5th New Zealand Aviation Meteorology Symposium

Meeting Report

Date:	27 October 2021	Time:	1000-1430
Venue:	Microsoft Teams	Actions:	Refer Appendix 1

Discussion Summary

Item	Discussion/Action
Opening and introductions	Keith Manch, Director Civil Aviation, made the opening remarks, welcoming attendees to the meeting. Keith noted it was the second year the Symposium had to be held virtually and thanked participants for their time today. Keith noted progress being made in the international meteorological forums, with improved methods of sharing volcanic hazard information and hazardous weather information being developed. Closer to home, he noted the excellent collaboration across the wider Pacific region, between the New Zealand and Australian meteorological services as well as support being provided by both to the Pacific Islands. Keith encouraged participants to engage in discussion with our Part-174 meteorological service providers, and also GNS Science, all presenting on topics that continue to support the safety and efficiency of aviation in New Zealand. Finally, Keith offered this whakataukī for consideration by the Symposium attendees: *Nā to rourou, nā taku rourou, ka ora ai te iwi*. Literally this means "with your food basket and my food basket, the people will thrive." This whakataukī talks of community and collaboration. It acknowledges that everybody has something to offer, a piece of the puzzle, and by working together we can flourish and therefore thrive, so this refers to us all working together.
Actions Review	Refer Appendix 1
Presentations	The PowerPoint (PPT) presentations mentioned below are available on the CAA web site *Meteorology* pages under *Met Developments.* (refer to: https://www.aviation.govt.nz/airspace-and-aerodromes/meteorology/met-developments/)

International MET Developments – Paula Acethorp (CAA – ICAO MET Panel member) and James Lunny (MetService – WMO Manager)	ICAO
	• The 5th ICAO MET Panel meeting was held in June 2021, with approved Annex 3 provisions including (among others) those related to:
	  ○ Introduction of Volcano Observatory Notice to Aviation (VONA) as a recommended practice for State volcano observatories to issue (will form part of standard MET briefing documentation).
	  ○ Introduction of a quantitative volcanic ash information service (eventually replace VAA/VAG).
	  ○ Development of the aerodrome observation in IWXXM (more information may be included, may be issued more frequently).
	• Under the ICAO Asia-Pacific MET sub-group, activities have focused on harmonisation of SIGMETs across FIR borders, supporting other States in meeting ICAO requirements through targeted exercises and guidance, looking at MET needs for ATM/ATFM.
	
	WMO
	• WMO Governance reform is now complete at a global level, now looking at regional level.
	  ○ Introduction of the Standing Committee on Services for Aviation, with includes three Expert Teams
	  ▪ Education, Training and Competency

	▪ Aeronautical Meteorological Hazards Science ▪ Impacts of Climate Change and Variability on Aviation ○ The establishment of an advisory group (rather than an Expert Team) addressing volcanic sciences for applications remains under consideration with a view to being established soon – this is proposed to be a joint arrangement between the WMO and the IUGG (International Union of Geodesy & Geophysics). • WMO prepared guidelines to assist meteorological services in their response to CV-19 pandemic, with large impacts on service providers. • Survey on gender equality in aeronautical meteorology, 500+ responses with results to contribute to WMO's gender action plans and related initiatives. • Extraordinary session of Congress (11-22 Oct 2021) ○ No direct issues addressing aeronautical meteorology ○ WMO Unified Data Policy approved Pacific Island Aviation Weather Services Panel (Paula & James members) • Workplans developed to address meteorological deficiencies of certain Pacific ICAO Member States. • Regional OPMET Centre (ROC) Wellington providing IWXXM translation services for multiple states across the region.
NZ Regulatory Developments – Jo Nicholas (CAA – Principal Policy Advisor)	Civil Aviation Bill • The Ministry has been revising the Civil Aviation Act for a number of years now. CAA has been supporting them in this work. • Some of the key changes include: Drug and Alcohol Management Programmes, protection of safety information, powers relating to unmanned aircraft, the exemption provision, and the regulatory powers of CAA inspectors. • The Bill has been introduced to Parliament, had its first reading and is now with Select Committee. The SC will examine the Bill, review public submissions and usually holds public hearings to listen to people's views. The Committee will then work through everything they have heard and decide what changes should be made to the Bill. • Make a submission to have your say. **The last day for submissions is 2 December.** • Best place for more information is the Parliament webpage for the Bill - has the most up to date version, and includes how to make a submission. Runway Condition Reporting • This is a project to implement the global reporting format for contamination on the runway due to water, snow or ice. The SARPs come into force in November this year, but NZ is running one year behind on this. • Aerodromes will need to report on the condition of the runway using the standard format, with ATS communicating that information to the aircraft. • Aiming for an NPRM consultation late 2021 or early 2022, with implementation in November 2022. Air Navigation Services Regulatory Framework project • Looking to start a holistic review of the regulatory framework for ATS. The key aim is to keep pace with technology developments in this area. The focus will be on Parts 171, 172, 65 and 174. • In very early days of scoping what this might look like. This is a really large and complex project, that will take quite a few years. We'll be reaching out to stakeholders on this soon. (Not at the stage where we would have anything meaningful to engage on yet.)
MetService – Ray Thorpe, Kevin Alder, Marcel Roux, Pete Lowe, Iman Soltanzadeh	• The short and medium focus areas for MetService were outlined, highlighting related initiatives. • A relocation for MetService will occur later this year to Featherston St, while the Kelburn office is strengthened and upgraded/modernised. • User engagement has been a highlight this year, with the Aviation Transformation Services Group and NSS the main forums.

