

ARCHIVED REPORT

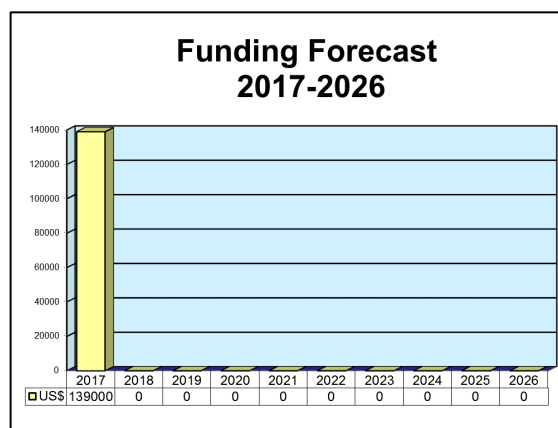
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Information Warfare Support

Outlook

- Main effort transferred to Network-Centric Collaborative Targeting in FY14. Enhancement R&D will continue under NCCT Core Technology effort
- Minor follow-up and transitional funding will continue for next few years to tie up loose ends
- This report will be archived in 2018 in favor of the "Network-Centric Collaborative Targeting" report



Orientation

Description. The Information Warfare Support program, led by the U.S. Air Force, studies, develops, and demonstrates prototypes of systems that will provide warning and self-protection to personnel and equipment against combat systems employed by adversaries.

Sponsor

U.S. Air Force
Electronic Systems Center (ESC)
Hanscom AFB, MA 01731
USA
Website: <http://www.hanscom.af.mil>

Status. Effort transferred to Network-Centric Collaborative Targeting program.

Application. Research and development for quick technology insertion.

Price Range. Program effort transferred. Small amount of funding to tie up loose ends.

Contractors

Prime

General Dynamics Mission Systems	http://gdmissionsystems.com , 12450 Fair Lakes Circle, Fairfax, VA 22033 United States, Tel: + 1 (877) 449-0600, Email: ais.contact@gd-ais.com , Program Participant (RDT&E IWPC)
L3 Technologies - Linkabit	http://www2.l-3com.com/linkabit/ , 9890 Towne Centre Dr, San Diego, CA 92121 United States, Tel: + 1 (858) 552-9500, Fax: + 1 (858) 552-9645, Program Participant (Information Warfare Support)

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MITRE C3I Division	http://mitre.org , 202 Burlington Rd, Bedford, MA 01730-1420 United States, Tel: + 1 (781) 271-2488, Fax: + 1 (781) 271-2000, Program Participant (Information Warfare Support)
Northrop Grumman Aerospace Systems	http://www.northropgrumman.com , 1 Space Park, Redondo Beach, CA 90728 United States, Tel: + 1 (310) 812-4321, Program Participant (Information Warfare Support)

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

Technical Data

Design Features. Information Warfare Planning Capability (IWPC) is a full-spectrum offensive and defensive planning capability. IWPC operators will develop information warfare courses of action for the Joint Forces Air Component Commander and nominate information warfare "targets" for inclusion in the Master Air Attack Plan and the Joint Integrated Prioritized List.

The U.S. Air Force Electronic Systems Center (ESC) at Hanscom Air Force Base in Massachusetts manages the development of an evolving suite of interoperable information warfare planning and decision support capabilities comprising (as required) software, hardware, and communications products. The ESC

identifies and implements an open, scalable system architecture to accommodate growth in functionality, and allows functional modules to interact, with the goal of interoperability as security policy permits. It is compliant with evolving Global Command and Control System standards. An IWPC spiral is released once a year. Requirements for spirals will be developed by the IWPC Spiral Development Integrated Process Team. Spirals within the acquisition cycle allow deficiencies to be identified and considered for future spirals, and to be applied to current capabilities. Integration efforts will capitalize on the synergy between evolving technologies and ongoing system program modifications to maximize the return on investment.



