

AIRWAYS

**A I R W A Y S U P D A T E
M E T E O R O L O G Y
S Y M P O S I U M**

October 2018

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SBAS Trial

Project Title	Benefits derived from SBAS enabled LPV instrument approach procedures in New Zealand
Project Leader and Organisation	Mike Haines Airways New Zealand
Project Collaborators	Aeropath NZ Auckland Rescue Helicopter Trust Civil Aviation Authority New Zealand Helicopters Otago Limited (HeliOtago) IQ Aviation
Start Date	October 2017
Technical Report	Complete
Final Report	Complete

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SBAS Trial Process

The process followed included;

- Testing the SBAS L1 and L1/L5 service coverage across New Zealand. This verified signal reception at various aerodromes, heliports, and a number of both high and low level IFR routes.
- Testing the reliability of the SBAS L1 and L1/L5 signal in-flight to ensure it met the requirements to enable instrument approach procedures with lower minima to be promulgated and flown.
- At selected aerodrome and heliport locations, assess the actual minima reduction achievable from the use of SBAS. From this data assess the possible benefits from lower approach minima.

Specific emphasis was placed on two types of operations;

1. Helicopter Emergency Medical Services (HEMS) where the availability of SBAS can provide guidance to heliports in poor weather, and open up enroute altitudes that aren't affected by inflight icing.
2. Regional aerodromes where poor weather conditions, coupled with constraints of existing instrument approach procedures, lead to flight diversions and cancellations.

Recording and monitoring equipment was deployed on board a specialised flight inspection aircraft (and suitably equipped helicopters) to record real time SBAS coverage and performance, along with conventional and non-augmented GPS signals.

SBAS Trial Outcomes

- The results found the SBAS L1 and L1/L5 test-bed signal available was acceptable for use by aircraft to conduct instrument approach procedures.
- The results show minima reductions at several regional aerodromes where current instrument procedures limitations mean that in certain weather conditions an aircraft must divert to another aerodrome or in some cases not operate at all.
- For helicopter operations SBAS can enable a better enroute flight level due to enhanced accuracy of the lateral guidance which results in operations that are currently cancelled to being able to operate and for medical flights this can result in lives being saved.
- SBAS also assists the development of specific vertical guided heliport approach procedures to low volume or isolated locations.

Minima improvement at assessed Airports.

Of the 25 assessed runway vectors at the airports selected;

- 4% saw no improvement in minima
- 20% achieved at least minimal improvement in minima (<100ft)
- 32% achieved at least moderate improvement in minima (100-200ft)
- 44% achieved significant improvement in minima (>200ft)

Of the 19 runway vectors assessed as achieving either substantial or moderate improvement in minima;

- 12 (63%) are classified as having low or medium design difficulty.
- 7 (37%) are classified as having high design difficulty.

In relation to RPT operations, of the 25 runway vectors assessed;

- 12 (48%) currently cater for 2nd and 3rd tier RPT traffic.
- 14 of these 25 presently cater for, or have catered for 2nd and 3rd Tier RPT traffic in the last 10 years.

DIGITAL TOWERS

RFP was published

- Decision to enter contract
- 2019 trial to commence
- Looking at Invercargill
- Possible as a contingency at others
- Other options for flexibility

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New ATM System Implementation

- Commenced March 2017 with completion July 2021

key milestone/deliverable	status*	planned/ revised completion date	comments
Build 1	<input checked="" type="checkbox"/>	Feb 2018	Completed. Is operational on live ATM system.
Build 2	<input type="checkbox"/>	Oct 2018	Completion of new operator interface, merging and new trajectory model is in production.
Build 3	<input type="checkbox"/>	Jun 2019	Completion of new system on new hardware and new HMI, medium term conflict detection, data linking and dual channel architecture is in planning phase
Testing and Final Installation	<input type="checkbox"/>	Mar 2020	Factory test in Christchurch and install and test in Auckland and towers, stability test.
Domestic ATM transition	<input type="checkbox"/>	Sep 2020	Domestic sectors and towers transition to new system over 6 months
Build 4	<input type="checkbox"/>	Nov 2019	Initial Oceanic Build from Leidos
Airways Oceanic Build	<input type="checkbox"/>	Oct 2020	Final Oceanic Build from Airways
Test Oceanic Features	<input type="checkbox"/>	May 2021	Test the software
Oceanic ATM transition	<input type="checkbox"/>	Jun 2021	Oceanic sectors working on new Skyline X system

New ATM system

- The software Build 2 is being built. This will complete the merge of Airways and Leidos code bases; provides the basic new operator interface; and integrates a new trajectory model in the lab for testing. This Build is two thirds the way through and on track for completion in October.

