ICAO BANGKOK UNITING AVIATION

Validating IWXXM

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Webinar on the implementation of the ICAO Meteorological Information Exchange Model (IWXXM), 27 to 29 October 2020

Validating IWXXM

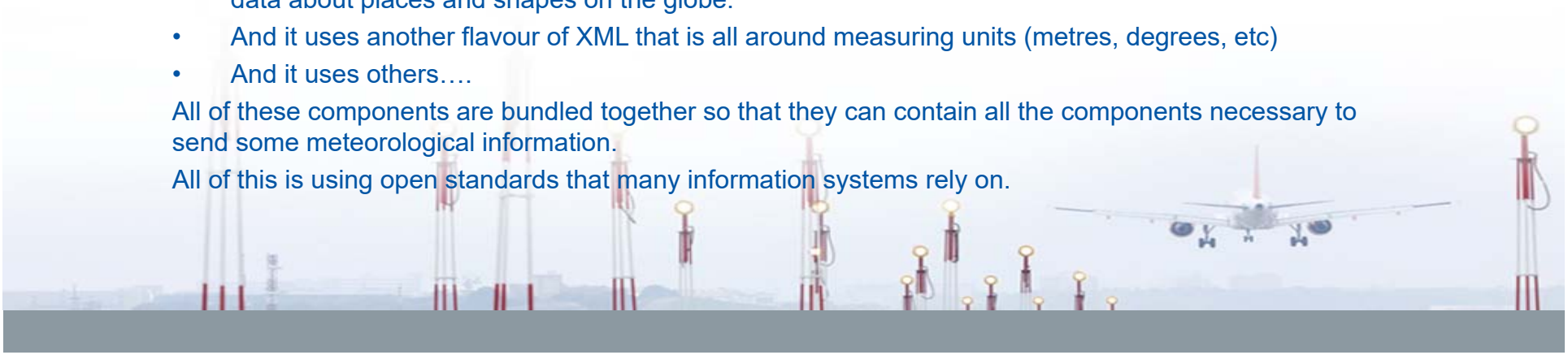
This discussion is not to teach anyone technically about how to use XSDs, its to explain why!

IWXXM is based on a generic data structure called XML. XML grew out a family of computer languages that are based around data. eXtensable Markup Language.

- It uses another flavour of XML called GML “Geographic Markup Language” that specialises in holding data about places and shapes on the globe.
- And it uses another flavour of XML that is all around measuring units (metres, degrees, etc)
- And it uses others….

All of these components are bundled together so that they can contain all the components necessary to send some meteorological information.

All of this is using open standards that many information systems rely on.

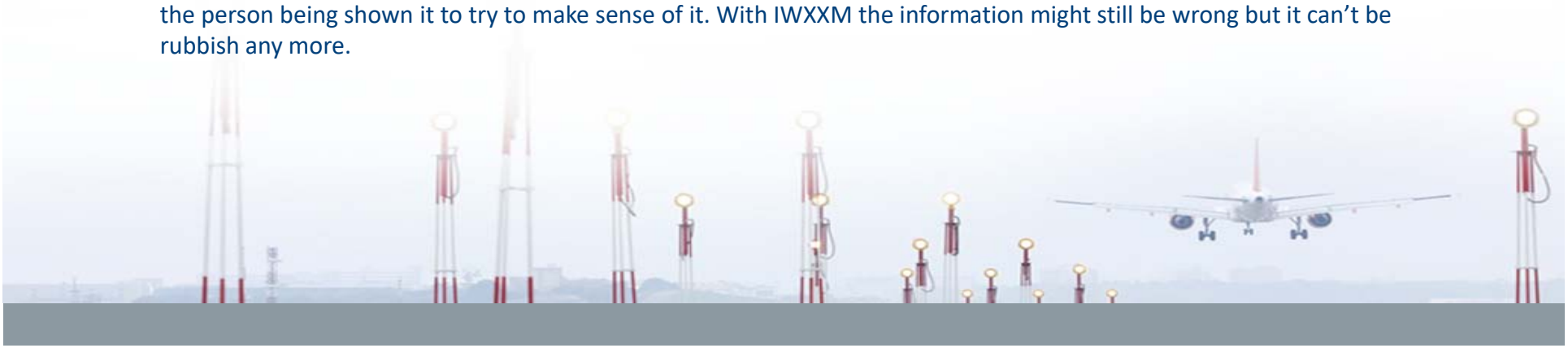


Previous met formats

Before IWXXM, to really understand some met data the receiver needed to know or have access to a lot of other information. Basic stuff like “Where an airport was” etc because an ICAO designator like “NZWN” doesn’t tell you much really. The receiving person or system just had to know or have knowledge, manuals, books, etc at hand.

