



ATM occurrences analysis ANSP perspective



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CONTENTS

I Investigation process at the PNA/ONDA

Description of the different stages of the process

II A case study

Description of an ATM occurrence investigation





ONDA/PNA as ANSP in few words



1. ONDA/PNA is the national Air navigation service provider
2. ATS provided through 27 ATS units : 2 ACC (Casablanca & Agadir) and 25 airports
3. 418 437 flights handled during 2022 (≈ 1200 flights per day)
4. Investigations conducted through an investigation Division on ATM occurrences



Art 3.1 Annexe 13

“The sole objective of the investigation of an accident or incident shall be the prevention of accidents and incidents. It is not the purpose of this activity to apportion blame or liability.”

The 4013 Act (Civil Aviation Act) -

Art 272

“ Air Navigation Service providers must apply safety management systems in accordance with the provisions of the Chicago Convention and its annexes and must make available to the authority responsible for civil aviation, at its request, all information relating to actual or potential deficiencies in civil aviation safety.”

The 1728 regulation .Article 4

Any air navigation service provider implements a formal mechanism for the notification and analysis of occurrences related to air traffic management which constitute a real or potential threat to the safety of flights or traffic management services



CONTENTS

Investigation process at the PNA/ONDA

Description of the different stages of the process

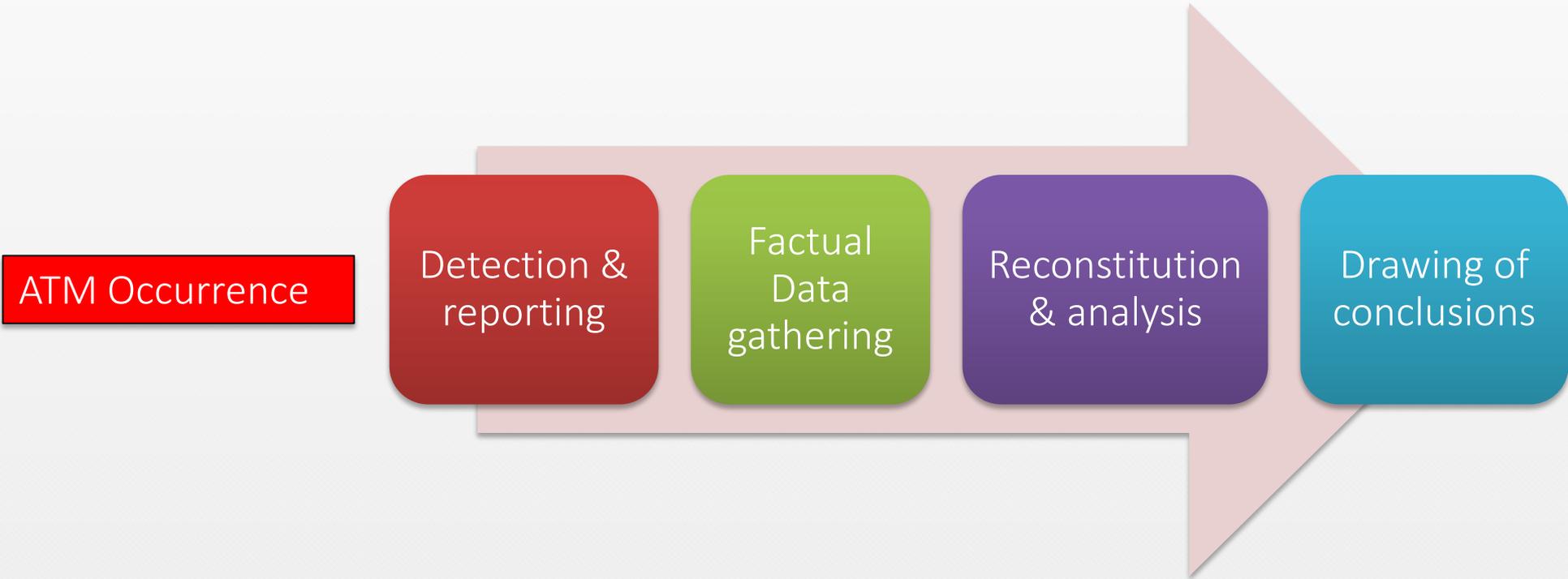




1. Description of the process



- Multi-actor process involving : Investigator (or investigation team), Front-line operators (or first hand actors (ATCOs, ATSEP, A0..)), Managers, CAA, back office personnel...
- Sequential process composed of many phases : Detection, Informative, Analytical and productive phases.

