

# NATIONAL STRATEGIC TRAINING AND EDUCATION PLAN (NSTEP)

August 2003

## **I. INTRODUCTION**

This document describes the mechanism by which National Weather Service (NWS) Training and Education requirements are identified, prioritized, and met. Since a variety of training methods are available, a plan is developed to balance the need for residence training and non-residence training (teletraining, World Wide Web (WWW) based, etc.) within the constraints of the annual budget. This forms the basis of the National Strategic Training and Education Plan (NSTEP).

## **II. MISSION, VISION, AND GOALS**

The NSTEP mission is to ensure the NWS's highest priority training needs are met annually. This means maintaining an efficient and effective work force and facilitating the transfer of scientific developments into operations. Within the context of this mission, the vision for the program is to develop and deliver effective training in response to NWS work force needs. The following goals specify the framework by which this vision will be realized:

### **GOAL 1:**

*Establish a logical, flexible, and responsive training infrastructure to quickly translate field training and education requirements into easily accessible, usable, and effective training materials.*

### **TO MEET GOAL:**

An NSTEP Team (referred to as "the Team" hereafter and defined in Section III) comprises representatives from the field, National and Regional Headquarters, and the NWS training facilities. The Team defines and establishes priorities for training via a well-defined process. This process ensures training deficiencies and associated requirements are driven directly by the field or agency (e.g., NWS, National Oceanic and Atmospheric Administration (NOAA), or Department of Commerce) for systematic coordination and prioritization by the Team. The prioritized requirements are then passed directly to trainers for development of relevant and easily accessible training materials.

**GOAL 2:**

*Implement an efficient, open, and consistent process for defining and establishing priorities for NWS training requirements.*

**TO MEET GOAL:**

The responsibility for defining and recommending prioritized training requirements rests with the field representatives to the Team. These requirements are based on deficiencies which are identified by the NWS. The end users of NWS products are solicited for their feedback on any such deficiencies. All proposed requirements from other entities must pass through the field representatives to generate a single, consistent set of requirements for the entire NWS training program.

**GOAL 3:**

*Create an integrated model for defining required knowledge, skills, and abilities to successfully perform job tasks. These definitions will be easily accessible and understood by users and are used by the trainers as the template for development.*

**TO MEET GOAL:**

The Professional Development Series (PDS) structure is used by the Team as a model for defining training requirements. The PDS provides an integrated framework to define the knowledge, skills, and abilities required to perform any individual job task. All PDS outlines reside on the Internet's WWW for easy access by all NWS staff at:

<http://www.nwstc.noaa.gov/nwstrn/d.ntp/pds.html>

**GOAL 4:**

*Develop annual implementation plans (IP) for training and science support to ensure responsiveness to field requirements and to sustain the high level of science and technical infusion required to maintain the high forecast standards of the NWS.*

**TO MEET GOAL:**

As an integral component of the NSTEP process, the NSTEP Team works together on a regular annual cycle to identify and prioritize new or unmet training requirements. At the conclusion of this process, the annual IPs are prepared and posted on the WWW so the training providers can adjust their internal plans to the field.

Each year, the IP is formally approved by the NWS Regional Headquarters and National Headquarters Directors; the Director of the National Centers for Environmental Prediction (NCEP); and signed by the Director of the Office of Climate, Water, and Weather Services (OCWWS). This approval ensures support of the agreed-upon priorities as well as the allocation of human and financial resources at all levels in the organization. In

addition, the Team keeps NWS senior management informed of any critical requirements which cannot be met within existing budgets. The IP also details the requirements which are recommended for development in the future.

The current year's IP can be accessed on the WWW under the "National Training Plans" section at:

<http://www.nws.noaa.gov/om/os/org/training/index.shtml>

**GOAL 5:**

*Create a process to facilitate rapid response to new or changing training priorities within any fiscal year. Identify requirements which cannot be met due to resource limitations or additions to training priorities, and raise them to senior management.*

**TO MEET GOAL:**

The field representatives to the Team communicate via periodic conference calls, e:mail, and telephone as needed to discuss any revisions to requirements which arise during the year. It is the Team's responsibility to identify any recommended adjustments to the annual IP for consideration by senior management. The Team also notifies senior management if the work load for developing new training exceeds the capacity of the trainers to perform such development.

