

INC 16

When the RIN promises a cutting-edge international conference, what you get is a cutting-edge international conference, with researchers from some of the world's most renowned institutions.

'Day One was the best first day of any conference I have been to anywhere – and the other two days weren't bad, either!'

Just one of many similar comments from delegates who made it to Glasgow in November 2016.

The three-day event kicked off with a welcome from HRH Princess Anne, The Princess Royal, and got quickly down to the business of wowing the crowd. Jonathan Firth from Virgin Galactic explained how the dream of commercial spaceflight had blossomed from an idea in the head of Richard Branson to a fully realised plan for a spaceport, and both a passenger service and a regular hardware-delivery service. His presentation bridged the gap between the science fiction of two or three decades ago and our imminent reality as a species – and it set the tone for the rest of the conference. Position, navigation and timing technology, as much as stem cells and nanotech, is where the dreams of yesterday are becoming the businesses of today and the commonplace of tomorrow. That's the privilege that the Royal Institute of Navigation has – born of a need to commercialise technologies that helped determine the outcome of one of humanity's bloodiest wars, it finds itself at the forefront of a technological revolution that will change the world forever in a thousand ways. Many of those ways were showcased and highlighted in Glasgow across the three days of INC 16.

Turning Genius Into Cash

The reality-defining presentations continued. Kai Bongs picked up the theme with a presentation on quantum sensors for inertial navigation systems, and told delegates that the focus now was on a shift from current research into commercially viable products, which can be used in applications that can make money.

Turning current research into commercially viable products to make money could also be said to be a cornerstone of Google's success over the last decade. Frank van Diggelen helped bring some Googlethink to the party, telling us of how the availability of raw pseudorange data would help deliver new, more accurate PNT services, including a form of phone-based indoor navigation – thought for some time to be the next Holy Grail of navigation challenges.

And so it went on – research area after research area yielding nuggets of wonder. Readers of *Navigation News* will be familiar with Professor Kate Jeffery's work on three-dimensional thinking, but her presentation at INC took delegates' understanding to new levels as she explained the three-dimensional mazes through which her students had trained animals to navigate so they could test the cells in their brain and get a more accurate idea of how their mental mapping worked. Yeshpal Singh from the University of Birmingham took quantum sensors into whole new realms of precision. Dr Paul Groves thrilled the audience by getting high concept, talking about 'Intelligent GNSS,' and bringing the maths to back up the excitement he inspired.

Long-Term Developments

Some presentations were more rooted in updates of what's happening than in pushing boundaries – Martin Bransby from the General Lighthouse Authorities updated conference on the progress of e-Navigation in the maritime realm, while Gerrard Offermans from UrsaNav brought us up to speed with developments and decisions in the US about the nation's relationship with eLoran – though

what effect the results of the US election (which took place while INC ran its course) will have on that relationship has yet to be seen.

This balance of the boundary-pushing and the updating of long-term developments and trends continued across all three days. Steve Hill from the Satellite Applications Catapult gave us an outline of 'the road to autonomous cars,' a theme picked up in Professor Ross Anderson's keynote address on who will be programming our cars, and with what kind of decision-making protocols.

There was hardcore science from the University of Texas as G Nathan Green talked algorithms for Triplex systems, and Professor Dorota Grejner-Brzezinska from Ohio State explained the use of LiDAR-derived point clouds to estimate aircraft departure from runway centrelines. China – a nation growing its presence in the RIN's *Journal of Navigation* – was also well represented by the likes of Mr Huang Ye from the Wuhan University of Technology, who gave us a new distance estimation algorithm based on a long focal length lens stereo vision system.

The International Dimension

As befits an international conference, much of Europe was in fact represented at the event, with two presentations in particular, from Rodrigo Gonzalez SAS from ESSP in Spain and Francesco Rispoli from Ansaldo STS in Italy, giving different insights into the less headline-grabbing but no less revolutionary business of using GNSS to revolutionise train operations worldwide. There were presentations from the Czech Republic, from the Netherlands and Norway, as well as from Canada and in a particular highlight from Dr Suresh Kibe from GNSS India on improvements being made to GNSS in the region.

Outside the impressive presentation programme, INC16 also allowed organisations and companies like Spirent, Chronos and Innovate UK to meet and explain their newest products and opportunities to delegates at a lively exhibition, which thronged at every tea and lunch break. There was also a lively competition for 'poster' research, eventually won by Trine Bjerva Thorsteinn Sigurjónsson, and Jon Anders Græsli from the Hedmark University of Applied Sciences, Faculty of Public Health from Elverum, Norway, with a poster on that ever-controversial subject, Navigation and Gender.

The INC in its second year proved the point of having a larger, international conference, and reasserted the reputation of the RIN around the world as one of the most successful institutes of navigation, being able to draw commercial experience and academic genius together in one place and make that fundamental difference – turning the science fiction of yesterday into the business of today and the commonplace of tomorrow. Now our eyes are turned forward to INC17, where, with the signature combination of cutting-edge research, updates on long-term developments in navigation, opportunities for poster research to make its mark, and the social and networking potential to bring the navigation world together in one venue, we'll be pushing through the boundaries to the future of navigation once again. Be sure to check the website and upcoming issues of Navigation News for more information on INC17 as it's released.