



eCASS



RTCASS

# Naval Aviation Automatic Test System (ATS) Roadmap and Challenges

For NDIA ATC's August 2024 Meeting



26 August 2024  
NAVAIR PMA260



# NAVAIR PMA260, Aviation Support Equipment, Mission



**PMA260 delivers** common aviation support equipment to enhance the **maintenance capability** of Sailors and Marines tasked to operate, repair and service naval aircraft. We provide professional acquisition management, exacting test and evaluation and world-class sustainment while delivering our products **on time, on cost, with proven functionality and reliability.**

▪

# PMA260 "ATS" Portfolio

## Consolidated Automated Support System (CASS) Family of Testers (FoT)



**CASS**



**RTCASS**



**eCASS**

### Specialty O-Level Testers



**JSECTS**



**SGTS**



### Operational Test Program Set (OTPS)



**Hybrid Test Set (HTS)  
(F-18E/F, EA-18G)**



**F-35 Navy Depot  
eCASS Program**

### Aviation Maintenance Advancement Solutions (AMAS)

- PEMAs
- SPECSc
- ARMS



### Mobile Facilities (MF)





# PMA260 Naval Aviation Support Equipment (ASE) Flight Plan

Requirements – "Flight Plan"



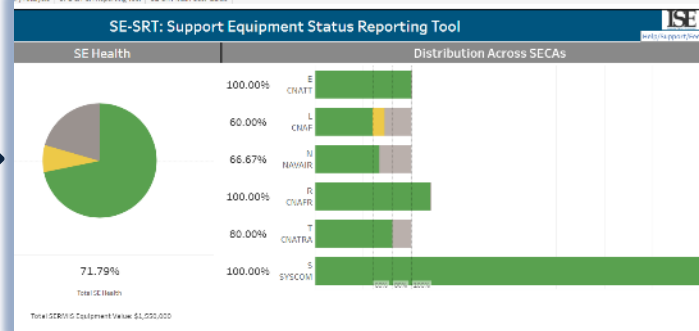
## Naval ASE Flight Plan

NIIN INDEX	CODE	COMMODITY	SUPPORT EQUIPMENT END ITEM	QTY	LAST IOC	ACQ COST \$M	FUNDED/ UNFUNDED	Delivery Year														
								FY20	FY22	FY24	FY26	FY28	FY30	FY32	FY34	FY36	FY38	FY40				
<b>Common Armament &amp; Weapons Handling Support Equipment</b>																						
1	C11	AWSE	A/M32K-10 USMC Munitions Trailer SEC	645	Dec-12	22.0	Funded															
2	C11	AWSE	AM32U-21 USMC Maintenance Trailer SEC	14	Jun-14	5.3	Funded															
2	C11	AWSE	AM32U-21 USMC Maintenance Trailer SEC	14	Jun-14	5.3	Unfunded															
3	C11	AWSE	A/E32K-11 Munitions Loader Assembly	6	Feb-18	5.7	Unfunded															
4	C11	AWSE	A/E32K-11 MLA Shelter Sunshade	6	N/A	TBD	Unfunded															
5	C11	AWSE	MHU-191/M Munitions Transporter	4,506	Apr-14	26.6	Funded															
5	C11	AWSE	MHU-191/M Munitions Transporter				Unfunded															
6	C11	AWSE	MHU-83D/E Aerial Stores Lift Truck	252	Feb-20	38.5	Funded															
7	C11	AWSE	MHU-230 Small Munitions Trailer	707	N/A	18.3	Funded															
7	C11	AWSE	MHU-230 Small Munitions Trailer				Unfunded															
8	C11	AWSE	Self Propelled Ordnance Transporter	34	N/A	18.6	Unfunded															
9	C11	AWSE	HLU-288/E & HLU-196/E Bomb Hoist Replacement	815	Aug-81	14.7	Funded															
10	C11	AWSE	A/F32K-1A Weapons Assembly Table	69	1980's	3.1	Funded															
<b>Weapons Control Common Support Equipment</b>																						
12	C12	WCSE	AWM-103 Stores Management Test Set ECP	607	Feb-06	8.4	Funded															
12	C12	WCSE	AWM-103 Future Replacement				Unfunded															
13	C12	WCSE	UWM-10 Common Aircraft Armament T/S	219	Jun-16	46.0	Funded															
13	C12	WCSE	UWM-10 Future Replacement	219			Unfunded															
14	C12	WCSE	Advanced Boresight Equipment (ABE) SLEP	80	Jun-06	11.5	Funded															
14	C12	WCSE	ABE Future Replacement				Unfunded															
