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ASSOCIATION OF OLD CROWS

Electronic Warfare in the Intelligence for Operations Environment

Lt Col Quinton Dickson

Introduction

- Many great minds work hard to develop the technology the SAAF uses in the field, in operations – “Where the tyre meets the tar”.
- Electronic warfare (EW) is one of those technologies that is not often spoken about. It is kept “secret”, as it depends – more often than not- on this secrecy to be effective.
- We need to look at what EW really means to operations, even in military operations other than war.
- Military Intelligence is intimately linked with the conduct of operations, and indeed the conduct of EW.
- Intelligence for Operations therefore has a deep interest in what EW can offer.
- The fact is EW is something we cannot afford to ignore…

Introduction

- The SAAF now operates in a diverse environment, with many potential threats, ranging from MANPADS to AAA, to formidable fighter aircraft. Now, more than ever, the SAAF needs to leverage the advantage EW support can give. But is enough attention and emphasis being given to EW and the important roles it has within the intelligence environment?

Intelligence for Operations

- Who are these Intelligence for Operations folk?
  - Intelligence for Operations (IOPS) is the nerve centre of tactical (and operational level) intelligence in the South African Air Force.
  - Based at the Air Force Command Post (AFCP).
  - Centralised controller of the SAAF sensors and reconnaissance capabilities
    - Image Intelligence.
    - Electronic Warfare.
      - Airborne – C47-TP (EW), Oryx Jammers (OCJ/ORJ).
      - Ground Based – Mobile Ground SIGINT System (MGSS).

Aim

- To examine the value of EW as a force multiplier for the SAAF in operations and how Intelligence for Operations can leverage it.

Scope

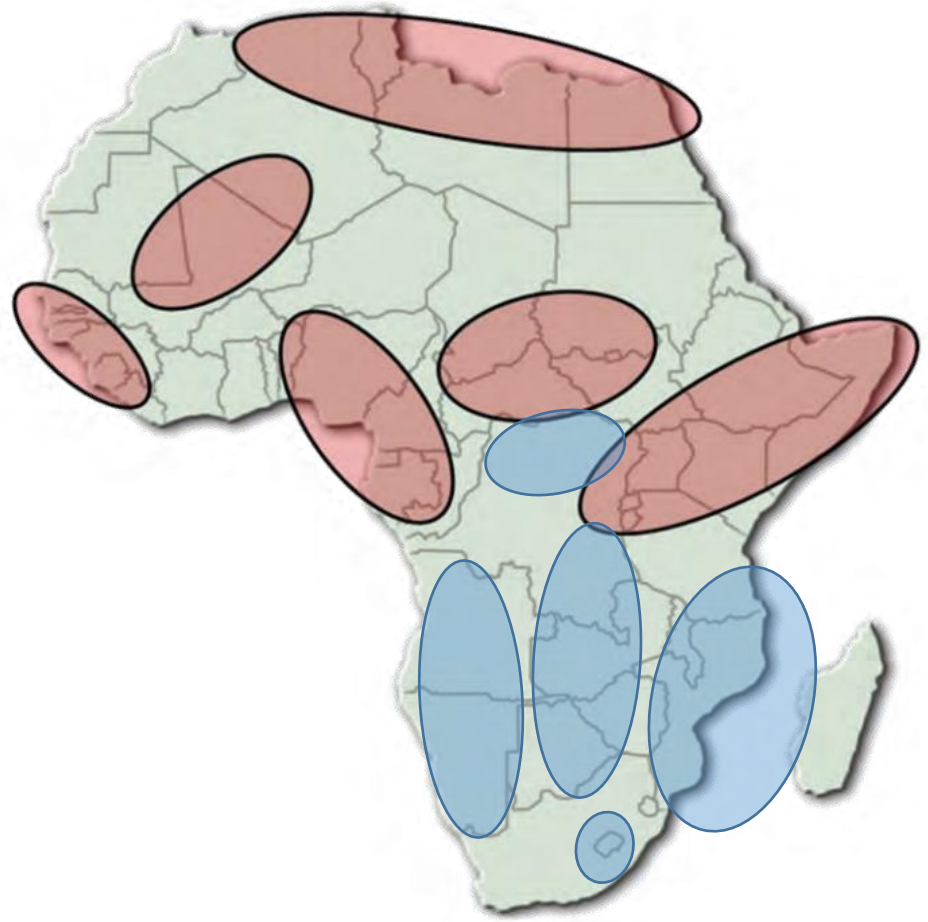
- SAAF operations in Africa (and the world)
- EW threats the SAAF has encountered
- SIGINT (very brief…)
- ECM: Jamming (also very brief…)
- Lessons learned
- The future

