Four FMS Model Options for Installation Flexibility
Platform for NextGen and SESAR Capabilities and Mandates

SBAS–FMS

Satellite-Based Augmentation System – Flight Management System

Certified on Over 50 Aircraft Types
Advanced Interfaces for Communication, Safety and Situational Awareness
TSO-C146c Approved System Supports ADS-B Requirements

UNIVERSAL™AVIONICS
an **Elbit Systems** Company

Platform for NextGen and SESAR

The avionics systems you invest in today must be able to support the Next Generation of Communication, Navigation, Surveillance / Air Traffic Management (CNS/ATM). They must possess the processing power, speed, memory and interface capabilities to meet the growing demands of the US Next Generation Air Transportation System (NextGen) and Europe's Single European Sky ATM Research (SESAR).

Since introducing the industry's first multi-sensor FMS (the UNS-1) in 1982, Universal Avionics has continually taken the industry forward with a pilot-focused vision of flight management. Today's SBAS-capable FMSs build upon the company's popular market-proven product design, offering more advanced features and interfaces, and a growth path to meet the requirements of the future.

High-Integrity Navigation: SBAS

Universal Avionics SBAS-capable FMSs feature an extremely precise, internal SBAS Global Positioning System (GPS) receiver that improves accuracy and integrity of GPS-derived position information. The Receiver Autonomous Integrity Monitor (RAIM) prediction requirements in US airspace are thereby removed and navigation capabilities for all classes of aircraft in all phases of flight are increased.

The embedded SBAS/GPS receiver provides ILS-like guidance down to near CAT I ILS minimums.

In addition, Universal Avionics SBAS-FMSs meet stringent internal monitoring requirements to provide guidance to any of the Minimum Descent Altitude (MDA) levels for Area Navigation (RNAV) (GPS) approach guidance:

• Localizer Performance with Vertical (LPV)

• Lateral Navigation/Vertical Navigation (LNAV/VNAV)

• LNAV-Only

• Approach Procedures with Vertical (APV)

Universal Avionics SBAS-FMSs are compatible with the regional SBAS around the world:

• Europe – European Geostationary Navigation Overlay Service (EGNOS)

• North America – Wide Area Augmentation System (WAAS)

• Japan – Multi-functional Satellite Augmentation System (MSAS)

• India – GPS-Aided Geo-Augmented Navigation (GAGAN)

Calculate the payback period of an SBAS upgrade *for your aircraft with Universal's WAAS/SBAS Payback Calculator at www.uasc.com/products.*

Use the calculator to find out how many flight hours, fuel and engine reserves you could save each year with performance improvements from WAAS/SBAS LPV.

Key Benefits

• SBAS	• CPDLC and CPDLC DCL
• LPV	• Video and Graphics Capability
• RNP	• NVG Compatibility
• RNAV	• Large Database Memory
• ADS-B	• Fuel Savings with FlexPerf

SBAS-FMS Family - LP/LPV Monitor, UNS-1Lw, MCDU, -1Fw and -1Ew

RNP and RNAV

Required Navigation Performance (RNP) and RNAV are key aspects of all airspace modernization programs. Performance–Based Navigation (PBN) is proven to save fuel, relieve congestion and reduce delays at many airports, domestic and international. Universal Avionics is the technology leader in both RNAV and RNP. The SBAS-FMSs meet emerging RNP/Actual Navigation Performance (ANP) airspace operational requirements around the world, including European Basic–RNAV (B–RNAV) and Precision–RNAV (P–RNAV).

Implemented in 1998, B-RNAV defines a minimum RNP for aircraft operating in European Civil Aviation Conference (ECAC)-controlled airspace. B-RNAV offers a number of advantages over the conventional ground-based navigation system, including: improved safety, more direct routes and savings in fuel.

European states are implementing numerous P-RNAV procedures in the terminal areas of major airports. Only P-RNAV qualified aircraft will be allowed to fly these procedures, essentially creating a "best equipped, best served" situation. Restrictions are also being placed at certain airports within European airspace for aircraft that are not P-RNAV equipped. P-RNAV offers operators benefits including shorter, more direct routes and more precise navigational accuracy in the terminal and approach airspace.

The RNP associated with the current leg is displayed on the NAV pages. The RNP value is obtained from the navigation database when provided for that leg; otherwise it is the FMS default value for the current phase of flight.

ADS-B Out

As an FAA TSO-C146c approved FMS, Universal Avionics SBAS-FMSs meet the requirement for the navigation source part of an aircraft's Automatic Dependent Surveillance-Broadcast (ADS-B) Out installation and approval. ADS-B Out is a key part of the FAA's NextGen National Airspace System (NAS) with mandates beginning in 2020. ADS-B Out is the transmission of a GPS position from an aircraft in order to display the aircraft's location to Air Traffic Control (ATC) on the ground or to pilots in the cockpits of aircraft equipped with ADS-B In.

Aircraft that are equipped for ADS-B Out realize many benefits, including: improved situational awareness and safety, reduced separation between aircraft and increased coverage.

2

# Advanced Interfaces for Communication, Safety and Situational Awareness

The SBAS-FMSs are the most versatile in the industry. Full interface capability is provided for flight guidance systems, autopilots and flight deck displays utilizing both digital and analog formats. The SBAS-FMSs provide navigation from takeoff to touchdown, engineered precisely for your aircraft.

Multiple navigation sensor compatibility allows for interfacing to a host of navigation sensors to match your operational requirements.

Select from external GPS, Inertial, VHF Omni-directional Range (VOR), Distance Measuring Equipment (DME), Tactical Air Navigation System (TACAN) and/or Hybrid sensors.

In addition, up to four fuel flow sensor inputs, accommodating a variety of formats, are utilized for fuel and performance management calculations depending on system capabilities.

