DATA SUMMARY

LOCATION

Date and time	**Saturday, 29 October 2005; 10:13 UTC[1]**
Site	**UW100 (FL 260) 50 NM of CJN VOR**

AIRCRAFT

Registration	**D-AIRL**	**UR-GAL**
Type and model	**AIRBUS 321**	**BOEING 737-300**
Operator	**Lufthansa German Airlines**	**Ukraine Intern. Airliness**

Engines

Type and model	**IAE 2530-A5**	**N/A**
Number	**2**	**2**

Crew

Pilot in command

Age	**39 years**	**45 years**
Licence	**ATPL**	**ATPL**
Total flight hours	**9,459 h**	**11,804 h**
Flight hours on the type	**2,700 h on A320**	**4,700 h [400 h as capt. B737 (classic)]**

INJURIES

	Fatal	Serious	Minor/None	Fatal	Serious	Minor/None
Crew			**N/A**			**2**
Passengers			**N/A**			**115**
Third persons						

DAMAGE

Aircraft	**None**	**None**
Third parties	**None**	**None**

FLIGHT DATA

Operation	**Comm. air transport – Scheduled intern. passenger flight**	**Comm. air transport – Scheduled intern. passenger flight**
Phase of flight	**Descent**	

REPORT

Date of approval	**30 May 2007**

[1] Time reference in this report is Coordinated Universal Time (UTC) unless otherwise stated. It is necessary to add two hours to obtain the local time.

1. FACTUAL INFORMATION

1.1. History of the flight

On Saturday 29 October 2005, a Ukraine International Airlines Boeing 737-300 with call sign AUI 941 was flying from Kiev (UKBB) to Madrid (LEMD). A Lufthansa German Airlines Airbus 321 with call sign DLH-88C was following it with the same track in a flight from Frankfurt (EDDF) to Madrid (LEMD). Both aircraft were being controlled by the Madrid Area Control Centre (LECM).

According to the ATS incident notification from Lufthansa, when DLH-88C was at FL264, making a descent to the cleared FL250, a TCAS Traffic Advisory (TA) was issued and the LECM air traffic controller (ATCO) requested them to maintain FL260. Shortly afterwards, a TCAS Resolution Advisory (RA) instructed the crew to climb. They followed this instruction, climbing up to FL265.

Meanwhile, the AUI-941 crew was also following a TCAS RA instruction to descend. A few seconds before, ATCO had cleared them to FL 210 and had requested them to increase the rate of descent to 2,000 ft/min or more. AUI-941 read back the flight level assigned but not the instruction to increase the rate of descent. ATCO did not ask them to acknowledge it either.

Both crew followed their respective TCAS RA commands. The minimum vertical and horizontal distances between both aircraft were estimated to be 600 ft and around 0.41NM respectively (according to the radar data). After the event, both aircraft continued their flights normally. The crew of the DLH-88C filled in a TCAS report. The crew of the other aircraft did not prepare a formal report of the event. The crew stated that they did not hear any comment about the event and they considered it as a nuisance warning from TCAS.

No injuries or damages were reported by any aircraft.

1.2. Personnel information

1.2.1. *AUI 941 Captain*

Sex, age:	Male, 45
Nationality:	Ukrainian
Licence:	ATPL
Type rating renewal:	12-05-2005

Medical check valid:	Till 04-10-2006
Proficiency check valid:	Till 25-03-2006
Total flight time:	11,804 h
Hours on the type:	4,700 h, 400 as captain B737 (classic)
Hours in the last 72 h:	3 h
Hours in the last 30 days:	70,1 h
Duty period previous to the incident date:	4 h 50 min (26-10-2005)
Rest period previous to the incident date:	56,5 h (26-10-2005)

1.2.2. *AUI 941 First Officer*

Sex, age:	Male, 43
Nationality:	Ukrainian
Licence:	ATPL
Type rating renewal:	31-03-2005
Medical check valid:	Till 23-05-2006
Proficiency check valid:	Till 02-10-2006
Total flight time:	8,286 h
Hours on the type:	1,483 h
Hours in the last 72 h:	4 h
Hours in the last 30 days:	69,9 h
Duty period previous to the incident date:	4 h 5 min (28-10-2005)
Rest period previous to the incident date:	17 h 20 min (28-10-2005)

1.2.3. *DLH 88C Captain*

Sex, age:	Male, 39
Nationality:	German
Licence:	ATPL

Total flight time:	9,459 h
Hours on the type:	2,700 h

1.2.4. *Madrid Area Control Centre (LECM) Controller*

Sex, age:	Male, 50
Nationality:	Spanish
Title:	Air Traffic Controller
Licence:	Officially issued by the DGAC
Rating in LECM:	En route, since 25-1-1006, and TMA, since 23-02-2001
Medical check:	Valid up to 10-3-2007
Experience as ATCO:	29 years, 9 months, 21 days

1.3. Statements

1.3.1. *DLH-88C crew statement*

According to the statement of the DLH-88C crew, extracted from the ATS incident notification, when they were at FL264 (10:13 h), making a descent to the cleared FL250, a TCAS Traffic Advisory (TA) was issued and the LECM air traffic controller (ATCO) called them, instructing them to stop their descent at FL260. ATC advised them that the conflicting traffic was reaching FL250. During the ATC call a RA was received with an instruction to climb. They followed this instruction and climbed up to FL265.

1.3.2. *AUI-941 crew statement*

The AUI-941 crew stated that they were cleared for descent to FL250 by Madrid ATCO and just before reaching that altitude (about a minute) a TCAS TA was displayed followed by a TCAS RA. The RA manoeuvre was carried out. Then they regained FL250 with minor deviations. And when they were already at FL250 (just after RA, probably less than a minute) they received a command for the second time: "Alfa Uniform India 941, descend to FL250 (female voice)". They answered: 941 FL250. A few minutes later they were cleared for a further descent may be for FL210 by ATCO (male voice). They stayed on the same frequency during these events. No reports concerning the RA manoeuvre were made there.

