

The background of the slide is a photograph of sand dunes. A faint, circular logo is visible in the center, featuring a stylized plant or tree inside a circle. Overlaid on this is a semi-transparent rectangular box containing the title text.

Aardvark Roost AOC **Conference**

25 August 2009



Aim

The African Battle Space and its EW demands

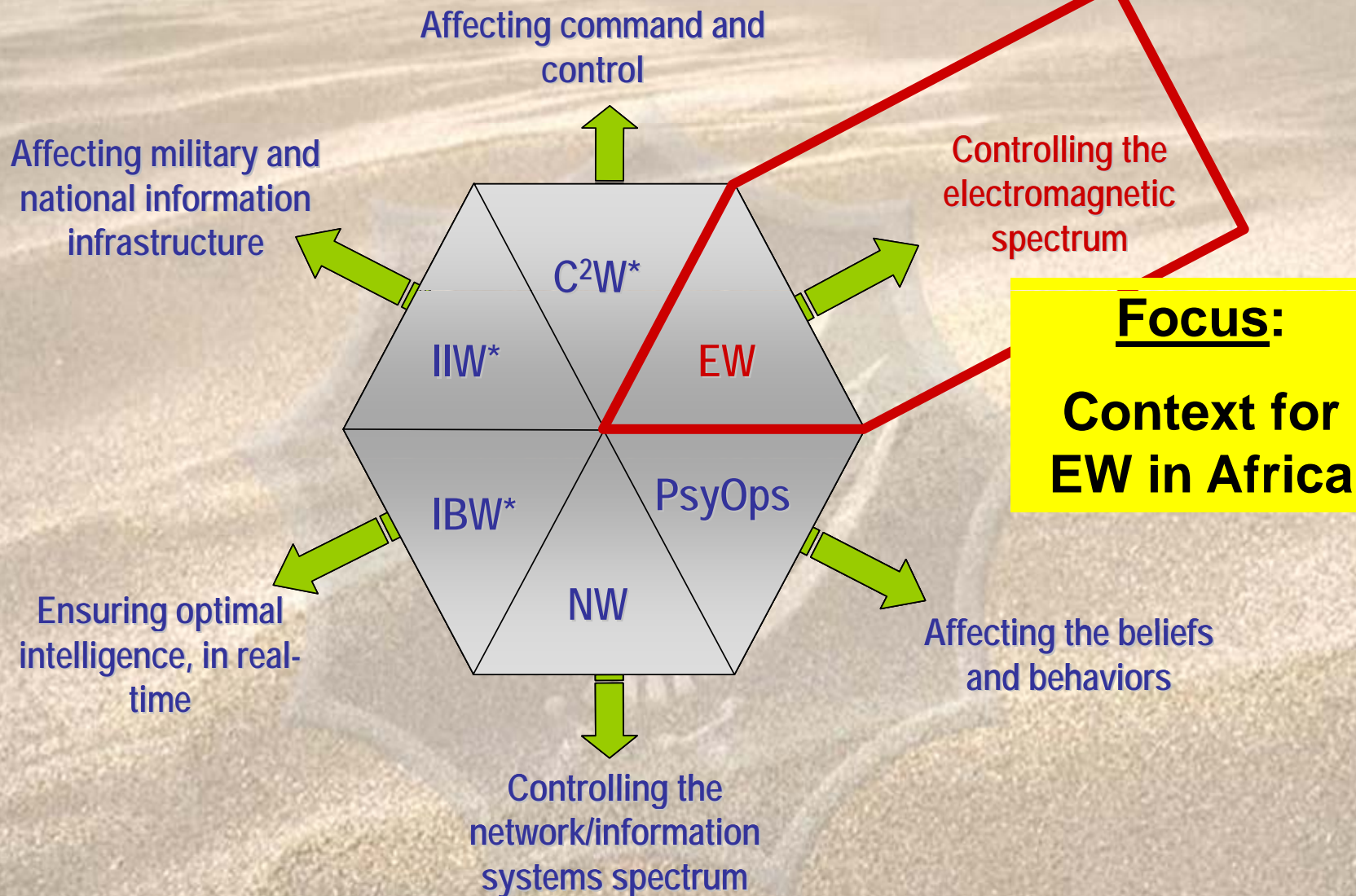
Scope

- Introduction
- African Battle Space
- Concept and Approach
- Requirements
- Conclusion

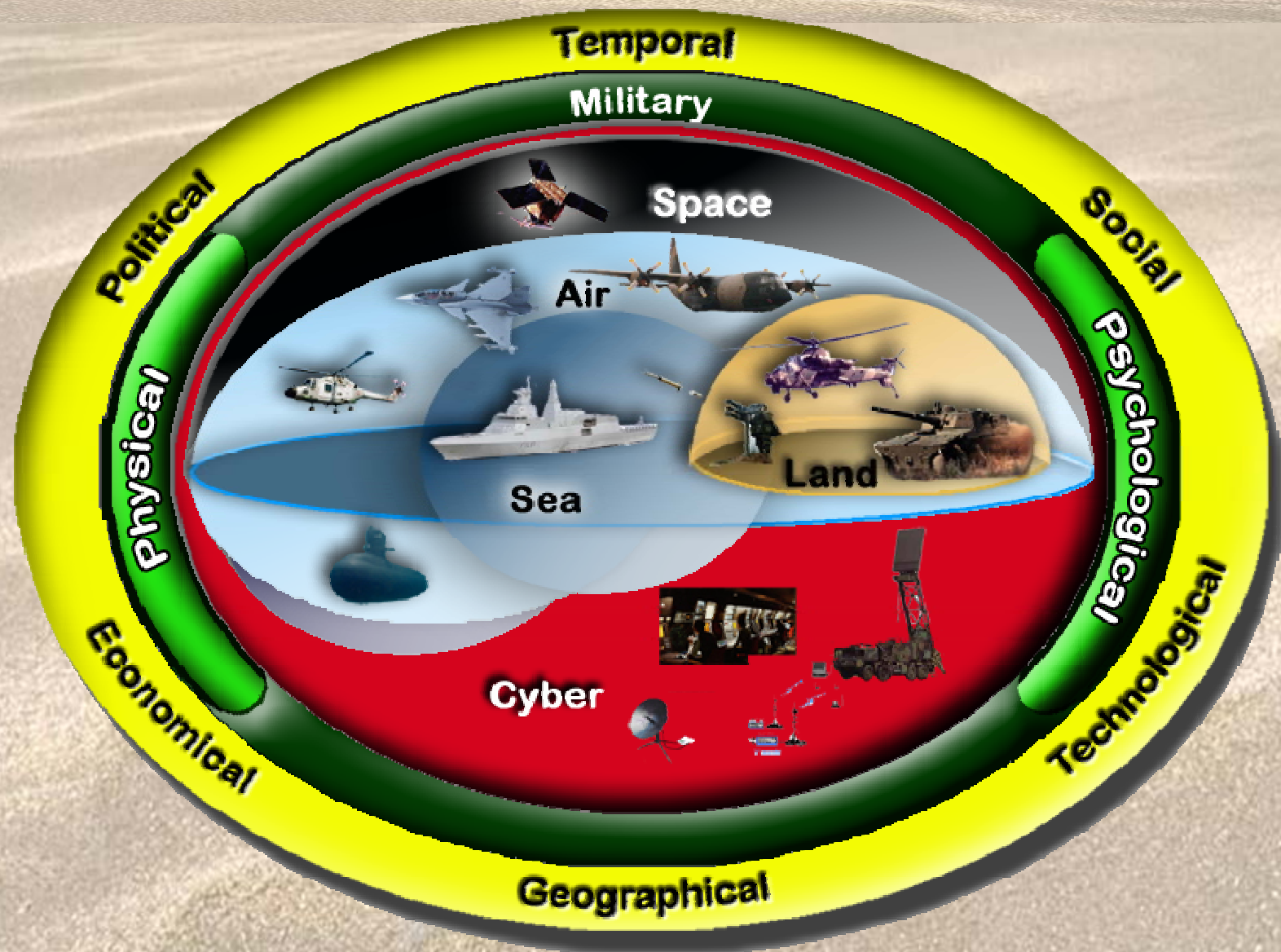


Introduction

EW and Related Fields



Battlespace Dimensions



The background of the slide is a photograph of a vast, arid desert landscape with rolling sand dunes. In the lower half of the image, there is a large, faint, and somewhat blurry mural of a lion's head, which appears to be painted on a wall or rock face. The lion's head is facing forward, with its mane and facial features visible. The overall tone of the image is warm and golden, typical of a desert environment.

