



**EAS**  
ENVI ANALYTICS SYMPOSIUM

# Remote Sensing for Enhancing Global Security

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# This Date in History: August 15<sup>th</sup>



**1620:** Mayflower sets sail from Southampton, England, with 102 Pilgrims

**1769:** *Happy 250<sup>th</sup> Birthday, Napoléon Bonaparte!*



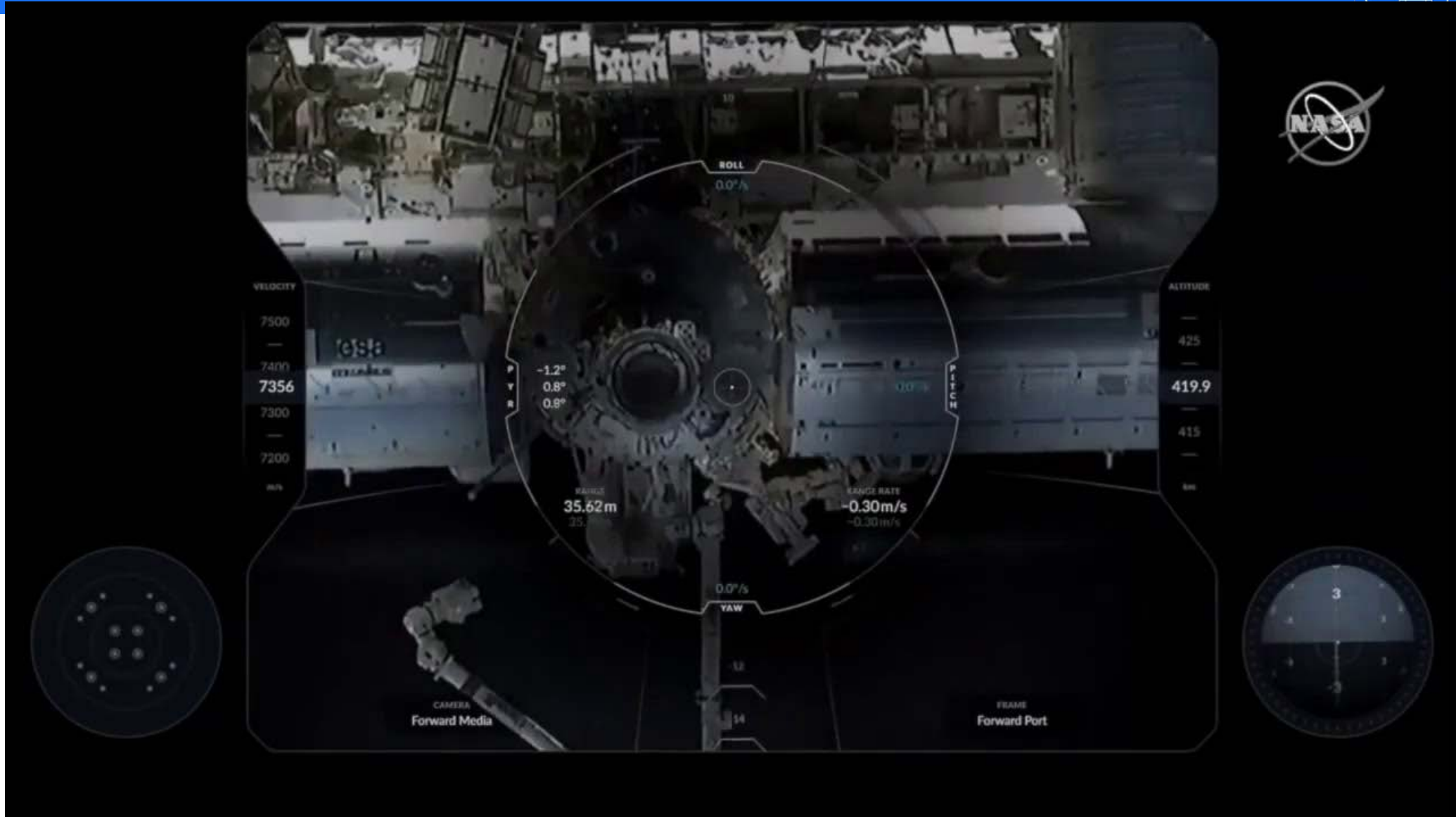
# Four Tenets of Data Analytics



- **Our perspective is increasing** (*in scope & breadth*)
- **Technology is getting better** (*faster than expected*)
- **Speed of decision is essential** (*in business & in battle*)
- **Everything has a signature** (*we just need to find it!*)



