A wireframe model of an aircraft is shown against a dark background. The model is composed of a grid of white lines. Several components are highlighted in a bright green color, including a rectangular block on the fuselage and a smaller rectangular block on the tail section. The aircraft is oriented horizontally, with the nose pointing to the left.

AOC - Electronic Warfare Europe

Spectrum Dominance in a Changing World

Frank Kessler, Product Manager SIGINT and Electronic Support
15th May 2019
Stockholmsmässan, Sweden

Agenda

00 Motivation

01 Challenges in a changing world

02 Resulting problem statement

03 Technology approaches to solve it

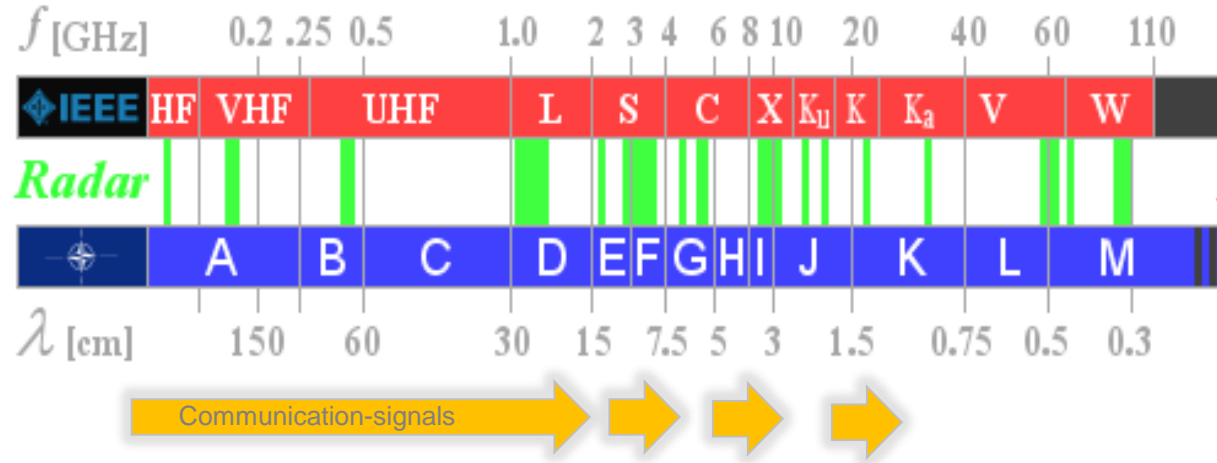
04 Conclusion

00 Motivation

- **GET HOME SAFE**
- **Enhanced survivability for platforms operating in today's contested and congested EMS environments is key**
- **Today's EMS for Radar EW is a complex, very dense and high dynamic mixture of different signal types, from military and civil sources with different signal strength and distributed over a wide frequency range.**

01 Challenges in a changing world

The COMs Challenge



Statement:

The EMS is a complex mixture of different signal types.

Task: What is the signal of interest?

01 Challenges in a changing world

The COTS/MOTS Challenge



Statement: The technology cycles are going faster and faster.

Task: Provide innovative, flexible, modular MOTS product in a short time to the market

01 Challenges in a changing world

The false alarm Challenge



Source: n-tv.de, mmo/dpa

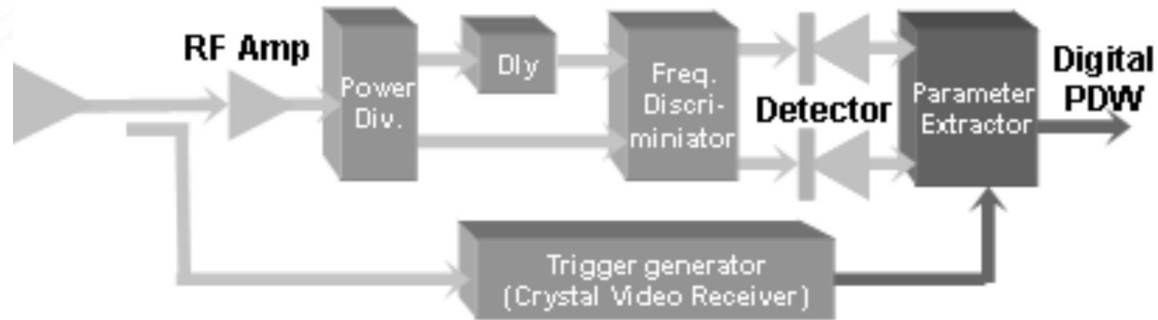
Statement: False alarms are increasing crew workload and reduce confidence towards the equipment

Task: Reduce false alarms for a reliable classification.

