U.S. Army Medical Research & Materiel Command

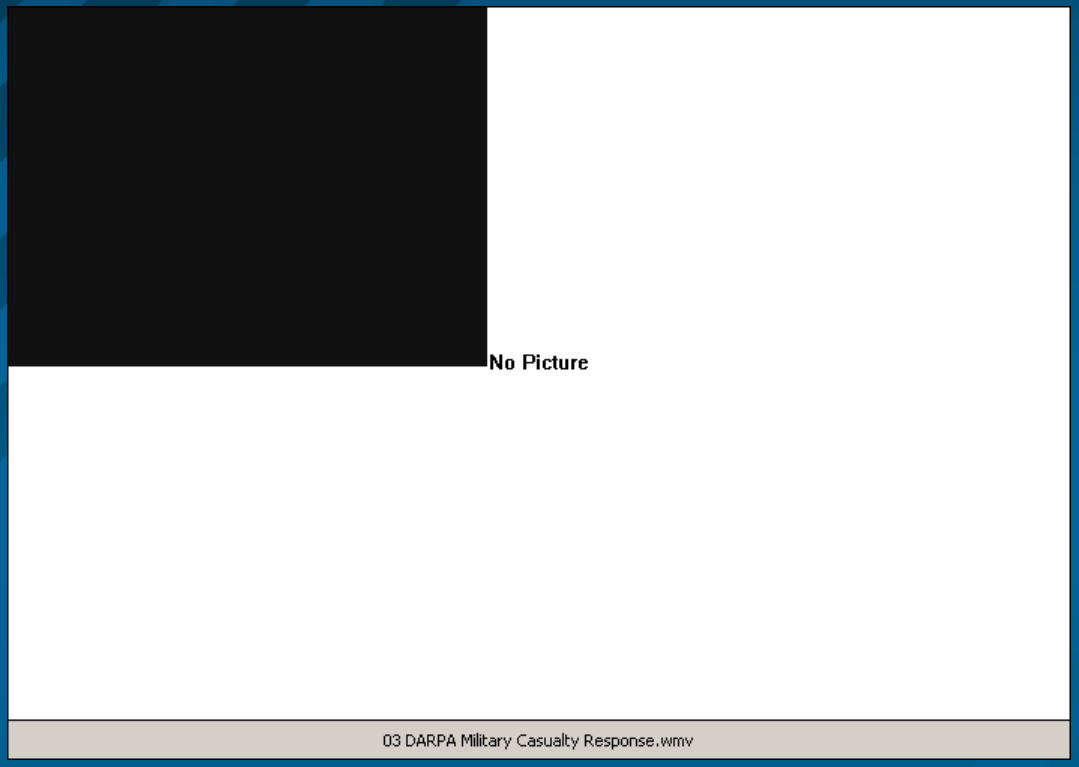
Fulfilling The Vision Thru R&D

Overview Brief

Virginia Telehealth Initiative Consensus Conference

6 November 2006

DARPA – TATRC Trauma Pod Program



USAMRMC Functions

★★★CG, MEDCOM ★★★
★★CG, USAMRMC ★★

Support the Warfighter on Point for the Nation

Medical Research, Development and Acquisition
-
Core Program
Congressional Program

Medical Logistics

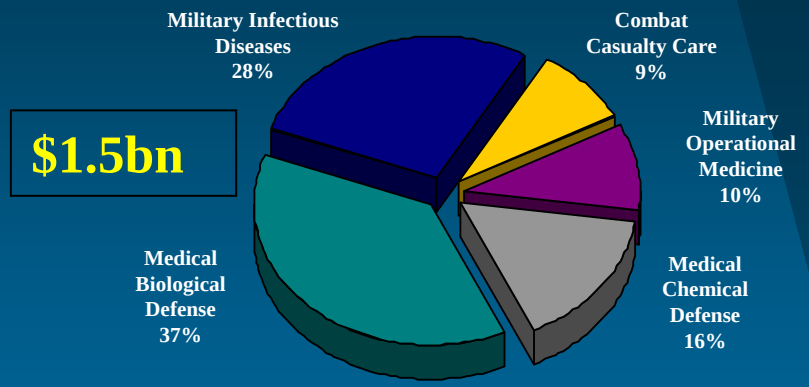
Medical IM/IT

Medical Facilities

Cradle-to-Grave Medical Materiel Acquisition

Transforming Army Medicine

U.S. Army Medical Research and Materiel Command Core Medical S&T Program Areas



Military Infectious Diseases

- Medical readiness
- Vaccines
- Biotechnology
- Prophylaxis/treatment drugs
- Diagnostics/prognostics
- Vector control

Combat Casualty Care

- Lightweight medical equipment
- Medical C4ISR
- Trauma care
- Health monitoring and diagnostic technology

Medical Biological Defense

- Vaccines/therapies
- Field-portable diagnostic systems
- Medical readiness
- Biotechnology

Military Operational Medicine

- Soldier selection and sustainment
- Soldier performance
- Warrior system modeling
- Health hazards protection
- Diagnostics/prognostics
- Health monitoring

Medical Chemical Defense

- Medical management of chemical warfare casualties
- Medical readiness
- Drug prophylaxes/ pretreatments
- Diagnostics/therapeutics

Telemedicine and Advanced Medical Technology Program

Mission

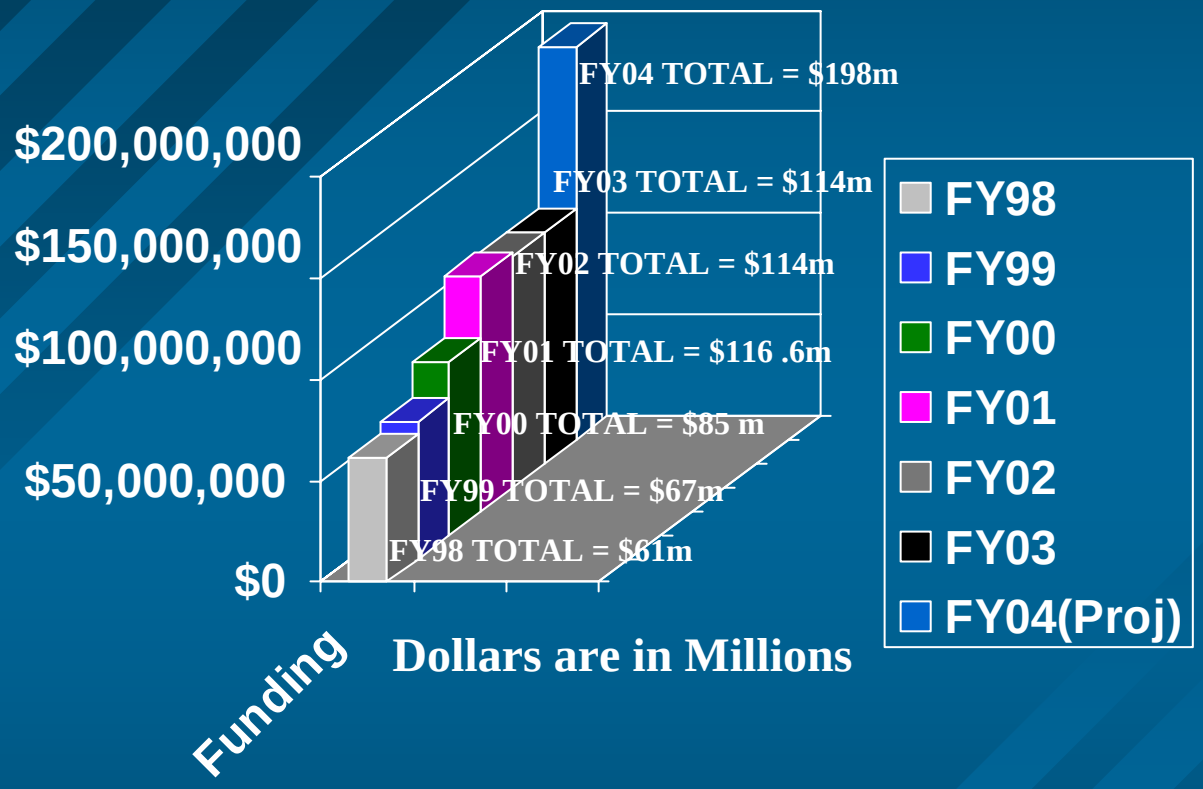
Apply physiological and medical knowledge, advanced diagnostics, simulations, and effector systems integrated with information and telecommunications for the purposes of enhancing operational and medical decision-making, improving medical training, and delivering medical treatment across all barriers.

The program scope is to identify, explore, and demonstrate key technologies and biomedical principles required to overcome technology barriers that are both medically and militarily unique.

Department of Defense,
Joint Warfighting Science and Technology Plan, Chapter IX, Joint Readiness and Logistics, 1999

Total Funding

FY04 TOTAL = $198m



TATRC Science & Technology Portfolio – 500+ Funded Projects

Telemedicine and Advanced Technology

(www.tatrc.org)

Operational Capability Areas

- Joint Medical Readiness
- Battlespace Medical Awareness
- Effective Employment of Medical Forces

Pre-Deployment
Wellness, Training, Planning, Assessment

Real-Time
Health Monitoring, Measurement,Management

Care Management
Trauma Care
Medical Care
Evacuation

Computer Aided Instruction
3D Surgical Simulations
Joint Medical Simulations
Force Feedback - Virtual Reality
Health Care Complex Modeling
Computerized Patient Records
Medical Data Mining
Intelligent Decision Systems

Physiological Sensors
Microelectromechanical Systems
Digital Image Acquisition Devices
Medical Data Processing
Medical Image & Data Displays
Medical Situational Analysis

Wireless Medical Systems
Teleconsultation Systems
Global Grid Telemed System
Predictive Diagnostics
3D Medical Image Analysis
Minimally Invasive Therapies
Image Guided Therapies
Robotics - Biomaterials

T A T R C

S U P P O R T I N G B U S I N E S S P R ACTICES

TATRC manages projects through professional business processes

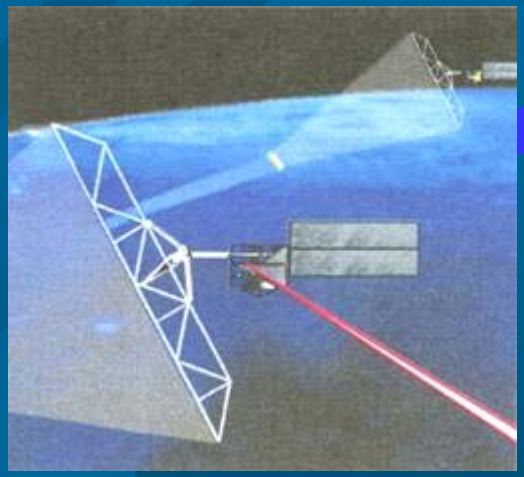
- **Integrated Research Team (IRT)**
  - Program level
  - Periodic, as required
  - Broad strategic planning and oversight
- **Milestone Reviews**
  - Project Level
  - Pre-Award
  - Establish performance metrics, deliverables and milestones
- **Integrated Product Team (IPT)**
  - Project level
  - More frequent, scheduled
  - Project-specific guidance
- **Product Line Review (PLR)**
  - Assessments of research by outside experts
  - One research category per month; annual cycle

Build R&D Strategy
…On Integrated Partnerships

Link to the Warfighter

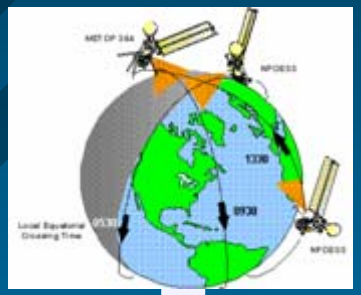
Service Labs

DARPA



High Risk, High Payoff

Expanded Resource Base



Interagency

Maximum Payoff

International Coalitions

New Ideas, Knowledge

Universities

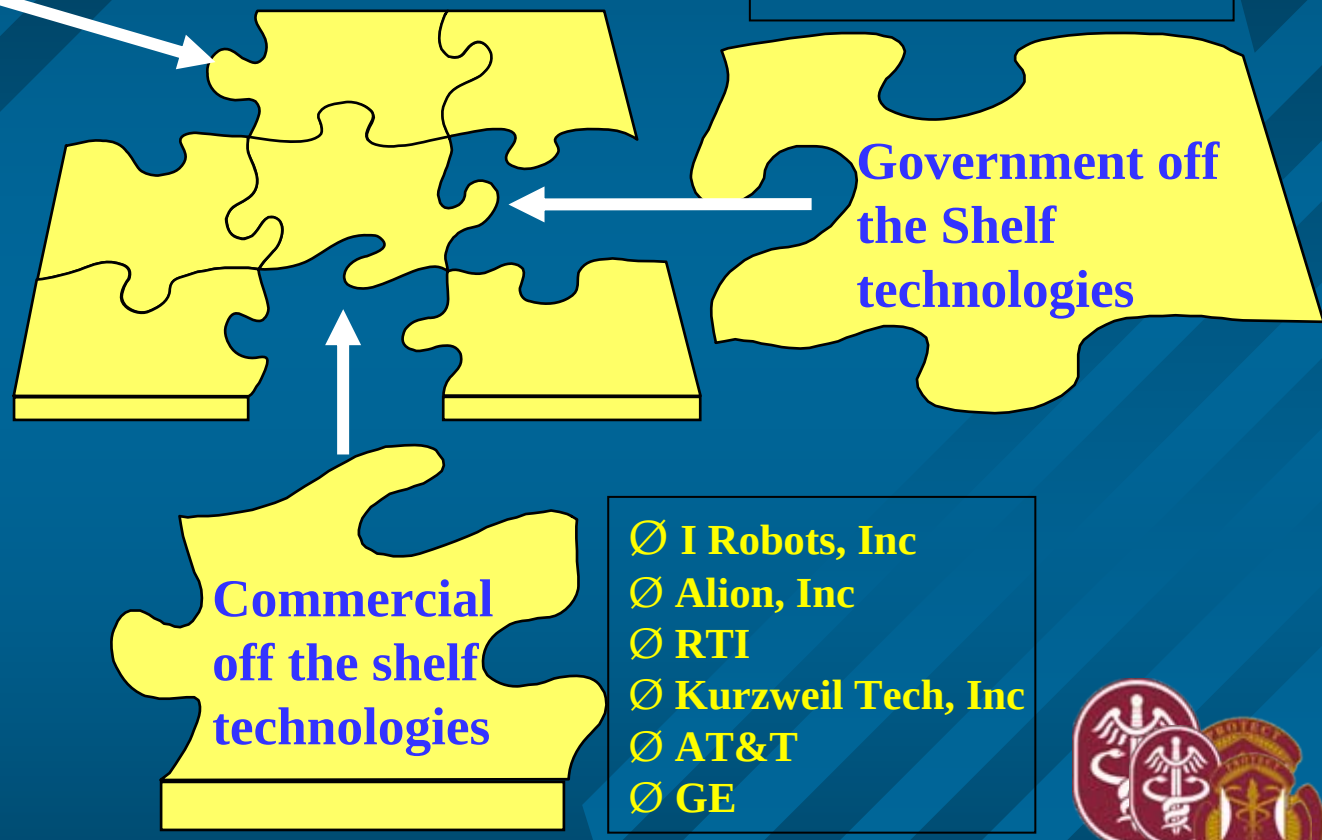
Industries

Innovation, Transition

TATRC – Develops Internal Prototype Solutions

- DARPA
- TACOM
- RDECOM
- Signal Battle Lab
- CECOM
- ARL

Emerging Technologies



- I Robots, Inc
- Alion, Inc
- RTI
- Kurzweil Tech, Inc
- AT&T
- GE

Leverages Academic Partnerships

…For Basic and Applied Research

• **Georgetown University**	**(CA-Medical Vangaurd)**
• **Howard University**	**(CRDA-Urban Telemed)**
• **Harvard University**	**(CA-CIMIT)**
• **Mass Institute of Technology**	**(CA-CIMIT)**
• **University of Maryland**	**(IPA/CA – ORF)**
• **University of Utah**	**(Contract-Teleopth)**
• **Rutgers University**	**(CA-CEMBR)**
• **Saint Francis University**	**(CRDA-CERMUSA)**
• **Drexel University**	**(CA-CIMERC)**
• **Loma Linda University**	**(CA-NMTB/Proton Beam)**
• **University of Tex - Houston HSC**	**(CA-DREAMS)**
• **University South Florida**	**(CA-Telerad/Adv Cancer Detect)**
• **University of Hawaii**	**(CA-Telemed Curric'lm)**
• **University of Pittsburgh**	**(Contract-GGTS)**
• **Stanford University**	**(Contract-Affiliates Prog)**
• **Yale University**	**(IPA-Adv Tech Watch)**
• **Texas A & M**	**(CA-DREAMS)**
• **Johns Hopkins University**	**(CA-Periscopic MIS)**
• **University of Southern Calfornia**	**(CA-NGI)**
• **University of Oregon**	**(CA-BBM)**

Uses DoD & Federal Partnerships for Non-Medical and Supporting Technologies

R&D Panels and Command "Partnerships"

- U.S. Army Research Laboratory
- Los Alamos National Laboratory
- Sandia National Laboratory
- U.S. Army, Signal Battle Laboratory
- Commo & Electronic Command
- Oak Ridge National Laboratory
- Veterans Administration
- NASA
- DARPA
- National Library of Medicine (NIH)
- Agency for Health Research & Quality (HHS)

* Distributed, Synchronized Databases
* Advanced, Adaptive Multilevel Security
* Data Mining of Disparate Databases
* Secure Global Positioning System
* Network Management Tools
* Info Warfare Surveillance & Defense Tools
* Artificial Intelligence - Expert Systems
* Fault Avoidance and Recovery Systems
* Hands Free, Wireless Telecom
* Wireless Networking
* Data Compression
* High Bandwidth Datalinks
* Low Power Electronics
* Multi-platform, Interoperable Software
* Complex Modeling and Simulation

TATRC is a network of "Best of Breed" public/private advanced medical technology partnerships.

Leverages…
International Partnerships to Accelerate Development

- US/Norway Telemedicine (Wireless, Handheld)
- European Union Collaboration
- NATO – Telemedicine Standardization Committee
- Canada: International Space Station (Telesurgery)
- South African Military Health Service (Peacekeeping)
- Vietnam: Puresense Networked Water Sensor System
- International Global Satellite System: Poland (CME)
- Landmine Victim Assistance: Central America > Bosnia > Afghanistan
- Partnership for Peace – Romanian Needs Assessment
- Fellowship Programs: Pakistani, Polish
- Yuma Proving Ground - Panama Telepathology – Hyperspectral Imaging
- Argentina – Civilian Medical Emergency Response
- Israeli Trauma Simulator
- South Korean Exchange Program
- ATA Symposiums: EU (2001) – Africa (2002) - Latin America (2003)
  Eastern Europe (2004) – Asia (2005)

Designed to Accelerate the "Flash to Bang"

…from Basic Research to Tech Transfer

Nanomedicine
BioTechnology
Molecular Genetics
Biomateriels
BioSensors

Basic Research

Assured Connectivity
Medical Informatics
Med Training Technologies
Robotics
Therapeutics

Applied Research
Advanced Technology Development
Early Prototyping

Forward Deployed Digital Systems
Medical Modeling & Simulation
Operating Room of the Future
Wireless Medical Enterprises
IM/IT Systems
Homeland Security Systems
Disease Surveillance Systems
Telemedicine

Demonstration & Validation

Technology Transfer

Engineering Manufacturing Development,
Procurement,
Operations & Maintenance

Program Managers for
Army (PM, MC4), Navy, Air Force, DOD, Industry

TATRC
Product Line Portfolios

Basic Research

MATRIX Management Approach

Medical Modeling & Simulation DR MOSES	Bio-Sensors DR CURLEY	Advanced Surgical Technology DR MOSES	Advanced Imaging DR MOGEL	Robotics & Artificial Intelligence DR GILBERT
HOMELAND SECURITY/DISASTER RELIEF SYSTEMS INT: M. PARKER				
FWRD DEPLOYED DIGITAL MED TMNT FAC SYS INT: G. GILBERT				
BATTLEFIELD SYSTEMS INT: T. MORRIS				
OPERATING ROOM OF THE FUTURE SYS INT: G. MOSES				
CLINICAL SYSTEMS INTEGRATOR: R. POROPATICH				
TRAINING SYSTEMS INTEGRATOR: C. PUGH				
OPERATIONAL T'MED SYS INTEGRATOR: T. MORRIS				

Straight Line of Sight To the End user

Technology Transfer

Examples of Recent TATRC Prototype Deliverables

BMIS-T

Chest Tube Simulator

Digital X-ray

Dreams Digital Ambulance

Smallpox Inoculation Training Unit

Medical Robotics

BRSS

STAT-Care

Retinal Imaging

Telemedicine Settings …And Why?

Level of Care	Requirement	Program
Preventative Care	Education Prevention	Family Planning Education Screening
Primary Care	Early Detection Routine Care	Physician Practice Hospital Outpatient Surgical Centers Mental Health Clinic
Secondary Care	Emergency Diagnostic Acute Care Intensive	Emergency Rooms Hospitals:Inpatient Urgent Care Center
Tertiary Care	Specialist Services Regional	Teaching Hospital Specialty Hospital Medical Centers
Restorative Care	Follow-up Rehab Home Health	Home Health Agency Rehab Clinics Home Self Care
Continuing Care	Long term Hospice	Nursing Homes Adult Day Care

Health Care System

TELEMEDICINE

- Community Health
- Information Networks
- Med Record Repository
- Automated Care Plans
- Teledermatology
- Remote Surgery
- Telepsychiatry
- Teleradiology
- Point of Care Data
- Collection Systems
- Continuing Medical Ed
- Telepathology
- Video Consultation
- Monitoring Systems
- Virtual Reality: DataSuit
- Patient Education Syste
- Automated Med Recor
- Coordinated Care

Evolution of Telemedicine Systems

Original Telemedicine Set, 1993

- 330 lbs
- 40 cubic feet
- $150K

Telemedicine Set, 1997

- 112 lbs
- 6 cubic feet
- $68K

Current Telemedicine Set, 2004

- 44 lbs
- 3 cubic feet
- $35 K

TF 325 Med
(Bagram)

Radiology
Dermatology
Neurosurgery

Tri-Service Global Encrypted Teleradiology Network

U.S. Army Sites
U.S. Air Force Sites
U.S. Navy Sites
Joint Forces

* = 2004

KEFLAVIK, ICELAND
US Naval Air Station

RAMSTEIN, GERMANY
Ramstein Air Base

RHEIN MEIN GERMANY
Rhein Mein Air Base

GERMANY - PHASES 1 - 3

Landstuhl Reg. Medical Ctr.
Wuerzberg MEDDAC
Heidelberg MEDDAC
Baumholder Health Clinic
Dexheim Health Clinic
Weisbaden Health Clinic
Stuttgart Health Clinic
Schweinfurt Health Clinic
Hanau Health Clinic
Vilseck Health Clinic
Bamburg Health Clinic
Grafenwoehr Health Clinic
Hohenfels Health Clinic
Illehsiem Health Clinic
Katterbach Health Clinic
Kitzingen Health Clinic
Friedberg Health Clinic
Budigen Health Clinic
Babenhausen Health Clinic
Darmstadt Health Clinic
Kleber Kasern Health Clinic
Coleman Barracks Health Clinic
Mannheim Health Clinic
Butzbach Health Clinic

SOUTH KOREA

121st General Hospital
Yongson Health
Camp Long
Camp Stanley
Camp Carroll
Camp Page
Camp Hiaeleah
Camp Red Cloud
Camp Humphrey
Camp Edwards
Camp Casey
Camp Walker
18th Medical Command
DCSIM, Telemedicine

