

AICM/AIXM Training Class Class Exercises

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**Federal Aviation
Administration**



Exercise 1: Practicing Entity-Relationship Modeling

Objectives & Instructions

- **Objectives**

- Understanding of Entity-Relationship model symbols
- Understand how to interpret Entity-Relationship models
- Practice encoding into XML

- **Instructions**

- Draw an entity relationship model for a house
- Use the Entity-Relationship “cheat sheet” for help
- Encode the instructor's house into an XML document

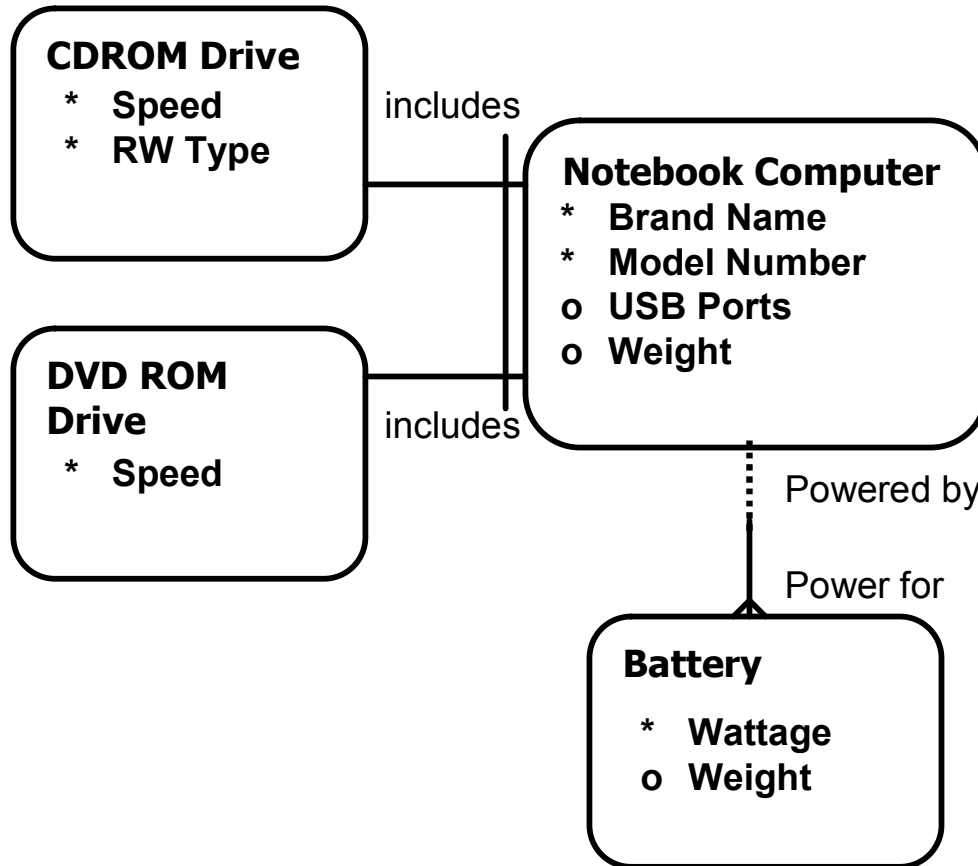
Exercise 1: Practicing Entity-Relationship Modeling

Simple Notebook Computer Model

- **Computer**
 - Attributes
 - Must have a brand name
 - Must have a model number
 - May have an attribute specifying number of USB ports
 - May have a weight
 - Relationships
 - A computer may have one or more batteries
 - A computer must either have a CD ROM Drive or a DVD ROM drive
- **Battery**
 - Must have a wattage
 - May have a weight
 - A battery must be part of a computer.
- **CD ROM drive**
 - Must have a speed
 - Must have a codeType describing Read Only for Read/Write.
 - A CD ROM drive must be on a computer.
- **DVD ROM drive**
 - Must have a speed
 - A DVD ROM must be on a computer

Exercise 1: Practicing Entity-Relationship Modeling

Simple Notebook Computer Diagram



- **Place objects**
 - Computer, DVD, CD, Battery
- **Add attributes**
 - Computer: Brand Name, Model Number, USB Ports, Weight
 - CD ROM: Speed, RW Type
 - DVD ROM: Speed
 - Battery: Wattage, Weight
- **Add relationships**
 - Computer may have one or more batteries
 - Battery must be on computer
 - Computer must have either CD or DVD

Exercise 1: Practicing Entity-Relationship Modeling

House Model

- **House**

- Attributes

- May have an owner name attribute
 - Must have an address attribute

- Relationships

- A house must have windows
 - A house must have doors
 - A house may have either a garage or a car port

- **Window**

- Must have a codeType describing the type of window (e.g., bay window, casement window, flat window)
 - Must either be on a house or on a garage
 - May be on a door

- **Door**

- Must have a codeType describing the type of door (e.g., French door, sliding glass door, standard door, pet door)
 - A door may be on a garage
 - A door may be on a house
 - May contain a window
 - Door may have a pet door

- **Garage**

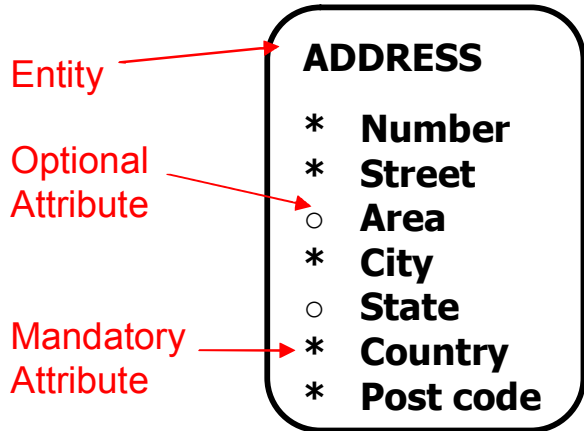
- A garage may be part of a house
 - A garage may have windows
 - A garage must have at least one door

- **Car Port**

- A car port must be part of a house

Exercise 1: Practicing Entity-Relationship Modeling

Reference Sheet

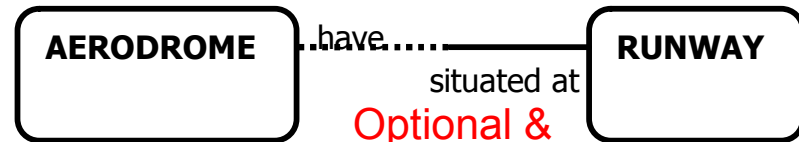


Relationships



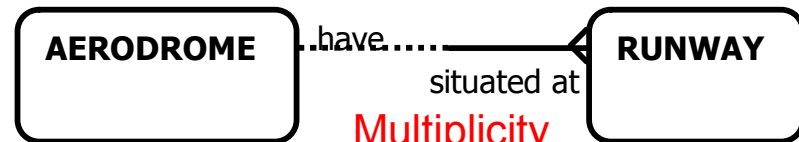
Mandatory

A person must have an address
An address must locate a person



Optional & Mandatory

An aerodrome may have a runway
A runway must be situated at an aerodrome



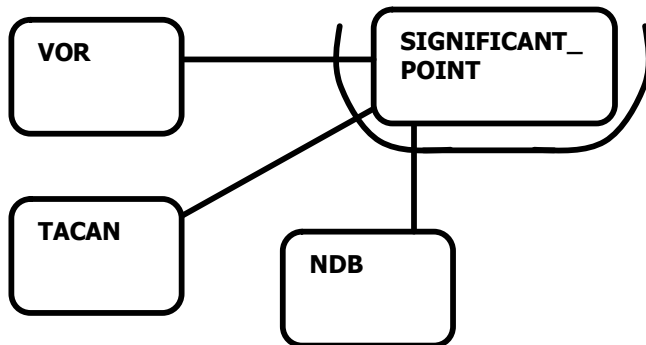
Multiplicity

An aerodrome may have one or more runways



Unary relationship

Two aerodromes may be collocated

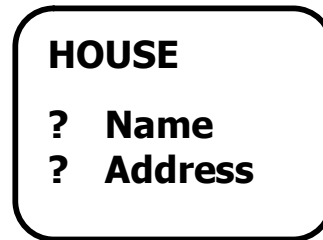


Mutual Exclusivity

A significant point must be defined by either a VOR, TACAN or NDB

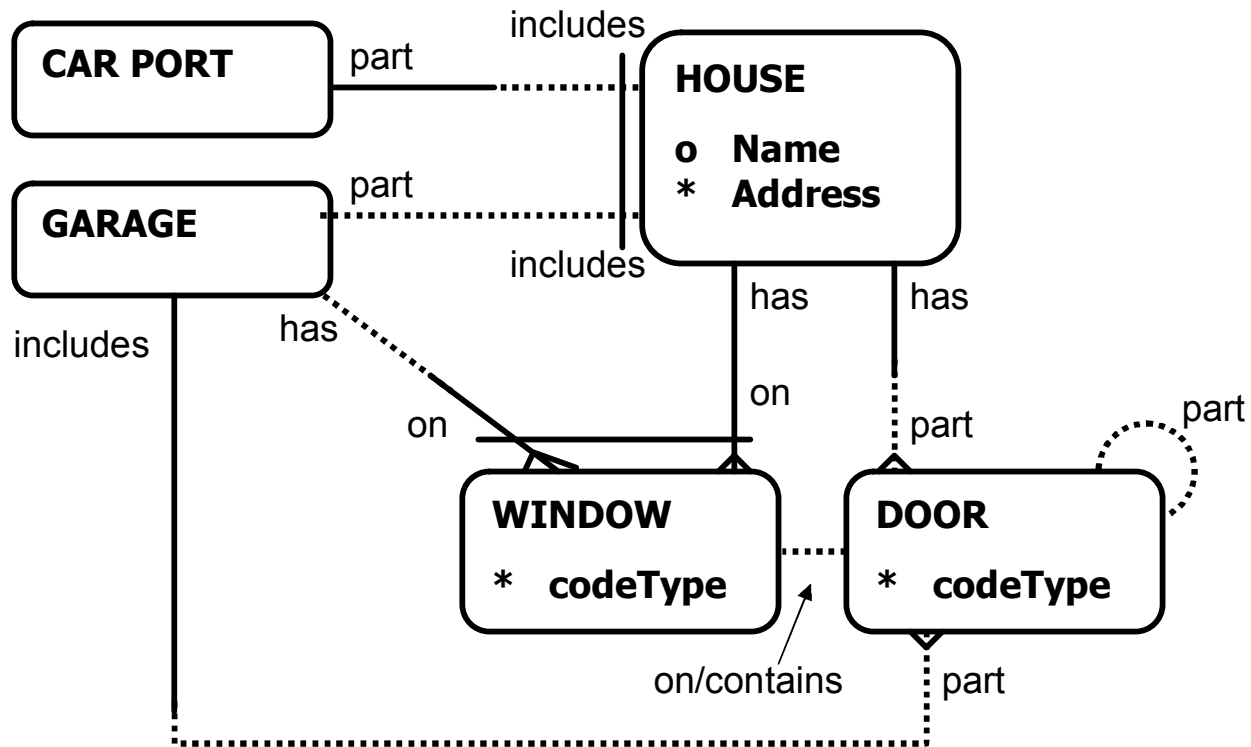
Exercise 1: Practicing Entity-Relationship Modeling

