

# Flexible Display Manufacturing Technology

Establish an integrated pilot line and processes to manufacture affordable flexible full-color active matrix displays to improve yield and reduce manufacturing costs.

## OBJECTIVE / SOLUTION

The objective of this ATO-M is to enable a pilot-line compatible process to deliver 1000 flexible displays/year with a resolution of at least 320 x 240 pixels to meet the requirements of the Army transformation, and to improve the yield and reduce manufacturing costs. Reflective and emissive technologies implemented will be more rugged and efficient than current displays in use. The flexible attribute will enable new applications not possible with glass-based displays. This ATO-M is supported by Flexible Display Technologies S & T (PE 62705).



Flexible Display Unit



Arm Mounted Flexible Display Unit

## ACHIEVEMENTS

Test displays (reflective & emissive) were completed with partners. Electrophoretic lamination technology from a partner was transferred to the Center, which enables the fabrication of fully integrated reflective displays. The 6-inch wafer scale pilot line has been fully qualified, and the center is producing a-Si backplanes on plastic and flexible stainless steel substrates. The manufacturing process yields and device performance are being steadily improved from baseline first lot results. GEN II pilot line tools have been obtained. State-of-the-art metrology tools have been installed for rapid manufacturing process development.

## BENEFITS

- Lightweight, rugged, low-power flexible displays will enable situational awareness in daylight, night, and adverse weather conditions.
- Flexible display technologies will enable situational awareness from technology not commercially available with attributes that cannot be realized from glass-based displays. It provides affordable manufacturing capability, lower production costs, extended operation lifetime, and reduced life-cycle costs (environmental).

## STATUS

- Six inch processing line operational.
- GEN II tool acquisition and installation on schedule.
- Center has 16 industrial partners with 1 additional partner in process of joining.

## WEAPON SYSTEMS / SECONDARY ITEMS IMPACTED

- Portable applications include human-borne and body-worn displays for Future Force Warrior (FFW). Upgrades to portable electronics such as Force XXI Battle, Brigade-and-Below (FBCB2) and vehicle displays for FCS-UA

## POTENTIAL COST AVOIDANCE

- \$600/diagonal inch cost reduction per display unit, from \$800/diagonal inch to \$200/diagonal inch.
- Possible 5X savings in life cycle costs.