

WASTEWATER-TALK

International exchange

Episode 05 Mar. 2022

Live Flow Monitoring

Klaus Jilg & Siqi Tong

Wastewater-talk

monthly new theme

International exchange

Wastewater is an issue
that absolutely needs
to be clarified



Klaus Jilg

Expert on odor and
other wastewater issues

- Monthly a new topic for discussion
- 2 alternative meeting times from April on
- Exchange of knowledge in wastewater
- Passion sharing
- Get to know you!
- [About Wastewater-Talk](#)

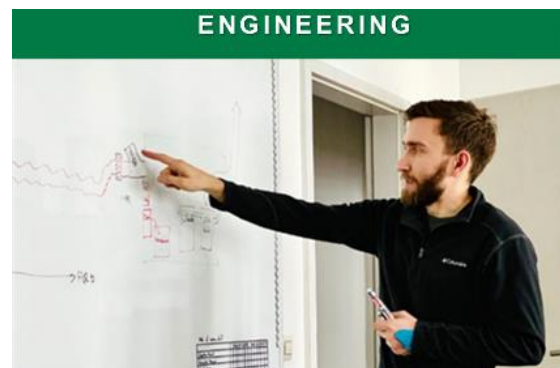


Abwassertalk:

<https://www.podcast.de/podcast/795779/abwassertalk>

Episode	Topic	Content	Time (CET)
01	Rat Control in Drainage Systems	Environmental risks & application of waterproof baiting station in drainage systems	05 Nov. 21 10:00
02	Drainage System Inspection (Drone & Boat)	Innovative inspection of drainage systems using drone and camera-equipped boat	02 Dec. 21 10:00
03	Extraneous Water Entrance Prevention	Impacts of extraneous water & countermeasures?	13 Jan. 22 10:00
04	Indirect Discharger Cadaster Investigation	How to easily obtain full supervision over indirect discharger in your region?	03 Feb. 22 10:00
05	Live Flow Monitoring in Drainage Systems	Why is it so important to know the live-flow in our drainage system?	03 Mar. 22 10:00
06	Exhaust Air Treatment in Wastewater Management	Odour treatment through external equipments	07 Apr. 22 10:00
07	Sulfide Balance in Drainage Systems	Automatic calculation of sulfide balance & introduction to SULFIDUS	05 May 22 10:00
08	Special Episode: IFAT Munich 2022	What is new at the IFAT this year?	02 Jun. 22 10:00

since 1990



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since 2000



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PRODUCTS



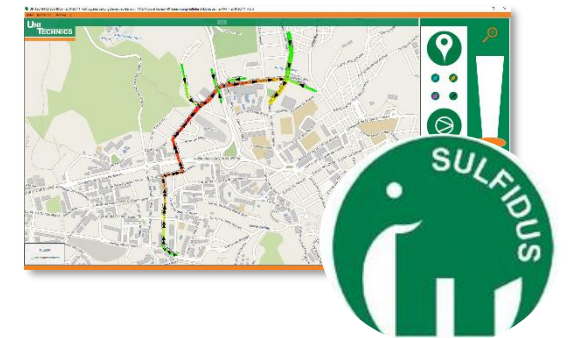
Engineering Consulting



Indirect Discharger Investigation



Sewer System Inspection



Sulfide Balance SULFIDUS



Odour & Corrosion



Extraneous Water Seal



Dosing & Exhaust Air Treatment



Rat Control



Live Flow Monitoring

- An essential procedure to collect data for evaluating and characterizing wet-weather and dry-weather flow conditions in sanitary sewer collection system
- Real time use of the data for supporting operational decision-making/optimization and in-time maintenance activities

Level Measurement

- the distance between flow surface and sensor is recorded using level measuring devices.

Flow Measurement

- quantification of fluid movement through a pipe for the purpose of monitoring (e.g. determining the flow rate) and control (e.g. flow rate limitation)

