Six Distinct Search Patterns
Drifting Target and Mark On Target (MOT) Capability

MMMS

Multi-Mission Management System

NVG-Compatible Monochrome Display Option
Single Switch Mission Erase Feature
Configurable Roll Gain Turn Rate

UNIVERSAL™ AVIONICS
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Multi-Mission

The Multi-Mission Management System (MMMS) incorporates the advanced technology, system design, features and capabilities included in the SBAS-enabled Flight Management Systems (FMS) with special interfaces and the ability to fly six distinct patterns. The MMMS features Drifting Target and Mark On Target functionality for Search and Rescue (SAR) operations, as well as Night Vision Goggle (NVG) compatibility essential for SAR and other special missions. A Flight Plan Erase option allows the active flight plan and stored pilot data to be erased automatically upon removal of system power. The MMMS is unmatched for special mission operations such as SAR, reconnaissance, surveillance, maritime patrol, border patrol, geo-physical survey and flight inspection.

Mission Support

- Maritime Surveillance Aircraft (MSA)
- Flight Inspection and Navaids Calibration
- Search and Rescue (SAR)
- Border Patrol and Surveillance
- Airborne Law Enforcement (ALE)
- Intelligence, Surveillance and Reconnaissance (ISR)
- Geophysical Survey
- Environmental Protection

Patterns

The MMMS generates and steers the aircraft through six pattern types: rising ladder, expanding square, racetrack, sector search, orbit and border patrol. From the Control Display Unit (CDU) the operator is able to select the pattern and define the specific parameters appropriate to the mission.

The type of pattern is graphically displayed along with active/interrupted status and leg sequencing. Track, bearing, time and distance are numerically displayed as referenced to appropriate pattern waypoints throughout mission operations.

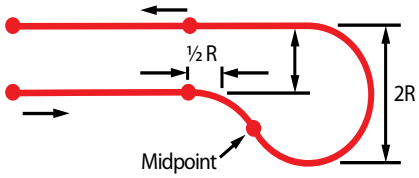
Patterns can be activated, canceled, or interrupted at any time. The pattern being flown can be interrupted and a new pattern selected. This second pattern can be terminated and the aircraft automatically returned to the first pattern at the point of interruption. This special capability provides you with the greatest degree of flexibility and control of real-time inflight parameters while maintaining mission integrity.

In addition, a configurable input option for roll steering gain allows helicopter operators to achieve maximum bank angles, if necessary, during search patterns.

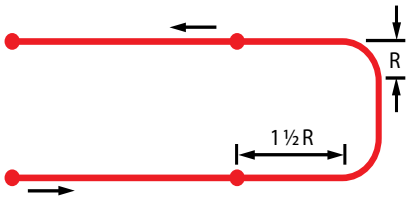
Turn Sequencing

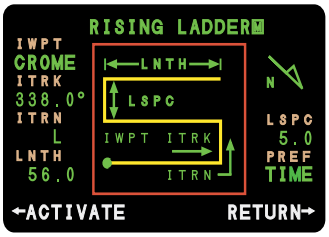
R = Minimum turn radius

Leg Separation less than 2R



Leg Separation greater than or equal to 2R



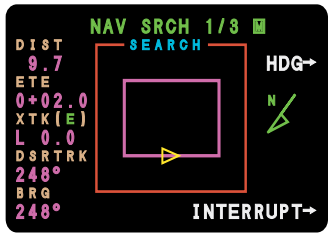


Rising Ladder

The rising ladder search pattern consists of an alternating series of parallel legs adjoined with fly-over waypoints. These are connected by special turn sequences designed to assure that the aircraft is on track at the beginning of each new leg. The initial waypoint (List or Direct Entry), initial track (Magnetic or True), initial turn direction (left or right), leg separation distance (99.9 nm max), and leg length (999.9 nm max) are entered into the MMMS by the flight crew.

Rising ladder also features a "Minimum Turn Time" option to help manage search pattern leg transitions, allowing the aircraft to navigate to the next search pattern leg with minimal bank regardless of aircraft speed, configured bank angle and the leg separation distance.

The graphic representation displayed on the CDU shows the aircraft presently on the return leg, along with crosstrack distance, desired track, and the distance, bearing and time to the next waypoint.

