Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army											Date: February 2018	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0708045A / *INDUSTRIAL PREPARDEDNESS*							
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	-	59.891	60.877	53.958	-	53.958	59.848	61.071	62.543	63.749	0.000	421.937
E25: *Mfg Science & Tech*	-	59.891	60.877	53.958	-	53.958	59.848	61.071	62.543	63.749	0.000	421.937

A. Mission Description and Budget Item Justification

This Program Element (PE) develops, demonstrates, and transitions manufacturing processes that enable improvements in producibility and affordability of emerging and enabling components and subsystems of Army ground and air platforms, Soldier systems, weapons systems, air & missile defense systems, and sensors and electronics. Initiatives within the PE result in cost savings and reduced risk of transitioning military-unique manufacturing processes into production. Project E25 fosters the transfer of new/improved manufacturing technologies to the industrial base, including manufacturing efforts that have potential for high payoff across the spectrum of Army systems.

Work in this PE is related to, and fully coordinated with, PE 0603710A (Night Vision Advanced Technology), PE 0602303A (Missile Technology), PE 0602105A (Materials Technology), PE 0602618A (Ballistics Technology), PE 0602601A (Combat Vehicle and Automotive Technology), and PE 0603005A (Combat Vehicle and Automotive Advanced Technology), PE 0603002 (Medical Advanced Technology), and PE 0602705A (Electronics and Electronic Devices).

The cited work is consistent with the Assistant Secretary of Defense, Research and Engineering Science and Technology focus areas and the Army Modernization Strategy.

Work in this PE is performed by: the U.S. Army Research Development and Engineering Command (RDECOM), Aberdeen Proving Ground, MD; The U.S. Army Medical Research and Materiel Command (MRMC), Ft. Detrick, MD; and the Army Space and Missile Defense Command/Army Forces Strategic Command (SMDC/ARSTRAT), Huntsville, AL.

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	62.287	60.877	59.083	-	59.083
Current President's Budget	59.891	60.877	53.958	-	53.958
Total Adjustments	-2.396	0.000	-5.125	-	-5.125
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-2.366	-			
• Adjustments to Budget Years	-	-	-5.125	-	-5.125

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Army				Date: February 2018	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 7: *Operational Systems Development*		R-1 Program Element (Number/Name) PE 0708045A *I INDUSTRIAL PREPARDEDNESS*			
• FFRDC	-0.030	-	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army			Date: February 2018
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0708045A / *INDUSTRIAL PREPARDEDNESS*	Project (Number/Name) E25 / *Mfg Science & Tech*	

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
E25: *Mfg Science & Tech*	-	59.891	60.877	53.958	-	53.958	59.848	61.071	62.543	63.749	0.000	421.937
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Project develops and demonstrates manufacturing processes that enable improvements in producibility and affordability of emerging and enabling components and subsystems of Army ground and air platforms, Soldier systems, weapons systems, air & missile defense systems, and sensors and electronics. Focus is on components and subsystems such as advanced armor, lightweight structural components, sensors, propellants, and gun tubes. In addition, work is conducted to advance the state of the art in processing and fabrication techniques for coatings, multifunctional materials, and structural elements for Army specific applications.

