Space - Cyberspace

Responsibility – Protection

Ethics – Social Responsibility

Dr. Nick Demos

- **Internal and external factors affect massively**

1. *ECONOMIC DEVELOPMENT*
2. *PROFITABILITY*
3. *INCREASE INCOMES*
4. *Increase or Decrease of POVERTY*
5. *SOCIAL BENEFITS*
6. *GENERAL WELL-BEING*

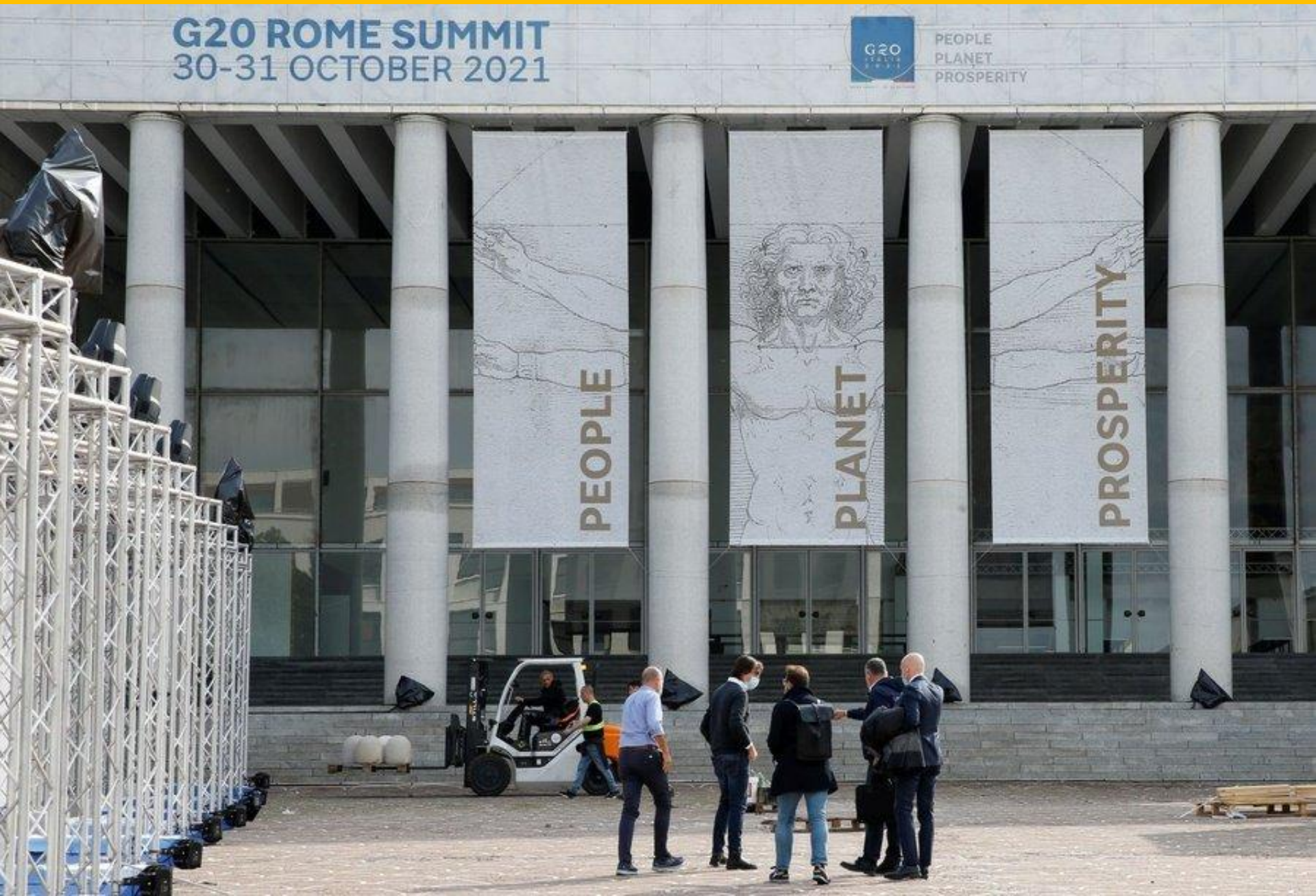
- **Also, disturbances of the SUPPLY CHAIN locally and globally affect**

1. *ECONOMIC SURVIVAL*
2. *VITALITY & GROWTH*
3. *DEMONSTRATIONS & REVOLUTIONS*

- **But ABOVE EARTH or SPACE-related issues affect our**

  PROSPERITY & SECURITY & WELL-BEING

2021 …


G20 ROME SUMMIT
30-31 OCTOBER 2021
G20
PEOPLE
PLANET
PROSPERITY
PEOPLE
PLANET
PROSPERITY

2023 …

What is the theme of the G20 23?
The theme of the Indian G20 Presidency,

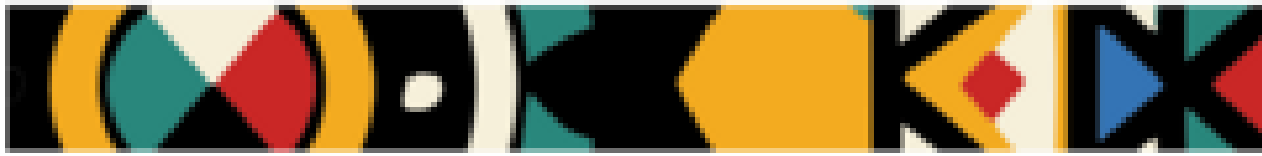
One Earth, One Family, One Future,

drawing upon the age-old belief of Vasudhaiva Kutumbakam, was endorsed by all.

2024 …

2024 G20 Summit
Theme: "**Building a Just World and a Sustainable Planet"**
Host: Brazil
Key focus areas: Addressing global challenges with a focus on social inclusion, the fight against poverty, energy transition, and climate action

2025 …



Solidarity

Equality

Sustainability

G20
SOUTH AFRICA 2025

Earth

exists as part of the

Cosmos

OURANOS …

How

Space

affects

Life, Social Policies, Wellbeing, and Prosperity,…

"ΜΗΝ ΤΟ ΡΩΤΑΣ ΤΟΝ ΟΥΡΑΝΟ, ΤΟ ΣΥΝΕΦΟ ΚΑΙ ΤΟ ΦΕΓΓΑΡΙ"

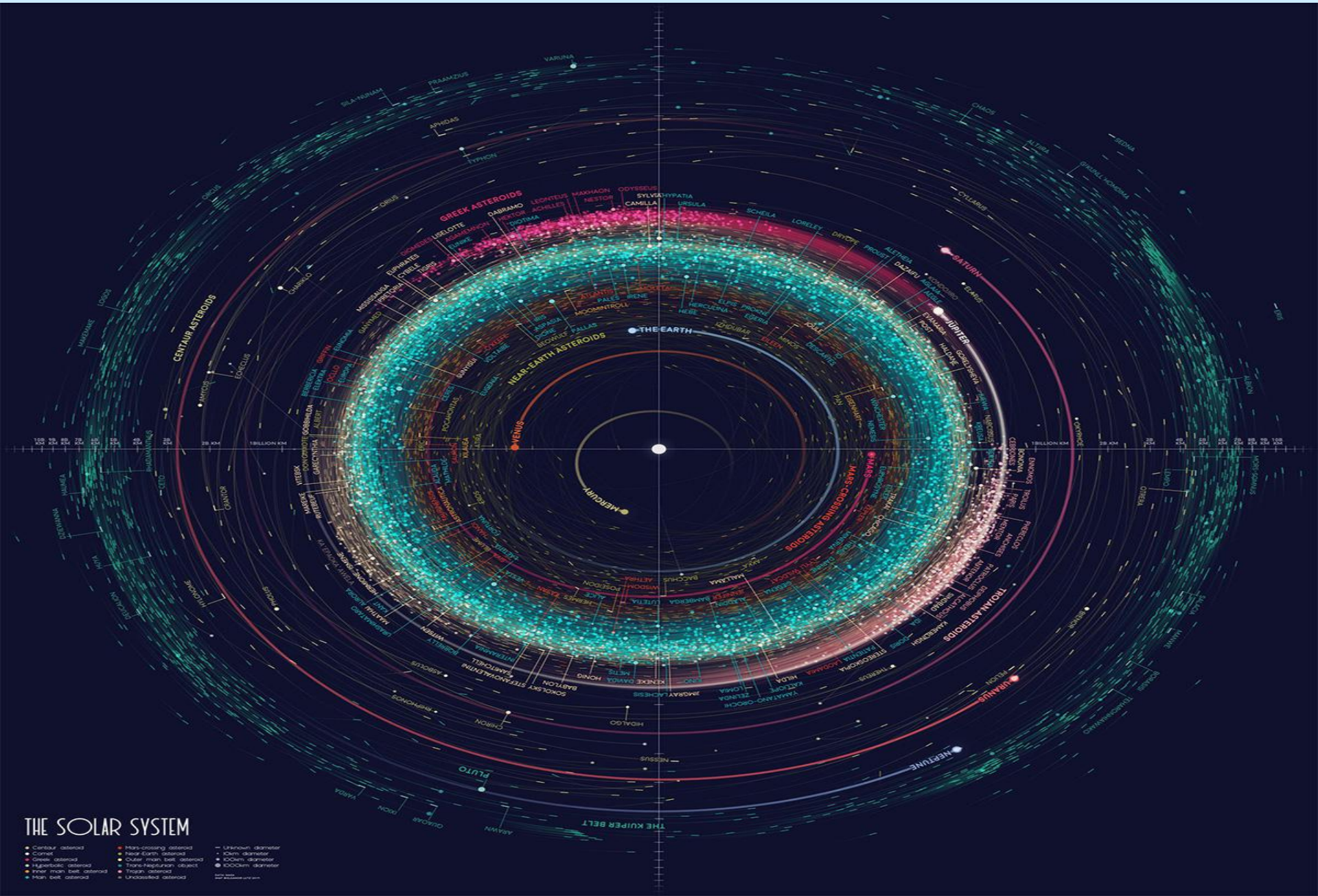
Contents

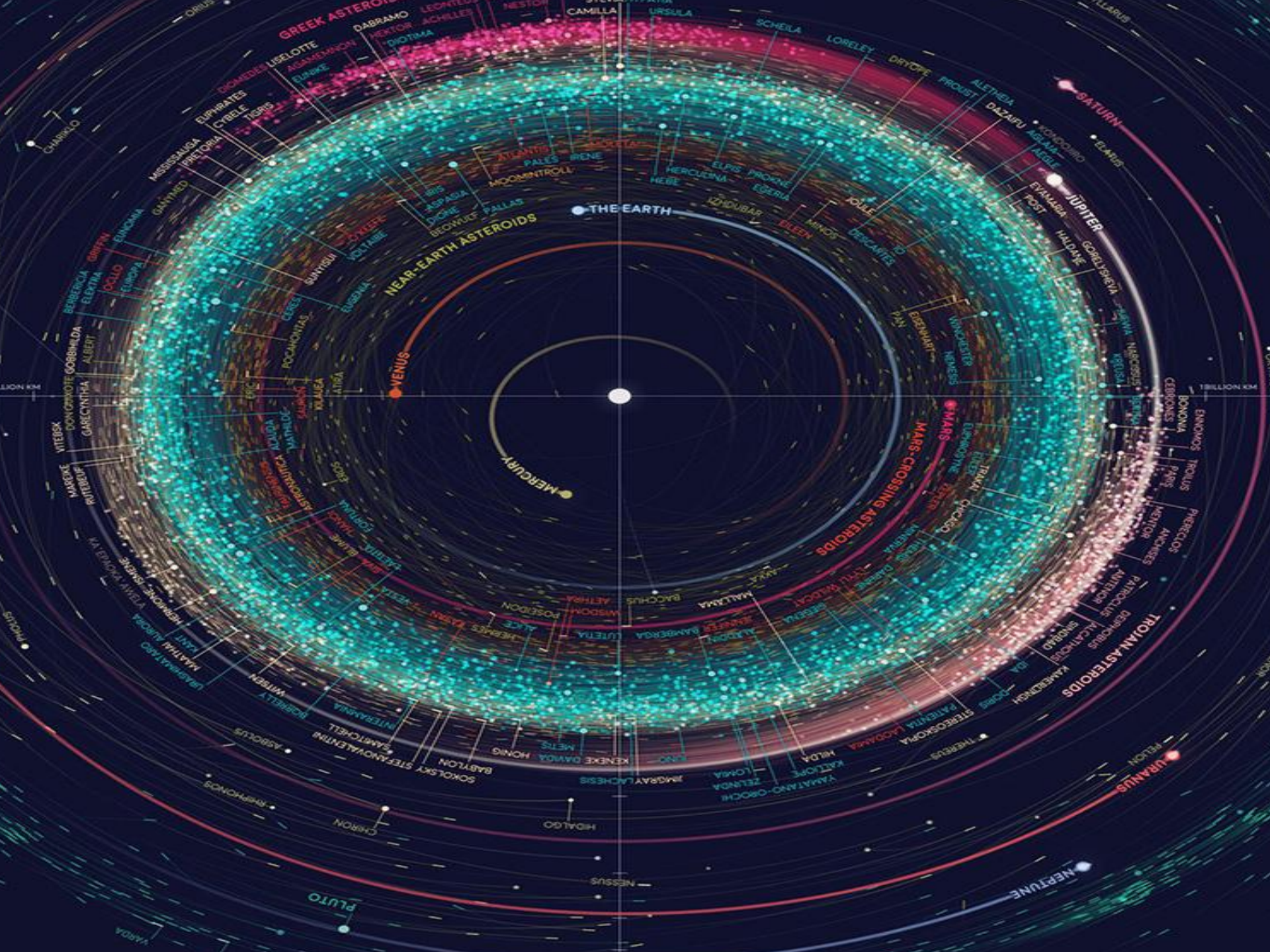
1. Space-*The new frontier*
2. Exploring Space or Spying Earth
3. Tracking-Watching-Spying-Profiling-Cheating …
4. MAMMY BLUE
5. Next Decade-Space AIMS and Social Challenges
6. *Cyberspace-Cybersecurity-Individual SHARED RESPONSIBILITY-Social Wellbeing*

1. Space …

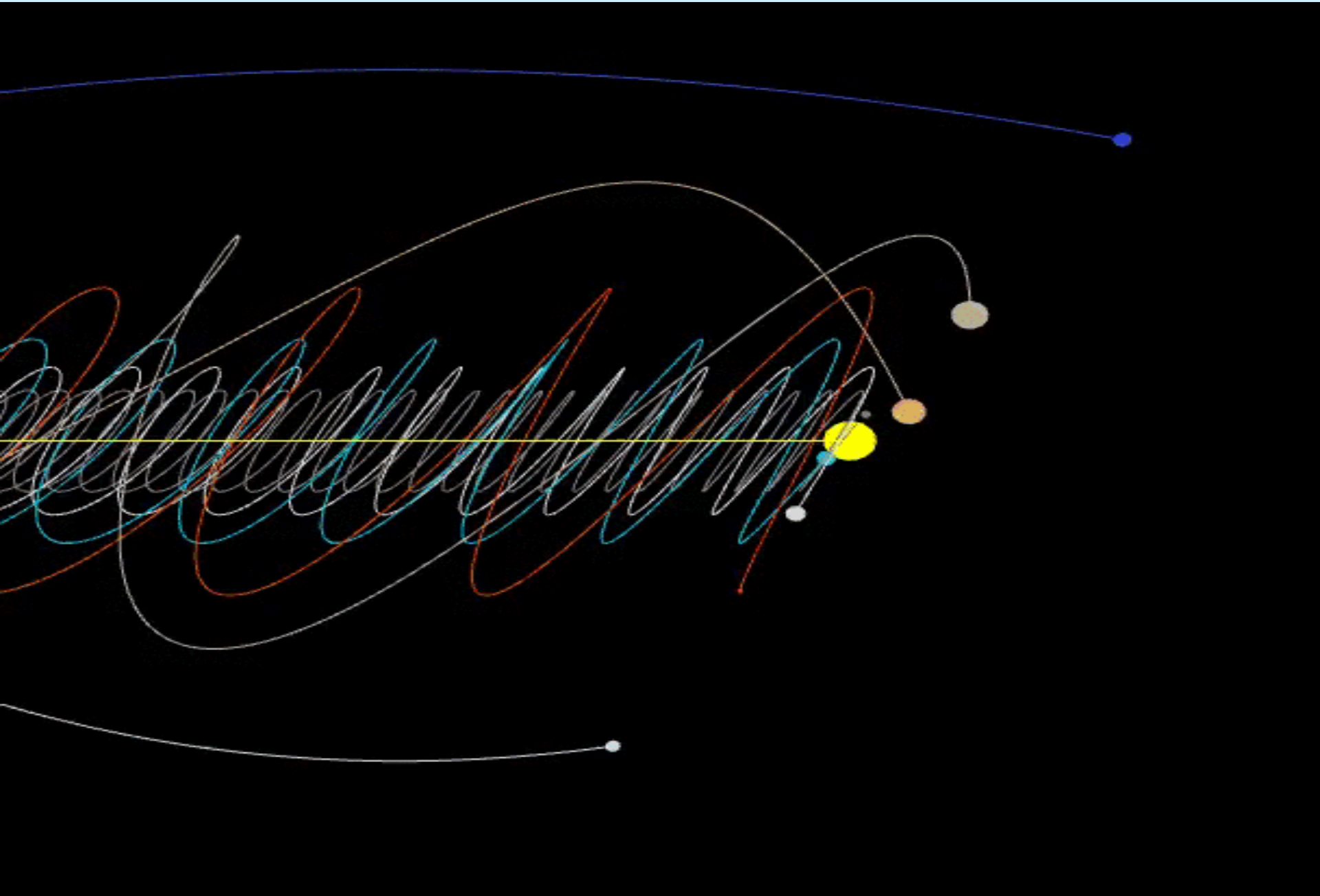
The new frontier

Space

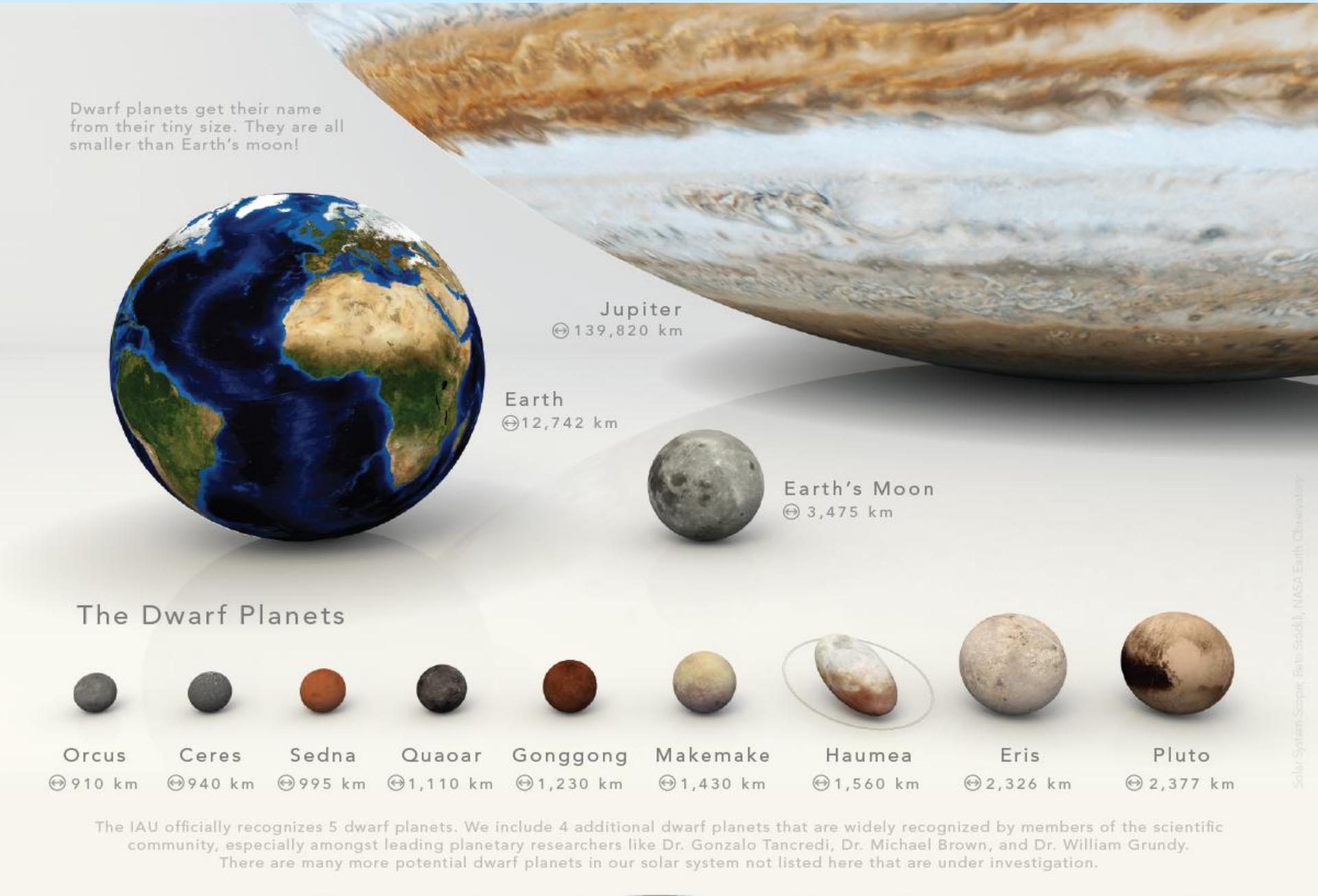

THE SOLAR SYSTEM
GREEK ASTEROIDS
CENTAUR ASTEROIDS
NEAR-EARTH ASTEROIDS
MARS-CROSSING ASTEROIDS
TROJAN ASTEROIDS
THE EARTH
VENUS
MERCURY
MARS
JUPITER
SATURN
URANUS
NEPTUNE
PLUTO
THE KUIPER BELT


GREEK ASTEROIDS
NEAR-EARTH ASTEROIDS
MARS-CROSSING ASTEROIDS
TROJAN ASTEROIDS
THE EARTH
MERCURY
VENUS
MARS
JUPITER
SATURN
URANUS
NEPTUNE
PLUTO
CHIRON
HIDALGO
NESSUS
1 TRILLION KM
1 TRILLION KM

Our … tiny … Solar System



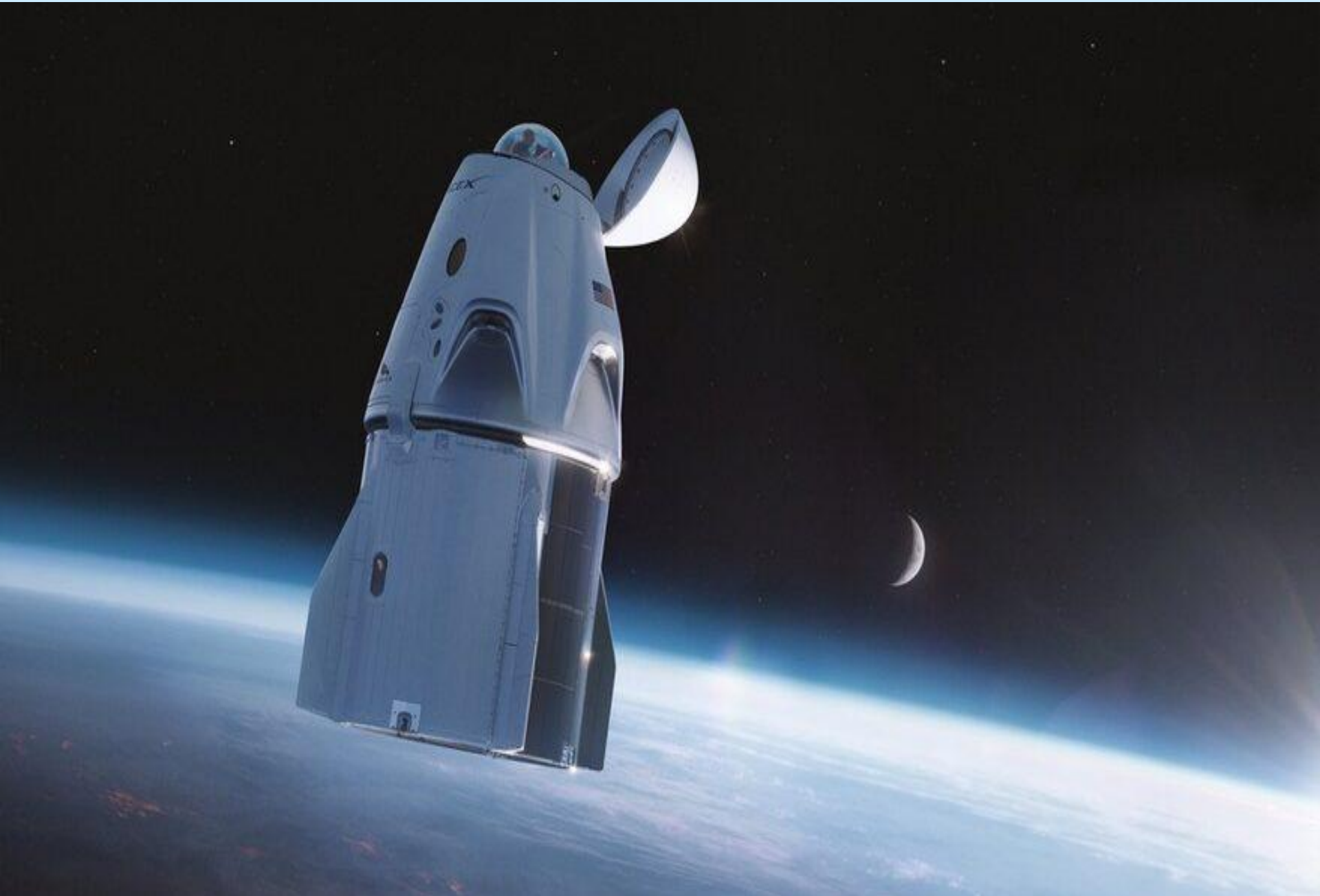
Our Home … so small ?



Our first steps … into … Space

1957 – First satellite launched: Sputnik1
1961 – First human in space: Yuri Gagarin
1965 – First human spacewalk: Aleksei Leonov
1969 – First human on the Moon: Neil Armstrong
1984 – First untethered spacewalk: Bruce McCandless
1998 – First modules launch to begin construction of the International Space Station

Americans … in Space (21st Century)

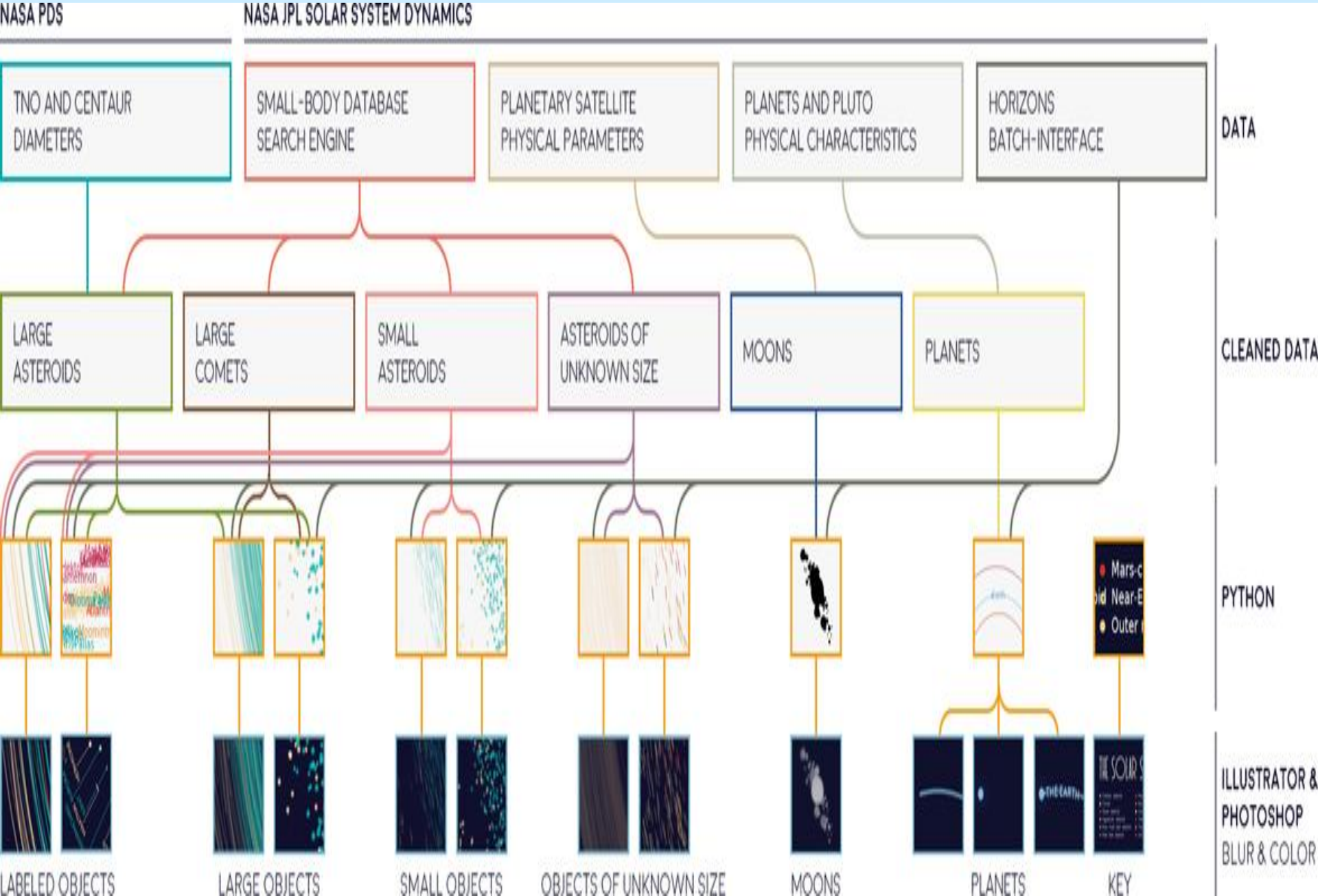


Americans … in Space … 2021

SpaceX said it will send someone around the moon on its BFR vehicle and will identify that person at a Sept. 17, 2021, event.

