

REPORT DOCUMENTATION PAGE				<i>Form Approved</i> OMB No. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Washington Headquarters Service, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.					
PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.					
1. REPORT DATE (<i>DD-MM-YYYY</i>)		2. REPORT TYPE		3. DATES COVERED (<i>From - To</i>)	
4. TITLE AND SUBTITLE				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSORING/MONITORING AGENCY REPORT NUMBER	
12. DISTRIBUTION AVAILABILITY STATEMENT					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER (<i>Include area code</i>)



AFOTEC YEAR IN REVIEW 2020

AFOTEC YEAR IN REVIEW 2020



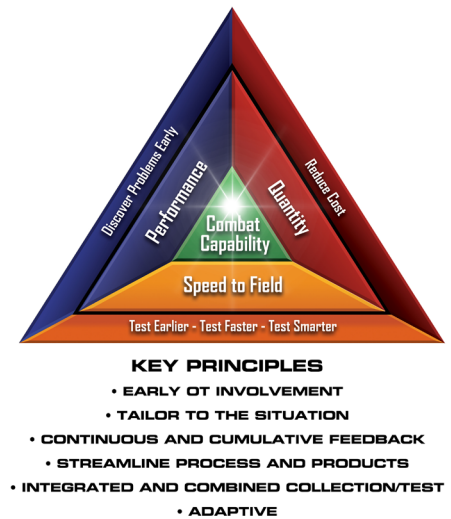
Maj Gen James R. Sears, Jr.

On May 21, 2020, the Senate of the 116th Congress (2019-2020) confirmed by voice vote the appointment in the United States Air Force of the Commander of the Air Force Operational Test and Evaluation Center (AFOTEC), Kirtland Air Force Base (AFB), New Mexico to the grade of Major General. Then-Brigadier General James R. Sears, Jr., assumed command of the center as its twenty-first Commander in a change of command ceremony held April 6, 2020.¹

AFOTEC's origins stemmed from the results of a Presidential blue ribbon defense panel convened in 1970, which noted that Operational Test and Evaluation (OT&E) could and should "contribute appreciably to decision-making at all levels of the Department of Defense (DoD)." AFOTEC acted as the Air Force's Operational Test Agency (OTA) and a Direct Reporting Unit (DRU), answering to the Chief of Staff of the Air Force (CSAF). Its mission called for the conduct of OT&E of all Acquisition Category (ACAT) I and II, Multi-Service Operational Test and Evaluation (MOT&E) programs, and projects under the oversight of the Office of the Secretary of Defense's Director, Operational Test and Evaluation (DOT&E), as required by U.S. Code (USC) Title 10. AFOTEC's Experimentation Office (AFOTEC/EX) also conducted operational test and rapid prototyping on behalf of the center in conjunction with the Air Force Research Laboratory's (AFRL) Strategic Development, Planning, and Experimentation (SDPE) office. In January 2020, AFOTEC's portfolio contained over 90 projects, including Joint and high impact/high-visibility programs, with a total combined value

of over \$933 Billion. As of October 2020, the total value of AFOTEC operational test and evaluation projects had risen to over \$1.3 Trillion.²

In recent years, the center had moved toward codifying AFOTEC Adaptive Relevant Test principles (AART), now simply called the 6 Core Test Principles (6P). This led to a shift away from a simple focus on an end-of-project Operational Utility Evaluation (OUE) as the sole involvement of the center in the acquisition life cycle. 6P included getting involved early on in the formulation of projects, tailoring test processes to the situation/project, providing continuous feedback to the customer, streamlining processes and products, integrating and synchronizing test, such as integrating combined test with the developmental test community, and remaining adaptable.³ Aspirations for the reform of operational test and evaluation had appeared as early as the 1970s.⁴ These ideas also came under discussion during the tenure of the seventeenth commander of the center, Maj Gen David J. Eichhorn, between 2010 and 2012. General Eichhorn espoused similar ideals, such as early involvement in test programs, and a recognition of the wastefulness of serial developmental and operational test and evaluation. Moreover, a similar emphasis on a rapid test philosophy had come under discussion at AFOTEC in 2017 under Commander Maj Gen Matthew T. Molloy.⁵ The greatest differences between the earlier discussions of operational test reform and 6P had arisen both with the codification of a set of principles championed by the AFOTEC Commander, and the expectation that the center's personnel would apply those principles in a wide variety of situations.



