

Redtacton

Prof.Vasantkumar Upadhye

*Department of Electrical and Electronics Engineering
Angadi institute of technology and management, Belagavi , Karnataka, India*

Pooja C Kallatti

*Department of Electrical and Electronics Engineering
Angadi institute of technology and management, Belagavi, Karnataka, India*

Abstract- There is new concept of “RED TACTON” which makes the human body as a communication network by name HAN (Human Area Network). NTT lab from Japan is currently testing & developing this revolutionary technology. Red Tacton is the major requirement and advantage for people. Red Tacton uses the minute electric field generated by human body as medium for transmitting the data. The chips which will be embedded in various devices contain transmitter and receiver built to send and accept data in digital format. In this paper we consider about red tacton, its working principle, different applications and future development of redtacton.

Keywords – Red Tacton, Network, NTT.

I. INTRODUCTION

Communication plays an important role in our life. Our life will be simple if safe, secure and easy communication is possible. RedTacton is a new Human Area Networking technology that uses the surface of the human body as a safe, high speed network transmission path. RedTacton uses the minute electric field emitted On the surface of the human body. Technically, it is completely distinct from wireless and infrared .A transmission path is formed at the moment a part of the human body comes in contact with a RedTacton transceiver. Physically separating ends the contact and thus ends communication Using Red Tacton, communication starts when terminals carried by the user or embedded in devices are linked in various combinations according to the user's Communication is possible using any body surfaces, such as the hands, fingers, arms, feet, face, legs or torso.

This technology was developed by Japanese Company Nippon Telegraph and Telephone Corporation. The NTT labs has announced that it is currently testing a revolutionary technology called “ red tacton ”,which uses the electric fields generated by the human body as medium for transmitting the data . The chips which will be embedded in various devices contain a transmitter and receiver built to send and accept data in digital format. The chips can take any type of file such as mp3 music file or mail and convert it in to the format that takes the form of digitals pulse that can be passed and read through a human being electric field .the chip in receiver devices reads these tiny changes and convert the file back into its original for.

II. CONCEPT OF REDTACTON

However, they each have various fundamental technical limitations that constrain their usage, such as the precipitous fall-off in transmission speed in multi-user environments producing network congestion

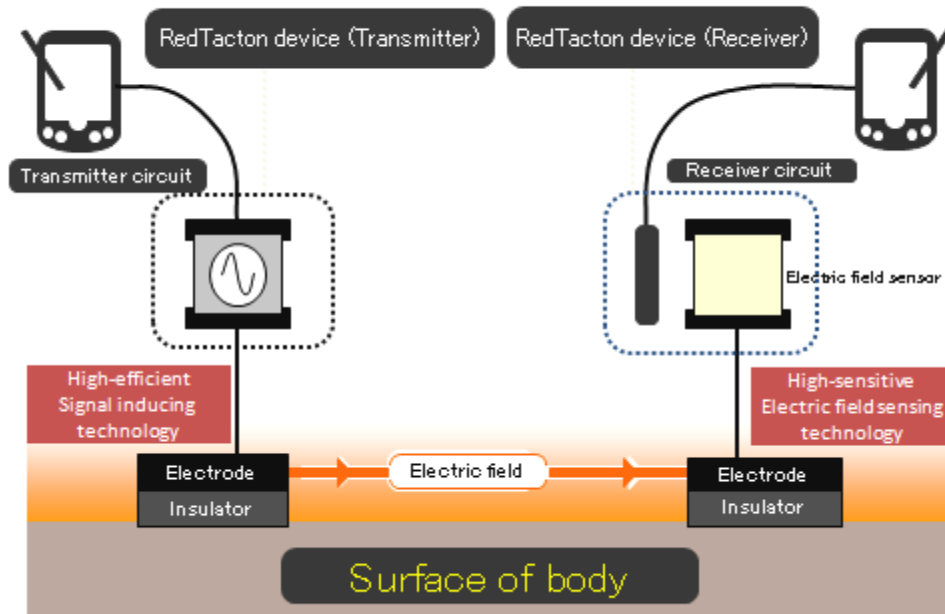
1. RedTacton uses the minute electric field emitted on the surface of the human body. Technically, it is completely distinct from wireless and infrared.
2. A transmission path is formed at the moment when a part of the human body comes in contact with a RedTacton transceiver. Physically separating ends the contact and thus ends the communication.
3. Using RedTacton, communication starts when terminals carried by the user or embedded in devices are linked in various combinations according to the user's natural, physical movements.
4. Communication is possible using any body surfaces, such as the hands, fingers, arms, feet, face and legs. RedTacton works through shoes and clothing as well.

