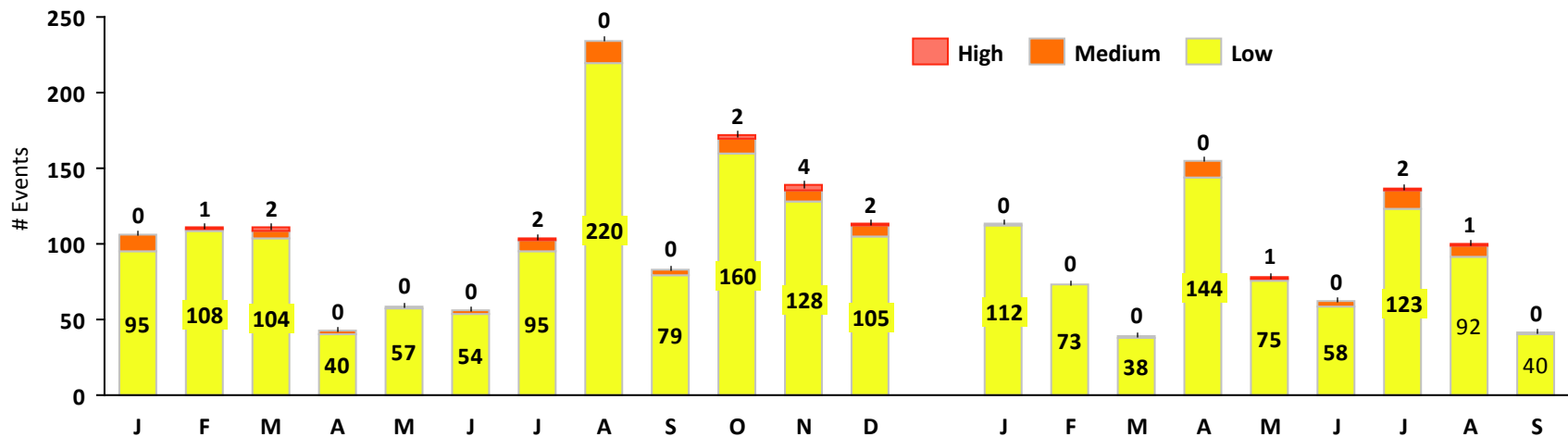
Event #	Event Description
2004	Continuously Steep during final
2003	Continuously Fast during final
2002	Continuously High during final
2201	High Energy Situation in Approach
2000	Continuously Low during final

Considera todos los eventos All Severity.

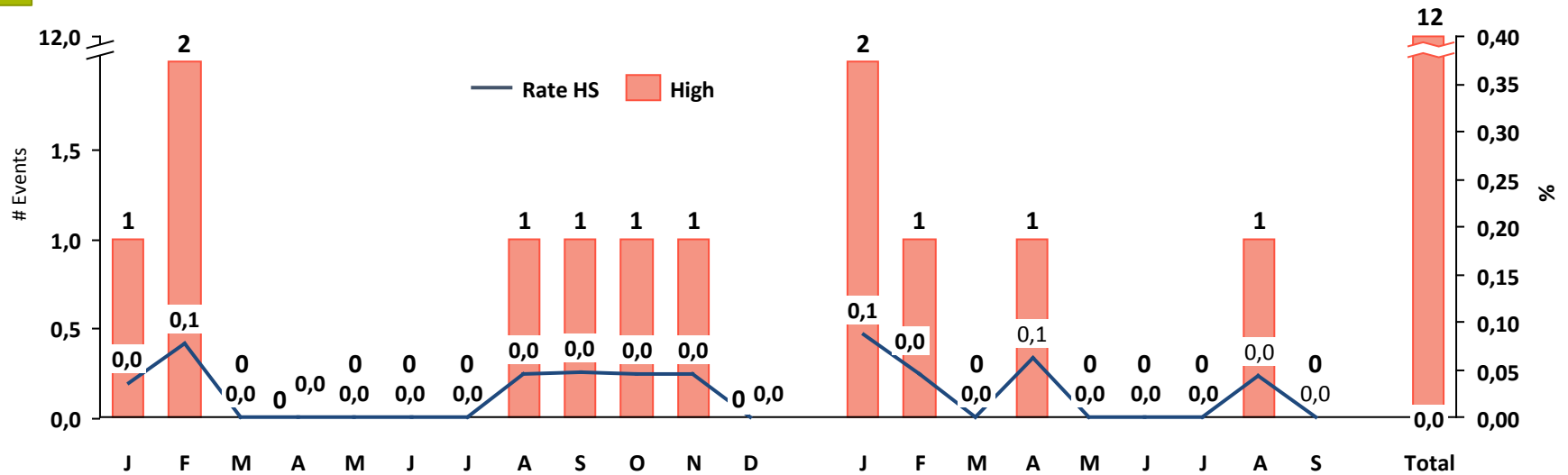
TCAS_RA_Events



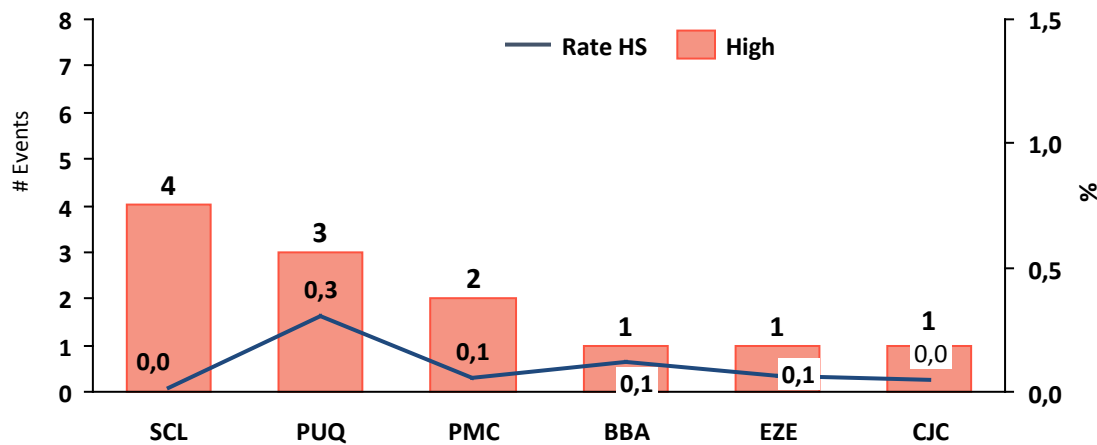
Vertical Acceleration in Flight



Month



Airport

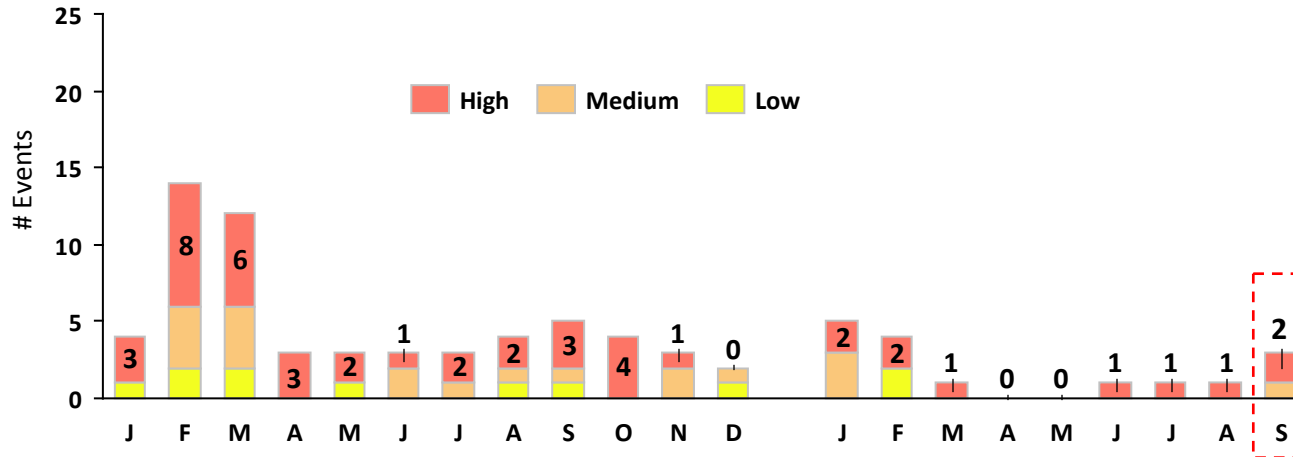


Event Information	
Number	1903
Description	Windshear Warning
Category	Warning

Deviation Limits	
	_WARNING =
LOW	_WINDSHEAR_PREDICTIVE (SEV INFO)
MEDIUM	#
HIGH	_WINDSHEAR_REACTIBE

Month

High Energy Situation Approach x Month

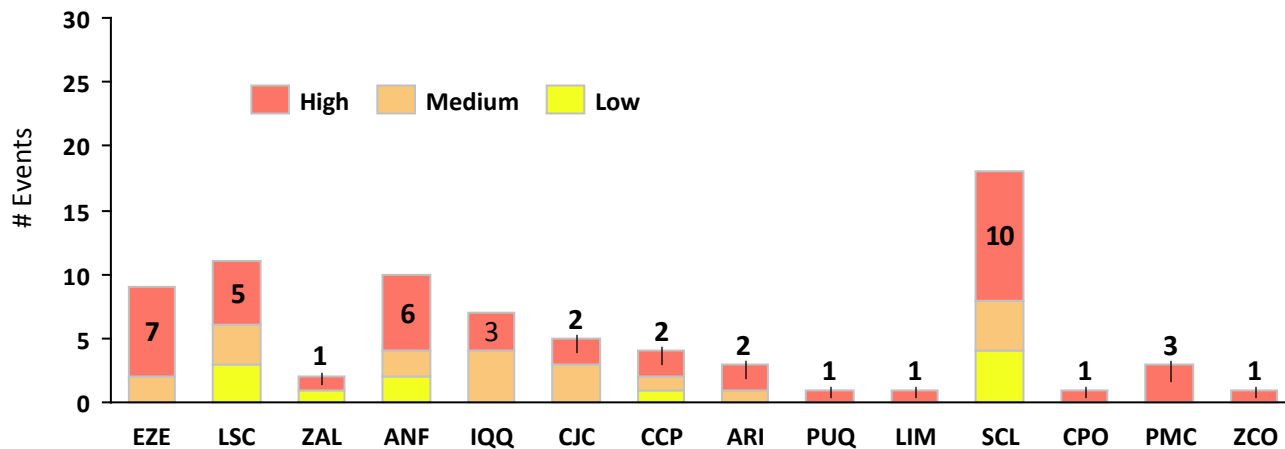


Order	Description
2002	Continuously High during final
2003	Continuously Fast during final
2004	Continuously Steep during final
2201	High Energy Situation in Approach

Total_High Sev_2015: 35
Total_High Sev_2016: 10

Airport

High Energy Situation Approach x Airport

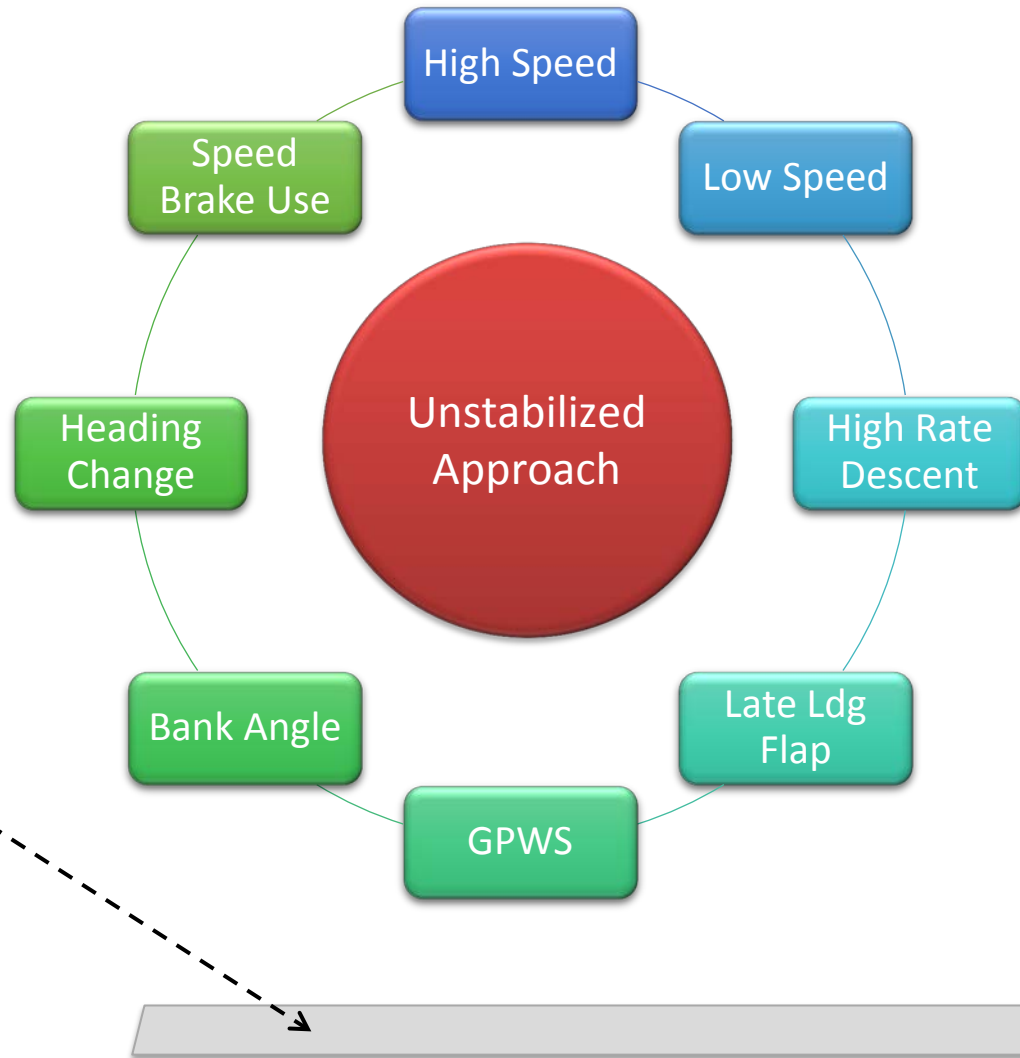


2015_2016

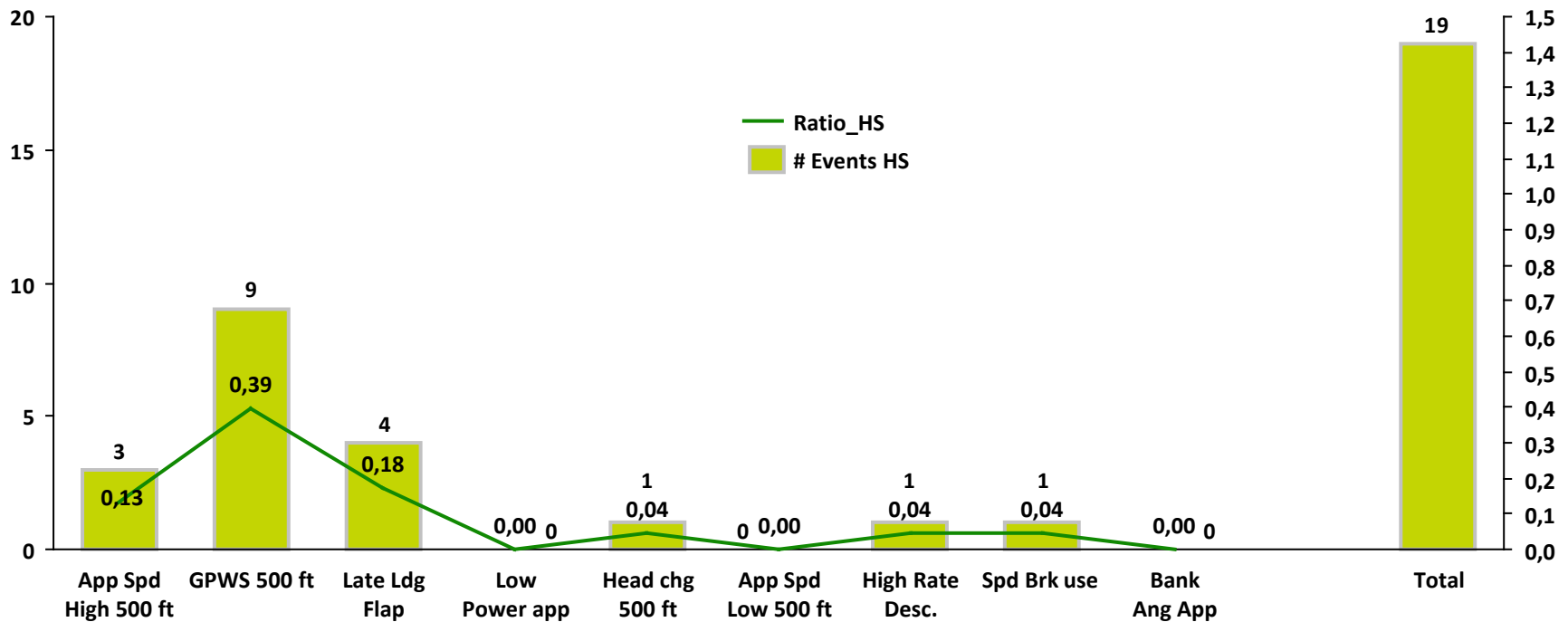


Unstabilized Approach

Unstabilized Approach (RE) | 500 ft

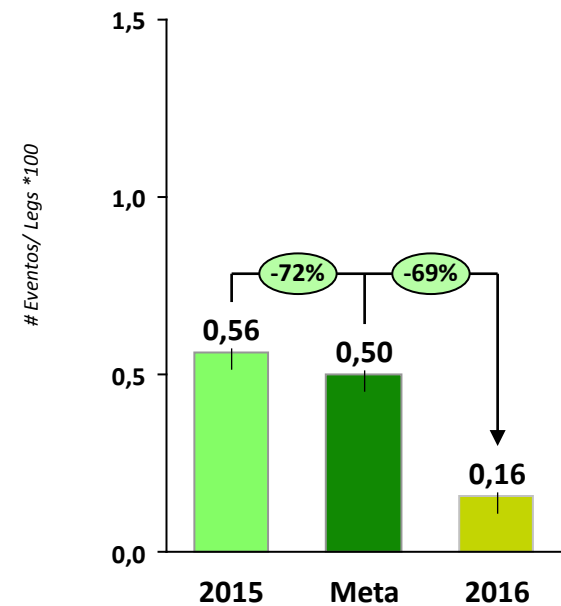
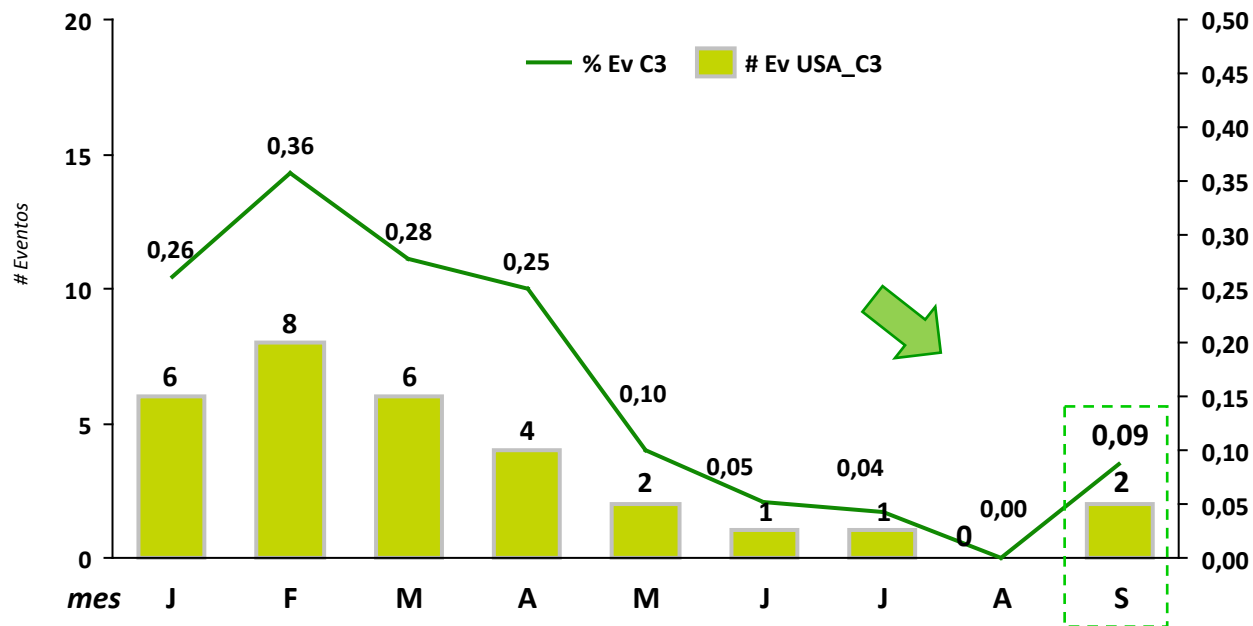


