**法規名稱：**(終)IMPLEMENTING ARRANGEMENT #16 CONTINUING DEVELOPMENT OF THE LOCAL ANALYSIS AND PREDICTION SYSTEM AND DEVELOPMENT OF A WARNING DECISION SUPPORT SYSTEM PURSUANT TO 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

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IMPLEMENTING ARRANGEMENT #16 CONTINUING DEVELOPMENT OF THE LOCAL ANALYSIS AND PREDICTION SYSTEM AND DEVELOPMENT OF A WARNING DECISION SUPPORT SYSTEM PURSUANT TO 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

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 the Central Weather Bureau (CWB), the designated representative of the Taipei Economic and Cultural Representative Office in the United States (TECRO) and AIT's designated representative, NOAA/FSL.

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 sixtee-

nth such arrangement under a succession of umbrella agreements between AIT and TECRO.

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 #16 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 SCAN (System for Convective Analysis and Nowcasting), SCAN will provide short range forecasts of precipitation from remote-sensor observations, and 4) continuing integration on earlier cooperative projects.
Tasks under this agreement range from full scale developmental collaboration to system upgrades and support to allow systems to operate to 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)
FSL and CWB have demonstrated the LAPS hot start capability at CWB with improved cloud and precipitation analysis during Implementing Arrangement #15. The Taiwan LAPS analysis improvements include surface observation ingest software, greater use of available surface observations and ingest of CWB dropsonde data
For the satellite data, FSL has supported the transition of GMS data ingest to GOES-9 data. FSL and CWB continue to use the CWB NFS (Non-hydrostatic Forecast System) model as background for Hot Start. There is also on-going work on improving utilization of radar data. FSL also incorporated improvements made by CWB visiting scientists into Hot Start analysis work. The LAPS analysis software was also transferred to a Linux platform during IA #15.

For Implementing Arrangement #16, FSL and CWB will add additional backgrounds as options for LAPS analysis and Hot Start MM5 runs. Candidates for backgrounds are CWB GFS (Global Forecast System), TFS (Typhoon Forecast System) and NFS with different

resolutions. FSL and CWB will also implement the existing LAPS real-time verification system (LRTVS) for state variables for Hot Start MM5. Adding a precipitation verification component will be attempted as a cooperative effort between the CWB and FSL MM5 groups. FSL and CWB will continue to improve the cloud scheme and provide support on ingesting new data sources such as GPS and GOES IPW. FSL also will establish a shadowing system of CWB's Hot Start MM5 at FSL.

Task #2 - Warning Decision Support System (WDSS)
The National Severe Storms Laboratory (NSSL) will lead the effort to continue development of a warning decision support system for CWB and the WRA (Water Resources Agency). The objective of this task is to improve flash flood and severe storm short term forecasting in Taiwan. The Warning Decision Support System (WDSS) consists of four components: 1) data integration and quality control, 2) Quantitative Precipitation Estimation and Segregation Using Multiple Sensors (QPESUMS) and very short-term Quantitative Precipitation Forecast (QPF), 3) Severe Storm Analysis Program (SSAP), and 4) distributive hydrological model.

During IA #15, NSSL has delivered WDSS to the CWB. During IA#16, the system will be further enhanced to include the following:

* Single radar SSAP products
* Refined QPE-SUMS
* Severe storms products based on 3-D Mosaic field
* Initial QPF products (0-1 hour forecast updated at 10 minute intervals)
* Advanced data quality control
* Refined Vflo for the Tanshui River Basin

NSSL also provided initial WDSS application training to CWB. NSSL will also continue to assess and perform field-testing to identify real-time simulation issues and further operational ne-

eds.

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.

SCAN (System for Convection Analysis and Nowcasting) is a continuing activity for the AWIPS modernization within the U.S. National Weather Service (NWS). SCAN is an integrated suite of multi-sensor applications which detects, analyzes and monitors convection and generates short-term probabilistic forecast and warning guidance for severe weather and flash floods. SCAN will provide more accurate, timely, and consistent severe weather and flash flood warnings.

During IA #15, FSL and CWB completed porting SCAN code to WINS II. The initial SCAN component will have a series of severe weather detection and prediction algorithms plus data integration techniques for CWB forecasters to use during severe weather warning operations. The SCAN team has developed a rainfall amount forecast from a statistical extrapolative technique utilizing multiple sensor observations. The system yields forecasts of rainfall probability and rain amount.

During IA #16, FSL and CWB will collaborate to port an existing QPF system of short range forecasts of precipitation from remote-sensor observations using statistical extrapolative techniques.

During IA #16, FSL will also provide training on using SCAN and technical support on IFPS, D3D and FX-C software customization to CWB so that CWB can include these components as part of WINS II.

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 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. $950,000.00. 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 Arra-

ngement. 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, 2004.

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| FOR THE AMERICAN INSTITUTE IN TAIWAN | FOR THE TAIPEI ECONOMIC AND CULTURAL REPRESENTATIVE OFFICE IN THE UNITED STATES |
| Barbara Schrage | Lee Chen-hsiung |
| Deputy Managing Director | Deputy Representative |
| Date: 04/29/2004 | Date: 06/29/2004 |