FINAL REPORT

SriLankan Airlines Flight UL 226, Airbus Industries A330-200, bearing registration 4R-ALS, experienced a lateral runway excursion during landing at Bandaranaike International Airport, Katunayake, Sri Lanka on 08th July 2024

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GLOSSARY OF ABBREVIATIONS USED IN THIS REPORT

AAIB	Aircraft Accident Investigation Board
AP	Auto Pilot
ATPL	Air Transport Pilot Licence
BEA	Bureau of Enquiry and Analysis for Civil Aviation Safety
CAASL	Civil Aviation Authority of Sri Lanka
CVR	Cockpit Voice Recorder
DFDR	Digital Flight Data Recorder
EASA	European Union Aviation Safety Agency
FCTM	Flight Crew Techniques Manual
FD	Flight Director
FO	First Officer
FOD	Foreign Object Debris
ICAO	International Civil Aviation Organization
ILS	Instrument Landing System
METAR	Meteorological Aerodrome Reports
MHz	Mega Hertz
MLG	Main Landing Gear
NTSB	National Transportation Safety Board
OEM	Original Equipment Manufacturer
OMDB	Dubai International Airport, United Arab Emirates
PAPI	Precision Approach Path Indication
PF	Pilot Flying
PIC	Pilot -In Command
PM	Pilot Monitoring
RWY	Runway
SOP	Standard Operating Procedures
UL	SriLankan Airlines
UTC	Coordinated Universal Time
VCBI	Bandaranaike International Airport, Katunayake, Sri Lanka
VHF	Very High Frequency

SYNOPSIS

At approximately 2334 UTC (0504 Local) on 8th July 2024, an Airbus A330-200, bearing aircraft registration 4R-ALS, during its approach into Bandaranaike International Airport, Katunayake, drifted left of Runway 22 centerline. The aircraft touched down to the left of the centerline and veered further left before being recovered. Consequently, four tyres on the left main landing gear (MLG) and four runway edge lights sustained damage.

Upon the initial notification from the air operator, CAASL dispatched a team to visit the site and inspect the aircraft on the same day. On reviewing the nature of the damage to the aircraft and impact, this authority appointed an Aircraft Accident Investigation Board (AAIB) to initiate ICAO Annex 13 investigation.

The incident was notified to the International Civil Aviation Organization (ICAO), the Bureau of Enquiry and Analysis for Civil Aviation Safety (BEA- France) being the State of Manufacturer and the State of Design of the aircraft, and National Transportation Safety Board (NTSB) as per the Standards and Recommended Practices stipulated in ICAO Annex 13, to the Convention.

BEA- France appointed an investigator as an accredited representative, two technical advisers from Airbus and EASA and NTSB appointed one investigator to assist in the technical investigation.

1 FACTUAL INFORMATION

1.1 History of the flight

Srilankan Airlines flight UL226 was a schedule flight, departed from Dubai International Airport (OMDB), United Arab Emirates to Bandaranaike International Airport (VCBI), Katunayake, Sri Lanka at approximately 1900 hrs (UTC) on the 7th of July 2024. There were two hundred and seventy (270) passengers and fourteen (14) crew members on board. The Pilot-in-Command (PIC) was the Pilot Monitoring (PM) and the First Officer (FO) was the Pilot Flying (PF) for this flight. Both pilots were adequately rested in Dubai (layover rest for nearly 24 hours) before the flight.

Throughout the flight from Dubai, the flight crew did not encounter any anomalies with the aircraft systems and the flight remained uneventful until the final approach and landing phase.

Before approach to VCBI the flight crew had received the latest aerodrome and weather information through the Automatic Terminal Information Service (ATIS), which indicated that wind variable 3 Knots, visibility 9 km and light rain over the field. During descent, the flight crew established communication with Colombo Director (VHF 132.40 MHz) and they were cleared for ILS approach for Runway 22 (RWY 22) at VCBI. After fully established on ILS RWY 22, flight crew contacted Colombo Tower (VHF 118.70 MHz) for landing clearance.

The flight crew received the landing clearance for RWY 22, with a reported surface wind condition light and variable and runway condition wet due to light rain. They read back the clearance and continued on ILS (precision) approach with the auto-pilot system engaged.

At 23:32:59 (UTC), the aircraft was at 1000ft RA with both autopilot (AP) and Flight Director (FD) were engaged in glide slope (vertical) and localizer (lateral) modes and the Automatic Flight System correctly tracked the ILS path and the speed target. According to the PF, due to light rain visibility was around 05-06 km and they requested to increase the intensity of runway lights on finals.

At approximately 390ft RA, the flight crew voluntarily disengaged AP via the sidestick instinctive pushbutton and then final approach was manually handled by the FO (PF). After AP disengagement, PF sidestick inputs varied between a third of full left and approximately 2/5 of full right deflection and roll angle varied between -2.5° (left wing down) and +2.5° (right wing down). Further, no significant rudder pedal input was recorded and heading varied between 216° and 218° and with that localizer deviation slightly increased up to approximately 1/7 DOT to the left of the localizer.

From approximately 150ft RA (23:34:08 UTC) to touchdown (23:34:20 UTC), PF applied several left and right roll orders, with a left roll tendency, leading the roll angle to increase up to a maximum of -3.5° (left roll) and the roll angle was thus mainly a left roll in the last 10s before touchdown (Shown as ❸ in Figure 2). At the same time, according to the wind analysis, the crosswind component started to reverse from left to right (In the last 200ft, the crosswind component reversed from approximately 5kt left to 3kt right – Refer Figure 1).

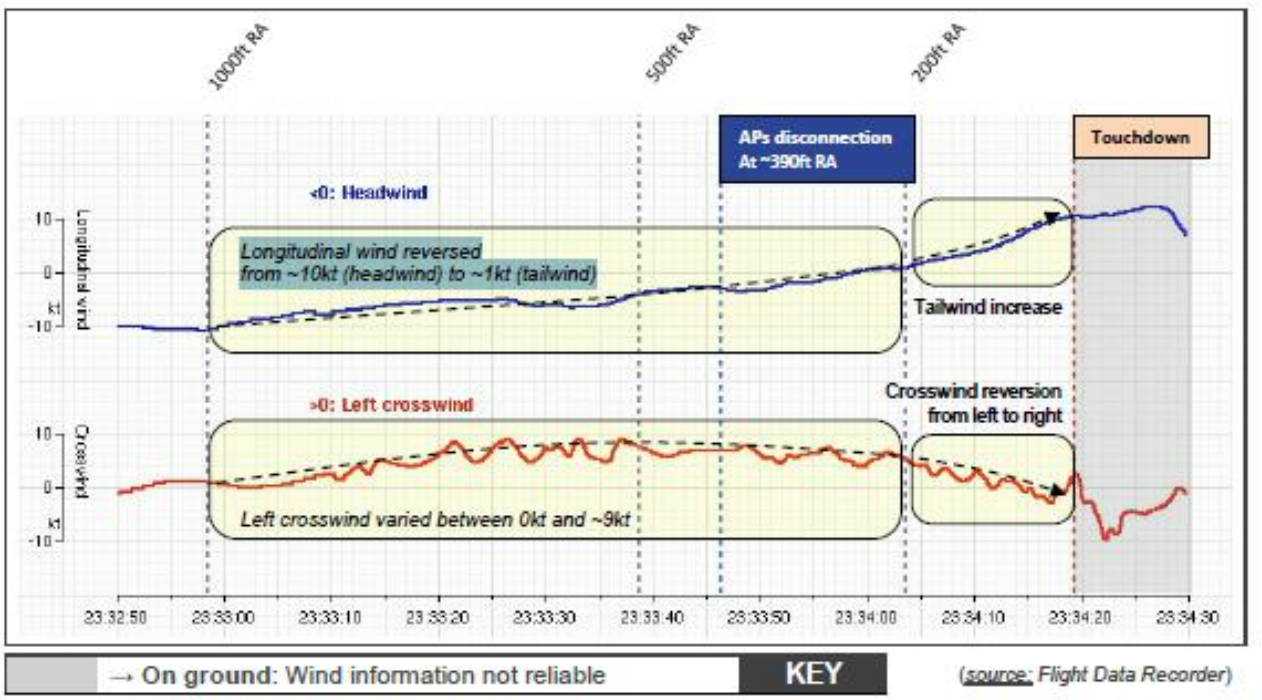


Figure 1 – Reconstructed wind along the runway axes (Source: Flight Data Recorder)

The mainly left roll angle maintained for approximately 10 seconds, associated with the crosswind reversion, initiated a left dynamics leading localizer deviation to start increasing and therefore, the aircraft deviated to the left of the runway centreline.

During this period there was no any call out from the PM ('Localiser' or 'centreline' or 'deviating left') to remind the PF to align the aircraft with the extended runway centreline. According to PM, he knew the aircraft was not aligned with runway centreline, but he observed that PF had applied flight inputs to correct the mis-alignment and therefore, he did not intervene with controls. According to PF, to counter the left deviation, he applied a rightward rudder inputs instead roll inputs as the aircraft was close to the ground.

Before the aircraft flare-out (approximately 50ft RA) and noting that the aircraft was still drifting, both flight crew members did not consider executing a go-around since they were in a perception that the offset from the runway centreline was still acceptable for a safe landing.

