ENHANCED SITUATIONAL AWARENESS FOR MODERN WARFARE

By

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US extraterritorial sanctions: Begging for a waiver now is the worst possible option for India

Brahma Chellaney
Source Link

By imposing extraterritorial or "secondary" sanctions, the US seeks to effectively extend its jurisdiction far beyond its borders. Armed with unmatched power from the role of the US dollar as the world's reserve currency, America has the capacity and will to coerce allies and adversaries alike by threatening to lock them out of the US financial system. But make no mistake: Its extraterritorial sanctions violate international law, the UN Charter and WTO rules. India is directly in the crosshairs of the new US extraterritorial sanctions targeting Russia and Iran. India is already suffering the unintended consequences of President Donald Trump's unilateral withdrawal from the Iran nuclear deal – a pullout that has spurred higher oil-import bills, the rupee's weakening against the US dollar, and increased foreign exchange outflows. This is just the latest financial hit India has suffered since 2005 when New Delhi, under US persuasion, voted against Iran in the International Atomic Energy Agency's governing board, prompting Tehran to cancel a long-term LNG deal favourable to India.
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The Problems With Hacking Back

By Don Maclean
Source Link

Whether a Social Security number from an individual, or financial information from a company, hackers continue to find ways to steal data from millions of Americans. To combat these crimes, the idea of active cyber defense has arisen on Capitol Hill with the introduction of the Active Cyber Defense Certainty (ACDC) Act. In January, Homeland Security Secretary Kirstjen Nielsen voiced measured support for empowering companies to be more active in their approach to cybersecurity. These active measures would allow companies to access other computer networks in order to thwart cyber attacks, monitor the hackers, collect evidence or destroy stolen files.
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Warfare

General
Air Land Battle
Asymmetric Warfare
Effect Based Operations (EBO)
Fourth Generation Warfare(4GW)
Future Warfare
Hybrid Warfare
Information Warfare

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- Electronic Warfare
- Psychological Warfare
  - Media
  - Strategic Communication
  - Social Media
  - Perception Management

Irregular Warfare
Maneuver Warfare
Mountain Warfare
Network Centric Warfare (NCW)
Peace Keeping Operations
Small War
Space Warfare
Special Forces
Water Warfare

PREVIEW

- Definition
- Shared Understanding
- Process
- Shared Situation Awareness
- Today’s Battlefield
- Augmented Reality
- Issues That Merit Attention
- Caveat

- Gathering of information on the state of one's own forces—as well as the enemy and on such external factors as weather and terrain. The information having been gathered, means must be found to store, retrieve, filter, classify, distribute and display it.

- Based on the information processed an estimate of the situation must be formed. Objectives must be laid down and alternative methods for attaining them worked out. A decision must be made. Orders must be drafted then transmitted, their arrival and proper understanding by the recipients verified. Execution must be monitored by means of feedback system, at which time the process repeats itself

-- Martin van Creveld , Command in War

One of the most successful users of offensive situational awareness were the Mongols, who employed it in building the largest land empire of all time with an astonishingly small number of warriors on horseback. Combining a fierce reputation for victory through slaughter, psychological warfare and mass deception, the Mongols created in their enemies a carefully crafted - and often false - "situational awareness“ with only one option: Submit to the Great Khan or face extinction.

Situational Awareness:

DEFINITION

- Situation awareness is the perception of the elements in the environment within a volume of time and space, the comprehension of their meaning, and the projection of their status in the near future. Each of the three hierarchical phases and primary components of this definition can be made more specific (Mica Endsley, 1995)

- Situational awareness is defined as “the ability to maintain a constant, clear mental picture of relevant information and the tactical situation including friendly and threat situations…. The RSTA [Reconnaissance, Surveillance, and Target Acquisition] elements must provide situational understanding of the operational environment in all of its dimensions— political, cultural, economic, demographic, as well as military factors.”

  —Dostal, 2001

- Situational awareness is “Knowledge and understanding of the current situation which promotes timely, relevant, and accurate assessment of friendly, enemy, and other operations within the battle space in order to facilitate decision making.” -- The US Army

