FAA
AJV-2

Federal NOTAM System TLO Scenarios

Including AIXM 5.1 Sample Messages

Table of Contents

Appendix 2 - EBNF

1 Introduction

1.1 Introduction to the Federal NOTAMs System (FNS)

The distribution of aeronautical information in an accurate and timely manner is essential to the safety of the National Airspace System (NAS). Aeronautical information encompasses many aspects of the NAS, but the focus with respect to this document is on the origination, storage, and distribution of Notices to Airmen (NOTAM). NOTAMs communicate temporary changes to components of, or hazards in, the NAS. The current NOTAM system is a compilation of many processes and systems, developed over many years, with significant overlap of function. Today's NOTAM system is deficient for both NOTAM originators and NOTAM recipients. Currently, most NOTAMs are reported by verbal, fax, or electronic communication with a flight service station (FSS) specialist. The FSS specialist will then type the NOTAM and submit it to the United States NOTAM System (USNS) for storage and dissemination. This process is slow, cumbersome, and contains errors approximately 40% of the time. Currently, NOTAMs are based largely on free text which limits the ability to sort through each NOTAM to filter only those that are applicable.

The Federal NOTAM System (FNS) is the new NOTAM management system designed to digitize the collection, dissemination, and storage of NOTAMs. The goal is to create a single authoritative source for NOTAM entry and dissemination improving efficiency, safety, and data quality. The concept behind the FNS is to have the originator of a NOTAM, such as an airport, generate and submit the NOTAM using a web-based standard NOTAM template. The inputs from the standard template will be validated against policy-driven business rules and immediately published and available to airmen for review. Also, by adhering to a digital format, these NOTAMs will be in a computer readable format such that air traffic control and flight planning around the world can easily sort through the NOTAMs finding only those that are relevant to their operations.

1.2 Introduction to the Aeronautical Information Exchange Model (AIXM version 5.1)

The Aeronautical Information Exchange Model (AIXM) is designed for the management and distribution of Aeronautical Information Services (AIS) data through the use of a common exchange model in digital format. The current version, 5.1, of AIXM uses existing and emerging information engineering standards. AIXM 5.1 contains an extensive temporality model, including support for the temporary information contained within a NOTAM. AIXM 5.1 is also aligned with International Organization for Standardization (ISO) standards for geospatial information, including the use of Geography Markup Language (GML). More information about AIXM can be found at the website: www.aixm.aero. The primary benefit in using AIXM is that by using a common exchange model, systems can achieve neutrality against applications and local views of data.

AIXM has two main components: the AIXM Conceptual Model and the AIXM Extensible Markup Language (XML) Schema. The AIXM Conceptual Model describes the features and properties in the aeronautical domain using the Unified Modeling Language (UML). The Conceptual Model is composed of Features, Objects, Attributes, and Relationships between features and objects. The AIXM XML Schema is an exchange model for aeronautical information data and is an implementation of the Conceptual Model as an XML schema.

1.3   Digital NOTAMs and AIXM version 5.1

A digital NOTAM is a dataset that contains NOTAM information in a structured format and can be fully interpreted by an automated system without human intervention. The concept of the digital NOTAM is based on the temporality rules of AIXM 5.1. NOTAMs communicate temporary changes to the NAS and AIXM can capture these dynamic changes through the use of timeslices. A pictoral representation of the temporality model is shown below. In this case, a feature has five distinct properties, which can vary independently over time. For each property changes, there is a new timeslice associated with the feature.

Figure 1

from Archive at aixm.aero
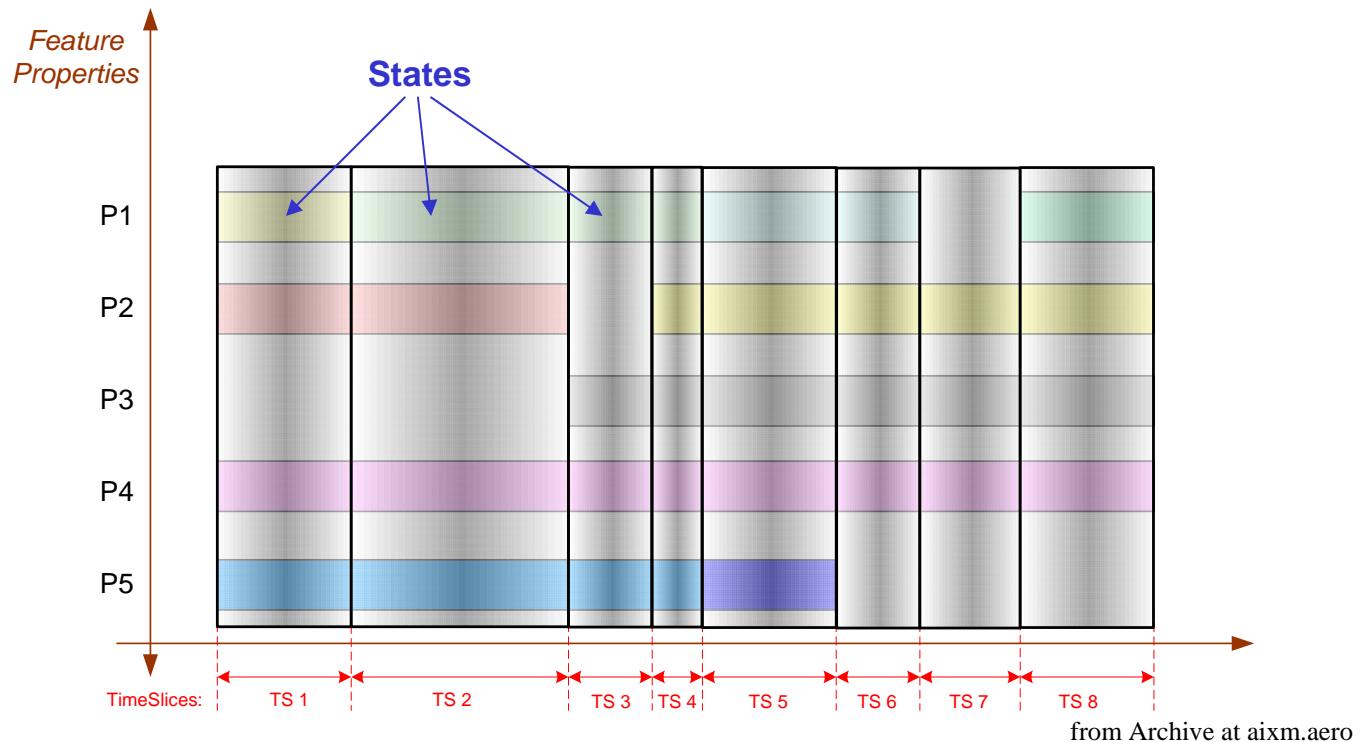
Most Digital NOTAM encodings will be captured as a timeslice of type TEMPDELTA. For example, a runway closure will be encoded as a new timeslice of type TEMPDELTA with the operationalStatus set to UNSERVICEABLE. Because of the structure of the model, a pre-requisite for any digital NOTAM is the availability of the corresponding static data on which the NOTAM information is based.

1.4   AIXM Event Schema for Digital NOTAM Messages

An AIXM application schema for creating the digital NOTAM messages is currently being developed as a collaborative effort between Eurocontrol, FAA, and stakeholders. Messages can be composed of any number of specified features and objects and is used to convey the digital NOTAM information between systems.

The UML model that defines the structure of the digital NOTAM message is shown in the diagram below. This schema also includes the options of updating other aeronautical information such as information published as AIP Supplements, AIP Amendments or AIC.

Changes to the model are available in the AIXM work area (http://www.aixm.aero/workarea). The model shown below is the most recent version, as of December 20, 2010.

Figure 2
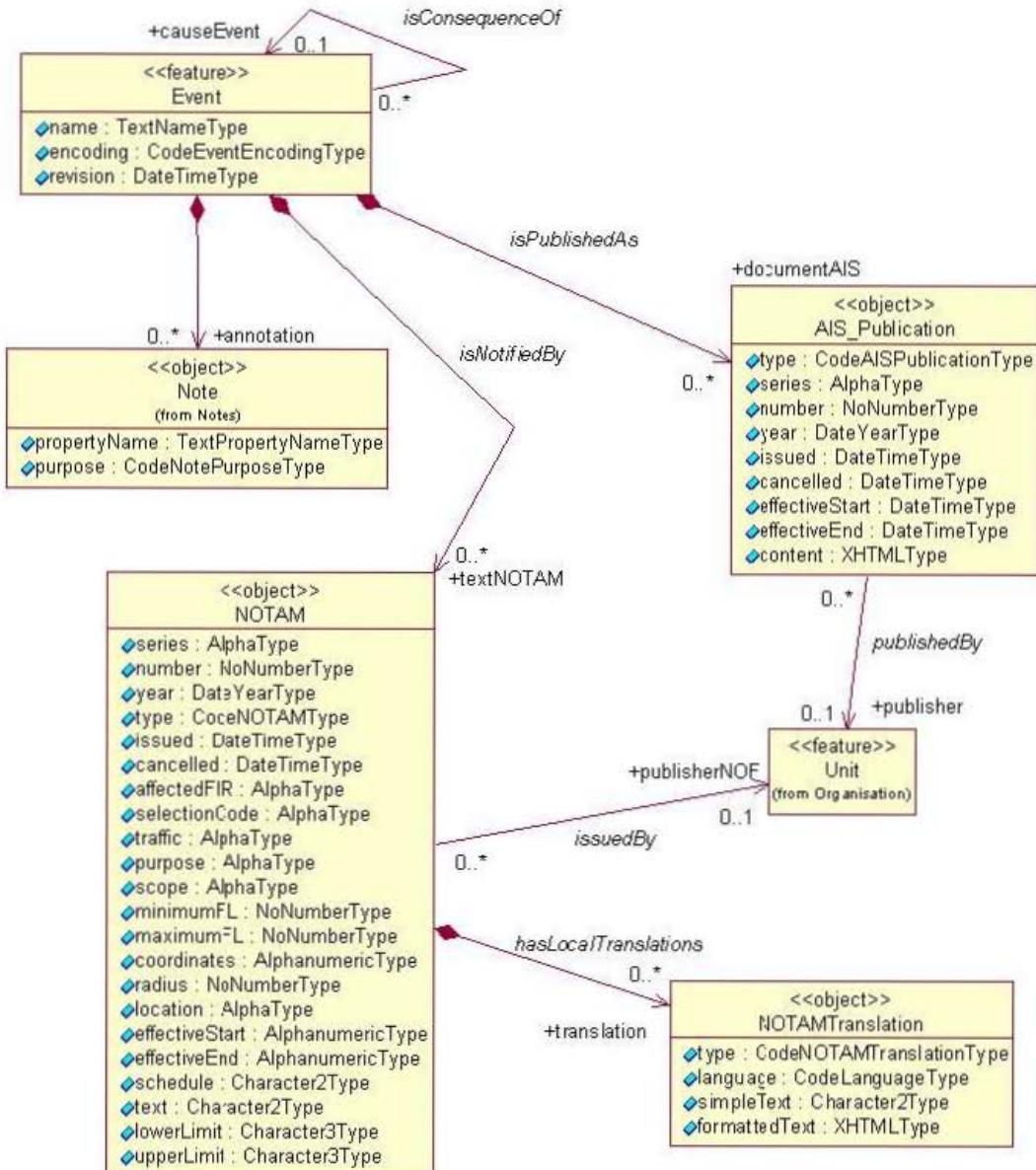
Where the feature is related to the event by the following schema:
Figure 3
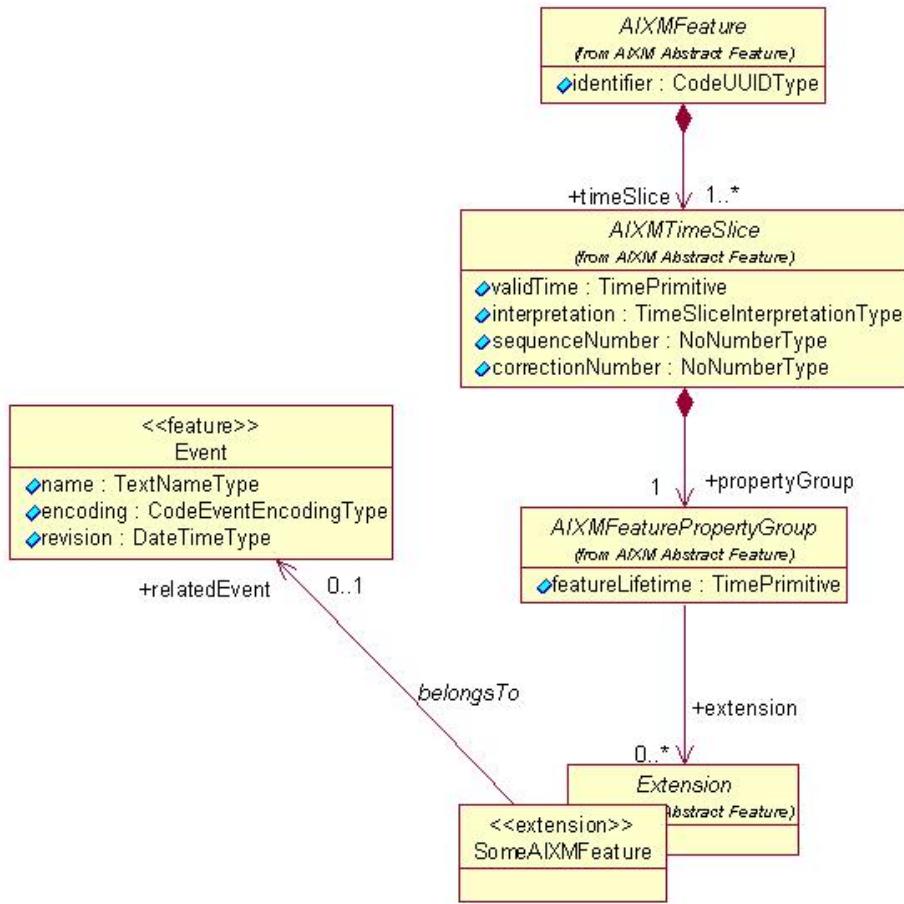
1.5   *Purpose of Event Scenarios*

The scenarios detailed in the chapters below describe the NOTAM condition that can be originated as the responsibility of Tower Light Operator Personnel. In practice, Tower Light Operators are only responsible for issuing two types of NOTAMs: the simple Tower Lights Status and the bulk Tower Lights Status (for cases where numerous tower lights are out of service in a localized area). Each event scenario is linked to a feature from the baseline data or a digitally-defined affected area. The purpose of this documentation is to capture the rules that are specific to Tower Light Operator Originated NOTAM. This includes capturing the digital translations of each piece of the required NOTAM information, defining the applicable business rules (template, policy, and digital encoding) and providing the translation from AIXM to supported text formats: FAA Legacy, ICAO, and Plain Text.