SAAF Operations in Africa

- Air Power has a number of attributes that make it so useful:
  - Quick reaction
  - Reach
- This means the SAAF could be deployed to just about any location on earth at short notice…
- An intelligence officers nightmare but also an indication that SAAF aircraft can and will be exposed to any number of threats – including significant EW ones…

SAAF Operations in Africa

- Hot spots per the Defence Review 2015 (in red).
- Some recent SAAF areas of operation/exercises (in blue).
- VVIP aircraft also often journey to trouble spots in the African region on diplomatic missions.
- The SAAF regularly flies in Africa:
  - C-130
  - Oryx
  - Rooivalk
  - Casa
  - King Air
- Gripen/Rooivalk on CAR standby.



SAAF Operations in Africa

- General Aerospace Intelligence
  - Who has what?
  - And where?
  - And how much?
  - What is their intent?
- Technical intelligence:
  - What is the performance data of the potential threats?
  - What countermeasures are there?

SAAF Operations in Africa

- In view of the fact that SAAF aircraft could be in a number of high threat environments, particularly in Africa ensuring the safety of crew and aircraft is of great importance.
- We go about this by looking at what are the potential threats.
- Then we look at how we can combat against these.
- Then we get worried and depressed…
- The reality is Africa can be a dangerous place to fly. There is risk. A lot of risk. Fortunately good training, awareness of potential threats and countermeasures can help.
- But it not that simple of course. Many challenges stand in the way of this.

EW threats the SAAF has encountered

- The civil war of Libya – 2011
  - The 17 February Revolution in Libya in 2011 had a profound effect on the illicit arms trade, and the consequences of this still affect us today.
  - As a result of this a proliferation of MANPADS filtered in the African region – Central Africa being a natural area of such trade.

#WORLD NEWS MARCH 11, 2014 / 8:51 PM / 4 YEARS AGO

Shoulder-launched anti-aircraft missiles flow abroad from Libya: U.N.

Michelle Nichols 5 MIN READ

UNITED NATIONS (Reuters) - Shoulder-launched anti-aircraft missiles have been trafficked out of Libya to Chad, Mali, Tunisia, Lebanon and likely Central African Republic, with attempts made to send them to Syrian opposition groups, according to a U.N. report on Tuesday.

An independent panel of experts monitoring U.N. sanctions on Libya, that include an arms embargo imposed at the start of the 2011 uprising that ousted leader Muammar Gaddafi, reported that the weapons, known as MANPADs, that were found in Mali and Tunisia "were clearly part of terrorist groups' arsenals."

"Despite efforts by Libya and other countries to account for and secure MANPADs in Libya, Panel sources state that thousands of MANPADs were still available in arsenals controlled by a wide array of non-state actors with tenuous or non-existent links to Libyan national authorities," the experts

