



Using ICT for Earthquake Disaster Risk Reduction (DRR) in Iran

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ICT Application Modes

- Traditional Usage (Telephone, Radio and TV,...),
- Modern Usage (PC and Internet,....),
- Advanced Usage (GIS, Remote Sensing, Mobile GIS, ...).



Application of Advanced ICT in Disasters

1) Application of Information Technology

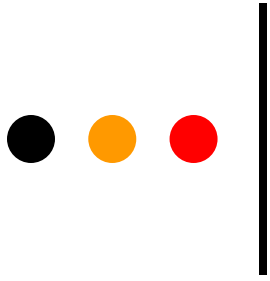
Processing the information

Such as GIS (Mobile GIS) and RS Image Processing,

2) Application of Communication Technology

Transfer of information

Such as Remotely Sensed Images and related processing (Post-disaster Damage Estimation).



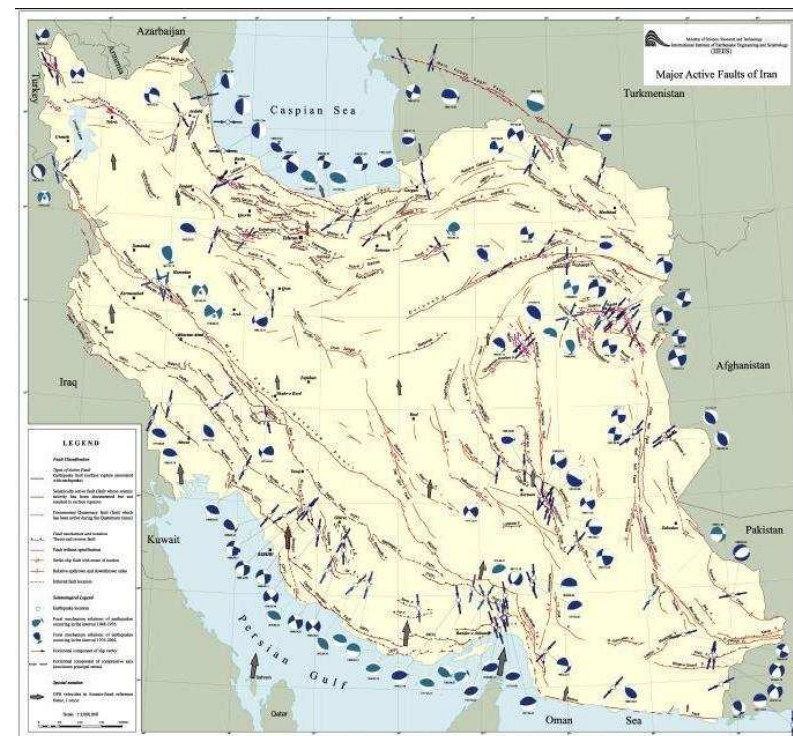
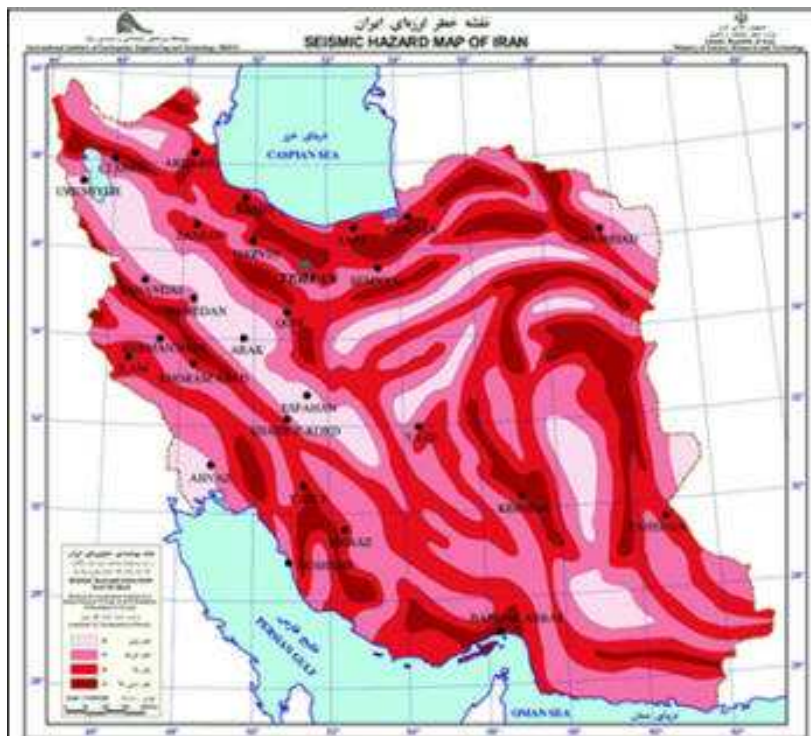
Samples of Information Processing

