

**AIXM**

**Holding**

**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

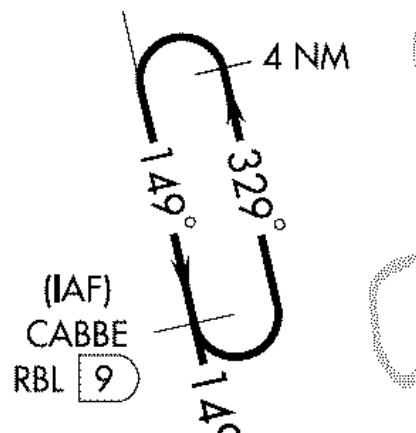
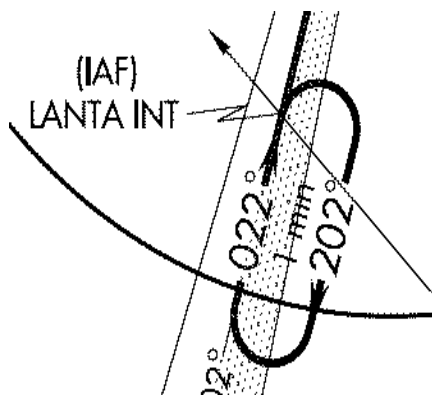
##### 1.2.1.2 Holding

#### Holding Feature Background

Holding procedure or pattern is a predetermined manoeuvre which keeps an aircraft within a specified airspace while awaiting further clearance.

Air Traffic Control uses holding patterns to adjust/regulate air traffic flow. Holding patterns are built into instrument flight procedures for this purpose.

Holding patterns can be based on a ground navigation facility or a designated point. If the holding pattern is flown conventionally the holding pattern will reference a navaid. If a holding pattern is used on an RNAV procedure flown by the latitude and longitude of the waypoint it will not have a reference navaid.



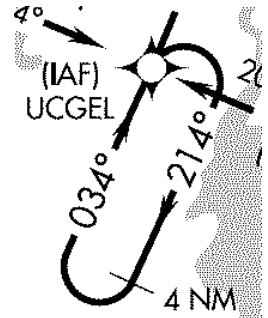
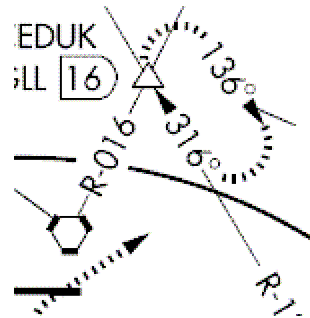
The length of holding can be defined by a time, distance or an outbound end point. Time and distance are shown above.

**Holding Segment Types**

There are three types of holding segments:

**Missed Approach Holding**

A holding pattern is defined when the final phase of a missed approach ends with holding.

