A. MISSION AND AREAS OF FOCUS
The High Performance Database Research Center (HPDRC) conducts research on database management systems and various applications, leading to the development of new types of database systems and the refinement of existing database systems. The HPDRC, a research division of the Florida International University School of Computer Science, has a strong commitment to training graduate and undergraduate students and preparing them for their future roles as scholars and specialists employed by industry.

HPDRC is presently collaborating with a number of entities to further its mission. These collaborations would be impractical in a departmental setting. HPDRC researchers are collaborating with others at FIU to develop new database applications and technology. These groups include the Department of Physics’s Experimental Nuclear Physics group, the Library’s GIS lab, the International Hurricane Center, members of the Geology department, and others. As the home of one of NASA’s Regional Application Centers, HPDRC is in a prime position to perform research and development using remotely sensed data; this position has recently been further strengthened by the execution of a Cooperative Research and Development Agreement between the HPDRC and the United States Geological Survey. HPDRC is also collaborating with researchers at the University of Miami, NOAA, and space research agencies from across the state to develop better ways to store and retrieve remotely sensed data. HPDRC has hosted students from the Miami-Dade County Public School’s Advanced Academic Internship Program for the past three years and plans to continue this partnership. HPDRC is also collaborating with industry to bring them new information technology solutions via its Sem-ODB and TerraFly technologies.

B. ORGANIZATION, EXTERNAL TRENDS AND STRATEGIC DIRECTIONS
1. Organizational Issues
   Provide an organizational chart that delineates the functions of all faculty and staff, and include any advisory boards.

2. Advisory Board Members
   List of members n/a
   Enhanced Program n/a

3. External Trends
   What external trends may influence your programs or operations over the next five years?
Government and Private sectors preferences to fund dual use technologies and incorporation of semantic database models in operations.

How do you intend on adjusting to these?

Develop dual use solutions, prepare materials for government and private sectors awareness of the HPDRC qualifications and approach to solve problems.

4. Strategic Directions and Areas of Emphasis
Provide a vision of your unit in five years from now.

150 to 175 employees (full and part-time), $3,000,000 annual funding from all sectors.

Include strategic directions and special areas of emphasis in which you expect to be known for excellence. Specify how the unit pursues one or more of the University Academic Themes: International, Environment, Urban, Health, Information.

Pursue federal, state and local governments solutions funding (database development: GIS, health, environmental, etc.); contract with private companies; and form alliances with NSF & NASA funded Centers of Excellence. HPDRC intends to continue its research and to be known as a leader in information management research and development. HPDRC will also leverage its information management knowledge with its remote sensing and data visualization research to provide tools that will allow better understanding of our environment. HPDRC is also pursuing using its information management expertise in the field of health science.

C. ANNUAL AND LONG RANGE GOALS

Long Range Goal 1: (Addresses University Goal IV – To be recognized as a leading institution for teaching and research in the areas of International, Environmental, Urban, Health, and Information)

Measurable Outcome (Assessment Criteria and Procedures): HPDRC will help Florida International University to be recognized as a leading institution in Information Management and Environmental Sciences by increasing annual funding from $2,000,000 to $3,000,000 through contracts and grants.

2000-2001 Objective 1A: Submit 10 proposals that emphasize HPDRC’s strengths.
2000-2001 Outcome: Submitted 14 proposals that emphasized HPDRC’s strengths.
Six proposals totaling $8.95M (including matching) were funded. Four proposals are still pending.
Use of Results for Program Improvement: Better focusing our proposals to our strengths allowed us to better address the problems we want to pursue.

Long Range Goal 2: (Addresses University Goal VI – To achieve Carnegie Foundation Research II status by the year 2001, and research I status by the year 2008)

Measurable Outcome: Grant doctoral degrees in computer science and secure contracts and grants.
- 2000-2001 Objective 2A: Produce two Ph.D.’s, increase annual funding to $3M.
- 2000-2001 Outcome: Produced 2 Ph.D.’s, annual funding at $2.7M
- Use of Results for Program Improvement: While increased annual funding goal was not met, we were awarded $5.5M in software from IBM for our research efforts, which will serve us for years to come, and were awarded nearly $700K in in-kind services per year for 5 years from the USGS.

