Information Decision Making Technology

Outlook

- Machine learning techniques will be initiated to enhance and optimize space operations in FY19

- Funding will peak in 2018 at $32.40 million, then be flat for the remainder of the forecast period

Funding Forecast 2018-2027

US$M	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
US$M	32.40	18.50	19.25	19.50	20.45	19.00	19.90	18.00	19.85	20.60
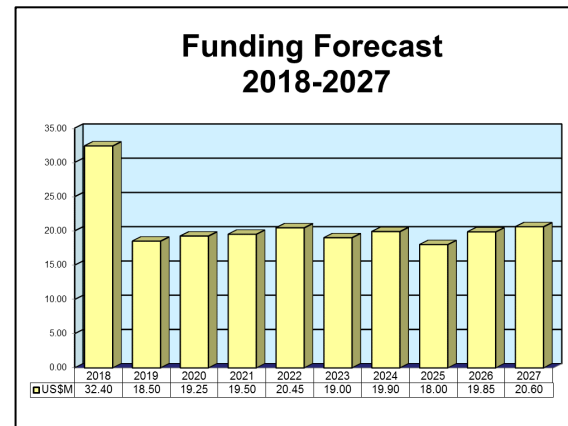
Orientation

Description. The U.S. Air Force's Information Decision Making Technology project conducts research and development into technologies that address anticipatory decision support and course-of-action development, planning, scheduling, and assessment, as well as the real-time effective portrayal of complex data sets.

Sponsor

United States Air Force
  Pentagon
  Washington, DC

Status. Ongoing research and development.

Application. Anticipatory decision-making, course-of-action development, and planning.

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

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Technical Data

The USAF has a stated requirement for advances in technologies that will improve the ability of commanders and their staffs to achieve desired effects across the full spectrum of operations (air, space, and cyberspace) at all levels of war (strategic, operational, and tactical), and during all phases of conflict (pre-conflict, conflict through stability operations). The Information Decision Making Technology project is part of PE#0602788F (Dominant Information Technology). The project consists of the following subprojects:

Campaign Planning Technologies. The Campaign Planning Technologies subproject develops next-generation monitoring, planning, and assessment technologies that enable aerospace commanders to develop effects-based campaigns.

Command and Control System Technologies. The Command and Control System Technologies subproject investigates, analyzes, and develops technologies for the automatic, rapid reconfiguration of distributed intelligent, integrated C2 information systems to achieve the commander's intent during varying crisis levels.

Program Review

Below are summaries of the recent activity under the subprojects of the Information Decision Making Technology project:

Campaign Planning Technologies. In FY10, the Campaign Planning Technologies subproject investigated ways to seamlessly move between geospatial and non-geospatial data to enhance situational awareness and enable integrated decisions over the air, space, and cyber domains. This work was completed in FY11.

In FY11, this subproject initiated the development and demonstration of decision workflow and workload management capabilities that could be applied to "manage the command and control constellation of resources focused on specific missions." In FY12, the subproject initiated the development of a hybrid wargaming concept of decision theory and game theory to provide safeguarded courses of action in adversarial environments with varying degrees of information.

In FY13, the Campaign Planning Technologies subproject investigated full-spectrum, quantitative analysis techniques that aid the operational assessor's ability to link actions to effects and to desired objectives. From FY14 through FY16, this subproject developed robust autonomous control algorithms for heterogeneous and distributed assets capable of "learning" in dynamic environments.

In FY15, this subproject completed research and development into "cooperative agency and group transfer learning." In FY16, it initiated the development of combat planning and tactical assessment software services supporting distributed C2 capabilities. This work continued into FY18.

Given the simulated hostile environments and limited communications at the Stockbridge (New York) testing site, in FY17, the Campaign Planning Technologies subproject worked on developing and demonstrating multi-agent autonomous ISR capabilities.

In FY18, the subproject is initiating the development of software algorithms and architecture to show that an autonomous system can execute a tactical mission in response to commands and changing operational and environmental conditions. In FY19, it will develop algorithms that can dynamically adapt to varying situations based on situational awareness. It will also develop algorithms that facilitate data-efficient leaning and can be integrated with a machine learning framework.

Command and Control System Technologies. In FY10, the Command and Control System Technologies subproject developed advanced interactive displays, including information visualizations, suitable both for high-fidelity, accurate wargames and for rapid deployment in harsh environments with C2 applications and command centers. This work was completed in FY11. From FY11 through FY13, this subproject developed capabilities that will allow more agility within a net-centric environment. Specifically, models of cyber-network attacks were developed to enable better operation of cyber assets with air and space assets.