**GOAL 6:**

*Establish an effective evaluation process to ensure staff are reaping the intended benefits of training. Involve local supervisors in assessing the impact of training on job performance and providing feedback to the Team.*

**TO MEET GOAL:**

Developers of each PDS Instructional Component (IC) are responsible for producing an end-of-training evaluation to allow trainees and their supervisors to assess the impact of the training. Local management is responsible for assessing whether the training had the desired effect on job performance. Local management also coordinates with their regional headquarters staff to address training needs and to ensure any remaining training deficiencies are brought to the attention of the Team.

### III. TRAINING INFRASTRUCTURE

This section outlines the organizational structure of the Team in support of the goals described in Section II. The Team is led by the OCWWS Director and has three specific organizational components, as follows:

1. The **Field Requirements Group (FRG)**, made of up one representative from each Regional office and NCEP, is charged with representing the training needs of NWS field staff. Thus, the FRG defines and prioritizes training requirements and deficiencies, and provides recommendations for the yearly IPs. The FRG representative is selected by the Regional/NCEP Director and may be changed from year to year.

As part of the prioritization process, the FRG discusses and validates any training requirements proposed by the National Headquarters Group or Heads of Training Centers Group (defined in 2. and 3. below, respectively). In addition, the FRG accepts responsibility for prioritizing any training requirements mandated from entities outside the NSTEP process. Such mandates may be defined by senior NWS management or one of the NWS's parent agencies. While these activities are generally funded outside of the NWS training program, they should be included in the NSTEP prioritization process to ensure their relevance to the field.

Once prioritization is complete, the FRG has responsibility for recommending the distribution of the discretionary portion of the Training Program budget across all prioritized activities. It is important to note the representative from each regional office within the FRG is responsible for articulating all training needs, including (but not restricted to) hydrometeorological, technical, and administrative requirements.

The FRG is also responsible for ensuring the implementation of training in their Region or office. This includes coordinating residence course attendees and completion of Distance Learning materials.

On occasion, the FRG may elect to designate representatives to make recommendations to the Heads of Training Group (HOTG) with respect to training needs in specific subject areas. Such subgroups, designated as "Instructional Design Teams" (IDTs) or Field Requirements Teams (FRTs), may be comprised of staff from diverse sources, including NWS national and/or regional headquarters, NWS field offices, or from applied research partners of NWS, such as NOAA's Forecast Systems Laboratory, to work with the HOTG. The charge of IDTs and FRTs is to recommend specific learning objectives, structure, curricula, length and resource requirements for new courses to the FRG and HOTG for an

upcoming fiscal year. Members of IDTs and FRTs may be consulted as needed usually in reviewing draft presentation materials and attending prototype courses.

2. The FRG is responsible for passing its prioritized requirements to the second component within the infrastructure, the **National Headquarters Group (NHG)**. This group consists of designated representatives from NWS Headquarters as follows:

The **OCWWS Training Division** provides end-to-end support for science-based, meteorological forecast technology at Weather Forecast Offices (WFOs), River Forecast Centers (RFCs), Center Weather Service Units (CWSUs), and NCEP Service Centers, and develops and supports relevant scientific and operational training in response to regional needs. The Training Division receives meteorological training requirements through its interactions with other headquarters groups.

The **Office of Operational Systems (OOS)** provides support for existing and modernized NWS systems at all NWS field sites and obtains requirements relating to training on these systems in response to agency and regional needs. OOS receives training requirements for the engineering and electronics programs through its interactions with the Systems Operations Divisions at the regional headquarters offices.

The **Office of Hydrologic Development (OHD)** serves as the primary interface between the NWS Headquarters and technical aspects of NWS hydrologic programs. The Office identifies requirements for the development, testing and support of hydrologic forecast algorithms/tools and hydrologic data to improve efficiency and effectiveness of NWS hydrologic operations and services. Based upon these requirements, the Office develops plans, and coordinates their implementations with the Hydrology Laboratory and RFCs.

The **Office of Science and Technology (OS&T)** drives science and technology advances into NWS operations. OS&T responds to field requirements and emerging opportunities, plans, develops and implements enterprise solutions, and enables continuous improvement of NWS systems.