Hyogo Framework for Action: 2005-2015

Priorities for action:

- Identify, assess and monitor disaster risks and enhance early warning

National and local risk assessments



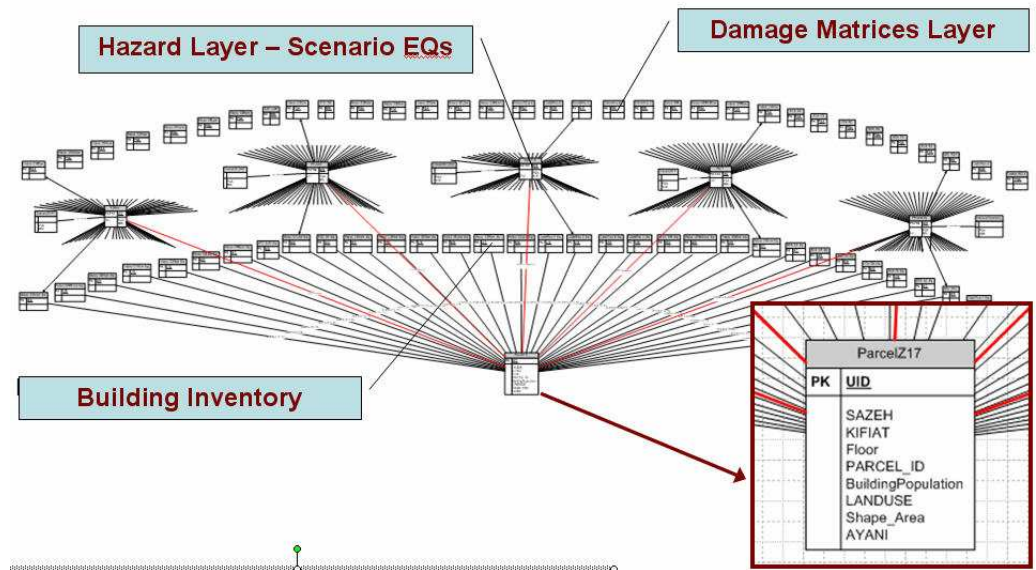
Preparing Maps of Hazard and Active Faults of Iran

Source: IIEES



- Development of user-friendly local and national inventories and easy-to-use disaster risk reduction technologies