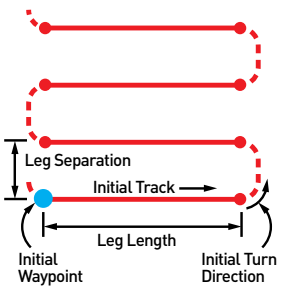


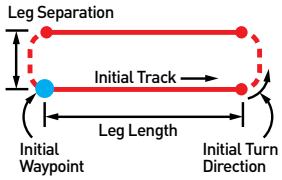
Race Track

The race track search pattern consists of two parallel legs. The initial waypoint (List or Direct Entry), initial track (Magnetic or True), initial turn direction (left or right), leg separation distance (99.9 nm max), and leg length (999.9 nm max) are entered into the MMMS by the flight crew.

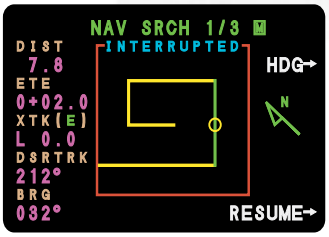
Race track also features a "Minimum Turn Time" option to help manage search pattern leg transitions, allowing the aircraft to navigate to the next search pattern leg with minimal bank regardless of aircraft speed, configured bank angle and the leg separation distance.

The graphic representation displayed shows the aircraft presently on the return leg, along with crosstrack distance, desired track, and the distance, bearing, and time to the next waypoint.





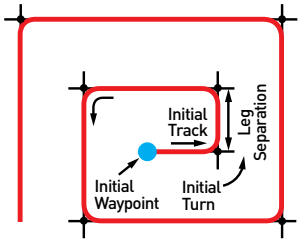
SBAS-MMMS Family *LP/LPV Monitor, UNS-1Lw, -1Fw and -1Ew*

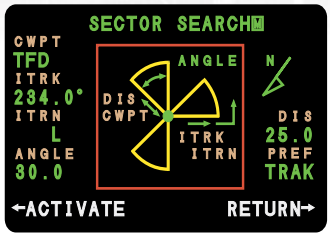


Expanding Square

The expanding square search pattern consists of a series of legs flown with conventional turn anticipation. The leg length will be increased by the leg separation distance after every other leg is flown. The initial waypoint (List or Direct Entry), initial track (Magnetic or True), initial turn (left or right) and separation of parallel legs (99.9 nm max) are entered by the flight crew.

The graphic representation of the flight path will be displayed on the CDU along with crosstrack distance, desired track, and the distance, bearing and time to the next waypoint. Initial leg length will be the greater of the specified leg separation or twice the minimum aircraft turn radius.



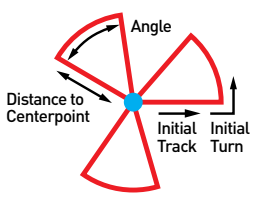


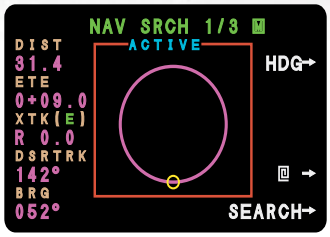
Sector Search

The sector search pattern resembles a cloverleaf and consists of a series of legs which pass through a center waypoint. The center waypoint (List or Direct Entry), initial track (Magnetic or True), turn direction (left or right), angle of turn (99.9° max) and distance of the pattern radius (99.9 nm max) will be entered by the flight crew.

Distance and time are referenced to the point closest to the aircraft position at the time ACTIVATE is selected (pattern starting point). Crosstrack distance, desired track and angle as referenced to the track are displayed, as are the bearing and distance to the center point. When inbound, distance displayed is to the center point and when outbound, distance displayed is to the outside point.

Sector search also features a "Minimum Turn Time" option to help manage search pattern leg transitions, allowing the aircraft to navigate to the next search pattern leg with minimal bank regardless of aircraft speed, configured bank angle and the leg separation distance.



