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Coactive Multifunction Systems Engineering Toolset (COMSET)

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BAE SYSTEMS

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COMSET is a modeling and simulation tool used to predict the performance of Radio Frequency (RF) systems in the presence of interference. Tested on more than 35 platforms, this tool provides our customers with the accurate data they need to operate effectively.

This tool enables users to understand how large-scale communication systems, sensors, radar, and navigation systems can interoperate. COMSET is also used for system architecture design, requirement derivation, validation, and mission planning.

COMSET is much more than an RF propagation modeling tool, it considers the linear and non-linear behaviors of the modeled RF system components to accurately predict not only the degree of interference, but also the root cause RF effects. This allows the right solutions to be selected for interference mitigation. Choosing the correct co-site mitigation techniques and equipment requires a thorough analysis of a complex RF system. Typical items to consider for a thorough analysis, depending on the systems, are:

- Antenna locations and coupling
- Receiver desensitization
- Receiver linearity
- Receiver noise figure
- Receiver RF and intermediate frequency selectivity
- Receiver and transmitter phase noise
- Transmitter broadband noise emissions
- Transmitter linearity
- Power amplifiers gain, noise figure, linearity, and selectivity
- Low-noise amplifier gain, noise figure and linearity
- Filter selectivity and insertion loss
- Cabling lengths and losses
- Signal path loss
- Satellite/base station characteristics (if applicable)
- Transmit and receive duty cycles
- Frequency bands of operation
- Frequency agile waveform characteristics
- Simultaneity

COMSET

BAE Systems' COMSET models these items for every RF component on any platform, including radar, communications, and identification friend or foe systems. COMSET simulates the resulting performance under any scenario of simultaneous transmitters and receivers. It provides recommended frequency separations between all combinations of systems. For frequency agile waveforms, the tool features an analysis construct to predict interference in a statistical manner.

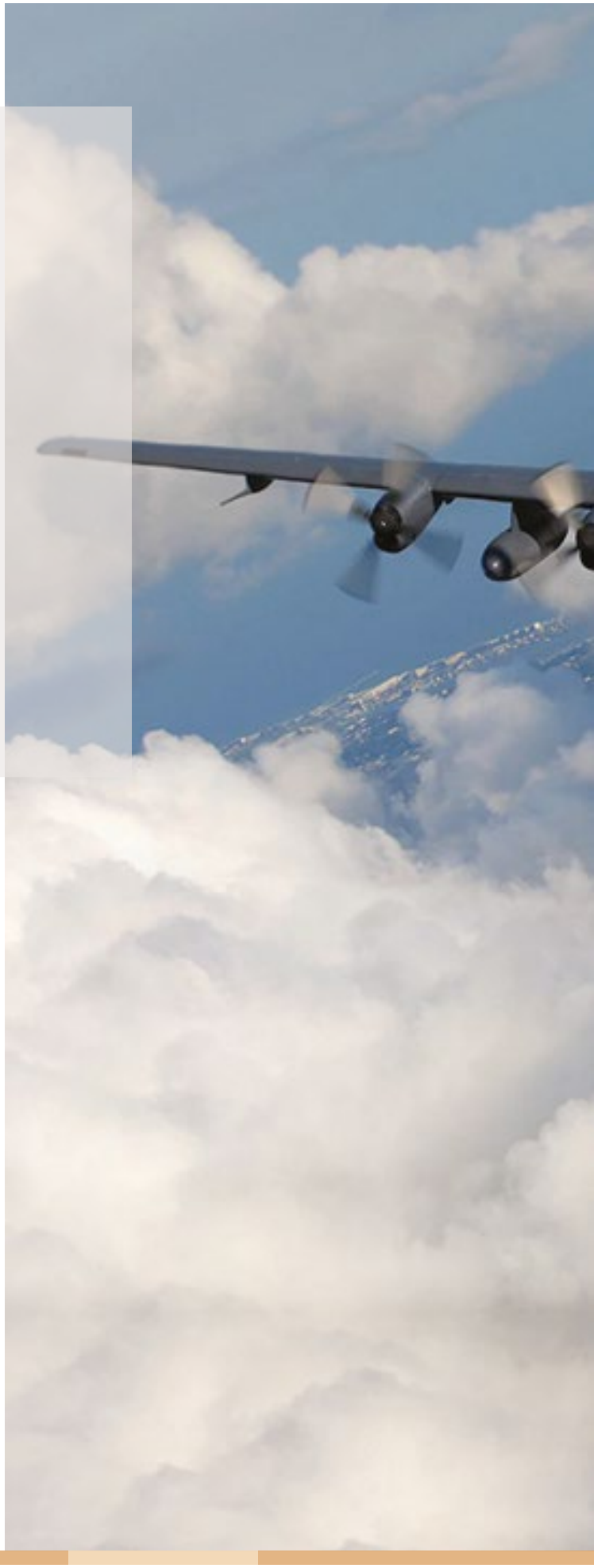
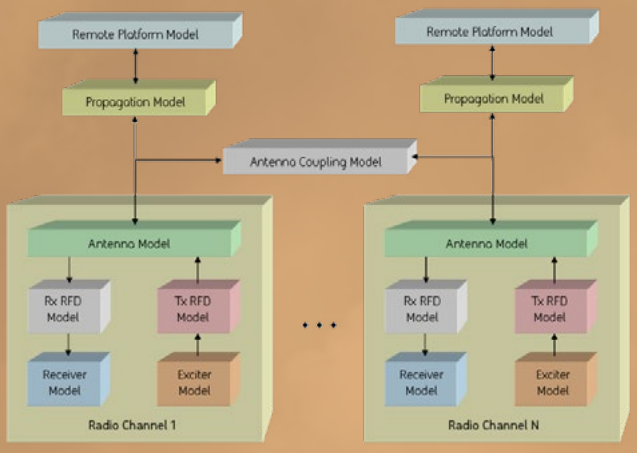


