



# Unpredictable Intelligence Surveillance & Reconnaissance (ISR)/Electronic Warfare (EW)

Art of the Possible

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<https://www.kennedyspacecenter.com/launches-and-events/events-calendar/2022/november/rocket-launch-spacex-falcon-heavy-ussf-44>

# Understanding and Challenge

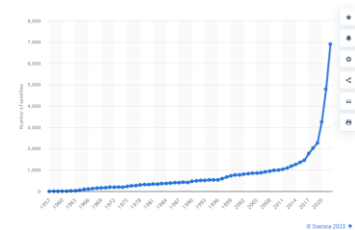
- Global strategic environment continues - characterized primarily by competition between the United States and a rising China
- Major change is due to a Russian resurgence since 2017
- Competition is marked by Chinese and Russian malign activities below the threshold of armed conflict
  - Significantly eroded United States' 50-year military advantage to include our operationally important capability associated with U.S. ISR assets
- Acknowledged by analysts and operators: Our space-based (and airborne) ISR is a predictable overhead capability
  - Collecting lots of ISR data that is not useful due target preparedness
  - Methods and timing is predictable, anticipated, and projected
  - Adversary space-based intentions primarily terrestrial ISR one dimensional “looking up”



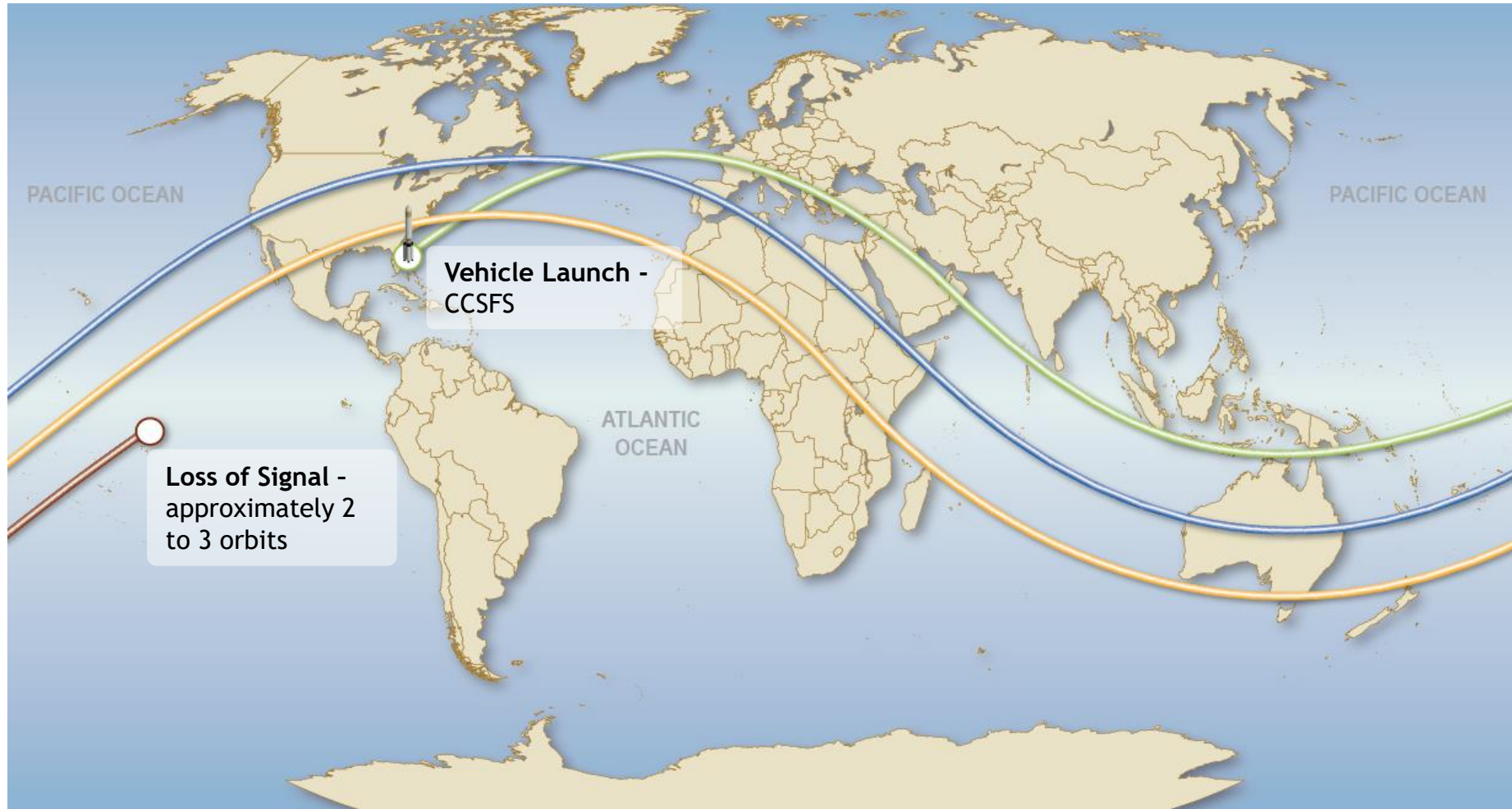
Challenge: how do we generate better defensive/offensive dominance from the Overhead and Space to Space ISR domains by being unpredictable?