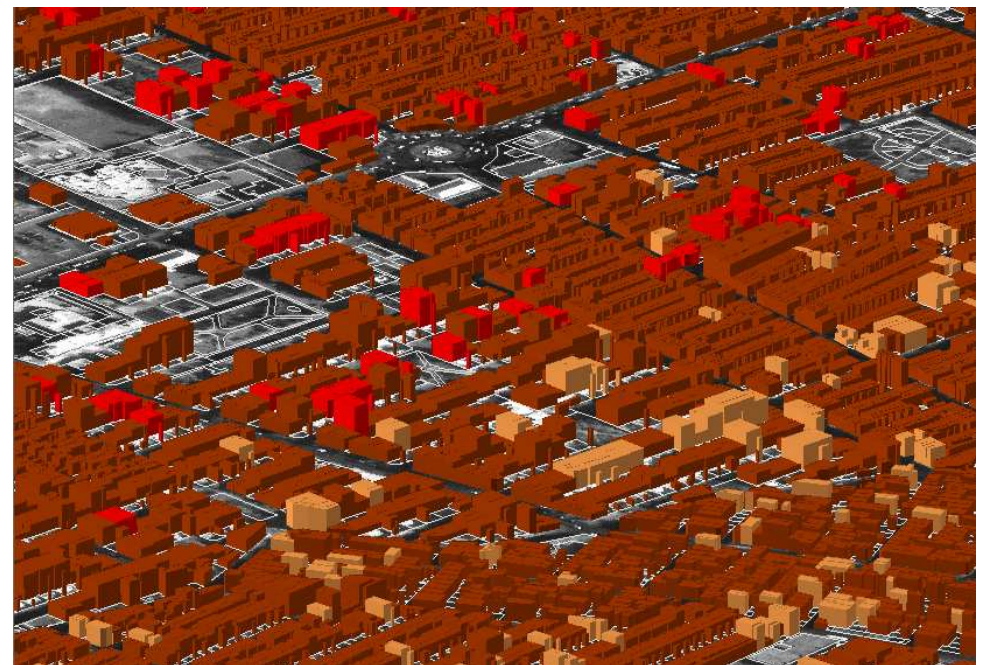
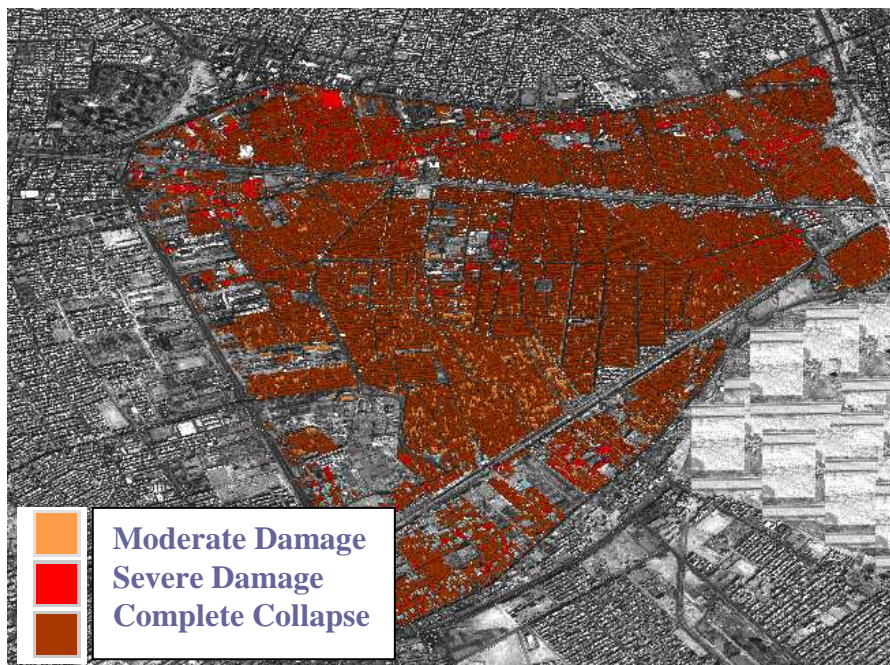
Conceptual Model – Geodatabase – Building Loss Module



Source: IIEES



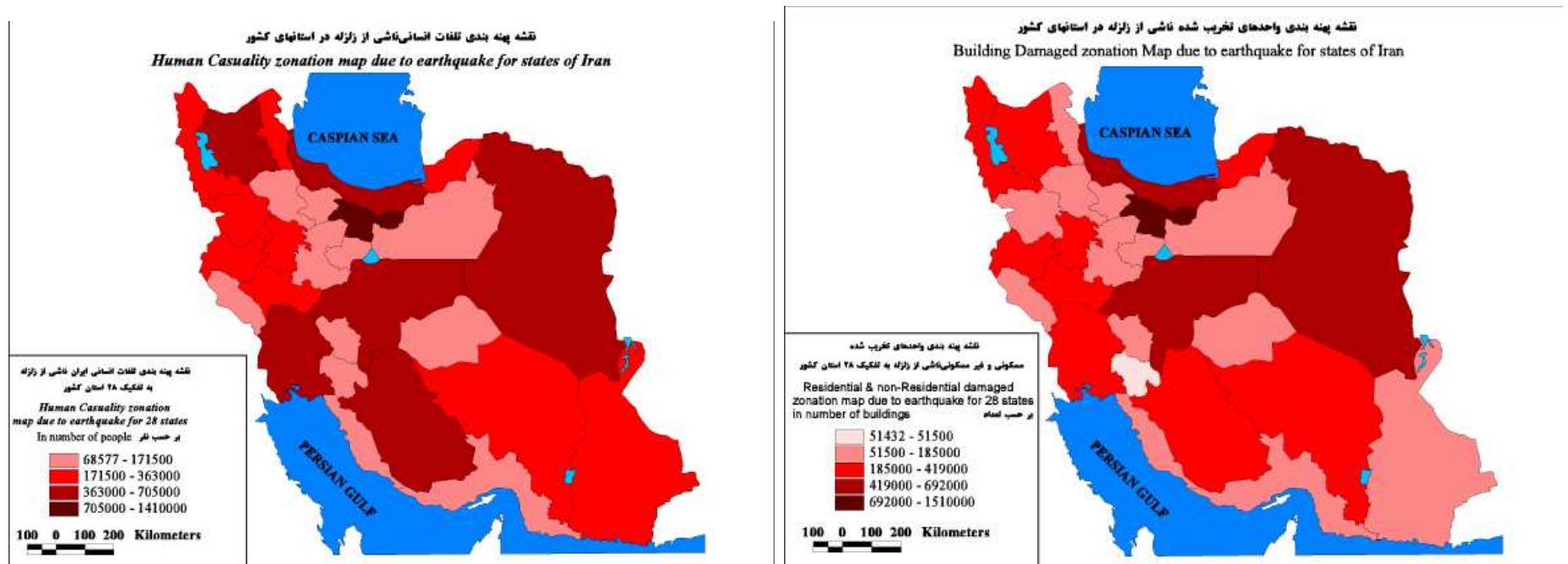
- Development of relevant city geo-databases and generating 2D & 3D Risk Maps for a district of Tehran