# Skylab 1973 vs. Dragon 2019



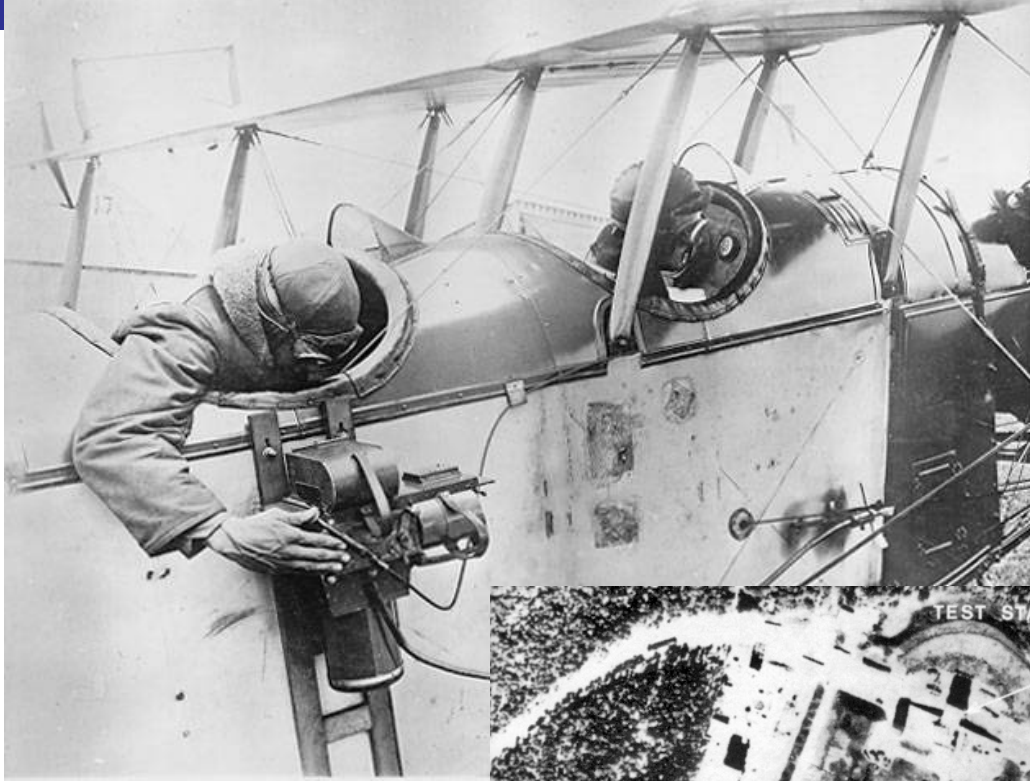
# Many “Information Ages”



- **1<sup>st</sup> Information Age:** Verbal information exchange
- **2<sup>nd</sup> Information Age:** Stored Information
  - *Cave writings, Petroglyphs*
- **3<sup>rd</sup> Information Age:** Portable Information
  - *Sumerian tablets; Egyptian papyrus*
- **4<sup>th</sup> Information Age:** Mass-Produced Information
  - *Gutenberg's moveable-type press*
- **5<sup>th</sup> Information Age:** Demassification of Information
  - *Freedom from physical form: telegraph to TCP/IP*



# Early Aviation: *Polite Reconnaissance*



- **Pre-WW I:** Opposing pilots would wave at each other during missions
  - ... until ground forces realized the value of overhead reconnaissance.
  - *Then they started shooting at each other!*
- Today, Air Supremacy is a primary mission of USAF



