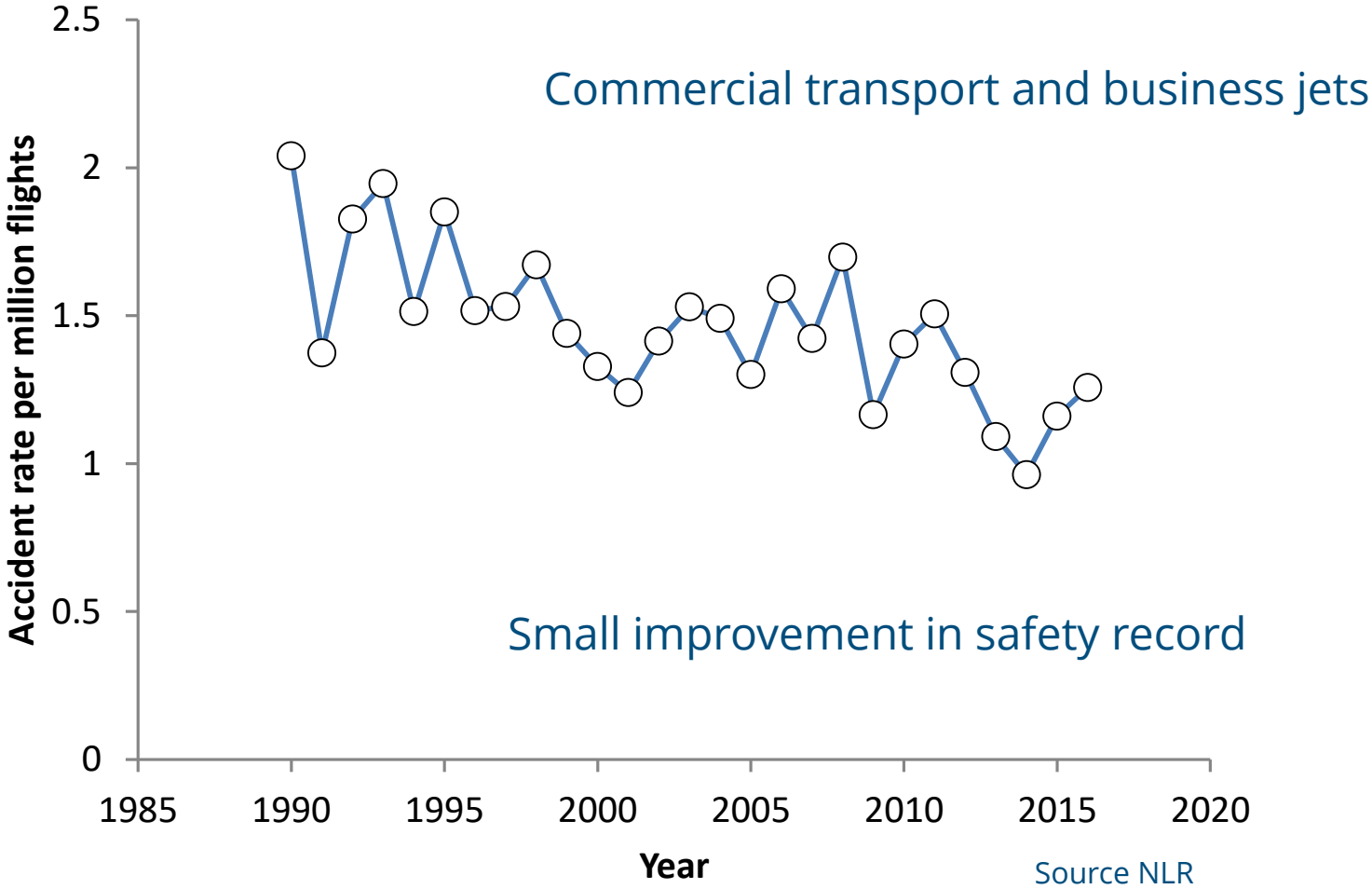
How can we reduce runway excursion risk?

Gerard van Es, FSS Public Workshop 8-9 March, 2017

2 runway excursions per week!

