

SDR+ XML Format Reference Guide

SDR+ XML Format Reference Guide

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1.0 About the SDR+ XML Format

This document is intended as a reference for the SDR+ XML format. This format is used in the XML report produced by the SDR+ Export module, and was designed as a standard format for the output of SDR+ job information.

Note: For details about the SDR+ Export module, or about using this XML format with XSL transformation (XSLT) templates, refer to the SDR+ *User Guide*. For technical information about using XSLT when working with XML file formats, refer to <http://www.w3.org/TR/xslt>. For general technical information about XML, refer to <http://www.w3.org/XML>.

Currently, SDR+ uses XSLT version 1.1. All XSLT conversion files must conform to this version to work with SDR+.

1.1 Overview

The general structure of the XML report is as follows:

```
<?xml version="1.0" encoding="UTF-8" standalone="yes" ?>
<JOB>...
  <Job properties> </Job properties>
  <First record> </First record>
  ...//time-ordered
  <Last record> </Last record>
</JOB>
```

Job properties (see Section 2.0) are located at the beginning of the XML report.

The order of job data records is time-ordered. The first entry in the XML report corresponds to the earliest record in the job, and the last entry corresponds to the most current record in the job. See Section 3.0 for details about job data records.

1.2 Unit Formats

The following unit formats are always used in the SDR+ XML format, unless otherwise specified in this document:

- All linear values are output in meters.
- All angular values are output in decimal degrees.

1.3 Field Formats

The following field formats are used to describe the type of data presented in each field.

Format	Description
INT	Integer value
BOOL	Boolean value (true/false)
STRING	String
ENUM	Enumerated value
FLOAT	Floating point value. If a value is not available or not computable, "NotComputable" is written in

	the field.
UID	Unique Identifier. This ID is unique within the job, but not across multiple jobs.
GUID	Globally Unique Identifier
TIMESTAMP	Time (see Section 1.3.1).
COORD	Coordinates (see Section 1.3.2).
CARTCOORDTYPE	Cartesian coordinates (see Section 1.3.3)

1.3.1 TIMESTAMP

All timestamps are with respect to the system time set on the data controller at the time the record was created or was last modified. In this document, records that include a time subsection refer to it as the field "Time" of the format TIMESTAMP.

All timestamps have the following form:

```
<Time>
  <Year>2007</Year>
  <Month>5</Month>
  <Day>2</Day>
  <DayOfWeek>3</DayOfWeek>
  <Hour>10</Hour>
  <Min>36</Min>
  <Sec>45</Sec>
  <ms>789</ms>
</Time>
```

Field	Description	Format	Options
<Year>	Year	INT	
<Month>	Month	ENUM	January = 1, February = 2, ..., December = 12
<Day>	Day of the month	INT	
<DayOfWeek>	Day of the week	ENUM	Sunday = 0, Monday = 1, ..., Saturday = 6
<Hour>	Hour the job was created	INT	
<Min>	Minute the job was created	INT	
<Sec>	Second the job was created	INT	
<ms>	Millisecond the job was created	INT	

1.3.2 COORD

All point coordinates are presented using the COORD field type. The COORD format has the following form:

```
<Coord>
  <CoordSystemGUID>6A2047E0-CA04-01C2-0B02-18D2CA05102F</CoordSystemGUID>
  <C1>123.321</C1>
  <C2>123.321</C2>
```

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```
<C3>123.321</C3>
</Coord>
```

All coordinates are written with respect to an associated coordinate system record (in the <CoordSystemGUID> field).

All coordinate values are written in meters and decimal degrees.

Height values are exported as follows:

- For **Geographic** systems, Height values are exported as orthometric if the associated coordinate system has a geoid applied; otherwise, they are ellipsoidal.
- For **Projected** systems, Height values are exported as orthometric if the associated coordinate system has a geoid applied; otherwise, they are grid heights.
- For **Local grid** systems, all Height values are exported as grid heights.

Projected and Local grid systems assume positive N/Y axes in the up direction and E/X axes in the right direction (a right handed system).

Coordinate field values displayed in the C1, C2, and C3 fields are dependent on the associated coordinate system frame:

- Frame is LLH (Geographic). C1, C2, and C3 correspond to Latitude, Longitude, Height.

```
<Coord>
  <CoordSystemGUID>6A2047E0-CA04-01C2-0B02-18D2CA05102F</CoordSystemGUID>
  <C1>51.32101254</C1>           // This value is Latitude in decimal degrees
  <C2>-114.123321</C2>          // This value is Longitude in decimal degrees
  <C3>1024.201</C3>             // This value is Height in meters
</Coord>
```

- Frame is NEH (Projected). C1, C2, and C3 correspond to Northing, Easting, Height.

```
<Coord>
  <CoordSystemGUID>6A2047E0-CA04-01C2-0B02-18D2CA05102F</CoordSystemGUID>
  <C1>5666939.125</C1>           // This value is Northing in meters
  <C2>707280.985</C2>           // This value is Easting in meters
  <C3>1024.201</C3>             // This value is Height in meters
</Coord>
```

- Frame is XYH (Local Grid). C1, C2, and C3 correspond to Y, X, Height.

```
<Coord>
  <CoordSystemGUID>6A2047E0-CA04-01C2-0B02-18D2CA05102F</CoordSystemGUID>
  <C1>1000.000</C1>             // This value is Y in meters
  <C2>5000.000</C2>           // This value is X in meters
  <C3>10.00</C3>               // This value is Height in meters
</Coord>
```

- If the coordinates are not computable, "NotComputable" is written to the field.

```
<Coord>
  <CoordSystemGUID>6A2047E0-CA04-01C2-0B02-18D2CA05102F</CoordSystemGUID>
  <C1>NotComputable</C1>
  <C2>NotComputable</C2>
  <C3>NotComputable</C3>
</Coord>
```

1.3.3 CARTCOORD Type

ECEF Cartesian point coordinates will be included in the XML report using the CARTCOORD field type.

The ECEF Cartesian coordinates will be calculated using the current job coordinate system datum and ellipsoid.

The ECEF Cartesian coordinates will be calculated from ellipsoidal heights.

If the Frame is XYZ (the ECEF Cartesian Export option was selected): C1, C2, and C3 will correspond to X, Y, Z.

The ECEF Cartesian coordinate values will be in meters.

The CARTCOORD format will have the following form:

```
<CartesianCoords>
  <X>123.321</X>
  <Y>123.321</Y>
  <Z>123.321</Z>
</CartesianCoords>
```

If the Cartesian coordinates are not computable, NotComputable will be written in the X, Y, and Z fields.

2.0 Job Properties

Job properties are always included in the XML report, regardless of the job data content. Job properties include the following information:

Job Property	Section String
Job Name	JobName
Job Timestamp	Time
Versions	Versions
Job Properties	JobProperties
Job Settings	JobSettings
Coordinate System	CoordinateSystem

2.1 Job Name

The job name section contains the name of the job:

```
<JobName>Job01</JobName>
```

2.2 Job Timestamp

The job timestamp section contains the job's last modified date and time. It follows the format for timestamps described in Section 1.3.1.

2.3 Versions

The versions section contains the SDR+ version and the XML Export Format version:

```
<Versions>
  <XMLExport>2.0</XMLExport> 1
  <SDRPlus>7.3.1.17990</SDRPlus>
</Versions>
```

Field	Comments	Format
<XMLExport>	Format of V.R, where V is the version number and R is the revision number.	STRING
<SDRPlus>	Format of V.V.V.RRRRR, where V.V.V is the SDR+ version number and RRRRR is the SDR+ build number.	STRING

2.4 Job Properties

The job properties section contains all the properties of the job:

```
<JobProperties>
  <Project>Ring Road Job</Project>
  <Location>Calgary N.W.</Location>
  <Surveyor>B. Jones</Surveyor>
  <SurveyorCompany>Bob's Surveys</SurveyorCompany>
  <Client>City of Calgary</Client>
  <ClientCompany>Calgary City Council</ClientCompany>
  <Comments>Secondary survey of the new Ring Road addition to Sarcee Trail</Comments>
</JobProperties>
```

Field	Format
<Project>	STRING
<Location>	STRING
<Surveyor>	STRING
<SurveyorCompany>	STRING
<Client>	STRING
<ClientCompany>	STRING
<Comments>	STRING

2.5 Job Settings

The job settings section contains the job's settings information:

```
<JobSettings>
  <BacksightWeighting>Uniform</BacksightWeighting>
  <EarthRadius>63190000</EarthRadius>
```

¹ As of SDR+ version 9.2.1., the current SDR+ XML Format Version is 2.0.

```

<ScaleFactor>1.000</ScaleFactor>
<ApplyAtmosphericCorrection>>true</ApplyAtmosphericCorrection>
<ApplyCurvatureAndRefractionCorrection>>true</ApplyCurvatureAndRefractionCorrection>
<RefractiveIndex>0.14</RefractiveIndex>
<ApplySeaLevelCorrection>>true</ApplySeaLevelCorrection>
<VerticalAngleReference>Zenith</VerticalAngleReference>
<LinearUnit>Meters</LinearUnit>
<LinearPrecision>4</LinearPrecision>
<AngularUnit>DMS</AngularUnit>
<AngularPrecision>5</AngularPrecision>
<TemperatureUnit>Celsius</TemperatureUnit>
<PressureUnit>mmMercury</PressureUnit>
<GradeUnit>Percent</GradeUnit>
<SideSlopeUnit>Ratio</SideSlopeUnit>
<AreaUnit>SquareMeters</AreaUnit>
<AreaPrecision>4</AreaPrecision>
<VolumeUnit>CubicMeters</VolumeUnit>
<VolumePrecision>4</VolumePrecision>
<ScalarUnit>Scalar</ScalarUnit>
<ScalarPrecision>9</ScalarPrecision>
</JobSettings>

```

Field	Comments	Format	Options
<BacsightWeighting>		STRING	ByDistance Uniform
<EarthRadius>	Units are meters.	FLOAT	
<ScaleFactor>	Value is always scalar.	FLOAT	
<ApplyAtmosphericCorrection>		BOOL	
<ApplyCurvatureAndRefractionCorrection>		BOOL	
<RefractiveIndex>	Only included if ApplyCurvatureAndRefractionCorrection field is set to true. Unitless value.	FLOAT	
<ApplySeaLevelCorrection>		BOOL	
<VerticalAngleReference>	From Application settings.	STRING	Horizon Zenith

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Field	Comments	Format	Options
<LinearUnit>	From Application settings.	STRING	Meters Feet USFeet Yards Inches
<LinearPrecision>	From Application settings.	INT	
<AngularUnit>	From Application settings.	STRING	DMS DM Degrees Gons Mils Radians HP
<AngularPrecision>	From Application settings.	INT	
<TemperatureUnit>	From Application settings.	STRING	Celsius Fahrenheit
<PressureUnit>	From Application settings.	STRING	MmMercury InchesMercury Millibars Psi Pascals
<GradeUnit>	From Application settings.	STRING	Percent Ratio
<SideSlopeUnit>	From Application settings.	STRING	Percent Ratio
<AreaUnit>	From Application settings.	STRING	SquareMeters SquareYards SquareFeet SquareUSFeet SquareMiles Hectares Acres
<AreaPrecision>	From Application settings.	INT	

Field	Comments	Format	Options
<VolumeUnit>	From Application settings.	STRING	CubicMeters CubicYards CubicFeet CubicUSFeet
<VolumePrecision>	From Application settings.	INT	
<ScalarUnit>	From Application settings.	STRING	Scalar ppm
<ScalarPrecision>	From Application settings.	INT	

2.6 Coordinate System

The coordinate system section contains the job's coordinate system information:

```

<CoordinateSystem>
  <IsJobSystem>true</IsJobSystem>
  <GUID>6A2047E0-CA04-01C2-8601-93D145058B2E</GUID>
  <Name>UTM Zone 11 (N)</Name>
  <Description>UTM Zone 11 (N) on NAD83</Description>
  <IsGeoidApplied>>false</IsGeoidApplied>
  <Frame>NEH</Frame>
  <LinearUnit>meters</LinearUnit>
  <LinearHorizontalPrecision>3</LinearHorizontalPrecision>
  <LinearVerticalPrecision>3</LinearVerticalPrecision>
  <AngularUnit>DMS</AngularUnit>
  <AngularPrecision>5</AngularPrecision>
</CoordinateSystem>

```

Field	Format	Options
<IsJobSystem>	BOOL	
<GUID>	GUID	MAXLENGTH = 36
<Name>	STRING	MAXLENGTH = 32
<Description>	STRING	MAXLENGTH = 64
<IsGeoidApplied>	BOOL	
<Frame>	STRING	XYH (Local grid) NEH (Projected System) LLH (Geographic System)

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Field	Format	Options
<LinearUnit>	STRING	Meters Feet USfeet Yards
<LinearHorizontalPrecision>	INT	
<LinearVerticalPrecision>	INT	
<AngularUnit>	STRING	DMS DM Degrees HP
<AngularPrecision>	INT	

3.0 Job Data Records

All job data records are contained in separate sections. The available record types include the following:

Job Record Type	Section String
Job Point	Point
KI Point	KICoordinate
KI Azimuth	KIAzimuth
KI Line	Line
KI Arc	Arc
KI Spiral	Spiral
Polygon	Polygon
Polyline	Polyline
COGO Radiation	COGORadiation
COGO Inverse	COGOInverse
Instrument	Instrument
Station	Station
Target	Target
ETS Observation	ETSObservation
Resection Station	ResectionStation
Resection Observation	ResectionObservation
RTK Session	RTKSession
GPS Antenna	GPSAntenna

Job Record Type	Section String
RTK Observation	RTKObservation
Meteorological	Meteorological
Note	Note
Traverse	Traverse

3.1 Point

