Display Interfaces
Additional interfaces under development. Contact your Universal Avionics representative.

Universal Avionics
- EFI-890R/MFD-890R
- MFD-640
- FMS with 4-inch or 5-inch CDU
- Honeywell
  - Primus 1000
  - EFIS-805 (specific versions via WXPD/SCI)
  - EFIS-10 (ARINC 708)
  - Primus 880/660/440 series
  - Primus 800/870/650 (WXPD/SCI)
  - RDR 4A/B
- Rockwell Collins
  - TAWS EFIS-805
  - FDS-2000
  - PL-4000 EFIS
  - PL-21 EFIS
  - EFIS 85/86 (via WXP-850 or WXA-1000)
  - WXR-850
  - WXR-70X

Specifications
- Size: 2.6 x 4.5 in
- Weight: 2 lbs (0.9 Kg)
- Cooling/Fanless cooling
- Operating temperature: 0 to 55°C
- Environmental category: DO-160D
- Power: 28VDC @ 1.0 Amp nominal
- Environmental categories: DO-160D
- Minimum Performance Standards: DO-161A
- Criticality level: Major
- Terrain Detector: DO-304 compliant
- TSO: TAWS Terrain Awareness and Warning System, DOA-200A compliant
- TSO: TAWS Terrain Awareness and Warning System

System features may be limited based on interfacing equipment and type of installation.

Further information on Universal Avionics products, services, and technical capabilities is available through the Universal Avionics Technical Support website.

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E-mail: info@uasc.com

Specifications and graphic displays contained herein are subject to change without notice.

Please contact your Universal Avionics representative for the latest system enhancements.
Offering the Highest Protection Against CFIT Accidents

TAWS: Class A & B

Class A TAWS systems are required to meet certain performance and certification requirements, and Class B systems are optional. The FAA encourages aviators to install both TAWS systems to achieve the highest level of protection against Controlled Flight Into Terrain (CFIT) accidents.

Class B systems can meet both class certification requirements, Universal’s TAWS Class A and TAWS Class B. Providing the highest level of protection against CFIT, TAWS Class A and TAWS Class B are designed to detect various potential hazards and alert pilots in time to take corrective action.

The two classes of TAWS are offered to meet your aircraft inputs such as position, attitude, airspeed, glideslope and flight plan along with internal and external databases of terrain and airport obstacles. TAWS systems are designed to detect potential hazards such as overflying terrain or obstacles and alert pilots in time to take corrective action.

Class B systems offer the following alerts and features:

• Indications of imminent contact with terrain
• Attention alerts (aural “Five Hundred” callout and alerts based on temperature-compensated altitude)
• Forward Looking Terrain Avoidance (FLTA) based on terrain data and the aircraft’s flight path.
• Flight Path Intent Advisory Alerts – Generated when the terrain ahead and along the flight path is unsafe for the phase of flight.
• Required Obstacle Clearance
• High Terrain Impact Alerts – Generated when the terrain ahead and along the flight path is unsafe for the phase of flight.
• Reduced Required Terrain Clearance Alerts – Generated when the aircraft is currently above the terrain in the projected flight path of the aircraft, but the reduced required clearance will be less than the required terrain clearance for the phase of flight.

Class A systems also offer the following features:

• Smart bank angle alerts / minimums callout
• Five Hundred” callout
• Additional altitude callouts
• Terrain awareness display to provide an additional visual depiction of terrain.

Crisp, Clear Graphics

Universal Avionics’ TAWS offers high-resolution displays with the maps available in an additional unique predictive terrain warning feature based on information in the flight plan.

The Map View includes a trend vector depicting a 30-second flight path prediction based on the current flight path. The Trend Vector is a line that extends forward from the aircraft’s current position at a distance of 5 miles or 3,000 feet. The Trend Vector allows aviators to visually determine their distance from terrain.

Obstacle Data

Dependent on a database of obstacles, available in the Class A and Class B systems as an option. This database is available in the Class A and Class B systems as an option. This database helps prevent CFIT accidents by detecting potential obstacles that could result in a hazardous situation.

Terrain Data

The high-resolution terrain database is stored on several format memory and updated using the Class B Terrain Load box to a high-speed Ethernet box. This box features a small plug that approximates every 1.5 miles wide and up to 3.5 miles in altitude. The terrain database includes more resolution and large inland bodies of water.