# Vision

- Commercial space partners - platforms/vehicles deliver payloads
  - Unpredictability through use of the rocket as the collection platform, launch frequency, geographic options, and telemetry variability
  - Secondary/tertiary non-persistent capability for effective ISR (can operate in A2/AD domains)
- Frequency of the current national and international launch cadence provides
  - Continuity (not persistence) of collect and consistency for operationally useful data (e.g. potential change detection monitoring)
  - “Real-Time” data delivery via emerging and innovative high bandwidth BLOS platforms and technologies
- Enablement is provided by
  - Innovative and available “attritable” sensors and on-board processing technologies
  - Engineering and materials development from decades of platform evolution and emerging methods inherent in hypersonic initiatives



# Approach



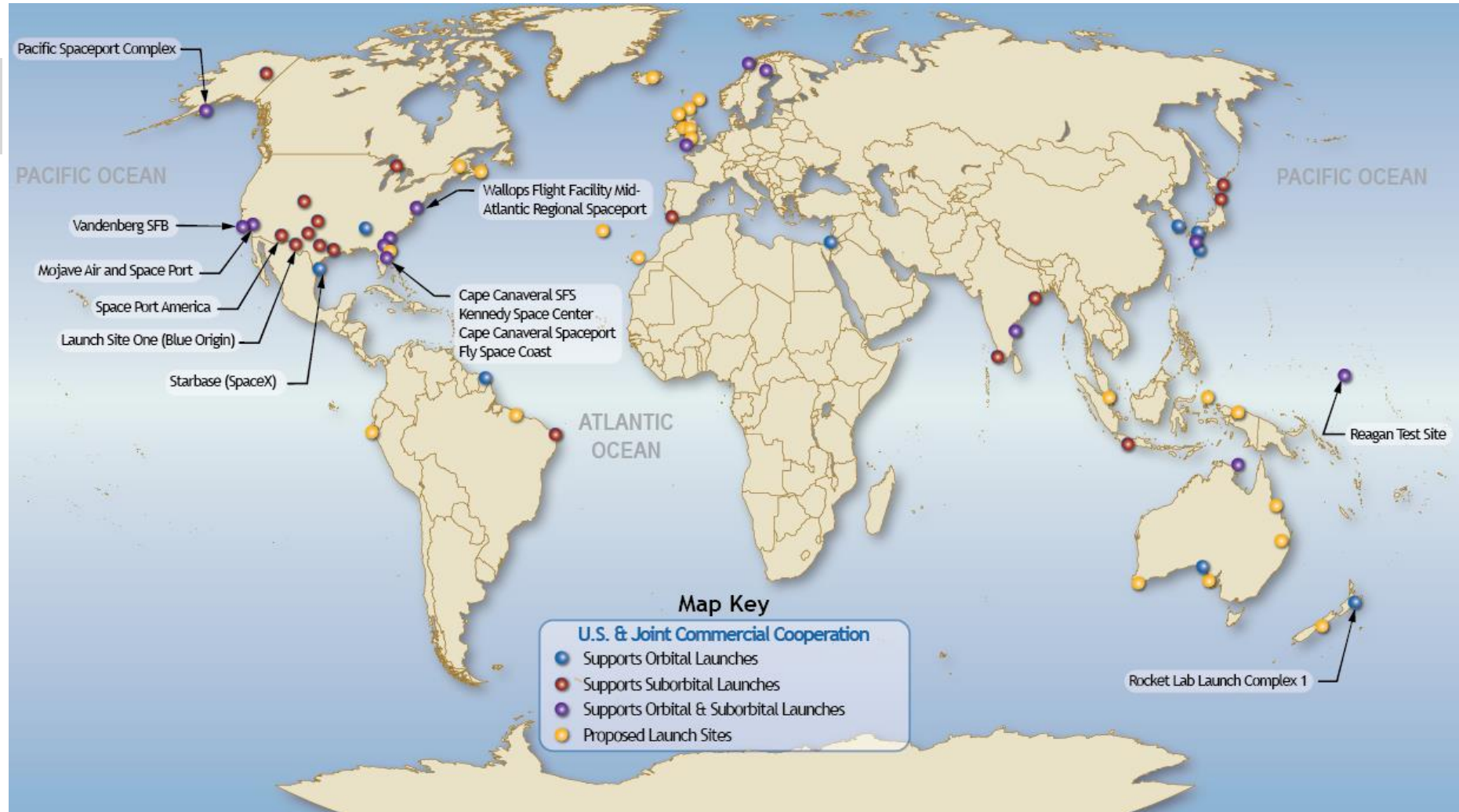
