

11:26:56

OCA PAD AMENDMENT - PROJECT HEADER INFORMATION

04/08/96

Active

Project #: B-03-618 Cost share #: Rev #: 1
Center #: 10/24-6-R8661-0A0 Center shr #: OCA file #:
Contract#: AGR DTD 950809 Mod #: 3.27.96 LTR Work type : RES
Prime #: Document : AGR
Contract entity: GTRC
Subprojects ? : N CFDA:
Main project #: PE #:

Project unit: BEC Unit code: 03.010.203
Project director(s):
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Sponsor/division names: SHEPARD PATTERSON / SIVER SPRING, MD
Sponsor/division codes: 218 / 116

Award period: 950809 to 960517 (performance) 960530 (reports)

Sponsor amount	New this change	Total to date
Contract value	0.00	48,098.00
Funded	0.00	48,098.00
Cost sharing amount		0.00

Does subcontracting plan apply ? : N

Title: FEASIBILITY STUDY FOR DEMONSTRATING TELEMEDICINE CAPABILITIES DURING THE...

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Security class (U,C,S,TS) : U ONR resident rep. is ACO (Y/N): N
Defense priority rating : supplemental sheet
Equipment title vests with: Sponsor GIT
N/A

Administrative comments -

3.27.96 LETTER APPROVES A NCE THRU MAY 17, 1996.

GEORGIA INSTITUTE OF TECHNOLOGY
OFFICE OF CONTRACT ADMINISTRATION

NOTICE OF PROJECT CLOSEOUT

Closeout Notice Date 12/10/96

Project No. B-03-618

Center No. 10/24-6-R8661-0A0

Project Director BURROW M F

School/Lab BEC

Sponsor SHEPARD PATTERSON/SIVER SPRING, MD

Contract/Grant No. AGR DTD 950809 Contract Entity GTRC

Prime Contract No.

Title FEASIBILITY STUDY FOR DEMONSTRATING TELEMEDICINE CAPABILITIES DURING THE.

Effective Completion Date 960517 (Performance) 960530 (Reports)

Closeout Actions Required:

Y/N Date
Submitted

Final Invoice or Copy of Final Invoice	Y	
Final Report of Inventions and/or Subcontracts	N	
Government Property Inventory & Related Certificate	N	
Classified Material Certificate	N	
Release and Assignment	N	
Other	N	

Comments

Subproject Under Main Project No.

Continues Project No.

Distribution Required:

Project Director	Y
Administrative Network Representative	Y
GTRI Accounting/Grants and Contracts	Y
Procurement/Supply Services	Y
Research Property Management	Y
Research Security Services	N
Reports Coordinator (OCA)	Y
GTRC	Y
Project File	Y
Other	N
	N

B-03-618

#1

(New)

Interim Report

Georgia Tech Project No. B-03-618

FEASIBILITY STUDY FOR DEMONSTRATING TELEMEDICINE CAPABILITIES DURING THE GAMES OF THE XXVIth OLYMPIAD

November 1995

Prepared by

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Prepared under

Research Contract No. AGR DTD 950809

Prepared for

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TABLE OF CONTENTS

<u>Section No.</u>	<u>Section</u>	<u>Page No.</u>
	FOREWORD	i
SECTION 1	IDENTIFICATION OF TELEMEDICINE DEMONSTRATIONS	1
SECTION 2	EFFORTS TO OBTAIN APPROVAL FOR TELEMEDICINE DEMONSTRATIONS	4
SECTION 3	SUMMARY OF EFFORTS TO DATE AND FUTURE DIRECTIONS	12
APPENDIX 1	AGENDA FOR SEPTEMBER 8, 1995 MEETING OF THE SOUTHEAST TELEMEDICINE ALLIANCE AND CORPORATE SPONSORS	14
APPENDIX 2	AGENDA FOR THE SEPTEMBER 29, 1995 MEETING OF THE SOUTHEAST TELE-MEDICINE ALLIANCE	15
APPENDIX 3	INFORMATION ON OLYMPIC SPORTING EVENTS, VENUES AND PLANS FOR MEDICAL ASSISTANCE	16
APPENDIX 4	GUIDELINES FOR OCTOBER 16, 1995 MEETING OF THE SOUTHEAST TELE-MEDICINE ALLIANCE VIA VIDEO TELECONFERENCE	17
APPENDIX 5	GUIDELINES FOR OCTOBER 23, 1995 MEETING OF THE SOUTHEAST TELE-MEDICINE ALLIANCE VIA AUDIO CONFERENCE	18
APPENDIX 6	AGENDA AND HANDOUT MATERIALS FOR THE NOVEMBER 3, 1995 MEETING OF THE SOUTHEAST TELEMEDICINE ALLIANCE AND CORPORATE SPONSORS	19

FOREWORD

This interim report summarizes investigative efforts performed on this project from August 9, 1995 through November 8, 1995 by personnel from the Biomedical Interactive Technology Center in the Institute for Bioengineering and Bioscience at the Georgia Institute of Technology, Atlanta, GA. In addition, Dr. Bruce Ramshaw, a surgeon and the Director of the Telemedicine Program at the Georgia Baptist Medical Center, has been a major contributor to the project as a medical consultant. The project is a subcontract under a Shepard Patterson & Associates, Inc. contract with the Advanced Research Projects Agency. Within Shepard Patterson & Associates, Inc., the project is identified as Contract No. AGR DTD 950809, and Ms. Sharon Downey is the Technical Point-of-Contact. Within the Georgia Institute of Technology, Mr. Michael F. Burrow, Senior Research Engineer, serves as the Project Director, and he is assisted by Mr. James C. Toler, Principal Research Engineer, and Mr. John W. Peifer, Senior Research Scientist.

Investigative efforts over this three-month period have had a dual focus. One focus has involved meetings with medical professionals from major medical centers. The purpose of these meetings has been to define demonstrations that can be performed to showcase telemedicine's capabilities for delivering enhanced medical care under conditions occurring at events such as the Olympic Games. As a result of these meetings, four telemedicine demonstrations have been identified involving the six members of the Southeast Telemedicine Alliance (Georgia Baptist Medical Center, Emory University School of Medicine, Medical College of Georgia, Eisenhower Army Medical Center, Morehouse School of Medicine, and Georgia Tech). These demonstrations involve both wired and wireless telecommunication links and telemedicine systems that provide wide- and moderate-bandwidth pathways between major civilian and military medical centers, the Centers for Disease Control, and the Health Services Center within the Olympic Village. Telemedicine systems will be located in medical centers, mounted in a mobile van, mounted in a MedFlight helicopter, and located in a kiosk in the Olympic Centennial Park.

The second focus has involved obtaining approvals necessary for conducting the telemedicine demonstrations during the Olympic Games and at locations over which the Atlanta Organizing Committee (AOC) has jurisdiction. Initial meetings with positive results have been held with Dr. John Cantwell, Director of the Medical Commission for the 1996 Olympic Games and with Ms. Elizabeth Martin of the AOC. Additionally, the four proposed telemedicine demonstrations have been presented to corporate sponsors of the Olympic Games, and enthusiastic indications of support were received. Finally, a meeting has been held with the Director of the Health Services Center in the Olympic Village, and again a high level of interest resulted.

Detailed activities associated with efforts under each of these foci are presented in the following sections.

SECTION 1

IDENTIFICATION OF TELEMEDICINE DEMONSTRATIONS

Formal discussions regarding the feasibility of conducting telemedicine demonstrations during the Olympic Games were initiated at a meeting of the Southeast Telemedicine Alliance at the Georgia Baptist Medical Center on September 8, 1995. Representatives from each organization comprising the Alliance were present at this meeting, and were as follows:

- o Eisenhower Army Medical Center,
- o Emory University School of Medicine,
- o Georgia Baptist Medical Center,
- o Georgia Tech,
- o Medical College of Georgia, and
- o Morehouse School of Medicine.

In addition, representatives from four Olympic corporate sponsors--AT&T, Panasonic, IBM, and Kodak--were present, as were medical representatives from the Paralympic Games.

During this meeting, telemedical activities that might be undertaken as part of this project were discussed in detail, with frequent reference to efforts presented in Georgia Tech Proposal No. BEC-1506 to the Advanced Research Projects Agency (ARPA). The agenda for, and minutes of, this meeting are provided in Appendix 1, with several key discussion items summarized as follows:

- o Earlier meetings with Dr. John Cantwell, Chairman of the Olympic Medical Commission for the 1996 Games, and with Ms. Elizabeth Martin of the Atlanta Organizing Committee were described. It was noted that Dr. Cantwell would not accept telemedicine as a means for delivering medical care to athletes, coaches, etc. during the 1996 Olympic Games because its capabilities have not been adequately proven. However, he was highly receptive to demonstrations that could be staged for the purpose of showing to the Medical Commission the capabilities of telemedicine for enhancing medical care delivery during major sporting events such as the Olympic Games. Ms. Martin endorsed these opinions of Dr. Cantwell.
- o The desire to assure that telemedicine demonstrations conducted during the 1996 Games reflect telemedicine capabilities at several different technology levels was agreed upon. The technology levels identified were (1) large, multi-rack systems with wide-bandwidth connectivity that offer very-high-quality motion video capabilities, (2) desktop-mounted, PC-based systems with moderate-bandwidth connectivity that offer reasonably-high-quality motion video capabilities, (3) portable systems with wireless connectivity that offer limited-quality motion video and very-high-quality still-image capabilities, and (4) palm-top systems with cellular telephone connectivity that offer still-image transfer capabilities.

- o It was agreed that a series of demonstrations need to be identified, discussed, and ultimately accepted by the Alliance members, and then presented to the corporate sponsors and the Advanced Research Projects Agency (ARPA) for their response. Ultimately, responsibility for planning and conducting individual demonstrations during the Olympic Games will be assumed by individual Alliance members working in consort with corporate members and ARPA.
- o Hardware and software legacies were discussed, with an emphasis on telecommunication networks and telemedicine hardware that can remain in place and be used in the daily delivery of medical care following the Olympic Games. Special interest was expressed in legacies that included wide-bandwidth wired and wireless telecommunication networks between major medical centers, a van-mounted telemedicine capability, a MedFlight helicopter equipped with a telemedicine capability, and a telemedicine kiosk for public locations.
- o Military involvement in the demonstrations was discussed from the point-of-view of disaster scenarios, triage management, mobile medical mentoring (M3V) vehicles, language translation, and command and control protocols to be integrated into activities that showcase the capabilities of telemedicine.
- o There was interest in working closely with persons planning medical care delivery for the Paralympics to determine whether telemedicine demonstrations would also be appropriate in this setting. It was noted that the Paralympics may not have all the medical assistance that is available to the Olympics, and therefore may be receptive to having telemedicine as an actual component of their medical care delivery system.

At the conclusion of this initial meeting, it was agreed that the six members of the Alliance should hold further meetings as necessary to identify candidate demonstrations for showcasing the capabilities of telemedicine during events such as the 1996 Olympic Games. Once these candidate demonstrations are identified, they should be presented to Dr. Cantwell of the 1996 Olympic Medical Commission, appropriate members of the AOC, ARPA, and corporate sponsors for approval. It was also requested that Georgia Tech provide information on Olympic sporting events, venues, and plans for medical assistance for the follow-on meeting of Alliance members. This meeting was scheduled for September 29, 1995.

The next meeting of Alliance members was held on September 29, 1995 at the Emory University School of Medicine, with representatives from all six Alliance members in attendance. The agenda for this meeting is provided in Appendix 2. Information on Olympic sporting events, venues, and plans for medical assistance were provided (see Appendix 3). The meeting began with an overview of the four possible demonstrations outlined in the agenda. There followed a discussion of the widest possible range of potential medical scenarios, infrastructure requirements, audiences, foci, venues, time periods, etc. For example, one possible approach consisted of conducting all demonstrations prior to the 1996 Olympic Games, video taping the demonstrations as they are conducted, and then using the tape to present the capabilities of telemedicine to (1)

invited audiences during the Games and (2) the Medical Commission following the Games. Advantages of this approach included the ability to plan and conduct demonstrations without concerns regarding approvals from the Olympic Medical Commission and AOC, and without the crowds, confusion, etc. likely to exist during the Games. A contrasting approach consisted of working closely with the Medical Commission and AOC to conduct the demonstrations at venues during the Games, video tape the demonstrations as they are conducted, and use the video tape to showcase telemedicine's capabilities to the Medical Commission and AOC following the Games. Various other possibilities were discussed, but they consisted generally of combinations of features of the two above approaches.

This meeting concluded with Alliance members feeling that there was a need for time to digest the information that had been exchanged, and then to meet again for the process of narrowing the range of possibilities. The next meeting was scheduled as an October 16, 1995 video teleconference using the Georgia Statewide Academic and Medical System (GSAMS).

On October 16, 1995, representatives of the six Alliance members met using the GSAMS teleconferencing capability. Information provided for guiding the discussions during this meeting is provided in Appendix 4. For the most part, this meeting was a continuation of the September 29, 1995 meeting in which widely ranging discussions continued regarding possible medical scenarios, infrastructure requirements, audiences, foci, venues, time periods, etc. The teleconference concluded with a agreement that a further meeting was necessary, and this meeting was scheduled as a audio conference on October 23, 1995.

An audio conference involving representatives of the six Alliance members was held on October 23, 1995, and the information provided to guide discussions during this conference is presented in Appendix 5. By the time this conference was held, Alliance members had thoroughly considered the various possibilities for telemedicine demonstrations associated with the Olympic Games, and a consensus regarding specific approaches and demonstrations began to emerge. Notes made during the conference were subsequently used to document these approaches and demonstrations in a format that could be used during the follow-on meeting that was scheduled for November 3, 1995. It was determined that the purpose of this follow-on meeting should be to propose these approaches and demonstrations to the corporate sponsors and solicit indications of approval.

SECTION 2

EFFORTS TO OBTAIN APPROVAL FOR TELEMEDICINE DEMONSTRATIONS

In conversations following the October 23, 1995 audio conference involving Alliance members, it was decided that approval of the approaches and demonstrations identified during that conference would be sought first from corporate sponsors. Upon receipt of their approval, the Medical Commission and AOC would be contacted for the purpose of obtaining additional approvals.

On November 3, 1995, representatives from each of the Alliance members met at the Georgia Baptist Medical Center with corporate representatives from AT&T, Panasonic, and IBM. In addition, Dr. Earl Claire of the Southeastern Technology Center in Augusta, GA was invited to attend this meeting. Dr. Claire's invitation resulted from the fact that he and Dr. Dan Ward from Eisenhower Army Medical Center had developed a proposal for using telemedicine to deliver veterinary care to horses at the equine event during the Olympic Games. They had also presented this proposal to AT&T and requested corporate support. The AT&T representative felt that the support needed for telemedicine demonstrations proposed by the Alliance might be shared in some way with the needs requested for the equine event.

Preparation for the November 3, 1995 Alliance meeting included assembly of a handout (see Appendix 6) that presented a summary of the telemedicine approaches and demonstrations that emerged from the October 23, 1995 meeting. These approaches and demonstrations are summarized as follows:

- o Approach #1: Conduct the demonstrations prior to the Games**
 - o Identify medical and athletic sites/scenes similar in appearance and layout to selected Olympic events
 - o Identify simulated medical scenarios and telemedicine demonstrations that could be conducted at these sites
 - o Identify financial requirements needed to film the telemedicine demonstrations/medical scenarios and these sites/scenes
 - o Present the filming plans and financial requirements to potential sponsor, and obtain necessary support
 - o Film the sites/scenes and the medical scenarios/telemedicine demonstrations
 - o Integrate the two films into a video presentation that depicts how telemedicine can enhance medical care delivery at events such as the Olympic Games
 - o Provide this video to Alliance members and corporate officials, and encourage its presentation during and after the Olympics
 - o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine could be used to enhance medical care delivery during future Olympic Games

- o **Approach #2: Conduct the demonstrations at Olympic sites during the Games**
 - o Identify Olympic and Olympic-related sites where the capabilities of telemedicine can be demonstrated during simulated medical scenarios
 - o Identify simulated medical scenarios and telemedicine demonstrations to be conducted at these sites
 - o Identify infrastructure, financial support, etc. necessary for conducting these demonstrations
 - o Present the medical scenarios, telemedicine demonstrations, infrastructure requirements, financial needs, etc. to corporate officials from Olympic sponsors and to ARPA, and obtain the necessary support
 - o Obtain approval of Olympic Officials to conduct the demonstrations at identified Olympic sites
 - o Conduct and film the telemedicine demonstrations during the Olympics
 - o Prepare a video presentation from the film and make it available to sponsors and Alliance members for advertising, public relations, program development, sales, etc. purposes
 - o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine could be used to enhance medical care delivery during future Olympic Games

- o **Approach #3: Conduct the demonstrations in the new Georgia Center for Telecommunications Technology (GCATT) building during the Games**
 - o Arrange Biomedical Interactive Technology Center space in the GCATT Building to simulate medical care delivery areas
 - o Identify simulated medical scenarios and telemedicine demonstrations that can be conducted in the GCATT Building space
 - o Identify infrastructure, financial support, etc. necessary for conducting these demonstrations.
 - o Present the medical scenarios, telemedicine demonstrations, infrastructure requirements, financial needs, etc. to corporate officials and to ARPA, and obtain their support
 - o Conduct and film the demonstrations during the Olympics
 - o Prepare a video presentation from the film and make it available for advertising, public relations, program development, sales, etc. purposes
 - o Invite VIP's, members of the media, corporate officials and potential customers, government and military officials, company employees, etc. to observe repeated demonstrations on a scheduled basis
 - o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine could be used to enhance medical care delivery during future Olympic Games

o Demonstration #1

Purpose:

To demonstrate the ability of telemedicine to deliver enhanced medical care to a foreign visitor who becomes ill while attending an event within the Olympic Ring

Assumptions:

- o Major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, and MSM) will be networked to each other and to the Student Health Services Center on the Georgia Tech (GIT) campus via wide-bandwidth (T-1), wired telecommunication pathways.
- o Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth video teleconferencing, and will be linked both to each other and to the wide-bandwidth telecommunications pathways that join the major medical centers.
- o The telemedicine system at the GIT Student Health Services Center will be located in one of the examination rooms and will support wide-bandwidth teleconsultations. This telemedicine system will be linked to the wide-bandwidth telecommunications pathways that join the major medical centers.
- o Military language translators will be available in the Student Health Services Center and at each of the major medical centers.
- o A person participating in the demonstration will pose as a foreign visitor who becomes ill in the spectator stands at an event within the Olympic Ring. The demonstration will begin with the transfer of this person into the Student Health Services Center examination room that is equipped with the telemedicine system.
- o All activities in the Student Health Services Center examination room will be filmed and narrated, beginning with the transfer of the ill foreign visitor to the examination room.
- o Medical professionals in the Student Health Services Center will examine the ill visitor, using the language translator to facilitate communications. A tentative diagnosis of the visitor's medical situation will be identified.
- o Medical professionals in the Student Health Services Center will desire to corroborate this diagnosis by consulting with medical specialists at two different major medical centers. The telemedicine system in the Student Health Services Center examination room will be linked via wide-bandwidth telecommunications pathways to first one, and then the other, Conference Room telemedicine systems in the major medical centers.
- o Using the two-way audio, video, and data capabilities of the telemedicine systems, the specialist in first one, and then the other, major medical center will consult with the medical professional in the Student Health Services Center while the ill visitor is further examined. During this further examination, the language translator will continue to be used to interact with the ill visitor.
- o The medical professional in the Student Health Services Center will provide a final

diagnosis and specify an appropriate treatment.

Keywords:

Wired, wide-bandwidth telecommunication pathways linking major medical centers and the GIT Student Health Services Center; person posing as an ill foreign visitor; spectator stands at a venue within the Olympic Ring; Student Health Services Center near the spectator stands; language translator; telemedicine capabilities at two locations within each major medical center; telemedicine system in one examination room of the Student Health Services Center.

Legacy:

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via wired pathways, to quality, cost-effective medical care at the point-of-need.

- o wired, wide-bandwidth (T-1) telecommunication pathways linking major medical centers and the GIT Student Health Services Center,
- o telemedicine system at two locations within each major medical center,
- o telemedicine system in one examination room in the Student Health Services Center, and
- o foreign language translation capability at major medical centers and at the Student Health Services Center.

o Demonstration #2

Purpose:

To demonstrate the ability of a mobile telemedicine system to deliver enhanced medical care to a spectator injured while attending an Olympic event at a remote venue.

Assumptions:

- o A van-mounted telemedicine system that supports wireless, wide-bandwidth video teleconferencing will be available at a selected remote venue, and will be linked via a wireless, wide-bandwidth (T-1) pathway to a telecommunications node located at one of the major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, and MSM).
- o The wireless telecommunications node at one of the major medical centers will provide wired access to the other non-node major medical centers; thereby providing wireless, wide-bandwidth connectivity between the mobile van and all major medical centers.
- o Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth, wireless video teleconferencing, and will be linked both to each other and to the telecommunications node that provides wireless access to the telemedicine system in the mobile van. (These telemedicine systems will be the same as those used in Demonstration #1, assuming both demonstrations are approved and funded.)
- o A person participating in the demonstration will pose as a spectator that has sustained multiple traumatic injuries while at the remote venue. The demonstration will begin with this person being transferred into the mobile van.

- o All activities in the mobile van will be filmed and narrated, beginning with the transfer of the person posing as an injured spectator into the van.
- o In the mobile van, on-site medical professionals will provide initial care while using the audio, video, and data capabilities of the van's wireless telemedicine system to consult with medical professionals at selected major medical centers.
- o It will be determined, as a result of consultations using the wireless telemedicine link, that the injured spectator can not be adequately treated on-site, and therefore must be transported to a major medical center. Throughout transport to the selected major medical center, medical professionals in the van will administer telemedically-proctored medical care.
- o As a result of the on-site and en-route teleconsultations, appropriate medical care will have been delivered to the injured spectator prior to arrival at the major medical center. Medical professionals at the major medical center will therefore be fully prepared to continue treatment upon arrival of the injured spectator.

Keywords:

Spectator with multiple traumatic injuries; remote venue; wireless wide-bandwidth link to, and between, major medical centers; telemedical proctoring during transport to major medical center

Legacy:

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via wireless pathways, to quality, cost-effective medical care at the point-of-need.

- o wireless, wide-bandwidth (T-1) telecommunication link between major medical centers,
- o a van-mounted mobile telemedicine system, and
- o a telecommunications node at a major medical center to support the delivery of medical care over wide geographical areas.

o Demonstration #3

Purpose:

To demonstrate the ability of a kiosk-based telemedicine system to deliver enhanced medical care to a foreign visitor who is on a doctor-prescribed medication and becomes ill in a highly-congested public recreation area near the Olympic events.

Assumptions:

- o A telemedicine kiosk with a wired, moderate-bandwidth (1/4 T-1), two-way audio, video, and data link to major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, MSM) will be available in the Olympic Centennial Park. This kiosk will support the remote monitoring of a basic array of physiological parameters and will be equipped to accept SmartCards as a means of patient access and information exchange.
- o The major medical centers will have a distributed system of desktop-mounted, PC-based

- telemedicine systems that link medical subspecialists in their offices. Language translators will be available in the major medical centers and at the doctor's offices.
- o The major medical centers will also have available a wireless, wide-bandwidth (T-1) telemedicine link to the CDC.
 - o A person participating in the demonstration will pose as a foreign visitor who becomes ill while enjoying recreation in the Olympic Centennial Park. This ill visitor will be taking an obscure drug prescribed by a medical doctor in their country-of-origin, and will have no experience with telecommunications-based medical care delivery. Additionally, this person will have basic personal information and medical records on a SmartCard.
 - o The telemedicine kiosk will be used by the ill visitor to access medical assistance at one of the major medical centers. Accessing this medical care will be initiated by use of the SmartCard, and will be aided by the availability of multi-language instructional coaching provided via the kiosk.
 - o Medical subspecialists will interview the ill visitor telemedically, and will desire to seek the opinion of a specialist in one of the other major medical centers. With the ill visitor on-line, the second specialist will be accessed using the wide-bandwidth telecommunication link between major medical centers. Following discussions with the first specialist and an interview with the ill visitor, the second specialist will endorse the first specialist's conclusions. This endorsement will include a recommendation that medical professionals at CDC be consulted regarding the drug the ill visitor is taking.
 - o Medical professionals at CDC will be consulted regarding the drug the ill visitor is taking, and will provide guidance relative to drug-drug interactions, etc.
 - o The demonstration will conclude with the ill visitor being advised obtain rest, and seek additional medical assistance if symptoms persist.

Keywords:

Foreign visitors taking doctor-prescribed drugs becomes seriously ill; Olympics-related recreational area; telemedicine kiosk; SmartCard technology; wired, moderate-bandwidth link between kiosk and major medical centers; wireless link between major medical centers and CDC; language translation; distributed desktop telemedicine capability.

Legacy:

A technically-advanced, telecommunications-based system that provides rapid and convenient access, via a kiosk capability, to quality, cost-effective medical care for persons in public areas.

- o telemedicine kiosk with wireless communications and SmartCard capability,
- o moderate-bandwidth telecommunication links between a principal public area and major medical centers,
- o wireless, wide-bandwidth telemedicine link to the CDC, and
- o foreign language translation capability at major medical centers and the CDC.

o Demonstration #4

Purpose:

To demonstrate the ability of telemedicine with cellular linkages to deliver effective medical care in emergency situations involving multiple traumatic injuries.

Assumptions:

- o An emergency medical vehicle and a MedFlight helicopter equipped with portable, moderate-bandwidth telemedicine capabilities will be available, and will be linked via cellular pathways to major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, MSM).
- o A mini-van transporting foreign visitors attending the Olympic Games is involved in a serious vehicular accident, resulting in a variety of life-threatening injuries to several persons.
- o The emergency medical vehicles and MedFlight helicopter equipped with portable telemedicine capabilities will be dispatched to the accident site. These vehicles will also have language translators onboard
- o At the accident site, persons participating in the demonstration will pose as foreign visitors that have received various traumatic injuries. The demonstration will begin with the arrival of the emergency medical vehicles and helicopter.
- o Medical professionals associated with the emergency medical vehicles and the helicopter will use the language translators and portable telemedicine capabilities to consult with the injured visitors and medical specialists at the major medical centers regarding stabilization of the injured persons. Within the major medical centers, the medical specialists will be accessed via a distributed system of desktop-mounted, PC-based telemedicine units in their hospital and home offices.
- o Following stabilization at the accident site, the injured visitors will be transported in the emergency medical vehicles and MedFlight helicopter to Emergency Rooms in selected major medical centers.
- o During transport, the language translators and portable telemedicine capabilities will be used to continuously transfer medical updates on the injured visitor's medical status to the major medical centers. As a result, Emergency Room medical professionals will be fully ready to administer appropriate care upon arrival of the emergency vehicles and the helicopter.

Keywords:

Vehicular accident resulting in multiple traumatic injuries; portable telemedicine capabilities in emergency medical vehicles and MedFlight helicopter; cellular telecommunications links; distributed desktop-mounted telemedicine units;

Legacy:

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via a portable wireless capability, to quality, cost-effective medical care in emergency situations.

- o portable telemedicine capability at major medical centers and
- o emergency medical vehicles and MedFlight helicopters equipped with portable telemedicine capabilities.