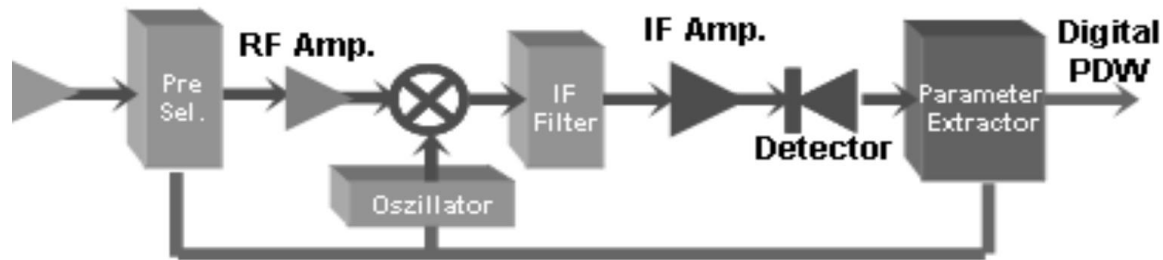
01 Challenges in a changing world

The receiver Challenge

IFM Receiver



Superhet Receiver



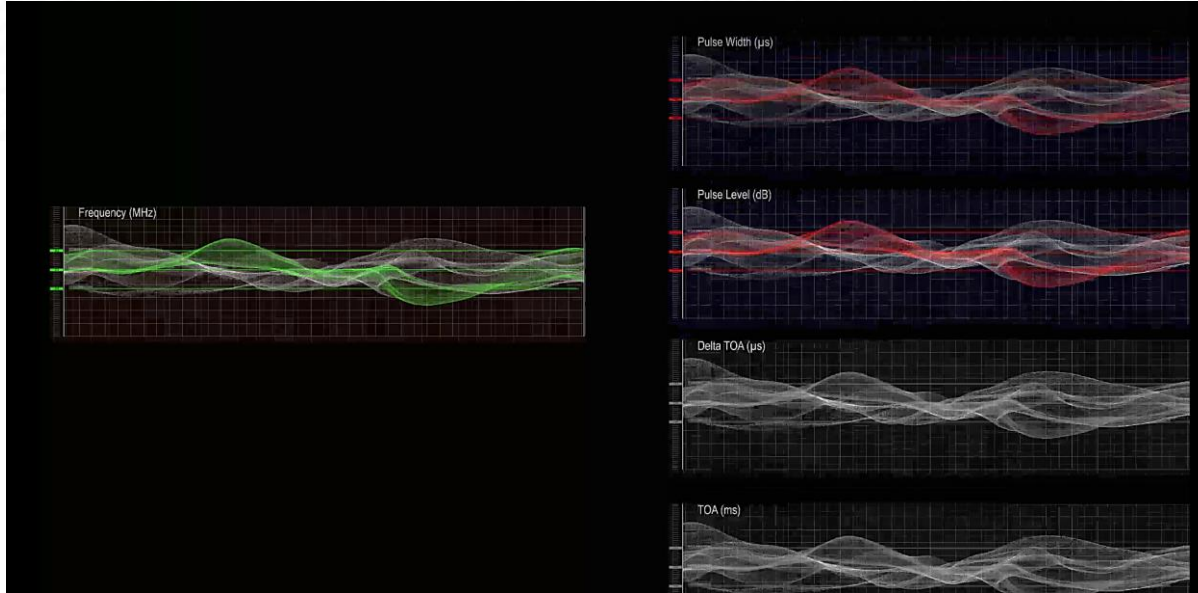
Statement: Some receivers architectures have difficulties to handle e.g. HPRF and LPRF emitters, pulse + CW

Task: Receiver required

- Highest sensitivity
- High dynamic
- High instantaneous bandwidth
- Multi signal capability

01 Challenges in a changing world

The data Challenge



Statement: The amount of data is massively increasing.

Task: Provide support tools for the operator to handle the data for the relevant information.

02 Resulting problem statement

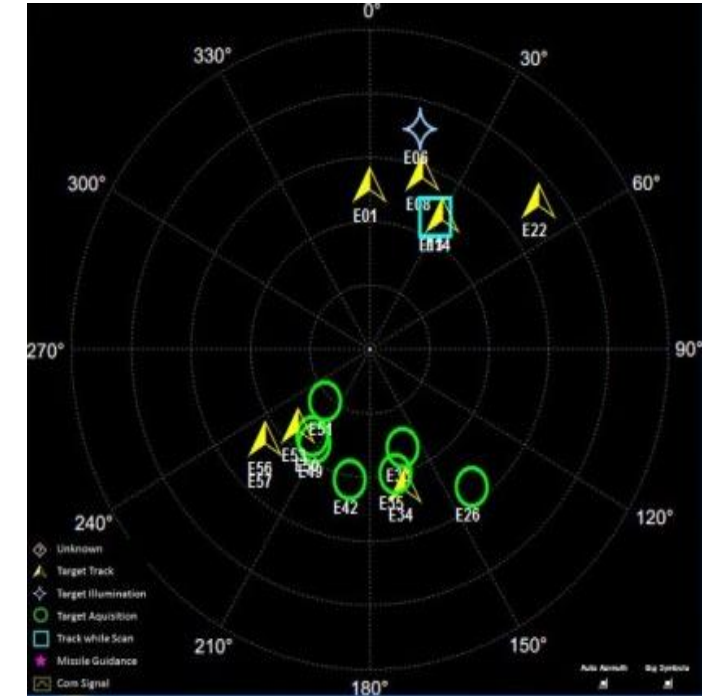
We need modular EW products for our customers demand by providing

