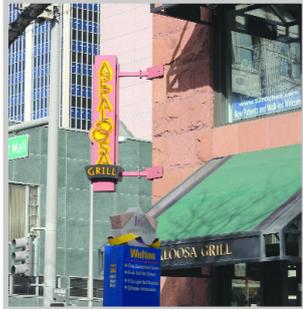




Airborne and terrestrial solutions in the Mile High City

By Adam P. Spring



A trip to Denver, Colorado (above) found our reporter at the 2012 International LiDAR Mapping Forum. From laser maps to bathymetric data, there was plenty to study. But sometimes captured data can prove all too accurate, as one presenter reported.

From January 23rd to 25th 2012, Denver, Colorado, hosted the 12th Annual International LiDAR Mapping Forum. Situated in a city made famous for being one mile exactly above sea level, this mecca for airborne sensor aficionado's continues to go from strength to strength. Even multi-sensory lawman – Riegl's **Andreas Ulrich** – rode into town to take questions and demonstrate new features in RiAQUIRE, part of the company's mobile mapping solution.

History and development

The Forum has rotated between Denver and New Orleans, Louisiana, since the inaugural gathering in 2000. A UK-run, but US-based event, the forum expanded into Europe as ELMF in 2010 – a larger conference with steady attendance figures of around 1500. Part of its evolution has included a move away from TMS International Ltd in an organisational capacity (though it is still a partner) to Intelligent Exhibitors. The Gloucestershire based company still works closely with **Alastair McDonald**, TMS International's MD and one of the original team responsible for ILMF. In 2012 Alastair took the reigns as conference chairman, encouraging questions and stimulating debate.

Growth and development

Established with airborne sensors and markets in mind, the forum has continued to evolve with the times. Over 30 presentations, 773 delegates from 30 countries and nearly 60 exhibitors were at Denver's Hyatt Regency. Rather bigger than the first ILMF in 2000, which

attracted 80 delegates and 2 exhibitors.

Included in its development is a cross over into other markets, user communities and sensory applications. In line with the current industry zeitgeist of integrated technologies synergy between sensor and information flows this theme was explored to great extent (see also *GW Sept/Oct 2011 Hexagon's integrated technologies*). In part this was encouraged by a clear demand for combined datasets, multi-sensory work flows and common sense thinking.

LAS 1.4 and laser mapping

In the opening plenary, **Lewis Graham** set the tone for the ASPRS Hot Topics session. A supporter of ILMF, the director of the organisation's LiDAR division was well placed to go over the latest LAS 1.4 updates. Backwards compatible with older versions, this latest offering takes advantage of the fledgling terrestrial equivalent, E 57 also.

Graham went on to discuss a series of recurrent themes that cropped up over the three days. Included was the need for better and more universal guidance for horizontal data validation in aerial LiDAR capture, increased multi-sensor utilisation and multi-channel data management. Keen to reaffirm these ideas, speaker Karl Heidemann was quick to point out, 'until we know data is geometrically good we should not move on from such issues'.

Laser maps

Representing the next generation of users was **Ashleigh Turner**, an Appalachian State University Master's student. Much like **Jann Bohm's** 2005 work on laser mapping, in which an HDS3000 was used with other data to map buildings in urban areas, Ashleigh used a GPS equipped Leica C10 to combine terrestrial and airborne data. Taking the best of both worlds, she was able to predict potential flood zones on her university campus. Ironically the technique proved all too accurate – the building she determined would flood did so shortly after the prediction!

Bathymetric data

Vegetation and canopy penetration using airborne LiDAR systems is well established and a 'loaded gun' in terms of application. The increased role such systems continue to play in river and shallow seabed information capture, however, is rapidly improving with each new development in sensor technology. In his presentation, *Collaboration on Coastal*



There was plenty to attract the record number of delegates (right) including a live band (above).



Louisiana Airborne LiDAR Acquisition, **Jeffery Danielson** was quick to point out how topobathymetric information is providing insight into past events and helping to understand and inform potential risks as part of future management strategies. Currently popular in research on areas like river basins and shallow coastal / tidal zones, it is only a matter of time before depth of capture increases. The Loch Ness Monster had better have a LiDAR cloaking swimsuit ready and waiting.