30% of cases damage to aircraft

Trend in runway excursion accident rate



Source NLR

Classical risk definition

low

high

Consequences

high

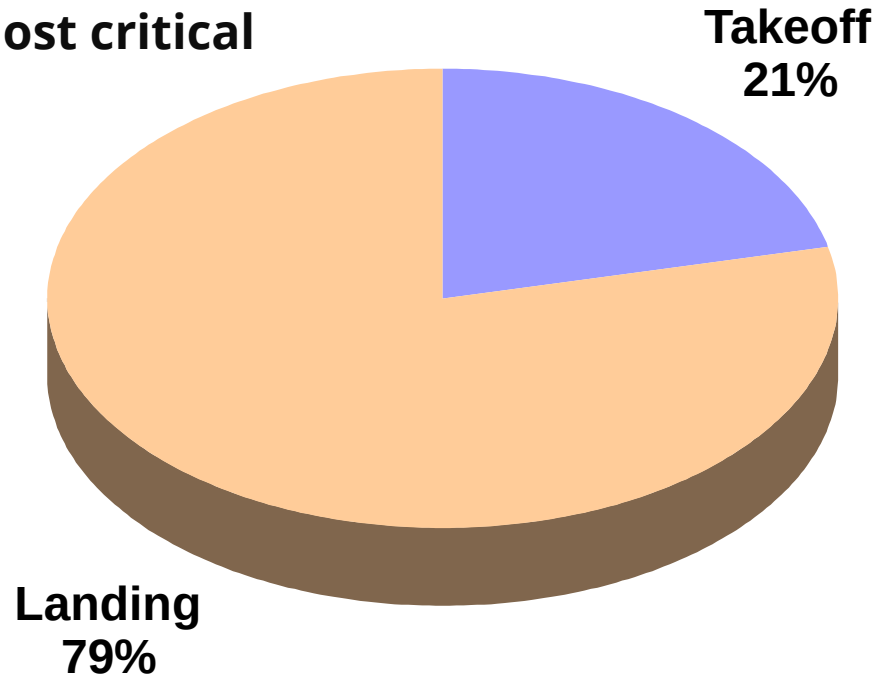
Probability

Unacceptable risk level

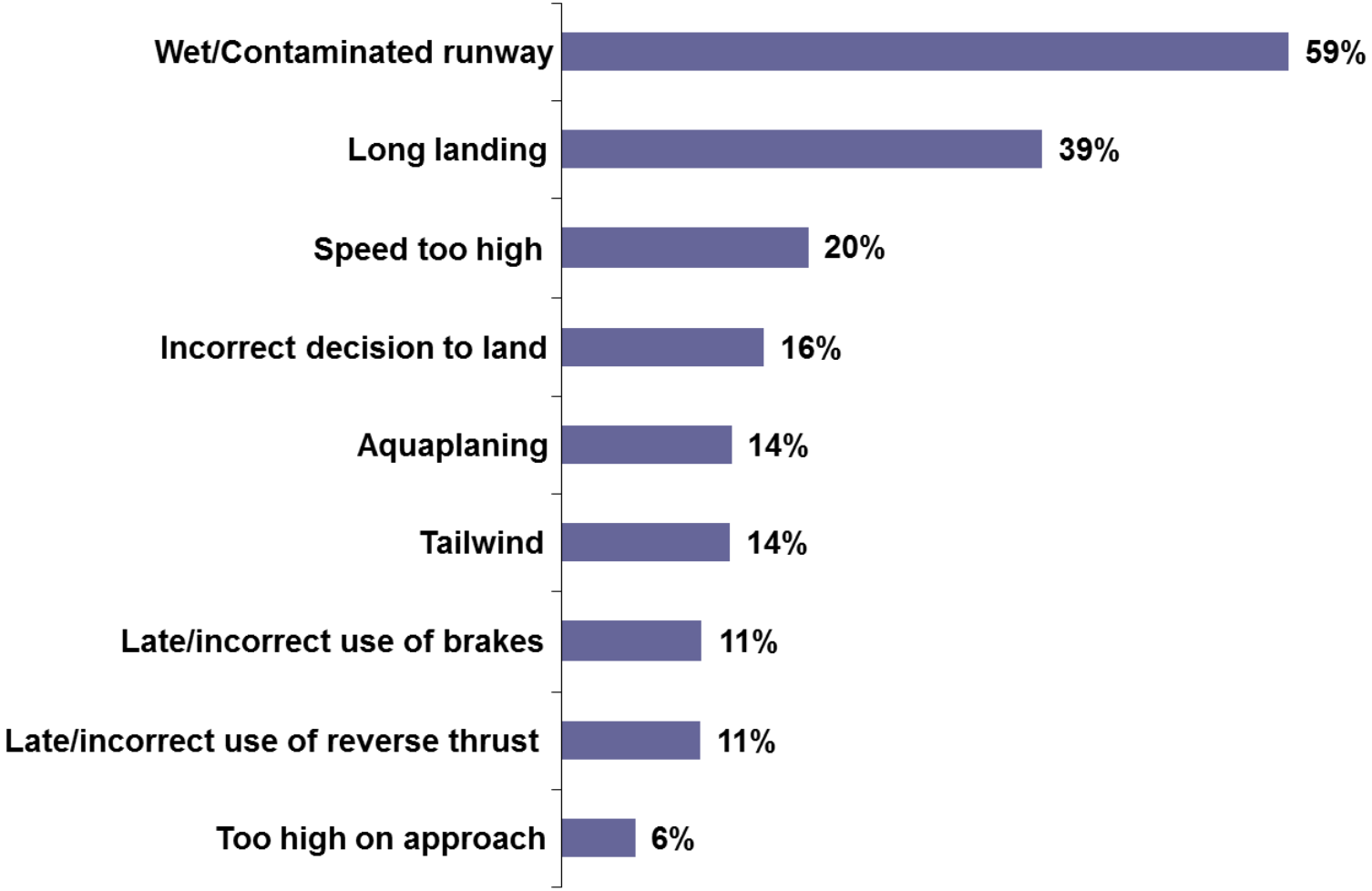
Location in risk matrix airport dependent

