

Occurrence in the Havana FIR of several LHD events,  
caused by anti-collision system failures (TCAS).

Presented by:

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Case No. 1: December 29, 2018.

Aircraft involved:

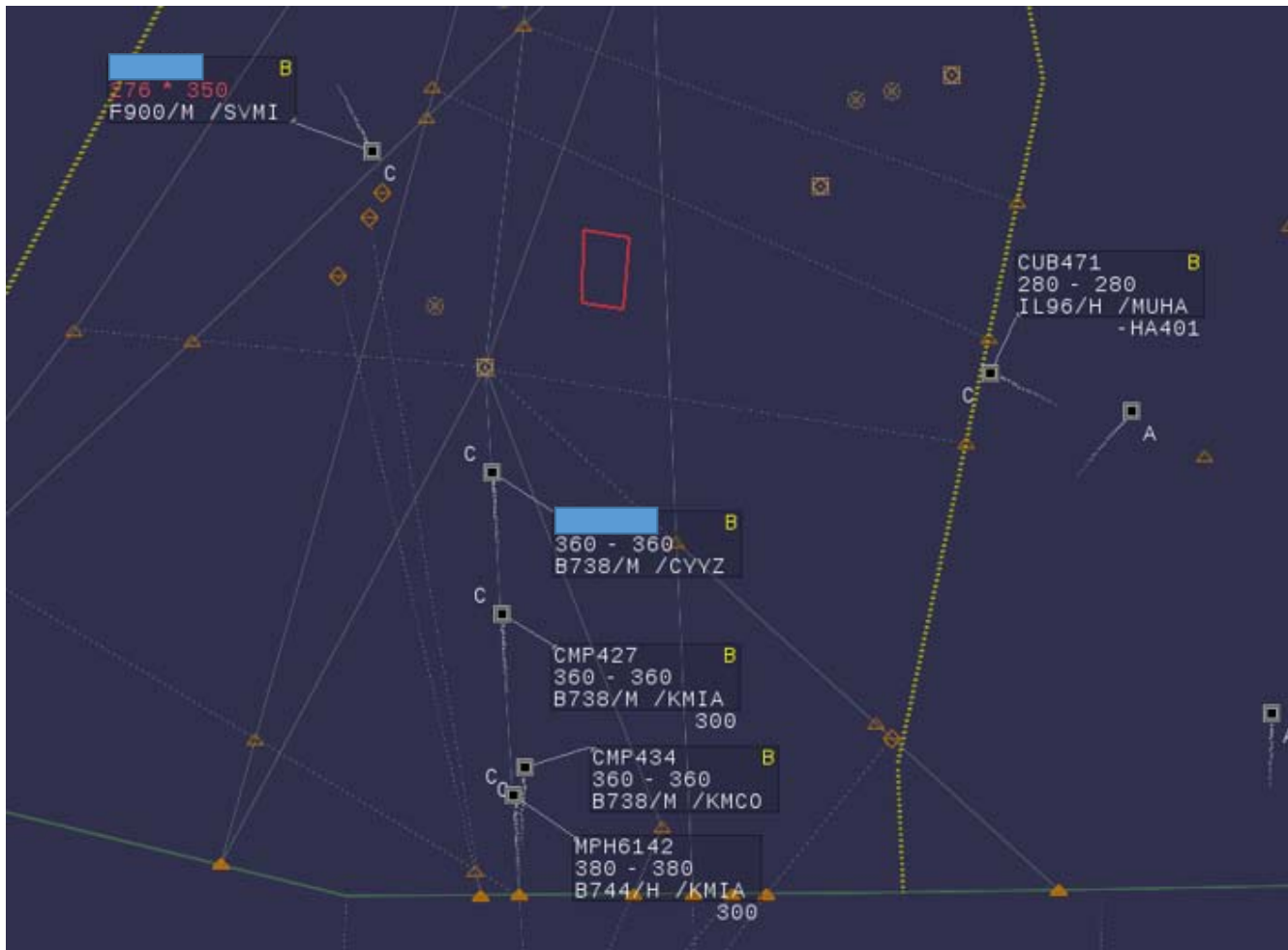


Dassault Falcon 900



Boeing 737/800 NG





Both aircraft converging and vertically separated, see assigned flight levels (FL350 and FL360).

