SOFTWARE SUBCOMMITTEE REPORT

Considerable Progress but Much More to Do!

- This is a partial summary of proposed updates to the report

  We received additional information at yesterday's meeting that we haven't yet incorporated

- Two parts to this summary
  - Systemic issues
  - Some research areas deserving attention

Making the Case for Software Research

- We need to do a better job explaining software research to non-IT people
  - Differentiate software design from producing artifacts

- We must continue to explain why software research needs are not satisfied by commercial activity

- Software research done by mission agencies must be presented in agency mission terms
  - E.g. Agent-based systems *for coordination of autonomous vehicles*
  - E.g. Embedded software design tools *for avonics, medical devices, and weapons*

9/25/01

Creating a Balanced Research Portfolio

We're very pleased with the response to our 1999 report!

Big NSF increase; some mission agency increase

Excellent interagency collaboration and planning

ITR is making a big difference!
- New kinds of projects
- New collaborations
- Mixture of grant sizes and durations

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Creating a Balanced Research Portfolio

But …

- **Need distribution in risk as well as size and duration**
  - Panels and peer review favor incremental progress
  - Researchers don't pose long-term hard important questions

  (long-term grand-challenge proposals get poor reviews)

- **Funding still too low**
  - Excellent proposals unfunded
  - Low success rates despite large reductions in proposal budgets
  - Encourages conservative proposals
- **Community concerns about review process**

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Creating a Balanced Research Portfolio

Recommendation we made in May

- **Monitor changes in modes of funding**
  - **Trends in number of grants/PI**
  - **Funding/PI including shares of multi-PI awards**
  - **Need larger, longer awards in basic programs as well as in special initiatives**
  - **Need special initiatives**

Multi-disciplinary Research

- **Progress in encouraging and sponsoring multi-disciplinary research**
  - **E.g. ITR projects**
  - **E.g. Biology/IT collaborations**
  - **Must remain attentive that IT is advanced as well as the application**

- **Need to strengthen interdisciplinary research within IT**
  - **E.g. inter-PCA (mentioned in May)**
  - **E.g. HCI and AI**

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Many Software Research Areas Need Continuing Attention

Doing well but need to continue

- **Scalability**

- **Digital Libraries**

- **Human Interaction Technologies**
  - **Speech and natural language**
  - **Vision**
  - **Information visualization**

- **Etcetera**

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Some Software Research Areas Need Increased Attention

- **Evaluation and assessment**
  - **Need to do it more**
  - **Need to learn how to do it better**

- **Reliable, dependable, safe, secure, trusted systems**
  - **Applications in e-commerce, banking, national security, personal security, privacy, productivity, critical infrastructure, …**

- **Software design and development**

- **Managing intellectual property**

- **Etcetera**

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