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Welcome to the August 2008 edition of the R2A Newsletter.

This edition contains a feature article on the recently developed Aerodrome Airspace Collision Risk Model originally devised for the Civil Aviation Authority (CAA) in New Zealand and adapted for the Office of Airspace Regulation in Australia. It highlights the importance of transparent, simple risk models for effective risk communication and decision-making.

Recently completed commissions include: Tasports Pilotage Reviews for Hobart, Bell Bay, Devonport & Burnie; Palmerston North and Taupo Aerodrome Airspace Collision Risk Modelling for the CAA, Safety Criticality Review for Nyrstar and high level risk training for the Rail Projects group at the Department of Transport, (Victoria).

With a new round of Victorian rail projects, R2A have been commissioned to complete various risk reviews for Connex and the Department of Transport.

R2A Website

The R2A website www.r2a.com.au has recently undergone a facelift with updated representative commissions, clients and CVs.

In addition there is a new section on Technical Due Diligence. This includes a commentary on the risk application of safety case arguments (the need to achieve the common law balance), enterprise risk profiling, enterprise availability profiling and SIL allocation.

Courses

Richard Robinson continues to present the Risk & Liability Management two-day short course for Engineering Education Australia.

Remaining dates for 2008 public courses are: Adelaide, 26-27 November Brisbane, 20-21 August Melbourne, 29-30 October Perth, 17-18 September.

See the EEA website at www.eeaust.com.au for further details and registration.

Engineers Australia

R2A Director, Gaye Francis, recently stepped down as Co-chair of the Victorian Women in Engineering Committee.

The WIE Committee is enjoying continued success with overwhelming support at the numerous events held. A highlight was the Purple Boots Charity Breakfast which Gaye hosted. (Purple boots for women and men can be pur-

chased to support breast cancer research. See www.purpleboots.com.au).



Gaye Francis, Ros Worthington, Dr Susan Davis and Glenn Archer at the Purple Boots Charity Breakfast

Engineers Australia declared 2007 the Year of Women in Engineering. The purpose of the year was to increase the awareness within the industry and the community of the roles and contributions women make to our society as engineers and to showcase their achievements. The motto

for the year was Creative / Diverse / Inspiring.

To build on the key messages from a very successful 2007 and in line with 2008 'The Year of the Engineering Team', the Victorian Committee has themed this year as 'Diversity and Retention of Women in the Engineering Team'.

R2A Text

The 7th edition of Risk & Reliability - An Introductory Text is being revised and reprinted in August.

The revision updates references, case studies and has numerous editorial changes to improve readability. The overall format and price remains the same (A4 softcover, black and white, AUD\$100 plus GST, postage and handling).

Criticality Not Risk

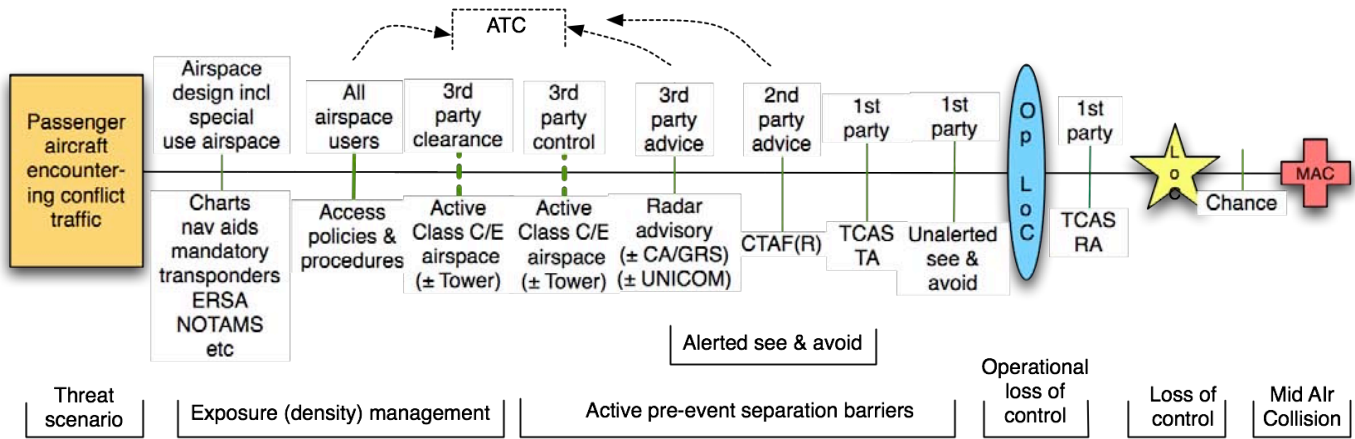
Senior decision makers, meaning cabinet ministers, CEOs and judges primarily make decisions using the concepts of threat and criticality rather than the notions of hazard and risk. A simple example relates to desalination plants.

