



## **FINAL REPORT**

**Incident of lateral runway deviation of SriLankan Airlines Flight UL707, Airbus Industries A320-214, bearing registration 4R-ABN during landing at Seychelles International Airport, Seychelles on 17<sup>th</sup> December 2022.**

Released by the Civil Aviation Authority of Sri Lanka



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### List of Acronyms & Abbreviations

AAIB	-	Aircraft Accident Investigation Bureau
AP	-	Auto Pilot
ATC	-	Air Traffic Control
ATPL	-	Airline Transport Pilot Licence
BEA	-	Bureau of Enquiry and Analysis for Civil Aviation Safety
CAASL	-	Civil Aviation Authority of Sri Lanka
CVR	-	Cockpit Voice Recorder
DGCA	-	Director General of Civil Aviation
DFDR	-	Digital Flight Data Recorder
DME	-	Distance measuring equipment
EASA	-	European Union Aviation Safety Agency
FC	-	Flight Cycle
FCOM	-	Flight Crew Operating Manual
FCTM	-	Flight Crew Training Manual
FH	-	Flight Hours
FL	-	Flight Level
FSIA	-	Seychelles International Airport, Seychelles
Ft	-	feet
hrs	-	hours
ILS	-	Instrument landing system
MET	-	Meteorological / meteorology
MOR	-	Mandatory Occurrence Report
MSN	-	Manufacturer Serial Number
PAPI	-	Precision approach path indicator
PF	-	Pilot Flying
PIC	-	Pilot in Command
PM	-	Pilot Monitoring
RVR	-	Runway visual range
SLA	-	SriLankan Airlines
SOP	-	Standard Operating Procedures
UTC	-	Coordinated Universal Time
VCBI	-	Bandaranaike International Airport, Katunayake, Sri Lanka





**Incident of lateral runway deviation of SriLankan Airlines Flight UL707, Airbus Industries A320-214, bearing registration 4R-ABN during landing at Seychelles International Airport, Seychelles on 17<sup>th</sup> December 2022**

## 1. Synopsis

The incident was notified to the Civil Aviation Authority of Sri Lanka by the Flight Safety Section of Sri Lankan Airlines on 17<sup>th</sup> Dec 2022, via phone and then email. Subsequently, a Mandatory Occurrence Report (MOR) was received by this office.

On reviewing the MOR, the Authority appointed an Aircraft Accident Investigation Board (AAIB) to investigate this incident with a view to prevent the recurrence of similar events in the future.

The investigation team notified the incident to the CAA-Seychelles being the State of Occurrence, 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 the International Civil Aviation Organization (ICAO) as per the requirement stipulated in Section 4.1 of ICAO Annex 13.

The Bureau of Enquiry and Analysis for Civil Aviation Safety (BEA- France), appointed an investigator as an accredited representative, an adviser from Airbus and an adviser from EASA to assist in the investigation. The AAIB obtained an expertise to decode the DFDR information and analysis of flight parameters at the time of the incident.

### 1.1 Objective

The objective of this investigation is to prevent the recurrence of similar incidents in future.

## 2. Factual Information

Operator	:	SriLankan Airlines Ltd Airline Centre, Bandaranaike International Airport Katunayake, Sri Lanka
Registered Owner	:	ALC A320, 4869, LLC. United State of America
Aircraft Make and Model	:	Airbus, A320 -214 (MSN 4869)
Aircraft Nationality	:	Sri Lanka (4R)
Aircraft Registration	:	4R-ABN
Place of Incident	:	Runway 31 at Seychelles International Airport (FSIA)
Date and Time	:	17 <sup>th</sup> December 2022 ;
Time	:	approx. 01:24 UTC : 05:24 Local Time ; Night time
Local time zone	:	+ 0400hrs

### 2.1 History of Flight

SriLankan Airlines aircraft, Airbus A320 bearing the registration 4R-ABN was a scheduled flight from Bandaranaike International Airport, Katunayake, Sri Lanka (VCBI) – Seychelles International Airport, Seychelles (FSIA) –VCBI at 2100UTC on 16<sup>th</sup> Dec 2022.

The flight departed from VCBI at 2110UTC on 16 Dec 2022. The flight had been uneventful until the approach into FSIA. During the approach, the ATC tower of FSIA had cleared UL 707 for FSIA TILOM-1E arrival for ILS Z approach Runway 31. At this time the PIC was pilot flying (PF) and the First Officer was Pilot Monitoring (PM). As per the flight crew weather had been prevalent throughout the final approach path, and they had fully configured the aircraft to fly through the weather on approach.





On the first approach, at around 700ft just prior to minima, PF had disconnected the autopilot and continued the approach. However, the PAPI had indicated three whites and thereafter four whites which the first officer had called out, and called “*unstable go around*”. Subsequently, the PF had initiated the go around.

On the second approach, the ATC tower had cleared UL 707 to PETER and ILS Z31. At around 400ft the aircraft had deviated from the centerline and had been corrected while the first officer also called it out. Flight UL 707 had continued on profile till flare height. During the flare, the aircraft had drifted to the right side just prior to touchdown. The first officer had called “Go around”. As the aircraft was already touching down right of the center line, the PIC had landed the aircraft and brought the aircraft to the centerline and stopped the aircraft on the runway. Flight UL 707, 4R-ABN had experienced a lateral runway deviation at landing after an ILS approach to runway 31 at FSIA on 17<sup>th</sup> Dec 2022.

## 2.2 Injuries to Persons: Nil

## 2.3 Damage to Aircraft: Nil

## 2.4 Other Damages: there were damages to the two runway edge lights.

## 2.5 Personnel Information:

### 2.5.1 Pilot-In-Command (PF)

Licence : Valid ATPL (CAASL-72-A-10312) issued by the DGCA Sri Lanka

Age : 56 yrs, Male

Aircraft Ratings with issued dates:

A320 issued on 05<sup>th</sup> Sept 2008

A340 issued on 08<sup>th</sup> Aug 2009 (expired)

A330 issued on 05<sup>th</sup> June 2010

Flying experience:

Total: 18300+ hrs

Total P1: 11000+ hrs

Total P1 on A320: 3000+ hrs

### 2.5.2 First Officer (PM)

Licence : Valid ATPL (CAASL-72-A-10533) issued by the DGCA Sri Lanka

Age : 33 years, Male

Aircraft Ratings : A320 issued on 17<sup>th</sup> July 2017

A330 issued on 14<sup>th</sup> May 2019

Flying Experience : Total: 3854:54 hrs

Total P2: 3584:08 hrs

Total P2 on A320: 1712:07 hrs

## 2.6 Aircraft Information

Type and Model : Airbus A320-214

Manufacturer's Serial No. : 4869

Certificate of Registration : No 241, Registered in Sri Lanka Civil Aircraft Register





Certificate of Airworthiness : No 193 and valid till 24<sup>th</sup> October 2023.