```

<Point>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <ID>1001</ID>
  <FeatureCode>Corner</FeatureCode>
  <Computable>3D</Computable>
  <Coord>
    <CoordSystemGUID>6A2047E0-CA04-01C2-0B02-18D2CA05102F</CoordSystemGUID>
    <C1>5666939.721</C1>
    <C2>707280.216</C2>
    <C3>1045.154</C3>
  </Coord>
  <CartesianCoord>
    <X>5666939.721</X>
    <Y>707280.216</Y>
    <Z>1045.154</Z>
  </CartesianCoord>
  <HorizontalDerivation>ETSObservation</HorizontalDerivation>
  <VerticalDerivation>ETSObservation</VerticalDerivation>
  <IsStaked>>false</IsStaked>
  <StakedDesign>
    <DesignEntityUID>235795224</DesignEntityUID>
    <VerticalReference>JobData</VerticalReference>
    <AlongLine>2.04</AlongLine>
    <HorizontalOffset>1.000</HorizontalOffset>
    <VerticalOffset>0.0000</VerticalOffset>
    <PolyLineStakedType>Back</PolyLineStakedType>
    <SlopeType>RightCut</SlopeType>
    <Slope>2.000</Slope>
  </StakedDesign>

```

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```

</StakedDesign>
<CutFill>
  <DeltaX>0.012</DeltaX>
  <DeltaY>1.023</DeltaY>
  <DeltaH>1.023</DeltaH>
  <DeltaHorizontal>1.023</DeltaHorizontal>
  <Delta3D>1.023</Delta3D>
  <DeltaAlongLine>1.023</DeltaAlongLine>
  <DeltaOffline>1.023</DeltaOffline>
  <CenterCutFill>1.023</CenterCutFill>
</CutFill>
</Point>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<ID>		STRING	MAXLENGTH = 32
<FeatureCode>		STRING	MAXLENGTH = 128
<Computable>		STRING	Vert Horz 3D Not
<Coord>	See Section 1.3.2 for more information. Units are decimal degrees and meters. Frame is frame from CoordinateSystem record.	COORD	
<CartesianCoord>	See Section 1.3.3 Units will be meters. Frame will be XYZ and Cartesian coordinates will be computed based on the current coordinate system datum and ellipsoid. If coordinates cannot be computed, NotComputable is written in place of values.	CARTCOORD	

Field	Comments	Format	Options
<HorizontalDerivation>	See Section 3.1.1 for information about derivation types.	STRING	ETSObservation RTKObservation MultiRTK MultiETS MultiRTKSetups MultiETSSetups Multisource KeyboardInput Resection COGORadiation NotCoordinated
<VerticalDerivation>	See Section 3.1.1 for information about derivation types.	STRING	ETSObservation RTKObservation MultiRTK MultiETS MultiRTKSetups MultiETSSetups Multisource KeyboardInput Resection COGORadiation NotCoordinated
<IsStaked>		BOOL	
<StakedDesign>	-- SUB-SECTION HEADER -- StakedDesign section is included only if IsStaked value is true (a staked value has been recorded).		
<DesignEntityUID>	Included only if staking job data (not included for surface staking).	UID	
<VerticalReference>		STRING	DTM + <Offset> <FixedElevation> JobData
<AlongLine>	Included only if staking Line, Arc, or Polyline (not included for surface staking or point staking). Units are meters.	FLOAT	

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Field	Comments	Format	Options
<HorizontalOffset>	Included only if staking Line, Arc, or Polyline (not included for surface staking or point staking). Units are meters.	FLOAT	
<VerticalOffset>	Included only if staking Line, Arc, or Polyline (not included for surface staking or point staking). Units are meters.	FLOAT	
<PolyLineStakedType>	Included only if the design entity is a polyline.	STRING	Back Bisect Ahead Normal (not staking an intersection)
<SlopeType>	Included only if staking Line, Arc, or Polyline (not included for surface staking or point staking).	STRING	None RightCut RightFill LeftCut LeftFill
<Slope>	Included only if SlopeType is NOT None. Percentage.	FLOAT	
<CutFill>	-- SUB-SECTION HEADER -- Included only if IsStaked value is true.		
<DeltaX>	Included only when staking job data (not included for surface or slope staking). Units are meters.	FLOAT	
<DeltaY>	Included only when staking job data (not included for surface or slope staking). Units are meters.	FLOAT	
<DeltaH>	If staking slopes, this value is the Slope Delta Height. Units are meters.	FLOAT	
<DeltaHorizontal>	Included only if point was staked from a line, arc, or polyline and not slope staked. Units are meters.	FLOAT	
<Delta3D>	Included only if point was staked from a line, arc, or polyline and not slope staked. Units are meters.	FLOAT	

Field	Comments	Format	Options
<DeltaAlongLine>	Included only if the point was staked from a line, arc, or polyline and an interval was defined. Units are meters.	FLOAT	
<DeltaOffline>	Included only if the point was staked from a line, arc, or polyline. Always positive for slope staked data. Units are meters.	FLOAT	
<CenterCutFill>	Included only if SlopeType is NOT None. Units are meters.	FLOAT	

3.1.1 Derivation Types

Type	Description
RTKObservation	One RTK observation coordinates the point
ETSObservation	One ETS observation coordinates the point
MultiRTK	More than one RTK observation from the same session coordinates the point
MultiETS	More than one ETS observation from the same station coordinates the point
MultiRTKSetups	RTK observations from different sessions coordinate the point
MultiETSSetups	ETS observations from different stations coordinate the point
Multisource	Both RTK and ETS observations coordinate the point
KeyboardInput	Derivation was keyed in, imported, created during Static/Kinematic survey, auto-generated by COGO tape from baseline, COGO point projection, COGO points from polyline, COGO intersection, or auto-generated when defining an Arc or Spiral.
Resection	Resection derived
COGORadiation	COGO radiation derived
NotCoordinated	No derivation method

3.2 KI Coordinate

```

<KICoordinate>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>

```

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```

</Time>
<DerivationType>UserInput</DerivationType>
<Coord>
  <CoordSystemGUID>6A2047E0-CA04-01C2-0B02-18D2CA05102F</CoordSystemGUID>
  <C1>51.23231254</C1>
  <C2>-114.05231254</C2>
  <C3>1045.315</C3>
</Coord>
<PointUID>874653217</PointUID>
<IsControl>True</IsControl></KICoordinate>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<DerivationType>		STRING	UserInput StaticKinematic Intersection PointProjection Endpoint Import TapeFromBaseLine PointsFromPolyline TraverseAdjustment Arc Spiral
<Coord>	See Section 1.3.2 for more information. Units are decimal degrees and meters. Coordinate system frame follows the frame in the associated CoordSystemGUID record.	COORD	
<PointUID>		UID	
<IsControl>		BOOL	

3.3 KI Azimuth

```

<KIAzimuth>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>

```

```

    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <FromPointUID>915154734</FromPointUID>
  <ToPointUID>514746015</ToPointUID>
  <Azimuth>110.1541587</Azimuth>
</KIAzimuth>

```

Field	Comments	Format
<UID>		UID
<Time>	See Section 1.3.1 for more information.	TIMESTAMP
<FromPointUID>		UID
<ToPointUID>		UID
<Azimuth>	Units are decimal degrees.	FLOAT

3.4 Line

```

<Line>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <ID>1001</ID>
  <FeatureCode>Some feature code</FeatureCode>
  <FromPointUID>898093495</FromPointUID>
  <ToPointUID>953202353</ToPointUID>
  <Azimuth>120.0154678</Azimuth>
  <DeltaHeight>1.0101</DeltaHeight>
  <Length2D >1.041</Length2D >
  <Length3D >2.041</Length3D >
</Line>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<ID>		STRING	MAXLENGTH = 32
<FeatureCode>		STRING	MAXLENGTH = 128
<FromPointUID>		UID	
<ToPointUID>		UID	
<Azimuth>	Units are decimal degrees.	FLOAT	
<DeltaHeight>	Units are meters.	FLOAT	
<Length2D >	Units are meters.	FLOAT	
<Length3D >	Units are meters.	FLOAT	

