

法規名稱：(終)IMPLEMENTING ARRANGEMENT #17 CONTINUING DEVELOPMENT OF THE LOCAL ANALYSIS AND PREDICTION SYSTEM AND DEVELOPMENT OF A WARNING DECISION SUPPORT SYSTEM PURSUANT TO THE AGREEMENT BETWEEN THE TAIPEI ECONOMIC AND CULTURAL REPRESENTATIVE OFFICE IN THE UNITED STATES AND THE AMERICAN INSTITUTE IN TAIWAN FOR TECHNICAL COOPERATION IN METEOROLOGY AND FORECAST SYSTEMS DEVELOPMENT

終止日期：民國 94 年 12 月 31 日

Article I - Scope

This Implementing Arrangement describes the scientific and technical activities to be undertaken by the American Institute in Taiwan (AIT), through its designated representative, the Forecast Systems Laboratory (FSL) of the National Oceanic and Atmospheric Administration (NOAA), United States Department of Commerce. It provides for continuing development of the forecast system being developed by the Joint Forecast Systems Project. This project is a cooperative effort between AIT's designated representative, NOAA/FSL, and the Central Weather Bureau (CWB), the designated representative of the Taipei Economic and Cultural Representative Office in the United States (TECRO).

Article II - Authorities

The activities described in this Implementing Arrangement will be carried out under the general terms and conditions established by the Agreement between the American Institute in Taiwan and the Taipei Economic and Cultural Representative Office in the United States for Technical Cooperation in Meteorology and Forecast Systems Development, and any subsequent revision as agreed to by the parties. This Implementing Arrangement is the seventeenth such arrangement under a succession of umbrella agreements between TECRO and AIT.



NOAA has authority to participate in the meteorology and forecast systems development project with AIT under:

- A.15 U.S.C. 1525, the DOC Joint Project Authority, which provides that DOC may enter into joint projects with nonprofit, research, or public organizations on matters of mutual interest, the cost of which is equitably apportioned;
- B.22 U.S.C. 3301 et seq., the Taiwan Relation Act of April 10, 1979, Public Law 96-8, which authorizes agencies of the United States Government to perform services for, and to accept funds in payment from AIT;
- C.15 U.S.C. 313, the Weather Service Organic Act, which authorizes the Secretary to perform meteorological services;
- D.49 U.S.C. 44720(b), the Federal Aviation Act, which authorizes the Department of Commerce to promote safety and efficiency in air navigation; and
- E. An agreement between AIT and the Taipei Economic and Cultural Representative Office in the United States (TECRO), which authorizes AIT to provide technical assistance from a designated agency to an agency designated by TECRO. AIT has designated NOAA to provide technical assistance in meteorology and forecast systems development. TECRO has designated the Central Weather Bureau (CWB) of Taiwan to receive such technical assistance.

This Implementing Arrangement is hereby attached to that Agreement and becomes part of the Agreement.

Article III - Services

During the period of Implementing Arrangement #17



the FSL-CWB joint team will focus on four ongoing tasks. The four ongoing tasks are: 1) the Local Analysis and Prediction System (LAPS), which performs high-resolution analyses and provides short-range forecasts of the weather using both locally and centrally available meteorological observations, 2) the development of a Warning Decision Support System (WDSS), 3) the continuation of enhancing CWB's current forecast workstation including a new system called SAFESEAS (System AWIPS for Forecasting and Evaluation Seas and Lakes), SAFESEAS will provide a nowcast assistance tool for monitoring marine weather, and 4) continuing integration on earlier cooperative projects.

Tasks under this agreement range from full scale developmental collaboration to system upgrades and support that allow systems to operate with the latest technical and scientific capabilities and specifications. These ongoing activities, described in more detail in the Statement of Work, will include the following four tasks:

Task #1 - Local Analysis and Prediction System (LAPS)

During Implementing Arrangement #16, FSL and CWB added additional backgrounds such as NFS-15km and NFS-45km as options for LAPS analysis and Hot Start MM5 runs. FSL and CWB also implemented an initial version of the LAPS real-time verification system (LRTVS) for state variables for Hot Start MM5. FSL and CWB continued to improve the cloud scheme and radar QC to enhance LAPS wind analysis. The CWB visiting scientist also began to investigate using typhoon radar derived wind observations for LAPS analysis. FSL



has established a shadowing system of CWB's Hot Start MM5 at FSL.

During Implementing Arrangement #17, FSL and CWB will continue to improve the LAPS analysis in the areas of cloud microphysics (Water In All Phases) and assimilation of vertical motion estimates from convective and stratus cloud analysis. FSL and CWB will also investigate any new motion retrieval algorithms based on the horizontal convective wind field using radar winds.

FSL and CWB will begin to adapt the WRF (Weather Research and Forecast) system to link to Taiwan LAPS. Together, we will explore higher model resolution to improve model performance for typhoon rain bands. FSL will implement the typhoon bogussing system in the shadowing system. FSL and CWB will continue to improve the LAPS real-time verification system (LRTVS) for point verification of precipitation and for gridded verification of model QPF with LAPS QPE. FSL will continue running the CWB shadowing system at FSL during Implementing Arrangement #17.

