

Common aviation risk models (CARM)

The future of safety knowledge sharing?

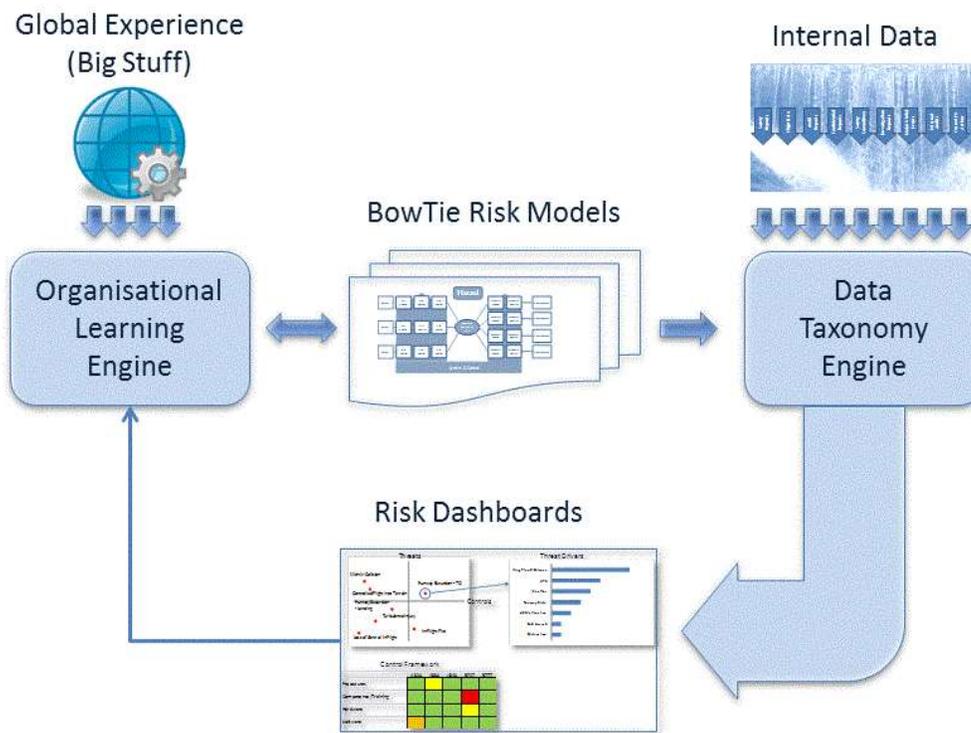
There is a long history of sharing safety information in aviation. In the early days this took the form of sharing the results of accident investigations and contributed substantially to early safety gains. Subsequently the focus shifted to sharing incident information and also sharing data on known or suspected issues. ICAO and international groups such as IATA and the Flight Safety Foundation (FSF) have done much to facilitate this process.

The practice extends beyond formal exchange programs – as an airline safety manager I always felt comfortable reaching out to safety managers in other aviation organisations to ask about their experiences in an area and they always responded positively.

While these practices have helped immeasurably to enhance aviation safety and will continue to do so they have their limits:

- Data standardisation and comparison is hard – while it is possible to merge data across multiple organisations this takes major efforts and a willingness to use standard taxonomies and methods. Such efforts are not common or widespread despite much effort over the years.
- Aviation is data rich with many types and forms of safety data available. Integrating all of this information in a meaningful way in a single organisation is challenging – sharing integrated information with other organisations is almost impossible.

However, an approach which is helping integrate data within organisations may also take global safety sharing to the next level. The approach ([see here](#)) is to use BowTie risk models of the key safety risks to structure safety data, develop performance measures, and focus management on critical weaknesses in risk barriers and growing threats. Taking this approach to the global sharing context leads to the notion of CARM – Common Aviation Risk Models.



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1/18/2016

Put simply CARM would involve the joint development and sharing of BowTie risk models by industry experts. Models would cover the key hazards associated with all aspects of aviation operations. On a global basis CARM becomes the place where risk understanding can be captured and incorporated continuously. It moves the process away from the existing one shot accident/investigation/actions process to a global learning “engine”.

How would such a concept work in practice and what are the benefits?

First the benefits:

- *Shifts the focus from incidents to risk.* Common risk models go beyond the traditional sharing and counting of incident data to a holistic and nuanced understanding of risk – how threats are changing, the effectiveness of existing defences, how often operations are straying across the safety boundary into recovery mode.
- *For operators* CARM provides a basis for building models of your operation that capture the industry’s best understanding of each risk. Such models
 - Give you a running start on building BowTie models of the risks to your operation;
 - Provide a basis for integrating all of your safety data into a coherent picture, and
 - Provide a benchmark for your risk management performance.

- *For Industry associations* CARM establishes a basis for industry associations to support their members with a structured approach to risk management. The common models can be used to improve risk management among members and eventually to provide tools to measure and benchmark risk management performance
- *For industry regulators and safety authorities* CARM provides a basis for state and global assessments of risks that build on the industry's best understanding of aviation safety risks.
- *For state investigative agencies* CARM provides a structured model for investigations based on the shared understanding of risk embodied in BowTie models

How might the CARM concept be successfully implemented? There are clearly many ways in which this might evolve. At the informal level airlines and others have been sharing BowTie models of specific risks for many years. At a more formal level the UK CAA has shown the way with their development of BowTie risk models for their Significant Seven risks ([see here](#)) and the publication of these models. At a technical level CGE Risk Management Solutions have developed mechanisms ([see here](#)) for the sharing of BowTie models both within and across industries.

A critical challenge to data sharing in the past has been the issue of data confidentiality and the potential for safety data to be used in inappropriate legal action. In the early stages of CARM this is unlikely to be a major issue in that it is not intended to share data but rather share knowledge to jointly develop risk models. At a later stage there will be the opportunity to use data to develop performance measures and benchmarks. Solutions may be needed at that point to deal with these issues which are likely to be no greater and probably less than for existing data sharing schemes. ICAO is currently leading an initiative to address some of these risks. In addition the sharing of data within an agreed structure of BowTie risk models offers a number of mechanisms to address the data confidentiality issue.

In the long term our vision for CARM would envisage:

- A global industry collaborative – made up of operators, industry associations, regulators and state safety authorities, safety software developers, global safety organisations.
- Small working groups of industry experts focussed on specific risk areas to develop candidate risk models. Such models would build on previous efforts such as CAST ([Commercial Aviation Safety Team](#)) and ECAST ([European CAST](#)), safety studies such as the [FSF study on Runway Safety](#) and in some cases existing models developed by members such as the CAA models or individual operator developed models.

- To keep costs down and to allow a broad representation the collaborative and working groups would mostly meet electronically. When possible face to face meetings might also be organised around existing industry meetings.
- Models developed by the working groups would be published in a downloadable format for all collaborative members to share and use.
- As models become more mature the effort would shift to developing performance metrics for each model to measure risk management performance relative to each risk. Such metrics would form the basis for sharing of data relative to each risk to allow the development of benchmarks.
- On an annual basis models would be reviewed against recent data and updated as appropriate. Such updates would be broadcast to the entire aviation community to provide risk trend advice.

To move forward with CARM, The Aloft Group is planning a webinar in the near future to give industry members around the globe the opportunity to:

- Explore the CARM concept
- Discuss feasibility
- Identify next steps

If you would be interested in attending the webinar or being kept informed of developments please send me an email at bob.dodd@thealoftgroup.com.