The cited work is consistent with the Assistant Secretary of Defense for Research and Engineering Science & Technology focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Long Range Precision Fires	-	-	12.869
Description: The effort funds manufacturing improvements to support areas such as Advanced Weapon Systems, Fire Control, and Advanced Energetics and Warheads. Work focuses on addressing challenges in areas such as enhanced missile seekers; fuses and initiators for munitions; and boring, honing, and rifling cannon and mortar barrels.			
FY 2019 Plans: Will complete development of manufacturing processes for battery free initiators for scatterable munitions; develop methods to manufacture large caliber canon-boring tools at reduced cost; develop safer and more cost effective methods for mixing and packing of propellants; develop enhanced processes to fabricate large-caliber cannon and mortar tubes with longer range and higher durability than existing systems; and complete development of manufacturing technologies for complex missile seekers.			
FY 2018 to FY 2019 Increase/Decrease Statement: Planned progression of effort. Continues work from Lethality.			
Title: Next Generation Combat Vehicle (Formerly Ground Maneuver)	14.088	18.244	13.875
Description: This effort funds manufacturing technology advances needed for more affordable components and subsystems for tactical and combat vehicles and weapons systems. Work focuses on addressing challenges in areas such as advanced armor, lighter weight components, insensitive propellants, precision munitions, and vehicle power devices.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Fabricate hatch and ramps for demonstration on selected vehicles, document and transition magnesium alloy ballistic specifications; demonstrate a cathode coating process and enhanced production of high energy density safe 5 volt lithium-ion batteries for use in Army ground vehicle systems; prove out and deliver a manufacturing line and associated processes for adaptive protection modules; transition improved rocket nozzle insulation processes to PM Precision Fires; construct an agile manufacturing cell and sensor suite to demonstrate efficient welding of thicker plate materials used for armored multi-purpose and other vehicles; continue development of a lithium-ion battery pilot line leveraging multiple battery form factors leading to reduced cost and increased throughput; research novel joining technology processes that will replace existing steel components leading to lighter heavy combat vehicles. ***FY 2019 Plans:*** Will develop manufacturing technology to reduce the cost and improve the performance of weight sensitive armor protection systems against future threats; demonstrate manufacturing technologies to reduce cost and improve performance when joining dissimilar materials for ground platform structural components; develop manufacturing techniques for ground vehicle powertrain components with improved efficiency and power density. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Planned progression of the effort.			
Title: Future Vertical Lift (Formerly Air Systems) ***Description:*** This effort funds manufacturing technology advances needed for more affordable manned and unmanned aircraft components and subsystems. Work focuses on addressing challenges in areas such as engine performance and life, ballistically tolerant fuel bladders and composite transmission sumps, reliable component integration/attachment, structural durability at low weight, sensors for aircraft protection and pilotage, and reduced corrosion. ***FY 2018 Plans:*** Transition to Utility Helicopters Project Office for qualification testing direct digitally manufactured helicopter engine components of additively manufactured articles resulting in increased performance and reduced weight of the T700 platform. ***FY 2019 Plans:*** Will investigate novel manufacturing methods for fabrication of composite material air platform components with reduced weight and improved fatigue resistance. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Planned progression of the effort.	3.373	1.557	0.592
Title: Networks and Command, Control, Communications and Intelligence (Formerly Command, Control, Communications and Intelligence Systems)	17.271	11.678	8.314

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: This effort funds manufacturing technology advances needed for more affordable components and subsystems for intelligence, surveillance, reconnaissance and targeting systems, mission command systems, electronic warfare and improved explosive device detect/defeat systems. Work focuses on addressing challenges in areas such as large format multi-color focal plane arrays, flexible displays, night vision sensors, target detectors, advanced antennas and sensors. ***FY 2018 Plans:*** Transition improved processes for 12um focal plane arrays used in high definition cameras to Project Manager (PM) ? Soldier Sensors and Lasers; deliver to PM Aircraft Survivability Equipment millimeter wave packaging improvements to include module development and antenna/module interface advancements of devices used in radio frequency threat warning applications in air combat platforms; continue optimization of a manufacturing process to produce ultra-thin, lightweight, wide-band conformal antennas; continue refining and validating a 3D, read-only integrated circuit manufacturing process resulting in sensors with improved sensitivity and dynamic range; improve assembly processes utilizing epoxies that resist high shocks & temperature cycling for weapon boresight systems. ***FY 2019 Plans:*** Will complete optimization of manufacturing process to produce ultra-thin, wide-band, conformal antennas for Army platforms; investigate process improvements for digital imagers and sensors for aviation protection and pilotage. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Planned progression of the effort. Work continues in Future Vertical Lift and Soldier Lethality.			
Title: Air & Missile Defense ***Description:*** This effort funds manufacturing improvements to support areas such as High Energy Laser system components (e.g. diodes, optics), interceptor components, and armament systems for counter-unmanned aerial systems and counter-rocket, artillery, and mortar systems. ***FY 2019 Plans:*** Will develop processes to improve manufacturing yield for high energy laser diodes. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Planned progression of effort. Continues work from Lethality.	-	-	0.592
Title: Soldier Lethality (Formerly Soldier Systems) ***Description:*** This effort funds manufacturing technology advances needed for more affordable components and subsystems in areas such as combat feeding, aerial delivery of supplies, expeditionary basing, Soldier-borne sensors, clothing, and protective equipment. Work focuses on addressing challenges in areas such as multifunctional fabrics for shelters, uniforms and portage	3.420	4.554	12.167