Height (AFE) <= 500 ft

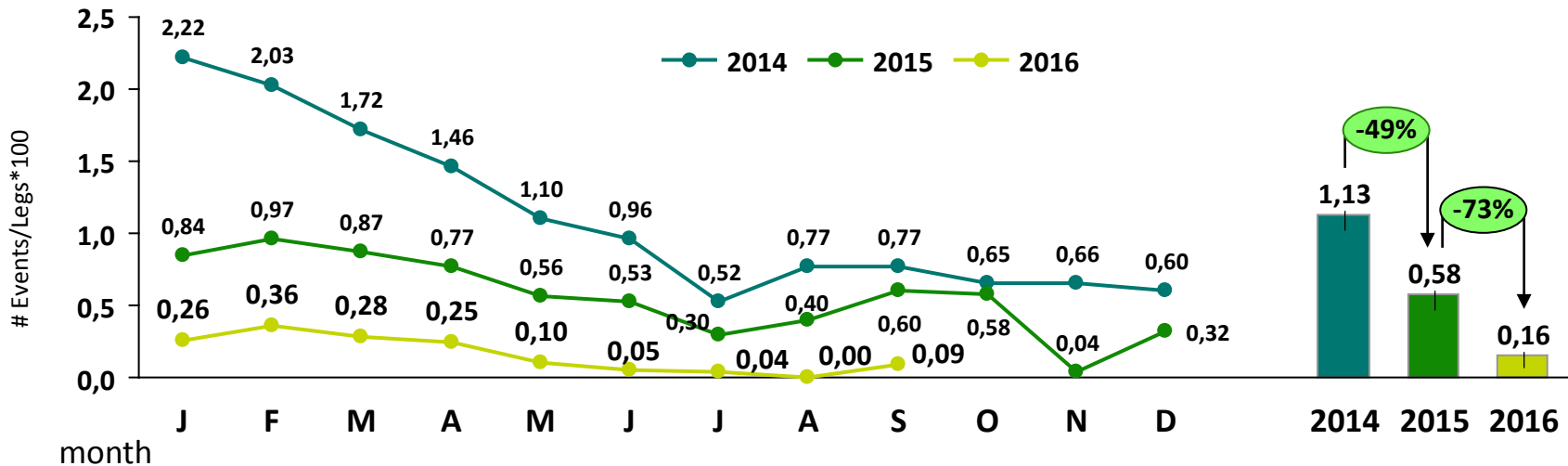
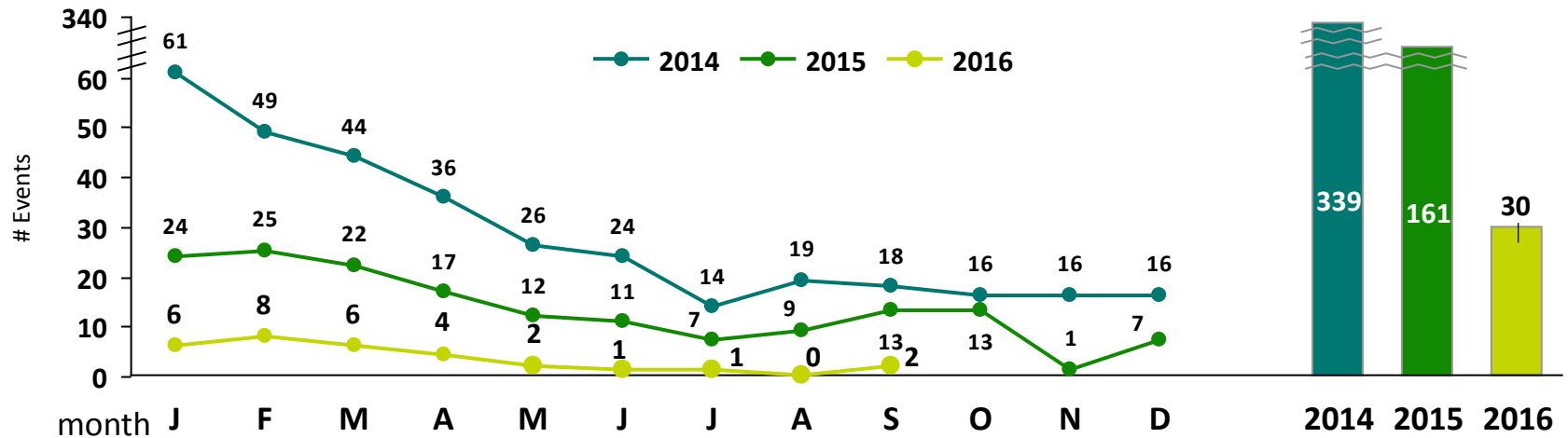


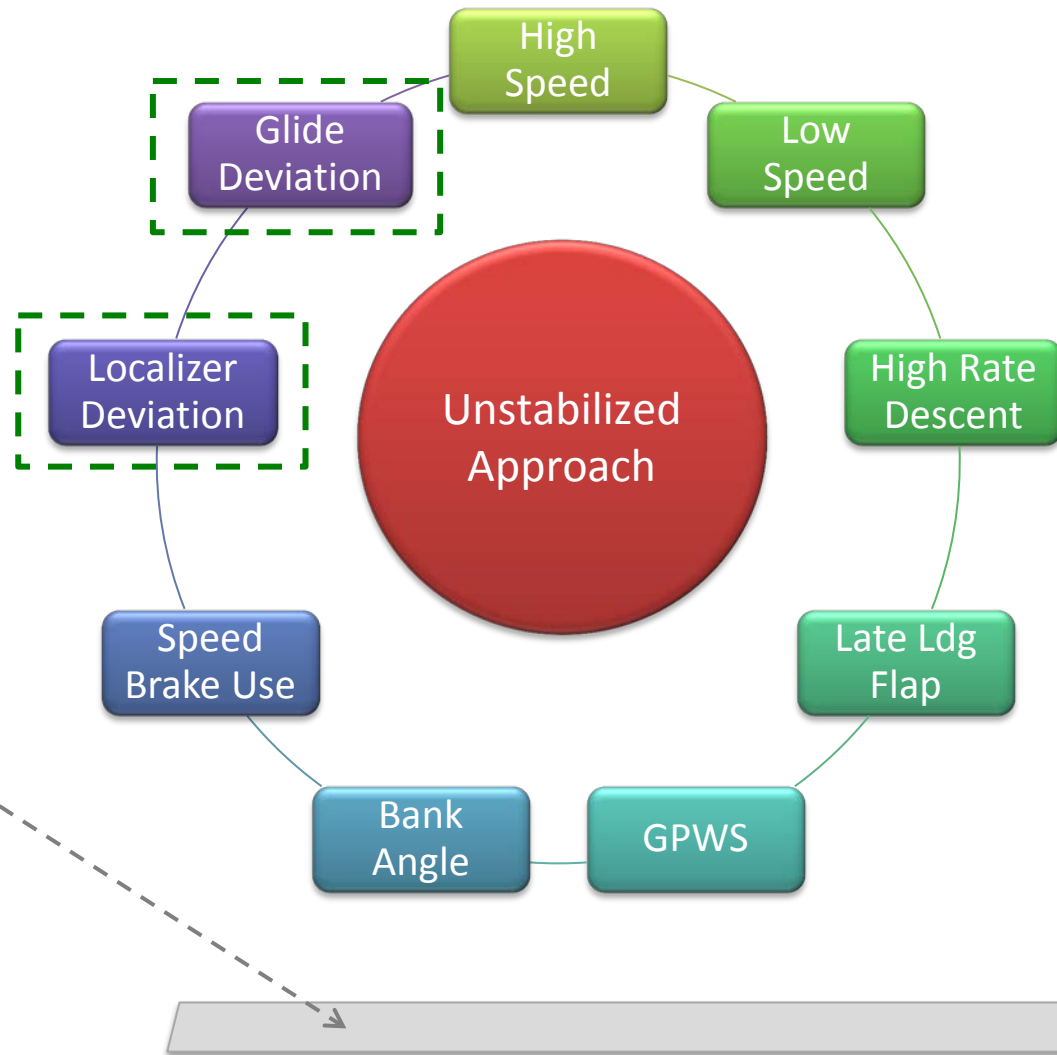
High / Low Speed
High Rate of Descent
Bank angle
Late heading change
Late landing config
GPWS
Use speed brakes

Unstabilized Approach (Blw. 500 ft)



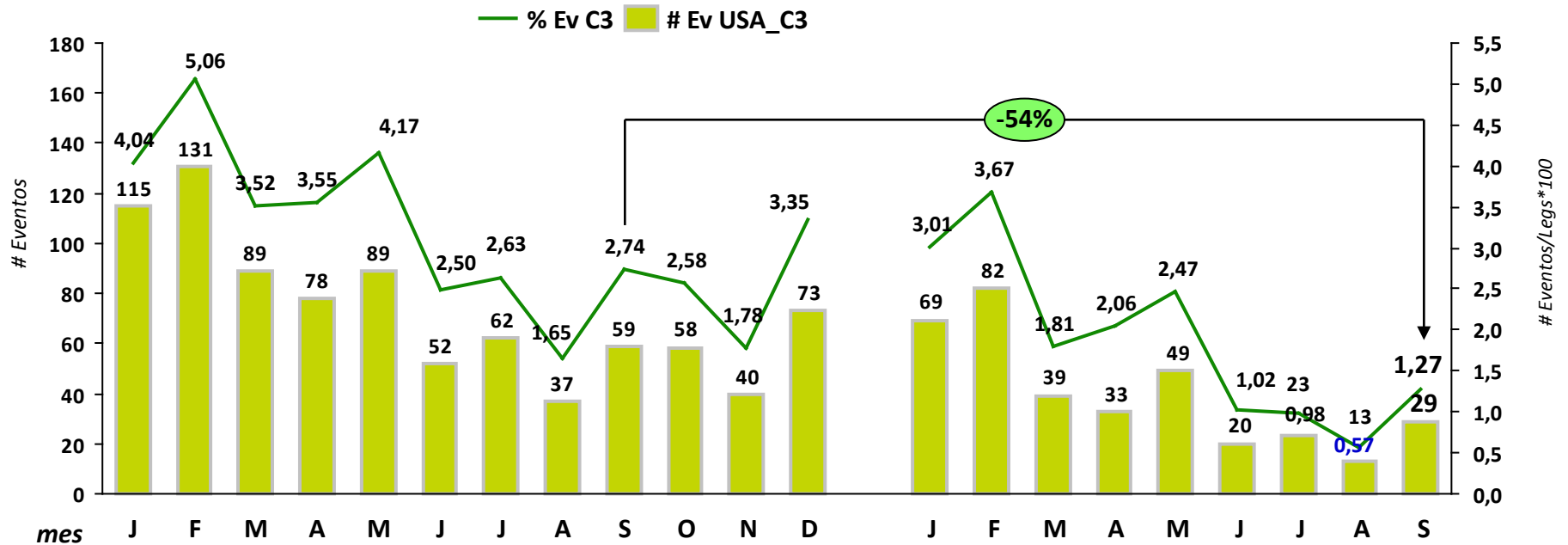
Unstabilized Approach (Blw. 500 ft)





Height (AFE) $\leq$ 1000 ft

Unstabilized Approach (Blw. 1000 ft)





High Acceleration at Touchdown

A320 Flight Profile Specification

11/11/2003



1504 – High acceleration at touch down

Reference: AFPS_M1_00215_0003_1504_001.000
 Last Modification: 10/30/2003 4:21:38 PM
 Author: Airbus

Operational Goal:

This event detects hard landings by monitoring touch downs which exceed a Vertical Acceleration of 1.5G.

Monitoring Window(s):

Active Flight Phases:

FLIGHT_PHASE -> FIN_APPRCH

FLIGHT_PHASE -> LANDING

VRTGMAX monitoring is made in the FLIGHT_PHASE -> FIN_APPRCH or FLIGHT_PHASE -> LANDING during the following period:

MW starts 10 seconds before the AIR_GRD parameter changes to AIR_GRD -> GROUND and for 4 seconds afterward.

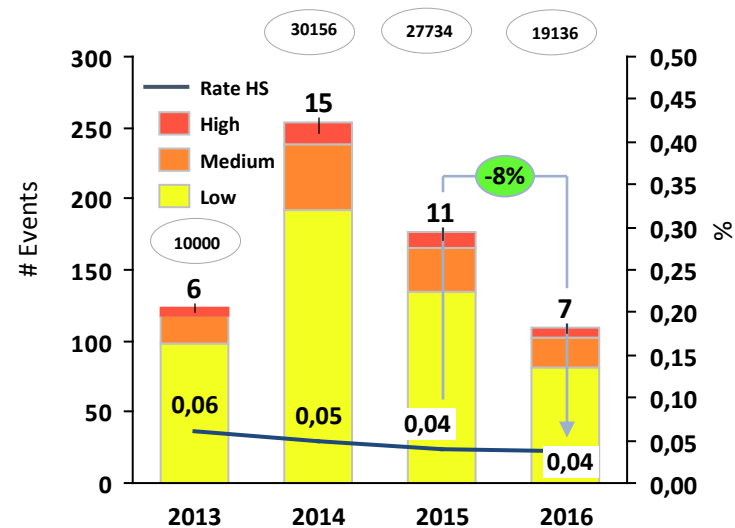
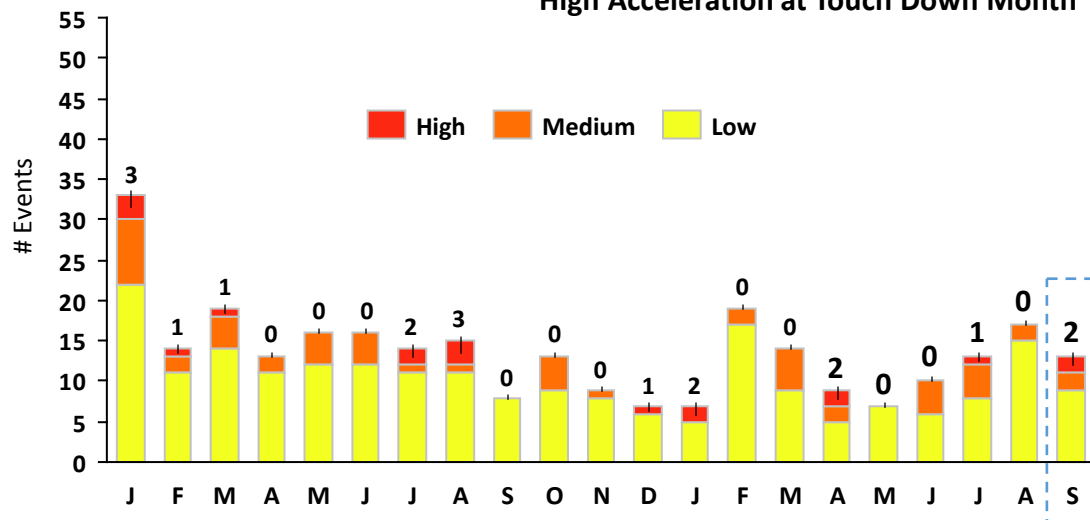
Event Occurrence Management:

Only one event is raised per MW at the maximum of VRTGMAX, but several events can be raised if conditions for initiating another MW are encountered during the flight such as a Touch and Go landings (other FLIGHT_PHASE -> LANDING after a FLIGHT_PHASE -> TOUCH_A_GO).

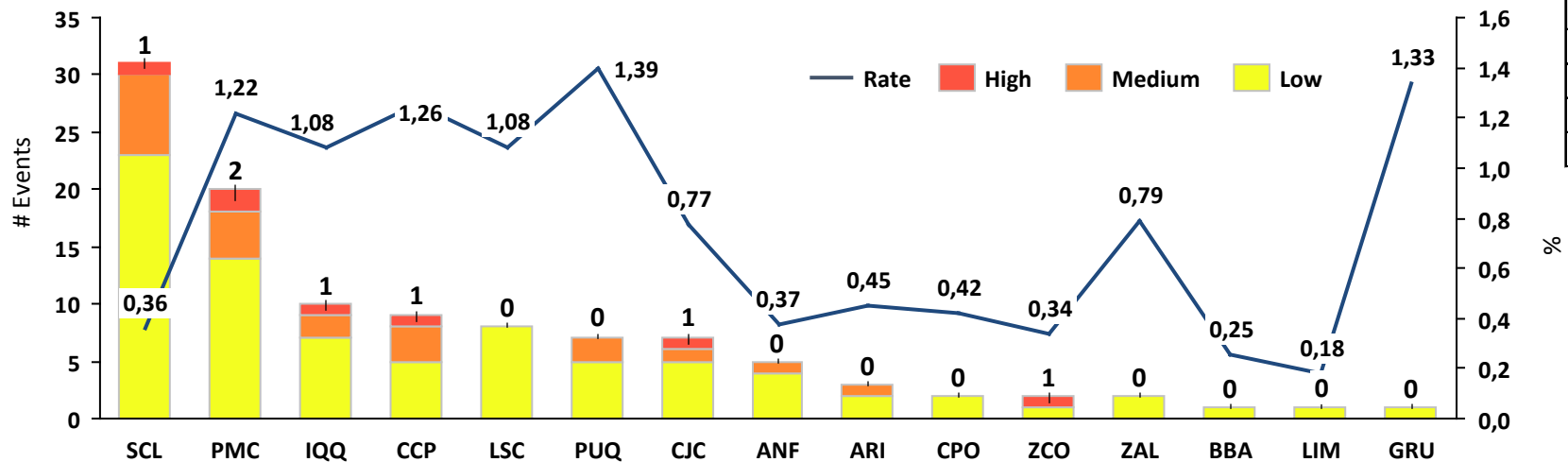
Deviation Limits:

