Global Express Series Operational Update

Rainer Hau **Customer Liaison Pilot**

0750 – 0830 EST 06 Dec 2016

Global Express Series Operational Update

Rainer Hau **Customer Liaison Pilot**

1250 – 1330 EST 06 Dec 2016

AGENDA

- **FLEET STATISTICS**
- CURRENT OPERATIONAL ISSUES
- ADVISORY WIRES, TRs, and UPDATES
- NICE TO KNOW…
- QUESTIONS?

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Global Fleet Statistics

Model	Total Number of Aircraft *	In Service Number of Aircraft
Global 700	*148*	*143*
Global XRS	*163*	*161*
Global 5000	*115*	*112*
Global 6000	*210*	*209*
Global V5000	*98*	*98*
Fleet Size	734	723

- In-Service Fleet Hours/Landings
  - 1,957,921 Flight Hours
  - 718,126 Landings
- Average Annual In-Service Utilization
  - 377 Flight Hours
  - 135 Landings
  - 2.8 Hours Per Flight
- Total Fleet Hours/Landings
  - 1,976,936 Flight Hours
  - 725,496 Landings

*Excludes aircraft in production and completion
AS OF October 31, 2016

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Global Fleet Statistics

Model	Number of A/C		Cumulative Hours		Cumulative Landings		High Time Aircraft (Hours)**	High Time Aircraft (Cycles)**
	Total*	In-Service	Total*	In-Service	Total*	In-Service		
GLOBAL 700	148	143	841,686	825,072	311,110	304,993	SN 9035 (12,749)	SN 9098 (7,441)
GLOBAL XRS	163	161	477,306	476,831	162,330	162,102	SN 9355 (23,378)	SN 9175 (2,597)
GLOBAL 5000	115	113	320,214	318,598	128,924	128,046	SN 9219 (7,461)	SN 9155 (3,496)
GLOBAL 6000	210	209	239,081	239,034	82,561	82,540	SN 9506 (10,507)	SN 9475 (1,893)
GLOBAL V5000	98	98	98,649	98,386	40,571	40,445	SN 9480 (4,088)	SN 9480 (1,798)

*Excludes aircraft in production and completion
**Current in-service aircrafts only

As of October 31, 2016

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Global Fleet Annual Utilization

Model	Last 12 Months Annual Average Flight Hours	Last 12 Months Annual Average Landings	Last 12 Months Average Flight Duration
Global 700	313	108	2.9
Global XRS	339	120	2.8
Global 5000	306	120	2.6
Global 6000	488	168	2.9
Global V5000	403	156	2.6

As of October 31, 2016

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AGENDA

- FLEET STATISTICS
- **CURRENT OPERATIONAL ISSUES**
- ADVISORY WIRES, TRs, and UPDATES
- NICE TO KNOW…
- QUESTIONS?

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CURRENT OPERATIONAL ISSUES

- Global Express crosswind operating techniques/issues - Updated
- YD In-op Limitations - Explanation
- Hold Entry Limitation
- Limitation on Use of Max Spoiler
- ‘Swept Wing Growth’ or ‘Wing Creep’ 3’2”?
- APU Shutdown best practice
- Steep Approach Definition
- Cold Weather Operartions
- Brake Warming Procedure
- Terminating Check – Procedural Changes …APU
- Updates to the ICAO Flight Plan Guidance (on CIC Website)
- Differences between Global Vision and Honeywell Global

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CURRENT OPERATIONAL ISSUES - V_{REF}

**Global Express V_{REF} – Minimum landing reference speed

- based on 1.33 (or 1.30) V_S versus 1.2 V_S (or something else) for other aircraft
- AFM performance data provided for V_{REF}

Approved additions to V_{REF} detailed in AFM:

- Winds and gusts: add ½ gust up to max of 10 knots;
- One Engine Inoperative: +5 knots;
- Contingency configurations such as SLATS OUT / FLAP ZERO, etc:
  Add corrections as detailed in the QRH procedure

**Ref: AFM 06-01-1

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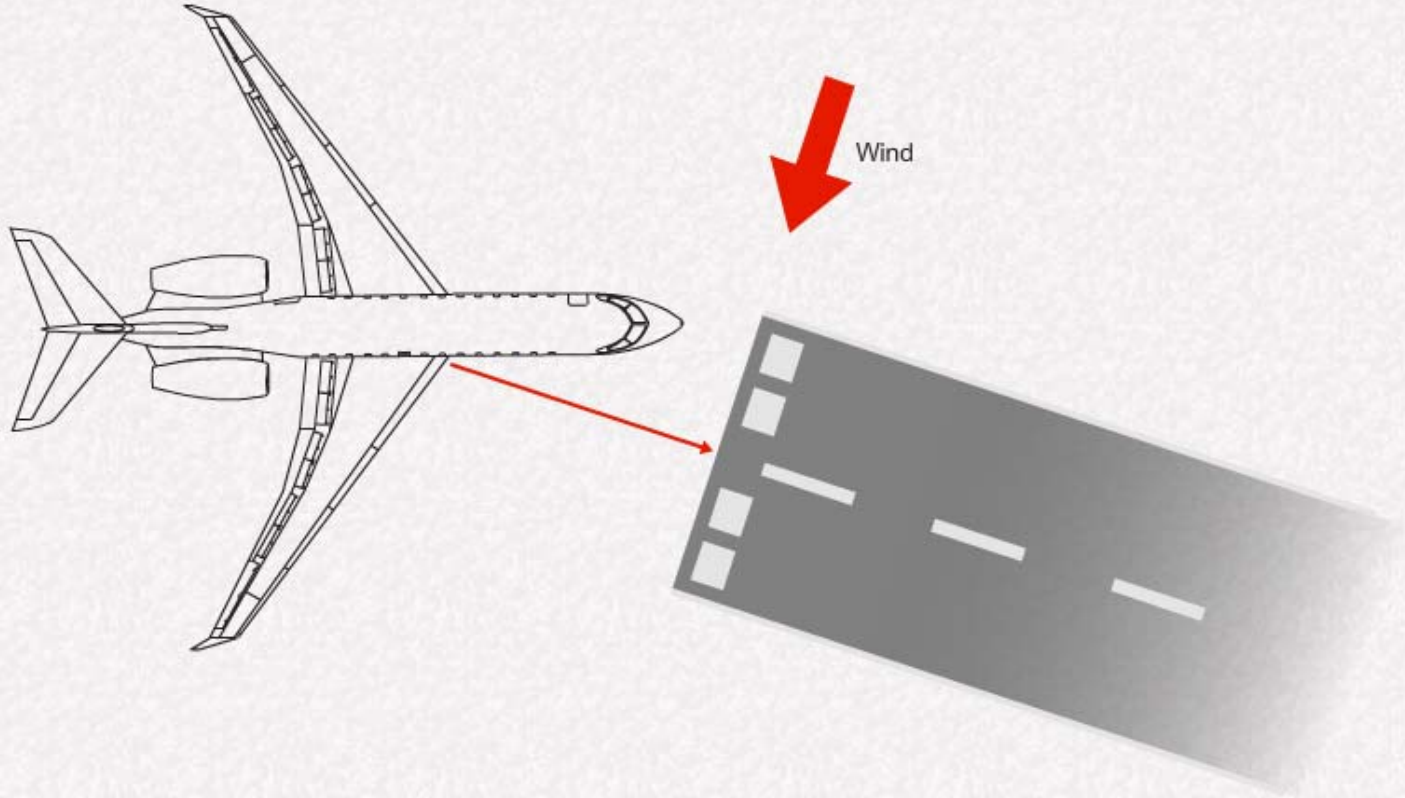
CROSSWIND LANDINGS

Approach

- Wings level crab approach:
  - Aircraft pointing into wind
  - Tracking along the runway centerline



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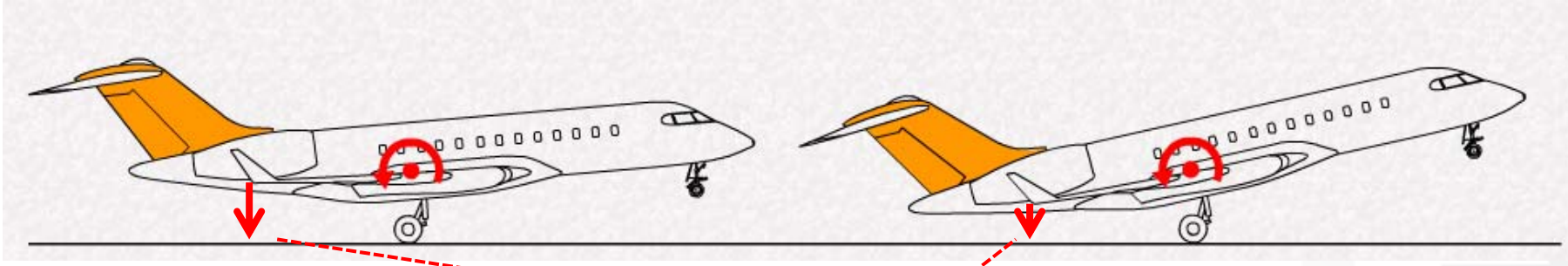
CROSSWIND LANDINGS – Recommended Technique

Effect of Pitch on wing-tip contact angle

PITCH angle	Bank Angle for wing tip contact (ground, no lift)	In Flight (lift, increased dihedral)
0	10.6	13.5
3	9.6	12.3
6	8.5	11.2
9	7.4	10.1



Wing Tip Clearance
At Touchdown Target Pitch ~ 7°- 8°

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CROSSWIND LANDINGS – Recommended Technique

Flare to Crosswind Landing

- At approximately 30 feet, commence the flare.
- During the latter part of the flare, prior to touchdown:
  - Introduce sufficient rudder to align the aircraft with the runway (de-crab);
  - Simultaneously apply opposite aileron to maintain wings level or very slightly into-wind wing down (max 3°) – avoid down-wind wing low.

