

EfficienSea – Efficient, Safe and Sustainable Traffic at Sea

Document No. D_WP5_3_12
Document Access: Public



The EfficienSea AIS VHF Datalink Manager

System documentation

Version 1.6, 2011-12-20

DOCUMENT STATUS

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Document History

<i>Revision / code version</i>	<i>Date</i>	<i>Organisation</i>	<i>Initials</i>	<i>Revised pages</i>	<i>Short description of changes</i>
1.6	2012-01-12	DMA	JKJ	all	Documentation from VTT developers added.

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About EAVDAM 1.6

EAVDAM – the Efficiensea AIS VHF Datalink Manager - is a specialized tool intended to assist the transnational cooperation between operators of fixed AIS stations. It aids the coordinated management of the use of the frequencies allocated for the maritime AIS (Automatic Identification System), with the aim of maintaining the safe function of the AIS VDL (VHF Data Link).

EAVDAM version 1.6 has been developed under Work Package 5 of the EfficienSea project. More information about EfficienSea can be found at www.EfficienSea.org

This application is available – for free – as Open Source Software under the Free BSD license – please see Next section. This basically means that all involved parties are welcome to copy it, use it, to modify it, and to integrate it with other applications as they see fit.

The EfficienSea project has provided this application to you and invite you to participate in it's future evolution, if you or your organisation find it useful, and have the resources to contribute to the future development. The source code is available at <https://github.com/DaMSA/EAVDAM>. At this site, you will also find install scripts and resources for cooperation on the future development of EAVDAM.

Besides the documentation available in this document, the code is commented using the JAVADOC format, and JAVADOC web documentation is available in the ZIP file containing the source- and compiled code for EAVDAM version 1.6.

License conditions

About EAVDAM

EAVDAM - EfficienSea AIS VHF Datalink Manager

Version: 1.6

The EAVDAM application is provided under the FreeBSD license:

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The views and conclusions contained in the software and documentation are those of the authors and should not be interpreted as representing official policies, either expressed or implied, of the Danish Maritime Authority.

The application uses the following open source components:

[Apache Commons Net](#) [Apache Derby](#) [Image4j](#) [JavaMail](#) [opencsv](#) [OpenMap](#)

Data structures in EAVDAM

In this paper we describe the database and the XML-schema used in EAVDAM.

Design of the XML was based on the requirements of data sharing between organizations. The database was designed to match the XML and include data structures required only locally. The local data structures include mostly information related to user settings.

Database

We use Apache Derby 10.8.1.2 as the database. Apache Derby, an Apache DB subproject, is an open source relational database implemented entirely in Java and available under the Apache License, Version 2.0 (<http://db.apache.org/derby/>).

