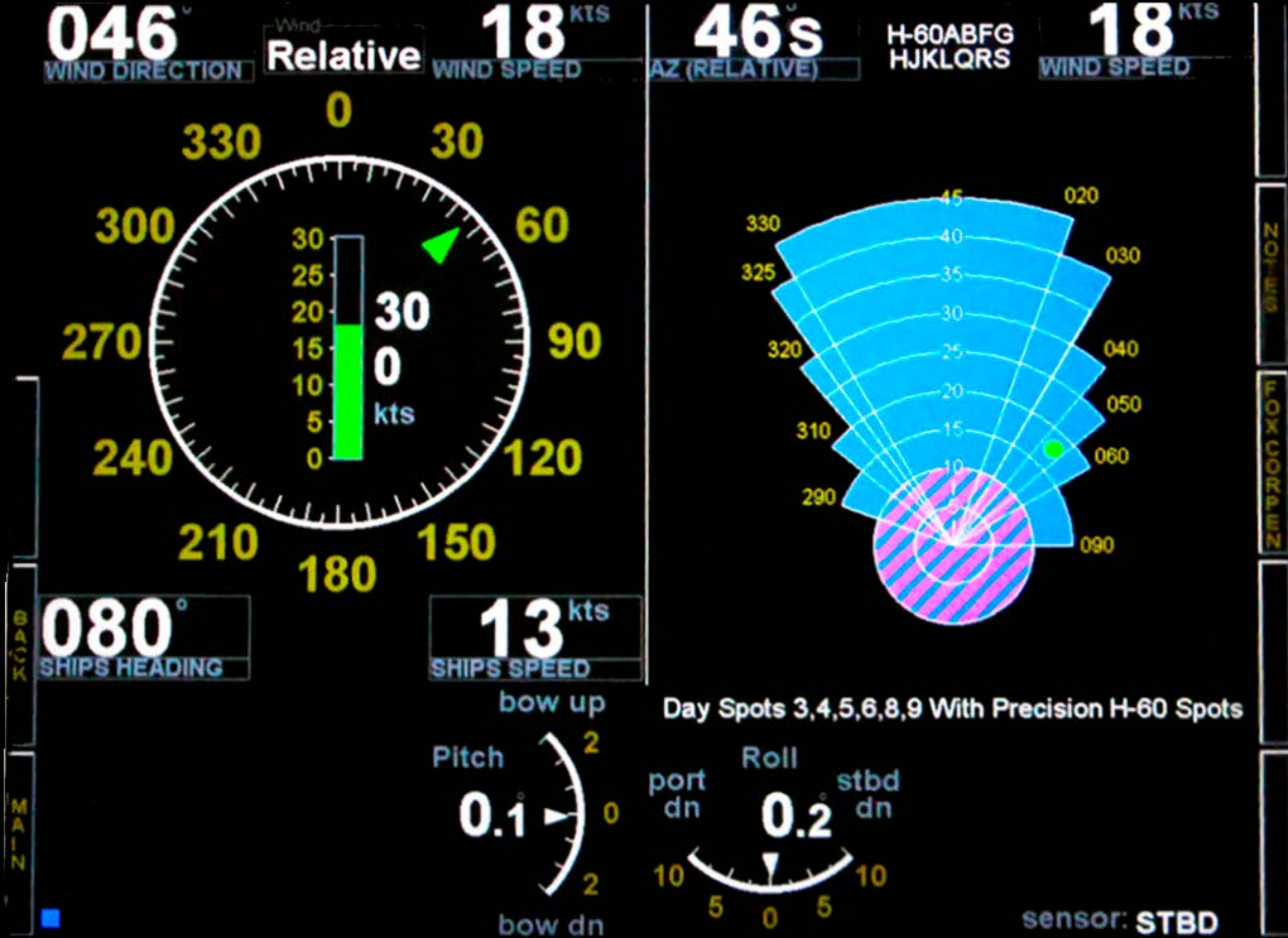
MWS Moriah Wind System

http://www.agiltd.co.uk/marine_instrumentation/moriah_wind_system/pdfs/moriah_brochure.pdf

"...The MWS is based on AGI's AGIMET Naval Wind Measurement and Meteorological System, which is proven and in service with many navies worldwide. The MWS has been expanded to provide greater capability for data distribution, alleviating the need for dedicated retransmission units. The design is highly modular and has spare capacity for plug-in RS422 modules, LAN modules, Synchro modules, together with spare memory and processor power, which allows for future system expansion, upgrades & refit.

