

# OCEAN2020FOM\_COMMCE\_v1.0

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Version: 1.0

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Security Classification: Unclassified

## Description:

OCEAN2020 HLA EVOLVED simulated trials FOM definition for Communication Simulation in Contested Environment & Electromagnetic Modelling. Evaluate radio communication link between platforms.

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# Module Data

## **OCEAN2020FOM\_COMMCE\_v1.0**

Type:	FOM
Version:	1.0
Modification Date:	2019-10-10
Security Classification:	Unclassified
Release Restrictions:	European Defence Agency - OCEAN2020 Project Beneficiaries
Use Limitations:	European Defence Agency - OCEAN2020 Project Beneficiaries
Purpose:	OCEAN2020 HLA EVOLVED communication link FOM module revision 0.7.
Application Domain:	Maritime
Description:	OCEAN2020 HLA EVOLVED simulated trials FOM definition for Communication Simulation in Contested Environment & Electromagnetic Modelling. Evaluate radio communication link between platforms.
Use History:	--NONE--
Other:	

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# HLAobjectRoot (Object)

Full Name: .HLAobjectRoot  
Module: OCEAN2020FOM\_COMMCE\_v1.0  
Sharing: Neither  
Semantics:  
Notes:

Added Attributes: This object adds no attributes

# TxRxLink\_obj (Object)

Full Name: 0.TxRxLink\_obj  
Module: OCEAN2020FOM\_COMMCE\_v1.0  
Sharing: PublishSubscribe  
Semantics: Define the communication link between platform transmitter node and platform receiver node.  
Notes:

Added Attributes:

## Capacity

dataType: BitRateData	updateType: NA
ownership: Divest	updateCondition: On Change
sharing: PublishSubscribe	transportation: HLAbestEffort
order: Receive	
Dimensions: --none--	
Semantics: A rough estimation of the maximum bitrate according to Shannon Hartley theorem. Expression in Kb/s.	

## Frequency

dataType: FrequencyHertzUnsignedInteger64	updateType: Conditional
ownership: DivestAcquire	updateCondition: On Change
sharing: PublishSubscribe	transportation: HLAbestEffort
order: Receive	
Dimensions: --none--	
Semantics: Operative frequency of the radio transmission.	

## LinkStatus

dataType: RPRboolean	updateType: Conditional
ownership: DivestAcquire	updateCondition: On Change
sharing: PublishSubscribe	transportation: HLAbestEffort
order: Receive	
Dimensions: --none--	
Semantics: Whether the link is operational or not.	

## Rx\_ObjectID

dataType: RTIobjectId	updateType: Static
ownership: DivestAcquire	updateCondition: NA
sharing: PublishSubscribe	transportation: HLAbestEffort
order: Receive	
Dimensions: --none--	
Semantics: The RTI object instance ID of the receiver involved on the link.	

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dataType: Float32  
ownership: Divest  
sharing: PublishSubscribe  
order: Receive

updateType: Conditional  
updateCondition: On Change  
transportation: HLABestEffort

Dimensions: --none--

Semantics: The signal to noise ratio on the considered communication channel. It represents the desired signal level to the total noise plus undesired signal level ratio.

Tx\_ObjectID

dataType: RTIobjectId  
ownership: DivestAcquire  
sharing: PublishSubscribe  
order: Receive

updateType: Static  
updateCondition: NA  
transportation: HLABestEffort

Dimensions: --none--

Semantics: The RTI object instance ID of the transmitter involved on the link.

## HLAinteractionRoot (Interaction)

Full Name: .HLAinteractionRoot  
Module: OCEAN2020FOM\_COMMCE\_v1.0  
Sharing: Neither  
Semantics:  
Notes:

Added Parameters: This object adds no parameters

## TxRx\_Link\_OffReq (Interaction)

Full Name: 0.TxRx\_Link\_OffReq  
Module: OCEAN2020FOM\_COMMCE\_v1.0  
Sharing: PublishSubscribe  
Semantics: TxRxLink\_obj deletion request.  
Notes:

Added Parameters:

Rx\_HostObjectID

dataType: RTIobjectId

Semantics: The RTI object instance ID of the entity platform object which receiver embedded system is part of.

NOTE:Not optional

Tx\_HostObjectID

dataType: RTIobjectId

Semantics: The RTI object instance ID of the entity platform object which transmitter embedded system is part of.