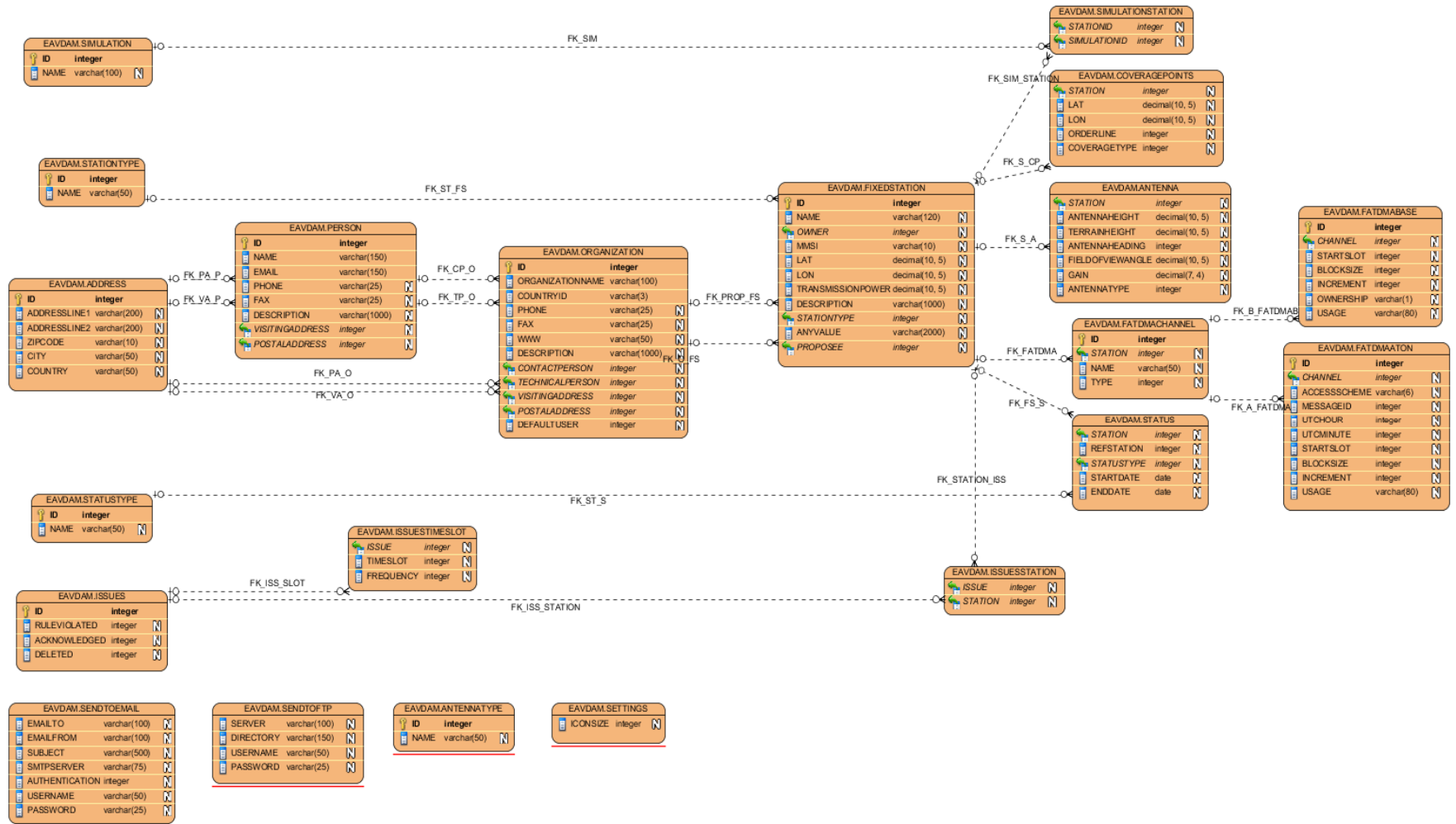
XML format for data exchange

XML-schema was created using XMLSpy (<http://altova.com/>).

The following description consists of four parts:

1. Figure describing the database, its tables and columns.
2. Plain text SQL clauses used for creating the database.
3. Figures describing the XML-schema.
4. Plain text XML-schema.

E/R diagram for Derby database used in EAVDAM.



