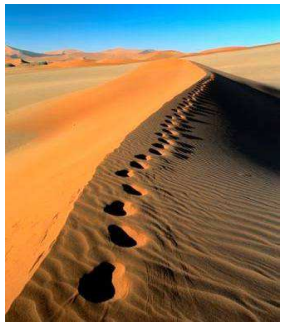

Use and perspectives of SatCom in public safety

November 2011

Sept 2011

Our global satellite network


Courtesy ILS & Lockheed Martin Corporation

- 11 L-band satellites in geostationary orbit
- 3 generations and global coverage in L-band
- Commercial life into the 2020s
- Alphasat L-band satellite to be launched early 2013
- 3 Ka-band satellites under construction by Boeing, launch in 2013/14

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High-quality end-user base

Government / Military	Enterprise	International Aid
UNITED STATES DEPARTMENT OF DEFENSE	BBC	ICRC
US NAVY	CNN	
ROYAL NAVY	REUTERS	
OUR ARMY THE DECISIVE FORCE	bp	
	BRITISH AIRWAYS	
	BECHTEL	
	MAERSK	
	HALLIBURTON	

Supplying mission-critical applications to a diverse end-user base

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Non disaster

Risk assessment for mitigation action

Hazard prediction, modelling - advocacy – public awareness- geo information

-training -

Before disaster

Information gathering – monitoring environment and critical infrastructure

Emergency planning and training, early warning

Recovery after disaster

Emergency management, damage assessment, site security, information for logistics and meeting community needs

During disaster

alert, real time monitoring mobilizing help, command and control co-ordination, situational awareness, information dissemination, emergency healthcare

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Use during different stages of disaster

	immediate	24-48 hours	After 48 hours
	Increasing bandwidth requirements		
Communications requirement	**Rapidly deployable and highly portable – lightweight terminals** Ease of use (non tech users) Voice/data for alert Internet/VPN for	**Netted comms-interoperability** Interoperability voice/data Integrations with imagery for decision support and logistics and information dissemination	**More permanent installations** Damage assessment – mapping – re-establishing transport and backhaul for terrestrial communications
Inmarsat Satellite solution	Search and rescue (GMDSS – aero safety) – first aid Handheld, low data rate and pre-emptive emergency communications	Telecom and access to data BGAN – simultaneous voice/data (450+Kb/sec), email, internet, broadcast quality IP streaming	Global Xpress VSAT higher bandwidth

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Recent public security developments

- Key data points:
- **Event / disaster driven usage**
  - UK: **national civil contingencies programme**
  - Hessen: **Emergency triage application**
- **Business as usual**
  - Interviews with UK blue light services (**ESA-biway study; IGT, next gen emergency comms system**)

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UK civil contingencies – Programme summary

- The Civil Contingencies Secretariat (CCS) within the UK Cabinet Office published in April 2007 the Resilient Telecommunications Strategy for Local Resilience Forums (**LRFs being operated at typically UK county level**)
- **The specialised Telecommunications Sub Group** within each LRF is responsible for maintaining a telecommunications plan to be used where response to natural disasters, acts of terrorism or other such events
- Through the CCS, each LRF has been provided with Inmarsat BGAN to **provide them with guaranteed interoperable voice communications should the terrestrial networks fail**

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Defined role of Inmarsat BGAN service

- The feasibility of exploiting the broadband data capability delivered by BGAN is being investigated with a view to enable the delivery of the **UK National Resilience Extranet** genesis in 7/7 response. Sharing data up to 'Restricted' level
- Allows key organisations in the UK resilience community to share knowledge, plan responses to emergency situations and manage incidents as they happen

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Capability exploitation in practice

- Each LRC responsible for planning for civil contingencies covering
  - Category 1: 1st responders, police, hospitals etc
  - Category 2: utilities etc
- Worked off a national risk register (Counter terrorism, flooding etc)
- Global programme with local nesting: each LRF looks in context – warning and forming group – how to inform public on impending disaster
- Telecoms subgroup provides resilient comms across community
  - Police HQs should be able to speak with each other
  - Inmarsat used for normal coordination comms (last line of defence, not normal ‘Top Secret’ use
  - Cabinet office pay the bill so local authorities use it for free.

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Lessons learnt: field feedback

- **Make part of normal business** – Olympics helping that – familiarity is the issue, not ‘training’
- **Test / use satphones regularly** – ensure operation/ familiarity
- **Interoperability** with other systems: Tetra, 2G, 3G satellite is key – scalability built in to take account of technology developments
- **Interoperability between forces and beyond national borders:** UK sends fire/rescue to disasters through FCO – interoperability is key. All agencies need telecoms side to be completely interop globally – UK fireman can take handset to eg Japan and speak to allied response in theatre
- **Balancing act with trade offs**: 1 Security level; 2 Cost; 3 Accessibility
  - need to optimise e.g nice to have cheap, secure – sometimes necessary to simply get the message out

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Deutsches Rotes Kreuz
Bezirksverband Frankfurt am Main e.V.