During the November 3, 1995 meeting, the above approaches and demonstrations were presented in detail to the corporate sponsors. The following decisions resulted:

- o Regarding approaches to the demonstrations, it was decided that a combination of the three approaches should be pursued based on approval from the Olympic Medical Commission, AOC, and ARPA. When structuring these combinations of approaches, emphasis should be placed on demonstrations at the venues during the Games and at the new GCATT building during the Games.
- o The demonstrations should be video taped, and the video tapes made available for purposes such as presentations to the Olympic Medical Commission, marketing to prospective customers, program development, etc. Scenes, as appropriate, should be taped prior to the Games for splicing into the tapes filmed during the Games.
- o Corporate representatives from AT&T and Panasonic enthusiastically endorsed the combination of approaches to the demonstrations and urged quick presentation to the Medical Commission and AOC. The IBM representative felt that the ideas presented should be reviewed internally by IBM management before they could provide a formal response.
- o No decision was reached regarding sharing resources used in demonstrations proposed by the Alliance with demonstrations proposed by Drs. Claire and Ward for the equine event; however, it was noted that resources such as the mobile van equipped with a telemedicine capability and used for the demonstration proposed by the Alliance could be made available for use at the equine event.
- o It was agreed that a meeting with the Medical Commission (Dr. Cantwell) and appropriate officials from AOC should be arranged for the earliest possible date, and Dr. Ramshaw of the Georgia Baptist Medical Center was asked to assume responsibility for arranging these meetings. Approval to proceed should be sought during these meetings, and with these approvals, a meeting with ARPA representatives will be arranged. Again approval to proceed will be sought.
- o Following approval from the corporate sponsors, the Medical Commission, AOC, and ARPA, it was agreed that individual Alliance members will assume responsibility for individual demonstrations. This will include completing the definition of the demonstrations by adding needed detailed procedures and defining financial support needs. Detailed plans and financial needs for each demonstration will then be presented to prospective sponsors, including corporations and ARPA.

SECTION 3

SUMMARY OF EFFORTS TO DATE AND FUTURE DIRECTIONS

During the two-month period of September 8, 1995 through November 8, 1995, five meetings of the Southeast Telemedicine Alliance were held for the purpose of discussing and planning demonstrations to showcase the capabilities of telemedicine for enhancing the delivery of medical care during the 1996 Olympic Games. The first and last of these meetings involved selected corporate sponsors of the 1996 Olympic Games. At the final meeting, several different approaches for showcasing telemedicine's capabilities, along with four proposed telemedicine demonstrations, were presented for consideration by the corporate representatives. It was concluded that approaches for showcasing telemedicine's capabilities should involve a combination of demonstrations at Olympic venues and at the new GCATT building which, upon completion of construction, will be located within four city blocks of the Olympic Village. Four demonstrations of telemedicine's capabilities were agreed upon as follows:

- o **Demonstration #1:** A foreign visitor becomes ill in the spectator stands at an event within the Olympic Village, and is removed to the adjacent Health Services Center for diagnosis. Using a language translator and a wired, wide-bandwidth telemedicine capability between the Health Services Center and major medical centers in the area, access to medical specialists is achieved and a comprehensive diagnosis is made.
- o **Demonstration #2:** A visitor becomes ill at a remote venue and is removed to a mobile van for diagnosis. This van is equipped with a wireless, wide-bandwidth telemedicine capability that is used to access medical specialists at major medical centers in the area. These medical specialists provide detailed instructions regarding care delivery to medical technicians as the ill visitor is transported to one of the major medical centers.
- o **Demonstration #3:** A foreign visitor taking a doctor-prescribed drug becomes ill while enjoying recreation in the Olympic Centennial Park, and accesses medical assistance via a telemedicine kiosk equipped with a language translation capability. The kiosk is linked to major medical centers in the area and the CDC via wired, moderate-bandwidth pathways. A comprehensive medical diagnosis is completed.
- o **Demonstration #4:** A vehicular accident occurs in which several persons receive traumatic injuries. Emergency vehicles and a MedFlight helicopter with wireless telemedicine capabilities are dispatched to the scene. Critical medical procedures are administered at the scene and onboard the vehicles as the injured persons are transported to emergency medical facilities in the area.

Representatives from AT&T and Panasonic enthusiastically endorsed these demonstrations. Representatives from IBM are considering the proposed demonstrations, and will provide an indication of their level of approval at a later time.

Regarding future directions, plans are proceeding to obtain approvals from the Medical Commission, AOC, corporate sponsors, and ARPA to conduct the demonstrations at Olympic sites and at the new GCATT building during the 1996 Games. Initial approvals are being sought from the Medical Commission (Dr. Cantwell) and AOC (Ms. Martin), and Dr. Ramshaw is leading the effort to obtain these approvals. With approvals from the Medical Commission and AOC, lead responsibility for individual demonstrations will be assumed by individual members of the Telemedicine Alliance, and an overall coordinating/planning function will be established within the Telemedicine Alliance. Additionally, a liaison will be established with both corporate sponsors and ARPA. Working under the overall coordinating function, the individual Alliance members will identify detailed protocols, infrastructure needs, and funding support necessary for each demonstration. A close working relationship will be maintained with corporate sponsors and ARPA throughout the process of identifying these protocols, infrastructure needs, and funding requirements. These efforts will result in finalized descriptions of the demonstrations, including time and budget estimates. The time and budget estimates will be submitted in appropriate formats to the corporate sponsors and/or ARPA for action. Upon acceptance of these estimates and receipt of necessary funding, members of the Alliance will initiate efforts necessary to conduct the demonstrations during the 1996 Olympic Games.

APPENDIX 1

**AGENDA FOR SEPTEMBER 8, 1995 MEETING OF THE SOUTHEAST
TELEMEDICINE ALLIANCE AND CORPORATE SPONSORS**

September 6, 1995

MEMORANDUM

TO : DISTRIBUTION

FROM : JIM TOLER, BIOENGINEERING CENTER

SUBJECT : NEXT MEETING OF THE SOUTHEAST TELEMEDICINE ALLIANCE

The next meeting of the Southeast Telemedicine Alliance will be on September 8, 1995 at the Georgia Baptist Medical Center College of Nursing Building, Board Room (2nd floor), 300 Boulevard, NE, in Atlanta. The College of Nursing Building adjoins, and is immediately south of, the Georgia Baptist Hospital. Parking suggestions are attached. The meeting time is 11:00 am to 2:00 pm, with lunch served at 12 N.

Contrary to our earlier meetings, this meeting will focus on a single agenda item, viz., the identification of telemedicine demonstrations that can be conducted during the 1996 Olympic Games. The purpose of these demonstrations will be to show how telemedicine can augment/enhance conventional medical care delivery in environments that exist during events such as the Olympic Games. Based on these augmentations/enhancements, it is hoped that officials planning future Olympic Games will want to integrate telemedicine into their medical care delivery efforts.

An agenda for this meeting is attached.

DISTRIBUTION:

Eisenhower Army Medical Center
Mr. Jack Horner
Dr. Betsey Blakeslee

Emory University
Mr. Jeff Dunbar
Dr. Randy Martin
Ms. Dana Heyl

Georgia Baptist Medical Center

Dr. Bruce Ramshaw

Ms. Virginia Carr

Medical College of Georgia

Dr. Jay Sanders

Dr. Kevin Grisby

Ms. Laura Adams

Georgia Tech

Mr. Mike Burrow

Mr. Lanny Feorene

Mr. Mike Sinclair

Mr. John Peifer

Dr. Demetrius Paris

Morehouse School of Medicine

Dr. John Anderson

Dr. Beth Bowen

Dr. Pricilla Oliver

cc: Dr. Dan Sudnick, AT&T
Mr. Ritch Smith, U.S. Army
Dr. Rick Satava, ARPA
Dr. Robert Wells, Paralympics
Dr. Michael Ferrara, Paralympics
Ms. Julie Rhame, GIT TelePhoto
Mr. Randy MacAfee, Kodak
Mr. Harry Randolph, Kodak

AGENDA AGENDA AGENDA AGENDA

SOUTHEAST TELEMEDICINE ALLIANCE MEETING

September 8, 1995
Georgia Baptist Medical Center
Board Room, 2nd Floor, College of Nursing Building
300 Boulevard, NE
Atlanta, GA
11:00 am to 2:00 pm

CALL TO ORDER

WELCOME AND INTRODUCTIONS

1. PURPOSE OF MEETING

This 8th meeting of the Southeast Telemedicine Alliance (STA) is for the purpose of identifying ideas for telemedicine demonstrations to be conducted in conjunction with the 1996 Olympic Games. These demonstrations are intended to show how telemedicine can enhance medical care delivery at an event such as the Olympic Games. Ideas resulting from this meeting will be (1) presented to appropriate persons within the Atlanta Committee for the Olympic Games (ACOG) for approval and (2) included in the Georgia Institute of Technology's (GIT) Final Report to the Advanced Research Projects Agency (ARPA) on Project No. B-03-___, titled "Feasibility Study for Demonstrating Telemedicine Capabilities During the Games of the XXVIth Olympiad".

2. BACKGROUND INFORMATION

Approximately two years ago, Dr. Bruce Ramshaw of the Georgia Baptist Medical Center (GBMC) began discussing with GIT researchers the possibility of using telemedicine, where appropriate, to deliver medical care during the 1996 Olympic Games. Ideas were generated, and on Dr. Ramshaw's initiative, meetings were arranged with Dr. John Cantwell, Director of the 25-member Medical Commission for the 1996 Olympic Games, and, subsequently, with Ms. Elizabeth Martin of ACOG.

Using information obtained from these meetings, GIT and GBMC collaborated on preparation and submittal of a joint Grant Application (Proposal No. BEC-1506, "Feasibility Study for Demonstrating Telemedicine Capabilities During the Games of the XXVIth Olympiad") to Dr. Rick Satava of ARPA. This Grant Application requested funds to support 3.5 person-months of GIT time, plus consulting time for Drs. Ramshaw

and Cantwell, to propose plans for telemedicine demonstrations during the 1996 Olympic Games.

During the third STA meeting, Dr. Ramshaw and Mr. Toler reviewed the Grant Application submitted to ARPA and invited the full STA membership to participate in the planning effort if funding were received.

During the TCIMS demonstration in Augusta, GIT researchers met with Dr. Satava and his assistant, Ms. Jenny Fung, to discuss the Grant Application. During these discussions, Dr. Satava indicated that the Grant Application was going to be funded, and asked Ms. Fung to initiate the appropriate contractual procedures.

Following the TCIMS meeting, Dr. Betsey Blakeslee helped expedite funding of the Grant Application by arranging a meeting with Dr. John Silva of ARPA. During this meeting, GIT researchers outlined benefits from the proposed efforts and presented the collaborative group that would be involved. Dr. Silva forwarded results of this meeting to Dr. Satava.

3. IDEAS FOR TELEMEDICINE DEMONSTRATIONS

Project No. B-03-___ will permit the STA to coordinate various demonstrations during the 1996 Olympic Games that showcase telemedicine as an effective means for delivering quality medical care; however, these demonstrations must be conducted on a non-interfering basis and will not replace conventional approaches, proven during earlier Olympic Games, for delivering medical care. Also, during the meetings with Dr. Cantwell and Ms. Martin, it was made clear that ACOG requires plans for telemedicine demonstrations to not involve interactions with athletes, coaches, officials, etc. during events at venue sites. Therefore, STA planning should focus on telemedicine demonstrations that involve family members, spectators, members of the press, visitors, VIPs, etc. as they attend events, relax in living quarters, visit area sites, etc. This planning should be in terms of simulated scenarios where medical care will be needed in situations that are difficult to respond to unless a delivery approach such as telemedicine were available.

o On-Site Olympic Locations (venues, housing, recreational areas, etc.)

- o For each scenario, define
 - o What is the difficult medical care delivery situation that makes the use of telemedicine advantageous?
 - o language differences
 - o cultural differences
 - o medication differences
 - o crowds making transport difficult
 - o long distance to medical facility
 - o
 - o
 - o

- o Who is to be the recipient of the medical care?
 - o family member
 - o VIP
 - o spectator
 - o press
 - o volunteer worker
 - o
 - o
 - o
- o For what medical condition is care needed?
 - o heat exhaustion
 - o diabetic coma
 - o problem pregnancy
 - o asthma
 - o
 - o
 - o
- o What medical protocol is appropriate?
 - o
 - o
 - o
- o Where will the recipient of the medical care be located?
 - o in the spectator stands
 - o in the Olympic Village
 - o at a remote venue site
 - o on Olympic grounds
 - o in off-site housing
 - o
 - o
 - o
- o What medical facilities should be involved?
 - o GIT Student Health Center
 - o Crawford-Long Hospital
 - o Grady Hospital
 - o Georgia Baptist Hospital
 - o Georgia Baptist Med Flight
 - o Emory Hospital
 - o Northside Hospital
 - o Medical College of Georgia
 - o Hospital near remote venue site
 - o Hospital in recipient home country
 - o
 - o
 - o

- o What telecommunications infrastructure is required?
 - o wired/wireless
 - o store and forward
 - o audio
 - o motion video
 - o data
 - o satellite
 - o
 - o
 - o
- o Who can provide this infrastructure?
 - o public medical facility
 - o private medical facility
 - o industry
 - o university
 - o government
 - o
 - o
 - o
- o Who will assume responsibility for the demo for this scenario?
 - o Georgia Baptist
 - o GIT
 - o Emory
 - o MCG
 - o EAMC
 - o Morehouse
 - o Industry
 - o
 - o
 - o
- o How will the demonstration be documented for later showing to Olympic officials?
 - o video tape
 - o photographs
 - o written description
 - o
 - o
 - o

- o **On-Site Paralympic Locations**
- o **Off-Site Olympic Locations**
- o **Off-Site Paralympic Locations**

APPENDIX 2

**AGENDA FOR THE SEPTEMBER 29, 1995 MEETING OF THE SOUTHEAST
TELEMEDICINE ALLIANCE**

AGENDA

SOUTHEAST TELEMEDICINE ALLIANCE MEETING

September 29, 1995
Emory University
Room 415, Woodruff Health Sciences Building
Clifton Road at Haygood Road
2:00 to 4:00 pm

CALL TO ORDER

WELCOME AND INTRODUCTIONS

✓1. **UPDATE ON STATUS OF TELEMEDICINE DEMONSTRATIONS FOR THE INTERNATIONAL MEDICAL ROBOTICS AND COMPUTER-ASSISTED SURGERY CONFERENCE, Baltimore, MD, November 5-7, 1995**

✓2. **COMMENTS ON THE LANGUAGE TRANSLATOR**

3. PURPOSE OF MEETING

This meeting of the Southeast Telemedicine Alliance (STA) is for the purpose of following up on ideas, identified during our September 8, 1995 meeting at Georgia Baptist Medical Center, for telemedicine demonstrations to be conducted during the time period of the 1996 Olympic Games. At the conclusion this 9th meeting, members of the Alliance should have firm ideas regarding specific telemedicine capabilities we would like to demonstrate, the medical scenarios these demonstrations could logically involve, locations at which the demonstrations could be conducted, organizations able to assume responsibility for individual demonstrations, etc.

Approximately two weeks after this meeting, a larger meeting will be held with all persons and organizations involved in the September 8, 1995 meeting, including representatives from AT&T, IBM, Panasonic, Kodak, etc. At that meeting, conclusions from this meeting will be presented, along with additional information related to infrastructure needs, demonstration details, costs, etc. Decisions regarding specific demonstrations will then be finalized.

4. DISCUSSION OF CANDIDATE TELEMEDICINE DEMONSTRATIONS

Based on reviews of the minutes from the September 8, 1995 meeting, several potential telemedicine demonstrations involving different technologies, connectivities, venues, injuries, illnesses, etc. have been identified. These candidate demonstrations are summarized as below.

Demonstration #1

EU & MH

Purpose:

To demonstrate the ability of telemedicine to deliver effective medical care to a foreign visitor who becomes ill while attending an event within the Olympic Ring

Assumptions:

1. A foreign visitor becomes ill in the spectator stands at one of the Olympic events, and is removed to the GIT Student Health Services Center near the event site.
2. Tertiary care centers with which Alliance members are associated will be linked to each other, to selected venues within the Olympic Ring, and to the Student Health Services Center, via wide-bandwidth, wired telecommunication pathways.
3. Telemedicine capabilities within each tertiary care center will be located in an Emergency Room and in one Conference Room, and will be linked together.
4. Military language translators will be available in the Student Health Services Center and at the selected venues.
5. Medical professionals in the Student Health Services Center and at the selected venues will consult, via the telemedicine network, with medical subspecialists at selected tertiary care centers regarding diagnosis and treatment of the visitor's illness. The consultations will involve the transfer of images. The language translator will be used to interact with the visitor during the consultations.

Keywords:

Seriously ill foreign visitor; spectator stands and venues within the Olympic Ring; Student Health Services Center; language translator; teleconsultations involving image transfer; wired wide-bandwidth links between tertiary care centers, telemedicine capabilities at two locations within each tertiary care center

Legacies:

Wired, wide-bandwidth telecommunication link between tertiary care centers; telecommunications link between tertiary care centers and GIT Student Health Services Center; telemedicine capabilities at two locations within each tertiary care center

Demonstration #2

MLC

Purpose:

To demonstrate the ability of mobile telemedicine to deliver effective medical care to a spectator who is seriously injured while attending an Olympic event at a remote venue.

Assumptions:

1. The spectator has sustained multiple traumatic injuries while at the venue.
2. Telemedicine capabilities will be available at the remote venue in a mobile van linked via wireless pathways to the tertiary care centers with which Alliance members are associated.
3. A wireless node will be located at one of the medical sites (perhaps the Student Health Services Center) where telemedicine capabilities are available. This node will provide all

- tertiary care centers with wireless access to the telemedicine mobile van.
4. The injured spectator will be taken to the mobile van where on-site medical professionals will provide initial care while consulting telemedically with remote medical professionals at selected tertiary care centers.
 5. It will be determined, as a result of consultations using the wireless telemedicine link, that the spectator must be transported to a tertiary care center, and an appropriate center will be identified. Medical professionals will administer medical care, telemedically proctored by medical professionals at the tertiary care center, to the injured spectator throughout transport to the tertiary care center.
 6. As a result of the on-site and en-route consultations, appropriate basic medical care will be delivered to the injured spectator prior to arrival at the tertiary care center.

Keywords:

Spectator with multiple traumatic injuries; remote venue; wireless wide-bandwidth link to, and between, tertiary care centers; telemedicine consult during transport to tertiary care center

Legacies:

Wireless, wide-bandwidth telecommunication link between tertiary care centers; van-mounted telemedicine system

Demonstration #3 *GIT*

Purpose:

To demonstrate the ability of a telemedicine kiosk in Centennial Park and desktop-mounted telemedicine units in hospitals, each with wired, moderate-bandwidth telecommunication pathways, to provide effective medical care to a foreign visitor on doctor-prescribed medication and in a highly congested public area near the Olympic Ring.

Assumptions:

1. A foreign visitor, who is taking a doctor-prescribed drug and has no experience with telecommunications-based medical care delivery, suddenly becomes ill while enjoying recreation in Centennial Park.
2. A telemedicine kiosk with a wired, two-way audio, video, and data link to tertiary care centers will be available in Centennial Park. This kiosk will provide a capability for interactive two-way audio and video as well as monitoring basic physiological parameters.
3. The telemedicine kiosk will be used by the visitor to access medical assistance at one or more tertiary care centers. Accessing this medical care will be aided by the availability of multi-language instructional coaching provided by the kiosk.
4. The tertiary care center will have a distributed system of desktop-mounted, PC-based telemedicine units that link medical subspecialists in their hospital and home offices. Language translators will be available in the tertiary care centers and at the doctor's hospital and home offices.
5. The tertiary care center will also have available a wireless, wide-bandwidth telemedicine link to the CDC.
6. Medical subspecialists will evaluate the ill visitor via the kiosk and its link to the tertiary

care center via a wireless telecommunications pathway. Within the tertiary care center, medical subspecialists will be accessed via desktop-mounted telemedicine units. Also, doctors at CDC are consulted regarding the drug the visitor is taking. An evaluation is provided in which it is concluded that the visitor should rest, and seek additional medical assistance if symptoms persist.

Keywords:

Foreign visitors taking doctor-prescribed drugs becomes seriously ill; Olympics-related recreational area; telemedicine kiosk; wired, moderate-bandwidth link between kiosk and tertiary care center; wireless link between tertiary care center and CDC; language translation; distributed desktop telemedicine capability;

Legacy:

Telemedicine kiosk with wireless communications capability; wireless, wide-bandwidth telemedicine link to the CDC;

Demonstration #4

GBMC & EAMC

Purpose:

To demonstrate the ability of telemedicine with cellular linkages to deliver effective medical care in emergency situations involving multiple traumatic injuries.

Assumptions:

1. A mini-van filled with foreign visitors in Atlanta to attend the Olympic events is involved in a serious vehicular accident, resulting in a variety of life-threatening injuries to several persons.
2. Ambulances and med-flight helicopters equipped with portable, low-bandwidth telemedicine units and language translators will be dispatched to the accident.
3. At the accident site, medical professionals will use the portable telemedicine units to consult with medical subspecialists at tertiary care centers regarding stabilization of the injured persons. Within the tertiary care centers, the medical subspecialists will be accessed via a distributed system of desktop-mounted, PC-based telemedicine units in their hospital and home offices.
4. Following stabilization at the accident site, the injured visitors will be transported in ambulances and med-flight helicopters to Emergency Rooms in selected tertiary care centers.
5. During transport, portable telemedicine units will be used to continuously transfer medical updates on the injured visitor's medical status to the tertiary care center. As a result, Emergency Room medical professionals will be fully ready to administer appropriate care upon arrival of the ambulances/helicopters.

Keywords:

Vehicular accident resulting in multiple traumatic injuries; portable telemedicine capabilities; med-flight telemedicine links; distributed desktop-mounted telemedicine units;

Legacy:

Portable telemedicine capability in tertiary care centers; ambulances and med-flight helicopters with telemedicine capability;

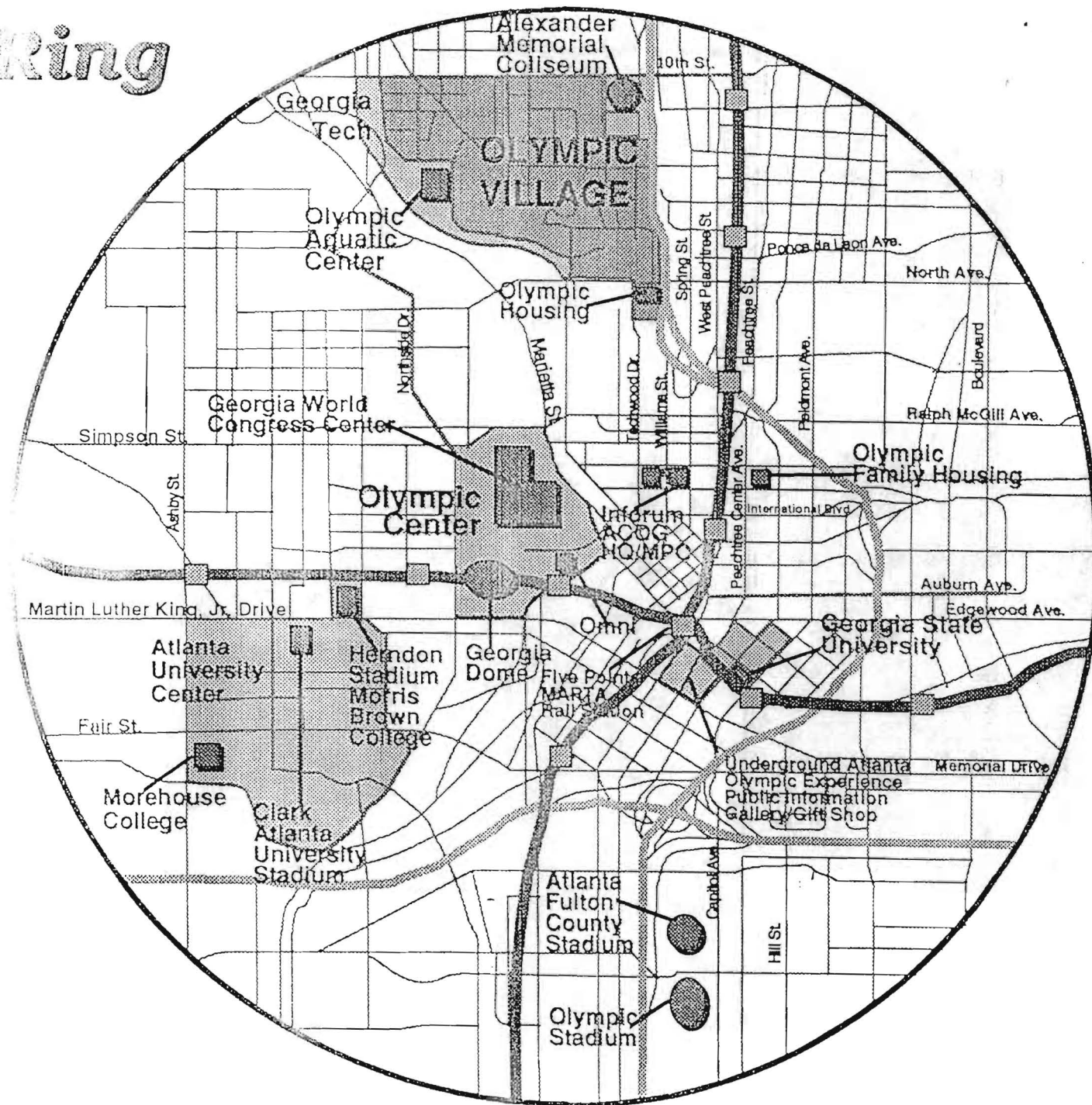
Some thoughts regarding the candidate demonstrations:

1. The above demonstrations don't involve telemedicine's capabilities for delivering medical care via a telecommunications link to a foreign country. Also, there is no demonstration that showcases medical care delivered telemedically as part of the response to a terrorist act or major natural disaster.
2. To the extent possible, different demonstrations should not duplicate the capabilities of telemedicine to deliver medical care during events such as the Olympics.

APPENDIX 3

**INFORMATION ON OLYMPIC SPORTING EVENTS, VENUE, AND
PLANS FOR MEDICAL ASSISTANCE**

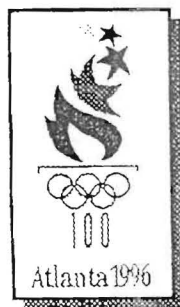
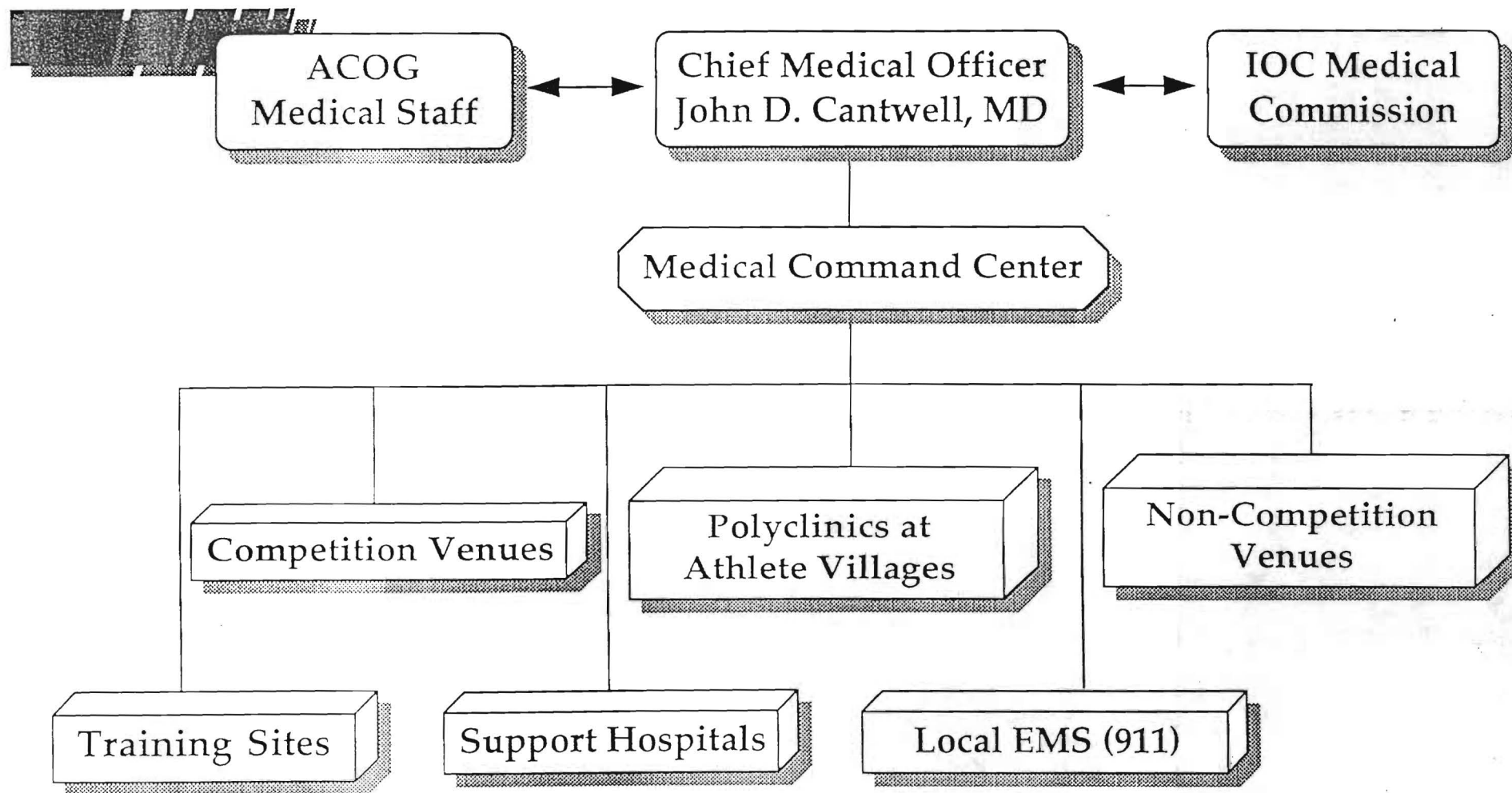
Olympic Ring



MEDICAL SERVICES

- ☆ To provide primary and emergency health care for athletes and the Olympic Family at all competition, training and event sites.
- ☆ To provide first aid and emergency care for all spectators at competition and event sites.





