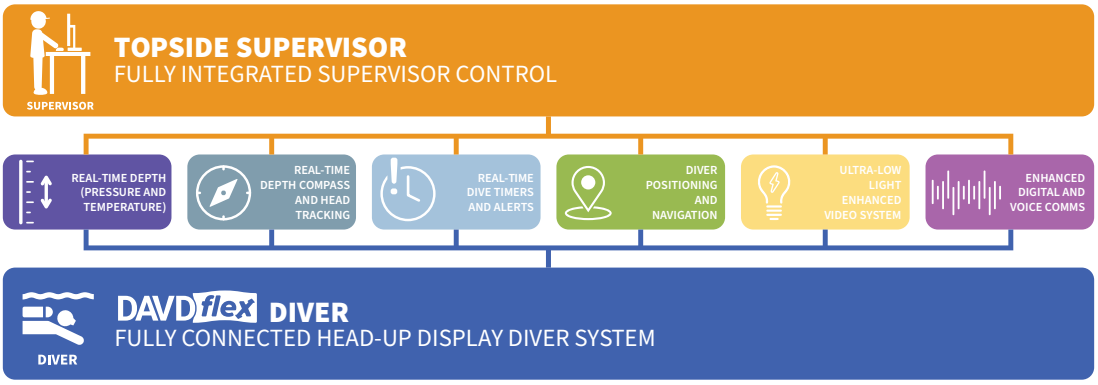
Coda Octopus:DIVE
Augmented Digital Diving Solutions

DAVD flex

Revolutionary Diver Management System

DAVD flex

The DAVD flex integrates topside control, a Head-Up Display (HUD), and digital communications for divers, facilitating seamless real-time information exchange between divers and supervisors via augmented reality displays in the diver's helmet or mask. Supervisors use the Coda Octopus 4G USE® DAVD flex Edition software to manage the HUD, displaying real-time 3D imagery and communicating with divers through images, videos, technical drawings, and messages. Divers access critical technical data and support from surface teams, optimizing mission outcomes with features like real-time depth, compass, head tracking, dive timers, alerts, positioning, navigation, and enhanced video and audio capabilities. The system supports both rapid deployment scenarios and detailed planning with annotated 3D maps, beneficial for salvage operations and other complex dives.



DAVD flex Features

Mixed Reality 3D Display with Real-Time Imagery in 1st or 3rd Person Perspective

- Transparent High-Definition HUD
- Mixed-Reality 3D Display using Live Sonar and 3D Models
- Supports numerous Kirby Morgan Helmets & Full-Face masks including the Interspiro Diveator MKII, OTS Guardian, Dräger Panorama Nova® and Diveways PR Full-Face Mask.

Comprehensive Diver Helmet/Full-Face Mask Compatibility

- HUD Adjustable between 2D Augmented Reality, 2D Mixed Reality and 3D Mixed Reality with 1st and 3rd Person Perspectives

Seamless Communication with Real-Time Images, Videos and Text Messages

- Integrated Noise-Cancelling Digital Audio
- Instant Voice and Text Communication with Automatic or Pre-Defined Messaging
- Transmit On-Demand Media to Diver: Images, Videos, Drawing and More to assist in Live Operations

Integrated Camera, Navigation and IR-Illumination Modules

- Integrated 1st Person Ultra-Low Light Camera with Advanced Video Processing and Real-Time Edge Enhancement
- Diver Head Tracking for Accurate 3D Visualization and Compass
- Optional IR Illumination and Positioning Module

Instant Telemetry, Information Display and Mission Planning

- On-Demand Telemetry: Dive Timers, Depth, Compass, Dive Computer Data, Waypoint Range and Bearing
- Create and Transfer step-by-step Mission Instructions with Text, Video and Image Support

Coda Octopus:DIVE
Augmented Digital Diving Solutions

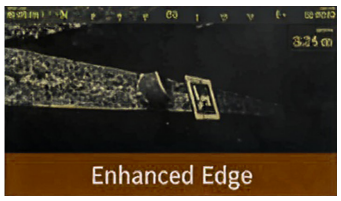
DAVD flex

Highlighted Features

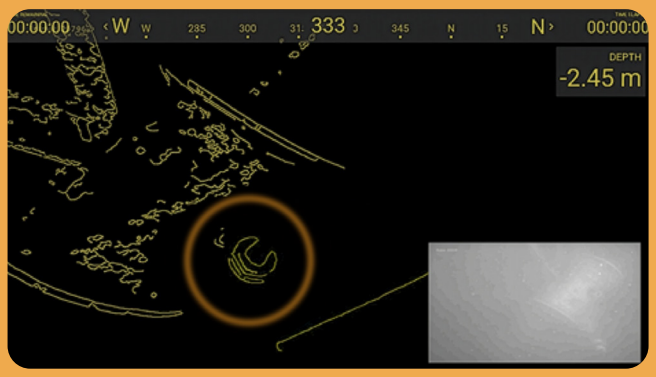
Real-Time Video Processing with Edge Enhancement

Traditionally, divers have carried video cameras to allow surface supervisors to monitor and assist with operations. However, the diver rarely benefits from this video data and often ends up functioning as a cameraman for the surface team, unable to see what the camera captures.