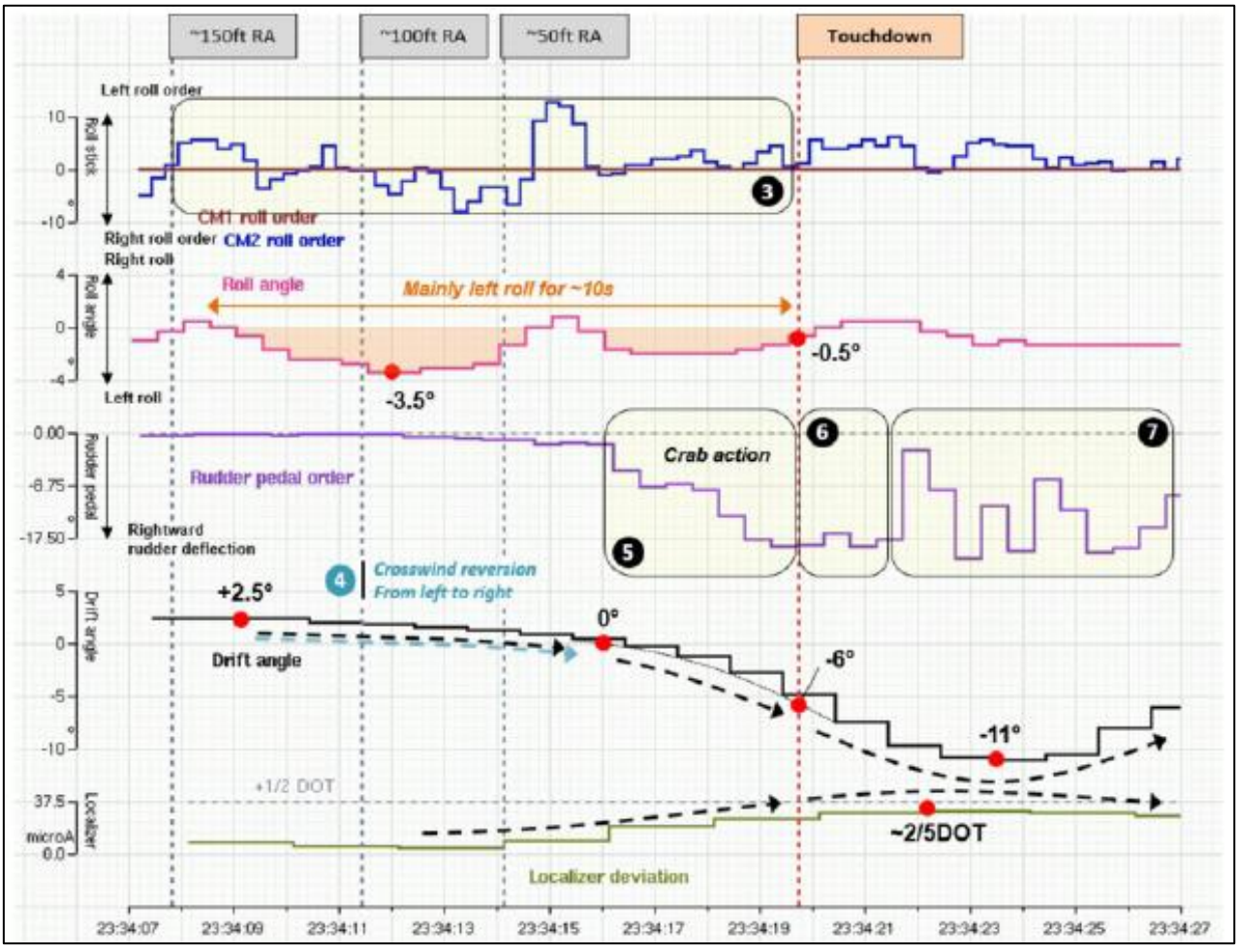


Figure 2 - The last 150ft / Lateral and directional axes (Source: Flight Data Recorder)

Approximately from 20ft RA, most probably to counter the left deviation, the flight crew applied a rightward pedal order up to half of full deflection (Shown as ❺ in Figure 2). This rightward rudder pedal order (crab action), associated with the crosswind reversion, led the drift angle to increase up to -6° (aircraft nose toward the right of the track) prior to touchdown. The aircraft touched down at approximately 250m after the runway threshold with a localizer deviation around +2/5DOT to the left of the runway.

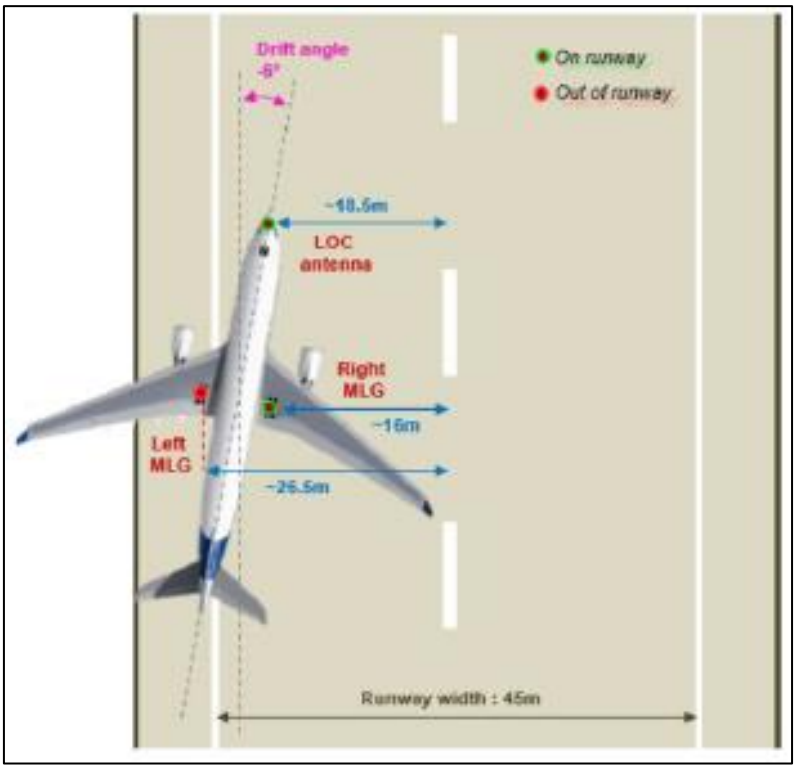


Figure 3 – Initial touchdown analysis (Source: Flight Data Recorder)

The aircraft thus touched down with the left MLG on the runway shoulder (out of runway) and with the right MLG still on the runway. At that time, left MLG position was around 26.5m on the left of the runway centreline and the right MLG position was around 16m on the left of the runway centreline (runway width of 45m and the side stripe marking was at 22.5m from centreline).

Figure 4 – Landing markings on runway

After touchdown, the rightward rudder pedal order applied just before touchdown was maintained (Shown as ❻ in Figure 2). Consequently, the drift angle continued to increase up to -11°.

Concomitantly, the localizer deviation reached its maximum of around +2/5DOT to the left of the localizer before starting to decrease. During this period the aircraft veered further to left resulting left MLG moved further left up to around 29m and the right MLG positioned up to around 18.5m on the left of the runway centreline. At that time, based on estimated trajectory, the left MLG was out of the runway (still on the paved surface) and the right MLG was on the runway.

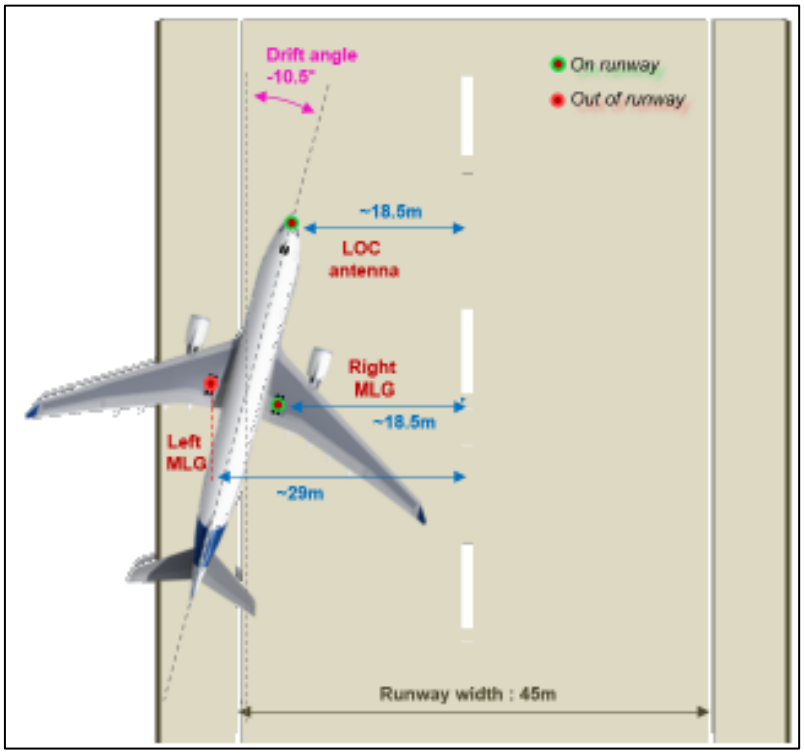


Figure 5 – After touchdown analysis (Source: Flight Data Recorder)

Then the rightward rudder pedal order (Shown as ❼ in Figure 2) was almost fully released by the flight crew before being reapplied up to approximately 3/5 of full right deflection and as a result the lateral deviation reduced. Around 23:34:26 UTC, the runway was recovered (all main landing gears were on the runway) around 700m after threshold. Then, the runway centreline was recovered around 900m after threshold and the aircraft then exited the runway via taxiway C and taxi was performed uneventfully.