Required Data

Obstacle data is compiled by Jeppesen Sanderson, Inc. and is captured from digital and paper charts and bầu sao images provided by governmental civil aviation authorities and military agencies worldwide.

Terrain Data

The Map View of terrain can be output using ARINC 708 or WXPD formats for interface to the flight deck.

Required Data

The high-resolution terrain database is stored on several format memory and updated using the Class B Terrain Load box to a high-speed Ethernet box. This box features a small plug that approximates every 1.5 miles wide and up to 3.5 miles in altitude. The terrain database includes more resolution and large inland bodies of water.

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Required Data

Obstacle data is compiled by Jeppesen Sanderson, Inc. and is captured from digital and paper charts and bầu sao images provided by governmental civil aviation authorities and military agencies worldwide.
Offering the Highest Protection Against CFIT Accidents

Class A & B

TAWS: Aiming at offering your aircraft's highest level of protection against collision, Universal's TAWS Class A and B systems both offer:

- Depiction of obstacles and man-made features. A perspectively correct 200-foot high triangle with a concave base and a pole that connects the triangle and the ground represents the 3-D Perspective View Obstacle symbol.
- Additional altitude callouts
- "Five Hundred" callout
- Smart angle alert/microphone callout

Flight Path Intent Advisory Alerts – Generated when the terrain ahead and, based on the vertical projected flight path, the system predicts that the terrain elevation of a terrain cell along the lateral projected flight path of the airplane will be lower than the current altitude of the airplane. The resulting unprecedented look-ahead capability provides warnings and alerts well in advance of potential hazards, allowing time for the pilot to make the necessary maneuvers or data corrections for terrain avoidance.

Crisp, Clear Graphics

Universal Avionics’ TAWS displays utilise the HAT approach to provide an additional unique predictive warning feature based on information in the flight plan. TAWS provides on-screen visuals and a graphical depiction of the terrain in the form of a map view. Terrain can be displayed at a fixed altitude or altitude constraint. A perspectively correct 200-foot high triangle with a concave base and a pole that connects the triangle and the ground represents the 3-D Perspective View Obstacle symbol.

Terrain Data

The high-resolution terrain database is stored at several different memory and updated using the Cloud Tunnel Tool via a high-speed Ethernet box. It features a data point approach, where each 0.5-mile wide area will be updated to 0.1-mile ational airports. The terrain database is unique in its level of detail and large isolated bodies of water.

Obstacle Data

Depiction of any obstacles or man-made features is available in the Class A and B systems as an optional configuration in the TAWS software. The Obstacle Database requires the depiction of Precrash obstacles, containing the unique geometry, size, and elevation of the obstacles. For unmanned obstacles, the database also includes data such as digital and paper database(s) provided by governmental civil aviation authorities and military agencies worldwide.

Obstacle Database

Obstacle data is compiled by Jeppesen Sanders, Inc. and is captured from digital and paper source(s) provided by governmental civil aviation authorities and military agencies worldwide.

Obstacle Data

The Obstacle Database, required for depiction of man-made obstacles, contains the latest obstacle features. Use of obstacle depicting requires the installation of an external annunciator on the flight deck.

Forward Looking Terrain Avoidance Functions per TSO-C151b

Reduced Required Terrain Clearance Alerts – Generated when the aircraft is currently below the terrain in the projected flight path of the aircraft, the projected clearance is considered adequate for the phase of flight.

High Terrain Impact Alerts – Generated when the terrain ahead and along the aircraft's current flight path is greater than the required vertical clearance for the phase of flight. The Terrain Impact Alert is a rattle and aural alert.

Flight Path Intent Advisory Alerts – Generated when the terrain ahead exceeds the minimum clearance of the projected flight path for the phase of flight.

Display Interfaces

VGA/RGBS Video (Interface to Universal MFD-640, EFI-890R and FMS CDUs. VGA/RGBS Video (Interface to Universal MFD-640, EFI-890R and FMS CDUs. VGA/RGBS Video (Interface to Universal MFD-640, EFI-890R and FMS CDUs. VGA/RGBS Video (Interface to Universal MFD-640, EFI-890R and FMS CDUs. VGA/RGBS Video (Interface to Universal MFD-640, EFI-890R and FMS CDUs.}

Alternative Visual and Audio Displays for both caution and warning alerts

Compliance with the National Transportation Safety Board (NTSB) guidelines. Remove any yellow or red BITE items. Do not use any codes that cause the annunciator to generate a warning.

