



**US Army Corps
of Engineers®**

Engineer Research and
Development Center

User Productivity Enhancement and Technology Transfer Program (PET)

Description

The User Productivity Enhancement and Technology Transfer (PET) Program, formerly Programming Environment and Training, is responsible for gathering and deploying the best ideas, algorithms, and software tools emerging from the national high performance computing (HPC) infrastructure into the Department of Defense (DoD) user community. The PET Program transfers leading-edge HPC computational and computing technology in DoD from other government, industrial, and academic HPC communities. Its goal is to enhance DoD HPC user productivity by providing world-class technical support and training through strategic partnerships and focused enabling tool development and deployment. The PET Program is hosted by three Major Shared Resource Centers (MSRCs) of the DoD High Performance Computing Modernization Program: U.S. Army Research Laboratory, Aberdeen Proving Ground, MD; Aeronautical Systems Center, Wright-Patterson Air Force Base, OH; and the U.S. Army Engineer Research and Development Center (ERDC), Vicksburg, MS.

Capabilities

The PET Program comprises ten DoD computational technology areas and four crosscutting support areas. The [PET Online Knowledge Center \(OKC\)](#), a portal-based Web site, gives information on the technology areas and crosscutting support areas. The ERDC MSRC hosts Component 3 of the PET Program, which supports four computational technology areas: Computational Fluid Dynamics (CFD); Computational Structural Mechanics (CSM); Environmental Quality Modeling (EQM); and Climate/Weather/Ocean Modeling (CWO); and one crosscutting area: User Training Coordination (UTC).

The University of Alabama at Birmingham (UAB) is the lead university for PET support in CFD. Support is provided through a combination of university personnel and onsite staff. Along with general support for the CFD user community, the PET CFD team offers expertise in the following areas: (1) solution technology for store separation and other moving body problems, (2) unstructured grid and solution technology, (3) structured overset grid and solution technology, and (4) turbulence modeling.

UAB is the PET lead university for CSM. University and onsite staff support the CSM user community with expertise in the following areas: (1) use of hydrocodes for modeling explosion effects, structural damage and failure, (2) solution of aircraft structural problems related to damage from enemy fire and the use of composite materials, and (3) code coupling technologies for modeling projectile flight, impact, and penetration.

The University of Texas at Austin (UTA) is the PET lead university for EQM. Support is provided through a combination of university personnel and onsite staff. In addition to general support to the EQM community, the PET EQM team provides expertise to the DoD in parallel discretizations with adaptivity-based estimators and solvers and code coupling of multiphysics, multiphase, multicomponent flow and reactive transport.

UTA is the PET lead university for CWO. University and onsite staff support the CWO user community with expertise provided to the DoD in the following areas: (1) high-resolution weather and oceanographic forecasts leading to incisive decision

making and enhanced operational capability in adverse weather with reduced weather-related damage and fuel cost; and (2) realistic simulations of the dynamic oceanic and atmospheric environment to permit effective mission planning, rehearsal and training, and more effective materiel acquisition.

The University of Hawaii is the lead university for UTC. This crosscutting functional area encompasses all PET-sponsored training for DoD High Performance Computing Modernization Program (HPCMP) users. Activities in this area include coordinating on-site training at the HPCMP's shared resource centers and remote sites, arranging for instructors, handling all registration activities, and soliciting and responding to training evaluations by students; and arranging for webcasting of training to off-site attendees and for video-capturing of training for later downloads from the OKC.

Supporting Technology

PET uses bold and innovative university/industry/Government effort to provide collaborative assistance and training essential to DoD user support. This support is necessary to address the wide variety of research and development demands arising from the science/technology and test/evaluation programs supporting DoD weapons development and warfighting support systems.

Benefits

The PET Program develops, trains, and supports new and existing DoD HPC users with education, knowledge access, and tools to maximize productivity as follows:

- The PET Program provides training and collaborative assistance to DoD HPCMP users.
- PET functional area points of contact (FAPOCs) are provided for each of the 10 DoD computational technology areas and for four crosscutting support areas.
- The PET FAPOC fields a team of onsite staff located at DoD centers with user concentrations, supported by other staff at the PET team institutions. These PET onsite staffs support DoD users across the HPCMP, not just those at their location.
- PET provides both short-term assistance to users to meet emerging immediate needs and longer term user support through annual technical projects. PET also conducts training courses at DoD user sites.
- User support is available throughout the year from the FAPOC team, while annual projects and training schedules, resulting from expressed user needs, are set yearly.
- DoD HPCMP users may contact either the FAPOC or the onsite staff any time with current needs for assistance and/or training.

ERDC POC

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