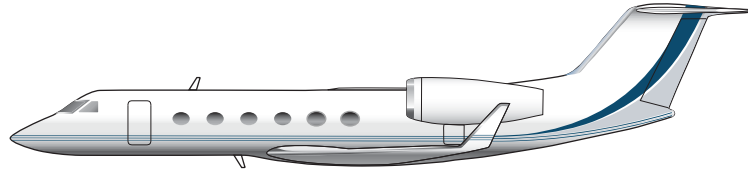


# Gulfstream G450

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## **AIRCRAFT SERVICE CHANGE**

NUMBER 059B

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### **SUBJECT**

NAVIGATION (ATA 34)

ENHANCED NAVIGATION

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DECEMBER 22, 2011

*"December 22, 2011"*

## PILOTS INFORMATION SHEET

### ENHANCED NAVIGATION

This service change provides hardware and software necessary to modify the aircraft with a package of navigational system optional functions.

This service change revision moves the activation of CPDLC functionality to a separate ASC (071) and revises the modification instructions to address changes incorporated to the aircraft during initial phase manufacturing.

**This service change revision supersedes all previous versions of ASC 059 and is now reissued as ASC 059B.**

Aircraft operating under FAA regulations will require FAA Airplane Flight Manual (AFM) Revision 24, or later approved version, as a result of this service change.

Aircraft operating under EASA / JAA regulations will require JAA Airplane Flight Manual (AFM) Revision 12, or later approved version, as a result of this service change.

PLEASE DETACH AND GIVE TO FLIGHT DEPARTMENT PERSONNEL

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*"December 22, 2011"*

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Aircraft operating under EASA / JAA regulations will require JAA Airplane Flight Manual (AFM) Revision 12, or later approved version, as a result of this service change.

PLEASE RETAIN THIS COPY WITH THE ASC BOOKLET

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*"December 22, 2011"*

The design change effected by this Aircraft Service Change (ASC) has been classified as Level 1 Major. This modification is approved and accepted by:

- The United States Federal Aviation Administration (FAA) – Project Number TD9612AT-T
- The European Aviation Safety Agency (EASA) – Project Number - EASA.IM.A.C.01793

The design of this ASC is approved by aircraft type design data for installation on aircraft registered for operation in accordance with applicable regulations of the FAA and EASA.

The design of an ASC is configured to a standard ("green") production aircraft. If spare wires, pin connections or locations called out have been used for another modification, the installing agency must ensure the development, documentation and approval of any required deviations.

The following instructions, in step-by-step form, are written as a guide to perform this ASC. Compliance with safe maintenance practices, as defined in the Aircraft Maintenance Manual and FAA or EASA regulations, is required. It is the responsibility of the installing facility to read all instructions contained in this service change and refer to all associated documents, drawings and manuals for applicable actions.

Gulfstream considers this ASC a means to enhance aircraft capabilities to meet individual operator requirements. The modification is not related to any safety or airworthiness condition.

Subject: Navigation (ATA 34) – Enhanced Navigation

Purpose / Discussion: Enhanced Navigation is a package of options providing several new or upgraded navigational and display features. This service change provides hardware and software necessary to modify the aircraft with a package of navigational system optional functions. New or improved features include:

- Circling approaches
- Temperature compensated VNAV
- SRN / LRN transition
- Automatic preview LRN / SRN
- WAAS / LPV approaches
- Peaks display
- Electronic terminal charts certified paperless
- RNP 0.1
- CPDLC - FANS 1/A (via ASC 071)

*"December 22, 2011"*

## Purpose / Discussion Continued:

This service change revision moves the activation of CPDLC functionality to a separate ASC (071) to permit individual purchase for those operators not opting to purchase the Enhanced Navigation package. In addition, CPDLC activation has been incorporated into initial phase manufacturing beginning with aircraft serial number 4230; therefore, the modification instructions, pricing and parts list have been revised to address these changes. The intent is that all aircraft having Enhanced Navigation will be equipped with CPDLC and fully FANS 1/A compliant.

**Step C.** instructions apply to aircraft 4001 – 4229 performing initial installation. ASC 071 – CPDLC-FANS 1/A is a concurrent requirement for this effectivity group and is included in the price of this ASC.