- Relatively aggressive control inputs may be required depending on crosswind component and intensity.
- Avoid ‘walking” back and forth on rudder to steer aircraft.
- Do not use rudder to roll the aircraft.
- Do not delay touchdown”

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CROSSWIND LANDINGS – Recommended Technique

- **Maintain crab to compensate for drift while on approach:**
  - **V_{REF} + ½ Gust (max of 10 Kts).**

- **Consider use of autobrake.**

- **Consider use of HUD:**
  - **may channelize attention if intensity not set appropriately or if crew not current with HUD use**
  - **How current are you with the HUD? Should it be used?**

- **During the flare, align with the runway using sufficient rudder and into-wind aileron to keep the wings level or <u>slightly</u> wing down to compensate for drift. - Focus should be on wings level.**

- **Plan a positive landing – put the aircraft on the runway without delay - which is preferable to increasing / extended exposure to crosswind.**

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CROSSWIND LANDINGS – Recommended Technique

- **During gusty crosswind conditions touch down deliberately.**
  - **Delayed touch-down may resultant in drift - may jeopardize safe landing within lateral runway parameters.**

- **Limit bank angles (max 3º) into wind --- FOCUS on WINGS LEVEL**
  - **wing tip strike may occur at approximately 8º of bank.**

- **Accept small amount of crab on touchdown.**

- **During roll-out, apply (increase) crosswind control inputs (aileron into wind) until the aircraft has achieved a normal taxi speed**
  - **Especially important on wet/contaminated surfaces**

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CROSSWIND LANDINGS – Recommended Technique

DO NOT

- **Hold off the touch-down to achieve a smooth landing!**
  - **It is not appropriate to try to finesse a landing with significant crosswind, especially with gusty conditions.**

REMEMBER

- **The wing sweep (34º) and span cause the wing tips to be closer to the ground as the pitch is increased during flare.**

More detailed information on crosswind operations of the Global series of aircraft is available on-line. It is free at the following URL:
http://www.batraining.com/elearning/freecourses/crosswind

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CURRENT OPERATIONAL ISSUES – all Global Express Series
Refuel/Defuel Manifold Cracking

Cause - overpressure caused by fuel thermal expansion within the refuel/defuel manifold

- expansion of fuel trapped in the refuel/defuel manifold can potentially generate a pressure rise sufficient to surpass the manifold's burst pressure. The probability of an over pressure event is higher if the fuel system is serviced and the aircraft is then parked in a very hot environment.

Mitigation Procedure - open the center refuel/defuel valve

- After pressure refueling is completed:
  - Disconnect fueling nozzle
  - Select Fueling Knob to MANUAL - REFUEL
  - Select MANUAL CTR switch to OPEN
  - Select MANUAL CTR switch to CLOSE
  - Select Fueling Knob to OFF

Ref: AW700-28-0558 Refuel/Defuel manifold cracking
August 2, 2016

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Yaw Damper In-Operative Limitations Explanation

- With both YDs inop, the autopilot is inop.
- With one YD inop, the autopilot is operative.

- Honeywell Global:

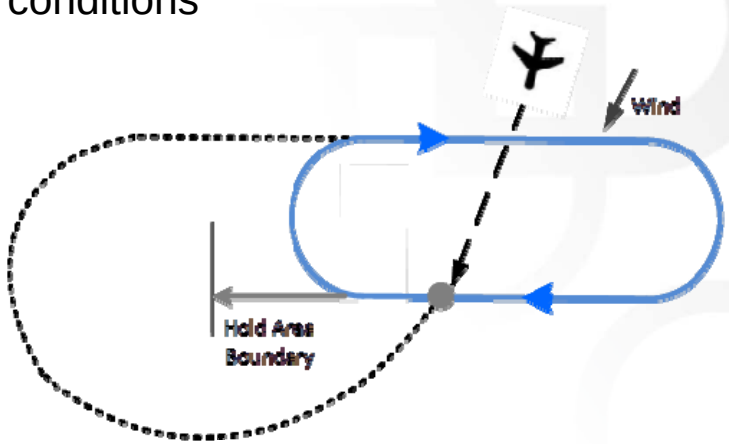
  - The YD hard over malfunction tests with one YD operative always result in the YD tripping off line and not available to help keep the roll upset within limits. With both YDs inoperative, by definition the pilot is manually flying and the max altitude is defined by the maximum altitude where the YD off flight characteristics meet the rules. This results in the max altitude is slightly different between the two cases – one (single YD failure) defined by hardover of the operative YD, and second (dual YD failure) by the basic flight characteristics w/o any YD.

- Global Vision:

  - The R-C Fusion avionics has different architecture and hardovers are not required or applicable. Therefore, single YD ops is the same as dual YD ops. Both YDs failed is same as Classic. Therefore, Vision's only limitation on YD failures is for the dual YD failure. No limitation on single YD."

CURRENT OPERATIONAL ISSUES – Global Vision

- Anomaly discovered during software development involving direct entry into a hold pattern while under FMS guidance
  - The constant bank turn commanded may be less than required for the intercept angle and wind conditions



Limitation:

- Holding patterns with a direct entry may be flown under FMS navigation to the holding fix, then HDG mode with normal bank (30°) must be used during the direct entry turn to the outbound leg. FMS navigation may be used once the aircraft is established in the hold.

- TR BD700-150 and BD700-5000-110 May 18, 2016
- AW700-34-0554 - FMS Direct Entry Hold Overshoot **July 29, 2016**
- V5 Software will fix issue – Q1 2017

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CURRENT OPERATIONAL ISSUES – all Global Express Series

Limitation on Use of MAX Spoiler

This limitation should have been included (AFM & FCOM) since the start of the program and was inadvertently omitted.

- As of April 2016, over 180 aircraft inspected with no issues reported.
- Engineering is reviewing data, etc. – Possible that limitation may be removed if review indicates that there will be no associated issues.

Limitation:

- Use of MAX spoilers is prohibited except during emergency conditions or as required by AFM procedures:
  - **EMERGENCY DESCENT** Procedure (un-annunciated)
  - **EMERGENCY DESCENT**
  - **CABIN ALT**
- Ground occurrences / requirements are not restricted.
  - **GND LIFT DUMP** after landing
  - **DCU 1 FAIL** after landing
  - **DCU 2 FAIL** after landing
- TR BD 700/144 released and then incorporated in REV 18, 04 May 2016
- AW700-27-0556 - Flight Spoiler AFM Limitations - April 6, 2016

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CURRENT OPERATIONAL ISSUES – All Global Express Series

Swept Wing Growth or Wing Creep

- Swept wing aircraft such as Global Express, - subject to a phenomenon known as ‘swept wing growth’ or ‘wing creep’.
- Occurs during a turn when wing tip describes an arc greater than the normal wingspan
  - due to aircraft geometry and landing gear arrangement;
  - effect is less noticeable at moderate curvature of turn;
  - any turn results in some ‘swept wing growth’ that will erode the perceived wing tip clearance.

- Care must be exercised in towing as well as taxiing.

