

# **AIXM**

## **Nav aids Points Requirements**

### **Data Dictionary**

# Aeronautical Information Exchange Model (AIXM)

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## Model Information

### 1. Logical View

**Model Name: AIXM 5.0.Phase\_2.g.mdl**

#### **1.1 Common Packages**

- AIXM Data Types
- AIXM Metadata

#### **1.2 Packages**

##### 1.2.1 Class Diagrams

##### **1.2.1.1 AIXM Feature**

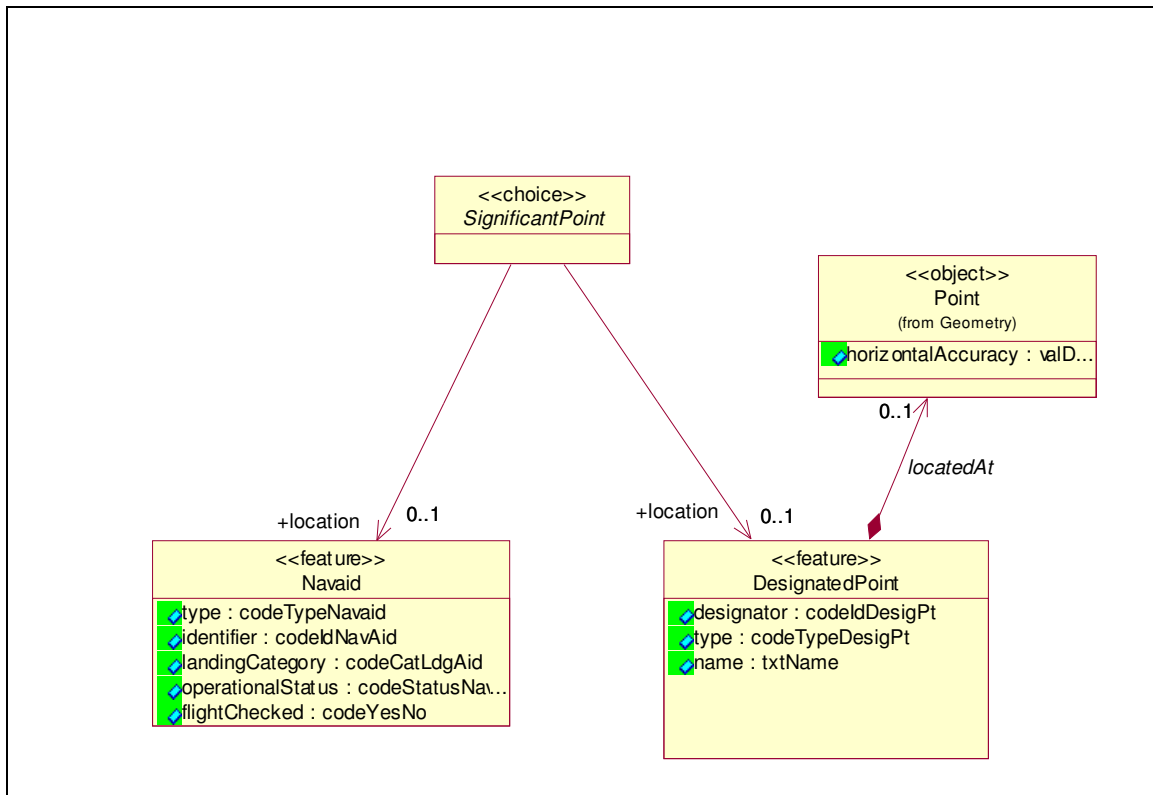
##### **1.2.1.2 Nav aids Points**

### **Significant Point / Designated Point**

A significant point is defined by ICAO as "a specified geographical location used to define an ATS route, the flight path of an aircraft or for other navigation/ATS purposes".

A significant point in AIXM is a NAVAID or Designated Point.

Any significant point *not marked by the site of a radio navigation aid* is a designated point.

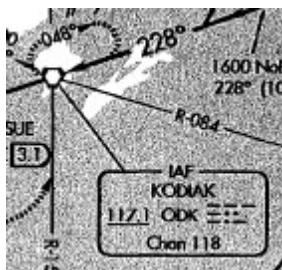


**Figure 1: 1 - Significant Points**

A "significant point" is a choice between a navaid and a designated point.

## Background

### A Significant Point as a Navaid



A point that is defined directly over a Navaid. Example: ODK VORTAC. ODK is a Navaid made up of two components (navaid equipment); a VOR and a TACAN. The holding significant point is located directly over the ODK VORTAC Navaid facility.

### A Significant Point as a Designated Point

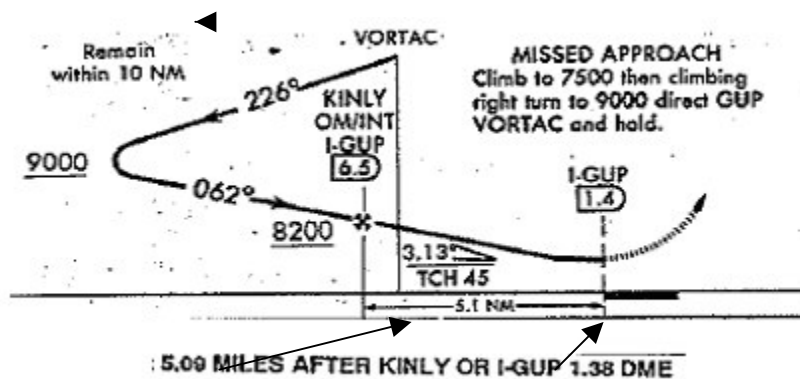
For Space-based RNAV procedure where a designated point (fix) is used as a waypoint the latitude and longitude are the only required attributes necessary for flying the procedure. For ground based procedure, the reference facilities (PointReference) with distances (DistanceIndication) and/or

radial/bearing/courses (AngleIndication) must be defined. See 5 – Point Reference Diagram.

**Designated Point as a Missed Approach Point (MAP)**

A named or unnamed point. This Point can be described multiple ways to function with different aircraft equipment. An example for a Localizer Missed approach point is “5.09 miles after KINLY or I-GUP 1.38 DME fix” as shown below.

Miles after usually refers to so many miles after the Final Approach Fix along the Final Approach Course. This convention is only used to describe MAP.

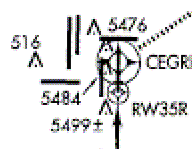


The Missed Approach Point specified on a precision segment is the DA (Decision Altitude).

The Missed Approach Point for a nonprecision segment may be a navigation facility , a fix, a Runway, or a specified distance from the FAF.

**Runway Threshold**

A point that is defined directly over a Runway Threshold.



RW35R is the missed approach point for the procedure.

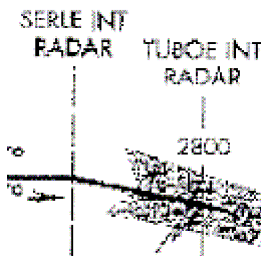
**Decision Altitude(DA)**

The DA applies to approach procedures where the pilot is provided with glidepath deviation information; e.g., ILS, MLS, TLS, GLS, LNAV/VNAV,

Baro VNAV, WAAS, LAAS, or PAR. The DA is the barometric altitude, specified in feet above MSL, at which a missed approach shall be initiated if the required visual reference has not been established. DA's shall be established with respect to the approach obstacle clearance and HAT requirements.

**Designated Point as a Glideslope Intercept**

Glideslope Intercept or PFAF – a named or unnamed point defined where the aircraft intercepts the glideslope. This point may only be used on a precision Intermediate and Final segments. The glideslope will be the “End” point on a precision Intermediate segment and the “Start Point” on the precision Final segment.



The ILS final segment starts where the aircraft intercepts the glideslope. In this example it is between SERLE INT and TUBOE INT. This point is not named.

**Designated Point as an Altitude**

Altitude – An unnamed point defined to end at a given altitude. The altitude will be defined as part of the segment.

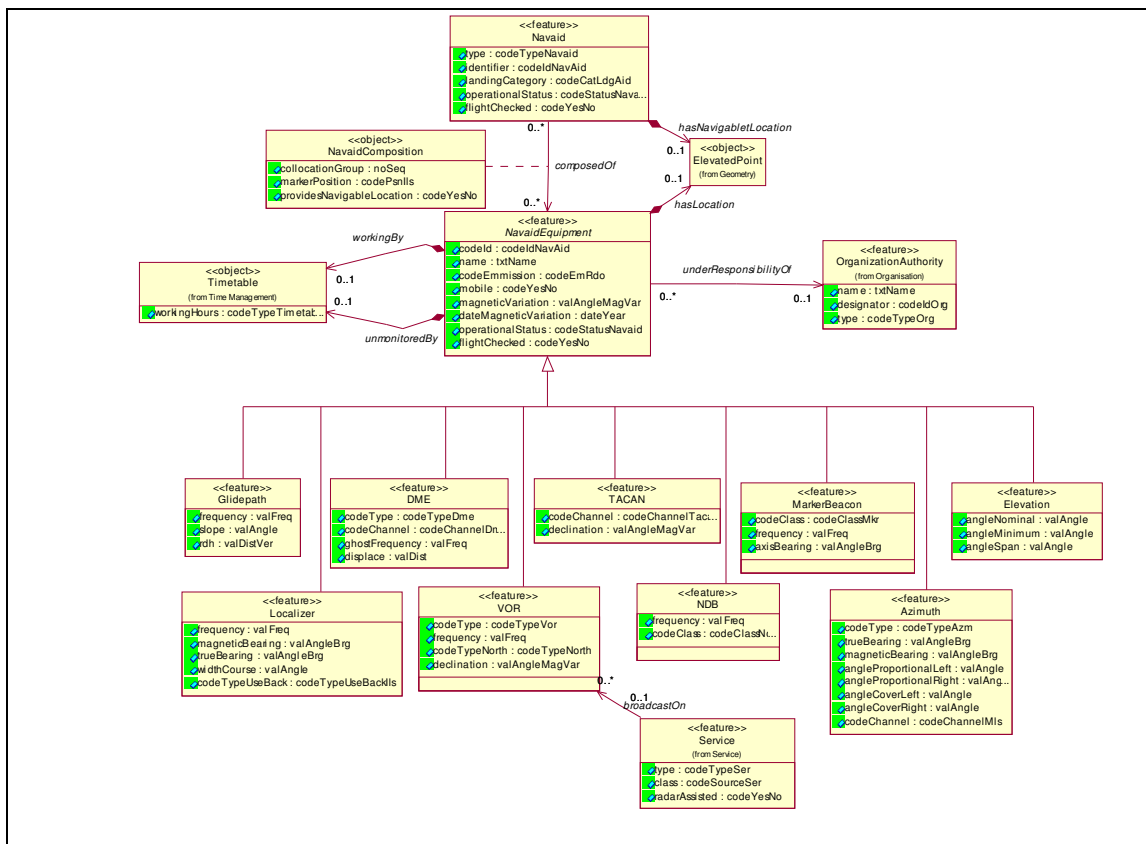
1. Missed Approach:
  - Track 004° MAG and climb to 1500 ft AMSL.
  - Inform ATC.
  - At 2.8 north of SPL climb to 2000 ft AMSL.

