

# Affordable Software Defined Radio (SDR) Components for Joint Tactical Radio System (JTRS) Cluster 5

Establish an RF Integrated Circuit (IC) Chipset, power amplifier, and tunable RF filters derived from JTRS HMS specifications and architecture to ensure JTRS embedded communications affordability.

## OBJECTIVE / SOLUTION

This ATO-M ensures that the JTRS Handheld, Man Pack and Small form fit (HMS) meets Size, Weight, and Power and Cost (SWAP-C) requirements for the Future Combat Systems (FCS) Unit of Action (UA) embedded SDR network communications. In FY05 completed system engineering design and manufacturability analysis and definition of common SDR core transceiver product concept; in FY06 analyzed the manufacturing process and defined the qualification test methodology design; in FY07 prototyping and Radio Frequency Integrated Circuit (RFIC) manufacturing sub-process development; in FY08 demonstrate prototype RFIC common SDR core transceiver product and manufacturing and test methods in laboratory environment; in FY09 complete modeling and simulation analysis and demonstrate system engineering and test validating manufacturing methods and production processes. By 2009, support PM JTRS HMS cost-share strategy through industry teaming with JTRS HMS hardware suppliers supporting low-rate initial production decision by the end of FY09.

## ACHIEVEMENTS

ATO-M components include electronically tunable wideband preselector filters for the SDR RF Front End utilizing thin-film Barium Strontium Titanate capacitor technology and miniaturized packaging techniques which improve reliability for frequency agility across the entire JTRS RF operating band; RFIC derived from JTRS HMS baseline specifications and architecture through the Trusted Foundry; wideband, highly efficient power amplifier based on Gallium Nitride (GaN) Monolithic Microwave Integrated Circuit (MMIC) technology; miniaturized CSP techniques to increase memory density and reduce SWAP of SDR baseband processors; performed engineering studies to identify Soldier Radio Waveform (SRW) requirements and hardware dependencies resulting from the Communications-Electronics Research, Development and Engineering Center (CERDEC) Soldier Level Integrated Communications Environment (SLICE) Project software programmable radio prototype development.

## BENEFITS

- Improves mobility and transportability by significantly reducing the size and weight of embedded JTRS network communications for FCS UA systems.
- Enhances operational availability of sensor-to-shooter network connectivity.
- Provides interoperability with FCS UA with reduced O&S costs.
- Delivers low power and affordable SDR components to PM JTRS by FY08.
- Ensures that JTRS HMS products will satisfy JTRS CAIV requirements.

## STATUS

- Delivered first iteration tunable preselector filter prototypes in the SINCGARS RF operating band and a detailed plan for manufacturing with Agile Materials & Technologies. A final prototype will be delivered and the mass production manufacturing line will be put in place in future years of the program.
- Delivered RF building blocks for the RFIC fabricated with the Trusted Foundry in FY06. A final chip and manufacturing plans will be delivered through IBM Design Services will be delivered in future years of the program.
- Delivered first iteration prototypes for a 10-watt core transceiver power amplifier based on GaN MMIC technology with Hittite Microwave. A final prototype will be delivered and the mass production manufacturing line will be put in place in future years of the program.
- Leveraging advanced CSP and high density interconnect technologies to deliver a low-power programmable baseband processor with Tesseria Inc. suitable for military requirements. Stackable DRAM package delivered in FY04. Microprocessor/Flash flip-chip and field programmable gate array (FPGA) packages delivered in FY05, completed Multi-Package Module, and established MRL 5.

## WEAPON SYSTEMS / SECONDARY ITEMS IMPACTED

- Future Combat Systems (FCS) Manned and Unmanned Systems
  - Land Warrior (LW)
  - Unattended Ground Sensors (UGS)
  - Non-Line-of-Sight Launch System (NLOS-LS)

## POTENTIAL COST AVOIDANCE

- \$331,000,000.



Joint Tactical Radio System (JTRS) Network