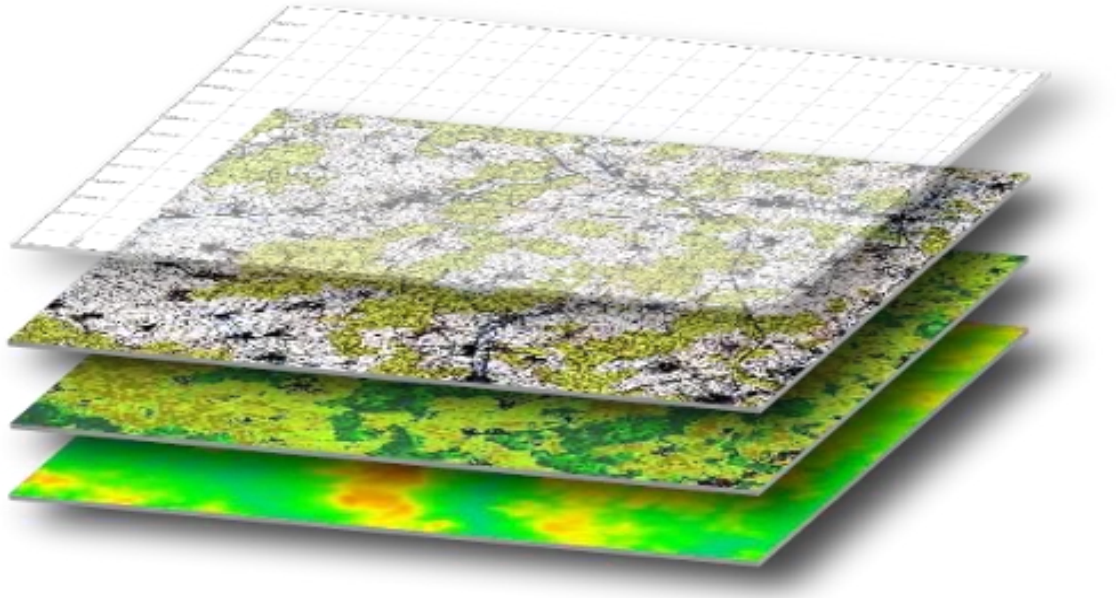
Why Indigenous GIS is Necessary for Indian Armed Forces ?????



Air Vice Marshal PK Srivastava VSM (Retd)

Agenda

- ***Background Information***
- ***What is GIS?***
- ***Application of GIS***
- ***NCW & GIS***
- ***COTS GIS Vs Indigenous GIS***
- ***Key Features/Functional features of GIS***
- ***Conclusion***

Background Information

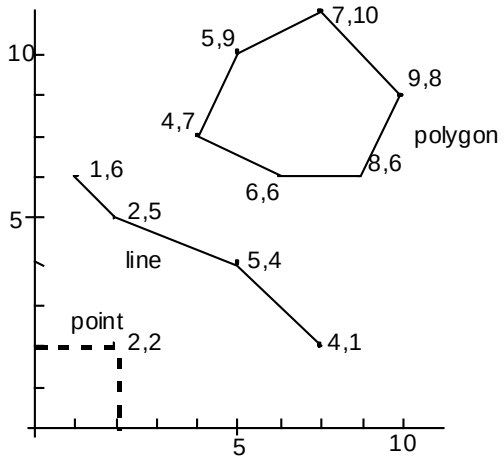
- Conduct of military operations need spatially oriented information
- Concept of C^4 i.e. Command, Control, Communication and Coordination in military operations is largely dependent on the availability of accurate and timely spatial information
- I^2SR – information, intelligence, surveillance and reconnaissance may be embedded with spatial information
- Modern battle space being very complex timely Geospatial Information (GI) will play a vital role
- GIS is a necessary tool to effectively conduct these operations
- GIS has potential to shorten OODA cycle thereby enhance
  - Operational preparedness
  - Operational readiness
  - Combat power
- GIS is well placed to be used as an effective decision

What Is GIS?

- GIS is a computerised system capable of
  - Storing
  - Manipulating
  - Displaying geographically referenced information
- Each entity is represented by
  - Point
  - Line or
  - Polygon
- Each entity has two sets of data attached to it
  - Spatial data --- geographical location
  - Non-spatial data - other useful information

