Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force											Date: March 2024	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*							
COST ($ in Millions)	**Prior Years**	**FY 2023**	**FY 2024**	**FY 2025 Base**	**FY 2025 OCO**	**FY 2025 Total**	**FY 2026**	**FY 2027**	**FY 2028**	**FY 2029**	**Cost To Complete**	**Total Cost**
Total Program Element	-	6.729	8.751	15.143	0.000	15.143	17.883	13.978	11.481	11.708	Continuing	Continuing
673587: *Air Traffic Control System*	-	6.729	8.751	15.143	0.000	15.143	17.883	13.978	11.481	11.708	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

To support the Air Force worldwide flying mission, the Air Traffic Control and Landing System (ATCALS) program element funds research, development, and management of fielded and emerging air traffic control communications, surveillance, automation, positioning, and precision approach and landing systems. ATCALS programs are focused on development of technology and strategies to support Agile Combat Employment (ACE) adaptive basing and agile basing concepts of operation as well as modernizing airfield operations to ensure enduring, resilient, efficient, and safe air operations. ATCALS also pursues opportunities in the organization, training, and equipping of ATC associated career fields and any new civil ATCALS technologies that may have military utility.

ATCALS currently includes three programs: Air Traffic Control (ATC) Future Technology (AFT), development of a Man-Portable (MP) Tactical Navigation (TACAN) Electronically Scanned Antenna (ESA), and development of a Multi-Band (MB) Multi-Function Tactical Radar System (MTRS). In FY24 MB-MTRS funding was included in the AFT program line. In FY25 MB-MTRS is funded as a separate program.

1. AFT is a multi-project program focused on identifying and documenting capability gaps and associated future technologies in multiple areas of aircraft launch and recovery for both fixed and expeditionary operations. These gaps and technologies will be outlined in a bridging strategy, capability-based assessments, and capability roadmaps.

FY25 AFT research and development programs span multiple projects that include the following:

-The Man-Portable (MP) TACAN High Powered Beacon Amplifier (HPBA) project continues design qualification and verification testing of a prototype unit with increased range, coverage volume and operational capability. This technology will be incorporated into the MP-TACAN replacement program once mature and is separate from the development efforts to replace the mechanically scanned antenna with an electronically scanned antenna as discussed below.

-Lightweight Deployable Instrument Landing System (LD-ILS) and Mode-5 (Identification Friend or Foe) capable Tactical Transponder Landing System (TTLS) aims to improve existing D-ILS technology to reduce transport and set-up times.

-Multi-Band (MB), Multi-Function Tactical Radar (MTRS) will complete technology demonstration and transition to a stand-alone development program in FY25 leading to full-rate development decision in FY26.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force	Date: March 2024
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

As these and other technologies and architectures mature, any applicable fixed-base or deployable, ground-system upgrades will be coordinated and fielded concurrently with related manned and unmanned aircraft avionics capabilities as required. When implemented, these efforts will enable DoD aircraft to enhance safety, security, efficiency, and affordability of global flight operations.

2. The MP-TACAN ESA will replace the MP-TACAN mechanical rotating antenna. It will improve system reliability and reduce system weight. The MP-TACAN provides aircraft with point-to point navigating and instrument flight approaches to operating sites/landing zones and is critical to mission success in adverse weather conditions and Global positioning System denied operations.
&E and procurement of prototype units. The MP-TACAN ESA is fully funded across the Future Years Defense Program.

FY24 RDT&E funding for PE 0305114F, ATCALS MP-TACAN ESA is in compliance with budgeted end items per the approved test strategy and FY23 Omnibus, Sec. 8059.
Using FY24 funds, this effort will be complete in FY25 and integration of the electronically scanned antenna into the MP-TACAN procurement program will begin.