AFOTEC's Detachment 6 put 6P to work in the F-15EX program in CY2020. The F-15EX, under contract to Boeing as of mid-July 2020, would replace the Air Force's oldest F-15Cs and -Ds. The Air Force intended the two-seat, U.S.-only fighter's Open Mission Systems architecture to allow rapid upgrades to new technologies, as well as a speedy transition from F-15Cs and -Ds to the F-15EX once delivered to Air Force bases. Detachment 6 exemplified the application of the 6 core test principles in providing early tester involvement, while integrating operational with developmental test through its participation in F-15EX planning with the Operational Flight Program Combined Test Force (CTF) at Eglin AFB.⁶

AFOTEC's Commander had since 2014 defined the center's mission as informing the warfighter and acquisition through operational test. General Sears also promulgated a new goal, to transform AFOTEC to meet the challenges of 2030, with a vision of becoming ever more integrated and relevant, ensuring relevance in 2030. His vision for the center included seeing AFOTEC become the leader of the test enterprise in accelerating change, aligned with the viewpoint of the new Chief of Staff of the Air Force, Gen Charles Q. Brown, and his exhortation that the Air Force must accelerate change or lose.⁷

1 Nomination, 116th Congress, "PN 1755--Air Force," 21 May 2020, downloaded 28 Jul 2020 at <https://www.congress.gov/nomination/116th-congress/1755>, SD 2029.

2 Brfg w/6 Atchs, AFOTEC, "AFOTEC Mission Brief," 21 Jul 2020; Brfg w/5 Atchs, AFOTEC, "AFOTEC Mission Brief," 1 Oct 2020; Plan, AFOTEC/CC, "Strategic Plan: AFOTEC Vision 2020," Dec 2019.

3 Brfg w/6 Atchs, AFOTEC, "AFOTEC Mission Brief," 21 Jul 2020; Brfg w/5 Atchs, AFOTEC, "AFOTEC Mission Brief," 1 Oct 2020.

4 Plan, AFOTEC/CC, "Strategic Plan: AFOTEC Vision 2020," Dec 2019.

5 Brfg Dave Ray, AFOTEC/A-3, "AFOTEC View on Agile Acquisition," 30 Sep 2017.

6 Rel, SAF/PA, "Contract Awarded For New F-15EX Aircraft Inbound to Eglin," 13 Jul 2020.

7 Plan, AFOTEC/CC, "Strategic Plan: AFOTEC Vision 2020," Dec 2019; Brfg w/6 Atchs, AFOTEC, "AFOTEC Mission Brief," 21 Jul 2020; Jennifer Hlad, "Brown: 'Accelerate Change or Lose,'" Air Force Magazine, (103:8), 30 Aug 2020.

AFOTEC's operational test and evaluation mission largely took place under the aegis of the center's detachments and operating locations. The center commenced CY2020 with five detachments: Detachment 1 at Edwards AFB, Calif., which in conjunction with foreign partners conducted OT&E of the F-35 Joint Strike Fighter; Detachment 2 at Eglin AFB, Fla., which executed OT&E of weapons, electronic warfare system, navigation, information technology, and Command and Control systems; STAR Delta Detachment 4, formerly AFOTEC Detachment 4 at Peterson AFB, Colo., which accomplished space, cyberspace, missile and missile defense; Detachment 5, also at Edwards AFB, which effected OT&E of bomber and mobility aircraft, Command, Control, Intelligence, Surveillance and Reconnaissance, as well as of training and Special Operations systems; and Detachment 6 at Nellis AFB, Nev., which conducted OT&E of upgrades to legacy and fifth-generation fighter aircraft systems.⁸

Early in CY2020, Detachment 1 transitioned to an operating location under the Commander of Detachment 6 at Nellis AFB, the usual consequence for detachments that had outlived the need for their test expertise. With the shift of the F-35 Joint Strike Fighter away from the OT&E of Block 3 to a follow-on program for Block 4 software, the center no longer had need of a dedicated JSF detachment. Reactivation of Detachment 3 followed in the third quarter of CY2020 to participate in a Ground Based Strategic Deterrent Combined Test Force at Hill AFB, Utah, replacing Operating Location-Hill AFB, Utah in that effort.⁹



Boeing T-7A

The center also approved two additional operating locations under Detachment 5 in 2020.¹⁰ Operating Location San Antonio, Texas (OL-ST) would support operational test of the VC-25B, a modification of a Boeing 747-8 intended to provide the next Air Force One presidential aircraft. AFOTEC leadership also approved the activation of Operating Location-St. Louis (OL-SM), co-located with Boeing to support OT&E of the new Advanced Pilot Trainer e-T7A.¹¹