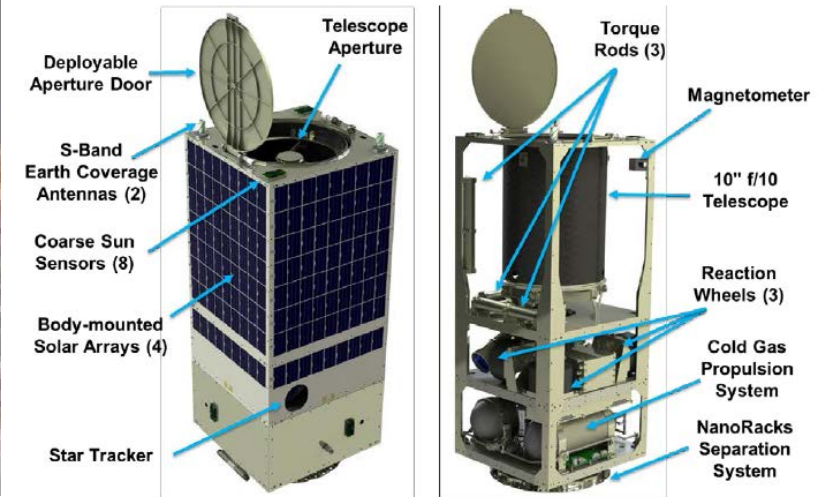
# Global Perspectives: *Instant Worldwide Awareness*



# Overhead Imagery: *No Longer just for Superpowers*



Kestrel Eye microsat deployment from ISS (October 2017)

