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TFR Protocol

FAA professionals are creating graphical TFR NOTAM data packets and posting them to a Jeppesen server via the Internet. FAA Flight Service Stations can then retrieve the data packets via the Internet and can display graphical TFR NOTAMs on a special version of Jeppesen's FliteStar® software to assist in pilot briefings. The TFR Protocol document was developed by Jeppesen in co-ordination with the FAA and both organizations have agreed to make the document available to the public. All interested vendors who wish to use the FAA's graphical TFR publishing system to receive and display real time graphical TFR NOTAMs may use this document to develop value-added software applications.

Revision History

Version	Update Comments	Author
1.0	Initial Revision	TS, BL, AA, SA, JPL

Table of Contents

Purpose of Document

The purpose of this document is to describe the technical specifications and commands used in the FliteStar TFR display program. This document assumes an understanding of XML and HTTP.

I. Client and Server Specifications

TFR access is based on XML data interchange via HTTP requests. The client and server implementations are not strictly specified, but must conform to the protocol specification for transmitting and receiving TFR data.

The TFR database system consists of 10 commands. Each of these commands may be executed on a TFR server. Each command must include a “UserID” and “Password” parameter that specifies a user who is known to the server.

Script Name	Action
Access.asp	Returns the list of available access parameters.
Types.asp	Returns the list of available types.
Colors.asp	Returns a list of colors.
Patterns.asp	Returns a list of patterns.
Available.asp	Returns a list of Unique IDs currently available.
Submit.asp	Submits a new TFR to the database.
Verify.asp	Verifies a newly submitted TFR.
Query.asp	Returns a TFR.
Delete.asp	Deletes a TFR.
Recover.asp	Recovers a deleted TFR.

Access.asp

This script returns a comma-separated list of strings that can be set into the “Access” parameter on a published TFR. A client that will not be publishing TFRs does not need to query this script.

Example:
http://www.jepptech.com/tfr/Access.asp?UserID=Public

```
<ACCESS>FAA,Public</ACCESS>
```

Types.asp

This script returns a comma-separated list of strings that can be set into the "Type" parameter on a published TFR. A client that will not be publishing TFRs does not need to query this script.

Example:
http://www.jepptech.com/tfr/Types.asp?UserID=Public

```
<TYPES>Miscellaneous,Chemical Spill,Earthquake,Fire,Flooding,Natural
Disaster,International Event,Law Enforcement,Military Activity,Natl Security Area,Olympic
Games,Power Plant,Presidential Event,Search/Rescue Effort,Shuttle/Missile Laun,Sports
Event</TYPES>
```

Colors.asp

This script returns a comma-separated list of colors and color names that can be used in the "Appearance" parameter on a published TFR. These are not the only colors than can be used; any color can be specified by its red, green and blue components. A client that will not be publishing TFRs does not need to query this script.

Example:
http://www.jepptech.com/tfr/Colors.asp?UserID=Public

```
<COLORS>Red=ff0000,Dark Red=800000,Green=00ff00,Dark
Green=008000,Blue=0000ff,Dark
Blue=000080,Cyan=00ffff,Magenta=ff00ff,Yellow=ffff00,Orange=ff8000</COLORS>
```

Patterns.asp

This script returns a comma-separated list of 64-bit hexadecimal integers representing patterns that can be used in the "Appearance" parameter on a published TFR. These are not the only patterns than can be used; any pattern can be specified directly. A client that will not be publishing TFRs does not need to query this script.

Example:
http://www.jepptech.com/tfr/Patterns.asp?UserID=Public

```
<PATTERNS>83070e1c3870e0c1,30180c060381c060,8000000000000000,80000000800000
00,8800000088000000,cccc0000cccc0000,5500550055005500,55aa55aa55aa55aa,010204
0810204080,8040201008040201,60c08103060c1830,c1e070381c0e0783,1122448811224
488,8844221188442211,3366cc993366cc99,99cc663399cc6633,0101010101010101,0303
030303030303,0707070707070707,0f0f0f0f0f0f0f0f,ff00000000000000,ffff000000000000,
ffffff0000000000,ffffffff00000000,ffffffff00000000</PATTERNS>
```