- Build 2 continuing. Build 2.3 software is completed and is being tested. The merge is 82% complete with focus on coordination and tracking
- Scenario testing of a 42 inch display in the simulator with enroute and terminal controllers showing no safety issues
- Electronic Flight Strip requirements for towers being finalised and software development commenced

- Build 2.3 tested.
- Mock-up of windows on displays for various sectors and deciding on a display configuration
- Oceanic design review in the US with Leidos

Airways AMHS implementation - Update

- AMHS messaging will support the full ASCII character set and the exchange of non-textual data via File Transfer Body Parts (FTBP). As such, AMHS can be used to exchange MET Data in IWXXM format.
- MetService have replaced their Kelburn AFTN connection with an AMHS connection (operational in early August 2018). Their Auckland DR system already has an AMHS connection.
- Incoming MET data from MetService is routed via AMHS all the way to the Airways smartWeather system. However, MET data (METAR, TAF, SIGMET) is still received in the form of TAC-format MET messages.
- The Airways connection to the USA is via AMHS.
- Airways link to Australia will be upgraded to an IP-based AFTN connection in Q4 2018 (interim solution for loss of X.25 connection).
- Airways AMHS link to Australia is scheduled for Q1/Q2 2019 once the CRV is operational.

Airways smartWeather support for IWWXM

- Airways use a Frequentis 'smartWeather' system for the reception, validation, storage and distribution of TAC-format MET reports.
- Version 5.2 of the smartWeather product fully supports the reception, validation, storage and distribution of MET data in both TAC and IWXXM format. It also support the conversion of TAC to IWWXM and *vice versa*.
- The IWXXM functionality provided by smartWeather version 5.2 is being used operationally by Naviair (Denmark).
- Airways will need to upgrade their smartWeather system to version 5.2 in order to be IWXXM capable.
- Acquisition of the IWXXM capability will involve a considerable additional SW licensing cost.

I W W X M Converter Test utility

- Frequentis have made an IWXXM Converter utility available for testing and feedback by the Aviation industry:

<http://iwxxmconverter.projects.frequentis.com>

The screenshot shows the Frequentis IWXXM Converter web application. The header is dark blue with the Frequentis logo and navigation links: About, TAC to IWXXM (highlighted with an orange underline), and IWXXM to TAC. A user profile 'Ian Dore' is visible in the top right. The main content area is light blue and contains a text input field labeled 'TAC text' with a placeholder 'TAC text'. Above the input field is a prompt: 'Copy paste a TAC message or choose an example from the dropdown:' followed by a blue button labeled 'Examples' with a dropdown arrow. Below the input field is a blue button labeled 'Convert to IWXXM'.

I W W X M Converter Test utility

FREQUENTIS
IWXXM Converter

About TAC to IWXXM IWXXM to TAC Ian Dore

Copy paste a TAC message or choose an example from the dropdown: Examples ▾

```
SANZ31 NZKL 262230
METAR NZAA 262230Z AUTO 23011KT 9999 BKN055/// 15/09 Q1017 NOSIG=
METAR NZWN 262230Z AUTO 15009KT 9999 FEW048/// OVC070/// 11/06 Q1017 NOSIG=
METAR NZCH 262230Z AUTO 21004KT 110V330 9999 NCD 12/02 Q1016 NOSIG=
```