SQL commandes for creating database

Below can be found the SQL create table commands used for creating the database. The database creation is done automatically using `dk.frv.eavdam.io.derby.DerbyDBInterface.createDatabase(dbName);`

```
CREATE TABLE ADDRESS(  
ID INT PRIMARY KEY,  
ADDRESSLINE1 VARCHAR(200),  
ADDRESSLINE2 VARCHAR(200),  
ZIPCODE VARCHAR(10), + CITY VARCHAR(50),  
COUNTRY VARCHAR(50))
```

```
CREATE TABLE PERSON(  
ID INT PRIMARY KEY,  
NAME VARCHAR(150) NOT NULL,  
EMAIL VARCHAR(150) NOT NULL,  
PHONE VARCHAR(25),  
FAX VARCHAR(25),  
DESCRIPTION VARCHAR(1000),  
VISITINGADDRESS INT,  
POSTALADDRESS INT,  
CONSTRAINT fk_va_p FOREIGN KEY (VISITINGADDRESS) references ADDRESS(ID),  
CONSTRAINT fk_pa_p FOREIGN KEY (POSTALADDRESS) references ADDRESS(ID))
```

```
CREATE TABLE ORGANIZATION(  
ID INT PRIMARY KEY,  
ORGANIZATIONNAME VARCHAR(100) NOT NULL,  
COUNTRYID VARCHAR(3) NOT NULL,  
PHONE VARCHAR(25),  
FAX VARCHAR(25),  
WWW VARCHAR(50),  
DESCRIPTION VARCHAR(1000),  
CONTACTPERSON INT,  
TECHNICALPERSON INT,  
VISITINGADDRESS INT,  
POSTALADDRESS INT,  
DEFAULTUSER INT,  
CONSTRAINT fk_cp_o FOREIGN KEY (CONTACTPERSON) references PERSON(ID),  
CONSTRAINT fk_tp_o FOREIGN KEY (TECHNICALPERSON) references PERSON(ID),  
CONSTRAINT fk_va_o FOREIGN KEY (VISITINGADDRESS) references ADDRESS(ID),  
CONSTRAINT fk_pa_o FOREIGN KEY (POSTALADDRESS) references ADDRESS(ID))
```

```
CREATE TABLE ANTENNATYPE(  
ID INT PRIMARY KEY,  
NAME VARCHAR(50))
```

```
CREATE TABLE STATIONTYPE(  
ID INT PRIMARY KEY,  
NAME VARCHAR(50) NOT NULL)
```

```
CREATE TABLE STATUSTYPE (  
ID INT PRIMARY KEY,  
NAME VARCHAR(50))
```

```
CREATE TABLE FIXEDSTATION(  
ID INT PRIMARY KEY,  
NAME VARCHAR(120),  
OWNER INT,  
MMSI VARCHAR(10),  
LAT DECIMAL (10,5),  
LON DECIMAL (10,5),  
TRANSMISSIONPOWER DECIMAL (10,5),  
DESCRIPTION VARCHAR(1000),  
STATIONTYPE INT,  
ANYVALUE VARCHAR(2000),  
PROPOSEE INT,  
CONSTRAINT fk_prop_fs FOREIGN KEY (PROPOSEE) references ORGANIZATION(ID),  
CONSTRAINT fk_o_fs FOREIGN KEY (OWNER) references ORGANIZATION(ID),  
CONSTRAINT fk_st_fs FOREIGN KEY (STATIONTYPE) references STATIONTYPE(ID))
```

```
CREATE TABLE STATUS(  
STATION INT,  
REFSTATION INT,  
STATUSTYPE INT,  
STARTDATE DATE,  
ENDDATE DATE,  
CONSTRAINT fk_fs_s FOREIGN KEY (STATION) references FIXEDSTATION(ID),  
CONSTRAINT fk_st_s FOREIGN KEY (STATUSTYPE) references STATUSTYPE(ID))
```

```
CREATE TABLE ANTENNA(  
STATION INT,  
ANTENNAHEIGHT DECIMAL (10,5),  
TERRAINHEIGHT DECIMAL (10,5),  
ANTENNAHEADING INT,  
FIELDVIEWANGLE DECIMAL (10,5),  
GAIN DECIMAL (7,4),  
ANTENNATYPE INT,  
CONSTRAINT fk_s_a FOREIGN KEY (STATION) references FIXEDSTATION(ID))
```



```
CREATE TABLE COVERAGEPOINTS(  
STATION INT,  
LAT DECIMAL (10,5),  
LON DECIMAL (10,5),  
ORDERLINE INT,  
COVERAGETYPE INT,  
CONSTRAINT fk_s_cp FOREIGN KEY (STATION) references FIXEDSTATION(ID))
```

```
CREATE TABLE FATDMACHANNEL(  
ID INT,  
STATION INT,  
NAME VARCHAR(50),  
TYPE INT,  
CONSTRAINT pk_fatdmac_a PRIMARY KEY (ID),  
CONSTRAINT fk_fatdma FOREIGN KEY (STATION) references FIXEDSTATION(ID))
```

```
CREATE TABLE FATDMAATON(  
ID INT,  
CHANNEL INT,  
ACCESSSCHEME VARCHAR(6),  
MESSAGEID INT,  
UTCHOUR INT,  
UTCMINUTE INT,  
STARTSLOT INT,  
BLOCKSIZE INT,  
INCREMENT INT,  
USAGE VARCHAR(80),  
CONSTRAINT pk_fatdma_a PRIMARY KEY (ID),  
CONSTRAINT fk_a_fatdma FOREIGN KEY (CHANNEL) references FATDMACHANNEL(ID))
```

```
CREATE TABLE FATDMABASE(  
ID INT,  
CHANNEL INT,  
STARTSLOT INT,  
BLOCKSIZE INT,  
INCREMENT INT,  
OWNERSHIP VARCHAR(1),  
USAGE VARCHAR(80),  
CONSTRAINT pk_fatdma_b PRIMARY KEY (ID),  
CONSTRAINT fk_b_fatdmab FOREIGN KEY (CHANNEL) references FATDMACHANNEL(ID))
```

```
CREATE TABLE SENDTOFTP(  
SERVER VARCHAR(100),  
DIRECTORY VARCHAR(150),  
USERNAME VARCHAR(50),  
PASSWORD VARCHAR(25))
```

```
CREATE TABLE SENDTOEMAIL(  
EMAILTO VARCHAR(100),  
EMAILFROM VARCHAR(100),  
SUBJECT VARCHAR(500),  
SMTPSERVER VARCHAR(75),  
AUTHENTICATION INT,  
USERNAME VARCHAR(50),  
PASSWORD VARCHAR(25))
```

```
CREATE TABLE SETTINGS(  
ICONSIZE INT)
```

```
CREATE TABLE SIMULATION(  
ID INT PRIMARY KEY,  
NAME VARCHAR(100))
```

```
CREATE TABLE SIMULATIONSTATION(  
STATIONID INT,  
SIMULATIONID INT,  
CONSTRAINT fk_sim_station FOREIGN KEY (STATIONID) references FIXEDSTATION(ID),  
CONSTRAINT fk_sim FOREIGN KEY (SIMULATIONID) references SIMULATION(ID))
```

```
CREATE TABLE ISSUES(  
ID INT,  
RULEVIOLATED INT,  
ACKNOWLEDGED INT,  
DELETED INT,  
CONSTRAINT pk_issue PRIMARY KEY (ID))
```

```
CREATE TABLE ISSUETIMESLOT(  
ISSUE INT,  
TIMESLOT INT,  
FREQUENCY INT,  
CONSTRAINT fk_iss_slot FOREIGN KEY (ISSUE) references ISSUES(ID))
```

```
CREATE TABLE ISSUESSTATION(  
ISSUE INT,  
STATION INT,  
CONSTRAINT fk_iss_station FOREIGN KEY (ISSUE) references ISSUES(ID),  
CONSTRAINT fk_station_iss FOREIGN KEY (STATION) references FIXEDSTATION(ID))
```

The following values were added to the database during creation.

```
INSERT INTO ANTENNATYPE VALUES("+ANTENNA_DIRECTIONAL+", 'Directional Antenna')  
INSERT INTO ANTENNATYPE VALUES("+ANTENNA_OMNIDIR+", 'Omnidirectional Antenna')
```

```
INSERT INTO STATIONTYPE VALUES("+STATION_BASE+", 'Base station')  
INSERT INTO STATIONTYPE VALUES("+STATION_REPEATER+", 'Repeater')
```

```
INSERT INTO STATIONTYPE VALUES("+STATION_RECEIVER+", 'Receiver')
INSERT INTO STATIONTYPE VALUES("+STATION_ATON+", 'ATON')
```

```
INSERT INTO STATUSTYPE VALUES("+STATUS_ACTIVE+", 'Active')
INSERT INTO STATUSTYPE VALUES("+STATUS_OLD+", 'Old')
INSERT INTO STATUSTYPE VALUES("+STATUS_SIMULATED+", 'Simulated')
INSERT INTO STATUSTYPE VALUES("+STATUS_PROPOSED+", 'Proposed')
INSERT INTO STATUSTYPE VALUES("+STATUS_PLANNED+", 'Planned')
```