A Nuclear Forensics Ground Collection Team in protection equipment screens a debris sample in a field exercise in Idaho.

Source: U.S. DTRA

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U.S. Air Force Information Warfare Center

Source: U.S. Air Force



Information Warfare Planning Capability (IWPC)

Source: General Dynamics - Advanced Information Systems



U.S. Air Force Cyber Command

Source: U.S. Air Force

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Program Review

Many years ago, the U.S. Secretary of Defense identified the need for the rapid development of warfare information technology, and, with the unanimous approval of the services and the Unified Commands, the Joint Chiefs of Staff made this function a part of the Joint Information Operations Center mission. The U.S. Air Force, as executive agent, funds this effort.

The Information Warfare Support program was reprogrammed from other information warfare funding in FY02. Program activity for FY02, FY03, FY04, and FY05 focused on IWPC software testing and development, with Joint Expeditionary Force Exercise system integration the final goal.

Future efforts will explore management of intelligence, surveillance, and reconnaissance (ISR) assets; global mobility; and dynamic battle control.

Information a Critical Component of Modern Warfare

In FY06, a new project, Information Operations Technology, began as a follow-on to the IWPC effort for the purpose of developing courses of action for the information operations community within the U.S. Department of Defense.

The IWPC portion was completed by the end of FY08 with the conclusion of software version 4.2. Following final acceptance, USAF sites received a technical refresh of all previously fielded versions of software leading up to version 4.2.

Efforts during FY09-FY11 focused on upgrades to the IWPC suite of planning and decision support tools, plus related training. Software and hardware updates were found necessary in order to keep up with existing technology and to maintain interoperability with external programs.

The agenda for FY12 called for continuing the program maintenance work in progress. Additionally, the project funded research and development of military and commercial efforts that could satisfy unfulfilled operational requirements.

In FY13, a new effort was added and funded – the National Technical Nuclear Forensics (NTNF) program. This effort provides the U.S. government with a framework for identifying the source of a nuclear detonation in U.S. or allied territory. U.S. Air Force contributions to this effort include, but are not limited to, collection of airborne particulate material following an incident. The collection was accomplished via a

WC-135 Constant Phoenix aircraft, which was a limited availability asset (only one primary aircraft in the fleet).

The U.S. Defense Threat Reduction Agency (DTRA) is developing a pod (the Harvester) capable of being mounted on an aircraft (TBD) that will provide additional capacity to conduct this mission. Funding will support integration and testing of that pod.

This program is a part of Budget Activity 7, Operational System Development. Budget Activity 7 covers efforts to upgrade systems currently fielded or that have been approved for full-rate production and are expected to be funded in the current or subsequent fiscal year.

Nuclear Forensics

The field of nuclear forensics (the ability to identify the source of nuclear material from radioactive debris) is critical to America's national defense and security. Swift and accurate forensic and attribution (identification) capabilities are vital to developing an appropriate national response to a nuclear event and preventing future attacks in a timely manner.

The Defense Science Board Task Force emphasized the need to improve U.S. nuclear forensics capabilities in 2000. Soon after, DTRA initiated the Domestic Nuclear Event Attribution (DNEA) program to address and improve overall U.S. capabilities by integrating interagency partners in the field of nuclear forensics.

The successes of the DNEA program evolved into an expanded NTNF program with increased capabilities to collect, analyze, and evaluate nuclear data and debris. Numerous federal agencies and laboratories participate in this program, including the Department of Justice, the Department of Homeland Security, the Department of Energy, the Department of State, the intelligence community, the U.S. Strategic Command Center for Combating Weapons of Mass Destruction (SCC-WMD), and the Air Force Technical Application Center.

DTRA's role in the NTNF program includes developing a robust capability to characterize post-nuclear detonation radioactive materials via the collection of ground samples, the analysis and evaluation of collected materials along with existing laboratory data for attribution, and administration of a program to sustain post-detonation nuclear forensics.

