Investigating Tabletop Interfaces to Support Collaborative Decision-Making in Maritime Operations

Stacey Scott, Antoine Allavena, Katie Cerar, University of Waterloo

Glenn Franck, Mark Hazen, Defence Research & Development Canada

Ted Shuter, Chris Colliver, Gallium Visual Systems, Ltd.

Gallium

University of Waterloo

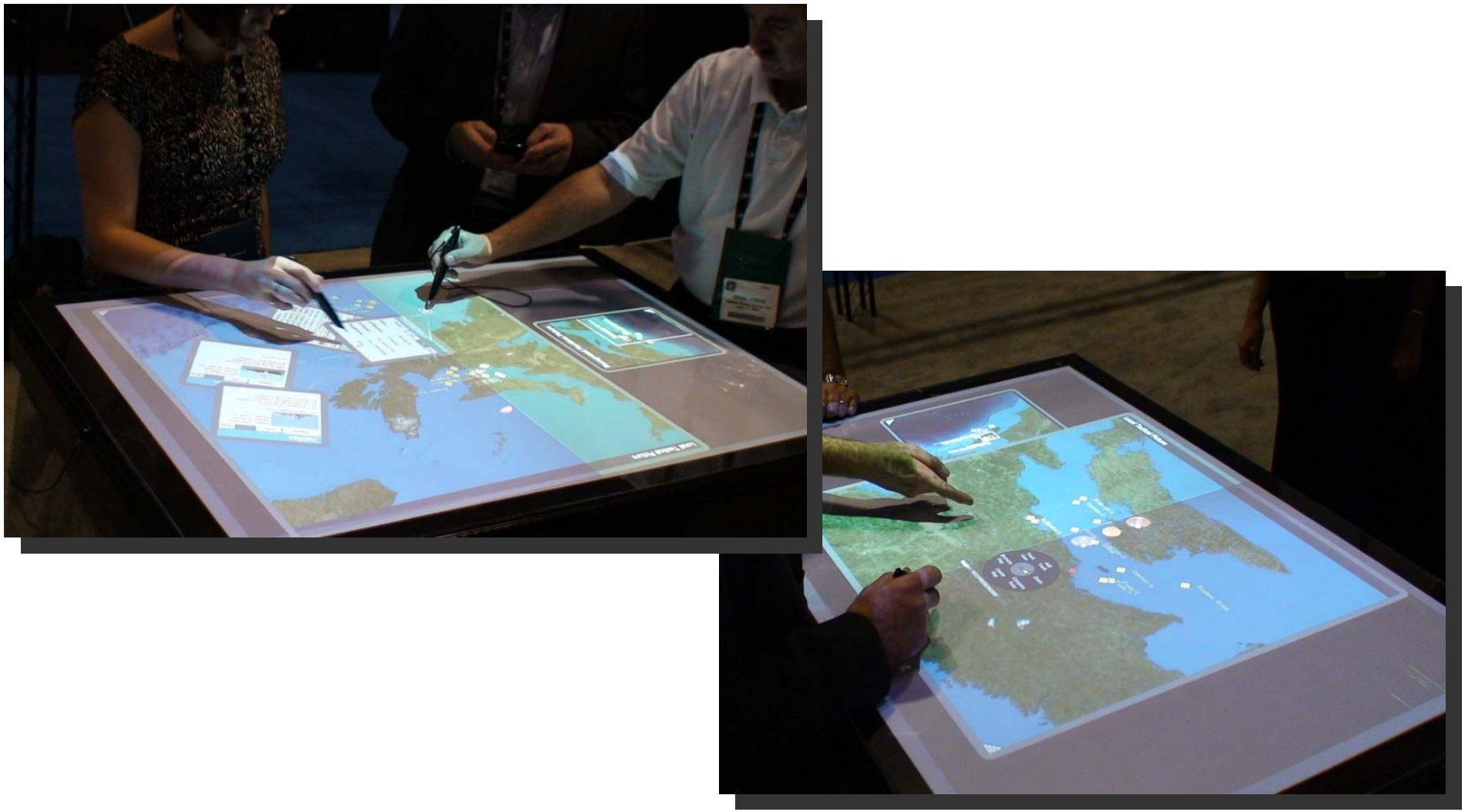
DEFENCE R&D DÉFENSE

Motivation: To improve on current methods of map-based collaborative decision-making

