

AVIONICS in BRIEF

Aeronautical Software Categories

EUROCAE is the European Organisation for Civil Aviation Equipment, a not-for-profit organisation formed in 1963 to provide a European forum for resolving problems with electronic equipment used in the air transport industry.

RTCA is a not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance and air traffic management (CNS/ATM) issues. RTCA functions as a USA Federal Advisory Committee. Its recommendations are used by the Federal Aviation Administration (FAA) as the basis for policy, program, and regulatory decisions and by the private sector as the basis for development, investment and other business decisions. Organized in 1935 as the Radio Technical Commission for Aeronautics, RTCA today includes roughly 335 government, industry and academic organizations from the United States and around the world.

EUROCAE document ED-12B corresponding to RTCA document DO-178B provides the international civil aviation community with guidelines for determining that software aspects of airborne systems and equipment comply with airworthiness requirements.

Five levels are defined, based upon the contribution of software to potential failure conditions.

Level A: Software whose anomalous behaviour would cause or contribute to a failure of system function resulting in a **catastrophic** failure condition, resulting in many fatalities including the crew. A level A failure might occur 1 in 1 billion flights.

Level B: Software whose anomalous behaviour would cause or contribute to a failure of system function resulting in a **hazardous/severe-major** failure condition, reducing the capability of the aircraft or its crew to cope with adverse operat-

ing conditions, potentially leading to fatal injuries. A level B failure might occur 1 in 10 million flights.

Level C: Software whose anomalous behaviour would cause or contribute to a failure of system function resulting in a **major** failure condition, i.e. it would reduce the capability of the aircraft or its crew to cope with adverse operating conditions potentially leading to discomfort and possible injury. A level C failure might occur 1 in 100,000 flights.

Level D: Software whose anomalous behaviour would cause or contribute to a failure of system function resulting in a **minor** failure condition, i.e. it would not significantly reduce aircraft safety but could lead to inconvenience to occupants.

Level E: Software whose anomalous behaviour would cause or contribute to a failure of system function resulting in a **no effect** failure condition, i.e. it would not affect the operational capability of the aircraft or increase crew workload.

Summary of software effects:

- **Level A / Catastrophic** - Failure may cause a crash.
- **Level B / Hazardous** - Failure has a large negative impact on safety or performance, or reduces the ability of the crew to operate the plane due to physical distress or a higher workload, or causes serious or fatal injuries among the passengers.
- **Level C / Major** - Failure is significant, but has a lesser impact than a hazardous failure, for example, leads to passenger discomfort rather than injuries.
- **Level D / Minor** - Failure is noticeable, but has a lesser impact than a major failure, for example, causing passenger inconvenience or a flight plan change.
- **Level E / No Effect** - Failure has no impact on safety, aircraft operation, or crew workload.