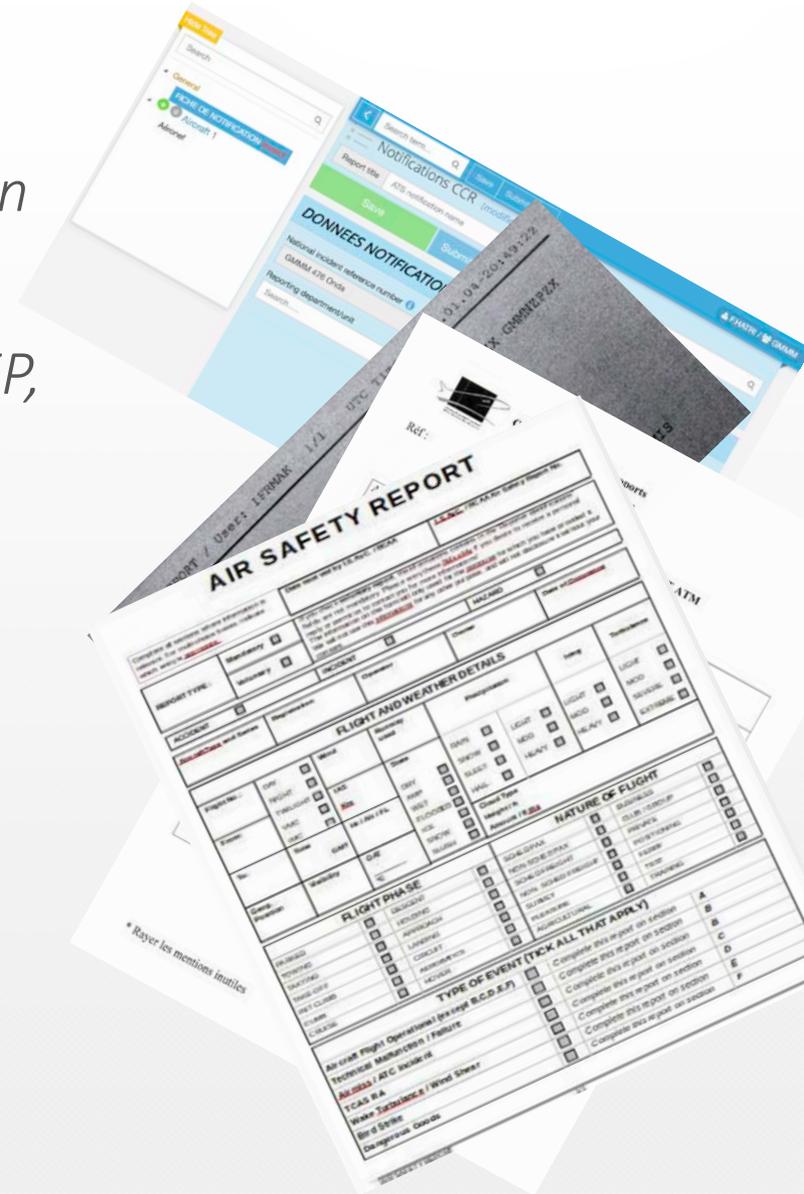




1. Detection phase



- *The notification triggers the investigation process*
- *Allows front-line operators (ATCOs, ATSEP, crew) or any other agent, to report any ATM-related occurrence.*
- *Used tool : Operational units daily logs (Pre established templates of paper & electronic forms), mails, AFTN...*
- *Confidential reporting system (mandatory & voluntary)*





1. Detection phase



Witch occurrences are to be reported ?

Generic definition & a minimal list

*“Accidents, serious incidents and incidents as defined in Annex 13 ... & any other defect or malfunction of an aircraft, its equipment or any element of the air navigation system used or designed to be used for the purpose of or in connection with the operation of an aircraft **or the provision of an ATM service or navigational aid to an aircraft.**”*



1. Detection phase



Minimal list :

-Accidents,

-Near collisions : *specific situations where 1 aircraft and another aircraft/the ground/a vehicle/person or object is perceived to be too close to each other:*

Examples : Separation minima infringement, • Inadequate separation, • Near CFIT, • RI where avoiding action was necessary

-Potential collisions or near collisions : *situations having the potential to be an accident or a near collision, if another aircraft is in the vicinity:*

(RI without avoiding action, • Aircraft deviation from ATC clearance • Unauthorized penetration of airspace, ...)

