# The Bathymetry, Hydrology and Topometry Laboratory

It is equipped with ultra-performing bathymetry / hydrology / topography systems which may be used for:

- analyzing the evolution of the river sections from a hydro-morphological point of view;
- generating bathymetric maps;
- generating 3D-models of terrains;
- monitoring river-flow parameters (flows, flow rates);
- high-precision topographic applications;
- determining land settlement;
- sediment transport;
- modelling river flows;
- determining flood risk and natural hazards associated with them.

# The Bathymetry, Hydrology and Topometry Laboratory

## Members:

- **Lecturer dr. eng. Maxim ARSENI**

https://dcfm.ugal.ro/index.php/membri/2-uncategorised/46-arseni-maxim)

- **Lecturer dr. eng. Octavian ROMAN**

https://www.transfrontaliera.ugal.ro/index.php/ro/despre/departamente/departament-2

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Octocopter drone Predator 1115 Octa with LIDAR system***

## Uses:

- high-quality video recordings and pictures;
- multispectral images;
- air quality;
- georeferenced frames;
- LiDAR georeferenced point clouds;
- thermal images and video recordings;
- precision orthophotoplans;
- MDT / MDS;
- temperature, humidity, atmospheric pressure, PM 1.0, PM2.5, PM10, O3, NO2, CO, SO2, CxHx, HCl, H2S, NH3;
- spatial monitoring by using UAV technologies;
- biodiversity monitoring;
- spatial analysis of flood risk and hazard areas;
- making MDTs by using UAVs;
- high-precision topographic applications.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Octocopter drone Predator 1115 Octa with LIDAR system***

## Technical Specifications:

- battery-free flight time: approx. 60 minutes;
- maximum flight time with built-in lidar equipment: 40 minutes;
- telemetry 20km;
- accessories: thermal camera, topography camera, LiDAR sensor;
- multispectral camera, air quality sensor.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Electronic topographic level TOPCON DL-501***

## Uses:

- high-precision level ratings;
- high accuracy measurement of level differences;
- leveling applications for roads / dams;
- accurate determination of water level on lakes /canals/ rivers;
- high-precision measurement of dimensions.

## Technical Specifications:

- accuracy H using invariant sight: 0.2 mm, 0.3 mm (standard deviation, 1 km double run);
- H accuracy using standard sight: 1.0 mm (standard deviation, 1 km double run);
- accuracy D: 15 mm to 30 m (standard deviation, 500 ppm for distances up to 50 m, 1,000 ppm for distances greater than 50 m).

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Total 3D scanning station Focus Plus S-350 headlight***

## Uses:

- georeferenced point cloud;
- visible images;
- three-dimensional images;
- long- and medium-range applications;
- topographic measurements;
- geology and land monitoring;
- civil engineering and infrastructure;
- excavations;
- tunnels;
- urban modeling and mobile scanning;
- related fields: civil engineering and infrastructure, archeology, interior surveying, monitoring and protection of cultural heritage.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Total 3D scanning station Focus Plus S-350 headlight***

## Technical Specifications:

- measured distance range: 0.6 - 350m;
- maximum no. of point/sec: 2 million points / sec;
- noise range: ± 1mm; - fast scan time: <3min.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Base + Rover terrain GPS set, with rugged tablet terrain***
***TOPCON HIPER HR Pump***

## Uses:

- coordinate points established with subdecimetric precision;
- static recordings;
- RTK recordings;
- coordinate points for GIS;
- topographic measurements;
- geology and terrain monitoring;
- civil engineering and infrastructure;
- excavations;
- medium- and high-accuracy GIS and geospatial determinations.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Base + Rover terrain GPS set, with rugged tablet terrain***
***TOPCON HIPER HR Pump***

## Technical Specifications:

- the most advanced GNSS board with 452 universal channels, and reception of all available GNSS systems;
- GSM super sensitive modem, efficient UHF modem, Bluettooth, LongLink, Wi-Fi, static measurements, RTK, network or rover-base operation, efficient replaceable batteries.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Road profile system TOPCON RD-M1 Scanner***

## Uses:

- georeferenced point cloud;
- travel trajectory;
- TIN model;
- DTM / DSM model;
- high-precision coordinate points;
- transverse and longitudinal profiles;
- volumes to be added or shaved off a road or dike;
- constant data flow while driving a car.

## Technical Specifications:

- mobile scannig of longitudinal roads/ protective dams profiles with a speed of up to 60 km / h;
- millimeter accuracy of point determination;
- intuitive and low-cost installation providing precise conditions for measuring the scanned area;
- fast long-distance scanning without a costly closing of lanes.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Mobile scanner with camera and capture distance up to 100m***

***TOPCON IP-S3***

## Uses:

- georeferenced point cloud;
- travel trajectory;
- TIN model;
- DTM / DSM model;
- high precision coordinate points;
- visible panoramic images;
- RAW data; urban monitoring applications;
- monitoring river banks or canals;
- obtaining georeferenced point cloud and generating 3D models of the surface/terrain;
- calculation of filling and digging volumes.