During post flight inspection a maintenance technician observed that all four tyres on left MLG were damaged and he informed situation to duty engineer, but there was no pilot report regarding the incident. After the engineer's inspection, he informed Apron Control supervisor regarding the incident through Flight Control Centre.

Approximately 00:15:00 UTC (0545 Local) initial runway inspection was carried out on runway 22 touchdown area and no any observation made. During second inspection (during day light) they found that four runway edge lights on left side of runway 22 has damaged and some tyre derbies were on the left edge of the runway 22 landing zone.

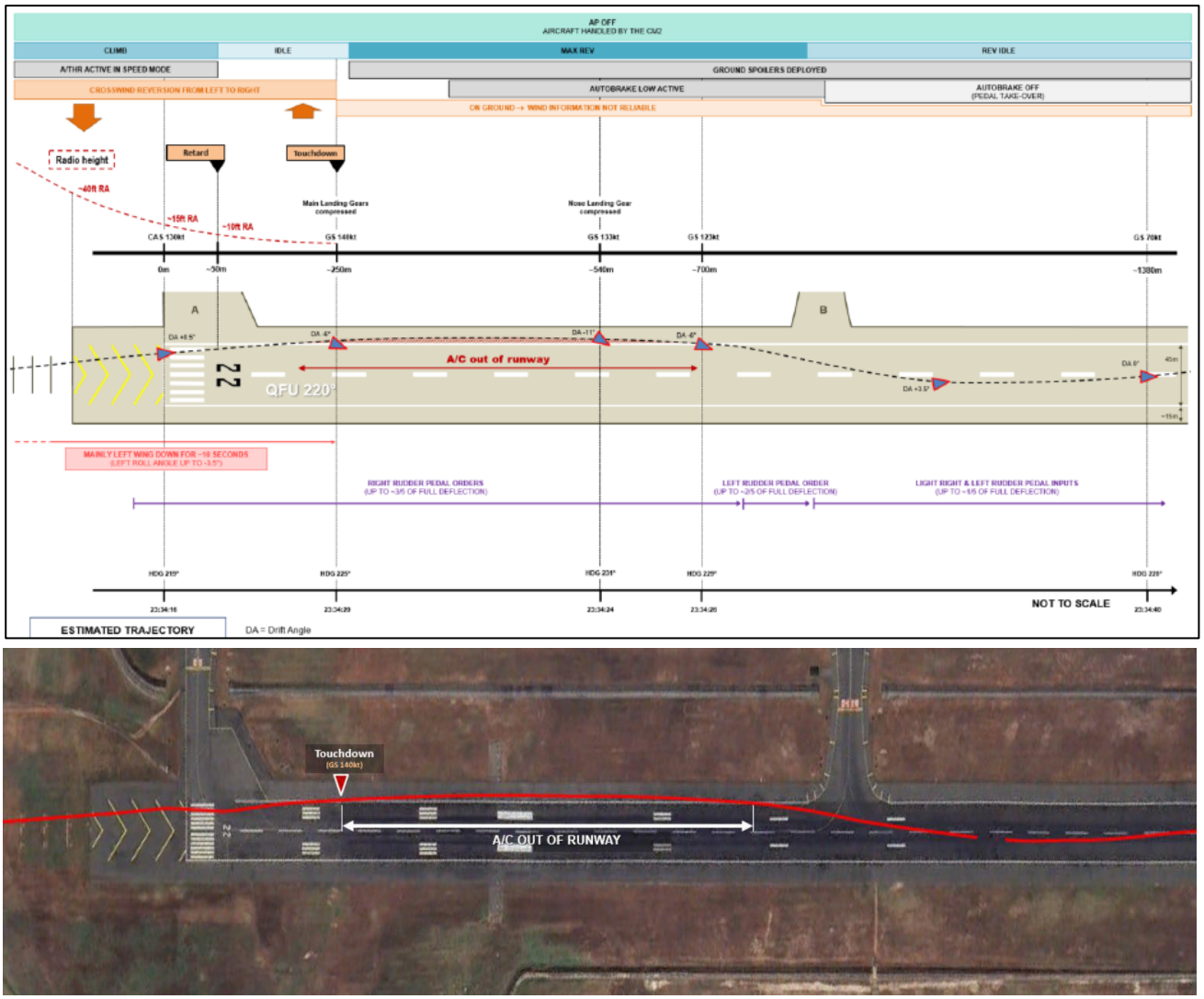


Figure 6 - An estimated aircraft trajectory (Source: Flight Data Recorder)

1.2 Injuries to persons

None

1.3 Damage to aircraft

All 4 tires (# 1,2,5 & 6) of the left main landing gear were damaged.

Figure 7 – Damages to the tyres of left MLG

1.4 Other damages

Four (04) Runway edge lights were damaged.

Figure 8 – Damaged runway edge lights

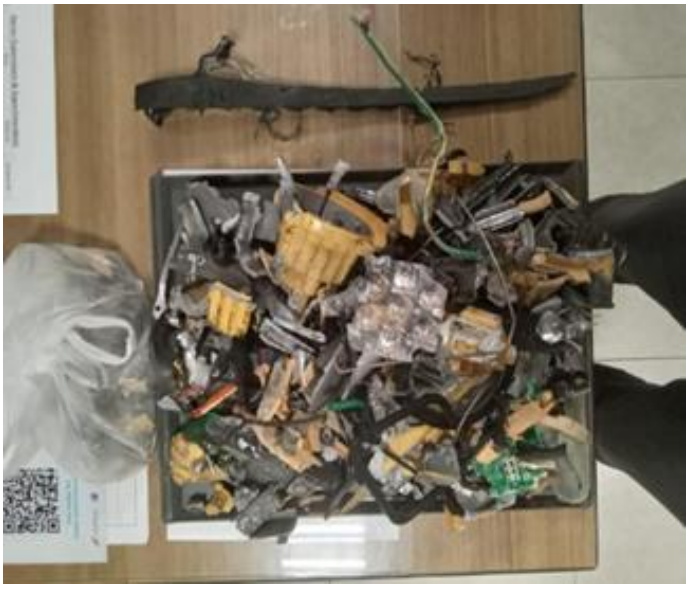


Figure 9 – Runway edge light and tyre debris recovered from runway

1.5 Personnel information

1.5.1 Pilot in Command

a). Licence : Valid ATPL (CAASL-72-A-10334) issued by the DGCA Sri Lanka
b). Age : 38 yrs, Male
c). Aircraft Ratings with issued dates: A320 issued on 05th Sept 2012
A330 issued on 15th June 2014

d). Flying experience: Total - 8268 hrs
Total P1 - 2875 hrs
Total P1 on A330 - 1845 hrs

e). Recent Training and flight checks:

Training/ Check	Completion date	Expiry date
A330 SIM	21 May 2024	20 May 2025
A330 Line check	20 Apr 2024	19 Apr 2025

1.5.2 First Officer

a). Licence : Valid ATPL (CAASL-72-A-10039) issued by the DGCA Sri Lanka
b). Age : 29 years, Male
c). Aircraft Ratings with issued dates: A320 issued on 09th Nov 2018
A330 issued on 18th May 2022

d). Flying Experience: Total - 3520 hrs
Total P2 - 3316 hrs
Total P2 on A330 - 1322 hrs

e). Recent Training and flight checks:

Training/ Check	Completion date	Expiry date
A330 SIM	10 May 2024	09 May 2025
A330 Line check	25 Sep 2023	24 Sep 2024

1.6 Aircraft information

a) Type and Model : Airbus A330-243
b) Manufacturer's Serial No. : 1008
c) Certificate of Registration : No 322, Registered in Sri Lanka Civil Aircraft Register
d) Certificate of Airworthiness : No 274 and valid till 20th Jan 2025
e) Total Airframe Hours : 40800:59 FH/ 8272 FC (as at 08th July 2024)
f) No. of Engines & Type : 2 numbers & RR TRENT772B

Engine	Serial Number	Total Cycles	Total Hours
#01 TRENT772B60-16	41618	9358	47201:17
#02 TRENT772B60-16	41301	16319	71775:11

1.7 Meteorological information

The METAR issued by VCBI Meteorology office around time of event as follows:

METAR VCBI 080010Z 20007KT 140V280 9000 FEW014 SCT015 25/25 Q1007 NOSIG=
METAR VCBI 072310Z VRB03KT 9000 SCT015 25/24 Q1006 NOSIG=
METAR VCBI 072210Z 16003KT 120V230 9999 SCT016 25/24 Q1006 NOSIG=

1.8 Aids to navigation

Runway 22 at VCBI is equipped with a standard ILS, DVOR/DME and PAPI system and also runway and approach, lighting system.