Total Airframe Hours : 38602.59 FH/ 14520 FC (as at 17<sup>th</sup> Dec 2022)

No. of Engines & Type : 02 numbers, CFM56-5B4/3

Engine	Serial Number	Total Cycles	Total Hours
No. 1	643679	38602.59	14520
No. 2	643694	38602.59	14520

Weight and Balance : The aircraft was properly loaded.

## 2.7 Meteorological Information:

- a) During final approach, the aircraft had experienced gusty wind conditions. The METAR/SPECI around time of event was as follows;

METAR/SPECI from FSIA, Seychelles Inter-National Airport (Seychelles)
METAR FSIA 170200Z 27015G28KT 220V310 8000 -SHRA FEW010 FEW015CB BKN018 25/22 Q1008 RESHRA TEMPO 5000 SHRA= <b>SPECI FSIA 170135Z 28013G24KT 230V330 5000 +SHRA FEW010 FEW015CB BKN018 24/22 Q1008 TEMPO 3000=</b> METAR FSIA 170100Z 30013G24KT 270V330 8000 SHRA FEW010 FEW015CB BKN018 25/23 Q1008 TEMPO 5000=

(source: ogimet.com)

- b) SPECI published approx. 11 minutes after the event was as follows;

Wind	Direction : 280 <sup>0</sup> with variation between 230 <sup>0</sup> and 330 <sup>0</sup>
Speed	13kt with gusts at 24kt
Sky condition	Visibility : 5000m Clouds: cloud coverage was few at 1000ft and 1500ft (cumulonimbus) and broken at 1800ft
Temperature	+24 <sup>0</sup> C with dew point at +22 <sup>0</sup> C QNH: 1008hPa
Weather	Heavy rain showers Temporarily visibility of 3000m

- c) Wind reconstruction during the event

As per the report received from BEA, France a specific wind reconstruction was computed by the Aircraft Manufacturer to determine the influence of the wind on the aircraft behavior during short final approach. The wind reconstruction had been computed on runway 3 axes, based on Anemometric and Inertial data from FDR; Anemometric correction: estimation of sideslip and ground effects and inertial bias reconstruction.





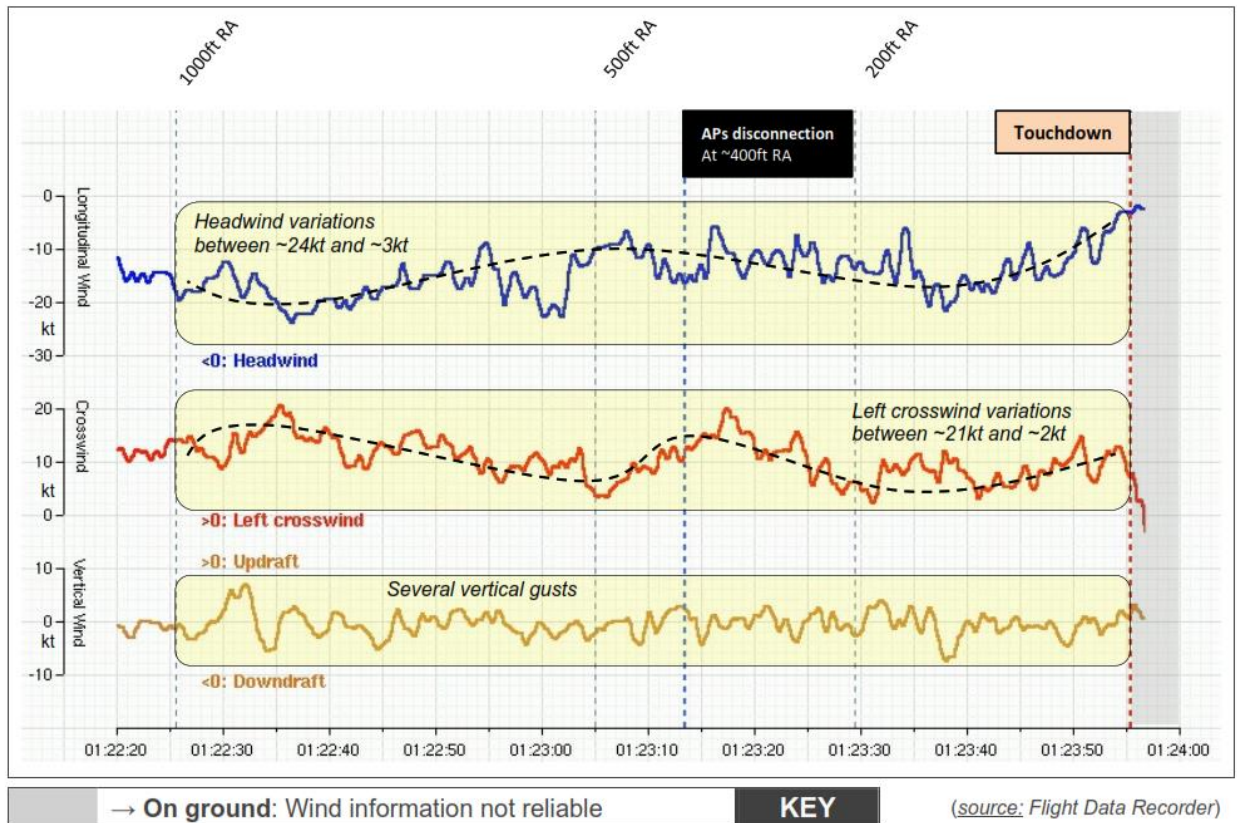


Figure 01: Reconstructed wind along the runway axes

Accordingly, the reconstructed longitudinal, lateral and vertical wind evolutions highlight below;

Between 1000ft RA (01:22:26 UTC) and touchdown (01:23:55 UTC), the average wind comes from 265° at 20kt (with variations up to 33kt):

- Headwind component varied between ~24kt and ~3kt.
- Left crosswind component varied between ~21kt and ~2kt.
- Several vertical gusts were encountered.

According to the DFDR analysis report, all available weather information sources are consistent and highlight gusty wind conditions during final approach and landing. When considering a wet runway, the most restrictive crosswind is 20kt according to FCOM Limitation. Thus, the crosswind experienced by the aircraft in the last feet (~10kt) was compatible with the landing.

## 2.8 Aids to Navigation:

Runway 31 is equipped with a standard simple approach light system (ALS), runway threshold identification lights (RTIL), and edge lights. The ILS and PAPI glideslope are not aligned, and the ILS Glide path antenna is not located at the same location. This information is published in GEN 1.7.2 of the AIP of Seychelles notifying as a difference.