System operators and utilities adopt **technological advances**

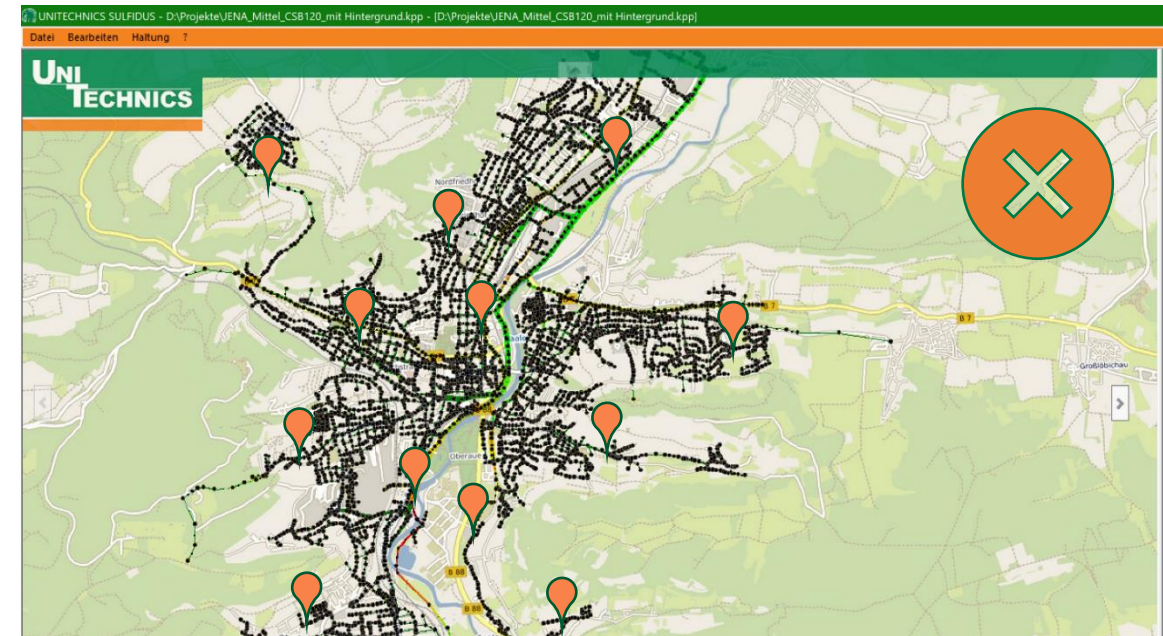
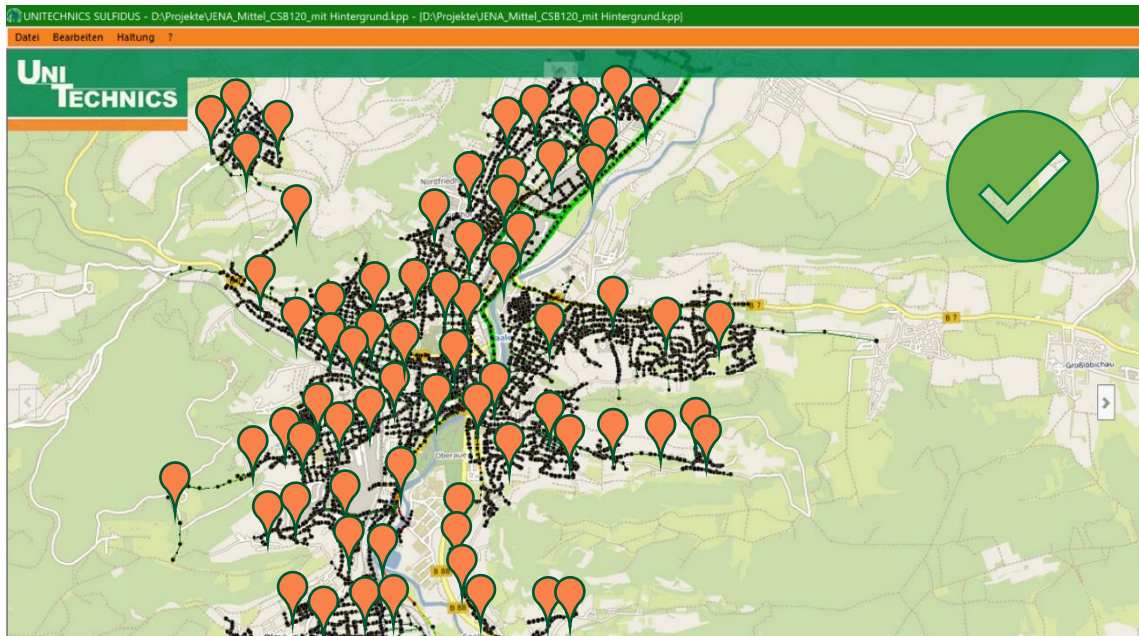
→ data driven decision-making

→ improvement of operational efficiency

Technological advances

- Low cost sensors and data storage
- Connectivity to IoT for component operation and monitoring
- Faster data communication through wireless networks
- Development of user interface / dashboards