15	C12	WCSE	AWM-102A Electronic Firing Circuit T/S	949	Aug-11	5.5	Unfunded															
16	C12	WCSE	AN/USM-715 Rocket Pod Test Set	211	Dec-10	5.5	Unfunded															
<b>Software Loading &amp; Instrumentation Common Support Equipment</b>																						
17	C12	S/W Loading	AN/USQ-203 Program Loader Set	689	Aug-14	45.6	Funded															
17	C12	S/W Loading	AN/USQ-203 Program Loader Set ECP				Funded															
18	C12	Instrumentation	TS-4508/U Air Data Test Set SLEP	740	Jul-19	19.2	Funded															
18	C12	Instrumentation	TS-4508/U Air Data Test Set Replacement				Unfunded															
19	C12	Instrumentation	TTU-597E Fuel Control Test Set SLEP	469	Jun-07	15.0	Funded															
19	C12	Instrumentation	TTU-597E Fuel Control Test Set Replacement	469	Jun-07	15.0	Unfunded															
<b>Communication/Navigation/Interrogation (CNI) Common Support Equipment</b>																						
20	C12	CNI	AN/USM-708 CRAFT SLEP	742	Oct-12	19.5	Funded															
20	C12	CNI	AN/USM-708 CRAFT Replacement	742	Oct-12	19.5	Unfunded															
21	C12	CNI	ARM-206 I-Level TACAN Test Set	109	Sep-14	12.5	Unfunded															
22	C12	CNI	P-Static Simulator Test Set	34	Jun-09	2.1	Unfunded															
23	C12	CNI	MC-2000 Magnetic Compass Calibrator	115	Sep-04	7.8	Unfunded															

# Strategic Planning Cycle

Requirements – "Flight Plan"

## Health Metrics



## Naval ASE Flight Plan

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## Current Efforts & Future Opportunities

- NAVAIR S&T Projects
- Emerging Technologies
- Industry R&D Investments

## Capability Gaps

- Emerging Requirements
- Changing CONOPS
- Diminishing Sources
- Reliability & Maintainability
- Affordability

# CASS Family



- CASS is the first generation of the CASS Family of Testers (FoT) comprised of 5 configurations for test and diagnostics of complex weapon systems
- Over 500 were in Navy I-Level and Depot, shore and ship inventory, with Initial Operational Capability achieved in 1992
- Targeted to be out of Navy I-Levels by 2027 being replaced by eCASS

## Capability Gaps

- Operating beyond its 20-year projected life cycle
- Aging test technologies

## Current Efforts / Opportunities

- In sundown period so limited changes
- Reclaiming parts from removed stations to support sustainment
- 7-year follow-on Performance Based Logistics (PBL) contract awarded April 2024

## Future Strategy

- Replace with eCASS at Navy sites
- Sustain until 2035 timeframe for the International Partners

# RTCASS Family



- RTCASS is the second generation of the CASS FoT comprised of 2 configurations for test and diagnostics of complex weapon systems used by the Marine Aviation Logistics Squadron (MALS)
- Initial Operational Capability achieved in 2008 and operated in Mobile Facilities at shore I-Level sites
- Currently used by both Rotary Wing and Fixed Wing MALS
- eCASS is being introduced to the Fixed Wing MALS for F-35 support

## Capability Gaps

- Limited test capability
- Not practical to upgrade to support F-35 test requirements

