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Accident Investigation Coordinating Committee

Aircraft Accident Report 2017/02

Final Report on the Accident to
Viking Air DHC-6-300, 8Q-ISB
Velana International Airport, Maldives
4 October 2017

Introduction

Maldives is a signatory to Convention on International Civil Aviation (Chicago 1944) which established the principles and arrangements for the safe and orderly development of international air transport. Article 26 of the Convention obligates Signatories to investigate accidents to civil aircraft occurring in their State.

This investigation has been conducted in accordance with Annex 13 to the Chicago Convention, the Civil Aviation Act 2/2012 and the Civil Aviation Regulations. The sole objective of this investigation and the Final Report is to prevent accidents and incidents. It is not the purpose of this investigation to apportion blame or liability.

The AICC was assisted by the Maldives Civil Aviation Authority (CAA), Island Aviation Services Limited, the Maldives National Defence Force and the Maldives Police Service.

The recommendations in this report are addressed to the CAA, unless otherwise stated.

All times in this report are in local time unless stated otherwise. Time difference between local and UTC is +5 hrs.

The report is released on 23 January 2019.

Mr. Abdul Razzak Idris

Chairperson

Accident Investigation Coordinating Committee



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Aircraft Accident Report No: 2017/02

Owner	Aerostar Bravo Limited
Registered Owner	Island Aviation Services Limited
Operator	Island Aviation Services Limited
Aircraft Type	Viking Air (De Havilland) DHC-6-300
Nationality	Maldivian
Registration	8Q-ISB
Manufacturer's Serial Number	655
Place of Accident	Velana International Airport
Date and Time	4 October 2017 at 1616 hrs

Synopsis

On 4th October 2017, a DHC-6 aircraft, registration number 8Q-ISB owned by Aerostar Bravo Limited and operated by Island Aviation Services Limited met with an accident. It was on a scheduled flight from Niyama Private Island to Velana International Airport. The flight was conducted in accordance with the Visual Flight Rules (VFR). There were fifteen passengers, two pilots and one cabin crew on board the aircraft. The first officer was the pilot flying. The accident occurred during landing at Velana International Airport water aerodrome.

The aircraft landed on the North Right Water Runway during a rain shower with a gusting westerly cross wind. The aircraft first touched down on its left float and bounced. The captain initiated a go-around by applying full power while the flaps were still in the fully extended position. The aircraft was at a very low speed in a nose-high and right-wing-low attitude. The aircraft thereafter touched down on its right float, the right wing tip digging into water. As a result the aircraft started turning right towards the shore. The aircraft continued to turn on a right bank and finally flipped and crashed into the sea resting upside down, close to the shore in a fairly shallow area, facing south. The aircraft sustained substantial damage.

The passengers and crew did not sustain any serious injuries. All passengers evacuated themselves from the aircraft before arrival of the rescue boats. The passengers and crew

were safely taken to the ARFF Marine Station and later taken to Hulhumale' Hospital for medical assessment.

The accident site was secured by MNDF personnel and the investigation initiated immediately. The aircraft wreckage was salvaged and brought to a secure place on the same day for investigation.

1 Factual information

1.1 History of the flight

1.1.1 Background

The flight crew reported for duty on 4th October 2017 to IASL base at 1230 hours for a scheduled flight at 1330 hours.

The crew arrived at the aircraft (8Q-ISB) and found a defective aft fuel gauge. The defect was rectified and the crew carried out pre-flight check as per the company procedures before accepting the aircraft.

The company usually schedules a series of flight sectors back to back and issues a combined “flight release” for all sectors.

The flight for the roundtrip, Male'-Niyaama-Male', was released with 3 crew members (2 flight crew and 1 cabin crew) and 14 passengers from Male' to Niyaama. As per the flight release document, the aircraft was loaded with 432 lbs of baggage and 950 lbs of fuel, with a take-off mass of 12,494 lbs. The PIC was PF for the first sector of the flight. According to the crew, taxi-out, take-off, cruise and the landing at Niyaama were normal.

The aircraft took off from Niyaama for the second sector of the flight with the same crew and 15 passengers. As per the flight release (manifest), the aircraft was loaded with 468 lbs of baggage and 840 lbs of fuel, with a take-off mass of 12,499 lbs. The flight duration of this sector was estimated to be 47 minutes. According to the crew, PIC taxied and did the take-off from Niyaama because the winds were observed around 15kts, with rough sea conditions. After the aircraft was airborne, passing 1000 ft, the captain handed over the controls to the co-pilot to continue the rest of the flight to Velana International Airport.