	• Upgrade to the National Lightning Detection network completed in June 2021, with improved strike detection, particularly cloud-to-cloud lightning.
	• Planned upgrade of Wellington weather radar during March-May 2022.
	• Forecaster focus on collaboration with Australia and Fiji forecasters, for SIGMET and VAAC services. How the aviation forecasters connected with users was also highlighted, through activities such as Walsh Memorial Flying School; visits/familiarisation flights and on-site forecaster trials.
	• Future of weather services:
	  ○ Making use of enhanced data sets.
	  ○ Making data available directly to customer systems using APIs.
	  ○ Automation allowing forecasters to focus on where they add value – with the recent release of the new automate Aviation SIGWX charts highlighted as an example. The new charts make use of the upgraded WAFC hazard fields for turbulence and icing.
	  ○ New aviation weather portal, developed in partnership with Aeropath as an integrated aeronautical information and meteorological service solution. Interactive, intuitive, customisable and desktop/tablet/mobile friendly.
	• An outline of the "nowcasting" roadmap was presented, describing how high-resolution models are regularly updated with new observations to provide higher accuracy forecast products for the subsequent 1 to 12 hrs. Currently focusing on "raincast" and will soon be working on "windcast", "cloudcast" and "satcast".
	• Data centre migration project has seen over 250 servers migrated to either cloud or new data centre location. Remaining server and network migrations to be completed by December.
	
	Comments:
	• Air NZ complemented and thanked MetService for the successful embedded forecaster trial, saying it was valuable for their team to be able to liaise and engage with the forecaster.
	• Noting the focus on collaboration with industry, users are encouraged to collaborate via the ATSG – contact Ray.Thorpe@metservice.com
	• AOPA asked about the planned MetService/Aeropath briefing tool and asked about connectivity and delays while in the cockpit. MetService advised that connectivity relies on user connection to cell tower or WiFi, but data receipt should only be a few minutes following publication. Noted that education is important for users to understand any latency issues (eg weather radar scan takes 7min to complete, so by very nature is already up to 7min old once available).
	• Meeting noted the excellent forecast research work on nowcasting – asked about "satcast" output. Initially will be just cloud coverage, but may ingest ceilometer data in the future to provide cloud base information.

Navigatus – Geraint Bermingham	• An overview of the Navigatus Queenstown (Wakatipu) Aviation Weather reporting system was given, noting it was originally implemented to support night operations but quickly showed its value to also support day operations. • By providing a detailed 'picture' of the wind around the Queenstown basin, a notable reduction in go-arounds and diverts/returns has been achieved. • Looking at the relationship between the Navigatus system's turbulence calculation vs reported aircraft deviation from 1g (aircraft data), finding some correlation, but noting the difficulty in turbulence forecasting/verification given it is variable in time and space. Further refinement of the algorithm continues. Comments: • General discussion around the difficulty of assessing turbulence using the subjective scale currently used in aviation, given range of aircraft and experiences in same conditions. • Also noted that the Queenstown turbulence work is based on pilot experience and feedback and is intended to be calibrated for effect on jet aircraft.

	• Further, noted work under ICAO with AMDAR project looking to report objective Eddy Dissipation Rate (EDR) and turbulence forecasts to provide forecast EDR values to allow user-specific information to be available.
A Day in the Life of an Aviation Meteorologist – Andrew James (MetService Aviation Meteorologist)	• Refer video linked at https://www.youtube.com/watch?v=pP1mMZc4YSI.

