



Red Tacton

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Abstract

This paper describes a model of HAN (Human Area Networking technology) that enables communication by touching, a technology we call it as Red Tacton. The technology is called TACTON because this influences communication, that starts by touching (Touch) leading to various actions (ACTON). Red is used to convey the meaning of warmth in communication. Red Tacton was one of the advanced Pervasive technology that are genuinely user-friendly to everyone will require technologies that enable communication between people and objects in close proximity. Nippon Telegraph and Telephone Corporation (NTT) lab from Japan is currently testing & developing this revolutionary technology. Red Tacton uses IEEE 802.3 standard to achieve a data rate of 10Mbps. Red Tacton transceivers use the body's electrical field to transmit digital messages. Optical crystal and laser technology converts the changes in electrical field back into a signal at the receiver. This method of data transfer is harmless. We can imagine our future crawl with antenna and emitters. In this world, there is a place for human being as a data transmitter. This is a tough competitor for the wireless network. The Red Tacton is a technology different from the wireless technology but this idea is trending one. This method is user friendly and fast. It is the developing technology which is currently growing effectively and efficiently in the field of networking. This paper presents a review of Red Tacton and its practice in authorization.

Index Terms: Red Tacton, Human Area Networking, NTT, Network.

1. Introduction

Communication plays very important role in everyone's life. Our life is safe if safe, simple and easy communication is possible. Due to the growth of wireless communication technology, we can imagine our future is a place crawling with antennas and emitter and on this place, there is a huge place for human body as a media of data transmission. 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. 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 "RedTacton", 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 digital 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.

1.1 What is Red Tacton?

The Human Society is entering in the era of the omnipresent computing, where any information is available on figure tip as everything is in a network.

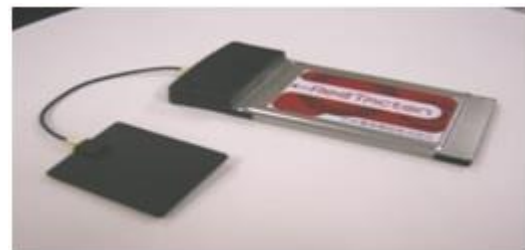


Fig-1: Red Tacton

RedTacton is a point to point networking concept which uses human body as a communication network by name HAN (Human Area Network). 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 RedTacton, 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 anybody surfaces, such as the hands, fingers, arms, feet, face, legs or torso. RedTacton works natural, physical movements.

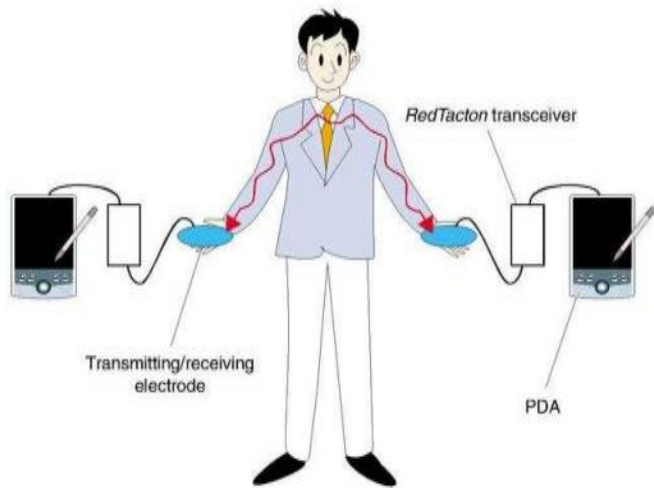


Fig-2: Experimental setup of Red Tacton

2. Working Principle

The Transmitter embedded in Red Tacton device transmit a data based on fluctuation in the electric field is induced in human body. The receiver placed on Red Tacton device which receive data senses the change happened in electrical field of body which happened by inducing the data by transmitter. The Red Tacton relies upon the principle that the optical properties of an electro-optic crystal can vary according to the changes of a weak electric field. Red Tacton detects changes in the optical properties of an electro-optic crystal using a laser and converts the result to an electrical signal in a optical receiver circuit.

Using a new super-sensitive photonic electric field sensor, Red Tacton can achieve duplex communication over the human body at a maximum speed of 10 Mbps.

Note- Red Tacton Transceiver which works as transmitter and receiver is also available. The physical layer does transmission and reception alternatively (half duplex communication) using the proprietary protocol called CSMA/CD Protocol.

