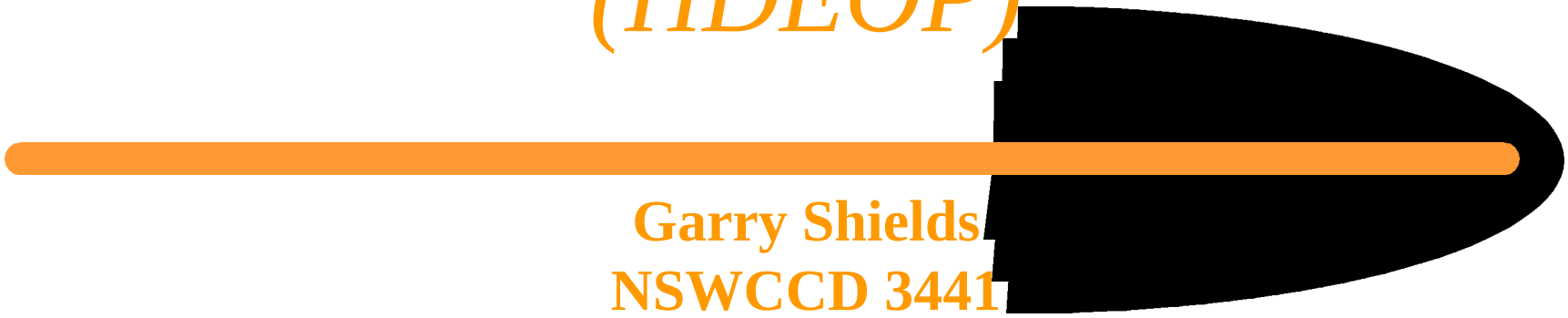
High Definition Electro-Optical Program (HDEOP)



Garry Shields
NSWCCD 3441
9500 MacArthur Blvd
West Bethesda MD 20817-5700

THIC Meeting at NSSWC Carderock Division

October 13, 1998

AGENDA

- Background
- Problem Statement
- HDEOP Definition
- Activities
- Where We Are Going
- Relevance THIC
- Proposed AVTC THIC Goals
- The Real Problem
- How Do We Share Leverage Our Lead ?

BACKGROUND

The FCC has mandated a fundamental change in television transmission standards and associated technologies beginning by the end of FY 98. These changes incorporate digital video and high definition video. Recent advances in HDTV technology have created a competitive environment in which the US must respond to these mandates. Members of THIC can actively participate and benefit from these developments if a means is found by which investments made by NSWCCD, DARPA, NASA, and others are leveraged adequately.

PROBLEM

Participation in the HDTV revolution requires significant advances in camera technology, telecommunications infrastructure, high-performance computing, and archiving and retrieving. In addition to these efforts, investigations into the application and utilization of these converging technologies are ongoing. To date the most significant efforts in this arena have been sponsored by DARPA, NSWCCD, NRL, and the NSA.

HDEOP

The HDEOP represents a predominate effort in these converging technologies.

HDEOP consists of Research, Development, and Applications efforts aimed at the demonstration and proof of concept of the utility of Advanced Electro-Optical and Communications technologies.

CAMERA DEVELOPMENT

Cameras

- Experimental Color
- Nikon F-5 Still/Video
- Navy Control
- BCE Camera
- 1080 CMOS (2)
- Super HD Monochrome
- Yellow/Cyan (2)
- Advanced

CAMERA DEVELOPMENT

Components

- Raid Recorder
- 1080 CMOS Chip
- High Sensitivity 720 CMOS
- HD Video Compression & Surveillance
- Multi-Scan Formats
- Isoluminant Color Simulation
- Yellow/Cyan Sensor Simulation
- BCE
- ASIC

APPLICATION IDENTIFICATION

Remote Viewing

- Tele-Medical
- Targeting
- Robotic Systems
- Remote Vehicles

Advanced Camera Applications

- Smart Optical Systems

Image Analysis

- High-Performance Computing
- Astronomical Data
- Flow Visualization

DEMONSTRATIONS

AVTC Lab Set-Up

- Install Workstations & Displays
- Connect Camera/Raid Recorder
- SAR Chip Integration
- Camera Integration

