Table D.23 — DeviceProcessData attributes

Attribute	XML	Use	Type	Length/range	Comment
DeviceProcessDataObjectId	A	r	xs:unsigned-Short	1 to 65534	Unique number inside a single device
DeviceProcessDataDDI	B	r	xs:hexBinary	0000_{16} to $FFFF_{16}$	Unique number which specifies the process data variable (defined in ISO 11783-11)
DeviceProcessDataProperty	C	r	xs:NMTOKEN	0 to 7	Bit combination to specify the ProcessDataVariable property: 1 = belongs to default set 2 = settable 4 = control source[a]
DeviceProcessDataTrigger-Methods	D	r	xs:integer	0 to 31	Bit combination to specify supported trigger methods: 1 = time interval 2 = distance interval 4 = threshold limits 8 = on change 16 = total
DeviceProcessDataDesignator	E	o	xs:string	max. 32	Designator of DeviceProcessData
DeviceValuePresentationObjectId	F	o	xs:unsigned-Short	1 to 65534	Object ID of DeviceValuePresentation

[a] This bit value is introduced in ISO 11783-10 version 4.

EXAMPLE

```
<DPD A="1" B="1234" C="3" D="1"/>
```

D.24 DeviceProperty — DPT

Type:

Coding data

Description:

The DeviceProperty XML element describes a property of a DeviceElement by means of a reference and a value for a DDI. This XML element is part of the device descriptor.

References XML element:

— *DeviceValuePresentation*

Referenced by XML element:

— *DeviceObjectReference*

Included by XML elements:

— *Device*

Table D.24 — DeviceProperty attributes

Attribute	XML	Use	Type	Length/range	Comment
DevicePropertyObjectId	A	r	xs:unsignedShort	1 to 65534	Unique number inside a single device
DevicePropertyDDI	B	r	xs:hexBinary	0000_{16} to $FFFF_{16}$	Unique number which defines the property (specified in ISO 11783-11)
DevicePropertyValue	C	r	xs:long	-2^{31} to $(2^{31}-1)$	Property value
DevicePropertyDesignator	D	o	xs:string	max. 32	Optional designator for property
DeviceValuePresentationObjectId	E	o	xs:unsignedShort	1 to 65534	Object ID of DeviceValuePresentation

EXAMPLE

```
<DPT A="8" B="1235" C="-65233"/>
```

D.25 DeviceValuePresentation — DVP

Type:

Coding data

Description:

The DeviceValuePresentation XML element is used to specify the presentation of the data dictionary entity-defined integer values that are used within a single device. The presentation shall be according to the following formula:

Presented value = (integer value + Offset) * Scale

Presented values are always rounded to the number of decimals specified in the NumberOfDecimals attribute.

Referenced by XML elements:

— *DeviceProcessData*

— *DeviceProperty*

Included by XML elements:

— *Device*

Table D.25 — DeviceValuePresentation attributes

Attribute	XML	Use	Type	Length/ range	Comment
DeviceValuePresentationObjectId	A	r	xs:unsigned-Short	1 to 65534	Unique number inside a single device
Offset	B	r	xs:long	-2^{31} to $(2^{31}-1)$	Offset to be applied to the value for presentation
Scale	C	r	xs:decimal	0.000000001 to 100000000.0	Scale to be applied to the value for presentation
NumberOfDecimals	D	r	xs:unsigned-Byte	0 to 7	Number of decimals to be presented after the decimal separator

Table D.25 *(continued)*

Attribute	XML	Use	Type	Length/ range	Comment
UnitDesignator	E	o	xs:string	max. 32	Optional unit designator string

EXAMPLE

```
<DVP A="1" B="0" C="1.0" D="0" E="kg"/>
<DVP A="2" B="18" C="1.8" D="1" E="°F"/>
```

D.26 Farm — FRM

Type:

Coding data

Description:

The Farm XML element contains all required information to describe a farm. In the data transfer file set, a farm can hold a collection of fields that is managed independently from other farms. The relationships between a customer and farms and partfields can be multiple. To determine which farms or partfields belong to a specific customer, the CustomerIdRef values of all farms or partfields, respectively, shall be examined for a match with a particular CustomerId value.