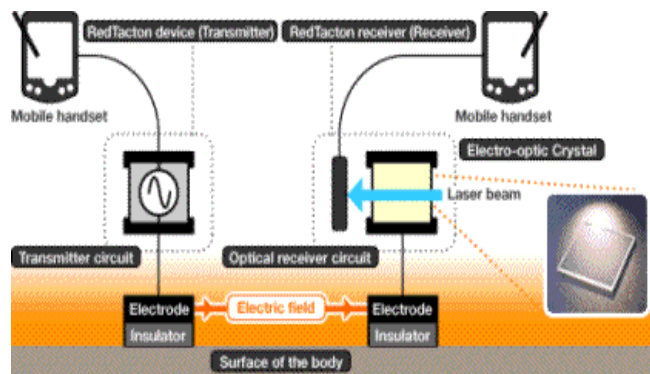


Fig-3: Working of Red Tacton

3. Mechanism of communication with Red Tacton

The Red Tacton transmitter sends the data to the body by inducing fluctuations in the minute electric field on the surface of human body. The Electric field in the human body is not very strong due to electric field is returning it towards the ground and which is dissipated by the Earth. Receiver receive the signals using photonic electric field sensor which is the combination of an electro-optical crystal and a laser light which detects the fluctuations in the minute electric fields. This sensor measures faint electric fields by using a laser beam to detect fluctuations in the optical

properties of an electro-optic crystal that are caused by peripheral electric fields.

The crackling sensation one feels when shocked by static electricity is caused by an electric current of several dozen milli-amperes suddenly flowing into the body from the outside. The Red Tacton transmitter is covered with insulating material, therefore there is no chance of getting electric current inside the body i.e. no chance of getting electrical shock. However, as in mobile phones, a weak induction current is created in the body owing to the minute electric field created near the body when the movement occurs. This induction current is very weak as similar to those occurring in everyday life. There is no chance of harm due to this weak electric current. The size of the induction current emitted on the body with Red Tacton is in conformity with the "Radio Frequency-Exposure Protection Standard <RCR STD-38> established by the Association Radio Industries and Businesses (ARIB).

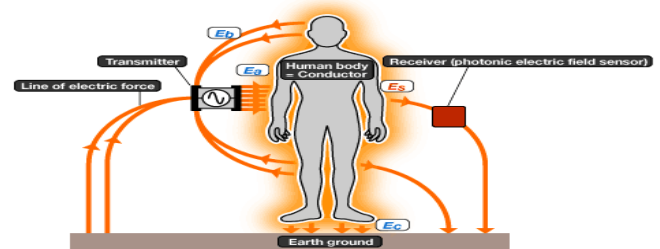


Fig-4: Mechanism of Communication

4. Human Safety

Investigating the effects of Red Tacton technology on human health, which is obviously an important issue. 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. From this concept we can, say that Red Tacton is the current safe.

5. Features of Red Tacton

1) Touch: Communication takes place by a simple touch, which spontaneously initiates the flow of data between the two devices. For example, two people equipped with Red Tacton devices could exchange data by just shaking hands. Using Red Tacton Touching, gripping, sitting, walking, stepping and other human movements can be the triggers for unlocking or locking, starting or stopping equipment, or obtaining data. Using Red Tacton, communication starts when terminals carried by the user or embedded in devices are linked in various combinations through physical contact according to the human's natural movement.

2) Broadband & Connectivity: Broadband and Interactive Duplex, interactive communication is possible at a maximum speed of 10Mbps. Because the transmission path is on the surface of the body, transmission speed does not deteriorate in congested areas where many people are communicating at the same time. Communication speed can deteriorate in crowded spaces due to a lack of bandwidth. Device drivers can be downloaded instantly and executable programs can be quickly sent.

3)Any Media: In addition to the human body, various conductors and dielectrics can be used as transmission media. Conductors and dielectrics may also be used in combination. A communication environment can be created easily and at low-cost by using items close at hand, such as desks, walls, and metal objects. But there is one limitation on the length of the conductor to be propagated, on installation locations, and on the thickness of the dielectric to be passed through.



Fig-5: Features of Red Tacton

6. Application of Red Tacton

6.1) Instant private data shearing.

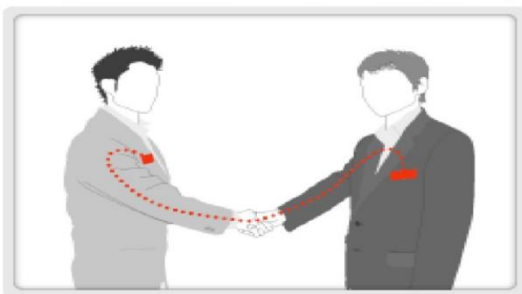


Fig-6.1: Instant private data shearing

By shaking hands, personal profile data can be exchanged between mobile terminals on the user. (Electronic exchange of business cards) Communication can be kept private using authentication and encryption technologies. Group photos taken with digital cameras are instantly transferred to individual's mobile terminal. Diagrams written on white boards during meetings are transferred to individual's mobile terminals on the spot.

