



GA risk: how should it be quantified and managed

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Disclosure Information

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I work for the UK Civil Aviation Authority

Opinions expressed are mine and not necessarily policy of the CAA

I have no financial relationships to disclose.

I will not discuss off-label use and/or investigational use in my presentation

EASA “Roadmap for Regulation of GA”

18 November 2012

WORKING PAPER

ROADMAP FOR REGULATION OF GENERAL AVIATION

- Presented by Commission and EASA -

This draft roadmap is a follow up of the discussions in the Management Board of EASA in September 2012 on the subject of General Aviation and also takes into account the meeting paper and the discussion on overregulation during the DGCA meeting in October. In the September Management Board the Commission took the initiative to present a roadmap to the EASA Committee on how the principles contained in these two previous papers could be put into practise, realising that besides the European Commission and EASA also the Member States and the General Aviation Community were addressed in the recommendations to implement or to assist in implementing the recommendations.

This paper lays down some basic principles as well as a preliminary work programme for such a new approach. It stresses in particular the need to base regulations on identified and relevant risks as well as on a need for regulatory protection determined by a clear risk hierarchy. The risk hierarchy is also linked to the type of activity within General Aviation.

Consequently the approach advocates a move away from the traditional manner of regulating first Commercial Air Transport (CAT) and then basing the General Aviation (GA) rules on a slightly reduced set of CAT rules. Instead the new GA rules should be more "tailor made" and more "proportionate" to the type of GA-activity, with additional "risk modules" based on safety analysis added to a basic rule set for more risky GA activities.

The attached action items list will be updated twice per year as work progresses.

The Committee is invited to discuss the draft roadmap.

Develop a risk-based approach... (1)

- Traditionally much regulation has been blanket, aiming to cover all possible risks by saying something about everything although the vast majority of fatalities are caused by a small number of recurring causes
- Occasional participants cannot remember all the rules, nor do they consider the majority of rules relevant to them
- The result is a culture of indifference and non-compliance which represents a major safety risk as those people choose to ignore rules they consider irrelevant

So

- Either.. Increase oversight and write tighter regulations,
- Or...Focus on regulation of actual risk and to prioritise rules that target the biggest and most relevant risks

Develop a risk-based approach... (2)

More frequent oversight and tighter regulations:

- “We have come to the end of this road”
- GA complaints of overregulation
- Diminishing NAA resources

Fewer but better targeted and less burdensome regulations

- Less burden on NAAs
- More emphasis on operational side
- More harmonisation amongst Member States on oversight
- All Member States should have a risk-based oversight rather than compliance-based oversight system

And acceptable risk limits... (1)

- European regulations quote a “high level of safety”
 - What does this mean?
 - It cannot mean the same level for all activities



- Societal risks context



And acceptable risk limits... (2)

- ICAO Annex 6:

“The Commission endorsed the philosophy... for the safety of operations in non-commercial operations where travel is not open to the public. In such operations the Standards and Recommended Practices need not be as prescriptive as those in Annex 6, Part 1, due to the inherent self-responsibility of the owner and pilot-in-command. The States does not have an equivalent ‘duty of care’ to protect the occupants as it does for fare-paying customers in commercial operations”

- Adults who have sufficient understanding of the risks involved, may choose out of their own free will to engage in risky activities
 - Though sometimes they might need saving from themselves!



EASA Risk Hierarchy... (1)

1. Uninvolved 3rd Parties
2. Fare-paying passengers in commercial air transport (CAT)
3. Involved 3rd Parties (e.g. airshow spectators, airport ground workers)
4. Aerial work participants / Air crew members involved in aviation as workers
5. Passengers (“participants”) on non-commercial flights
6. Private pilots on non-commercial flights

The limits of effectiveness of prescriptive regulation... (1)

- Post war to 1980s, steady and rapid fall in fatal accidents evidenced by reports from FAA USA, CAA UK, DGAC France and CASA Australia
- Now rates have levelled with unevenness

- Top 5 FA causes accounting for 80% of casualties...
 1. Loss of control in VMC (i.e. basic handling, inc stall/spin)
 2. Controlled flight into terrain (CFIT) (inc press-on-it is in bad weather)
 3. Low altitude aerobatics or buzzing
 4. Loss of control in IMC (inc decision to climb into cloud)
 5. Forced landings due to pilot error (mostly running out of fuel)