The **Office of the Chief Information Officer (CIO)** provides the key information technology (IT) planning and evaluative activity for the NWS, to include coordination and development of the annual NWS IT Operating Plan, the NWS IT Strategic Plan, and coordination and implementation of all NWS IT security and critical IT infrastructure activities.

The **Office of the Chief Financial Officer (CFO)** obtains and effectively manages financial, human, physical, and

information resources to enable the NWS to fulfill its mission and vision of the Strategic Plan.

In addition to the above groups, representatives from OCWWS Service Programs are included as needed. The Chief of the Meteorological Services Division takes the lead in coordinating with Service Programs to ensure training is available to support their service goals as expressed in the NWS Service Improvement Plan (SIP). The Service Programs also coordinate with OS&T to ensure the goals of the Science and Technology Infusion Plan (STIP) are addressed.

The NHG regularly coordinates requirements with the FRG to form national policy, manages the national budget for training and education, and finalizes the yearly IPs for wide distribution.

3. The **HOTG** comprises the training facilities which are primarily responsible for the development and delivery of training and education to NWS personnel. The HOTG responds to the requirements identified in the IP. However, any individual or entity which provides approved training becomes a member of the HOTG. Three training facilities reside within the OCWWS Training Division, and include the NWS Training Center (NWSTC), the Cooperative Program for Operational Meteorology, Education and Training (COMET) Branch, and the Warning Decision Training Branch (WDTB).

Each facility within the HOTG plays a unique role in responding to training and/or educational needs. The NWSTC focuses on NWS job-specific training in the electronics, engineering and facilities areas, as well as management, leadership and scientific arenas. COMET focuses on advanced scientific education and the transfer of knowledge and applied research from the academic community into the NWS operational environment. The WDTB focuses on supporting the warning decision process and continuing Doppler weather surveillance radar (WSR-88D) training. The Directors of the three training facilities confer routinely through conference calls and meetings to ensure their activities and policies are well coordinated. As an important adjunct to their course development, the training facilities also provide highly usable, well organized materials for attendees to share with other office staff.

As examples of training providers outside the three primary training facilities, OHD/OCWWS Hydrologic Services Division (HSD) serves as a member of the HOTG by leading workshops at field offices on various components of RFC and WFO operational hydrologic forecast systems and by developing distance-learning training modules on operational hydrology and hydrometeorology. In addition, the Virtual Institute for Satellite Integration Training (VISIT), a collaborative project with the NWS and the National Environmental

Satellite, Data, and Information Service (NESDIS), serves as a provider of essential training on the integration of remote sensing technology into the forecast process. Finally, any NWS office or facility with responsibility for providing training may occasionally, or as necessary, contract with other government agencies or non-government vendors to provide required training for NWS employees.

The Team routinely coordinates to assess the status of training and scientific education activities, plans future activities within allotted resources, anticipates future training needs for budget planning, and addresses issues related to assessing the effectiveness of training activities. It is through the Team which the NSTEP process is guided and specified.

#### **IV. IDENTIFYING POTENTIAL TRAINING REQUIREMENTS AND A MODEL FOR STRUCTURING THEM**

##### **A. IDENTIFYING REQUIREMENTS**

Due to limitations in budget and staffing resources, the FRG must establish priorities for potential training topics so resources can be directed to those areas where the need is greatest, namely, where the impact on operations would be the greatest by **not** providing training. In order to effectively establish training priorities, the universe of potential training activities has been defined and is composed of several PDSs, the concept of which is described in Section B below.

##### **B. THE PROFESSIONAL DEVELOPMENT SERIES (PDS) CONCEPT**

The PDS concept is made up of three main components: PDS, Professional Competency Units (PCUs) and Instructional Components.

A PDS is a set of integrated instructional materials and presentations which describe the skills, knowledge, and abilities necessary to fulfill a major job responsibility. For any given topic, a PDS should be focused on advancing staff to a level of performance which enables them to meet their job responsibilities.

