HISTORY OF RADAR

RADAR is a device that sends out radio waves for finding the position and speed of a moving object. The term is an acronym for "***R***adio ***D***etection ***A***nd ***R***anging", the U.S. Navy code to describe secret development conducted in 1939.

Short pulses of radio energy—key to the advancement of modern radar systems.

Radio **D**etection **A**nd **R**anging was not a new idea. In 1862 Scottish physicist **James Clark Maxwell** predicted through his experiments and equations the existence of electromagnetic waves and radio waves. In 1868-1888 a German physicist **Heinrich Hertz** conducted a series of experiments that proved Maxwell's theory. Hertz showed that the nature of these energy waves are similar to visible light in their ability to be reflected, refracted, and polarized. **Christian Hülsmeyer** demonstrated the use of radio echoes to protect shipping in bad weather but never developed his equipment further due to the lack of interest by naval authorities. In 1899 **Guglielmo Marconi** had conducted radio beacon experiments. In a 1922 paper submitted before the Institute of Electrical Engineers in London, he concluded that a transmitted beam of reflected waves could be transmitted across country or used on shipping lanes to reveal the presence and location of other ships. By 1915 **Robert Watson Watt** began his investigation of atmospheric phenomena and during the next 20 years developed ways to track thunderstorms using radio waves generated by lightning strikes detected by a directional antenna and display oscilloscopes. In 1927 Radio Research Station and the Department of Scientific and Industrial Research where formed in the United Kingdom. Watt's was appointed Superintendent of Radio Research Station.

On February 12, 1935, Watson Watt sent the Air Ministry a secret report titled" The Detection of Aircraft by Radio Methods". On June 17, 1935, radio-based detection and ranging was first demonstrated in Britain credited to the Radio Research Station team of Watt, Wilkins and Bowen.

Radar was patented in Britian in April 1935

The ASP-4 was an airborne light-weight, pod-mounted continuous-wave search Radar which was suitable for Airborne Interception (AI) or Air-to-Surface-Vessel (ASV) applications. This was a very advanced system that was first used by the U.S. Navy on carrier-borne aircraft F6F Hellcat and F4U-2 Corsair. The Radar dish could scan from side to side for (AI) applications and could be controlled to look up and down enabling search for surface vessels below (ASV) and aircraft from above.

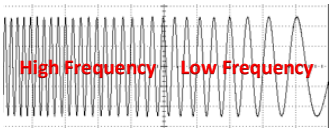
ASP-4 Search Radar

Pod mounted ASP-4

There are now many radar technologies

Physicists and engineering pioneers in the fields of Geophysics, electromagnetism, radio waves and theory of light provided discoveries and insights but were limited in further development by the lack of available material and technology of their time.

Physicist Christian Andreas Doppler in 1842 first described the frequency of light and sound and how these waves are affected by the motion of the source of sound and its relationship to the receiver. This phenomenon became known as the "Doppler Effect". The experimental works of Christian Doppler are the key components in the advanced modern day Doppler technologies.



A listener watching as a speeding vehicle or airplane goes by will hear sounds attributed to the Doppler Effect. At a stationary location the listener will become a receiver of a small wavelength and high frequency sound as the vehicle approaches. As the vehicle moves away it produces a long wavelength with low frequency sound. The Doppler Effect is the bases for a specialized Doppler radar that bounce microwave signals off a target and then analyze the returning signal to produce velocity data about the object at a distance and is used in aviation, police speed guns, radiology, healthcare and defense.

Pulse-Doppler radar systems combine the features of continuous-wave and pulse-radar. Pulse-timing techniques will determine the range of a target and the Doppler Effect of the returned signal is used to determine velocity of the target. Doppler techniques filter out the returned reflection of unwanted ground signals to reveal aircraft and vehicles. Most modern weather radar uses the Pulse-Doppler technology in meteorological radar that can determine wind speed from the velocity and direction of any precipitation in the air. Other radar techniques have been developed for aircraft and satellite-mounted imaging such as Synthetic-aperture radar (SAR) with its origins from an advanced form of side-looking airborne radar (SLAR) that uses the motion of the radar antenna to produce high resolution images of landscapes. Widely used medical intervention applications of Doppler take the form of ultrasound used in most diagnostic examinations.

An asteroid has been named for Christian Doppler discovered in 1984 by A. Mikos at Klit' Czech Republic. 3905 Doppler