

法規名稱：(AD.1991.02.02) IMPLEMENTING ARRANGEMENT NO.3 TO THE AGREEMENT BETWEEN CCNAA (COORDINATION COUNCIL FOR NORTH AMERICAN AFFAIRS) AND AIT (AMERICAN INSTITUTE IN TAIWAN) FOR TECHNICAL COOPERATION IN METEOROLOGY AND FORECAST SYSTEMS DEVELOPMENT FOR PREPARING

簽訂日期：民國 80 年 02 月 02 日

生效日期：民國 80 年 02 月 02 日

ARTICLE I -SCOPE

This Implementing Arrangement describes the cooperative scientific and technical activities to be undertaken by the American Institute in Taiwan (AIT) and its designated representative, the Forecast Systems Laboratory (FSL) of the Environmental Research Laboratories (ERL) of the National Oceanic and Atmospheric Administration (NOAA), to define the functional requirements for Central Facility and Workstation software, to initiate software development and to define training requirements for the Forecast System being developed by the Joint Forecast Systems Project between the Central Weather Bureau (CWB) of Taiwan, the designated representative of the Coordination Council for North American Affairs (CCNAA), and NOAA/FSL.

ARTICLE II -AUTHORIZATION

The activities described in this Implementing Arrangement will be carried out under the general terms and conditions established by the Agreement between AIT and CCNAA for Technical Cooperation in Meteorology and Forecast Systems Development. This Implementing Arrangement is hereby attached to that Agreement and becomes part of the Agreement.

ARTICLE III -SERVICES

The Forecast System is comprised of two primary subsystems: a Central Facility and a Forecaster Workstation Subsystem comprised of an indeterminate number of forecaster workstations. The Forecast System also has necessary communications between these subsystems and interfaces with existing sources of meteorological data through the CWB Data Acquisition System and with distribution circuits that disseminate forecasts and warnings to various

users.

A detailed description of the Forecast System planned for the CWB is provided in the Project Implementation Plan for the Joint Forecast System Project that was prepared as part of Implementing Arrangement #1 of this Agreement. Implementing Arrangement #2 of this Agreement provides for cooperation between FSL and the CWB in the detailed planning and initial development of the Forecast System Central Facility hardware and software requirements and for radar upgrades.

The activities described in this Implementing Arrangement are directed to the definition of functional requirements for the Central Facility software; to the definition of functional requirements and the initiation of software development for the forecaster workstation; and to planning for the training needed to accomplish the transfer of technology and capability to CWB. FSL will provide both technical assistance and advisory support to the CWB in areas where the CWB has the lead implementation responsibility. FSL will also work in collaboration with the CWB in areas where FSL has the lead implementation responsibility. These technical areas are:

- Functional Requirements for the Central Facility Software and Forecaster Display Products - The CWB has decided to develop the software for the new Central Facility internally, using CWB technical staff resources. Before this development can commence, the CWB must understand fully the functional requirements of the Central Facility and the nature of the software designed to support it. To do this, the CWB will assign technical staff to the Joint Team at NOAA/FSL to evaluate seaware that presently supports the FSL Central facility in view of the CWB's planned Central Facility configuration.

On the basis of this evaluation the Joint Team will assemble software and documentation that is applicable to CWB needs and will develop a preliminary software development plan that CWB can use to begin its development effort. Although the CWB has lead implementation responsibility, FSL will continue to

provide advice to the CWB as needed during the course of the activity.

- Functional Requirements for the Forecaster Workstation - NOAA/FSL is engaged in a major research and development program directed toward bringing to operational status a UNM-based forecaster workstation, and associated software and display products. This is an ongoing activity, with major design decisions scheduled for 1991. The CWB will participate in this program and plans to base its workstation selection decisions upon those of NOAA/FSL.

Accordingly, the cooperative activity under this Implementing Arrangement will be to assign CWB technical staff to FSL to participate in the workstation development activity. These staff will build upon their technical experience, will contribute to the technical effort, and will be responsible for continuing development of the workstation upon their return to the CWB.