According to the flight crew, no malfunctions on the aircraft were observed throughout the flight. As the aircraft approached Velana International Airport, both the captain and the co-pilot noticed inclement weather approaching from the west. On initial contact with Male' Tower (20NM from the field), the Captain (PNF) reported that the aircraft was on

descent through 800ft and requested to fly direct to “Delta” (reporting point at 6 NM SE of the field) to avoid the approaching weather.

From “Delta” the aircraft joined right base to North Right (NR) Water Runway at an altitude of 500 ft as instructed by the Tower. There was light rain and the winds were picking up due to the approaching weather. According to the crew, at 300ft the aircraft was configured for landing with full flaps and propeller levers at the full forward position. Wind shield wipers were turned on due to the light rain.

From the take-off at Niyaama to approach and until the first touch down at Velana International Airport, the flight was uneventful.

According to the information given by the tower, the wind direction was Westerly at approximately 12 kts. The instantaneous wind velocity at touch down could not be verified as the wind was fast picking up with the approaching weather.

According to available video footages the visibility was also deteriorating when the



Figure 1: 8Q-ISB aircraft final approach path to RWY NR

aircraft approached to land. Right after the aircraft first contacted water, the visibility briefly dropped to near zero due to heavy rain.

The aircraft touched down in the intended landing area (Figure 1), on the left float first and bounced, then contacted the water a second time on the right float. The co-pilot reduced power by pulling the power levers back. At the same time, as stated by the Captain, he placed his right hand on the power levers (over the co-pilot's left hand) and pushed the power levers fully forward, applying full power with the intention of going around whilst calling "Max power". The Captain neither announced that he was taking over control, nor called for flaps 10°, as per the procedures. There was no response from the co-pilot in handing over of controls to the Captain.

The aircraft banked sharply to the right, turning right and crashed. The aircraft finally flipped over and came to rest upside down, facing south and was partly submerged.



Figure 2: The aircraft wreckage

(Figure 2).

All passengers and crew evacuated safely through the right hand emergency exit, which was above the water. The rescue teams were at the accident site almost immediately and

assisted the passengers. There was no fire, although a considerable amount of fuel was spilled.

1.1.2 Flight crew

Records indicate that the flight crew members were certified and qualified for the flight in accordance with existing regulations.

The captain held an Airline Transport Pilot's licence (ATPL) and was rated for single and multi-engine land and sea operations. The captain's instrument rating was valid until 31st May 2018, and his Class 1 medical was valid until 10th September 2018. Initial training on the DHC-6 aircraft was completed on 19 February 2007. The last licence proficiency check (LPC) was done on 28th May 2017. During the course of the training, the pilot was able to successfully demonstrate approach to stall, recognition and recovery from the following configurations: clean, full flaps, approach, while in a turn and go-around (balked landing) with maximum landing flaps.

The Co-pilot held a CPL and was rated for single-engine land and multi-engine sea operations. The Co-pilot does not have an instrument rating endorsed, which is not required for DHC-6 VFR operations as per the existing regulations. Initial type rating training on DHC-6 on floats began in December 2016 and was completed in June 2017. This initial type rating training consisted of a total of 31 hours. Initial LPC on the DHC-6 was completed on 7th June 2017 and he was undergoing Line indoctrination, under supervision when the accident occurred. During the course of the training the pilot was able to successfully demonstrate approach to stall, recognition and recovery from the following configurations: clean, full flaps, approach, while in a turn and go-around (balked landing) with maximum landing flaps.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	-	-	-
Serious	-	-	-
Minor/None	3	15	-

1.3 Damage to aircraft

The aircraft was substantially damaged.

