



# Tenth Annual Information Meeting

April 5-6, 2016

Pfahl Executive Education Building, The Ohio State University, Columbus, OH

## **Tuesday Morning, April 5**

7:30	Meeting Registration and Continental Breakfast
8:00	Welcome, introductions and meeting overview <i>Frank van Graas, COUNT Director</i>
8:15	Government presentation: Paul Olson, US Army
8:45	Presentation by Honeywell, Inc.
9:15	Presentation by Northrop Grumman Corporation
9:45	<i>Break</i>
10:15	Overview of Navigation Related Research at The Ohio State University ElectroScience Laboratory, <i>Inder "Jiti" Gupta</i>
	Poster Presentations by OSU ESL (45 minutes)
	SPIRE Cubesat GPS Reflectometry Antenna Development -- Domenic Belgiovane and Chi-Chih Chen
	A Novel, Light-Weight, Broadband, Multipath-Rejecting GNSS Antenna Design -- Brian Clark and Chi-Chih Chen
	Blind Beamforming in GNSS Receivers -- Jay Chuang and Jiti Gupta
	Integrity Monitoring for GNSS Receivers with Adaptive Antennas -- Eric Loria, Andrew O'Brien and Jiti Gupta
	Design of a Ground-Based Beacon Signal for Calibration of Space-borne GNSS Remote Sensing Instruments -- Matthew Buchanan and Andrew O'Brien
	Target Following and Approach Using Echoic Flow -- Saif Alsaif and Graeme Smith
	Array Based Passive Radar Target Localization -- Jamie Huang et al.
	GPS Anti-Jam Antennas and Situational Awareness -- Nicole Tchorowski and Jiti Gupta
	Field Testing of the Direct Mapping Method for Geolocation of Multiple Ground-Based RF Emitters -- Andrew Kintz, Andrew O'Brien and Jiti Gupta
	Studies of GNSS-R Altimetry -- Jeongwhan Park and Joel Johnson
11:45	<i>Lunch</i>

## Tuesday Afternoon, April 5

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13:00

Government Presentation: Dr. Robert Anderson, NGA

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13:30

Overview of Navigation Related Research at The Ohio State University  
Satellite Positioning and Inertial Navigation Laboratory, *Charles Toth*

Poster Presentations by OSU SPIN (45 minutes)

Multi-Session Monocular Navigation and Mapping with Crowd Sourced  
Data -- Jianzhu Huai

An Airborne LiDAR/INS Integrated Navigation Algorithm based on SIFT --  
Haowei Xu

Extracting Navigation Data of Aircraft Movement from Point Clouds --  
Zoltan Koppanyi

LiDAR Point Cloud Simulation of Aircrafts to Improve Aircraft Navigation at  
Airfields -- Yuan Yang

Performance Evaluation of Various UWB Network Configurations Based on  
Simulation -- Seyedfarhad Mirkazemi

Navigating ground transportation platforms in GPS-denied environment  
using traffic lights -- Siavash HosseinyAlamdary

GPS-denied Geo-Localization using Visual Odometry and GIS Database --  
Ashish Gupta

Monocular Visual-Inertial Odometry Based on Multi-Geometry Constraints  
-- Huan Chang

Semantic Enrichment and Automatic Update of Maps Techniques for Auto-  
Navigation -- Rongjun Qin

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15:00

Overview of Navigation Related Research at Colorado/Miami University,  
*Jade Morton*

Poster Presentations by Colorado/Miami University (45 minutes)

Improved TEC, TEC Gradients, and Receiver Bias Estimation By  
Integrating Code Phase Multipath Noise Estimation -- Harrison Bourne,  
Jade Morton, Frank van Graas

High Resolution 3D Imaging of the Ionosphere Using Common Volume  
GNSS from Ground Network and LEO Radio Occultation -- Brian  
Breitsch, Jade Morton

Apply Machine Learning for Ionospheric Scintillation Event Detection -- Yu  
Jiao, Jade Morton, Mahmood Azimi-Sadjadi