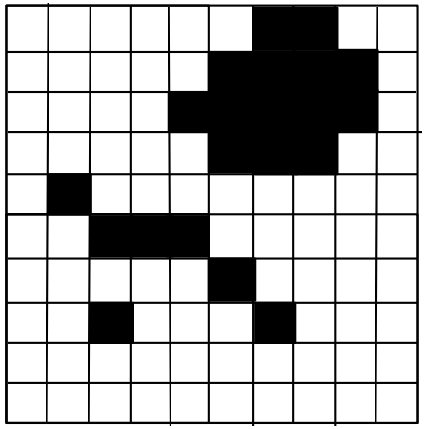
Vector & Raster Representation

- Vector model



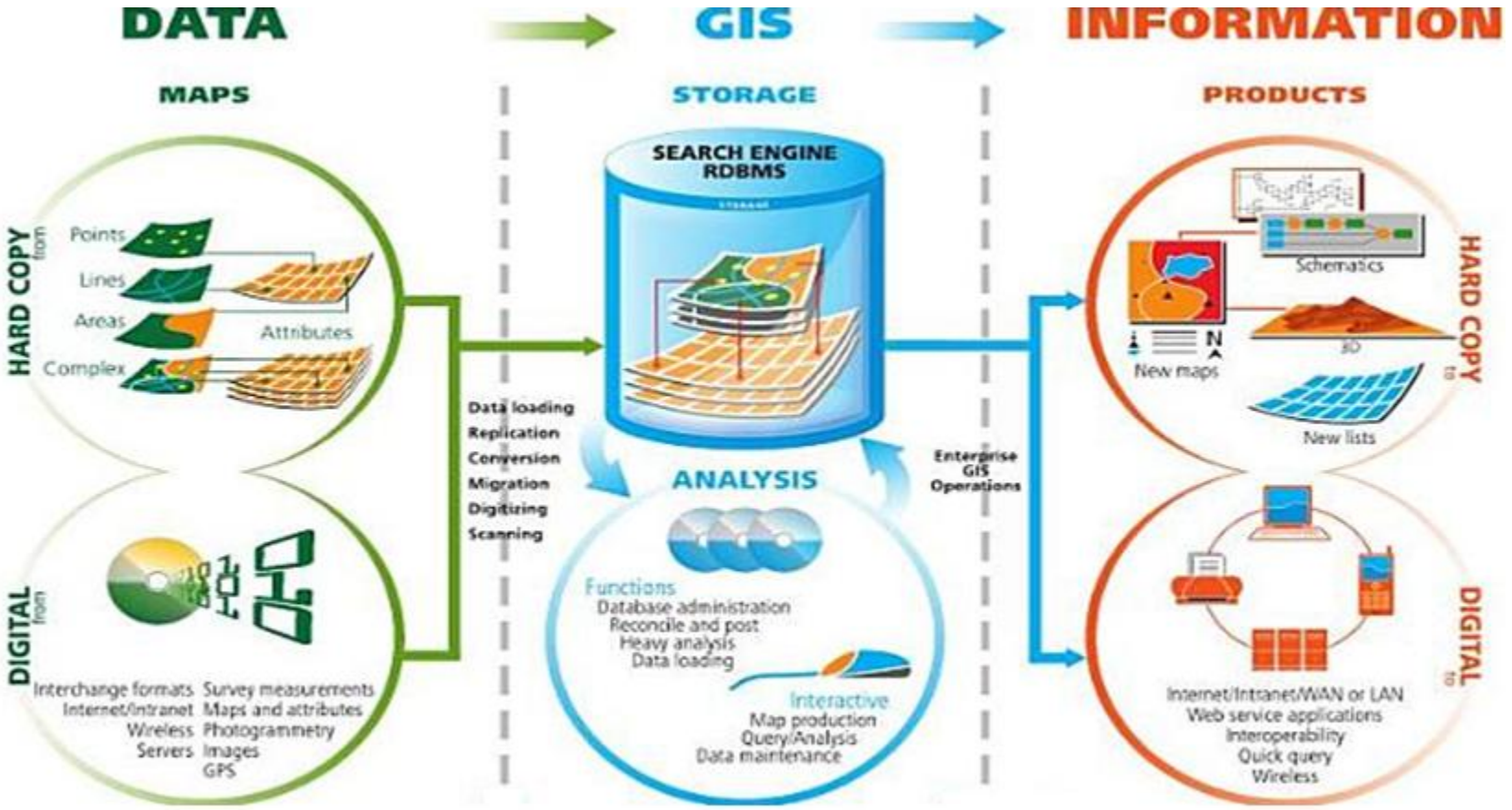
Represented by geometric objects: points, lines, polygons