African Battle Space

Threats To Security: An International View

Threats and risks

Terrorism

Nuclear weapons and other weapons of mass destruction

Trans-national organised crime

Global instability and conflict, and failed and fragile states

Civil emergencies

State-led threats to the mainly Western World Countries

Drivers of insecurity

Challenges to the rules-based international system

Climate change

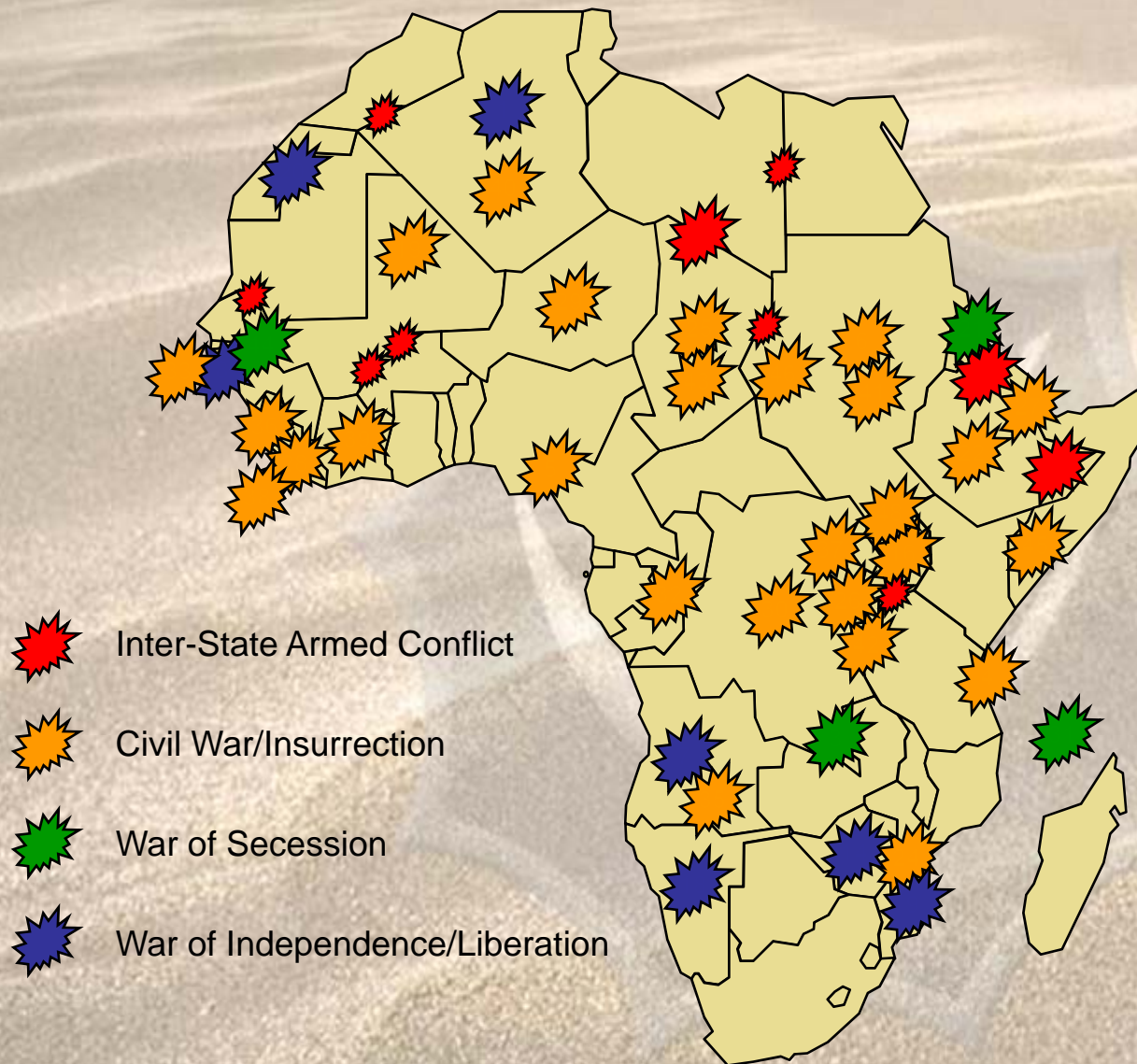
Competition for energy

Poverty, inequality, and poor governance

Source: The National Security Strategy of the United Kingdom - Security in an interdependent world, March 2008

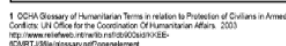
Almost 100% match with SANDF views!

Conflict in Africa: Distribution of Wars of the 1960's to Present



- Predominantly intra-state – civil wars, insurrections
- Inter-African and external interventions and support to belligerents common – virtual proxy wars in some cases
- Direct inter-state conflict the exception
- Major inter-state wars rare:
 - Ogaden
 - Libya-Chad
 - Ethiopia - Eritrea

Africa: Conflicts Without Borders
Sub-national and Transnational Conflict-Affected Areas
January 2007 - October 2008



3. Alex Schmidt and A.J. Jongman, *PRODOM* (PRODOM is a Dutch acronym for Interdisciplinary Research Program on Root Causes of Human Rights Violations; Leiden, the Netherlands, 1997) based on Department of Peace and Conflict Research, Uppsala University, Sweden.

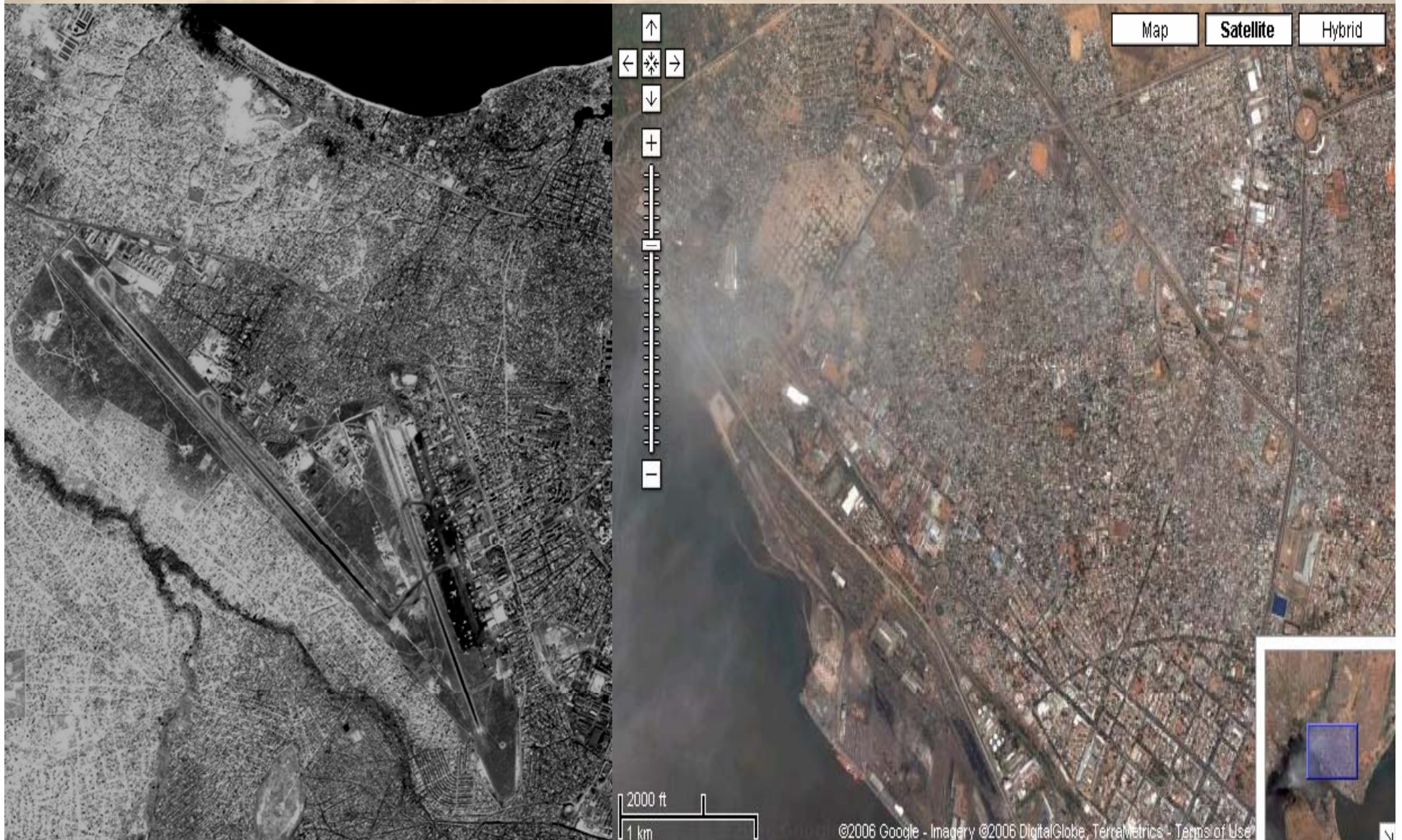




Kinshasa, central market area – National Geograph
Nov 1991



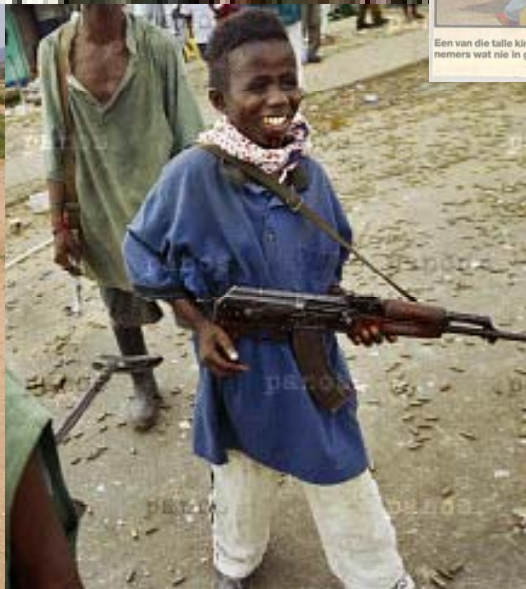
Access to Ports of Entry



Social Anomalies: Child Soldiers



Een van die talloze kindersoldate van die Unie vir Kongolese Patriotte (UKP) in Bunia. Die lede van die UNICEF en die VN het verskeie keer versoek gemaak dat die lede van die UKP wat nie in gevegte betrokke raak nie, maar die VN het verlede week besluit om hulle te ontwapen.