Create an E-R diagram for the House



Exercise 1: Practicing XML Encoding

Solution: House E-R Model



Exercise 1: Practicing XML Encoding

The Instructor's House

- **House**
 - Instructor's Home
 - Beaumont, Texas
 - 2 Standard Doors (Front Door, Back Door)
 - 1 Bay Window
- **Garage**
 - Part of the House
 - 1 Standard Door (Garage Door)
 - No windows

Exercise 1: Practicing XML Encoding

Encode Instructor's House

```
<House>
  <HouseID>H1</HouseID>
  <Name>_____</Name>
  <Address>_____</Address>
</House>
<Door>
  <DoorID>D1</DoorID>
  <HouseID>_____</HouseID>
  <Name>Front</Name>
  <codeType>_____</codeType>
</Door>
<Door>
  <DoorID>D2</DoorID>
  <HouseID>_____</HouseID>
  <Name>Back</Name>
  <codeType>_____</codeType>
</Door>
```

```
<Door>
  <DoorID>D3</DoorID>
  <GarageID>_____</GarageID>
  <Name>_____</Name>
  <codeType>_____</codeType>
</Door>
<Window>
  <WindowID>W1</WindowID>
  <HouseID>_____</HouseID>
  <codeType>_____</codeType>
</Window>
<Garage>
  <GarageID>G1</GarageID>
  <HouseID>_____</HouseID>
</Garage>
```

Exercise 1: Practicing XML Encoding

Solution: Encode Instructor's House

```
<House>
  <HouseID>H1</HouseID>
  <Name>Instructor's Home</Name>
  <Address>Beaumont TX</Address>
</House>
<Door>
  <DoorID>D1</DoorID>
  <HouseID>H1</HouseID>
  <Name>Front</Name>
  <codeType>Standard</codeType>
</Door>
```

Exercise 1: Practicing XML Encoding

Solution: Encode Instructor's House

```
<Door>  
  <DoorID>D2</DoorID>  
  <HouseID>H1</HouseID>  
  <Name>Back</Name>  
  <codeType>Standard</codeType>  
</Door>
```

Exercise 1: Practicing XML Encoding

Solution: Encode Instructor's House

```
<Door>
  <DoorID>D3</DoorID>
  <GarageID>G1</GarageID>
  <Name>Garage</Name>
  <codeType>Standard</codeType>
</Door>
<Window>
  <WindowID>W1</WindowID>
  <HouseID>H1</HouseID>
  <codeType>Bay</codeType>
</Window>
<Garage>
  <GarageID>G1</GarageID>
  <HouseID>H1</HouseID>
</Garage>
```

Exercise 2: Xml Encode an Aerodrome

Objectives & Instructions

- **Objectives**

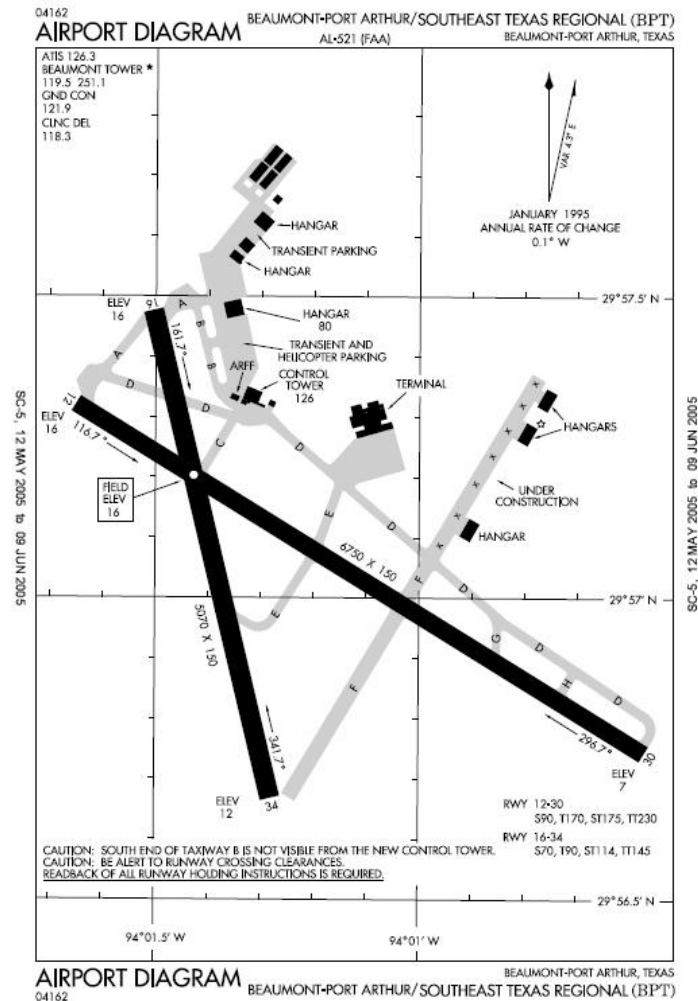
- Map an Airport diagram to an AIXM XML document
- Understand how aerodromes are represented in AIXM/XML
- Gain familiarity with XML

- **Instructions**

- For the attached layout of the Beaumont/Port Arthur Airport, map the highlighted entities into the XML document

Exercise 2: Xml Encode an Aerodrome

Beaumont/Port Arthur Airport Diagram



Additional Information:

ICAO Airport Code KBPT

Airport Reference 295703N, 940114.5W

Datum assume WGS84

Model the “Transient and Helicopter Parking”

Exercise 2: Xml Encode an Aerodrome

AIXM Snapshot XML

```
<?xml version="1.0" encoding="UTF-8"?>
<AIXM-Snapshot xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="C:\Documents and Settings\Brett\My
Documents\AIXM\AIXM 4.0 Reference\aixm\AIXM-Snapshot.xsd" version="1"
origin="" created="" effective="">
  <Ahp>
    <AhpUid>
      <codeId>_____</codeId>
    </AhpUid>
    <OrgUid>
      <txtName>_____</txtName>
    </OrgUid>
    <txtName>_____</txtName>
    <codeIcao>_____</codeIcao>
    <codeType>_____</codeType>
    <geoLat>_____</geoLat>
    <geoLong>_____</geoLong>
    <codeDatum>_____</codeDatum>
    <valElev>_____</valElev>
    <uomDistVer>_____</uomDistVer>
    <txtNameCitySer>_____/txtNameCitySer>
    <valMagVar>_____</valMagVar>
    <dateMagVar>_____</dateMagVar>
    <valMagVarChg>_____</valMagVarChg>
  </Ahp>
  <Rwy>
    <RwyUid>
      <AhpUid>
        <codeId>_____</codeId>
      </AhpUid>
      <txtDesig>_____</txtDesig>
    </RwyUid>
    <valLen>_____</valLen>
    <valWid>_____</valWid>
    <uomDimRwy>_____</uomDimRwy>
  </Rwy>
</AIXM-Snapshot>
```

```
<Rwy>
  <RwyUid>
    <AhpUid>
      <codeId>_____</codeId>
    </AhpUid>
    <txtDesig>_____</txtDesig>
  </RwyUid>
  <valLen>_____</valLen>
  <valWid>_____</valWid>
  <uomDimRwy>_____</uomDimRwy>
</Rwy>
<Apn>
  <ApnUid>
    <AhpUid>
      <codeId>_____</codeId>
    </AhpUid>
    <txtName>_____</txtName>
  </ApnUid>
</Apn>
<Gsd>
  <GsdUid>
    <ApnUid>
      <AhpUid>
        <codeId>_____</codeId>
      </AhpUid>
      <txtName>_____</txtName>
    </ApnUid>
    <txtDesig>_____</txtDesig>
  </GsdUid>
  <codeType>_____</codeType>
  <geoLat>_____</geoLat>
  <geoLong>_____</geoLong>
  <codeDatum>_____</codeDatum>
</Gsd>
</AIXM-Snapshot>
```


Exercise 2: Xml Encode an Aerodrome

Aerodrome Entity-Relationship Report Reference

Insert Supplementary Documents:
Exercise 2 BPT Airport Diagram.pdf
Exercise 2 Airport Reference.doc