3. The FY25 MB-MTRS funding captures the results of the AFT MTRS development and establishes MTRS as a separate program to mature the technology and proceed to production. Funding supports a multi-band, multi-function capability, precision approach and ATC surveillance sensor to support expeditionary operations and precision approach radar, air defense, force protection and weather processing missions. Prototype system will provide a multifunction ATC radar that has lower total footprint and lifecycle cost than the current system. When developed and in production MB-MTRS will mitigate the current capability gap and support expeditionary ATC operations.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY23 $0.129M was expended for civilian pay expenses in this program element, and in FY24 $0.162M is forecasted for civilian pay expenses in this program element.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force	Date: March 2024
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

B. Program Change Summary ($ in Millions)	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total
Previous President's Budget	8.367	8.751	15.116	0.000	15.116
Current President's Budget	6.729	8.751	15.143	0.000	15.143
Total Adjustments	-1.638	0.000	0.027	0.000	0.027
• 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	-1.411	0.000			
• SBIR/STTR Transfer	-0.227	0.000			
• Other Adjustments	0.000	0.000	0.027	0.000	0.027

Change Summary Explanation

$-1.411M FY23 funding reprogrammed as follows: $900K BTR from AFT (early-to-need) to Mission Planning System program, $300K BTR from AFT to Communication, Navigation, and Surveillance Air Traffic Management program (funds excess due Multi-Function Tactical Radar System schedule slip), and $211K BTR from NOTAMS to Defense Readiness Reporting System program (funds excess as program completed early with FY23 funds).

C. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
Title: Air Traffic Control (ATC) Future Technologies (AFT)	5.377	5.950	7.283
Description: Focus is on aircraft launch and recovery, airspace interoperability, expeditionary technology development and prototyping, optimization of flight capability and adherence to safety of flight mandates. AFT will continue coordination with the AF Flight Standards Agency and the FAA to develop air traffic control radar systems and evaluate technologies supporting multiple functions such as Airfield Operations and systems operating in a tactical environment. ***FY 2024 Plans:*** - Continues development of the Lightweight Deployable Instrument Landing System (LD-ILS) glide-slope antenna to include analysis and test and evaluation. - Awards two Multi-Band (MB) Multi-Function Tactical Radar System (MTRS) design and technical evaluation contracts which will include, but not be limited to, a wideband actively electronic scanned array to detect multiple types of air targets and export the data to multiple processing systems to enable air base defense, ATC/airspace control, and C2 information via experimentation to determine the actual size of the system, coverage capabilities, and Multi-Band (MB) MTRS effectiveness. In FY25 MB-MTRS is broken out as a program separate from AFT.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force	Date: March 2024
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Continues to develop a Man-Portable TACAN high power beacon transponder amplifier to increase range of coverage. MP-TACAN HPBA work is funded under the AFT program and is separate from work to develop an electronically scanned antenna funded as a separate program. - Completes evaluation of a reconfigured prototype Transportable Transponder Landing System (TTLS) to include Mode-5 Identification Friend or Foe (IFF) capability and a physically smaller system. ***FY 2025 Plans:*** Continue AFT Analyses and Research to drive innovation for the Airfield Operations community which include the following tasks: - Will complete the LD-ILS glide-slope antenna test and evaluation and exercise a contract option to design and analyze a LD-ILS localizer antenna. This will lead to a mechanical packaging of the complete system into a more compact, deployable end-item. - Will complete MB-MTRS design and technical evaluation and down select to one design vendor while transitioning to a stand-alone program in FY25. - Will complete the MP-TACAN HPBA amplifier design and qualification testing prior to integration with the MP-TACAN program in order to increase its range and coverage volume. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** FY25 funding increases by $1.318M to fund Multi-Band MTRS base contract requirements.			
Title: Man-Portable TACAN Electronically Scanned Antenna (MP-TACAN ESA)	1.352	2.801	0.000
Description: Develops new electronically scanned antenna to replace the existing Man-Portable Tactical Air Navigation (TACAN) mechanical antenna. The new antenna will reduce system weight, improve reliability, and extend battery life. The Development and Test Effort includes one prototype antenna and three additional antennas for qualification testing. The Man-Portable TACAN provides aircraft with point-to-point navigation and instrument flight approaches to forward operating sites/landing zones, and is critical to mission success in adverse weather conditions. It replaces 40+ year old legacy systems that are no longer supportable. The Man-Portable TACAN also supports the 2022 NDAA and 2022 National Defense Strategy for rapidly deployable, adaptive, and scalable family of systems. A total of 68 systems will be procured (58 for the Active Duty and 10 for the Air National Guard). ***FY 2024 Plans:*** - Manufactures three qualification units			