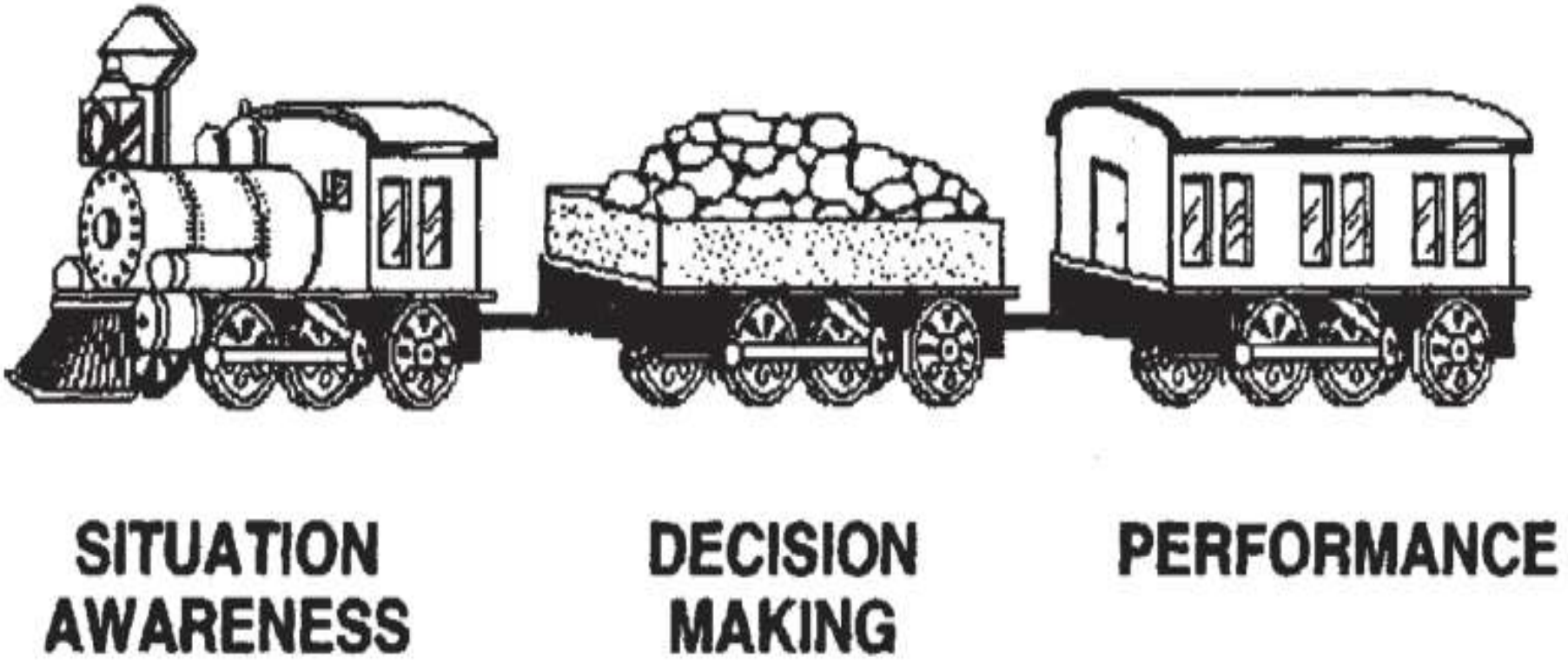
LEVELS OF SITUATION AWARENESS

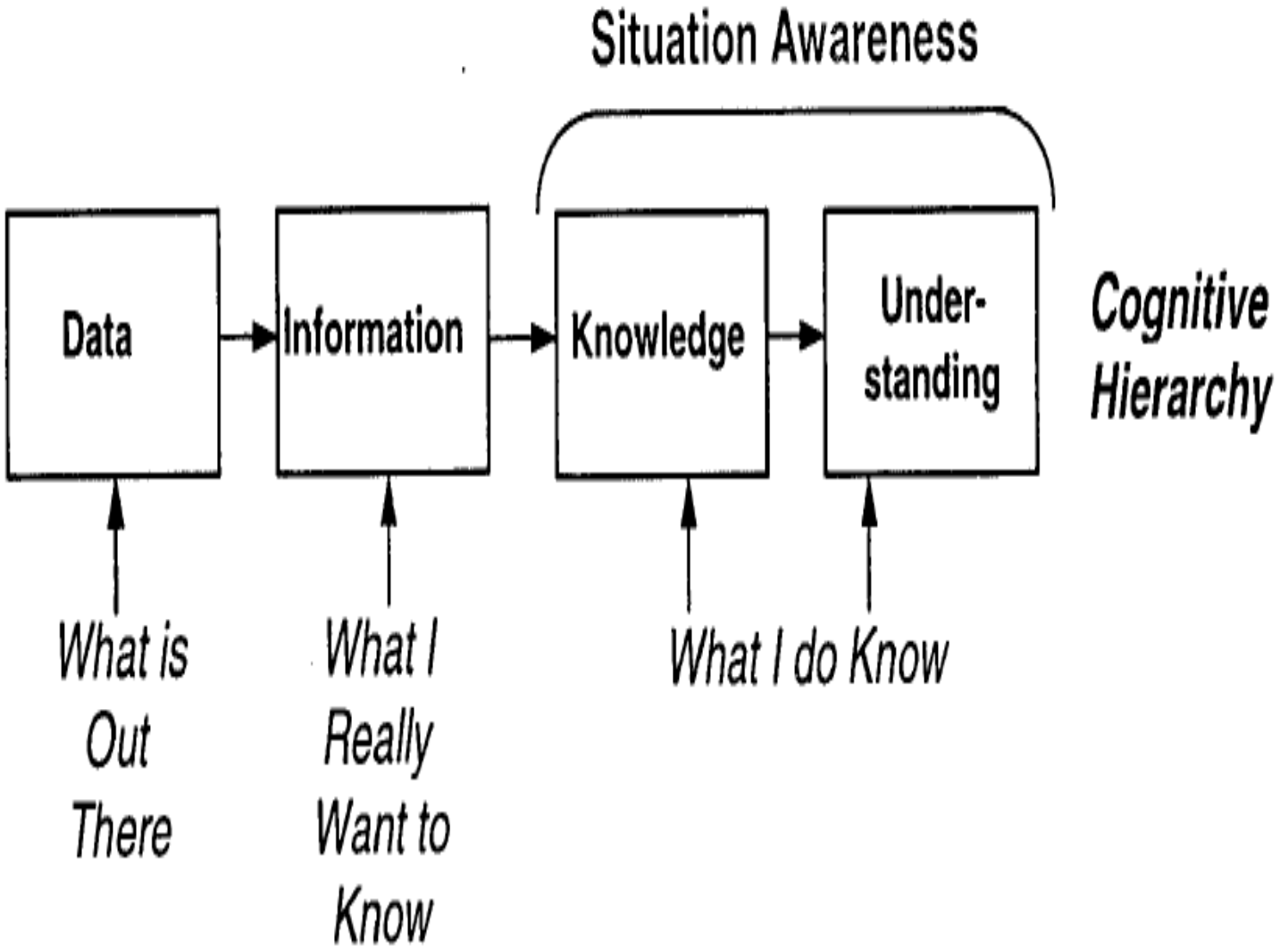
- Level 1. Perception of the elements in the environment. This is the identification of the key elements or "events" that, in combination, serve to define the situation. This level tags key elements of the situation semantically for higher levels of abstraction in subsequent processing.

- Level 2. Comprehension of the current situation. This is the combination of level 1 events into a comprehensive holistic pattern, or tactical situation. This level serves to define the current status in operationally relevant terms in support of rapid decision making and action.