**Step D.** instructions apply to aircraft 4230 – subsequent which have CPDLC functionality activated during initial phase manufacturing. There is no concurrent requirement for this effectivity group.

Description / Man-Hours  
Required Per Aircraft:

This service change loads new software and installs new or upgraded:

- 2 GPS antennas (4001 – 4193)
- 2 GPS modules (4001 – sub)
- 1 CMC module (4001 – 4193)
- 3 IRUs (4001 – 4229)

**Step C.** will require approximately 38 man-hours for kit 1 or approximately 26 man-hours for kit 2 installation.

**Step D.** will require approximately 12 man hours for this installation.

**Aircraft having ASC 059 or 059A require no further action and should return the service reply card marked "previously complied with". This service change revision supersedes all previous versions of ASC 059 and is now reissued as ASC 059B.**

## Approved Engineering Data:

The source data for this aircraft service change is:  
1159ASC47059 Rev. "C" Top Drawing – ASC 059  
PlaneView Avionics Enhancement (Cert F)

## Prerequisites:

G450 ASC 908 – PlaneView Master Operating Software Update (Cert Fox), or later approved version

*“December 22, 2011”*

Prerequisites continued:

Prior to, or at the time this ASC is ordered, operators will be required to supply a configuration report of the Central Maintenance Computer (CMC). The CMC configuration report can be stored on the aircraft PC laptop then electronically submitted to Gulfstream at [asc.software@gulfstream.com](mailto:asc.software@gulfstream.com). Allow 3-5 days for the CMC report review and up to 21 days for the creation of a new Options Data disk.

Concurrent Requirements:

Aircraft 4001 – 4229: ASC 071 – CPDLC (FANS 1/A)

Associated Documents:

G450 Aircraft Maintenance Manual (AMM), Chapters 20, 31 and 34

GER-9238 – IRU APM Configuration File Backup and Loading

GIVX-GER-1694 - Aerodynamic Contour Smoothness General Specification

GIVX-GER-9934 – PlaneView Software Loading, Verification and Return To Service Procedures. Includes appropriate Data Load Guide based on aircraft Cert level and is located in Maintenance Applications on the aircraft laptop.

Flight Manual Revision / Supplement Required:

Aircraft operating under FAA regulations will require FAA Airplane Flight Manual (AFM) Revision 24 or later approved version, as a result of this service change.

Aircraft operating under EASA / JAA regulations will require JAA Airplane Flight Manual (AFM) Revision 12, or later approved version, as a result of this service change.

Publications Data:

Data concerning this service change will be published in a future revision of the affected manual(s). This booklet will provide technical data until the revision(s) is published.

Effectivity

This service change is applicable to aircraft serial numbers 4001 – subsequent.

Effect on Spares:

None

Special Equipment / Tools Required:

Aircraft PC Laptop with Remote Terminal Tool version 20.2 or later. Refer to Gulfstream PlaneView Maintenance Applications disk, PN 1159LAP59000.

26019960-215 – APM Config Index File (Fox)

**Gulfstream G450**

**Aircraft Service Change 059B**

*“December 22, 2011”*

Special Equipment / Tools  
Required continued:

1159GSE50527 - IRS Alignment Harness or approved alternates as noted in GER-9238  
26018704 (-103/-104 for 95/98/98NT, -205 for Windows 2000/XP, -206 for XP) – IRS Alignment Software

Skill Type Required:

Knowledge of the G450 navigation, indicating / recording systems and electrical standard practices will be required for this installation.

Price:

Prices are subject to change without notice.

Installed Price:

Installation labor is included in the price.