## Potential Telemetry to support ISR

- Orbital tracks are ideal due to the coverage and possibility of more than one pass before return or destruction
- Due to altitude and track, collect covers a broader geographic area
- Location of communication constellations enables BLOS data delivery to specified ground stations
- Typical orbital speed and time is 17,500 mph/90 min
- Even suborbital tracks can yield useful collection if the target area within planned distance
- Typical suborbital time depends on altitude, 62+ miles

# Orbital and Suborbital Launch Sites of the World

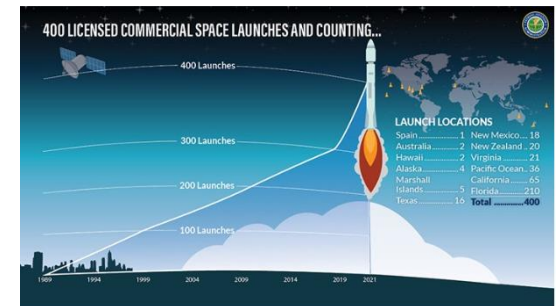
## Numerous Mission Options Available

- Space “use” is exploding
- Commercial Space Partners are executing broad global presence
- With existing and planned sites, geographic coverage will drive launch cadence
- CONUS sites are ideal for use of orbital missions due to existing agreements and familiar infrastructure
- CONUS and Int’l sites can be ideal for suborbital collect purposes due to the variability of telemetry