IFF, Rules of Engagement regarding Child Soldiers?

Broadening Concept of Security

- Concept of security has broadened.
- Includes everything that poses a threat to individual, natural or human induced.



Photo: Yasmina Bouziane, 4 Jun 2004

Implications: Defence Forces are increasingly tasked to conduct “collateral” operations.

This imply that it is not security first and on its own



Photo:UNICEF

Asymmetric Conflict

“That is, when two combatants are so different in their characters and in their areas of comparative strategic advantage, that a confrontation between them comes to turn on one side’s ability to force the other to fight on their own terms.”

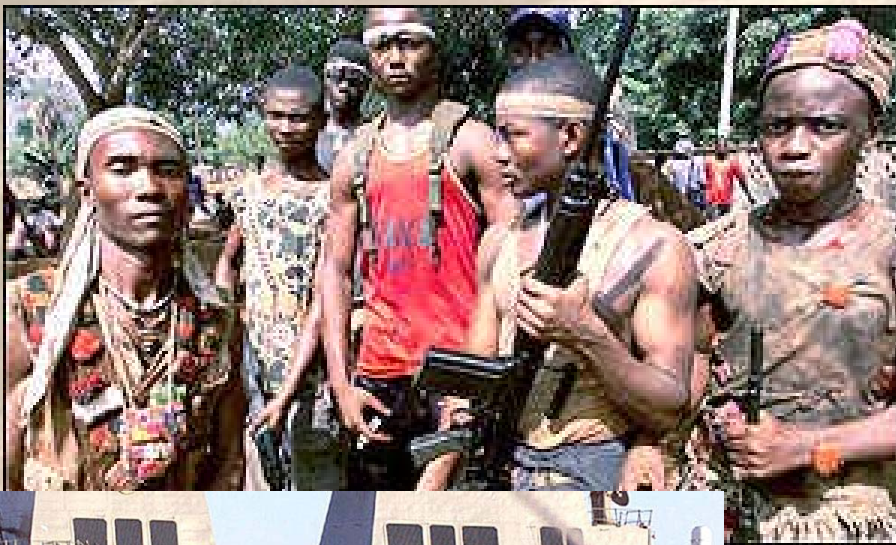


Photo: SAAB

Hackers and Cyber Warriors/Terrorists

Incompetent Amateurs

Hackers

Disgruntled Employees

Criminals

Organised Crime

Political Dissidents

Terrorists

Espionage Services

Orchestrated Info war



Threats to Security in Africa

Sub-state conflict

Humanitarian threats

Disease: HIV/Aids, malaria, cholera, etc.

Food/water Insecurity

Displacement and migration

Demographic stresses: e.g. Urbanisation, youth bulge, etc

Poverty and underdevelopment

Vulnerable political structures

Environmental degradation, exacerbated by climate change

(International) Organised crime

International terrorism (Targets and Bases)

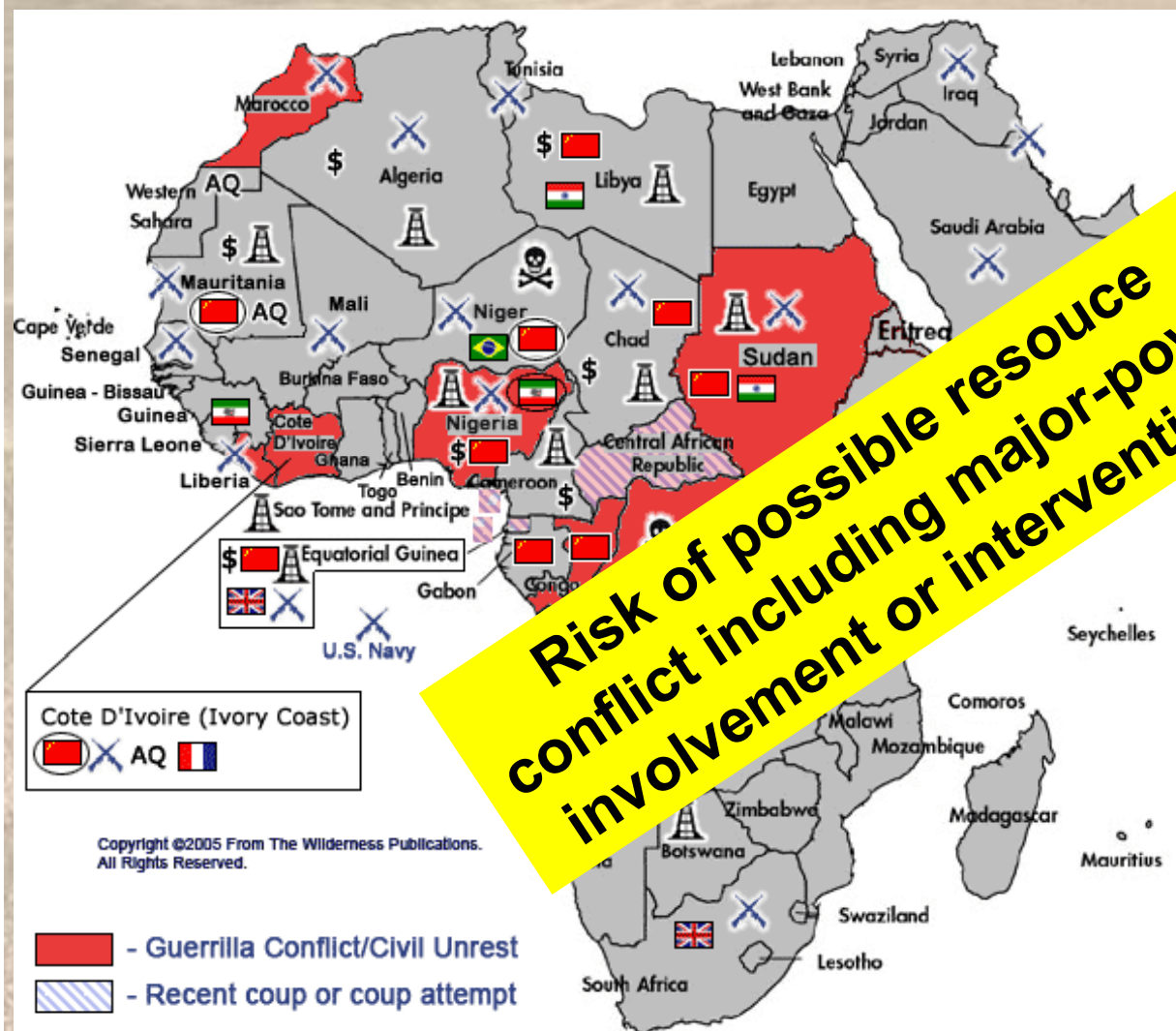
Exceptionally, Inter-State armed conflict