- Raster model



Represented by image files composed of Grid-cells

Processes involved in GIS

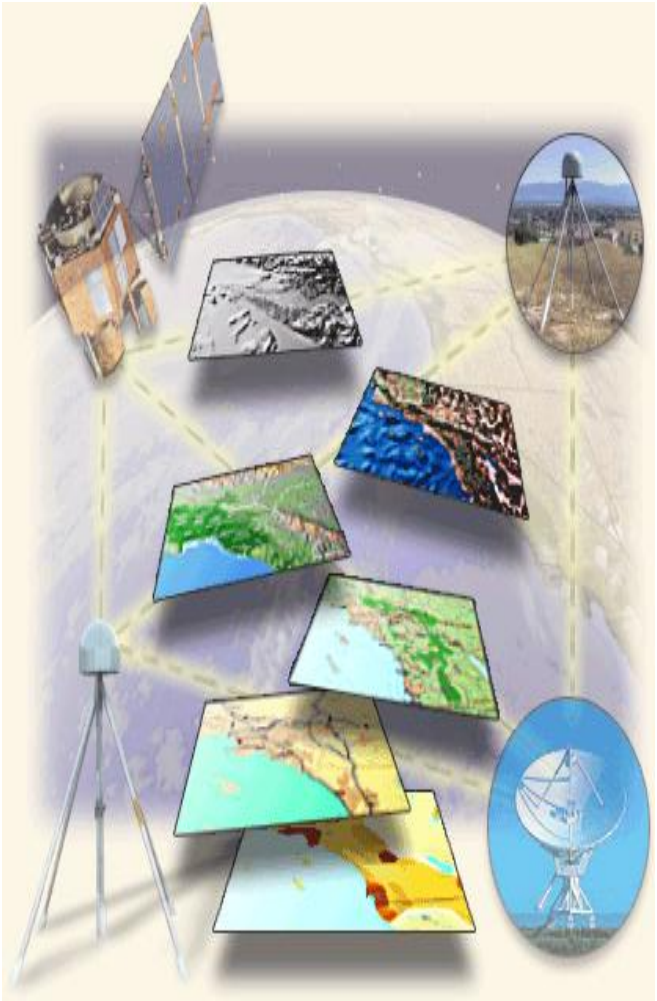


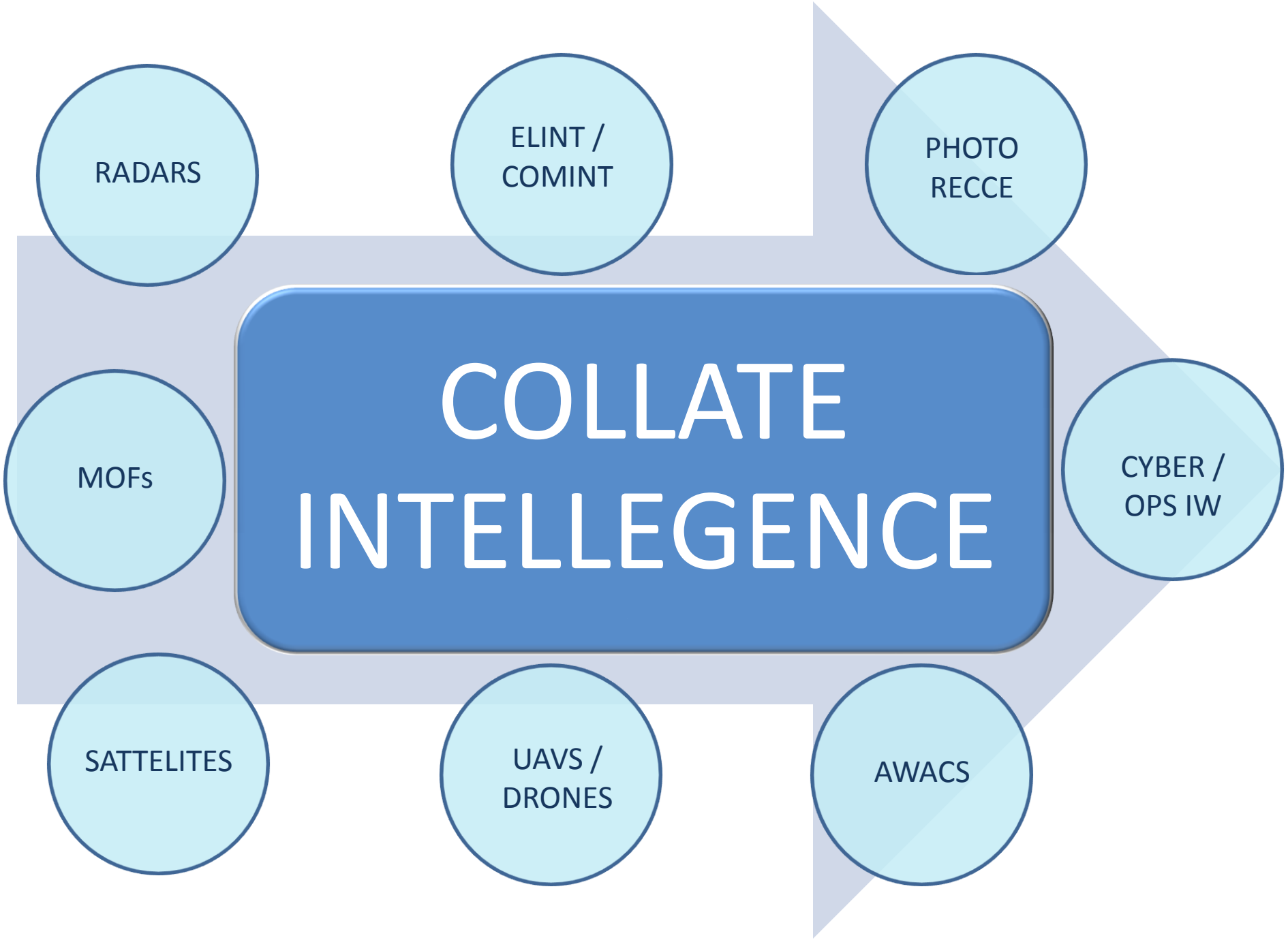
Applications of GIS

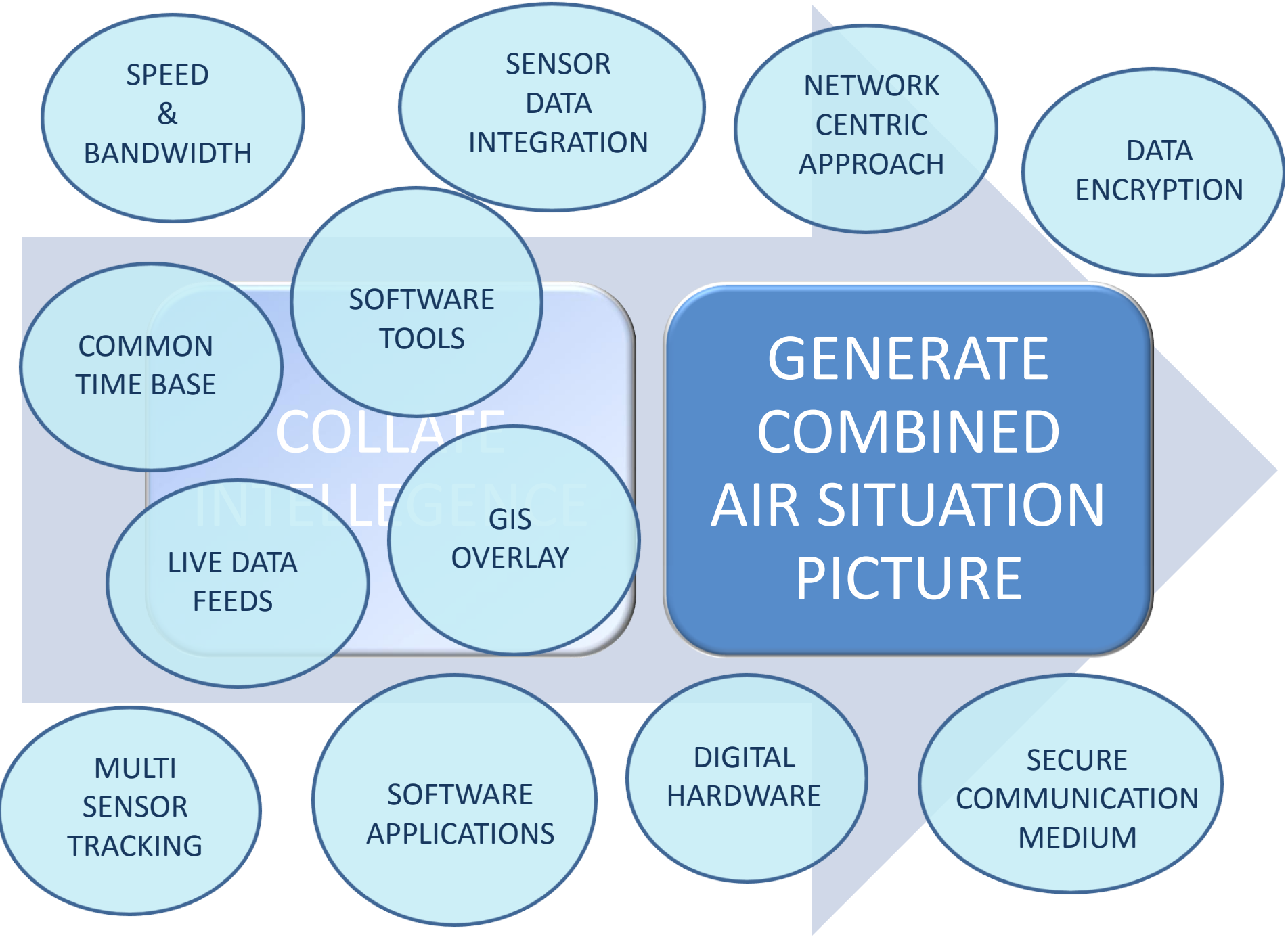
- Aerial Cameras for Survey and Reconnaissance Photography.
- Aerial Roll Film Scanners for Conversion of Aerial Photographs to Digital Images.
- Imagery/SAR Data Exploitation.
- Map Capture and Feature Mapping from St ata
- Image Management and Ops Room Briefing.
- Simulation of a Fly through Approach to Targ
- Mission Planning, Rehearsal and Damage A ss
- Operations Room Briefing Display for O ns
- Creation of Heads up Navigational Displ Cockpit.
- Asset Tracking of Vehicles Carrying Critical
- Analysis of "What if" Scenarios

