
CENTER FOR INTEGRATED TRANSMISSION AND EXPLOITATION CITE

Director of Information Institute

AFRL/IF-CA

http://www.rl.af.mil/rrs/Info_Inst/index.html

Outline

- **Motivation for CITE**
- **Vision for CITE**
- **New Capabilities Enabled by CITE**

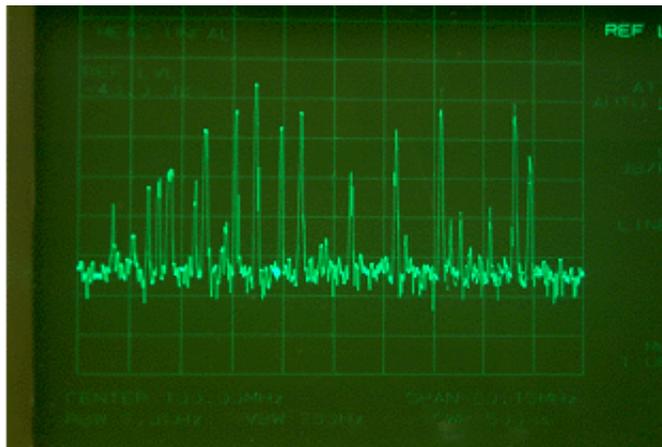
CITE MOTIVATION

- **Why Integrated Transmission and Exploitation**
- **Why a Center**

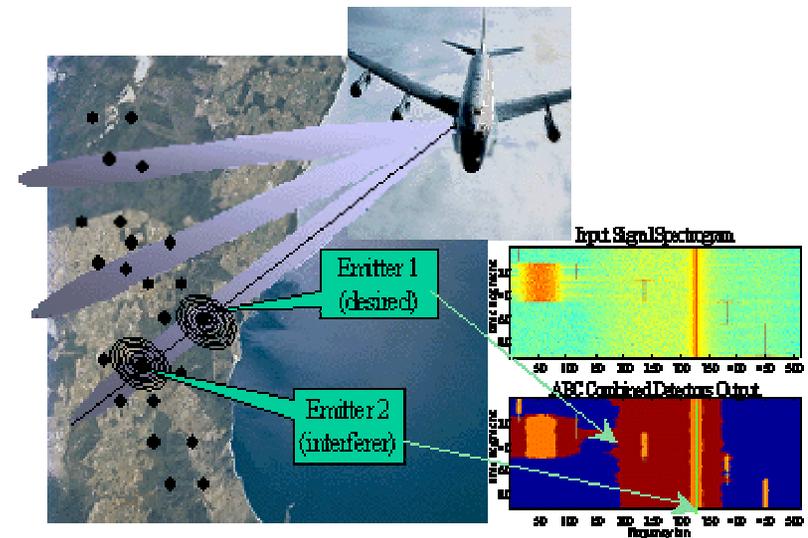
Why Integrated Transmission and Exploitation

- **A Changing World**

- Frequency Allocations
- Need For Bandwidth/High Data Rate Applications
- Density of Emitters
- New Platforms
 - UAVs, microUAVs, Surrogate Satellites, Smart Weapons
 - Micro-Satellites
 - Distributed Platforms



FM Radio Band Near 100 MHz



Emitter Density

Why Integrated Transmission and Exploitation (cont.)

- **Changing Technology**
 - **Software Radios/Processing Suites**
 - **Common Functions**
 - **Moore's Law, MEMs, Wide Band Devices**
 - **Radios That Estimate the Environment and Adapt**
 - **Exploitation Systems Estimate the Environment and Filter**



Motorola WITS Radio

Why a Center

- **IF has capable In-House groups now working on Basic Transmission and Exploitation Technologies Independently**
- **Communications and Exploitation share a Common Technology Foundation**
- **Continue to support current excellent work and add a new challenge problem that will expand and enhance the research by**
 - **Exploring the White Spaces Between the Disciplines**
 - **Add New Partnerships**
 - **Create New Capabilities**

CITE Vision

- **A World Class Basic Research Center**
 - **An In-House Team of Government and Contractor Staff supplemented by Post-Docs and Visiting Scientists**
 - **Collaboration with Academic and Industrial Centers of Excellence in Supporting Technologies**
 - **New and Exciting Research Directions**
- **X-CITE**
 - **World-Class/Unique Test Bed Available to Center Staff and Partners to Evaluate New Technologies and Showcase Ideas to Customers**