Instant rescue for major accidents with mass casualties- MCI

(In German: SOGRO- Sofortrettung bei Großunfall mit Massenanfall von Verletzten)

CPN Satellite Services
enabling communication wherever you go

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- German Red Cross Frankfurt/Main
- Siemens AG
- Andres Industries AG
- Albert-Ludwigs-University Freiburg in the Breisgau
- University of Paderborn
- University of Stuttgart

Scenario

Major accident with mass casualties (MCI)

- **Plane crash**
- **Accident or attack at major events like Olympic Games**
- **Terrorist attacks on subways, railways, large buildings**

MCI is characterized by

- **High number of injured (e.g. 500)**
- **Lack of information**
- **Overburdened infrastructure**
- **Chaos**

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Scenario: Challenges

Speed is crucial, to

- save lifes
- minimize health damages

Optimization of the Time before the start of the individual medical care

- overview of the Current situation for those responsible
- flow of information to the downstram involved parties as EMS, hospitals, police and others

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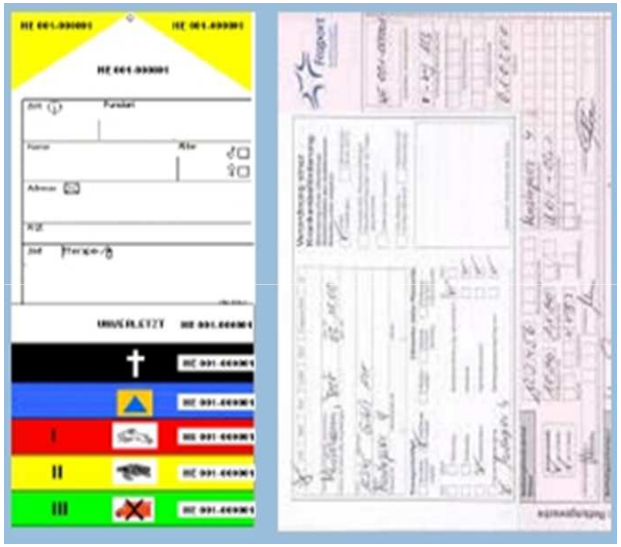
Scenario: RFID-based Triage



- Handwritten registrations
- Collection and transport to the command post by messenger

- Data entry via PDA
- Automatic transfer of information to the command post

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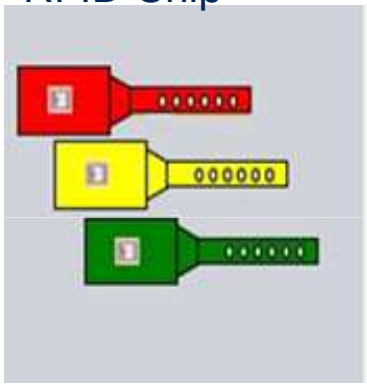
Components of the RFID-Triage-Solution