3.5 Arc

```

<Arc>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <ID>1001</ID>
  <FeatureCode>Arc feature code</FeatureCode>
  <FromPointUID>324993322</FromPointUID>
  <ToPointUID>934923490</ToPointUID>
  <Direction>Left</Direction>
  <Radius>2.04</Radius>
  <ArcLength>2.04</ArcLength>
  <ChordLength>2.04</ChordLength>
  <DegreeOfCurve>15.00000</DegreeOfCurve>
  <Delta>2.00000</Delta>
  <TangentAzimuth>2.04</TangentAzimuth>
  TangentDistance>2.04</TangentDistance>
  <DeltaHeight>2.04</DeltaHeight>
</Arc>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<ID>		STRING	MAXLENGTH = 32
<FeatureCode>		STRING	MAXLENGTH = 128
<FromPointUID>		UID	
<ToPointUID>		UID	
<Direction>		STRING	Left Right
<Radius>	Units are meters.	FLOAT	
<ArcLength>	Units are meters.	FLOAT	
<ChordLength>	Units are meters.	FLOAT	
<DegreeOfCurve>	Units are decimal degrees.	FLOAT	
<Delta>	Units are decimal degrees.	FLOAT	
<TangentAzimuth>	Units are decimal degrees.		
<TangentDistance>	Included only if computable. Units are meters.	FLOAT	
<DeltaHeight>	Units are meters.	FLOAT	

3.6 Spiral

```

<Spiral>
  <UID>1174405121</UID>
  <Time>
    <Year>2008</Year>
    <Month>11</Month>
    <Day>7</Day>
    <DayOfWeek>5</DayOfWeek>
    <Hour>14</Hour>
    <Min>9</Min>
    <Sec>43</Sec>
    <ms>270</ms>
  </Time>
  <ID>TSSCSpiral_Sprl</ID>
  <FeatureCode>Modified FC</FeatureCode>
  <FromPointUID>100663298</FromPointUID>
  <ToPointUID>100663299</ToPointUID>
  <SpiralType>CSToSC</SpiralType>
  <Direction>Left</Direction>
  <RadiusIn>100.0</RadiusIn>
  <RadiusOut>100.0</RadiusOut>

```

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```

<DegreeOfCurveIn>100.0</DegreeOfCurveIn>
<DegreeOfCurveOut>100.0</DegreeOfCurveOut>
<CentralAngle>100.0</CentralAngle>
<TangentAzimuth>100.0</TangentAzimuth>
<A>100.0</A>
<CStoSCLength>102.673072406242</CStoSCLength>
<TStoSCLength>102.673072406242</TStoSCLength>
<SpiralLength>102.673072406242</SpiralLength>
<DeltaHeight>102.673072406242</DeltaHeight>
</Spiral>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1	TIMESTAMP	
<ID>		STRING	MAXLENGTH = 32
<FeatureCode>		STRING	MAXLENGTH = 128
<FromPointUID>		UID	
<ToPointUID>		UID	
<SpiralType>		STRING	TSToSC SCToST CSToSC ReverseCSToSC (used when long radius is the radius out)
<Direction>		STRING	Left Right
<RadiusIn>	Units will be meters. Exported only when Spiral Type is Arc-Spiral-Line or Arc-Spiral-Arc	FLOAT	
<RadiusOut>	Units will be meters. Exported only when Spiral Type is Line-Spiral-Arc or Arc-Spiral-Arc	FLOAT	
<DegreeOfCurveIn>	Units will be meters Exported only when Spiral Type is Arc-Spiral-Line or Arc-Spiral-Arc	FLOAT	
<DegreeofCurveOut>	Units will be meters Exported only when Spiral Type is Line-Spiral-Arc or Arc-Spiral-Arc	FLOAT	
<CentralAngle>	Units will be decimal degrees	FLOAT	
<TangentAzimuth>	Units will be decimal degrees	FLOAT	
<A>	Units will be meters Exported only when Spiral Type is Arc-Spiral-Arc	FLOAT	

Field	Comments	Format	Options
<SpiralLength>	Units will be meters Exported only when Spiral Type is Arc-Spiral-Line or Line-Spiral-Arc	FLOAT	
<CStoSCLength>	Units will be meters Exported only when Spiral Type is Arc-Spiral-Arc	FLOAT	
<TStoCSLength>	Units will be meters Exported only when Spiral Type is Arc-Spiral-Arc	FLOAT	
<DeltaHeight>	Units will be meters	FLOAT	

3.7 Polygon

```

<Polygon>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <ID>PolyId</ID>
  <FeatureCode>Poly feature code</FeatureCode>
  <IsFeatureCodeGenerated>>false</IsFeatureCodeGenerated>
  <Perimeter>12.021</Perimeter>
  <Area>9.053</Area>
  <Volume>17.021</Volume>
  <Height>2.04</Height>
  <MemberList>
    <Member>
      <UID>234640932</UID>
      <IsReversed>>true<IsReversed>
    </Member>
    <Member>
      <UID>234640932</UID>
      <IsReversed>>true<IsReversed>
    </Member>
  </MemberList>
  <UID>234640932</UID>

```

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```

        <IsReversed>true</IsReversed>
    </Member>
</MemberList>
</Polygon>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<ID>		STRING	MAXLENGTH = 32
<FeatureCode>		STRING	MAXLENGTH = 128
<IsFeatureCodeGenerated>		BOOL	
<Perimeter>	Units are meters.	FLOAT	
<Area>	Units are meters squared.	FLOAT	
<Volume>	Units are meters cubed.	FLOAT	
<Height>	Units are meters.	FLOAT	
<MemberList>	---SUBSECTION HEADER---		
<Member>	---SUBSECTION HEADER---		
<UID>		UID	
<IsReversed>		BOOL	

3.8 Polyline

```

<Polyline>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <ID>PolyId</ID>
  <FeatureCode>Poly feature code</FeatureCode>
  <IsFeatureCodeGenerated>>false</IsFeatureCodeGenerated>
  <Length2D>12.021</Length2D>
  <MemberList>
    <Member>
      <UID>234640932</UID>
      <IsReversed>true</IsReversed>
    </Member>
  </MemberList>
</Polyline>

```

```

</Member>
<Member>
  <UID>234640932</UID>
  <IsReversed>true<IsReversed>
</Member>
<Member>
  <UID>234640932</UID>
  <IsReversed>true<IsReversed>
</Member>
</MemberList>
</Polyline>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<ID>		STRING	MAXLENGTH = 32
<FeatureCode>		STRING	MAXLENGTH = 128
<IsFeatureCodeGenerated>		BOOL	
<Length2D>	Units are meters.	FLOAT	
<MemberList>	---SUBSECTION HEADER---		
<Member>	---SUBSECTION HEADER---		
<UID>		UID	
<IsReversed>		BOOL	

3.9 COGO Radiation

```

<COGORadiation>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <IsCoordinating>true</IsCoordinating>
  <FromPointUID>872920438</FromPointUID>
  <ToPointUID>823898322</ToPointUID>
  <Type> RadiationXYZ</Type>
  <DeltaX>68.154</DeltaX>

```

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```

<DeltaY>100.548</DeltaY>
<DeltaZ>14.154</DeltaZ>
<Azimuth>128.2236215</Azimuth>
<VerticalAngle>87.22551458</VerticalAngle>
<Distance>60.04</Distance >
<Height>10.215</Height>
</COGORadiation>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<IsCoordinating>		BOOL	
<FromPointUID>		UID	
<ToPointUID>		UID	
<Type>		STRING	RadiationXYZ RadiationHVD RadiationHDZ
<DeltaX>	Included only when Type is RadiationXYZ. Units are meters.	FLOAT	
<DeltaY>	Included only when Type is RadiationXYZ. Units are meters.	FLOAT	
<DeltaZ>	Included only when Type is RadiationXYZ. Units are meters.	FLOAT	
<Azimuth>	Included only when Type is RadiationHVD or RadiationHDZ. Units are decimal degrees.	FLOAT	
<VerticalAngle>	Included only when Type is RadiationHVD. Units are decimal degrees. Vertical reference is zenith.	FLOAT	
<Distance>	Included only when Type is RadiationHVD or RadiationHDZ. Units are meters.	FLOAT	
<Height>	Included only when Type is RadiationHDZ. Units are meters.	FLOAT	

