Preface

All praises are due to Allah, God Almighty, Who made this annual event of successful. The “3rd Annual Basic Science International Conference (BaSIC-2013)” is an annual scientific event organized by the Faculty of Mathematics and Natural Sciences, Brawijaya University. As a basic science conference, it covered a wide range of topics on basic science: physics, biology, chemistry, mathematics and statistics. In 2013, the conference took a theme of “Basic Science Advances in Energy, Health and Environment” as those three aspects of life are hot issues.

The conference in 2013 was the continuation of the preceding conferences initiated in 2011 as the International Conference on Basic Science (ICBS), where it was a transformation from the similar national events the faculty had organized since 2004. What also changed in year 2013 was the use of the ISSN for the conference proceedings book, instead of an ISBN used in previous proceedings books. The change was based on the fact that BaSIC is an annual event, and, therefore, the use of ISSN is more appropriate. The proceedings book was also divided into four books: Physics, Biology, Chemistry and Mathematics, each with a different ISSN. The proceedings were also published in electronic forms that can be accessed from BaSIC website. I am glad that for the first time both types of publication can be realized.

This event is aimed to promote scientific research activities by Indonesian scientists, especially those of Brawijaya University, in a hope that they may interact and build up networks and collaborations with fellow overseas counterparts who participated in the conference. This is in line with university vision as a World Class Entrepreneurial University.

I am grateful to all the members of the program committee who contributed for the success in framing the program. I also thank all the delegates who contributed to the success of this conference by accepting our invitation and submitting articles for presentation in the scientific program. I am also indebted to PT Semen Gresik and PT PLN (Persero) for their support in sponsoring this event.

I wish for all of us a grand success in our scientific life. And I do hope that the coming conferences will pick up similar success, and even better.

Malang, April 2013

Johan Noor, Ph.D.
Conference Chairperson
Foreword by the Rector of Brawijaya University

First of all I would like to congratulate the Organizing Committee for the success in organizing this amazing event. I believe all dedicated time and efforts will contribute to the advancement of our beloved university.

I would like to welcome all participants, domestic and overseas, especially the distinguished invited speakers, to Malang, to the conference. An international conference is a good means to establish and build relationships and collaborations among participants. So, I hope this conference will facilitate all of you, the academicians and scientists, to setup a network of mutual and beneficial collaboration. As a university with a vision to be “A World Class Entrepreneurial University”, Brawijaya University will support all efforts to realize that dream.

Finally, I do hope that the conference will run smoothly and nicely and is not the last one. I would like to thank all parties who have lent their hands in making this conference happened.

Malang, April 2013

Prof. Dr. Yogi Sugito
Rector, Brawijaya University
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Abstract - Semeru Volcano at East Java which have about 20 minutes eruptions' average repose time is suitable for an integrated sensor system experiment. A design of integrated seismic and infrasonic waves monitoring and recording system is going to be completed. Wireless sensor network is used for online data transmission, recording, processing, and decision support system. At the end of the process, level or state of volcanic activity will be sent by short message service (SMS) to public community.

Keywords: Wireless Sensor Network – Seismic – Infrasonic - SMS

I. INTRODUCTION

Semeru volcano is one of the volcanoes that are still active in the area of East Java, located between the administrative area Malang district and Lumajang district with geographical coordinates between 7° 51' - 8° 11' latitude of south and 112° 47' - 113° 10' longitude of east. With a height of 3,676 mdpl, position ourselves as the highest volcano in Java.

Semeru volcano activity is characterized by the release of energy each time duration of 20 - 45 minutes so that the condition makes the characteristic of Semeru volcano (Kusumadina, 1979). Semeru volcano activity monitoring systems are still using methods of monitoring that is both conventional procedure and mono system that takes a long time at the time of delivery of information and required an analysis of the decision process, while the current requirement is to obtain information can be accessed remotely with easy.

Volcano monitoring system that will be developed in the study completed the doctoral program at UGM is a double systems integration consisting of a seismic sensor and infrasound sensor with bases wireless sensor network and SMS (be composed: sensing unit, telemetry unit and web server unit), used to recording, monitor and evaluate the status of Semeru volcano activity by online. So that the peoples around Semeru volcano can a request for that information directly from remotely by sending an SMS to a data processing center (server and a provider). In addition, monitoring station Semeru volcano activity and related parties can receive information and find out the time change Semeru volcano activity by online and up to date.

II. RESEARCH METHODS

The system will be developed in the study, consisting of two parts: hardware unit (shown in the figure 1, 2, 3 and 4) and a software unit (shown in the figure 5, 6, and 7).
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Fig. 3. Flowchart of recording system

Fig. 4. Flowchart of data communication

Figure 5. Flowchart connection

Fig. 6. Flowchart data logger monitor and data logger connection
Fig. 7. Flowchart SMS service

III. RESEARCH RESULTS

Seismic activity always occurred at Semeru volcano as a sign of the volcanic alert and ready to erupt. The eruption of Semeru volcano don’t occur without prior warning. Thus, monitoring system in the future will be done with an integrated wireless sensor networking approach.

The system (shown in the figure 8) in application is divided into three, namely:
2. Data Acquisition: the process of collecting data on the status of volcanic activity that is up to date and online so that the data is directly stored in the database system.
3. Controlling: supervisors and the public can monitor the status of volcanic activity by online and offline.

IV. CONCLUSION

Realization of the information system, the public can monitor the status of Semeru volcano activity by sending an SMS (Sort Message Service) to a data processing center. Because this system is capable of providing information online and up to date as well as the accessible to the public directly from a distance so as to warn people about the status of Semeru volcano activity.

ACKNOWLEDGMENT

Development of the information system will function as a reference (standard operational procedure, SOP) the monitoring system of volcano activity by online and up to date using only SMS in the future, given the number of volcanoes in Indonesia as many as 129 are active status.

With this researcher thanked:
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4. Friends in the Doctoral Program of Physics UGM.
5. And stakeholders.

REFERENCES