

## Consolite Technology Data Sheet 16

### Flat Screen Display NVG Upgrades

Consolite Technology has developed a tremendous depth of experience in the upgrade of flat screen displays to night vision goggle (NVG) compatibility.

A variety of techniques are available, dependent on screen configuration, required performance and budget, but all have been proven in applications including aircraft cockpits, warship flight control positions, military vehicles and hand-held devices.

All can be made fully compliant with relevant standards such as MIL-STD-3009.

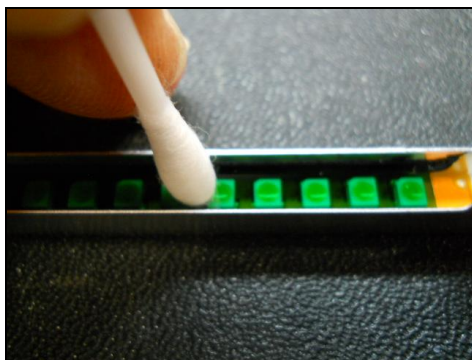
The two main techniques are:

- Add an external overlay filter to the front of the screen. This has the benefit of simplicity as no internal modifications are required. However, filters may need to be large.
- Add a filter to the light source internally. This means that the display must be dismantled with possible internal modifications to accommodate and fit the filter, but there is no disruption to the external appearance of the display. The filter size is generally small.



*Filtered cockpit map display*

*Courtesy Honeywell UK*



*Adding a filter to an LED display backlight*

Both techniques have successfully been used on a wide variety of displays, including CCFL and LED backlit screens, for both full colour and monochrome, from very small to very large. The techniques can also be used on touch sensitive displays with the appropriate filter type. Special filters have been developed for OLED displays as well as for commonly used devices such as the iPad and the Toughbook range.

Consolite has a fully equipped dark room facility permitting measurements to be made on displays to determine the best filter solution, as well as certification of compliance with the required standard once the filter is fitted.

A variety of filter types can be supplied including polymer or glass absorption filters, hybrid designs and coated glass interference filters. The optimum choice will depend on a variety of factors including weight limitations, required hardness, and need for optical coatings (anti-reflection, ITO). Thin, flexible polymer filters are available for touch screen applications where internal fitment is not possible.

### Aircraft Displays

Flat screen multi-function displays are increasingly found in modern aircraft cockpits as the optimum way to present a wide range of information to pilots and navigators. Consolite supplies filters to display OEMs for integration into new displays, as well as to organisations engaged in cockpit upgrades for retrofit to existing displays. Filtered displays meet the requirements of common standards such as MIL-STD-3009 or RTCA/DO-275.



Typical helicopter console with flat screen MFDs

### Warship Displays



External filter retrofitted to warship display

Aviation capable warships are increasingly being modified to NVG compatibility to permit unimpeded aircraft operations on NVGs. Consolite is the world leader in this field. Displays in prominent locations such as flight control areas and flight deck officer positions can interfere with NVGs if not modified. The same techniques described above are applicable, and standards such as STANAG1445 and Def Stan 02-587 Part 3 reference MIL-STD-3009 for internal displays.

### Land System Displays

Both military vehicles and dismounted soldiers may use displays that require modification for use with NVGs. Here the requirement may not only be to avoid interfering with friendly NVGs, but also to avoid detection by hostile personnel using NVGs. For the latter an additional secure lighting requirement may apply, such as the US CECOM guidelines. Consolite can provide filters for all such requirements. Polymer filters are of particular value here for their ruggedness and ability to be used on touch screens.



Clip-on filter for handheld touch screen OLED display

Courtesy Cobham Surveillance