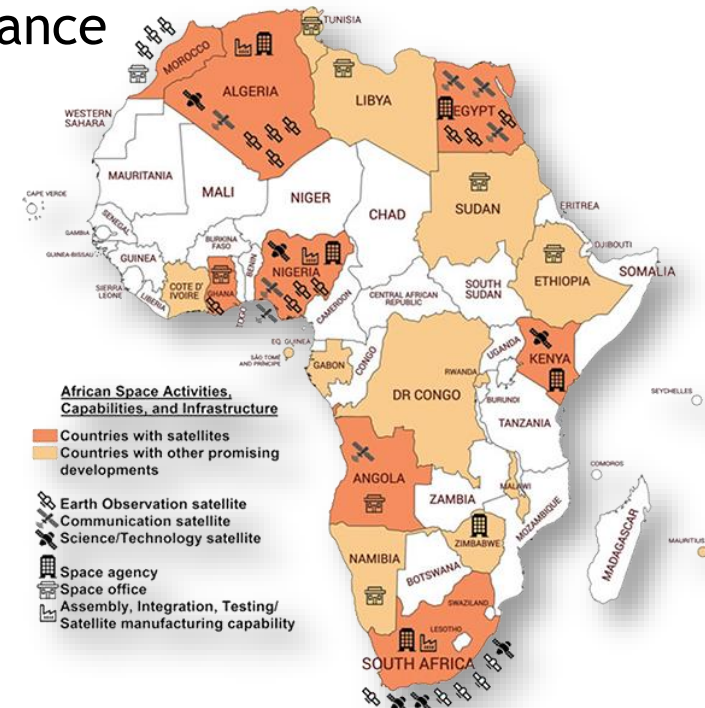
# Methodology

- Commercial launch vehicles and platforms “CAN/COULD”
  - Provide configurable space inside the fuselage for various collection sensors, onboard processing and data transmission
  - Engineer and fabricate “moldable pods” that would provide for external configurations if space restricted or sensor accommodation is needed
  - Depending on the INT, much of the data “hidden” in the telemetry transmission stream with high-speed BLOS
  - Due to “pass” speed, even large data streams is transmitted before the vehicle burns up on re-entry
  - If agreed upon by commercial contractor, even EW is considered critical
  
- Geographically diverse and available US and Allied Nations launch locations used by commercial space companies
  - Available in every hemisphere and almost every time zone
  - US and international launch frequency, 83 launches (2.59/wk) Jan-Aug '23 of suborbital and orbital vehicles



# Direct and Adjacent Opportunities

- Drive expedited contracting to incentivize commercial offeror participation and cooperation
  - USG Innovation directorates and Labs collaborate with industry on requirements for applicable innovative and emerging technologies (means funding with purpose)
  - Streamline SBIR/OTA governance to incentivize participation
  - USG streamline related FMS/FMF acquisition/funding timelines to incentivize initiatives; provide greater Direct Commercial Sale protection/assistance
- Expedite economic investment for the nations of Africa and South America
  - They are open for business and our adversaries are consistently ahead to the negotiating table; clear strategic move for adversaries
  - Partner with governments to build launch facilities
  - Incentivize commercial companies to expand manufacturing and launch sites
  - Expedite and expand “proposed” site construction to enable broader options for coverage



# Risks

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- Adversary hostilities and aggression towards commercial launches
  - Direct aggression through hostile government kinetic action
  - Hostile governments incentivizing/encouraging direct aggression through terrorism
  - Direct aggression through cyber attacks from hostile governments and surrogates
- Commercial company skepticism towards protections of their assets
- Incentive funding availability
- Slow USG execution to modify acquisition governance and international partner engagement; countering adversary engagement in same territory





# Recommendations

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- Near Term
  - Collaborate/Incentivize Commercial Space Providers to ...
    - Develop and test a multi-INT sensor suite and an optional RF directed energy Irregular Warfare/Electronic Warfare (IW/EW) capability
    - Develop and test a pod to be mounted to the rocket
    - Develop and test internal custom racks with power configuration to hold the sensor(s) and comms equipment
    - Incorporate ISR missions into commercial launches
  - Develop data PED capabilities to capitalize on the data received to formulate actionable responses
  - Collaborate/Incentivize construction of “proposed” launch sites globally
- Longer Term
  - Modify acquisition governance to expedite delivery of this capability
  - Expedite FMS/FMF funding to same or sooner budget cycle as typical DoD budget
  - Expedite negotiations and treaties with Cooperative Nations to get ahead of the Power Competition

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