## Technical Specifications:

- IP65 / IP67 resistance;
- scan with over 700,000 pct / sec .;
- GNSS positioning system with a 3600 mm accuracy range;
- horizontal range up to 100 m;
- continuous scanning up to 8 hours.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Multibeam interferometric echosounder, GeoAcoustics GeoSwath 4R 500kHz***

## Uses:

- shallow water hydrographic surveying;
- inspection of underwater infrastructures;
- detection and mapping of objects and debris;
- detailed dredging and construction surveys;
- environmental studies and habitat mapping;
- mapping of harbours, inland waterways and shipping channels.

## Technical Specifications:

- ultra high resolution swath bathymetry;
- IHO SP-44, special order compliant;
- co-regstered geo-referenced side scan;
- frequency version: 500 kHz;
- up to 12 times water depth coverage;
- 240° view angle;
- dual transducer set-up with versatile mounting options;
- full software solution included: data acquisition, calibration processing, Interface presentation for all standard peripheral sensors;
- software packages.

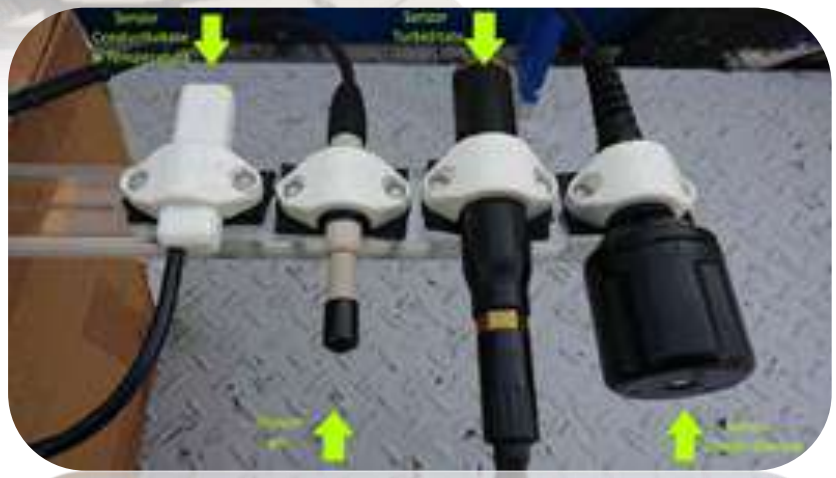
# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Hydrometric station - NAV-HYDROMET-10***

## Uses:

- water level record;
- flood prediction and management;
- water quality management;
- environmental monitoring;
- water level measurement;
- wind speed measurement;
- humidity measurement;
- wind direction measurement;
- barometric pressure measurement;
- determination of total solar radiation;
- visibility measurement;
- atmospheric temperature measurement.

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Hydrometric station - NAV-HYDROMET-10***

## Technical Specifications:

- water level measurement in m, maximum accuracy 0.015 m;
- wind speed measurement from 0.01 to 60 m/s, with an accuracy of ±3% (at 40 m/s);
- wind direction measurement in degrees, continuous measurement range 360°;
- atmospheric temperature measurement with ±0.3 °C accuracy (at 20 ° C);
- humidity measurement measuring range 0-100 %RH, with accuracy ±2 %RH (at 20 °C);
- barometric pressure measurement range from 600 to 1100 hPa, with maximum accuracy of ±0.5 hPa (at 25 °C);
- determination of total solar radiation, measurement range from 0 to 1600 W/ m2, ISO 9060 Second Class standard;
- visibility measurement from 5 m to 75000 m, maximum accuracy ±8% (up to 600 m).

# The Bathymetry, Hydrology and Topometry Laboratory

## Equipment:

***Suspended sediment instrument, AQUATEC AQUAscat 1000S***

## Uses:

- Surveys;
- observation of load and mean particle size;
- sediment transport studies;
- profile observation of suspended sediment concentration over a series of depths within a water column to give valuable knowledge on the sediment processes taking place;
- profile observation in a single location to produce a time series,
- transects taken to observe spatial variability;
- horizontal or vertical profiling.

## Technical Specifications:

- uses acoustic backscatter method;
- 4 fixed transducers;
- profiles of <1 m to 10 m;
- vertical resolution of 2.5 mm to 4 cm;
- deployment in fresh and seawater to 1000 m depth;
- internal batteries and memory for autonomous deployment;
- integral temperature and pressure sensors.