Available.asp

This script returns a list of TFR Unique IDs that are currently available. By default, TFRs that have been deleted are only returned for 15 minutes after they are deleted. TFRs that have expired are only returned for 24 hours after they expire. Optionally, two parameters can be specified that modify these times:

DeletedMinutes=N
ExpiredMinutes=N

Example:
http://www.jepptech.com/tfr/Available.asp?UserID=Public

```
<AVAILABLE>623,635,637,638,639,640,641,642,645,653,725,726,727,728,729,913,923,924
,1018,1237,1337,1390,1473,1503,1513,1520,1530,1533,1542,1558,1573,1574,1575,1576,
1577,1579,1580,1581,1582,1583,1584,1585,1586</AVAILABLE>
```

http://www.jepptech.com/tfr/Available.asp?UserID=Public&DeletedMinutes=0&ExpiredMinutes=0

```
<AVAILABLE>1575,1576,1577,1579,1580,1581,1582,1583,1584,1585,1586</AVAILABLE>
```

Submit.asp

Submit creates a new TFR. The data elements are sent as parameters to the script. Note that most HTTP servers will not accept a GET command longer than 256 characters, so a POST command must be used to send the data. On success, the response is the Unique ID of the new TFR. This new TFR is "unverified" so it must be downloaded via **Query.asp**, compared against the local version and marked as verified with **Verify.asp**.

If the UniqueID parameter is set when calling Submit.asp, the existing TFR with that ID will be modified. The modified TFR will have its "Verified" flag cleared, and must be re-verified.

Example:
http://www.jepptech.com/tfr/Submit.asp
Post data: UserID=Public&NID=&Name=&Comment=…

```
<NEWID>1587</NEWID>
```

Verify.asp

Marks a specific TFR "verified."

Example:
http://www.jepptech.com/tfr/Verify.asp?UserID=Public&ID=1587

```
<RESULT>OK</RESULT>
```

Query.asp

Query retrieves one or more TFRs. If the ID parameter is sent, the particular TFR with that ID is returned. If the ID parameter is not sent, or is blank, the Query script will return the full text of all the TFRs that are available. This is the same list that would be returned from **Available.asp**, and the same parameters are accepted to modify the expired and deleted times.

Example:
http://www.jepptech.com/tfr/Query.asp?UserID=Public&ID=1520

1520.xml

http://www.jepptech.com/tfr/Query.asp?UserID=Public

Tfrset.xml

Delete.asp

Deletes a specific TFR by ID.

Example:
http://www.jepptech.com/tfr/Delete.asp?UserID=Public&ID=1587

```
<RESULT>OK</RESULT>
```

Recover.asp

Recovers a deleted TFR.

Example:
http://www.jepptech.com/tfr/Recover.asp?UserID=Public&ID=1587

```
<RESULT>OK</RESULT>
```

If any of these 10 commands fail, an error similar to the following example will be returned:

```
<ERROR>
   <CODE>11</CODE>
   <TEXT>The User ID and password did not match any on file.  Please
       check your login information.  </TEXT>
 </ERROR>
```

The numeric portion of the error is primarily for reporting purposes, and the textual portion is for the benefit of the end user.

II. Individual TFR Specifications

An individual TFR consists of 20 data elements. The elements are described in table 1 below. The XML tag name and data type is listed for each element.

Field ID	Field Name	Example
ID	Unique Identifier	“42”
DELETED	Deleted Flag	"False"
NID	NOTAM ID	"ZAN 1/1109"
NAME	Name	"AK PAVD 1/1109 1 OF 2"
COMMENT	Comments	"...contact your local FSS."
ACCESS	Access Specifier	"Public"
APPEAR	Appearance	"2;0000ff;1;0000ff;30180c060381c060"
TYPE	Type	“Natural Disaster”
MINALT	Minimum Altitude	“2000A”
MAXALT	Maximum Altitude	“5000A”
SEGS	Segment Count	“7”
BOUND	Boundary	"CN38.837606W86.803R005.00"
SRC	Source Text	"!FDC 2/2183 ZID..."
CREATED	Creation Date/Time	"37461.7885756134" and "7/24/2002 6:55:33 PM"
MODIFIED	Modification Date/Time	"37461.7885756134" and "7/24/2002 6:55:33 PM"
ACTIVE	Activation Date/Time	"37461.7885756134" and "7/24/2002 6:55:33 PM"
EXPIRES	Expiration Date/Time	"37461.7885756134" and "7/24/2002 6:55:33 PM"
SUBMITID	Submitter ID	“Publisher”
SUBMITHOST	Submitter Host	“1.2.3.4” or “enduser5.faa.gov”

Unique Identifier

Each TFR is uniquely identified by a positive integer. This value is assigned by the server when the TFR is submitted.

