



# Displays with Tactile-Touch Technology

May 2004



## Problem Statement

- Mechanical switches for pilot interaction
- Mechanical switches have low reliability
- Legends are fixed format
- Changing legends require extensive cost to modify or obsoletes the assembly





## Current Technology



- Electromechanical switches located around perimeter of display
- Requires additional space to accommodate switches
- Increased pilot workload



## Technology Description



- Interface has developed a patented tactile touch-screen technology





## Technology Description



➤ COTS AMLCD display with NFI (Near Field Imaging) tactile touch-screen overlay:

- Replaces electromechanical switches



## Technology Description



- Touch-pad or “switch” layout achieved through software
- Tactile response by actuators
- Actuator response is software controlled





## Advantages of Tactile Touch-screens

- Sensory combination of visual & tactile confirmation
  - Reliability >1 million actuations
  - Increased viewing angles
  - Improved human interface through eye-reduction workload
- Configurable and programmable for variety of mission profiles
  - Adaptable to variety of display sizes



## Advantages of Tactile Touch-screens

- Reduction of life cycle costs
- Legends programmable through software
  - Changes to switches without modifying or replacing the bezel
  - Reduction of parallax
  - Systems growth





## Benefits of the Technology

- No electromechanical switches or bezel assembly
- Programmable switch functionality
  - Touch switches dimensionally controlled through software
  - Configuration changes easily implemented
  - Programmable color coding or switch highlighting for system interface cueing



## Benefits of the Technology

- Programmable pages provide multi-tasking capability within one display
  - Efficient use of displays thus reducing number of displays needed



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## Design Versatility — Typical Display Control Unit




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## Platforms That Can Use Tactile Touch-screens

- Avionics platforms
  - Displays used for flight, control and communications
- Marine Control Centers
- Command and Control
- Ground-based systems
  - Maintenance
  - Ground stations
  - Training centers
  - Simulators



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## Product Readiness

- Design completed
- Preliminary software/firmware testing completed
- Two prototypes built
- Product demonstrations available now



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## Target Opportunities

- Demonstration to following program offices
  - US ARMY
  - NAVY
  - AIR FORCE

Interface will manufacture custom tactile touch-screens to customer specifications and requirements

- Introduction of standard sizes, i.e. 10.4", 12.1" and 15"



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## The Company

- Customization and ruggedization of controls and displays for both commercial and military avionics
- Founded in 1976
- Modern 25,000 sq. ft. facility located in Oceanside, CA
- Certified small business



## Core Capabilities

- Turn-key engineering
- CAD/CAM and Solid Works
- Complete manufacturing
  - Electromechanical assembly
  - Test (electrical, environmental, optical)
  - Machining centers
  - MIL-SPEC finishing
- ISO 9001 / AS9100 quality certification





# Markets Supported



Military



Commercial



Military Ground Vehicles  
Central Control Centers

Simulation & Training Systems  
UAV- Ground Operator Stations



# Customers Supported

## ➤ Military Programs: Teaming agreement with several companies

- |                      |                    |                  |
|----------------------|--------------------|------------------|
| AAI Corporation      | GEC-Marconi        | Rockwell Collins |
| Avisys               | Harris Corporation | SAIC             |
| BAE Systems          | Honeywell          | SCI              |
| Boeing Company       | Lockheed Martin    | Sikorsky         |
| CAE                  | NAMRL              | Smiths Aerospace |
| Coastal Systems      | Northrop Grumman   | Titan            |
| Cubic Systems        | Palomar Products   | TEAC America     |
| Dayton T. Brown, Inc | Raytheon Systems   | US ARMY          |
| Flight Safety        |                    | US NAVY          |
|                      |                    | US AIR FORCE     |





## Customers Supported

### ➤ Commercial Programs

Alaska Airlines	Continental Airlines COPA	Pacair Trading
Air Shamrock	Dalfort Aerospace	RADA
Air Pacific	Futura Airlines	Rockwell Collins
AMS	Hapag-Lloyd Flug	Ryan Air
Boeing Company	Honeywell	Saudi Arabia Airlines
British Airways	Japan Air Systems	Smiths Aerospace
British West Indies Airline	Lan Chile	South African Airlines
BMW-Rolls Royce	Lufthansa Technik	Southwest Airlines
China Airlines	Midway Airlines	United Airlines
		United Parcel Service



## Program Experience

<u>Customer</u>	<u>Program</u>	<u>Product</u>
AAI	A-10	LCD for weapon alignment
Allied Signal	V-22 SOA	MFD Switch Bezel assembly
AVISYS	A340-400	Electronic Warfare Processor Unit
BAE Systems	C-17	Custom LCDs for LoadMaster Panel
BAE Systems	C-17	Custom LCDs for Flight Director
BAE Systems	F-16	ATVR Control Unit
BAE Systems	F-15 / F-16	ECM Keypads and Panels
Bell Helicopter	407	Caution/Warning Annunciator Panel
Boeing	C-40B	Data / Comm Panel
Boeing	C-40B / C-32A	Power Control Panel
Boeing	C-17	Control Display Unit (simulated)
Boeing	F/A-18	Upfront Control Unit (simulated)





## Program Experience

**Customer**

Boeing  
 CAE  
 CAE  
 Flight Safety Intl  
 Honeywell  
 Honeywell  
 Hughes  
 Lockheed Martin  
 Lockheed Martin  
 Lockheed Martin FS  
 Mathtech  
 NAWC

**Program**

C-130 AMP  
 H-60  
 C-130  
 C-17  
 B747 / 757  
 B727 / 747  
 E-6  
 C-17  
 B-1  
 LAMPS  
 Hawkeye  
 F/A-18

**Product**

QWERTY Keyboard  
 Control Display Unit (simulated)  
 SKE Panels (simulated)  
 Multi-Function Displays (simulated)  
 Keypad assemblies  
 Data Link Integrated Switch Panels  
 Display Switch Bezel  
 LCDs for Autopilot Flight Director  
 SATCOM CDU  
 MFD Switch Bezel  
 ICS Intercom Control System  
 Control Display Unit (simulated)



## Current Programs



**MH-53E Mine Sweeper  
 Control Display Unit**

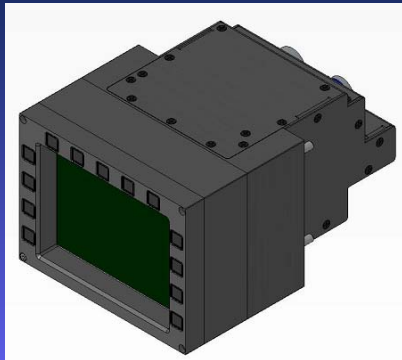


**Widebody Integrated Platform  
 Protection System (WIPPS) CDU  
 (Homeland Security)**





# Current Programs



RAH-66 Cockpit Instrumentation Display System



Health & Maintenance CCU



KC-135R Engine Monitor Display



# INTERFACE

DISPLAYS & CONTROLS

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