In FY14, this subproject developed fundamental components, such as live video over 3-D terrain, that address the Air Force's visualization problems. In FY15, it continued research into the dynamic employment of multiple moving target defense components, configurations, and services across the information enterprise to ensure the mission.

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In FY16, this subproject continued to develop concepts for space operations, and in FY17, it initiated horizontal and vertical integration of kinetic and non-kinetic effects across domains. It also initiated optimization and dynamic constraint monitoring.

In FY18, the subproject developed assessment services that enable plan deviations to be recognized and the need for re-planning across a degraded operational environment to be determined. In FY19, this subproject will initiate research and development of multi-domain command and control technologies. Also, it will seek to determine how to apply machine learning techniques to enhance and optimize space operations.

Information Decision Making Technology is a project of the U.S. Air Force.

Source: U.S. DARPA

Funding

U.S. FUNDING

	FY17 QTY	FY17 AMT	FY18 QTY	FY18 AMT	FY19 QTY	FY19 AMT
RDT&E (U.S. Air Force)						
PE#0602788F						
Project 625317	-	14.75	-	28.35	-	16.72

	FY20 QTY	FY20 AMT	FY21 QTY	FY21 AMT	FY22 QTY	FY22 AMT	FY23 QTY	FY23 AMT
RDT&E (U.S. Air Force)								
PE#0602788F								
Project 625317	-	17.50	-	18.50	-	18.70	-	17.74

All $ are in millions.

Source: U.S. Air Force FY19 RDT&E budget document

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Contracts/Orders & Options

No contract information regarding the Information Decision Making Technology project has been disclosed.

Timetable

Year	Major Development
FY10	Command and Control System Technologies subproject develops technologies to improve computer-based wargames used to prepare contingency plans and response strategies
FY11	Command and Control System Technologies subproject develops models of cyber-network attacks toward the goal of greater agility within a net-centric environment
FY12	Campaign Planning Technologies subproject begins developing a hybrid wargaming concept of decision theory and game theory to provide safeguarded courses of action in adversarial environments
FY13	Command and Control System Technologies subproject develops techniques for visualizing cyber situational awareness
FY14	Campaign Planning Technologies subproject develops robust autonomous control algorithms for heterogeneous and distributed assets capable of "learning" in dynamic environments
FY15	Command and Control System Technologies subproject continues research into dynamic employment of multiple moving target defense components, configurations, and services across the information enterprise to ensure the mission
FY16	Campaign Planning Technologies subproject initiates combat planning and tactical assessment software services supporting distributed C2 capabilities
FY17	Command and Control System Technologies subproject initiates optimization and dynamic constraint monitoring
FY18	Campaign Planning Technologies subproject will deliver combat planning and tactical assessment software services supporting distributed C2 capabilities
FY19	Command and Control System Technologies subproject will seek to apply machine learning techniques to enhance and optimize space operations

Worldwide Distribution/Inventories

The Information Decision Making Technology project is an effort of the **U.S. Air Force**.

Forecast Rationale

Forecast International projects that the U.S. Air Force will spend more than $200 million on the Information Decision Making Technology project over the next 10-plus years. Driving this funding is the USAF's need for technologies that will enhance the ability of commanders and their staffs to productively perform military objectives across air, space, and cyberspace operations at all levels of war and during all phases of conflict.

The Information Decision Making Technology project conducts research and development into technologies that address anticipatory decision support and course-of-action development, planning, scheduling, and assessment, as well as the real-time effective portrayal of complex data sets.

Project funding will peak in FY18 at $32.40 million, then drop and remain flat for the remainder of the forecast period.

Ten-Year Outlook

ESTIMATED CALENDAR YEAR RDT&E FUNDING (in millions US$)											
Designation or Program		**High Confidence**				**Good Confidence**			**Speculative**			
	Thru 2017	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**Total**
MFR Varies												
Information Decision Making Technology Military <> United States <> Air Force												
	130.67	32.40	18.50	19.25	19.50	20.45	19.00	19.90	18.00	19.85	20.60	207.45
Total	130.67	32.40	18.50	19.25	19.50	20.45	19.00	19.90	18.00	19.85	20.60	207.45