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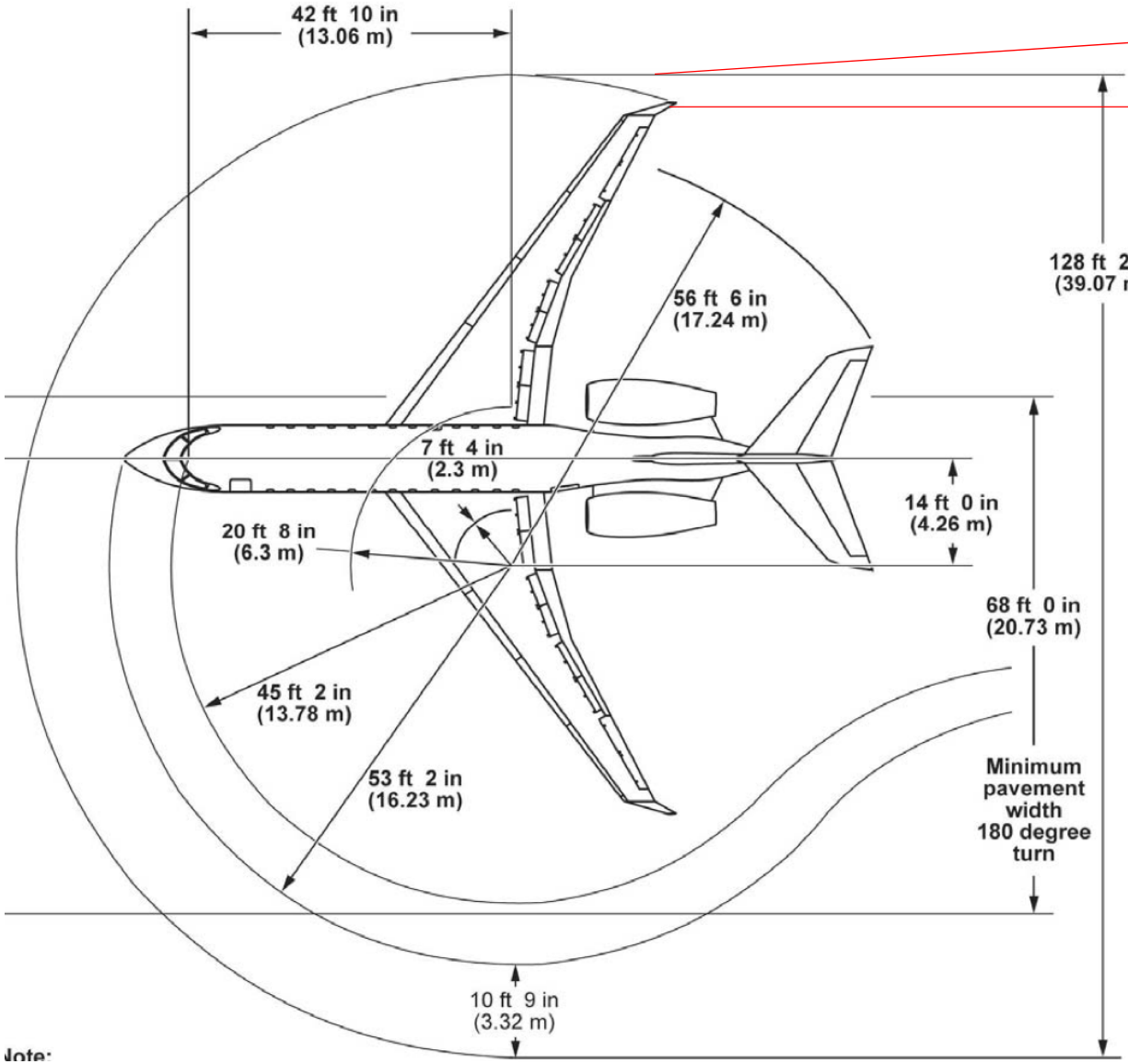
CURRENT OPERATIONAL ISSUES – All Global Express Series

Global Express ‘swept wing growth’ or ‘wing creep’ = 3’ 2” (not labelled in FCOM 2)



Challengers ~ 10”

See FCOM Vol 2
Global Vision:
01-10-28

XRS:
01-10-22

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CURRENT OPERATIONAL ISSUES – All Global Express Series

APU Shutdown Best Practice

Current QRH / FCOM guidance:

8. APU .....Shutdown

When the APU has shutdown (APU RPM<70%)

Before turning off lights and BATTERY MASTER

Several cases of APU door failures or door not closing

At least one case of battery depletion after undetected door failure.

Solution:

Delay Battery OFF until APU RPM and EGT removed from display.

With indications removed APU FADEC is no longer powered,
During door closing, FADEC monitors and if no faults
detected / displayed, none exist.
Switching off battery earlier – fault may not be noticed until next power-up.

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CURRENT OPERATIONAL ISSUES – All Global Express Series

Steep Approach Definitions

Supplement 29 = **STEEPER** than Normal - All Global Series

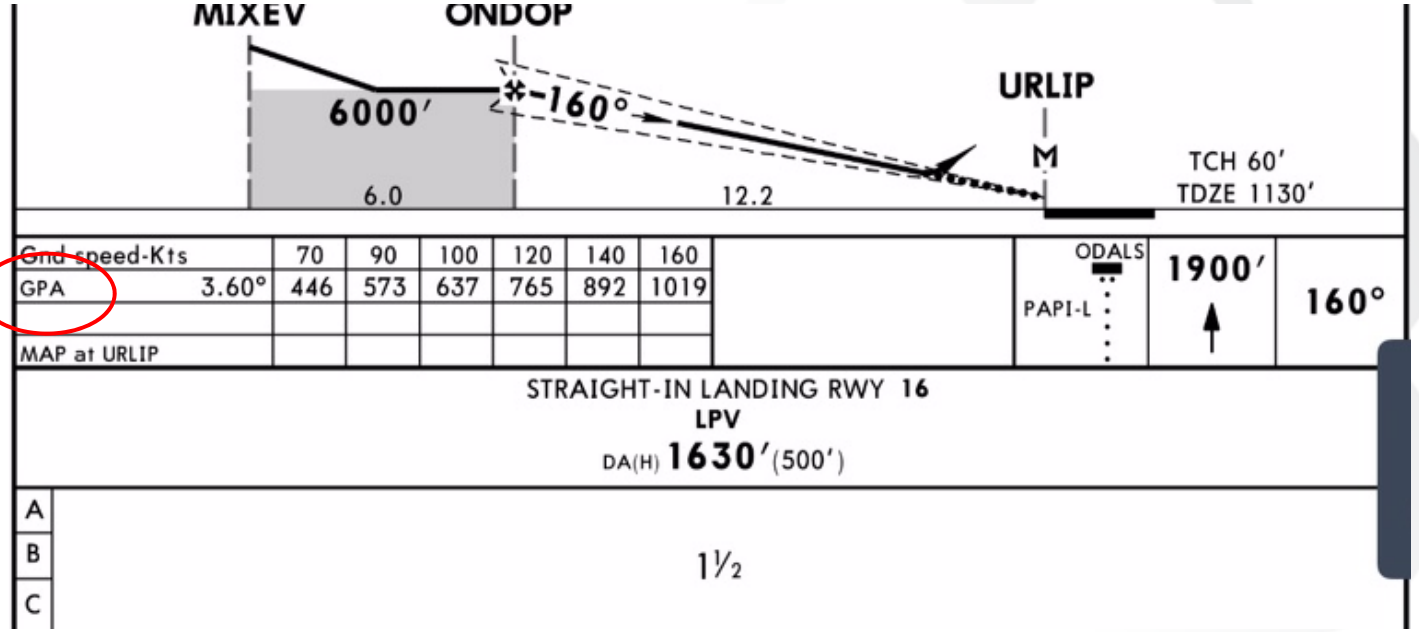
Approaches with Published Glidepath Angles Between 3.5 and 4.5 Degrees

Supplement 40 = **STEEP** - Global Vision only

Approaches with Published Glidepath Angles From 4.5 and 5.5 Degrees

Published runway threshold glidepath angle – ILS or LPV

GPA
GS



CURRENT OPERATIONAL ISSUES – All Global Express Series
Cold Weather Operations

AW700-00-0455, Rev. 3 November 11, 2016 (with active url links)

- Infoservice newsletter available on the CIC website http://cic.bombardier.com/ , within Technical Library > Newsletters > Infoservice > Global > 2016

- Winter ops awareness training courses (free) available via the public area of CIC website http://cic.bombardier.com/ within the “Important Links” section > Winter Operations Awareness and Training, as well as the Bombardier Aircraft Training website http://www.batraining.com/ .
- http://www.batraining.com/elearning/freecourses/icing
- http://www.batraining.com/elearning/freecourses/hot
- http://www.batraining.com/elearning/freecourses/winteropsawareness

- It is the season for winter ops – A good review is highly recommended

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Brake Warming Procedure – to Prevent Frozen Brakes

From FCOM Vol 1 Supplementary Procedures, Cold Weather Operations:

- When operating from runways or taxiways covered or contaminated with water, snow or slush or following overnight parking in known icing conditions, the following steps are applicable in order to prevent freezing of the wheel brakes:
  - During taxi, use light brake applications to warm brakes to approximately 4 units BTMS before take-off.
  - Monitor BTMS during taxi

•Past incidents of frozen brakes:

- •Aircraft washed inside a hangar and took off in dry conditions;
- •Aircraft taxied in wet or slushy conditions without heating brakes before take-off;
- •Wet conditions but short taxi: "…we didn't have time to heat the brakes…".

