URDE
UNIVERSAL RESEARCH & DEVELOPMENT ENTERPRISE

Approved and Registered Federal Contractor
CAGE Code: 7XH54

The URDE company has developed mathematical foundations for a family of new signal processing technologies in real information transmission systems in noisy channels.

The information transfer technology that we developed and tested on mathematical and hardware stand models allows us to obtain the following main results:

1. Significant (**tens of times**) reduction of the required transmitter power while maintaining reliability and other communication quality indicators. This is equivalent to **not less than a tenfold** reduction in the unit costs of information transmission, due to the increase in the communication distance and the saving of the used frequency band and transmitter power. All this leads to at least a tenfold increase in profitability from the provision of communication services.

2. Essential (**in dozens and hundreds of times**) increase in the data transfer rate while maintaining the existing frequency-energy balance of the channels. This will make it possible to use low-resource physical channels for reliable high-speed transmission of large volumes of information and data. This means acquiring the possibility of higher quality communications using 10-100 times cheaper equipment

3. Multiple increases in the secrecy and security of data transmission through the use of relatively weak signals with a special structure.

4. Creation of new principles for organizing multi-channel communication and multiple access systems. This will allow **several times to increase** the number of simultaneously served subscribers in the fixed physical resource of group channels. The proposed technologies allow the use of even non-orthogonal signal designs of individual channels while ensuring the complete absence of mutual interfering influence. As a result - a **multiple reduction** (up to 10 times) in the cost of creating and operating mobile networks.

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5. Intensification of the use of satellite channels, which will allow **several times to increase** the number of transmitted data without putting new repeaters into orbit. For example, where several satellites are currently used, it is quite possible to get by with just one.

6. Significant increasing the reliability and speed of data transfer between remote objects (for example, navy ships, including submarines) under natural and deliberate interference.

7. Improving the sensitivity, reliability and accuracy of radar and navigation systems which will reduce the amount of expensive equipment and improve the efficiency of real-time remote control, etc.

It is very difficult to accurately assess the economic effect of implementing project results. But taking into account the listed areas of application of our technologies and the effect achieved, we can confidently talk about hundreds of billions of dollars.

Approximate estimates for an example of only two directions:

- Satellite connection.

  The approximate cost of developing, manufacturing and launching (the most expensive part of total cost of a satellite) one satellite into geostationary orbit ranges from $500,000,000 to $1,500,000,000. One satellite provides operation in a frequency band of approximately 500 MHz. Consequently, the cost of 1 Hz bandwidth only at the satellite creation stage ranges from $1 to $3. We increase the specific transmission speed (1 Hz) tens of times while simultaneously increasing transmission reliability. Consequently, for only one satellite we achieve an economic effect comparable to $15,000,000,000. Instead of a dozen satellites, you can use only one.

- Terrestrial radio communication networks (including mobile cellular systems).
  40 years ago, in the work [Berlekamp, E. R. "The Technology of Error-Correcting Codes," Proceedings of the IEEE, Vol 68, No. 5, pp. 564-593, May 1980] the economic effect of an increase in specific energy efficiency by 1 dB for a medium-scale regional network is estimated at approximately $1,000,000. We increase specific energy efficiency tenfold. Therefore, for just one network the effect is at least $10,000,000.

By saving these funds, the manufacturer gains the opportunity to participate in the distribution of very significant profits.

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