POCKET FM Smart and Small Radio Transmitter for Crisis Regions

Pocket FM is developed by Media in Cooperation and Transition (MICT) and IXDS as an development platform for the production of modular FM transmitters. In the following we give you an overview of the Pocket FM Story, the first Version, (up and running in Syria right now), a preview of want is planed for the next Iteration and the scope of possible Use Cases.

Challenges

When you aim to find a solution for spreading information in a crisis region, either during a conflict or after a humanitarian catastrophe, you may face a number of severe challenges:



In crisis regions, the telecommunications and transport infrastructure may have been destroyed.



... Broadcast infrastructure for television and radio may be destroyed or controlled by one of several warring factions....



... The electricity supply might not be reliable...







... Freedom of speech might be severely inhibited or non-existent.

Co-Creation Approach

For the project presented here we started a "co-creation process" (Sanders, E., et al.: "Co-Creation and the new landscapes of design", 2008), involving all relevant internal and external stakeholders, including end-users. Due to their involvement, potential benefits and problems can be identified faster and the overall innovation process is accelerated.



Results

In cooperation with a team of specialists from diverse backgrounds, we collected all available information, mapped potential solutions to the requirements, and defined the constraints for the product / service we wanted to develop, to make sure it meets the needs of the intended users.



Idea

This process led us to understand that the best way to transfer information, in lieu of reliable internet infrastructure, was FM radio. Rather than setting up large antennas with powerful transmitters, it seemed more feasible to create a network of small FM transmitters, which would enable us to reach not just metropolitan areas but also the countryside, which is not served by any telecommunications infrastructure at all in some countries.



big Antennas ...

...can reach a whole city, but...

- ... are very expensive
- ... hard to set up
- (Experts needed and hard to find)
- ... dangerous to set up
- ... need a lot of power
- ... easy to locate
- ... and therefor easy to rob



many small Antennas ...

- ...can reach a radius of 5-10 km, but...
- ... are much cheaper
- ... easy to setup by anybody
- ... can be run on battery
- ... easy to transport
- ... and easy to hide

Constraints

To build a product that meets its users needs, we needed to develop a system which is easy to use, and which can be set-up by people without any technical knowledge. It also became clear that the system needed to be modular, in order to avoid detection and to facilitate transport. We also tried to use standard components as much as possible, to enable users to modify and repair the units with locally available materials.



The system can be powered by a standard 12V car battery, so it can be installed outside people's homes. The battery also serves as a backup power supply during power cuts.

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The system is embedded in a robust casing, which makes it look like a radio receiver, rather than a transmitter. The ribbed casing also cools the system, so it doesn't require a noisy fan.



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The system is able to automatically find a new frequency, when the default frequency isn't available or jammed. Listeners can find the station by its RDS signature, which is broadcast along with the audio signal. RDS can also be used to quickly send out short text messages to listeners.



Product

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Technical Setup

Setting up the system is easy, even without any technical expertise. The shapes of the sockets indicate which plug needs to be attached to them. Numbers show the order of connecting the different components, because it is important to connect the antenna first. Due to the pictographic set-up instructions, the system is difficult to recognize as a radio transmitter, which is is an important safety feature for those transporting and operating the system. The Pocket FM signal reaches an area of 6 km radius, by a weight of ca 1.5 kg. and it will take only 10-20 Minutes to install it (depending on the antenna placing).





Satellite Receiver Standard product





Power Supply

Because the system requires a 12V power supply, you can connect it to a standard car battery.

Radio Network Ecosystem – Existing Setup

Currently, PocketFM radio programs are produced in several different locations. They are stored on a server, from where they can be accessed over the internet, like a regular podcast. The programs are also transmitted to target locations via satellite downlink. This signal is received by a standard sat receiver, and forwarded to the PocketFM transmitter, which transforms it into an FM signal. The FM signal is broadcast via a small antenna, which can be easily made from locally available materials. The reach of the FM signal depends on the height at which the antenna is mounted. The signal can be received by any standard FM radio.