CURRENT OPERATIONAL ISSUES – All Global Express Series
Terminating Check – Procedural Changes …APU

From FCOM 1 – Terminating Check :

6. CABIN POWER (if installed) ..... OFF

7. WING XFER ..... OFF

8. APU BLEED..... OFF

NOTE

Wait 15 seconds before proceeding to the next step.

9. APU .....Shutdown

When the APU has shutdown (APU RPM<70%):

10. External lights ..... OFF

11. BATTERY MASTER switch ..... OFF

12. Area lights / Fuel / Oil Panels ..... OFF

NOTE

When leaving the airplane with no maintenance personnel in attendance, the doors must be closed.

13. APU BLEED.....AUTO

———— END ————

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CURRENT OPERATIONAL ISSUES – All Global Express Series
ICAO Flight Plan Guidance

From CIC Website:

Latest information on ICAO Flight Plan Guidance:

GEX_XRS_G5000 ICAO FPL(REV4).pdf

GEX_XRS_G5000 Post BATCH3 ICAO FPL(REV3).pdf

GVFD G5000_G6000 ICAO FPL (REV5).pdf

On CIC - steps to getting there:

TECHNICAL LIBRARY

> GENERAL PUBLICATIONS

> Global Express

> pick a model of Global Express

> ICAO Flight Plan

> choose the appropriate model / pdf document

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CURRENT OPERATIONAL ISSUES – Weight and Balance – FMS Curtailed Envelope Amber – 5000 GVFD

CG presentation anomaly (primarily 5000 GVFD)

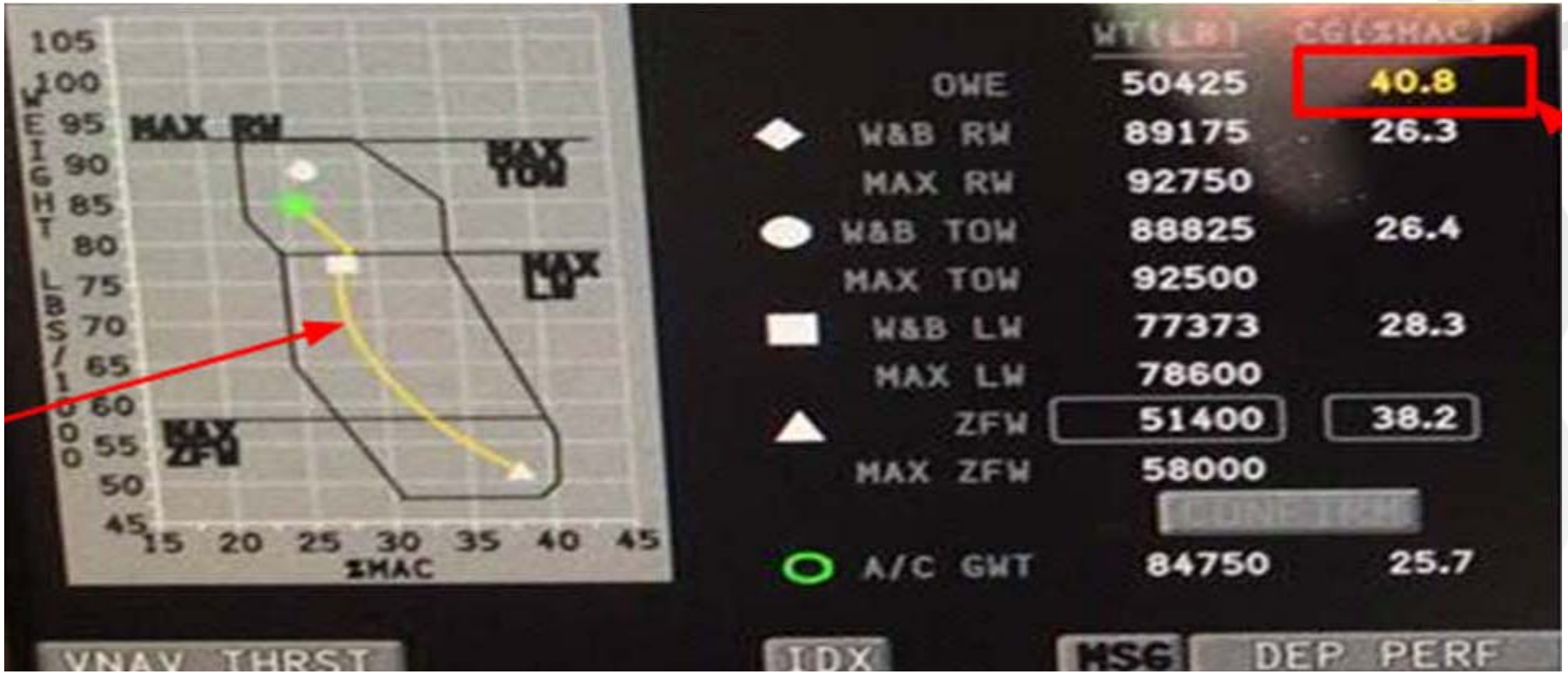
OWE CG (%MAC) value presented amber – intended to be white

- Fuel Burn curve incorrectly shown amber with no "**CHECK WT/BAL**"

AW700-34-0522 Nov 4, 2015

If "**CHECK WT/BAL**" present with envelope "on the edge" of curtailed envelope

Use detailed W&B calculation to resolve "edge of envelope issue"



Weight & Balance Tool – Issued with Bombardier-completed Globals approx. last 30 months – Generic version to be distributed to Training Centers

Disclaimer

AIRCRAFT REGISTRATION: _____ FLIGHT #: _____ FROM: _____ TO: _____

PREPARED BY: _____ CAPTAIN'S SIGNATURE: _____

Detailed crew, baggage, equipment, water, parts, etc, payload details

G6000 LOADSHEET * TRAINING *

A/C 9XXX REV: TBD

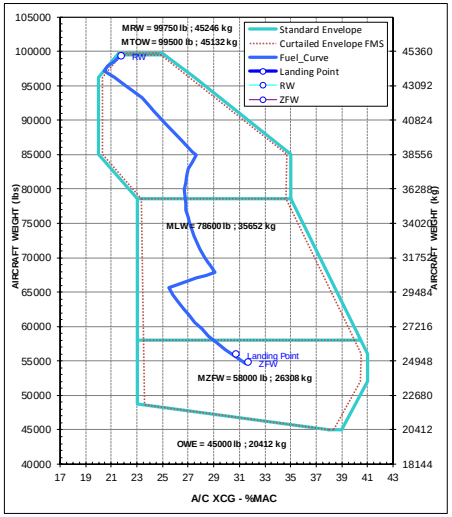
Item Description	Weight [lb]	Weight [kg]	FS Arm [in]	FS Arm [m]	C.G. [%MAC]
TRUE EMPTY WEIGHT (Per RAW-BM700-9XXX Rev TBD)	50950	23110	740.3	18.80	41.3%
Pilot	210.0	95.3	255.0	6.48	
Co-Pilot	210.0	95.3	255.0	6.48	
Cockpit Crew Baggage	60.0	27.2	835.0	21.21	
Jumpseat Occupant	190.0	86.2	285.0	7.24	
Jumpseat Occupant Baggage	30.0	13.6	835.0	21.21	
Crew Rest Occupant	190.0	86.2	398.1	10.11	
Crew Rest Occupant Baggage	30.0	13.6	835.0	21.21	
Cockpit Flight Manuals	30.0	13.6	274.0	6.96	
Flight Manuals (Entrance Enclosure)	80.0	36.3	299.0	7.59	
Supplies & Catering (Galley storage)	350.0	158.8	379.2	9.63	
Maintenance Laptop	12.8	5.8	298.8	7.59	
Storage Box (Contents Only)	60.0	27.2	967.6	24.58	
Tow Bar Shaft	20.6	9.3	982.0	24.94	
Tow Bar Extension	17.8	8.1	982.0	24.94	
Tow Bar Head	24.9	11.3	973.0	24.71	
Potable Water (28.6 U.S. Gal / Max. 238 lb)	238.0	108.0	805.4	20.46	
Life Vests (Qty 16)	21.3	9.7	563.4	14.31	
Life Raft (Mid RHS Divan)	64.9	29.4	632.0	16.05	
Life Raft (Aft RHS Divan)	71.4	32.4	713.2	18.11	
Add/Remove Items					
N/A	0.0	0.0	0.0	0.00	
N/A	0.0	0.0	0.0	0.00	
N/A	0.0	0.0	0.0	0.00	
N/A	0.0	0.0	0.0	0.00	
N/A	0.0	0.0	0.0	0.00	
N/A	0.0	0.0	0.0	0.00	
Others	0.0	0.0	0.0	0.00	
Others	0.0	0.0	0.0	0.00	
Aircraft on ground					
Ballast @ Nose Jacking Point	0.0	0.0	278.0	7.06	
OPERATING WEIGHT EMPTY	52862	23978	731.0	18.57	35.2%
PAYLOAD :					
PAX #1	195.0	88.5	439.6	11.17	
PAX #2 ZONE A	195.0	88.5	439.6	11.17	
PAX #3	195.0	88.5	505.4	12.84	
PAX #4	195.0	88.5	505.4	12.84	
PAX #5	195.0	88.5	557.6	14.16	
PAX #6	195.0	88.5	557.6	14.16	
PAX #7 ZONE B	195.0	88.5	588.6	14.95	
PAX #8	195.0	88.5	620.4	15.76	
PAX #9	0.0	0.0	620.4	15.76	

