Automatic Targeting Solutions Over Heterogeneous Databases Using Intelligent Agents

Presenter: Keith Davis
Integrity Applications Incorporated

Danny Searle & Nathan Kielman
NAVAIR Weapons Engagement Office

Ken Abeloe & Dan Crisp
Integrity Applications Incorporated

iGeoAgent

Project Overview

<u>Operational Statement</u>: Streamlines time critical targeting (TCT) processes by providing real-time updated precision IMINT solutions to targeteers, weaponeers, mission planners, and intel analysts.
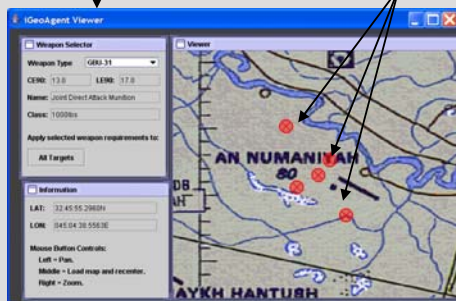
iGeoAgent

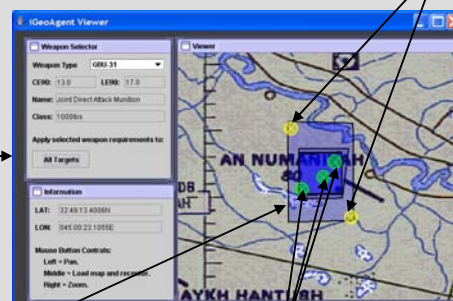# Project Overview (CONOPS)

Targets of Interest

No Solution: Not Processed

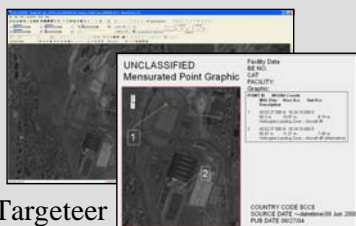Unsatisfied: Image Solution Unavailable
(Further Processing Required)

PGM Quality?

Weapon Requirements

Image Footprints

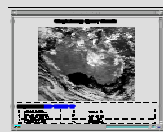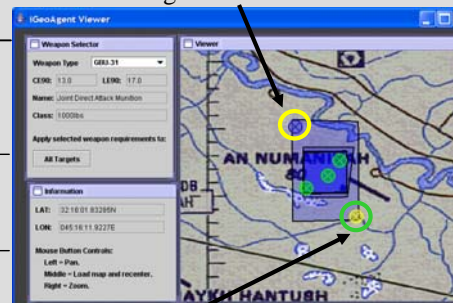Satisfied: Image Solution Available
(JDAM Accuracy, Local Imagery)

Unsatisfied: Image Solution Unavailable
(Collection Management Parameters Available)

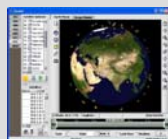3 Targets for Mensuration

Targeteer

UNCLASSIFIED
Mensurated Point Graphic

1 Target for Image Retrieval

1 Target for Collection Manager

Satisfied: Image Solution Available
(Images Available at Remote Archive)
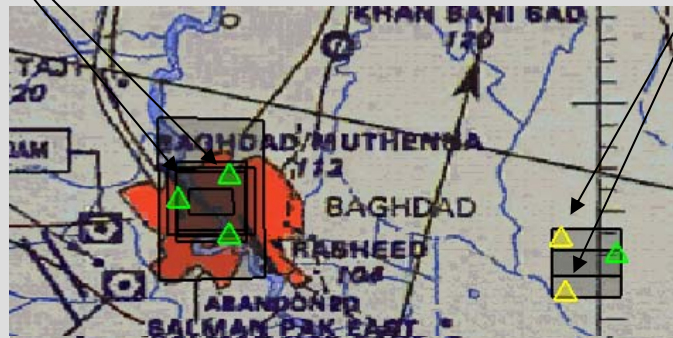
Intel