1.4. ATC communications

According to the communications transcription (see table 1), at 10:09:55 ATCO cleared AUI-941 to descend to FL210 and at 10:10:01 AUI-941 read back the clearance. Around a minute later, ATCO instructed DLH-88C to continue their descent to FL250 and they read back the clearance.

Time	Station	Text
10:06:16	AUI 941	MADRID CONTROL BUENOS DÍAS UKRAINE OINTERNATIONAL NINE FOUR ONE DESCENDING TWO FIVE ZERO
10:06:21	LECM	NINE FOUR ONE BUENOS DÍAS RADAR CONTACT DESCEND LEVEL TWO FIVE ZERO
10:06:26	AUI 941	OK. TWO FIVE ZERO UKRAINE INTERNATIONAL NINE FOUR ONE
10:07:27	DLH 88C	MADRID BUENOS DÍAS LUFTHANSA EIGHT EIGHT CHARLIE WE ARE PASSING LEVEL THREE TWO SEVEN DESCENDING LEVEL TWO NINE ZERO
10:07:37	LECM	SAY AGAIN YOU CALL SIGN?
10:07:39	DLH 88C	LUFTHANSA EIGHT EIGHT CHARLIE
10:07:44	LECM	LUFTHANSA EIGHT EIGHT CHARLIE BUENAS RADAR CONTACT DESCENDING LEVEL TWO NINE ZERO
10:07:47	DLH 88C	ROGER DESCENDING LEVEL TWO NINE ZERO, LUFTHANSA EIGHT EIGHT CHARLIE
10:09:08	LECM	LUFTHANSA EIGHT EIGHT CHARLIE CONTINUE DOWN LEVEL TWO SEVEN ZERO
10:09:13	DLH 88C	LUFTHANSA EIGHT EIGHT CHARLIE DESCENDING FLIGHT LEVEL TWO SEVEN ZERO
10:09:55	LECM	UKRAINE NINE FOUR ONE CONTINUE DOWN LEVEL TWO ONE ZERO
10:10:01	AUI 941	CLEAR DOWN TWO ONE ZERO UKRAINE INTERNATIONAL NINE FOUR ONE
10:11:11	LECM	LUFTHANSA EIGHT EIGHT CHARLIE CONTINUE DOWN …EH CONTINUE DOWN LEVEL TWO FIVE ZERO
10:11:19	DLH 88C	LUFTHANSA EIGHT EIGHT CHARLIE SORRY SAY AGAIN?
10:11:22	LECM	OK. CLEAR LEVEL TWO FIVE ZERO
10:11:23	DLH 88C	CLEAR FLIGHT LEVEL TWO FIVE ZERO LUFTHANSA EIGHT EIGHT CHARLIE, THANK YOU
10:12:31	LECM	LUFTHANSA EIGHT EIGHT CHARLIE CLEAR LEVEL TWO SIX ZERO INITIALLY, MAINTAIN TWO SIX ZERO
10:12:37	DLH 88C	...ININTELIGIBLE... TWO SIX ZERO LUFTHANSA EIGHT EIGHT CHARLIE AND HAVE THE TRAFFIC BELOW IN SIGHT
10:12:40	LECM	ROGER, ALFA UNIFORM INDIA NINE FOUR ONE RATE TWO THOUSAND OR MORE, DESCENDING LEVEL TWO ONE ZERO
10:12:47	AUI 941	OK. TWO ONE ZERO UKRAINE INTERNATIONAL NINE FOUR ONE
10:12:50	LECM	NINE FOUR ONE MADRID APPROACH ONE ONE EIGHT DECIMAL FOUR, ADIOS
10:12:53	DLH 88C	…EIGHT EIGHT CHARLIE T-C-A-S CLIMB
10:12:55	AUI 941	ONE ONE EIGHT DECIMAL FOUR UKRAINE INTERNATIONAL NINE ONE FOUR
10:12:58	LECM	OK. YOUR TRAFFIC IS NOW REACHING LEVEL TWO FIVE ZERO INCREASING RATE OF DESCENT

Table 1. ATC Communication Transcription [see last two communications between AUI-941 and LECM to compare with the DFDR data (Graph 2)]

Time	Station	Text
10:13:03	DLH 88C	EIGHT EIGHT CHARLIE WE'VE THE T-C-A-S CLIMB WE ARE LEVEL TWO SIX ZERO AGAIN AND AH... MAINTAINING TWO SIX ZERO NOW
10:13:13	LECM	ROGER ROGER
10:13:16	DLH 88C	WHERE IS THE... IT WAS REALLY... ININTELIGIBLE... WAS A RESOLUTION ADVISORY AND EH THAT WAS... ININTELIGIBLE...
10:13:23	LECM	OK. YOUR TRAFFIC IS NOW LEAVING TWO FOUR EIGHT, TWO FOUR EIGHT ALTITUDE
10:14:26	LECM	LUFTHANSA EIGHT EIGHT CHARLIE CLEAR LEVEL TWO THREE ZERO
10:14:30	DLH 88C	LUFTHANSA EIGHT EIGHT CHARLIE WE ARE LEVING NOW LEVEL TWO SIX ZERO DESCENDING LEVEL TWO THREE ZERO
10:14:46	DLH 88C	LUFTHANSA EIGHT EIGHT CHARLIE FOR YOUR INFORMATION WE HAVE TO WRITE A REPORT ABOUT THIS EVENT, IT WAS REALLY... ININTELIGIBLE...
10:14:52	LECM	ROGER
10:15:36	LECM	LUFTHANSA EIGHT EIGHT CHARLIE CLEAR LEVEL TWO ONE ZERO, MADRID FREQUENCY ONE ONE EIGHT DECIMAL FOUR
10:15:43	DLH 88C	EIGHT EIGHT CHARLIE EH…ROGER DESCEND LEVEL TWO ONE ZERO, ONE ONE EIGHT FOUR, BYE
		END OF TRANSCRIPTION

Table 1. ATC Communication Transcription [see last two communications between AUI-941 and LECM to compare with the DFDR data (Graph 2)] *(continuation)*

At 10:12:31 ATCO requested DLH-88C to maintain FL260. DLH-88C read back the command and they added that they had the traffic below in sight (10:12:37).