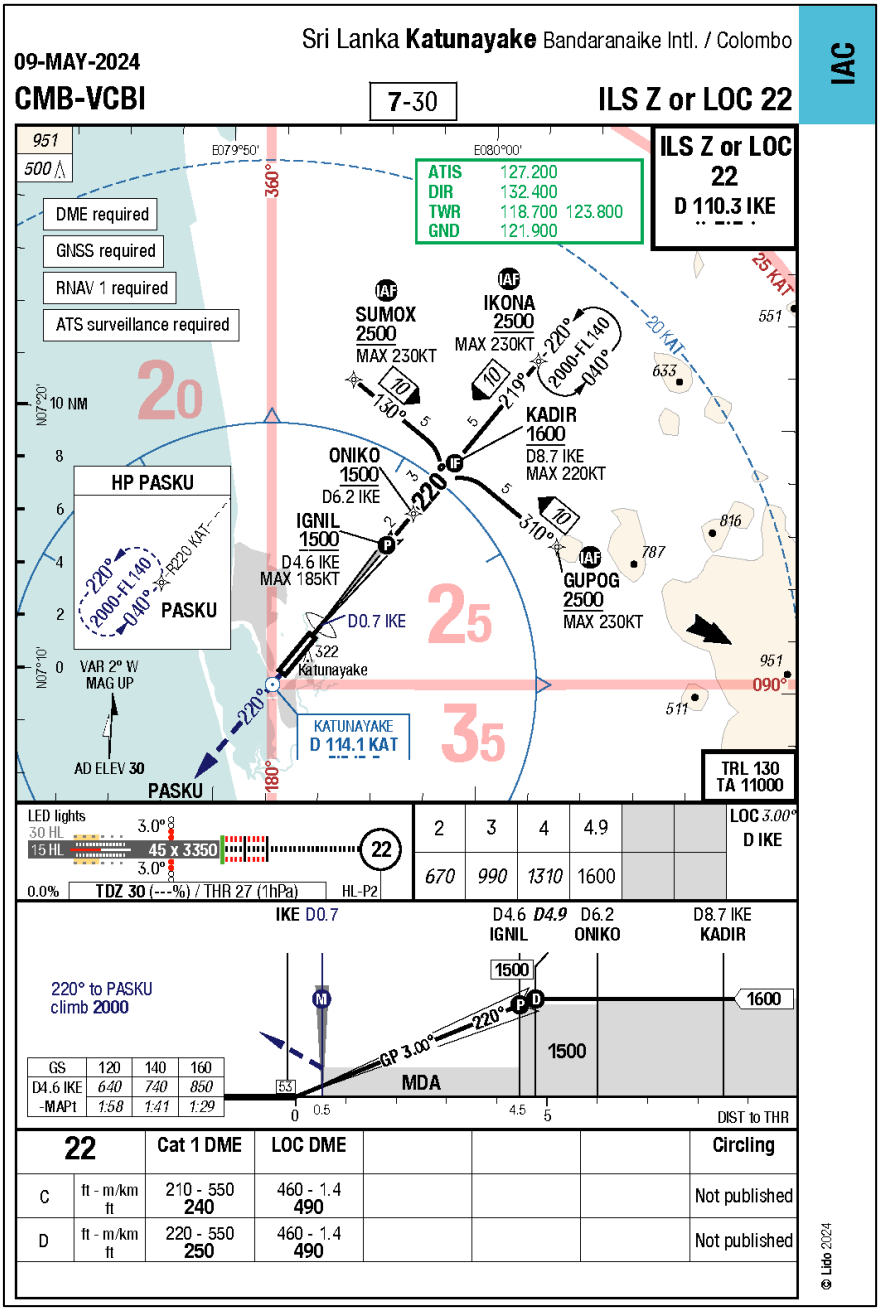


Figure 10– VCBI ILS Approach Chart for Runway 22

1.9 Communications

The flight crew had standard communication with Colombo Director on VHF 132.40 MHz until establish final approach and then transferred to Colombo Tower on VHF 118.70 MHz.

1.10 Aerodrome information

Airport type : International
Owner : Government of Sri Lanka
Operator : Airport and Aviation Services (Sri Lanka) (Private) Limited (AASL)

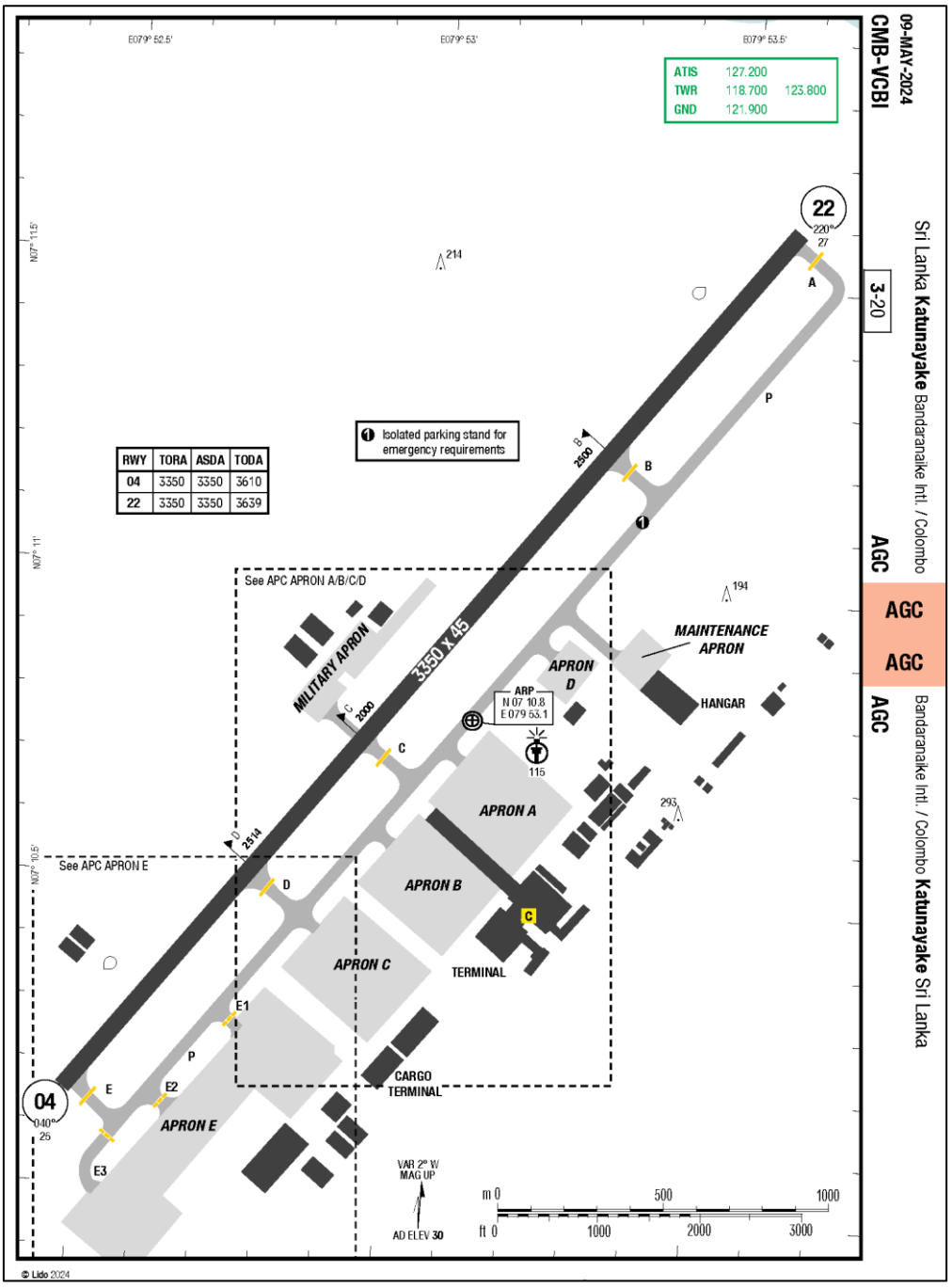


Figure 11 - Bandaranayake International Airport Chart

1.11 Flight recorders

CVR and DFDR raw data files were available and shared with BEA, France to obtain the decoded data readouts and analysis for the investigation.

However, initial CVR raw data file was found to be corrupted as conveyed by the BEA-France, and was subsequently shared with NTSB as recommended by BEA. The NTSB also confirmed that same CVR data file was un-recoverable. Later, the operator provided recovered CVR decoded data file through Honeywell (OEM).

Decoded data readouts, graphical representations, and a detailed analysis report of the DFDR data were obtained from the BEA-France for this investigation.

1.12 Wreckage and impact information

Nil

1.13 Organizational and management information

SriLankan Airlines, the national carrier of Sri Lanka, operates a fleet comprising Airbus A330 and Airbus A320 aircraft. The airline is responsible for ensuring safe flight operations in compliance with regulations. Its main hub is located at Bandaranaike International Airport, Katunayake, Sri Lanka.

1.14 Additional information

Nil

1.15 Useful or effective investigation techniques

A330 simulator session was conducted to understand the incident scenario to the investigators and evaluate the aircraft position in relation to runway during touchdown and of crew response according to the situation.

Investigations conducted as per the procedures and techniques laid down in Aircraft accident and incident investigation procedures Manual of CAASL.

2 ANALYSIS

The investigation looked into the following:

(a) Handling of the aircraft,

(b) Weather condition over the aerodrome,

(c) Decision to continue landing without “go-around”,

(d) Failure of leadership and crew resource management,

(e) Flight crew failure to report incident, and

(f) Runway inspection after incident.