***Implication: Persistent, mainly sub-state conflict,
often with external support and/or intervention***

New Threats

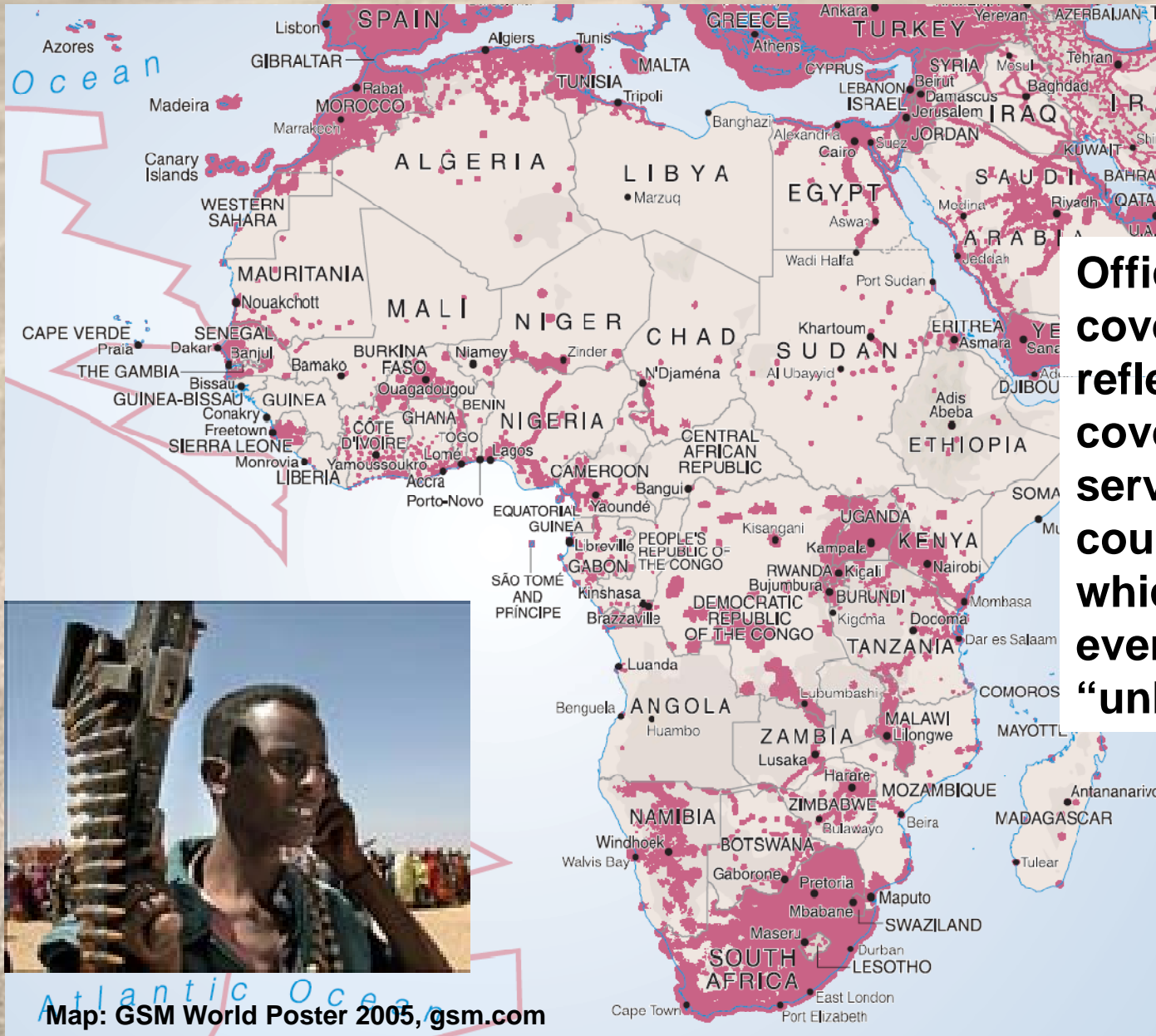
IED Incidents and the African Battle Space

Foreign Involvement In Africa



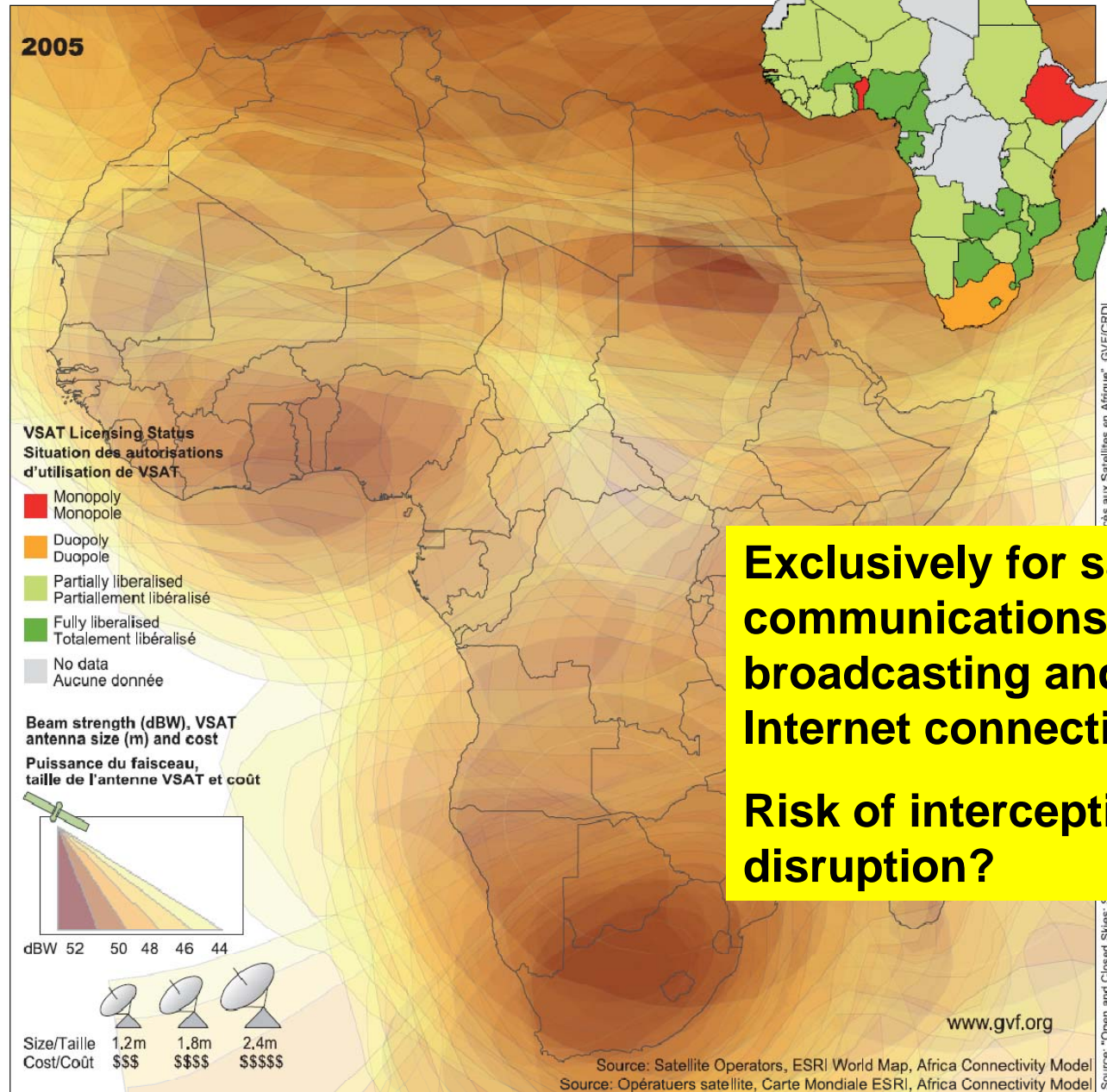
-Trade between China and Africa up 50% in 2004 (IAGS - Energy Security Nov. 15, 2004)
 -Sir Mark Thatcher pled guilty to involvement in coup attempt in Equatorial Guinea on Jan 11th
 -"OIL IS THE ONLY U.S. INTEREST IN AFRICA" - The Economist

Cell phone Coverage in Africa: GSM



Official network coverage does not reflect unregulated coverage by multiple service providers in countries like Somalia, which “works almost everywhere” with “unbeatable tariffs”