US naval battle management centre

Mission planning room on USS Harry S. Truman (http://www.life.com/image/1861529)

Emerging digital tabletop computers enable collaborative interactions over dynamic data

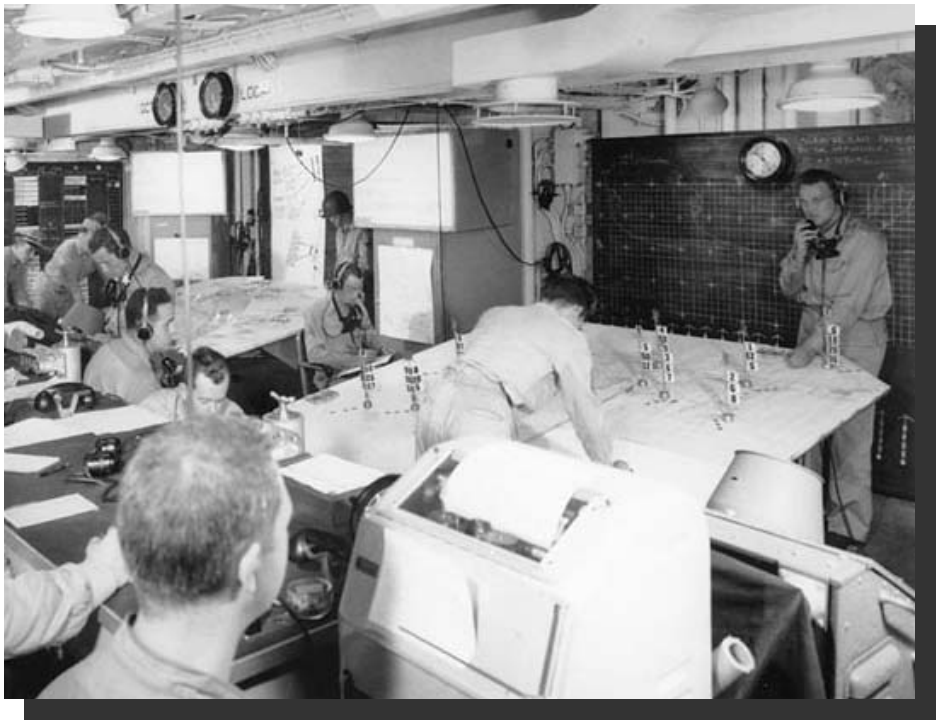


Early prototype of the ASPECTS Collaborative Digital Tabletop System at I/ITSEC 2009, Orlando, FL

Exploring collaborative tabletop interfaces to support maritime operations

- Joint project with **DRDC-Atlantic** and **Gallium Visual Systems**
- Project aimed to develop an experimental platform to explore collaborative planning and decision-making for maritime operations involving geospatial data around a tabletop computer

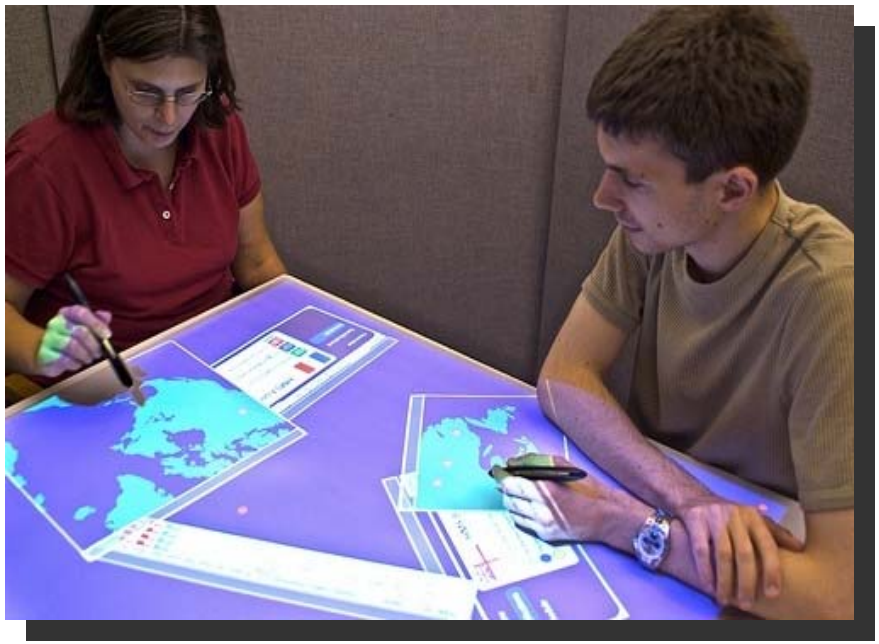
(http://www.go-explore-trans.org/images/2009/march/USS-San-Antonio_400px.jpg