A "Best Computed Position" is based upon inputs from the internal SBAS/GPS receiver, auto-scanning DME-DME measurements and data from your complement of external navigation sensors.
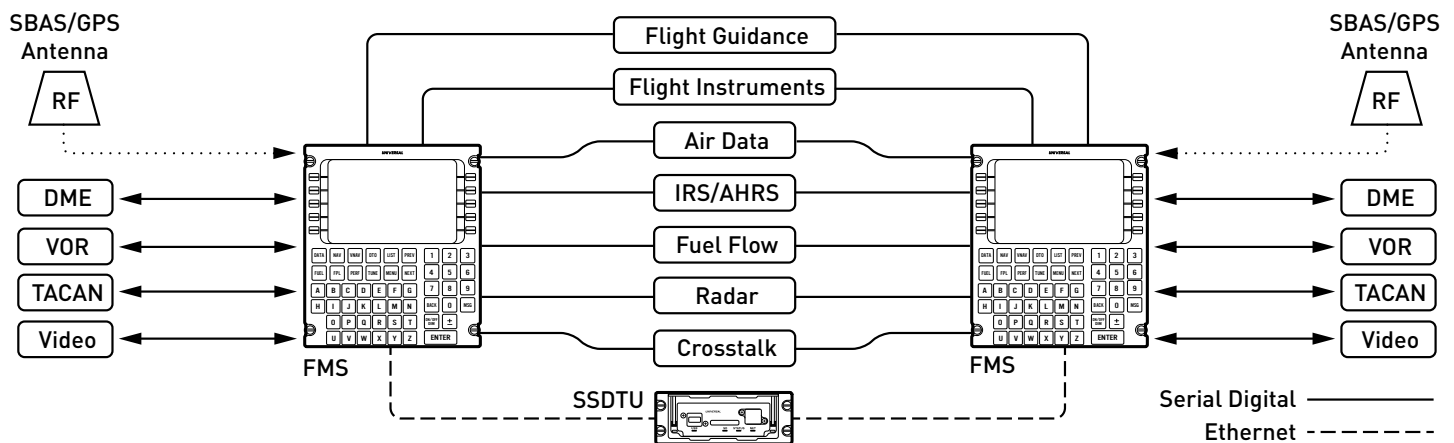
Terrain Awareness Warning System

Universal Avionics FMSs are designed to interface with both the Class A and Class B Terrain Awareness Warning Systems (TAWS), housed in a separate 2-MCU Line Replaceable Unit (LRU). TAWS increases situational awareness by providing visual terrain displays relative to current and predicted aircraft position supplied by the SBAS-FMS. Alerts in accordance with standard Ground Proximity Warning System (GPWS) modes are also provided.

The SBAS-FMSs provide 3-Dimensional guidance using the exact procedures from the navigation database, thereby providing the highest level of safety in protecting against Controlled Flight into Terrain (CFIT) accidents.

TAWS provides an exceptionally crisp and clear graphical depiction of actual terrain in three view formats (Map View, 3-D Perspective View and Profile View), on the Flat Panel Control Display Units (FPCDU).

Depiction and alerting of man-made obstacles is also available in the Class A and Class B systems as an optional configuration in the TAWS software, accompanied by a separate Obstacle Database.

The Profile View shows terrain under the projected flight path. VNAV waypoints from the flight plan can be shown at their respective assigned altitudes. Look Ahead conflict advisories are depicted with a white threat symbol.

UniLink™ Communications Management Unit

Universal Avionics' optional airborne data link system, the UniLink UL-800/801 Communications Management Unit (CMU), provides advanced air-to-ground, two-way data link capabilities. It is housed in a separate 1-MCU LRU and can support single, dual or triple SBAS-FMS installations.

Capable of providing FANS 1/A+ and Aeronautical Telecommunications Baseline 1 (ATN B1) operations, the UniLink UL-800/801 includes Controller Pilot Data Link Communications (CPDLC) and Automatic Dependent Surveillance-Contract (ADS-C) functionality.

Combined with Universal's SBAS-FMSs, the UniLink UL-800/801 provides an opportunity to take full advantage of the benefits that advanced data link capabilities offer, like flight operations efficiency and reduced pilot workload.

UNS-1Ew FMS with UniLink UL-800/801 CMU

Configuration Module

A configuration module mounted on the system's rear connector identifies the aircraft's specific parameters including the communication formats, all Input/Output (I/O) ports, specifications of navigation sensors, air data, Electronic Flight Instrument System (EFIS) displays, flight guidance systems, fuel inputs and others.

The easily programmed module simplifies in-field upgrades and sensor complement modifications. It provides quick configuration verification as well as positive identification of aircraft model for aircraft-specific performance data as applicable.

Database Integrity

The FMS databases are safely stored in non-volatile flash memory devices. The navigation databases are produced and provided in accordance with the highest quality standards as specified in DO-200A/ED-76. Universal Avionics holds an FAA Type 2 Letter of Acceptance (LOA) for processing and producing the FMS navigation database.
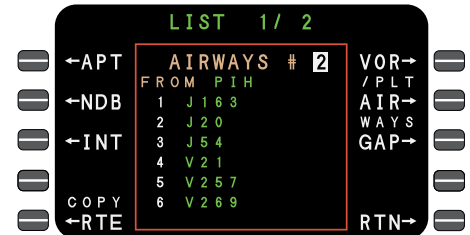
Capabilities

Flight Planning

FMS Flight Planning

The Flight Planning (FPL) function provides you with the quickest, most efficient means of creating a flight plan, and the most pilot-friendly method of altering the flight plan elements as desired or required by ATC. It has been engineered to incorporate the greatest level of safety, with numerous built-in safeguards such as the entry of list-referenced selections which reduce both keystrokes and errors.

```
        FPL MENU 1/2
←COMPRESSED    STORE FPL→
←CLEARANCE     XFILL FPL→
←PPOS TO WPT   RAIM PRED→
←DEPART           ARRIVE→
←DELETE FPL       RETURN→
```

Menu format provides selections for flight plan displays, SIDs, STARs, approaches, flight plan storing and reversing.

```
             LIST  1/ 2
←APT    AIRWAYS # 2    VOR→
         FROM  PIH      /PLT
←NDB     1 J163        AIR→
         2 J20         WAYS
←INT     3 J54         GAP→
         4 V21
         5 V257
COPY     6 V269
←RTE                   RTN→
```

