

HXI-REC Radar Products and Capabilities Overview

Originally founded as Harmonix Corp. in 1992, the company's first products were a 60 GHz hand-held, concealed weapons detector developed for law-enforcement personnel, and Fast Ethernet, OC-3, and OC12 60 GHz radios (the first unlicensed-use radios to be certified by the FCC).

A few years later, Harmonix won the *Phase I* contract (and later, all subsequent *Phases*, including sole-source full production) to produce the Ka-band sections of the TALS UAV portable landing system: that landing system currently serves the most popular UAV of all time, having performed >170,000 missions to date.

As a consequence of the success of its radar and radio integrated products, HXI later *reverse vertically integrated* by offering its captive components for sale. In HXI's case, reverse vertical integration was a natural result of having a seasoned engineering staff that came from local Boston-area prime contractors, including Raytheon, Sanders (a Lockheed Company, now BAE), Lockheed Martin Aerospace Electronic Systems, Textron Defense Systems, M/A-Com, and top-tier subcontractors including Alpha Industries and Millitech.

In 2008, HXI was purchased by Renaissance Electronics Corp. (REC) and operates as a wholly-owned subsidiary of REC. In 2010 it moved to Harvard, MA where it is co-located with REC. The facility is cleared *Secret* and is AS9100 certified.



HXI's first radar product: a 60 GHz hand-held, concealed weapons detector developed for law-enforcement personnel (top left: complete unit; top right: 60 GHz radar front end).

Providing several meters of stand-off distance, the detector indicated weapon location prior to "pat-down", the most dangerous action for a police officer.



DoD Photo

HXI is the sole-source supplier for the Ka-band section of the Tactical Automatic Landing System (TALS) which eliminates the need for an external pilot. The TALS day/night all-weather system can interface with any fixed or rotary-wing UAV, and serves both tactical and fixed-based environments.

The TALS landing system is shown above supporting the Shadow Tactical Unmanned Aircraft System (TUAS). A staple of the US Army and the US Marine Corps, the Shadow TUAS has achieved a landmark 750,000 total flight hours, mostly over the battlefields of Iraq and Afghanistan.

HXI has continued its heritage of providing reliable, state-of-the-art MMW radar front ends (“RFEs”) at reasonable cost to its military, industrial, and academic customers: some of that hardware is shown below.

To better serve our customers, HXI recently initiated a partnership with a recognized DSP and radar algorithm development center to provide *turn-key, one-stop solutions*.

Industrial Sensing



60 GHz FMCW RFE

- Very small, low cost level sensing and target detection
- Homodyne, single (duplexed) antenna
- Unlinearized 60 GHz GUNN (typically open-loop linearized via. “look-up” table)

Tx Module



Rx Module



Local Osc. Module



94 GHz Pulse Radar RFE

- Test bed for automatic landing system
- Uses very high power handling (100W Peak), high switching speed (5 nS/150 nS) “Bulk-Window” diode Rx protection switch
- 1W (Peak) Tx Amp. output (up to 2W avail.)
- ITAR restricted

Military Sensing



60 GHz Pulse/FMCW Dual Mode RFE

- Uses very high power handling (50W Peak/10W CW), high switching speed (5 nS/90 nS) “Bulk-Window” diode Rx protection switch
- 0.5W (Pulse/CW) Tx Amp. output (up to 2.5W avail.)
- ITAR restricted

70-77 GHz Multi-Static RFE

- Supports extremely high range resolution, multi-look angle, SAR-processed, target signature data collection
- Fully coherent
- 7 GHz FM sweep bandwidth
- Closed-loop Linearized VCO (linearity >99.99%)
- Supports up to (8) remotely located Tx/Rx Modules, in any combination, as supplied - expandable to many more modules
- ITAR restricted



60 GHz Integrated Receiver

- Designed to customer specifications
- Highly integrated for smallest possible size in production