Overview

- Introduction and Motivation
- Aeronautical Data Quality
- Aeronautical Information Exchange Model
- ADQ and Surveyors
- Next steps
Introduction and Motivation

- International air traffic has reached its limitations due to steady growth and demands optimization of the air traffic management
- ICAO initiated a cooperation of
  - aircraft industries
  - airlines
  - airports
  - air traffic control
  - surveyors
  - FAA (Federal Aviation Administration)
  - EUROCONTROL
  - EASA (European Aviation Safety Agency)
Result: demand for modern air traffic management with aspects of data quality, integrity, reliability and assurance

Global Air Traffic Management Operational Concept, 2003

EU Initiative

- 2004: Frame concept (ICAO standards integrated)
- 2004: European Commission Regulation about Interoperability including aims for interoperability, safety, cost efficiency and environment protection
- 2009: European Air Traffic Management Master Plan, with focus on aeronautical data and aeronautical information
- 2010: European Commission Regulation 73/2010, requirements on the quality of aeronautical data and aeronautical information for the European single sky

ADQ Implementing Rule
Aeronautical Data Quality

The exchange format in between all steps is AIXM 5.1

Aeronautical Data Quality

- Structured electronic data
- Lossless transfers
- Electronic work flow management
- Documentation of all involved parties and individuals
- Documentation of purchase order, used equipment, calibration reports, date and time of operations, used software, reference information (datum)
- All coordinates are x, y, z (as attribute) and time
- Complete chain must be ADQ compliant
- Due to the amount of metadata the complete history can be recovered
AIXM 5.1

- The latest version of the Aeronautical Information Exchange Model is AIXM 5.1
- Enable interoperability between the actors of the aeronautical data chain
- Some rules:
  - unified modeling language (UML) or feature catalogue
  - temporality concept (time slice objects)
  - geographical information – spatial concept, i.e. points, curves and surfaces
- Data encoding by Extensible Markup Language (XML) resp. GML for geographical data which should be provided by standard GIS software

Example of dynamic feature (here runway) with time slice property

```xml
<complexType name="RunwayTimeSliceType">
  <complexContent>
    <extension base="aixm:AbstractAIXMTimeSliceType">
      <sequence>
        <group ref="aixm:RunwayPropertyGroup"/>
        <element name="extension" minOccurs="0" maxOccurs="unbounded">
          <complexType>
            <sequence>
              <element ref="aixm:AbstractRunwayExtension"/>
            </sequence>
            <attributeGroup ref="gml:OwnershipAttributeGroup"/>
          </complexType>
        </element>
      </sequence>
    </extension>
  </complexContent>
</complexType>
```
Surveyors are involved in capturing and updating terrain, obstacle and aerodrome data, called ETOD.

This information will be published later in the AIP, the aeronautical information package.

Defined by ICAO:
- feature catalogue
- horizontal reference system WGS 84 (geographic coordinate system)
- height reference system EGM 96
- temporal reference Gregorian calendar and UTC

All data transformations to be documented in metadata.
Each action and interaction to be documented including personalized data.
ADQ and Surveyors

Aerodrome obstacle chart

Demand for electronic work flow management system starting from incoming purchase orders at the surveyors office as data originator till the delivery of AIXM data

- Not covered by standard office software
- GIS suppliers are on their way like ESRI (limited to AIXM 4) or Bentley ‘s MAP Airport Data Model (just GML)
- Extensive variety of metadata to be delivered
ADQ – Next Steps

- Surveyors community has very few awareness of the actual situation to be compliant with FAA and ADQ regulations
- 2 Service Providers coming from aeronautical information services and surveying services teamed up and offering
  - consultancy
  - training
  - work flow management and audit
  - AIXM 5.1 conversion
in this new field of Aeronautical Data Quality

- Deadline for ADQ compliance of **30.06.2017** is challenging
Thank you for your attention