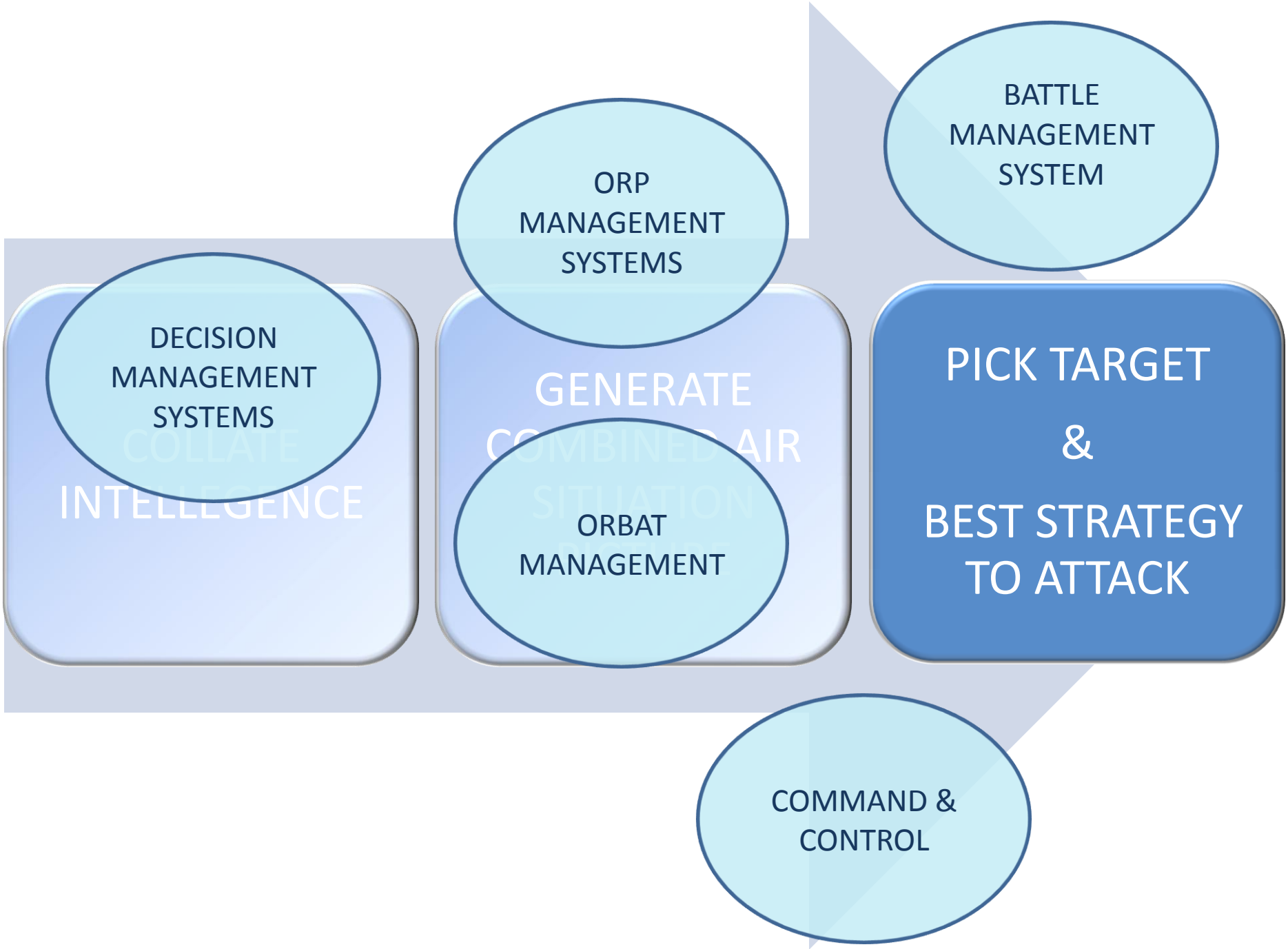
NCW & GIS

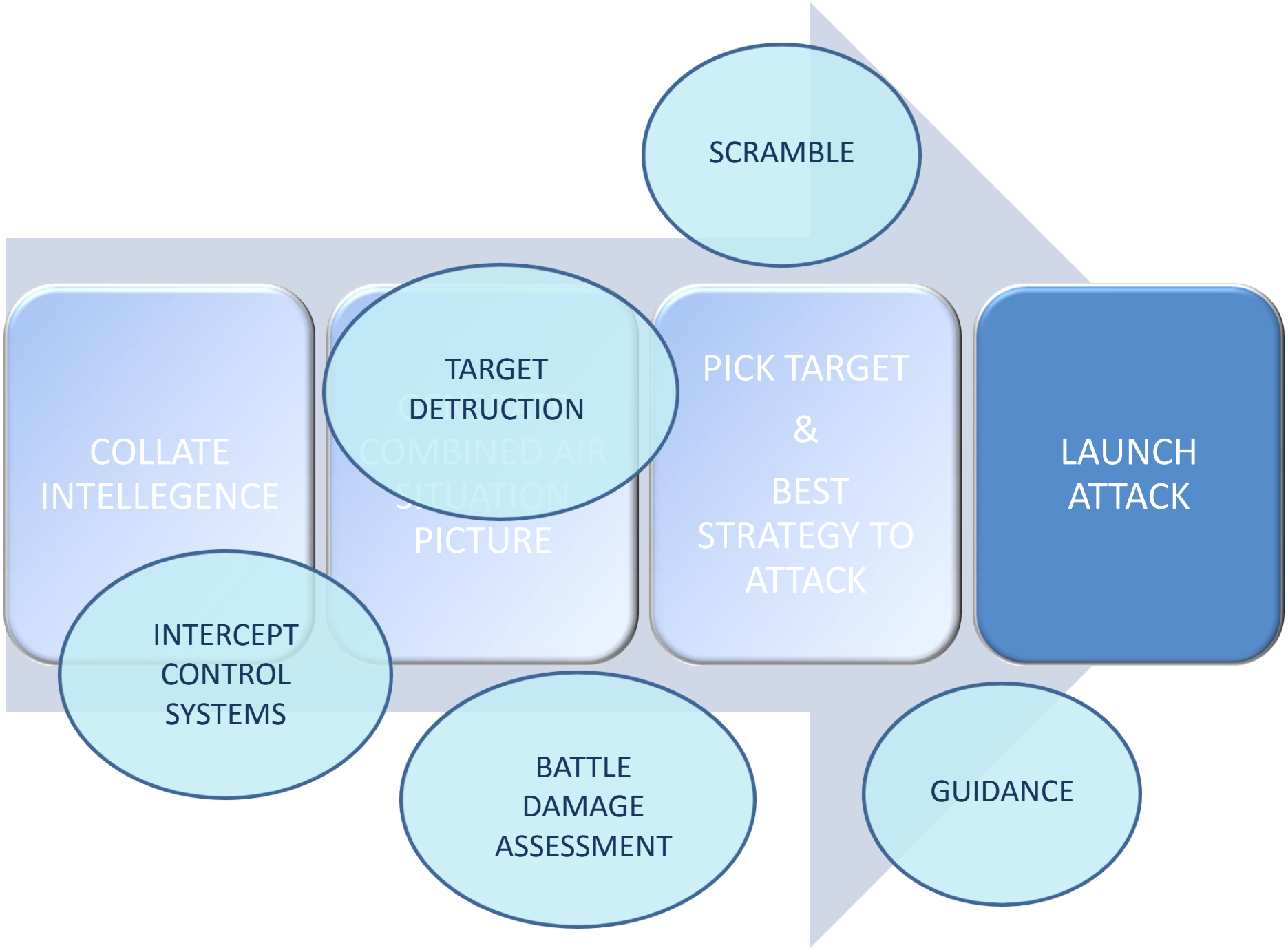
- NCW is defining future battle space
- GIS is definitely a force multiplier
- Networking of sensors, decision makers and shooters essential
- GIS is a potent decision support system enhances battle space awareness between operational and command elements.
- GIS plays a crucial role in

