Service

SpecificationName	SpecificationType	AssignedNumber	SpecificationLevel
Open Spatial Service	net.openspatial.service.open_spatial	00000002-0000-1000-8000-a0e5e9000000	

Characteristics

SpecificationName	SpecificationType	AssignedNumber	SpecificationLevel
Position2D	net.openspatial.characteristic.position_2d	00000206-0000-1000-8000-a0e5e9000000	
Pose6D	net.openspatial.characteristic.pose6d	00000205-0000-1000-8000-a0e5e9000000	
ButtonState	net.openspatial.characteristic.button_state	00000207-0000-1000-8000-a0e5e9000000	
Gestures	net.openspatial.characteristic.gestures	00000208-0000-1000-8000-a0e5e9000000	

Description

Last Modified: 2014-07-03 **Approved:** No

Name: Open Spatial Service

Type: net.openspatial.service.open_spatial
Assigned Number: 00000002-0000-1000-8000-a0e5e9000000

Abstract:

The Open Spatial framework, with its rich set of APIs, enables applications to interact with their environment using natural gestures.

Summary:

This service implemented on the device, provides gesture data (through characteristics) to hosts interested in them. It also exposes characteristic(s) for host to send commands to the device. The open spatial service is instantiated as a primary service.

Service Dependencies

This service has no dependencies on other GATT-based services.

GATT Requirements

Sub-Procedure	Server Requirement
Write Characteristic Value	Mandatory
Notifications	Mandatory
Read Characteristic Value	Mandatory

Transport Dependencies

Transport	Supported
Classic	false
Low energy	true

Error Codes

This service does not define any application error codes that are used in attribute protocol.

Service Characteristics

<table>
<tr><th>Overview</th><th>Properties</th><th>Security</th><th>Descriptors</th></tr>
<tr>
<td>Name:
Position2D

Description:
This characteristic is used to expose the relative motion of the device from its last known position in 2D space. It is expressed as a tuple(x, y) which holds the respective displacements along those axes.</td>
<td>
<table>
<tr><th>Property</th><th>Requirement</th></tr>
<tr><td>Read</td><td>Mandatory</td></tr>
<tr><td>Write</td><td>Excluded</td></tr>
<tr><td>WriteWithoutResponse</td><td>Excluded</td></tr>
<tr><td>SignedWrite</td><td>Excluded</td></tr>
<tr><td>Notify</td><td>Mandatory</td></tr>
<tr><td>Indicate</td><td>Excluded</td></tr>
<tr><td>WritableAuxiliaries</td><td>Excluded</td></tr>
<tr><td>Broadcast</td><td>Excluded</td></tr>
<tr><td>ExtendedProperties</td><td></td></tr>
</table>
</td>
<td>None</td>
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</tr>
<tr>
<td>Name:
Pose6D

Description:
This characteristic is used to expose the relative translation and rotation of the device from its last known position and orientation in 3D space. It is expressed as a sextet(x, y,z, roll, pitch, yaw) which hold the respective displacements along those axes.</td>
<td>
<table>
<tr><th>Property</th><th>Requirement</th></tr>
<tr><td>Read</td><td>Mandatory</td></tr>
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<tr><td>ExtendedProperties</td><td></td></tr>
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<td>None</td>
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</tr>
<tr>
<td>Name:
ButtonState

Description:</td>
<td>
<table>
<tr><th>Property</th><th>Requirement</th></tr>
<tr><td>Read</td><td>Mandatory</td></tr>
</table>
</td>
<td></td>
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</tr>
</table>

<table>
<tr>
<td>This characteristic provides information about the state of buttons and tactiles, e.g., pressed, released etc.</td>
<td>
<table>
<tr><td>Write</td><td>Excluded</td></tr>
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<tr><td>SignedWrite</td><td>Excluded</td></tr>
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<td>Name:
Gestures

Description:
This characteristic provides information about ScrollUp/ScrollDown, translation of the device to up/down/left/right in 3D space and for any such gestural events.</td>
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</table>

Last Modified: 2014-07-03 Approved: No

Name: Position2D

Type: net.openspatial.characteristic.position_2d

Assigned Number: 00000206-0000-1000-8000-a0e5e9000000

Summary:

The Position2D characteristic is used to expose the relative translation of the device from its last known position in 2D space. It is expressed as (x, y) which hold the respective displacements along those axes.