On the basis of the development decisions taken, the Joint Team will work with NOAA/FSL technical groups to develop a preliminary software development plan for the workstation that will be used to begin the development effort. Although FSL has the lead implementation responsibility for this activity, the CWB is responsible for obtaining and integrating the new workstations into the new CWB Forecast System.

- Initiation of Workstation Software Development - The workstation software development is a major undertaking that will extend beyond the scope of this Implementing Arrangement. It is anticipated that the work will continue under subsequent Implementing Arrangement(s). When the system design has been finalized and the preliminary software development plan prepared, interim milestones for the system development and implementation will be established.
- Establishment of a Training Plan - Training of CWB technical staff is a critical element to the success of Joint Forecast Systems Project. The successful transfer of new Forecast Sys-

tems science and technology, and its continued independent use and development by the CWB, is dependent upon the capability of the CWB and of its technical staff

The following types of training will likely be included in the Training Plan:

- Training in the forecast techniques used in mesoscale nowcasting
- Training in the use of the Forecast Workstation
- Training in system operations
- Training in system maintenance
- Training providing design overview and software descriptions
- Configuration management procedures

Training requirements for the new systems science and technology are multidisciplinary in nature, and sources and types of training will be varied. A systematic evaluation is required to understand the full scope of training requirements. The results of this evaluation will be incorporated into a Forecast System Project Training Plan that will be mutually accepted. The plan will include training requirements that fall within the scope of the Forecast Systems Project, as well as those that will be the responsibility of the CWB to arrange internally, or from other outside sources.

ARTICLE IV-FINANCIAL PROVISIONS

- A. In accordance with the Agreement, CCNAA will reimburse AIT for all costs incurred by AIT, and its designated representative, NOAA/FSL, in association with this Implementing Arrangement.
- B. The total cost for activities described in this Implementing Arrangement is mutually agreed to be US\$400,000. It is also agreed that fifty percent of the funds will be transferred in advance and that the remaining 50 percent will be transferred within thirty days of the acceptance of the final summary report by CCNAA, and its designated representative, CWB.

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 for the FSL Forecast System are public domain. Reports, specifications, and computer software prepared under the terms of this Implementing Arrangement will also be public domain once they have been approved in final form by NOAA, AIT, CCNAA, and the CFVB.

ARTICLE VI-EFFECTIVE DATE, AMENDMENT, AND TERMINATION

This Implementing Arrangement is effective on the date of the last signature hereafter. This Implementing Arrangement may be amended and/or terminated in accordance with the terms of the Agreement. The estimated completion date for activities described in this Implementing Arrangement is June 30, 1991.

FOR THE AMERICAN INSTITUTE IN TAIWAN

(Signed)

Clarke N. Ellis

Deputy Managing Director

Date: January 22, 1991

FOR THE COORDINATION

COUNCIL

FOR NORTH AMERICAN AFFAIRS

(Signed)

Date: February 2, 1991

Statement of Work - For Implementing Arrangement #3

System Requirements and Initial

Development Activities To the Agreement

for Cooperation in Meteorology and

Forecast Systems Development Forecast

Systems Laboratory - Central Weather

Bureau Joint Forecast Systems Project

1.0 BACKGROUND AND OBJECTIVES

The Agreement between the American Institute in Taiwan (AIT) and the Coordination Council for North American Affairs (CCNAA) provides for technical cooperation between the National Oceanic and Atmospheric Administration's Forecast Systems Laboratory (NOAA/

FSL) and the Central Weather Bureau of Taiwan (CWB) in meteorology and forecast systems development. FSL is providing technical advice to the CWB to improve CWB weather forecasting capabilities, particularly of mesoscale weather phenomena.

The new Forecast System that the CWB intends to implement is comprised of two primary subsystems: a Central Facility; and, a Forecaster Workstation Subsystem comprised of an indeterminate number of forecaster workstations. The Forecast System also includes the necessary communications between these subsystems and must interface with existing sources of meteorological data through the CWB Data Acquisition System and with distribution circuits that disseminate forecasts and warnings to various users.

