

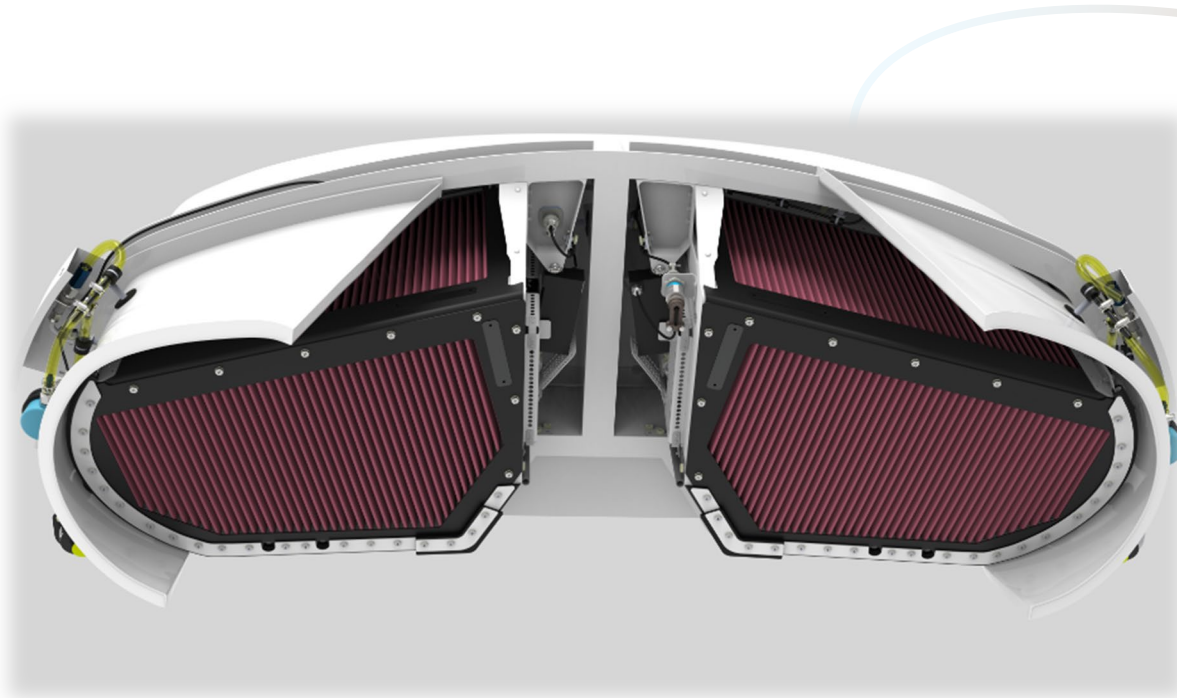
Donaldson Bell 430/230 IBF

August 1, 2020

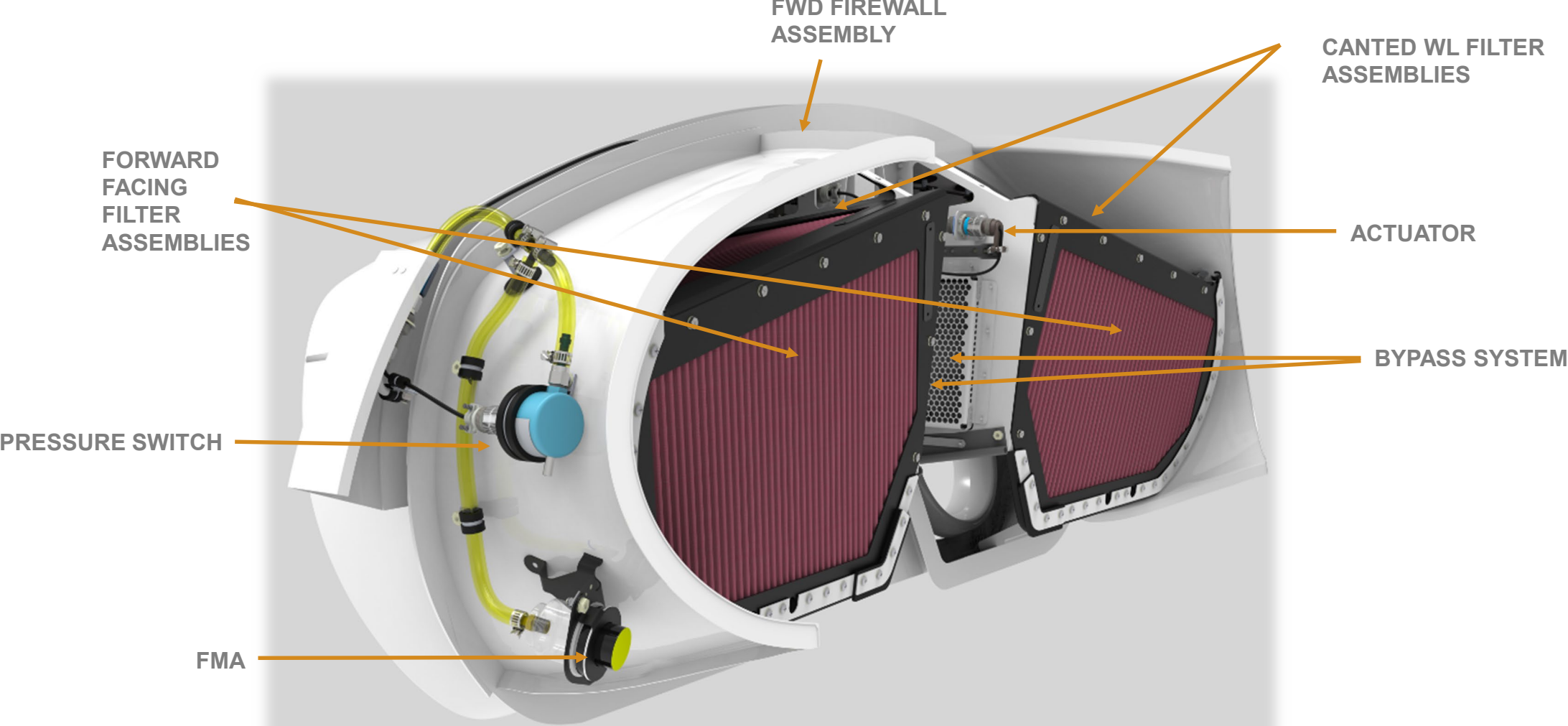
BELL 430/230



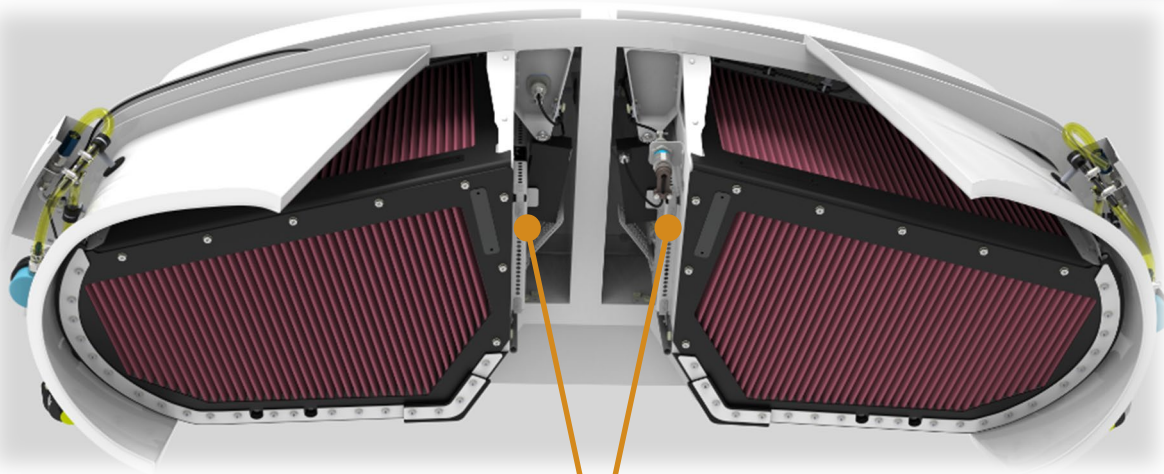
BELL 430/230 IBF SYSTEM DESIGN



BELL 430/230 IBF SYSTEM DETAILS



BELL 430/230 IBF FILTER BYPASS SYSTEM



BYPASS DOOR



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.

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



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, Leonardo A119, AW139, AW189, Airbus AS350, EC130, and MD Helicopters MD500.



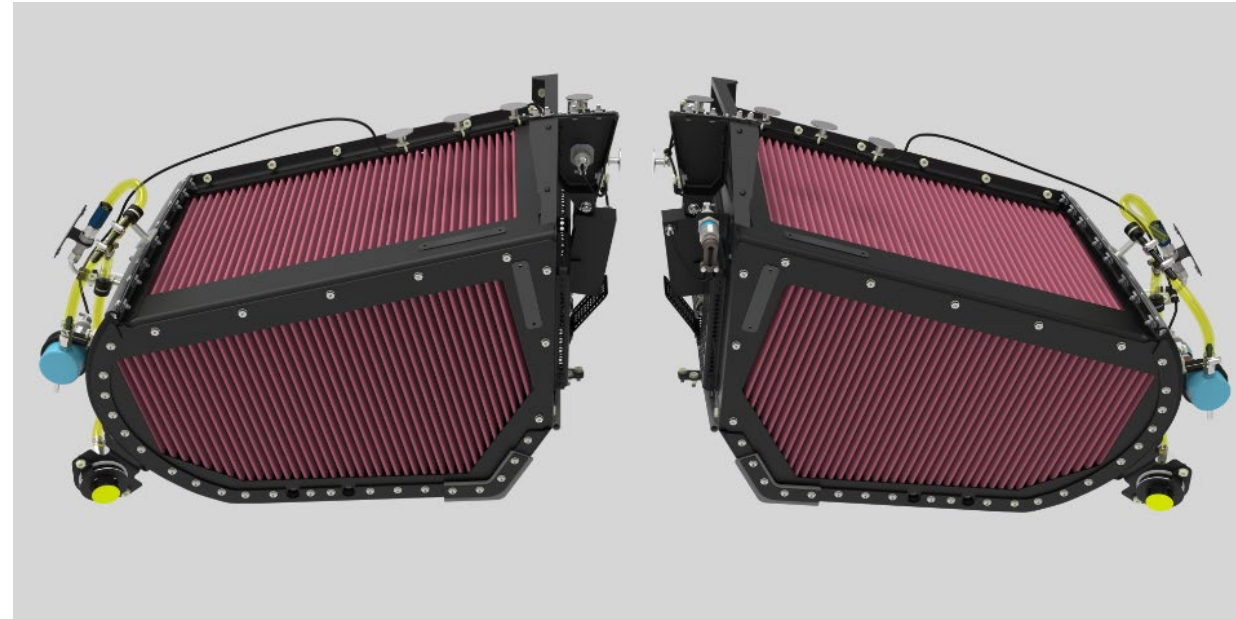
IBF BENEFITS: PERFORMANCE

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 EAPS.



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. Filter sized for Bell 430/230 engine airflow.
- Engine performance retention after barrier filter installation.
- Inlet air bypass system backup not available with EAPS; added safety feature.
- Certified for flight with baffles installed in falling and blowing snow IAW helicopter manufacturers flight manual requirements.



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.



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



Thank You

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