The general format of a D-NOTAM distributed by the FAA is shown below followed by two real examples of distributed NOTAMs:

NOTAM_Format
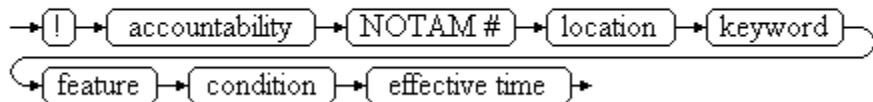
EXAMPLES-

!ACY 07/033 ACY OBST CRANE 120 (60 AGL) .8 S (3926N07434W) LGTS OTS WEF 0907161200-0907162000

!COU 12/530 ZKC OBST NUMEROUS LIGHTS OTS ZKC AIRSPACE TIL 0912272010

1.6 Scope

A Tower Light Outage NOTAM is issued for light outages on towers or other obstructions/vertical structures. Reporting the condition of a Tower Light Outage (TLO) is the responsibility of the operator/owner of the structure. Currently the tower operators are required to call the National Outage Reporting and NOTAM Line to report an outage within 30 minutes of the outage. In most cases, the tower operator provides the Antenna Structure Registration (ASR) number, but can also be asked to provide the coordinates and location of the closest public airport. The concept for the FNS NOTAM entry system is to provide a system interface to improve the process for issuing TLO NOTAMs by eliminating freeform text. The rest of the static data for issuing the NOTAM is contained in the baseline data, which eliminates human error when issuing these types of NOTAMs.

The scenarios contained in this document include the NOTAM conditions that are reported by Tower Owners and Operators. The NOTAM entry system for creating digital NOTAMs requires the definition of several key components that are described below in the order that they will appear in the NOTAM scenario documentation.

First, the NOTAM condition is identified with a short description followed by a flow diagram that depicts the required format of the reported NOTAM. The information provided in these flow diagrams covers the information provided in the keyword, feature, and condition segments of the schema above. The flowchart for each scenario does not include the accountability, NOTAM number, or location identifier that would precede the NOTAM scenario. The flowcharts also do not depict the effective time for each NOTAM scenario. Because every NOTAM must have this information it is assumed that this information is present and is not shown in the figures to avoid redundancy. The ordering of the information elements contained in the flow diagram for each scenario is dictated first by policy and then by subject matter experts review and a review of historical NOTAMs. The documentation also provides a short sampling of historical NOTAMs that fall into the condition category.

The next section contains the information for mapping the identified NOTAM condition into AIXM 5.1 digital format. In this section, information is provided for the transformation of each element of the NOTAM into AIXM 5.1 compliant digital format. Objects that are required for FAA issued NOTAMs that do not currently have a representation in AIXM 5.1 are highlighted in blue. This identifies the extensions created in the UML Model to accommodate this information in a digital format. Additionally, this section provides a translation of the information contained in the digital format to FAA, ICAO and Plain Text. The FAA and ICAO translations will have the standardized and approved NOTAM

contractions, if applicable, where as the Plain Text will provide the plain language translation. When mapping the digital NOTAM into ICAO format, a
QCode for the condition must be provided. The QCode and Series are identified in the following section and are generally linked to the status of the NOTAM condition, although there are exceptions. This information is provided such that the NOTAM entry system will be able to translate the NOTAM format from digital to FAA, ICAO, plain text and graphical formats.

Business rules (template, policy, and data encoding) are also determined for each NOTAM scenario to guarantee that the NOTAM created by FNS conforms to current FAA policy. The template business rules specify the rules associated with what information is required in the template and which information is optional and conforms to the flow diagram provided at the beginning of the individual scenario. Policy business rules are provided, if applicable, and identify the policies that dictate the issuance of NOTAMs specific to those conditions. Additionally, encoding business rules for creating the AIXM 5.1 digital message are provided. A sample AIXM 5.1 compliant digital message is provided for each NOTAM condition scenario, along with the identified extensions.

Lastly, translation templates to FAA, ICAO, and Plain Language are provided using the digital data elements defined in the documentation. Additional analysis and solutions to potential policy related issues are presented when needed.

1.7 References

The relevant documentation used for this analysis includes:
- Order JO 7930.2M, Notices to Airmen (NOTAM)
- Order JO 7930.2M CHG 1, Notices to Airmen (NOTAM)
- Order JO 7340.2A, Contractions
- Aeronautical Information Manual, Official Guide to Basic Flight Information and ATC Procedures (Change 1 2008)
- International Civil Aviation Organization (ICAO) Doc 8126 Aeronautical Information Services Manual (Sixth Edition 2003)
- ICAO Annex 15 to the Convention on International Civil Aviation, Aeronautical Information Services (Thirteeth Edition 2010)
- ICAO Doc 8400 Procedures for Air Navigation Services, ICAO Abbreviations and Codes (Seventh Edition 2007)
- EUROCONTROL Guidelines, Operating Procedures for AIS Dynamic Data (OPADD) (Edition 3.0 2009)
- US NOTAMs Repository Database (for examples of current NOTAMs)
- Guidelines for the use of GML in AIXM 5.1 (v 0.1) (2010)
- Proposed practices for the use of XLink and XPointer in AIXM 5.1, AIXM Proposal (v 0.3) (2010)
- Open Geospatial Consortium Inc: Requirements for Aviation Metadata Discussion Paper (Discussion Paper 2010)
- Open Geospatial Consortium Inc: Guidance on the Aviation Metadata Profile (Discussion Paper 2010)
- AIXM 5 Feature Identification and Reference: use of xlink:href and UUID
- AIXM 5.1 Business Rules
- Examples provided by the AIM Policy Office and the US NOTAMs Office

2 Accountability (in Metadata)

The accountable organization for the NOTAM. This information appears in two locations in the Metadata because, in the concept of operations for FNS, the originator is the same as the point of contact.

2.1   AIXM Mapping and Translation

2.1.1   Scenario Details

TABLE 2.1

Attribute	Value
Description	Accountable Organization
Feature Type Id	Metadata
Feature Xpath	messageMetadata
Standard	ISO 19115

2.1.2   Accountable Organization [*gmd:organisationName*]

Description: The name of the accountable organization for the orignator/point of contact.

Source: Assigned by the user account.

TABLE 2.2
NOTAM Number

Attribute	Value
AIXM Path (UML)	MD_Metadata (feature)/ contact (element)
AIXM Element Xpath	gmd:MD_Metadata/ gmd:contact/ gmd:CI_ResponsibleParty/ gmd:organisationName/ gco:CharacterString
Type	CharacterString
AIXM Path (UML)	MD_Metadata (feature)/ MD_Identification (abstract)/ pointOfContact (element)
AIXM Element Xpath	gmd:MD_Metadata/ gmd:identificationInfo/ gmd:MD-DataIdentification/ gmd:pointOfContact/ gmd:CI_ResponsibleParty/ gmd:organisationName/ gco:CharacterString
Type	CharacterString

2.1.3   Contact Information [*gmd:voice*]

Description: The contact information for the orignator/point of contact.

Source: Assigned by the user account.

TABLE 2.3
NOTAM Number

Attribute	Value
AIXM Path (UML)	MD_Metadata (feature)/ contact (element)
AIXM Element Xpath	gmd:MD_Metadata/ gmd:contact/ gmd:CI_ResponsibleParty/ gmd:contactInfo/ gmd:CI_Contact/ gmd:phone/ gmd:CI_Telephone/ gmd:voice/ gco:CharacterString
Type	CharacterString
AIXM Path (UML)	MD_Metadata (feature)/ MD_Identification (abstract)/ pointOfContact (element)

AIXM Element Xpath	gmd:MD_Metadata/ gmd:identificationInfo/ gmd:MD-DataIdentification/ gmd:pointOfContact/ gmd:CI_ResponsibleParty/ gmd:contactInfo/ gmd:CI_Contact/ gmd:phone/ CI_Telephone/ gmd:voice/ gco:CharacterString
Type	CharacterString

2.1.4 Contact Information [*gmd:voice*]

Description: The contact information for the orignator/point of contact.

Source: Assigned by the user account.

<p align="center"><i>TABLE 2.4</i>
NOTAM Number</p>

Attribute	Value	
AIXM Path (UML)	MD_Metadata (feature)/ contact (element)	
AIXM Element Xpath	gmd:MD_Metadata/ gmd:contact/ gmd:CI_ResponsibleParty/ gmd:role/ gmd:CI_RoleCode [codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode" codeListValue="pointOfContact">pointOfContact</gmd:CI_RoleCode]	
Type	String	
	Defined:	pointOfContact
AIXM Path (UML)	MD_Metadata (feature)/ MD_Identification (abstract)/ pointOfContact (element)	
AIXM Element Xpath	gmd:MD_Metadata/ gmd:identificationInfo/ gmd:MD-DataIdentification/ gmd:role/ gmd:CI_RoleCode [codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode" codeListValue="**originator**">]	
Type	String	
	Defined:	originator

2.2   Sample AIXM Message

```
<?xml version="1.0" encoding="UTF-8"?>
<notamMessage:AIXMBasicMessage xsi:schemaLocation="http://www.aixm.aero/schema/5.1
./AIXM_Features.xsd http://www.aixm.aero/schema/5.1/message ./message/AIXM_BasicMessage.xsd "
gml:id="FNS-Message" xmlns:notamMessage="http://www.aixm.aero/schema/5.1/message"
xmlns:aixm="http://www.aixm.aero/schema/5.1" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns="http://www.aixm.aero/schema/5.1" xmlns:gts="http://www.isotc211.org/2005/gts"
xmlns:srv="http://www.isotc211.org/2005/srv">
<messageMetadata>
  <gmd:MD_Metadata>
    <gmd:contact>
      <gmd:CI_ResponsibleParty>
        <gmd:organisationName>
          <gco:CharacterString>USNOF</gco:CharacterString>
        </gmd:organisationName>
        <gmd:contactInfo>
          <gmd:CI_Contact>
            <gmd:phone>
              <gmd:CI_Telephone>
                <gmd:voice>
                  <gco:CharacterString>+12025807400</gco:CharacterString>
                </gmd:voice>
              </gmd:CI_Telephone>
```

```
        </gmd:phone>
      </gmd:CI_Contact>
    </gmd:contactInfo>
    <gmd:role>
      <gmd:CI_RoleCode codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
codeListValue="pointOfContact">pointOfContact</gmd:CI_RoleCode>
    </gmd:role>
  </gmd:CI_ResponsibleParty>
</gmd:contact>
…
  <gmd:identificationInfo>
    <gmd:MD_DataIdentification>
      <gmd:pointOfContact>
        <gmd:CI_ResponsibleParty>
          <gmd:organisationName>
            <gco:CharacterString>ACY</gco:CharacterString>
          </gmd:organisationName>
          <gmd:contactInfo>
            <gmd:CI_Contact>
              <gmd:phone>
                <gmd:CI_Telephone>
                  <gmd:voice>
                    <gco:CharacterString>+12025807400</gco:CharacterString>
                  </gmd:voice>
                </gmd:CI_Telephone>
              </gmd:phone>
            </gmd:CI_Contact>
          </gmd:contactInfo>
          <gmd:role>
            <gmd:CI_RoleCode codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
codeListValue="originator">originator</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
…
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
</gmd:MD_Metadata>
</messageMetadata>
<notamMessage:hasMember>
…
</notamMessage:hasMember>
</notamMessage:AIXMBasicMessage>
```

3   NOTAM Information (Number)

The NOTAM number assigned by the USNS.

3.1   AIXM Mapping and Translation

3.1.1   Scenario Details

TABLE 3.1

Attribute	Value
Description	NOTAM Number
Maps to Keyword	AD, APRON, OBST, RWY, TWY, SVC
Feature Type Id	Event
Feature Xpath	aixm:Event
AIXM Mapping Diagrams	AIXM Event Schema (for digital NOTAMs)

3.1.2   NOTAM Number [*number*]

Description: A number assigned by the USNS to a published NOTAM.

Source: Assigned by USNS (required for distribution).

TABLE 3.2
NOTAM Number

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ number (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ number
Type	NoNumberType

3.1.3   Year [*year*]

Description: The year the NOTAM is published.

Source: Assigned by NOTAM Entry Application (required for distribution).

TABLE 3.3
Publication Year

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ year (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ year
Type	DateYearType

3.1.4   Series [*series*] (FUTURE Policy)

Description: A series letter assigned by the USNS to a published NOTAM.

Source: Assigned by USNS (required for distribution).

TABLE 3.4
Series

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ series (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/

	textNOTAM/ NOTAM/ series
Type	AlphaType

3.1.5 QCode [*selectionCode*] (**FUTURE Policy**)

Description: The QCode, as defined by the sections below

Source: Determined by NOTAM Entry Application, (required for distribution).

TABLE 3.5
QCode

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ selectionCode (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ selectionCode
Type	AlphaType

3.1.6 Traffic [*traffic*] (**FUTURE Policy**)

Description: The traffic, as defined by the sections below

Source: Determined by NOTAM Entry Application, (required for distribution).

TABLE 3.6
Traffic

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ traffic (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ traffic
Type	AlphaType

3.1.7 Purpose [*purpose*] (**FUTURE Policy**)

Description: The purpose, as defined by the sections below

Source: Determined by NOTAM Entry Application, (required for distribution).

TABLE 3.7
Purpose

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ purpose (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ purpose
Type	AlphaType

3.1.8 Scope [*scope*] (**FUTURE Policy**)

Description: The scope, as defined by the sections below

Source: Determined by NOTAM Entry Application, (required for distribution).

TABLE 3.8
Scope

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ scope (attribute)

AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ scope
Type	AlphaType

3.1.9 Coordinates [*coordinate*] (FUTURE Policy)

Description: The coordinates of the hazard, Airport ARP.

Source: Baseline data. (required for distribution).

TABLE 3.9
Coordinates

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ coordinates (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ coordinates
Type	AlphaNumericType

3.1.10 Radius of Influence [*radius*] (FUTURE Policy)

Description: The radius of influence.

Source: Determined by NOTAM Entry Application, (required for distribution).

TABLE 3.10
Radius of Influence

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ radius (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ radius
Type	NoNumberType

3.2 Business Rules

3.2.1 Data Encoding Business Rules

   a. All information should be intered as BASELINE.

   b. The times defined in the text NOTAM must match those in the digital message.

