# SUPPORTING BETTER CABIN AIR QUALITY

The cabin air on today’s commercial aircraft comes from two sources – half from recirculated cabin air and half from “fresh air”. For the recirculated air system, we use High Efficiency Particulate Air (HEPA) filter systems, but for the “fresh air” component there is no filtration. The “fresh air” component of cabin air either comes from air bleed off the compressor stages of the engines or in the case of the Boeing 787 Dreamliner, from ram air coming from outside the aircraft. However, this “fresh air” can contain many contaminants including carbon monoxide (CO), carbon dioxide (CO₂), ozone (O₃), hydraulic fluids, engine oils, pyrolysis products, Volatile and Semi-Volatile Organic Compounds (SVOC/VOC) and particulates. To improve cabin air quality and prevent fume events which can impact the safety and well-being of flight crews and passengers, the removal of these contaminants is essential. As the industry starts to think of air quality based on safety, as well as comfort, the decision-making by airlines is starting to dramatically change regarding how to improve the air quality in the cabin of the aircraft. There have been more concerns raised surrounding fume events in the cabin and the impact these fume events have on the health of flight crews and incidence of “Aerotoxity Syndrome”. Airlines, OEM’s, flight crews and the traveling public are just now starting to realize how important cabin air quality is to the aviation industry and we are being challenged more each day to provide a safe cabin through the removal of bacteria and viruses.

PTI Technologies believes that ensuring high-quality cabin air is an ecosystem problem that requires products and technologies to address each source of possible contamination. To achieve this solution, a transdisciplinary approach which addresses aircraft ground and flight modes with different integrated solutions is required. Our approach is the development of our CabinSafe® family of products for treating “fresh air”, recirculated air and in-cabin air. PTI has been involved in developing and producing cabin air filtration systems since the 1980’s, when we first developed the Cabin Air Filtration (CAF) System for the Northrop B-2 program. Since the B-2 program, we have leveraged our technology and continued to develop cabin air filtration for a number of other commercial and military applications. We continue to invest in special filter media, customized proprietary adsorbents, catalyst development and advanced filter systems to meet challenging customer needs for clean air.

PTI has developed and been in production of HEPA filters as part of our CabinSafe® product line for a number of years to clean recirculated cabin air on commercial aircraft by capturing particles such as dust, fibers, bacteria, fungal spores, pollen and viruses. However, the airlines and the traveling public want even more performance to capture gases and odors. PTI is developing and testing a new generation of cabin air filters combining HEPA with activated carbon to not only remove particles, bacteria and viruses from the recirculated cabin air, but also gases and vapors with superior performance exceeding OEM requirements and the performance of other current options in the market.

PTI Technologies is also working on cleaning up the “fresh air” component of cabin air and addressing fume events in the cabin. Our approach has been the development of integrated filter technology for the aviation industry to capture bleed air contaminants. We first developed the basic technology through our Fuel Tank Inerting System (FTIS) filtration applications. Now working with an industry partner in catalysts, we are applying this technology to ECS bleed air filtration handling flows up to 1,200 cfm and temperatures up to 500 °F (250 °C). PTI has completed our first round of prototype bleed air testing of a high-flow filter design against various contaminants including toluene, engine oils, carbon monoxide, ozone and propylene glycol at various temperatures. Based on the initial results and further in-house R&D, we have now designed and are manufacturing this next generation design of our filtration technology, set to be tested in early fall with the OEM’s in their test facilities. The goal is to integrate our filtration technology into an aircraft and start on-aircraft flight testing to show we can deliver improved cabin air quality and mitigate fume events with an easily maintained, long life system. This is the next step towards providing “fresh air” filtration for both new production and existing aircraft fleets, enhancing the safety and comfort of anyone who flies on a commercial aircraft.

Another objective in our CabinSafe® technology roadmap is to address in-cabin issues and for this, PTI Technologies is evaluating the use of ionization systems to provide cleaner air in areas such as cockpits, galleys and lavatories.

With our over 60 years of experience in aerospace filtration design, we are confident that PTI’s CabinSafe® technology will provide improved cabin air quality and mitigate fume events, to provide aircraft manufacturers, airlines, flight crews and passengers with the best possible experience on aircraft. This is PTI Technologies CabinSafe® vision.

To learn more about PTI Technologies and to discuss how we can improve your cabin air quality with our CabinSafe® technology, visit us at the ESCO Aerospace & Defense booth in Hall 3, Booth #C148.