Additional organizational changes to AFOTEC would support the development of the U.S. Space Force (USSF). In March 2020, the U.S. Space Force announced plans to transfer 23 U.S. Air Force organizations to the Space Force, providing the new force with personnel with relevant expertise and experience. The Space Force identified Air Force Operational Test and Evaluation Center Detachment 4 as one among those organizations identified for transfer. Detachment 4 provided operational test and evaluation of space, cyber, and missile systems. A forthcoming transfer from AFOTEC to the Space Force would not require a move by the personnel of Detachment 4. All units transferred to Space Force would remain in place, leveraging their current infrastructure, talent, and capabilities at their existing locations.¹²

AFOTEC began Fiscal Year 2020 (FY20) operating with \$13.3 Million of Research, Development, Test and Evaluation (RDT&E) funds to meet \$22.1 Million in requirements. Both what AFOTEC Commander General Sears termed a "dynamic fiscal situation," and the COVID-19 pandemic created uncertainty and delay in the more than 90 programs in the AFOTEC portfolio. Refining the center's forecasting of obligations and test accomplishment, and working with Air Force Acquisition (SAF/AQ), Air Force Test and Evaluation (AF/TE), Air Force Materiel Command (AFMC) and other higher headquarters and mission partners helped mitigate any financial shortfalls, while allowing the center to continue to conduct OT&E without mission impact. Ameliorating program uncertainty in a pandemic, however, proved a different matter altogether.¹³

The COVID-19 pandemic disrupted the rhythms of daily work, the level of personnel allowed on the installation, as well as access to the installation in general. A stop movement order across the DoD dated March 13, 2020 restricted travel, leading to interruptions in test and evaluation programs across the acquisition community. Dr. Will Roper, Assistant Secretary of the Air

8 Brfg w/6 Atchs, AFOTEC, "AFOTEC Mission Brief," 21 Jul 2020.

9 Msg, HQ AFOTEC/CC to AFOTEC/A-5/8, "Operating Location Edwards AFB, California (OL-EC) Activation Order 2020-02," 16 Feb 2020; Plan, AFOTEC, "AFOTEC Programming Plan 2020-01: Activation of AFOTEC Detachment 6/Operating Location Edwards AFB, California (OL-EC)—Disposition of Programs, Personnel, Facilities and Equipment," 24 Feb 2020; Plan, AFOTEC, "AFOTEC Programming Plan 2020-02 (PPlan 2020-02): Inactivation of AFOTEC Detachment 1—Disposition of Programs, Personnel, Facilities and Equipment," 24 Feb 2020; Order, AFOTEC, "Activation Order AO-2020-01," 10 Apr 2020; .

10 Overview, AFOTEC Detachment 5, LinkedIn (see <https://www.linkedin.com/company/afotecdet5/about/>, accessed 1 March 2021).

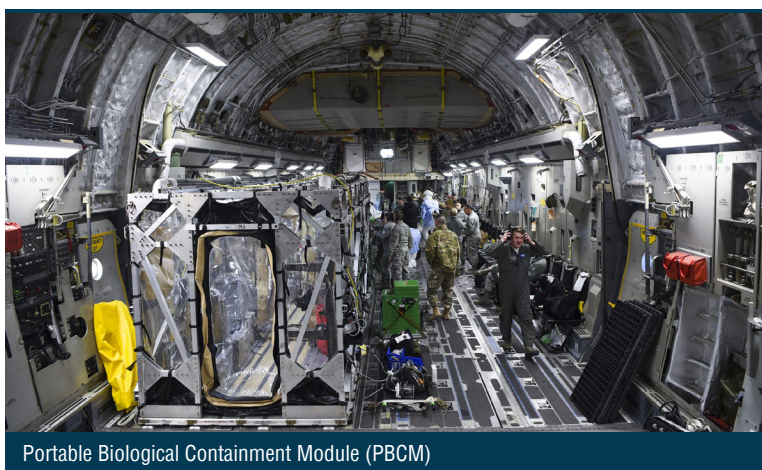
11 Brfg w/6 Atchs, AFOTEC, "AFOTEC Mission Brief," 21 Jul 2020.