Kit Price only:

	<b>Group 1</b>	<b>Group 2</b>
	<b>*4001 - 4229</b>	<b>4230 - sub</b>
<u>Domestic:</u>	\$325,000.00	\$205,000.00
<u>International:</u>	\$331,000.00	\$209,100.00

<b>*NOTE:</b>	Aircraft <b>4001 - 4229</b> having ASC 071 – CPDLC-FANS 1/A - previously installed will receive the Group 2 pricing.
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<b>NOTE:</b>	This ASC is a managed program and may only be installed at Gulfstream Aerospace or Gulfstream-approved facilities. Incorporation must be coordinated through Gulfstream Aircraft Scheduling at 800-810-GULF (4853) or 912-965-4178. If not scheduled, aircraft downtime could increase significantly.
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“December 22, 2011”

**MODIFICATION INSTRUCTIONS:**

CAUTION:	PROTECT WIRE BUNDLES, CONNECTORS AND SURROUNDING STRUCTURE DURING ANY MAINTENANCE PROCEDURE FROM SHAVINGS, DEBRIS AND CONTAMINATION. MAINTAIN A PROPERLY CLEANED WORK AREA THROUGHOUT THE PROCEDURE TO ENSURE THE INTEGRITY OF THE AFFECTED COMPONENT / SYSTEM. VISUALLY INSPECT WORK AREA USING ADDITIONAL LIGHT AS NECESSARY TO VERIFY ABSENCE OF ANY DEBRIS PRIOR TO COMPLETION OF PROCEDURE. FAILURE TO COMPLY MAY RESULT IN DAMAGE TO COMPONENTS AND / OR SYSTEMS.
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NOTE:	Prior to, or at the time this ASC is ordered, operators are required to supply a configuration report of the Central Maintenance Computer (CMC). The CMC will be reviewed for current configuration. The CMC report may be stored on the aircraft PC laptop then electronically submitted to Gulfstream Technical Operations at <a href="mailto:asc.software@gulfstream.com">asc.software@gulfstream.com</a> .
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**A. Software preparation for modifications:**

1. Verify a CMC configuration report has been submitted.

**B. Prepare aircraft for safe maintenance / modification as follows:**

1. Remove all electrical power, turn all cockpit switches off and disconnect battery quick disconnects. Refer to G450 AMM, Chapter 20.
2. Pull, tag and install safety clips on all circuit breakers (CBs) as noted in G450 AMM, Chapters 31-44-01, and / or 34-42-01 and 34-52-01 and others as required.
3. Gain access to the left and right electronic equipment racks (LEER/REER).
4. Gain access to the #2 IRU located in the REER and #1 and #3 IRUs located under the floorboards at fuselage stations (FS) 242.5 and 255.5.
5. Modify aircraft per Step C. or D. as applicable by aircraft effectivity.

**C. Modify aircraft 4001 - 4229 as follows:**

1. Using appropriate G450 AMM procedures, remove the following components for update or replacement as applicable:

NOTE:	<p>Prior to removing Honeywell components, coordinate the shipment with Gulfstream Scheduling at 800-810-GULF (4853) or 912-965-4178, for availability of component upgrades and turn times. If not scheduled, aircraft downtime could increase significantly.</p> <p>Verify component part numbers and MOD level. Any component meeting the new part number and minimum MOD level criteria will not require removal.</p> <p>Part number and MOD level listed below is the minimum level required for functionality with this service change. Later approved versions will be acceptable as they become available.</p>
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“December 22, 2011”

Component	Qty	Old Part Number	New Part Number	Update / Replace	Minimum MOD Level	Effectivity
CMC module	1	71026548-XXXX	7034055-1901	Replace	N/A	4001-4193
GPS module	2	245-604067-001	245-604067-100	Replace	N/A	4001-sub
IRUs	3	HG2100AB02	HG2100AB07	Update	N/A	4001-4229

2. Remove the #2 IRU located in the REER and #1 and #3 IRUs located under the floorboards at fuselage stations (FS) 242.5 and 255.5 for modification. Install updated components or exchange units as coordinated with Scheduling.
3. Replace the CMC module (if required) and GPS cards. Refer to G450 AMM, Chapters 31 and 34.

NOTE:	Instructions concerning GPS antenna replacement only apply to aircraft 4001–4193. Aircraft 4194-sub should proceed to Step E. of this ASC.
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4. Gain access to GPS antennas located in the over head area forward of the main entry door (MED) on aircraft serial numbers 4001 - 4193. Refer to G450 AMM, Chapter 34 and Figure 1.
5. Remove existing GPS antennas, PN S67-1575-232. Hardware may be retained and reused or replaced. Refer to Figure 1.