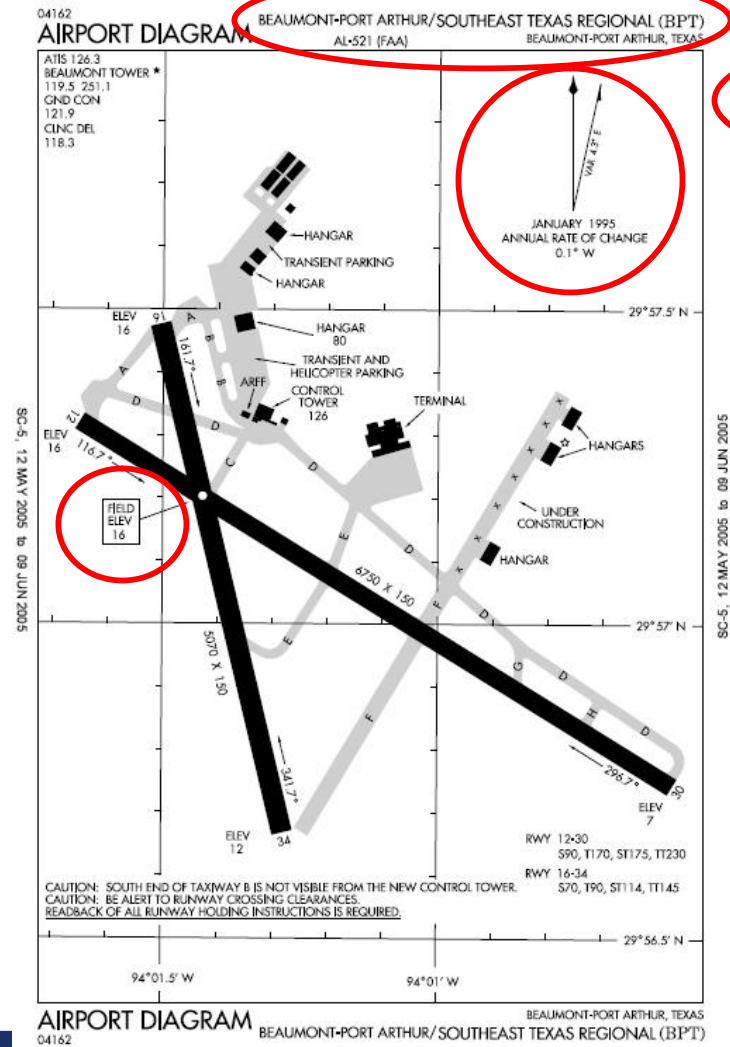
Exercise 2: Xml Encode an Aerodrome

Solution: XML Encoding of Airport

```
<?xml version="1.0" encoding="UTF-8"?>  
<AIXM-Snapshot xmlns:xsi="http://www.w3.org/2001/XMLSchema-  
instance" xsi:noNamespaceSchemaLocation="C:\Documents and  
Settings\Brett\My Documents\AIXM\AIXM 4.0 Reference\xaixm\AIXM-  
Snapshot.xsd" version="1" origin="" created="2005-05-23T10:00:00"  
effective="2005-05-23T10:00:00">
```

Exercise 2: Xml Encode an Aerodrome

Solution: Location of XML Elements



Additional Information:

ICAO Airport Code KBPT

Airport Reference 295703N, 940114.5W

Datum assume WGS84

Model the “Transient and Helicopter Parking”

Exercise 2: Xml Encode an Aerodrome

Solution: XML Encoding of Airport

```
<Ahp>
  <AhpUid>
    <codeId>KBPT</codeId>
  </AhpUid>
  <OrgUid>
    <txtName>FAA</txtName>
  </OrgUid>
  <txtName>BEAUMONT-PORT ARTHUR/SOUTHEAST TEXAS REGIONAL</txtName>
  <codeIcao>KBPT</codeIcao>
  <codeType>AH</codeType>
  <geoLat>295703N</geoLat>
  <geoLong>0940114.5W</geoLong>
  <codeDatum>NAW</codeDatum>
  <valElev>16</valElev>
  <uomDistVer>FT</uomDistVer>
  <txtNameCitySer>BEAUMONT</txtNameCitySer>
  <valMagVar>4.3</valMagVar>
  <dateMagVar>1995</dateMagVar>
  <valMagVarChg>-0.1</valMagVarChg>
</Ahp>
```

Exercise 2: Xml Encode an Aerodrome

Solution: Location of XML Elements

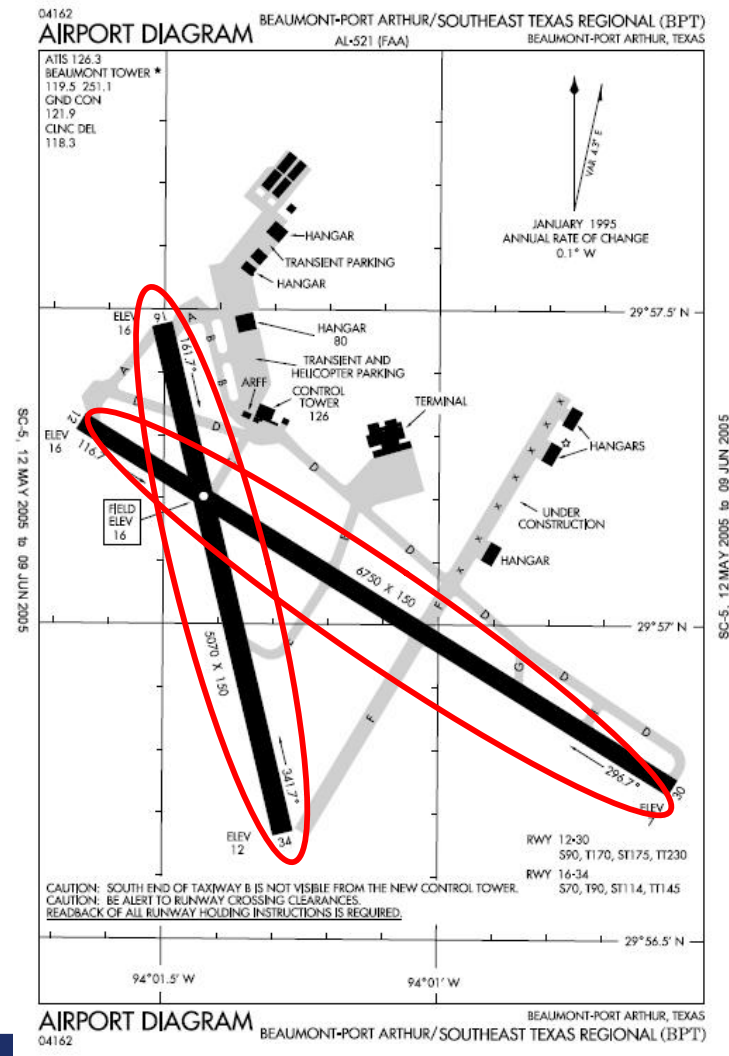
Additional Information:

ICAO Airport Code KBPT

Airport Reference 295703N, 940114.5W

Datum assume WGS84

Model the “Transient and Helicopter Parking”



Exercise 2: Xml Encode an Aerodrome

Solution: XML Encoding of Airport

```
<Rwy>
  <RwyUid>
    <AhpUid>
      <codId>KBPT</codId>
    </AhpUid>
    <txtDesig>12/30</txtDesig>
  </RwyUid>
  <valLen>6750</valLen>
  <valWid>150</valWid>
  <uomDimRwy>FT</uomDimRwy>
</Rwy>
<Rwy>
  <RwyUid>
    <AhpUid>
      <codId>KBPT</codId>
    </AhpUid>
    <txtDesig>16/34</txtDesig>
  </RwyUid>
  <valLen>5070</valLen>
  <valWid>150</valWid>
  <uomDimRwy>FT</uomDimRwy>
</Rwy>
```


Exercise 2: Xml Encode an Aerodrome

Solution: XML Encoding of Airport

```
<Apn>
  <ApnUid>
    <AhpUid>
      <codeId>KBPT</codeId>
    </AhpUid>
    <txtName>TRANSIENT AND HELICOPTER PARKING</txtName>
  </ApnUid>
</Apn>
<Gsd>
  <GsdUid>
    <ApnUid>
      <AhpUid>
        <codeId>KBPT</codeId>
      </AhpUid>
      <txtName>TRANSIENT AND HELICOPTER PARKING</txtName>
    </ApnUid>
    <txtDesig>PARKING1</txtDesig>
  </GsdUid>
  <codeType>UKN</codeType>
  <geoLat>295725N</geoLat>
  <geoLong>0940115W</geoLong>
  <codeDatum>NAW</codeDatum>
</Gsd>
```


Exercise 3: Encoding the Timesheet Model

Objectives & Instructions

- **Objectives**

- Understand how AICM and AIXM represent recurring times
- Encoding human understandable operating hours into the AICM Timesheet/Timetables

- **Instructions**

- Using the Aerodrome Heliport Ground Service and Ground Service Timetable encode the operating hours for Fueling, Security, De-icing services.

Exercise 3: Encoding the Timesheet Model

Ground Service Operating Hours

Ground Service Type	Hours
Security	<u>01 JAN – 31 DEC</u> Everyday, 24 HOURS A DAY
Fueling	<u>01 May - 31 OCT</u> Starting 0600 Mon through 2200 Friday SAT, SUN 0900 – 1700 each day <u>01 NOV - 30 APR</u> Everyday 0900 – 1700 each day
De-icing	<u>01 OCT – 31 MAR</u> Working Days: 0930 – 60 minutes before sunset

For this exercise all times are UTC+0

Exercise 3: Encoding the Timesheet Model

Timesheet Reference

See Exercise 3 Encoding the Timesheet Model.doc



Exercise 3: Encoding the Timesheet Model

Ground Service Operating Hours

AD_HP_GND_SER (Ground Service) and TIMESHEET table

MID <i>(Internal unique identifier)</i>	AD_HP.MID	CODE_TYPE	CODE_CAT	TXT_DESCR_FAC	CODE_WORK_HR	TXT_RMK_WORK_HR	TXT_RMK
	<i>[Aerodrome MID]</i>	<i>[Type] values: FIRE, CUST, SAN, FUEL, HAND, etc.</i>	<i>[Category (only for fire fighting)]</i>	<i>[Associated facility description]</i>	<i>[Applicability hours] values: H24, HJ, HN, TIMSH - timesheet, etc.</i>	<i>[Remarks to working hours]</i>	<i>[Remark]</i>
1001	KBPT	SECUR					
1002	KBPT	FUEL					
1003	KBPT	DEICE					

Exercise 3: Encoding the Timesheet Model

Ground Service Operating Hours

AD_HP_GND_SER_TIMETABLE (Ground Service) table, *first part...*

MID (<i>Internal unique identifier</i>)	AD_HP_GND_SER.MID	CODE_TIME_REF	DATE_VALID_WEF	DATE_VALID_TIL
	[AD Ground Service MID]	[Time reference system] <i>values: UTC, UTCW.</i>	[Yearly start date]	[Yearly end date]
1031				
1032				
1033				
1034				
1035				
1036				
1037				
1038				

Exercise 3: Encoding the Timesheet Model

Ground Service Operating Hours

AD_HP_GND_SER_TIMETABLE (Ground Service) table continued...