The MWS Processor Unit is a stand alone Data Distribution System with multiple input / output capability. It can be bulkhead or deck mounted & contains two Sub-Processors, operating in a dual redundant configuration to avoid system downtime. Built-In-Test facilities are included, using an external PC & Graphic User Interface for detailed reporting of faults & system set up.

The Processor unit provides sensor interface & data distribution to other ship's systems &/or AGI's range of Multi-Function Color Displays. These TFT Liquid Crystal Display instruments provide highresolution color displays, suitable for complex graphics data & feature multiple pages on a single instrument. Data pages include, but are not limited to, True & Relative Wind Speed & Direction, Meteorological & Oceanographic data, Deck Cross-wind, Headwind & Tailwind, Ship's Speed & Heading, Ship's Roll & Pitch, Launch & Recovery Envelope data, Recovery Only Bulletin data, Fox Corpen data, BRC data & MWS Status Indication. The instruments offer excellent viewing angle properties & with fully dimmable back lighting, ensure maximum readability in a variety of ambient conditions, from direct sun light to the subdued environment of the Operations Room...."



"The high-end Moriah wind display installed the USS George H.W. Bush (CVN 77) is capable of displaying both digital and analog graphics and can be used during daylight and night-time-reduced light conditions. (U.S. Navy photo)"

http://www.navair.navy.mil/img/uploads/IMG_0547.JPG

http://commons.wikimedia.org/wiki/File:US_Navy_031213-N-7408M-001_Landing_Signal_Officer_(LSO)_Lt._Joe_M._Seeburger_from_Pemberville,_Ohio,_adjusts_the_heads-up_display_on_the_LSO_Platform_located_on_the_port_quarter_of_the_ship%5Ersquo,s_flight_deck.jpg

U.S. Navy photo by Photographer's Mate Airman Justin McGarry.

“Arabian Gulf (Dec. 13 2003) -- Landing Signal Officer (LSO) Lt. Joe M. Seeburger from Pemberville, Ohio, adjusts the heads-up display on the LSO Platform located on the port quarter of the ship’s flight deck aboard the nuclear powered aircraft carrier USS Enterprise (CVN 65). Marine Corps Capt. Robert B. Brodie of Richboro, Pa, looks on. Enterprise is currently deployed in support of Operation Iraqi Freedom & the continued war on terrorism.”

USS Enterprise LSO Station

“Landing signal officers watch an F/A-18E Super Hornet assigned to the Gunslingers of Strike Fighter Squadron (VFA-105) land aboard the aircraft carrier USS Harry S. Truman (CVN 75). (U.S. Navy photo)”

http://www.navair.navy.mil/index.cfm?fuseaction=home.PhotoGalleryDetail&key=FA4ED314-FA65-4AED-AC50-F3572795CCF3

http://www.navair.navy.mil/img/uploads/100725-N-6003P-244.jpg

Aviation Data Management and Control System (ADMACS)

http://www.navair.navy.mil/index.cfm?fuseaction=home.display&key=5074CC29-4B5F-43F3-ADD5-37099DE79C91

“The Aviation Data Management and Control System (ADMACS) is a tactical, real-time data management system connecting the air department, ship divisions & embarked staff who manage aircraft launch & recovery operations on CV/CVN ships. ADMACS communicates aviation & command-related data elements across the ADMACS Local Area Network (LAN) & Integrated Shipboard Network System (ISNS) that electronically display position & location of aircraft on flight & hangar decks. ADMACS also displays the aircraft’s status, launch & recovery equipment, fuel, weapons types & quantity, & other aviation and ship related information. The primary goal of the ADMACS program is to significantly improve ship air operations effectiveness & workload reduction through process automation, optimization & integration of key operational systems.

The complexity of air operations aboard naval aircraft carriers requires accurate, continuous & timely information distribution to all work centers in need of vital data. The ADMACS family of block upgrades will develop & integrate a standard data management & control system to provide accurate & timely data throughout the ship.

ADMACS will provide an interface for data sharing to other key programs such as the Electromagnetic Aircraft Launch System, Advanced Arresting Gear, Joint Precision Approach & Landing System & the Moriah Wind System. ADMACS Block 1 is currently operational on 9 commissioned aircraft carriers.”