Flight planning is simplified by using High and Low Altitude airways.

```
        FPL   1/11  M
                     ALT/FL
1  KSEA              ----
   HDG341°
2 )(829FT)          ↑829
   CRS338°    SEA
3  (D-8.0)    SEA    ↑4000
→ HDG070°
4  (R-139)    PAE    ----
   HDG165°
5  (INTCPT)         ----
```

Normal view of flight plan pages shows a wealth of information including altitude restrictions.

```
           FPL SUMMARY  M
DEPART               ARRIVE
 KSEA     2155 NM      KATL
ETD UTC             ETA UTC
 15:00    4+29       19:29
 - 8 LCL            - 5 LCL
 07:00               14:29
TAS (MAN)          RESERVES
 480                  2000
FF (MAN)    LBS    MIN FUEL
 2000                10971
```

Review time, distance and fuel requirements for the flight plan created.

Off-Line Flight Planning

The Universal Flight Planning (UFP) Windows-based software package provides you with off-line flight planning and GPS Fault Detection and Exclusion prediction capabilities using a personal computer and your subscription navigation database. The software allows the user to create and edit items in your Pilot Database such as routes, waypoints, departures, arrivals, approaches and more. In addition, the SBAS-FMSs offer a unique Company Routes Database, created only off-line with the UFP program.
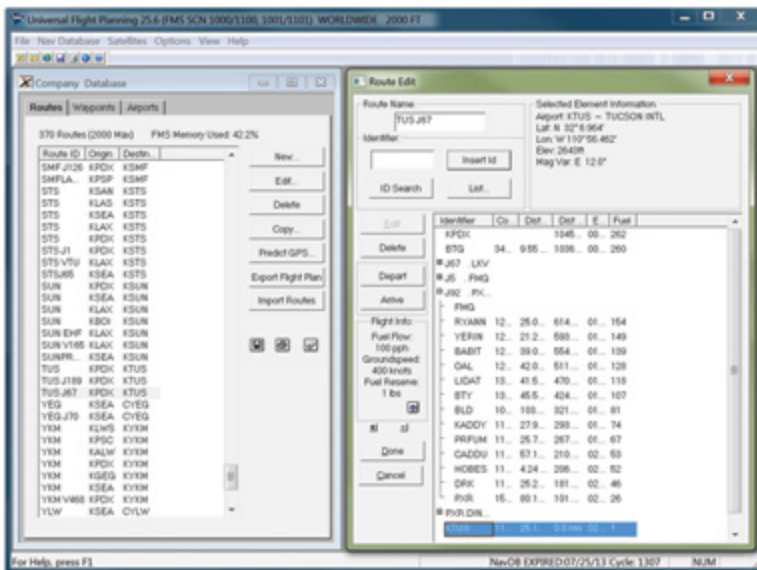
UFP Company Routes Database
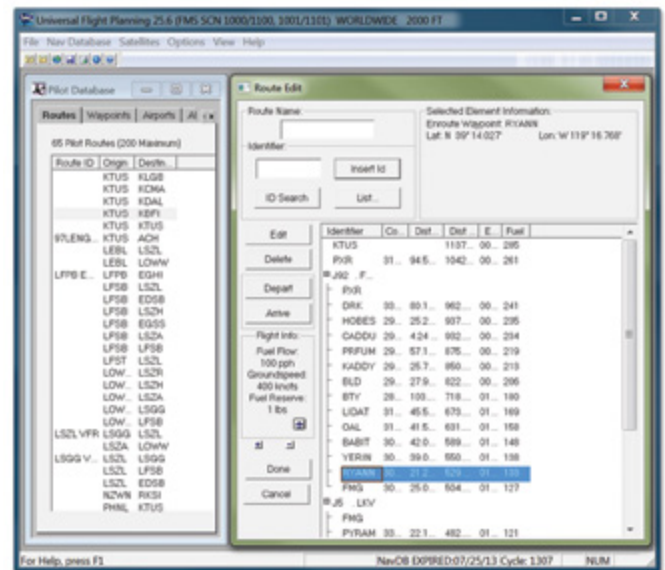
*UFP Pilot Database*

Performance

The UNS-1Ew and UNS-1Fw SBAS-FMSs provide a Performance (PERF) option for select aircraft types for which performance charts from the Airplane Flight Manual (AFM) are digitized and stored in memory. These FMSs will use pertinent data such as GW, ALT, OAT, etc., to provide exact values for V1, VR and V2, along with Takeoff N1.

V-bugs may also be driven through the SBAS-FMSs. Required field lengths are computed and displayed, factoring in your entry of runway conditions.

During climb and cruise, maximum power setting values are presented. For landing, Vref is calculated along with approach speeds for different flap settings.
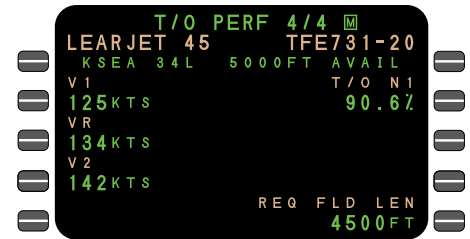
T/O speeds, runway length and N1 settings from AFM Performance Charts stored in memory.

FlexPerf™ Trip Performance

FlexPerf Trip Performance for Universal Avionics SBAS-FMSs and Multi-Mission Management System (MMMS) provides advanced fuel saving predictions for aircraft performance in Climb, Cruise and Descent phases of flight.

FlexPerf provides a standard alerting function, including caution display when:

• An altitude performance constraint is not achievable

• Fuel remaining is predicted to be less than the reserve fuel

• The flight path leg is too short for cruise segment

FlexPerf helps you achieve the most efficient fuel economy by advising the best climb, descent and speed commands for each flight phase. It is available in FMS Software Control Number (SCN) 1001 and MMMS SCN 1101.