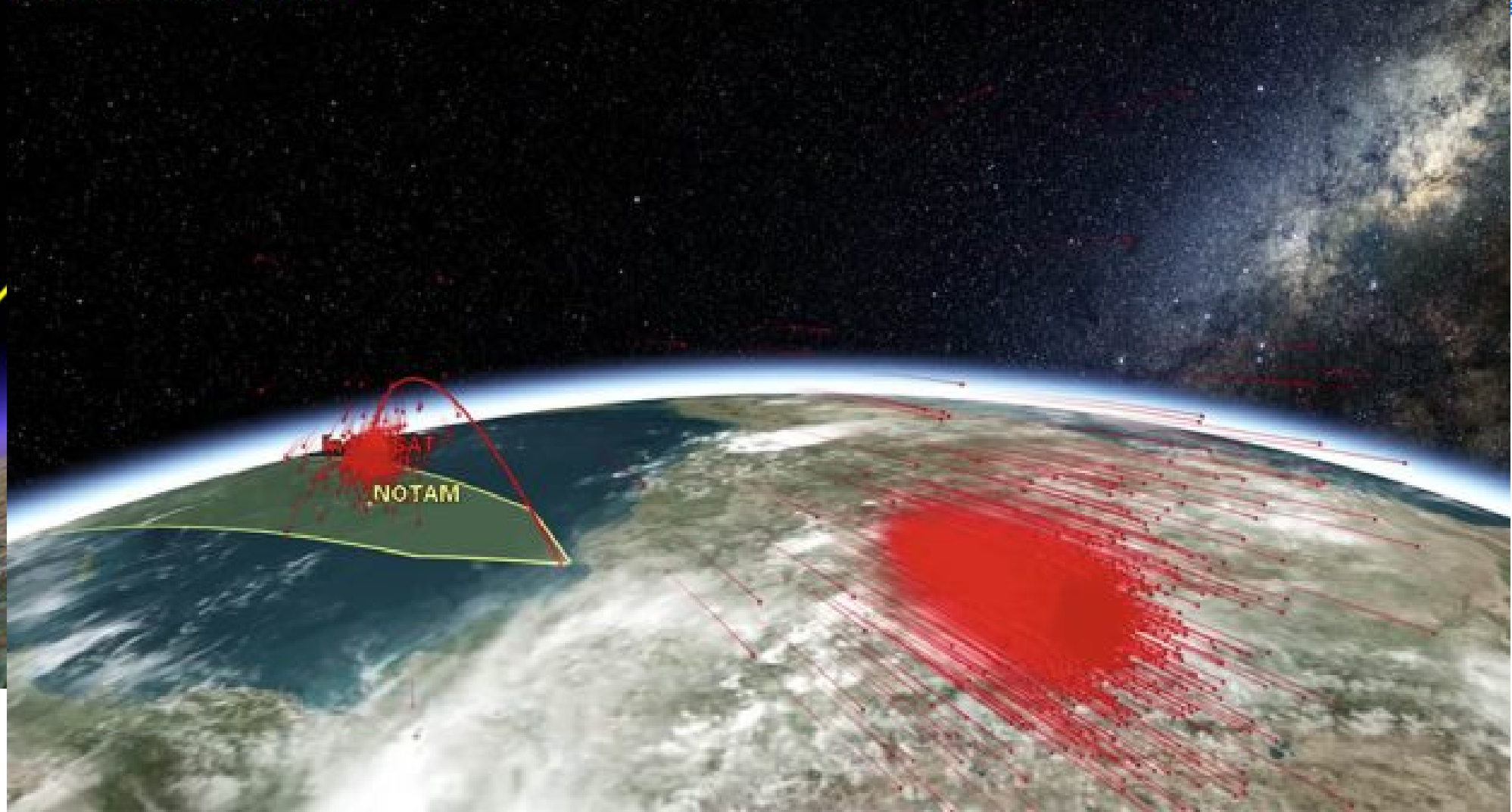




# Space: *Increasingly Congested and Contested!*



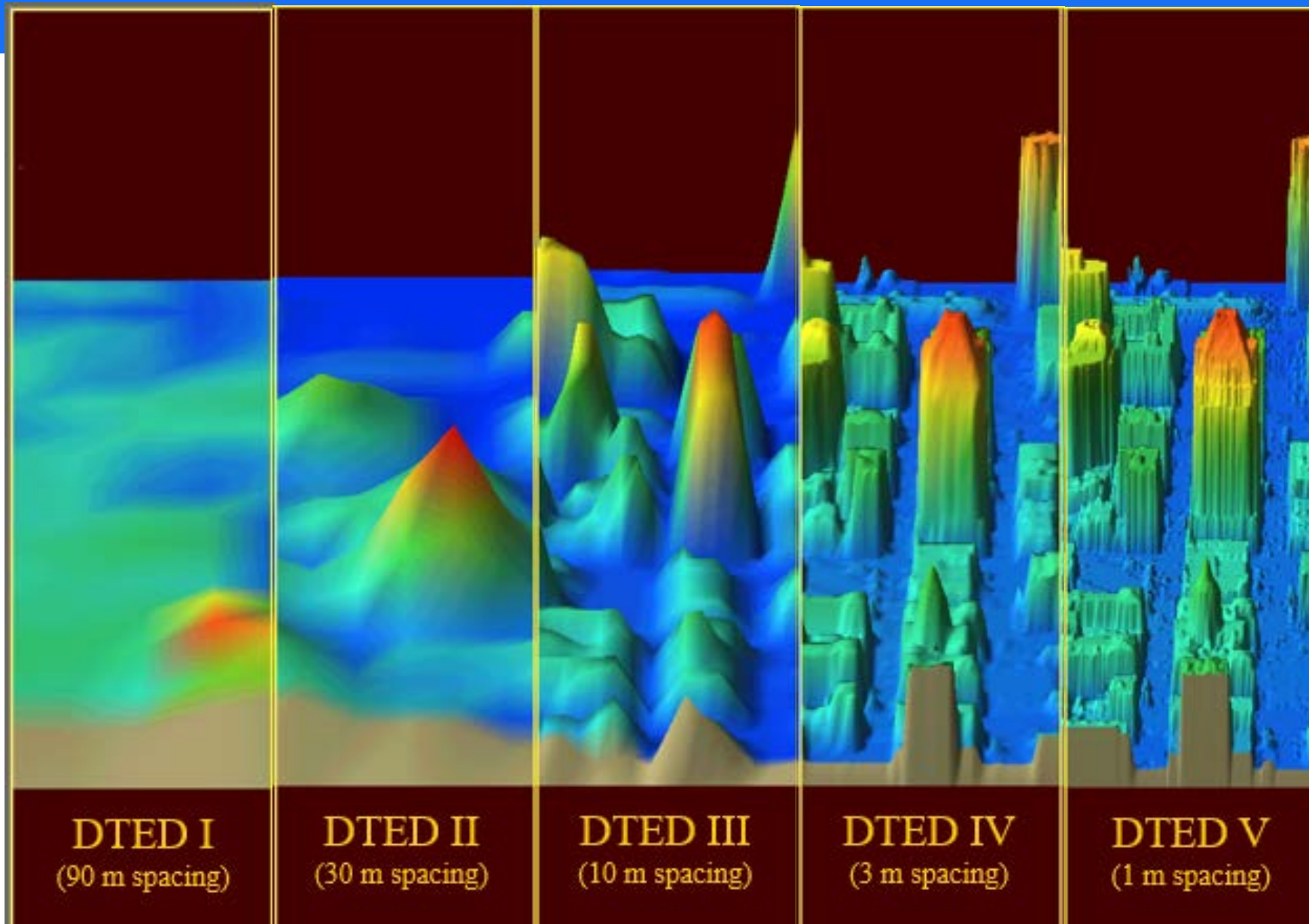
27 Mar 2019 05:45:10.50



NOTAM



# Technology: Quickly Outpacing Policy & Law



**DTED:** Digital Terrain  
Elevation Data (an  
NGA data standard)





