



SAREL Consult GmbH

System Safety & Operational Reliability

Risk Assessment on Aircraft Level & Safe Transport of Lithium Batteries

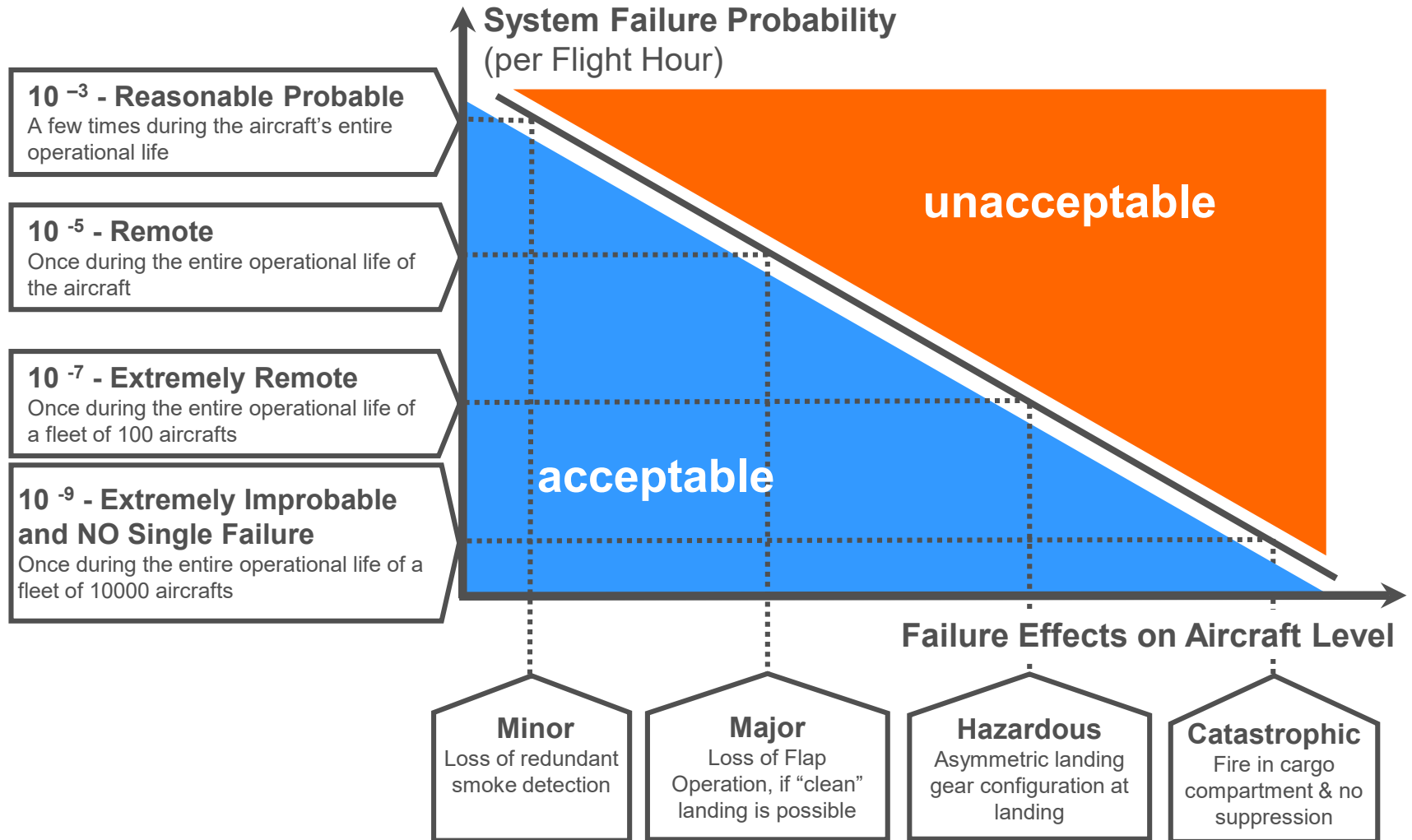
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SaBatAir Project

Brussels

14th November 2019

Certification Specification EASA CS 25.1309 AMC



Cargo Fire Protection System

“Class C” Cargo Compartments of Passenger Aircraft

- **System Functions**
 - A. Smoke detection
 - B. Fire / smoke indication to flight crew
 - C. Halon fire suppression

- **Dependent System Functions**
 - A. Electrical power – ATA 24
 - B. Isolation of cargo compartment – ATA 21

Function Hazard Assessment (FHA)

Failure Condition: Fire in class C cargo compartment & no suppression

- **Flight Phase** All
- **Repercussions** Uncontrolled fire may cause loss of systems and damage to the aircraft structure.
- **Classification** **CATASTROPHIC**
- **Safety Objective** **1.0E-09 / fh**
- **Detection Means** Indications: Loss of smoke detection, discharge of halon bottles.
- **Flight Crew Actions** Emergency procedure and LAND ASAP