- **COTS, MOTS solution**
- **Lowest false alarm rate**
- **Full digital solution**
- **Solution for big data handling**
- **Short time to market**

03 Technology approaches

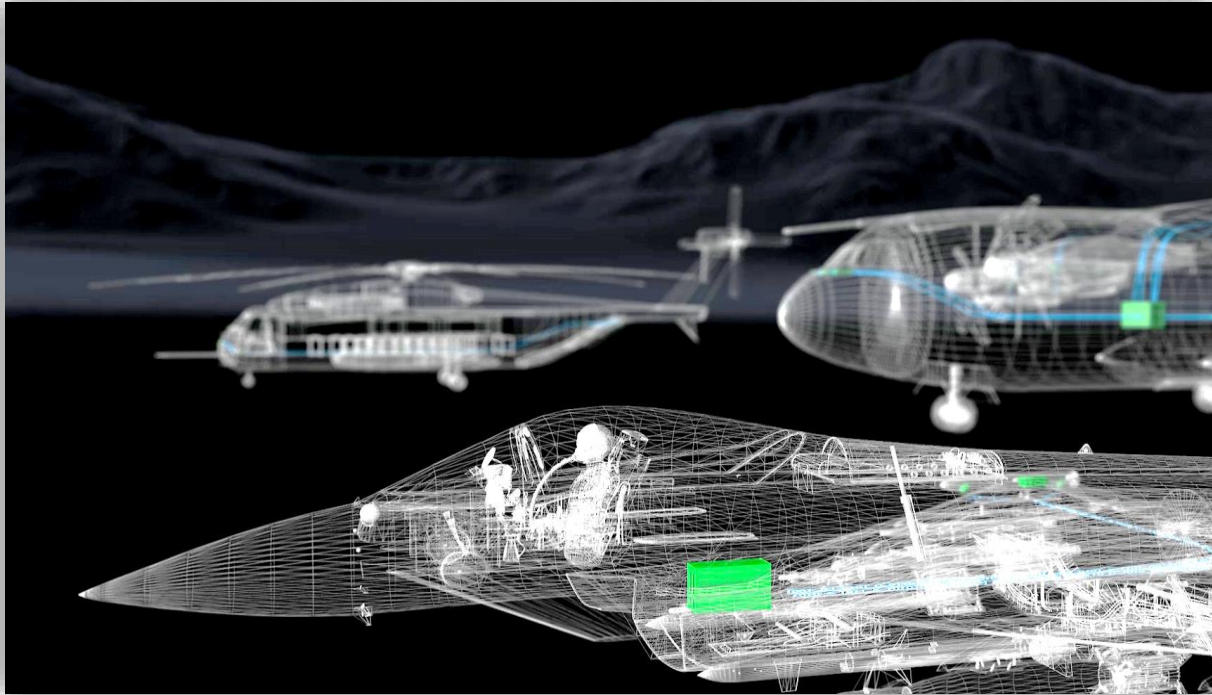
Multisignal capability: Handling of CW, Pulse, and COMS signals

Label	Mode ID	Track Duration	Confidence	Function	RF Type	RF Levels	PRI Mean
E01	1	192.16 s	100.0 %	TT	Stable	1	1450 µs
E08	9	377.36 s	100.0 %	TT	Stable	1	265 µs
E13	14	372.56 s	100.0 %	TWS	Switch	6	35 µs
E14	15	365.41 s	100.0 %	TT	Switch	7	43 µs
E33	67	353.53 s	100.0 %	TA	Jump	5	833 µs
E26	60	358.31 s	100.0 %	TA	Jump	2	4 µs
E34	68	353.50 s	100.0 %	TT	Jitter	1	330 µs
E35	69	156.64 s	100.0 %	TA	Stable	1	1966 µs
E42	76	339.24 s	100.0 %	TA	Stable	1	1027 µs
E49	83	336.96 s	100.0 %	TA	Stable	1	1027 µs
E22	23	491.07 s	100.0 %	TT	Stable	1	5 µs
E50	84	332.12 s	100.0 %	TA	Stable	1	862 µs
E51	85	325.11 s	100.0 %	TA	Stable	1	1218 µs
E53	87	322.71 s	100.0 %	TT	Stable	1	290 µs
E56	90	315.66 s	90.9 %	TT	Stable	1	192 µs
E06	7	230.26 s	100.0 %	TI	Unknown	1	CW



