[NAV.UNS] Navaid unserviceable - coding

Definition

The unavailability of a ground based radio navigation equipment and service, both if used for en-route or for airport.

Notes:

- *this scenario enables the encoding of the information about the unavailability (or limited availability) of a complete navaid or of one of its component equipments. In case a component is concerned, this is limited to the unavailability of a single component;*
- *in order to keep the digital encoding consistent with the current practices, the term "primary component" is used in the case of composite navaids (such as VOR/DME, ILS, etc.) The principle is that the unavailability of composite navaid is considered directly related only to the unavailability of its primary components. The unavailability of a non-primary component (such as a MKR used by an ILS) needs to be encoded separately;*
- *the outage of a navaid is likely to trigger the unavailability of Procedures and Routes; these are defined as separate scenario and such scenario inter-dependencies will need to be further investigated;*
- *this scenario does not cover the downgrading of an ILS category; please see the dedicated scenario ILS downgraded for that purpose;*
- *this scenario does not support the modification of information about navaid coverage/range. Although this data can be encoded digitally using AIXM 5.1(.1), no immediate usage has been identified and therefore that scenario is left for being defined later.*

Event data

The following diagram identifies the information items that are usually provided by a data originator for this kind of event.

The table below provides more details about each information item contained in the diagram. It also provides the mapping of each information item within the AIXM 5.1 structure. The name of the variable (first column) is recommended for use as label of the data field in human-machine interfaces (HMI).
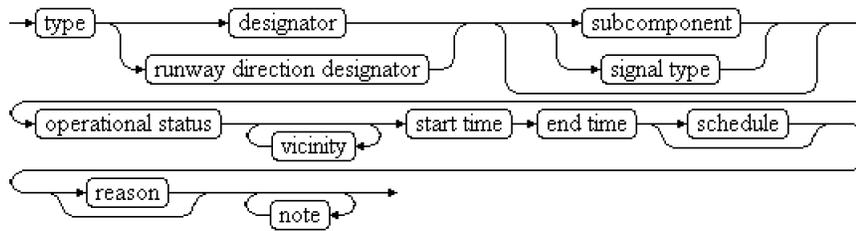
EBNF Code

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input = "type" ( "designator" | "runway direction designator" ) [("subcomponent" | "signal type")] \n
"operational status" {"vicinity"} "start time" "end time" ["schedule"] \n
["reason"] {"note"}.
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Data item	Value	AIXM mapping
type	The type of navaid service. In combination with other items, this is used to identify the Navaid and/or the NavaidEquipment concerned.	Navaid.type with this list of values CodeNavaidServiceType **and/or** one of the non-abstract subtypes of NavaidEquipment (see coding rules)
designator	The published designator of the navaid. In combination with other items, this is used to identify the Navaid and/or NavaidEquipment concerned.	Navaid.designator and/or NavaidEquipment.designator
runway direction designator	The designator of the runway direction that is served by the navaid (especially for ILS). In combination with other items, this is used to identify the Navaid concerned.	Navaid.runwayDirection
subcomponent	A specific navaid equipment, used as part of a composed navaid service, in case the unserviceable status affects only this component. In combination with other items, this is used to identify the NavaidEquipment and eventually other Navaid(s) concerned.	One of the non-abstract subtypes of NavaidEquipment

signal type	A specific sub-signal of a composed navaid service, in case the unserviceable status affects only this signal type. In this scenario, this is limited to the Azimuth or Distance indication of a TACAN Navaid.	NavaidOperationalStatus.signalType. This can be specified only if the navaid is a TACAN or VORTAC and only the values "AZIMUTH" or "DISTANCE" may be used from its list of values CodeRadioSignalType
operational status	The operational status. The typical value is "unserviceable", also abbreviated "U/S". Other values are possible, such as "on test, do not use", "false indication possible", etc.	(NavaidEquipment and Navaid)/NavaidOperationalStatus. operationalStatus with this list of values CodeStatusNavaidType
vicinity	The indication of closely located airport(s) which use the navaid for approach /departure/arrival procedures. The Digital NOTAM data provider interface might offer suggestions with respect to the features affected by the navaid unserviceability, but in any case, the operator shall be allowed to take the final decision.	Event.associatedAirport href
start time	The effective date & time when the event starts	Navaid and NavaidEquipment)/TimeSlice/TimePeriod. beginPosition, Event/EventTimeSlice.validTime/timePosition and Event/EventTimeSlice.featureLifetime/beginPosition
end time	The end date & time when the event ends. It might be an estimated value.	Navaid and NavaidEquipment)/TimeSlice/TimePeriod. endPosition and Event/EventTimeSlice.featureLifetime /endPosition also applying the rules for {{Events with estimated end time}}
schedule	A schedule might be provided, in case the navaid status changes according to a regular timetable, within the period between the start time and the end time.	Navaid and/or NavaidEquipment)/NavaidOperationalStatus /Timesheet/... according to the rules for Event Scheduled
reason	A reason for the navaid operational status change	Navaid and/or NavaidEquipment)/NavaidOperationalStatus. annotation with propertyName="operationalStatus" and purpose="REMARK"
note	A free text note that provides further instructions concerning the navaid operational status situation.	Navaid and/or NavaidEquipment)/NavaidOperationalStatus. annotation with purpose="REMARK"