3.10 COGO Inverse

```

<Inverse>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <FromPointUID>943209432</FromPointUID>
  <ToPointUID>890230952</ToPointUID>
  <Azimuth>60.04141548</Azimuth>
  <VerticalAngle>45.5563215</VerticalAngle>
  <Distance>160.04</Distance>
</Inverse>

```

Field	Comments	Format
<UID>		UID
<Time>	See Section 1.3.1 for more information.	TIMESTAMP
<FromPointUID>		UID
<ToPointUID>		UID
<Azimuth>	Units are decimal degrees.	FLOAT
<VerticalAngle>	Units are decimal degrees. Vertical reference is zenith.	FLOAT
<Distance>	Units are meters.	FLOAT

3.11 Instrument

```

<Instrument>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>

```

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```

    <ms>789</ms>
  </Time>
  <Type>RTK</Type>
<DefinitionName>Sokkia GSR2700 IS</DefinitionName>
  <ProfileName>Sokkia GSR2700 IS NTRIP</ProfileName>
  <Brand>Sokkia</Brand>
  <Model>GSR2700 IS</Model>
  <SerialNumber>NZH0537003</SerialNumber>
  <FirmwareVersion>3.21</FirmwareVersion>
  <UserAppVersion>2.000</UserAppVersion>
  <HasIntegratedAntenna>true</ HasIntegratedAntenna>
  <RTKLinkType>GPRSCell</RTKLinkType>
  <CorrectionFmt>RTCA</CorrectionFmt>
  <Address>192.32.45.01</Address>
  <PhoneNumber>192-321-451</PhoneNumber>
  <MountPoint>CALG01</MountPoint>
  <PortNumber>201</PortNumber>
  <GGARate>5</GGARate>
  <GroupRefIndexJ>2.32</GroupRefIndexJ>
  <WaveCarrier>321.23</WaveCarrier>
</Instrument>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<Type>		STRING	RTK GNSS ETS MTS
<DefinitionName>		STRING	
<ProfileName>		STRING	
<Brand>		STRING	
<Model>		STRING	
<SerialNumber>		STRING	
<FirmwareVersion>		STRING	
<UserAppVersion>		STRING	
<HasIntegratedAntenna>	Included only if Type is RTK or GNSS	BOOL	

Field	Comments	Format	Options
<RTKLinkType>	Included only if Type is RTK.	STRING	CellularModem GPRSCell UHFRadio None(Autonomous)
<CorrectionFmt>	Included only if Type is RTK and RTKLinkType is <u>not</u> None(Autonomous)	STRING	RTCA RTCM RTCMv3 CMR CMR+
<Address>	Included only if RTKLinkType is GPRSCell.	STRING	
<PhoneNumber>	Included only if RTKLinkType is CellularModem.	STRING	
<MountPoint>	Included only if RTKLinkType is GPRSCell.	STRING	
<PortNumber>	Included only if RTKLinkType is GPRSCell.	INT	
<GGARate>	Included only if RTKLinkType is GPRSCell or CellularModem.	INT	
<GroupRefIndexJ>	Included only if Type is ETS. Unit-less value.	FLOAT	
<WaveCarrier>	Included only if Type is ETS. Unit-less value.	FLOAT	

3.12 Station

```

<Station>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <IsOrientable>true</IsOrientable>
  <OrientationCorrection>1.23</OrientationCorrection>
  <IsUsedInTraverse>>false</IsUsedInTraverse>
  <ApplyHCollimation>>false</ApplyHCollimation>
  <HorzCollimation>0.004</HorzCollimation>

```

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```

<ApplyVCollimation>>false</ApplyVCollimation>
<VertCollimation>0.002</VertCollimation>
<PointUID>329439253</PointUID>
<AssociatedInstrumentUID>745923023</AssociatedInstrumentUID>
<InstrumentHeight>2.04</InstrumentHeight>
</Station>

```

Field	Comments	Format
<UID>		UID
<Time>	See Section 1.3.1 for more information.	TIMESTAMP
<IsOrientable>		BOOL
<OrientationCorrection>	Units are decimal degrees.	FLOAT
<IsUsedInTraverse>		BOOL
<ApplyHCollimation>	If the job setting is set to "Never", the station value is overridden and always set to false.	BOOL
<HorzCollimation>	Units are always arcseconds.	FLOAT
<ApplyVCollimation>	If the job setting is set to "Never" the station value will be overridden and always set to false.	BOOL
<VertCollimation>	Units are always arcseconds.	FLOAT
PointUID		UID
AssociatedInstrumentUID		UID
InstrumentHeight	Units are meters.	FLOAT

3.13 Target

```

<Target>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <TargetHeight>2.04</TargetHeight>
  <PrismConstant>7.00</PrismConstant>
  <Type>Reflectorless</Type>
</Target>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<TargetHeight>	Units are meters.	FLOAT	
<PrismConstant>	Always in millimeters.	FLOAT	
<Type>		STRING	Prism 360Prism Reflectorless ReflectiveSheet

3.14 ETS Observation

```

<ETSObservation>
  <UID>45646546</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>12</Hour>
    <Min>05</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <ObservationSettings>
    <AzDirection>CW</AzDirection>
    <IsHorizonVerticalReference>>false</IsHorizonVerticalReference>
    <IsF2>>false</IsF2>
    <ObsFormat>RawObs</ObsFormat>
  </ObservationSettings>
  <MeasurementType>HVD</MeasurementType>
  <IsCoordinating>>false</IsCoordinating>
  <IsBacksight>>true</IsBacksight>
  <IsUsedInTraverse>>false</IsUsedInTraverse>
  <InstrumentObservation>
    <HorizontalAngle>60.04</HorizontalAngle>
    <VerticalAngle>60.04</VerticalAngle>
    <SlopeDistance>60.04</SlopeDistance>
  </InstrumentObservation>
  <PrismAndAtmosCorrectedObservation>
    <HorizontalAngle>60.04</HorizontalAngle>
    <VerticalAngle>60.04</VerticalAngle>
    <SlopeDistance>60.04</SlopeDistance>

```

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```

</PrismAndAtmosCorrectedObservation >
<CorrectedObservation>
  <HorizontalAngle>60.04</HorizontalAngle>
  <VerticalAngle>60.04</VerticalAngle>
  <SlopeDistance>60.04</SlopeDistance>
  <Azimuth>123.45</ Azimuth >
  <HorizontalDistance>55.55</HorizontalDistance>
  <VerticalDistance>55.55</ VerticalDistance >
</CorrectedObservation>
<ToPointUID>145761451</ToPointUID>
<FromPointUID>145761450</FromPointUID>
<TargetUID>913156145</TargetUID>
<StationUID>328416436</StationUID>
<HasOffset>true</HasOffset>
<Offset>
  <Type>Angle<Type>
  <HorizontalAngle>60.04</HorizontalAngle>
  <VerticalAngle>60.04</VerticalAngle>
  <Distance>60.04</Distance>
  <Height>60.04</Height>
  <UseVertAngleFromOffset>true</UseVertAngleFromOffset>
  <POILocation>left</POILocation>
  <DeltaX>60.04</DeltaX>
  <DeltaY>60.04</DeltaY>
  <DeltaZ>60.04</DeltaZ>
</Offset>
</ETSObservation>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<ObservationSettings>	---SUBSECTION HEADER---		
<AzDirection>		STRING	CW CCW
<IsHorizonVerticalReference>		BOOL	
<IsF2>		BOOL	
<ObsFormat>		STRING	RawObs
<MeasurementType>		STRING	HV HVWithOffset HVD HVDWithOffset
<IsCoordinating>		BOOL	

