Advanced Microwave Systems, Ltd
**History**

The primary objective target of the scientific-engineering team that comprises the company *Advanced Microwave Systems (AMS) Ltd* is the design and development of custom RF and microwave assemblies for both the military and commercial market.

The management team of the company Dr. Yorgos Stratakos and Mr. Anastasios Garetsos have a strong experience of RF and microwave systems development during their engagement in several national and international research projects.

Company’s employees have a strong theoretical and engineering background. All of them have obtained a PhD degree.

The company is certified according to *ISO-9001:2000*. 
Co-operation with FORTH (Foundation of Research and Technology) institute of microelectronics concerning the design and development of MMIC telecommunication circuits.

Co-operation with Demokritos Nuclear Research Institute for the design and development of superconductive microwave filters.

RACE-2005, MODAL (Microwave Optical Antenna Duplex Link), 1992

PAFOS, Design and development of X-Band MMICs, 1998.


Hellenic and International Co-operations (2)

- CELLO, development of modular broadband adaptive arrays at 1800 MHz.
- CAD (Computer Aided Design) Design and development of MMICs for wireless telecommunication applications based on F20 (MESFET process) and H40 (HEMT process) MARCONI processes.
- PAVET 2001, Smart Antenna Arrays, HELIC S.A
- PAVET 2002, Development of RF front-end for wireless communications on multilayered ceramic substrates.
- Greek Ministry of Defense contracts on electronic warfare systems (ESM, ECM, Communication and Radar).
✓ Spread Spectrum Direct Sequence and Frequency Hopping patented telecommunication jammer systems.
✓ Radar jammers.
✓ Spread spectrum high bit rate satellite links.
✓ Surveillance short range mmW radars.
✓ ESM mmW digital receivers.
✓ IFM real time frequency measurement systems.
✓ Custom RF and Microwave low noise amplifiers.
- Up-converters and Down-converters up to mmW frequencies.
- Direction Finding systems.
- Frequency hopping tracking filters with digital or analog control.
- Airborne and Navy Active decoys.
- Broadband Detector Logarithmic Video Amplifiers for Radar receiver applications.
- Phased Array Antenna Systems.
- Mixed Analog and Digital software radio warfare systems (based on FPGA real time processing).
- Military grade antenna development.
Design and development of a patented military frequency hopping telecommunications jammer with jamming protection of friendly networks. The system is housed in a S-280 shelter.

Option for upgrading the above jamming system for SATURN και LINK-16 applications.

Fully remote control of the communications jammer from the headquarters via VSAT Ku band, 802.11a/b/g, wired twisted pair και point to point microwave link.

Development of Wideband Digital RF Memory systems for HF up to microwave frequencies.
Spread Spectrum Direct Sequence and Frequency Hopping patented telecommunication jammer systems. (2)
DRFM Radar jammers.

Jammers for diverse radar technologies such as CW, FMCW, Pulsed Doppler, CDMA-DS, CDMA-FH.

In house know-how for the full development of the systems including software, hardware, firmware, mechanical design and testing.
Spread spectrum high bit rate satellite links

- Custom VSAT Ku band DS-Spread Spectrum 2Mb/s RF front-end.
- Extensive use of multilayered printed circuit board hybrid low cost technology.
- Used for both civilian and military communication links.
- Potential upgrade to higher bit rates.
Surveillance short range mmW radars

- Low probability of intercept microwave radars development.
- Applications include civilian use for closed and open spaces protection. Military applications include the surveillance of military camps.
- In house custom software development.
- Phased array technology used for better target resolution.
Development of an ELINT X-Band receiver in closed co-operation with ICCS-MFOL of NTUA. The system is operational in the Greek Navy.

Optional extension of the frequency coverage of the system up to 40GHz.
Development of a wideband IFM system for the real measurement of microwave signals in the frequency range of 0.1-12 GHz.

Optional upgrade of the system up to mmW.

Adoption of the system to a radar jammer.

In house software development for the system operation.
Custom RF and Microwave Low Noise Amplifiers (1)

- **Frequency coverage**: HF, VHF, UHF, L, C, X, Ku, J bands.

- **Output power capabilities**: HF-UHF frequency coverage with output power levels of 1000Watts. At L, C, X, Ku, J frequency bands linear output power levels from 200W to 10Watt depending on the frequency band of operation.