Task #2 Warning Decision Support System (WDSS)

The National Severe Storms Laboratory (NSSL) will continue research towards the refinement and development of applications and algorithms required for the CWB and the WRA (Water Resources Agency) operations. The NSSL research is directed towards improving the monitoring and prediction of flash floods and severe storm short-term identification and forecasting for the Taiwan environment. The NSSL research and development will focus on four core areas: 1) data



integration and quality control, 2) multi-sensor Quantitative Precipitation Estimation (QPE), 3) 0-1 hour Quantitative Precipitation Forecast (QPF), and 4) distributive hydrological model (Vflo).

During IA#17, NSSL will provide algorithm documentation and source code where appropriate in addition to conducting biannual training for CWB and WRA.

Task #3 Forecast Assistant System

FSL and CWB will continue to enhance CWB's current forecast workstation, the Weather Integration and Nowcasting System (WINS), to take advantage of continued AWIPS modernization. FSL will support enhancement of WINS II in the area of severe weather warning and forecast capability.

During IA #16, FSL provided forecasters training on using SCAN and IFPS. FSL also provided technical support on D3D and FX-C software customization to CWB so that CWB can include these components as part of WINS II. During IA #16, FSL and CWB have investigated an existing 0-3 hour probability QPF system of short range forecasts of precipitation from remote-sensor observations using statistical extrapolative techniques. During IA #17, FSL will provide support to CWB to customize this 0-3 hour probability QPF system using statistical data collected in Taiwan.



Like SCAN (System for Convection Analysis and Nowcasting), FFMP (Flash Flood Monitoring and Prediction) is another integrated nowcast assistance tool for analyzing and monitoring precipitation and other data sets in order to detect and predict flash flood events. It automatically alerts forecasters of flash flood potential. FFMP uses small basin areas to improve accuracy of the basin average rainfall and provides a better estimate of accumulation and therefore flash flood potential. FFMP provides forecasters with accurate, timely, and consistent heavy precipitation warnings. FFMP can serve CWB as a "first alert" warning system and minimize False Alarms Reports (FAR). During IA #17, FSL will provide design approach information to CWB that follows the AWIPS/FFMP implementation document so CWB can assess the future value of their FFMP implementation in the Taiwan area.

SAFESEAS (System AWIPS for Forecasting and Evaluation Seas and Lakes) is another integrated nowcast assistance tool for monitoring weather conditions that threaten marine vehicles (ships, buoys, etc) and for helping forecasters to decide when to alert the marine community when dangerous conditions exist. During IA #17, FSL will provide support to port SAFESEAS code to WINS II, so CWB can expand SAFESEAS to monitor general point observations.

FXC (FX-Collaborate) has provided collaborative functions and elaborate drawing capabilities (analogous to white-boarding) to forecasters in US. FSL will provide technical support to

customize FXC as a drawing tool for CWB forecasters during IA #17.

Task #4 - Continuing Interaction on Earlier Cooperative Projects

Several earlier cooperative tasks have been completed. Technology has been transferred successfully and is beginning to be used operationally at CWB. FSL's development activities in these areas continues, and further CWB/FSL interaction is important to keep CWB staff up-to-date on current developments. This task will allow continuing interaction at an appropriate level, including new software releases of the forecast information system including the internet-based forecast workstation, data assimilation, forecaster training, exchange of visits, copying papers and reports, and e-mail interaction.

Article IV - Financial Provisions

In accordance with the Agreement, NOAA/FSL is undertaking this work as the designated representative of AIT. TECRO is required to reimburse AIT for all costs incurred by AIT's designated representative, NOAA/FSL, in association with the project covered by this Implementing Arrangement. AIT shall transfer to NOAA/FSL all payments made by TECRO to AIT for costs incurred by NOAA/FSL in association with this Implementing Arrangement.

The total cost for activities described in this Implementing Arrangement is mutually agreed to be U.S. \$920,000.00. TECRO agrees to transfer fifty



percent of the funds to AIT in advance, with the remaining fifty percent to be transferred upon completion of the year's activities.

The funding arrangement represents an equitable apportionment of project costs. NOAA's performance of activities under this Implementing Arrangement is subject to the availability of funds.

Article V - Intellectual Property Considerations

No intellectual property considerations are expected to arise in conjunction with activities described in this Implementing Arrangement. Existing system designs and computer software of the FSL Forecast System are in the public domain. Reports, specifications, and computer software prepared under this Implementing Arrangement also will be in the public domain once NOAA and CWB have approved them in final form.

Article VI - Effective Date, Amendment, and Termination

This Implementing Arrangement is effective on the date of the last signature hereto. This Implementing Arrangement may be amended and/or terminated in accordance with the terms of the Agreement. The estimated completion date for the activities described in this Implementing Arrangement is December 31, 2005.

FOR THE TAIPEI ECONOMIC AND
CULTURAL REPRESENTATIVE
OFFICE IN THE UNITED STATES

FOR THE AMERICAN INSTITUTE IN
TAIWAN

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Barbara Schrage

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8/17/2005

6/9/2005

Date

Date