SHAPE, BELGIUM
Army MTF* & NATO Clinic*

LIVORNO, ITALY
Livorno Health Clinic

VICENZA, ITALY
Army MTF*

BOSNIA
Eagle Air Base

KOSOVO
Camp Bonsteel

AFGHANISTAN

YOKOSUKA, JAPAN
US Naval Hospital

AGANA, GUAM
US Naval Hospital

UNITED STATES - ARMY

5 HONOLULU, HAWAII
Tripler Army Medical Center

6 FORT BRAGG, NORTH CAROLINA
Womack Army Medical Center

12 WASHINGTON, D.C.
Walter Reed Army Medical Center

13 FORT DETRICK, MARYLAND
U.S. Army Garrison Fort Detrick - TATRC

14 FORT DETRICK, MARYLAND
APPMO - Army PACS Program Management Office

15 FORT GORDON, GEORGIA
RIS - MEDSITE

16 FORT LEWIS, WASHINGTON
Madigan Army Medical Center

17 FORT SAM HOUSTON, TEXAS
Brooke Army Medical Center

18 FORT GORDON, GEORGIA
Dwight D. Eisenhower Army Medical Center

24 FORT LEE, VIRGINIA
Fort Lee Medical Treatment Facility*

25 FORT BRAGG, NORTH CAROLINA*
DENCOM

26 ENERGY PLAZA, TEXAS*
DENCOM

27 FORT HOOD, TEXAS*
DENCOM

28 FORT DRUM, NEW YORK*
DENCOM

32 HONDURAS
JTF-Bravo - Soto Cano Air Base

UNITED STATES - NAVY

3 CAMP PENDLETON, CALIFORNIA
US Naval Hospital

4 TWENTY-NINE PALMS, CALIFORNIA
US Naval Hospital

7 CHERRY POINT, NORTH CAROLINA
US Naval Hospital

8 CAMP LEJEUNE, NORTH CAROLINA
US Naval Hospital

9 GUANTANAMO BAY, CUBA
US Naval Hospital

10 CELBA, PUERTO RICO
Roosevelt Roads, US Naval Hospital

11 JACKSONVILLE, FLORIDA
Radiation Health Dept., US Naval Hospital

12 USS RONALD REAGAN

22 BETHESDA, MARYLAND
Naval Telemed Business Office

23 USS DWIGHT D EISENHOWER

UNITED STATES - AIR FORCE

1 FORT WAINWRIGHT, ALASKA
Eielson Air Force Base

19 WICHITA, KANSAS
McConnell Air Force Base*

20 ROSAMOND, CA
Edwards Air Force Base*

21 NORTH CAROLINA
Shaw Air Force Base*

29 WYOMING
FE Warren Air Force Base*

30 NEW MEXICO
Cannon Air Force Base*

31 GREENLAND
Thule Air Force Base*

Features

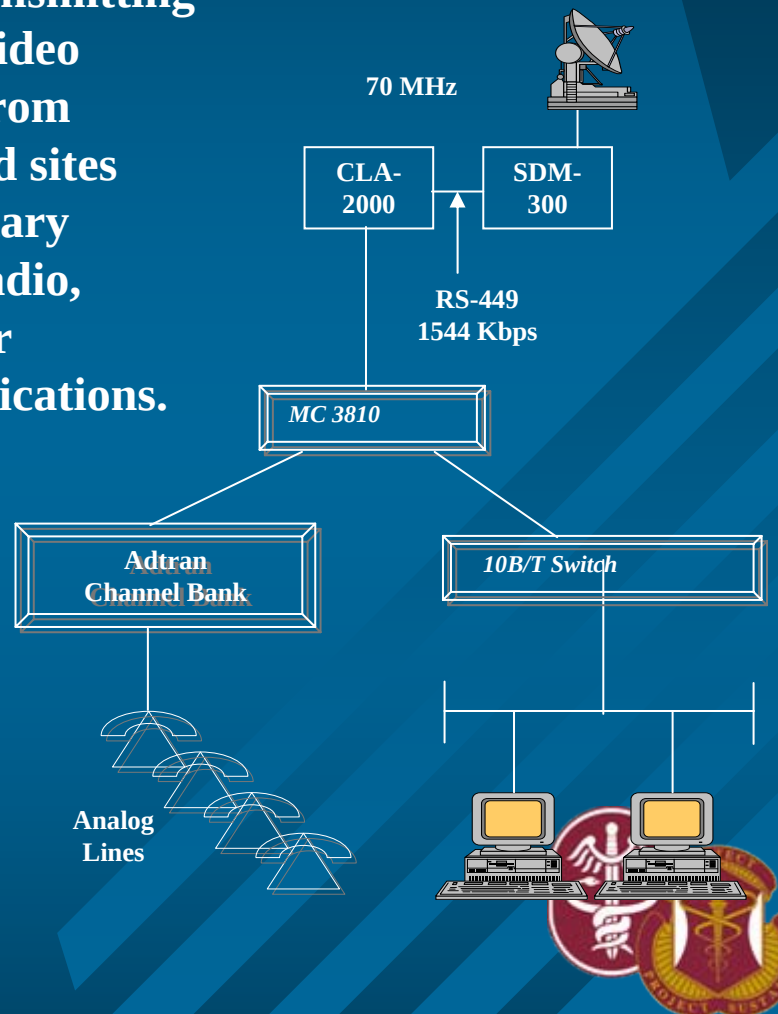
- Integrated Encryption Engine
- Integrated Compression
- Integrated Webserver
- Integrated DICOM Workflow
- Virtual Reading Room
- At Home, Secure Teleradiology
- Integrated Report Delivery
- Integrated CHCS Tunneling
- Integrated Broker Routing
- Integrated Output to Self Playing CD Devices and USB Drives
- Integrates with Existing PACS: AGFA, G.E., Philips, Siemens
- Secure , Self-Recovering DICOM Study Delivery

Medweb
DISTRIBUTED TELEMEDICINE

Brigade Remote Subscriber System (BRSS)

Description:

The BRSS is capable of receiving and transmitting voice, data and video simultaneously from multiple deployed sites using either military or commercial radio, wired, wireless or satellite communications.



Capabilities:

- **24 Local telephones**
  - Internal calling
  - External world-wide dialing
- **Internet Access**
- **Video Conferencing**
- **Secure Communications**

Teleradiology

Orex CR

- Proven technology
- Two MEDWEB RaQ 4 Servers connected to Landsthul RMC PACS
  - Compact Disk (CD) Printer
  - CD Writer
  - CT
  - Ultrasound
    - Hand held device
- Enables networking with other theater medical facilities
  - Secondary read
  - Consultation
  - Archiving
- Is the one telemedicine tool that is widely recognized (reimbursed by HCFA & private insurance companies).

Kodak

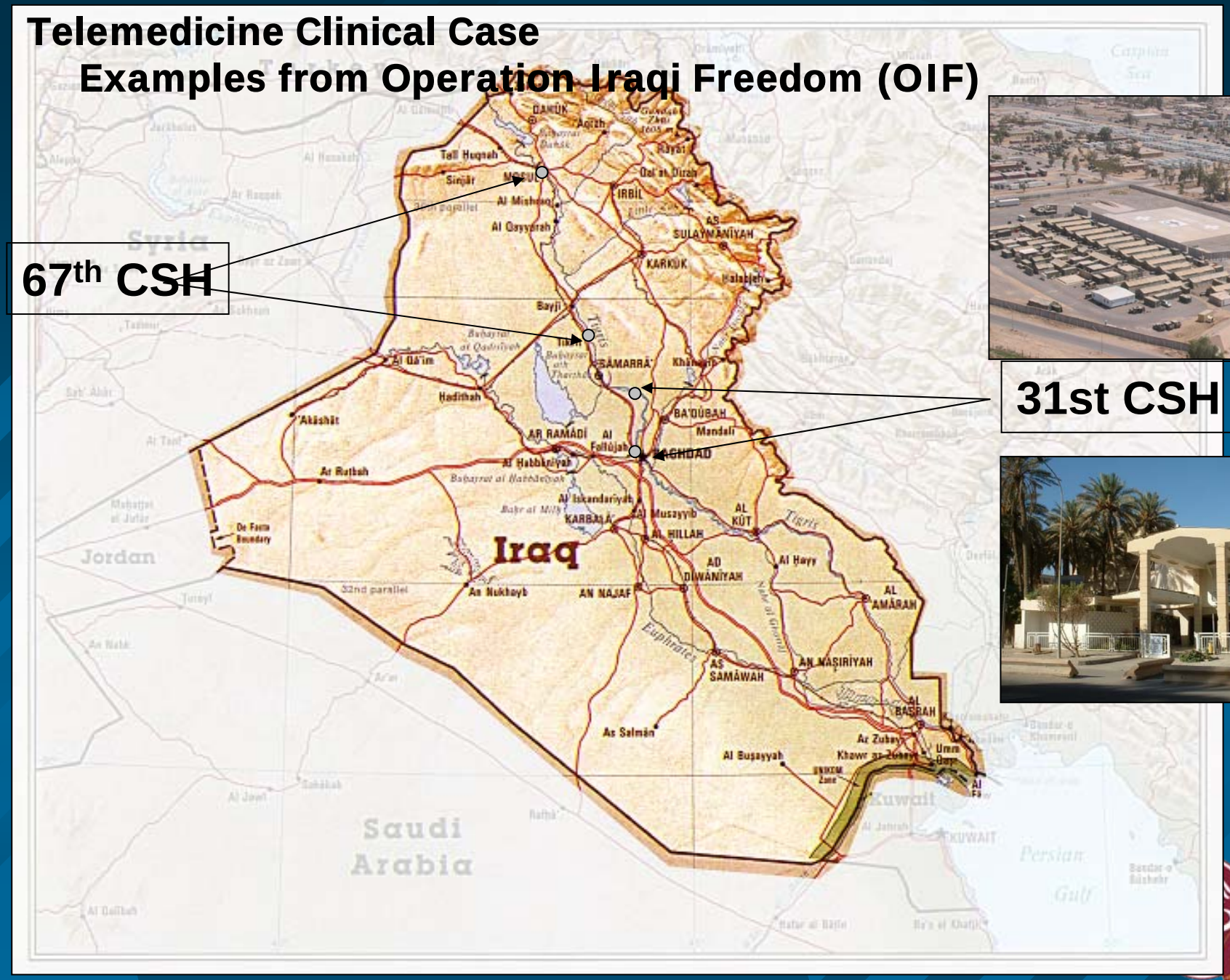
ACR 2000

MEDWEB RAQ-4

Tele-Neurosurgery

- **No neurosurgeon at LRMC or OEF to support theater**
- **VTC capability**
  - German hospital at Homburg for tele-consult to WRAMC
  - 452nd CSH in OEF theater (operational)
  - ~$26K per VTC unit
- **Opportunity to leverage bandwidth (in place - OEF)**

Telemedicine Clinical Case
Examples from Operation Iraqi Freedom (OIF)



Digital Radiology System
31st CSH - Balad

Digital Radiology System
31st CSH - Baghdad

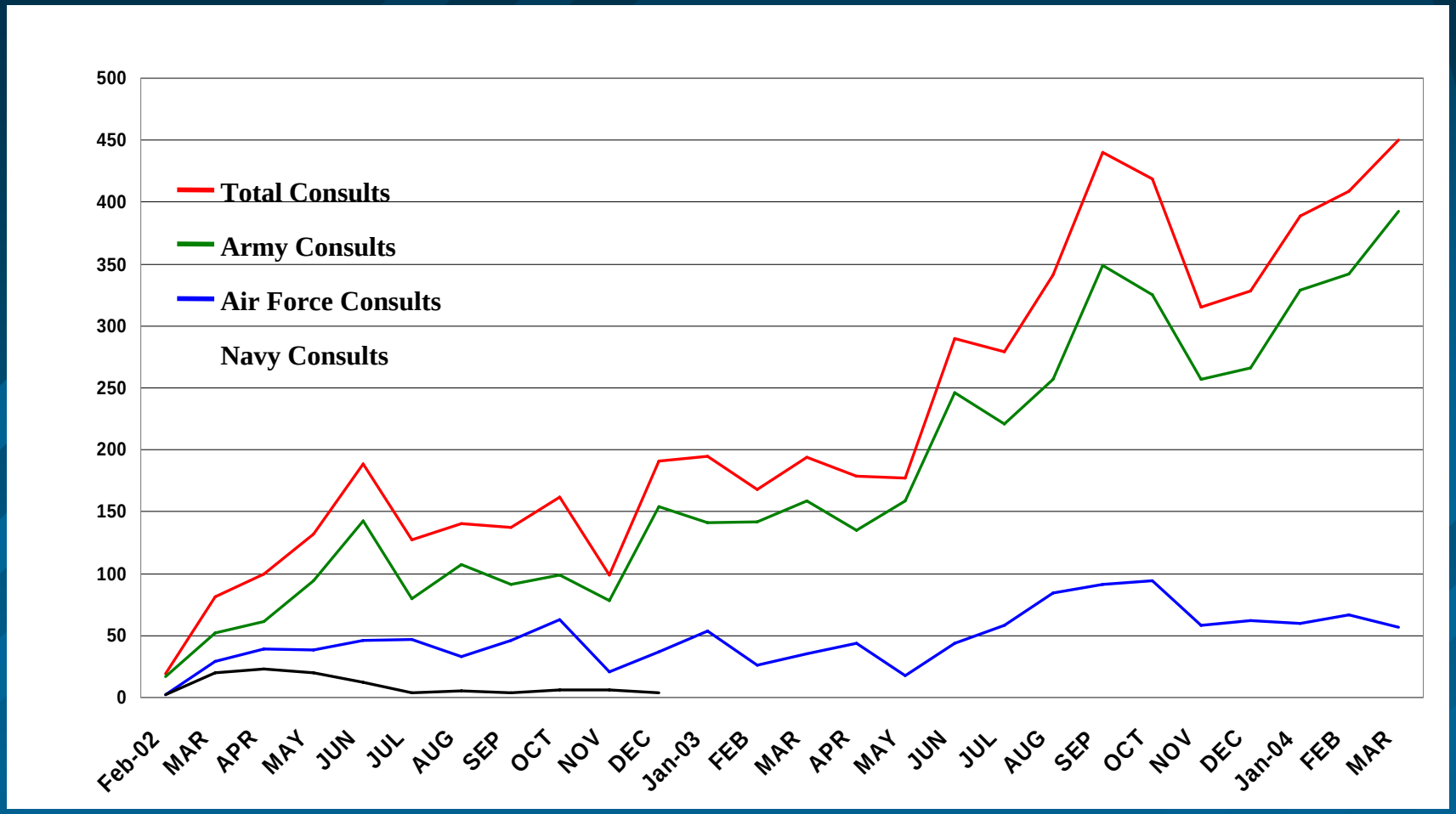
Leishmaniasis

Localized Rxn after Vaccination

Psoriasis

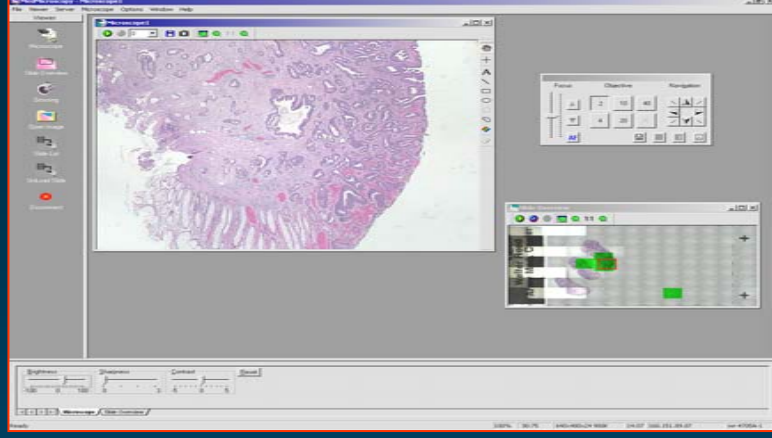
AMEDD Teledermatology Deployments – FY98-00

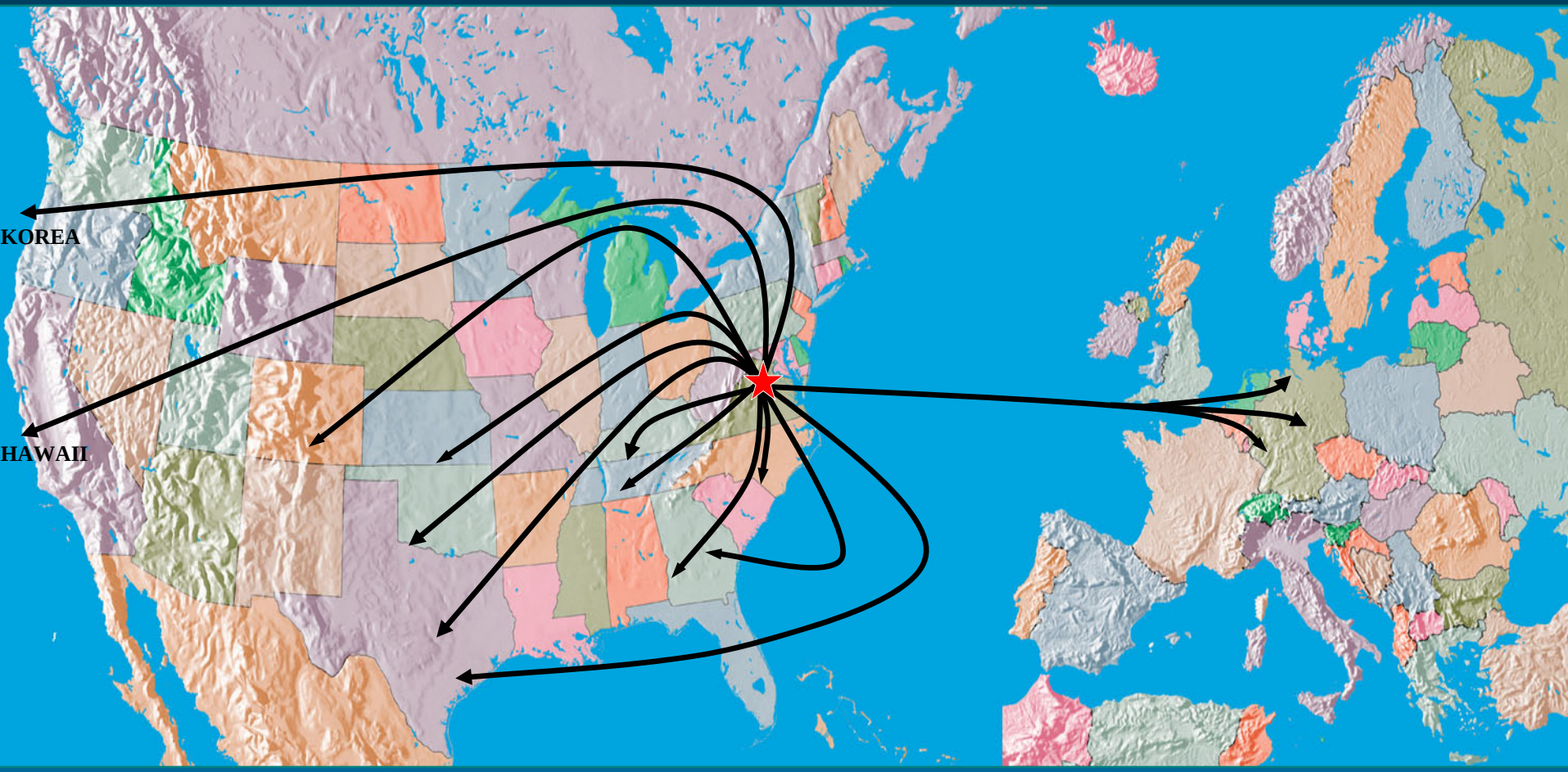
Great Plains Regional Medical Center (GPRMC) Teledermatology



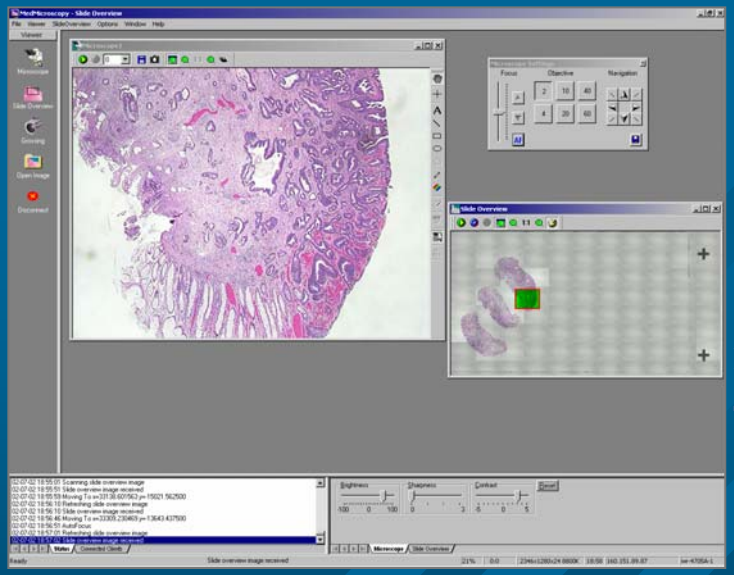
Feb 2002 – Mar 2004 – 5,950 consults answered
Would have cost $495,814 if purchased in network (ave. cost $83.33)

