



## Onsite EENSAT courses program

### Introduction.

The EENSAT program, a collaboration between 3 Ethiopian Universities and the Faculty ITC, envisaged a number of outcomes:

- Educational support, related to geo-spatial processing and management of education both at University and TVET level;
- Research, supported by (sandwich) PhDs, mobilized from the 3 universities in conjunction with local MSc studies;
- Outreach, enhanced collaboration with relevant (non) Governmental and private organizations, especially in the field of the Ethiopian Agricultural Transformation agenda.

Due to the global pandemic and the political situation in Ethiopia, the activities envisaged for the first outcome were delayed and could not be executed as planned, e.g. through execution of courses delivered by distance and blended education activities. Therefore it was decided to invite senior staff, involved within the EENSAT program, together with representatives from their management, to come to ITC. The train the trainer program developed is consisting of an intensive face to face training covering the various topics that have been specified at the beginning of the EENSAT educational program.

The onsite training is covering 2 batches of courses:

- Batch 1:
  - 'Train the trainer' for 3 vice presidents of collaborating Ethiopian Universities in educational quality assurance, - management and entrepreneurship (1 week)
  - 'Train the trainer' for 6 senior staff members (including the 3 EENSAT Operational Management Group staff) on DE / blended course development, enriching content using audio visual capabilities applied to development of drone mapping course (3 weeks)
- Batch 2:
  - 'Train the trainer' for 6 senior staff members on scripting, use of Jupyter notebooks, cloud services, App development and geo-statistics (3 weeks)

The educational materials, already developed for the initially envisaged EENSAT DE/blended courses (available within the EENSAT Moodle LMS Environment) will be re-used and updated if needed and made available in the EENSAT LMS, to facilitate the staff attending this 'train the trainer' program to conduct trainings at their home location for other staff and students.

Furthermore, onsite support missions (e.g. in Bahir Dar) with support from ITC staff are planned, in conjunction with a meeting of the Operational Management Group (OGM), in the 2<sup>nd</sup> quarter of 2024, on:

- Drone operations
- Hackathon

The staff – students attending those events should have followed the course conducted by the staff trained during the face to face training at ITC. Details on the train the trainer program are given below.

### Program for Vice Presidents from 3 Ethiopian Universities – 1 week (02 to 06 October 2023)

Ethiopian visitors:

- Emebet Malugeta Tefera (Academic Vice President - AAU)
- Abdelkader Kedir Baidgign (Academic Vice President - MU)
- Birhanu Gedif Adane (Vice President Administrative Affairs - BDU)

Accommodation: Intercity Hotel, Enschede

1 week training on university teaching qualification, academic skills, education management, quality assurance, entrepreneurship and institutional support

Objectives:

- Introduce vice presidents to UTwente and Faculty ITC;
- Introduce new housing and facilities Faculty ITC – University of Twente;
- How is University of Twente / Faculty ITC supporting professional development of teaching staff and student professional, academic skills and entrepreneurship;
- How is education managed, administered and procedures in place for quality assurance;
- How to continue collaboration in the future – after EENSAT?

Timing: morning sessions from 09:15 – 12:15, lunch from 12:15 – 13:45 and afternoon sessions from 13:45 – 16:45

Program:

(note: first 2 days and last period of Thursday and Friday together with 6 senior staff members, resource persons in italic)

Monday (02-Oct) Room LA 2109	Tuesday (03-Oct) Room LA 2109	Wednesday (04-Oct) Room LA 1218	Thursday (05-Oct) Room LA 1218	Friday (06-Oct)
10:00 Welcome to ITC; Coffee ready as from 09:45	M-Geo and M-SE program overview ( <i>Jeroen Verplanke</i> ) 09:15-09:45	Education Quality assurance / accreditation ( <i>Lisanne Verheij, Wan Bakx</i> )	Education management and administration ( <i>Emile Dopheide, Michiel Bresser</i> ) From 09:15 to 16:00	Room: At Novel T Start-up and entrepreneurship support – Novel T ( <i>Tom Loran, Albert-Jan de Croes</i> )
Administrative issues – advance collection, etc. ( <i>Paul Oostrom</i> )				
From 10:45 – 12:10 Facilities ITC-UT (1) short visits: GNC-reception, Audio Visual Studio, Library, Drone-lab, GeoScience-lab	Academic and professional skill development for students ( <i>Grietha de Jonge, Chris Hecker – 1st year, Jeroen Verplanke – 2nd year</i> )			Business incubator program, OneSpaceHub and Netherlands Space Campus ( <i>Parya Pasha</i> ) From 09:45 – 12:15

