Smoke Detector Response Time Comparison to Artificial Smoke Sources

IASFPF 31 Oct 2018
Atlantic City

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Background

How shall a reference smoke generation source for future smoke detector integration verification look like?

Where did we stop last time?

Summary

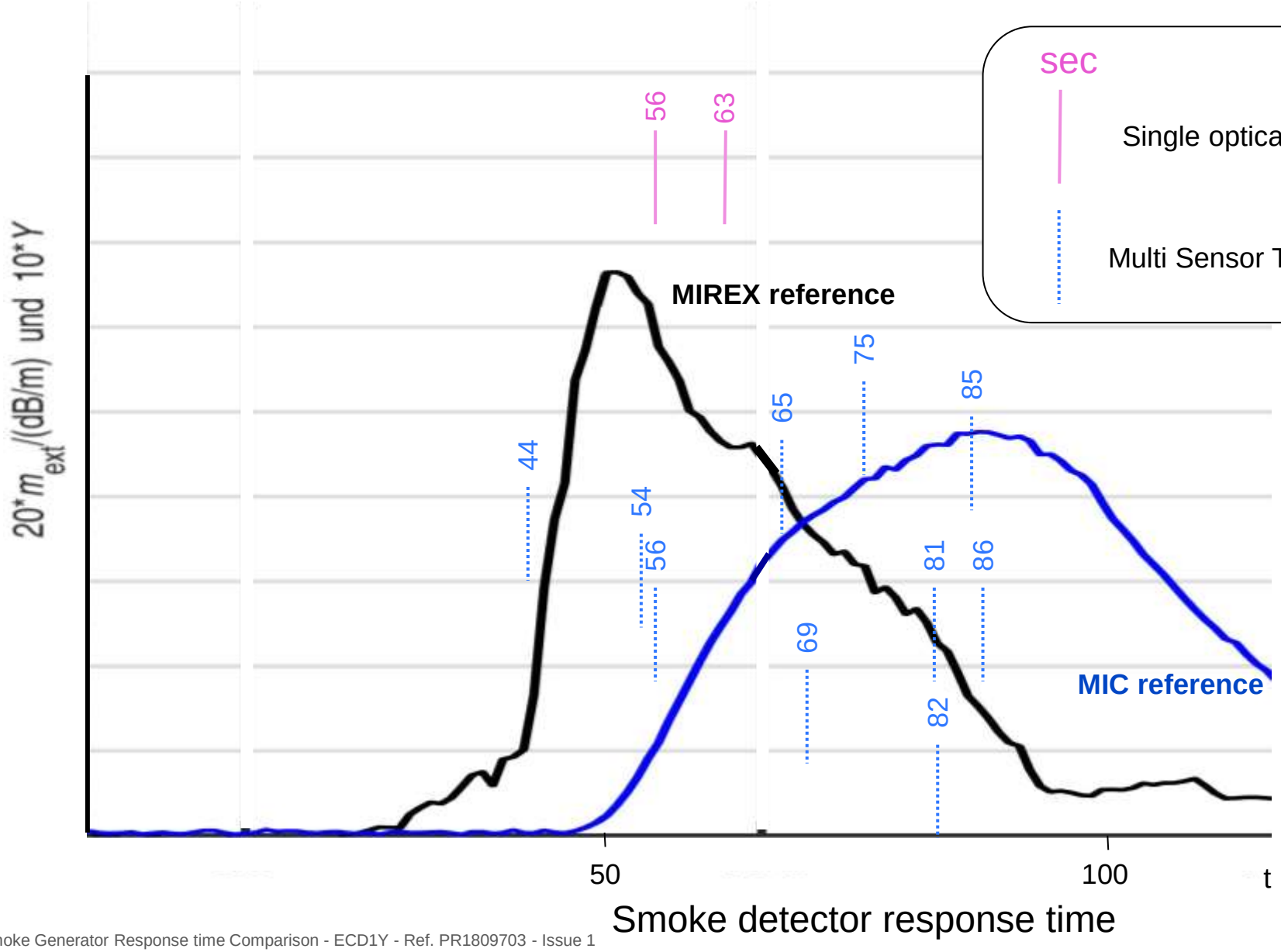
- Siemens and Aviator smoke generators show good match in unventilated wooden aircraft cargo compartment mock-up
- Different results for Siemens and Aviator Smoke Generator occur in a different environment (EN54 room)
- Particle size distribution matches well between Siemens and Aviator Smoke Generator

Next steps

- Discussion on feasibility of a standardized smoke generator calibration approach
- International agreement on reference
- Investigations on in-flight changes of smoke generator application (cabin pressure, cargo door leakage, etc.)
- Correlation to Smoke Detector responses

Smoke Generator test

Siemens Smoke Generator Program 5 in EN54 test environment



- Multisensor smoke detectors respond differently to artificial smoke
- The Siemens smoke generator is generally useable to certify multisensor smoke detectors