NOTE:Not optional

## TxRx\_Link\_OnReq (Interaction)

Full Name: 0.TxRx\_Link\_OnReq  
Module: OCEAN2020FOM\_COMMCE\_v1.0  
Sharing: PublishSubscribe  
Semantics: TxRxLink\_obj creation request.  
Notes:

Added Parameters:

FrequencyHopping

dataType: FrequencyHertzUnsignedInteger64

Semantics: Hopping process selected center frequency of the radio transmissions.

NOTE:Not optional

Rx\_HostObjectID

dataType: RTIobjectId

Semantics: The RTI object instance ID of the entity platform object which receiver embedded system is part of.

NOTE:Not optional

Tx\_HostObjectID

dataType: RTIobjectId

Semantics: The RTI object instance ID of the entity platform object which transmitter embedded system is part of.

NOTE:Not optional

# Basic Data Types

## **HLAinteger16BE**

size: 16  
interpretation: Integer in the range  $[-2^{15}, 2^{15} - 1]$   
endian: Big  
encoding: 16-bit twos complement signed integer. The most significant bit contains the sign.

## **HLAinteger32BE**

size: 32  
interpretation: Integer in the range  $[-2^{31}, 2^{31} - 1]$   
endian: Big  
encoding: 32-bit twos complement signed integer. The most significant bit contains the sign.

## **HLAinteger64BE**

size: 64  
interpretation: Integer in the range  $[-2^{63}, 2^{63} - 1]$   
endian: Big  
encoding: 64-bit twos complement signed integer first. The most significant bit contains the sign.

## **HLAfloat32BE**

size: 32  
interpretation: Single-precision floating point number  
endian: Big  
encoding: 32-bit IEEE normalized single-precision format. See IEEE Std 754-1985

## **HLAfloat64BE**

size: 64  
interpretation: Double-precision floating point number  
endian: Big  
encoding: 64-bit IEEE normalized double-precision format. See IEEE Std 754-1985

## **HLAoctetPairBE**

size: 16  
interpretation: 16-bit value  
endian: Big  
encoding: Assumed to be portable among devices.

## **HLAinteger16LE**

size: 16  
interpretation: Integer in the range  $[-2^{15}, 2^{15} - 1]$   
endian: Little  
encoding: 16-bit twos complement signed integer. The most significant bit contains the sign.

## **HLAinteger32LE**

size: 32  
interpretation: Integer in the range  $[-2^{31}, 2^{31} - 1]$   
endian: Little  
encoding: 32-bit twos complement signed integer. The most significant bit contains the sign.

## **HLAinteger64LE**

size: 64  
interpretation: Integer in the range  $[-2^{63}, 2^{63} - 1]$   
endian: Little  
encoding: 64-bit twos complement signed integer first. The most significant bit contains the sign.

### **HLAfloat32LE**

size: 32  
interpretation: Single-precision floating point number  
endian: Little  
encoding: 32-bit IEEE normalized single-precision format. See IEEE Std 754-1985

### **HLAfloat64LE**

size: 64  
interpretation: Double-precision floating point number  
endian: Little  
encoding: 64-bit IEEE normalized double-precision format. See IEEE Std 754-1985

### **HLAoctetPairLE**

size: 16  
interpretation: 16-bit value  
endian: Little  
encoding: Assumed to be portable among hardware devices.

### **HLAoctet**

size: 8  
interpretation: 8-bit value  
endian: Big  
encoding: Assumed to be portable among hardware devices.

### **RPRunsignedInteger16BE**

size: 16  
interpretation: Integer in the range  $[0, 2^{16}-1]$   
endian: Big  
encoding: 16-bit unsigned integer.

### **RPRunsignedInteger32BE**

size: 32  
interpretation: Integer in the range  $[0, 2^{32}-1]$   
endian: Big  
encoding: 32-bit unsigned integer.

### **RPRunsignedInteger64BE**

size: 64  
interpretation: Integer in the range  $[0, 2^{64}-1]$   
endian: Big  
encoding: 64-bit unsigned integer.

### **RPRunsignedInteger8BE**

size: 8  
interpretation: Integer in the range  $[0, 2^8-1]$   
endian: Big  
encoding: 8-bit unsigned integer.