Then, at 10:12:40, ATCO requested AUI-941 to maintain a rate of two thousand or more towards the cleared level FL210; AUI-941 read back the FL210, but not the rate of two thousand or more, and ATCO did not ask for further acknowledgment either. ATCO gave AUI-941 the frequency of Madrid Approach, and just two seconds before the readback of this instruction by the crew of AUI-941 (it was the last communication between ATCO and AUI-941), DLH-88C informed they had a "TCAS CLIMB" resolution advisory. ATCO then said***: "****OK. YOUR TRAFFIC IS NOW REACHING LEVEL TWO FIVE ZERO INCREASING RATE OF DESCENT"* but no call sign was included in this communication and nobody answered.

The crew of DLH-88C communicated their intention to file a report about the event and this was acknowledged by the ATCO.

1.5. Radar data

Both aircraft were maintaining the same track on descent to point TERSA. This is the track needed to begin the STAR (Standard Instrumental Arrival) called TERSA1B to approach Madrid Airport (runways 33L/33R, see Figure 1).

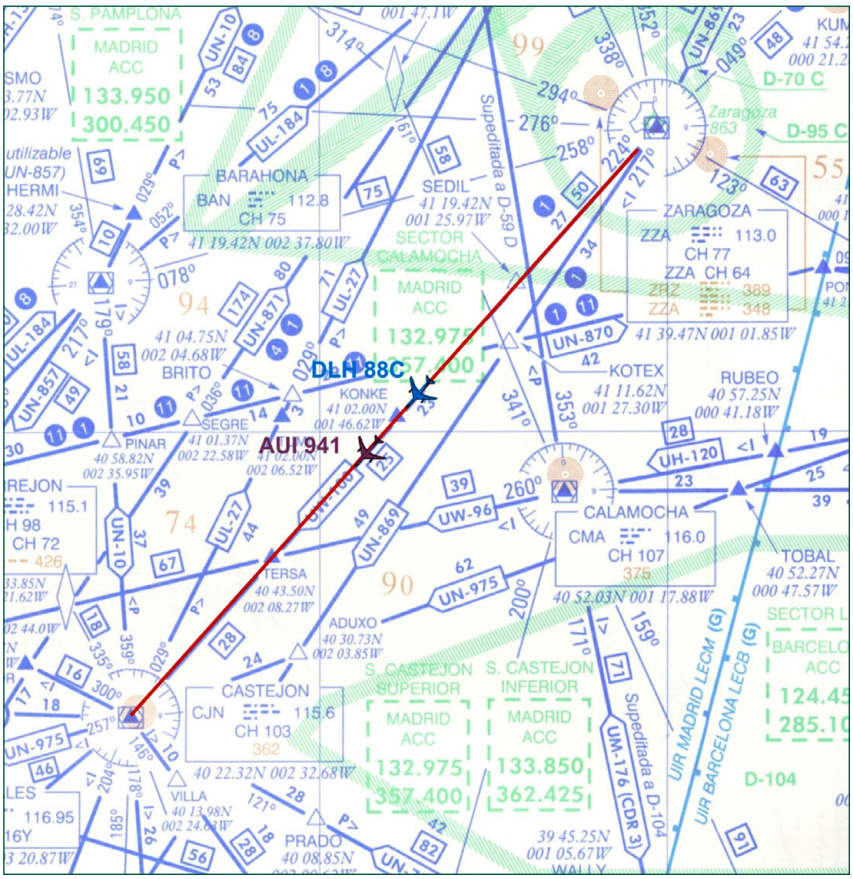


Figure 1. Track that the aircraft were maintaining

Based on the radar data, the average rates of descent of both aircraft have been calculated from the 10:12:07 to the moment when the first alert of conflict traffic violation (defined as VAC on radar system) was issued on the ATC screen (10:12:37). The results of this calculation are the following:

Rate of descent of AUI-941	1,200 ft/min
Rate of descent of DLH-88C	2,200 ft/min

Using FL250 as a reference, AUI-941 was reaching this level at 10:13:02 ("Radar data clock"). On the other hand, ATCO told somebody "OK. YOUR TRAFFIC IS NOW REACHING LEVEL TWO FIVE ZERO INCREASING RATE OF DESCENT"" at 10:12:58 ("ATC communication clock"). If this sentence can be assumed to be addressed to DLH-88C to inform them about the AUI-941 location, a delay of around 4 seconds appears between Radar data clock and ATC communication clock. Therefore, at the moment when the DLH-88C told the ATCO that they had the traffic below in sight they were at approximately FL264 and AUI-941 was at FL256 (800 ft of separation between both aircraft). Figure1 shows this moment, just before the TCAS RA warning was issued. It can be observed that the vertical distance between both aircraft decreases from 800 ft to 700 ft.