Crew of the F900 acknowledged twice the correct assigned FL 350. No significant weather reported.



333 ↑ 350  
F900/M /SVMI

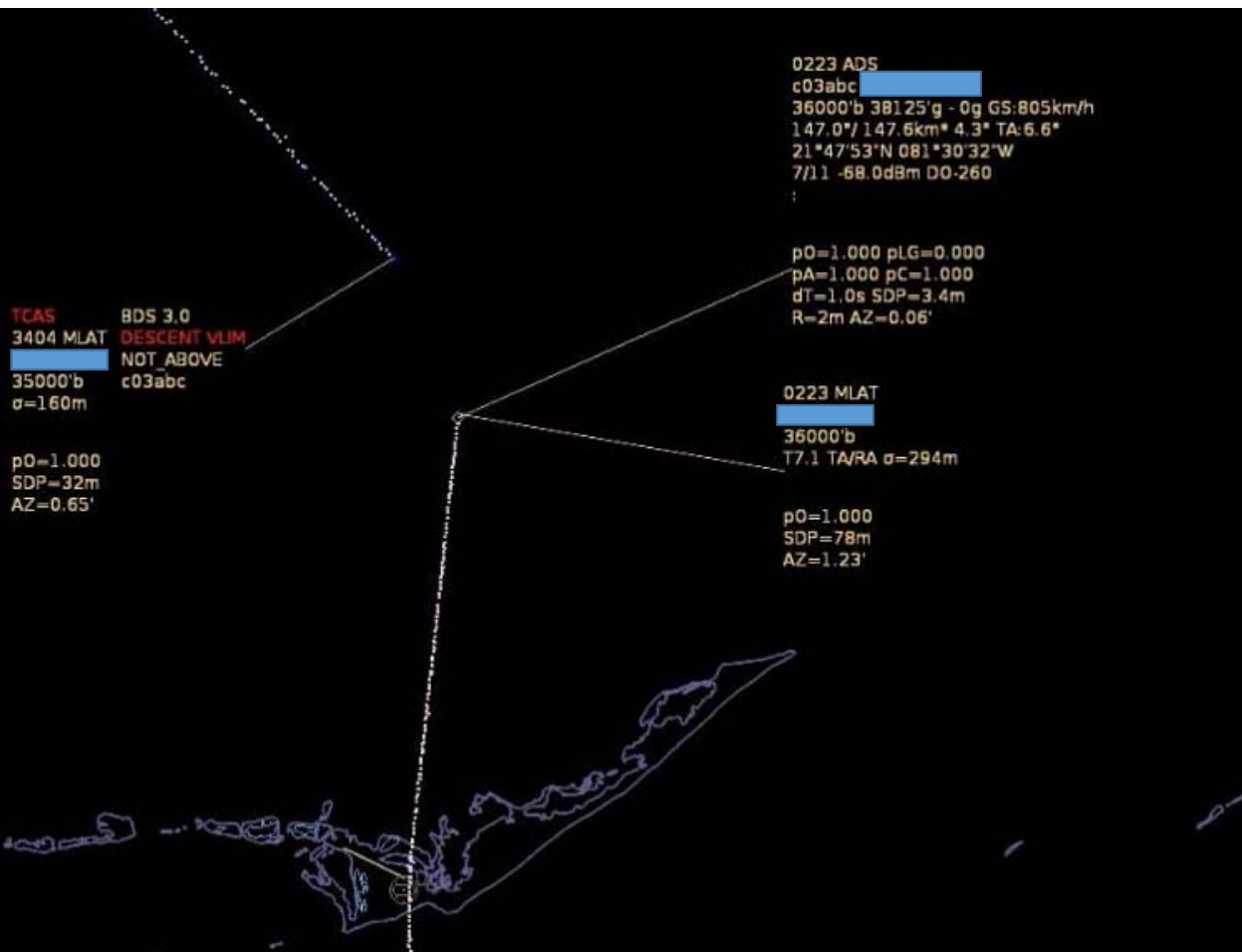
360 - 360  
B738/M /CYYZ

30 seconds to cross, vertically separated (2700 feet).