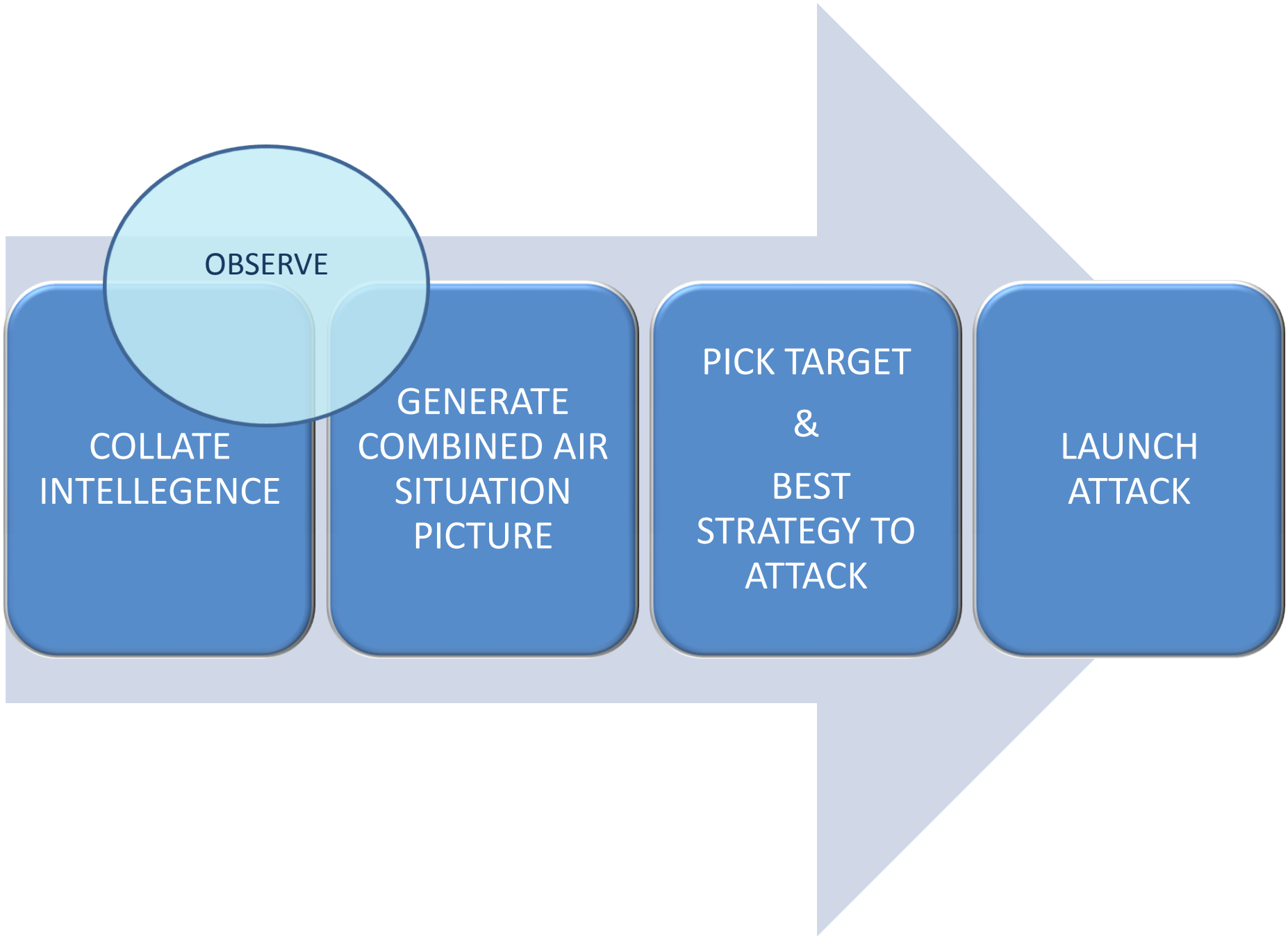


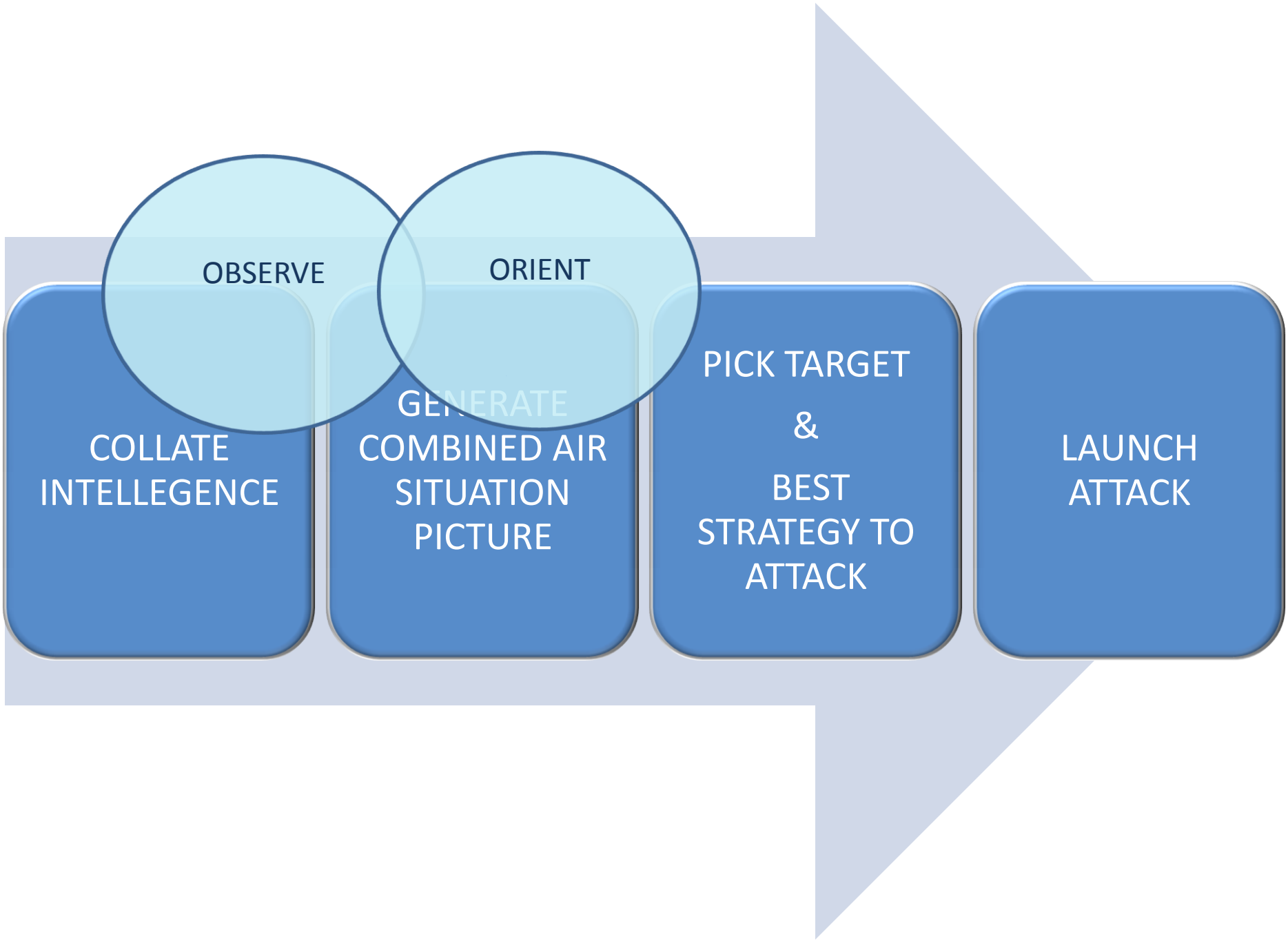

RADARS
ELINT / COMINT
PHOTO RECCE
MOFs
COLLATE INTELLEGENCE
CYBER / OPS IW
SATTELITES
UAVS / DRONES
AWACS

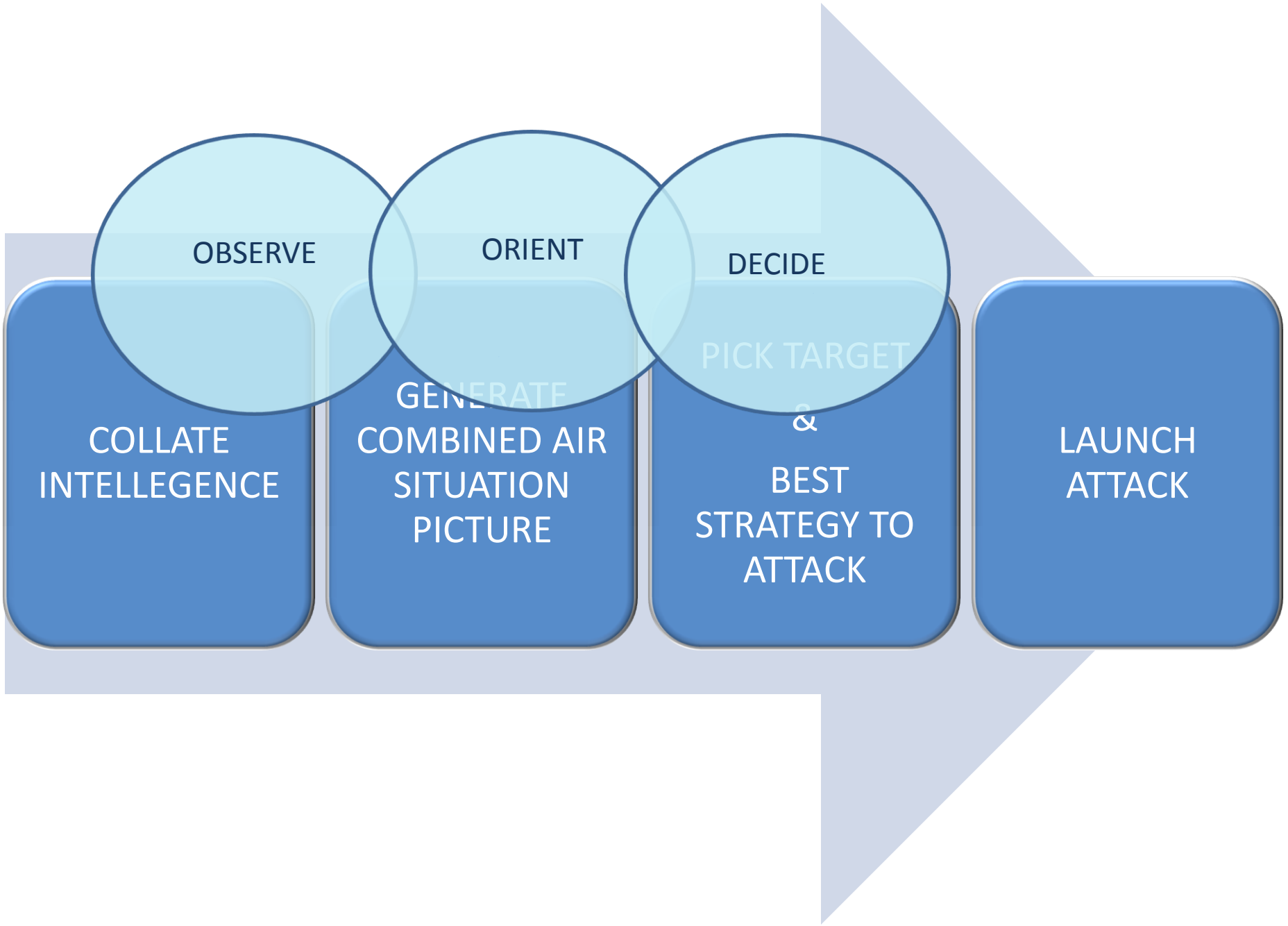

SPEED & BANDWIDTH
SENSOR DATA INTEGRATION
NETWORK CENTRIC APPROACH
DATA ENCRYPTION
COMMON TIME BASE
SOFTWARE TOOLS
COLLATE INTELLIGENCE
LIVE DATA FEEDS
GIS OVERLAY
GENERATE COMBINED AIR SITUATION PICTURE
MULTI SENSOR TRACKING
SOFTWARE APPLICATIONS
DIGITAL HARDWARE
SECURE COMMUNICATION MEDIUM