AMEDD Telepathology Site Locations





AMEDD Telepathology Program



Photos courtesy of

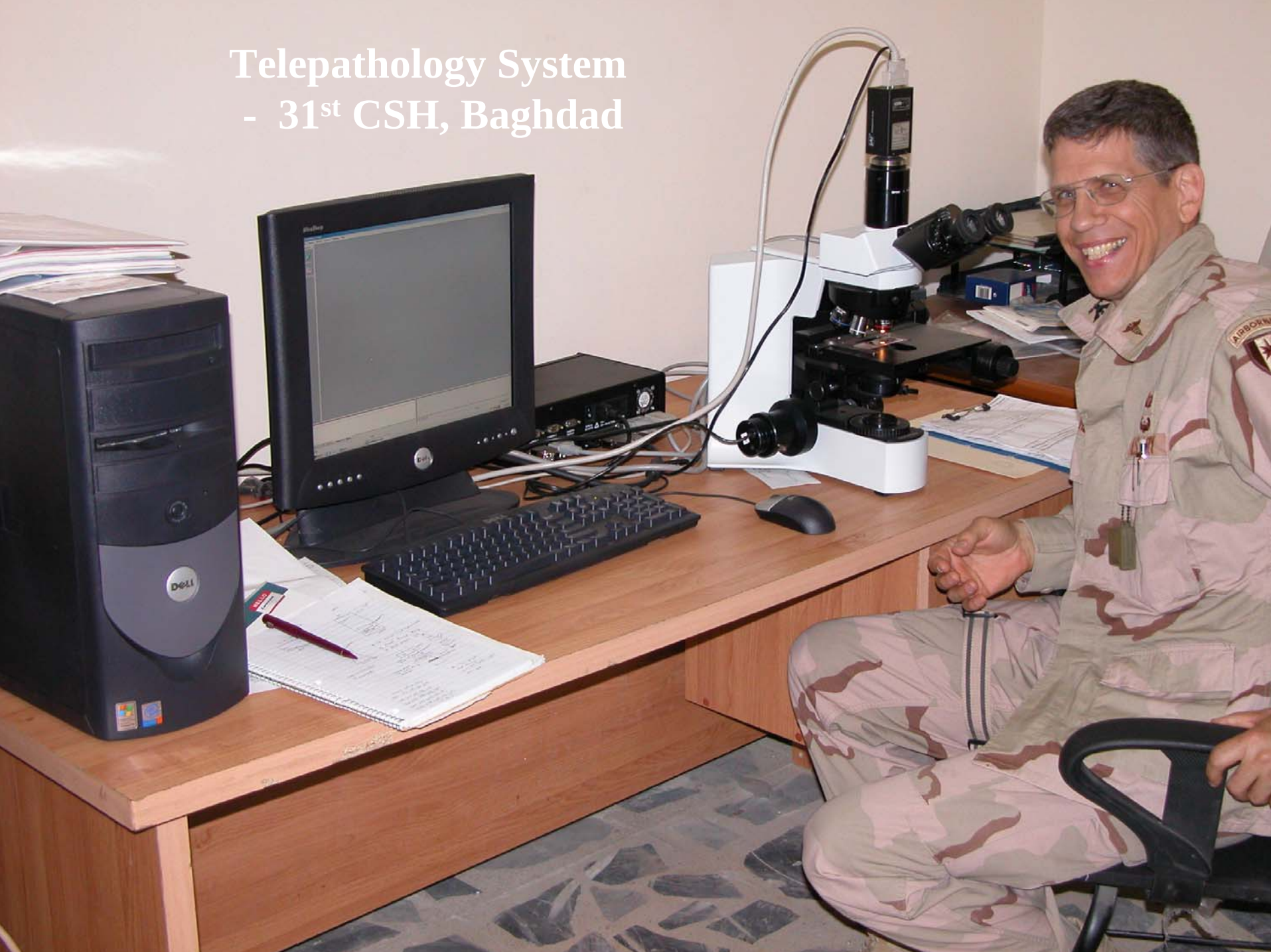
The Trestle Corporation

TRESTLE™

AMEDD Telepathology Consults to AFIP

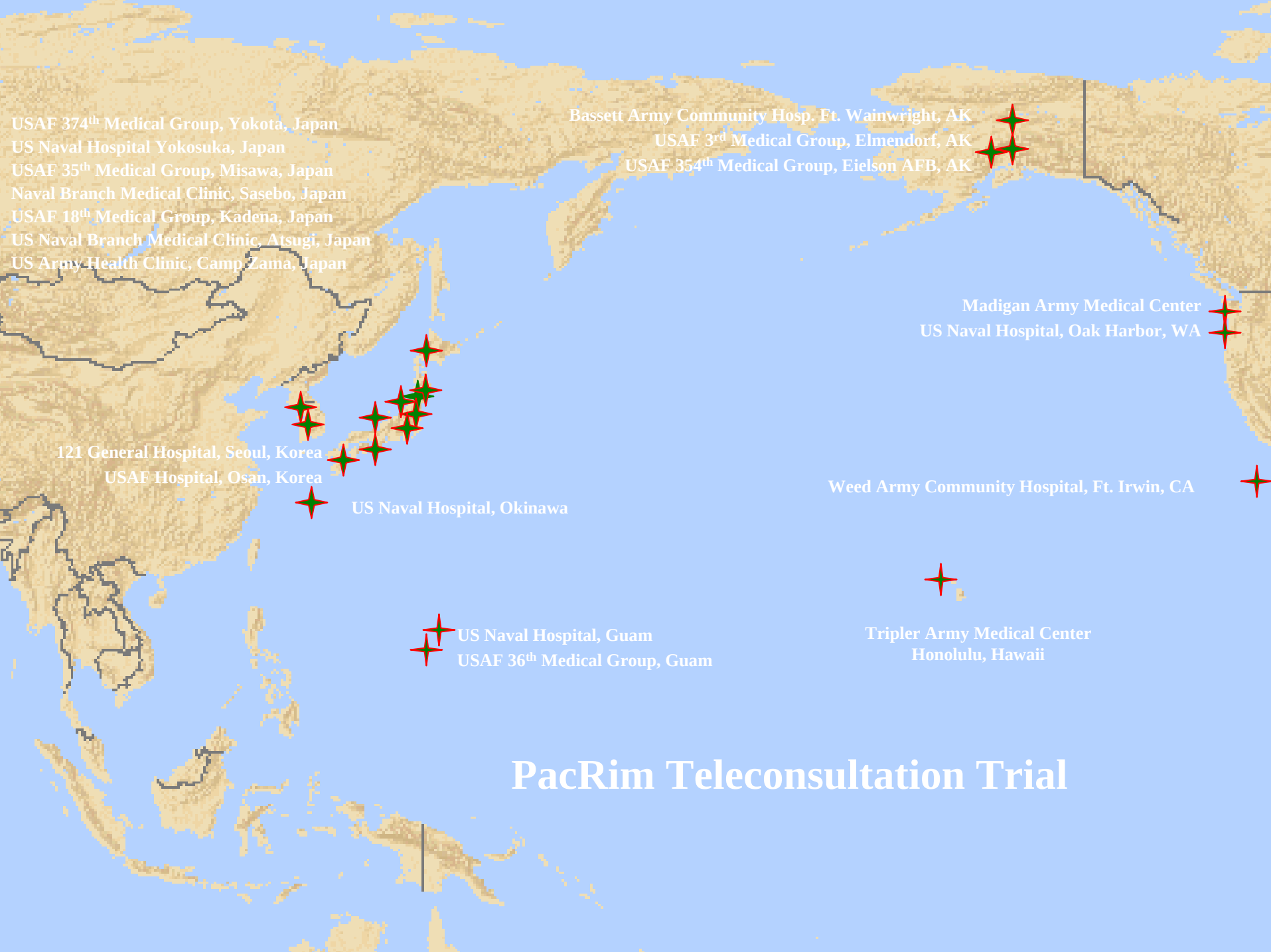
Region	Site	Jan 2003	Feb 2003	Mar 2003	Apr 2003	May 2003	Jun 2003	Jul 2003	Aug 2003	Sep 2003	Oct 2003	Nov 2003	Dec 2003	Jan 2004	Feb 2004	Mar 2004	Site Totals	
NARMC																		
	WRAMC, DC	6	4	4	6	2	7	5	0	2	9	7	5	2	2	7	**68**	
	Fort Bragg, NC	1	1	0	1	1	1	0	0	0	0	0	0	0	0	0	**5**	
	Fort Knox, KY	3	5	3	1	4	1	2	3	6	2	2	2	1	3	6	**44**	
																		117
SERMC																		
	Fort Benning, GA	2	7	0	1	7	0	1	0	0	1	4	2	1	1	1	**28**	
	Fort Campbell, KY	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6	**6**	
	Fort Jackson., MI	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	**1**	
	DDEAMC, GA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	**1**	
																		36
GPRMC																		
	BAMC, TX	NA	0	0	0	0	0	0	0	0	0	1	0	1	2	0	**4**	
	Fort Carson, Co	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	1	**2**	
	Fort Hood, TX	NA	2	3	3	0	0	0	0	0	0	0	0	0	0	0	**8**	
	Fort Riley, KS	NA	NA	NA	NA	NA	NA	NA	NA	NA	3	1	0	0	0	0	**4**	
	Fort Sill, OK	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	1	1	1	2	2	**8**	
																		26
Pacific																		
	Seoul, Korea	NA	0	5	5	4	0	2	0	1	3	2	4	3	2	4	**35**	
	Tripler, HI	?	2	1	6	0	0	1	0	0	0	0	1	0	0	3	**14**	
																		49
Europe																		
	LRMC, Germany	0	0	0	0	0	0	0	0	0	0	3	5	4	2	0	**14**	
	Heidelberg, Germany	4	5	1	1	1	3	2	0	1	4	1		0	0	2	**25**	
	Wuerzburg, Germany	7	5	3	4	6	0	0	0	6	3	6	3	4	4	8	**59**	
																		98
	Totals:	**23**	**31**	**20**	**28**	**25**	**12**	**13**	**3**	**16**	**26**	**28**	**23**	**17**	**19**	**42**		----------
																	Total:	**326**

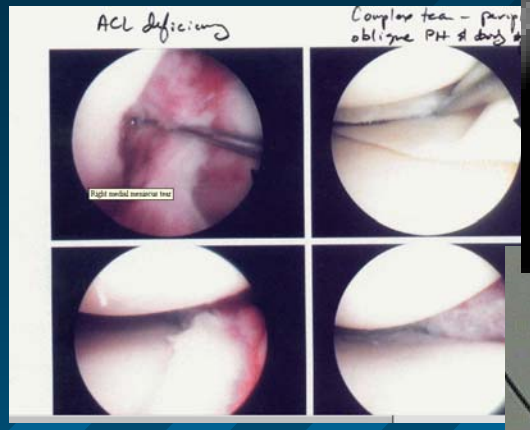
Telepathology System - 31st CSH, Baghdad

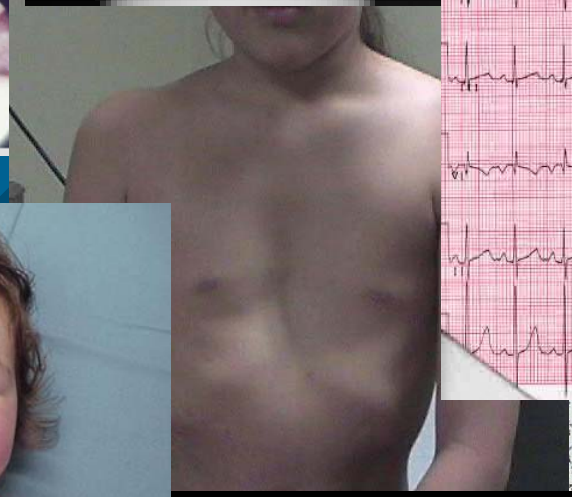


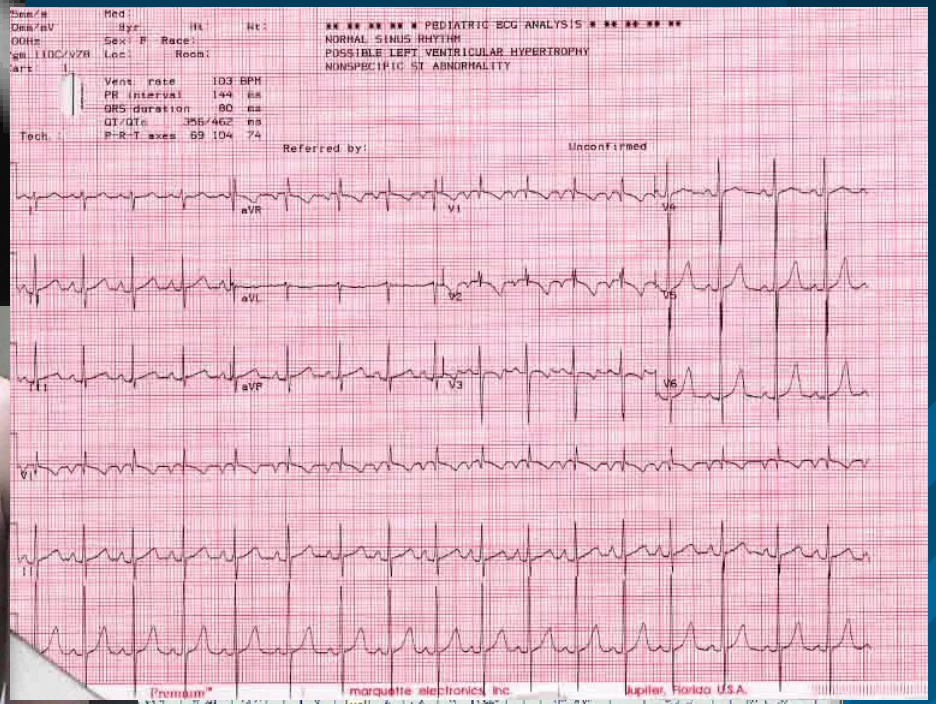
Tripler Army Medical Center
Honolulu, Hawaii
Pediatric Telemedicine Consultation Service

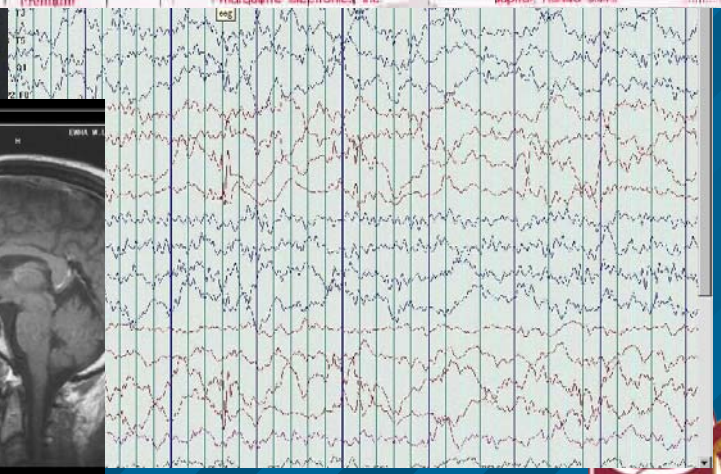
Electronic Children's Hospital of the Pacific
"ECHO-Pac"

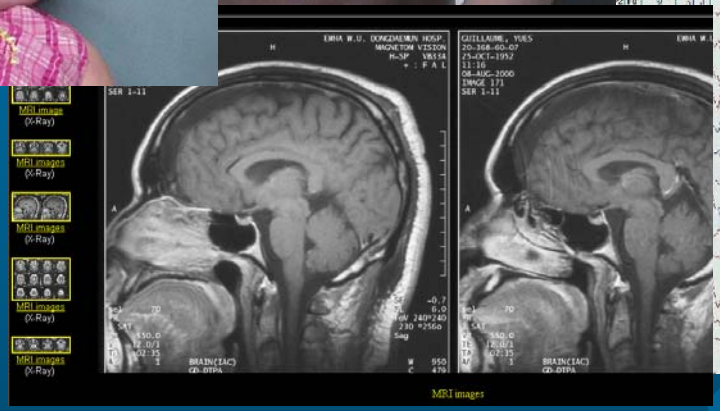

USAF 374th Medical Group, Yokota, Japan
US Naval Hospital Yokosuka, Japan
USAF 35th Medical Group, Misawa, Japan
Naval Branch Medical Clinic, Sasebo, Japan
USAF 18th Medical Group, Kadena, Japan
US Naval Branch Medical Clinic, Atsugi, Japan
US Army Health Clinic, Camp Zama, Japan
Bassett Army Community Hosp. Ft. Wainwright, AK
USAF 3rd Medical Group, Elmendorf, AK
USAF 354th Medical Group, Eielson AFB, AK
Madigan Army Medical Center
US Naval Hospital, Oak Harbor, WA
121 General Hospital, Seoul, Korea
USAF Hospital, Osan, Korea
US Naval Hospital, Okinawa
Weed Army Community Hospital, Ft. Irwin, CA
US Naval Hospital, Guam
USAF 36th Medical Group, Guam
Tripler Army Medical Center
Honolulu, Hawaii
PacRim Teleconsultation Trial


ACL deficiency




** ** ** ** * PEDIATRIC ECG ANALYSIS * ** ** ** **
NORMAL SINUS RHYTHM
POSSIBLE LEFT VENTRICULAR HYPERTROPHY
NONSPECIFIC ST ABNORMALITY
Vent. rate 103 BPM
PR interval 144 ms
QRS duration 80 ms
QT/QTc 356/462 ms
P-R-T axes 69 104 74
Referred by:
Unconfirmed
aVR
V1
V4
aVL
V2
V5
aVF
V3
V6
Premium
marquette electronics, inc.
Jupiter, Florida U.S.A.




MRI images

Results: Pac Rim Trial (Oct 02-Oct 03)

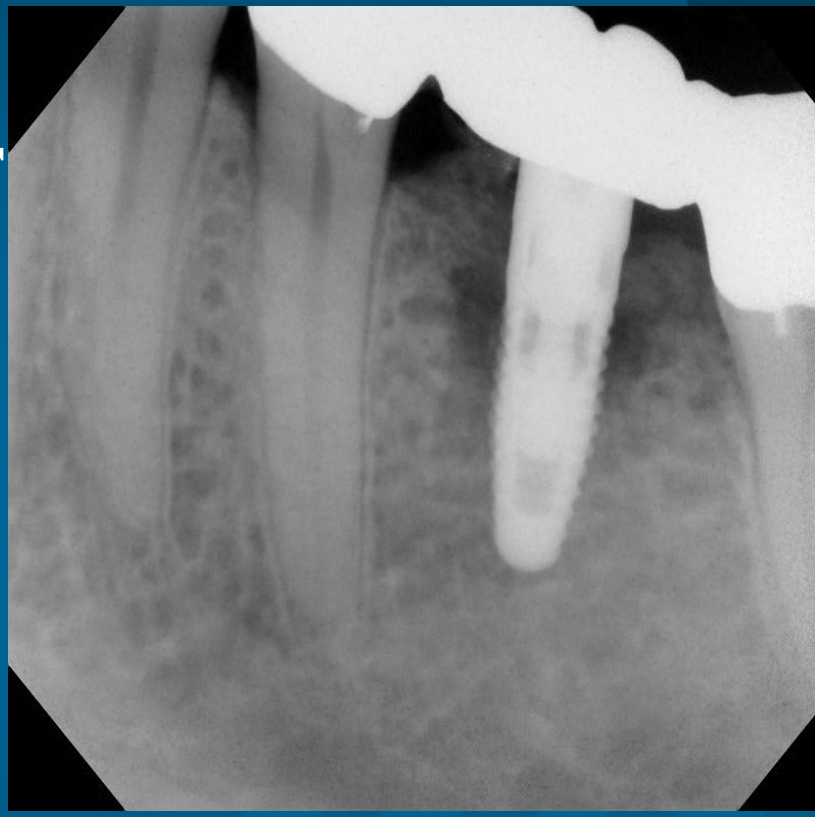
Impact on Cost of Care

- **Physician Review Panel (267 study cases)**
  - 12% (32/267) patients A/E routine
  - Air Evacuation Cost Savings (flight and per diem only)
    - Flight cost $1977 x 2 $3954
    - Per diem cost $184 x 10 days $1840 (Total $5794 / flight)
    - Total for 32 patients $185,408
  - **Projected Network Costs (100% referral, $152 initial, $91 f/u CMAC)**
    - Network Costs (1.48 f/u consult) $76,544
  - **Total Savings** $261,952
    - Initial TATRC Grant Cost $183,779

- **Practitioner Review Misawa (56 cases)**
  - 61% (34/56) patients sent by routine A/E ($196,996 saved)

Tele-Dentistry in OIF2 Theater

- Widely deployed in OIF2 theater
- Clinical uses:
  - Tele-consultation
  - Human remains ID
    (Panorex sent to Dover AFB)

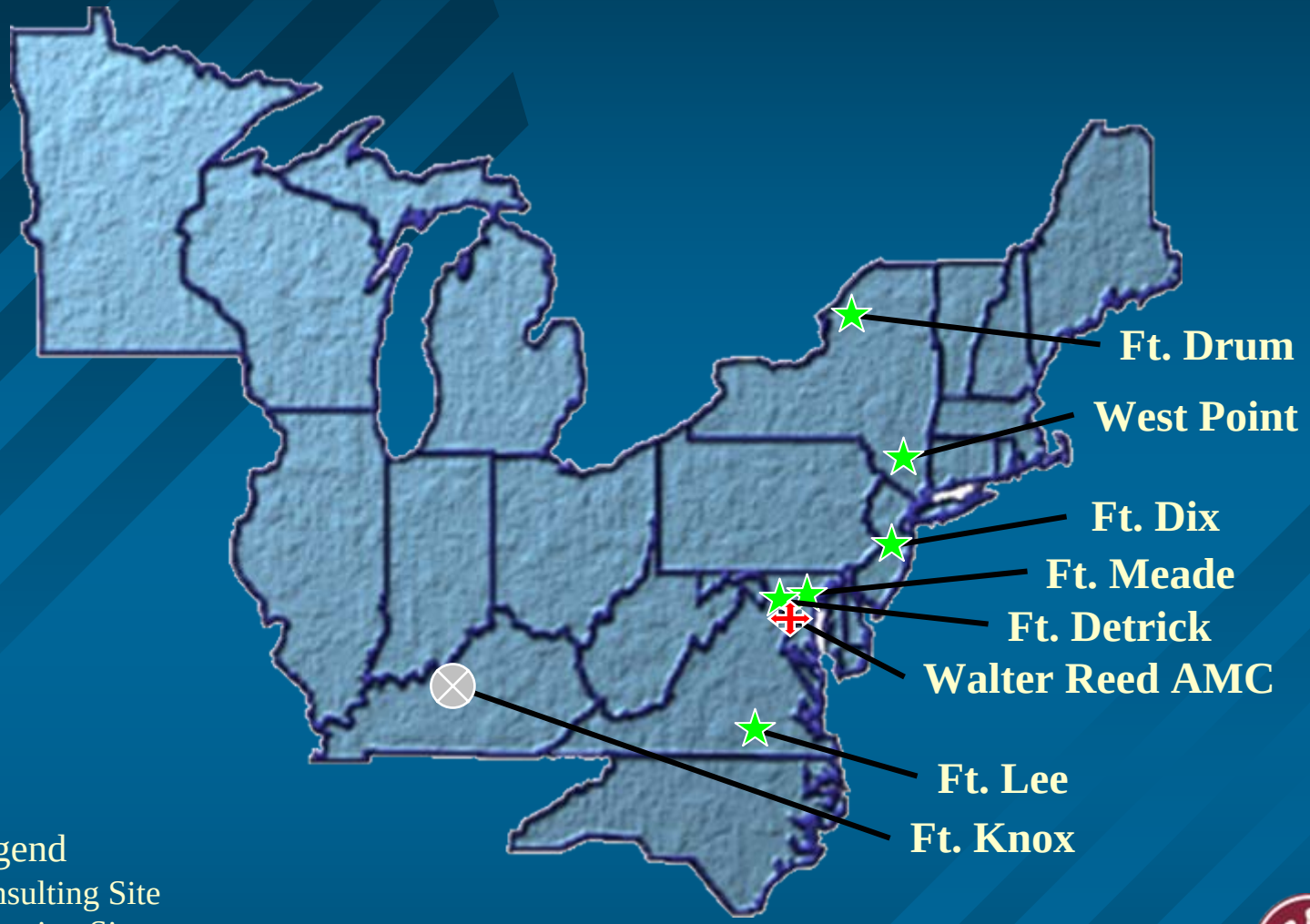


Dental image from 31st CSH - Baghdad

Teledentistry
31st CSH - Baghdad

Digital Cardiac Echocardiography
31st CSH, Baghdad

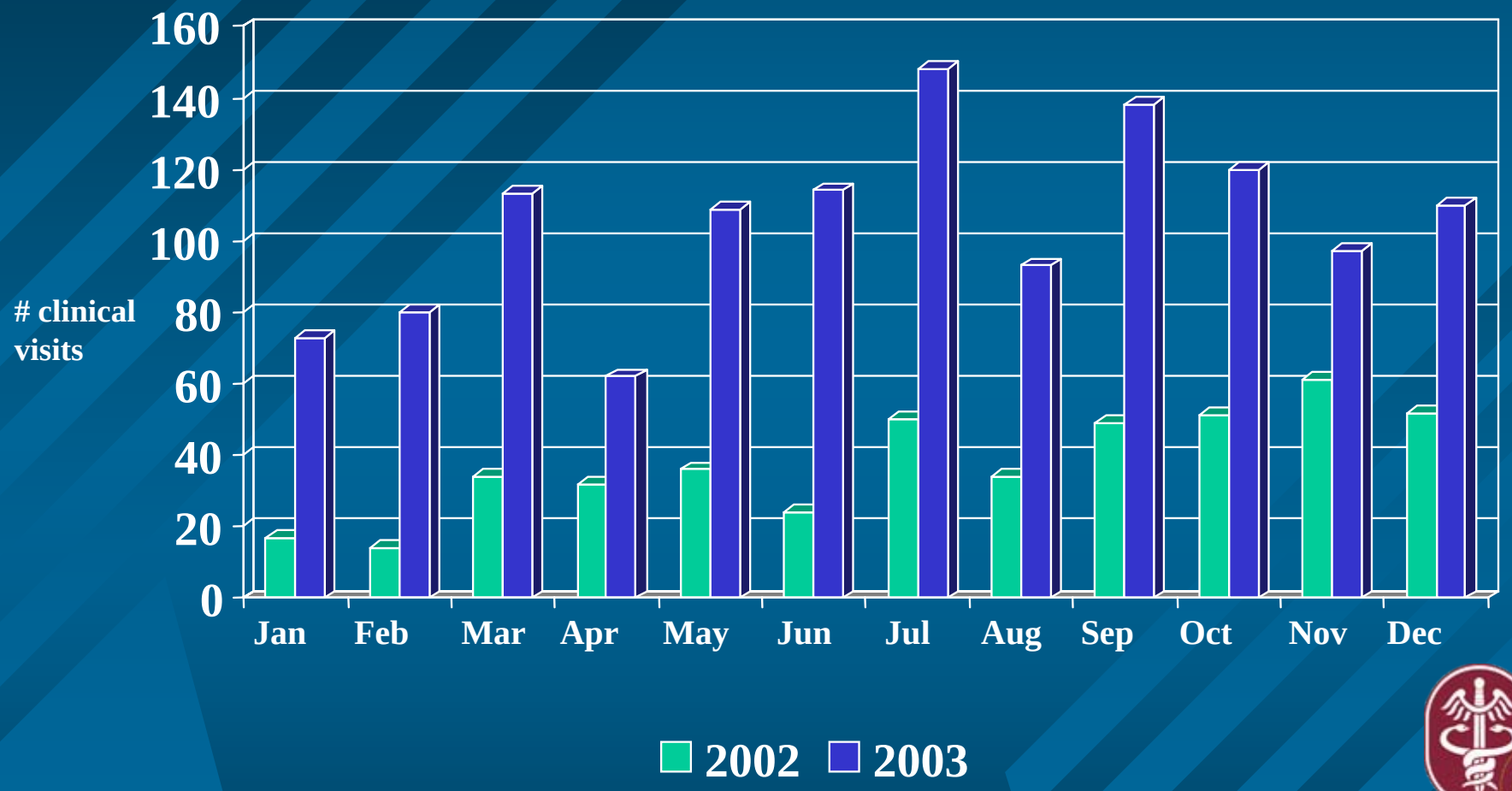
North Atlantic Regional Medical Command
Adult and Child Psychiatry Support



