Donaldson Leonardo AW109 IBF

April 6, 2020

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AW109E/S/SP INLET BARRIER FILTER (IBF)

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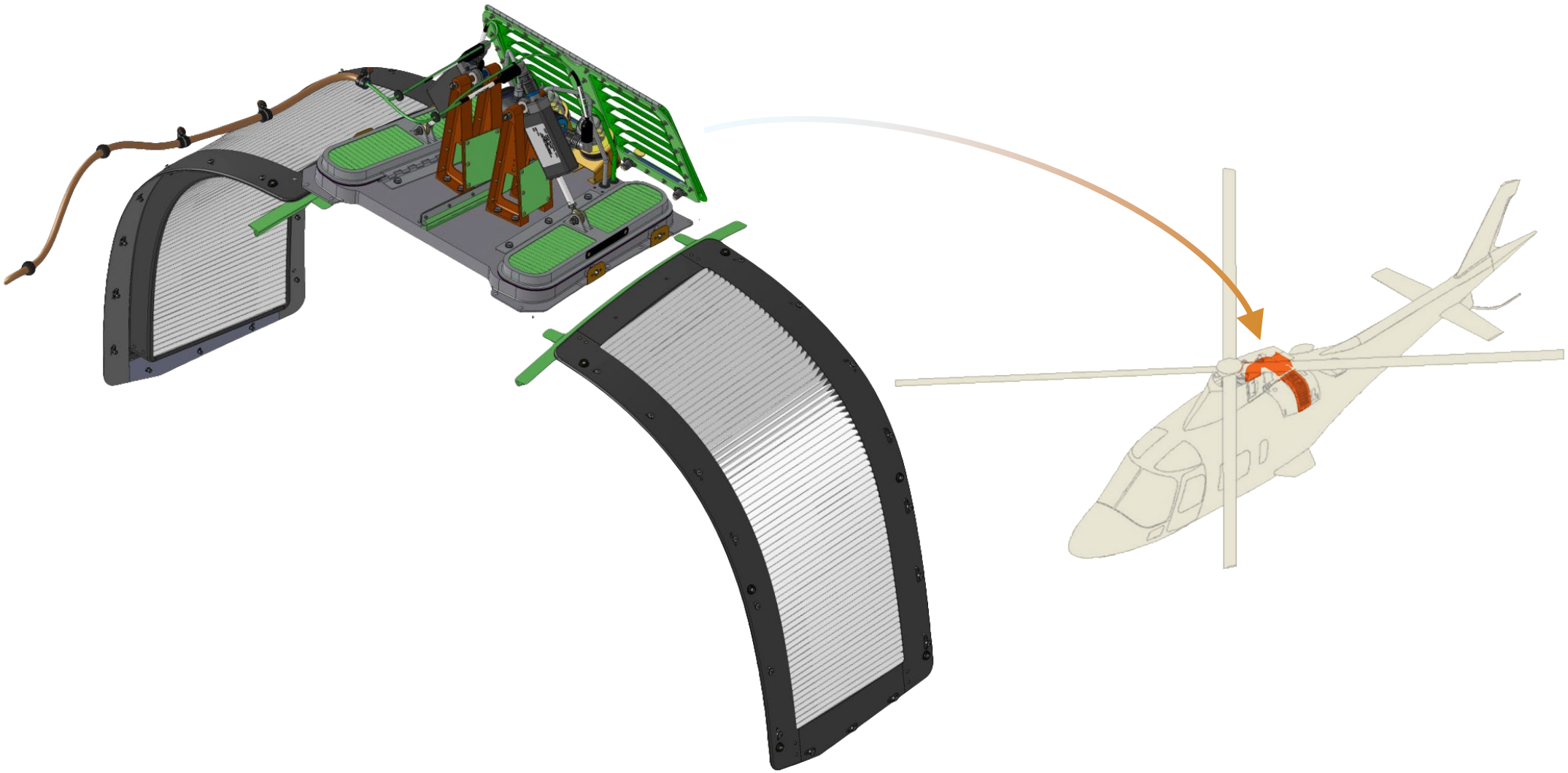
AW109 IBF SYSTEM DESIGN