NOTE:	Bonding area on the aircraft must conform to the antenna footprint. If needed, burnish the aircraft structure to a dimension 0.12 inches larger than the actual footprint of the antenna. Treat with Alodine 600.
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6. Install new GPS antennas, PN S67-1575-237, and gaskets, PN GAG810GG1-9, using screws, PN MS24694-C48 and MS24694-C52. Orient antennas so the right angle connectors point towards the rear of the aircraft. Ensure appropriate hardware is utilized in correct location. Refer to Figures 1 and 2.
7. Touch up exposed areas on external structure with epoxy primer per finish code 3012 prior to sealing.
8. Fillet seal external seams existing between antenna, gasket and aircraft structure using AMS-S-8802 or equivalent. Sealing must comply with aero smoothness requirements per GIVX-GER-1694.
9. Place vinyl dots, PN 1159SCF457-15, on each screw head and fill recesses flush to area using sealant AMS-S-8802 or equivalent. Sealant may extend above the countersinks but must comply with aero smoothness requirements per GIVX-GER-1694.
10. Locate decals approximately as shown in Figure 2, view C-C. Overcoat with clear epoxy top-coat extending 1/8<sup>th</sup> inch beyond edge of decal. Remove any existing decals if necessary.
11. Proceed to Step E. Software Modifications and Follow-on Procedures.

“December 22, 2011”

**D. Modify aircraft 4230 - Subsequent as follows:**

1. Replace existing GPS cards with new cards, PN 245-604067-100. Refer to G450 AMM, Chapter 34.
2. Ensure there is adequate access to the IRUs to accommodate software update. Note that on aircraft 4230 and subsequent; the IRUs do NOT need to be removed. The unit installed during initial phase manufacturing, PN HG2100BB02 is a later approved version than PN HG2100AB07. Proceed to Step E.

**E. Software Modifications and Follow-on Procedures:**

1. Prepare aircraft for safe maintenance and application of electrical power. Refer to G450 AMM, Chapter 20.

NOTE:	When updating IRU software, the APM data must be READ and then backed up prior to attempting to change the configuration index file. Read GER-9238 in its entirety prior to accessing IRU APM data. Failure to properly back up IRU APM data could result in full IRU tray alignment procedure being required.
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2. Connect IRU test equipment and start up alignment software. Update IRU APM in accordance with to GER-9238. Remove IRU test equipment.

NOTE:	When multiple ASCs containing software are compiled with simultaneously, the software installations should be conducted sequentially and completely. Using the date and time stamp on the Authorization Report of the Loadable Avionics Software Configurations (Options) software, each ASC will be loaded beginning with the earliest calendar date and time, and progressing to the most current date. Following Data Load Guide procedures, install software in the order specified. Each software installation of an ASC will be complete by following the Verification and Test Procedures found on the Authorization Report. Reference 1159SB51000.
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NOTE:	Correct setup of the aircraft laptop with the CMC Remote Terminal Tool is <b>critical</b> to the successful loading and operation of all software. Follow Data Load Guide procedures CAREFULLY. <b>Ensure any firewalls, anti-virus programs or wireless LAN connections are disabled and the laptop is connected to 60 Hz aircraft power.</b>
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NOTE:	Refer to the appropriate Data Load Guide for aircraft Cert level for software procedures when loading and verifying software. Data Load Guide is included in GIVX-GER-9934 – PlaneView Software Loading, Verification and Return To Service Procedures located in Maintenance Applications on the aircraft laptop.
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NOTE:	Options CDs are security enabled. Note the security code on the disk label before loading into aircraft laptop. Enter security code when prompted.
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*"December 22, 2011"*

3. Install Loadable Avionics Software Configurations (Options) software using Data Load Guide Procedures.
4. Verify software loads in accordance with Data Load Guide procedures.