Legend
- Consulting Site
- Referring Site
- Scheduled Site

NARMC Telebehavioral Health Virtual Clinic

VTC Clinical Workload Comparison



The PDA in the Medical Information Environment

Point of care patient information

Evidence-based medicine

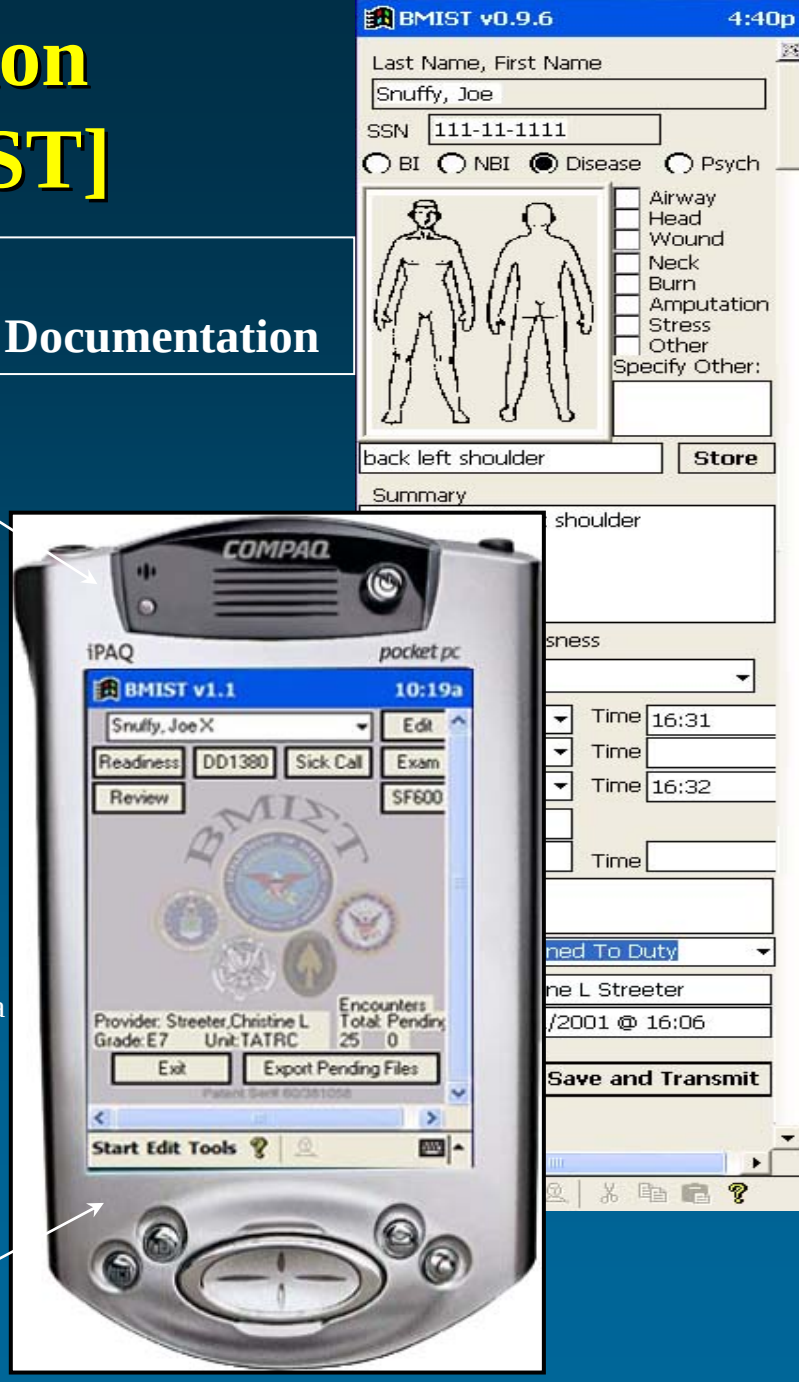
Research support

Administrative (billing) support

Battlefield Medical Information System – Telemedicine [BMIST]

Point of care
Patient Information & Documentation

- Used by:
  - Stryker Brigade
  - Special Operations Forces Command
  - 325th Airborne Regiment
  - White House Medical Unit
  - U.S. Army Center for Health Prevention and Prevenative Medicine
  - U.S. Air Force units
  - U.S. Marine Corps units
  - U.S. Navy units
  - Program Executive Office DOD Health Affairs - Integration lab
  - AMEDD Center and School - Directorate of Combat and Doctrine Development
  - AMEDD Advanced Noncomissioned Officers Course
- Adopted by the DOD Health Affairs Theater Medical Information Program (TMIP)
- Warfighter Personal Status Monitor (WPSM)
  - Collection device for the sensor suite
  - U.S Army Institute of Surgical Research (ISR) developing integrated trauma algoritms on BMIST- scheduled to be part of the Advanced Technology demonstration for WPSM
  - 25th Airborne Regiment
- Other apps being developed for :
  - Behavioral Health
  - Veteranarians
  - Medical Maintenance



Evidence-based medicine

SFEMH – Just in Time References

Problem-based, Solution-Oriented

SOFMH 10:55

Table of Contents

- Introduction
- Part 1 Operational Issues
- Part 2 Clinical Process
- Part 3 General Symptoms
- Part 4 Organ Systems
- Part 5 Specialty Areas
- Part 6 Operational Environments
- Part 7 Trauma
- Part 8 Procedures
- Appendices

Skyscape ™ Navigation

- Table of Contents
- Comprehensive Index
- Medication Index

Medication –> Indication

Image Index in Final

S-O-A-P Navigation

Forward and Back Buttons

Top bar navigation icons

* Skyscape™ – developed the five minute medical consult system for Pocket PC

*SOFMH date March 200

COTS Cost - $ 69.00

SOFMH 10:55

Main Index

Main Index
Medication Index
Table of Contents

Abdomen, acute pain in, assessme...
Abdomen, acute pain in, field man...
Abdomen, acute pain in, follow-up
Abdomen, acute pain in, patient e...

look for:

File Edit View Tools Help

SOFMH 12:07

Smallpox Biologic...

Objective: Signs

Using Basic Tools: Characteristic rash appears 2-3 days after the onset of symptoms; all lesions progress synchronously from macules to papules to pustules, and are concentrated on the hands, face and trunk; fever and mental status changes; complications include viral "sepsis"

SOFMH 12:08

Smallpox Biologic...

Plan

[Show Section Outline]

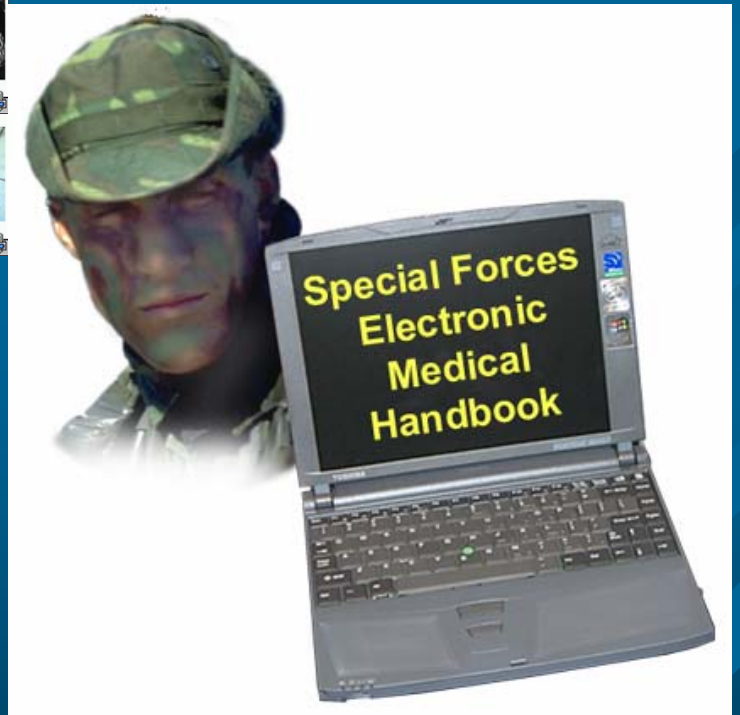
Treatment

Primary:

Supportive (oxygen, intravenous fluids, and antipyretics).

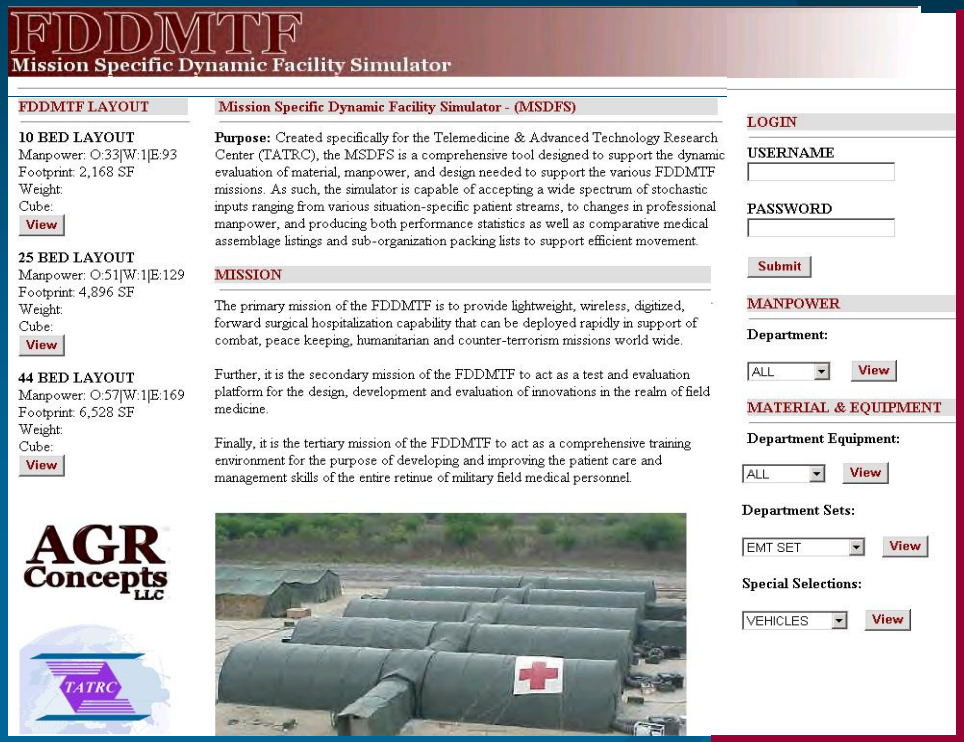
Patient Education

General: Smallpox is contagious. Caregivers should employ airborne and contact precautions when dealing with patients. At a minimum, mask either the casualty or the health-care team and close contacts. Wear gloves when



- **Mission Specific Dynamic Facility Simulator (MSDFS)**
  - Staffing levels and type
  - Facility configuration
  - Logistics management
  - Load planning
  - Real time prediction of:
    - Transportation requirements
    - Weight and cube characteristics
    - Class VIII requirements
    - Equipment requirements
    - Overall unit readiness
- Wirelessly linked to a PDA
  - DEPMEDS database
    - Materiel/TTT files
    - Healthcare time and provider characteristics
- Support to Trauma Critical Care

Special Medical Augmentation Response Teams (SMART)



Management tool

Evaluation tool

Planning tool

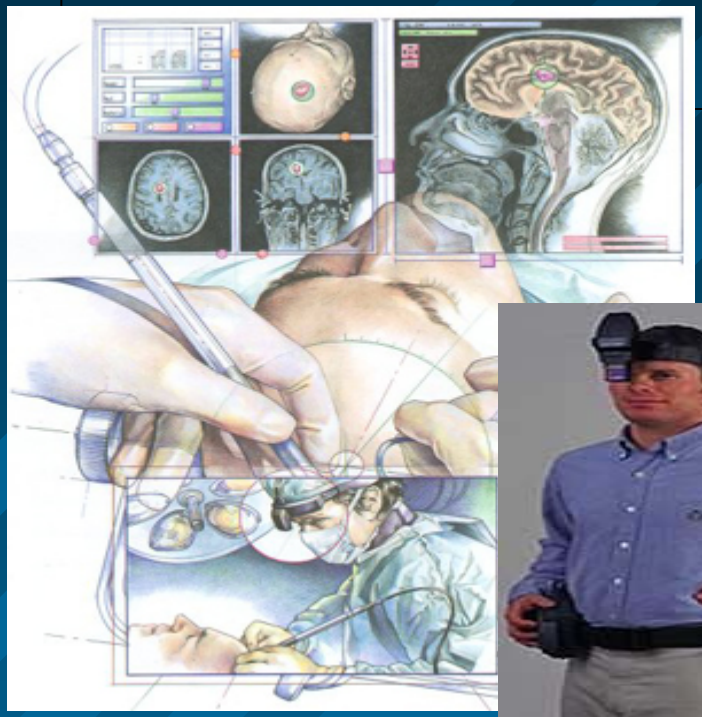
Speech Capable PDA: (PSI)

Wireless Headset and Microphone with Voice Control

Planning System Inc

- **FCS Block I**
- **Item:** Speech capable PDA
- **Capability:** Speech input to provider's PDA; hands free PDA operation
- **Wgt. , cube, & Pwr:** < .25 pound; Powered by rechargable battery
- **User(s):** Combat medic, physician assistant, physician & other providers, FST, FCS Platform, CSH
- **Estimated Schedule:**
  - Prototype Acoustic Array microphone & Speech Recognizer FY04
  - Ruggedized PDA field tests FY06
  - Available for fielding: FY08
- **FDA approval:**
- **Funding:** Congressional
- **SORC Supported:** Sustainability, F(8,15), Agility & Versatility, (C17, 25, 27,28)

Virtual Retina Laser Display



Microvision Inc

Head mounted display allows vehicle commanders and medical staff to view data in a hands-free manner. Used by STRYKER vehicle commanders in Iraq to view FBCB2 without going down into the vehicle.

- **FCS Block I**
- **Item:** Virtual Retina Laser Computer Display
- **Capability:** Hands-free Computer and PDA display
- **Wgt. , cube, & Pwr:** < 1 pound; Powered by rechargable battery
- **User(s):** Combat medic, physician assistant, physician & other providers, FST, FCS platform, CSH
- **Estimated Schedule:**
  - Wired wearable Prototype FY03
  - Ruggedized miniature wireless field tests FY05
  - Available for fielding: FY06
- **FDA approval:**
- **Funding:** Congressional
- **SORC Supported:** Sustainability, F(8,13); Agility & Versatility, (C17, 25, 27,28)

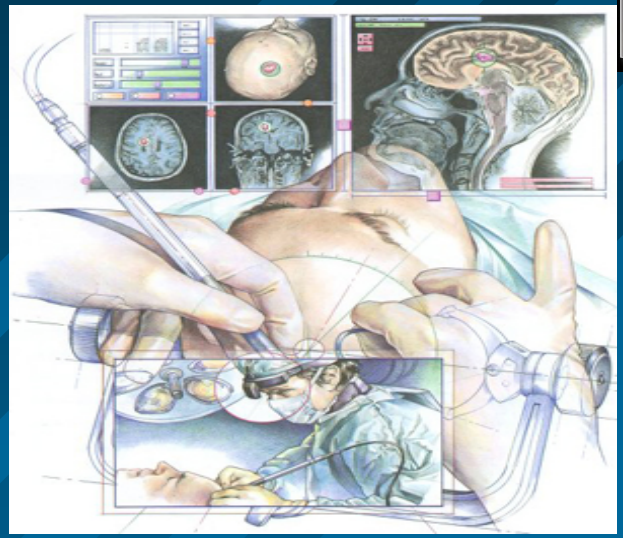
Personal Information Carrier (PIC)

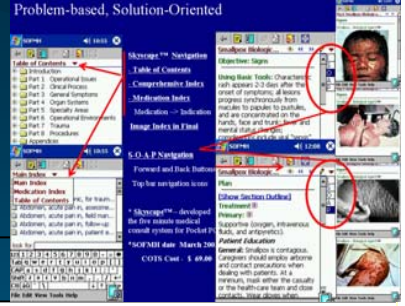
Cost – (option year 2 – 10 Sep 01 to 09 Sept 02)

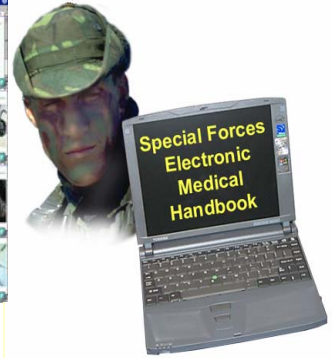
(1) 8mb PIC is $16.81
(2) 16mb PIC is $24.15
(3) 32mb PIC is $34.55
(4) 64mb PIC is $80.85
(5) 96mb PIC is $117.60
(6) 128mb PIC price estimate is not available as of 26 Sep 2001 (NOTE: every 24mb increase should decrease the price by approximately 12%).
(7) PIC PCMCIA adapter is $39.64.

- ***Cross platform compatibility and universal read/write access without special drivers or middleware were objectives.***
- ***Used standard PCMCIA interface and standard OS drivers.***
- ***To be effective will require standard clinical nomenclature, data representation, and security features.***

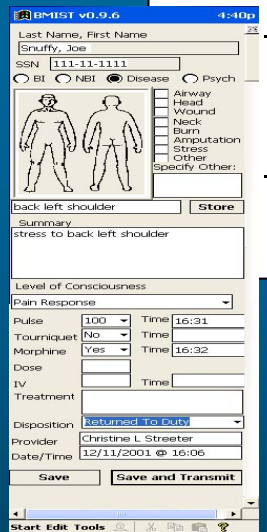
Tomorrow…Today



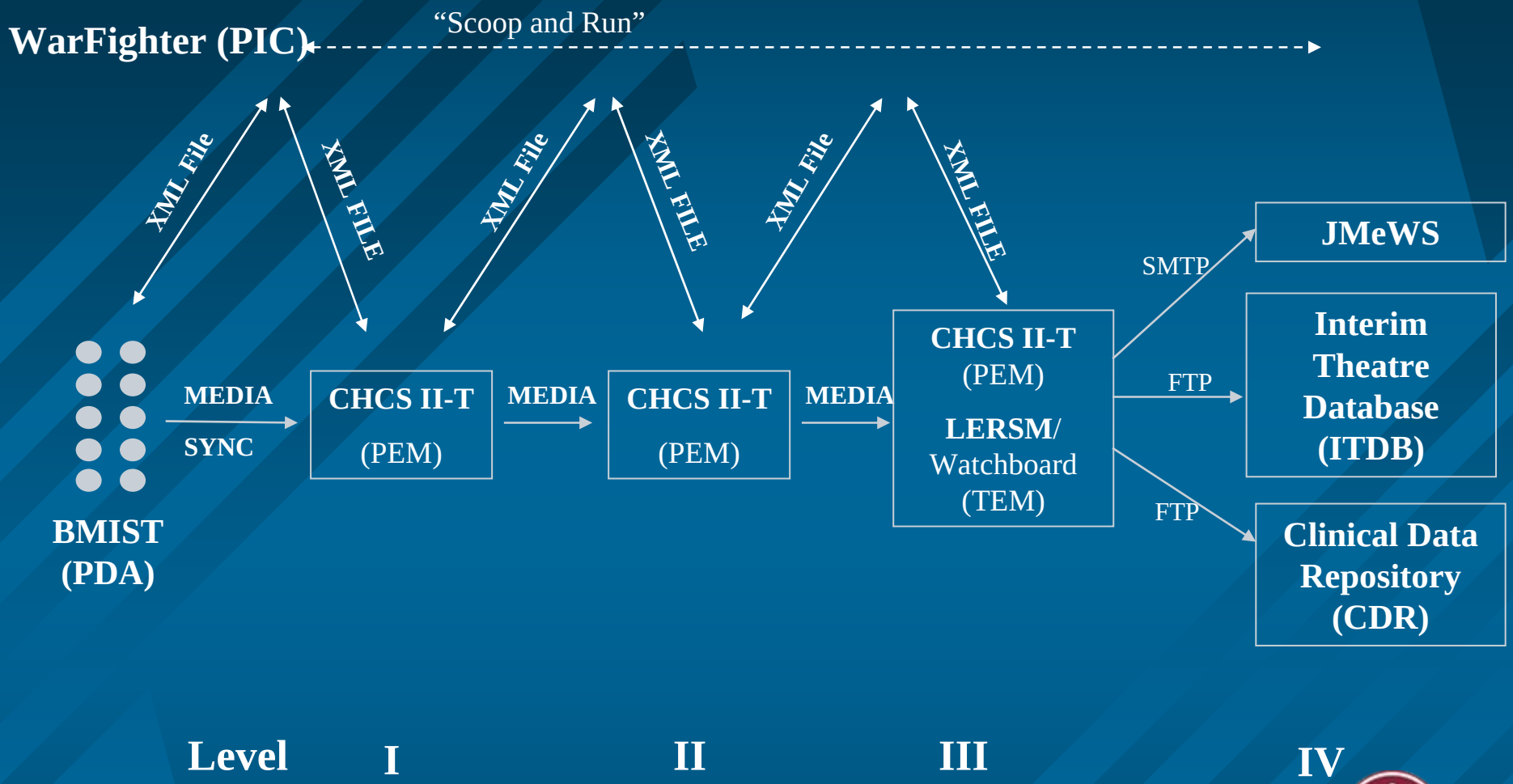




- Integration of
  - BMIS-T
  - Wireless Electronic Information Carrier (EIC)
    - Comprehensive electronic medical reference resource
  - Virtual Retina Scanning Laser Image Display
  - Automatic Speech Recognition (ASR)/NLP
  - Reference Material (i.e. SF Medical Handbook)
  - Physiological Sensors



+ Soldier-Centric Architecture



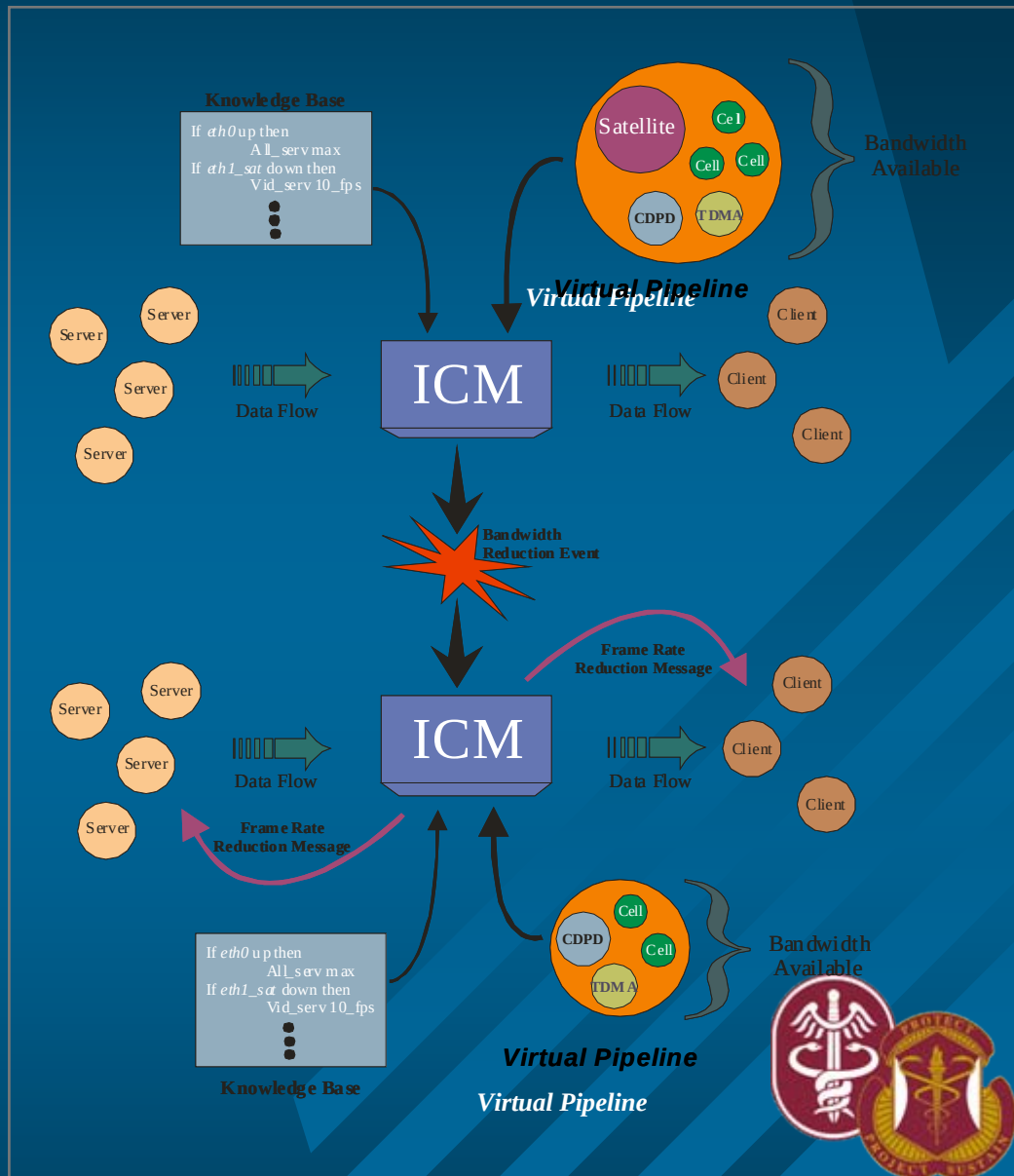
U.S. Military Field Ambulance

DREAMS-UT Houston Health Science Center / Texas A & M

- All medical equipment electronically integrated into single work station monitor.
- Medical equipment integrated with digital patient record, and on-board communications,
- Includes development of satellite antenna to allow sending of video, voice, and data while on the move.
- User evaluation with United States Marines Corps (USMC) Chemical Biological Initial Reaction Force (CBIRF) team completed in June 2003
- Evaluation with Air Force scheduled for December 2004.
- Baseline requirement specification for Future Combat System.

