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IOT BEYOND OF SMART CITIES

Abstract

The implementation of projects for the building of Smart Cities involves the creation of a powerful communication infrastructure that combines the capabilities of wireless, fiber optic, satellite and other types of communication.

However, building the Internet of Things for households located in remote, hard-to-reach foothill and forest areas is complicated by a number of problems associated with the lack of a reliable communication environment. For the most part, households, such as summer cottages, farmlands, livestock farms are outside the coverage area of mobile and fixed communications.

This significantly limits the possibilities of online remote monitoring of crop maturation on agricultural land, irrigation management, etc.

Satellites are envisaged to play a critical role in future communication networks. The satellite networks are considered to be one of the most promising solutions for connecting the unconnected in remote and rural areas, they can provide a plethora of additional applications and services elsewhere on earth.

The work provides the outcomes a critical analysis of technologically affordable approaches proposed to address challenges associated with providing the Low Earth Orbits (LEO) related communication to user ground terminals (UTs) located at site. This technology promises to be able to support local area networking in a wide agricultural land, and support the deployment of a wide range of Internet of Things (IoT) applications can work in vast hard-to-reach areas.

To this end, the various aspects of using of distributed massive multiple-input multiple-output (MIMO) technology allowing ground user terminals to be connected to a cluster of satellites, have been explored. The paper proposes an optimized communication architecture that integrates ground user terminals (UTs) into the structure of a local area network (LAN) covering the agri-food production zone. LAN connects rest of communication devices at ground level, including IoT devices. The LAN combines wireless and wired technologies that are maximally adapted to the conditions of the area and the nature of agricultural production.