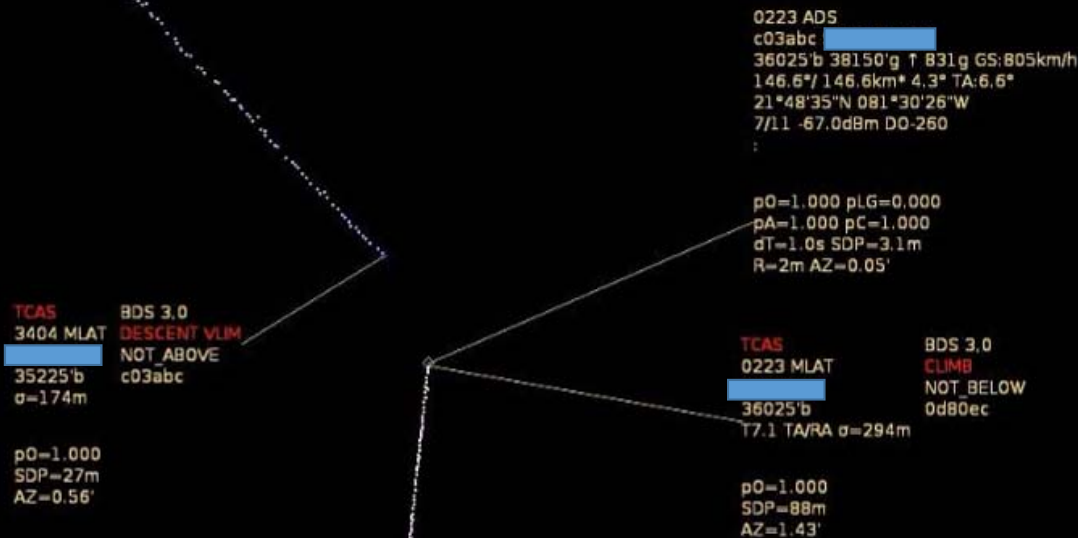


F900 Mode S and B738 ADS-B information obtained from MLAT, see F900 receiving TCAS RA (DESCENT) when crossing 34550 feet.





F900 passing FL350, still showing TCAS RA DESCENT.



0223 ADS  
c03abc  
36025'b 38150'g T 831g GS:805km/h  
146.6°/ 146.6km\* 4.3° TA:6.6°  
21°48'35"N 081°30'26"W  
7/11 -67.0d8m DO-260

p0=1.000 pLG=0.000  
pA=1.000 pC=1.000  
dT=1.0s SDP=3.1m  
R=2m AZ=0.05'

TCAS 3404 MLAT  
35225'b  
σ=174m  
p0=1.000  
SDP=27m  
AZ=0.56'

