

Improve Modeling of Flight Level or Altitude or Range

CR Number (ID): 151		Submission Date: 3/24/2022	
GENERAL INFORMATION (AUTHOR TO COMPLETE)			
Author	FAA FIXM Development Team		
Brief Description (Subject)	Employ improved modelling techniques to increase validation capabilities and decrease XML nesting for flight level or altitude or range structure.		
Priority*	<input type="checkbox"/> Immediate	<input type="checkbox"/> High	<input type="checkbox"/> Medium <input checked="" type="checkbox"/> Low
Scale*	<input type="checkbox"/> Major	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> Minor
Expected Impact to Implementers*	<input type="checkbox"/> High	<input type="checkbox"/> Medium	<input checked="" type="checkbox"/> Low <input type="checkbox"/> None
Target FIXM Component(s)	<input checked="" type="checkbox"/> FIXM Logical Model <input type="checkbox"/> FIXM Application <input checked="" type="checkbox"/> FIXM XML Schemas <input type="checkbox"/> Other Specify...		
Target FIXM Release	<input checked="" type="checkbox"/> FIXM Core Version 4.3.0 <input type="checkbox"/> Application Version		
Related FIXM CRs			
Motivation / Change Reason	<input type="checkbox"/> Requirement <input checked="" type="checkbox"/> Functionality/Operability <input type="checkbox"/> Maintenance <input type="checkbox"/> Defect <input type="checkbox"/> Other Specify ...		

* Optional fields; FIXM Secretariat may update during review

MOTIVATION / CHANGE REASON DESCRIPTION (AUTHOR TO COMPLETE)

The current modeling of FlightLevelOrAltitudeOrRangeChoice is somewhat awkward, has an extra unneeded layer of XML nesting, and allows for questionable data representation by allowing a level range to be present but that range having no upper or lower bounds. This modeling could be improved via minor changes employing standalone xsd:choice and xsd:sequence structures.

PROPOSED CHANGE (AUTHOR TO COMPLETE)

Remove the “flightLevelOrAltitudeValue” association between the FlightLevelOrAltitudeOrRangeChoice class and the FlightLevelOrAltitudeChoice class in the RangesAndChoices package.

Update the definition of the FlightLevelOrAltitudeOrRangeChoice class to: “Represent either a specific level or a level range with a lower and/or upper bound.”.

Add a required “altitude” attribute of type Altitude to the FlightLevelOrAltitudeOrRangeChoice class with a definition of: “Altitude specification.”

Add a required “flightLevel” attribute of type FlightLevel to the FlightLevelOrAltitudeOrRangeChoice class with a definition of: “Flight level specification.”

Change the name of the association between the FlightLevelOrAltitudeOrRangeChoice class and the VerticalRange class to be “range” and modify the definition to be: “A vertical range with a lower and/or upper bound.”.

Change the VerticalRange class from a sequence to a choice, delete its extension attribute, and rename it to “VerticalRangeChoice” with a definition of: “Represents a vertical range with a lower and/or upper bound.”.

Delete the VerticalRangeExtension class from the Extension package.

Delete the “lowerBound” association between the VerticalRangeChoice class and the FlightLevelOrAltitudeChoice class.

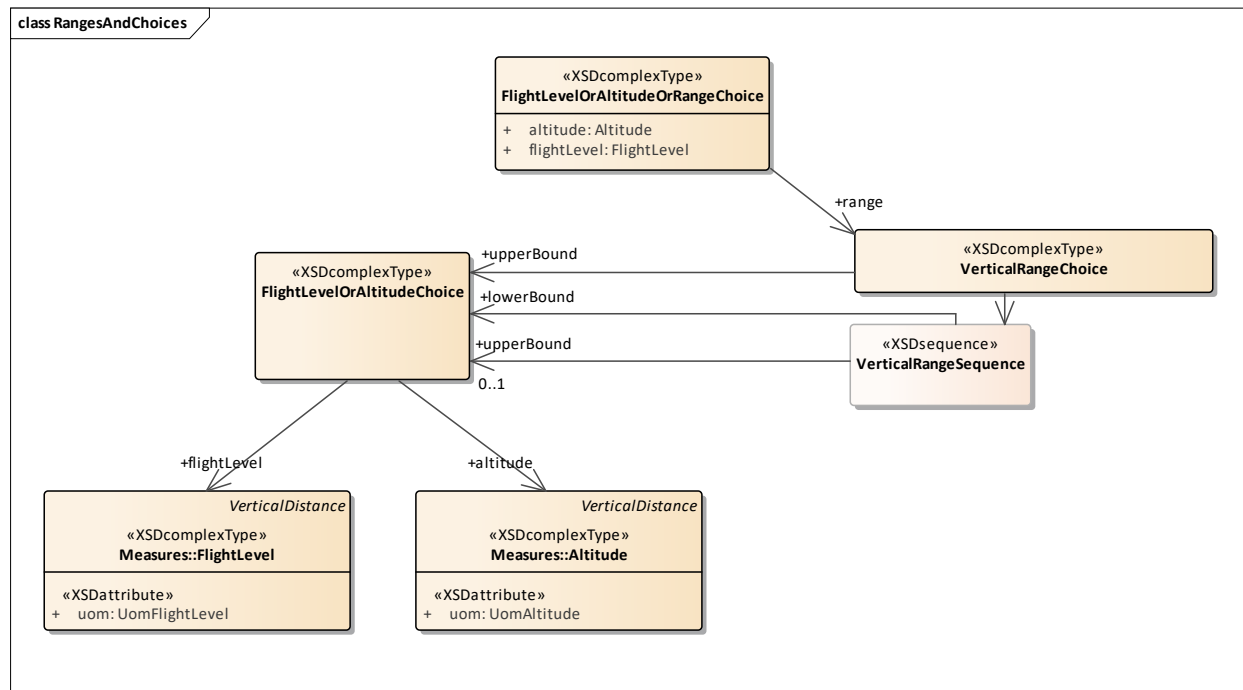
Modify the “upperBound” association between the VerticalRangeChoice class and the FlightLevelOrAltitudeChoice class to be required and change its definition to: “Upper bound of the vertical range.”