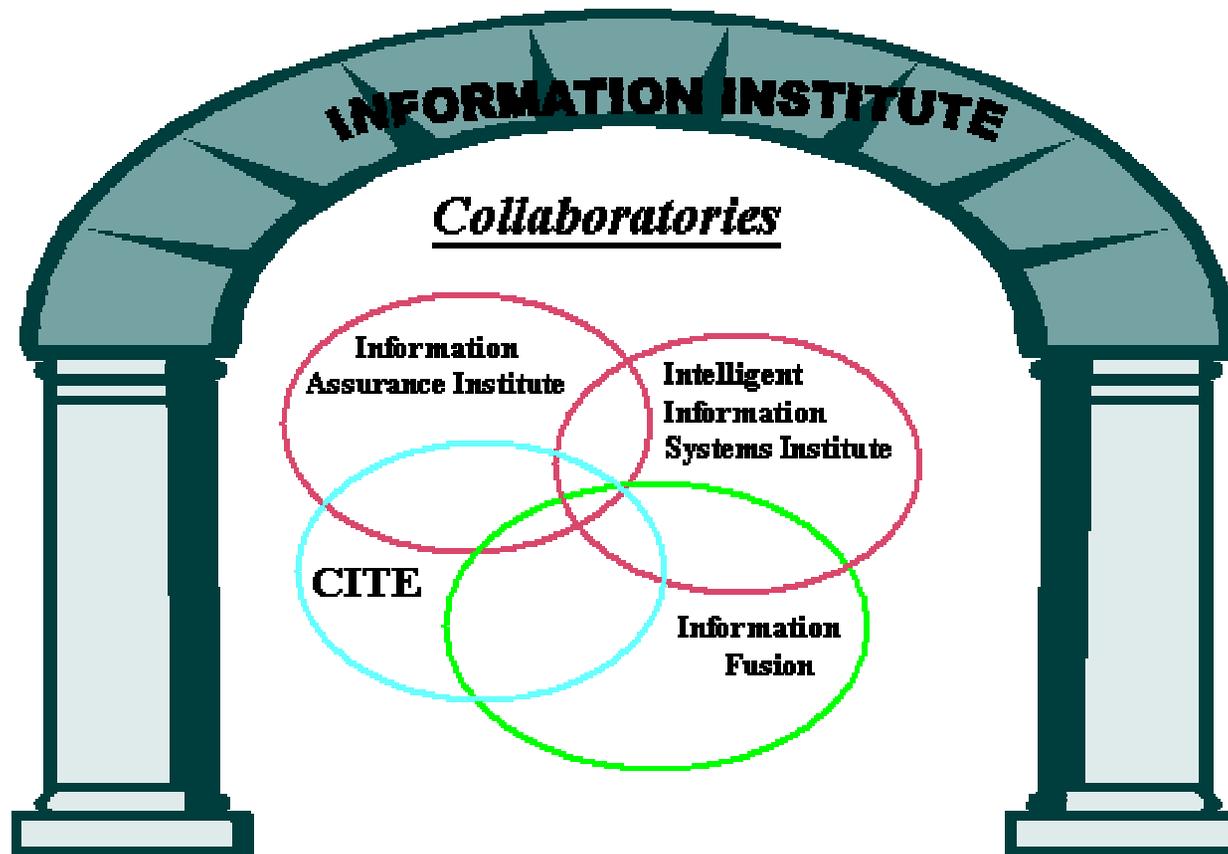
New Capabilities Enabled By CITE Research

- **Better Communications and Exploitation Systems**
 - **Better Communications Enabled by Understanding the Threat and the Environment**
 - **Better Exploitation by Understanding the Principles of New Waveforms / Communications Techniques**
- **Combined Communications and Exploitation Systems**
 - **Common Hardware and Software**
 - **Exploit when not Communicating**
 - **Communicate when not Exploiting**
 - **Information Sharing**
 - **Communicate in Spectrum Notches**
 - **Morph to Operate Anywhere**
 - **Mask Signals, Tailor Spectrum**

New Capabilities Enabled By CITE Research (cont.)

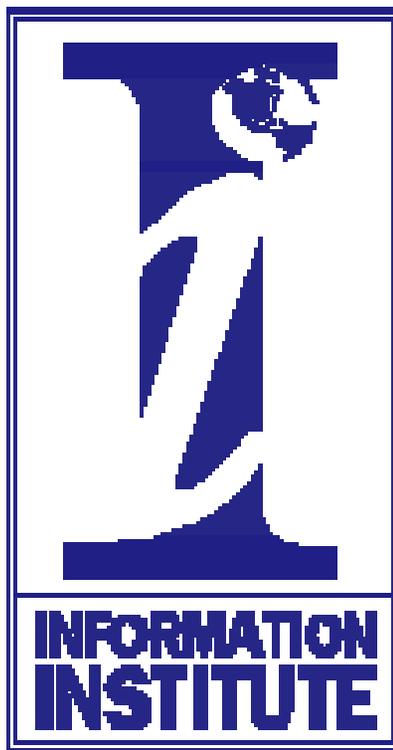
- **Distributed Operation**
 - **Every Radio has Part of the Exploitation Picture**
 - **Local Knowledge - Now Used Locally then Discarded**
 - **Swarms of (Micro) Sensor Platforms that Exploit then Communicate**
- **Adaptive Smart Sensor and Communications Systems**

Planned and On-going Institutes & Centers



Summary

- **CITE is One of Four New Collaborative Research Opportunities Between IF, AFOSR and Academia**
- **With help from the AFOSR, the Information Directorate is Raising the Level of Basic Research in Information**



http://www.ri.af.mil/rrs/Info_Inst/index.html