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
equipment; affordable, non-contaminating packaging for rations; lightweight materials for body armor; and medical technologies such as biotechnology and vaccine production. ***FY 2018 Plans:*** Transition to Soldier protection systems programs of record a full scale manufacturing pilot line developed for polyethylene films; build a continuous reactor to demonstrate high yield manufacturing processes for gallium arsenide based solar arrays for portable Soldier power sources; refine manufacturing processes in the production of low cost augmented reality eyepieces that provide the Soldier with high resolution imagery across a wide field of view for increased situational awareness. ***FY 2019 Plans:*** Will develop manufacturing techniques for flexible light-weight solar cells, low cost freeform prism eyepieces, and components for Infantry sighting systems; develop manufacturing process improvement techniques for optical coatings and optical components to reduce cost and improve performance; complete characterization of a scaled up process for Adenovirus vaccine production. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Planned progression of the effort. Continues work from Medical and Networks and Command, Control, Communications and Intelligence.			
Title: Cross-cutting ***Description:*** This effort funds manufacturing technology advances with impact across processes or platforms of Army interest. Work focuses on addressing challenges in areas such as advanced additive manufacturing technologies for fabrication of weapons systems, platforms, and munitions; and novel manufacturing techniques for expedient and cost effective repair of worn or damaged platform components. ***FY 2018 Plans:*** Complete delivery to PM MAS processes and tooling requirements of 2D and 3D additively manufactured energetics and electronics for use in 40mm grenades; demonstrate a laser enhanced net shaping repair process at Anniston Army Depot for the qualification and reclamation of Army components; perform modeling and simulation for cold spray repair processes to reduce the sustainment cost of Army weapon systems. ***FY 2019 Plans:*** Will demonstrate advanced additive manufacturing capabilities for the build, remanufacture, and life extension of critical weapon systems components to improve performance, allow fabrication of structures not possible thorough subtractive methods, and/or improve component affordability; demonstrate an integrated augmented reality solution for advanced machining. ***FY 2018 to FY 2019 Increase/Decrease Statement:***	11.420	12.643	5.549

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Planned progression of effort.			
Title: Lethality ***Description:*** The effort funds manufacturing improvements to support areas such as Advanced Weapon Systems, Fire Control, Logistics, Emerging Technologies, and Advanced Energetics and Warheads. Work focuses on addressing challenges in areas such as enhanced missile seekers; fuses and initiators for munitions; and boring, honing, and rifling cannon and mortar barrels. ***FY 2018 Plans:*** Improve manufacturing methods, conduct materials analysis and demonstrate more efficient production processes that enable multi-mode missile seekers; build and test prototype programmable initiators of an automated, scaled-up manufacturing process addressing requirements for Family of Scatterable Munitions (FASCAM); develop smart tooling and process models of a software-based module capable of aiding production engineers across the organic industrial base and S&T community to verify and implement best value part manufacturing programs; fabricate disk components and test components to demonstrate spark plasma sintering process to reduce costs and lead times for large caliber cannon broach cutting tools; demonstrate processes on internal components that validate suitable energetic inks in the production of next generation hand grenades and small munitions; mature the manufacturing processes for the fabrication of small format liquid reserve batteries which support small to medium caliber munitions and hand emplaced munitions; mature waterjet milling to produce the rifling in large caliber cannon tubes in order to replace the expensive broaching process; investigate advanced manufacturing techniques for small caliber lightweight cartridge cases. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Planned progression of the effort. Work from this effort is continues in Long Range Precision Fires and in Air & Missile Defense.	9.319	11.100	-
Title: Medical ***Description:*** This effort funds manufacturing technology advances needed for more affordable process methods in areas such as manufacturing of lighter weight multi-functional materials, biotechnology, vaccines, medical equipment power sources, and component ruggedization that directly address Soldier rehabilitation. ***FY 2018 Plans:*** Produce test batches in the development of a modernized, scaled-up production process addressing spray drying and encapsulation methods of the Adenovirus vaccine. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Planned progression of effort. Work continues in Soldier Lethality.	1.000	1.101	-
Accomplishments/Planned Programs Subtotals	59.891	60.877	53.958

Exhibit R-2A, RDT&E Project Justification: PB 2019 Army		Date: February 2018
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C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Not applicable for this item.

