

Application

Road Autonomous Meteorological station (SAM) enables on a specific road part to evaluate the road surface condition in relation to the climatic conditions.

SAM is installed in locations with frequent occurrence of dangerous road conditions (frost, ice, aquaplaning possibility) for the purpose of detecting the conditions or predicting their occurrence.

The goal of SAM installation is more efficient winter road maintenance and increased traffic safety in the monitored road section.

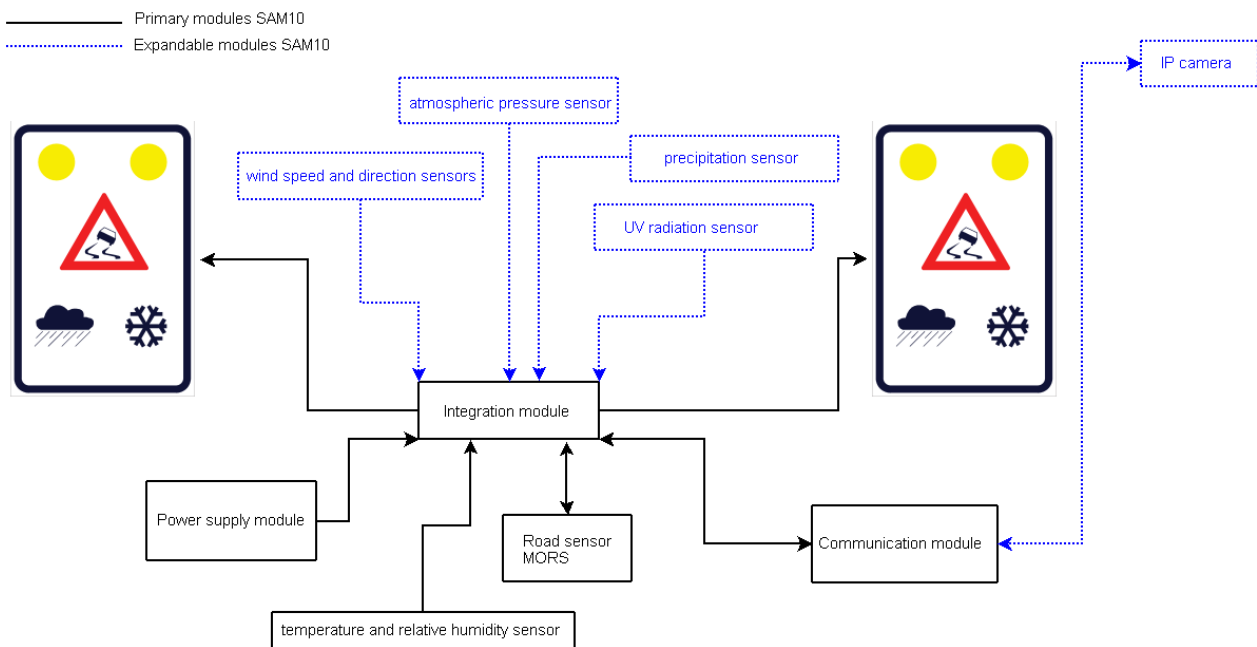
SAM output is information on the occurrence of the road hazardous condition:

- Delivered to the local authorized organization performing the road maintenance,
- Delivered to the drivers entering the hazardous section monitored by SAM system



In basic configuration, SAM system comprises of:

- MORS road sensor with the integration module, sensor of moisture content and air temperature,
- Traffic signs „skid hazard“ (A 8) in sheet metal reflexive design with meaning restricted to the additional table „Text“ (E13), completed with 2 warning „Interrupted yellow lights“
- Common road modules as per the connection type,
- Power supply module – power supply from batteries charged from photovoltaic panels or only from batteries charged by means of replacement method or LV lines.



SAM system module scheme

SAM core is the intelligent road sensor which measures with high accuracy and evaluates with sophisticated algorithm data required for the definition of the road surface condition.

Description

One of the main SAM features is its autonomous position. In the basic configuration, SAM consumption is very low and it can be supplied from PV panels or from periodically replaceable batteries. This applies for the meteorological station and for the applied traffic signs. Any available connection (GSM, Wi-Fi, radio network ...) can be used for the information transmission between the meteorological station, traffic signs, organization performing the road maintenance and servicing company.

SAM configuration is selected in order to minimize the investment and operation costs and simplify the legislation process for permitting the installation.

Established values and transmitted information

SAM differentiates the road conditions in 9 categories and evaluated the black ice risk in 5 categories. It also establishes the temperature of road surface freezing depending on the type and amount of salt application.

Information on the road condition is transmitted to the local authorized organization providing the winter road maintenance. SAM basic configuration includes information transmission by means of SMS messages, and optionally information can be recorded and visualized on PC.

Based on the ice hazard information, the instruction is issued for the traffic signs covering the monitored section. In such case, reflexive warning yellow lights flash on the signs until the dangerous condition is over.

SAM in basic configuration does not transmit periodic reports on the road condition into any superior information systems.

Basic measured values

Road surface temperature:	-40°C to +80°C, accuracy ± 0.1°C
Air Temperature:	-40°C to +60°C, accuracy ± 0.3°C
Air humidity:	0% to 100% RH, accuracy ± 1.5%
Freezing point temperature:	-20°C to 0°C
Road surface condition:	Dry, damp, wet, flooded, damp and covered with salt, wet and covered with salt, ice, snow, black ice
Black ice occurrence risk:	None, low, medium, high, very likely
Detected spread composition:	NaCl, MgCl, CaCl, urea, saltpeper, acetate, potassium



Installation and construction design

Meteorological sensors are installed on vertical column with horizontal beams in order to prevent mutual affects. The road sensor cuts directly into the bituminous road layer. The construction design fully enables using the options of the applied sensors and respects the respective standards and laws.

Technical Parameters

Dimensions of the switchboard cabinet:	500x400x230, specific dimension is specified by the selected equipment
Rated supply voltage:	12V DC
Power input:	Meteorological station <5W, two traffic signs <5W during warning, otherwise 0W
Scope of operating temperatures:	-40°C to +60°C
Air moisture content:	0% to 100% RH, non-condensing
IP protection min.:	54
EMC as per ČSN EN 55022, 61000	

Detailed data on the construction and technical parameters are specified in the descriptions of applied sensors and result from the specific power supply method and data transmission.



Maintenance and service

All elements of the SAM system in its basic configuration are designed to minimize the maintenance necessity in the installation location. The servicing includes the remote supervision over the SAM function, potentially periodic replacement of the batteries.

Extension options

As required SAM module can be extended with sensors measuring further meteorological data, potentially the supervision camera. Added elements affect the total SAM consumption and the amount of data transmitted. If required data can be transmitted to the superior systems (JSMIS ..).