Making the Soft Side of Engineering Harder

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"Soft"? ABET Criteria 3(c,f,h)

- (c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

- (f) an understanding of professional and ethical responsibility

- (h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context

Impact of the soft-side

- Products, processes
- The public
- Social justice
- Respectability and development of the profession

Curricular, classroom (theory)

- ✦ Undergraduate engineering ethics education:
    - ✦ Excellent resource materials!
    - ✦ A few lectures in a design course?
    - ✦ Ethics across the curriculum?
    - ✦ Dedicated course (1 or 3 credit hours)?
    - ✦ Reliance on others (STS, Philosophy)?
- ✦ Graduate engineering ethics education (e.g., above + research ethics)

Design, Laboratory, Community (practice)

- Design projects, service-learning (e.g., EPICS)

- Service-learning (curricular) vs. engineering student service organizations (extracurricular)

- Interdisciplinary?

Engineering volunteerism

- EWB, ESW, EPICS, ECOS,...
- Highly interdisciplinary
- "Community-based learning"
- A generation of volunteers!
- Anecdotal: More women, good GPAs!
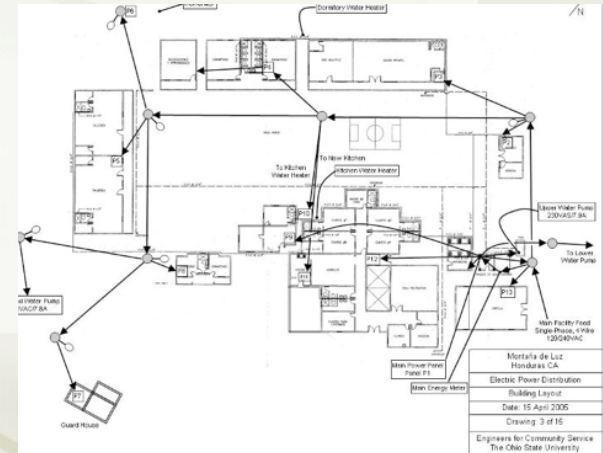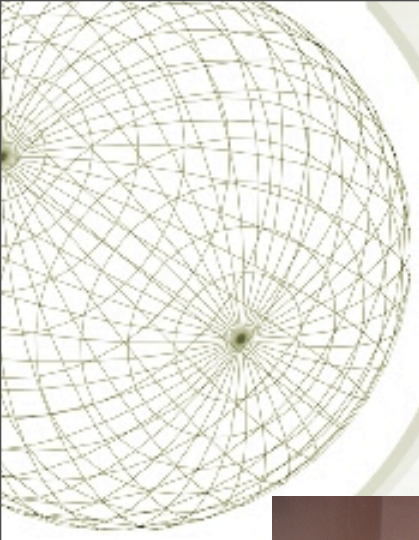- A bunch of "do-gooders" solving the world's problems?

The Ultimate Challenge

+ Integrating scholarship and research enterprise into delivery of community service

+ Finding a **global health** focus

+ Science, engineering, and technology *can* help promote social justice

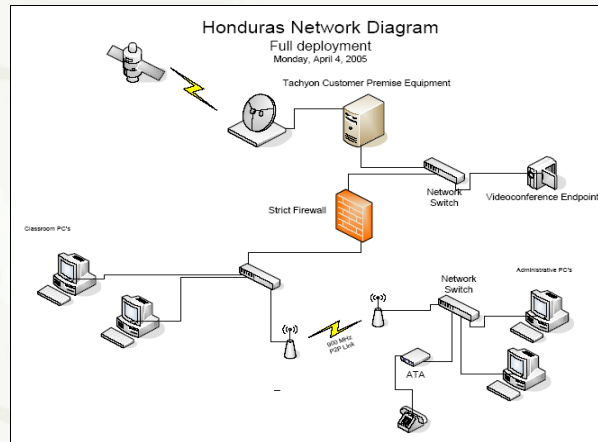# *Needs, solutions, successes*

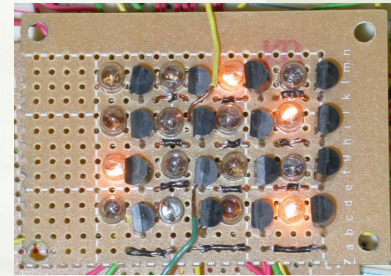# *More needs, solutions*

Culture

Simple needs

Demanding needs

Current initiatives…

- Teaching Engineering Ethics Consortium (TEEC) development

- Science, Engineering, and Technology for the Developing World Project

- PhD student international service learning (workshops, low-cost lab development, educating global faculty)

Conclusions

- "Soft side" is hard (challenging), **important**, and interesting
- Generally, curricula are lacking (in content, focus)
- Extracurricular approaches provide valuable educational experiences
- Long term impact on academia? Industry? Community?