EW threats the SAAF has encountered

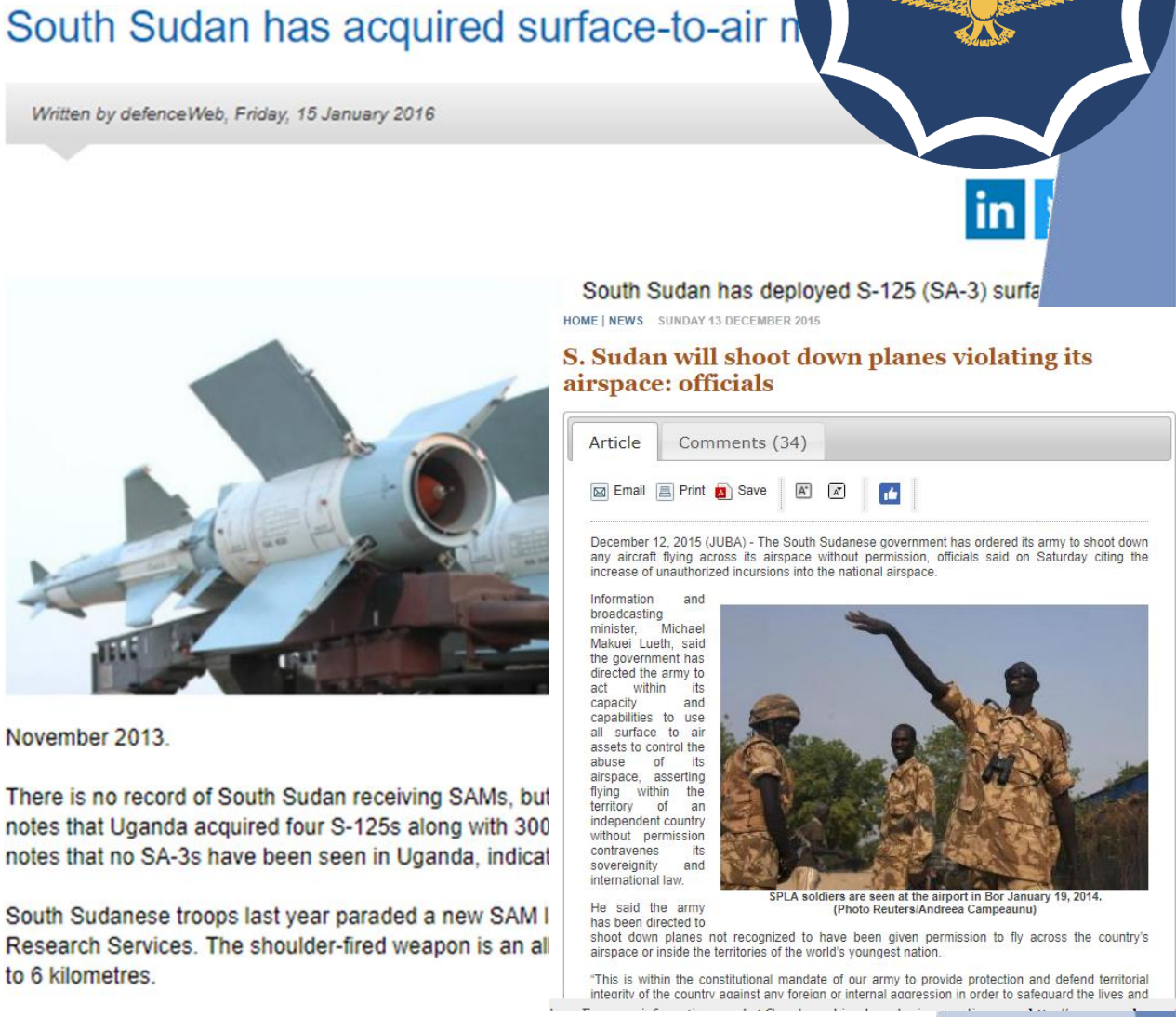
- MAWS alerts…aka the importance of reliable warning systems
- A MAWS defends against the launch of passive IR missiles, such as MANPADS. Reaction time is critical and these systems allow an automated response (ECM) to protect the aircraft being targeted.
- These systems need to be as reliable as possible, and false alarms kept to the minimum (or not at all).
- Otherwise it gets turned off…
- *“Intelligence regarding the whereabouts of MANPADS, especially in the hands of "non state" organizations, is usually vague and unreliable. This, in turn, makes it difficult to anticipate where and when to expect MANPADS attacks.”*

EW threats the SAAF has encountered

- South Sudan and the SA-3
- ”…according to IHS Jane's Defence Weekly, which analysed satellite data to reveal that South Sudan has had the S-125 missiles since at least 2013.

  Digital Globe satellite imagery shows 16 5P71 two-rail missile launchers for the S-125 system and support vehicles parked at a military camp 20 km southwest of the capital Juba on 9 June 2015, IHS Jane’s said, adding that this suggests South Sudan has four S-125 batteries each with four launchers, supported by an unidentified surveillance radar. The camp was built between March and November 2013…”

- South Africa has been and will continue to be involved in South Sudan at some level at least (e.g. diplomacy -> VVIP missions).
- South Sudan air space and the threat to shoot down aircraft violating their sovereign air space.



South Sudan has acquired surface-to-air m

Written by defenceWeb, Friday, 15 January 2016

November 2013.