Field	Comments	Format	Options
<IsBacksight>		BOOL	
<IsUsedInTraverse>		BOOL	
<InstrumentObservation>	<p>---SUBSECTION HEADER---</p> <p>This section will contain the observation as received from the instrument.</p> <p>Any corrections that have been applied directly on the instrument will not be unapplied in SDR+.</p>		
<HorizontalAngle>	Units are decimal degrees.	FLOAT	
<VerticalAngle>	<p>Units are decimal degrees.</p> <p>Vertical reference is zenith.</p>	FLOAT	
<SlopeDistance>	<p>Included only if MeasurementType is HVD or HVDWithOffset.</p> <p>Units are meters.</p>	FLOAT	
<PrismAndAtmosCorrectedObservation>	<p>---SUBSECTION HEADER---</p> <p>This section will contain the observation (as received from the instrument) reduced for the prism constant and atmospheric corrections, if these corrections have been turned on in SDR+.</p>		
<HorizontalAngle>	Units are decimal degrees.	FLOAT	
<VerticalAngle>	<p>Units are decimal degrees.</p> <p>Vertical reference is zenith.</p>	FLOAT	
<SlopeDistance>	<p>Included only if MeasurementType is HVD or HVDWithOffset.</p> <p>Units are meters.</p>	FLOAT	
<CorrectedObservation>	<p>---SUBSECTION HEADER---</p> <p>This section will contain the observation (as received from the instrument) reduced for all corrections turned on in SDR+:</p> <p>These may include:</p> <ul style="list-style-type: none"> • Prism constant • Atmospheric correction • Instrument and target heights • Horizontal collimation 		

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Field	Comments	Format	Options
	<ul style="list-style-type: none"> Vertical collimation Curvature and refraction Grid scale factor Sea level correction 		
<HorizontalAngle>	Units are decimal degrees	FLOAT	
<VerticalAngle>	Units are decimal degrees Vertical reference will be zenith	FLOAT	
<SlopeDistance>	Included only if MeasurementType is HVD or HVDWithOffset Units are meters	FLOAT	
<Azimuth>	Units are decimal degree	FLOAT	
<HorizontalDistance>	Included only if MeasurementType is HVD or HVDWithOffset Units are meters	FLOAT	
<VerticalDistance>	Included only if MeasurementType is HVD or HVDWithOffset Units are meters	FLOAT	
<ToPointUID>		UID	
<FromPointUID>		UID	
<TargetUID>		UID	
<StationUID>		UID	
<HasOffset>		BOOL	
<Offset>	---SUBSECTION HEADER--- Offset section included only if MeasurementType is HVWithOffset or HVDWithOffset		
<Type>		STRING	Angle SingleDistance RadiationXYZ RadiationHVD RadiationHDZ RemoteElevation
<HorizontalAngle>	Included only when OffsetType is Angle, RadiationHVD or RadiationHDZ.	FLOAT	

Field	Comments	Format	Options
	Units are decimal degrees.		
<VerticalAngle>	Included only when OffsetType is Angle, RadiationHVD or RemoteElevation. Units are decimal degrees. Vertical reference is zenith.	FLOAT	
<Distance>	Included only when OffsetType is SingleDistance, RadiationHVD or RadiationHDZ. Units are meters.	FLOAT	
<Height>	Included only when OffsetType is SingleDistance or RadiationHDZ. Units are meters.	FLOAT	
<UseVertAngleFromOffset>	Included only when OffsetType is Angle.	BOOL	
<POILocation>	Included only when OffsetType is SingleDistance.	STRING	Left Right Front Back
<DeltaX>	Included only when OffsetType is RadiationXYZ. Units are meters.	FLOAT	
<DeltaY>	Included only when OffsetType is RadiationXYZ. Units are meters.	FLOAT	
<DeltaZ>	Included only when OffsetType is RadiationXYZ. Units are meters.	FLOAT	

3.15 Resection Station

```

<ResectionStation>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>

```

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```

    <ms>789</ms>
  </Time>
  <IsOrientable>true</IsOrientable>
  <OrientationCorrection>1.23</OrientationCorrection>
  <IsUsedInTraverse>false</IsUsedInTraverse>
  <ApplyHCollimation>false</ApplyHCollimation>
  <HorzCollimation>0.004</HorzCollimation>
  <ApplyVCollimation>false</ApplyVCollimation>
  <VertCollimation>0.002</VertCollimation>
  <PointUID>329439253</PointUID>
  <AssociatedInstrumentUID>745923023</AssociatedInstrumentUID>
  <InstrumentHeight>2.04</InstrumentHeight>
  <ResectionSolution>
    <LeastSquaresStatusXY>Converged</LeastSquaresStatusXY>
    <IterationsToConvergeXY>9<IterationsToConvergeXY>
    <DegreesOfFreedomXY>4<DegreesOfFreedomXY>
    <StdDevY>1.23<StdDevY>
    <StdDevX>2.345<StdDevX>
    <LeastSquaresStatusZ>Converged</LeastSquaresStatusZ>
    <IterationsToConvergeZ>9<IterationsToConvergeZ>
    <DegreesOfFreedomZ>1<DegreesOfFreedomZ>
    <StdDevZ>0.890<StdDevZ>
    <EnteredHeight>2.04</EnteredHeight>
  </ResectionSolution>
</ResectionStation>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<IsOrientable>	Indicates whether the station orientation correction can be currently computed.	BOOL	
<IsUsedInTraverse>		BOOL	
<OrientationCorrection>	Units are decimal degrees.	FLOAT	
<ApplyHCollimation>		BOOL	
<HorzCollimation>	Units are always arcseconds.	FLOAT	
<ApplyVCollimation>		BOOL	
<VertCollimation>	Units are always arcseconds.	FLOAT	
<PointUID>		UID	
<AssociatedInstrumentUID>		UID	
<InstrumentHeight>	Units are meters.	FLOAT	
<ResectionSolution>	---SUBSECTION HEADER---		

Field	Comments	Format	Options
<LeastSquaresStatusXY>		STRING	Converged DidNotConverge InsufficientObs InvalidInput MatrixNotInvertible NotAttempted NotComputableInGeographic UpdateError
<IterationsToConvergeXY>	Included only if LeastSquaresStatusXY is Converged.	INT	
<DegreesOfFreedomXY>	Included only if LeastSquaresStatusXY is Converged.	INT	
<StdDevX>	Included only if LeastSquaresStatusXY is Converged. Units are meters.	FLOAT	
<StdDevY>	Included only if LeastSquaresStatusXY is Converged. Units are meters.	FLOAT	
<LeastSquaresStatusZ>		STRING	Converged DidNotConverge InsufficientObs InvalidInput MatrixNotInvertible NotAttempted UserInput UpdateError
<IterationsToConvergeZ>	Included only if LeastSquaresStatusZ is Converged.	INT	
<DegreesOfFreedomZ>	Included only if LeastSquaresStatusZ is Converged.	INT	
<StdDevZ>	Included only if LeastSquaresStatusZ is Converged.	FLOAT	
<EnteredHeight>	Included only if LeastSquaresStatusZ is UserInput. Units are meters.	FLOAT	