## 2.9 Communication:

The flight crew had standard communication with FSIA ATC via VHF 118.3 MHz throughout the landing. The investigation team obtained the ATC transcript from the CAA –Seychelles.





## 2.10 Aerodrome Information:

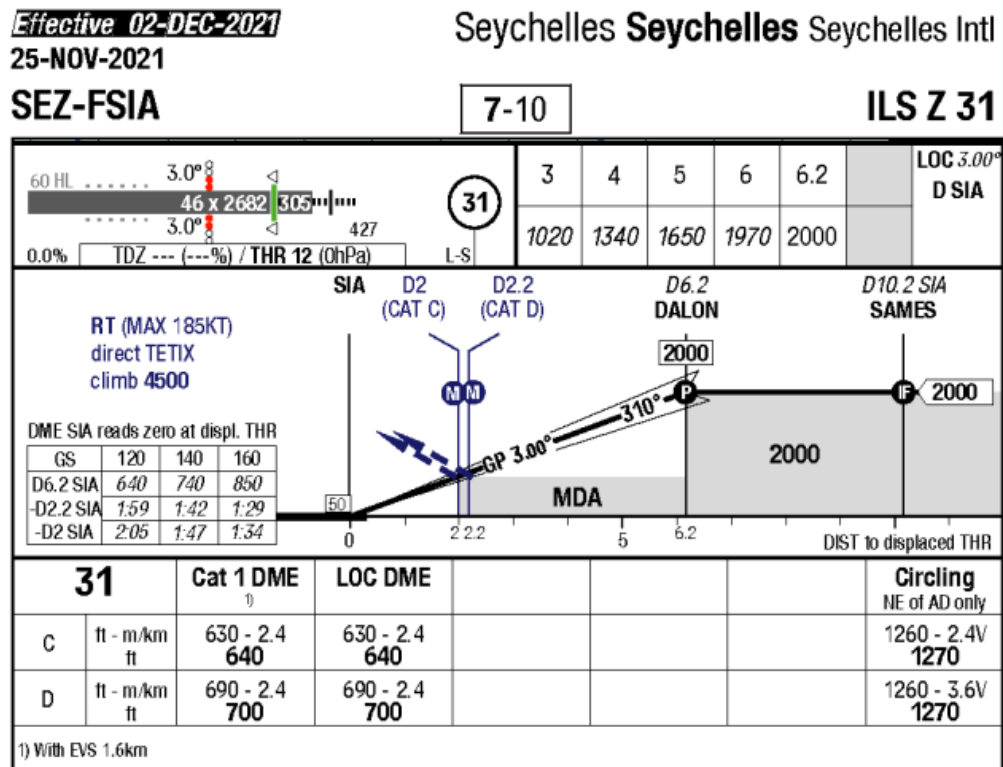


Figure 02: Approach Chart at Seychelles International Airport



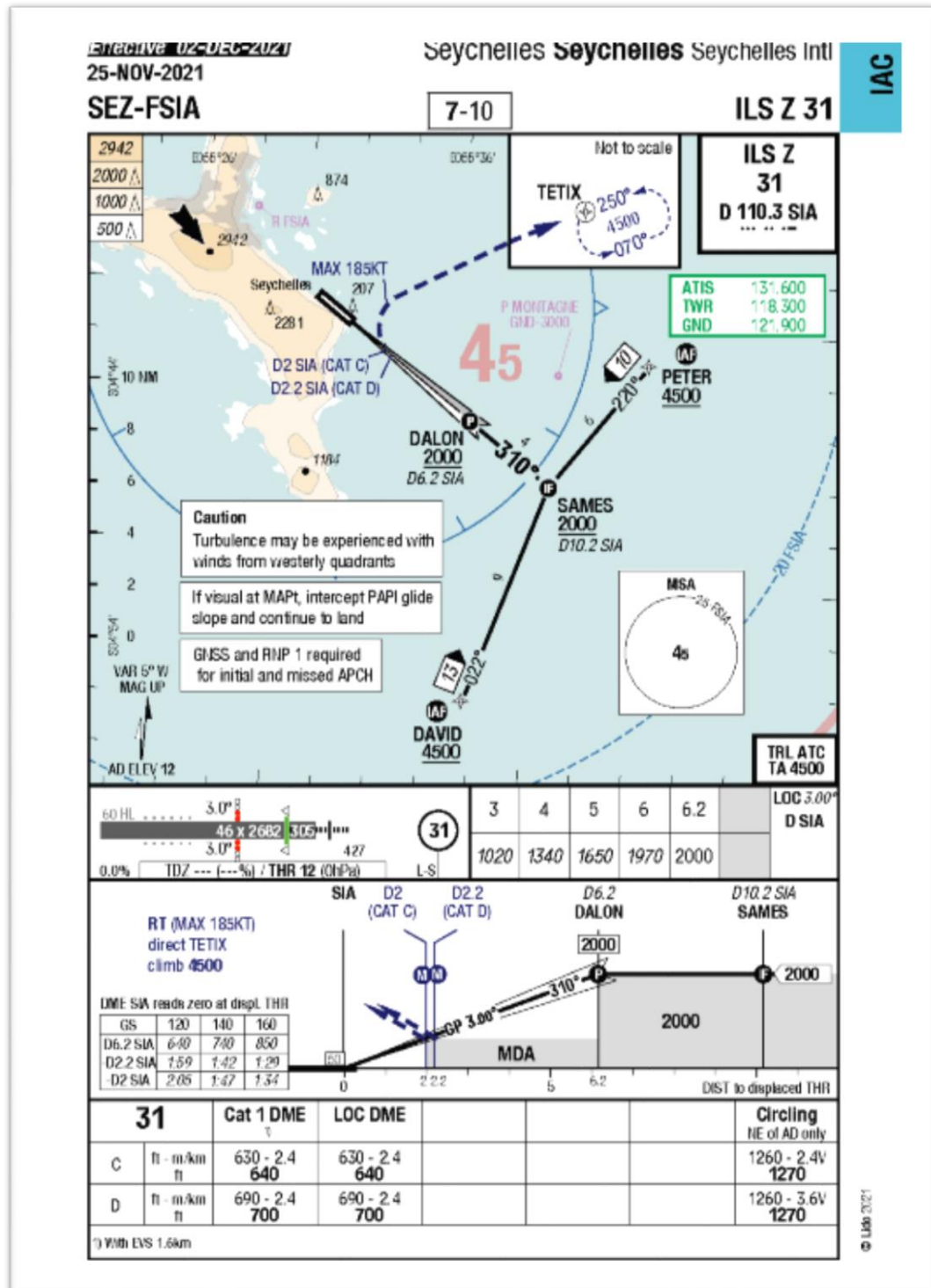


Figure 03: Approach Chart – Rwy 31 – FSIA

The approach chart of ILS Z 31 indicates that the runway is equipped with ILS DME CAT1 and the Glide slope at 3°.

