

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Aviation Engineering Division
Washington, DC 20594

April 15, 2011

AIRWORTHINESS GROUP CHAIRMAN'S FACTUAL ADDENDUM FOR WEIGHT AND BALANCE

- A. **ACCIDENT:** ANC10MA068
- LOCATION:** Near Aleknagik, Alaska
- DATE/TIME:** August 9, 2010
- AIRCRAFT:** DeHavilland Canada DHC-3 "Turbine Otter", N455A

B. GROUP MEMBERS:

Chairman: Robert L. Swaim
 Washington, DC

C. SUMMARY:

On August 9, 2010, about 1442 Alaska daylight time (ADT), a single engine, turbine-powered, amphibious float-equipped de Havilland DHC-3T airplane, N455A, impacted mountainous tree-covered terrain about 10 miles northeast of Aleknagik, Alaska. Of the nine people aboard, the airline transport pilot and four passengers died at the scene, and four passengers sustained serious injuries. The airplane sustained substantial damage. The flight was operated by General Communication, Incorporated (GCI), Anchorage, Alaska, under the provisions of 14 *Code of Federal Regulations* (CFR) Part 91. The flight originated at a GCI-owned remote fishing lodge on the shoreline of Lake Nerka at about 1427 ADT and was en route to a remote sport fishing camp on the banks of the Nushagak River, about 52 miles southeast of the GCI lodge. At the time of the accident, marginal visual meteorological conditions were reported at the Dillingham Airport, about 18 miles south of the accident site; however, the weather conditions at the accident site at that time are not known. No flight plan was filed.

This addendum provides weight and balance information for the airplane.

D. DETAILS OF THE INVESTIGATION:

The following table provides the weight and balance information that would have existed at the time of the accident, prior to addition of occupants, baggage, and fuel. The source of data for seat row station locations was the Installed Equipment List for this airplane. (See Attachment 1 for the empty weight data and Attachment 2 for the seat and loading source.)

ITEM	WEIGHT	ARM	MOMENT
	POUNDS	INCHES	
Empty weight	5423	131.198	711486.754
Pilot		98	
Cockpit passenger		98	
Seat 1 Left		137	
Seat 1 Right		137	
Seat 2 Left		165	
Seat 2 Right		165	
Seat 3 Left		195	
Seat 3 Right		195	
Seat 4 Right		218	
Seat 5 Left or Right		250	
Baggage, Aft (Est.)		279	
Fuel, 120 gallons ¹		154	
Oil, engine, 6 qts	(Included)	-21.9	(Included)
Oil, tank, 2 qts	(Included)	9	(Included)
TOTALS	5423	131.198	711486.754
Allowable Gross Weight (pounds)	8,000	Note: See text regarding 8,367 pound limit.	

Table 1. Weight and balance items at the time of the accident.

The last actual weighing of the airplane took place at Kal-Air Repair on April 26, 2005, following the engine change from piston to turbopropeller. The 2005 record showed that the airplane had been weighed with full oil and with residual fuel. (See Attachment 3)

The weight and balance form created by Kal-Air was superseded when the recorded empty weight was increased 14 pounds on April 15, 2008. The revised weight and balance sheet was created by a mathematical revision to the data from April 26, 2005, in accordance with FAA Advisory Circular (AC) 43.13-1B and -2A. The 2008 weight increase was from a modification that installed parts to the wings, per AOG Air Support Supplemental Type Certificate (STC) # SA00438NY. (See Attachment 4) The STC contains a “Description of Type Design Change” that stated the change was to provide an:

¹ The operating manual states that fuel is drawn from the forward tank for taxi and takeoff, then in order from the aft, then mid, then forward fuel tanks. Fuel selection is manual.

Increase in maximum gross weight to 8367 pounds in accordance with AOG Air Support Inc, Top Drawing No. AOG-03-001-1, Revision A, dated December 17, 1997.


The physical modifications to the wing were performed and approved in accordance with the requirements for use of FAA Form 337, titled Major Repair and Alteration, dated February 20, 2007.

An inconsistency was found within the STC documentation that had been obtained for the modification. The STC contained an Approved Configuration List that citing specific engines and floats that were required to obtain approval for operation at the increased gross weight. The Garrett/Honeywell turbine engine and Wipaire Model 8000 floats that the accident airplane was equipped with were not in the list.