MEDICAL SERVICES INCLUDES:

- ☆ First Aid and emergency facilities at the competition venues and training sites
 - ☆ Polyclinics at villages
 - ☆ Doping control
 - ☆ Gender testing
 - ☆ Medical services at non-competition venues
 - ☆ Support hospitals
 - ☆ Medical Command Center
-

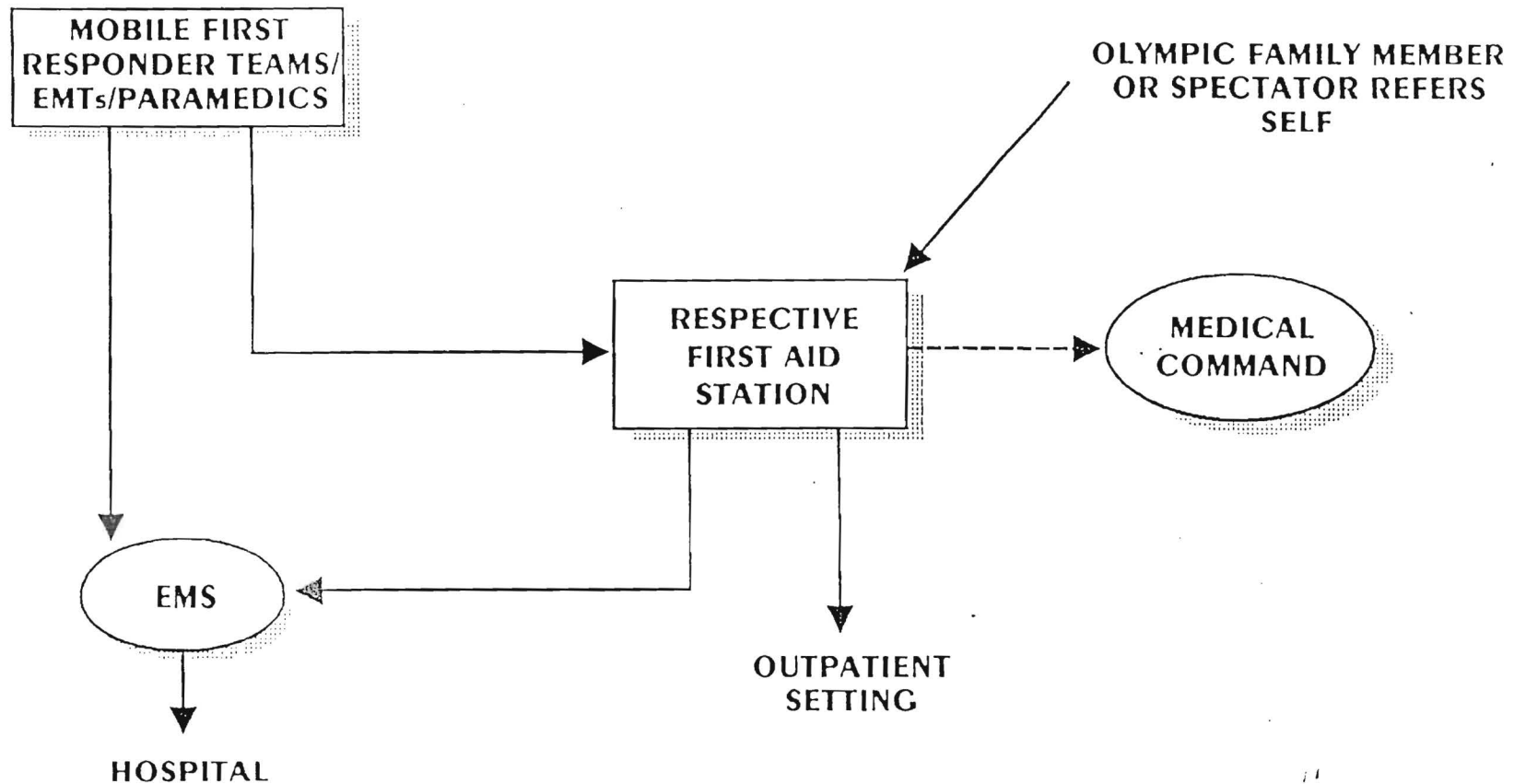


POLYCLINIC

- ☆ **Main Polyclinic at GA Tech Health Center**
 - ☆ **24 hour primary care and emergency coverage 7/5 - 8/7**
 - ☆ **Other Polyclinics located at remote sites**
 - ☆ **Services provided include physician evaluation and treatment, dentistry, x-ray, pharmacy, laboratory, physical therapy, massage therapy, and athletic training.**
-



OLYMPIC FAMILY & SPECTATOR MEDICAL CARE



Sporting Events & Venues

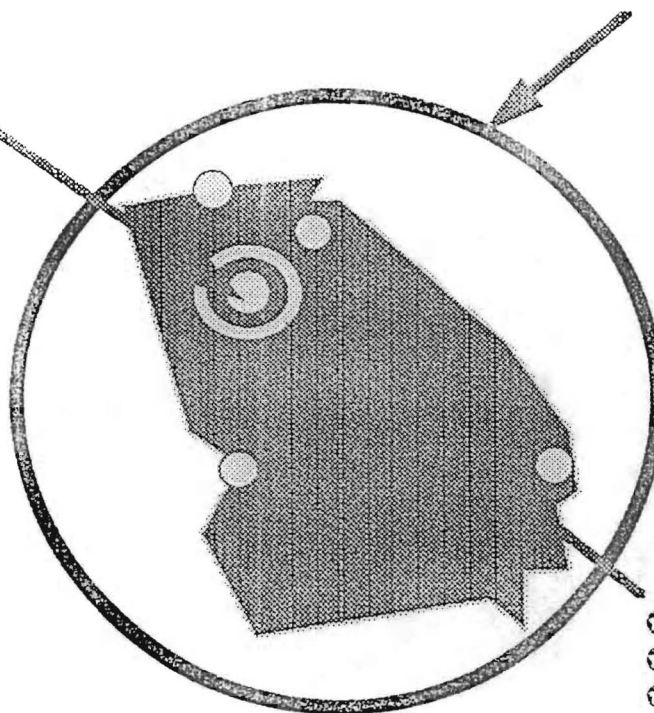
8

Outside 60 Mile Radius

20

Within Olympic Ring

- ⊙ Athletics (Olympic Stadium)
- ⊙ Badminton (Georgia State University)
- ⊙ Baseball (Atlanta-Fulton County Stadium)
- ⊙ Basketball (Georgia Dome)
- ⊙ Basketball (Morehouse/AUC)
- ⊙ Boxing (Georgia Tech)
- ⊙ Fencing (Georgia World Congress Center)
- ⊙ Gymnastics - Artistic (Georgia Dome)
- ⊙ Handball (Georgia World Congress Center)
- ⊙ Hockey (Clark Stadium)
- ⊙ Hockey (Herndon Stadium)
- ⊙ Judo (Georgia World Congress Center)
- ⊙ Marathon (City of Atlanta)
- ⊙ Race Walk (City of Atlanta)
- ⊙ Swimming/Diving (Georgia Tech)
- ⊙ Table Tennis (Georgia World Congress Center)
- ⊙ Volleyball (Omni)
- ⊙ Water Polo (Georgia Tech)
- ⊙ Weightlifting (Georgia World Congress Center)
- ⊙ Wrestling (Georgia World Congress Center)



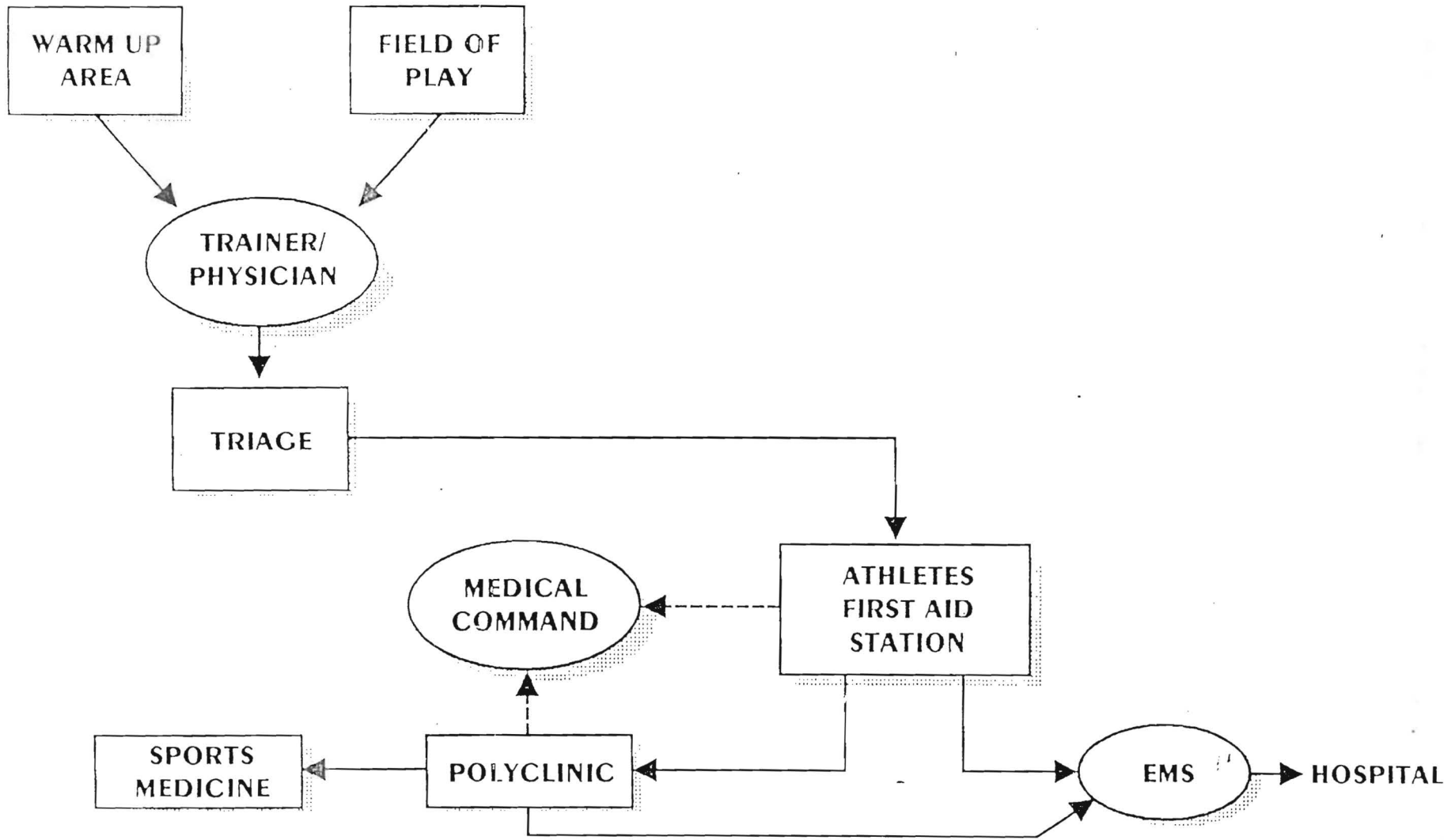
- ⊙ Canoe/Kayak-Slalom (Ocoee River, TN)
- ⊙ Football Preliminaries (Birmingham, AL ● Miami, FL, ● Orlando, FL ● Washington, DC)
- ⊙ Softball (Columbus)
- ⊙ Volleyball Preliminaries (Athens)
- ⊙ Yachting (Savannah)

13

Within 60 Mile Radius

- ⊙ Archery (Stone Mountain)
- ⊙ Beach Volleyball (Clayton County)
- ⊙ Canoe/Kayak-Sprint (Lake Lanier)
- ⊙ Equestrian (Conyers)
- ⊙ Football Finals (Athens)
- ⊙ Modern Pentathlon (Various Sites)
- ⊙ Mountain Biking (Rockdale County)
- ⊙ Road Cycling (Buckhead)
- ⊙ Rowing (Lake Lanier)
- ⊙ Shooting (Wolf Creek)
- ⊙ Tennis (Stone Mountain)
- ⊙ Track Cycling (Stone Mountain)
- ⊙ Volleyball (Athens)

ATHLETES MEDICAL CARE



NON-COMPETITION VENUES

☆ Include:

- Airport
- Cultural Olympiad
- International Broadcast Center
- International Zone of Athlete Village
- Main Press Center
- Olympic Family Hotels
- Transportation Hubs
- Youth Camp

☆ Level of service will be dependent on risk and audience



APPENDIX 4

**GUIDELINES FOR OCTOBER 16, 1995 MEETING OF THE SOUTHEAST
TELEMEDICINE ALLIANCE VIA VIDEO TELECONFERENCE**

INFORMATION FOR THE VIDEO TELECONFERENCE MEETING
OF THE
SOUTHEAST TELEMEDICINE ALLIANCE

October 16, 1995

2:00 PM

Room G758, Emory University Hospital

1. The meeting purpose is to make decisions regarding plans for telemedicine demonstrations to be simulated and filmed during the 1996 Olympic Games. (Reference: Proposal No. BEC-1506 titled "Feasibility Study for Demonstrating Telemedicine Capabilities During the Games of the XXVIth Olympiad", funded by ARPA for a six-month period beginning August 9, 1995)
2. The purpose of the simulated/filmed demonstrations is to provide a video presentation that shows how the capabilities of telemedicine can be used to enhance the delivery of medical care at events such as the Olympic Games.

It is not the purpose of the filmed demonstrations to show Georgia's telemedicine capabilities, or the telemedicine capabilities of one or two technologies, or the capabilities of individual Alliance members, etc.

3. Conversations with Dr. John Cantwell, the Chair of the Medical Commission for the 1996 Olympics, indicate that no plans should be made that include interacting with the athletes, coaches, judges, etc. Instead, plans should include interacting with spectators, visitors, film crews, etc.

This situation may change somewhat for the remote venues, and there may also be a different view by the Paralympic officials if we become involved with them. But, in general, plans should be for scenarios involving spectators, visitors, etc. in locations such as recreation areas, business areas, medical facilities, etc.

4. Since we can't schedule our filming by waiting for a spectator, visitor, etc. to need medical assistance, simulated needs will be filmed. Therefore, plans should be made in which persons with simulated medical needs are filmed.
5. The major benefit we get from undertaking this effort is the telemedicine legacy that will exist following the Olympics. This legacy will be primarily infrastructure in nature, and can consist of such things as wired and wireless telecommunications links between medical centers, state-of-the-art telemedical equipment, perhaps a mobile telemedicine capability, improved telemedical capabilities for med-flights, etc.

Secondary benefits for us will be the video presentation that can be used by individual Alliance members for various purposes (program development, for example) funding for

projects from which we can learn more about telemedicine capabilities ourselves, the opportunity to work together through the Alliance, etc.

6. The primary target audience for the video presentation is officials, specifically including the Medical Commissions, for future Olympic Games. Secondary audiences include the internal and external groups, organizations, etc. to whom individual members of STA might want to present the video.
7. There are some definite advantages to filming the majority of the presentation during, rather than before and/or after, the Olympics. These advantages are related to audience interest in events that actually occurred during the Olympics, and the authenticity added to the point being made by the presentation if filming is done during the Olympics. We know that the project sponsor was particularly attracted to the idea of "showing telemedicine's capabilities during the Olympics". This doesn't preclude having "introductory" or "concluding" material filmed apart from the Olympics and spliced to the presentation for purposes of overview, cohesion, summary, etc.

Having said all this, it is recognized that circumstances may dictate that some or all filming be done independent of the Olympics, and if that's the way it has to be, then we will do it that way.

APPENDIX 5

**GUIDELINES FOR OCTOBER 23, 1995 MEETING OF THE SOUTHEAST
TELEMEDICINE ALLIANCE VIA AUDIO CONFERENCE**

MEMORANDUM

October 20, 1995

TO : MEMBERS OF THE SOUTHEAST TELEMEDICINE ALLIANCE
FROM ; JIM TOLER
SUBJECT : ARRANGEMENTS AND AGENDA FOR MONDAY'S (OCT. 23) AUDIO CONFERENCE

Arrangements have been completed through the appropriate State offices for Monday's 9:00 am audio conference. These arrangements are as follows:

1. Each participant will be called by the State office just before 9:00 am and asked to "Hold" until all participants have been contacted.
2. Once all participants are on "Hold", the operator will connect everyone together in an audio conference call.

Below are the participants and phone numbers provided the State office:

Morehouse School of Medicine: Dr. Beth Bowen, 404-220-0365

Emory School of Medicine Mr. Jeff Dunbar, 404-727-8218
Ms. Dana Heyl, 404-727-8218

Medical College of Georgia Dr. Max Stachura, 706-721-6616
Ms. Laura Adams, 706-721-6616
Ms. Ann Brown, 706-721-6616

Georgia Baptist Medical Center Dr. Bruce Ramshaw, 404-460-4724
Ms. Virginia Carr, 404-681-3657
Ms. Deborah Eng, 404-681-3657

Eisenhower Army Medical Center Mr. Jack Horner, 706-787-2381/2383

Georgia Tech Mr. Jim Toler, 404-894-3964
Mr. Mike Burrow, 404-894-3964
Mr. John Peifer, 404-894-3964

The meeting's agenda will focus on interest in the preparation of a video presentation that depicts, in an integrated fashion, the breadth and depth of telemedicine capabilities of the Alliance; therefore, we will need to discuss content, filming, funding, distribution, etc. for the video presentation.

October 23, 1995

Thoughts for the Oct. 23, 1995 audio conference of the Southeast Telemedicine Alliance:

1. Purpose is to continue discussion of the preparation of video presentation materials.
2. Have separated out the two purposes for which video materials are to be prepared--
 - demonstrate the usefulness of telemedicine during events such as the Olympics. Efforts are in response to a GA Baptist and GA Tech contractual obligation to ARPA and need to involve filming during the Olympics. Primary target audience is the Medical Commission that will make decisions regarding methods used to deliver medical care during future Olympic Games.
 - present the telemedicine capabilities of the Alliance. Efforts are in response to desires on the part of Alliance members for a video presentation that reflects to breadth and depth of telemedicine capability represented by the six organizations comprising the Alliance. Filming can be done anytime, and if done prior to the Olympics, the presentation will be available for showing to visitors during the Olympics. Primary target audience is visitors, prospective sponsors, etc. with whom Alliance members interact.
3. GA Baptist and GIT are following up on the presentation materials needed for their contractual obligation. A meeting last Friday got that ball rolling. This audio conference is to focus on efforts to prepare the second video presentation; therefore, this morning we need to define overall efforts and then content, funding/filming, integration of individual presentations, distribution, etc.
4. Overall Efforts--
 - each member responsible for securing funding for filming their activities (unless someone knows of funding that might be available for the overall effort) and for getting their filming done
 - need to define the format, time schedule, etc. to assure that individual results can be integrated, in a timely manner, into an Alliance presentation
5. Content--
 - each member prepare video materials showing their telemedicine interests and capabilities
 - o EAMC
 - o EU
 - o GBMC
 - o GIT
 - o MCG
 - o MSM
6. Integration--
 - Who can do this???? Funding???? Time frame????

{ Jeff - afternoon of 3rd
MCG - none - see...

APPENDIX 6

**AGENDA AND HANDOUT MATERIALS FOR THE NOVEMBER 3, 1995
MEETING OF THE SOUTHEAST TELEMEDICINE ALLIANCE AND
CORPORATE SPONSORS**

AGENDA

SOUTHEAST TELEMEDICINE ALLIANCE MEETING

November 3, 1995
Georgia Baptist Medical Center
Board Room/Nursing School Building
300 Boulevard, NE
Atlanta, GA
1:30 -- 3:30 pm

CALL TO ORDER

WELCOME AND INTRODUCTIONS

- 1. REVIEW OF RESULTS FROM SEPTEMBER 8 MEETING REGARDING TELEMEDICINE DEMONSTRATIONS DURING THE 1996 OLYMPICS**
- 2. DISCUSSION OF NEEDS THAT MUST BE SATISFIED BY TELEMEDICINE DEMONSTRATIONS**
 - o Alliance members--video presentation that can be presented to administrators, prospective sponsors, military officials, Congressional delegates, etc. for program development, publicity, information dissemination, etc. purposes
 - o Georgia Baptist/Georgia Tech Planning Project--video presentation that can be presented to the Olympic Medical Commission to show how telemedicine can enhance medical care delivery at sport events involving large numbers of culturally-diverse people crowded together in environmentally-extreme climates
 - o Corporate officials--video presentation and live demonstrations during the Olympics that can be presented to employees, corporate officials, prospective customers, VIP's, etc. for the purpose of information dissemination, advertising, product sales, etc.
 - o Advanced Research Projects Agency (ARPA)--video presentation that can be presented to Olympic Medical Commission and military officials to indicate how telemedicine can be used to enhance medical care delivery under inhospitable conditions characterized by large numbers of culturally-diverse people crowded together in environmentally-extreme climates
- 3. DISCUSSION OF APPROACHES TO CONDUCTING TELEMEDICINE DEMONSTRATIONS DURING THE OLYMPICS**
 - o **Conduct telemedicine demonstrations prior to the Olympics**
 - o Identity medical and athletic sites/scenes similar in appearance and layout to selected Olympic events

- o Identify simulated medical scenarios and telemedicine demonstrations that could be conducted at these sites
 - o Identify financial requirements needed to film the telemedicine demonstrations/medical scenarios and these sites/scenes
 - o Present the filming plans and financial requirements to potential sponsor, and obtain necessary support
 - o Film the sites/scenes and the medical scenarios/telemedicine demonstrations
 - o Integrate the two films into a video presentation that depicts how telemedicine can enhance medical care delivery at events such as the Olympic Games
 - o Provide this video to Alliance members and corporate officials, and encourage its presentation during and after the Olympics
 - o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine could be used to enhance medical care delivery during future Olympic Games
- o Conduct telemedicine demonstrations at Olympic sites during the Olympic Games**
- o Identify Olympic and Olympic-related sites where the capabilities of telemedicine can be demonstrated during simulated medical scenarios
 - o Identify simulated medical scenarios and telemedicine demonstrations to be conducted at these sites
 - o Identify infrastructure, financial support, etc. necessary for conducting these demonstrations
 - o Present the medical scenarios, telemedicine demonstrations, infrastructure requirements, financial needs, etc. to corporate officials from Olympic sponsors and to ARPA, and obtain the necessary support
 - o Obtain approval of Olympic Officials to conduct the demonstrations at identified Olympic sites
 - o Conduct and film the telemedicine demonstrations during the Olympics
 - o Prepare a video presentation from the film and make it available to sponsors and Alliance members for advertising, public relations, program development, sales, etc. purposes
 - o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine could be used to enhance medical care delivery during future Olympic Games
- o Conduct telemedicine demonstrations in the new GCATT Building during the Olympic Games**
- o Arrange Bioengineering Center space in the GCATT Building to simulate medical care delivery areas
 - o Identify simulated medical scenarios and telemedicine demonstrations that can be conducted in the GCATT Building space

- o Identify infrastructure, financial support, etc. necessary for conducting these demonstrations.
- o Present the medical scenarios, telemedicine demonstrations, infrastructure requirements, financial needs, etc. to corporate officials and to ARPA, and obtain their support
- o Conduct and film the demonstrations during the Olympics
- o Prepare a video presentation from the film and make it available for advertising, public relations, program development, sales, etc. purposes
- o Invite VIP's, members of the media, corporate officials and potential customers, government and military officials, company employees, etc. to observe repeated demonstrations on a scheduled basis
- o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine could be used to enhance medical care delivery during future Olympic Games

4. DISCUSSION OF CANDIDATE DEMONSTRATIONS

- o **Demonstration #1:** A medical scenario is simulated in which a foreign visitor has become ill in the spectator stands during an event within the Olympic Ring. The ill visitor presents at the Health Services Center adjacent to the event. The visitor is admitted to an Examination Room equipped with a telemedicine system that is linked via wired, wide-bandwidth telecommunication pathways to major medical centers at organizations represented by Alliance members (EAMC, EU, GBMC, MCG, MSM). Based on an examination by medical professionals at the Health Services Center and on teleconsultations with medical specialists at two major medical centers, all assisted by use of the military's language translator, the ill visitor's medical status is rapidly diagnosed and appropriate interventions are prescribed without a need for physical transportation to a major medical center.
- o **Demonstration #2:** A medical scenario is simulated in which a spectator at a remote Olympic venue becomes seriously ill. The ill spectator presents at an on-site medical van equipped with a mobile telemedicine capability that is linked via wireless, wide-bandwidth telecommunication pathways to major medical centers at organizations represented by Alliance members (EAMC, EU, GBMC, MCG, MSM). Following an initial examination of the ill visitor by medical professionals in the van, the wireless telemedicine system is used to link with medical specialists at two of the major medical centers. As a result of the wireless teleconsultations with specialists, it is determined that transportation of the ill visitor to a major medical center is necessary. Using the telemedicine system in a teleproctoring mode, appropriate care is provided the ill visitor throughout transport to the major medical center.
- o **Demonstration #3:** A medical scenario is simulated in which a foreign visitor on doctor-prescribed medication becomes ill in the Olympic Centennial Park. The ill visitor is using a SmartCard that contains basic identification information and medical record. The ill visitor presents at a telemedicine kiosk in Centennial Park

that is linked via wired, moderate-bandwidth pathways to both major medical centers at organizations represented by Alliance members (EAMC, EU, GBMC, MCG, MSM) and to the Centers for Disease Control (CDC). Incorporated into the telemedicine kiosk is the military's language translator and a SmartCard reader. Using the SmartCard to access the telemedicine kiosk, the ill visitor is seen by a specialist at a major medical center and is guided through a medical interview and examination. Based on results of this examination, it is decided that specialists at CDC need to be consulted regarding the medication being taken by the ill visitor; consequently, the major medical facility establishes the CDC link and obtains guidance regarding drug-drug interactions. Based on results of the teleconsultations, it is concluded that admittance to a major medical center is unnecessary. The SmartCard is updated to reflect this medical episode.