Notes:

- The word "locator" is expected to be used for low power NDB in the operational language.

Assumptions for baseline data

- It is assumed that information about the Navaid(s) and NavaidEquipments(s) already exists in the form of Airspace BASELINE TimeSlice(s) covering the complete period of validity of the event, coded as specified in the Coding Guidelines for the (ICAO) AIP Data Set - Navaid [NAV].
- *Proposals for Coding rule:*
    - *it is assumed that no NavaidEquipment exists without being used as component for at least one Navaid;*
    - *it is assumed that all Navaid of type ILS or MLS are associated with at least one runway direction.*

Data encoding rules

The data encoding rules provided in this section shall be followed in order to ensure the harmonisation of the digital encodings provided by different sources. The compliance with some of these encoding rules can be checked with automatic data validation rules.

Note that, in the case of composite Navaid (that have more than one navaid component) the term "primary components" has the following meaning:

Navaid type	*Primary components* *[for data encoding purpose in this scenario]*
VOR, DME, NDB, TACAN, MKR, VORTAC, VOR_DME, NDB_DME, TLS, LOC, LOC_DME, NDB_MKR, DF, SDF, OTHER	All NavaidEquipment that compose the Navaid
ILS	Localizer and Glidepath
ILS_DME	Localizer, Glidepath and DME
MLS	Azimuth and Elevation
MLS_DME	Azimuth, Elevation and DME

Identifier	*Data encoding rule*

ER-01	First, a new with a Event BASELINE TimeSlice (encoding="DIGITAL", scenario="NAV.UNS", version="2.0") for which a PERMDELTA TimeSlice may also be provided
ER-02	Second, identify the NavaidEquipment that are affected, as follows: • if neither a subcomponent nor a signal type was specified, then it is assumed that all its primary components NavaidEquipment are affected; • if a subcomponent was specified, then it is assumed that only the corresponding NavaidEquipment component is affected; • if a signal type was specified (only possible for TACAN or VORTAC Navaids), then it is assumed that its TACAN NavaidEquipment component is affected only for that signal type. For each of these NavaidEquipment(s): • encode a new TimeSlice of type TEMPDELTA, in which the "event:theEvent" property points to the Event instance created according to ER-01. The TEMPDELTA shall contain containing at least one NavaidOperationalStatus object with operationalStatus=UNSERVICEABLE. Note that because the NavaidEquipment is an abstract type, in fact the TEMPDELTA shall be created for the appropriate non-abstract sub-type: VOR, DME, LLZ, etc. The rule ER-11 (special encoding in case of schedules) shall apply to each equipment individually).
ER-03	Third, identify the Navaid affected by considering all Navaid which use one or more of the NavaidEquipment identified applying ER-02 as primary component. For each of these Navaid(s): • encode a new TimeSlice of type TEMPDELTA, in which the "event:theEvent" property points to the Event instance created according to ER-01. The TEMPDELTA shall contain containing at least one NavaidOperationalStatus
ER-04	The value "PARTIAL" can be used for the operationalStatus of a TACAN NavaidEquipment only if just one of its signalType (AZIMUTH or DISTANCE) is affected.
ER-05	The values "FALSE_POSSIBLE" and "CONDITIONAL" cannot be used in this scenario.
ER-06	The value "UNSERVICEABLE" shall be used only if the navaid does not emit any signal. Otherwise, the value "ON_TEST" shall be used, which will be decoded as "On test, do not use. False indication possible".
ER-07	In the case of a Navaid for which all its primary components NavaidEquipment are affected (have a temporarily changed operational status), then its NavaidOperationalStatus.operationalStatus attribute shall get the value specified by the "operational status" input parameter
ER-07	In the case of a Navaid for which only some of its components NavaidEquipment are affected (have a temporarily changed operational status) but not all, then the TEMPDELTA TimeSlice of the Navaid shall have the value indicated in the following table (priority from top to bottom): <table><tr><th>NavaidEquipment operationalStatus</th><th>Recommended Navaid operationalStatus</th></tr><tr><td>at least one FALSE_INDICATION</td><td>FALSE_INDICATION</td></tr><tr><td>at least one ONTEST</td><td>ONTEST</td></tr><tr><td>at least one UNSERVICEABLE</td><td>PARTIAL</td></tr><tr><td>at least one INTERRUPT</td><td>INTERRUPT</td></tr><tr><td>at least one PARTIAL or IN_CONSTRUCTION</td><td>PARTIAL</td></tr><tr><td>at least one DISPLACED</td><td>DISPLACED</td></tr><tr><td>at least one OTHER</td><td>OTHER For example, if a VOR (equipment) component of a VOR/DME navaid (service) is unserviceable, then the Navaid (of type VOR/DME) shall have a TEMPDELTA TimeSlice with operationalStatus="PARTIAL". In the same time, the VOR (NavaidEquipment) will have a TEMPDELTA TimeSlice with operationalStatus="UNSERVICEABLE".</td></tr></table>

