



SHARING SURVEY SKILLS

Building Capacity in Developing World Design Professionals

by Patrick Cochrane, ASCT
Technical Support Volunteer /
Board of Trustees, EMI Canada



While volunteering on an EMI project trip to Uganda in February 2011, I had the opportunity to work alongside a Ugandan surveyor. I soon discovered that although Ugandan universities do a great job of teaching the theory of surveying, resources to impart its practical application are not always available. My colleague, who had graduated from a four-year geomatics engineering program two years previously, appreciated the practical skills that I was able to share with him – skills that empowered him to greater excellence in his career, in serving others, and in providing for his family.

Second and third year Geomatics Engineering Students in Uganda are required to obtain practical work experience through a placement with the survey industry, but placement opportunities are lacking. Engineering Ministries International, in a desire to invest in developing world design professionals, launched a pilot partnership Geomatics Industrial Training Program, which is essentially a practicum program between EMI Canada, EMI East Africa, and Kyambogo University in Kampala.

I coordinated the training as an EMI Canada volunteer, EMI East Africa staff helped with logistics, and Kyambogo University provided the students as well as access to classes and campus grounds for the delivery of our training. The presence of our team surveying on the Kyambogo campus generated a great deal of interest in our program!

SOFTWARE APPLICATION

Western post-secondary students encounter an abundance of exposure to technology throughout all aspects of their life. In Uganda, these opportunities are not available to most. This leaves a pressing need to develop basic hands-on technical skills, especially in fields such as geomatics which utilize ever-changing high-tech equipment.

We used the free educational version of MicroSurvey CAD (MSCad) to introduce basic CAD commands, point file import and export, creating a surface model and contouring – all leading up to the production of a topographic site plan.



Students working with survey software.

We also touched on Google Earth software for pre-survey planning and layout and for site imagery. We introduced Garmin Mapsource for interfacing autonomous GPS data, both for data capture and site layout.

Before the class ventured into the field, we were able to utilize *desktop emulators*: software applications that can be used on computers but mimic the actual process of the data collectors which interface with total stations and RTK GPS systems.

EQUIPMENT APPLICATION

Thanks to the generous donation of survey equipment by survey supply companies in Canada, our students were able to receive training on a full range of equipment including simple hand level, auto level, digital theodolite, hand-held autonomous GPS, total station and data collector, and two different RTK GPS systems.



Students using a total station.

Competency and confidence are built through instruction and hands-on practice. Some of the more high tech survey equipment may not be at the disposal of these students during their careers. By providing training on a combination of lower cost equipment such as hand levels, autonomous GPS and theodolites (stadia), students were enabled to provide useful topographic information within the financial limitations often encountered in the developing world. Using varying equipment and model builds had the added benefit of preparing students for rapid adaptation to new equipment they will encounter in their careers.

Thank you to Butler Survey Supplies, Cansel and Spatial Technologies for their donation of survey equipment for the Geomatics Industrial Training Program and Microsurvey for use of their survey/CAD software.

LIFE APPLICATION

Our goals for this program went beyond surveying skills, to encouraging work ethics, respect, and life application. EMI East Africa staff member John Breitenstein personally participated in the program, and he was integral to its success: sharing his faith and heart and providing invaluable mentoring for the students, while navigating the many cultural challenges that we faced. We took time to get to know the students' stories and we looked for avenues to meaningfully share the love of Christ.

Another life application was in the area of improving workplace health and safety. Our Ugandan administrator, Aparo Hope, delivered a half day of training in first aid, a concept that was new to most of our students.

FIELD SURVEY

Our seven-day field survey put to test the training covered in the program's first half. This also provided our team a valuable opening to use their skills to serve others, while experiencing some of the aspects of liaising with a client.