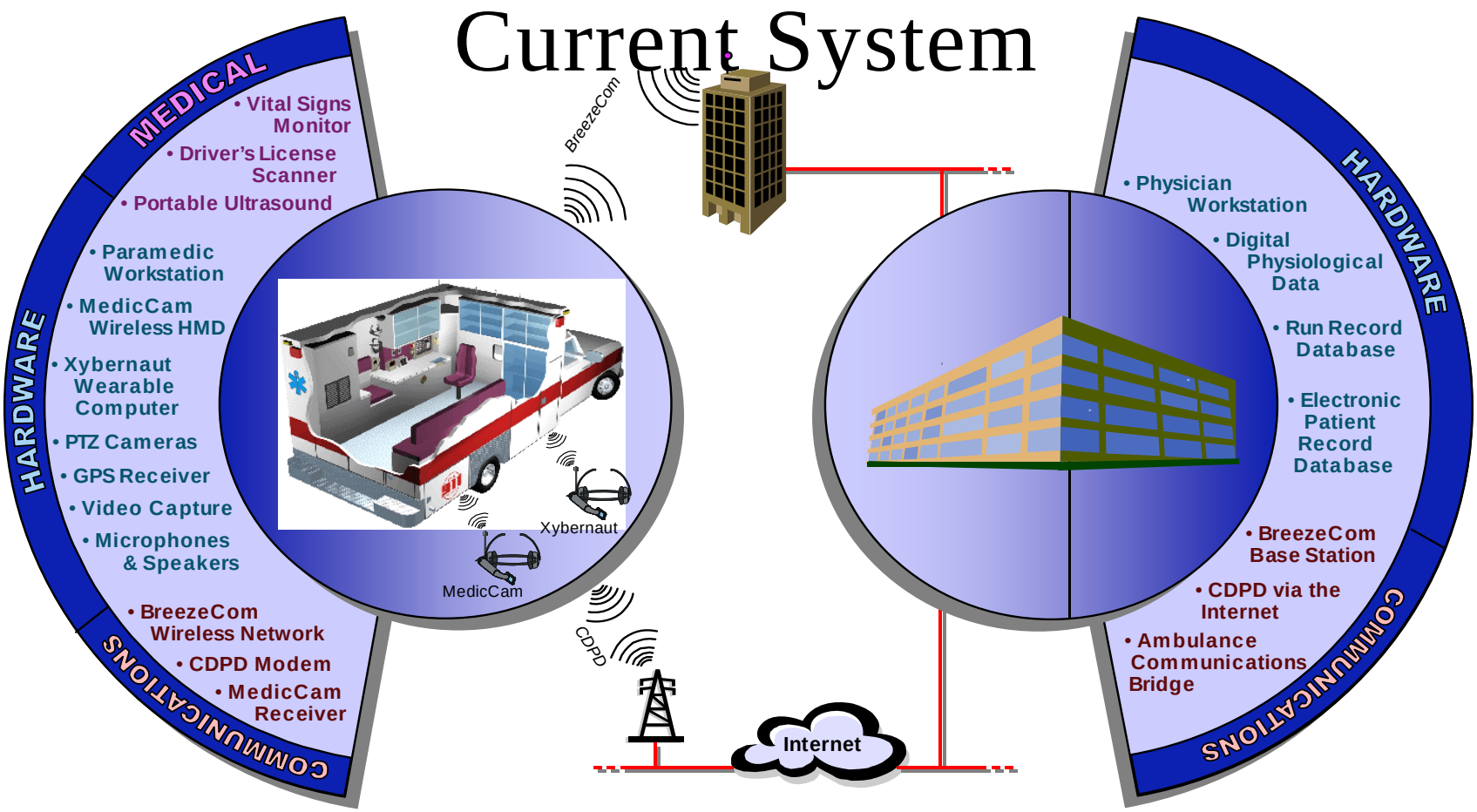
DREAMS: (Texas A & M)
Intelligent Communications Manager (ICM)

- Provides intelligent communications management across multiple heterogeneous devices based on the following parameters:
  - Bandwidth
  - Reliability (Availability)
  - Cost
  - Data priority
  - Rule effects
- Inference engine uses a rule base for making decisions which affect system data providers.
- Applications in the system register with the ICM and expose a controllable interface which is used for management of data streams through a callback interface.



Disaster Relief & Emergency Medical Services (DREAMS)

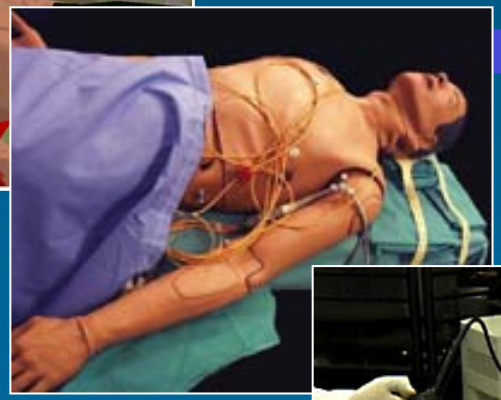
Digital Emergency Medical Services



MULTIPLE TECHNOLOGIES

TO MEET MULTIPLE TRAINING NEEDS

PC-based Interactive VR/Multimedia



Digitally Enhanced Mannequins

Virtual Workbenches

Total Immersion Virtual Reality

VIRGIL - CIMIT

(Army Best Invention 2003)

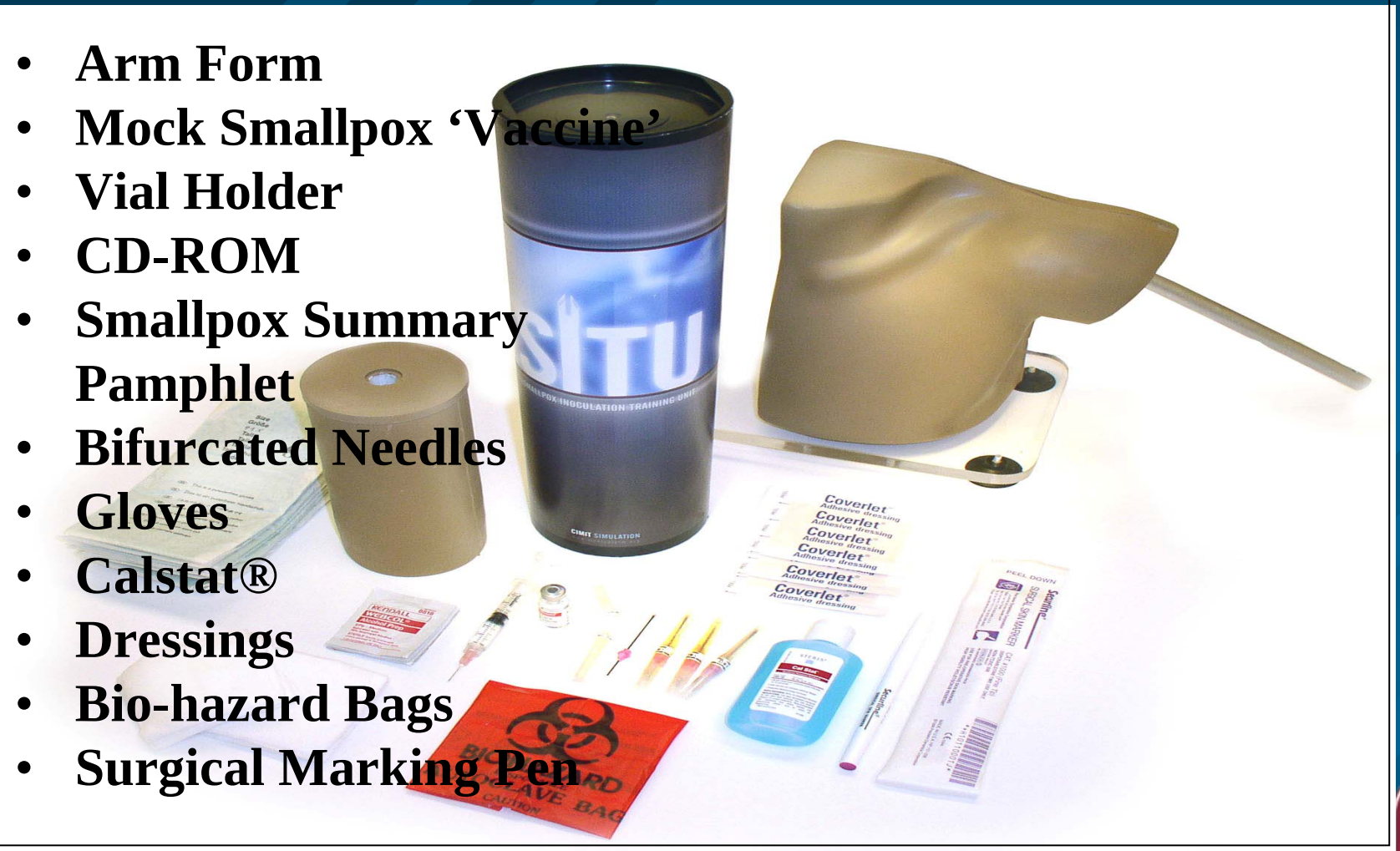
Chest Tube Insertion Simulator

- VIRGIL simulator is being reduced in size to make it “field deployable” and easy to carry into a training situation.
- System is being “ruggedized” to assure reliable performance in real-use situations.
- System is available for field testing and adoption into the DoD training process, including:
  - Simulator
  - Training modules
  - Curriculum

Smallpox Inoculation Training Unit (SITU) - CIMIT

Kit contents include

- **Arm Form**
- **Mock Smallpox 'Vaccine'**
- **Vial Holder**
- **CD-ROM**
- **Smallpox Summary Pamphlet**
- **Bifurcated Needles**
- **Gloves**
- **Calstat®**
- **Dressings**
- **Bio-hazard Bags**
- **Surgical Marking Pen**

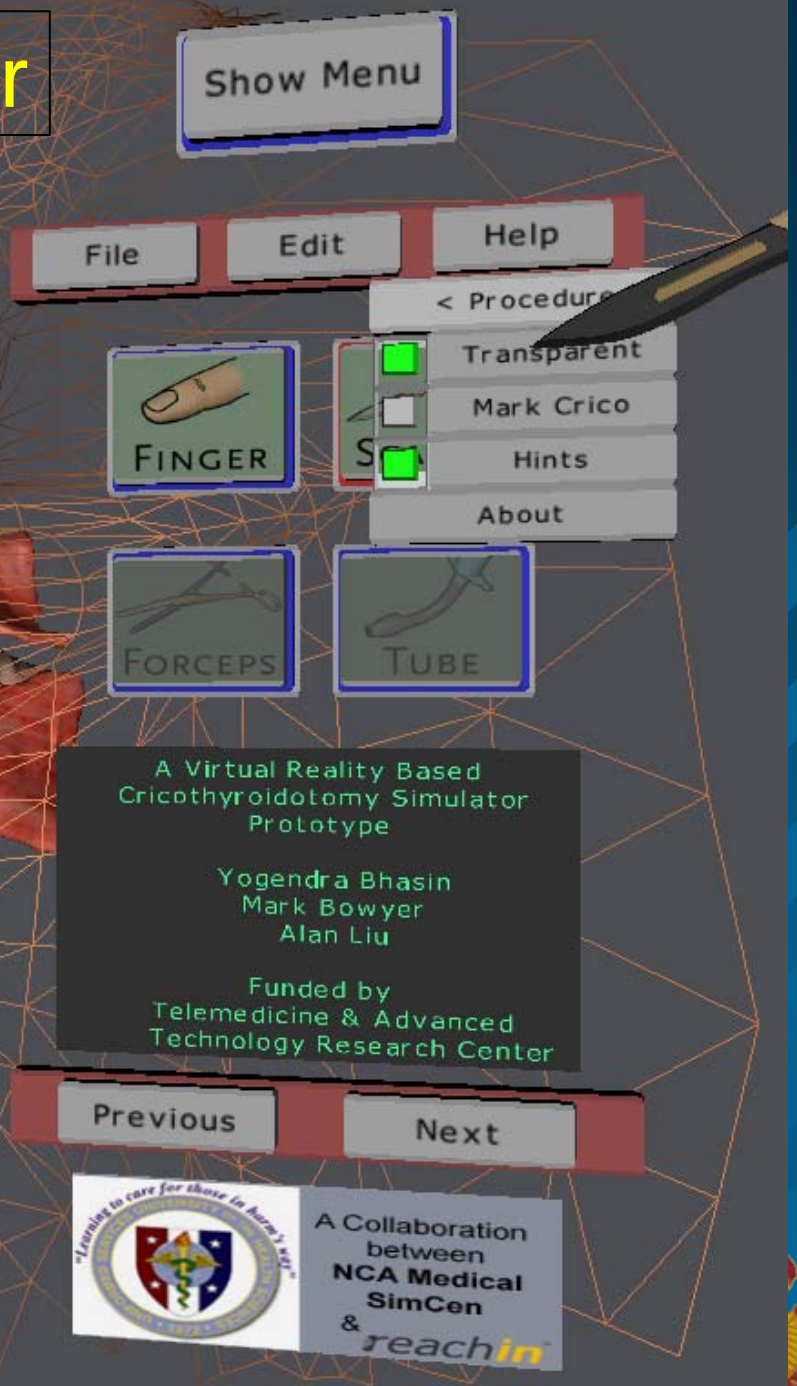


(NO hazardous materials in the kit.)

Cricothyroidotomy Simulator

Cricothyroidotomy Simulator

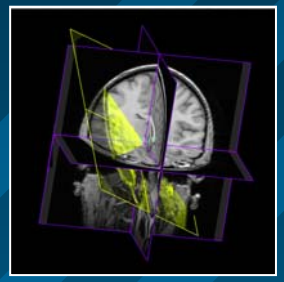
- Simulate cricothyroidotomy procedure using virtual-reality
- 3D computer graphics (visual)
- Haptics (touch)
- Virtual humans with simulated anatomy and physiology
- Didactic content
- Collaboration with ReachIn Technologies, Sweden



Straw-man Military Medical Training Architecture Based on Civilian UMich Visible Human Architecture

User Tracking

User Request



Visual Data Representation

Remote Internet Database Look-up

Navigable Volume Data Linked to other Data Sources

XML Tags

Deployment: Medical Instructional Space

Trauma Skills	CBNR	First Responders
User Security and Privacy		Middleware
Advanced Distributed Learning (ADL) SCORM Standards		

XML Tags

Medical Corps Skill Instruction Area

	Army Medical	Navy/ CBIRF	Air Force	Special Ops	National Guard
Audio					
Video					
Quizzes					
Tests					

The Future…

Core Research Leads to ….Transformational Technologies

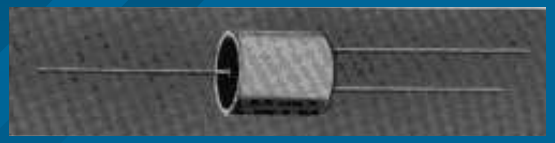
Decade of the 1950's

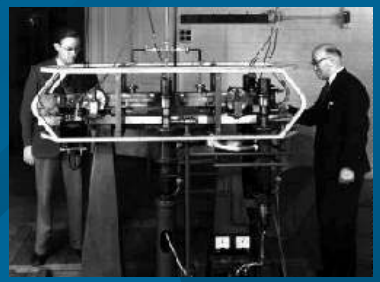
Lasers

Programmable Systems

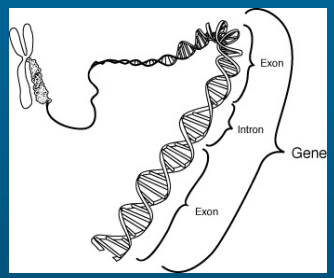
ENIAC

Transistor





Atomic Clock



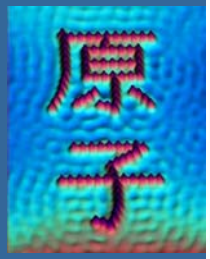
DNA

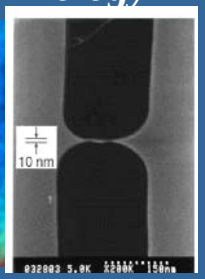
This Decade

Directed Energy

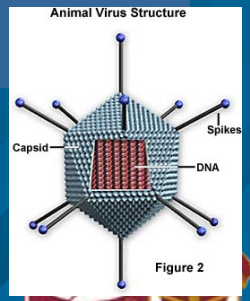
Robotics

Nanotechnology





Immersive VR Environments



Biotechnology

5 P's of Precision Healthcare

Scope of TATRC Functional Objectives

Predictive - **Leverage Emerging Developments in Genetics, Bio-Informatics & Multi-Modality Imaging**

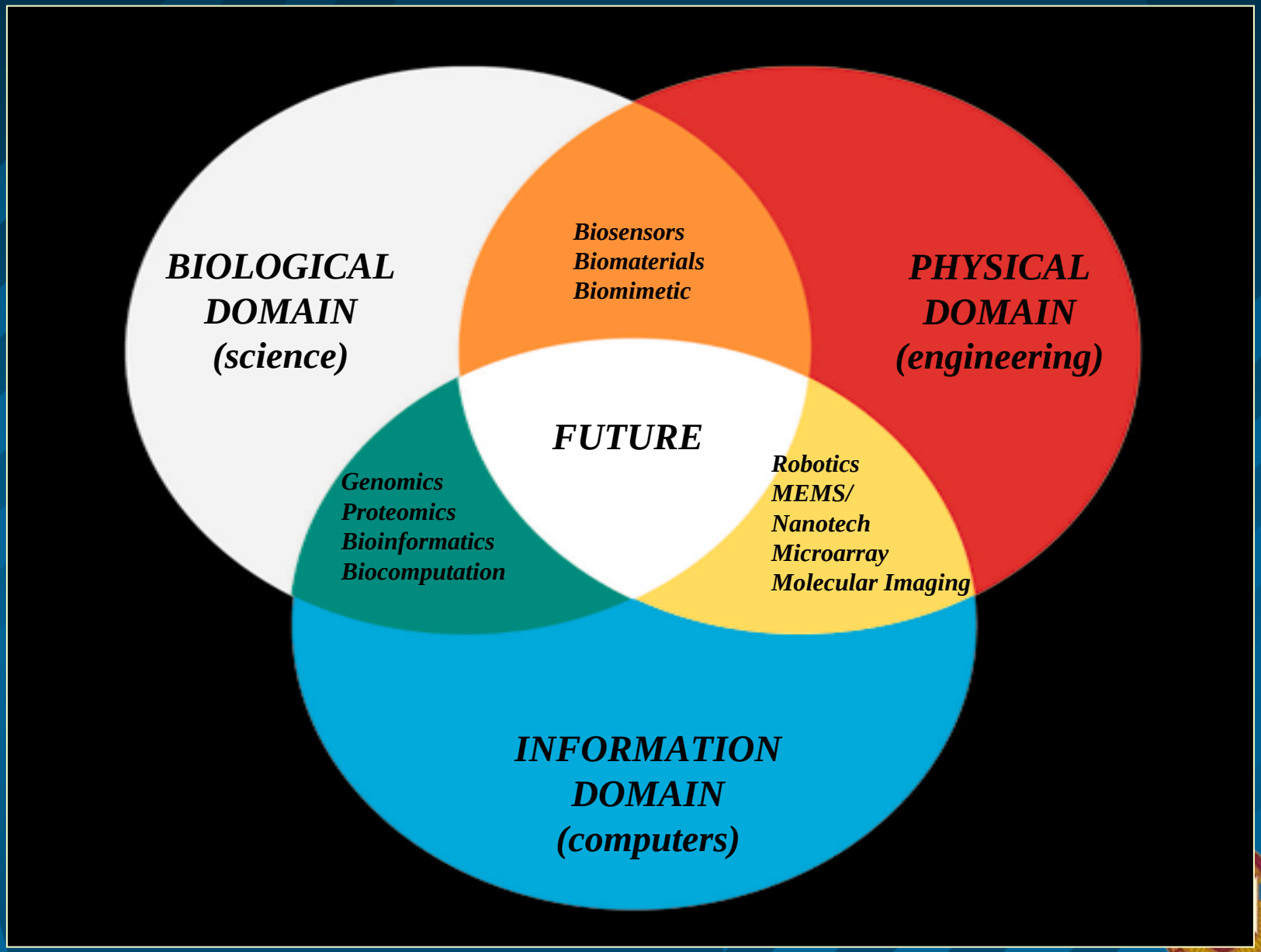
Preventive - **Act Proactively to Prevent Disease**

Point of Care - **Utilize Mobile Communications, Ubiquitous Computing and Local intelligence**

Parametric - **Analyze Multi-Parametric Information Referenced to Patient Baseline and Standard Model**

Personalized - **Individualize Therapeutics to Each Patient**

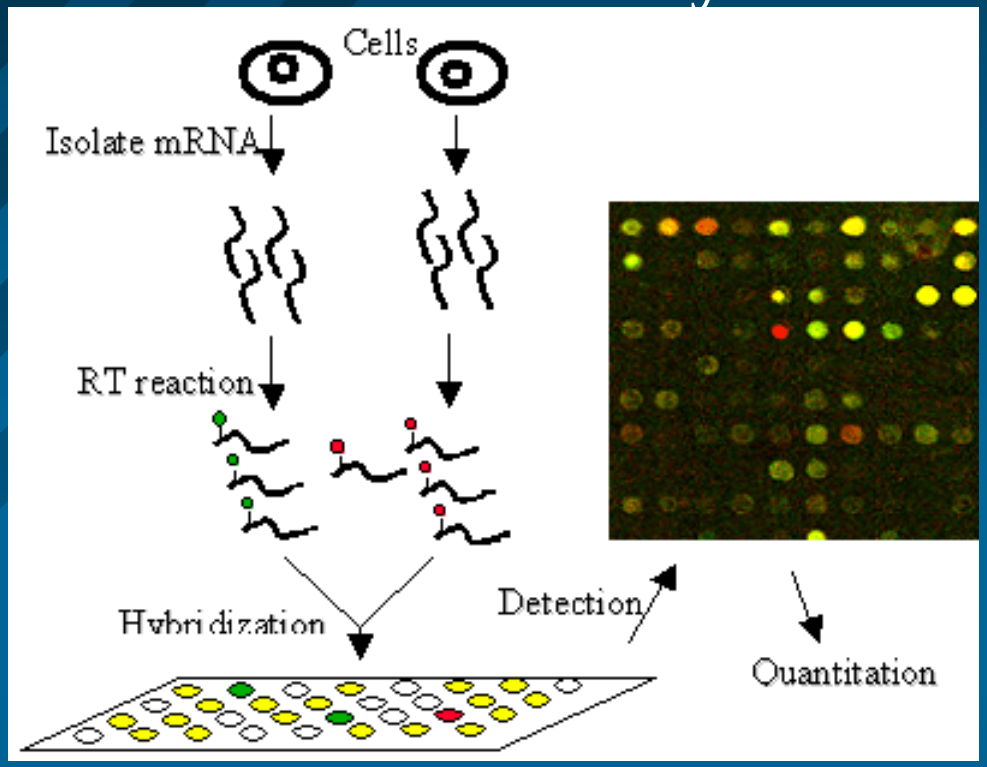
5Ps Transition to Bio Intelligence!



