

Research to Develop a Survey of Small Identification Friend-or-Foe (IFF) Sensors for Group 1 Unmanned Aerial Vehicles (UAVs)



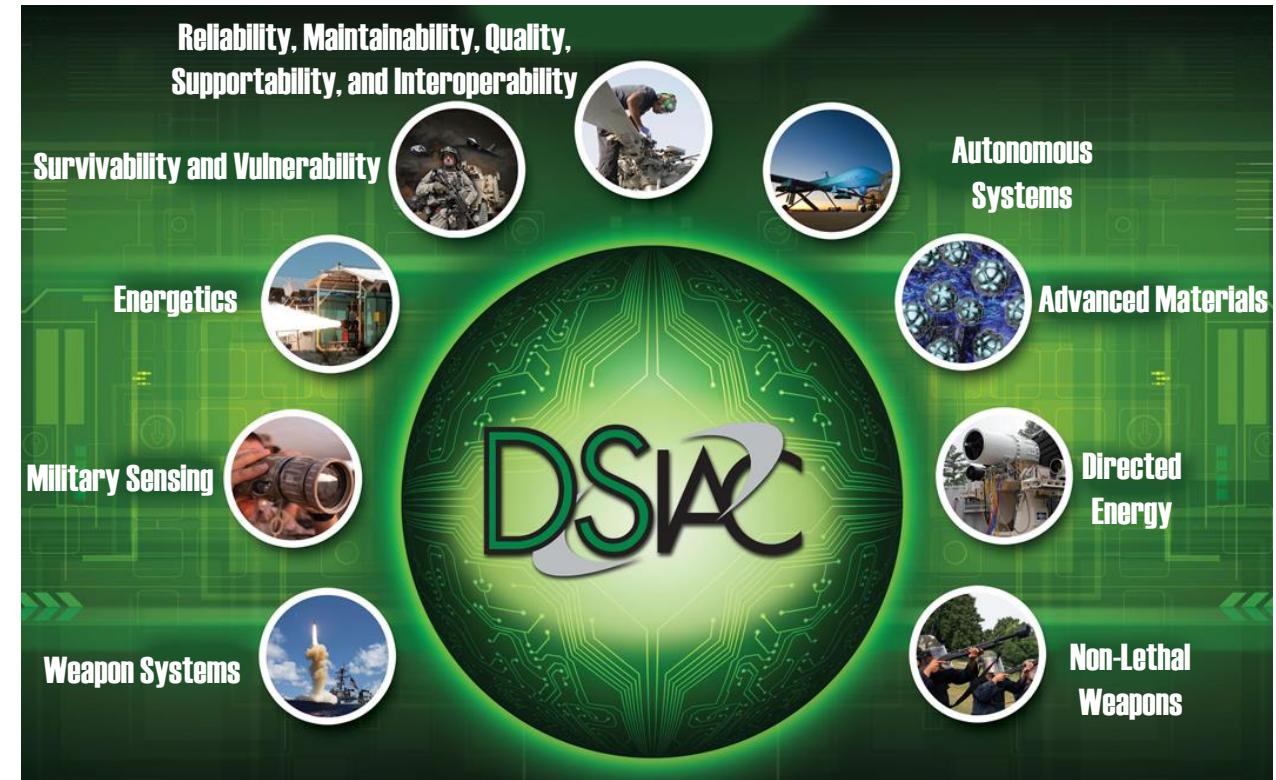
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DSIAC is a DoD Information Analysis Center (IAC) sponsored by the Defense Technical Information Center (DTIC), with policy oversight provided by the Office of the Under Secretary of Defense (OUSD) for Research and Engineering (R&E). DSIAC is operated by the SURVICE Engineering Company.



Background

- **Established on 1 January 2014** as a consolidation of former DoD-sponsored IACs
- **USD(R&E) / DTIC entity** functioning as a “government-owned, contractor-operated” organization
- **Specializing in 9 defense systems communities of interest**
- **Mission:** The mission of DSIAC is to generate, collect, analyze, synthesize, and disseminate scientific and technical information (STI) to DoD and federal government users and industry contractors.
- **DoD Information Research Partner**



Receiving the Technical Inquiry



“What small/micro identification, friend or foe (IFF) transponders could be used in small, Group 1 UAVs?”

- Submitted via DSIAC.org.
- DSIAC analyst communicated with client to gather more details to hone our research.

