

**UNCLASSIFIED**

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319: Research, Development, Test & Evaluation, Navy I BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0604530N I (U)Advanced Arresting Gear (AAG)							
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	0.000	0.000	184.106	-	184.106	147.435	93.491	22.588	0.762	0.000	448.382
2367: Advanced Arresting Gear	0.000	0.000	0.000	184.106	-	184.106	147.435	93.491	22.588	0.762	0.000	448.382
Program MDAP/MAIS Code: Project MDAP/MAIS Code(s): 529												
Note FY18 and prior year funding for Advanced Arresting Gear (AAG) is funded under Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recover project unit 2232. All Prior Years RDTEN funding for the program is \$711.700M; FY17 is \$100.402M; and FY18 is \$170.526M.												
A. Mission Description and Budget Item Justification The Advanced Arresting Gear (AAG) program designs, develops, tests and fields an aircraft arrestment system to replace the legacy Mark 7 arresting gear. AAG systems will be installed on all new construction aircraft carriers. AAG will provide the U.S. Navy with improved operational capability, while reducing operating and support costs. The AAG system will recover all existing and projected carrier based tail hook-equipped air vehicles well into the 21st century.  This program is funded under SYSTEM DEVELOPMENT AND DEMONSTRATION because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.												
B. Program Change Summary (\$ in Millions)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total				
Previous President's Budget				0.000	0.000	0.000	-	0.000				
Current President's Budget				0.000	0.000	184.106	-	184.106				
Total Adjustments				0.000	0.000	184.106	-	184.106				
• Congressional General Reductions				-	-							
• Congressional Directed Reductions				-	-							
• Congressional Rescissions				-	-							
• Congressional Adds				-	-							
• Congressional Directed Transfers				-	-							
• Reprogrammings				-	-							
• SBIR/STTR Transfer				-	-							
• Program Adjustments				0.000	0.000	186.357	-	186.357				
• Rate/Misc Adjustments				0.000	0.000	-2.251	-	-2.251				
Change Summary Explanation Technical: AAG established in its own Program Element and Project Unit in FY19 and out.												

**UNCLASSIFIED**

<b>Exhibit R-2, RDT&amp;E Budget Item Justification:</b> PB 2019 Navy		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319: <i>Research, Development, Test &amp; Evaluation, Navy I BA 5: System Development &amp; Demonstration (SDD)</i>		<b>R-1 Program Element (Number/Name)</b> PE 0604530N I (U) <i>Advanced Arresting Gear (AAG)</i>
<p>Cost: FY19 in the previous President's budget submission was \$194.457M. Decrease in FY19 (-\$8.1M) resulting in \$186.272M is due to ARBs no longer required as a result of DoN decision to divest of legacy Hornets F/A-18A-D.</p> <p>R-2 Program Change Summary in PE 0604512N Shipboard Aviation Systems shows the AAG funding profile transferred out as a program adjustment (\$-194.457M). This R2 exhibit's Program Change Summary displays the net program adjustment in (+\$186.357M) after the \$8.1M reduction.</p> <p>Schedule: Schedule updated to support the additional funding added in FY18 and out for Life Cycle Support items such as Software Support Activity (SSA), Depot Planning and the development of a permanent training solution.</p> <p>Milestone C moved from 4Q FY 2020 to 4Q FY 2021.            Test &amp; Evaluation Jet Car Test Site (JCTS) Test End Date moved from 2Q FY2019 to 4Q FY2020            Test &amp; Evaluation for Runway Arrested landing Site (RALS) Test Start Date moved from 2Q FY2016 to 1Q FY 2017            Test &amp; Evaluation for Runway Arrested landing Site (RALS) Test End Date moved from 1Q FY2020 to 1Q FY2022.            Schoolhouse Training Curriculum Development moved from 1Q FY2019 to 4Q FY2019</p>		

# UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018		
Appropriation/Budget Activity 1319 / 5					R-1 Program Element (Number/Name) PE 0604530N / (U)Advanced Arresting Gear (AAG)				Project (Number/Name) 2367 / Advanced Arresting Gear			
COST (\$ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
2367: Advanced Arresting Gear	0.000	0.000	0.000	184.106	-	184.106	147.435	93.491	22.588	0.762	0.000	448.382
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		
Project MDAP/MAIS Code: 529												
Note Advanced Arresting Gear (AAG) was previously funded under Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recovery project unit 2232 in FY 2018 and prior.												
A. Mission Description and Budget Item Justification The Advanced Arresting Gear (AAG) program will design, develop, test and field an aircraft arrestment system to replace the legacy Mark 7 arresting gear. AAG systems will be installed on all new construction aircraft carriers. AAG will provide the U.S. Navy with improved operational capability, while reducing operating and support costs. The AAG system will recover all existing and projected carrier based tail hook-equipped air vehicles well into the 21st century.  The AAG Program's SDD phase test article consists of a single wire configured aircraft arresting system, which includes associated hardware and software needed to conduct system integrated testing by arresting both dead-loads and aircraft.  The increase from \$0M in FY18 to \$184.1M in FY19 is a direct result of Advanced Arresting Gear (AAG) program moving PE 0604512N PU 2232 to PE 0604530N PU 2367. The overall \$13.6M increase from FY 2018 \$170.5M (in the Shipboard Aviation Systems program element 0604512N) to FY 2019 \$184.1M is part of the effort to fund AAG to the Nunn-McCurdy cost estimate. This increase provides support for Primary HW Development efforts, AAG Test & Evaluation efforts, Depot Planning efforts, Software Support Activity and Training efforts that were not previously fully funded under the ACAT designation.												
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)								FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Advanced Arresting Gear (AAG) Primary Hardware Development  Articles:  FY 2018 Plans: N/A  FY 2019 Base Plans: Continue AAG System Development and Demonstration including hardware and software analysis and design efforts for system controls, electrical and mechanical components to meet the requirements of the AAG performance specification. Complete developmental component, environmental and shock qualification testing. Complete developmental efforts including deadload and aircraft recoveries required to issue the CVN 78 Post								0.000	0.000	92.382	0.000	92.382
								-	-	-	-	-

**UNCLASSIFIED**

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018				
Appropriation/Budget Activity 1319 / 5		R-1 Program Element (Number/Name) PE 0604530N / (U)Advanced Arresting Gear (AAG)		Project (Number/Name) 2367 / Advanced Arresting Gear				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Shakedown Availability (PSA) Aircraft Recovery Bulletins (ARB). Complete requirements verification efforts necessary to certify the AAG System. Initiate High Cycle verification testing. Continue the development of AAG logistics products including the Final Interactive Electronic Technical Manual In Process Review and issuance.  <b>FY 2019 OCO Plans:</b> N/A  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The increase in FY 2018 to FY 2019 is due to the Advanced Arresting Gear (AAG) program moving from Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recover project unit 2232 to program element 0604530N, project unit 2367.								
<b>Title:</b> Advanced Arresting Gear Test & Evaluation  <b>Articles:</b>				0.000 -	0.000 -	50.116 -	0.000 -	50.116 -
<b>FY 2018 Plans:</b> N/A  <b>FY 2019 Base Plans:</b> Perform Integrated Test and Evaluation (IT&E) for AAG barricade testing, T-45 Aircraft Compatibility Testing, full AAG Envelope Testing and Reliability Growth Testing. Develop IT&E test plans, procure hardware to support barricade testing. Initiate barricade testing at the Jet Car Track Site (JCTS) for the issuance of the barricade Aircraft Recovery Bulletin (ARB) in FY20. Initiate Dynamic Control System (DCS) software development tests in support of T-45 and Full Envelope testing. Initiate the installation of T-45 aircraft test instrumentation in preparation for manned aircraft arrestment testing at the Runway Arrested Landing Site (RALS).  <b>FY 2019 OCO Plans:</b> N/A  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The increase in FY 2018 to FY 2019 is due to the Advanced Arresting Gear (AAG) program moving from Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recover project unit 2232 to program element 0604530N, project unit 2367.								
<b>Title:</b> Advanced Arresting Gear Depot Planning  <b>Articles:</b>				0.000 -	0.000 -	14.229 -	0.000 -	14.229 -
<b>FY 2018 Plans:</b>								