Cruise Performance

*Descend Performance*

Climb Performance

Fuel Management

Using inputs from the fuel flow sensors, the SBAS-FMSs provide real-time fuel management with the most extensive fuel information and calculations available – the kind that can eliminate unnecessary fuel stops, save you time and money and provide increased safety.

Specific range and endurance are provided along with fuel, time and distance predictions for your destination. Fuel requirements are easily accessed and evaluated for alternate destinations as well. For your convenience, data can be entered and displayed in either pounds (lbs) or kilograms (kg).
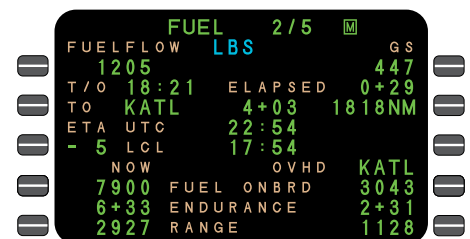
Extensive real-time fuel information.

☼ *Real-Time Fuel Management* (lbs/kg Selectable)

• *Gross weight*

• *Fuel on board*

• *Ground nm/lb (or kg)*

• *Air nm/lb (or kg)*

• *Range*

• *Endurance*

• *Equivalent Still Air Distance (ESAD)*

• *Fuel overhead destination*

• *Range overhead destination*

• *Endurance overhead destination*

• *Landing weight*

• *Alternate destination planning*

Lists

The unique LIST function provides a quick and efficient means to access and enter data, minimizing alphanumeric entries and reducing input errors. The "smart" lists are geographically prioritized based on aircraft position and course, then alphabetized on each page. You can quickly enter airports, navaids, intersections and airways all by simply entering the list reference number corresponding to the data desired. Plain language references for airports, Very High Frequency (VHF) and Non-Directional Beacon (NDB) navaids eliminate confusion over airport/navaid identifiers. In addition to providing an advanced shortcut for flight planning, making entries through the LIST function increases both the accuracy and the safety of off-flight plan maneuvers.


```
        LIST   1/10

    VOR/PLT             # 5
  1  ADH    ADA
  2  DUC    DUNCAN
  3  IRW    WILL ROGERS (OK
  4  LAW    LAWTON
  5  PWA    WILEY POST (OKL
  6  SWO    STILLWATER
  7  TIK    TINKER (OKLAHOM
                    RETURN→
```

Plain language references eliminate confusion over navaid and airport identifiers.

Navigation Data Management

The DATA function key provides access to a variety of navigation data management capabilities.

Pages provide easy access to your stored navigation database for detailed review of SIDs, STARs, approaches, runways, airways, intersections, navaids and airports. Your pilot-defined database can be accessed and edited, allowing you to create new or modify your pre-defined departures, arrivals, approaches, runways, airports, waypoints, alignment points and stored routes. Your non-editable company route database can be accessed as well.

Other DATA pages provide access to, and control of, your complement of navigation and air data sensors. The status of each navigation sensor and its position as compared with the SBAS-FMS "Best Computed Position" is displayed. Sensor selection/de-selection, position updating, UniLink communications and TAWS display controls are available through this function as well.
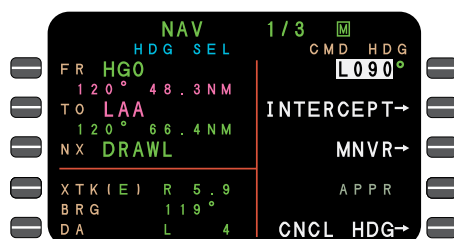
Enroute

Navigation

The SBAS-FMSs will fly all procedural leg types in accordance with ARINC 424. This sophisticated capability allows you to fly the most complex procedures such as heading to altitude, precision arc, procedure turn, holding pattern and more – all the necessary maneuvers required to accurately fly SIDs, STARs and approaches. Crosstrack and vertical scaling are provided in accordance with enroute, terminal and approach criteria set forth in TSO-C146c. The Navigation (NAV) function also displays the RNP associated with your current leg/maneuver as referenced from the navigation database, along with your ANP. LSKs provide quick access to off-flight plan maneuvers such as establishing a parallel-offset course, tracking to/from a Pseudo-VOR, heading commands, holding patterns, arrivals and approaches.
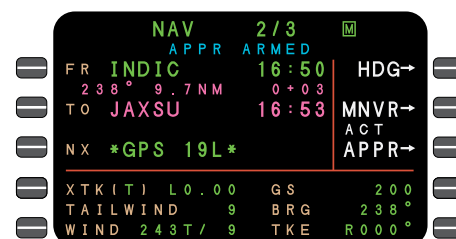
Most important, all these maneuvers are controlled by the SBAS-FMS while the flight guidance system conveniently remains in FMS mode.

Whenever you need to fly radar vectors, you can do so easily by accessing the FMS Heading Mode with the HDG line select key on the normal NAV display. Simply enter your desired heading to activate your command. With compatible EFIS/flight guidance system, these heading commands are interactive with the flight guidance heading select knob.


```
        NAV    1/3   M
      HDG SEL        CMD HDG
 FR  HGO              L090°
     120°  48.3NM
 TO  LAA            INTERCEPT→
     120°  66.4NM
 NX  DRAWL           MNVR→

 XTK(E)  R  5.9        APPR
 BRG      119°
 DA       L    4    CNCL HDG→
```

Headings can be flown through the SBAS-FMS, complete with auto intercept selection and interactive heading bug control.


```
        NAV    2/3   M
      APPR ARMED
 FR  INDIC      16:50    HDG→
     238°  9.7NM    0+03
 TO  JAXSU      16:53    MNVR→
                        ACT
 NX  *GPS 19L*          APPR→

 XTK(T) L0.00   GS     200
 TAILWIND   9   BRG    238°
 WIND 243T/ 9   TKE   R000°
```

Line select keys provide access to SBAS-FMS-commanded Heading Mode, maneuvers such as holding patterns and PVOR tracking, and the Approach mode.