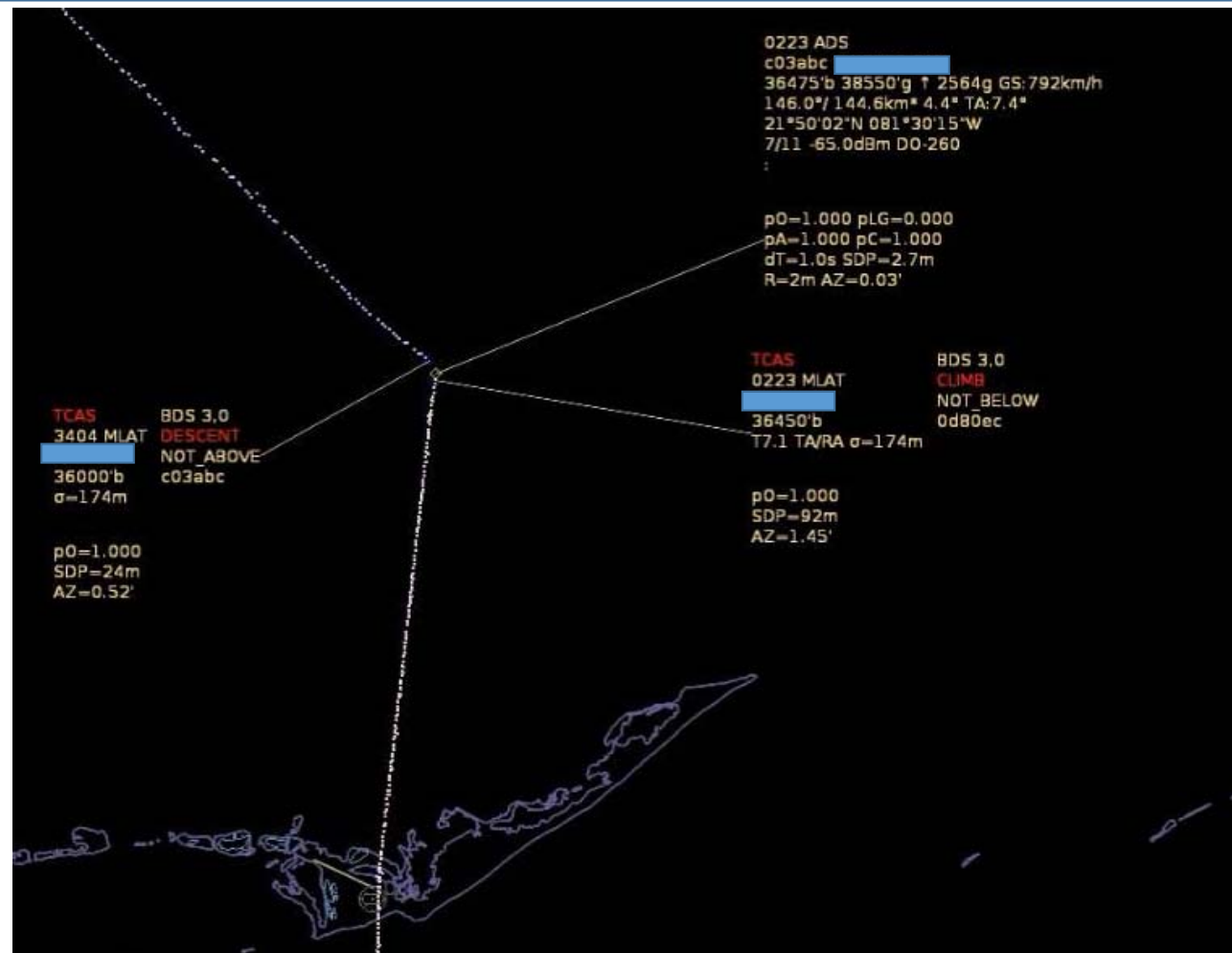
BDS 3.0  
DESCENT VLM  
NOT\_ABOVE  
c03abc

TCAS 0223 MLAT  
36025'b  
17.1 TA/RA σ=294m  
p0=1.000  
SDP=88m  
AZ=1.43'

BDS 3.0  
CLIMB  
NOT\_BELOW  
0d80ec

F900 225 feet above assigned flight level, rapidly increases rate of climb, second aircraft reacts immediately to TCAS RA (CLIMB), leaving 36025 feet.

F900 alerted by ATC, crew replay "TCAS RA". Second aircraft also stated "TCAS RA".



F900 reaching FL360, 1000 feet above assigned altitude, second aircraft only 450 feet above, both aircraft almost crossing.





Both aircraft passing by, only 525 feet of vertical separation.