Volcano Observatory Communication – Brad Scott (GNS)	• The presentation highlighted the "volcano challenge", for context NZ has not had any sustained eruptions in 25 years, but just 8 'single event' short lived eruptions.
	• NZ has 12 active volcanoes (including offshore Raoul Island), monitored via in-situ stations, webcams, satellite imagery, public/end-user reports – all feeds in to monitoring by the Volcano Monitoring Group, which includes the National Geophysical Monitoring Centre (NGMC).
	• Products that are pushed out includes the Volcanic Alert Bulletin (VAB), VONA, along with ashfall forecasts – also critical for airports, given that they are included as transport infrastructure in NZ.
	• Other Communication from GNS comes via their website, social media, media releases and the GeoNet app which can 'push' notifications (need to set app notification rules to alert on volcanic bulletins).
	• The NZ Volcanic Alert Level System (Post 2014) is one system to cover all NZ's volcanoes and is based on the currently occurring phenomena. Now has two levels of 'unrest' (but not erupting), and three levels of eruption.
	• The VAB are issued on an 'as appropriate' basis and includes the current VAL and aviation colour code (ACC). It indicates the activity trend (eg increasing/steady/decreasing) and highlights any current or expected hazards (eg acid rain or ash remobilisation/re-suspension). It is distributed by email list/published to web page/social media/GeoNet app.
	• Developing a new ashfall tool, in collaboration with MetService, which will provide a 24hr forecast of ash deposition.
	• The VONA is the aviation-focused product issued, outlining the current ACC and current activity of each volcano. Currently emailed but will be available along with other meteorological observations and warnings through usual aviation briefing portals, likely late 2023.
	  ○ To receive VAB or VONA, you can email info@geonet.org.nz and ask to be added to the email distribution list. Note, a generic email address is preferred (eg "operations@airline.com").
	  ○ Also recommend downloading the free GeoNet app – available on Google Play or Apple Store.
	• For more information on volcanic ash impacts and mitigation, have a look at USGS hosted site – includes aviation specific information:
	  ○ https://volcanoes.usgs.gov/volcanic_ash/
	
	Comments
	• Asked about how GNS help in the Pacific – this is via a request via MFAT, with work undertaken in the past with Vanuatu Geohazards and with Tonga Geological Services.
	• For NZ specific information on how volcanic ash information is shared and used in NZ, have a look at:
	  ○ https://www.aviation.govt.nz/assets/licensing-and-certification/meteorology/living-with-volcanic-ash.pdf
	• More information expected to be presented year as the VONA elevation to a recommended practice progresses, with user guidance to be created and there are plans for a web portal for volcano observatories in the wider Pacific to create and issue VONA for their volcanoes.

VAAC Wellington Update – Marcel Roux (VAAC Wellington Manager) and Rosa Trancoso (MetService Forecast Research Scientist)	VAAC Research • An overview was provided of the VOLcanic Cloud Analysis (VOLCAT) system running at MetService, which looks for evidence of volcanic ash in satellite imagery and provides information about that potential ash cloud, such as height, concentration and particle size. • Once VOLCAT detects possible volcanic ash, an ash dispersion model run is automatically triggered, using three eruption source parameter scenarios and run over up to three weather models (depending on volcano location). • An example of quantitative volcanic ash information for a recent Yasur eruption was provided, showing the ash concentration over 3 hourly time steps at different altitudes. • Using the dispersion modelling system to create different downstream products such as the quantitative volcanic ash information, ensemble statistic products such as probabilities of exceedance and risk matrices. • Utilisation of cloud computing has been improved for increased automation, timeliness and reliability. Comments: • A question around the usefulness of VOLCAT eruption heights was asked <what was the response here again?> • Given VOLCAT can sometimes provide false alarms, can a forecaster cancel a subsequent triggered model run? As the dispersion model is run in a cloud environment, there are no problems with availability of computer resources – each model run simply starts on a new cloud instance, so there are no queueing issues. Initial Basic Volcanic Ash SIGMET • The initial basic volcanic ash (VA) SIGMET has in the past been the first piece of information aviation might see when an eruption occurs within the NZZC FIR, however it has traditionally used free text which is no longer allowable under ICAO SIGMET templates and not universally ingestible by user systems. • This initial VA SIGMET will now take the form of a point forecast, simply indicating volcanic ash has been observed at a given location (likely the volcano position) and will hopefully (but not necessarily) include a cloud height and movement, if this information is available. The focus is to get this first message out ASAP to warn aviation in the vicinity and then follow up as soon as possible once more information is available. It will however no longer include the text “more information to follow”. • The VAAC forecaster workflow was presented, where the initial VA SIGMET is followed by an initial VAA, then a full VAA and full SIGMET. The timeline of when each forecast is expected to be issued was also discussed with the VAAC aiming for all forecasts being sent within 35 minutes of the confirmation of airborne volcanic ash. Comments: • It was noted that education is important in this area, that users understand more information actually will follow (or the SIGMET may also be cancelled if volcanic ash is not found to be present in the atmosphere). • It was noted that given the volcanic ash shift is only rostered once per day, it can be difficult when events occur outside the hours of that shift or continue over a significant time period. The availability of VAAC forecasters extends outside of the immediate aviation team, with other forecasters in the wider forecast room having been trained and assessed as competent to carry out VAAC duties, meaning assistance is available as needed.
Further discussion	• None.

