Fire **S**afety **E**ngineering **G**roup

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SCIENTISTS ADDRESS EVACUATION CONCERNS OVER FUTURISTIC 'FLYING WING' AIRCRAFT

University of Greenwich researchers will this week present details of how 'Flying Wing' passenger aircraft can be evacuated safely by over 1000 passengers. Speaking at a conference on the future of aircraft design, Professor Ed Galea will explain how the university's Fire Safety Engineering Group has used innovative mathematical modelling techniques to overcome safety concerns about the radical new aircraft concept.

"With eight aisles, the 'flying wing' is almost as wide as it is long, making it more like a flying auditorium than a traditional tubular aircraft," says Professor Galea. "With a capacity of over 1000 passengers, it is significantly bigger than the largest passenger planes currently flying, compounding the evacuation challenges faced by its designers, including the industry benchmark 90 second evacuation certification trial."

The break-through is an important technological step in the development of this distinctive super-plane concept. With eight aisles and up to 20 exits on three sides, its futuristic 'delta' shape resembles a giant flying wing. While military variants of 'blended wing' aircraft technology, such as the US Stealth bombers, routinely take to the skies, they only carry a small crew and do not have to satisfy stringent commercial aviation safety regulations such as the 90 second evacuation certification test.

The University of Greenwich team drew on its world-leading expertise in aircraft evacuation and fire modelling to simulate how air passengers behave in a crisis, and how fire, smoke, toxic gases and heat spread through a burning aircraft. The challenges posed by the Flying Wing's vast interior required major reengineering of the team's aircraft evacuation model, airEXODUS. A sophisticated new version of the software was developed to predict how passengers behave in the new expansive layouts and interact with the large number of internal aisles to eventually find an exit and a way out. Evacuation trials using a large scale cabin mock-up and over 700 volunteers were used to verify that the new model made realistic predictions.

"We combined our fire simulation and passenger evacuation models to answer the fundamental question about this aircraft; can passengers and crew get out safely?" continues Professor Galea. "This type of safety analysis potentially goes far beyond traditional evacuation tests using volunteers. Embedding the experience of aviation accidents from around the world it accounts for how real people react in a crisis by swapping aisles, climbing over seats, reacting to fire and smoke and so on."

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NOTES FOR EDITORS:

1. The NACRE Flying Wing is a concept vehicle to pull innovation in aircraft design.

2. The Flying Wing analysis is part of the EU Framework 6 Integrated Project, NACRE (New Aircraft Concepts Research), led by AIRBUS focusing on novel aircraft technologies. The four year project has a budget of over €30 million and 36 partners from 14 nations.

3. Professor Galea's paper is entitled: "Fire and Evacuation analysis in BWB aircraft configurations: Computer Simulations and Large-Scale Evacuation Experiment" by Galea, E.R., Filippidis, L., Wang, Z., and Ewer, J.

4. The paper will be presented at the 2nd NACRE (New Aircraft Concepts Research) conference which is held at the University of Greenwich from July 8 to July 10, 2008. The Flying Wing is only one of the novel technologies to be discussed at the conference. Professor Galea's presentation on the Flying Wing is scheduled for 11:30am on July 10. For more details visit the conference web site at http://fseg.gre.ac.uk/NACRE/index.html or contact Mrs Francoise Barkshire 0208 331 8706.

5. The Fire Safety Engineering Group
   Prof Ed Galea is a world expert on modelling fires and how people behave in emergencies. His software and expertise has helped to design safer structures around the world including the Sydney Olympic Stadium, the O2 Dome, Arsenal's Emirates Stadium, the Airbus A380 and the new aircraft carriers for the Royal Navy. His software was also used by the US government authority charged with investigating the World Trade Centre 9/11 evacuation and he is currently completing work on a £1.5 million EPSRC project interviewing survivors of the disaster.

   The Fire Safety Engineering Group has won the Queen's Anniversary Award for Higher & Further Education, the British Computer Society's IT Award and the European Information Society Technologies prize.

6. The airEXODUS software
   Developed by the University of Greenwich's Fire Safety Engineering Group (http://fseg.gre.ac.uk), airEXODUS is a member of the EXODUS family of evacuation simulation software designed specially for aviation applications. It uses complex interacting sub-models to predict human performance and behaviour during emergency evacuation situations. The software's sophistication means that people are represented as individuals with real human behaviour, such as reaction to crew commands and attempting to climb over seat backs. Simulated occupants even react to the heat, smoke and toxic gases generated by a fire. airEXODUS simulations allow engineers to assess more potential designs than conventional methods and are free of the potential danger and high cost of conventional human evacuation trials. airEXODUS is currently used for aircraft design and accident investigation purposes.

For further information, interviews, photos and images from the computer modelling contact:

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