Large-scale use of level measurements vs. Small-scale use of flow meters



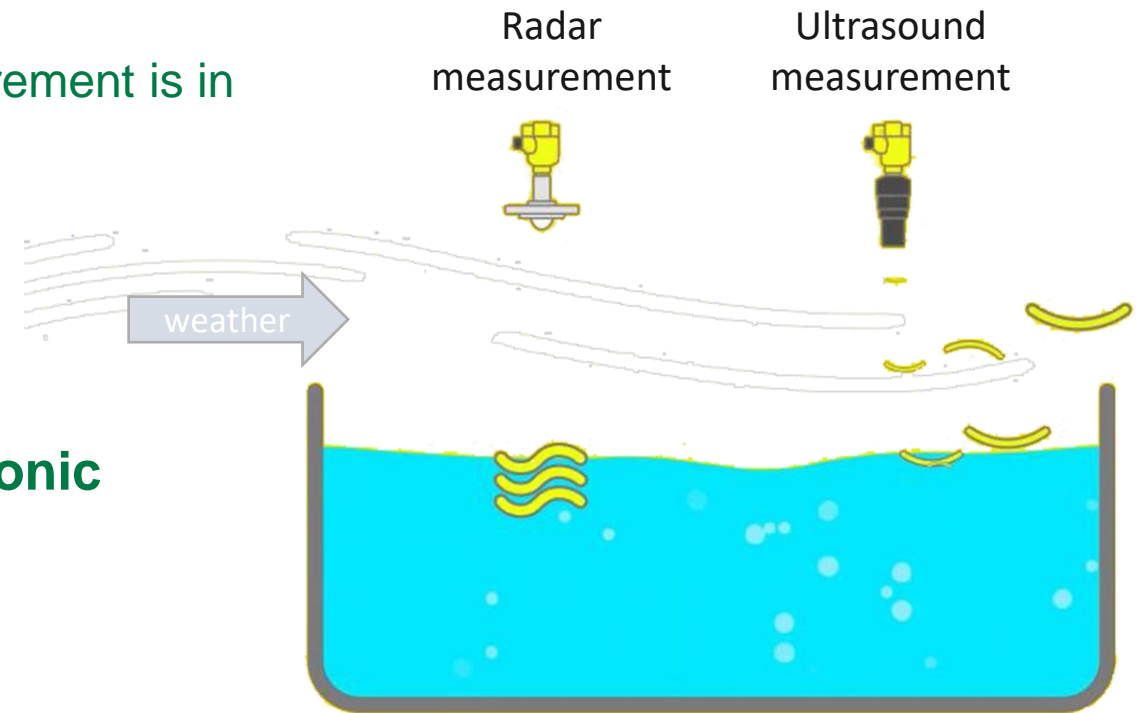
→ Many simple & cheap level measurements offer a **more comprehensive overview** than a few complex & expensive flow measurements!

Differences between radar and ultrasound

- Electromagnetic waves vs. sound waves
- Compared to ultrasonic measurement, radar measurement is in the high-frequency range
- Stronger signal focusing due to the higher frequency
- Reduction of the influence of interference signals

Advantages of radar measurement over ultrasonic

- No influence from temperature fluctuations
- No influence from contamination of the sensor
- Insensitive to gas or pressure
- No influence by air currents



Source: Vega

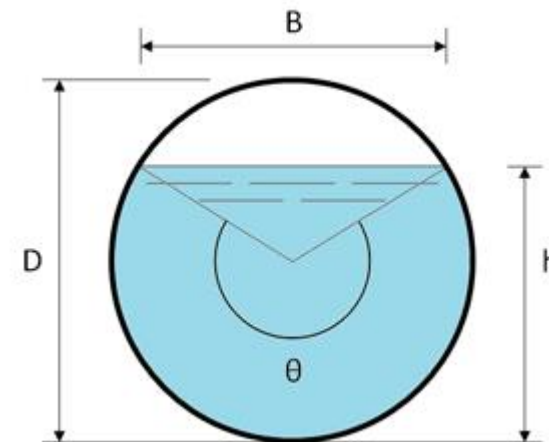
Installation of the measuring devices

- Use in sewage shafts & sewers or over open channels
- Entry into shafts is not necessary
- Optimum conditions of use: distance to the sole approx. 1.0 m
- Larger distances also possible (to be estimated on site)