The inconsistency in the AOG documentation was that the Approved Configuration List did not include the Wipaire Wipline Model 8000 floats, but the Operating Limits specifically included a set of operational limits for that model. (See Attachment 5)

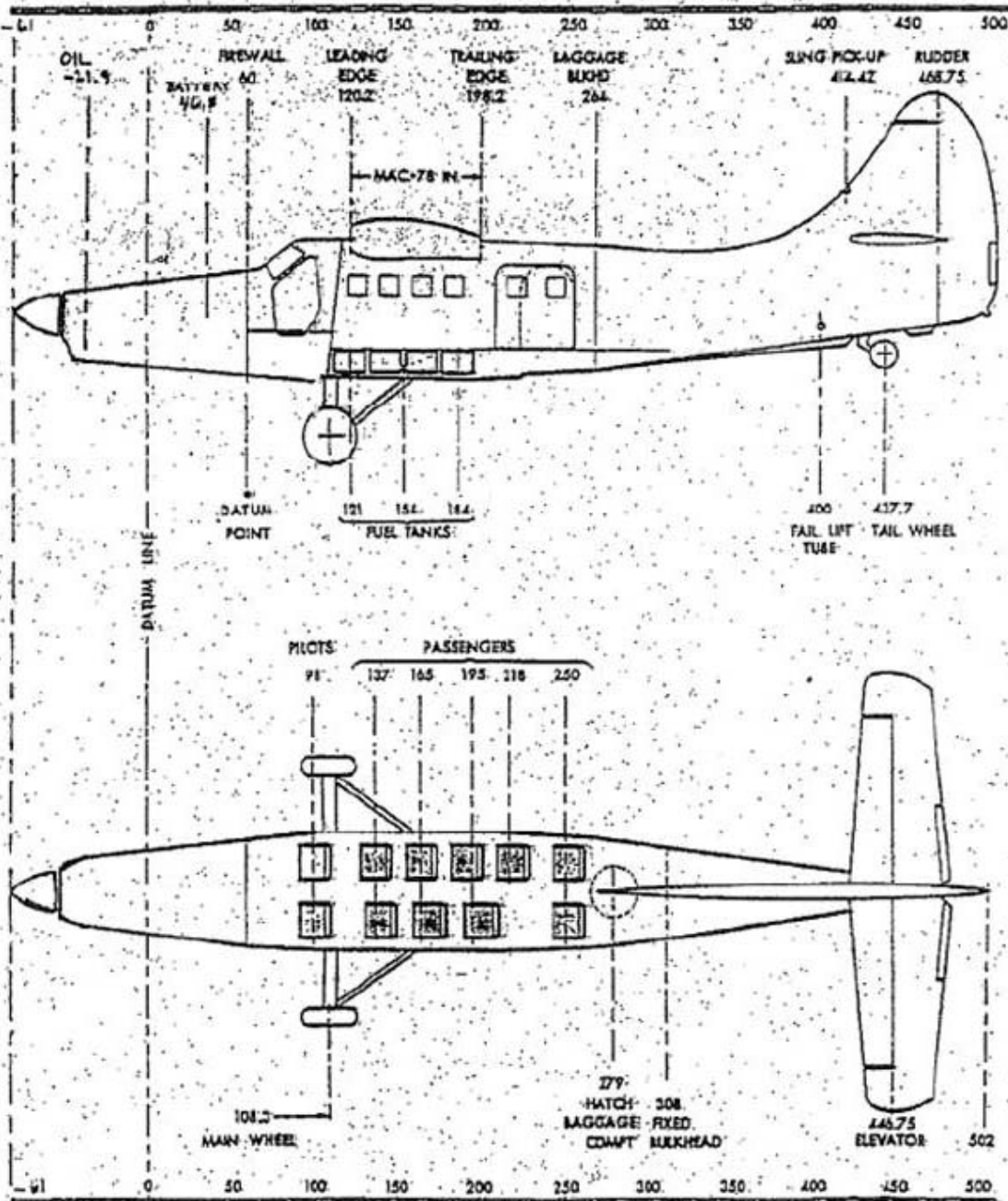
AOG Air Support closed between when the modification was installed and the date of the accident so could not be reached for clarification.

ATTACHMENT 1
Most recent weight and balance data.