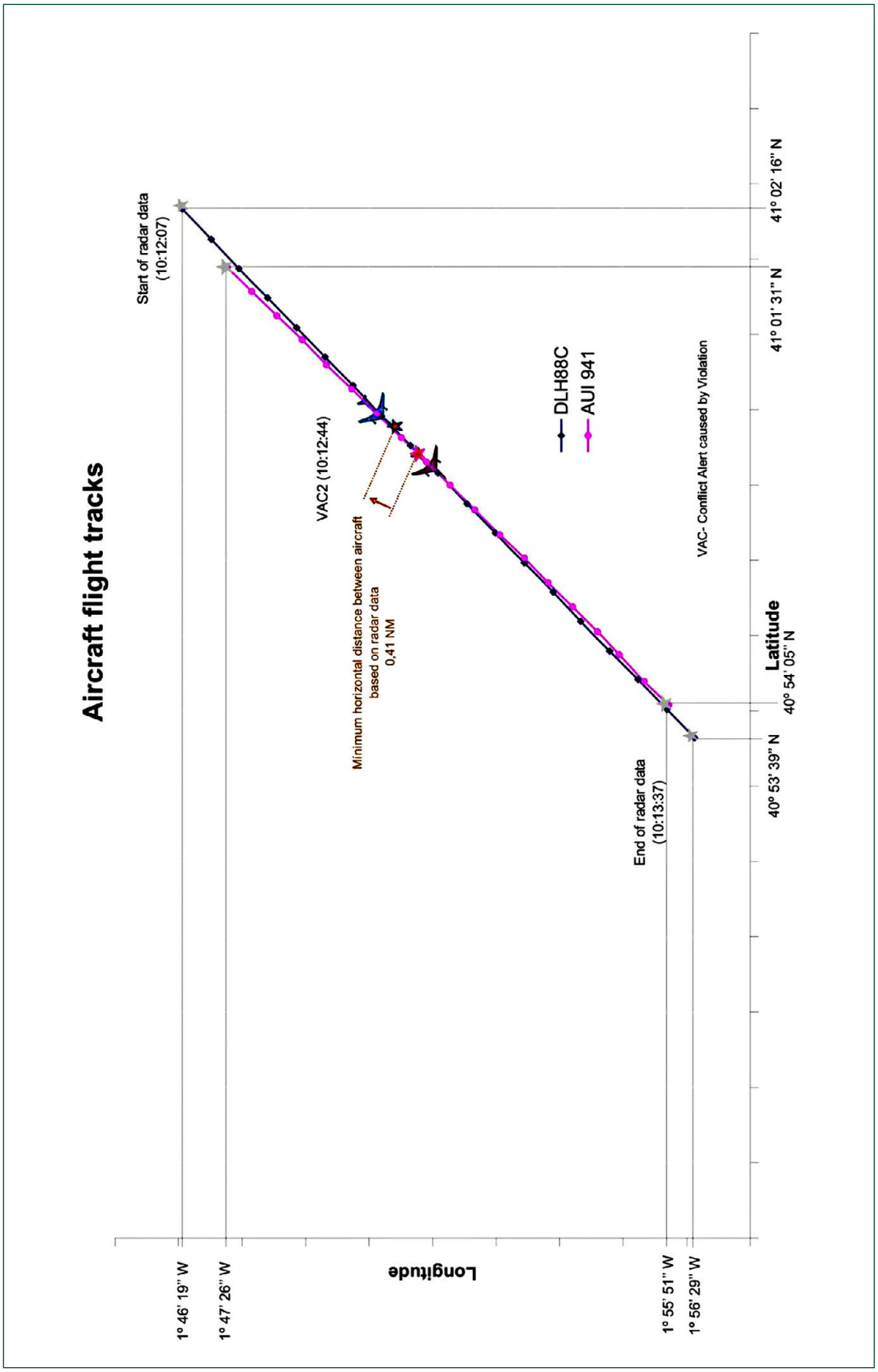


Figure 2. Aircraft flight tracks

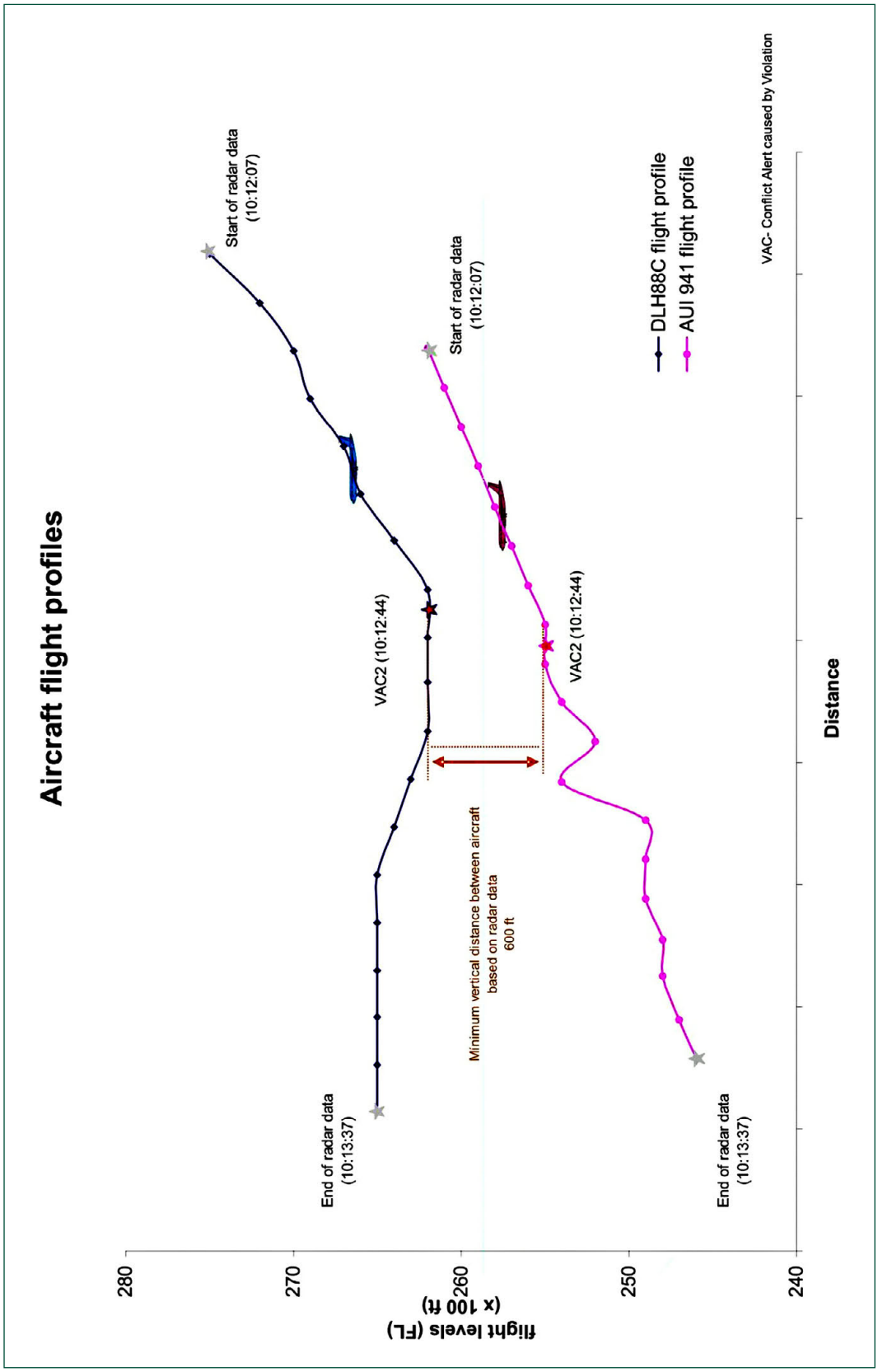


Figure 3. Aircraft flight profiles

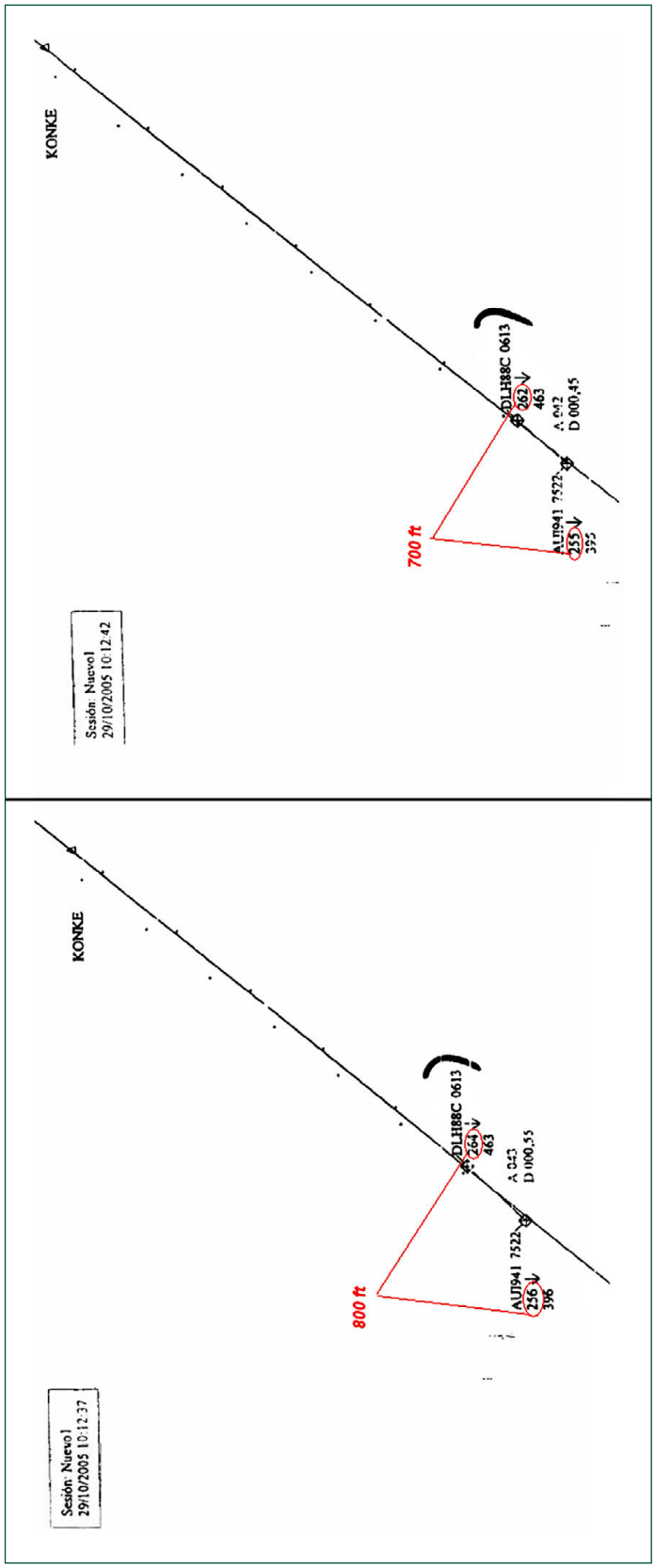


Figure 4. Two pictures of RADAR presentation

1.6. Information obtained from the DFDR

The DFDR data from the German airplane were not kept after the incident and thus were unavailable for the investigation. The DFDR recording from the Ukrainian airplane was available.

Using the push to talk (PTT) parameter recorded in the AUI-941 DFDR, it has been determined that the ATC communications clock has a delay of around 5 seconds with respect to the DFDR clock. Times used in this paragraph are those based on the ATC communications clock.

The crew began to increase their rate of descent to 2000 ft/min from the moment the TCAS RA was issued (at approximately 10:12:44). ATCO had requested them to maintain a rate of 2000 ft/min or more at 10:12:40.

