Introduction

Applied Research Associates
Unmanned Systems and Security Products
Lead Scientist: Dr. Lance Besaw
Prime Qualifications

• Proven ability to build and manage large diverse technical teams performing on long duration competitive R&D programs
• Stable research firm comprised of in-house staff with deep technical capabilities
• Nimble, customer-focused project management and execution
• Proven experience with image/video processing R&D and deployment
• Proven deep learning technologies applied to many sensing phenomenologies (EO/IR, radar, EMI, seismic & acoustic)
Motion Imagery Intelligence System

Currently developing sequence-to-sequence video recognition technologies for security applications (FMV or < FMV)

- Convert image pixels to textual descriptions of objects and actions of interest
  - Objects: people, vehicles, infrastructure, weapons, digging tools suspicious artifacts, etc.
  - Actions: digging, carrying, entering/exiting…

After 2014 Intelligence Analysis White Paper

Relationship of Data, Information and Intelligence

Collection

Processing and Exploitation

Analysis and Production

Operational Environment

Data

Information

Intelligence

Frames

CNN

LSTMs

... armed

man

enters
Past Performance

- **IRAPA FINDER**: Current prime in 4th phase of 4+ year program for image/video geolocation
- **US Army Deep Learning**: Prime for 3 yr program using deep neural networks with GPR and EMI sensor modalities
- **DARPA ULTRA-Vis**: Prime for HMD situational awareness soldier system ➔ Net Warrior and immersive training community
- **DTRA IMEA**: Current prime for 20+ years of weapons effects modeling and force protection analysis software
- **JIDA Culvert Challenge**: Prime for seismic/video detection and discrimination, object/action/intent recognition
- **NRO Geospatial Metaverse**: Major contributing sub for feature extraction and object reconstruction. End-to-end generation of game environments from source data.
Research Area of Interest
RDT&E security sensors and algorithms
Video analytics: FMV and WAMI processing and exploitation
Machine learning (deep learning)

Desired Complementary Technologies
Person/object re-identification
Tracking across multiple non-overlapping camera viewpoints
Super-resolution video processing
HPC with GPU clusters
Contact Information

Lance Besaw, Ph.D.
250 Beanville Road
Randolph, VT 05060
lbesaw@ara.com
(802)728-7411
www.ara.com