# Array Data Types

## **HLAASCIIstring**

dataType: HLAASCIIchar  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: ASCII string representation

## **HLAunicodeString**

dataType: HLAunicodeChar  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: Unicode string representation

## **HLAopaqueData**

dataType: HLAbyte  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: Uninterpreted sequence of bytes

## **HLAtoken**

dataType: HLAbyte  
cardinality: 0  
encoding: HLAfixedArray  
semantics:

## **HLAhandle**

dataType: HLAbyte  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: Encoded value of a handle. The encoding is based on the type of handle

## **HLAtransportationName**

dataType: HLAunicodeChar  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: String whose legal value shall be a name from any row in the OMT transportation table (IEEE Std 1516.2-2010)

## **HLAupdateRateName**

dataType: HLAunicodeChar  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: String whose legal value shall be a name from any row in the OMT update rate table (IEEE Std 1516.2-2010)

## **HLAlogicalTime**

dataType: HLAbyte  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: An encoded logical time. An empty array shall indicate that the values is not defined

## **HLAtimeInterval**

dataType: HLAbyte  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: An encoded logical time interval. An empty array shall indicate that the values is not defined

## **HLAhandleList**

dataType: HLAhandle  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: List of encoded handles

## **HLAinteractionSubList**

dataType: HLAinteractionSubscription  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: List of interaction subscription indicators

## **HLAargumentList**

dataType: HLAunicodeString  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: List of arguments

## **HLAobjectClassBasedCounts**

dataType: HLAobjectClassBasedCount  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: List of counts of various items based on object class. In all MOM interactions that have a parameter of datatype HLAobjectClassBased- Counts, if an HLAobjectClassBasedCount element of the HLAobjectClassBasedCounts array would have a value (object class, 0), the HLAobjectClassBasedCount element shall not be present in the HLAobjectClassBasedCounts array. In other words, only HLAobject- ClassBasedCount elements that have positive counts shall be present in an HLAobjectClassBasedCounts array. From this, it follows that if all object class counts have a zero value, then the HLAobjectClass- BasedCounts array shall not have any elements in it; it shall be an empty HLAobjectClassBasedCounts array.

## **HLAinteractionCounts**

dataType: HLAinteractionCount  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: List of interaction counts. In all MOM interactions that have a parameter of datatype HLAinteractionCounts, if an HLAinteractionCount element of the HLAinteractionCounts array would have a value (interaction class, 0), the HLAinteractionCount element shall not be present in the HLAinteractionCounts array. In other words, only HLAinteractionCount elements that have positive counts shall be present in an HLAinteractionCounts array. From this, it follows that if all interaction class counts have a zero value, then the HLAinteractionCounts array shall not have any elements in it; it shall be an empty HLAinteractionCounts array.

## **HLAsynchPointList**

dataType: HLAunicodeString  
cardinality: Dynamic  
encoding: HLAvariableArray

semantics: List of names of synchronization points.

### **HLAsynchPointFederateList**

dataType: HLAsynchPointFederate

cardinality: Dynamic

encoding: HLAvariableArray

semantics: List of joined federates and the synchronization status of each.

### **HLAmoduleDesignatorList**

dataType: HLAunicodeString

cardinality: Dynamic

encoding: HLAvariableArray

semantics: List of designators of FOM modules.

### **RTIobjectId**

dataType: HLAASCIIchar

cardinality: Dynamic

encoding: RPRnullTerminatedArray

semantics: An RTI object instance identification string.

### **RTIobjectIdArray**

dataType: RTIobjectId

cardinality: Dynamic

encoding: HLAvariableArray

semantics: Set of IDs of registered object instances.

### **RPRUserDefinedTag**

dataType: HLAASCIIchar

cardinality: [8..2147483647]

encoding: RPRnullTerminatedArray

semantics: The array shall be at least 8 bytes (octets) in size, which shall contain the time according to the DIS time stamp field format (IEEE 1278.1-1995 section 5.2.31) converted into hexadecimal American Standard Code for Information Interchange (ASCII) character representation (0-9 and A-F), with leading zeros included. The ordering of the characters shall be in accordance with section 5.1.1 of IEEE 1278.1-1995, that is most significant octet first, with the most significant bits first (i.e. the character for bits 4-7 precedes the character for bits 0-3). This encoding is equivalent to the result of the C-statement `sprintf(UserTag, %08X, DIStimestamp)`, where `DIStimestamp` is represented in native format. More user-supplied information may be included, starting from the 9th character, as specified in the federation agreements.