Source: Mansouri, IIEES



National and local risk assessments

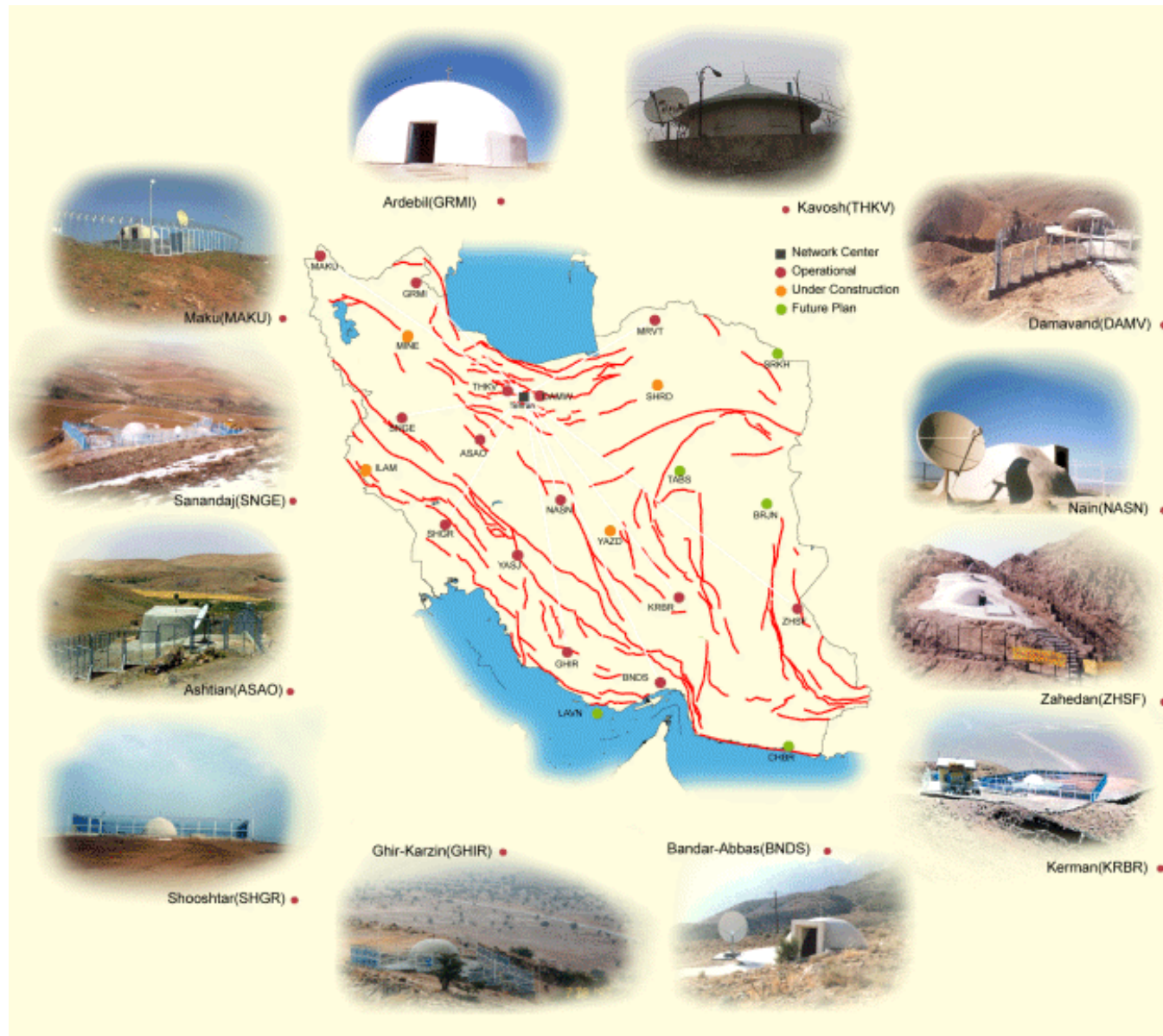


Source: IIEES

Estimation Human Casualty and Building Damage



Samples of Communication and Information Transfer

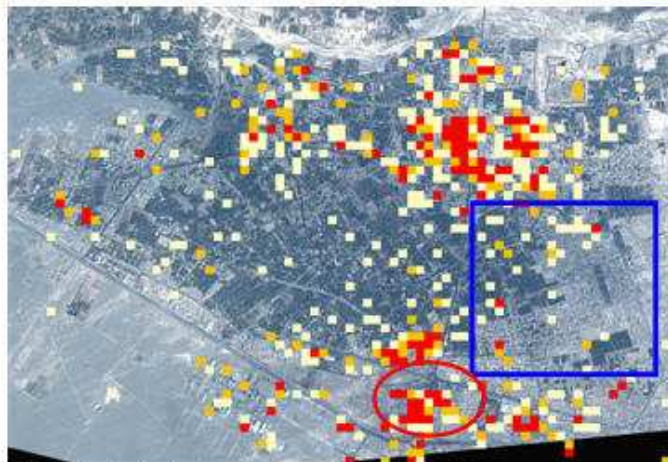
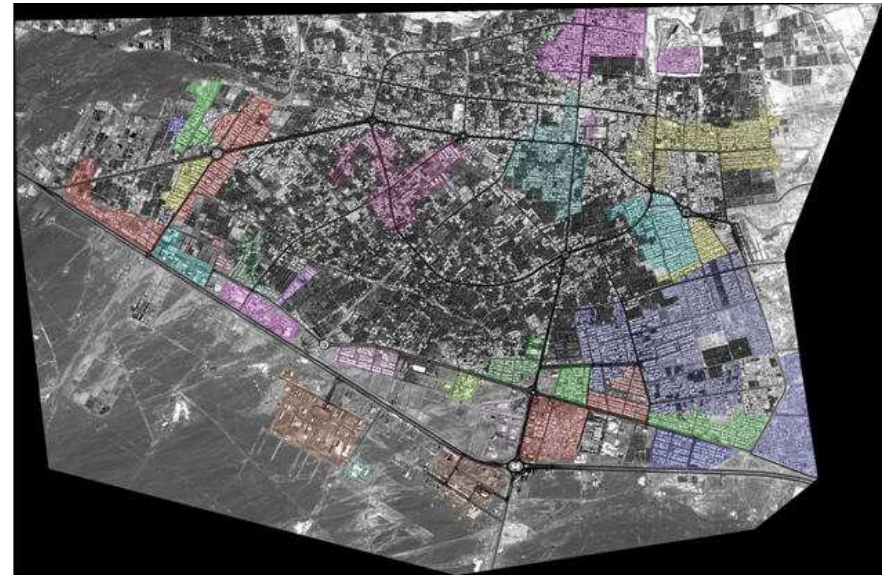


Iranian National Seismic Network (INSN)

Source: IIEES



- Application of space-based Remote Sensing Technologies for city monitoring
- Development of models to assess seismic vulnerabilities (Human, Structural and Road Networks) for one part of Tehran



Block statistics average of difference in cross-powers
not calibrated



Calibrated by building block orientation
cross-power difference map

Source: Mansouri, IIEES



Comparison of Satellite photos before and after Bam Earthquake, 2003



Color photo from the Satellite Optical Sensor (Quickbird)

Source: Mansouri, IIEES



Remote Sensing and GIS

1) Optical Satellite System

Application:

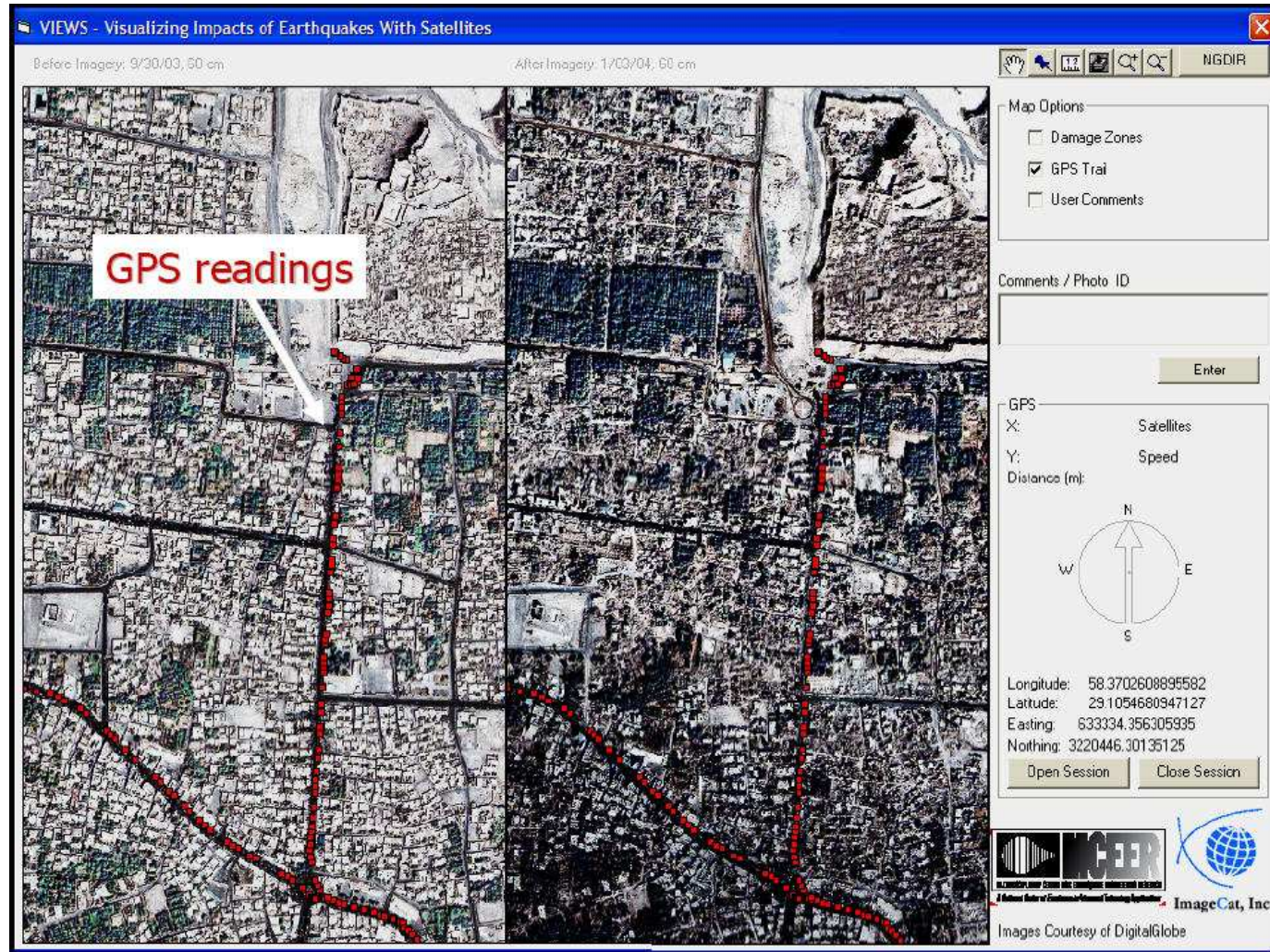
- *Emergency response teams (receiving data from dispatcher)*
- *Safe evacuation*
- *Geotechnical instability*
- *Hazardous materials*
- *Damage estimation*
- *Plan for reconstruction*
- *Disaster response*
- *Disaster documentation*

2) 3 Dimensional Imaging Systems such as Stereo-photography and LIDAR)

3) Web GIS and Mobile GIS Systems.

System VIEWS, Showing satellite pictures and GPS information on the computer monitor in Bam Earthquake

Navigations and visualization of systems in disasters



(Source: Imagecat Inc.)



