Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army											Date: March 2019	
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0607139A *I Improved Turbine Engine Program*							
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	-	167.532	188.903	206.434	-	206.434	279.600	217.900	166.400	165.662	Continuing	Continuing
ES6: *Improved Turbine Engine Program*	-	167.532	188.903	206.434	-	206.434	279.600	217.900	166.400	165.662	Continuing	Continuing

Note

For Fiscal Year (FY) 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A - Aircraft Modifications/Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to PE 0607139A, Project ES6.

A. Mission Description and Budget Item Justification

ITEP develops, tests, qualifies, and integrates the next generation turboshaft engine on the Black Hawk and Apache aircraft. The Improved Turbine Engine (ITE) replaces the existing T700 engine design originated in the 1970's and meets the operational requirement of 6,000 feet pressure altitude and 95 degrees (6K/95). The ITE will fit inside the existing engine bays of the Black Hawk and Apache Helicopters and provides a significant power enhancement of up to fifty percent (total of 3,000 class shaft horsepower) with increased fuel efficiency. Additional benefits include improved design life, enhanced reliability, lower maintenance cost and restored capability lost due to aircraft weight growth, without increasing the logistics footprint. The program consists of systems engineering and program management, detailed design engineering, design assurance, hardware manufacturing and testing, component and module level development and testing, system level testing and qualification, as well as integration into the airframe.

FY 2019 funds the Engineering and Manufacturing Development (EMD) contract that will be awarded to one vendor, platform/engine integration design engineering, and ballistic assessments ending in FY 2020. FY 2020 funding continues both the EMD effort and platform/engine integration A-kit development, resulting in a Critical Design Review (CDR). Engine component testing will begin, and engine fit check will be performed for both platforms. FY 2021 continues the EMD effort, continues A-Kit component testing, begins Preliminary Flight Rating (PFR) testing leading to First Engine To Test (FETT). FY 2021 also begins physical airframe integration. FY 2022 funding will continue PFR testing, leading to a Flight Test Air Worthiness Release (AWR) in early FY 2023. FY 2023 funding provides for aircraft flight/qualification testing for both Apache and Black Hawk and the initiation of engine full qualification testing. FY 2024 funding provides for completion of engine qualification, completion of aircraft flight/qualification testing for both Apache and Black Hawk, and Low Rate Initial Production (LRIP).

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Army					Date: March 2019
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 7: *Operational Systems Development*			R-1 Program Element (Number/Name) PE 0607139A *I Improved Turbine Engine Program*		
B. Program Change Summary ($ in Millions)	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**
Previous President's Budget	204.304	192.637	246.810	-	246.810
Current President's Budget	167.532	188.903	206.434	-	206.434
Total Adjustments	-36.772	-3.734	-40.376	-	-40.376
• Congressional General Reductions	-0.142	-0.234			
• Congressional Directed Reductions	-29.800	-3.500			
• Congressional Rescissions	-	-			
• Congressional Adds	-	-			
• Congressional Directed Transfers	-	-			
• Reprogrammings	-	-			
• SBIR/STTR Transfer	-6.830	-			
• Adjustments to Budget Years	-	-	-40.376	-	-40.376

Change Summary Explanation

For FY 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A - Aircraft Modifications/ Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to PE 0607139A, Project ES6.

FY 2018 funding was reduced by $29.800M due to funding ahead of need (Apache Integration & Qualification) and SBIR/STTR Transfer in the amount of $6.972M.

FY 2019 funding was reduced by $234K for a General Reduction and $3.500M for Testing Ahead of Need.

FY 2020 budget adjustment of $40.376 million from the President's Budget 2019 submission was based on the Department's mission priorities during the budget build.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / *Improved Turbine Engine Program*	Project (Number/Name) ES6 / *Improved Turbine Engine Program*	

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
ES6: *Improved Turbine Engine Program*	-	167.532	188.903	206.434	-	206.434	279.600	217.900	166.400	165.662	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

For Fiscal Year (FY) 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A - Aircraft Modifications/Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to PE 0607139A, Project ES6.