	Max VTRG >=:	
LOW Limit	1.5 g	
MEDIUM Limit	1.6 g	
HIGH Limit	1.75 g	

High Acceleration at Touch Down Month



High Acceleration at Touch Down Airport / 2016



High_Acc_at_TD	
	VRTG >=
LOW	1,5 g
MEDIUM	1,6 g
HIGH	1,75 g



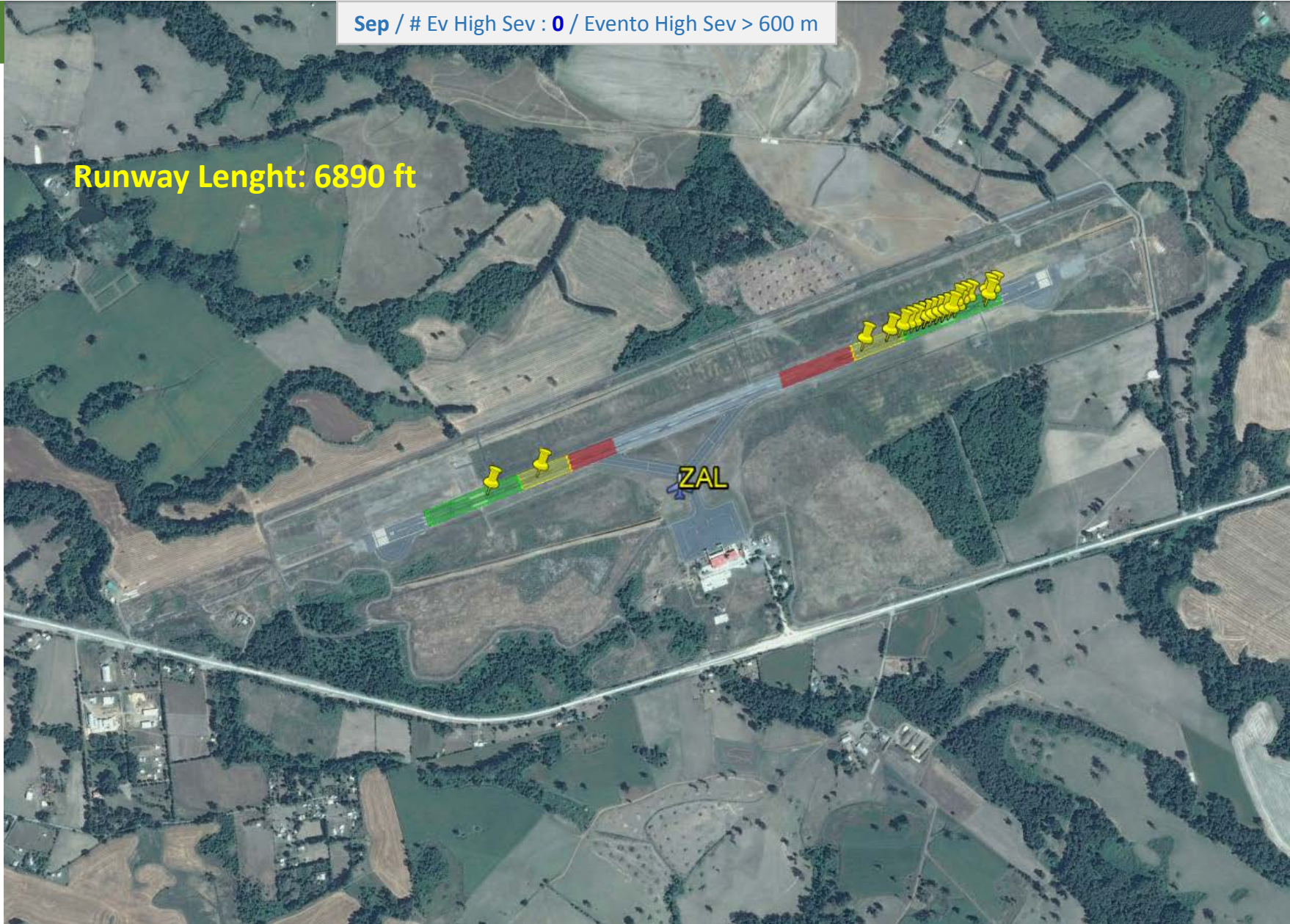
Deep Landing



ZAL

Sep / # Ev High Sev : 0 / Evento High Sev > 600 m

Runway Length: 6890 ft



ZOS

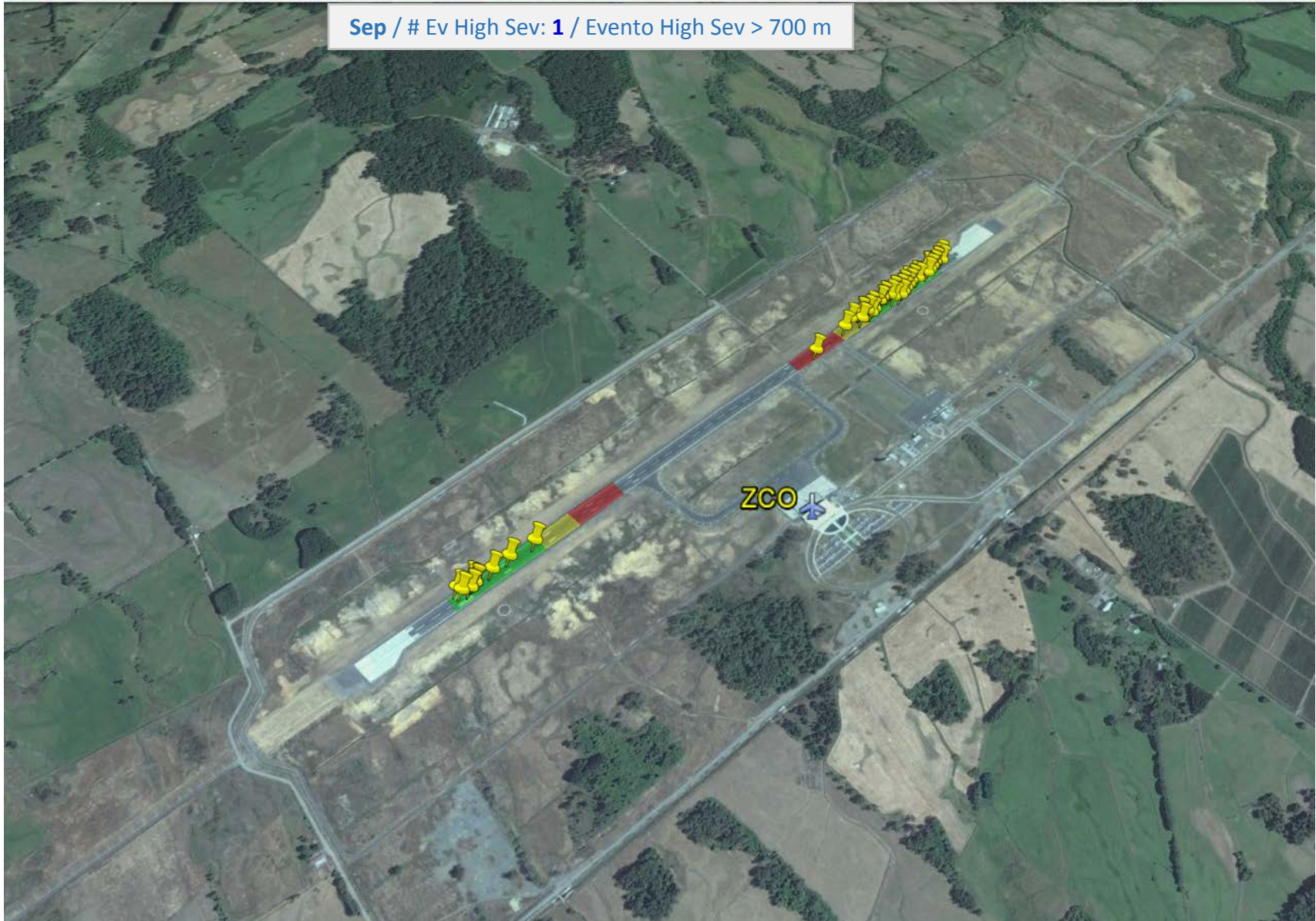
Sep / # Ev High Sev : 0 / Evento High Sev > 600 m

Runway Length: 5577 ft



ZCO

Sep / # Ev High Sev: **1** / Evento High Sev > 700 m



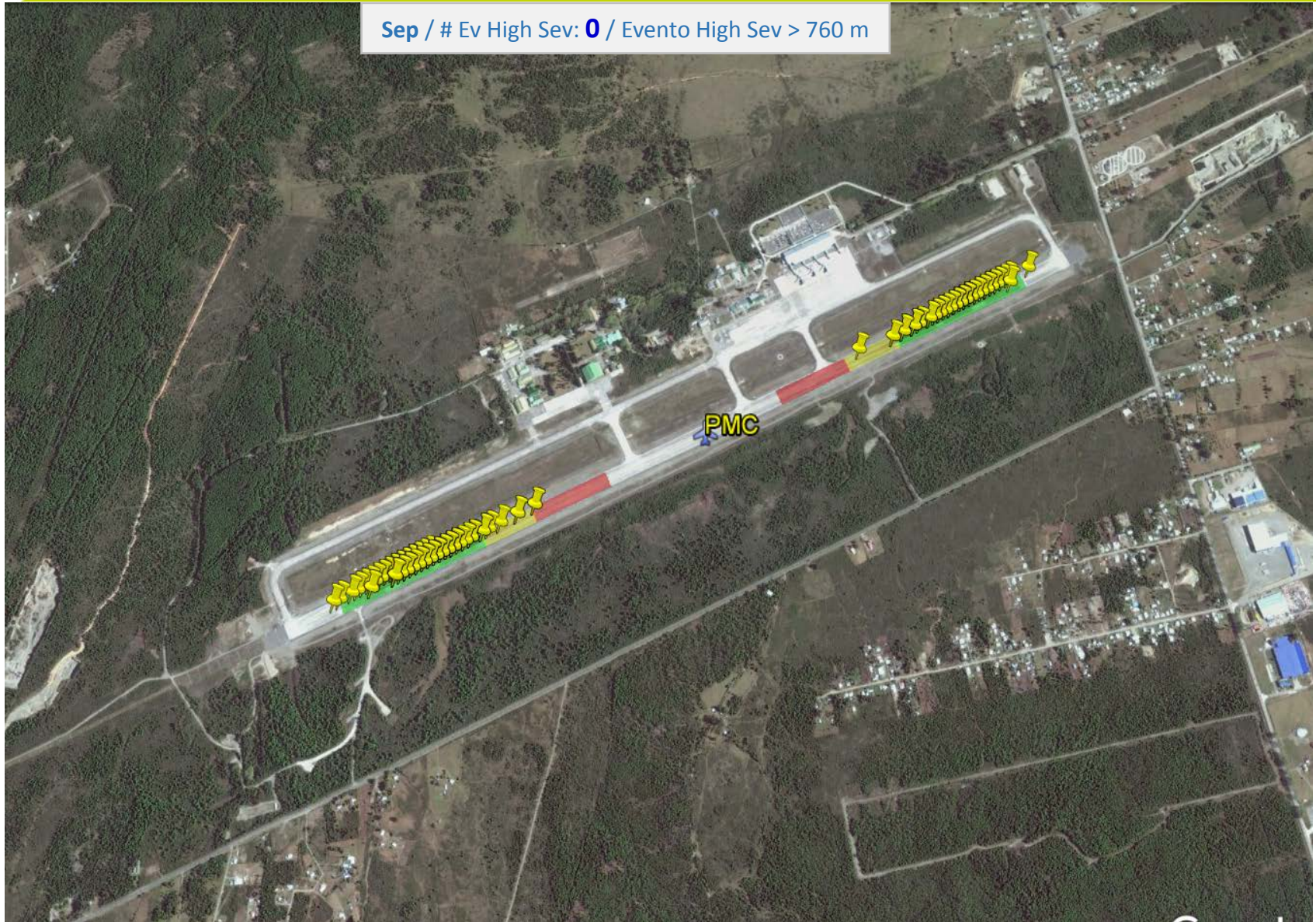
PUQ

Sep / # Ev High Sev: 0



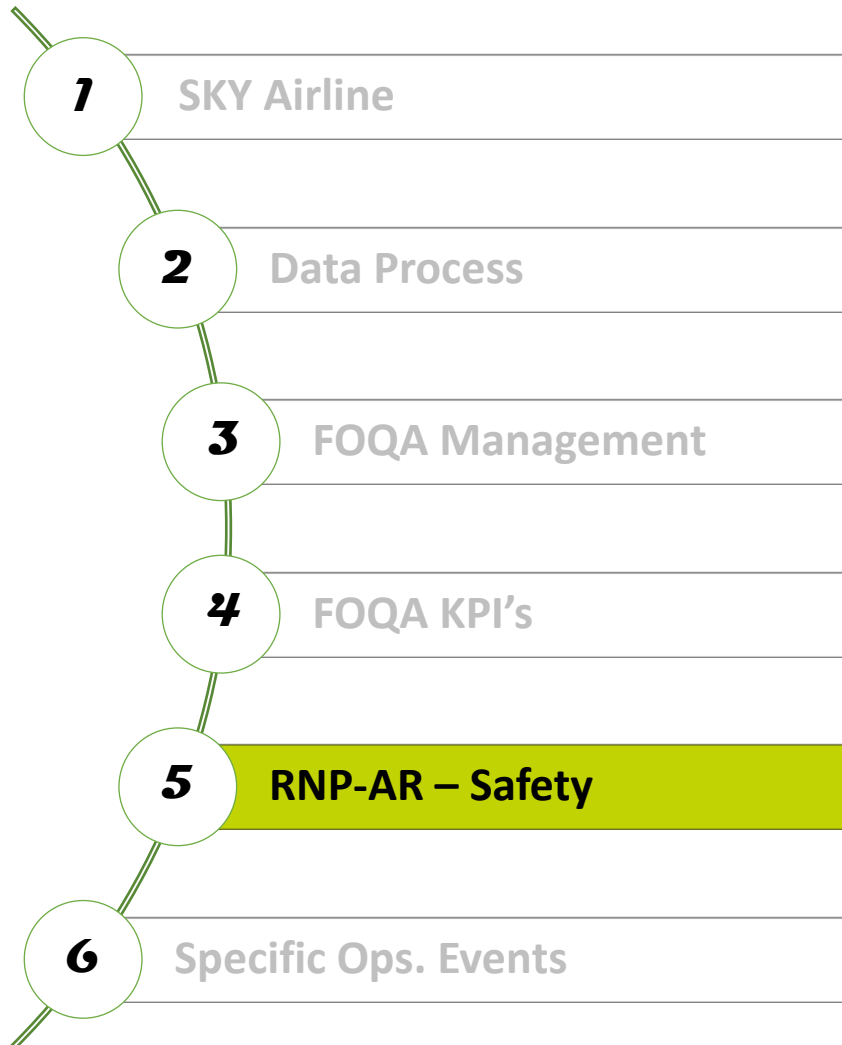
PMC

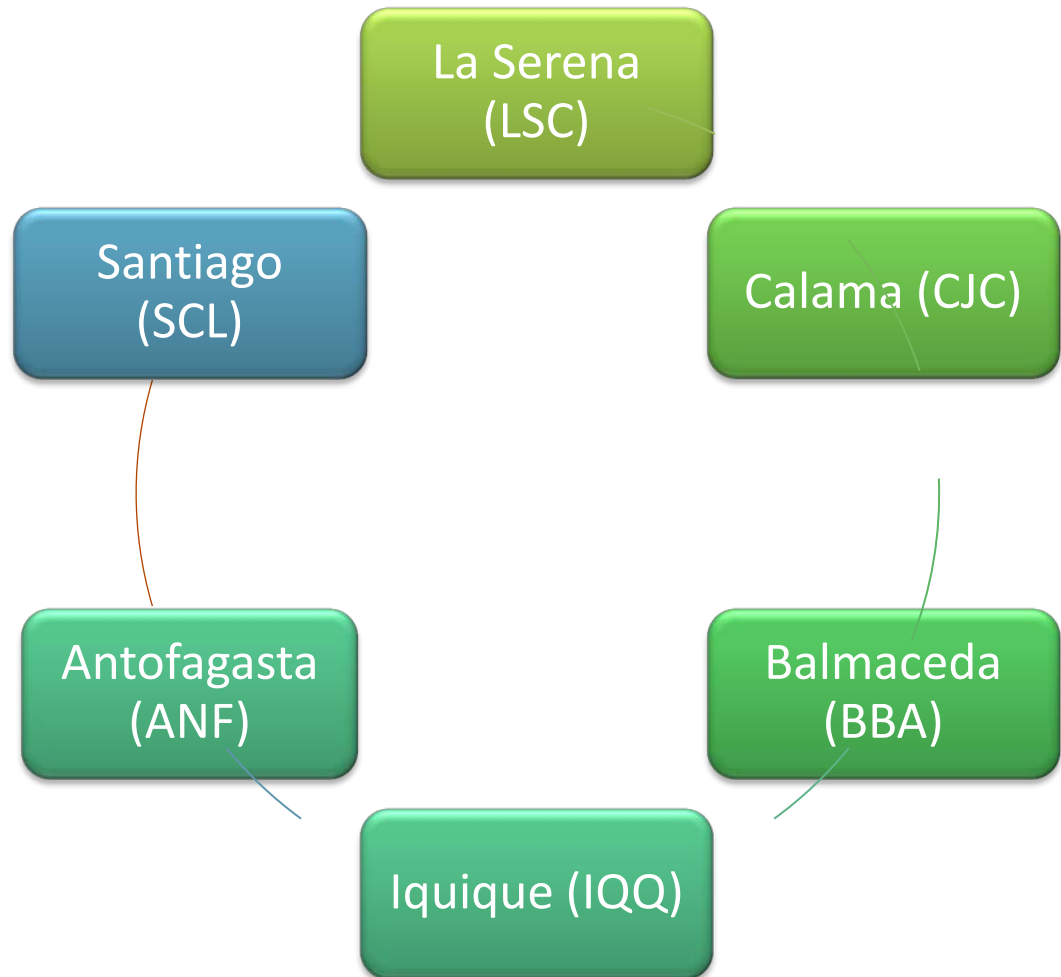
Sep / # Ev High Sev: **0** / Evento High Sev > 760 m





