

Training in the use of halon cockpit extinguishers

Air Formation, a company specialising in firefighting and evacuation training for aircraft crews, provided the BEA with an A340 cockpit in which it carries out recurrent training for flight crews.

Fire attack procedure:

The fire is attacked at the base of the flames, on the nearest outbreak, by spraying the product at a low angle, at a distance of about 1 m from the centre. If possible, the fire extinguisher should be kept in a vertical position; if not, it should not be tilted more than 45°¹.



Activation of a cockpit fire extinguisher in the cockpit of Air Formation's A340

¹ If this is not the case (i.e. steep angle) the propellant - pressurised neutral gas - is expelled instead of the extinguishing agent, halon.

Recording noise produced by the activation of a cockpit fire extinguisher

Two fire extinguishers were activated in the cockpit and the cylinders completely emptied. The Cockpit Area Microphone (CAM) was used to pick up the background noise. A crew headset was placed in the rest position (on the side windshield post) to pick-up the noise detected by the boomset mike of a crew member. It should be noted that no environmental noise was emitted in the cockpit (ventilation, aerodynamic noise, engine noise, etc.).

Model H3R Aviation C352TS
(extinguisher widely used on commercial transport aircraft and in business aviation):

Note: the extinguisher emptied in 19.4s of uninterrupted spraying.



Model Air Total 74-20
(extinguisher in the cockpit of the SU-GCC):

Note: the extinguisher emptied in 15 s of uninterrupted spraying.



The following two pages show the spectral content of the noise produced by the activation and emptying of each of the two fire extinguishers.

