DR. A. STEWART WALKER

Complementary Technologies

Still coming to grips with my new role, I am fortunate to have attended two excellent conferences. The Commercial UAV Expo in Las Vegas, Nevada, in late October was vibrant and well run by Diversified Communications, attracting around 2000 attendees from 53 countries and 150 exhibitors. The excitement of walking the aisles amidst booths bedecked with UAVs of all shapes and sizes doesn't abate. One of the key happenings, however, was an announcement by Lisa Murray, Director of Commercial UAV Expo, during her opening remarks, that Diversified Communications had acquired Drone World Expo from JD Events. Drone World Expo has historically taken place in San José, California, but from next year the two events will be combined and will take place on 1–3 October 2018 in Las Vegas. As LIDAR sensors become smaller and lighter and more companies master their integration on to UAVs, the LIDAR community can be expected to flock to Nevada. ASPRS ran several sessions at this year's event, including one in which candidates for the Society's recently launched UAS certifications (Certified Mapping Scientist, UAS; Certified UAS technologist) took their examinations. The result was an unprecedented 14 successful candidates in one day! ASPRS plans to expand on this by offering examinations for its LIDAR certifications (Certified Mapping Scientist, LIDAR; Certified LIDAR technologist) during ILMF, which takes place in Denver on 5–7 February 2018. This is the first time ASPRS will hold its annual conference in conjunction with ILMF, resulting in an unprecedented number of exhibits, combined networking opportunities, and the innovative GEO League Challenge, which will pair students with industry professionals and academics to compete in a fun event open to all attendees.

Whereas it sometimes seems that any geospatial event these days is dominated by UAVs, this was certainly not the case at the 20th William T. Pecora Memorial Remote Sensing Symposium (Pecora 20 for short), run jointly by ASPRS, USGS and NASA in Sioux Falls, South Dakota in mid-November. It attracted about 450 participants. The Pecora Symposium series was established by the USGS and NASA in the 1970s as a forum to foster the exchange of scientific information and results derived from applications of Earth observing data to a broad range of land-based resources, and discuss ideas, policies, and strategies concerning land remote sensing. It commemorates William Thomas Pecora (1913–72), who

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PUBLISHER Allen E. Cheves
publisher@spatialmedia.us

MANAGING EDITOR Dr. A. Stewart Walker
stewart.walker@lidarmag.com

GROUP EDITOR Marc S. Cheves, LS
marc.cheves@spatialmedia.us

CONTRIBUTING WRITERS
Marco Cecala
Dr. Srini Dharmapuri
Jeff Fagerman
Lewis Graham
Ted Knaak
Dr. David Maune
Jarlath O'Neil-Dunne
Michael Raphael
John Russo
Karen Shuckman
Ken Smerz
Paul Tice
Larry Trojak
James Wilder Young

The staff and contributing writers may be reached via the online message center at our website.

GRAPHIC DESIGN LTD Creative, LLC
WEBMASTER Joel Cheves
AUDIENCE DEVELOPMENT Edward Duff
MEDIA RELATIONS Richard Bremer

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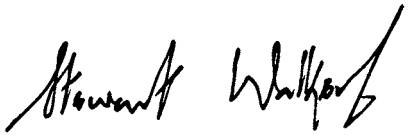
advocated, when he was director of USGS in the 1960s, for the creation of a remote sensing satellite that would be used to gather information about the surface of the Earth, which resulted in the launch of ERTS 1, now known as Landsat, on 23 July 1972. Currently Landsats 7 and 8 are flying and we learned about the progress of Landsat 9, due for launch in December 2020, and further missions beyond that. We are blessed with more than 40 years of imagery, providing rich time series to help us learn what has happened to our planet. Does Landsat imagery have anything to do with LIDAR? Many presenters were involved in calibration, experts in the science underlying the processing of Landsat imagery to be consistent and most likely to give trustworthy results. One made an intriguing remark to me. He felt that the demand for calibration of high-end airborne cameras, flown in manned aircraft, is lessening, perhaps owing to the remarkable performance of medium-format cameras, or perhaps to the effect of the use of UAS imagery, which is displacing conventional manned photogrammetric missions for certain applications. If he is correct, could a similar trend eventually emerge for LIDAR? Moreover, I attended a session in which multiple presenters talked about using Landsat and LIDAR together to estimate various quantities, such as tree height and biomass, required for forest management. This is a bellwether, since the combination of complementary technologies is crucial to the geospatial future—we'll regularly address the topic of data fusion, moving forward.

Last month I promised to follow up on "certification, licensure, ethics, standards, guidelines and procurement regulations". ASPRS maintains a leadership role in the development of guidelines, standards, specifications, and calibration processes for those sensors and activities of primary importance to the membership by using established procedures for developing, reviewing, modifying, approving standards, and publishing them. A USGS-ASPRS Work Group (WG) has investigated various factors associated with the geometric quality of LIDAR data. The WG has noted that while the quality of LIDAR data has improved tremendously in the past few years, the QA/QC of these data is not standardized, including the semantics, processes for measurement and reporting, and meta data. To ensure the geometric quality of LIDAR data, the WG has recommended several topics for research and development. In addition, the WG created guidelines on quantifying the relative horizontal and vertical errors observed between conjugate features in the overlapping regions of LIDAR data. The effort has been supported by the USGS National Geospatial Program (NGP) and the Land Remote Sensing (LRS) program. In March 2017, ASPRS implemented the first phase of an outreach campaign by approving draft versions of *Summary of Research and Development Efforts Necessary for Assuring Geometric Quality of LIDAR Data* and *Guidelines on Geometric Inter-Swath Accuracy and Quality of LIDAR Data* and releasing them for review by the membership. Industry stakeholders and the general public were invited to participate in the approval process by downloading the draft versions, reviewing the content, and providing comments with a final deadline of October 30, 2017. These inputs are under review by the WG and the documents being revised as appropriate. When the final versions are published, we will have an article about them in *LIDAR Magazine*.

No-one complained about me using space in last month's editorial to describe two interesting items I had found as I scan my collection of thousands of technical papers and brochures. Less treasure has been uncovered this month, so my eye was drawn by something current instead. LIDAR is not typically associated with the "dismal science", yet earned a paragraph in *The Economist* of 4 November 2017, in an article about the Lockheed Martin Matrix, a full-size unicopter development, sponsored by DARPA, that is expected to fly early in 2018. "The main sensor is a form of LIDAR, the laser equivalent of radar. LIDAR is a part of the equipment of driverless cars, but the Matrix version is more powerful. It can detect objects hundreds of meters away."[1] Our technology is on coffee tables, tablets and phones the world over!

In closing, I wish all of you a successful and healthy 2018!



A. Stewart Walker // Managing Editor

[1] Anon, 2017. Back to the unicopter, *The Economist*, v425, #9065, p78.