Direct-To

The Direct-To (DTO) function key is specifically dedicated for flight plan changes in response to "Direct-To" clearances. The SBAS-FMSs easily take you from your present position direct to any point on or off your flight plan using circular arc steering. If the desired waypoint is on the flight plan, it may be selected by entering its list reference number. If the desired waypoint is not on the flight plan, the LIST function can be used to access other waypoints/airports within the surrounding area from the database, or the identifier can be manually entered into the field.

Turn direction options (LEFT, RIGHT) allow you to force the turn direction in those cases when ATC commands a "long way around" Direct-To.

Vertical Navigation

Universal Avionics SBAS-FMSs incorporate the most advanced concepts in vertical guidance and control. VNAV pages provide for such features as computed Top-Of-Descent, Target Vertical Speed indication and selection, and Vertical Direct-To commands. Vertical waypoints can be conveniently defined with altitudes or Flight Levels, and lateral offsets.

The SBAS-FMSs output vertical deviations for flight guidance displays. Pitch commands are output to the autopilot for fully coupled descents.

Frequency Management

Frequency management capabilities allow you to tune your NAV and COMM radios through the SBAS-FMS – completely interfaced with your existing Radio Management Unit. The SBAS-FMSs present a list of suggested COMM, Nav and NDB frequencies pre-selected based on aircraft position and phase of flight. Additionally, you can customize the radios tuned through the SBAS-FMS by storing an "active" and up to four "preselect" frequencies. A "recall" feature allows you to swap the active with the last frequency tuned without affecting the preselect frequencies.

VOR and NDB frequencies can be readily tuned by their navaid identifier or choosing from the suggested frequency list utilizing the LIST function or by simply typing in the identifier. The SBAS-FMSs will automatically tune the appropriate frequency.
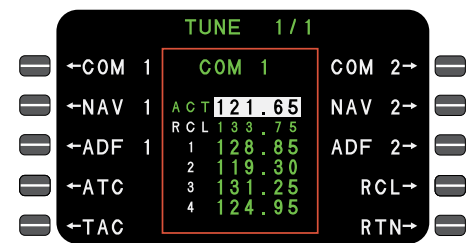
Frequency management through the SBAS-FMS.

Messages

An extensive library of messages has been programmed into the SBAS-FMSs. The message annunciator alerts you of system status advisories, including waypoint alerts, sensor watchdog functions, TAWS alerts and self-test.

"Pop-up" messages in response to invalid entries further simplify system operation. The Message (MSG) key may also be used to access data link communications should this optional equipment be installed.

UniLink may be accessed from the message page.

Holding Patterns

Holding patterns are accurately flown through the SBAS-FMSs automatically, complete with appropriate entry procedure: direct, parallel or teardrop. The navigation database includes holding patterns that are part of departure, arrival, approach and missed approach procedures. The aircraft will fly the normal flight plan legs and then automatically enter the holding pattern upon reaching the holding fix. You may also manually define a holding pattern by specifying the holding fix, inbound course, turn direction and either time or distance of holding leg. When armed, the holding pattern will be entered automatically upon reaching the fix. A DTO HOLD command is also provided to enable you to go direct to a holding fix at any time.

While in the holding pattern, estimated time of arrival at the fix will be displayed in UTC at all times and will be updated each time the fix is overflown, based upon current TAS and wind conditions. The system will also alert you if the groundspeed is too high to remain in protected airspace.

When cleared to proceed, the aircraft will continue the current holding circuit until overflying the holding fix and then proceed to the next waypoint. You can also exit the pattern at any time by initiating a Direct-To command.

Holding patterns are accurately flown through the SBAS-FMS automatically, complete with appropriate entry procedure: direct, parallel or teardrop.
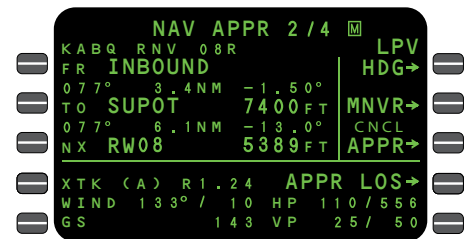
Approach

Once near your destination, you can easily link the appropriate approach for the active runway into your flight plan. Approaches and runways from the navigation database, and those which have been pilot defined, are easily accessed.

The navigation database contains precision and non-precision approaches, including bent and curved approaches with multiple step-down fixes. When you select the approach transition and approach, both are inserted into the flight plan along with the missed approach procedure. Using the appropriate navigation sensor input, the SBAS-FMSs will fly a three-dimensional precision or precision-like approach to any airport in the world. Computed pseudo-localizer and pseudo- glideslope information will be output to the flight guidance system and displays, providing a stabilized descent complete with accurate approach scaling and sensitivity, as well as distance to touchdown. The SBAS-FMSs incorporate a unique subsystem that provides high-level integrity monitoring required for RNAV (GPS) approaches. By using altitude from

the SBAS/GPS satellites, the SBAS-FMSs provide reliable position information for LPV approach minima. Approach Levels of Service (LOS) for LPV, LNAV/VNAV and LNAV approaches are displayed on the FMS approach pages as well as through external annunciations for increased situational awareness.

Approaches can be flown fully coupled and are approved for published SBAS and non-precision approaches. With compatible EFIS/autopilot, the SBAS-FMS "Nav-to-Nav" feature will provide a smooth transition to an ILS approach once the Localizer and Glideslope signals are captured. This enables you to fly all approach transitions coupled up to the capture point.

The SBAS-FMSs can also be configured to provide Cold Temperature Compensation, automatically calculating altitude corrections for landing in areas of extreme cold.

SBAS-FMS Approach Mode provides 3-D guidance on GPS, GPS-overlays (VOR/DME, VOR and NDB), RNAV, LOC, BC, VOR/DME, and VOR approaches IFR approved.

SBAS-FMS Approach Mode provides ILS-like guidance with LPV, LNAV/VNAV and LNAV level of service for RNAV (GPS) approaches.