Lunch in the Gallery 12:15 – 13:45	09:45-12:15			
14:00 – 14:30: ITC new housing ( <i>David Korringa</i> )				
Facilities ITC-UT (2) short presentations: IT Facilities at UT by Ralph Mettinghof (14:45 – 15:15)	Staff Professional Development - University Teaching Qualification (BKO) ( <i>Angelique Assink - CELT</i> )		Room LA 2109 GeoVersity ( <i>Peter Oostrom</i> ) 16:15 – 16:45	Future collaboration and EENSAT PhDs ( <i>Prof. V. Jetten</i> , ITC Faculty Board Member (online) <i>Prof. Tom Veldkamp</i> , Rector Magnificus UT, <i>all</i> ) Room LA 2109 14:15 – 15:30
In-situ observation network by Diana Chavarro (15:15 – 15:45)				Room LA 2109 At 15:45 - Farewell-drink, together with involved staff and EENSAT PhDs
UT Campus Tour 16:00 - 17:00 (weather permitting)				

Get together on Tuesday evening with Dean ITC – Prof. *Freek van der Meer*, *Tom Loran* (Bardot Restaurant, Langestraat 47C, 7511 HB, Enschede (tel: 053 - 303 40 20), from 18:00 hrs onwards)

Coordinating staff: Ben Maathuis, Chiel Stroeven

Other staff involved Day 1: Facilities at ITC/UT: Drone-lab, GeoScience-lab, etc – *Karin Nieuwenhuizen*, GNC-reception - *Petra Budde*, Audio Visual Studio – *Job Duim*, Library – *Grietha de Jonge / Marco Veller*, Data Centre, UT JNB-Hub and IT (cloud computing) facilities (*Ralph Mettinkhof*), In-situ observation network (Diana Chavarra Rincon)

### **Train the trainer program for Senior staff – 3 week (02 to 20 October 2023) - Batch 1:**

6 staff from 3 partner universities, Bahir Dar (BDU), Mekelle (MU) and Addis Ababa Universities (AAU) (2 each)

Ethiopian visitors:

- Daniel Ayalew Mengistu (OMG - BDU)
- Daniel Asfaw Bekele (BDU)
- Daniel Teka (OMG - MU)
- Yigzaw Hagos Haileselassie (MU)
- Abiy Zegeye (OMG - AAU)
- Aklilu Amsalu Taye (AAU)

Accommodation: ITC International Hotel, Enschede

The overall objective is that during the 3 weeks a course on drone mapping is developed by the participants, allowing them to deliver this course to staff (onsite in Ethiopia) as well as interested

organizations (like INSA, EDRMC, etc.), eventually through distance education or blended means of training delivery.

Specific objectives of the 3 weeks program:

- Introduce senior staff to UTwente and Faculty ITC;
- Introduce new housing and facilities Faculty ITC – University of Twente;
- How is University of Twente / Faculty ITC supporting professional development of teaching staff and student professional and academic skills;
- How to develop a DE / Blended course on drone mapping and enrich the course materials with audio – visual recordings such that the materials can be delivered through Distance or Blended Education modes, using a Learning Management System (Moodle-based);
- Familiarization with audio-visual equipment and conduct audio–visual recordings;
- Prepare a detailed ‘story-board’ on course layout linked to (specific) objectives and learning activities required to prepare and collect course materials;
- Provide the required theoretical basis qualification for drone operations (using qualification for EASA Open Category A1 / A3) and flight planning;
- Getting familiar with the Phantom 4 Pro V0.2 drone and associated software tools;
- Execute a test flight, including collection of ground control data (DGPS);
- Introduction to drone photogrammetry and the installation / use of OpenDroneMap (ODM);
- Processing test flight data (including Gulele flight recordings), creating ortho image map, DSM and DTM using ODM, quality control and data visualization in a GIS;
- Integration of all required content in the LMS to facilitate course execution in Ethiopia

Week 1: Introduction, university teaching qualification, academic skills, drone mapping course design and use of audio visual studio

(note: first 2 days together and last period Friday with 3 Vice Presidents, resource persons in italic. Audio-visual equipment from MU, still at ITC will be used)

Monday (02-Oct) Room LA 2109	Tuesday (03-Oct) Room LA 2109	Wednesday (04-Oct) Room LA 2109	Thursday (05-Oct) Room LA 2109	Friday (06-Oct) Room LA 2109
10:00 Welcome to ITC; Coffee ready as from 09:45	M-Geo and M-SE program overview ( <i>Jeroen Verplanke</i> ) 09:15- 09:45	DE / Blended training skills – course design ( <i>Janet King</i> )	DE / Blended training skills - course design (continued) ( <i>Janet King</i> )	DE / Blended training skills - use LMS / other digital tools ( <i>Ivan Oliveira</i> )
Administrative issues – advance collection, etc. ( <i>Paul Oostrom</i> )	Academic and professional skill development for students ( <i>Grietha de Jonge, Chris Hecker – 1st year, Jeroen Verplanke – 2nd year</i> ) 09:45- 12:15			
From 10:45 – 12:10 Facilities ITC-UT (1) short visits: GNC-reception, Audio Visual Studio, Library, Drone-lab, GeoScience-lab				