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<collect:MeteorologicalBulletin xmlns:iwxxm="http://icao.int/iwxxm/2.1" xmlns:sams="http://www.opengis.net/samplingSpatial/2.0" xmlns:gml="http://www.opengis.net/gml/3.2" xmlns:gts="http://www.isotc211.org/2005/gts" xmlns:opm="http://def.wmo.int/om/2013" xmlns:aixm="http://www.aixm.aero/schema/5.1.1" xmlns:metce="http://def.wmo.int/metce/2013" xmlns:gco="http://www.isotc211.org/2005/gco" xmlns:sf="http://www.opengis.net/sampling/2.0" xmlns:collect="http://def.wmo.int/collect/2014" xmlns:om="http://www.opengis.net/om/2.0" xmlns:xlink="http://www.w3.org/1999/xlink" xmlns:gmd="http://www.isotc211.org/2005/gmd">
  <collect:meteorologicalInformation>
    <iwxxm:METAR status="NORMAL" automatedStation="true" translatedBulletinID="LANZ31NZKL262230" translatedBulletinReceptionTime="2018-09-27T02:59:48.399Z" translationCentreDesignator="LRCL" translationCentreName="Cluj International Airport" translationTime="2018-09-27T02:59:48.415Z" gml:id="metar-NZAA-20180927003000Z">
      <iwxxm:observation>
        <om:OM_Observation gml:id="observation-604b47db-3292-4e76-9507-">
          <gml:descriptionReference xlink:href="http://codes.wmo.int/49-2/observation-type/IWXXM/1.0/MeteorologicalAerodromeObservation" xlink:title="Aerodrome Observation"/>
          <om:phenomenonTime>
            <gml:AbstractTimeObject xsi:type="gml:TimeInstantType" gml:id="time-object-ba4b771f-a7e9-4a57-853a-" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
              <gml:timePosition>2018-09-26T22:30:00Z</gml:timePosition>
            </gml:AbstractTimeObject>
          </om:phenomenonTime>
          <om:resultTime>
            <gml:TimeInstant gml:id="time-instant-edb87efd-c3e7-46d7-b804">
```


I W W X M Converter Test utility

- Provided by Frequentis to demonstrate the IWXXM/TAC conversion functionality provided within its latest smartWeather product.
- Only need to provide a name and email address in order to access the utility. Information for use is provided on the initial screen.
- On 'TAC to IWXXM' tab, input :

```
SANZ31 NZKL 262230
METAR NZAA 262230Z AUTO 23011KT 9999 BKN055/// 15/09 Q1017 NOSIG=
METAR NZWN 262230Z AUTO 15009KT 9999 FEW048/// OVC070/// 11/06 Q1017 NOSIG=
METAR NZCH 262230Z AUTO 21004KT 110V330 9999 NCD 12/02 Q1016 NOSIG=
```

- Converted to IWXXM and then used the IWXXM result as input in the 'IWXXM to TAC' tab.
- Resulting output:

```
SANZ31 NZKL 262230
METAR NZAA 262230Z AUTO 23011KT 9999 BKN055/// 15/09 Q1017 NOSIG =
METAR NZWN 262230Z AUTO 15009KT 9999 FEW048/// OVC070/// 11/06 Q1017 NOSIG =
METAR NZCH 262230Z AUTO 21004KT 110V330 9999 NCD 12/02 Q1016 NOSIG =
```

MET – related IFIS changes

- In July the IFIS Briefing functionality was updated to:

- Replace textual ARFOR reports with:

- Textual Aviation Area Wind (AAW) reports.
- Graphical Area Forecast (GRAFOR) charts.
- Graphical NZ Significant Weather (GNZSIGWX) charts.

Note: Access to the above graphical MET chart types is provided when AAW reports are requested.

- Provide access to Graphical SIGMET (GSM) charts when the following SIGMET reports are requested:

- SIGMET NZZC
- SIGMET NZZO

MET – related IFIS changes

Clicking on ‘AAW Areas’ label provides help:

AAW Areas

AAW (Aviation Area Wind) are low-level (surface - 10,000ft) wind forecasts. AAW forecasts are issued routinely twice daily - between 0530 and 0610 local, and between 1130 and 1210 local. The forecasts expire at midnight (local) and are not available again until the first issue of the day. AAW amendments are issued as required.

New Zealand is divided into 17 Aviation Areas, as shown in the adjacent map. Each Aviation Area has a unique two-letter identifier code, e.g. 'FN' for the Far North Aviation Area.

To include AAW forecasts in your briefing, click the checkboxes for the AAW Areas you intend to be flying in.

The 'All NI' button can be used to select/de-select all of the 'North Island' AAW Areas (FN through to ST).

The 'All SI' button can be used to select/de-select all of the 'South Island' AAW Areas (ST through to FD).

If one or more AAW Areas are selected, then in addition to returning any textual AAW reports corresponding to these areas, the system will also provide access to the following graphical MET charts:

- A number of Graphical Area Forecast (GRAFOR) charts covering up to an 18-hour period. Each GRAFOR has a validity period of 6 hours.
Note: The number of valid GRAFOR charts that are available at any one time varies depending on the time of day.
- A Graphical NZ Significant Weather (GNZSIGWX) chart.

These charts, together with the textual AAW reports provide a complete Aviation Area forecast.



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[Home](#) > MET Pre-Flight Briefing

MET Pre-Flight Briefing

[Help](#)

This Briefing provides access to MET information only. Please use one of the other Briefing options if you want MET and NOTAM information in the same briefing.

Load Favourite

Intl airports

MET Information

ATIS METAR TAF

MET Locations

SIGMET NZZC NZZO

AAW Areas - Select the areas for which you require AAW reports ([see AAW Areas map](#))

FN TA TK ED ST TN WW KA AL
 CP MH SA DV PL CY GE FD

Save Favourite Name

Create New Favourite

MET - related IFIS changes

FD (FIORDS)

```

AVIATION AREA FD VALID 1200 TO 0600 UTC
BECOMING                2200-0000      0400
1000      26010          33015
3000      28005          32020
5000      28010 MS06          31025 MS04
7000      27015 MS08
10000     26015 MS13
    
```

 NOTE: ALL HEIGHTS ARE IN FEET AMSL

NO MET REPORTS FOR THE FOLLOWING LOCATIONS :