Display and User Control

Display and user control is provided through the 4-inch or 5-inch FPCDU. A Multi-function Control Display Unit (MCDU) is specially tailored for airline or special mission operations. Universal's FPCDUs feature graphics capabilities and incorporate the latest technology in Active Matrix Liquid Crystal Color Displays (AMLCD). They feature the highest contrast, lowest reflection and greatest horizontal and vertical viewing angles available, and offer superb sunlight readability. Unique parallax control is also provided. The system uses two character sizes and line graphics to enhance data recognition.

All FPCDUs are capable of displaying graphics and video, as available from Universal's UniLink CMU, TAWS, Vision-1™ Synthetic Vision System (SVS) and other compatible sources.

Line Select Keys (LSK), function keys and a full alpha numeric keyboard provide for quick and easy data selection and entry. The durable faceplate with flush-mounted keys reduces the possibility of mis-keyed data entries.

The most complex flight maneuvers are easily managed with a few simple keystrokes, thanks

to the advanced menu operating format, list-reference-number entries, logical data sequencing and cursor prompting. The result means less time interpreting displays, less time entering data, more time dedicated to situational awareness and an overall increase in the safety of your flight.

Video and graphics capabilities are standard features on the 5-inch FPCDU and UNS-1Ew integral CDU, and optional features on the 4-inch FPCDU. Both video and graphics capabilities are standard features on the MCDU.

Night Vision Goggle-Compatible

Universal Avionics 4-inch and 5-inch FPCDUs are modified with Night Vision Goggle (NVG)-compatible glass display panels, which changes the lighting output in such a way that the unit can be used in flight decks where operators are wearing night vision goggles.

Features

- **Flat Panel Color Displays (integral/CDU)**
- **Internal 12-channel SBAS/GPS**
  - *TSO-C146c, Class Gamma-3*
  - *FDE prediction program for remote/oceanic ops*
- **Company Routes Database**
  - *Up to 2,000 routes, 200 company waypoints and 100 company airports*
- **Clearance-language format**
- **Navigation Database**
  - *SID/STAR procedures*
  - *Airways*
  - *Approaches*
  - *Plain-language references*

- **ARINC 424 procedural leg guidance**
- **Heading Mode**
- **VNAV**
  - *Fully coupled*
  - *Computed top-of-descent*
  - *Target vertical speed*
  - *Vertical Direct-To*
- **Holding Patterns**
  - *Included in Navigation Database*
  - *Manually defined*
- **3-D Approach Mode**
  - *Laterally coupled*
  - *Vertically coupled*

- **Fuel Management**
  - *4 Fuel flow inputs*
- **Take Off/Landing (excluding UNS-1Lw)**
- **Frequency Management**
- **UniLink Compatible**
  - *Text Messaging*
- **TAWS Compatible**
  - *TAWS graphics*
- **Universal Cockpit Display Compatible**
- **SCAT-I GPS Approach Compatible**
- **SBAS Planned Growth**
- **LAAS Planned Growth**

Certified on Over 50 Aircraft Types

Universal Avionics specializes in flight deck upgrades, providing flexible options for over 50 aircraft types, ranging from the Pilatus PC-12 to the Boeing 747.

Avionics for you, your aircraft and the way you fly - Universal Avionics.

Aérospatiale *SN 601 Corvette*
Agusta *A109, AW139*
Airbus *A300*
ATR *42, 72*
BAC *1-11*
BAE *146, Avro RJ, Advanced Turbo Prop (ATP), Jetstream 41*
Beechcraft *1900/1900C, C-12, RC-12, King Air 90/100/200/300/350*
Beechjet *400*
Bell *212, 214ST, 412, 430*
Boeing *707, 727-100/200, 737-200/300/400/800, 747, 747SP/200, 767-300, RC-135, T-43*
Bombardier *Challenger CL-600/601, CL215/415, Q-Series 100/200/300/400 (Dash 8)*
Britten-Norman *Defender*
CASA *C-212, CN-235*
Cessna *208B, Citation Bravo 550, Encore, Excel 560-XL/560-XLS, Citation I 500, I/SP 501, II 550, II/SP 551, III 650, S/II S550, V 560, Citation V Encore 560, V Ultra 560, Citation VII 650, CitationJet 525, CJ1 525*

Convair *580*
Dassault Falcon *10/100, 20/200, 50, 50 EX, 900, 2000*
de Havilland *DHC-6, DHC-7 (Dash 7)*
Dornier *DO-228*
Embraer *EMB-120, E-170, E-190, ERJ-135/140/145/170/190, Legacy*
Eurocopter *AS332 Super Puma, EC-135/155, BK117, AS365 Dauphine*
Fokker *27, 50*
Grumman *HU-16 Albatross*
Gulfstream *Astra, G-100/200/450/550/650, G-II/GIIB, GIII, GIV, GV*
Hawker *125-400/800, 400, 800XP, HS 125-700, Siddeley BH.125-400A*
Honda Aircraft Co. *Hondajet*
IAI Westwind *1124, Astra 1125, Astra 1125 SPX*
Iluushin *IL-76*
Jetstream *31/41*
Learjet *25, 31, 31A, 35, 36A, 40, 45, 55, 60, C21A*
Let Aircraft Industries *L410*

Lockheed *C-130/L100/L382, Electra, Jetstar II, L1011, P-3 Orion*
Martin *WB-57*
McDonnell Douglas *DC-8, DC-9, DC-10, MD-11, MD-82, MD-83, MD-87, MD-902*
MIL *MI-17, MI-172*
Mitsubishi *Diamond 1A, MU300*
Northrop *T-38 Talon*
Piaggio *P180 Avanti*
Pilatus *PC-9, PC-12*
Piper *Super Cheyenne*
Saab *340, 2000*
Sabre *60, 65*
Short *360, C-23B Sherpa*
Sikorsky *S-70 Black Hawk, S-76, S-92, UH-60 Black Hawk*
Tupolev *TU-154*
Xian *MA60*

The Universal Avionics SBAS-FMS Family

Universal Avionics SBAS-FMSs combine the benefits of advanced programming; compact, lightweight packaging and installation flexibility. Four basic models provide you with the ability to select the optimum system to meet your desired features and capabilities that match your aircraft equipment and interface requirements.