### **ArticulatedParameterStructLengthlessArray**

dataType: ArticulatedParameterStruct

cardinality: Dynamic

encoding: RPRlengthlessArray

semantics: Dynamic array of ArticulatedParameterStruct elements, may also contain no elements. The array is encoded without array length, containing only the elements.

### **ClockTimeStructLengthlessArray**

dataType: ClockTimeStruct

cardinality: Dynamic

encoding: RPRlengthlessArray

semantics: Dynamic array of ClockTimeStruct elements, may also contain no elements. The array is encoded without array length, containing only the elements.

### **EntityTypeStructLengthlessArray**

dataType: EntityTypeStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Dynamic array of EntityTypeStruct elements, may also contain no elements. The array is encoded without array length, containing only the elements.

### **Float32Array1Plus**

dataType: Float32  
cardinality: [1..2147483647]  
encoding: HLAvariableArray  
semantics: Generic dynamic array of Float32 elements, containing at least one element.

### **Integer16Array1Plus**

dataType: Integer16  
cardinality: [1..2147483647]  
encoding: HLAvariableArray  
semantics: Generic dynamic array of Integer16 elements, containing at least one element.

### **OctetArray**

dataType: Octet  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: Generic dynamic array of Octet elements, may also contain no elements.

### **OctetArray1Plus**

dataType: Octet  
cardinality: [1..2147483647]  
encoding: HLAvariableArray  
semantics: Generic dynamic array of Octet elements, containing at least one element.

### **OctetArray2**

dataType: Octet  
cardinality: 2  
encoding: HLAfixedArray  
semantics: Generic array of two Octet elements.

### **OctetArray3**

dataType: Octet  
cardinality: 3  
encoding: HLAfixedArray  
semantics: Generic array of three Octet elements.

### **OctetArray4**

dataType: Octet  
cardinality: 4  
encoding: HLAfixedArray  
semantics: Generic array of four Octet elements.

### **OctetArray7**

dataType: Octet

cardinality: 7  
encoding: HLAfixedArray  
semantics: Generic array of seven Octet elements.

### **OctetArray8**

dataType: Octet  
cardinality: 8  
encoding: HLAfixedArray  
semantics: Generic array of eight Octet elements.

### **OctetPadding32Array**

dataType: Octet  
cardinality: Dynamic  
encoding: RPRpaddingTo32Array  
semantics: Generic dynamic array of meaningless Octet elements, to align the subsequent data structure to the next 32 bit octet boundary value (OBV). The array is encoded without array length, containing zero to three elements.

### **OctetPadding64Array**

dataType: Octet  
cardinality: Dynamic  
encoding: RPRpaddingTo64Array  
semantics: Generic dynamic array of meaningless Octet elements, to align the subsequent data structure to the next 64 bit octet boundary value (OBV). The array is encoded without array length, containing zero to seven elements.

### **OrientationStructLengthlessArray**

dataType: OrientationStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Dynamic array of OrientationStruct elements, may also contain no elements. The array is encoded without array length, containing only the elements.

### **UnsignedInteger16Array1Plus**

dataType: UnsignedInteger16  
cardinality: [1..2147483647]  
encoding: HLAvariableArray  
semantics: Generic dynamic array of UnsignedInteger16 elements, containing at least one element.

### **UnsignedInteger32LengthlessArray**

dataType: UnsignedInteger32  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Generic dynamic array of UnsignedInteger32 elements, may also contain no elements. The array is encoded without array length, containing only the elements.

### **UnsignedInteger64Array1Plus**

dataType: UnsignedInteger64  
cardinality: [1..2147483647]  
encoding: HLAvariableArray  
semantics: Generic dynamic array of UnsignedInteger64 elements, containing at least one element.

### **UnsignedInteger8LengthlessArray**

dataType: UnsignedInteger8

cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Generic dynamic array of UnsignedInteger8 elements, may also contain no elements. The array is encoded without array length, containing only the elements.

### **WorldLocationStructLengthlessArray**

dataType: WorldLocationStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Dynamic array of WorldLocationStruct elements, may also contain no elements. The array is encoded without array length, containing only the elements.