System Safety Assessment

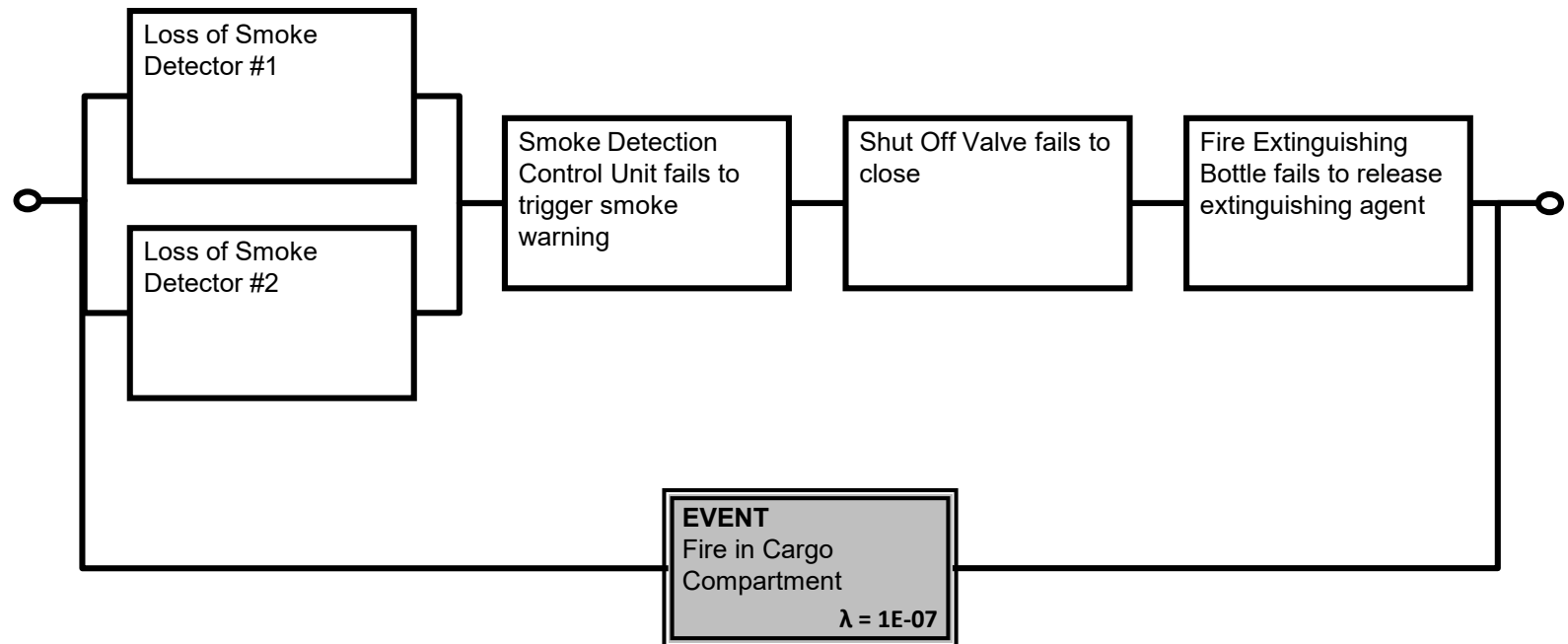
Reliability Block Diagram

Failure Condition:
suppression

Fire in class C cargo compartment

& no

- **Classification:** CATASTROPHIC
- **Safety Objective:** 1.0×10^{-09} per fh



System Safety Assessment

Reliability Block Diagram

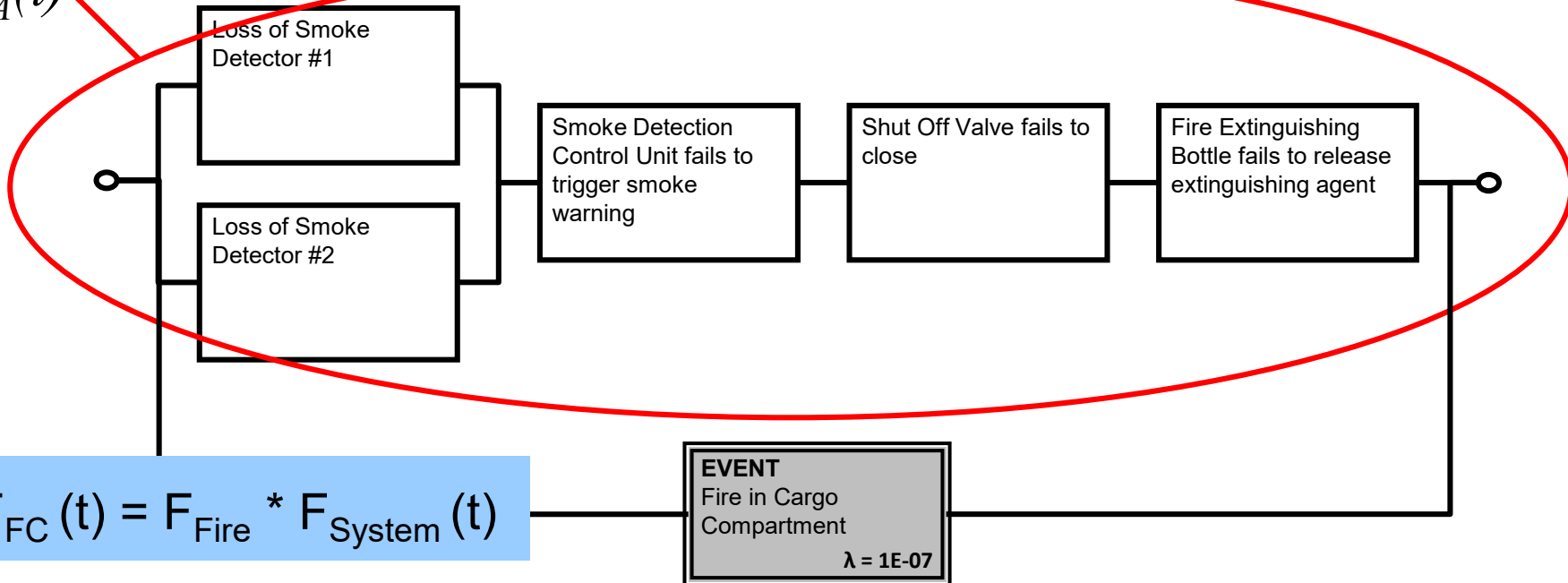
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$F_A(t)$



