

SpeedUP



Call for solutions “Smart flow”

Ordering party	Administration de la gestion d'eau (Water Management Authority)
Objectives of the call for solutions	The objective of the call for solutions is to continuously analyse the still and moving images of various cameras in order to obtain a usable surface flow velocity and calculate an average velocity and the discharge of the cross section of the river.
Type of solution required	Development of a solution allowing for the metering of gauge boards and the determination of flow rates.
Selection criteria	/
Standards to be met	Not applicable
IP and other details	The algorithm, solution, results as well as the data generated are protected by the relevant intellectual property and copyright laws and will remain the exclusive property of the Water Management Authority for the duration of the project and beyond. Unless otherwise specified, the Water Management Authority grants no license or authorization with regard to

	the intellectual property rights, which it holds in respect of the project. Therefore, all sharing of the algorithm, solution, results and data in regard of the project is strictly prohibited unless specifically authorized by the Administration. All disputes concerning this project shall be governed by Luxembourg law, and the courts of the Grand Duchy of Luxembourg shall have exclusive jurisdiction to hear and settle such disputes.
Deadline for submission of the offer	19 th June 2023
Schedule	Questions should be sent until 4 th June 2023
Contact for questions and for the submission of offers	SmartFlow@eau.etat.lu

**Description of the
problem /
challenge**

The Water Management Authority maintains a network of monitoring stations on Luxembourg's streams and rivers. This network is constantly being expanded and modernised. Currently, data is collected at 42 stations.

Based on these data, a water balance model is run to calculate forecasts (water level, discharge).

As with all forecasts, the quality, station coverage and data resolution of the input data is crucial. By now, discharges are determined by manual discharge measurements for the whole spectrum of occurring water levels, so on an irregular and long-term base. In order to improve and validate the related rating curves the idea came up to develop a solution of getting high resolution discharge data, similar to already existing market solutions but more on a camera-based system to combine the advantages of recording pictures of the actual on-site situation.

The work consists of continuously analysing the still and moving images of various cameras in order to obtain a usable surface flow velocity and calculate an average velocity and the discharge of the cross section of the river. This data will be used to validate measured time series over the whole water level measurement spectrum.

All data must be provided with corresponding time stamps.

The data are divided into two groups:

Water levels

The water level values at the staff gauges visible in the pictures have to be determined and translated into consistent water level time series with a resolution of 0,5cm.

Flow velocity

Measure the surface flow velocity of the water in different sections using moving images and video files.

Calculate a mean velocity on the basis of the k-factor (roughness).

Calculate the discharge values.