IT DIVISION - HIGH PERFORMANCE COMPUTING CENTER

STRATEGIC PLAN

MISSION STATEMENT
The High Performance Computing Center (HPCC) promotes research and teaching by integrating leading-edge, high-performance computing and visualization for the faculty, staff, and students of Texas Tech University/Texas Tech Health Sciences Center, as well as advance disciplinary diversity, partnerships, and excellence.

VISION STATEMENT
The HPCC will facilitate research and aid in educational advancement by integrating leading edge, high-performance computing and visualization to individual administrative units, as well as multidisciplinary units across campus. The Center will embrace this disciplinary diversity by creating partnerships, supporting and servicing all high-performance computers on campus. It will ensure that Texas Tech retains superior computing and visualization facilities.
GOALS, CRITICAL SUCCESS FACTORS, and OBJECTIVES (including Strategies and Assessments)

Goal 1. Technological Innovation for HPC and Visualization: Continue to promote technological innovation.

Critical Success Factors *(measures the degree of success over the next 5 years)*:
- Obtain computing capabilities of 2 (.2) TFLOPS.
- Move from top 50 to top 25 in Academic High-Performance Computing.

Objectives:

Objective 1.1: *Obtain additional computing and visualization resources.*

Strategies:
- Expand cluster.
- Evaluate and possibly acquire new shared-memory machine.
- Increase funding by $300,000 ($150,000 per year) to maintain and upgrade cluster (replacement cycle every 2 years).
- Increase funding by $1,200,000 ($400,000/year) to acquire and maintain new shared memory machine (replacement cycle every 3 years).
- Expand visualization capability by acquiring a Cave Automatic Virtual Environment (CAVE) or other high-end visualization systems.

Assessment:
- Total GFLOPS and visualization hardware (polygon count) and software.

Objective 1.2: *Make tools and techniques developed for supercomputing and visualization available to the entire HPC community at Texas Tech University.*

Strategies:
- Interact closely with researchers on campus.
- Work in conjunction with other departments on visualization techniques.
- Use new tools, techniques, and methodologies in multi-disciplinary research.

Assessment:
- Publications, grants, and computer and tool usage.
Objective 1.3: Maintain hardware and software capabilities.

Strategies:

- Keep hardware support contracts current.
- Update software to minimize downtime.
- Provide constant monitoring of the resources requested on the SGI/Cray, the Virtual Reality Theater, and future resources.

Assessment:

- Amount of downtime and usage.
Goal 2. Expansion of Funding: Explore expansion of funding options.

**Critical Success Factors** *(measures the degree of success over the next 5 years):*

- Enhance research-based funding to $250,000 per year.
- Increase University HPC related funding to $3 million per year, ($2 million/year).
- Successfully implement Grid Computations.

**Objectives:**

**Objective 2.1: Develop Grid Computing.**

**Strategies:**

- Connect HiPCAT (High-Performance Computing Association of Texas) resources; such collaboration would increase our computing resources, thereby expanding the University’s opportunity for funding.
- Encourage local grids.

**Assessment:**

- Grid computing usage.

**Objective 2.2: Facilitate multidisciplinary research to increase funding for HPC and visualization.**

**Strategies:**

- Proceed with work on the Admiral Elmo R. Zumwalt National Program for Counter Measures to Biological and Chemical Threats in conjunction with TEIHH and other departments.
- Sponsor internal conferences for the benefit of faculty and students.
- Aid in the preparation of grants that require high-performance computing or high-performance visualization.
- Invite outside speakers on high-performance computing and visualization to increase the knowledge base of HPCC personnel and TTU faculty.

**Assessment:**

- Dollar amount of funding.
Goal 3. Personnel: Recruit and retain high-caliber personnel.

Critical Success Factors (measures the degree of success over the next 5 years):

- Maintain a low attrition rate.
- Expand staff size by 10 FTE (Full-time Equivalent) and Research Associates/Assistants by 4 FTE.

Objectives:

Objective 3.1: Recruit and retain a talented staff.

Strategies:

- Encourage qualified faculty within the department to attend professional meetings and share the knowledge gained with faculty, staff, and students.
- Create a departmental policies and procedures manual that conforms to the University OP manuals.
- Maintain state-of-the-art resources.
- Maintain competitive salary, benefits, and opportunities vis-à-vis peers.

Assessment:

- Success/failure of staff retention and recruitment.

Objective 3.2: Increase staff size by 10 and research assistants by 8 to meet needs, and add capabilities to the HPCC.

Strategies:

- Encourage other research projects to contribute to the cost of HPC.
- Encourage multidisciplinary projects.
- Increase HPC visibility by writing articles for the newspaper and by publicizing successes.
- Increase capabilities of staff to deliver user services.

Assessment:

- Staff size and capabilities.
Goal 4. Integration: Continue efforts toward integration and collaboration of high-performance computing activities.

Critical Success Factors (measures the degree of success over the next 5 years):

- Increase involvement of faculty, staff, and students by a factor of 4.
- Collaborate with 3 Lubbock businesses.
- Demonstrate HPC and virtual reality capabilities to over 1,000 visitors a year.

Objectives:

Objective 4.1: **Provide new opportunities in HPC and visualization.**

Strategies:

- Work with the newly formed Environmental Visualization Program in Architecture to explore our current and future high-end visualization needs.
- Teach courses in parallel and scientific computing.
- Bring in outside speakers on high-performance computing and visualization to increase knowledge base of HPCC personnel and TTU.
- Sponsor internal conferences for the benefit of faculty and students.
- Present and develop relevant HPC and Virtual Reality demonstrations.

Assessment:

- New projects, technologies brought to the University, increase in users, classes taught, and presentation attendance; and monitor computer and visualization usage.

Objective 4.2: **Partner with local companies to advance a research agenda that benefits both Texas Tech and the Lubbock community.**

Strategies:

- Demo the facility to prospective and current Reese tenants and LRRA (Lubbock Reese Redevelopment Association).
- Assist companies in grant preparation.

Assessment:

- Active participation in 3 commercial research and development projects.