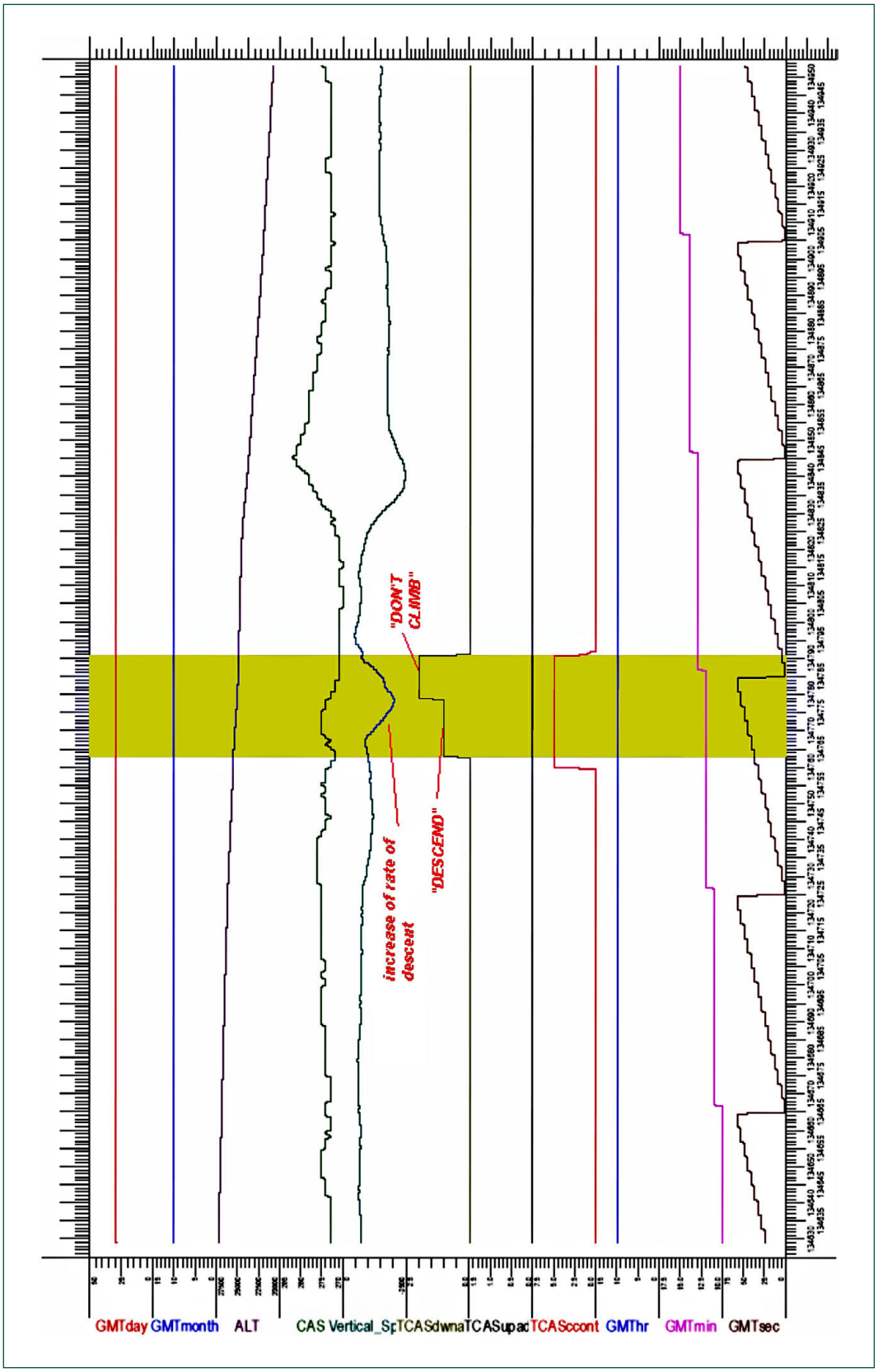
The AUI-941 crew continued talking (see the PTTvhf1 of Graph 2 that shows the moment when the microphone key is pressed) around ten seconds after they had read back the Madrid Approach frequency (at 10:12:53).

1.7. Organizational and management information

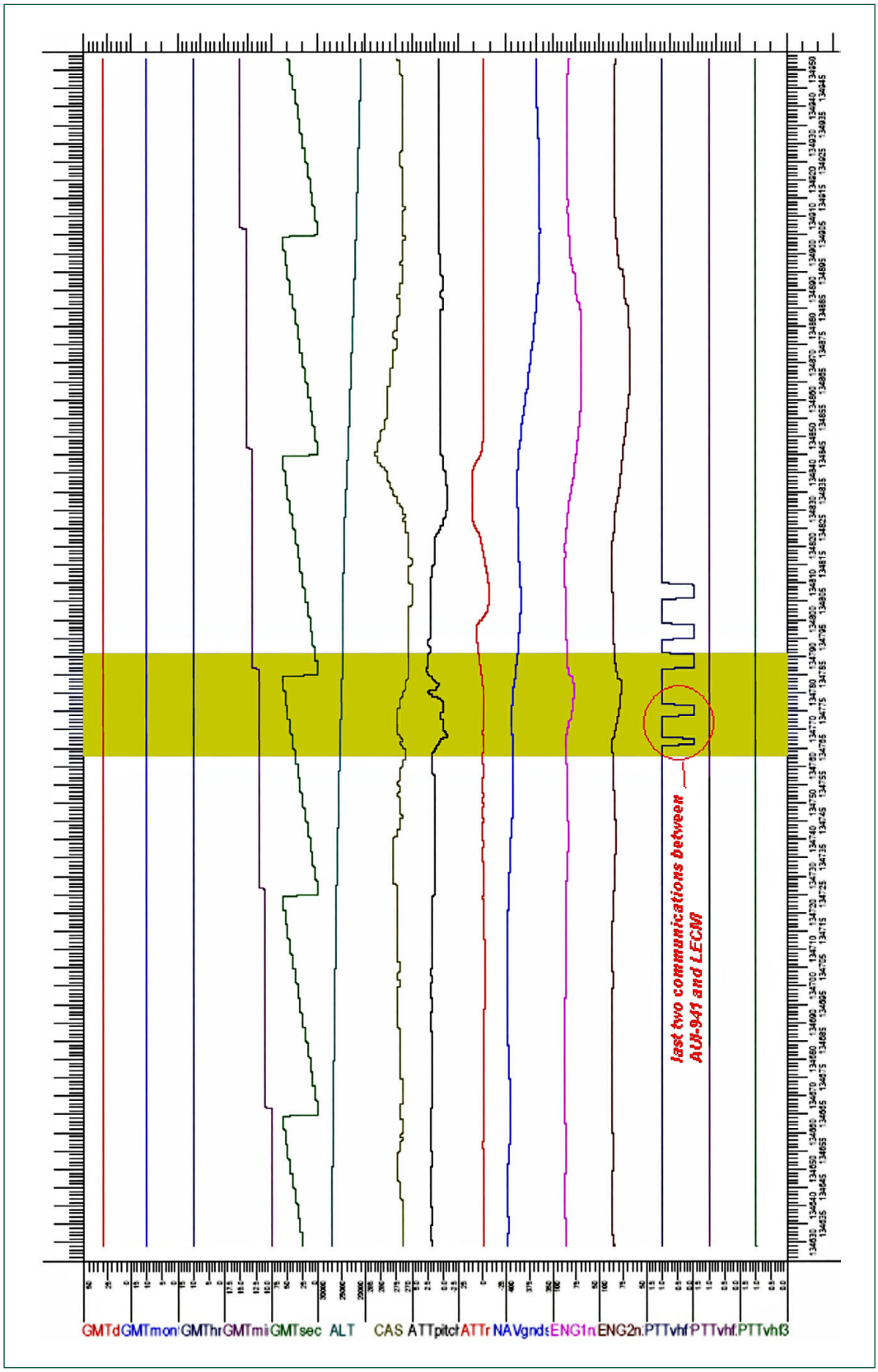
1.7.1. *Information about TCAS/ACAS reporting on Ukraine International Airlines*