Application of Modern ICT in Disasters

Using ICT in Iran Villages: A Successful Experience



Rural ICT – A Strategic Plan in Iran

- Iran Rural ICT Strategic Plan is one of the Iran ICT Development National Plan inferior plans, and is considered as a reference for integrated coordinating of Iran rural ICT development.
- One third of all Iranians (33.65%) live in 68,000 villages across the country. Most of these villages have yet to use ICT as a development tool. (Source: VSPCO 2006)



The Plan Contains:

- Developing and strengthening transition systems to use new technologies,
- Developing economic technologies and paying subsidy to rural people,
- Motivating private sector to invest money in the development of rural ICT,
- Developing the information culture in villages and making rural people familiar with importance of information technology,
- Delivery of new services and applications to rural people,



Continued

- Improving the quality and quantity of access to communication network for villages,
- Compiling the supportive laws for development of rural information and communication technology,
- Advancement in the automation delivery of e-services in organizations relative to rural people,
- Development of information technology of human resource in villages.



The First Rural ICT Centre in Iran

- The first rural ICT centre in Iran-Gharnabad village is a public facility offers shared access to information communication technology applications for poverty reduction and for the economic empowerment of poor women and men in rural areas in Iran.
- It is used as a development tool for reduction of the need to travel means of boosting the rural socio-economic and providing job opportunities support for trade using ecommerce and tourism reducing isolations and extending e-learning facilities, etc (Source: Jalali).

(Source: A.A. Jalali,
VSPCO 2006)





(Source: A.A. Jalali, VSPCO 2006)



The first rural ICT center in Iran-Gharnabd village has been constructed physically and financially by the help of local community and with the participation of residents toward bridging the digital divide.

- This center has been internationally focused by UNESCO and the World Bank for possible use in other regions.

- Villagers in Gharnabad are provided with:
 - virtual educations,
 - virtual library,
 - e-commerce,
 - e-banking,
 - distance working,
 - and similar services.

- Link to video:
<http://video.aol.com/video-detail/the-first-rural-ict-center-in-iran-gharnabd-village/4251455084>



The Potential Relation between ICT and Disaster Risk Reduction

- Effective channels for knowledge dissemination, of which a part can be the required information for “risk communication”.
- Appropriate architectural design, in order to offer multiple functions as training centers, public gathering places, and even emergency shelters.
- Capacity building in developing countries by making use of the appropriate technology options.

All of these usages are exactly in line with the “community-based disaster risk reduction” which is highly regarded by risk reduction experts and authorities all over the world.



Proposed Usages of Rural ICT Centers



Rural ICT Centers as Training and Educational Bases

- Holding various training courses for the use of interested learners, considering that an ICT centre:
 - has appropriate architectural design for educational purposes;
 - is well equipped with various educational tools;
 - benefits from the internet as an effective source of information and educational media;
 - can be usable by various groups of society.



(Source: A.A. Jalali)

(Source: A.A. Jalali)





Rural ICT Centers as a Mean for Dissemination of Information to Public

- In social and cultural events, for which the rural people gather in one place.
- In the aftermath of a disaster, during which people need information and guidance, and so on, provided that an appropriate media is considered to offer services to the various audience.



Courtesy: Shahkooh website



(Source: VSPCO 2006)



(AP PHOTO)



Rural ICT Centers as Emergency Shelters

- The buildings of ICT centers are resistance to such a level that can function properly after the event (Immediate Occupancy Performance Level),
- Therefore, these centers can be used as the emergency shelters after a major earthquake for those who have lost their houses during the disaster,
- Due to the more availability of land in rural areas, large yards can be used for this purpose as well.



Rural ICT Centers as Field Emergency Hospitals

- Part of the building of the centre can be used as emergency room in a disaster, provided that this functionality has been considered in its architectural design,
- Land availability, which leads to large yards and can create the potential of field hospital,
- The operating personnel have the potential of acting as emergency workers since they are highly educated people, provided that they have been trained for this purpose beforehand.

