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Latest development of the meteorological components

for the new CNS/ATM systems in Hong Kong, China

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7th Meeting of the Communications/Navigation/Surveillance and

Meteorology Sub-Group of APANPIRG (CNS/MET SG7) &

10th Meeting of the Communications/Navigation/Surveillance

and Air Traffic Management Implementation Coordination

Sub-Group of APANPIRG (CNS/ATM IC SG/10),

Bangkok, Thailand, 15-21 July 2003

Agenda Item 13:   **Review developments, research, trial and demonstration relating to CNS/ATM**

LATEST DEVELOPMENT OF THE METEORLOGICAL COMPONENTS FOR THE NEW CNS/ATM SYSTEMS IN HONG KONG, CHINA

(Presented by Hong Kong, China)

Summary

This paper presents the development of the meteorological components for the new CNS/ATM systems in Hong Kong, China over the past year.

1.   Introduction

1.1   The development of the meteorological systems in support of the new Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM) systems in Hong Kong, China, continued during the year 2002/03. Means of meteorological data downlink besides Automatic Dependant Surveillance (ADS) and Controller-Pilot Data Link Communication (CPDLC) were studied. A trial on weather database access via Aeronautical Telecommunication Network (ATN) was conducted.

2.   Meteorological Data Downlink

2.1   Following the ADS meteorological data downlink trial conducted in early 2002, other methods of downlink were explored. The weather reporting using mode-S datalink specified in ICAO Manual on Mode S Specific Services (Doc 9688), which does not incur ACARS (Aircraft Communications Addressing and Reporting System) communication cost, appears to be an attractive alternative to ADS, in particular in airspace where ADS may not be used for aircraft surveillance. While exploring with airlines the feasibility of using the mode-S datalink for weather reports, it was noted that the weather reporting function had not been implemented in the mode-S transponder software. Furthermore, the transponder supplier has no plan to implement the weather reporting function because of the lack of requirements from airlines. Other meteorological authorities may like to note the potential of mode-s datalink for aircraft weather reporting and explore with their national ATS authorities and airlines the feasibility of its implementation.

2.2   Weather data downlink using ACARS with ARINC 620 capability was also explored. A trial is being set up using a fixed wing aircraft of the Hong Kong Government Flying Services for transmitting ACARS weather reports. The trial is expected to be conducted later this year.

3.   Meteorological Information Uplink

3.1   To demonstrate the feasibility of users "pulling" real-time weather information from weather databases via the ATN, a trial on real-time retrieval of weather information from a Hong Kong Observatory (HKO) database was conducted in June 2003. In the trial, airline users sent queries from their workstations and obtain weather information from the HKO weather database via the ATN/ATS Message Handling System (AMHS). The trial configuration is shown in Fig.1.

3.2   During the above trial, en-route wind/temperature information, local terminal weather warnings and weather reports, and TAF/METAR of destination aerodromes were made available. Sample requests/replies are shown in Fig. 2. Users' feedback is being analysed and will be used as input for the planning of uplink weather products.

4.   Meteorological support for air traffic management

4.1   Hong Kong, China introduced Reduced Vertical Separation Minima (RVSM) in the Hong Kong Airspace in October 2002. To support the RVSM operations, grid wind data for various flight levels over the South China Sea operationally provided to the ATS was enhanced with the vertical resolution reduced from 2000 ft to 1000 ft.

4.2   To improve the efficiency of runway usage, preparation is underway for trials with aircraft arrival metering and sequencing system which will make use of high resolution forecast wind fields generated by the HKO numerical weather prediction (NWP) model. The impact of real-time weather data downlinked from aircraft on the accuracy of predicted aircraft trajectory will be studied.

5.   Action by the Meeting

5.1   The meeting is invited to note the information provided in this paper.

Fig 1: Trial Configuration for the ATN Weather Database
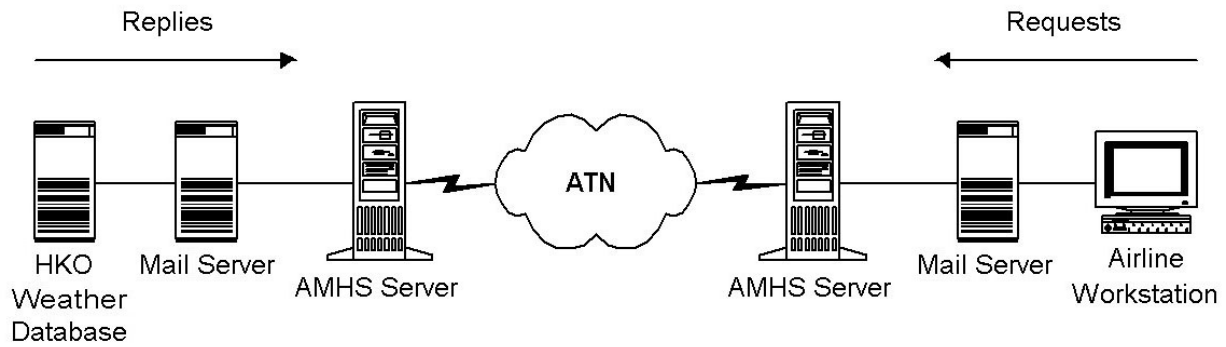
Fig.2: Sample Requests and Replies for the ATN Weather Database Trial
(explanatory remarks in italics)

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Request: WINDTEMP=N34.5/E123.5/300 (requesting the latest wind/temperature at
34.5N 123.5E FL300)


Reply:
Data Retrieval Time            Mon May 19 10:09:26 UTC 2003
Forecast Time                  Mon May 19 12:00:00 UTC 2003
Forecast Hour                      +06 hour(s)

Input Latitude                  34.50 degree
Input Longitude                123.50 degree
Flight Level                    FL300

Temperature in Degree C

 lat\long  120.00E      121.25E      122.50E      123.75E      125.00E

 36.25N       -37          -38          -39          -39          -40
 35.00N       -35          -34          -34          -35          -35
 33.75N       -34          -34          -34          -34          -34
 32.50N       -32          -32          -32          -33          -33
 31.25N       -30          -30          -30          -30          -31

Direction (Degree) / Wind Speed (Knots)

 lat\long  120.00E      121.25E      122.50E      123.75E      125.00E

 36.25N    290 /100    290 / 90    280 / 80    280 / 75    280 / 70
 35.00N    290 /115    280 /110    280 /115    280 /110    280 /110
 33.75N    280 /110    280 /110    280 /115    280 /115    280 /115
 32.50N    280 /110    280 /110    280 /110    280 /105    280 /105
 31.25N    280 /100    280 /100    280 /105    280 /105    280 /105

INFORMATION BASED ON PRODUCTS FROM WORLD AREA FORECAST CENTRE LONDON


Request: HKIA-WARN (requesting the latest weather warning at HKIA)


Reply:
AERODROME WARNING ISSUED BY THE HONG KONG AIRPORT METEOROLOGICAL OFFICE
AT 170318 UTC MAY 2003
WEATHER INFORMATION FOR THE PROTECTION OF AIRCRAFT AND LAUNCHES AT THE AIRPORT
VALID FOR 2 HOURS FROM LOCAL TIME ON 11:15 A.M. ON 17 MAY 2003.
FRESH TO OCCASIONALLY STRONG GUSTY SOUTHWESTERLY WINDS ARE EXPECTED=
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