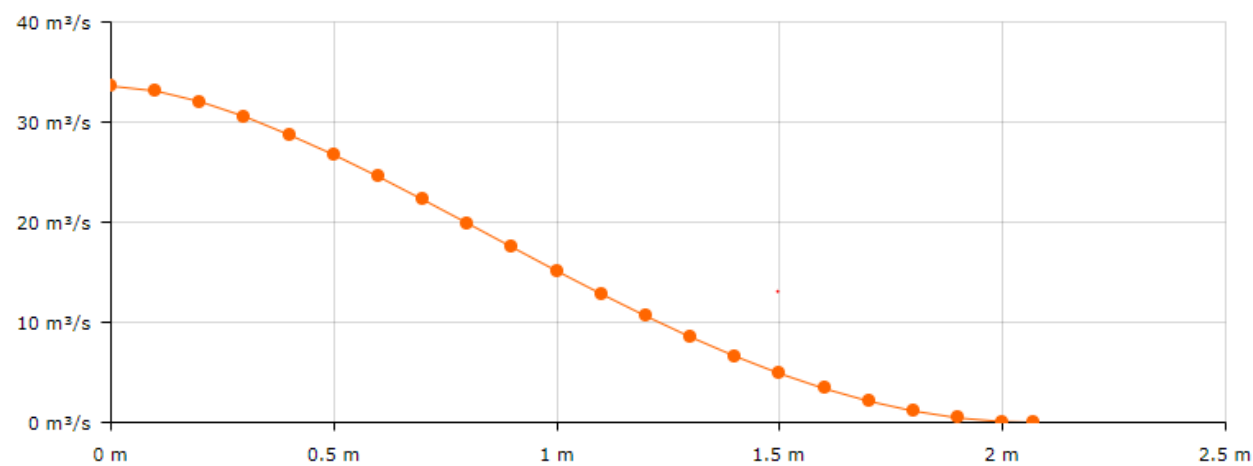
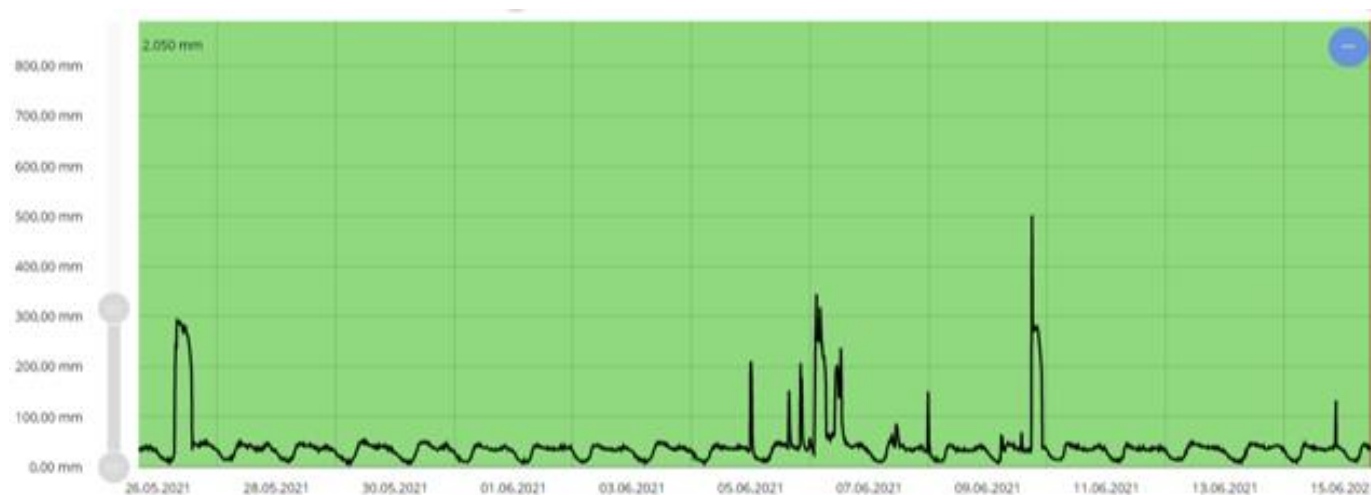