Visible and olfactory effects observed

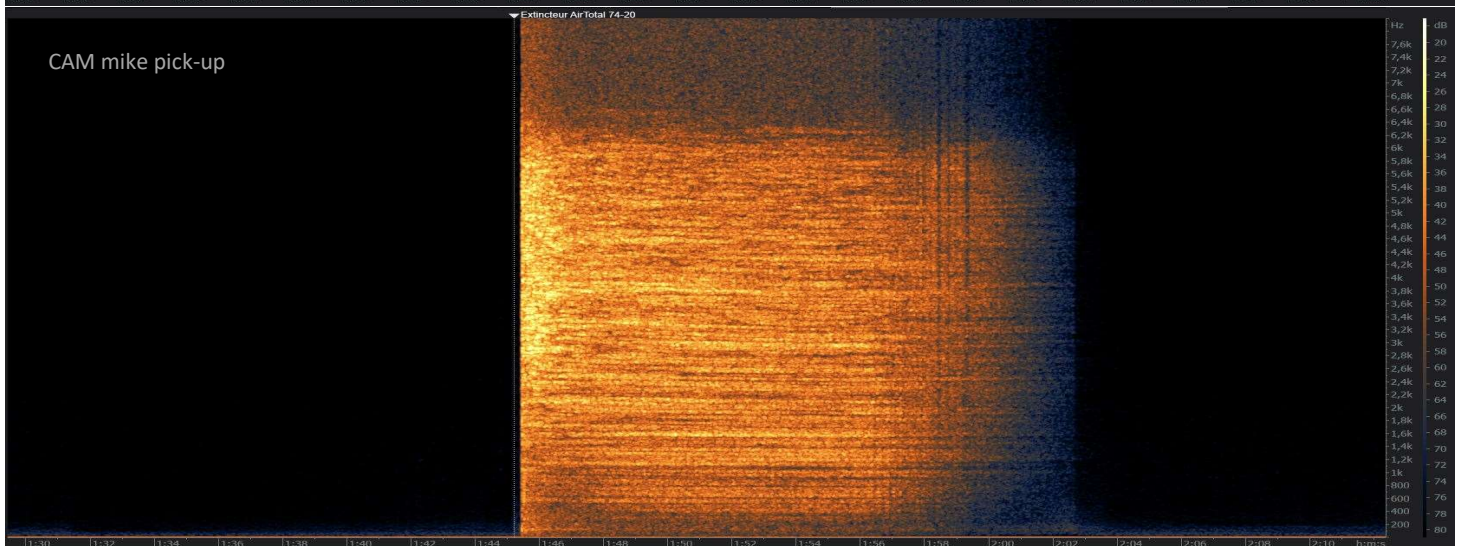
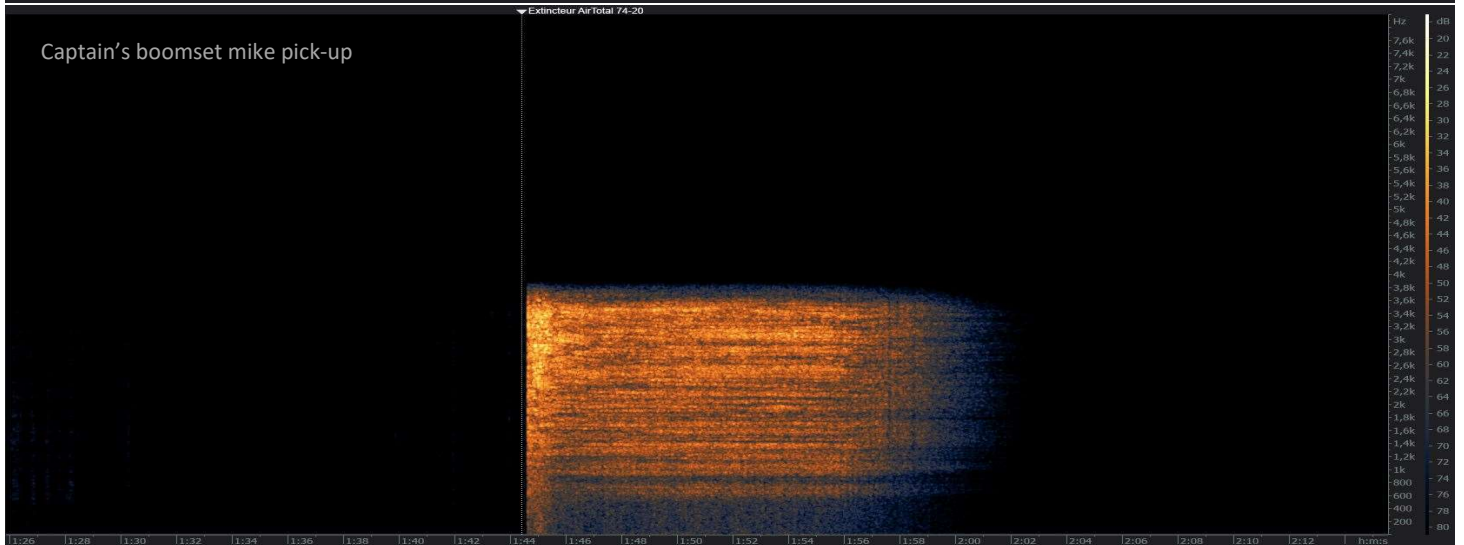
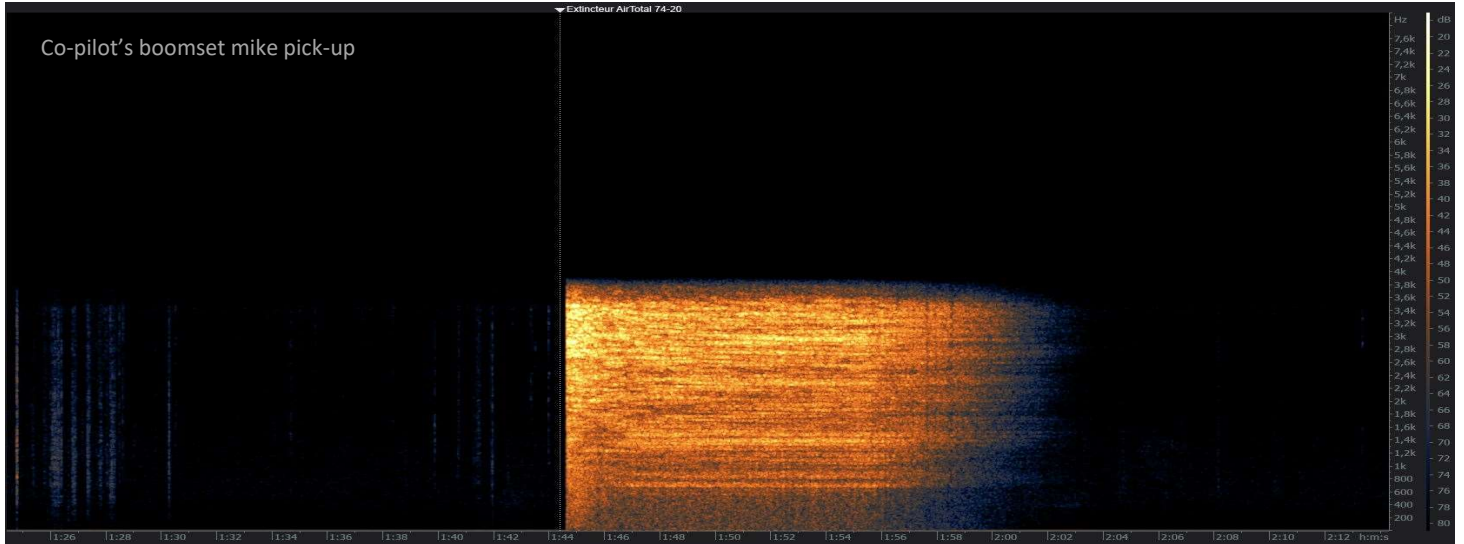
In a training situation - without a fire - the halon gas spray is odourless and colourless.