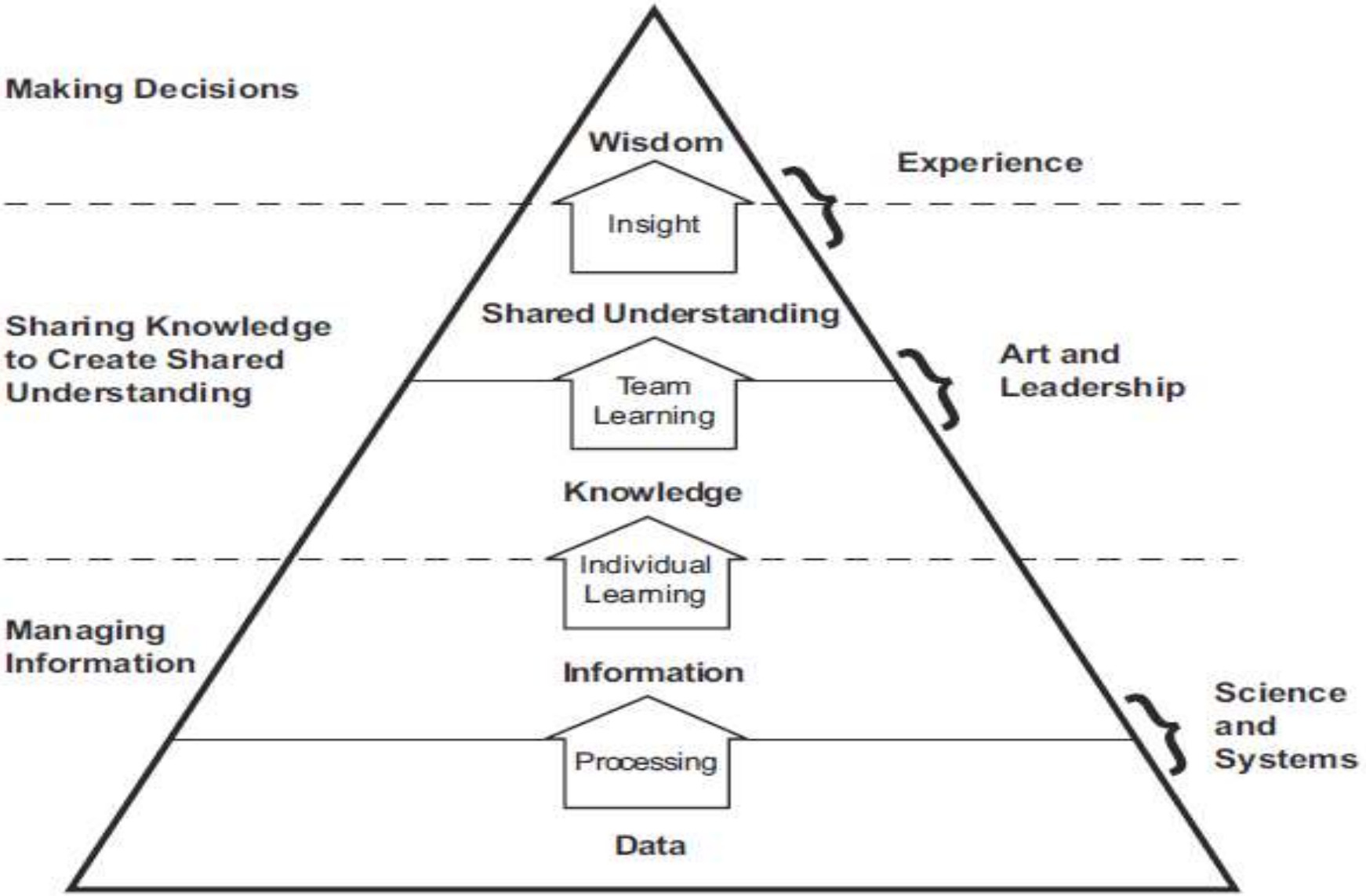
- Level 3. Projection of future status. This is the projection of the current situation into the future in an attempt to predict the evolution of the tactical situation. This level supports short term planning and option evaluation when time permits.

Situation Awareness drives decision making and performance in complex and dynamic systems (Endsley et al., 2003)

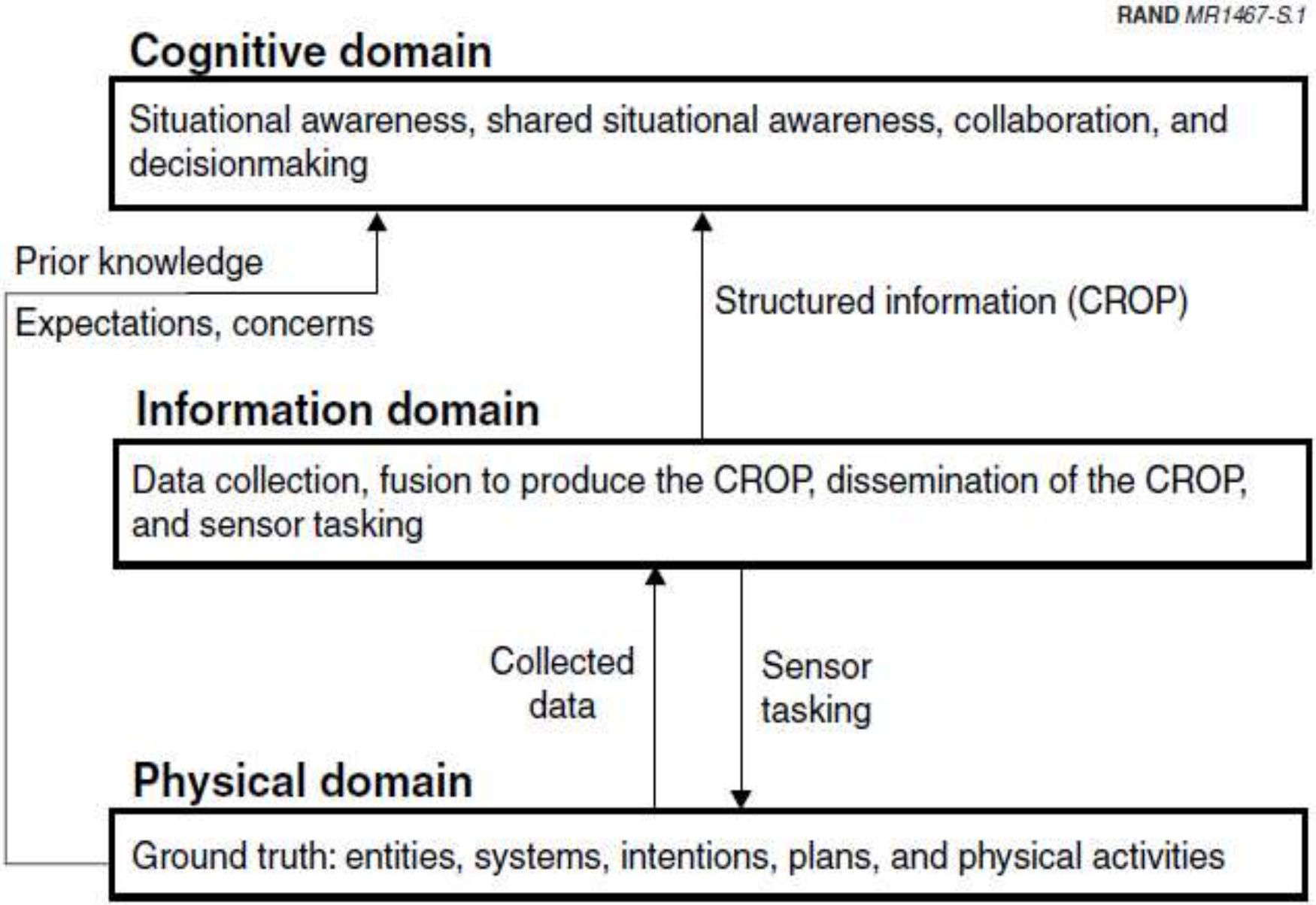



Situation Awareness
Data
Information
Knowledge
Under-
standing
Cognitive
Hierarchy
What is
Out
There
What I
Really
Want to
Know
What I do Know