-ASOs : *situations where the ability to provide safe ATM services is affected.*



1. Detection phase



Reporting and just culture

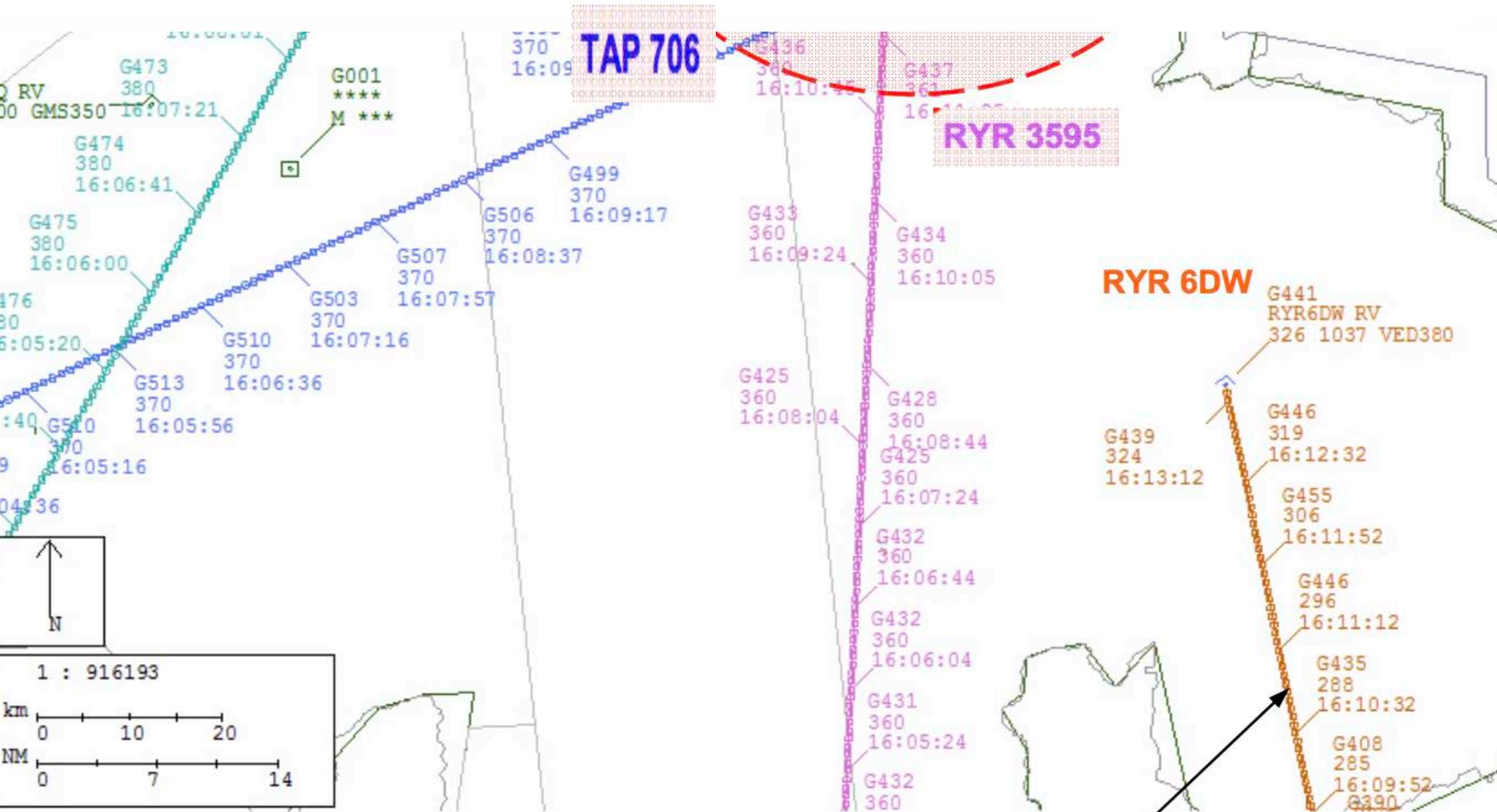
- Article 274 of the Moroccan Civil Aviation Act 4013 :

“Personnel of ANSPs who [...] report accidents, incidents, safety deficiencies or threats presenting a real or potential risk to the safety of the aircraft must not be subject to threats or sanctions from their employers because of the information provided during their activities, [...]”

