Addressable Radios for Emergency Alert (AREA):
A WorldSpace offering for effective delivery of alerts

Prepared by Dr. S. Rangarajan
WorldSpace Satellite Radio

Presented by Greg Englerth
Genglerth@worldspace.com
+1-301-960-1212
www.worldspace.com

Regional Conference on
Disaster: Relief & Management- International Cooperation & Role of ICT
14-17 April 2007 Alexandria Egypt
Alert Delivery: Wish List

- Can it cover 100+ countries with one secure uplink?
- Can it be addressed by country, group, tier or even the current location of the receiver?
- Can it be delivered with a latency of less than 10 secs?
- Can it automatically trigger a siren/alarm even if receiver not under use?
- Can the receiver display text and also automatically switch to audio information in a local language(s)?
- Can it cater to diverse requirements/infrastructure ranging all the way from a sophisticated weather office, down to a fisherman out at sea?
- Can it go beyond conventional modes of communication and supplement/complement other technologies?
- Can it survive even under most hazardous conditions & power failures?
- Can it be re-used for the daily requirements of the community (entertainment, agriculture, health, training etc)?
- Will it be economical when there is a scattered population?
- Is the system tested and ready to be deployed TODAY?
WorldSpace: a snapshot

- Wide Coverage
- Transmission to Audio Receivers
- Solar Powered
- Creating a Digital Library
- Selectively Addressable Automatic Alerts
- Individual
- Village Classroom
Applications of a DAB satellite: e.g., WorldSpace

Audio
• Direct delivery of multiple channels of Pre recorded/ Live Audio to compact receivers

Data Multicasting

File Broadcast Services
• Provides for the distribution of files to all recipients of a CUG.

Data stream transmission
Provides the distribution of data streams to all recipients of a CUG.

Combined Live Audio & Slide Show (CLASS)
Synchronous, live instructor lead classroom.

Distribution of Emergency Alert Messages
Selectively addressable, secure, reliable and instantaneous.
All Hazard Warning via WorldSpace Satellite

Highly reliable and proven satellite based system

Radio or Land lines

Event Sensors

Warning Centers

WorldSpace Satellite Uplink CAP format

Satellite Coverage Area

To AREA Receivers

CAP formatting, Audio in Multiple Languages
Disaster Alert Delivery - WorldSpace Solution

- Alert signal generated by national & international agencies.
- Adoption of CAP (Common Alert Protocol) 1.1 format.
- Signal uploaded by authorized agency using a secure web interface to WorldSpace uplink server.
- Message as IP data into WS channel, addressed by group or tier or geographical location.
- Specially designed WS radio (AREA) all the time looking for an alert message.

Normal Radio transforms to Special Disaster Radio automatically as needed
Disaster Alert Delivery - WorldSpace Solution

contd...

- When message arrives, AREA ceases to be a normal WorldSpace radio, authenticates the alert and displays the alert parameters.

- Disaster radio channel automatically initiated to provide specific information in local languages.

- AREA connects to an external box via USB to provide
  - More extensive display
  - Operate a relay to trigger a siren when the alert arrives
  - Interface with a GPS receiver for geo-referencing of the alert.

WS Radio will perform all the above functions whether the radio is being used or not.
**Addressable Radio for Emergency Alert**

Alert Generation

Different configurations to suit different needs
AREA-A

- AREA-A is a configuration that connects to the USB port of a computer.
- Supports all audio and data services of WorldSpace.
- Onset of alert is indicated by a computer generated siren.
- Displays all the alert parameters (mandatory & optional).
- Can support audio/data download even during the alert state.
- Can support text-to-speech for the alert description.

Ideal for Airports, Harbors, NGO’s & First Responders
• AREA-C is ideal for community deployment.
• Immunity to loss of mains power at the time of the alert.
  • 7 AH battery can be recharged by mains or Solar.
• External siren controlled by a relay
• Can be connected to Public Address system.
• Additional box displays all the alert parameters.
• Radio plays the remotely selected audio channel that carries authentic information.

Ideal for remote locations, beaches, Community Centers & Worship places
AREA-M

- AREA-M is meant for mobile users.
- Through the external box a GPS receiver is connected.
- The box displays the current location of the receiver before the onset of alert.
- The alert is triggered only if the current location of the receiver is within the alert zone defined by the sender.
- Can be powered by the vehicle power supply and it does not use the external battery and siren.
- Ideal for the travelers on land and sea.

Ideal for trucks, ships, boats & vessels
Integration & Co-existence of Multiple Technologies
DAB complementing FM radios

- A very large number of transmitters needed.
- They must be deployed, manned and maintained.
- More vulnerability to hazardous conditions.
- The information must be backhauled into each and every transmitter.
- FM radio cannot have wake-up or other digital technology features like addressability.
- DAB can provide the feed for the community FM transmitter (e.g. COLME project).

FM radio usable in places where there is already a coverage.

AREA, on the other hand, is ideal for direct digital delivery covering remote and vast areas.
DAB complementing Internet

- Type of Connectivity is point to point.
- Bandwidth not guaranteed at the time of greatest need.
- Time to download can vary.
- Depends on telecom infrastructure available.
- Problems in handling large files.
- Problems in handling streaming data.
- Initial costs, usage and connectivity charges increase with network size.

Internet usable in places where the telecom infrastructure is well-developed and the network is small to medium.

AREA, on the other hand, is the best for very large networks covering remote areas.
DAB complementing conventional communication satellites (C, Ku, Ka bands)

- Two-way communication of large bandwidths.
- Fixed cost per site significantly higher.
- Infrastructure requirements higher.
- Installation, Maintenance issues.
- More demanding in pointing to the satellite.
- More prone to rain attenuation.
- AREA receive system simpler & cheaper.

VSAT’s good for small Closed User Groups with large data requirements,

DAB better for delivery to a large number of sites
DAB complementing Cell phones for Hazard Warning

- Individual & Location-specific Alerts.
- Audio in an appropriate language.
- Take advantage of rapid expansion.
- Remote areas not covered adequately.
- Base Station vulnerable during hazard.
- System overloads during disaster.
- AREA can deployed to fill in gaps of cellular coverage and for community alerts.

Excellent vehicle when the link exists. Needs supplementing with a satellite system with wider coverage and less vulnerability to hazardous conditions.
Sri Lanka Pilot Study

- One year Pilot Project ended March 2007.
- Community-based last mile Warning.
- 56 AREA receivers including 32 villages
- AREA adjudged most effective & reliable among 5 different technologies \{mobile phones, fixed CDMA, VSAT, AREA & Community Alarm Device\}.
- Implementation in 1000 villages recommended.

Independent & Extended third party Evaluation. All recommendations being implemented.
Advantage: AREA

- **Scalability**
  - Coverage already exists and so easy to roll out services.
  - Being a broadcast service, cost per site decreases as the network grows.
  - Possibility of expanding to other geographical areas.
  - Possibility of expanding to multiple sectors, like education or health.

- **Sustainability**
  - Does not require technical expertise to install, operate or maintain.
  - Can be configured even in places with poor or no Electric mains supply.
  - Would survive adverse environmental conditions.
  - Independent of terrestrial, telecom and Internet availability.

- **Affordability**
  - Lower initial cost than any other satellite-based system.
  - Lower recurrent costs.
  - Cost can be spread across multiple projects as the system can be reused.