WAN/LAN Connectivity

- Point-to-Point Transmissions
- DREN OC-3
- CWES/NRL
- ATD Net

Core Technologies

- 480p/ISDN
- 720p
- 1080p
- Advanced

COMMUNICATIONS INFRASTRUCTURE

LAN Implementation

- Fiber Connection to Hubs
  - Buildings 2, 7,16, 17, 192, 193
- ATV Lab Connection
  - Kerberos Server
  - Andrews File System
  - OC-3 & OC-48
  - ASX 1000 Switch
  - George's & Advanced TV Boxes

ATD Net Connection

- WAN Connection
- SAR Chip

Proposed LAN Configuration

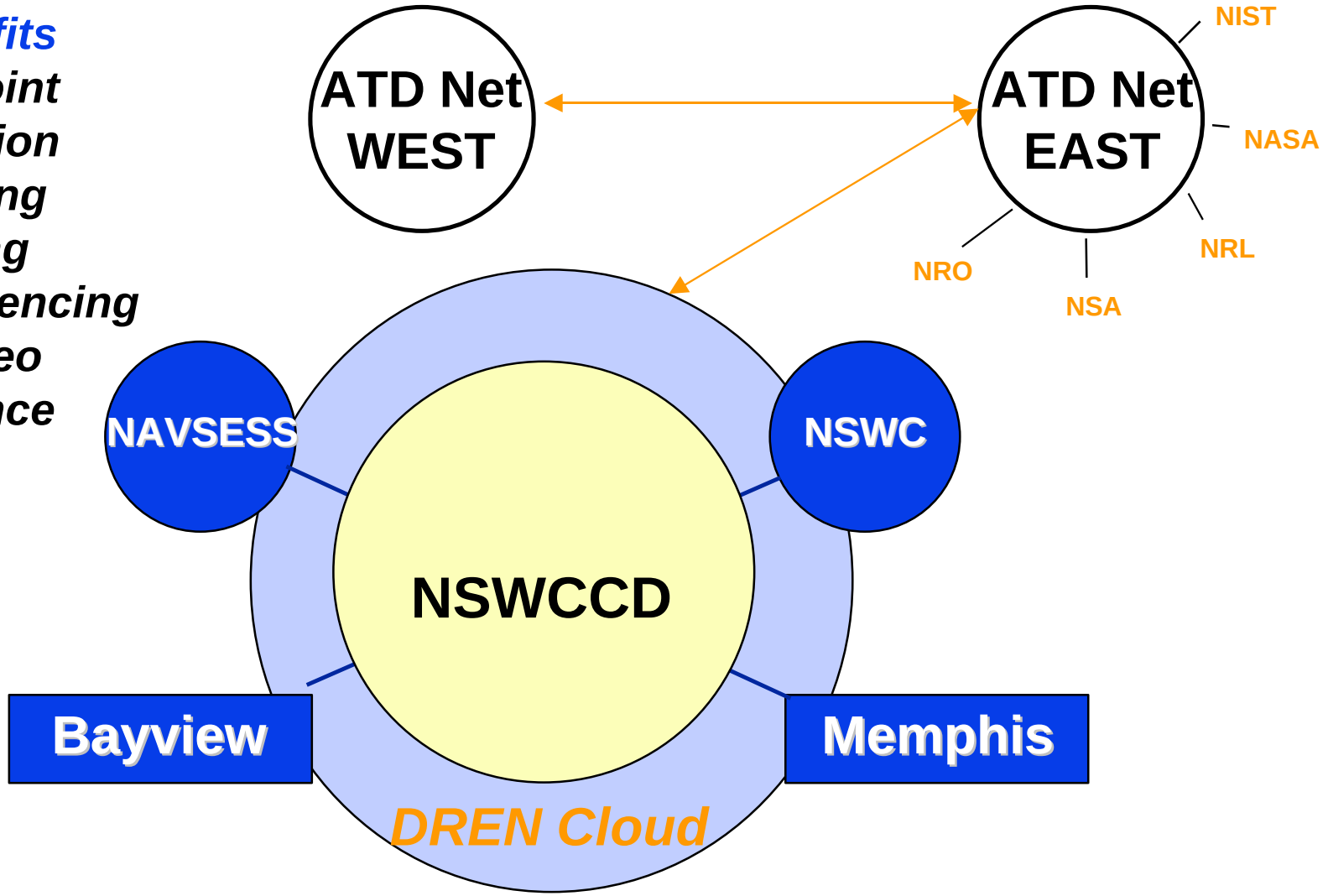
- Scalable OC-3/OC-48 Fore ASX 1000 Switch
- ASX 200 Switch on loan from NRL
- Sun Sparc Stations for Kerberos and Andrews File System on loan from NRL
- Fore ATV/ATB or George's Video Boxes
- SGI-Octane workstation with OC-3 NIC
- AV PCs with OC-3 NIC (3)