(http://www.history.navy.mil/photos/images/g210000/g215083.jpg)

Specific project objectives

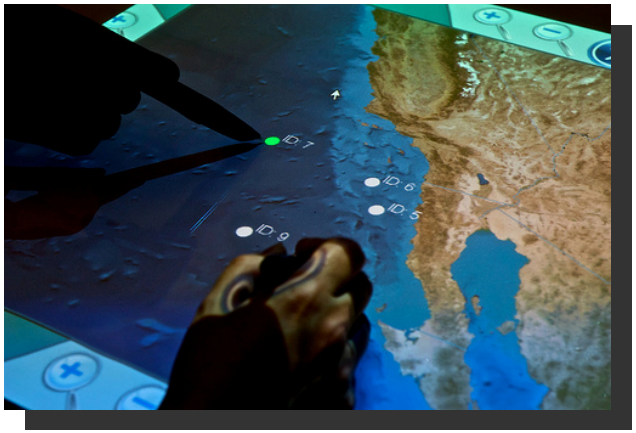
- To develop a **multi-user computing platform** to support collaborative interactions during naval planning tasks



- To provide **user identification** in the computing platform to enable interface tailoring for
  - Role-based interaction, and
  - Security-level enforcement

Project partnership

- University of Waterloo:
  - o developed tabletop hardware
  - o developed user interface to enable 360-degree, multi-user interaction
- DRDC-Atlantic:
  - o provided project requirements
  - o provided simulation engine for emulating track data
- Gallium Visual Systems:
  - o provided map rendering software (InterMAPics)
  - o developed map-related interface components