A Climb to Altitude (CA) leg as the first segment of the missed approach is the most common example of a segment point ending at an altitude.

**NAVAID / Navaid Equipment**

NAVAIDS are ground-based facilities that provide guidance services to pilots for instrument flight. They can provide course and/or distance information. Some NAVAID facilities are collocated components (navaid equipment) and are usually under a frequency-pairing plan. Aircraft receiving equipment, which provides for automatic DME selection assures reception of azimuth and distance information from a common source.

Navaid Equipment is the physical component providing course guidance or distance information for instrument flight.



**Figure 2: 2 - Navaid Equipment**

This diagram shows the separation between navaid equipment (the physical antenna) and the navaid service. For example, a VOR/DME is a navaid service, using two physical equipments.

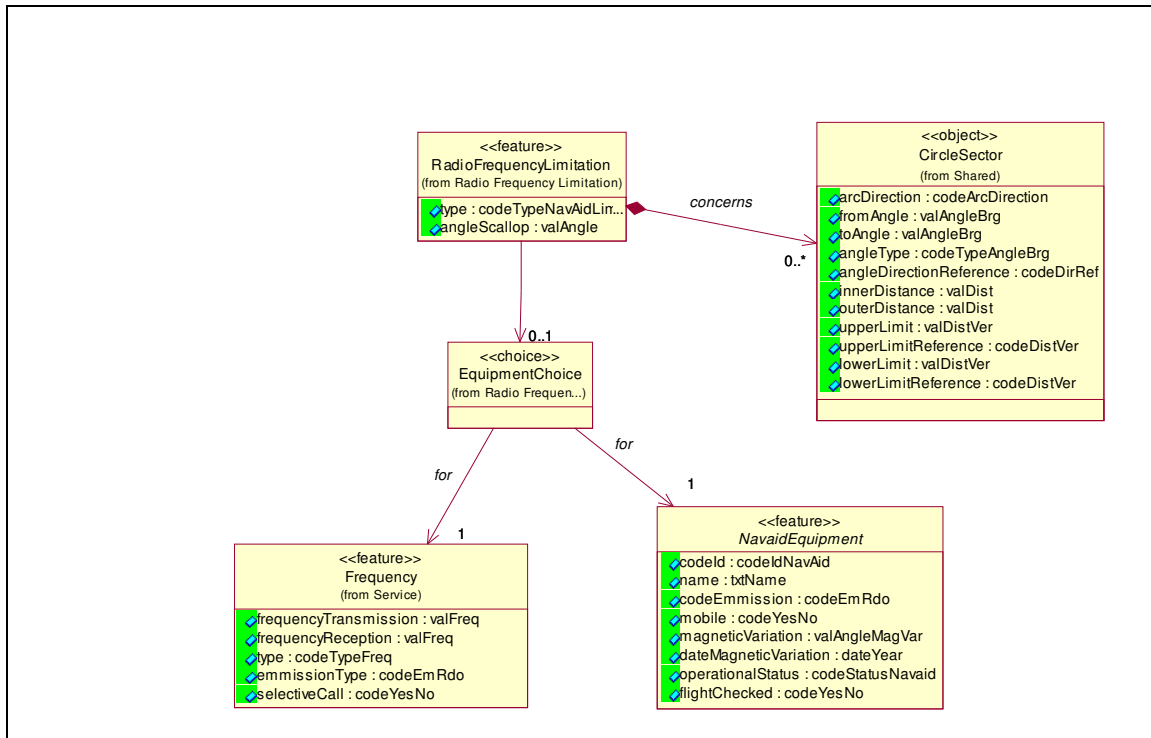
Navaid Composition is used to describe the relationship of each equipment to the navaid service; equipment located together (collocatedGroup), navigable location for products such as charting and ARINC, and marker role.

### Service Volumes

Standard Service Volume: Most air navigation radio aids, which provide positive course guidance, have a designated standard service volume (SSV). The SSV defines the reception limits of unrestricted NAVAIDs, which are usable for random/unpublished route navigation.

Navaid Restrictions: Navaid equipment will be classified as restricted if it does not conform to flight inspection signal strength and course quality standards throughout the published SSV.

Extended/Expanded Service Volume (ESV): In some cases there is a need to use the navaid equipment beyond the standard service volume. The need will be checked for signal strength and course quality standards. The ESV will be approved if passed flight inspection. Operational Service Volume is the combination of the above.



**Figure 3: 3 - Navaid Limitation**

The usage limitations associated with the frequency of a navaid are modelled using sectors of circle. The same concept may apply for the Frequency class, which is associated with a service, and which is shown here for completeness.

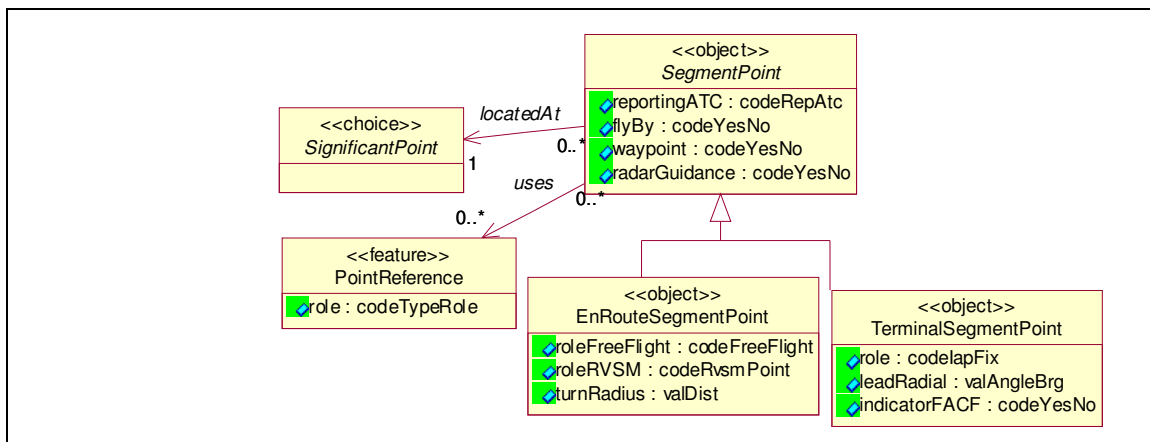
Radio Frequency Limitation feature is used to model all usages; service limitations as well as standard service coverage and extended coverage.

### Segment Point

Segments begin and end at significant points (Nav aids or Designated Points). However, under some circumstances segments may begin at specified points where no fixes are available. For example, the final approach segment of a precision approach may start where the intermediate flight altitude intersects the glide path (the final approach point). These points are established in AIXM 5.0 as a designated point of type “Designed Point”.

The SegmentPoint contains specific information about the segment point such as:

- How the point is to be flown; flyby or flyover (flyby)
- The role; IAF, IF, FAF, etc. (role – Terminal Segment Point)
- Is the point a ATC reporting point (reportingATC)
- Is the point a undefined point; DA, Altitude, etc. (designated point of type “Designed Point”)
- See attribute definitions for more



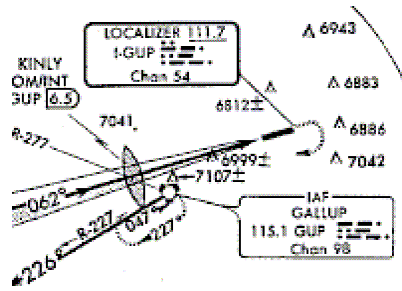
**Figure 4: 4 - Segment Points**

Significant Points used for the definition of a route segment or terminal procedure are first modelled as "SegmentPoints". This enables the association with an optional PointLocation and the specification of attributes that are common to both en-route points and terminal points.

## Point Reference

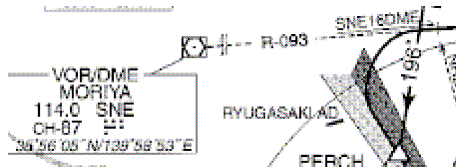
When defining a point used on a segment a reference to another point or to one or more nav aids may be required. An example would be a point used as an Intersection. The point is a named fix. In AIXM the named point is represented as a designated point. The intersection is described by an along track course referencing a nav aid and one or more crossing radials referencing different nav aids. These references are contained in the PointReference feature and AngleIndication and DistanceIndication Objects.

The following example shows KINLY Intersection is made of an along course reference and a crossing radial reference. The along course reference is radial 242 at 6.5 dme of GUP LOC/DME. The crossing radial is R-277 of GUP VORTAC.