A detailed description of the Forecast System planned for the CWB is provided in the Project Implementation Plan for the Joint Forecast System Project that was prepared as part of Implementing Arrangement #1 of this Agreement.

Under Implementing Arrangement #2 to this Agreement FSL, has provided CWB with assistance in evaluating requirements and providing technical information to be utilized in preparing the functional specifications for the CWB's new Forecast System Central Facility.

This Statement of Work (SOW) addresses the tasks that will be undertaken by the joint team of CWB and FSL personnel in accordance with the terms of Implementing Arrangement #3.

The CWB is in the process of procuring, from domestic vendors, the hardware, systems software, maintenance and other technical services associated with the new CWB Central Facility and forecaster workstations. The Central Facility and workstations will be modeled after the systems that have been developed at FSL.

The CWB has decided to undertake the development of the Central

Facility software and Forecaster Display products internally, using CWB technical staff resources. The Forecast Systems Laboratory will provide both technical assistance and advisory support to the CWB in this part of the system development. Before th-

is development can commence, the CWB must understand fully the functional requirements of the Central Facility and the nature of the software designed to support it.

In addition, the CWB will participate with FSL in FSL's ongoing research and development program directed toward bringing to operational status a forecaster workstation, and associated software and display products on a UNIX-based platform, and to base its workstation selection decisions upon the FSL developments. FSL will undertake the software development for the workstation, with CWB participation

Training in all aspects of the new science and technology associated with the Forecast System, its Central Facility and Workstations is a critical element to the success of the technology transfer objectives of the Joint Forecast Systems Project. Therefore, this SOW included the preparations of a training plan specifying all of the training activities required prior to operational use of the system.

The tasks will be accomplished by the CWB-FSL Joint Team working at the FSL facility in Boulder, Colorado and at the CWB facility in Taipei, Taiwan, as appropriate. The Joint Team will consist of CWB personnel on both long and short term assignment to FSL, and FSL staff from the project office and FSL technical units. Accordingly, this Statement of Work addresses the tasks that will be undertaken jointly by FSL and CWB under the terms of Implementing Arrangement #3 and establishes the performance schedule, deliverables and resources requirements.

2.0 TASK DESCRIPTIONS

Implementing Arrangement #3, Article III: Services, describes four technical areas of activity:

- Definition of Functional Requirements for the Central Facility
- Definition of Functional Requirements for the Forecaster Workstation
- Initiation of Workstation Software Development
- The Establishment of a Training Plan

The tasks described in this SOW address the requirements of each of these areas and establish the separate and joint responsibilities of FSL and the CWB.

Task 1. Definition of Functional Requirements for the Central Facility

A Central Facility Familiarization Class was provided by FSL staff as part of Implementing Arrangement #2. This class provided CWB development team leaders with a firm understanding of the functions and design features of the Central Facility that has been developed by FSL.

The CWB development team leaders will continue to work with FSL staff in Boulder, CO for 4 to 6 months after the the training class. The objective of their stay is to prepare a Central Facility Functional Requirements Document for the development activities that will be undertaken by CWB upon their return. The development plan may likely include:

- System design plans to the subroutine level
- Specifications of software programs and subroutines
- Schedules and staffing requirements for each development task

As the system development proceeds, test and evaluation plans will, of course, also need to be prepared.

This plan will allow the orderly development of the Central Facility to begin when the development team leaders return from their stay at FSL. FSL support to the Central Facility Development Effort will continue throughout the development, with FSL staff members providing technical input as required, as well as technical suggestions on finished products. Specific FSL staff will be identified who will continue to be available to support CWB as needed.

The FSL role in Task 1 activities is largely advisory. CWB staff will prepare the development plan and will undertake the development. FSL staff Will give help and advice as requested.