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force	Date: March 2024
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Conducts Qualification Testing - Completes Preliminary and final Qualification Test Reports - Conducts Performance Test Demonstration with Government furnished Beacon/Transponder - Conducts Validation/Verification Testing - Conducts Technical Validation - Conducts Type I Training - Conducts Operational Testing - Conducts Physical Configuration Audit - Conducts Functional Configuration Audit - System Development Complete - MTA Completion Acquisition Decision Memorandum signed - Mar 25 ***FY 2025 Plans:*** NA ***FY 2024 to FY 2025 Increase/Decrease Statement:*** FY25 decrease reflects completion of the MP-Portable TACAN ESA development program. No funds requested in FY25.			
Title: Multi-Band (MB) Multi-Function Tactical Radar (MTRS) ***Description:*** This is a multi-band (S, L and X) multi-function capability, precision approach and ATC surveillance, sensor to support expeditionary operations. Supports ATC surveillance and precision approach, air defense, force protection and weather processing missions. The new system will provide a multifunction Air Traffic Control (ATC) radar that has lower total footprint and lifecycle costs. The MTRS program captures the AFT MB-MTRS technology demonstration results and continues system development as a stand-alone program. ***FY 2024 Plans:*** N/A ***FY 2025 Plans:*** - Continue the development and maturation of MB-MTRS technology including, but not limited to a wideband active electronically scanned array. This array will detect multiple types of air targets and export the data to multiple processing systems in order to inform ATC/airspace control centers.	-	0.000	7.860

Exhibit R-2, RDT&E Budget Item Justification: PB 2025 Air Force	Date: March 2024
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2023	FY 2024	FY 2025
- Through experimentation, development efforts will determine the actual size of the system, coverage capabilities, and MB-MTRS effectiveness with respect to both ATC/airspace control and C2 information exchange. ***FY 2024 to FY 2025 Increase/Decrease Statement:*** The increased FY25 funds transition the AFT MB-MTRS program from technology assessment to a program of record to execute vendor prototyping, engineering, manufacturing, and development, and establishment of a program office.			
Accomplishments/Planned Programs Subtotals	6.729	8.751	15.143

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2023	FY 2024	FY 2025 Base	FY 2025 OCO	FY 2025 Total	FY 2026	FY 2027	FY 2028	FY 2029	Cost To Complete	Total Cost
• OPAF 03 0305114F: *Air Traffic Control, Approach, and Landing System*	5.971	2.503	11.349	-	11.349	11.596	12.007	12.257	12.499	0.000	68.182

Remarks

E. Acquisition Strategy

ATCALS is a basket program element with multiple programs in various stages of acquisition which provide the air traffic control infrastructure to support peacetime and wartime missions. The ATC Future Technology (AFT) portfolio is focused on fixed-based and lightweight, scalable, readily deployable ATC equipment to support the National Defense Strategy. Current contracting efforts include, but are not limited to, Man-Portable TACAN High Powered Amplifier (MPPA), Multi-Band (MB) Multi-Function Tactical Radar (MTRS), and Lightweight Deployable - Instrument Landing System (LD-ILS).

Contract types include, but are not limited to, full and open competition, Other Transaction Authority (OTA), Small Business Innovative Research (SBIR) and Small Business Technology Transfer (STTR).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Air Force		Date: March 2024
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*	**Project (Number/Name)** 673587 / *Air Traffic Control System*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AFT Expeditionary Technology Development and Prototyping	C/FFP	AFLCMC/HBA : Hanscom AFB, MA	-	3.318	Mar 2023	3.189	Mar 2024	4.630	Mar 2025	-		4.630	Continuing	Continuing	-
Man-Portable TACAN Electronically Scanned Antenna	C/FFP	AFLCMC/HBAA : Tinker AFB, OK	-	1.306	Jan 2023	2.490	Jan 2024	-		-		-	0.000	3.796	-
Multi-Function Tactical Radar System (MTRS)	C/CPAF	AFLCMC/HBA : Hanscom AFB, MA	-	0.000		0.000		4.917	Dec 2024	-		4.917	Continuing	Continuing	-
		Subtotal	-	4.624		5.679		9.547		-		9.547	Continuing	Continuing	N/A

Remarks

AFT Expeditionary Technology Development and Prototype: line includes funding for Mode-5 capable TTLS, LD-ILS, and the MP-TACAN HPA.

