NSF/ENG Strategic Planning Interim Report

Engineering Directorate
Advisory Committee Meeting
April 14-15, 2010

STRATEGIC THINKING WORKING GROUP (STG)

- Sohi Rastegar, EFRI*
- Kesh Narayanan, IIP**
- Maria Burka, CBET
- Darren Dutterer, OAD
- Samir El-Ghazaly, ECCS
- Cecile Gonzalez, OAD
- Barbara Kenny, EEC
- John McGrath, CBET
- Steve McKnight, CMMI
- Betty Person, CMMI
- Mike Roco, OAD
- Al Soyster, EEC
- Bob Trew, ECCS

* STG Chairman

** 2005 STG Chairman

Strategic Planning Working Groups

- Strategic Thinking Working Group (STG)
- Awards and Solicitation
- Evaluation and Assessment
- Public Understanding of Engineering
- Engineering Education and Workforce

STG Charge and Process

- Charge

  Review the strategic plan, identify any gaps in strategic needs, and advise if any ‘midcourse corrections’ are necessary.

- Process

  1. Review 2005 Strategic Plan
  2. Identify Current Strategic Needs/Opportunities
  3. Review/Revise Overarching Strategic Goals and Objectives

Current Overarching Strategic Goals of ENG (established in 2005)

1. ***Overarching Frontier Research Goal:*** Effectively invest in frontier engineering research that has potential for high impact in meeting national and societal needs.

2. ***Overarching Engineering Innovation Goal:*** Effectively invest in fundamental engineering innovation that has potential for high impact in meeting national and societal needs.

3. ***Overarching Engineering Education and Workforce Goal:*** Effectively invest in frontier engineering education and workforce advancement that has potential for high impact.

4. ***Public Understanding of Engineering Goal:*** Effectively invest in and seek partnerships to educate the public about the value of engineering research and education.

5. ***Organizational Excellence Goal***: Effectively organize the Directorate to provide agile, multidisciplinary leadership in engineering research, innovation, and education.

http://www.nsf.gov/eng/about.jsp
http://www.nsf.gov/eng/general/strategic/index.jsp

Actions Taken by STG

- Re-organization Survey (web-based)
- STG SWOT
- Global Engineering Workshop
- Input from individual PDs
- All-Hands SWOT

Re-organization Survey
Summary of Results - Strategic

Strategic Results 1 = Strongly Disagree to 6 = Strongly Agree	
Goal One: ENG maintains leadership at the frontiers of engineering discovery, innovation, and education.	**Agree: 96%** Disagree: 3%
Goal Two: ENG is flexible and allows for change (e.g., creating new programs, combining programs, moving funds from mature to emerging areas, etc).	**Agree: 74%** Disagree: 18%
Goal Three: ENG appropriately supports interdisciplinary research.	**Agree: 84%** Disagree: 9%
Goal Four: ENG provides opportunities for exploring new areas not yet realizing their full potential.	**Agree: 77%** Disagree: 15%
Goal Five: Research in ENG core programs is easily integrated with and across NSF-wide and ENG-wide priority areas (e.g., cyberinfrastructure, nanotechnology, and sustainable energy).	**Agree: 83%** Disagree: 11%
Goal Six: ENG fosters synergy between education and basic research.	**Agree: 80%** Disagree: 11%
Overall, the current organizational structure provides intellectual advantages over the previous (pre-2006) organizational structure.	**Agree: 40%** Disagree: 22% **No Basis to Judge: 38%**

Re-organization Survey
Summary of Results - Tactical

Overall Tactical Results 1 = Strongly Disagree to 6 = Strongly Agree (Responses have been aggregated into positive, negative, and neutral groups.)	
My physical space is conducive to a good working environment.	**Agree: 83%** Disagree: 18%*
If you are a supervisor, is your staff sitting in an appropriately close proximity?	**Yes: 65%** No: 35%
If you are a supervisor, are you able to adequately supervise your employees in the current office configuration?	**Yes: 75%** No: 25%
There is good communication between the ENG divisions.	**Agree: 71%** Disagree: 29%
There is good communication in my team.	**Agree: 83%** Disagree: 17%
My division works together as one team.	**Agree: 81%** Disagree: 19%
Overall, the current ENG organizational structure provides operational advantages over the previous (pre-2006) organizational structure.	**Agree: 32%** Disagree: 25% **No Basis to Judge: 44%***

All-Hands Meeting – Feb 2010

- Strong turn-out (over 90 people out of ~140)
- Strong engagement by participants
- Very positive feedback from participants
- Unifying for the Staff
- Good issues identified through SWOT