Underwater video recording poses significant challenges, especially in dark, sediment-filled waters where traditional illumination is ineffective. The DAVD Camera addresses these challenges with an ultra-low light HD camera module and optional illuminators, connected digitally to the DPPmax processor. The DAVD flex system transforms the traditional underwater video setup by providing the diver with high-resolution, low-latency video directly to their HUD, which is then broadcast to the dive supervisor and support staff.



The Dive Supervisor can enhance the video by hand-annotating the scene to highlight items or objects of interest that may be difficult for the diver to see. For reference, the raw video image is displayed inset without any additional processing or enhancement.



Real-Time Digital Audio

Traditional diver audio communications can be challenging in the best of conditions, but are the primary form of communication between the diver and the supervisor. DAVD flex opens the gateway to a new era of digital diver communications with the surface, providing a number of critical features including auto-noise cancellation and background noise suppression. These functions provide clear audio communications even with background noise at either the diver or on the surface. Recorded speech, videos with audio tracks and automated computer speech instruction are output digitally from the DPPmax on the diver in crystal clear audio.

Coda Octopus:DIVE
Augmented Digital Diving Solutions

DAVD flex

Why DAVD flex Revolutionizes Diving?

PROBLEM
Diving Challenges

Diving is regularly conducted in low to zero visibility environments in which standard visual displays, cameras and gauges are virtually useless. Even in somewhat visible environments, situational awareness, navigation and topside communication can be problematic and very limited. The tasks the diver is expected to perform are technical in nature and often in complex hostile locations. This requires prior detailed information and instruction. Divers, depending on the water depth, have limited time on the seafloor to perform this tasks – this could be as little as 20 minutes.

SOLUTION
DAVD flex

The DAVD Flex System radically transforms the dive mask into an immersive display capable of providing everything from life support data, to live high resolution 3D Sonar Data (Echoscope®) to advanced navigation displays to 3D Augmented Reality Displays


Information

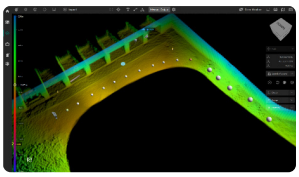
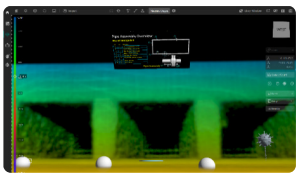

Life Support Data

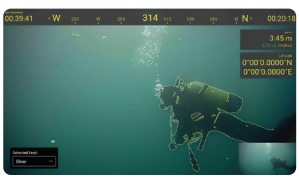

3D Augmented Navigation


Project Scene Data

Benefits

DAVD flex addresses critical diving challenges and uniquely places the diver in full control of his personal augmented reality display. Five core features areas are provided effortlessly allowing users to adapt to all levels of detail and complexity.



Location
Real-Time Diver Compass, Depth and Location, and navigation to Dive Stage, Work Site and Identified Waypoints and Hazards

Visbility
Enhance the Diver experience with Real-Time Video, 3D Sonar and Augmented Reality Scene Awareness

Communication
Communicate with rapid Text Messaging, Detailed Instructions and Procedures, Simple Guidence and Digital Speech and Audio

Safety
Diver Life Support, Navigation and Dive Timer data synchronized with supervisor in Real-Time to ensure safe diver monitoring

Data
Diver and Supervisor can share and access all project data and information On-Demand in Real-Time.

Coda Octopus:DIVE
Augmented Digital Diving Solutions

DAVD flex

Main Components

1. Diver Processing Pack Max (DPPmax)

The DPPmax is a high-performance, rugged computer system worn by the diver. It manages, acquires, and processes data from all diver-worn sensors, displaying the data on the Diver HUD. This includes digital audio, digital video, diver depth, full head tracking (and temperature), external sensors, and processed real-time 3D sonar data.

2. DiveVisionTracker (DVT_2)

The DiveVisionTracker is a module combining an Ultra-Low-Light Camera and AHRS unit. The unit can be used to capture real-time and high-definition video from the diver's perspective. The AHRS unit provides a Diver Heading measurement for real-time display within the HUD.

3. Diver Head-Up Display (GEN_4 HUD)

The HUD is used as a data display portal and is compatible with numerous helmets and face masks including those from Kirby Morgan, Interspiro, Draeger and OTS Guardian. The HUD is supplied in the visor and is removable. It is a completely waterproof and depth-rated Augmented Reality display system. (Patent Notice: US10877282)

4. Single Diver Power Supply Unit (SD_PSU_1)

The Control Panel facilitates all power and data communications between the diver-worn DPPmax and the topside DAVD laptop. It offers AC and DC power protection, ensuring safe power handling as well as a reliable data link for video, digital audio, and 3D sonar data. For scenarios that require up to 3 divers, there is a Multi-Diver PSU Version available.