D. Acquisition Strategy

Not applicable for this item.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Army			Date: February 2018
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	C/Various	TBD : TBD	-	-		0.018		-		-		-	0.000	0.018	-
		Subtotal	-	-		0.018		-		-		-	0.000	0.018	N/A

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TBD	Various	TBD : TBD	231.921	59.891		60.859		53.958		-		53.958	0.000	406.629	-
		Subtotal	231.921	59.891		60.859		53.958		-		53.958	0.000	406.629	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	231.921	59.891		60.877		53.958		-		53.958	0.000	406.647	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0708045A / *INDUSTRIAL PREPARDEDNESS*	**Project (Number/Name)** E25 / *Mfg Science & Tech*

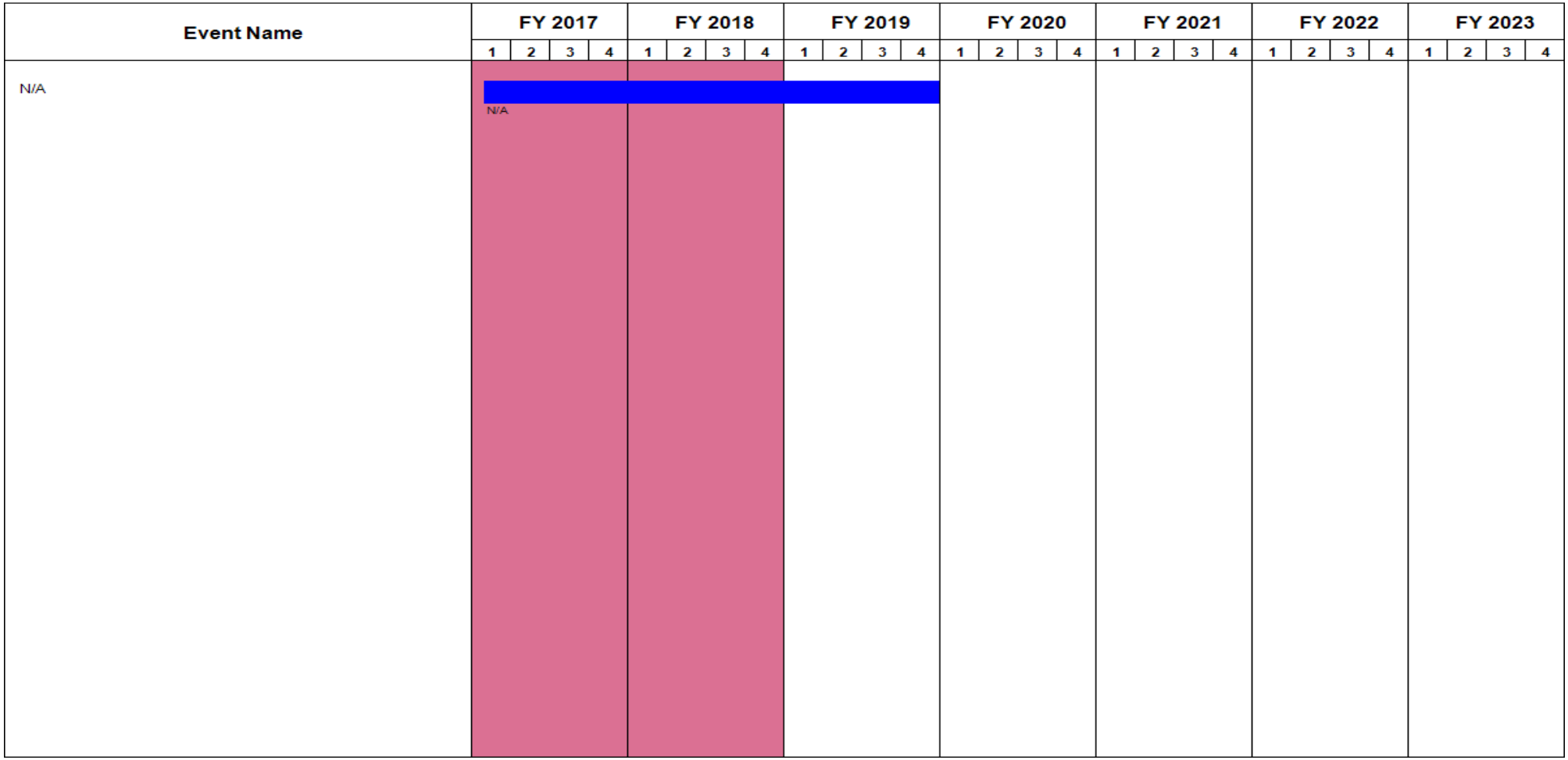

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Army		Date: February 2018
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0708045A / *INDUSTRIAL PREPARDEDNESS*	**Project (Number/Name)** E25 / *Mfg Science & Tech*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
N/A	1	2016	4	2019

Note

N/A