Adjustments for item addition or removal

- Ballast @ Nose Jacking Point
- OWE
- Zone A, B

Loadsheet No. : 1 Cockpit Crew : 3
Weighing Date : 10-Jun-15 Cabin Crew : 1
Today's Date : 27-Nov-15 PAX : 8

REFERENCE DOCUMENT: RAW-BM700-9XXX Rev TBD



Warnings embedded for any conditions out of limits

Detailed CG Envelope including:

- Standard Envelope
- Curtailed envelope
- Fuel burn curve
- Landing point
- Ramp weight
- Zero fuel weight

The airplane is SAFE for Take-Off / Stable on Ground

NOSE LANDING GEAR LOAD (1900 lb minimum) 9405

Load on Nose Gear

AIRCRAFT STABILITY on ground: SAFE REGION, Towing is allowed

Stability on ground for safe towing

G6000 AIRCRAFT CENTER OF GRAVITY (% MAC)

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Weight & Balance Tool – Issued with Bombardier-completed Globals approx. last 30 months – Generic version to be distributed to Training Centers

Detailed pax loading
- Zones B, C

Payload details

ZFW

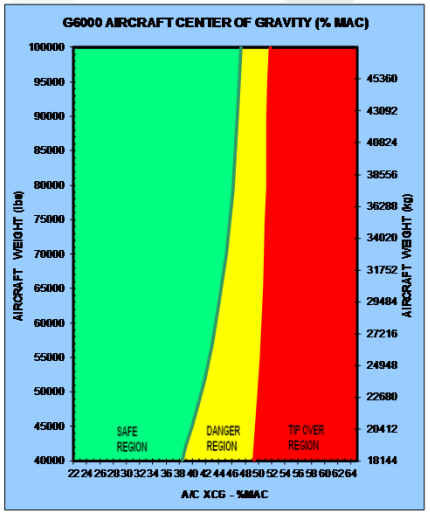
Fuel density calc.
Enter specific gravity

- Max quantity possible per tank
- Ramp Weight
- Landing Weight

- Delta temp for fuel overspill

- Warnings from W&B Manual

PAX #7	ZONE B	195.0	88.5	588.6	14.95	
PAX #8		195.0	88.5	620.4	15.76	
PAX #9		0.0	0.0	620.4	15.76	
PAX #10		0.0	0.0	670.6	17.03	
PAX #11		0.0	0.0	672.2	17.07	
PAX #12	ZONE C	0.0	0.0	699.5	17.77	
PAX #13		0.0	0.0	726.9	18.46	
PAX #14		0.0	0.0	727.4	18.48	
Passenger Baggage (MAX Total Baggage = 1000 lb)		240.0	108.9	835.0	21.21	
Additional Payload :						
Entrance Enclosure (Max 167 lb ; 75.7 kg)		0.0	0.0	298.9	7.59	
Forward Lavatory (Max 39 lb ; 17.7 kg)		0.0	0.0	306.3	7.78	
Galley & Annex (Max 505 lb ; 229.1 kg)		0.0	0.0	370.3	9.41	
Crew Rest Area (Max 83 lb ; 37.6 kg)		0.0	0.0	362.4	9.20	
Workstation (Max 60 lb ; 27.2 kg)		0.0	0.0	553.3	14.05	
Aft RHS Divan Fwd Armrest (Max 10 lb ; 4.5 kg)		0.0	0.0	652.6	16.58	
Aft RHS Divan Aft Armrest (Max 10 lb ; 4.5 kg)		0.0	0.0	744.8	18.92	
Under Divan Storage (Max 15 lb ; 6.8 kg)		0.0	0.0	672.2	17.07	
Aft Wardrobe (Max 110 lb ; 49.9 kg)		0.0	0.0	775.5	19.70	
Aft Lavatory (Max 40 lb ; 18.1 kg)		0.0	0.0	787.6	20.01	
Fwd Cabin Aft Facing Seats (Max 16 lb ; 7.3 kg)		0.0	0.0	439.5	11.16	
Fwd Cabin Fwd Facing Seats (Max 16 lb ; 7.3 kg)		0.0	0.0	506.5	12.87	
Aft Cabin Aft Facing Seat (Max 8 lb ; 3.6 kg)		0.0	0.0	670.0	17.02	
Aft Cabin Fwd Facing Seat (Max 8 lb ; 3.6 kg)		0.0	0.0	727.5	18.48	
ZERO FUEL WEIGHT (Max 58000 lb; 26308 kg)		54662	24794	725.6	18.43	31.7%
Jet Fuel Specific Wt (kg/L or lb/US G	6.7500					
MAX 45050 lb; 20435 kg @ 6.75 lb/USGAL, 0.8088 kg/L)						
Main Tanks (MAX 30092 lb; 13650 kg)		30092	13649.4	701.89	17.83	
Center Tank including Fwd Tank (MAX 12683 lb; 5753 kg)		12200	5533.8	631.41	16.04	
Aft Tank (MAX 2275 lb; 1032 kg)		2275	1031.9	879.38	22.34	
TOTAL FUEL		44567	20215.1	691.7	17.57	
RAMP WEIGHT (Max 99750 lb ; 45246 kg)		99229	45009	710.3	18.04	21.8%
Estimated Fuel at Landing (lb)	1200					
LANDING WEIGHT (Max 78600 lb ; 35652 kg)		55862	25338	724.1	18.39	30.7%

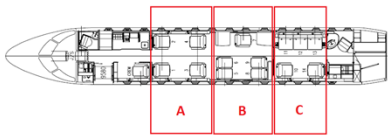


C of G depiction

FLIGHT LIMITATIONS:
BAGGAGE LIMIT (lb) = 1000
MZFW LIMIT (lb) = 58000
AFM Supp 42 added ? (YES/NO) = NO

MZFW 58,000 lb option – Y / N

FLOORPLAN



Zones A, B, C

STABILIZER TRIM TAKE-OFF SETTING - SLAT OUT					
FLAP 0	8.6	FLAP 6	9.9	FLAP 16	10.5

Trim Settings

FUEL OVERSPILL CONDITION *** Calculations from this section are INDEPENDENT from the above *** Please see table below for Fuel Temperature vs. Density ***
Fuel Bulk Temperature LOW (°C) = 28
Max Fuel Weight (lb) for selected TEMP = 44916
Total Fuel QTY in the airplane (lb) = 44900

A TEMPERATURE DELTA of 22 degC may cause an overspill

WARNING:
OBEY THE PRECAUTIONS THAT FOLLOW WHEN YOU LIFT THE AIRCRAFT ON JACKS:

MAKE SURE THAT THE AIRCRAFT WEIGHT IS NOT MORE THAN 70 000 lb (31750 KG)
MAKE SURE THAT THE CENTER OF GRAVITY IS NOT MORE THAN A FORWARD LIMIT OF 20% MAC (F.S707.60)
MAKE SURE THAT THE CENTER OF GRAVITY IS NOT MORE THAN AN AFT LIMIT OF 35% MAC (F.S730.60)

F YOU DO NOT DO THIS, THE AIRCRAFT WILL NOT BE IN A STABLE CONDITION. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO THE EQUIPMENT
THE USE OF A NOSE BALLAST OR FUEL MAY BE REQUIRED IN ORDER TO FULFILL THE ABOVE REQUIREMENTS *