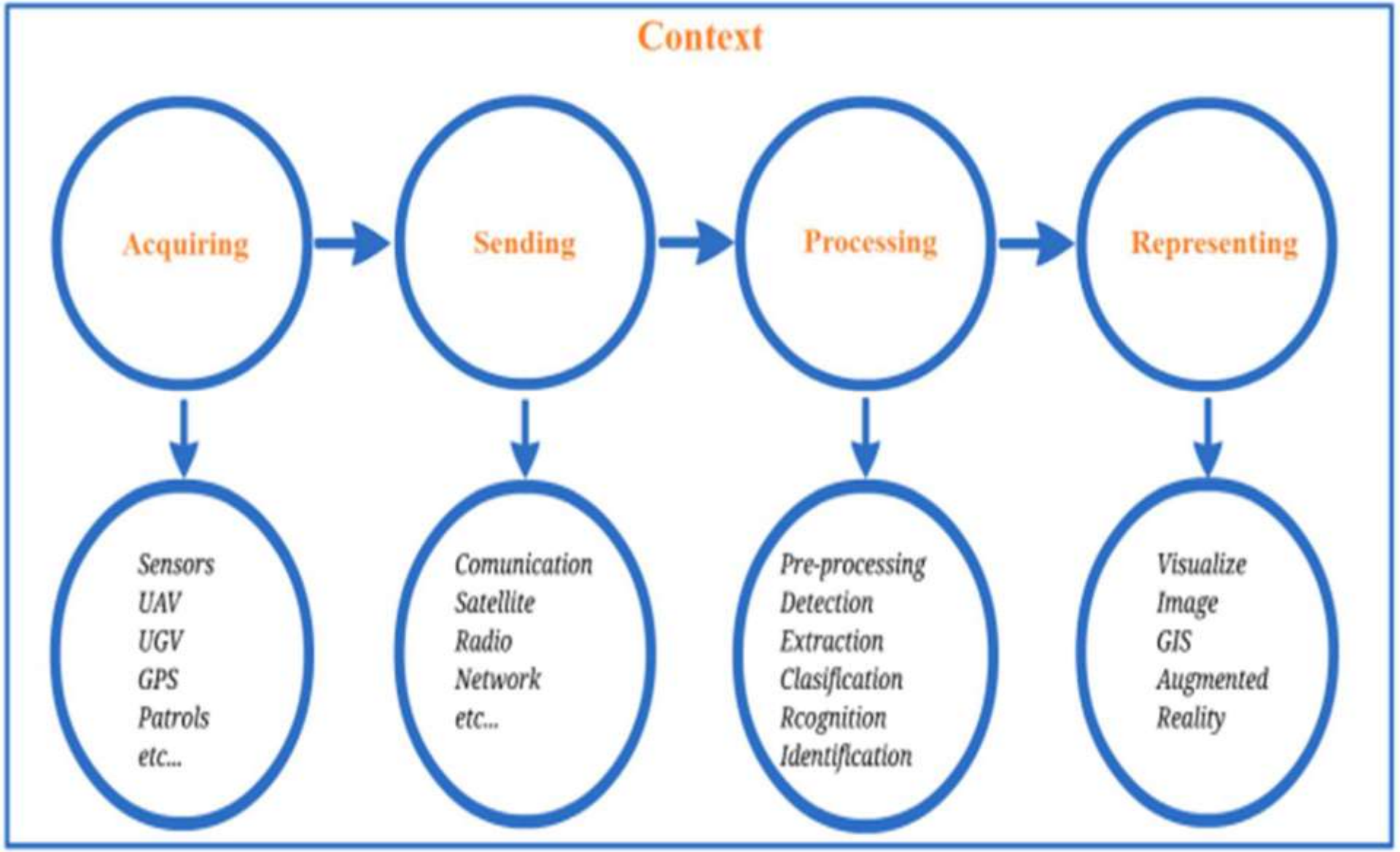
Creating Shared Understanding



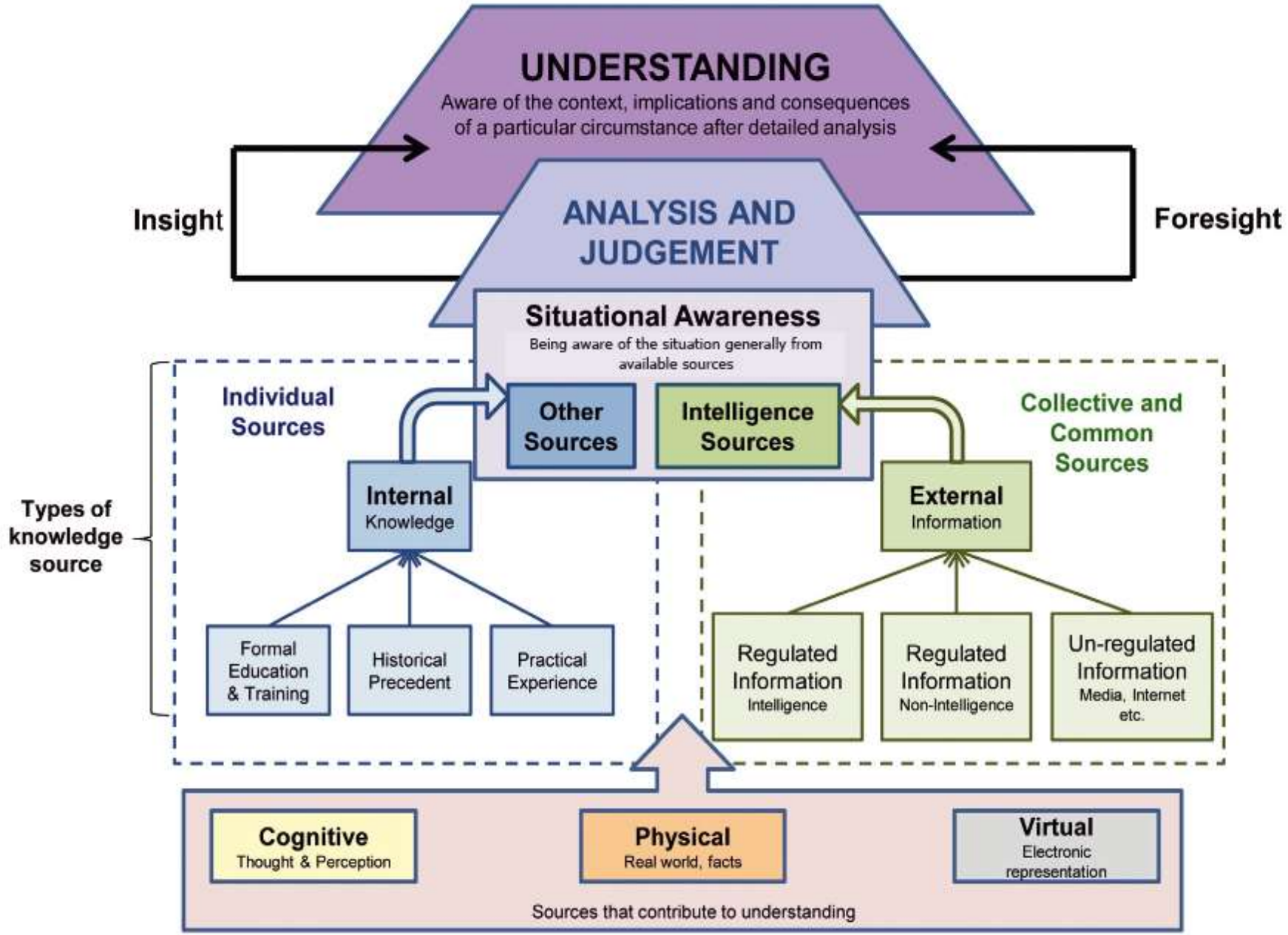
Common Relevant Operating Picture (CROP)



Info Transformation Process



Situation awareness involves far more than simply perceiving information in the environment. It includes comprehending the meaning of that information in an integrated from compared to one’s goals and providing projected future states of the environment. These higher levels of SA are particularly critical for effective decision making in a dynamic environment such as combat.


UNDERSTANDING
Aware of the context, implications and consequences of a particular circumstance after detailed analysis
Insight
Foresight
ANALYSIS AND JUDGEMENT
Situational Awareness
Being aware of the situation generally from available sources
Individual Sources
Other Sources
Intelligence Sources
Collective and Common Sources
Types of knowledge source
Internal Knowledge
External Information
Formal Education & Training
Historical Precedent
Practical Experience
Regulated Information Intelligence
Regulated Information Non-Intelligence
Un-regulated Information Media, Internet etc.
Cognitive Thought & Perception
Physical Real world, facts
Virtual Electronic representation
Sources that contribute to understanding

Reduce Time to Achieve SA

- Get the Information
  - Real –Time sensors, transmission.
  - Information selection, fusion and presentation.
- Understand the information
  - Integrate information.
  - Compare to goals required states.
- Project future actions. (friendly and enemy forces)
  - Projection information
  - Projection tools.
  - Mental Models.

- Michael Webb, former CNA representative to the Navy's "Top Gun" School, observed that situational awareness is "as squishy and ill-defined a term as you'll ever find," and goes on to note that "It's one of those indefinable human qualities like genius, Championship ability, charisma. You're not quite sure what it is, but you know who has it and who doesn't.“

- This is the key to true information dominance: Get the right information to the right person at the right time, and in a form that they can rapidly assimilate and use.

- An essential challenge in the battle space of the future will not be the lack of data, but the abundance of it.

SITUATIONAL AWARENESS

This tank didn't have it

PROT.COM

Shared Situational Awareness

- Shared situational awareness is the commander's conveyance of operational intent and assessment of a situation to distributed organizations in order to influence efforts of the organization and to guide the outcome of operations.

- Shared situational awareness requires the alignment of command and control so information is readily shared, providing commanders with common near-real-time information on which to base decisions.