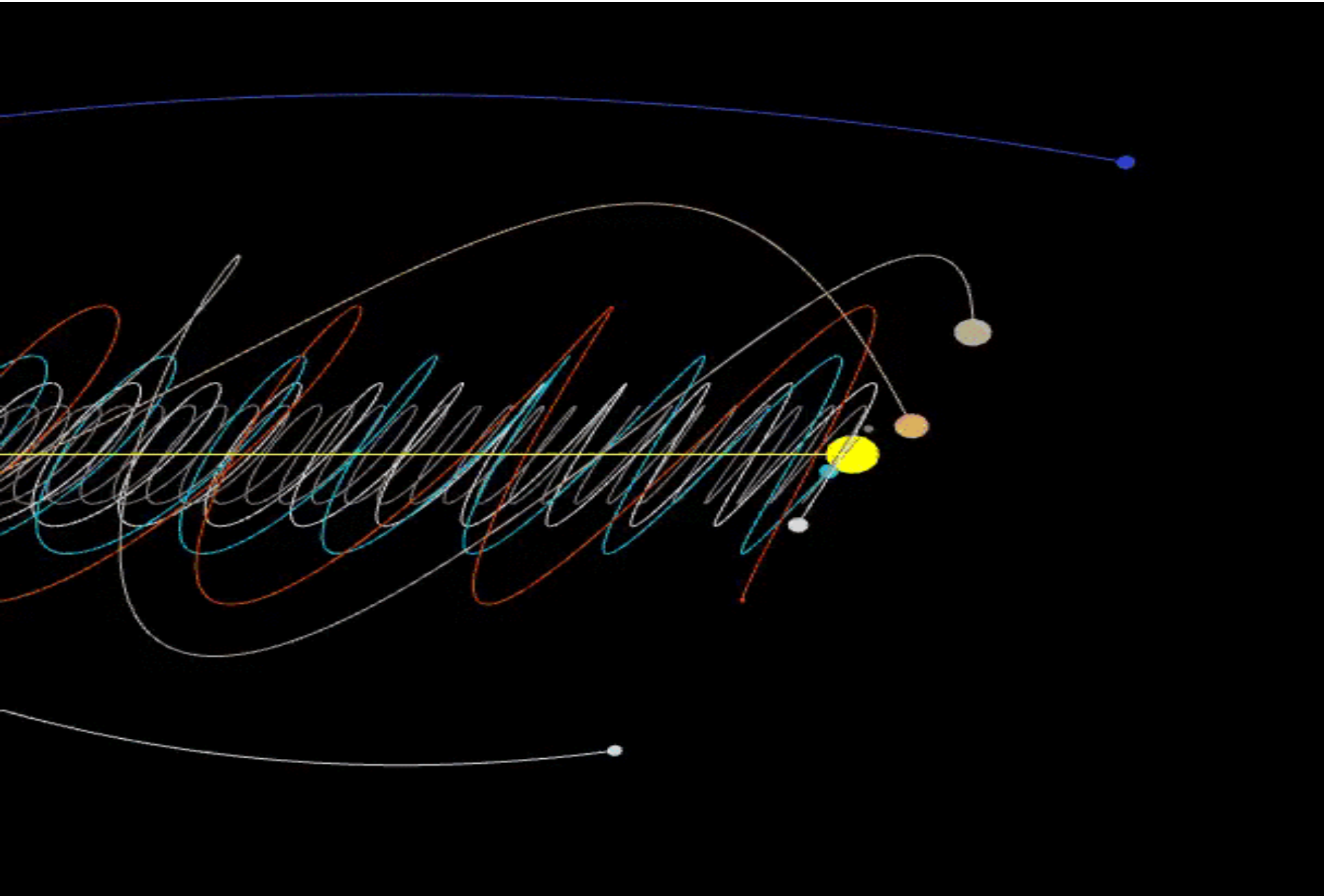
Russians too … in Space in 2021

Mapping & Collecting Data from … Space



2. Exploring Space or Spying Earth ?

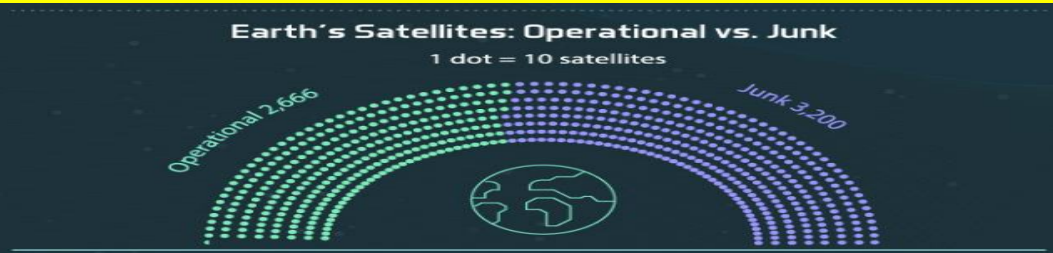
Who is watching … Earth …? … with WHAT ?



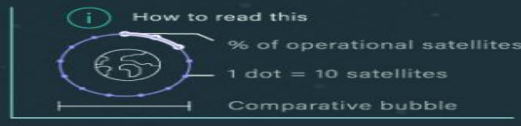
… Satellites

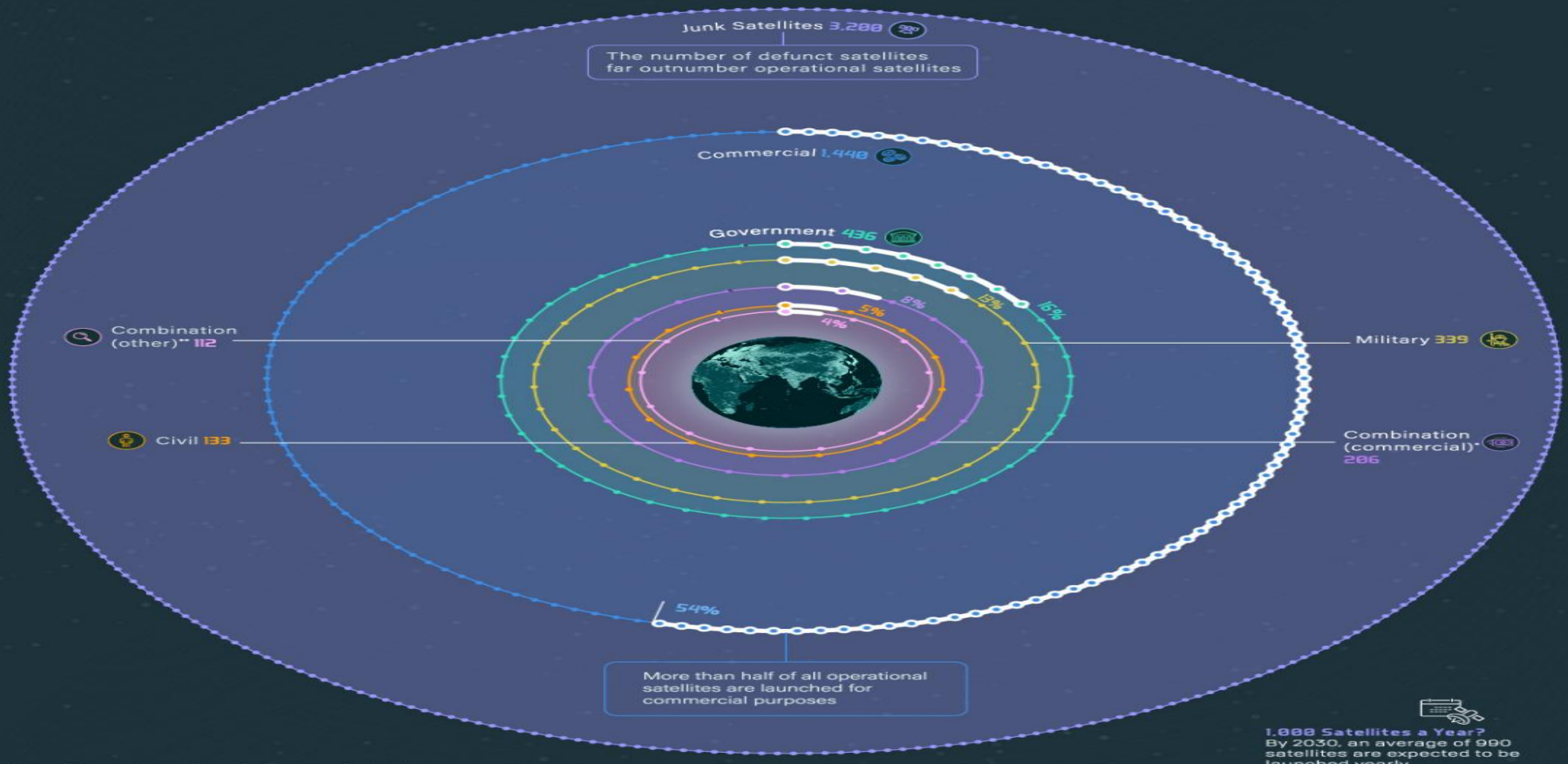
The new space race is on. Hundreds of satellites are launched into Earth's orbit every year for purposes ranging from communications and IoT, to environmental monitoring and border security.

Thousands more defunct satellites are orbiting the planet as space junk. In total, there are nearly 6,000 satellites circling our tiny planet—and that number keeps growing.

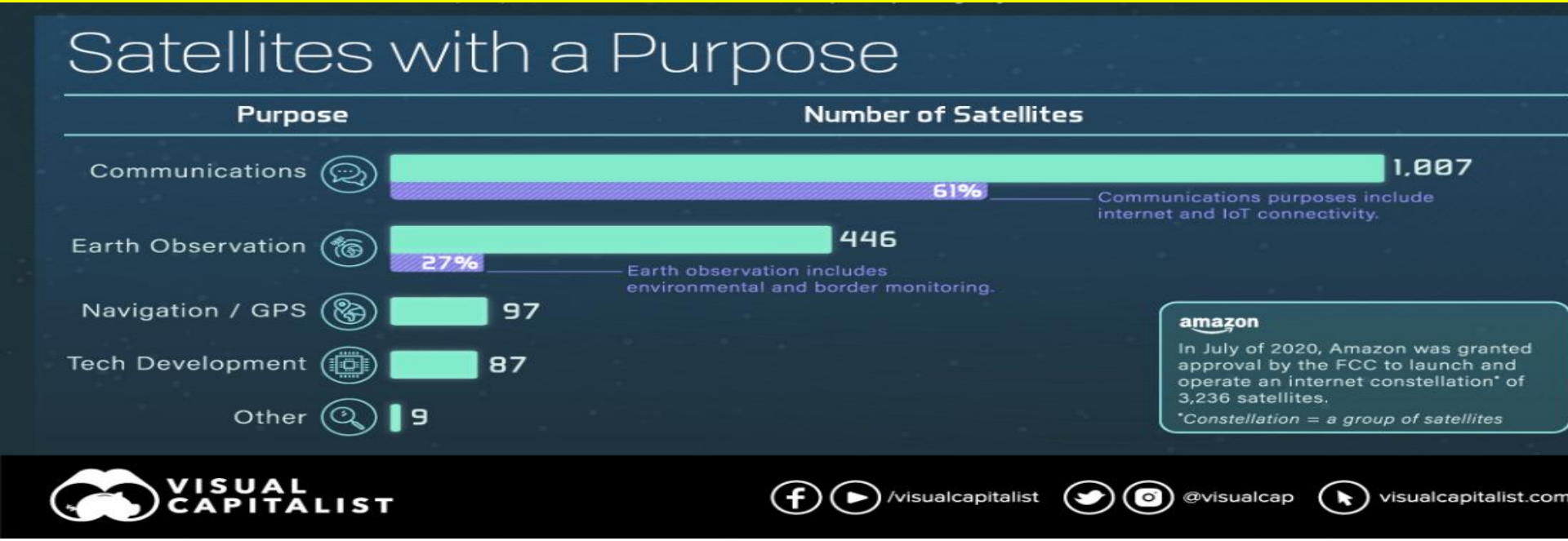


All of Earth's Satellites

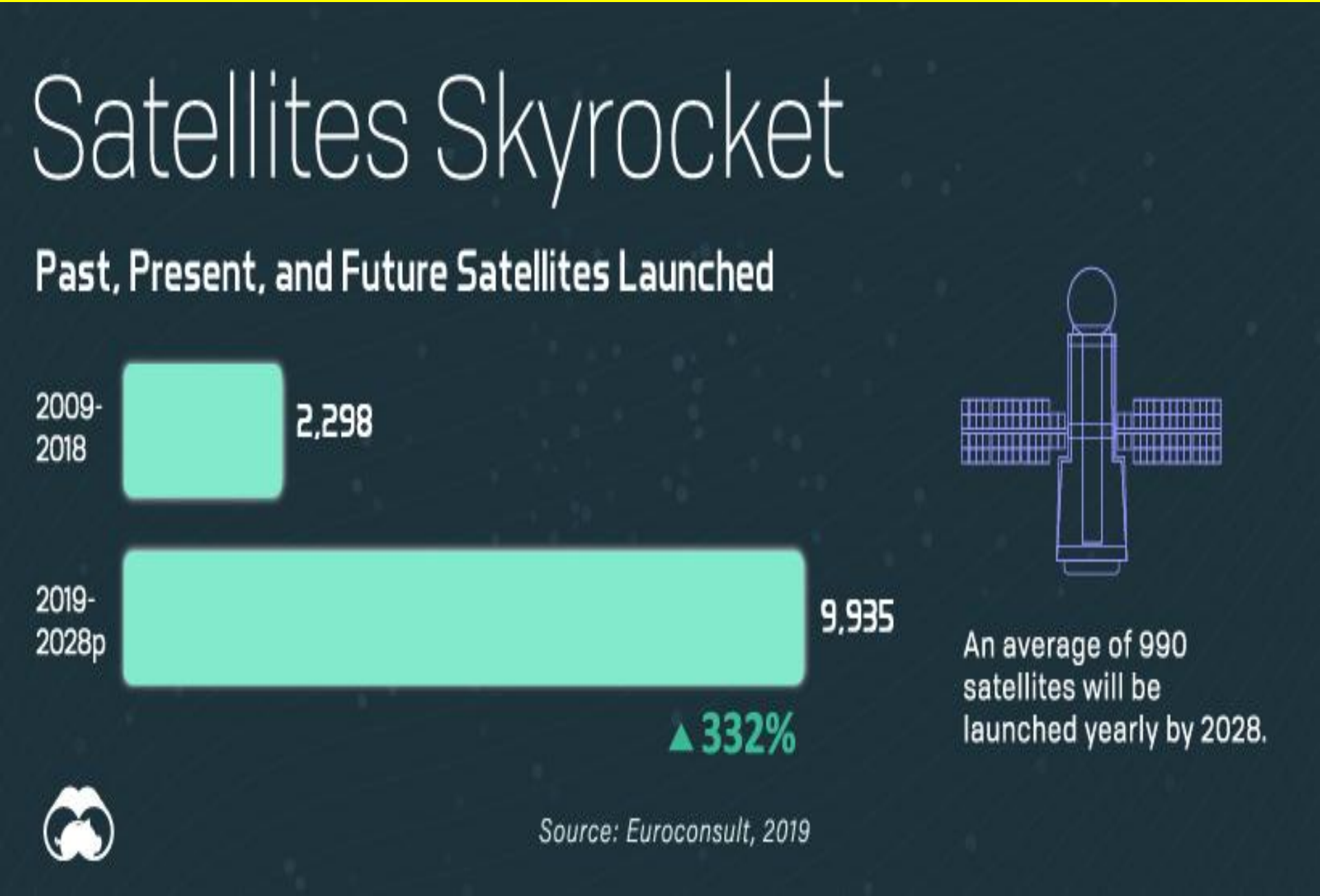




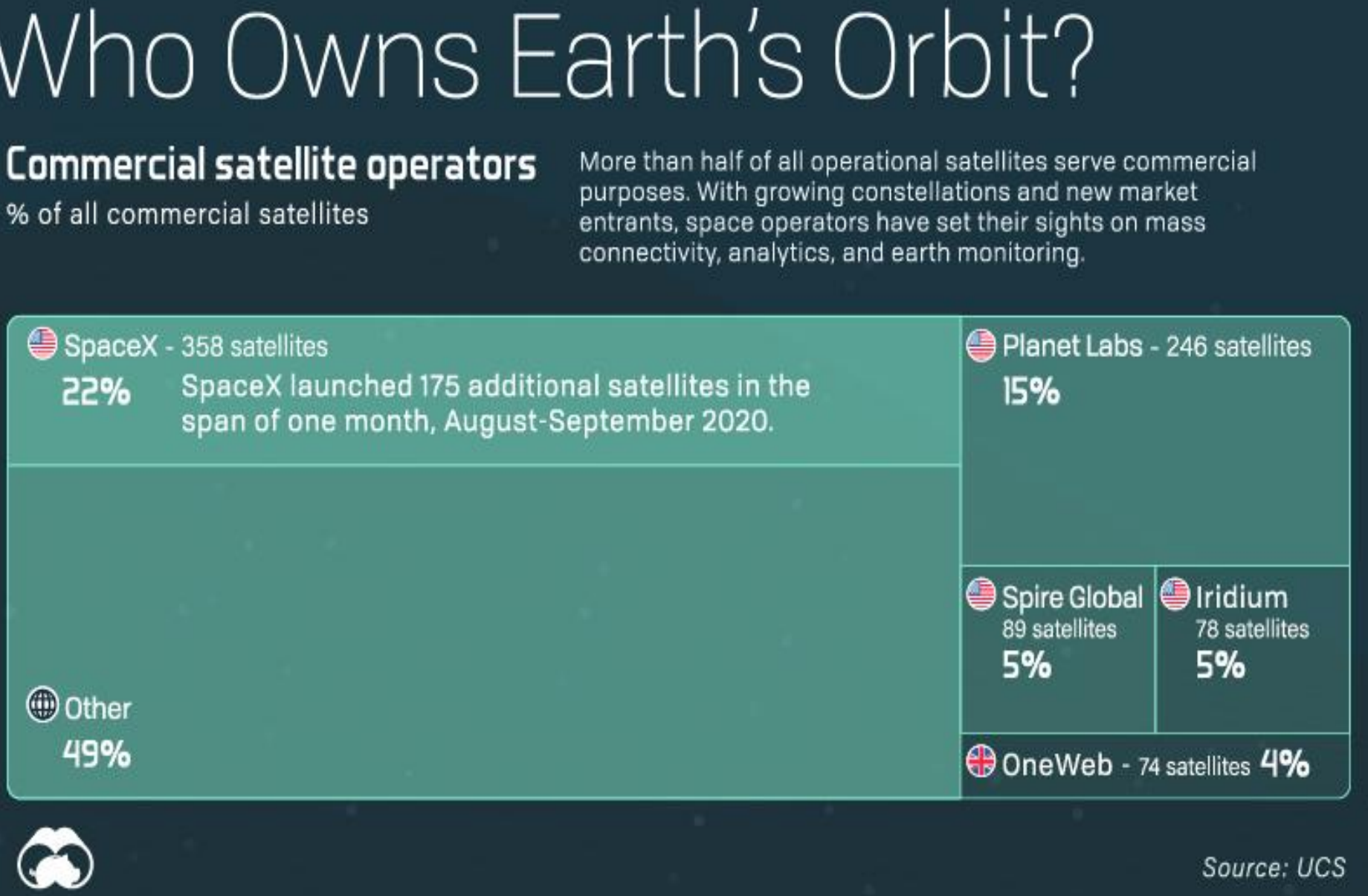
Mission Impossible ... *by* Satellites



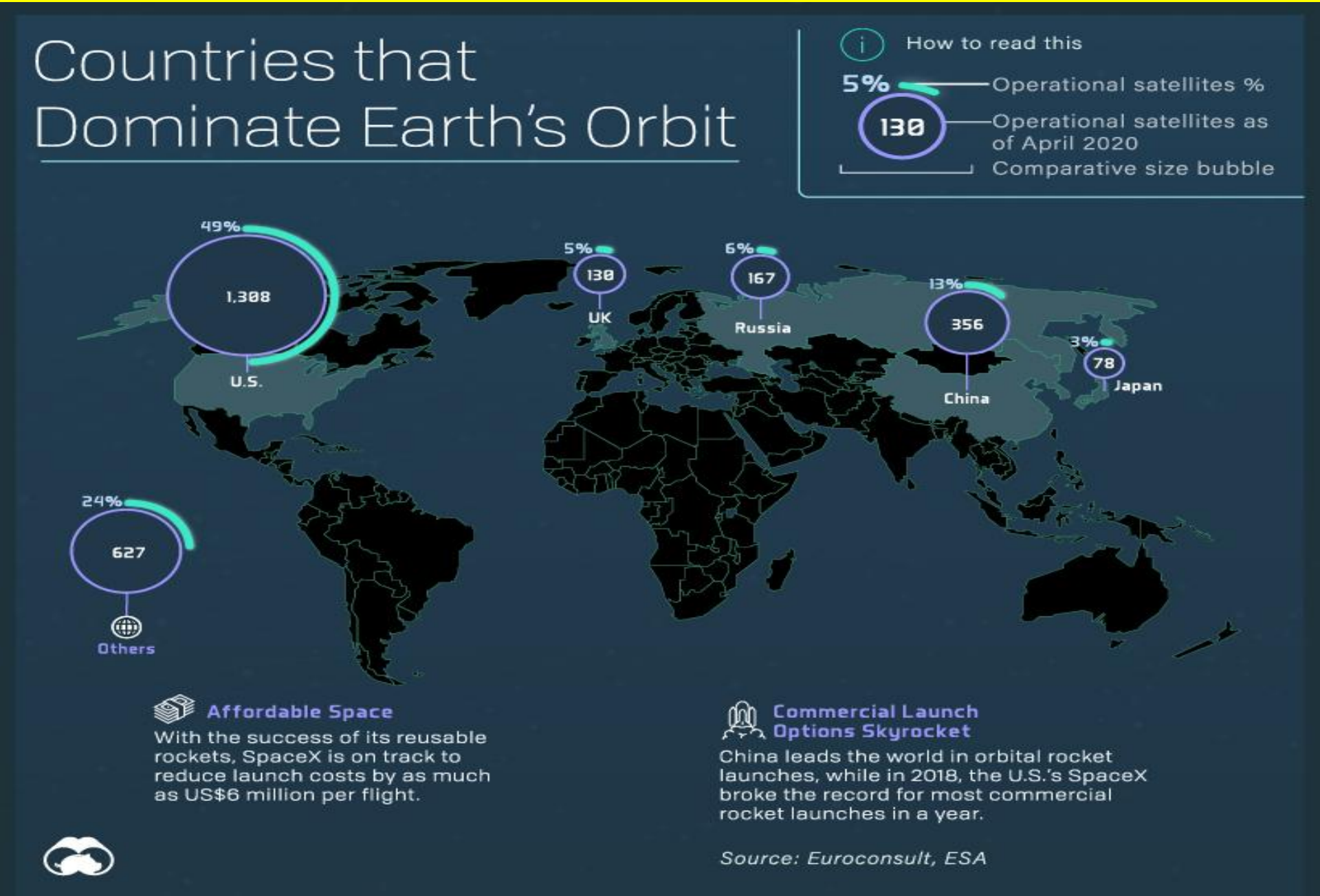
Satellites: 10,000 +



Who controls the skies?



Who invests in & owns most of Satellites?



Satellite Types

Operational Satellites by Type	Number of Satellites	Percentage of Operational Satellites
Commercial	1440	54%
Government	436	16%
Military	339	13%
Civil	133	5%
Combination (Other)	112	4%
Combination (Commercial)	206	8%
Defunct Satellites	3200	

Commercial Satellites ???

Commercial Satellites by Purpose	Number of Satellites
Communications	1007
Earth Observation	446
Navigation / GPS	97
Tech Demonstration & Development	87
Other	9
All Commercial Satellites (including combination)	1646

Satellite Owner/Operator	Number of Satellites	Country of Operator/Owner
SpaceX	358	USA
Planet Labs, Inc.	246	USA
Spire Global Inc.	89	USA
Iridium Communications, Inc.	78	USA
OneWeb Satellites	74	United Kingdom
SES S.A.	51	Luxembourg
Intelsat S.A.	51	USA
ORBCOMM Inc.	35	USA
DoD/US Air Force	33	USA
Globalstar	32	USA
European Space Agency (ESA)	26	ESA
O3b Networks Ltd.	20	United Kingdom
Chang Guang Satellite Technology Co. Ltd.	15	China
Gonets Satcom	15	Russia
Sky Perfect JSAT Corporation	15	Japan
Telesat Canada Ltd. (BCE, Inc.)	14	Canada
Echostar Corporation (entire payload leased from Telesat Canada Ltd.)	9	USA
Zhuhai Orbita Aerospace Science and Technology Co.	13	China
Aerospace Corporation	12	USA
DirecTV Latin America/Intelsat	12	Brazil

Selected … Satellites "looking in"… Cyprus …

Ministry of Defense	33	Egypt
Hellas-Sat Consortium Ltd.	3	Greece
Russian Federal Space Agency	3	Russia
Samara State Aerospace University, SGAU	3	Russia
Sky and Space Global, UK	3	United Kingdom
Space-Communication Ltd.	3	Israel
Hellas-Sat Consortium Ltd./INMARSAT	1	Greece/United Kingdom
INMARSAT, Ltd.	13	United Kingdom
Turksat	3	Turkey
AISTech	2	Spain
Arab Satellite Communications Org. (ASCO)	2	Multinational
Italian Defense Ministry/Telespazio	1	Italy
NSLComm	1	Israel
OHB Italia	1	Italy
AISTech	1	Spain
Elbit Systems	2	Israel
German Aerospace Center (DLR)	2	Germany
University of Vigo/Alén Space	1	Spain
Es'hailSat	1	Qatar

- **Many people believe that the vaccines for Covid have a mission**
  - ➢ **to control and/or kill many people**

- **We should take a closer look that**
  - ❑ ***our lives, privacy, health and wellbeing***
  - ❑ ***are massively affected by***
  - ❑ ***SPACE TOOLS that control and manipulate tools***
  - ❑ ***that everybody sleeps with DAY & NIGHT***
  - ❑ ***but in fact, these tools …***