```

SIGMET : NZZC
CYCLONE SIGMET : NZZC NZZO
VOLCANIC SIGMET : NZZC NZZO
    
```

END.

Charts

[Display/hide all charts](#)

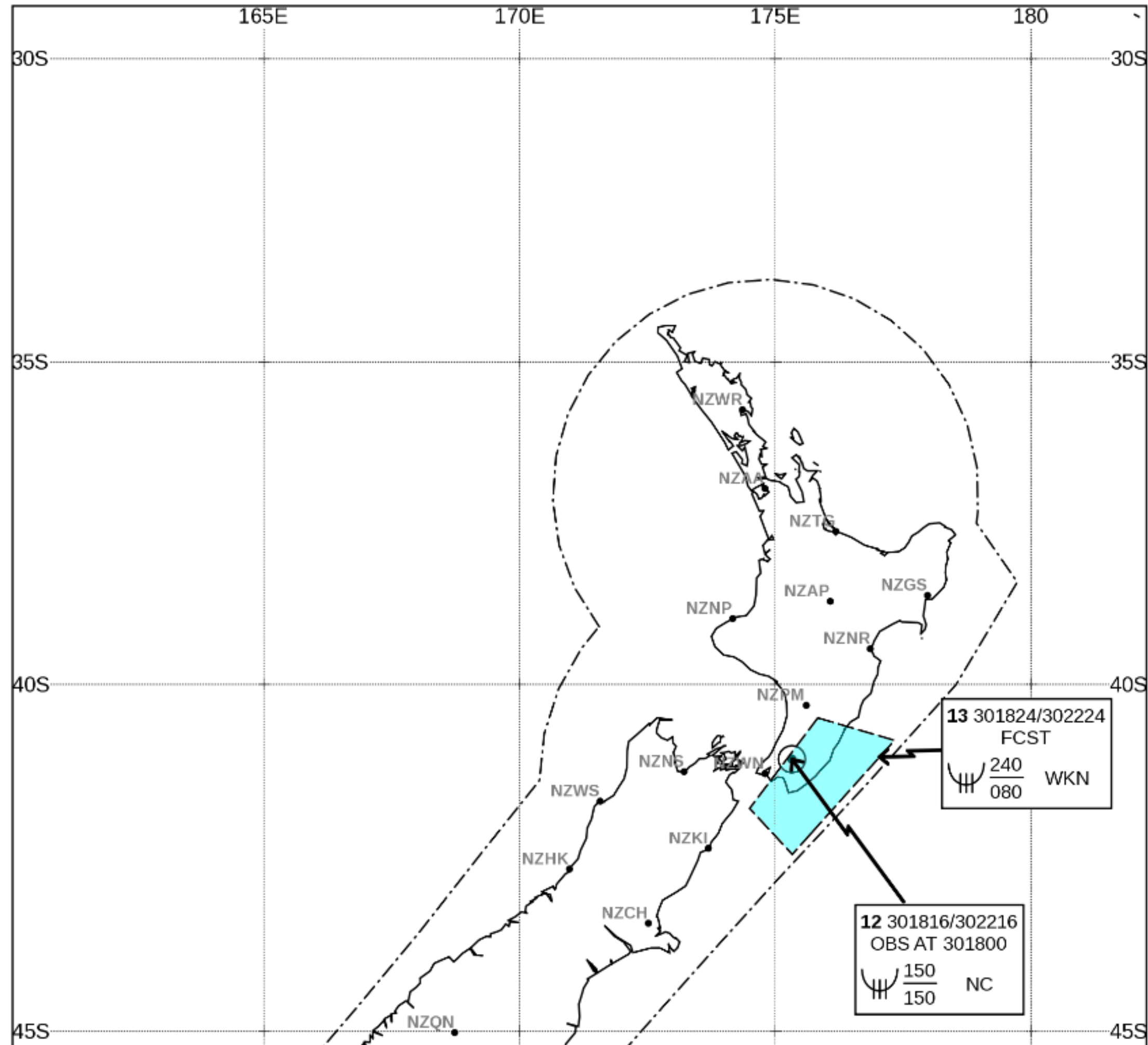
- SIGMET NZZC (issued 2018-09-27 16:00)
- SIGMET NZZO (issued 2018-09-27 17:11)
- GRAFOR 18 (issued 2018-09-27 10:47, valid 2018-09-27 15:00 to 2018-09-27 21:00 UTC)
- GRAFOR 00 (issued 2018-09-27 10:48, valid 2018-09-27 21:00 to 2018-09-28 03:00 UTC)
- GRAFOR 06 (issued 2018-09-27 10:51, valid 2018-09-28 03:00 to 2018-09-28 09:00 UTC)
- SIGWX FL100 (issued 2018-09-27 14:37, valid 2018-09-27 15:00 to 2018-09-28 06:00 UTC)

MET – related IFIS changes

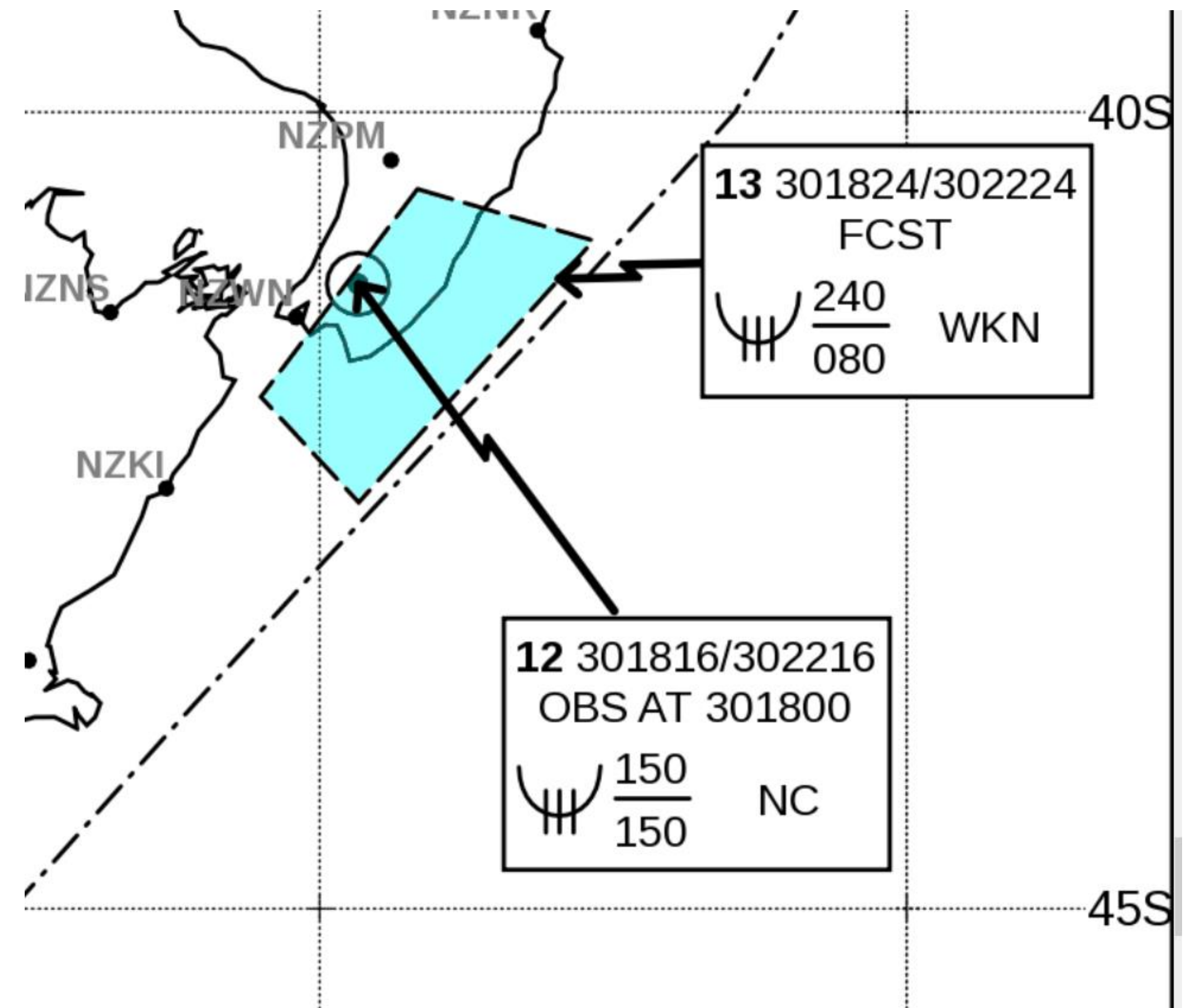
- Access to Graphical MET charts is provided at the end of the Briefing output. Bandwidth considerations (for users with slow Internet access):
 - Charts are not displayed by default.
 - Clicking on the [Display/hide all charts](#) link provides the ability to download and view all of the provided charts with a single click.
 - The Links to individual charts provide the user with the option to only view the charts which are needed. For example, using the briefing output listed on the previous slide:
 - If there are no valid SIGMET for NZZC then the chart will be empty and there is no need to download and display the SIGMET NZZC chart.
 - If a pilot is only going to be flying between 1900 and 2200 UTC (say) then there is probably no need to download and display the [‘GRAFOR 06’](#) chart.

MET – related IFIS changes

SIGMET NZZC (issued 2018-09-30 19:51)



Clicking on the map increases/decreases the resolution:



M E T – r e l a t e d I F I S c h a n g e s

- The text of the links to the MET charts provides details of the chart issue time and where applicable, the validity period of the chart.
- IFIS accesses the Graphical MET charts via the MetService API.
- IFIS checks for updated/new charts every minute but only downloads charts which it doesn't already have (i.e. changed or new charts).
- If IFIS has not been able to access chart information for more than 15 minutes, the user is warned that the chart might be out of date, e.g.:

SIGWX FL100 (issued 2018-09-27 01:54, valid 2018-09-27 03:00 to 2018-09-27
18:00 UTC)

WARNING: May be out of date. No updates received for 18 minutes.

- If IFIS cannot access a valid chart, then the user is also notified, e.g.:

GRAFOR - no charts available at present

QUESTIONS?