6.2) Authentication mechanism

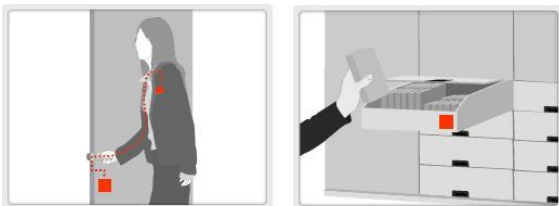


Fig-6.2: Authentication mechanism

Automatic user authentication and log-in with just a touch. ID and privileges are recorded in a mobile RedTacton device. Corresponding RedTacton receivers are installed at security check points. The system can provide authentication and record who touched the device, and when.

6.3) Authorization system.



Fig-6.3: Authorization system

When the person stands in front of authentication mechanism the device sensor senses the people by touch. The data present in his/her batch card may get check in the database and if the match of that data gets found then the authentication of the people is successful.

6.4) Conference system

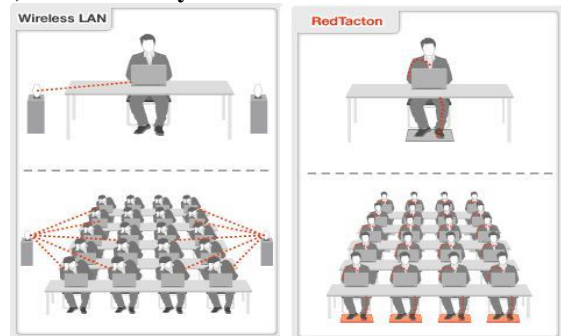


Fig-6.4: Conference system

An electrically conductive sheet is embedded in the table. A network connection is initiated simply by placing a laptop on the table. Using different sheet patterns enables segmentation of the table into subnets. Walls and partitions can be used as communication media, eliminating construction to install electrical wiring. Ad hoc networking using conductive liquid sprays is possible.

7. 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.

8. Disadvantages

- It has no compelling applications that aren't already available.
- Too costly.
- It can be useful within centimeter.
- Effects on human body is still under research.

9. Issues

- There is no interface in Wireless communication and Red Tacton communication as both are totally different from each other. However, communication may not be possible in some circumstances where the electric field is influenced by a powerful source of noise in the usage environment.
- The physical layer enables half-duplex communication (transmission and reception are done alternatively) using the proprietary CSMA/CD protocol. As with Ethernet cards, each transceiver card has a unique MAC (medium access control) address. The upper layer above this is compliant with standard TCP/IP protocols.
- Multiple transceivers can be used simultaneously. This is because Red Tacton uses a proprietary CSMA/CD (Carrier Sense Multiple Access with Collision Detection) protocol that allows multiple accesses with the same medium from multiple nodes.

10. CONCLUSION

Red Tacton is one of the best adaptive technology for short distance communication. It is done by interface of human which is one of the most effective technology for communication. The communication also provides high speed i.e. 10mbs which is very good for short distance communication. Red Tacton has created a transmitter to send data through human body without affecting body. On the other side receiver i.e. Photonic electric sensor receives the data from Transmitter.

Red Tacton provides various application with less fault tolerance and it can be supportive for mobile devices also. It has many important features such as Touch, Bandwidth, media. It also has high security as data is transmitting through human it cannot be hacked. The evolution of Red Tacton technology is growing very fast which is a high achievement for these complicated projects. Finally, I conclude that Future is full of Interactive Environment which will be mostly depended on Red Tacton Technology.

REFERENCES

- [1] <https://www.en.wikipedia.org/>
 [2] ISSN 2320-5407 International Journal of Advanced Research (2014), Volume 2, Issue 9, 177-179.

- [3] IOSR Journal of Computer Engineering (IOSR-JCE) e-ISSN: 2278-0661, p- ISSN: 2278-8727 Volume 14, Issue 5 (Sep. - Oct. 2013), PP 52-56.
 [4] Ankit Verma, "Intra-body Communication using RedTacton - Human Area Network Technology", IJERS International Journal of Engineering Research and Studies, Vol. 01, August 2013.
 [5] Gurpreet Singh, Jaswinder Singh." Red Tacton", IJCST Vol.2, Nos 3,2011.
 [6] J.Arun Prakash, "Red Tacton: An Innovative Human Area Networking Technology", Advances in Digital Multimedia (ADMM).
 [7] Sayli M. Rane, Vishakha V. Dalvi, Bhushan Gaikwad and Sanchita D. Balsarf, "Red Tacton", International Journal on Recent and Innovation Trends in Computing and Communication, Volume 2, Issue 1.