- o **Demonstration #4:** A medical scenario is simulated in which several persons receive different traumatic injuries in a vehicular accident on an Interstate Highway. A MedFlight helicopter and emergency medical vehicles are dispatched to the scene, and use wireless telemedicine systems to first triage and then present the injured persons to emergency physicians at major medical centers at organizations represented by Alliance members (EAMC, EU, GBMC, MCG, MSM). The emergency physicians guide the on-site medical team's delivery of point-of-injury care, and continue providing this guidance during enroute helicopter and ambulance transfer of injured persons to different major medical centers. When the injured persons arrive at the major medical centers, they will have received all appropriate medical care and emergency rooms will be appropriately prepared to immediately initiate continued care delivery.

5. REPORT OF PLANS FOR VETERINARY TELEMEDICINE DEMONSTRATION DURING THE OLYMPIC GAMES

6. RECOMMENDED COURSE OF ACTION

- o Corporate officials provide Alliance indications of support appropriate for proceeding to net level of planning
- o Alliance review plans with Olympic Medical Commission and Organizing Committee
- o Alliance members assume responsibility for individual demonstrations, and develop detailed plans for their implementation
- o Detailed plans are presented to corporate officials and begin to move toward implementation



TELEMEDICINE DEMONSTRATIONS DURING THE 1996 OLYMPIC GAMES

Summary of Demonstrations



OVERVIEW

- **Alliance Members**

- Eisenhower Army Medical Center (EAMC)
- Emory University School of Medicine (EU)
- Georgia Baptist Medical Center (GBMC)
- Georgia Tech Bioengineering Center (GT)
- Medical College of Georgia (MCG)
- Morehouse School of Medicine (MSM)

- **Partners**

- ARPA
- AT&T
- IBM
- Kodak
- Panasonic

- **Objective**

To conduct telemedicine demonstrations during the Olympic Games for the purpose of showing how the delivery of medical care can be enhanced through the use of telemedicine

- **Benefits**

- Opportunities for public relations and advertising
- Opportunities for program development
- A legacy infrastructure to enhance the delivery of health care to the citizens of Georgia



DEMONSTRATION #1

- **Scenario:** A foreign visitor becomes ill in the stands at an Olympic venue and is transported to an adjacent health services center
- **Goal:** To demonstrate how telemedicine can enhance the deliver of medical care through instantaneous access to medical specialists at a remotely-located major medical center
- **Legacy:** High bandwidth land lines (T-1) between major medical centers (EAMC, EU, GBMC, MCG, MSM) and health services centers to enhance the delivery of medical care for the citizens of Georgia
- **Resources Required:**
 - T-1 telecommunications infrastructure between identified sites
 - Language translator
 - Video teleconferencing systems
 - Financial resources necessary to cover professionals who plan, implement, and conduct the demonstration

DEMONSTRATION #1

Purpose:

To demonstrate the ability of telemedicine to deliver enhanced medical care to a foreign visitor who becomes ill while attending an event within the Olympic Ring

Assumptions:

1. Major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, and MSM) will be networked to each other and to the Student Health Services Center on the Georgia Tech (GIT) campus via wide-bandwidth (T-1), wired telecommunication pathways.
2. Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth video teleconferencing, and will be linked both to each other and to the wide-bandwidth telecommunications pathways that join the major medical centers.
3. The telemedicine system at the GIT Student Health Services Center will be located in one of the examination rooms and will support wide-bandwidth teleconsultations. This telemedicine system will be linked to the wide-bandwidth telecommunications pathways that join the major medical centers.
4. Military language translators will be available in the Student Health Services Center and at each of the major medical centers.
5. A person participating in the demonstration will pose as a foreign visitor who becomes ill in the spectator stands at an event within the Olympic Ring. The demonstration will begin with the transfer of this person into the Student Health Services Center examination room that is equipped with the telemedicine system.
6. All activities in the Student Health Services Center examination room will be filmed and narrated, beginning with the transfer of the ill foreign visitor to the examination room.
7. Medical professionals in the Student Health Services Center will examine the ill visitor, using the language translator to facilitate communications. A tentative diagnosis of the visitor's medical situation will be identified.
8. Medical professionals in the Student Health Services Center will desire to corroborate this diagnosis by consulting with medical specialists at two different major medical centers. The telemedicine system in the Student Health Services Center examination room will be linked via wide-bandwidth telecommunications pathways to first one, and then the other, Conference Room telemedicine systems in the major medical centers.
9. Using the two-way audio, video, and data capabilities of the telemedicine systems, the specialist in first one, and then the other, major medical center will consult with the medical professional in the Student Health Services Center while the ill visitor is further examined. During this further examination, the language translator will continue to be used to interact with the ill visitor.
10. The medical professional in the Student Health Services Center will provide a final diagnosis and specify an appropriate treatment.

Keywords:

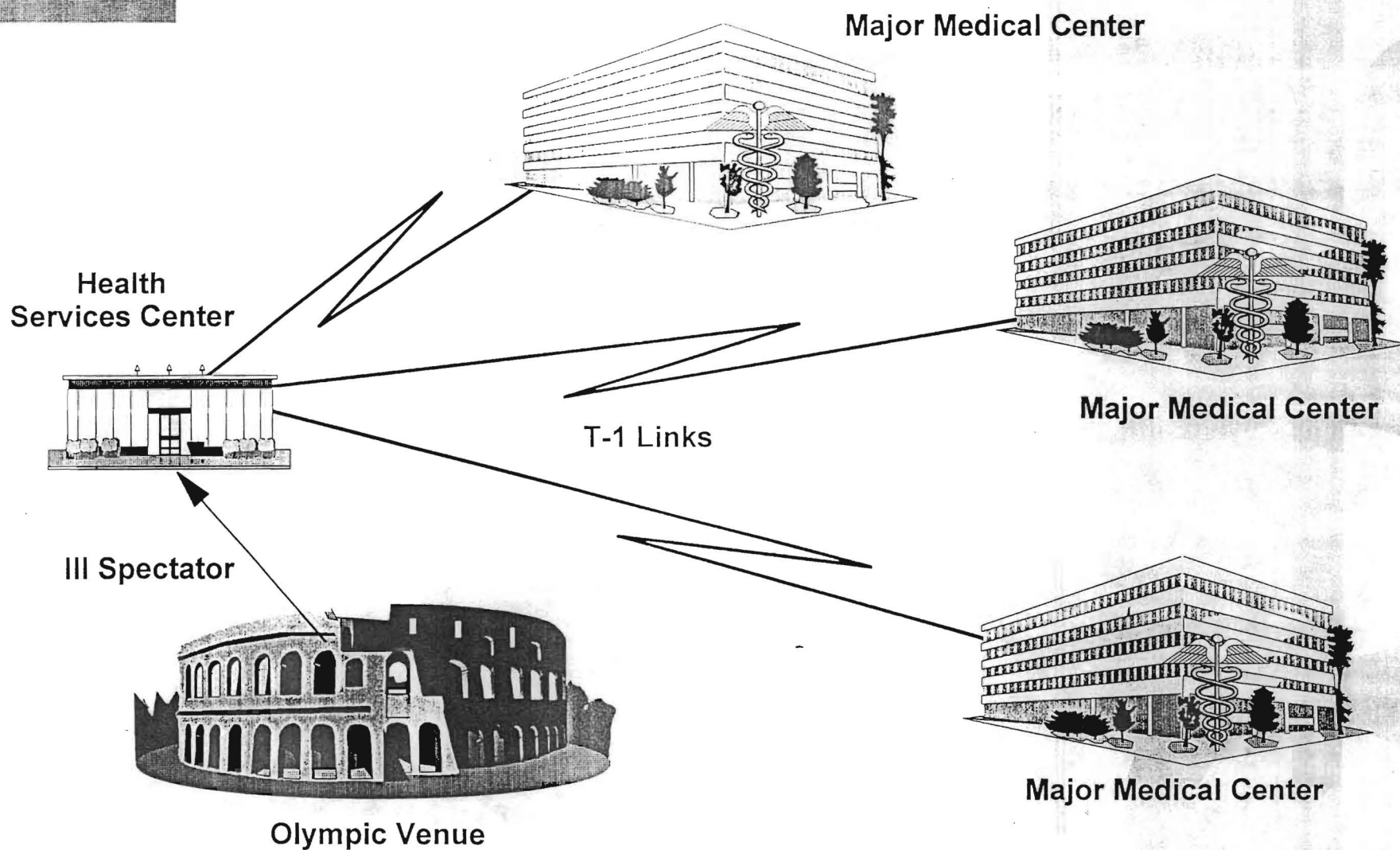
Wired, wide-bandwidth telecommunication pathways linking major medical centers and the GIT Student Health Services Center; person posing as an ill foreign visitor; spectator stands at a venue within the Olympic Ring; Student Health Services Center near the spectator stands; language translator; telemedicine capabilities at two locations within each major medical center; telemedicine system in one examination room of the Student Health Services Center.

Legacies:

Wired, wide-bandwidth (T-1) telecommunication pathways linking major medical centers and the GIT Student Health Services Center; telemedicine system at two locations within each major medical center; telemedicine system in one examination room in the Student Health Services Center; foreign language translation capability at each major medical center and at the Student Health Services Center



DEMONSTRATION #1





DEMONSTRATION #2

- **Scenario:** Spectator becomes seriously ill at a remote Olympic venue and is transported via a telemedicine van to a major medical center
- **Goal:** To demonstrate how telemedicine can enhance the delivery of medical care at a remote location through the use of a mobile telemedicine van equipped with wireless video conferencing capabilities
- **Legacy:** A mobile telemedicine van that can be used to deliver health care to remote rural locations via wireless connections to major medical centers
- **Resources Required:**
 - Vehicle equipped as telemedicine van
 - Wireless telecommunications capabilities in the van and at a base station
 - If not provided by demonstration #1, land line communications between a base station and major medical centers
 - Video teleconferencing systems
 - Financial resources to support professionals to plan, implement, and conduct the demonstrations

DEMONSTRATION #2

Purpose:

To demonstrate the ability of a mobile telemedicine system to deliver enhanced medical care to a spectator injured while attending an Olympic event at a remote venue.

Assumptions:

1. A van-mounted telemedicine system that supports wireless, wide-bandwidth video teleconferencing will be available at a selected remote venue, and will be linked via a wireless, wide-bandwidth (T-1) pathway to a telecommunications node located at one of the major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, and MSM).
2. The wireless telecommunications node at one of the major medical centers will provide wireless access to the other non-node major medical centers; thereby providing wireless, wide-bandwidth connectivity between the mobile van and all major medical centers.
3. Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth, wireless video teleconferencing, and will be linked both to each other and to the telecommunications node that provides wireless access to the telemedicine system in the mobile van. (These telemedicine systems may be the same as those used in Demonstration #1.)
4. A person participating in the demonstration will pose as a spectator that has sustained multiple traumatic injuries while at the remote venue. The demonstration will begin with this person being transferred into the mobile van.
5. All activities in the mobile van will be filmed and narrated, beginning with the transfer of the person posing as an injured spectator into the van.
6. In the mobile van, on-site medical professionals will provide initial care while using the audio, video, and data capabilities of the van's wireless telemedicine system to consult with medical professionals at selected major medical centers.
7. It will be determined, as a result of consultations using the wireless telemedicine link, that the injured spectator can not be adequately treated on-site, and therefore must be transported to one of the major medical centers. Throughout transport to the selected major medical center, medical professionals in the van will administer telemedically-proctored medical care.
8. As a result of the on-site and en-route teleconsultations, appropriate medical care will have been delivered to the injured spectator prior to arrival at the major medical center. Medical professionals at the major medical center will therefore be fully prepared to continue treatment upon arrival of the injured spectator.

Keywords:

Spectator with multiple traumatic injuries; remote venue; wireless wide-bandwidth link to, and between, major medical centers; telemedical proctoring during transport to major medical center

Legacies:

Wireless, wide-bandwidth (T-1) telecommunication link between major medical centers; van-mounted mobile telemedicine system; telecommunications node for wireless telemedicine systems at a major medical center

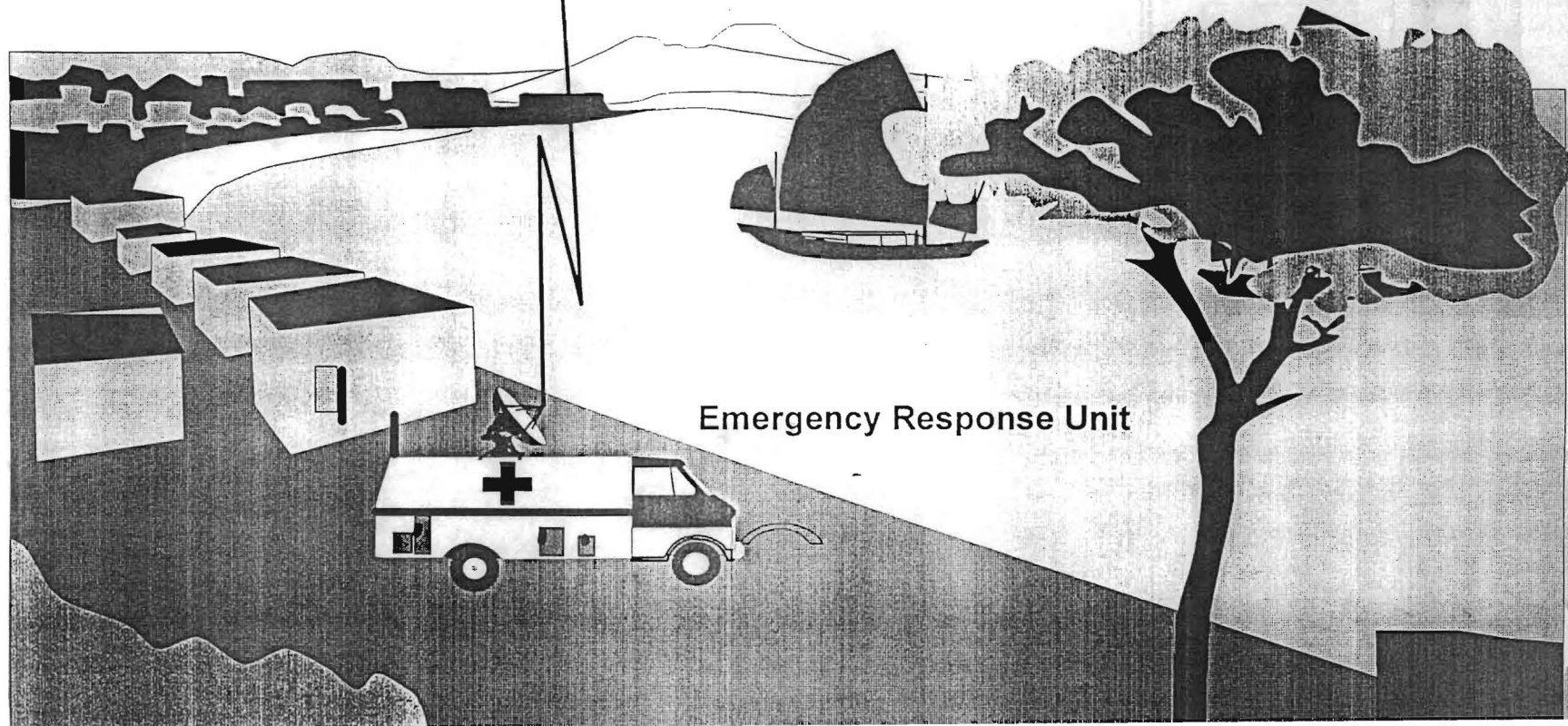


DEMONSTRATION #2



Major Medical Center

Remote Olympic Venue



Emergency Response Unit



DEMONSTRATION #3

- **Scenario:** A foreign visitor on a doctor-prescribed medication becomes ill in the Olympic Centennial Park and seeks medical assistance via a telemedicine kiosk
- **Goal:** To demonstrate how the delivery of health care can be enhanced through the use of a telemedicine kiosk providing language translation, SmartCard technology, medical information and two-way audio and video communication with an attending physician
- **Legacy:** A telemedicine kiosk that can be used in public areas (hotels, parks, shopping centers, etc.) to provide medical information and initial care to the general public
- **Resources Required:**
 - Telecommunications infrastructure from the telemedicine kiosk to a medical base station
 - Language translation and SmartCard technology
 - Booth to house the telemedicine kiosk
 - Video teleconferencing systems
 - Financial resources to support professionals to plan, implement and conduct the demonstration

DEMONSTRATION #3

Purpose:

To demonstrate the ability of a kiosk-based telemedicine system to deliver enhanced medical care to a foreign visitor who is on a doctor-prescribed medication and becomes ill in a highly-congested public recreation area near the Olympic events.

Assumptions:

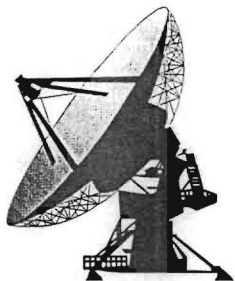
1. A telemedicine kiosk with a wired, moderate-bandwidth (1/4 T-1), two-way audio, video, and data link to major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, MSM) will be available in the Olympic Centennial Park. This kiosk will support the remote monitoring of a basic array of physiological parameters and will be equipped to accept SmartCards as a means of patient access.
2. The major medical centers will have a distributed system of desktop-mounted, PC-based telemedicine systems that link medical subspecialists in their offices. Language translators will be available in the major medical centers and at the doctor's offices.
3. The major medical centers will also have available a wireless, wide-bandwidth (T-1) telemedicine link to the CDC.
4. A person participating in the demonstration will pose as a foreign visitor who becomes ill while enjoying recreation in the Olympic Centennial Park. This ill visitor will be taking an obscure drug prescribed by a medical doctor in their country-of-origin, and will have no experience with telecommunications-based medical care delivery. Additionally, this person will have basic personal information and medical records on a SmartCard.
5. The telemedicine kiosk will be used by the ill visitor to access medical assistance at one of the major medical centers. Accessing this medical care will be initiated by use of the SmartCard, and will be aided by the availability of multi-language instructional coaching provided via the kiosk.
6. Medical subspecialists will interview the ill visitor telemedically, and will desire to seek the opinion of a specialist in one of the other major medical centers. With the ill visitor on-line, the second specialist will be accessed using the wide-bandwidth telecommunication link between major medical centers. Following discussions with the first specialist and an interview with the ill visitor, the second specialist will endorse the first specialist's conclusions. This endorsement will include a recommendation that medical professionals at CDC be consulted regarding the drug the ill visitor is taking.
7. Medical professionals at CDC will be consulted regarding the drug the ill visitor is taking, and will provide guidance relative to drug-drug interactions, etc.
8. The demonstration will conclude with the ill visitor being advised obtain rest, and seek additional medical assistance if symptoms persist.

Keywords:

Foreign visitors taking doctor-prescribed drugs becomes seriously ill; Olympics-related recreational area; telemedicine kiosk; SmartCard technology; wired, moderate-bandwidth link between kiosk and major medical centers; wireless link between major medical centers and CDC; language translation; distributed desktop telemedicine capability.

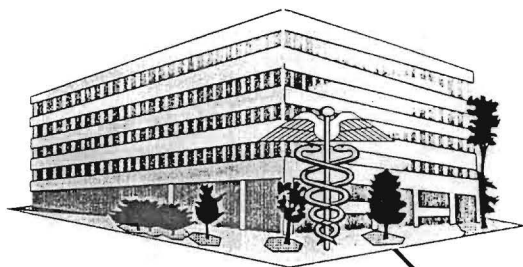
Legacy:

Telemedicine kiosk with wireless communications and SmartCard capability; moderate-bandwidth telecommunication links between major medical centers; wireless, wide-bandwidth telemedicine link to the CDC;

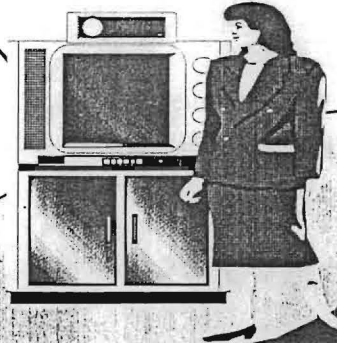


DEMONSTRATION #3

Major Medical Center

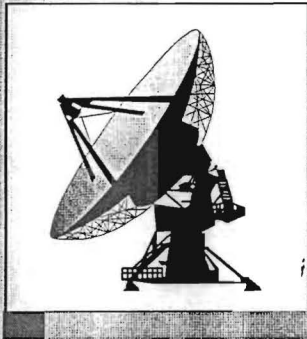


Telemedicine Kiosk



Centennial Park





DEMONSTRATION #4

- **Scenario:** Foreign visitors receive multiple trauma injuries as a result of a vehicular accident and are transported to major medical centers via MedFlight helicopters
- **Goal:** To demonstrate how the delivery of health care in trauma situations can be enhanced through the use of portable telemedicine systems capable of transmitting images from an accident site and en route to major medical centers
- **Legacy:** A portable telemedicine capability that can be used by paramedics to assist in the delivery of health care in trauma situations
- **Resources Required:**
 - Video teleconferencing systems
 - A wireless communications infrastructure to support transmission of images from the accident site to major medical centers
 - Financial resources to implement a helmet mounted camera system to be used by flight paramedics to transmit images from an accident site and en route to major medical centers
 - Financial resources to support professionals to plan, implement, and conduct the demonstration

DEMONSTRATION #4

Purpose:

To demonstrate the ability of telemedicine with cellular linkages to deliver effective medical care in emergency situations involving multiple traumatic injuries.

Assumptions:

1. An emergency medical vehicle and a MedFlight helicopter equipped with portable, moderate-bandwidth telemedicine capabilities will be available, and will be linked via cellular pathways to major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, MSM).
2. A mini-van transporting foreign visitors attending the Olympic Games is involved in a serious vehicular accident, resulting in a variety of life-threatening injuries to several persons.
3. The emergency medical vehicles and MedFlight helicopter equipped with portable telemedicine capabilities will be dispatched to the accident site. These vehicles will also have language translators onboard.
4. At the accident site, persons participating in the demonstration will pose as foreign visitors that have received various traumatic injuries. The demonstration will begin with the arrival of the emergency medical vehicles and helicopter.
3. Medical professionals associated with the emergency medical vehicles and the helicopter will use the language translators and portable telemedicine capabilities to consult with the injured visitors and medical specialists at the major medical centers regarding stabilization of the injured persons. Within the major medical centers, the medical specialists will be accessed via a distributed system of desktop-mounted, PC-based telemedicine units in their hospital and home offices.
4. Following stabilization at the accident site, the injured visitors will be transported in the emergency medical vehicles and MedFlight helicopter to Emergency Rooms in selected major medical centers.
5. During transport, the language translators and portable telemedicine capabilities will be used to continuously transfer medical updates on the injured visitor's medical status to the major medical centers. As a result, Emergency Room medical professionals will be fully ready to administer appropriate care upon arrival of the emergency vehicles and the helicopter.

Keywords:

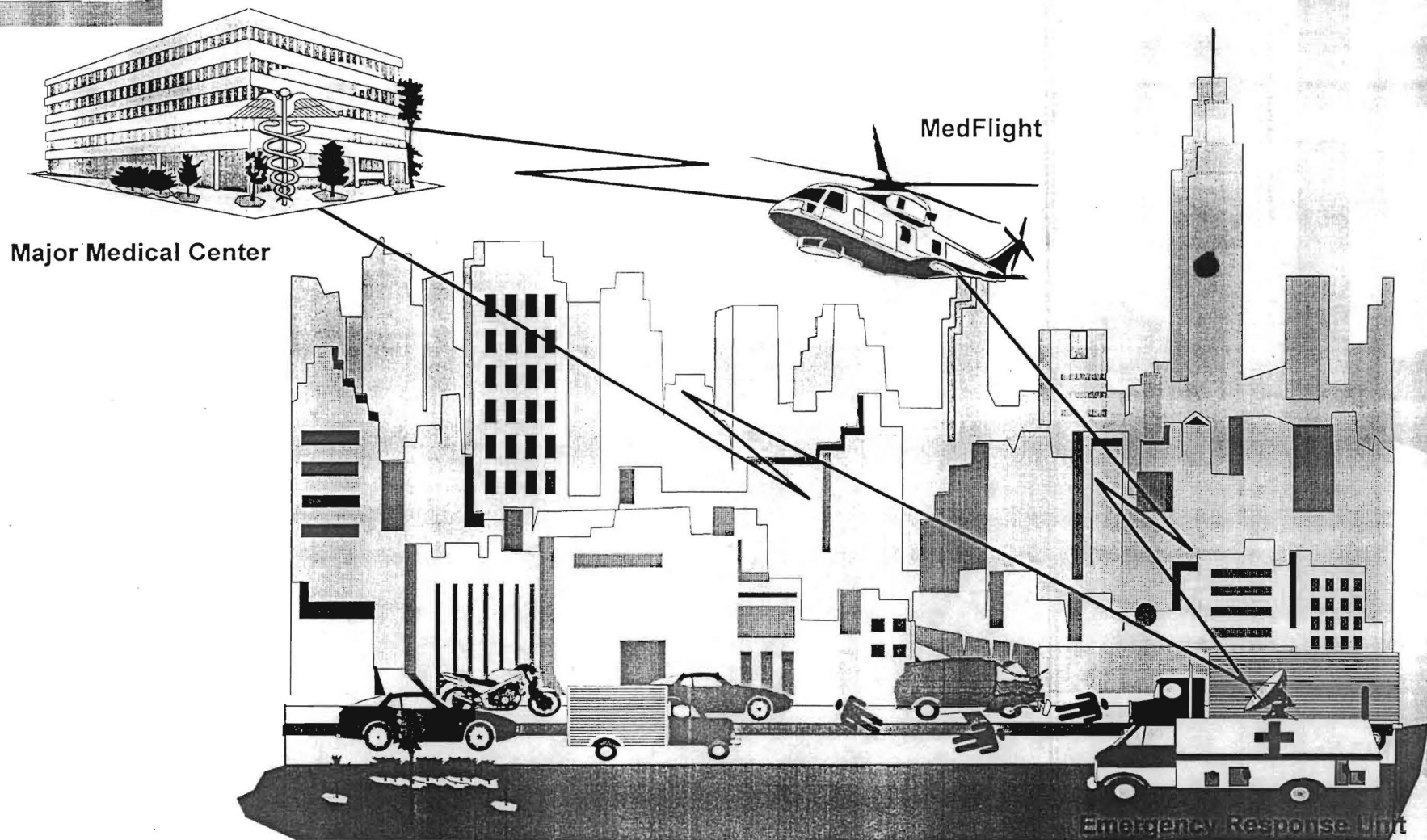
Vehicular accident resulting in multiple traumatic injuries; portable telemedicine capabilities in emergency medical vehicles and MedFlight helicopter; cellular telecommunications links; distributed desktop-mounted telemedicine units;

Legacy:

Portable telemedicine capability in major medical centers; emergency medical vehicles and MedFlight helicopters equipped with telemedicine capability;



DEMONSTRATION #4



B-03-618
#2
(Final)

Final Report

Georgia Tech Project No. B-03-618

**FEASIBILITY STUDY FOR DEMONSTRATING
TELEMEDICINE CAPABILITIES DURING THE
GAMES OF THE XXVth OLYMPIAD**

November 1996

Prepared by

**Michael F. Burrow
James C. Toler
John W. Peifer**

Prepared under

Research Contract No. AGR DTD 950809

Prepared for

SHEPARD PATTERSON & ASSOCIATES, INC.
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Attn.: Michael Genna

FOREWORD

This Final Report documents efforts intended to showcase the capabilities of advanced telemedicine systems for delivering enhanced medical care in situations characterized by very large numbers of culturally-diverse people located in close proximity at a high-visibility sporting event where temperature and humidity are high and conventional transportation is limited. These efforts were conducted over the time period August 9, 1995 through May 30, 1996 under the direction of personnel in the Biomedical Interactive Technology Center in the Institute for Bioengineering and Bioscience at the Georgia Institute of Technology (Georgia Tech), Atlanta, GA. Dr. Bruce Ramshaw, a surgeon and the Director of the Telemedicine Program at the Georgia Baptist Medical Center in Atlanta, GA, was a major contributor to the project as a consultant in clinical protocols and telemedicine. Plans for showcasing the capabilities of advanced telemedicine systems were developed by members of the Southeast Telemedicine Alliance, an informal group of six organizations focused on collaboratively furthering the use of telemedicine in medical care delivery. Legally, the project was a subcontract under a Shepard Patterson & Associates, Inc. contract with the Advanced Research Projects Agency. Within Shepard Patterson & Associates, Inc., the project was identified as Contract No. AGR DTD 950809, and Ms. Sharon Downey was the Technical Point-of-Contact. Within Georgia Tech, the effort was identified as Project No. B-03-618, and Mr. Michael F. Burrow, Senior Research Engineer, was the Project Director. Mr. Burrow was assisted by Mr. James C. Toler, Principal Research Engineer, and Mr. John W. Peifer, Senior Research Scientist, at Georgia Tech, and by members of the Southeast Telemedicine Alliance.