High Performance Computing Over WANs

- Monster Reality Machines (NRL)
- CM-5 (NRL)
- High Capacity Storage (NSA)
- Additional systems made available by ATD Net partners

1998 Benefits

Point to Point
Transmission
Simulcasting
Multicasting
Teleconferencing
Stereo Video
Telepresence



Where We Are Going

Advanced Video Technology Center

Demonstration Facility

- CAVE
- Advanced Displays
- Stereo Theatre

Partnering Relationships

- NASA
- Entertainment Company
- NRL/NRO
- MIT
- SGI/Intergraph

Advanced Applications

- Battle Space Visualization
- Space Station

Advanced Technologies

- Increased bandwidths - OC-48/WDM
- High-Definition Electro-Optical Systems

Advanced Visual Technology Center(AVTC)

GOALS

•The demonstration of advanced collaborative and interactive technologies that support research, business development and marketing.

•The acquisition of high resolution video images. The point to point transmission and remote viewing of Standard and High Definition signals over advanced ATM LAN and WAN networks in real time.

•Using High Performance Computers (HPC) to extract stereo and 4D data from video data, and to generate high resolution graphic simulations for integrated product models.

•Converging these technologies to develop interactive and collaborative virtual work environments.

Proposed AVTC THIC Goals

- Developing of High-Bandwidth ATM networks for data transmission and distribution.
- The remote viewing of video images for teleconferencing, qualitative and quantitative visualization.
- Developing HPC strategy to generate collaborative and interactive environments for high resolution graphic simulations for integrated product models and the analysis of visual data from video streams.