Content

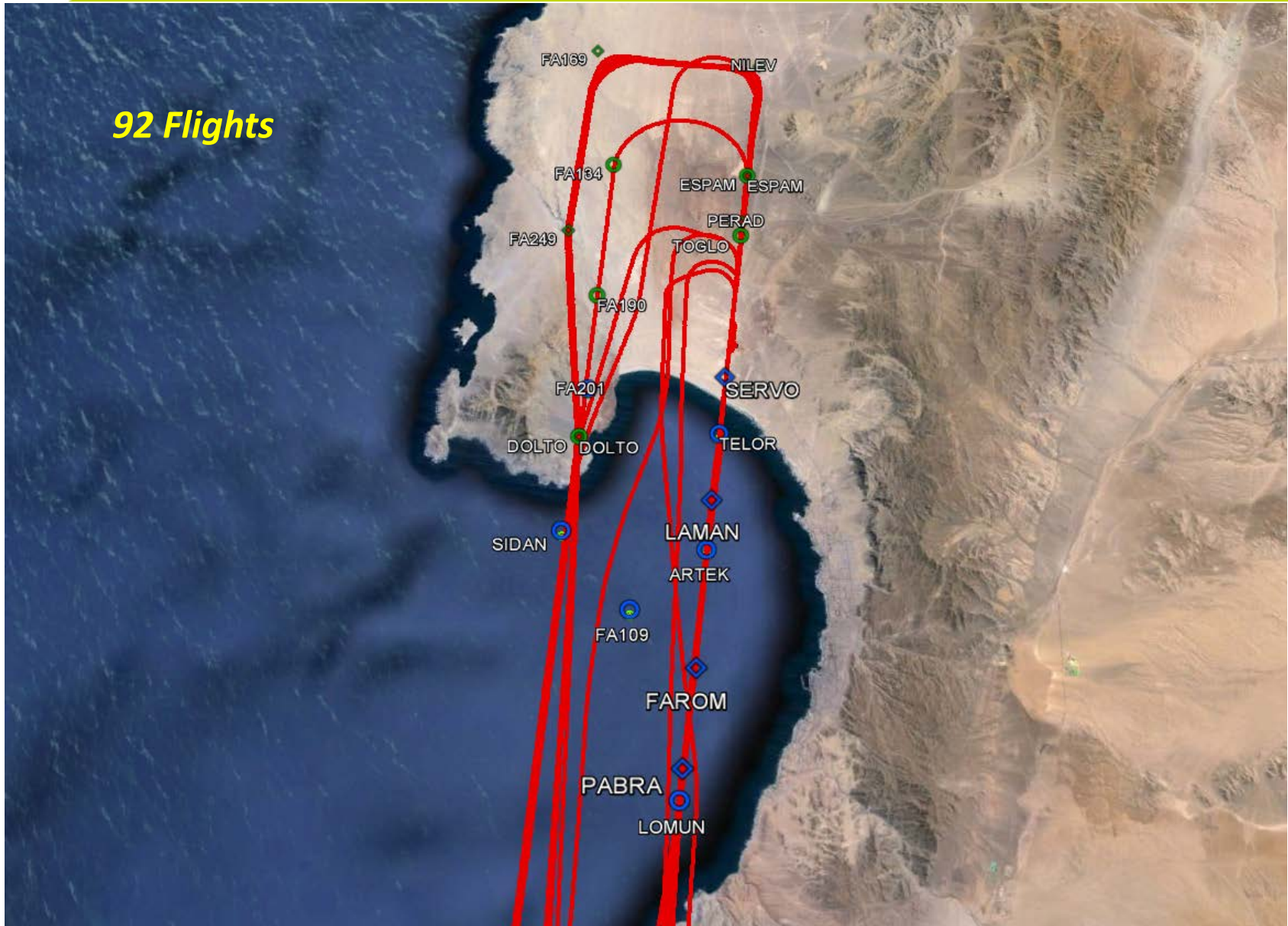


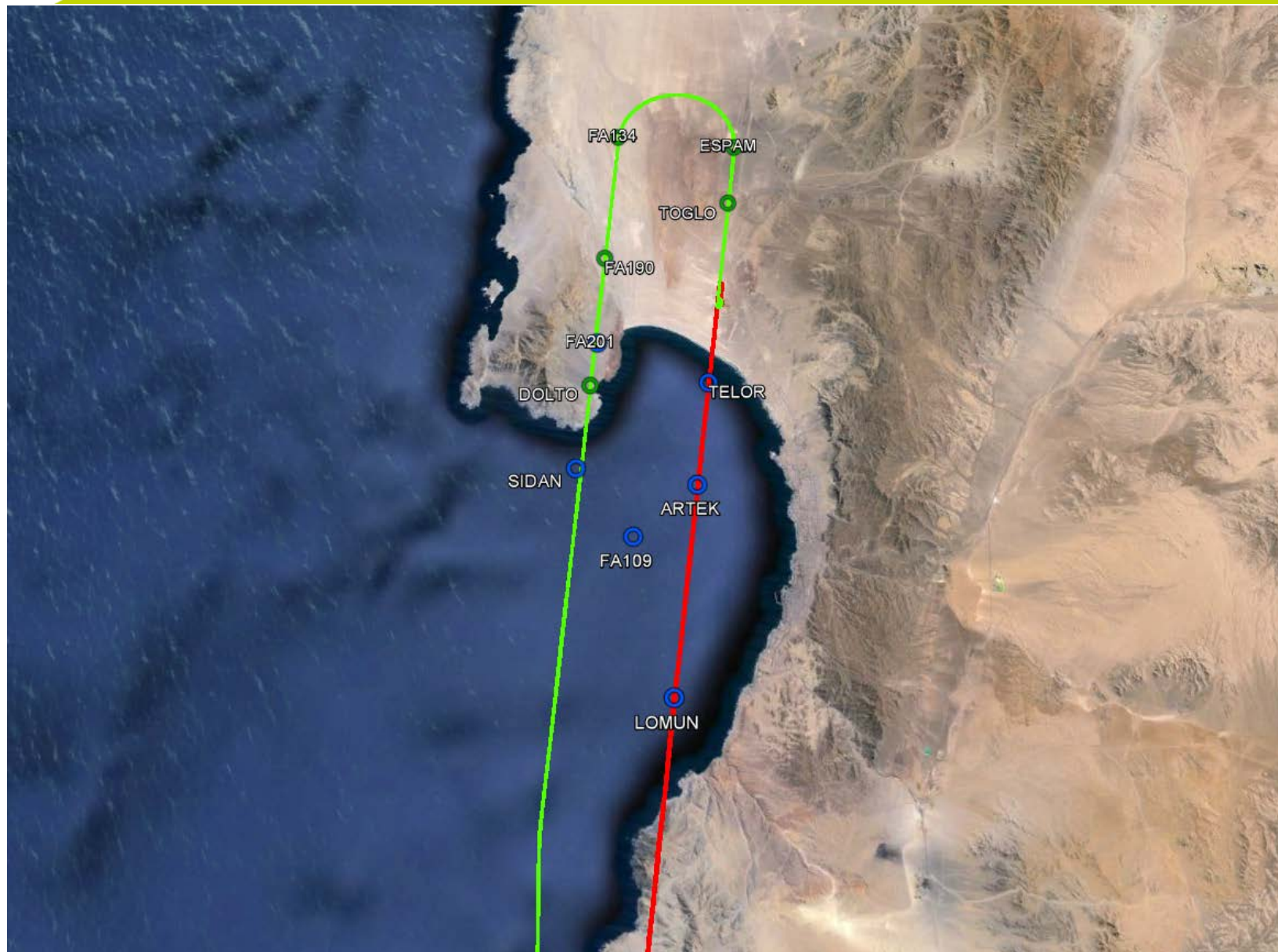


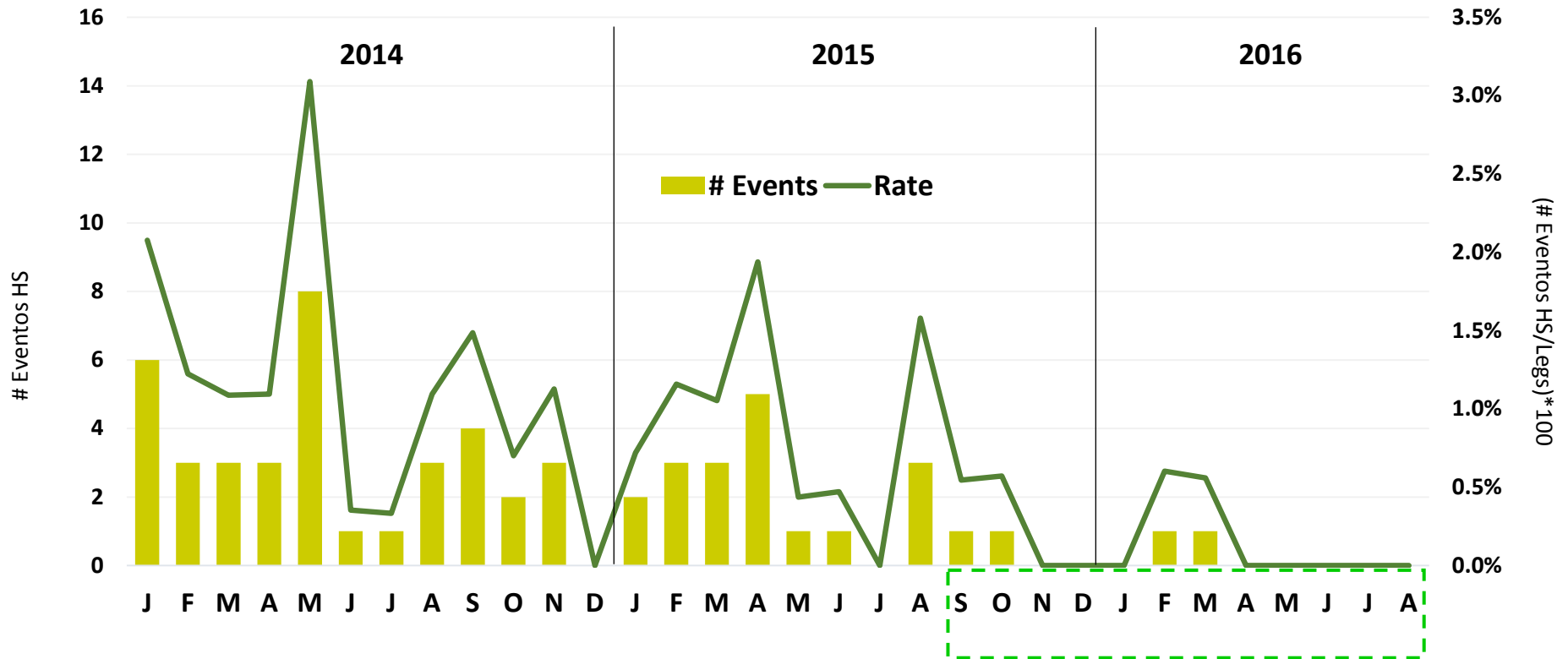


Antofagasta Airport (ANF)

92 Flights



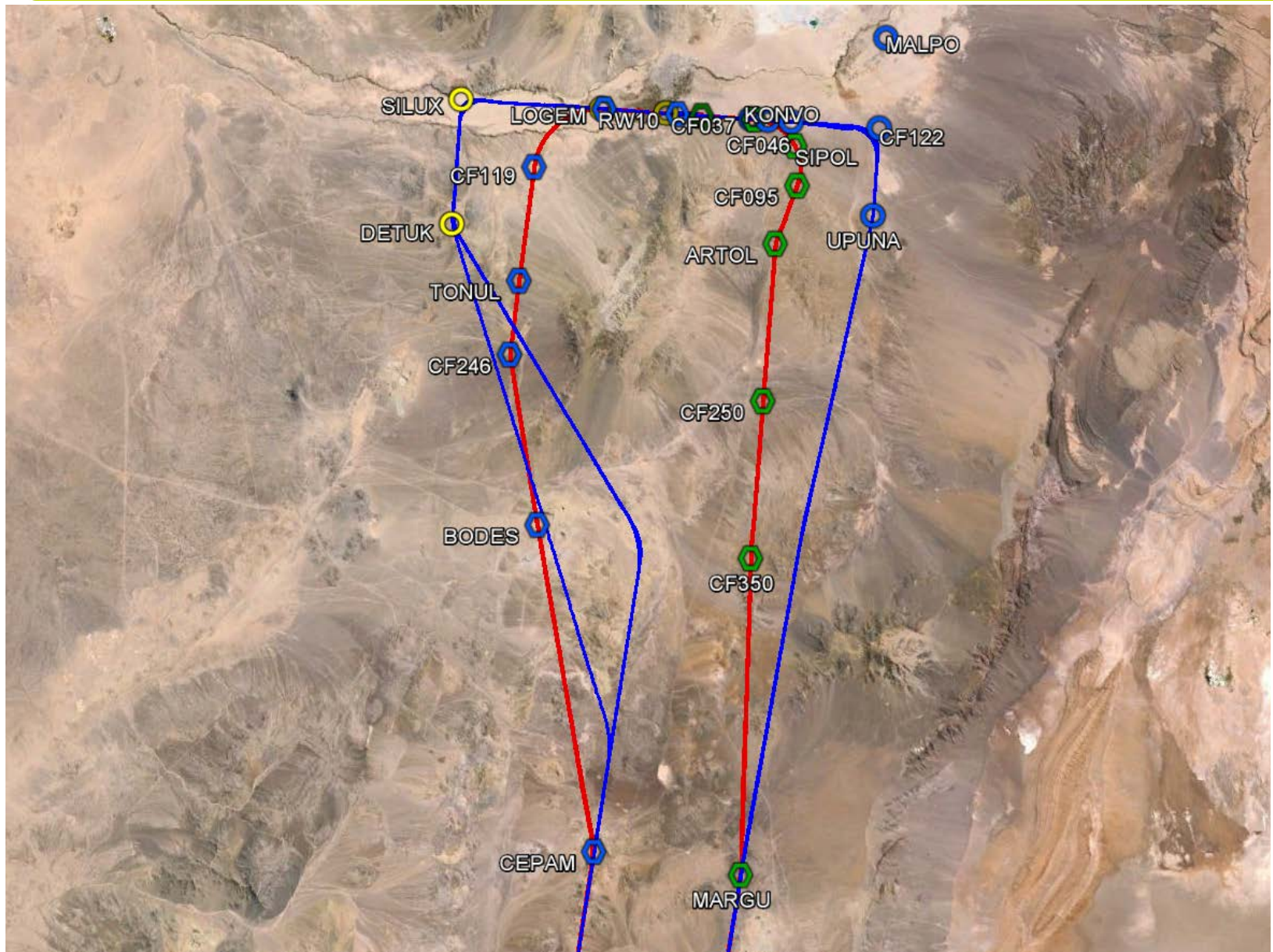


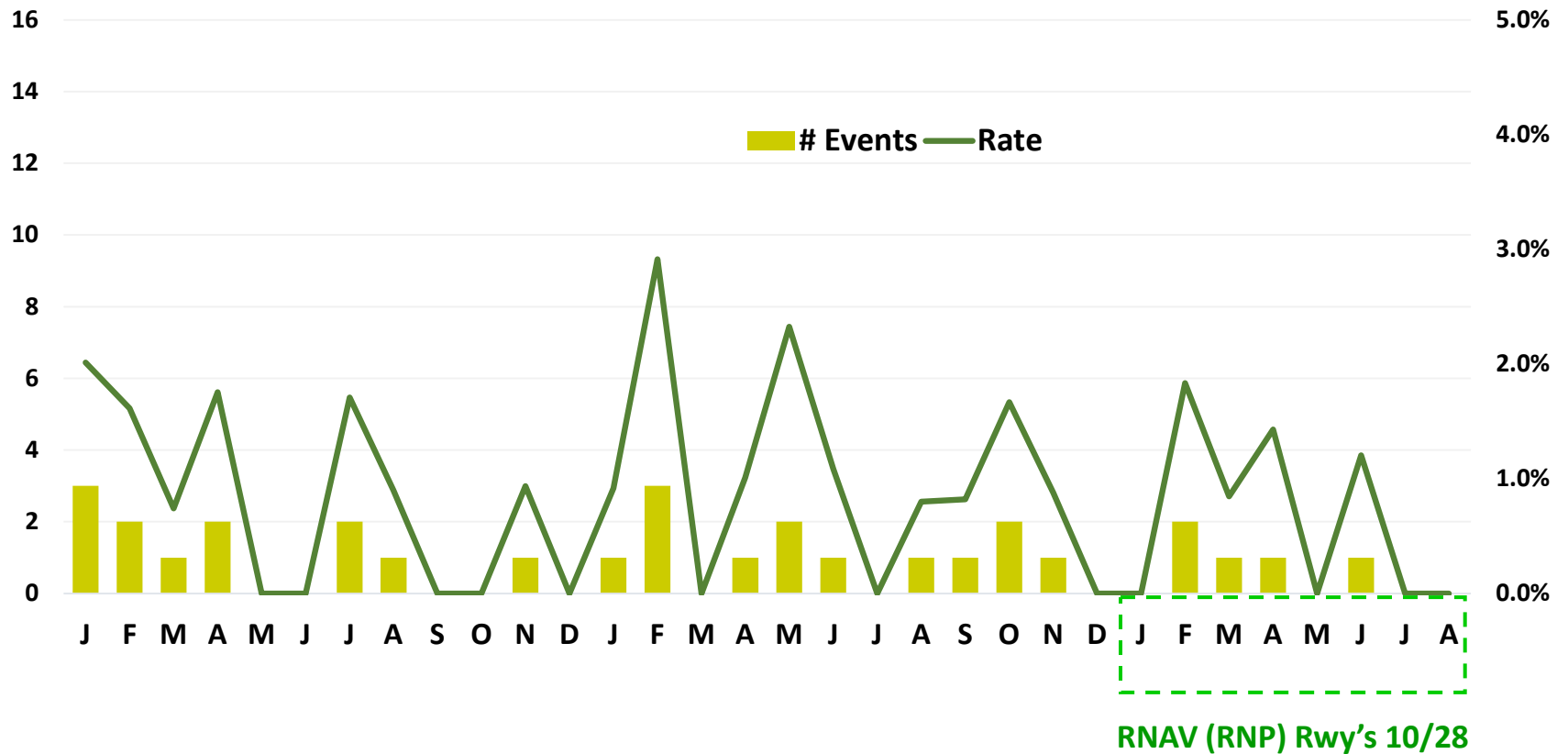


RNAV (RNP) Rwy's 01/19



Calama Airport (CJC)







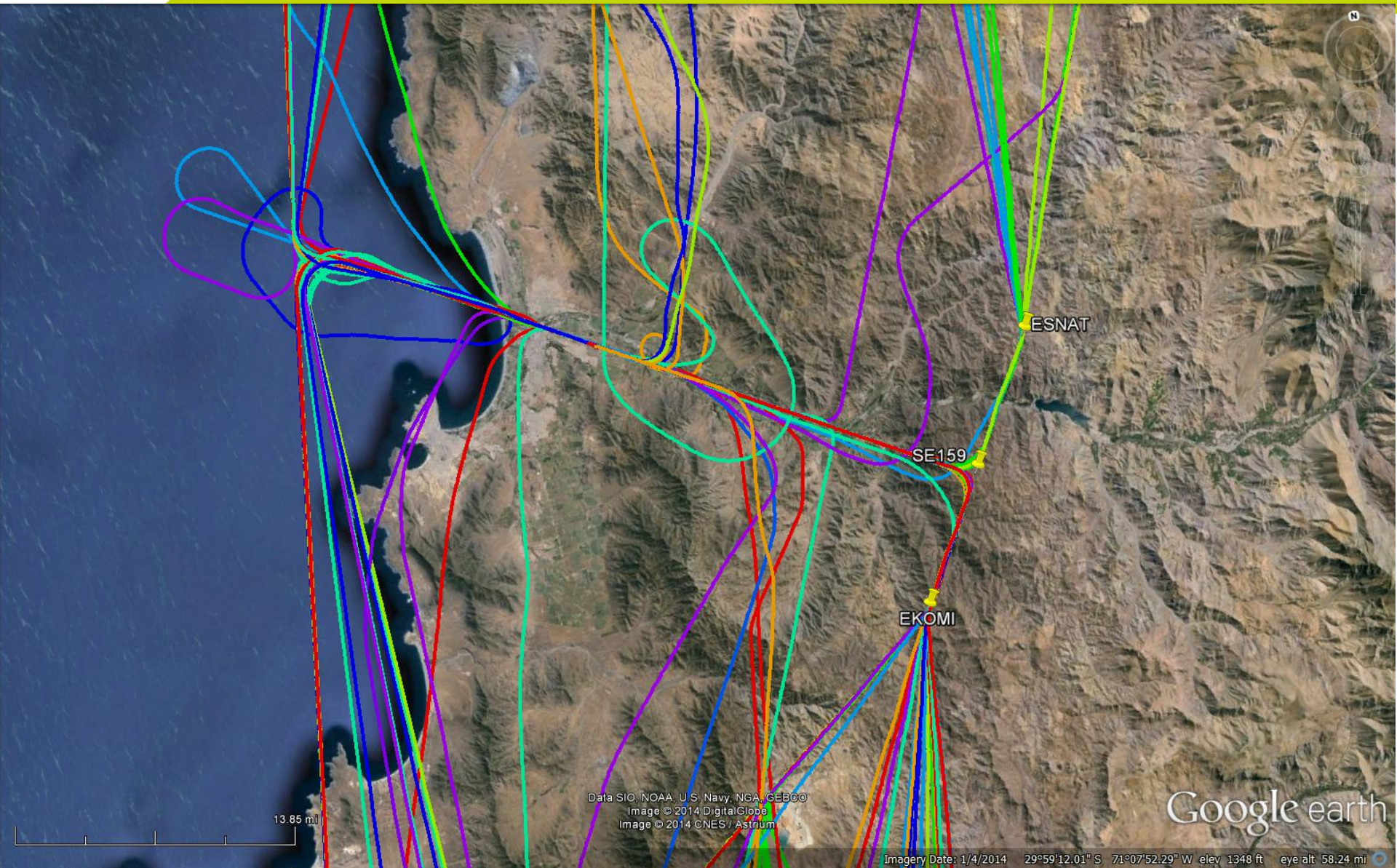
La Serena Airport (LSC)

La Serena (LSC) Airport

- Runway: 12/30
- Rwy Length: 6358 ft
- ILS Category: None
- Fog problem (sea)
- Valley approach
- Non precisión Approach
- Offset



Approach SCSE



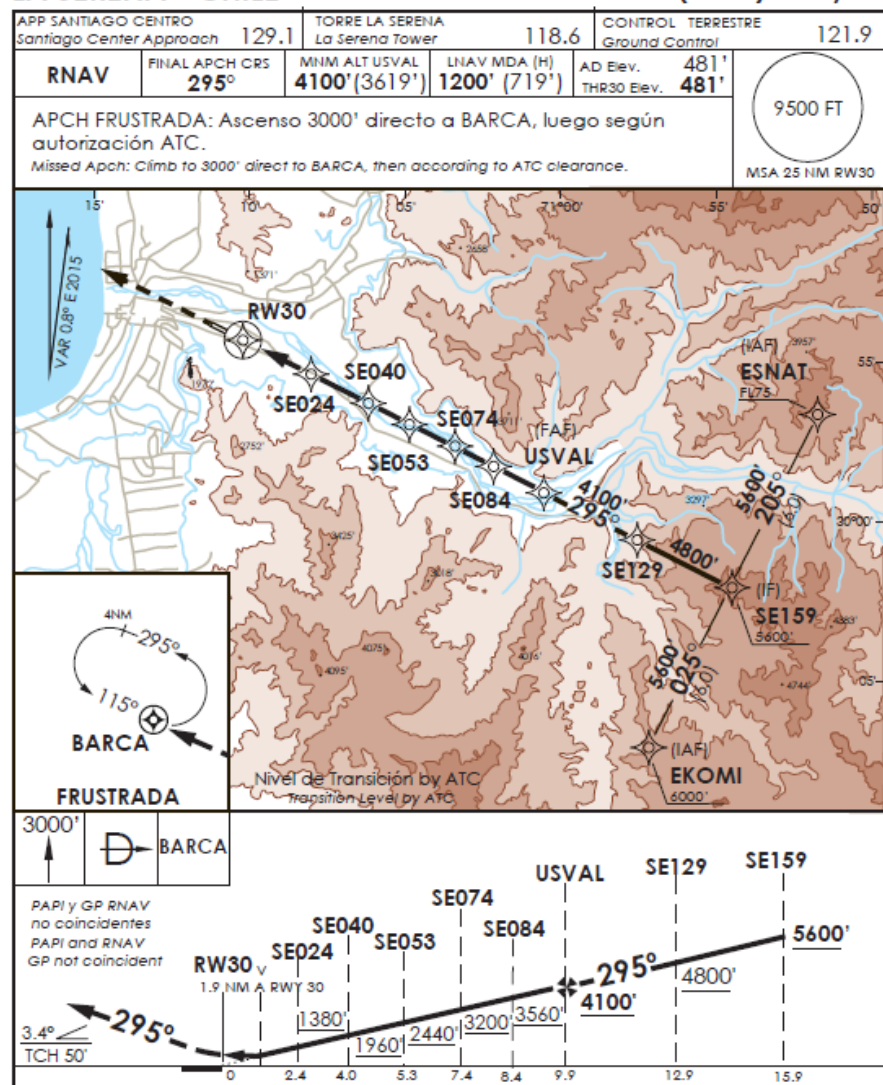
RNAV (GNSS) Rwy 30 (SCSE)