A detailed description of activities undertaken during the project is presented in the following sections of this report.

TABLE OF CONTENTS

<u>Section No.</u>	<u>Section</u>	<u>Page No.</u>
	FOREWORD	
SECTION 1	IDENTIFICATION OF TELEMEDICINE DEMONSTRATIONS	2
SECTION 2	EFFORTS TO OBTAIN APPROVAL FOR TELEMEDICINE DEMONSTRATIONS	5
SECTION 3	SUMMARY OF EFFORTS	16
APPENDIX 1	INFORMATION ON OLYMPIC SPORTING EVENTS, VENUES AND PLANS FOR MEDICAL ASSISTANCE	18
APPENDIX 2	GUIDELINES FOR OCTOBER 16, 1995 MEETING OF THE SOUTHEAST TELE-MEDICINE ALLIANCE VIA VIDEO TELECONFERENCE	19
APPENDIX 3	PROPOSAL FOR TELEMEDICINE DEMONSTRATIONS AT THE EQUESTRIAN EVENT	20
APPENDIX 4	GEORGIA TECH DRAFT PROPOSAL BEC-1602	21
APPENDIX 5	DR. SATAVA RESPONSE TO GEORGIA TECH PROPOSAL BEC-1602	22

SECTION 1

IDENTIFICATION OF TELEMEDICINE DEMONSTRATIONS

Project discussions aimed at developing plans for showcasing the capabilities of advanced telemedicine systems during the Games of the XXVIth Olympiad were initiated at a meeting of the Southeast Telemedicine Alliance at the Georgia Baptist Medical Center on September 8, 1995. Representatives from the following six organizations comprising the Alliance were present:

- o the Eisenhower Army Medical Center at Fort Gordon, GA,
- o the Emory University School of Medicine in Atlanta, GA,
- o the Georgia Baptist Medical Center in Atlanta, GA,
- o Georgia Tech in Atlanta, GA,
- o the Medical College of Georgia in Augusta, GA, and
- o the Morehouse School of Medicine in Atlanta, GA.

In addition, representatives from four Olympic corporate sponsors (AT&T, Panasonic, IBM, and Kodak) and medical representatives from the Paralympic Games were present.

During this meeting, telemedical activities that might be undertaken under this project were discussed in detail, with frequent reference to efforts outlined in the previously submitted Georgia Tech Proposal No. BEC-1506 to the Advanced Research Projects Agency (ARPA). Key discussion items are summarized as follows:

- o Results of earlier meetings with Dr. John Cantwell, Chair of the international Medical Commission for the 1996 Olympic Games, and with Ms. Elizabeth Martin of the Atlanta Committee for the Olympic Games (ACOG) were discussed. It was noted that Dr. Cantwell would not accept conventional telemedicine, and especially not telemedicine that introduced advanced technologies, as the means for delivering medical care to athletes and their coaching staff. This position was based on his concern that the capabilities of telemedicine using conventional technologies had not been adequately proven. However, he was highly receptive to the performance of non-interfering demonstrations conducted to demonstrate advanced telemedical capabilities for enhancing medical care delivery to non-athletes (visitors, families of the athletes, spectators, etc.) during the Games. Demonstrations accommodating situations at remote event sites were of special interest. Ms. Martin of ACOG was of essentially the same opinion as Dr. Cantwell.
- o The desire to assure that the telemedicine capabilities showcased during the 1996 Games reflected a mix of technology levels, communications media, and medical applications was agreed upon. The technology levels were identified as (1) large, multi-rack systems with wide-bandwidth connectivity that support very-high-quality motion video, (2) desktop-mounted, PC-based systems with moderate-bandwidth connectivity that offer reasonably-high-quality motion video, (3) portable systems with wireless connectivity that offer limited-quality motion video and/or very-high-quality still-image displays, and (4) palm-

top systems with wireless connectivity that offer very limited quality still-image displays. The communications media of interest were fiber optic cable, copper telephony circuits, and cellular telephone wireless pathways. Medical applications included both emergency and non-emergency care needs at venues within and external to the Olympic Ring in which civilian and military protocols would be appropriate.

- o It was agreed that a series of demonstrations would have to be identified, discussed, and ultimately accepted by Alliance members, and then presented to corporate sponsors, ARPA, the Olympic Medical Commission, and ACOG for their response. Ultimately, responsibility for planning and conducting individual telemedicine demonstrations during the Olympic Games would be assumed by individual Alliance members working in concert with corporate members and ARPA.
- o Hardware and software legacies were discussed, with emphasis on telecommunication networks and telemedicine hardware that might remain in place and be used to support improved local medical care delivery following the Olympic Games. Special interest was expressed in legacies that included wide-bandwidth wired and wireless telecommunication networks linking major medical centers, a van-mounted telemedicine capability, a med-flight helicopter equipped with a telemedicine capability, and a capability for providing telemedicine kiosks in locations frequented by the general public.
- o Military involvement in the demonstrations was discussed from the point-of-view of disaster scenarios, triage management, mobile medical monitoring vehicles, language translation, and command and control protocols to be integrated into activities that showcase the capabilities of telemedicine. Several advanced technologies developed by ARPA for military applications were discussed as means for upgraded conventional telemedicine systems to be showcased during the demonstrations.
- o There was interest in working closely with persons planning medical care delivery for the Paralympics to determine whether either conventional or advanced telemedicine demonstrations would also be appropriate in this setting. It was noted that the Paralympic Games may not have all the medical assistance that is available to the Olympic Games, and therefore might be receptive to having telemedicine as an integral component of their medical care delivery system.

At the conclusion of this initial meeting, it was agreed that the six members of the Alliance would hold additional meetings as necessary to identify candidate demonstrations for showcasing the capabilities of advanced telemedical technologies during the 1996 Olympic Games. Once these candidate demonstrations were identified, they would be presented to Dr. Cantwell of the 1996 Olympic Medical Commission, appropriate members of the ACOG, ARPA, and corporate sponsors for approval. It was also requested that Georgia Tech provide information on Olympic sporting events, venues, and plans for medical assistance for the next meeting of Alliance members. This meeting was scheduled for September 29, 1995.

The next meeting of Alliance members was held on September 29, 1995 at the Emory University School of Medicine, with representatives from all six Alliance members in attendance. Information on Olympic sporting events, venues, and plans for medical assistance was provided (see Appendix 1). The meeting began with an overview of four possible telemedicine demonstrations developed by Georgia Tech prior to the meeting. There followed a discussion of the widest possible range of potential medical scenarios, infrastructure requirements, technologies, audiences, foci, venues, time periods, etc. For example, one discussion considered an approach that involved conducting all demonstrations prior to the Games, video taping the demonstrations as they are conducted, and then using the tape to present the capabilities of telemedicine to invited audiences during the Games and to the Medical Commission following the Games. Advantages of this approach included the ability to plan and conduct demonstrations without concerns regarding approvals from the Olympic Medical Commission and ACOG, and without the crowds, confusion, etc. likely to exist during the Games. A contrasting discussion considered working closely with the Medical Commission and AOC to conduct demonstrations at venues during the Games, video tape the demonstrations as they are conducted, and use the video tape to showcase telemedicine's capabilities to the Medical Commission and AOC following the Games. Various other possibilities were discussed, but they consisted generally of combinations of features of these two approaches.

This meeting concluded with Alliance members feeling that there was a need for time to digest the information that had been exchanged, and then to meet again for the process of narrowing the range of possibilities. The next meeting was scheduled as an October 16, 1995 teleconference using Georgia's statewide, wide-bandwidth academic and medical video teleconferencing system.

On October 16, 1995, representatives of the six Alliance members met using the statewide teleconferencing capability. Information provided for guiding the discussions during this meeting is provided in Appendix 2. For the most part, this meeting was a continuation of the September 29, 1995 meeting in which widely ranging discussions continued regarding possible medical scenarios, infrastructure requirements, audiences, foci, venues, time periods, etc. The teleconference concluded with a agreement that a further meeting was necessary, and this meeting was scheduled as a audio teleconference on October 23, 1995.

The audio conference involving representatives of the six Alliance members was held on October 23, 1995. By the time this conference was held, Alliance members had thoroughly considered the various possibilities for telemedicine demonstrations associated with the Olympic Games, and a consensus regarding specific approaches and demonstrations began to emerge. Notes made during this audio teleconference were subsequently used to document these approaches and demonstrations in a format that could be used during the follow-on meeting that was scheduled for November 3, 1995. It was determined that the purpose of this follow-on meeting should be to propose these approaches and demonstrations to the corporate sponsors and solicit their approval.

SECTION 2

EFFORTS TO OBTAIN APPROVAL FOR TELEMEDICINE DEMONSTRATIONS

In conversations following the October 23, 1995 audio teleconference involving Alliance members, it was decided that approval of the approaches and demonstrations identified during that conference would be sought first from corporate sponsors. Upon receipt of their approval, ARPA, the Medical Commission, and the ACOG would be contacted for the purpose of obtaining additional approvals.

On November 3, 1995, representatives from each of the Alliance members met at the Georgia Baptist Medical Center with corporate representatives from AT&T, Panasonic, and IBM. In addition, Dr. Earl Claire of the Southeastern Technology Center in Augusta, GA attended this meeting. Dr. Claire's presence resulted from the fact that he and Dr. Dan Ward from Eisenhower Army Medical Center at Fort Gordon, GA had developed a proposal for using telemedicine to deliver veterinary care to horses at the equestrian event during the Olympic Games (see Appendix 3). They had also presented this proposal to AT&T with a request for corporate support. It was felt by AT&T representatives that support needed for telemedicine demonstrations proposed by the Alliance might be shared in some way with the needs requested for the equestrian event.

Preparation for the November 3, 1995 Alliance meeting included assembly of a handout that presented a summary of the telemedicine approaches and demonstrations that emerged from the October 23, 1995 meeting. These approaches and demonstrations are summarized as follows:

Approach #1: Conduct Telemedicine Demonstrations Prior to the Games

- o Identify medical and athletic sites/scenes similar in appearance and layout to selected Olympic events
- o Identify simulated medical scenarios and telemedicine demonstrations that could be conducted at these sites
- o Identify financial requirements needed to film the telemedicine demonstrations/medical scenarios and these sites/scenes
- o Present the filming plans and financial requirements to potential sponsors, and obtain necessary support
- o Film the sites/scenes and the medical scenarios/telemedicine demonstrations
- o Integrate the two films into a video presentation that depicts how telemedicine can enhance medical care delivery at events such as the Olympic Games
- o Provide this video to Alliance members and corporate officials, and arrange for its presentation during and after the Olympics
- o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine can be used to enhance medical care delivery during future Olympic Games

**Approach #2: Conduct Telemedicine Demonstrations at Olympic Sites
During the Games**

- o Identify Olympic and Olympic-related sites where the capabilities of telemedicine can be demonstrated during simulated medical scenarios
- o Identify simulated medical scenarios and telemedicine demonstrations to be conducted at these sites
- o Identify infrastructure, financial support, etc. necessary for conducting these demonstrations
- o Present the medical scenarios, telemedicine demonstrations, infrastructure requirements, financial needs, etc. to corporate officials from Olympic sponsors and to ARPA, and obtain the necessary support
- o Obtain approval of Olympic Officials to conduct the demonstrations at identified Olympic sites
- o Conduct and film the telemedicine demonstrations during the Olympic Games
- o Prepare a video presentation from the film and make it available to sponsors and Alliance members for advertising, public relations, program development, sales, etc. purposes
- o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine can be used to enhance medical care delivery during future Olympic Games

**Approach #3: Conduct Telemedicine Demonstrations in the New Georgia Center for
Telecommunications Technology (GCATT) Building During the Games**

- o Arrange Biomedical Interactive Technology Center space in the GCATT Building to simulate medical care delivery areas
- o Identify simulated medical scenarios and telemedicine demonstrations that can be conducted in the GCATT Building space
- o Identify infrastructure, financial support, etc. necessary for conducting these demonstrations.
- o Present the medical scenarios, telemedicine demonstrations, infrastructure requirements, financial needs, etc. to corporate officials and to ARPA, and obtain their support
- o Conduct and film the demonstrations during the Olympics
- o Prepare a video presentation from the film and make it available for advertising, public relations, program development, sales, etc. purposes
- o Invite VIP's, members of the media, corporate officials and potential customers, government and military officials, company employees, etc. to observe repeated demonstrations on a scheduled basis
- o After the Olympics, present the video to the Olympic Medical Commission, emphasizing how telemedicine can be used to enhance medical care delivery during future Olympic Games

Telemedicine Demonstration #1

Purpose:

To demonstrate the ability of telemedicine to deliver enhanced medical care to a foreign visitor who becomes ill while attending an event within the Olympic Ring

Assumptions:

- o Major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, and MSM) will be networked to each other and to the Student Health Services Center on the Georgia Tech (GIT) campus via wide-bandwidth (T-1), wired telecommunication pathways.
- o Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth video teleconferencing, and will be linked both to each other and to the wide-bandwidth telecommunications pathways that join the major medical centers.
- o The telemedicine system at the GIT Student Health Services Center will be located in one of the examination rooms and will support wide-bandwidth teleconsultations. This telemedicine system will be linked to the wide-bandwidth telecommunications pathways that join the major medical centers.
- o Military language translators will be available in the Student Health Services Center and at each of the major medical centers.
- o A person participating in the demonstration will pose as a foreign visitor who becomes ill in the spectator stands at an event within the Olympic Ring. The demonstration will begin with the transfer of this person into the Student Health Services Center examination room that is equipped with the telemedicine system.
- o All activities in the Student Health Services Center examination room will be filmed and narrated, beginning with the transfer of the ill foreign visitor to the examination room.
- o Medical professionals in the Student Health Services Center will examine the ill visitor, using the language translator to facilitate communications. A tentative diagnosis of the visitor's medical situation will be identified.
- o Medical professionals in the Student Health Services Center will desire to corroborate this diagnosis by consulting with medical specialists at two different major medical centers. The telemedicine system in the Student Health Services Center examination room will be linked via wide-bandwidth telecommunications pathways to first one, and then the other, Conference Room telemedicine systems in the major medical centers.
- o Using the two-way audio, video, and data capabilities of the telemedicine systems, the specialist in first one, and then the other, major medical center will consult with the medical professional in the Student Health Services Center while the ill visitor is further examined. During this further examination, the language translator will continue to be used to interact with the ill visitor.
- o The medical professional in the Student Health Services Center will provide a final diagnosis and specify an appropriate treatment.

Keywords:

Wired, wide-bandwidth telecommunication pathways linking major medical centers and the GIT Student Health Services Center; person posing as an ill foreign visitor; spectator stands at a venue within the Olympic Ring; Student Health Services Center near the spectator stands; language translator; telemedicine capabilities at two locations within each major medical center; telemedicine system in one examination room of the Student Health Services Center.

Legacy:

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via wired pathways, to quality, cost-effective medical care at the point-of-need.

- o wired, wide-bandwidth (T-1) telecommunication pathways linking major medical centers and the GIT Student Health Services Center,
- o telemedicine system at two locations within each major medical center,
- o telemedicine system in one examination room in the Student Health Services Center, and
- o foreign language translation capability at major medical centers and at the Student Health Services Center.

Telemedicine Demonstration #2

Purpose:

To demonstrate the ability of a mobile telemedicine system to deliver enhanced medical care to a spectator injured while attending an Olympic event at a remote venue.

Assumptions:

- o A van-mounted telemedicine system that supports wireless, wide-bandwidth video teleconferencing will be available at a selected remote venue, and will be linked via a wireless, wide-bandwidth (T-1) pathway to a telecommunications node located at one of the major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, and MSM).
- o The wireless telecommunications node at one of the major medical centers will provide wired access to the other non-node major medical centers; thereby providing wireless, wide-bandwidth connectivity between the mobile van and all major medical centers.
- o Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth, wireless video teleconferencing, and will be linked both to each other and to the telecommunications node that provides wireless access to the telemedicine system in the mobile van. (These telemedicine systems will be the same as those used in Demonstration #1, assuming both demonstrations are approved and funded.)
- o A person participating in the demonstration will pose as a spectator that has sustained multiple traumatic injuries while at the remote venue. The demonstration will begin with this person being transferred into the mobile van.
- o All activities in the mobile van will be filmed and narrated, beginning with the transfer of the person posing as an injured spectator into the van.

- o In the mobile van, on-site medical professionals will provide initial care while using the audio, video, and data capabilities of the van's wireless telemedicine system to consult with medical professionals at selected major medical centers.
- o It will be determined, as a result of consultations using the wireless telemedicine link, that the injured spectator can not be adequately treated on-site, and therefore must be transported to a major medical center. Throughout transport to the selected major medical center, medical professionals in the van will administer telemedically-proctored medical care.
- o As a result of the on-site and en-route teleconsultations, appropriate medical care will have been delivered to the injured spectator prior to arrival at the major medical center. Medical professionals at the major medical center will therefore be fully prepared to continue treatment upon arrival of the injured spectator.

Keywords:

Spectator with multiple traumatic injuries; remote venue; wireless wide-bandwidth link to, and between, major medical centers; telemedical proctoring during transport to major medical center

Legacy:

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via wireless pathways, to quality, cost-effective medical care at the point-of-need.

- o wireless, wide-bandwidth (T-1) telecommunication link between major medical centers,
- o a van-mounted mobile telemedicine system, and
- o a telecommunications node at a major medical center to support the delivery of medical care over wide geographical areas.

Telemedicine Demonstration #3

Purpose:

To demonstrate the ability of a kiosk-based telemedicine system to deliver enhanced medical care to a foreign visitor who is on a doctor-prescribed medication and becomes ill in a highly-congested public recreation area near the Olympic events.

Assumptions:

- o A telemedicine kiosk with a wired, moderate-bandwidth (1/4 T-1), two-way audio, video, and data link to major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, MSM) will be available in the Olympic Centennial Park. This kiosk will support the remote monitoring of a basic array of physiological parameters and will be equipped to accept SmartCards as a means of patient access and information exchange.
- o The major medical centers will have a distributed system of desktop-mounted, PC-based telemedicine systems that link medical subspecialists in their offices. Language translators will be available in the major medical centers and at the doctor's offices.

- o The major medical centers will also have available a wireless, wide-bandwidth (T-1) telemedicine link to the CDC.
- o A person participating in the demonstration will pose as a foreign visitor who becomes ill while enjoying recreation in the Olympic Centennial Park. This ill visitor will be taking an obscure drug prescribed by a medical doctor in their country-of-origin, and will have no experience with telecommunications-based medical care delivery. Additionally, this person will have basic personal information and medical records on a SmartCard.
- o The telemedicine kiosk will be used by the ill visitor to access medical assistance at one of the major medical centers. Accessing this medical care will be initiated by use of the SmartCard, and will be aided by the availability of multi-language instructional coaching provided via the kiosk.
- o Medical subspecialists will interview the ill visitor telemedically, and will desire to seek the opinion of a specialist in one of the other major medical centers. With the ill visitor on-line, the second specialist will be accessed using the wide-bandwidth telecommunication link between major medical centers. Following discussions with the first specialist and an interview with the ill visitor, the second specialist will endorse the first specialist's conclusions. This endorsement will include a recommendation that medical professionals at CDC be consulted regarding the drug the ill visitor is taking.
- o Medical professionals at CDC will be consulted regarding the drug the ill visitor is taking, and will provide guidance relative to drug-drug interactions, etc.
- o The demonstration will conclude with the ill visitor being advised obtain rest, and seek additional medical assistance if symptoms persist.

Keywords:

Foreign visitors taking doctor-prescribed drugs becomes seriously ill; Olympics-related recreational area; telemedicine kiosk; SmartCard technology; wired, moderate-bandwidth link between kiosk and major medical centers; wireless link between major medical centers and CDC; language translation; distributed desktop telemedicine capability.

Legacy:

A technically-advanced, telecommunications-based system that provides rapid and convenient access, via a kiosk capability, to quality, cost-effective medical care for persons in public areas.

- o telemedicine kiosk with wireless communications and SmartCard capability,
- o moderate-bandwidth telecommunication links between a principal public area and major medical centers,
- o wireless, wide-bandwidth telemedicine link to the CDC, and
- o foreign language translation capability at major medical centers and the CDC.

Telemedicine Demonstration #4

Purpose:

To demonstrate the ability of telemedicine with cellular linkages to deliver effective medical care in emergency situations involving multiple traumatic injuries.

Assumptions:

- o An emergency medical vehicle and a MedFlight helicopter equipped with portable, moderate-bandwidth telemedicine capabilities will be available, and will be linked via cellular pathways to major medical centers with which Alliance members are associated (EAMC, EU, GBMC, MCG, MSM).
- o A mini-van transporting foreign visitors attending the Olympic Games is involved in a serious vehicular accident, resulting in a variety of life-threatening injuries to several persons.
- o The emergency medical vehicles and MedFlight helicopter equipped with portable telemedicine capabilities will be dispatched to the accident site. These vehicles will also have language translators onboard
- o At the accident site, persons participating in the demonstration will pose as foreign visitors that have received various traumatic injuries. The demonstration will begin with the arrival of the emergency medical vehicles and helicopter.
- o Medical professionals associated with the emergency medical vehicles and the helicopter will use the language translators and portable telemedicine capabilities to consult with the injured visitors and medical specialists at the major medical centers regarding stabilization of the injured persons. Within the major medical centers, the medical specialists will be accessed via a distributed system of desktop-mounted, PC-based telemedicine units in their hospital and home offices.
- o Following stabilization at the accident site, the injured visitors will be transported in the emergency medical vehicles and MedFlight helicopter to Emergency Rooms in selected major medical centers.
- o During transport, the language translators and portable telemedicine capabilities will be used to continuously transfer medical updates on the injured visitor's medical status to the major medical centers. As a result, Emergency Room medical professionals will be fully ready to administer appropriate care upon arrival of the emergency vehicles and the helicopter.

Keywords:

Vehicular accident resulting in multiple traumatic injuries; portable telemedicine capabilities in emergency medical vehicles and MedFlight helicopter; cellular telecommunications links; distributed desktop-mounted telemedicine units;

Legacy:

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via a portable wireless capability, to quality, cost-effective medical care in emergency situations.

- o portable telemedicine capability at major medical centers and
- o emergency medical vehicles and MedFlight helicopters equipped with portable telemedicine capabilities.

During the November 3, 1995 meeting, the above approaches and demonstrations were presented in detail to corporate sponsors of the 1996 Olympic Games. The following decisions resulted:

- o Regarding approaches to the demonstrations, it was decided that a combination of the three approaches should be pursued based on approval from the Olympic Medical Commission, ACOG, and ARPA. When structuring these combinations of approaches, emphasis should be placed on demonstrations at the venues during the Games and at the new GCATT building during the Games.
- o The demonstrations should be video taped, and the video tapes made available for purposes such as presentations to the Olympic Medical Commission, publicity and marketing, program development, etc. Scenes, as appropriate, should be taped prior to the Games for splicing into the tapes filmed during the Games.
- o Corporate representatives from AT&T and Panasonic enthusiastically endorsed the combination of approaches to the demonstrations and urged quick presentation to the Medical Commission and ACOG. The IBM representative felt that the ideas presented should be reviewed internally by IBM management before they could provide a formal response.
- o No decision was reached regarding sharing resources required in demonstrations proposed by the Alliance with demonstrations proposed by Drs. Claire and Ward for the equestrian event; however, it was noted that resources such as the mobile van equipped with a telemedicine capability and used for the demonstration proposed by the Alliance could be made available for use at the equestrian event.
- o It was agreed that a meeting with the Medical Commission (Dr. Cantwell) and appropriate officials from ACOG should be arranged for the earliest possible date, and Dr. Ramshaw of the Georgia Baptist Medical Center was asked to assume responsibility for arranging these meetings. Approval to proceed should be sought during these meetings, and with these approvals, a meeting with ARPA representatives should be arranged for the purpose of obtaining sponsor approval, and hopefully funding, to proceed.
- o Following approval from the corporate sponsors, the Medical Commission, ACOG, and ARPA, it was agreed that individual Alliance members will assume responsibility for particular demonstrations. This would include completing the definition of the demonstrations by adding needed detailed procedures and defining financial support needs. Detailed plans and financial needs for each demonstration would then be presented to prospective sponsors, including Olympic corporate sponsors and ARPA.
- o It was agreed that an initial effort should be made to develop an estimate of the worst-case total cost required to conduct the four proposed demonstrations. Alliance members from Georgia Tech agreed to develop a worst-case cost estimate with the following

understandings: (1) the Georgia Tech proposal format would be used for initial convenience, but could be changed before a formal proposal was submitted to a prospective sponsor, (2) time estimates for each task would be based on the assumption that all efforts were to be undertaken by Georgia Tech personnel, and this also could be changed later, (3) time estimates would assume that no volunteer labor, such as might later be available from corporate sponsors, was available, (4) it would be assumed that all equipment had to be purchased rather than loaned or donated by corporate sponsors, (5) equipment purchased for one demonstration could be used on other demonstrations if time conflicts did not prohibit, (6) it would be assumed that all telecommunications infrastructure would be loaned or donated by corporate sponsors, (7) Georgia Tech's labor categories, labor rates, and fringe benefit rates would be used but would change later as labor from other sources was introduced, and (8) Georgia Tech's indirect cost rate would be used but would change later as other organizations contributed to the effort.

- o It was agreed that individual members of the Alliance should establish contacts with Olympic corporate sponsors other than AT&T, Panasonic, and IBM. It was hoped that these other sponsors (for example, Coca Cola, Delta Airlines, Kodak, Motorola, etc.) would have an interest in the use of telemedicine to enhance the delivery of medical care within their organizations; therefore, the Olympic demonstrations would provide an opportunity to gain useful insights into telemedicine's capabilities at various levels of technology.

Following the November 3, 1995 meeting, efforts began at Georgia Tech on the development of a worst-case cost estimate for conducting the four demonstrations summarized above. These efforts yielded an unofficial document designated Georgia Tech Draft Proposal No. BEC-1602 and dated November 30, 1995 (see Appendix 5). This draft document was then unofficially forwarded to Dr. Rick Satava of ARPA with a request for his thoughts regarding (1) the appropriateness of proposed demonstrations and (2) the possibility that ARPA might fund the proposed demonstrations. Unfortunately, this document was thought to be a formal Georgia Tech response to an ARPA-sponsored program of research and development set forth in BAA 94-14 titled "Advanced Biomedical Technology" and issued January 27, 1994. Consequently, Dr. Satava officially reviewed the draft proposal and provided formal comments in a memorandum dated January 17, 1996 (see Appendix 4). In summary, these comments expressed concern (1) that too much commercial, off-the-shelf equipment, as opposed to cutting-edge technologies such as ARPA-developed Personal Status Monitors, Language Translators, and Head-Mounted Displays, was proposed, (2) that demonstrations of, rather than actual, medical care delivery was proposed, and (3) there was insufficient indication that an advanced telemedical system would be put in place, used during the Olympic Games, and then left for continuing use; therefore, ARPA funding would not be available unless proposed efforts were significantly revised.