EQUIPMENT CHANGE - WEIGHT & BALANCE			
REG. NO. N455A	MODEL DHC3	Serial No. 206	
Items: (Description / P/N / S/N)	Weight	Arm	Moments
	Pounds	Inches	Inch/Pounds
Previous Aircraft Empty Weight:	5409	131.1	709330.5
			0
Add Lift Strut Cuffs	14	154	2156
			0
			0
			0
			0
(User records the removed/installed equipment with actual weights (B) and locations (C).)			0
			0
			0
			0
			0
			0
			0
			0
Totals	5423		711486.5
(User records the weight & balance info from his current records.)			
A. Old Empty Weight	5409	Pounds	
B. Old Empty CG	131.1	Inches	
C. Old Empty Weight CG Moment	709330.5	Inch/Pounds	
D. Max Gross Weight	8000	Pounds	
E. Old Useful Load	2591	Pounds	
(The new values are automatically calculated and the results shown below.)			
A. New Empty Weight	5423	Pounds	
B. New Empty CG	131.198	Inches	
C. New Empty Weight CG Moment	711486.5	Inch/Pounds	
D. Max Gross Weight	8000	Pounds	
E. New Useful Load	2577	Pounds	
This new weight & balance information superseads all previous weight and balance data. For aircraft loading, see instructions in Weight & Balance Section of Aircraft Flight Manual.			
FAA Form 337 Completed?	<u>Y</u>	N	
Equipment List Amended?	<u>Y</u>	N	
Alan J. Hawsey		<u>4/18/2008</u>	
Notes:			
This form may also be used for Metric CG calculations. For Metric, change Pounds to Kilograms and Inches to Meters.			

ATTACHMENT 2

Installed equipment list and page from the Texas Turbines Airplane Flight Manual Supplement, used for seat station data and showing addition of wing cuff parts for STC SA00438NY.



Tailwind Aviation

INSTALLED EQUIPMENT LIST

DATE	MODEL	REGISTRATION #	SERIAL #	SIGNATURE
5/22/98	DHC 3	N455A	206	<i>[Signature]</i> APP 5/27/98
ITEM	WEIGHT	ARM	MOMENT	
PROPELLER - HYDROMATIC	300.0	13	3900	
STARTER - 1416	25.0	54	1350	
ALTERNATOR - 7555-1	12.0	50	600	
CONTROL COLUMN - DUAL (ADDITIONAL)	4.0	83	332	
PILOTS SEAT AND LAP HARNESS	15.0	105	1575	
CO-PILOTS SEAT AND LAP HARNESS	19.0	105	1995	
PILOT AND COPILOT SHOULDER HARNESS	6.0	111	666	
FIRST ROW CABIN SEAT WITH BELT - LH	8.0	138	1104	
FIRST ROW CABIN SEAT WITH BELT - RH	8.0	130	1040	
SECOND ROW CABIN SEAT WITH BELT - LH	8.0	168	1344	
SECOND ROW CABIN SEAT WITH BELT - RH	8.0	163	1304	
THIRD ROW CABIN SEAT WITH BELT - LH	8.0	199	1592	
THIRD ROW CABIN SEAT WITH BELT - RH	8.0	190	1520	
FOURTH ROW CABIN SEAT WITH BELT - RH	8.0	218	1744	
REAR CABIN SEAT WITH BELT - LH	8.0	250	2000	
REAR CABIN SEAT WITH BELT - RH	8.0	250	2000	
BATTERY - AN 3151	56.0	301	16856	
HAND HELD FIRE EXTINGUISHER	7.0	106	742	
WIPAIRE 8000 AMPHIBIOUS FLOATS (COMPLETE)				
VENTRAL FIN	12.0	444	5328	
APOLLO 2001 NMS GPS	3.6	68	245	
ARGUS 3000 MOVING MAP	4.0	66	262	
KING KY 96 VHF COM	2.8	68	190	
NAT AA8 - 063 INTERCOM	.7	72	50	
KING KT 76A TRANSPONDER	3.1	68	211	
AMERIKING AK 350 ALTITUDE ENCODER	.4	71	28	
ARTEX ELT 115 406 ELT AND TRAY	4.1	301	1232	
LAKE AND AIR LANDING GEAR ADVISORY SYSTEM				
DUAL LANDING LIGHTS WITH PULSLITE FLASHER				
Lift STRUT Cuffs	14.0	154	2156	

