Division Plan for 2009 and Beyond

Engineering Education and Centers

Spring 2007
A.L. Soyster
2004 COV Findings

(1) EDUCATION and HUMAN RESOURCES
   “Strong sense that there is no overarching plan to specify goals and directions.”

(2) ENG RESEARCH CENTERS
   “.... The COV observes that an overwhelming majority of EEC Awards are made to research intensive institutions and that more capacity needs to be built at other institutions.”
EEC Objectives for 2020

1. Enhance the K-12 Pipeline and its Diversity;
   * 10% of all matriculates study engineering.
2. Promote the Success of the Undergraduate Learning Experience;
   * 3 of 4 students complete BS in engineering.
3. Improve the Pathway to Graduate Engineering Programs for US and Permanent Residents;
   * 5000 PhDs granted to domestic students.
4. Build a Culture of Discovery and Innovation in Engineering through Multi-Disciplinary Centers;
   * 1000 Center-related students graduate annually

Enabling Objectives

5. Formalize Partnerships with Organizations both within and External to NSF; and

6. Promote the Critical Importance of EEC Programs and optimize EEC Team (staff, panels, reviewers) performance
New Initiatives

- Council of Undergraduate Associate Deans (Clients for “How students learn” and other initiatives)
  Meet with Engineering Deans and ASEE (April 07)

- “Business of Engineering Education” (Summer Workshop, preliminary study underway)

- Renaissance of PhD Education – A New Strategy (Too long, too narrow and too insulated)
Who Does It? Who Gets It? Who Needs It?

Observations

• Supply-side Driven
• Where is Demand-side?

ASEE Undergrad Council
60,000 Student Evaluations
Northeastern University

Teaching Effectiveness (Q14)

Amount Learned (Q11)
60,000 Student Evaluations
Northeastern University

"Tuition" vs Income vs Teaching Effectiveness (Q14)
Eng College Revenues

3 Billion Fed Research
6 Billion Tuition
Renaissance of PhD Education

Which Path would you take?

PhD

Industry

B.S. ENG

$ $ $ $ $
New K-12 Partnership Initiatives

- Project Lead the Way (curricular)
- FIRST Robotics (extra-curricular)
- Pre-AP Engineering (curricular)
- School Superintendents (meet with VA group in May 07)
Growth in PLTW Schools

For the 2007-08 school year:
2300 schools
250K students
7000 Trained Teachers
49 states & DC
STUDENT PIPELINE

K-12 | School Board Advisory | University | Industry Advisory Board | Industry
Engineering Research Centers

(A) Continuing Efforts

• 207 Letters of Intent for 2008
• 5 “Gen 3” Centers to be funded 2008
• NSECS, NCN
New Key Features of Gen 3 ERCs

- Engage small innovative firms in the ERC’s research teams
  
  Build partnerships with at least one academic, state and local government, and other program designed to stimulate entrepreneurs

- Engage ERC students in all phases of innovation

- Strategically design education programs to produce creative, innovative engineers

- Provide faculty and students with cross-cultural, global research experiences through partnerships with foreign universities

- Build long-term sustained partnerships with a few pre-college institutions
B) New Initiatives (2004 COV Recommendations)

- “While praising the ERC Program…, the COV recommends that smaller interdisciplinary teams be funded…”
- “The COV observes that an overwhelming majority of EEC Awards are made to research intensive institutions and that more capacity needs to be built at other institutions.”
25% of all engineering students study at schools in EPSCoR states

45% of all engineering students in non-EPSCoR states study at schools that are ERC Leads or Core Institutions

8% of all engineering students in EPSCoR states study at schools which are ERC Leads or Core Institutions
Proposed EPSCoR Plan

- Hold “small” Center EPSCoR Competition “in between” ERC bi-annual competition
- EPSCoR Small Centers at $2 Mil per year
- EPSCoR Small Centers for 5 years
- EPSCoR Awards total $10 Mil
EEC in 2020

Human Resources
Strong Pipeline

GRADUATE EDUCATION
World Class PhD Programs

Undergraduate Education
Improve Retention

Centers
Innovative Graduates