Risk Management and Dependability –
What Are the Key Factors?

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Prologue
On June 4th, 1996, the maiden flight of the Ariane 5 launcher exploded about 37 second after lift-off. Scientist with experiments on board that had taken years to prepare were devastated. For many software engineering researchers, however, the disaster is a case study rich in lessons [1].

The very first questions were: How come? Who dunnit?
And the next one: How to avoid this in future?

A. Sketching the Topic
1. Dependability is defined as
   - The ability to deliver service that can justifiably be trusted. J.-C. Laprie
   or
   - Ability to perform as and when required. IEC, TC 56/ISO TC 176; adopting in ISO 9000 pending.

2. Characteristics of dependability as risk factors are (not complete)
   - Attributes
     - Safety
     - Security
     - Reliability
     - Availability
     - Maintainability
     - Confidence
     - Integration
     - ...
   - Means
     - Fault prevention
     - Fault tolerance

3. These characteristics of dependability are disciplines of their own. We have even renowned conferences, journals named after those factors.
4. Development and deployment of large, complex computer systems are risky.
5. Risk Management: tentatively defined via (subject to be changed/to be discussed, [2])

   Risk Exposure (Impacts/Costs) \equiv Probability (Loss) \times Size (Loss)

B. Some of the Questions to be Discussed
1. Are these characteristics to be handled equally when managing risks?
2. Or, should we decide for one key factor and forget the others?
3. Or, should we decide for a selection of (privileged) key factors?
4. Or, is there a standard/canonical ranking of them, e.g., safety before reliability before confidence, etc.?
5. If ranking, do they cause pair wise conflict(s) when assigning priorities, e.g., security vs. fault tolerance?
6. After the next disaster: We do not want to ask “Who Dunnit”? Better, we should ask to avoid any disaster: Whose job is it?
   - Project manager’s?
   - Test & Quality engineer’s?,
   - Designer’s?
   - Programmer’s?
   - Or, whoever else?
C. Documentation
The documentation of the discussion can be visited under
http://adt.upb.de/aktuelles/veranstaltungen/comp-sac2004/

Arguments and positions can be sent to bell@upb.de
(also after the conference).

D. Participants
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analysts of mechatronic dependability among this topic
including analysis of the Concorde disaster.

Dr. LAPRIE Jean-Claude
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is the research director with the Dept. Dependable
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