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Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force										Date: February 2019		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development					R-1 Program Element (Number/Name) PE 0207610F I Battlefield Abn Comm Node (BACN)							
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	-	0.000	42.349	26.946	0.000	26.946	14.781	29.487	0.000	0.000	Continuing	Continuing
671201: E-11 Development	-	0.000	0.000	26.946	0.000	26.946	14.781	29.487	0.000	0.000	Continuing	Continuing
675383: BATTLEFIELD AIRBORNE COMM NODE (BACN)	-	0.000	42.349	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

This program, BA 7, PE 0207610F, project 671201, BACN Simulators/Trainers, is a new start.

A. Mission Description and Budget Item Justification

Battlefield Airborne Communications Node (BACN) enables tactical edge Joint and Coalition information interoperability via air, space, and surface systems, to include a Backbone Network for high capacity data transfer. As requirements emerge, BACN will integrate new hardware and software capabilities that improve system performance, interoperability, availability and open mission system technologies. Efforts include, but are not limited to, expansion of external time reference capabilities, Military GPS enhancements, integration of advanced antennas and waveforms, and assimilation of mandates levied on the BACN systems. This effort will include an Engineering Change Proposal (ECP) that will develop and integrate Military GPS on the E-11A BACN platform. Military GPS is required for BACN fleet to fly in increasingly contested AORs. Safety of flight considerations, including performance, aircraft structural integrity, availability, and continuity of service requirements will be addressed. Efforts will include required non-recurring engineering and Diminishing Manufacturing Sources (DMS) issues, the development of simulators/trainers, development of training materials, and technical publications.

Execute the acquisition and sustainment of two (2) complete Battlefield Airborne Communications Node (BACN) Payload systems operation and maintenance training simulators and two (2) Payload Control Element (PCE) operations and maintenance training simulators. The BACN Payload simulators are designed for replication of both the E-11A and the EQ-4B platforms with platform-dependent payload configurations; one simulator for each platform. The PCE simulators will be specifically designed for both the PCE-Launch (L) configuration and the PCE-Mission (M) configuration. This effort would include design of all trainers (E-11A payload, EQ-4B payload, PCE-L, and PCE-M), training materials, operations and maintenance technical manuals for the assigned trainers.

Execute risk reduction activities for development of future capabilities on BACN payload/aircraft efforts.

This effort will including developing the data and publications needed for a Program of Record

This effort will include Acquisition Support Contractors

This program element may include necessary civilian pay expenses required to manage, execute, and deliver BACN capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>
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As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is \$14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary (\$ in Millions)	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020 Base</u>	<u>FY 2020 OCO</u>	<u>FY 2020 Total</u>
Previous President's Budget	0.000	42.349	0.000	0.000	0.000
Current President's Budget	0.000	42.349	26.946	0.000	26.946
Total Adjustments	0.000	0.000	26.946	0.000	26.946
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	26.946	0.000	26.946

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force										Date: February 2019		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>				Project (Number/Name) 671201 / <i>E-11 Development</i>			
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
671201: <i>E-11 Development</i>	-	0.000	0.000	26.946	0.000	26.946	14.781	29.487	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note This program, BA 7, PE 0207610F, project 671201, BACN Simulators/Trainers, is a new start.												
A. Mission Description and Budget Item Justification Battlefield Airborne Communications Node (BACN) enables tactical edge Joint and Coalition information interoperability via air, space, and surface systems, to include a Backbone Network for high capacity data transfer. As requirements emerge, BACN will integrate new hardware and software capabilities that improve system performance, interoperability, availability and open mission system technologies. Efforts include, but are not limited to, expansion of external time reference capabilities, Military GPS enhancements, integration of advanced antennas and waveforms, and assimilation of mandates levied on the BACN systems. This effort will include an Engineering Change Proposal (ECP) that will develop and integrate Military GPS on the E-11A BACN platform. Military GPS is required for BACN fleet to fly in increasingly contested AORs. Safety of flight considerations, including performance, aircraft structural integrity, availability, and continuity of service requirements will be addressed. Efforts will include required non-recurring engineering and Diminishing Manufacturing Sources (DMS) issues, the development of simulators/trainers, development of training materials, and technical publications. Execute risk reduction activities for development of future capabilities on BACN payload/aircraft efforts. Execute the acquisition and sustainment of two (2) complete Battlefield Airborne Communications Node (BACN) Payload systems operation and maintenance training simulators and two (2) Payload Control Element (PCE) operations and maintenance training simulators. The BACN Payload simulators are designed for replication of both the E-11A and the EQ-4B platforms with platform-dependent payload configurations; one simulator for each platform. The PCE simulators will be specifically designed for both the PCE-Launch (L) configuration and the PCE-Mission (M) configuration. This effort would include design of all trainers (E-11A payload, EQ-4B payload, PCE-L, and PCE-M), training materials, operations and maintenance technical manuals for the assigned trainers. This program element may include necessary civilian pay expenses required to manage, execute, and deliver BACN capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.												
B. Accomplishments/Planned Programs (\$ in Millions)								FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: BACN Simulators/Trainers								0.000	0.000	15.600	-	15.600
Description: This effort will be used to develop payload simulator trainers.												