Man-Portable TACAN Electronically Scanned Antenna: line funds procurement of one prototype unit and three first-article antennas for qualification testing.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AFT Research/Analysis	MIPR	FAA : Washington, DC	-	0.469	Oct 2022	1.480	Dec 2023	1.500	Dec 2024	-		1.500	Continuing	Continuing	-
AFT Travel	Various	Not specified. : TBD	-	0.030	Jan 2023	0.071	Jan 2024	0.056	Jan 2025	-		0.056	Continuing	Continuing	-
AFT Civilian Direct Cite Authorizations	Allot	AFLCMC/FZA : TBD	-	0.129	Oct 2022	0.162	Dec 2023	0.000		-		0.000	0.000	0.291	-
MTRS Research/Analysis	TBD	AFLCMC/HBA : Hanscom AFB, MA	-	-		-		1.491	Feb 2025	-		1.491	Continuing	Continuing	-
MTRS Travel	Various	Not specified. : TBD	-	-		-		0.054	Jan 2025	-		0.054	Continuing	Continuing	-
		Subtotal	-	0.628		1.713		3.101		-		3.101	Continuing	Continuing	N/A

Remarks

Various contract types, performing activity and citry/states are result of the use of Military Interdepartmental Purchase Requests (MIPR), Purchase Requests (PR), Project Orders (PO), etc. that are sent to multiple agencies in support of some tasks.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2025 Air Force			Date: March 2024
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*	**Project (Number/Name)** 673587 / *Air Traffic Control System*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AFT Remote Air Traffic Control Tower Capability EOA	WR	Various : Various	-	0.015	Jul 2023	0.000	Mar 2024	0.000		-		0.000	0.000	0.015	-
AFT ATCALS Operational Test & Evaluation	WR	Various : Various	-	0.245	Jul 2023	0.139	Jul 2024	0.142	Jul 2025	-		0.142	Continuing	Continuing	-
MP TACAN Government Test	MIPR	Various : Various	-	0.041	Jun 2023	0.086	Mar 2024	-		-		-	Continuing	Continuing	-
MTRS	WR	Not specified. : TBD	-	-		-		0.184	Mar 2025	-		0.184	Continuing	Continuing	-
		Subtotal	-	0.301		0.225		0.326		-		0.326	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2023 Cost	FY 2023 Award Date	FY 2024 Cost	FY 2024 Award Date	FY 2025 Base Cost	FY 2025 Base Award Date	FY 2025 OCO Cost	FY 2025 OCO Award Date	FY 2025 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Man-Portable TACAN Electronically Scanned Antenna Program Support Cost PSC	C/CPFF	AFLCMC/HBAA : Tinker AFB, OK	-	0.225	Jul 2023	0.225	Jul 2024	0.000		-		0.000	Continuing	Continuing	-
AFT Program Support Cost PSC Contractor Services AFLCMC/HBAG,	C/CPFF	Various : Hanscom AFB, MA	-	0.951	Jul 2023	0.909	Jul 2024	0.971	Jul 2025	-		0.971	Continuing	Continuing	-
MTRS Program Support Cost PSC Contractor Services AFLCMC	C/CPFF	Various : Hanscom AFB, MA	-	-		-		1.198	Dec 2024	-		1.198	Continuing	Continuing	-
		Subtotal	-	1.176		1.134		2.169		-		2.169	Continuing	Continuing	N/A