So the basic idea about IWXXM is that every message tells the receiver enough information to use the information without any prior knowledge about where and when the data is about. Also, the data can be manipulated and combined with data from other sources.

In the past with TAC the computer really just had to show what it was given. It could be wrong or rubbish and it was up to the person being shown it to try to make sense of it. With IWXXM the information might still be wrong but it can’t be rubbish any more.

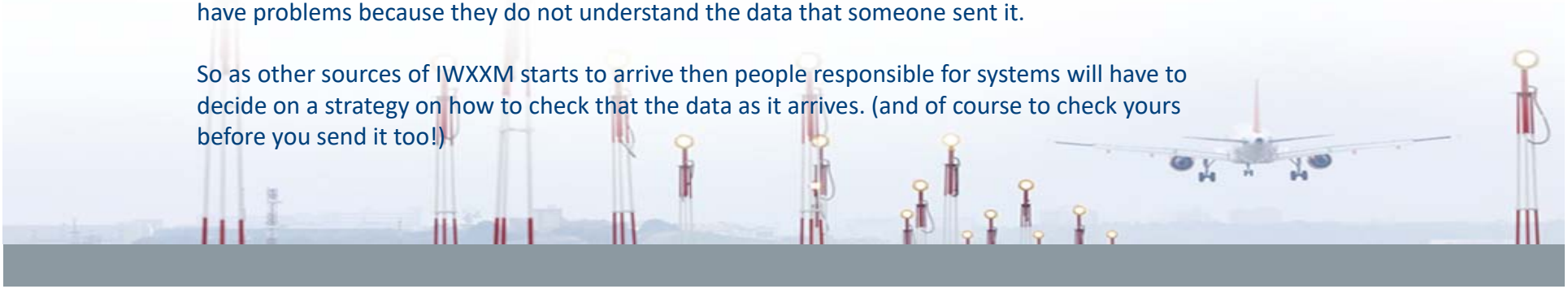


From XML came XSDs

As XML grew in popularity people and their computer systems wanted to check that these data structures were correct so they invented another layer of complexity that could be used to check that a file of XML had the right structure or shape. So another type of data structure grew up, called XSD “XML Schema Definition” which was a means of describing what the data should look like.

So the expected process is that when the receiver of some IWXXM (XML) gets some new data from somewhere then the first thing to do is check that the XML is good before it tries to use it or give it to someone else. This is done by checking the XML against its XSD. The reason that this should be done is no one wants that the multiple computer systems under their control have problems because they do not understand the data that someone sent it.

So as other sources of IWXXM starts to arrive then people responsible for systems will have to decide on a strategy on how to check that the data as it arrives. (and of course to check yours before you send it too!)



What will your strategy be for handling IWXXM data?

What will not work is anyone looking at the data to manually check it.

The expected process is that at steps along the way a component in your system, with the IWXXM XSD, and all its children, at hand checks that each XML file passing through is good.

What comes with this check is a decision for you to make about what do you do with any rejected messages.

Ideally every system that gets the data should checks that its complete and correct and “well formed” before it tries to use it.

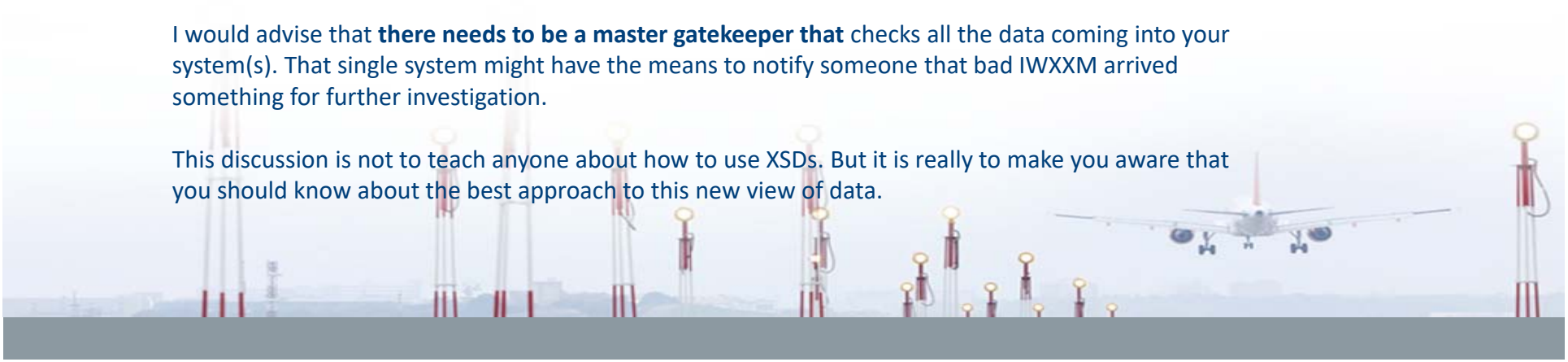
The XSD's for IWXXM are publicly accessible on the internet but :