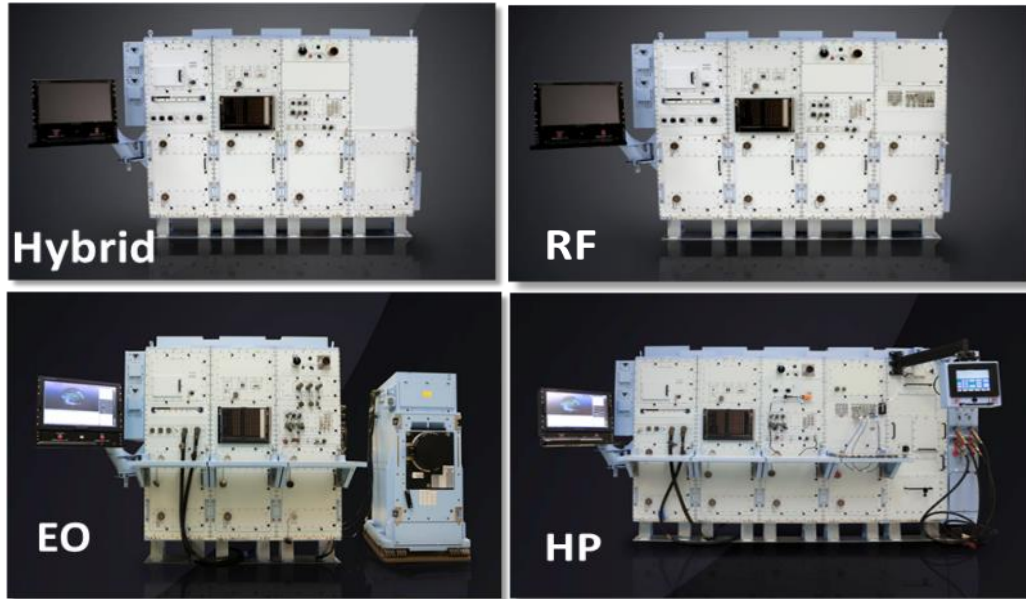
## Current Efforts / Opportunities

- Reclaiming parts from removed stations to support sustainment
- 7-year follow-on PBL contract awarded April 2024

## Future Strategy

- Fixed Wing MALS will use eCASS with the introduction of F-35 I-Level capability
- Marine Corps Head Quarters evaluating replacing RTCASS with eCASS at Rotary Wing MALS

# eCASS Family



- eCASS is the third generation of the CASS FoT comprised of 4 configurations for test and diagnostics of complex weapon systems
- Initial Operational Capability achieved in 2017 operating at Navy ship and shore I-Levels, Depots, and Marine Corps L-Class ships
- Replaces CASS at Navy and Marine Corps sites and several International Partners

## Capability Gaps

- Upgrading test capability to support F-35 and other Platform's test requirements at I-Level and Depot

## Current Efforts / Opportunities

- Complete production
- Upgrade the EO Console
- Upgrade for F-35/other support
- Completed the "Migration" of CASS TPSs to eCASS
- Moved to PBL repairable support in May 2024

## Future Strategy

- eCASS on track to replace CASS at I-Level sites
- With last production buy in 2023, working to establish a follow-on production contract for the 2025 timeframe
- Plan obsolescence upgrades



# eCASS Family (Cont.)

## Electro-Optical 4<sup>th</sup> Generation eCASS EO Subsystem

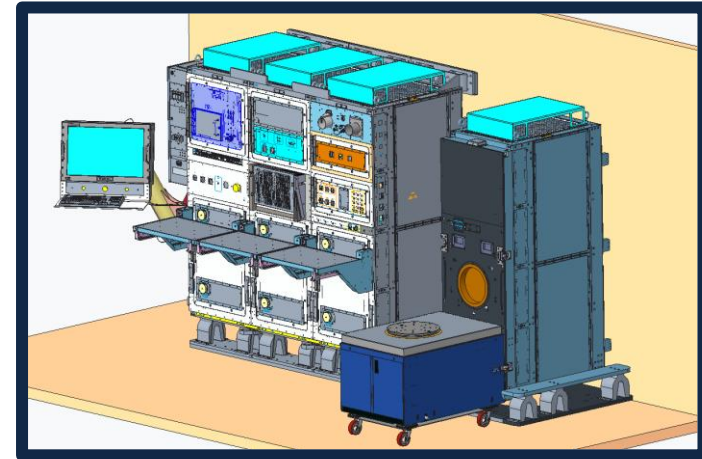
- Replaces the aging EO3 Console
- In development with Lockheed Martin
- Fielding in the 2026 timeframe

