



- ADVANCED CONCEPT ENGINEER FOR GEOSPATIAL, L3HARRIS TECHNOLOGY'S SPACE AND AIRBORNE SYSTEMS
- "SENSORS AND TECHNOLOGY IMPACTS ON THE FUTURE OF AI"

JOHNNIE DELAY

johnnie.delay@l3harris.com



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SENSORS AND TECHNOLOGY IMPACTS ON THE FUTURE OF AI

John L. DeLay
321-984-6943, johnnie.delay@L3harris.com

Nov. 12th 2020

Agenda



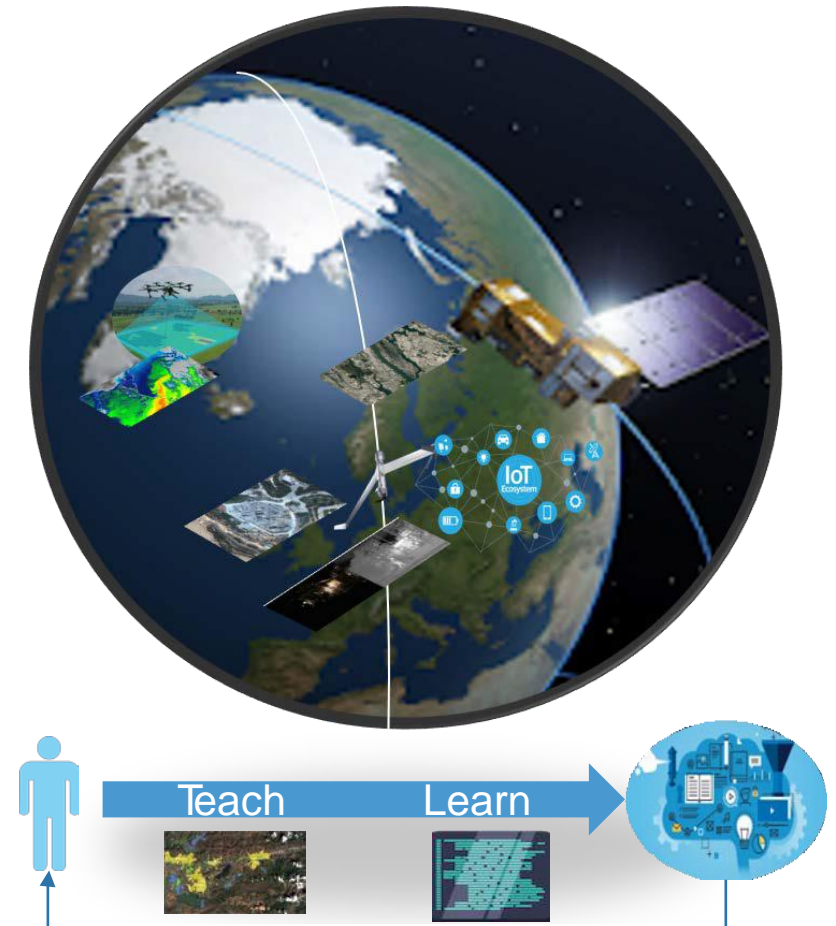
- Realities for modernizing GEOINT
- Critical elements for successful artificial intelligence (AI)/machine learning (ML)
- Advanced concepts for automating data management and analytic outcomes

Realities For Modernizing GEOINT



- EO constellations fundamentally will change earth observation
- Increases in ground, aerial and UAV platforms impact data integration challenges
- Data must become interoperable, and service-enabled via web friendly standards like “STAC”
- “Virtual Constellations” integrated data = persistence which changes AI from target based to scene and mission-based
- AI label data training will struggle to keep up with demand while synthetic training data approaches mature

More Data Enables The Next Generation of Intelligence



<https://www.erd.c.usace.army.mil/Media/Fact-Sheets/Fact-Sheet-Article-View/Article/712948/army-geospatial-enterprise-age-node>
Image credit to the Enterprisesproject.com
1: What to do when Machines Do Everything, Malcom Frank, Paul Roehrig and Ben Pring

Critical Elements for Successful AI/ML Application

- Data driven AI is really hard



Albert Einstein: “artificial intelligence is no match for natural stupidity”