3.3 Sample AIXM Message

```
<message:hasMember>
 <event:Event gml:id="e01">
   <event:timeSlice>
     <event:EventTimeSlice gml:id="e01-1">
       <gml:validTime>
         <gml:TimePeriod gml:id="e01-2">
           <gml:beginPosition>2010-12-22T00:00:00</gml:beginPosition>
           <gml:endPosition>2010-12-22T01:00:00</gml:endPosition>
         </gml:TimePeriod>
       </gml:validTime>
       <aixm:interpretation>BASELINE</aixm:interpretation>
       <aixm:sequenceNumber>1</aixm:sequenceNumber>
       <aixm:featureLifetime>
         <gml:TimePeriod gml:id="e01-3">
```

```xml
            <gml:beginPosition>2010-12-22T00:00:00</gml:beginPosition>
            <gml:endPosition>2010-12-22T01:00:00</gml:endPosition>
          </gml:TimePeriod>
        </aixm:featureLifetime>
        <event:encoding>DIGITAL</event:encoding>
        <event:textNOTAM>
          <event:NOTAM gml:id="e01-4">
            <event:series>A</event:series>
            <event:number>0667</event:number>
            <event:year>2010</event:year>
            <event:issued>2010-12-22T00:00:00</event:issued>
            <event:selectionCode>QOLAS</event:selectionCode>
            <event:traffic>ALL</event:traffic>
            <event:purpose>NBO</event:purpose>
            <event:scope>AE</event:scope>
            <event:radius>999</event:radius>
            <event:effectiveEnd>2010-12-22T01:00:00</event:effectiveEnd>
            <event:text>ACY OBST TOWER 295 (235 AGL) 10.5 NNW LGTS OTS
(3926N07434W)</event:text>
            <event:concernedAirportHeliport xlink:href="urn:faa:gov:nasr:74efb6ba-a52a-46c0-a16b-03860d356882"/>
            <event:translation>
              <event:NOTAMTranslation gml:id="NT01">
                <event:type>LOCAL_FORMAT</event:type>
              </event:NOTAMTranslation>
            </event:translation>
          </event:NOTAM>
        </event:textNOTAM>
        <event:update xlink:href="urn:faa:gov:nasr:74efb6ba-a52a-46c0-a16b-03860d356882"/>
      </event:EventTimeSlice>
    </event:timeSlice>
  </event:Event>
</message:hasMember>
```

4 Affected Location By Bounding Box (in Metadata)

A bounding box can be defined around the affected location contained in the digital NOTAM message. This information will assist in search of available aviation data. The box should be defined with westbound and eastbound longitudes, and southbound and northbound latitudes in decimal degrees with a precision of a minimum of two significant figures.

[Source: OWS-6, INSPIRE IR (4.1), Annex 15 (Chapter 10)]

4.1 Sample AIXM Message

```xml
<gmd:extent>
  <gmd:EX_Extent>
    <gmd:geographicElement>
      <gmd:EX_GeographicBoundingBox>
        <gmd:westBoundLongitude>
          <gco:Decimal>-74.70</gco:Decimal>
        </gmd:westBoundLongitude>
        <gmd:eastBoundLongitude>
          <gco:Decimal>-74.53</gco:Decimal>
        </gmd:eastBoundLongitude>
        <gmd:southBoundLatitude>
          <gco:Decimal>39.40</gco:Decimal>
        </gmd:southBoundLatitude>
        <gmd:northBoundLatitude>
          <gco:Decimal>39.48</gco:Decimal>
        </gmd:northBoundLatitude>
      </gmd:EX_GeographicBoundingBox>
    </gmd:geographicElement>
  </gmd:EX_Extent>
</gmd:extent>
```

5 Affected Location (in AIXM)

Provides the affected location information of the NOTAM.

5.1 AIXM Mapping and Translation

5.1.1 Details

TABLE 5.1

Attribute	Value
Description	Affected Location
Maps to Keyword	AD, APRON, OBST, RWY, TWY, SVC
Feature Type Id	AirportHeliport
Feature Xpath	aixm:AirportHeliport
AIXM Mapping Diagrams	AirportHeliport

5.1.2 Designator [*designator*] – Aerodrome

Description: A coded designator for an Aerodrome/Heliport.

The rules according to which this identifier should be formed are as follows:

a. If the AD/HP has an ICAO four-letter location indicator, then this one will become the CODE_ID for the Aerodrome/Heliport;

b. If the AD/HP does not have an ICAO four-letter location indicator, but it has an IATA three letter code, then this one will become the CODE_ID for the Aerodrome/Heliport;

c. If the AD/HP has neither an ICAO four-letter location indicator nor an IATA three letter code, then an artificial generated code will be used. This will contain a group of letters and a number. The group of letters could be the two-letter code of the State responsible for the Aerodrome/Heliport, and the number could be an integer between 0001 and 9999.

Source: User-selected from baseline data (required).

TABLE 5.2
Aerodrome FAA designator

Attribute	Value
AIXM Path (UML)	AirportHeliport (feature) – designator (attribute)
AIXM Element Xpath	AirportHeliport/ timeSlice/ AirportHeliportTimeSlice [interpretation SNAPSHOT]/ designator
AIXM Mapping	Class: AirportHeliport
Type	CodeAirportHeliportDesignatorType
Min length	3
Max length	6
Pattern	([A-Z]|\d)*

5.1.3 ICAO Designator [*ICAOType*] – Aerodrome

Description: The four-letter ICAO location indicator of the aerodrome/heliport, as listed in ICAO DOC 7910.

Source: User-selected from baseline data – translated from FAA designator.

TABLE 5.3
Aerodrome ICAO designator

Attribute	Value
AIXM Path (UML)	AirportHeliport (feature) – locationIndicatorICAO (attribute)
AIXM Element Xpath	AirportHeliport/ timeSlice/ AirportHeliportTimeSlice [interpretation SNAPSHOT]/ locationIndicatorICAO
AIXM Mapping	Class: AirportHeliport
Type	locationIndicatorICAO
Min length	4
Max length	4
Pattern	[A-Z]*

5.1.4   Name [*name*] – Aerodrome

Description: The primary official name of an aerodrome as designated by an appropriate authority.

Source: User-selected from baseline data – translated from FAA designator.

TABLE 5.4
Official Aerodrome Name

Attribute	Value
AIXM Path (UML)	AirportHeliport (feature) – name (attribute)
AIXM Element Xpath	AirportHeliport/ timeSlice/ AirportHeliportTimeSlice [interpretation SNAPSHOT]/ name
AIXM Mapping	Class: AirportHeliport
Type	CodeNameType
Min length	1
Max length	60
Pattern	[A-Z]*

5.1.5   Location [*location*]

Description: The affected location (added to the text NOTAM wrapper)

Source: Baseline data. (Required).

TABLE 5.5
Location

Attribute	Value
AIXM Path (UML)	Event (feature)/ NOTAM (object)/ location (attribute)
AIXM Element Xpath	Event/ timeSlice/ EventTimeSlice [interpretation: BASELINE]/ textNOTAM/ NOTAM/ location
Type	AlphaType

5.2   Business Rules

5.2.1   Data Encoding Business Rules

For entering *designator, locationICAO*, *name,* and *ARP* use a TimeSlice of type SNAPSHOT.

5.3   Sample AIXM Message

```
<notamMessage:hasMember>
  <AirportHeliport gml:id="ACY">
    <timeSlice>
```

```xml
<AirportHeliportTimeSlice gml:id="ACY_TS01">
  <gml:validTime>
  <gml:TimeInstant gml:id="ACY_TI01">
    <gml:timePosition>2010-04-07T09:00:00</gml:timePosition>
  </gml:TimeInstant>
  </gml:validTime>
  <interpretation>SNAPSHOT</interpretation>
  <designator>ACY</designator>
  <name>ATLANTIC CITY INTERNATIONAL AIRPORT</name>
  <locationIndicatorICAO>KACY</locationIndicatorICAO>
  <ARP>
    <ElevatedPoint srsName="urn:ogc:def:crs:EPSG::4326" srsDimension="2" gml:id="EP01">
      <gml:pos>39.27 -74.34</gml:pos>
    </ElevatedPoint>
  </ARP>
</AirportHeliportTimeSlice>
  </timeSlice>
</AirportHeliport>
</notamMessage:hasMember>
```

6 NOTAM Effective Times

Provides the effective times of the NOTAM. Based in AIXM 5.1 Temporality Model.

6.1 AIXM Mapping and Translation

6.1.1 Details

TABLE 6.1

Attribute	Value
Description	Effective times
Maps to Keyword	AD, APRON, OBST, RWY, TWY, SVC
Feature Type Id	ALL
Feature Xpath	
AIXM Mapping Diagrams	GML – decimal

6.1.2 SNAPSHOT (TimeInstant)

Description: The time instant of a given snapshot of baseline data

Source: Determined at the time of digital capture.

TABLE 6.2
Interpretation: SNAPSHOT

Attribute	Value
AIXM Element Xpath	gml:ValidTime/ gml:TimeInstant/ gml:timePosition
Type	TimePositionUnion (ISO 19108)
Pattern	YYYY-MM-DDTHH:MM:SS

```
<gml:validTime>
  <gml:TimeInstant gml:id="TWY01_TS01_TI01">
    <gml:timePosition>2010-04-07T09:00:00</gml:timePosition>
  </gml:TimeInstant>
</gml:validTime>
```

6.1.3 TEMPDELTA (TimePeriod)

Description: The effective time of a temporary change.

Source: User-entered (required).

TABLE 6.3
Interpretation: TEMPDELTA

Attribute	Value
AIXM Element Xpath	gml:ValidTime/ gml:TimePeriod/ gml:beginPosition gml:ValidTime/ gml:TimePeriod/ gml:endPosition
Type	TimePositionUnion (ISO 19108)
Pattern	YYYY-MM-DDTHH:MM:SS

201004070900 – 201004091500
```
<gml:validTime>
  <gml:TimePeriod gml:id="TWY02_TS01_TP01">
    <gml:beginPosition>2010-04-07T09:00:00</gml:beginPosition>
    <gml:endPosition>2010-04-09T15:00:00</gml:endPosition>
  </gml:TimePeriod>
</gml:validTime>
```

6.1.4 PERMDELTA

Description: The effective time of a permanent change on an existing feature (90 days or longer between start and end time).

Source: User-entered (required).

TABLE 6.4
Interpretation: PERMDELTA

Attribute	Value	
AIXM Element Xpath	gml:ValidTime/ gml:TimePeriod/ gml:beginPosition gml:ValidTime/ gml:TimePeriod/ gml:endPosition	
Type	TimePositionUnion (ISO 19108)	
Pattern for	YYYY-MM-DDTHH:MM:SS	
Pattern for indeterminatePosition	unknown	…
	after, before, now	YYYY-MM-DDTHH:MM:SS

201004070900 – 201009091500
```
<gml:validTime>
  <gml:TimePeriod gml:id="TWY02_TS01_TP01">
    <gml:beginPosition>2010-04-07T09:00:00</gml:beginPosition>
    <gml:endPosition>2010-09-09T15:00:00</gml:endPosition>
  </gml:TimePeriod>
</gml:validTime>
```

201004070900 – PERM
```
<gml:validTime>
  <gml:TimePeriod gml:id="TWY02_TS01_TP01">
    <gml:beginPosition>2010-04-07T09:00:00</gml:beginPosition>
    <gml:endPosition indeterminatePosition="unknown"/>
  </gml:TimePeriod>
</gml:validTime>
```

6.1.5 BASELINE/BASELINE with End of Life

Description: The effective time of a baseline condition (new feature).

Source: User-entered (required).

TABLE 6.5
Interpretation: BASELINE

Attribute	Value	
AIXM Element Xpath	gml:ValidTime/ gml:TimePeriod/ gml:beginPosition gml:ValidTime/ gml:TimePeriod/ gml:endPosition	
Type	TimePositionUnion (ISO 19108)	
Pattern for	YYYY-MM-DDTHH:MM:SS	
Pattern for indeterminatePosition	unknown	…
	after, before, now	YYYY-MM-DDTHH:MM:SS

201004070900 – PERM
```
<gml:validTime>
  <gml:TimePeriod gml:id="TWY02_TS01_TP01">
    <gml:beginPosition>2010-04-07T09:00:00</gml:beginPosition>
    <gml:endPosition indeterminatePosition="unknown"/>
  </gml:TimePeriod>
</gml:validTime>
```

201004070900 – 201004191500 (example: Temporary Obstacle)
```
<gml:validTime>
  <gml:TimePeriod gml:id="TWY02_TS01_TP01">
    <gml:beginPosition>2010-04-07T09:00:00</gml:beginPosition>
    <gml:endPosition 2010-04-19T15:00:00"/>
  </gml:TimePeriod>
</gml:validTime>
```

6.1.6   Estimated (EST) Times

According to Annex 15, Appendix 6, any NOTAM which includes an EST shall be cancelled or replaced before the date-time specified in item C). However, for events that include a gml:endPosition element with a value for the "indeterminatePosition" attribute, FNS or USNS will require an action from the originators.

Description: The effective time of a temporary condition.

Source: User-entered (required).

TABLE 6.6
Estimated End Times

Attribute	Value	
AIXM Element Xpath	gml:ValidTime/ gml:TimePeriod/ gml:beginPosition gml:ValidTime/ gml:TimePeriod/ gml:endPosition	
Type	TimePositionUnion (ISO 19108)	
Pattern	YYYY-MM-DDTHH:MM:SS	
Pattern for Estimated End Time	unknown	YYYY-MM-DDTHH:MM:SS
	after, before, now	YYYY-MM-DDTHH:MM:SS
Source	Data Encoding Rules	

201004070900 – 201006091500EST
```
<gml:validTime>
  <gml:TimePeriod gml:id="TWY02_TS01_TP01">
    <gml:beginPosition>2010-04-07T09:00:00</gml:beginPosition>
    <gml:endPosition indeterminatePosition="unknown"/>2010-06-09T15:00:00</gml:endPosition>
  </gml:TimePeriod>
</gml:validTime>
```

6.2   Business Rules

6.2.1   Template Business Rules

a. The start date/time must be at or after the current date/time.

b. The end date/time must be after the start date/time.

6.2.2   Policy Business Rules

a. The NOTAM shall not be published if the start time is more than 72 hours in the future.

b. The day begins at 0000 and ends at 2359

c. All start and end times are entered in Coordinated Universal Time (UTC)

d. The start and end times are stated in 10 digits (year, month, day, hour, minute)

e. Do not use sunrise (SR) or sunset (SS)

6.2.3 Data Encoding Business Rules

a. The beginPosition and endPosition for the TEMPDELTA of each feature should correspond to the NOTAM activity times.

b. The timePosition for the SNAPSHOT of each feature should correspond to the beginPosition.