Excursions by flight phase

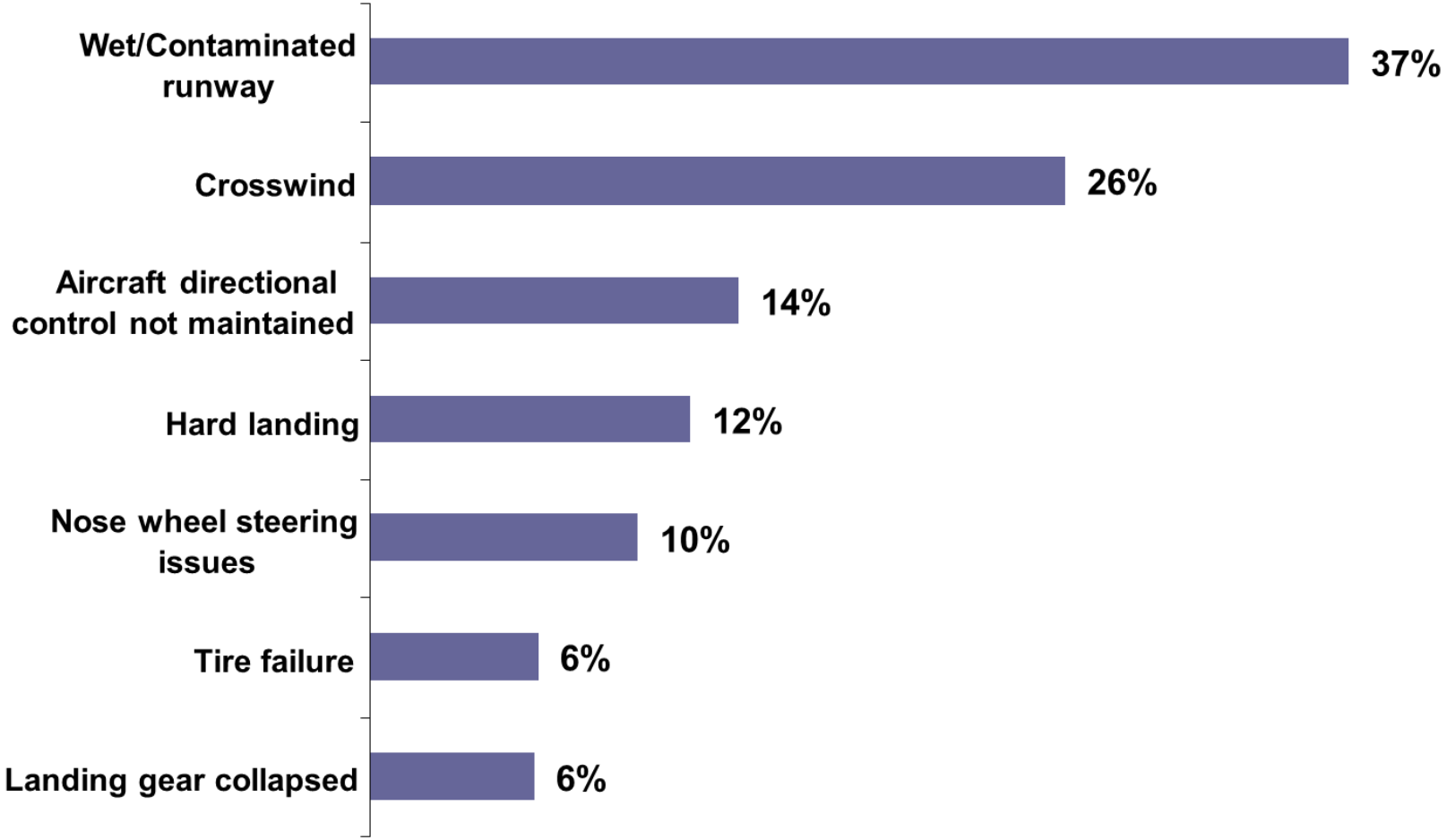
Landing phase most critical



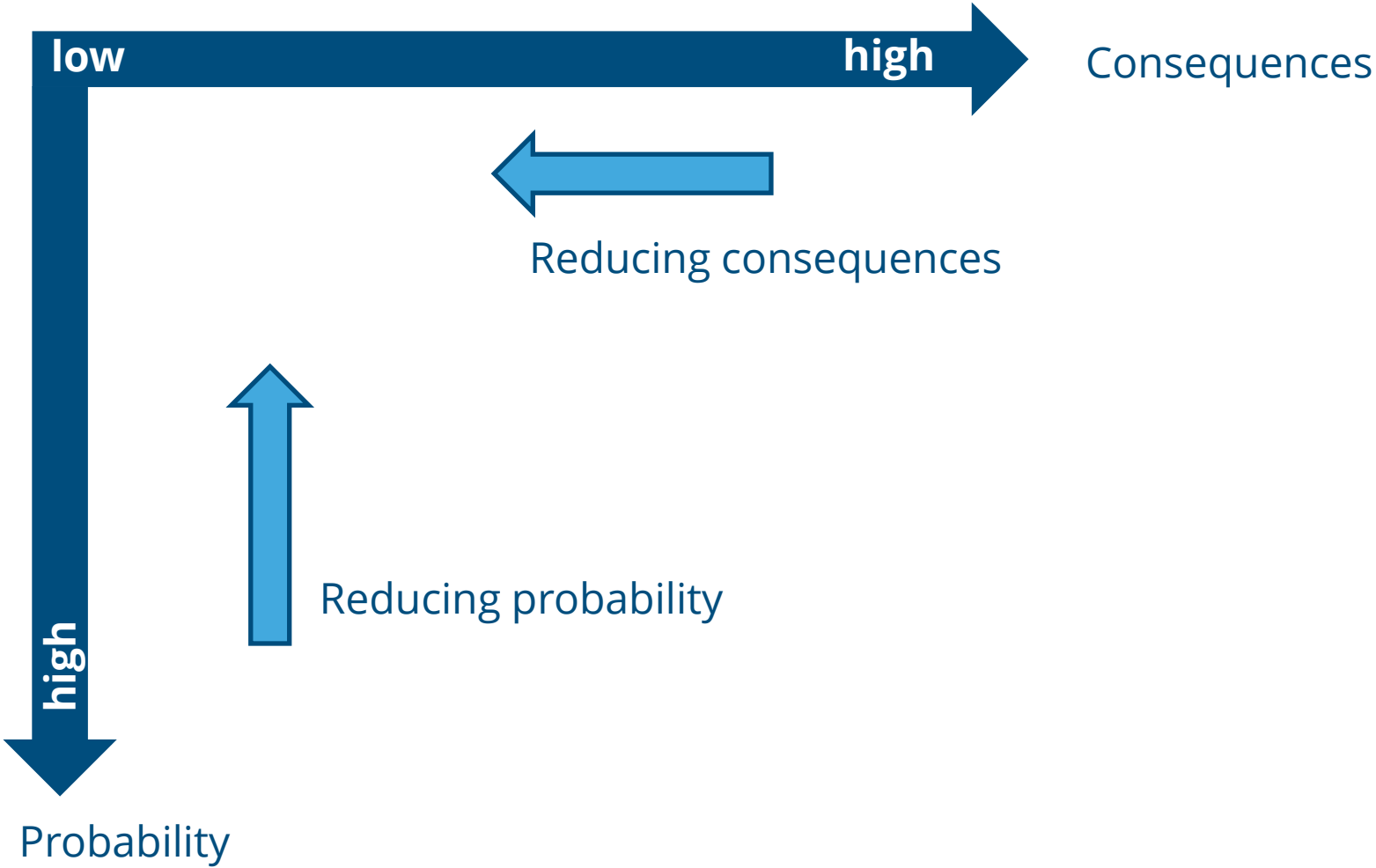
Landing overruns causal factors



Landing veeroffs causal factors

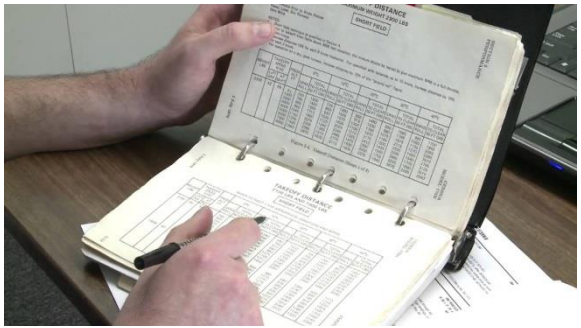


Reducing the excursion risk

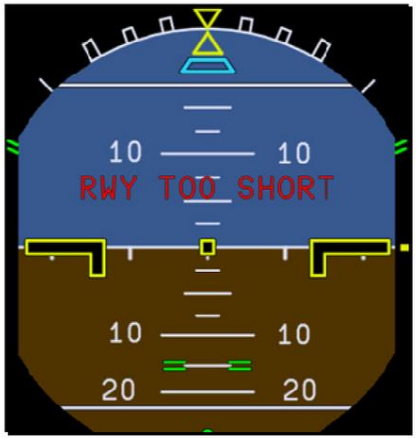


Reducing probability of an excursion

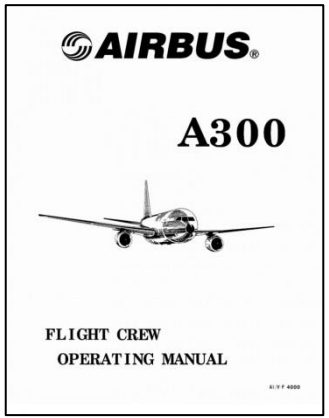
Conservative/realistic a/c performance assessment



Technology



Improved procedures



Better training

Better information

Example of better information – runway condition

Assessment of runway condition –where is what on the runway?;

Example improved procedures - crosswind

- Guidelines on how to deal with gusts;
