Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy												Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0207163N *I AMRAAM*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	193.264	29.486	28.235	39.029	-	39.029	37.319	28.190	25.622	26.133	49.446	456.724
0981: *AMRAAM*	193.264	29.486	28.235	39.029	-	39.029	37.319	28.190	25.622	26.133	49.446	456.724
Program MDAP/MAIS Code: **Project MDAP/MAIS Code(s):** 185												

A. Mission Description and Budget Item Justification

This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the Advanced Medium Range Air-to-Air Missile (AMRAAM) into Navy aircraft with analysis of Navy unique applications, aircraft missile integration tasks, product improvement efforts including missile software upgrade development and procurement of hardware to support Navy test and evaluation tasks. The development program enhances AMRAAM capability and operational flexibility against current and projected threats, incorporates high payoff technology development, performs risk reduction activities, and investigates new variants and/or alternate missions that may use AMRAAM attributes. Funding in FY 2020 through FY 2024 supports Navy unique Test & Evaluation for Navy fielding of improved capability via System Improvement Program (SIP).

This program is funded under OPERATIONAL SYSTEMS DEVELOPMENT because it includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate funding in the current or subsequent fiscal year.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	25.364	32.473	35.853	-	35.853
Current President's Budget	29.486	28.235	39.029	-	39.029
Total Adjustments	4.122	-4.238	3.176	-	3.176
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-4.238			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	4.914	0.000			
• SBIR/STTR Transfer	-0.792	0.000			
• Program Adjustments	0.000	0.000	3.236	-	3.236
• Rate/Misc Adjustments	0.000	0.000	-0.060	-	-0.060

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Navy	Date: March 2019
Appropriation/Budget Activity 1319: *Research, Development, Test & Evaluation, Navy I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0207163N *I AMRAAM*

Change Summary Explanation

The FY 2020 funding request was increased by $10.794 million to develop a software solution for AIM-120C3-C7 to improve missile performance against a rapidly advancing threat and to complete flight test requirements and Hardware-in-the Loop Facility efforts to support 5th generation aerial target emulation.

Technical: FY 2020 includes funding for improved missile performance at longer range, increased survivability, improved lethality via System Improvement Program (SIP) efforts through software development, simulation and test efforts, and 5th generation aerial target emulation efforts.

Schedule: N/A

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0207163N / *AMRAAM*	Project (Number/Name) 0981 / *AMRAAM*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
0981: *AMRAAM*	193.264	29.486	28.235	39.029	-	39.029	37.319	28.190	25.622	26.133	49.446	456.724
Quantity of RDT&E Articles		-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 185

A. Mission Description and Budget Item Justification

This joint Navy/Air Force program is structured in response to the Joint Service Operational Requirement and Mission Element Need Statement to develop an air superiority air-to-air missile with significant improvements in operational utility and combat effectiveness. This program supports the integration of the Advanced Medium Range Air-to-Air Missile (AMRAAM) into Navy aircraft with analysis of Navy unique applications, aircraft missile integration tasks, product improvement efforts including missile software upgrade development and procurement of hardware to support Navy test and evaluation tasks. Funding in FY 2020 through FY 2024 supports Navy unique Test & Evaluation for Navy fielding of improved capability via SIP.

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Test and Evaluation	12.338	13.972	15.939	0.000	15.939
Articles:	-	-	-	-	-
Description: Test and Evaluation (T&E) and associated governmental support required to ensure AIM-120 missile integration with threshold US Navy aircraft platforms (F/A-18 C/D/E/F/G and F-35). Increased funding in FY20 is required due to additional flight test requirements and Hardware-in-the Loop Facility efforts to support 5th generation aerial target emulation.					
FY 2019 Plans: Complete EPIP Advanced Tape 2 OT test report and generate the fielding decision for EPIP Advanced Tape 2 fielding decision for F/A-18 aircraft in 2QFY19. Complete AIM-120D SIP-2 OT test events, supply inputs to the OT test report and generate the fielding decision for SIP-2 on F/A-18 aircraft in 4QFY19. Provide necessary documentation and provide test results for SIP-3 DT events. Evaluate Hardware-in-the-Loop Facility to support 5th generation aerial target emulation initiatives. Continue to provide test support to complete AIM-120D SIP DT and OT events.					
FY 2020 Base Plans: Continue AIM-120D SIP support, Hardware-in-the-Loop activities to include 5th generation aerial target emulation efforts, software update candidates, weapon systems of systems evaluation against current and emerging threats. Continue to provide test support to complete AIM-120D SIP-3 DT and OT events.					
FY 2020 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0207163N / *AMRAAM*	**Project (Number/Name)** 0981 / *AMRAAM*