A. Mission Description and Budget Item Justification

ITEP develops, tests, qualifies, and integrates the next generation turboshaft engine on the Black Hawk and Apache aircraft. The Improved Turbine Engine (ITE) replaces the existing T700 engine design originated in the 1970's and meets the operational requirement of 6000 feet pressure altitude and 95 degrees (6K/95). The ITE will fit inside the existing engine bays of the Black Hawk and Apache Helicopters and provides a significant power enhancement of up to fifty percent (total of 3,000 class shaft horsepower) with increased fuel efficiency. Additional benefits include improved design life, enhanced reliability, lower maintenance cost and restored capability lost due to aircraft weight growth, without increasing the logistics footprint. The program consists of systems engineering and program management, detailed design engineering, design assurance, hardware manufacturing and testing, component and module level development and testing, system level testing and qualification, as well as integration into the airframe.

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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: ITEP	167.532	181.866	206.434
Description: ITEP - a multi-platform turbine engine development required across existing Army aircraft to fill the capability gaps for Army Aviation Operations			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607139A / *Improved Turbine Engine Program*	**Project (Number/Name)** ES6 / *Improved Turbine Engine Program*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Will down-select to a single vendor, and award an EMD contract to develop, test, and qualify the engine design. Platform/engine integration design engineering will begin. ***FY 2020 Plans:*** Continuation of the EMD engine development effort culminating in a Critical Design Review (CDR). Continue platform/engine integration and A-kit design/development resulting in two A-kit Preliminary Design Reviews (PDRs) - one for Apache and one for Black Hawk. Completion of ballistic assessment, begin engine component testing, and perform engine fit check for both platforms. Life cycle support planning, and completion of the Analysis of Product Support Alternatives. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** Engine ballistic assessment to support CDR, begin engine component testing, and perform engine fit check into both platforms. Integration efforts to support two A-kit PDR events, one for Apache and one for Black Hawk.			
Title: FY2019 SBIR/STRR TRANSFER ***Description:*** FY2019 SBIR/STRR Transfer ***FY 2019 Plans:*** FY2019 SBIR/STRR Transfer ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY2019 SBIR/STRR Transfer. FY2020 SBIR/STRR Transfer will be determined in year of execution.	-	7.037	-
Accomplishments/Planned Programs Subtotals	167.532	188.903	206.434

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

For Fiscal Year (FY) 2014 and prior, all funding for the Improved Turbine Engine Program (ITEP) was contained in Program Element (PE) 0203744A - Aircraft Modifications/Product Improvement Programs, Project 504. FY 2015 funding was initially moved to PE 0203744A, Project EB1. Prior to execution, FY 2015 and beyond funding was moved to to PE 0607139A, Project ES6.

D. Acquisition Strategy

ITEP TMRR contracts were based on Full and Open Competition. Awarded Fixed Price Incentive (Firm Target) contracts in FY 2016 to two vendors for TMRR. Following a successful Milestone B decision, there will be a cost-plus-incentive-fee contract awarded to one vendor for EMD contractual effort.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607139A / *Improved Turbine Engine Program*	**Project (Number/Name)** ES6 / *Improved Turbine Engine Program*

ITEP Platform Integration Trade Studies Contracts were awarded to the Boeing Company and the Sikorsky Corporation in FY 2015. In FY 2019, two follow-on efforts will be awarded to design and develop A-kits to integrate the ITE into both the Apache and Black Hawk platforms. Pending a successful CDR in FY 2020, the integration efforts will continue to include fabrication of the A-kits, flight test support, and pubs/provisioning.

E. Performance Metrics

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / *Improved Turbine Engine Program*	Project (Number/Name) ES6 / *Improved Turbine Engine Program*	

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
ITEP SEPM - Organic	Allot	Program Management Office (PMO) Aviation Turbine Engines Project Office (ATE), Various : Redstone Arsenal, AL	12.418	13.290	Oct 2017	10.299	Oct 2018	10.402	Oct 2019	-		10.402	Continuing	Continuing	Continuing
ITEP SEPM - Contractor	C/IDIQ	Program Management Office (PMO) Aviation Turbine Engines Project Office (ATE), Various : Redstone Arsenal, AL	5.101	4.567	Oct 2017	4.664	Oct 2018	4.764	Oct 2019	-		4.764	Continuing	Continuing	Continuing
ITEP SEPM - OGA	MIPR	Program Management Office (PMO) Aviation Turbine Engines Project Office (ATE), Various : Redstone Arsenal, AL	11.621	3.394	Oct 2017	3.465	Oct 2018	3.500	Oct 2019	-		3.500	Continuing	Continuing	Continuing
ITEP EMD SSEB	MIPR	Program Management Office (PMO) Aviation Turbine Engines Project Office (ATE), Various : Redstone Arsenal, AL	-	5.708	Oct 2017	-		-		-		-	0.000	5.708	-
		Subtotal	29.140	26.959		18.428		18.666		-		18.666	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / *Improved Turbine Engine Program*	Project (Number/Name) ES6 / *Improved Turbine Engine Program*	