**UNCLASSIFIED**

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy				Date: February 2018				
Appropriation/Budget Activity 1319 / 5		R-1 Program Element (Number/Name) PE 0604530N / (U)Advanced Arresting Gear (AAG)		Project (Number/Name) 2367 / Advanced Arresting Gear				
B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)				FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A								
<b>FY 2019 Base Plans:</b> Begin the development of the required processes and procedures to plan for Depot level activities (i.e. Depot Interactive Electronic Technical Manuals (IETM) and Depot Task Analysis). Initiate the planning and analysis necessary to standup AAG Depot Level maintenance, overhaul and repair facility/facilities for AAG components.								
<b>FY 2019 OCO Plans:</b> N/A								
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The increase in FY 2018 to FY 2019 is due to the Advanced Arresting Gear (AAG) program moving from Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recover project unit 2232 to program element 0604530N, project unit 2367.								
<b>Title:</b> Advanced Arresting Gear Software Support Activity (SSA)  <b>Articles:</b>				0.000 -	0.000 -	11.468 -	0.000 -	11.468 -
<b>FY 2018 Plans:</b> N/A								
<b>FY 2019 Base Plans:</b> Initiate the establishment of an Organic Software Support Activity (SSA) for modifications to the system's software following initial fielding. Initiate the design and development of laboratory hardware necessary to establish an organic software development and test capability. Begin the development of organic software development, test, release and quality assurance processes.								
<b>FY 2019 OCO Plans:</b> N/A								
<b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The increase in FY 2018 to FY 2019 is due to the Advanced Arresting Gear (AAG) program moving from Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recover project unit 2232 to program element 0604530N, project unit 2367.								
<b>Title:</b> Advanced Arresting Gear Training  <b>Articles:</b>				0.000 -	0.000 -	15.911 -	0.000 -	15.911 -
<b>FY 2018 Plans:</b>								

# UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy										Date: February 2018	
Appropriation/Budget Activity 1319 / 5				R-1 Program Element (Number/Name) PE 0604530N / (U)Advanced Arresting Gear (AAG)				Project (Number/Name) 2367 / Advanced Arresting Gear			
<b>B. Accomplishments/Planned Programs (\$ in Millions, Article Quantities in Each)</b>											
						FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	
N/A  <b>FY 2019 Base Plans:</b> Continue the Formal Training Course Development. Begin the development of the AAG Multipurpose Reconfigurable Training System (MRTS) necessary for the Center for Naval Aviation Technical Training (CNATT) to declare Ready For Training (RFT) in FY22.  <b>FY 2019 OCO Plans:</b> N/A  <b>FY 2018 to FY 2019 Increase/Decrease Statement:</b> The increase in FY 2018 to FY 2019 is due to the Advanced Arresting Gear (AAG) program moving from Shipboard Aviation Systems program element 0604512N, CV/CVN Launch and Recover project unit 2232 to program element 0604530N, project unit 2367.											
Accomplishments/Planned Programs Subtotals						0.000	0.000	184.106	0.000	184.106	
<b>C. Other Program Funding Summary (\$ in Millions)</b>											
Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPN/4217: Advanced Arresting Gear (AAG)	0.000	10.900	11.054	-	11.054	4.723	3.137	2.460	2.513	263.910	298.697
• OPN/4213: Aircraft Launch & Recovery Equipment	81.428	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• SCN/2001: Carrier Replacement Program	2,626.567	4,461.772	1,598.181	-	1,598.181	2,146.535	3,239.606	2,910.491	3,378.355	10,602.689	52,295.070
<b>Remarks</b> OPN 4213 includes a portion of line item funding for Aircraft Launch & Recovery Equipment in FY17 and prior.											
<b>D. Acquisition Strategy</b> The Navy competitively awarded two Cost Plus Fixed Fee Technical Development phase contracts to develop the Advanced Arresting Gear (AAG) system. Upon completion of the Preliminary Design and Integrated Baseline reviews, the Navy awarded a single Cost Plus Award Fee option to General Atomics for the System Development and Demonstration (SDD) phase to develop and demonstrate a production representative AAG at the NAVAIR Lakehurst Jet Car Track Site and Runway Arrested Landing Site. Continuing development on the SDD contract awarded in 2004.											

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2019 Navy		Date: February 2018
Appropriation/Budget Activity 1319 / 5	R-1 Program Element (Number/Name) PE 0604530N / (U)Advanced Arresting Gear (AAG)	Project (Number/Name) 2367 / Advanced Arresting Gear
<b>E. Performance Metrics</b> Will complete System Development and Demonstration integrated testing at Jet Car Track Site and Runway Arrested Landing Site. AAG will demonstrate its key performance parameters and readiness for operational test.		