References XML element:

— *Customer*

Referenced by XML elements:

— *Partfield*

— *Task*

Table D.26 — Farm attributes

Attribute	XML	Use	Type	Length/range	Comment
FarmId	A	r	xs:ID	min. 4 to max. 14	Unique identifier of Farm Format: (FRM|FRM-)([0–9])+ Records generated on MICS have negative IDs
FarmDesignator	B	r	xs:string	max. 32	Farm designator/name
FarmStreet	C	o	xs:string	max. 32	Street
FarmPOBox	D	o	xs:string	max. 32	PO Box
FarmPostalCode	E	o	xs:string	max. 10	Postal code
FarmCity	F	o	xs:string	max. 32	City
FarmState	G	o	xs:string	max. 32	State or county
FarmCountry	H	o	xs:string	max. 32	Country
CustomerIdRef	I	o	xs:IDREF	min. 4 to max. 14	Reference to XML element customer Format: (CTR|CTR-)([0–9])+

EXAMPLE

```
<FRM A="FRM1" B="bonanza ranch" />
```

D.27 Grid — GRD

Type:

Task data

Description:

The Grid XML element describes the dimension and position of a set of gridcells. There shall be a definition of the minimum north/east position, the size of each gridcell, and the number of gridcells in the north/east direction. There can only be a single grid specified per task. The grid is always related to a partfield but the definition of grid is always task-specific. The grid cells of a grid contain a reference to a TreatmentZone or a process data variable value. The grid shall be specified as a complete array of gridcells in ascending order, as gridcells do not contain any ordering information.

The gridcells shall be defined in a binary format in a separate file. There can only be a single binary file per grid and per task. The gridcell files shall exist in the same directory as the other files of the data transfer file set. The name of the gridcell files shall be unique over all grids referred to by tasks of a data transfer file set.

A Task can have at a maximum one Grid. TaskControllers (with limited processing capacity) can handle only one Grid per Task. This means that in case of more OperTechPractises, the FMIS shall formulate a common Grid which specifies the TreatmentZones which are valid for all OperTechPractises. Note that a single TreatmentZone may contain more than one ProcessDataVariable to be controlled by a position-based controller. Multi-variable position-based control is possible with both grid type 1 and grid type 2.

References XML element:

— *TreatmentZone*

Included by XML elements:

— *Task*

Table D.27 — Grid attributes

Attribute	XML	Use	Type	Length/ range	Comment
GridMinimumNorthPosition	A	r	xs:decimal	–90.0 to 90.0	Minimum north position of the grid Format: WGS84
GridMinimumEastPosition	B	r	xs:decimal	–180.0 to 180.0	Minimum east position of the grid Format: WGS84
GridCellNorthSize	C	r	xs:double	0.0 to 1.0	North direction gridcell size Format: WGS84
GridCellEastSize	D	r	xs:double	0.0 to 1.0	East direction gridcell size Format: WGS84
GridMaximumColumn	E	r	xs:unsignedLong	0 to (2^{32}–1)	Number of the gridcells in east direction
GridMaximumRow	F	r	xs:unsignedLong	0 to (2^{32}–1)	Number of the gridcells in north direction
Filename	G	r	xs:ID	8	Unique name of gridcell file Format: GRD[0–9][0–9][0–9][0–9][0–9]
Filelength	H	o	xs:unsignedLong	0 to (2^{32}–2)	Length of gridcell file in number of bytes

Table D.27 *(continued)*

Attribute	XML	Use	Type	Length/ range	Comment
GridType	I	r	xs:NMTOKEN	1 to 2	Grid type specification: 1 = grid type 1 2 = grid type 2
TreatmentZoneCode	J	o	xs:unsigned-Byte	0 to 254	Grid type 2 TreatmentZoneCode

EXAMPLE

Grid type 1 XML element specification:

```
<GRD A="58.096653" B="8.54321" C="0.012" D="0.012" E="200" F="300" G="GRD00001" I="1"/>
```

See 8.6.2 for examples of both grid type 1 and grid type 2 specifications.

D.28 GuidanceAllocation — GAN

Type:

Task data

Description:

The GuidanceAllocation XML element describes the allocation of a GuidanceGroup to a Task. The AllocationStamp entry describes the start/stop time of allocations and enables tracking of the changes of the guidance allocations to a task.

The included GuidanceShift XML element specifies geospatioal shifts applied to the GuidancePatterns in the allocated GuidanceGroup. Each GuidanceShift XML element contains its won AllocationStamp XML element. If multiple shift operations occur, then each shift operation is recorded in a new GuidanceShift XML element in the GuidanceAllocation XML element.

The GuidanceAllocation XML element is added in ISO 11783-10 version 4.