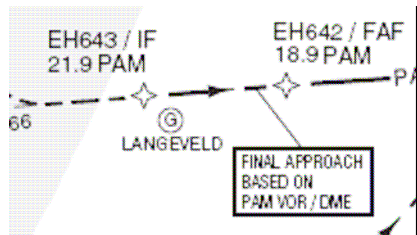


Other examples include:

- Radial DME Fix – A named or unnamed point that is defined by a distance from a Navaid along a given Radial

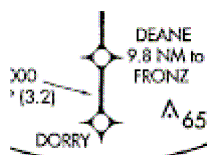


SNE 16 DME is an unnamed point on the R-093 radial from Moriya (SNE) VOR/DME

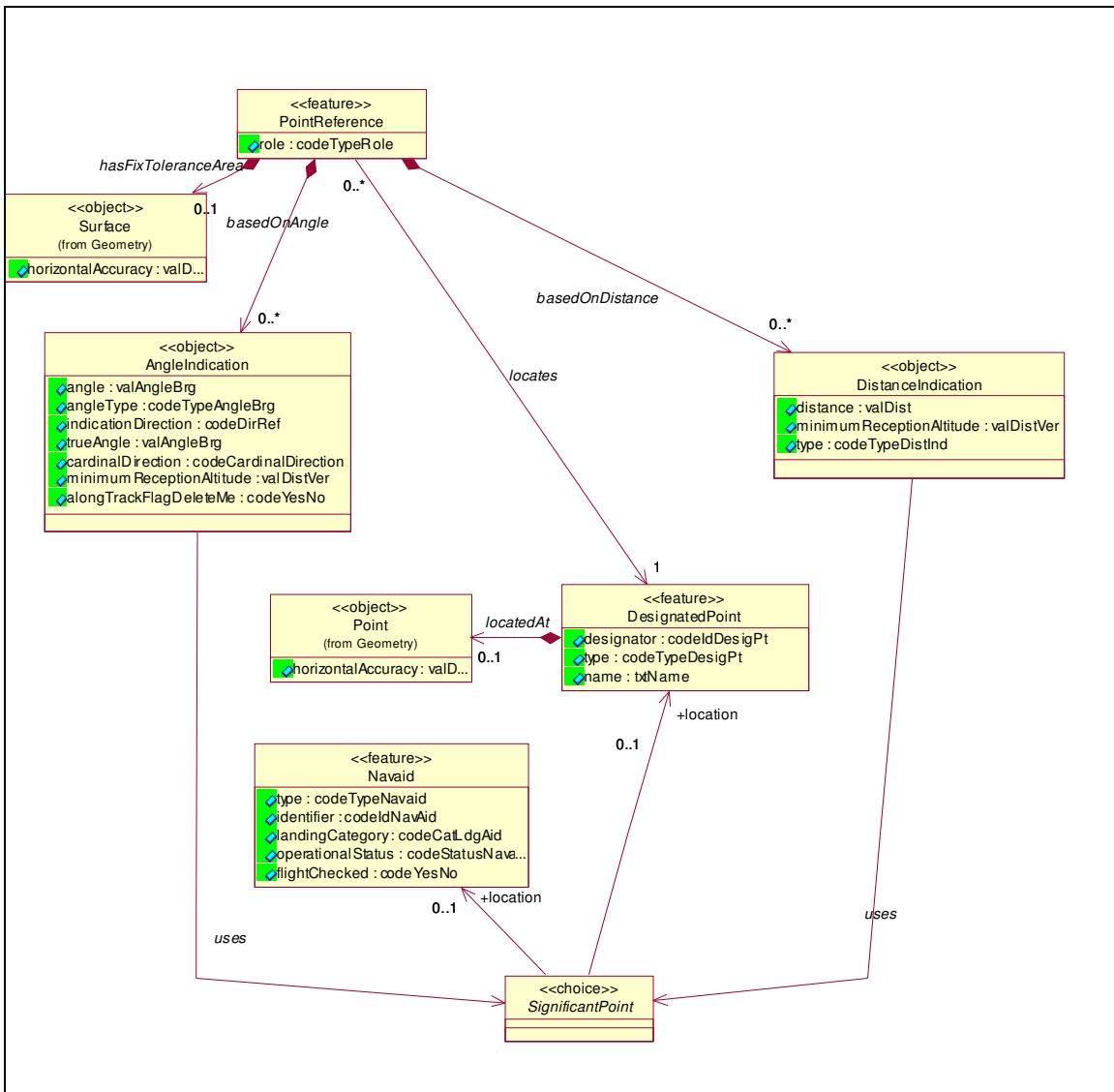


EH643 is a named Radial DME Point. The ground reference is 21.9 DME from PAM VOR/DME on radial 266.

- Along Track Distance (ATD) – A named or unnamed point described as a distance from or to a fix or navaid along a track.



This is a named point described by an ATD. DEANE WP is the designated point. DEANE is 9.8 NM to FRONZ. FRONZ is also a named waypoint. No reference is needed for this waypoint.

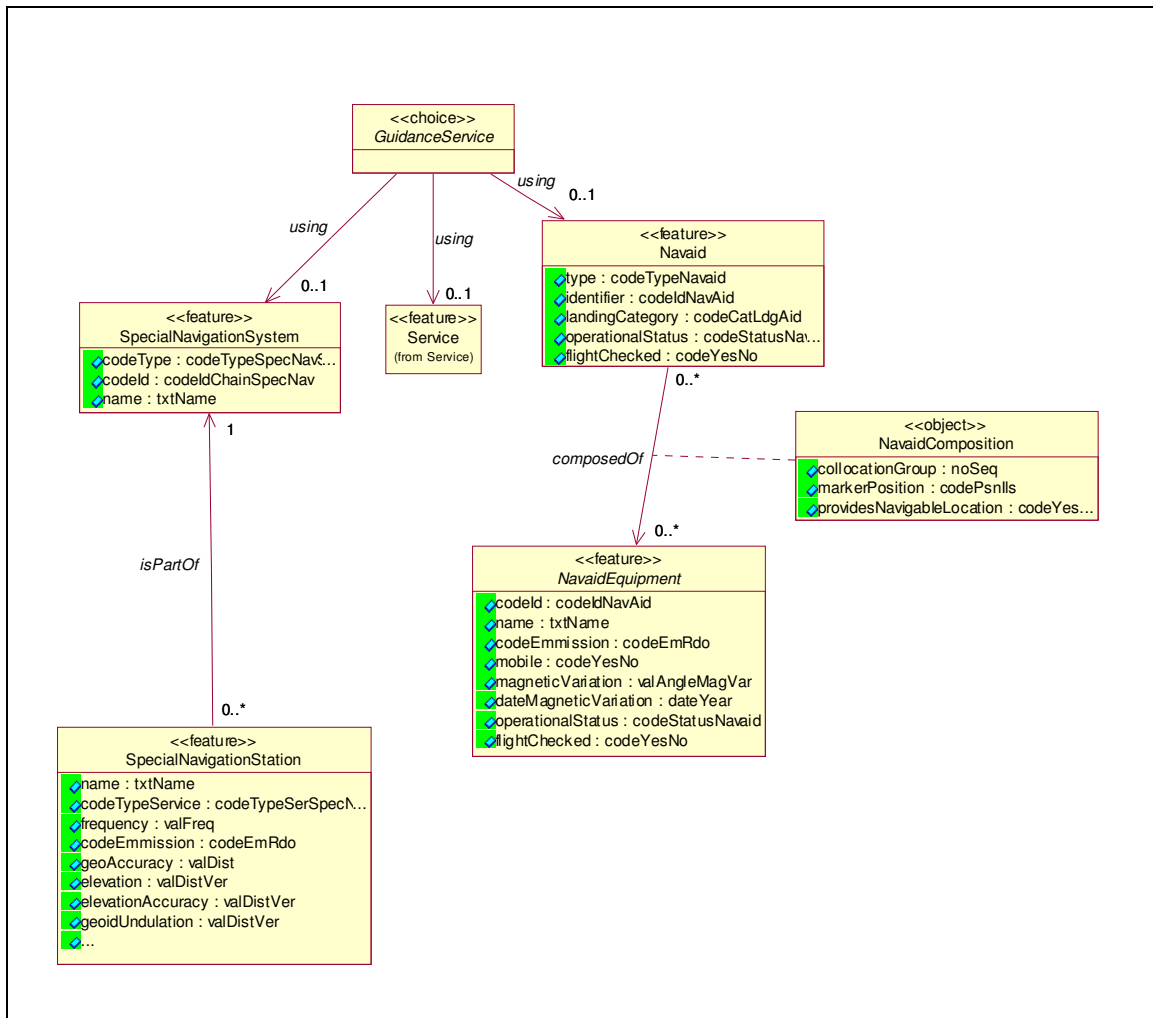


**Figure 5: 5 - Point Reference**

This diagram shows how angles and distances from a navaid or from another designated point are composed in order to provide the location of a DesignatedPoint.