ER-09	In the case of a Navaid that has more than one NavaidEquipment component, if only some of its primary components NavaidEquipment are affected (have a temporarily changed operational status = UNSERVICEABLE, ON_TEST, FALSE_INDICATION or IN_CONSTRUCTION) but not all, then it is possible that the unavailability of one of the components changes the nature of the navaid service. If this is the case, then the TEMPDELTA TimeSlice encoded for the Navaid shall also temporarily change the type of the Navaid. For example, if the DME component of a VOR/DME navaid is unserviceable, then the Navaid TEMPDELTA TimeSlice shall also indicate that type="VOR" only and the operationalStatus shall be "PARTIAL". The table below provides more detailed rules:

Navaid type	NavaidComponent operational status (UNSERVICEABLE, ON_TEST, FALSE_INDICATION or IN_CONSTRUCTION)	Navaid temporarily changed type
VOR_DME	VOR	DME
VOR_DME	DME	VOR
NDB_MKR	MKR	NDB
NDB_MKR	NDB	MKR
VORTAC	VOR	TACAN
VORTAC	TACAN	VOR
NDB_DME	DME	NDB
NDB_DME	NDB	DME
ILS	Glidepath	LOC
ILS_DME	Glidepath	LOC_DME

ER-10	If the Navaid or NavaidEquipment status change is limited to a discrete schedule within the overall time period between the "start time" and the "end time", then this shall be encoded using as many as necessary timeInterval/Timesheet properties for the NavaidOperationalStatus of their TEMPDELTA Timeslice. See also the rules for Event Schedules. It is recommended that the HMI of a data provider application allows to provide a schedule only in relation with active times, because only these will be translated into NOTAM text.
ER-11	In accordance with the AIXM Temporality Concept (see sections 3.4 and 3.5 in version 1.0), the NavaidOperationalStatus associated with the TEMPDELTA replaces all the BASELINE NavaidOperationalStatus information, during the TEMPDELTA time of applicability. Therefore, if the modified operational status only concerns certain times, the other times when the navaid or equipment eventually remains with the same status as in the Baseline data, shall be explicitly included in the TEMPDELTA. The calculation of the necessary additional NavaidOperationalStatus elements to be included in the TEMPDELTA shall be automatically done by the applications implementing this specification.

All NavaidOperationalStatus elements that are copied from the BASELINE data for completeness sake shall get an associated Note with purpose=REMARK and the text="Baseline data copy. Not included in the NOTAM text generation". This is based on the current NOTAM practice which consists of including in the NOTAM only the changed information and not explicitly including the static data that remains valid during the NOTAM applicability.It is recommended that the input interface provides a "calendar/level" view of the navaid/equipment unserviceability, enabling the operator to graphically check the navaid/equipment operational status at different times, such as in the example below:

In the calendar view, the Baseline information that remains valid during the Event validity time shall be visibly identified from the information that is specific to the Event, for example by using a different colour fill pattern. |
| ER-12 | The Event BASELINE shall contain associationEvent with reference (href) to each of the AirportHeliport features indicated by the operator to be affected by the navaid unserviceability. |

Examples

Following coding examples can be found on GitHub (links attached):

- DN_NAV.UNS_all_components.xml