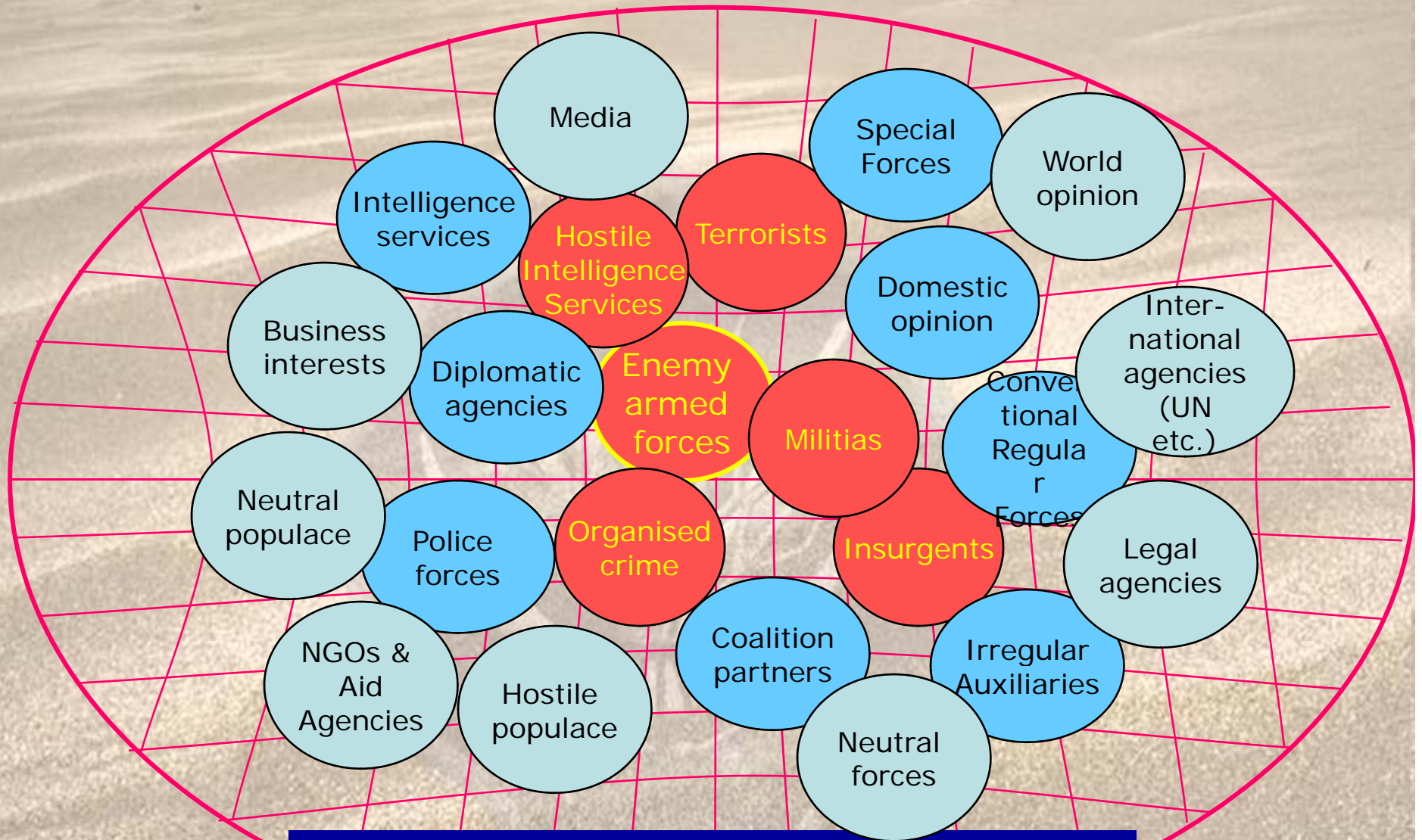
Ku-band Satellite Coverage



Exclusively for satellite communications - broadcasting and 2-way Internet connections

Risk of interception or disruption?

Complexity



Complex Environment - physical,
human, informational

Remember

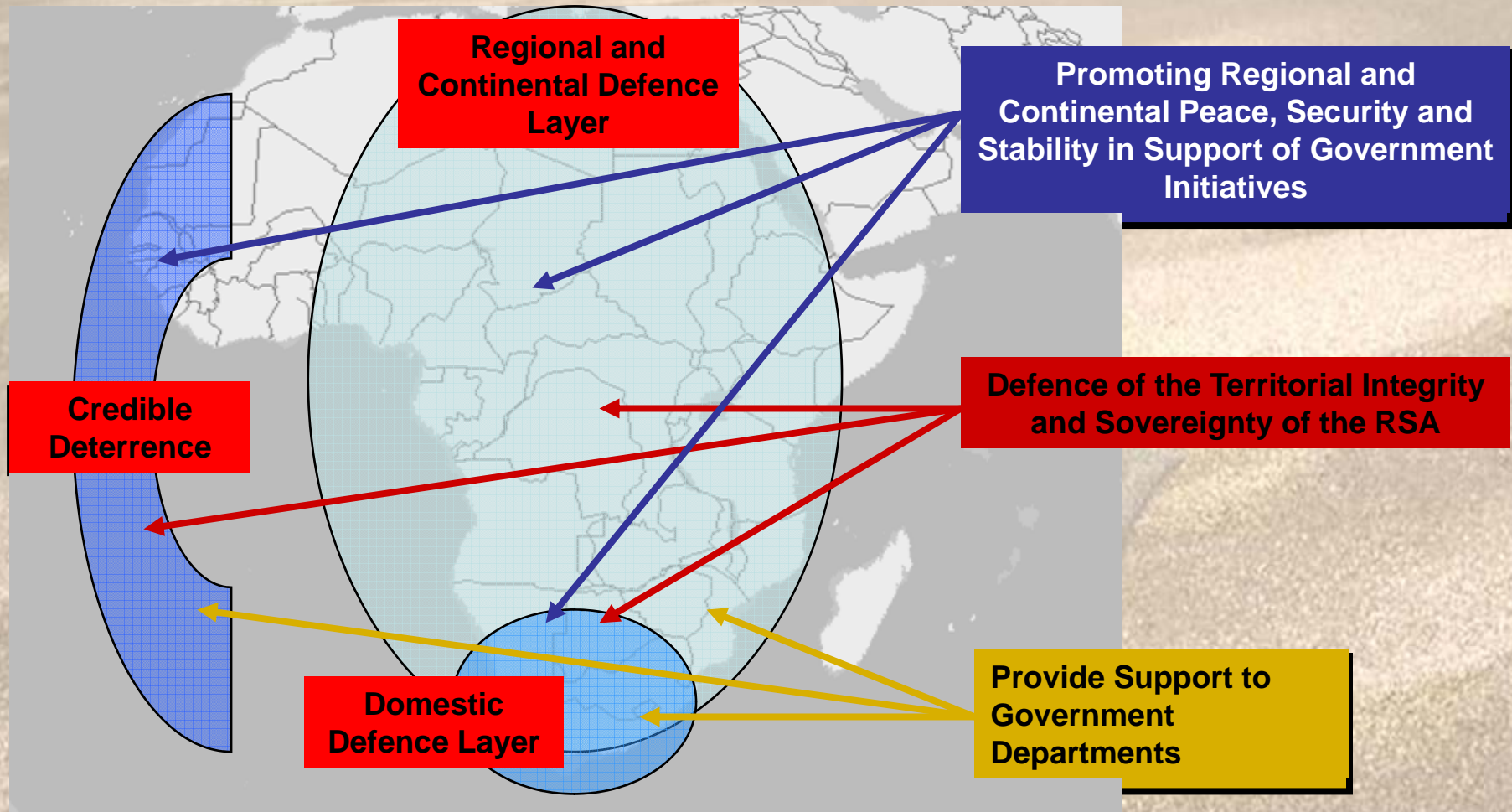
The attacker needs only one vulnerability.

The Defender needs to protect every avenue.



Concept and Approach

JFE Objectives: Within a Layered Approach



Eric Smith

ADMIRAL, WITH ALL
DUE RESPECT—
COULD WE HAVE LESS
NETWORK-CENTRIC
AND MORE ROUNDS
ON TARGET?!



Range of Military Operations

	Military Operations	General Goals	Type of Operation (Examples)	Opposition
C O M B A T	War	Defeat Enemy	Major Combat Operations	Military
	N O N C O M B A T	Deter War & Resolve Conflict	Peace Enforcement Counterinsurgency Show of Force/Raid/Strike Peacekeeping Counterterrorism	Military/ Para-Military
		Promote Peace & Support Civil Authorities	Freedom of Navigation Counterdrug Protection of Shipping Humanitarian Assistance Civil Support	Criminal

(Adapted from US JP3-07 Joint Doctrine for Military Operations Other Than War, 16 June 1995)

EW capabilities must enable and support operations across the spectrum from combating crime to major combat

Looking Back: 1997

Potential Threat of Info Attack on US National Security

Source	Validated Existence	Existence Likely	Likely by 2005	Beyond 2005
Incompetent (Amateur)	W			
Hacker	W			
Disgruntled employee	W			
Criminal	W			
Organised crime	L		W	
Political dissident		W		
Terrorist group		L	W	
Foreign espionage	L		W	
Tactical countermeasures		W		
Orchestrated tactical IW			L	W
Major strategic disruption				L

W = Widespread, L=Limited

Source: From a Defence Science Board (US Department of Defence) Task Force report on 'Information Warfare – Defence', quoted in "Waging the infowar" by J.R. Wilson, Jane's IDR Extra, Volume 2 No.4, April 1997

A Later US View C. 2005

- Continued asymmetric opposition to US interests
 - Non-state actors
 - Nation states
 - Military actions
-certain trends are obvious:
 - Nuclear, chemical, bio weapons continue to proliferate
 - Terrorism continues
 - Increasing violence and political influence by non-state actors
 - Proliferation of primitive (but effective) as well as modern weapons/systems
- Threats Impacting Navy-Marine Corps Missions
 - Proliferation of capabilities for sophisticated information warfare
 - “Network centrality” creates vulnerabilities for US forces
 - **Interruption/jamming**
 - **Effective emission control impossible**
 - **Information overload**
 - **Over-dependence on reachback**

EW Activities

Electronic Attack Activities

Activities related to electronic attack are either offensive or defensive and include —

- Countermeasures.**
- Electromagnetic deception.**
- Electromagnetic intrusion.**
- Electromagnetic jamming.**
- Electromagnetic pulse.**
- Electronic probing.**

Electronic Warfare Support Activities

Activities related to electronic warfare support include —

- Electronic reconnaissance.**
- Electronic intelligence.**
- Electronics security.**

Source: FM 3-36: Electronic Warfare In Operations, February 2009

EW Activities (Contd)

Electronic Protection Activities

Activities related to electronic protection include —

Electromagnetic hardening.