AD. LA FLORIDA

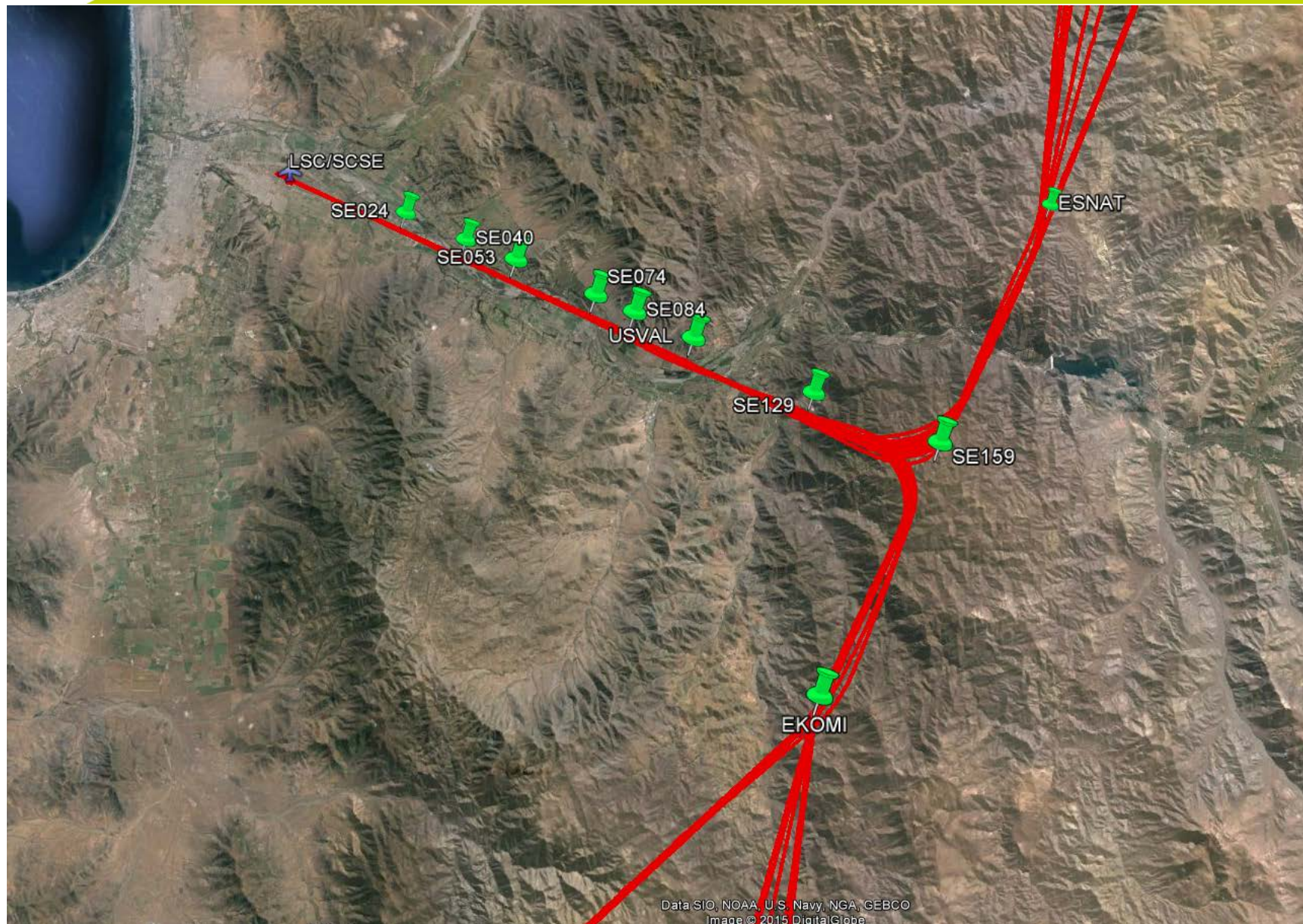
LA SERENA - CHILE

SCSE IAC 3

RNAV (GNSS) X Rwy 30



Unstabilized Approach LSC

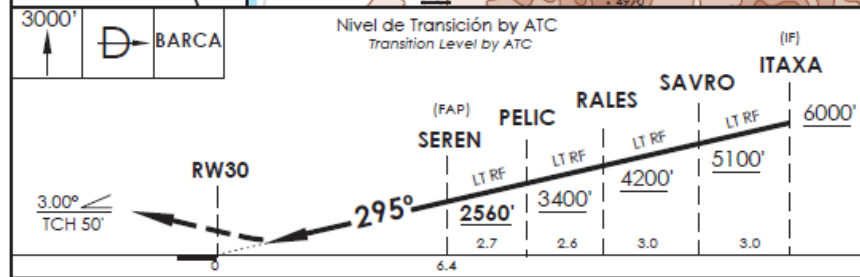
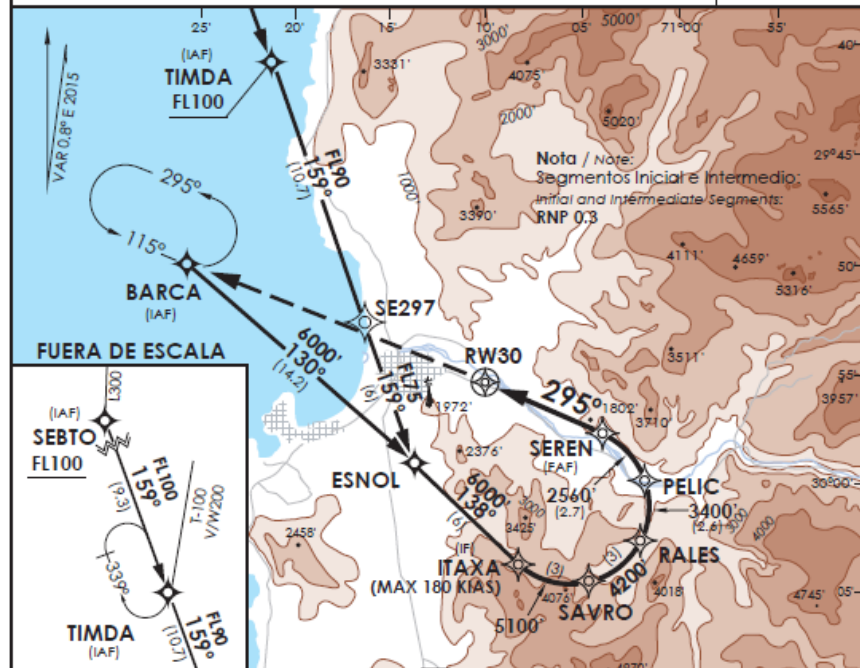


RNAV (RNP) Y/Z Rwy 30 (SCSE)

AD. LA FLORIDA
LA SERENA - CHILE

SCSE IAC 5
RNAV (RNP) Y Rwy 30

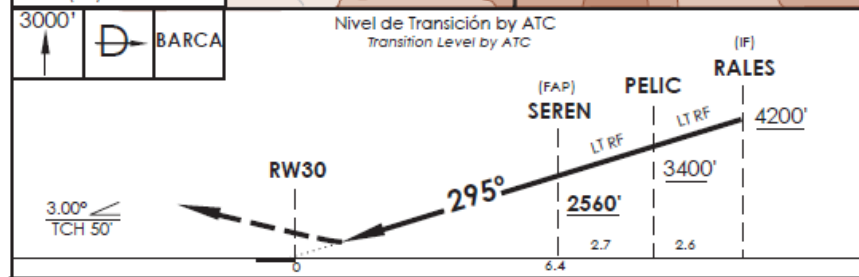
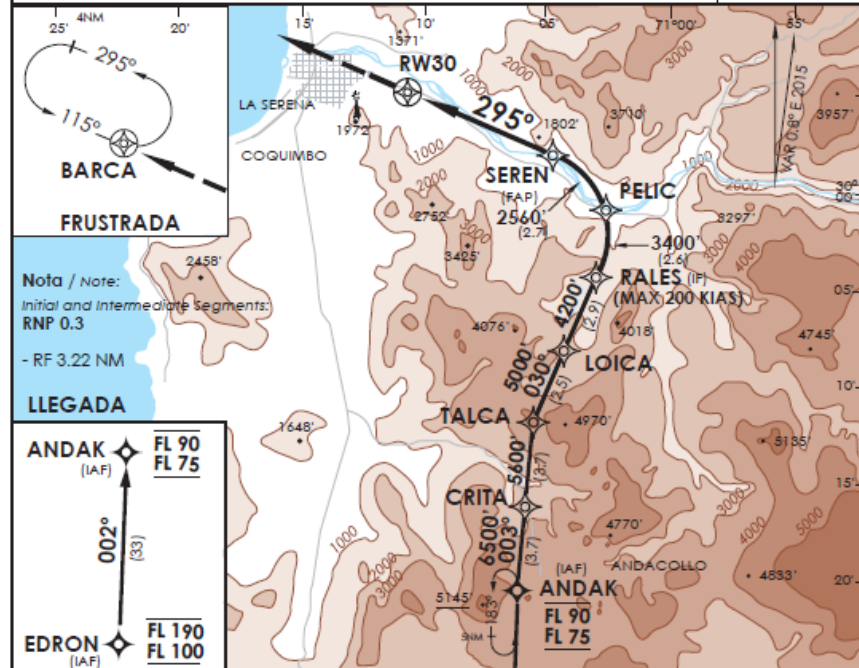
APP SANTIAGO CENTRO Santiago Center Approach	129.1	TORRE LA SERENA La Serena Tower	118.6	CONTROL TERRESTRE Ground Control	121.9
RNAV	FINAL APCH CRS 295°	MINIM ALT SEREN 2560' (2079')	DA/H ver mínimos DA/H refer to minimums	AD Elev. 481'	THR30 Elev. 481'
APCH FRUSTRADA: Ascenso 3000' directo a BARCA, luego según autorización ATC. Missed Apch: Climb to 3000' direct to BARCA, then according to ATC clearance.					9500 FT
MSA 25 NM RW30					

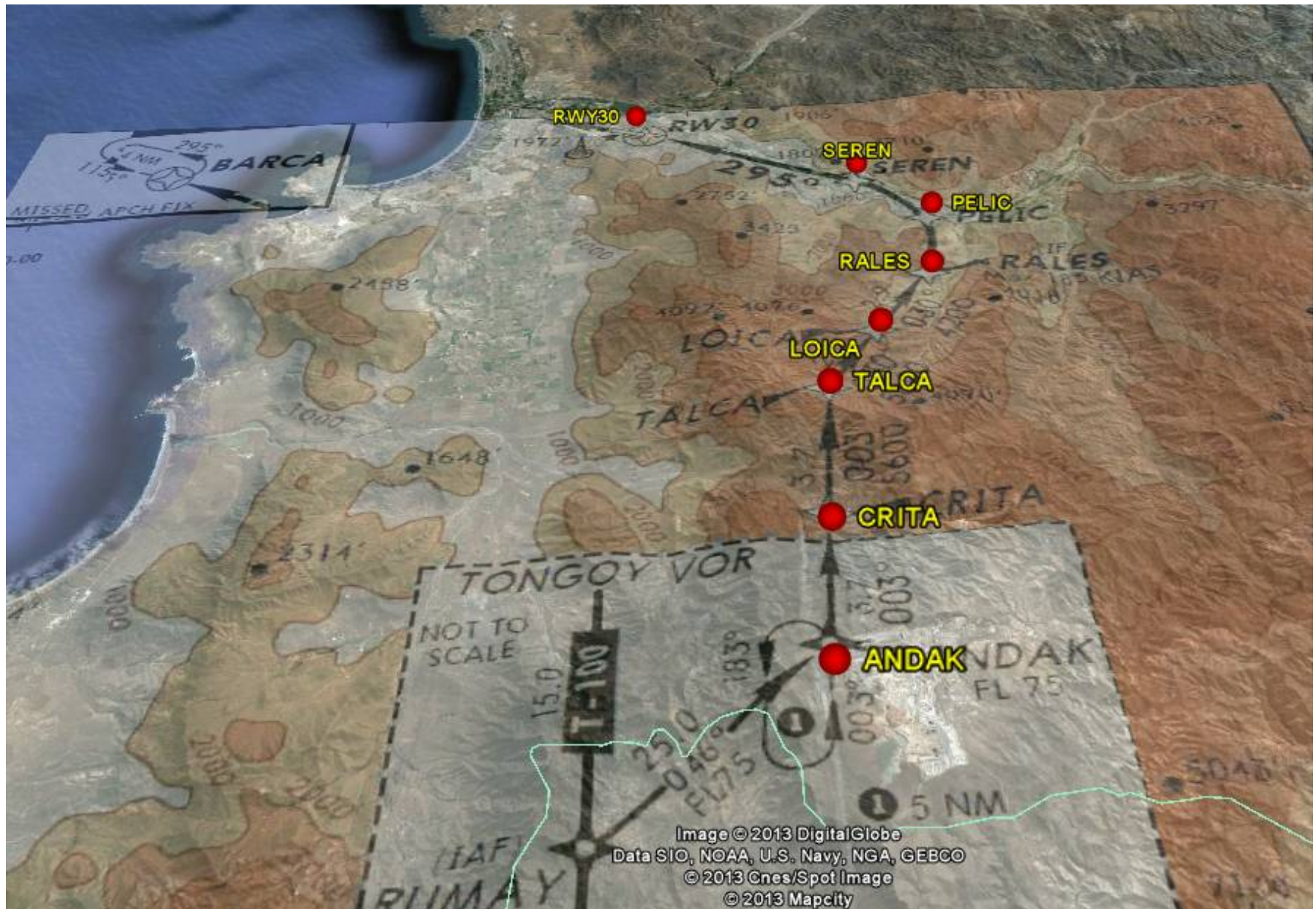


AD. LA FLORIDA
LA SERENA - CHILE

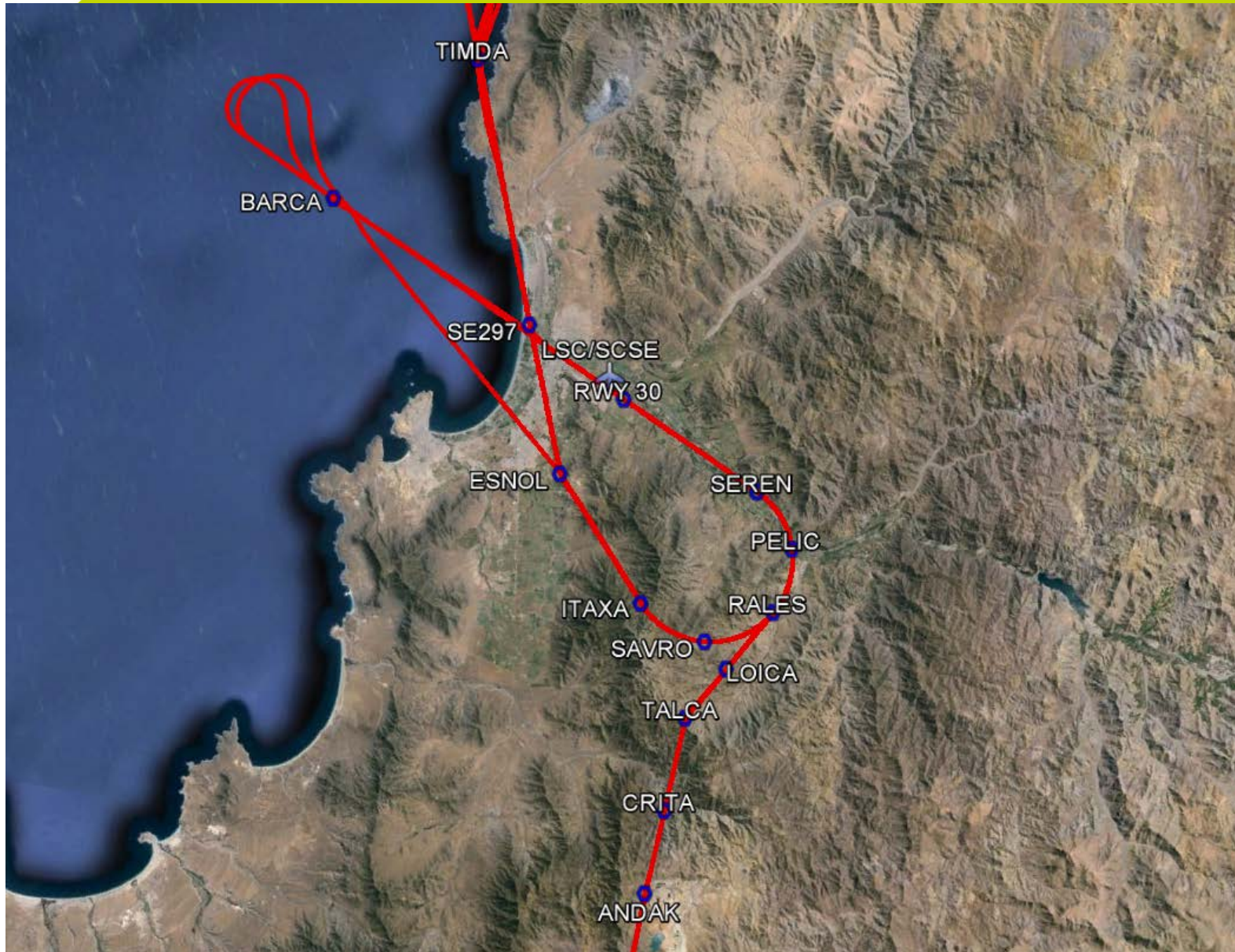
SCSE IAC 4
RNAV (RNP) Z Rwy 30

APP SANTIAGO CENTRO Santiago Center Approach	129.1	TORRE LA SERENA La Serena Tower	118.6	CONTROL TERRESTRE Ground Control	121.9
RNAV	FINAL APCH CRS 295°	MINIM ALT SEREN 2560' (2079')	DA/H ver mínimos DA/H refer to minimums	AD Elev. 481'	THR30 Elev. 481'
APCH FRUSTRADA: Ascenso 3000' directo a BARCA, luego según autorización ATC. Missed Apch: Climb to 3000' direct to BARCA, then according to ATC clearance.					9500 FT
MSA 25 NM RW30					





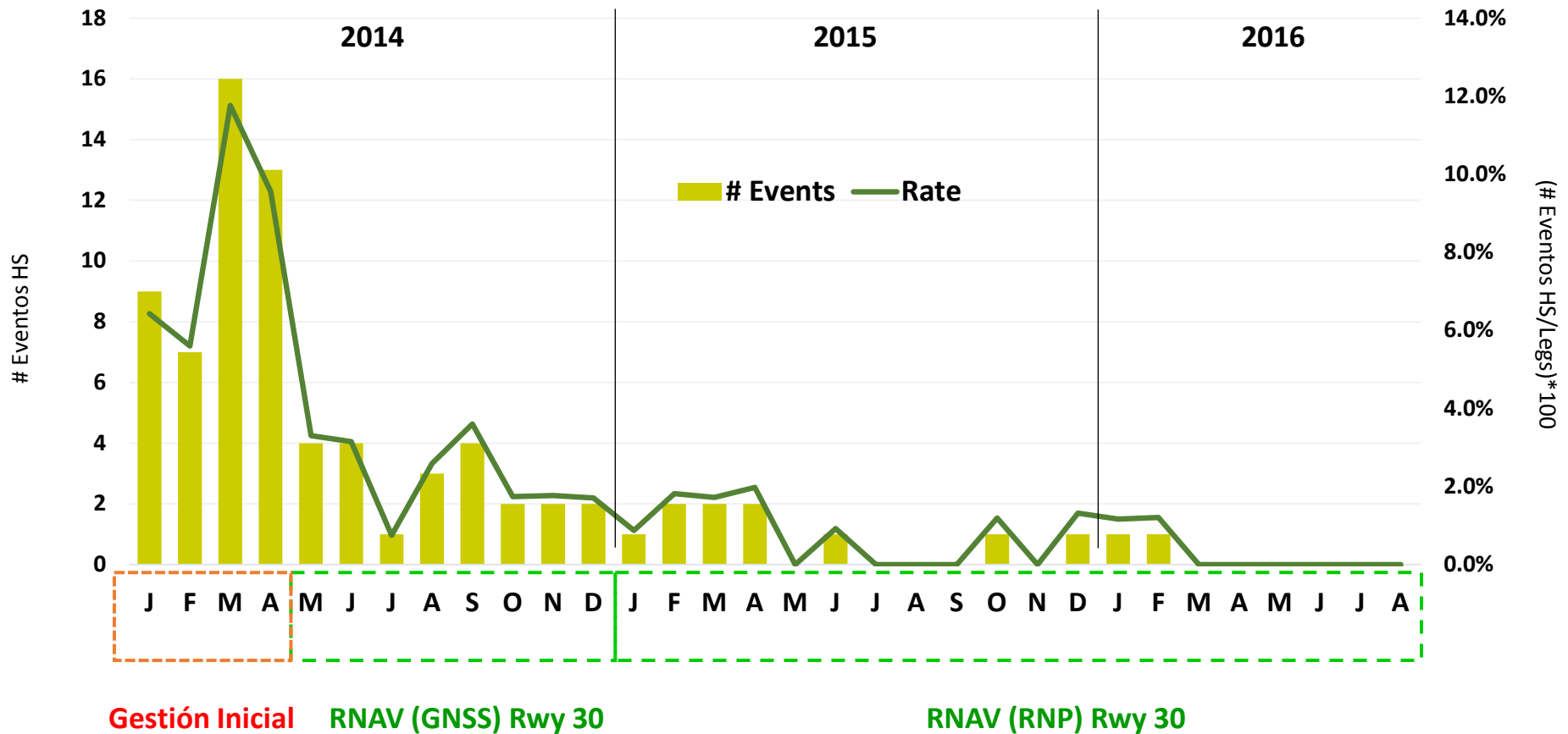
RNAV (RNP) Y/Z Rwy 30 (SCSE)



RNAV (RNP) Y/Z Rwy 30 (SCSE)