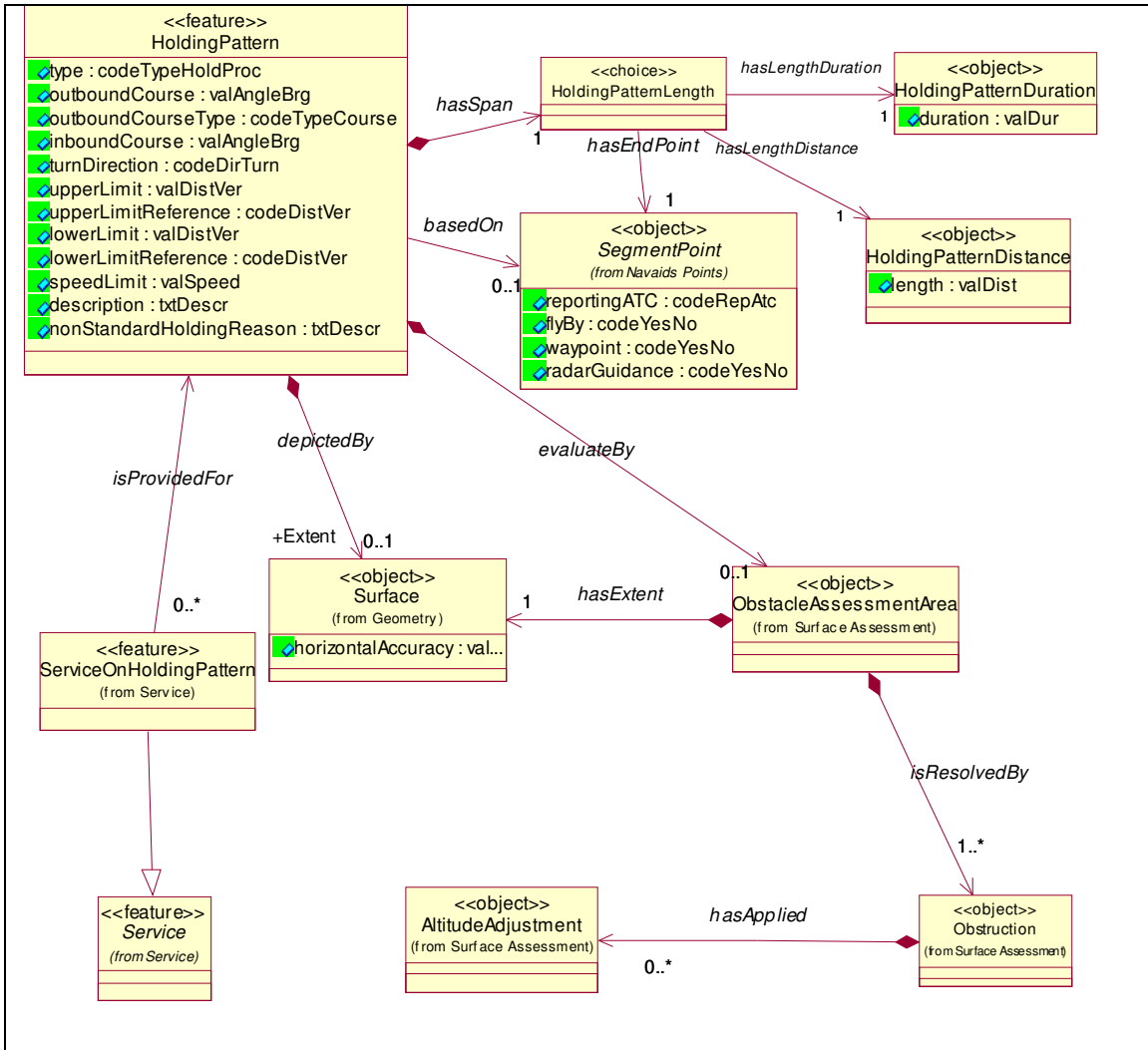


**Hold in Lieu (Holding segment used as Course Reversal)**

The reversal procedure may be proceeded by maneuvering in a suitably located holding pattern.

**Arrival Holding**

A holding pattern is defined at the initial approach fix when holding is required prior to entering the initial approach segment.



**Figure 1: 1 - Holding Pattern**  
UML Diagram

The HoldingPattern Feature defines the specifics about a holding pattern.

Standard holding is developed with right turns. Left turn holding is considered Non-standard and the reason for non-standard holding should be captured here.

The span of a holding pattern can be defined by a time, distance or a specified point. The HoldingPatternLength depicts these three choices. The DurationType attribute is used to define time, the DistanceType attribute is used to define distance and the SegmentPoint object is used to define a specified end point for the outbound leg.