Collections

Back

Next

iGeoAgent

Project Overview (First Phase)

Satisfied Targets
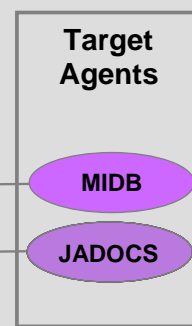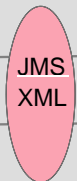(Ready to Strike)

Unsatisfied Targets
(Further Processing)

Imagery Data Sources
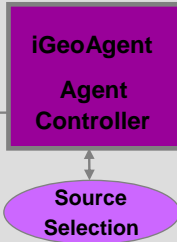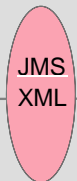
Image Agents

IPL

JMS XML

iGeoAgent Agent Controller

Source Selection

JMS XML

Target Agents

MIDB

JADOCS

Target Data Sources

New Targets

Back

Next
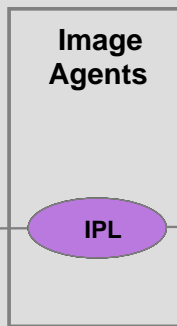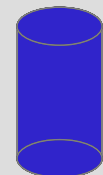
iGeoAgent

Precision Solution Determination

- Various individual images are combined and tested using rigorous sensor models
  - Only image header data is required
  - 1- 5 images combinations are tested

- Solutions are determined for various PGM's
  - SDB, JDAM, JSOW, SLAM-ER

- Solutions are determined for NTM, DPPDB, Commercial products

iGeoAgent

Precision Solution Determination

- Individual images are weighted based on external information
  - Support Data: NIIRS, GSD, Elevation Angle
  - Time of Collection
  - Weather Conditions (per user specification)

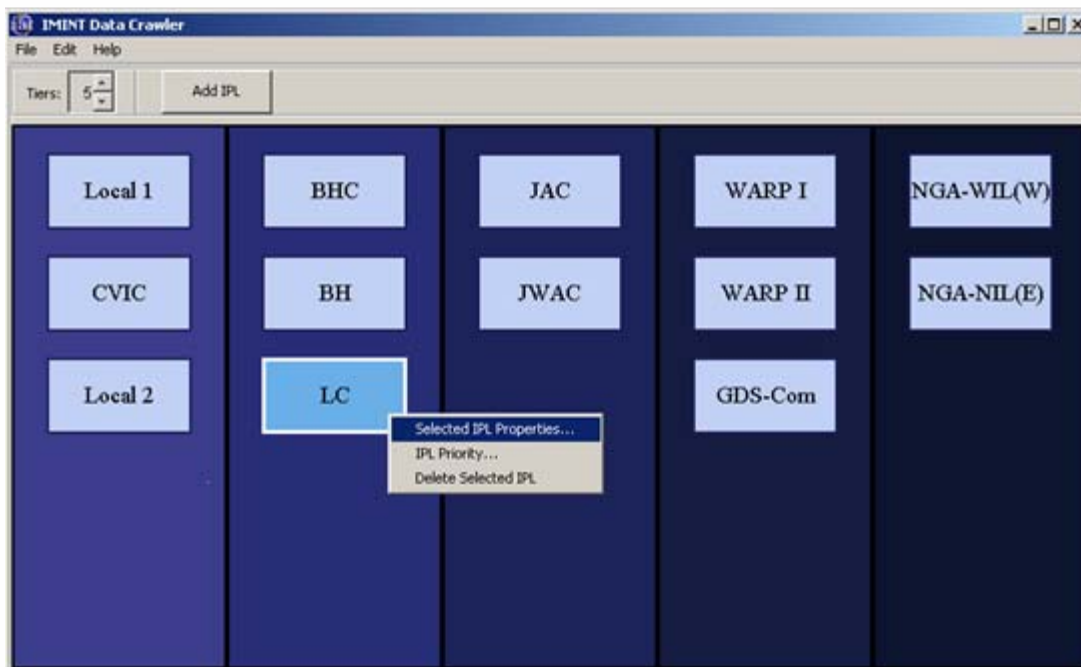- Higher FOM images are prioritized in the source selection algorithm

iGeoAgent

Further Processing (IMINT Data Crawler)