There is no record of South Sudan receiving SAMs, but notes that Uganda acquired four S-125s along with 300 notes that no SA-3s have been seen in Uganda, indicat

South Sudanese troops last year paraded a new SAM I Research Services. The shoulder-fired weapon is an all to 6 kilometres.

South Sudan has deployed S-125 (SA-3) surfa

HOME | NEWS SUNDAY 13 DECEMBER 2015

S. Sudan will shoot down planes violating its airspace: officials

Article Comments (34)

Email Print Save

December 12, 2015 (JUBA) - The South Sudanese government has ordered its army to shoot down any aircraft flying across its airspace without permission, officials said on Saturday citing the increase of unauthorized incursions into the national airspace.

Information and broadcasting minister, Michael Makuei Lueth, said the government has directed the army to act within its capacity and capabilities to use all surface to air assets to control the abuse of its airspace, asserting flying within the territory of an independent country without permission contravenes its sovereignty and international law.

SPLA soldiers are seen at the airport in Bor January 19, 2014. (Photo Reuters/Andreea Campeaunu)

He said the army has been directed to shoot down planes not recognized to have been given permission to fly across the country's airspace or inside the territories of the world's youngest nation.

"This is within the constitutional mandate of our army to provide protection and defend territorial integrity of the country against any foreign or internal aggression in order to safeguard the lives and

EW threats the SAAF has encountered

- The proliferation of MANPADS in the Central African region
  - South Sudan
    - SPLM 2014/15: Chinese QW-2.

QW-2 MISSILE WEAPON SYSTEM

The QW-2 is a new generation of man-portable IR passive homing anti-aircraft missile weapon system, Which is used to intercept invading fighters, attackers, armed helicopter, unmanned reconnaissance aircraft and cruise missile at low and very low altitude to carry out field battle or critical area air defense.It has excellent detective capability, guidance accuracy, target destroying capability, night operation performance as well as very easy, simple and reliable operation advantage.The most outstanding is that the latest anti-infrared interference technology is applied to the system, therefore the missile can be used effectively against every kind of artificial IR jammers and IR flares in the course of firing and attacking.

1.Leading features

- Larger attacking zone
- Excellent anti-jamming ability
- Direct aiming and firing
- Effective initial guidance
- Fully new terminal guidance
- Accurate guidance
- Powerful lethality
- Firing motor left in tube
- Effective night operation

Missile weight	11kg
Missile length	1,590mm
Missile diameter	72mm
System weight	18.4kg
Environment temperature	-40~+55℃
Service life	10 years

- Anti-jamming capability
  against background jamming
  against electromagnetic ware
  against artificial IR jammer
  against artificial IR flares
  against jamming actively
  against jamming in the whole procedure
  against jamming continuosly
  against multipie flares

2.Main tactical and technical specifications

Max. target speed	400m/s (head-on) 320m/s (tail-on)
Target altitude	10~ 4,000m
Target slant distance	500~ 6,000m
Time ready to fire	less than 5s
Missile speed:	more than 25m/s 600m/s(at endurance)
Single shot killing probability	75%
Manouverable overload:	16g(average) 18g(max.)

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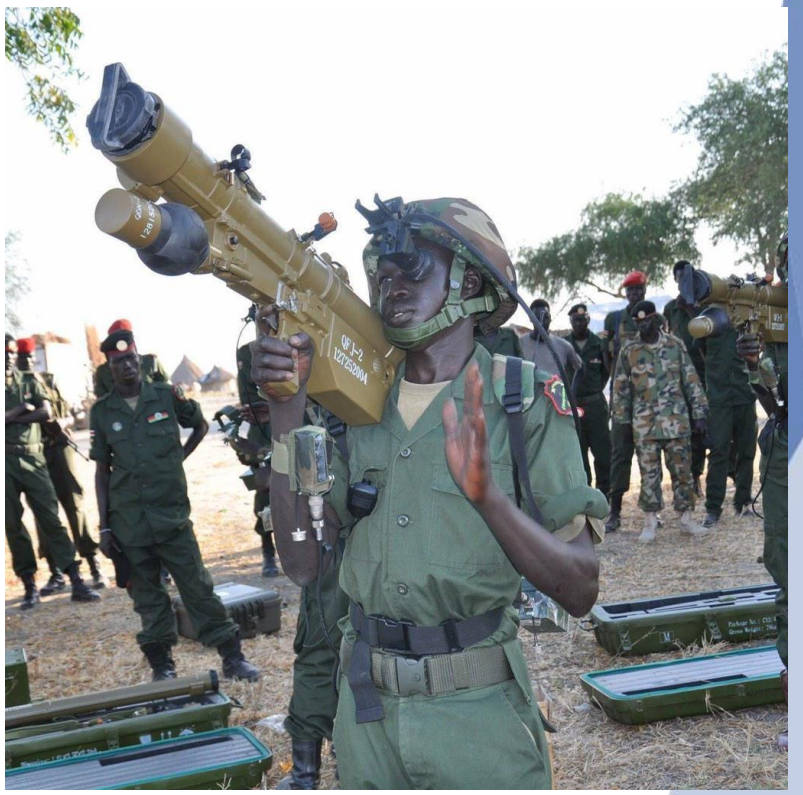


