

# Development of virtual instrumentation on mobile devices

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## Introduction

The virtual instrumentation can be defined as a layer of software and/or hardware, added to a general purpose computer, so that users can interact with the computer in the same way that they interacted with traditional electronic instruments such as oscilloscopes, multimeters and signal generators. The virtual instrumentation obtains a new integration environment which has not been well explored yet, compared with the great growth that occurred in the mobile devices area. Nowadays it is possible to take measurements in more places by combining mobile devices with data acquisition hardware to create extremely portable and interconnected measurement systems. This report shows the development of software and hardware that makes possible the use of virtual instrumentation on mobile devices for radiation monitoring in nuclear installations. It is presented the hardware and the application software for data capture of radiation monitors, developed to iOS devices.

## Mobile technologies in nuclear installations

The utilization of mobile technologies for data transfer to/from the field in nuclear and industrial installations, such as component status and remote monitoring, has its potential to improve plant productivity, reliability and safety. The presence of wireless technology and mobile devices in the form of tablets and smart phones provide novel opportunities for advanced work practices and information flow in the installations [1].

## Hardware to wireless data transmission

Wireless connectivity technologies include Wi-Fi, Bluetooth, ZigBee and many others. For data communication with mobile devices, Wi-Fi and Bluetooth technologies can be used. The Wi-Fi technology takes advantage since it can be easily integrated with ethernet local area networks.

The radiation monitors must be equipped with interface hardware for communication with ethernet networks to report the ambient radiation levels. The communication interface of the radiation monitor to the network can be wired or wireless. The Radiation Environment Monitor MRA 7027 received a new communication board,

originally for RS485 interface, to communicate with ethernet networks. The Figure 1 shows the prototype of the new board, also available for wireless communications.

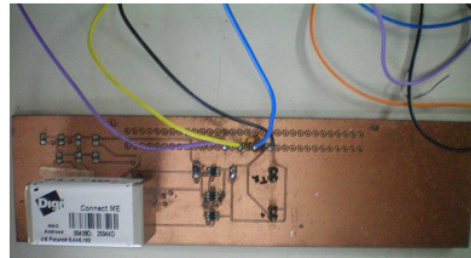


Fig. 1 – Board to ethernet communication.

## Virtual instrument to iOS devices

A program was developed to capture data from the radiation monitor through your IP address. The program runs on mobile devices with iOS system (iPad and Iphone) and was developed in Objective-C language. The Figure 2 shows the developed program running in the Ipad Simulator.

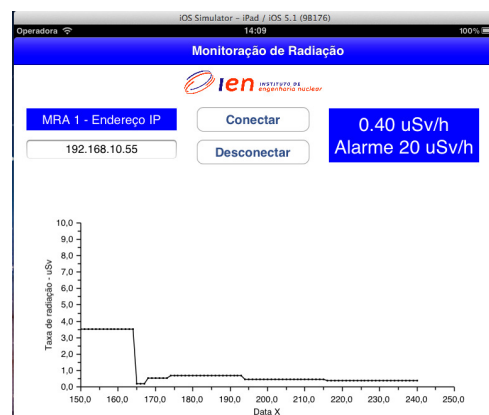


Fig. 2 – Program developed to iOS devices.

## Conclusion

Several applications of mobile technology in nuclear facilities should be developed in the coming years. The application presented here can be adopted for other functions in nuclear facilities, bringing benefits as portability, advanced communication capabilities, and also the ability to provide workers with instant access to data.

## References

- [1] Farris, R. K., & Medema, H. (2012). Guidance for Deployment of Mobile Technologies for Nuclear Power Plant Field Workers.