Lunch in the Gallery 12:15 – 13:45	Staff Professional Development - University Teaching Qualification (BKO) ( <i>Angelique Assink - CELT</i> )	Setup audio visual studio – checking equipment ( <i>Job Duim, Ivan Oliveira</i> )	Use of audio visual studio equipment – test recordings ( <i>Job Duim, Ivan Oliveira</i> )	Prepare course layout DE / Blended training on 'drone mapping' ( <i>Janet King</i> )
14:00 – 14:30: ITC new housing ( <i>David Korringa</i> )				Future collaboration and EENSAT PhDs ( <i>Prof. V. Jetten, ITC Faculty Board Member (online) Prof. Tom Veldkamp, Rector Magnificus UT, all</i> ) Room LA 2109 14:15 – 15:30 Room LA 2109 At 15:45 - Farewell-drink, together with involved staff and EENSAT PhDs
Facilities ITC-UT (2) short presentations: IT Facilities at UT by Ralph Mettinkhof (14:45 – 15:15)				
In-situ observation network by Diana Chavarro (15:15 – 15:45)				
UT Campus Tour 16:00 - 17:00 (weather permitting)			Room LA 2109 GeoVersity ( <i>Peter Oostrom</i> ) 16:15 – 16:45	

Get together on Tuesday evening with Dean ITC – Prof. *Freek van der Meer, Tom Loran* (Bardot Restaurant, Langestraat 47C, 7511 HB, Enschede (tel: 053 - 303 40 20), from 18:00 hrs onwards)

Week 2: Drone rules and regulations, flight planning and execution, collecting DGPS ground control points, intro photogrammetry and OpenDroneMap

Monday (09-Oct) Room LA 2109	Tuesday (10-Oct) Room LA 2109	Wednesday (11-Oct) Room LA 2109	Thursday (12-Oct) Room LA 2109	Friday (13-Oct) Room LA 2109
Drone rules and regulations - EASA Open Category A1 / A3: DDA Chapters 1 (Aviation regulations and airspace restrictions) ( <i>Gabriel Parodi</i> )	Drone rules and regulations - EASA Open Category A1 / A3, DDA Chapter 3 (UAS general knowledge) ( <i>Gabriel Parodi</i> )	Drone rules and regulations - EASA Open Category A1 / A3, DDA Chapter 4 (Operational procedures and planning) ( <i>Gabriel Parodi</i> )	Test exam on drone rules and regulations	Collected data quality check and DGPS data processing
			Transit to field location and flight – DGPS data collection preparation	Introduction to drone photogrammetry and Open Drone Map (ODM): 'OpenDroneMap

			<i>(Gabriel Parodi, Timothy Roberts, Camilla Marcatelli)</i>	– The missing Guide’ (P. Toffanin) <i>(Yolla Al Asmar, Bashar Alsadik)</i>
Drone rules and regulations - EASA Open Category A1 / A3: DDA Chapter 2 (human factors) <i>(Gabriel Parodi)</i>	Getting familiar with the drone: DJI Phantom 4 Pro V2.0 and additional software tools <i>(Gabriel Parodi, Timothy Roberts)</i>  (note: drone from MU, still at ITC, will be used)	Flight planning: prepare flight plan, camera setting, flying tips, ground control points (DGPS) <i>(Gabriel Parodi, Timothy Roberts, Camilla Marcatelli)</i>	Flight execution and DGPS control point collection <i>(Gabriel Parodi, Timothy Roberts, Camilla Marcatelli)</i>	Install ODM, using script developed & introduction to Docker desktop - <i>(Bas Retsios)</i>
Reading and self-study	Reading and self-study	Reading and self-study	Room: LA 1208 14:30 – 16:30 Meeting Ethiopian Staff, (co)Promotors and EENSAT PhDs	

Week 3: Drone data processing, data visualization, final course (material) development and prepare audio – visual materials, finalize course in LMS

Monday (16-Oct) Room LA 2109	Tuesday (17-Oct) Room LA 2109	Wednesday (18-Oct) Room LA 2109	Thursday (19-Oct) Room LA 2109	Friday (20-Oct) Room LA 2109
ODM – create uncontrolled photomosaic – check ground control points and quality report <i>(Yolla Al Asmar, Bashar Alsadik, Ben Maathuis)</i>	Review of other processing options in ODM <i>(Yolla Al Asmar, Bashar Alsadik, Ben Maathuis)</i>	Data Visualization (QGIS / ILWIS386 – 3D visualization) <i>(Yolla Al Asmar, Bashar Alsadik, Ben Maathuis)</i>	Preparing course and audio visual materials <i>(Job Duim, Ivan Oliveira, Janet King, Ben Maathuis)</i>	Upload all materials in LMS, create final course layout / content <i>(Job Duim, Ivan Oliveira, Janet King, Ben Maathuis, Yolla Al Asmar)</i>