Signal Fading Characteristics of Equatorial Scintillation Observed Across  
the GPS Frequency Bands -- Yu Jiao, Dongyang Xu, Jade Morton,  
Charles Rino

Big Data for GNSS Research - Challenges and Solutions -- Steve Taylor,  
Harrison Bourne, Jade Morton

Semi-Open Loop Tracking of Strong Scattered GNSS Signals -- Dongyang  
Xu, Jade Morton

Ionosphere Remote Sensing Using Closely Spaced GNSS Arrays -- Jun  
Wang, Jade Morton, William Bristow

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## Tuesday Afternoon, April 5 – Continued

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Poster Presentations by Colorado/Miami University (continued)

Performance Evaluation of Radio Occultation Data Processing Software in Southeast Asia -- Bo Han, Erry Gunawan, Kay-Soon Low, Jade Morton  
Exploiting Frequency- and Angle-Diversity of Target Scenes for Detection and Identification with UWB OFDM Radar -- Melissa Simms, Dmitriy Garmatyuk, Jade Morton

Experimental Assessment of Indoor Target-aided Navigation with UWB OFDM Software-defined System -- Zak Abner, Daniel Balch, Tay Johnson, Dmitriy Garmatyuk

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16:30 Overview of Navigation Related Research at Ohio University Avionics Engineering Center, *Maarten Uijt de Haag*

Poster Presentations by Ohio University (45 minutes)

Small-UAS Navigation using 3D Imager and Infrared Camera in Structured Environments -- Akshay Bharadwa, and Joel Huff

A Navigation and Collision Avoidance Method for UAS during Under-the-Canopy Forest Operations -- Adam Schultz and Russell Gilabert

Evaluating Technologies for Improved Airplane State Awareness and Prediction -- Phil Duan and Maarten Kastelein

Indoor Flight Demonstration Results of an Autonomous Multi-copter using Multiple Laser Inertial Navigation -- Russell Gilabert and Adam Schultz

A Real-time Relative Navigation Capability for Multi-copter Collision Avoidance -- Maarten Kastelein and Kyle Shiflett

Aircraft Antenna Group Delay Variation Impact on Position Accuracy and Protection Levels -- Anurag Raghuvanshi

Sequential Carrier Phase Loop with Residuals and Its Equivalence to Iterated Batch Processing -- Rakesh Kashyap

An Energy Management Display for General Aviation Safety Enhancement -- Tony Adami

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18:30 *COUNT-Hosted Banquet*

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## Wednesday Morning, April 6

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7:30	<i>Continental Breakfast</i>
8:00	Government Presentation: Dr. Mikel Miller, AFRL/RV
8:30	Presentation by Rockwell Collins, Inc.
9:00	Presentation by Lockheed Martin Corp.
9:30	<i>Break</i>
10:00	Overview of Navigation Related Research at the Air Force Institute of Technology, <i>John Raquet</i>  Poster Presentations by AFIT (45 minutes) Visual-INS Using a Human Operator and Converted Measurements -- Capt TJ Montgomery Satellite Ephemeris Correction via Remote Site Observation for Star Tracker Navigation Performance Improvement -- Capt Jorge Diaz Toward Automated Aerial Refueling: Real-Time Pose Estimation from Stereo Vision -- Brad Denby GNSS Signal Monitoring Research and Development at the AFIT ANT Center -- Dr. Sanjeev Gunawardena Real-Time Absolute Positioning of UAV Using Vision -- 1st LT Timothy Machin Development of a Unified Command and Control Architecture for Multiple Cooperative Unmanned Vehicles through the Integration of Commercially Available Components and Open Source Software -- Jeremy Gray Aerial Navigation using Magnetic Anomaly Fields -- Capt Aaron Canciani Smart Cables and Scorpion: End-to-End Sensor Fusion -- Daniel Marietta Civilian GPS Spoofing Detection and Classification Using RF-DNA -- Capt Adam Lemmenes
11:30	Discussions and Concluding Remarks

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