The investigation identified the following damages to the aircraft;

Flight Controls

- LH outboard fore flap detached from STA310 and missing
- LH aileron detached from STA360 and missing
- Inboard LH fore flap and trailing flap damaged
- RH aileron outboard fore flap detached from STA310
- Minor damage on RH inboard fore flap and trailing flap
- RH elevator and interconnect trim tab damaged
- LH elevator detached and hanging from STA42.55
- Rudder and rudder trim tab bent from STA134.875
- LH aileron cables broken
- LH elevator twisted from mid hinge
- Flap actuator and 'A' frame detached from attaching point

Wings

- LH wing detached from fuselage at wing adaptor
- RH Wing severely damaged from STA310
- LH Engine nacelle torn off
- LH Wing strut detached from fuselage attachment lower point

Stabilizers

- Minor damages on RH horizontal stabilizer, top finlet detached
- LH horizontal stabilizer broken off and hanging from STA42.55
- Vertical stabilizer leading edge damaged from STA134.875
-

Fuselage

- LH skin punctured at STA391 floor level
- Skin dent at STA262 to STA239
- Bottom wing step severely damaged
- Floor skin punctured at STA86 floor
- Floor skin punctured at STA20 floor
- RH wing dented at STA262 to 239
- Rear cargo door skin damaged
- Air stair door skin damaged
- LH AFT cabin door damaged
- LH wing strut attachment damaged
- RH engine control cable pulley set at cabin roof found damaged
- All antennas damaged

- Aircraft battery damaged

- Flight deck instruments, communication and navigation equipment damaged .

I.4 Other damage

None

I.5 Personnel information

1.5.1 Commander

Age: 45
Licence: Airline Transport Pilot Licence (Aeroplanes)
Aircraft Ratings: DHC-6 (on Maldivian licence)
Last proficiency check: 28 May 2017
Last instrument rating renewal: 28 May 2016
Last line check: 01 December 2016
Last medical: Class 1 (11 September 2017)
Flying experience: Total all types: 9449:70 hours
On Type: 9233 hours
Last 90 days: 163 hours 45 minutes
Last 28 days: 77 hours 15 minutes
Last 24 hours: 54 minutes
Previous rest period: 69 hours 44 minutes

1.5.1 Co-pilot

Age: 31
Licence: Commercial Pilot License (Aeroplanes)
Aircraft Ratings: DHC-6
Last proficiency check: 7 June 2017
Last instrument rating renewal: NIL
Last medical: Class 1 (15 October 2016)
Flying experience: Total all types: 261:20 hours
On Type: 93:15 hours
Last 90 days: 62 hours 15 minutes
Last 28 days: 24 hours 50 minutes
Last 24 hours: 54 minutes
Previous rest period: 96 hours 55 minutes

1.5.1 Cabin crew

Age: 22
Licence: Cabin Crew Licence
Last recurrent training: 25 September 2017
Last medical: 4 October 2016
Previous rest period: 18 hours

1.6 Aircraft information

1.6.1 General information

The DHC-6-300 “Twin Otter” is an unpressurised, all-metal, high wing aircraft powered by two Pratt & Whitney PT6A-27 engines driving Hartzell three-blade, reversible-pitch, full feathering propellers. The aircraft is designed for seating two pilots, side by side with dual controls and standard flight instrumentation.

Manufacturer:	Viking Air (De Havilland)
Registration:	8Q-ISB
Powerplants:	2 x Pratt & Whitney PT6A-27 turboprop engines
Manufacturer’s serial number:	655
Year of construction:	1979
Airframe hours at time of accident:	26,314.52 hrs
Certificate of Airworthiness:	Normal category, issued on 26 October 2016
Airworthiness Review Certificate:	Issued on 26 October 2016

1.6.2 Cabin layout and configuration

The aircraft was in float configuration with Wipaire 13000S floats installed. The aircraft was configured for 15 passengers and one cabin attendant. The right rear passenger door area and the aft baggage compartment were designated baggage loading areas. The aircraft had four exits in the cabin and two in the cockpit. But the aircraft was approved to use the rear (left) main door, two window exits and two cockpit doors as emergency exits.

1.6.3 Recent maintenance

The last Equalised Maintenance for Maximum Availability (EMMA) carried out was EMMA # 09, on 13 September 2017 (at 26234.34 TAT and 43550 TAC). Also, LH aileron upper cable was replaced under Non Routine Task Card (NRTC) #1 and scheduled LH engine fuel nozzles were replaced on 13 September 2017 (at 26234.34 TAT and 43550 TAC). The last routine A&E inspection was carried out on 02 October 2017 (at 26308.50 TAT and 43672 TAC).