7   NOTAMs with a Schedule

Guidelines for the day/time schedule for an intermittent NOTAM.   Relationship between the time-related expressions shown in **Error! Reference source not found.**.

Figure 4

from OPADD
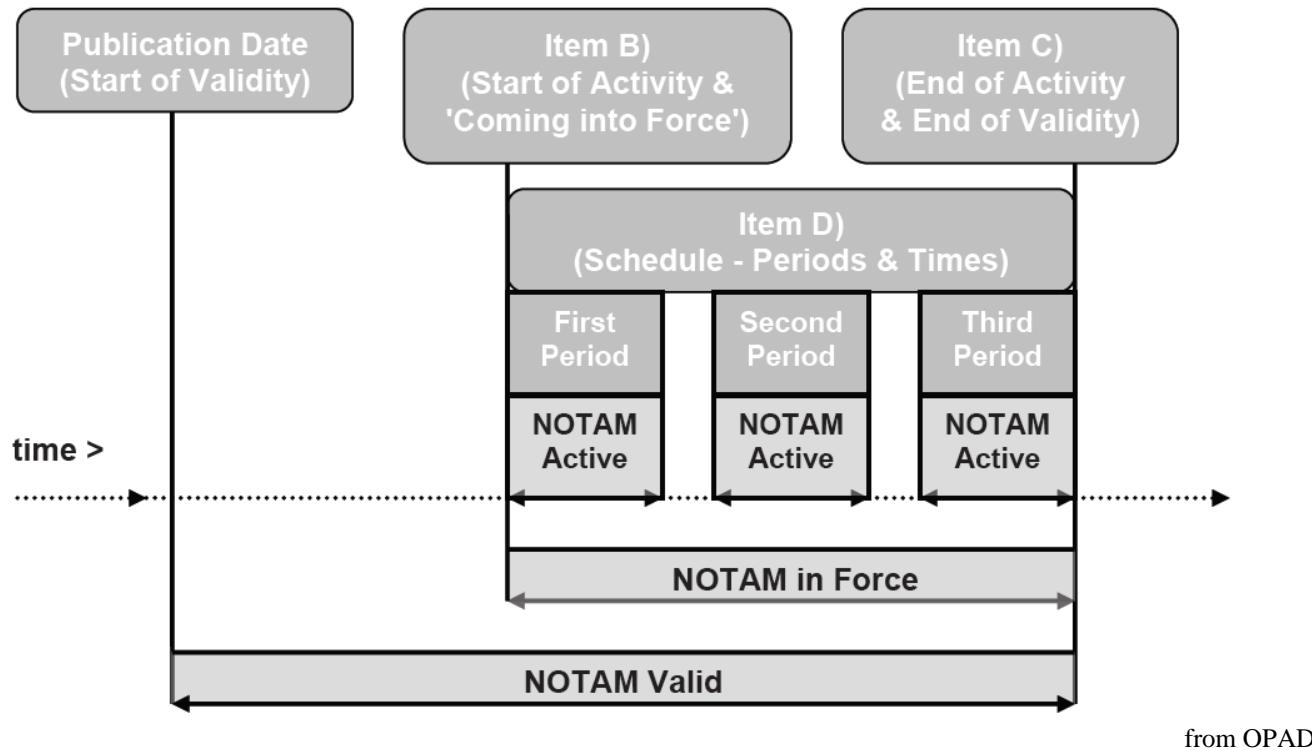
7.1   AIXM Mapping and Translation

7.1.1   Details

TABLE 7.1

Attribute	Value
Description	Properties with Schedule
Maps to Keyword:	AD, APRON, OBST, RWY, TWY
AIXM Mapping Diagram	PropetiesWithSchedule
NOTAM lifespan	
Start ASAP	No

Description: The effective time of a condition/activity that repeats.

Source: User-entered (optional).

TABLE 7.2
Schedules

Attribute	Value	
Aerodrome		
AIXM Path (UML)	AirportHeliport/ AirportHeliportAvailability/ PropertiesWithSchedule (object)/ Timesheet (object)	
AIXM Element Xpath	AirportHeliport/ timeSlice/ AirportHeliportTimeSlice [interpretation TEMPDELTA]/ availability/ AirportHeliportAvailability/ timeInterval/ Timesheet/	
Apron		
AIXM Path (UML)	AirportHeliport/ ApronAreaAvailability/ PropertiesWithSchedule (object)/ Timesheet (object)	
AIXM Element Xpath	Apron/ timeSlice/ ApronTimeSlice [interpretation TEMPDELTA]/ availability/ ApronAreaAvailability/ timeInterval/ Timesheet/	
Obstacle		
AIXM Path (UML)	Obstacle/ Verical Structures/ VerticalStructureLightingStatus/ PropertiesWithSchedule (object)/ Timesheet (object) Obstacle/ Verical Structures/ VericalStructurePart/ PropertiesWithSchedule (object)/ Timesheet (object)	
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation TEMPDELTA]/ lightingAvailability/ VerticalStructureLightingStatus/ timeInterval/Timesheet/ VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation SNAPSHOT]/ part/ VerticalStructurePart/ timeInterval/Timesheet/	
Runway		
AIXM Path (UML)	AirportHeliport/ ManoeuvringAreaAvailability/ PropertiesWithSchedule (object)/ Timesheet (object)	
AIXM Element Xpath	Runway/ timeSlice/ RunwayTimeSlice [interpretation TEMPDELTA]/ availability/ ManoeuvringAreaAvailability/ timeInterval/Timesheet/	
Taxiway		
AIXM Path (UML)	AirportHeliport/ ManoeuvringAreaAvailability/ PropertiesWithSchedule (object)/ Timesheet (object)	
AIXM Element Xpath	Taxiway/ timeSlice/ TaxiwayTimeSlice [interpretation TEMPDELTA]/ availability/ ManoeuvringAreaAvailability/ timeInterval/Timesheet/	
AIXM Mapping	Class: Timesheet	
Enumeration	StartDate	DateMonthDayType
	EndDate	DateMonthDayType
	Day	CodeDayType
	startTime	TimeType
	endTime	TimeType
	timeReference	CodeTimeReferenceType
	daylightSavingAdjust	CodeYesNoType

7.2   Business Rules

7.2.1   Template Business Rules

General

a. The start date/time must be at or after the current date/time.

b. The end date/time must be after the start date/time.

Rules to prevent overlapping schedules

c. Each day of the week (Monday, Tuesday, etc.) can be used a maximum of one time in the schedule

d. If the user selects "Daily" then no other days of the week (Monday, Tuesday, etc.), or "Weekdays", or "Weekends" can be selected.

e. If the user selects "Weekdays" or "Weekends", then no other days of the week (Monday, Tuesday, etc.) or "Daily" can be selected.

Rules related to the period of validity

f. The start and end dates/times for the schedule must be within the period of validity (effective time)

g. A period of validity greater than 24 hours is required

h. A period of validity greater than 24 hours, but less than 48 hours requires the option of "Daily" only.

i. A period of validity greater than or equal to 48 hours requires more than one day listed in the schedule (Daily, Weekends, MON/TUE, WED/SUN, etc.).

j. A period of validity greater than or equal to five days is required for the use of "Weekdays".

Rules to format NOTAM text correctly

k. If the schedule applies to the same time period for everyday during the period of validity, the NOTAM text should read: !ACY XX/XXX ACY RWY 04/22 PAEW CONSTRUCTION ADJ 0800-1700 DLY WEF 1009210800-1009271700

l. If the schedule applies to the same time period for Monday through Friday only, the NOTAM text should be consolidated to read: !ACY XX/XXX ACY RWY 04/22 PAEW CONSTRUCTION ADJ 0800-1700 WKDAYS WEF 1009200800-1009241700

m. If the schedule applies to the same time period for Saturday and Sunday only, the NOTAM text should be consolidated to read: !ACY XX/XXX ACY RWY 04/22 PAEW CONSTRUCTION ADJ 0800-1700 WKENDS WEF 1009250800-1009261700

n. If the schedule applies to the same time period for multiple days, but not every day during the period of validity, then the NOTAM text should be consolidated to read: !ACY XX/XXX ACY RWY 04/22 PAEW CONSTRUCTION ADJ 0800-1700 MON/TUE/WED/SAT/SUN WEF 1009200800-1009271700

7.2.2   Policy Business Rules

a. The day begins at 0000 and ends at 2359

b. All start and end times are entered in Coordinated Universal Time (UTC)

c. The term "WKEND" means Saturday and Sunday

d. The term "WKDAYS" means Monday through Friday

7.2.3   Data Encoding Business Rules

a. The timeInterval (schedule) should appear in the TimeSlice TEMPDELTA.

b. The timeReference for all NOTAMs should be UTC.

c. For timeIntervals that are effective daily, then one time interval is needed with the element day = ANY.

d. For timeIntervals that are effective for only specific days, a new timeInterval is needed for each effective day.

e. The element daylightSavingsAdjust should accurately reflect the regional observance of daylight savings time.

7.3 Sample AIXM Message

0900-1500 DLY

```
<timeInterval>
  <Timesheet gml:id="TimeSheet_01">
    <timeReference>UTC</timeReference>
    <startDate>07-04</startDate>
    <endDate>15-04</endDate>
    <day>ANY</day>
    <startTime>09:00</startTime>
    <endTime>15:00</endTime>
    <daylightSavingAdjust>YES</daylightSavingAdjust>
  </Timesheet>
</timeInterval>
```

0900-1500 MON/WED/FRI

```
<timeInterval>
  <Timesheet gml:id="TimeSheet_01">
    <timeReference>UTC</timeReference>
    <startDate>07-04</startDate>
    <endDate>15-04</endDate>
    <day>MON</day>
    <startTime>09:00</startTime>
    <endTime>15:00</endTime>
    <daylightSavingAdjust>YES</daylightSavingAdjust>
  </Timesheet>
</timeInterval>
<timeInterval>
  <Timesheet gml:id="TimeSheet_02">
    <timeReference>UTC</timeReference>
    <startDate>07-04</startDate>
    <endDate>15-04</endDate>
    <day>WED</day>
    <startTime>09:00</startTime>
    <endTime>15:00</endTime>
    <daylightSavingAdjust>YES</daylightSavingAdjust>
  </Timesheet>
</timeInterval>
<timeInterval>
  <Timesheet gml:id="TimeSheet_03">
    <timeReference>UTC</timeReference>
    <startDate>07-04</startDate>
    <endDate>15-04</endDate>
    <day>FRI</day>
    <startTime>09:00</startTime>
    <endTime>15:00</endTime>
    <daylightSavingAdjust>YES</daylightSavingAdjust>
  </Timesheet>
</timeInterval>
```

7.4 *Additional Analysis*

A schedule with "2200-0800 MON" implies 2200 on Monday through 0800 Tuesday and is acceptable.

8 Obstruction - Permanent Obstacle Light Status

Specify that a structure has a light out of service

Production_rule
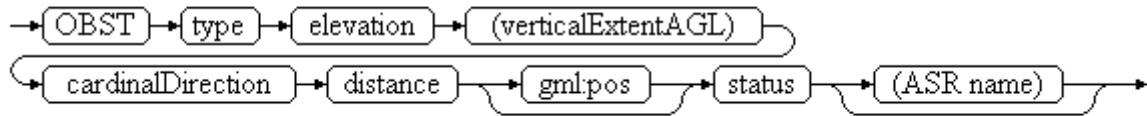
8.1 Example NOTAMs

1. !ACY 07/037 ACY OBST TOWER 295 (235 AGL) 3.26 NNW LGTS OTS (ASR 1048333) TIL 0908022251

2. !ACY 07/033 ACY OBST CRANE 120 (60 AGL) .8 S (3926N07434W) LGTS OTS WEF 0907161200-0907162000

3. !ACY 03/004 ACY OBST TOWER 395 (390 AGL) 5.00 SE LGTS OTS (ASR 1031208) TIL 1003170115

Source: US NOTAM Repository

8.2 AIXM Mapping and Translation

8.2.1 Scenario Details

TABLE 8.1

Attribute	Value
Description	Specify details of an Obstacle Light Status
Maps to Keyword	OBST
Feature Type Id	Vertical Structure
Feature XPath	aixm:VerticalStructure
AIXM Mapping Diagram	Obstacle/Vertical Structures
NOTAM lifespan	15 days
Start ASAP	Yes

8.2.2 Name [*name*]

Description: The name (ASN Number) of the vertical structure, if applicable.

Source: User-selected (ASN Number from list of feature designators).

TABLE 8.2
ASN Number

Attribute	Value
AIXM Path (UML)	VerticalStructure(feature)/ name(attribute)
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice [interpretation SNAPSHOT]/ name
AIXM Mapping	Class: VerticalStructure
Type	TextNameType
Min length	1
Max length	60

Baseline Data Source	ASN Number

8.2.3 ASR Number [*designator*]

Description: An alphanumeric code by which the structure is identified locally.

Source: Baseline Data

<div align="center">*TABLE 8.3*
ASR Number</div>

Attribute	Value
AIXM Path (UML)	VerticalStructure(feature)/ VerticalSturcturePart(object)/ designator(attribute)
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice [interpretation SNAPSHOT]/ part/ VerticalStructurePart/ designator
AIXM Mapping	Class: VerticalStructurePart
Type	TextDesignatorType
Min length	1
Max length	16

8.2.4 Type [*type*]

Description: A code indicating the type of vertical structure, such as building, tower, cable, etc.

Source: Baseline data.

<div align="center">*TABLE 8.4*
Obstacle Type</div>

Attribute	Value		
AIXM Path (UML)	VerticalStructure(feature) – type (attribute)		
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation SNAPSHOT]/ type		
AIXM Mapping	Class: VerticalStructure		
Enumeration	CodeVerticalStructureType		
	AIXM	**Translations**	
	ANTENNA	ICAO	ANTENNA
		FAA	ANTENNA
		Plain Text	Antenna
	TOWER	ICAO	TOWER
		FAA	TOWER
		Plain Text	Tower
	CRANE	ICAO	CRANE
		FAA	CRANE
		Plain Text	Crane
	BUILDING	ICAO	BLDG
		FAA	BLDG
		Plain Text	Building
	RIG	ICAO	RIG
		FAA	RIG
		Plain Text	Rig
	STACK	ICAO	STACK
		FAA	STACK
		Plain Text	Stack
	BRIDGE	ICAO	BRIDGE
		FAA	BRIDGE
		Plain Text	Bridge

	CONTROL_TOWER	ICAO	CONTROL TOWER
		FAA	CONTROL TOWER
		Plain Text	Control Tower
	DOME	ICAO	DOME
		FAA	DOME
		Plain Text	Dome
	GRAIN_ELEVATOR	ICAO	SILO
		FAA	SILO
		Plain Text	Silo
	NATURAL_HIGHPOINT	ICAO	HILL
		FAA	HILL
		Plain Text	Hill
	POLE	ICAO	POLE
		FAA	POLE
		Plain Text	Pole
	TRANSMISSION_LINE	ICAO	POWER LINE
		FAA	POWER LINE
		Plain Text	Power Line
	TREE	ICAO	TREE
		FAA	TREE
		Plain Text	Tree
	WATERTOWER	ICAO	WATERTOWER
		FAA	WATERTOWER
		Plain Text	Water Tower
	WINDMILL	ICAO	WIND TURBINE
		FAA	WIND TURBINE
		Plain Text	Wind turbine
	WINDMILL_FARM	ICAO	WIND TURBINE FARM
		FAA	WIND TURBINE FARM
		Plain Text	Wind turbine farm

8.2.5   Height (AGL) [*verticalExtent*]

Description: The extent of the vertical structure part.