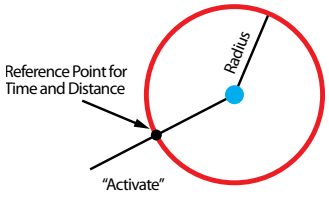


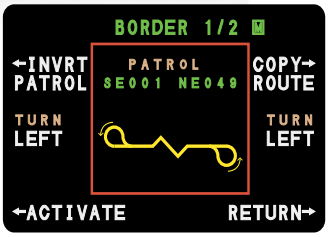
Orbit

Orbit search pattern consists of flying a constant radius circle in a predefined direction around a point. The location of the center of the circle (List or Direct Entry), the direction of turn (clockwise or counterclockwise) and the radius (99.9 nm max) of the circle will be entered by the flight crew.

Distance and time are referenced to the point on the circle closest to the aircraft position at the starting point. The CDU displays crosstrack distance and desired track referenced to the orbit track, as well as bearing to the center point.

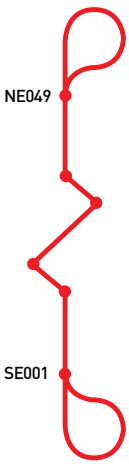
Circular arc steering provides the computed nominal bank angle for the current conditions in order to fly an arc of desired radius.





Border Patrol

The border patrol pattern consists of flying a track between pilot-defined waypoints, or a stored route, with course reversal at the final waypoints. The pattern can be initiated at either end. Additionally, the pilot may choose a left or right turn at either end waypoint.

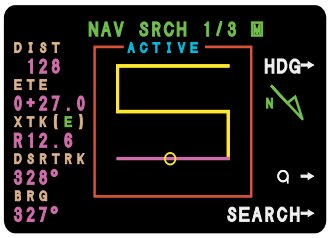


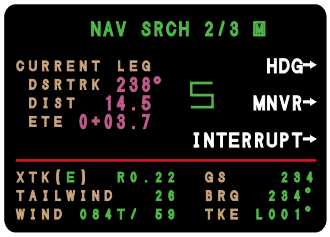
Nav Search

When a search pattern is activated, NAV SRCH (Nav Search) page 1 will be displayed. This page presents a graphical display of the search pattern, with an aircraft or helicopter position symbol in the center of the aircraft's current guidance leg. The search mode is displayed as either ACTIVE, SEARCH or INTERRUPTED. The page easily allows the flight crew to interrupt or resume the pattern, or access the Heading Mode.

During the period of interruption, the NAV SEARCH page displays crosstrack to the leg the aircraft was on when the search pattern was interrupted and distance to the point of interruption. Leg sequencing will not occur until the search pattern is resumed. This allows the crew to maneuver the aircraft freely, while allowing resumption of the search pattern with no loss of coverage.

The information presented on Nav Search page 2 correlates with the information displayed on the HSI. Complete information is provided about the current navigation leg. An icon depicting the search pattern selected is displayed on the screen.



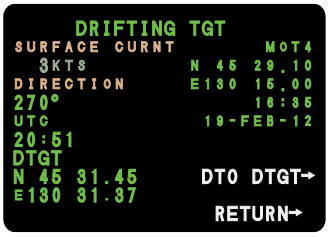


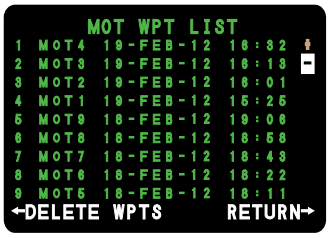
Drifting Target

The MMMS will calculate and display drifting target (DTGT) information for SAR missions. Surface current speed and direction are derived from the difference between the MMMS velocities and those from an external Doppler sensor. Manual entries are accepted as well.

The MMMS calculates a delta position using current speed, direction and ETA, then adds the delta position to the original position to generate the estimated DTGT location. Selecting DTO DTGT causes the aircraft to turn and fly direct to the DTGT coordinates. During Drifting Target operations, bearing and distance information is output for display on the EFIS.

Mark On Target (MOT) coordinates can be manually entered or can be automatically entered via a cockpit mounted MOT switch which will mark the aircraft's present position, along with current time and date. In addition, the LIST function will access up to nine previously stored MOT waypoints.





Specifications

Systems

The MMMS is a specialized software version available for the SBAS-enabled FMS, including the UNS-1Ew, UNS-1Espw, UNS-1Fw and UNS-1Lw models.

Interfaces

These MMMS systems may support interface capabilities which are in addition to those standard with the associated FMS. These may include types of TACAN, radar, Doppler, EFIS and others. Specific details can be found by calling your Universal Avionics sales representative.

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