



**AIXM 5 in practice: tools,
research, and actual
implementations**

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Overview

- **Luciad Introduction**
- **AIXM 5 implementation**
- **Projects using Luciad AIXM 5**
- **Demos**
- **Questions**

01

Luciad Introduction

- Who is Luciad?
- Who are Luciad customers?
- What does Luciad offer?



Who is Luciad?

**Specialized in high-performance visualization
for situational awareness applications in
Aviation, Defense, and, Security**

Who are our customers?



What products does Luciad offer?

- **LuciadMap**

- Lucy
- Web Services suite
- 30+ RAD packages

LUCIAD | MAP

LUCIAD | LUCY

LUCIAD | WEB
SERVICES SUITE

- **Luciad ATCPlayback**

LUCIAD | ATC
PLAYBACK

- **LuciadEarth™**

LUCIAD | EARTH™

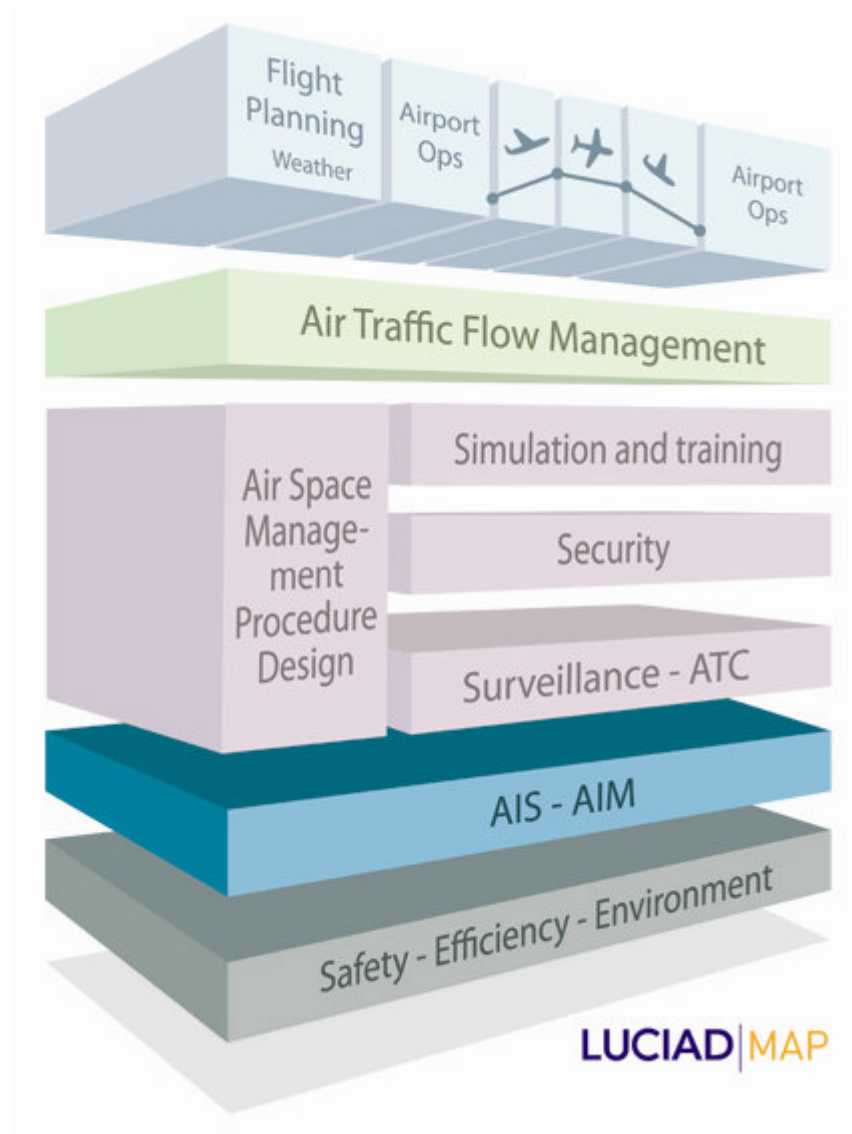
LUCIAD | MAP

Software platform for ATM application development

- **High performance visualization**
- **Open, object-oriented architecture**
- **Flexible, modular structure**
- **Direct support for Aeronautical Data Standards:**
 - ARINC424, AIXM 3.3, 4.5 & 5.0, DAFIF, AMXS, ASTERIX, ASDI-ETMS, ...
- **High-precision geometry calculation**
- **Terrain and Weather**
- **Support for mission critical applications**
- **OGC Compliant web services**
 - WMS, WFS, WFS, ...



Expertise and Strengths in ATM



02

Luciad AIXM 5 implementation

Goals

Decoding / Encoding

Extensions

Temporality



Luciad AIXM5 Implementation

Goal

- **Allow easy development of applications using the full power of AIXM 5**
- **Take away complexity – Leave in flexibility**
 - 3000+ Schema elements
 - Xpath / Xlink resolution
 - Extensions
 - Temporality
 - High performance visualization

LuciadMap 9.0 - AIXM5 support

- **Full AIXM 5.0 support**
- **Round trip decoding, editing, encoding**
- **Fully integrated in LuciadMap toolkit**
 - Easy to program applications on top of API
 - Integrates with 2D, 3D, Web services, ...
- **High performance**
- **Visualization according to ICAO symbology**
- **Full temporality support (NOTAM, updates)**
- **Support for AIXM 5 extensions**