III. BASIC PRINCIPLE

The basic principles of RED TACTON are

1. The RedTacton transmitter induces a weak electric field on the surface of the body.

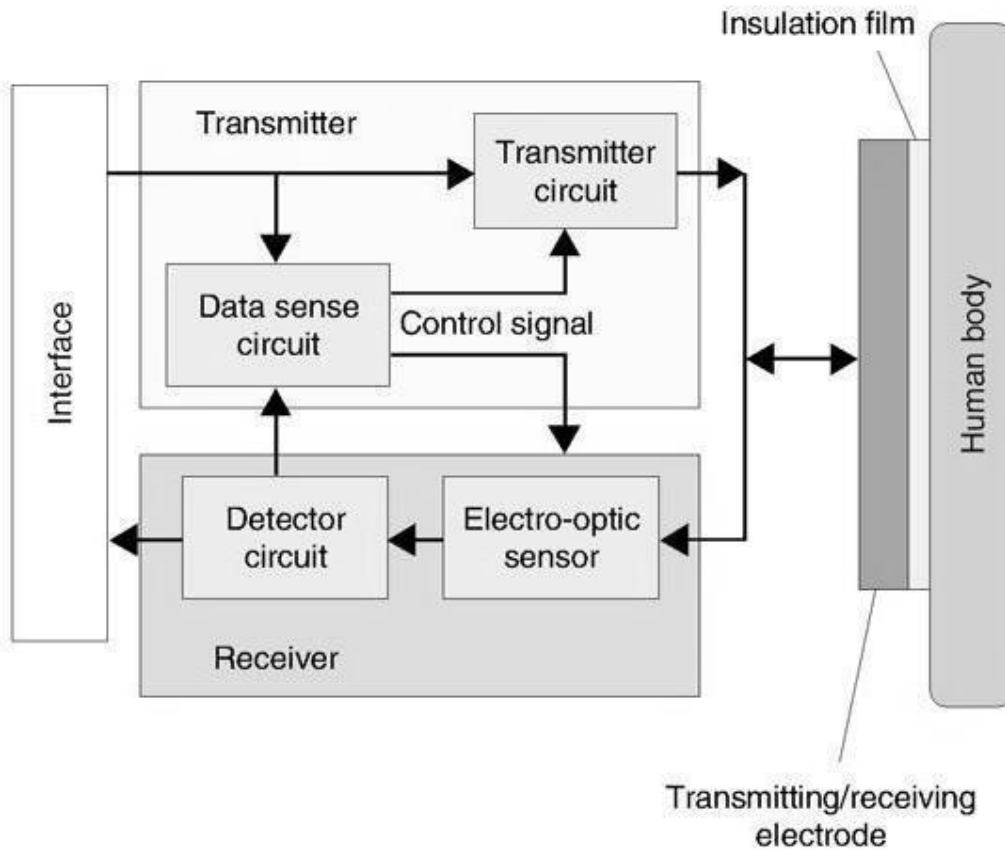
2. The RedTacton receiver senses changes in the weak electric field on the surface of the body caused by the transmitter.
3. RedTacton relies upon the principle that the optical properties of an electro-optic crystal can vary according to the changes of a weak electric field.
4. RedTacton detects changes in the optical properties of an electro-optic crystal using a laser and converts the result to an electrical signal in an optical receiver circuit.



ABOVE FIGURE SHOWS THE WORKING OF THE RED TACTON DEVICE OVER THE SURFACE OF OUR BODY. THE TRANSMITTING RED TACTON DEVICE CHANGES THE ELECTRIC FIELD ON THE SURFACE OF OUR BODY. THIS SENSED BY THE ELECTRIC FIELD SENSOR AND THE VARIATIONS ARE GIVEN TO THE RECEIVING RED TACTON

IV. REDTACTON TRANSCEIVER

Figure below shows the block diagram of a RED TACTON transceiver. The signal from the interface is sent to the data sense circuit and the transmitter circuit. The data sense circuit senses the signal and if the data is present it sends control signal to the transmitter which activates the transmitter circuit. The transmitter circuit varies the electric field on the surface of our body. This change in the electric field is detected by the electro-optic sensor. The output of the electro-optic sensor is given to the detector circuit, which in turn given to the interface of the receiving RED TACTON device.



