



Reprint 513

Latest development of the meteorological components  
for the new CNS/ATM systems in Hong Kong, China

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7<sup>th</sup> Meeting of the Communications/Navigation/Surveillance and  
Meteorology Sub-Group of APANPIRG (CNS/MET SG7) &  
10<sup>th</sup> 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



*International Civil Aviation Organization*

**Seventh Meeting of CNS/MET Sub-Group of APANPIRG**

Bangkok, Thailand, 15 – 21 July 2003

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

**LATEST DEVELOPMENT OF THE METEOROLOGICAL 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.

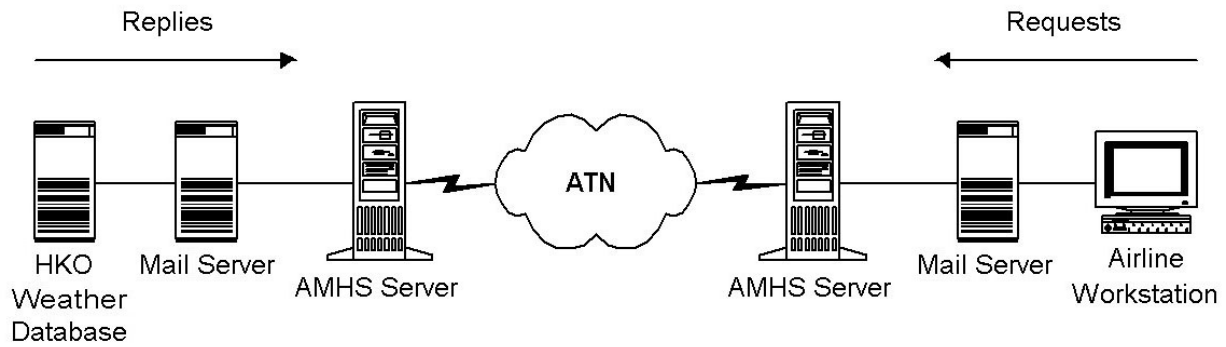
### **4. Meteorological support for air traffic management**

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)

**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=