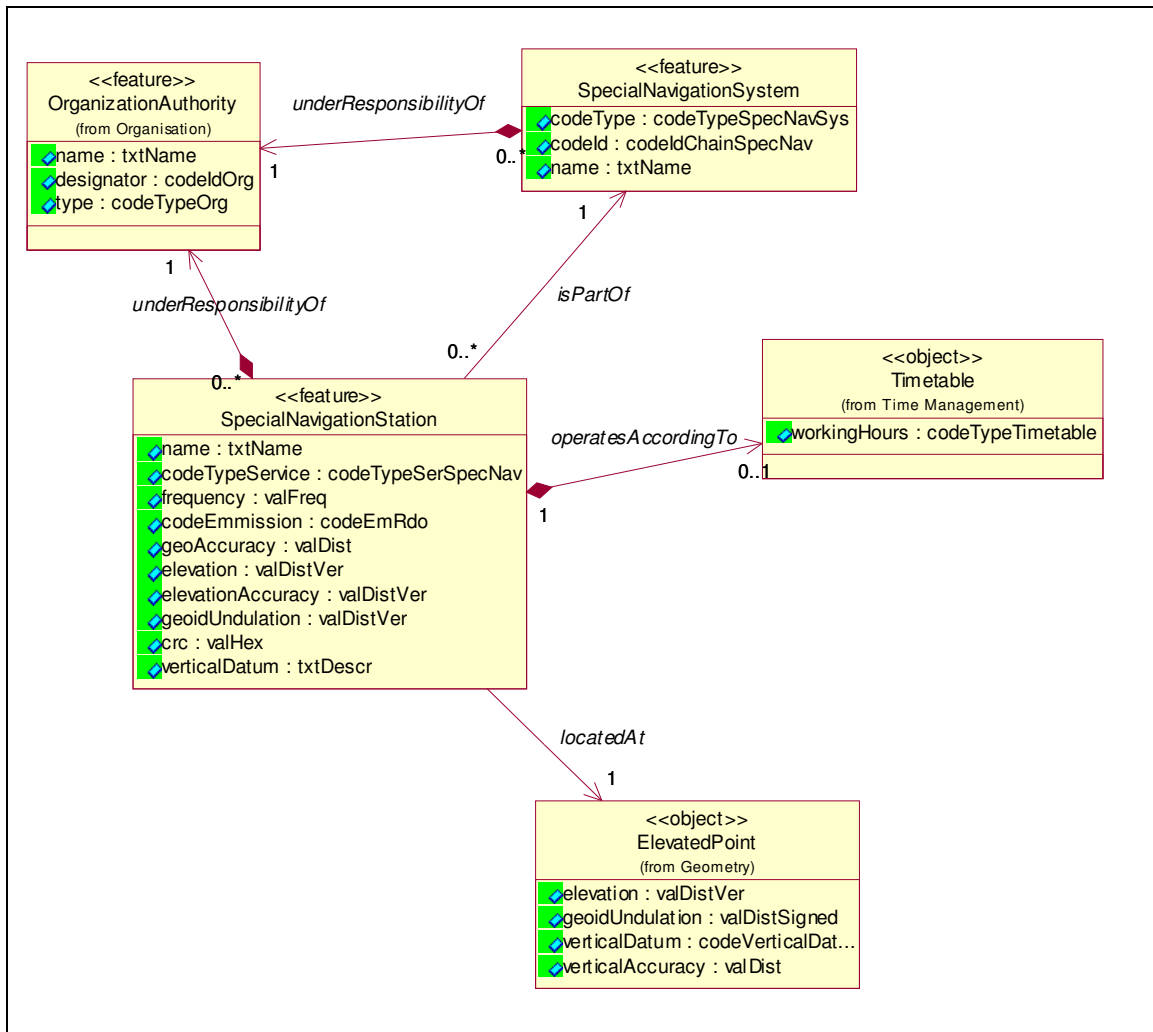
**Guidance Service**

Guidance Service will be further developed to include Radar (PAR, ASR, etc.) in Candidate Release 2.



**Figure 6: 6 - Guidance Service**

Guidance Service is a choice of special (LORAN or DECCA), Radar or navaid services for aircraft guidance.



**Figure 7: 7 - Special Navigation System**

Special Navigation Station is used to define the type of service provided by a station in a special navigation system chain such as LORAN or DECCA.

### Navigation System Checkpoint

Navigation System Checkpoint will be further developed in Candidate Release 2.

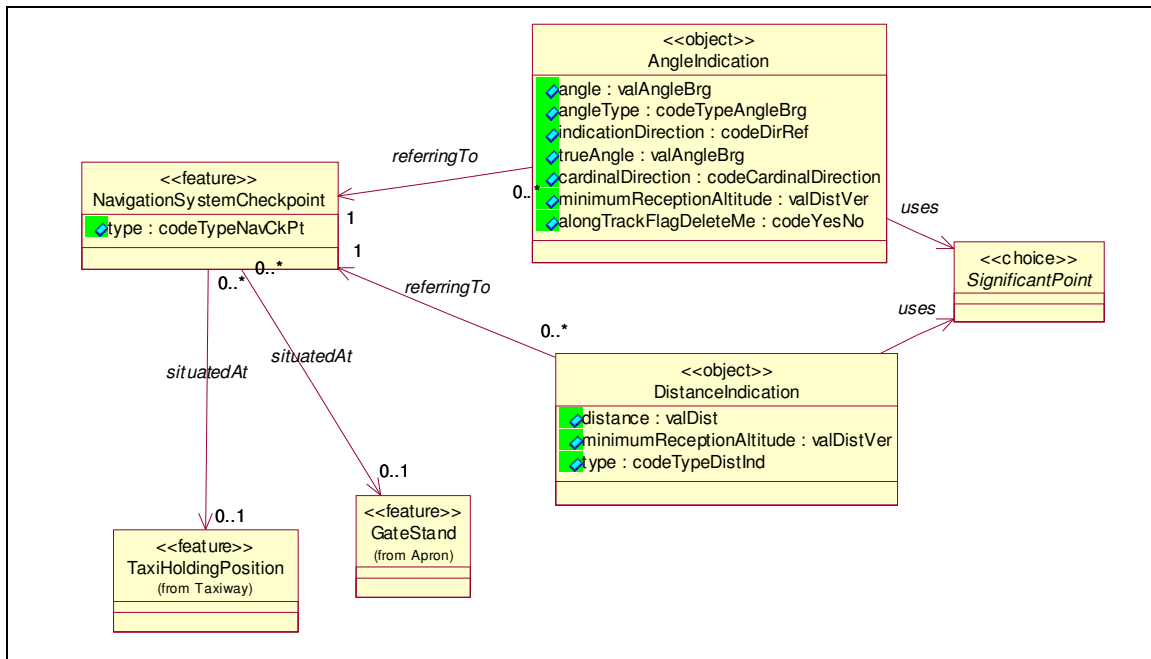


Figure 8: 8 - Navigation System Checkpoint

## Classes

### 1.2.1.2.1 VOR

A VHF omnidirectional radio range beacon. A short-range, very-high-frequency omnidirectional beacon which provides an indication in the aircraft of the bearing of the beacon, or left-right track indication.

#### ATTRIBUTES

<a href="#">codeType</a>	Data Type: codeTypeVor
Definition:	A code indicating a type of VOR, e.g. conventional VOR or Doppler VOR.

<a href="#">frequency</a>	Data Type: valFreq
Definition:	The value of the frequency.

<a href="#">codeTypeNorth</a>	Data Type: codeTypeNorth
Definition:	A code indicating the direction of the 'zero bearing' provided by the station. For example: magnetic north, true north.

<a href="#">declination</a>	Data Type: valAngleMagVar
Definition:	The angular difference between True North and the station declination (Magnetic North - as indicated

by the station).

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition: The identifying code given to the navaid	

<a href="#">name</a>	Data Type: txtName
Definition: The long name given to the navaid equipment.	

<a href="#">codeEmmission</a>	Data Type: codeEmRdo
Definition: A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.	

<a href="#">mobile</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment is mobile.	

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition: The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".	

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition: The year the magnetic variation was measured.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition: Indicates the state of the navaid.	

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment has been flight checked.	

**ASSOCIATIONS**

Service 0..1 <b>broadcastOn</b> 0..* VOR	Is Aggregate: False
Definition: Some services can be received through the VOR frequency.	

**Class appears in diagram:**

- Service
- 2 - Navaid Equipment

### 1.2.1.2.2 DME

UHF distance measuring equipment, operating on the interrogation-answer principle. The time required for the round trip of the signal exchange is measured in the airborne DME unit and translated into distance.

#### ATTRIBUTES

<a href="#">codeType</a>	Data Type: codeTypeDme
Definition: A code indicating a particular type of UHF distance measuring equipment. Examples: DME/N, DME/W, DME/P.	

<a href="#">codeChannel</a>	Data Type: codeChannelDme
Definition: The channel of the DME. See Annex 10, Table A, end of Chapter 3 for channelling details and for a list of allowable values.	

<a href="#">ghostFrequency</a>	Data Type: valFreq
Definition: The frequency of a virtual VHF facility paired with the DME according to ICAO Annex 10, table A, ch.3.	

<a href="#">displace</a>	Data Type: valDist
Definition: The value of the displacement, for example, the distance from the DME antenna to where the zero range indication occurs.	

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition: The identifying code given to the navaid	

<a href="#">name</a>	Data Type: txtName
Definition: The long name given to the navaid equipment.	

<a href="#">codeEmission</a>	Data Type: codeEmRdo
Definition: A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.	

<a href="#">mobile</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment is mobile.	

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition: The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic	

best"".

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition: The year the magnetic variation was measured.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition: Indicates the state of the navaid.	

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment has been flight checked.	

**ASSOCIATIONS**

RouteDme 0..* <b>uses</b> 1 DME	Is Aggregate: False
Definition: <a href="#">DME facilities are used for a particular route for DME/DME navigation.</a>	

**Class appears in diagram:**

- 2 - Navaid Equipment
- 7 - Route Portion DME

**1.2.1.2.3 Glidepath**

A component of an ILS consisting of a UHF transmitter radiating signals and providing a straight line descent path in the vertical plane containing the center line of the runway served by the ILS, and thereby furnishing descent information down to the lowest authorized decision height or to the surface of a runway, depending on the Facility Performance Category of the ILS.

**ATTRIBUTES**

<a href="#">frequency</a>	Data Type: valFreq
Definition: The frequency value of the glide path indicator.	

<a href="#">slope</a>	Data Type: valAngle
Definition: The angle of the glide path.	

<a href="#">rdh</a>	Data Type: valDistVer
---------------------	-----------------------

Definition:	The value of the ILS Reference Datum Height (ILS RDH).
<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition:	The identifying code given to the navaid
<a href="#">name</a>	Data Type: txtName
Definition:	The long name given to the navaid equipment.
<a href="#">codeEmmission</a>	Data Type: codeEmRdo
Definition:	A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.
<a href="#">mobile</a>	Data Type: codeYesNo
Definition:	Indicates if the navaid equipment is mobile.
<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition:	The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".
<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition:	The year the magnetic variation was measured.
<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition:	Indicates the state of the navaid.
<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition:	Indicates if the navaid equipment has been flight checked.

## ASSOCIATIONS

### Class appears in diagram:

2 - Navaid Equipment

### 1.2.1.2.4 Localizer

A component of an ILS consisting of a VHF transmitter, radiating signals in the direction served by the ILS, to provide a straight line descent path in the vertical plane containing the center line of the runway.

