



GE Aerospace

# Open Display Platform

Flexible user interface device that meets future Modular Open Systems Architecture (MOSA) demands

GE's Open Display Platform product line provides a flexible User Interface Device (UID) designed to meet future MOSA display platform design demands. Open Display Platform (ODP) allows customers to minimize cost and time to market, while reducing workload through human-centered design. ODP supports mission system implementations with smart and dumb Cockpit Display System (CDS) configurations using a common architecture. ODP provides a platform that integrates GE's advanced TrueCourse™ Common FMA and other Avionics applications in a MOSA/FACE environment, as well as supporting traditional CDU and CDS solutions.

The smart version of the ODP, the Touchscreen Open Display Unit (TODU), is designed to provide mission system designers with a flexible FACE-aligned multi-core graphics & processing smart display platform that optimizes system effectiveness. TODU supports applications developed by GE, 3rd parties, or customers. The Customer will be in control of the content and configuration. Apps can range from Navigation/Guidance functions (like GE's TrueCourse™ Common FMA), lighting, air management, store selection/interface, maps/weather, standby flight, PFD, MFD and other functionality. TODU is offered as a stand-alone smart display unit that utilizes built-in ARINC 429, 1553 and Ethernet/TSN interfaces with physical keys and touchscreen to access the aircraft data network in conjunction with the Cockpit Display System (CDS).

The CDU version of ODP provides operators an ARINC 739 Multi-Purpose Control Display Unit (MCDU) to interface a traditional FMS solution with physical key and touchscreen interfaces. The Touchscreen CDU (TCDU) graphical user interface emulates an A739 keyboard function, look and feel and provides alternate graphical user interfaces to increase reliability and decrease pilot workload. This obsolescence refreshed CDU solution provides a form, fit and function drop-in replacement for 20,000 plus legacy GE CDUs to minimizing training impacts on operators. This refresh CDU can support addition new and retrofit CDU opportunities.

The Open Display Platform common architecture supports a federated Cockpit Display System (CDS) implemented with an Open Graphics & Processing Unit (OGPU) and multiple external Dumb Display Units (DDU). The Open Graphics & Processing Unit is a flexible FACE-aligned multi-core graphics & processing platform that drives the Cockpit Display System (CDS). Dumb Display Units are available with multiple display sizes, resolutions and interfaces.

- Proven display technologies
- Standard industry interfaces
- Reduction in pilot workload
- Touchscreen and/or physical keys
- Cost effective with multiple screen sizes
- Improved situational awareness



# Overview

## ODP Architecture

ODP baseline internal architecture is comprised of the following components

- Display and backlight assembly (DLA)
- Multi-touch touchscreen and physical keyboard
- Processor, I/O, and display module
- EMI filter and standard avionics connector module
- Enclosure (chassis)

## Development Status

GE currently has fielded over 20,000 Display Units over the past 40 years. The Touchscreen Control Display Unit is backwards compatible with ARINC 739 MCDUs. Hosted Flight Management Application and ARINC 661 Server is at TRL 6 (as of May 2023). It has been demonstrated in System Integration Lab environments.

## Next Generation Capabilities

Low SWAP-C

CPU:

- Feature scalable multi-core Arm® Cortex® architecture with 26K-36K DMIPS depending on configuration

Memory:

- ECC-SDRAM & NAND Flash for Boot & OFP and eMMC Flash for File System

GPU:

- High-performance 3D graphics engine capable of up to 4K graphics

Platform Software:

- Safety-Critical DAL-A A653 RTOS to support Multi-Core Processing, FACE™ 3.0, OpenGL SC 2.0 graphics & A661

Aircraft interfaces:

- ARINC-429, MILS-STD-1553, Ethernet, TSN, RS-232/422/485, discrete IO and video in & out (A818 or other)
- Large multi-touch touchscreen display for flexible GUI and advanced apps

## Standards

Safety-Critical DAL-A A653 RTOS

FACE™ 3.0

OpenGL SC 2.0 graphics

ARINC 739 MCDU

ARINC 702 EFIS compatible

ARINC 661 display applications

DO-178, DO-254, DO-160

MIL-STD-810, 704, 461 & 464

NVIS MIL-STD-3009



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## Navigation Display Parameters

Display flight plan map (North up)

Display navigation maps (HDG up)

Wind, ground speed, POI displays

Single UNDO for modifications

Vertical deviation (descent path)

Trend vector (rate/direction of turn)

Display enhancements (pilot inputs)

## Display Interface

FMS information is provided to the Display Interface. Data entry/selections are verified and updated with current display state.

Display Interface provides FMS isolation function from crew displays and controls.

## User Interface Device Features

Touchscreen and/or physical keys ARINC 739 MCDU or ARINC 661 ODP

Alternative navigation hosted (EFIS)

- 250 waypoint route
- GPS/IRS nav capable
- EFIS Map data capable



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