The minima are:

- DH 630ft (DA 640ft).
- RVR 2.4km.

Based on DFDR, the runway used was 31 at Seychelles international airport (FSIA).

Runway 31 characteristics are as follows;

- QFU 310°.



- Length 2682m and a displaced threshold of 305m.
- Width 46m.
- Elevation 12ft.

## 2.11 Flight Recorders:

The CVR data was not able to extract aftermath of the incident due to inability to ship spare CVR to the location, as the Air Operator has stopped operation into FSIA with this flight. The possibility of downloading CVR after returning to VCBI was not successful due to 2hrs memory limitation.

The DFDR data was available and shared with BEA - France to obtain the decoded data readouts for the investigation.

## 2.12 Wreckage and impact information

There were no damage to the aircraft. However, during post incident inspection carried out by FSIA authorities had confirmed that two runway edge lights on right side of the runway had blown off.

## 2.13 Organizational and Management Information

### 2.13.1 The Air Operator

SriLankan Airlines, the national carrier of Sri Lanka was launched in 1979. The Airline currently operates a fleet of Airbus 330 and Airbus 320 aircraft.

The Airline operates to 36 destinations in 21 countries from its main hub located at Bandaranaike International Airport, Katunayake, Sri Lanka. This flight from VCBI to FSIA was the last flight prior to termination of operation of sector VCBI- FSIA.

### 2.13.2 The Aerodrome

The Seychelles International Airport (FSIA) is the main airport of the Seychelles Islands located on Mahe, in the capital city of Victoria. It has two terminals – international terminal accommodating international flights and the domestic terminal which offers inter-island flights daily. The airport is managed by the Seychelles Civil Aviation Authority (SCAA) which is the regulatory body for aviation in the Seychelles.

## 3. Analysis

The following analysis is from the DFDR analysis report received from BEA and excerpts from the Analysis Report have been included in this Final Report.

### 3.1 Flight Operation

The flight UL 707 which was flying to Seychelles International Airport (FSIA), Seychelles had proceeded for an ILS approach to runway 31 (QFU 310°). As per the DFDR data, at the initial condition at 1000RA, the Automatic Flight System had correctly tracked the ILS path and the speed target. The positive drift angle (aircraft nose toward the left of the track) is consistent with the left crosswind experienced by the aircraft during the final approach.

#### a) At 1000RA Aircraft configuration was as follows;

- Gross weight was 63.4t < MLW (64.5t).
- CG was 34.2%.
- Aircraft was in CONFIGURATION FULL (Slats/Flaps 27°/35°).
- Landing gear was selected down.
- Ground spoilers were armed.
- Auto brake LOW mode was armed.





#### AP/FD engagement status

- Both autopilots (APs) and flight directors (FDs) were engaged in G/S (vertical) and LOC (lateral) modes.

#### Speed

- Auto thrust (A/THR) was active in SPEED mode.
- Recomputed VLS was 133kt.
- Speed target was managed at 148kt (VLS+15kt).
- CAS was 154kt (speed target+6kt).

#### Attitude and trajectory

- Rate of descent was approximately 650ft/min.
- Pitch angle was +1° (nose-up).
- Heading was 305° (QFU 310°).
- Drift angle was +5° (aircraft nose toward the left of the track).
- The aircraft was on the glide slope and the localizer.

#### b) From 1000ft RA (01:22:26 UTC) to APs disengagement at ~400ft RA (01:23:13 UTC):

##### On the longitudinal axis

- Pitch angle varied between -2° (nose-down) and +2.5° (nose-up).
- Speed target varied between 155kt (VLS+22kt) and 144kt (VLS+11kt).
- CAS varied between 159kt (speed target+7kt) and 143kt (speed target-7kt).
- Rate of descent varied between ~300ft/min and ~1050ft/min.
- Vertical load factor varied between +0.75G and +1.25G.
- Aircraft was on the glide slope.

##### On the lateral axis

- Roll angle varied between +6° (right wing down) and -5° (left wing down).
- Heading varied between 301° and 307° (QFU 310°).
- Drift angle varied between +8.5° and +1.5° (aircraft nose toward the left of the track).
- Lateral load factor varied between -0.05G and +0.05G.
- Aircraft was on the localizer.

According to the weather information, the aircraft encountered gusty wind conditions, also highlighted by:

- The variation in vertical load factor and in rate of descent.
- The “Ground Speed Mini” (FCOM DSC-22\_30-60-20 GROUND SPEED MINI FUNCTION) function activation leading the speed target to vary between 155kt and 144kt.

At 1000ft RA (stabilization height recommended in IMC) and 500ft RA (stabilization height recommended in VMC):

- The aircraft was on the correct lateral and vertical flight path.
- The aircraft was in the landing configuration.
- The thrust was stabilized and the aircraft was around the target speed for approach.
- No excessive flight parameter deviation was recorded.

In accordance with FCOM PRO-NOR-SOP-18 Stabilization Criteria and the callout flight parameters deviations defined in FCOM PRO-NOR-SCO Flight Parameters, the final approach can be considered as stabilized at 1000ft RA and 500ft RA.

However, due to the gusty wind conditions, several parameters briefly exceeded their callout value between 1000ft RA and 400ft RA:

- SPEED: CAS was briefly below its callout value (<speed target-5kt) 4 times.





- SINK RATE: Rate of descent slightly exceeded its callout value (>1000ft/min) at ~900ft RA for less than 1s.

c) At ~400ft RA, the flight crew voluntarily disengaged both APs via the side stick instinctive pushbutton. Then final approach was manually handled by the PF with the A/THR active in SPEED mode. The speed target was managed.

d) **From APs disengagement at ~400ft RA (01:23:13 UTC) to touchdown (01:23:55 UTC): On the longitudinal axis**

- Pilot Flying side stick inputs varied between a half of full nose-down and ~3/5 of full nose-up deflection:
  - Pitch angle varied between -1° (nose-down) and +4° (nose-up).
  - Rate of descent varied between ~850ft/min and ~50ft/min.
- At ~35ft RA, thrust levers were retarded to the IDLE detent leading to A/THR disconnection.
- CAS varied between 158kt (speed target+9kt) and 138kt (VLS+5kt).

