# Red Tacton: An Emerging trend in Communication

Miral S. Patel,
Email : miral9036@gmail.com
IDS, Nirma University,
Ahmedabad-382481, Gujrat, India

Karuna A. Mahajan,
Email : karuna_mahajan@nirmauni.ac.in
IDS, Nirma University,
Ahmedabad-382481, Gujrat, India

***Abstract*** **- Human area networking (HAN) is an emerging trend in the field of communication. Red tacton is a technology that uses human body as a medium for transfer of data. Red tacton uses IEEE 802.3 standard to achieve a data rate of 10 Mbps. 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. This method is user friendly and fast. It also has an additional advantage of being independent of the environment in which it is used in. This paper describes briefly about this emerging technology, its features and applications.**

***Keywords****-Red Tacton, Human area Network, LAN, MAN, WAN.*

## I. INTRODUCTION

People can communicate anytime, anywhere, and with anyone over a cellular phone network. Moreover, the Internet lets people download immense quantities of data from remotely located servers to their home computers. Essentially, these two technologies enable Communications between terminals located at a distance from each other. User-friendly ubiquitous services involve more than just networking between remotely located terminals.

Communication between electronic devices on the human body (wearable computers) and ones embedded in our everyday environments is also critical, so this has driven extensive research and development on human area networks.

**Red Tacton** is a new Human area networking technology which uses human body as a high speed transmission path Short-range wireless comm- unication systems such as Bluetooth and wireless local area networks have some problems. Throughput is reduced by packet collisions in crowded spaces such as meeting rooms and auditoriums filled with people and communication is not secure because signals can be intercepted. The principle drawback of infrared communications (IrDA) is the tight directionality of beams between terminals needed for the system to be effective. The ultimate human area network solution to all these constraints of conventional technologies is "i**ntrabody**" communication, in which the human body serves as the transmission medium. Human society is entering an era of ubiquitous computing, where everything is networked .By making Human Area Networks feasible, Red Tacton will enable ubiquitous services based on human-centered interactions and therefore more intimate and easier for people to use. In ubiquitous services, if we could use the human body itself as a transmission medium, then this would be an ideal way of implementing human area networks because it would solve at a stroke all the problems including throughput reduction, low security, and high network setup.

The rest of the paper is organized as follows. Section II describes about History of the Red Tacton. Section III gives the details regarding the working of the Red Tacton. The comparison of Red Taction with other technologies and advantages are given in section IV and V respectively while section VI describes the applications of Red Tacton. Finally, conclusion is presented in Section VII.

## II. HISTORY OF RED TACTON

The concept of intrabody communication, which uses the minute electric field propagated by the human body to transmit information, was first proposed by IBM . The communication mechanism has subsequently been evaluated and reported by several research groups around the world. However, all those reported technologies had two limitations: that are the operating range through the body was limited to a few tens of centimeters and the top communication speed was only 40kbit/s. These limitations arise from the use of an electrical sensor for the receiver. An electrical sensor requires two lines (a signal line and a ground line), whereas in intrabody communication there is essentially only one signal line, i.e., the body itself, which leads to an unbalanced transmission line, so the signal is not transmitted correctly The system, called RedTacton, grew out of a different research project and came about somewhat by accident. Nippon Telegraph & Telephone Corp., (NTT) researchers were working on an ultra-sensitive system for measuring voltages in chip circuits, when an engineer discovered by chance that his body could carry a weak signal. Work began on that discovery

as an additional project, and thus RedTacton was born. NTT has started working to perfect the networking technology RedTacton, which could ultimately let people transfer data to each other's handhelds by means of a handshake or a slap on the back.

## III. WORKING

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.

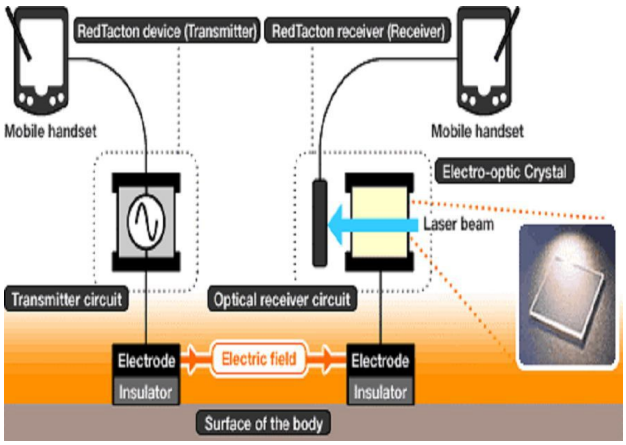


Fig. 1 Red Tacton Transceiver

A transmission path is formed at the moment a part of the human body comes in contact with a RedTacton transceiver. The RedTacton transmitter induces a weak electric field on the surface of the body. The transmitter consists of a transmitter circuit that induces electric fields toward the body and a data sense circuit, which distinguishes transmitting and receiving modes by detecting both transmission and reception data and outputs control signals corresponding to the two modes to enable two-way communication. The RedTacton receiver senses changes in the weak electric field on the surface of the body caused by the transmitter. The receiver consists of an electro-optic sensor and a detector circuit that 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. A series of trials have been conducted in which data was sent through human bodies using RedTacton transceivers. 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.