PDSs are maintained and updated with the help of Executive Producers and Producers. The Executive Producer oversees the entire PDS, and helps to secure budget and personnel resources to support the development and implementation of the PCUs by coordinating with the FRG. The Executive Producer ensures the cohesiveness of the PDS by coordinating the development and implementation of PCUs across training centers. In most cases, Executive Producers are from one of the three training centers (NWSTC, COMET, WDTB), or from training positions in Regional or National NWS Headquarters. Generally speaking, the Executive Producer maintains "ownership" of a PDS for its existence.

The role of a PDS Producer is to coordinate the development and implementation of a PCU. Executive Producers and Producers coordinate regularly to coordinate changes and updates to the PDS. Any changes or updates are given to Regional focal points and the FRG for comments over a two week period. The changes or updates go into effect at the end of the two-week period if there are no objections. If objections are raised, a conference call may be required to examine them.

Within the PDS structure, PCUs define specific job tasks and competencies to be achieved. PDS Producers coordinate the subject matter experts, initial content script, relevant case data sets, and production resources to ensure PCU content fits together and works to achieve the desired competency level.

The ICs are the instructional part of the PCU, and identify training materials and technologies necessary to meet the competencies defined by individual PCUs. This training can include on-the-job training, classroom instruction, teletraining, and WWW modules.

Figure 1 below illustrates the relationship between the PDS components.

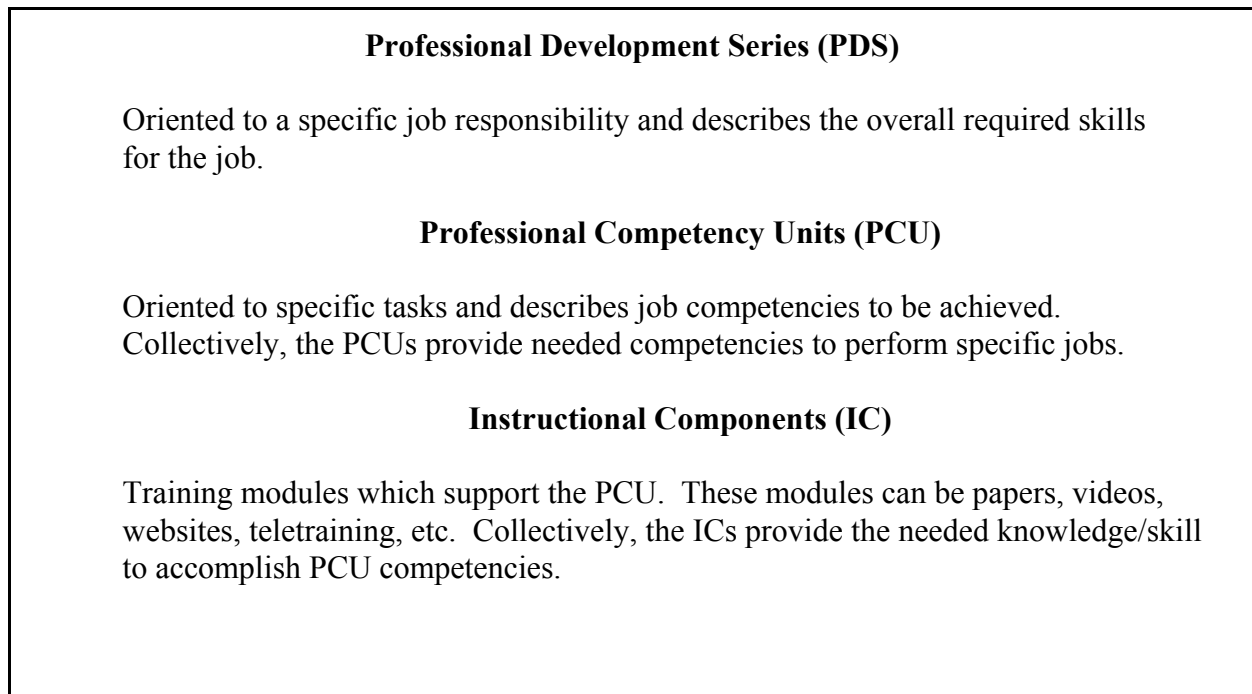


Figure 1

Completed PDS outlines are placed on the NWSTC web page at <http://www.nwstc.noaa.gov/nwstrn/d.ntp/fun.html>. The PDSs on this page are broken down by program area (i.e., aviation, engineering). The goal of this page is to provide a single reference source for training information and materials. Because



this information will be placed on the WWW only (i.e., no paper copy will be produced), additions or revisions to materials for any PDS can be updated rapidly and easily. A Concept Paper in which the PDS concept is defined is available on COMET's web site at [http://www.comet.ucar.edu/pds/PDS\\_V3.htm](http://www.comet.ucar.edu/pds/PDS_V3.htm).