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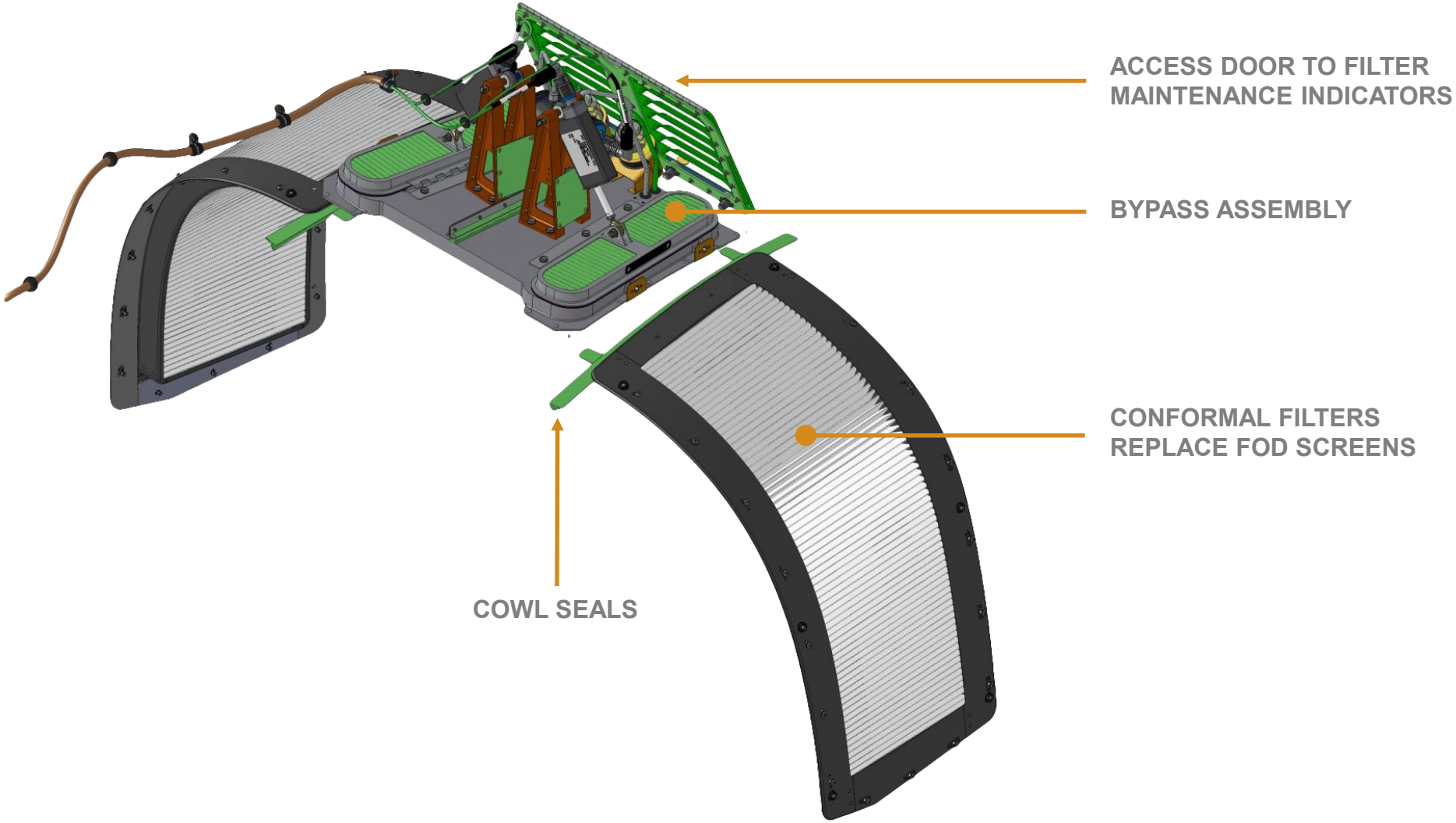
AW109 IBF SYSTEM DETAILS