Electromagnetic interference.

Electronic masking.

Electronic warfare reprogramming.

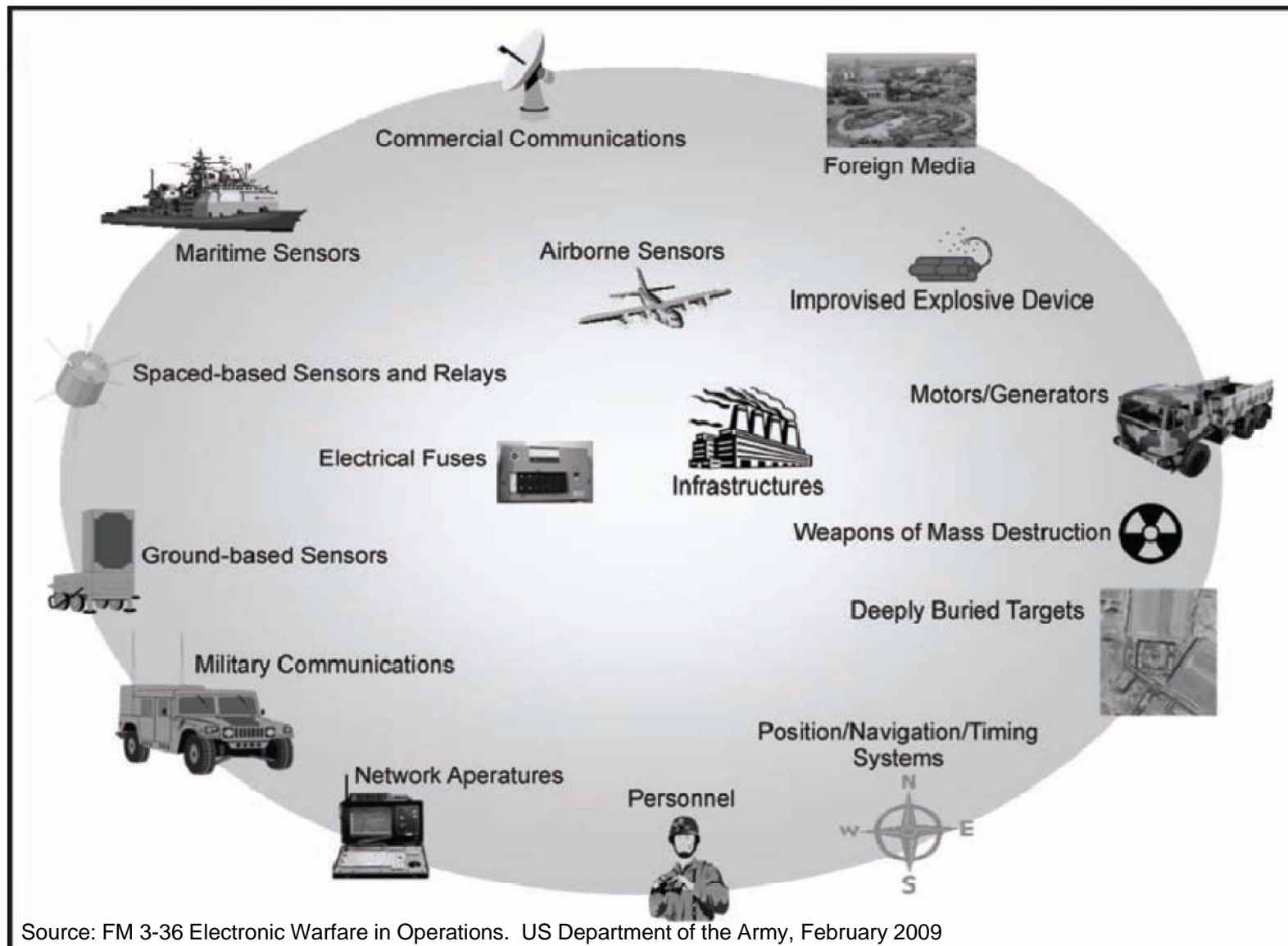
Emission control.

Spectrum management.

Wartime reserve modes.

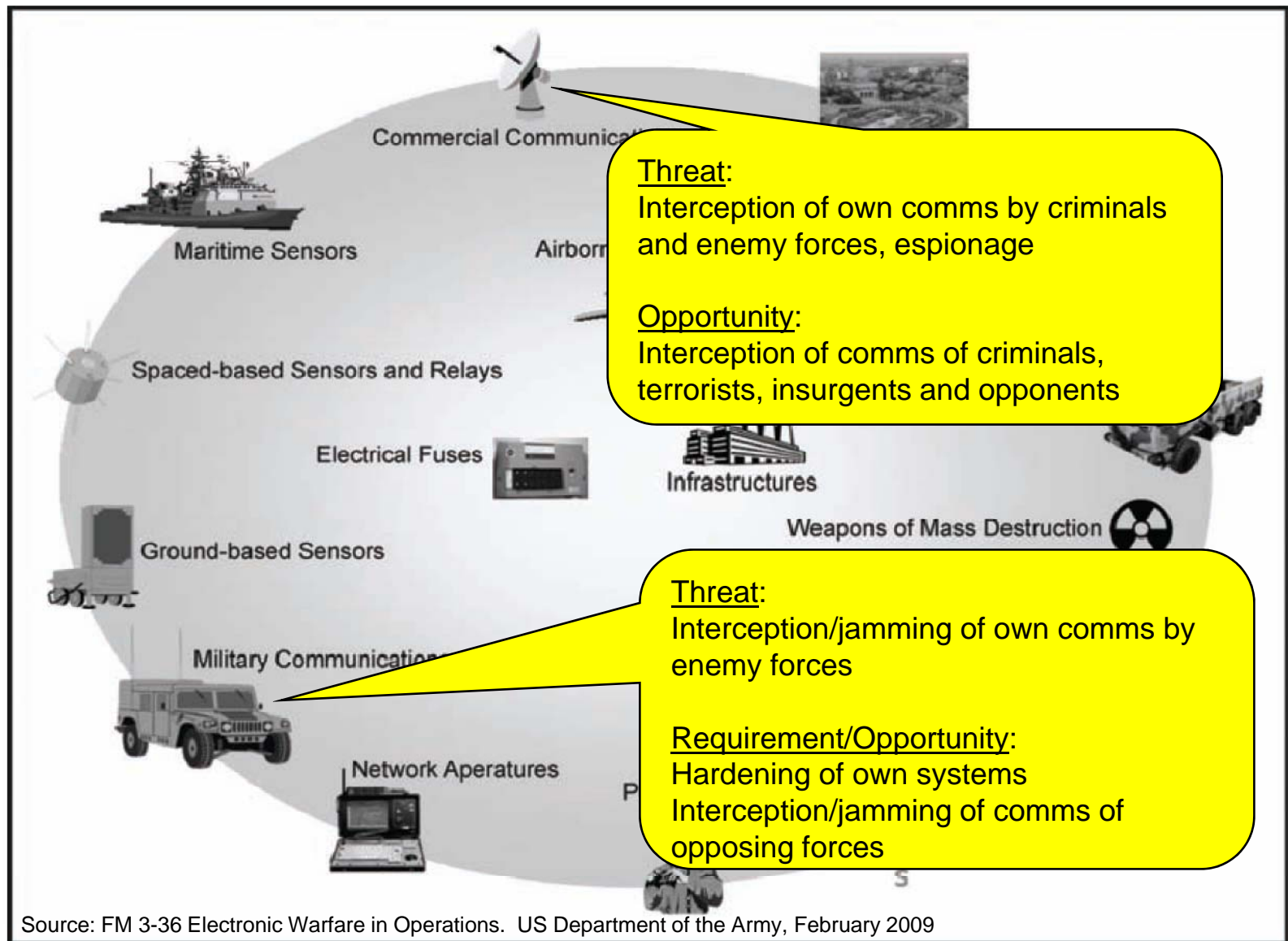
Electromagnetic compatibility.