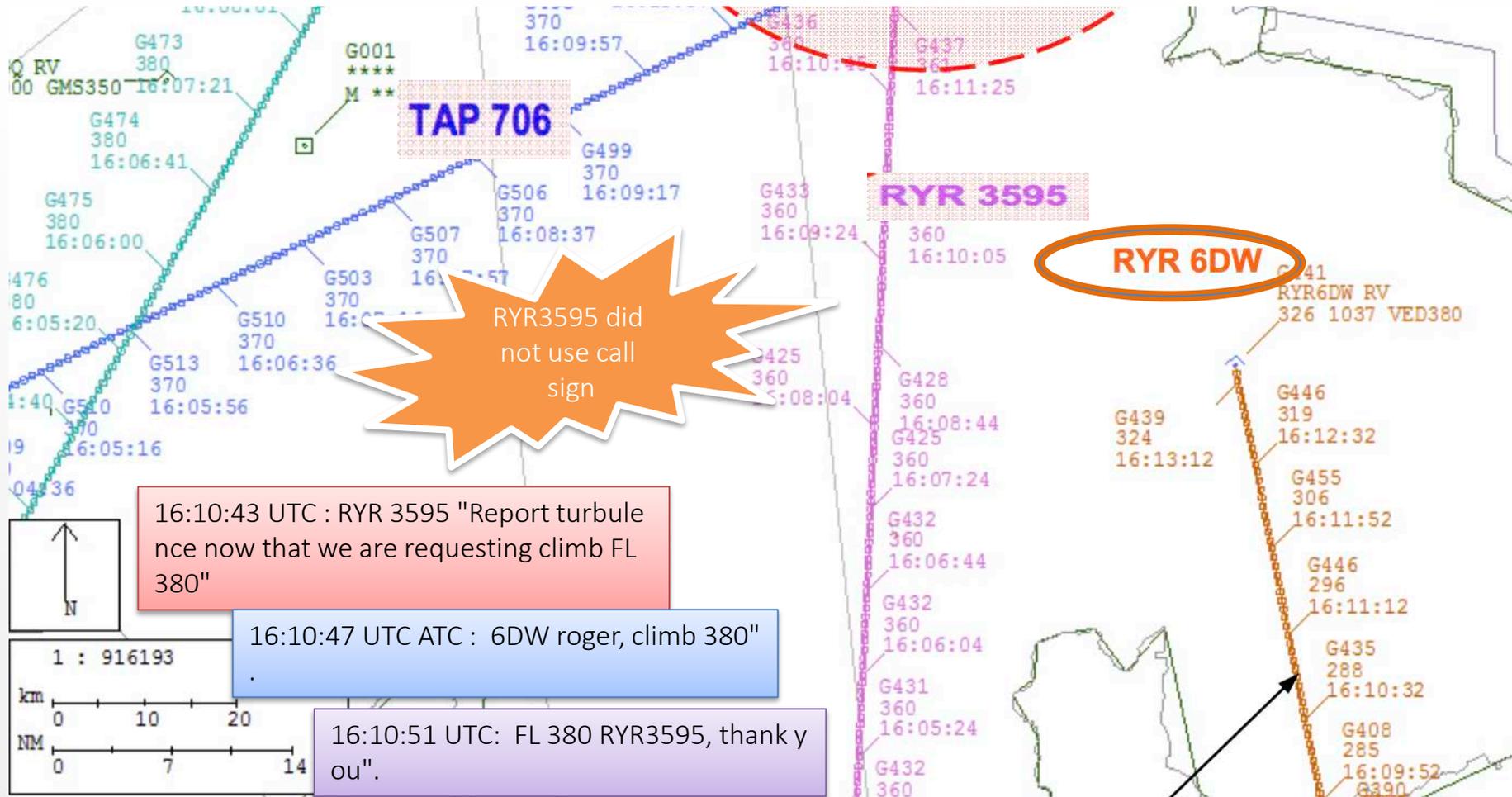
- Just culture Vs Comparative Law ! (the Swiss case)