MID (<i>Internal unique identifier</i>)	CODE_DAY	TIME_WEF	CODE_EVENT_WEF	TIME_REL_EVENT_WEF	CODE_DAY_TIL	TIME_TIL	CODE_EVENT_TIL	TIME_REL_EVENT_TIL
	<i>[Affected day or start of affected period]</i>	<i>[Start - time]</i>	<i>[Start - Event] values: SR (sunrise), SS (sunset)</i>	<i>[Start - Relative to event] (number of minutes +/-)</i>	<i>[End of affected period]</i>	<i>[End - time]</i>	<i>[End - Event] values: SR (sunrise), SS (sunset)</i>	<i>[End - Relative to event] (number of minutes +/-)</i>
1031								
1032								
1033								
1034								
1035								
1036								
1037								
1038								

Exercise 3: Encoding the Timesheet Model

Solution for Security

AD_HP_GND_SER (Ground Service) and TIMESHEET table

MID <i>(Internal unique identifier)</i>	AD_HP.MID	CODE_TYPE	CODE_CATEGORY	TXT_DESCR_FAC	CODE_WORK_HR	TXT_RMK_WORK_HR	TXT_RMK
	<i>[Aerodrome MID]</i>	<i>[Type] values: FIRE, CUST, SAN, FUEL, HAND, etc.</i>	<i>[Category (only for fire fighting)]</i>	<i>[Associated facility description]</i>	<i>[Applicability hours] values: H24, HJ, HN, TIMSH - timesheet, etc.</i>	<i>[Remarks to working hours]</i>	<i>[Remark]</i>
1001	KBPT	SECUR			H24		
1002	KBPT	FUEL					
1003	KBPT	DEICE					

Security: 01 Jan – 31 Dec, 24 hours a day



Exercise 3: Encoding the Timesheet Model

Partial Solution for Fueling

AD_HP_GND_SER (Ground Service) and TIMESHEET table

MID (Internal unique identifier)	AD_HP.MID [Aerodrome MID]	CODE_TYP E [Type] values: FIRE, CUST, SAN, FUEL, HAND, etc.	CODE_CAT [Category (only for fire fighting)]	TXT_DESCR_FA C [Associated facility description]	CODE_WORK_H R [Applicability hours] values: H24, HJ, HN, TIMSH - timesheet, etc.	TXT_RMK_WORK_ HR [Remarks to working hours]	TXT_RMK [Remark]
1001	KBPT	SECUR			H24		
1002	KBPT	FUEL			TIMSH		
1003	KBPT	DEICE					

Exercise 3: Encoding the Timesheet Model

Partial Solution for Fueling

AD_HP_GND_SER_TIMETABLE (Ground Service) table

MID (<i>Internal unique identifier</i>)	AD_HP_GND_SER.MID	CODE_TIME_REF	DATE_VALID_WEEK	DATE_VALID_TIME
	[AD Ground Service MID]	[Time reference system] <i>values: UTC, UTCW.</i>	[Yearly start date]	[Yearly end date]
1031	1002	UTCW	01-05	31-10
1032				
1033				
1034				
1035				
1036			31 May – 31 Oct	
1037			Starting 0600 Mon through 2200 Friday.	
1038				

Exercise 3: Encoding the Timesheet Model

Partial Solution for Fueling

AD_HP_GND_SER_TIMETABLE (Ground Service) table continued...

MID <i>(Internal unique identifier)</i>	CODE_DAY	TIME_WEEK	CODE_EVENT_WEEK	TIME_REL_EVENT_WEEK	CODE_DATE_TIL	TIME_TIL	CODE_EVENT_TIL	TIME_REL_EVENT_TIL
	<i>[Affected day or start of affected period]</i>	<i>[Start - time]</i>	<i>[Start - Event] values: SR (sunrise), SS (sunset)</i>	<i>[Start - Relative to event] (number of minutes +/-)</i>	<i>[End of affected period]</i>	<i>[End - time]</i>	<i>[End - Event] values: SR (sunrise), SS (sunset)</i>	<i>[End - Relative to event] (number of minutes +/-)</i>
1031	MON	0600				2200		
1032								
1033								
1034								
1035								
1036								
1037								
1038								

31 May – 31 Oct
Starting 0600 Mon through 2200 Friday.

Exercise 3: Encoding the Timesheet Model

Solution for Ground Services

AD_HP_GND_SER (Ground Service) and TIMESHEET table

MID <i>(Internal unique identifier)</i>	AD_HP.MID	CODE_TYP E	CODE_CAT	TXT_DESCR_FA C	CODE_WORK_H R	TXT_RMK_WORK_ HR	TXT_RMK
	<i>[Aerodrome MID]</i>	<i>[Type] values: FIRE, CUST, SAN, FUEL, HAND, etc.</i>	<i>[Category (only for fire fighting)]</i>	<i>[Associated facility description]</i>	<i>[Applicability hours] values: H24, HJ, HN, TIMSH - timesheet, etc.</i>	<i>[Remarks to working hours]</i>	<i>[Remark]</i>
1001	KBPT	SECUR			H24		
1002	KBPT	FUEL			TIMSH		
1003	KBPT	DEICE			TIMSH		

Exercise 3: Encoding the Timesheet Model

Solution for Ground Services

AD_HP_GND_SER_TIMETABLE (Ground Service) table

<i>MID (Internal unique identifier)</i>	<i>AD_HP_GND_SER.MID</i>	<i>CODE_TIME_REF</i>	<i>DATE_VALID_WEEK</i>	<i>DATE_VALID_TILL</i>
	<i>[AD Ground Service MID]</i>	<i>[Time reference system] values: UTC, UTCW.</i>	<i>[Yearly start date]</i>	<i>[Yearly end date]</i>
1031	1002	UTCW	01-05	31-10
1032	1002	UTCW	01-05	31-10
1033	1002	UTCW	01-05	31-10
1034	1002	UTCW	01-11	30-04
1035	1003	UTCW	01-10	31-03
1036				
1037				
1038				

Exercise 3: Encoding the Timesheet Model

Solution for Ground Services

AD_HP_GND_SER_TIMETABLE (Ground Service) table continued...

MID (Internal unique identifier)	CODE_DAY	TIME_WEF	CODE_EVENT_WEF	TIME_REL_EVENT_WEF	CODE_DAY_TIL	TIME_TIL	CODE_EVENT_TIL	TIME_REL_EVENT_TIL
	<i>[Affected day or start of affected period]</i>	<i>[Start - time]</i>	<i>[Start - Event] values: SR (sunrise), SS (sunset)</i>	<i>[Start - Relative to event] (number of minutes +/-)</i>	<i>[End of affected period]</i>	<i>[End - time]</i>	<i>[End - Event] values: SR (sunrise), SS (sunset)</i>	<i>[End - Relative to event] (number of minutes +/-)</i>
1031	MON	0600			FRI	2200		
1032	SAT	0900				1700		
1033	SUN	0900				1700		
1034	ANY	0900				1700		
1035	WD	0930					SS	-60
1036								
1037								
1038								

Exercise 4: E-R diagramming for Navigation Aids

Objectives & Instructions

- **Objectives**

- Practice interpreting Entity-Relationship models
- Understand the data model for Navigation Aids

- **Instructions**

- An entity-relationship diagram for navigation aids has been started, complete it by encoding the following rules.

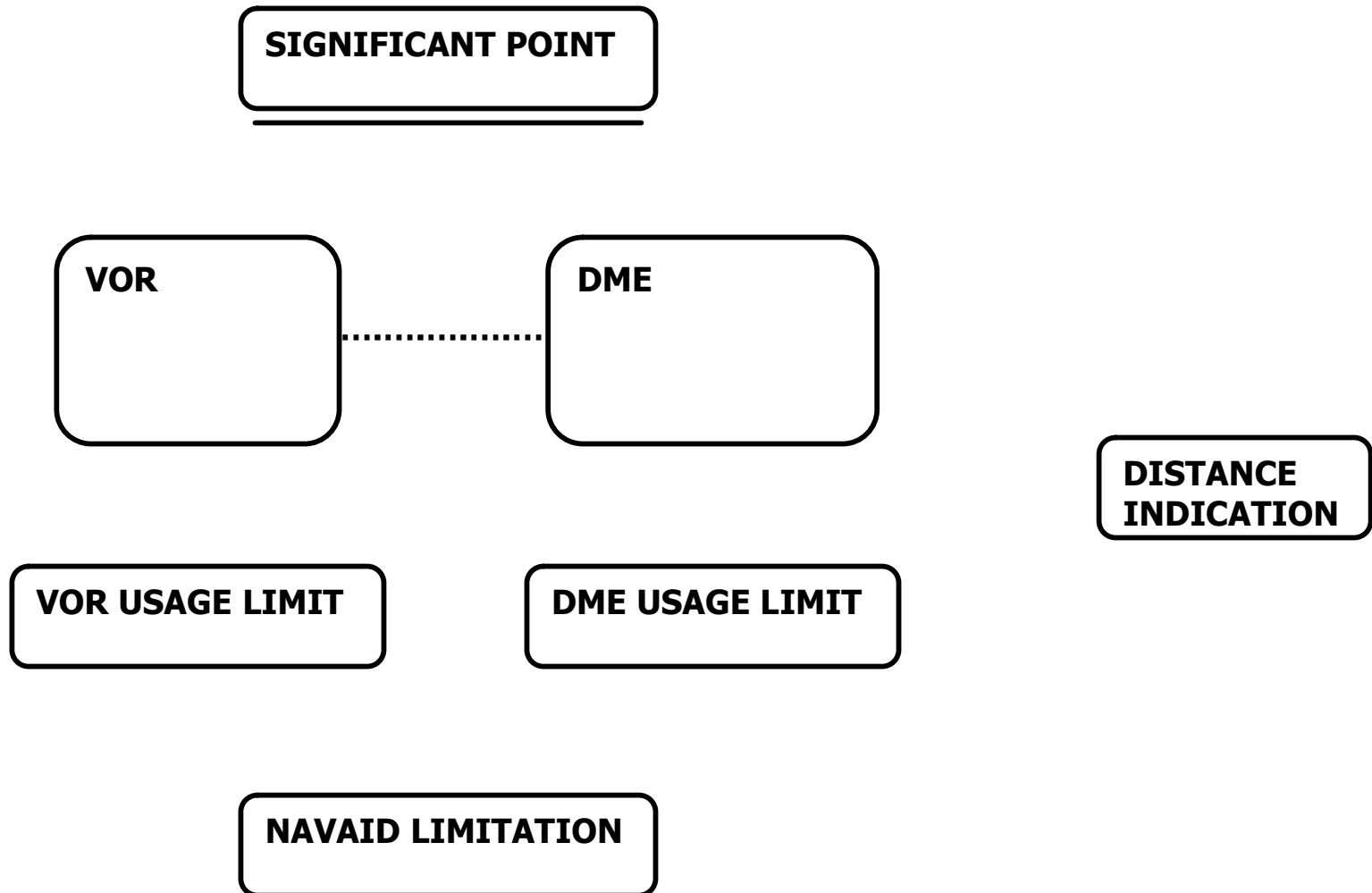
Exercise 4: E-R diagramming for Navigation Aids