- Correction of maximum crosswind for slippery runways.

Example technology – runway surface

High macro texture depth and harsh micro texture are essential for good wet braking performance

Reducing consequences of excursions

- Use of runway strips and runway end safety areas:
  - Defined areas around the runway;
  - Minimise damage to an aircraft overrunning or veering off runway.
- Arresting systems:
  - To stop or slow down the aircraft;
  - Only for overruns, not (yet) for veeroffs.

Arresting systems

- Cables and barricades (military, tested from the late 1920s);
- Water ponds (tested in the 1960s);
- Gravel beds (tested in the 1960s);
- Foamed plastic (tested in the 1970s);
- Soft Ground Arresting Systems -EMAS (tested in the 1980s and 1990s, installed at ±112 runways);
- Crushable glass gravel beds (approved in 2012, installed at Chicago Midway & Zurich airport).

Soft ground arresting systems


中国民航科学技术研究院
B-2950
737-300

B727 tests stopping on soft ground arrestor system

Does EMAS work?

11 successful cases reported since 1999

How can do what in reducing the risk levels?


Runway excursions can happen anywhere – even in Brussels!
May, 2008, Brussels Airport, runway 20

Dedicated to innovation in aerospace

Fully engaged

Netherlands Aerospace Centre

NLR Amsterdam
Anthony Fokkerweg 2
1059 CM Amsterdam

p) +31 88 511 31 13 f) +31 88 511 32 10
e) info@nlr.nl i) www.nlr.nl

NLR Marknesse
Voorsterweg 31
8316 PR Marknesse

p) +31 88 511 44 44 f) +31 88 511 42 10
e) info@nlr.nl i) www.nlr.nl