Value Fields

Names	Field Requirement	Format	Minimum Value	Maximum Value	Additional Information
x	Mandatory	int16	n/a	n/a	
y	Mandatory	int16	n/a	n/a	

Data packaging of Position2D:

bytes 3 - 2	bytes 1 - 0
y	x

Note: The byte stream above is little-endian formatted.

Last Modified: 2014-07-03 Approved: No

Name: Pose6D

Type: net.openspatial.characteristic.pose6d

Assigned Number: 00000205-0000-1000-8000-a0e5e9000000

Summary:

This characteristic is used to expose the relative translation and rotation of the device from its last known position and orientation in 3D space. It is expressed as a sextet(x, y,z, roll, pitch, yaw) which hold the respective displacements along those axes.

Value Fields

Names	Field Requirement	Format	Minimum Value	Maximum Value	Additional Information
x	Mandatory	int16	n/a	n/a	
y	Mandatory	int16	n/a	n/a	
z	Mandatory	int16	n/a	n/a	
r (roll)	Mandatory	int16	n/a	n/a	
p (pitch)	Mandatory	int16	n/a	n/a	
y (yaw)	Mandatory	int16	n/a	n/a	

x, y and z are the three axes from cartesian coordinate system which are relative to the position of the device. As the device orientation changes, the coordinate system moves accordingly.

Data packaging of Pose6D:

Bytes 11 - 10	Bytes 9 - 8	Bytes 7 - 6	Bytes 5 - 4	Bytes 3 - 2	Bytes 1 - 0
y	p	r	z	y	x

Note: The byte stream above is little-endian formatted.

Last Modified: 2014-07-03 Approved: No

Name: ButtonState

Type: net.openspatial.characteristic.button_state

Assigned Number: 00000207-0000-1000-8000-a0e5e9000000

Summary:

This characteristic provides information about the state of buttons and tactiles, e.g., pressed, released etc.

Value Fields

Names	Field Requirement	Format	Minimum Value	Maximum Value	Additional Information
Touch0	Mandatory	uint16[+]	n/a	n/a	bit 0 is 1 if touched*, 0 otherwise bit 1 is 1 if released, 0 otherwise
Touch1	Mandatory	uint16[+]	n/a	n/a	bit 2 is 1 if touched*, 0 otherwise bit 3 is 1 if released, 0 otherwise
Touch2	Mandatory	uint16[+]	n/a	n/a	bit 4 is 1 if touched*, 0 otherwise bit 5 is 1 if released, 0 otherwise
Tactile0	Mandatory	uint16[+]	n/a	n/a	bit 6 is 1 if touched*, 0 otherwise bit 7 is 1 if released, 0 otherwise
Tactile1	Mandatory	uint16[+]	n/a	n/a	bit 8 is 1 if touched*, 0 otherwise bit 9 is 1 if released, 0 otherwise

* If touched and released events are delivered at the same time, then the order for processing them are touched followed by released event.

[+] The bit packaging is as follows

bits 15 - 10	bits 9 - 8	bits 7 - 6	bits 5 - 4	bits 3 - 2	bits 1 - 0
Reserved	Tactile 1	Tactile 0	Touch 2	Touch 1	Touch 0

Note: The byte stream above is little-endian formatted.

Last Modified: 2014-07-03 Approved: No

Name: Gestures

Type: net.openspatial.characteristic.gestures

Assigned Number: 00000208-0000-1000-8000-a0e5e9000000

Summary:

This characteristic provides information about ScrollUp/ScrollDown, translation of the device to up/down/left/right in 3D space and for any such gestural events.

Value Fields

Names	Field Requirement	Format	Minimum Value	Maximum Value	Additional Information
Gesture	Mandatory	variable[+]	n/a	n/a	This is an array of bytes carrying gesture opcode in first two bytes, with relevant payload data if any in subsequent bytes

[+] The byte format is as below:

Data (Bytes 2 and beyond upto size of bluetooth PDU)	Opcode (Byte 0 and 1)
optional	See gestures opcode table below

Note: The byte stream above is little-endian formatted.

Gestures opcode table:

Opcode name	Opcode value (byte1 byte0)	Data (byte3 byte4 byte5 …)	Additional Information
Scroll	0x0001	0x01 - slide left 0x02 - slide right	device implementation specific
Directions	0x0002	Following values are provided in byte 3: 0x01 - right gesture 0x02 - left gesture 0x03 - down gesture 0x04 - up gesture 0x05 - CW (clock-wise) 0x06 - CCW (counter clock-wise)	relative direction to device translation
Reserved	0x0003 to 0xFFFF	undefined	