Navigation Aid Entity-Relationships

- **VOR**
 - May have a name
 - Must have an ID code
 - May be co-located with a DME
 - May have one or more VOR USAGE LIMITS
 - May be used as a SIGNIFICANT POINT
- **DME**
 - Must have an ID code
 - May have a Channel code
 - May be co-located with a VOR
 - May have one or more DME USAGE LIMITS
 - May be used as a SIGNIFICANT POINT
 - May define one or more DISTANCE INDICATIONS
- **SIGNIFICANT POINT**
 - Must be located at either a VOR, DME
 - May be referred to in one or more DISTANCE INDICATIONS
- **VOR USAGE LIMITS**
 - Must define coverage of a single VOR
 - May be made from one or more NAVAID LIMITATIONS
- **DME USAGE LIMITS**
 - Must define coverage of a single DME
 - May be made from one or more NAVAID LIMITATIONS
- **NAVAID LIMITATION**
 - Must be either part of a DME USAGE LIMIT or VOR USAGE LIMIT
- **DISTANCE INDICATION**
 - Must point to a SIGNIFICANT POINT
 - Must be defined using a DME

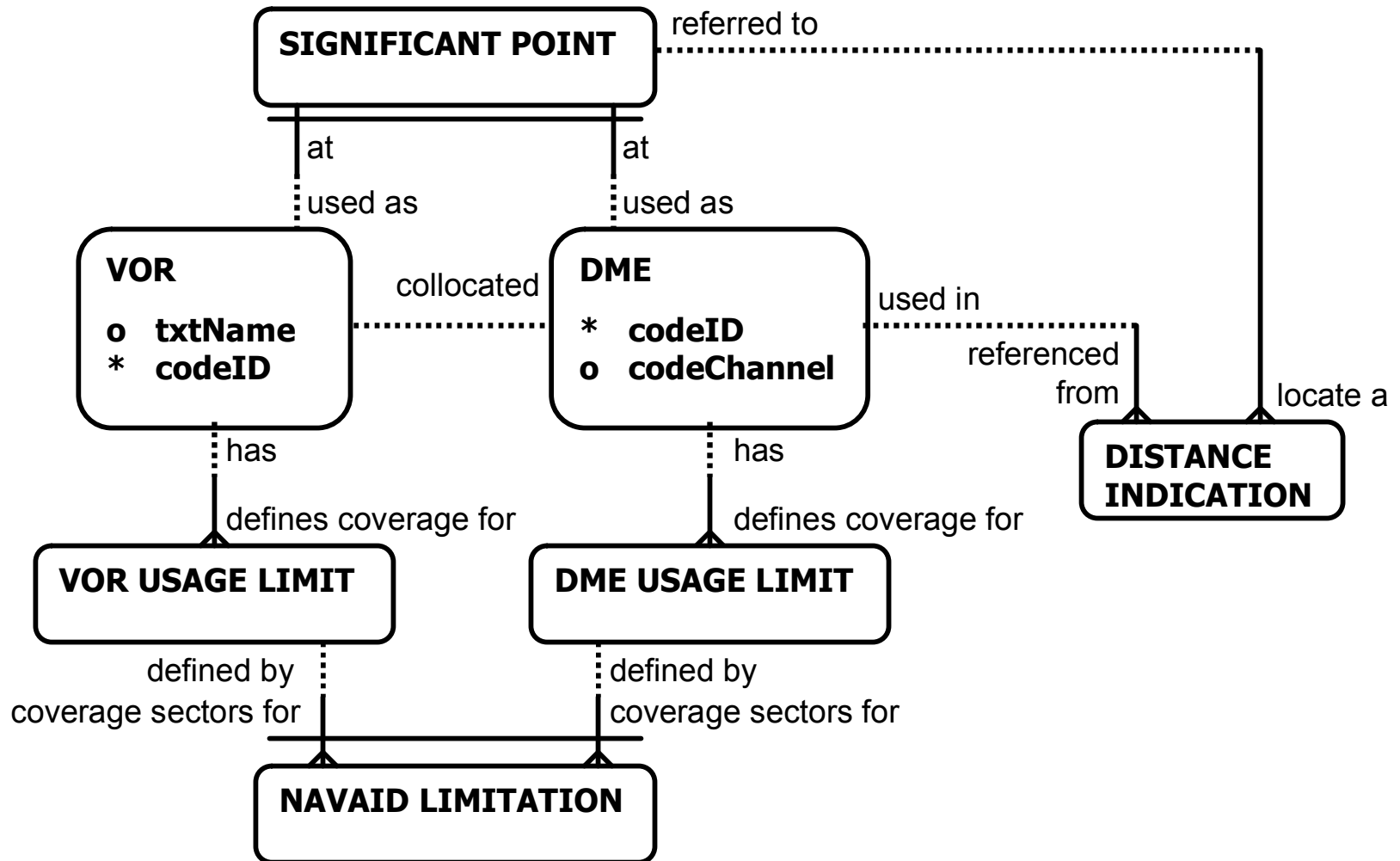
Exercise 4: E-R diagramming for Navigation Aids

Finish the E-R diagram



Exercise 4: E-R diagramming for Navigation Aids

Solution: Navigation Aid E-R Diagram



Exercise 5: Encoding an Enroute Route

Objectives & Instructions

- **Objectives**

- Practice encoding an Enroute Route into AICM format

- **Instructions**

- A copy of an airway defined in a fictitious Aeronautical Information Publication is provided. Encode the airway into the AICM Tables.



Exercise 5: Encoding an Enroute Route

Reference Materials and Tables

- **See Exercise 5 Route Usage Data.tif**
- **See Exercise 5 Route Usage Form**



Exercise 6: Complex Airspace using Aggregation

Objectives & Instructions

- **Objectives**

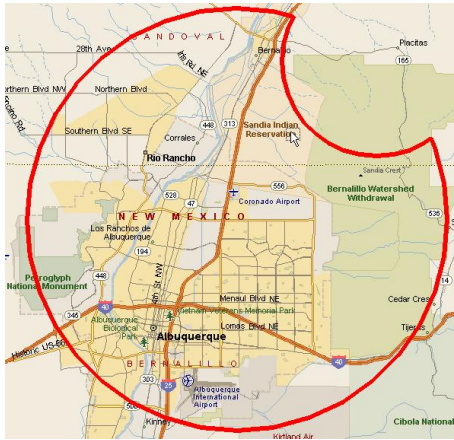
- Get familiar with Airspace Aggregation concepts
- Get familiar with how horizontal boundaries are constructed
- Encode a sample airspace in XML

- **Instructions**

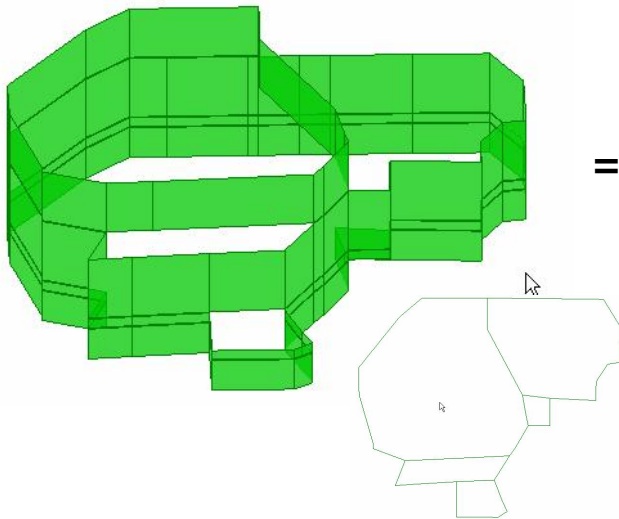
- For each of the Complex Airspaces shown, draw the series of Airspaces and Airspace Aggregation Operations used to create the Complex Airspace
- For each Horizontal Boundary describe the Point and Path used to build the boundary.
- Encode the sample Airspace in AIXM.

