

ELECTRONIC SYSTEMS **FORECAST**

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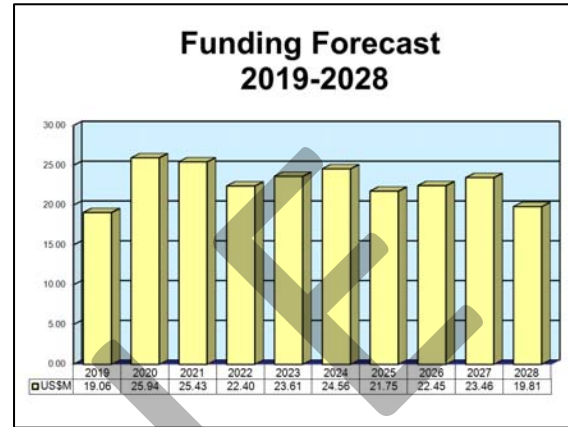
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Combat Identification Technology

Outlook

- Mission requirement of Combat Identification Technology program is perennial, so it will receive steady funding into the foreseeable future
- Passive RF ID Environment (PRIDE), Hydra Vision/Air to Air, and Compact AiTR (Aided Target Recognition) and Sustainable Environment (CASE) are non-cooperative subprojects receiving the most funding
- Non-cooperative CID technologies will receive majority of program funding



Orientation

Description. The U.S. Air Force's Combat Identification (CID) Technology program analyzes, develops, and tests target identification technologies. Both cooperative and non-cooperative technologies are encompassed within the program, with the capability to positively identify in air-to-air, air-to-ground, and air-to-surface scenarios.

Status. Ongoing research and development.

Application. The CID Technology program's activities are in service of U.S. Air Force platforms and installations.

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Contractors

Contractor(s) not selected or not disclosed.

Contractors are invited to submit updated information to Editor, International Contractors, Forecast International, 22 Commerce Road, Newtown, CT 06470, USA; rich.pettibone@forecast1.com

Combat Identification Technology



BAE Systems' APX-113, APX-125, and APX-126 are examples of Cooperative IFF Identification systems.

Source: BAE Systems

Technical Data

For air forces, the need to effectively identify enemy, friendly, and neutral aircraft; battlefield equipment; and personnel is crucial. The U.S. Air Force's Combat Identification Technology program seeks to enhance identification capabilities through development, testing, and implementation of domestic and international standard CID techniques.

As the Combat Identification Technology program consists entirely of RDT&E efforts and has no intimately associated equipment, technical data is not provided with this report.

Program Review

The following is an overview of the Combat Identification Technology program's current activities, which are organized under two projects: Project 642597, Non-Cooperative Identification Subsystems; and Project 642599, Cooperative Identification Techniques.

Project 642597: Non-Cooperative Identification Subsystems

The Non-Cooperative Identification Subsystems project activities analyze and support a number of sensing and signal processing techniques to identify air, ground, or surface platforms. This project's activities concern planning and execution for both current programs and future programs.

As of FY19, the Non-Cooperative Identification Subsystems project encompassed nine subprojects: Compact AiTR (Aided Target Recognition) and Sustainable Environment (CASE); Hydra Vision/Air to Air; Hydra Vision/Air to Ground; Laser Vision/3-D Radar; Laser Vision/SIREN; Laser Vision/VAMP; Passive RF ID Environment (PRIDE); Radio ID (RID);

and Studies. The largest three of these are examined more closely below.

1. Passive RF ID Environment (PRIDE). The most expensive Non-Cooperative Identification Subsystems subproject will be PRIDE. PRIDE develops passive radio frequency target ID capability for denied access environments. Its developmental technologies utilize passive RF and electronic warfare information and have potential non-traditional ISR (Intelligence, Surveillance, and Reconnaissance) capabilities. FY18 PRIDE activities included the development of passive radar-based ID, assessment of strike fighter integration feasibility, and initial design for integration of PRIDE capabilities into platform relevant hardware. Going forward, the subproject will conduct proof-of-concept testing for target platforms.

2. Hydra Vision/Air to Air. Hydra Vision is a multi-sensor enhanced ID system, providing an amalgamated product of sensor data from multiple sources for higher confidence of CID. The Non-Cooperative Identification Subsystem project includes both air-to-air and air-to-ground Hydra Vision

Combat Identification Technology

subprojects, with the air-to-air component being the second-most expensive subproject.

In FY18, the Hydra Vision/Air to Air subproject investigated phenomenology such asIRST (Infrared Search and Track) and laser radar, evaluated and selected technology suitable for Air Target ID inclusion, and investigated the potential for implementing Air-to-Air Hydra Vision techniques on ISR platforms. For FY19, Hydra Vision/Air to Air will downselect from FY18's identified phenomenology, refine solutions, adapt algorithms, and generate models and databases.

3. Compact AiTR (Aided Target Recognition) and Sustainable Environment (CASE). The third-most expensive subproject, CASE concerns efficiency and sustainability issues in the development, operations, and maintenance of non-cooperative AiTR technologies. There are two major activities currently organized under this subproject: flight demonstration of a compact SAR AiTR algorithm, and a feasibility study for addressing High Resolution Radar (HRR) AiTR sustainment issues. FY19 and forward activities will consist only of flight

demos, excising laboratory demos from the subproject's responsibilities.