Where the given "+VALUE+" is the predefined integer number of the value. The values are defined in dk.frv.eavdam.io.derby.DerbyDBInterface and they are as follows:

```
public static final int STATUS_ACTIVE = 1;
public static final int STATUS_OLD = 2;
public static final int STATUS_SIMULATED = 3;
public static final int STATUS_PROPOSED = 4;
public static final int STATUS_PLANNED = 5;

public static final int ANTENNA_DIRECTIONAL = 1;
public static final int ANTENNA_OMNIDIR = 2;

public static final int STATION_BASE = 1;
public static final int STATION_REPEATER = 2;
public static final int STATION_RECEIVER = 3;
public static final int STATION_ATON = 4;

public static final int COVERAGE_TRANSMIT = 1;
public static final int COVERAGE_RECEIVE = 2;
public static final int COVERAGE_INTERFERENCE = 3;

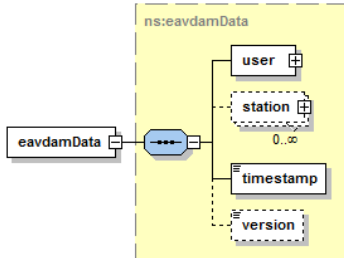
public static final int FATDMA_CHANNEL_A = 1;
public static final int FATDMA_CHANNEL_B = 2;
```

Some null/unknown values were added also. These are used, for example, when the organization does not input the persons and/or addresses:

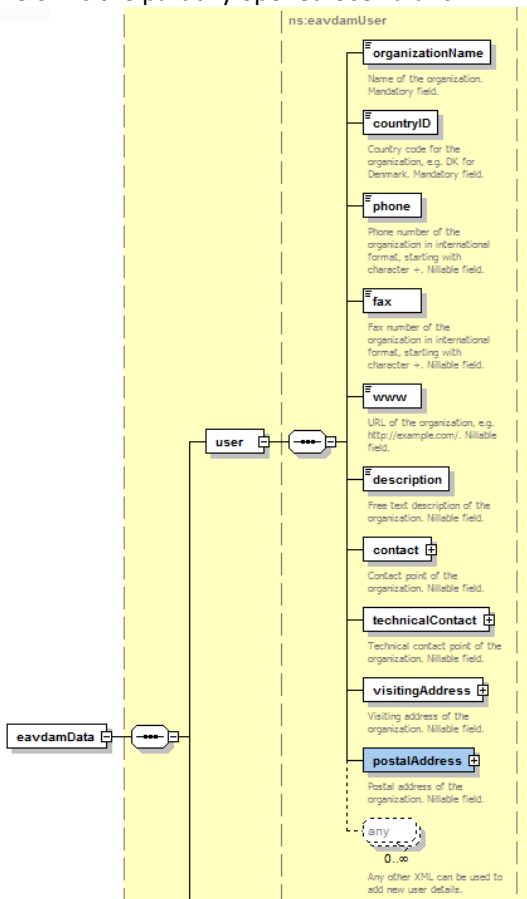
```
INSERT INTO ANTENNATYPE VALUES(0, 'No antenna')
INSERT INTO ADDRESS VALUES(0,"",null,null,null)
INSERT INTO PERSON VALUES(0,'Unknown',"","","",0,0)
INSERT INTO ORGANIZATION VALUES(0,'Unknown','NO',"","","",0,0,0,0,0)
```

XML-schema E/R diagram for data exchange between users

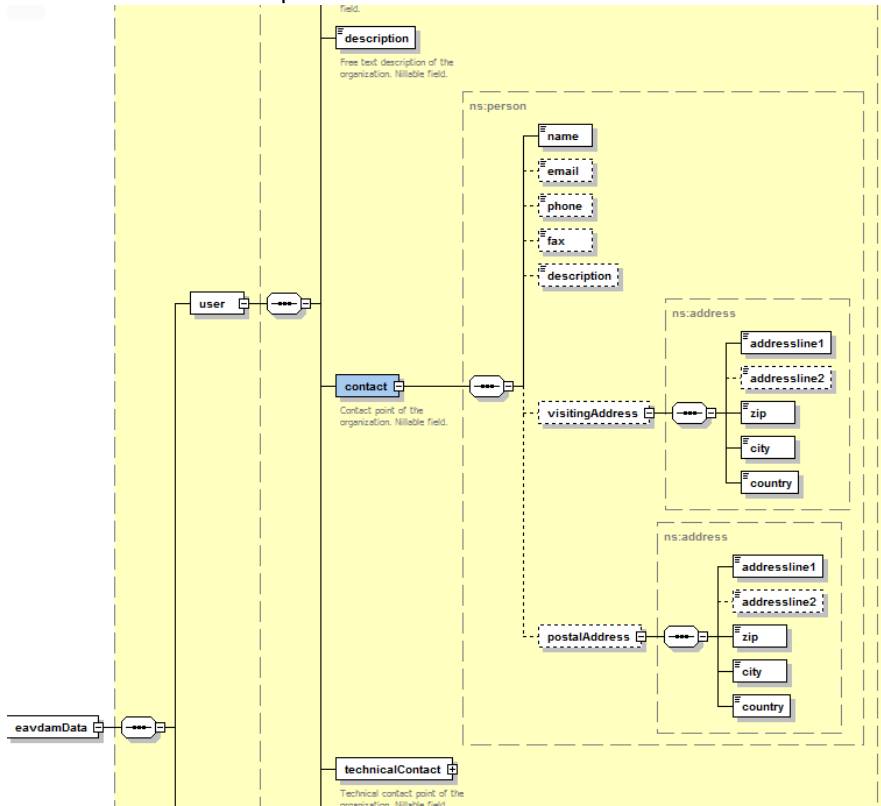
The image below shows the elements near the root (eavdamData)