### ATTRIBUTES

<a href="#">frequency</a>	Data Type: valFreq
Definition:	The frequency of the localizer.

<a href="#">magneticBearing</a>	Data Type: valAngleBrg
Definition:	The measured angle between the localizer beam and Magnetic North at the localizer antenna.

<a href="#">trueBearing</a>	Data Type: valAngleBrg
Definition:	The measured angle between the localizer beam and True North at the localizer antenna. Note : The True North is the north point at which the meridian lines meet.

<a href="#">widthCourse</a>	Data Type: valAngle
Definition:	The localizer course width, in degrees.

<a href="#">codeTypeUseBack</a>	Data Type: codeTypeUseBackIls
Definition:	A code indicating the usability of the localizer signal in the back course sector.

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition:	The identifying code given to the navaid

<a href="#">name</a>	Data Type: txtName
Definition:	The long name given to the navaid equipment.

<a href="#">codeEmission</a>	Data Type: codeEmRdo
Definition:	A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.

<a href="#">mobile</a>	Data Type: codeYesNo
Definition:	Indicates if the navaid equipment is mobile.

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition:	The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition: The year the magnetic variation was measured.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition: Indicates the state of the navaid.	

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment has been flight checked.	

## ASSOCIATIONS

### Class appears in diagram:

2 - Navaid Equipment

### 1.2.1.2.5 Azimuth

A component of an MLS consisting of an SHF transmitter and associated equipment, radiating signals in a volume of airspace served by the MLS, thereby furnishing azimuth indications to aircraft approaching the runway or back azimuth indications to aircraft departing from the runway or performing a missed approach procedure.

## ATTRIBUTES

<a href="#">codeType</a>	Data Type: codeTypeAzm
Definition: A code indicating if it is 'normal' or 'back' azimuth equipment.	

<a href="#">trueBearing</a>	Data Type: valAngleBrg
Definition: The measured angle between theazimuth beam and True North at the azimuth antenna. Note : The True North is the north point at which the meridian lines meet.	

<a href="#">magneticBearing</a>	Data Type: valAngleBrg
Definition: The measured angle between the direction of the azimuth beam and Magnetic North at the azimuth antenna.	

<a href="#">angleProportionalLeft</a>	Data Type: valAngle
Definition: The value of the angle within which the azimuth indication is proportional to the deviation from the azimuth zero indication direction, and left of this direction from the azimuth antenna.	

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<a href="#">angleProportionalRight</a>	Data Type: valAngle
Definition: The value of the angle within which the azimuth indication is proportional to the deviation from the azimuth zero indication direction, and right of this direction from the azimuth antenna.	

<a href="#">angleCoverLeft</a>	Data Type: valAngle
Definition: The value of the angle from the zero indication direction within which the azimuth indication is usable, and left of this direction from the azimuth antenna.	

<a href="#">angleCoverRight</a>	Data Type: valAngle
Definition: The value of the angle from the zero indication direction within which the azimuth indication is usable, and right of this direction from the azimuth antenna.	

<a href="#">codeChannel</a>	Data Type: codeChannelMls
Definition: A code indicating the channel on which the Microwave Landing System is operating.	

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition: The identifying code given to the navaid	

<a href="#">name</a>	Data Type: txtName
Definition: The long name given to the navaid equipment.	

<a href="#">codeEmission</a>	Data Type: codeEmRdo
Definition: A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.	

<a href="#">mobile</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment is mobile.	

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition: The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".	

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition: The year the magnetic variation was measured.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
-----------------------------------	-----------------------------

Definition:	Indicates the state of the navaid.
-------------	------------------------------------

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition:	Indicates if the navaid equipment has been flight checked.

## ASSOCIATIONS

### Class appears in diagram:

2 - Navaid Equipment

### 1.2.1.2.6 Elevation

A component of an MLS consisting of an SHF transmitter, and associated equipment radiating signals within a volume of airspace served by the MLS, thereby furnishing elevation information as an angular value to aircraft approaching the runway.

### ATTRIBUTES

<a href="#">angleNominal</a>	Data Type: valAngle
Definition:	The normal glide path angle for the MLS installation.

<a href="#">angleMinimum</a>	Data Type: valAngle
Definition:	The value of the lowest elevation angle authorized for an MLS procedure.

<a href="#">angleSpan</a>	Data Type: valAngle
Definition:	The value of the span angle of the elevation transmitter signal between the lower and the upper limits.

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition:	The identifying code given to the navaid

<a href="#">name</a>	Data Type: txtName
Definition:	The long name given to the navaid equipment.

<a href="#">codeEmmission</a>	Data Type: codeEmRdo
Definition:	A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.

<a href="#">mobile</a>	Data Type: codeYesNo
Definition:	Indicates if the navaid equipment is mobile.

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition: The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".	

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition: The year the magnetic variation was measured.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition: Indicates the state of the navaid.	

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment has been flight checked.	

## ASSOCIATIONS

### Class appears in diagram:

2 - Navaid Equipment

### 1.2.1.2.7 DesignatedPoint

A named geographical location not marked by the site of a radio navigation aid, used in defining an ATS route, the flight path of an aircraft or for other navigation or ATS purposes.

### ATTRIBUTES

<a href="#">designator</a>	Data Type: codeIdDesigPt
Definition: The coded designator of the point. For example, the five-letter ICAO name of the point, etc..	

<a href="#">type</a>	Data Type: codeTypeDesigPt
Definition: The specific type of designated point whether published by the State, published by the ICAO or created by another agency for convenience of identification etc.	

<a href="#">name</a>	Data Type: txtName
Definition: The full textual name of a designated point, if any. For example, 'GOTAN Intersection' for GOTAN.	

**ASSOCIATIONS**

DesignatedPoint 0..1 <a href="#">DesignatedPoint</a>	Is Aggregate: False
Definition: The association to a designated point	

DesignatedPoint <a href="#">locatedAt</a> 0..1 Point	Is Aggregate: True
Definition: Represents the graphical location of the designated point	

DesignatedPoint 0..* <a href="#">locatedAtCentre</a> 0..1 TouchDownLiftOff	Is Aggregate: False
Definition: <a href="#">The DesignatedPoint is located above the centre of the TLOF</a>	

DesignatedPoint 0..* <a href="#">locatedAtReferencePoint</a> 0..1 AerodromeHeliport	Is Aggregate: False
Definition: The Airport Reference Point	

DesignatedPoint 0..* <a href="#">associatedWith</a> 0..1 AerodromeHeliport	Is Aggregate: False
Definition: <a href="#">The designated Point indentifier is unique within all other designated points associated with the same aerodrome/heliport. Typically, such points are used for RNAV procedures at that aerodrome/heliport.</a>	

DesignatedPoint 0..* <a href="#">situatedAt</a> 0..1 RunwayCenterlinePoint	Is Aggregate: False
Definition: <a href="#">Fix is over a centerline point</a>	

PointReference 0..* <a href="#">locates</a> 1 DesignatedPoint	Is Aggregate: False
Definition: Indicates the fix	

DesignatedPoint <a href="#">hasRemarks</a> 0..* Notes	Is Aggregate: True
Definition:	

DesignatedPoint <a href="#">reviewed</a> UnplannedHolding	Is Aggregate: False
---	---------------------

Definition:	holding over a designated point is reviewed along the course providing guidance.
-------------	--

**Class appears in diagram:**

- 2 - Aerodrome Associations
- 3 - Unplanned Holding
- 5 - Point Reference
- 1 - Significant Points
- 4 - RoutePortion

**1.2.1.2.8 MarkerBeacon**

A marker beacon serving to identify a particular location in space by means of a 75MHz transmitter which transmits a directional signal to be received by aircraft flying overhead.

**ATTRIBUTES**

<a href="#">codeClass</a>	Data Type: codeClassMkr
Definition: A code indicating the class of the radio marker. For example, fan marker, low-powered fan marker, Z marker.	

<a href="#">frequency</a>	Data Type: valFreq
Definition: The value of the radio emission frequency.	

<a href="#">axisBearing</a>	Data Type: valAngleBrg
Definition: The true bearing of the minor axis of the marker beacon. (source: ARINC 424 Specification)	

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition: The identifying code given to the navaid	

<a href="#">name</a>	Data Type: txtName
Definition: The long name given to the navaid equipment.	

<a href="#">codeEmmission</a>	Data Type: codeEmRdo
Definition: A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.	

<a href="#">mobile</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment is mobile.	

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
-----------------------------------	---------------------------

**Definition:** The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
---------------------------------------	---------------------

**Definition:** The year the magnetic variation was measured.

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
-----------------------------------	-----------------------------

**Definition:** Indicates the state of the navaid.

<a href="#">flightChecked</a>	Data Type: codeYesNo
-------------------------------	----------------------

**Definition:** Indicates if the navaid equipment has been flight checked.

## ASSOCIATIONS

Obstacle <a href="#">isMarkedBy</a> 0..1 MarkerBeacon	Is Aggregate: False
---	---------------------

**Definition:**

### Class appears in diagram:

- 1 - Obstacle Feature
- 2 - Navaid Equipment

## 1.2.1.2.9 NDB

A Non-directional radio beacon. A low or medium frequency radio beacon which transmits signals whereby the pilot of an aircraft properly equipped can determine bearings and 'home in' on the station.

## ATTRIBUTES

<a href="#">frequency</a>	Data Type: valFreq
---------------------------	--------------------

**Definition:** The frequency of the NDB emission.

<a href="#">codeClass</a>	Data Type: codeClassNdb
---------------------------	-------------------------

**Definition:** The class of the NDB.  
For example, NDB or Locator.

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition:	The identifying code given to the navaid
<a href="#">name</a>	Data Type: txtName
Definition:	The long name given to the navaid equipment.
<a href="#">codeEmission</a>	Data Type: codeEmRdo
Definition:	A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.
<a href="#">mobile</a>	Data Type: codeYesNo
Definition:	Indicates if the navaid equipment is mobile.
<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition:	The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".
<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition:	The year the magnetic variation was measured.
<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition:	Indicates the state of the navaid.
<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition:	Indicates if the navaid equipment has been flight checked.