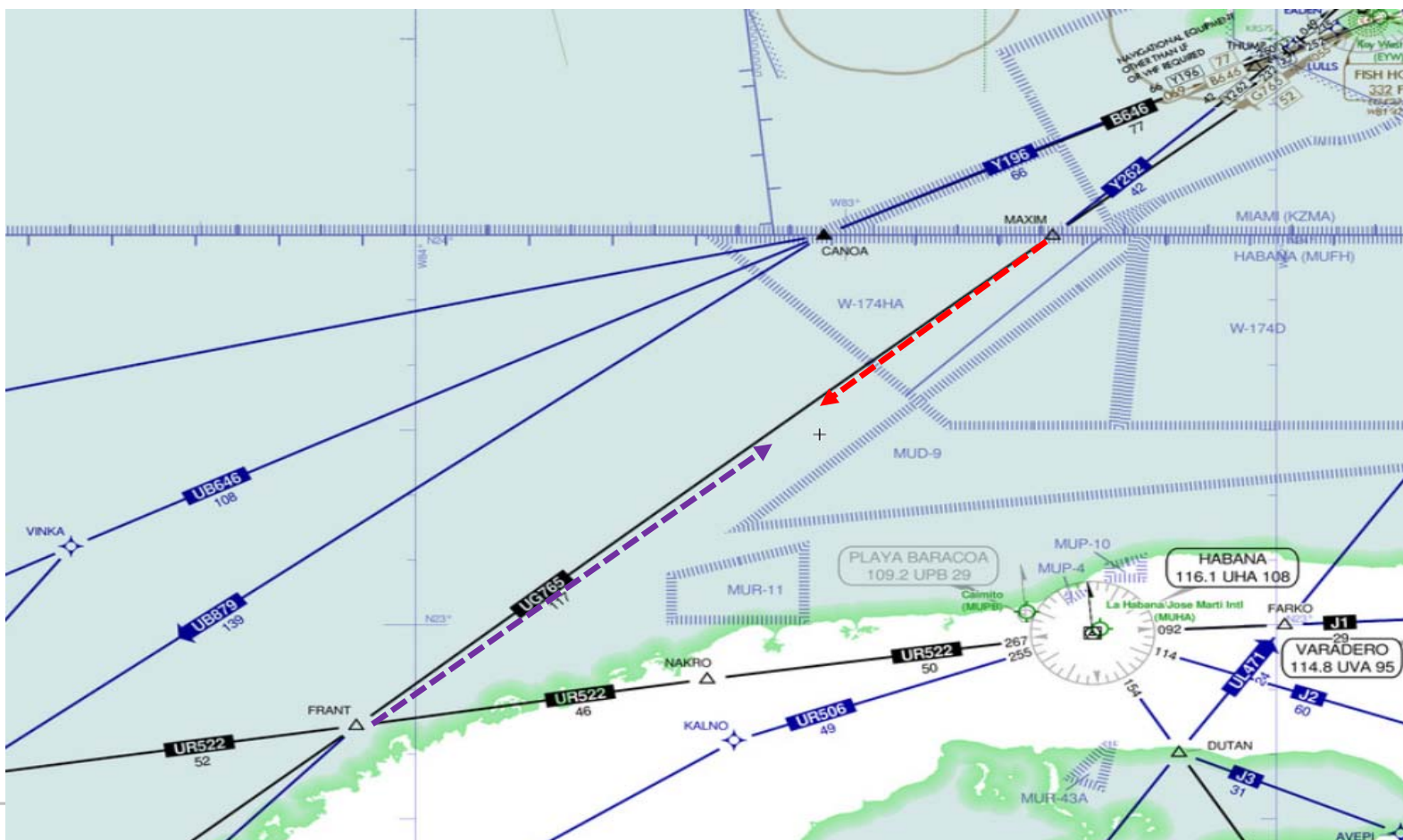
Case No. 2 : April 23, 2019.



Airbus 319/100.




Cessna 501 Citation 1 SP.





Both aircraft on the same route on opposite direction, separated vertically (1000 feet) by assigned cruise flight levels. No significant weather reported.



361 - 360  
C501/L N0316

A 370 - 370  
A319/M N0467

Suddenly the C501 climbs and turned to the right .



STCA  
365 ↑ 360  
C501/L N0288

A B  
371 - 370  
A319/M N0467


ATC issues an alert to the C501, pilot replay "TCAS RA".  
Second aircraft begins climb.

STCA  
[redacted] B  
366 ↑ 360  
C501/L N0288

STCA  
A [redacted] B  
374 - 370  
A319/M N0467

Both aircraft climbing.