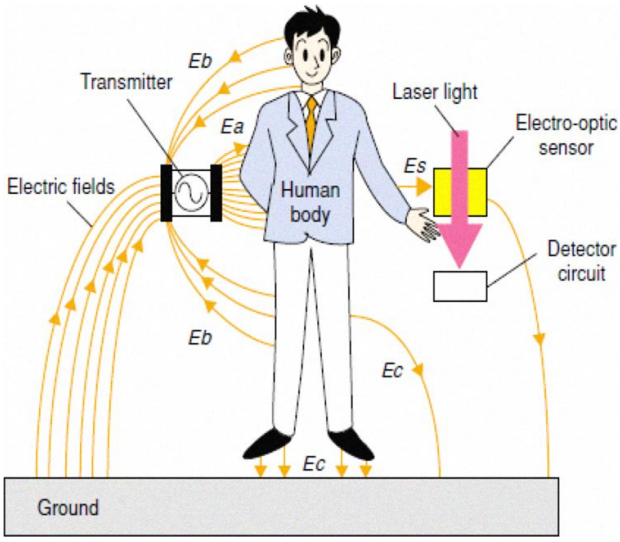


Fig. 2 Principle of RedTacton [3]

The operating principle of RedTacton is illustrated in the above figure. The electric field induced toward the body by the transmitter's signal electrode is represented by Ea . The system requires a ground close to the transmitter signal electrode, so electric field Eb induced from the body can follow a return path to the transmitter ground. Moreover, since people are usually standing on a floor or the ground, electric field Ec escapes from the body to ground, mainly from the feet. The electric field Es that reaches the receiver is Es.

Es = Ea – (Eb + Ec ).

It couples to the electro-optic crystal and changes the crystal's optical proper- ties. This change is detected by laser light and transformed into digital data by a detector circuit.

## IV. COMPARISON WITH OTHER TECHNOLOGIES

1. RedTacton has high transfer speed than wireless and infrared network technologies.
2. Simultaneous use by many people in small space is efficient performed by RedTacton compared to LAN and close-range wireless
3. Using RedTacton the specification of user positioning is excellent than infrared ,close-range wireless, LAN etc
4. Now comparing with other human area networking, duplex communication i.e., communication between mobile terminals and between mobile terminals & external equipment is possible through RedTacton.
5. Communication is possible anywhere on the body where as in amperage electric and voltage

electric technologies it is possible through elbow to fingertip and wrist to fingertip respectively.

6. Speed of communication is up to 10Mbps in RedTacton where as it is only 3kbps and 1kbps respectively for the above mentioned technologies.

## V. ADVANTAGES

1. It is a wireless communication.
2. Two-way communication is supported between any two points on the body at a throughput of up to 10 Mbps.
3. RedTacton can utilize a wide range of materials as a transmission medium, as long as the material is conductive and dielectric, which includes water and other liquids, various metals, certain plastics, glass, etc. Using ordinary structures such as tables and walls that are familiar and readily available, one could easily construct a seamless communication environment at very low cost using RedTacton .

## VI. APPLICATIONS

1. RedTacton devices embedded medicine bottles transmit information on the medicines' attributes.
2. 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.
3. Print out where you want just by touching the desired printer with one hand and a PC or digital camera with the other hand to make the link Complicated configurations are reduced by downloading device drivers "at first touch".
4. By shaking hands, personal profile data can be exchanged between mobile terminals on the users. (Electronic exchange of business cards)
5. Communication can be kept private using authentication and encryption technologies.

## VII. CONCLUSION

RedTacton is an exciting new technology for human area networking. A transceiver electric-field sensor that uses an electro-optic crystal and laser light. RedTacton provides an independent transmission path for each individual person (that is, for each conductor) even in congested places, so it provides very secure, fast communication without any interference. Almost anything that acts as a conductor—a human or animal body, water, metal, etc.—can serve as a RedTacton transmission path. This means that there is no need for a dedicated cable or antenna. The main objective is to implement a RedTacton system supporting two-way intrabody communication at a rate of 10 Mbps between any two points on the body, more researches are being conducted to reduce the size and power consumption of the transceiver to enhance its portability.

## REFERENCES


[1] Mitsuru Shinagawa, Katsuyuki Ochiai, Hideki Sakamoto,and ToshiakiAsahi,"Human Area Networking Technology: RedTacton" ,*NTT Tech Rev*,VoI.3,No.5, May 2005.

[2] Thomas G. Zimmerman,"Personal Area Networks: Ncar-Field IntrabodyCommunication", *IBM Systems Journal*,VoI.35,Nos.3/4,1996.

[3] Srikkanth Govindaraajan and Saranya , " MR.TACTON (MBEDDED RED TACTON)" *2nd International Conference on Power Electronics and Intelligent Transportation System*, 2009.

[4] Debnath Bhattacharyya, Poulami Das, Tai-hoon Kim,and Samir Kumar Bandyopadhyay,"Vascular Pattern Analysis towards Pervasive Palm Vein Authentication ",*Journal of Universal Computer Science*,VoI.15,No.5,March 2009

[5] www.jntuworld.com