- The concept impacts the development of C2 systems and processes in order to provide commanders with the agility required to quickly respond to situations.

- “Analysts must absorb information with the thoroughness of historians, organize it with the skill of librarians, and disseminate it with the zeal of journalists. They must embrace open source, population centric information as the lifeblood of their analytical work. They must open their doors to anyone who is willing to exchange information.“

  - Major General Michael T. Flynn, Fixing Intel: A Blueprint of Making Intelligence Relevant in Afghanistan (published in 2010)

In Future Operational Environment the Engagements will be

- Compressed in time, as the speed of weapon delivery and their associated effects accelerate enormously.

- Extended in space, in many cases to a global extent, via precision long-range strike and interconnectedness, particularly in the information environment.

- Far more lethal, by virtue of ubiquitous sensors, proliferated precision, high kinetic energy weapons and advanced area munitions.

- Routinely interconnected – and contested — across the multiple domains of air, land, sea, space and cyber.

- Interactive across the multiple dimensions of conflict, not only across every domain in the physical dimension, but also the cognitive dimension of information operations, and even the moral dimension of belief and values.

Today's Battlefield

- Current military operations involve small units and small unit leaders. This form of combat relies more on raw sensory experience as input, with less use of technology and information systems. It is characterized by shorter response times, more immediate feedback, and more rapid fluctuations in relevant conditions.

- Sensors are ubiquitous, multi-domain and capable of discreetly and accurately locating and targeting many and everything moving in the battlespace. Similarly, advances in lethal, smart weapons systems, mostly autonomous, and munitions enable precision, real-time, effective attack and destruction of discreet targets in all domains throughout the battlespace. Integrating these sensor / shooter combinations will be holistic, integrated mission command systems that ensure real-time situational understanding, decision making and execution, much of which will be autonomous."

  -- Unified Quest report

- "Historically, you had to go to different locations to get pieces of intelligence. If you wanted imagery, you went to the imagery ground station. [DCGS] brings all those types of intelligence together in a single system. An analyst can look at one screen and do robust imagery analysis, signals analysis, human intelligence, biometrics. It's a powerful capability because you're doing multiple-discipline intelligence. It's comprehensive situational awareness about the enemy."