Appendix 1 – Consolidated Actions and Updates

Mtg	Action / Decision	Description and comment	State	Who/Lead
2017	8	Investigate the potential implementation and costs of meteorologist direct link to airport/ATM/airline operations. This has been actioned, with an embedded forecaster trial held with Air NZ.	Closed	MetService
2018	2	Progress the new air navigation-based MET charging model in conjunction with Airways, in close liaison with CAA, recognising that a change to current legislation may be required. With regards to the charging model review, this has been delayed by the delta variant relapse and subsequent funding received from the ETC scheme to assist MetService to reach break-even which is expected to continue until March 2022. The current approach will be to review pricing of services under the current arrangements (individual contracts) for core services, after which we will again look at feasibility of adopting Sector Wide charging OR Govt funding for core services, noting the MoT review/rescoping of the Air Navigation System may consider how MET services are funded in future.	Open	MetService
2019	3	CAA to undertake a review of current processes, as they relate to space weather advisories. CAA also to make available education material on space weather and its impacts, as well as the space advisory system and how users (in particular operators and ATC) may make use of those advisories. New Southern Sky 'System Safety Assessment' exercise found that during a significant space weather event (taking out GNSS), ATC could safely ensure aircraft could land. However, it found that there was little knowledge about SWX advisories, despite material available on CAA website. A NZ aviation space weather exercise is planned to assist in increasing awareness and understanding of SWX impacts and to allow aviation organisations to develop/refine processes for dealing with a SWX event (exercise date TBC). This action is now replaced by 2021/1.	Closed	CAA
2020	1	CAA and MetService work together to develop education and outreach material for the aviation industry, utilising a variety of interactive means. GAP Flying Around Volcanoes being finalised, GAP VFR MET recently refreshed. Looking to use webinar format for providing education material. Unfortunately, not progressed as quickly as we would have liked. "A Day in the Life of an Aviation Meteorologist" presentation to be recorded and made available for education purposes. Additionally, MetService has continued the usual customer engagement activities, such as hosting aviation industry visitors (Airways Auckland Oceanic team, Kāpiti Aero Club Young Eagles) and visiting industry (Massey School of Aviation, QMUG).	Open	CAA & MetService

Mtg	Action / Decision	Description and comment	State	Who/Lead
2020	2	MetService to report back to the next MET Symposium on progress of the Aviation Transformation Services Group activities, noting the industry expectation for services to be optimised to support the safety and efficiency of all aviation operations. Note, regular updates are also provided to the New Southern Sky working group. The focus of Aviation Transformation Services Group will now shift to project specific/workstream engagement with relevant groups with quarterly update sessions for the wider group. Examples of likely engagement include user groups to help with automation for QNH and 2000ft winds, the 30HR TAF implementation and future testing of the new pre-flight system to replace MetFlight.	Closed	MetService
2020	3	Aviation industry encouraged to provide feedback to VAAC Wellington on the proposed quantitative volcanic ash information – in particular, the utility of the presented charts and how they may be used in operations. Feedback provided by some, thank you. Propose close this action, but noting that VAAC Wellington will continue to engage with stakeholders and will continue to present updates to MET Symposium as part of standard VAAC updates.	Closed	All
2020	4	Updates on the implementation of quantitative volcanic ash information to be a standing agenda item within the MET Symposium. This has been added as a standing item – propose to remain a standing item until operational and then be addressed as part of regular Part-174 updates.	Closed	CAA
2021	1	CAA to plan and lead, in coordination with MetService and Airways, an aviation space weather exercise, potentially working in with ICAO SWX Centre exercise plans.	New	CAA