## ASSOCIATIONS

### Class appears in diagram:

2 - Navaid Equipment

### 1.2.1.2.10 SignificantPoint

A specified geographical location used to define an ATS route, the flight path of an aircraft or for other navigation/ATS purposes.

## ATTRIBUTES

### ASSOCIATIONS

SignificantPoint	0..1 DesignatedPoint	Is Aggregate: False
Definition:	The association to a designated point	

SignificantPoint	0..1 Navaid	Is Aggregate: False
Definition:	The association to a navaid	

SignificantPointInAirspace	0..* <b>locatedAt</b> 1 SignificantPoint	Is Aggregate: False
Definition:	<a href="#">Associates the type of Significant Point with the Airspace (such as "entry point", "border point", etc.</a>	

AngleIndication	<b>uses</b> SignificantPoint	Is Aggregate: False
Definition:	Indicates the navigation aid on which the fix is based.	

DistanceIndication	<b>uses</b> SignificantPoint	Is Aggregate: False
Definition:	Indicates the navigation aid on which the fix is based.	

SegmentPoint	0..* <b>locatedAt</b> 1 SignificantPoint	Is Aggregate: False
Definition:	Segments use a significant point as a point segment.	

SafeAltitudeArea	1 <b>basedOn</b> 1 SignificantPoint	Is Aggregate: False
Definition:	Safe Altitude Area references a significant point as its base.	

TerminalArrivalArea	<b>usedForDistance</b> 1 SignificantPoint	Is Aggregate: False
Definition:	TAA lateral boundaries are defined by the extension of the left and right base initial segments.	

TerminalArrivalArea	<b>usedForAngle</b> 1 SignificantPoint	Is Aggregate: False
Definition:	The TAA reference points are the initial approach and/or intermediate fixes. The outer area boundaries are determined by arc radius centered on each of the three reference points.	

RoutePortion	<b>startingAt</b> 1 SignificantPoint	Is Aggregate: False
Definition:		

FlightConditionElement 0..* 1 SignificantPoint	Is Aggregate: False
Definition:	

FlightRestrictionRouteElement 0..* 1 SignificantPoint	Is Aggregate: False
Definition:	

RoutePortion <b>endingAt</b> 1 SignificantPoint	Is Aggregate: False
Definition:	

DirectFlightSegment 0..* 1 SignificantPoint	Is Aggregate: False
Definition:	

ChangeOverPoint <b>locatedAt</b> 0..1 SignificantPoint	Is Aggregate: True
Definition:	

DirectFlightSegment 0..* 1 SignificantPoint	Is Aggregate: False
Definition:	

RoutePortion <b>passingThrough</b> 0..* SignificantPoint	Is Aggregate: False
Definition: To be used when necessary to distinguish between alternative branches of a route.	

**Class appears in diagram:**

Minimum and Emergency Safe Altitude

2 - Flight Restriction - conditions

5 - Point Reference

4 - Segment Points

1 - Significant Points

8 - Navigation System Checkpoint

2 - Airspace Associations

4 - RoutePortion

6 - Route Portion Change Over Points

Terminal Arrival Area

### 1.2.1.2.11 SpecialNavigationStation

A land based station of a special navigation system.

#### ATTRIBUTES

<a href="#">name</a>	Data Type: txtName
Definition: The textual name of the station.	

<a href="#">codeTypeService</a>	Data Type: codeTypeSerSpecNav
Definition: A code indicating the type of service within the chain. E.g. Master, Red Slave (DECCA), Slave (LORAN) etc..	

<a href="#">frequency</a>	Data Type: valFreq
Definition: The value of the emission frequency.	

<a href="#">codeEmission</a>	Data Type: codeEmRdo
Definition: A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.	

<a href="#">geoAccuracy</a>	Data Type: valDist
Definition: The horizontal distance from the stated geographical position within which there is a defined confidence of the true position falling.	

<a href="#">elevation</a>	Data Type: valDistVer
Definition: The vertical distance of the position from Mean Sea Level. The geoidal height of the position.	

<a href="#">elevationAccuracy</a>	Data Type: valDistVer
Definition: The vertical distance from the stated elevation within which there is a defined confidence of the true position falling.	

<a href="#">geoidUndulation</a>	Data Type: valDistVer
Definition: The distance of the geoid above (positive) or below (negative) the mathematical reference ellipsoid. The difference between the ellipsoidal height as defined by the World Geodetic System ? 1984 (WGS-84) and the orthometric height represents the WGS-84 geoid undulation.	

<a href="#">crc</a>	Data Type: valHex
Definition: Hexadecimal value of a 32-bit polynomial cyclic redundancy check (CRC) over the values of a selected set of attributes that model critical, essential and routine data, according to ICAO Annex 15, item 3.2.10.	

<a href="#">verticalDatum</a>	Data Type: txtDescr
Definition: Attribute to take the \"Vertical Datum\" (viz. the tide gauge to determine MSL - for example, \"AMSTERDAM GAUGE\", \"NEWLYN\" etc.).	

## ASSOCIATIONS

SpecialNavigationStation 0..* <b>isPartOf</b> 1 SpecialNavigationSystem	Is Aggregate: False
Definition: Station provides a service in a special navigation system chain	

SpecialNavigationStation 1 <b>operatesAccordingTo</b> 0..1 Timetable	Is Aggregate: True
Definition: Special navigation system station - Version is operating according to Special navigation system station	

SpecialNavigationStation 0..* <b>underResponsibilityOf</b> 1 OrganizationAuthority	Is Aggregate: True
Definition: Special navigation system station - Version is under responsibility of Organisaton or authority	

SpecialNavigationStation <b>locatedAt</b> 1 ElevatedPoint	Is Aggregate: False
Definition: Represents the graphical location of the Special Navigation Station.	

SpecialNavigationStation <b>hasRemarks</b> 0..* Notes	Is Aggregate: True
Definition:	

### Class appears in diagram:

- 6 - Guidance Service
- 7 - Special Navigation System

## 1.2.1.2.12 TACAN

A UHF Tactical Air Navigation beacon. A navigation system developed by military and naval forces providing, as far as the navigating pilot is concerned and for suitably equipped aircraft, the same indication as a VOR/DME system.

## ATTRIBUTES

<a href="#">codeChannel</a>	Data Type: codeChannelTacan
Definition: A code indicating the channel of the TACAN system.	

<a href="#">declination</a>	Data Type: valAngleMagVar
Definition: The angular difference between the direction of the 'zero bearing' indicated by the station and the direction of the True North.	

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition: The identifying code given to the navaid	

<a href="#">name</a>	Data Type: txtName
Definition: The long name given to the navaid equipment.	

<a href="#">codeEmmission</a>	Data Type: codeEmRdo
Definition: A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.	

<a href="#">mobile</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment is mobile.	

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition: The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".	

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition: The year the magnetic variation was measured.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition: Indicates the state of the navaid.	

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment has been flight checked.	

## ASSOCIATIONS

### Class appears in diagram:

## 2 - Navaid Equipment

**1.2.1.2.13 NavigationSystemCheckpoint**

A point established and marked on the surface of an aerodrome allowing the checking of a navigation system (like VOR, GNSS, etc.) or initialisation of an inertial navigation system.

**ATTRIBUTES**

<b>type</b>	Data Type: codeTypeNavCkPt
Definition:	The type of navigation system for which the checkpoint has been established. For example, INS, VOR, GNSS, etc.

**ASSOCIATIONS**

NavigationSystemCheckpoint 0..* <b>situatedAt</b> 0..1 GateStand	Is Aggregate: False
Definition:	<a href="#">Navaid checkpoint is at the gate stand</a>

DistanceIndication 0..* <b>referringTo</b> 1 NavigationSystemCheckpoint	Is Aggregate: False
Definition:	

AngleIndication 0..* <b>referringTo</b> 1 NavigationSystemCheckpoint	Is Aggregate: False
Definition:	

NavigationSystemCheckpoint <b>hasRemarks</b> 0..* Notes	Is Aggregate: True
Definition:	

NavigationSystemCheckpoint 0..* <b>situatedAt</b> 0..1 TaxiHoldingPosition	Is Aggregate: False
Definition:	

**Class appears in diagram:**

Taxiway Holding Position

8 - Navigation System Checkpoint

2 - Gate/Stand

### 1.2.1.2.14 DistanceIndication

A distance reference from a navaid or with reference to a designated point.

#### ATTRIBUTES

<a href="#">distance</a>	Data Type: valDist
Definition: The value of the distance.	

<a href="#">minimumReceptionAltitude</a>	Data Type: valDistVer
Definition: The lowest altitude that an aircraft can receive signal.	

<a href="#">type</a>	Data Type: codeTypeDistInd
Definition: indicates the distance is from distance measuring equipment or just a simple distance	

#### ASSOCIATIONS

PointReference <a href="#">basedOnDistance</a> 0..* DistanceIndication	Is Aggregate: True
Definition: Indicates the distance from the navigation aid(s) or designated point on which the fix is based.	

DistanceIndication 0..* <a href="#">referringTo</a> 1 NavigationSystemCheckpoint	Is Aggregate: False
Definition:	

DistanceIndication <a href="#">hasRemarks</a> 0..* Notes	Is Aggregate: True
Definition:	

DistanceIndication <a href="#">uses</a> SignificantPoint	Is Aggregate: False
Definition: Indicates the navigation aid on which the fix is based.	

SegmentLeg <a href="#">limitedByDistance</a> 0..1 DistanceIndication	Is Aggregate: False
Definition: Aircraft trajectory must not cross this distance indication.	

#### Class appears in diagram:

- 5 - Point Reference
- 8 - Navigation System Checkpoint
- Segment Leg

### 1.2.1.2.15 AngleIndication

An angular reference from a navaid or with reference to a designated point.