UNS-1Fw

The UNS-1Fw is comprised of an FPCDU and a remotely mounted Navigation Computer Unit (NCU). Three FPCDUs are available: a compact FPCDU with 4-inch color display, the standard FPCDU with 5-inch color display and an airline-type MCDU. The NCU is housed in a 2-MCU sized LRU which includes the integral SBAS/GPS receiver.

The UNS-1Fw incorporates extensive I/O capabilities for advanced system integration and includes twice the number of ARINC ports available as the UNS-1Lw.

UNS-1Lw

The UNS-1Lw features a standard set of I/O capabilities for interface with essential components of the flight deck. The system is comprised of a 4- or 5-inch FPCDU along with a remotely mounted NCU. The NCU is contained in a 2-MCU LRU which includes an internal SBAS/GPS receiver.

UNS-1Ew

The UNS-1Ew features a self-contained design which includes control/display functions and the NCU with integral SBAS/GPS receiver. The system includes a graphics- and video-capable 5-inch diagonal display with a housing depth of approximately 9 inches.

A special package version, the UNS-1Espw has a reduced depth and includes the same features with the exception that it is an all-digital system only. The UNS-1Espw is ideal for applications where console or panel depth pose an integration challenge. Analog Roll steering and discretes are included with the UNS-1Espw.

MCDU

Developed for airline or special mission operations, the MCDU features additional ARINC 429 I/O ports which can support up to six ARINC 739 interfaces for ACARS, Satcom and future NextGen CNS/ATM systems.

The MCDU interfaces with the UNS-1Fw and UNS-1Lw NCUs. It also includes an ARINC 702 bus for interface with third party FMSs.

LP/LPV Monitor

The LP/LPV Monitor is a 2-MCU LRU specifically designed to provide LP/LPV approach capability for single SBAS-FMS installations.

The LP/LPV Monitor provides monitoring and positioning information for RNAV (GPS) approaches with LP/LPV minima. The unit incorporates a second SBAS receiver operating with the most advanced software ever developed to monitor the guiding SBAS-FMS during critical LP/LPV operations.

Together, the LP/LPV Monitor and SBAS-FMSs provide the level of integrity required to meet the performance criteria mandated by certification authorities. The LP/LPV Monitor is certified to TSO- C146c Class Gamma-3.

Specifications

Hardware	UNS1-Ew	UNS-1Espw	UNS-1Fw	UNS-1Lw
Size	6.38 in. H x 5.75 in. W x 8.98 in. D	6.38 in. H x 5.75 in. W x 7.62 D*	7.64 in. H x 2.24 in. W x 15.26 in. D	7.64 in H x 2.24 in. W x 15.26 in. D
Weight	8.1 lbs.	7.2 lbs.	6.7 lbs.	6.7 lbs.
Mounting	¼ turn Dzus Fasteners	¼ turn Dzus Fasteners	2 MCU Rack	2 MCU Rack
Control/Display	Integral 5-inch color Flat Panel Display	Integral 5-inch color Flat Panel Display	Compatible with MCDU, 5-inch FPCDU, 4-inch FPCDU	Compatible with MCDU, 5-inch FPCDU, 4-inch FPCDU
Standard Interfaces	All Digital Configuration, Digital & Analog Configuration, ASCB Version A Configuration	All Digital Configuration	All Digital Configuration, Digital & Analog Configuration, ASCB Version A Configuration	All Digital Configuration, Digital & Analog Configuration
	8 Inputs/4 Outputs (Digital & Analog) 16 Inputs/8 Outputs (All Digital)	8 Inputs/5 Outputs	16 Inputs/8 Outputs	8 Inputs/5 Outputs
Power Primary Input	28 VDC standard	28 VDC standard	28 VDC standard	28 VDC standard
Lighting	5 or 28 VDC	5 or 28 VDC	5 or 28 VDC	5 or 28 VDC
Consumption	78 Watts max.	78 Watts max.	56 Watts max.	56 Watts max.
Cooling	Convection	Convection	Convection	Convection
Internal SBAS/GPS Receiver	12-Channel Satellite Tracking Engine, TSO-C146c, Class Gamma-3, FDE Prediction Program for Remote/Oceanic Ops			
FAA TSO/ETSO	C109, C115b, C146c, C190, JTSO C115b			
LP/LPV Monitor	The LP/LPV Monitor is a 2 MCU Line Replaceable Unit (LRU). Together, the LP/LPV Monitor and SBAS-FMSs make it possible to obtain operational approval for WAAS/SBAS LPV approaches in single SBAS-FMS installations.			