The likelihood of a major Australian city running out of water, even with global warming is actually quite small in itself. There will almost certainly be some rain in the catchments over the next few years. But no Australian government can accept the credible possibility of such a calamity occurring to a major population centre. So whilst the possibility of totally running out of water is really quite small, precautions are put in place to manage the worst credible critical scenario, simply because the consequences if its occurrence are so totally devastating. Hence, very expensive to build and operate desalination plants are on the menu for most mainland cities.

## Aerodrome Airspace Collision Risk Reviews

R2A has been involved in a number of airport airspace risk reviews in Australia and New Zealand including Taupo, Palmerston North for the Civil Aviation Authority (CAA) and Avalon and Williamtown for the Office of Airspace Regulation (OAR). Copies of the Avalon and Williamtown studies have been published on the OAR website: [www.casa.gov.au/oar/papers/index.htm](http://www.casa.gov.au/oar/papers/index.htm)

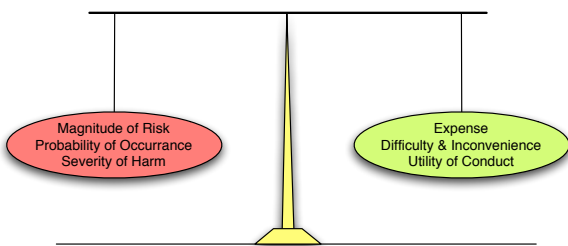
Such an approach suggests that the users of the airport airspace collectively determine what they believe is the appropriate level of precautions for the airport airspace. The proposal is then put up for scrutiny by the regulator and other parties who test it in various ways and if satisfactory, come to a view often expressed as: *We see nothing wrong with what is proposed.*



**Aerodrome Airspace Collision Risk Concept Threat-Barrier Diagram**

The risk approach adopted in all these studies is generative in nature focussing on precautions rather than hazards. Risk insight is based on the common law principle that all reasonable practical precautions need to be demonstrated as being in place based on the balance of the significance of the risk vs the effort required to reduce it. As such the approach automatically receives the imprimatur of both High Courts (Australia and New Zealand).

The aerodrome airspace collision risk model is an estimative risk model that demonstrates the change in risk for the addition or removal of different control options. It is designed to determine the change in risk for the various control options both at the loss of control points and in terms of an annualised estimate of persons at risk. That is, it demonstrates the relative risk balance between competing precautions.



**The Common Law Balance**

This legal consistency of approach has been tested with legal counsel for both the OAR and CAA. This approach parallels what R2A understands to be the intent of the safety case regime, perhaps best described by Lord Cullen (2001):

*A safety case regime provides a comprehensive framework within which the duty holder's arrangements and procedures for the management of safety can be demonstrated and exercised in a consistent manner. In broad terms the safety case is a document – meant to be kept up to date – in which the operator sets out its approach to safety and the safety management system which it undertakes to apply. It is, on the one hand, a tool for internal use in the management of safety and, on the other hand, a point of reference in the scrutiny by an external body of the adequacy of that management system – a scrutiny which is considered to be necessary for maintaining confidence on the part of the public.*

The primary strength of the model is as a communication tool that facilitates robust internal conversation at the airport between the airspace users and consequent external review. This transparency should enable defensible risk decision-making, both by airport operators and regulators.

The risk component of the studies are generally short and sharp. The New Zealand work particularly is usually completed inside a week on site with write up completed within a fortnight after that.

Considering the reviews collectively, a number of interesting insights have appeared. The threat-barrier diagram above (taken from the Avalon report) demonstrates one.

As a rule, low cost high reliability arises when there are multiple, low cost independent barriers rather than a single high cost 'gold plated' barrier. Air traffic control, in the example shown, whilst obviously very effective is an expensive barrier which supplants other, individual low reliability, low cost barriers. But collectively, these low cost barriers can be very effective and often approach the effectiveness of a single 'gold plated' barrier.

Low reliability barriers can generally be readily enhanced with little effort and expense. A common observation by airspace users is that the protection of TCAS equipped passenger aircraft is most simply enhanced by ensuring a defined, transponder mandatory, aerodrome airspace.