Verified Flag

When a TFR is submitted to the server, it initially exists in an "unverified" state. The client that submitted the TFR must then query the new TFR and compare it to the original submission. Having verified that the server's TFR is identical to the original data, the client sends a specific request to the server to mark the new TFR as verified.

By default, unverified TFRs will not be returned in TFR requests.

Deleted Flag

When a publisher deletes a TFR, the server retains the TFR data and sets the "Deleted" flag for the TFR. Generally, the TFR data is retained for potential use in troubleshooting or investigation.

By default, the server will include deleted TFRs in the “available” list only if they have been deleted within the last 15 minutes.

NOTAM ID

An optional, human-readable text field identifying the NOTAM in which the TFR was described.

Name

An optional, human-readable text field generally used for listing TFRs to an end-user.

Comments

An optional, human-readable text field generally containing text from the original NOTAM other than that text describing the TFR boundary.

Access Specifier

One of the values derived from an "Access Request". This value controls what clients will have access to this TFR.

Appearance

A parsable string containing color, line style and other data controlling the desired appearance of the TFR. See section X for a description of the format of this field.

Type

A human-readable string categorizing the TFR. The possible values for this field can be obtained by making a "Types.asp” Request.

Minimum Altitude

A parsable altitude value describing the lower limit of the restriction. This value is a number in units of feet followed by "A" for "Above Ground Level" (AGL) or "M" for "Above Mean Sea Level" (MSL). "Ground Level" is specified by "0A."

Maximum Altitude

A field of the same format as Minimum Altitude, specifying the upper limit of the restriction.

Segment Count

This field is currently unused.

Boundary

A parsable text field containing the boundary of the TFR. See section X for a description of the format. This field may be blank for "Text Only" TFRs.

Source Text

The Source text is an optional, human-readable text field containing the original boundary description from the source NOTAM.

Creation Date/Time

Creation Date/Time is the date and time of the original submission. See section X for a description of the format.

Modification Date/Time

The date and time of the most recent modification. See section X for a description of the format.

Activation Date/Time

The date and time when the TFR becomes active. See section X for a description of the format. This field is optional. If left blank, the TFR is active immediately.

Expiration Date/Time

The date and time after which the TFR is no longer active. See section X for a description of the format. This field is optional. If left blank, the TFR is active until further notice.

Submitter ID

A text field containing the login ID used to submit this TFR.

Submitter Host

A text field containing the IP address or host name of the client used to submit this TFR.

Format of Date/Time Fields

Each date/time field is an XML tag containing the date and time in two formats.

The value contained in the child XML tag "NUMERIC" is a double-precision floating point number representing a date between January 1, 100 and December 31, 9999, inclusive. The value 2.0 represents January 1, 1900; 3.0 represents January 2, 1900, and so on. Adding 1 to the value increments the date by a day. The fractional part of the value represents the time of day. Therefore, 2.5 represents noon on January 1, 1900; 3.25 represents 6:00 A.M. on January 2, 1900, and so on. Negative numbers represent dates before December 30, 1899. This is the Microsoft "variant" date type.

The value contained in the child XML tag "TEXT" is a string in the format "MM/DD/YYYY HH:MM:SS [A|P]M". For example, "7/24/2002 7:00:04 PM" or "07/24/2002 07:00:04 PM."

All date/time values should be UTC.

Format of the Appearance field

The appearance field is in the format "a;bbbbbb;c;dddddd;eeeeeeeeeeeeeeee" where:

"a" is the outline width in pixels.

"bbbbbb" is the outline color, hexadecimal format. The least significant byte represents red, the next most significant byte represents green, the next most significant byte represents blue and the most significant byte is unused.