Technical Setup

In the next version, we intend to make the system even more autonomous to increase the security of those operating and transporting the transmitter, and to obtain the possibility to operate and monitor the system remotely. By optimizing the electronics, the signal should cover at least a 10 km radius reachability. In addition connecting it to the internet is offering the possibility of using multiple input. Connecting the Pocket Fm to each other is helping to recognize earlier if one of them is broken and to compensate within the grid. It will as well have an USB Port to play off previously installed radio sessions from a USB-Stick. To avoid any abuse, the sessions can include a signal identified by the Pocket FM software.



To operate the system remotely, a satellite receiver will be built directly into the system, thus enabling the remote operator to:

Solar Power Supply to increase the autonomy of the system, it will be equipped with a solar panel.

Radio Network Ecosystem – Next Set Up Version

Once all the components are assembled, we will be able to run the system autonomously due to the solar power supply. The built-in satellite receiver can be operated, updated and destroyed remotely from anywhere. Via a small satellite telephone module, the remote operators can receive feedback from the transmitter. A cloud-storage service will enable the operators to organize radio programs from different sources and offer podcasts, which can be accessed and downloaded by anyone with access to the internet.

PocketFM will also feature a wifi network interface to access the internet whenever there is a stable connection. The built-in hard disk can be used to to buffer and play back previously downloaded podcasts when the internet connection is down.





Radio Network Ecosystem – Next Set Up Version

Because of its high level of autonomy, the Pocket FM setup can be run in places far removed from human habitation to minimize the risks that might be involved in operating an FM transmitter in a crisis region.



Radio Network Ecosystem – For Refugee-Camps

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Radio Network Ecosystem – Local Radio Set Up

Pocket FM can also be used in a completely different context:

Imagine a small village or town in the country-side, without access to telecommunications infrastructure, and no funds to establish access. With Pocket FM you can set up a radio-station to produce local radio programs for the people in the area, which requires minimal investment, and no technical know-how.



Pocket FM is a cooperation of:

mct

MICT - Media in Cooperation and Transition is a German non-profit organization that implements media development projects in the Middle East and Northern Africa. Activities focus on the interplay between conflict, media coverage and reconciliation in crisis regions.

IXDS

IXDS supports their clients to identify the right strategic direction and to translate this into a suitable service eco-system – across analog and digital touch-points. To achieve this we integrate an user-centered innovation approach with expert knowledge in the field of electronics and new technology and with knowhow on business modeling. Furthermore, we keep an eye on future developments by actively participating in academic research.

Set Up Manual

ANTENNA PLACEMENT:

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Make sure the antenna is well connected with the device before you proceed.

DANGER:

The antenna generates a strong electromagnetic field, therefore the device should not be operated in inhabited buildings.

DANGER:

Please also keep in mind that FM transmitters are easily located and traced using FM receivers. If there is any danger of detection you should switch off the device immediately.

ATTENTION!

Make sure the antenna is well connected with the device before you proceed.

free

leave

2

3

1



Check the setup and frequency with a radio receiver. If the sound is distorted or too low, adjust the volume of the satellite receiver.

Switch on the device. It will automatically start to transmit on 103.5Mhz. You can change that frequency by using the **+** - buttons or automatically search for a free slot in the FM band by using the auto tune button > (Press for 1 second)



provide 12V/6A.

4

POCKET FM

Pocket FM is developed by Media in Cooperation and Transition (MICT) and IXDS as an open development platform for the production of modular FM transmitters, which can be: • extended in terms of functionality and range • adapted to suit the requirements of different user groups • operated with a range of different power sources (battery, generator, mains, etc.) • used securely due to encryption and a tamper-proof design.

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ixds.com





Connect Pocket FM to a power source. You can use either a wall socket, a car battery or a generator that can