Upon receipt of the response from Dr. Satava, another meeting of Alliance members was arranged for January 26, 1996. In conversations with Alliance members prior to this meeting, a summary of the ARPA response to the draft proposal was provided. At the meeting, it was generally concluded that the limited time available before the Olympic Games would not permit

a significant revision of the technologies identified in the planned efforts, and that ARPA funding would therefore most likely not be available. In arriving at this conclusion, it was recognized that (1) telemedicine demonstrations during the Olympic Games would have to be funded by a combination of organizations consisting of Alliance member organizations and Olympic corporate sponsors interested in telemedicine and (2) this would almost certainly mean a scaling back of planned efforts. To assist in defining the scaled-back efforts, a matrix was developed and used to identify possible telemedicine demonstrations as a function of anticipated outcomes, minimum equipment requirements, minimum infrastructure requirements, demonstration locations, hardware and software available from corporate sponsors, and Alliance members to be involved in each demonstration. As this matrix was being filled out, corporate sponsor representatives began to identify additional requirements that would have to be met if their funding support were to be made available. With the exception of the following two requirements from corporate sponsors, acceptable solutions were found for the other corporate needs:

- o during the Games, infrastructure, equipment, etc. provided by the corporate sponsors would have to be used to deliver actual medical care to real patients rather than demonstrations using medical protocols with simulated patients and
- o following the Games, infrastructure, equipment, etc. provided by corporate sponsors must continue to be used, on a revenue-generating basis, to deliver actual medical care to real patients.

Implications of these requirements were many. For example, using telemedicine to deliver actual medical care to real patients introduced issues related to medical liability and malpractice, staffing of and floor space for telemedicine equipment in medical facilities, the generation of medical protocols to be followed during care delivery, approvals from Institutional Review Boards, the probability that patients would present at sites where appropriate telemedicine equipment and staff were available, etc. With regard to post-Olympic use of telecommunications infrastructure on a revenue-generating basis, assurances were difficult to secure without firm identifications of the infrastructure that would be available and the monthly fee that would be charged for its use.

The meeting concluded without an agreement on scaled-back telemedicine demonstrations and with no identification as to how arrangements could be worked out to comply with the above two corporate-sponsor requirements in the time remaining before the Games. A date of February 16, 1996 was set for the next meeting.

The February 16, 1996 meeting was conducted primarily by representatives from AT&T, Panasonic, IBM, and Kodak. Modified versions of the four demonstrations developed earlier were presented by Alliance members, but were considered only briefly. Ultimately, the corporate sponsors concluded that AT&T would work with a selected Alliance member (most likely Emory University School of Medicine) to provide a mobile van for use in delivering actual medical care to real patients at selected Olympic venues. A schedule of van availability at venues would be worked out with AOC, and AT&T employees would fill all non-medical personnel positions. In

addition, AT&T would provide the necessary telecommunications infrastructure, a telemedicine-equipped van from an Oklahoma location, and local housing for out-of-state AT&T personnel. The van would also be used to provide telemedicine support for veterinary care at equestrian events being planned by the Southeast Technology Center and the College of Veterinary Medicine at the University of Georgia. Panasonic would work independently with a selected Alliance member (most likely the Georgia Baptist Medical Center) to provide desktop video teleconferencing units for use in delivering actual medical care to real patients at selected venues and at selected sites such as hotels and local corporate facilities. Kodak would independently provide a state-of-the-art imaging capability to support a teleradiology link between the Olympic Health Services Center and West Paces Ferry Hospital.

This transfer of leadership of the Olympic telemedicine project from the Alliance to corporate sponsors assured that multi-million dollar sponsorship fees were protected, i.e., ambush marketing would be precluded and telemedicine-related materials for audio and video dissemination were available as needed during the Games. There was no agreement that results from the corporate-directed telemedicine efforts would be available for reporting to ARPA or for presentation to officials of future Olympic Games.

SECTION 3

SUMMARY OF EFFORTS

During the nine-month period from September 8, 1995 through May 30, 1996, seven formal meetings of the six-member Southeast Telemedicine Alliance were held for the purpose of discussing and planning means by which the capabilities of advanced telemedicine systems could be showcased during the 1996 Olympic Games. In addition, meetings were held with the Chair of the Medical Commission for the 1996 Games and with representatives of the Atlanta Committee for the Olympic Games. At various times, these meetings included representatives from selected corporate sponsors of the 1996 Games (AT&T, Panasonic, IBM, Kodak), medical planners for the 1996 Paralympic Games that followed the 1996 Olympic Games, and the Southeast Technology Center in Augusta, GA. At these meetings, various approaches for showcasing telemedicine's capabilities were considered, resulting ultimately in the generation of a draft proposal outlining four telemedicine demonstrations in detail. These demonstrations included

- o telemedicine systems at four different technology levels,
- o a combination of wired and wireless transmission media,
- o visitor, spectator, and VIP "patients" at local and remote venues,
- o fixed and van-mounted equipment configurations,
- o advanced technologies in the form of kiosks with the ability to remotely diagnose patients by monitoring six basic biological parameters, ARPA-developed language translators, etc., and
- o broad, moderate, and narrow bandwidth telecommunication infrastructures linking civilian and military, public and private, teaching and research, and educational and non-educational organizations.

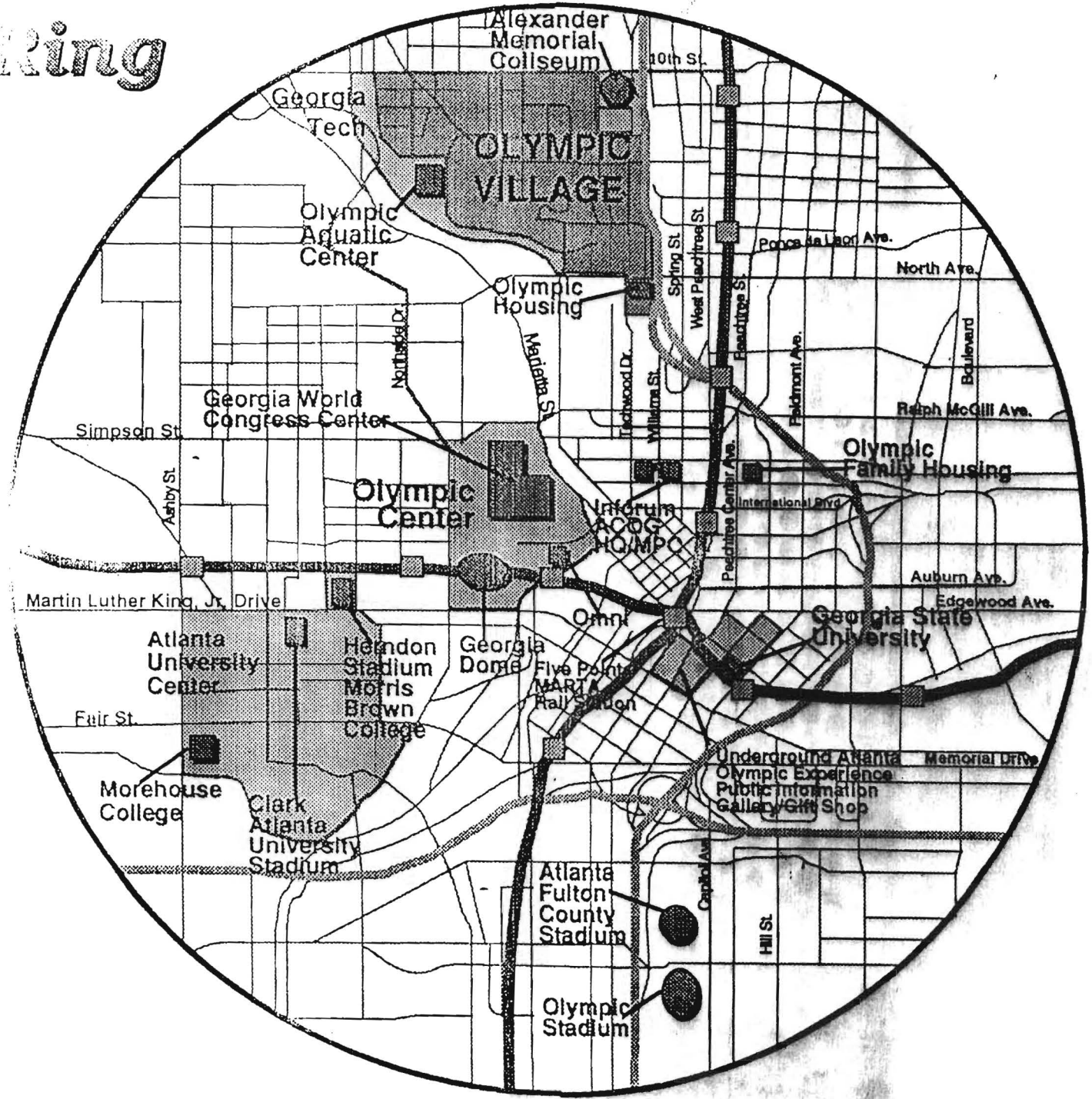
During the ARPA review, the proposed demonstrations were identified as requiring major revision because the level of technology in the telemedicine systems was insufficiently advanced. The review by corporate sponsors resulted in additional requirements that (1) the proposed demonstrations would have to include actual medical care delivery to real patients during the Games and (2) an agreement that infrastructure installed for the Games would be used on a revenue-generating basis following the Games.

As Alliance members considered how to respond to these requirements in the time remaining before the Games, the corporate sponsors arranged several independent demonstrations that would showcase their telemedicine capabilities while protecting their financial investments in the Games. Plans for these demonstrations were discussed at the last meeting of the Alliance,

where it was accepted that the corporate-sponsored demonstrations circumvented the demonstrations being planned by the Alliance under this project. No details relative to the corporate-sponsored telemedicine demonstrations were available prior to the Games and no reports of telemedicine demonstrations have been available since the Games.

APPENDIX 1
INFORMATION ON OLYMPIC SPORTING EVENTS, VENUES
AND PLANS FOR MEDICAL ASSISTANCE

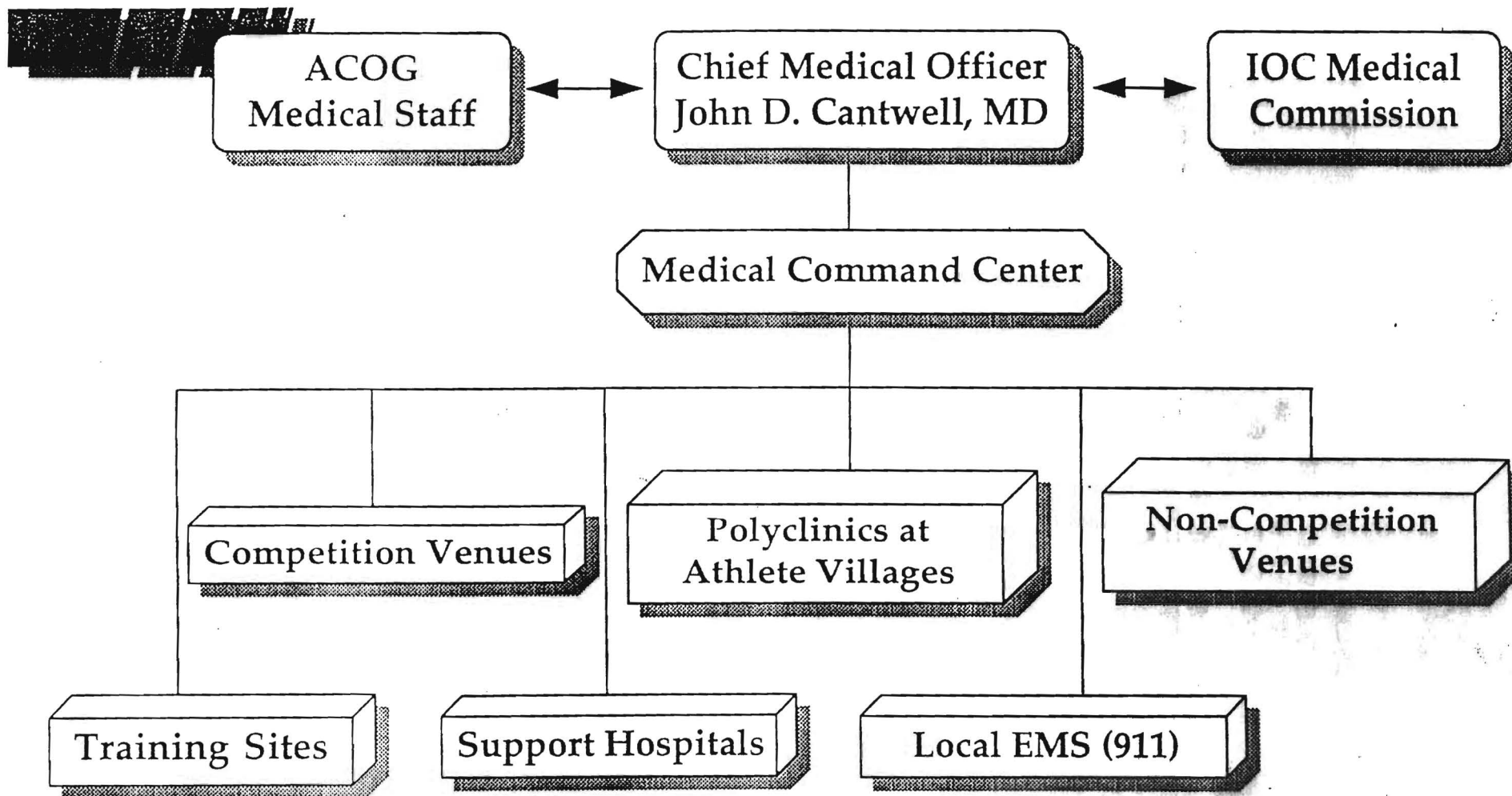
Olympic Ring



MEDICAL SERVICES

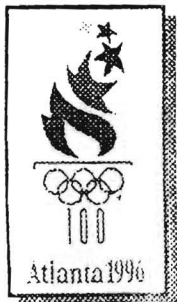
- ☆ To provide primary and emergency health care for athletes and the Olympic Family at all competition, training and event sites.
- ☆ To provide first aid and emergency care for all spectators at competition and event sites.





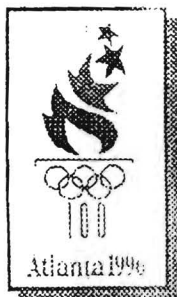
MEDICAL SERVICES INCLUDES:

- ☆ **First Aid and emergency facilities at the competition venues and training sites**
 - ☆ **Polyclinics at villages**
 - ☆ **Doping control**
 - ☆ **Gender testing**
 - ☆ **Medical services at non-competition venues**
 - ☆ **Support hospitals**
 - ☆ **Medical Command Center**
-

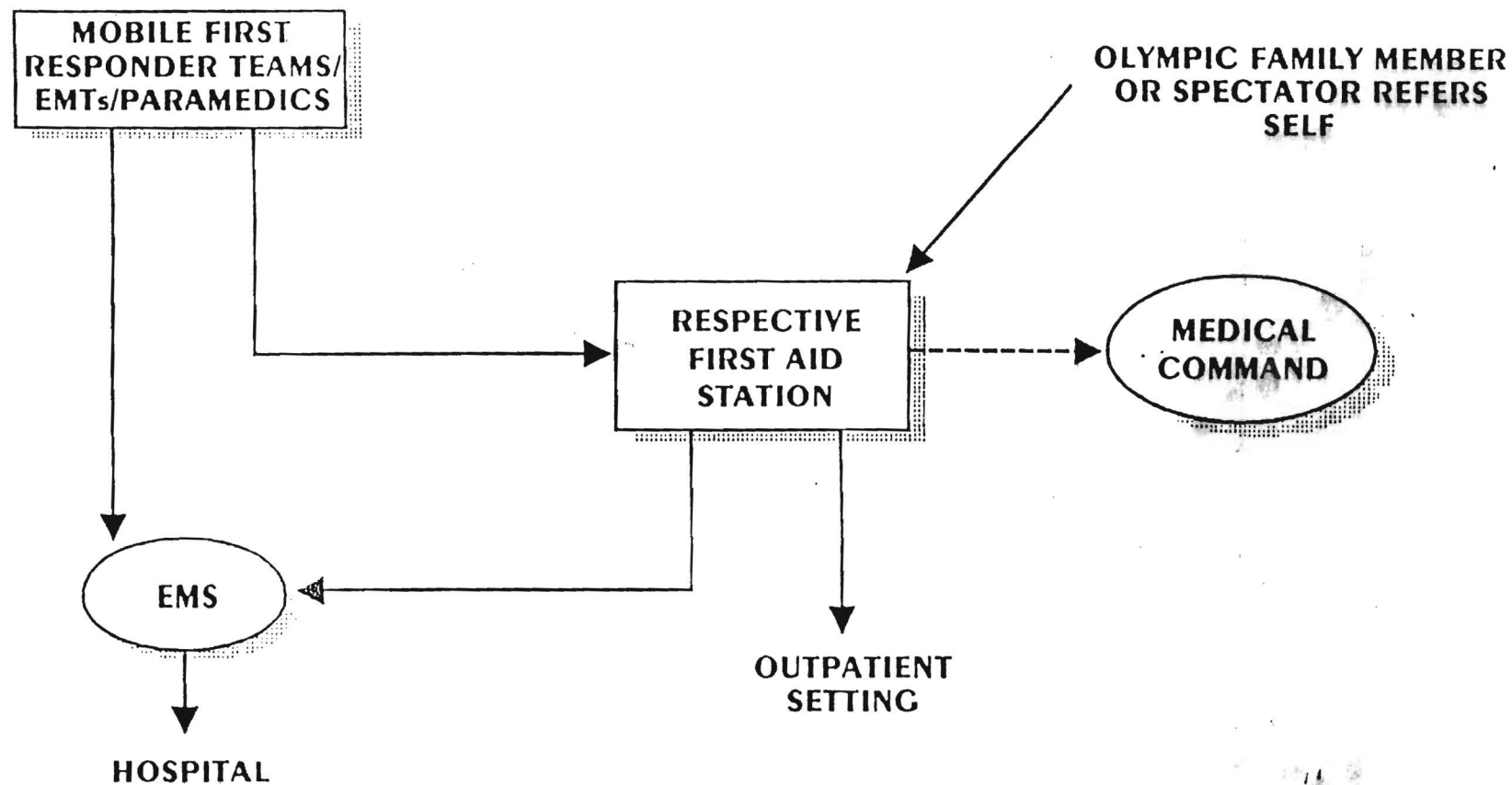


POLYCLINIC

- ☆ **Main Polyclinic at GA Tech Health Center**
 - ☆ **24 hour primary care and emergency coverage 7/5 - 8/7**
 - ☆ **Other Polyclinics located at remote sites**
 - ☆ **Services provided include physician evaluation and treatment, dentistry, x-ray, pharmacy, laboratory, physical therapy, massage therapy, and athletic training.**
-



OLYMPIC FAMILY & SPECTATOR MEDICAL CARE



Sporting Events & Venues

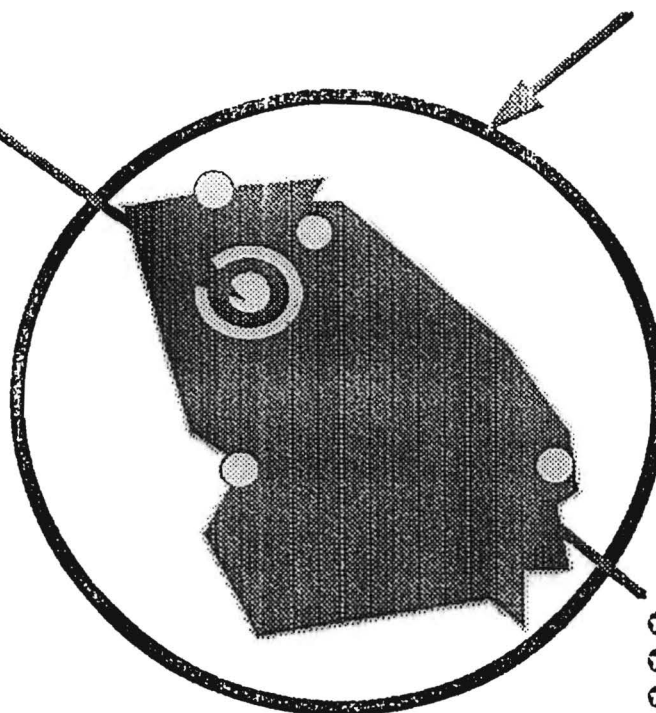
8

Outside 60 Mile Radius

20

Within Olympic Ring

- ⊛ Athletics (Olympic Stadium)
- ⊛ Badminton (Georgia State University)
- ⊛ Baseball (Atlanta-Fulton County Stadium)
- ⊛ Basketball (Georgia Dome)
- ⊛ Basketball (Morehouse/AUC)
- ⊛ Boxing (Georgia Tech)
- ⊛ Fencing (Georgia World Congress Center)
- ⊛ Gymnastics - Artistic (Georgia Dome)
- ⊛ Handball (Georgia World Congress Center)
- ⊛ Hockey (Clark Stadium)
- ⊛ Hockey (Herndon Stadium)
- ⊛ Judo (Georgia World Congress Center)
- ⊛ Marathon (City of Atlanta)
- ⊛ Race Walk (City of Atlanta)
- ⊛ Swimming/Diving (Georgia Tech)
- ⊛ Table Tennis (Georgia World Congress Center)
- ⊛ Volleyball (Omni)
- ⊛ Water Polo (Georgia Tech)
- ⊛ Weightlifting (Georgia World Congress Center)
- ⊛ Wrestling (Georgia World Congress Center)



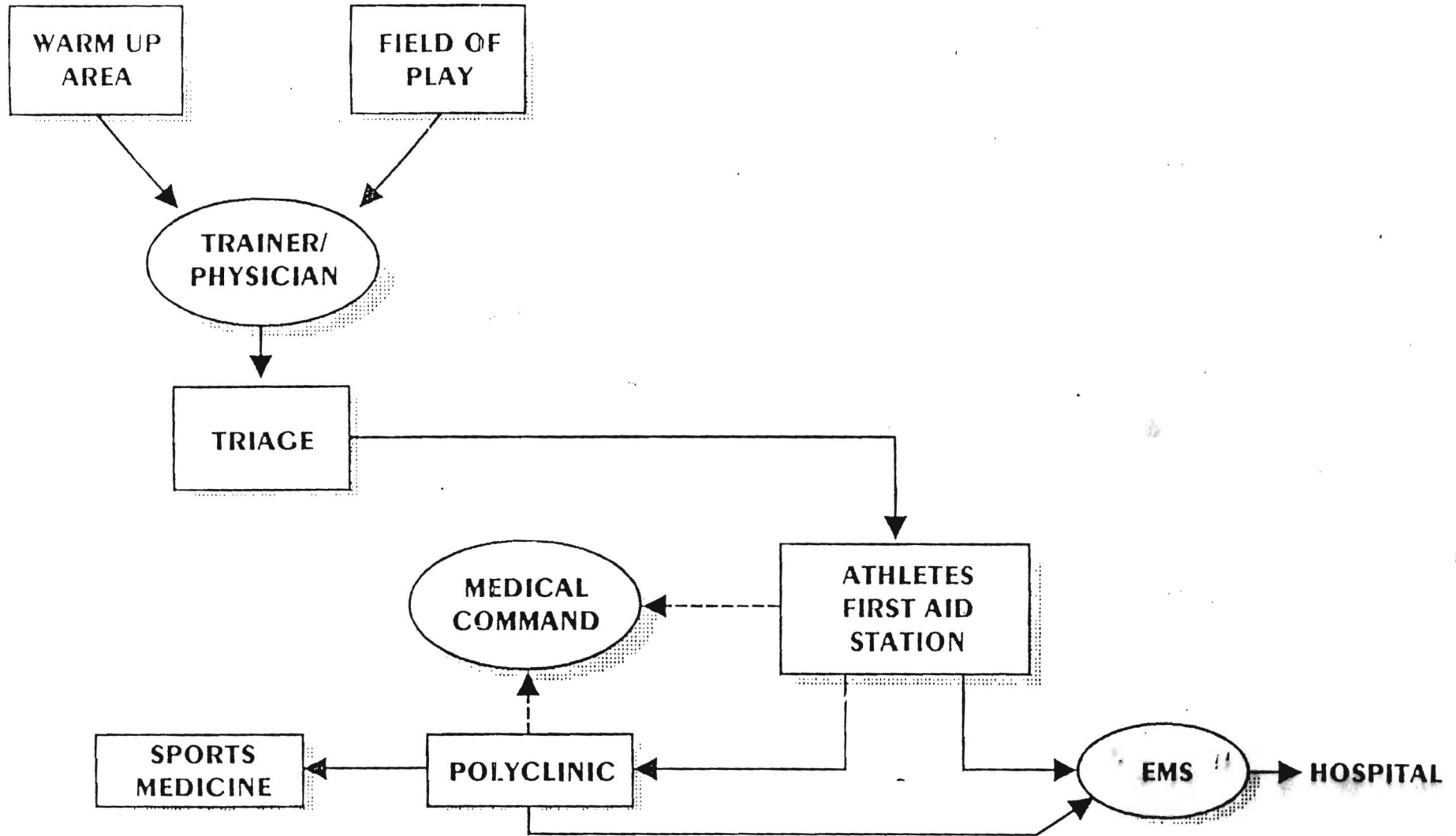
- ⊛ Canoe/Kayak-Slalom (Ocoee River, TN)
- ⊛ Football Preliminaries (Birmingham, AL ● Miami, FL, ● Orlando, FL ● Washington, DC)
- ⊛ Softball (Columbus)
- ⊛ Volleyball Preliminaries (Athens)
- ⊛ Yachting (Savannah)

13

Within 60 Mile Radius

- ⊛ Archery (Stone Mountain)
- ⊛ Beach Volleyball (Clayton County)
- ⊛ Canoe/Kayak-Sprint (Lake Lanier)
- ⊛ Equestrian (Conyers)
- ⊛ Football Finals (Athens)
- ⊛ Modern Pentathlon (Various Sites)
- ⊛ Mountain Biking (Rockdale County)
- ⊛ Road Cycling (Buckhead)
- ⊛ Rowing (Lake Lanier)
- ⊛ Shooting (Wolf Creek)
- ⊛ Tennis (Stone Mountain)
- ⊛ Track Cycling (Stone Mountain)
- ⊛ Volleyball (Athens)

ATHLETES MEDICAL CARE



NON-COMPETITION VENUES

☆ Include:

- Airport
- Cultural Olympiad
- International Broadcast Center
- International Zone of Athlete Village
- Main Press Center
- Olympic Family Hotels
- Transportation Hubs
- Youth Camp

☆ Level of service will be dependent on risk and audience



APPENDIX 2

GUIDELINES FOR OCTOBER 16, 1995 MEETING OF THE SOUTHEAST TELEMEDICINE ALLIANCE VIA VIDEO TELECONFERENCE

INFORMATION FOR THE VIDEO TELECONFERENCE MEETING
OF THE
SOUTHEAST TELEMEDICINE ALLIANCE

October 16, 1995
2:00 PM
Room G758, Emory University Hospital

1. The meeting purpose is to make decisions regarding plans for telemedicine demonstrations to be simulated and filmed during the 1996 Olympic Games. (Reference: Proposal No. BEC-1506 titled "Feasibility Study for Demonstrating Telemedicine Capabilities During the Games of the XXVIth Olympiad", funded by ARPA for a six-month period beginning August 9, 1995)
2. The purpose of the simulated/filmed demonstrations is to provide a video presentation that shows how the capabilities of telemedicine can be used to enhance the delivery of medical care at events such as the Olympic Games.