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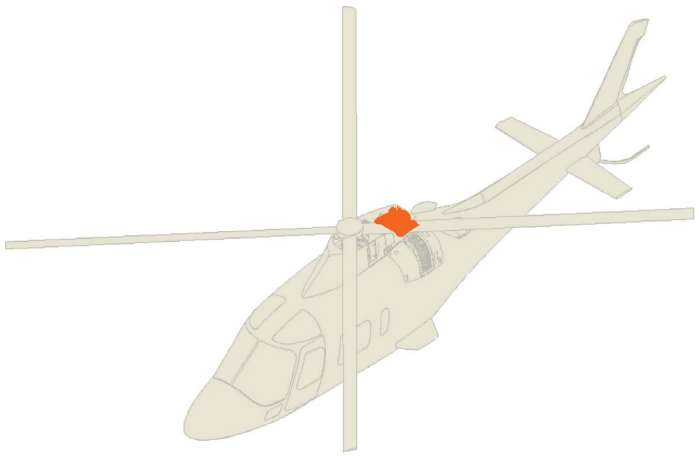
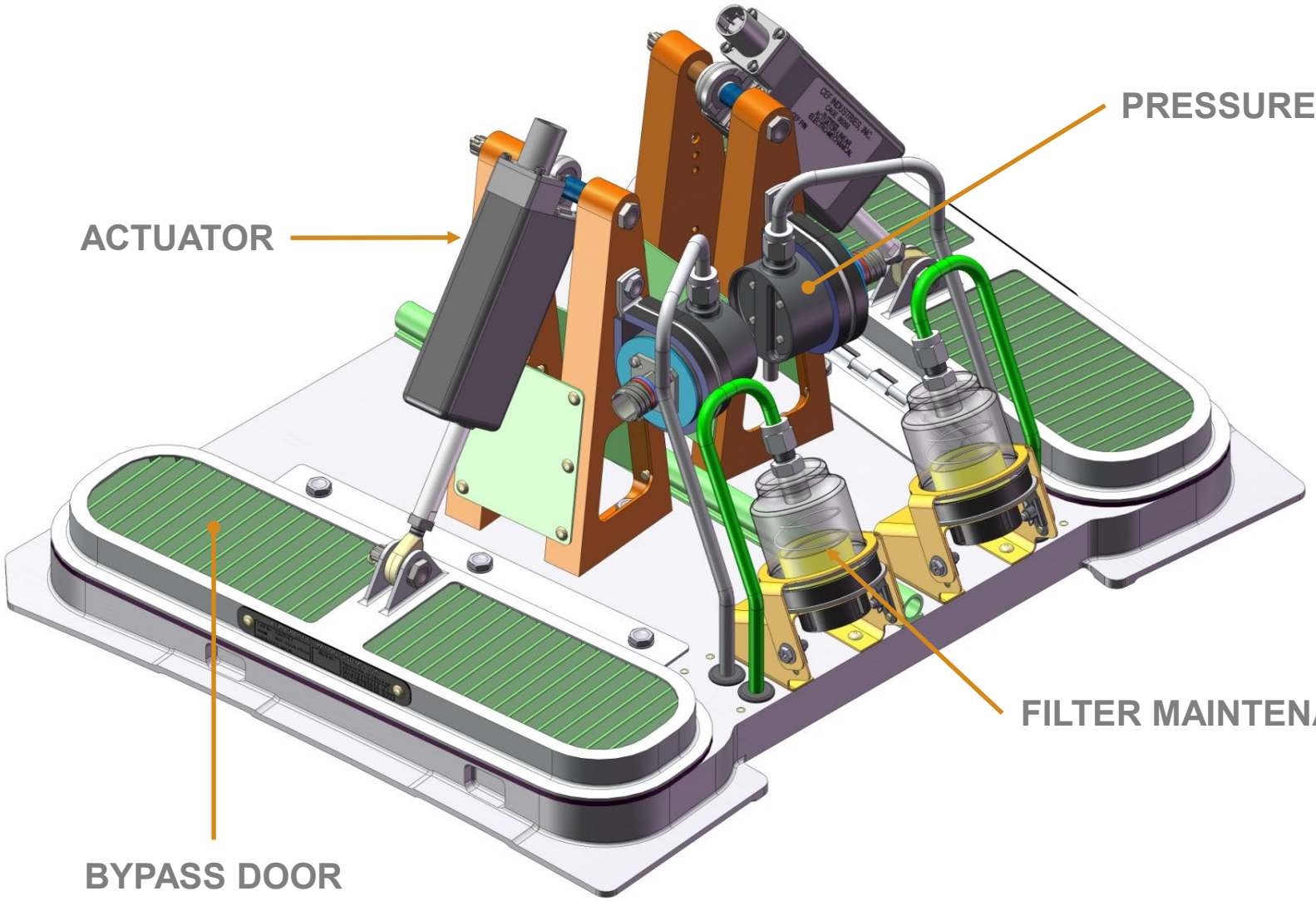
AW109 IBF BYPASS MAJOR COMPONENTS



Internal Positioning,
within OEM Cowling
Aft of Rotor Mast



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AW109 IBF FILTER BYPASS SYSTEM

Pilot commands the bypass door to open
to increase engine airflow until clear of debris conditions.