Mobile mapping

A focal point in terms of ideas and application, mobile mapping played a prominent role at ILMF 2012. With several vendors in the exhibition area, live demonstrations and vehicle tours outside, the laser mapping process was a stand out feature. Andreas Ulrich and Riegl USA's mobile mapping team played a prominent role throughout along with the myriad of players' vehicles. The absence of photogrammetric solutions like earthmine (see **Nick Day's Overcurrents**, page 26) however, was unfortunate and one to invite to future events.

Motion is our friend

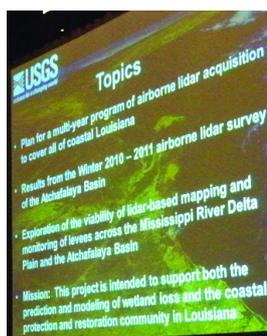
No stranger to terrestrial modes of moving data capture was CEO of Allpoint Systems and Carnegie Mellon Robotics graduate, Dr **Aaron Morris**. In a thought-provoking talk on feature extraction examples from work previously done, such as the California Transport Agency, Morris highlighted that once you know what you're looking at, the world becomes a very regular place in terms of mapping. That is, at least in terms of urban environments.

Grammy nominated exhibitors

No stranger to the irregular was grammy nominated LiDAR specialist, **Rick Yoder**. Part of the San Francisco Bay Area based company Velodyne, Rick produced the landscape scans for Radiohead's video for "House of Cards" (2007). Unphased by the rock 'n' roll lifestyle, Rick was quick to point out that the concept for the original video was greatly altered by time restrictions. In addition, what would have been classed as data noise in conventional applications was reinterpreted as artistic licence by a post MTV generation.

The kinky state

A landscape known for its mesas and mountains, Colorado is no stranger to mapping prior to becoming joint home for the ILMF. One of three states not to have a natural border – Wyoming and Utah being the other two – its shape was defined by lines of longitude and latitude. In fact a minor error in its boundaries by the original survey teams (1855 - 1961) literally makes it the kinky state. A mistake, it is hoped, that would not have occurred if present day technologies had been used.



Above, from left to right: The USGS Louisiana LiDAR programme; robotics graduate Dr Aaron Morris; Andreas Ulrich welcomes a visitor to the Riegl stand.

Hyatt Regency

The Hyatt Regency was a venue that embraced the vernacular and essence of what makes Denver unique. With 1,100 rooms, spectacular panoramas of the mountains and city as well as concierge extraordinaire **Roger Feakes**, the hotel was well equipped for three days of light fuelled geometric data capture discourse. Decorated with art from the city's vibrant arts and craft movement, the hotel presented an absolute sense of place. This was reiterated by outdoor civic sculptures like Lawrence Argent's "I See What You Mean" – or **The Big Blue Bear** as it has become known by native Coloradans.

The Napa Valley of beer

Tuesday's social gathering was held at the Wynkoop Brewery in the city's lower downtown or 'LoDo'. Housed in the J. S. Brown Mercantile Building (1899), the bar was opened in 1988 as part of a successful redevelopment strategy for the oldest section of Denver. This, in part, was aided by a major league baseball team coming to the area also.

Since that time the Wynkoop has become a topic of conversation and springboard its owner and entrepreneur, *Time Magazine* featured Mayor and current Democrat Governor for Colorado, **John Hickenlooper**. Cited in the *Denver Business Journal* as the "Napa Valley of beers", the bar is the first of many brewpubs in Colorado. In fact the centennial state, nicknamed due to its formation as the 38th state in 1876, has topped the beer charts many times in the US. It still remains top of the pops in terms of beer production per capita and second in number of breweries.

Conclusion

The international LiDAR Mapping Forum 2012 was an event where the seeds of data fusion had started to emerge. Though mindsets were still centered in the (point) clouds, the possibility of a union between airborne and terrestrial systems had started to gain gravity. It is only a matter of time before what transpires in the air translates to users on the ground on a wider scale and vice versa. Either way the conference certainly brought new meaning to joining the mile high club.

“... once you know what you're looking at, the world becomes a very regular place in terms of mapping.”



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