System Safety Assessment

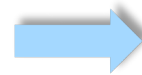
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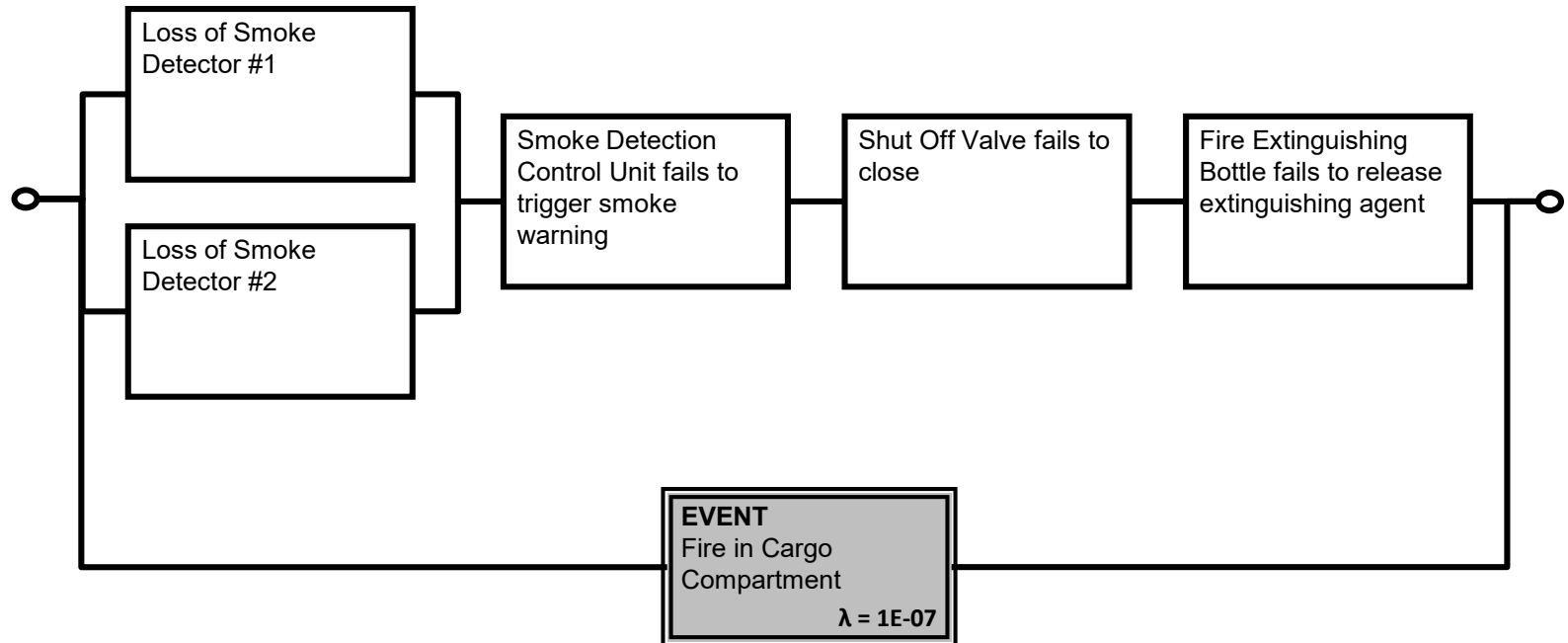
Fire in class C cargo compartment

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Increased LDCC Fire Rate



Reduced Maintenance
Intervals (CMR)



System Safety Assessment

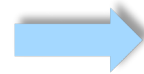
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