## eCASS F-35B/C I-Level support

- Capability not originally planned for F-35 support
- eCASS F-35 upgrade adds:
  - 4 internal eCASS instruments
  - 2 new external ancillaries
- First eCASS F-35 upgrade fielded March 2022
- F-35 TPS development continues

## eCASS F-35 Depot support

- Defining plans to replace existing ATE at two Navy Depots with eCASS



eCASS EO4 Configuration



F-35C

# Hybrid Test Set (HTS) TPS Offload to CASS/eCASS



- HTS is a 1980s vintage SRA tester, originally an I-Level tester but now used at Depot supporting F/A-18
- High failure UUTs were “Offloaded” to CASS in the early 2000s for I-Level use
- HTS is now very difficult to support, and the objective is to “Offload” at least the F/A-18E/F and EA-18G SRAs as soon as possible
- CASS/eCASS HTS “Offload” Group “A” (OTPS A) and Group “B” (OTPS B) are in process

## Capability Gaps

- HTS is difficult to support and canalizable stations are minimal
- No other F/A-18 SRA support is available in government or industry for the remaining UUTs supported
- FMS Partners are struggling

## Current Efforts / Opportunities

- Most urgent “Offload”, OTPS A -- development is complete and in production for I-Level use
- Final “Offload”, OTPS B -- development in process

## Future Strategy

- Sundown the HTS at Depot when F/A-18C/Ds are out of Navy inventory

# Joint Services Electronic Combat System Tester (JSECST)



- JSECST is a primary flight line Electronic Warfare (EW) and Communication Navigation Identification (CNI) testers used by Naval Aviation to functionally test systems (go/no-go) and provide guided diagnostics to isolate faults
- Tester completed a mid-life upgrade of this aging Tester and engineering life extension changes continue

## Capability Gaps

- Given the age of the System, close DMSMS monitoring required for component obsolescence

## Current Efforts / Opportunities

- Continue engineering life extension changes as needed
- Acquired 2 Testers from the Royal Australian Air Force as sustainment mitigation
- Textron funded by Air Force to investigate redesign Solution of Hand Held Control Unit (HHCU)
- Joint Service PMR at Textron early June

## Future Strategy

- Planning for Tester replacement by the early 2030s

# Signal Generator Test Set (SGTS)



- SGTS is a flight line Electronic Warfare (EW) and Communication Navigation Identification (CNI) RF cable tester
- Additional requirements have emerged however this aging System is no longer procurable
- Plan to replace in the 2027 timeframe

## Capability Gaps

- Given the age of the System, close DMSMS monitoring required
- No longer procurable
- Immediate quantities needed for several International Partners who have no capability

## Current Efforts / Opportunities

- ECPs in process to be able to sustain until 2027
- IOC for upgraded DoD Cyber Compliant system planned May 2024

## Future Strategy

- Have selected a commercial replacement solution for the International Partners
- RFI for potential Navy solution planned summer 2024
  - Market research performed via Industry day Dec. 2024

# Electrical Intermittent Fault Detection Systems (EIFDS) OSD RSIP Effort

Automatic Wire Test Set  
(AWTS)



Wire Intermittent Fault Tester  
(WIFT)

- OSD FY24 & FY25 RSIP effort to target efforts aimed at reducing intermittent faults in Electrical Wiring Interconnect Systems (EWIS) on aircraft to improve readiness and reduce related non-value-added maintenance costs.
- Develop and field Test Program Sets (TPSs) to test & troubleshoot high degrader EWIS using currently fielded aircraft wiring test equipment and/or procure additional quantities of aircraft wiring SE to support additional aircraft support equipment requirements driven by activities to help reduce EWIS intermittence such as phased EWIS inspection requirements.