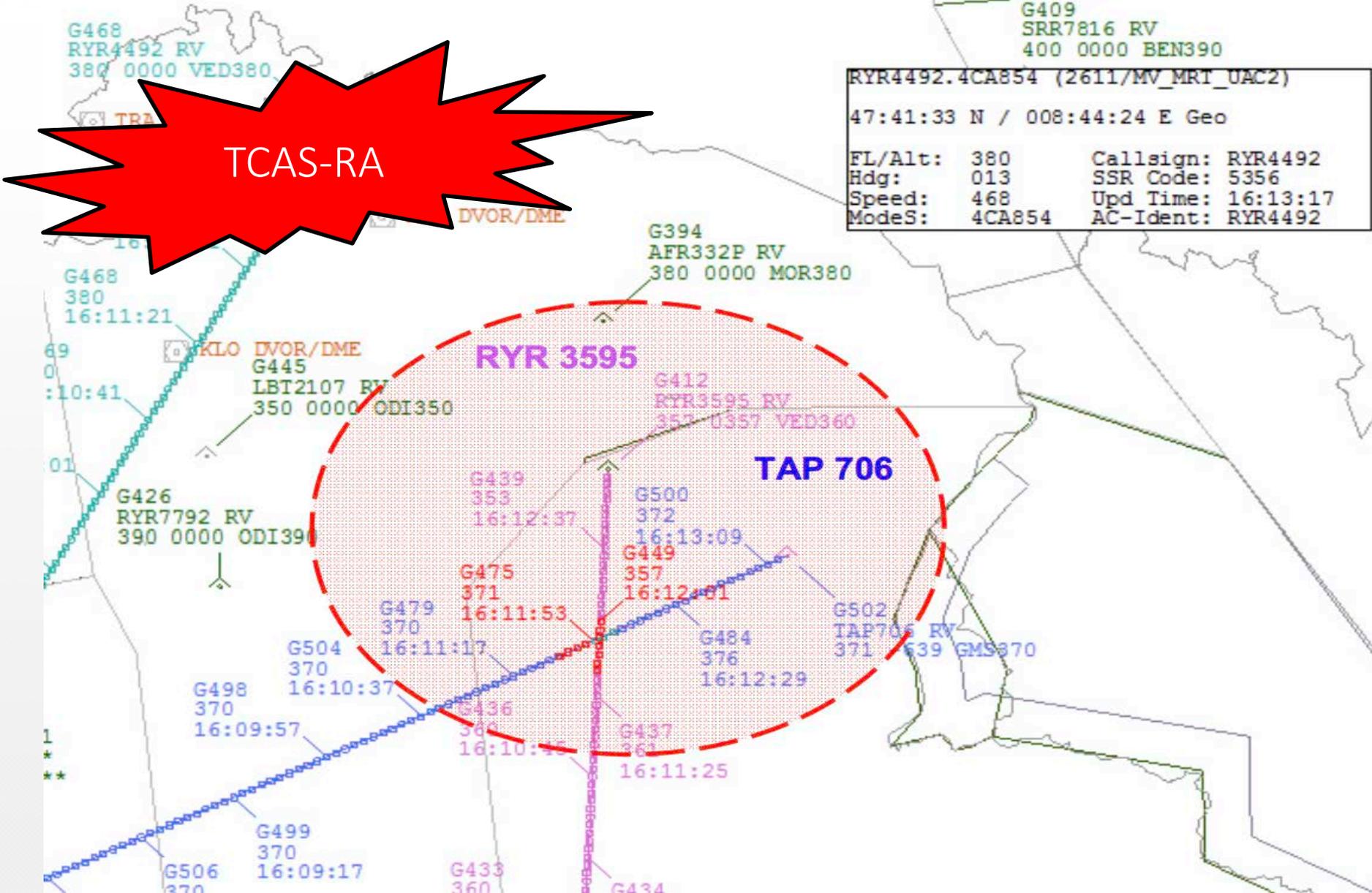


1. Detection phase



1. Detection phase







1. Detection phase



Just culture and comparative law

- The federal prosecutor brought charges against the ATC
- On 30 May 2018, the Federal Criminal Court held that the ATC had endangered the life of the passengers and crew of TAP706 and RYR3595 under Art. 237 of the Swiss Criminal Code.
- The court sentenced the ATC to a monetary penalty of 60 daily units of Sfr300 (to be suspended pending a probation period).
- This judgement created a precedent. Comparative law can influence precedent.



2. Data gathering



- 3 major questions are to be answered : what, where and when ?
- A variety of information sources will be used to collect the necessary and sufficient data for the reconstruction of the event and to conduct a systemic analysis.
- The main objective is to find out relevant facts which will support the analysis.
- Used tools :
 - Voice recorders' transcription
 - Surveillance data recorders including D.A tools, safety nets
 - Interviews (non-observable information, depending on the occurrence, confidential)



2. Data gathering



- Date/time of the occurrence;
- Geographical data: FIR, ATS Unit, Position, sectors involved
- Traffic load data, (ATFCM measures,)
- Traffic typology (IFR/VFR)
- Emergencies,
- Meteorological data: (VMC/IMC)
- Data about involved aircraft (Type of flight, Operator, call sign, type of aircraft, Origin, destination)
- Data about involved personnel ATCO's or any other concerned staff (e.g. Supervisor)
- HF Data : CTO, breaks, shifts, stress, fatigue, low attention
- On the Job Training Instruction at the moment of the occurrence
- Operational data Operational documentation (MoO, LoA's, etc.)
- Airspace classification (military exercises, aerial works, special areas (D/R/P) , NOT AM in force,
- Safety nets in place.



3. Reconstruction and analysis



- Investigators have to answer 2 questions : what and how ?
- Provides the explanatory factors (operational, technical, organizational, regulatory, procedural..)?
- Beyond the manifest causes, it is crucial to identify all the contributory factors, (system's defenses' or other organizational factors)
- Chronological reconstruction of the chain,
- Objective facts Vs investigator's opinions
- (radar images, communications' transcription, except of applicable regulation and operational procedures, key information about the involved aircraft, etc).
- To take into account :
 - Investigators have less “pressure” and more “information” than the involved persons.
 - The halo effect.