Richard M. Satava, MD
U of Washington/
TATRC/DARPA

Genomics Research

DNA Microarrays



Problem Definition

- Find those genes that are differentially expressed (activated) when control (reference) and experiment are compared

Proteomics Research

Protein Sequence Information + **Protein 3D Structure Information**

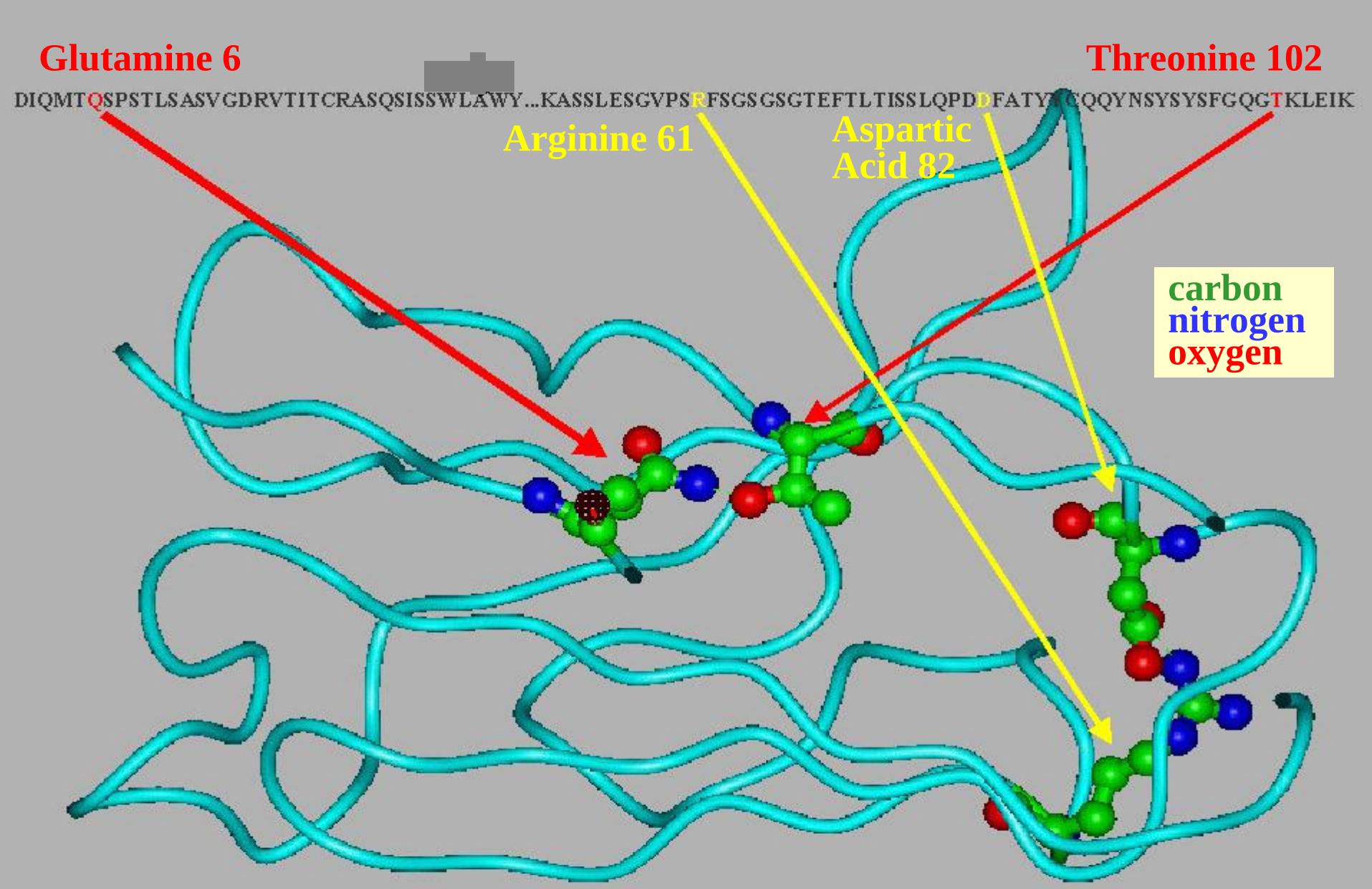
↓

Machine-Learning Tools

↓

Protein Function

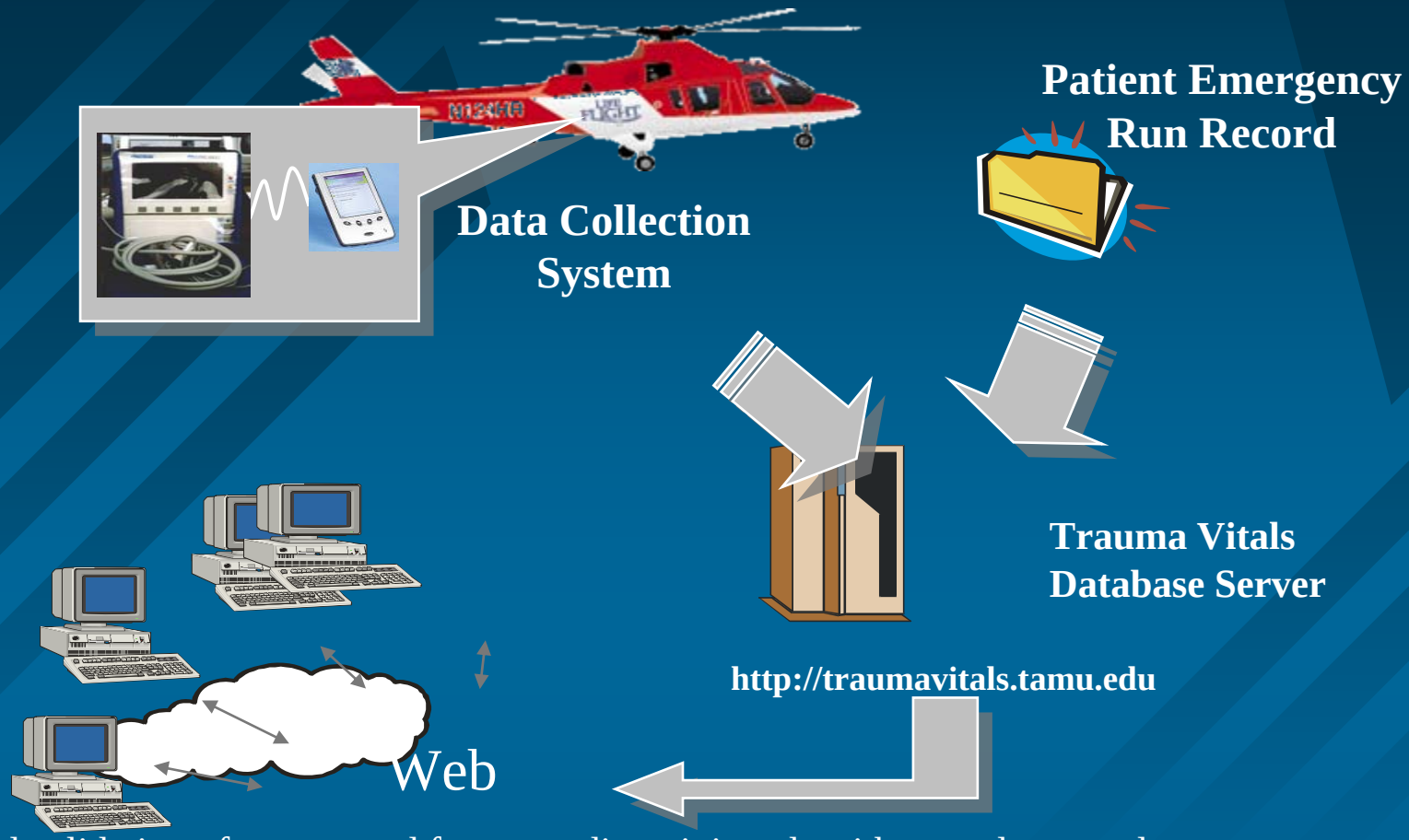
- **Classification**
- **Markers (feature selection)**



Buried polar interactions between amino acids widely separated in the primary structure are often critical contributors to protein stability.

Courtesy F. Stevens

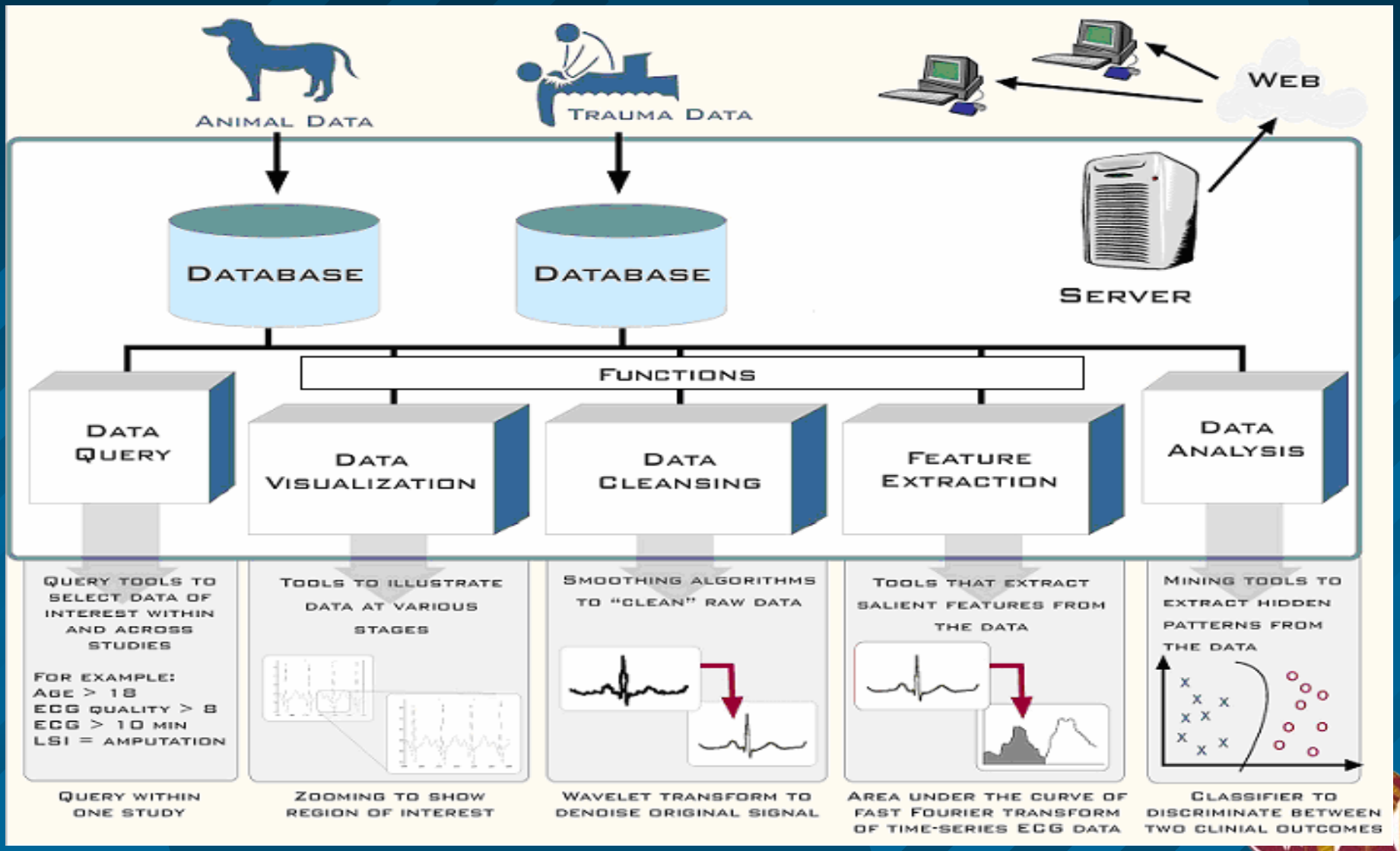
Trauma Vital Signs: DREAMS System Overview



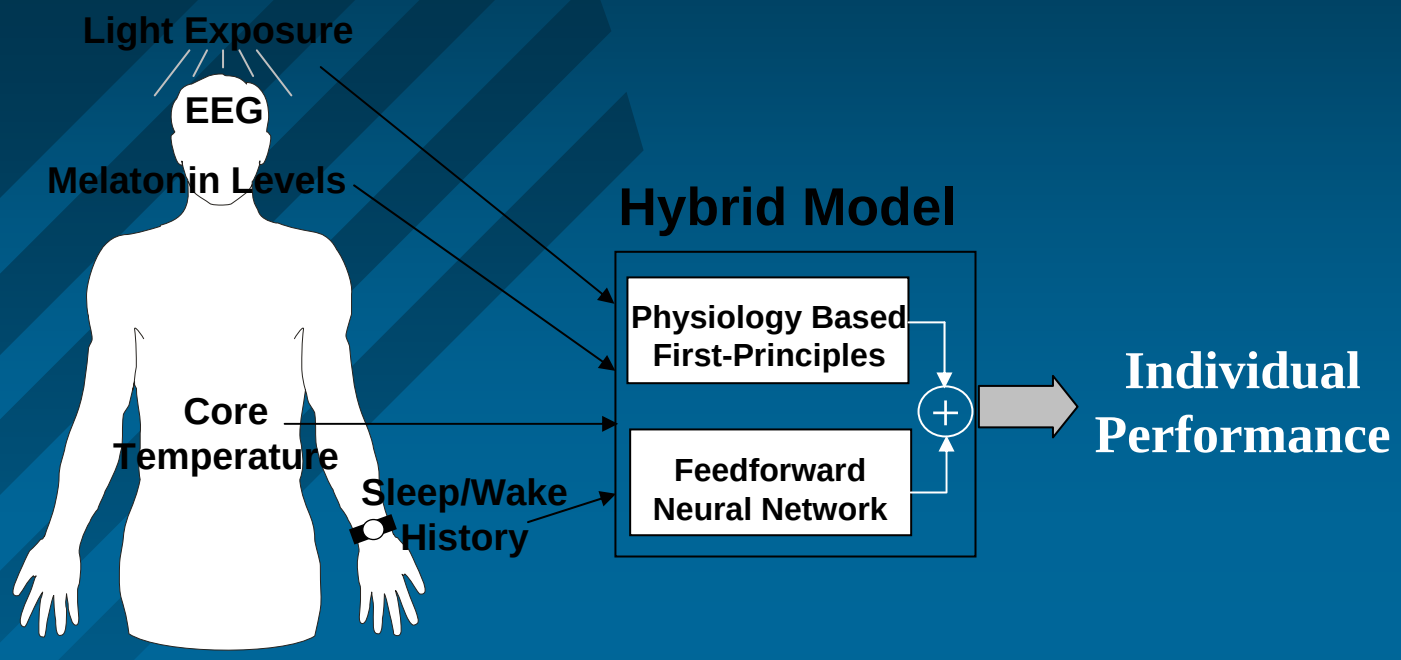
- Verification and validation of current and future medic training algorithms and protocols.
- New analysis/correlation of effect of different trauma injuries and LSIs on patient outcomes.
- Basis for knowledge base and prediction systems to be used in future Remote Triage devices.

Medical Informatics & Simulation

Physiotools: Trauma Data Discovery Environment
USAMRMC Bioinformatics Cell



Hybrid (neural nets+first-principles) Models

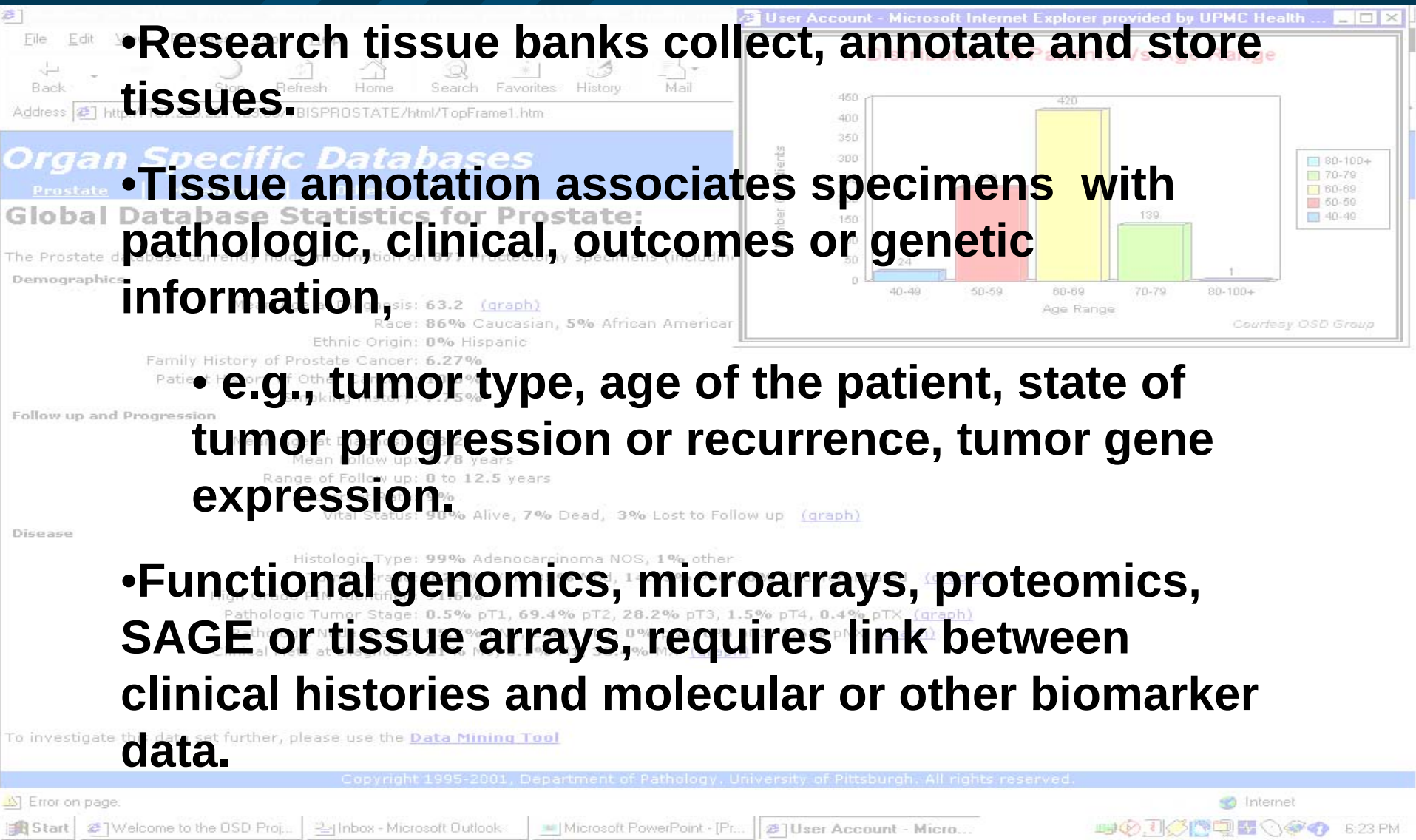


- Neural network captures
  - Unmodeled physiology in the first-principles model
  - Individual biological variability

Advanced Tissue Banking Information System

(University of Pittsburgh/NMTB)

- Research tissue banks collect, annotate and store tissues.
- Tissue annotation associates specimens with pathologic, clinical, outcomes or genetic information,
  - e.g., tumor type, age of the patient, state of tumor progression or recurrence, tumor gene expression.
- Functional genomics, microarrays, proteomics, SAGE or tissue arrays, requires link between clinical histories and molecular or other biomarker data.



Advanced Tissue Banking Information System

(University of Pittsburgh/NMTB)

Automated Annotation:

Pathology **Registry** **Inventory** **Markers** **Morphology**

Staging Engine

Meta data dictionary ↔ **Mapping Engine**

Change Management

Transformation and Loading

Identified Data Warehouse **(relational)**

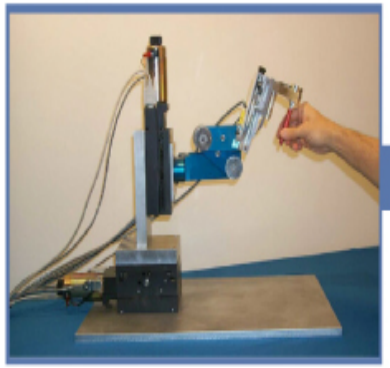
De-identification

Data Mart(s) **(dimensionally modeled)**

Web Front End

THE OPERATING ROOM OF THE FUTURE

TELEMEDICINE AND ADVANCED TECHNOLOGY RESEARCH CENTER (TATRC), FORT DETRICK, MARYLAND



The OR of the Future consortium has the potential to revolutionize surgery in the U.S. and is a groundbreaking collaboration for TATRC and many of its partners. Since the U.S. is a worldwide leader in medicine, the project may influence the surgical care of all U.S. citizens, as well as benefiting people and institutions throughout the world.

The OR of the Future will provide an Information Rich Environment

Enabling opportunities for integration, registration, and utilization of preoperative and real-time information sources.

New Opportunities for Robotically Enhanced Dexterity

- New clinical fields:, smaller more complex, lower cost
- Motion: guided, local autonomy
- Shared decision and control
- Simulation training
- Integration of Information: overlay, pre- and intra-operative
- Shared and enhanced reality

ENHANCING

- Pre-op plans
- Setup
- Navigation
- Constraint
- Collaboration

Contract Officer Representative: Dr. Gerry Moses

TATRC Project Officer: Mr. Jim Farr at farr@tatrc.org

or (301) 619-4010.

The Operating Room of the Future
'White Papers'

TATRC

Patient Safety

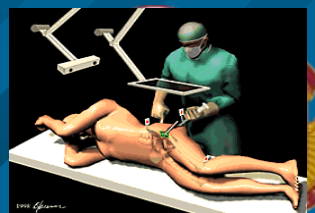
* Five specific areas of surgical research were agreed upon as being an integral part of the Operating Room of the Future

Advanced Devices

Medical Informatics

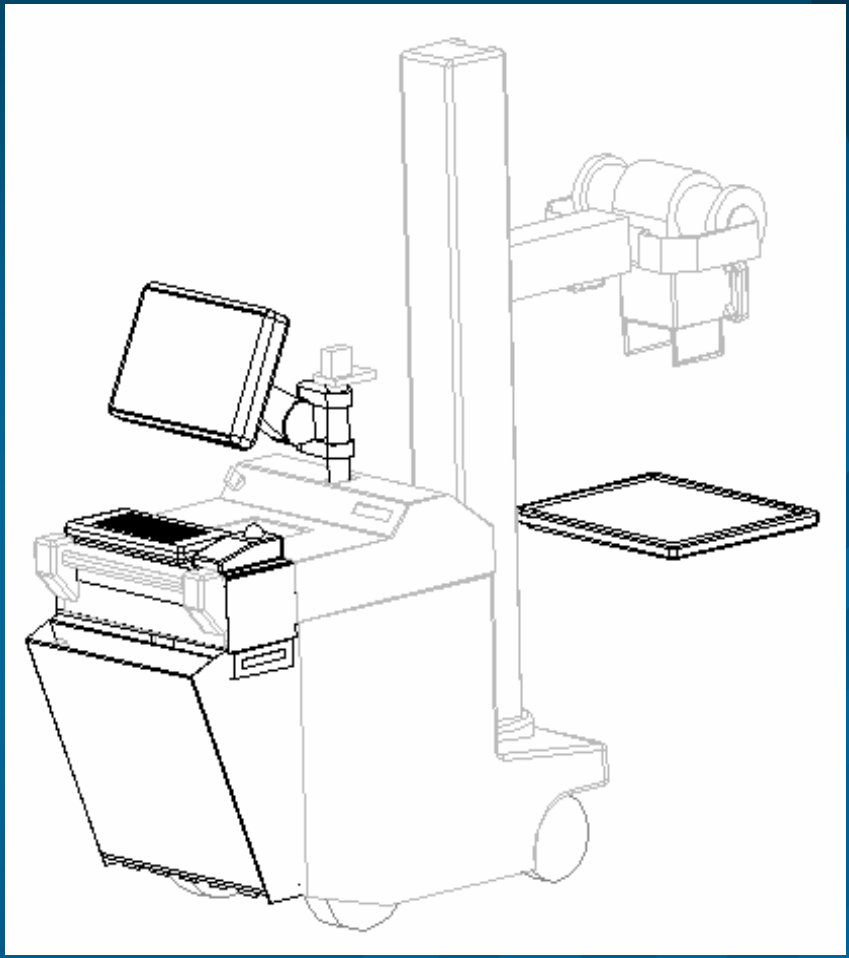
Tele-Surgery

Perioperative Systems Design



AMX-4 Prototype Portable Digital X-Ray System General Electric

- Minimal modifications to AMX-4 X-ray generator to allow easy approval for clinical trials
- ❖ Working Prototype delivered and demonstrated at TATRC summer 2003
- Addition of internal computer in place of film storage
- Flat panel display for image review
- Cooling and storage caddy



Direct Capture Portable Digital Radiology

MinXray Model HF100H High Frequency X-ray Generator

- Technology developed in ’80s
- Commercial use for mobile services
- Can run on relatively “dirty” power
- Less than 90 lbs
- Less than 20 cu ft

- Elimination of chemistry
- Rapid set up
- Portable
- Wider viewing angle
- Extra brightness

Varian PaxScan 4030R

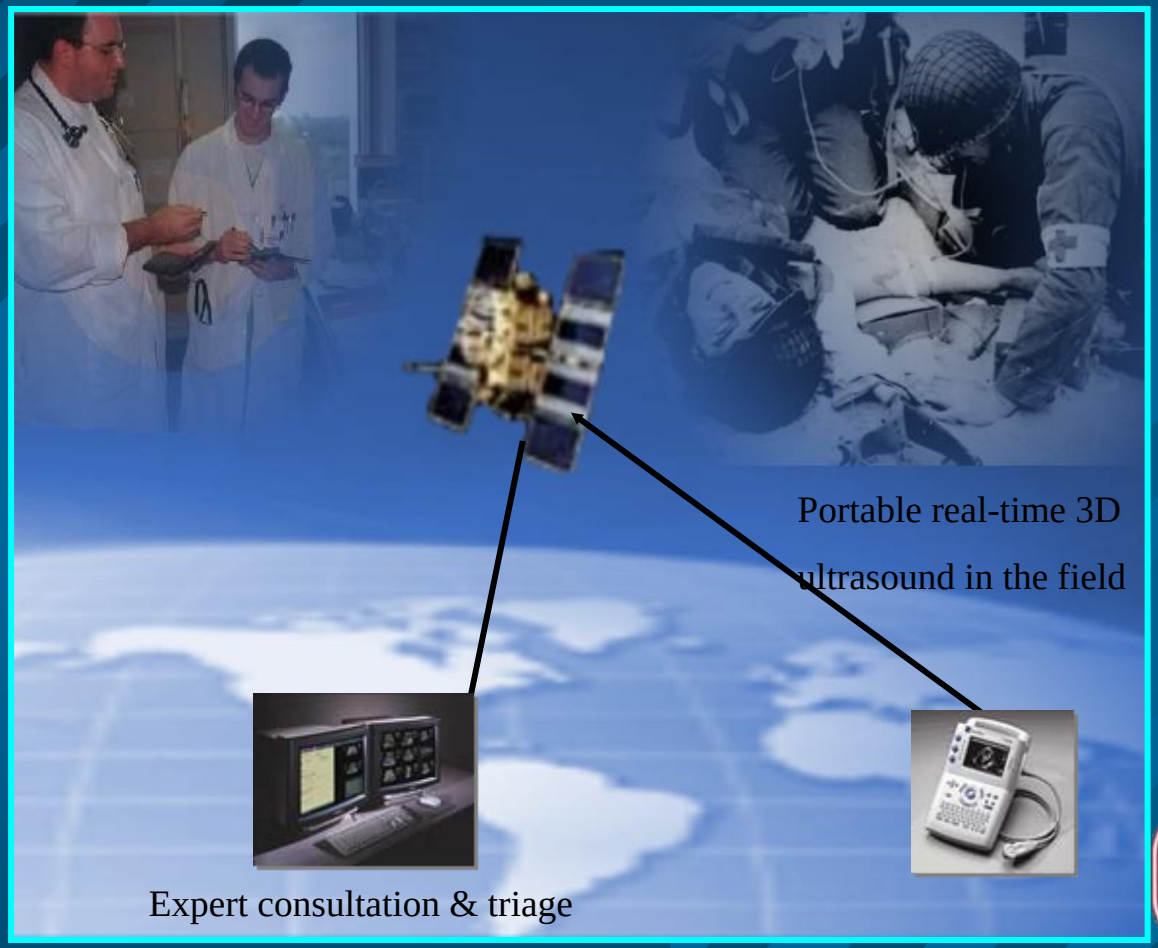
- Image Area: 11.5 x 16 in
- Pixel Pitch: 127 µ
- Weight: 20 lbs
- Physical Size:
  14.4 x 19.7 x 1.9 in
- Temperature: 50-86 °F