## Capability Gaps

- FY24 RDT&E funding to conduct trade studies to determine root causes of intermittence, assess the effectivity of existing fielded test aircraft wiring test equipment to combat EWIS intermittence and to identify any EIFDS gaps. Trade Study initiated July 2024 (CR Delayed start)

## Current Efforts/ Opportunities

- In FY24, H-60 and T-45 procuring AWTS' and TPSs to test & troubleshoot top degrader wiring harnesses, wiring panels, junction boxes & chassis assemblies. \$7.5 of \$8M Obligated.
- In FY25, PMA260 procuring WIFTs to complement AWTS in isolating insulation & other faults detected by AWTS.

## Future Strategy

- Continue to leverage AWTS and WIFT to develop test and troubleshooting capabilities for high degrader EWIS as identified across all T/M/S aircraft. Work to close any EIFDS gaps identified through RDT&E trade studies.

# Augmented Reality Maintenance System (ARMS)



- ARMS is an Augmented Reality headset (currently Hololens 2) based remote tech assist tool that virtually brings together Fleet technicians and shore-side Subject Matter Experts (SMEs)
- ARMS provides real-time communication (video/audio/text/model sharing/hologram placement) between SMEs and on-site technicians to enable remote assistance, reducing time & travel costs to effect repairs

## Capability Gaps

- Responsive and affordable SME technical assistance for deployed forces and combat repair
- Dependable/available network connectivity across multiple Fleet force domains

## Current Efforts / Opportunities

- Initial version developed by NAWC-AD Lakehurst
- In development for cloud based application/portal
- ARMS testing using SATCOM (Starlink/Starshield) connectivity

## Future Strategy

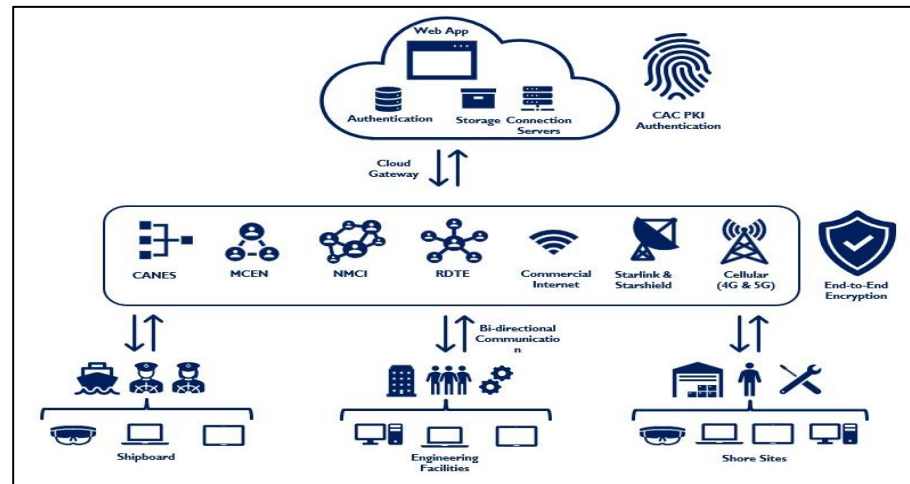
- Advance efforts to develop militarized (rugged) Augmented Reality goggles
- Integrate technical data and Artificial Intelligence (AI) for voice automated access to repair and troubleshooting procedures



# Thank You

## Augmented Reality Maintenance System (ARMS) development

- ARMS is an Augmented Reality headset (currently Hololens 2) based remote tech assist tool that virtually brings together Fleet technicians and shore-side Subject Matter Experts (SMEs)
- Software developed by Naval Air Warfare Center Aircraft Division Lakehurst and demonstrated down to very low bandwidths, including below 256 kbps
- Currently in development for a cloud based SME application portal (hardware agnostic)
- ARMS to leverage enterprise shore & afloat networks and SATCOM (Starlink/Starshield) to maximize connection opportunity between deployed technicians and SMEs



