APPLIED RADAR, Inc.
210 Airport Street, Quonset Point, North Kingstown, RI 02852
TEL: 401-295-0062 FAX: 401-295-9911 Internet: www.appliedradar.com

Executive Summary

About Applied Radar, Inc:

Applied Radar, Inc is an established research, development and engineering company specializing in microwave systems such as radar and communications systems and antenna systems including phased-array antennas and advanced lightweight conformal antennas. Core engineering expertise lies in advanced antenna design and development using novel materials, highly-integrated RF transceiver development using hybrid MMIC packaging, high-speed digital acquisition and processing, RF waveform synthesizers, and embedded microprocessor systems. These unique capabilities with an emphasis on hardware system development find wide application in a number of high-technology commercial and military sectors including wireless communication, sensing and navigation.

Applied Radar products offer many advantages over existing systems. Advanced phased-array antennas allow replacement of mechanically-scanned antennas with electronically-scanned antennas, enabling a low-profile antenna array with superior electrical performance and less maintenance. Our RF transceivers are low-cost and utilize highly-integrated packaging. Lightweight conformal antennas manufactured by Applied Radar, Inc. utilize novel lightweight materials to allow drastic reductions in cost and weight. Wireless digital communication systems manufactured by Applied Radar, Inc. allow high-speed digital channels for applications such as SATCOM and comm-on-the-move.

History:

Applied Radar was started by Dr. William H. Weedon in 1996 and built on SBIR funding from various DoD agencies including the US Air Force Research Lab. (AFRL), the US Army RDECOM, DARPA and MDA as well as contract work from commercial companies such as M/A-COM, ITT, Coleman Research, Cyterra, Infrasense and Schlumberger-Doll Research. The current business focus is on maintaining existing business relationships in the government and commercial sectors, writing new proposals with an emphasis on teaming with strategic business partners, protecting critical intellectual property through patents, and developing and marketing commercial products resulting from contract activity.

Core Technology Areas:

Phased-Array Antennas
Applied Radar is an industry leader in the development of advanced phased-array antennas. These next-generation antenna systems replace mechanically-scanned antennas, typically containing large dish antennas which are subject to slow scan rates, mechanical wear, and high wind loading with sleek low-profile electronically-scanned arrays, offering greatly-improved beam steering and beam shape optimization capability with lower maintenance. These phased-array antennas typically utilize either digitally-controlled MMIC phase shifters or digital beamforming (DBF). Applied Radar is a pioneer in the development of DBF antennas, through sponsored research programs with AFRL and RDECOM. More customary MMIC arrays are developed using Applied Radar's custom T/R modules, which form the heart of the phased array. These phased-array antennas find commercial and military application in both radar and communications systems.

Advanced Lightweight Conformal Antennas
Applied Radar, operating under contract to DARPA, has developed a technology that allows antennas to be produced using novel textile components and methods. These antennas offer the advantages of significantly reduced weight and cost in a flexible or conformal antenna. Working with a team of textile companies, universities and numerous textile suppliers, Applied Radar has developed three patent pending methods of constructing textile antennas. Using these methods, planar and conformal antennas, as well as microwave feeds can be constructed for a wide variety of uses. Examples include wireless network antennas, wearable antennas and conformal vehicle and aircraft antennas. Uses include radar and communication systems operating at frequencies from below 100 MHz to more than 3 GHz.

Radar Systems
Radar system development forms Applied Radar's core business, through several on-going radar development programs and several technologies that feed the development of advanced radar systems. The X-band Interferometric Radar (XBIR) is an example of an advanced phased-array radar that Applied Radar is developing for the US Army under a Phase II SBIR. Working with M/A-COM (division of Tyco Electronics), Applied Radar has also developed automotive collision-avoidance radars, and is investigating additional uses of these low-cost radar sensors.

Communication Systems
Combining custom RF front-end transceiver modules with high-speed digital processing, Applied Radar is developing next-generation high-speed communications systems for applications such as SATCOM and comm-on-the-move. One example is a Ku-band (14 – 18 GHz) transceiver that Applied Radar is developing under an AFRL Phase II SBIR, along with a wideband digital acquisition system and processor, allowing over 1 GHz instantaneous bandwidth. Such a wideband communication link is instrumental for transmitting live video data, such as from an unmanned aerial vehicle (UAV).

3D Antenna Design

Lightweight Antenna

X-band Digital Beamformer

X-Band Receiver Module

Custom Data Acquisition Brd

Markets:

Applied Radar serves both the commercial and military sectors with advanced radar, communications and antenna products. At present, the majority of our customers are within the US military. However, there is a great demand for wireless products in the commercial sector. Current efforts are aimed at addressing the market needs in various commercial industries including the aerospace industry, the public safety sector, and various communications industries.

Products:

Applied Radar has developed several novel textile antennas that offer the advantages of lower cost and lighter weight over competing solutions, with the added advantage of a flexible substrate. This technology is presently being extended to include composite-embedded conformal antennas. These products are presently being marketed to the wireless communications, automotive and aerospace industries.

An X-band interferometric radar (XBIR) is being developed for the US Army. This system adds a precision targeting capability to the Army's Multi-Mission Radar (MMR), which is critical for fire-control and precision approach control radar applications. The Army has expressed a great interest in this system, and has identified an operational need for its capability. We are presently working with the Army to transition this advanced development product to the field.

Applied Radar has developed a 32-channel digital beamforming system (DBF-3200). This system accepts up to 32 plug-and-play modules such as the DRX-1000 X-band digital receiver module or an equivalent digital transmit module being developed under an AFRL Phase II SBIR. Our DBF-3200 can be used in various radar, sonar and communications applications. Currently, we are marketing this system to research laboratories and universities as a test instrument.

A Ku-band (14 – 18 GHz) receiver and high-speed digital processor is being developed for wideband radar and communications applications. We are currently investigating applications of this system for synthetic aperture radar (SAR) and SATCOM applications.

Applied Radar, working with M/A-COM, has developed miniature 24 and 77 GHz radar sensors by modifying and enhancing automotive collision-avoidance radar products. We are presently marketing these sensors for a variety of applications.

Contact:

Dr. William H. Weedon
Applied Radar, Inc.
210 Airport Street
N. Kingstown, RI 02852
401-295-0062 (Voice)
401-295-9911 (Fax)
info@appliedradar.com

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