4thTWLWG Meeting – Fish Hoek, South Africa

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XML Exchange Format for Harmonic Constituents and Predictions

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Exchange of data is important between FGHO's

- Ensures that the most up-to-date information is used in tidal / navigational products
- Less manual data entry – reduces the likelihood of random human error
- In harmony with IHO Technical Resolutions:

Relevant IHO Technical Resolutions

Title	Resolution Number	Latest Amendment (If any)	1st Edition Reference
EXCHANGE OF TIDAL INFORMATION	9/1919 as amended	42/2000	A6.1

It is resolved that published tidal information shall be freely exchanged. The exchange of tide and tidal current observations and predictions shall be made as far as possible in a form directly usable in electronic computers.

ADVANCE SUPPLY OF TIDAL PREDICTIONS	10/1919 as amended	75/2006	A6.2

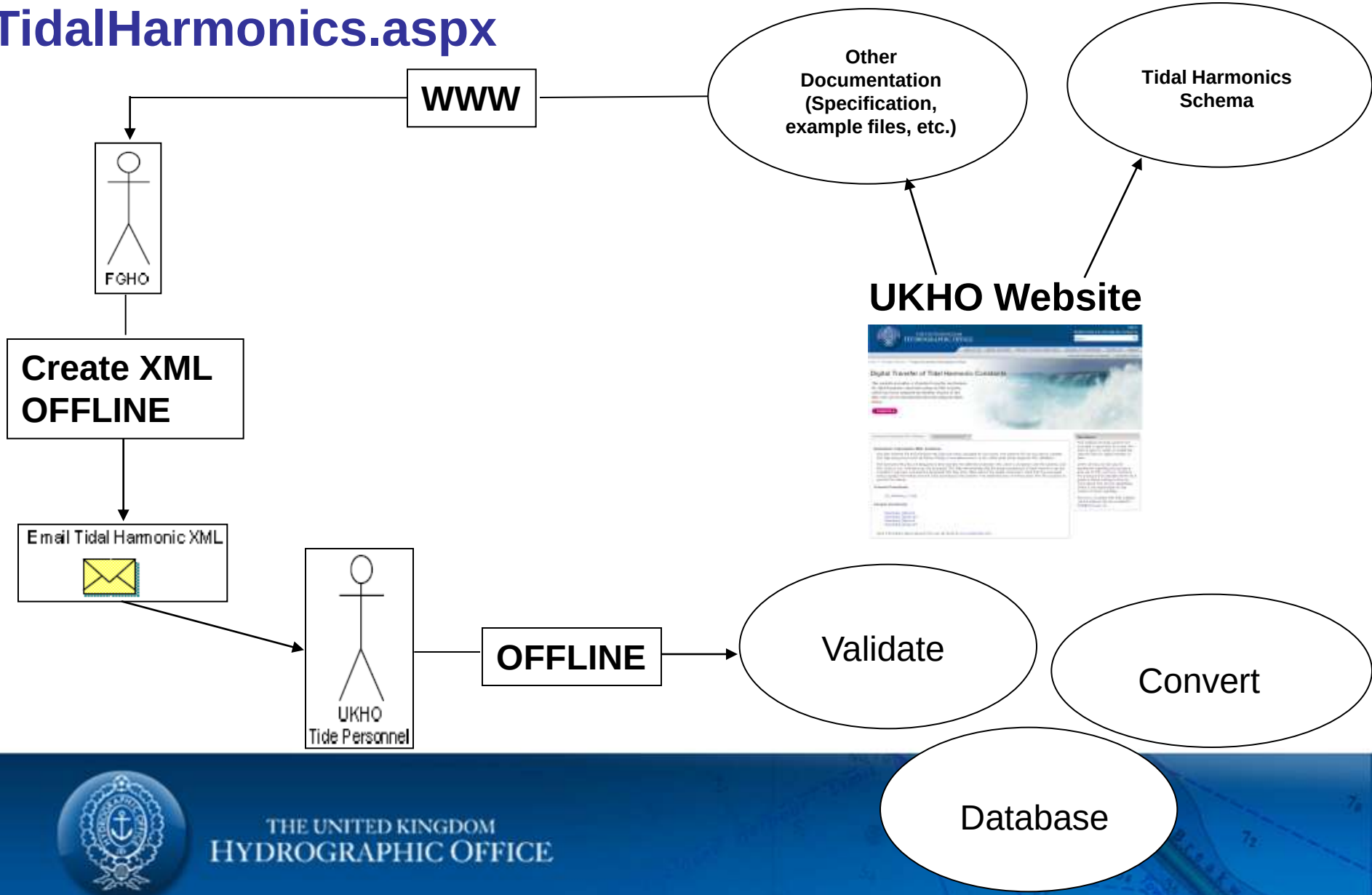
1 It is resolved that advance copies of tidal predictions shall be supplied on request to those Member States who require them for inclusion in their own published tables.

2 It is strongly recommended that these advance copies be supplied in sufficient time to be in the hands of the publishing authority not later than twelve months before 1 January of the year of predictions.

3 It is recommended that when tidal constituents or values of harmonic constants are changed from those used for tidal predictions for the previous year, the tidal constituents should also be supplied to the producer nation upon request together with the national tidal predictions.

4 It is recommended that tidal predictions supplied to other countries be in the form of the times and heights of high and low waters, unless these values are not normally predicted or are requested in another form.

