To: Prof. Jasmina Najjar

From: XXXXXXXXXXXXxxxx

Date: Wednesday, October 27, 2011

Subject: Proposal to research the possibility of data transfer using LEDs.

**Overview**

**Background information**

In today’s day and age, high-speed wireless communication has become a must. 74% of American adults use the internet, and around 74% of them connect to the internet wirelessly (Lee Rainie, 2010). There are more than 5 billion mobile subscriptions in the world (Ian Mansfield, 1 February 2011).

Today, all these devices communicate using **radio waves.**

In recent years, scientific research has led to the emergence of a new way of communication: “Wireless Data transmitted through LED”.

LEDs, or Light-Emitting Diodes, can be turned on and off very quickly, while traditional light bulbs cannot. By inserting them with microchips, we can turn LEDs on and off at a specific frequency, too high for the human eye to notice. In this fashion, one can transmit data to a receiver, much like Morse code.

**Why do we need it?**

* Radio waves have a smaller spectrum of frequencies than that of visible light, and **we are running out of it.**
* There are 1.4 million cellular radio masts throughout the world. They are only **5% efficient** (Harald Haas, 2011).
* Radio waves **cannot be used everywhere**: in places near MRI machines in hospitals, in airplanes, or underwater.
* In mobile communication, radio waves are sometimes **received by the wrong mobile phone.**
* **Data transmission slows down** when too many people are on the internet or their phones.
* Wireless reception can change drastically from one region to another. **It is not always reliable.** (New York Society Library, June 2003).

In contrast, light is everywhere, has always been, and has a broader spectrum of possible frequencies one can use (Harald Haas, 2011). By using light as a platform for wireless communication, it can become available everywhere

**Credibility: Why this, and Why Us.**

Original research

Harold Haas, professor Electrical Engineering at Jacobs University since the year 2000, has been conducting research on the subject.

He has a PhD in Electronics and Electrical Engineering, and is the recipient of multiple awards, of which the Honorary Fellowship of the Faculty of Science and Engineering in 2001, awarded by the university of Edinburgh, UK.

Our team

\_\_\_\_\_\_\_\_ is majoring in Computer and Communications Engineering, which means the transmission of wireless data through light is very relevant to his field of study.

All other team members are majoring in Mechanical Engineering: we will be greatly concerned with the machines that will make use of such a technological advancement.

Problem analysis

While researching on the topic, the following questions arose:

* Is it cost-efficient?
* Is it environment-friendly?
* What are its limitations?
* Can it be available everywhere?
* Does it restrict your mobility to the lighten area?
* Does it restrict the number of people using it?
* Does it have any side effects on our health, the environment, or animals?
* What new prospects does it open?
* Can it totally replace radio wave-transmitted information?

**Scope and limitations:**

We nevertheless decided to narrow down our work to the following points:

**Scope**

* Reliability: is it as reliable as Wi-Fi?
* Availability: who, where and how will we have internet access?
* Practicality
* Economical aspect
* Environmental effects
* Security and Privacy

**Limitations**

Due to time limitations, we will restrict our research to the above points. Were we not limited; we would have liked to research the possible effects on pets, human health, and the possible social repercussions.

**Procedures**

In order to get the most accurate information possible, we will only make use of primary and secondary sources:

**Primary**

* An interview with an Electrical and Communication Engineer, or a Computer and Communication Engineer.
* A survey conducted on AUB students.

**Secondary**

* Library resources
* Web research.

**Deadlines**

November 18: Research outline deadline.

December 16: Research draft deadline.

December 23: Research report deadline.

References

http://infousa.state.gov/economy/technology/docs/51246EBFd01.pdf

[radio wave](http://www.credoreference.com/entry/hmsciencedict/radio_wave). (2005). In The American Heritage Science Dictionary. Retrieved from <http://www.credoreference.com/entry/hmsciencedict/radio_wave>

<http://www.itu.int/ITU-D/ict/newslog/Mobile+Broadband+Subscriptions+To+Hit+One+Billion+In+2011.aspx>