

WORLD METEOROLOGICAL ORGANIZATION



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ORGANIZATION



WORLD WEATHER RESEARCH PROGRAMME (WWRP)

STANDING COMMITTEE ON SERVICES FOR AVIATION (SC-AVI)

*A subsidiary body of WMO's Commission for Weather, Climate, Water and
Related Environmental Services and Applications (SERCOM)*

ONLINE MEETING OF THE AVIATION RESEARCH AND DEVELOPMENT PROJECT – PHASE 2 (AvRDP2) SCIENTIFIC STEERING COMMITTEE

19 April 2023

Meeting minutes

Published 11 May 2023

0. OPENING OF THE MEETING

Chris Davis and Piers Buchanan welcomed everyone to the meeting. The list of attendees can be found at the end of this report.

The agenda for the meeting includes:

1. Report on Airport pair 1 (London-Johannesburg)
2. Report on Airport pair 2 (Hong Kong-Singapore)
3. Confirm date for AvRDP phase 2 meeting f2f in Sep 2023
4. Next online meeting.
5. Actions.

1. REPORT ON AIRPORT PAIR 1 – LONDON TO JOHANNESBURG (PIERS B)

- The plan for this Pair includes:
 - Use global probabilistic approach to determine the probability of encountering convective weather and high-altitude ice crystals (HAIC) along the flight route using an ensemble of forecast data,
 - Exploring other convective diagnostics,
 - Blending the high-resolution model data (at the terminal) into the global data,
 - Adding satellite data - Morné mentioned the option to use the Nowcasting Satellite Application Facilities (SAF) products for turbulence and HAIC, this still needs evaluation to determine how accurate it is
 - Examine the value added of using ensemble forecast compared to a single forecast realization.
- University of Reading has made available two Master students, who will carry out a case studies for their thesis.
- It could be considered to use GEO satellite data to verify the NWP products, e.g., overshooting tops
- The group wondered whether the chosen airport pairs would be good examples of HAIC.
- What is not covered by the work of the two Master students:
 - Blended techniques
 - The societal benefits of the information
 - Objective verification
 - Customer engagement - a survey to be sent to pilots/airlines could be considered.
- Claire and Piers will work on two case studies with the Master students and provide the feedback towards August.
- Piers mentioned that we should look at 1-3 common focus areas between the 2 airport pairs.

2. REPORT ON AIRPORT PAIR 2 – HONG KONG TO SINGAPORE (PING C)

- The plan for this airport pair includes:
 - A seamless blending product (NWP and satellite nowcast) for convective areas.
 - Integration of the flight plan (if available) to blended forecast to determine duration of flight inside convection or the deviation required for safe routes for participating airplane.
 - Products generated hourly and forecast up to 8 hours ahead.
 - Trial between the pair is planned to start in Q1 or Q2/2024.
 - On HKO side, prototype will be generated and tested with local airline(s) first before actual trial.
 - Merging of the satellite data with different models (global and regional) will be considered - still at the design stage.

- Currently only deterministic forecast will be used considering the short flight time between HKG-SIN.
 - Detail verification metrics have not been determined yet.
 - There is ongoing discussion between HKO and SIN on the list of data to be exchanged. A draft project plan has been developed.
 - Another HKG-SIN meeting is scheduled for 25 April. SSC members Michiko and Xiaoming are also invited to join.
- Other points discussed:
 - Two data sources will be used as ground truth for verification: a) data from the airline (onboard measurement for Cathay Pacific fleet) and b) pilot reports.
- Frequency of convective/turbulent weather can be determined by looking at the duration of the flight from one destination to another, checking if they have changed course to avoid convective weather/turbulent zone.
- A questionnaire for forecasters to assess the effectiveness of the prototype products could help the verification process. Stephanie L would be asked to take the lead.
- A cost-loss approach can be considered to realize benefits from prototype products.
- It is important to consider how to respond to false alarms and understand how the use of the information will impact user decisions.
- UK Met Office and Met Services Singapore have several ongoing collaborative projects. It is therefore important to understand which methodology is used and in what way it is similar or different between airport pairs.
- For HKG-SIN route, airlines are not ready to use probabilistic forecasts because the airplane routes are very short. Also, airlines are not using the convective weather information to determine operational flight route.
- Next steps:
 - Airport pairs will continue to work on products and case studies
 - Outcome of the meeting between HKO and SIN next week (25 Apr 2023) should be shared with the group
 - Develop the prototype products and conduct the trials.

3. CONFIRM DATES FOR AVRDP2 SSC 2ND F2F MEETING IN SEP 2023

- Face to face meeting will be on the 26th –28th September 2023 at NCAR premises in Boulder, Colorado, USA
- The meeting will be hybrid (zoom link)

4. NEXT ONLINE MEETING: 7th August 2023

| AvRDP2-SSC-actions | Who/Due date |
|--|--|
| <ul style="list-style-type: none"> ● Work on two case studies (Get MSc students to do the case study and Piers and Claire (prototype)) ● Provide update in August | Pair 1 August 2023 |
| <ul style="list-style-type: none"> ● Work on working arrangement between HKO and SIN ● Develop the prototype products and conduct the trials ● Provide updates to the group at the end of May | Pair 2 August 2023 Ping to update the group |
| <ul style="list-style-type: none"> ● HKO mentioned that they might be able to re-establish the pair with BoM after Emile left. | Ping to update group |
| <ul style="list-style-type: none"> ● India showed interest in joining/participating the AvRDP Phase 2, from an old email to Phase 1 leaders. | Secretariat to respond to the email |
| <ul style="list-style-type: none"> ● Next SSC meeting will be online on 7th August 2023 | WMO Secretariat to send invitations |

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|--|---|
| • In-person meeting will be 26-28 Sep 2023 in Boulder, Colorado | WMO Secretariat to secure budget and send invitations |
| • NCAR scientists doing aviation research to be invited to the face-to-face SSC meeting. | Chris and Piers to discuss the agenda |

LIST OF ATTENDEES

1. SSC members

| COUNTRY | NAME | E-MAIL | WMO AFFILIATION |
|--------------------------|--------------------------------|--|-----------------|
| UNITED STATES OF AMERICA | Fanglin YANG | fanglin.yang@noaa.gov | WCRP/WGNE |
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| UNITED STATES OF AMERICA | DAVIS, Chris ^[1] | cdavis@ucar.edu | WWRP |
| SOUTH AFRICA | LANDMAN, Stephanie | stephanie.landman@weathersa.co.za | WWRP |

^[1] Co-chair of AvRDP-SSC

Apologies from Stephanie Landman

2. WMO Secretariat

| NAME | POSITION | E-MAIL |
|----------------------|--|--|
| WIGNIOLLE, Stéphanie | Scientific Officer, Services for Aviation Division, Services Department | swigniolle@wmo.int |
| DE CONING, Estelle | Head, World Weather Research Division, Science and Innovation Department | edeconing@wmo.int |
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