### **MarkingArray31**

dataType: Octet  
cardinality: 31  
encoding: HLAfixedArray  
semantics: String of characters represented by a 31 element character string.

### **SilentAggregateStructLengthlessArray**

dataType: SilentAggregateStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Set of silent aggregates (aggregates not registered in the federation).

### **SilentEntityStructLengthlessArray**

dataType: SilentEntityStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: A set of silent entities (entities not registered in the federation).

### **VariableDatumStructLengthlessArray**

dataType: VariableDatumStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Set of additional data associated with an aggregate.

### **AntennaPatternVariantStructLengthlessArray**

dataType: AntennaPatternVariantStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Represents an antennas radiation pattern, its orientation in space, and the polarization of the radiation.

### **CoefficientsLengthlessArray1Plus**

dataType: Float32  
cardinality: [1..2147483647]  
encoding: RPRlengthlessArray  
semantics: Represents the power distribution from the antenna as the coefficients of a spherical harmonic expansion. The highest order of the expansion can be determined by the number of coefficients in the array.

### **SignalDataLengthlessArray1Plus**

dataType: Octet  
cardinality: [1..2147483647]

encoding: RPRLengthlessArray  
semantics: The audio or digital data conveyed in a radio transmission.

### **BreachableSegmentStructLengthlessArray**

dataType: BreachableSegmentStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Specifies a breachable linear object (a collection of segments)

### **BreachedStatusArray8**

dataType: BreachedStatusEnum8  
cardinality: 8  
encoding: HLAfixedArray  
semantics: Specifies the breached appearance for each individual segment portion of length = BreachLength

### **BreachStructLengthlessArray**

dataType: BreachStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Specifies a breach linear object (a collection of segments)

### **EnvironmentRecStructArray**

dataType: EnvironmentRecStruct  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: Specifies environment records as a collection of geometry and state records

### **ExhaustSmokeStructLengthlessArray**

dataType: ExhaustSmokeStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Specifies an exhaust smoke linear object (a collection of smoke segments)

### **GridAxisStructLengthlessArray**

dataType: GridAxisStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Specifies detailed information for a collection of grid axes

### **GridDataStructLengthlessArray**

dataType: GridDataStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Specifies detailed information for a collection of grid data representations

### **AttributeValuePairStructArray1Plus**

dataType: AttributeValuePairStruct  
cardinality: [1..2147483647]  
encoding: HLAvariableArray  
semantics: Array of AttributeValuePairStruct.

### **DatumIdentifierLengthlessArray**



dataType: DatumIdentifierEnum32  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Array of DatumIdentifierEnum32.

### **FixedDatumStructLengthlessArray**

dataType: FixedDatumStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Array of FixedDatumStructs.

### **RecordSetStructArray1Plus**

dataType: RecordSetStruct  
cardinality: [1..2147483647]  
encoding: HLAvariableArray  
semantics: Array of RecordSetStruct

### **RecordStructArray**

dataType: RecordStruct  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: Array of RecordStruct

### **VariableDatumStructArray**

dataType: VariableDatumStruct  
cardinality: Dynamic  
encoding: HLAvariableArray  
semantics: Array of VariableDatumStruct

### **ShaftDataStructLengthlessArray1Plus**

dataType: ShaftDataStruct  
cardinality: [1..2147483647]  
encoding: RPRLengthlessArray  
semantics: Array of propulsion shaft states, one per shaft

### **SupplyStructLengthlessArray**

dataType: SupplyStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: A list of supply types and the number of each being offered or requested.

### **FundamentalParameterDataStructLengthlessArray**

dataType: FundamentalParameterDataStruct  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Array of Fundamental Parameter Data records.

### **DepthMeterFloat32LengthlessArray**

dataType: DepthMeterFloat32  
cardinality: Dynamic  
encoding: RPRLengthlessArray  
semantics: Specifies ground - snow - water burial depth offset for each mine in a collection of mines

### **MineDielectricDifferenceLengthlessArray**

dataType: MineDielectricDifference  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Specifies local dielectric difference between the mine and the surrounding soil (reflectance) for each mine in a collection of mines

### **MinefieldLaneMarkerStructLengthlessArray**

dataType: MinefieldLaneMarkerStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Specifies a minefield lane marker (a collection of segments)

