Recent Updates on Prevention and Recovery Networks for Indonesia Natural Disasters based on the Internet-of-Things (PATRIOT-Net)

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***Abstract*—This paper reports the recent updates of Prevention and Recovery Networks for Indonesia Natural Disasters based on the Internet-of-Things (PATRIOT-Net) for the first year of total three years. The PATRIOT-Net project is targeting on 7 outcomes: (i) optimal high dense internet of things (IoT) networks, (ii) network coding algorithm for heterogeneous sensors and applications, and (iii) optimal routing algorithm, (iv) new IoT devices, (v) mobile cognitive radio base station (MCRBS), (vi) apps, (vii) monitoring room.**

***Index Terms*—Internet-of-things, network coding, mobile cognitive radio base station, 2G, 3G, 4G, 5G.**

I. Introduction and System Model

This Prevention and Recovery Networks for Indonesia Natural Disasters based on the Internet-of-Things (PATRIOT-Net) project is highly motivated by four disasters occuring in Indonesia with high probability. The four disasters including the map of sensors in Padang city is shown in Fig. 1, which are (i) earthquake, (ii) tsunami, (iii) landslide, and (iv) flooding.

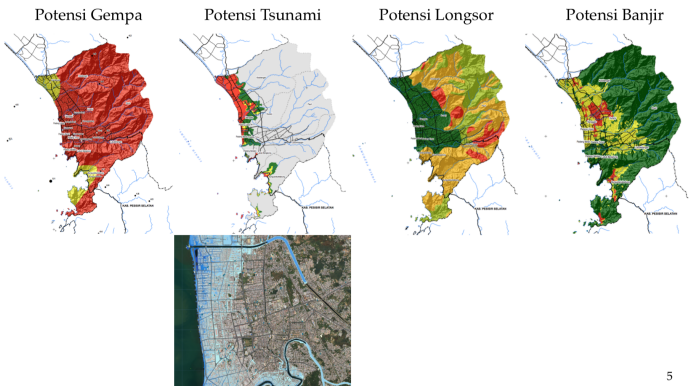

Fig. 1. Map of Padang city for sensor locations used to mitigate four disasters occuring with high probability in Indonesia.

The PATRIOT-Net project proposes solution using two networks: (i) prevention networks and (ii) recovery networks, as shown in Fig. 3. The prevention network collect regularly updted information from the environment, while the recovery networks tries to recover the destroyed network infrastructures. This PATRIOT-Net project proposes to recover the network using mobile cognitive radio base station (MCRBS), which is extendeable using drone.[1]

II. Recent Results and Conclusions

The outcomes of this project is shown in Fig. 2, where in total of seven outcomes are expected for duration of three years. In Year I, we have completed realization of antenna of MCBS. We have also completed the theory of IoT under high-dense networks.

This research is supported in part by the LPDP RISPRO under the project PATRIOT-Net, 2018–2021.

[1]However, drone applications is out-of-the scope of this PATRIOT-Net project.

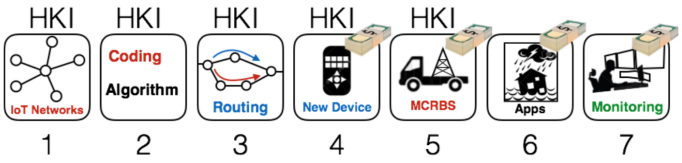

Fig. 2. The seven outcomes of PATRIOT-Net.

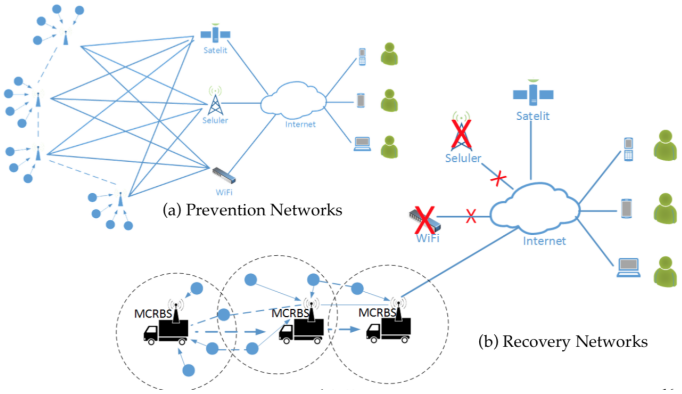

Fig. 3. Prevention and recovery network structure in PATRIOT-Net.

In the Year I, we have many results, e.g. (i) raptor coding scheme in IEEE WPMC 2018 [1] (ii) network coding in IEEE WPMC 2018 [2], (iii) benefit of coded random access in ISITIA 2018 [3], (iv) routing algorithm in ICELTICS 2018 [4], and (v) antenna design in ICT-RuDev 2018 [5].

In the Year I, we have reached several milestone ready to be reported in the mid-term report of Year I.

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