



**Short Training Course in  
“Critical Assessment of Drone Imaging for IoT: Signals,  
Sensors, and Systems”**

**Date: 5th-9th November  
Kigali, Rwanda**

IEEE Geoscience and Remote Sensing Society in collaboration with The African Center of Excellence in Internet of Things (ACEIoT) at University of Rwanda, and Rochester Institute of Technology-USA are organizing a 5 day short course in “Critical Assessment of Drone Imaging for IoT: Signals, Sensors, and Systems.” The short course uses an end-to-end systems approach to examine how imaging from drones can be integrated into IoT applications to measure and monitor a variety of built, agricultural, and natural environments. The short course targets experts in Public, Private, and Academic institutions who wish to understand with a critical eye how drone imaging systems may help solve their problems.

## Program

Monday, November 5 <sup>th</sup> , 2018			
Session	Time	Activity	
<b>Opening Drone Workshop</b>	8.00-9.00 am	Registration of Participants	
	9.00-9.15 am	Welcome Remarks	Dr. Ignace Gatare Principal, UR-CST Prof. Philip Cotton, VC, University of Rwanda. Prof Anthony Vodacek, RIT
	9.15-9.30 am	Opening Remarks	
	9.30 -10.00 am	About IEEE Geoscience and Remote Sensing Society	
	<b>10.00-10.30 am</b>	<b>Coffee Break</b>	
	10.30-10.45 am	About Remote Sensing at RIT	Prof. Vodacek, RIT
	10.45-11.30 am	Introduction to drone remote sensing	Prof. Vodacek, RIT
	11.30-12.00 am	Drones in Rwanda	Rep from Charis
	12.00 -12.30 pm	Use cases for drone remote sensing in East Africa	Dr. Gaspard Rwanyiziri
	12.30 -1.00 pm	About ACEIoT	Director, ACEIoT
	<b>1.00-2.00 pm</b>	<b>Lunch Break</b>	
<b>Design Practice</b>	2.00-6.00 pm	Introduction to the Imaging Chain as a concept for critical design	Prof Vodacek, RIT Tim Bauch, RIT
		Critical design exercises for application areas	Students groups
		Presentations of student use cases	Student groups

Tuesday, November 6 <sup>th</sup> , 2018			
<b>Fundamental remote sensing concepts</b>	8.00-10.30 am	Basics of Radiometry Basics of Camera design Basics of Spectral imaging Sensor hardware interfacing	Prof. Vodacek, RIT  Tim Bauch, RIT
	<b>10.30- 11.00 am</b>	<b>Coffee Break</b>	
	11.00 am-1.30 pm	Demonstration of Spectral sensing	Prof. Vodacek, RIT  Ryan Ford, RIT
<b>1.30 to 2.30 pm</b>		<b>Lunch Break</b>	
<b>Practical: signal collection</b>	2.30-6.00 pm	The importance of reference data collection Characterizing sources Measuring reflectance/temperature Processing spectral data	Prof. Vodacek, RIT  Ryan Ford, RIT  Student groups
Wednesday, November 7 <sup>th</sup> , 2018			
<b>3D imaging from drones, Structure from Motion</b>	8.00-10.30 am	Why 3D imaging? Context and example applications Basics of photogrammetry Introduction to multiview geometry (structure from motion) Signals, software, and caveats in structure from motion	Prof. Vodacek, RIT  Tim Bauch, RIT
	<b>10.30-11.00 am</b>	<b>Coffee Break</b>	
	11.00 am-1.30 pm	Introduction to mission planning for drone flights	Tim Bauch, RIT  Student groups
<b>1.30-2.30 pm</b>		<b>Lunch Break</b>	
<b>Drone flights for 3D imaging</b>	2.30-6.00 pm	Drone flight training Drone flights by students 3D image processing	Prof. Vodacek, RIT  Tim Bauch, RIT  Student groups
Thursday, November 8 <sup>th</sup> , 2018			
<b>Drone flights for spectral sensing</b>	8.00-10.30 am	Sensor selection and tradeoffs	Prof. Vodacek, RIT
	<b>10.30-11.00 am</b>	<b>Coffee Break</b>	
	11.00 am-1.30 pm	Built environment flights Natural environment flights	All
<b>1.30-2.30 pm</b>		<b>Lunch Break</b>	
<b>Flight analysis</b>	2.30-6.00 pm	Processing flight data	All



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	<b>Friday November 9<sup>th</sup>, 2018 - Stakeholder workshop (ministry, external companies and association, NGO) and showcases, certification</b>		
<b>Morning</b>	8.00-10.30 am	Revisit/revise the application area critical design projects	Student groups
	<b>10.30-11.00 am</b>	<b>Coffee Break</b>	
	11.00 am-1.30 pm	Showcase the student group drone sensing design studies	Student groups
	<b>1.30-2.30 pm</b>	<b>Lunch Break</b>	
<b>Afternoon</b>	2.30-4.00 pm	Comments from various stakeholders Awarding of Certificates Closing Remarks	DVC Academic Affairs and Research, UR Principal, UR-CST
	<b>Close of the Short Training Course</b>		