SINGLE-CHIP SOLUTION

Our partner Silicon Radar has developed a SiGe MMIC implementing full RADAR functionality. The chip is embedded into IMST’s TxRx frontend, taking advantage of the antenna’s excellent properties.

The system is intended for low cost and high volume applications within the ISM frequency band. For initial testing the frontend is fully compatible to our high performance baseband module and software, but may be combined with a cost-optimized alternative.

RF CIRCUIT AND ANTENNA DESIGN

IMST GmbH is a center of excellence and developer of professional radio technology. The development of micro-electronic circuits, chip design, or antennas is a core ability of our teams. Circuits and antennas can be found in diverse applications like radio communications, radar technology and industrial metrology. We cover ranges from the lowest to the highest frequencies. Various integration levels are available: miniaturised as integrated circuits in Si- or GaAs technology, as LTCC-modules, and, with the largest dimensions, as classic printed circuit boards.

IMST has a complete repertoire!

AirRobot® microUAV using Radar modules for obstacle avoidance manoeuvres.

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→ 24 GHz RADAR SENSOR

- FMCW and Doppler Mode
- ISM to 2 GHz Bandwidth
- Onboard Signal Processing
- Evaluation Software included
MODULAR RADAR SYSTEM

IMST has developed a versatile FMCW RADAR-system which operates in the 24 GHz band. It can be easily adapted to customer application requirements and enables a unique efficiency in product development. Due to the usage of high quality components an exceptionally high bandwidth of up to 2 GHz is achieved.

Thanks to a fully configurable Digital Direct Synthesis Controller (DDS) in combination with a fast-locking Phase-Locked Loop (PLL) the user may define an arbitrary RADAR waveform that suits the respective target environment. With an output power of 20 dBm (EIRP) targets in up to 70m distance may be detected. The RADAR system is built out of frontend-, baseband- and DC-modules that can be replaced depending on the desired functionality.

MULTI-CHANNEL FRONTENDS

For applications that require an angular resolution of targets IMST offers multi-channel modules. These modules have multiple receive (Rx) antennas in a very compact array design. A 2Rx channel module with full IQ capability is directly available. Sensors providing a larger number of channels can be developed on request.

Typ. properties of Single- and Multi-channel frontends

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distance to Target</td>
<td>10 cm to 70 m</td>
</tr>
<tr>
<td>Resolution</td>
<td>dm Range (depending on bandwidth)</td>
</tr>
<tr>
<td>Accuracy</td>
<td>cm Range (depending on bandwidth)</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>ISM to 2 GHz</td>
</tr>
<tr>
<td>Radiated Power</td>
<td>20 dBm (EIRP)</td>
</tr>
<tr>
<td>Antenna Characteris.</td>
<td>e.g. 64° Azimuth, 36° Elevation (can be adapted to customer requirements)</td>
</tr>
<tr>
<td>Angular Resolution</td>
<td>~ 1°@5 m</td>
</tr>
</tbody>
</table>

BASEBAND AND WiMOD™ MODULES

The baseband module carries the digital processing unit and implements the communication with the user system. Depending on the system’s mounting position the module may be connected with USB cable or to a WiMOD™ module.

Accordingly the system can be directly powered by USB or battery pack to enable full mobility. IMST has developed an additional software package that enables the user to perform out-of-the-box measurements. The software establishes the data transfer and performs a variety of signal processing steps, including tracking and clearance algorithms. These routines are already implemented on the controller of the baseband module and are ready to be applied by the user.

www.ltcc.de/radar

www.wireless-solutions.de