3. Tracking …

Watching …

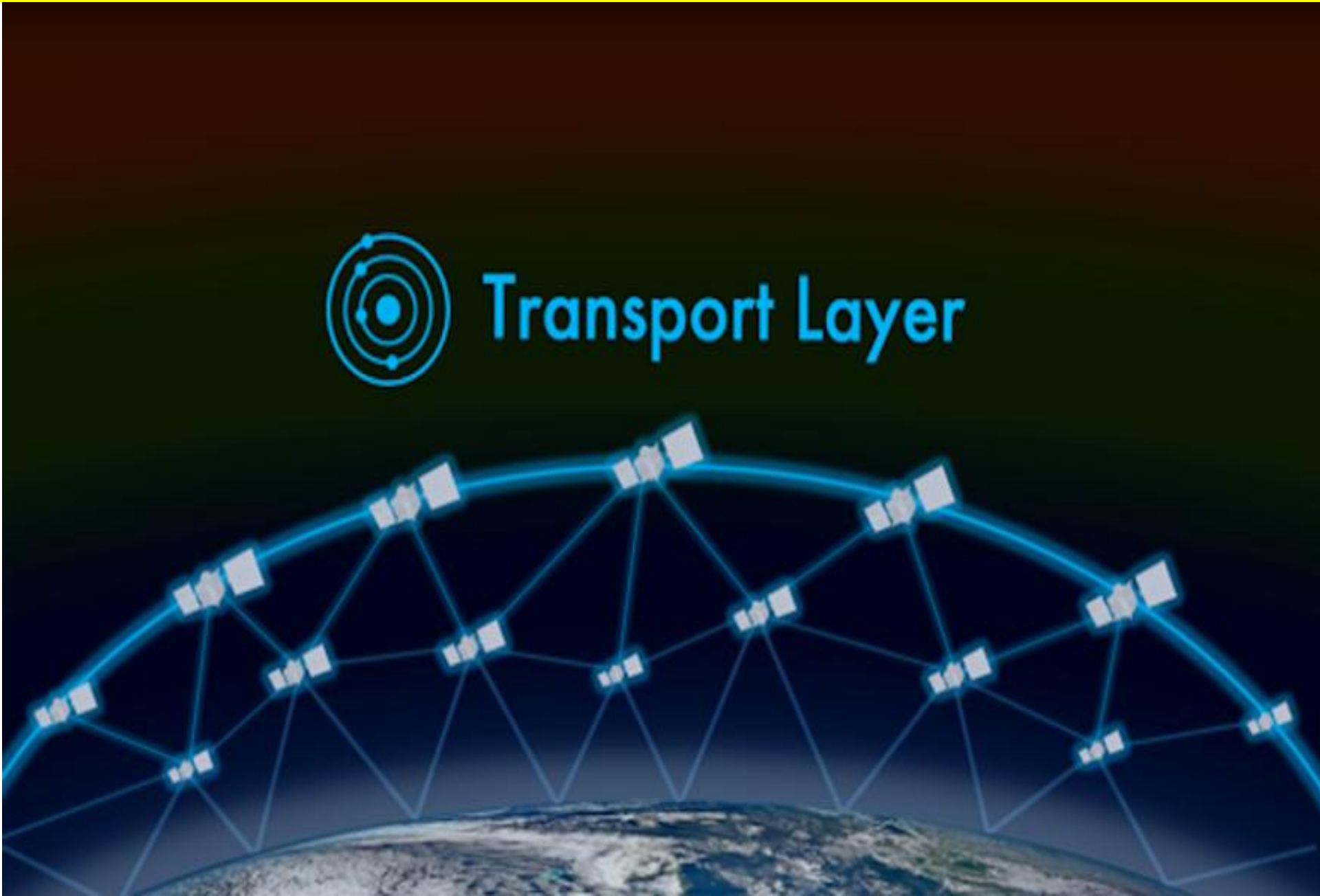
Spying …

Profiling …

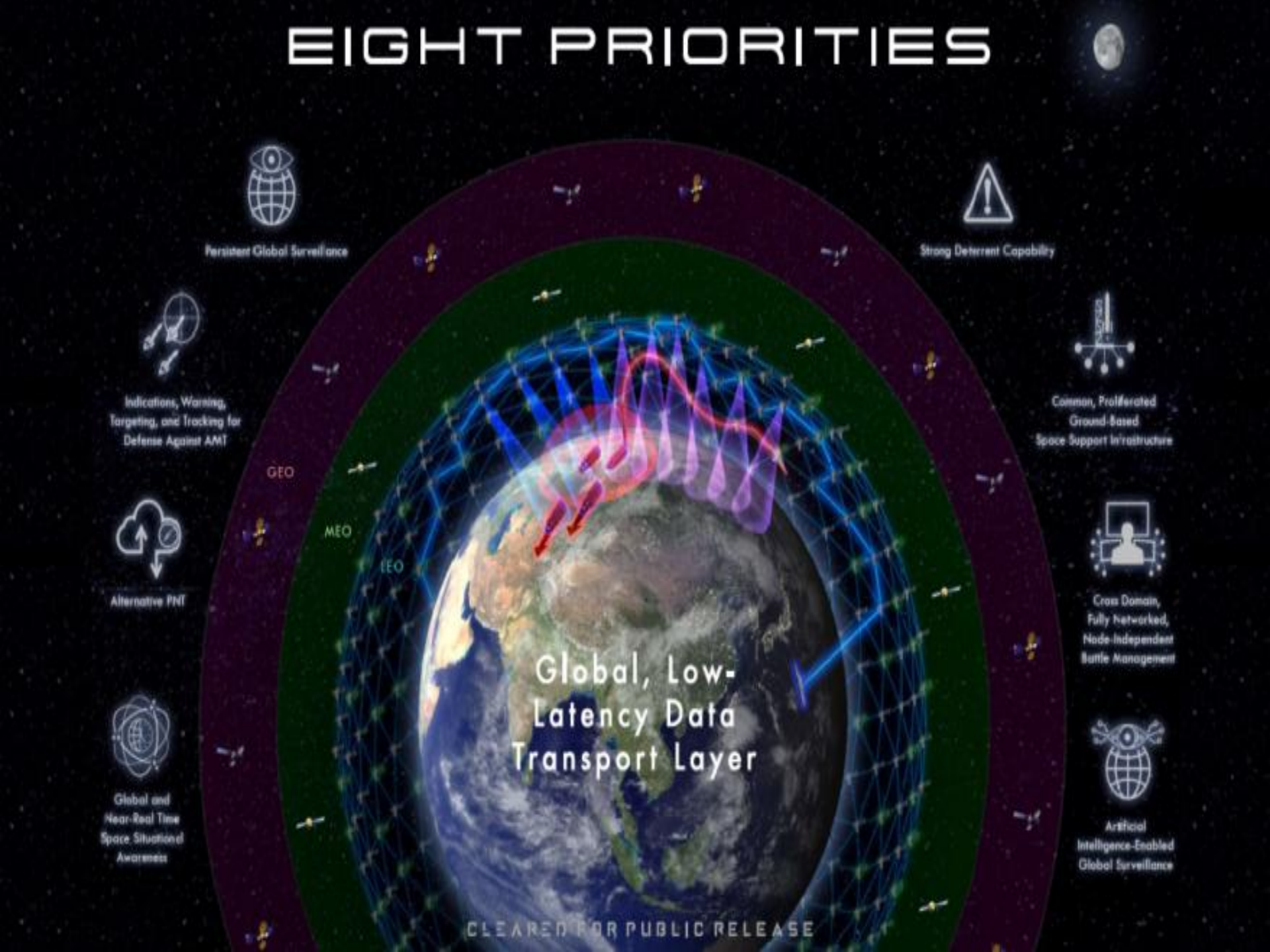
Deceiving …

Cheating …

Satellites Net … MODEL …



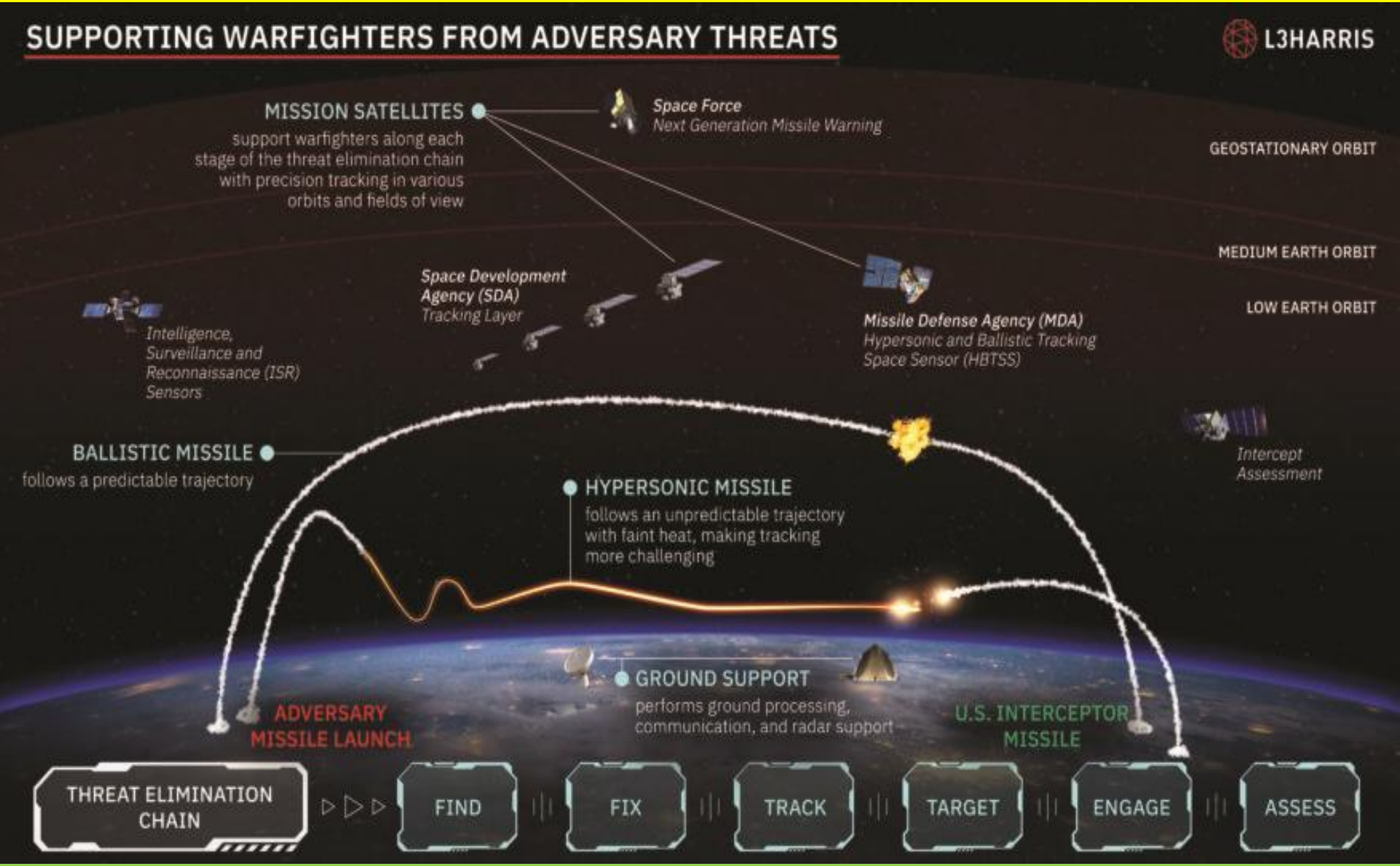
EIGHT PRIORITIES



Satellites Net before Covid …

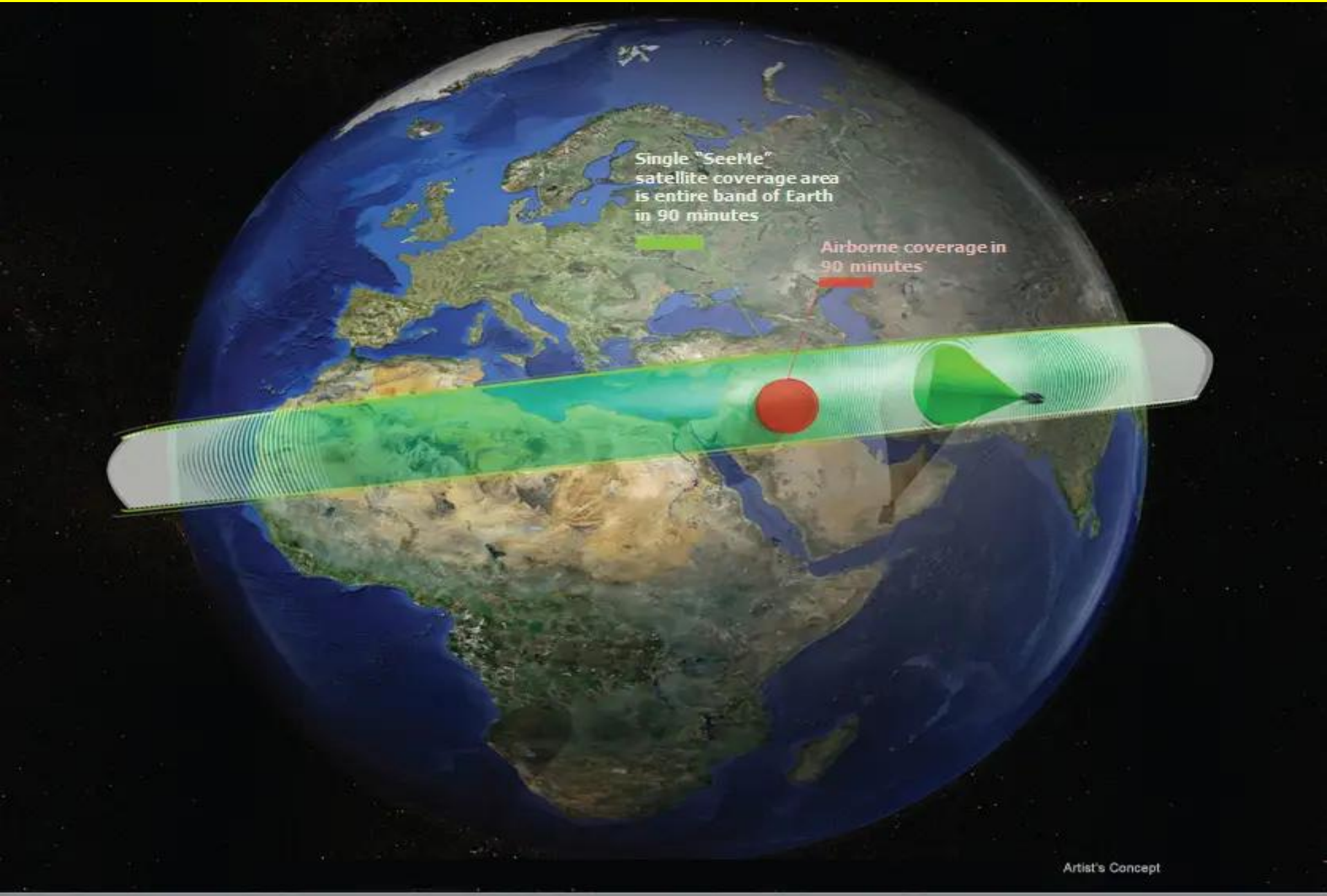
First Objective … COMMUNICATIONS

…but always MILITARY objectives first …

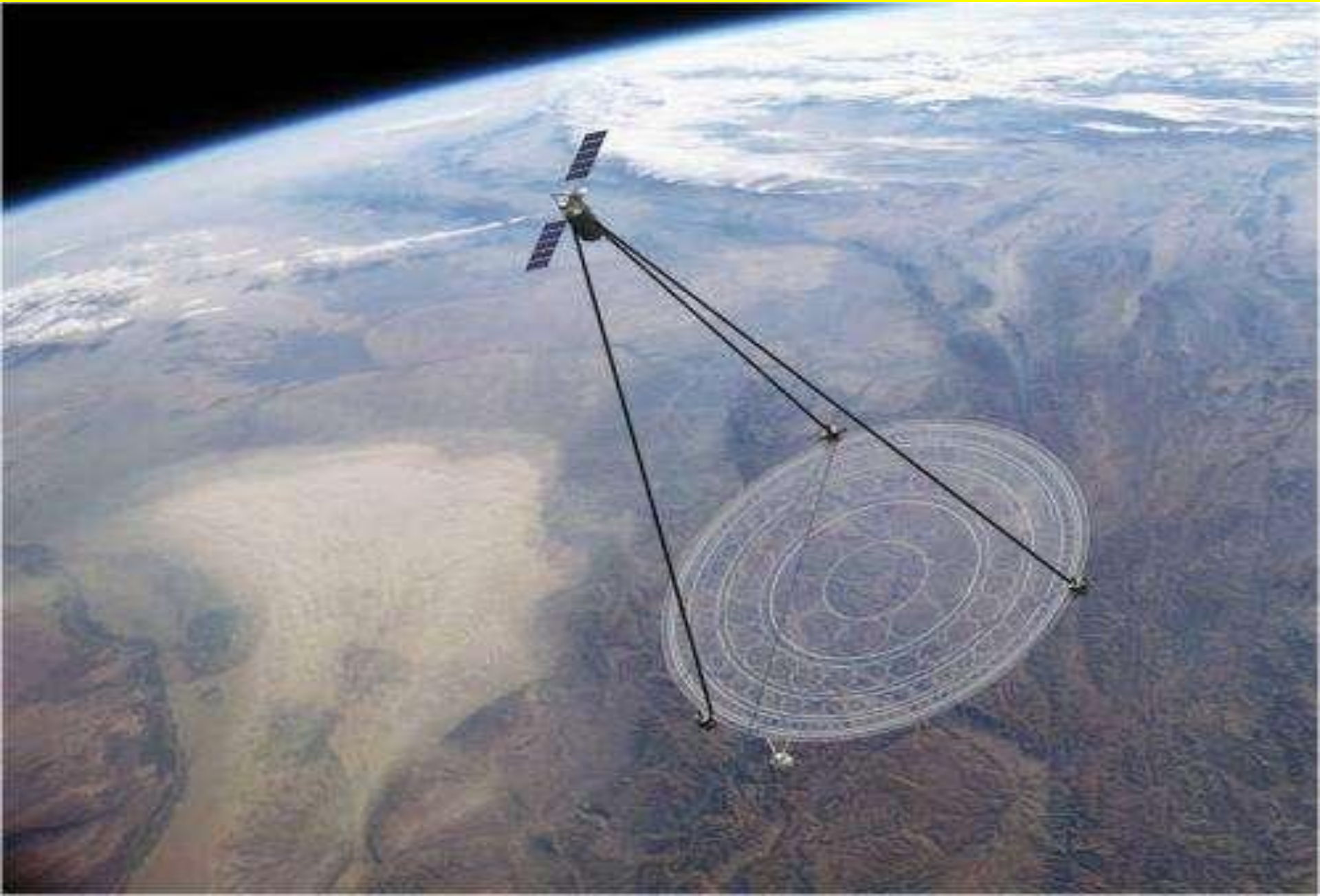


L3Harris, which has won Missile Defense Agency and Space Development Agency contracts within the last year to produce missile-tracking satellites, outlines a “threat elimination chain” in this graphic.

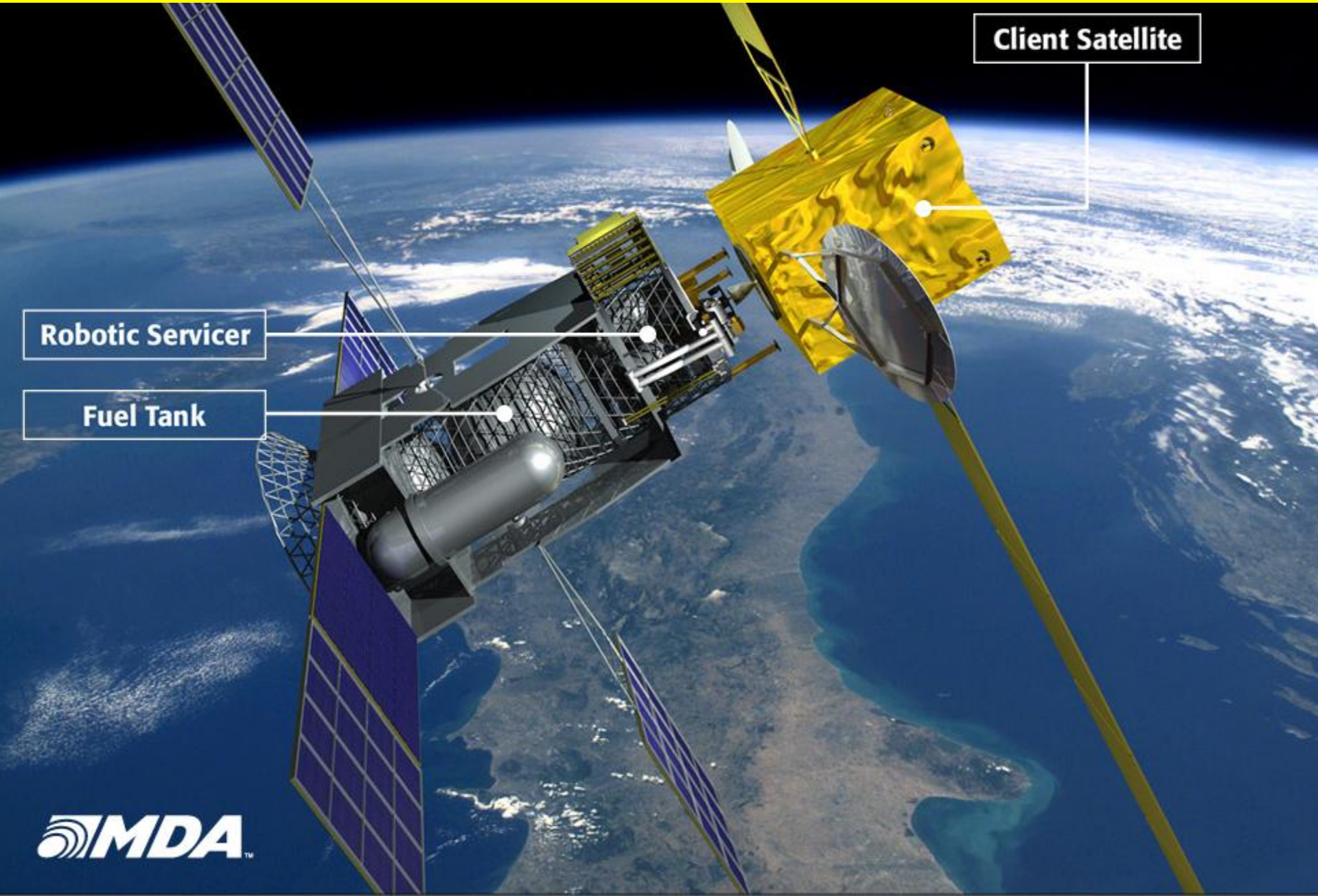
… 1.5 hours … around Earth



… 1.5 years … onto one location

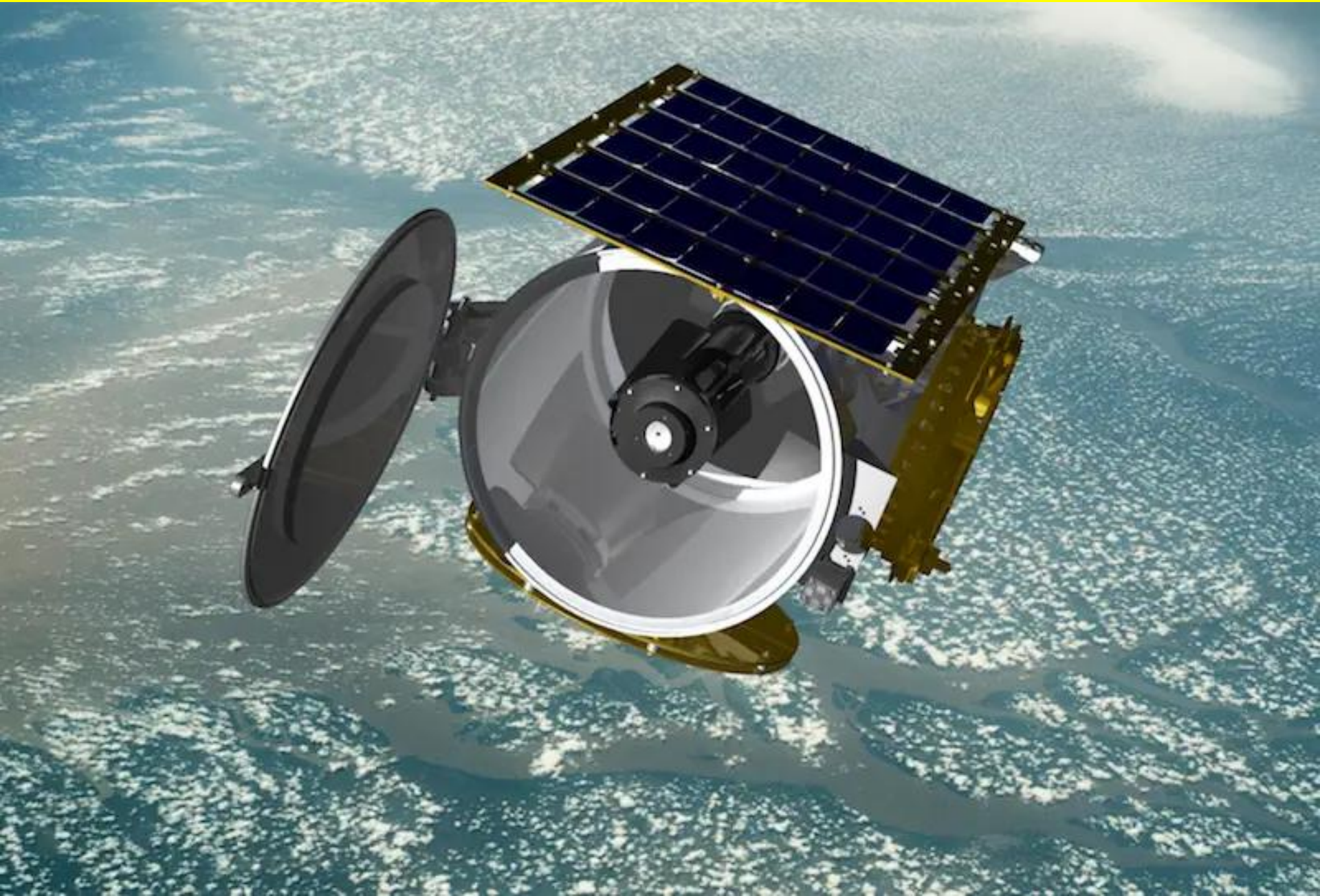


… watching ITALIAN soccer …



Overlapping coverage of Cyprus …

… using SOLAR PANELS … above GREENLAND



… EVERYBODY … is DETECTED

… EVERYBODY … could be watched & crosschecked …

…but always MILITARY in mind …

Military Space - Pivot to Low Earth Orbit (LEO)

Demonstrate a space order of battle architecture that cannot be easily defeated by a near peer, and enables one to two year technology refresh cycles vs current 10 year cycles.

LEVERAGE:
Commercial LEO Mega-Constellation
- Global "Space Internet"
- High-speed crosslinks
- Launch, operations, and ground infrastructure in place

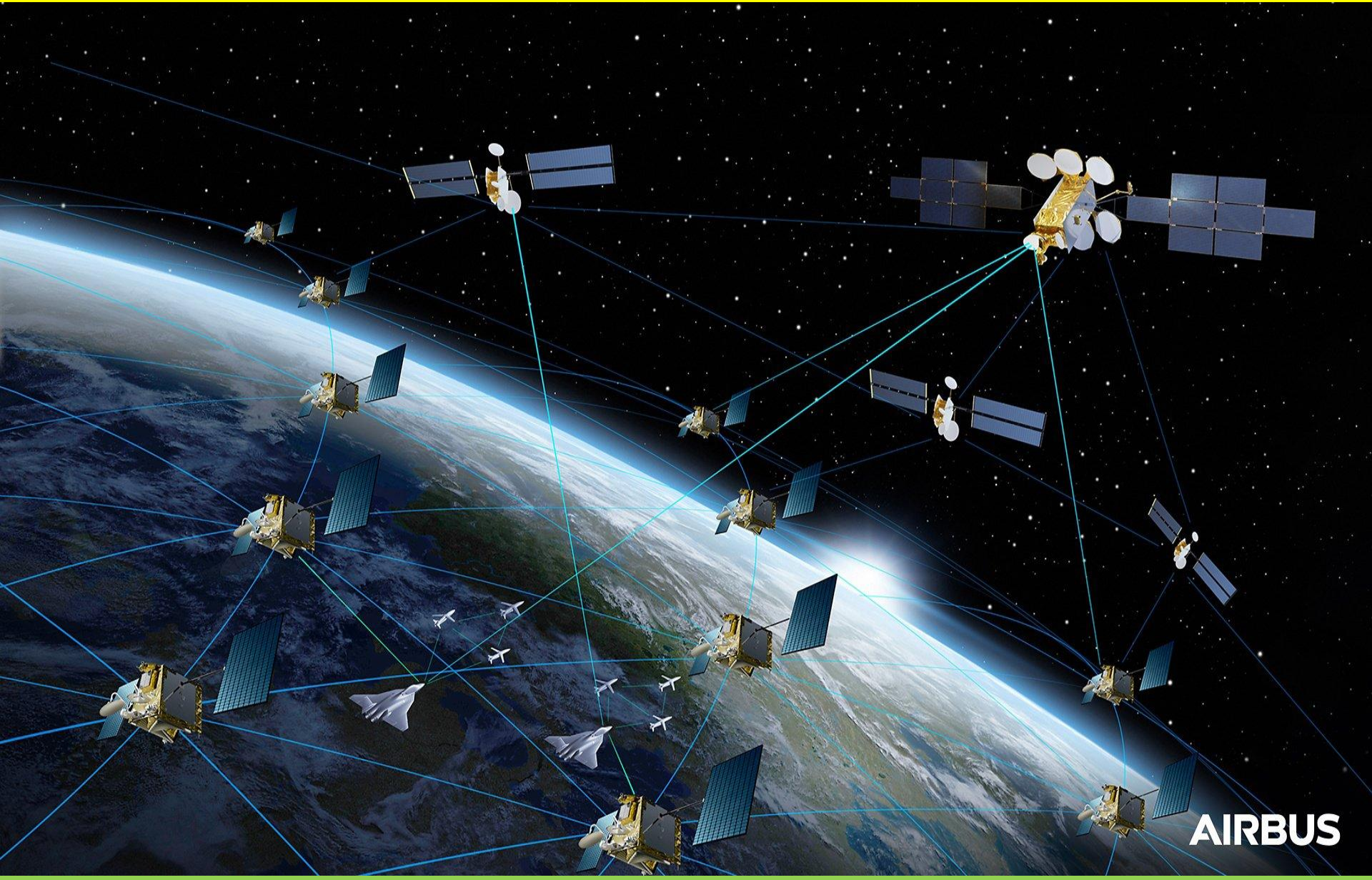

Commercial Network Satellite


Military Satellite

DEVELOP:
Co-Orbiting Military Demo Constellation
- Rapid tech refresh
- Resilience
- Global persistence
- Autonomous ops
- Overhead Persistent Infrared (OPIR)/Position Navigation Timing (PNT)/ Communication/Radio Frequency (RF)
- Low-cost commoditized COTS bus
- Rapid response to future threats

