



DHI SOLUTION

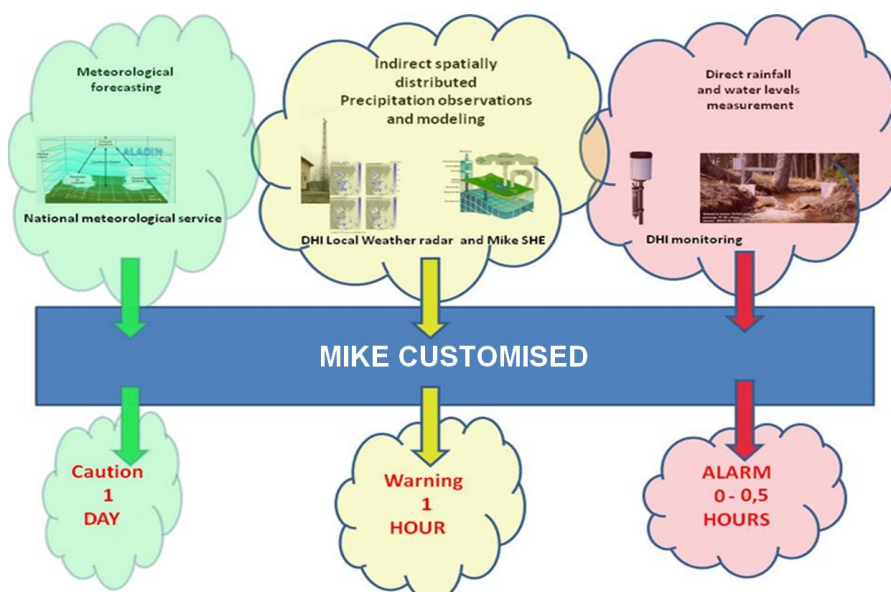
# LOCAL FLASH FLOOD WARNING SYSTEM

An integrated and flexible system

## LOCAL FLASH FLOOD WARNING SYSTEM BASED ON MIKE CUSTOMISED BY DHI

Conventional flood warning systems mainly focus on discharge predictions in the main rivers. However, local floods in smaller streams and tributaries (not generally covered by conventional warning systems) may cause a large amount of damage – particularly in urban areas. Our Local Flash Flood Warning System considers the catchment area as a whole – including flood plain and tributaries. It uses a combination of data processing, modelling and communication tools to give you the timely and accurate forecasts required to aid in proper decision making. Based on our MIKE CUSTOMISED by DHI framework, our flexible Local Flash Flood Warning System can be tailored to your specific needs.

Our Local Flash Flood Warning System is based on existing and newly developed components of our MIKE CUSTOMISED by DHI framework. The system utilises a large variety of input data, sophisticated mathematical models, and advanced hydrological analysis processes.



General scheme of the architecture of the Flash Floods Solution system. ©DHI

## SUMMARY

### CLIENT

- Regional administrations
- Municipalities
- Disaster risk managers
- Forecast and warning services
- Emergency response services

### CHALLENGE

- Difficulty forecasting local flash flood risks
- Inability to issue flood warning for areas not covered by traditional flood warning systems

### SOLUTION

An integrated and customisable Local Flash Flood Warning System utilising:

- radar-based precipitation forecast
- spatially distributed hydrological modelling
- data management
- alarm distribution
- publishing tools

### VALUE

- Ability to forecast local flash floods by covering the entire catchment area
- Frequent forecast updates appropriate for local dynamic rainfall events and storms
- Ability to perform one-dimensional (1D) hydrodynamic modelling on small streams
- Ready linkability to 1D and two-dimensional (2D) hydrodynamic modelling of floodplains
- Flexibility in terms of connecting to data sources

Fully automated, it combines ground-based observations with meteorological radar data from:

- existing meteorological radar devices (such as those owned by a country's national meteorological services)
- high-resolution local weather radar, such as the DHI Local Area Weather Radar (LAWR)

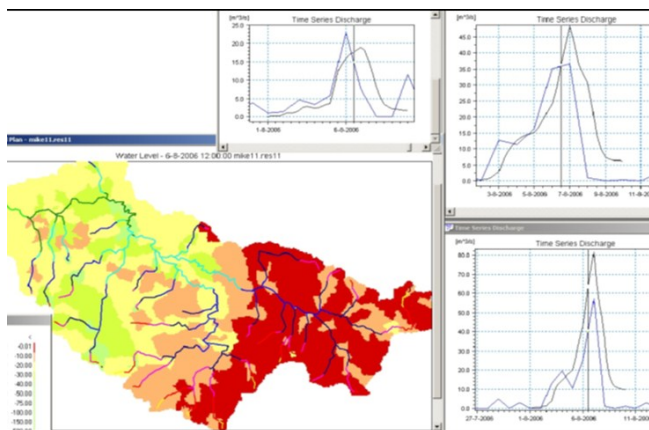
### MAIN BUILDING BLOCKS

The main building blocks of our Local Flash Flood Warning System include:

- MIKE CUSTOMISED – platform, tools, data conversions, pre- and post-processing, and scheduling
- DIMS.CORE – data download and management, alarm distribution, and optional DHI LAWR
- MIKE SHE – distributed rainfall-runoff and water balance model
- Dashboard Manager – web presentation and publishing

The rainfall-runoff model in MIKE SHE uses the data to simulate runoff hydrographs. Subsequently, our MIKE FLOOD software may then use the data from this model for one-dimensional (1D) and two-dimensional (2D) hydrodynamic simulation of flood routing in river channel networks and flood plains. Distributed deterministic modelling in MIKE SHE is also used to update initial conditions for the next run of the model. It is also used to simulate instantaneous soil retention capacity and water balance for the forecast period.

Based on MIKE SHE results, the system then generates maps indicating the relative danger of fast runoff occurrence in the model area. Next, the maps and extracted information are post-processed into user-friendly formats. This is then delivered via communication channels (such as SMS and Internet) to decision makers and the wider public. Our MIKE CUSTOMISED Dashboard Manager allows users to view the results directly and enables results to be published online.



Example of simulated flood danger map for 4,000 km<sup>2</sup> Sázava River catchment (Czech Republic). This map utilises user-defined areas and compares simulated (black) and measured (blue) discharges in three selected flow gauges.



June 2013 flood in Ceské Budejovice, Czech Republic. © DHI

### A WIDE RANGE OF CUSTOMISABLE FEATURES

The flexibility of our MIKE CUSTOMISED platform means the Local Flash Flood Warning System can be tailored to your specific needs. It includes:

- Time series analysis tools and visualisation of information – numerous data interfaces make it compatible with external data providers in real time
- GIS processing and visualisation with a range of built-in GIS providers, including Google Maps
- Visualisation of forecasts using charts, tables and flood maps for selected time steps
- DIMS.CORE (database) for data download, storage and management; alarm distribution; and plug-ins (for example, DHI LAWR data processing)
- SMS, email and web publishing to manage the dissemination of information, including data, maps, and reports
- Scenarios for comparative assessments of potential flood levels based on MIKE by DHI models or third party modelling tools
- Jobs scheduling that allows for the automation of user configured tasks
- Scripting tools based on the Python programming language, which enable users to develop their own tools
- Spreadsheets that allow for the creation of user defined analyses and reports
- Document storage to keep track of mission critical files and documents
- Metadata to qualify your data with descriptive information
- Indicators such as social, environmental and economic calculations to evaluate impacts in comparative scenario assessments
- Ensembles to assess uncertainty, allowing for more robust decisions that take numerous possible futures into account

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