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Weight & Balance Tool – Issued with Bombardier-completed Globals approx. last 30 months – Generic version to be distributed to Training Centers

JET A/A1 FUEL DENSITY VALUES		
TEMP (degC)	DENS (lb/US GAL)	DENS (kg/L)
-55	7.240	0.868
-54	7.234	0.867
-53	7.228	0.866
-52	7.222	0.866
-51	7.216	0.865
-50	7.210	0.864
-49	7.204	0.864
[illegible]	[illegible]	[illegible]
52	6.578	0.788
53	6.572	0.787
54	6.566	0.786
55	6.560	0.786
56	6.554	0.785
57	6.548	0.784
58	6.542	0.783
59	6.536	0.783
60	6.530	0.782

*Jet B density is roughly 3.3% less than Jet A/A1

Jet A / A1 Fuel Density Table presented at end of Tool

- Temp -55º C to 60º C
- Density – lb/US GAL
- Density – kg/L

- Conversion factor for Jet B density

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Differences between Global Vision and Honeywell Global

- Aircraft differences may require different pilot inputs / reactions, e.g:
  - NAV TO NAV Transfer - Vision Auto In – Auto Out
  - AT for SE ops for Vision – NOT for Honeywell Global
  - AFCS reversions AP, YD, AT,
  - IRS - Auto align / align in flight on Vision - NOT ON HONEYWELL GLOBAL
  - TCAS, XPNDR selections / switching, IDENT,
  - WX Radar Test, and operations
  - RNP AR - YES for Vision, NO for Honeywell Global – yet both capable of RNP 0.3
  - W&B + Perf - FMS approved for Vision NOT for Honeywell Global
    - Curtailed C of G Envelope for Vision
  - PFD FPV for Vision - FD for Honeywell Global - FPV Cage capability for Vision
  - SVS for Vision
  - EVS CAL one long for Vision - long or short for Honeywell Global
  - Temp Comp limitation for Vision not for Honeywell Global
  - FPA Vision - “PIT” for Honeywell Global
    - In reality it’s a Path Angle mode for both
    - Not indicated as such on Honeywell Global

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AGENDA

- FLEET STATISTICS
- CURRENT OPERATIONAL ISSUES
- **ADVISORY WIRES, TRs, and UPDATES**
- NICE TO KNOW…
- QUESTIONS?

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ADVISORY WIRES & UPDATES – Last 6 Months – See CIC Website

- “GEN 2, 3 or 4 FAIL” associated with fault message “Open Circuit TR2/TR3”
- Batch 3.3 Software Upgrade and ACARS DMU FAIL Message
- Avionics battery heater harness failures
- Batch 3.3 Software Upgrade
- CDU-820 – Intermittent Blanking Display and No Fault Found Update
- Engine power pull-back to idle during ground operation
- Global Vision Flight Deck Avionics Software Version Status and Roadmap
- SBAS GNSSU failure in flight
- Unintentional AFD Shutdown While Dimming RSP-6200 Potentiometers
- Waypoint Change from Fly-Over to Fly-By

BOMBARDIER

“GEN 2, 3 or 4 FAIL” associated with fault message “Open Circuit TR2/TR3” – Global Vision

- AW700-24-0572 November 28, 2016
- Approx 25 occurrences – Prior to aircraft delivery
  - Observed mainly with cabin power OFF when hydraulic pump 3A was selected ON after the completion of the alternate landing gear extension test or the SLAT/FLAP movement to the OUT position. All the events have coincided with the hydraulic pumps automatic activation by the system’s logic.
  - On all the occasions, with the generator reset the indications returned to normal.

- Investigation continues

- Occurs on the ground? - follow SmartFix Plus guidance
  - http://cic.bombardier.com in Tools & Services > Technical Tools > SmartFix Plus
- Occurs in Flight? - Complete procedure for **GEN 1 (2) (3) (4) FAIL**

- **Report circumstances to your FSR**

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Batch 3.3 Software Upgrade and ACARS DMU FAIL Message – Global Express, XRS, 5000

- AW700-31-0563 Rev. 02 November 03, 2016

Some reports of intermittent occurrences of “ACARS DMU FAILED” FMS CDU scratchpad messages

- Approx 15 occurrences – Post-Batch 3.3 upgrade
  - On the ground and in flight
  - Momentary or, in some other cases, several minutes loss of CPDLC functionality
  - Bombardier Technical Services is actively investigating this issue with Honeywell in order to determine root cause.

- **Report occurrences to your FSR**

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Avionics battery Heater Harness Failures – All Globals

AW700-24-0547, Rev 1 November 22, 2016

- During scheduled or unscheduled battery maintenance, numerous avionics batteries were found with the heater harness assembly, internal components and/or case damaged.
- Some cases reported where the avionics batteries have experienced internal/case damaged during normal operation. In some instances, it was noted that the “AV BATT HEAT” (D3) CB in the CCBP had previously tripped. In most cases, the CB was reset and all indications appeared normal. In other cases, the CB didn’t trip but different symptoms were observed:
  - **AV BATT FAIL** CAS msg with non-nominal battery temperature value (i.e.: -22°C) on the DC synoptic after approx 6 hours of flight;
  - Abnormal Avionics battery voltage variation observed on DC synoptic page;
  - **AV BATT FAIL** CAS msg posted with nominal values on DC synoptic page

- **Apparent cause** - Arcing between heater blanket and battery
- **Fix** – Safran Power/SAFT issued SB to replace avionics battery harness assembly
  - Recommended for next scheduled maintenance of batteries.

- **Report occurrences to your FSR**

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Batch 3.3 Software Upgrade – Global Express, XRS and 5000

- AW700-31-0563 Rev. 01 September 06, 2016
  - Provides updates on availability of Printed Manuals

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Batch 3.3 Software Upgrade – Content – Global Express, XRS and 5000

IAC Batch 3.3 software upgrade provides correction and one additional feature to the IAC software for the following items identified in service and documented in corresponding Advisory Wires and/or Forum Articles:

Autothrottle Retard due to FMS Reset	AW700-22-0423 Rev. 1 Released Sep/14
Datalink Off report and On report missing airport code information and FMS Block Data	AW700-23-0432 Rev.1 Released Nov/14
Post Batch 3 - Vertical Track Alert Double C-Chord Aural Tone Logic: • Design change to inhibit the issuance of VTA aural alerting when aircraft is flying in Advisory VNAV • Logic change to inhibit VTA Aural Alert On-Ground during take-off roll	AW700-31-0453 Rev. 1 Released Dec/14
FMS – LNAV Reduction of Navigation Database Procedures Content – ITEMS J, K, L, M, N, O, P. Some 566 procedures will be re-instated	AW700-34-0327 Rev. 6 Released Nov/15
FMS – Loss of Enroute Waypoints as a Result of SID and STAR Both Containing FLY XXX AS ASSIGNED Legs	AW700-34-0388 Released Jun/12
Post Batch 3 - FMS Performance Discrepancy may display incorrect distance, time and fuel to a waypoint or destination during flight (Advisory Action 34-29-M-932)	AW700-34-0449 Rev. 2 Released Aug/14
Post ADS-B Out Service Bulletin - Transponder Preselected Altitude incorrect transmission. Interface issue between parameters output from the FMS to the transponder. IAC/FMS software change	AW700-34-0457 Rev. 1 Released Nov/14

Batch 3.3 Software Upgrade – Content – Global Express, XRS and 5000

IAC Batch 3.3 software upgrade provides correction and one additional feature to the IAC software for the following items identified in service and documented in corresponding Advisory Wires and/or Forum Articles:

Post Batch 3 – FMS Drop From DUAL to SINGLE Mode	AW700-34-0468 Rev. 1 Released Jun/14
FMS – Speed Restriction Anomaly	AW700-34-0470 Released Jun/14
FMS – Change of Destination not allowed when first Leg in Missed Approach Procedure is Type ARC (AF or RF Leg)	AW700-34-0486 Released Nov/14
Post Batch 3 – FMS – Lateral Navigation (LNAV) drops to Roll Mode when aircraft sequences the first heading to Altitude Termination (VA) Leg on Standard Instrument Departure (SID)	AW700-34-0488 Released Jul/15
FMS – Control Display Unit (CDU) Blanking caused by Uplinked Flight Plan	AW700-34-0500 Released Jul/15
FMS – Descent Angle changes upon Place-Distance (PD) HOLD Insertion	AW700-34-0501 Released Jul/15
FMS – LNAV Guidance issued commanding a turn in an opposite direction	AW700-34-0502 Released Jul/15
FMS – Standard Arrival Route (STAR) Procedure Re-Entry Anomaly	AW700-34-0506 Released Jun/15
Post Batch 3 – FMS – Melding of TO Waypoint with Common Waypoint in new Arrival	AW700-34-0507 Released Aug/15
EGPWS MODE 5 alert during LPV approaches enabling the use of the excessive downward deviation from the glideslope function	New Feature

