



# AEROSPACE RECOMMENDED PRACTICE

ARP5533™

REV. B

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Superseding ARP5533A

Stationary Runway Weather Information System (In-Pavement)

## RATIONALE

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## 1. SCOPE

This SAE Aerospace Recommended Practice (ARP) covers the requirements for a Stationary Runway Weather Information System (referred to as the system) to monitor the surface conditions of airfield operational areas to ensure safer ground operations of aircraft. The system provides (1) temperature and condition information of runway, taxiway, and ramp pavements and (2) atmospheric weather conditions that assist airport personnel to maintain safer and more efficient airport operations. The system can be either a wired system or a wireless system.

## 2. APPLICABLE DOCUMENTS

FAA Advisory Circular 150/5300-13, Airport Design

## 3. TECHNICAL REQUIREMENTS

### 3.1 General Description

The basic system shall consist of four primary components (Figure 1).

1. Sensors, in-pavement surface sensor(s), subsurface probe(s), and atmospheric sensors, to monitor pavement surface conditions and atmospheric conditions at specific locations around the airfield. These sensors shall be connected by wire or fiber optic means to a field processing unit that will, in turn, pre-process the monitored conditions.
2. Field Processing Unit to report the measured information to a central computer (CC) at a central monitoring location on the airport using wire or wireless data transmission means or a hosted service using cellular, wireless or wired communications.
3. Central Computer or hosted service to disseminate the above information to users using industry standard computer networks and protocols. The central computer/hosted service shall have the ability to support remote access to the information via standard network communications.
4. Data Display to display all sensor data.

In-Pavement Runway Weather Information shall be displayed on a map, in tabular text and graphical formats using industry standard World Wide Web based browsers\*. Some vendors may offer additional applications specific to displaying the information from the system that may include supporting mobile devices or tablets.

### 3.2 In-Pavement Sensors

#### 3.2.1 Performance

The pavement sensor shall sense and electronically transmit primary surface information to the rest of the system for processing and dissemination. The sensor shall report pavement temperature, pavement status, chemical concentration, ice condition, and calculated freeze point of surface taking into account the applied deicing agent (if available). Passive sensor technology will require the field processing unit to be configured correctly for the chemical type of deicing agent that is being used.

NOTE: Some newer sensing technologies may not report a freeze point temperature but an alternative to let the user know of current surface condition.

If an active sensor is used, pavement status (wet/dry) and a freeze point of solution shall be reported.

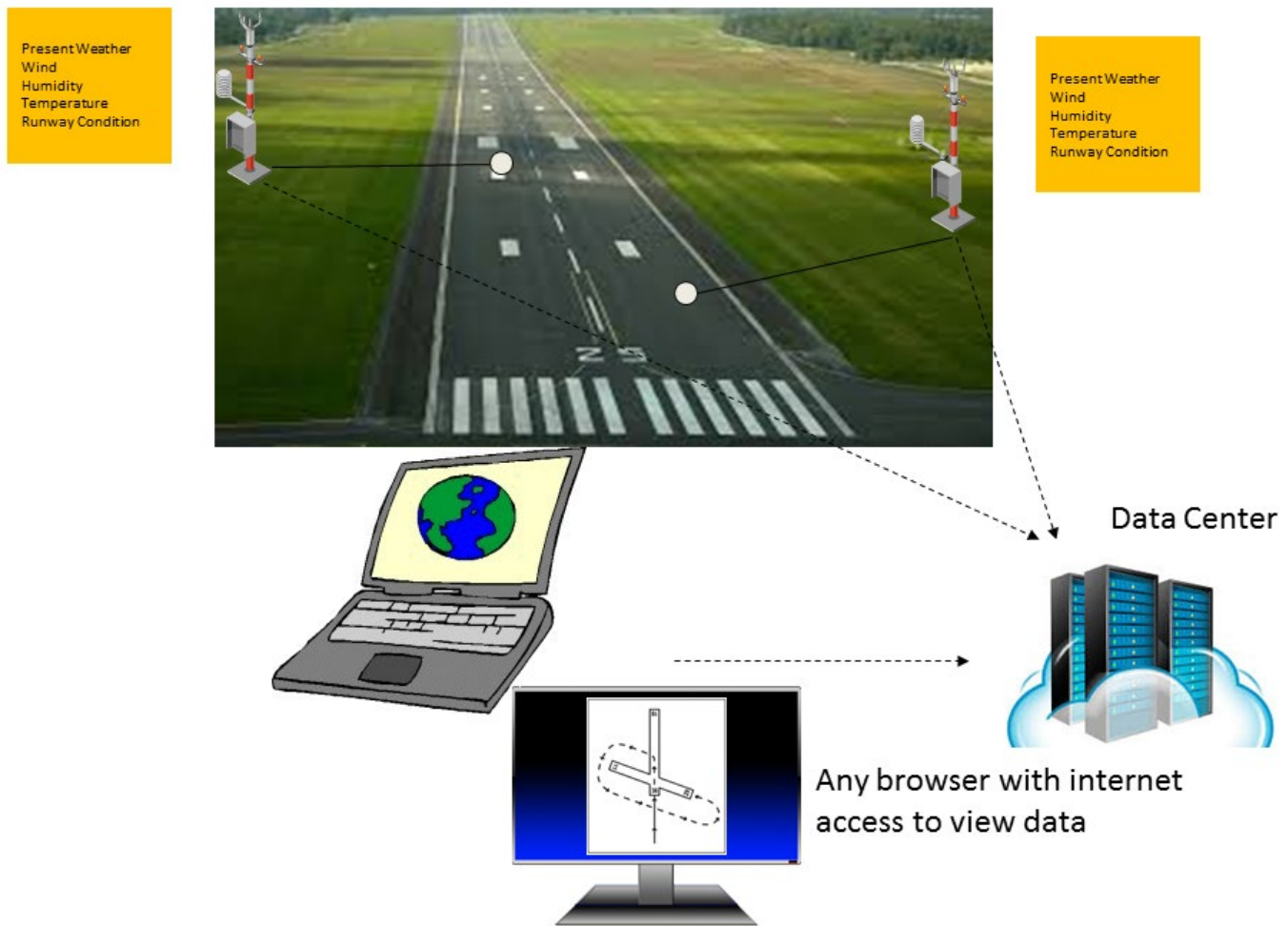


**Figure 1 - System components**

### 3.2.2 Design

Passive In-Pavement surface sensors shall be solid state in design without relays, tubes or other electromechanical devices. The pavement sensor shall be factory adjusted, and no adjustment in the pavement sensor device itself shall be required by airport users.

Active surface sensors are also available, these require additional information to be provided by the vendor to ensure reliability and any maintenance requirements that are not covered in this document.

#### 3.2.2.1 Operating Temperature Requirements

The head of the sensor shall have sufficient durability to function over a range of pavement surface and/or air temperatures from -40 to 176 °F (-40 to 80 °C).

The sensor shall contain a temperature-sensing device to measure the temperature of the sensor surface. The temperature measurements shall have an accuracy of at least  $\pm 0.9$  °F ( $\pm 0.5$  °C). The accuracy of the temperature measurements shall be maintained over a temperature range of -40 to 176 °F (-40 to 80 °C). Documentation confirming that the temperature measurements meet the stated temperature accuracy must be submitted with the system.