12 Article, "U.S. Air Force to Transfer 23 Units to the Space Force," Spacenews.com.

13 Rpt, AFOTEC/CC to VCSAF, "Commander's Inspection Report," 8 Jul 2020.

Force for Acquisition, Technology and Logistics cited the AFOTEC Experimentation Office's Advanced Battle Management System (ABMS) demonstration as an example of the impact of the pandemic on acquisition and test and evaluation. ABMS constituted an alternative to replacing the E-8C Joint Surveillance Target Attack Radar System (JSTARS). Pandemic travel restrictions meant the postponement of an ABMS demonstration scheduled for April to June 2020. Dr. Roper pointed out that incorporating use of devices used in ABMS, tabletONE and phoneONE, improved distributed access among a newly remote workforce.¹⁴

The pandemic also led to the operational test and evaluation of innovative, exigent approaches to addressing it. With thousands of Americans requiring transport from overseas per month, the U.S. Air Force's U.S. Transportation Command requested a Joint Urgent Operational Need (JUON) test to identify an appropriate solution quickly. A Portable Biological Containment Module (PBCM), in use by the U.S. Department of State became one of several systems the Air Force began testing in CY2020 for transporting infectious patients. The PBCM consisted of a hard roll-on-roll-off containment unit holding up to three patients for air transport in the C-17. AFOTEC's Detachment 2 commenced an Operational Utility Evaluation of the system in March 2020, providing test data to support a May 15, 2020 safe-to-fly certification on the C-17. Hopes of having the PBCM quickly approved for use in the C-5 came to naught in 2020, due to restrictions on aircrew in the cargo area during critical phases of flight.¹⁵



Portable Biological Containment Module (PBCM)

The Air Force fielded another Detachment 2 Joint Urgent Operational Need test program, the Negatively Pressurized CONEX, only 95 days after the U.S. Transportation Command (USTRANSCOM) published a joint urgent operational need statement enumerating requirements for high-capacity transport of patients possibly infected with COVID-19. The NPC consisted of a 40-foot metal shipping container outfitted with air-handling equipment providing negative pressure to keep aircrew safe from COVID. NPC would allow ferrying of up to 23 COVID patients or 30 ambulatory COVID patients aboard a C-17. An NPC-Lite version consisted of a custom-built aluminum structure 12 feet shorter than the NPC and carrying fewer patients, intended to fit on the smaller C-130. The C-17 NPC flew its first operational mission from Ramstein Air Base in Germany on June 30, 2020, while tests on the C-130 NPCL ended June 24.¹⁶

COVID-19 travel restrictions also delayed operational tests by a Detachment 5 test team from Edwards AFB of the KC-46A Pegasus tanker replacement at McConnell AFB. Nonetheless, Detachment 5's KC-46 test personnel provided ground- and flight-tested aeromedical procedures useful in completing a crucial operational test of one of the tanker's key mission sets, aeromedical evacuation (AE). A July 10, 2020 17-hour test mission included six sorties and stops at four Air Force bases while carrying and sustaining five patients and their required aeromedical equipment, along with two flight nurses and three medical technicians. The detachment's efforts paved the way for the first live KC-46A patient aeromedical evacuation.¹⁷

Despite any setbacks due to COVID-19 restrictions, Detachment 5 received recognition for its accomplishments from both inside and outside the Air Force in 2020. The Chief of Staff of the Air Force recognized the detachment's efforts with a nomination for the 2020 Air Force Association Citation of Honor. In addition, Detachment 5 also received the International Test and Evaluation Association (ITEA) Special Achievement Award in 2020 for its innovative approaches, practices, and management processes applied while executing the KC-46A Initial Operational Test and Evaluation from July 1, 2019 through June 30, 2020.¹⁸

14 Statement, Dr. William B. Roper, Jr., Assistant Secretary of the Air Force for Acquisition, Technology and Logistics, "A Statement from Dr. Roper on COVID-19," 24 Mar 2020, SD 2028.

15 Rel, Katherine C. Gandara, AFOTEC, "Testers Unite in Solution to Transport COVID-19 Patients," 24 Apr 2020; Rel, Lt Col Paul Hendrickson, AFLCMC/WNU, "Epic Team Effort Leads to Operational Test of NPC and NPC Lite," 5 Jun 2020; , C. Todd Lopez, "Urgent Acquisition Effort Provides Safe COVID-19 Patient Transport in 95 Days," DoD News, 7 Jul 2020; , J.M. Eddins, Jr., "Negative for COVID," Airman Magazine, 24 Feb 2021.

16 Rel, Lt Col Paul Hendrickson, AFLCMC/WNU, "Epic Team Effort Leads to Operational Test of NPC and NPC Lite," 5 Jun 2020; Rel, "NPC and NPC Lite Advance to Operational Test Phase in South Carolina," Airforce Technology, 8 Jun 2020; , C. Todd Lopez, "Urgent Acquisition Effort Provides Safe COVID-19 Patient Transport in 95 Days," DoD News, 7 Jul 2020; Rel, CENTCOM/PA, "405th EAES Conducts NPC-Lite Training," 14 Aug 2020.

17 Rel, 22 ARW/PA, "KC-46 Completes its First AE Mission," 16 Jul 2020; Article, Brian W. Everstine, "KC-46 Flies First Aeromedical Evacuation Test Mission," Air Force Magazine, (Vol. 103, No. 7), 16 Jul 2020.