3.16 Resection Observation

```

<ResectionObservation>
  <UID>45646546</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>12</Hour>
    <Min>05</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <ObservationSettings>
    <AzDirection>CW</AzDirection>
    <IsHorizonVerticalReference>>false</IsHorizonVerticalReference>
    <IsF2>>false</IsF2>
    <ObsFormat>RawObs</ObsFormat>
  </ObservationSettings>
  <MeasurementType>HV</MeasurementType>
  <ToPointUID>145761451</ToPointUID>
  <TargetUID>913156145</TargetUID>
  <ResectionUID>100663313</ResectionUID>
  <ResectionStationUID>328416436</ResectionStationUID>
  <HorizontalAngle>60.04</HorizontalAngle>
  <VerticalAngle>60.04</VerticalAngle>
  <Distance>60.04</Distance>
  <CorrectedHorizontalAngle>60.04</CorrectedHorizontalAngle>
  <CorrectedVerticalAngle>60.04</CorrectedVerticalAngle>
  <CorrectedDistance>60.04</CorrectedDistance>
  <UseHorizontalAngle>>false</UseHorizontalAngle>
  <UseVerticalAngle>>true</UseVerticalAngle>
  <UseDistance>>true</UseDistance>
  <HorizontalResidual>0.00</HorizontalResidual>
  <VerticalResidual>1.17</VerticalResidual>
  <HorizontalDistanceResidual>0.00</HorizontalDistanceResidual>
  <VerticalDistanceResidual>0.14</VerticalDistanceResidual>
</ResectionObservation>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<ObservationSettings>	---SUBSECTION HEADER---		
<AzDirection>		STRING	CW

Field	Comments	Format	Options
			CCW
<IsHorizonVerticalReference>		BOOL	
<IsF2>		BOOL	
<ObsFormat>		STRING	RawObs
<MeasurementType>		STRING	HVD HV
<ToPointUID>		UID	
<TargetUID>		UID	
<ResectionUID>		UID	
<ResectionStationUID>		UID	
<HorizontalAngle>	Units are decimal degrees.	FLOAT	
<VerticalAngle>	Units are decimal degrees. Vertical reference is zenith.	FLOAT	
<Distance>	Included only if MeasurementType is HVD or HVDWithOffset. Units are meters.	FLOAT	
<CorrectedHorizontalAngle>	Units are decimal degrees.	FLOAT	
<CorrectedVerticalAngle>	Units are decimal degrees. Vertical reference is zenith.	FLOAT	
<CorrectedDistance>	Included only if MeasurementType is HVD or HVDWithOffset. Units are meters.	FLOAT	
<UseHorizontalAngle>		BOOL	
<UseVerticalAngle>		BOOL	
<UseDistance>		BOOL	
<HorizontalResidual>	Units are decimal degrees. "NotComputable" is written if resection solution did not converge or was not attempted.	FLOAT	
<VerticalResidual>	Units are decimal degrees. "NotComputable" is written if resection solution did not converge or was not attempted.	FLOAT	
<HorizontalDistanceResidual>	Units are meters. "NotComputable" is written if resection solution did not converge or was not attempted.	FLOAT	

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Field	Comments	Format	Options
<VerticalDistanceResidual>	Units are meters. "NotComputable" is written if resection solution did not converge or was not attempted.	FLOAT	

3.17 RTK Session

```

<RTKSession>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <AssociatedInstrumentUID>434318309</AssociatedInstrumentUID>
  <IsPositionMode>>false</IsPositionMode>
  <IsAutonomousMode>>false</IsAutonomousMode>
  <BroadcastID>INNB</BroadcastID>
  <RTKFormat>RTCMV3</RTKFormat>
  <BasePointUID>909853431</BasePointUID>
  <BaseTrueAntennaHeight>2.04</BaseTrueAntennaHeight>
  <BroadcastedBaseCoords>
    <WGS84Latitude>51 23 15.12548</WGS84Latitude>
    <WGS84Longitude>-114 02 48.15489</WGS84Longitude>
    <WGS84Height>1044.681</WGS84Height>
  </BroadcastedBaseCoords>
</RTKSession>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<AssociatedInstrumentUID>		UID	
<IsPositionMode>		BOOL	
<IsAutonomousMode>		BOOL	
<BroadcastID>	Included only if IsAutonomousMode is false.	STRING	MAXLENGTH = 4

Field	Comments	Format	Options
<RTKFormat>	Included only if IsAutonomousMode is false.	STRING	RTCA RTCM RTCMv3 CMR CMR+
<BasePointUID>	Included only if IsPositionMode and IsAutonomousMode are false.	UID	
<BaseTrueAntennaHeight>	Included only if IsPositionMode and IsAutonomousMode are false. Units are meters.	FLOAT	
<BroadcastedBaseCoords>	---SUBSECTION HEADER--- Included only if IsPositionMode and IsAutonomousMode are false.		
<WGS84Latitude>	Included only if IsPositionMode and IsAutonomousMode are false. Values are always WGS84 geographic coordinates (LLH). Units are decimal degrees.	FLOAT	
<WGS84Longitude>	Included only if IsPositionMode and IsAutonomousMode are false. Values are always WGS84 geographic coordinates (LLH). Units are decimal degrees.	FLOAT	
<WGS84Height>	Included only if IsPositionMode and IsAutonomousMode are false. Values are always WGS84 geographic coordinates (LLH). Units are meters.	FLOAT	

3.18 GPS Antenna

```

<GPSAntenna>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  
```

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```

</Time>
<InstrumentUID>566578645</InstrumentUID>
<Model>SK-502</Model>
<Type>Vertical</Type>
<MeasuredHeight>2.04</MeasuredHeight>
<TrueHeight>89.23</TrueHeight>
<Model>SK-502</Model>
<Radius>18.0</Radius>
<SlantOffset>0.0</SlantOffset>
<VerticalOffset>0.0</VerticalOffset>
<PhaseCenterOffset>14.0</PhaseCenterOffset>
<UserOffset>0.0</UserOffset>
</GPSAntenna>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<Type>		STRING	Slant Vertical TrueVertical
<InstrumentUID>		UID	
<Model>		STRING	
<TrueHeight>	Units are meters.	FLOAT	
<MeasuredHeight>	Units are meters.	FLOAT	
<Radius>	Always in millimeters.	FLOAT	
<SlantOffset>	Always in millimeters.	FLOAT	
<VerticalOffset>	Always in millimeters.	FLOAT	
<PhaseCenterOffset>	Always in millimeters.	FLOAT	
<UserOffset>	Always in millimeters.	FLOAT	