These should be cached – you don't want to get all this every time for each document. If a computer system has no internet connection it still wants to be able to check and display the data.

These should be updateable, added to occasionally – If there is a change to IWXXM then there will be a corresponding new version of XSD (so there will be an XSD for IWXXM version 3 and another for 3.1… and another when IWXXM 4 comes along)

I would advise that **there needs to be a master gatekeeper that** checks all the data coming into your system(s). That single system might have the means to notify someone that bad IWXXM arrived something for further investigation.

This discussion is not to teach anyone about how to use XSDs. But it is really to make you aware that you should know about the best approach to this new view of data.



The advantages of this approach:

New versions of IWXXM or some of its underlying libraries are more manageable, but as with any new technology, it comes with some start up overheads. We are all in this start up phase.

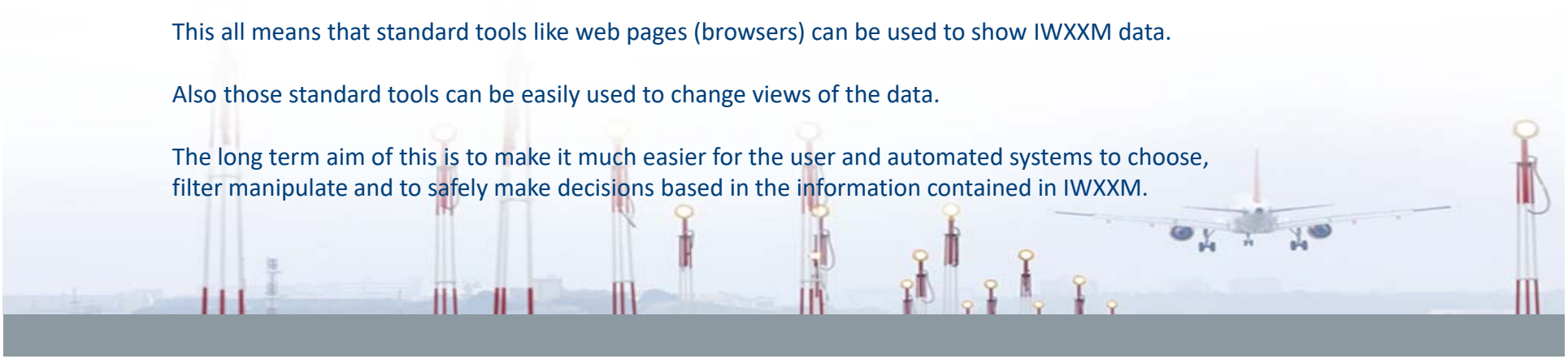
Cleaner data. Less faults due to bad data breaking systems.

Less custom code needs to be maintained. Someone else maintains the XSD's you just need to be able to get new ones as necessary.

This all means that standard tools like web pages (browsers) can be used to show IWXXM data.

Also those standard tools can be easily used to change views of the data.