5. DAVD Lightweight Umbilical Cable (CA0000832)

The DAVD umbilical cable serves as a single tether, supplying low voltage DC power (<24V DC) to the diver-worn DPPmax and facilitating an Ethernet data link between the diver and the supervisor topside.

6. 4G USE® DAVD flex Edition Software

The software enables the supervisor to manage all information displayed to the diver, including real-time 3D imagery of the diver's environment in 1st or 3rd person perspective, regardless of water visibility conditions.

Coda Octopus:DIVE
Augmented Digital Diving Solutions

DAVD flex

Compatible Diver Accessories

The Heads-Up Display (HUD) Unit is widely compatible and supports a range of Helmets and Full-Face Masks, including:

Interspiro Divator MKII

Dräger Panorama Nova® Dive

OTS Guardian

Diveways PR

SL17K SL27 KM37 KM37ss KM47

KM57 KM77ss KM97ss Diamond®

KM BandMask®

The Head-Up Display (HUD) unit is compatible with the following dive equipment:

Helmets

Kirby Morgan®	Diamond®, SuperLite®17, KM37, KM37ss, KM97

Full-Face Masks

Diveways	FFM
Dräger	Panorama Nova® Dive
Interspiro	Divator MKII
Kirby Morgan®	BandMask®
Ocean Technology Systems	Guardian

*Please note that helmets and masks are not supplied with the DAVD Flex. Installation Guides are provided for installation of the HUD into your existing equipment. We continue to expand the range of compatible dive equipment, so please contact us if your preferred equipment is not shown on the list.

Kirby Morgan® Diamond® Helmet equipped with DAVD HUD-4

Coda Octopus:DIVE
Augmented Digital Diving Solutions

DAVD flex

Technical Specifications

SD_PSU_1	
Dimensions (h x w x d)	270mm x 246mm x 174mm approx. (10.62 x 9.68 x 6.85 in approx.)
Weight	3.5kg approx. (7.71 lbs approx.)
Power Input	110-240Vac, 10A
DAVD FLEX Interface	Ethernet / Power (to CA0000832)
Connectors	1 x IEC Male (AC Input) SubConn® MCIL6F (to CA0000832)
Ethernet Connectors	2 x RJ45 Ethernet (Laptop and 3D Sonar)
GEN 4.0 HUD	
Dimensions (h x w x d)	114 x 60.5 x 24 mm approx. (4.48 x 2.38 x 0.94 in approx.)
Weight	0.105 kg approx. (0.23 lbs approx.)
Display	Dual Optical Engines, (R + L Eye)
Audio	1 x MIC, 2x Speakers
Power	5V DC
Interface	Custom HDMI/USB
Resolution	1080p (1920 x 1080)
Connectors	Glenair® Aquamouse 19-pin Marsh Marine 4-pin (for Audio)
Depth Rating	100m
DAVD-DPPmax	
Dimensions (h x w x d)	178mm x 114mm x 52mm approx. (7.00 x 4.48 x 2.04 in approx)
Weight	1.2kg (2.20 lbs approx.)
Power	18 - 48V
Sensors	Pressure Sensor
Connectors	SubConn® MCoM6M (Power + Ethernet), Glenair® Aquamouse (DVT-2) SubConn® MCOM6F (Audio) Glenair® Aquamouse (DAVD-HUD-4)
Depth Rating	100m
DiveVisionTracker	
Dimensions (h x w x d)	50 x 50 x 94mm (1.97 x 1.97 x 3.7 in)
Weight	0.194kg Approx (0.42 lbs Approx)
Camera	Ultra Low Light 2 MP
Power	5V DC, 2W
Monitor Sensors	AHRS 1° Heading, 0.2° Roll / Pitch
Connector	Cobalt Series Bulkhead Connector
Depth Rating	100m
Part Number	DVT-2

DAVD Lightweight Umbilical Cable CA0000832 (300ft Umbilical)	
Dimensions (h x w x d)	345mm x 225mm x 375mm approx. (10.62 x 9.68 x 6.85 in approx.)
Weight	16.5 kg Approx. (36.37 lbs Approx.)
Cable Length	100m
Connections	Ethernet, 24V DC Power
Connectors	MCIL6M/E (from SD_PSU_1) MCIL6F/E (to DAVD-DPPmax)
Depth Rating	100m
DAVD flex Composition Shipping Case	
Dimensions (h x w x d)	524 x 428 x 206 mm Approx (20.62 x 16.85 x 8.11 in approx.)

Depth and Pressure Ratings

The DAVD flex is qualified for operation at 328ft/100m and 10 bars. Each system component and their respective qualified depths and pressure of operation are listed below:

	Depth Rating	Pressure Rating
DAVD System	100m / 328ft	10 Bar
Gen 4.0 HUD	100m / 328ft	10 Bar
DPPmax	100m / 328ft	10 Bar
DiveVisionTracker	100m / 328ft	10 Bar