OGC Web Services Initiative, Phase 8 (OWS-8):
Aviation Thread - Portrayal

Alex Brooker, Envitia
Jeroen Dries, Luciad
Daniel Tagesson, Carmenta
Aviation Portrayal - Objective

• Investigate OGC Standards based portrayal of AIXM according to ICAO guidelines
  – OGC Styled Layer Descriptor (SLD)
  – OGC Symbology Encoding (SE)
  – OGC Feature Portrayal Service (FPS)

• Portrayal Team:
ICAO

• ICAO: International Civil Aviation Organization
  United Nations agency for promoting worldwide safe and orderly development of international civil aviation.

• ICAO Annex 4: Aeronautical Charts
  ICAO Standards and Recommended Practices - Annex 4 to the Convention on International Civil Aviation “Aeronautical Charts”
Aviation Portrayal - Architecture

- Client performing local portrayal
Aviation Portrayal - Architecture

- Client using FPS for portrayal
Aviation Portrayal - Issues

• Portrayal of AIXM is complex
  – Relational model
    Often unidirectional relationships between features
  – Hierarchical data
    Different styles applied to nested children based on children’s properties
    Example:
    
    ```xml
    <RunwayDirectionLightSystem>
      ...
      <LightElement> ... </LightElement>
      <LightElement> ... </LightElement>
    </RunwayDirectionLightSystem>
    ```
  – Temporality!
Aviation Portrayal - Issues

• ICAO Symbology
  – Graduated fading boundaries
  – Complex line styles
  – Many inter-woven business rules and dependencies
Aviation Portrayal - Issues

- Symbology not covered by ICAO
  - Closed Runways or Taxiways
  - Unserviceable Navaids

- Proposed Stylings
Aviation Portrayal - Issues

• Label deconfliction
  – Cluttered maps when viewed in large-area overviews
  – Need for label deconfliction in SE/SLD
  – Need for context-driven deconfliction rules

```xml
<xsd:element name="Deconfliction">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element ref="se:CanBeRemoved" minOccurs="0"/>
      <xsd:element ref="se:Priority" minOccurs="0"/>
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
```
Portrayal - Results

• Conclusions
  – OGC standards can be used to portray most ICAO styles

• Suggestions
  – Portrayal of AIXM5 is complex
    Relational – XLink/WFS 2.0 recommended
    Hierarchical - Requires update to SE
      Change Request: "SE Symbolizer and Rule for styling of nested child objects"
      
  – Many icons and fillstyles => time consuming to create
    Common repository of SVG symbols proposed
  – Deconfliction hints in SLD/SE
    Requires further changes

• Engineering Report
  – OGC-11-089 ”Guidelines for ICAO portrayal using SLD/SE”
Future: Portrayal of Status Information from NOTAMs?