It is not the purpose of the filmed demonstrations to show Georgia's telemedicine capabilities, or the telemedicine capabilities of one or two technologies, or the capabilities of individual Alliance members, etc.

3. Conversations with Dr. John Cantwell, the Chair of the Medical Commission for the 1996 Olympics, indicate that no plans should be made that include interacting with the athletes, coaches, judges, etc. Instead, plans should include interacting with spectators, visitors, film crews, etc.

This situation may change somewhat for the remote venues, and there may also be a different view by the Paralympic officials if we become involved with them. But, in general, plans should be for scenarios involving spectators, visitors, etc. in locations such as recreation areas, business areas, medical facilities, etc.

4. Since we can't schedule our filming by waiting for a spectator, visitor, etc. to need medical assistance, simulated needs will be filmed. Therefore, plans should be made in which persons with simulated medical needs are filmed.
5. The major benefit we get from undertaking this effort is the telemedicine legacy that will exist following the Olympics. This legacy will be primarily infrastructure in nature, and can consist of such things as wired and wireless telecommunications links between medical centers, state-of-the-art telemedical equipment, perhaps a mobile telemedicine capability, improved telemedical capabilities for med-flights, etc.

Secondary benefits for us will be the video presentation that can be used by individual Alliance members for various purposes (program development, for example) funding for

projects from which we can learn more about telemedicine capabilities ourselves, the opportunity to work together through the Alliance, etc.

6. The primary target audience for the video presentation is officials, specifically including the Medical Commissions, for future Olympic Games. Secondary audiences include the internal and external groups, organizations, etc. to whom individual members of STA might want to present the video.
7. There are some definite advantages to filming the majority of the presentation during, rather than before and/or after, the Olympics. These advantages are related to audience interest in events that actually occurred during the Olympics, and the authenticity added to the point being made by the presentation if filming is done during the Olympics. We know that the project sponsor was particularly attracted to the idea of "showing telemedicine's capabilities during the Olympics". This doesn't preclude having "introductory" or "concluding" material filmed apart from the Olympics and spliced to the presentation for purposes of overview, cohesion, summary, etc.

Having said all this, it is recognized that circumstances may dictate that some or all filming be done independent of the Olympics, and if that's the way it has to be, then we will do it that way.

APPENDIX 3

**PROPOSAL FOR TELEMEDICINE DEMONSTRATIONS
AT THE EQUESTRIAN EVENT**

February 27, 1996

Dr. Daniel Sudnick

AT&T

Voice: (202) 776-6530

Fax: (202) 776-6639



Dear Dr. Sudnick,

Attached for your consideration is a revised draft of our Televeterinary Medicine Proposal. While an initial version of this proposal has been included as a unit of the overall telemedicine proposal being submitted by the Georgia Institute of Technology on behalf of the Southeast Telemedicine Alliance and us, it can also be performed and completed as an independent task.

The ACOG-designated Head Veterinarian for the Olympic Equestrian Events has already enthusiastically approved this application of telemedicine to events at the Georgia International Horse Park (GIHP). Note that this is not structured as a demonstration. Rather, it is an explicit application of telemedicine to provide the highest level of health care to the equine athletes.

This application has the potential to stimulate interest in establishing permanent telemedicine facilities at both the GIHP and the University of Georgia College of Veterinary Medicine Teaching Hospital as a legacy for improved veterinary health care throughout the states of Georgia, and South Carolina, as well as contiguous regions of Tennessee, and Alabama. In addition, there is tremendous potential for stimulating interest in establishing permanent telemedicine facilities at zoos throughout the world to connect the zoos with the veterinary hospitals worldwide.

We will appreciate your comments on this proposal as soon as possible. We hope that you and AT&T will be able to support this proposal with both funds and equipment. Please contact either Dr. John Church or me at 706-722-3490 if you have any questions or would like additional information.

Very truly yours,

Earl J. Caire

Executive Director/CEO

CC: Dr. Keith Prasse, Univ. of Ga.
Dr. Daniel Ward, U.S. Army Eisenhower Medical Center
Mr. Bill Winship, AT&T
Mr. Jim Foler, GIT
Dr. John P. Church, STC

706-722-3490

Augusta, Georgia 30204

706-722-3490

DRAFT PROPOSAL

**"TELEVETERINARY MEDICINE APPLICATION
TO SUPPORT THE EQUESTRIAN EVENTS AT
THE 1996 OLYMPICS"**

Prepared By:

University of Georgia College of Veterinary Medicine

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U. S. Army Center for Total Access, Eisenhower Medical Center

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Southeastern Technology Center

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"TELEVETERINARY MEDICINE DEMONSTRATION TO SUPPORT THE EQUESTRIAN EVENTS AT THE 1996 OLYMPICS"

SUMMARY

Telemedicine has an immediate and important application to link the Olympic Equestrian venue to the official referral hospital at the University of Georgia College of Veterinary Medicine at Athens, Georgia. The Olympic Equestrian veterinarians already plan to use the above referral hospital staff extensively on any serious problems. Telemedicine technology can dramatically decrease the response time for such consultations and will provide the highest quality of healthcare for the equine athletes. This technology will be used to transmit radiographic, ultrasonographic, and thermographic images and to enhance the use of onsite cytological and endoscopic examinations.

INTRODUCTION

The 1992 Olympic Games in Barcelona were remarkably successful except for the criticism received regarding the Equestrian Events. It is anticipated that climate conditions for the 1996 Olympic Games may provide an even more severe test for the Equestrian Events. Therefore, this proposal is intended to enhance the level of veterinary care available to participants in the 1996 Equestrian Events by using advanced telemedicine systems to provide immediate, real-time, access to the expertise of the University of Georgia College of Veterinary Medicine.

The equestrian events in the 1996 Olympic games will be held at the Georgia International Horse Park (GIHP) in Conyers. These events include some of the most demanding of all sporting disciplines, requiring horses to demonstrate speed, agility, jumping ability and endurance. Veterinarians involved in the 1996 Olympic games fully expect that the physically taxing effects of these events will be greatly exacerbated by the heat and humidity characteristic of Georgia summers. Such increased stress can produce devastating results in some horses as occurred at the games in Barcelona.

To prevent a recurrence of such terrible results, considerable effort has been spent to develop methods of reducing the effects of heat and humidity on horses during the competition, to develop an onsite area for evaluating and treating horses at the GIHP, and to establish a sound relationship with the clinicians at the official referral hospital for the 1996 Equestrian Events. Horses that require diagnostic, therapeutic, or surgical procedures not available at the GIHP will be referred to the Veterinary Teaching Hospital. This hospital is at the University of Georgia in Athens, and is about 50 miles from the GIHP at Conyers.

The technologies presently being used in telemedicine can substantially enhance the transfer of information between Conyers and Athens, thereby markedly improving the quality of veterinary care available during the Olympics. Rather than rely on telephone communication, clinicians in Athens could, in real time, view images of horses in question, evaluate physiologic recordings (e.g., heart and respiratory sounds), and evaluate diagnostic images (e.g., radiographic, ultrasonographic and endoscopic images). This would vastly improve communication between the two sites and allow the university clinicians to have a role in the discussions and decisions at the Olympic venue, thereby improving the quality of treatment being given the horses.

BACKGROUND

Telemedicine is a rapidly emerging field with enormous potential for:

- 1) Improved medical care in terms of both quality and timeliness for both civilian and military personnel.
- 2) Reduced cost, and greatly reduced time required, for consultations with specialists.
- 3) Humanitarian assistance with the ability to provide medical care to remote areas.
- 4) Economic development with the emergence of new industries, product lines, and the provision of communication services to provide telemedicine enhanced health care.

Televeterinary medicine, the application of telemedicine systems for the care of animals, has identical potential. In fact, televeterinary medicine has particular relevance because of the relatively few large-animal hospitals in the country. Because most of these hospitals are associated with teaching facilities, and are thus sited near universities, they are located at relatively long distances from most of the potential patients. A particularly useful application for televeterinary is at zoos where a telemedicine equipped examination room can provide access to specialists from all over the world. In this way a zoo can provide unexcelled health care to exotic and rare animals at minimal sustained cost.

The equestrian events at the Olympic games provide an outstanding opportunity to showcase new communication technologies and the application of these technologies to veterinary medicine in general and equine veterinary practices in particular. In equine veterinary practice, physical examinations are of greatest importance in evaluating the animal, while diagnostic procedures are largely limited to those that can be accomplished on the client's premises with a minimum of equipment. Although radiography or ultrasonography may be used, the radiographic films can only be developed and evaluated after the veterinarian has returned to the office. Also, many practitioners do not have immediate access to endoscopy.

Equine veterinarians tend to work out of their vehicles, and their practices generally cover large rural or semi-rural areas of the state. For assistance with difficult cases in Georgia and western South Carolina, for example, these practitioners rely upon telephone communications with veterinary clinicians at the University of Georgia's Veterinary Teaching Hospital in Athens, Georgia. Presently, these consultations are limited to conversations between the two veterinarians. The clinician's recommendations often must be based on assumptions that the clinician must make about the animal's status. More detailed consultation requires mailing radiographs to Athens with consequent time delays, transport of the animal to Athens, or the clinician traveling to the site of the animal. In most instances, the latter travel consumes far more time than actual examination, diagnosis, and treatment recommendation.

These deficiencies could be minimized, and the validity of the clinician's recommendations increased, if the clinicians had real-time access to visual and diagnostic images obtained by the veterinary practitioner. It should be feasible initially to establish facilities in various regions of the state from which the veterinary practitioners could transmit, share, and discuss clinically relevant data with clinicians at the University of Georgia Veterinary Teaching Hospital. As technology progresses, the cost of telemedicine equipment should decrease to justify broad distribution of such facilities.

OBJECTIVES

- 1) To use telemedicine to provide effective veterinary specialist care from the University of Georgia College of Veterinary Medicine for horses that are injured or ill while participating in the Equestrian Olympics at the Georgia International Horse Park.
- 2) To stimulate interest in a permanent telemedicine link between the Georgia International Horse Park in Conyers and the Veterinary Teaching Hospital in Athens.
- 3) To stimulate interest in the potential for televeterinary medicine for practicing veterinarians and animal owners and trainers worldwide.
- 4) To stimulate interest in establishing permanent telemedicine links between zoos and veterinary hospitals worldwide.

DISCUSSION

Likely Clinical Scenarios

As a result of the extreme rigors of the equestrian events, horses at the GIHP may develop clinical problems such as damage to a tendon, obstruction of the upper respiratory tract, abdominal pain due to intestinal obstruction or ischemia, severe colic, extreme dehydration, excessive body temperature, or neurogenic shock. The veterinarians at the GIHP will have the ability and equipment required to provide primary care for such horses, while the veterinary clinicians at the Teaching Hospital at The University of Georgia College of Veterinary Medicine will have the capability to provide more intensive medical care, anesthetic services, and surgical expertise. Consequently, it is critical that communications between the veterinarians at the Conyers facility and those in the Teaching Hospital be accurate and timely to facilitate prompt referral of horses requiring those services available only at the Teaching Hospital.

A telemedicine link will provide the most effective means of communication between the two sites, allowing real-time transfer of images ranging from panoramic views of the entire horse to macroscopic views of particular areas of concern. Vital additional diagnostic data could be transmitted from radiographic and ultrasonographic images of the horse's bones and tendons, endoscopic views of the upper respiratory tract, ECG tracings, and recordings of the horse's heart and respiratory sounds. This real-time transfer of data and ability to consult with experts at the Teaching Hospital will help the veterinarians involved determine when horses should be referred and thus will allow the people involved in the 1996 Olympic Games to provide the best level of care to the horses, trainers, and owners representing countries throughout the world.

An additional benefit of the telemedicine link between Conyers and Athens will be the real-time, onsite exposure that it will provide students in all four years of their veterinary education. The veterinary clinicians at the Teaching Hospital will use the images, data and conversations with veterinarians at the Conyers facility to reinforce how veterinarians make decisions regarding the diagnosis of specific conditions, the methods of treatment, and the animal's prognosis. The telemedicine link will allow the veterinary students the unique opportunity to experience the veterinarian's role in the equestrian events at the Olympic Games.

SYSTEM CONFIGURATION

The primary objective is to have a high-quality televeterinary medicine system linking the equine venue for the 1996 Olympics, The Georgia International Horse Park (GIHP) at Conyers, with the nearby University of Georgia College of Veterinary Medicine in Athens, Georgia.

The desired televeterinary medicine system should have the following integrated capabilities and performance

- Full motion video, 25-30 fps, if possible
 - Single frame video
 - Full color
 - 800 lines resolution (2000 desired for digital radiography; can get by with less for prototype)
 - Video annotation or highlighting capability
 - Additional instruments attached
 - Stethoscope
 - Endoscope
 - TBD
 - Two-way audio link
- Digital camera/scintillation plate packaged to provide instant radiographs

TERMINAL LOCATIONS

The baseline system configuration would have a fixed terminal with the preceding capabilities located in the Treatment Area at the GIHP in Conyers, Georgia, and an appropriate terminal, fixed or mobile, at the University of Georgia College of Veterinary Medicine in Athens, Georgia.

An optional system configuration would have a mobile or portable terminal with the desired capability mounted on a relatively small vehicle (jeep, small 4 wheel drive truck) to permit ready access to the injured horse regardless of location at the equine venue. This portable system should be available for use in either the Treatment Area or the field at the option of the chief veterinarian.

An optimum system configuration would be to have the baseline system configuration with a fixed terminal located in the Treatment Area and the appropriate terminal at the University of Georgia College of Veterinary Medicine; plus a portable or mobile terminal that could communicate via RF link to the fixed terminal in the Treatment Area and through that terminal could also communicate with the terminal at the University of Georgia College of Veterinary Medicine.

PRE-OLYMPIC CHECKOUT

TBD

OLYMPIC OPERATIONAL PROCEDURE

TBD

LEGACY

An advanced-technology telecommunications-based telemedicine system that provides veterinarians with access to expert consultation and resources in situations where difficult cases are presented. Facilities left as legacy include:

- Wired wide-bandwidth (T-1) telecommunication pathway linking the Georgia International Horse Park at Conyers, Georgia, with the University of Georgia College of Veterinary Medicine.
- Telemedicine capability at the University of Georgia College of Veterinary Medicine.
- Telemedicine capability at the the Georgia International Horse Park at Conyers, Ga.

PROPOSED BUDGETSalaries and Wages \$118,522.

Project Engineer/Project Coordinator \$28,000.

Planning, coordination, negotiation, development of the master workplan, sponsor interface, presentations and briefings, generation of reports, etc. (4.0 person-months at avg. \$7,000./mo.)

Senior Research Engineer \$39,000.

System specification, hardware/software procurement, system integration requirements, design digital camera/scintillation plate package, staff supervision, development of multimedia interfaces, generation of detailed procedures and protocols, etc. (6.0 person-months at avg. \$6,500./mo.)

Veterinary Medicine Support Staff \$32,000.

Develop Olympics Support Procedures, support pre-Olympics checkout, support during Olympics. (4.0 person-months at avg. \$8,000./mo.)

Technician \$12,532.

Hardware/software setup and debugging, operations support. (4.0 person-months at avg. \$3,133/mo.)

Graduate Assistants \$6,990.

Hardware/software setup and debugging, operations support. (750 person-hours at avg. \$9.32/hr.)

Fringe Benefits \$33,460.

At 30.0 percent of Salaries and Wages
(Excludes Graduate Assistants)

Materials and Supplies \$800.

Veterinary Supplies \$500.

Miscellaneous electrical and mechanical components \$250.

Office Supplies \$50.

Equipment \$45,000.

Digital Camera/scintillation plate package \$40,000.

GlobalMed terminals (Four total: two for UGA, one for GfHP, one backup.) (donated) \$0.

Mobile telemedicine capability (donated) \$0.

Veterinary instruments \$5,000.

Travel

\$4,000.

Local travel between Augusta, Athens, Atlanta,
and Conyers, GA.

Communication Links

Wired wide-bandwidth link between the equestrian
center at the GIHP and the UGA College of
Veterinary Medicine (donated)

\$0.

Total Direct Cost

\$201,782.

Indirect Cost

\$38,016.

At 18.84 percent of Direct Cost

Total Cost\$239,798.

APPENDIX 4
GEORGIA TECH DRAFT PROPOSAL BEC-1602

PROPOSAL NO. BEC-1602

FOR

**TELEMEDICINE DEMONSTRATIONS
DURING THE GAMES OF THE
XXVIth OLYMPIAD**

November 30, 1995

Submitted to

**ARPA
AT&T
COCA COLA
'DELTA AIRLINES
IBM
KODAK
MOTOROLA
PANASONIC**

Submitted by

BIOMEDICAL INTERACTIVE TECHNOLOGY CENTER

*Institute for Bioengineering and Bioscience
Georgia Institute of Technology
Atlanta, GA 30332-0200*

Contracting through

GEORGIA TECH RESEARCH CORPORATION

*Georgia Institute of Technology
Atlanta, GA 30332*

SUMMARY

Over the past few months, several meetings (two of which involved representatives from corporate sponsors of the 1996 Olympic Games) have been held for the purpose of identifying demonstrations with simulated clinical scenarios that would permit telemedicine's capabilities for enhancing the delivery of human and veterinary medical care to be showcased during the 1996 Olympic Games. These meetings have been coordinated and hosted by the Southeast Telemedicine Alliance, an informal organization representing telemedicine interests of medical, engineering, and military professionals in the State. Five demonstrations that provide a comprehensive presentation of telemedicine's capabilities have now been identified, and a plan for managing corporate, medical, veterinary, and engineering participation in the demonstrations has been developed.

This proposal describes the demonstrations plus a management plan for their implementation, and seeks funding necessary for conducting the demonstrations during the 1996 Olympic Games. The proposed demonstrations and management plan are summarized as follows:

PROPOSED DEMONSTRATIONS

DEMONSTRATION #1

The clinical scenario involves simulating a foreign visitor who becomes ill while attending an event within the Olympic Ring. The ill visitor is transported to the Health Services Center for diagnosis and treatment. The Health Services Center is equipped with a language translator and a telemedicine system that is networked via wired, wide-bandwidth telecommunication links to major medical centers that are also equipped with language translators and telemedicine systems. The medical professional in the Health Services Center uses the telemedicine capability to obtain expert consultative assistance from medical specialists in two major medical centers. Budget estimate: \$587,365.

DEMONSTRATION #2:

The clinical scenario involves simulating a non-foreign spectator who is injured while attending an Olympic event at a remote venue, and is transported to a mobile medical facility for diagnosis and treatment. The mobile medical facility is equipped with a telemedicine system that is networked via wireless, wide-bandwidth telecommunication links to major medical centers that are also equipped with telemedicine systems. The medical professional in the mobile facility uses the telemedicine capability to obtain expert consultative assistance from medical specialists in the major medical center prior to, and during, transport of the injured spectator to a major medical center. Budget estimate: \$292,696.

DEMONSTRATION #3

The clinical scenario involves simulating a foreign visitor who is taking a doctor-prescribed drug and becomes ill while enjoying recreational activities in the Olympic Centennial Park. Medical assistance is accessed by means of a kiosk located in the Park and equipped with a language

translator and telemedicine system. The telemedicine system is networked via wired, moderate-bandwidth telecommunication links to major medical centers that are also equipped with language translators and telemedicine systems. Medical professionals in the major medical centers guide the visitor in using the diagnostic capabilities of the telemedicine system in the kiosk. The nature of the illness is determined and appropriate treatment is recommended. Budget estimate: \$265,385.

DEMONSTRATION #4

The clinical scenario involves simulating multiple traumatic injuries to occupants of a van that wrecks while traveling on a local interstate highway. Ambulances and a MedFlight helicopter equipped with portable, low-bandwidth and air-borne, moderate-bandwidth telemedicine systems respond to the emergency. Emergency medical technicians use the telemedicine systems to obtain expert medical diagnostic and treatment consultation prior to, and during, transport of the injured persons to major medical centers. Budget estimate: \$_____.

DEMONSTRATION #5

The clinical scenario involves a horse with a simulated injury received during Olympic equestrian events at the International Horse Park. The horse is transported to the veterinary facility at the Park, and this facility is equipped with a telemedicine capability that is linked via wired, wide-bandwidth telecommunication networks to the University of Georgia School of Veterinary Medicine. The School of Veterinary Medicine is also equipped with telemedicine capabilities. Veterinarians at the Park use the telemedicine system to obtain expert diagnostic assistance as they examine and treat the horse at the Park. Budget estimate: \$315,758.

Telemedicine activities during each of the above demonstrations will be filmed. The films will be available for multiple uses, including corporate marketing, university program development, review by Olympic officials to determine how telemedicine can be used in future Olympic Games, etc. At the conclusion of the Olympic Games, the basic infrastructure required to support the demonstrations will remain in place as a legacy, and will be used to enhance the delivery of human and veterinary medical care within the State.

MANAGEMENT PLAN

The proposed management plan includes a Project Coordination function with the responsibility for working with corporate sponsors and members of the Southeast Telemedicine Alliance to develop and implement a master workplan. In this workplan, emphases will be placed on conducting demonstrations that reflect the full range of telemedicine's capabilities while fulfilling corporate needs related to marketing and showcasing technology. It is proposed that funding for the demonstrations be managed through the Georgia Tech Research Corporation. This Corporation will provide overall financial accountability and will subcontract appropriate funds to the several organizations that assume responsibility for individual tasks associated with conducting the demonstrations.

1.0 BACKGROUND

This proposal is submitted by the Biomedical Interactive Technology Center, a unit of the Institute for Bioengineering and Bioscience at the Georgia Institute of Technology (GIT), and is concerned with plans for conducting telemedicine demonstrations during the 1996 Olympic Games. Details describing these demonstrations have evolved from meetings of the Southeast Telemedicine Alliance (STA) and the Southeast Technology Center (STC); therefore, although the proposal is submitted through GIT, its submittal is on behalf of the STC and of organizations comprising the STA. If the proposal is successful and financial support becomes available, the single point-of-contact for contracting efforts will be the Georgia Tech Research Corporation (GTRC). Following Notice of Award, the GTRC will subcontract appropriate portions of the funded effort to individual members of STA and to STC for the fulfillment of contractual obligations.

The STA is an informal consortium of the six organizations shown below, and is committed to promoting the use of telemedicine as a cost-effective means for making quality medical care accessible to Georgians independent of geographical location. It is unique in that it provides, on

*Eisenhower Army Medical Center (EAMC),
Emory University School of Medicine (EUSM),
Georgia Baptist Medical Center (GBMC),
Georgia Institute of Technology (GIT),
Medical College of Georgia (MCG), and
Morehouse School of Medicine (MSM).*

a voluntary and cooperative basis, a strong combination of medical and engineering capabilities for meeting both civilian and military needs in the rapidly emerging field of telemedicine. The geographical span over which these capabilities are provided ranges from individual medical centers in rural and urban areas up through regions comprised of multiple states.

The purpose of the telemedicine demonstrations proposed herein is to showcase the recently-available and continually-emerging capabilities of telecommunication- and computer-based approaches for delivering enhanced medical care under circumstances that exist during events such as the Olympic Games. These events are characterized by large numbers of culturally-diverse persons in unfamiliar and congested environs during periods of climatic extremes when access to community services is limited. Four demonstrations that comprehensively reflect the capabilities of telemedicine under these circumstances have now been defined. These demonstrations, plus a fifth demonstration developed by the STC to showcase telemedicine's capabilities for providing effective veterinary care to horses during the Olympic equestrian event, are described in the following sections of this proposal.

2.0 *PROPOSED DEMONSTRATIONS*

As noted in the previous section, five telemedicine demonstrations are described herein. The first four demonstrations are concerned with the effective delivery of quality medical care to persons either attending the 1996 Olympic events (Demonstrations #1 and #2) or involved in activities related to 1996 Olympic events (Demonstrations #3 and #4). The fifth demonstration is concerned with the effective delivery of quality veterinary care to animals that are an integral part of the 1996 Olympic equestrian event. Descriptions of these demonstrations are presented below in terms of an Overall Description, Legacy, and Proposed Budget.

DEMONSTRATION #1

A. OVERALL DESCRIPTION

The purpose of this demonstration is to showcase the ability of telemedicine to deliver enhanced medical care to a foreign visitor who becomes ill while attending an event within the Olympic Ring. Activities to be performed in conducting this demonstration are proposed as follows:

- o Major medical centers with which Alliance members are associated (EAMC, EUSM, GBMC, MCG, and MSM) will be networked to each other and to the Student Health Services Center on the GIT campus via wide-bandwidth (T-1), wired telecommunication pathways.
- o Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth video teleconferencing, and will be linked both to each other and to the wide-bandwidth telecommunications pathways that join the major medical centers.
- o The telemedicine system at the GIT Student Health Services Center will be located in one of the examination rooms and will support wide-bandwidth teleconsultations. This telemedicine system will be linked to the wide-bandwidth telecommunications pathways that join the major medical centers.
- o Military language translators will be available in the Student Health Services Center and at each of the major medical centers.
- o A person participating in the demonstration will pose as a foreign visitor who becomes ill in the spectator stands at an event within the Olympic Ring. The demonstration will begin with the transfer of this person into the Student Health Services Center examination room that is equipped with the telemedicine system.
- o All activities in the Student Health Services Center examination room will be filmed and narrated, beginning with the transfer of the ill foreign visitor to the examination room.
- o Medical professionals in the Student Health Services Center will examine the ill visitor,

using the language translator to facilitate communications. A tentative diagnosis of the visitor's medical situation will be identified.

- o Medical professionals in the Student Health Services Center will desire to corroborate this diagnosis by consulting with medical specialists at two different major medical centers. The telemedicine system in the Student Health Services Center examination room will be linked via wide-bandwidth telecommunications pathways to first one, and then the other, Conference Room telemedicine systems in the major medical centers.
- o Using the two-way audio, video, and data capabilities of the telemedicine systems, the specialist in first one, and then the other, major medical center will consult with the medical professional in the Student Health Services Center while the ill visitor is further examined. During this further examination, the language translator will continue to be used to interact with the ill visitor.
- o The medical professional in the Student Health Services Center will provide a final diagnosis and specify an appropriate treatment.

B. LEGACY

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via wired pathways, to quality, cost-effective medical care at the point-of-need.

- o wired, wide-bandwidth (T-1) telecommunication pathways linking major medical centers and the GIT Student Health Services Center,
- o telemedicine system at two locations within each major medical center,
- o telemedicine system in one examination room in the Student Health Services Center, and
- o foreign language translation capability at major medical centers and at the Student Health Services Center.

C. PROPOSED BUDGET

Salaries and Wages

\$ 97,392

Principal Research Engineer/Project Coordinator
Planning, coordination, negotiation, development
of the master workplan, sponsor interface,
presentations and briefings, generation of reports, etc.
3.0 person-months at avg. \$8,306/mo.

\$24,918

Senior Research Engineer
Design of demonstrations, hardware/software pro-
curement, system integration requirements,
staff supervision, development of multimedia
interfaces, generation of detailed procedures
and protocols, etc.
8.0 person-months at avg. \$6,619/mo.