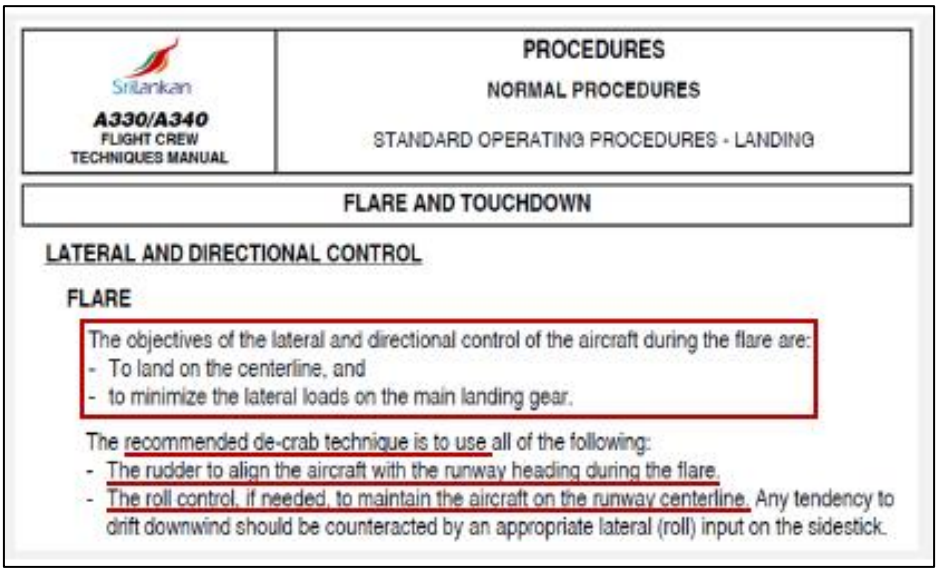
2.1 Handling of the aircraft

Initial stage of the final approach, the autopilot was engaged and was maintaining the aircraft on the extended runway centreline. At approximately 390ft RA, the flight crew voluntarily disengaged both APs via the sidestick instinctive pushbutton. Then final approach was manually handled by the First Officer (PF) with the A/THR active in SPEED mode.

After the autopilot was disengaged, when the aircraft was about 150ft RA, PF applied several left and right roll orders with a left roll tendency, leading the roll angle to increase up to a maximum of -3.5° (left roll): the roll angle was thus mainly a left roll in the last 10 seconds before touchdown. The left roll angle maintained for 10 seconds, associated with the crosswind reversion, initiated a localizer deviation to the left of the runway centreline.

Approximately 20ft RA, most probably to counter the left deviation, the flight crew applied a rightward pedal order up to half of full deflection (crab action). However, the rightward pedal inputs applied by PF was not sufficient to arrest the leftward drift of the aircraft. This rightward rudder pedal order (crab action), associated with the crosswind reversion, led the drift angle to increase (aircraft nose toward the right of the track) prior to touchdown.

As recommended in the Flight Crew Techniques Manual (FCTM), the rudder should be used during the flare to align the aircraft with the runway heading (decrab technique) and the roll control should be used, if needed, to maintain the aircraft on the runway centreline. According to the aircraft manufacturer's operational and safety documentation, the right technique to correct minor lateral deviation during approach is to apply small amount of roll input. In this case, the flight crew should have applied more right roll input instead of right rudder input. Applying rudder input is not an appropriate method to correct lateral deviations.


SriLankan
A330/A340
FLIGHT CREW
TECHNIQUES MANUAL

PROCEDURES
NORMAL PROCEDURES
STANDARD OPERATING PROCEDURES - LANDING

FLARE AND TOUCHDOWN

LATERAL AND DIRECTIONAL CONTROL

FLARE

The objectives of the lateral and directional control of the aircraft during the flare are:
- To land on the centerline, and
- to minimize the lateral loads on the main landing gear.

The recommended de-crab technique is to use all of the following:
- The rudder to align the aircraft with the runway heading during the flare,
- The roll control, if needed, to maintain the aircraft on the runway centerline. Any tendency to drift downwind should be counteracted by an appropriate lateral (roll) input on the sidestick.

Figure 12 - Extract of FCTM PR-NP-SOP-250 FLARE AND TOUCHDOWN

As mentioned in Section 1.1, the PF had tried to land without success to prevent the aircraft from continuing to drift towards the left edge of the runway. The aircraft touched down at approximately 250m after the runway threshold with the left main landing gear on the runway shoulder (out of runway) and with the right main landing gear still on the runway. The runway was recovered (all main landing gears were on the runway) around 700m after threshold and the runway centreline was recovered around 900m after threshold (Shown in Figure 6).

2.2 Weather condition over the aerodrome

The aircraft was flying through light rain during the final approach. The PIC (PM) confirmed that according to the ATC information wind was calm, light rain was prevailing and runway condition was wet. According to the PF, due to light rain visibility was around 05-06 km and they requested to increase the intensity of runway lights on finals. Both PF and PM (PIC) explained that they understood wind was veering and during touchdown it was from the right.

According to ATC, they should inform pilots of the prevailing weather if it has changed significantly from the last observed or broadcasted over ATIS. From the duty controller's point of view, there was no significant change in weather conditions, so she did not inform the flight crew of the conditions over the aerodrome during final approach.

According to the flight crew, they were not affected by the prevailed light rainy condition and however, associated with the crosswind reversion from left to right, left roll input applied by PF, initiated a left roll dynamics and lead to an increased localizer deviation to left (The aircraft deviated to the left of the runway centreline).

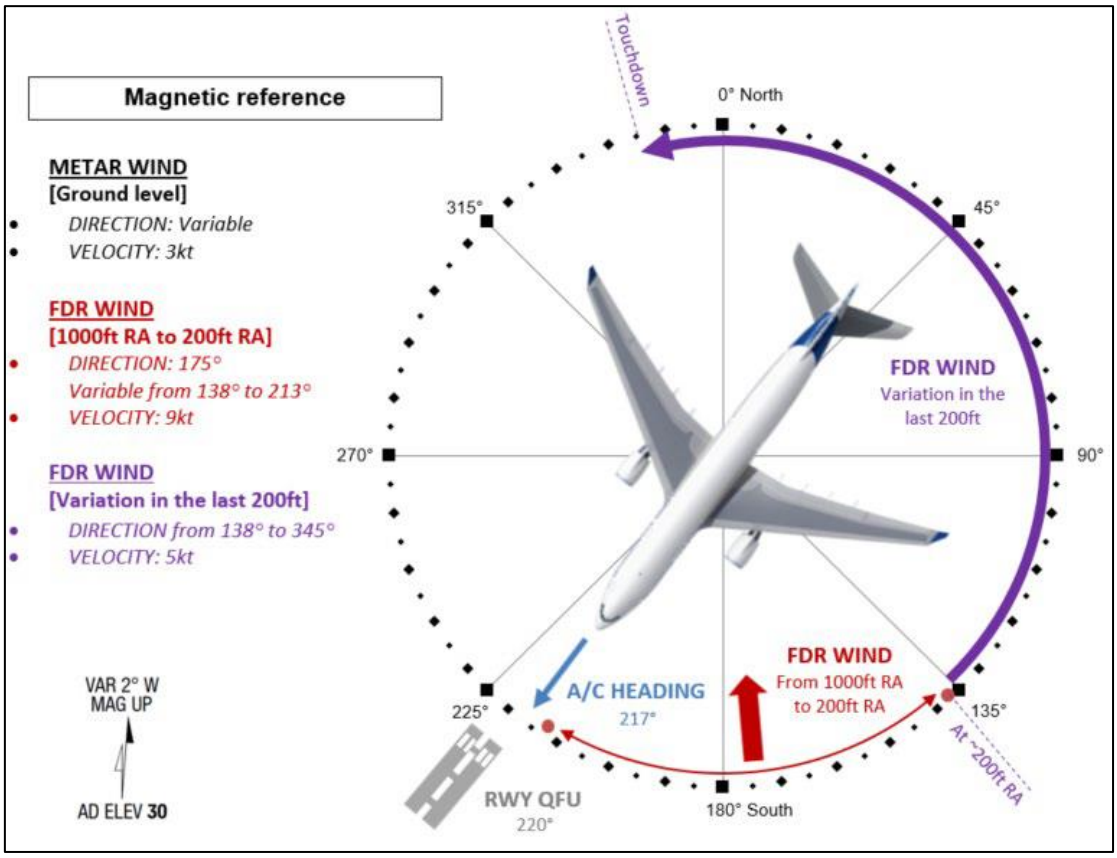


Figure 13 - Wind conditions sum-up (Source: Flight Data Recorder)

2.3 Decision to continue landing without "go-around"

Before the aircraft flare-out (approximately 50ft RA) and noting that the aircraft was still drifting, the PM (as the PIC) should call out "go-around". The PIC stated the investigation team that he knew the aircraft was not aligned with runway centreline, but he observed that the PF had applied flight inputs to correct the mis-alignment. Further, both flight crew members were in perception that deviation from the extended runway centreline was still acceptable for safe landing.