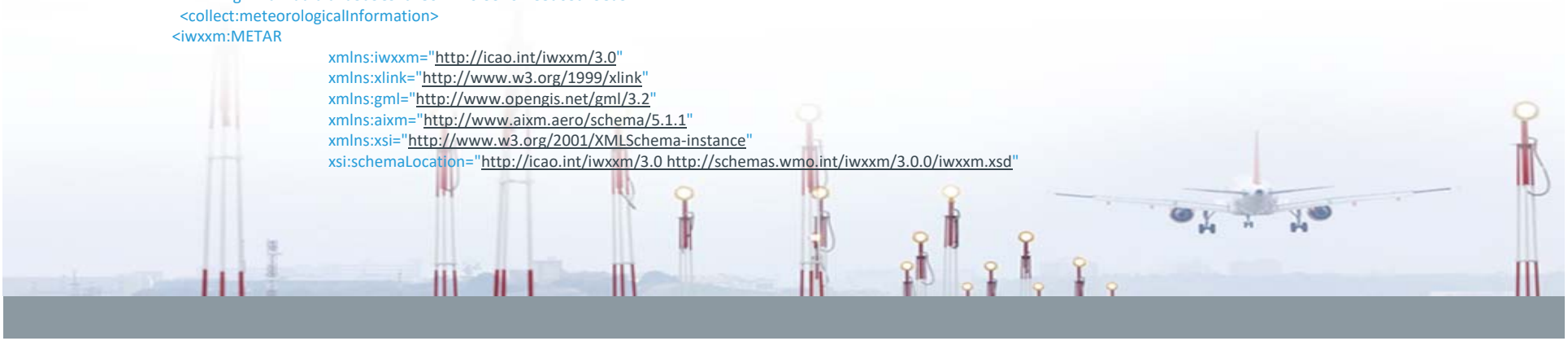
The long term aim of this is to make it much easier for the user and automated systems to choose, filter manipulate and to safely make decisions based in the information contained in IWXXM.



Where are these XSDs?

At the top of any IWXXM document there is a section for the checking systems to use that. So the IWXXM says where the XSDs are that describe the IWXXM

```
<?xml version="1.0" encoding="UTF-8"?>
<collect:MeteorologicalBulletin
        xmlns:collect="http://def.wmo.int/collect/2014"
        xmlns:gml="http://www.opengis.net/gml/3.2"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
        xsi:schemaLocation="http://def.wmo.int/collect/2014 http://schemas.wmo.int/collect/1.2/collect.xsd"
        gml:id="uuid.a2a3d9e9-b280-4110-9946-7e8d03a798a5">
 <collect:meteorologicalInformation>
<iwxxm:METAR
                xmlns:iwxxm="http://icao.int/iwxxm/3.0"
                xmlns:xlink="http://www.w3.org/1999/xlink"
                xmlns:gml="http://www.opengis.net/gml/3.2"
                xmlns:aixm="http://www.aixm.aero/schema/5.1.1"
                xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
                xsi:schemaLocation="http://icao.int/iwxxm/3.0 http://schemas.wmo.int/iwxxm/3.0.0/iwxxm.xsd"
```



XSDs are also just another XML format

```
−<schema elementFormDefault="qualified" targetNamespace="http://icao.int/iwxxm/3.0" version="3.0.0">
    <include schemaLocation="measures.xsd"/>
    <include schemaLocation="common.xsd"/>
    <import namespace="http://www.opengis.net/gml/3.2" schemaLocation="http://schemas.opengis.net/gml/3.2.1/gml.xsd"/>
  −<annotation>
    −<documentation>
        METAR and SPECI reporting constructs as defined in ICAO Annex 3 / WMO No. 49-2. METAR and SPECI reports include identical information but are issued for
        different purposes. METAR reports are routine observations made at an aerodrome throughout the day. METAR observations are made (and distributed) at intervals of or
        hour or, if so determined by regional air navigation agreement, at intervals of one half-hour. SPECI reports are special (i.e., non-routine) observation made at an aerodror
        as needed. SPECI observations are made (and distributed) in accordance with criteria established by the meteorological authority, in consultation with the appropriate AT
        authority, operators and others concerned. References to WMO and ICAO Technical Regulations within this XML schema shall have no formal status and are for
        information purposes only. Where there are differences between the Technical Regulations and the schema, the Technical Regulations shall take precedence. Technical
        Regulations may impose requirements that are not described in this schema.
      </documentation>
    </annotation>
  −<element name="MeteorologicalAerodromeObservationReport" type="iwxxm:MeteorologicalAerodromeObservationReportType" substitutionGroup="iwxxm:Report"
    abstract="true">
    −<annotation>
      −<documentation>
          A report of observed and trend forecast weather phenomenon from the surface near an aerodrome. This is a shared superclass for METAR and SPECI reports, which
          have identical reported information.
        </documentation>
      </annotation>
    </element>
  −<complexType name="MeteorologicalAerodromeObservationReportType" abstract="true">
    −<complexContent>
      −<extension base="iwxxm:ReportType">
        −<sequence>
          −<element name="issueTime" type="gml:TimeInstantPropertyType">
            −<annotation>
                <documentation>The time at which this report was issued</documentation>
              </annotation>
            </element>
          −<element name="aerodrome" type="iwxxm:AirportHeliportPropertyType">
```

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THANK YOU