B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increase in FY20 is to support 5th generation aerial target emulation efforts.					
Title: System Improvement Program (SIP) Efforts	17.148	14.263	23.090	0.000	23.090
Articles:	-	-	-	-	-
Description: Continuation of System Improvement Program (SIP)/Technical Maturity and Risk Reduction (TMRR) efforts for the AMRAAM weapon system. These include systems engineering, program management, missile software and/or hardware upgrades to increase capability, survivability, lethality, as well as aircraft Operational Flight Profile updates on a recurring basis. EPIP Advanced Tape 1 and Tape 2 capability improvements on the C7 missile variant will be incorporated into AIM-120D SIP-2 and 3 software updates. AIM-120D SIP-3 software will be re-hosted in AIM-120D3 hardware. ***FY 2019 Plans:*** Complete SIP-2 OT events required for fielding decision for the AIM-120D software improvement. Complete AIM-120C7 EPIP Advanced Tape 2 OT efforts and field Tape 2 in the AIM-120C7 variant. Continue AIM-120D SIP-3 development efforts. Award AIM-120D SIP-4 Risk Reduction contract and begin technology maturation and risk reduction. ***FY 2020 Base Plans:*** Complete SIP-3 development efforts to include SIP-3 Integrated Test (IT). Complete SIP-3 Functional Configuration Audit (FCA) and support dedicated OT. Continue SIP-4 TMRR and AIM-120D SIP candidate selection process to analyze solutions for warfighter's deficiencies and enhancements. Begin SIP3F development to re-host SIP-3 software on AIM-120D3 hardware. Award advanced C3-C7 software contract to address advancing threat. ***FY 2020 OCO Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Increased funding in FY20 is required due to start of SIP3F development to re-host SIP-3 software on AIM-120D3 hardware and to address AIM-120C3-C7 missile performance against rapidly advancing threat.					
Accomplishments/Planned Programs Subtotals	29.486	28.235	39.029	0.000	39.029

Exhibit R-2A, RDT&E Project Justification: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0207163N / *AMRAAM*	**Project (Number/Name)** 0981 / *AMRAAM*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• WPN/ 2206: *AMRAAM*	185.285	188.441	224.502	-	224.502	354.160	359.358	367.390	374.737	0.000	4,595.098
• MPAF/3479: *AMRAAM*	304.327	340.486	392.150	-	392.150	464.324	421.970	425.182	455.956	1,087.172	13,271.622
• RDTE,AF/673777: *AMRAAM*	61.322	61.393	65.965	-	65.965	67.114	68.508	69.756	71.012	344.090	1,365.043

Remarks

D. Acquisition Strategy

AMRAAM production procurements will continue across the FYDP with periodic pre-planned technical design refreshes and value engineering change proposals.

AMRAAM's Acquisition Program Baseline (APB) was updated on 28 Oct 2015.