Last scheduled maintenance carried out on aircraft were as follows;

1. Auto-feather and Over Speed Governor test carried out on 21 September 2017 (at 26264.53 TAT and 43602 TAC)
2. PC safety valve inspection carried out on 24 September 2017 (at 26276.40 TAC and 43621 TAC)
3. Float 50/100 hrs. inspection carried out on 24 September 2017 (at 26276.40 TAC and 43621 TAC)
4. Routine A&E inspection carried out on 26 September 2017 (at 26287.29 TAT and 43637 TAC)
5. RH engine mounts replaced on 27 September 2017 (at 26289.16 TAT and 43641 TAC)
6. RH engine fuel nozzle replaced and Boroscope inspection carried out on 28 September 2017 (at 26291.04 TAT and 43643 TAC)
7. Propeller over-speed Governor and auto-feather test carried out on 29 September 2017 (at 26295.01 TAT and 43649 TAC)

The following defects were reported and rectified in the 30 days prior to the accident. One of them was a deferred defect while the other a Line defect.;

1. 'AFT Fuel Quantity gauge dropped to zero' was reported on 03 October 2017 (at 26311.52 TAT and 43677 TAC). The defect was cleared on 04 October 2017 (at 26314.52 TAT and 43681 TAC).
2. 'LH engine torque at 44 psi on take-off' was reported and rectification action was taken on 03 October 2017 (at 26311.52 TAT and 43677 TAC).

1.6.4 Flight controls

The flight controls consist of conventional, manually actuated primary flight controls operated through cables, pulleys, and mechanical linkages. Rudder and elevator trim are manually controlled and mechanically actuated; aileron trim is electrically actuated. Secondary flight controls consist of hydraulically actuated wing flaps.

The flight controls were inspected after the aircraft was recovered from the seabed and no issues were identified in the flight control system.

1.6.5 Powerplants

The aircraft was powered by two Pratt & Whitney Canada PT6A-27 turboprop engines. Each engine is fitted with a Hartzell (HC-B3TN-3DY), three-bladed, constant speed, full feathering and reversible propeller.

The pilots did not report any defects related to the engines or propellers.

1.7 Meteorological information

Meteorological information Male' (VRMM) issued on 4th October 2017 at 1600 hrs LT.

Date & Time in LT	Avg Wind Speed		Temperature	Dew Point	Pressure	Rainfall
	Knots	Dir	°C	%	hPa	mm
4.10.2017 16:00	16	280	28	95	1005	10.3

1.8 Aids to navigation

The aircraft was operating under Visual Flight Rules. Aids to navigation was not a factor in this accident.

1.9 Communications

The aircraft was equipped with two VHF sets both of which were serviceable and no communication problem was reported.

1.10 Aerodrome and approved facilities

Velana International Airport has 3 water runways; North Right (NR)/South Left (SL), North Left (NL)/South Right (SR), and East/West (EW). All the runways and taxi ways are marked with buoys.

1.12 Wreckage and impact information

1.12.1 General

The aircraft landed on the North Right water runway. It flipped over and came to rest at the South (East) end of the runway. The aircraft sustained substantial damage during the accident.

1.12.3 Salvage operations

The wreckage was salvaged from Velana International Airport water runway on the same day. The salvage operation was jointly accomplished by MNDF and IASL personnel, overseen by the investigators.

1.13 Medical and pathological information

The Medical examinations were performed on all passengers at Hulhumale' Hospital. The crew were tested for alcohol and narcotic drugs with the help of MPS and they were found to be all negative.

The crew held valid aviation medical certificates.

1.14 Fire

There was no report or evidence of fire.

1.15 Survival aspects

1.15.1 Emergency Locator Transmitter (ELT)

8Q-ISB was equipped with an Artex model C406-1 ELT (capable of transmitting on 121.5/243 and 406 MHz) fixed in the aft baggage compartment. The ELT was connected by cable to an external roof-mounted antenna and to a remote cockpit switch.

No distress signals were received from the accident aircraft. The ELT was found attached to the aircraft within the wreckage. The battery expiry date indicated on the unit is July 2022.

1.15.2 Life jackets

The aircraft had crewmember life-vests at every crew seat location and passenger life-vests under every passenger seat. None of the passengers reported any issues related to the life jackets.

1.15.3 Evacuation

All the passengers and crew had their seat belts fastened during landing.