## UNCLASSIFIED

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Navy												Date: February 2018			
Appropriation/Budget Activity 1319 / 5						R-1 Program Element (Number/Name) PE 0604530N / (U)Advanced Arresting Gear (AAG)				Project (Number/Name) 2367 / Advanced Arresting Gear					
Product Development (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary HW Development	C/CPAF	General Atomics : San Diego, CA	0.000	0.000		0.000		72.528	Nov 2018	-		72.528	108.119	180.647	180.647
Primary HW Development	C/CPAF	ESL : Cranston, RI	0.000	0.000		0.000		2.714	Dec 2018	-		2.714	0.000	2.714	2.714
Primary HW Development	WR	NAWCAD : Lakehurst, NJ	0.000	0.000		0.000		38.848	Nov 2018	-		38.848	28.844	67.692	-
Systems Engineering	WR	NAWCAD : Lakehurst, NJ	0.000	0.000		0.000		6.995	Nov 2018	-		6.995	4.884	11.879	-
Training Development	TBD	TBD : TBD	0.000	0.000		0.000		13.359	Nov 2018	-		13.359	11.395	24.754	-
Subtotal			0.000	0.000		0.000		134.444		-		134.444	153.242	287.686	N/A
Support (\$ in Millions)				FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics Support	WR	NAWCAD : Lakehurst, NJ	0.000	0.000		0.000		4.483	Nov 2018	-		4.483	2.234	6.717	-
Government Engineering Support	WR	Various : Various	0.000	0.000		0.000		0.425	Nov 2018	-		0.425	1.380	1.805	-
Training Support	WR	NAWCAD : Orlando, FL	0.000	0.000		0.000		2.552	Nov 2018	-		2.552	2.749	5.301	-
Software Development	TBD	General Atomics : San Diego, CA	0.000	0.000		0.000		9.174	Nov 2018	-		9.174	12.683	21.857	21.857
Government Engineering Support	WR	NAWCAD : Lakehurst, NJ	0.000	0.000		0.000		5.851	Nov 2018	-		5.851	19.243	25.094	-
Depot Planning	TBD	General Atomics : San Diego, CA	0.000	0.000		0.000		10.672	Nov 2018	-		10.672	17.685	28.357	28.357
Subtotal			0.000	0.000		0.000		33.157		-		33.157	55.974	89.131	N/A
Remarks															
The increase in support costs from FY2018 to FY2019 is to provide for the Training System Development, Depot Planning and Software Support Activity (SSA) Standup as well as government engineering support at Lakehurst, NJ that will provide the logistics support for the Depot Planning and SSA Standup.															



**UNCLASSIFIED**

<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2019 Navy</b>													<b>Date:</b> February 2018		
<b>Appropriation/Budget Activity</b> 1319 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0604530N / (U)Advanced Arresting Gear (AAG)						<b>Project (Number/Name)</b> 2367 / Advanced Arresting Gear			

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Developmental T&E	WR	NAWCAD : Lakehurst, NJ	0.000	0.000		0.000		15.717	Nov 2018	-		15.717	53.156	68.873	-
Operational T&E	WR	Various : Various	0.000	0.000		0.000		0.312	Nov 2018	-		0.312	0.723	1.035	-
<b>Subtotal</b>			0.000	0.000		0.000		16.029		-		16.029	53.879	69.908	N/A

<b>Management Services (\$ in Millions)</b>				<b>FY 2017</b>		<b>FY 2018</b>		<b>FY 2019 Base</b>		<b>FY 2019 OCO</b>		<b>FY 2019 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Program Mgmt Support	C/CPFF	Sierra Management & Technologies : California, MD	0.000	0.000		0.000		0.306	Nov 2018	-		0.306	0.767	1.073	1.073
Travel	Various	Various : Various	0.000	0.000		0.000		0.042	Oct 2018	-		0.042	0.096	0.138	-
Program Management Support	WR	Various : Various	0.000	0.000		0.000		0.128	Nov 2018	-		0.128	0.318	0.446	-
<b>Subtotal</b>			0.000	0.000		0.000		0.476		-		0.476	1.181	1.657	N/A

			<b>Prior Years</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019 Base</b>	<b>FY 2019 OCO</b>	<b>FY 2019 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			0.000	0.000	0.000	184.106	-	184.106	264.276	448.382	N/A