STRIKE TEST NEWS Air Test and Evaluation Squadron 23 Newsletter 2013 Issue [produced 11 Oct 2013]

Precisions Approach & Landing System (PALS) Mode I Performance & Winds

MORIAH

LCDR Pat " WHO?" Bookey

You've probably seen us borrowing your jets during CVN flight deck certifications and watched us zorch around low and fast conducting endless Mode I approaches. Our goal is to verify that the Improved Fresnel Lens Optical Landing System (IFLOLS), SPN-41 Instrument Carrier Landing System (ICLS) and SPN-46 Automatic Carrier Landing System (ACLS) function properly, are aligned with each other and lead the pilot to a good start. We leave your ship after having ensured that the systems, specifically Mode I, are operating correctly within certification limits and available for those rare but much needed times when the pilot is otherwise incapable of getting aboard on his/her own (low visibility, IFR in the cockpit, injury, etc.) These systems, specifically the ACLS, are aging, and although we at VX-23 do our best to ensure proper functionality, degradations to their performance can be expected over time. Because we only come out every two years for verifications and there is no clear replacement for ACLS in the near future, it falls on the ship and Airwing to recognize when the system is misbehaving and report it to us so we can evaluate and fix it. Sometimes there are hardware-related problems which need to be corrected, but sometimes we field concerns from the Airwing resulting from misconceptions regarding how the system is intended to function. This year, in an effort to educate the fleet on the Mode I, we're going to focus on wind conditions, displayed wind sources and their effect on Mode I performance.

The wind over the deck (WOD) is measured from three anemometers on the ship (FWD, STBD, and PORT). These three anemometers feed the Moriah System, which is the wind display in PriFly and the bridge that is used to drive the ship to get recovery WOD. The Moriah display from the Mini Boss station allows the different anemometers to be selected individually. The FWD anemometer is at the top of the navigation pole to the right of catapult #1. The PORT and STBD anemometers are at the top of the mast on the island on outriggers on the port and starboard sides. Some ships still have the traditional "whirlybird" on the navigation pole, but it doesn't feed Moriah. An actual anemometer looks like a three pronged fork with no moving parts that measures the wind magnitude and direction via sonic waves. I won't get into the details on how that works, but it's pretty accurate. In general, for all ships we have seen that the FWD anemometer provides the most accurate measurement of the WOD in the landing area (LA). The PORT and STBD winds do not display the most accurate winds because of the numerous obstructions to "clean" air flow that exist on the mast. We have seen these sensors differ from the FWD by as much as ten degrees in direction and six knots in magnitude. Each ship is different and the errors of the mast-mounted anemometers differ. Due to these observations, we recommend that the FWD anemometer be selected from the Mini Boss Moriah display for all fixed wing recoveries to ensure the most accurate display of winds to the bridge, PriFly and the LSO platform. The FWD can be manually selected or the AUTO function chosen, which will automatically choose the FWD anemometer

while the ship is turned into the wind.

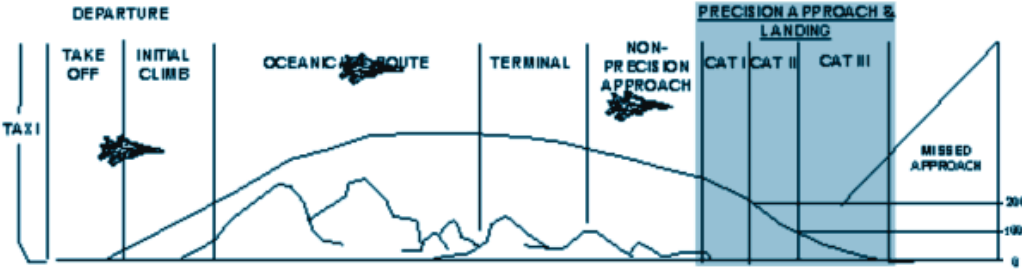
How does wind factor into Mode I performance? The first important concept to understand is that the ACLS does not use wind inputs from any anemometer in its computations of aircraft guidance through the datalink. The ACLS system merely commands corrections to deviations from commanded course (final bearing) via bank angle commands and glideslope via pitch attitude commands coupled with on-speed control through the auto-throttles (ATC) in the aircraft. The second concept to understand is the expected performance of Mode I in high and/or starboard winds. As wind conditions increase in magnitude beyond ~35 kts or shift to more starboard component (> 4 kts STBD), Mode I performance will degrade as the burble gets stronger. Increasing burble strength translates to larger deviations from commanded course/glideslope and therefore larger corrections from the aircraft. In the Rhino, these large deviations and corrections tend to make the jet float and bolter, while the Hornet tends to settle into early wires during Mode Is in these adverse wind conditions. These are normal Mode I reactions to these conditions, so your best bet for successful Mode I is to ensure you know the actual WOD conditions in the LA.