Artist's Concept

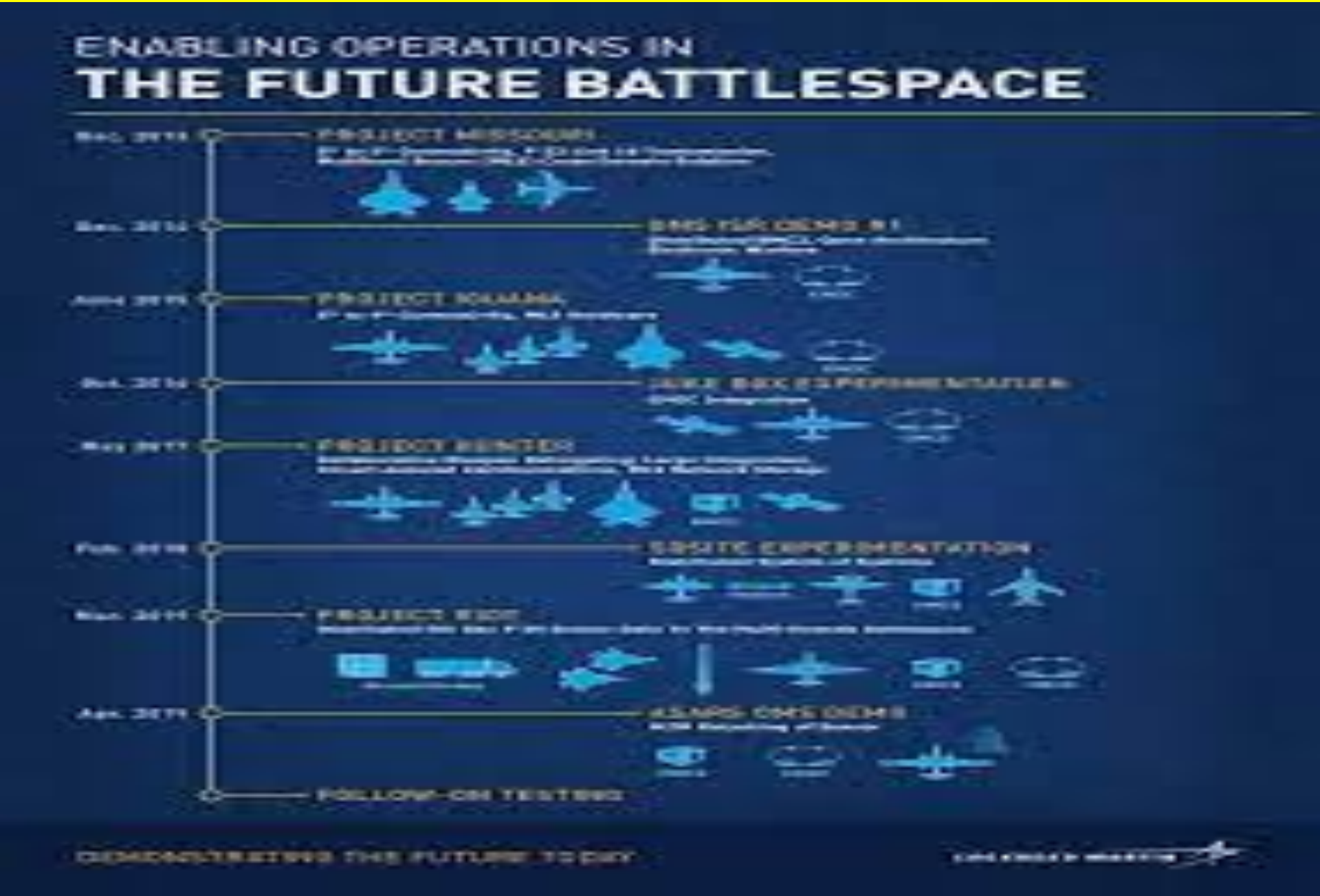
…Europeans too …



No Air dominance without Space dominance - Defence - Airbus

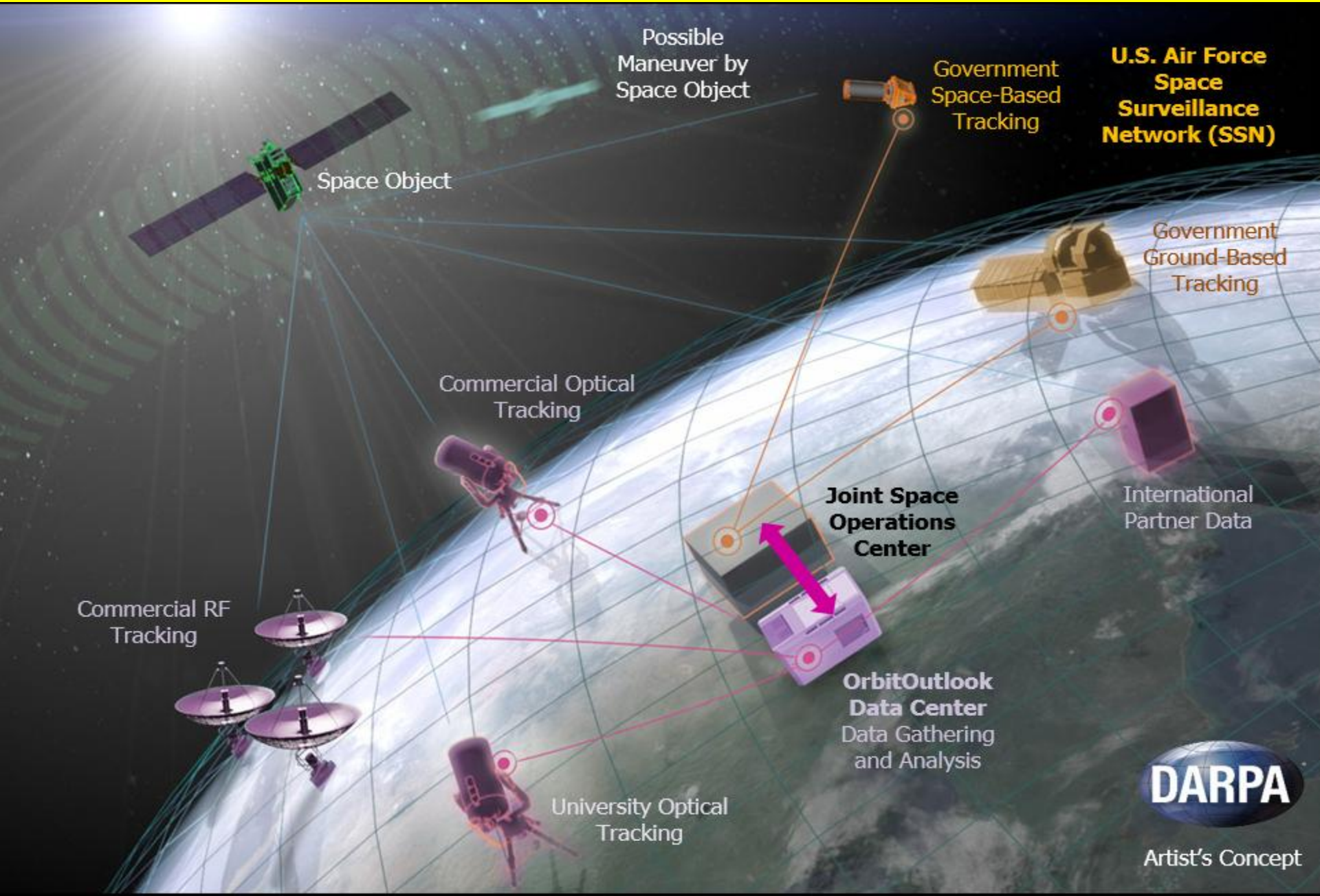
… Hollywood shows us …

… and the US army plans …

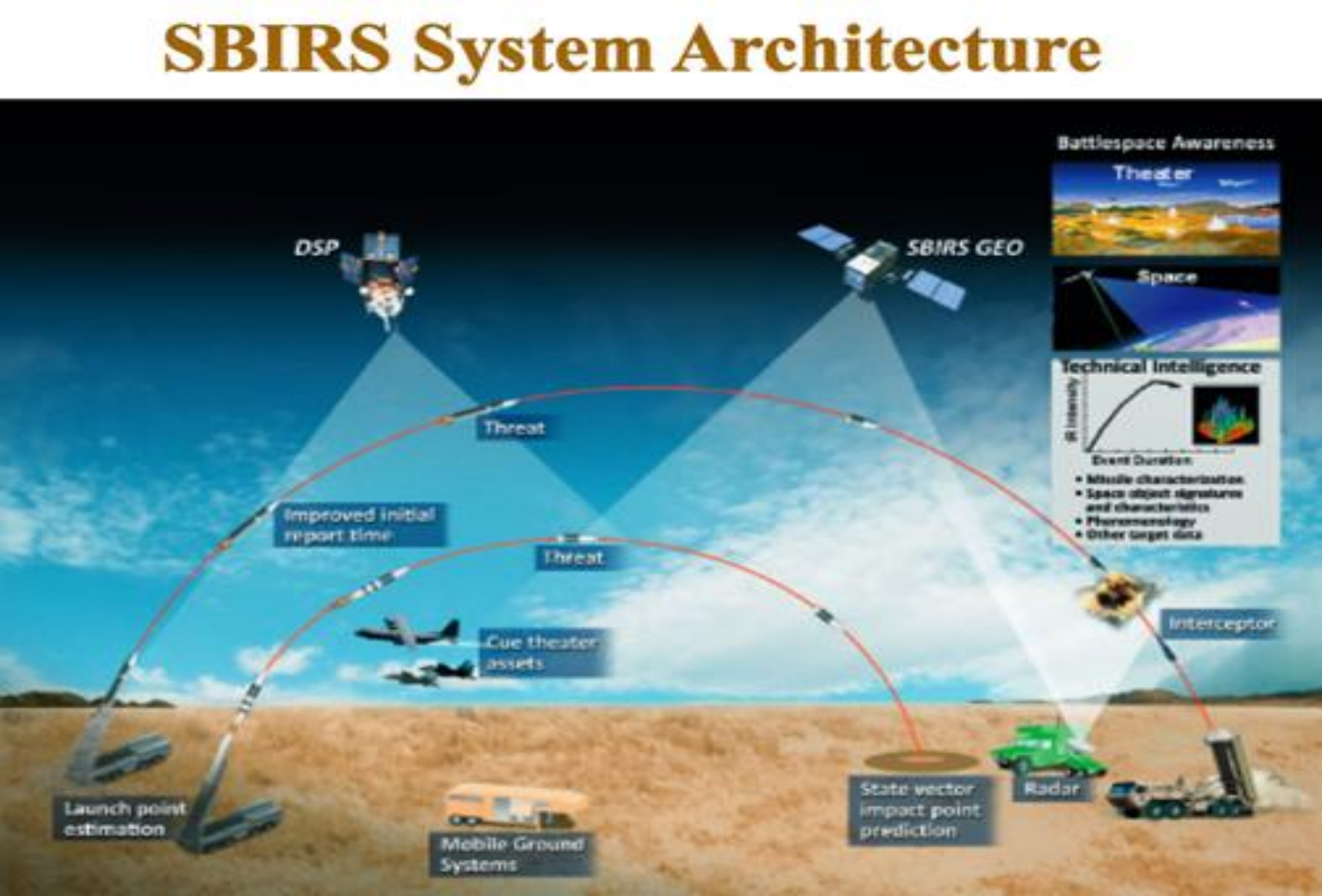


… near future … *(not a movie…)*

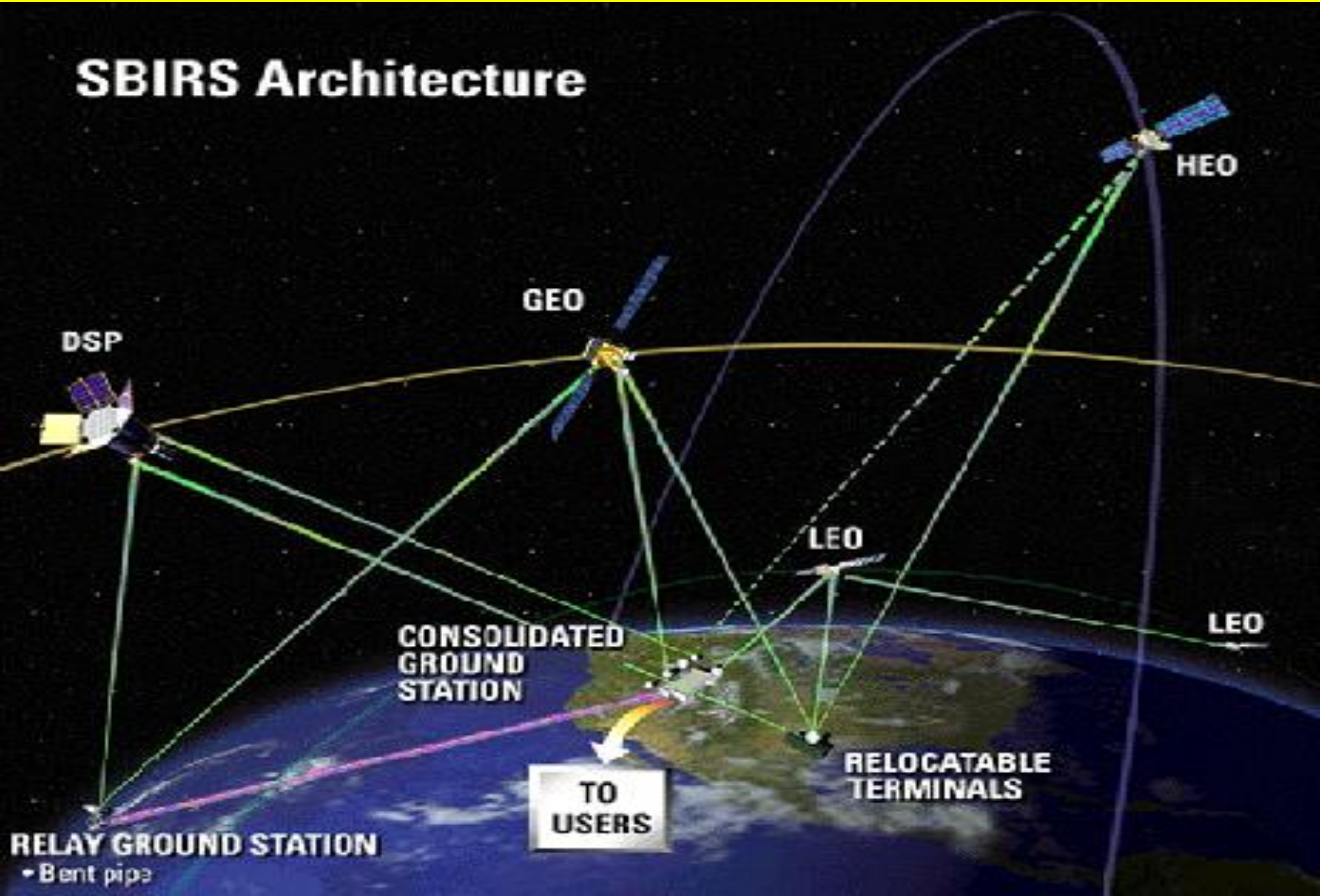
…Space Surveillance Network (SSN)



…Space Based Infrared System (SBIRS)



…Space Based Infrared System (SBIRS)



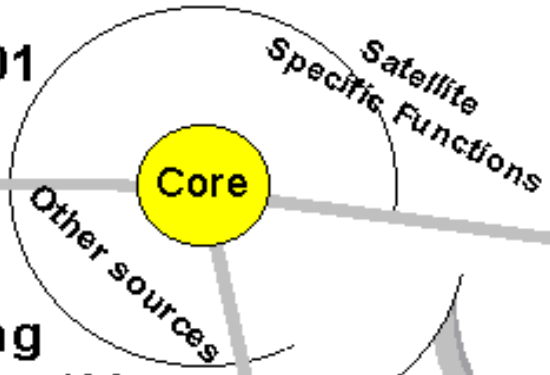
…Space Based Infrared System (SBIRS)

SBIRS Architecture Baseline
High Now - Low Later

4 Satellites Geosynchronous Orbits (GEO)
- 1st Delivery '02

2 Satellites Highly Elliptical Orbits (HEO)
- 1st Sensor Delivery '01

TBD Satellites Low Earth Orbits (LEO)
- DAB '97
- 1st Delivery '06



Multi-IR Source Ground Processing
- DSP Consolidation '99
- Objective Ground '01

- DSP - Operational
- ALERT - Operational

Integrated Architecture to Meet SBIR System ORD

4. *From …* MAMMY BLUE …

Every applicable innovation to become Commercial and Benefit Society Is born and starts from the Military …

For the last 70 years from **... MAMMY BLUE ...**

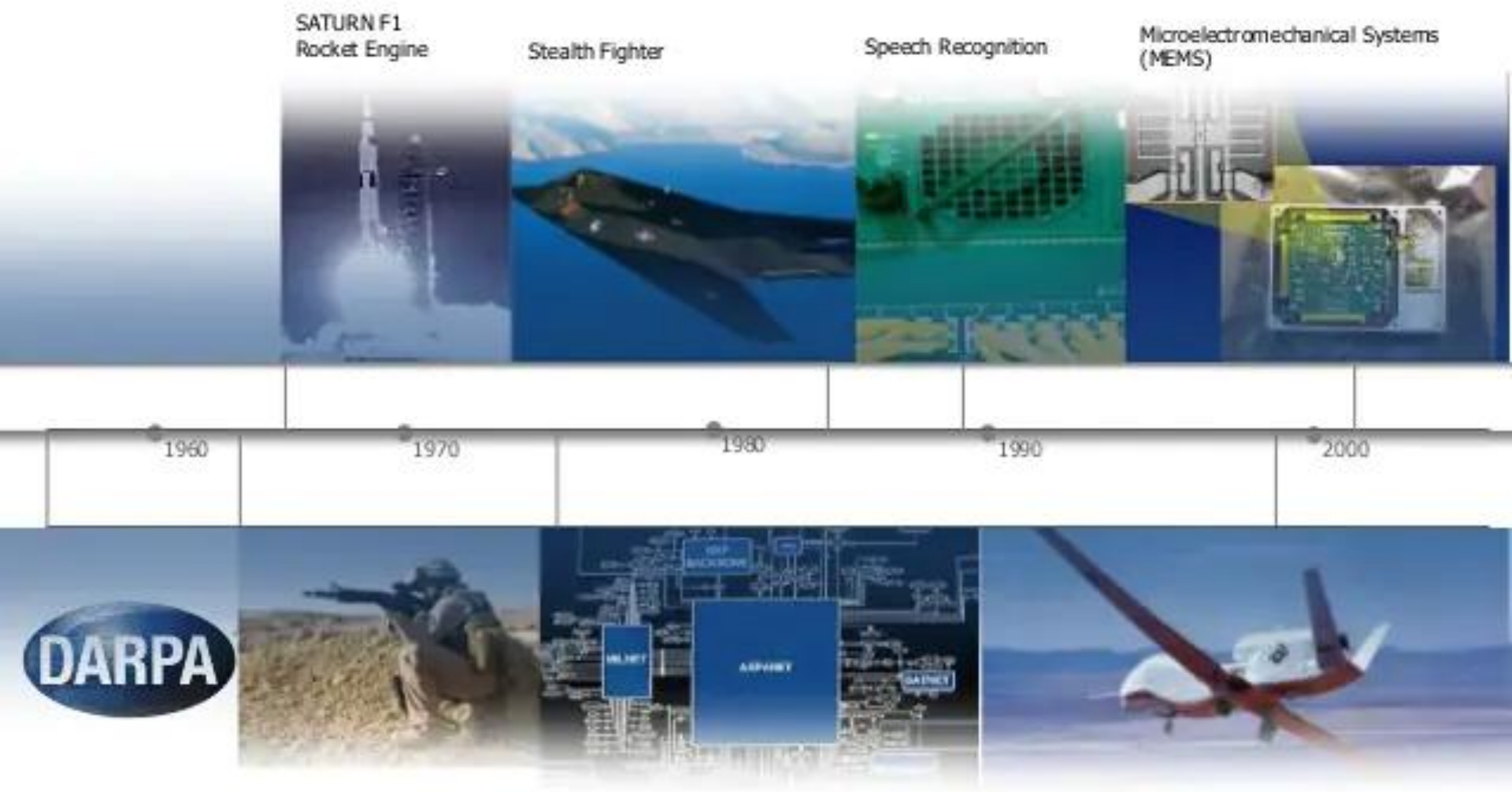
Like all Mothers-Priority: PROTECTION

DARPA

DARPA

DEFENSE ADVANCED
RESEARCH PROJECTS AGENCY

DARPA history



DARPA & .....ARPA ...(Mother & Daughter)

DARPA: Creating Breakthrough Technologies for National Security

For nearly 60 years, the Defense Advanced Research Projects Agency (DARPA) has had a singular mission: to make pivotal investments in breakthrough technologies for national security. Through its investments, DARPA catalyzes the development of new capabilities that give the Nation technology-based options for preventing—and creating—strategic surprise.

Established in 1958 as part of the U.S. Department of Defense, DARPA is designed to pursue opportunities for transformational change rather than incremental advances. It does so collaboratively as part of a robust innovation ecosystem that includes academic, corporate, and governmental partners. And while its focus is always on the Nation's military Services, which count on DARPA to create new strategic and tactical options, DARPA's work has historically catalyzed fundamental breakthroughs that have benefited broader society as well.

and sometimes entire industries have sprung from DARPA-funded research—reflecting the Agency's commitment to pursue its ideas all the way from initial concept to demonstration of practical feasibility through prototype development.

DARPA programs are led by program managers who come from academia, industry, national laboratories and other parts of government for stints that typically last just a few years—a time limit that helps drive the Agency's signature sense of urgency. They

arpa·e
CHANGING WHAT'S POSSIBLE

THE ADVANCED RESEARCH PROJECTS AGENCY-ENERGY

OVERVIEW

ABOUT ARPA-E

The Advanced Research Projects Agency-Energy (ARPA-E) catalyzes transformational energy technologies that could create a more secure and affordable American future. We advance high-potential, high-impact energy technologies that are too early for private-sector investment. ARPA-E awardees are unique because they are developing entirely new ways to generate, store, and use energy.

ARPA-E projects have the potential to radically improve U.S. economic prosperity, national security, and environmental well-being. We focus on transformational energy technology projects that can be meaningfully advanced with a small investment over a defined period of time. Our streamlined awards process enables us to act quickly and advance cutting-edge areas of energy research.

ARPA-E empowers America's energy researchers with funding, technical assistance, and market readiness. Our rigorous program design, competitive project selection process, and active program management ensure thoughtful expenditures. ARPA-E Program Directors serve for limited terms to ensure a constant infusion of fresh thinking and new perspectives.

ARPA-E HISTORY

In 2005, leaders from both parties in Congress asked the National Academies to identify concrete steps that federal policymakers could take to bolster U.S. competitiveness in science and technology to help the U.S. prosper and stay secure in the 21st century. The National Academies recommended that Congress establish an Advanced Research Projects Agency within the U.S. Department of Energy (DOE). In 2007, Congress passed, and President Bush signed into law, the America COMPETES Act, establishing ARPA-E. In 2009, Congress appropriated and President Obama allocated the new agency's first $400 million in funding.

ARPA-E is modeled after the successful Defense Advanced Research Projects Agency (DARPA) in the Department of Defense (DoD), the agency credited with such innovations as GPS, the stealth fighter, and computer networking.

"Pound for pound, dollar for dollar, it's hard to find a more effective thing government has done than ARPA-E."

–FedEx founder, chairman, president, and CEO Fred Smith

ARPA-E PROJECTS

To date, ARPA-E is investing in over 275 high-potential energy technology projects across 14 distinct program areas. The Agency also issues periodic open funding solicitations to address the full range of energy-related technologies, as well as funding solicitations aimed at supporting America's small business innovators.

Many ARPA-E projects have already demonstrated early indicators of technical success. For example, ARPA-E awardees have doubled the world-record energy density for a rechargeable lithium-ion battery, developed a 1 megawatt silicon carbide transistor the size of a fingernail, engineered microbes that use hydrogen and carbon dioxide to make liquid transportation fuel, and pioneered a near-isothermal compressed-air energy storage system.

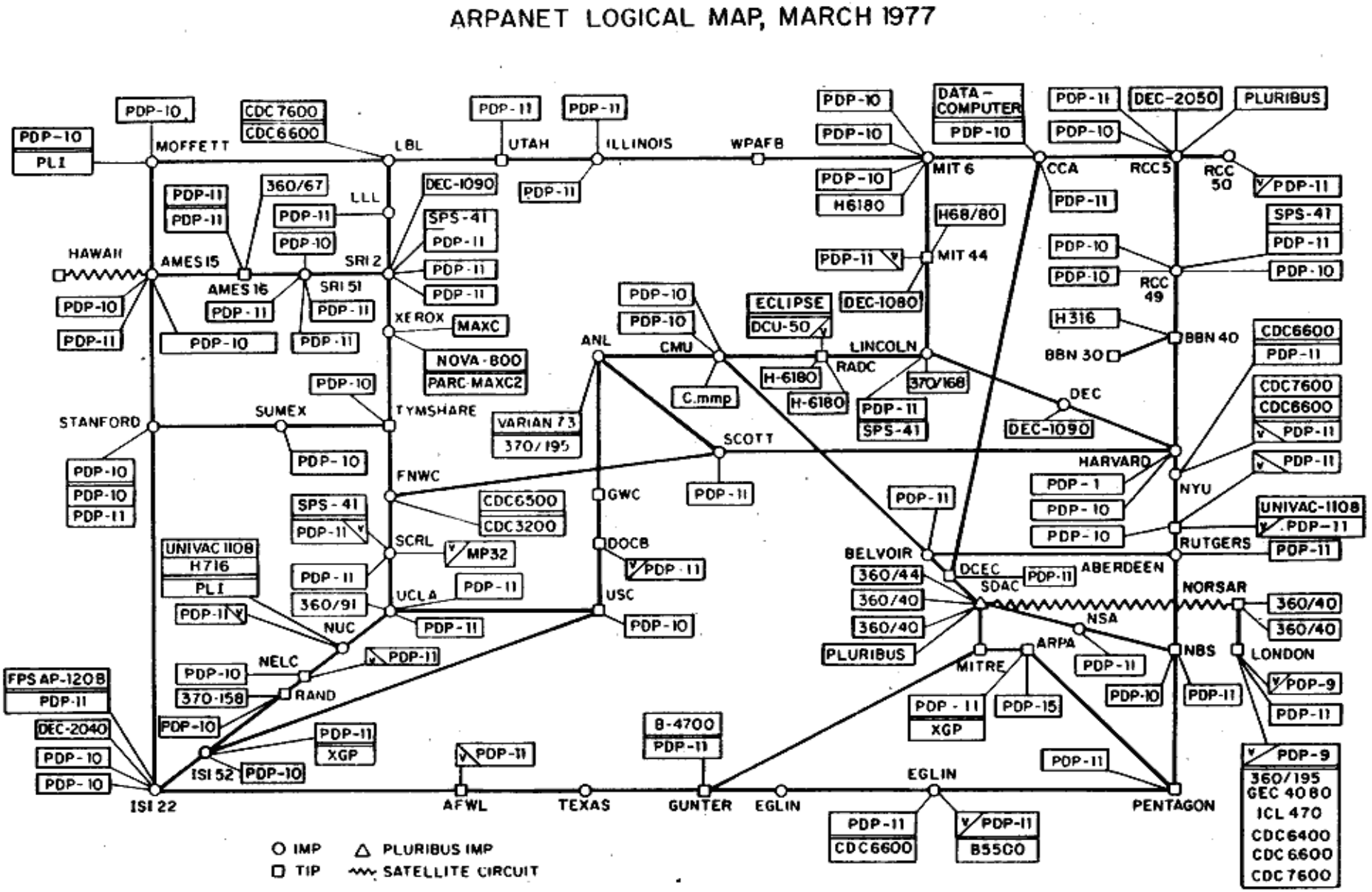
Technical achievements like these have spurred millions of dollars in follow-on private-sector funding to a number of ARPA-E awardees. In addition, several ARPA-E awardees have formed start-up and spin-off companies.

MEASURING SUCCESS

ARPA-E measures its success in a variety of ways, including:

- Breakthrough achievements
  - Patents
  - Publications
- Moving technology to market
  - Partnerships with other government agencies
  - Licensing/acquisition by an established firm
  - Licensing/acquisition resulting in a spinoff
  - Private-sector funding
  - Growth of existing company (e.g. organic growth)
- Operational milestones
  - Award and contracting benchmarks

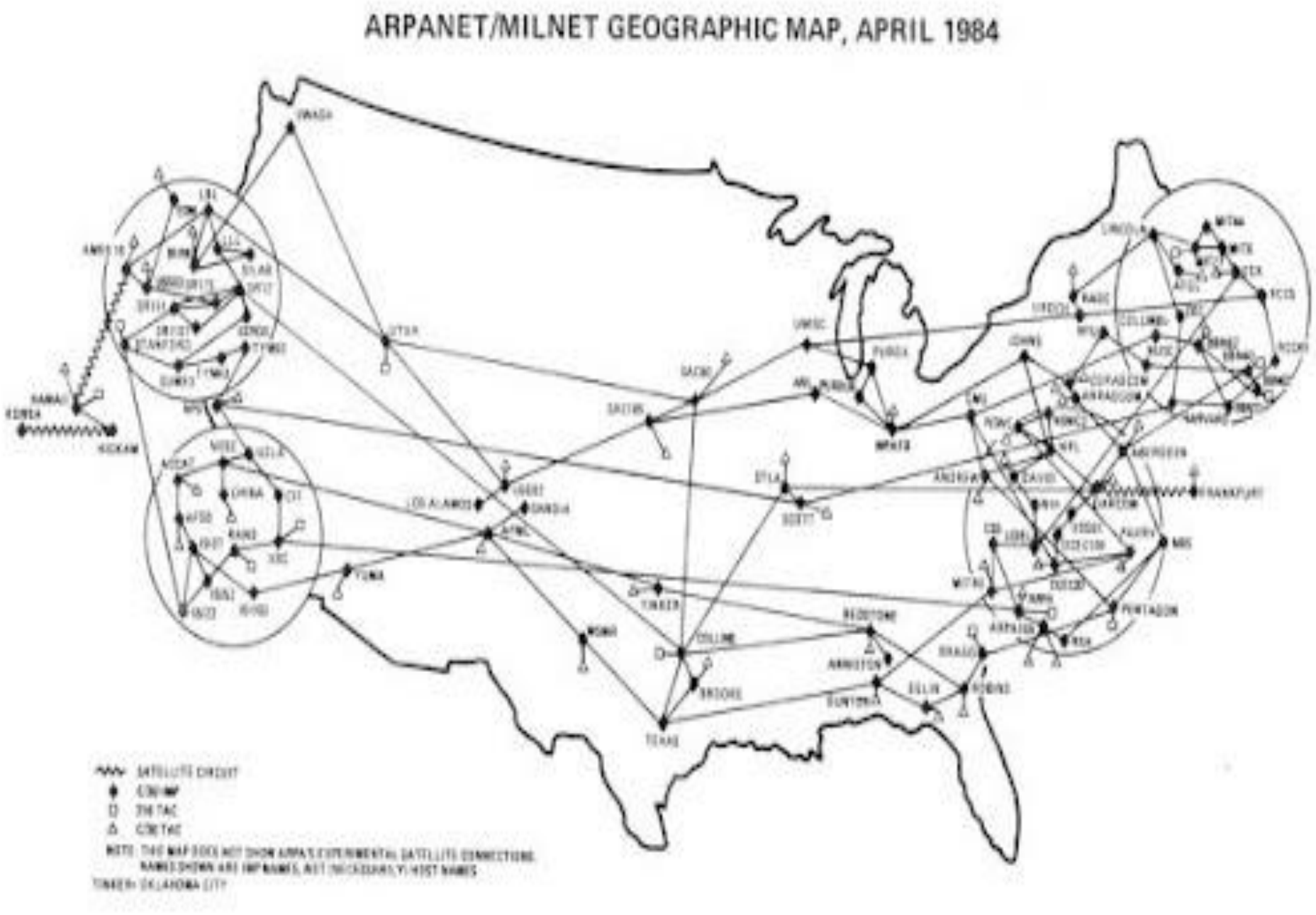
ARPANET ...before it was baptized INTERNET



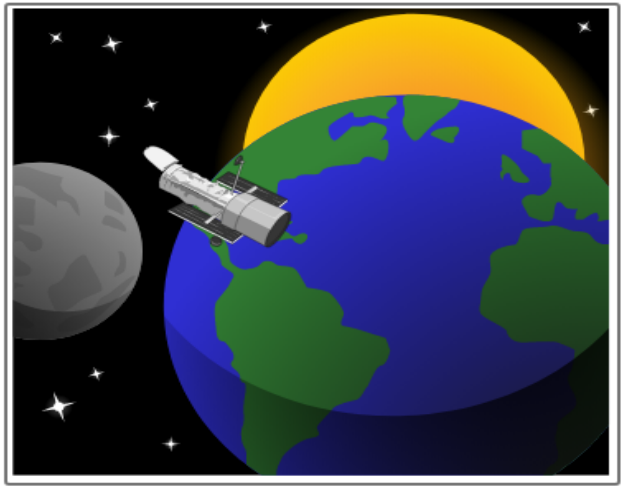
(PLEASE NOTE THAT WHILE THIS MAP SHOWS THE HOST POPULATION OF THE NETWORK ACCORDING TO THE BEST INFORMATION OBTAINABLE, NO CLAIM CAN BE MADE FOR ITS ACCURACY)

NAMES SHOWN ARE IMP NAMES, NOT (NECESSARILY) HOST NAMES

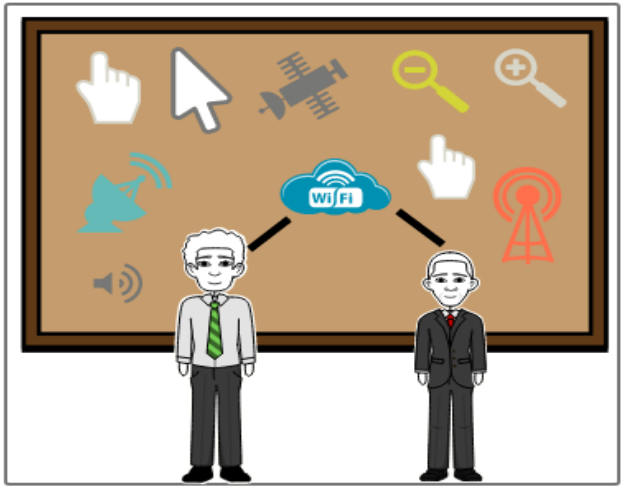
ARPANET ...before it was baptized **INTERNET**



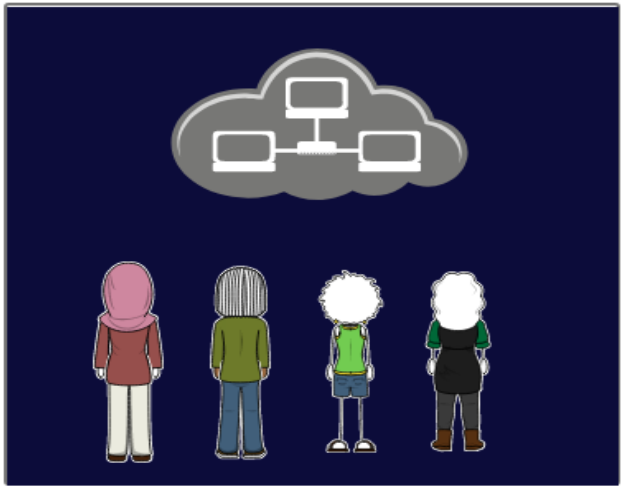
DARPA & ARPA …Contributions



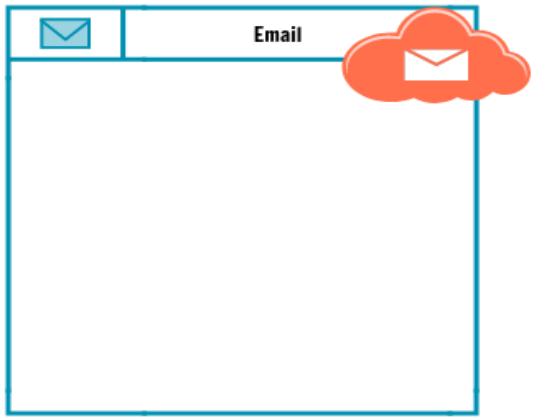
In 1957 the first satilite was launched into space by The Soviet Union. It was called Sputnik. This launch made the US Defence Department think and create ways that important info could be distroyed after a nuclear attack even if they were gone.