Information extracted from the Operating Procedures of the Ukraine International Airlines General Flight Operations Manual shows the following:

> 8.3.6 Policy and Procedures for the use of TCAS/ACAS- Reporting
>
> "TCAS/ACAS occurrence shall be reported to the company.
> A RA should be notified to ATC when a manoeuvre induced by the system leads the pilot to deviate from the assigned clearance. [...]
> A Commander´s report is compulsory after any RA.
> If the TCAS RA was from an actual risk of collision or loss of separation an "Air Traffic Incident Report" and a "TCAS Report" shall be appended to the Chief pilot. If the TCAS RA is to be considered as "false" or "nuisance," risk only a "TCAS Report" shall be appended to the Chief pilot. Such reports help to identify problems with current TCAS versions and to develop better TCAS software."
> [...]
>
> 11.4.3 Reporting (Of Occurrences)
>
> "[…] After an occurrence, regardless of its nature, the **Commander is** responsible to notify the company, by appropriate means, and to write a report.[…]



Graph 1. AUI 941 DFDR data I



Graph 2. AUI 941 DFDR data II

2. Airborne Collision Avoidance System Resolution Advisory

A Commander shall notify the ATS-unit concerned and submit an Air Safety Report to the Authority whenever a flight has manoeuvred in response to an ACAS/Resolution Advisory.

1.7.2. *AENA Control Centre organization and operation*

The control centre manages air traffic throughout the different Flight Information Regions, which are in turn divided into sectors. The configuration of the different positions in the operations room is determined from the supervisor's post at the control centre depending on the active sectors.

The Centre-North control centre maintains the technical-operational posts listed below which, in keeping with the collective bargaining agreement between AENA and the air traffic controllers (CCA in Spanish), carry out, among others, the following duties:

- The controller

  [...] Carries out the duties involving control, information and alert services in accordance with the powers granted to him by virtue of holding an Air Traffic Controller's licence and the corresponding local ratings, in keeping with applicable national and international norms. [...]

- The supervisor

  – Supervises operations within an assigned area,
  – [...] Proposes the operational configurations to the Watch Manager to best meet traffic demands, keeping in mind published capacities, technical and weather conditions, and the capacity, number and experience of the controllers under his direction, while ensuring that the traffic volume does not exceed limits which may compromise safety. [...]
  – Advises controllers providing ATC services on operating actions to take.
  – Tracks work load by sector or position to verify their suitability and informs the Chief Supervisor in this respect.

- The Chief Supervisor

  – Directs and coordinates the Supervisors and Technical Supervisors in the performance of their duties, ensuring proper uniformity of criteria and supervisory methods.
  – Ensures the Supervisors exercise proper competence.

- The Watch Manager is the maximum authority and is responsible for the daily operation and running of the operations room. He ensures

  – ATC services are provided in accordance with established norms and procedures asegura que los servicios de tránsito aéreo son facilitados de acuerdo con las normas y procedimientos establecidos
  – Work in the operations room is performed efficiently
  – Operations room staff conduct themselves appropriately.

1.8. Additional information

1.8.1. *Information about filling an Air Traffic Incident Report*

According to ICAO Doc.4444 (Air Traffic Services Management), paragraph 15.7.3. "Procedures in regard to aircraft equipped with airborne collision avoidance systems (ACAS)" the following sentence appears:

> "15.7.3.5- Following an RA event, or other significant ACAS event, pilots and controllers should complete an air traffic incident report."

The Aeronautical Information Publication (AIP) Spain (ENR 1.14.1, Air traffic incidents) requests pilots to notify incidents using an "Air Traffic Incident Report Form".

1.8.2. *Information about vertical speed control instructions*

ICAO Doc.4444 (Air Traffic Services Management), paragraph 4.7 "Vertical Speed Control Instruction" establishes the following:

> "In order to facilitate a safe and orderly flow of traffic, aircraft may be instructed to adjust their rates of climb or rates of descent. Vertical speed control may be applied between two climbing aircraft or two descending aircraft in order to establish or maintain a specific vertical separation minimum."

1.8.3. *Information provided on the radar screen. Conflict alerts*

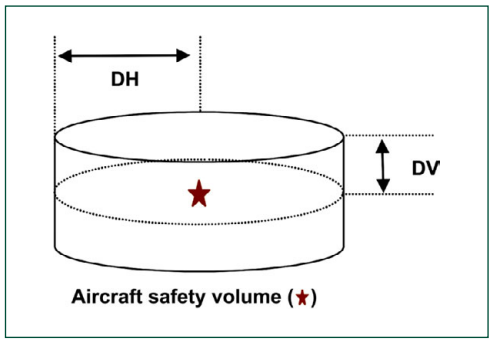
The information presented on the controller's radar screen concerning a loss of separation between aircraft is issued by way of *conflict alerts*. The aim of these alerts is to anticipate or detect the moment at which the proximity between two or more aircraft exceeds established safety limits.

There are two types of conflict alerts:

- CPA (Conflict Prediction Alert)
- CVA (Conflict Violation Alert)

A conflict prediction alert is issued when the system forecasts that an aircraft is going to violate another aircraft's safety volume within a time period below the alarm time (AT). The AT is the predicted time to entering said safety volume and is defined beforehand in the system. The safety volume is delineated by a cylinder, with the aircraft at its center, whose dimensions can be configured within the system. In the current version of this system, the parameters are set as follows:

Vertical level	Horizontal distance (NM) DH	Vertical distance (ft) DV
0-307	7.2	800
307-1,000	7.2	1,700



A conflict violation alert is issued when the system detects the entry by one aircraft into another's defined safety volume.