System total weight - 168 lbs
213 w/ cases

MinXray w/ stand 9.5x8.75x16 in.	- 84 lbs
Varian system	
Detector plate 19.7x14.4x1.9 in.	- 20 lbs
Computer/cables	- 50 lbs
Display station monitor 17x15x3 in.	- 14 lbs
Carrying case (computer)	- 20 lbs
Carrying case (cables/plate)	- 25 lbs

Overall aim:

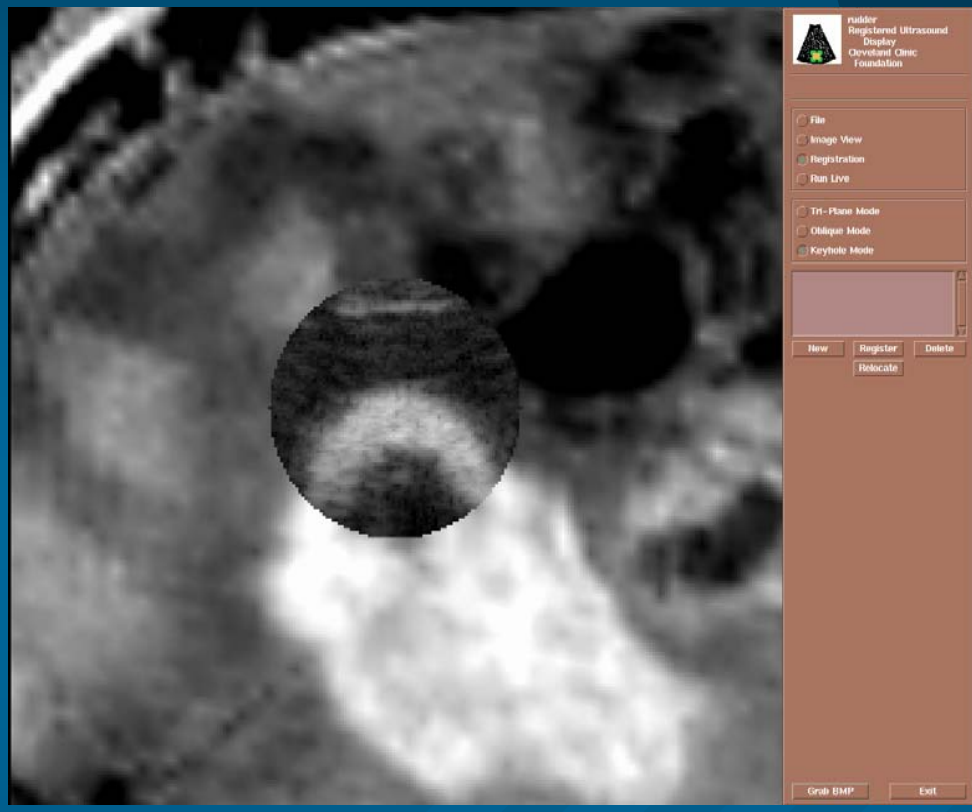
To improve survival of battlefield trauma through ultrasound telemedicine and remotely guided therapeutics.



Multimedia/Multimodality Imaging

Cleveland Clinic

- Combines preoperative image data with intraoperative ultrasound acquisition
- Applicable to any two modalities
- Enables clearer understanding of U.S.



Bringing Advanced Technology to the Operating Room

Laparoscopic Procedures

Integrated OR

Advanced Procedure Room

Real Time Image Guidance

Endo-video, Instruments

PC's,Remote Monitoring, Communications

Wireless, New Devices

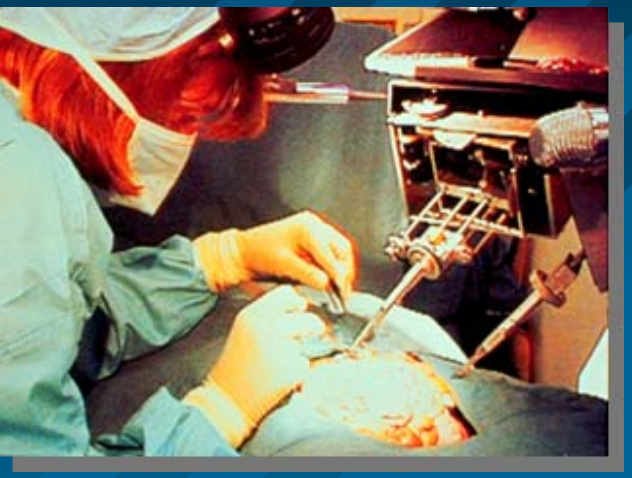
Models, Grid Computing

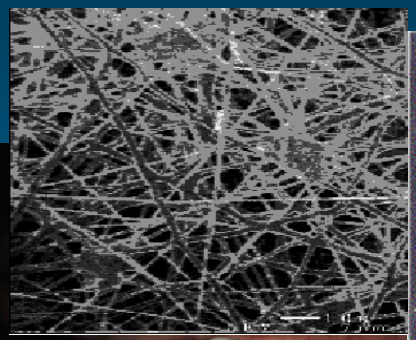
High Technology Base

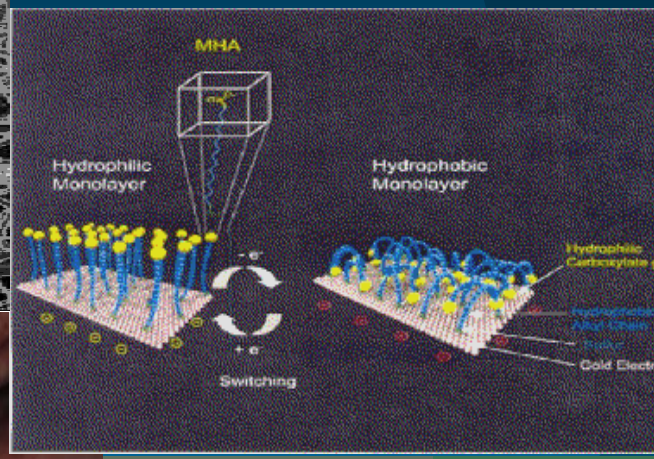
U.S. Army Medical Research and Materiel Comma
Telemedicine & Advanced Technology Research Ce
Cutting Edge Medical Tech

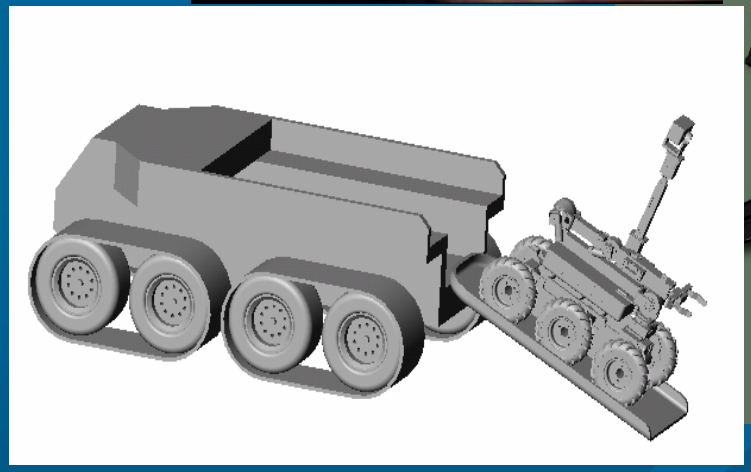
Robotics & Nanotechnology

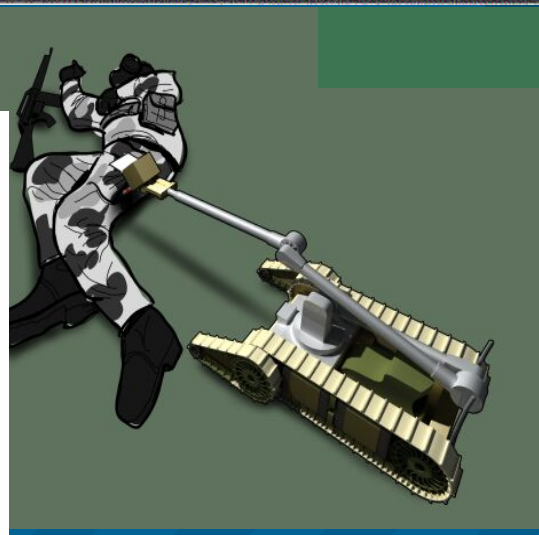
ATA Advanced Briefing for Industry







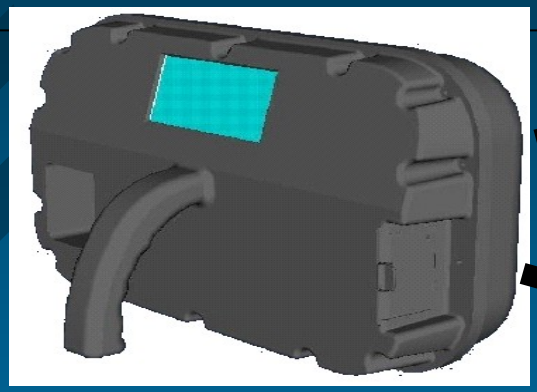


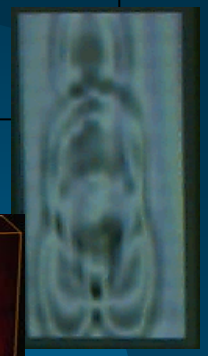


Gary R. Gilbert, Ph.D.
University of Pittsburgh & U.S. Army Medical Research and Materiel Command
Telemedicine and Advanced Technologies Research Center (TATRC)

Patient Detection Technologies

Passive RF Transponders





Remote Casualty Location and Assessment Device (RCLAD) – motion, breathing & heartbeat.

Long-wave
Infra-red Cameras

Warrior Personal
Status Monitor (WPSM)

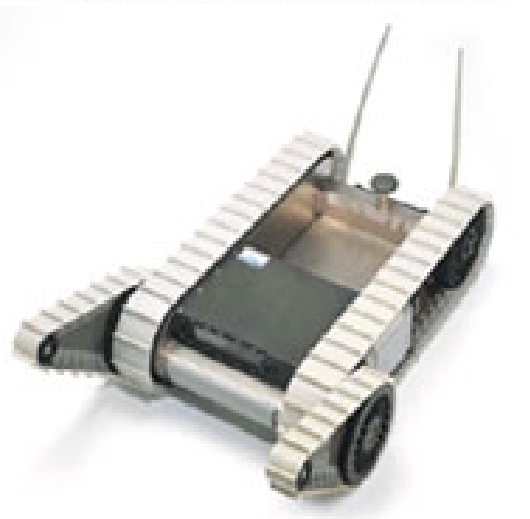
Color Image
Segmentation

Robotic Casualty Extraction (SBIR *A02 – 179)*

Irobot

Bloodhound & Packbot

Bloodhound navigation prototype with laser rangefinder



Model for robotic medic assistant team

Functional Modules
(physiological assessment, treatment, evacuation)

Special Tools
(robotic arms, monitoring instruments)

Planning Modules
(with backtracking search, protection, evasion & escape)

Environmental Assessment Modules
(computer vision, pattern matching, sound analysis/speech input, tactile feedback)

Command, Control, Communications, & Coordination Modules
(system of systems, wireless, secure, adequate bandwidth)

Mobility Systems

Applied Perception Inc.

Evacuation Vehicle Concept Design

SBIR *A02 – 179*

Stretcher with on-board life support system.

The LSTAT litters would be deployed on the ground next to the patient.

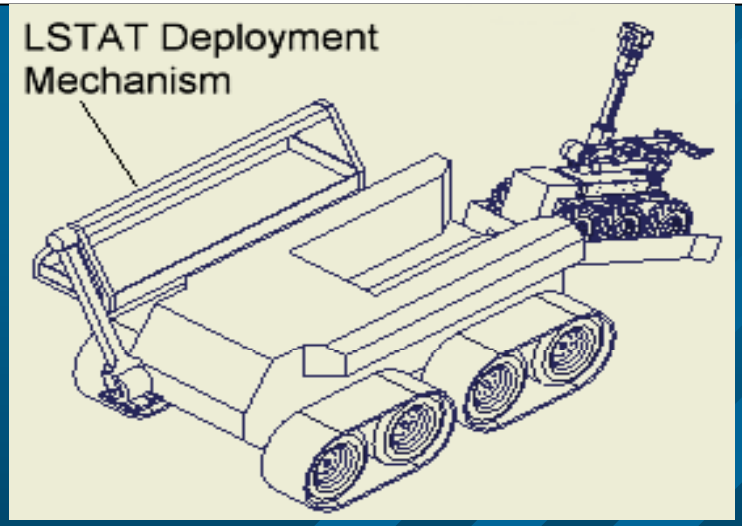
The LSTAT litters can be retracted into the vehicle for transport.

The LSTAT litters can be quickly removed from the vehicle and replaced.

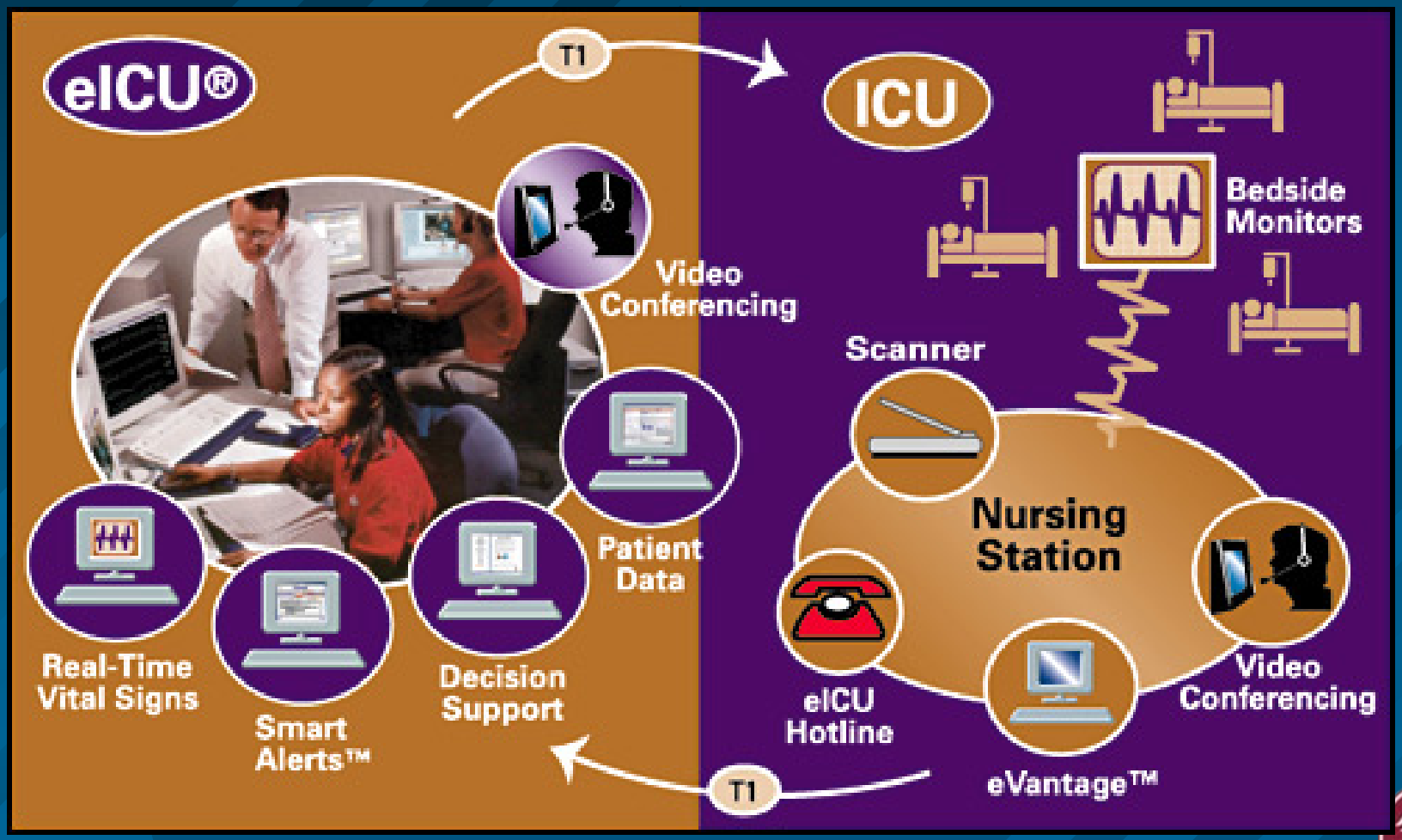
Manipulator arm, LSTAT and patient stretchers can be stowed when not in use.

LSTAT Litter

(Life Support for Trauma and Transport)



Project Description: VISICU



TATRC HomeLand Security - Relevant Projects & Collaborators

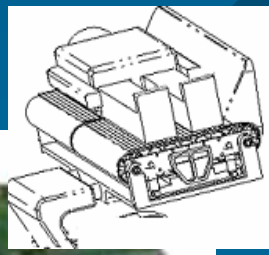
- Biodetection
- Environmental Sensing
- Medical Surveillance
- Communication Systems Integration
- Education & Preparedness

Saint Francis University

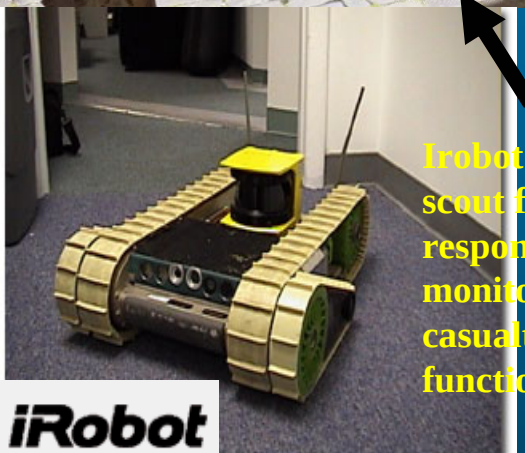
Center of Excellence for Remote and Medically Underserved Areas

Robotic Emergency Medicine and Danger-Detection (REMeD-D)

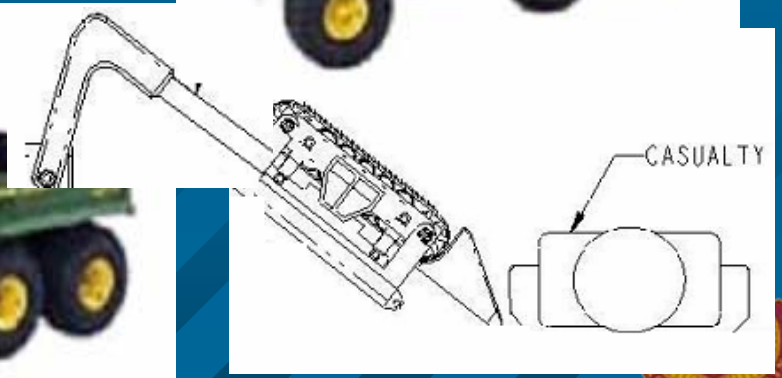
CERMUSA Danko Mobile Communication Platform (MCP)



Applied Perception Inc. John Deere Gator Unmanned Autonomous Vehicle with Foster-Miller Robotic Casualty Extraction System



Irobot Packbot scout for first responder monitoring and casualty location functions



Environmental Sensing & Medical Surveillance (Project Argus)

Dr. Wilson

(Georgetown University):

Infectious Disease and Environmental Surveillance

- Co-chair ID work group, Global Disaster Info Network
- Geographic Information Systems Biodefense Applications, DC Dept of Health – Project "Medical Vanguard" (West Nile Virus)
- National Environmental Satellite, Data & Info Service, National Oceanic & Atmospheric Administration
- WHO Consultant, Ebola Hemorrhagic Fever Project
- Bio & Agricultural Anti-Terrorism Partnership Program
- ENCOMPASS (DARPA) surveillance project

National Bioterrorism Civilian Response Center

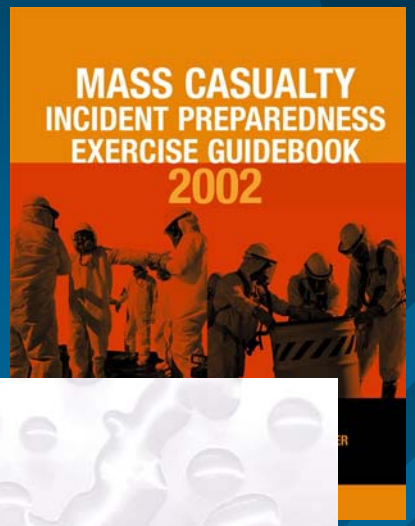
CIMERC (Drexel)

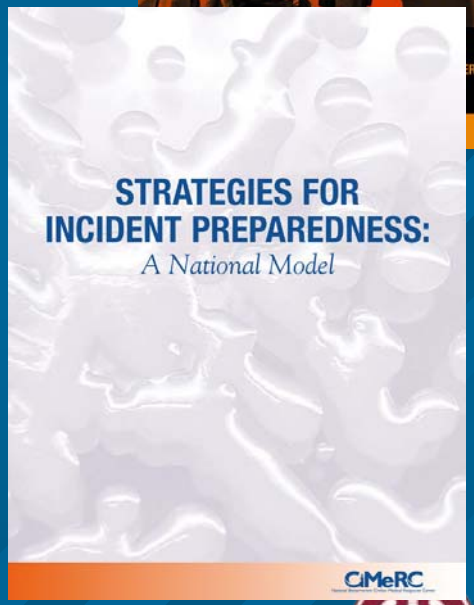
Strategies For Incident Preparedness

Allows health care organizations to prepare for mass casualty events.

The new *Strategies for Incident Preparedness: A National Model* released in May 2003.

20 region specific scenarios may be tailored for the unique characteristics of distinct locales.





Netscape
File Edit View Go Communicator Help
Back Forward Reload Home Search Netscape Print Security Shop Stop
Bookmarks Location: http://209.204.112.202/forms/hahnemann/bt/selfassess_grid.asp What's Related
Connections SmartUpdate RealPlayer

MCP Hahnemann University
Mercy Health System

National Chemical/Biological Research Center

Self-Assessment Instrument

Select the self-assessment questions that you wish to answer, then click on the Continue button at the bottom of the list.

- ☐ In the event of a mass casualty event, do you currently have a pre-designated, *triage area within (inside) your hospital?*
- ☐ In the event of a mass casualty event, do you currently have a *pre-designated triage area proximate to, but outside of the hospital?*
- ☐ In the event of a mass casualty event, do you currently have a policy addressing morgue capabilities/post mortem care planning?
- ☐ Do you currently possess any detection equipment for biological or chemical identification?
- ☐ The number of *full-time emergency physicians* on your staff?
- ☐ The number of *part-time emergency physicians* on your staff?
- ☐ How many of the *full-time physicians* have completed the *formal Domestic Preparedness (DP) training course* sponsored by the Department of Defense (DOD)?
- ☐ How many of the *full-time physicians* have completed *other formal training* regarding biological/chemical weapons of mass destruction?