Long Range Goal 3: ( Addresses University Goal III – To solve critical social, educational, environmental, health, and transportation problems through applied research and service)

Measurable Outcome (Assessment Criteria and Procedures): HPDRC will submit proposals to apply its information management expertise to solve environmental and health problems.
- 2000-2001 Objective 3A: Submit proposals that will support research collaborations with environmental and health scientists.
- 2000-2001 Outcome: We submitted a proposal to the Everglades National Park, which will be funded in 2001-2002. We also submitted a proposal to the Florida Space Grant Consortium, which was awarded, but is stalled pending award of matching funds from the International SeaKeeper’s Foundation.
- Use of Results for Program Improvement: We will continue to focus proposals towards these areas.

Long Range Goal 4: (Addresses University Goal II – To promote research and creative activities which contribute to the social, artistic, cultural, economic, environmental, scientific, and technological foundations of the 21st century.

Measurable Outcome: HPDRC will further disseminate its information management research and will develop proposals for information management tools that will enable scientists to better perform their research.
- 2000-2001 Objective 4A: Publish more research findings. Submit proposals that will support research collaborations with domain scientists (physicists, materials scientists, etc.)
- 2000-2001 Outcome: We submitted large proposals in collaboration with physicists and materials scientists at FIU. Fourteen scholarly papers were published during the reporting period.
- Use of Results for Program Improvement: We will further refine the submitted proposals and will continue to pursue these research tracks.
D. 2001-2002 ANNUAL GOALS

2001-2002 Goal 1: HPDRC will help Florida International University to be recognized as a leading institution in Information Management and Environmental Sciences by increasing annual funding from $2,000,000 to $3,000,000 through contracts and grants. (Addresses University Goal IV)

   Measurable Outcome: Submit 10 proposals that emphasize HPDRC’s strengths. Expand upon our current strengths to include further applications of remote sensing data.

2001-2002 Goal 2: Grant doctoral degrees in computer science and secure contracts and grants. (Addresses University Goal V)

   Measurable Outcome: Grant more than 2 doctoral degrees. Increase annual funding to $3M.

2001-2002 Goal 3: HPDRC will submit proposals to apply its information management expertise to solve environmental and health problems. (Addresses University Goal III)

   Measurable Outcome: Submit more proposals that will support research collaborations with environmental and health scientists.

2001-2002 Goal 4: HPDRC will further disseminate its information management research and will develop proposals for information management tools that will enable scientists to better perform their research. (Addresses University Goal II)

   Measurable Outcome: Publish more research findings. Submit proposals that will support research collaborations with domain scientists (physicists, materials scientists, etc.)

E. EXECUTIVE SUMMARY

1. Activities - Prior Year
   a. Scholarly activities (e.g., forums or conferences that support faculty research, teaching, and service interests)

      We continue to recruit promising students to take advantage of the funds provided by our MII grant and continue to fund current graduate students via MII as new students are identified. Jai Navlakha (FIU School of Computer Science) and Andrei Kirienko (FIU High Performance Database Research Center) continue to research methods to enhance the retention of graduate students through the PhD. We have stepped up our recruiting efforts by
sending out a letter containing information on FIU’s PhD program in Computer Science to current graduate students. We have also sent information on FIU’s graduate programs in Computer Science to 800 graduates of FIU’s CS undergraduate program who have qualifying GPAs. Presentations on FIU’s CS graduate programs were made at meetings of the local ACM student chapter and followup discussions were held. We are continuing recruitment efforts directly with Florida A&M University, Florida Memorial College, Miami-Dade Community College, and the Miami-Dade County Public Schools. To this end, Martha Gutierrez, an NSF-supported PhD student, made a presentation on "Career Opportunities in Computer Science" at "The Exact and Natural Sciences Conference 2000," which was held at Miami Dade Community College's InterAmerican Campus. She stressed the need for computer scientists with four year and advanced degrees and the opportunities available to students who achieve these degrees. Nagarajan Prabakar, a Senior Investigator, gave presentations of our computer science research and recruited students at Miami Sunset Senior High and Miami-Dade County's Marine and Science Technology magnet high school. We have involved high school students in our research through Miami-Dade County Public School's Advanced Academic Internship Program. Their involvement provides us a pipeline of researchers from high school through the PhD.