Figure 1: COMSET-modeled RF blocks

Figure I illustrates multiple RF system models (transmit and receive), on-aircraft RF distribution (RFD) models, antenna models, and antenna coupling models on the same platform. The propagation to/from remote platform(s) may be modeled as well.

COMSET considers many interference mechanisms occurring with RF co-site interference, such as gain compression, transmit amplitude modulation spectral noise, reciprocal mixing, fundamental TX power, cross-modulation (detected modulation), and TX FM/PM spectral noise. These mechanisms can be turned on and off through simulation in order to isolate the dominant source of interference.



Validated radio models:

- AN/ARC-231
- RT-1523E (SINCGARS)
- AN/ARC-222
- AN/PSC-5
- AN/ARC-232
- AN/ARC-164
- AN/ARC-187
- AN/ARC-210
- GPS Receiver (Commercial)
- AN/USC-61 (DMR)
- AN/ARC-234
- DragonFire
- AN/ARC-186
- AN/GRC-171

Platforms and sites analyzed:

- DDG-85
- DDG-78
- DDG-1000
- CVN-76
- CVN-71
- LHA-6
- LHD
- SSN-774
- AC-130U
- C-130 Avionics Modernization Program
- C-130J Super Hercules
- E-2D Advanced Hawkeye
- AV-8B Harrier II
- A-10 Thunderbolt II
- E-8 Joint STARS
- E-10 Multi-Sensor Command and Control Aircraft (MC2A)
- Airborne Stand-Off Radar
- AH-64 Apache
- CH-47 Chinook
- UH-60 Black Hawk
- Airborne Command and Control System UH-60L
- PAX River NAS
- Polk AFB
- Langley AFB
- Mobile Modular Command and Control Vehicle
- Tactical Air Control Party
- CAM-C2
- Next Generation Jammer
- MQ-1 Predator
- MQ-9 Reaper
- Army Crimes Records Center (CRC)
- MQ-8B Fire Scout
- RQ-7 Shadow
- Mine-Resistant Ambush Protected (MRAP)
- E-3 Sentry

Model accreditation:

- DD(X), 18 July 2005
- DDG-1000, 20 March 2008

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