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force				Date: February 2019		
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>		Project (Number/Name) 671201 / <i>E-11 Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)						
		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<i>FY 2019 Plans:</i> New Start in FY20 <i>FY 2020 Base Plans:</i> Procure training systems and begin training BACN payload operators in an environment conducive for learning <i>FY 2019 to FY 2020 Increase/Decrease Statement:</i> Increase due to new start						
<i>Title:</i> BACN PoR <i>Description:</i> Development of Training materials, technical publications, and manuals. Performs Human Machine Interface (HMI) studies. <i>FY 2019 Plans:</i> Conversion from JUON to a Program of Record <i>FY 2020 Base Plans:</i> Continue establishment of BACN PoR <i>FY 2019 to FY 2020 Increase/Decrease Statement:</i> Increase due to switching from OCO to Base funding		0.000	0.000	11.346	-	11.346
Accomplishments/Planned Programs Subtotals		0.000	0.000	26.946	-	26.946
C. Other Program Funding Summary (\$ in Millions)						
N/A						
Remarks						
D. Acquisition Strategy						
The BACN Branch provides for common development, integration and interoperability of the BACN payload, platforms and supporting systems and equipment. Acquisition strategies vary by effort, will utilize all contracting options available but the majority of development and integration is normally accomplished by the weapon system prime contractor.						
E. Performance Metrics						
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force												Date: February 2019			
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0207610F / Battlefield Abn Comm Node (BACN)				Project (Number/Name) 671201 / E-11 Development					
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Prime Mission Product Hardware	SS/CPAF	Northrup Grumman : San Diego, CA	-	-		-		17.132		-		17.132	Continuing	Continuing	-
Payload Data	Various	Northrup Grumman : Various	-	-		-		3.584		-		3.584	Continuing	Continuing	-
Subtotal			-	-		-		20.716		-		20.716	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
Acquisition Support	Various	Various : Various, MA	-	-		-		5.871	Dec 2019	-		5.871	Continuing	Continuing	-
Subtotal			-	-		-		5.871		-		5.871	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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
BACN A&AS	Various	A&AS : Bedford, MA	-	-		-		0.192		-		0.192	Continuing	Continuing	-
MITRE	Various	MITRE : Bedford, MA	-	-		-		0.167		-		0.167	Continuing	Continuing	-
Subtotal			-	-		-		0.359		-		0.359	Continuing	Continuing	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			-	-		0.000		26.946		-		26.946	Continuing	Continuing	N/A
Remarks															

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force										Date: February 2019									
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0207610F / Battlefield Abn Comm Node (BACN)					Project (Number/Name) 671201 / E-11 Development									

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Battlefield Airborne Communication Node (BACN)																												
Program of Record Publication and Data																												
Payload Trainer																												

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>	Project (Number/Name) 671201 / <i>E-11 Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Battlefield Airborne Communication Node (BACN)</i>				
Program of Record Publication and Data	2	2020	3	2022
Payload Trainer	3	2020	4	2022

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force										Date: February 2019		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0207610F / Battlefield Abn Comm Node (BACN)				Project (Number/Name) 675383 / BATTLEFIELD AIRBORNE COMM NODE (BACN)			
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
675383: BATTLEFIELD AIRBORNE COMM NODE (BACN)	-	0.000	42.349	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Battlefield Airborne Communications Node (BACN) enables tactical edge Joint and Coalition information interoperability via air, space, and surface systems, to include a Backbone Network for high capacity data transfer. As requirements emerge, BACN will integrate new hardware and software capabilities that improve system performance, interoperability, availability and open mission system technologies. Efforts include, but are not limited to, expansion of external time reference capabilities, Military GPS enhancements, integration of advanced antennas and waveforms, and assimilation of mandates levied on the BACN systems. Military GPS is required for BACN fleet to fly in increasingly contested AORs. Safety of flight considerations, including performance, aircraft structural integrity, availability, and continuity of service requirements will be addressed. Efforts will include required non-recurring engineering and Diminishing Manufacturing Sources (DMS) issues.

This effort will include an Engineering Change Proposal (ECP) that will develop and integrate Military GPS on the E-11A BACN platform.