DTRA's leadership also extends to managing the Nuclear Forensics Research and Development program as part of a coordinated agency effort to provide new

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technologies and technical solutions to nuclear forensics missions.

As part of the NTNF program, DTRA also deploys teams to exercise capabilities with the combatant commands (COCOM), such as USNORTHCOM and USPACOM, and works with the USSTRATCOM Center for Combating Weapons of Mass Destruction to sustain strong COCOM support of nuclear defense.

The agency maintains a cadre of personnel that is trained and equipped to respond globally to any nuclear or radiological incident.

AFRL Transitions Information Warfare Software Tool to the Operational Community

In June 2007, researchers from the U.S. Air Force Research Laboratory and ManTech International's Cognitive Systems Engineering Center teamed to develop the Information Warfare Combat Assessment Tool (IWCAT), an air campaign decision and situational awareness aid. Focused on the cognitive work that warfighters perform within their respective domains, IWCAT helps users interpret information and make decisions in the proper context. Essentially, the tool enhances the warfighter's ability to understand and anticipate the direct and indirect behavioral effects of offensive and defensive – lethal and nonlethal – kinetic and non-kinetic actions directed against adversary information-based processes and information systems.

Over the past several years, the program team has successfully deployed a number of IWCAT prototypes, transitioning and integrating portions of these products into the Information Warfare Planning Capability. Originally a tool suite used exclusively by the Air Force information operations community, IWPC – including portions of IWCAT – now extends to users throughout the Air Operations Center for planning and assessment purposes.

IWPC provided the baseline for another effort involving IWCAT as well. This follow-on work leverages both IWPC and its IWCAT components in establishing Joint Information Operations Planning Capability, the designation for a suite of tools ultimately intended to facilitate integrated joint force activity. IWCAT version 5.0 includes specific advancements in support of this joint functionality.

In designing the IWCAT software, the program team employed a cognitive systems engineering approach. In general, the decision-centered analysis inherent to this design methodology has extended the state-of-the-art for systems development; specifically, this approach has produced powerful tools and information management applications that reduce volumes of complex data into

tailored, domain-specific displays. These representative displays improve battlespace awareness, enhancing the ability of a warfighting staff and commander both to understand the combat effectiveness of a combined air, space, and information campaign and to rapidly grasp the impact of current operational decisions on mission success and future combat capability. As a result, IWCAT has improved the overall assessment capability of the Air Force Information Operations Center.

Efforts Transferred to Network-Centric Collaborative Targeting: NCCT Core Technology Project

In FY14, efforts under PE#0208021F Information Warfare Support, Project 670374 Tech & Support were transferred to PE#0305221F Network-Centric Collaborative Targeting, Project 675197 NCCT Core Technology in order to better support and align with the Suter Program System (SPS), a military computer program.

Although as of FY17 the program element number for this effort is no longer listed, minimal funding (around \$250,000 per year) will probably be provided for the next few years to tie up loose ends and assist with technology integration into PE#0305221F, Project 675197.

For further market coverage, please see Forecast International's report "Network-Centric Collaborative Targeting."

NCCT Program to Receive \$156 Million over Next Decade

The U.S. Air Force's Network Centric Collaborative Targeting (NCCT) program develops technologies and subnodal analysis tools for use in integrating ISR systems and platforms in order to detect, identify, and locate targets. Forecast International projects that the Air Force will spend more than \$156 million on its NCCT program over the next 10 years. The Air Force's desire to execute wars in a network-centric manner is propelling this funding. From FY17 through FY20, NCCT program spending will average \$17 million per year.

The NCCT program can be seen as creating a "network application" that uses machine-to-machine interfaces and Internet Protocol connectivity to assimilate different battle management, command and control, and ISR assets and systems. According to the Air Force, the final objective of this network application is to deliver fast detection, identification, and geo-location of targets to U.S. combatant commanders and their forces.

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Related News

U.S. Air Force Chief Discusses Changing Face of War – New technologies, new tactics, new threats, limited budgets – all these have combined to change the face of warfare in the 21st century, and Air Force Chief of Staff Gen. David L. Goldfein is among the leaders sorting out just what that will mean.