<b>Remarks</b>											

UNCLASSIFIED

Exhibit R-4, RDT&amp;E Schedule Profile: PB 2019 Navy

Date: February 2018

Appropriation/Budget Activity

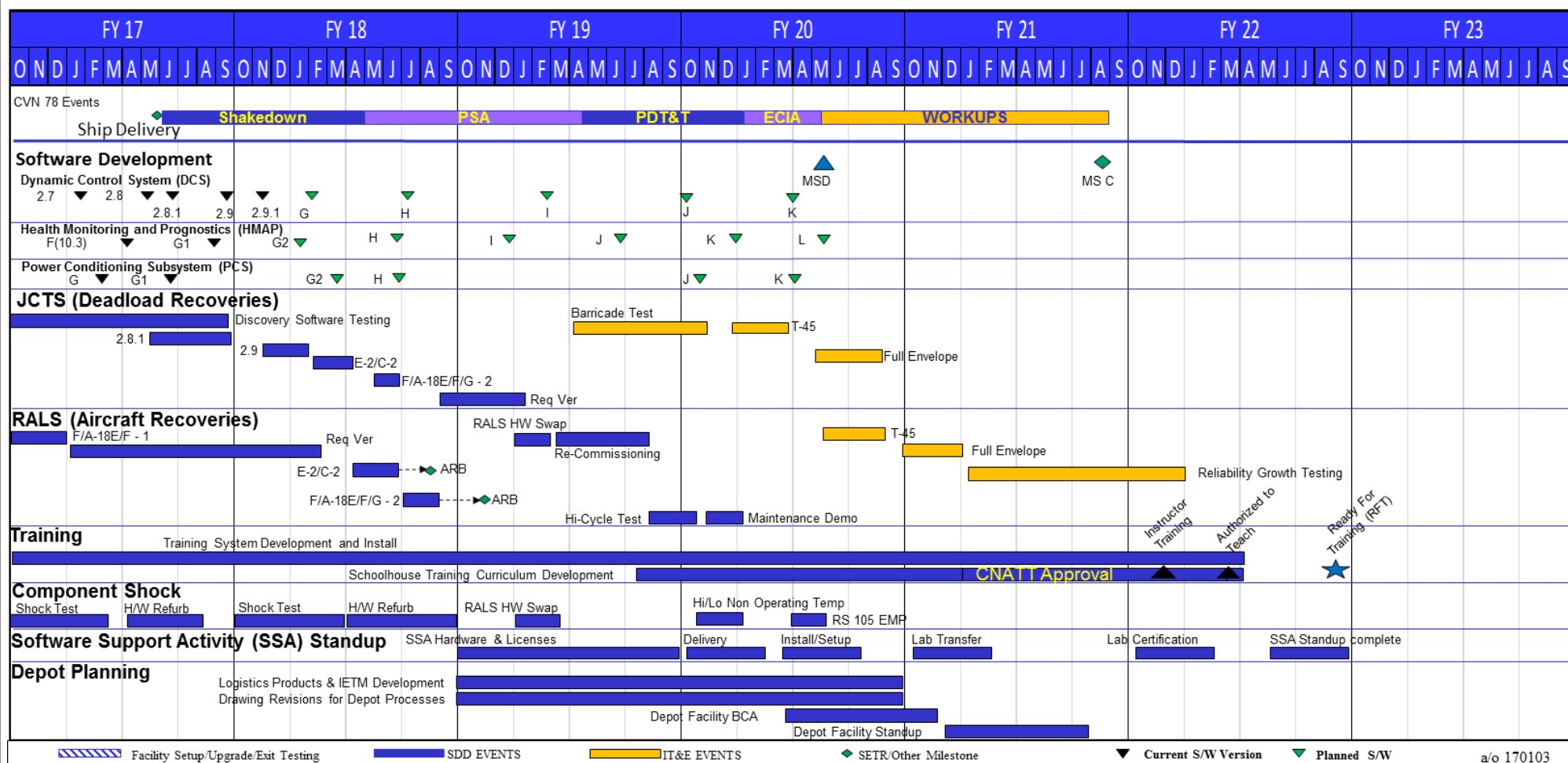
1319 / 5

R-1 Program Element (Number/Name)

PE 0604530N / (U)Advanced Arresting Gear (AAG)

Project (Number/Name)

2367 / Advanced Arresting Gear



a/o 170103

**UNCLASSIFIED**

<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2019 Navy		<b>Date:</b> February 2018
<b>Appropriation/Budget Activity</b> 1319 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0604530N / (U)Advanced Arresting Gear (AAG)	<b>Project (Number/Name)</b> 2367 / Advanced Arresting Gear

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>ADVANCED ARRESTING GEAR (AAG)</b>				
Acquiisition Milestones: Milestones: Milestone C	4	2021	4	2021
Test & Evaluation: Technical Evaluation: Jet Car Test Site (JCTS) Test	1	2017	4	2020
Test & Evaluation: Technical Evaluation: Runway Arrested Landing Site Test (RALS)	1	2017	1	2022