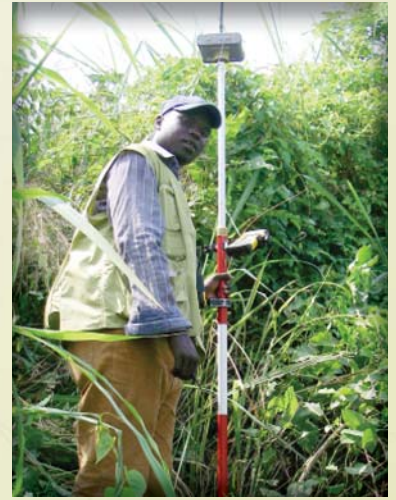


Field survey team at Restoration Gateway sign.

Restoration Gateway, a ministry that works with vulnerable children and war-torn people of northern Uganda, had engaged EMI to master plan outreach facilities. Our geomatics team went ahead of the EMI design team to carry out a challenging 500 acre topographic survey of the site along the banks of the Nile, complete with twelve-foot grasses and some of the thickest brush I've witnessed, making a Ugandan panga (machete) essential survey gear. Back at Kyambogo University, we produced a site plan which enabled the EMI design team to hit the ground running . . .

SUMMARY

The students' program evaluations were encouraging; the students recognized that they had been gifted a unique learning opportunity which had produced significant progress in their practical survey skills. They even confidently instructed their geomatics lab faculty on newly acquired processes on their university's total station! These students are not only better positioned for their future careers, but also for impacting others with their gifts and skills – whether through EMI or through other opportunities. The skills that they have demonstrated, coupled with their enthusiasm, is already generating interest for next years' program. EMI, too, has benefitted from the arrangement, as we were able to provide our partner ministry with a more comprehensive survey than would have been possible through a traditional project trip. Plus, we're investing in developing world design professionals, building into their practical survey skills and into their lives. As design professionals, this is one more way to leverage our heart and abilities to design a world of hope.



Practicum student surveying at Restoration Gateway site.

Patrick Cochrane, ASCT
Joan Cochrane, wife
Technical Support Volunteer /
Board of Trustees, EMI Canada



Do you have a heart for mentoring developing world design professionals? Engineering Ministries International is already preparing for next year's Geomatics Industrial Training Program. We're looking for a few surveyors to help us conduct the training, as well as for financial sponsors to help underwrite project costs. Visit emicanada.org/projects/projectprofile_10037.shtml for more information.

volunteers needed

spring 2013 projects

Sub-Saharan Africa

Niger	Sahel Academy Flood Mitigation	Late Jan- Early Feb	jrolfs@emiusa.org
Dem. Rep. of the Congo	Lubumbashi Elementary School	February	gmacphee@emiusa.org
Burundi	Kibuye Hope Hospital	February & May	philip@emiea.org
Burundi	Kigobe Mission Station	February & May	sarah@emiea.org
Kenya	Tenwek Hospital, Master Plan Update	February	rbarber@emiusa.org, or hwatts@emiusa.org
Kenya	Touching Lives Ministries Medical Center	February	danderson@emiusa.org
Uganda	Christian Boarding School	February	bcrawford@emiusa.org
Uganda	Construction Management	February or March	jeff@emiea.org

Middle East North Africa

Ethiopia	Training and Mission Base	February	mena@emiusa.org
Lebanon	Special Needs Children's School	Early February	mena@emiusa.org
Middle East North Africa	Conference Center and Bible School	Early February	mena@emiusa.org

Southeast Asia

Cambodia	Cambodian Children's Homes	February	mhood@emiusa.org
India	Children's Adventure Camp	Early February	rkoeniger@emi2.org
India	Wastewater Infrastructure Improvements	Early February	dkoeniger@emi2.org
India	Pre-Construction Survey & Site Engineering	Early February	mcoffey@emi2.org
Nepal	Water System Survey and Design	Late February	gfrank@emi2.org

Eastern Europe

Albania	Campground Master Plan & Building Expansion	February	bsmith@emiusa.org
---------	---	----------	-------------------

Central America & the Caribbean

Haiti	Vocational Training Center & Church	February	kwiens@emicanada.org
Honduras	Medical Clinic and Diagnostic Center	February	tclm@emilatina.org
Costa Rica	Corral de Piedra Missions Base (YWAM)	March	dputtcamp@emilatina.org

More information about these projects can be found at emiworld.org