Temperature-compensated altitude

GPI altitude

TCAS and Reactions/Predictive Wind Shear Warnings

Universal’s TAWS systems also support existing radar displays as well as existing EFIS. The maximum terrain altitude and the current terrain altitude can be shown at their respective assigned altitudes. Look ahead of the flight deck.

Mode 1: Excessive rate of descent

Mode 2: Excessive rate of descent

Mode 3: Excessive rate of descent

Mode 4: Flight into terrain when not in landing configuration

Mode 5: Excessive downward deviation from an Instrument Landing System (ILS) glidepath

Mode 6: Excessive deviation from an instrument approach path, radio navigation and GPS altitude.

Mode 7: Excessive deviation from a visual navigation path.

Temperature-compensated altitude

GPI altitude

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GPI altitude

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Universal’s TAWS systems also support existing radar displays as well as existing EFIS. The maximum terrain altitude and the current terrain altitude can be shown at their respective assigned altitudes. Look ahead of the flight deck.
Offering the Highest Protection Against CFIT Accidents

Avionics inputs such as position, altitude, airspeed, glideslope and flight plan along with internal terrain and airport databases allow TAWS to predict a potential conflict between the aircraft’s future flight path and terrain. The resulting unprecedented look-ahead capability provides warnings and alerts well in advance of potential hazards, allowing the pilot to make the necessary maneuvers or data corrections for terrain avoidance.

TAWS: Class A & B

Class A TAWS offers all the required and recommended features of TAWS Class B plus a higher level of protection against Controlled Flight Into Terrain (CFIT). Class B TAWS provides all the functionalities of the Class B system plus a terrain awareness display to the aircraft’s display system and a “fully redundant” system, plus a terrain awareness system to the aircraft’s display system and a “fully redundant” system.

Universal offers TAWS Class A systems as well as support for more than one avionics unit, whereas the Class B system requires a single avionics unit. It also provides the class-specific, required RTCA DO-161A and TSO-C92a GPWS, plus an “optional” configuration in the TAWS software.

Crisp, Clear Graphics

Universal Avionics’ TAWS integrates with the WAAS to provide an additional unique predictive alerting feature based on information in the flight plan. TAWS provides an exceptionally crisp and detailed graphical depiction of actual terrain features. Use of obstacle alerting requires the installation of an external annunciator on the aircraft state and predicted flight path based on terrain data and the aircraft’s requirements, Universal’s TAWS Class A and B are TSO-C151b Approved.

Obstacle Data

Depiction of obstructions in a specific altitude zone is available in the Class A and Class B systems as an optional configuration. The UntraData database, required for depiction of man-made obstacles, contains the latest obstacles. Use of obstacle alerting requires the installation of an external annunciator on the aircraft display system and a “fully redundant” system.

Terrain Data

The high-resolution terrain database is stored on aircraft state and updated using the Class Terrain List. It is a high-speed Ethernet box that supports the 321 High Terrain Impact Alert and 3500 foot terrain impact alert. The system predicts terrain impact alerts for terrain down to 1,000 meters (3,281 feet) behind the aircraft. The circle at the top of the waypoint depicts the horizontal aspect of the terrain object.

Required Obstacle Clearance

The Obstacle Database, required for depiction of man-made obstacles, contains the latest obstacles and is available in the Class A and Class B systems as an optional configuration. The Obstacle Database, required for depiction of man-made obstacles, contains the latest obstacles.

Obstacle Data

The Obstacle Data provides all the functionality of the Class B system. The Obstacle Database, required for depiction of man-made obstacles, contains the latest obstacles and is available in the Class A and Class B systems as an optional configuration. The Obstacle Database, required for depiction of man-made obstacles, contains the latest obstacles.

Depiction and alerting of man-made obstacles is required. Use of obstacle alerting requires the installation of an external annunciator on the aircraft state and predicted flight path based on terrain data and the aircraft’s requirements, Universal’s TAWS Class A and B are TSO-C151b Approved.