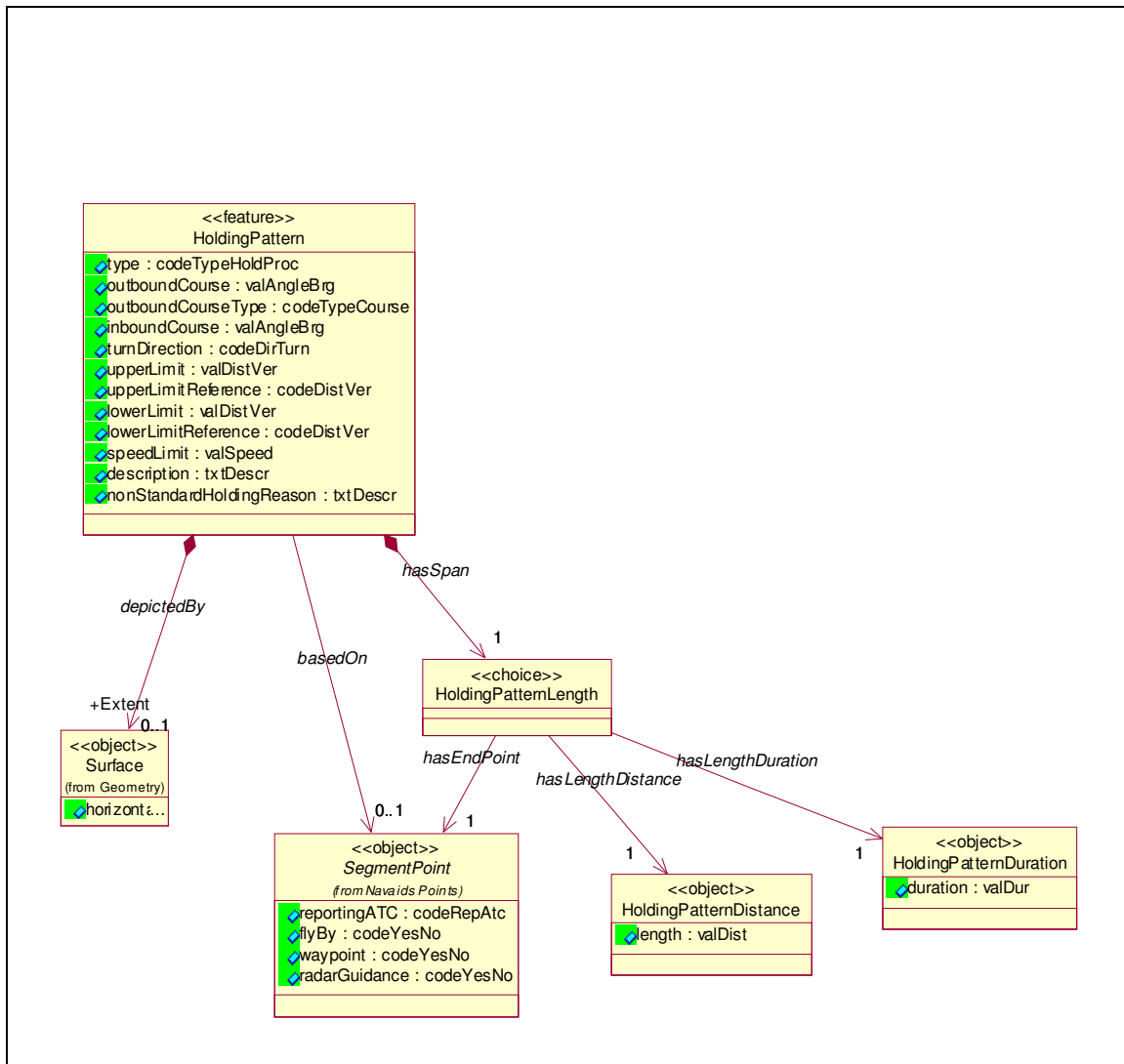
The minimum and maximum altitudes are identified by determining the highest obstacle in the obstacle clearance area and applying operational factors. See Surface Assessment Diagram for details.

The highest obstacle is documented using ControllingObstacle object.

The obstacle clearance area is defined using the SurfaceAssessment object.

Operational factors are documented using AltitudeAdjustment object.

The ServiceOnHoldingPattern captures a service that is provided for aircraft flying a Holding Procedure.



**Figure 2: 2 - HoldingPatternChoice**

The span of a holding pattern can be defined by a time, distance or a specified point. The DurationType attribute is used to define time, the DistanceType attribute is used to define distance and the SegmentPoint object is used to define a specified end point for the outbound leg.