NOTE:	All new software is issued with an Authorization Report. The information contained on the report will match the information on the disk including aircraft specific information. Individual return-to-service procedures for new software, as stated on the Authorization Report, must be completed.
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5. Perform test procedures found on the Authorization Report.
  6. Perform applicable operational checks for replaced or updated components in accordance with G450 AMM.
- F. A CMC configuration report **MUST** be submitted to reflect completion of software installation and verify aircraft configuration. Attach the report to an email and send to [asc.software@gulfstream.com](mailto:asc.software@gulfstream.com) noting the aircraft serial number in the subject line.
  - G. If any firewalls, anti-virus programs or wireless LAN connections were disabled as part of this installation, be sure to re-enable these applications.
  - H. Remove electrical power from aircraft. Refer to G450 AMM, Chapter 20.
  - I. Remove disk from laptop and store on board the aircraft. Discard previous version of Options disk.
  - J. Ensure work area is clean and clear of foreign objects and debris (FOD).
  - K. Close all areas accessed for modification.
  - L. Record compliance with this aircraft service change in the aircraft permanent maintenance records and return aircraft to flight status.
  - M. Report compliance with this aircraft service change to Gulfstream CMP via electronic transmittal or fill out and fax the attached service reply card.

“December 22, 2011”

WEIGHT AND BALANCE DATA:	The effect of this service change, when performed in a stand alone configuration, is negligible with regards to aircraft basic weight and balance. It is the responsibility of the installing facility to perform weight and balance computations in accordance with the AMM and Gulfstream Aircraft Weight and Balance manual. Changes to the weight and balance shall be documented in the aircraft permanent records.			
	<b>MOD</b>	<b>WEIGHT</b>	<b>HORIZONTAL</b>	<b>MOMENT</b>
	ASC 059B (4001 – 4193)	-0.2 lbs	84.836	-16.967
	ASC 059B (4194 – sub)	≈0.0 lbs	-	-

ELECTRICAL LOAD ANALYSIS DATA:	The effect of this change on the aircraft electrical loading is 0.
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Kit Effectivity:	Kit 1 – Aircraft serial numbers 4001 – 4193 Kit 2 – Aircraft serial numbers 4194 – 4229 Kit 3 – Aircraft serial numbers 4230 – subsequent
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**PARTS REQUIRED PER AIRCRAFT:**

Item	Part Number	Nomenclature	Qty.			Notes/Alt./Substitutes
			-1 Kit	-2 Kit	-3 Kit	
1.	S67-1575-237	GPS antennas	2	-	-	
2.	GAG810GG1-9	Gasket	2	-	-	
3.	MS24694-C48	Screw	8	-	-	
4.	MS24694-C52	Screw	8	-	-	
5.	1159SCF457-15	Vinyl dot	16	-	-	
6.	GAD12C-3-ASC059A1	Decal	1	-	-	
7.	GAD12C-3-ASC059A2	Decal	1	-	-	
8.	1159ASC47059-SW	Software Package	1	1	1	Item 9 included ✓
9.	1159SB51000	Loadable Avionics Software Configurations	✓	✓	✓	Options disk
10.	245-604067-100	GPS card	2	2	2	Items 10-12 are not part of the ASC kit. New or upgraded parts must be arranged through scheduling.
11.	7034055-1901	CMC module	1	-	-	
12.	HG2100AB07	IRUs	3	3	-	

*NOTE:	All software media required for this ASC will be issued as a separate package by PN 1159ASC47059-SW. Prior to ordering this ASC kit a CMC configuration report must be submitted.
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"December 22, 2011"

