Republic of Rwanda

Ministry of Infrastructure

Aviation Accident and Incident Investigation Directorate General

Final Investigation Report

Incident in relation to RwandAir Aircraft Airbus A330-300 with Registration number 9XR-WP, involving Entry into French Airspace without Communication on 21st August, 2023.

Ref AAID 2023-04

The sole objective of investigations carried out by the AAID is to prevent aircraft accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or determine liability.

LIST OF ABRAVIATION

AAID – Aviation Accident and Incident Investigation Directorate General

ATC – Air Traffic Control

ATS – Air Traffic Services

CVR – Cockpit Voice Recorder

FDR – Flight Data Recorder

ICAO – International Civil Aviation Authority

PCDG – Paris Charles de Gaulle International Airport

RCARs – Rwanda Civil Aviation Regulations

TOD – Top of Descent

WB700 – RwandAir Flight number from Kigali to Brussels via Paris

SYNOPSIS

On 22nd August 2023, RwandAir Aircraft, Airbus A330-300 with registration number 9XR-WP conducted a commercial flight, number WB700, from Kigali International Airport to Brussels via Charles de Gaulle International Airport. The flight was operated with augmented flight crew. During the flight, cockpit crew took in-flight rest in accordance with the Regulations. Subsequently, one of the crew felt fatigued and requested for a controlled rest in the cockpit from the second pilot. This is normally a coordinated activity between pilots. While at LATAN Waypoint, in Italian Airspace, WB700 were instructed by ATC to report overflying AOSTA Waypoint, before entering into French Airspace. However, they did not. The flight entered into French airspace without communication until top of descent when the captain tried to communicate but realized that they were on wrong frequency as instructed by Paris Charles de Gaulle International Airport Departure Control. While in the process of requesting for descent, the pilots observed a French air force Jet flying in close proximity on the captain's side of the airplane. WB700 tried to contact the French Airforce jet several times via emergency frequency, 121.5MHz, but they were unsuccessful. Subsequently, French Airforce jet contacted WB700 via the arrival frequency given by Paris Charles de Gaulle International Airport Departures. The Air force jet informed WB700 that they had violated French airspace for 49 minutes. Thereafter, WB700 continued communication with Paris Charles de Gaulle International Airport ATC Arrivals and landed. The investigation team established that inappropriate implementation of controlled rest during flight WB700 by cockpit crew was the cause of the incident. Safety recommendations were formulated and addressed to the Operator and regulator to prevent occurrence of similar incident in future.

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1. Factual Information

1.1. History of Flight

1.1.1. General

On 22nd August 2023, RwandAir Aircraft, Airbus A330-300 with registration number 9XR-WP with flight number WB700 conducted a commercial flight from Kigali International Airport to Brussels via Charles de Gaulle International Airport with 273 Persons on board. Before entering into French airspace, WB700 flew over Italian and Switzerland airspace as per flight plan and entered French airspace without communication with ATC.

The flight crew team was composed of Captain and two First officers (Augmented Crew Operation), purser, flight attendants, Maintenance Engineer and Air Marshals.

The WB700 flight crew didn't realize any problem until top of descent to Paris Charles de Gaulle international Airport when communication difficulties with ATC were encountered.

1.1.2. Fatigue Management Procedures applicable to the WB700 flight

The flight was operated with augmented crew in accordance with the RCARs and approved Operator's Manuals and this required on board crew rest implementation for at least 25% of the flight time per crew for a three-man crew regime. The regulatory crew rest was conducted properly as planned during the flight. The captain was the last crew to take rest to enable him be available before top of descent.

During the rest period of the captain, the first officer A requested a controlled rest in the cockpit which normally does not exceed 45 minutes and a 20 minutes time to recover from sleep inertia. This is normally a coordinated activity between pilots. During the investigation interview, the first officer A stated that his controlled rest took about one hour and twenty minutes. In meantime, when the first officer B who was on controls wanted to use

washroom and woke up the first officer A from the controlled rest and had a short briefing of about 5 minutes.

