APPENDIX F

MUTUAL BACKUP BY WAFCs OF WAFS PRODUCTS AND BACKUP OF SATELLITE BROADCASTS

1. Introduction

There is a need for the two World Area Forecast Centers (WAFCs) to have the ability to provide backup of World Area Forecast System (WAFS) products required by the Standards and Recommended Practices (SARPs) in Annex 3, and the ability for each to supply that information for broadcast on either the International Satellite Communications System (ISCS) or the Satellite Distribution System (SADIS). This will ensure States the uninterrupted ability to acquire the data and products required by Annex 3 to support civil aviation operations.

2. Discussion

2.1 To achieve the objectives of the WAFS, the two WAFCs produce, and provide for broadcast on ISCS and SADIS, global forecasts in gridded binary format (GRIB) of upper winds, temperatures, tropopause heights, etc. Each also produces forecasts in pictoral form (T4 charts) of wind and temperatures aloft for all areas specified by ICAO, for specified flight levels (FL) and forecast times (+6 to +36 hours). In addition, the two WAFCs, and the remaining Regional Area Forecast Centers (RAFCs) produce forecasts of high level (FL250 - 600) significant weather (SIGWX) as T4 charts for specified ICAO areas, and SIGWX Medium (FL100 - 240) for limited geographical areas as determined by regional air navigation (RAN) agreement.

2.2 The two WAFCs are working to ensure that each WAFS satellite broadcast will contain:

1) the global GRIB data, currently two model runs per day, SIGWX High (SWH) for all ICAO areas, SIGWX Medium (SWM) forecast charts for all areas required by RAN agreement, and wind and temperature forecast charts for all required ICAO areas (wind and temperature charts are not required for areas J and K), for all required flight levels and for all required forecast times; and

2) that like products, i.e., the wind and temperature forecast chart for Area A for FL300 at +12 hours, have the same WMO header with the exception of the XXX indicating the issuing WAFC.

2.3 The WAFCs have been meeting to develop a plan to ensure mutual backup and product consistency, and the ability to provide all required products to either WAFS satellite system. The last meeting was in the United Kingdom during February 2000. The outcome was a proposed hierarchical plan to assure continued product availability in the event of failures at either WAFC. If numerical model production capability is lost, the WAFC would use the other's model. For example, if the U.S. National Centers for Environmental Prediction loses production capability of the AVN model, WAFC Washington will use the UKMET model will to generate WAFS products. A three-level backup procedure is proposed in the event of failure of either WAFC's production facility:

1) As a first-level backup, the full product suite would be provided by the still functioning WAFC. GRIB products and wind and temperature charts would be identical with the exception of the numerical model used, and the issuing office.

2) As a second-level backup, each WAFC would produce a full set of products from alternate model source data. Washington would use the U.S. Navy Model and London would use ECMWF model output.

3) As a third-level backup, the WAFC that has failed would produce a full set of products from its previous model run in case of failure in the first two levels of backup procedures. This approach would use both "on-time" and "off-time" model runs.

4) If a WAFC does not produce all T4 wind and temperature charts, it would not produce any beyond those it already provides. It is proposed that Local Meteorological Authorities in contracting States have the responsibility to produce and provide the wind and temperature charts from the already available GRIB data.

5) Backup procedures would be tested every six months, alternating between the two WAFCs, beginning later in 2000.

A remaining issue is the training and resources required at each WAFC to provide the full set of required SWH and SWM charts which have been forecaster quality controlled.

Outstanding needs and logistical issues were also addressed. The needs were:

1) concurrence from IATA, and ATA in the U.S., that the proposed set of procedures provides sufficient backup, i.e., the risk of failure beyond these measures is considered to be sufficiently small to not require further action; and

2) guidance from IATA and ATA on a common delay period, e.g., what length of time is acceptable before invoking backup at each of the three proposed levels after loss of model production or product production capability, with those times possibly different for GRIB and SIGWX products.

The outstanding logistical issues related to an acceptable delay period are:

1) air carrier flight planning system update cycles; and

2) backup model availability.

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