E. Performance Metrics

Meeting cost, schedule, performance, funding and life cycle sustainment requirements in accordance with the Acquisition Program Baseline.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy			Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0207163N / *AMRAAM*	Project (Number/Name) 0981 / *AMRAAM*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hdw Development (EGLIN)	SS/CPAF	RAYTHEON COMPANY : Tucson AZ	84.863	9.175	Jan 2018	11.444	Jan 2019	18.935	Jan 2020	-		18.935	133.619	258.036	258.036
Award Fees (EGLIN)	SS/CPAF	RAYTHEON COMPANY : Tucson AZ	13.480	1.619	Jan 2018	2.019	Jan 2019	3.342	Jan 2020	-		3.342	23.580	44.040	44.040
Primary Hdw Development (NAWCAD)	WR	NAWCAD : Patuxent River MD	4.014	0.296	Nov 2017	0.302	Nov 2018	0.307	Nov 2019	-		0.307	2.684	7.603	-
Prior Years Dev Cost no longer funded in the FYDP	Various	Various : Various	26.921	0.000		0.000		0.000		-		0.000	0.000	26.921	-
Primary Hdw Development (NAWCWD)	WR	NAWCWD : China Lake, CA	0.000	5.556	May 2018	0.000		0.000		-		0.000	0.000	5.556	-
		Subtotal	129.278	16.646		13.765		22.584		-		22.584	159.883	342.156	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support (NSMA)	WR	NAVY SYST MGT ACT : Arlington VA	4.500	0.000	Jan 2018	0.000	Jan 2019	0.000		-		0.000	0.000	4.500	-
Prior Years Support costs no longer funded in the FYDP	Various	Various : Various	19.295	0.000		0.000		0.000		-		0.000	0.000	19.295	-
		Subtotal	23.795	0.000		0.000		0.000		-		0.000	0.000	23.795	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Dev Test & Eval (NAWCWD)	WR	NAWCWD : China Lake CA	32.194	11.337	Nov 2017	12.977	Nov 2018	14.927	Nov 2019	-		14.927	52.933	124.368	-
Oper Test & Eval	WR	COMOPTEVFOR : Norfolk, VA	0.595	1.011	Mar 2018	0.995	Mar 2019	1.013	Mar 2020	-		1.013	8.829	12.443	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	R-1 Program Element (Number/Name) PE 0207163N / *AMRAAM*	Project (Number/Name) 0981 / *AMRAAM*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	32.789	12.348		13.972		15.940		-		15.940	61.762	136.811	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	C/CPFF	PMA-259 : Patuxent River, MD	0.000	0.424	Mar 2018	0.432	Mar 2019	0.440	Mar 2020	-		0.440	1.674	2.970	2.970
Travel	MIPR	PMA-259 : Eglin AFB FL	3.400	0.068	Oct 2017	0.066	Oct 2018	0.065	Oct 2019	-		0.065	0.521	4.120	-
Prior Years Mgmt Costs no longer funded in the FYDP	Various	Various : Various	4.002	0.000		0.000		0.000		-		0.000	0.000	4.002	-
		Subtotal	7.402	0.492		0.498		0.505		-		0.505	2.195	11.092	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	193.264	29.486		28.235		39.029		-		39.029	223.840	513.854	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0207163N / *AMRAAM*	**Project (Number/Name)** 0981 / *AMRAAM*