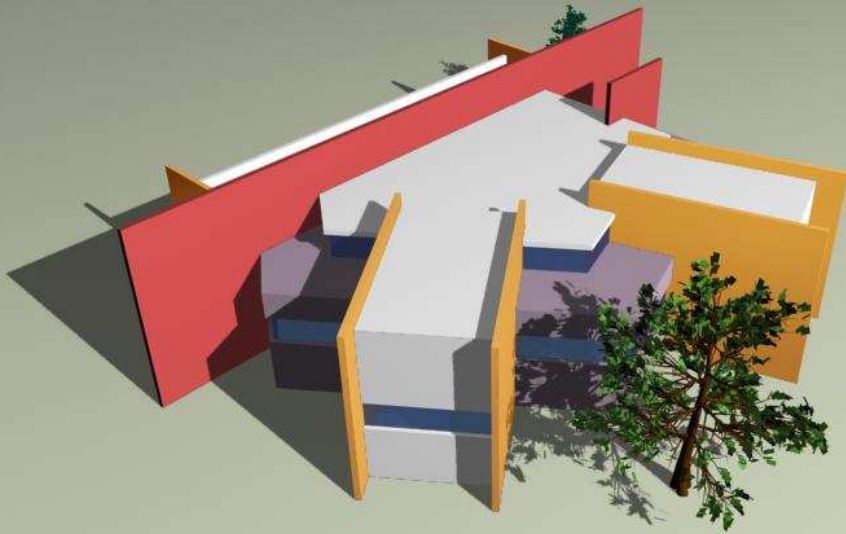


The Required Special Architecture

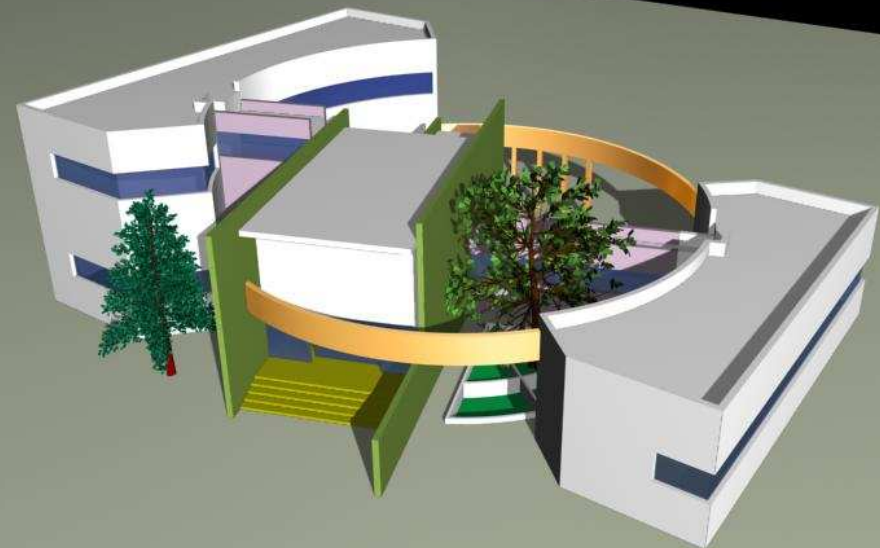
The Multi-purpose ICT centre should:

- Have earthquake resistant architecture;
- Have emergency management room with necessary equipment;
- Be appropriate for performing the earthquake drills;
- Have a room changeable to medical emergency room;
- Have large yards for settlement of shelters or field hospitals;
-

Therefore, it needs specific architectural design,...



Which gives a good opportunity to those architects,
who like challenging works.





**Proposed Regional Network
for Natural Disaster
Management based on ICT
and Space Technology
(APIDM)**



Proposed Asia-Pacific ICST enabled DM Center (APIDM)

- A 24 hour functional center for data monitoring related to metrological and earth crust. The center should be in contact with the data provider centers in order to be ready for the emergency warning;
- Receive and send information using space technology;
- Since natural disasters are different with regard to the scale of their impacts, the most important disasters will be the main focus of this center;
- Survival of people as an immediate need in relief operations. The force of nature is unpredictable. Also, the structural vulnerability is in a way which the damage to the buildings can not be prevented. Therefore the early /emergency warning by using the simple and advanced technology can reduce the casualties and damage noticeably;
- Warning, exchange of information, and quick communication before and during emergencies in the first golden hours is very important. Every second of on-time early warning can reduce the casualties.



Source: Iman Raahbord, 2009



USE of ICT for DRR Efforts in Human Capacity Building

- Public disaster education in various levels from preschool to adults, through usage of traditional and modern ICT,
- Training selected groups of volunteer people from both governmental and non-governmental sectors through holding workshops and especial related DRR courses.



Plans for Future of ICT in DRR

Part of plans for ICT in DRR includes:

- Cooperation between regional and local DRR networks,
- Training of ICT experts for DRR,
- National Plans such as portals
DesInventar. <http://undp.desinventar.net>
by UNDP in Iran,
- Exchange the principles and experiences of ICT for DRR efforts between countries which suffer from serious disaster impact.



Thank you

(Source: VSPCO 2006)



(Source: Mansouri 2009)

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