

2018 ASPRS UAS Symposium

at Commercial UAV Expo

The Westgate, Las Vegas, NV

October 4, 2018

Attendees of the Commercial UAV Expo are invited to join ASPRS for additional in-depth technical symposium. Registration at Commercial UAV Expo is required; the ASPRS UAS Symposium is an optional add-on event.

To register: <https://xpressreg.net/register/uava1018/>.

Attendees of the ASPRS UAS Symposium can register for Part 1 only, or for the entire day.

Cost
Part 1 Only: \$175
Full Day: \$250

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UAV EXPO  expouav.com

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The ASPRS High Precision Mapping by UAS Working Group, a collaboration of the Unmanned Aerial Systems (UAS) and Primary Data Acquisition (PDAD) Divisions



INSTRUCTORS

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Part 1: High Precision Mapping by Drones – An Introduction (8 AM – 12:15 PM)

1. Mapping Frames of Reference (Datums) - Mostafa

- Datum Definition (Traditional vs. Modern)
- Ellipsoid vs Geoid vs MSL
- Earth-Centered Earth-Fixed Systems
- NAD83, WGS84, ITRF, NATRF
- ITRS vs ITRF
- The Geoid: NAVD88, EGM96 vs EGM2008
- Map Projections – UTM, State Plane Mapping

2. Errors and Statistical Measures in the Mapping Profession - Abdullah

- Measurements and Errors
- Error Characterization
- Biases and Blunders
- Random Errors and the Gaussian Curve
- Accuracy and Precision

3. Photogrammetry Concepts - Schuckman

- Photogrammetric Sensors, platforms, and applications
- Standard Mapping Products
- Geometric Resolution
- Radiometric Resolution
- Image Georeferencing
 - Aerial Triangulation
 - Structure from Motion
 - PPK – Assisted Aerial Triangulation
 - DG – Direct Georeferencing
 - ISO – Integrated Sensor Orientation
- Photogrammetric Data Accuracy Assessment

4. Lidar Concepts - Schuckman

- Definitions
- Lidar Sensors, platforms and applications
- Lidar-derived mapping products
- Calibration in Lidar
- Lidar data georeferencing
- Lidar accuracy assessment

5. Real World Examples - Mostafa

- Photogrammetric Data workflow
- Lidar data workflow
- Data processing and Analysis
- Quality Control
- Product Delivery

Part 2: High Precision Mapping by Drones – Operations and Best Practices (1:15 PM - 5:30 PM)

6. GNSS Introduction - Mostafa

- GNSS Worldwide systems (GPS, GLONASS, Galileo, Beidou)
- GNSS Satellite Positioning – How does it work
- The Measurement Domain vs. Positioning domain
- GPS Error sources
- Error Modeling, elimination, and/or reduction
- GPS Achievable Accuracy using different Mechanisms
- PPK vs RTK GNSS
- Alternatives to GPS Base Stations - Examples
 - CORS, OPUS, GEONET, CSRS, and ARGN

7. Inertial Navigation - Mostafa

- Rigid Body Motion
- Inertial Sensors
- Inertial Navigation Mechanization
- Coordinate Frames of Reference
- GNSS and Inertial Integration

8. System Integration - Mostafa

- System Integration for positioning, navigation, imaging, and Lidar
- Lidar vs Photogrammetry
- System integration for rapid response versus mapping
- Time Synchronization
- Calibration in Multi-Sensor Systems

9. Best Practices – Mostafa/Stallings

- Requirement Identification
- User Needs Assessment
- Planning Considerations
- Site setup
- Datums Implications
- Base Stations, GCP, Check points, etc
- Mission Planning
- Data Acquisition
- QA vs QC
- Pre-mission QC
- Post-mission QC
- Pre-Processing QC
- Data Processing best practice
- Post-processing QC
- Map Product Delivery