In the mid 1960's the original prototype of the internet was created by ARPANET (Advanced Research Projects Agency Network). They used packet switching to allow many different computers to use the same network together at the same time.



In the 1970's scientists Vinton Cerf and Robert Kahn are the original creators of Transmiting controll protocol and internet protocol. This communication software proved that dada could be transmitted between many networks.



The creation of email was one of ARPANET's greates inventions. The first email was created by **Ray Tomlinson in 1971** while he was working for ARPANET. Then email was the first type of fast, efficient, global communication that the world had seen. In 1978 a 14 year old boy called **Shiva Ayyadurai** was asked by the University Of Medicine and Dentistry to try and update email so it was easier and clearer to use.

The world wide web enables everyone to have the abitlity to contact people from all over the globe in a matter of seconds. This fast communication has benefited the world to help us stay connected and informed.

The evolution of the start of the internet has provided us with the social media, and internet we have today.

ARPA …Commercialization up to now …

Since 2009 ARPA-E has provided

$1.8 billion

in R&D funding to more than **660 projects**

71 projects

have formed **new companies**

109 projects

have **partnered with other government agencies** to further development

136 Projects have attracted more than

$2.6 billion

in private-sector follow-on funding

*Does not include $338.5M from 3 aquisitions with strong links to ARPA-E supported technology

1,634

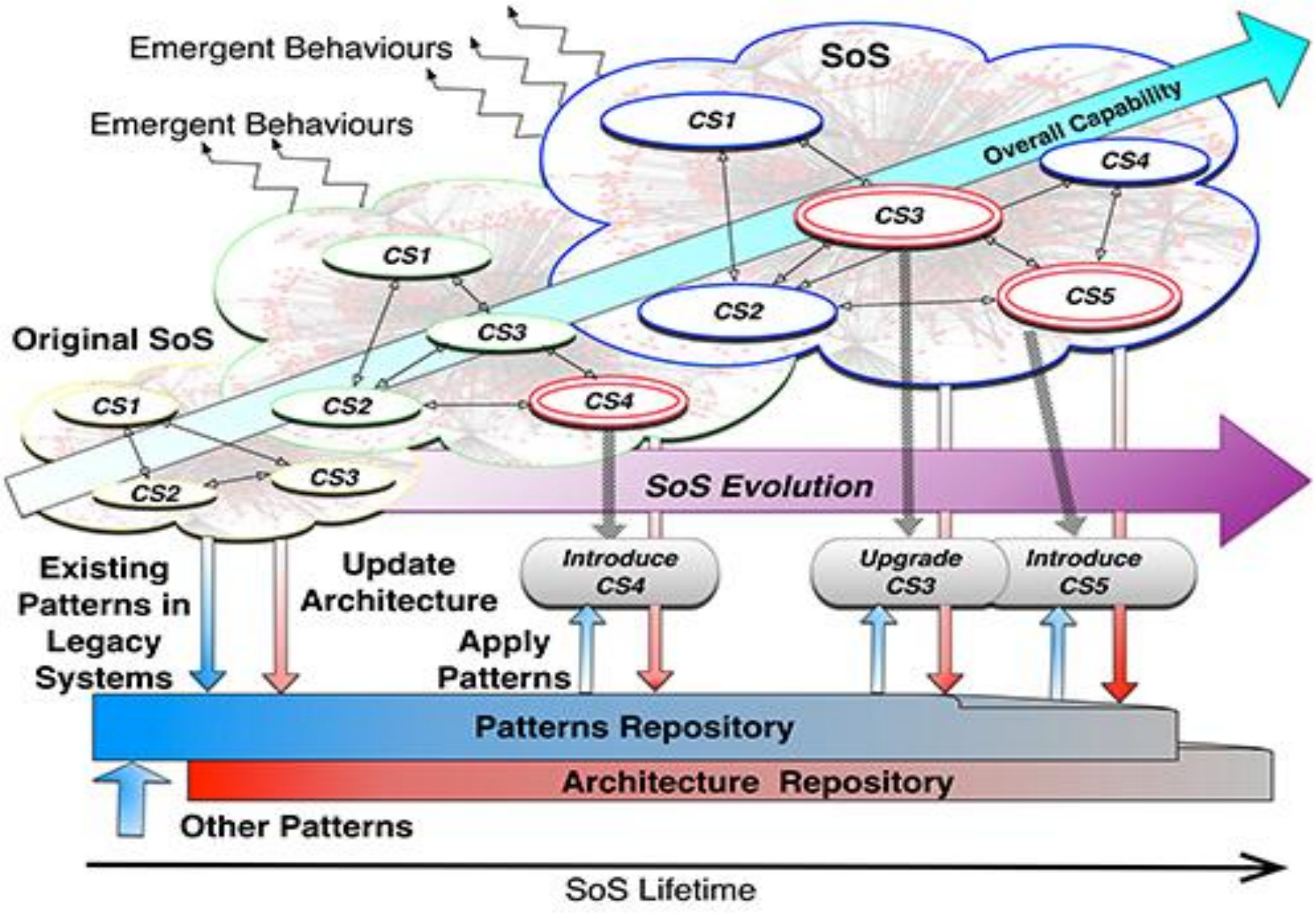
peer-reviewed **journal articles** from ARPA-E projects

248 patents

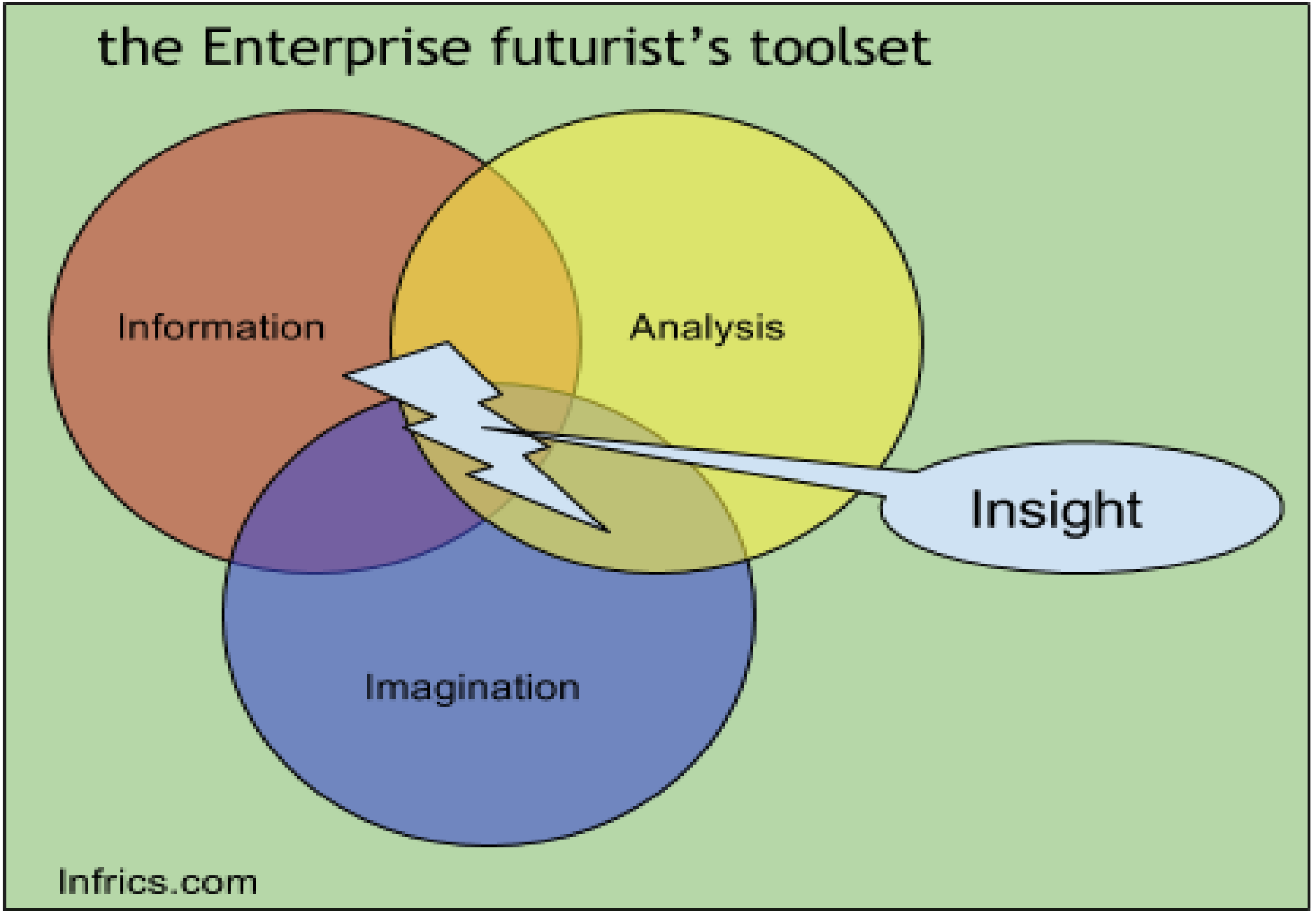
issued by U.S. Patent and Trademark Office

As of February 2018

ARPA …taps Patterns & Behaviours …



ARPA …uses **MIND** capabilities …



DARPA & *ARPA-Mind & Psychology*

DARPA

OPTIMISING PERFORMANCE

OF THE HUMAN BODY AND MIND

Dr. Eric Van Gieson, Program Manager in the Biological Technologies Office (BTO) at DARPA, Defense Advanced Research Projects Agency, interviewed by Ira Pastor, ideaXme life sciences ambassador.

ideaxme

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DARPA & *ARPA-Mind …*

BRAIN INITIATIVE TIMELINE

2013:
- Obama announces BRAIN Initiative.
- NIH, NSF, and DARPA commit $100M for 2014.

2014:
- FDA and IARPA join.
- Initiative establishes long-term vision and research priorities.

2016 – 2020:
- $400M per year funding period dedicated to the development of new tools and technologies

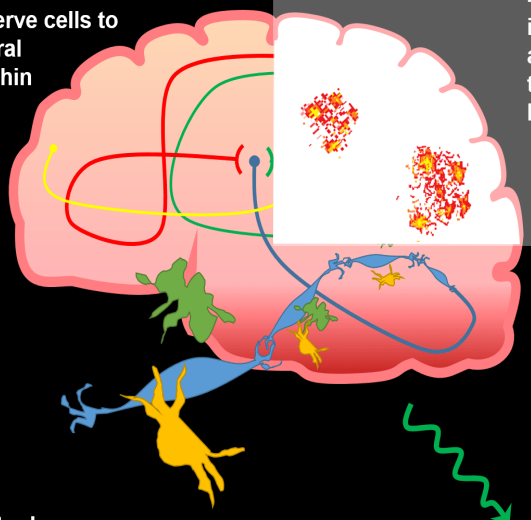
2021 – 2025:
- $500M per year funding period for application of new tools to study of the brain

RESEARCH PRIORITY AREAS

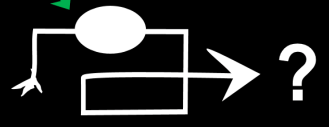
1) Brain Cell Types
- Identify the many different cells that comprise the brain and determine their functions

2) Tools for Circuit Diagrams
- Map connections between nerve cells to define neural circuits within the brain

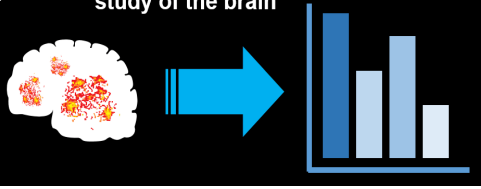
3) Technology to Monitor Neural Activity
- Monitor activity of individual nerve cells and neural circuits over the breadth of the entire brain simultaneously



4) Precise Interventional Tools
- Determine the role of different neural circuits in behavior by targeted manipulation



5) Theory and Data Analysis Tools
- Develop new methods to work with data acquired during study of the brain



6) Human Neuroscience
- Study the human brain and work toward treatments for disorders

7) Integrated Approaches
- Combine the tools and findings of other priority areas for a comprehensive understanding of brain function

FEDERAL PARTNERS

NIH — Development of new tools and techniques

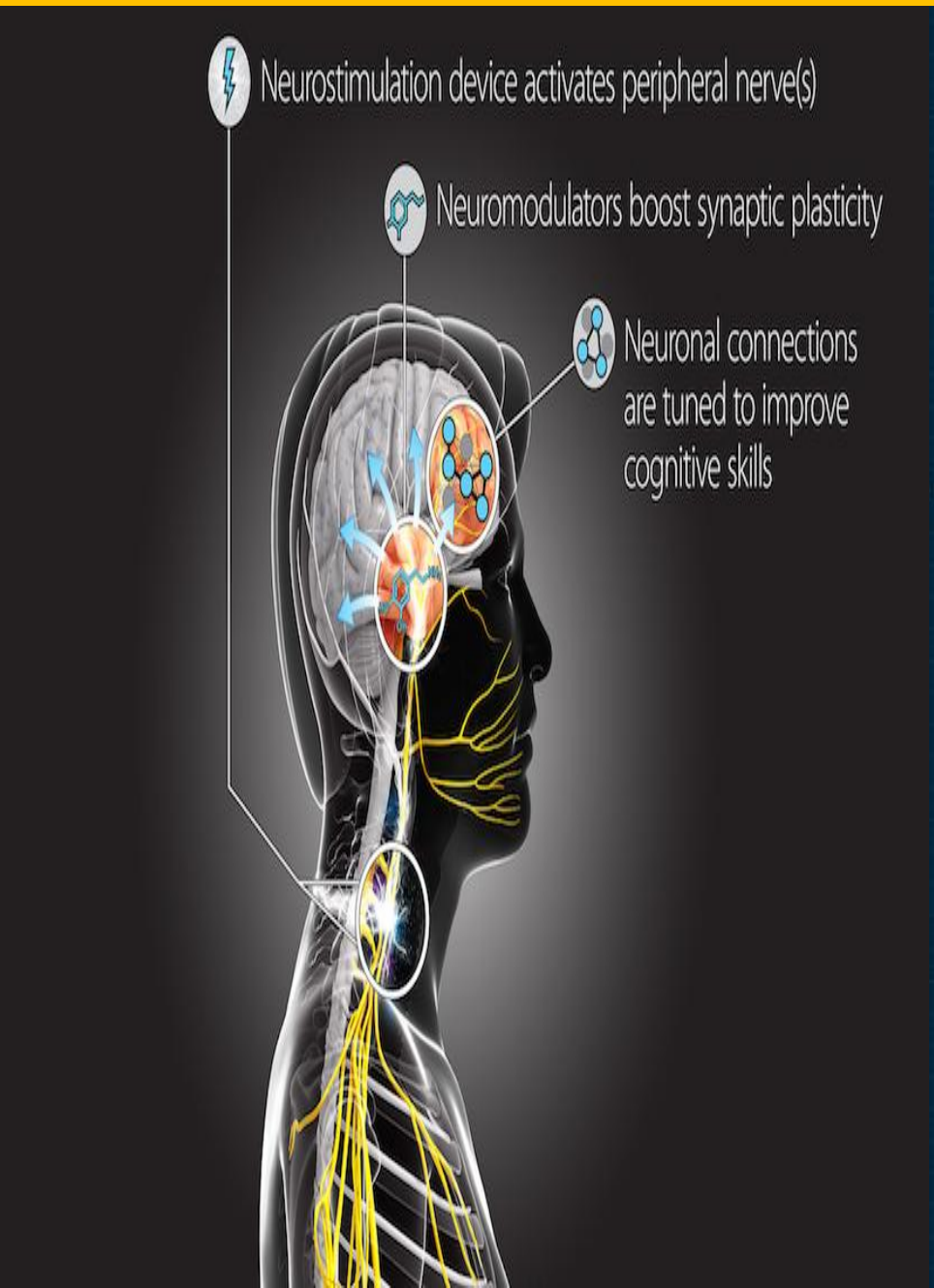
NSF — Fundamental biology and technology development

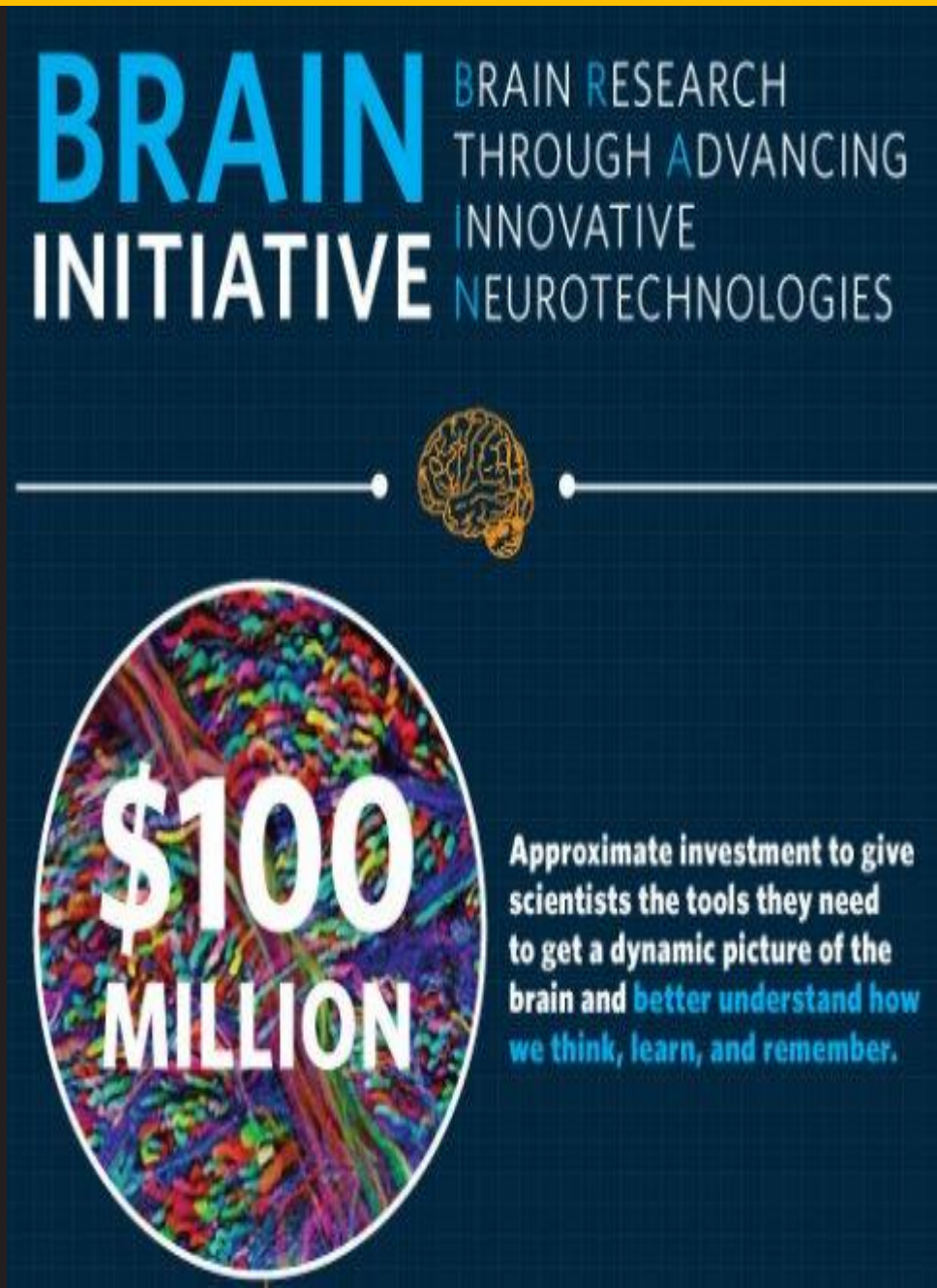
DARPA — Rehabilitation of warfighters and civilians

FDA — Regulation of neurological medical devices

IARPA — Cognition and computation in the brain

DARPA & *ARPA-Mind & Psychology*





Next Battlefield …AI

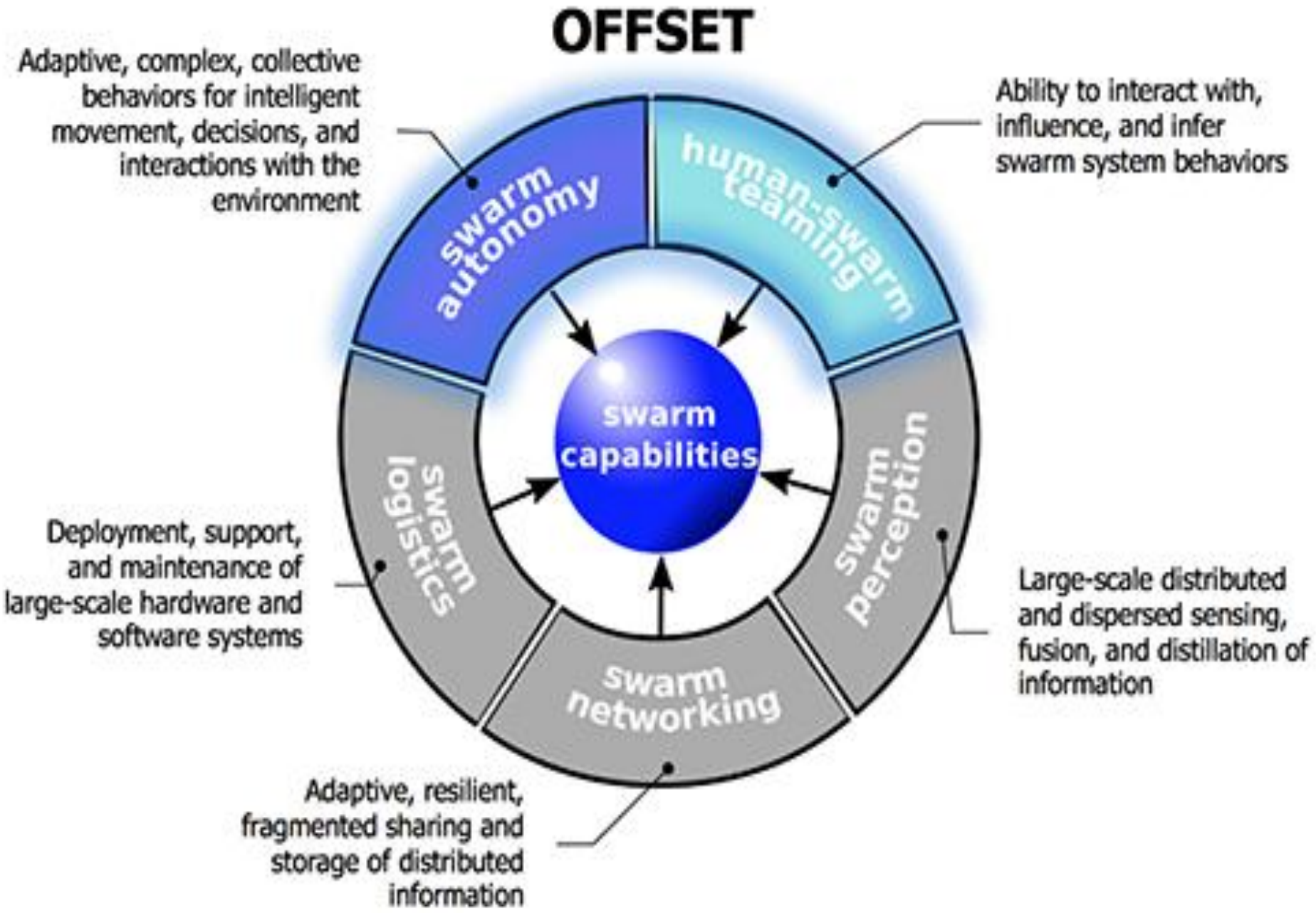
Last Decade's products …

The Edge of Tomorrow - *Swarm Technology …*

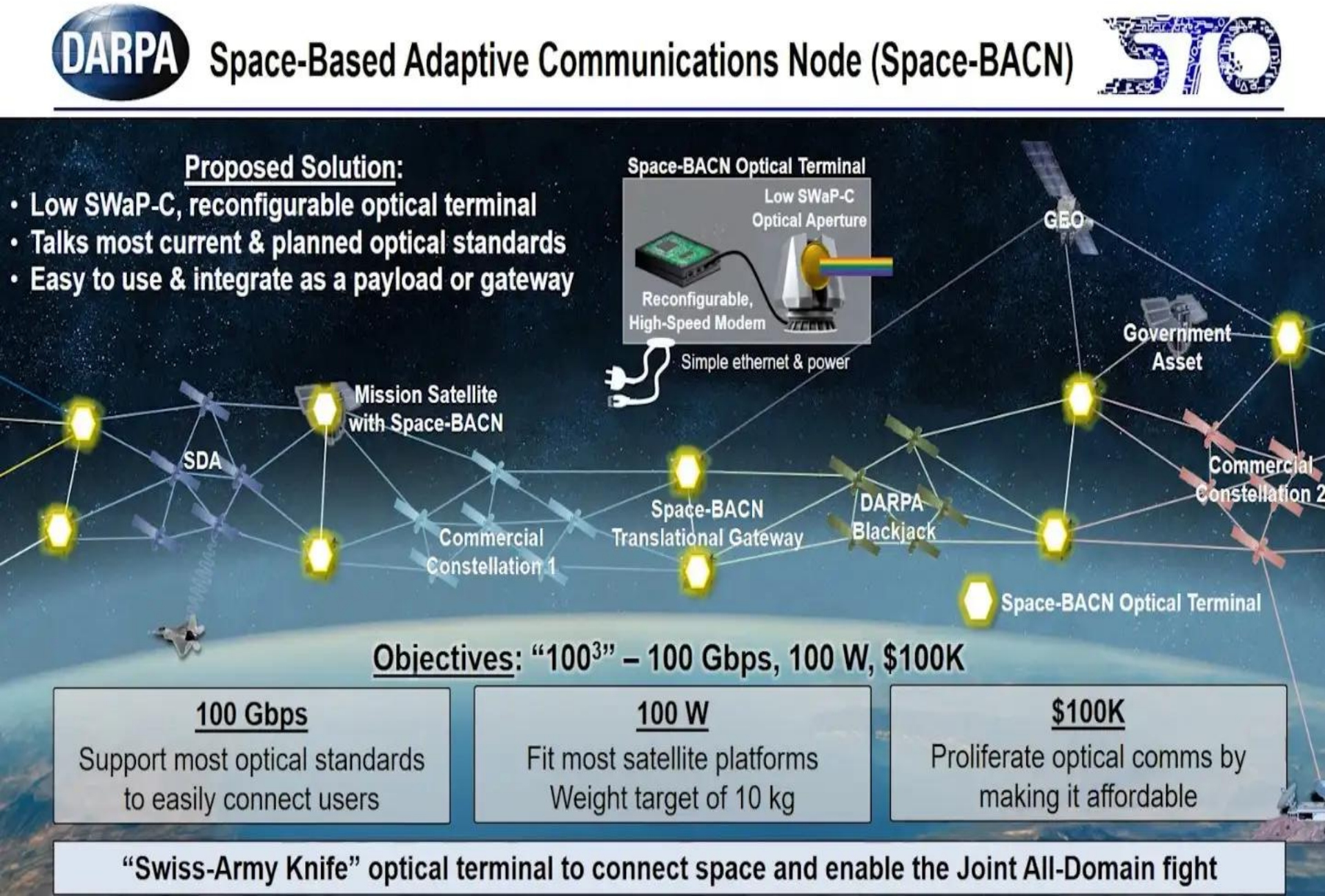
Indian Army's drone swarm of mass destruction