03 Technology approaches

Modular MOTS products



Central Processing



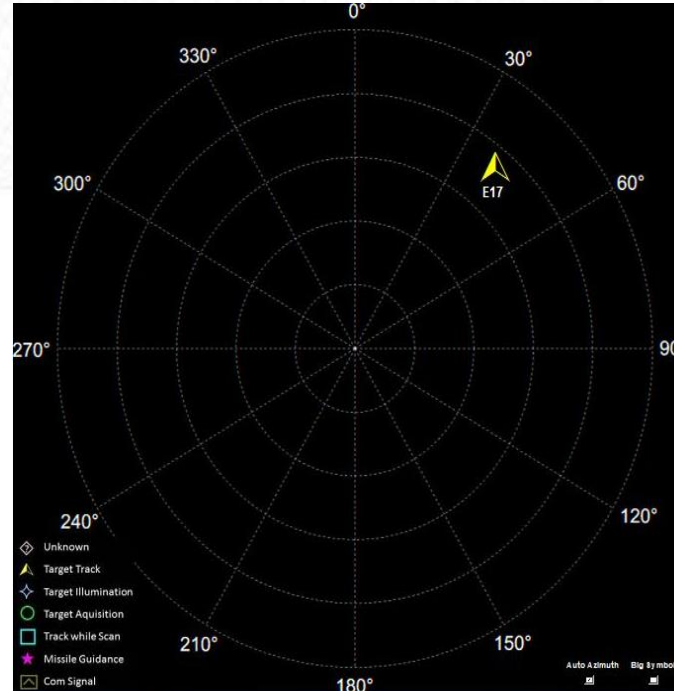
Digital Front End Receiver

- **Modular products for RWR, ESM & ELINT applications**
- **Software upgradeability for future threats**
- **For UAVs, fix wing, helicopters and transport platforms**

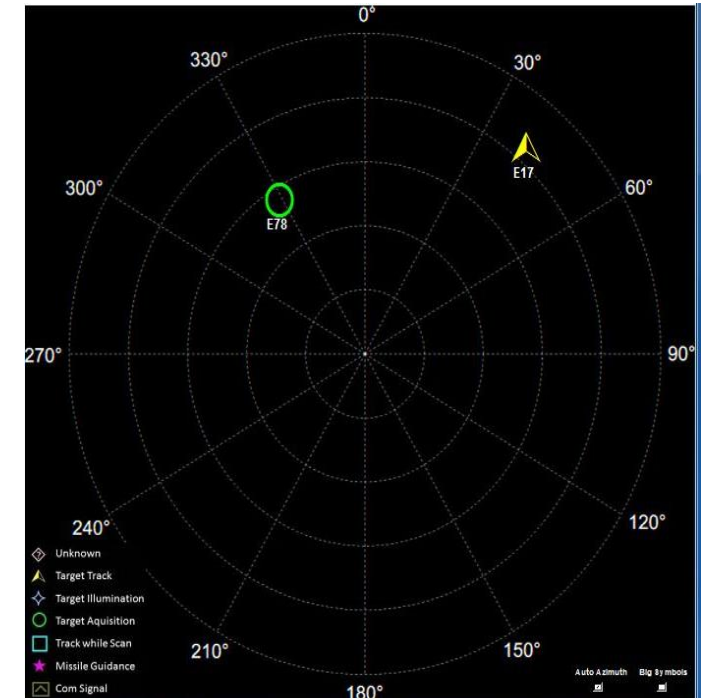
03 Technology approaches

Multisignal capability: Handling of different threat signals

- **Modern systems are required to show weak and strong threat signals, even on the same frequency**



Only strongest threat signal shown



Weak and strong threat signals on same frequency shown at different angles

03 Technology approaches

Full digital receiver product



- Full digital receiver technology for quick & reliable classification
 - Excellent multi-signal capabilities for dense scenario
 - Avoiding RF cabling
- Best protection for the platform

04 Conclusion

- **Enhanced survivability for platforms operating in today's contested and congested EMS environments is key!**
- **Tackling current real world challenges requires fully modular, SW-defined, digital RWR, ESM & ELINT products with extremely low false alarm rates off the shelf**
- **Cognitive support tools based on artificial intelligence can optimally support the operators in handling “big data”**
- **It is real! Please visit us at our booth A12**

Thank you
for your attention.