EW threats the SAAF has encountered

- The proliferation of MANPADS in the Central African region
  - South Sudan
    - SPLM 2016: Chinese FN-6.

South Sudan army admits acquisition of surface-to-air missiles

Article | Comments (47)

Email | Print | Save

January 2, 2016 (JUBA) - The Sudan People's Liberation Army (SPLA), an official army of South Sudan, has admitted to have recently acquired supplies of shoulder-fired surface-to-air missiles brought through the neighboring countries of Kenya and Uganda, prompting United States government to warn its citizens of danger to fly in South Sudan.

A high ranking military officer in the army and a longtime military ally of President Salva Kiir told *Sudan Tribune* on the New Year Eve that the army had obtained dozens of shoulder missiles, which were delivered to them via neighbouring Mombasa port of Kenya through Uganda.

Chinese shoulder fired surface to air missiles known as FN-6 (Photo APL-Chine.com)

"Yes, our military defense system will never remain the same. There is a great improvements in terms of weapons and training and we hope that the year 2016 will be a year in which the general command and the government will pay a significant attention to our strategic and master plan to modernize and professionalize the army in order to be a conventional army capable of defending the country, lives of our people and their resources," said the high ranking military officer on Friday.

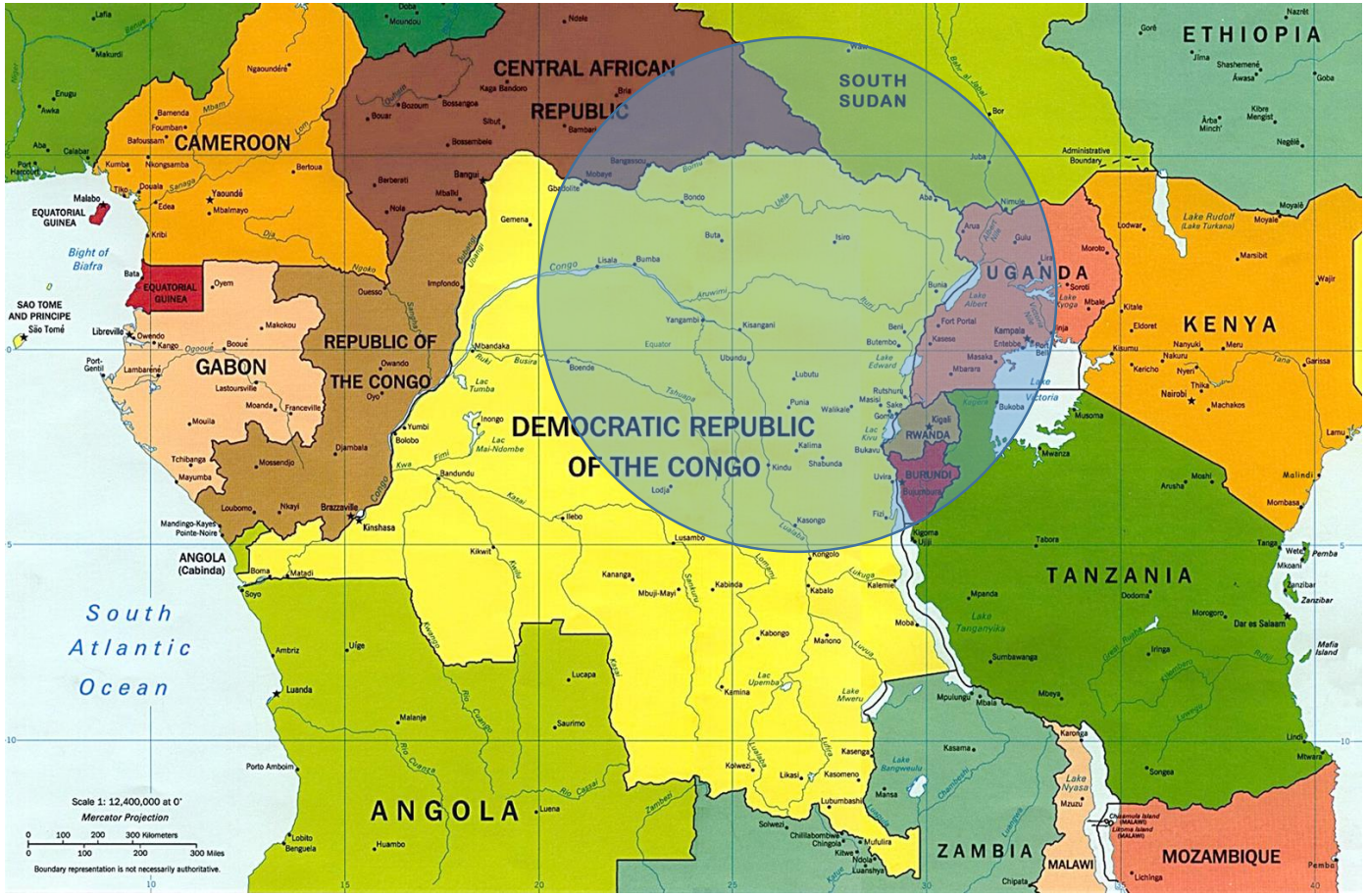
The original source of supply remains unclear, although critics of the government of president Kiir have pointed fingers to China, which is widely believed to have in the past sold huge consignments of assorted weapons, including amphibian tanks to help the government fight the rebels allied to the former vice-president, turned armed opposition leader, Riek Machar.

EW threats the SAAF has encountered

- The proliferation of MANPADS in the Central African region
  - South Sudan
    - 2014 9K310 Igla-1.
      (NATO designation: SA-16 Gimlet)
      Rebel forces. SPLM-IO?