UK MoD Invests £2.5m in Drone Swarm Tech

The Edge of Tomorrow - *Swarm Technology …*



DARPA … flying up …



DARPA … SPACE operations …

DARPA space portfolio

Normalize and simplify space

Technical goals

- Affordable routine access
- Reduce escalating systems cost
- New capabilities
- Survivability / resilience / reconstitution / autonomy
- Disaggregation/simplification
- Space situational awareness

DARPA … SPACE children …

DARPA … SPACE paradigms…

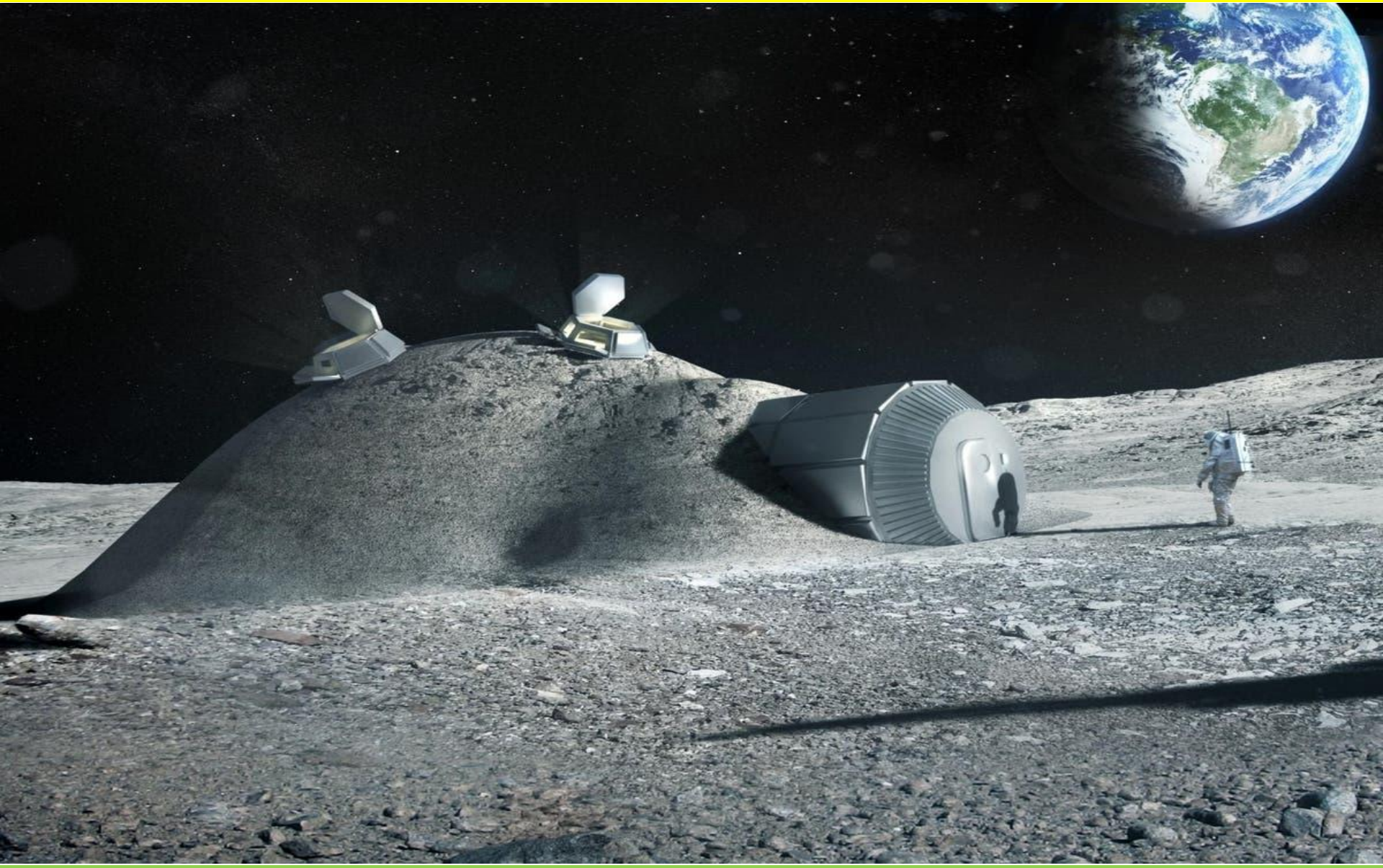
5. Next Decade

Space AIMS

and

Social Challenges

1) … next… to colonize … AVATAR



www.assemblymag.com

DARPA Launches Program to Develop Manufacturing in Space and on the Moon | 2021-04-27 | ASSEMBLY

2) … Intelligence Surveillance & Reconnaissance (ISR)

Raytheon

Evolving ISR Capabilities

Existing

- Stove-piped Platforms
  - Sensors
  - Processing
  - Ground Stations
  - U2, JSTARS

Today

- Integrated Sensor Systems
  - Integrated Sensors & Processing
  - Integrated Ground Stations
  - Unmanned Platforms

Tomorrow

- Multi-Mission Systems
  - E-10A/MC2A
  - Space Based Radar
  - USAF C2C
  - Multi-INT
  - Information Fusion
  - Multi-Mission aircraft (MMA)
  - DD(X)

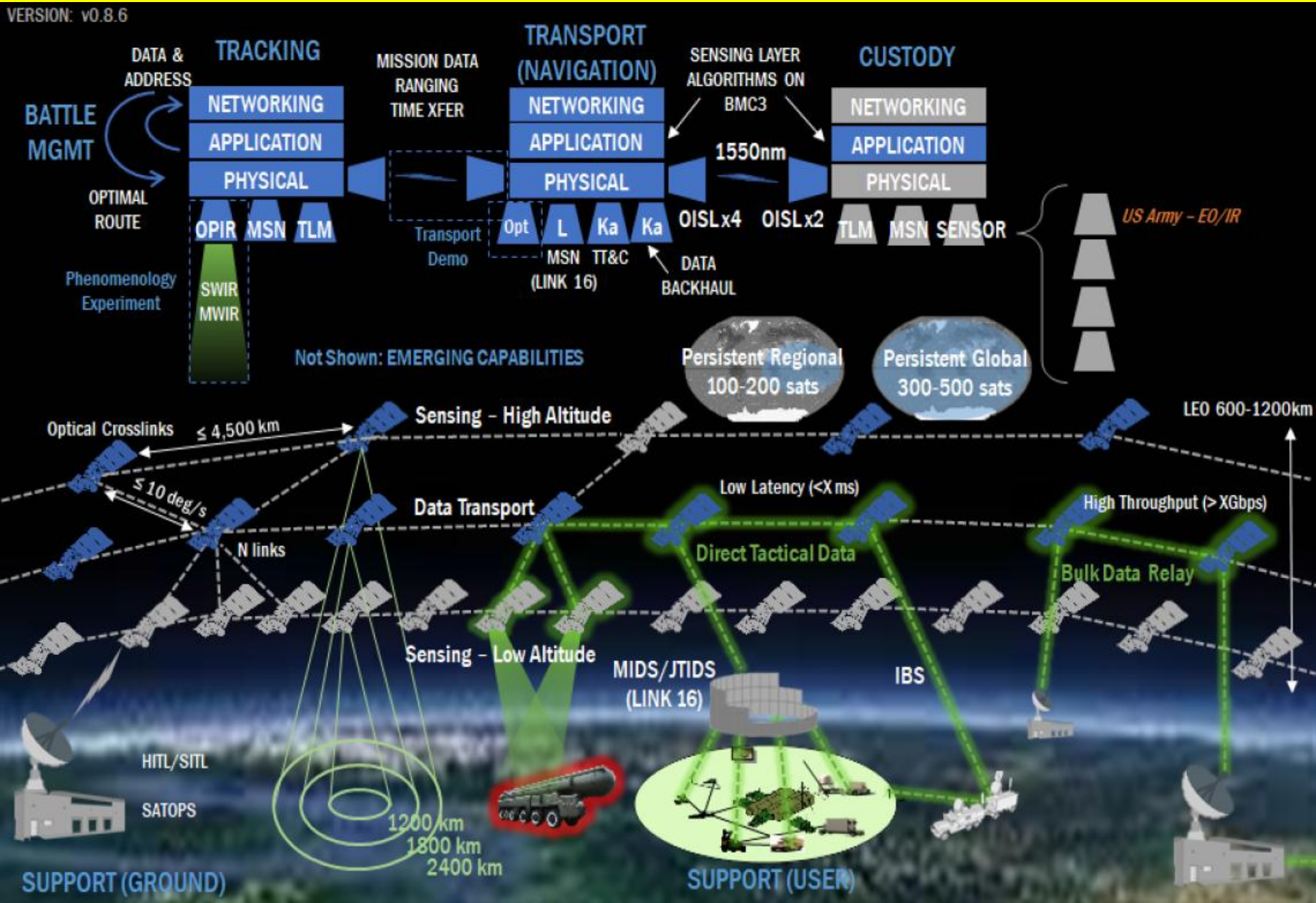
Objective

- Network Centric Warfare
  - Fully Interoperable Global Grid
  - Real-Time, Interactive Multi-INT
  - Achieve Rapid Global Engagement of strategic targets

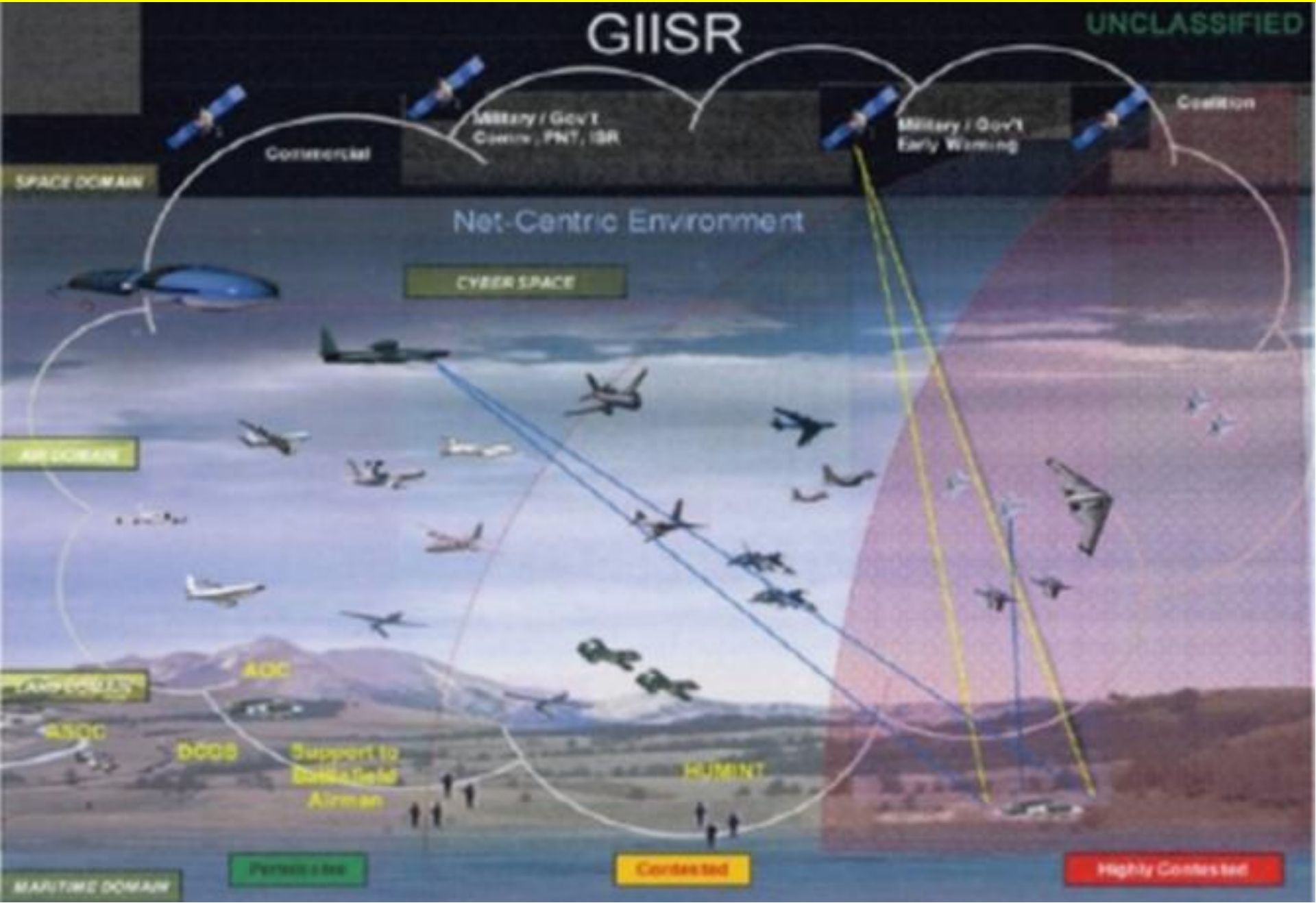
Goal – Integrated Air, Space, and Ground C2ISR

10/6/2009

ISR for Military …



ISR for Military …

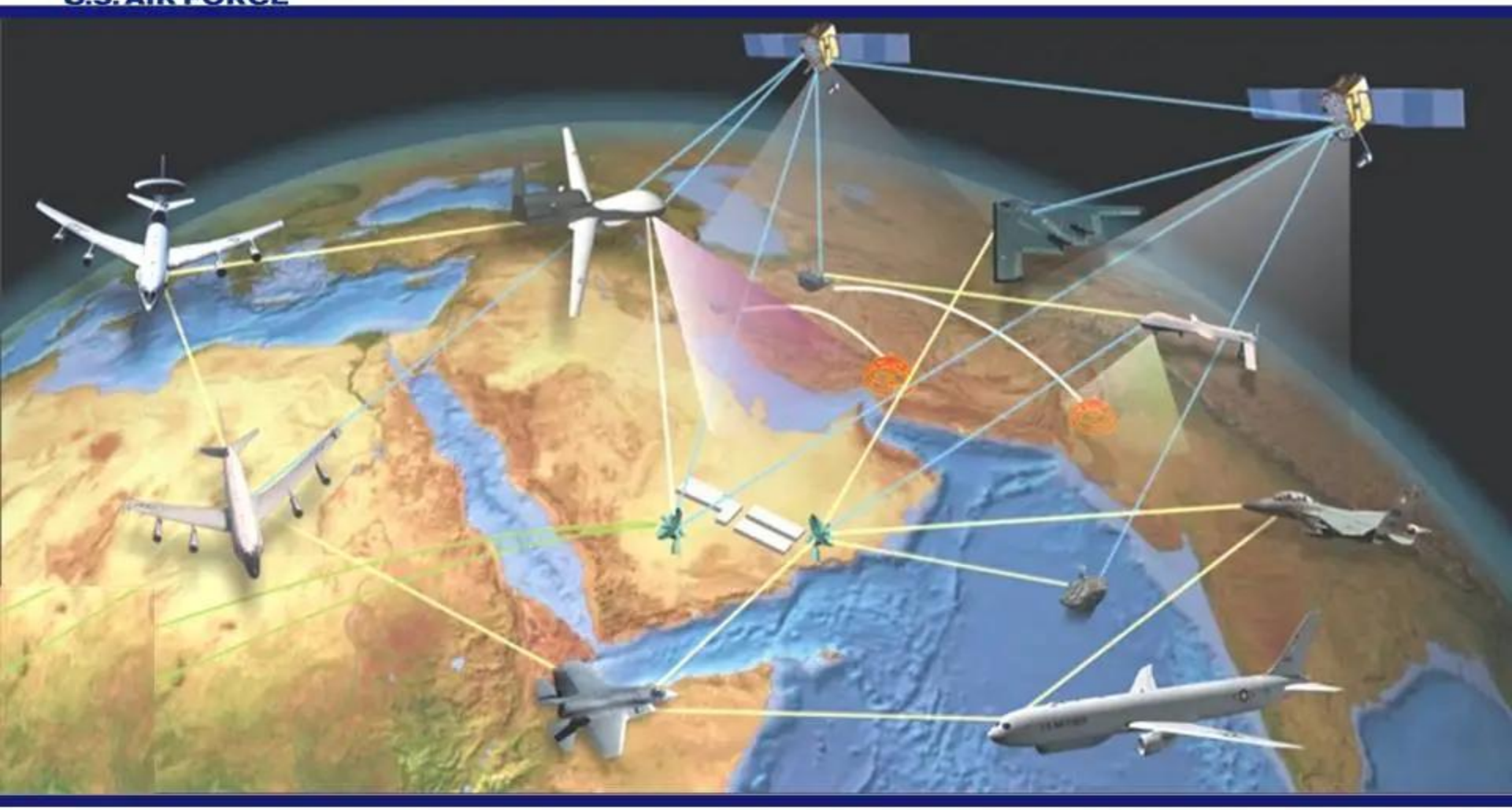



SAVE THE DATE!
Next Generation ISR
Intelligence Surveillance and Reconnaissance
April 7-8-9, 2021 (Virtual)
Mission Capabilities – New Opportunities – Emerging Threats

ISR in action above Cyprus…

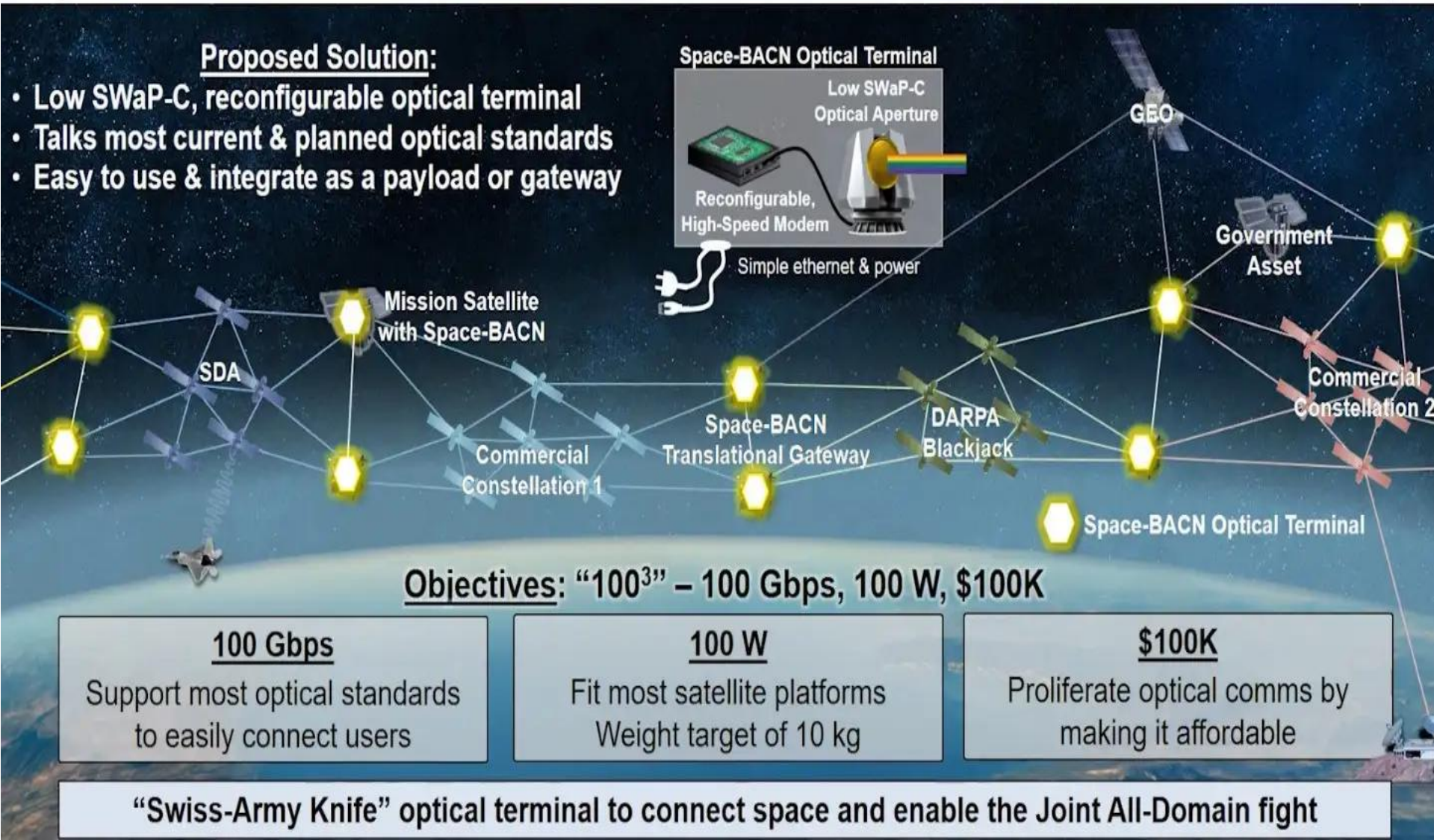
U.S. AIR FORCE

Air Force ISR Surge



Integrity - Service - Excellence

3) … Space-Based Adaptive Communications

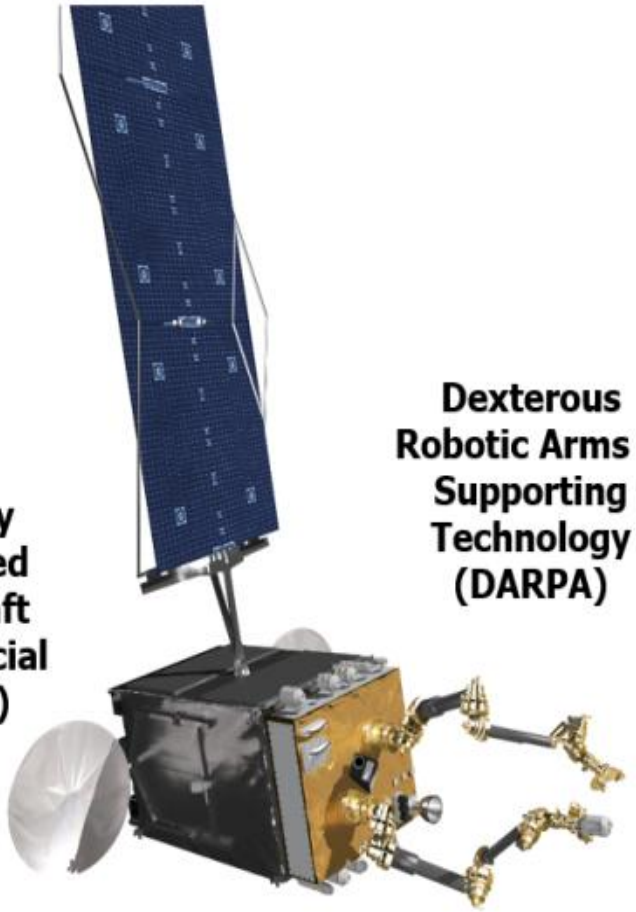


4) … Space-Robotics

Robotic Servicing Vehicle (RSV) & Envisioned Missions

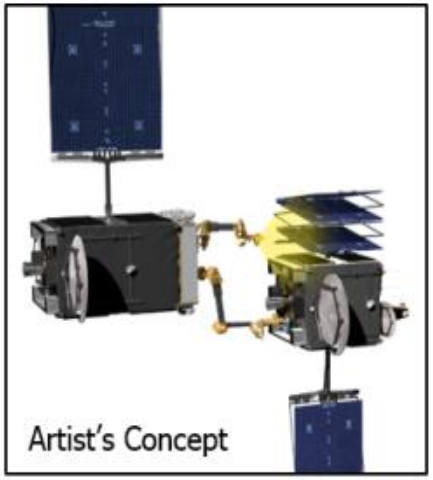
Privately Developed Spacecraft (Commercial Partner)

Dexterous Robotic Arms & Supporting Technology (DARPA)

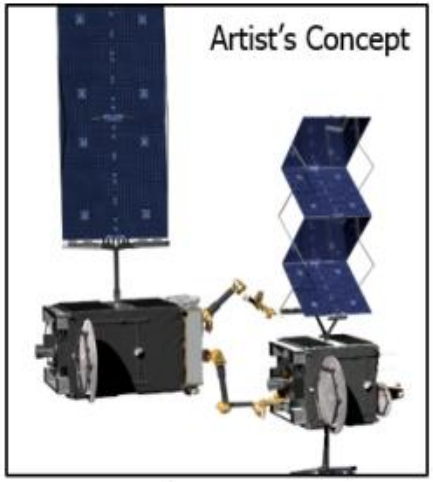


Artist's Concept

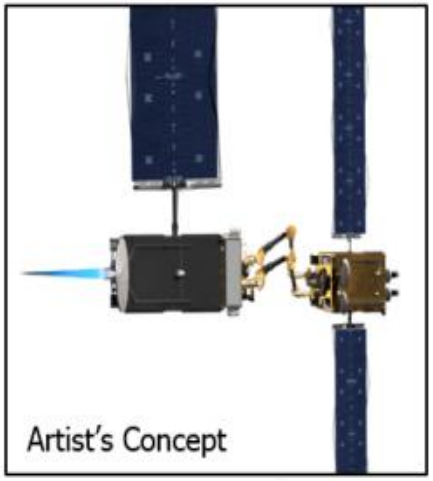
DARPA



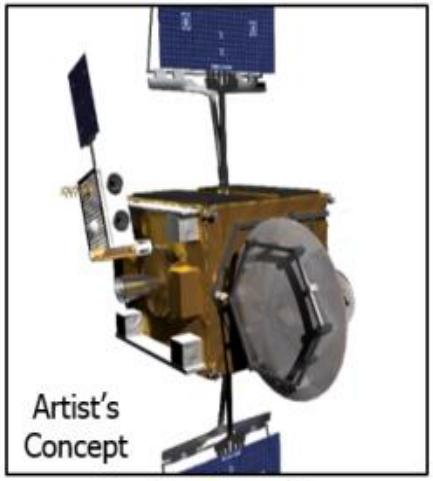
High-Resolution Inspection



Anomaly Correction

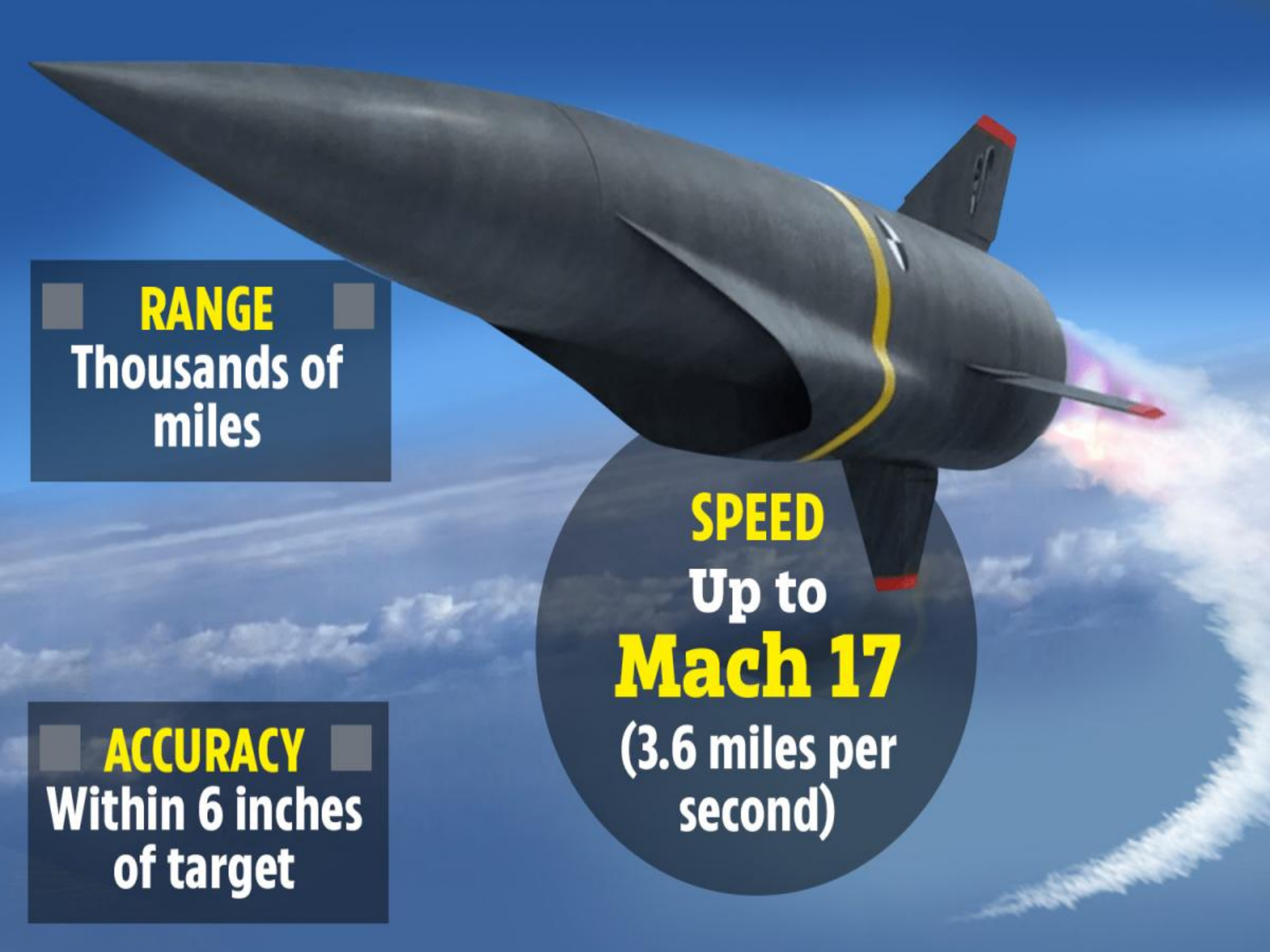


Cooperative Relocation

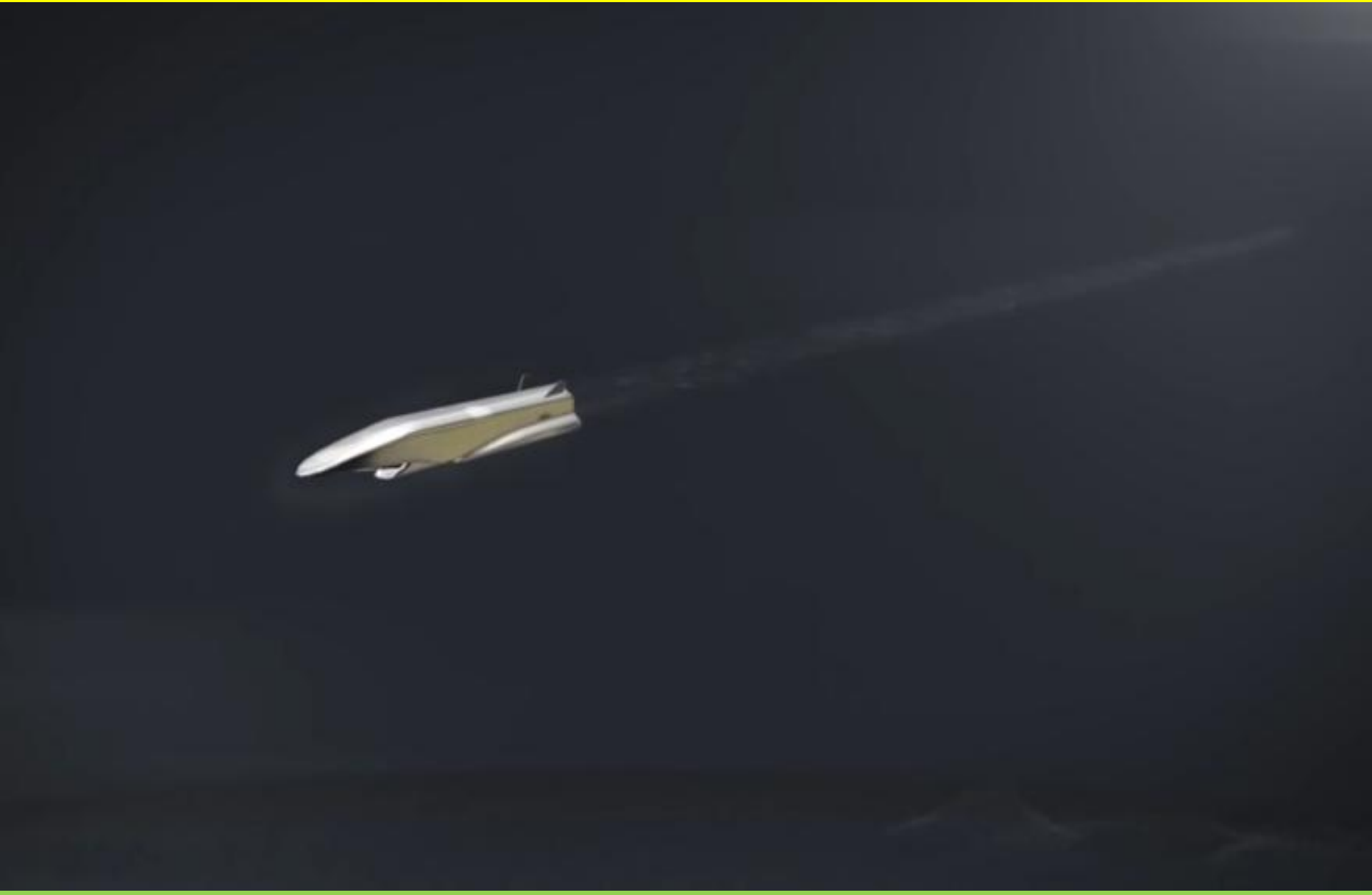


Upgrade Installation

5) Hypersonic … vehicles …plus


RANGE
Thousands of miles
SPEED
Up to
Mach 17
(3.6 miles per second)
ACCURACY
Within 6 inches of target

… American … Hypersonic …



Hypersonic missiles are a new class of military threat capable of maneuvering and flying faster than 5,000 kilometers per hour.