Block diagram of Red TACTON transceiver

V. WORKING PROCEDURE

“RedTacton” takes a different technical approach. Instead of relying on electromagnetic waves or light waves to carry data.

- RedTacton uses weak electric fields on the surface of the body as a transmission medium.
- “RedTacton relies upon the principle that the optical properties of an electro-optic crystal vary according to the changes of a weak electric field”
- A RedTacton transmitter couples with extremely weak electric fields on the surface of the body
- The weak electric fields pass through the body to a RedTacton receiver, where the weak electric field affects the optical properties of an electro-optic crystal.
- The extent to which the optical properties are changed is detected by laser light which is then converted to an electrical signal by a detector circuit.

Using a new super-sensitive photonic electric field sensor, RedTacton can achieve duplex communication over the human body at a maximum speed of 10 mbps. The RedTacton transmitter induces a weak electric field on the surface of the body. The RedTacton receiver senses changes in the weak electric field on the surface of the body caused by the transmitter. RedTacton relies upon the principle that the optical properties of an electro-optic crystal can vary according to the changes of a weak electric field. RedTacton detects changes in the optical properties of an electro-optic crystal using a laser and converts the result to an electrical signal in an optical receiver circuit. The transmitter sends data by inducing fluctuations in the minute electric field on the surface of the human body. Data is received using a photonic electric field sensor that combines an electro-optic crystal and a laser light to detect fluctuations in the minute electric field.



The naturally occurring electric field induced on the surface of the human body dissipates into the earth. Therefore, this electric field is exceptionally faint and unstable. The photonic electric field sensor developed by NTT enables weak electric fields to be measured by detecting changes in the optical properties of an electro-optic crystal with a laser beam.

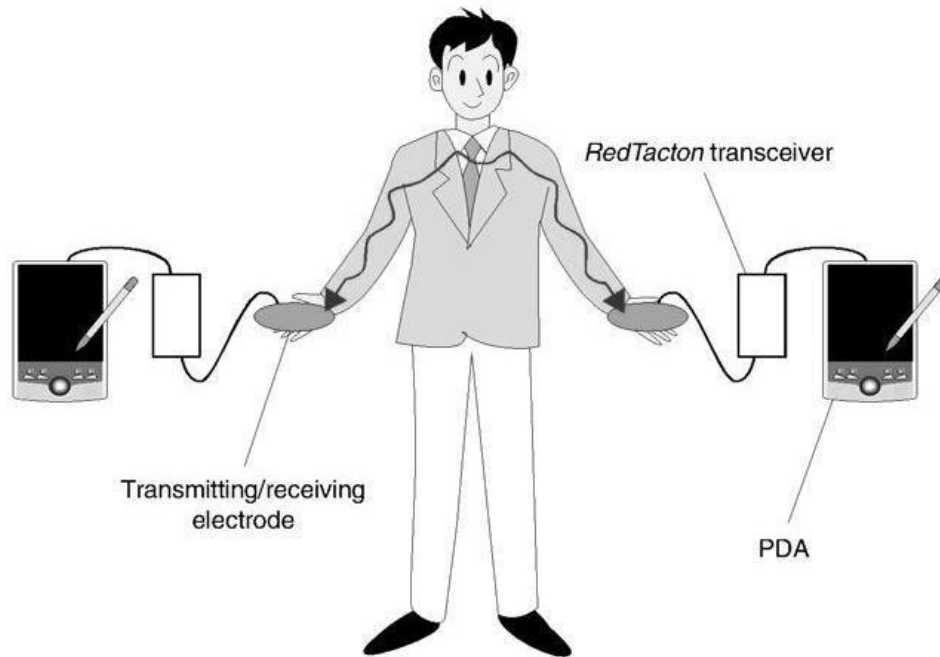


Fig. 4. Experimental setup for intrabody communication.