Cabin Attendant and First Officer collectively initiated the evacuation of the passengers immediately after the crash. The right hand window emergency exit was used for the evacuation. Since the aircraft came to rest at a very shallow area of the lagoon (knee deep), there was no need for passengers to use the life jackets for the evacuation. All crew and passengers walked to the shore.

1.16 Tests and research

No tests or researches were carried out as there were no technical defects identified during the course of the accident investigation.

1.17 Organisational and management information

1.17.1 Company structure

Island Aviation Services Ltd (IASL) holds Maldives Civil Aviation Authority (MCAA) approved Air Operator Certificate (AOC) no.: 007. It provides international and domestic air services with a fleet of A320/321, DHC-8 and DHC-6 on float. The company is authorised to conduct scheduled and non-scheduled Operations.

Regular inspections and periodical flight checks were conducted on the operation and crew by the MCAA to verify compliance and competency. The company also holds an Aircraft Maintenance Organisation Approval. Annual audits with random spot checks and regular Airworthiness Review Inspections were carried out by the MCAA.

1.18 Additional information

National Transportation Safety Board Accident Report AAR-91/01

The following is an excerpt of an investigation report (AAR-91/01) from the National Transportation Safety Board (NTSB) following a similar DHC-6-300 accident which occurred in 1989:

“Grand Canyon Airlines’ Pilot Operating Manual (POM) for the DHC-6...contains a caution statement that; in a go-around with flaps extended, the nose will point below the actual flight path. Pilots reported that applying power at low airspeeds when the flaps were fully deployed would result in the airplane pitching up. The pilots further reported that positive pressure against the control yoke was needed to stop or prevent this pitching tendency. While some pilots reported that occasionally it was necessary to use both hands on the control yoke to prevent the airplane from pitching up, no one reported that the control forces exceeded the Federal Aviation Administration (FAA) maximum limitation of 50 pounds.

The NTSB investigation sought to determine the factors that might have caused the pilots to lose control of the airplane during the go-around. During the dynamic situation while the airplane was right wing down and heading for the side of the runway, the pilot’s reaction might have been to raise the nose and add power for an anticipated go-around.

At airspeeds near stall, the downwash on the horizontal stabilizer tends to raise the nose of the airplane, requiring the control yoke to be pushed forward to maintain a normal pitch attitude for the same trim setting. If the pilot pulled back on the control yoke while adding power, this could have resulted in the airplane lifting off in a nose high, power-on stall or near-stall condition. In addition, the visual reference may have been misleading. According to the operations manual for the DHC-6, with 40° (full flap is frequently referred to as 40°, but is actually 37.5°) of flaps, the airplane’s deck angle is below the flight path angle during a go-around. Therefore, an increase in pitch to a typical nose-up reference attitude while the flaps were at 40° would increase the possibility of aerodynamic stall and subsequent loss of lift.^{1”}

This is also supported by 'Aviation Investigation Report A11W0144' of Transport Safety Board of Canada.

I.19 Useful or effective investigation techniques

Desktop research was carried out on similar accidents occurred across the globe involving DHC 6 aircraft to understand the causes that lead to the accident on 8Q-ISB.

¹ National Transportation Safety Board, *Grand Canyon Airlines flight Canyon 5, De Havilland Twin Otter, DHC-6-300, N75GC, Grand Canyon National Park Airport, Tusayan, Arizona, September 27, 1989*, (Washington, D.C.: National Transportation Safety Board, 1991), page 13.

2. Analysis

2.1 General

Pilot statement, videos and photographs of the damages are available to the investigators to analyse the situation and determine the cause(s) of the preceding events. Inspectors from MCAA were at the location and assisted AICC with assessment of the damage and analysis.

This analysis is focused on the handling of the aircraft during the landing and attempted go-around.

The flights from MLE-NIY-MLE were normal until the first touch-down at MLE. No abnormalities were reported during the flight. Examination carried out on the wreckage revealed no evidence of any technical defects which could have contributed to the accident.

During the interview, crew indicated while on approach to MLE, they noticed inclement weather approaching from the West. According to the crew, at 300ft the aircraft was configured for landing with full flaps and propeller levers at the full forward position. Wind shield wipers were turned on due to the light rain.