Execute the acquisition and sustainment of two (2) complete Battlefield Airborne Communications Node (BACN) Payload systems operation and maintenance training simulators and two (2) Payload Control Element (PCE) operations and maintenance training simulators. The BACN Payload simulators are designed for replication of both the E-11A and the EQ-4B platforms with platform-dependent payload configurations; one simulator for each platform. The PCE simulators will be specifically designed for both the PCE-Launch (L) configuration and the PCE-Mission (M) configuration. This effort would include design of all trainers (E-11A payload, EQ-4B payload, PCE-L, and PCE-M), training materials, operations and maintenance technical manuals for the assigned trainers.

This effort will include an Engineering Change Proposal (ECP) that will develop a Deployable PCE.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver BACN capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Military GPS, E-11A & Deployable Program Control Element (PCE)	0.000	42.349	0.000	0.000	0.000

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019			
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207610F / Battlefield Abn Comm Node (BACN)	Project (Number/Name) 675383 / BATTLEFIELD AIRBORNE COMM NODE (BACN)				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
<p>Description: Battlefield Airborne Communications Node (BACN) enables tactical edge Joint and Coalition information interoperability via air, space, and surface systems; Backbone Network for high capacity data transfer.</p> <p>Military GPS is required for BACN fleet to fly in increasingly contested AORs. Safety of flight considerations, including performance, integrity, availability, and continuity of service requirements for long range reference, local area reference, and landing/terminal reference, are directly affected by how GPS sensors are used.</p> <p>This effort will include an Engineering Change Proposal (ECP) that will develop and integrate Military GPS on the E-11A BACN platform.</p> <p>Deployable Program Control Elements (PCEs) are required to provide agile deployment support to establish remote and full ground control locations in a timely manner to shorten the kill-chain.</p> <p>This effort will include an Engineering Change Proposal (ECP) that will develop a Deployable PCE.</p> <p>FY 2019 Plans: N/A</p> <p>Will conduct an Engineering Change Proposal (ECP) that will develop and integrate Military GPS on the E-11A BACN platform.</p> <p>Conducted an Engineering Change Proposal (ECP) that will develop a Deployable PCE.</p> <p>FY 2020 Base Plans: Continue efforts started in FY19.</p> <p>FY 2020 OCO Plans: N/A</p> <p>FY 2019 to FY 2020 Increase/Decrease Statement: new start in FY19, decrease due to funding switching to procurement</p>						
Accomplishments/Planned Programs Subtotals		0.000	42.349	0.000	0.000	0.000

UNCLASSIFIED

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>	Project (Number/Name) 675383 / <i>BATTLEFIELD AIRBORNE COMM NODE (BACN)</i>
C. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
D. Acquisition Strategy The BACN Branch provides for common development, integration and interoperability of the BACN payload, platforms and supporting systems and equipment. Acquisition strategies vary by effort, will utilize all contracting options available but the majority of development and integration is normally accomplished by the weapon system prime contractor.		
E. Performance Metrics Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force												Date: February 2019				
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0207610F / Battlefield Abn Comm Node (BACN)				Project (Number/Name) 675383 / BATTLEFIELD AIRBORNE COMM NODE (BACN)						
Product Development (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	
Military GPS, E-11A	C/CPFF	AFLCMC/HNA : Hanscom AFB, MA	-	-		41.727		-		-		-	Continuing	Continuing	-	
Subtotal			-	-		41.727		-		-		-	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 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	
MilGPS PM, Eng A&AS	Various	Not specified. : TBD	-	-		0.595		-		-		-	Continuing	Continuing	-	
MilGPS Travel	Various	Not specified. : TBD	-	-		0.027		-		-		-	Continuing	Continuing	-	
Subtotal			-	-		0.622		-		-		-	Continuing	Continuing	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			-	-		42.349		-		-		-	Continuing	Continuing	N/A	
Remarks																

UNCLASSIFIED

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force			Date: February 2019		
Appropriation/Budget Activity		R-1 Program Element (Number/Name)		Project (Number/Name)	
3600 / 7		PE 0207610F / Battlefield Abn Comm Node (BACN)		675383 / BATTLEFIELD AIRBORNE COMM NODE (BACN)	

	FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Battlefield Airborne Comm Node (BACN)																												
Military GPS, E-11A																												

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0207610F / <i>Battlefield Abn Comm Node (BACN)</i>	Project (Number/Name) 675383 / <i>BATTLEFIELD AIRBORNE COMM NODE (BACN)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Battlefield Airborne Comm Node (BACN)</i>				
Military GPS, E-11A	1	2019	4	2020