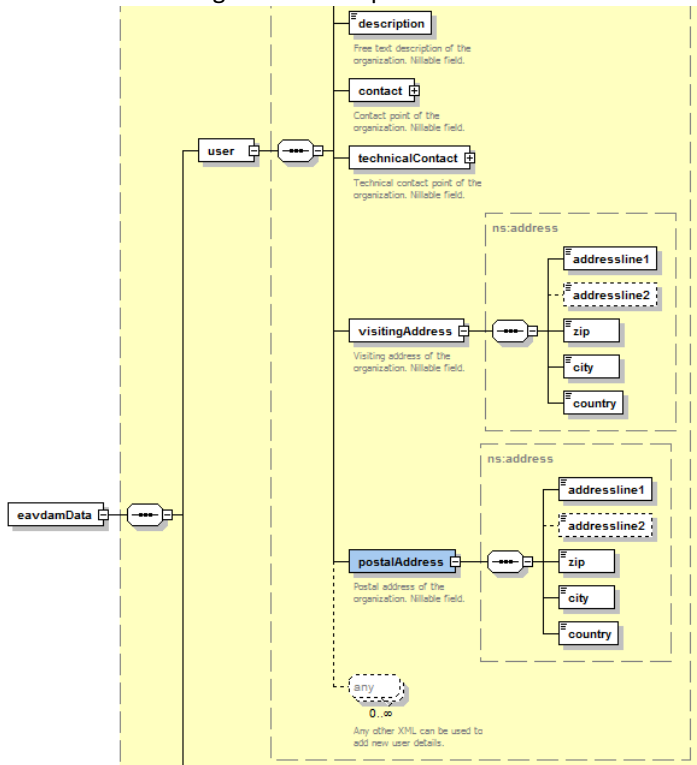
Below is the partially opened User branch.



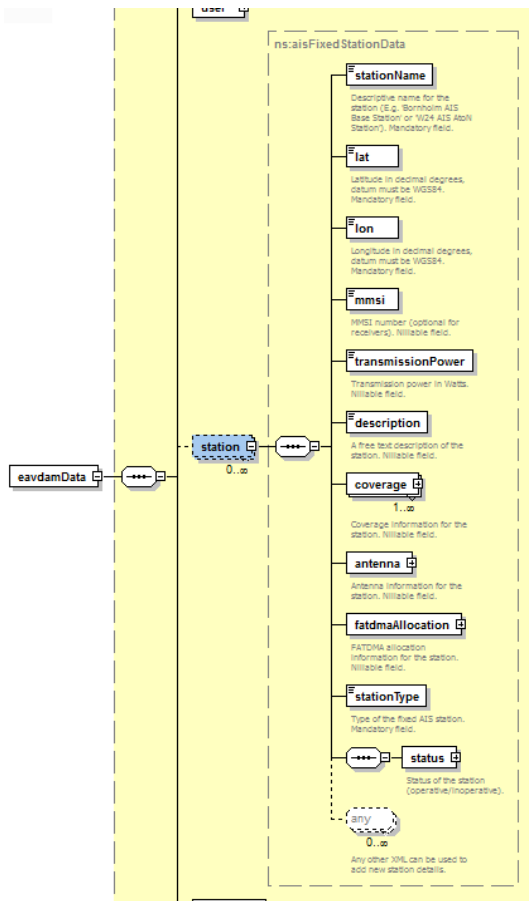
Below can be seen the opened contact branch which is similar with the technicalContract branch.



Below is the visitingAddress and postalAddress branches.