ATTACHMENT 3
Prior weight and balance form

KAL-AIR REPAIR LTD

AIRCRAFT REBUILDERS

6400 TRONSON ROAD, VERNON, BRITISH COLUMBIA V1H 1N5 CANADA
250-545-4886 email: kalair@junction.net FAX 250-545-5080 www.KalairRepair.com

AIRCRAFT WEIGHT AND BALANCE REPORT

Date APRIL 26, 2005

Manufacturer Dehavilland Model DHC-3

Serial Number 206 Registration N455A

Datum Location: 60" Forward of the Firewall

Levelling Means: Aft Cabin Floor Rails

Landing Gear Configuration: Wipline 8000 Floats with Ventral Fin

<u>Item</u>	<u>Weight(Lb)</u>	<u>Arm(In)</u>	<u>Moment(Lb In)</u>
Aircraft Empty Weight	5409.00	131.10	709330.50

C of G = 131.10 Inches Aft of Datum

Licensed Gross Weight Sea Plane 8000 Lb Empty Weight 5409 Lb Useful Load 2591 Lb

Remarks Aircraft Weighed With Full Oil & Residual Fuel

The maintenance described above has been performed in accordance with the applicable standards of airworthiness.

Date: APRIL 26, 2005 Signature [Signature] Licence No [Redacted]

Kal-Air Repair Ltd
AMO# 129-91

Supervised by 4-12-05

ATTACHMENT 4

AOG Air Support, Inc.
Supplemental Type Certificate SA00438NY and supporting documents



U.S. Department of
Transportation
Federal Aviation
Administration

MAJOR REPAIR AND ALTERATION (Airframe, Powerplant, Propeller, or Appliance)

Form Approved
OMB No. 2120-0020
11/30/2007

Electronic Tracking Number

For FAA Use Only

INSTRUCTIONS: Print or type all entries. See FAR 43.9, FAR 43 Appendix B, and AC 43.9-1 (or subsequent revision thereof) for instructions and disposition of this form. This report is required by law (49 U.S.C. 1421). Failure to report can result in a civil penalty not to exceed \$1,000 for each such violation (Section 901 Federal Aviation Act 1958)

1. Aircraft	Nationality and Registration Mark N455A	Serial No. 206	
	Make Dehaviland	Model DHC 3T	Series
2. Owner	Name (As shown on registration certificate) General Communications Inc		Address (As shown on registration certificate)
			Address: [REDACTED] City: Anchorage State: AK Zip: 99503 Country: USA

3. For FAA Use Only

4. Type		5. Unit Identification			
Repair	Alteration	Unit	Make	Model	Serial Number
<input type="checkbox"/>	<input checked="" type="checkbox"/>	AIRFRAME	_____	(As described in item 1 above)	_____
<input type="checkbox"/>	<input type="checkbox"/>	POWERPLANT			
<input type="checkbox"/>	<input type="checkbox"/>	PROPELLER			
<input type="checkbox"/>	<input type="checkbox"/>	APPLIANCE	Type		
			Manufacturer		

6. Conformity Statement

A. Agency's Name and Address		B. Kind of Agency	
Name: Cary Foster		<input checked="" type="checkbox"/> U.S. Certificated Mechanic	<input type="checkbox"/> Manufacturer
Address: [REDACTED]		<input type="checkbox"/> Foreign Certificated Mechanic	C. Certificate No.
City: Anchorage State: AK		<input type="checkbox"/> Certificated Repair Station	[REDACTED]
Zip: 99507 Country: USA		<input type="checkbox"/> Certificated Maintenance Organization	

D. I certify that the repair and/or alteration made to the unit(s) identified in item 5 above and described on the reverse or attachments hereto have been made in accordance with the requirements of Part 43 of the U.S. Federal Aviation Regulations and that the information furnished herein is true and correct to the best of my knowledge.

Extended range fuel per 14 CFR Part 43 App. B <input type="checkbox"/>	Signature/Date of Authorized Individual Cary Foster 2/20/2007
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7. Approval for Return to Service

Pursuant to the authority given persons specified below, the unit identified in item 5 was inspected in the manner prescribed by the Administrator of the Federal Aviation Administration and is APPROVED REJECTED

BY	FAA Fit Standards Inspector	Manufacturer	Maintenance Organization	Person Approved by Canadian Department of Transport
	FAA Designee	Repair Station	<input checked="" type="checkbox"/> Inspection Authorization	Other (Specify)

Certificate or Designation No. IA [REDACTED]	Signature/Date of Authorized Individual Cary Foster 2/20/2007
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NOTICE

Weight and balance or operating limitation changes shall be entered in the appropriate aircraft record. An alteration must be compatible with all previous alterations to assure continued conformity with the applicable airworthiness requirements.