### **MinefieldPaintSchemeLengthlessArray**

dataType: MinefieldPaintSchemeEnum32  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Specifies the camouflage scheme/color for each mine in a collection of mines

### **MinefieldSensorTypeLengthlessArray**

dataType: MinefieldSensorTypeEnum32  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Specifies a collection of minefield sensor types

### **MineFusingStructLengthlessArray**

dataType: MineFusingStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Specifies the type of primary fuse, the type of the secondary fuse and the anti-handling device status for a collection of mines

### **MineIdentifierLengthlessArray**

dataType: MineIdentifier  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Identifies the mine entity identifier for each mine in a collection of mines

### **MissingRecordNumbersLengthlessArray1Plus**

dataType: UnsignedInteger8  
cardinality: [1..2147483647]  
encoding: RPRlengthlessArray  
semantics: Specifies missing record numbers as a collection

### **PerimeterPointStructLengthlessArray**

dataType: PerimeterPointStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Specifies the location of perimeter points (collection)

### **TemperatureDegreeCelsiusFloat32LengthlessArray**

dataType: TemperatureDegreeCelsiusFloat32  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: Specifies thermal contrast for each mine in a collection of mines

### **MarkingArray11**

dataType: Octet  
cardinality: 11  
encoding: HLAfixedArray  
semantics: String of characters represented by an 11 element character string.

### **PropulsionSystemDataStructLengthlessArray**

dataType: PropulsionSystemDataStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: A set of Propulsion System Data descriptions.

### **VectoringNozzleSystemDataStructLengthlessArray**

dataType: VectoringNozzleSystemDataStruct  
cardinality: Dynamic  
encoding: RPRlengthlessArray  
semantics: A set of Vectoring Nozzle System Data description.

# Simple Data Types

## **HLAASCIIchar**

representation: HLAoctet  
units: NA  
resolution: NA  
accuracy: NA  
semantics: Standard ASCII character (see ANSI Std x3.4-1986)

## **HLAunicodeChar**

representation: HLAoctetPairBE  
units: NA  
resolution: NA  
accuracy: NA  
semantics: Unicode UTF-16 character (see The Unicode Standard, Version 3.0)

## **HLAbyte**

representation: HLAoctet  
units: NA  
resolution: NA  
accuracy: NA  
semantics: Uninterpreted 8-bit byte

## **HLAcount**

representation: HLAinteger32BE  
units: NA  
resolution: NA  
accuracy: NA  
semantics: NA

## **HLAseconds**

representation: HLAinteger32BE  
units: s  
resolution: NA  
accuracy: NA  
semantics: NA

## **HLAmsec**

representation: HLAinteger32BE  
units: ms  
resolution: NA  
accuracy: NA  
semantics: NA

## **HLAnormalizedFederateHandle**

representation: HLAinteger32BE  
units: NA  
resolution: NA  
accuracy: NA  
semantics: The type of the normalized value of a federate handle as returned by the Normalize Federate Handle service. The value is appropriate for defining the range of the HLAfederate dimension for regions with this dimension.

## **HLAindex**

representation: HLAinteger32BE  
units: NA  
resolution: NA  
accuracy: NA  
semantics: NA

## **HLAinteger64Time**

representation: HLAinteger64BE  
units: NA  
resolution: 1  
accuracy: NA  
semantics: Standardized 64 bit integer time

## **HLAfloat64Time**

representation: HLAfloat64BE  
units: NA  
resolution: 4.9E-308  
accuracy: NA  
semantics: Standardized 64 bit float time

## **AccelerationMeterPerSecondSquaredFloat32**

representation: HLAfloat32BE  
units: meter per second squared ( $\text{m}/(\text{s}^2)$ )  
resolution: NA  
accuracy: NA  
semantics: Linear acceleration vector composed of SI base units. Based on the Linear Acceleration Vector record as specified in IEEE 1278.1-1995 section 5.2.33b.

## **AngleDegreeFloat32**

representation: HLAfloat32BE  
units: degree (deg)  
resolution: NA  
accuracy: NA  
semantics: Datatype for quantity angle, based on unit degree (of arc), unit symbol °.

## **AngleRadianFloat32**

representation: HLAfloat32BE  
units: radian (rad)  
resolution: NA  
accuracy: NA  
semantics: Datatype for quantity angle, based on SI derived unit radian, unit symbol rad.