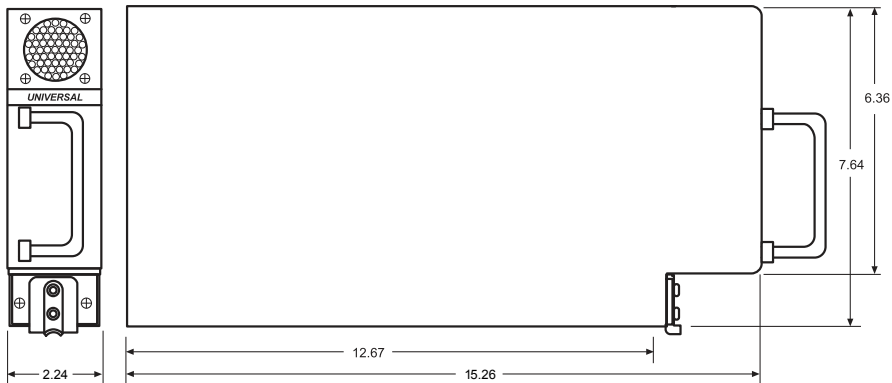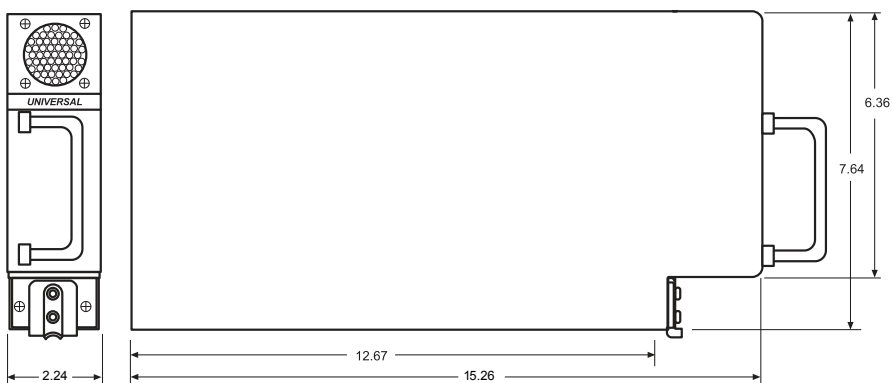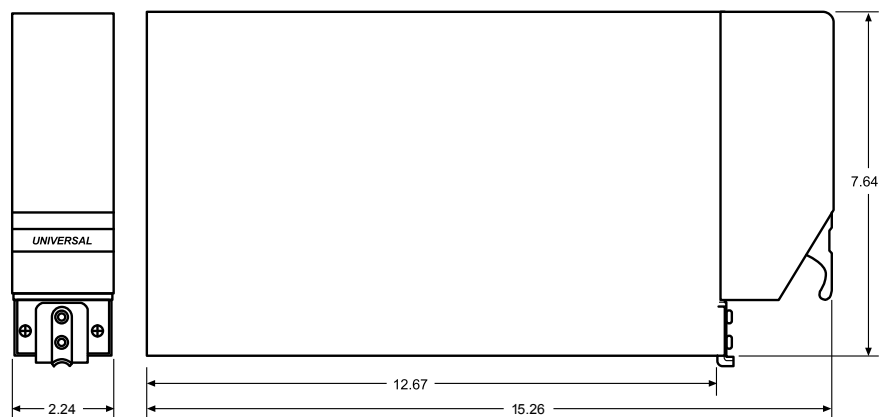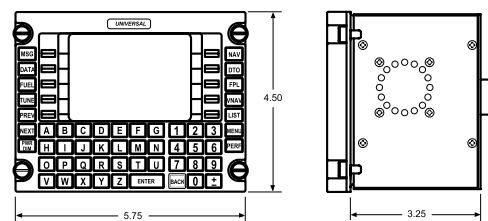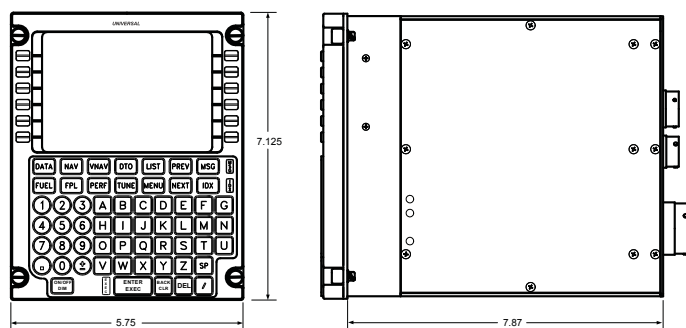| Control Display Units	MCDU	5-inch FPCDU	4-inch FPCDU
Size	7.125 in. H x 5.75 in. W x 7.87 in. D	6.37 in. H x 5.75 in. W x 4.177 in. D	4.50 in. H x 5.75 in. W. x 3.25 in. D
Weight	5.98 lbs.	2.41lbs. - 4.1lbs.	2.41lbs. - 4.1lbs.
Display	Color	Color	Color
Faceplate Color	Gray or Black	Gray or Black	Gray or Black
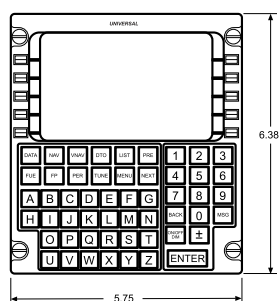
UNS-1Espw
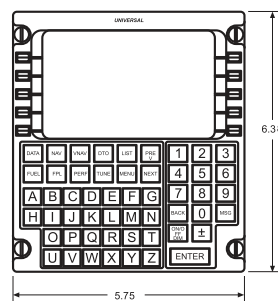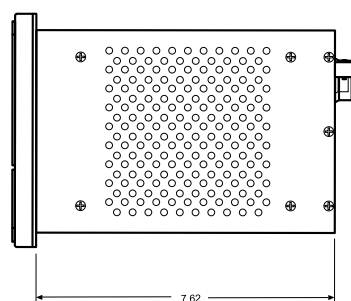
UNS-1Ew
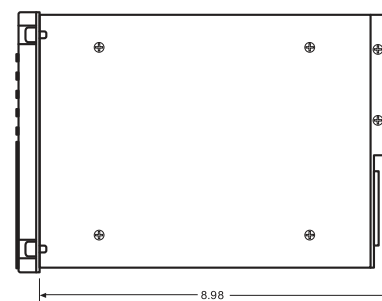
LP/LPV Monitor

UNS-1Lw NCU

UNS-1Fw NCU
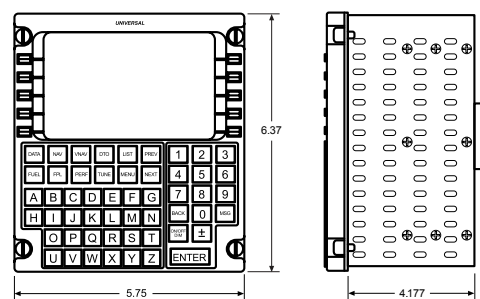
MCDU

4-Inch FPCDU

5-Inch FPCDU

UNIVERSAL AVIONICS
*an **Elbit Systems** Company*

⌖ 3260 E. Universal Way, Tucson, AZ 85756 USA

☐ +1 520 295 2300 / 800 321 5253

⊕ info@uasc.com

✉ uasc.com

05-20-2022