EM Spectrum Targets

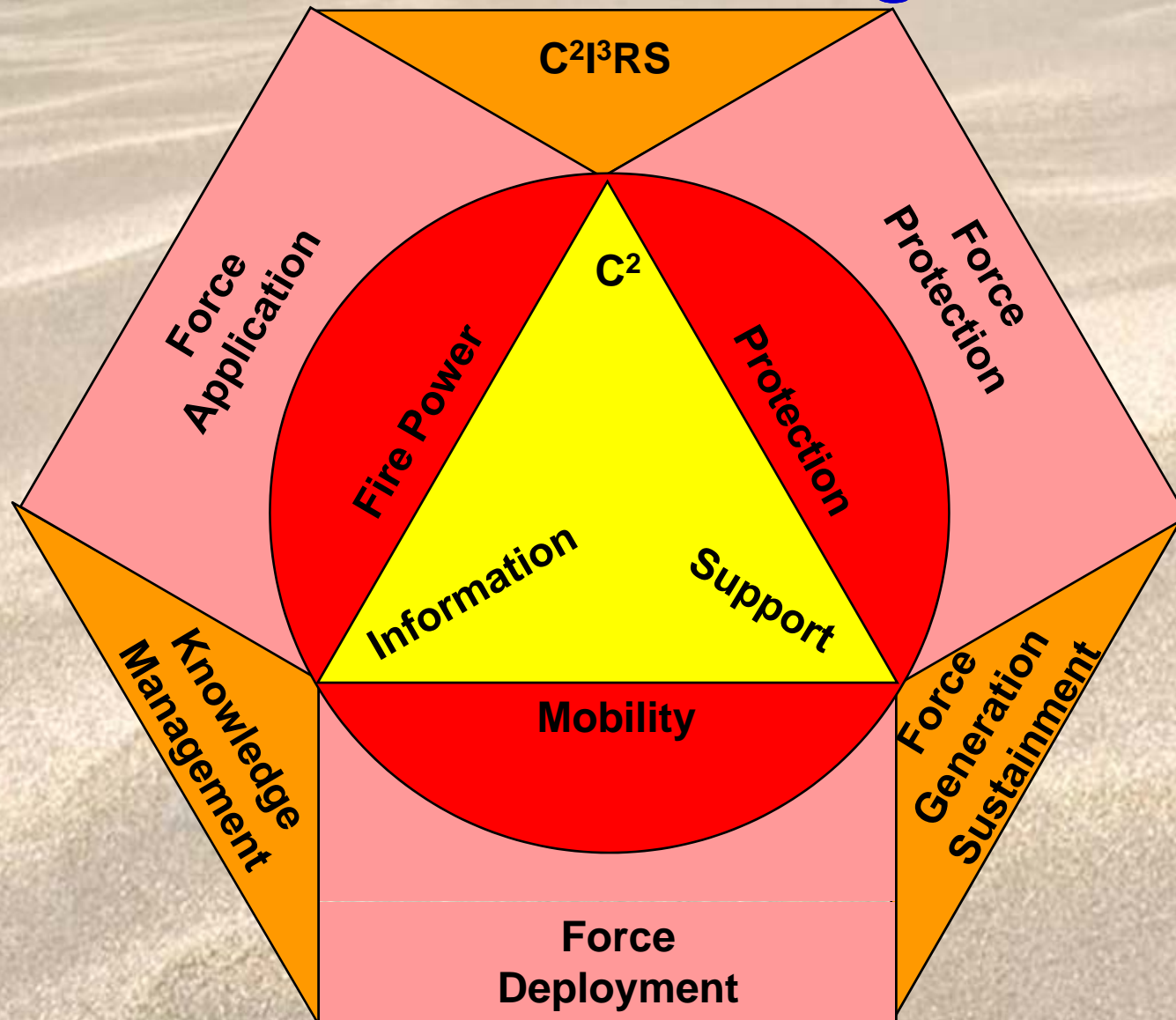


Source: FM 3-36 Electronic Warfare in Operations. US Department of the Army, February 2009

Opportunities and Threats for the SANDF



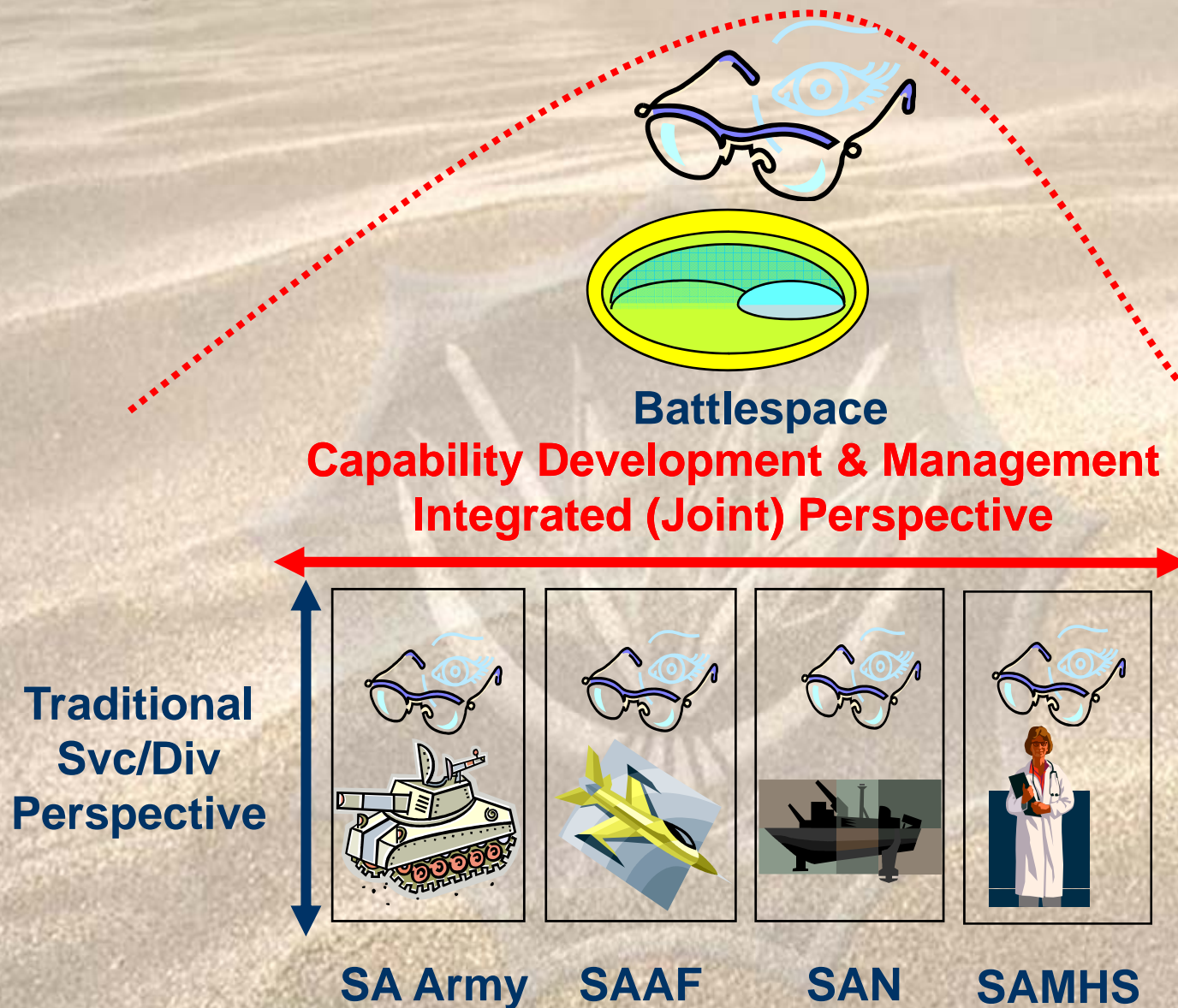
Utilising trade-off studies to better decision making