- **Noise figure**: 0.5dB from L-Band to 4dB at Ka-band.

- **VSWR**: less than 1.5:1 at the input or output for all amplifier cases.
Custom RF and Microwave low noise amplifiers. (2)

- Power supply capabilities 110VAC/220VAC/380VAC at 50, 60 or 400 Hz.
- Over-voltage, over-temperature, over-current and standing waves interlocks protect the amplifier units.
- Automatic gain and power output control.
- Military grade amplifier units that comply to the following environmental and electrical conditions:

  Operating Temperature range: –20 °C to +60 °C
  MIL-STD-810E, Methods 502.3 and 501.3, Procedure II.
  Salt Corrosion: 48 hours salt spray (on metal parts of the unit) + 48 hours drying
  MIL-STD-810E, Method 509.3, Procedure I.
  Random Vibration: 20 – 2000 Hz, 7 grms, 1 hour per axis
  MIL-STD-810E, Method 514.4, Procedure I, Category 10.
  Mechanical Shock: 50g, Half-sine, 11 msec, 3 shocks / axis / direction
  MIL-STD-810E, Method 516.4, Procedure I.
  Electromagnetic Compatibility (EMC):
  MIL-STD-461E, Procedures CE102, CS101, CS115, RE102, RS103
  EN 61000-4-2, Electrostatic Discharge (Contact / Air, up to 15kV)
  Electrical Bonding, < 5mOhm.
Design and Development of custom up/down frequency converters.

- INTEGER PLL, FRACTIONAL PLL and DDS technologies.
- Computer controlled.
Custom military digital D/F systems for the Greek ministry of Defense.

Adoption of the D/F system with the AMS patented frequency hopping communication jammer.
AMS Ltd has developed innovative fast electronically tunable filters which are used in the electronic warfare systems.

The notch filters have a hopping speed capability of better than 5μsec and rejection of at least 40dB at a 100KHz range around the central freq., while the -10db range is only 1MHz. They cover the range 1-500 MHz (at least one octave per filter type).
Airborne and Naval Active decoys

- Development of an airborne active decoy for the Greek Ministry of Defense operating at X-band (increases the aircraft RCS to 100m²)
- Optional extension of operating freq. range to mmW
- The active decoys are ejected from existing airplane injectors.
- Extension of the decoy design for naval use.
Development of Broadband Detector Logarithmic Video Amplifiers for the Greek Navy in cooperation with ICCS-MFOL. These systems cover the range 0.1-20GHz and are used at D/F systems.
Phased Array Antenna Systems

- Design & Development of a 4X8 modular phased array system for mobile traffic focusing. (European project CHELLO)
- Application of phased array technology for the implementation of multiple parallel stages of MMIC amplifiers to achieve high total power for replacement of TWT tubes.
- Custom development of innovative passive or active phased array systems.
Implementation of a FPGA based frequency hopping receiver and analyzer (for warfare applications).

- Real time processing up to 2000 hops/sec which covers the frequency band from 1-500 MHz.
- Optional extension of the system capabilities to higher frequency bands.
- Adoption of the system with AMS patented communications jammer.
Military grade antenna development

In house analysis design, development and testing of RF and microwave antennas. Extensive use of commercially available CAD software tools as well as in house custom software development for electromagnetic analysis and synthesis. (Mast antennas, Omni antennas, Log-periodic VHF/UHF, Microstrip arrays, Horn, Diconic, Helical, conformal arrays, dish antennas). Recent development of a Casegrain small dish for UAV satellite link.
High Power 3x3 Switch Matrix Unit
High Power 3x3 Switch Matrix Unit (Panoramic view)
HF RF power detector
UHF RF power detector
Our customers

- GREEK MINISTRY OF DEFENSE. (GREEK ARMY, GREEK NAVY, GREEK AIR FORCES).
- EUROPEAN SPACE AGENCY (ESA).
- NATO MAINTANANCE AND SUPPLY AGENCY (NAMSA).
- HELLENIC AEROSPACE INDUSTRY (EAB)
- INTRACOM S.A.
- KINTEK S.A.
- INSTITUTE OF COMMUNICATIONS AND COMPUTER SYSTEMS OF THE NATIONAL TECHNICAL UNIVERSITY OF ATHENS (ICCS-NTUA).
- INSTITUTE OF ACCELERATING SYSTEMS AND APPLICATIONS (IASA).
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