

# FREQUENCY SPECTRUM DISCUSSION



DENEL DYNAMICS

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# HISTORY

- Development of OTR and TFDC in the early 1980's.
- Based on the IRIG 106 Telemetry standards.
- S\_Band 2200-2400 MHz allocated for flight testing.
- Tracking antenna center frequency at 2300MHz.
- DD test equipment developed/bought around these frequencies.
- SAAF's flight test aircraft instrumented with S-Band transmitters and antenna's.
- DD weapon Telemetry 2300-2345 MHz, 15 MHz apart.
- SAAF aircraft Telemetry 2240-2285 MHz, 15 MHz apart.
- OTR 2200-2400 MHz.

# WHY DO WE NEED TELEMETRY?

- During development of airborne systems Telemetry is the core to success for data, tracking and monitor safe flight testing.
- Post analyses of real time data save time and money.
- Carriage clearance on aircrafts depends heavily on telemetry.
- Video footage became a powerfull marketing tool.
- How much total operating bandwidth?

200 MHz – Ideal for OTR

100 MHz – Ideal for DD

# AREA's WHERE WE USE TELEMETRY

- **Overberg Test Range, Arniston Western Cape.**

**Rx Station**      **MS2 and L1\_Tel**

**Altitude**      **0 – 35000 ft**

**Range**      **120 km**

- **Alkantpan Test Range, Copperton Northern Cape.**

**Rx Station**      **Klein Strandberg**

**Altitude**      **0 – 15000 ft**

**Range**      **80km**

- **TFDC and Makhado airforce bases.**

- **Denel Dynamics facility, Centurion.**

**Fly Pass take off from Denel Aviation**





# OTR



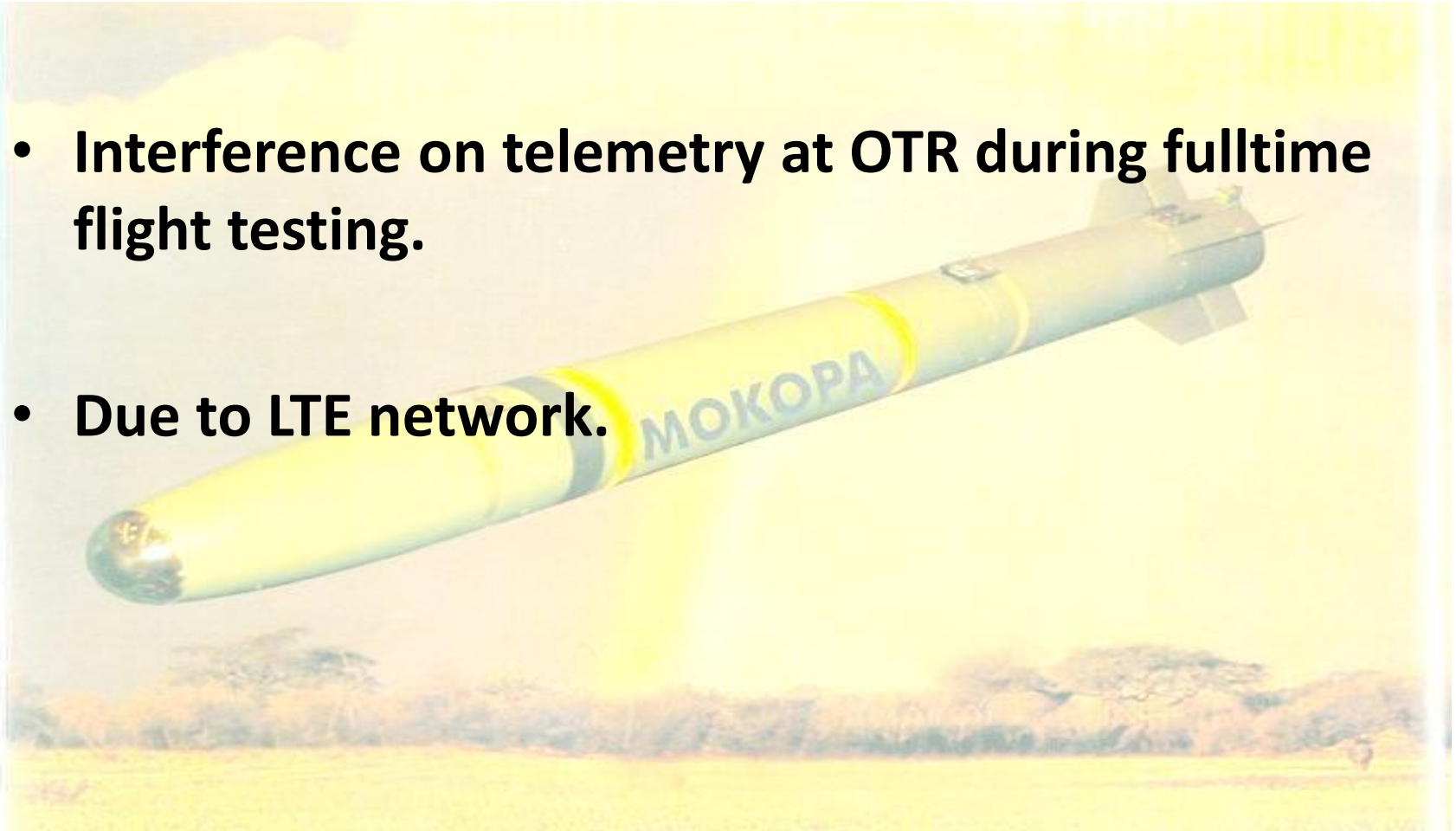
# ALKANTPAN





# PROBLEM DEFINITION

- Interference on telemetry at OTR during fulltime flight testing.
- Due to LTE network.





# POSSIBLE SOLUTIONS

- **Telkom switch off LTE. (Designated area at OTR and Alkantpan)**
- **LTE antenna pointing away from OTR area. (Reflections from mountains still too strong due to high power output.)**
- **Avoid LTE frequencies 2300 – 2360 MHz. (Possible for DD, OTR need to service overseas clients in the designated band.)**
- **Upper S-Band 2361 – 2400 MHz (DD short term solution)**
- **Lower S-Band 2200 – 2399 MHz (DD short term solution)**
- **Moving to C-Band (Lower 4.40 – 4.940 GHz)  
(Middle 5.091- 5.150 GHz)  
Long term solution  
Reluctance of flight test clients to move  
Huge capital needed  
Huge technical challenges**

# CONCLUSIONS

- Over the last 15 years DOD's all over the world has lost use of parts of the RF spectrum allocated for flight test due to sell off to the commercial sector.
- The loss of telemetry spectrum will continue to be a challenge for the foreseeable future.
- Flight test organizations such as Denel, together with authorities and commercial sector must develop policies to ensure the fair efficient use of the spectrum.