Synthesis / audio analysis

The emptying of a halon fire extinguisher produced a broadband noise that occupied the entire bandwidth offered by the recording channel. The sound event was long (measured duration varying from 13 to 19 s over all the tests carried out (Air Formation and INERIS), and its level was average. No event with an acoustic signature similar to that of the fire extinguisher emptying, recorded during these tests, was identified on the CVR recording of flight MS804.



Activation and emptying of an Air Total 74-20 halon fire extinguisher
 (A340 cockpit - fire extinguisher directed towards the co-pilot's doc storage compartment)

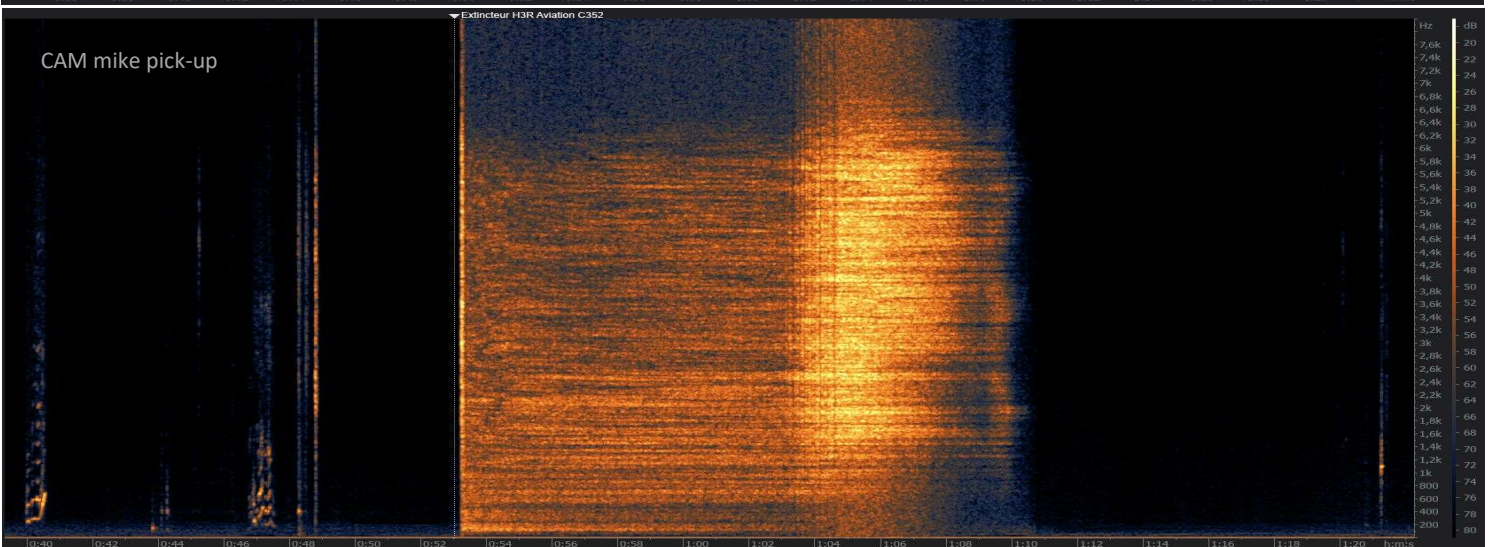
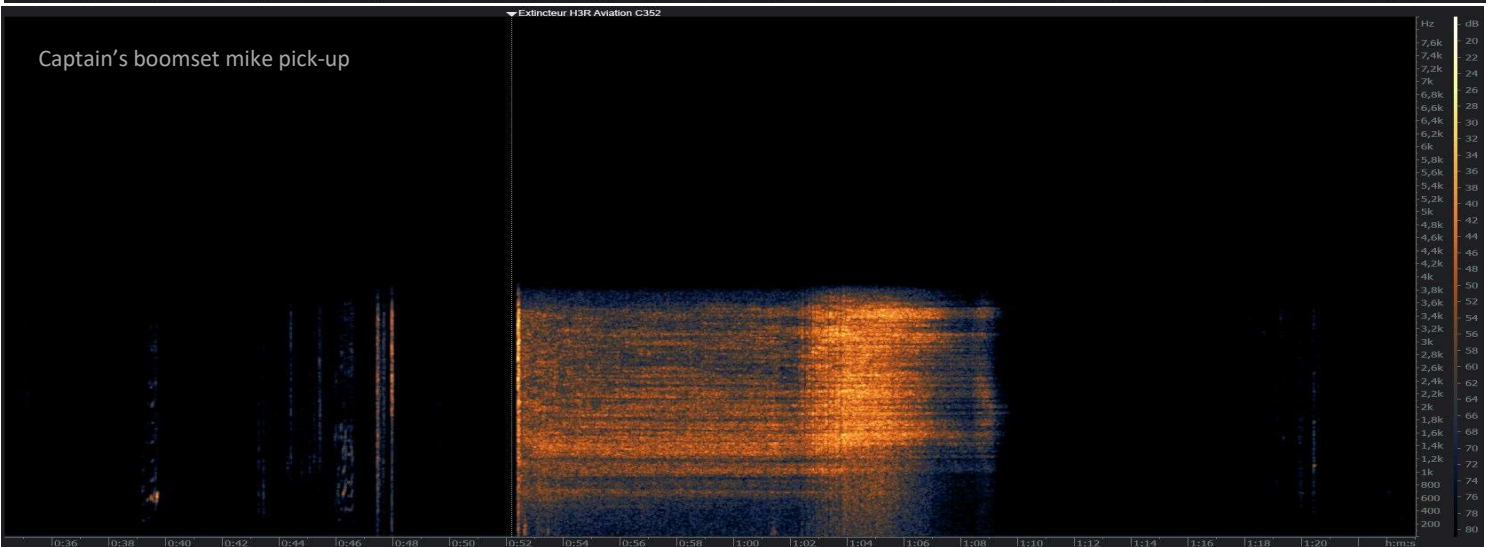
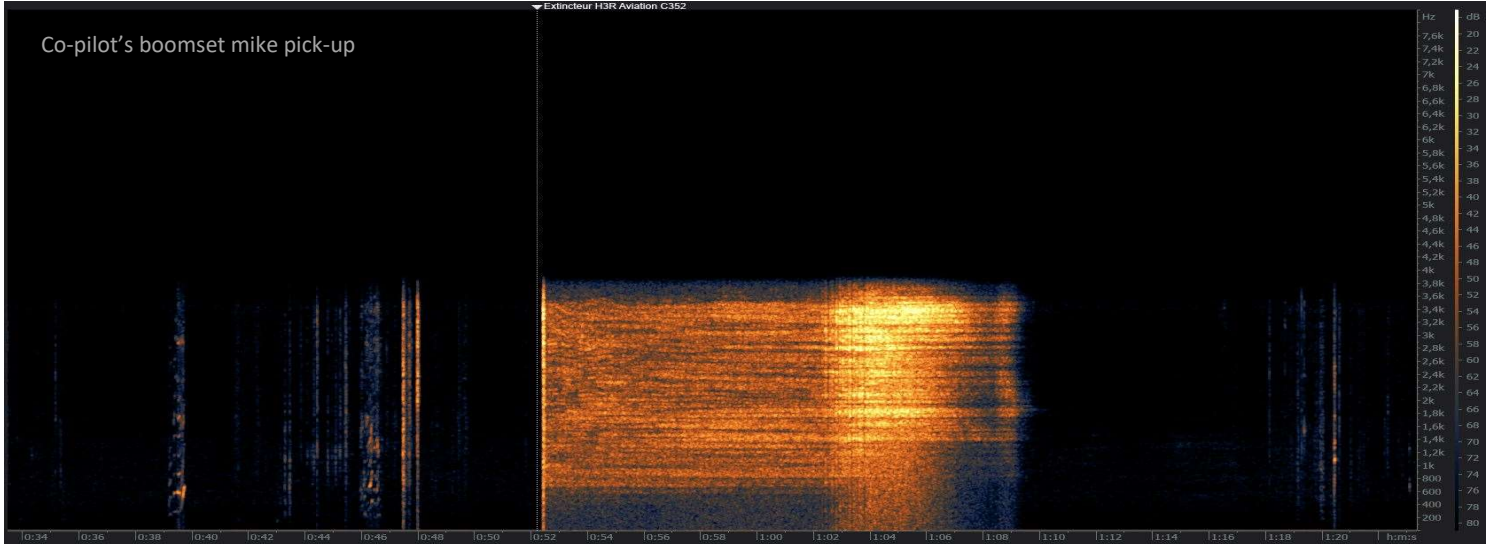


Summary Total time = 15 s

- Flight crew boomset channels: broadband noise from 800 Hz to 3.8 kHz, fairly pronounced between 2 and 3.8 kHz
- CAM channels: broadband noise over the entire bandwidth of the CVR CAM channel



Activation and emptying of an H3R Aviation C352TS halon fire extinguisher (A340 cockpit - fire extinguisher directed towards the co-pilot's doc storage compartment)



Summary Total time = 19.4 s

- Flight crew boomset channels: broadband noise from 800 Hz to 3.8 kHz. Noise reinforcing between 1.4 and 3.8 kHz when cylinder emptied of two-thirds of the content.
- CAM channels: diffuse broadband noise over the entire bandwidth of the CVR CAM channel. Noise reinforcing between 1.4 and 3.8 kHz when cylinder emptied of two-thirds of the content.