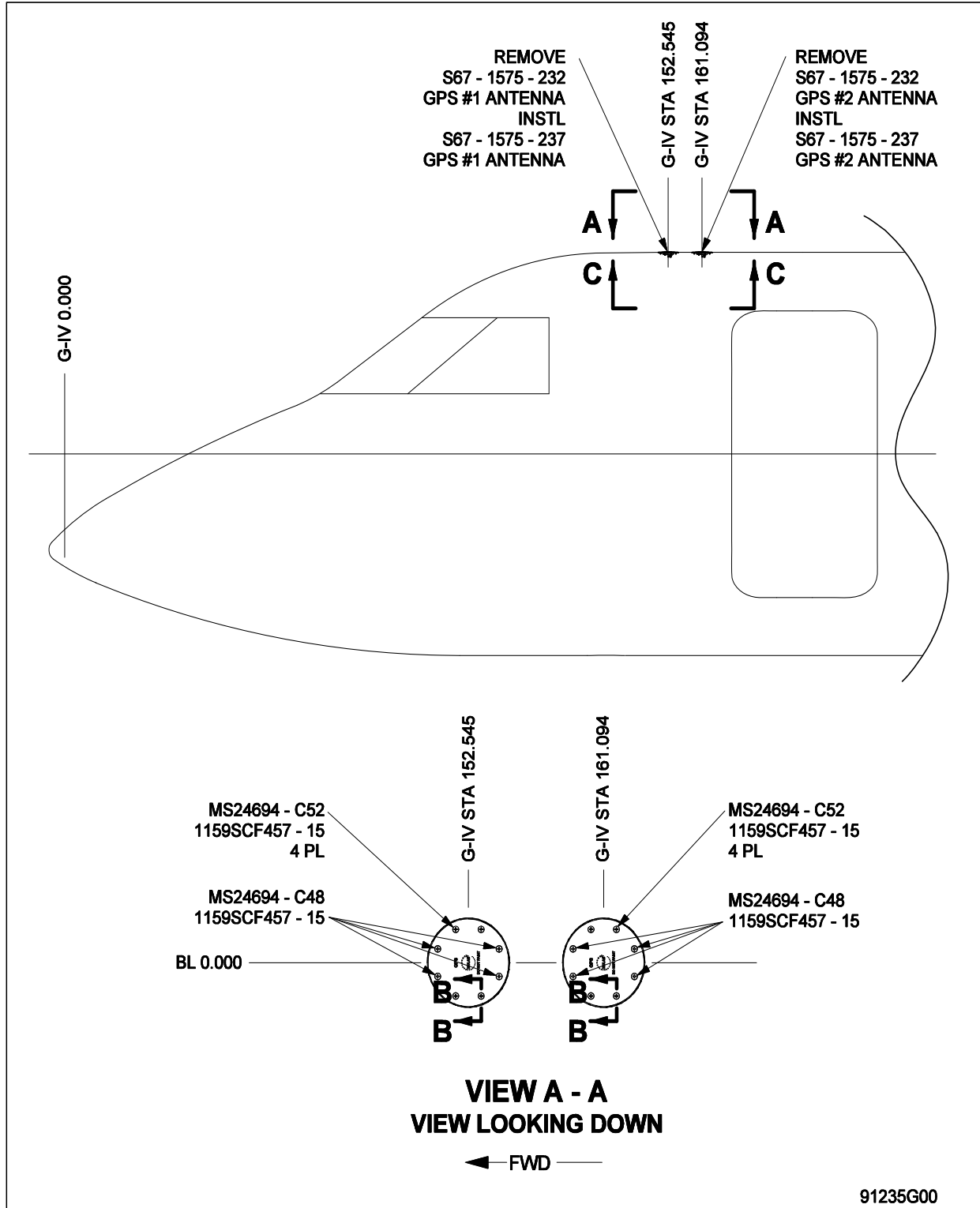


FIGURE 1 (4001 – 4193)

"December 22, 2011"

