

Published by the Integrated Media Systems Center, a National Science Foundation Engineering Research Center at the University of Southern California

Director's Message

IMSC developing Five-Year Transition Plan

We are developing a Five-Year Transition Plan as a roadmap for self-sufficiency after our National Science Foundation (NSF) Engineering Research Center (ERC) grant expires in



Prof. Ulrich Neumann

2007, and we presented a draft to the joint meeting of the IMSC Board of Councilors and Scientific Advisory Board in November for comments.

We appreciate our Board members' active participation and suggestions, and their input will be reflected in the final version.

The recent interest on self-sufficiency from NSF led to a special session on the topic at the recent annual ERC meeting. Nichole Phillips, IMSC's Executive Administrative Director, summarized the IMSC plan in this session, and her talk was well received.

Under IMSC's plan, the Center will focus its research and funding efforts in three Core Science areas: Decision Support, Collaborative Systems, and Serious Games.

IMSC has an established track record in these areas or related ones that provides credibility and an ability to respond rapidly to government and private sector needs. The new areas offer a broad range of funding opportunities within government, industry and university sectors.

The Decision Support initiative, termed InfoDec: Information Comprehension for Decision Support, assists experts in decision-making based on data acquired from a variety of sources, including sensors, satellites, databases, the Internet and private intranets. IMSC

researchers view the decision-making process as the three phases of information filtering and analysis, information integration and information presentation.

The Collaborative Systems initiative, termed ACE: Aware Collaborative Environments, focuses on a high-quality telecollaboration experience employing multichannel audio, high-definition video, multi-point streaming over IP networks, and natural multimodal

sensing and system awareness to facilitate effective human interaction and automatic operator-free system behavior. IMSC investigators seek to overcome barriers imposed by physical location and language through high-presence and automated task assistance.

The Serious Games initiative develops technologies for advancing games for serious application domains, *(Please turn to page 8)*

IMSC demonstrates first live Internet immersive environment

IMSC researchers demonstrated the first-ever live immersive environment over the Internet for a performance by the Miró Quartet, a nationally-known chamber music group, at the annual member meeting of the Internet 2 organization at the University of Texas (UT), Austin, in September.

"We were tremendously excited to

work with the Internet 2 organization and the Miró Quartet to demonstrate some of IMSC's latest technologies," according to IMSC Director Prof. Ulrich Neumann.

He pointed out that IMSC has developed award-winning applications in pre-recorded and streamed immersive *(Please turn to page 6)*



MIRÓ QUARTET LIVE OVER THE INTERNET—Each member of the Miró Quartet appeared on a separate screen (above) as IMSC researchers transmitted their live performance to a second auditorium to demonstrate the first-ever live Internet immersive environment at an Internet 2 organization meeting in September.

Tech Spotlight A special feature on IMSC projects

IMSC developing novel translation system

IMSC key investigator Prof. Shri Narayanan and his team are developing a novel language translation system that allows English-speaking doctors to communicate with Persian-speaking patients about their medical concerns.



Prof. Shri Narayanan

uses new technology to allow real-time spoken language communication between health professionals and patients," according to Prof. Narayanan, an associate professor of electrical engineering, computer science and linguistics who heads the Speech Analysis and Interpretation Laboratory (SAIL).

"Presently, most automatic translators are restrictive in the sense that people can speak only a fixed set of phrases," he said. "But our system allows for natural two-way dialog between people speaking two different languages."

The system, called the Transonics Spoken Dialog Translator, is being developed for the Defense Advanced Research Projects Agency (DARPA).

Prof. Narayanan said the system is in its first stages of development, but has already provided a compelling proof of concept. However, he pointed out, the creation of a truly context-aware translator that can be easily and rapidly ported to other domains and languages is an ongoing research quest.

Teams at other university and industry sites are building medical translation systems for Mandarin Chinese, Pashto and Thai for the DARPA project.

In using the laptop-based system, the doctor and patient each wear a headset with microphones and ear-

phones. The doctor asks a question in English, and the computer translates on the fly with the patient hearing the question in Persian. When the patient answers in Persian, the computer translates the response into English immediately. They hear their questions and answers via a computer-generated voice.

Prof. Narayanan pointed out that the system has been evaluated for basic usability by English-speaking doctors and nurses with Persian speakers acting as patients. "Informal results indicate that participants can sometimes communicate quite effectively using our system," he said.

The system uses a number of cutting-edge technologies, including computer speech recognition, bi-directional language translation, dialog tracking and speech synthesis, according to Dr. Panayiotis Georgiou, research faculty in electrical engineering from IMSC and an investigator on the project.

Dr. Georgiou also said the development of the system involves extensive

data collection, including collection of a corpus of interactions between USC medical students and actors portraying patients with different ailments.

The Transonics team is a partnership between USC and industry collaborator HRL Laboratories. USC team members, in addition to Prof. Narayanan and Dr. Georgiou, include Dr. Kevin Knight and Dr. Daniel Marcu, research faculty in computer science from USC's Information Sciences Institute, and Dr. David Traum, research faculty in computer science from USC's Institute for Creative Technologies.

Key HRL investigators include USC alumni Dr. Robert Belvin and Howard Neely, and Cheryl Hein. Ph.D. students in electrical engineering and computer science who have made key contributions include Emil Ettellaie, Dagen Wang, Sudeep Ghande, Ananthakrishnan Shankar and Murtaza Bulut. The project's Web site at <http://sail.usc.edu/transonics> features more details and a video.



NOVEL TRANSLATION SYSTEM—IMSC researchers are building a translation system for English-speaking doctors to communicate with Persian-speaking patients.