  -- Col. Charles Wells, project manager of DCGS-A, the Army's version of the program

- Technological advances are no substitute for the human component of understanding, including linguistic skills, cultural empathy and the unique role of human intelligence. Because war is essentially a human activity, these capabilities are likely to remain as important as technical ISTAR Capacity.

- Specific ISTAR adaptations – including the many applications of UAVs, the use of sophisticated intelligence fusion techniques and building human-intelligence networks – are likely to have wider relevance in future conflicts.

Augmented Reality (AR)

- Emerged in mid 1990s, is a technique that can enhance user's perception of surrounding environment through the use of helmet mounted displays

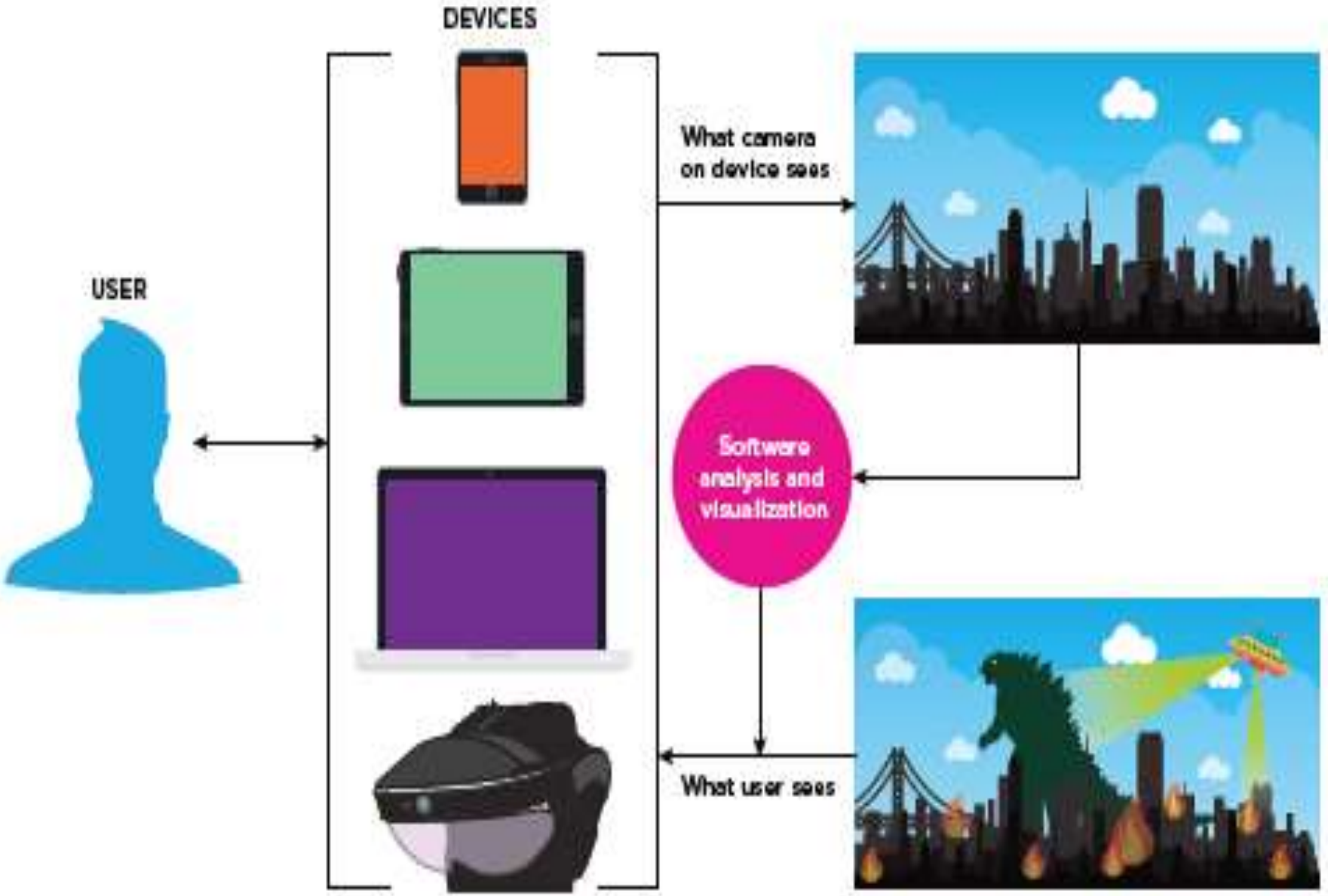
- AR provides the user with superimposed information that can be seen in the real world. It complements the real world with virtual information.

- AR improves the perception of the natural world by adding information to the senses such as visual, sound, smell or tactile sensations.

- AR refers to the mix of the signals from the tridimensional real environment on the user perception. Particularly it denotes the fusion of virtual 3-D images on the users' natural vision of the world around them, using glasses or HMD (headmounted display).

- Through the ability to present superimposed information integrated in the user environment, AR has the potential to provide significant benefits in many application areas.

HOW AR WORKS


DEVICES
USER
What camera on device sees
Software analysis and visualization
What user sees

Comprehensive Battlespace Awareness Provides

- Timely, accurate, fused common operational picture to include: disposition and intent of adversary forces; total asset awareness of friendly forces; disposition of neutral forces and non-combatants; advanced knowledge of impacts of meteorological, oceanographic (METOC), exo-atmospheric and terrain conditions; and decision support systems to support processing and understanding information.

- Multi-dimensional visualization, with emphasis on multiple information display options and advanced tools and displays to rapidly assess raw data and finished analyses.

- Light weight, high resolution, rugged, deployable displays.

- Melding of intelligence disciplines, environmental considerations, geo-spatial information and services (GI&S), open source, economic, sociological, demographic and political information.

- Virtual secure collaboration and cooperation to support Information Superiority for tasking and analysis.

- Highly standardized data and information management protocols, policies, and procedures.

- Flexible information and organization architectures to accommodate changes in technology requirements, including reachback. Includes emphasis on increased reliance on commercial systems and architectures.

- Multi-level security.

- Fused, integrated all-source.

- Asymmetric Warfare.

- Optimized capability to profile terrorists/potential terrorists and predict terrorist activities and recognize full scope of non-traditional WMD indicators.

- Integrated, enhanced, multi-sensor (human and technical) capability with emphasis on non-traditional use of sensors, such as environmental sensing, sensing shooters, lethal sensors and discrimination among individuals in the urban battlespace.