And the Chinese plans - Chinese DF-ZF hypersonic glide vehicle

…and the West reacts … to Chinese moves …

October 28, 2021 - 2:19 AM EEST Aerospace & Defense

Top U.S. general confirms 'very concerning' Chinese hypersonic weapons test

By Phil Stewart

October 28, 2021

US confirms China's hypersonic missile test with concern, says it's 'close to a Sputnik moment'

Key points:

- *Hypersonics move at speeds of more than five times the speed of sound, or about 6,200 kph*
- *Sources say the test involved a weapon that first orbited the earth, something called 'fractional orbital bombardment'*
- *China has denied the claims, saying what it tested was a space vehicle*

…is confrontation in Space … coming ?

Hypersonic defense from space artist concept.

Hypersonic planes …soon …

Roadmap: Hypersonics

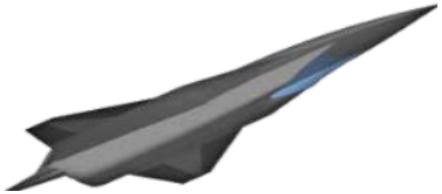
High Speed Strike Weapons

Rapid strike from standoff

Tactical Strike/ISR

Deep strike of high value targets

Reusable/Persistent



Penetrating, persistent reusable ISR & strike

Hypersonics S&T Disciplines

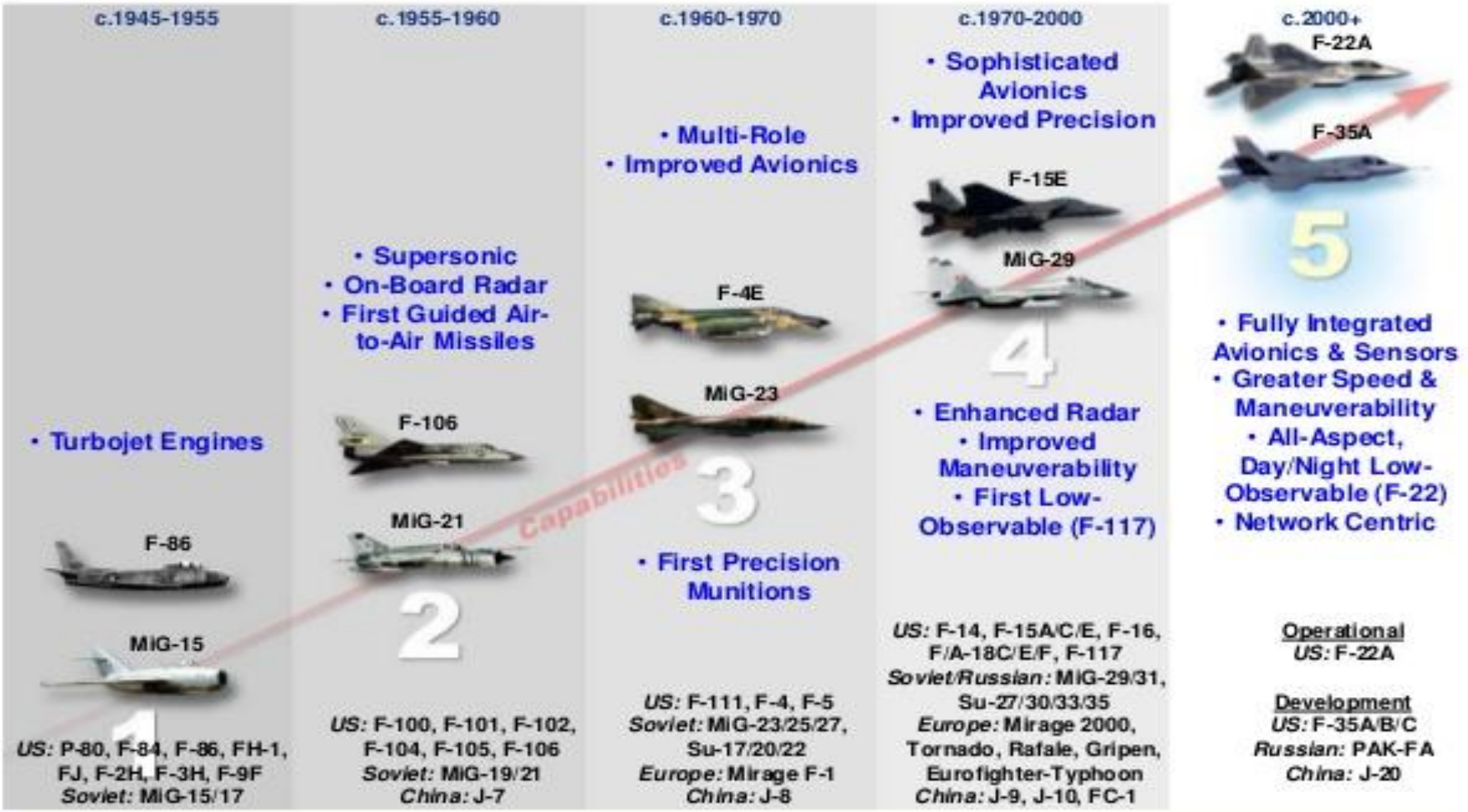
- Aerodynamics
- Aerothermodynamics
- Materials & Structures
- Propulsion
- Guidance, Navigation & Control
- Ordnance & Payloads
- Configuration & Integration

2020+ 2030+ 2040+

Ensure rapid and survivable strike in contested environments

AFRL

5G in combat stealth planes …



HYPERSONIC WEAPONS ALTER THE GLOBAL STRATEGIC BALANCE

Valdai | Discussion Club

Hypersonic weapons can significantly alter the world's strategic balance. It limits the opponent's reaction time to a minimum, while high-precision maneuverable hypersonic ballistic missiles can pass through any missile defense system. Hypersonic speed is 5 to 10 Mach, or 6,174-12,348 km/h

Speed | Range | Flight ceiling

USA

Lockheed Martin SR-72

A successor of the SR-71 Blackbird spy plane, decommissioned in 1998

6,400 km/h | 24,000 m

Boeing X-51 Waverider

Hypersonic cruise missile

6,200 km/h | 740 km | 21,300 m

Advanced Hypersonic Weapon (AHW)

Part of the Prompt Global Strike program

Hypersonic Technology Vehicle 2

Developed by DARPA

Passes 17,000 km, the distance from London to Sydney, in 49 minutes

21,000 km/h

HTV-3X

Project Blackswift

Halted in 2008, said to be revived.
The HTV-3X is the size of an ordinary fighter jet

Boeing X-37B

Could potentially be used as a hypersonic delivery system. Can spend extended periods time in orbit

28,044 km/h

FRANCE

ASN4G

Air-to-surface cruise missile
Development started
No information on when first prototype will be ready

8,496 km/h

RUSSIA

Yu-71

Project 4204 aircraft

11,200 km/h | 5,500 km | 80,000 m

AS-19 «Koala»

Strategic hypersonic air-to-surface cruise missile

Tu-95 used as delivery vehicle

5,310 km/h | 3,000 km | 7,000 m (launch altitude)

Zircon 3M22

Sea-based hypersonic missile

50 times stronger kinetic energy at strike than existing air-to-ship or ship-to-ship missile.
Will possibly enter service in 2018

6,500 km/h | 30,000 m

INDIA

BrahMos-2

Hypersonic cruise missile

Developed in cooperation by NPO Mashinostroyeniya (Reutov, Russia) and India's Defence Research and Development Organization

7,434 km/h | 290 km (estimated)

Shaurya

Tactical surface-to-surface hypersonic missile

Nuclear warhead-capable

7,434 km/h | 750-1,900 km

CHINA

DF-ZF (American designation Wu-14)

Hypersonic aircraft

Can be used as nuclear warhead delivery vehicle, or for high-precision conventional strikes

6,173-12,359 km/h

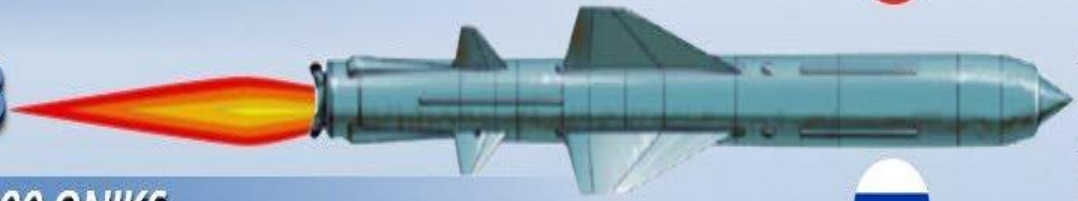
01 BRAHMOS

Length: 8.4m/ 28ft
Warhead: 200 kg conventional semi-armour piercing nuclear
Guidance system: INS, Active radar homing, GPS/ GLONASS/GAGAN Satellite guidance
Maximum speed: Mach 3
Operational range: 500 km/ 310 miles

02 3M54 KALIBR

Length: 6.2-8.9m/ 20.3-29.2ft
Warhead: 400-500 kg HE or thermonuclear
Guidance system: Inertial guidance plus terminal active radar homing, by satellites, DSMAC
Maximum speed: Mach 0.8-2.9
Operational range: 220-4500 km/ 137-2796 miles

03 P-800 ONIKS



Length: 8.9m/ 29.1ft
Warhead: 300 kg semi-armour piercing HE, thermonuclear
Guidance system: midcourse inertial guidance, active radar homing- passive radar seeker head
Maximum speed: Mach 2.5
Operational range: 300-600 km/ 174 miles

04 TOMAHAWK BLOCK IV

Length: 5.56m/ 18.2ft
Warhead: Penetration, high-explosive blast
Guidance system: GPS, INS, TERCOM, DSMAC, active radar homing
Maximum speed: Mach 0.74
Operational range: 1700 km/ 1000 miles

05 STORM SHADOW

Length: 5.1m/ 16.9ft
Warhead: 450 kg BROACH
Guidance system: Inertial, GPS and TERPROM, Terminal guidance using imaging infrared DSMAC
Maximum speed: Mach 0.8-0.9
Operational range: 560 km/ 350 miles

07. DEEPSTRIKE

Role: Hypersonic Missile
Manufacturer: Lockheed Martin
Status: underdevelopment

Role: Hypersonic glide vehicle
Manufacturer: DRDO
Status: Tested

08. HSTDV MISSILE

09. ASN4G MISSILE

Role: Hypersonic Missile
Manufacturer: ArianeGroup
Status: underdevelopment(expected by 2021)

Role: Hypersonic glide vehicle
Manufacturer: IEAv & BAF
Status: Underdevelopment

10. 14-X

11. PERSEUS MISSILE

Role: Multi-platform air-launched cruise missile
Manufacturer: MBDA
Status: Design study

Role: Hypersonic glide vehicle
Manufacturer: CALT
Status: Initial operating capability

12. DF-ZF

6) … Multi-Domain Operations (MDO)

MULTI-DOMAIN OPERATIONS (MDO) VISION

To Produce High-velocity, operationally agile operations
that present multiple dilemmas for an adversary at an operational tempo they cannot match:

- **Interoperability across various mission systems**
- **Fast-track ability to develop, deploy and field capabilities**
- **Accelerate sharing of information and decision making**

Resilient
Distributed
Multi Domain
Open Architecture
Platform Agnostic
Affordable

Every Node Connects – Shares – Learns Involves Multi-Domain Planning…and Execution

… MDO for the Military …

Multi-Domain Operations:

Warfare that operates using the integrated capabilities of:

- **Space**
- **Air**
- **Land**
- **Surface**

Today's Battlefield (Capability Perspective)

NORTHROP GRUMMAN

- Group Services by Type (or mission)
- Surveillance
- Communications
- Tactical

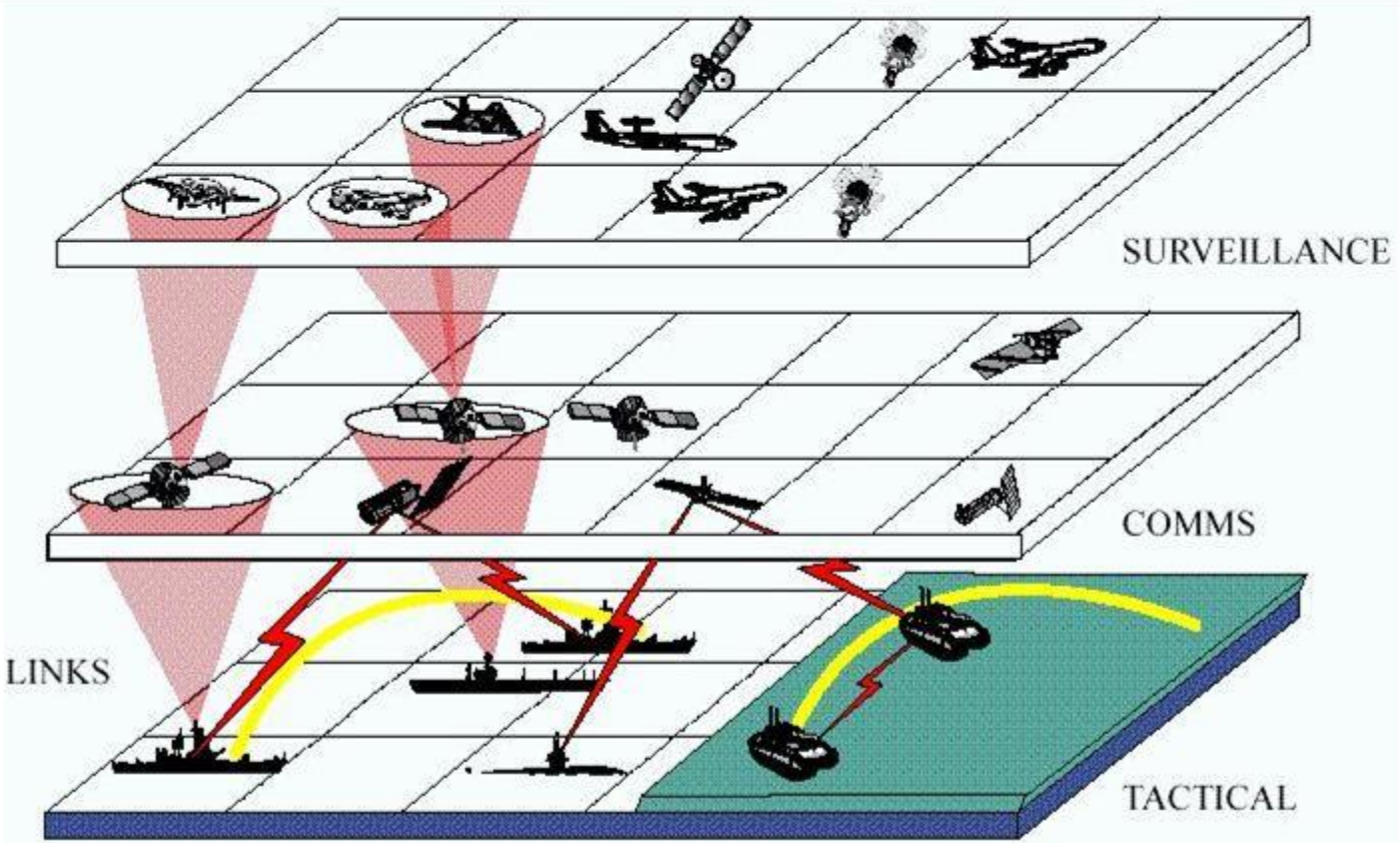
- In operations of any nature its essential to ascertain impact of cyber attack by capability
  - What have I lost?