EASY

Data



TOO MUCH DATA

Trained Analyst



Cant Scale

Analysts Interrupt The Entire Image



We Trust Analysts

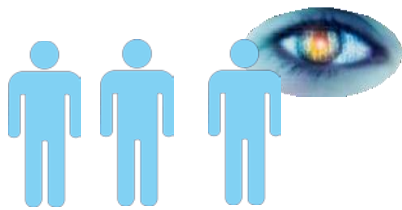
“The speed of disruption from machine driven AI and (CA) Cognitive Analysis will have more impact faster than humans could ever achieve”

Image Scientist + Data Scientist + Trained Analyst

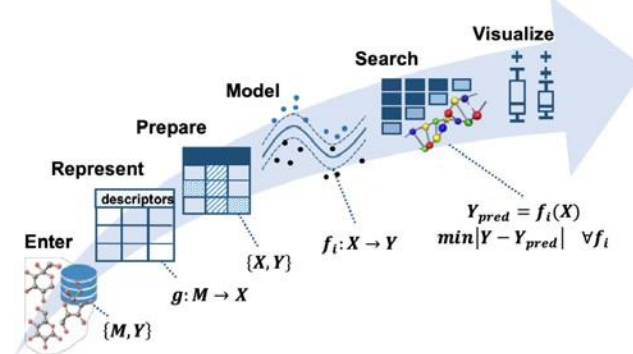
Massive Number of Variables

Machines Interrupt What They Are Taught

Really Hard

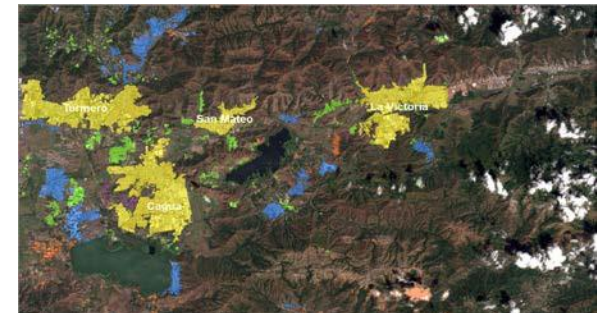


Harder to Scale



Unlimited Scalability

We Have to Prove Trust

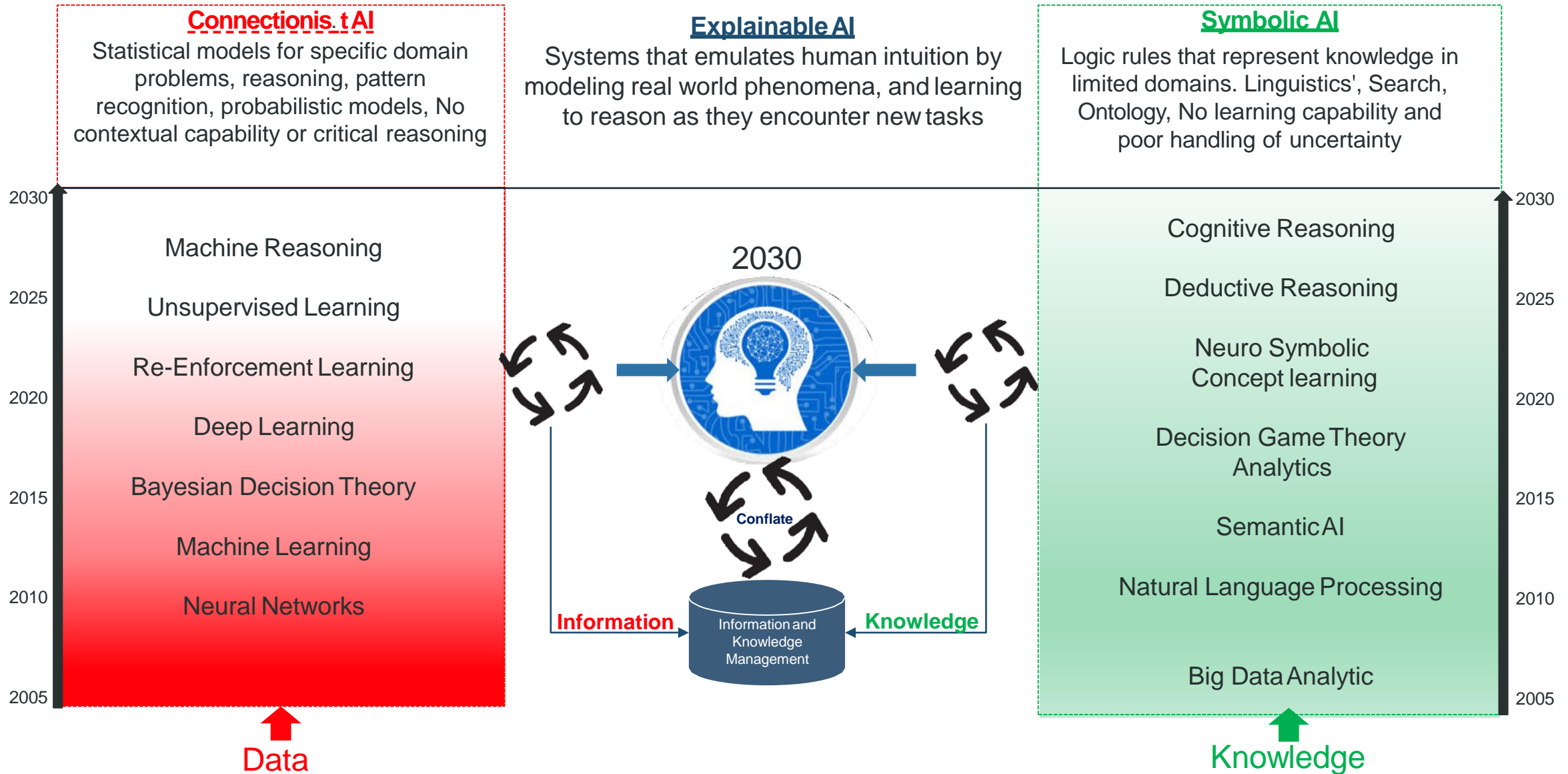


Detect Things

Image credit to: <http://inspirehep.net/record/1718140/plots>

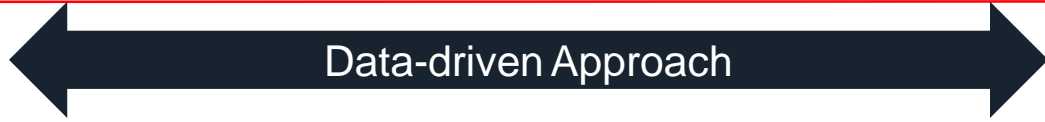
The evolution of AI

-Future state GEOINT



Critical elements for successful AI/ML application

- Five levels of automation will impact AI



We are investing here



Analyst produced trusted intelligence through proven tradecraft

Human



Manual

Machine detections of simple to extract objects of interest used to augment analyst workflows

Detections



Simple

A system to derive one or more detections from multi-modal data used to extract objects or signatures

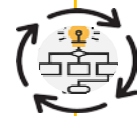
Multi Modal AI



Partial

Streaming Intelligence
A analyst derived model to analyze complex scenes or missions that deal with all variables based on trained parameters

Model & Scene Driven AI



Conditional

Knowledge Graph
Machine derived intelligence through semantic driven search enrichment of dynamic ontologies to discover linked data

Semantic AI



Full

Machine derived ability to understand normal form abnormal and predict outcomes based on multiple hypothesis