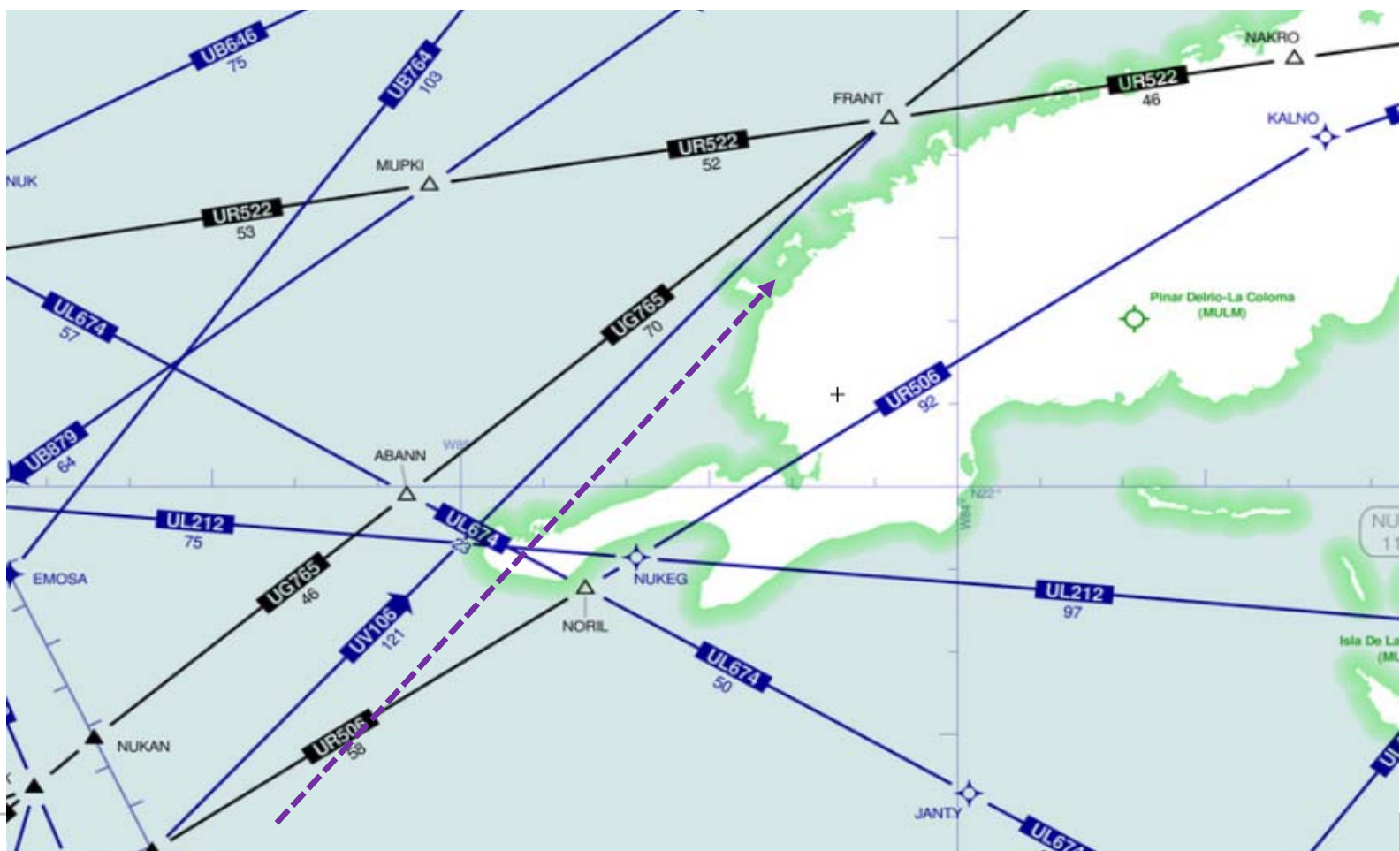


B  
367 ↑ 360  
C501/L N0288

STCA  
A B  
378 ↑ 370  
A319/M N0467

Already crossed, both aircraft  
climbed 700 and 800 feet each  
other.

Case No. 3 : 2019.



