A Novel Method Using Space Technologies for the Benefit of Public Health during Natural Disasters

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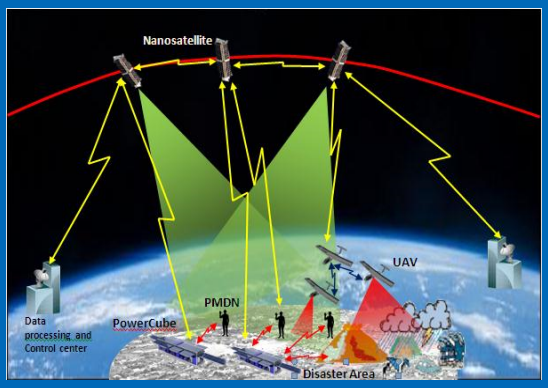
Introduction

- Between 1980 and 2012, natural disasters caused approximately $3.8 trillion in damages worldwide, while 1.4 million human lives were lost by weather-related natural disasters.
- Cost-benefit predictions suggest that preparedness and mitigation will reduce expected economic losses due to natural disaster by 40% to 68% by 2030.
- Space spin-off technologies can develop new treatments for patients on the ground.

- **Aim:** The Space for Health (S4H) Project aimed to improve the way space assets and experiences are used in support of public health during disaster relief efforts. The S4H Project also aimed to use Disruptive Innovations in order to create a new relief system.

Proposed Operational System



- **Figure by Jingbo Huang (China) and Hooman Jazebizadeh (Iran)**

- A nano-satellite constellation (NC) provides the necessary communication and remote-sensing (RS) services to the mobile self-contained relief units (ie, PowerCubes).

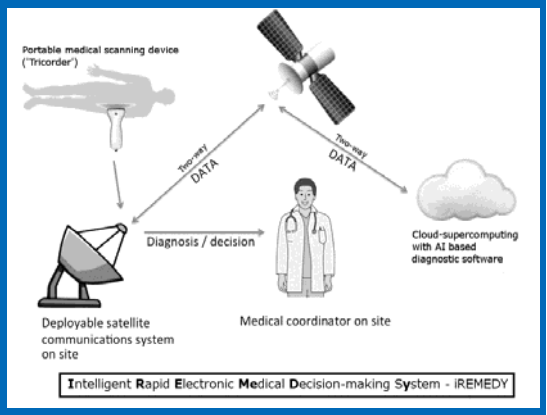
- Individual scanning devices, and regional prevention centre.

- The micro-unmanned aerial vehicles (micro-UAVs) and mobile self-contained relief units can be connected for efficient information transfer by using the NC. The information collected by the micro-UAVs can be directly transferred to any place on Earth by using the NC.
- Diagnostic tools may benefit from data transmission through the NC or by using mobile self-contained relief units as intermediaries for receiving and sending data to the NC.
- PMDN: personal medical device and its networks.

References

Dinas PC, et al. Innovative Methods for the Benefit of Public Health Using Space Technologies for Disaster Response. Disaster Med Public Health Prep. 2015 Apr 14:1-10.

The Intelligent Rapid Electronic Medical Decision-Making System



Recommendations

- Proposed operational system
- Training of stakeholders in technical design, operation and the medical, ethical, and humanitarian procedures.
- Stakeholders should adopt methods to identify disruptive innovations.
- Coordination between civil and military organizations
- Government funded programs to support research and development
- New regulatory laws and policies should be used.

Nano-satellite estimated cost

Component	Estimated cost ($)
Nano-satellite	$ 120,000
Launch cost per satellite (10Kg satellite - $5.000/Kg)	$ 50,000
Operation cost (Three months)	$ 25,000
Total (5 satellites / three months operation)	$ 875,000

Estimated costs of micro-UAVs "swarm"

Component	Estimated costs ($)
Micro-UAVs	Average $ 25,000
Maintenance (1 UAV per day)	$ 100
Operation cost (One month)	$ 25,000
Total "swarm" system (12 x UAVs / one month operation)	$ 343,000

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