8. Description of Work Accomplished

(If more space is required, attach additional sheets. Identify with aircraft nationality and registration mark and date work completed.)

N455A

2/20/2007

Nationality and Registration Mark

Date

Installed STC #SA00438NY AOG up gross kit, in accordance with installation instruction. Supplied owner with Continued Airworthiness instructions.

Additional Sheets Are Attached

United States of America
Department of Transportation -- Federal Aviation Administration

Supplemental Type Certificate

IMPORT

Number SA00438NY

This certificate issued to AOG Air Support Inc.
PO Box 2340, Station R
Kelowna, British Columbia V1X 6A5
Canada

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 of the Civil Air Regulations.

Original Product -- Type Certificate Number : A-815

Make : DeHavilland

Model : DHC-3

THIS STA/STC AUTHORIZED FOR
USE ON ONE AIRPLANE ONLY

REGISTRATION # N455A
SERIAL # 206

Description of Type Design Change :

Increase in maximum gross weight to 8367 pounds in accordance with AOG Air Support Inc., Top Drawing No. AOG-03-001-1, Revision A, dated December 17, 1997.

(See STC SA 95-32)

Limitations and Conditions :

1. Refer to Approved Configuration List on Page 2 for limitations and required documents.
2. The Maintenance Manual Supplement of AOG Air Support listed in the Approved Configuration List is required for Continued Airworthiness of the aircraft following the modification described.
3. Compatibility of this design change with previously approved modifications must be determined by the installer.
4. If the holder agrees to permit another person to use the certificate to alter the product, the holder shall give the other person written evidence of that permission.

(See Continuation Sheet 2)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application : January 06, 1996

Date issued :

Date of issuance : May 31, 1996

Date amended : June 22, 1998, September 1, 2000,
December 2, 2004



By direction of the Administrator

Vito A. Pulera

(Signature)
For Vito A. Pulera
Manager, New York Aircraft Certification Office

(Title)

Any alteration of this certificate is punishable by a fine of not exceeding \$1,000, or imprisonment not exceeding 3 years, or both.

United States of America
 Department of Transportation -- Federal Aviation Administration
Supplemental Type Certificate
 (Continuation Sheet)

Number SA00438NY
 Amendment Date: December 2, 2004

APPROVED CONFIGURATION LIST

CONFIGURATION ITEM	1	2	3
Addition Required Installation		Baron STOL Kit per STC SA00287NY (STA SA94-114)	
Maximum Gross Weight (Lbs.)	8367	8367	8367
Engine	P&W PT6A-135 or PT6A-135A or PT6A-34 per STC SA3777NM (STA SA89-32)	P&W R1340-59, R1340-61, S1H1-G and S3H1-G per Type Certificate A-815 (A-27)	Pezetel PZL ASZ-621R-M18 per STC SA327NE (STA SA83-18)
Floats	Any FAA approved float installation, up to and including EDO 7850 size, which provides a minimum buoyancy to 7530 floats.	Any FAA approved float installation, up to and including EDO 7850 size, which provides a minimum buoyancy to 7530 floats.	Any FAA approved float installation, up to and including EDO 7850 size, which provides a minimum buoyancy to 7530 floats.
Flight Manual Supplement	No. 5, Revision C, DOT Approved 7/28/00	No. 6, Revision A, DOT Approved 6/6/00	No. 7, Revision B, DOT Approved 6/6/00
AOG Air Support Inc. Maintenance Manual Supplement	MMS-191-95-001, Rev. C, DOT Approved September 27, 2004	MMS-191-95-001, Rev. C, DOT Approved September 27, 2004	MMS-191-95-001, Rev. C, DOT Approved September 27, 2004

.....END.....



