|  |  |
| --- | --- |
| Project | **Standard for Actuator Interface for Cyber and Physical World**<https://sagroups.ieee.org/2888/ **>** |
| Title | **Data Formats for Environmental Changing Related Actuator** |
| DCN | **2888-21-0026-00-0002** |
| Date Submitted | **June 15, 2021** |
| Source(s) | Yegi Lee zxcasd312@naver.com (Konkuk University)Shin Kim new.xin22@gmail.com (Konkuk University)Eunji Choi c950707@gmail.com (Konkuk University)Kyoungro Yoon yoonk@konkuk.ac.kr (Konkuk University) |
| Re: |  |
| Abstract | This contribution proposes syntaxes, semantics, and examples for representing environmental changing related actuator information in the physical world in a standardized data format. |
| Purpose | To start discussion on purpose of the standard |
| Notice | This document has been prepared to assist the IEEE 2888 Working Group. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. |
| Release | The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE’s name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE’s sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that IEEE 2888 may make this contribution public. |
| Patent Policy | The contributor is familiar with IEEE patent policy, as stated in [Section 6 of the IEEE-SA Standards Board bylaws](http://standards.ieee.org/guides/opman/sect6.html#6.3) <[http://standards.ieee.org/guides/bylaws/sect6-7.html#6](http://127.0.0.1:4664/cache?event_id=757737&schema_id=1&s=5X0vID10lu_E6yrIkWkNd4Wz2H8&q=hancock)> and in *Understanding Patent Issues During IEEE Standards Development* <http://standards.ieee.org/board/pat/faq.pdf> |

# Introduction

This contribution proposes actuator command types which can generate environmental changing related effect. It contains syntaxes, semantics, and examples for representing environmental changing related actuator information in the physical world in a standardized data format. Environmental changing related actuators include sprayer actuator, fog actuator, wind actuator and bubble actuator.

2 Data formats for interfacing actuator command

* 1. Sprayer actuator
		1. General

This sub-clause specifies a actuator command type which can generate a spraying effect.

* + 1. Syntax

|  |
| --- |
| "sprayerCommandData": { "type": "object", "properties": { "sprayingType": { "$ref": "#/definitions/sprayingType" }, "intensity": { "type": "integer", "default": 100 } }, "required": [ "sprayingType" ]}, |

* + 1. Semantics

Semantics of the sprayerCommandData:

| *Name* | *Definition* |
| --- | --- |
| sprayerCommandData | Provide a structure for describing a command for a sprayer actuator. |
| sprayingType | Describes the type of the sprayed material that shall be using the sprayingType. |
| intensity | Describes the intensity that the liquid is sprayed in percentage with respect to the maximum intensity described in the actuator capability. If the intensity is not specified, this command shall be interpreted as turning on at the maximum intensity. |

* + 1. Examples

This example shows the description of an actuator command of the sprayer effect with the following semantics. This sprayer actuator commands the material to be sprayed pure water, and the intensity shall be 45% of the maximum intensity.

|  |
| --- |
| { "commandInfoBaseAttributes": {}, "sprayerCommandData": { "sprayingType": "water", "intensity": 45, }} |

* 1. Fog actuator
		1. General

This Subclause specifies an actuator command type which can generate a fog effect.

* + 1. Syntax

|  |
| --- |
| "fogCommandData": { "type": "object", "properties": { "intensity": { "type": "integer", "default": 100 } }}, |

* + 1. Semantics

Semantics of the fogCommandData:

| *Name* | *Definition* |
| --- | --- |
| fogCommandData | Provide a structure for describing a command for a fog actuator. |
| intensity | Describes the intensity of the fog effect in percentage with respect to the maximum intensity described in the actuator capability. If the intensity is not specified, this command shall be interpreted as turning on at the maximum intensity. |

* + 1. Example

This example shows the description of an actuator command of fog effect with the following semantics. This fog actuator commands the intensity 50% of the maximum intensity.

|  |
| --- |
| { "commandInfoBaseAttributes": {}, "fogCommandData": { "intensity": 50}} |

* 1. Wind actuator
		1. General

This Subclause specifies an actuator command type which can generate a wind effect.

* + 1. Syntax

|  |
| --- |
| "windCommandData": { "type": "object", "properties": { "intensity": { "type": "integer", "default": 100 } }}, |

* + 1. Semantics

Semantics of the windCommandData:

| *Name* | *Definition* |
| --- | --- |
| windCommandData | Provide a structure for describing a command for a wind actuator. |
| intensity | Describes the intensity of the wind effect in percentage with respect to the maximum intensity described in the actuator capability. If the intensity is not specified, this command shall be interpreted as turning on at the maximum intensity. |

* + 1. Example

This example shows the description of an actuator command of wind effect with the following semantics. This wind actuator commands the intensity 60% of the maximum intensity.

|  |
| --- |
| { "commandInfoBaseAttributes": {}, "windCommandData": { "intensity": 60,}} |

* 1. Bubble actuator
		1. General

This sub-clause specifies the actuator command type which can generate a bubble effect.

* + 1. Syntax

|  |
| --- |
| "bubbleCommandData": { "type": "object", "properties": { } }}, |

* + 1. Semantics

Semantics of the bubbleCommandData:

| *Name* | *Definition* |
| --- | --- |
| bubbleCommandData | Tool for describing a bubble actuator command. |

* + 1. Example

This example shows the description of a actuator command of bubble effect with the following semantics. The activate value is true.

|  |
| --- |
| { "commandInfoBaseAttributes": {}, "bubbleCommandData": {}} |