Conducting the Research

Reviewed database
of past technical
inquiries (TIs)



Utilized subject matter
experts (SMEs)



Searched DTIC's
Research &
Engineering Gateway



R&E GATEWAY Powered by
DTIC

Explored the
SBIR/STTR
database



SBIR · STTR
America's Seed Fund

Acquired system
documentation



DSIAC

The Findings

Acquiring datasheets



Reviewing datasheets, extracting data



Features

- Reduced SWaP
- ADS-B out per RTCA/DO-260B
- Supports 1090 MHz receive for ADS-B, ADS-R TIS-B and growth to Mode 5 level 2 broadcast in
- Modes 1, 2, 3/A, C, 4, and Mode 5 (Level 1 and 2)
- Mode S Level 3 and interface to TCAS II system per RTCA/DO-181C
- Elementary surveillance (ELS) and enhanced surveillance (EHS) compliant
- Growth to support UAT ADS-B In
- Interchangeable platform interface module allows for drop-in replacement of existing transponders or customization
- DOD AIMS 03-1000B certified
- MIDS/JTIDS compatible
- Multiple interface buses available including MIL-STD-1553, ARINC 429, Ethernet, RS-485, and RS-232
- Optional remote control unit for use on nondata based aircraft
- GPS appliqué offers a significant cost savings by not impacting the existing navigation and flight management systems

Specifications

Weight	Less than 7 lbs with crypto and GPS appliques installed
Dimensions	5.375" H x 5.375" W x <4" D
Power	28 VDC, IAW MIL-STD-704A-F
Maintainability	Front-panel BIT activation and LRU/WRA status indicator for rapid verification of operational readiness
Temperature	Operating -50°C to +71°C MIL-STD-810G
EMI	MIL-STD-461F
Shock, Vibration	MIL-STD-810G

Summarizing the Findings

Table of candidate systems and specs

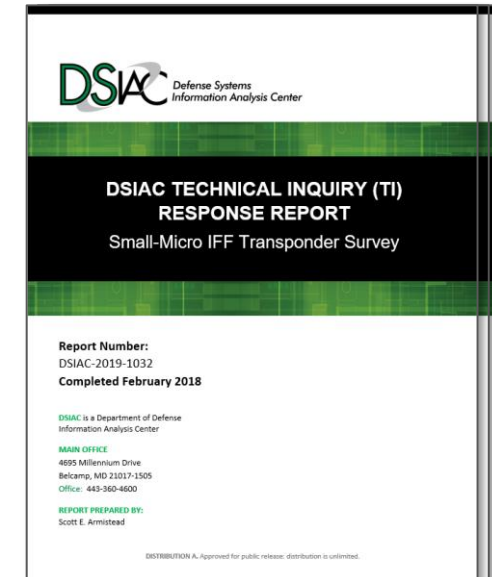
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- | | |
|---|--|
| <ul style="list-style-type: none"> • Aviation transponder interrogation modes available (1, 2, 3A, 3C, 4, 5, S) • Peak power out • Weight • Dimensions (and volume) • Whether or not it was crypto capable | <ul style="list-style-type: none"> • If it requires crypto applique (and if so, the applique's weight and volume) • Existing certifications (AIMS, ETSO, European, FAA, NSA, STANG) • Current integrated systems • Unit cost • Additional notes |
|---|--|

Compilation of system datasheets



Technical report of research methods, sources, and findings



Information Analysis Options

Technical Inquiry (TI) Research/Analysis Service

- 4 hours
- Free



E.g., would a metal having a negative coefficient of thermal expansion be of interest for athermalizing infrared optics?

Extended Technical Inquiry (ETI) Research/Analysis Service

- 5-160 hours
- <\$50k



E.g., what are the effects of radio frequency directed-energy weapons to soldiers and their equipment?

Task Order Research/Analysis Service

- <12 months
- <\$1M

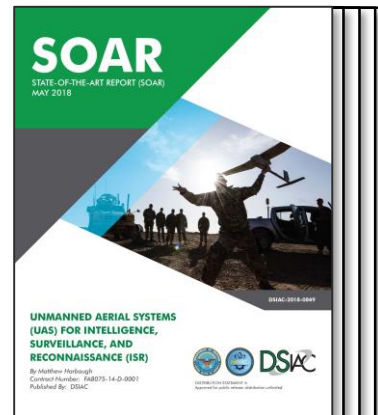


E.g., horizon scanning to support the Air Force Research Laboratory's 2030 study.

State-of-the-Art Reports (SOARs)

- 2 SOARs published per year
- Comprehensive report on broad topic

E.g., unmanned aerial systems for intelligence, surveillance, and reconnaissance



Journals

- Quarterly publication
- Technical defense system topics

E.g., "Overcoming the Barriers to Human-Machine Teams"