Batch 3.3 Software Upgrade – Content – Global Express, XRS and 5000

IAC Batch 3.3 software upgrade provides correction and one additional feature to the IAC software for the following items identified in service and documented in corresponding Advisory Wires and/or Forum Articles:

FMS – Duplicate waypoints in airway portion of Aeronautical Operation Control (AOC) and Future Air Navigation System (FANS) uplink not properly defined Only FANS uplinks with duplicate waypoints are not properly defined. Standard AOC uplinks work correctly for duplicate waypoints.	AW700-34-0487 Released Nov/14 (AW700-34-0487 Rev. 1 – In work)
Post Batch 3 – FMS – Incorrect Level Off at an Altitude Constraint Leveling off above altitude constraint instead of AT is still an issue, while final approach vertical path will now be intercepted	AW700-34-0505 Released Jun/15 (AW700-34-0505 Rev. 1 – In work)

Batch 3.3 Software Upgrade – Content – Global Express, XRS and 5000

IAC Batch 3.3 software upgrade provides correction and one additional feature to the IAC software for the following items identified in service and documented in corresponding Advisory Wires and/or Forum Articles:

FMS – LNAV Reduction of Navigation Database Procedures Content – ITEM Q 100 SID procedures with large course change and altitude legs (known as extra 360 degrees turn)	AW700-34-0327 Rev. 6 Released Nov/15
Post Batch 3 - FMS Single Engine Go-Around Speeds The current AFM Limitation will remain in effect.	AW700-34-0476 Released May/14
APU oil level indication amber dashes with Mobil 254 oil issue (Advisory Action 49-26-M-858)	Honeywell SIL # APU-86 Released July 22, 2004

CDU- 820 – Intermittent Blanking Display and No Fault Found Update – Global Express, XRS and 5000

- AW700-34-0348, Rev. 02 September 06, 2016

- Root cause - an impedance incompatibility present between some CDU-820 and IAC.
- Correction would require a CDU-820 hardware modification
  - no plan from Honeywell to develop a fix for this issue.

- Work-around procedure: in the event of CDU-820 blanking:
  - Recommended to cycle the power on EMS CDU > NAV > Choose the applicable FMS CDU > (OUT/IN) of affected display to regain normal operation as depicted:
    - FMS 1 CDU BATT IN

    or
    - FMS 2 CDU DC 2 IN

    or
    - FMS 3 CDU DC 1 IN

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Engine power pull-back to idle during ground operation – All Global Series

- AW700-73-0378, Rev. 5 October 04, 2016
- Rolls Royce NTO 174 addresses
- Procedures in AFM for FADEC Reset upon each aircraft power-up.

- Unable to advance power beyond Idle

- Root cause - an on-ground EEC single channel Health Level degradation
  - No posting of **L-R FADEC FAIL**
  - No ability to auto-switch to other EEC channel

- FIX - X2.0 software to be implemented via Bombardier SBs and Rolls Royce SB Following the incorporation of this SB, the latest applicable Airplane Flight Manual issue should be used to remove the requirement to reset the FADEC from the Flight Compartment Safety Check – SB applicability 'box' will apply.
  - SBs are available now
  - Schedule upgraded software – free for 60 month upgrade period.

- TRs published to address procedures for aircraft incorporating the SB

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Global Vision Flight Deck Avionics Software Version Status and Roadmap – Global Vision 1 of 3

- AW700-34-0438, Rev. 6 November 07, 2016
- V5.1.5 will be available Q1 2017.

New Features:

1 New runway extension mile markers symbols SVS

2 Altimeter readout powers up to cyan dashes instead of 22.00 and first rotation of altimeter knob returns to last setting

3 New HALO color logic over dome (dep / dest / alt)

4 No longer have to select CAI for landing PERF for single engine ops when CAI not required

5 New FLAPS 6 OVERSPEED feature in FMS DEP PERF (Improved Climb Performance – AFM SUPP 5)

6 Rate aiding removed for ALT and SPD knobs

7 Rate aiding reduced for HDG (easier to accurately set a heading instead of passing it)

8 Indication on lower right of MFW of selection active when XM or DLK WX are selected from OVLY menu

9 New messages during loss of GNSS while on RNAV approach

10 New FMS message: IRS-FMS DISGREE

11 Proportional runway on VSD

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Global Vision Flight Deck Avionics Software Version Status and Roadmap – Global Vision 2 of 3

New Features:

12 Now able to program arrival performance at altitude (with Mach presented) & for OEI

13 Change of indication to the TAWS PEAKS (single peak grey indication within inner ring – has to be above 900 feet elevation and is rounded to next highest 100 feet)

14 APU monitoring during APU shutdown at the end of the flight without having to select a different view

15 MEM STORE function is now able to retain selected map symbols

16 New CAS messages

I. IMS FAIL
II. SMS SHORT RUNWAY INOP
III. SMS NOT AVAILABLE
IV. ATC 1 FAIL
V. ATC 2 FAIL
VI. ATC 1 FAIL
VII. ATC 2 FAIL
VIII. ATC 1-2 FAIL
IX. ADS-B OUT FAIL

17 Daily GNSS sensor comparison check is no longer required for LPV approach operations

18 Balanced Field Length V1/VR Ratio for flaps 0 departure (automatic)

19 Naming of PRESET frequencies for VHF, NAV, and ADF (previously on HF only for version 4.5.8)

Global Vision Flight Deck Avionics Software Version Status and Roadmap – Global Vision 3 of 3

New Features:

20 Three types of SMS (Surface Management System) alerts on takeoff “NOT A RUNWAY” “RUNWAY MISCOMPARE” “SHORT RUNWAY” (AFM SUPP-41) NOTE: this is an optional portion of Version 5.1.X

21 Two types of SMS alerts on landing “NOT A RUNWAY” “SHORT RUNWAY” (AFM SUPP-41) NOTE: this is an optional portion of Version 5.1.X

22 Ability to enter a STEP climb and optimize a STEP (OPSTEP)

23 Witness improved NAV to NAV transfer capability

24 Removal of Limitation to not use FMS speeds for takeoff

25 Removal of Limitation to not use FMS speeds for an FMS based visual approach

26 Constant Speed Target lost only after power down instead of upon landing

27 Removal of TEMP COMP limitation

28 Transfer from active database to non-active database while on the ground now indicates in amber

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SBAS GNSSU failure in flight – Global Express, XRS, 5000 1 of 2

- AW700-34-0516, Rev 01 Sep 06, 2016

- ISSUE - single or dual loss of GPS signal in flight
  - FMS msg “GPS FAILED” + other cascading CAS messages (e.g. **GND PROX FAIL, ADS-B FAIL**)
  - Only observed after installation of SBAS GNSSU (for SBAS with LPV capability).
  - Most events observed in the Greenland / Iceland vicinity at cruise altitude and were observed with the GPS in either NAVIGATION mode (SBAS Off) or DIFFERENTIAL mode (SBAS On).

- Software anomaly observed when the aircraft located north of 47 degrees latitude or under specific conditions that exist within the SBAS network.
  - Small probability of encountering issue
  - Not possible for operator to predict
  - Seems more frequent when close to edge of SBAS coverage areas

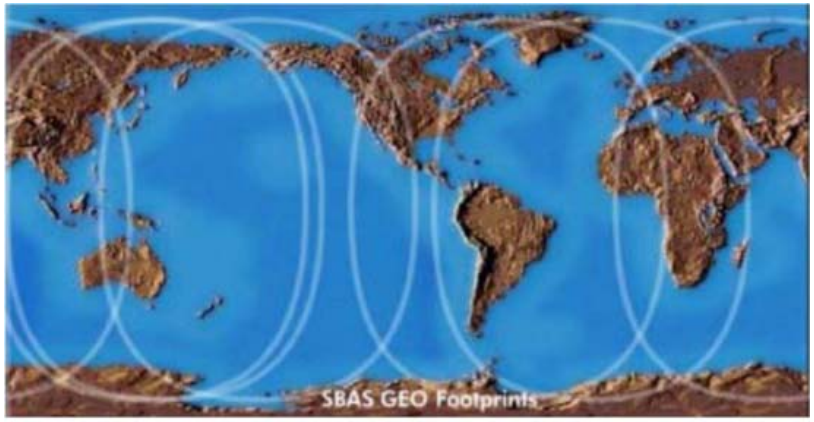

Figure 1- SBAS Satellite Coverage Map

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SBAS GNSSU failure in flight – Global Express, XRS, 5000 2 of 2

- Mitigation:
  - Although cycling circuit breakers is not a standard practice recommended by Bombardier, cycling power to the affected GNSSU via the EMS CDU > NAV > GPS 1 / GPS 2) will correct this condition
    - Only way to recover when this situation occurs in flight.