Considerations for flow rate calculation

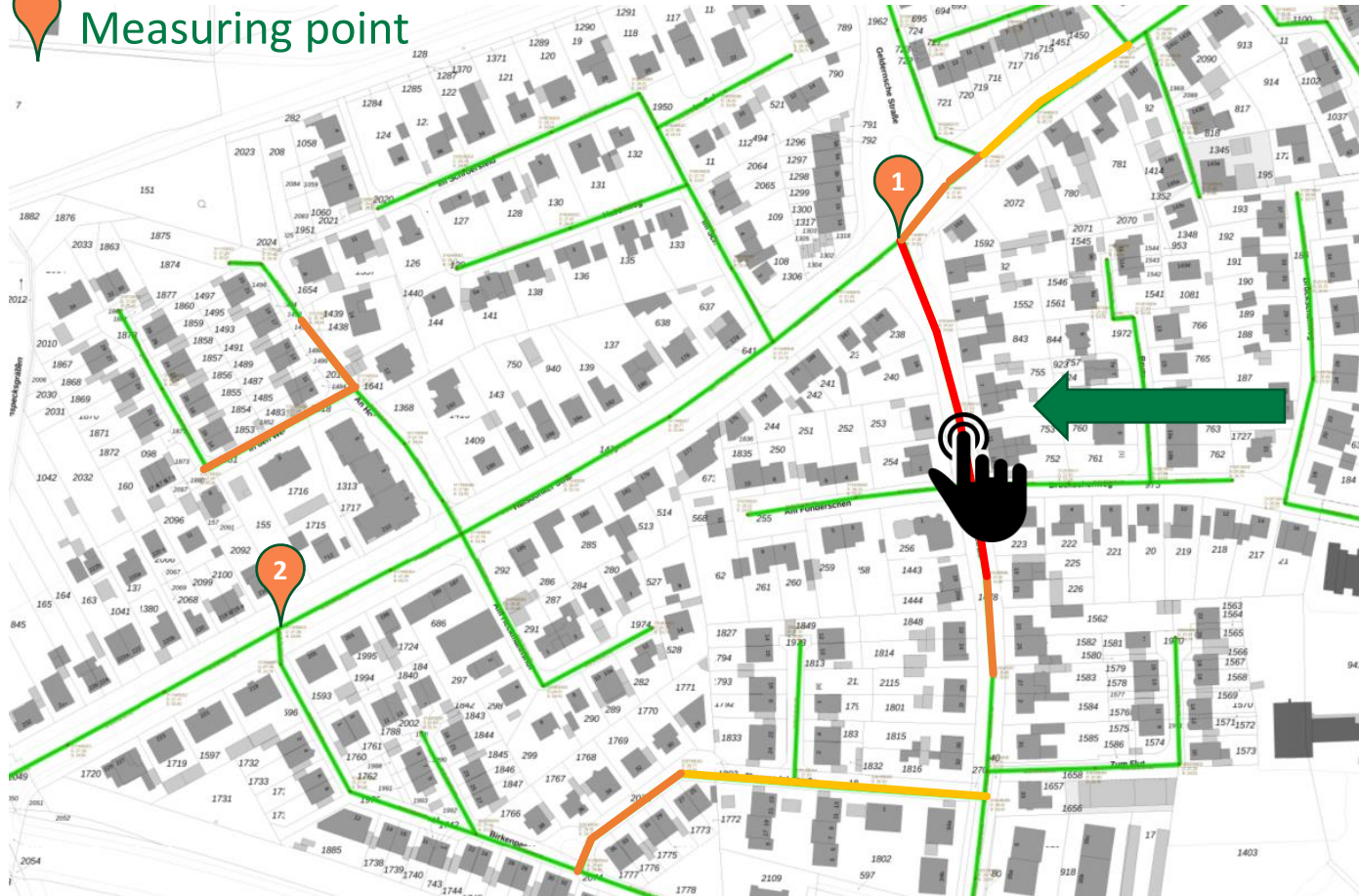
- Material of sewer pipelines / channels
- Dimensions of sewer pipelines / channels
- Bottom slope
- Hydraulic calculation



$$\rightarrow V = \left(\frac{8g}{\lambda}\right)^{\frac{1}{2}} R_h^{\frac{1}{2}} I_o^{\frac{1}{2}}$$



 Measuring point



Attribut	Wert
Grunddaten	
Uhrzeit	01.04.2021 10:28 Uhr
Haltungsname	101602
Ablaufschacht	3185S008
Zulaufschacht	3185S009
Länge	52 m
DN	250
Profil	Kreis
Material	STZ
Gefälle	2,1 ‰
Hydraulik (Jetzt)	
Schmutzwasserdurchfluss	5 l/s
Grundwassereintrag	1 l/s
Niederschlagseintrag	10 l/s
Ermittlungsmethode	Berechnet
Niederschlag aktuelle Stunde	2 mm
Auswertungen	
Zur historischen Haltungsauswertung	