VI. HUMAN SAFETY

We investigated the effects of Red Tacton technology on human health, which is obviously an important issue. First as shown in figure on the previous page, the transmitting and receiving electrodes of the Red Tacton receiver are completely covered with insulating film, so the body of the person acting as a transmission medium is completely insulated. This makes it possible for current to flow into a person's body from a transceiver. When communication occurs, displacement current is generated by the electrons in the body because the body is subjected to minute electrical fields. However such displacement currents are very common everyday occurrences to which we are all subjected.

Red Tacton conforms to the "Radio Frequency- Exposure Protection Standard (RCR STD-38)" [6 issued by the association of Radio industries and business (ARIB). The levels produced by Red Tacton are well below the safety limit specified by this standard.

VII. APPLICATIONS

1. One to one services

With the ability to send attribute data from personal information devices worn on the body to computers embedded in the environment, one-to-one services could be implemented that are tailored to the individual needs of the user.

2. Intuitive operation of personal information

Communication is triggered by totally natural human actions and behavior, so there is no need to insert smart cards, connect cables, tune frequencies, or any of the other inconveniences usually associated with today's electronic devices.



A simple handshake can transfer data.

Device personalization

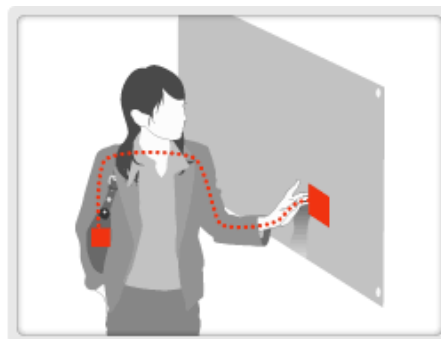
Setup, registration, and configuration information for an individual user can all be uploaded to a device the instant the device is touched, eliminating the need for the device to be registered or configured in advance.

3. New behavior patterns

Tables, walls, floors and chairs can all act as conductors and dielectrics, turning furniture and other architectural elements into a new class of transmission medium. For example, a user could have instant access to the Internet merely by placing a laptop onto a conductive tabletop.

4. Marketing applications

When a consumer stands in front of an advertising panel, advertising and information matching his or her attributes is automatically displayed. By touching or standing in front of items they are interested in, consumers can get more in-depth information.



A customer touching the advertising panel and getting information about that advertisement through RED TACTON device

5. Security applications

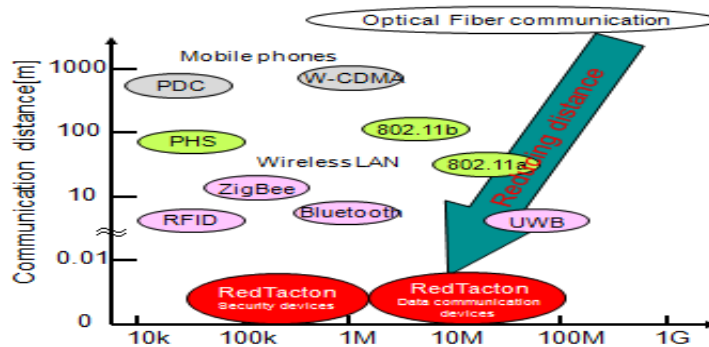
RedTacton could be installed on doors, cabinets and other locations calling for secure access, such that each secure access could be initiated and authenticated with a simple touch. At the same time, all the transaction details and relevant user attributes (personal identity, security clearance, etc.) could be logged by the security system. The transmitting and receiving electrodes of the RedTacton transceiver are completely covered with insulating film. When communication occurs, displacement current is generated by the electrons in the body because the body is

subjected to minute electrical fields. However, such displacement currents are very common everyday occurrences to which we are all subjected.

VIII. COMPARISON WITH OTHER NETWORKS

The chart below shows the positioning of RedTacton with respect to existing communication technologies. The focus on ubiquitous service has brought about the shortening of distances in communication. RedTacton is positioned as the last 1m solution to ultimate close-range communication. Wireless communication creates connections when signals arrive, allowing for easy connections because connectors are unnecessary. However, seen from another aspect, the arriving signals can be intercepted, so security becomes an issue.

