PROPOSAL

IMPLEMENT AN AIR-BASED MOBILE BASE STATION TO CRISIS AND EMERGENCY MANAGEMENT

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Contents

PROBLEM STATEMENT

Statement

This project aims at providing an efficient rescue plan on crisis and emergency management for official organization and authority only. Any illegal commercial application shall be sanctioned by law.

Approach

This project takes effect by existing GSM technology (Global System for Mobile Communications) and SMS (Short Messaging Service), with initiative mobile BS (base station) conception.

When confront large-scale natural or man-made disaster, traditional base stations often fail to diffuses and collect vital signals, because of shocks, outage or man-made detriment. According to reports about communication passage in the Wenchuan great earthquake, Sichuan, China, 2008, telecommunication of civilian use did not recover until 25 hours later[1]. Even though the center government deployed 2 sets of satellite car, 1 power truck, 6 satellites phones (330 mobile telecommunication equipment in total) to cope with the damage of mobile communication invalidation at first time, unfortunately, mostly installments are blocked on the way to distress area.

Therefore, this project desires to provide a new method to accelerate rescue process by a pseudo service zone. All entities in need are Helicopters (more than three), mobile base station and an information processing backstage, and the latter can be settled outside of disaster area.

SUPPORT ANALYSIS

Mobile phones application (TE+MS)

According to a report from International Telecommunication Union 2010, 57% of residents in developing or less-developed countries sign up own mobile phones[2]. The current state is even more hopeful, because many people do use unregistered mobile phones.

Helicopter

- Carrying capacity: more than 20 T[3]
- Max flying duration: more than 24 hours
- Max hang stops time span: more than 20min[4]

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[1] http://www.cnetnews.com.cn/2008/0514/859588.shtml, accessible on November 11, 2010
[2] http://news.bbc.co.uk/2/hi/8560310.stm, accessible on November 11, 2010
[3] http://2jjj.com/?p=917, http://www.deagel.com/Tactical-Support-Helicopters/Mi-26_a000359001.aspx accessible on November 11, 2010

Base Station

- GSM has covered the entire world. Data shows every ¼ mobile phone users is a consumer of GSM network.[5]
- Fixed base stations or even outside distributed mobile base stations are not stable for

Figure 2 Base station's malfunction in storms, Guangxi, China 2008-02-02 16:26:29

Figure 1 icing cable in storms, Guangxi, China 2008-02-02 16:26:29

serious natural or man-made conditions.

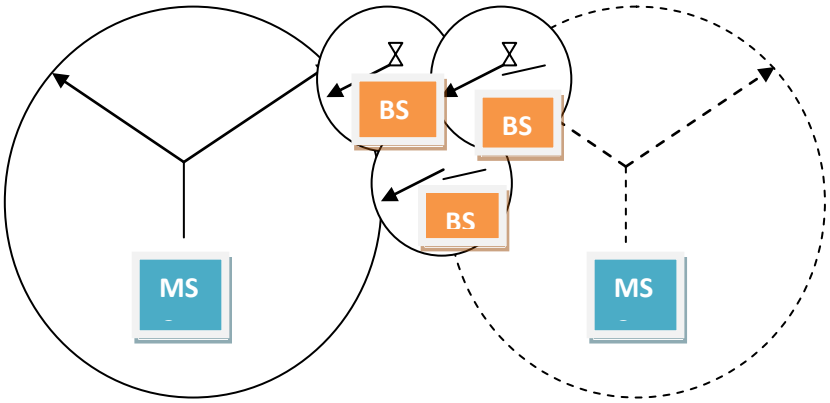

Figure 3 minimization feature and construction of base stations deployment.

Cooperation Involved

- Local Government
- International NGOs
- Technology Group and Information Processing Group
- Rescue Teams

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4 http://en.wikipedia.org/wiki/Helicopter , http://en.wikipedia.org/wiki/Boeing_A160_Hummingbird, Accessible on November 11, 2010

5 http://www.cnetnews.com.cn/2010/1104/1930268.shtml, Accessible on November 11, 2010

IMPLEMENT PROCEDURE

The core processing procedures conclude:

A. To calculate and program an emergency information processing center with basis of MSC (mobile switching center) for collecting and dismiss messages.
B. To install and implement mobile base stations on helicopters, which hang in the air with a honeycomb structure.
C. To set up a pseudo service area and induce a spontaneous signal with IMSI (International Mobile Subscriber Identity) sent from victims' active mobile phone. With all collected IMSI data, center will know how much mobile phone keep standby mode.
D. To push in one self-rescued instruction message (SMS) to standby users' mobile phones
E. To collect a "read report" data from active user, calculate all/active users' framing signal by an Antenna Decline Technology. Meanwhile, a time angle of arrival (AOA) data fusion location algorithm is proposed to draft two pictures: one is all the standby mobile phone's distribution graph, the latter shows active users' frame of references on the former.
F. To process collected and summarize short massages from victims.
G. To appoint a pointed rescue team to the most-help-in- need district.