References XML element:

— *GuidanceGroup*

Included by XML element:

— *Task*

Includes XML elements:

— *AllocationStamp*

— *GuidanceShift*

Table D.28 — GuidanceAllocation attributes

Attribute	XML	Use	Type	Length/ range	Comment
GuidanceGroupIdRef	A	r	xs:IDREF	min. 4 to max. 14	Reference to XML element GuidanceGroup Format: (GGP|GGP-)([0–9])+ Records generated on MICS have negative IDs
AllocationStamp		r	xs:element		Includes a single XML element AllocationStamp
GuidanceShift		o	xs:element		Includes a list of XML element GuidanceShift

EXAMPLE

```
<PFD A="PFD3" C="hill" D="32000" G="CTP3">
   <PLN A="1" B="Field Boundary" C="32000" D="1">
      <LSG A="1" B="Line1" C="20" D="280000" E="1" >
         <PNT A="2" B="start" C="40.84982" D="-96.596045" E="150234" F="1" />
         <PNT A="2" B="mid" C="40.84982" D="-96.592655" E="148987" F="1" />
         <PNT A="2" B="end" C="40.846573" D="-96.592526" E="148284" F="1" />
      </LSG>
   </PLN>

   <GGP A="GGP1">
      <GPN A="GPN1" C="1" D="1">
         <LSG A="5" B="Guidance1" C="6000" D="1500000" E="1">
            <PNT A="6" B="start" C="40.84934" D="-96.593445" E="148987" F="1" H="0.05"/>
            <PNT A="7" B="end" C="40.84683" D="-96.592225" E="150234" F="1" H="0.04"/>
         </LSG>
      </GPN>

      <GPN A="GPN2" C="1" D="1">
         <LSG A="5" E="1" B="Guidance2" D="900000" C="18000" F="LSG2">
            <PNT A="2" B="start" C="40.84934" D="-96.122322" E="123506" F="1" I="2.0"/>
            <PNT A="2" B="end" C="40.84911" D="-96.591122" E="122544" F="1" I="2.0"/>
         </LSG>
      </GPN>
   </GGP>
</PFD>

<TSK A="TSK1" F="WKR1" G="1">
   <GAN A="GGP1">
      <ASP A="2003-08-20T08:00:00" B="2003-08-20T17:00:00" D="1"/>
   </GAN>
</TSK>
```

D.29 GuidanceGroup — GGP

Type:

Coding data

Description:

The GuidanceGroup XML element groups together one or more Guidance Patterns (GPN). Guidance Patterns in the group are intended to be used simultaneously. Typically a guidance group will contain two headland guidance patterns and a single mainfield guidance pattern, but it could contain any combination of main and headland guidance patterns. Situations where a partfield is bounded with multiple exterior polygons can require the use of multiple headland/mainland guidance patterns. A guidance group can contain only a single guidance pattern, in which case that guidance pattern shall be a mainland guidance pattern.

The GuidanceGroup XML element is added in ISO 11783-10 version 4.

Includes XML element:

— *GuidancePattern*

— *Polygon*

Included by XML element:

— *Partfield*

Referenced by XML element:

— *GuidanceAllocation*

Table D.29 — GuidanceGroup attributes

Attribute	XML	Use	Type	Length/ range	Comment
GuidanceGroupId	A	r	xs:ID	min. 4 to max. 14	Unique identifier of GuidanceGroup Format: (GGP|GGP-)([0–9])+ Records generated on MICS have negative IDs
GuidanceGroupDesignator	B	o	xs:string	max. 32	Designator of GuidanceGroup
GuidancePattern		r	xs:element		Includes a list of XML element GuidancePattern
BoundaryPolygon		o	xs:element		Includes a list of XML element Polygon to define the boundary for this GuidanceGroup. The boundary polygons are used to limit the geometry of the GuidancePatterns in this GuidanceGroup to a certain area inside the field boundary. Note that each boundary polygon can have interior boundaries in addition to the exterior boundary to designate exclusion zones.

EXAMPLE

```
<GGP A="GGP1">
   <GPN A="GPN1" B="Adaptive Curve" C="2" D="1">
      <LSG A="5">
       <PNT A="6" C="58.8754321" D="8.945632"/>
       <PNT A="9" C="58.8757777" D="8.94777"/>
       <PNT A="7" C="58.8789999" D="8.99889099"/>
      </LSG>
   </GPN>
</GGP>
```

D.30 GuidancePattern — GPN

Type:

Coding data

Description:

The GuidancePattern XML element describes the properties necessary to transfer the data for executing a guidance activity. The GuidancePattern XML element contains the properties that classify a guidance pattern while the LineString XML child element describes the geospatial information.

