HCI Challenges in Government Contracting

A CHI '94 SIG Report
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Introduction

Governments spend huge resources on custom computer systems, developed by contractors to government specifications under government monitoring. HCI development faces challenges from this environment's constraints and the HCI community's virtual neglect.

Over 30 people from a wide variety of government and contractor organizations met during CHI '94 to discuss the issues and challenges and to explore approaches to addressing them. The SIG focused on potential solutions to identified challenges. The authors served as the SIG organizers. Additionally, the following people provided insights from several perspectives to help focus the early discussions on the challenges faced by HCI professionals in the Government environment:

Martha Szczur, NASA Goddard Space Flight Center
Bonnie Hawkins, Computer Sciences Corporation
Debby Hix, Virginia Tech and the Naval Research Laboratory
Nigel Bevan, National Physical Laboratory

The Challenges

After hearing brief position presentations from representatives of U.S. Government, contractor, consultant, and European government organizations, the SIG participants spent most of the session expounding and exploring. We identified the following challenges to HCI development on government contracts:

Lack of specification
Most of the government personnel who write project specifications and requests for proposals (RFPs) are unaware of HCI concerns and/or insensitive to them. These documents have historically overlooked HCI topics.

Vague specifications
Even when government specifications do address the HCI, the requirements tend to be untestable, calling for such features as "a user-friendly interface."

Lack of information
HCI literature and research do not easily spread beyond the HCI community. It is difficult for government employees and their contractors to become aware of the issues, especially the behavioral ones, unless they are part of this community.

Unspecified user involvement
Government specs and RFPs do not require user involvement in the development process. Bidders hesitate to propose non-required activities for fear that higher development costs will lose them the contract.

Incompatible development methodology
Government-sponsored projects, both by tradition and by official requirement, use the waterfall development methodology, which does not readily accept newer HCI techniques such as iterative design and participatory design.

Long development time
Most government projects see several years elapse between the issuance of an RFP and the delivery of the system. Concepts and technologies can undergo much change in this time, making the delivered system greatly out of date.

Organizational responsibilities
Government agencies tend to be structured so that one organization funds and oversees development and a different one funds and oversees operations. This has two effects:

Persuading the procurement organization to increase development funding for HCI activities is difficult when the operations organization will be the one to realize the cost savings.
End users tend to be unaware of the requirements and uninvolved in their definition.

Adversarial relationship
The nature of the government/contractor relationship tends to be somewhat adversarial, and effective HCI development requires cooperation.

Lack of usability legislation
The United States has no legal requirements regarding usability, and U.S. contracting parties tend to have no knowledge or awareness of HCI standards beyond the somewhat outdated military standards.

System complexity
Government projects often involve large, complex systems with fairly small, well defined user populations. This imposes three constraints on HCI development:

Often the user population is very busy and unavailable to the development team.
User tasks tend to be more complex and difficult to model than most of those in commercial environments.
Safety tends to be more important than advanced GUI features. User tasks have very high criticality in systems such as manned space flight, air traffic control, and warfare.

Organizational bias
Contractors and government organizations alike may be biased toward approaches and technologies with which they are familiar. Government organizations may be biased toward one contractor over another.

Security and political concerns
National security and national/international politics may affect requirements, contract awards, and other decisions.

Reticence of human factors professionals
Human factors professionals tend to undervalue themselves and underplay their own roles in HCI development.

Low visibility in HCI community
Funding for research projects and even the preparation and presentation of papers is difficult to obtain, so government and contractor personnel tend to be less visible in the HCI community than do their commercial colleagues.

Virtual neglect by the HCI community
The HCI community is largely unaware of, and seen to be unconcerned about, the special characteristics of government contract environments. Very little literature, especially in the organizational and cost/benefit areas, addresses our issues and concerns.

The unique nature of the Government environment
Although some (if not most) of these challenges also exist for HCI development in other environments, in government contracting they wear a special face.

Meeting the Challenges

After identifying the challenges (which we managed to do with almost no whining!), SIG participants explored and discussed ways in which we might approach them. We listed the following things we might do to meet the challenges.

Educate everyone you can
Speak the developers' language. Learn to talk HCI to them in ways they will understand. Educate through experience about HCI process.
Identify seed personnel and target them specifically. They can help educate others.

Spread the word about HCI standards, tools, and development/evaluation methods.
Become familiar with cost/benefit studies, to the extent that they can be applied to government contracting.
Keep up with "success stories" of HCI activities and "failure stories" of cases in which HCI was done badly or not at all.

Educate government organizations
Inform legislators about HCI issues and recommended approaches in government contracting. Encourage a more responsive procurement approach.
Urge the Software Engineering Institute to include HCI activities in its Capability Maturity Model (CMM).

Educate contractor organizations
Speak the managers' language. Develop entrepreneurial skills to understand their concerns and to educate them.

Educate HCI researchers
Increase your visibility in the HCI community.
Write papers whenever you can. (Do it on your own time if you have to.) Publish them, and present them at conferences.
Join committees in SIGCHI or related organizations.
Speak up about government contracting issues whenever possible.

Push for HCI requirements
Work to get good HCI requirements in RFPs and specifications.
Urge the inclusion of requirements for user performance and satisfaction.
Urge the government to address the development process as well as the characteristics of the HCI itself.

Promote iterative development
Seek ways of reconciling the spiral development approach with the waterfall model.

Economize
Find ways of incorporating low-budget HCI activities into your projects.

Track costs and benefits
Keep records of HCI-related costs and benefits on government contracts, and conduct your own analyses.

Be visible
Increase your visibility and respect in the contracting environment.
Seek training and lateral moves within your organization; become more of a generalist to become more widely respected.
Let all involved know you are there.

Demand attention from the HCI community
Demand that HCI researchers study our environment. Urge them to explore our cost/benefit issues, complex systems, organizational considerations, and system life cycles.

An Invitation to All

The challenges and approaches listed above are compilations of the discussions held during the SIG session and represent the statements of individual SIG participants. Given the short time that we had, we still need to define the items in detail and to reach a consensus on them. Efforts are underway to organize a workshop on the subject during CHI '95.

The SIG session did result in the formation of an electronic mailing list for the further discussion of issues and topics concerning HCI in government contracts, and for the further exploration of how to surmount or remove our obstacles. The list is being maintained by Curtis Bingham of Pacific Northwest Labs. Government, contractor, consultant, and research personnel are all welcome on this list. For information, send a note to gov-hci-request@msrc.pnl.gov.

See you at CHI '95, and on gov-hci!

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