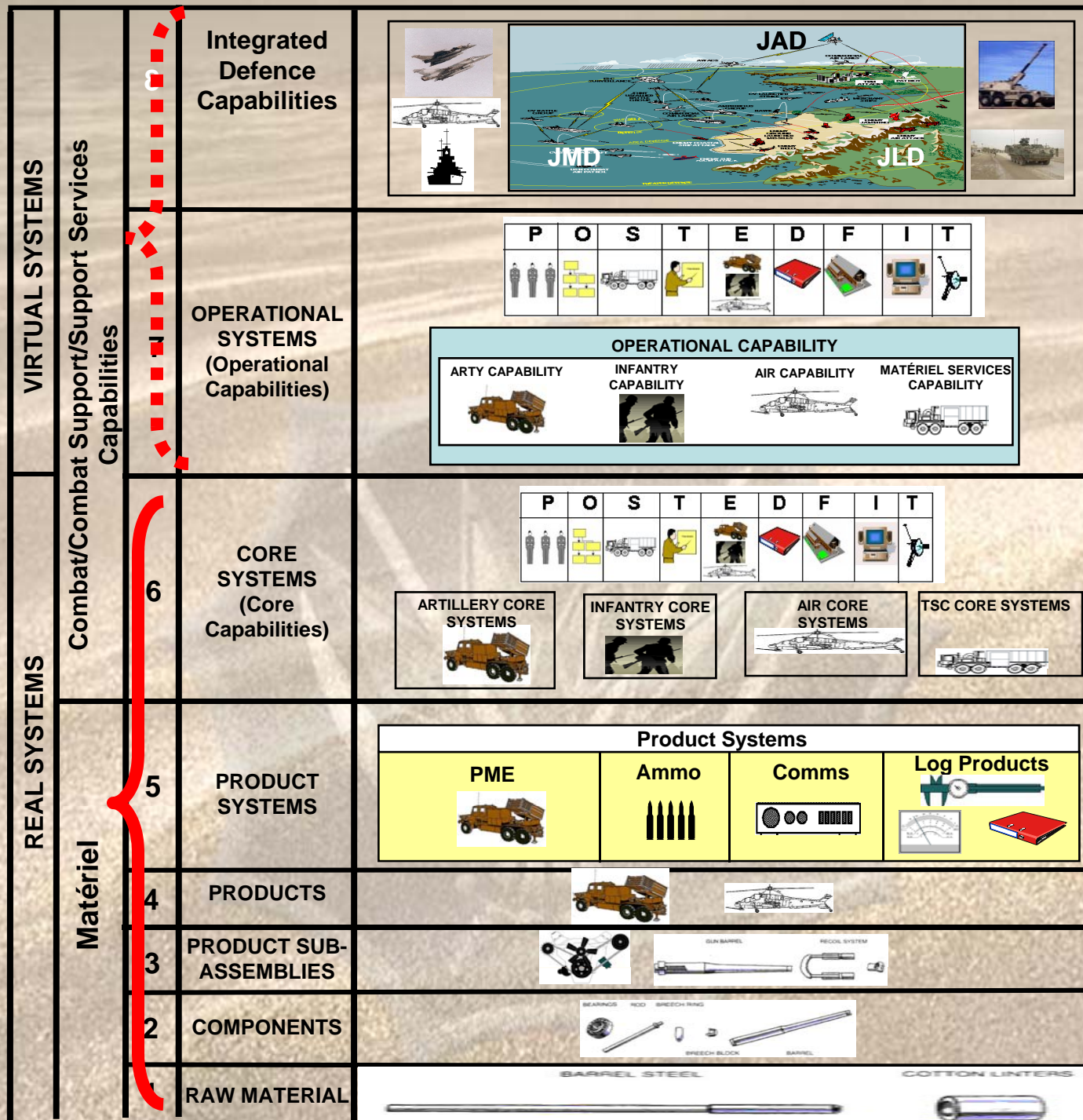




Integrated Requirements

Integrated (Joint) Perspective

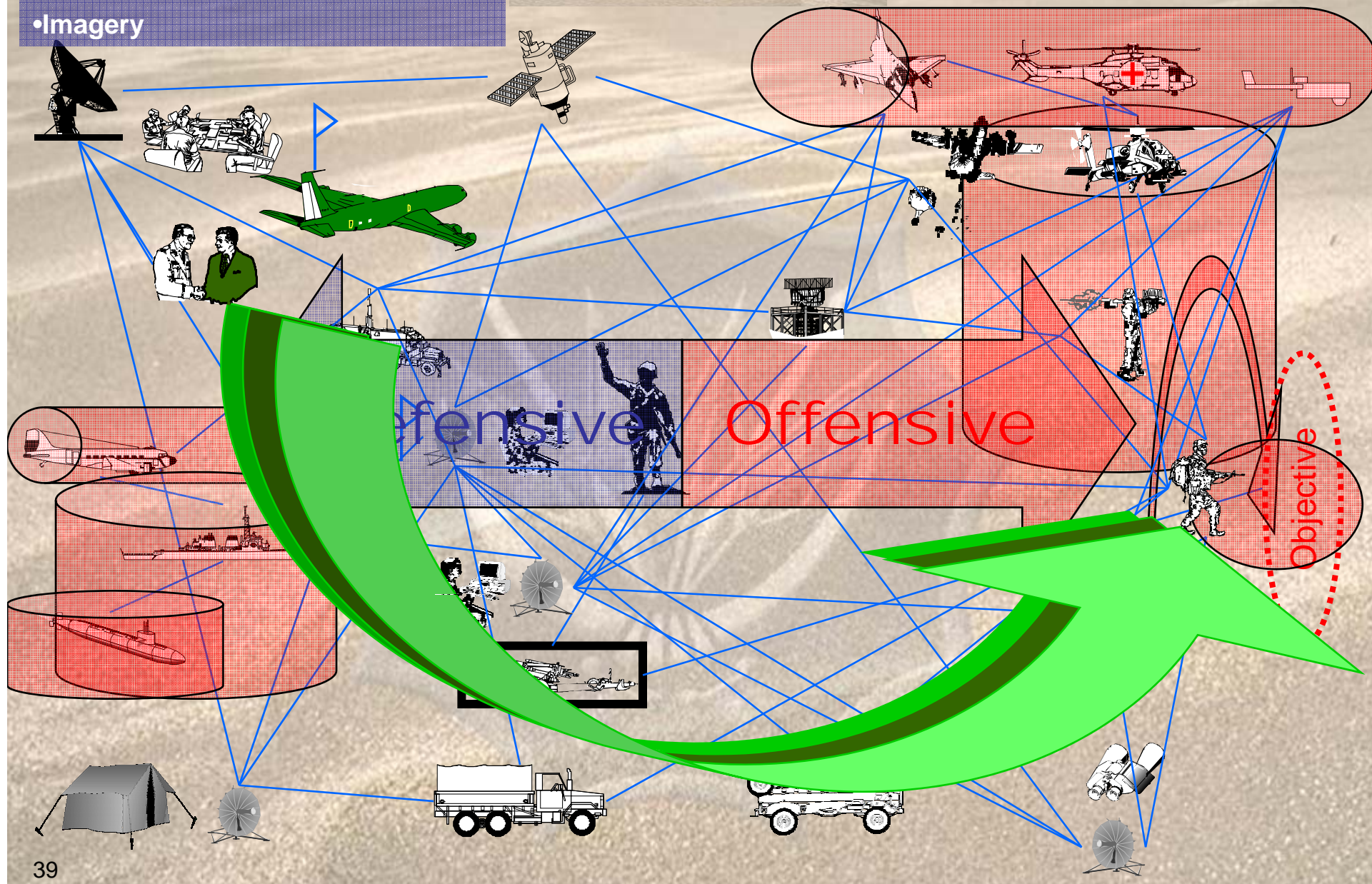




All blue lines can consists of either:

- Voice
- Text
- Imagery

Reality



Example of Capability Requirements

Table XI-1. Functional Capabilities Needed—Electronic Warfare

Mapping	Functional Capabilities	Operational Capability Elements									
		Electronic Attack						Electronic Protection	Electronic Warfare Support		
		Attack Warning	Aircraft Protection	Ship Protection	Land Combat Vehicle Protection	C ² Attack	Lethal SEAD		Signal Collection	Emitter ID/Location	Battlespace Awareness
1. Real-Time Threat Detection, ID, and Geolocation		●	●	●	●	●	●	Not addressed in this Joint Warfighting S&T Plan	●	●	●
2. Missile Approach Warning		●	●	●	●		●				●
3. Modular, Programmable EW Receiver/Processor		●	○	○	○	●	●		●	●	●
4. Sensor/Data Fusion, Electronic Intelligence		●	●	●	●	●	○		●	●	●
5. Decoy Terminal Threat Weapons			●	●	●		●				
6. UAV EW Employment		○	●	●	●	●	●		●	●	●
7. Robust, Multispectral EA of Simultaneous Threats			●	●	●		●				
8. Broadband, Coherent, Surgical RF Countermeasures			●	●	●	●	○				
9. Second-Generation Directed IRCM			●	●	●						
10. Laser-Based IRCM			●	●	●						
11. Counter IADS Surveillance, Acquisition, and C ²			●	●	●	●	○		○	○	○

● Strong Support

○ Moderate Support

Source: US Joint Warfighting Science and Technology Plan, Chapter XI, Electronic Warfare



Conclusion

The EW Challenges

- Exponential technology growth – high levels of unpredictability and uncertainty
- Today, military only; tomorrow, off-the-shelf
- Finding focus with limited resources
- Leveraging limited capabilities
- Need for a System of systems approach
- Increased protection requirement

Key Requirements for SANDF

- Secure communications
- Secure C2 and computer networks
- Encryption/decryption
- Electronic surveillance
- Disruption/jamming
- Advanced signal processing
- Deconfliction of EW spectrum
- Realisation of interoperability requirements



How can I guarantee the basics?

- The most basic communication requirements for dismounted soldiers are to know (1) their own location, (2) the location of friends, and (3) the location of enemies.
- Can we guarantee even that for the next decades?



Questions/Discussion