Unstable Approaches (high sev) LSC



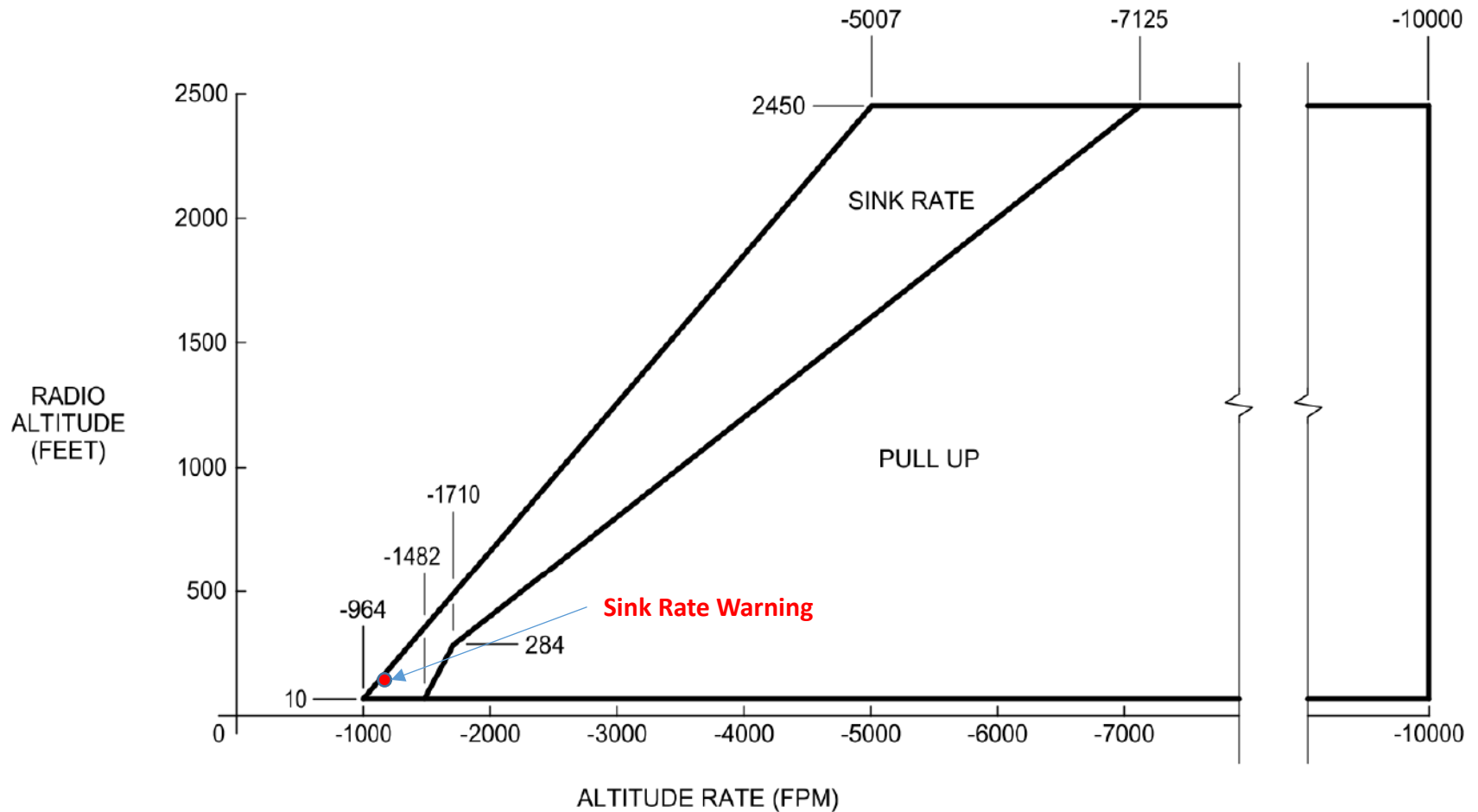


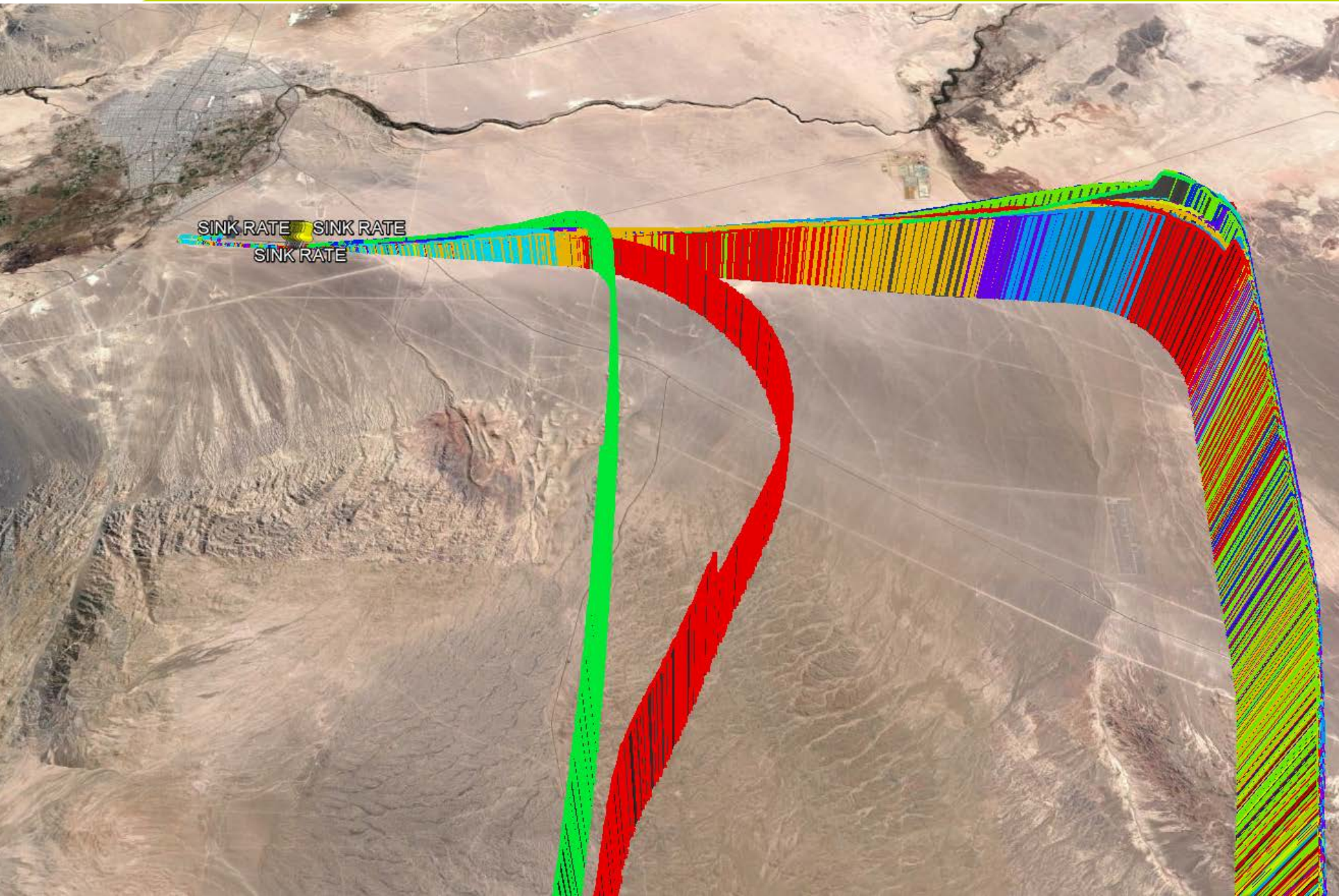
Content





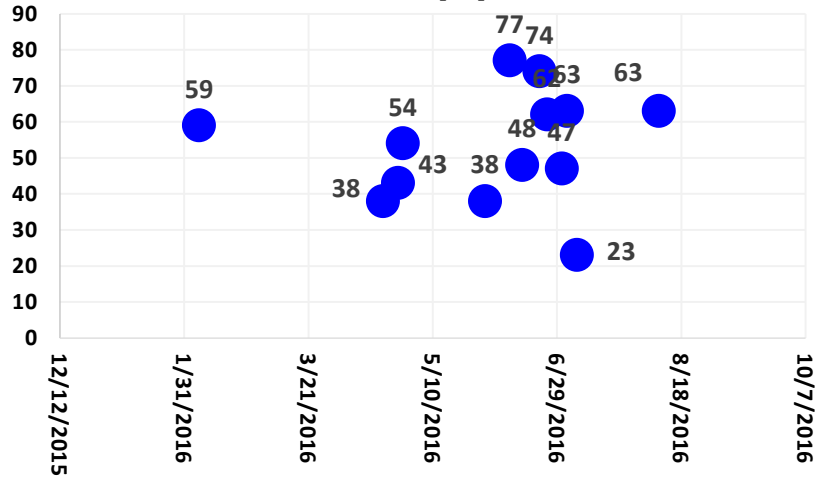
GPWS Sink Rate CJC – ANF Airports



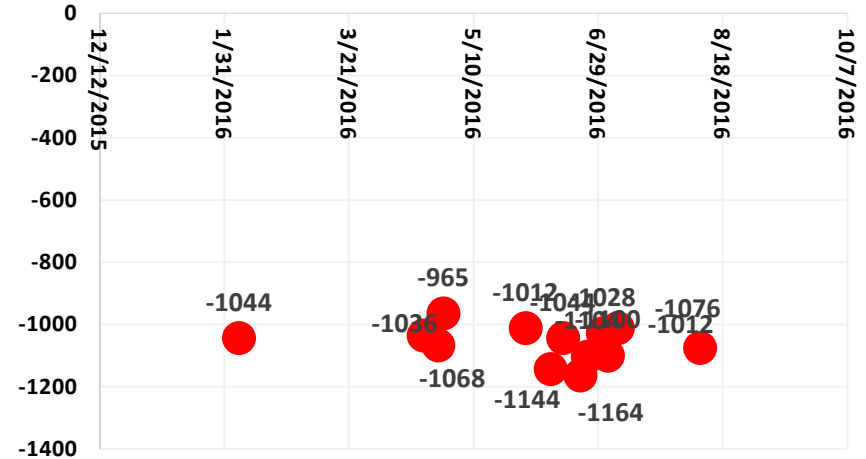




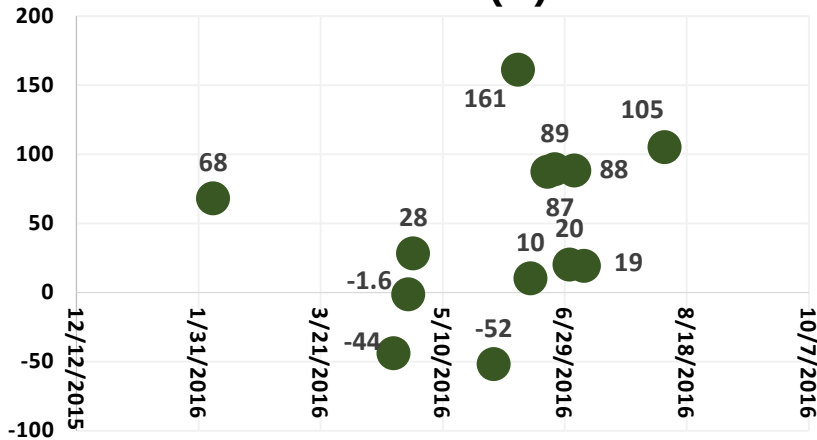
RALT (ft)



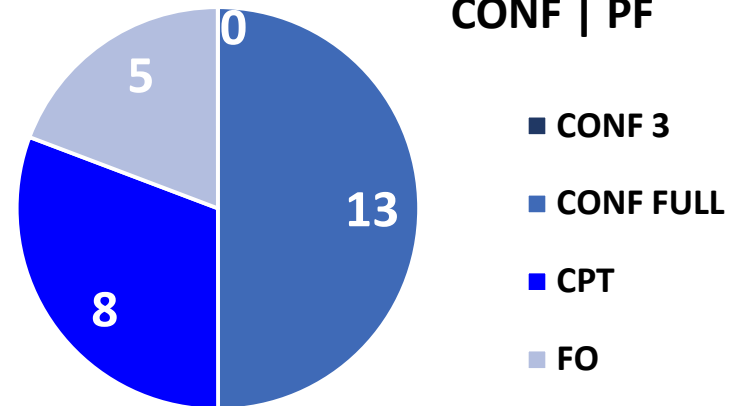
IVV (ft/min)

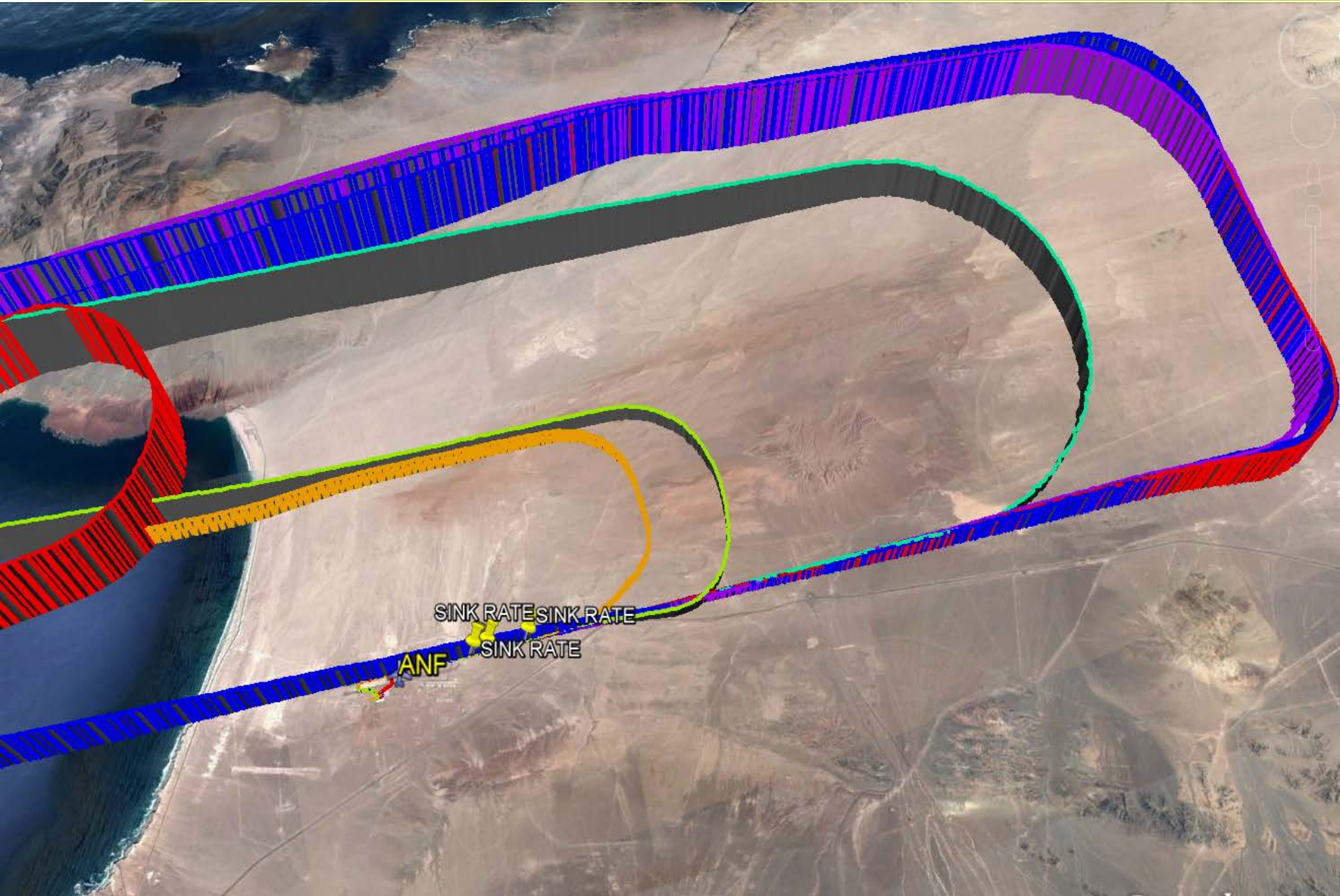


DIST THR (ft)

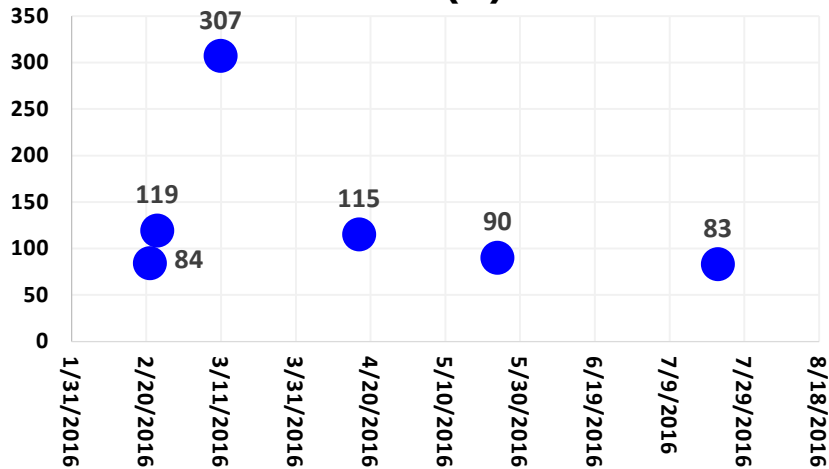


CONF | PF

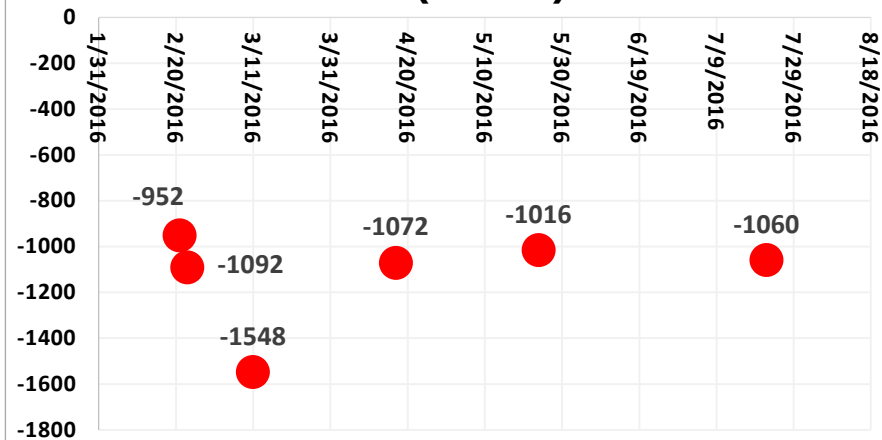




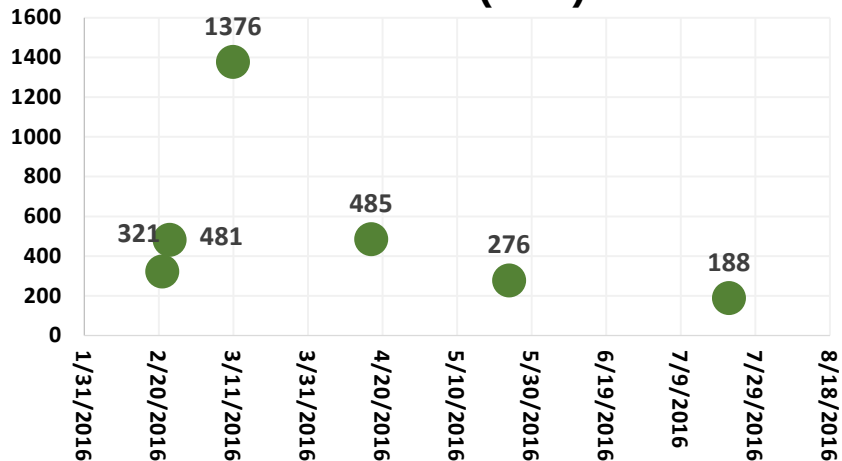
RALT (ft)



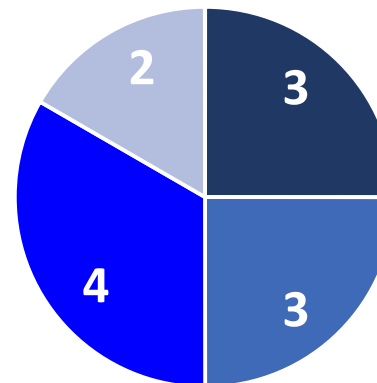
IVV (ft/min)



DIST THR (mts)