## **AngularVelocityRadianPerSecondFloat32**

representation: HLAfloat32BE  
units: radian per second (rad/s)  
resolution: NA  
accuracy: perfect  
semantics: Angular velocity vector composed of SI base units. Based on the Angular Velocity Vector record as specified in IEEE 1278.1-1995 section 5.2.2.

### **ClockTimeHourInteger32**

representation: HLAinteger32BE  
units: hour  
resolution: 1  
accuracy: perfect  
semantics: Time past on the clock in full hours since a specified point in time.

### **DepthMeterFloat32**

representation: HLAfloat32BE  
units: meter (m)  
resolution: NA  
accuracy: NA  
semantics: Datatype for quantity depth, based on SI base unit meter, unit symbol m.

### **Float32**

representation: HLAfloat32BE  
units: NA  
resolution: NA  
accuracy: NA  
semantics: Single-precision floating point number.

### **Float64**

representation: HLAfloat64BE  
units: NA  
resolution: NA  
accuracy: NA  
semantics: Double-precision floating point number.

### **FrequencyHertzFloat32**

representation: HLAfloat32BE  
units: hertz (Hz)  
resolution: NA  
accuracy: NA  
semantics: Datatype for quantity frequency, based on SI derived unit hertz, unit symbol Hz.

### **Integer16**

representation: HLAinteger16BE  
units: NA  
resolution: 1  
accuracy: perfect  
semantics: Integer in the range  $[-2^{15}, 2^{15}-1]$ .

### **Integer32**

representation: HLAinteger32BE  
units: NA  
resolution: 1  
accuracy: perfect  
semantics: Integer in the range  $[-2^{31}, 2^{31}-1]$ .

### **InterrogationsPerSecondFloat32**

representation: HLAfloat32BE  
units: interrogations/second

resolution: NA  
accuracy: perfect  
semantics: Number of interrogations per second.

### **LengthMeterFloat32**

representation: HLAfloat32BE  
units: meter (m)  
resolution: NA  
accuracy: NA  
semantics: Datatype for quantity length, based on SI base unit meter, unit symbol m.

### **MassKilogramFloat32**

representation: HLAfloat32BE  
units: kilogram (kg)  
resolution: NA  
accuracy: NA  
semantics: Datatype for quantity mass, based on SI base unit kilogram, unit symbol kg.

### **MeterFloat32**

representation: HLAfloat32BE  
units: meter (m)  
resolution: NA  
accuracy: perfect  
semantics: Datatype based on SI base unit meter, unit symbol m.

### **MeterFloat64**

representation: HLAfloat64BE  
units: meter (m)  
resolution: NA  
accuracy: perfect  
semantics: Datatype based on SI base unit meter, unit symbol m.

### **Octet**

representation: HLAoctet  
units: NA  
resolution: 1  
accuracy: perfect  
semantics: Uninterpreted 8-bit value.

### **PercentFloat32**

representation: HLAfloat32BE  
units: percent (%)  
resolution: NA  
accuracy: NA  
semantics: Percentage

### **PercentUnsignedInteger32**

representation: RPRunsignedInteger32BE  
units: percent (%)  
resolution: 1  
accuracy: perfect  
semantics: Percentage

### **PowerRatioDecibelMilliwattFloat32**

representation: HLAfloat32BE

units: decibel milliwatt (dBm)

resolution: NA

accuracy: perfect

semantics: Abbreviation for the power ratio in decibels (dB) of a measured power referenced to 1 milliwatt (mW).

### **RevolutionsPerMinuteInteger16**

representation: HLAinteger16BE

units: revolutions per minute (RPM)

resolution: 1

accuracy: NA

semantics: Frequency of rotation, expressed in revolutions per minute.

### **TemperatureDegreeCelsiusFloat32**

representation: HLAfloat32BE

units: degree Celsius (C)

resolution: NA

accuracy: NA

semantics: Datatype for quantity temperature, based on SI derived unit degree Celsius, unit symbol °C.

### **TimeMicrosecondFloat32**

representation: HLAfloat32BE

units: microsecond

resolution: NA

accuracy: NA

semantics: Datatype for quantity time, based on SI base unit second, expressed in microsecond, unit symbol  $\frac{1}{1000000}$  s .