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- Essentially all should have been prevented by the regulations
- Almost invariably causes are pilot error or attitude and only rarely by 3rd parties e.g. airworthiness
- Regulations have stifled innovation
- Most certified GA aircraft rely on 1930s engine technology, 1940s aerodynamics, even the new glass cockpit technologies is much behind current low-cost consumer electronics
- Most developments are occurring in ultralights and annex II aircraft
- Must culturally move to education and soft law that makes extensive use of best practice in industry/GA
- Devolve to GA organisations

Developing Regulations

Principles

1. All regulations should be screened against the identified risks and their relevance to overall serious accident numbers
2. All regulation should be screened against the backdrop of the above risk hierarchy and resulting need for protection

The limits of acceptability

Worldwide causes of deaths per 100,000 population, age std'd (WHO 2011)

	Lowest	Median	Highest
All cancers:	54	112	265
CAD:	12	113	405
Drowning:	0	4	24
RTAs:	2	16	53
Violence	0	7	75

Sport and Risk

Cause of Death	Country	Year	Number of Deaths	Population Estimate	Crude Rate per 100k population	Odds of Dying (1 in)
BASE Jumping	Norway	1995-2005	9	20,850	43.17	2,317 jumps
Swimming	Germany	1997-2006	31	1,754,182	1.77	56,587
Cycling	Germany	1997-2006	19	1,754,182	1.08	92,325
Running	Germany	1997-2006	18	1,754,182	1.03	97,455
Skydiving	US	2006	21	2,122,749	0.99	101,083 jumps
	Sweden	1994-2003	9	1,126,704	0.8	125,189 jumps
Football	Germany	1997-2006	17	1,754,182	0.97	103,187
Hang-gliding	UK				0.86	116,000 flights
Tennis	Germany	1997-2006	15	1,754,182	0.86	116,945
Sudden cardiac death whilst running a marathon	US	1975-2005	26	3,292,268	0.79	126,626 runners
Horse Riding	Germany	1997-2006	10	1,754,182	0.57	175,418
American Football	US	1994-1999	6	1,100,142	0.55	182,184
Scuba Diving	UK					200,000 dives
Table Tennis	Germany	1997-2006	7	1,754,182	0.4	250,597
Rock Climbing	UK				0.31	320,000 climbs
Canoeing	UK				0.13	750,000 outings
Skiing	US	2002/2003	37	57,600,000	0.06	1,556,757 visits

UK General Aviation

- 50,000 pilots (A)
- Up to 100,000 passengers (B)
- 500,000 flights (C) totalling 1 Million Hours (D)
- 15 FAs per year (E) on average 1 pilot (F) and 1/2 pax (G)

so....

- Deaths per 100,000 pilots participating = $\text{Ex F} \times 100,000 / \text{A} = 30.0$
- Deaths per 100,000 passengers participating = $\text{Ex G} \times 100,000 / \text{B} = 7.50$

- Pilot death per flight = $\text{Ex F} / \text{C} = 3 / 100,000$
- Passenger death per flight = $\text{Ex G} / \text{C} = 1.5 / 100,000$

- Helicopters = approx 1.5x Aeroplane rates
- Microlights, gyros, Gliders & Footlaunched = 2-4 times Aeroplane rate

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Aeroplanes		30	
Helicopters		45	
MCI/Gyro/FootL		60-120	

EASA Risk Hierarchy... (1)

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EASA Risk Hierarchy

?some tolerable targets?

1. Uninvolved 3rd Parties }
2. Fare-paying passengers in commercial air transport (CAT) } 0.1- 1 per million
} (lightning=1/1M)
3. Involved 3rd Parties (e.g. airshow spectators, airport ground workers) }
} }
4. Aerial work participants / Air crew members involved in aviation as workers } 1-10 per million workers
} (6/1M HSE UK death risk)
} }
5. Passengers (“participants”) on non-commercial flights } 10 -20 per million
} }
6. Solo Private pilots on non-commercial flights } 30-100 per million
} }

Risk-confusion/mismatch

- Air Taxi Class 1 CPL/ATPL 3Pax

- Flying Instruction Class 1 CPL/ATPL
- Class 2 PPL

- Private VMC / IR Class 2 PPL 3Pax

- Private VMC LAPL+Med 3Pax

- Solo Private VMC LAPL+Med 0 Pax



So where now?

- Nth America and Europe now have sub-ICAO private/sport flying medical standards
 - So how 'light touch' can the regulators be with medical standards for sport flying?
 - What duty do we have to their passengers?
 - How do we discharge our duty to the public on the ground & in the air?
- There a need for harmonisation & who should do it?
 - ICAO? Sport flying associations
 - ASMA?
 - ESAM?



Thank you



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