# Commercial Imagery has Changed Warfighting



**Right:** 10 m open-source imagery  
(from Sentinel-2 satellite)

- Much coarser view
- *Unknown data latency*
- Free of charge

**Left:** 0.5 m hi-res (Airbus's Pleiades)

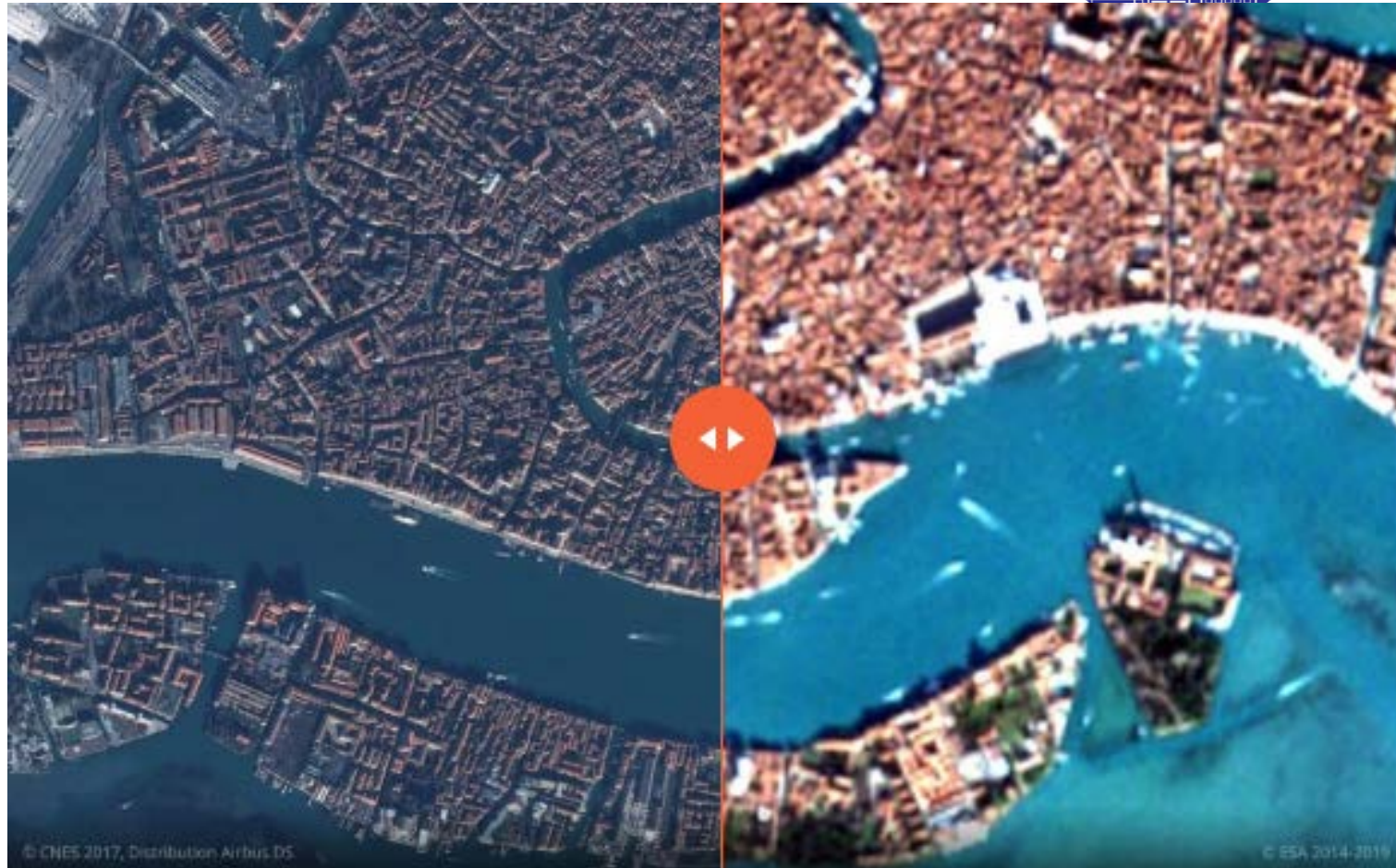
- *Clearly representing details like small boats & narrow streets*
- But this comes at a cost