"c" is the fill type.
 0 - No Fill (Just an outline)

1 - Partial Fill (A thick, partially transparent line just inside the outline)
2 - Solid Fill (A partially transparent fill throughout the shape)

"dddddd" is the fill color, in the same format as the outline color.

"eeeeeeeeeeeeeeee" is the fill pattern. The fill pattern is a 64-bit hexidecimal value that represents the bits of an 8 by 8, monochrome bitmap. The first byte makes up the first row of the bitmap; the second byte makes up the second row of the bitmap, and so on.

Format of the Boundary field

The boundary field consists of a list of shapes, where each shape consists of a list of elements. Each shape may be "inclusive" or "exclusive". Exclusive shapes can be used to exclude an area from the restriction that is already part of an existing shape.

There are three shape element types. Each shape element type is identified by a single character:

"C" - Circle

Circle segments are in the format "[N|S]aa.aaaaaa[E|W]bbb.bbbbbbRc.cc" where:

"[N|S]aa.aaaaaa" is the latitude (north or south) of the center of the circle.
"[E|W]bbb.bbbbbb" is the longitude (east or west) of the center of the circle.
"c.cc" is the radius of the circle in nautical miles.

For example: "CN61.081389W146.39R001.00"

A circle segment must be the only segment within a shape. No other segments may precede or follow a circle segment.

"A" - Arc

Arc segments are in the format "A[+|-][N|S]aa.aaaaaa[E|W]bbb.bbbbbb[N|S]cc.cccccc[E|W]ddd.dddddd" where:

"+" describes a clockwise arc.
"-" describes an anti-clockwise arc.

"[N|S]aa.aaaaaa" is the latitude (north or south) of the center of the arc.
"[E|W]bbb.bbbbbb" is the longitude (east or west) of the center of the arc.
"[N|S]cc.cccccc" is the latitude (north or south) of the start of the arc.
"[E|W]ddd.dddddd" is the longitude (east or west) of the start of the arc.

The end of the arc is defined by the next point in the element sequence. The radius of the arc is computed from the distance between the center point and start point given.

For example: "A+N61.133950W146.24N61.163622W146.467873"

"L" - Line

Line segments are in the format "L[N|S]aa.aaaaaa[E|W]bbb.bbbbbb" where:

"[N|S]aa.aaaaaa" is the latitude (north or south) of the start of the line.
"[E|W]bbb.bbbbbb" is the longitude (east or west) of the start of the line.

For example: "LN61.063837W146.423738"

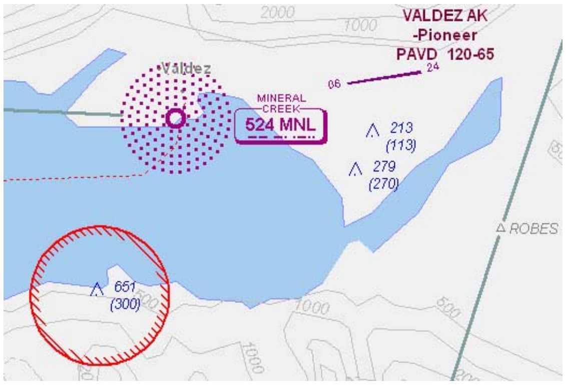
A line segment describes a line from the end point specified in the line segment to the start of the following segment.

A shape is described by one or more concatenated elements. Each shape is assumed to be closed, so the end point required by the last element is the start point of the first element.

Shapes are preceded by "R" for an inclusive shape or "B" for an exclusive shape. If the character is missing on the first shape, the shape is assumed to be inclusive. The character must be included on any additional shapes.

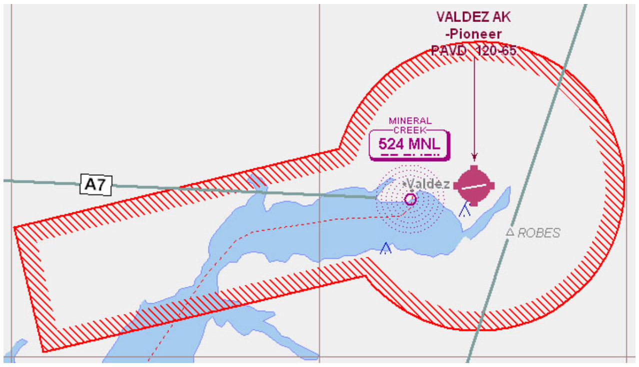
Shape examples:

"<BOUND>CN61.081389W146.39R001.00</BOUND>" (TFR 635: A single circle.)