3.19 RTK Observation

```

<RTKObservation>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>

```

```

    <ms>789</ms>
  </Time>
  <IsCoordinating>>false</IsCoordinating>
  <IsPositionMode>>false</IsPositionMode>
  <IsAutonomousMode>>false</IsAutonomousMode>
  <RTKSessionUID>152490932</RTKSessionUID>
  <ToPointUID>239432923</ToPointUID>
  <AntennaUID>233213421</AntennaUID>
  <X>432.3214</X>
  <Y>434321.41241</Y>
  <Z>5232.43214</Z>
  <Duration>600</Duration>
  <SolutionType>L1Fixed</SolutionType>
  <StdDevX>0.01</StdDevX>
  <StdDevY>0.01</StdDevY>
  <StdDevZ>0.04</StdDevZ>
  <Epochs>300</Epochs>
  <FloatEpochs>4</FloatEpochs>
  <PDOP>2.17</PDOP>
  <SVCount>7</SVCount>
  <HasOffset>>true</HasOffset>
  <Offset>
    <Type>RadiationXYZ<Type>
    <DeltaX>60.04</DeltaX>
    <DeltaY>60.04</DeltaY>
    <DeltaZ>60.04</DeltaZ>
    <HorizontalAngle>60.04</HorizontalAngle>
    <VerticalAngle>60.04</VerticalAngle>
    <Distance>60.04</Distance>
    <Height>60.04</Height>
  </Offset>
</RTKObservation>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<IsCoordinating>		BOOL	
<IsPositionMode>		BOOL	
<IsAutonomousMode>		BOOL	
<RTKSessionUID>		UID	
<ToPointUID>		UID	
<AntennaUID>		UID	
<X>	Units are meters.	FLOAT	

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Field	Comments	Format	Options
<Y>	Units are meters.	FLOAT	
<Z>	Units are meters.	FLOAT	
<Duration>	Units are always seconds.	INT	
<SolutionType>		STRING	None L1Fixed L1Float NarrowFixed NarrowFloat WideLaneFixed IonoFloat DGPS Averaged Single
<StdDevX>	Units are meters.	FLOAT	
<StdDevY>	Units are meters.	FLOAT	
<StdDevZ>	Units are meters.	FLOAT	
<Epochs>		INT	
<FloatEpochs>	Included only if IsAutonomousMode is false.	INT	
<PDOP>	Unit-less value.	FLOAT	
<SVCount>		INT	
<HasOffset>		BOOL	
<Offset>	---SUBSECTION HEADER--- Included if HasOffset is true.		
<Type>		STRING	RadiationXYZ RadiationHVD RadiationHDZ
<DeltaX>	Included only when Type is RadiationXYZ. Units are meters.	FLOAT	
<DeltaY>	Included only when Type is RadiationXYZ. Units are meters.	FLOAT	
<DeltaZ>	Included only when Type is RadiationXYZ. Units are meters.	FLOAT	
<HorizontalAngle>	Included only when Type is RadiationHVD or RadiationHDZ. Units are decimal degrees.	FLOAT	

Field	Comments	Format	Options
<VerticalAngle>	Included only when Type is RadiationHVD. Units are decimal degrees. Vertical reference is zenith.	FLOAT	
<Distance>	Included only when Type is RadiationHVD or RadiationHDZ. Units are meters.	FLOAT	
<Height>	Included only when Type is RadiationHDZ. Units are meters.	FLOAT	

3.20 Meteorological

```

<Meteorological>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>
    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <Temperature>21.000</Temperature>
  <Pressure>760.000</Pressure>
  <Humidity>50</Humidity>
</Meteorological>

```

Field	Comments	Format
<UID>		UID
<Time>	See Section 1.3.1 for more information.	TIMESTAMP
<Temperature>	Units are degrees Celsius.	FLOAT
<Pressure>	Units are mmHg.	FLOAT
<Humidity>	Units are decimal percentage (that is, 10% is 10.0).	FLOAT

3.21 Note

```

<Note>
  <UID>874653217</UID>
  <Time>
    <Year>2007</Year>
    <Month>5</Month>

```

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```

    <Day>2</Day>
    <DayOfWeek>3</DayOfWeek>
    <Hour>10</Hour>
    <Min>36</Min>
    <Sec>45</Sec>
    <ms>789</ms>
  </Time>
  <IsSystemNote>true</IsSystemNote>
  <IsFeatureAttributeNote>>false</IsFeatureAttributeNote>
  <Text>LOSS OF LOCK at 11:04:23.05</Text>
</Note>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1 for more information.	TIMESTAMP	
<IsSystemNote>		BOOL	
<IsFeatureAttributeNote>		BOOL	
<Text>		STRING	MAXLENGTH = 4096

3.22 Traverse

```

<Traverse>
  <UID>1140850689</UID>
  <Time>
    <Year>2008</Year>
    <Month>7</Month>
    <Day>28</Day>
    <DayOfWeek>1</DayOfWeek>
    <Hour>12</Hour>
    <Min>49</Min>
    <Sec>19</Sec>
    <ms>10</ms>
  </Time>
  <AdjustmentMethod>CompassRule</AdjustmentMethod>
  <AppliedInJob>true</AppliedInJob>
  <IsClosedLoop>>false</IsClosedLoop>
  <TraverseLength>7.10138524110416</TraverseLength>
  <TraverseSize>7</TraverseSize>
  <AngleBalanceOption>ByDistance</AngleBalanceOption>
  <ClosingAzimuthUserEntered>>false</ClosingAzimuthUserEntered>
  <ClosingAzimuth>1.70026414578458</ClosingAzimuth>
  <ClosingAzimuthMisclosure>0.00423405421542</ClosingAzimuthMisclosure>
  <HeightBalanceOption>ByDistance</HeightBalanceOption>
  <HeightMisclosure>0.25908216330044</HeightMisclosure>

```

```

<TraverseList>
  <StartNode>
    <NodePoint>100663298</NodePoint>
    <NodeStation>201326593</NodeStation>
  </StartNode>
  <AdjustedNode>
    <NodePoint>100663300</NodePoint>
    <NodeStation>201326594</NodeStation>
  </AdjustedNode>
  <AdjustedNode>
    <NodePoint>100663301</NodePoint>
    <NodeStation>201326595</NodeStation>
  </AdjustedNode>
  <AdjustedNode>
    <NodePoint>100663302</NodePoint>
    <NodeStation>201326596</NodeStation>
  </AdjustedNode>
  <ClosingNode>
    <NodePoint>100663303</NodePoint>
    <NodeStation>201326597</NodeStation>
  </ClosingNode>
  <ClosingAzimuthPoint>
    <NodePoint>100663304</NodePoint>
  </ClosingAzimuthPoint>
</TraverseList>
</Traverse>

```

Field	Comments	Format	Options
<UID>		UID	
<Time>	See Section 1.3.1	TIMESTAMP	
<AdjustmentMethod>		STRING	CompassRule TransitRule AngleBalance
<AppliedInJob>		BOOL	
<IsClosedLoop>		BOOL	
<TraverseLength>		FLOAT	
<TraverseSize>		INT	
<AngleBalanceOption>		STRING	NotApplied ByDistance Uniform
<ClosingAzimuthUserEntered>		BOOL	
<ClosingAzimuth>		FLOAT	
<ClosingAzimuthMisclosure>		FLOAT	

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<HeightBalanceOption>		STRING	NotApplied ByDistance Uniform
<HeightMisclosure>		FLOAT	
<TraverseList>	---SUBSECTION HEADER---		
<StartNode>	---SUBSECTION HEADER---		
<NodePoint>		UID	
<NodeStation>		UID	
<AdjustedNode>	---SUBSECTION HEADER---		
<NodePoint>		UID	
<NodeStation>		UID	
<ClosingNode>	---SUBSECTION HEADER---		
<NodePoint>		UID	
<NodeStation>		UID	
<ClosingAzimuthPoint>	---SUBSECTION HEADER---		
<NodePoint>		UID	