



WMO Weather Symbols

4th Workshop on the Use of GIS/OGC Standards in Meteorology

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Contents

This presentation covers the following areas

- History
- Progress
- What next?
- Questions and answers



Ancient History



WMO Weather Symbols

- ~200 symbols unchanged for ~50 years
- ~150 symbols unchanged for ~25 years
- WMO No.485 Manual on Global Data Processing System still has at least one error
- WMO Manual scanned from paper & ink copies



Where are they defined?

- http://www.wmo.int/pages/prog/www/DPFS/documents/485_Vol_I_en_colour.pdf
- Are there any in WikiMedia or WikiCommons?
 - About 150, put up by NOAA, a Czech and a German
 - E.g.
 - http://commons.wikimedia.org/wiki/File:Symbol_code_ww_05.svg
- Resources?
 - http://external.opengeospatial.org/twiki_public/MetOceanDWG/FeatureAndCoveragePortrayal
 - Mainly low res, crude vector representations
 - http://external.opengeospatial.org/twiki_public/MetOceanDWG/WMOandICAStyles



Mediæval History



International Graphics Standards

- 2D Vector (& Image) Graphics sorted in 1970-1980s
 - Core, GKS, CGM, Postscript
- 3D Vector Graphics sorted in 1980-1990s
 - GKS3D, Phigs, OpenGL
- Vector graphics guerrilla 'wars', lock-in, etc
- Unicode established 1990s, pervasive 2010s
- Attempts to standardise fonts failed
 - Full scale font wars



International Graphics Standards Progress or not?

- Various Weather Fonts produced:
 - ESRI Weather font <http://www.fontpark.net/en/font/esri-weather/>
- Failed to get Weather Symbols into Unicode
 - Symbols not glyphs: use 2000 Private Use spaces
 - Random selection already included!
- Succeeded in getting 22 Station Circles into international registry of CGM Marker symbols
 - http://isotc.iso.org/livelink/livelink/fetch/-8916524/8916549/8916590/6208440/class_pages/markertype.html

INTERNATIONAL REGISTER OF ITEMS

[Go To Register](#)


Markertype Section

Register Identifier	Name of Registered Item (if name not present, description given in parenthesis)	Proposal Number
1	Dot	76
2	Plus sign	77
3	Asterisk	78
4	Circle	79
5	Diagonal cross	80
6	Meteorological Station Circle, one okta of cloud	81
7	Meteorological Station Circle, two oktas of cloud	82
8	Meteorological Station Circle, three oktas of cloud	83
9	Meteorological Station Circle, four oktas of cloud	84
10	Meteorological Station Circle, five oktas of cloud	85
11	Meteorological Station Circle, six oktas of cloud	86
12	Meteorological Station Circle, seven oktas of cloud	87
13	Meteorological Station Circle, eight oktas of cloud	88
14	Meteorological Station Circle, sky obscured	89
15	Meteorological Station Circle, sky not observed	90
16	Meteorological Automatic Station Circle, no cloud	91
17	Meteorological Automatic Station Circle, one okta of cloud	92
18	Meteorological Automatic Station Circle, two oktas of cloud	93
19	Meteorological Automatic Station Circle, three oktas of cloud	94
20	Meteorological Automatic Station Circle, four oktas of cloud	95
21	Meteorological Automatic Station Circle, five oktas of cloud	96
22	Meteorological Automatic Station Circle, six oktas of cloud	97
23	Meteorological Automatic Station Circle, seven oktas of cloud	98
24	Meteorological Automatic Station Circle, eight oktas of cloud	99
25	Meteorological Automatic Station Circle, sky obscured	100
26	Meteorological Automatic Station Circle, sky not observed	101

[Go To Register](#)

REGISTER FOR GRAPHICAL ITEMS

Markerstyle Section

Markertype value:	21
Name:	Meteorological Automatic Station Circle, five oktas of cloud
Sponsoring authority:	BSI
ISO Approval Date:	October 8, 1992
Date of Registration:	January 6, 1993
Amendment record:	
Description:	
<p>A hollow equilateral triangle with horizontal base and an inscribed circle with the right hand semicircle filled solid and a horizontal radius dividing the left hand semicircle into two quadrants, with the following visual representation.</p> <p>This symbol is used by all meteorologists in the 160 countries, and other territories, of the United Nation's World Meteorological Organisation, to mark the location of an observation on a map and to denote the observed cloud cover. Registration will make graphics vendors aware of this widespread standardization and improve the provision of graphical systems to meteorological users.</p>	
Argument Point:	The centre of the circle.
	
Relationship to standards:	
<p>1) ISO/IEC 7942:1985, Information processing systems - Computer graphics - Graphical Kernel System (GKS) functional specification - Specifies a registered markertype to supplement those defined in subclause 5.4.1 of ISO 7942.</p> <p>2) ISO/IEC 8632-1:1987, Information processing systems - Computer graphics - Metafile for the storage and transfer of picture description information - Part 1: Functional specification (CGM)- Specifies a registered markertype to supplement those defined in subclause 5.7.6 of ISO 8632.</p> <p>3) ISO /IEC 8805:1988, Information processing systems - Computer graphics - Graphical Kernel System for Three Dimensions (GKS-3D) functional description - Specifies a registered markertype to supplement those defined in subclause 5.4.1 of ISO 8805.</p>	



Modern History



Web 2.0 & Graphics

- SVG Scalable Vector Graphics in XML starting to be pervasive
- XML Namespaces starting to work properly
- WMO is adopting registries resolvable through XLink/URIs for its semantic content
- OGC WMS, WMTS and therefore SLD/SE becoming important to Meteorology
- 3rd Workshop on the Use of GIS/OGC Standards in Meteorology resolved:

SLD/SE & Portrayal Objectives

OGC standards
in meteorology

15 to 17 November 2010

Third workshop

- Make Met Ocean Symbologies and Layer Styles readily available to industry and institutions
- Help WMO establish formal ultimate ownership of the styles in a modern digital way (registries, etc)
- Contribute to the Portrayal and SLD/SE roadmap
- Do above by OGC TC Bonn, March 2011

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SLD/SE & Portrayal

Use of GIS/OGC standards
in meteorology

15 to 17 November 2010

Third workshop

- Collect comprehensive examples of WMO weather symbols (ECMWF, Met Office, IBL, KNMI, FMI?...)
- Create sample registry, with authoritative textual definitions
- Document some Product style rules (e.g. Metview chart)
- Formalise WMO point / line / area styles
- Document some detailed use cases for above
- Document a Roadmap and priorities for above
- Engage other communities: DGIWG, EGOWS, WMO, ISO
 - By Bonn TC – Feb 2011
- Excluded some work – out of scope or too soon

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Initial Flurry of Activity

- Collected lots of samples (mainly non-SVG)
- Identified WMO & ICAO reference material
- Found ~150 SVG symbols on Wikipedia/Media
- Set up OGC Met Ocean DWG Wiki pages:
 - http://external.opengeospatial.org/twiki_public/MetOceanDWG/FeatureAndCoveragePortrayal
- Nothing much for a while
- Then May 2012 NASA Space Apps Challenge hackathon, hosted session at Exeter
 - <http://2012.spaceappschallenge.org/home/>
 - Established GitHub,
 - Created and labelled another 50 symbols (~200)

NASA Space Apps Challenge: International Weather Symbols What to do?

- Put all WMO weather symbols on WikiPedia/Media
 - As SVG
 - With PNG fall backs
 - With some semantic info to relate back to strict WMO definitions
- Build some SKOS conceptual models if you want
 - Probably need to ask an old style meteorologists to get conceptual hierarchies correct enough
- Start on intelligent apps to display correct symbols



Thanks for joining all around the world in creating solutions of global importance related to spaceflight





Current Situation



Complete WMO set available

- Installed Inkscape on laptop
- Remaining ~150 symbols created in Inkscape
 - V0 Original files from Wikimedia & NASA Apps on GitHub
 - V1 first Complete Set (but no aviation specific)
 - V2 Complete Set, consistent sizes & CRS (55x55)
 - V3 All 'Inkscape'isms removed, consistent namespaces
- Work in Progress
 - Consistent descriptive metadata block defined:
 - Dublin Core, Linked Data RDF, Creative Commons, WMO
- V4 Symbol specific metadata to be done



Near Future



Tasks to be done

- Finish V4 with full metadata
 - Can always be stripped out for performance
- Choose minimal resolution and precision
 - For performance
 - For ease of generating image fall-backs
- Refine visual consistency
- Add a few more symbols and line styles:
 - Trough line, Ridge line, Intertropical Discontinuity, ITCZ, Convergence line, Shear line, Instability line, Squall line
 - Aviation symbols and linestyles
- Add polychromatic styling (e.g. **red** and **dashed**)



Met Office

Metadata Default Block

```
<svg:title>xxx</title>
<svg:desc>WMO international weather symbol:
xxx</desc>
<svg:metadata>
<rdf:RDF>
<cc:Work rdf:about="URIOfThisSVG">
<dc:format>image/svg+xml</dc:format>
<dc:type
rdf:resource="http://purl.org/dc/dcmitype/StillImage" />
<dc:title>xxx: Version0.3: statusProvisional</dc:title>
<dc:date>2013-01-25</dc:date>
<dc:creator>
<cc:Agent>
<dc:title>WMO CBS IPET-DR&C</dc:title>
</cc:Agent>
</dc:creator>
<dc:publisher>
<cc:Agent>
<dc:title>WMO</dc:title>
</cc:Agent>
</dc:publisher>
<dc:rights>
<cc:Agent>
<dc:title>Creative Commons Attribution 3.0
Unported Licence</dc:title>
</cc:Agent>
</dc:rights>
```

```
<dc:identifier>uri:http://codes.wmo.int/306/yyy</dc:identifier>
<dc:source>WMO-No.485 Manual on the Global Data-
processing and Forecasting System, Volume I, Part II,
Section 4, Appendix II-4</dc:source>
<dc:language>English</dc:language>
<dc:subject>
<rdf:Bag>
<rdf:li>meteorology</rdf:li>
<rdf:li>weather</rdf:li>
<rdf:li>symbol</rdf:li>
</rdf:Bag>
</dc:subject>
<dc:coverage>Global</dc:coverage>
<dc:description>WMO international weather symbol: xxx:
Version0.3: statusPROVISIONAL</dc:description>
<dc:contributor>
<cc:Agent>
<dc:title>Chris Little</dc:title>
</cc:Agent>
</dc:contributor>
<cc:license
rdf:resource="http://creativecommons.org/licenses/by/3.0/"
/>
</cc:Work>
</rdf:RDF>
</svg:metadata>
```



Publish

- Formal WMO registers:
 - [uri:http://codes.wmo.int/306/0200/0](http://codes.wmo.int/306/0200/0)
 - [uri:http://codes.wmo.int/def/bufr4/codeflag/0-20-086/6](http://codes.wmo.int/def/bufr4/codeflag/0-20-086/6)
 - [uri:http://codes.wmo.int/def/grib2/codeflag/4.2/0.2.1](http://codes.wmo.int/def/grib2/codeflag/4.2/0.2.1)
 - [uri:http://codes.wmo.int/ICAO/3/1/](http://codes.wmo.int/ICAO/3/1/)
- Wikimedia
 - Needs Wikipedia articles referencing them



Questions & answers