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
ITEP Technology Maturation/Risk Reduction (TMRR) Contracts	C/FPIF	General Electric Company (GE), and Advanced Turbine Engine Company (ATEC) : Lynn, MA (GE), and Phoenix, AZ (ATEC)	142.336	117.634	Oct 2017	-		-		-		-	0.000	259.970	-
Engine OEM EMD Contract	C/FPIF	TBD : TBD	-	-		129.903	Jan 2019	137.517	Oct 2019	-		137.517	Continuing	Continuing	Continuing
Boeing - ITEP Vehicle Platform Integration Trade Studies Contract	SS/IDIQ	The Boeing Company : Phoenix, AZ	9.998	5.202	Oct 2017	-		-		-		-	0.000	15.200	-
Sikorsky Aircraft - ITEP Vehicle Platform Integration Trade Studies Contract	SS/FPIF	The Sikorsky Corporation : Stratford, CT	18.900	7.428	Oct 2017	-		-		-		-	0.000	26.328	-
Platform Integration and Qualification Contracts	SS/CPIF	The Boeing Company, The Sikorsky Corporation : Phoenix, AZ, Stratford, CT	-	-		22.529	Mar 2019	36.788	Oct 2019	-		36.788	Continuing	Continuing	Continuing
SBIR/STRR	TBD	HQDA : Washington, DC	-	-		7.037		-		-		-	0.000	7.037	-
		Subtotal	171.234	130.264		159.469		174.305		-		174.305	Continuing	Continuing	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
ITEP Engineering Support - Organic	Allot	Program Management Office (PMO) Aviation Turbine Engines	0.313	0.170	Oct 2017	0.174	Oct 2018	0.178	Oct 2019	-		0.178	Continuing	Continuing	Continuing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / *Improved Turbine Engine Program*	Project (Number/Name) ES6 / *Improved Turbine Engine Program*	

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
		Project Office (ATE), Various : Redstone Arsenal, AL													
ITEP Engineering Support - Contractor	C/IDIQ	Program Management Office (PMO) Aviation Turbine Engines Project Office (ATE), Various : Redstone Arsenal, AL	1.435	3.488	Oct 2017	3.561	Oct 2018	3.638	Oct 2019	-		3.638	Continuing	Continuing	Continuing
ITEP Engineering Support - OGA	MIPR	Program Management Office (PMO) Aviation Turbine Engines Project Office (ATE), Various : Redstone Arsenal, AL	7.981	6.651	Oct 2017	7.046	Oct 2018	9.297	Oct 2019	-		9.297	Continuing	Continuing	Continuing
		Subtotal	9.729	10.309		10.781		13.113		-		13.113	Continuing	Continuing	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
Government Test Planning	SS/TBD	Program Management Office (PMO) Aviation Turbine Engines Project Office (ATE), Various : Redstone Arsenal, AL	-	-		0.225	Mar 2019	0.350	Oct 2019	-		0.350	Continuing	Continuing	Continuing
		Subtotal	-	-		0.225		0.350		-		0.350	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Army			Date: March 2019
Appropriation/Budget Activity 2040 / 7	R-1 Program Element (Number/Name) PE 0607139A / *Improved Turbine Engine Program*	Project (Number/Name) ES6 / *Improved Turbine Engine Program*	

	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	210.103	167.532		188.903		206.434		-		206.434	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607139A / *Improved Turbine Engine Program*	**Project (Number/Name)** ES6 / *Improved Turbine Engine Program*