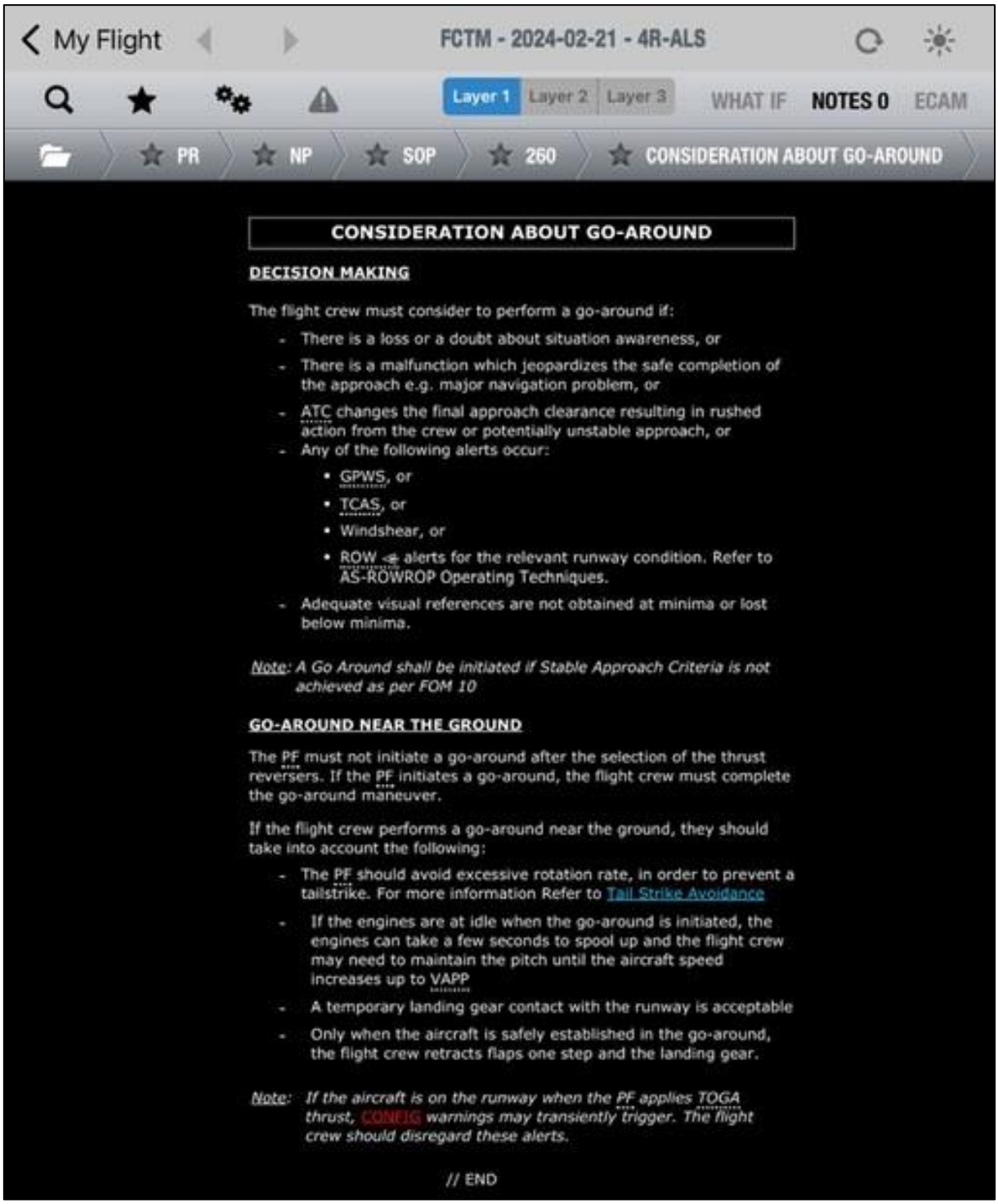


Figure 14 - Extract of FCTM CONSIDERATION ABOUT GO-AROUND

The investigation team conducted a simulation test (on A330 flight simulator) applying the conditions prevailed during incident and it was observed that after realising the aircraft deviation to the left of centreline, flight crew had enough time to carryout safe go-around without continuing to land. As recommended in the FCTM for CONSIDERATION ABOUT GO-AROUND, failure to recognise the need and to execute go-around, is a major cause of approach and landing accidents/incidents.

Flight crew shall perform a go-around where the pilot feels uncomfortable or unsafe to continue the landing, especially if the aircraft is not on the correct glide path or localizer during the final approach (un-stabilized approach). According to the manufacture's Safety First Article for Preventing Lateral Runway Excursions Upon Landing: Best Operational Practices, emphasized followings;

a. Be aware of the landing conditions,
b. Be go-around minded, as long as needed,
c. Be stabilized until the flare. If not, go-around,
d. As long as reversers are not selected, a go-around is always possible.

During post incident interview, both pilots confirmed that they didn't consider go-around at any stage on final approach. The investigating team in the opinion that PM as PIC should have initiate the go-around with better situational awareness assessment which may hindered by Continuation Bias (the unconscious cognitive bias to continue with the original plan in spite of changing conditions).

2.4 Failure of leadership and crew resource management

The flight crew's decision to continue landing without fully understanding situation does not accord with good cockpit resource management (CRM) practices. Pilots are trained to communicate openly and assertively. CRM training emphasizes teamwork and effective communication in the cockpit. Pilots are trained to work collaboratively and respect each other's opinions, promoting a culture where all crew members feel comfortable voicing concerns.

The PIC is directly responsible for safe operation of aircraft. In this incident, the PIC as the PM should have to voice out any safety concerns to PF and response immediately to deal with the situation. According to the CVR analysis, there was no any call out from the PM ('Localiser' or 'centreline' or 'deviating left') to remind the PF to align the aircraft with the extended runway centreline.

Pursuant to the Section 2.4 of Implementing Standard (SLCAIS) 026 issued in compliance with ICAO Annex 2, the PIC of an aircraft shall have final authority as to the disposition of the aircraft while in command. Therefore, PIC should maintain awareness of all aspects of his flight including the changing and dynamic flight environment in which he operates. Using SOP and CRM skills ensures that the procedures in place are followed in order to face every flight phase as predicated and minimize risk of errors, as well as mitigate any threat that might arise.

Investigation team in the opinion that poor situational awareness, ineffective communication, combine with cognitive biases of both flight crew had led to poor decision making. Further, maintain of lower authority gradient (democratic style) and/or inadequate leadership of PIC had led to his blurred responsibilities and slower decision making.

2.5 Flight crew failure to report incident

After the incident, the aircraft was taxied in and parked at the designated parking bay at VCBI by flight crew and during maintenance inspection duty technician had observed four tires of the left MLG had been damaged. Thereafter, an occurrence report was submitted by SriLankan Engineering to CAASL, but there was no pilot report available.

During investigation both flight crew were questioned regarding non reportage the incident and both pilots stated that they did not have any indication for any system failure during landing roll and during taxi and as they considered that it was a normal landing, they did not deem it necessary to report. However, both PIC and FO indicated that they were aware of the operator's occurrence reporting requirement. This indicted that both pilots were on degraded situational awareness (unknowing the severity of incident) or intentionally evasion of reporting the incident.

Safety information that is provided from the flight crew has the potential to be highly descriptive and contextualised to the perspective of the front-line operator, aiding the identification and interpretation of hazardous conditions that may be present in the system.

The Investigating Team reviewed the Final Investigation Report issued by the Transport Safety Investigation Bureau of Singapore concerning a similar incident that occurred on 21st March 2019 at Changi International Airport involving an A320 aircraft operated by SriLankan Airlines. It was highlighted that, during that incident flight crew also had failed to report the incident and they did not deem it necessary to file an occurrence report.

Therefore, as a front-line operator, SriLankan Airlines should ensure a safe and open reporting culture withing organization by complying to regularity requirements since, each incident is a learning opportunity and an opportunity to improve safety in the operational environment.

2.6 Runway inspection after incident

After observing the damages to all four tyres on left MLG, SriLankan Engineering Department has informed Apron Control Supervisor regarding the incident. Approximately 0015 hrs (0545 Local), around 35 minutes after the landing, initial runway inspection was carried out on runway 22 touchdown area and no any observation were made. During this inspection they were limited to runway 22 touchdown zone (around runway 22 centreline) as they were informed of a suspected tyre burst had occurred during landing.

During the subsequent inspection approximately at time 0555 Local, they found that four runway edge lights on left side of runway 22 were damaged and some tyre derbies were on the edge of the runway 22 landing zone. The transmission of inaccurate information from the source (SriLankan Engineering Department), about the tyre damage, caused the inspection team to focus on a potential tyre burst, leading them to overlook Foreign Object Debris (FOD) during the initial inspection.

Therefore, the damaged runway edge lights and tyre derbies posed a FOD hazard other aircraft used the runway 22 until it was detected.

3 CONCLUSION

3.1 Findings

a. Flight crew had valid licence.

b. Aircraft had valid certificate of Airworthiness and Certificate of Registration.

c. Flight crew were adequately rested before the flight.

d. At 1000 ft AGL aircraft was correctly on the runway 22 ILS path with autopilot engaged in glide slope (vertical) and localizer (lateral) modes. During approach flight crew were experienced light rain and visibility has reduced to 5 to 6 km.

e. At approximately 390ft RA, the flight crew voluntarily disengaged AP and since then final approach was manually handled by the FO.

f. After autopilot was disengaged during the approach, the aircraft drifted towards the left of the centreline. This was the cumulative effect of a series of left roll inputs from the PF and the reversing of crosswind component from left to right.

g. The PF's attempt to correct the aircraft's drift by applying rudder inputs was not an appropriate method to correct lateral deviations and therefore he did not manage to correct the leftward drift to bring the aircraft back to the runway centreline.

h. The PM (PIC) did not advice the PF regarding the deviation and did not took over controls to correct it, however PIC inquired FO after landing.

i. Both flight crew members did not consider a go-around since, they were in perception that deviation from the extended runway centreline was still acceptable for safe landing.

j. The aircraft touched down to the left of the runway centreline with the left MLG on the runway shoulder (out of runway) and with the right MLG still on the runway.

k. During the landing roll four (04) runway edge lights were damaged and crew managed to recover aircraft (all main landing gears were on the runway) around 700m after threshold.

l. During post flight inspection maintenance technician has found that four tyres of left MLG was damaged.

m. The flight crew did not report the deviation or drift experienced during landing, even though they claimed to be unaware of the damage caused to the aircraft.

n. Inaccurate description of the damage (suspected tyre "burst" instead of tyre "damage") communicated to ATC.

o. The initial runway inspection had failed to find any debris due to inaccurate information received from the source.