The HoldingPatternLength depicts the three choices available for providing the outbound leg end.e and the Horizontal Duration is used to implement distance.

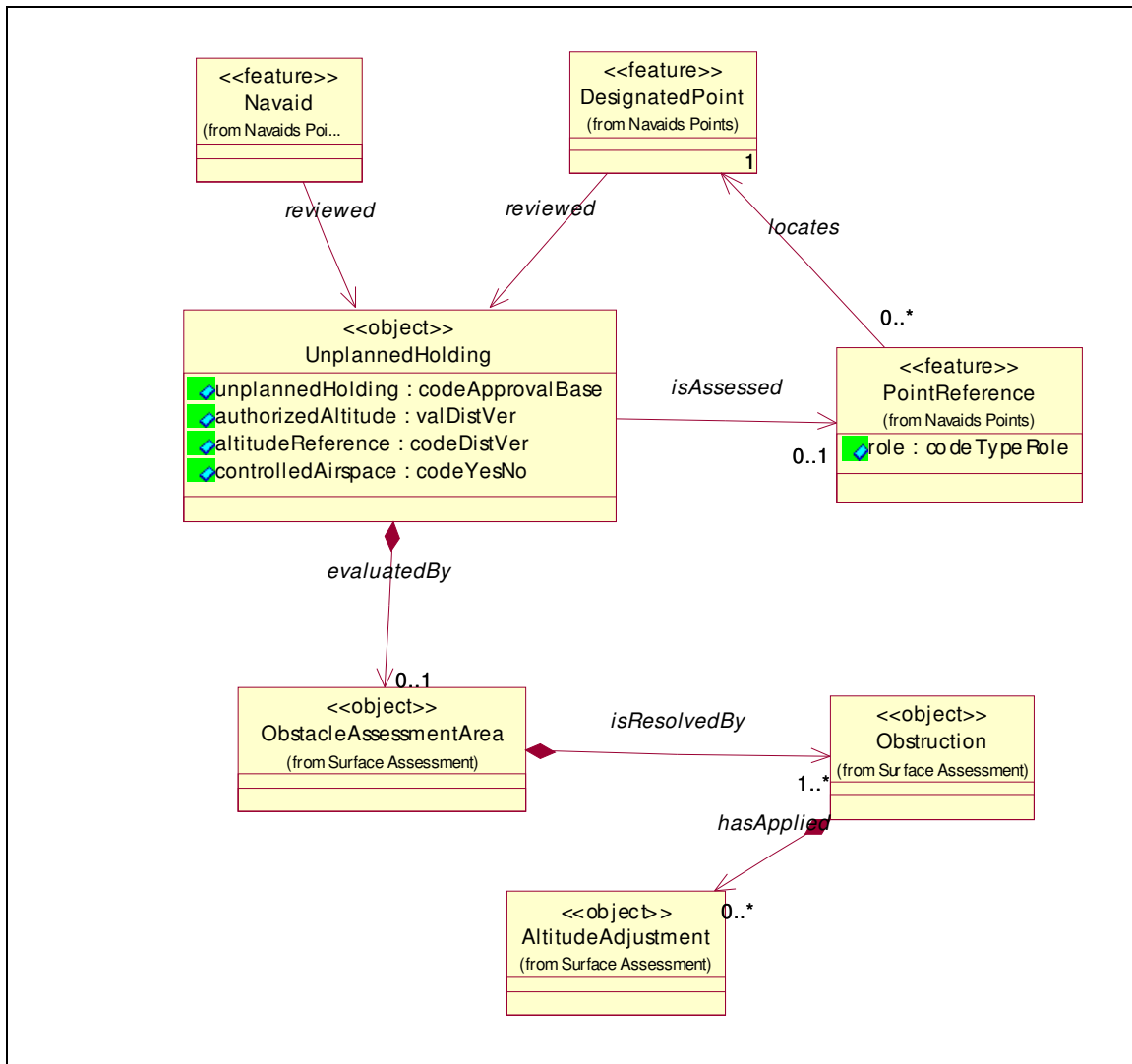
### **Unplanned Holding Background**

Unplanned Holding is used for en route fixes, providing holding along all airways transverse the fix; or over NAVAIDs providing holding over all radials/bearings from the NAVAID.