Exercise 6: Complex Airspace using Aggregation

Aggregating Complex Airspace



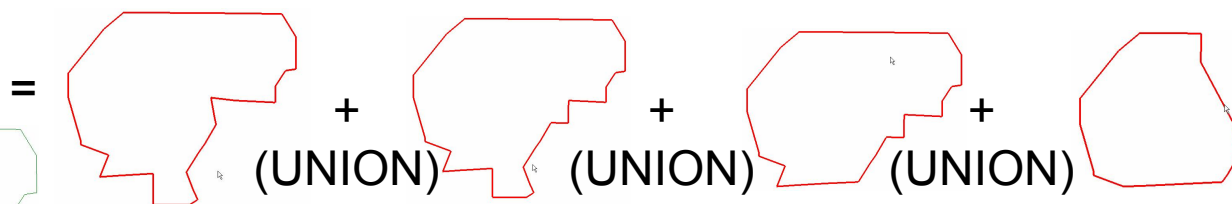
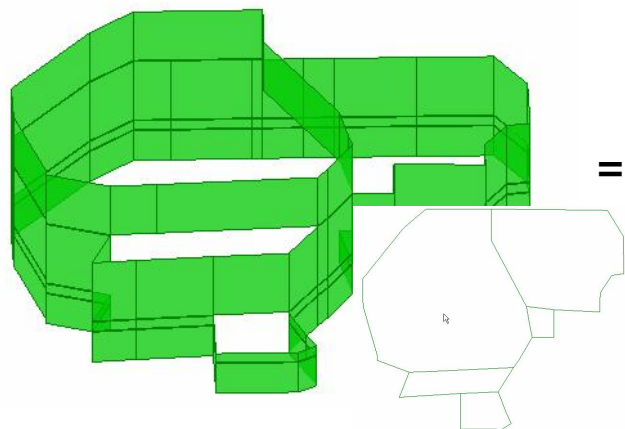
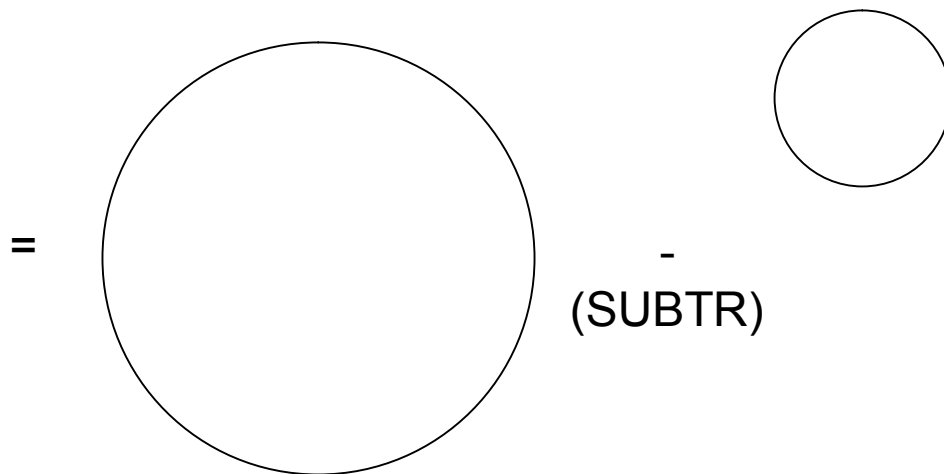
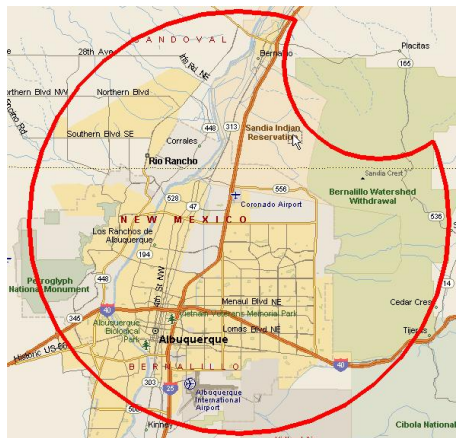
=



=

Exercise 6: Complex Airspace using Aggregation

Solution: Airspace Aggregation



Each layer will have a different altitude band

Exercise 6: Complex Airspace using Aggregation

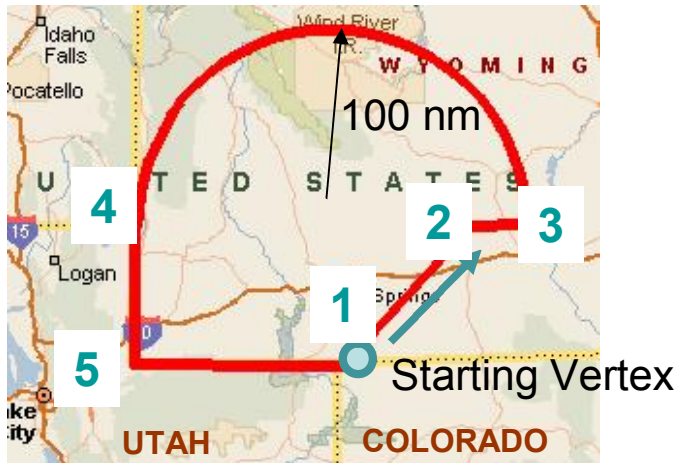
Point and Path for Horizontal Boundaries

GeoBorder - GeoVertex

txtName	codeType ST [State border.], TW [Territorial waters limit.], CS [Coastline.], RW [River centreline.], RB [River bank.]	codeType GRC [Great Circle = line segment for short distances.] END [The last vertex (open shape).]	geoLat, geoLong [Check if filled in]

Exercise 6: Complex Airspace using Aggregation

Solution: Horizontal Boundaries



Airspace Border – Airspace Vertex

Vertex	codeType [ABE [Arc By Edge.], GRC [Great Circle], RHL [Rhumb Line (Loxodromic Line).], CCA [Counter Clockwise Arc.], CWA [Clockwise arc.], FNT [Sequence of geographical (political) border vertexes]	geoLat geoLong [Check if these fields will be filled in]	geoLatArc, geolongArc [Check if these fields will be filled in]	valRadArc	uomRadArc NM [Nautical Miles.], KM [Kilometres.], M [Metres.], FT [Feet.]
1	GRC	X			
2	GRC	X			
3	CCA	X (Vertex 3)	X (center)	100	NM
4	FNT				

Exercise 6: Complex Airspace using Aggregation

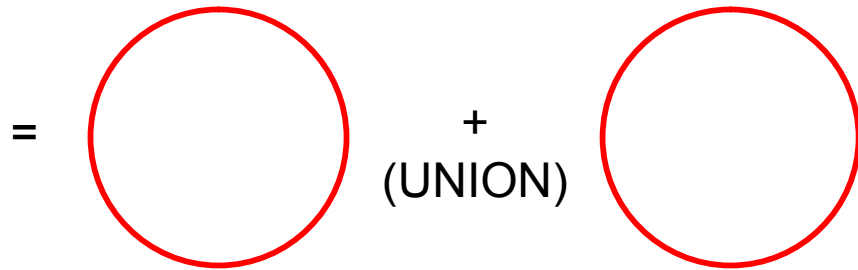
Solution: Horizontal Boundaries

GeoBorder - GeoVertex

txtName	codeType ST [State border.], TW [Territorial waters limit.], CS [Coastline.], RW [River centreline.], RB [River bank.]	codeType GRC [Great Circle = line segment for short distances.] END [The last vertex (open shape).]	geoLat, geoLong [Check if filled in]
UT-WY	ST	GRC	Vertex 4->5
UT-WY	ST	GRC	Vertex 5->1

Exercise 6: Complex Airspace using Aggregation

XML Encoding Airspace



FL180 to FL240
Control Sector 15
80 NM radius circles

West Circle Center = 42.13N, 109.67W
East Circle Center = 40.46N, 106.87W

Exercise 6: Complex Airspace using Aggregation

XML Encoding Airspace

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<AIXM-Snapshot xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:noNamespaceSchemaLocation="C:\Documents and Settings\Brett\My
Documents\AIXM\AIXM 4.0 Reference\aixm\AIXM-Snapshot.xsd" version=""
origin="" created="" effective="">
```

```
<Ase>
```

```
<AseUid>
```

```
<codeType>_____</codeType>
```

```
<codId>_____</codId>
```

```
</AseUid>
```

```
<codeActivity>_____</codeActivity>
```

```
<codeDistVerUpper>_____</codeDistVerUpper>
```

```
<valDistVerUpper>_____</valDistVerUpper>
```

```
<uomDistVerUpper>_____</uomDistVerUpper>
```

```
<codeDistVerLower>_____</codeDistVerLower>
```

```
<valDistVerLower>_____</valDistVerLower>
```

```
<uomDistVerLower>_____</uomDistVerLower>
```

```
</Ase>
```

```
<Ase>
```

```
<AseUid>
```

```
<codeType>_____</codeType>
```

```
<codId>_____</codId>
```

```
</AseUid>
```

```
<codeDistVerUpper>_____</codeDistVerUpper>
```

```
<valDistVerUpper>_____</valDistVerUpper>
```

```
<uomDistVerUpper>_____</uomDistVerUpper>
```

```
<codeDistVerLower>_____</codeDistVerLower>
```

```
<valDistVerLower>_____</valDistVerLower>
```

```
<uomDistVerLower>_____</uomDistVerLower>
```

```
</Ase>
```

```
<Ase>
```

```
<AseUid>
```

```
<codeType>_____</codeType>
```

```
<codId>_____</codId>
```

```
</AseUid>
```

```
<codeDistVerUpper>_____</codeDistVerUpper>
```

```
<valDistVerUpper>_____</valDistVerUpper>
```

```
<uomDistVerUpper>_____</uomDistVerUpper>
```

```
<codeDistVerLower>_____</codeDistVerLower>
```

```
<valDistVerLower>_____</valDistVerLower>
```

```
<uomDistVerLower>_____</uomDistVerLower>
```

```
</Ase>
```

Exercise 6: Complex Airspace using Aggregation

XML Encoding Airspace

```
<Abd>
  <AbdUid>
    <AseUid>
      <codeType>_____</codeType>
      <codId>_____</codId>
    </AseUid>
  </AbdUid>
  <Circle><geoLatCen>_____</geoLatCen>
<geoLongCen>_____</geoLongCen>
  <codeDatum>_____</codeDatum>
  <valRadius>_____</valRadius>
  <uomRadius>_____</uomRadius>
</Circle>
</Abd>
```