Source: Baseline data.

TABLE 8.5
Height AGL

Attribute	Value		
AIXM Path (UML)	VerticalStructure (feature)/ VerticalStructurePart (object)/ verticalExtent (attribute)		
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation SNAPSHOT]/ part/ VerticalStructurePart/verticalExtent		
AIXM Mapping	Class: VerticalStructurePart		
Datatype	ValDistanceType		
Min inclusive	0		
Unit Conversion	Units of Measure: 1 FT = 0.3048 M		
Enumeration	UomDistanceType	FAA	FT
		ICAO	M
		Plain Text	Feet

8.2.6 Height (MSL) [*elevation*]

Description: The elevation (distance from Mean Sea Level) at the top of the obstacle.

Source: Baseline data.

TABLE 8.6
Elevation

Attribute	Value		
AIXM Path (UML)	VerticalStructure(feature)/ VerticalStructurePart (object)/ VerticalSturcturePartGeometry (choice)/ ElevatedSurface (object)		
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation SNAPSHOT]/ part/ VerticalStructurePart/horizontalProjection_location/ ElevatedPoint/ elevation		
AIXM Mapping	Class: ElevatedSurface		
Datatype	ValDistanceVerticalType		
Min inclusive	0		
Unit Conversion	Units of Measure: 1 FT = 0.3048 M		
Enumeration	UomDistanceType	FAA	FT
		ICAO	M
		Plain Text	Feet

8.2.7 Affected Airport [*airport*]

Description: The closest Airport.

Source: User-entered (optional, required with radius)

TABLE 8.7
Affected Airport

Attribute	Value
AIXM Path (UML)	ObstacleArea (feature)/ reference_ownerAirport (xlink:href)
AIXM Element XPath	ObstacleArea/ timeSlice/ ObstacleAreaTimeSlice [interpretation TEMPDELTA]/ reference_ownerAirport xlink:href
AIXM Mapping	Class: AirportHeliport
Datatype	CodeAirportHeliportDesignatorType
Min length	3
Max length	6

8.2.8 Distance and Direction [*ARP*]

Description: An AIXM Point derived from GM_Point that includes properties for describing a point with elevation and vertical extent. Used in obstacles, navaids, etc.

Source: Baseline data.

TABLE 8.8
Airport ARP

Attribute	Value
AIXM Path (UML)	AirportHeliport(feature)/ Elevated Point(object)
AIXM Element Xpath	AirportHeliport/ timeSlice/ AirportHeliportTimeSlice [interpretation SNAPSHOT]/ ARP/ ElevatedPoint/ gml:pos
AIXM Mapping	Class: ElevatedPoint

Datatype	GML – decimal

NOTE: GML uses decimal format for the latitude longitude. The NOTAM should read in degrees minutes seconds format.

<div align="center">

TABLE 8.9
Obstacle location
</div>

Attribute	Value
AIXM Path (UML)	VerticalStructure/ VerticalStructurePart (object)/ VerticalSturcturePartGeometry (choice)/ ElevatedSurface (object)
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation SNAPSHOT]/ part/ VerticalStructurePart/horizontalProjection_location/ ElevatedPoint/ gml:pos
AIXM Mapping	Class: ElevatedPoint
Datatype	GML – decimal
Calculated Value	distance direction = GML (VerticalStructure) relative to GML (Airport)

NOTE: All obstacles that are within 5SM (4.3NM) of the Airport boundaries should be included for the airport. If the obstacle is greater than 5 statute miles from the Airport ARP, then the series letter will change.

8.2.9   Status [operationalStatus]

Description: A code indicating the operational status of the lighting.   For example, serviceable, unserviceable, work in progress, etc.

Source: User-selected when choosing the event specification.

<div align="center">

TABLE 8.10
Obstacle Lighting Operational Status
</div>

Attribute	Value		
AIXM Path (UML)	VerticalStructure(feature)/ VerticalStructureLightingStatus(object)		
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation TEMPDELTA]/ lightingAvailability/ VerticalStructureLightingStatus/ status		
AIXM Mapping	Class: VerticalStructureLightingStatus		
Enumeration	CodeStatusOperationsType		
	AIXM	**Translations**	
	UNSERVICEABLE	ICAO	LGTS OUT OF SERVICE
		FAA	LGTS OTS
		Plain Text	Lights Out of service

8.3   Q Codes and Series

<div align="center">

TABLE 8.11
QCodes for Obstacle Lights Out of Service
</div>

AIXM Code	Q Code	
UNSERVICEABLE	Q Code	QOLAS
	Scope	AE
	Traffic	IV
	Purpose	NBO
	Series	A (if within 5 SM of Airport ARP)

		K (if on Airport Property but outside 5 SM of Airport ARP)

8.4 Business Rules

8.4.1 Template Business Rules

a. The baseline data must adhere to the NOTAM format once the user selects the obstacle and event specification.

b. The ASR number must be displayed if available.

c. The latitude and longitude must be entered in degree, minute, second format.

d. For the issued NOTAM, either an ASR Number or the coordinates (degree, minute, second format) of the structure must be displayed.

8.4.2 Policy Business Rules

a. The NOTAM must automatically expire within 15 days.   It may be replaced if the condition is not repaired within 15 days.

b. The baseline data must be populated with all obstacles within 5 SM (4.3 NM) of the Airport ARP.

c. For obstacles on airport property that are farther than 5SM from the Airport ARP, the series letter should be K.   (Source: Donna McCord AJV-2, to comply with future policy).

8.4.3 Data Encoding Business Rules

a. For verticalStructure, the SNAPSHOT should contain the ASN Number of the obstacle, the type of structure, the baseline lighting expectation, the height of the obstruction in AGL (verticalExtent), the calculated value for the height in MSL (verticalExtent plus elevation), the ASN number, if applicable, and a tag that points to the nearest airport.

b. The AIXM Message need only to have the coordinates of the verticalStructure and of the Airport. The direction and distance can be calculated by these coordinates.

c. For verticalStructure, the TEMPDELTA should contain the status of the lights.

d. The latitude and longitude must be converted to decimal for the AIXM Message.

8.5 Sample AIXM Message

Sample NOTAM Message: TOWER 187 (120 AGL) 12 ESE LGTS OTS (ASR1058102)

```xml
<?xml version="1.0" encoding="UTF-8"?>
<notamMessage:AIXMBasicMessage xsi:schemaLocation="http://www.aixm.aero/schema/5.1
./AIXM_Features.xsd http://www.aixm.aero/schema/5.1/message ./message/AIXM_BasicMessage.xsd"
gml:id="FNS-Message" xmlns:notamMessage="http://www.aixm.aero/schema/5.1/message"
xmlns:aixm="http://www.aixm.aero/schema/5.1" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns="http://www.aixm.aero/schema/5.1">
<notamMessage:hasMember>
  <ObstacleArea gml:id="OA01">
  <gml:identifier codeSpace="uuid">a82b3fc9-4aa4-4e67-8def-aaea1ac595j</gml:identifier>
    <timeSlice>
      <ObstacleAreaTimeSlice gml:id="OA01_TS01">
        <gml:validTime>
          <gml:TimeInstant gml:id="OA_TS01_TI01">
```

```xml
          <gml:timePosition>2010-04-07T09:00:00</gml:timePosition>
        </gml:TimeInstant>
      </gml:validTime>
      <interpretation>SNAPSHOT</interpretation>
      <reference_ownerAirport xlink:href="urn:uuid:a82b3fc9-4aa4-4e67-8def-aaea1ac595j"/>
      <obstacle xlink:href="urn:uuid:a82b3fc9-4aa4-4e67-8def-aaea1ac592j "/>
    </ObstacleAreaTimeSlice>
  </timeSlice>
</ObstacleArea>
</notamMessage:hasMember>
<notamMessage:hasMember>
  <VerticalStructure gml:id="VS01">
  <gml:identifier codeSpace="uuid">a82b3fc9-4aa4-4e67-8def-aaea1ac592j</gml:identifier>
    <timeSlice>
      <VerticalStructureTimeSlice gml:id="VS01_TS01">
        <gml:validTime>
          <gml:TimeInstant gml:id="VS_TS01_TI01">
            <gml:timePosition>2010-04-07T09:00:00</gml:timePosition>
          </gml:TimeInstant>
        </gml:validTime>
        <interpretation>SNAPSHOT</interpretation>
        <name>ASNNUMBER</name>
        <type>TOWER</type>
        <lighted>YES</lighted>
      </VerticalStructureTimeSlice>
    </timeSlice>
    <timeSlice>
      <VerticalStructureTimeSlice gml:id="VS02_TS01">
        <gml:validTime>
          <gml:TimePeriod gml:id="VS02_TS01_TP01">
            <gml:beginPosition>2010-04-07T09:00:00</gml:beginPosition>
            <gml:endPosition>2010-04-22T09:00:00</gml:endPosition>
          </gml:TimePeriod>
        </gml:validTime>
        <interpretation>TEMPDELTA</interpretation>
        <sequenceNumber>6</sequenceNumber>
        <lightingAvailability>
          <VerticalStructureLightingStatus gml:id="VSLS01">
            <status>UNSERVICEABLE</status>
          </VerticalStructureLightingStatus>
        </lightingAvailability>
      </VerticalStructureTimeSlice>
    </timeSlice>
  </VerticalStructure>
</notamMessage:hasMember>
<notamMessage:hasMember>
  <AirportHeliport gml:id="ACY01">
  <gml:identifier codeSpace="urn:us:gov:dot:faa:aim">a82b3fc9-4aa4-4e67-8def-aaea1ac595j</gml:identifier>
    <timeSlice>
      <AirportHeliportTimeSlice gml:id="ACY_TS01">
        <gml:validTime>
          <gml:TimeInstant gml:id="ACY_TS01_TI01">
            <gml:timePosition>2010-04-07T09:00:00</gml:timePosition>
          </gml:TimeInstant>
        </gml:validTime>
        <interpretation>SNAPSHOT</interpretation>
        <ARP>
```

```
        <ElevatedPoint srsName="urn:ogc:def:crs:EPSG::4326" srsDimension="2" gml:id="EP02">
          <gml:pos>38 -119</gml:pos>
        </ElevatedPoint>
      </ARP>
    </AirportHeliportTimeSlice>
  </timeSlice>
</AirportHeliport>
</notamMessage:hasMember>
</notamMessage:AIXMBasicMessage>
```

8.6   Translation Templates

8.6.1   FAA

OBST *type elevation (verticalExtent AGL) distance direction status (designator)* **WEF**

8.6.2   ICAO E Line

OBST *type elevation (verticalExtent AGL) distance direction status (designator)* **WEF**

8.6.3   Plain Language

Accountable Airport: *accountableFacility*

NOTAM Number: XX/XXX

Affected Airport: *affectedFacility*

Effective Time Frame
Valid From: *startDate*
Valid To: *endDate*

[**Schedule:** *recurring schedule*]

Obstacle Lights Out of Service

Affected Obstacle: *type (designator)*

Direction from Nearest Airport: *distance direction*

Height: *elevation* MSL *(verticalExtent AGL)*

Status: *status*

8.7   Additional Analysis

Nearly all obstruction NOTAMs are for *type* = TOWER.   Other obstacles listed in OBST NOTAMs for 2009 – 2010 are crane, stack, antenna, rig, moored balloon, rig, tree, wind turbine farm, ship, silo, power line, hill, trailer, beacon, and pole. Those that are not included in the drop down are log pile, rollercoaster, and ship mast. These are so infrequent that they should be entered using free text.

9 Obstruction – Bulk NOTAM Light Status

Specify that a structure has a light out of service
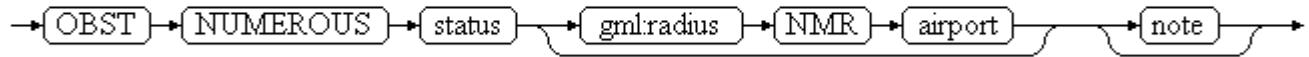
9.1 Example NOTAMs

1. !MKL 12/269 ZME OBST NUMEROUS TOWER LIGHTS OTS TIL 0912272010

2. !FTW 01/435 ZFW OBST NUMEROUS LGTS OTS TIL 1002011900

3. !COU 12/530 ZKC OBST NUMEROUS LIGHTS OTS ZKC AIRSPACE TIL 0912272010

4. !PNM 12/499 ZMP OBST NUMEROUS LIGHTS OTS ZMP AIRSPACE TIL 0912272010

5. !HUF 08/080 ZID OBST IN. NUMEROUS LIGHTS OTS ENTIRE STATE TIL 0908071700

6. !ABC ZHU OBST LA. NUMEROUS LIGHTS OTS SOUTH OF A LINE FROM DEF TO GHI TIL 0810172359

7. !ABC ZHU OBST LA. NUMEROUS LIGHTS OTS 100 NMR DEF TIL 0810172359

Source: US NOTAM Repository

9.2 AIXM Mapping and Translation

9.2.1 Scenario Details

TABLE 9.1

Attribute	Value
Description	Specify a bulk obstacle light outage/status
Maps to Keyword	OBST
Feature Type Id	Vertical Structure
Feature XPath	aixm:VerticalStructure
AIXM Mapping Diagram	Obstacle/Vertical Structures
NOTAM lifespan	15 days
Start ASAP	Yes

9.2.2 Numerous [*group*]

Description: A flag indicating whether the vertical structure consistes of a number of closely situated similar objects.