Here is the flow chart for automatically completed process:

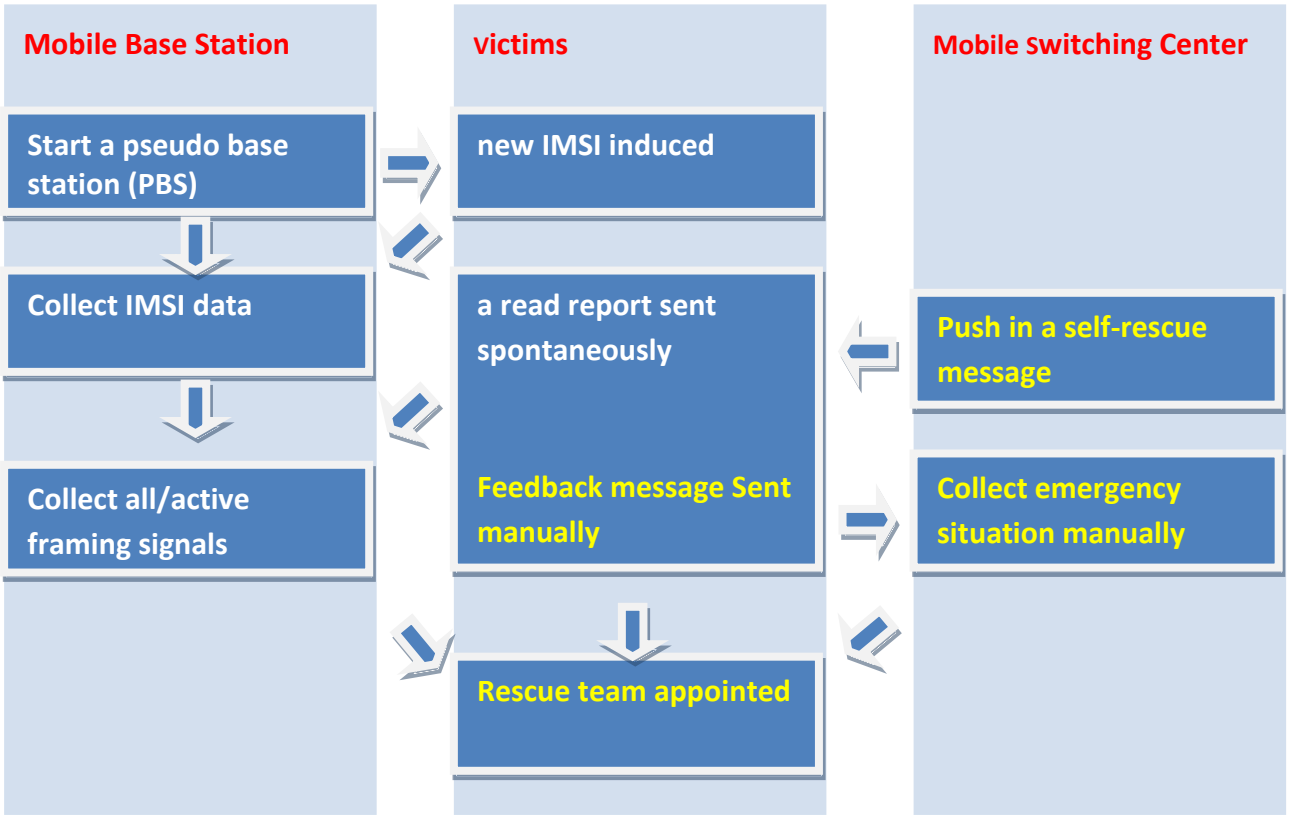

Figure 4 Notice: all procedure in white is implemented inartificially; others in yellow are led by artificial intelligence.

Time Line

This project involves a great number of budget analysis and negotiation process. Therefore, the timeline of whole project is depends on the speed of response of technology group people and permission given by relevant government.

Hopefully, when three parts involved in the emergency management get ready. Helicopters will arrive fast, and all the signal distribution and gathering process will be finished in 0.3-140s.

DISCUSSION

This project has an innovation implemented into a high-level information processing platform of SMS application and mobile base station development. It has practical and theoretical guiding value, especially for today's world wide crisis and emergency studies.

Analysis the complementation of all above, advantages of this project is:

- Considering the limitation of 3G coverage in less-developed countries;
- Considering the practical application cost and feasibility of helicopters;
- Considering the existing weakness of mobile base station shipped by automobile on ground;
- Considering the distinction between mobile phones in standby mode and active mode;
- Considering the multi-dimensions of information's collection and summary.

EXPECTED OUTCOMES

- Start a crisis and emergency management in 30 min.
- Pseudo Base Station network takes effect.
- Communication with SMS and relevant channel won't stop for more than 1 hour.
- Victims distribution graph will help to allocate aid requires with scale error in 5-50m.
- This project saves 30% more victims in first 3 years.

BIBLIOGRAPHY

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