CONF | PF



CONF 3

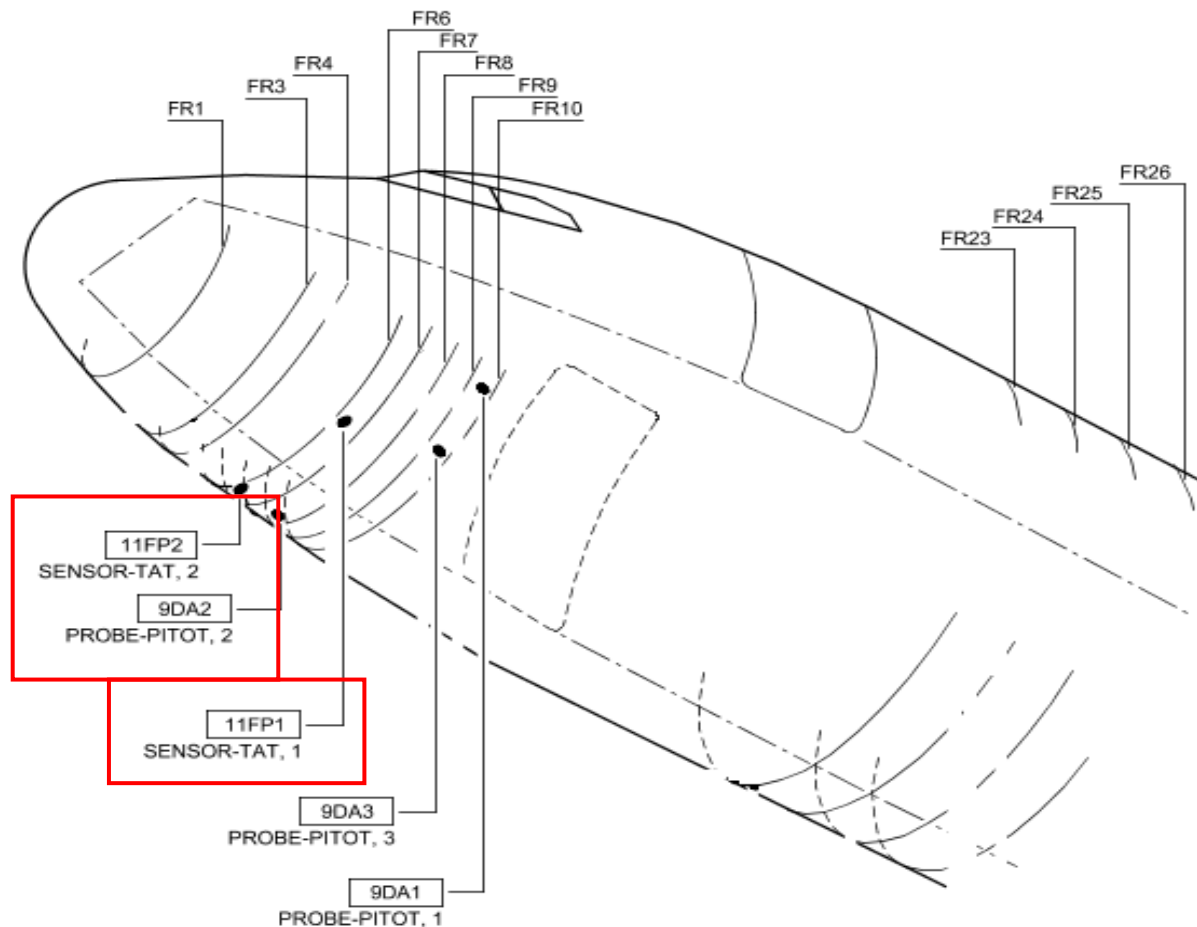
CONF
FULL
CPT

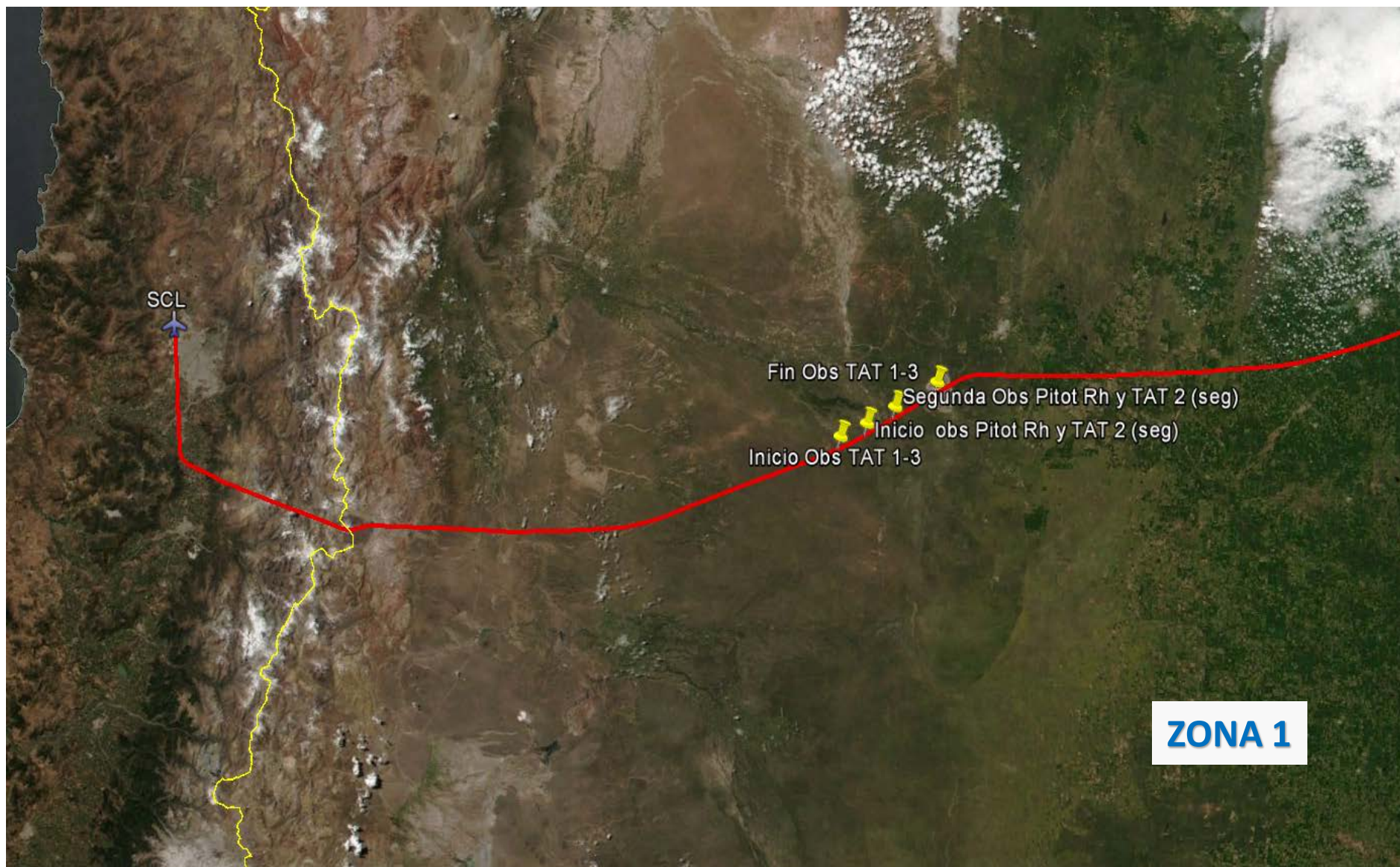


ATA 34 – Navigation

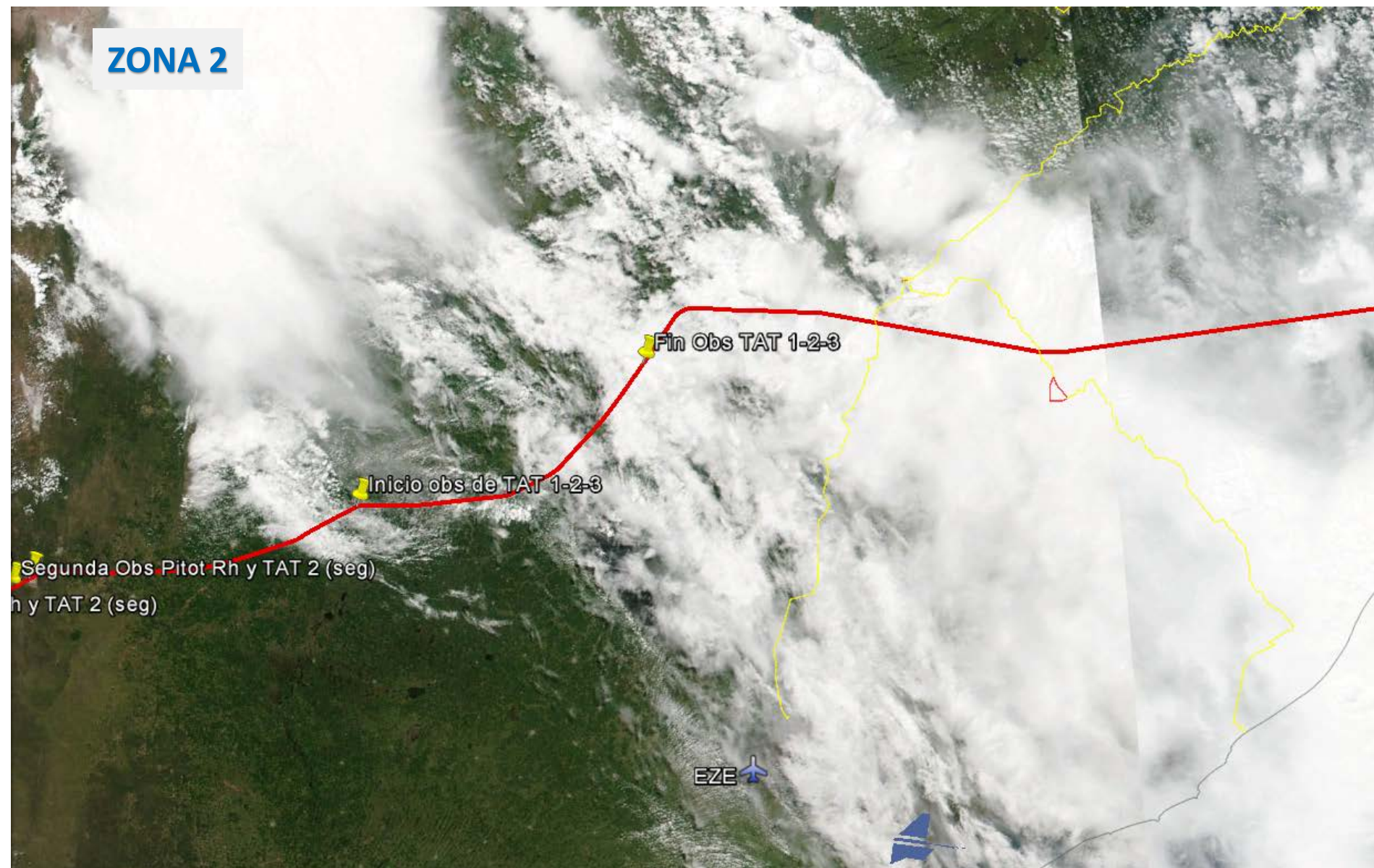
ICE Event

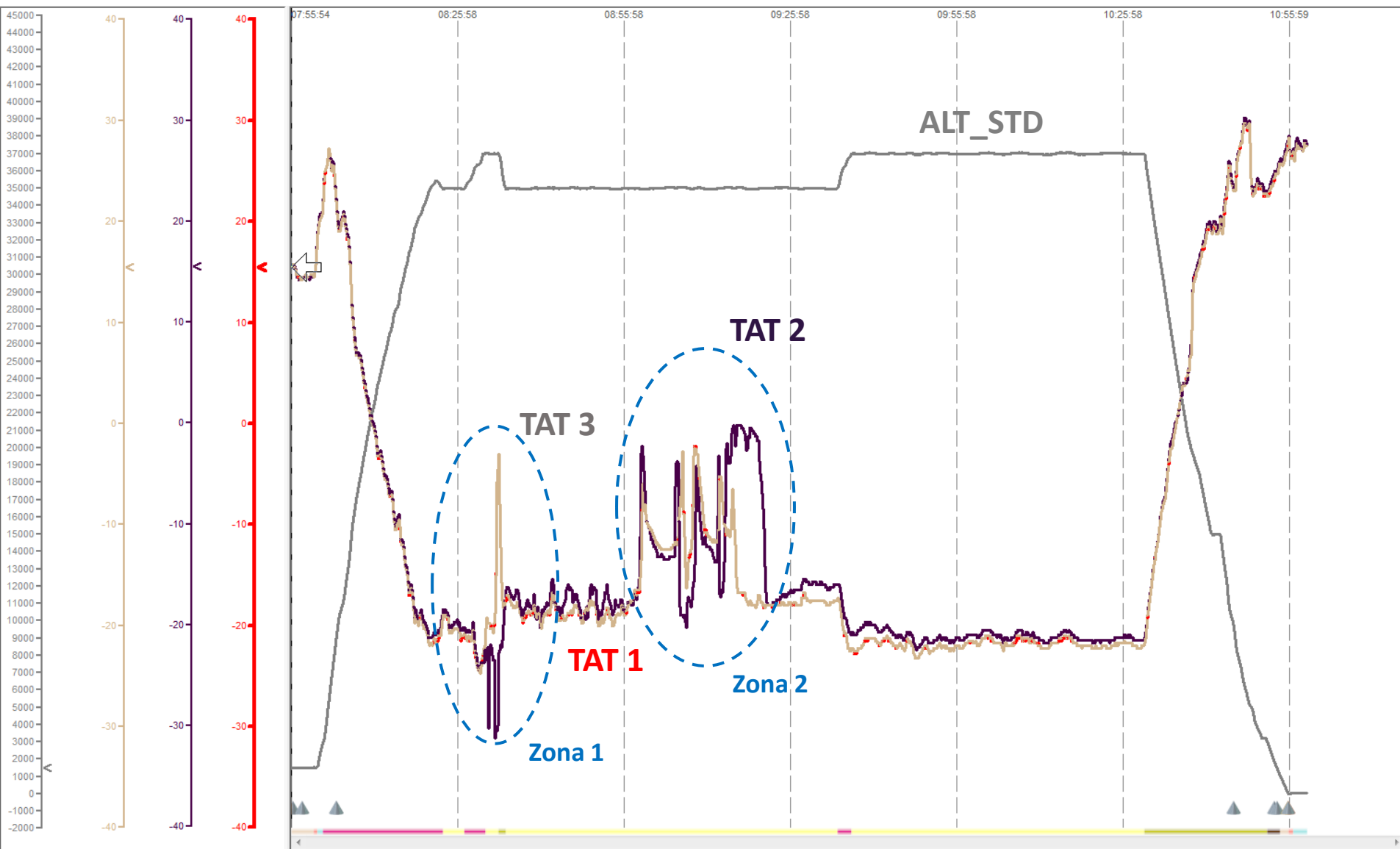
❑ SCL-FLN (TAT & PITOT RH)





ZONA 2





Envío de Raw Data Airbus

Análisis para Operaciones

Análisis para Ingeniería & Mantto. SKY



RALT - Fail

<i>Flight Number</i>	<i>Tramo</i>	<i>Observacion</i>	<i>MFL</i>
SKU002	PMC-SCL	DURING APCH RA1 AND 2 SIGANL LOST PASSING FROM CAT III DUAL TO CAT II TO CAT I	6022

SKU111	CPO-SCL	DURING APROACH ILS CAT III WAS DEGRADED INTERMITTEN TO CAT II	6042
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SKU008	PUQ-SCL	DURANTE APROX. ILS CAMBIA INTERMITENTEMENTE DE CAT 3 A CAT 2 EN FMA SIN INDICAR FALLA EN EL ECAM	6078
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<i>Flight Number</i>	<i>Tramo</i>	<i>Observacion</i>	<i>MFL</i>
SKU161	ANF-SCL	DURING ILS APP CAT 3 DUAL REVERT TO CAT 2	6091

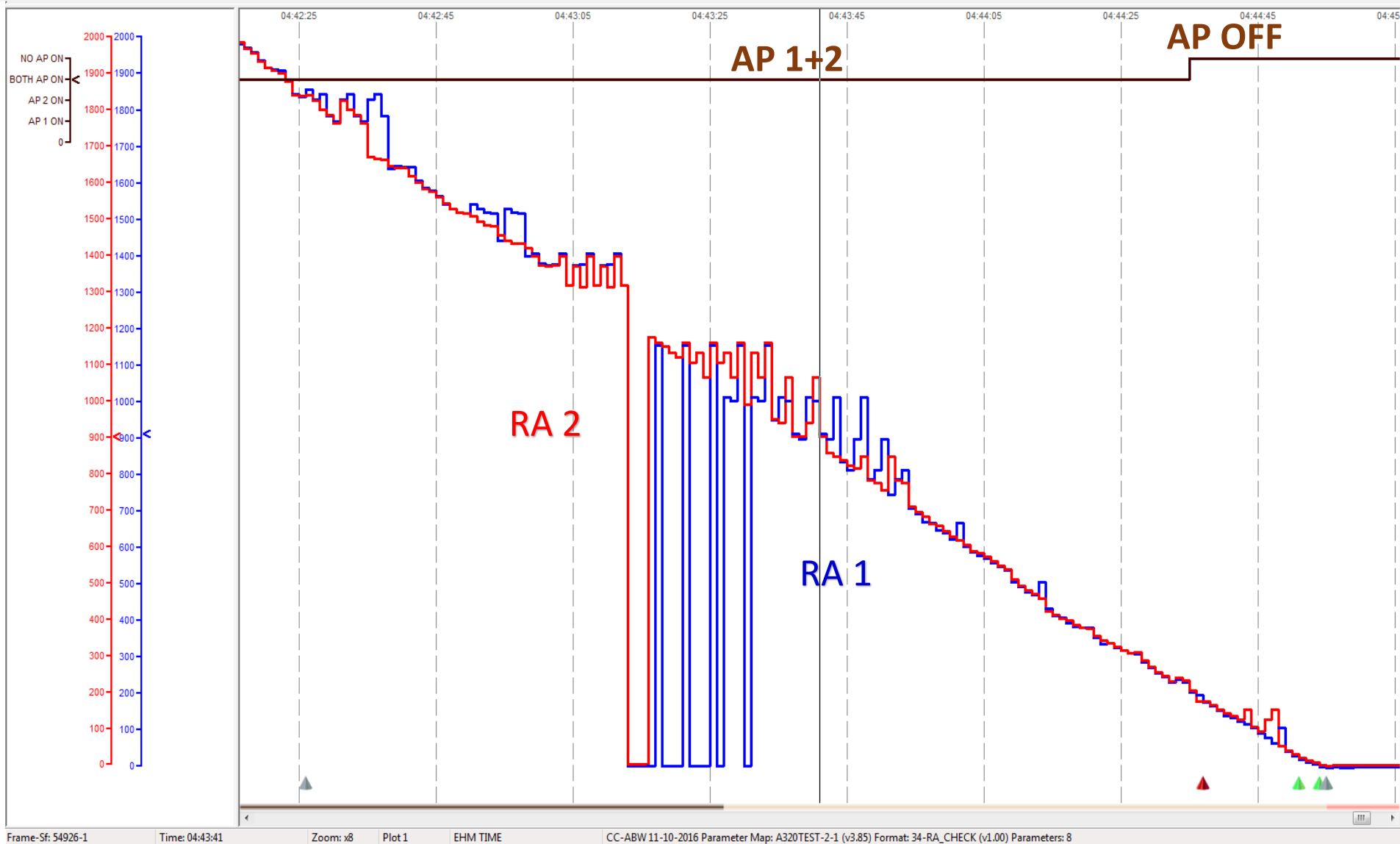
SKU002	PMC-SCL	DURING APP ILS CAT III REVERTS TO CAT II	6097
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SKU161	ANF-SCL	BOTH RA INTERMITENT DURING APPROACH	6104
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SKU002	PMC-SCL	DURING APP ILS CAT III REVERTS TO CAT I	6108
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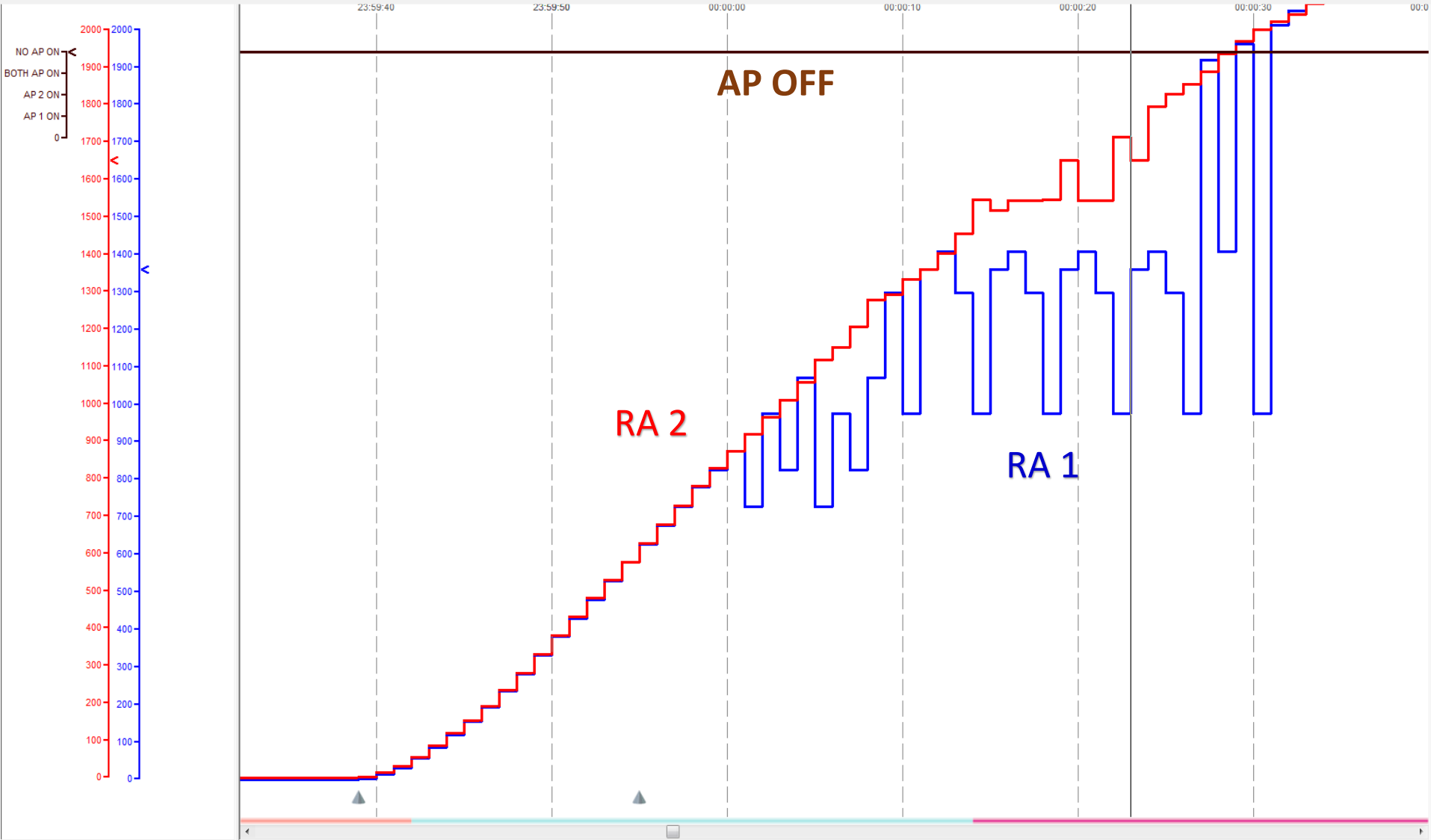