```
<Abd>
  <AbdUid>
    <AseUid>
      <codeType>_____</codeType>
      <codId>_____</codId>
    </AseUid>
  </AbdUid>
  <Circle> <geoLatCen>_____</geoLatCen>
<geoLongCen>_____</geoLongCen>
  <codeDatum>-----</codeDatum>
  <valRadius>_____</valRadius>
  <uomRadius>_____</uomRadius>
</Circle>
</Abd>
```

Exercise 6: Complex Airspace using Aggregation

XML Encoding Airspace

```
<Adg>
  <AdgUid>
    <AseUid>
      <codeType>_____</codeType>
      <codeld>_____</codeld>
    </AseUid>
  </AdgUid>
  <AseUidBase>
    <codeType>_____</codeType>
    <codeld>_____</codeld>
  </AseUidBase>
  <codeOpr>_____</codeOpr>
  <AseUidComponent>
    <codeType>_____</codeType>
    <codeld>_____</codeld>
  </AseUidComponent>
</Adg>
</AIXM-Snapshot>
```

Exercise 6: Complex Airspace using Aggregation

Solution: XML Encoding Airspace

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<AIXM-Snapshot xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"  
xsi:noNamespaceSchemaLocation="C:\Documents and Settings\Brett\My Documents\AIXM\AIXM 4.0  
Reference\xaixm\AIXM-Snapshot.xsd" version="" origin="" created="2005-05-05T10:00:00"  
effective="2005-05-05T10:00:00">
```

```
<Ase>
```

```
<AseUid>
```

```
<codeType>SECTOR</codeType>
```

```
<codeId>15</codeId>
```

```
</AseUid>
```

```
<codeActivity>ATS</codeActivity>
```

```
<codeDistVerUpper>STD</codeDistVerUpper>
```

```
<valDistVerUpper>240</valDistVerUpper>
```

```
<uomDistVerUpper>FL</uomDistVerUpper>
```

```
<codeDistVerLower>STD</codeDistVerLower>
```

```
<valDistVerLower>180</valDistVerLower>
```

```
<uomDistVerLower>FL</uomDistVerLower>
```

```
</Ase>
```

Exercise 6: Complex Airspace using Aggregation

Solution: XML Encoding Airspace

```
<Ase>
  <AseUid>
    <codeType>PART</codeType>
    <codeId>15A</codeId>
  </AseUid>
  <codeDistVerUpper>STD</codeDistVerUpper>
  <valDistVerUpper>240</valDistVerUpper>
  <uomDistVerUpper>FL</uomDistVerUpper>
  <codeDistVerLower>STD</codeDistVerLower>
  <valDistVerLower>180</valDistVerLower>
  <uomDistVerLower>FL</uomDistVerLower>
</Ase>
```


Exercise 6: Complex Airspace using Aggregation

Solution: XML Encoding Airspace

```
<Ase>
  <AseUid>
    <codeType>PART</codeType>
    <codeId>15B</codeId>
  </AseUid>
  <codeDistVerUpper>STD</codeDistVerUpper>
  <valDistVerUpper>240</valDistVerUpper>
  <uomDistVerUpper>FL</uomDistVerUpper>
  <codeDistVerLower>STD</codeDistVerLower>
  <valDistVerLower>180</valDistVerLower>
  <uomDistVerLower>FL</uomDistVerLower>
</Ase>
```

Exercise 6: Complex Airspace using Aggregation

Solution: XML Encoding Airspace

```
<Abd>
  <AbdUid>
    <AseUid>
      <codeType>PART</codeType>
      <codeId>15A</codeId>
    </AseUid>
  </AbdUid>
  <Circle><geoLatCen>40.46375N</geoLatCen>
<geoLongCen>106.872306W</geoLongCen>
  <codeDatum>WGE</codeDatum>
  <valRadius>80</valRadius>
  <uomRadius>NM</uomRadius>
</Circle>
</Abd>
```

Exercise 6: Complex Airspace using Aggregation

Solution: XML Encoding Airspace

```
<Abd>
  <AbdUid>
    <AseUid>
      <codeType>PART</codeType>
      <codeId>15B</codeId>
    </AseUid>
  </AbdUid>
  <Circle> <geoLatCen>42.12700735N</geoLatCen>
<geoLongCen>109.67860619W</geoLongCen>
  <codeDatum>WGE</codeDatum>
  <valRadius>80</valRadius>
  <uomRadius>NM</uomRadius>
</Circle>
</Abd>
```

Exercise 6: Complex Airspace using Aggregation

Solution: XML Encoding Airspace

```
<Adg>
  <AdgUid><AseUid>
    <codeType>SECTOR</codeType>
    <codeId>15</codeId>
  </AseUid></AdgUid>
  <AseUidBase>
    <codeType>PART</codeType>
    <codeId>15A</codeId>
  </AseUidBase>
  <codeOpr>UNION</codeOpr>
  <AseUidComponent>
    <codeType>PART</codeType>
    <codeId>15B</codeId>
  </AseUidComponent>
</Adg>
</AIXM-Snapshot>
```

Exercise 7: Encoding Organizations & Services

Objectives & Instructions

- **Objectives**

- Understand the data model for Organizations and Services
- Interpret an eAIP and encode it into AICM

- **Instructions**

- Encode Moldova Air Traffic Services from the trial eAIP for Moldova.

Exercise 7: Encoding Organizations & Services

Reference Material

- **Exercise 7 Organization Moldova eAIP.doc**



Exercise 7: Encoding Organizations & Services

AICM Tables

Org_Auth (Organization or Authority)

Mid	txtName	codeID	codeType (S [State.], GS [Group of States.], O [Organisation within a State.], IO [International Organisation.], AOA [Aircraft Operating Agency.], ATS [Air Traffic Services Provider.], HA [Handling Agency.], A [National Authority.])
10			
11			

Org_Auth_Address (Address of Organization Authority)

Mid	Org_Auth Mid	codeType (POST [postal address.], PHONE [telephone number.], FAX [fax number.], TLX [telex address.], SITA [Societe Internationale de Telecommunications Aeronautique.], AFS [Aeronautical Fixed Service address.], EMAIL [Electronic mail address.], URL [Uniform Resource Locator (for the World Wide Web).], RADIO [Radio frequency.])	txtAddress
20			
21			
22			
23			
24			
25			

Exercise 7: Encoding Organizations & Services

AICM Tables

Unit (Organization Unit Providing Services)

Mid	Org Mid	txtName	codeType	codeClass (ICAO or Other)	codeId (optional)
30					
31					
32					
33					
34					
35					
36					

CODE_TYPE_UNIT (A unit providing particular ATS services.)

ACC [Area Control Centre.] ADSU [Automatic Dependent Surveillance Unit.] ADVC [Advisory Centre.] ALPS [Alerting Post.] AOF [Aeronautical Information Services Office.] APP [Approach Control office.] APP-ARR [Arrivals Approach Control office.] APP-DEP [Departures Approach Control office.] ARO [Aerodrome Reporting Office/ATS Reporting Office.] ATCC [Air Traffic Control Centre.] ATFMU [Air Traffic Flow Management Unit.] ATMU [Air Traffic Management Unit.] ATSU [Air Traffic Services Unit.] BOF [Briefing Office.] [note: Not ICAO listed but nonetheless used.] BS [Commercial Broadcasting Station.] COM [Communications office/centre.] FCST [Forecasting office.] FIC [Flight Information Centre.] GCA [Ground Controlled Approach Systems office.] MET [Meteorological office.] MWO [Meteorological Watch Office.] NOF [International NOTAM Office.] OAC [Oceanic Control Centre.] PAR [Precision Approach Radar centre.] RAD [Radar unit/office.] RAFC [Regional Area Forecast Centre.] RCC [Rescue Co-ordination Centre.] RSC [Rescue Sub-Centre.] SAR [Search And Rescue centre.] SMC [Surface Movement Control office.] SMR [Surface Movement Radar office.] SRA [Surveillance Radar Approach office/centre.] SSR [Secondary Surveillance Radar centre.] TAR [Terminal Area surveillance Radar office/centre.] TWR [Aerodrome Control Tower.] UAC [Upper Area Control Centre.] UDF [UHF Direction-Finding station.] UIC [Upper Information Centre.] VDF [VHF Direction-Finding station.] WAFC [World Area Forecast Centre.] ARTCC [Air Route Traffic Control Center.] FSS [Flight Service Station.] TRACON [Terminal Radar Approach Control.] MIL [Military station/unit] (or Military office in general).] MILOPS [Planning/briefing office for military flight operations.]

Exercise 7: Encoding Organizations & Services

AICM Tables

Service (In this exercise, code the ATS, Radar and AFIS only!)