## V. IDENTIFYING TRAINING PRIORITIES AND ASSIGNING DEVELOPMENT

This section defines the process for identifying training deficiencies using the PDSs as a base. The prioritization process is critical because training resource restrictions will always limit the amount of training which can be offered or developed in any given year. In consideration of training required for the range of NWS services, a priority list will be established for each service by identifying the impact of *not* conducting associated training on the overall NWS mission.

The FRG and members of the NHG identify training deficiencies by polling field and local offices (WFOs, RFCs, CWSUs, NCEP Service Centers, NWS Headquarters Divisions). These deficiencies are then prioritized within the constraints of the annual budget. During this prioritization process for the yearly IPs, it becomes apparent some training deficiencies will be met via courses or materials which are already available. However, other critical deficiencies will require new training courses or distance-learning materials be developed. It is for cases in the latter category which a process for assignment and development of training must be defined. PDS Executive Producers have the responsibility to revise PDSs and coordinate with the FRG as necessary on matters relating to the timing of training provision, instruction methods, beta testing, and evaluation.

## VI. EVALUATION OF TRAINING

With the increased emphasis on results, there is a need to assess whether staff are reaping the intended benefits of training. It must be determined whether employees are acquiring new knowledge and skills from these training efforts and whether the training is having an impact on how employees do their job.

The difference between current performance and expected or desired performance represents a training deficiency. Training deficiencies define the focus of training and can be translated into a set of training objectives. If properly stated, these training objectives define the knowledge and skills which a trainee is expected to have when the training is complete. The training objectives are then used to design and develop the content of the training. *Thus, training evaluation should measure whether the training accomplishes its stated objective.*

A Training Evaluation Program should:

- Determine how trainees perceive the impact of training.

- Assess objectively the extent to which participants changed attitudes, improved knowledge, or increased skills as a result of the training.
- Determine the impact of training on job performance as evaluated by the local supervisor.
- Determine the relative cost/benefit to the NWS of utilizing the various available training modalities.
- Assess the quality and adequacy of the training as it applies to the intended purpose.

Each PDS defines ICs which accomplish desired training. For practical purposes, each component can be thought of as a "lesson". Each lesson is evaluated as follows:

- (1) The developers of each IC are responsible for producing and collecting results from an evaluation. Trainers utilize these results to find ways to enhance materials for future presentations.
- (2) Training leaders and supervisors must take an active part in the training process. They need to know why a person took part in a training program, what knowledge and skills the training program was intended to provide, and then follow up to ensure the training is applied to the work environment. Annual performance evaluations and Individual Development Plans (IDPs) provide the mechanism for this process. Training leaders and supervisors are also responsible for assessing the impact of the training on the office as a whole, and for reporting these results to their FRG representative and the appropriate training provider.

## **VII. SUMMARY OF ANNUAL NSTEP PROCESS**

A process has been described by which training requirements are logically and systematically coordinated by the NSTEP Team for coordination and prioritization within available resources. This process and timeline is summarized as follows and is shown graphically in Figure 2.