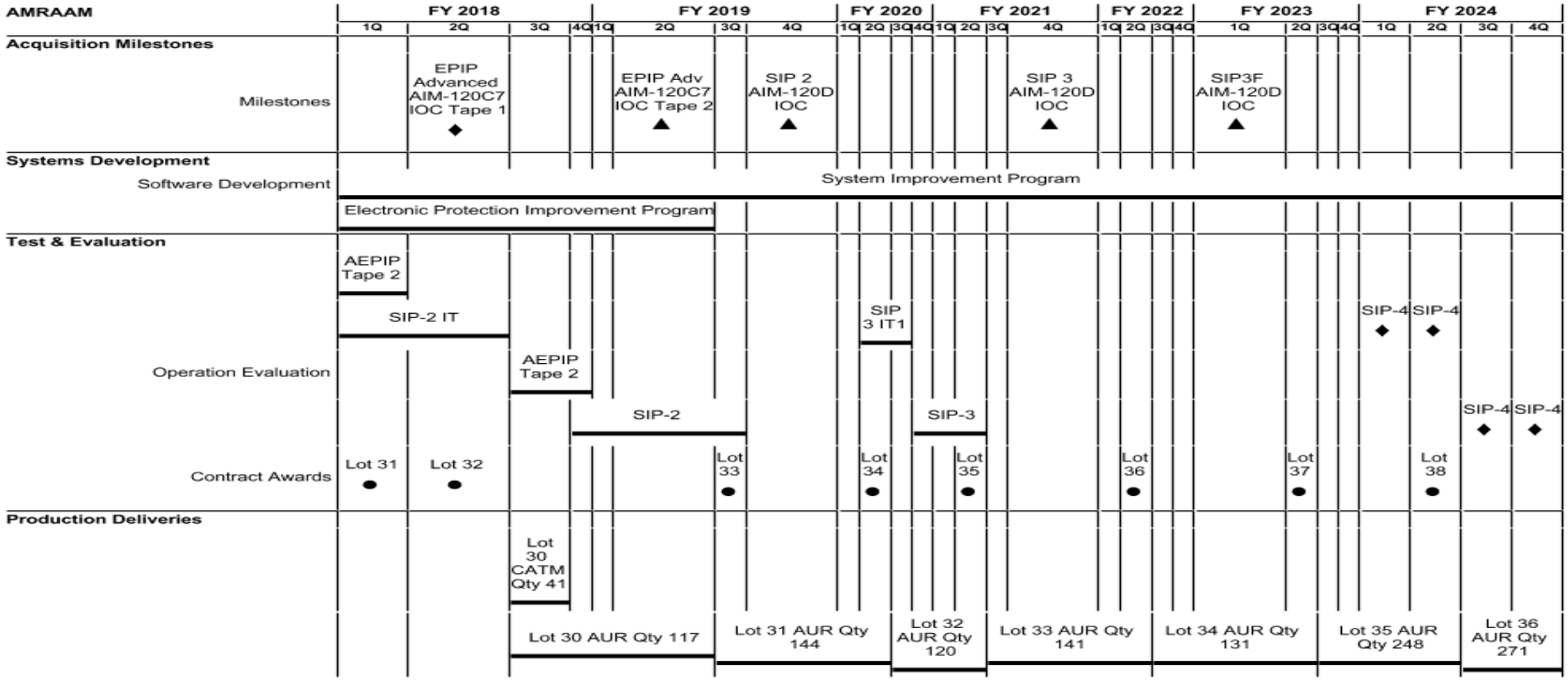

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Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0207163N / *AMRAAM*	**Project (Number/Name)** 0981 / *AMRAAM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AMRAAM				
Acquisition Milestones: Milestones: EPIP Advanced AIM-120C7 IOC Tape 1	2	2018	2	2018
Acquisition Milestones: Milestones: SIP 2 AIM-120D IOC	4	2019	4	2019
Acquisition Milestones: Milestones: SIP 3 AIM-120D IOC	4	2021	4	2021
Acquisition Milestones: Milestones: SIP3F AIM-120D IOC	1	2023	1	2023
Acquisition Milestones: Milestones: EPIP Advanced AIM-120C7 IOC Tape 2	2	2019	2	2019
Systems Development: Software Development: System Improvement Program	1	2018	4	2024
Systems Development: Software Development: Electronic Protection Improvement Program	1	2018	2	2019
Test & Evaluation: AEPIP Tape 2 IT-4/5	1	2018	1	2018
Test & Evaluation: SIP-2 IT-1/2/3	1	2018	2	2018
Test & Evaluation: SIP 3 IT1-3	2	2020	3	2020
Test & Evaluation: SIP-4 IT-1	1	2024	1	2024
Test & Evaluation: SIP-4 IT-2/3	2	2024	2	2024
Test & Evaluation: Operation Evaluation: AEPIP Tape 2 OT-4/5/6	3	2018	4	2018
Test & Evaluation: Operation Evaluation: SIP-2 OT-1/2/3/4	4	2018	3	2019
Test & Evaluation: Operation Evaluation: SIP3 OT1-4	4	2020	2	2021
Test & Evaluation: Operation Evaluation: SIP-4 OT-1	3	2024	3	2024
Test & Evaluation: Operation Evaluation: Sip-4 OT-2/3	4	2024	4	2024
Test & Evaluation: Contract Awards: Production Lot 31 Contract Award	1	2018	1	2018
Test & Evaluation: Contract Awards: Production Lot 32 Contract Award	2	2018	2	2018
Test & Evaluation: Contract Awards: Production Lot 33 Contract Award	3	2019	3	2019
Test & Evaluation: Contract Awards: Production Lot 34 Contract Award	2	2020	2	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Navy		Date: March 2019
Appropriation/Budget Activity 1319 / 7	**R-1 Program Element (Number/Name)** PE 0207163N / *AMRAAM*	**Project (Number/Name)** 0981 / *AMRAAM*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Test & Evaluation: Contract Awards: Production Lot 35 Contract Award	2	2021	2	2021
Test & Evaluation: Contract Awards: Production Lot 36 Contract Award	2	2022	2	2022
Test & Evaluation: Contract Awards: Production Lot 37 Contract Award	2	2023	2	2023
Test & Evaluation: Contract Awards: Production Lot 38 Contract Award	2	2024	2	2024
Production Deliveries: Production Lot 30 CATM Qty 41	3	2018	3	2018
Production Deliveries: Production Lot 30 AUR Qty 117	3	2018	2	2019
Production Deliveries: Production Lot 31 AUR Qty 144	3	2019	2	2020
Production Deliveries: Production Lot 32 AUR Qty 120	3	2020	2	2021
Production Deliveries: Production Lot 33 AUR Qty 141	3	2021	2	2022
Production Deliveries: Production Lot 34 AUR Qty 131	3	2022	2	2023
Production Deliveries: Production Lot 35 AUR Qty 248	3	2023	2	2024
Production Deliveries: Production Lot 36 AUR Qty 271	3	2024	4	2024