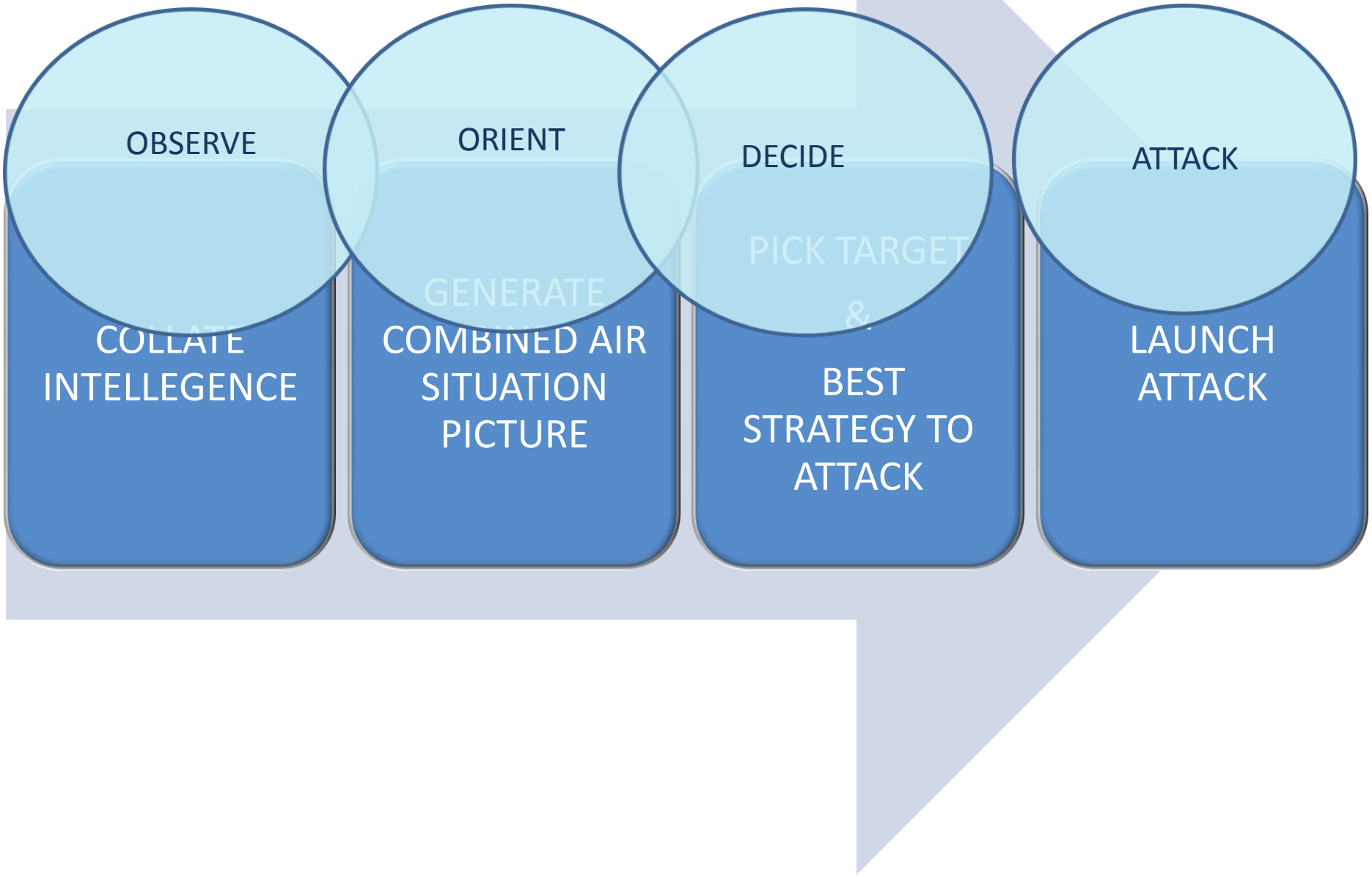

BATTLE MANAGEMENT SYSTEM
ORP MANAGEMENT SYSTEMS
DECISION MANAGEMENT SYSTEMS
GENERATE
ORBAT MANAGEMENT
PICK TARGET
&
BEST STRATEGY TO ATTACK
INTELLIGENCE
COMMAND & CONTROL


SCRAMBLE
COLLATE INTELLEGENCE
TARGET DETRUCTION
COMBINED AIR SITUATION PICTURE
PICK TARGET & BEST STRATEGY TO ATTACK
LAUNCH ATTACK
INTERCEPT CONTROL SYSTEMS
BATTLE DAMAGE ASSESSMENT
GUIDANCE


OBSERVE
COLLATE INTELLEGENCE
GENERATE COMBINED AIR SITUATION PICTURE
PICK TARGET
&
BEST STRATEGY TO ATTACK
LAUNCH ATTACK


OBSERVE
ORIENT
COLLATE INTELLEGENCE
GENERATE COMBINED AIR SITUATION PICTURE
PICK TARGET & BEST STRATEGY TO ATTACK
LAUNCH ATTACK


OBSERVE
ORIENT
DECIDE
COLLATE INTELLEGENCE
COMBINED AIR SITUATION PICTURE
PICK TARGET
&
BEST STRATEGY TO ATTACK
LAUNCH ATTACK


OBSERVE
COLLATE INTELLEGENCE
ORIENT
GENERATE
COMBINED AIR SITUATION PICTURE
DECIDE
PICK TARGET
&
BEST STRATEGY TO ATTACK
ATTACK
LAUNCH ATTACK

COTS GIS Vs Indigenous GIS

- Mostly, COTS GIS is driving military applications
- However, COTS GIS
  - Comes with strict licensing policy
  - Prone to technology denial
  - Interoperability with other GIS systems is limited
- GIS, being base of C4I2SR systems, is critical from security perspective.
- Development of uniform indigenous GIS for defence forces a necessity due to
  - Standardisation
  - Interoperability and
  - Integration

Key Features of Indigenous GIS

- To be base for implementation of C4I²SR – key to joint operations.
- Own source code to ensure security of critical operational data
- Capable of integrating with existing systems in Indian military
- Capable of working with multiple RDBMS
- Capable of being available on multiple platforms from

Functional Features of Indigenous GIS

- Utilise vector / raster data produced by CAMS and Survey of India and images supplied by DIPAC.
- Facilitate integration of imageries and photos, creation of mil symbols/ overlays, annotation of maps, creation of attribute data for overlays and analytical processing of data.
- Provide tools for terrain analysis, situation analysis, annotation and customisation to military commanders.
- Offer presentation facilities such as selective display, zooming, panning, scrolling etc.
- Carry out 3D generation, satellite imagery draping and provide fly-through facility

Conclusion

- GIS is a powerful tool for reduction of OODA cycle and thus enhancing the tempo of military operations.
- A must for implementation of C4I2SR in the context of net centric warfare
- Provides insights into current and emerging threats on a continuum.
- Indigenous GIS is a necessity in view of
  - Sensitivity of ops data
  - Full exploitation of GIS technology during military operations.

Thank You

- SELF DEPENDENCY ON CRITICAL FACTORS
  - NETWORK HARDWARE INFRASTRUCTURE
  - SOFTWARE TOOLS
  - SYSTEM SOFTWARE
  - SOFTWARE APPLICATIONS
  - DATA ENCRYPTION / DECRYTION
  - GEO SPATIAL / GEO GRAPHIC INFORMATION SYSTEMS
  - CONTROL ON SENSORS DATA FORMATS
  - COMMUNICATION BANDWIDTH (ALL MEDIUMS)