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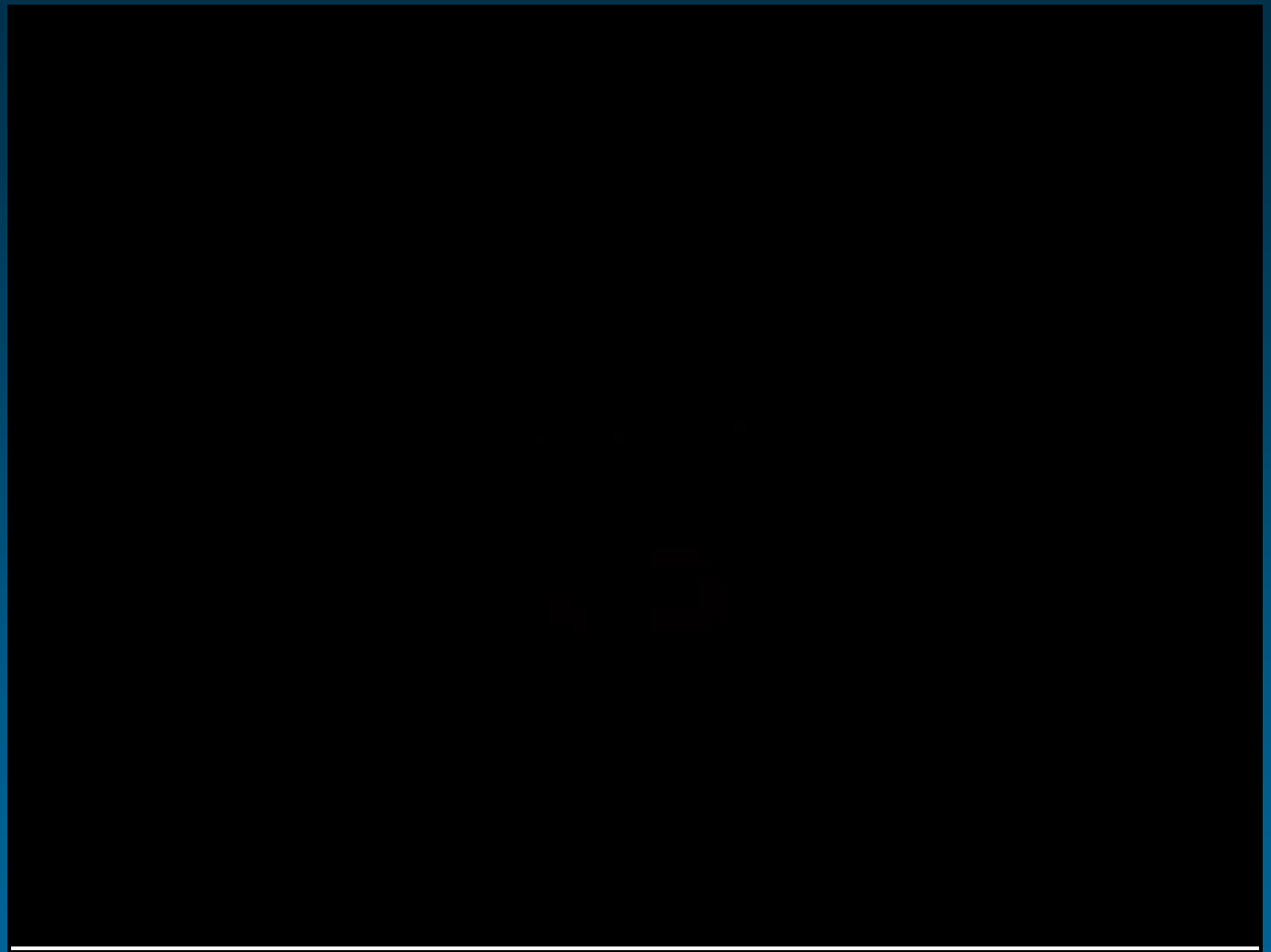
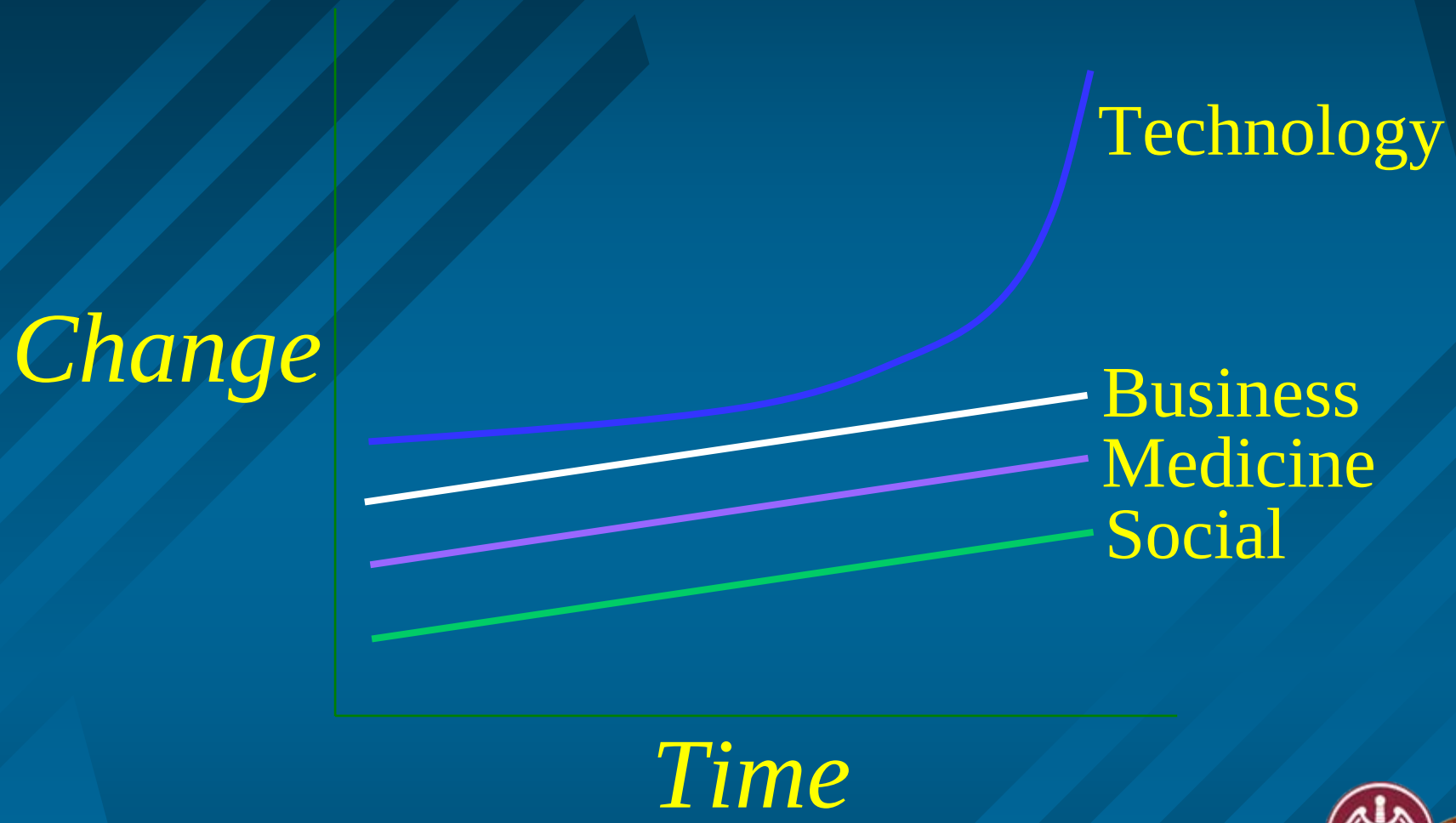
Start 9:20 AM



02 CERMUSA Civilian Casualty Response.wmv

Where do we go from here?

All Institutions are Falling Behind the Pace of Technology Changes



Unleashing the Killer App : Digital Strategies for Market Dominance
- Larry Downes, Chunka Mui http://www.killer-apps.com/

Evolution of Ideas

Seeking new ways to translate medical research into clinical solutions …

- Indignant rejection
- Reasoned objection
- Qualified opposition
- Tentative acceptance
- Qualified endorsement
- Judicious modification
- Cautious adoption
- Impassioned espousal
- Proud parenthood
- Dogmatic propagation

HK Silver, 1965

The TATRC Technology Transfer Imperative

- Patent and Trademark Law Amendment Act (Bayh-Dole Act) of 1980
  - Option to retain rights to inventions
    - Must disclose invention to government (within 2 months)
    - Must file patent
    - Must pursue commercialization
    - Must give preference to small business for licensing
    - Must ensure products manufactured in US
    - Must provide government a “non-exclusive, non-transferrable, irrevocable paid-up license” to use federally funded inventions.

The TATRC Technology Transfer Imperative

Federal Technology Transfer Act passed in 1986 (PL 99-502)

- Requires Federal Labs to transfer tech
- Chartered Federal Laboratory Consortium (FLC) to promote tech transfer
- Specifies following tech transfer activities:
  - Tech Assistance – Request from company, university, or government to a Federal Lab.
  - Authorizes laboratories to assign or license inventions
  - Cooperative Research and Development Agreements (CRADAs) – Agreement between Federal Lab and industry, non-profit or government to collaborate on project of mutual interest.
  - Educational Partnerships – May loan equipment, donate surplus, provide lab personnel
  - Cooperative Agreements – Provides funding to support research of interest to Fed Lab. –
  - Grants – Same as CA, but does not involve govt involvement.
- TATRC granted laboratory authority in 4th Quarter, FY 03

Center for Integration of Medicine and Innovative Technology

PROBLEM RICH ENVIRONMENT

SOLUTION RICH ENVIRONMENT

MASSACHUSETTS GENERAL HOSPITAL

BRIGHAM AND WOMEN'S HOSPITAL

PARTNERS HEALTHCARE

Beth Israel Deaconess Medical Center

CIMIT

DRAPER LABORATORY

MIT

CIMIT Office of Technology Development

*i*PIP *i*ndividualized Patient Impact Program

*i*ndividualized Patient Impact Profile

- Patient care impact
- Asset creation
- Asset valuation
- Asset realization for CIMIT

*i*ndividualized Patient Impact Plan

- Intellectual assets management
- Resource allocations
- Contracts and agreements planning
- Exit strategies

CIMIT
Industry Liaison Group

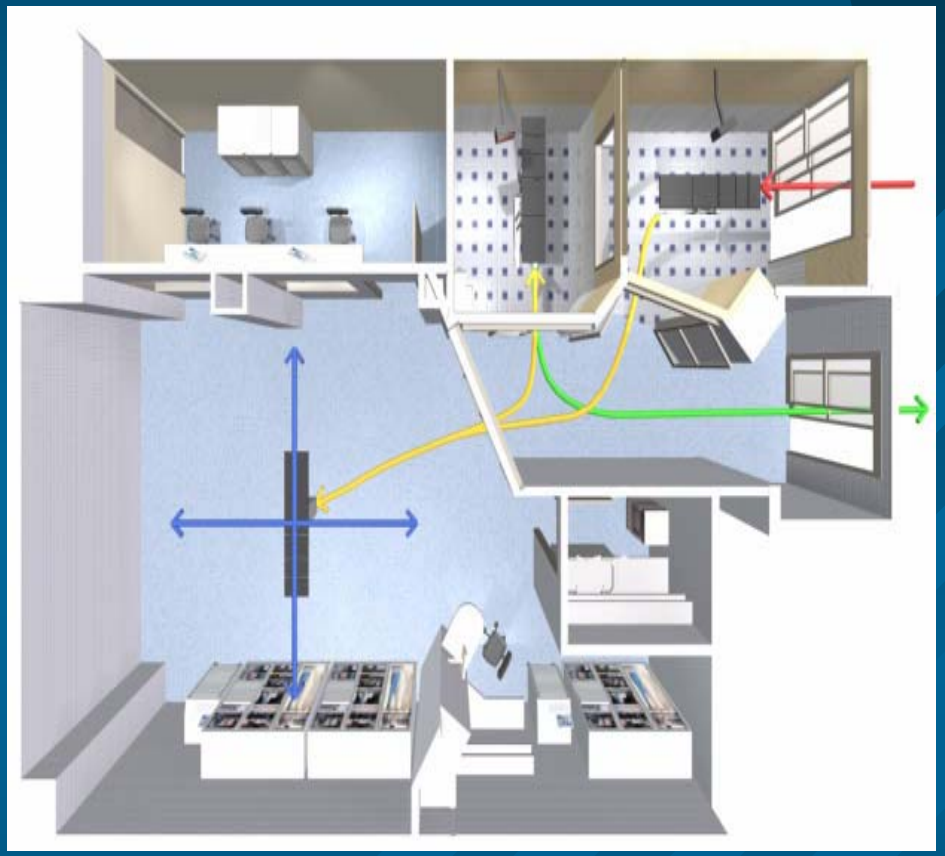
- General Electric Medical Systems
- Johnson & Johnson
  - Cordis
  - Ethicon Endosurgery
  - COSAT
- Karl Storz Endoscopy
- Omnicell, Inc
- Pentax Precision Instrument Corp
- Radianse, Inc
- 10 Blade, Inc
- Ascension Technology, Corp
- AstraZeneca
- Baxter Healthcare, Corp
- B-K Medical Systems, Inc.
- Boston Scientific, Corp
- Olympus America, Inc.
- OmniGuide Communications, Inc.
- Pharmacia, Inc.
- Physical Sciences, Inc.
- Welch Allyn, Inc.
- Medtronic, Inc.
- Bristol Myers Squibb Co.
- Terumo Medical Corp
- Draeger Medical, Inc.
- Foster-Miller, Inc.
- Foxfire Interactive Corp
- Getinge-Castle, Inc.
- Harvard Clinical Technologies, Inc
- HydroCision, Inc.
- IDEO
- Instrumentarium, Corp
- Granite Peak Technology
- Hewlett Packard Company
- Guidant Corporation
- Mobile Aspects, Inc.
- Motorola, Inc.
- Percadia, Inc.
- Pfizer, Inc.
- TYCO
- TissueLink Medical, Inc.

Building collaborations with Industry to change the standard of care

Example: OR of the Future

CIMIT facilitated collaboration of Industry and MGH Surgery

- Recruited companies with shared vision of ORF program
- Negotiated and executed company agreements
- Manage on-going relationship to support the outcomes research in ORF and specific company goals



Industry Collaboration in ORF

11 companies -- providing equipment and engineering support to program and working together to improve surgical care…..

- **Karl Storz Endoscopy**
- **Ethicon Endo-Surgery**
- **B-K Medical**
- **Pentax Precision Instruments**
- **GE Medical Systems**
- **Drager Medical**
- **Harvard Clinical Technologies**
- **Omnicell**
- **Getinge Castle**
- **Mobile Aspects**
- **Sentinel Wireless**

Cleveland Clinic Foundation
Computer Assisted Minimally Invasive Surgery (CAMIS)

Cleveland Clinic Foundation (CCF) Innovations

>New Technology Transfer Center<

"October, 2003 Medical Innovation Summit Participants"

Pamela Bailey President, AdvaMed
John Brown CEO, Stryker
Samuel Colella Director, Versant Ventures
Art Collins CEO, Medtronic
Brian Dovey Partner, Domain Associates
Tom Fogarty, M.D. Cofounder, Three Arch Partners
Mike Hildreth Partner, E&Y
George Hatsopoulos, Ph.D. CEO, Pharos
Carl Kohrt, Ph.D. CEO, Battelle
Caroline Kovac, Ph.D. IBM Life Sciences
Jouko Karvinen President and CEO Philips Medical Systems
Harry Kraemer CEO, Baxter
Edward Ludwig CEO, BD
Dane Miller, Ph.D. CEO, Biomet
Mal Mixon CEO, Invacare
Michael Mussallem CEO, Edwards Lifesciences
Harry Rein Foundation Medical Partners
Erich Reinhardt, D.Eng. CEO, Siemens Medical Solutions
Tim Ring CEO, C.R.Bard
Bill Sanford Chairman, BioEnterprise
Les Vinney CEO, STERIS
John Wareham CEO, Beckman Coulter
Raymond Warrell, M.D. CEO, Genta
Bill Weldon CEO, Johnson & Johnson
Miles White CEO, Abbott Laboratories
Jack Lasersohn General Partner, The Vertical Group

Dr. McClelland, FDA Commissioner - Mr. Sculley, Director, Centers for Medicare & Medicaid Services

CeMBR
The Center for Military Biomaterials Research

Biomaterials Solutions to Acute Trauma

Bringing the Full Power of Materials Science to Combat Casualty Care

THE STATE UNIVERSITY OF NEW JERSEY RUTGERS

UMDNJ UNIVERSITY OF MEDICINE & DENTISTRY OF NEW JERSEY

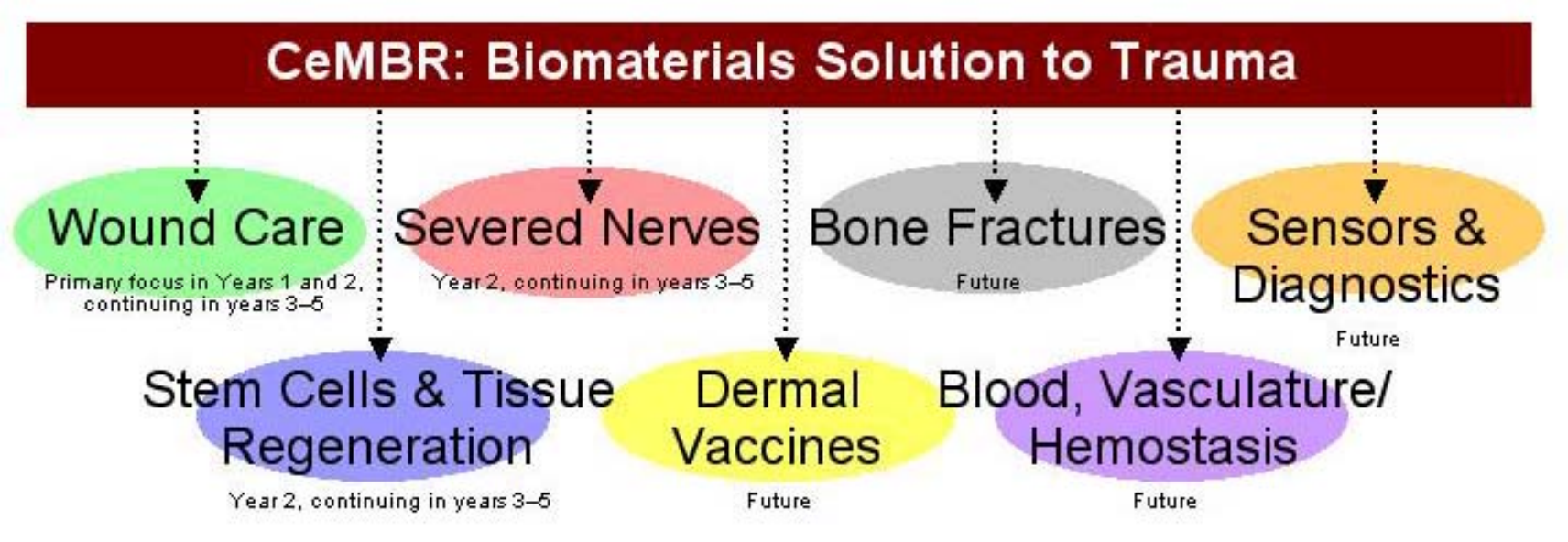
NJIT New Jersey Institute of Technology

TATRC Cutting Edge Medical Technology

New Jersey Center for Biomaterials

A University and Industry-Sponsored Research Center
njbiomaterials.org

Initial Technical Focus Areas



CEMBR Industrial Members 2003

A Diverse Group of Synergistic Companies

Medical Device Start-ups

- Advanced Materials Design
- BioCure
- REVA Medical
- Vectramed
- Vyteris

Midsize Medical Device Companies

- Enzon
- Integra Lifesciences
- Hydro Med Sciences
- LifeCell
- Osteotech
- Stratec

Major Corporations

- Avon Products
- Boston Scientific
- Cordis, a J&J Company
- Dupont
- Medtronic
- Unilever

Associated Research Centers

- Center for Biomaterials & Advanced Technologies, Medical Products Group (Ethicon, Inc.)

Production and Fabrication

- The MedTech Group
- Corium

Supporting Law Firm

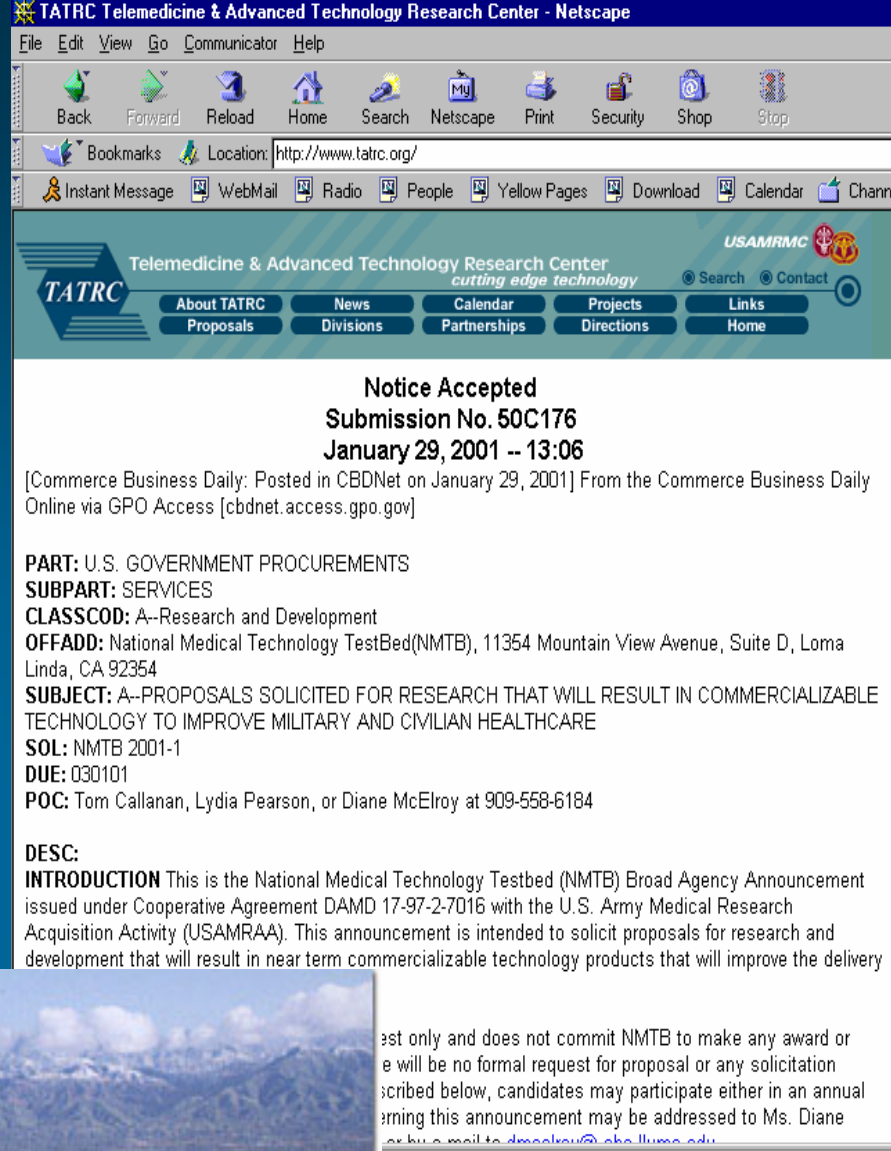
- Norris, McLaughlin and Marcus

Participating Venture Capital Groups

- The Vertical Group

National Medical Technology Testbed

- Program objectives:
  - Revitalize the economy
  - through conversion of defense technology
  - Improve military and civilian healthcare
  - through technology research and development
  - Become self-sustaining through royalties
- Managed by Loma Linda University Medical Center
- Cooperative agreement signed in 1997
- Funds commercialization of dual use medical products
- 50 active projects; 6 commercialized by end of FY04
- Received first royalties in FY 2003
- Developed systems for:
  - Market analysis
  - Business development
  - IP development
- TATRC Commercialization
- Subject Matter Experts



Telemedicine & Advanced Technology Research Center

Cutting Edge Medical Technology

Address http://www.tatrc.org/

Links Customize Links Free Hotmail Windows Media Windows

TATRC Cutting Edge Medical Technology

USAMRMC

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NEWS ARCHIVE | PAST MEETINGS | CALENDAR | PROJECTS | PROPOSALS | PARTNERSHIPS | LINKS

TATRC TIMES
VOLUME 4 / ISSUE 1

FY03 AMEDD TELEMEDICINE INITIATIVE
PRE-PROPOSAL SUBMISSIONS SYSTEM

FY03 MHS AMP
advances in medical practice
PROPOSAL SUBMISSIONS SYSTEM
SUBMISSION DEADLINE EXTENDED TO 30 SEP

LATEST NEWS

> TATRC Cosponsors the Cybermedic Workshop 2002
> ATSP Embraces Distance Learning at Telehealth 2002
> Senator Conrad to Propose Telemedicine Network
> Remote Alaskan Towns Rely on Telemedicine
> IRT Biomedical Informatics 2001 SUMMARY ONLINE
> Reimbursement for Remote Monitoring Services
> Program to Extend Global Telemedicine
> Army Telemedicine Partnerships 2002
> Telemedicine may reduce number of tests...
> Call for Presenters at Telehealth 2002
> Intensive Care, From A Distance
> Bioterrorism Response Act of 2001
> CMS Posts HIPAA Compliance Extension Instructions
> May Telemedicine TeleJournal

FEATURED PROJECTS

WMEWG wireless medical enterprise working group

SMART MC3-T Special Medical Augmentation Response Teams

PIC Personal Information Carrier

RIMR Risk Information Management Resources

HAPPENINGS

FY02 NMTB broad agency announcement
NATIONAL MEDICAL TECHNOLOGY TESTBED

DOD BAA to combat terrorism
PENTAGON SEEKS IDEAS ON COMBATING TERRORISM

operating room OR OF THE FUTURE website