Boeing 737/800 NG

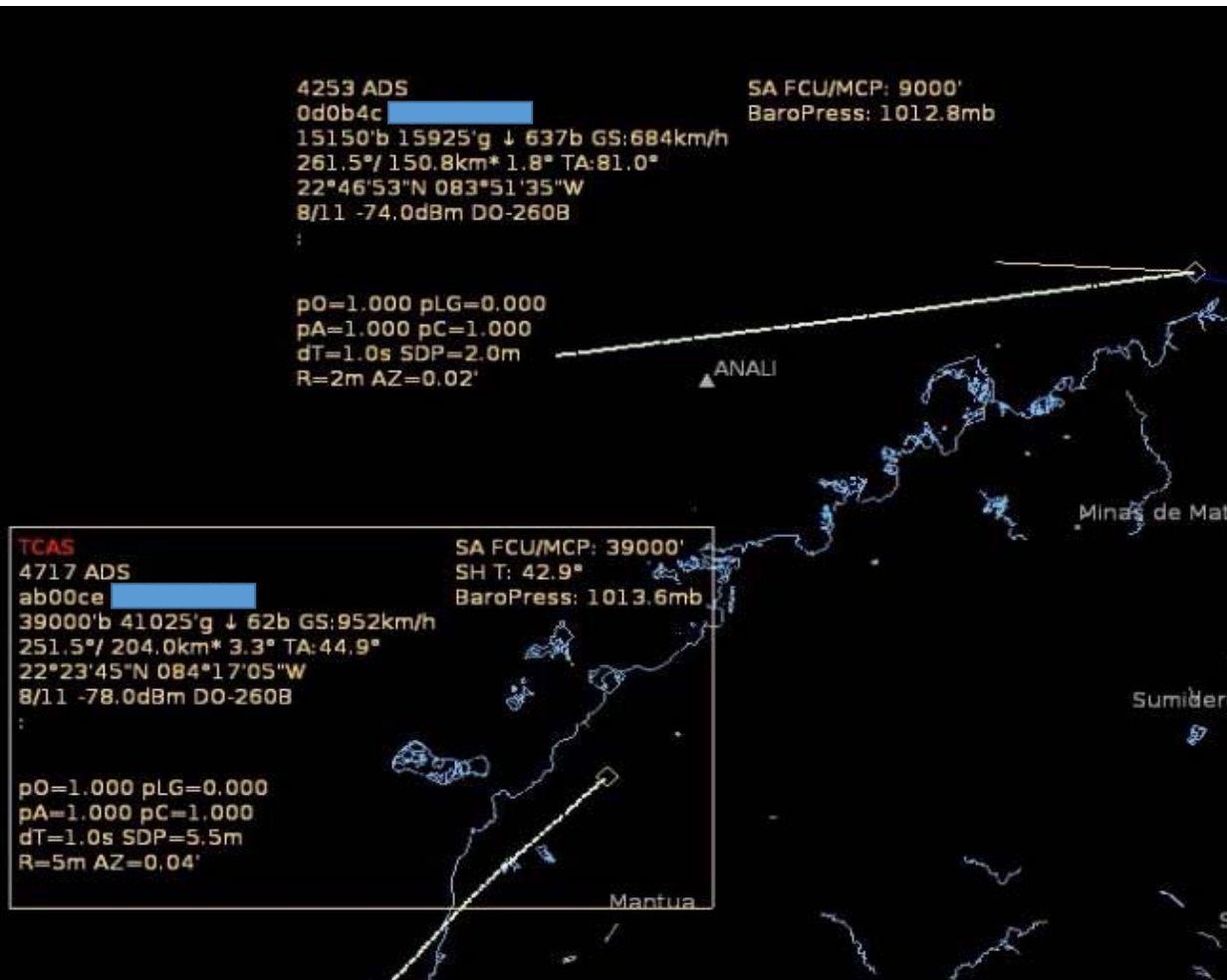


See involved aircraft flying a direct track. Closest aircraft descending on the transition from route to approach, 18400 feet below and 45 nautical miles away. No significant weather reported.



Crew reported “TCAS RA” and start a violent climb. ATC advice that there wasn’t any reported conflicting traffic and offers traffic information about the descending aircraft.

Nevertheless crew continues the climb.



ADS-B information, see the TCAS advice.



Crew stopped at 39700 feet and immediately descended back to assigned flight level.



## Identification of common issues for the first two events.

- Both events involved the operation of general aviation aircraft, together with scheduled airline aircraft.
- In both events, the proximity of the aircraft involved, as well as the rate of climb that both general aviation aircraft performed above the level authorized by the ATC, prevented it from having time to apply any control action with the objective to recover the separation between both aircraft. In both cases, almost immediately; TCAS RA notification was received, which states that the ATC does not issue instructions.
- Only the immediate execution of evasive maneuvers by the crews of both airline aircraft guaranteed the minimum separation and, in the first event, prevented the occurrence of a RVSM airspace collision.

## Suggested action.

- The meeting is invited to take note of the information contained in this document.





**THANK YOU.**

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