### **TimeMillisecondUnsignedInteger32**

representation: RPRunsignedInteger32BE

units: millisecond (ms)

resolution: NA

accuracy: NA

semantics: Datatype for quantity time, based on SI base unit second, expressed in millisecond, unit symbol ms.

### **TimeSecondInteger32**

representation: HLAinteger32BE

units: second (s)

resolution: 1

accuracy: perfect

semantics: Datatype for quantity time, based on SI base unit second, unit symbol s.

### **TimestampUnsignedInteger32**

representation: RPRunsignedInteger32BE

units: 1.676 microsecond

resolution: 1

accuracy: perfect

semantics: The scale of the time value contained in the most significant 31 bits of the timestamp shall be determined by setting one hour equal to  $(2^{31}-1)$ , thereby resulting in each time unit representing  $3600 \text{ s} / (2^{31}-1) = 1.676$  microsecond.



### **UnsignedInteger16**

representation: RPRUnsignedInteger16BE  
units: NA  
resolution: 1  
accuracy: perfect  
semantics: Integer in the range  $[0, 2^{16}]$ .

### **UnsignedInteger32**

representation: RPRUnsignedInteger32BE  
units: NA  
resolution: 1  
accuracy: perfect  
semantics: Integer in the range  $[0, 2^{32}]$ .

### **UnsignedInteger64**

representation: RPRUnsignedInteger64BE  
units: NA  
resolution: 1  
accuracy: perfect  
semantics: Integer in the range  $[0, 2^{64}]$ .

### **UnsignedInteger8**

representation: RPRUnsignedInteger8BE  
units: NA  
resolution: 1  
accuracy: perfect  
semantics: Integer in the range  $[0, 2^8]$ .

### **VelocityMeterPerSecondFloat32**

representation: HLAfloat32BE  
units: meter per second (m/s)  
resolution: NA  
accuracy: perfect  
semantics: Speed/Velocity in meter per second.

### **WavelengthMicronFloat32**

representation: HLAfloat32BE  
units: micron  
resolution: NA  
accuracy: perfect  
semantics: Wavelength expressed in micrometer.

### **BitRateBitPerSecondUnsignedInteger32**

representation: RPRUnsignedInteger32BE  
units: bit/second  
resolution: 1  
accuracy: perfect  
semantics: Rate of transmission, in bits per second.

### **BitsUnsignedInteger16**

representation: RPRUnsignedInteger16BE  
units: bit

resolution: 1  
accuracy: perfect  
semantics: Transmission size, in number of bits.

### **FrequencyHertzUnsignedInteger64**

representation: RPRunsignedInteger64BE  
units: hertz (Hz)  
resolution: NA  
accuracy: NA  
semantics: Frequency of a radio transmission, in hertz.

### **SpeedChangeRateRPMPerSecondInteger16**

representation: HLAinteger16BE  
units: RPM/s  
resolution: 1  
accuracy: perfect  
semantics: Angular acceleration

### **PowerWattFloat32**

representation: HLAfloat32BE  
units: watt (W)  
resolution: NA  
accuracy: perfect  
semantics: The unit of power is the watt (W), which is equal to one joule per second.

### **TransponderModeCAAltitude100-FootInteger16**

representation: HLAinteger16BE  
units: 100-foot increment  
resolution: 1  
accuracy: perfect  
semantics: Actual Mode C altitude in the range 0-126,000 feet in 100-foot increments.

### **MineDielectricDifference**

representation: HLAfloat32BE  
units: NA  
resolution: NA  
accuracy: NA  
semantics: Local dielectric difference between the mine and the surrounding soil (reflectance)

### **MineIdentifier**

representation: RPRunsignedInteger16BE  
units: NA  
resolution: 1  
accuracy: NA  
semantics: Specifies a mine entity identifier

### **RevolutionsPerMinuteFloat32**

representation: HLAfloat32BE  
units: RPM  
resolution: NA  
accuracy: perfect  
semantics: Rotation speed expressed in revolutions per minute.

### **VelocityDecimeterPerSecondInteger16**

representation: RPRunsignedInteger16BE  
units: decimeter per second (dm/s)  
resolution: 1  
accuracy: perfect  
semantics: Velocity/Speed measured in decimeter per second.

### **BitRateData**

representation: HLAfloat32BE  
units: Kbps  
resolution: N/A  
accuracy: N/A  
semantics: N/A