Finally, below is the opened Station branch



xml-schema in plain text.

```
<?xml version="1.0" encoding="ISO-8859-1"?>
<xs:schema xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:ns="http://eavdam.frv.dk/schema"
targetNamespace="http://eavdam.frv.dk/schema">
  <xs:element name="eavdamData" type="ns:eavdamData"/>
  <xs:complexType name="eavdamData">
    <xs:sequence>
      <xs:element name="user" type="ns:eavdamUser"/>
      <xs:element name="station" type="ns:aisFixedStationData" minOccurs="0" maxOccurs="unbounded"/>
      <xs:element name="timestamp" type="ns:timestamp" minOccurs="1" maxOccurs="1"/>
      <xs:element name="version" type="ns:version" minOccurs="0" maxOccurs="1"/>
    </xs:sequence>
  </xs:complexType>
  <xs:complexType name="eavdamUser">
    <xs:annotation>
      <xs:documentation>A class for storing EAVDAM user specific data.</xs:documentation>
    </xs:annotation>
    <xs:sequence>
      <xs:element name="organizationName" type="ns:nonEmptyString">
        <xs:annotation>
          <xs:documentation>Name of the organization. Mandatory field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="countryID" type="ns:countryID">
        <xs:annotation>
          <xs:documentation>Country code for the organization, e.g. DK for Denmark. Mandatory field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="phone" type="ns:intlPhoneNumber" nillable="true">
        <xs:annotation>
          <xs:documentation>Phone number of the organization in international format, starting with character +. Nillable
field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="fax" type="ns:intlPhoneNumber" nillable="true">
        <xs:annotation>
          <xs:documentation>Fax number of the organization in international format, starting with character +. Nillable
field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="www" type="ns:httpUrl" nillable="true">
        <xs:annotation>
          <xs:documentation>URL of the organization, e.g. http://example.com/. Nillable field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="description" type="xs:string" nillable="true">
        <xs:annotation>
          <xs:documentation>Free text description of the organization. Nillable field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="contact" type="ns:person" nillable="true">
        <xs:annotation>
          <xs:documentation>Contact point of the organization. Nillable field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="technicalContact" type="ns:person" nillable="true">
        <xs:annotation>
          <xs:documentation>Technical contact point of the organization. Nillable field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="visitingAddress" type="ns:address" nillable="true">
        <xs:annotation>
          <xs:documentation>Visiting address of the organization. Nillable field.</xs:documentation>
        </xs:annotation>
      </xs:element>
      <xs:element name="postalAddress" type="ns:address" nillable="true">

```



```

    <xs:annotation>
      <xs:documentation>Postal address of the organization. Nillable field.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:any processContents="skip" minOccurs="0" maxOccurs="unbounded">
    <xs:annotation>
      <xs:documentation>Any other XML can be used to add new user details.</xs:documentation>
    </xs:annotation>
  </xs:any>
</xs:sequence>
</xs:complexType>
<xs:simpleType name="aisFixedStationType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="BASESTATION"/>
    <xs:enumeration value="REPEATER"/>
    <xs:enumeration value="RECEIVER"/>
    <xs:enumeration value="ATON"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="intlPhoneNumber">
  <xs:annotation>
    <xs:documentation>A phone number in international format, whitespace and dash separator allowed.</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:pattern value="\+[0-9 \-]+"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="fatdmaAllocation">
  <xs:annotation>
    <xs:documentation>ID of the allocated FATDMA slot.</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:pattern value="[0-9]"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="mmsiNumber">
  <xs:annotation>
    <xs:documentation>MMSI number</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:pattern value="[0-9]{9}"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="countryID">
  <xs:annotation>
    <xs:documentation>2-letter country identifier</xs:documentation>
  </xs:annotation>
  <xs:restriction base="xs:string">
    <xs:pattern value="\p{Lu}\p{Lu}"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="nonEmptyString">
  <xs:restriction base="xs:string">
    <xs:minLength value="1"/>
    <xs:pattern value="\S.*"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="httpUrl">
  <xs:restriction base="xs:string">
    <xs:pattern value="http(s)?://.+"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="heading">
  <xs:restriction base="xs:int">
    <xs:minInclusive value="0"/>
    <xs:maxInclusive value="359"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="lat">
  <xs:restriction base="xs:double">
    <xs:minInclusive value="-90"/>

```

```

    <xs:maxInclusive value="90"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="startDate">
  <xs:restriction base="xs:date"/>
</xs:simpleType>
<xs:simpleType name="endDate">
  <xs:restriction base="xs:date"/>
</xs:simpleType>
<xs:simpleType name="timestamp">
  <xs:restriction base="xs:dateTime"/>
</xs:simpleType>
<xs:simpleType name="version">
  <xs:restriction base="xs:string"/>
</xs:simpleType>
<xs:simpleType name="lon">
  <xs:restriction base="xs:double">
    <xs:minInclusive value="-180"/>
    <xs:maxInclusive value="180"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="nonNegativeDouble">
  <xs:restriction base="xs:double">
    <xs:minInclusive value="0"/>
  </xs:restriction>
</xs:simpleType>
<xs:complexType name="status">
  <xs:sequence>
    <xs:element name="status" type="ns:aisFixedStationStatus"/>
    <xs:element name="startDate" type="ns:startDate"/>
    <xs:element name="endDate" type="ns:endDate"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="person">
  <xs:annotation>
    <xs:documentation>Class for one contact point information</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="name" type="xs:string"/>
    <xs:element name="email" type="xs:string" minOccurs="0"/>
    <xs:element name="phone" type="ns:intlPhoneNumber" minOccurs="0"/>
    <xs:element name="fax" type="ns:intlPhoneNumber" minOccurs="0"/>
    <xs:element name="description" type="xs:string" minOccurs="0"/>
    <xs:element name="visitingAddress" type="ns:address" minOccurs="0"/>
    <xs:element name="postalAddress" type="ns:address" minOccurs="0"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="address">
  <xs:sequence>
    <xs:element name="addressline1" type="xs:string"/>
    <xs:element name="addressline2" type="xs:string" minOccurs="0"/>
    <xs:element name="zip" type="xs:string"/>
    <xs:element name="city" type="xs:string"/>
    <xs:element name="country" type="xs:string"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="omnidirectionalAntenna">
  <xs:sequence/>
</xs:complexType>
<xs:complexType name="directionalAntenna">
  <xs:sequence>
    <xs:element name="heading" type="ns:heading">
      <xs:annotation>
        <xs:documentation>Heading degrees</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="fieldOfViewAngle" type="ns:heading">
      <xs:annotation>
        <xs:documentation>Field of view angle degrees</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>