4. Drawing of conclusions



- Synopsis of the occurrence, its cause(s) and contributing factors,
- Determination of the ATM ground contribution,
- Determination of the related systemic and non-systemic element,
- Classification of the incident, with a severity scoring (detection, mitigation, adequateness of the solution, execution, reactivity to safety nets,

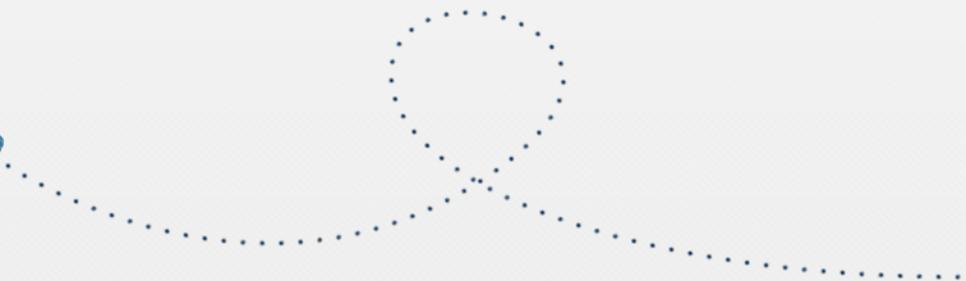


CONTENTS



A case study