Create a new class called VerticalRangeSequence with a stereotype of “XSDsequence” and a definition of: “Helper class to embed to create an embedded sequence structure.”

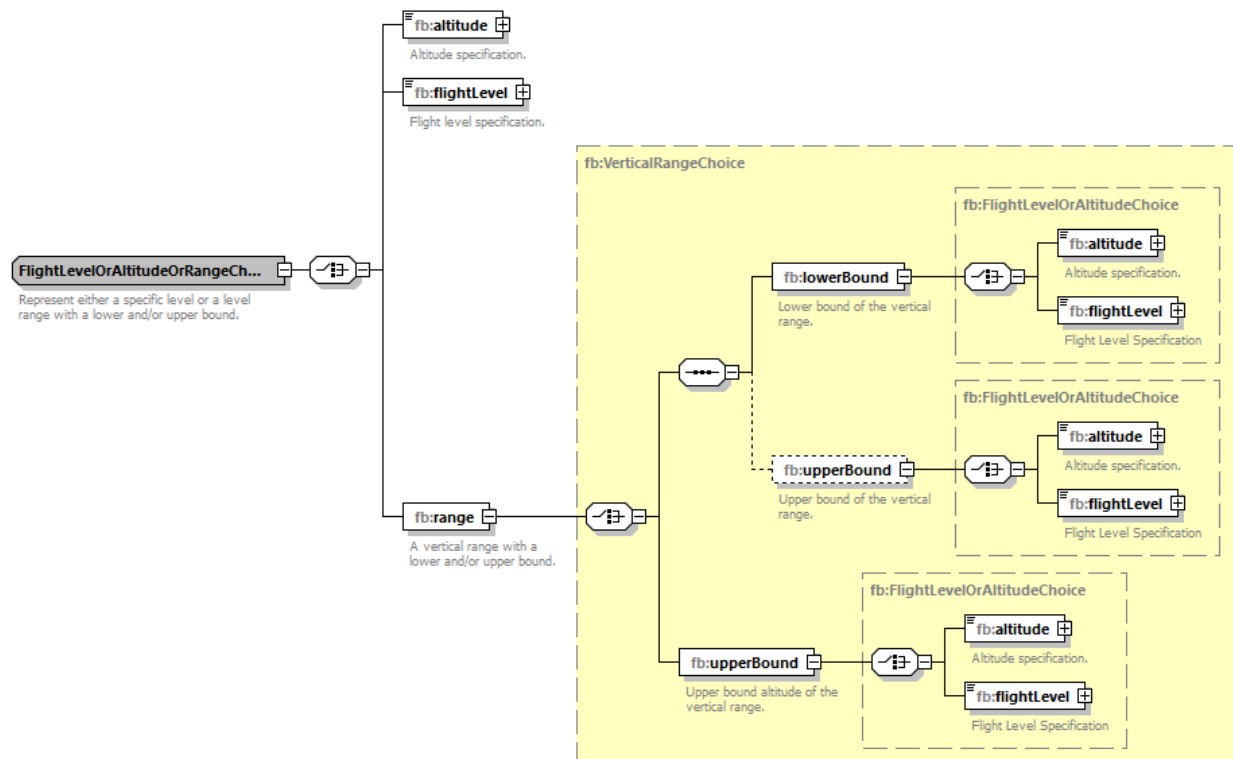
Create a required, unnamed association between the VerticalRangeChoice class and the VerticalRangeSequence class.

Create a required association named “lowerBound” between the VerticalRangeSequence class and the FlightLevelOrAltitude class with a definition of: “Lower bound of the vertical range.”

Create an association named “upperBound” with a multiplicity of 0..1 between the VerticalRangeSequence class and the FlightLevelOrAltitude class with a definition of: “Upper bound of the vertical range.”



Below is also included a visualization of what this portion of the model will look like when realized in the FIXM schemas.



As seen above, this new approach will provide users the ability to enter in an altitude value or a flight level value without the extra XML nesting. When providing a range, the choice structure requires a user provide at least a lower bound (top branch) or an upper bound (bottom branch) as well as allowing them to provide both if desired (top branch). While this does increase redundancy in the schema itself (by representing upper bound twice), it will not impact the resulting XML – it will just allow the user to provide an upper bound, lower bound, or both but require that at least one bound be present.

CCB SECRETARIAT	
External Standard Consistency Checked	<input type="checkbox"/> AIDX <input type="checkbox"/> AIRM
CR Status	<input checked="" type="checkbox"/> Proposed <input type="checkbox"/> Implemented <input type="checkbox"/> Withdrawn <input type="checkbox"/> Rejected
Decision Date	Click or tap to enter a date
Implemented In	X.X.X
Comments	Click or tap here to add any additional information or comments.

IMPLEMENTATION NOTES (CCB SECRETARIAT TO COMPLETE)
CCB Secretariat notes on any deviations that were required during implementation.