Source: User-selected (with scenario, required)

TABLE 9.2
ASN Number

Attribute	Value
AIXM Path (UML)	VerticalStructure(feature)/ group(attribute)
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice

	[interpretation TEMPDELTA]/ group
AIXM Mapping	Class: VerticalStructure
Enumeration	CodeYesNoType

AIXM	Translations	
YES	ICAO	NUMEROUS
	FAA	NUMEROUS
	Plain Text	Numerous

9.2.3   Tower [*type*]

Description: A code indicating the type of vertical structure, such as building, tower, cable, etc.

Source: Default (required)

TABLE 9.3
Obstacle Type

Attribute	Value
AIXM Path (UML)	VerticalStructure(feature) – type (attribute)
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation TEMPDELTA]/ type
AIXM Mapping	Class: VerticalStructure
Enumeration	CodeVerticalStructureType

AIXM	Translations	
TOWER	ICAO	TOWER
	FAA	TOWER
	Plain Text	Tower

9.2.4   Status [*operationalStatus*]

Description: A code indicating the operational status of the lighting. For example, serviceable, unserviceable, work in progress, etc.

Source: User-selected when choosing the event specification (required).

TABLE 9.4
Obstacle Lighting Operational Status

Attribute	Value
AIXM Path (UML)	VerticalStructure(feature)/ VerticalStructureLightingStatus(object)
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation TEMPDELTA]/ lightingAvailability/ VerticalStructureLightingStatus/ status
AIXM Mapping	Class: VerticalStructureLightingStatus
Enumeration	CodeStatusOperationsType

AIXM	Translations	
UNSERVICEABLE	ICAO	LIGHTS OUT OF SERVICE
	FAA	LIGHTS OTS
	Plain Text	Lights Out of service

9.2.5   Affected Area (FUTURE) [*extent*]

Description: An AIXM elevated surface.

Source: User-defined (geometry of affected area, if available).

TABLE 9.5
Affected Area

Attribute	Value
AIXM Path (UML)	VerticalStructure(feature)/ VerticalStructurePart(object)/ Elevated Surface (object)
AIXM Element Xpath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation TEMPDELTA]/ part/ VerticalStructurePart/ horizontalProjection/ ElevatedSurface/ patches/ PolygonPatch/ exterior/ LinearRing/ gml:pos
AIXM Mapping	Class: ElevatedSurface
Enumeration	GML – decimal

9.2.6   Radius [gml:radius]

Description: An AIXM Point derived from GM_Point that includes properties for describing the radius around a point.

Source: User entered (optional).

TABLE 9.6
Radius Affected

Attribute	Value		
AIXM Path (UML)	ObstacleArea (feature)/ Surface (object)		
AIXM Element XPath	ObstacleArea/ timeSlice/ ObstacleAreaTimeSlice [interpretation TEMPDELTA]/ surfaceExtent/ ElevatedSurface/ gml:patches/ gml:PolygonPatch/ gml:exterior/ gml:Ring/ gml:curveMember/ gml:Curve/ gml:segments/ gml:CircleByCenterPoint/ gml:radius		
AIXM Mapping	Class: ElevatedSurface		
Datatype	ValDistanceType		
Min inclusive	0		
Unit Conversion	Units of Measure: 1 NM = 1.85200 KM		
Enumeration	UomDistanceType	FAA	NM
		ICAO	NM
		Plain Text	Nautical Mile

9.2.7   Airport at Center [*airport*]

Description: The airport around which the radius is defined.

Source: User-entered (optional, required with radius)

TABLE 9.7
Airport at Center of Circle

Attribute	Value
AIXM Path (UML)	ObstacleArea (feature)/ reference_ownerAirport (xlink:href)
AIXM Element XPath	ObstacleArea/ timeSlice/ ObstacleAreaTimeSlice [interpretation TEMPDELTA]/ reference_ownerAirport xlink:href
AIXM Mapping	Class: AirportHeliport
Datatype	CodeAirportHeliportDesignatorType
Min length	3
Max length	6

9.2.8 Additional Location Description [*note*]

Description: The text in a note.
Source: User-entered (optional).

TABLE 9.8
Additional User-Entered Location Description

Attribute	Value	
AIXM Path (UML)	VerticalStructure(feature)/ VerticalStructurePart(object)/ Elevated Surface (object)/ annotation (object)/ note	
AIXM Element XPath	VerticalStructure/ timeSlice/ VerticalStructureTimeSlice/ [interpretation TEMPDELTA]/ part/ VerticalStructurePart/ annotation/ Note/ translatedNote/ LinguisticNote/ note	
AIXM Mapping	Class: Note, LinguisticNote	
Min length	1	
Max length	16	
Description	purpose	DESCRIPTION
Enumeration	TextNoteType	
	Format: cardinalDirection OF A LINE FROM *designator.AirportHeliport1* AND *designator.AirportHeliport2*	

9.3 Q Codes

TABLE 9.9
QCodes for Bulk Obstacle Lights Out of Service

AIXM Code	Q Code	
UNSERVICEABLE	Q Code	QOLXX
	Scope	AE
	Traffic	IV
	Purpose	NBO
	Series	K

9.4 Business Rules

9.4.1 Template Business Rules

a. All fields except for *gml.pos NMR airport* or *note* are required.

b. Either *gml.pos NMR airport* or *note* are required.

9.4.2 Policy Business Rules

a. The NOTAM must automatically expire within 15 days. It may be replaced if the condition is not repaired within 15 days.

9.4.3 Data Encoding Business Rules

a. For verticalStructure, the TEMPDELTA should contain all of the NOTAM information, since the baseline data will not be captured.

b. The latitude and longitude must be converted to decimal for the AIXM Message.

9.5 Sample AIXM Message

Sample NOTAM Message: !COU 12/530 ZKC OBST NUMEROUS LIGHTS OTS ZKC AIRSPACE

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 (http://www.altova.com) by Jocelyn Cox, CNA in support of FAA -->
<message:AIXMBasicMessage xmlns:message="http://www.aixm.aero/schema/5.1/message"
xmlns:aixm="http://www.aixm.aero/schema/5.1" xmlns:event="http://www.aixm.aero/schema/5.1/event"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gmd="http://www.isotc211.org/2005/gmd"
xmlns:gco="http://www.isotc211.org/2005/gco" xsi:schemaLocation="http://www.aixm.aero/schema/5.1/message
message/AIXM_BasicMessage.xsd" gml:id="M00001">
  <message:hasMember>
    <event:Event gml:id="e01">
      <event:timeSlice>
        <event:EventTimeSlice gml:id="e01-1">
          <gml:validTime>
            <gml:TimePeriod gml:id="e01-2">
              <gml:beginPosition>2010-11-01T13:00:00</gml:beginPosition>
              <gml:endPosition>2010-11-02T13:00:00</gml:endPosition>
            </gml:TimePeriod>
          </gml:validTime>
          <aixm:interpretation>BASELINE</aixm:interpretation>
          <aixm:sequenceNumber>1</aixm:sequenceNumber>
          <aixm:featureLifetime>
            <gml:TimePeriod gml:id="e01-3">
              <gml:beginPosition>2010-11-01T13:00:00</gml:beginPosition>
              <gml:endPosition>2010-11-02T13:00:00</gml:endPosition>
            </gml:TimePeriod>
          </aixm:featureLifetime>
          <event:encoding>DIGITAL</event:encoding>
          <event:textNOTAM>
            <event:NOTAM gml:id="e01-4">
              <event:series>K</event:series>
              <event:number>0667</event:number>
              <event:year>2010</event:year>
              <event:type>N</event:type>
              <event:issued>2010-11-01T13:00:00</event:issued>
              <event:selectionCode>QOLXX</event:selectionCode>
              <event:traffic>ALL</event:traffic>
              <event:purpose>NBO</event:purpose>
              <event:scope>AE</event:scope>
              <event:radius>999</event:radius>
              <event:text>OBST NUMEROUS LIGHTS OTS ZDC AIRSPACE</event:text>
              <event:publisherNOF xlink:href="#UNIT01"/>
              <event:translation>
                <event:NOTAMTranslation gml:id="NT01">
                  <event:type>LOCAL_FORMAT</event:type>
                </event:NOTAMTranslation>
              </event:translation>
            </event:NOTAM>
          </event:textNOTAM>
          <event:update xlink:href="urn:faa:gov:nasr:74efb6ba-a52a-46c0-a16b-03860d356882"/>
        </event:EventTimeSlice>
      </event:timeSlice>
    </event:Event>
  </message:hasMember>
  <message:hasMember>
```

```xml
<aixm:VerticalStructure gml:id="VS01">
  <aixm:timeSlice>
    <aixm:VerticalStructureTimeSlice gml:id="VS01_TS01">
      <gml:validTime>
        <gml:TimePeriod gml:id="VS01_TS01_TP01">
          <gml:beginPosition>2010-11-01T13:00:00</gml:beginPosition>
          <gml:endPosition>2010-11-02T13:00:00</gml:endPosition>
        </gml:TimePeriod>
      </gml:validTime>
      <aixm:interpretation>TEMPDELTA</aixm:interpretation>
      <aixm:sequenceNumber>1</aixm:sequenceNumber>
      <aixm:type>TOWER</aixm:type>
      <aixm:group>YES</aixm:group>
      <aixm:lightingAvailability>
        <aixm:VerticalStructureLightingStatus gml:id="VSLS01">
          <aixm:status>UNSERVICEABLE</aixm:status>
        </aixm:VerticalStructureLightingStatus>
      </aixm:lightingAvailability>
      <aixm:part>
        <aixm:VerticalStructurePart gml:id="VSP01">
          <aixm:annotation>
            <aixm:Note gml:id="N01">
              <aixm:purpose>DESCRIPTION</aixm:purpose>
              <aixm:translatedNote>
                <aixm:LinguisticNote gml:id="LN">
                  <aixm:note>ZDC AIRSPACE</aixm:note>
                </aixm:LinguisticNote>
              </aixm:translatedNote>
            </aixm:Note>
          </aixm:annotation>
          <aixm:verticalExtent uom="FT">2000</aixm:verticalExtent>
          <aixm:horizontalProjection_surfaceExtent>
            <aixm:ElevatedSurface gml:id="ES01">
              <gml:patches>
                <gml:PolygonPatch>
                  <gml:exterior>
                    <gml:LinearRing>
                      <gml:pos>39.5519 -77.6461</gml:pos>
                      <gml:pos>38.1813 -78.2435</gml:pos>
                      <gml:pos>37.2424 -76.0654</gml:pos>
                      <gml:pos>38.2127 -75.1448</gml:pos>
                    </gml:LinearRing>
                  </gml:exterior>
                </gml:PolygonPatch>
              </gml:patches>
              <aixm:elevation uom="FT">2500</aixm:elevation>
            </aixm:ElevatedSurface>
          </aixm:horizontalProjection_surfaceExtent>
        </aixm:VerticalStructurePart>
      </aixm:part>
    </aixm:VerticalStructureTimeSlice>
  </aixm:timeSlice>
</aixm:VerticalStructure>
</message:hasMember>
<message:hasMember>
  <aixm:Unit gml:id="UNIT01">
    <gml:identifier codeSpace="urn:faa:gov:nasr">74efb6ba-a52a-46c0-a16b-03860d356882</gml:identifier>
```

```
      <aixm:timeSlice>
        <aixm:UnitTimeSlice gml:id="UNIT01_TS01">
          <gml:validTime>
            <gml:TimePeriod gml:id="UNIT01_TS01_TP01">
              <gml:beginPosition>2008-12-27T23:00:00</gml:beginPosition>
              <gml:endPosition indeterminatePosition="unknown"/>
            </gml:TimePeriod>
          </gml:validTime>
          <aixm:interpretation>SNAPSHOT</aixm:interpretation>
          <aixm:name>WASHINGTON CENTER</aixm:name>
          <aixm:type>ARTCC</aixm:type>
          <aixm:designator>ZDC</aixm:designator>
        </aixm:UnitTimeSlice>
      </aixm:timeSlice>
    </aixm:Unit>
  </message:hasMember>
</message:AIXMBasicMessage>
```

9.6   Translation Templates

9.6.1   FAA

OBST *group type status note* **WEF**

9.6.2   ICAO E Line

OBST *group type status note* **WEF**

9.6.3   Plain Language

Accountable Airport: *accountableFacility*

NOTAM Number: XX/XXX

Affected Airport: *affectedFacility*

Effective Time Frame
Valid From: *startDate*
Valid To: *endDate*

[**Schedule:** *recurring schedule*]

Numerous Obstacle Lights Out of Service

Affected Area: *note*

Status: *status*

9.7   Additional Analysis

None.

Appendix 1 AIXM Reference

10 AIXM General Digital Encoding Business Rules

10.1 General Business Rules

An initial set of business rules for the Aeronautical Information Exchange Model (AIXM) version 5.1 is captured in an Excel report which has the following structure:

- Input source (ex: AIXM Model)
- Textual description
- AIXM Class associated with the business rule
- Category associated with the rule (minimal data rule, consistency, plausibility)
- Checking Level (error, warning)
- Name of the targeted AIXM classes and properties included
- Schematron code is provided (when available)

The provided Excel report also includes a macro which can generate a valid Schematron file (XML file) with all the selected rules. Directions on how to use the Schematron file can be found on the Eurocontrol Website.

10.2 Feature Identification and Reference (XLink and UUIDs)

The Aeronautical Information Exchange Model is a GML 3.2 application schema. The AIXM 5.1 schema uses the XLink schema bundled with GML 3.2 to represent the link between two features.

10.2.1 References within a message

In the case of the digital NOTAM messages, the AIXM 5.1 message will contain all or most of the referenced features in the message. When applicable, the Universally Unique Identifier (UUID) associated with the referenced AIXM feature should be included in the message. The UUID is a 128-bit number that should be unique and universal.

Each AIXM feature is identified through the use of the identifier property. In the AIXM Temporality Concept, the identifier property is the only time-invariant property and is therefore not captured within the timeSlice.

The current thinking, which can be found on the AIXM forum, is that the xlink:href should reference the UUID, if possible.

```
<Runway gml:id="RWY01">
<gml:identifier codeSpace="uuid">a82b3fc9-4aa4-4e67-8def-aaea1ac593j</gml:identifier>
  <timeSlice>
    <RunwayTimeSlice gml:id="RWY01_TS01">
      <gml:validTime>
        <gml:TimeInstant gml:id="RWYDIR01_TS01_TI01">
          <gml:timePosition>2010-11-30T15:32:41</gml:timePosition>
        </gml:TimeInstant>
      </gml:validTime>
      <interpretation>SNAPSHOT</interpretation>
      <designator>13/31</designator>
      <associatedAirportHeliport xlink:href="urn:uuid:a82b3fc9-4aa4-4e67-8def-aaea1ac595j"/>
    </RunwayTimeSlice>
  </timeSlice>
</Runway>
```

…
```xml
    <AirportHeliport gml:id="ACY">
      <gml:identifier codeSpace="uuid">a82b3fc9-4aa4-4e67-8def-aaea1ac595j</gml:identifier>
…
</AirportHeliport>
```

However, when a UUID is not available for the feature, then the xlink:href should reference the gml:id and include a leading hash.