Several "human body communication" technologies using the human body as a transmission medium have been reported in the past. But RedTacton employs a proprietary electric field/phonics method, which surpasses the other methods in terms of communication distance, transfer speed, and interactivity. Wired communication transmits data between two connection points, so interception is difficult and security can be considered to be high. However, connectors and cables are a nuisance. Taking the above points in account, RedTacton is situated directly between wireless and wired communication. In other words, RedTacton allows for easy connection without connectors, while at the same time allowing transmission of data only between two contact points. It thus has the feature of being difficult to intercept.



Above Figure shows the comparison of RED TACTON device with other networks with respect to distance.

IX. ADVANTAGES

- RedTacton does not require the electrode be in direct contact with the skin.
- High-speed communication is possible between two arbitrary points on the body.
- Body-based networking is more secure than broadcast systems ,such as Bluetooth which have high range of about 10m.
- Network congestion due to fall in transmission speed in multiuser environments is avoided.
- Superior than Infrared technology
- Superior than Wi-Fi.
- Data transfer during transfer is less.
- Use of minimum amount of power (of some mill volt range).
- Advantage Over Bluetooth:

While it is true that similar personal area networks are already accessible by using radio-based technologies like Wi-Fi or Bluetooth, this new wireless technology claims to be able to send data over the human skin surface at transfer speeds of up to 10Mbps, or better than a broadband T1 connection. Receiving data in such a system is more complicated because the strength of the pulses sent through the electric field is so low. RedTacton solves this issue by utilizing a technique called electric field phonics: A laser is passed though an electro-optic crystal, which deflects light differently according to the strength of the field across it. These deflections are measured and converted back into electrical signals to retrieve the transmitted data.

X. FUTURE DEVELOPMENTS

RedTacton has a wide range of unique new functional features and enormous potential as a Human Area Networking technology. NTT is committed to quickly identifying and opening up those application areas with the the most commercial promise for RedTacton, a business development process to be coordinated under NTT's Comprehensive Producer Function program.

RedTacton, which looks remarkably like a big pot of kryptonite is said to allow over 200kbps of data through the human hands or feet.

Telecom giant Nippon Telegraph and Telephone Corp. (NTT) is planning a commercial launch of a system to enter rooms that frees users from the trouble of rummaging in their pockets or handbags for ID cards or keys.

How does it work?

As data travels through the user's clothing, handbag or shoes, anyone carrying a special card can unlock the door simply by touching the knob or standing on a particular spot without taking the card out.

Applications

Walk-through ticket gate, a cabinet that opens only to authorized people and a television control that automatically chooses favorite programs.

The system also improves security. It ensures that only drivers can open their cars by touching the doors if the keys are in their pockets, not people around them.

It uses technology to turn the surface of the human body itself into a means of data transmission.

XI. CONCLUSION

The need for artificial body implants to communicate with each other as well as to report back to a portable device could have quite some value. In fact, according to other researchers, the most important application for body-based networking may well be for these type of communications within, rather than on the surface of, or outside, the body.

RedTacton technology is expected to dominate Bluetooth technology in the future. RedTacton technology could put the use of cables to an end. The problem faced by the RedTacton technology is the cost of development. This technology brings a new dimension of communication which effectively links the user to anyone he wants to communicate. Since it provides high speed communication, it can provide seamless service wherever, whenever and whoever uses it.

REFERENCES

- [1] Sayli M. Rane., Vishakha V. Dalvi., Bhushan Gaikwad., Sanchita D. Balsarf. International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 2 Issue: 1 160 – 164
- [2] Vidhu Rawal¹, Ashutosh Dhamija², Sonam Gupta³ ^{1,2Assistant Professor, ECE Deptt. JMIT, Radaur 3M.Tech Student (ECE Deptt.), SDD Institute of Engg. & Tech., Barwala}
- [3] Gurpreet Singh, Jaswinder Singh University College of Engineering (UCoE), Punjabi University, Patiala, India
- [4] wikipedia.(Februay2009)RedTacton[Online].Available:<http://en.wikipedia.org/wiki/RedTacton>
- [5] NTT (February 2005). "RedTacton: An innovative Human Area Networking technology"
- [6] "Basic Overview of HumanArea NetworkingTechnology". [Online] Available:<http://discuss.itacumens.com/index.php?top>