During the investigation interview, the first officer B stated that he briefed the first officer A to communicate once over AOSTA[1] to French ATC. However, the first officer A stated that he did not hear about the instruction to communicate to French ATC during briefing that was done four minutes before reaching waypoint AOSTA. When the first officer B left the cockpit to the washrooms, one of the crew members joined the active first officer in the cockpit ensuring that he is not left alone in accordance with the operator procedures.

During the investigation interview, it was found out that when first officer B returned to the cockpit from the washroom, there was no debrief conducted. Few minutes after, Captain joined them from the rest as they were about to arrive at the top of descent.

During interview, the first officer A stated that he had filed a fatigue report two days before the incident however, there was no assessment conducted in relation to the filed fatigue report.

1.2. Injuries to the Persons

There were no injuries incurred to people due to this incident.

1.3. Damages to the Aircraft

There were no damages due to this incident

1.4. Other damage

No third-party damages were identified.

[1] AOSTA is a waypoint in Italian Airspace with Latitude: 45˚47'47.00" N and Longitude: 007˚20'45.00"E

1.5. Personal Information

1.5.1. Captain

Age:		52 years
Licence	Type:	Air Line Transport Licence
	Date of issue:	17th May 2023
	Valid until:	31st May 2025
Medical certificate until:		03rd April 2024
Total flying experience		14839
Total flying experience on type		9460
Rest period within 48 hours		25:42

1.5.2. First Officer A

Age:		41
Licence	Type:	Air Line Transport Licence
	Date of issue:	28th October 2021
	Valid until:	31st October 2023
Medical certificate until:		20th March 2024
Total flying experience		8020
Total flying experience on type		4392
Rest period within 48 hours		55:00

First Officer B

Age:		39
Licence	Type	Commercial Pilot Licence
	Date of Issue	27Th May 2022
	Valid Until	31st October 2023
Medical certificate until:		08th February 2024
Total flying experience		5100
Total flying experience on type		4050
Rest period within 48 hours		55:00

1.6. Aircraft Information

Manufacturer	Airbus Industries
Type	A330-300
Serial Number	1759
Registration	9XR-WP
Engines	Rolls Royce Trent 772B-60
Date of manufacture	30th November 2016
Certificate of airworthiness	Date of issue: 29th November 2022 Date of expiry: 30th November 2023

1.7. Meteorological Information

Weather was not a factor and did not contribute to this incident.

1.9. Communication

Communication with Air Traffic Controllers is a key part for flight operations without which a flight cannot be operated between two points. This is to ensure

proper separation of traffic. During the flight, ATC provides continuity in separation by handing over a flight from one ATC control to the next which is on the flight path of the aircraft. This is normally implemented by providing next contact frequency to the aircraft and asking pilots to continue with the next ATC using that frequency. The aircraft normally acknowledges instructions given and if there is any error in the read-back, it is then corrected by the ATC. When required or necessary, ATC will ask the aircraft to report overflying some reporting points.

When WB700 passed the position LATAN[2] in Italian Airspace at 06:44 hours, they were asked to report overflying AOSTA which is a waypoint one hour twenty-three minutes (1h23mins) flight time away after LATAN. The WB700 failed to report overhead AOSTA as requested and thereby was not given the next communication frequency. Review of the navigation log identified period of non-communication of about one hour twenty minutes. From this position onwards, WB700 passed from Italy, through France, Switzerland and back to French airspace again without communication.

When the Captain came to the cockpit from the regulatory rest, WB700 started requesting for descent, since according to the flight plan, the Top of Descent was in Switzerland before final entry into French airspace. But they did not receive the requested clearance to descent because WB700 was on wrong frequency.