**On the lateral and directional axes**

- Pilot Flying side stick input varied between ~2/3 of full left and ~3/4 of full right deflection:
  - Roll angle varied between +7° (right wing down) and -5° (left wing down).
- Rudder pedal inputs varied between a quarter of full right and ~2/5 of full left deflection:
  - Heading varied between 310° and 300° (QFU 310°).
  - Drift angle varied between +7° and +1.5° (aircraft nose toward the left of the track).
- Localizer deviation increased up to around -3/5DOT to the right of the localizer (reached around 180ft RA) before decreasing toward ~0DOT (reached around 40ft RA). Then just before touchdown, lateral deviation increased again up to around -1/2DOT.





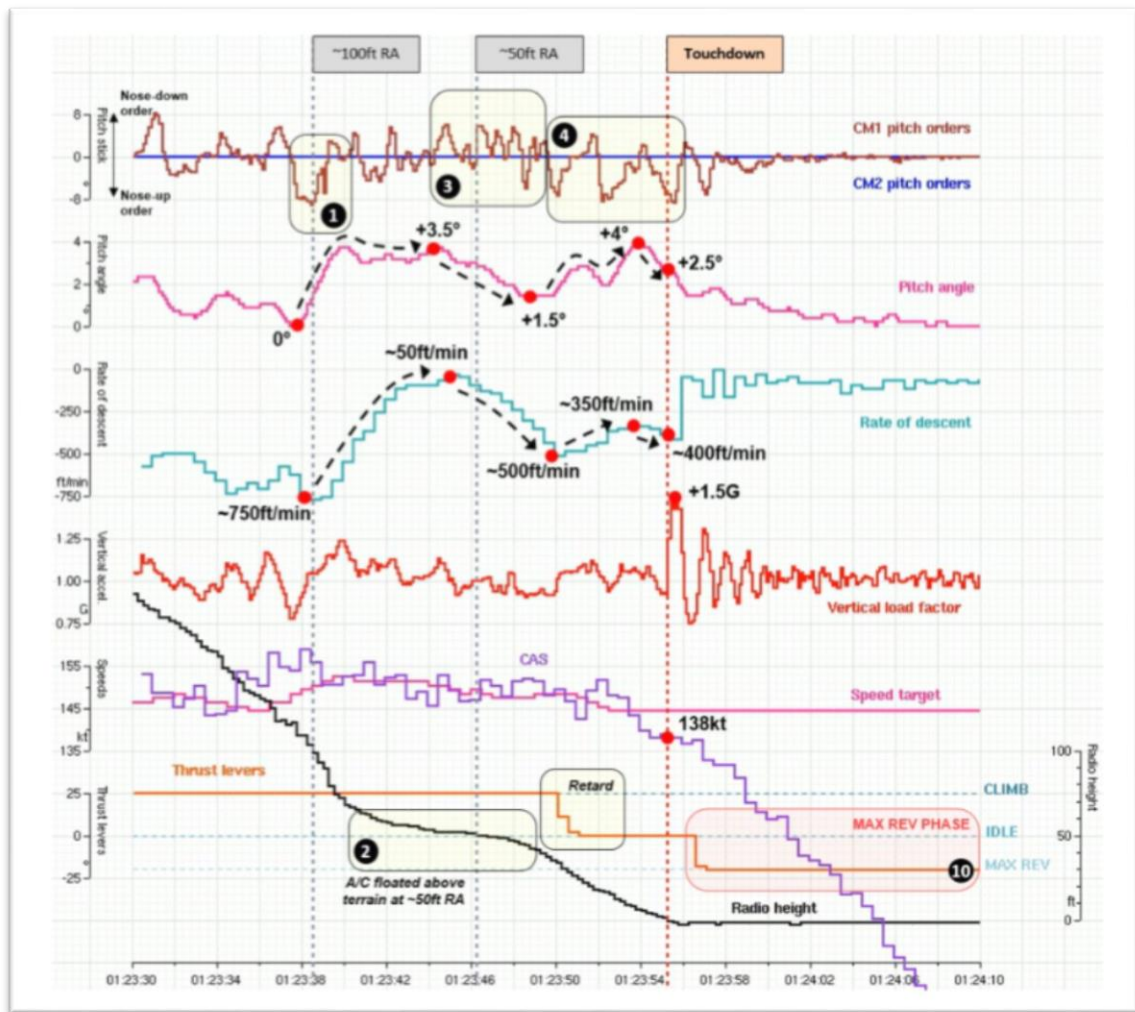


Figure 04: The Last 110ft – Longitudinal axis

**On the longitudinal axis (Please refer to above Figure)**

- e) At ~110ft RA, a half of full nose-up order ( ❶ ) was applied by CM1 (PF) and led: the pitch angle to increase from 0° to +3.5° and the rate of descent to decrease from ~750ft/min to ~50ft/min.

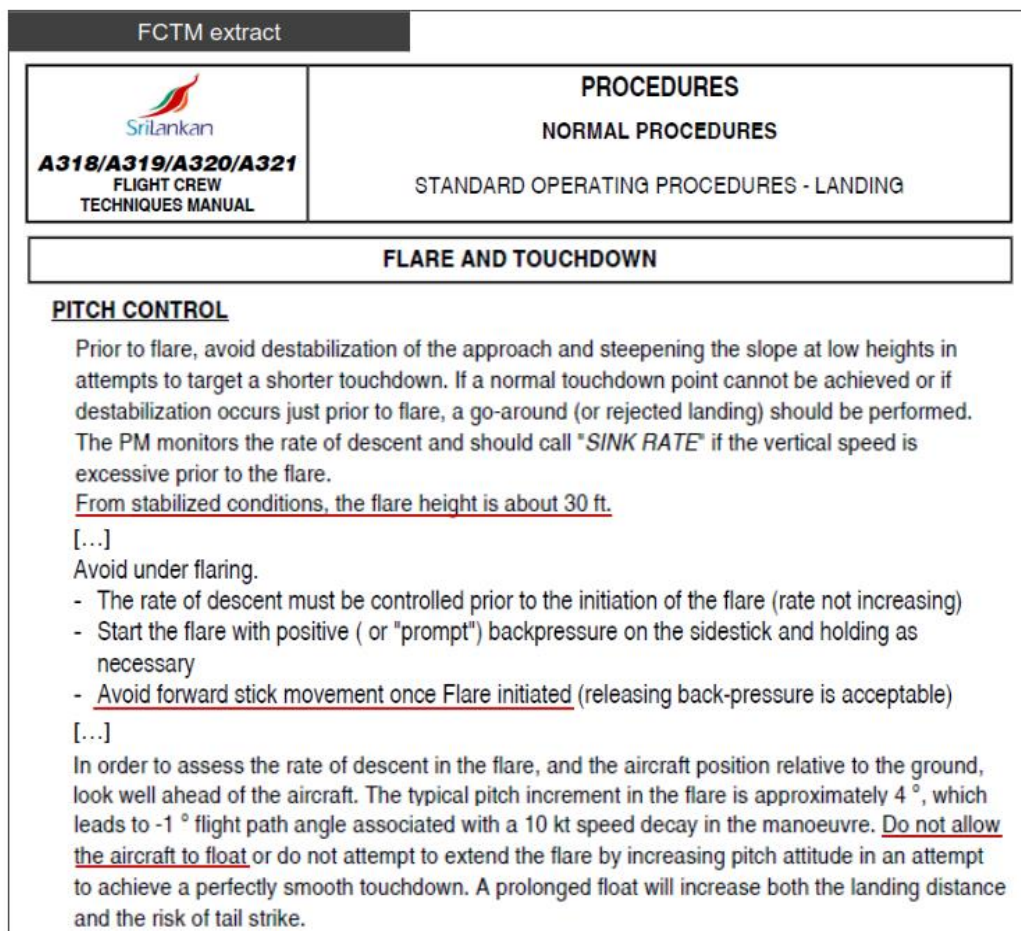
As a consequence, the flight path angle decreased from -3° to 0° and the aircraft thus floated above the runway at ~50ft RA ( ❷ ).