3.2 Probable Cause

The probable cause is the flight crew's decision to land the aircraft without initiating a go-around by misjudging the magnitude of the left deviation from the runway centre line.

The contributing factors are;

a. Improper application of flight control inputs by PF and the reversing of crosswind component from left to right,

b. Lack of flight deck leadership of PIC and poor situational awareness and decision making by flight crew which was triggered by incorrect perception and cognitive biases.

4 SAFETY ACTIONS

(a) Following training were recommended to the flight crew as immediate safety recommendations by the investigation team.

(i) SMS refresher training including incident reporting and company safety culture,

(ii) PIC responsibilities in respect to the decision making (for the PIC),

(iii) Refresher CRM training,

(iv) A refresher simulator (A330) training programme which shall include the following areas, and the training programme is required to be submitted to the CAASL for prior approval.
   a. Approached with significant wind variations
   b. Cross wind landings/take-offs
   b. Decision making on landings off the runway centre line

(b) Upon completion of the above, both flight crew were recommended for two route checks.

The aircraft operator completed recommended training/flight checks and the evidence was subsequently evaluated by the investigation team.

5 SAFETY RECOMMENDATIONS

(a) It is recommended that the aircraft operator to:

(i) Share a de-identified summary of the event with all pilots during their annual CRM session to enhance their situational awareness, leadership and decision making in challenging flight environments.

(ii) Review training policies and procedures to enhance the effectiveness of the role of the PM in identifying and verbalising situations where an approach becomes destabilised.

(iii) Remind its pilots during their technical training, the appropriate technique to correct lateral deviation during approach and landing and executing go-around where an approach becomes destabilised even at low levels.

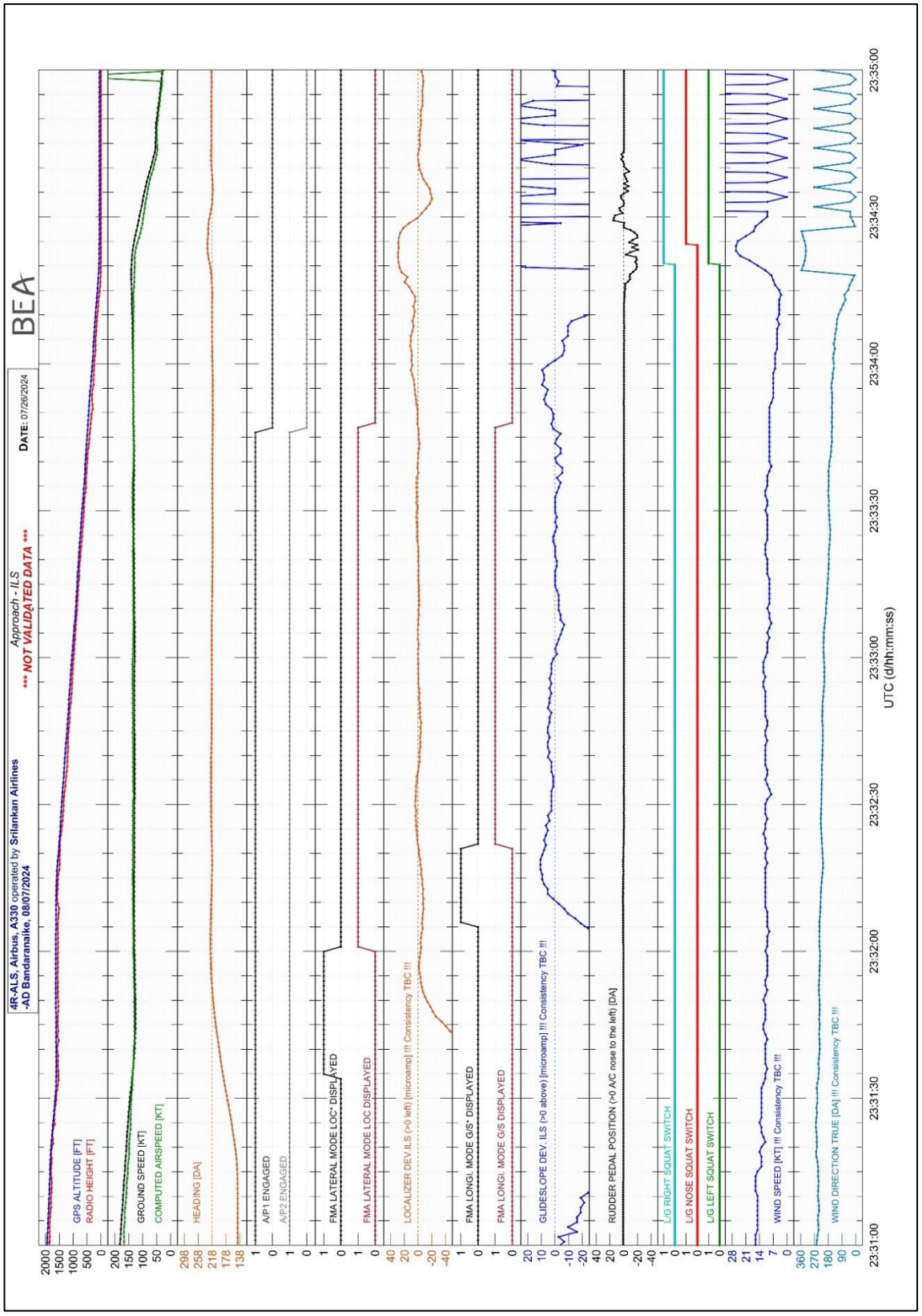
(b) The aircraft operator shall make necessary arrangements to ensure that flight crew submit all occurrence reports directly to the CAASL via the online reporting portal established by the CAASL, while copying the same report to the Corporate Safety Section of the airline within the stipulated timeframe.

(c) The aircraft operator shall verify and confirm the extracted and preserved data from flight data recorders before sharing it with the CAASL.

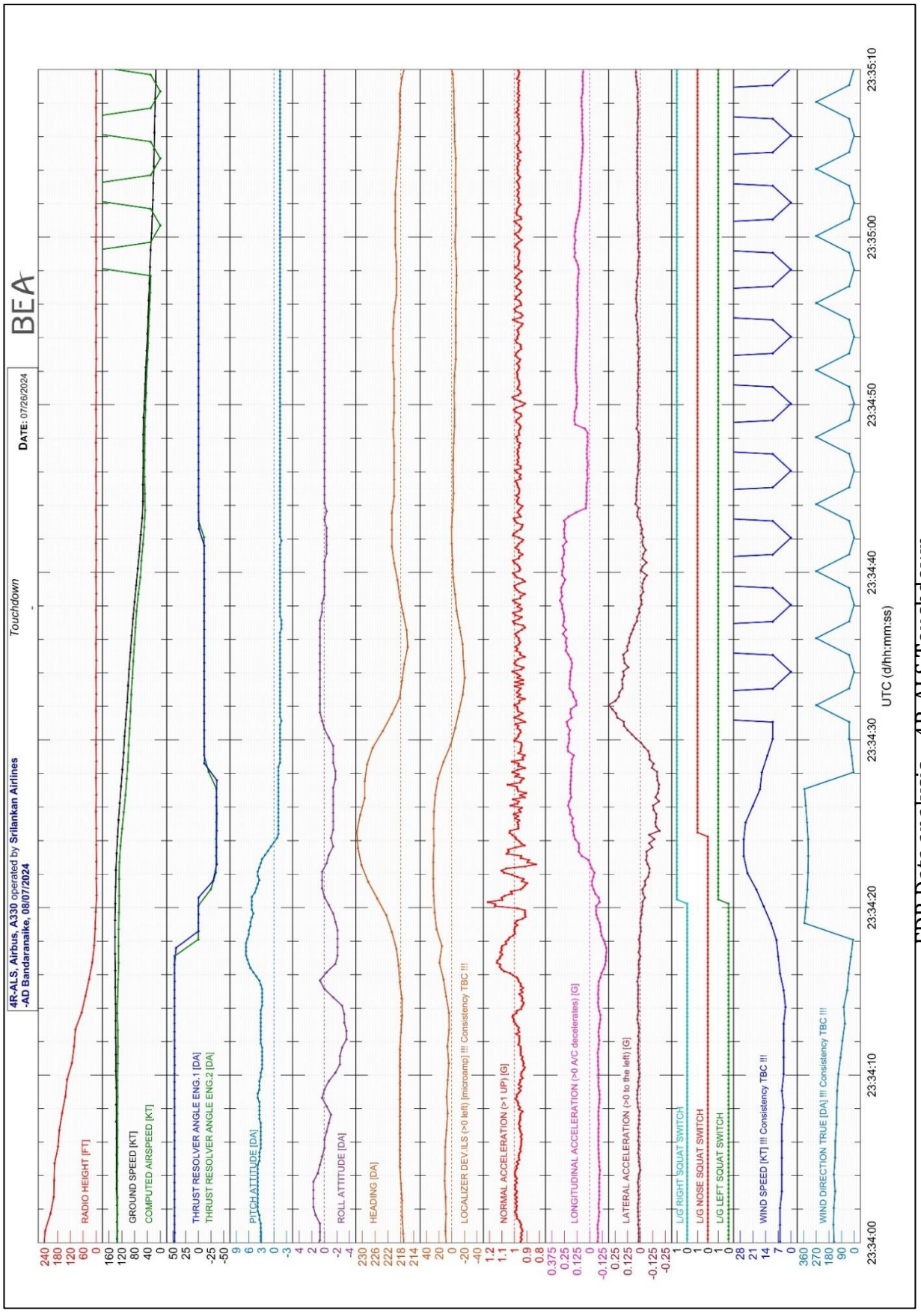
(d) The aircraft operator shall establish a streamlined process to ensure the timely notification of accurate information to the ATC and Aerodrome Operator, enabling them to conduct required post-inspections effectively.