Project 642599: Cooperative Identification Techniques

The Cooperative Identification Techniques project concerns CID technologies that identify friendly platforms. There is only one principal subproject organized under the Cooperative Identification Techniques project: Air Traffic Control Radar Beacon System, Identification Friend or Foe, Mark XIIA System (AIMS) Program Office.

Air Traffic Control Radar Beacon System, Identification Friend or Foe, Mark XIIA System (AIMS) Program Office. This subproject funds the AIMS Program Office for activities related to Mark XIIA (Mode 5) identification friend or foe (IFF) implementation. This includes interoperability testing, system development, and integration, as well as activities such as civil Mode S capability interoperability and FAA liaison support. These activities were funded in FY18 and continue into FY19.



The MQ-9 Reaper is incorporating Hydra Vision technology developed under the CID Technology Program's Non-Cooperative Identification Subsystems subproject.

Source: U.S. Air Force, Senior Airman Cory D. Payne

Combat Identification Technology

Funding

	U.S. FUNDING							
	PRIOR AMT	FY17 AMT	FY18 AMT	FY19 AMT	FY20 AMT	FY21 AMT	FY22 AMT	FY23 AMT
RDT&E (U.S. Air Force)								
<i>PE#0603742F -</i>								
Combat Identification Technology Project 642597 – Non-Cooperative	N/A	23.551	24.397	18.194	27.085	26.444	24.834	25.287
Identification Subsystems Project 642599 – Cooperative	N/A	21.186	22.442	18.194	21.907	22.287	22.749	23.164
Identification Techniques	N/A	2.365	1.955	[1.530]*	5.178	4.157	2.085	2.123

***Note:** Project 642599 – Cooperative Identification Techniques was erroneously zeroed out in initial Air Force budget documents.

N/A = Not Available

All \$ are in millions.

Source: U.S. Department of the Air Force, FY19 Budget Estimates, Air Force, Research, Development, Test & Evaluation, Vol. II, Budget Activity 4, February 2018

Timetable

<u>Year</u>	<u>Major Development</u>
FY12	Laser Vision project develops emerging EO technologies that can be installed in platforms such as targeting pods
FY13	Radar Vision project completes development and implementation of technologies that utilize wide-area radar identification
FY14	Hydra Vision project develops technology that synthesizes sensor data from multiple sources to provide warfighters with higher-confidence CID results on surface or air targets
FY15	Siren project conducts subsystem verification experiments
FY16	LV project conducts a flight test of 3-D Ladar technology
FY17	AIMS PO continues funding AIMS for interoperability testing, serves as an FAA liaison, and supports Mode 4/Mode 5 equipment
FY18	Project 2599 continues to fund AIMS for interoperability IFF testing (civil and military)

Worldwide Distribution/Inventories

Combat Identification Technology is a **U.S. Air Force** research, development, test, and evaluation program.

Forecast Rationale

The U.S. Air Force's Combat Identification Technology program analyzes, develops, and demonstrates identification technologies.

Under the program's current organization, RDT&E for CID technologies is funded under two projects, one for cooperative targets and one for non-cooperative targets (i.e., targets for which more aggressive identification methods must be used). Whereas more aggressive identification methods for non-cooperative targets utilize a wide range of distinct technologies in order to provide an accurate result, cooperative methods utilize simpler systems that are typically codified across

international fleets, both civil and/or military. Because of this distinction, the more complex activities funded by the non-cooperative project will receive the majority of CID Technology program funding.

From 2019 through 2028, the U.S. Air Force's CID Technology program is forecast to receive just under \$228.5 million, with steady funding stretching into the foreseeable future. The mission requirement of the CID Technology program is perennial, and funding will always be required to innovate and then implement the most effective means of providing identification services.

Combat Identification Technology

Ten-Year Outlook

ESTIMATED CALENDAR YEAR RDT&E FUNDING (in millions US\$)												
Designation or Program	High Confidence					Good Confidence			Speculative			Total
	Thru 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	
MFR Varies												
Combat Identification Technology <-> United States <-> Air Force												
	377.94	19.06	25.94	25.43	22.40	23.61	24.56	21.75	22.45	23.46	19.81	228.47
Total	377.94	19.06	25.94	25.43	22.40	23.61	24.56	21.75	22.45	23.46	19.81	228.47

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Analysis 1

The Market for U.S. Defense Electronics 2019-2028

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* * *

Analysis 1

Raytheon occupies the top position in the defense electronics C5ISR cybersecurity field – one of the strongest segments in the entire defense market. Raytheon's cybersecurity products will generate a windfall for the company.

In defense electronics, Lockheed Martin's AAQ-33 Sniper Advanced Targeting Pod, AAQ-40 ESM, and other systems are major success stories for the company. Other success stories include the AP-19 radar, the TPQ-53 counterfire radar, the TPS-77 multirole radar, and the VUIT-2 video system.

Making Harris a strong player in the defense electronics market is its dominance in the multimission radio segment, producing such radios as the PRC-117, PRC-119, and several others. Other products include the CREW Jammer, the ALQ-214 and ALQ-227 EW countermeasures suite, and the ALQ-214 and ALQ-227 EW countermeasure suites.

Big defense electronics sellers for BAE Systems are the AAR-57 CMWS, the APX-125 common interrogator transponder, the ALR-56 radar warning receiver, and the SRBOC Mk 36 (Super Rapid Bloom Offboard Countermeasures Chaff and Decoy Launching System).

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