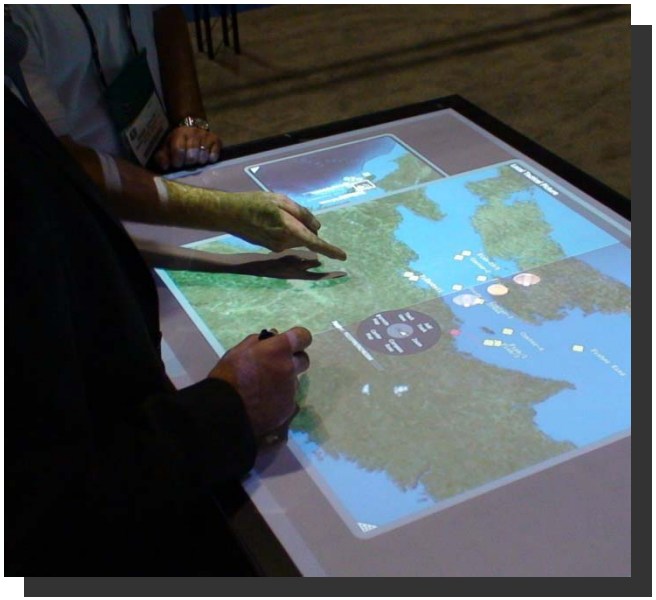


Gallium's InterMAPics map rendering software

Project results

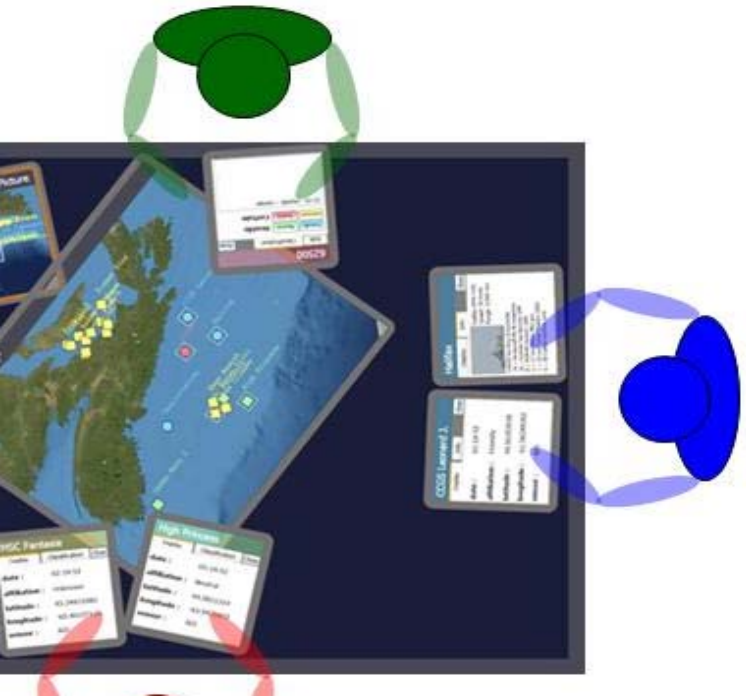
- An experimental application prototype was developed, called **ASPECTS** (ASset Planning Employing a Collaborative Tabletop System)

- Informal user feedback from I/ITSEC 2009 demonstration and demos to Canadian Forces personnel has been very positive

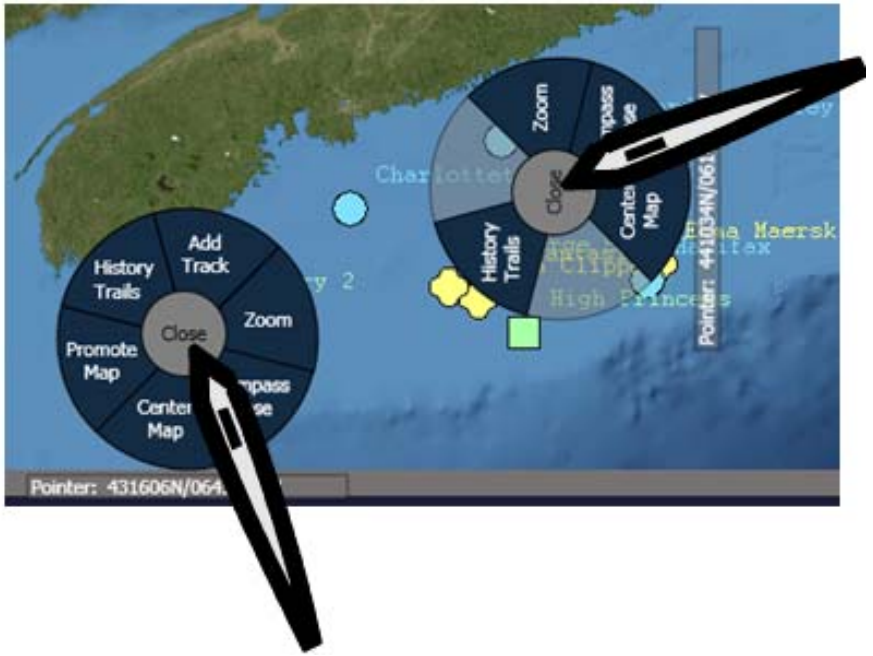


ome unique features of ASPECTS

ndow management that
bles accessing and sharing
a from anywhere at the
le (i.e. a 360˚ interface)



