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MOBILE SATELLITE COMMUNICATION SYSTEM BASED ON NEW DIGITAL PHASED ARRAY
BEAMFORMING TECHNOLOGY

Abstract

Today when new satellite communication systems are planned, requirements lodged on their antennae systems become more and more stringent and contradictory: high efficiency and power are often demanded as well as multibeam directional pattern forming and adaptive control, organized in severe space conditions. Thus for the purpose of providing mobile satellite communication services only phased array antennae system can efficiently solve all the problems posed.

Yaliny is a young and innovative company whose aim is to create a satellite communication system with a whole new level of performance. It is planned that the system will, having been fully deployed by the year 2018, provide communication services and fast Internet connection to any customer all over the globe.

- First and main segment will be a satellite constellation, consisting of 135 satellites in low earth orbits, each equipped with a hybrid phased array antennae combining digital and analogue beamforming. The highlight of the phased array itself is the beamformer fully developed by Yaliny engineers. It is essentially a PCB - a dielectric base with metallic layers, providing transmission and receiving linearly-polarized signal types. The main advantage here is that for deviating the antennae's directional pattern only half as much controlling elements are needed comparing to traditional phased array structure. This is achieved due to multimode structure of the beamformer. Its construction also provides an opportunity to combine two PCBs into a special crossed construction, thus with different profiles of independent powering of the PCBs any kind of polarisation can be attained.
- The second segment of the communication system will be its ground infrastructure. The satellites communicating with each other using a specially developed intersatellite optical communication hardware will also use a separate dish antenna for broadband connection with ground stations, via which they will be able to connect to the Internet. It is planned to strategically locate ground stations in different regions of the world to provide fast and convenient communication services.
- The third segment is the customer terminal - a device size of a regular smartphone capable of communicating with customers' smartphones or computers using Wi-Fi or Bluetooth, and the satellites. The link is designed so that its margin will allow to have up to several million users all over the world utilizing the network simultaneously.

Today the company already possesses all the technologies needed for the cause as well as the communication system prototype already manufactured.