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| Title | **Syntax and semantics of location related sensor capabilities** |
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| Abstract | This contribution illustrates the basic JSON schema structure for representing location related sensor capabilities in a standardized data format. The semantics and examples of the location related sensor capabilities are presented.  |
| Purpose | To start discussion on purpose of the standard |
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# Introduction

This contribution illustrates the basic JSON schema structure for representing location related sensor capabilities in a standardized data format. The semantics and examples of the location-related sensor capabilities are presented.

# Data formats for location sensor capabilities

## Orientation sensor capability

### General

This sub-clause specifies a sensor capability of an orientation sensor.

### Syntax

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| --- |
| "orientationSensorCapabilityType": { "type": "object", "properties": { "sensorCapabilityBaseType" : { "$ref": "#/definitions/sensorCapabilityBaseType" }, "orientationRange": { "type": "object", "properties": { "yawMin" : { "type" : "number" }, "yawMax" : { "type" : "number" }, "pitchMin" : { "type" : "number" }, "pitchMax" : { "type" : "number" }, "rollMin" : { "type" : "number" }, "rollMax" : { "type" : "number" }, } } } }, |

### Semantics

Semantics of the orientationSensorCapability:

| Name | Definition |
| --- | --- |
| orientationSensorCapabilityType | Tool for describing an orientation sensor capability. |
| orientationRange | Defines the range from the local coordinate system according to the Yaw, Pitch, and Roll. |
| yawMin | Describes the minimum value that the orientation sensor can perceive for Yaw in the unit of degree. |
| yawMax | Describes the maximum value that the orientation sensor can perceive for Yaw in the unit of degree. |
| pitchMin | Describes the minimum value that the orientation sensor can perceive for Pitch in the unit of degree. |
| pitch mix | Describes the maximum value that the orientation sensor can perceive for Pitch in the unit of degree. |
| rollMin | Describes the minimum value that the orientation sensor can perceive for Roll in the unit of degree. |
| rollMax | Describes the maximum value that the orientation sensor can perceive for Roll in the unit of degree. |

### Examples

This example shows the description of an orientation sensing capability with the following semantics. The sensor has the maximum value shall be yawMax ="10.0", pitchMax ="30.0" and rollMax ="45.0", and the minimum value shall be yawMin ="-10.0", pitchMin ="-20.0" and rollMin ="-45.0" .

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| --- |
| {"sensorCapabilityBaseType": {},"orientationRange": { "yawMin": -10.0, "yawMax": 10.0, "pitchMin": -20.0, "pitchMax": 30.0, "rollMin": -45.0, "rollMax": 45.0}} |

## Position sensor capability

### General

This sub-clause specifies the capability of a position sensor.

### Syntax

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| --- |
| "distanceSensorCapabilityType": { "type": "object", "properties": { "sensorCapabilityBaseType" : { "$ref": "#/definitions/sensorCapabilityBaseType" }, "range": { "type": "object", "properties": { "xMinValue" : { "type" : "number" }, "xMaxValue" : { "type" : "number" }, "yMinValue" : { "type" : "number" }, "yMaxValue" : { "type" : "number" }, "zMinValue" : { "type" : "number" }, "zMaxValue" : { "type" : "number" }, } } } }, |

### Semantics

Semantics of the positionSensorCapabilityType:

| *Name* | *Definition* |
| --- | --- |
| PositionSensorCapability Type | Tool for describing a position sensor capability. |
| range | Defines the range in a local coordinate system relative to the position of the sensor in the idle state according to the x-, y-, and z-axis. |
| xMinValue | Describes the minimum value that the position sensor can perceive along the x-axis in the unit of meter. |
| xMaxValue | Describes the maximum value that the position sensor can perceive along the x-axis in the unit of meter. |
| yMinValue | Describes the minimum value that the position sensor can perceive along the y-axis in the unit of meter. |
| yMaxValue | Describes the maximum value that the position sensor can perceive along the y-axis in the unit of meter. |
| zMinValue | Describes the minimum value that the position sensor can perceive along the z-axis in the unit of meter. |
| zMaxValue | Describes the maximum value that the position sensor can perceive along the z-axis in the unit of meter. |

### Examples

In this example, the sensor has the maximum value shall be xMaxValue="60.0", yMaxValue="50.0" and zMaxValue="50.0", and the minimum value shall be xMinValue="-20.0", yMinValue="-30.0" and zMaxValue="0.0".