Space Domain

Airborne Domain

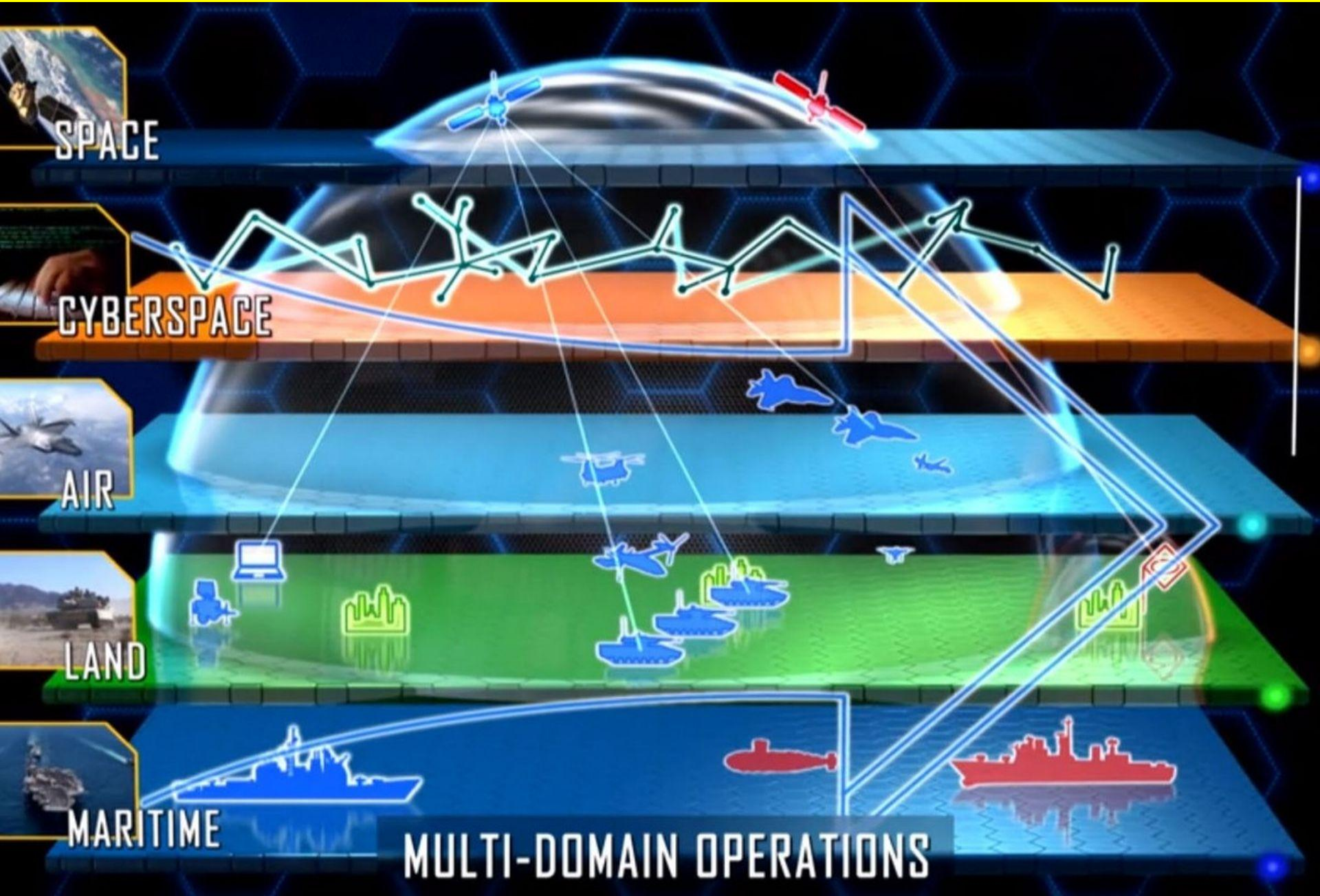
Terrestrial Domain

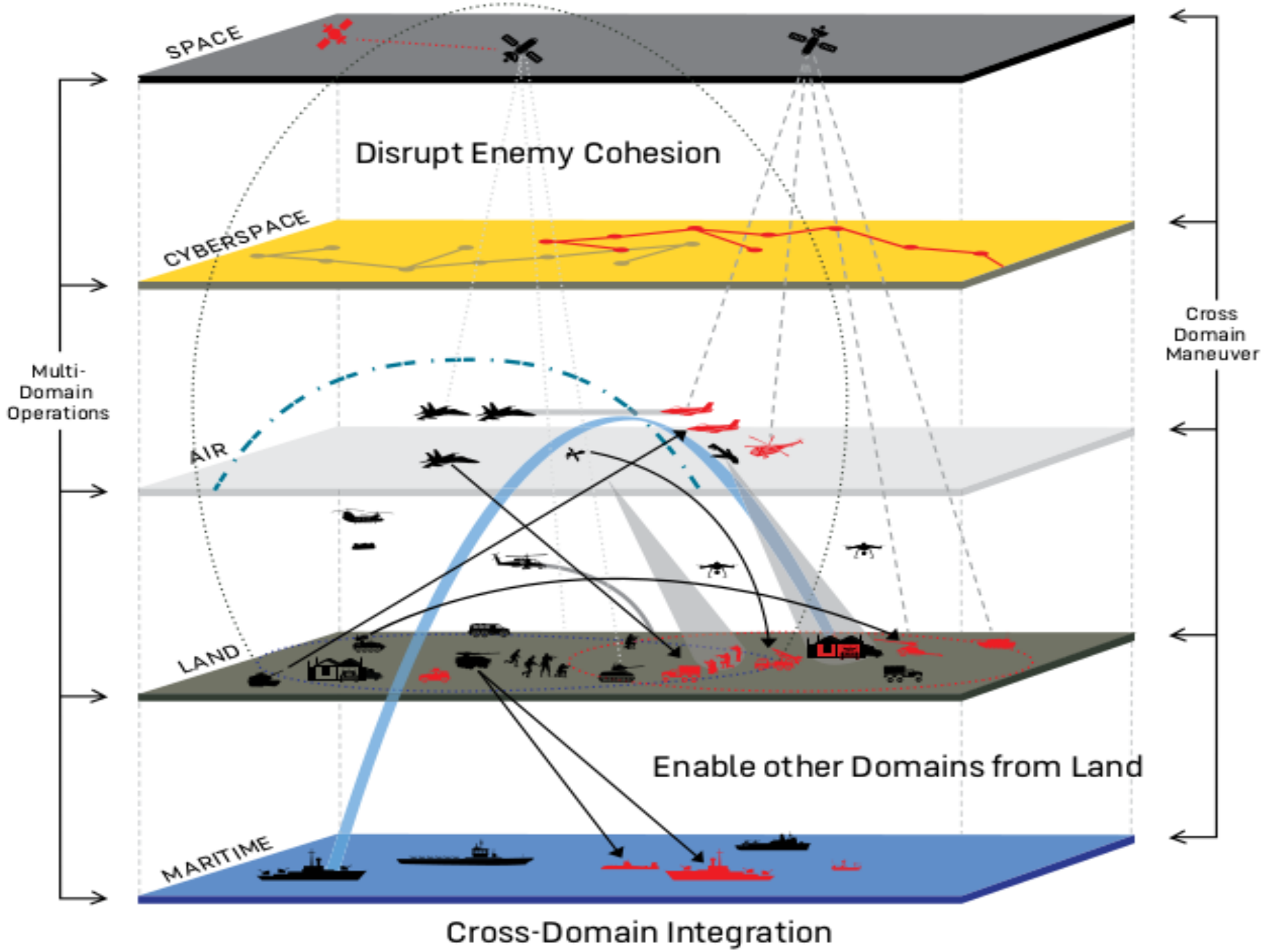
Maritime Domain



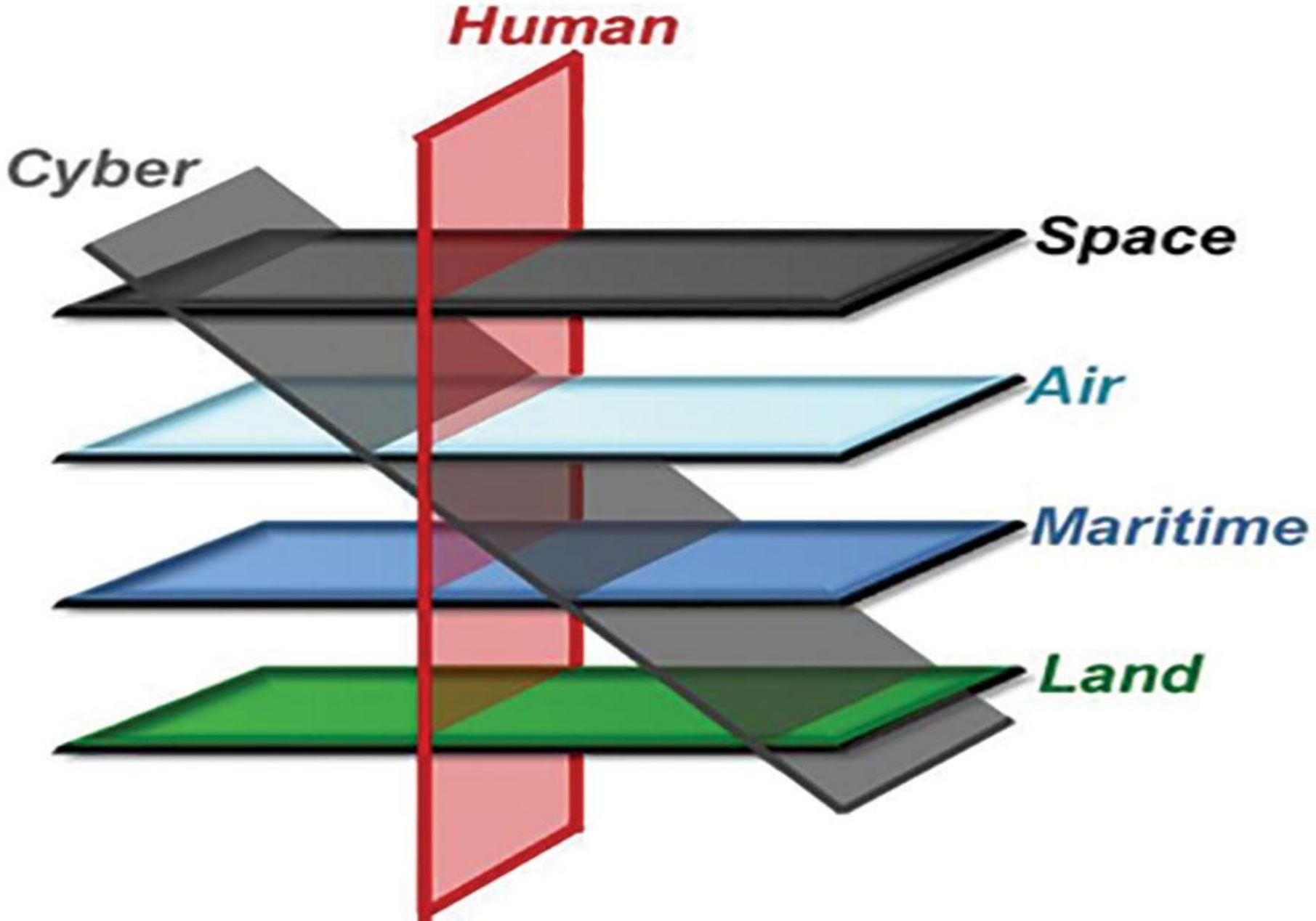
CyberSpace

… CYBERSPACE …

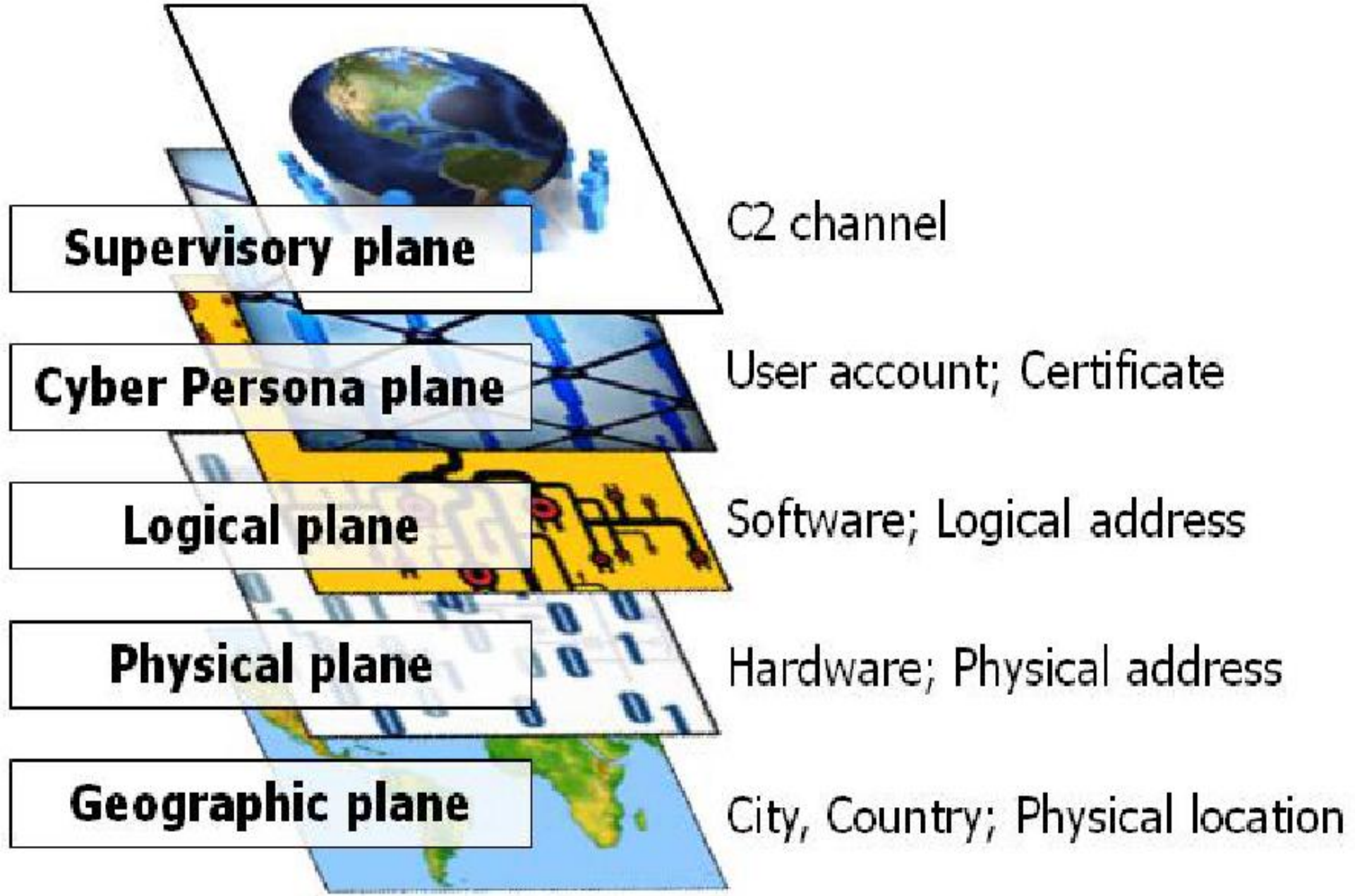

SPACE
CYBERSPACE
AIR
LAND
MARITIME
MULTI-DOMAIN OPERATIONS


SPACE
Disrupt Enemy Cohesion
CYBERSPACE
Multi-Domain Operations
Cross Domain Maneuver
AIR
LAND
Enable other Domains from Land
MARITIME
Cross-Domain Integration

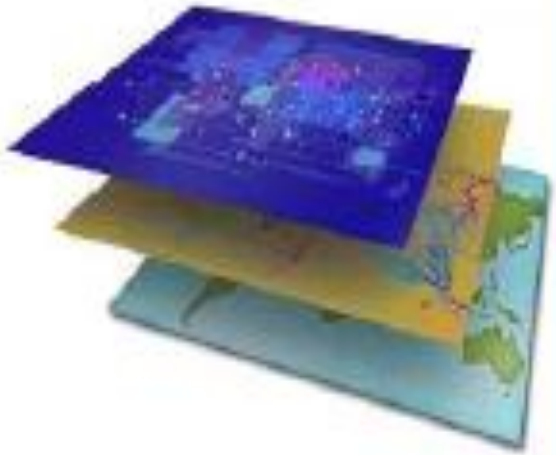
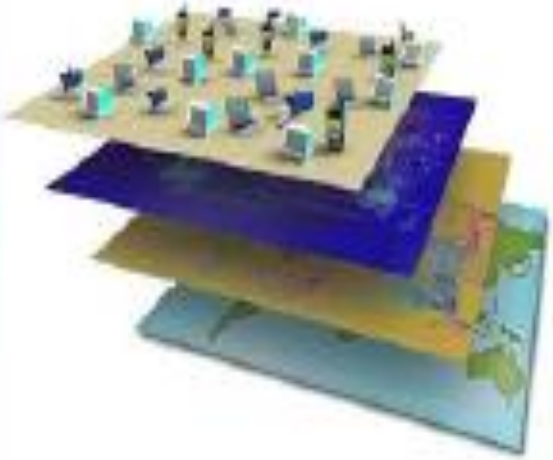
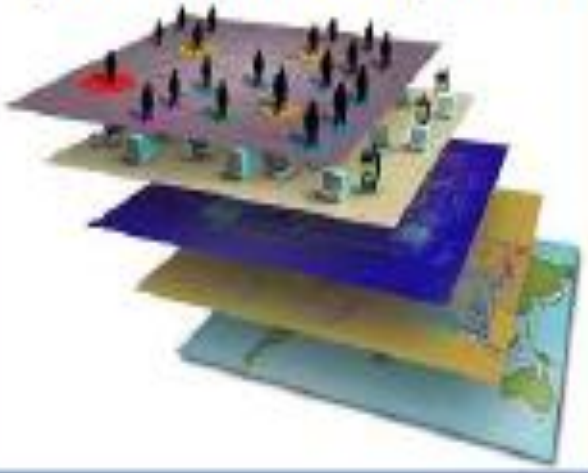
… CYBERSPACE & HUMAN touch…



… therefore Training & Education is CRITICAL …



… and ends up to SOCIAL …& Society

Physical Layer	Logical Layer	Social Layer
Geographic Components	Logical Network Components	Persona Components
		
Physical Network Components		Cyber Persona Components
		

6. CYBERSPACE

&

CYBERSECURITY

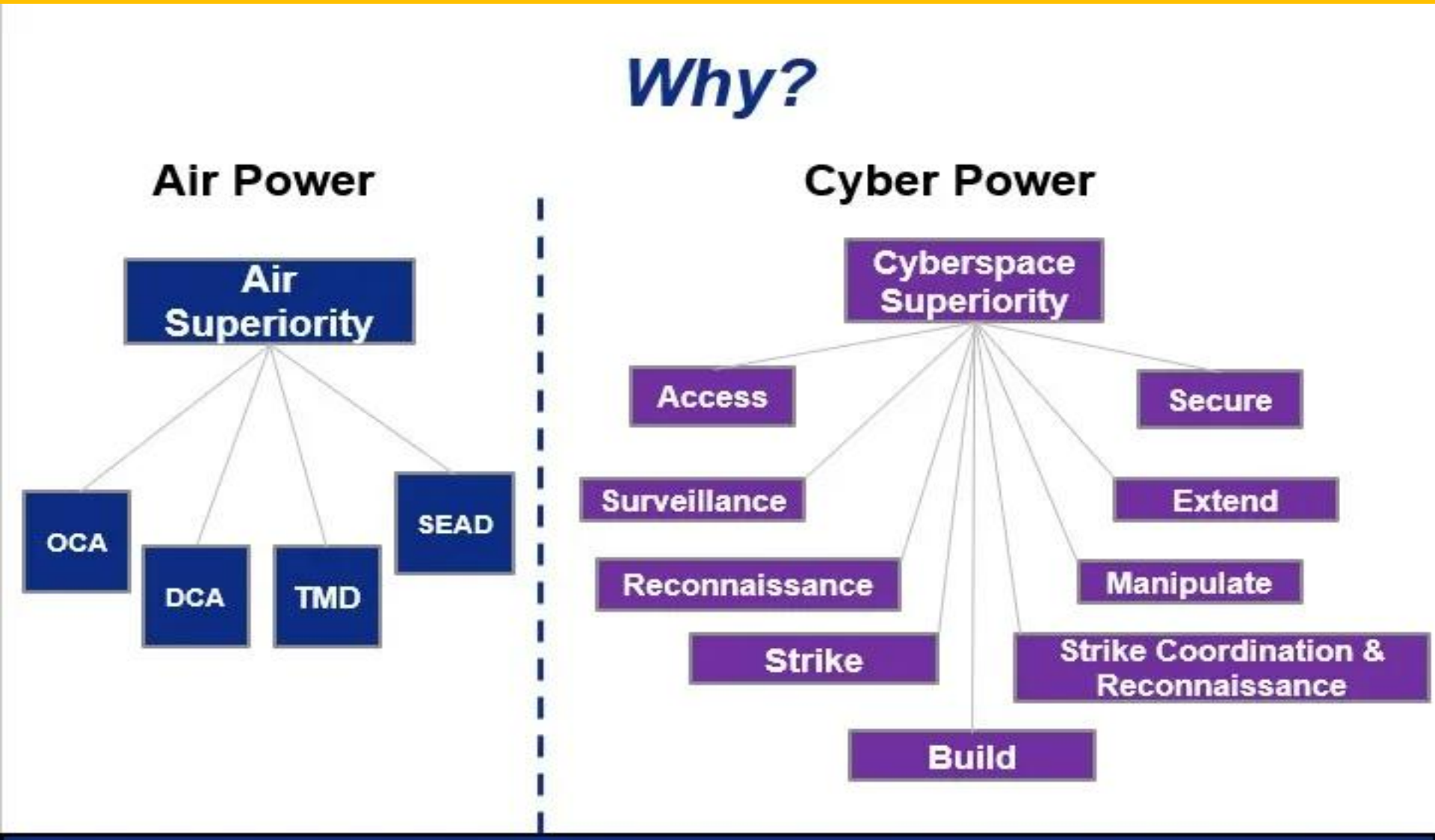
&

Individual SHARED RESPONSIBILITY

&

Social Wellbeing

… CYBER Power is more powerful than Air Power…



Defining Cyberspace Mission Types and associated core activities enables the Joint Force Commander to conceptualize and understand "what" and "how" cyberspace superiority is achieved

ARYA
COLLEGE OF ENGINEERING & I.T.
KUKAS - JAIPUR

WHAT IS CYBER SECURITY?

The body of technologies, processes, and practices designed to protect networks, devices, programs, and data from attack, damage, or unauthorized access. Cybersecurity may also be referred to as information technology security.

COMMON TYPES OF CYBER SECURITY

NETWORK SECURITY

Protect network traffic by controlling incoming and outgoing connections.

DATA LOSS PREVENTION (DLP)

Protects data by focussing on the location, classification and monitoring of information.

CLOUD SECURITY

Provides protection for data used in cloud-based services and applications.

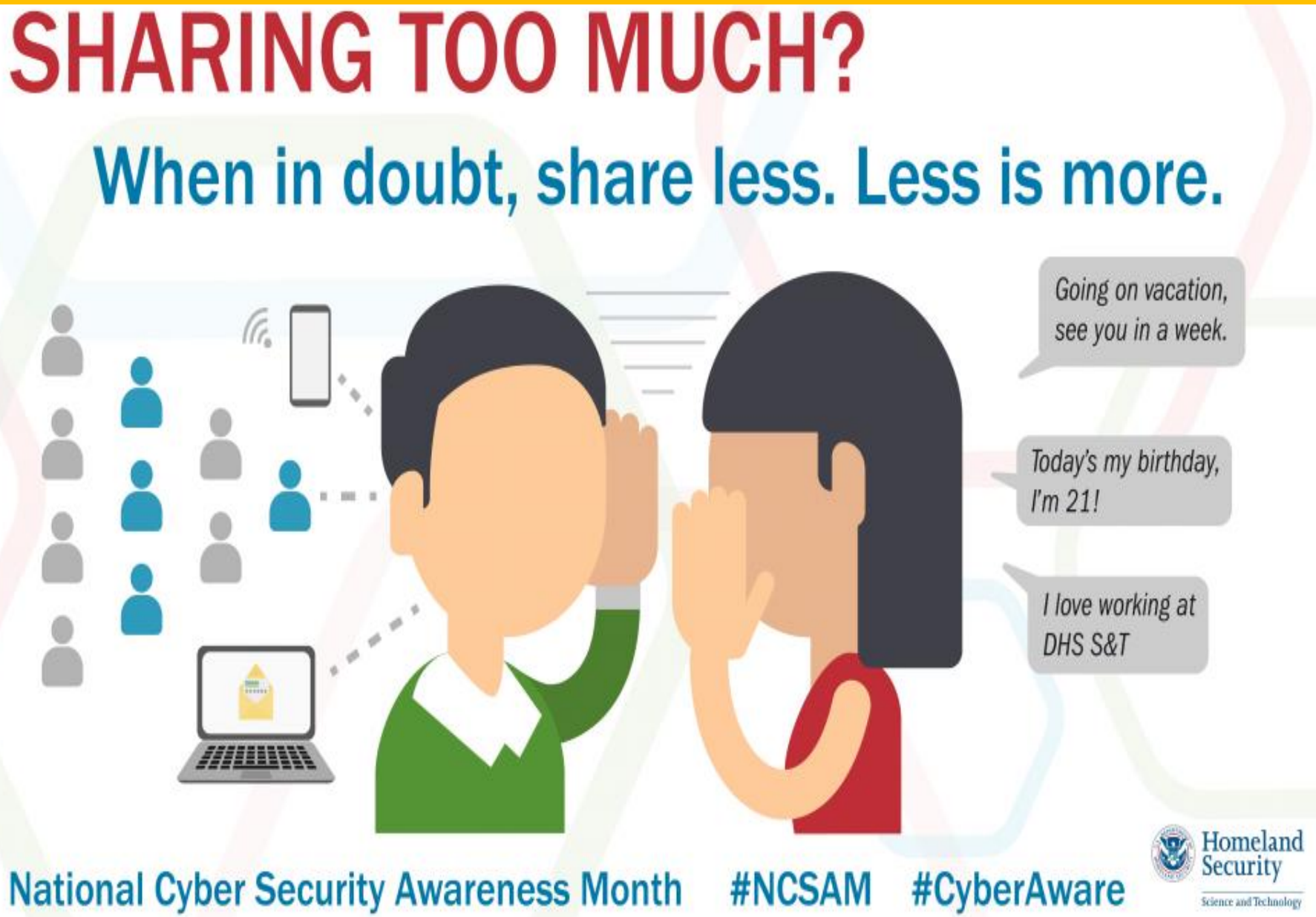
INTRUSION DETECTION SYSTEMS

Identify potentially hostile cyber activity.

ANTIVIRUS/ ANTI-MALWARE SOLUTIONS

Scan computer systems for known threats.

… Voluntary Disclosure …



… Voluntary Information on YOU, Your Loved Ones …

Cyber Security Awareness Tips

Avoid free downloads.

Use a phrase as a password. Example: !luVf!s^ = I love fish.

Pause. Think. Post.

Be cautious when opening email attachments.

Reboot your computer or mobile device on a regular basis.

Be careful when accessing "free" wireless Networks.

Do not share your passwords with others.
Do not write them on a small piece of paper either.

… Everybody Individual Responsibility …

CYBERSECURITY IS OUR SHARED RESPONSIBILITY

PROTECT YOUR INFORMATION

- ✓ *NEVER* share your password
- ✓ Run updates regularly
- ✓ Use a strong password
- ✓ Use anti-virus and anti spyware
- ✓ Use encryption
- ✓ Follow international *TRAVEL* guidelines

CSU Bakersfield
Office of the Provost

www.csub.edu/InfoSecurity
661-654-2835
InformationSecurity@csub.edu

… Voluntary Information and YOUR SAFETY …

… Your CELL phone …

CYBER SECURITY IS OUR SHARED RESPONSIBILITY

PROTECT YOUR SMART PHONE

✓ DO'S

- Make sure the OS and software are up to date at all times
- Download apps from reputable sites and closely review permission requests
- Make sure to check the feedback from other users before installing the program from an app store
- Use a strong, complex password
- Use a security app, if available for your device
- Turn off Bluetooth and other connections when not in use

✗ DON'TS

- Jailbreak your phone
- Download apps from third-party app stores and sites
- Leave your mobile device unattended in public places
- Enable your "Wi-Fi ad-hoc mode"

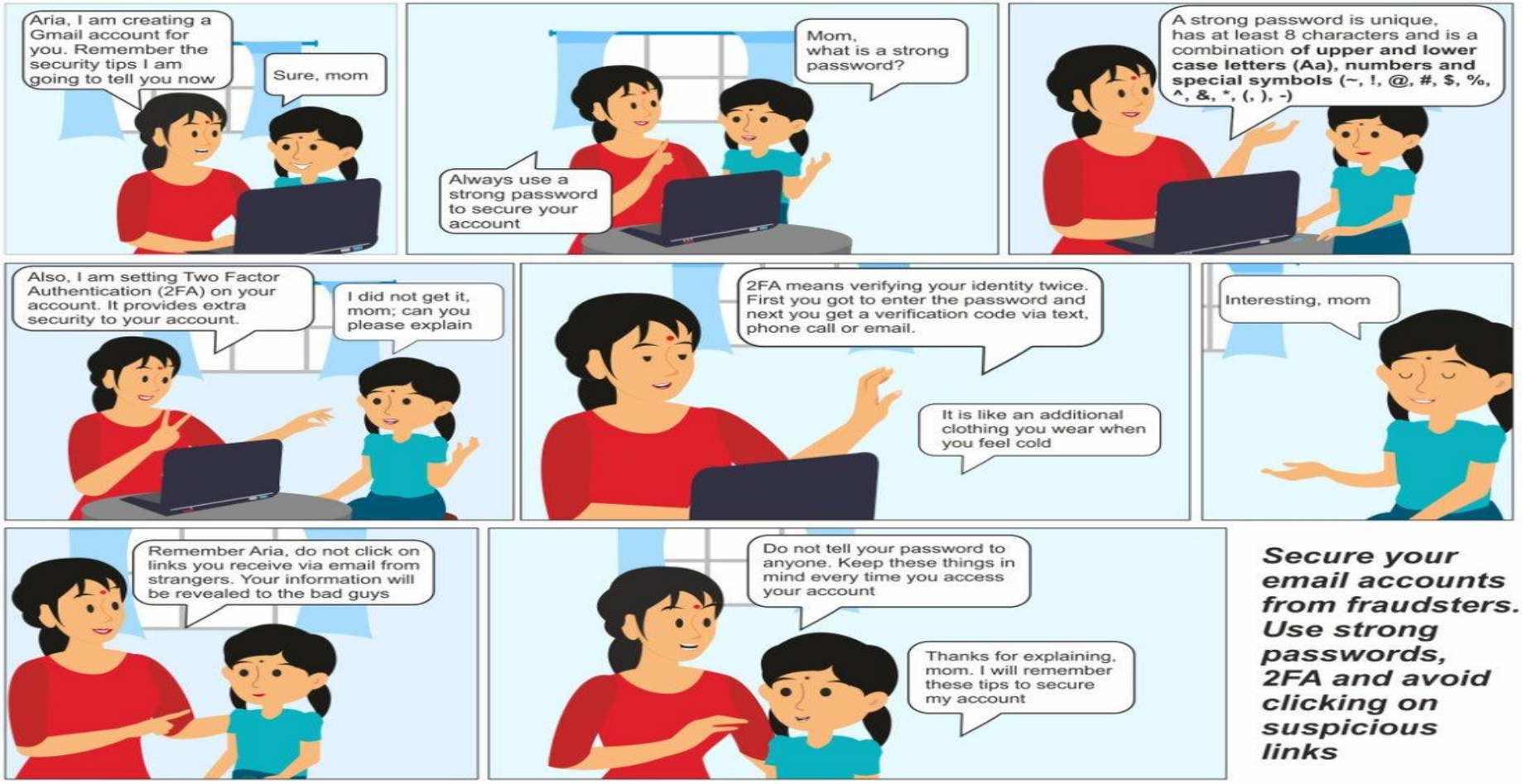
… Social Media … *(the elephant vs the ant)*

… Is your EMAIL safe?

InfoSec for KID CARTOON STORYBOARD

NATIONAL CYBER SECURITY AWARENESS MONTH
OCTOBER, 2020

E-mail Security



Secure your email accounts from fraudsters. Use strong passwords, 2FA and avoid clicking on suspicious links

www.infosecawareness.in

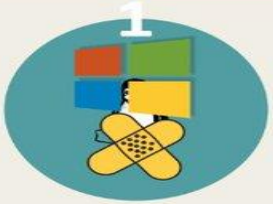
… is a MUST …

InfoSec POSTER

NATIONAL CYBER SECURITY AWARENESS MONTH
OCTOBER, 2020

DESKTOP SECURITY

Secure Yourself
Your System
& Your Network



Always update Operating System with latest patches before using them

Never install unknown or unsolicited software on your computer

Never keep any of your sensitive documents on your tabletop

Secure your Internet Connectivity with strong password

Always keep the desktop firewall ON

Use strong passwords and change regularly

Always maintain regular backup of your critical data

Always lock/logout while leaving your computer

… why: Community Watch …

National Cyber Security Awareness Month

CyberAware

securing our online lives is a

SHARED RESPONSIBILITY

Get involved this October and empower our global digital society to use the Internet safely and securely.

… Traps all over …

Information Security Education & Awareness
Department of Electronics & Information Technology,
Ministry of Communications & Information Technology,
Government of India.

I am aware of social engineering attacks

Like baiting, dumpster diving, vishing etc.

Do You ?

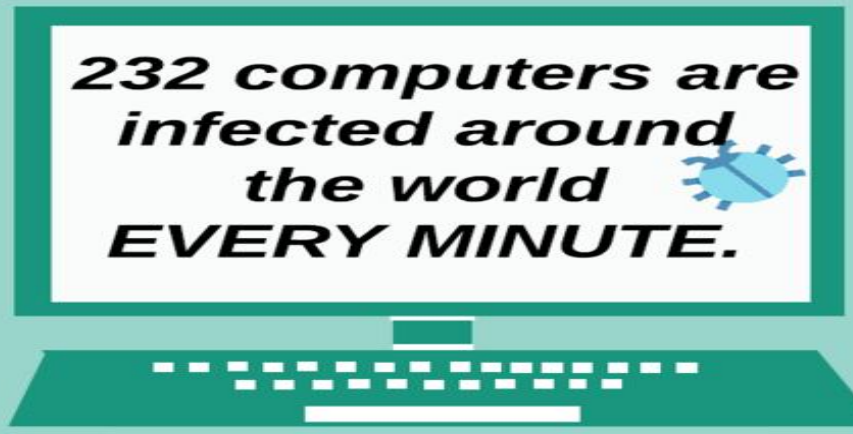
For more details logon to: www.infosecawareness.in

For Virus Alerts,Incident & Vulnerability Reporting
cert-in
Handling Computer Security Incidents

Executed by: सी डैक CDAC

प्रगत संगणन विकास केन्द्र
CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

… Proof from … Statistics …



70% of Canadian adults have experienced a cyber crime.

156 Million phishing emails are sent EVERY DAY.

8 Million phishing emails make it through filters and are opened.

80,000 people are hooked into giving vital info.

… Online … Scams, Porno and Gambling …

गृह मंत्रालय
MINISTRY OF HOME AFFAIRS
सत्यमेव जयते

Online Job Scam

Beware of fake job opportunities/appointment letters sent on email or messaging apps. Fraudsters may dupe in the name of registration/interview charges

Some fraudsters are misusing the names of the Government and Corporate Organizations to offer job opportunities online. Verify the authenticity of these websites before applying for jobs

155260 | CyberDost | www.cybercrime.gov.in

… Can we protect ourselves ?

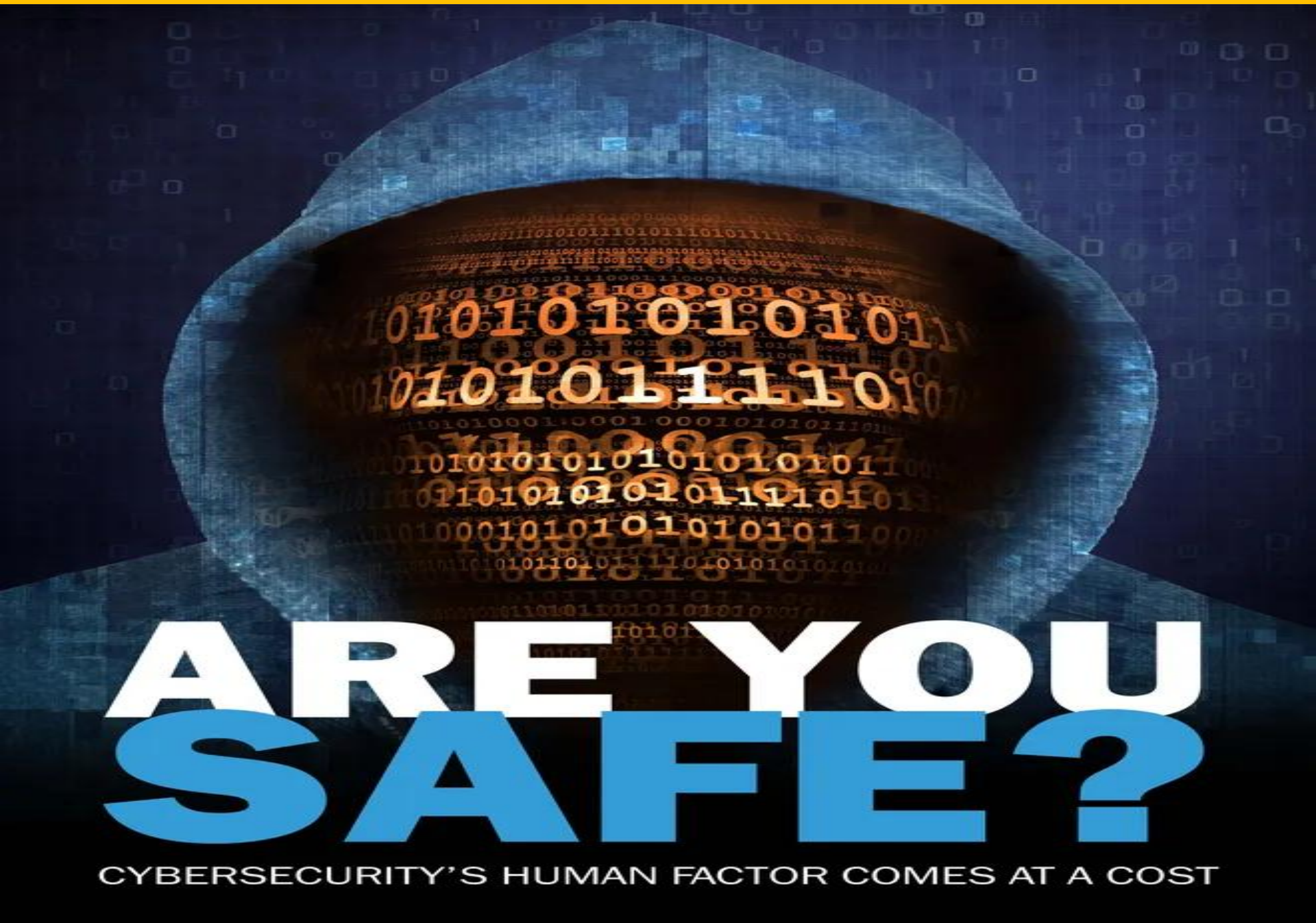
… Can we protect ourselves ?

- SET STRONG PASSWORDS: DO NOT SHARE THEM AND CHANGE THEM REGULARLY.
- LIMIT THE AMOUNT OF INFORMATION YOU SHARE ON SOCIAL NETWORKS.
- DON'T OPEN EMAILS FROM UNKNOWN SENDERS.
- BACK UP YOUR DATA.
- USE ANTIVIRUS SOFTWARE AND KEEP IT UP TO DATE.
- BE CAUTIOUS ABOUT OFFERS ONLINE.

Website : https://www.ica.in | email : cyberarmy@ica.in | Helpline No : 966660000

… Even our face is not ..Safe … and Ours …

Which is more dangerous? Covid Vaccinations or Cyber Vaccinations ?



Thank You

Sources

1) Copyright © 2021-2026 Visual Capitalist, All rights reserved.
2) Wikipedia
3) References at Slides