Present Systems in Use

- The U.S. Army currently employs a system called Blue Force Tracker (BFT). The system enables a commander to get a real-time picture of the battlefield from his or her personal computer. The commander can then track individual unit movement and provide this information to friendly units.

- The U.S. Marines have used BFT, although they initially opted for a more portable and rugged system called the Enhanced Position Location Reporting System, or "ePLRS." Both ePLRS and BFT share the same goal: real-time tracking of friendly forces.

- The downside to both systems, however, is that they are bulky, somewhat dated and require computers with operators who could otherwise be carrying a weapon

- Everything in the battle space is a sensor, whether that's a vehicle, rotor wing, fixed wing, aviation vehicle, ground vehicle, individual soldier or unmanned robotic platform. That becomes a sensor that I can be tracked for data. Data can be sent to it or take data, video or audio from it.

The DCGS-A – the Army's component of the Pentagon's Distribute Common Ground/Surface System

- It is an intelligence, surveillance, and reconnaissance (ISR) enterprise for gathering, analyzing, and distributing information across all Army echelons

- The latest version of DCGS-A connects commanders to hundreds of intelligence data sources, and integrates human intelligence, full-motion video, cloud computing, and new intelligence applications through the OZONE network, which also will provide two-way communications to link intelligence and command systems for visual information and decision support.

- The Proactive Situational Awareness project seeks to provide:

  - An integrated system that includes analysis and alerting tools.
  - Micro cloud computing to support operations and intelligence collaboration in real time at the company level.
  - Sensor data integration with common sensor interface, data correlation, data feed into squad tips and cues framework, and integration into the DCGS-A cloud.

ISSUES THAT MERIT ATTENTION

There is a lack of detail regarding the Decision Support tools

- Requires a specific focus on defining data standards and implementing procedures for sharing data across Groups and Services.

- Decision support tools like Big Data and Analytics can assist by analysing trends, statistical data and multiple inputs to highlight potential future issues (risks) and generate recommendations to minimise their impact or prevent their occurrence. In many cases, new specialist tools are not required; tools already exist and simply need to be refined, upgraded, and/or integrated with other systems to facilitate generation of Enterprise Situational Awareness.

- Using the contextual reasoning tools, semantic search engines and decision support tools available in the market, as well as the application of the need-to-know and other security filters, information can be managed to guard against information-overload, maintain appropriateness of availability and ultimately enable timely, accurate and efficient decisionmaking.

ISSUES THAT MERIT ATTENTION

- Information overload, where you base decisions on a subset of all that data and you may not have chosen the correct subsets. Creating the proper hierarchical structure so you don't overload inputs is necessary to avoid what is called 'analysis paralysis‘

- "There's only so much spectrum, so many connection points to the GIG [Global Information Grid], which means prioritizing traffic and slimming it down to the absolute essential for data transmission. Today's network is overloaded with data and the ability to transport it is the limiting factor

COMMUNICATION

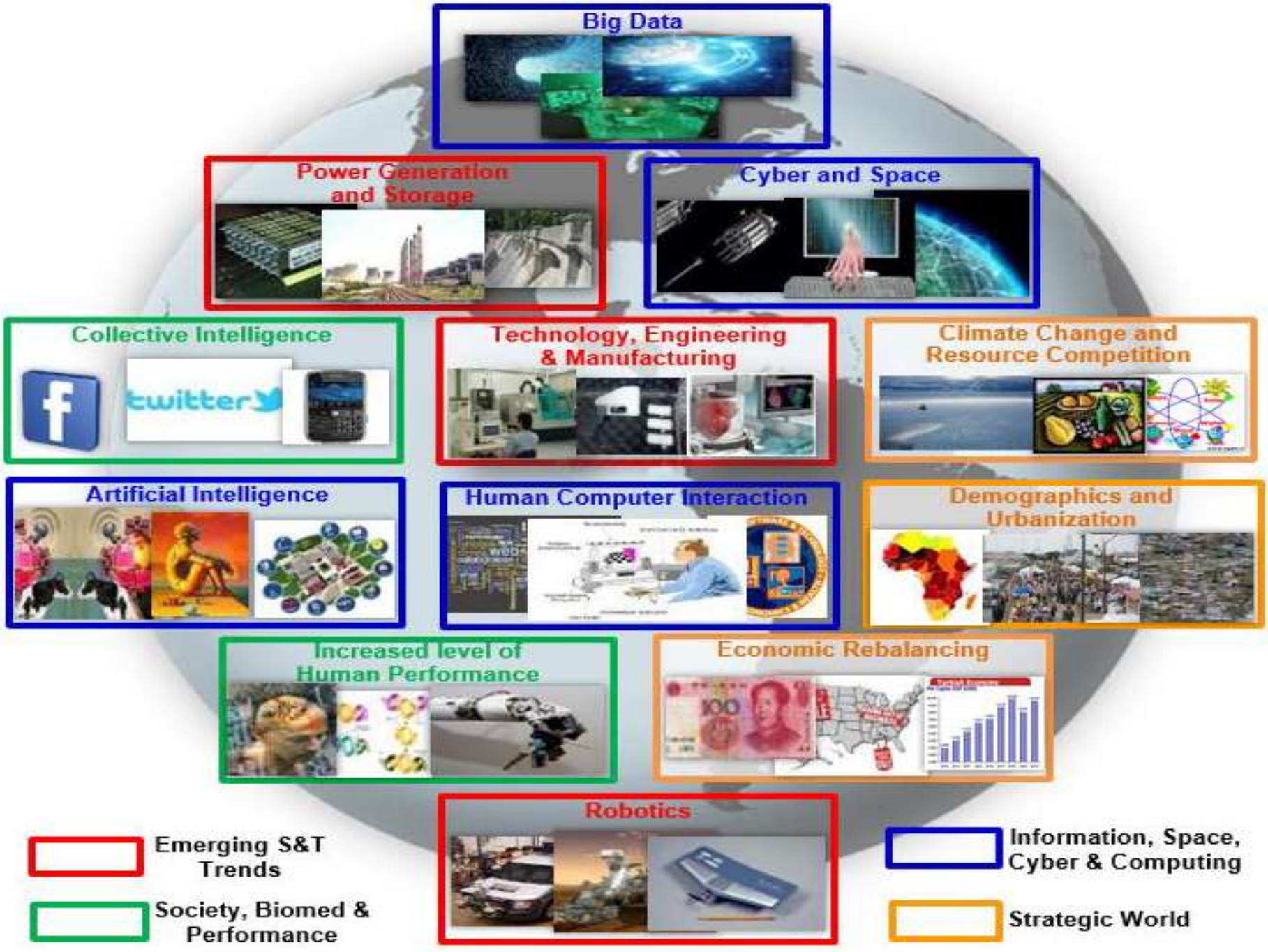
- Manned aircraft, unmanned UAVs, Satellites important source of sensor information.
- Concern for the resilience and capability of communications systems.
- Bandwidth required for deployment of UAVs is high. Radars, had to be switched off to allow sufficient bandwidth for UAV operations.
- In the case of UAVs communications signals from the ground, to and from the UAV, can be blanked out by the earth's curvature, especially if the UAVs are employed at low altitudes.
- Fully integrated communications system, is vulnerable to cyber threats, and the deployment of EMP weapons, which can destroy integrated circuits over large areas.
- In the past, different types of data - voice, datalink or sensor data - might have had different systems, each with its own encryption and waveform and box. The trend is to get all that onto one network, which is what already exists in the commercial world using IP. In the same standards will be followed getting EW, ISR, communications and other data onto the same network so they all can be managed essentially by COTS switches and routers using Ethernet IP.