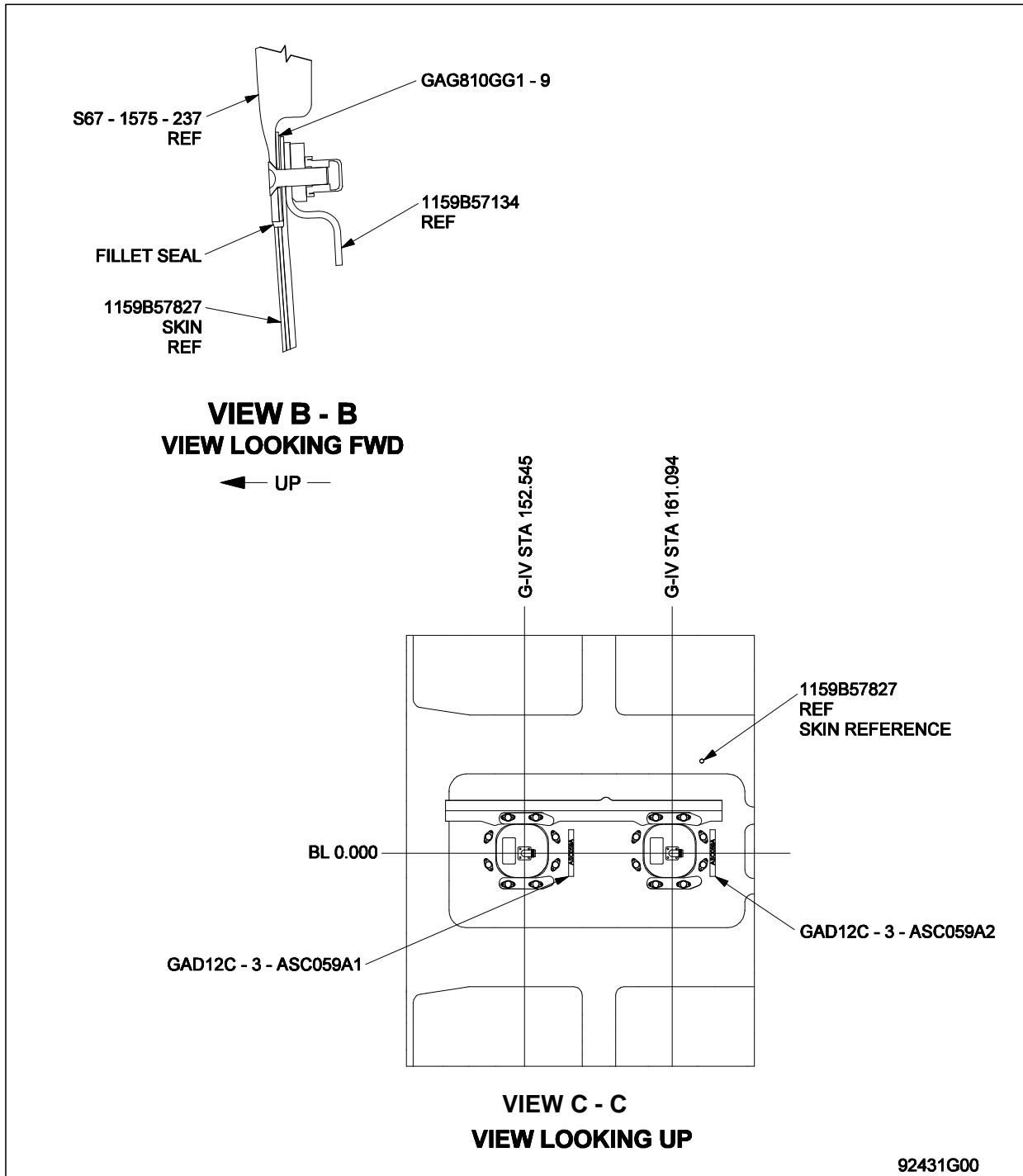


FIGURE 2 (4001 - 4193)

*"December 22, 2011"*

**SERVICE REPLY CARD**

PLEASE FAX THIS PAGE TO GULFSTREAM AEROSPACE CMP  
AT 800-944-1775 OR 912-963-0265.

THE FOLLOWING AIRCRAFT SERVICE CHANGE HAS BEEN COMPLIED WITH:

ASC NUMBER	A/C	AIRCRAFT TYPE	COMPLIANCE DATE
970592		G450	

AIRCRAFT HOURS: \_\_\_\_\_  
 AIRCRAFT LANDINGS: \_\_\_\_\_  
 NOT APPLICABLE: \_\_\_\_\_ DATE: \_\_\_\_\_

NOMENCLATURE		PART NUMBER	SERIAL NUMBER	CMP CODE
CMC MODULE	OFF:			
	ON:			
GPS ANTENNA #1	OFF:			
	ON:			
GPS ANTENNA #2	OFF:			
	ON:			
GPS MODULE	OFF:			
	ON:			
GPS MODULE	OFF:			
	ON:			
IRU #1	OFF:			
	ON:			
IRU #2	OFF:			
	ON:			
IRU #3	OFF:			
	ON:			

**DISC INFORMATION**

MEDIA TITLE		TOP LEVEL SYSTEM PART NUMBER	MEDIA PART NUMBER	MEDIA SERIAL NUMBER	CMP CODE
OPTIONS DATA	OFF:				319015 / 319017
	ON:				

SIGNATURE	TITLE / CERTIFICATE NUMBER	COMPANY
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COMMENTS / SUGGESTIONS / ACTIONS TAKEN:


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