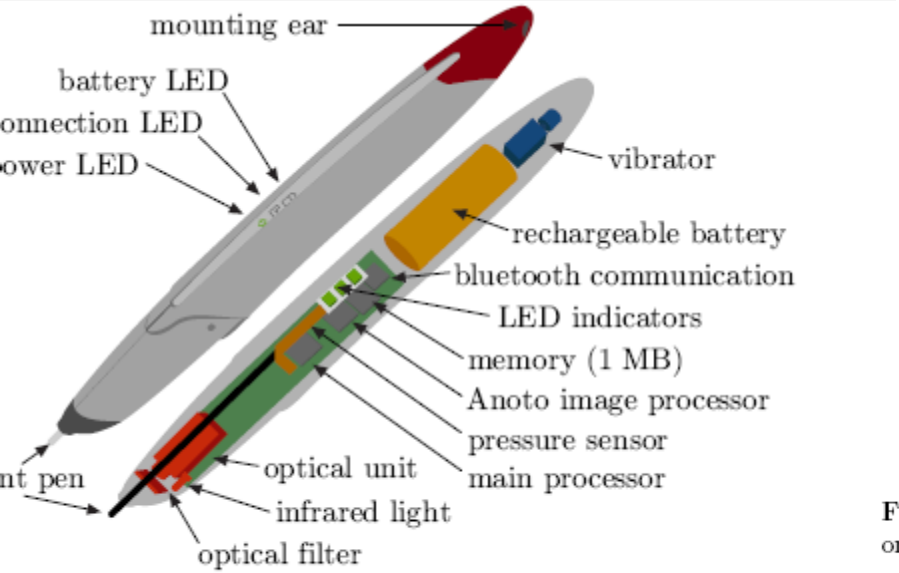
Tailored system menus based on user's authority level



oviding **identifiable** multi-user input

ital table uses Anoto digital ink pens[1]

- Enables **unique identification** of multiple tabletop users