- f) at ~50ft RA, most probably in order to stop floating above the runway, PF applied for several nose-down and nose-up orders up to ~2/5 of full deflection ( ❸ ), with a nose-down tendency, leading the pitch angle to decrease & stabilize around +1.5° and the rate of descent to increase up to ~500ft/min.

In the last 35ft, PF applied for several nose-up orders up to half of full deflection and some slight nose-down orders ( ❹ ). Consequently, the pitch angle gradually increased from +1.5° to +4° then decreased to +2.5° prior to touchdown and the rate of descent decreased from ~500ft/min to ~350ft/min then increased up to ~400ft/min before touchdown.

Simultaneously, the thrust levers were retarded to IDLE.

As recommended in the following FCTM extract which is shown below; **the flight crew should: - Start the flare at ~30ft RA** (from stabilized conditions) with a positive (or "prompt") back pressure on the side stick and holding as necessary; **Not allow the aircraft to float and avoid forward stick movement once flare initiated** (releasing back-pressure is acceptable).



*Figure05: FCTM PR-NP-SOP-250 FLARE AND TOUCHDOWN*

**On the lateral and directional axes** [Please refer to Figure below]

At ~400ft RA, just after APs disengagement, PF applied three right roll orders up to a quarter of full deflection leading the roll angle to increase up to +7° (right roll). Simultaneously, the flight crew applied a slight rightward rudder pedal input.

This **right roll angle**, associated with the rudder input, led the localizer deviation to increase up to around - 3/5DOT (reached around 180ft RA): **The aircraft deviated to the right of the correct lateral flight path.**

This deviation was progressively corrected with a commanded left roll order: the localizer deviation thus started to decrease (5).



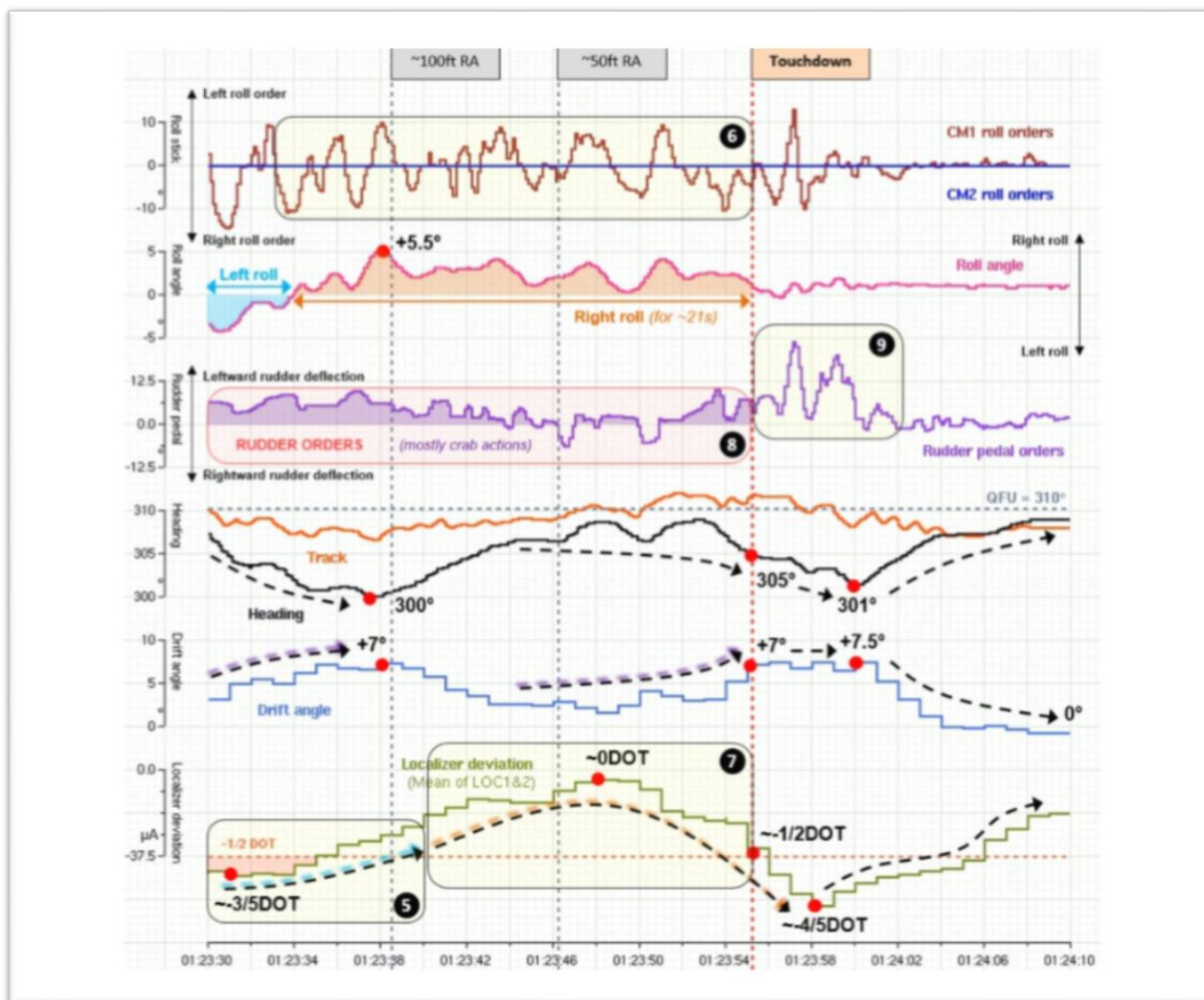


Figure 06: The last 200ft/Lateral & Directional axes

In the last 160ft, several right and left roll orders up to half of full deflection (6) were applied by CM1 leading the roll angle to increase up to +5.5° (right roll).