Description of an ATM occurrence investigation





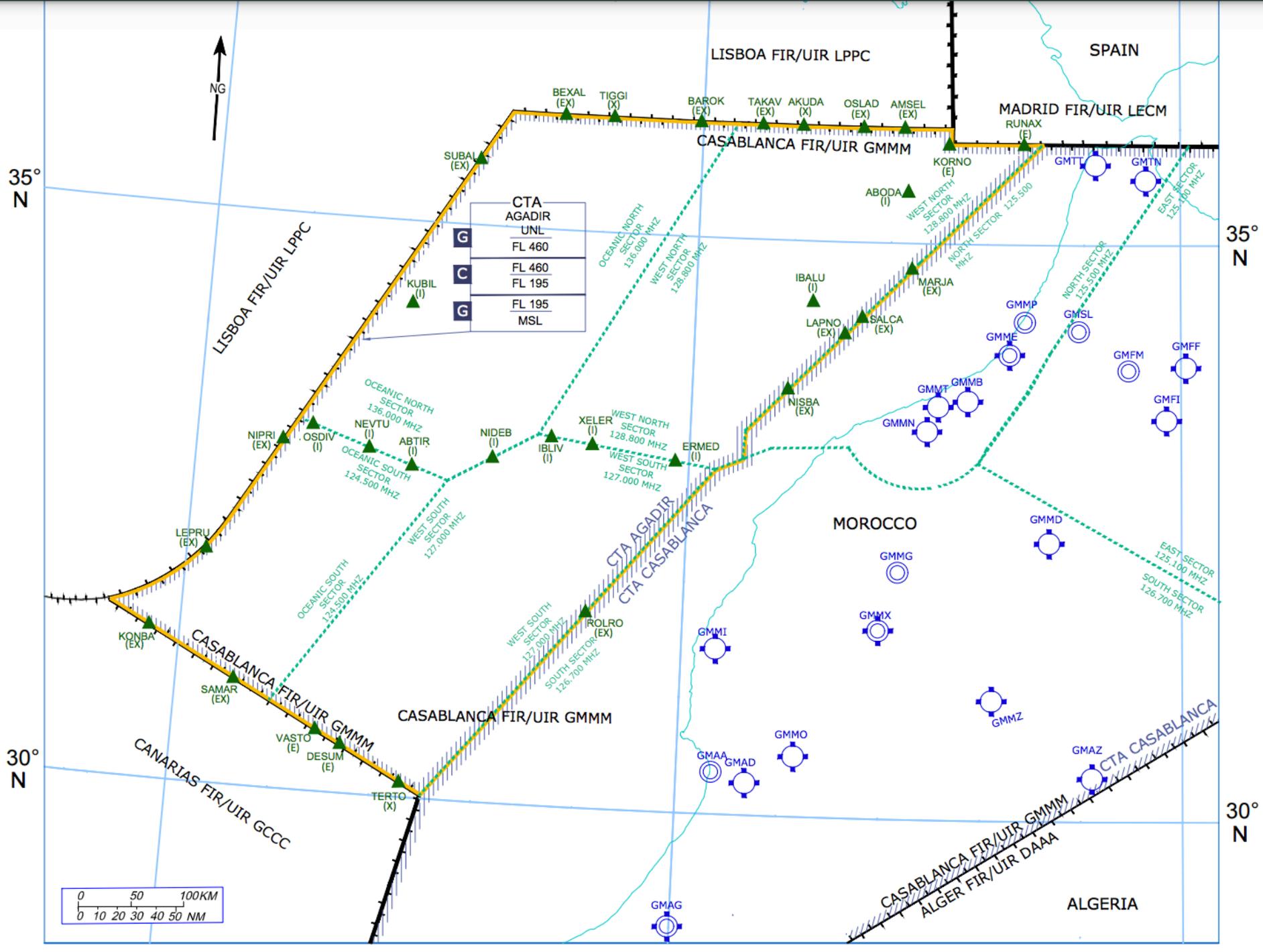
4. Drawing of conclusions

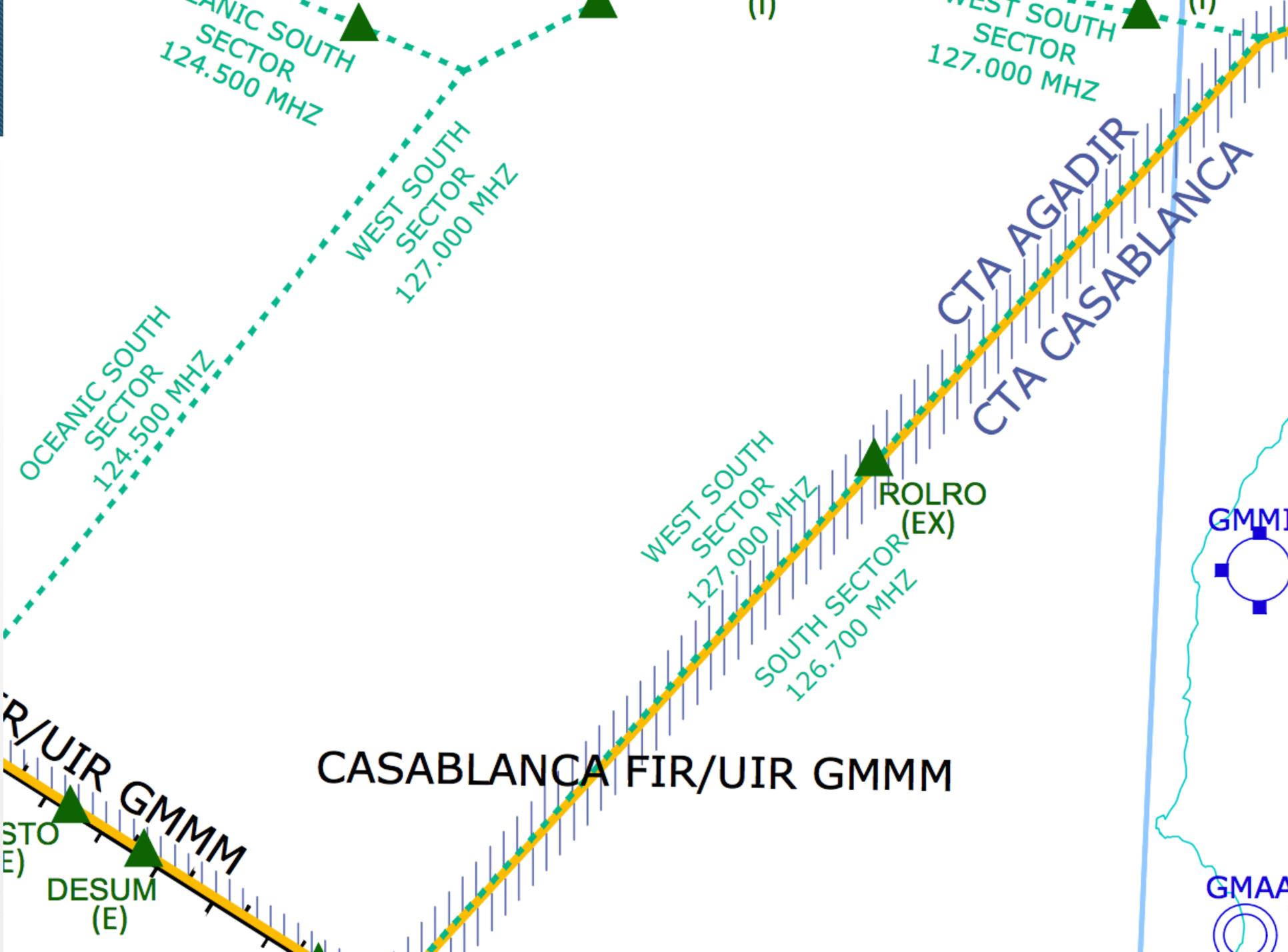


General circumstances

- Location : West-Southern Sector - Agadir ACC
- Position : TERTO
- Notification : ATC
- Traffic load : 12 aircrafts







09:10:24



- B-Agadir !
- Go ahead for B.
- Just for information, traffic ahead 2 miles, same destination, 2000 feet below, doing point 79.