- Enables **information tailoring** based on **role** and/or **security evel**



: Schematic view of the components of an Anoto digital pen.
f Jakob Leitner)

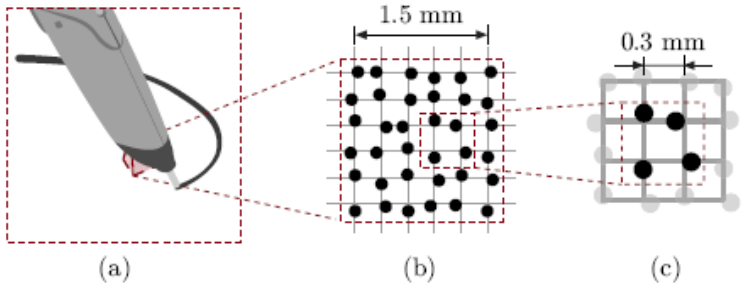
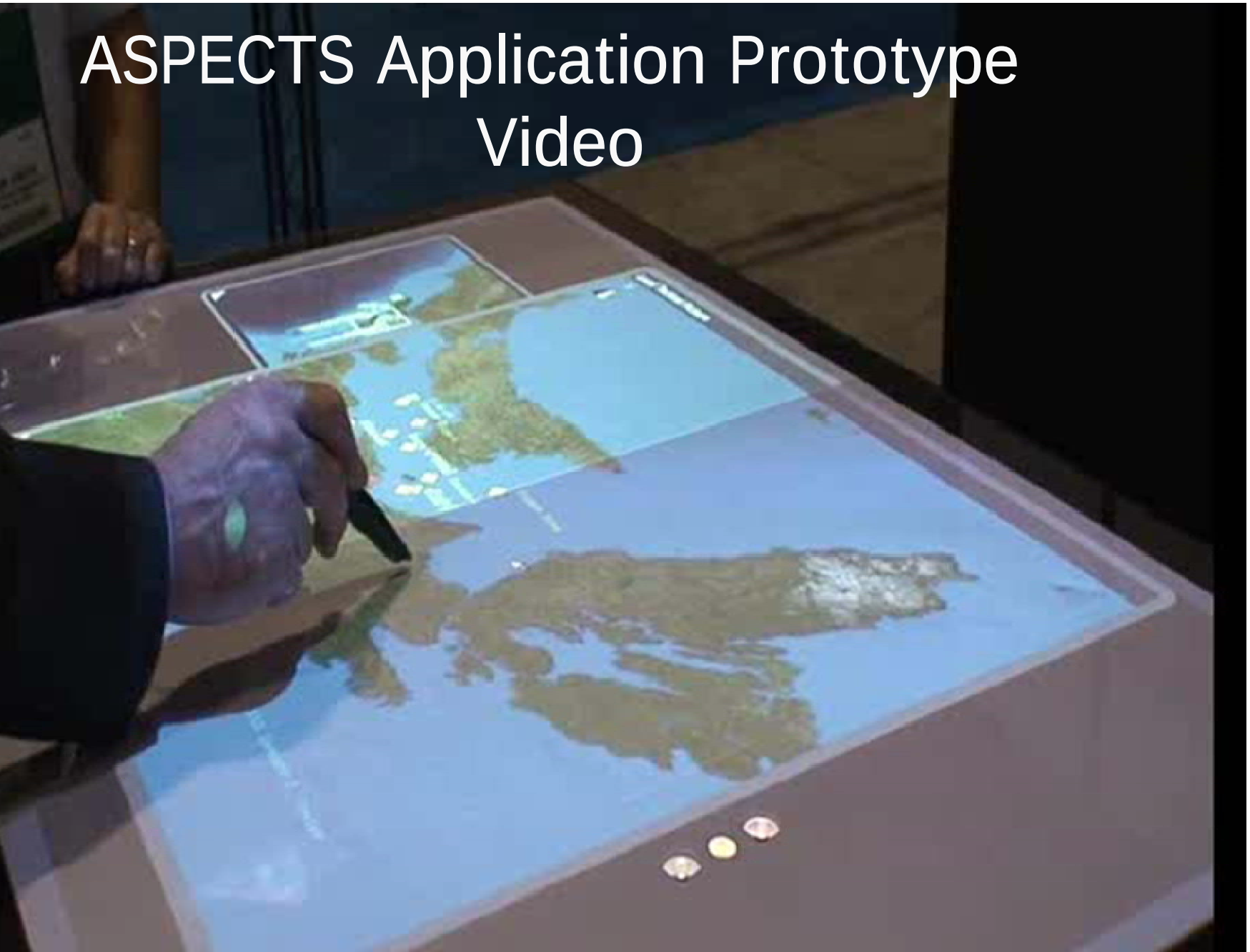