With a **right roll angle maintained for ~21s**, the localizer deviation stopped to decrease and reached ~0DOT at ~40ft RA, then started to increase again prior to touchdown (7): **The aircraft deviated to the right of the runway centerline.**

In addition, during the float above runway, **the left crosswind component slightly contributed to increase the deviation of the aircraft to the right of the runway centerline.**

Most probably in order to try to counter the right deviations (around 200ft RA and prior to touchdown), the flight crew applied several rudder pedal orders (mostly crab actions) up to ~2/5 of full deflection (8).

**These orders participated twice to increase the left drift angle up to +7°, but did not change significantly the aircraft trajectory to cancel the increasing lateral deviation.**

As recommended in FCTM AS-RUD OPERATIONAL RECOMMENDATIONS, in normal operations, the rudder should only be used during landing flare in case of crosswind for decrab purposes.

### 3.2 Go Around

A destabilization had occurred prior to touchdown:

- On the longitudinal axis, due to an unconventional flare action (with a nose-up order applied at ~110ft RA), the aircraft started to float above the runway.
- On lateral axis, due to a commanded right roll angle maintained for ~21s, the aircraft deviated to the right of the runway centerline.
- On the directional axis, due to a crab action initiated by the flight crew (most probably in order to try to counter the right deviations), an increase of the drift angle up to +7° occurred prior to touchdown.

As per the SOP-Go around in FCTM, the flight crew must consider performing a go-around if stability is not maintained until landing.

**FCTM extract**


 <b>A318/A319/A320/A321</b> FLIGHT CREW TECHNIQUES MANUAL	<b>PROCEDURES</b> <b>NORMAL PROCEDURES</b>  STANDARD OPERATING PROCEDURES - GO-AROUND
<b>GENERAL</b>	
Failure to recognize the need for and to execute a go-around, when required, is a major cause of approach and landing accidents. Because a go-around is an infrequent occurrence, <u>it is important to be "go-around minded"</u> . The decision to go-around should not be delayed, as an early go-around is safer than a last minute one at lower altitude.	
<b>CONSIDERATIONS ABOUT GO-AROUND</b>	
<b>DECISION MAKING</b>	
<u>The flight crew must consider to perform a go-around if:</u>	
[...]	
<ul style="list-style-type: none"><li>- The approach is unstable in speed, altitude, or flight path in such a way that <u>stability is not obtained by 1 000 ft AAL in IMC or (500 ft AAL in VMC), or is not maintained until landing, or</u></li></ul>	

Figure 07: FCTM PR-NP-SOP -260 Considerations about Go-Around

### 3.3 Touchdown

**At 01:23:55 UTC: Touchdown** The aircraft touched down with:

**On the longitudinal axis**

- +2.5° of pitch angle (nose-up).
- Around -400ft/min of vertical speed.
- +1.5G of vertical load factor.
- CAS 138kt.
- Ground spoilers started to extend.

**On the lateral axis**

- +1° of roll angle (right wing down).
- 305° of heading (QFU 310°).
- +7° of drift angle (nose toward the left of the track).
- +0.1G of lateral load factor.

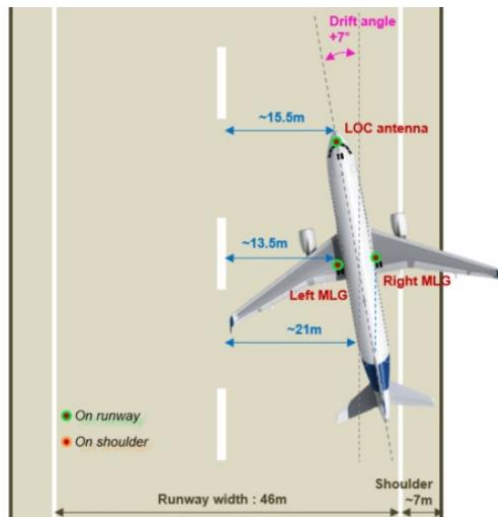
According to the roll angle recorded at touchdown (+1°), the right main landing gear touched down first followed by the left main landing gear. The aircraft touched down at ~900m after the runway threshold with a **localizer deviation around -1/2DOT to the right of the runway.**

The aircraft was thus on the right of the runway. The LOC antenna located at the cockpit level was at ~7.5m from the runway shoulder, but with the high left drift angle (+7°) at touchdown, the right main landing gear was close to the right side stripe marking of the runway (at ~2m from the runway shoulder).

Note: Aircraft lateral position was computed based on localizer deviation, threshold/aircraft distance and runway length. Computation at touchdown returned a LOC antenna position (being located under the radome) around 15.5m on the right of the runway centerline.

Then based on drift angle and aircraft geometry, another computation gave:

- A left main landing gear position around 13.5m on the right of the runway centerline.



- A right main landing gear position around 21m on the right of the runway centerline.

With a runway width of 46m, the side stripe marking was at 23m on the right of the runway.

### 3.4 Deceleration and Runway Deviation

#### From 01:23:55 UTC: On the longitudinal axis

- PF applied some brief nose-up orders up to half of full deflection:
  - Pitch angle progressively decreased toward 0°.
- Ground spoilers were fully extended.
- ~1s after touchdown, MAX REV thrust was applied for ~17s then REV IDLE thrust was applied for ~13s.
- ~4s after touchdown, manual braking was applied, leading to deactivate the auto brake function.

#### On the lateral axis

- PF side stick input varied between ~2/3 of full left and half of full right deflection:
  - Roll angle was close to 0°.
- ~3s after touchdown, localizer deviation reached a maximum of around -4/5DOT to the right of the localizer then started to decrease toward 0DOT.
- Leftward rudder pedal orders were applied up to full deflection then small rightward and leftward rudder inputs were applied:
  - Heading decreased to 301° then increased toward QFU value (310°).
  - Drift angle increased up to +7.5° then decreased toward 0°.

### 3.5 After touchdown

After touchdown, (Please refer above Figure 04 and Figure 06), the leftward rudder pedal orders, applied prior to touchdown, continued to be applied up to full deflection ( 9 ) leading the heading to decrease to 301° and the drift angle to increase up to +7.5°.