```

```

<xs:element name="gain" type="ns:nonNegativeDouble">
  <xs:annotation>
    <xs:documentation>Antenna gain (dB)</xs:documentation>
  </xs:annotation>
</xs:element>
</xs:sequence>
</xs:complexType>
<xs:complexType name="antenna">
  <xs:sequence>
    <xs:choice>
      <xs:element name="directionalAntenna" type="ns:directionalAntenna"/>
      <xs:element name="omnidirectionalAntenna" type="ns:omnidirectionalAntenna"/>
    </xs:choice>
    <xs:element name="antennaHeight" type="ns:nonNegativeDouble">
      <xs:annotation>
        <xs:documentation>Antenna height above terrain (meters).</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="terrainHeight" type="xs:double">
      <xs:annotation>
        <xs:documentation>Terrain height above sealevel (meters).</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="fatdmaSlotAllocation">
  <xs:sequence>
    <xs:element name="fatdmaChannelA" type="ns:fatdmaChannel" minOccurs="0" maxOccurs="1">
      <xs:annotation>
        <xs:documentation>List of allocated FATDMA Slots</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="fatdmaChannelB" type="ns:fatdmaChannel" minOccurs="0" maxOccurs="1">
      <xs:annotation>
        <xs:documentation>List of allocated FATDMA Slots</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="aisFixedStationData">
  <xs:annotation>
    <xs:documentation>A class for holding all properties of an AIS base station.</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="stationName" type="ns:nonEmptyString">
      <xs:annotation>
        <xs:documentation>Descriptive name for the station (E.g. 'Bornholm AIS Base Station' or 'W24 AIS AtoN Station').
Mandatory field.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="lat" type="ns:lat">
      <xs:annotation>
        <xs:documentation>Latitude in decimal degrees, datum must be WGS84. Mandatory field.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="lon" type="ns:lon">
      <xs:annotation>
        <xs:documentation>Longitude in decimal degrees, datum must be WGS84. Mandatory field.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="mmsi" type="ns:mmsiNumber" nillable="true">
      <xs:annotation>
        <xs:documentation>MMSI number (optional for receivers). Nillable field.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="transmissionPower" type="ns:nonNegativeDouble" nillable="true">
      <xs:annotation>
        <xs:documentation>Transmission power in Watts. Nillable field.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:element name="description" type="xs:string" nillable="true">

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    <xs:annotation>
      <xs:documentation>A free text description of the station. Nillable field.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="coverage" type="ns:aisFixedStationCoverage" nillable="true" maxOccurs="unbounded">
    <xs:annotation>
      <xs:documentation>Coverage information for the station. Nillable field.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="antenna" type="ns:antenna" nillable="true">
    <xs:annotation>
      <xs:documentation>Antenna information for the station. Nillable field.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="fatdmaAllocation" type="ns:fatdmaSlotAllocation" nillable="true">
    <xs:annotation>
      <xs:documentation>FATDMA allocation information for the station. Nillable field.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:element name="stationType" type="ns:aisFixedStationType">
    <xs:annotation>
      <xs:documentation>Type of the fixed AIS station. Mandatory field.</xs:documentation>
    </xs:annotation>
  </xs:element>
  <xs:sequence minOccurs="1" maxOccurs="1">
    <xs:element name="status" type="ns:status" nillable="false">
      <xs:annotation>
        <xs:documentation>Status of the station (operative/inoperative).</xs:documentation>
      </xs:annotation>
    </xs:element>
  </xs:sequence>
  <xs:any processContents="skip" minOccurs="0" maxOccurs="unbounded">
    <xs:annotation>
      <xs:documentation>Any other XML can be used to add new station details.</xs:documentation>
    </xs:annotation>
  </xs:any>
</xs:sequence>
</xs:complexType>
<xs:complexType name="aisFixedStationCoverage">
  <xs:annotation>
    <xs:documentation>A class for holding all information for AIS base station coverage area.</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="coverageType" type="ns:aisFixedStationCoverageType" nillable="false" minOccurs="1" maxOccurs="1">
      <xs:annotation>
        <xs:documentation>Type of coverage.</xs:documentation>
      </xs:annotation>
    </xs:element>
    <xs:sequence>
      <xs:element name="point" type="ns:coveragePoint" nillable="false" minOccurs="0" maxOccurs="unbounded"/>
    </xs:sequence>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="coveragePoint">
  <xs:annotation>
    <xs:documentation>lat,lon point of the coverage.</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="lat" type="ns:lat"/>
    <xs:element name="lon" type="ns:lon"/>
  </xs:sequence>
</xs:complexType>
<xs:complexType name="fatdmaChannel">
  <xs:annotation>
    <xs:documentation>FATDMA Channel information.</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="channelType" type="ns:channelType" minOccurs="1" maxOccurs="1"/>
    <xs:element name="channelName" type="ns:channelName" minOccurs="1" maxOccurs="1"/>