***What resolution do you need?***

***How quickly do you need it?***

***- Days? Hours? Seconds??***

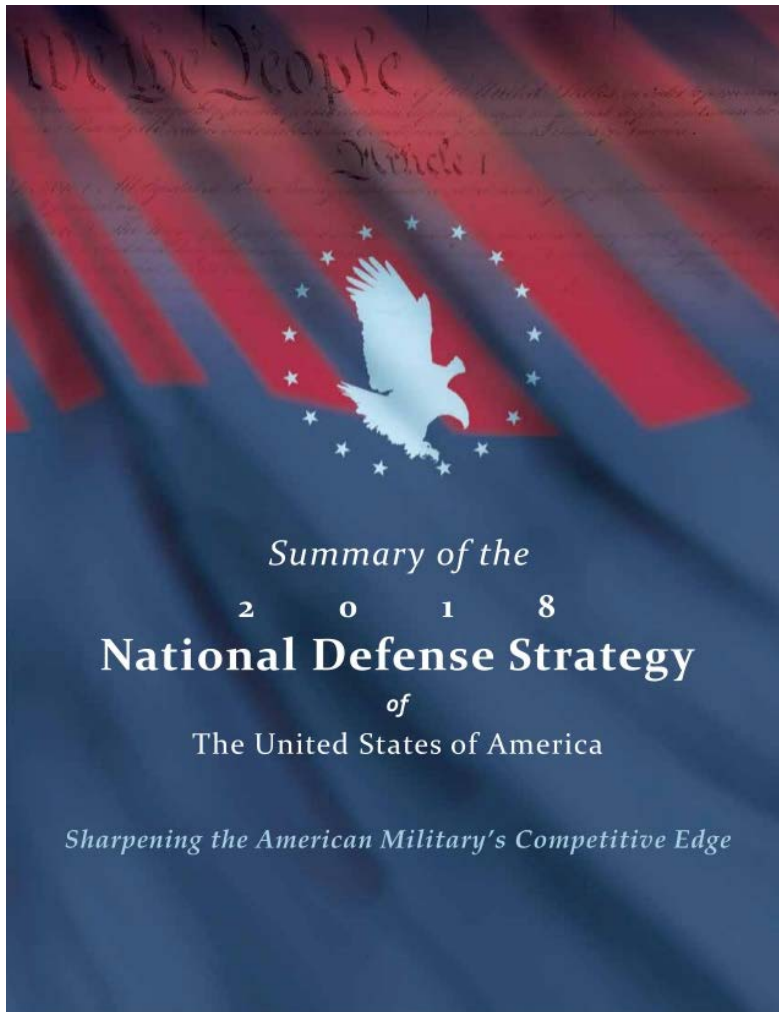
***Agriculture >> Wildfire >> War***



Source: <https://eos.com/blog/satellite-data-what-spatial-resolution-is-enough-for-you/>



# 2018 National Defense Strategy of the U.S.



***“Success no longer goes to the country that develops a new technology first, but rather to the one that better integrates it and adapts its way of fighting.”***





# “Generations” of War (*à la Mel Gibson movies*)



- “0<sup>th</sup>” Gen: Mob mentality
  - Mel: *Braveheart*
- “1<sup>st</sup> Gen”: Rank & File
  - Mel: *The Patriot*
- “2<sup>nd</sup> Gen”: Massed Fires
  - Mel: *Gallipoli*
- “3<sup>rd</sup> Gen”: Maneuver
  - Mel: *We Were Soldiers*
- “4<sup>th</sup> Gen”: Asymmetric
  - Mel: *Mad Max*



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# What if ... ?

- ... we could identify spectral signatures of all threats?
- ... everyone had easy access to precise, near-realtime data?
- ... we could inform decision makers quickly and accurately?

***Data provide a Universal Equalizer for Economic Growth – and Global Security!***