Transport Canada Transports Canada

Department of Transport

Supplemental Type Certificate

This approval is issued to:

Stolairus Aviation Inc.
6095 Airport Way
Kelowna, British Columbia
Canada V1V 1S1

Number: SA95-32

Issue No.: 7

Approval Date: March 28, 1995

Issue Date: June 29, 2007

Responsible Office: Pacific
Aircraft/Engine Type or Model: DEHAVILLAND DHC-3
Canadian Type Certificate or Equivalent: A-27
Description of Type Design Change: Increase in Maximum Gross Weight to 8367 Pounds

Installation/Operating Data, Required Equipment and Limitations:
Gross Weight increase is to be in accordance with AOG Air Support Top Drawing Number AOG-03-001-1, New Issue, dated August 11, 1995.

Basis of Certification:

CAR Part 3 as amended to November 1, 1949, plus CAR 3.242 as amended May 15, 1956

Required Documentation:

1. Refer to Approved Configuration List on Continuation Sheet for appropriate AOG Air Support Inc. Flight Manual Supplement (FMS)
2. AOG Air Support Inc. Maintenance Manual Supplement No. MMS-191-95-001, Revision C, DOT approved September 27, 2004 or later approved revision

Compliance with section B, Airworthiness Limitations of wing strut service life limit is mandatory.

⊙ TRANSFER FROM
C-FZDV (Serial 349)
OWNED BY AIR TINDI

THIS ST/STC AUTHORIZED FOR
USE ON ONE AIRPLANE ONLY

REGISTRATION # N455A
SERIAL # 206

KIT #
B400-89



Conditions: This approval is only applicable to the type/model of aeronautical product specified therein. Prior to incorporating this modification, the installer shall establish that the interrelationship between this change and any other modification(s) incorporated will not adversely affect the airworthiness of the modified product.

Natasa Mudrinic
For Minister of Transport

Canada



(Continuation Sheet)

Number: SA95-32 Issue 7

NOTE: THIS ADDENDUM SHALL REMAIN PART OF THE CERTIFICATE REFERRED TO THEREIN.

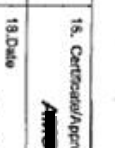
Limitations:

1. Maximum gross weight is 8367 pounds, and
2. STC applicable only to DHC-3 Otter aircraft conforming to:
 - i) An approved configuration as defined on Continuation Sheet, and
 - ii) An approved float installation, up to and including EDO 7850 size, which provide a minimum buoyancy equivalent to 7530 floats.(see respective FMS)

Approved Configuration List:

<u>No</u>	<u>Powerplant Installations</u>	<u>AOG FMS</u> <u>NO/ DOT approved</u>	<u>Additional Required Installations</u>
1	Pratt & Whitney PT6A-34, -135, -135A, per TC STC SA89-32	5, Rev. C 28, July 2000	1. Refer to Limitations above
2	Pratt & Whitney R-1340-9, R-1340-61, S1H1-G and S3H1-G per TC Type Certificate A-27	6, Rev. A, 6 June, 2000	1. Installation of Baron STOL kit per SA94-114, and 2. Refer to Limitations above
3	Pezetel PZL Asz-621R-M18 per TSTC SA83-18	7, Rev. B, 6 June, 2000	1. Refer to Limitations above

-- End --

1. Approving national aviation authority/country Transport Canada		2. AUTHORIZED RELEASE CERTIFICATE TCCA 24-0078		3. Form Tracking No. B400-89	
4. Approved Organization Name and Address AOG AIR SUPPORT INC. 6095 Airport Way, Kelowna, BC V1V 1S1			5. Work Order/Contract/Invoice - Don de travail/contrat/facture B400-89		
6. Item 1	7. Description 400 Lb. Upgross Kit	8. Part No. - No de piece B400-89	9. Eligibility DHC-3	10. Qty 1	11. Serial/Batch No. B400-89
					12. Status/Work Manufactured New
13. Remarks TO BE INSTALLED IN ACCORDANCE WITH AOG AIR SUPPORT INC. INSTALLATION INSTRUCTIONS ON AIRCRAFT REGISTRATION #C-FZDV, s/n 349 AND STC. TRANSDUCER TO NYSSA (Serial 206) (Never installed on C-FZDV)					
14. Certifies that the items identified above were manufactured in conformity to: <input checked="" type="checkbox"/> Approved design data and are in condition for safe operation. <input type="checkbox"/> Non-approved design data specified in block 13.					
15. Authorized Signature 		16. Certificate/Approval ref. No. Approved		19. Date April 13, 2006	
17. Name Bill Ross		18. Date April 13, 2006		20. Authorized Signature N/A	
		21. Certificate/Approval ref. No. N/A		22. Date (dd/mm/yyyy) N/A	
19. Certifies that, except where otherwise specified in block 13, the work identified in block 12 and described in block 13 was performed in accordance with CAR 671. <input type="checkbox"/> CAR 671 - Maintenance release. <input type="checkbox"/> Other regulation specified in block 13.					