VX-23 Carrier Suitability has seen several cases in the past few years in which ships were using the STBD anemometer as their standard wind source during fixed wing recoveries for various reasons. **On one ship, the difference in wind direction/magnitude measured from the STBD anemometer to the actual WOD in the LA was large enough to create an adverse starboard wind condition strong enough to degrade Mode I performance to the point where the ship stopped flying them because they thought something was wrong.** The winds displayed on Moriah measured from the STBD anemometer showed winds right down the angle, well within normal recovery winds. This particular instance resulted in rescue detachment from VX-23 meeting the ship on deployment. After extensive testing, we could not find anything wrong with the ACLS, switched the ship back to the FWD and Mode I performance improved back to our certification standards. We are currently evaluating the system on another ship that is using the STBD due to problems with their FWD anemometer. That ship is also reporting Mode I performance degradation. While the results from the evaluation are not yet complete, we are investigating the wind issue as a possible cause for degraded Mode I performance.

We field inquiries from ships and Airwings routinely with questions regarding possible degradations in Mode I performance. One of our first troubleshooting questions will be to identify which anemometer is being used. This is just one piece of the puzzle when troubleshooting the ACLS (aircraft ATC, beacons, SPN-46 radar dishes, computers, etc) and may not be the "smoking gun" causing problems. Hopefully a little better understanding of Mode I and the effect the WOD has on its performance will help manage expectations and better prepare the pilot and LSO for the anticipated deviations in adverse wind conditions. VX-23 is always available to discuss PALS performance. If you notice a trend of questionable Mode I performance, or experience even a single unsafe Mode I, please don't hesitate to contact us.

http://www.navair.navy.mil/nawcad/index.cfm?fuseaction=home.download&id=767

U.S. Navy Completes JPALS Ship-Based EMD Phase



JPALS addresses only the final approach phase of flight

BILL CAREY 03 Jan 2014
AIN DEFENSE PERSPECTIVE

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The Navy's VX-23 air test and evaluation squadron flew 60 autolands to the deck of the USS Theodore Roosevelt using the Joint Precision Approach and Landing System. (Photo: Navair)

The U.S. Navy recently completed engineering and manufacturing (EMD) development of the ship-based component of the Joint Precision Approach and Landing System (Jpals). The EMD phase of Jpals Increment 1A for ship systems included auto landings by F/A-18C Hornets to the deck of the aircraft carrier USS *Theodore Roosevelt*. The Increment 1B phase calls for integrating the system on aircraft.

Jpals is a GPS-based precision approach and landing system that will help ship- and land-based aircraft land in all weather conditions, providing guidance to 200 feet decision height and half-nautical-mile visibility. It is a tri-service program with multiple increments to include Air Force and Army requirements, eventually replacing "several aging and obsolete aircraft landing systems with a family of systems that is more affordable and will function in more operational environments," according to the Department of Defense (DoD).

The Navy conducted EMD demonstrations aboard the *Roosevelt* from November 9 to 19, logging approximately 30 flight test hours and 60 completed autolands to the deck using two F/A-18Cs operated by its VX-23 air test and evaluation squadron. The jets were equipped with Jpals "functionally representative" test kits.

The Jpals ship system includes multiple racks of equipment inside the ship and multiple GPS and UHF antennas on the mast, according to the Naval Air Systems Command (Navair), the contracting authority for sea-based Jpals. The system includes integrated processing, maintenance and monitoring systems and redundant UHF datalinks, inertial sensors and GPS sensors to achieve high reliability and availability. "Jpals is networked with legacy shipboard landing systems, but is capable of operating independently of those systems," Navair said.

Arinc, which served as lead technical contractor to the Navy during technology development of the system, said Jpals will integrate with the AN/TPX-42 air traffic control console, the AN/SPN-46 automatic carrier landing system, the AN/SPN-41 instrument landing system, the landing signal officer display system, the improved Fresnel lens optical landing system, the aviation data management and control system, and the Moriah Wind System. Last year, Rockwell Collins acquired Arinc.

In July 2008 Navair awarded Raytheon a $232 million contract for Jpals system development and demonstration, to include the delivery of eight ship system engineering development models and four aircraft system test avionics sets. Rockwell Collins, a major subcontractor, provides its digital integrated GPS anti-jam receiver.

Defense budget uncertainty has delayed a Milestone C decision that would begin low-rate production of the system, according to Navair. Congress authorized $194.7 million for the program in the Fiscal Year 2014 National Defense Authorization Act passed in December, some $10 million less than the President's request. The DoD has programmed funding for Jpals over the entirety of its five-year future-years defense program.

Future development efforts are focused on supporting integration of Jpals with the F-35 Joint Strike Fighter and on improving support for unmanned aircraft systems, Navair said.

http://www.ainonline.com/aviation-news/ain-defense-perspective/2014-01-03/us-navy-completes-jpals-ship-based-emd-phase