Sense Making



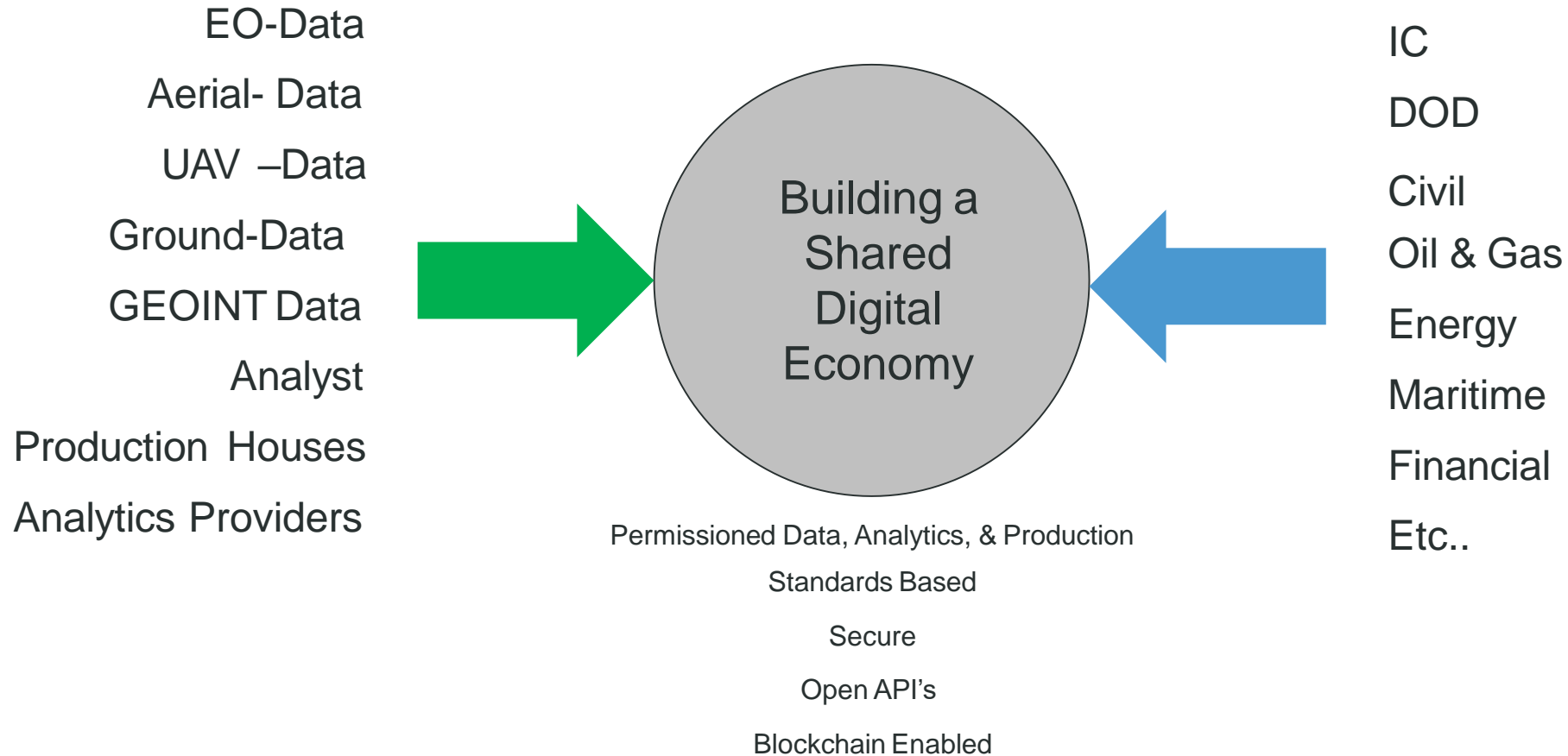
Prediction

Level of Automation

The Future “Democratized GEOINT”



ENABLING TRUSTED TRANSACTIONS THROUGH A MODERN SUPPLY CHAIN



Summary



- **More Earth Observation high cadence data will have a positive impact on the IC/DOD; however it requires better ways create a trusted environment to allow providers to engage with government consumers**
 - Ability to collect and analyze data cubes will increase pressure on automation.
 - Optimizing AI requires advances in labeling, transfer learning and synthetic data generation .
 - Simple AI could create a new data problem, without context detections are meaningless.
 - Connectionist and Symbolic AI will merge in future to allow machines to provide human-level intuition.
- **Lifecycle management solutions, standards & process, developments are needed to ensure “AI” Assurance, Transparency, Reliability, & Trust**
- **“Democratized GEOINT” will become the enabler for a new business opportunities by providing a trusted eco-system among providers and consumers**

For more information



John L. DeLay
Sr. Scientist, Advanced Concept Engineering
L3Harris, Geospatial Solutions
O: 321-984-6943
M: 513-289-4766
USGIF: Co-Chair ABI

<https://www.l3harris.com/>