- FIX:
  - SBAS GNSSU MOD 4 is available Free Of Charge on an attrition basis when performed with other repairs, on new SBAS GNSSUs and units sent for repair.

- Please contact your Bombardier Field Service Representative or the Customer Response Center with any questions

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Unintentional AFD Shutdown While Dimming RSP-6200 Potentiometers – Global Vision (Pre- SN 9625)

- AW700-31-0477 October 14, 2016:

- Issue: When dimming the AFD in some instances, the display is being turned off before actually reaching the OFF detent on the dimming knob.

- Mitigation:
  - Turn knob counter clockwise to turn on the AFD again.

- Fix:
  - Bombardier recommends the replacement of the affected RSP- 6200 units with units that have improved DSPL potentiometers Mod 2.

Please contact your local Field Service Representative

BOMBARDIER

Waypoint Change from Fly-Over to Fly-By– Global Vision

- AW700-34-0550 September 6, 2016

- Issue: FMS may change a Fly-Over waypoint to a Fly-By waypoint following a flight plan edit. (Approx 210 STARS at up to 70 airports affected):
  - **When** last two waypoints of a flight plan are a Fly-over waypoint (A) followed by a Fly-by waypoint (B) and waypoint B is deleted, waypoint A consequently becomes the last waypoint and is changed to a Fly-by waypoint.
  - **Enter** a flight plan with last waypoint as a Fly-over waypoint (A). Add an approach/STAR to the end of flight plan. A subsequent change to a different approach/STAR results in waypoint A changing to a Fly-by waypoint.
  - **Procedures** ending with a Fly-over waypoint followed by a (VECT) leg are not usually affected by changing to a different subsequent approach. However, due to differences in database coding, the system will sometimes allow the Fly-over waypoint to be changed to a Fly-by when changing approach procedures.
  - **Changing** the destination airport generally results in the deletion of any STARS or approaches in the flight plan associated with the airport. Hence, if the last waypoint prior to these procedures is a Fly-over, and the destination airport is changed, the Fly-over waypoint will switch to a Fly-by.

- Mitigation: Crew will need to intervene to “redefine” waypoints or choose alternate procedure

- FIX – V5.1.5 Q1 2017

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AGENDA

- FLEET STATISTICS
- CURRENT OPERATIONAL ISSUES
- ADVISORY WIRES, TRs, and UPDATES
- **NICE TO KNOW…**
- QUESTIONS?

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Nice to Know...
CORRECTION Global Express APU Oil Replenishment

- When APU is shut down, either EXT AC or BATT power must be applied on the aircraft for a minimum of 15 minutes for the APU oil replenishment system to be enabled.

- If 15 minutes have passed with either EXT AC or BATT power and power is removed from the aircraft, the enable bit for oil replenishment will be memorized and oil replenishment will be possible as soon as power is reapplied on the aircraft.

- Engine(s) could also be used to maintain power on the APU FADEC during 15 minutes – not a normal way of operating
  - APU oil quantity is displayed when APU is completely shut down. If oil is showing a quantity below 4.5 qts (but more than 3.5) when engines are already shut down, oil replenishment can be carried-out after the next flight with power from the engine(s) as the APU oil will indicate low only once a level of 3.5 is reached.

- Disconnecting batteries resets the timer and the count of 15 minutes will be restarted.

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Nice to Know... All Globals - LRC Optimization

How to optimize Long Range Cruise with Headwinds or Tailwinds

- Coming to a FPCCM near you …

  Guidance to be published in the FPCCM Page 04-05-01 will include:

  - ***LRC Speeds For Different Headwinds and Tailwinds (kts)***
  - Correction table
  - Example

  Preview on following slides

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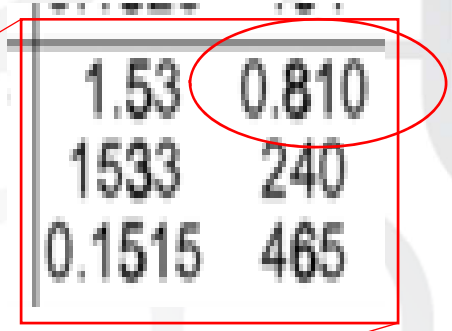
Nice to Know... All Globals - LRC Optimization

- How to optimize Long Range Cruise with Headwinds or Tailwinds

LONG RANGE CRUISE

NORMAL ACU'S A/I OFF	ISA 33% C.G.	EPR LB/HR/ENG NAM/LB	MACH KCAS KTAS

FLIGHT LEVEL	GROSS WEIGHT – 1000 LB											
	75		80		85		90		95		100	
510												
490												
470												
450	1.64 1483 0.1580	0.817 221 469	1.70 1596 0.1474	0.820 222 470								
430	1.56 1473 0.1597	0.820 232 470	1.60 1523 0.1523	0.809 229 464	1.65 1634 0.1431	0.815 231 468	1.71 1776 0.1327	0.822 233 471				
410	1.49 1470 0.1572	0.806 239 462	1.53 1533 0.1515	0.810 240 465	1.56 1584 0.1457	0.805 238 462	1.61 1674 0.1384	0.808 239 463	1.65 1796 0.1302	0.815 242 468	1.71 1952 0.1209	0.823 244 472
390	1.45 1470 0.1536	0.787 243 452	1.48 1547 0.1482	0.799 248 459	1.51 1618 0.1430	0.807 250 463	1.54 1673 0.1381	0.806 250 462	1.57 1735 0.1329	0.804 249 461	1.61 1828 0.1266	0.807 250 463
370	1.40 1412	0.739 238	1.43 1491	0.754 243	1.46 1593	0.779 252	1.48 1680	0.793 257	1.51 1757	0.801 260	1.54 1826	0.804 261



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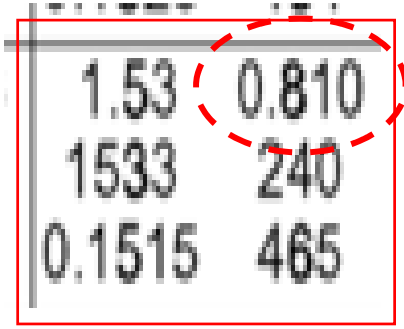
Nice to Know... All Globals - LRC Optimization

- How to optimize Long Range Cruise with Headwinds or Tailwinds

bd700/d34

LRC MACH	HEADWIND		ZERO	TAILWIND	
	-200	-100	0	100	200
	0.78	0.61	0.50	0.45	0.42
	0.82	0.68	0.60	0.54	0.51
	0.84	0.78	0.70	0.64	0.62
	0.84	0.79	0.71	0.65	0.63
	0.84	0.80	0.72	0.66	0.64
	0.84	0.81	0.73	0.67	0.65
	0.84	0.81	0.74	0.68	0.66
	0.84	0.82	0.75	0.69	0.67
	0.84	0.82	0.76	0.70	0.68
	0.84	0.82	0.77	0.71	0.69
	0.84	0.82	0.78	0.72	0.71
	0.84	0.83	0.79	0.74	0.72
	0.84	0.83	0.80	0.76	0.74
	0.84	0.83	0.81	0.78	0.77
	0.84	0.83	0.82	0.81	0.80

3



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From FPCCM 04-05-79
LONG RANGE CRUISE tables

Example – DETERMINATION OF THE LONG RANGE CRUISE SPEED WITH WINDS

Associated Conditions:

Gross Weight	=	80,000 lb
Temperature	=	ISA
Cruise Altitude	=	FL410
Wind	=	-150 kts, headwind

2

- Using Figure 04-05-79, the long range cruise (LRC) speed for a zero wind condition is Mach 0.810.
- Using the table, the corresponding LRC speed at -150 knots (headwind) is obtained by interpolating between -100 knots and -200 knots.
- The LRC speed is found to be Mach 0.835. This is rounded up to Mach 0.84.

BOMBARDIER

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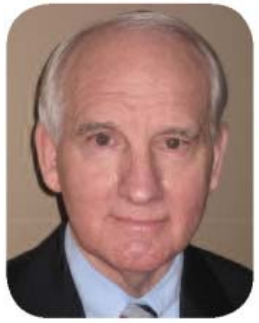

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AGENDA

- FLEET STATISTICS
- CURRENT OPERATIONAL ISSUES
- ADVISORY WIRES, TRs, and UPDATES
- NICE TO KNOW…
- **QUESTIONS?**

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QUESTIONS ?

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