APPENDICES

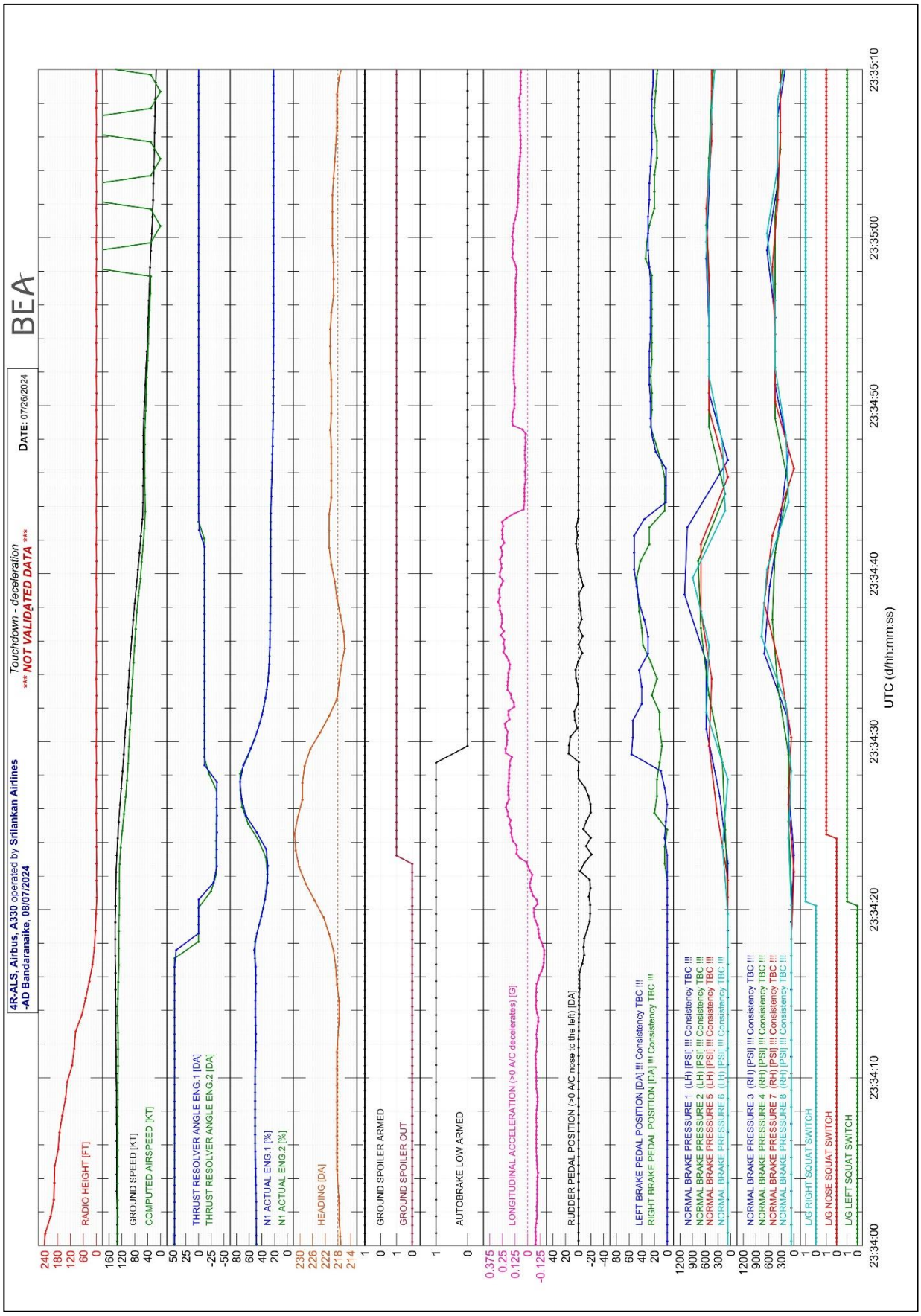
Appendix A: FDR Data analysis by BEA, France



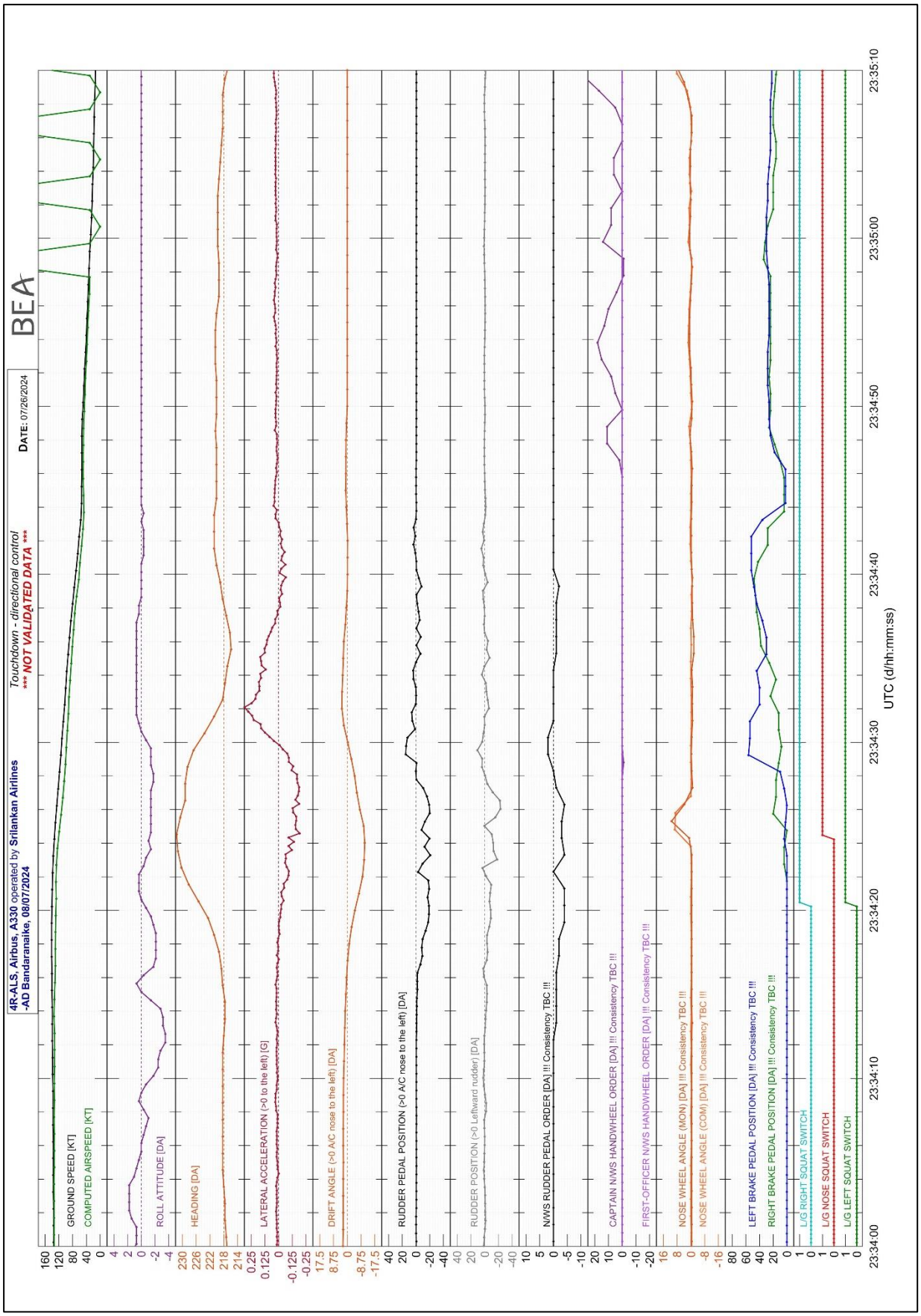
FDR Data analysis – 4R-ALS Final approach



FDR Data analysis – 4R-ALS Touchdown



FDR Data analysis – 4R-ALS Touchdown deceleration



FDR Data analysis – 4R-ALS Touchdown directional control