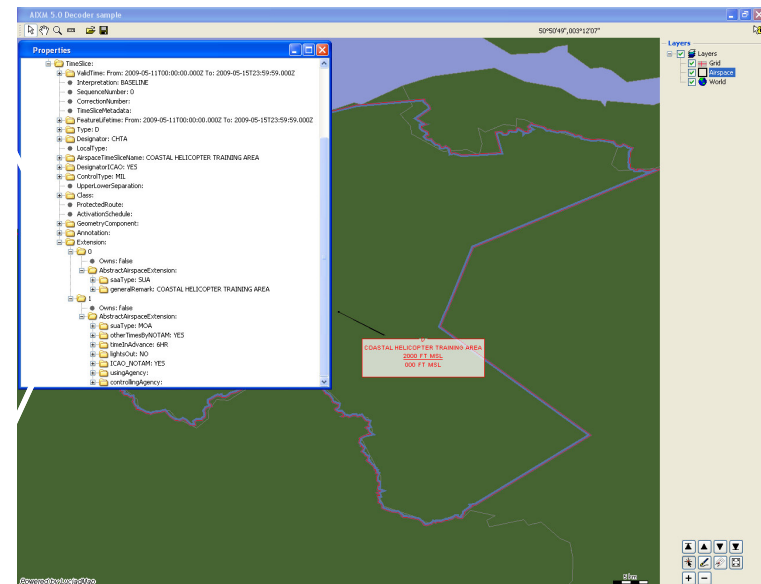
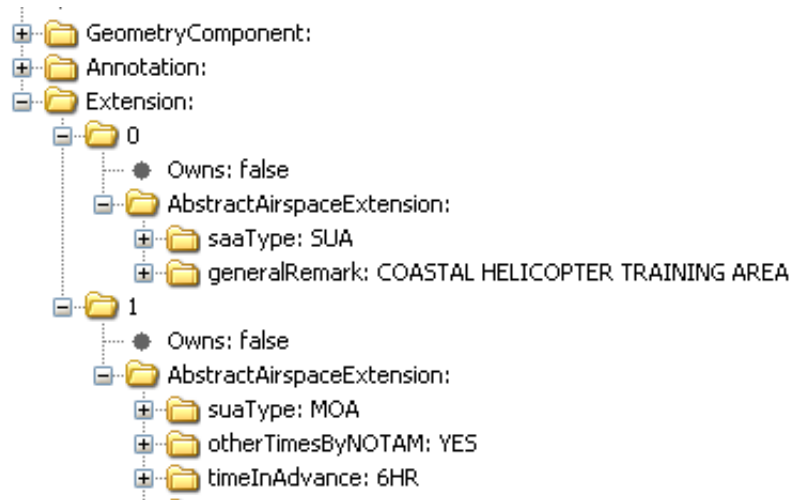
Luciad AIXM5 Decoding/Encoding

- **Deal with comprehensive model**
 - Code generation
 - Full access to domain objects & properties
 - Optimized for speed and memory use
 - Automatic Xlink resolution
 - Aggregate air spaces
- **Performance**
 - 30MB file → 5 to 6 seconds to decode & visualize
 - 30MB file → 2 to 3 seconds to encode
 - (20-30k features)

Luciad AIXM5 Extensions

- **AIXM 5 extensions**
 - Custom data
 - Extended schemas

- **All extensions automatically decoded**



Luciad AIXM5 Temporality

- **Flexible handling of AIXM temporality**
 - Explicit modeling of AIXM messages
 - Tools to merge messages in a snapshot/baseline

// Apply digital NOTAM to a baseline dataset

```
// Given TLcdAIXM5MessageAIXMBasicMessage basicMessage and TLcdAIXM5DNOTAMEvent digitalNOTAM
```

```
// Retrieve the feature with the TEMPDELTA time slice from the Digital NOTAM.
```

```
TLcdAIXM5AbstractAIXMFeature aixmFeature = digitalNOTAM.getHasMember().get(0).getAbstractAIXMFeature();
```

```
// Add the TEMPDELTA feature to the Basic Message.
```

```
basicMessage.addElement(aixmFeature, ILcdFireEventMode.FIRE_LATER);
```

```
// Merge the TEMPDELTA feature with the existing BASELINE feature in the message.
```

```
AIXM5MessageFilter.mergeUniqueFeatures(basicMessage);
```

// Create a snapshot at a specific time

```
TLcdAIXM5AbstractAIXMMessage snapshot = AIXM5MessageFilter.generateSnapshot(basicMessage, currentDate);
```

03

Luciad AIXM 5 in use

FAA SUA, Airport GIS
Eurocontrol Skyview 2
OGC OWS-6 AIM



Projects using Luciad AIXM 5

- **FAA Special Use Airspaces**
 - Airspace editing in AIXM 5
- **FAA Airport GIS**

- **Eurocontrol Skyview 2**
 - Will integrate decoding of AIXM 5 data

- **OGC OWS-6**
 - Electronic Flight Bag client based on LuciadMap
 - WFS, OGC Filter, Event/Notam mechanism



03



Lucy

Airspace editing



AIXM 5 Demos

Luciad AIXM 5 Roadmap

- **LuciadMap 9.0 has full AIXM 5.0 support**
- **AIXM 5.1**
 - Support in LuciadMap shortly after finalization of standard
- **Work with customers from early developments up to operational systems**

**Flexible, high performance AIXM 5
software platform**