NOTE: *Aircraft with particle separators must land immediately during heavy debris conditions and do not have the ability to keep flying like aircraft with a barrier filter bypass system.*

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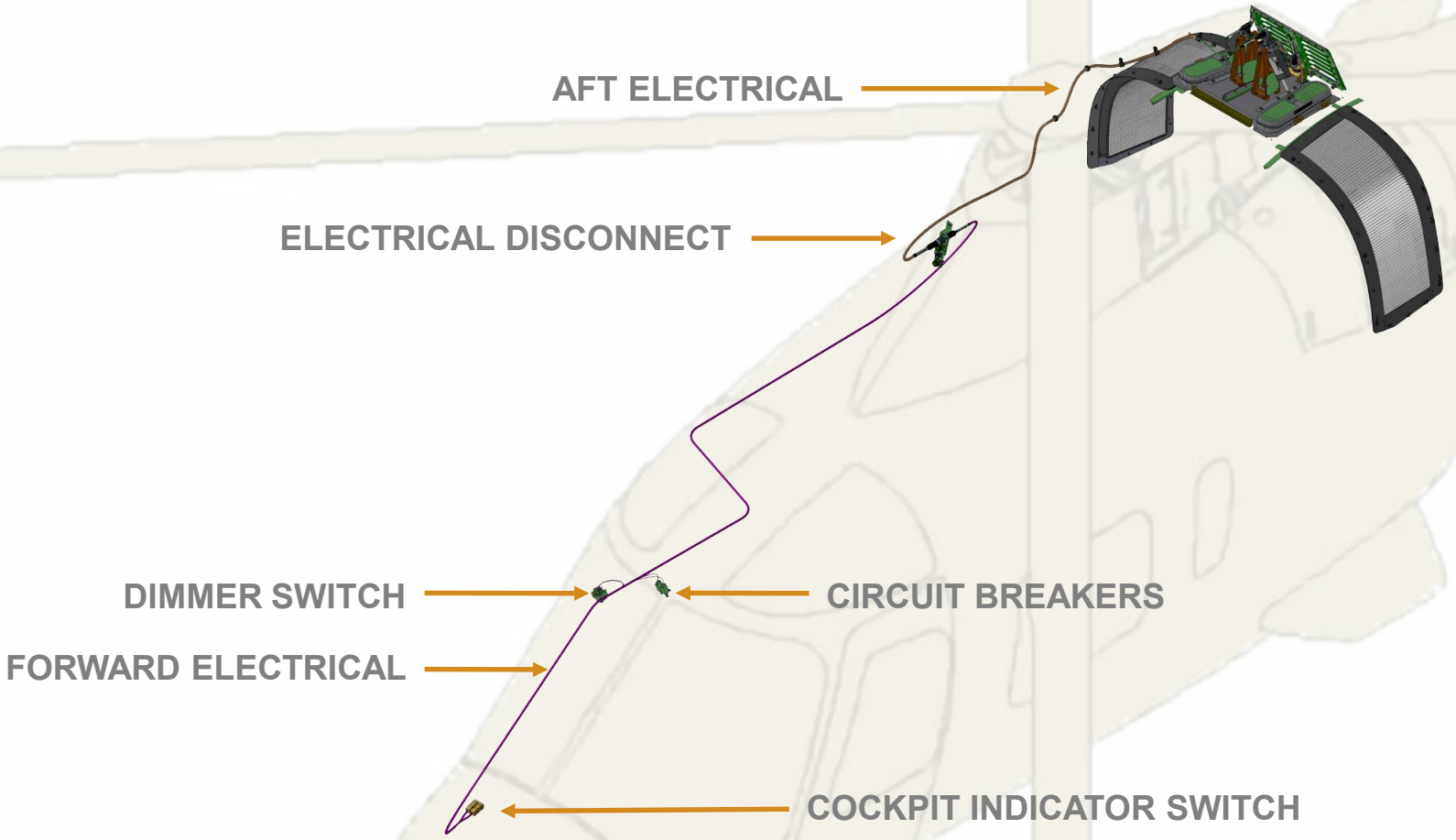
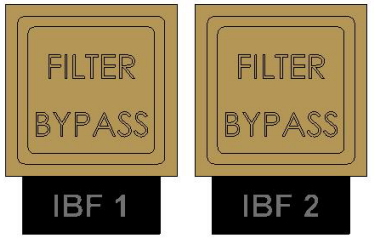
AW109 IBF WIRING DESIGN