EW threats the SAAF has encountered

- The proliferation of MANPADS in the Central African region



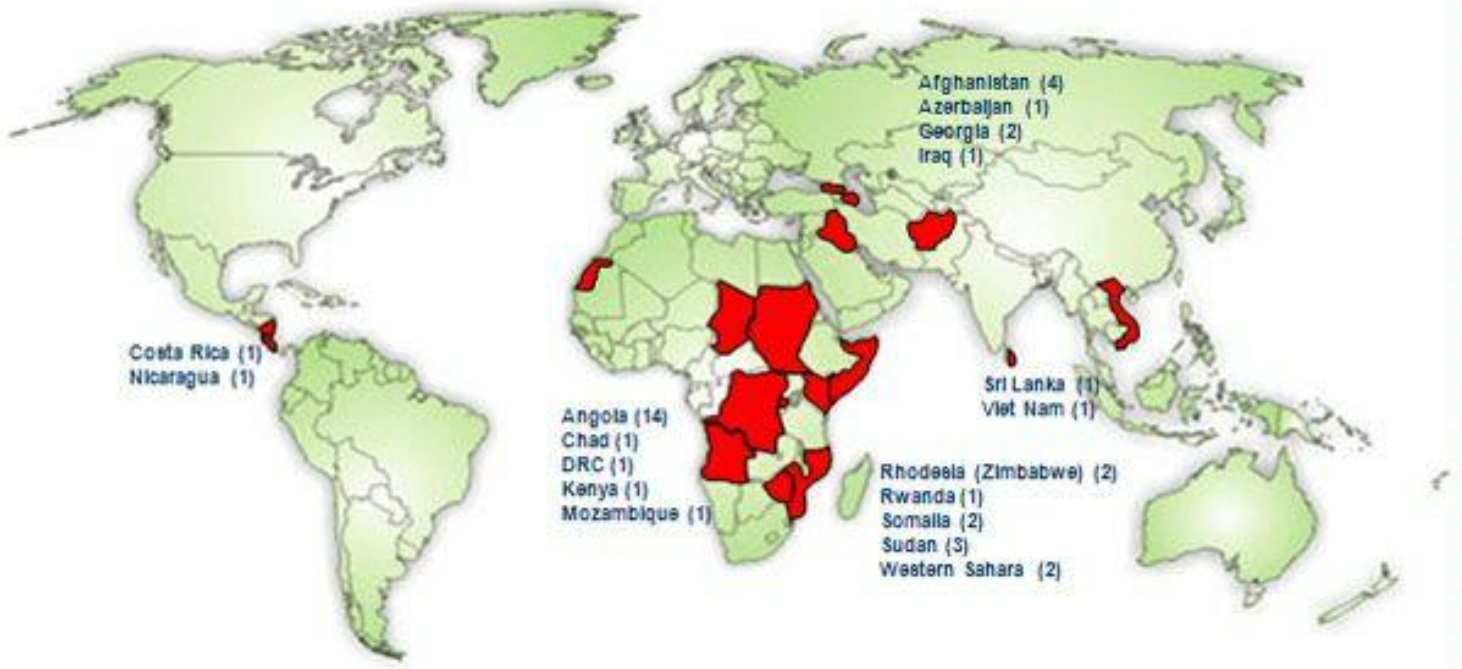
EW threats the SAAF has encountered

- The DRC SA-16 discovery
  - In 2016 FARDC forces operating in the northern regions of the DRC reported finding a SA-16.
  - This was not a complete system, missing a battery, but this was still a great point of concern.
  - The SAAF regularly operated aircraft in this region and such a threat cannot be ignored – you need to be aware of even the potential of such a threat and you need to be able to reduce the risk of such an attack.
    - What is the intention to use this against the SAAF by armed groups?
      - The success of the Rooivalk may be an important consideration here.
  - Add this to the ubiquitous nature of MANPADS in the region.

EW threats the SAAF has encountered

- The proliferation of MANPADS in the Central African region
  - Burundi/Rwanda
  - Central African Republic
  - Etc, etc, etc

- The risk of MANPADS being used can perhaps be illustrated by this map of civilian aircraft downed by such missiles since 1975.
- From an IOPS point of view one cannot dismiss this and this underlines, again the critical importance of EW – and it's links to the intelligence picture.