```xml
    <Runway gml:id="RWY01">
    <gml:identifier codeSpace="urn:us:gov:dot:faa:aim">a82b3fc9-4aa4-4e67-8def-aaea1ac593j</gml:identifier>
      <timeSlice>
        <RunwayTimeSlice gml:id="RWY01_TS01">
          <gml:validTime>
            <gml:TimeInstant gml:id="RWYDIR01_TS01_TI01">
              <gml:timePosition>2010-11-30T15:32:41</gml:timePosition>
            </gml:TimeInstant>
          </gml:validTime>
          <interpretation>SNAPSHOT</interpretation>
          <designator>13/31</designator>
          <associatedAirportHeliport xlink:href="#ACY"/>
        </RunwayTimeSlice>
      </timeSlice>
    </Runway>
…
    <AirportHeliport gml:id="ACY">
      <timeSlice>


…
</AirportHeliport>
```

The uniform resource name (URN) are unlike URLs as they cannot be inherently resolved to find the resource. It is then the responsibility of the user to resolve the reference. The URN should be based on the UUID for the referenced feature, although it is viable to use natural keys instead, if the UUID does not exist or is not available.

10.3 Geographical Markup Language (GML) – Defining Geometries

The Aeronautical Information Exchange Model (AIXM) uses the Geographical Markup Language (GML) version 3.2 for encoding positional and shape aeronautical data, such as airspace, runways, etc. The ISO 19107 spatial schema contains an extensive list of geometries, geometric properties and operations, many of which are unnecessary. Therefore, a common use of the concept should be applied. Here, the preliminary discussion is described, although, it should be understood that this is not final and is subject to change.

In GML, the geodetic datus is specified by reference to a Coordinate Reference System (CRS). The CRS reference is critical for the correct encoding and processing of geographical data contained in a digital NOTAM message. The reference indicates the geodetic reference datum as well as the order of the values (latitude/longitude) and the convention used for measuring angles. It is generally recommended that the EPSG:4326 CRS is used by AIXM 5.1 data sets, which corresponds to the WGS-84 reference datum imposed by ICAO.

When applied to the encoding of a surface in AIXM:

```
<ElevatedSurface gml:id="ES01" srsName="urn:ogc:def:crs:EPSG::4326" srsDimension="2">
  <gml:patches>
    <gml:PolygonPatch>
      <gml:exterior>
        <gml:LinearRing>
          <gml:posList>39.2704 -74.3430 39.2707 -74.3424 39.2705 -74.3421 39.2702
-74.3421 39.2704 -74.3430</gml:posList>
        </gml:LinearRing>
      </gml:exterior>
    </gml:PolygonPatch>
  </gml:patches>
</ElevatedSurface>
```

or a point:

```
<ElevatedPoint gml:id="EP02" srsName="urn:ogc:def:crs:EPSG::4326" srsDimension="2">
  <gml:pos>39.27 -74.34</gml:pos>
</ElevatedPoint>
```

The first and last latitude/longitude pair in a gml:posList of series of gml:pos must be equal, which is mandatory for a closed surface in GML. Also, the same space separator is used between both latitude and longitude values and also between the latitude/longitude pairs. Additionally, the srsDiminsion should be defined as 2, for a 2D CRS, such as EPSG:4326.

The GML Specification does not indicate in which direction surfaces are described (clockwise or counter-clockwise). There is an established practice in computer graphics for 'geographic' CRSs, the outside perimeter is encoded clockwise. Additionally, an inside perimeter would be encoded counter-clockwise. Therefore, it is recommended that the use of the EPSG:4326 CRS in the Aeronautical Information Domain should follow this practice.
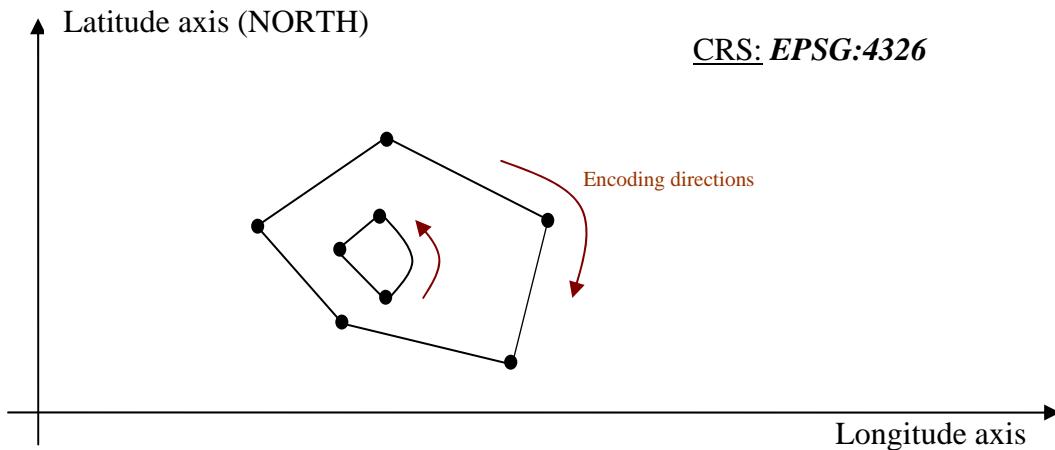
The following is proposed for a defined circle geometry (from Obstruction example):

```
<surfaceExtent>
  <ElevatedSurface gml:id="ES01" srsName="urn:ogc:def:crs:OGC:1.3:CRS84">
    <gml:patches>
      <gml:PolygonPatch>
        <gml:exterior>
          <gml:Ring>
            <gml:curveMember>
              <gml:Curve gml:id="CURVE01">
                <gml:segments>
                  <gml:CircleByCenterPoint numArc="1">
                    <gml:pos>38 -118</gml:pos>
```

```
                    <gml:radius uom="NM">0.5</gml:radius>
                  </gml:CircleByCenterPoint>
               </gml:segments>
             </gml:Curve>
           </gml:curveMember>
         </gml:Ring>
       </gml:exterior>
     </gml:PolygonPatch>
   </gml:patches>
 </ElevatedSurface>
</surfaceExtent>
```
In this example, the center of the circle is defined, as is the radius and units.

11 Metadata Message

The following sample of a metadata message is the minimal amount of information that is necessary to capture in the metadata message preceeding the features captured in the digital NOTAM. The metadata message contains the accountable organization, the bounding box (location), a time-stamp for each action (creation, publication, and revision, when applicable), the language (which, for the FAA is default English), and whether the NOTAM shall be publically distributed.

Sample Metadata Message:
Accountable Organization: ACY (contact number 202 580 7400)
Creation Time/Date: 02 April 2010 14:53 (12 seconds)
Publication Time/Date: 02 April 2010 14:53 (14 seconds)
Revision Time/Date: 07 April 2010 09:34 (42 seconds)
Bounding Box around ACY Airport: 39.48 -74.70 to 39.40 -74.58
Language: English
Topic Category: Transportation
Public Access (Public or Restricted): Public

```xml
<?xml version="1.0" encoding="UTF-8"?>
<notamMessage:AIXMBasicMessage xsi:schemaLocation="http://www.aixm.aero/schema/5.1
./AIXM_Features.xsd http://www.aixm.aero/schema/5.1/message ./message/AIXM_BasicMessage.xsd "
gml:id="FNS-Message" xmlns:notamMessage="http://www.aixm.aero/schema/5.1/message"
xmlns:aixm="http://www.aixm.aero/schema/5.1" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:gml="http://www.opengis.net/gml/3.2"
xmlns="http://www.aixm.aero/schema/5.1" xmlns:gts="http://www.isotc211.org/2005/gts"
xmlns:srv="http://www.isotc211.org/2005/srv">
<messageMetadata>
  <gmd:MD_Metadata>
    <gmd:contact>
      <gmd:CI_ResponsibleParty>
        <gmd:organisationName>
          <gco:CharacterString>ACY</gco:CharacterString>
        </gmd:organisationName>
        <gmd:contactInfo>
          <gmd:CI_Contact>
            <gmd:phone>
              <gmd:CI_Telephone>
                <gmd:voice>
                  <gco:CharacterString>+12025807400</gco:CharacterString>
                </gmd:voice>
              </gmd:CI_Telephone>
            </gmd:phone>
          </gmd:CI_Contact>
        </gmd:contactInfo>
        <gmd:role>
          <gmd:CI_RoleCode codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
codeListValue="pointOfContact">pointOfContact</gmd:CI_RoleCode>
        </gmd:role>
      </gmd:CI_ResponsibleParty>
    </gmd:contact>
    <gmd:dateStamp>
      <gco:DateTime>2010-04-07T09:34:42</gco:DateTime>
    </gmd:dateStamp>
    <gmd:identificationInfo>
```

```
<gmd:MD_DataIdentification>
  <gmd:citation>
    <gmd:CI_Citation>
      <gmd:title>
        <gco:CharacterString>NOTAM</gco:CharacterString>
      </gmd:title>
      <gmd:date>
        <gmd:CI_Date>
          <gmd:date>
            <gco:DateTime>2010-04-02T14:53:12</gco:DateTime>
          </gmd:date>
          <gmd:dateType>
            <gmd:CI_DateTypeCode
codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
codeListValue="creation">creation</gmd:CI_DateTypeCode>
          </gmd:dateType>
        </gmd:CI_Date>
      </gmd:date>
      <gmd:date>
        <gmd:CI_Date>
          <gmd:date>
            <gco:DateTime>2010-04-02T14:53:14</gco:DateTime>
          </gmd:date>
          <gmd:dateType>
            <gmd:CI_DateTypeCode
codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
codeListValue="publication">publication</gmd:CI_DateTypeCode>
          </gmd:dateType>
        </gmd:CI_Date>
      </gmd:date>
      <gmd:date>
        <gmd:CI_Date>
          <gmd:date>
            <gco:DateTime>2010-04-07T09:34:42</gco:DateTime>
          </gmd:date>
          <gmd:dateType>
            <gmd:CI_DateTypeCode
codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
codeListValue="revision">revision</gmd:CI_DateTypeCode>
          </gmd:dateType>
        </gmd:CI_Date>
      </gmd:date>
    </gmd:CI_Citation>
  </gmd:citation>
  <gmd:abstract>
    <gco:CharacterString>Updates to the following Airport: EBBR, EBBT</gco:CharacterString>
  </gmd:abstract>
  <gmd:pointOfContact>
    <gmd:CI_ResponsibleParty>
      <gmd:organisationName>
        <gco:CharacterString>ACY</gco:CharacterString>
      </gmd:organisationName>
      <gmd:contactInfo>
        <gmd:CI_Contact>
          <gmd:phone>
            <gmd:CI_Telephone>
              <gmd:voice>
```