Mid	Unit Mid	codeType	NoSeq	codeSource (ICAO [Service as defined by ICAO.] STATE [Service as defined by a State.] FAA [Federal Aviation Administration (USA).] OTHER [self explanatory.])	codeRadar (Y [Yes.], N [No.])
100					
101					
102					
103					
104					

CODE_TYPE_SER Type of a service such as Flight Information etc. **Allowable values:** **ACS** [Area Control Service.] **ADS** [Automatic Dependent Surveillance service.] **ADVS** [Advisory service.] **AFIS** [Aerodrome Flight Information Service.] **AFS** [Aeronautical Fixed Service.] **AIS** [Aeronautical Information Service.] **ALRS** [Alerting Service.] **AMS** [Aeronautical Mobile Service.] **AMSS** [Aeronautical Mobile Satellite Service.] **APP** [Approach Control Service for both Arrival AND Departure.] **APP-ARR** [Approach Control Service for Arrivals only.] **APP-DEP** [Approach Control Service for Departures only.] **ARTCC** [Air Route Traffic Control Centre Service.] **ATC** [Air Traffic Control service.] **ATFM** [Air Traffic Flow Management service.] **ATIS** [Automated Terminal Information Service.] **ATIS-ARR** [Automated Terminal Information Service for Arriving Traffic.] **ATIS-DEP** [Automated Terminal Information Service for Departing Traffic.] **ATM** [Air Traffic Management service.] **ATS** [Air Traffic Service.] **BOF** [Briefing service.] *[note: Not ICAO listed but nonetheless used.]* **BS** [commercial Broadcasting Service.] **COM** [Communications service.] **CTAF** [Common Traffic Advisory Frequency Service.] **DVDF** [Doppler VDF Service.] **EFAS** [En-route Flight Advisory Service.] **FCST** [Forecasting service.] **FIS** [Flight Information Service.] **FISA** [Automated FIS.] **FSS** [Flight Service Station Service.] **GCA** [Ground Controlled Approach service.] **OAC** [Oceanic Area Control service.] **NOF** [International NOTAM service.] **MET** [Meteorological service.] **PAR** [Precision Approach Radar service.] **RAC** [Rules of the Air and Air Traffic Services.] **RADAR** [Radar service.] **RAF** [Regional Area Forecasting service.] **RCC** [Rescue Co-ordination service.] **SAR** [Search And Rescue service.] **SIGMET** [SIGMET service.] **SMC** [Surface Movement Control service.] **SMR** [Surface Movement Radar service.] **SRA** [Surveillance Radar Approach service.] **SSR** [Secondary Surveillance Radar service.] **TAR** [Terminal Area Radar service.] **TWEB** [Transcribed Weather Broadcast Service.] **TWR** [Aerodrome Control Tower Service.] **UAC** [Upper Area Control service.] **UDF** [UHF Direction-Finding service.] **VDF** [VHF Direction-Finding service.] **VOLMET** [VOLMET service.] **VOT** [VOR Test Facility.] **OVERFLT** [Overflight Clearance Service.] *[note: A service providing crossing permissions through a given airspace.]* **ENTRY** [Entry Clearance Service.] *[note: A service providing entry permissions into a given airspace.]* **EXIT** [Exit Clearance Service.] *[note: A service providing exit permissions from a given airspace.]* **INFO** [Information Provision Service.] *[note: A service providing information about activities taking place at a location, such as inside an airspace.]*

Exercise 7: Encoding Organizations & Services

AICM Tables

Service in Airspace

Mid	Service Mid	Airspace Mid	Txt_Rmk
1000			
1001			
1002			
1003			
1004			

Airspace (partial table)

Mid	Code Type	Code ID	
10000	FIR	CHISINAU	
10001			

Exercise 7: Encoding Organizations & Services

Solution: AICM Tables

Org_Auth (Organization or Authority)

Mid	txtName	codeID	codeType (S [State.], GS [Group of States.], O [Organisation within a State.], IO [International Organisation.], AOA [Aircraft Operating Agency.], ATS [Air Traffic Services Provider.], HA [Handling Agency.], A [National Authority.])
10	Moldavian Air Traffic Services Authority	MoldATSA	ATS
11			

Org_Auth_Address (Address of Organization Authority)

Mid	Org_Auth Mid	codeType (POST [postal address.], PHONE [telephone number.], FAX [fax number.], TLX [telex address.], SITA [Societe Internationale de Telecommunications Aeronautique.], AFS [Aeronautical Fixed Service address.], EMAIL [Electronic mail address.], URL [Uniform Resource Locator (for the World Wide Web).], RADIO [Radio frequency.]	txtAddress
20	10	POST	MoldATSA, Bd. Dacia...Moldova
21	10	PHONE	373-22-52-51-30
22	10	FAX	373-22-52-59-07
23	10	AFS	LUKKZDZD
24	10	EMAIL	org@moldatsa.md
25			

Exercise 7: Encoding Organizations & Services

Solution: AICM Tables

Unit (Organization Unit Providing Services)

Mid	Org Mid	txtName	codeType	codeClass (ICAO or Other)	codeId (optional)
30	10	CHISINAU ACC	ACC	ICAO	
31	10	CHISINAU RADIO	COM	ICAO	
32	10	CHISINAU APP	APP	ICAO	
33	10	CHISINAU TWR	TWR	ICAO	
34	10	BALTI TWR	TWR	ICAO	
35	10	CAHUL TWR	TWR	ICAO	
36	10				

CODE_TYPE_UNIT (A unit providing particular ATS services.)

ACC [Area Control Centre.] ADSU [Automatic Dependent Surveillance Unit.] ADVC [Advisory Centre.] ALPS [Alerting Post.] AOF [Aeronautical Information Services Office.] APP [Approach Control office.] APP-ARR [Arrivals Approach Control office.] APP-DEP [Departures Approach Control office.] ARO [Aerodrome Reporting Office/ATS Reporting Office.] ATCC [Air Traffic Control Centre.] ATFMU [Air Traffic Flow Management Unit.] ATMU [Air Traffic Management Unit.] ATSU [Air Traffic Services Unit.] BOF [Briefing Office.] [note: Not ICAO listed but nonetheless used.] BS [Commercial Broadcasting Station.] COM [Communications office/centre.] FCST [Forecasting office.] FIC [Flight Information Centre.] GCA [Ground Controlled Approach Systems office.] MET [Meteorological office.] MWO [Meteorological Watch Office.] NOF [International NOTAM Office.] OAC [Oceanic Control Centre.] PAR [Precision Approach Radar centre.] RAD [Radar unit/office.] RAFC [Regional Area Forecast Centre.] RCC [Rescue Co-ordination Centre.] RSC [Rescue Sub-Centre.] SAR [Search And Rescue centre.] SMC [Surface Movement Control office.] SMR [Surface Movement Radar office.] SRA [Surveillance Radar Approach office/centre.] SSR [Secondary Surveillance Radar centre.] TAR [Terminal Area surveillance Radar office/centre.] TWR [Aerodrome Control Tower.] UAC [Upper Area Control Centre.] UDF [UHF Direction-Finding station.] UIC [Upper Information Centre.] VDF [VHF Direction-Finding station.] WAFC [World Area Forecast Centre.] ARTCC [Air Route Traffic Control Center.] FSS [Flight Service Station.] TRACON [Terminal Radar Approach Control.] MIL [Military station/unit] (or Military office in general.) MILOPS [Planning/briefing office for military flight operations.]

Exercise 7: Encoding Organizations & Services

Solution: AICM Tables

Service (In this exercise, code the ATS, Radar and FIS only!)

Mid	Unit Mid	codeType	NoSeq	codeSource (ICAO [Service as defined by ICAO.] STATE [Service as defined by a State.] FAA [Federal Aviation Administration (USA).] OTHER [self explanatory.])	codeRadar (Y [Yes.], N [No.])
100	30	ACS	1	ICAO	Y
101	33	AFIS	1	ICAO	N
102	34	AFIS	1	ICAO	N
103	35	AFIS	1	ICAO	N
104					

CODE_TYPE_SER Type of a service such as Flight Information etc. **Allowable values:** **ACS** [Area Control Service.] **ADS** [Automatic Dependent Surveillance service.] **ADVS** [Advisory service.] **AFIS** [Aerodrome Flight Information Service.] **AFS** [Aeronautical Fixed Service.] **AIS** [Aeronautical Information Service.] **ALRS** [Alerting Service.] **AMS** [Aeronautical Mobile Service.] **AMSS** [Aeronautical Mobile Satellite Service.] **APP** [Approach Control Service for both Arrival AND Departure.] **APP-ARR** [Approach Control Service for Arrivals only.] **APP-DEP** [Approach Control Service for Departures only.] **ARTCC** [Air Route Traffic Control Centre Service.] **ATC** [Air Traffic Control service.] **ATFM** [Air Traffic Flow Management service.] **ATIS** [Automated Terminal Information Service.] **ATIS-ARR** [Automated Terminal Information Service for Arriving Traffic.] **ATIS-DEP** [Automated Terminal Information Service for Departing Traffic.] **ATM** [Air Traffic Management service.] **ATS** [Air Traffic Service.] **BOF** [Briefing service.] [note: Not ICAO listed but nonetheless used.] **BS** [commercial Broadcasting Service.] **COM** [Communications service.] **CTAF** [Common Traffic Advisory Frequency Service.] **DVDF** [Doppler VDF Service.] **EFAS** [En-route Flight Advisory Service.] **FCST** [Forecasting service.] **FIS** [Flight Information Service.] **FISA** [Automated FIS.] **FSS** [Flight Service Station Service.] **GCA** [Ground Controlled Approach service.] **OAC** [Oceanic Area Control service.] **NOF** [International NOTAM service.] **MET** [Meteorological service.] **PAR** [Precision Approach Radar service.] **RAC** [Rules of the Air and Air Traffic Services.] **RADAR** [Radar service.] **RAF** [Regional Area Forecasting service.] **RCC** [Rescue Co-ordination service.] **SAR** [Search And Rescue service.] **SIGMET** [SIGMET service.] **SMC** [Surface Movement Control service.] **SMR** [Surface Movement Radar service.] **SRA** [Surveillance Radar Approach service.] **SSR** [Secondary Surveillance Radar service.] **TAR** [Terminal Area Radar service.] **TWEB** [Transcribed Weather Broadcast Service.] **TWR** [Aerodrome Control Tower Service.] **UAC** [Upper Area Control service.] **UDF** [UHF Direction-Finding service.] **VDF** [VHF Direction-Finding service.] **VOLMET** [VOLMET service.] **VOT** [VOR Test Facility.] **OVERFLT** [Overflight Clearance Service.] [note: A service providing crossing permissions through a given airspace.] **ENTRY** [Entry Clearance Service.] [note: A service providing entry permissions into a given airspace.] **EXIT** [Exit Clearance Service.] [note: A service providing exit permissions from a given airspace.] **INFO** [Information Provision Service.] [note: A service providing information about activities taking place at a location, such as inside an airspace.]

Exercise 7: Encoding Organizations & Services

AICM Tables

Service in Airspace

Mid	Service Mid	Airspace Mid	Txt_Rmk
1000	100	10000	MoldATSA provides ATS services in the FIR
1001			

Airspace (partial table)

Mid	Code Type	Code ID	
10000	FIR	CHISINAU	
10001			



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