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| --- |
| {"sensorCapabilityBaseType": {},"range": { "xMinValue": -20.0, "xMaxValue": 60.0, "yMinValue": -30.0, "yMaxValue": 50.0, "zMinValue": 0.0, "zMaxValue": 50.0}} |

## Distance sensor

### General

This sub-clause specifies a sensor data type, which describes a distance.

### Syntax

|  |
| --- |
| "distanceSensorCapabilityType": { "type": "object", "properties": { "sensorCapabilityBaseType" : { "$ref": "#/definitions/sensorCapabilityBaseType" }, "location" : { "$ref": "#/definitions/float3DVectorType" }, }, |

### Semantics

Semantics of the distanceSensorCapabilityType:

| *Name* | *Definition* |
| --- | --- |
| distanceSensorCapability Type | Tool for describing a distance sensor capability. |
| location | Describes the location of the device from the global coordinate system according to the x-, y-, and z-axis in the unit of the meter (m). |

### Examples

This example shows the description of a distance sensing capability with the following semantics. The sensed information is received at the location of (1.0, 2.0, 100.0).

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| --- |
| {“sensorCapabilityBaseType”: {},“location”: [1.0, 5.0, 100.0]} |

## Global position sensor

### General

This sub-clause specifies the capability of a global position sensor.

### Syntax

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| --- |
| "globalPositionSensorCapabilityType": { "type": "object", "properties": { "sensorCapabilityBaseType" : { "$ref": "#/definitions/sensorCapabilityBaseType" }, "crs" : { "type": "string" }, "latitudeOffset": { "type": "number" }, "longitudeOffset": { "type": "number" }, "maxOperatingTemp": { "type": "number" }, "minOperatingTemp": { "type": "number" } }, }, |

### Semantics

Semantics of the GlobalPositionSensorCapabilityType:

| *Name* | *Definition* |
| --- | --- |
| GlobalPositionSensorCapabilityType | Tool for describing a GPS sensor capability. |
| crs | Specifies the URI of the coordinate reference system based on which the values of longitude, latitude, and altitude are given.  |
| longitudeOffset | Describes the value added to a base value of longitude to get to a specific absolute value. |
| latitudeOffset | Describes the value added to a base value of latitude to get to a specific absolute value. |
| maxOperatingTemp | Describes a maximum operating temperature |
| minOperatingTemp | Describes a minimum operating temperature |

### Examples

This example shows the description of a global position sensor's sensing capability with the following semantics. The sensor has a maximum operating temperature of 90 degrees Celsius, a minimum operating temperature of -30 degrees Celsius.

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| --- |
| {"sensorCapabilityBaseType": {},"crs": "urn:ogc:def:crs:EPSG::4326","maxOperatingTemp": 90,"minOperatingTemp": -30} |

## Altitude sensor

### General

This sub-clause specifies the capapbility of an altitude sensor.

### Syntax

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| --- |
| "altitudeSensorCapabilityType": { "type": "object", "properties": { "sensorCapabilityBaseType" : { "$ref": "#/definitions/sensorCapabilityBaseType" }, "crs": { "type": "string" }},}, |

### Semantics

Semantics of the altitudeSensorCapabilityType:

|  |  |
| --- | --- |
| Name | Definition |
| AltitudeSensorCapabilityType | Tool for describing an altitude sensor capability. |
| crs | Specifies the URI of the coordinate reference system based on which the values of altitude is given. |

### Examples

This example shows the description of an altitude sensing capability with the following semantics. The sensor uses "urn:ogc:def:crs:EPSG::4326 as crs.

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| --- |
| {"sensorCapabilityBaseType": {},"crs": "urn:ogc:def:crs:EPSG::4326",} |