Figure 2.2: The pen camera captures 6×6 dots to determine its position on the Anoto pattern. (Courtesy of Jakob Leitner)

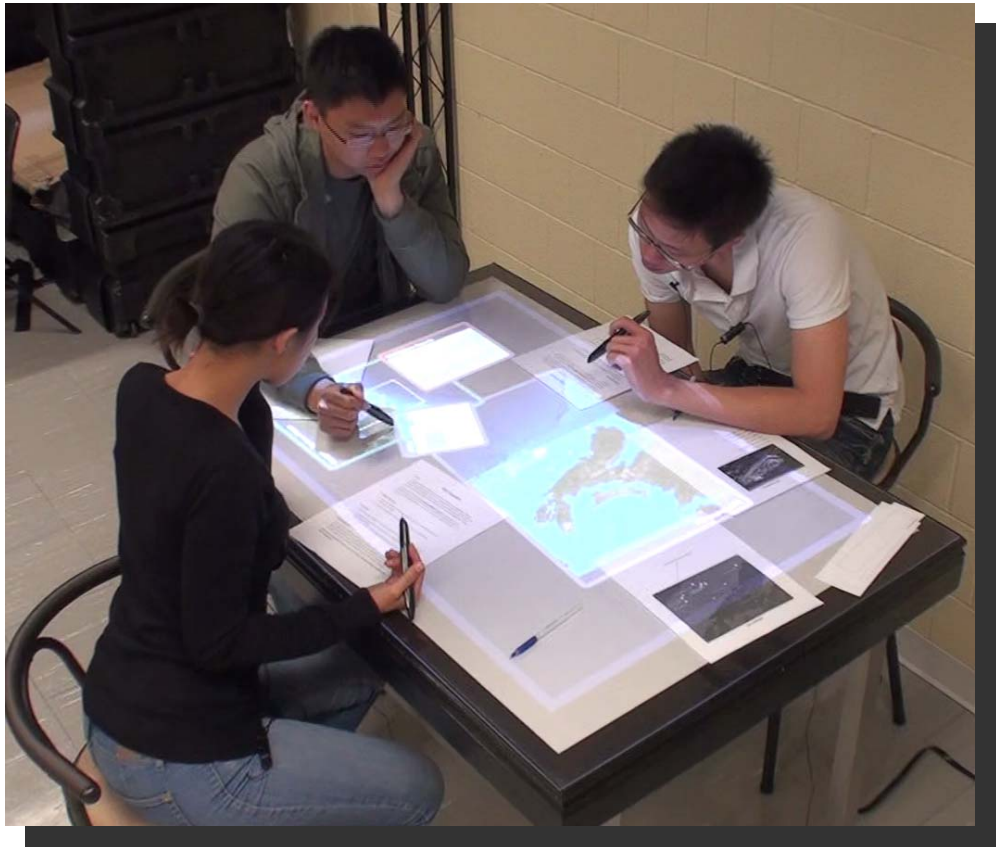
ASPECTS Application Prototype Video



ngoing Work

nducting formal
ability studies on the
PECTS system at the
iversity of Waterloo

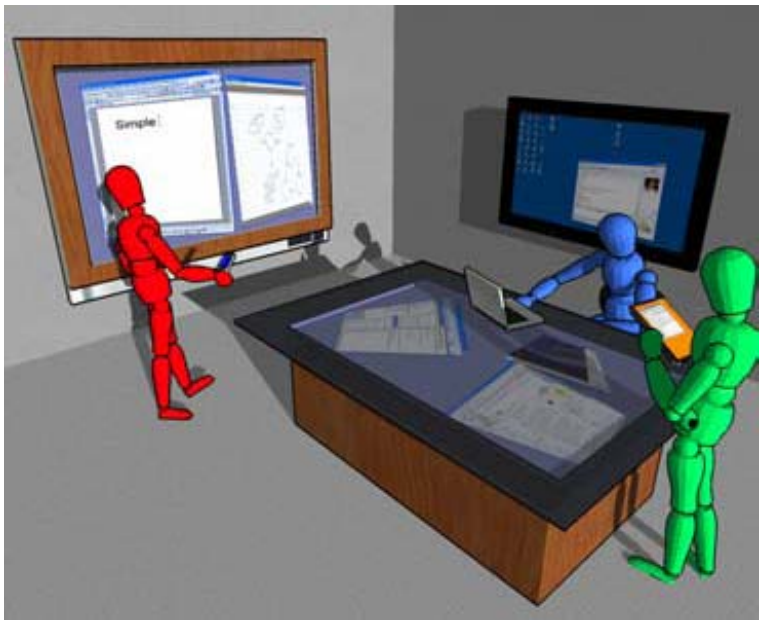
- Goal is to understand the strengths and weaknesses of current interface design
- Identify further system requirements to support collaborative decision making



verarching Research Network: SurfNet

SurfNet: Canada-wide research network on interactive tabletops and surfaces

SurfNet's mandate is to improve the development, performance, and usability of software applications for *surface computing environments: nontraditional* digital display surfaces including multi-touch screens, tabletops, and wall-sized displays



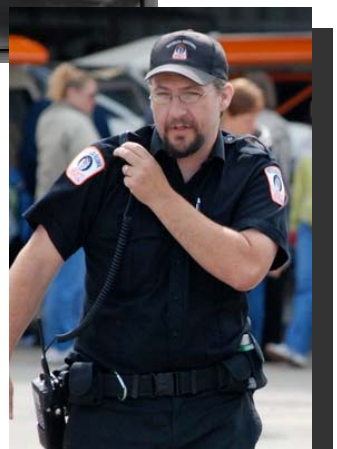
uture Work

Future development of the ASPECTS system for strategic planning mission scenarios

- Looking for domain partners for this work

Exploring extensions of ASPECTS prototype to other domain areas, including emergency response

- Currently partnered with local emergency support organization to outfit new mobile command centre with interactive collaborative surface technologies



Thanks for your attention!

Contact Information

Dr. Stacey D. Scott
Systems Design Engineering
University of Waterloo, Waterloo, Ontario, Canada
Email: s9scott@uwaterloo.ca
Website: http://www.eng.uwaterloo.ca/~s9scott

Project Partners

DRDC – Atlantic, Halifax, NS

Gallium Visual Systems, Inc., Ottawa, ON