\$52,952

Technician Hardware/software setup and debugging, conduct of demonstrations, etc. 4.0 person-months at avg. \$3,133/mo.	\$12,532
Student Assistants Hardware/software setup and debugging, conduct demonstrations, etc. 750 person-hours at avg. \$9.32/hr.	\$ 6,990
<u>Fringe Benefits</u>	\$ 22,420
At 24.8 percent of applicable Salaries and Wages (Excludes Student Assistants)	
<u>Materials and Supplies</u>	\$ 3,350
Materials for installation of telemedicine systems in major medical centers--\$1,000; materials for installation of telemedicine system in Health Services Center--\$1,000; office supplies--\$50; miscellaneous electrical and mechanical components--\$1,000; disks for language translators (6 x \$50) --\$300	\$3,350
<u>Equipment</u>	\$260,000
Equipment and devices for 13 desktop telemedicine systems (2 each in 5 major medical centers, 1 in the Student Health Services Center, and 2 back-up units) (13 x \$20,000)--\$260,000;	\$260,000
Language translator including disks and disk players--donated	\$0
<u>Travel</u>	\$ 125
Local travel between corporate, university, and medical locations (500 miles @ \$0.25/mile)	\$ 125
<u>Communications Links</u>	
Wide-bandwidth link between Health Services Center and major medical centers--donated	\$0

Wide-bandwidth link between the 5 major medical centers--donated	\$0
<u>Video Tape of Demonstration</u>	\$ 25,000
Final tape will be 10 minutes in length at a cost of \$2,500/minute to prepare script, arrange taping session, provide actors/actresses, film the demonstration, provide a master tape, etc.	
<u>Direct Cost</u>	\$408,287
<u>Indirect Cost</u>	\$224,558
At 55 percent of Direct Cost	
<u>Total Cost</u>	\$632,845

DEMONSTRATION #2

A. OVERALL DESCRIPTION

The purpose of this demonstration is to showcase the ability of a mobile telemedicine system to deliver enhanced medical care to a spectator injured while attending an Olympic event at a remote venue. Activities to be performed while conducting this demonstration are proposed as follows:

- o A van-mounted telemedicine system that supports wireless, wide-bandwidth video teleconferencing will be available at a selected remote venue, and will be linked via a wireless, wide-bandwidth (T-1) pathway to a telecommunications node located at one of the major medical centers with which Alliance members are associated (EAMC, EUSM, GBMC, MCG, and MSM).
- o The wireless telecommunications node at one of the major medical centers will provide wired access to the other non-node major medical centers; thereby providing wireless, wide-bandwidth connectivity between the mobile van and all major medical centers.
- o Telemedicine systems within each major medical center will be located in an Emergency Room and in a centrally-located Conference Room. These telemedicine systems will support wide-bandwidth, wireless video teleconferencing, and will be linked both to each other and to the telecommunications node that provides wireless access to the telemedicine system in the mobile van. (These telemedicine systems will be the same as those used in Demonstration #1, assuming both demonstrations are approved and funded.)
- o A person participating in the demonstration will pose as a spectator that has sustained multiple traumatic injuries while at the remote venue. The demonstration will begin with

- o this person being transferred into the mobile van.
- o All activities in the mobile van will be filmed and narrated, beginning with the transfer of the person posing as an injured spectator into the van.
- o In the mobile van, on-site medical professionals will provide initial care while using the audio, video, and data capabilities of the van's wireless telemedicine system to consult with medical professionals at selected major medical centers.
- o It will be determined, as a result of consultations using the wireless telemedicine link, that the injured spectator can not be adequately treated on-site, and therefore must be transported to a major medical center. Throughout transport to the selected major medical center, medical professionals in the van will administer telemedically-proctored medical care.
- o As a result of the on-site and en-route teleconsultations, appropriate medical care will have been delivered to the injured spectator prior to arrival at the major medical center. Medical professionals at the major medical center will therefore be fully prepared to continue treatment upon arrival of the injured spectator.

B. LEGACY

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via wireless pathways, to quality, cost-effective medical care at the point-of-need.

- o wireless, wide-bandwidth (T-1) telecommunication link between major medical centers,
- o a van-mounted mobile telemedicine system, and
- o a telecommunications node at a major medical center to support the delivery of medical care over wide geographical areas.

C. PROPOSED BUDGET

<u>Salaries and Wages</u>	\$97,392
Principal Research Engineer/Project Coordinator Planning, coordination, negotiation, development of the master workplan, sponsor interface, presentations and briefings, generation of reports, etc. 3.0 person-months at avg. \$8,306/mo.	\$24,918
Senior Research Engineer Design of demonstrations, hardware/software pro- curement, system integration requirements, staff supervision, development of multimedia interfaces, generation of detailed and procedures and protocols, etc. 8.0 person-months at avg. \$6,619/mo.	\$52,952

Technician	\$12,532
Hardware/software setup and debugging, conduct of demonstrations, etc.	
4.0 person-months at avg. \$3,133/mo.	
Student Assistants	\$ 6,990
750 person-hours at avg. \$9.32/hr.	
<u>Fringe Benefits</u>	\$ 22,420
At 24.8 percent of applicable Salaries and Wages (Excludes Student Assistants)	
<u>Materials and Supplies</u>	\$ 2,050
Materials for construction of work benches, equipment mountings, etc. in 750; office supplies--\$50; miscellaneous electrical and mechanical components--\$750; RF cable for connection of wireless components--\$500;	\$ 2,050
<u>Equipment</u>	\$ 36,700
Equipment and devices for telemedicine system to be mounted in the van--\$20,000; transmitter and receiver equipment and devices for wireless operation--\$10,000; diagnostic devices for use in the van--\$6,700;	\$36,700
Equipment for telemedicine systems in major medical centers--same as used for Demonstration #1	\$0
Global medical terminals--donated	\$0
Van for mobile telemedicine capability--donated	\$0
<u>Travel</u>	\$ 125
Local travel between corporate, university, and medical locations (500 miles @ \$0.25/mile)	\$ 125
<u>Video Tape of Demonstration</u>	\$ 25,000
Final tape will be 10 minutes in length at a cost of \$2,500/minute to prepare script, arrange taping session, provide	

actors/actresses, film the demonstration, edit tape, provide master tape, etc.

<u>Direct Cost</u>	\$183,687
<u>Indirect Cost</u>	\$101,028
At 55 percent of Direct Cost	
<u>Total Cost</u>	\$ 2 8 4 , 7 1 5

DEMONSTRATION #3

A. OVERALL DESCRIPTION

The purpose of this demonstration is to showcase the ability of a kiosk-based telemedicine system to deliver enhanced medical care to a foreign visitor who is on a doctor-prescribed medication and becomes ill in a highly-congested public recreation area near the Olympic events. Activities to be performed in conducting this demonstration are proposed as follows:

- o A telemedicine kiosk with a wired, moderate-bandwidth (1/4 T-1), two-way audio, video, and data link to major medical centers with which Alliance members are associated (EAMC, EUSM, GBMC, MCG, MSM) will be available in the Olympic Centennial Park. This kiosk will support the remote monitoring of a basic array of physiological parameters and will be equipped to accept SmartCards as a means of patient access and information exchange.
- o The major medical centers will have a distributed system of desktop-mounted, PC-based telemedicine systems that link medical subspecialists in their offices. Language translators will be available in the major medical centers and at the doctor's offices.
- o The major medical centers will also have available a wireless, wide-bandwidth (T-1) telemedicine link to the CDC.
- o A person participating in the demonstration will pose as a foreign visitor who becomes ill while enjoying recreation in the Olympic Centennial Park. This ill visitor will be taking an obscure drug prescribed by a medical doctor in their country-of-origin, and will have no experience with telecommunications-based medical care delivery. Additionally, this person will have basic personal information and medical records on a SmartCard.
- o The telemedicine kiosk will be used by the ill visitor to access medical assistance at one of the major medical centers. Accessing this medical care will be initiated by use of the SmartCard, and will be aided by the availability of multi-language instructional coaching provided via the kiosk.
- o Medical subspecialists will interview the ill visitor telemedically, and will desire to seek the opinion of a specialist in one of the other major medical centers. With the ill visitor on-line, the second specialist will be accessed using the wide-bandwidth

telecommunication link between major medical centers. Following discussions with the first specialist and an interview with the ill visitor, the second specialist will endorse the first specialist's conclusions. This endorsement will include a recommendation that medical professionals at CDC be consulted regarding the drug the ill visitor is taking.

- o Medical professionals at CDC will be consulted regarding the drug the ill visitor is taking, and will provide guidance relative to drug-drug interactions, etc.
- o The demonstration will conclude with the ill visitor being advised obtain rest, and seek additional medical assistance if symptoms persist.

B. LEGACY

A technically-advanced, telecommunications-based system that provides rapid and convenient access, via a kiosk capability, to quality, cost-effective medical care for persons in public areas.

- o telemedicine kiosk with wireless communications and SmartCard capability,
- o moderate-bandwidth telecommunication links between a principal public area and major medical centers,
- o wireless, wide-bandwidth telemedicine link to the CDC, and
- o foreign language translation capability at major medical centers and the CDC.

C. PROPOSED BUDGET

<u>Salaries and Wages</u>	\$ 97,392
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Principal Research Engineer/Project Coordinator Planning, coordination, negotiation, development of the master workplan, sponsor interface, presentations and briefings, generation of reports, etc. 3.0 person-months at avg. \$8,306/mo.	\$24,918
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Senior Research Engineer Design of demonstrations, hardware/software pro- curement, system integration requirements, staff supervision, development of multimedia interfaces, generation of detailed procedures and protocols, etc. 8.0 person-months at avg. \$6,619/mo.	\$52,952
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Technician Hardware/software setup and debugging, conduct of demonstrations, etc. 4.0 person-months at avg. \$3,133/mo.	\$12,532
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Student Assistants	\$ 6,990
Hardware/software setup and debugging, conduct demonstrations, etc.	
750 person-hours at avg. \$9.32/hr.	
<u>Fringe Benefits</u>	\$ 22,420
At 24.8 percent of applicable Salaries and Wages (Excludes Student Assistants)	
<u>Materials and Supplies</u>	\$ 1,800
Materials for construction of kiosk: exterior-grade plywood, varnish, paint, etc.--\$1500; office supplies--\$50; miscellaneous electrical and mechanical components--\$250	\$1,800
<u>Equipment</u>	\$ 13,430
Equipment and devices for telemedicine system in Centennial Park: computer platform (120 MHz Pentium)--\$3,275; teleconferencing system diagnostic devices--\$4,000; camera--\$1,500; video capture card--\$1,500; miscellaneous--\$2,500.	\$12,775
Equipment for telemedicine system in major medical center--same as the system used in Demonstration #1	\$0
Equipment for telemedicine system in CDC: computer platform (120 MHz Pentium)--\$3,275; teleconferencing system--\$2,550; miscellaneous--\$750.	\$ 6,575
Language translator including disks and disk players--donated	\$0
<u>Travel</u>	\$ 125
Local travel between corporate, university, and medical locations (500 miles @ \$0.25/mile)	\$ 125
<u>Communication Links</u>	\$0
ISDN link between kiosk and major medical center--donated;	\$0
ISDN link between major medical center and CDC--donated	\$0

<u>Video Tape of Demonstration</u>	\$ 25,000
Final tape will be 10 minutes in length at a cost of \$2,500/minute to prepare script, arrange taping session, provide actors/actresses, film the demonstration, edit tape, provide a master tape, etc.	
<u>Direct Cost</u>	\$160,167
<u>Indirect Cost</u>	\$ 88,092
At 55 percent of Direct Cost	
<u>Total Cost</u>	\$248,259

DEMONSTRATION #4

A. OVERALL DESCRIPTION

The purpose of this demonstration is to showcase the ability of telemedicine with cellular linkages to deliver effective medical care in emergency situations involving a major vehicular accident resulting in multiple traumatic injuries. Activities to be performed in conducting this demonstration are proposed as follows:

- o An emergency medical vehicle and a MedFlight helicopter equipped with portable, moderate-bandwidth telemedicine capabilities will be available, and will be linked via cellular pathways to major medical centers with which Alliance members are associated (EAMC, EUSM, GBMC, MCG, MSM).
- o A mini-van transporting foreign visitors attending the Olympic Games is involved in a serious vehicular accident, resulting in a variety of life-threatening injuries to several persons.
- o The emergency medical vehicles and MedFlight helicopter equipped with portable telemedicine capabilities will be dispatched to the accident site. These vehicles will also have language translators onboard
- o At the accident site, persons participating in the demonstration will pose as foreign visitors that have received various traumatic injuries. The demonstration will begin with the arrival of the emergency medical vehicles and helicopter.
- o Medical professionals associated with the emergency medical vehicles and the helicopter will use the language translators and portable telemedicine capabilities to consult with the injured visitors and medical specialists at the major medical centers regarding stabilization of the injured persons. Within the major medical centers, the medical specialists will be accessed via a distributed system of desktop-mounted, PC-based telemedicine units in their hospital and home offices.
- o Following stabilization at the accident site, the injured visitors will be transported in the

emergency medical vehicles and MedFlight helicopter to Emergency Rooms in selected major medical centers.

- o During transport, the language translators and portable telemedicine capabilities will be used to continuously transfer medical updates on the injured visitor's medical status to the major medical centers. As a result, Emergency Room medical professionals will be fully ready to administer appropriate care upon arrival of the emergency vehicles and the helicopter.

B. LEGACY

A technically-advanced, telecommunications-based system that provides Georgia citizens with enhanced access, via a portable wireless capability, to quality, cost-effective medical care in emergency situations.

- o portable telemedicine capability at major medical centers and
- o emergency medical vehicles and MedFlight helicopters equipped with portable telemedicine capabilities.

C. PROPOSED BUDGET

Salaries and Wages

\$ 97,392

Principal Research Engineer/Project Coordinator \$24,918
Planning, coordination, negotiation, development
of the master workplan, sponsor interface,
presentations and briefings, generation of reports, etc.
3.0 person-months at avg. \$8,306/mo.

Senior Research Engineer \$52,952
Design of demonstrations, hardware/software pro-
curement, system integration requirements,
staff supervision, development of multimedia
interfaces, generation of detailed procedures
and protocols, etc.
8.0 person-months at avg. \$6,619/mo.

Technician \$12,532
Hardware/software setup and debugging, conduct
of demonstrations, etc.
4.0 person-months at avg. \$3,133/mo.

Student Assistants \$ 6,990
 Hardware/software setup and debugging, conduct
 demonstrations, etc.
 750 person-hours at avg. \$9.32/hr.

Fringe Benefits \$ 22,420

At 24.8 percent of Salaries and Wages
 (Excludes Students Assistants)

Materials and Supplies \$ 27,500

Materials to assemble wireless air-borne
 audio/video teleconferencing system (EMT
 helmet, miniature cameras, communication
 devices, electrical and mechanical components,
 electrical and RF wiring/cabling, etc.)--\$27,500; \$27,500

Equipment \$ 35,000

Still-image telemedicine system plus back-up--
 \$10,000 \$10,000

Transmitter/receiver system and devices for
 wireless link between major medical center
 and helicopter--\$25,000 \$25,000

Equipment for telemedicine systems in major
 medical centers--same as used for Demonstration #1 \$0

Communication Links \$ 0

Moderate-bandwidth link between helicopter and
 major medical center--donated \$0

Wide-bandwidth link between major medical
 centers--same as in Demonstration #1 \$0

Helicopter \$

__ hours at \$ __/hr.

MedFlight helicopter will be available from Georgia
 Baptist Medical Center

<u>Travel</u>	\$ 125
<u>Video Tape of Demonstration</u>	\$ 25,000
Final tape will be 10 minutes in length at a cost of \$2,500/minute to prepare script, arrange taping session, provide actors/actresses, provide a master tape, etc.	
<u>Direct Cost</u>	\$
<u>Indirect Cost</u>	\$
At 55 percent of Direct Cost	
<u>Total Cost</u>	\$

DEMONSTRATION #5

A. OVERALL DESCRIPTION

The purpose of this demonstration is to showcase the ability of telemedicine to deliver enhanced veterinary care to horses that become injured or ill during equestrian events at the International Horse Park in Conyers, GA.

Events comprising the equestrian competition during the 1996 Games will include some of the most demanding of all sporting disciplines, requiring horses to demonstrate speed, agility, jumping ability, and endurance. The physically-taxing effects of these events may yield devastating results for some horses, as occurred during the 1992 Games in Barcelona, Spain. Veterinarians involved in planning for the 1996 Games fully expect the physical effects experienced during the equestrian event in 1992 to be magnified as a result of the combination of heat and humidity characteristic of Georgia summers; consequently, there is considerable interest in efforts that will enhance veterinary care available to horses during the competition in 1996.

Telecommunication and computer technologies that have converged to make telemedicine an attractive means for enhancing the delivery of medical care to humans can be equally effective in providing enhanced delivery of veterinary care for horses during equestrian events associated with the 1996 Games. Without a telemedicine capability, veterinarians delivering care to animals at the point-of-need must either rely on only their judgements and conclusions, or seek assistive inputs from other veterinarians via telephone. However, by using the two-way audio, video, and data exchanges possible with telemedicine, these veterinarians can rapidly and effectively access

a broader range of experienced information and consultation from other veterinarians at distant locations. For example, if a horse is injured or becomes ill, veterinarians at the equestrian venue could use telemedicine to readily access visual-based expert consultation and resources from other veterinarians at locations such as the University of Georgia (UGA) School of Veterinary Medicine. This electronic availability of visual-based expert consultation and resources will enhance the ability to deliver quality veterinary care to the animals.

Activities to be performed in conducting this demonstration are proposed as follows:

- o The equestrian center at the International Horse Park will be networked to the UGA School of Veterinary Medicine via wide-bandwidth (T-1), wired telecommunication pathways.
- o Telemedicine systems capable of supporting wide-bandwidth video teleconferencing will be located in a surgical suite and in a centrally-located Conference Room at the UGA School of Veterinary Medicine. The surgical suite will be capable of providing intensive veterinary care, anesthetic services, and surgical expertise.
- o The telemedicine system at the International Horse Park will be installed in an examination area that is centrally located in the equestrian center and will be linked to the wide-bandwidth telecommunication network to the UGA School of Veterinary Medicine. In addition, a van with a mobile telemedicine capability will be available to examine horses that become injured or ill and transportation is not advisable.
- o All activities forming a part of the demonstration will be filmed and narrated to assure an ability to show officials of future Olympic Games the enhancement telemedicine provides the delivery of veterinary care at an equestrian event.
- o A person and horse participating in the demonstration will pose as a trainer presenting an animal with abdominal pain due to severe intestinal obstruction or schema. The seriousness of the obstruction or schema will be such as to make consultation with veterinarians at a veterinary teaching hospital highly desirable.
- o The two-way telemedicine link will be established, and the on-site veterinarian will consult with the UGA veterinarian regarding an appropriate diagnosis and treatment.

B. LEGACY

A technically-advanced, telecommunications-based telemedicine system that provides veterinarians with access to expert consultation and resources in situations where difficult cases are presented.

- o wired, wide-bandwidth (T-1) telecommunication pathway linking the International Horse Park at Conyers, GA with the UGA School of Veterinary Medicine,
- o telemedicine capability at two locations in the UGA School of Veterinary Medicine, and
- o telemedicine capability at the International Horse Park.

C. PROPOSED BUDGET

<u>Salaries and Wages</u>	\$ 97,392
Principal Research Engineer/Project Coordinator Planning, coordination, negotiation, development of the master workplan, sponsor interface, presentations and briefings, generation of reports, etc. 3.0 person-months at avg. \$8,306/mo.	\$24,918
Senior Research Engineer Design of demonstrations, hardware/software pro- curement, system integration requirements, staff supervision, development of multimedia interfaces, generation of detailed procedures and protocols, etc. 8.0 person-months at avg. \$6,619/mo.	\$52,952
Technician Hardware/software setup and debugging, conduct of demonstrations, etc. 4.0 person-months at avg. \$3,133/mo.	\$12,532
Student Assistants Hardware/software setup and debugging, conduct demonstrations, etc. 750 person-hours at avg. \$9.32/hr.	\$ 6,990
<u>Fringe Benefits</u>	\$ 22,420
At 24.8 percent of Salaries and Wages (Excludes Student Assistants)	
<u>Materials and Supplies</u>	\$ 800
Miscellaneous electrical and mechanical com- ponents--\$250; office supplies--\$50; veterinary supplies--\$500	\$800
<u>Equipment</u>	\$ 80,000
Equipment and devices for four desktop telemedicine systems (2 for UGA, 1 for the equestrian center, 1 for back-up) (\$20,000 x 4)	\$80,000

Global medical terminals--donated	\$0	
Mobile telemedicine capability--same as used during Demonstration #2	\$0	
Veterinary instruments	\$0	
<u>Travel</u>		\$ 1,665
Automobile trips between Augusta, Athens, and Conyers, GA (2,500 miles @ \$0.25/mile)	\$625	
Room accommodations for 2 persons (3 nights @ \$80/night/person)	\$480	
Meals (\$35/day/person)	\$560	
<u>Communication Links</u>		\$0
Wired wide-bandwidth link between the equestrian center at the International Horse Park and the UGA School of Veterinary Medicine--donated	\$0	
Wireless wide-bandwidth link between the equestrian center at the International Horse Park and the UGA School of Veterinary Medicine--donated	\$0	
<u>Video Tape of Demonstration</u>		\$ 25,000
Final tape will be 10 minutes in length at a cost of \$2,500/minute to prepare script, arrange taping session, provide actors/actresses, provide a master tape, etc.		
<u>Direct Cost</u>		\$227,277
<u>Indirect Cost</u>		\$125,002
At 55 percent of Direct Cost		
<u>Total Cost</u>		\$352,279

3.0 *MANAGEMENT PLAN*

A strong emphasis is proposed for management and leadership aspects associated with demonstrations because of complexities resulting from the number of organizations involved and the uniqueness of the opportunity to showcase the capabilities of telemedicine. Therefore, the overall management and leadership responsibility will reside in a Project Coordination function as shown on the diagram below. This function will be the principal interface with counterparts within the corporate sponsor organizations to negotiate, and ultimately execute, satisfactory agreements and understandings that govern the conduct of the demonstrations and the results thereof. In negotiating and executing these agreements and understandings, this function will assure that requirements of membership of the Southeast Telemedicine Alliance, and of the Southeast Technology Center, are fully represented. An extensive amount of information dissemination, liaison, arranging meetings, etc. is expected in fulfilling this Project Coordination responsibility. These efforts will be reflected in the generation of a master workplan for the Project. This workplan will provide the guiding document by which demonstrations are conducted in a manner that fully showcases the capabilities of telemedicine while reflecting the interests of corporate sponsors. This function is budgeted at the level of 1.5 effective full-time (EFT) persons.

A high level of sensitivity to corporate interests will be essential to satisfactory accomplishment of this Project; therefore, corporate input to Project activities via the master workplan will be solicited. This input will be evident in activities of the Project Coordination function and in GTRC contractual arrangements.

As discussed earlier in this proposal, the Georgia Tech Research Corporation (GTRC) will be the legal entity through which contractual arrangements are finalized. Funding for the coverage of necessary salaries and wages, fringe benefits associated with salaries and wages, materials and supplies, equipment, travel, etc. will be provided in the contract with GTRC. Following award of this contract, negotiations with each of organizations involved in conducting the demonstrations will be held, and specific funding needs of these organizations will be identified. Subcontracts to these organizations will then be awarded in a manner that assures that the demonstrations are conducted in a manner fully satisfactory to the organizations and to the corporate sponsors.

Responsibility for the individual demonstrations will be assumed by members of the Southeast Telemedicine Alliance (Demonstrations #1-#4), working separately and in consort, and by the Southeast Technology Center (Demonstration #5). Coordination of activities specific to the conduct of individual demonstrations, the exchange of technical and planning information, and the arrangement of shared resources will be resolved in meetings of the Southeast Telemedicine Alliance and the Southeast Technology Center.

The convergence of recently-available and continually-emerging technologies in the fields of telecommunications and computers has made possible new equipment configurations that provide electronic access to quality medical care in locations here-to-fore considered difficult to access. These locations include rural areas, various inner city areas, military battlefields, etc., and the delivery of medical care to these locations using the new equipment configurations is referred to as telemedicine.

The potential of telemedicine is so great that there is much interest in demonstrating its effectiveness under various scenarios as quickly as possible. The Games of the XXVIth Olympiad offer a unique scenario for conducting highly-relevant telemedicine demonstrations. This scenario can be described as large numbers of culturally-diverse persons crowded together in unfamiliar environs with limited access to community services during periods of temperature and humidity extremes. With this opportunity in mind, members of the Southeast Telemedicine Alliance have identified four demonstrations which, when conducted during the 1996 Olympic Games, will showcase the capabilities of telemedicine to enhance the delivery of medical care

During the past several months, members of the Southeast Telemedicine Alliance have identified four demonstrations which, if conducted during the 1996 Olympic Games, would showcase the capabilities of telemedicine for enhancing the delivery of quality medical care under circumstances characterized by

Notes:

1. The Principal Research Engineer will serve as the Project Director and will have overall responsibility for assuring satisfactory performance on all management, technical and financial activities associated with the Project. In addition, this person will provide the interface between the Project activities and the Sponsors. Approximately one-third time over the estimated six-month performance period is proposed for this position.
2. Senior Research Engineers will be primarily responsible for the all design and implementation activities associated with the Project, and will report to the Principal Research Engineer. To assure that both hardware and software activities are adequately addressed, two Senior Research Engineers will serve the Project, one with expertise in hardware, the other with expertise in software. Each will devote approximately ____ percent time over the six-month performance period estimated for the Project.
3. Technicians will serve the Project by satisfactorily completing activities involving laboratory work, construction, assembly, wiring, test and checkout, etc. Persons filling these positions will report to the Senior Research Engineers. Each Technician will devote an estimated ____ percent time to the Project over the estimated six-month duration.
4. Student Assistants will be primarily undergraduate students serving the Project by undertaking the majority of the activities requiring physical labor. The students will report to the Technicians while providing assistance to some extent on almost every aspect of the Project. Two student assistance will be assigned to the Project in order to assure a reliable source of labor. These students will devote approximately ____ percent time to the Project over its estimated six-month duration.

APPENDIX 5

DR. SATAVA RESPONSE TO GEORGIA TECH PROPOSAL BEC-1602



ADVANCED RESEARCH PROJECTS AGENCY
3701 NORTH FAIRFAX DRIVE
ARLINGTON, VA 22203-1714



DSO/Biomedical Technology

January 17, 1996

RECEIVED JAN 29 1996

Mr. James Toler
Biomedical Interactive Technology Center
Institute for Bioengineering and Bioscience
Georgia Institute of Technology
Atlanta, GA 30332-0200

REF: 572-P: Telemedicine Demonstrations During the Games of the XXVIth Olympiad

Dear Mr. Toler,

This letter is in response to your proposal listed above, submitted in response to the Commerce Business Daily issue of January 27, 1994, for an ARPA-sponsored program of research and development of the Advanced Biomedical Technology ARPA/DSO BAA 94-14.

The proposal is based upon implementing telemedicine with current commercial off-the-shelf (COTS) equipment. There are very little innovative devices or systems being utilized. In addition, the cost of nearly \$2 million is for five staged demonstrations. What is needed is a system that will be put in place, utilized during the Olympics, and then left for continued utilization. Examples of what might be considered are:

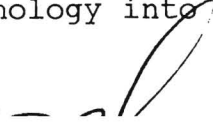
- 1) A series of kiosks with diagnostic equipment that can transmit information. The proposed kiosk is nothing more than a standard video teleconference.
- 2) Doc in a box. A fully functional telemedicine mini-clinic, with tele-diagnostic equipment (like Jay Sanders' system). This is then next step up from a kiosk system.
- 3) A mobile van as described, but which will actually move from venue to venue on a daily or time-share basis, and provide real medical coverage.
- 4) EMT-medical system as described, but with some new equipment (like personnel status monitors or head mounted displays, etc.) to provide robust, in-transit monitoring and communications.

Mr. James Toler
January 17, 1996
Page 2

The concept is right, but we need to have real provision of service, not demos. You might consider having computer-embedded translators, rather than having an army of humans to translate at every medical location site (doctors offices, clinics, etc.). While foreign guests will present a language problem, it is not advanced technology demonstration to have tons of human translators participating.

The merit of the overall proposal is valid; however, the implementation needs to be dramatically revised. If the revision is more acceptable, then an in depth cost proposal will be expected.

I realize the Olympics are very soon, so we need to move rapidly if there is to be insertion of this technology into practice. I hope we can accomplish this.

Sincerely, 

960117

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