

Pilot Measures Against Cabin Air Contamination

Task for a *Bachelor Thesis*

Background

In recent years health concerns associated with contaminated cabin air in aircraft have gained public attention. These concerns were raised by crew and passengers about potential short or long term health effects causing e.g. neurotoxic symptoms. Engine oil got into focus with its additive called tricresyl phosphate (TCP), an organophosphate. TCP can enter already during normal operation in small quantities from the engine bearings through bearing seals via bleed air (taken from the engine's compressor or the APU) into the aircraft cabin. In addition to TCP other substances from the pyrolysis of the oil, metallic particles from abrasion, substances from hydraulic fluids, from de-icing fluid, or from aviation fuel have also caused health problems or have impaired flight safety. Problems are pronounced in failure cases leading to Cabin Air Contamination Events (CACE) – commonly known as fume events or smell events. When pilots are confronted with a CACE they have to make a decision to continue the flight or to use an alternate airport to land the airplane as soon as possible. Pilots are thus concerned with options and strategies to determine a cabin air contamination, to isolate the contaminating source, and to mitigate effects of a possible CACE.

Task

The thesis should answer questions as follows:

- How can the initially subjective impression of a CACE be based on objective findings using sensors?
- In which way do checklists of various passenger aircraft address the situation of a CACE? Could checklists dedicated to cabin air contamination support pilots better than presently available more general checklists?
- How can the source of a cabin air contamination be isolated most quickly with systematic troubleshooting and switching between system configurations?
- Why and under which circumstances is a descent to 10000 ft beneficial and possible?

The report has to be written in English based on German or international standards on report writing.