

## Flow of Events for Use Case – Define Survey Points

Change Log	
19/06/2004	Changed to lower case name from UC_DefineSurveyPoints. Amended to deal with array of identified survey points instead of points in a rectangular grid.
17.10.2004	Use case changed to make use of IfcAnnotationSurface and IfcAnnotationPoint as discussed and agreed at IFG Experts Group meeting in Oslo on 13/10/2004
02/11/2004	Finalized for pre-integrated model

### Overview

Defines an array of survey points within a defined area and allocates their X, Y and Z coordinates. Each survey point is given an identifier.

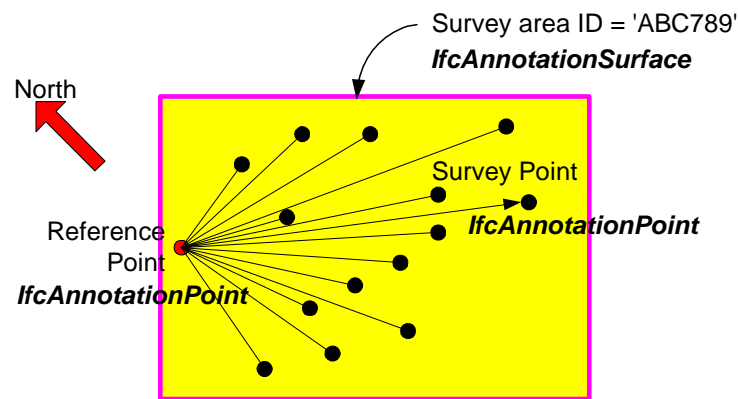


Figure 1: Survey area and points

### Process

#### Preconditions

- Map area within which the survey points are to be located is defined.

#### Actors

Applicant (Surveyor)

#### Main Flow

Flow	Entity
1. Define the area within which the survey points are to be defined. The area defined may be any shape and may be bounded geometrically using either a single 2D curve such as IfcPolyline or IfcCompositeCurve.	IfcShapeRepresentation IfcPolyline IfcCompositeCurve
2. Create an instance of an IfcAnnotationSurface entity to contain the specification of the points. The boundary of the annotation surface as defined above is associated as the shape representation.	IfcAnnotationSurface
3. Identify the IfcAnnotationSurface as a survey using the inherited ObjectType attribute	IfcAnnotationSurface.ObjectType
4. A unique identity may be applied to the survey	IfcAnnotationSurface.Name

	using the inherited IfcAnnotationSurface.Name attribute	
5.	Associate an occurrence of Pset_AnnotationSurfaceSurvey with the IfcAnnotationSurface and set the value for the means of collecting the survey data.	IfcAnnotationSurface Pset_AnnotationSurfaceSurvey
6.	Set the accuracy quality of the survey data (expected and achieved) within the Pset_AnnotationSurfaceSurvey	Pset_AnnotationSurfaceSurvey
7.	Identify the relationship of the current instance of IfcAnnotationSurface to other instances of IfcAnnotationSurface through an instance IfcRelNests if appropriate. This determines whether the current survey area is a more or less densely specified set of points in an area that is covered by elsewhere.	IfcAnnotationSurface IfcRelNests
8.	Confirm the reference point from which the specification of the set of points is to commence. If the patch is an extension of data within another patch, the reference point should conform to an identifiable point in the parent patch. Assign this point as an occurrence of IfcAnnotationPoint whose IfcAnnotationPoint.ObjectType is set to SurveyReferencePoint.	IfcAnnotationPoint IfcAnnotationPoint.ObjectType→SurveyReferencePoint
9.	Confirm the direction of North by reference to the IfcGeometricRepresentationContext.TrueNorth attribute.	IfcGeometricRepresentationContext.TrueNorth
10.	Confirm the local coordinate system within which the set of points is to be specified within the survey patch through identifying the directions of the X and Y axes.	
11.	Specify each point in the survey as an occurrence of IfcAnnotationPoint whose IfcAnnotationPoint.ObjectType is set to SurveyPoint.	IfcAnnotationPoint IfcAnnotationPoint.ObjectType→SurveyPoint
12.	A unique identity may be applied to each surveypoint using the inherited IfcAnnotationPoint.Name attribute	IfcAnnotationPoint.Name
13.	The set of survey points should be associated with the survey using the IfcRelAggregates relationship	IfcRelAggregates

### Post Conditions

A survey area is defined that contains a set of identifiable survey points.