12/09/2001 *Installer must cross-check eligibility with approved data

ATTACHMENT 5

AOG Air Support, Inc.
Operating Limits that cite Wipline Model 8000 floats.

AOG AIR SUPPORT INC.

CHAPTER I

DESCRIPTION OF AIRCRAFT

This modification increases the gross weight of a Serv-Aero Turbo Otter floatplane to a maximum gross weight of 8367 pounds.

This is accomplished by the installation of AOG Air Support Inc. 400 LB. Strut Cuff Mod and a replacement flap indicator plate per AOG Air Support Inc. Installation Instructions # AOG-03-002-2.

When operating a Seaplane Turbo Otter modified by this STA, this, AFM Supplement must be used in conjunction with the Serv-Aero Turbo Otter FAA Approved Airplane Flight Manual Supplement Report 041288.

The information contained herein supplements or supersedes Serv-Aero Otter FAA Approved Airplane Flight Manual Supplement Report 041288 and/or the basic manual only in those areas listed herein. For Limitations and procedures information not contained in this supplement, consult Serv-Aero Turbo Otter FAA Approved Flight Manual Supplement Report 041288 and/or the basic DHC-3 Otter Flight Manual.

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AOG AIR SUPPORT INC.
OPERATING LIMITS

CHAPTER IV
GENERAL REMARKS

The aircraft must be operated according to the following limitations and instructions.

AIRSPPEED LIMITS (MPH)	IAS	CAS
SEAPLANE		
MAXIMUM OPERATING LIMIT SPEED, V_{mo}	133	137
MANEUVERING SPEED, V_a	124	128
MAXIMUM FLAP EXTENDED SPEED, V_{fe}	91	95

FLOATS: This modification is approved for floats which includes the following categories or models.

- A/ EDO 7850 floats,
- B/ EDO 7170 floats with AOG Air Support Inc 22 aft Extension per STA SF 95-1
- C/ EDO 7490 floats that have had an approved conversion to remove the amphibious gear, or installation of approved flotation elements (meeting a minimum buoyancy of 7530 lbs).
- D/ WHIPLINE model 8000 seaplane or amphibious float installed in accordance with FAA STC SA331CH.
- E/ OR any other approved float installation with a minimum buoyancy of 7530 pounds.

GROSS WEIGHT

Maximum take-off and landing weight: 8367 lbs.

NOTE: TAKE-OFF & LANDING WEIGHTS FOR WIPLINE 8000 FLOATS

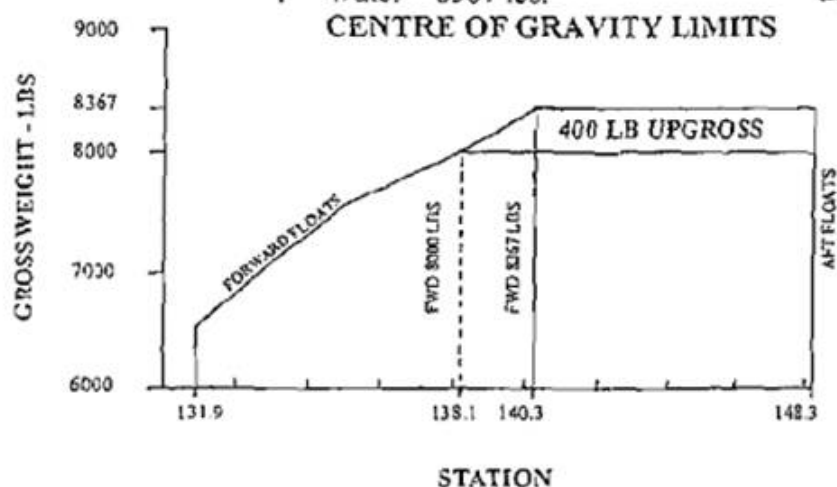
Max Take-off weight: Wheels 8367 lbs.

: Water 8367 lbs.

Max Landing weight: Wheels 8000 lbs.

: Water 8367 lbs.

*N455A
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REVISION: " C"
REVISION DATE: JULY 28, 2000
DOT APPROVED