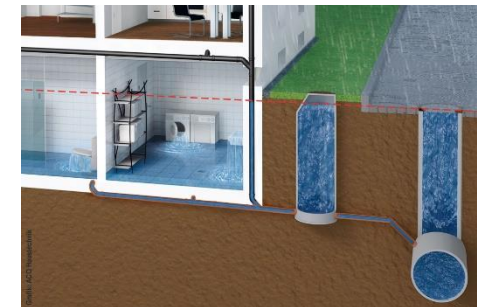
Optimization of sewer system operation

- Rainwater retention basins
- Stormwater overflows

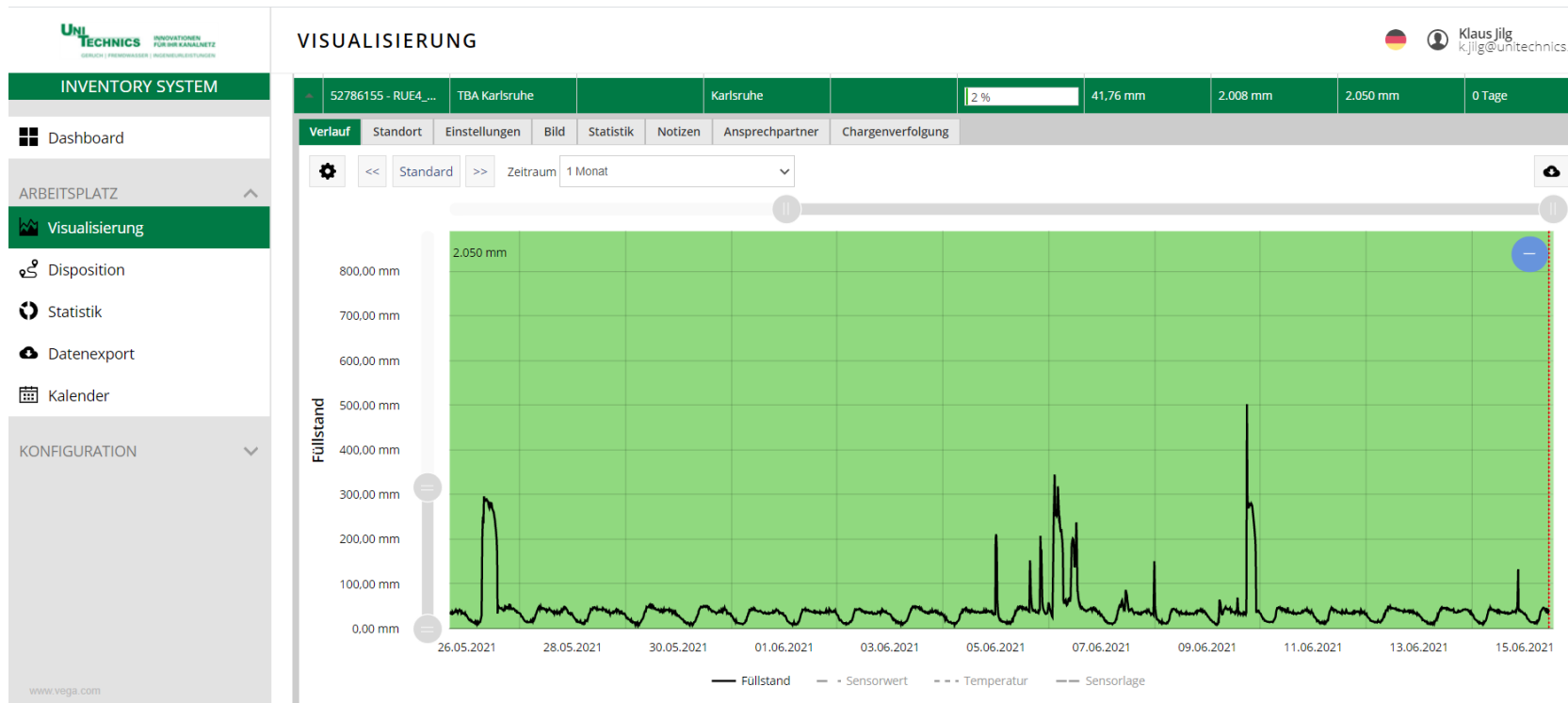


Recognition of sewer network risks

- Extraneous water intrusion
- Indirect discharger
- Backflow detection

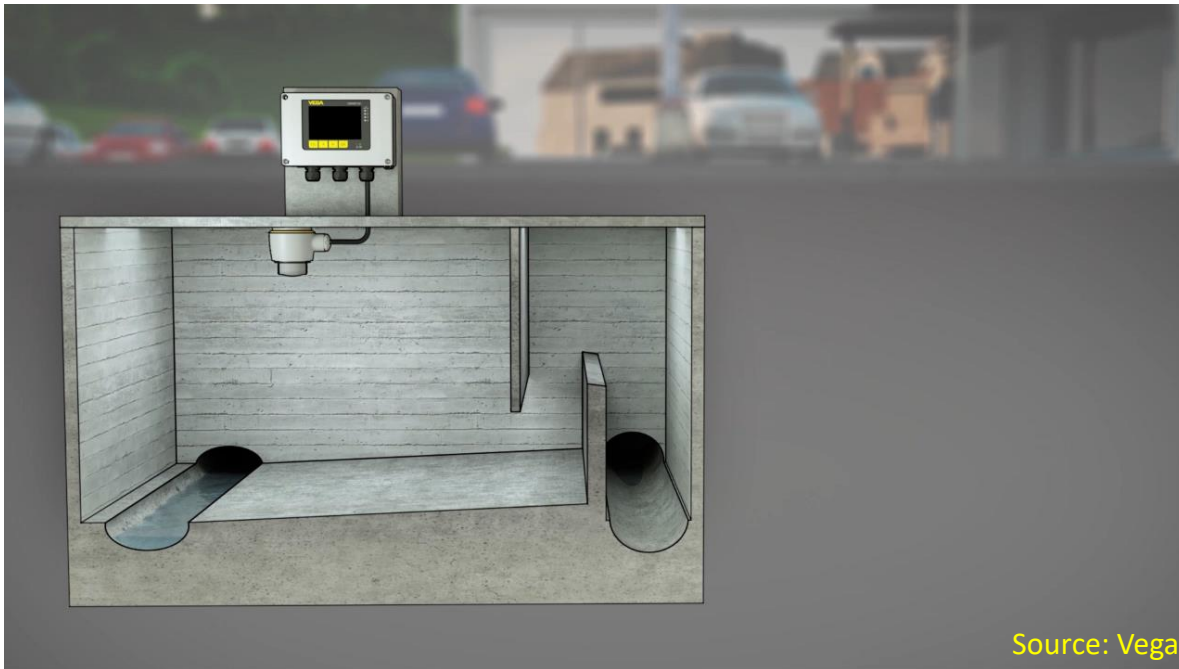


Analysis of extraneous water flow



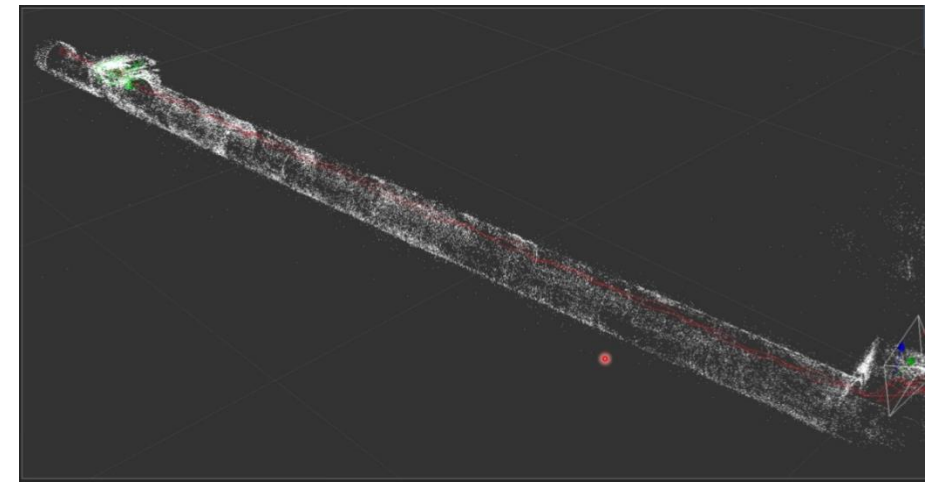
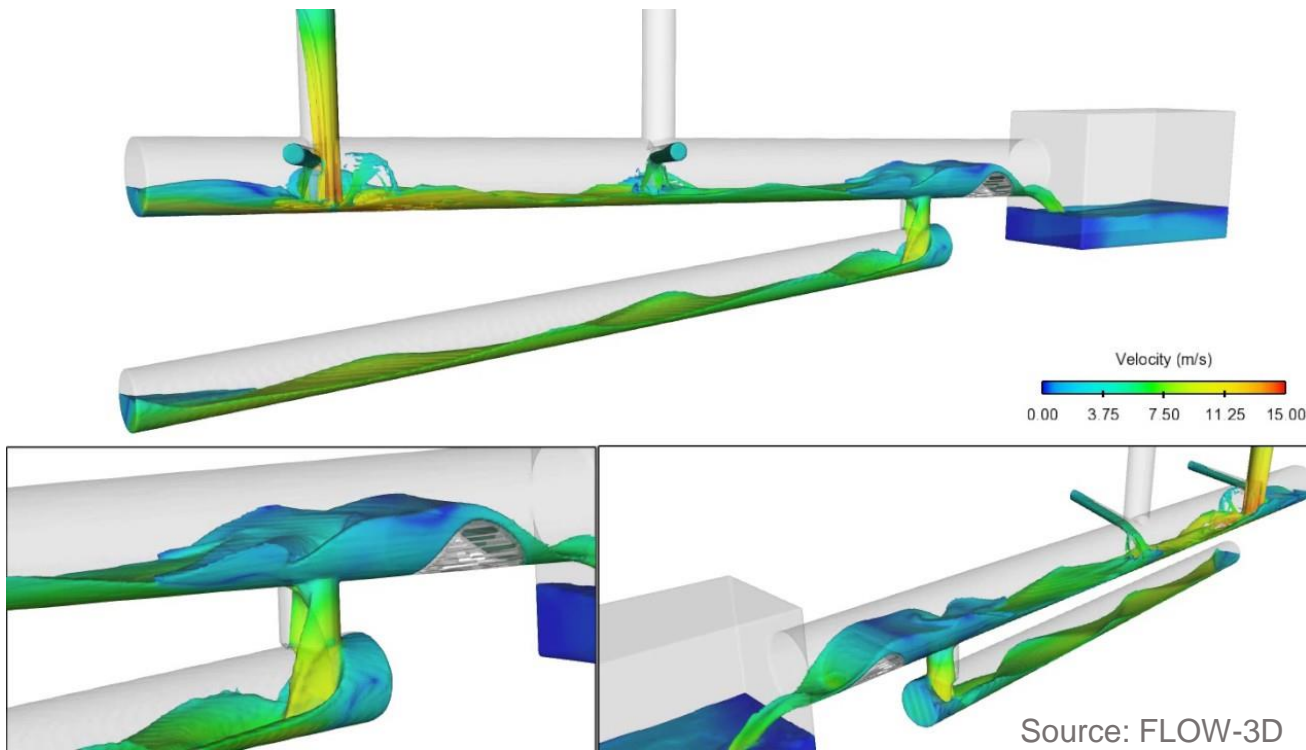
➤ **Wastewater-Talk Ep. 03** [Extraneous water prevention](#)