- Video
- Audio
- Chat
- File Sharing
- PhotoSharing
- Model Sharing
- Annotation/Holograms



**SME using 2-in-1 tablet**

- Viewing what the maintainer is working on
- Provides guidance through indications, voice communication, text chat, and file sharing

**Maintainer using AR Headset**

- Able to ask for assistance through voice communication, text chat, transmitting viewpoint, and sending images
- SME guidance overlaid during maintenance action







# PMA260 Naval Aviation Support Equipment (ASE) Flight Plan

Requirements – "Flight Plan"



CUI



## FLIGHT PLAN ROADMAP

Data Refresh Date: 8/6/2024 3:21:33 PM  
Extract Date: 5/30/2024  
Version Number: 3.0.0

Sort By: SE One List, desc  
Select a NIIN to navigate to its Flight Plan Details Page

### FILTERS

- CSE or PSE: PMA, PMA260
- IPT Code / Program: IPT Name / Model, All
- NIIN: Funded/Unfunded, Multiple values, All
- End Life Sustainment Strategy: All
- Health Assessment: All

IPT Code / Program	IPT Name / Model	NIIN	End Item	End Life Sustainment Strategy	SE One List Rank	SE Health	Buy Qty	Year of Required IOC	ACQ Cost (\$K)	Funded/Unfunded	Health Assessment	Year of Delivery Schedule									
												2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
PMA260D3	CASS Family of Teste..	016154707	BACKUP PWR TEST ..	Replacement	565	100.0%	3	2023	1,000,000.0	Funded	Green	AOC									
PMA260C14	Non-Destructive Ins..	016994852	TESTER, BONDED ..	Replacement	469	99.3%	141	2023	3,980.8	Funded	Green	AOC									
PMA260C14	Non-Destructive Ins..	016994852	TESTER, BONDED ..	Replacement	469	99.3%	136	2038	5,363.9	Unfunded*	Green										
PMA260C13	Composite Repair	013608210	TOOL SET, STRUCT..	Replacement	435	76.6%	131	2027	217,758.0	Funded	Green	AOC									
PMA260C24	Hydraulics	001073068	CART DISPENSING-...	Replacement	354	100.0%	163	2028	4,775.0	Funded	Green	AOC									
PMA260C14	Non-Destructive Ins..	015838302	DEFECT MEASURE..	Replacement	342	89.1%	481	2012	16,250.0	Unfunded	Green	AOC									
PMA260C14	Non-Destructive Ins..	015838302	DEFECT MEASURE..	Replacement	342	89.1%	0	2022	0.0	Unfunded*	Green										
PMA260C11	Armament & Weapon..	015708396	TRAILER, SMALL M..	Replacement	157	22.4%	698	2022	25,865.8	Funded	Yellow	AO									
PMA260C13	Aircraft Wiring	015285517	WIRE TEST SET, AU..	Replacement	153	93.9%	115	2031	9,448.0	Unfunded*	Green	POM									
PMA260C23	Cryogenics	012173299	400 GALLON MOBIL..	Replacement	116	51.4%	0	1981	0.0	Unfunded*	Red										
PMA260C23	Cryogenics	012173299	400 GALLON MOBIL..	Replacement	116	51.4%	35	2027	3,375.0	Funded	Yellow	AOC									
PMA260C21	Platforms	016817042	UTILITY CRANE, TO..	Replacement	110	79.3%	0	2028	0.0	Unfunded*	Yellow										
PMA260C11	Armament & Weapon..	014462422	TRUCK LIFT AFRIAL	Replacement	101	68.8%	245	2020	36,160.1	Funded	Yellow										

Unfunded - Government Cost Estimate  
Unfunded\* - Rough order of Magnitude Cost of Production

- Go To Landing Page
- Go To User Guide
- Download Crosstab
- Download PowerPoint
- Download PDF