RALT 1 /2 – FAIL Descent





RALT 1 /2 – FAIL Descent

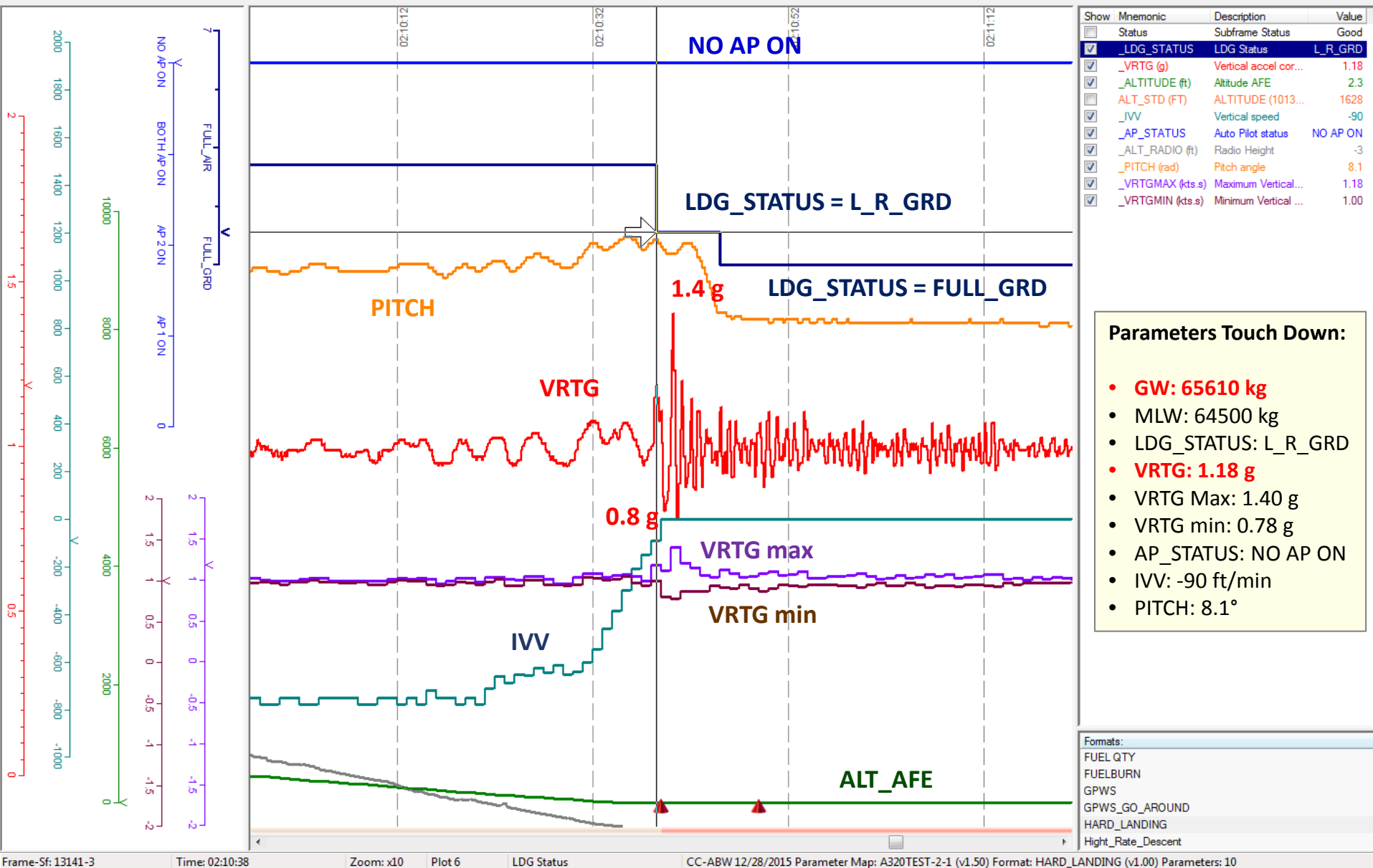


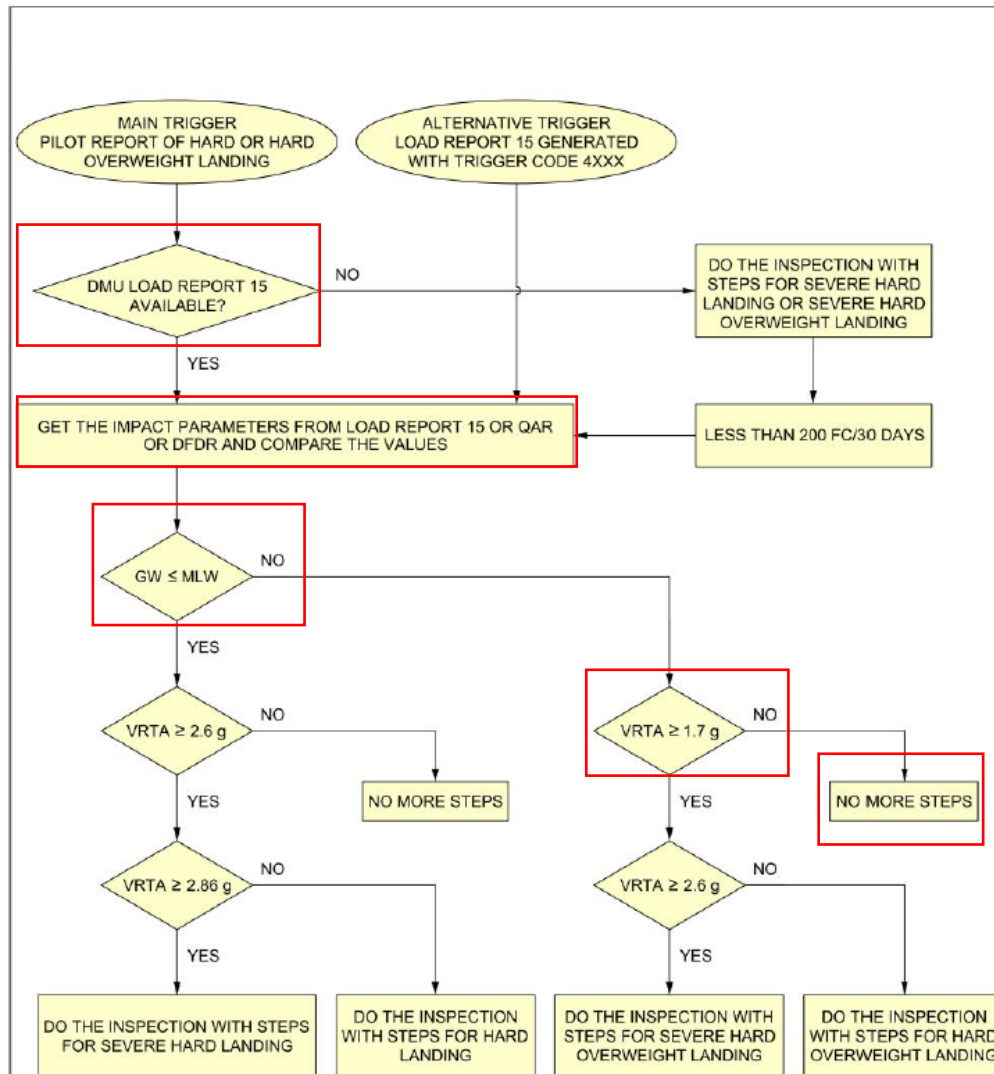


Overweight Landing



Overweight Landing





Parameters Touch Down:

- **GW: 65600 kg**
- **MLW: 64500 kg**
- LDG_STATUS: L_R_GRD
- **VRTG: 1.18 g**
- VRTG Max:
- VRTG min:
- AP_STATUS: NO AP ON
- IVV: -90 ft/min
- PITCH: 8.1°



***Speed Above VFE
(Max Flaps Out Speed)***



Speed Above VFE

Reg. #	Flight #	Num.	Event Name	Phase	Snapshot	Value
CC-AMP	SKU120	3007	APU Use Report	TKO		
CC-AMP	SKU120	3022	MANTTO	TKO		
CC-AMP	SKU120	509	Takeoff Derate for ECM Purposes	TKO	Flight Phase	TAKE OFF
CC-AMP	SKU120	508	Takeoff EGT Margin Event for ECM ...	CLB	Flight Phase	CLIMB
CC-AMP	SKU120	3028	Speed above 250kts (below 10000ft) ...	CLB	Calibrated Air Speed	250.13
CC-AMP	SKU120	507	Stable Cruise Event for ECM Purposes	CBS	Flight Phase	CRUISE
CC-AMP	SKU120	1017	Speed above VFE	DES	Calibrated Air Speed	251.38
CC-AMP	SKU120	3024	Landing Gear Down	APP	Landing Gear Sel Up/Do...	DOWN
CC-AMP	SKU120	1601	Flaps Late Setting at Landing	FNA	Altitude AFE	893.25
CC-AMP	SKU120	1315	Path Low in Approach (at 800ft)	FNA	Geometric glide angle	2.58
CC-AMP	SKU120	3025	Last Configuration Change	FNA	Altitude AFE	873.25
CC-AMP	SKU120	1317	Path Low in Approach (at 400ft)	FNA	Geometric glide angle	2.21
CC-AMP	SKU120	2000	Continuously Low during final	FNA	Geometric glide angle	2.21

1017 – Exceedance of flaps/slats limit speed after take off

Reference: AFPS M1_00304_0003_1017_001.000
Last Modification: 10/30/2003 4:21:37 PM
Author: Airbus

Operational Goal:

This event detects when the AC airspeed exceeded the Flaps / Slats maximum limit speed (VFE) for more than 3 seconds, before the flaps / slats were retracted after take off.

AC damage can be caused by exceeding AC structural limit speeds, and any exceedance will generate aural and visual warnings to alert the crew.

Events to detect these exceedances and AC warnings are essential in a Flight Monitoring System. The severity levels are Medium and High, with no Low level .

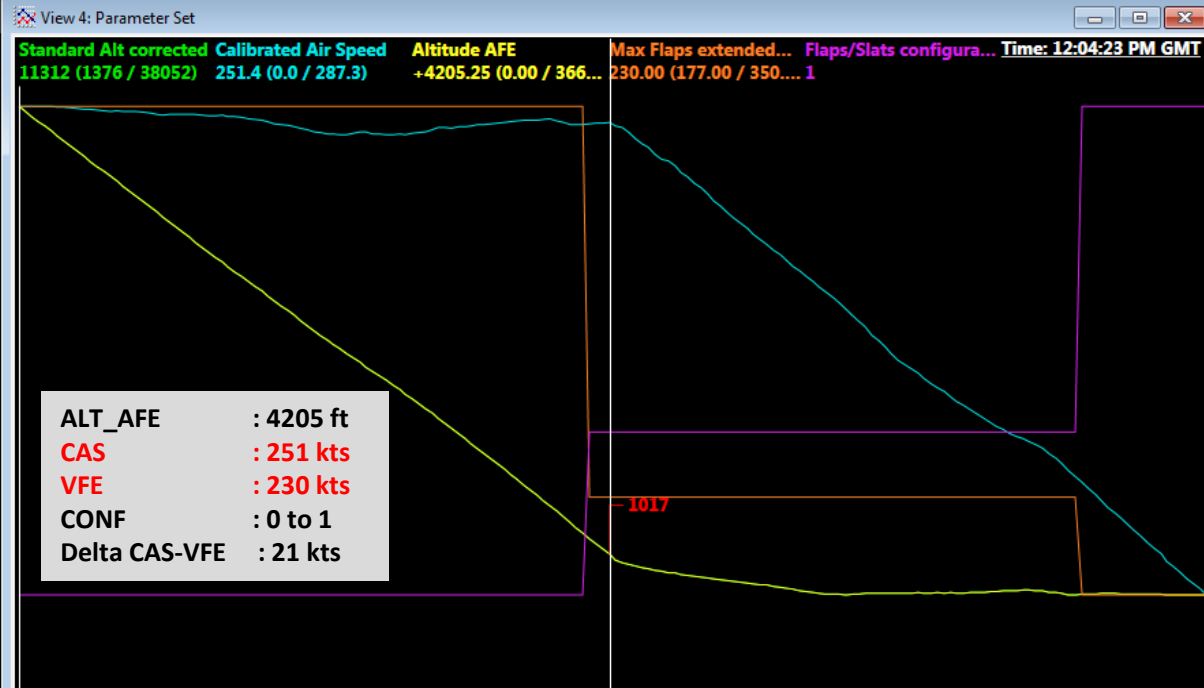
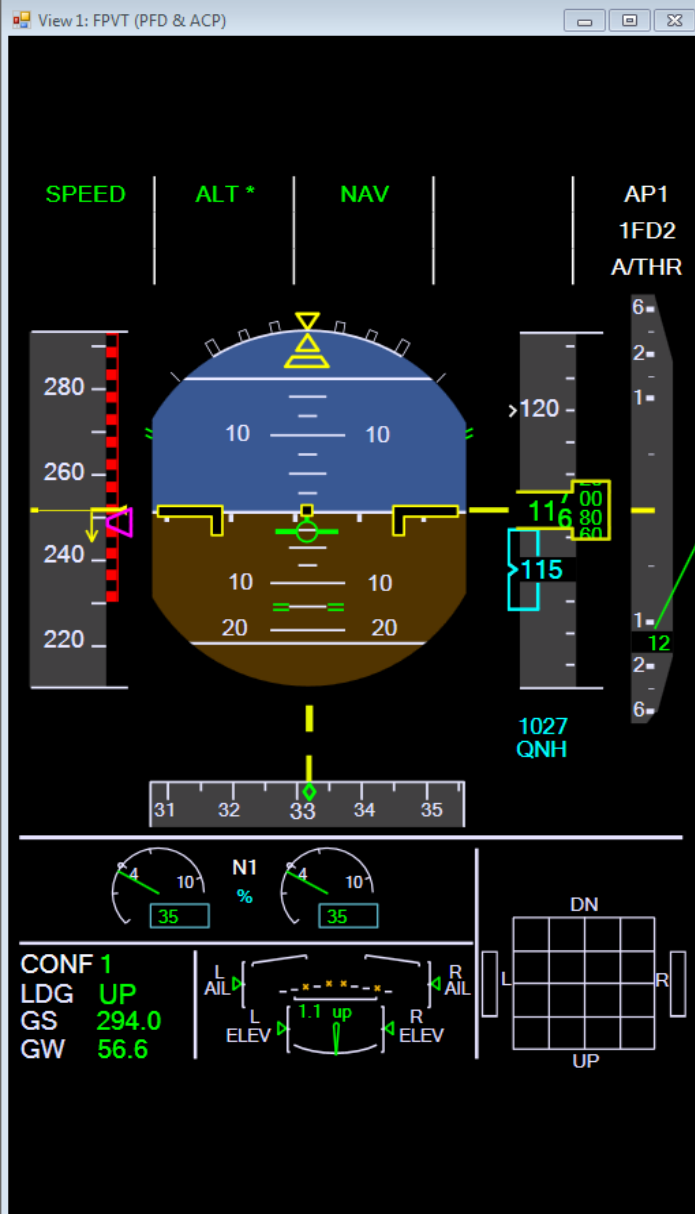
Only one event can be triggered per MW but after Go Arounds or Touch and Go landings several events can be triggered in one flight.

Deviation Limits:

	T > =3 s CASC >:
LOW Limit	#
MEDIUM Limit	VFE
HIGH Limit	VFE 4 kts

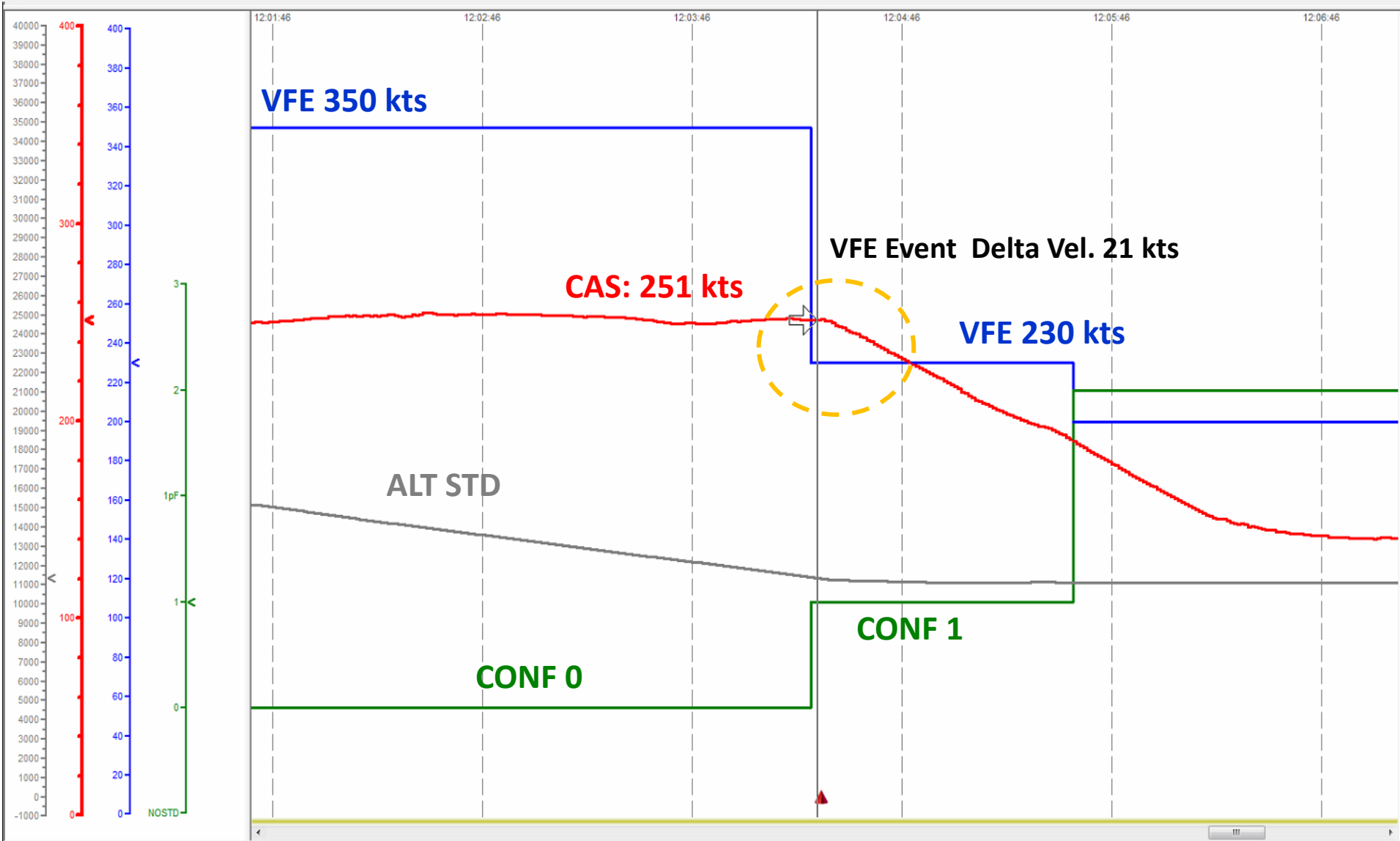


Speed Above VFE





Speed Above VFE





Speed Above VFE



AIRBUS

TASK 05-51-13-200-001-A

Inspection after Flap/Slat Extension at more than the Flap/Slat Limiting Speed

1. Reason for the Job

This inspection is necessary after a crew report and an activation of the overspeed aural warning:

- If the overspeed was not more than 10 Kts higher than the value shown on the VFE placard, only an extension and retraction test of the flaps and slats is necessary (refer to the operational test of the Flight Control Surfaces paragraph given in this procedure).

NOTE: If you find an unsatisfactory condition(s) during the operational test, the full inspection given in this procedure is applicable.

- If the overspeed was more than 10 Kts higher than the value shown on the VFE placard, you must do the full inspection given in this procedure.

- If an activation of the overspeed warning occurred during the movement of the flap and slat control lever (from position 0 to position 1), the inspection and the operational test of the flap system are not necessary (steps 4.C and 4.E.1 of this procedure).

NOTE: You can get confirmation of the slat and/or flap movement from the flight data recorder. If these data are not available, the maintenance procedures related to the pilot report are applicable.

TASK 05-51-13-200-001-A

Inspection after Flap/Slat Extension at more than the Flap/Slat Limiting Speed

1. Reason for the Job
2. Job Set-up Information
3. Job Set-up
4. Procedure
 - A. General
 - B. Inspection of the Wings
 - C. Inspection of the Flap System
 - D. Inspection of the Slat System
 - E. Operational Test of the Flight Control Surfaces



ITEM	INSP CODE	INSPECTION TASKS	PHASE 1	PHASE 2	PHASE 3	INSP SIGN	REF. FIG.
1.		Do an operational test of the flaps (Ref. AMM TASK 27-54-00-710-001) . Make sure that the flaps move smoothly and freely.	X				
2.		Do an operational test of the slats (Ref. AMM TASK 27-84-00-710-001) . Make sure that the slats move smoothly and freely.	X				
3.		Do an operational test of the spoilers (Ref. AMM TASK 27-64-00-710-001) . Make sure that the spoilers move smoothly and freely.	X				

5. Close-up

Speed Above VFE

- The five positions of the lever correspond to the following surfaces positions and flight phases :

Position	Slats	Flats	Flight phases	
0	0°	0°		Cruise / Hold
1	18°	0°		Hold / Approach
		10°	Take off	
2	22°	15°(14°)		Approach
3	22°	20° (21°)		Approach / landing
FULL	27°	35°(*) (25°)	Landing	

(*) : 40° for A320 with IAE engine or A319



Flap No
move



ECAM upper display





Questions...





Flight Data Monitoring

REPORTAR ES LOW COST