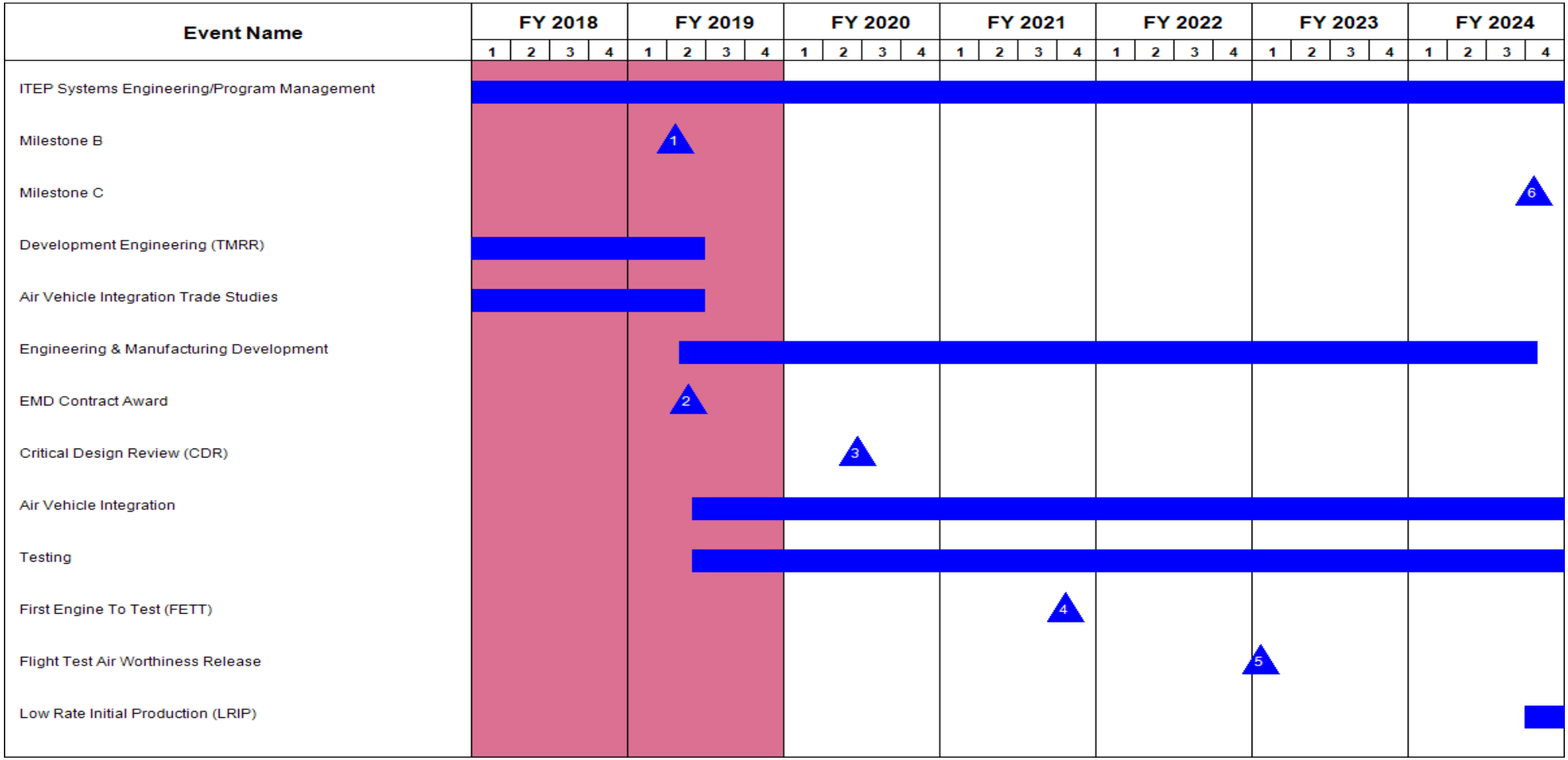

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Army		Date: March 2019
Appropriation/Budget Activity 2040 / 7	**R-1 Program Element (Number/Name)** PE 0607139A / *Improved Turbine Engine Program*	**Project (Number/Name)** ES6 / *Improved Turbine Engine Program*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
ITEP Systems Engineering/Program Management	1	2015	1	2026
Milestone B	2	2019	2	2019
Milestone C	4	2024	4	2024
Development Engineering (TMRR)	4	2016	2	2019
Air Vehicle Integration Trade Studies	1	2015	2	2019
Engineering & Manufacturing Development	2	2019	4	2024
EMD Contract Award	2	2019	2	2019
Critical Design Review (CDR)	2	2020	2	2020
Air Vehicle Integration	2	2019	4	2026
Testing	2	2019	1	2026
First Engine To Test (FETT)	4	2021	4	2021
Flight Test Air Worthiness Release	1	2023	1	2023
Low Rate Initial Production (LRIP)	4	2024	4	2026