- IMINT archives are crawled (query, retrieve) using a tiered approach for potential coverage
 - FOM's are applied to weigh dissemination time and ease of access

iGeoAgent

Further Processing (Collections)

- No IMINT solutions are available to meet a PGM accuracy requirement

- Messaging triggers a reverse source selection request

  - Inputs: Accuracy requirement, Failed Images

  - Outputs: Sensor tasking parameters for acquiring an additional 1-2 NTM image to meet accuracy
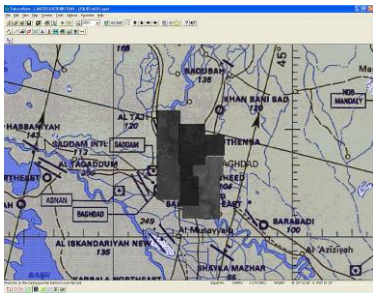
Current   Collection   Circular Error (CE)
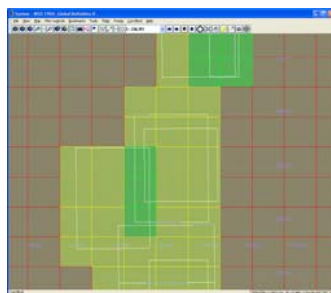
LE

LE

WGS-84   Linear Error (LE)
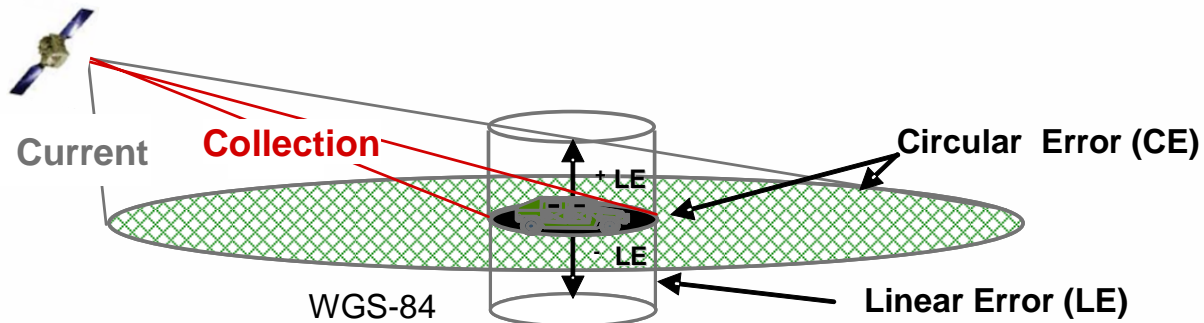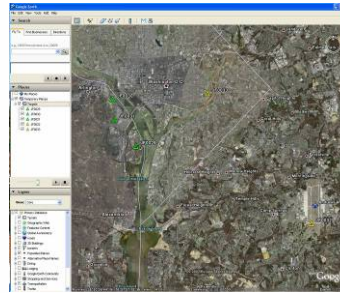
iGeoAgent

Further Processing (Feedback)

- Solutions set can be rejected by 3rd party apps through a web service interface

- Output results are available through web service
  - Visualization Systems: FalconView, Google Earth, GCCS COP
  - FIRES Systems: JADOCS

JADOCS

FalconView   GCCS COP   Google Earth

iGeoAgent

Conclusions

- Provides weaponeers, targeteers, and mission planners insight into the current availability of IMINT precision solutions

- Eliminates the manual hunt and peck process for locating data in time critical situations

- Increases the utilization of NTM and Commercial products (alternative to potentially old DPPDB)