Normally, request for descent is initiated before TOD to allow the aircraft to descend on profile. According to the FDR data, WB700 requested for descent exactly at TOD [07:18]. However, this request was on departure frequency of PCDG and after several calls, WB700 was asked to revert to their previous frequency, the instruction given were complied with however, had no contact on the previous frequency. WB700 therefore, went back to the PCDG Departures frequency and requested the appropriate frequency for arrivals. At this time WB700 observed a French air force Jet flying in close proximity on the captain's

[2] LATAN is a waypoint in Italian Airspace with Latitude: 39˚17'36.00" N and Longitude: 019˚00'00.00"E

side of the airplane. WB700 made several efforts to contact French air force jet on emergency frequency (121.5 MHz) but there was no response. After about four minutes, PCDG Departures provided the arrivals frequency to WB700. After WB700 made contact with PCDG Arrivals, the Air force jet communicated to WB 700 via the PCDG Arrivals frequency and told them that they have been flying into French Airspace for 49 minutes without communication which is a violation. WB700 captain replied that they are flying according to the filed flight plan, which does not traverse any prohibited or restricted airspace and therefore could not have committed any such violation. At this time, WB 700 was instructed to make a rapid descent from FL360[3] to FL150. Thereafter, the French air force jet slowed down and disappeared from sight behind them. There were no further events until touchdown.

The PCDG departures asked WB700 to wait for few minutes. After approximately four minutes, PCDG departures provided the requested frequency.

During investigation, WB700 CVR recordings were requested but not available since there were not preserved as required by RCARs.

1.17. Organizational and management information.

1.17.1. Controlled rest in the cockpit

The controlled rest is a procedure used to alleviate fatigue among flight crew during flight. It is normally implemented with the concerned crew sitting in crew seat. It allows the crew to take a short rest not exceeding 30 minutes of actual sleep so that the crew does not go into deep sleep. Thereafter, a sleep recovery time of up to 20 minutes is applied to enable a proper recovery and situation awareness before the crew resumes flying duty. If a crew is allowed to sleep for more than thirty minutes, he/she will progress into deep sleep and recovery can be quite difficult and lengthy. It is therefore important not to

[3] FL: Flight Level. It is the altitude above sea-level in 100 feet units measured according to a standard atmosphere. FL360 means 36000feet

exceed maximum of thirty minutes. In addition, the operator's Operations Manual requires Controlled rest periods to terminate at least 30 minutes before top of descent.

During the investigation interview, it was confirmed that the first officer A took the controlled rest of one hour and twenty minutes and was immediately handed over controls after a short briefing of less than five minutes without required sleep recovery time.

1.17.2. Pilots fatigue Management

Operators are required to ensure that adequate opportunities are provided for crew members to obtain rest and sleep so that the crew rest properly in order to minimize the risk fatigue.

During investigation interview, the first officer A stated that prior to the flight, he had previously submitted fatigue report. Thereafter he received automatic reply generated by the Q-pulse System[4], the same system he used to file the report and also received another email from safety office confirming that report was received and will be analyzed and he said no further action was done.

The investigation found out that the record of operator showed that the personnel have covered their fatigue Management Trainings.

[4] Q-Pulse is safety management system software used by RwandAir for reporting, analysis and follow-up occurrences and recording other safety related data.

2. Analysis

2.1. General

Lack of communication between aircraft and ATC may occur for a variety of reasons, some are technical and others result from errors of the man-machine interface. It may be transient or prolonged. Whether brief or prolonged, lack of communication has obvious flight safety significance. Potentially dangerous outcomes include the following:

1. Pilots will not be able to receive and therefore to follow a new clearance, and this may lead to the loss of separation between aircraft and perhaps an AIRPROX[5];
2. Pilots will not be able to pass important information to ATC;
3. Lack of communications may be interpreted as a security threat and result in military interception;

2.2. Lack of communication

According to extract from flight data recorder, there was no radio transmission from WB700 for one hour and seventeen minutes. This is normal when adhering to ATC instructions. Based on the WB700 flight plan, flight time from LATAN to AOSTA were one hour and twenty-three minutes. From LATAN to position AOSTA among which one hour and five minutes that were consistent with ATC request.