UKHO Website
http://www.ukho.gov.uk/AdmiraltyPartners/FGHO/Pages/TidalHarmonics.aspx



Product Specification: Gives details of…..

- Header Information and Data Record
- Precision of Phase Angle (g) and Amplitude (H) relative to observation period
- Extended Doodson Number (XDO)
- Computation of the Astronomical Argument and use of the XDO
- General information on the major tidal constituents
- Reproduces the Standard List of Tidal Harmonic Constituents (as published on the IHO website at http://www.iho.int/mtg_docs/com_wg/IHOTC/IHOTC_Misc/TWLWG_Constituent_list.pdf)
- Application and Computation of Nodal Corrections
- Derivation of Speeds and values of Nodal Corrections from Constituent Names

North Sea Hydrographic Commission (NSHC)
Tidal Working Group 18th Meeting
SHOM, Brest 7-8 February 2012

- France (SHOM) presented some information about their use of XML
- SHOM have already used XML format for several years
- Used to create Tide Tables
- Distribute tidal products (numerical files) for Web or mobile external applications:
- Only one XSD for all information (XSD = XML Schema Definition which defines the structure of the XML file) :
  - Predictions
  - Tidal Levels
  - Chart Datum values + relation with land Datum

SHOM XML Data format description :

Tide table HW /LW prediction

```
<values content=« prediction »>
<!-- 1 -->
    <value moon=« PQ » state=« high »  coef =« 56 » >
        <dateTime>2011-01-01T04:02:00+01:00</dateTime>
        <height>2.60</height>
    </value>
    <value state="low">
        <dateTime>2011-01-01T10:13:00+01:00</dateTime>
        <height>0.45</height>
    </value>
    …
```

Time Zone :
allow to propose prediction in legal time (with summer time)

HAT

Tidal levels

```
<values content="rattachement">
    <value>
    <dateTime level="phma">2011-01-01T00:00:00+01:00</dateTime>
    <height>05.81</height>
    </value>
    ….
```

Chart Datum and relation with land datum

-
```
    <ram>
    <name>NO-47</name>
    <organisme>IGN</organisme>
    <year>1999</year>
    <zh_ref>9.541</zh_ref>
    <zh_rf>5.905</zh_rf>
    <rf_ref>-3.636</rf_ref>
    <ref>IGN69</ref>
    </ram>
```

SHOM now propose to include harmonic constants in XSD structure

Based on XML format from UKHO :
http://www.ukho.gov.uk/AdmiraltyPartners/FGHO/Pages/TidalHarmonics.asp

Header comparison

SHOM

```
<port meanLevel="3.24" typeMaree="semi-diurne-ve" type=« standart">
        <name>Dunkerque</name>
        <position>
                <systemeGeodesique>wgs84</systemeGeodesique>
                <latitude>51.050000</latitude>
                <longitude>2.366667</longitude>
         </position>
         <dateTime>2011-01-01T04:02:00+01:00</dateTime>
```

UKHO

```
<Port>
        <name>Dunkerque</name>
        <country>FR</country>
        <position>
                <latitude>-90 27.09S</latitude>
                <longitude>109 27W</longitude>
        </position>
        <timeZone>0700</timeZone>
        <units>m</units>
        <observationStart>2007-09-11</observationStart>
        <observationEnd>2007-09-12</observationEnd>
        <comments/>
```

Header suggestions

```
<port  typeport="standard">
        <name>Dunkerque</name>
        <country>FR</country>
          <position>
                    <Datum>wgs84</Datum>
                        <latitude>51.050000</latitude>
                        <longitude>2.366667</longitude>
                </position>
        <dateTime>2011-01-01T04:02:00+01:00</dateTime>

                <observationStart>2007-09-11</observationStart>
                <observationEnd>2007-09-12</observationEnd>

                 <unitsAmplitude>m</unitsAmplitude>
                <unitsPhase>degree_per_hour</unitsphase>

<comments/>
```

keep information about port

Code or Name => normalized

Position in decimal degree => for GIS or KML/ GML application With datum information

Date of Harmonic constants computation

Unit for amplitude and Phase

- <timeZone>0700</timeZone> : move as attribute with data

- Suggestion : add gap in observations or number of data ; resolution of data (1h , 10 min….) ; ?

Data – harmonic suggestions

1. Regroup all “harmonic” element in a global “Harmonics” element to separate data from header and other information.
2. Add timezone information as attribute of “harmonics” element : specific information relative to harmonic constants
3. Add Doodson Number to identify wave (problem with name usual spelling or wave without name…
4. Annex file with complementary information as : wave speed and nodal corrections (to avoid duplicate information)

```
<harmonics timezone=" +07:00 " >
        <harmonic>
                <name>M2</name>
                <inferred>false</inferred>
                <doodsonNumber>255555</doodsonNumber>
                <phaseAngle>235.8</phaseAngle>
                <amplitude>2.510684</amplitude>
                (<speed>28.984104</speed>)

        </harmonic>
        <harmonic>
                <name>S1</name>
                <inferred>false</inferred>
                <doodsonNumber>164555</doodsonNumber>
                <phaseAngle>52.1</phaseAngle>
                <amplitude>1.510684</amplitude>
                (<speed>15.0000012</speed>)
        </harmonic>
</harmonics>
```