During their stay at FSL, the CWB staff will also become familiar with the installation and operation of all the FSL Central F-

acility software applicable to the CWB environment. This will be accomplished by having the CWB staff take the Central Facility software programs, break them down into subroutines and recombine them into a structure that will allow their use on a stand-alone processor. Each new program would include all functions for a particular data type. This process would be completed for several data types during the period of the CWB staff stay at FSL.

Performance Period: November through May 15, 1990 through May 15, 1991, with continuing FSL support through June 30, 1991.

Resources required: staff/months

10 FSL Staff

15 CWB Joint Team

(While in Boulder)

Deliverables: The CWB Development Team, with FSL technical input, will prepare the Central Facility Development Plan and compile existing source code and documentation used in the FSL real-time system. In addition, Case Study Data Sets used by FSL researchers will be provided to CWB.

Task2. Definition of Functional Requirements for the Forecaster Workstation

FSL has been developing a UNIX - based Forecaster Workstation, which will be used by the CWB. The basic functionality of the workstation has been completed, including the interface to the Central Facility, the overall system configuration, product selection procedures, the capability to display all products available, and the typical workstation functionality (Loop, zoom, roam, etc.) There remains, however, a number of developments remaining, as well as establishing specific features for operational use by CWB. The definition of these requirements will be specified in the Functional Requirements Specification.

Performance Period: November 15, 1990 through March 31, 1991

Resources required: staff/months

6 FSL Staff

6 CWB Joint Team

Deliverables: A Functional Requirements Specification

Task 3. Initiation of Workstation Software Development

Additional developments to the UNIX Workstation will begin as soon as the functional requirements specification has progressed to the point where specific tasks have been clearly identified.

Development tasks will be of two types:

- Tasks directed toward improving basic workstation capabilities, such as additional meteorological applications.
- Tasks directed toward tailoring the workstation for operational use within CWB.

Detailed development plans will be developed in Task 2, described above.

During the initial operation of the workstation systems at CWB, the principle use will be to allow CWB forecasters to become familiar with the operation of the workstation, as well as to evaluate the impact of the system on operational forecast procedures. For this purpose, the workstation software allowing delayed real-time operation, along with case-study date-sets of severe storms used by FSL researchers, will be provided for CWB use.

Performance Period: January 1 through June 30, 1991

Resources required: staff/months

16 FSL Staff

20 CWB Joint Team

Deliverables: Interim progress on the workstation software development. In addition, existing workstation source code and documentation and case-study datasets will be provided.

Task 4. Establishment of a Training Plan

The implementation of a Forecast Workstation System into the Central Weather Bureau forecast operations is an advancement that is, of course, expected to significantly improve the forecast capabilities of the CWB. It will, however, have a major impact on operational activities within CWB. Thus it is important that CWB staff be properly trained in the installation, operation, maintenance, use, and design of the system.

The Training Plan will identify all of the types of training and employee development activities necessary to bring the CWB staff to the level when they can effectively use and maintain the Forecast Workstation System. The following types of training will likely be included in the Training Plan:

- Forecaster training in the forecast techniques and procedures used in mesoscale nowcasting
 - Forecaster training in the use of the Forecast Workstation
 - Operations training in system operations and diagnostic procedures
 - Maintenance training in system hardware and software maintenance
 - Software development and maintenance training providing a design overview and subroutine-level software descriptions
-
- Configuration management procedures

As part of the planning of the project training program broader issues involving the impact of the Forecast System on the CWB must be considered. For example, in considering training of operations and maintenance staff, the question naturally arises as to whether round-the-clock staffing is required. This then leads to staffing requirements, education and experience required, and how this staff fit into the overall organization. These issues go beyond the training questions, but show that the planning of the training program is a time when CWB must start addressing these issues.

Performance Period: January 1 through April 30, 1991

Resources required: staff/months

4 FSL Joint Team

6 CWB Joint Team

Deliverables: Project Training Plan

3.0 SCHEDULE

Work will be performed between November 1, 1990 and June 30, 1991 at the FSL facility in Boulder, Colorado. If necessary, FSL personnel will visit the CWB facility in Taipei, Taiwan, for further



er consultations during the course of the work. As part of the ongoing activities, preparation of Implementing Arrangement #4 for the project activities for the period of July 1, 1991 to June 30, 1992 should be completed by June 1, 1991.