Since WB700 was instructed to report overflying AOSTA waypoint, which they failed, they ended up flying for twelve minutes from AOSTA to TOD [flying in French and Switzerland airspaces] without communication.

During the investigation interview, the first officer B stated that about 4minutes before the compulsory reporting point [AOSTA], he needed relief and therefore woke up the pilot under controlled rest [first officer A], gave a short briefing and he proceeded to the lavatory.

[5] AIRPROX: Aircraft proximity (AIRPROX) is a situation in which, in the opinion of pilot or ATC personnel, the distance between aircraft as well as their relative positions and speed have been such that the safety of the aircraft involved may have been compromised

Based on the information above, the first officer A did not take enough time to recover from sleep inertia before entrusted with the controls.

According to RwandAir operations Manual Part I in relation to the controlled rest on flight deck, the rest period should be no longer than 45 minutes (in order to limit any actual sleep to approximately 30 minutes). In addition, after this 45-minutes period, there should be a recovery period of 20 minutes during which sole control of the aircraft should not be entrusted to the pilot who has completed his rest.

According to the extract from FDR read-out, there was a period of more than one hour without communication with ATC and therefore the controlled rest for the first officer A took more than one hour and entered into deep sleep. In this case, first officer A did not report due to sleep inertia as he did not have enough time to recover from deep sleep. He was given control at the time he was likely being not fully awake and therefore had a poor situation awareness so that he could not follow up the communication procedures with air traffic control. The procedural 20 minutes recovery time before handover of control of the aircraft was not implemented and led to not communicating with ATC as required.

According to the WB700 flight plan, from AOSTA to TOD is thirteen minutes. However, RwandAir Operations Manual Part A required the controlled rest periods to terminate at least 30 minutes before top of descent[6] and hence the procedures to terminate the controlled rest were not respected.

Considering non- compliance of flight crew to the company procedures, there is a likelihood that they are not familiar with them or there is no emphasis to comply with them.

According to the flight plan, the period of break in communication with ATC of WB700 from AOSTA to TOD was 12 minutes.

[6] RwandAir Operations Manual Part A, WB/OMA/OPS/01, 7.7.13 (9) (g)

2.3. Fatigue Management

Normally, the next reporting frequency is given in 8-10mins time before reporting point. Before WB700 overflying AOSTA, ATC called WB700 and provided to them the frequency of the next reporting point which was AOSTA and instantly after selecting that frequency, the first officer B woke the first officer A from controlled rest.

At reporting point AOSTA, they did not communicate as required. However, when they reached at the TOD trying to communicate to PCDG ATC, that is where they realized they are on wrong frequency. First officer A stated that he assumed that before being handed over control, his fellow has already communicated with ATC and got the frequency of the next reporting point. It is likely that this confusion was caused by improper handover between first officers.

Analysis of the flight plan in conjunction with the interview identified lapses in the implementation of cockpit crew-controlled rest aspect of fatigue management. It is yet to be determined if it is due to crew negligence or improper practical training. So far, there has been no other such related incident reported to AAID. The tendency is that the crew did not properly record the process in order to ensure strict compliance with the timing of the controlled rest. In effect, the crew observing the controlled rest was allowed to sleep for over one hour twenty minutes [1h20] as result, he entered into deep sleep.

Furthermore, a longer wake up time should have been applied in this particular instance to ensure proper recovery from deep sleep. Unfortunately, this was not implemented with the second pilot leaving the cockpit while the other pilot was still under sleep inertia thereby lacking situational awareness. Under this condition, the pilot did not realize that they have passed AOSTA and subsequent reporting points for a period of almost twelve minutes.

During the investigation interview, the “first officers A” who was informed to communicate stated that he had submitted a fatigue report two days before the day of incident.