Wristband with RFID Chip



To attach on the injured

Read an writeable

R-PDA for resuers

Triage Software

Read an write module

WLAN, GPS, GSM, Camera

Communication usage site

WLAN, GSM

Read an write module

Satellite based internet connection

Triage Data Center

Triage Database

Visualization of the rescue process

Interface to dispatch centers

„Important link in the chain….“

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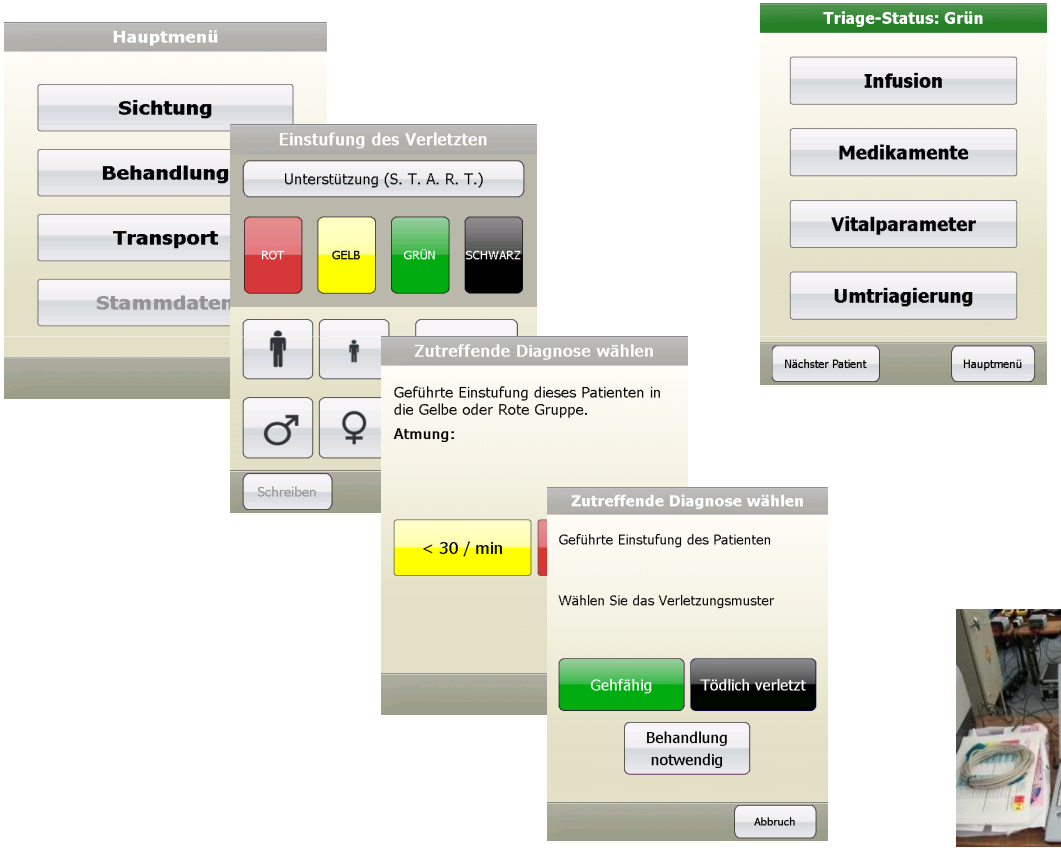
Triage-Usage-Software



Communication

Challenge

- Chaotic situation
- Collapse of GSM-network
- Only partially coverage via WLAN etc.
- Temporary collapse of networks
- Rescue workers can move outside of the coverage area
- Rescue workers are organized differently

Advantage

- Maximum of communication in the given communication infrastructure
- Use of standard technology
- Suitable for heterogeneous organizational structures of rescue organizations

Solution

- Communication is IP-based
- UMTS/GPRS are the basic channels
- Satellite connection for the connection of the usage site with the (functional) public networks (in case of a collapse)
- PDA transfer data in the background
- WLAN as an access to TETRA and Satellite communication

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Bi-way and UK blue light interviews

- **Bi-Way ESA study, UK IGT Recommendation, next generation emergency communications network**
- Frank discussions, found a remarkable level of consensus between different user groups on usability
- Requirements appeared to show a level of differentiation – but unclear to what extent these reflect experiences with legacy technology
- Political risks weigh heavily – public safety bodies need to take creative account of national political and economic conditions

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Lessons learnt: field feedback II

- UK has generally good communications infrastructure for basic voice functionality - **rural and remote areas provide a natural requirement for always on broadband connectivity**, but forces in these areas may operate under a limited budget
- Some personnel already carry up to 4 different mobile devices, so an **additional separate device would not be practicable or welcomed**. Integration with existing public/private network mobile devices is a key requirement. Integrate backhaul into a vehicular mount is favourable
- **Drivers for increased data transmission** and higher data rates include video and photography. Applications include number plate recognition and field assessment of licences (e.g. shotgun) – this increases the man resource away from the station
- Sense that **broadband demand will increase** when users integrate applications into day to day working – soon become indispensible
- Ability to agree in advance **prioritisation methods and SLA's** is a key requirement for any network. Network resiliency is a critical consideration

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Lessons learnt: field feedback II

- Emergency organisations require a system with proven capabilities and a track record, but this must be reconciled with the **requirement to have a leading edge system**. In practice this requires partnership between the emergency services and industry during product development
- **Technology refresh** as and when the devices become obsolete enhances security
- **Spectrum access is a key factor input**. Spectrum issues are expressed as concerns over capacity, coverage and prioritisation. The services no longer host significant radio engineers on staff
- **Cost sharing of infrastructure build-out with other governmental users** and initiatives e.g. smart metering, mobile broadband, other government comms, could deliver substantial expected savings. *NB: Recommendation 10 predicates the business model on cost sharing with other bodies/executive agencies*
- It is understood that the CIO Council proposed **aggregating network requirements** for blue light and other users c2 years ago

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