Functions	Completion
	Date
Task 1 a) Definition of Functional Requirements for the Central Facility	1/1 5/91
b) Complete Central Facility Development Plan	5/15/91
c) Initial Central Facility Development by CWB	6/30/91
Task 2 • Definition of Functional Requirements for the Forecaster Workstation	3/31/91
Task 3 • Initiation of Workstation Software Development	6/30/91
Task 4 • Establishment of a Training Plan	4/30/91

Schedule by Month

	10/1	11/1	12/1	1/1	2/1	3/1	4/1	5/1	6/1	6/30
Task 1 a)	_____>									
b)			_____>							
c)								_____>		
Task 2		_____>								
Task 3				_____>						
Task 4				_____>						

A Joint Management Progress Review is scheduled for early April 1991 either at Boulder, Colorado or in Taipei. A site visit to the CWB to review Central Facility Development progress will al-

so be scheduled.

4.0 BUDGET

As stated in Implementing Arrangement 3, funds available for the tasks described in this SOW will be US\$400,000.

All budget figures are estimates. Actual amounts will be accrued for purposed of fulfilling the financial arrangements described in the Implementing Arrangement, in accordance with the terms of the Agreement.

All programs within the Forecast Systems Laboratory use the same budget procedures, whether they are base-funded programs or externally-funded programs. In FY'91 a fixed rate facility charge is applied to all program funds to cover, management, administrative and indirect costs, and the use of the FSL facility and all of the equipment and data associated with it. This fee is projected to be 40% of the project budget and covers the following Laboratory over-head costs for both FSL and CWB employees at FSL :

- Management and Administrative Costs - 5%
- Use of the FSL Computer Facility (Operation and Maintenance)- 20%
- Additions to the FSL Computer Facility to meet new Laboratory needs - 15%

FSL staff time is charged at the employees salary plus the normal NOAA benefit, leave and overhead charge. FSL professional staff are primarily in the government grade scales of GS-11 to GS-14. Contract staff are in equivalent categories. Actual charges to a project are based on the salary of the individual staff assigned to the project. For budgeting purposes, we have found that using an average salary and overhead of \$6,000 per person-month for each FSL staff member assigned to the project provides a good initial estimate. The projected costs for each task identified in Table 1 are based on these figures.

Travel of FSL personnel will be performed in accordance with standard U.S. Government regulations and rates.

Charges for report reproduction, express deliver, shipping and



miscellaneous expenses will be at actual cost.

Table 1 - 1991 Budget Estimates*

FSL Personnel Cost by Task	Seaffing Cost		
	FSL CWB** (\$000)		
	(Person-months)		
1. Definition of Functional Requirements for the Central Facility Software and Forecaster Display Products	10	15	100
2. Definition of Functional Requirements for the Forecaster Workstation	6	6	60
3. Initiation of Workstation Software D- evelopment	16	20	160
4. Establishment of a Training Plan Oth- er Charges	4	6	50
Subtotal	36	47	360
Other Charges			
FSL Travel to Taiwan (4 trips x 14 days each), & 1 trip to Monterey, CA			25
Publication, Communications, Misc.			15
			TOTAL 400

* Including FSL facility user fees as discussed in Section 4.0

** Costs include use of all FSL facilities by CWB staff

5.0 CWB JOINT TEAM ASSIGNMENTS TO FSL

CWB staff will be actively involved in the FSL activities. This includes both participation in the training activities (Training class and training plan) and the Work-station planning and development. The following CWB staff are scheduled for long-term workstations at the FSL facilities:

3/90-4/91 CWB On-Site Coordinator

10/90-10/91 Meteorologist Analyst

11/90-5/91 Software Manager/DBMS Manager

11/90-5/91 Lead Central Facility Programmer/Analysts(2)

11/90-11/91 Workstation Programmers(a)



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