Technical challenges that are being addressed in order to maintain and secure overmatch capabilities.

- Fusion of disparate sensors into a combined capability.
- Tactical computing resources.
- Network connectivity and bandwidth.
- Sensor suitability for environmental observation.
- Reduced power requirements.
- Tailored, individual mechanisms through “sensored” Soldiers.
- Disguised unmanned systems to gather and communicate intelligence.

The Operational Environment and the Changing Character of Future Warfare

By mid-Century, it will prove increasingly difficult to stay hidden. Most competitors can access space-based surveillance, networked multi-static radars, drones and swarms of drones in a wide variety, and a vast of array of passive and active sensors that are far cheaper to produce than to create technology to defeat them. Quantum computing and quantum sensing will open new levels of situational awareness. Passive sensing, especially when combined with artificial intelligence and big-data techniques may routinely outperform active sensors. These capabilities will be augmented by increasingly sophisticated civilian capabilities, where commercial imagery services, a robust and mature Internet of Things, and near unlimited processing power generate a battlespace that is more transparent than ever before.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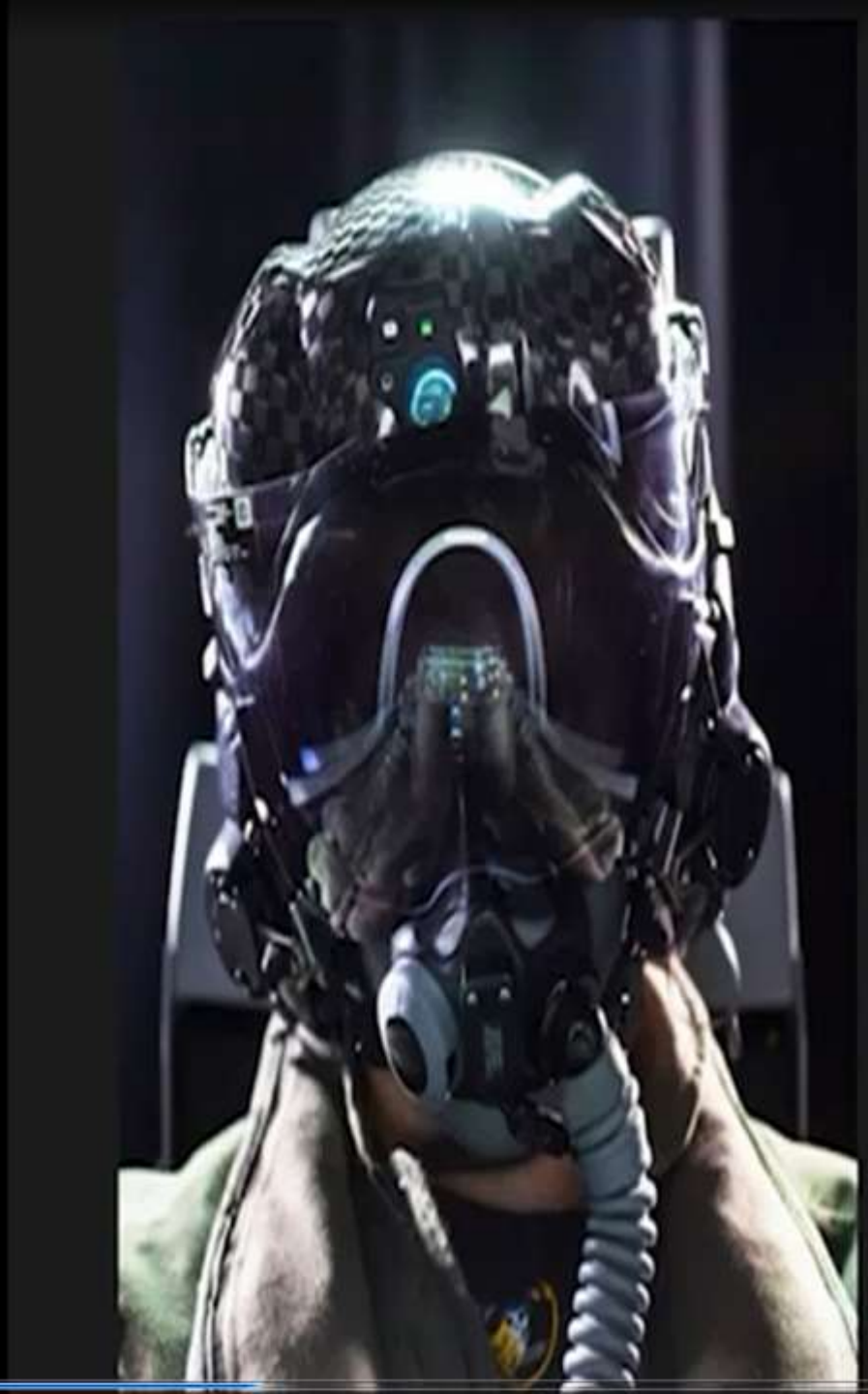
Artificial Intelligence
Human Computer Interaction
Demographics and Urbanization
Increased level of Human Performance
Economic Rebalancing
Robotics
Emerging S&T Trends
Society, Biomed & Performance
Information, Space, Cyber & Computing
Strategic World

CAVEAT



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