Every GuidancePattern XML element will contain one and only one LineString XML element. The points in the LineString will be determined by the GuidancePattern classification. The swathe width that separates the adjacent paths in the guidance pattern is represented by the LineStringWidth attribute in the LineString XML element. The following table defines the points that shall be used for each GuidancePattern type:

Table D.30 A — GuidancePattern types

Line Type	Required Points	Optional Points	Notes
AB	The start point shall be A and the end point shall be B.	No optional points	
A+	A single A point	No optional points	Shall have a heading defined. A+ lines with no heading are invalid
Curve	Start point shall be A, followed by any number of guidance points, followed by the end point B	Any number of guidance points (type 9) may exist between the A and B points	A curve is a 1-dimensional geometric primitive, representing the continuous image of a line. The curve type is considered an identical curve unless otherwise specified in the options attribute. Crossing its own line is allowed for curve type.
Pivot	A single Center point	A single centre point, followed by A, followed by B.	The A and B points are used to determine the angle of the start and end points for non-full circles. Pivots are considered full circles unless otherwise specified in the options attribute.
Spiral	A single A point followed by any number of guidance points followed by a single B point	Any number of guidance points (type 9) may exist between the A and B points	

Examples of these 5 pattern types are given in Figure D.1.

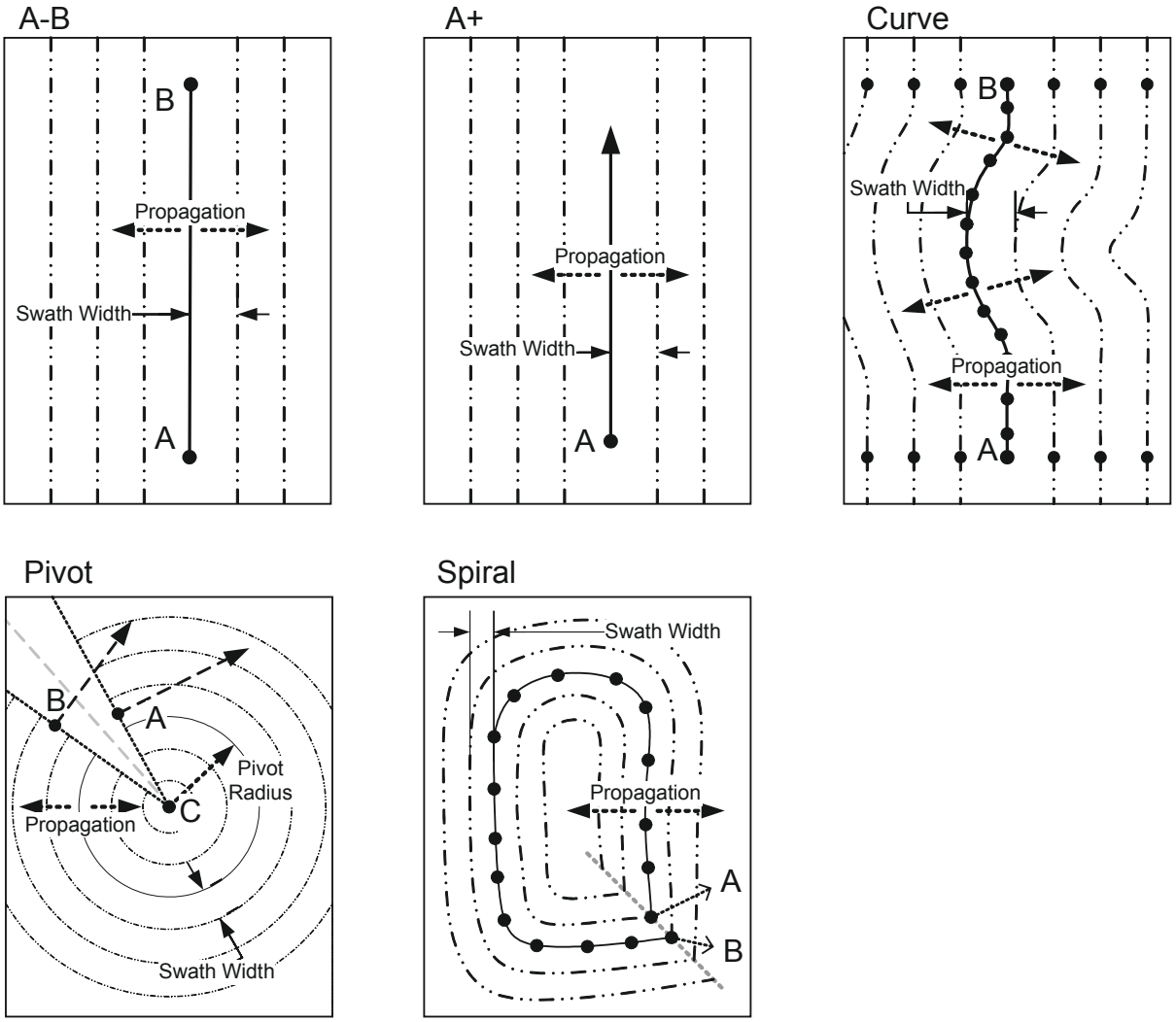

Figure D.1 — Guidance pattern types

AB, A+, and Curve lines will be generated parallel to the previous line and offset a distance determined by the swathe width.