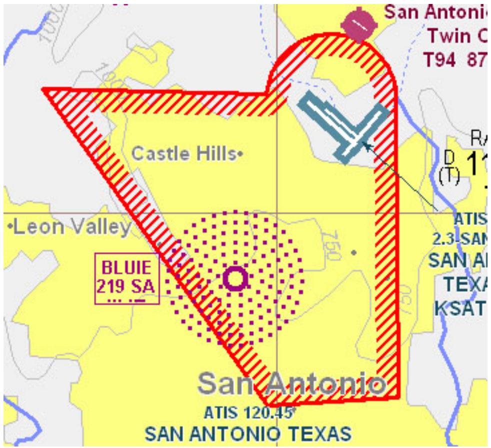
635.xml

"<BOUND>LN61.063837W146.423738LN61.003153W146.948197LN61.101608W146.996300A+N61.133950W146.24N61.163622W146.467873</BOUND>"
(TFR 623: A complex shape made up of lines and arcs.)



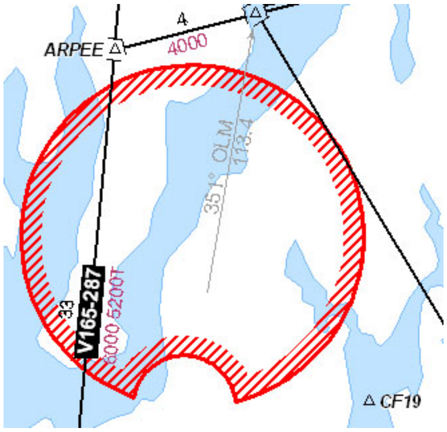
623.xml

"<BOUND>RLN44.200000W118.733333LN44.416667W118.733333LN44.583333W118.500000LN44.500000W118.083333LN44.200000W118.083333</BOUND>"
(TFR 672: A complex shape made up of lines and arcs, with the optional inclusive character.)



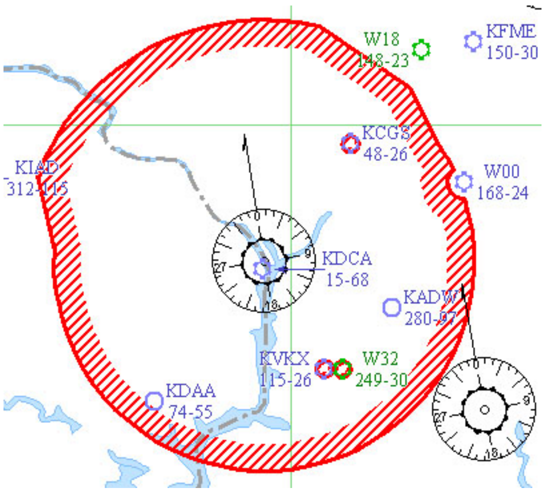
672.xml

"<BOUND>RCN47.742970W122.726371R005.00BCN47.660000W122.732333R001.50</BOUND>"
(TFR 726: A 5NM circle with a 1.5NM circle excluded from it)



726.xml

"<BOUND>RA+N38.859444W77.036422N38.948611W77.335556LN39.102350W76.964377LN39.038333W76.843889A+N38.859444W77.036422N38.983611W76.808889LN38.870572W77.313758BCN38.941333W76.772333R001.00</BOUND>"
(TFR 1520: A complex shape with a circle excluded.)



1520.xml

Glossary:

TFR	Temporary Flight Restriction. Included in TFRs are other airspace such as Special Rules Areas.
XML	Extensible Markup Language, a superset of Hypertext Markup Language (HTML).
HTML	Hypertext Markup Language.
HTTP	Hypertext Transport Protocol. HTTP is the Internet's standard protocol for transferring HTML.
NOTAM	Notice To Airmen.
NM	Nautical Mile (6076.12 feet or 1.15 Statute Miles)