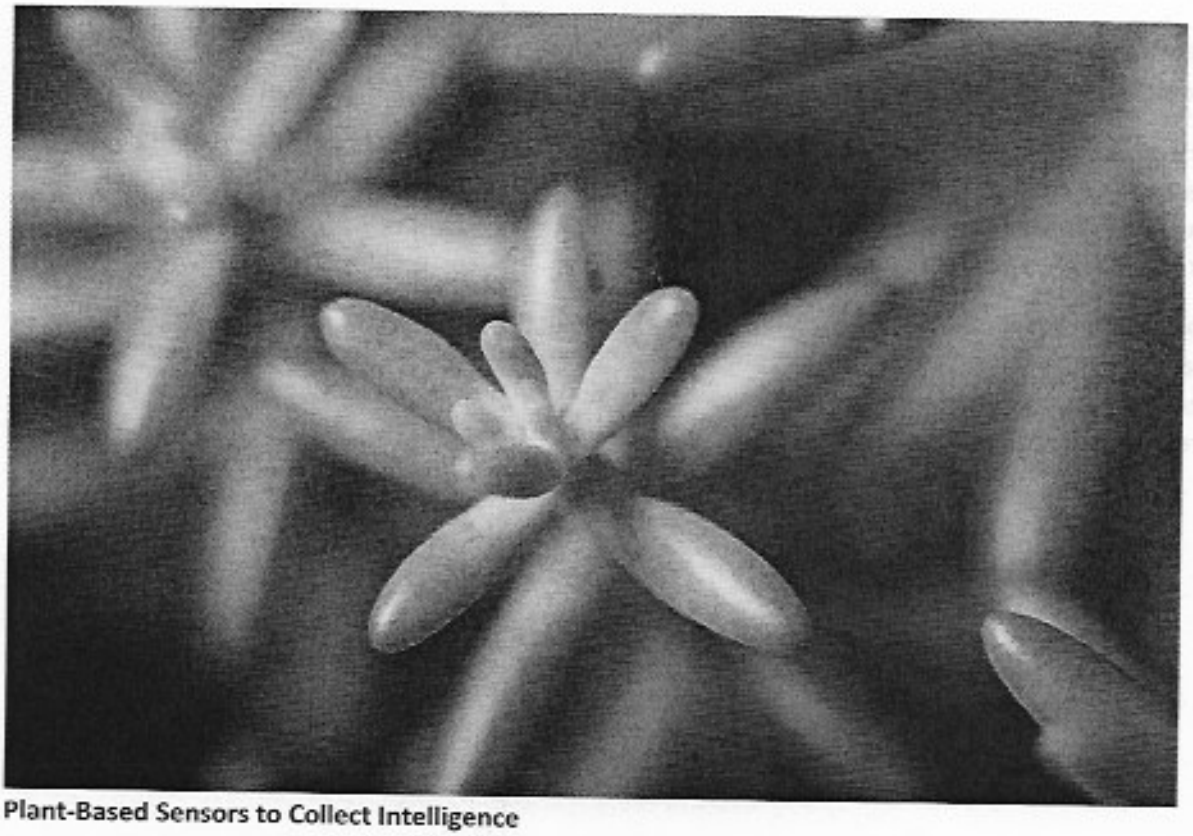


Plant-Based Sensors to Collect Intelligence

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The US Department of Defense evaluates that the military's traditional intelligence sensors are not always optimal for the tasks that have become more and more complex and challenging. A solution may be found in nature. DARPA's new Advanced Plant Technologies (APT) program looks to seemingly simple plants as the next generation of intelligence gatherers. The program will pursue technologies to engineer robust, plant-based sensors that are self-sustaining in their environment and can be remotely monitored using existing hardware, according to darpa.mil.

The task is to harness plants' natural mechanisms for sensing and responding to environmental stimuli and extend them to detect the presence of certain chemicals, pathogens, radiation, and even electromagnetic signals.

APT aims to modify the genomes of plants in order to program in these specific types of sensing and trigger discreet response mechanisms in a way that does not compromise the plants' ability to thrive. If the program is successful, it will deliver a new sensing platform that is energy independent, robust, stealthy, and easily distributed.

Such sensors could find application outside of the military too, making it possible, for instance, for communities to safely identify landmines or unexploded ordnance leftover from past conflicts or testing grounds.

"Plants are highly attuned to their environments and naturally manifest physiological responses to basic stimuli such as light and temperature, but also in some cases to touch, chemicals, pests, and pathogens," said Blake Bextine, the DARPA Program Manager for APT. "Emerging molecular and modeling techniques may make it possible to reprogram these detection and reporting capabilities

for a wide range of stimuli, which would not only open up new intelligence streams, but also reduce the personnel risks and costs associated with traditional sensors."

Past experiments of this type have reduced the fitness of modified plants by siphoning resources needed to sustain the plants. APT will seek to improve how plants collect and distribute resources, and optimize their fitness so that modified plants thrive despite anticipated interactions with natural stressors such as microbes, animals, insects, and other plants.

The program will rely on existing ground-, air-, and space-based technology to remotely monitor plant reporting. Such systems are already capable of measuring plants' temperature, chemical composition, reflectance, and body plan, among other qualities, from a standoff distance. The APT program will not fund development of new hardware for this purpose.