```xml
                    <gco:CharacterString>+12025807400</gco:CharacterString>
                  </gmd:voice>
                </gmd:CI_Telephone>
              </gmd:phone>
            </gmd:CI_Contact>
          </gmd:contactInfo>
          <gmd:role>
            <gmd:CI_RoleCode codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
codeListValue="originator">originator</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:pointOfContact>
      <gmd:resourceConstraints>
        <gmd:MD_SecurityConstraints>
          <gmd:classification>
            <gmd:MD_ClassificationCode codeList="./resources/codeList.xml#MD_ClassificationCode"
codeListValue="public">public</gmd:MD_ClassificationCode>
          </gmd:classification>
        </gmd:MD_SecurityConstraints>
      </gmd:resourceConstraints>
      <gmd:language>
        <gmd:LanguageCode codeList="./resources/codeList.xml#LanguageCode"
codeListValue="eng">eng</gmd:LanguageCode>
      </gmd:language>
      <gmd:extent>
        <gmd:EX_Extent>
          <gmd:geographicElement>
            <gmd:EX_GeographicBoundingBox>
              <gmd:westBoundLongitude>
                <gco:Decimal>-74.70</gco:Decimal>
              </gmd:westBoundLongitude>
              <gmd:eastBoundLongitude>
                <gco:Decimal>-74.53</gco:Decimal>
              </gmd:eastBoundLongitude>
              <gmd:southBoundLatitude>
                <gco:Decimal>39.40</gco:Decimal>
              </gmd:southBoundLatitude>
              <gmd:northBoundLatitude>
                <gco:Decimal>39.48</gco:Decimal>
              </gmd:northBoundLatitude>
            </gmd:EX_GeographicBoundingBox>
          </gmd:geographicElement>
        </gmd:EX_Extent>
      </gmd:extent>
    </gmd:MD_DataIdentification>
  </gmd:identificationInfo>
 </gmd:MD_Metadata>
</messageMetadata>
<notamMessage:hasMember>
…
</notamMessage:hasMember>
</notamMessage:AIXMBasicMessage>
```

12 Complete AIXM Digital NOTAM Message

Below is a sample AIXM Digital NOTAM Message using a draft Event Schema. Included in the message is the metadata in additional to all relevant NOTAM information.

!ACY 667 ACY RWY CLSD EXC EMERG ACFT 0900 – 1300 DLY 201012010900 – 201012151300

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!-- edited with XMLSpy v2008 (http://www.altova.com) by Marina Chumakov, CNA in support of FAA -->
<notamMessage:AIXMBasicMessage xsi:schemaLocation="http://www.aixm.aero/schema/5.1
./AIXM_Features.xsd http://www.aixm.aero/schema/5.1/message ./message/AIXM_BasicMessage.xsd"
gml:id="FNS-Message" xmlns:notamMessage="http://www.aixm.aero/schema/5.1/message"
xmlns:aixm="http://www.aixm.aero/schema/5.1" xmlns:gco="http://www.isotc211.org/2005/gco"
xmlns:gmd="http://www.isotc211.org/2005/gmd" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:event="http://www.aixm.aero/schema/5.1/event"
xmlns:gml="http://www.opengis.net/gml/3.2" xmlns="http://www.aixm.aero/schema/5.1">
  <messageMetadata>
    <gmd:MD_Metadata>
      <gmd:contact>
        <gmd:CI_ResponsibleParty>
          <gmd:organisationName>
            <gco:CharacterString>ACY</gco:CharacterString>
          </gmd:organisationName>
          <gmd:contactInfo>
            <gmd:CI_Contact>
              <gmd:phone>
                <gmd:CI_Telephone>
                  <gmd:voice>
                    <gco:CharacterString>+12025807400</gco:CharacterString>
                  </gmd:voice>
                </gmd:CI_Telephone>
              </gmd:phone>
            </gmd:CI_Contact>
          </gmd:contactInfo>
          <gmd:role>
            <gmd:CI_RoleCode codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
codeListValue="pointOfContact">pointOfContact</gmd:CI_RoleCode>
          </gmd:role>
        </gmd:CI_ResponsibleParty>
      </gmd:contact>
      <gmd:dateStamp>
        <gco:DateTime>2010-11-30T15:32:43</gco:DateTime>
      </gmd:dateStamp>
      <gmd:identificationInfo>
        <gmd:MD_DataIdentification>
          <gmd:citation>
            <gmd:CI_Citation>
              <gmd:title>
                <gco:CharacterString>NOTAM</gco:CharacterString>
              </gmd:title>
              <gmd:date>
                <gmd:CI_Date>
                  <gmd:date>
                    <gco:DateTime>2010-11-30T15:32:41</gco:DateTime>
                  </gmd:date>
                  <gmd:dateType>
```

```
                    <gmd:CI_DateTypeCode
codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
codeListValue="creation">creation</gmd:CI_DateTypeCode>
                    </gmd:dateType>
                  </gmd:CI_Date>
                </gmd:date>
                <gmd:date>
                  <gmd:CI_Date>
                    <gmd:date>
                      <gco:DateTime>2010-11-30T15:32:43</gco:DateTime>
                    </gmd:date>
                    <gmd:dateType>
                      <gmd:CI_DateTypeCode
codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_DateTypeCode"
codeListValue="publication">publication</gmd:CI_DateTypeCode>
                    </gmd:dateType>
                  </gmd:CI_Date>
                </gmd:date>
              </gmd:CI_Citation>
            </gmd:citation>
            <gmd:abstract>
              <gco:CharacterString>Updates to the following Airport: ACY</gco:CharacterString>
            </gmd:abstract>
            <gmd:pointOfContact>
              <gmd:CI_ResponsibleParty>
                <gmd:organisationName>
                  <gco:CharacterString>ACY</gco:CharacterString>
                </gmd:organisationName>
                <gmd:contactInfo>
                  <gmd:CI_Contact>
                    <gmd:phone>
                      <gmd:CI_Telephone>
                        <gmd:voice>
                          <gco:CharacterString>+12025807400</gco:CharacterString>
                        </gmd:voice>
                      </gmd:CI_Telephone>
                    </gmd:phone>
                  </gmd:CI_Contact>
                </gmd:contactInfo>
                <gmd:role>
                  <gmd:CI_RoleCode codeList="../ISO_19139_Schemas/resources/codeList.xml#CI_RoleCode"
codeListValue="originator">originator</gmd:CI_RoleCode>
                </gmd:role>
              </gmd:CI_ResponsibleParty>
            </gmd:pointOfContact>
            <gmd:resourceConstraints>
              <gmd:MD_SecurityConstraints>
                <gmd:classification>
                  <gmd:MD_ClassificationCode codeList="./resources/codeList.xml#MD_ClassificationCode"
codeListValue="public">public</gmd:MD_ClassificationCode>
                </gmd:classification>
              </gmd:MD_SecurityConstraints>
            </gmd:resourceConstraints>
            <gmd:language>
              <gmd:LanguageCode codeList="./resources/codeList.xml#LanguageCode"
codeListValue="eng">eng</gmd:LanguageCode>
            </gmd:language>
```

```
            <gmd:extent>
              <gmd:EX_Extent>
                <gmd:geographicElement>
                  <gmd:EX_GeographicBoundingBox>
                    <gmd:westBoundLongitude>
                      <gco:Decimal>-74.70</gco:Decimal>
                    </gmd:westBoundLongitude>
                    <gmd:eastBoundLongitude>
                      <gco:Decimal>-74.53</gco:Decimal>
                    </gmd:eastBoundLongitude>
                    <gmd:southBoundLatitude>
                      <gco:Decimal>39.40</gco:Decimal>
                    </gmd:southBoundLatitude>
                    <gmd:northBoundLatitude>
                      <gco:Decimal>39.48</gco:Decimal>
                    </gmd:northBoundLatitude>
                  </gmd:EX_GeographicBoundingBox>
                </gmd:geographicElement>
              </gmd:EX_Extent>
            </gmd:extent>
          </gmd:MD_DataIdentification>
        </gmd:identificationInfo>
      </gmd:MD_Metadata>
  </messageMetadata>
  <notamMessage:hasMember>
    <event:Event gml:id="EVENT01">
    <gml:identifier codeSpace="uuid">08504c89-d90c-4112-b757-dd6aedb61f96</gml:identifier>
      <event:timeSlice>
        <event:EventTimeSlice gml:id="EVENT01_TS01">
          <gml:validTime>
            <gml:TimePeriod gml:id="e01-2">
              <gml:beginPosition>2010-12-01T09:00:00</gml:beginPosition>
              <gml:endPosition>2010-12-15T13:00:00</gml:endPosition>
            </gml:TimePeriod>
          </gml:validTime>
          <aixm:interpretation>BASELINE</aixm:interpretation>
          <aixm:sequenceNumber>1</aixm:sequenceNumber>
          <aixm:featureLifetime>
            <gml:TimePeriod gml:id="FLT01_TP01">
              <gml:beginPosition>2010-12-01T09:00:00</gml:beginPosition>
              <gml:endPosition>2010-12-15T13:00:00</gml:endPosition>
            </gml:TimePeriod>
          </aixm:featureLifetime>
          <event:encoding>DIGITAL</event:encoding>
          <event:textNOTAM>
            <event:NOTAM gml:id="EVENT01_TEXT">
              <event:series>K</event:series>
              <event:number>0667</event:number>
              <event:year>2010</event:year>
              <event:type>N</event:type>
              <event:issued>2010-11-30T15:32:43</event:issued>
              <event:selectionCode>QOBAS</event:selectionCode>
              <event:traffic>ALL</event:traffic>
              <event:purpose>NBO</event:purpose>
              <event:scope>AE</event:scope>
              <event:coordinates>3926N7434W</event:coordinates>
              <event:radius>025</event:radius>
```

```xml
                <event:effectiveStart>1012010900</event:effectiveStart>
                <event:effectiveEnd>1012151300</event:effectiveEnd>
                <event:text>ACY OBST TOWER 295 (235 AGL) 10.5 NNW LGTS OTS
(3926N07434W)</event:text>
            </event:NOTAM>
          </event:textNOTAM>
        </event:EventTimeSlice>
      </event:timeSlice>
    </event:Event>
  </notamMessage:hasMember>
  <notamMessage:hasMember>
  <ObstacleArea gml:id="OA01">
  <gml:identifier codeSpace="uuid">a82b3fc9-4aa4-4e67-8def-aaea1ac594j</gml:identifier>
    <timeSlice>
      <ObstacleAreaTimeSlice gml:id="OA01_TS01">
        <gml:validTime>
          <gml:TimeInstant gml:id="OA_TS01_TI01">
            <gml:timePosition>2010-11-30T15:32:43</gml:timePosition>
          </gml:TimeInstant>
        </gml:validTime>
        <interpretation>SNAPSHOT</interpretation>
        <reference_ownerAirport xlink:href="urn:uuid:a82b3fc9-4aa4-4e67-8def-aaea1ac595j "/>
        <obstacle xlink:href="VS01"/>
      </ObstacleAreaTimeSlice>
    </timeSlice>
  </ObstacleArea>
  </notamMessage:hasMember>
  <notamMessage:hasMember>
  <VerticalStructure gml:id="VS01">
  <gml:identifier codeSpace="uuid">a82b3fc9-4aa4-4e67-8def-aaea1ac592j</gml:identifier>
    <timeSlice>
      <VerticalStructureTimeSlice gml:id="VS01_TS01">
        <gml:validTime>
          <gml:TimeInstant gml:id="VS_TS01_TI01">
            <gml:timePosition>2010-11-30T15:32:43</gml:timePosition>
          </gml:TimeInstant>
        </gml:validTime>
        <interpretation>SNAPSHOT</interpretation>
        <name>ASNNUMBER</name>
        <type>TOWER</type>
        <lighted>YES</lighted>
        <part>
          <VerticalStructurePart gml:id="VSP01">
            <verticalExtent uom="FT">235</verticalExtent>
            <designator>ASR1058102</designator>
            <horizontalProjection_location>
              <ElevatedPoint srsName="urn:ogc:def:crs:EPSG::4326" srsDimension="2" gml:id="EP01">
                <gml:pos>39.26 -74.34</gml:pos>
                <elevation  uom="FT">295</elevation>
              </ElevatedPoint>
            </horizontalProjection_location>
          </VerticalStructurePart>
        </part>
      </VerticalStructureTimeSlice>
    </timeSlice>
    <timeSlice>
      <VerticalStructureTimeSlice gml:id="VS01_TS02">
```

```
            <gml:validTime>
              <gml:TimePeriod gml:id="VS01_TS02_TP01">
                <gml:beginPosition>2010-12-01T09:00:00</gml:beginPosition>
                <gml:endPosition>2010-12-15T13:00:00</gml:endPosition>
              </gml:TimePeriod>
            </gml:validTime>
            <interpretation>TEMPDELTA</interpretation>
            <sequenceNumber>6</sequenceNumber>
            <lightingAvailability>
              <VerticalStructureLightingStatus gml:id="VSLS01">
                <status>UNSERVICEABLE</status>
              </VerticalStructureLightingStatus>
            </lightingAvailability>
            <extension>
              <event:VerticalStructureExtension gml:id="VSE01">
                <event:theEvent xlink:href="urn:uuid:08504c89-d90c-4112-b757-dd6aedb61f96"/>
              </event:VerticalStructureExtension>
            </extension>
          </VerticalStructureTimeSlice>
        </timeSlice>
      </VerticalStructure>
    </notamMessage:hasMember>
    <notamMessage:hasMember>
      <AirportHeliport gml:id="ACY">
        <gml:identifier codeSpace="uuid">a82b3fc9-4aa4-4e67-8def-aaea1ac595j</gml:identifier>
        <timeSlice>
          <AirportHeliportTimeSlice gml:id="ACY_TS01">
            <gml:validTime>
              <gml:TimeInstant gml:id="ACY_TI01">
                <gml:timePosition>2010-11-30T15:32:43</gml:timePosition>
              </gml:TimeInstant>
            </gml:validTime>
            <interpretation>SNAPSHOT</interpretation>
            <designator>ACY</designator>
            <name>ATLANTIC CITY INTERNATIONAL AIRPORT</name>
            <locationIndicatorICAO>KACY</locationIndicatorICAO>
            <ARP>
              <ElevatedPoint srsName="urn:ogc:def:crs:EPSG::4326" srsDimension="2" gml:id="EP02">
                <gml:pos>39.27 -74.34</gml:pos>
              </ElevatedPoint>
            </ARP>
          </AirportHeliportTimeSlice>
        </timeSlice>
      </AirportHeliport>
    </notamMessage:hasMember>
</notamMessage:AIXMBasicMessage>
```

Appendix 2 EBNF Diagrams

13 EBNF Diagrams

The data used to composed the NOTAM text is presented in the form of a "Template", using EBNF (Extended Backus Naur Form). This document includes graphical representations of the EBNF rules, as described below. The EBNF raw files are available in the next chapter (EBNF Sources).

NOTE-
The graphical representation of the EBNF rules was created with the free EBNF Visualizer 1.1.

13.1 EBNF Rules

13.1.1 Sequence

A terminal symbol is any string. In this example 'a' and 'b' are two terminal symbols that are required items in the rule.
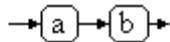
13.1.2 Optional Item

In this example item 'c' is an optional item denoted by the bypass line. The item 'c' may occur once or not at all in the rule.
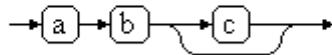
It is also possible to express a sequence of optional items as depicted in the example below.

13.1.3 Iterations

The item 'c' can occur from zero to infinite times.

In this example item 'c' can occur one to infinite times.

repeat_item_once_or_more

→(a)→(b)→(c)→
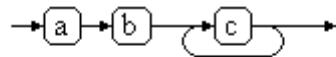
It is also possible to have an iteration of a sequence from zero to infinite times.

repeat_of_optional_items

→(begin)─────(again)←(and)────(end)→
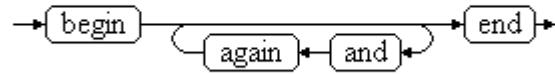
The rule below depicts the iteration between item 'ab' and item 'cd'.

iteration

→(ab)→
(cd)
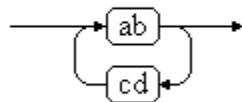
13.1.4   Choice

This rule depicts a choice between two items.   Only one path will be used in a scenario at any given time.

choice

→(a)→(b)→(d)→
   (c)
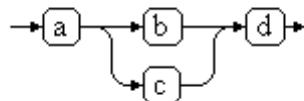
This rule can also be combined with a sequence to provide alternate paths of multiple items.

alternate_path

→(a)→(b)→
(c)

alternate_path2

→(a)→(b)→
(c)→(d)
(e)→(f)
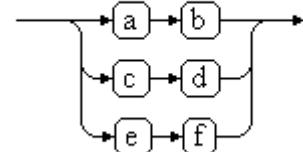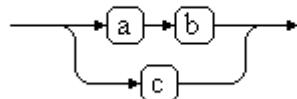
13.1.5 Non-Terminal Symbol

While a terminal symbol is depicted by a rounded box, a non-terminal symbol is represented by a box with square edges. A non-terminal symbol cannot be expressed explicitly. In the example below, 'sequence' is a non-terminal item expressed by the first rule of this appendix.

nonTerminalExample
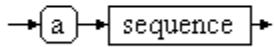
13.2   Example EBNF Sources

sequence= a b.
optional_item = a b [c].
repeat_item_zero_or_more= a b {c}.
repeat_item_once_or_more= a b c {c}.
sequence_of_optional_items= begin [optional things] end.
repeat_of_optional_items = begin {and again} end.
choice= a (b|c) d.
alternate_path= a b | c.
alternate_path2= a b | c d | e f.
iteration= ab {cd ab}.
nonTerminalExample= a sequence.

14 EBNF Sources

14.1   Obstruction

14.1.1   Obstruction – Permanent Obstacle Light Status

Production_rule = "OBST" "type" "elevation" "(verticalExtentAGL)"\n
"cardinalDirection" "distance" ["gml:pos"]"status" ["(ASR name)"].

14.1.2   Obstruction – Obstruction Bulk Light Status

Production_rule = OBST NUMEROUS status ["gml:radius" NMR airport] [note].

Acknowledgements

Delivered in Satisfaction of FAA Delivery Order Number DTFAWA-10-C-00112