

US-Egypt LiDAR Applications Workshop

15 -19 Jan 2012; Cairo, Egypt

The National Authority for Remote Sensing and Space Sciences (NARSS) will host and organize the First LiDAR Applications Workshop (FLA) that will be held from January 15 to 19, 2012. FLA aims at advancing and communicating research related to LiDAR application such as earthquake hazards, risk and its mitigation, earthquake engineering, and the tectonics land sliding and rock fall of some tested surrounding regions. This workshop will feature a special “hands on” session on the Technical Methodology and Applications of the LiDAR data modeling and processing, including a case study for the Moqattam and Gabal Hamza regions of Egypt. The technical methodology that will be used in the “hands on” session will be demonstrated for each major component of the LiDAR model fault data, ground motion equations, development of the buildings and infrastructure inventory, engineering fragility functions, analysis parameters, economic and social loss approach based primarily on the studied regions.

Participants will receive “hands on” experience using two types of terrestrial laser scanners, supporting material, and data sets. A suite of PCS will be available for the hands-on processing of data, but individuals may bring their own laptops, and we will provide installation for some of the software, plus setup support.

Importance of LiDAR Imaging Systems:

The coming imaging system is comprised of high-resolution digital photography and a laser-based technology called LIDAR, for "light detection and ranging."

LiDAR works something like RADAR, but instead of transmitting radio waves, LIDAR transmits laser light pulses. The light bounces off objects and scatters. A telescope receives the backscattered light and a sensitive detector measures the intensity. Using the data -- which can contain information about shape, measurements, distance and even chemical composition -- a computer produces a precise 3-D image.

Very precise measurements of dimensions is obtained through this system, which can be used to quantify damage, such as measure the volume of a rubble pile , the amount of shifting of a building, assessment of land slide , rock fall, monuments documentary.

Comparing the LiDAR image to the optical image. The optical image provides a good, overall view of the general damage. But the LiDAR image reveals precisely where and how the building is damaged. Moreover, the images can be used in the future, when it comes times to design new buildings. For longer term this data can be used for engineering studies to determine how buildings fail and how they can be built better.

The following is the agenda for the workshop:

- 1- Two days terrestrial LiDAR data collection, collect a test set of data, and process it. In Gabal Mokatom and Gabal Hamza in Ismaliya road.
- 2- Data processing and interpretation practice for sets of existing LiDAR data (both terrestrial data) US data available in land sliding and structural geology applications.
- 3- We could use some of the workshop time to plan how to proceed with the airborne LiDAR system.
- 4- Last workshop day, a larger proposal to get the airborne LiDAR up and running could be submitted to the US-Egypt Joint Research Grants, and they have a proposal deadline annually in October or March NSF deadline.

US-Egypt LiDAR Workshop agenda:**Sunday, 15 Jan. 2012**

Time	Presenter Name	Organization & Country	Title
9:00-9:15	NARSS chairman (Dr. Mohamed Medhat)	NARSS, Egypt	Welcome to NARSS
9:15-9:30	Professor Dr. Barbara Tewksbury	Hamilton College USA	Welcome to the workshop and project
9:30-9:45	NARSS X-chairman Dr. Ayman El Dosoky/ Dr. Walaa Sheata	NARSS, Egypt	3D laser scanning for pyramid plateau
9:45-10	Dr. Barbara	Hamilton College USA	Introduction of terrestrial laser scanning
10-10:30	Coffee Break, participants mingle		
10:30-11	Dr. Ashraf Helmy/ Dr. Ataya Bkhet/ Dr. Ashraf sharawy	NARSS, Egypt	The world of point cloud and cloud computing in geomatics
11-12	Mr. Jason Stoker	USGS EROS Center USA	Preparation for afternoon field work with terrestrial laser scanning (TLS) instruments, including any necessary background (the team)
12:00-1:00	Coffee Break		
1:00-5:00	All US-Egypt field work team	USA-Egypt	Data collection using the Leica instrument and the phase shift scanner, in the field, Mokattam Plateau; participants will collect data and will be divided into small groups, rotating jobs between the two instruments in order to gain familiarity with how to operate the instruments and collect basic data

US-Egypt LiDAR Workshop agenda:

Monday, 16 Jan. 2012

Time	Lecturer Name	Organization & Country	Title
9:00-11:00	Dr. Travis Doering & other team members	University of South Florida, USA	Processing of data from Monday afternoon field work, NARSS computer lab
11:00-12:00	Dr. Young and Dr. Collins	AeroMetric, Inc. USA University of South Florida, USA	Group discussion of results, followed by presentation on effective survey design and discussion of plans for collecting better data on Monday afternoon
12:00-1:00 12:00 -1:00	Lunch		
1:00-5:00	All US-Egypt field work team	USA-Egypt	Back out into the field on Mokattam to conduct an improved survey using both TLS instruments

US-Egypt LiDAR Workshop agenda

Tuesday, 17 Jan. 2012

Time	Lecturer Name	Organization & Country	Title
9:00-9:45	Dr. Stoker	USA	Presentation on airborne LiDAR: differences in instrumentation and data collection compared to terrestrial LiDAR
10:00-10:45 Case studies/examples of uses of airborne LiDAR (Crosby)	Dr. Crosby	University of California, San Diego, USA.	Case studies/examples of uses of airborne LiDAR
11:00-12:00	Dr. Collins and Dr. Doering	University of South Florida, USA College of Arts and Sciences Core Facility University of South Florida	Case studies/examples for cultural and natural resource applications of integrative approaches with terrestrial laser scanning and spatial data (GPS, GIS, ALS, and visualization software packages)
12:00-1:00 Lunch	Lunch		
1:00-5:00	All US-Egypt experts	USA , Egypt	Processing the 2nd batch of TLS data and processing/interpreting airborne LiDAR data sets that Chris will bring with him, NARSS computer lab; we will divide participants up into teams and have them do some of both.

US-Egypt LiDAR Workshop agenda

Wednesday, 18 Jan. 2012

Time	Lecturer Name	Organization & Country	Title
9:00-10:00	Prof Dr. Barbara Tewksbury	Hamilton College USA	Outline of possibilities for funding future collaborations including costs and constraints (Crosby and others)
10:00-10:45	Dr. Crosby	University of California, San Diego, USA.	Brainstorming in small groups what we might like to be able to do
11:00-12:00	All US-Egypt experts	USA Egypt	Report-backs to the main
12:00-1:00	Lunch		
1:00-4:00	All US-Egypt experts	USA , Egypt	Planning the nuts and bolts of one of more grant proposals.