#### ATTRIBUTES

<a href="#">angle</a>	Data Type: valAngleBrg
Definition: The indication of a bearing (at a given point) by the measurement of the angle between the bearing and either True North or Magnetic North (this should appear explicitly or implicitly). The angle is measured clockwise from 0 degrees up to but not including 360 degrees. The value can also be a VOR radial. For example, Westward is expressed as 270.	

<a href="#">angleType</a>	Data Type: codeTypeAngleBrg
Definition: A code indicating the direction of the zero bearing. For example, magnetic north or true north.	

<a href="#">indicationDirection</a>	Data Type: codeDirRef
Definition: Code indicating the if the angle is TO or FROM the Navaid or Designated Point that is used.	

<a href="#">trueAngle</a>	Data Type: valAngleBrg
Definition: The indication of a bearing (at a given point) by the measurement of the angle between the bearing and True North. The angle is measured clockwise from 0 degrees up to but not including 360 degrees. The value can also be a VOR radial. For example, Westward is expressed as 270.	

<a href="#">cardinalDirection</a>	Data Type: codeCardinalDirection
Definition: The angle expressed as compass direction.	

<a href="#">minimumReceptionAltitude</a>	Data Type: valDistVer
Definition: The lowest altitude that an aircraft can receive signal.	

<a href="#">alongTrackFlagDeleteMe</a>	Data Type: codeYesNo
Definition: defines the indication providing the course guidance for the segment.	

#### ASSOCIATIONS

PointReference <a href="#">basedOnAngle</a> 0..* AngleIndication	Is Aggregate: True
Definition: Indicates the angle from the navigation aid(s) or designated point on which the fix is based.	

AngleIndication 0..* <a href="#">referringTo</a> 1 NavigationSystemCheckpoint	Is Aggregate: False
Definition:	

AngleIndication <a href="#">hasRemarks</a> 0..* Notes	Is Aggregate: True
---	--------------------

Definition:
-------------

AngleIndication <b>uses</b> SignificantPoint	Is Aggregate: False
Definition: Indicates the navigation aid on which the fix is based.	

SegmentLeg <b>limitedByAngle</b> 0..1 AngleIndication	Is Aggregate: False
Definition: Aircraft trajectory must not cross the angle indication.	

### Class appears in diagram:

5 - Point Reference  
8 - Navigation System Checkpoint  
Segment Leg

## 1.2.1.2.16 NavaidEquipment

A physical navaid equipment like VOR, DME, localizer, TACAN, etc..

### ATTRIBUTES

<a href="#">codeId</a>	Data Type: codeIdNavAid
Definition: The identifying code given to the navaid	

<a href="#">name</a>	Data Type: txtName
Definition: The long name given to the navaid equipment.	

<a href="#">codeEmmission</a>	Data Type: codeEmRdo
Definition: A code indicating the type of emission, as defined at the 1979 ITU World Administrative Radio Conference.	

<a href="#">mobile</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment is mobile.	

<a href="#">magneticVariation</a>	Data Type: valAngleMagVar
Definition: The measured angle between Magnetic North and True North at the VOR and at the time reported in dateMagneticVariation. By convention, the measure is expressed as a positive number if Magnetic North is to the east of True North and negative if Magnetic North is to the west of True North. Therefore, magnetic bearing + magnetic variation = true bearing. The following rule of thumb applies: ""variation east-magnetic least, variation west-magnetic best"".	

<a href="#">dateMagneticVariation</a>	Data Type: dateYear
Definition: The year the magnetic variation was measured.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition: Indicates the state of the navaid.	

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition: Indicates if the navaid equipment has been flight checked.	

## ASSOCIATIONS

NavaidEquipment <b>hasLocation</b> 0..1 ElevatedPoint	Is Aggregate: True
Definition: This is the location where the navaid equipment resides.	

Navaid 0..* <b>composedOf</b> 0..* NavaidEquipment	Is Aggregate: False
Definition: Navaid system can have components that perform a specific function for aircraft guidance.	

NavaidEquipment <b>workingBy</b> 0..1 Timetable	Is Aggregate: True
Definition: This represents the hours the equipment is in service.	

NavaidEquipment <b>unmonitoredBy</b> 0..1 Timetable	Is Aggregate: True
Definition: This represents the hours the equipment is not monitored.	

NavaidEquipment 0..* <b>underResponsibilityOf</b> 0..1 OrganizationAuthority	Is Aggregate: False
Definition: Represents the organization responsible for the equipment.	

NavaidEquipment <b>hasRemarks</b> 0..* Notes	Is Aggregate: True
Definition:	

EquipmentChoice <b>for</b> 1 NavaidEquipment	Is Aggregate: False
Definition: Limitation is a navaid frequency limitation	

### Class appears in diagram:

- 2 - Navaid Equipment
- 6 - Guidance Service
- 3 - Navaid Limitation

## 1- Radio Frequency Limitation

**1.2.1.2.17 PointReference**

Unambiguously defines the location of a point using a combination of angles and distances. The set of angles and distances must not under specify the location.

Identifies the service that is used to locate the point. Unambiguously defines the location of a designated point using a combination of angles and distances based on the guidance service. The set of angles and distances must not under specify the location.

The indications that are part of the PointLocation must locate the same designated point.

**ATTRIBUTES**

<b>role</b>	Data Type: codeTypeRole
Definition:	Describes the role of the defined point reference. Example: DME, INT, recommended navaid, fix tolerance

**ASSOCIATIONS**

PointReference <b>basedOnAngle</b> 0..* AngleIndication	Is Aggregate: True
Definition:	Indicates the angle from the navigation aid(s) or designated point on which the fix is based.

PointReference <b>basedOnDistance</b> 0..* DistanceIndication	Is Aggregate: True
Definition:	Indicates the distance from the navigation aid(s) or designated point on which the fix is based.

PointReference <b>hasFixToleranceArea</b> 0..1 Surface	Is Aggregate: True
Definition:	The dimensions of the fix tolerance area are determined by the system use accuracy of the navigation aid(s) on which the fix is based, and the distance from the facility.

PointReference 0..* <b>locates</b> 1 DesignatedPoint	Is Aggregate: False
Definition:	Indicates the fix

PointReference <b>hasRemarks</b> 0..* Notes	Is Aggregate: True
Definition:	

SegmentPoint 0..* <b>uses</b> 0..* PointReference	Is Aggregate: False
---	---------------------

Definition:	Segment point is located on specific makeup known as a reference.
-------------	---

UnplannedHolding <b>isAssessed</b> 0..1 PointReference	Is Aggregate: False
Definition: If a designated point is established in the enroute environment, holding is assessed for reference providing guidance.	

### Class appears in diagram:

- 3 - Unplanned Holding
- 5 - Point Reference
- 4 - Segment Points

## 1.2.1.2.18 Navaid

One or more Navaid Equipment providing navigation services. The Navaid Equipment share business rules like paired frequencies.

### ATTRIBUTES

<a href="#">type</a>	Data Type: codeTypeNavaid
Definition: Type of the navaid service such as ILS, MLS, VORTAC, VOR/DME, etc.	

<a href="#">identifier</a>	Data Type: codeIdNavAid
Definition: the code given to the navaid system	

<a href="#">landingCategory</a>	Data Type: codeCatLdgAid
Definition: A code indicating the landing precision of a navaid when used as a landing system.	

<a href="#">operationalStatus</a>	Data Type: codeStatusNavaid
Definition: Indicates the state of the navaid.	

<a href="#">flightChecked</a>	Data Type: codeYesNo
Definition: Indicates if the navaid has been flight checked.	

### ASSOCIATIONS

Navaid 0..* <b>composedOf</b> 0..* NavaidEquipment	Is Aggregate: False
Definition: Navaid system can have components that perform a specific function for aircraft guidance.	

Navaid <b>hasNavigableLocation</b> 0..1 ElevatedPoint	Is Aggregate: True
Definition: This is the location used when the navaid acts as a significant point. This location is usually the	

location of one of the navaid equipments.

SignificantPoint 0..1 Navaid	Is Aggregate: False
Definition: The association to a navaid	

GuidanceService <b>using</b> 0..1 Navaid	Is Aggregate: False
Definition:	

Navaid <b>for</b> RunwayDirection	Is Aggregate: False
Definition: Mostly applies to ILS, MLS and maybe Marker Beacons.	

Navaid <b>hasRemarks</b> 0..* Notes	Is Aggregate: True
Definition:	

Navaid <b>reviewed</b> UnplannedHolding	Is Aggregate: False
Definition: holding over a designated point is reviewed for all radials around the navaid; 360 degrees.	

AerodromeHeliportNavaid 0..* <b>using</b> 1 Navaid	Is Aggregate: False
Definition:	

**Class appears in diagram:**

- 2 - Aerodrome Associations
- 3 - Unplanned Holding
- 2 - Navaid Equipment
- 6 - Guidance Service
- 5 - Point Reference
- 1 - Significant Points
- 4 - RoutePortion

**1.2.1.2.19 NavaidComposition**

The use of the navaid equipment within the navaid service. For example, the VOR equipment in a VORTAC provides angular guidance service.

**ATTRIBUTES**

<a href="#">collocationGroup</a>	Data Type: noSeq
----------------------------------	------------------

**Definition:** Set of navaid equipment that are collocated. All Navaid equipment that has the same value for this property are collocated together. For example in a VOR/DME Navaid the VOR and DME navaid equipment will be assigned the same collocationGroup number = 1. For example an ILS might have a Localizer with collocation Group number = 1 and collocated DME and Glidepath sharing collocationGroup number = 2.

<a href="#">markerPosition</a>	Data Type: codePsnIls
<b>Definition:</b> A code indicating the position, in a navaid landing system, of the markers situated on the centerline of a runway. For example: outer, middle, etc..	

<a href="#">providesNavigableLocation</a>	Data Type: codeYesNo
<b>Definition:</b> Indicates the navaid equipment used to specify the navigable location of the Navaid when the navaid is used as significant point	

**ASSOCIATIONS**

NavaidComposition <b>hasRemarks</b> 0..* Notes	<b>Is Aggregate:</b> True
<b>Definition:</b>	

**Class appears in diagram:**

- 2 - Navaid Equipment
- 6 - Guidance Service

**1.2.1.2.20 SpecialNavigationSystem**

A wide area (worldwide) navigation system based on a chain of land stations or a satellite constellation providing radio frequency signals which can be used by airborne equipment to determine at least, the aircrafts two-dimensional position or, depending on the capability of the system, the three-dimensional position.

