Collaboration opportunities for EW & NW in next generation warfare and defense

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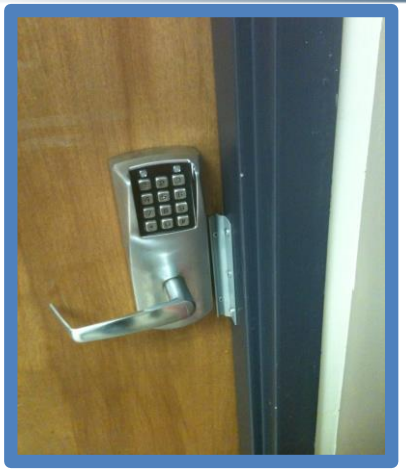
our future through science

Agenda

- Flashback: How did we get here?
- Role of Electronic Warfare (EW) and Network Warfare (NW)
- Current EW and NW situation
- Collaboration opportunities
- A possible approach to start collaboration
- Conclusion

Flashback: How did we get here?



Role of EW and NW

- EW – Clear focus on the electromagnetic spectrum (EMS).
  - Deny the use of EMS for the enemy
  - Allow own forces free use

- NW – Clear focus on information systems
  - Exploitation of enemy information systems
  - Defence of own systems

Current situation

- EW has a formalized structure with clear constant capabilities
- NW has a formalized structure, but technology and capabilities are constantly changing
- Significant overlap between EW and NW, but hard to formally define
  - EMS is a common denominator
  - OSI layers also provides commonalities
- Both EW and NW see the possibility of collaboration but barrier to entry is high
  - Significant knowledge domain differences

Collaboration opportunities (1)

Enemy information systems will not always be remotely accessible:

- Requires closer proximity to attack
- Location detection is currently not a focus point in NW
- EW can assist with direction detection, range increase and domain knowledge


Oncangwa
Katima Mulilo
ZIMBABWE
Tsumeb
Grootfontein
Outjio
Otjiwarongo
NAMIBIA
BOTSWANA
Okahandja
Gobabis
Usakos
Swakopmund
Walvis Bay
WINDHOEK
Rehoboth
Beitbridge
Messina
MOZAMBIQUE
Pietersburg
Phalaborwa
Readiness:
87%
Operational: 100%
Readiness:
23%
Operational: 60%
TARGET
PRETORIA
Witbank
JOHANNESBURG
Nelspruit
MBABANE
SWAZILAND
Ermelo
Aus
Keetmanshoop
Hotazel
Kuruman
Sishen
Upington
Karasburg
Kroonstad
Welkom
Newcastle
Vryheid
Bethelehem
Levurrisa
Readiness:
Unknown
Operational: 100%
Kimberley
BLOEMFONTEIN
Ladysmith
Richards Bay
MASERU
LESOTHO
Pietermaritzburg
Durban
Springbok
Prieska
De Aar
Aliwal North
Kokstad
Port Shepstone
Bitterfontein
Calvinia
Victoria West
Umtata
Port St. Johns
ATLANTIC OCEAN
INDIAN OCEAN
Beaufort West
Graaf Reinet
Bisho
East London
Saldanha
Oudtshoorn
Grahamstown
Paarl
Worcester
George
Knysna
Port Elizabeth
CAPE TOWN
Stellenbosch
Mossel Bay

Collaboration opportunities (2)

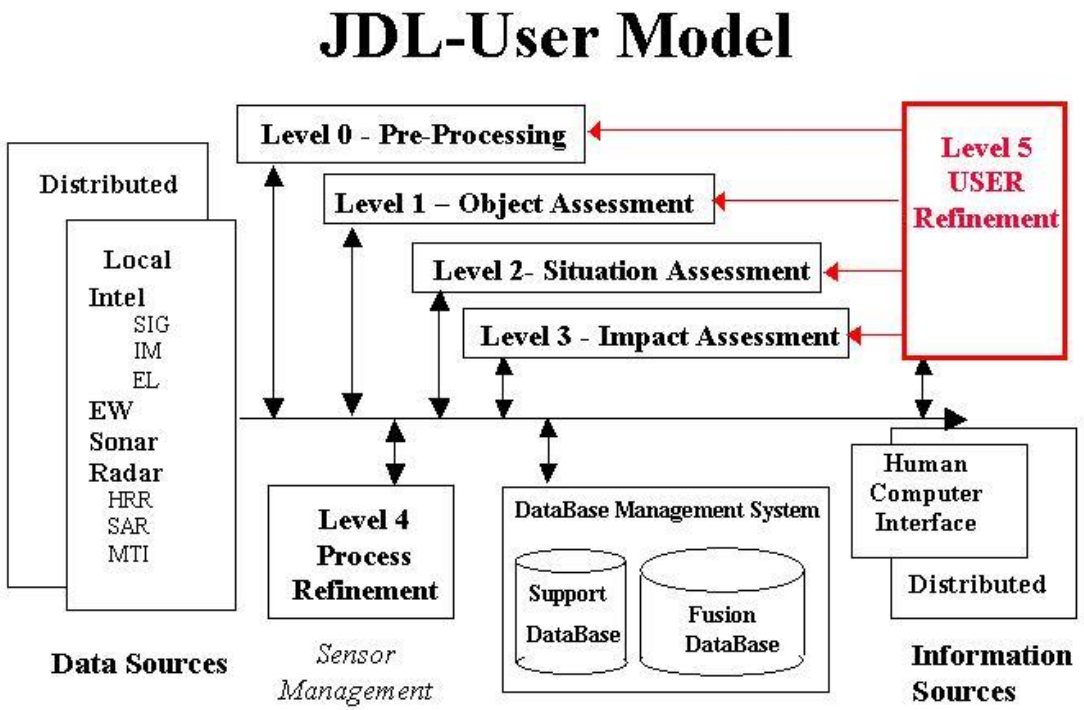
- Cyber ranges are used to test NW attacks e.g. Internet simulator but does not typically take EW capability into consideration
- Test operations prove EW capability, but does not typically take NW capability into consideration

- Consideration and inclusion of both fields in testing can stand to:
  - Extend the available attack surface for both EW and NW
  - Increase testing network fidelity

Collaboration opportunities (3)

- Multi sensor data fusion
  - Joint Directors of Laborator (JDL) model
  - Waltz model

- EW has a long history of successful data fusion
- NW has a volume of data that requires increased processing



Collaboration approaches

- Software Defined Radio (Prof Warren du Plessis)
  - Demonstrated decoding capability of commercial aircraft signals
  - Decoding of Automatic Identification Systems (AIS)
  - Decoding images from weather satellites
  - Decoding cellular signals, LTE included
  - Wi-Fi signal location and interception
- Low cost, cross platform and readily available

Conclusion

- The line between seemingly different domains are not always clearly defined
- It is however clear that the complexity present requires a multifaceted approach to effectively solve
- EW and NW have complementary roles, increased collaboration will only serve to enhance the effective capability of both pillars

Questions or comments?