The aircraft touched down in the intended landing area, on the left float first and bounced, then contacted the water a second time on the right float. According to the co-pilot, he reduced power by pulling the power levers back. At the same time, as stated by the Captain, he placed his right hand on the power levers (over the co-pilot's left hand) and pushed the power levers fully forward, applying full power with the intention of going around whilst calling "Max power". The Captain neither announced that he was taking over control, nor called for flaps 10°, as per the procedures. There was no response from the co-pilot in handing over of controls to the Captain. Proper procedures for the go around were not followed which is indicative of CRM breakdown.

During the investigation, it was revealed that the aircraft banked right sharply, turning right and crashed. The aircraft was found flipped over and resting overturned, facing south.

Studies of similar accidents involving same type of aircraft elsewhere in the world have shown that if a go-around was initiated when the aircraft is in a high pitch attitude at low speed and adding full power results in the aircraft lifting off in a very nose-high, right-wing low attitude. With full flaps selected and both wings in a stalled or semi stalled condition, the aircraft would not accelerate or climb. This results in the wings stalling and a loss of control.

2.2 Aerodynamics

There were no aerodynamics issues identified in the accident.

2.3 Flight crew

There was no evidence of adverse medical conditions that affected the flight crew. Drug tests indicated that neither the PIC nor the FO were under the influence of, or impaired by, drugs or alcohol at the time of accident.

2.4 Weather

According to the information given by the tower, the wind direction was Westerly at approximately 12 kts. The instantaneous wind velocity at touch down could not be verified as the wind was fast picking up with the approaching weather. However, the available video footages indicate that right after the aircraft first touched on water, visibility briefly dropped to nearly zero due to heavy rain.

2.5 Crew training

The operator is approved to conduct DHC-6 type conversion and recurrent training courses by the MCAA through Operations Manual Part D. The flight crew had completed the required training as per the Operator's OM.

2.6 Survival Aspects

2.6.1 Evacuation

All passengers and crew evacuated to safety through the right hand emergency exit, which was above the water.

No passengers or crew reported any difficulties in evacuation.

2.6.2 Emergency Response

The rescue teams were at the accident site almost immediately and assisted the passengers by taking them to the hospital, while the Airline attended to the welfare of the passengers and crew.

3. Conclusions

3.1 Findings

- a. The airplane was certified, equipped, and maintained in accordance with MCARs and approved procedures.
- b. There was no known existing defects reported on the airplane, its systems, or Powerplants.
- c. The flight crew were properly certified and qualified for their duties.
- d. The weather condition at the time of landing was gusty cross-winds with heavy precipitation and low visibility.

3.2. Causes

The investigation identified the following causes;

- a. Improper recovery techniques from a bounced landing; application of go-around procedures whilst the aircraft was at low speed with flaps fully extended.
- b. Breakdown of crew coordination during the attempted go-around.
- c. Poor judgement of approaching inclement weather condition; crew decided to land, hoping that they could make it before the approaching storm strikes the landing area.

4. Safety Recommendations

4.1 Recommendations to the MCAA

Subsequent to the findings of the investigation of this accident, the AICC makes the following recommendations to the MCAA:

Determine whether the airline procedures;

- a. Allowing the aeroplane to operate with full flaps are consistent with a safely initiated and implemented go-around manoeuvre in a DHC-6-300 aircraft from a stall or near stall condition.
- b. Contain a bounced landing and recovery procedure on DHC-6-300 aircraft operated on floats.
- c. Include specific procedures and trainings covering the aircraft upset recovery in all phases of flight.
- d. Have additional procedures drawn and implemented to avoid landing and take-off during adverse weather conditions.

4.2 Recommendations to the Operator

Subsequent to the findings of the investigation of this accident, the AICC makes the following recommendations to the Operator:

- a. If not already implemented, to add specific procedures covering the aircraft upset recovery in all phases of flight.
- b. Establish specific procedures pertaining to bounced landing recovery on DHC-6-300 aircraft operated on floats.
- c. Ensure the additional procedures are drawn and implemented to avoid landing and take-off in adverse weather conditions.