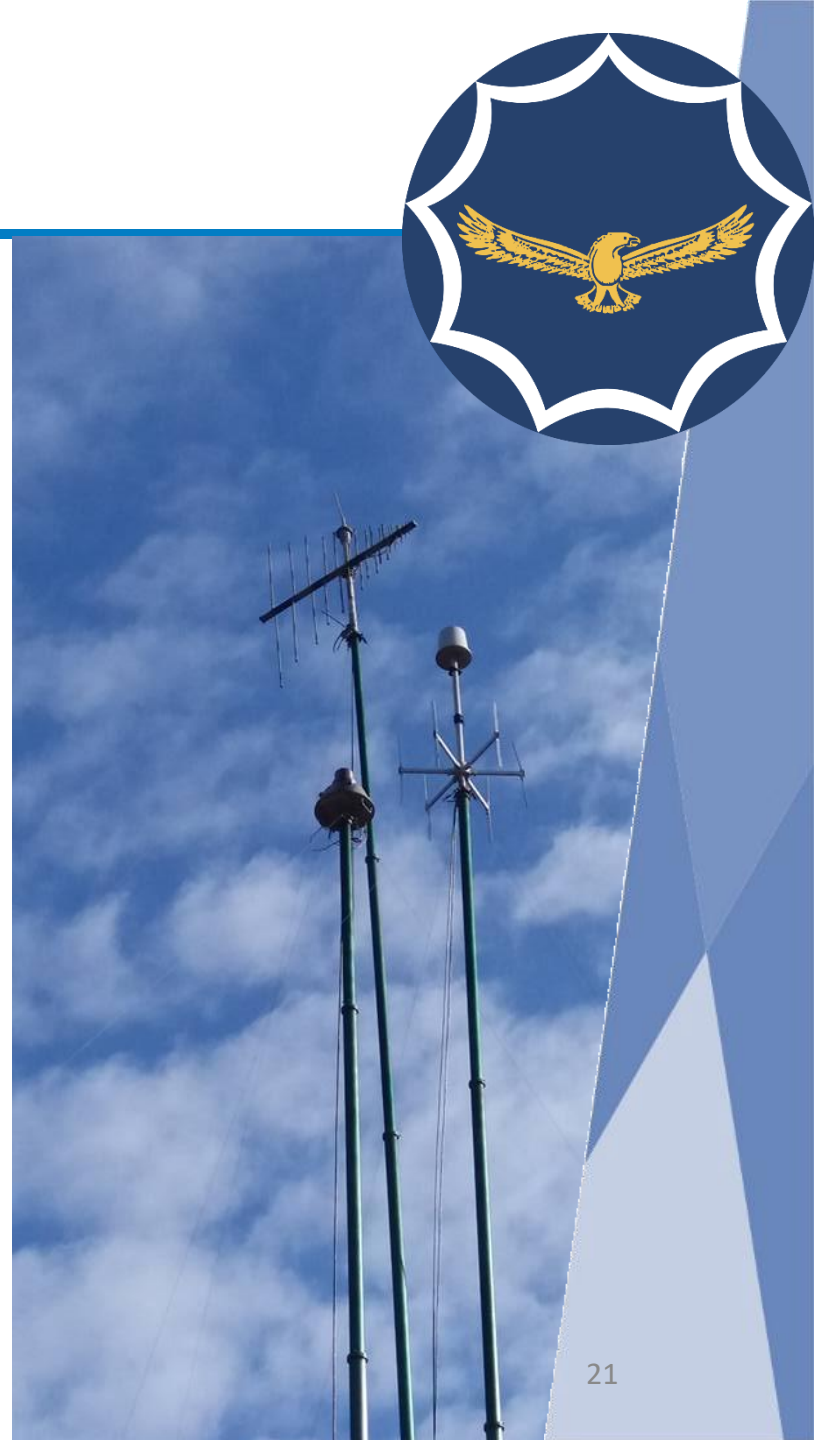


SIGINT

- The SAAF has maintained a SIGINT capability to this day, but it remains constrained and limited by budget. Nonetheless, it can still be valuable in the field of operations, especially on the tactical level, making a valuable contribution towards early warning (immediate threat cell), situational awareness and even on a more strategic level.
- ELINT and COMINT are catered for on both ground and air platforms.

SIGINT

- Mobile Ground SIGINT System (MGSS)



SIGINT

- C47-TP (EW)
  This is a training platform though…

ECM: Jamming

- The SAAF has some tactical ECM capability in terms of communications and radar jamming:
  - OCJ (Oryx Communications Jammer)
  - ORJ (Oryx Radar Jammer)

Other EW capable aircraft

- The SAAF has some latent EW capabilities in the form of the SA Navy's Super Lynx and the Gripen.
- These are future areas that can be examined for exploitation.

Lessons Learned

- EW is a critical aspect of air power
- Up to date and relevant technical intelligence is essential to combat threats
- SIGINT can be leveraged far more than currently.
- SAAF personnel need to be exposed far more to the world of EW.
- Smaller, more portable SIGINT systems are a good idea.
- Research and development and looking at emerging trends and technologies are essential to maintain capabilities.

The Future

- Trends:
  - More involvement in SADC/AU missions.
  - Budgetary constraints – both will impact EW and Intelligence.
  - Technology levels are increasing commensurate with the threat levels.
- The importance of the various fields of EW will increase as a force multiplication and protection element of SAAF operations.
- The SAAF will encounter more EW hostile environments and needs to be adequately prepared.
- Local industry will be an essential component in ensuring the SAAF has a continued EW capability.
- Local research and development of EW needs to work with the intelligence communities.
- Drones as an EW platform.
- EW and Cyber will become more closely associated.

Conclusion

- EW is a crucial aspect in the conduct of Intelligence for Operation in the SAAF.
- There is opportunity to leverage EW capabilities to a far greater extent.
- The intelligence and EW communities need to cooperate more closely and raise awareness of the need to create better capabilities.
- Effort needs to be maintained to preserve and grow local EW capability.
- The EW threat is real and growing. The SAAF cannot afford not to acknowledge this and ensure it is adequately equipped to deal with this.

Questions?