DARPA technologies to alter the future

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Prior DARPA programs have proven to be indicators of the capabilities of current and next-generation systems. The programs currently within the MTO Office are on the cusp of changing several technological landscapes. This talk will cover these specific technologies in detail, while attempting to predict the impact of these technologies on future systems.

DoD investments, specifically the investments by the DARPA MTO office, have enabled numerous capabilities, such as long-range radar engagement, night vision, and system coordination and precision. Today, our current systems are leveraging our previous investments in uncooled infrared technology for thermal imaging systems, GaAs in radars and communication systems, and traditional MEMS devices in our navigation systems.

More recent investments of the past decade in miniature uncooled infrared, GaN, and chip scale atomic clocks promise to enhance our capabilities in military and commercial systems currently under development. Our uncooled technology has been matured to a point where we can envision a world with high-performance IR cameras that are cheap enough to be integrated into things that we use on a daily basis, for example, smart phones. Our long history of investments in GaN are paying off and enabling long-range, efficient RF transmission. Finally, recent results in MEMS technology are enabling systems to operate on their own with or without GPS.

These three previous examples are a microcosm of the innovative capabilities that the DoD has enabled, and this long history of technology transition leads towards optimism of the future. This talk will look at the areas where optimism is warranted based on early lab results. In the not-so-distant future, I believe that GPS will be nice to have, not a need to have; mm wave transmission will be a means to connect everything with fiber-like interconnectivity; we will enable trust in our electronics through technology, not policy; light will become the next frequency for chip designers; and hope will not be a spectrum planning tool as we enable real-time, flexible, adaptable RF. The lab results which are the basis for these statements will be discussed during this presentation.