5. Appendices

5.1 Flight Release

a. Passenger and Cargo Manifest

PASSENGER AND CARGO MANIFEST

ALL WEIGHTS IN POUNDS (LBS)

FLT. NO.:	Q2-3005	ORIGIN:	NIY	PREPARED BY:	Farthih
A/C REG.:	SP 203	DEST.:	MLE	SIGNATURE:	
DATE:	04/10/2017	CREW:	2 1		

No.	Name / Cargo description	M	F	C	Priority 1 / 2	Baggage/Cargo		Pax Weight (lbs)
						Pcs	Weight	
1		X				4	116	189
2			X					150
3		X						189
4			X			1	42	150
5		X				2	63	189
6			X					150
7				X				77
8			X			2	47	150
9		X						189
10		X				2	50	189
11		X				2	49	189
12			X					150
13		X				2	85	189
14			X					150
15		X				2	16	189
16								
17								
Total						17	468	2439

<table border="1" style="width: 100%;"> <tr><td>M</td><td>189 Lbs</td></tr> <tr><td>F</td><td>150 Lbs</td></tr> <tr><td>C</td><td>77 Lbs</td></tr> <tr><td>I</td><td>22 Lbs</td></tr> </table>	M	189 Lbs	F	150 Lbs	C	77 Lbs	I	22 Lbs	Notes	Total Payload = DOW + Zero Fuel Weight = Take Off Fuel + TOW = Correction + Actual TOW = Burn Off Fuel - Landing Weight =	<table border="1" style="width: 100%;"> <tr> <th>Before LMC</th> <th>After LMC</th> </tr> <tr><td>2957</td><td>Lbs</td></tr> <tr><td>5670</td><td>Lbs</td></tr> <tr><td>11529</td><td>Lbs</td></tr> <tr><td>740</td><td>Lbs</td></tr> <tr><td>12487</td><td>Lbs</td></tr> <tr><td>30</td><td>Lbs</td></tr> <tr><td>12499</td><td>Lbs</td></tr> <tr><td>408</td><td>Lbs</td></tr> <tr><td>12091</td><td>Lbs</td></tr> </table>	Before LMC	After LMC	2957	Lbs	5670	Lbs	11529	Lbs	740	Lbs	12487	Lbs	30	Lbs	12499	Lbs	408	Lbs	12091	Lbs	NAME / SIGN: I certify that this aircraft is loaded in accordance with the approved weight and balance schedule. LMC limit is 250lbs and LMC correction is mandatory for Take-off weight, Landing weight and % MAC@TOW.
M	189 Lbs																															
F	150 Lbs																															
C	77 Lbs																															
I	22 Lbs																															
Before LMC	After LMC																															
2957	Lbs																															
5670	Lbs																															
11529	Lbs																															
740	Lbs																															
12487	Lbs																															
30	Lbs																															
12499	Lbs																															
408	Lbs																															
12091	Lbs																															

INDEX T.O.W			
INDEX L.W			

TRIM CALCULATOR USED

a. Load and Trim Calculator

ISLAND AVIATION SERVICES LIMITED		DHC-6 300 SEAPLANE LOAD AND TRIM CALCULATOR																																																																																																																																									
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5.3 List of Abbreviations

AICC	: Accident Investigation Coordinating Committee
ATC	: Air Traffic Controller
AOC	: Air Operator Certificate
COM	: Communication
CON	: Conrad Maldives Rangali Island
CVR	: Cockpit Voice Recorder
DHC-6-300	: Viking Air Twin Otter 300 Series
EMMA	: Equalised Maintenance for Maximum Availability
ELT	: Emergency Locator Transmitter
FAA	: Federal Aviation Administration
FDR	: Flight Data Recorder
FO	: First Officer
ICAO	: International Civil Aviation Organization
lb	: Pounds
LH	: Left hand
LT	: Local time
MCAA	: Maldives Civil Aviation Authority
MCAR	: Maldivian Civil Aviation Regulation
METAR	: Meteorological Aviation Report
MLE	: Male'
MNDF	: Maldives National Defence Force
NM	: Nautical Mile
NTSB	: National Transportation Safety Board
OM	: Operations Manual
PF	: Pilot Flying
PIC	: Pilot in command
PTT	: Push-To-Talk
POM	: Pilot Operating Manual
RCV	: Reverse Current Relay
RH	: Right hand
RWY	: Runway
TMA	: Trans Maldivian Airways Pvt. Ltd.
TRI	: Type Rating Instructors
UTC	: Universal Coordinated Time
VFR	: Visual Flight Rules
VRMM	: Velana International Airport
VMC	: Visual Meteorological Conditions