	Prior Years	FY 2023		FY 2024		FY 2025 Base		FY 2025 OCO		FY 2025 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	6.729		8.751		15.143		-		15.143	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Air Force		Date: March 2024
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*	**Project (Number/Name)** 673587 / *Air Traffic Control System*

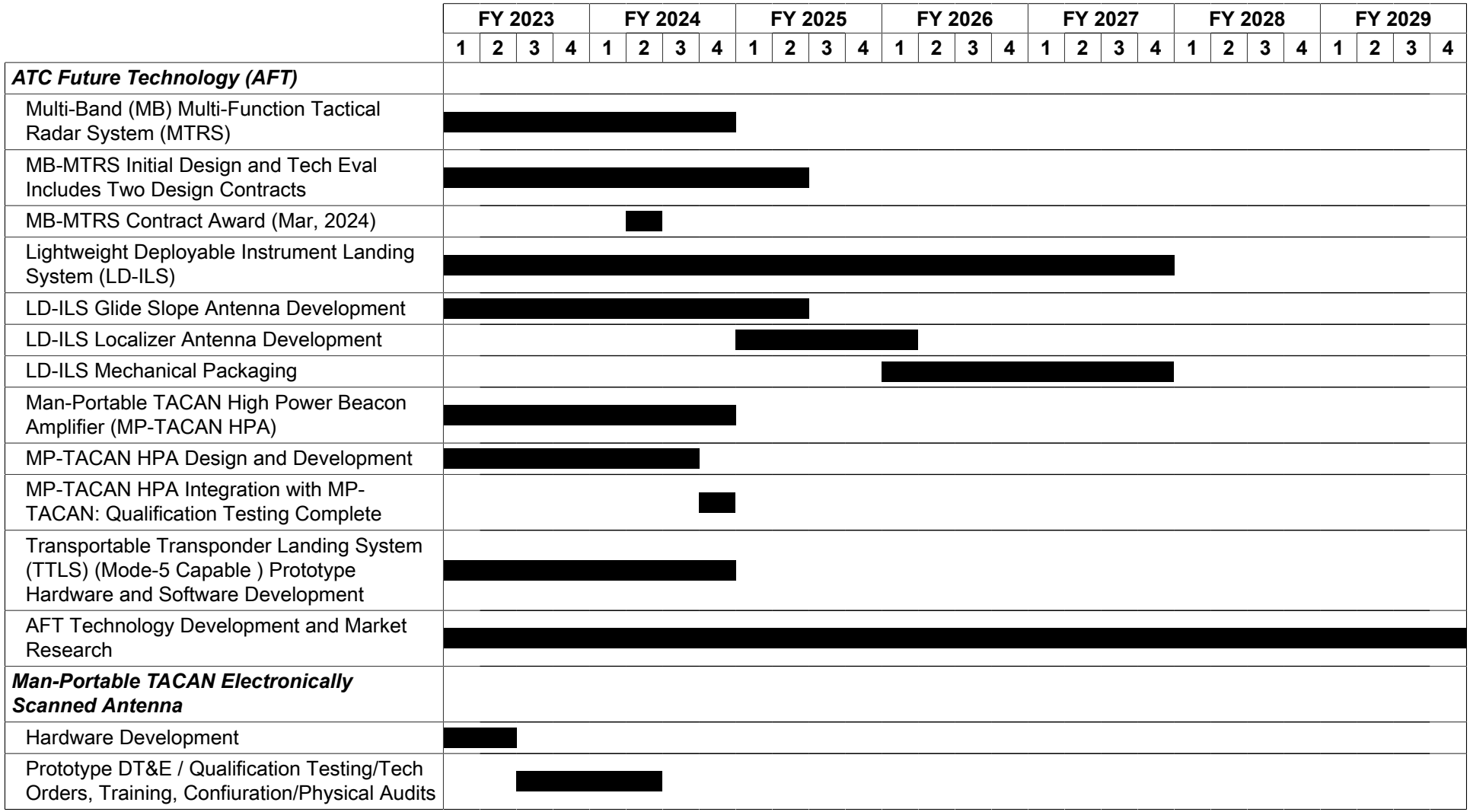

Exhibit R-4, RDT&E Schedule Profile: PB 2025 Air Force		Date: March 2024
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*	**Project (Number/Name)** 673587 / *Air Traffic Control System*