According to Operator Operations Manual:

- **Poorly Fatigued (0-39 points):** Crew member is allowed to be scheduled without authorizations from Flight Operation Administrators and no post- flight special mitigation is required.
- **Average Fatigued (40-79 points):** Crew member is allowed to be scheduled without authorizations from Flight Operation Administrators and post- flight special mitigation should be anticipated.
- **Highly Fatigued (80-99 points):** Crew member is allowed to be scheduled with authorizations from Chief Pilot if no standby is available and post- flight special mitigation is required. Pairing of Flight Deck Crew Members highly fatigued shall be avoided as far as possible.
- **Extremely Fatigued (>100 point):** Crew member is not allowed to be scheduled without authorization from Director of Flight Operations and post-flight special mitigation is required. Pairing of Flight Deck Crew Members extremely fatigued shall be avoided as far as possible.

Considering the operator’s fatigue management procedures, it is the responsibility of the operator’s management to assess the reported fatigue before the crew is scheduled for the next flight and also the crew members are required not act as operating crew if they know, or suspect that they are not in good physical or mental condition.

The Operator’s Operations Manual Part A does not contain procedures for logging details of controlled rest instances in the cockpit. This should have enabled the operator to further analyse the fatigue condition of the crew and inculcate into subsequent rosters for adequate fatigue management.

3. Conclusion

3.1. Findings

3.1.1 WB 700 entered French airspace without communication

3.1.2 The WB700 was an augmented flight conducted by a three-man cockpit crew.

3.1.3 The cockpit crew shared their rest period in compliance with the regulations for a three-man augmented crew operation.

3.1.4 During rest period of captain, the same first officer that filed fatigue report, requested a controlled rest in the cockpit

3.1.5 The controlled rest exceeded the allowed safety timeframe limit.

3.1.6 There is no record indicating when the controlled rest started and ended.

3.1.7 One of the first officers had filed a fatigue report two days before the WB700 flight

3.1.8 Up until the time of this investigation, there was no assessment conducted on the filed fatigue report

3.1.9. WB700 was instructed by Italian ATC at LATAN to report when overflying waypoint AOSTA before entering into French Airspace.

3.1.10 WB700 did not to report when overflying waypoint AOSTA

3.1.11 When ready for descent, WB700 realized that they were on the wrong frequency.

3.1.12 CVR recording were not secured after the incident.

3.1.13 Cockpit crew were properly licensed.

3.1.14 Manual Part A does not contain procedures log of details of controlled rest in the cockpit

3.1.15 At the Top of Descent, when WB700 was trying to establish communication with ATC, they observed a military jet in their close proximity.

3.2. Probable Cause

The investigation determines that the probable cause of this incident was inappropriate implementation of controlled rest procedures in flight.

3.3. Contributing Factors

- Cockpit crew did not comply with company procedures in relation to implementation of crew rest in flight.
- Inadequate briefing before leaving and after resuming cockpit duties between the crew.
- Lack of situation awareness by both first officers which should have triggered a reaction to the condition at hand.
- Lack of analysis for reported accumulated fatigue

4. Safety Recommendations

As a result of this incident investigation, AAID issued the safety recommendations as follows:

To: RWANDAIR

1. To ensure that the submitted fatigue reports are assessed on a timely manner and the response is shared to the concerned personnel.
2. To ensure pilots don't leave the cockpit during periods of anticipated high workload
3. To ensure that flight crew are properly trained to be able to assess their level of fatigue.
4. To ensure the controlled rest procedures are completed at least thirty minutes before entry into high workload situations as per Operator's Operations Manual Part A.
5. To review and ensure clarity of controlled rest procedures especially in area of communication between cockpit and cabin crew.
6. To ensure that instances of controlled rest are properly documented on the flight plan and captured for fatigue management purposes.
7. To ensure Cockpit Voice Recorder data is preserved in the event of any safety occurrence.

To: RCAA

8. To ensure that fatigue management trainings are properly conducted and implemented.
9. To ensure the enforcement of the RCARs requirement to preserve CVR data in the event of any safety occurrence