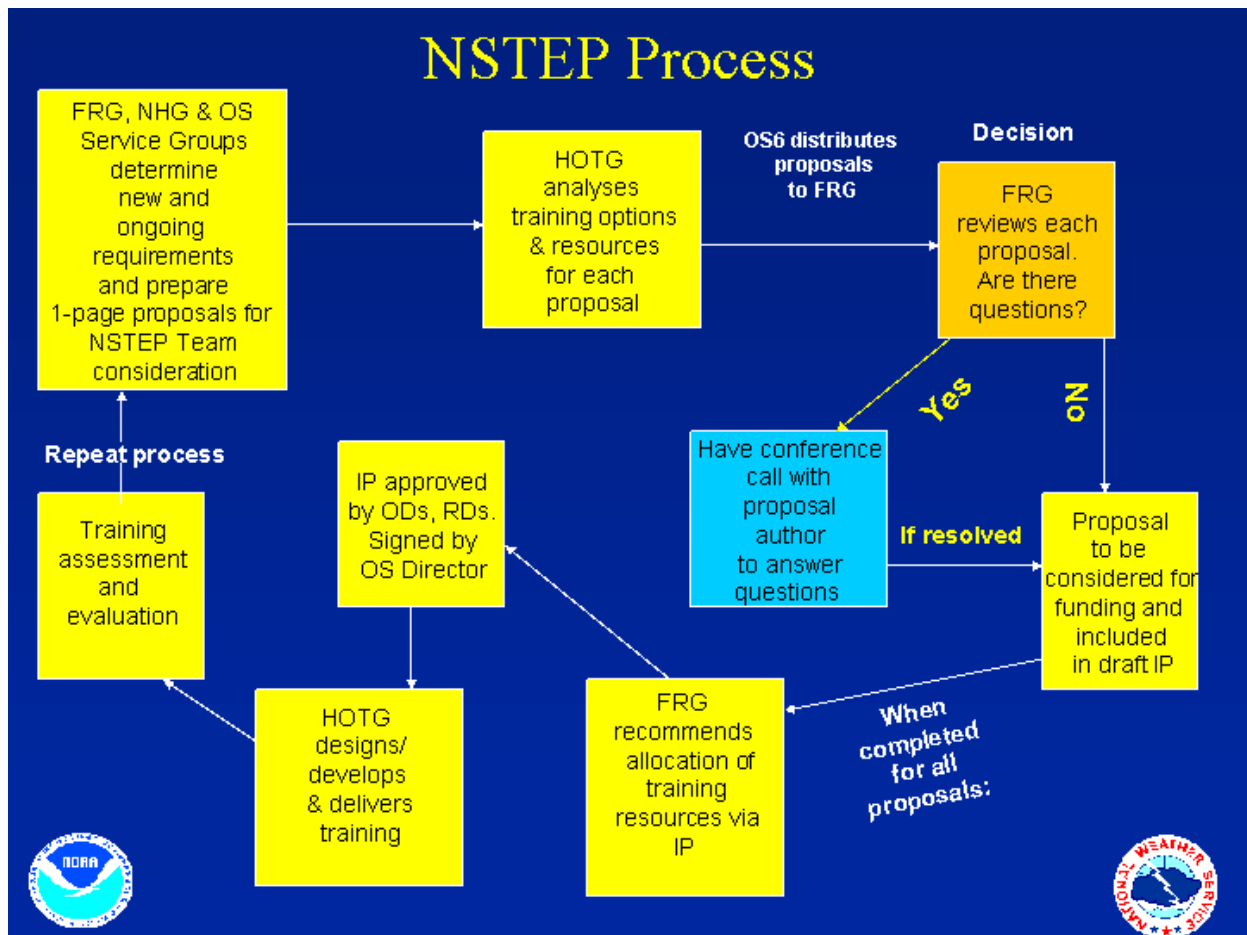


Figure 2

- (1) The FRG/NHG/OCWWS Service Groups determine new and ongoing training requirements and prepare proposals for NSTEP Team review and consideration. OCWWS Service Groups coordinate with OS&T to ensure STIP goals are addressed. Each group coordinates with the HOTG to determine training options and resources needed to accomplish. 1-page training proposals are submitted to the OCWWS Training Division (OS6). (December/January)
- (2) OCWWS Training Division distributes proposals and HOTG analyses to FRG for review. (By February 28)
- (3) The FRG reviews each proposal and generates any related questions. If there are questions, the OCWWS Training Division convenes a conference with proposal author(s) to address. Proposals will be considered for funding and included in draft IP. (By April 30)
- (4) The FRG jointly discusses and recommends the proposed allocation of training resources for the next fiscal year via the IP. (Early to mid May)

- (5) The IP is approved by the Office and Regional Directors (May 15) and signed by the OCWWS Director (By mid June). IP posted on NWSTC web page. (by Aug. 1)
- (6) HOTG designs, develops and delivers training in accordance with the annual IP. (Ongoing)
- (7) Training assessment/evaluation occurs. Return to Step (1).