COCKPIT INDICATOR SWITCHES



2-INCH x 2-INCH VIVISUN SWITCH,
EASY PANEL INSTALL

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IBF BENEFITS: PERFORMANCE

MAXIMUM ENGINE DEBRIS/FOD PROTECTION

Allows consistent flight operations and extends engine time on wing. Improved protection over an inertial design and significantly better protection than a FOD screen.

IMPROVED AIRFLOW

Pleated barrier filter element provides improved air flow versus inertial separation vortex/swirl tubes typical with IPS/EAPS.

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IBF BENEFITS: VALUE

RETURN ON INVESTMENT (ROI)

- Less premature engine removals, meet the expected engine TBO
- Long-life 4,500 flight hour filter assemblies (15 cleanings - 300 hour intervals)
- Reduction in corrosive salt air entering engine
- Engine overhaul cost reduction due to elimination of erosion and contamination on all rotating and pneumatic components
- Reduced maintenance time with improved plenum access.
- Common Line Replaceable Units (LRU) for mixed IBF fleets.
- Bleed air system maintenance eliminated with IBF

IBF OPERATIONAL CONSIDERATIONS

- Improved power margin for high/hot operations and confined landing zones. Scavenge air not required and immediate performance improvement with barrier filter versus Engine Air Particle Separator (EAPS).
- Engine performance retention after barrier filter installation.
- Inlet air bypass system backup not available with EAPS; added safety feature.
- FAA Certified for flight in falling and blowing snow referenced in the IAW helicopter manufacturers flight manual.

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IBF COMPARATIVE BENEFITS

- Engine Air Particle Separators (EAPS) utilize traditional inertial particle separation technology. Barrier Filters (BF) use current technology and state of the art integration.
- BF does not require the use of engine bleed air. EAPS does require engine bleed air which reduces engine power available.
- Engine bleed air system maintenance is eliminated. Reduced chance of engine stall from leaking valves and lines.
- Inertial separation vortex/swirl tubes routinely become clogged with straw, leaves and bugs degrading performance; Barrier filter immune to this type debris clogging and operates without degradation.

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IBF COMPARATIVE BENEFITS

- Barrier Filters (BF) have significantly higher separation efficiency than inertial separators. BF typically >99% capture efficient on ISO Coarse & Fine dust, inertial separator typically <96% capture efficiency on ISO Coarse dust and far less on ISO Fine dust.
- BF are effective regardless of engine power setting; inertial separators (PS) are only effective when they have adequate engine bleed air; PS adequacy typically available above flight idle power setting.
- Significant decrease in fine sand ingestion reduces engine erosion damage from offsite landings/unprepared sites; BF virtually eliminate concern about ramp FOD ingestion

IBF FILTER MAINTENANCE AID (FMA)

- Pre and Post flight indication of filter contamination level and maximum pressure drop.
- Allows flexibility for mission planning with predictable service cycles, particularly in high tempo desert environments.
- Verification of post cleaning effectiveness

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IBF FILTER MAINTENANCE AID (FMA)

- Provides the ability to meet Condition-Based Maintenance (CBM) between established cleaning intervals, eliminating unnecessary service.
- Measures plenum pressure versus ambient, across the filter system.
- Similar FMA used on other Donaldson IBFs for the Bell 205A, 206B, 206L-1/3/4, 407, 430, Leonardo AW119, AW139, Airbus AS350, EC130, and MD Helicopters MD500.

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Thank You

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