Spiral lines will be generated end-to-end of the previous line and offset a distance determined by the swathe width. These will commonly be headlands.

Guidance patterns can reference the base stations they were recorded with. Monitors are expected to operate on guidance patterns without base station references.

Propagation direction indicates how the parallel offset lines should grow from the original. The direction is defined while standing on the first point and looking to the second point. The propagation definition supplied in attributes GuidancePatternPropagationDirection, NumberOfSwathsLeft and BoundaryPolygon shall not contradict each other.

The horizontal and vertical accuracies can be defined once for the entire GuidancePattern or can be defined at each individual Point. If these accuracies are present in both XML elements, then the accuracies defined in the individual points take precedence.

The boundary polygon defines the region in which a guidance pattern line is propagated. If a boundary polygon is defined, then this polygon must fit inside the defined field boundary polygon in which this guidance pattern is contained.

The GuidancePattern XML element is added in ISO 11783-10 version 4.

Included in XML element:

— *GuidanceGroup*

Includes XML element:

— *LineString*

— *Polygon*

References XML element:

— *BaseStation*

Table D.30 B — GuidancePattern attributes

Attribute	XML	Use	Type	Length/range	Comment
GuidancePatternId	A	r	xs:ID	min. 4 to max. 14	Unique identifier of GuidancePattern Format: (GPN|GPN-)([0–9])+ Records generated on MICS have negative IDs
GuidancePatternDesignator	B	o	xs:string	max. 32	Designator of GuidancePattern
GuidancePatternType	C	r	xs:NMTOKEN	1...5	Selection of type: 1 = AB 2 = A+ 3 = Curve 4 = Pivot 5 = Spiral
GuidancePatternOptions	D	o	xs:NMTOKEN	1...3	1 = Clockwise - for pivot 2 = Counter-clockwise - for pivot 3 = Full Circle - for pivot
GuidancePatternPropagationDirection	E	o	xs:NMTOKEN	1...4	1 = Both directions 2 = Left direction only 3 = Right direction only 4 = No propagation The direction is defined while standing on the first point (A) and looking to the next point. When this attribute is not defined in the GuidancePattern then propagation shall be applied in both directions.

Table D.30 *(continued)*

Attribute	XML	Use	Type	Length/range	Comment
GuidancePatternExtension	F	o	xs:NMTOKEN	1..4	1 = From both first and last point 2 = From first point (A) only 3 = From last point (B) only 4 = No extensions When this attribute is not defined in the GuidancePattern then extensions shall be applied from both first and last point. Extension means that guidance shall be continued when the specified point of the Guidance-Pattern is passed. The GuidancePattern is extended by the guidance system.
GuidancePatternHeading	G	o	xs:decimal	0.0...360.0	Decimal degrees counting clockwise relative to the true north
GuidancePatternRadius	H	o	xs:unsignedLong	0 to (2^{32}-2)	Pivot radius information in mm
GuidancePatternGNSS-Method	I	o	xs:NMTOKEN	0...17	Reference to NMEA 2000 GNSS Method parameter: 1 = GNSS fix 2 = DGNSS fix 3 = Precise GNSS 4 = RTK Fixed Integer 5 = RTK Float 6 = Estimated (DR) mode 7 = Manual Input 8 = Simulate mode (NMEA 2000 defines at maximum 16 tokens for GNSS Method) Additional non- NMEA 2000 methods: 16 = Desktop generated data 17 = Other
GuidancePatternHorizontalAccuracy	J	o	xs:decimal	0.0 to 65.0	Horizontal estimated accuracy (RMS error) in m
GuidancePatternVerticalAccuracy	K	o	xs:decimal	0.0 to 65.0	Vertical estimated accuracy (RMS error) in m
BaseStationIdRef	L	o	xs:IDREF	min. 4 to max. 14	Reference to XML element BaseStation Format: (BSN|BSN-)([0–9])+