b. Published research, faculty productions or other media by primary authors giving credit to the institute/center for its support

HPDRC faculty and students combined to publish 14 papers during the period of July 2000 through June 2001. Additionally, Nirva Morisseau-Leroy, who each received her MS degrees while at HPDRC, collaborated to publish a book: *Oracle8i Java Components Programming with EJB, COSRA and JSP*, Osborne McGraw Hill.

c. External funding sources resulting of the prior year’s activities, or non-funded outreach

IBM awarded HPDRC $5.5M worth of software to support its database research. The United States Geological Survey entered into a Cooperative Research and Development Agreement with the HPDRC that will provide $3.4M in-kind to our TerraFly project. The Florida Space Grant Consortium, the International Hurricane Center, and the National Science Foundation combined to award HPDRC $52K in additional research and development funding.

d. Any form of public recognition by the mass media

none

e. Integration of faculty into center activities
Drs. Rishe, Sun, Ege, Prabakar, and Chen continue in their roles with HPDRC.

2. Activities - Coming Year
   a. Proposed research and scholarly activities

       We plan to continue our outreach program to the Miami-Dade County Public Schools.

   b. Teaching and training activities

       FIU’s High Performance Database Research Center has established an Affinity Group laboratory. The Affinity Groups are made up of faculty members, postdoctoral associates, graduate and undergraduate students, and high school students. Each group is focusing on deepening research in computer science. Groups established to date include the following: Semantic Database Engine Group - devoted to designing and developing semantic database technology; Applications Group - devoted to investigating spatial data technology and applications and GIS; Heterogeneous Database Group - devoted to deepening research in distributed heterogeneous databases; and Semantic-Relational Systems Group - devoted to making the semantic database technology available to all database users. The grouping of students at different stages of their academic careers enables training of students by direct contact with others further along in their studies, post docs, and faculty members. Students who have gained research experience are able to assume leadership roles and gain valuable experience by helping to train new research students. The Affinity Group laboratory provides the students with a dedicated space to meet, study, and to perform their research.

   c. Service and outreach – internal (e.g., with departments, colleges, or other university units) or external networking (e.g., with other universities, community colleges, public schools, public-private partnerships)

       HPDRC has hosted students from Miami-Dade County Public School’s Advanced Academic Internship Program each of the past three years. One of these students has matriculated to FIU and is volunteering at HPDRC. We plan to continue to host students and hope to recruit some more of them.

       HPDRC is collaborating with researchers from FIU’s International Hurricane Center, GIS Laboratory, Department of Physics, and Department of Geology. We plan to continue and expand these collaborations.

       HPDRC is collaborating with NOAA’s National Hurricane Center and is presently working with researchers from the University of Miami’s RSMAS, NOAA’s AOML, and Spaceport Florida to create a collaboration that will
focus on applying remotely sensed data and information management to environmental problems.

d. Opportunities for students (e.g., assistantships, service learning); or financial goals (e.g., levels of external funding, potential contracts)

HPDRC will continue to provide opportunities for undergraduate, graduate, and post doctoral students to pursue research and development activities on the cutting edge of information management.

e. Integration of faculty into center activities

HPDRC will continue its present faculty relations and will seek to recruit new SCS faculty into its research programs.