If any airway or NAVAID radial/bearing cannot support unplanned holding, Restrictions are indicated.

Unusual circumstances may require occasionally "quick fixing"; therefore, each control position should be analyzed according to altitude controlled and holding speeds normally encountered.

Where required for aircraft separation, ATC may request aircraft to hold at any designated reporting point in a standard holding pattern at the MEA or the minimum reception altitude (MRA), whichever altitude is the higher, at locations where a minimum holding altitude has not been requested. For this reason, the conditions to be considered for holding (obstacle clearance, communications, and facility performance) must be reviewed whenever reporting points are established or revised, even though specific holding authorization has not been requested by the ATC facility.



**Figure 3: 3 - Unplanned Holding**  
UML Diagram

UnplannedHolding feature is the main feature in this diagram. It indicates the approval for unplanned holding and controlled airspace assessment.

SurfaceAssessmentArea and ControllingObstruction objects are used to document the unplanned holding assessment. See Assessment Diagram.

The Notes object will be used to capture specific instructions about unplanned holding.



**Figure 4: 4 -**

**Holding Pattern Codelists**

**Classes**

**1.2.1.2.1 HoldingPattern**

A predetermined manoeuvre which keeps an aircraft within a specified airspace while awaiting further clearance.

**ATTRIBUTES**

<a href="#">type</a>	Data Type: codeTypeHoldProc
Definition:	A code indicating the type of holding procedure. E.g. en-route holding, terminal area holding.

<a href="#">outboundCourse</a>	Data Type: valAngleBrg
Definition:	The radial, course, bearing or magnetic directional course (if navaid is a localizer) from the facility or waypoint on which holding is based.

<a href="#">outboundCourseType</a>	Data Type: codeTypeCourse
Definition:	The type of course to be observed. E.g. true track, magnetic track, heading, VOR radial, true bearing,

magnetic bearing

<a href="#">inboundCourse</a>	Data Type: valAngleBrg
Definition: The course of the inbound leg.	

<a href="#">turnDirection</a>	Data Type: codeDirTurn
Definition: Direction of the turn	

<a href="#">upperLimit</a>	Data Type: valDistVer
Definition: Max altitude allowed for all aircraft categories at all defined speeds	

<a href="#">upperLimitReference</a>	Data Type: codeDistVer
Definition: A code indicating the reference for a vertical distance. Two series of values exist: 1) real distance: from GND, from the MSL, from the WGS-84 ellipsoid 2) pressure distance: QFE, QNH, STD.	

<a href="#">lowerLimit</a>	Data Type: valDistVer
Definition: Minimum altitude allowed for all aircraft categories at all defined speeds	

<a href="#">lowerLimitReference</a>	Data Type: codeDistVer
Definition: A code indicating the reference for a vertical distance. Two series of values exist: 1) real distance: from GND, from the MSL, from the WGS-84 ellipsoid 2) pressure distance: QFE, QNH, STD.	

<a href="#">speedLimit</a>	Data Type: valSpeed
Definition: Restricted speed for containment in a smaller pattern	

<a href="#">description</a>	Data Type: txtDescr
Definition: Printable text description of the holding pattern	

<a href="#">nonStandardHoldingReason</a>	Data Type: txtDescr
Definition: When holding with left turns, the reason should be stated	

**ASSOCIATIONS**

HoldingPattern	<b>depictedBy</b> 0..1 Surface	Is Aggregate: True
Definition: A race track pattern depicts a holding pattern.		

HoldingPattern	<b>hasSpan</b> 1 HoldingPatternLength	Is Aggregate: True
Definition: Span of the holding pattern as duration, length, or outbound to a significant point.		

