

# An International Landmine Telehealth Symposium between Hawaii and Thailand using an Internet2 and Multi-protocol Videoconferencing Bridge

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## Abstract

*An international telehealth symposium was conducted between healthcare institutions in Hawaii and Thailand using a combination of Asynchronous Transfer Mode, and Internet2 connectivity. Military and civilian experts exchanged information on the acute and rehabilitative care of landmine victims in Southeast Asia. Videoconferencing can promote civil-military cooperation in healthcare fields that have multiple international stakeholders.*

## Introduction

Landmines are a major public health problem in Thailand. The 2001 Landmine Impact Survey found that landmines along the Cambodia, Laos, Burma, and Malaysia borders affected 531 Thai communities in 27 provinces. According to the Survey, 346 new landmine casualties were recorded between June 1998 and May 2001.<sup>1</sup>

This telehealth symposium enabled landmine experts from Thai Non-Governmental Organizations (NGOs), the Royal Thai Army (RTA), a Hawaii charitable service organization (Shriners Hospital for Children), and the U.S. military to exchange information on the acute and rehabilitative care of landmine victims in Thailand.

We have previously reported successful, regularly conducted videoconferences on healthcare topics using either digital telephone (ISDN) or Internet2 connectivity between two tertiary care hospitals in Hawaii and Thailand.<sup>2,3</sup> Expanding on this model, we conducted the landmine symposium between three sites, two institutions in Hawaii and one in Thailand, using a combination of ISDN, Asynchronous Transfer Mode (ATM), and Internet2 connectivity over an electronic bridge.

## Methods

A three-hour seminar was conducted 27 July 2004 at 1600 (Honolulu) and 0900 28 July 2004 (Bangkok).

There were three participating sites. The Thailand videoconferencing site was Phramongkutklao Medical Center (PMK), a 1000-bed tertiary care hospital in Bangkok operated by the Royal Thai Army that treats civilians and military personnel. There were two participating sites in Honolulu: Tripler Army Medical Center (TAMC), a 242-bed tertiary care center for U.S. military personnel and their families; and Shriners' Hospital for Children (SHC), a free 40-bed surgical and rehabilitative orthopedic hospital.

The three participating sites utilized two differing forms of connectivity and a multi-protocol video-conference bridge to enable the sites to interconnect. Two sites (TAMC and PMK) utilized International Telecommunications Union standard H323 videoconferencing using Internet protocol (IP) over the Internet2 network to connect to the bridge. These two sites utilized Tandberg videoconference equipment. The third site (SHC) utilized a private ATM circuit carrying H323 IP to connect to the bridge, and also used Tandberg equipment.

The device enabling these disparate systems to communicate is called a multi-protocol videoconferencing bridge, and is operated by the State of Hawaii Telehealth Access Network and housed on the UH campus. The bridge maintains H320 (ISDN) ports to the public switched telephone system, H323 (IP) ports to the public Internet and Internet2, as well as ATM ports to private circuits. The bridge translates an incoming H320 protocol into an outgoing H323, and vice-versa, enabling the differing systems to communicate. The bridge can be configured for "Continuous Presence" where all sites hear all participants and see all participants on a split-screen (Hollywood Squares); for "Voice Activated" where all sites hear all participants and see only the actively speaking site; and for "Central Control" where the bridge operator makes determinations of who-hears-and-sees-what for the duration of a videoconference.

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All lectures were presented in English, with supporting PowerPoint slides. Thai NGO experts discussed the landmine problem; mine risk education; mobile prosthetic clinics; manufacture of prosthetics using local materials; research on social issues; and victim assistance. A Royal Thai Army physician discussed acute resuscitation and victim transport in Thailand, and three U.S. military healthcare providers discussed Blast Resuscitation and Victim Assistance (BRAVA) programs in Sri Lanka and Vietnam. At the conclusion of the program, participants anonymously used a wireless Audience Response System to rate the technical and educational quality of the videoconference on a 9-point Likert scale (1=awful, 9=excellent).

## Results

Seventy-one people participated in the seminar, 16 in Thailand and 55 in Honolulu. There were attendees from ten countries, including Thailand and the U.S. A total of 14 different NGOs were represented at the conference. In Hawaii, nine (18%) of the attendees represented NGOs, 32 (65%) were members of the Royal Thai Army or the U.S. military, and 14 (16%) were non-NGO civilians. In Thailand, ten (63%) of the attendees represented NGOs and six (37%) attendees were either in the Royal Thai Army or the U.S. military. Nearly half of the attendees were physicians, with a higher percentage (62%) in Hawaii than in Thailand (31%). Attendees agreed that there was significant training value in the conference (mean 6.97, SD 1.29, n=33). The quality of sound (mean 6.35, SD 1.57, n=34) and video (mean 6.16, SD 1.32, n=33) was good at all sites. No sites lost sound or video.

## Discussion

The United States has a long history of participating in demining activities in Thailand. In 2002-3, U.S. humanitarian demining assistance totaled over \$800,000, including \$650,000 from the State Department for Thai Mine Action Center activities, and the remainder allocated for U.S. military personnel to conduct two on-site train-the-trainer mine awareness sessions.<sup>4</sup> This was the first landmine symposium conducted simultaneously in Thailand and the U.S. using videoconferencing.

Most international distance learning initiatives have occurred in academic settings. A two-way interactive video and internet course for nurses between the University of North Carolina and the Mie Prefecture College of Nursing in Japan has been described.<sup>5</sup> Ekblad et al recently reported a pilot study with Swedish medical students, in which teachers from the U.S., Australia, and Sweden used videoconferencing to train the medical students in refugee mental health.<sup>6</sup>

In our experience, NGO workers are uncommonly used as teachers in undergraduate or graduate medical education training programs. Trehan et al reported that medical students from Northwestern University routinely travel to Central America to work in rural health clinics staffed mainly by NGOs, with the goal of exposing the students to a different set of medical and public health issues than they would typically encounter in the U.S.<sup>7</sup>

Our previous Internet2 videoconferences have been conducted point-to-point between PMK and TAMC. In the current model, the use of the bridge at the University of Hawaii allowed an audience from a non-Internet2 site to participate. One disadvantage of using the bridge was the loss of the capability to show speaker and

PowerPoint content simultaneously, a suboptimal situation when many participants speak English as a second language. Though it was possible to switch video input from "talking head" camera to direct input of PowerPoint slides, the resolution and scan conversion resulted in reduced legibility of images and small typeface on the PowerPoint material.

The bridge allowed the collaboration between Internet2, ATM, and ISDN-enabled sites, but a newer open-source software ensemble called the Access Grid™ permits more robust group-to-group interaction to take place over a distributed network such as Internet2. The simultaneous multipoint-to-multipoint capability of the Access Grid™ has the potential to overcome many limitations of traditional videoconferencing.

## Conclusion

The landmine symposium demonstrated that videoconferencing technology can be used to promote civil-military dialog for a health-care problem that is typically encountered only in the developing world, but that has relevance to stakeholders in developed countries as well. Videoconferencing is an effective method for members of the international medical community to link geographically remote teachers and learners with common educational goals. The high bandwidth capability of the Internet2 permits high quality point-to-point videoconferencing, and new Access Grid™ software offers the possibility of expanding the international telehealth conversation to multiple sites that are all interacting at the same time.

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