In spite of this leftward rudder pedal application, the localizer deviation reached around -4/5DOT to the right of the localizer before starting to decrease: **the aircraft skidded toward the right of the runway.**



**At maximal lateral deviation**, the LOC antenna was ~0.5m on the runway shoulder, and with the high left drift angle (+7.5°) **the right main landing gear was ~6m on the shoulder.**

Note: Based on localizer deviation, threshold/aircraft distance, and runway length, LOC antenna position at maximal lateral deviation was around 23.5m on the right of the runway centerline.

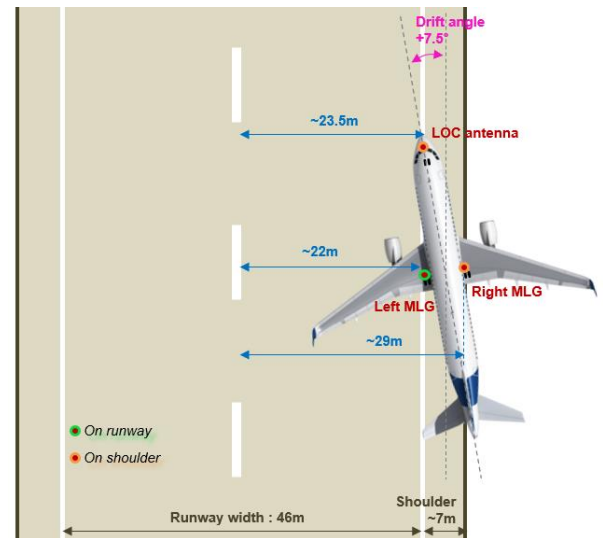
Then based on drift angle and aircraft geometry, another computation gave:

- A left main landing gear position around 22m on the right of the runway centerline.


- A right main landing gear position around 29m on the right of the runway centerline.

There is a shoulder of around 7m between the runway side stripe marking and the unpaved surface.

During the lateral runway deviation, MAX REV thrust (10 - figure) was applied by the flight crew for ~17s.



As recommended in the following FCTM extract, in case of lateral control problem, **the flight crew should consider to set the reverse thrust to REV IDLE** instead of MAX REV, as the reversers have a destabilizing effect on the airflow around the rudder and thus decrease the efficiency of the rudder. Furthermore they create a side force, in case of a remaining crab angle, which increases the lateral skidding tendency of the aircraft.

FCTM extract	
 <b>A318/A319/A320/A321</b> <b>FLIGHT CREW</b> <b>TECHNIQUES MANUAL</b>	<p align="center"><b>PROCEDURES</b></p> <p align="center"><b>NORMAL PROCEDURES</b></p> <p align="center">STANDARD OPERATING PROCEDURES - LANDING</p>
<p align="center"><b>ROLLOUT</b></p>	
<p><b>CROSSWIND CONDITIONS</b></p> <div style="border: 1px solid red; padding: 10px;"> <p>The reversers have a destabilizing effect on the airflow around the rudder and thus decrease the efficiency of the rudder. Furthermore they create a side force, in case of a remaining crab angle, which increases the lateral skidding tendency of the aircraft. This adverse effect is quite noticeable on contaminated runways with crosswind. In case a lateral control problem occurs in high crosswind landing, the pilot will consider to set reversers back to REV IDLE.</p> </div>	

*Figure 08: FCMT PR-NP-SOP-250 Rollout*

Due to the leftward rudder application, the lateral deviation started to reduce: **the aircraft stopped skidding toward the right of the runway.**

Around 01:24:02 UTC, the runway was recovered around 1300m after a threshold at a ground speed of ~109kt. Then the aircraft progressively re-aligned with the runway heading (310°).

After the incident, the aircraft stopped on the runway approx. 6 minutes and the flight crew had waited for aircraft inspection/runway inspection.



## 4. Conclusion

### 4.1 Findings

#### 4.1.1 Aircraft

- a) The aircraft had a valid Certificate of Airworthiness and a valid Certificate of Registration
- b) There were no pre-defects reported in the aircraft prior to the flight.
- c) There was no evidence of safety risk assessment conducted prior to the commencement of operation to FSIA in 2016.

#### 4.1.2 Flight crew

- a) Flight crew had valid licences.
- b) Both PIC and FO had flown to FSIA prior to the incident flight.
- c) Flight crew had communicated to inspect tyre while the aircraft was at runway 31, instead of taxiing out from the single runway.
- d) The PIC had not complied with Flight Crew Training Manual (FCTM) – Procedures (PR)- Normal Procedures (NP)- Standard Operating Procedures (SOP)-250 “FLARE AND TOUCHDOWN and SAFETY FIRST, lateral runway excursions upon landing”, in which the Pilot Flying (PF) should not allow the aircraft to float and should avoid forward stick movement once flare is initiated.
- e) The PIC had not complied with FCTM PR-NP-SOP-260 Considerations about Go-around, in which the PF must consider to perform a go-around if stability is not maintained until landing.
- f) The PIC had not complied with FCTM PR-NP-SOP-250 Rollout, in which the PF is required to set the reverse thrust to REV IDLE instead of MAX REVERSE to control the lateral deviation.
- g) The PIC had not complied with FCTM - SOPs – Landing, Rollout – crosswind condition, where it is required that the PF to consider to set reverses to REV IDLE.

### 4.2 Probable cause(s)

Before touchdown, a commanded right roll angle maintained for ~21s led to a deviation of the aircraft toward the right of the runway centerline.

The pitch-up order applied by the flight crew at ~110ft RA led the aircraft to float above the runway at ~50ft RA and thus exposed the aircraft to the lateral wind. The left crosswind component contributed to increase the deviation of the aircraft to the right of the runway centerline.

On ground, in spite of a leftward rudder pedal application, the aircraft skidded toward the right of the runway. This tendency to skid was a consequence of the aircraft dynamics (right roll + crosswind) and the reported weather conditions that led to a wet runway.

Additional contributors which may have perturbed approach and landing were:

- After a go-around, second approach was performed during the night with gusty wind conditions.
- Runway was most probably wet, as “rainy conditions” was reported in incident statement of the PIC and confirmed by METAR (heavy rain showers).





## 5. Safety Recommendations

### 5.1 The Operator

- i. The Operator shall ensure that the flight crew to consider vacating the active runway, as soon as possible when the aircraft is able to do so. Subsequent inspections of the aircraft are to be proposed at a suitable location beyond the active runway.
- ii. The Operator shall conduct a new safety risk assessment prior to recommencing operation into FSIA.

### 5.2 Recommendations already issued to the PIC, (PF)

- i. The PIC shall be trained as stated below;
  - a) The PIC shall train on the A320 to fly in adverse weather conditions, inclusive of max. crosswind conditions.
  - b) A check flight with a Type Rating Examiner nominated by the CAASL, which will be observed by the Flight Operations Inspector of the CAASL, upon completion of the above (a).

.....END.....