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

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

ServiceOnHoldingPattern 0..* <b>isProvidedFor</b> HoldingPattern	Is Aggregate: False
Definition: Services may be provided while holding	

HoldingPattern <b>evaluateBy</b> 0..1 ObstacleAssessmentArea	Is Aggregate: True
Definition: Obstacles are evaluated to determine if holding is permitted.	

HoldingUse <b>describesUseOf</b> 0..n HoldingPattern	Is Aggregate: False
Definition: segment leg uses a holding pattern for arrival holding, missed approach holding or hold in lieu of procedure turn.	

### Class appears in diagram:

- 1 - Holding Pattern
- 2 - HoldingPatternChoice
- 2 - Obstacle Assesment Associations
- Segment Leg

## 1.2.1.2.2 HoldingPatternLength

Representation of a span for a holding pattern that can be defined using either duration, distance or as outbound to a Significant Point. Note: abstract types will be ignored in XML encoding.

### ATTRIBUTES

### ASSOCIATIONS

HoldingPattern <b>hasSpan</b> 1 HoldingPatternLength	Is Aggregate: True
Definition: Span of the holding pattern as duration, length, or outbound to a significant point.	

HoldingPatternLength <b>hasLengthDuration</b> 1 HoldingPatternDuration	Is Aggregate: False
Definition: Span is time	

HoldingPatternLength <b>hasLengthDistance</b> 1 HoldingPatternDistance	Is Aggregate: False
Definition: span is length	

HoldingPatternLength <b>hasEndPoint</b> 1 SegmentPoint	Is Aggregate: False
Definition: 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

**1.2.1.2.3 UnplannedHolding**

First time a point is established in Enroute environment at a navaid, all radials are checked for holding; 360 deg. If the point is a designated point holding along the course guidance radial is checked. If no restrictions are found, holding on any radial (unplanned) is approved. If restrictions are found, holding restrictions may be noted or holding may be restricted to defined holding patterns.

**ATTRIBUTES**

<a href="#">unplannedHolding</a>	Data Type: codeApprovalBase
Definition: Indicates if the holding pattern is used as an unplanned holding.	
Note: Enroute use only.	

<a href="#">authorizedAltitude</a>	Data Type: valDistVer
Definition: value of the altitude approved based on unplanned holding assessment.	

<a href="#">altitudeReference</a>	Data Type: codeDistVer
Definition: Indicates: "HEI" = The distance measured from the ground,(AGL) "ALT" = The distance measured from mean sea level (MSL)	

<a href="#">controlledAirspace</a>	Data Type: codeYesNo
Definition: indicates unplanned holding is completely contained within controlled airspace.	

**ASSOCIATIONS**

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

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.		

UnplannedHolding	<b>evaluatedBy</b> 0..1 ObstacleAssessmentArea	Is Aggregate: True
Definition: Obstacle assessment areas (holding pattern templates) are used to evaluate for unplanned holding restrictions.		

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

DesignatedPoint	<b>reviewed</b> UnplannedHolding	Is Aggregate: False
Definition: holding over a designated point is reviewed along the course providing guidance.		

**Class appears in diagram:**

- 3 - Unplanned Holding
- 1 - Significant Points
- 2 - Obstacle Assesment Associations

**1.2.1.2.4 HoldingPatternDuration****ATTRIBUTES**

<b>duration</b>	Data Type: valDur
Definition: Duration of the holding pattern outbound leg.	

**ASSOCIATIONS**

HoldingPatternLength	<b>hasLengthDuration</b> 1	Is Aggregate: False
HoldingPatternDuration		
Definition: Span is time		

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

**Class appears in diagram:**

- 1 - Holding Pattern
- 2 - HoldingPatternChoice

**1.2.1.2.5 HoldingPatternDistance****ATTRIBUTES**

<a href="#">length</a>	Data Type: valDist
Definition: Length of the holding pattern outbound leg.	

**ASSOCIATIONS**

HoldingPatternLength <b>hasLengthDistance</b> 1	Is Aggregate: False
HoldingPatternDistance	
Definition: span is length	

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

**Class appears in diagram:**

- 1 - Holding Pattern
- 2 - HoldingPatternChoice