SWOT* - Strengths

- Reputation/high-quality staff
- Work effectively in partnership with industry and S&E community
- Bottom-up organization
- Makes a difference in society
- Full-spectrum research (from discovery to innovation and concept to practice)

* Consolidated and prioritized from All-Hands and STG

SWOT* - Weaknesses

- Proposal pressure/success rate
- Operating silos (communication/lack of collaboration within/between the Directorate)
- Fragmentation of technical areas in several Divisions/Directorates makes it difficult for faculty to identify with whom they need to work
- Managing IPA process well (interruptions in management, trained PDs leave and have to start over again)
- Lack of resources (work volume, human resources)

* Consolidated and prioritized from All-Hands and STG

SWOT* - Opportunities

- New administration: focus on science/engineering, Innovation agenda (it opens a lot of doors to reach public and impact community)
- Partnerships (universities, industry, other agencies, international)
- Increase international awareness and collaboration
- Use a whole host of tools to increase public awareness of engineering and what NSF/ENG does (i.e. focus on tangible local stories of how NSF/ENG relevant in home base)
- Establish stronger linkages to education (at all levels)

* Consolidated and prioritized from All-Hands and STG

SWOT* - Threats

- Proposal overload
- Lack of diversity in engineering population in general
- Lack of diversity in senior management of ENG
- Global economy and outsourcing of ‘routine’ engineering jobs
- Lack of integrated long-term funding strategy

* Consolidated and prioritized from All-Hands and STG

Next Steps

- Seek input from Advisory Committee
- Integrate Input from All Working Groups
- List Strategic Needs
- Revise Strategic Goals and Objectives (based on strategic needs)
- Hold second All-Hands meetings (May 2010)
- Implementation Strategy and Prioritization
- Prepare Final Report – July 1, 2010

Possible Discussion Points

- Overarching Goals
  - Any gaps in the SWOT?
  - Any other Strategic Needs/Opportunities?
- Innovation
- Mid-scale research and facilities

ADDITIONAL SUPPORTING MATERIALS

Updated ENG Vision

- ***Current ENG Vision***
  - NSF/ENG will be the global leader in advancing the frontiers of fundamental engineering research, stimulating innovation, and substantially strengthening engineering education.
- ***Proposed ENG Vision***
  - NSF/ENG will be a global leader in identifying and catalyzing fundamental engineering research, innovation, and education expanding the frontiers of current knowledge.

Reorganization Survey
Participations Data

- 73 people took the survey (~50% of the Directorate)
- 58.5% were present for the reorganization

What type of role?

- 55% DD/Program Directors
- 30% Support Staff
- 15% Other

What type of position?

- 76% Permanent
- 10% Fed Temp
- 8.5% IPA
- 5% Visiting Scientist

Input from Individual Program Directors

- **Medium/Large Research Facilities**
  - ENG needs to have a plan in place for post MREFC operational support whenever such applications are being made.
- **Team Research**
  - Current resources are insufficient to address the need of the ENG community to conduct team research.

Global Engineering Workshop

- Focus on 3 key areas: **Education Research Industry**
- Invited Speakers
  - Dr. Lester Gerhardt, *Rensselaer*
    - Advisor to the President Institute of International Education
  - Dr. Steven McLaughlin, *Georgia Tech*
    - Vice Provost for International Initiatives
  - Dr. Abhaya Datye, *University of New Mexico*
    - NSF PIRE Awardee
  - Dr. Dan Hirleman, *Purdue*
    - NSF/ENG IREE PI and Workshop Organizer
  - Peter Hoffman, *Boeing*
    - *Global Research and Development Strategy*
  - Larry Howell, *General Motors, retired*
    - *Former Executive Director for Science for General Motors, R&D Center*

Global Engineering Workshop – Feb 2010 Preliminary Ideas*

- **Educational**
  - **REU [Summer International Experience]**
  - **Global Hub Cyber-Tools for Research & Education**
- **Research**
  - **Two-Year Research Projects (Faculty/Post Docs): One Year Abroad Followed by One Year in US**
  - **Create Global ERC Concept**
  - **Track S&E Indicators of researcher's global activities**
- **Industry**
  - **NSF Global Engineer Corps "gap year" tailored to needs of companies**
  - **Engineers without Borders-like service opportunity**
  - **Industry fund international internships for students (Academics idea)**
  - **NSF funds for company international internships (Industry idea)**
  - **International experience provides edge- all other things equal**

* Caveat: This was a small workshop with only six presenters