THE REAL PROBLEM

- Query
- Storage
- Archival
- Retrieval

THE THIC PROBLEM

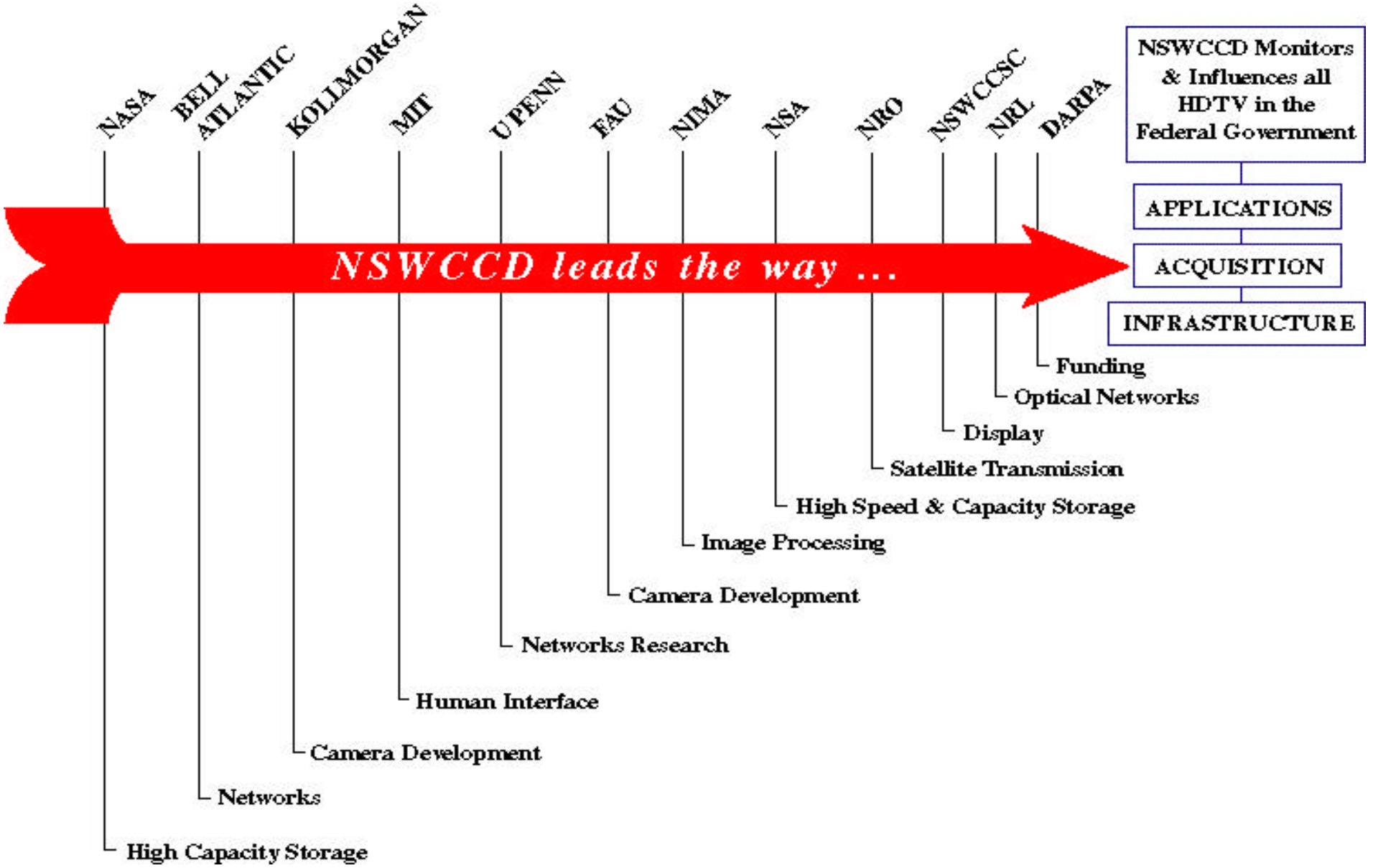
- The minimum 1080p requirement = 1camera

- 1 90 SEC EVENT = 11 GB OF STORAGE
- 30 EVENTS PER DAY = 330 GB PER DAY
- 330 GB PER DAY X 5 DAYS = 1.6 TB PER WEEK

How Do We Leverage Our Advantage?

- Partnering
- CRADAs
- NDAs
- Entrepreneurial Relationships
- Leverage HDEOCS and Storage Systems for DoD and Private Sector Applications
- Combined AVTC - THIC Solution

NSWCCD's High Definition Electro-Optical Visualization



AVTC & THIC Solution

- Use a multi-use equipment infrastructure.
- Use the AVTC's membership in the Advanced Technology Demonstration Network for initial testing and training.
- Develop a simple open, scalable, and extendable architecture the can be used at multiple sites.

Benefits

- Reduced Resource Requirements for Programs
- Provide Partners with Advanced Video, Network, and High-Performance Computing Technologies
- Provide HDEOP with Additional Applications

Actions

- Identify Potential Corporate Resources
  -
  -
- Define Implementation Schedule
  -
  -
- Propose Joint Program Strategy
  -

Where is our Impact?