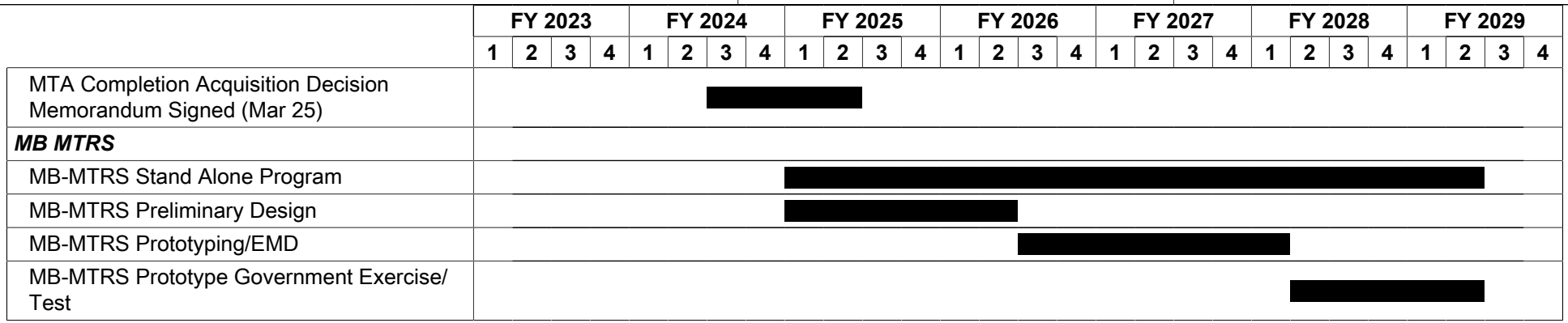

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Air Force		Date: March 2024
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*	**Project (Number/Name)** 673587 / *Air Traffic Control System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ATC Future Technology (AFT)				
Multi-Band (MB) Multi-Function Tactical Radar System (MTRS)	1	2023	4	2024
MB-MTRS Initial Design and Tech Eval Includes Two Design Contracts	1	2023	2	2025
MB-MTRS Contract Award (Mar, 2024)	2	2024	2	2024
Lightweight Deployable Instrument Landing System (LD-ILS)	1	2023	4	2027
LD-ILS Glide Slope Antenna Development	1	2023	2	2025
LD-ILS Localizer Antenna Development	1	2025	1	2026
LD-ILS Mechanical Packaging	1	2026	4	2027
Man-Portable TACAN High Power Beacon Amplifier (MP-TACAN HPA)	1	2023	4	2024
MP-TACAN HPA Design and Development	1	2023	3	2024
MP-TACAN HPA Integration with MP-TACAN: Qualification Testing Complete	4	2024	4	2024
Transportable Transponder Landing System (TTLS) (Mode-5 Capable) Prototype Hardware and Software Development	1	2023	4	2024
AFT Technology Development and Market Research	1	2023	4	2029
Man-Portable TACAN Electronically Scanned Antenna				
Hardware Development	1	2023	2	2023
Prototype DT&E / Qualification Testing/Tech Orders, Training, Confiuration/Physical Audits	3	2023	2	2024
MTA Completion Acquisition Decision Memorandum Signed (Mar 25)	3	2024	2	2025
MB MTRS				
MB-MTRS Stand Alone Program	1	2025	2	2029
MB-MTRS Preliminary Design	1	2025	2	2026
MB-MTRS Prototyping/EMD	3	2026	1	2028

Exhibit R-4A, RDT&E Schedule Details: PB 2025 Air Force		Date: March 2024
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305114F / *Air Traffic Control, Approach, and Landing System (ATCALS)*	**Project (Number/Name)** 673587 / *Air Traffic Control System*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MB-MTRS Prototype Government Exercise/Test	2	2028	2	2029

Note

Phase I funded under AFT program. MB-MTRS program fund events begin in FY25.