## ***IFC Usage and Extension Requirements***

### Existing Entity/Class Usage

<i>Entity Class Name</i>	<i>Usage</i>
IfcCompositeCurve	Used to define the shape representation of the boundary of the survey patch.
IfcGeometricRepresentationContext	Sets the context for determining the North direction
IfcPolyline	Used to define the shape representation of the boundary of the survey patch.

IfcRelAggregates	Creates an aggregation of survey points within a survey
IfcRelNests	Creates an aggregation of survey surfaces
IfcShapeRepresentation	Overall shape representation of a survey area defined as an annotation surface.

### New Entity/Class Requirement

<i>Entity Class Name</i>	<i>Usage</i>
IfcAnnotationSurface	An identifiable surface having a defined boundary that can be used to define the extents of a survey area.

<i>Attribute</i>	<i>Cardinality</i>	<i>Datatype</i>	<i>Definition</i>

<i>#</i>	<i>Type (DER, U, WHERE)</i>	<i>Proposition</i>

<i>Entity Class Name</i>	<i>Usage</i>
IfcAnnotationPoint	An identifiable point that can be used to define a point within a survey or a reference point for a complete survey.

<i>Attribute</i>	<i>Cardinality</i>	<i>Datatype</i>	<i>Definition</i>

### New Property Set Requirement

<i>Name:</i>	Pset_AnnotationSurfaceSurvey
<i>Applicability:</i>	IfcAnnotatedSurface entity
<i>Applicable Classes:</i>	IfcAnnotatedSurface
<i>Applicable Type Value:</i>	
<i>IFC Version:</i>	2x3
<i>Definition:</i>	Definition from IAI: Specifies particular details about a survey

<i>Property</i>	<i>Type</i>	<i>Datatype</i>	<i>Unit</i>	<i>Definition</i>
AcquisitionMethod	IfcPropertyEnumeratedValue	PEnum_AcquisitionMethod		The means by which survey data was acquired. Values include: GPS, LASERSCAN_AIRBORNE, LASERSCAN_GROUND, SONAR, THEODOLITE, USERDEFINED, NOTKNOWN, UNSET
AccuracyQualityObtained	IfcPropertySingleValue	IfcRatioMeasure		A measure of the accuracy quality of survey points as obtained expressed in percentage terms
AccuracyQualityExpected	IfcPropertySingleValue	IfcRatioMeasure		A measure of the accuracy quality of survey points as expected expressed in percentage terms

### Issue List

<i>Question</i>	<i>Answer</i>

<p>[TL 16.08.2004] Why do we need to store this information as being separate from existing IFC topology (i.e. why subtype of IfcControl – btw: currently controls cannot contain geometry/topology)? What is the purpose of XDirection/YDirection of survey ?</p>	<p>[JDW 17.10.2004] Survey details respecified using IfcAnnotationSurface and IfcAnnotationPoint as discussed and agreed by IFG Experts Group meeting in Oslo on 13.10.2004</p>
<p>[TL 16.08.2004] What is the result to be stored – is it the direction and elevation of the survey point from the reference? Or is it the coordinates of the survey point from which the direction and elevation can be calculated?</p>	<p>[JDW 17.10.2004] See response to Q1 above</p>
<p>[TL 16.08.2004] a patch is usually a two dimensional array of points, the current definition does not allow for it.</p>	<p>[TL 16.08.2004] proposed solution: either change the name (if it should not be a two dimensional array of points) or order the points according to an x- and y- array</p> <p>[JDW 17.10.2004] See response to Q1 above</p>
<p>[TL 16.08.2004] what is the difference to the survey point representation that already exist in IFC for IfcSite? Can't the solution be an extension of that?</p>	<p>[JDW 17.10.2004] See response to Q1 above</p>