In the current version of the SACTA (Air Traffic Control Automated System), the first CPA is issued 110 seconds before the "intruder" penetrates the aircraft's safety volume. The system is set up so that three pre-warning confirmations are actually received before the first CPA is issued. Since the data are updated every 5 seconds, in the 15 seconds prior to issuing the first CPA the system is confirming the existence of that CPA. If, due to instabilities in radar detection, the system went from a no-CPA condition to one which anticipates a CPA with CVA in a time below the setpoint, then the system would immediately warn without waiting for a PAC confirmation, in what is called the *Immediate Warning Period*, which is 55 seconds before the safety volume violation occurs.

In brief, under normal conditions the warning time for a CPA is at least 110 seconds, which would become the 55 seconds of the Immediate Warning Period in abnormal conditions.

Warnings are relayed visually on the screen with colour codes (yellow for CPA and red for CVA) and audibly with an intermittent beep whose minimum volume should make the signal audible at all times. The beep may not be turned off.

2. ANALYSIS AND CONCLUSION

2.1. Discussion

On the basis of the information gathered, the following considerations can be made:

- At first, it seemed that AUI-941 had not received any TCAS warning because the crew did not report any manoeuvre neither to the ATCO nor to the Authorities (with an

Air Traffic Incident Report). When the crew were asked after the incident, they stated they actually had received this resolution advisory, but they did not inform about it because no comments either from the ATCO or from the crew of the other aircraft were heard. Therefore they thought this warning was an "unnecessary warning" issued by the TCAS, and no report of the manoeuvre was made. The TCAS Report required by terms in the Company´s General Flight Operations Manual was not filled out either (see paragraph 1.7.1 above).
International and Spanish regulations establish that, after a RA event, a report should be filled out (see paragraph 1.8.1 above). As regards this case, the operator informed that they had taken the following actions so as to correct this fact:

– Prepared a special notice to all their flight crew and disseminated it through the company intranet.
– At the next monthly pilot's meeting reminded all of them to obey the procedures written in the GFOM related to TCAS RA reporting.
– Reviewed their seasonal training programme to include occurrence reporting procedures.

- According to the DFDR data, the AUI-941 crew continued talking (see the PTTvhf1 of Graph 2 related to the moment when the microphone key is pressed) around ten seconds after they had read back the Madrid Approach frequency (at 10:12:53). Therefore, it can be assumed that they had already changed the frequency and that this could be the reason why they did not hear any TCAS report from the DLH-88C or ATCO. In summary, it is possible that, when the TCAS RA warning was issued and followed, the AUI-941 crew was switching the VHF radio frequency and contacting Madrid Approach.
- Despite the fact that AUI-941 did not read back the instruction to increase their rate of descent, they began to increase it to 2000 ft/min. According to the DFDR data, this action was performed only from the moment TCAS RA was issued (at approximately 10:12:48). ATCO had requested them to adopt a rate of 2000 or more eight seconds before at 10:12:40 but the communication took some time and it is doubtful that, even if the AUI-941 crew had heard the instruction, they would have had enough time to follow it before the RA warning.
- The rates of descent of both aircraft can approximately be calculated based on the radar data just before the moment of the incident. AUI-941 vertical speed was around 1,200 ft/min as opposed to 2,200 ft/min of DLH-88C. At 10:12:37 DLH-88C read back the command from ATCO to maintain FL260 and they communicated that they had the traffic below in sight (it has been determined that at that moment the separation between aircraft was around 800 ft). In spite of seeing the traffic so near, they did not reduce their rate of descent (1,000 ft/min above the rate of descent of AUI-941).
- Lufthansa was the operator that reported the TCAS event to ATCO, communicated to him their intention to file a TCAS report form, and notified the Authorities, but they did not proceed to preserve the relevant data (i.e. DFDR data, more detailed crew statements...) so as to permit subsequent analysis of the event. When enquiries were made, the requested information was no longer available.

- LECM ATCO did not ask for further acknowledgment of the "rate of descent" command to AUI-941 and some minutes later he provided an instruction without any call sign: "OK. YOUR TRAFFIC IS NOW REACHING LEVEL TWO FICE ZERO INCREASING RATE OF DESCENT". Therefore, nobody read back this sentence.
- Following international regulations regarding vertical speed control instructions (see paragraph 1.8.2 above), ATCO instructed DLH-88C to maintain flight level 260 and he also instructed AUI-941 to increase its rate of descent in order to get the minimum separation required between aircraft. According to ATC communications transcription and to radar data, he began to instruct them at 10:12:31.
- According to radar data, the first CPA warning appeared at 10:12:05. According to the SACTA system configuration, the first CVA (conflict violation alert) would have appeared when the separation between the aircraft dropped below 800 ft. The minimum CPA alarm time prior to this alert would have been 55 seconds (under abnormal radar working conditions) and 110 seconds under normal conditions. The elapsed time between the initial alert is considered adequate for issuing separation instructions to both aircraft. The ATCO was also aware that the descent rate of DLH-88C was almost twice that of AUI-941.
- Although a supervisory post exists in the control room (see paragraph 1.7.2) from which the various control positions can be accessed, neither control nor supervisory personnel reacted promptly to the conflict alert warnings. According to the personal report he forwarded to the Chief Supervisor, the Watch Manager was not aware of the incident, nor was anything recorded in the logbook.
- The review of the communications transcript shows that on several occasions the crew of flight AUI-941 read back the instructions provided by the ATC, but did not confirm the navigational settings to which the values referred ("CLEAR DOWN TWO ONE ZERO UKRAINE INTERNATIONAL NINE FOUR ONE" instead of "...LEVEL TWO ONE ZERO..."). This circumstance could have lead to mistakes (heading 210 instead of flight level 210) and reduces the likelihood that the messages had been correctly understood.

2.2. Conclusions

According to the information gathered, it can be concluded that the most probable cause of the separation infringement and the subsequent evasive manoeuvres was that the ATCO instructions were given too late to allow a timely reaction by both aircraft.

3. SAFETY RECOMMENDATIONS

REC 24/07. It is recommended that AENA establish measures intended to ensure control personnel act promptly in response to conflict alert warnings from the instant the first conflict prediction alert (CPA) (visual and audible) is received.