18 Telecon Dr. Stephanie M. Smith, AFOTEC/HO with Col Glenn Rineheart, AFOTEC/Det 5/CC, [ca. 21 Sep 2020]; Citation, International Test and Evaluation Association, "ITEA 2020 Special Achievement Award: KC-46A Operational Test Team," 2020, <https://www.itea.org/annual-awards-announcement/>.

The pandemic had also delayed even the most high-visibility programs. Dr. Roper returned to the subject of the success of ABMS in September 2020, when he touted the results of an ABMS experiment long delayed by the pandemic. An artillery round fired from a tank downed a cruise missile in a test at White Sands Missile Range. The test milestone demonstrated the entire decision and kill chain, accelerated and enabled by ABMS. Dr. Roper also pointed out that Joint forces could use ABMS-enabled Joint command and control once fielded, taking advantage of data at machine speeds to accelerate decision-making.¹⁹

AFOTEC Commander General Sears also continued his drive toward ensuring the center's relevance in 2030. Late in CY2020, he directed that all Acquisition Category (ACAT) I projects commence the use of Mission-based Risk Assessment Process for Cyber (MRAP-C). The new cybersecurity process would allow the identification and evaluation of cyber vulnerabilities throughout a weapons system's life cycle. General Sears noted that "MRAP-C is the most revolutionary cyber test process to affect the Air Force in the last decade and we are working with our partners across the acquisition and test communities to implement it as soon as possible."²⁰

With the pandemic continuing into 2021, the center's attempts at adaptation and amelioration of delays caused by COVID-19 also continued. Pandemic restrictions to base access and to Temporary Duty (TDY) travel had the greatest impact on AFOTEC operations. These constraints ultimately affected nearly half of the center's programs during CY2020. AFOTEC personnel responded with adaptive and creative solutions, including virtual and remote test operations and data gathering.

GLOSSARY

6P	6 Principles (or 6 Core Test Principles)
AART	AFOTEC Adaptive Relevant Test
ABMS	Advanced Battle Management System
ACAT	Acquisition Category
AF/TE	Air Force Test and Evaluation
AFB	Air Force Base
AFMC	Air Force Materiel Command
AFOTEC	Air Force Operational Test and Evaluation Center
AFRL	Air Force Research Laboratory
ART	Adaptive Relevant Test
CSAF	Chief of Staff of the Air Force
CTF	Combined Test Force
CY	calendar year
DoD	Department of Defense
DOT&E	Director, Operational Test and Evaluation
DRU	Direct Reporting Unit
EX	AFOTEC Experimentation Office
FY	Fiscal Year
ITEA	International Test and Evaluation Association
JSTARS	Joint Surveillance Target Attack Radar System
JUON	Joint Urgent Operational Need
MOT&E	Multi-Service Operational Test and Evaluation
MRAP-C	Mission-based Risk Assessment Process for Cyber
OL	Operating Location
OT&E	Operational Test and Evaluation
OTA	Operational Test Agency
OUE	Operational Utility Evaluation
PBCM	Portable Biological Containment Module
PPlan	Programming Plan
RDT&E	Research, Development, Test and Evaluation
SAF/AQ	Air Force Acquisition
SDPE	AFRL's Strategic Development, Planning, and Experimentation Office
TDY	Temporary Duty
USSF	U.S. Space Force

¹⁹ Rel, SAF/PA, Advanced Battle Management System Field Test Brings Joint Force Together across All Domains during Second Onramp," 3 Sep 2020; Brian W. Everstine, "'Smart Bullet' Downed Cruise Missile in 2nd ABMS Test," Air Force Magazine, (103:9) Sep 2020.

²⁰ Sara Sirota, "Air Force Implementing New Cybersecurity Process Across Weapon Programs," Inside Defense, 7 Jul 2020; , Col Martha Monroe, Mr. Jeff Olinger, "[MRAP-C]," The ITEA Journal of Test and Evaluation, Dec 2020.

* An Acquisition Category I project involved the expenditure of over \$480M in RDT&E funds, or more than \$2.79B in procurement in FY2014 dollars. An Acquisition Category II program called for the eventual expenditure of more than \$185M in RDT&E, or more than \$835M in procurement, again in FY2014 dollars.

For more information contact:

The AFOTEC History Office

afotec.ho.workflow@us.af.mil



AFOTEC YEAR IN REVIEW **2020**

DISTRIBUTION STATEMENT A
APPROVED FOR PUBLIC RELEASE: DISTRIBUTION IS UNLIMITED