Odor control dosing campaign



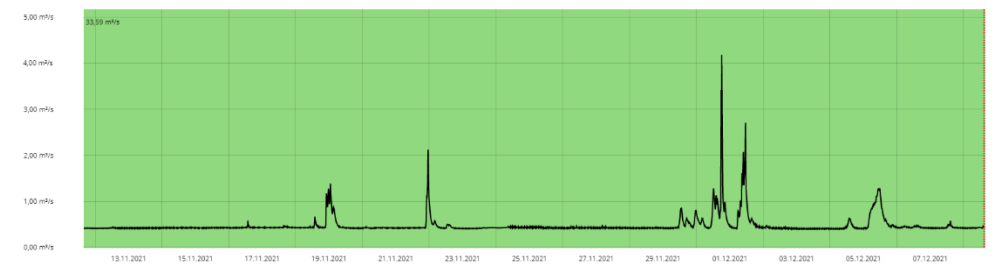
➤ **Wastewater-Talk Ep. 07 on 5th May [Sulfide balance](#)**

Hydrologic condition simulation



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Sewer flow issues & Flow monitoring in your country?

- A thermometer and realtime clock encased in a stainless-steel housing and weighing approximately 3g
- Recordings taken at a user defined rate and stored in the form of temperature values as a histogram
- Application in water level measurement:
 - Temperature differences between air and (waste)water
 - Data interpretation from temperature to water levels!



- More information to iButton: <https://i-button.co.uk/>
- Related reading: [The use of low cost “iButton” Temperature Logger Arrays to Generate High Spatial Resolution Tidal Inundation Regime Data](#)

Thank you!

See you next month
on 7th April

Ep. 06 Exhaust Air Treatment



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