Create ortho image, DSM and DTM, using ground control points, check quality report <i>(Yolla Al Asmar, Bashar Alsadik, Ben Maathuis)</i>		Preparing course and audio visual materials <i>(Ben Maathuis, Janet King, Job Duim)</i>		Presentation of the course developed <i>(All involved staff)</i>  Hand over certificate <hr/> Farewell
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Coordinating staff: Ben Maathuis, Chiel Stroeven

Remark: eventual attendance of EENSAT PhDs and if feasible using hybrid setup to include interested staff in Ethiopia

**Train the trainer program for Senior staff – 3 week (20-Nov to 08 Dec 2023) - Batch 2:**

6 staff from 3 partner universities, Bahir Dar (BDU), Mekelle (MU) and Addis Ababa Universities (AAU) (2 each). Provisional timing: Mid November – begin December 2023.

Ethiopian visitors:

- Daniel Ayalew Mengistu - BDU
- Andargachew Abeje Derseh - BDU
- Daniel Teka - MU
- Atkilt Girma - MU
- Abiy Zegeye - AAU
- Aklilu Amsalu Taye (AAU)

Accommodation: ITC International Hotel, Enschede

The objectives during the 3 weeks course are:

- Introduce course participants to current geo-information (cloud) processing capabilities applying Python in a Jupyter Notebook environment, incorporating various site packages, relevant for agricultural transformation;
- Creating value added Apps to be used as example for hackathon to build new software applications;
- Introduction to Geo-statistics using R.

Week 1: Introduction to Python scripting, use of site packages, Jupyter notebooks and spatial geo-data processing

Monday (20-Nov)	Tuesday (21-Nov)	Wednesday (22-Nov)	Thursday (23-Nov)	Friday (24-Nov)
Welcome to ITC	Python for geodata processing using ILWISPy: Introduction to ILWISPy  Data visualization using ILWIS386 / QGIS <i>(Ben Maathuis)</i>	ILWISPy: Introduction to Remote Sensing and advanced image classification <i>(Ben Maathuis)</i>	ILWISPY: Introduction to time series data processing <i>(Ben Maathuis)</i>	ILWISPy: processing data from GEONETCast and other cloud services.  OpenEO, ILWISPY and SatPy <i>(Ben Maathuis)</i>
Introduction Python, site packages and Jupyter notebooks and use in education <i>(Ben Maathuis)</i>				
Software installation and Introduction to Python and Matplotlib – basic statistics <i>(Ben Maathuis)</i>				



Week 2: App development – create a weather forecasting App on your Android smartphone

Monday (27-Nov)	Tuesday (28-Nov)	Wednesday (29-Nov)	Thursday (30-Nov)	Friday (01-Dec)
From a notebook to a phone application – GFS weather forecast ( <i>Bas Retsios</i> )	App development as business opportunity (Valentijn Venus)	Creation of the GFS Web API ( <i>Bas Retsios</i> )	Development of an Android app for GFS-File ( <i>Bas Retsios</i> )	Development of an Android app for GFS-File (continued) ( <i>Bas Retsios</i> )
Jupyter notebook on Retrieval of GFS forecast ( <i>Bas Retsios</i> )	Installation web-server (Apache) with python scripting capability ( <i>Bas Retsios</i> )	Web client demo for the GFS ( <i>Bas Retsios</i> ) Short introduction to Java ( <i>Bas Retsios</i> )		How to use this example to organize a Hackathon? ( <i>Ben Maathuis</i> )

Week 3: Introduction to Geo-statistics using R

Monday (04-Dec)	Tuesday (05-Dec)	Wednesday (06-Dec)	Thursday (07-Dec)	Friday (08-Dec)
Introduction to Linear Regression, Spatial Data and Deterministic Interpolation ( <i>Frank Osei</i> )	Spatial data classes ( <i>Frank Osei</i> )	Stochastic spatial processes ( <i>Frank Osei</i> )	Stochastic spatial interpolation ( <i>Frank Osei</i> )	Mini project
Exercises: Introduction to R and Regressions ( <i>Frank Osei</i> )	Exercises: Spatial data classes / spatial splines and inverse distance weighted interpolations ( <i>Frank Osei</i> )	Exercises: Semi variogram ( <i>Frank Osei</i> )	Exercises: Simple and ordinary kriging ( <i>Frank Osei</i> )	Hand over certificate and Farewell drink

Coordinating staff: Ben Maathuis, Chiel Stroeven

Remark: eventual attendance of EENSAT PhDs and if feasible using hybrid setup to include interested staff in Ethiopia