09:26:05

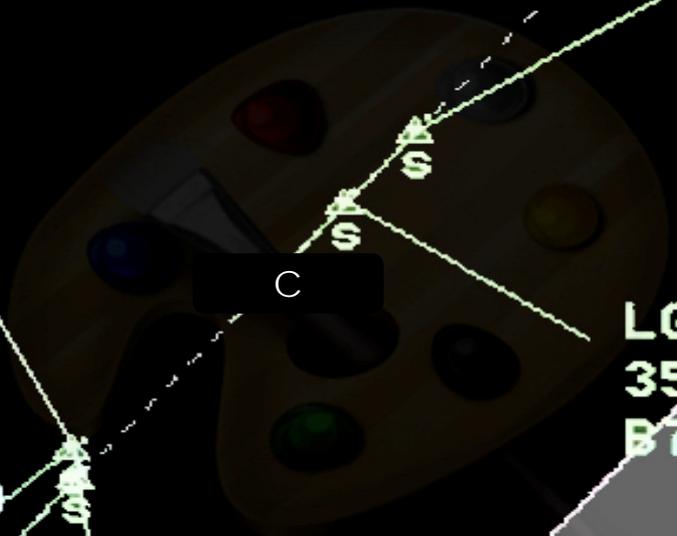
B
350
A319M GCRR
429
250

▲ TOURA
ENG8370 454
330 250
A319M GCRR BOLRO

B 360
R 1.4

LGL733 435
350
B738M GCFU

A
370 423
250



Paint 2



09 h 28 min

- B, Agadir !
- Go ahead !
- Turn right five more degrees Sir.
- 5 degrees more to the right, B

09:31:44

LGL733 433
350
B738M GCFU

GCCC RO
E B 426
350 350 250
A319M GCRR
h s r 350

EWG8370 458
330 250
A319M GCRR

B 143
R 9.3 6

GCCC
F A 427
361+330 250
B738M GCRR
h s r 370

UEDDD

ART701 446
310

TERTO

TERTO

450

SYSTEM TIME
09:32:01

GCCC RO
B 427
350 350 250
A319M GCRR
h s r 350

LGL733 435
350
B738M GCFU

EWG8370 459
330 250
A319M GCRR

B 143
R 9.8

GCCC
A 427
358+330 250
B738M GCRR
h s r 370

- A, start initial descent to FL 330
- Descending FL 330

ART701 449
310
TERTO

UEDOD

S

SYSTEM TIME
09:35:39

- A descend and maintain FL 2 5 0, . 7 8 or greater.
- Cleared 2 5 0, 7 8 or more, A.
- B, fly heading 2 1 5 degrees.
- Heading 2 1 5, B.



- B, descend and maintain FL 2 5 0 don't exceed . 7 7.
- Descend FL 2 5 0, Mach. 7 7, B.

SYSTEM TIME X
09:36:22

CCA907 478
330
B789H TERTO

SULAM

➤ B, fly heading 205.

R0
B 422
346+250
A319M GCRR

EWG8370 450
330 250
A319M GCRR

B 141
R 13.4
E 10'12
X 4.38

UED00
LGL733 431
350
B738M GCFU

A
319+250
B738M GCRR

➤ Heading 205, B.

TERTO

SDHSG



09 h 38 min

Phone communication with Canarias ACC

- *Hello,*
- *Can I clear A to FL 130 ? He will be number 1.*
- *You can give him FL 130.*
- *Ok Thank you.*

GCCC FQ
 B 429
 334+250 250
 A319M GCRR
 h s r 350

B 142
 R 12.5101
 E 07'06
 X 4.27

GCCC FQ
 A 433
 314+250 250
 B738M GCRR
 h s r 370

330 250
 A319M GCRR

LGL733 431
 350
 B738M GCFU

TERTO

EDDD

50NS0

CONFLICT				
C/S	C/S	CDIS	MDIS	1
-	A et B	12.6NM	4.25NM	

SYSTEM TIME
09:37:22

➤ A, continue descent
FL 130.

➤ Descend 130, A.

CCA907 477
330
B789H TERTO

SULAM

VASTO

GCCC FQ
B -22
325+250 250
A319M GCRR
h s r 350

EWG8370 453
330 250
A319M GCRR

UED00

LGL733 429
350
B738M GCFU

A
D 144
R 11.547
E 04'30
X 4.51

GCCC FQ
RJR1586 -9
310+250 250
B738M GCRR
h s r 370

TERTO

CONFLICT				
D/S	CDIS	MDIS		
1802	11.6NM	4.71NM	1	

A et B

SYSTEM TIME

X

09:38:07

330 250
A319M GCRR

GCCC FQ

B

-21

309+250 250

A319M GCRR

h s r 350

LGL733

428

350

B738M GCFU

B 328

R 9.8

E 03'36

X 4.74

TERTO

GCCC FQ

A

-9

303+250 250

B738M GCRR

h s r 370

50N50

CONFLICT

C/S C/S CDIS MDIS 1

A & B 9.95NM 4.56NM

09:40:00

GCCC FQ
B -8
274↓250 250
A319M GCRR
h s r 350

B 171
R 5.7 48
E 01'12
X 3.94

GCCC FQ
A -9
285↓130 250
B738M GCRR
h s r 370

FQ
LGL733 429
350
B738M GCFU

FQ
EWG8370 458
330↓250
A319M GCRR

TERTO

CONFLICT				
C/S	C/S	CDIS	HDIS	1
A & B		5.85NM	4.04NM	



THANK YOU