	Year of Funding Requirements														
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Funded (\$K)	5,536	12,285	15,398	16,626	13,005	1,012,613	108,851	69,595	75,417	13,840	0	4,500	5,250	4,500	0
Unfunded (\$K)									2,000	4,500	5,250	4,500	0		
Unfunded* (\$K)						0	0		302	6,721	9,146	20,075	25,452	11,560	8,
Grand Total	5,536	12,285	15,398	16,626	13,005	1,012,613	108,851	69,595	77,719	25,061	14,396	24,575	25,452	11,560	8,

Unfunded(\$M) = Unfunded + Unfunded\*

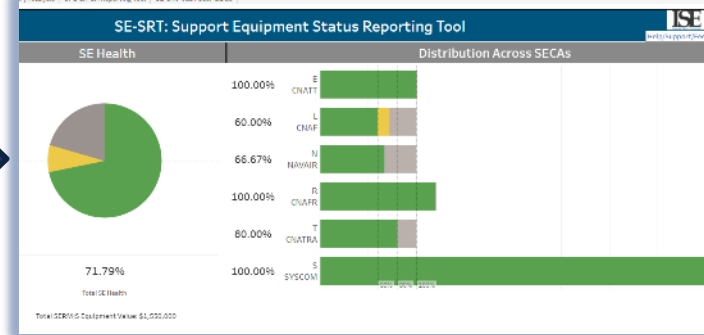
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Overall Classification: Controlled  
Unclassified Information (CUI)

CUI

# Strategic Planning Cycle

Requirements – Flight Plan

## Health Metrics



## Current Efforts & Future Opportunities

- NAVAIR S&T Projects
- Emerging Technologies
- Industry R&D Investments

Program	SE One List	SE Health	Buy Qty	Year of Required IOC	ACQ Cost (\$K)	Funded/Unfunded	Health Assessment			
PMA26003 CASS Family of Tests	016154707	BACKUP PWV TEST	Replacement	565	100.0%	3	2023	1,000,000.0	Funded	Green
PMA26004 Non-Destructive Ins.	016994852	TESTER, BONDED	Replacement	469	99.3%	141	2019	3,960.9	Funded	Green
PMA26004 Non-Destructive Ins.	016994852	TESTER, BONDED	Replacement	469	99.3%	136	2038	5,963.9	Unfunded*	Green
PMA26004 Composite Repair	013608210	TOOL SET, STRUCT.	Replacement	435	76.6%	131	2027	217,758.0	Funded	Green
PMA26004 Hydraulic	001073068	CART DISPENSING	Replacement	354	100.0%	163	2028	4,775.0	Funded	Green
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PMA26004 Armament & Weapon	015708396	TRAILER, SMALL M.	Replacement	107	22.4%	698	2022	25,865.8	Funded	Yellow
PMA26004 Aircraft Wiring	012805517	WIRE TEST SET, AU.	Replacement	153	93.5%	115	2021	9,448.0	Unfunded*	Green
PMA26004 Cryogenics	012173299	400 GALLON MOBIL.	Replacement	116	51.4%	0	2021	0.0	Unfunded*	Red
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PMA26004 Platforms	016817042	UTILITY CRANE, TO.	Replacement	110	79.3%	0	2028	0.0	Unfunded*	Yellow
PMA26004 Armament & Weapon	014662439	TESTER, IPT AFRAID	Replacement	101	68.8%	245	2020	56,160.1	Funded	Yellow

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Funded (\$K)	5,536	12,285	15,398	16,426	13,005	1,012,613	108,851	69,595	75,417	13,840	0	0	0	0	0
Unfunded (\$K)	0	0	0	0	0	0	0	0	2,000	4,500	5,250	4,500	0	0	0
Unfunded* (\$K)	0	0	0	0	0	0	0	0	302	6,721	9,144	20,075	25,462	11,560	8,000
Grand Total	5,536	12,285	15,398	16,426	13,005	1,012,613	108,851	69,595	77,219	25,061	14,395	24,575	25,462	11,560	8,000

## Capability Gaps

- Emerging Requirements
- Changing CONOPS
- Diminishing Sources
- Reliability & Maintainability
- Affordability