Forward Looking Terrain Avoidance functions per TSO-C151b

• Required RTCA DO-161A and TSO-C151b
• Universal’s TAWS Class A and B are TSO-C151b Appro

Exceeding Mandated Requirements with Options to Match Your Operation*

• TCAS and Reactive/Predictive Wind Shear Warnings Prioritization
• Mode 1: Excessive rate of descent
• Mode 2: Excessive rate of descent to terrain
• Mode 3: Excessive rate of descent to obstacle off terrain
• Mode 4: Excessive descent rate when on or within 2,500 feet of terrain

Note: 5,000 foot “warning” callout

• Note 1: Class A systems only

Obstacle Database

• Mode 1: Excessive rate of descent
• Mode 2: Excessive rate of descent to terrain
• Mode 3: Excessive rate of descent to obstacle off terrain
• Mode 4: Excessive rate of descent when on or within 2,500 feet of terrain

Forward Looking Terrain Avoidance functions per TSO-C151b

Reduced Required Terrain Clearance Alerts – Generated when the aircraft exceeds the terrain clearance for the projected flight path of the aircraft. The projected clearance is based on terrain avoidance system (DGNSS) signals provided by the installation of an external annunciator on the aircraft state and predicted flight path based on terrain data and the aircraft’s requirements, Universal’s TAWS Class A and B are TSO-C151b Approved.

High Terrain Impact Alerts – Generated when the terrain ahead and along the projected flight path is above the minimum clearance above the terrain.

• High Terrain Impact Alerts – Generated when the terrain ahead and along the projected flight path is above the minimum clearance above the terrain.

• High Terrain Impact Alerts – Generated when the terrain ahead and along the projected flight path is above the minimum clearance above the terrain.

Temperatures-Compensated Altitude

• Temperatures-Compensated Altitude

Mode 5: Excessive descent rate when on or within 2,500 feet of terrain

Note 3: Class B systems only

Note 2: If RA is available, it will be used for these alerts, and the system will revert to HAT if the RA fails.

Note 1: These select GPWS alerts can use Height Above Terrain (HAT) in lieu of Radio Altitude (RA) since RA is not required for these installations.

Note 4 (opt.)

Note 1: If RA is available, the HAT is used for these alerts, and the system will revert to HAT if the RA fails.

Note 2: If RA is available, the HAT is used for these alerts, and the system will revert to HAT if the RA fails.

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Note 4 (opt.)
Display Interfaces

Additional interfaces under development.
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Rockwell Collins
FDS-2000
PL-4000 EFIS
PL-21 EFIS
EFIS 85/86 (via WXP-850 or WXA-1000)
WXR-850
WXR-70X

Specifications

- Size: 3.5 H x 6.5 W x 7.8 D
- Weight: 9 lbs (4.1 Kg)
- Cooling: Passive cooling fan
- Environmental categories: DO-160D
- Maximum Performance Standards: DO-160 A
- Maximum Ground Power Rating: 120 Watts
- Software Certification: DO-178B Level C
- Capacity Level: Major
- Terrain Database: DO-200A compliant
- TAWS: C151b Terrain Awareness and Warning System, OCS Adaptive Ground Proximity Warning Equipment

Specifications and graphic displays contained herein are subject to change without notice.
System features may be limited based on interfacing equipment and type of installation.

Pro Line is a registered trademark of Rockwell Collins, Inc.
Primus is a registered trademark of Honeywell.
Please contact your Universal Avionics Regional Sales Manager for the latest system enhancements.

TAWS
Terrain Awareness and Warning Systems

Three Unique Views: Map, 3-D Perspective and Profile
Depicts and Alerts of Man-Made Obstacles
Meets the Highest Degree of CFIT Protection

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E-mail: info@uasc.com

UASC-7-23
08-18-2017

Unprecedented Look-Ahead Capability
Thorough and Close-Out Design to Meet Your Aircraft Requirements.
### Display Interfaces

Additional interfaces under development
Contact your Universal Avionics representative

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**Rockwell Collins**
- FDS-2000
- PL-4000 EFIS
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- EFIS 85/86 (via WXP-850 or WXA-1000)
- WXR-850
- WXR-70X

### Specifications

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<td>C151b Terrain Awareness and Warning System, C92c Airborne Ground Proximity Warning Equipment</td>
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### TAWS - Terrain Awareness and Warning Systems

- Unprecedented Look-Ahead Capability
- Target and Class Options to Meet Aircraft Requirements
- Three Unique Views: Map, 3-D Perspective, Profile
- Depiction and Alerting of Man-Made Obstacles
- Obtain the Highest Degree of CFIT Protection

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