The collection and effective exploitation of intelligence, surveillance, and reconnaissance (ISR) data from tactical platforms with limited payload SWAP (size, weight, and power) faces several key challenges:

• Simultaneous collection of wide-area and high-resolution imagery
• High volumes of data incompatible with the limits of tactical data links
• Ability to evaluate key information in time-critical situations

Critically, to maintain an ability to dynamically respond to a rapidly changing battle environment, future ISR sensor systems need to become truly modular and increasingly autonomous to maximize their effect within a multi-INT system of systems while reducing development and deployment costs.

To address these issues, the Naval Research Laboratory (NRL), in conjunction with the Space Dynamics Laboratory (SDL) and SRC, has built a multi-INT, autonomous cross-sensor cueing suite named TEISIT (Tactical EO/IR/SIGINT/SAR/FMV/GMTI Integrated for Targeting) for tactical ISR and operations support. The Office of Naval Research (ONR) funded the TEISIT program. TEISIT is a true integrated multi-INT collection platform with each sensor modality capable of serving as an autonomous cueing source for each of the other sensing modalities. The payload is designed to be SWAP compatible with deployment on a Group III unmanned aerial system (UAS). This system has demonstrated cooperative sensors that autonomously pass cues from both integrated, internal sensors, and sensors on external platforms (e.g. wide-area) to detail capturing inspection sensors, reducing data volume, analysis time, and corresponding manpower requirements for multi-INT systems. The system provides (1) real-time, full-spectrum collection of signatures of targets of interest without requiring human interpretation first and (2) higher quality data products as a result of a fusion of multiple sensors.

SDL has also developed a sensor-agnostic, embedded cross-cueing architecture that supports many ISR data types and some corresponding data processing algorithms. This architecture is called the Systems Intelligence Manager (SIGMA) and forms the core part of the TEISIT autonomous cueing and processing system. SIGMA is designed to handle sensor agnostic command and control, processing algorithms, and data collection and can adapt to dynamic missions across the DoD enterprise.

**OPERATING MODALITIES**
- X-Band SAR
- L-Band SAR
- Ground Moving Target Indicator (GMTI)
- Dismount Moving Target Indicator (DMTI)
- Electronic Support
- EO/IR

**FEATURES**
The TEISIT system provides the following benefits:
- Onboard sensor management system to coordinate and control SAR, GMTI, SIGINT, and EO/IR payloads
- Real-time SAR image formation, including reach-back processing via data link
- Real-time autonomous sensor cueing via SIGMA
- Real-time exploitation of target signatures
- Cross cueing with other sensor modalities, including hyperspectral (HSI)
- Autonomous solution reduces manpower operations costs to free valuable resources for other tasks
TEISIT SYSTEM COMPONENTS

TEISIT is a combination of technologies that includes new components and leverages existing platform-integrated sensors. The system components are:

- **Alticam EO/IR gimbal (built by Hood Tech)**
  - TEISIT controls the navigation of the Alticam to support the multi-INT system and target prosecution

- **Synthetic Aperture Radar built by NRL, SDL, and SRC**
  - Provides L-Band and X-Band SAR imagery in daytime, nighttime, and adverse conditions

- **GMTI/DMTI capability**
  - Providing the ability to detect and track movers in the scene

- **A broad-spectrum SIGINT card**
  - Provides electronic support and tactical SIGINT capabilities

- **Platform intelligence support**, including a high-fidelity navigation solution

Contact information:

Dr. Thomas J. Walls (NRL) - thomas.walls@nrl.navy.mil, (202) 767-9515 (o)

Scott Anderson (SDL) - saa@sdl.usu.edu, (435) 713-3444 (o)

Mike Addario (SRC) - addario@sricomp.com, (315) 452-8150 (o)