AIXM-ID: SnyType

AIXM-DESCRIPTION: Special navigation system - Version

++++ Change +++++

Set stereotype

AIXM-IDENTIFIER\_CLASS: SnyUidType

AIXM-IDENTIFIER\_ELEMENT: SnyUid

AIXM-IDENTIFIER\_DESCRIPTION: Special navigation system - Version is a version of Special navigation system

**ATTRIBUTES**

<a href="#">codeType</a>	Data Type: codeTypeSpecNavSys
<b>Definition:</b> A code indicating the type of special navigation system.	

For example, LORAN, DECCA, GNSS, etc.

<a href="#">codeId</a>	Data Type: codeIdChainSpecNav
Definition:	The coded identifier of a special navigation system chain.

<a href="#">name</a>	Data Type: txtName
Definition:	The textual name of the chain of a special navigation system. For example, Mangern Chain

### ASSOCIATIONS

SpecialNavigationStation 0..* <b>isPartOf</b> 1 SpecialNavigationSystem	Is Aggregate: False
Definition:	Station provides a service in a special navigation system chain

GuidanceService <b>using</b> 0..1 SpecialNavigationSystem	Is Aggregate: False
Definition:	

SpecialNavigationSystem 0..* <b>underResponsibilityOf</b> 1 OrganizationAuthority	Is Aggregate: True
Definition:	Special navigation system - Version is under the responsibility of Organisation or authority

SpecialNavigationSystem <b>hasRemarks</b> 0..* Notes	Is Aggregate: True
Definition:	

#### Class appears in diagram:

- 6 - Guidance Service
- 7 - Special Navigation System

### 1.2.1.2.21 TerminalSegmentPoint

Indicates a point associated with a defined terminal segment.

#### ATTRIBUTES

<a href="#">role</a>	Data Type: codeIapFix
Definition:	Identifies the function or position the point plays in the approach procedure.

<a href="#">leadRadial</a>	Data Type: valAngleBrg
Definition: The lead radial provides information for aircraft with single receiving equipment to change the receiver to the localizer or other facility providing the course guidance and to ensure the aircraft is within the clearance coverage area of LOC facilities before changing frequency or accepting oncourse indication.	

<a href="#">indicatorFACF</a>	Data Type: codeYesNo
Definition: Indicates the point is also a Final Approach Course Fix (FACF).	

<a href="#">reportingATC</a>	Data Type: codeRepAtc
Definition: code indicating the type of position report required by an ATC Unit. Eg.: compulsory or on request.	

<a href="#">flyBy</a>	Data Type: codeYesNo
Definition: Indicates if the aircraft is not required to fly directly over the fix. If code is Yes, then it is a 'flyby' waypoint. If the code is No or nil, then the associated fix is a 'fly-over' waypoint. [ICAO] Waypoints are identified as either flyover or fly-by.	
Fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure	
Flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.	

<a href="#">waypoint</a>	Data Type: codeYesNo
Definition: A point used for RNAV procedures/routes.	

<a href="#">radarGuidance</a>	Data Type: codeYesNo
Definition: Radar guidance is possible for reaching this point.	

**ASSOCIATIONS**

SegmentLeg <b>startingAt</b> 0..1 TerminalSegmentPoint	Is Aggregate: True
Definition: determines the starting point of the segment	

SegmentLeg <b>endingAt</b> 0..1 TerminalSegmentPoint	Is Aggregate: True
Definition: determines the ending point of the segment	

FinalLeg <b>hasVisualDescentPoint</b> 0..* TerminalSegmentPoint	Is Aggregate: True
Definition: Visual Descent Point (VDP). [AIM] The VDP is a defined point on the final approach course of a nonprecision straight-in approach procedure from which normal descent from the MDA to the runway touchdown point may be commenced, provided visual reference required by 14 CFR Section 91.175(c)(3) is established.	
Note: For RNAV procedures, VDPs apply only to aircraft utilizing LNAV minima, not LPV or LNAV/VNAV	

minimums.
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SegmentLeg <b>isArcCenter</b> 0..1 TerminalSegmentPoint	Is Aggregate: True
Definition: An segment known as an Arc can be defined as a radius and distance around a center point.	

**Class appears in diagram:**

4 - Segment Points

Segment Leg

SegmentLegSpecialization

**1.2.1.2.22 EnRouteSegmentPoint**

Indicates a point associated with a defined EnRoute segment.

**ATTRIBUTES**

<a href="#">roleFreeFlight</a>	Data Type: codeFreeFlight
Definition: Free flight is an air traffic control method that uses no centralized control (e.g. air traffic controllers). Instead, parts of airspace are reserved dynamically and automatically in a distributed way using computer communication to ensure the required separation between aircraft	

<a href="#">roleRVSM</a>	Data Type: codeRvsmPoint
Definition: A code indicating that the point has a specific role in the reduced vertical separation minima (RVSM) context.	

<a href="#">turnRadius</a>	Data Type: valDist
Definition: The recommended turn radius when continuing on the previous segment of the route (start point) or when continuing on the next segment of the route(end point).	

<a href="#">reportingATC</a>	Data Type: codeRepAtc
Definition: code indicating the type of position report required by an ATC Unit. Eg.: compulsory or on request.	

<a href="#">flyBy</a>	Data Type: codeYesNo
Definition: Indicates if the aircraft is not required to fly directly over the fix. If code is Yes, then it is a 'flyby' waypoint. If the code is No or nil, then the associated fix is a 'fly-over' waypoint. [ICAO] Waypoints are identified as either flyover or fly-by.	
Fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure	
Flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.	

<a href="#">waypoint</a>	Data Type: codeYesNo
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Definition:	A point used for RNAV procedures/routes.
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<a href="#">radarGuidance</a>	Data Type: codeYesNo
Definition:	Radar guidance is possible for reaching this point.

### ASSOCIATIONS

RouteSegment <b>startingAt</b> 1 EnRouteSegmentPoint	Is Aggregate: True
Definition:	

RouteSegment <b>endingAt</b> 1 EnRouteSegmentPoint	Is Aggregate: True
Definition:	

### Class appears in diagram:

- 4 - Segment Points
- 2 - Route Segment

## 1.2.1.2.23 GuidanceService

### ATTRIBUTES

### ASSOCIATIONS

GuidanceService <b>using</b> 0..1 Navaid	Is Aggregate: False
Definition:	

GuidanceService <b>using</b> 0..1 SpecialNavigationSystem	Is Aggregate: False
Definition:	

GuidanceService <b>using</b> 0..1 Service	Is Aggregate: False
Definition:	

**Class appears in diagram:**

6 - Guidance Service

**1.2.1.2.24 SignificantPointInAirspace**

Details about the meaning of the association between the SignificantPoint and the Airspace. For example, a significant point marking entry/exit points associated with an RVSM area.

**ATTRIBUTES**

<a href="#">type</a>	Data Type: codeTypeAsSignpnt
Definition:	A code indicating the type of association between a significant point and an airspace. Ex: entry point, exit point, etc..

**ASSOCIATIONS**

SignificantPointInAirspace 0..* <b>situatedWithin</b> 1 Airspace	Is Aggregate: False
Definition:	<a href="#">defines a point in the airspace</a>

SignificantPointInAirspace 0..* <b>locatedAt</b> 1 SignificantPoint	Is Aggregate: False
Definition:	<a href="#">Associates the type of Significant Point with the Airspace (such as "entry point", "border point", etc.</a>

SignificantPointInAirspace <b>hasRemarks</b> 0..* Notes	Is Aggregate: True
Definition:	

**Class appears in diagram:**

2 - Airspace Associations

**1.2.1.2.25 SegmentPoint**

Indicates a point associated with a defined segment.

**ATTRIBUTES**

<a href="#">reportingATC</a>	Data Type: codeRepAtc
Definition:	code indicating the type of position report required by an ATC Unit. Eg.: compulsory or on request.

<a href="#">flyBy</a>	Data Type: codeYesNo
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**Definition:** Indicates if the aircraft is not required to fly directly over the fix. If code is Yes, then it is a 'flyby' waypoint. If the code is No or nil, then the associated fix is a 'fly-over' waypoint. [ICAO] Waypoints are identified as either flyover or fly-by.

Fly-by waypoint. A waypoint which requires turn anticipation to allow tangential interception of the next segment of a route or procedure

Flyover waypoint. A waypoint at which a turn is initiated in order to join the next segment of a route or procedure.

<a href="#">waypoint</a>	Data Type: codeYesNo
<b>Definition:</b> A point used for RNAV procedures/routes.	

<a href="#">radarGuidance</a>	Data Type: codeYesNo
<b>Definition:</b> Radar guidance is possible for reaching this point.	

**ASSOCIATIONS**

SegmentPoint <b>hasRemarks</b> 0..* Notes	<b>Is Aggregate:</b> True
<b>Definition:</b>	

SegmentPoint 0..* <b>uses</b> 0..* PointReference	<b>Is Aggregate:</b> False
<b>Definition:</b> Segment point is located on specific makeup known as a reference.	

SegmentPoint 0..* <b>locatedAt</b> 1 SignificantPoint	<b>Is Aggregate:</b> False
<b>Definition:</b> Segments use a significant point as a point segment.	

HoldingPattern <b>basedOn</b> 0..1 SegmentPoint	<b>Is Aggregate:</b> False
<b>Definition:</b> holding occurs at this point	

HoldingPatternLength <b>hasEndPoint</b> 1 SegmentPoint	<b>Is Aggregate:</b> False
<b>Definition:</b> The second waypoint of a two point holding, used to define the end of the outbound leg.	

**Class appears in diagram:**

- 1 - Holding Pattern
- 2 - HoldingPatternChoice
- 4 - Segment Points

2 - Route Segment  
Segment Leg