    <xs:element name="broadcast" type="ns:channelBroadcast" minOccurs="0" maxOccurs="unbounded"/>
  </xs:sequence>

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</xs:complexType>
<xs:simpleType name="channelType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="ATON">
      <xs:annotation>
        <xs:documentation>Channel is of type ATON.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="BASE">
      <xs:annotation>
        <xs:documentation>Is of type BASE.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="channelName">
  <xs:restriction base="xs:string"/>
</xs:simpleType>
<xs:complexType name="channelBroadcast">
  <xs:annotation>
    <xs:documentation>FATDMA Channel broadcast information.</xs:documentation>
  </xs:annotation>
  <xs:sequence>
    <xs:element name="accessScheme" type="ns:accessScheme" minOccurs="0" maxOccurs="1"/>
    <xs:element name="messageID" type="ns:messageID" minOccurs="0" maxOccurs="1"/>
    <xs:element name="utcHour" type="ns:utcHour" minOccurs="0" maxOccurs="1"/>
    <xs:element name="utcMinute" type="ns:utcMinute" minOccurs="0" maxOccurs="1"/>
    <xs:element name="startSlot" type="ns:startSlot" minOccurs="1" maxOccurs="1"/>
    <xs:element name="blockSize" type="ns:blockSize" minOccurs="1" maxOccurs="1"/>
    <xs:element name="increment" type="ns:increment" minOccurs="1" maxOccurs="1"/>
    <xs:element name="ownership" type="ns:ownership" minOccurs="0" maxOccurs="1"/>
    <xs:element name="usage" type="ns:usage" minOccurs="0" maxOccurs="1"/>
  </xs:sequence>
</xs:complexType>
<xs:simpleType name="accessScheme">
  <xs:restriction base="xs:string">
    <xs:enumeration value="FATDMA">
      <xs:annotation>
        <xs:documentation>FATDMA Access Scheme</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="RATDMA">
      <xs:annotation>
        <xs:documentation>RATDMA Access Scheme</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="CSTDMA">
      <xs:annotation>
        <xs:documentation>CSTDMA Access Scheme</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="messageID">
  <xs:restriction base="xs:int">
    <xs:minInclusive value="0"/>
    <xs:maxInclusive value="64"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="utcHour">
  <xs:restriction base="xs:int">
    <xs:minInclusive value="0"/>
    <xs:maxInclusive value="24"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="utcMinute">
  <xs:restriction base="xs:int">
    <xs:minInclusive value="0"/>
    <xs:maxInclusive value="60"/>
  </xs:restriction>
</xs:simpleType>

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<xs:simpleType name="startSlot">
  <xs:restriction base="xs:int">
    <xs:minInclusive value="0"/>
    <xs:maxInclusive value="4095"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="blockSize">
  <xs:restriction base="xs:int">
    <xs:minInclusive value="1"/>
    <xs:maxInclusive value="5"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="increment">
  <xs:restriction base="xs:int">
    <xs:minInclusive value="0"/>
    <xs:maxInclusive value="324000"/>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="usage">
  <xs:restriction base="xs:string"/>
</xs:simpleType>
<xs:simpleType name="ownership">
  <xs:restriction base="xs:string">
    <xs:enumeration value="L">
      <xs:annotation>
        <xs:documentation>L: use by local station</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="R">
      <xs:annotation>
        <xs:documentation>R: use by remote station.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="aisFixedStationCoverageType">
  <xs:restriction base="xs:string">
    <xs:enumeration value="TRANSMISSION">
      <xs:annotation>
        <xs:documentation>Indicator of the transimission coverage area type.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="RECEIVE">
      <xs:annotation>
        <xs:documentation>Indicator of the receive coverage area type.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="INTERFERENCE">
      <xs:annotation>
        <xs:documentation>Indicator of the interference coverage area type.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
  </xs:restriction>
</xs:simpleType>
<xs:simpleType name="aisFixedStationStatus">
  <xs:restriction base="xs:string">
    <xs:enumeration value="OPERATIVE">
      <xs:annotation>
        <xs:documentation>Indicator that the station is in operative use.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="OLD">
      <xs:annotation>
        <xs:documentation>Indicator that the station is not in operative use anymore and exists only as a history
record.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
    <xs:enumeration value="PLANNED">
      <xs:annotation>
        <xs:documentation>Indicator that the station is planned but is not in operational use.</xs:documentation>
      </xs:annotation>
    </xs:enumeration>
  </xs:restriction>
</xs:simpleType>

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```
</xs:enumeration>
<xs:enumeration value="SIMULATED">
  <xs:annotation>
    <xs:documentation>The station is a simulation.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
<xs:enumeration value="PROPOSED">
  <xs:annotation>
    <xs:documentation>There are some proposals to the station.</xs:documentation>
  </xs:annotation>
</xs:enumeration>
</xs:restriction>
</xs:simpleType>
</xs:schema>
```