In 2016, Goldfein spoke at the Department of Defense with Defense One's Marcus Weisgerber and gave the reasoning behind the changes being contemplated for the future of defense. In addition to being responsible for the "man, train and equip" mission for the Air Force, the chief of staff is also a member of the Joint Chiefs of Staff.

Goldfein said he wants to have a conversation about the future of combined arms and joint warfare. He also wants to talk about what has changed and what remains constant. "What hasn't changed over time is the idea of trust and confidence," he said. "This is a foundation of doing joint warfare."

The U.S. military is the most joint force on Earth, he said, a fact that has been proven over the past 16 years of warfare. "We actually have trust and confidence that is built to the level that has set the table for us to do some really evolutionary work in the future," the general said.

Information Age

The military is now in the age of information warfare, Goldfein said, and the question now is, what does the future look like?

"It's going to be far more about networks," Goldfein said. "It's going to be far more about how you take all the information you collect and turn that into decision-quality information faster than any adversary could ever counter." It also will entail creating effects across all domains to create operational agility, which, he said, when combined with decision speed, creates a deterrent that no one can counter.

The United States probably makes decisions faster than any other country, but it will not be fast enough for the future, Goldfein said.

Common Systems

The future must be a common operating system, the general said. The proprietary systems that exist now are separate and require another system to amalgamate the information and assess it. The current system does not give leaders the situational awareness they need fast enough, according to Goldfein.

Some of this will be dependent on new technologies or advances in current technologies, the general added. Intelligence analysis today is too dependent on "industrial age" procedures, in which humans do much of the assessments that could be done faster and more accurately by computers.

"We've got to get into the next stage, which is machine-to-machine, human/machine teaming, and artificial intelligence – to turn all that data into decision-quality information and then you act," he said.

The Air Force is already experimenting with the process, Goldfein said. Called Data to Decision, the experiment takes information from all domains and places it into one common operating system. This could help the Air Force in many ways, the general said.

Air Strikes

Americans see the results of air strikes on the Islamic State of Iraq and the Levant in Mosul almost every night, Goldfein said, as they see footage of bombs or missiles going exactly where intended. "Sometimes we tend to focus on the end game, which is a bomb that goes into its intended location," Goldfein said.

People need to understand what happens before the boom, and that includes collecting the pattern of life at a target location, collecting intelligence, ensuring it is a valid and lawful target, confirming the position of any friendly forces, and limiting the exposure of any innocent civilians, the general said.

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"When I grew up flying F-16s, the pilot's prayer was, 'Please God, let me find my target and not let my buddies down,' " Goldfein said. "It's changed. In precision warfare and the information age, it's 'Please God, let me hit the right target, and not let my buddies down, because I am going to hit what I aim at, with 98 percent accuracy.'" (U.S. DoD News, 11/16)

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Funding

U.S. FUNDING

	FY16 <u>QTY</u>	FY16 <u>AMT</u>	FY17 <u>QTY</u>	FY17 <u>AMT</u>	FY18 <u>QTY</u>	FY18 <u>AMT</u>	FY19 <u>QTY</u>	FY19 <u>AMT</u>
RDT&E (U.S. Air Force)								
PE#0208021F								
Information Warfare Support (a)	-	0.25	-	0	-	0	-	0
PE#0305221F								
Network-Centric Collaborative Targeting (b)	-	17.2	-	20.1	-	16.2	-	14.3
Project 675197 NCCT Core Technology								

	FY20 <u>QTY</u>	FY20 <u>AMT</u>	FY21 <u>QTY</u>	FY21 <u>AMT</u>	FY22 <u>QTY</u>	FY22 <u>AMT</u>	FY23 <u>QTY</u>	FY23 <u>AMT</u>
RDT&E (U.S. Air Force)								
PE#0208021F								
Information Warfare Support (a)	-	0	-	0	-	0	-	0
PE#0305221F								
Network-Centric Collaborative Targeting (b)	-	14.8	-	15.1	-	15.5	-	N/A
Project 675197 NCCT Core Technology								

All \$ are in millions.