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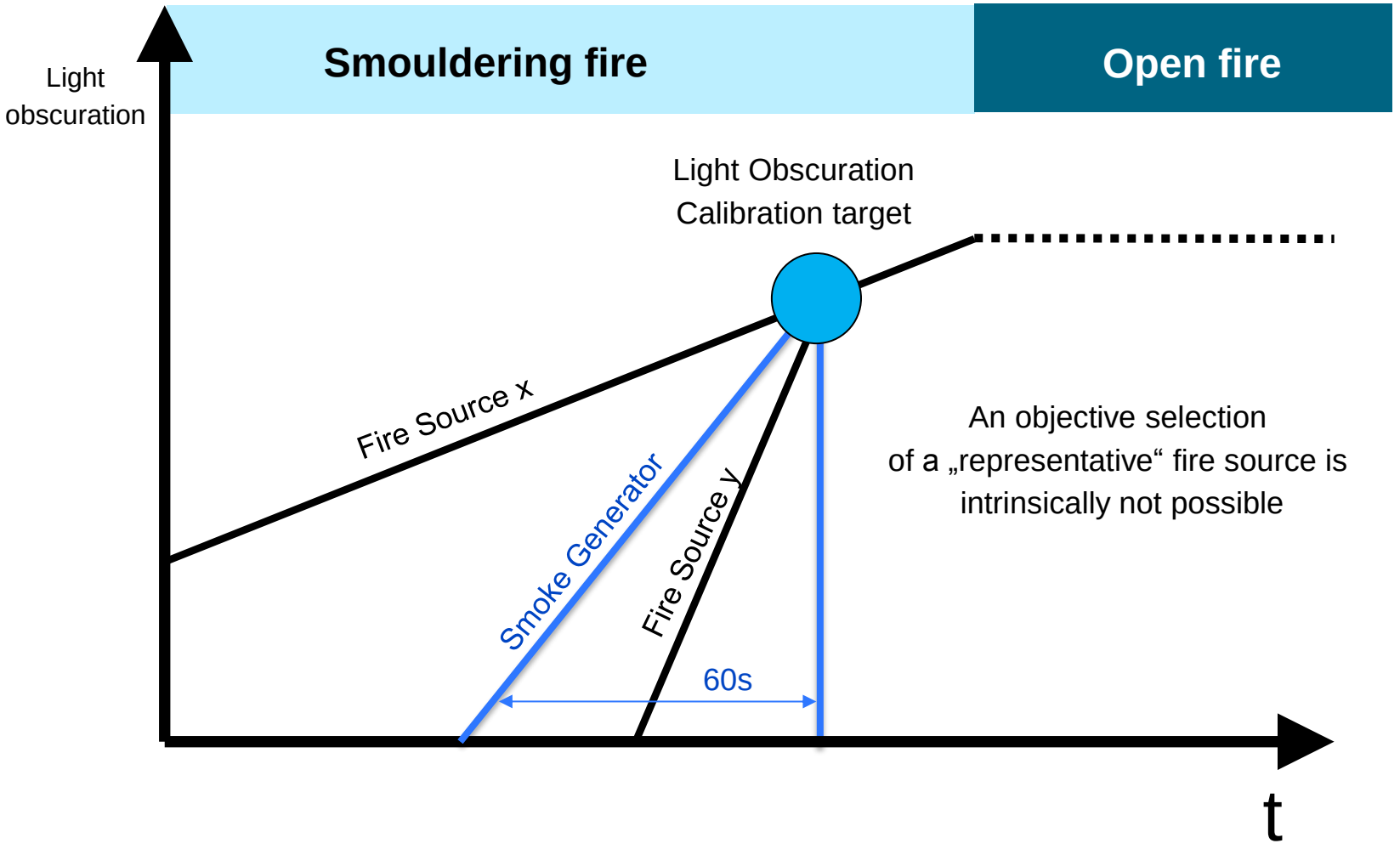
One possible way to the reference



CS 25.858 Cargo or baggage compartment smoke or fire detection systems

If certification with cargo or baggage compartment smoke or fire detection provisions is requested, the following must be met for each cargo or baggage compartment with those provisions:

(a) The detection system must provide a visual indication to the flight crew within one minute after the start of a fire.

(b) The system must be capable of detecting a fire at a temperature significantly below that at which the structural integrity of the aeroplane is substantially decreased.

The transition point from smouldering to flaming should be used
- **with an agreed and justified scenario and margin –**

to estimate the smoke density reference.

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Conclusion

Summary

- Multisensor smoke detectors respond differently to artificial smoke depending on the signal processing algorithm
- This might represent a challenge for certification testing
- The Siemens smoke generator is generally useable to certify multisensor smoke detectors

Next steps

- Comparative data gathering for aviator smoke generator
- Validation of calibration methodology
- Agreement on reference smoke amount and properties by expert consensus
- Verification flight test (long term)

Acknowledgements

- Rainer Hadamek, Airbus Fire Protection Design Office
- Dr. Thorsten Schultze and Wolfgang Krüll, University of Duisburg-Essen

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Thank you

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