N/A = Not Available

Source: U.S. Air Force FY18 RDT&E Program (R-2 RDT&E Budget Item Justification)

(a) Information Warfare Planning Capability (IWPC), developed under PE#0208021F Information Warfare Support, was reprogrammed from other information warfare funding lines in FY02. The Information Operations Technology program was started in FY06.

(b) Starting in FY14 and through the Future Years Defense Program (FYDP), RDT&E funding for Information Operations Battle Management/Suter Program System (IOBM/SPS) software has been embedded in the Network-Centric Collaborative Targeting (NCCT) Core Technology project.

Contracts/Orders & Options

No specific contracts for this effort have been identified.

<u>Contractor</u>	<u>Award (\$ millions)</u>	<u>Date/Description</u>
Northrop Grumman	11.9	Sep 2006 – Contract to manage Information Operations Concepts and Integration program for the USAF Information Warfare Center. Contract was completed by Dec 2011. (FA7037-06-D-0001)
General Dynamics	8.7	Mar 2009 – Contract for the fielding of information warfare planning capability to up to 73 U.S. Air Force Combatant Command sites to support the warfighter and further promote long-term sustainment of the fielded versions worldwide. (FA8707-00-D-0001)

Information Warfare Support

Timetable

<u>Month</u>	<u>Year</u>	<u>Major Development</u>
Jan	2002	Information Warfare Support reprogrammed
Qtr 1	2002	IWPC software development
Qtr 2	2002	IWPC software released
Qtr 4	2002	IWPC software integration testing
Qtr 1	2003	IWPC software development
Qtr 2	2003	IWPC software released
Qtr 4	2003	IWPC software integration testing (through 2009)
	FY06	Information Operations Technology Project start
	FY06	JEFX-06
	FY08	JEFX-08
	FY09	Sustain IWPC v4.2
	FY10	JEFX-10
	FY11	Sustain IWPC v4.2
	FY12	Sustain IWPC v4.2
Qtr 1	FY13	NTNF program integration and test
	FY14	Main effort transferred to NCCT program

Worldwide Distribution/Inventories

The Information Warfare Support program is a technology development effort of the **U.S. Air Force**.

Forecast Rationale

To achieve "information dominance," the U.S. needs cutting-edge technology, and it needs it now. Getting the latest technology into combat first can be a tremendous advantage for a military.

The U.S. Air Force's Information Warfare Support program provides the intelligence capabilities and electronic C4ISR support that battle commanders in the field need in order to make tactical and strategic decisions while on the move. This program was designed to help bridge the gap between technology developments. Efforts had been focusing on rapid development of technology for the Information Warfare Planning Capability (IWPC) program; however, in FY14 these efforts were transferred to PE#0305221F

Network-Centric Collaborative Targeting, Project 675197 NCCT Core Technology in order to better support and align with the Suter Program System (SPS).

Although as of FY17 the program element number for this effort is no longer listed, minimal funding (around \$250,000 per year) will probably be provided for the next few years to tie up loose ends and assist with technology integration into PE#0305221F, Project 675197.

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Information Warfare Support**Ten-Year Outlook**

ESTIMATED CALENDAR YEAR RDT&E FUNDING (in US\$)												
Designation or Program		High Confidence				Good Confidence			Speculative			
	Thru 2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total
MFR Varies												
Information Warfare Support												
Note: In FY14, PE#020802F Information Warfare Support: Project 670374 Tech & Spt, efforts were transferred to PE#0305221F Network Centric Collaborative Targeting: Project 675197 NCCT Core Technology.												
	124,294,000	139000	0	0	0	0	0	0	0	0	0	139,000
Total	124,294,000	139000	0	0	0	0	0	0	0	0	0	139,000