Introduction of the Experience and Progress of Chinese Emergency System




Institute of Public Safety Research, Tsinghua University

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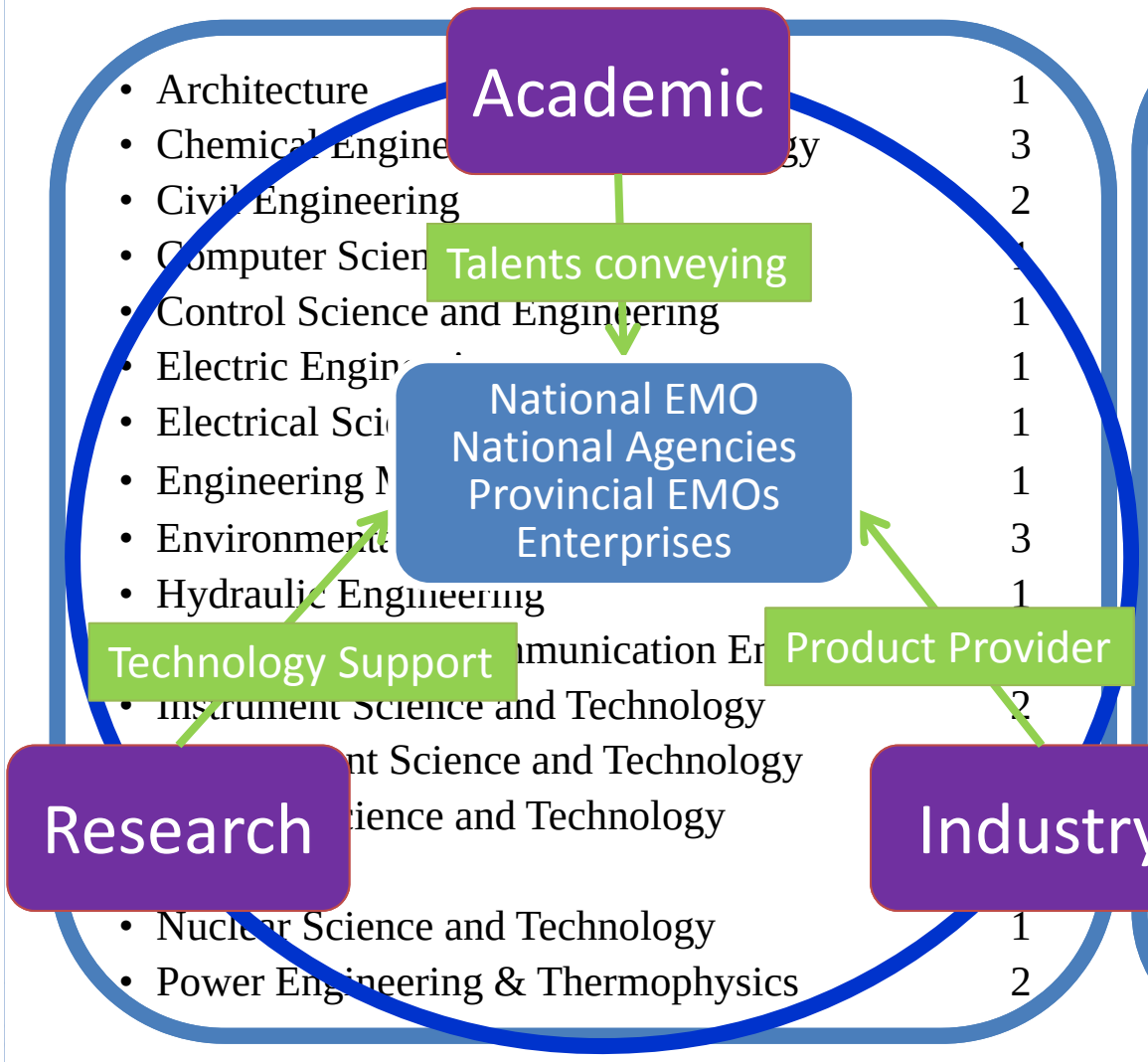
Outline

- **Brief Introduction of IPSR ,Tsinghua University**
- **Current Status of World Emergency Management**
- **Progress on Chinese Emergency Management System**
- **Some Suggestions and Discussions**

Tsinghua's Ranking (Eng) in 2007



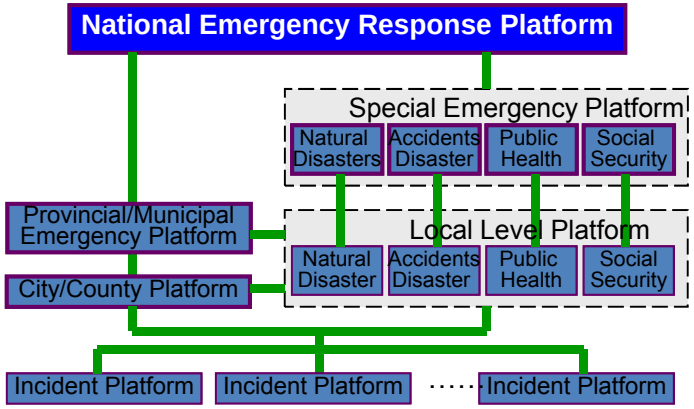
- Architecture 1
- Chemical Engine gy 3
- Civil Engineering 2
- Computer Scien 1
- Control Science and Engineering 1
- Electric Engin 1
- Electrical Sci 1
- Engineering M 1
- Environmenta 3
- Hydraulic Engineering 1
- mmunication En
- Instrument Science and Technology 2
- nt Science and Technology
- ience and Technology
- Nuclear Science and Technology 1
- Power Engineering & Thermophysics 2

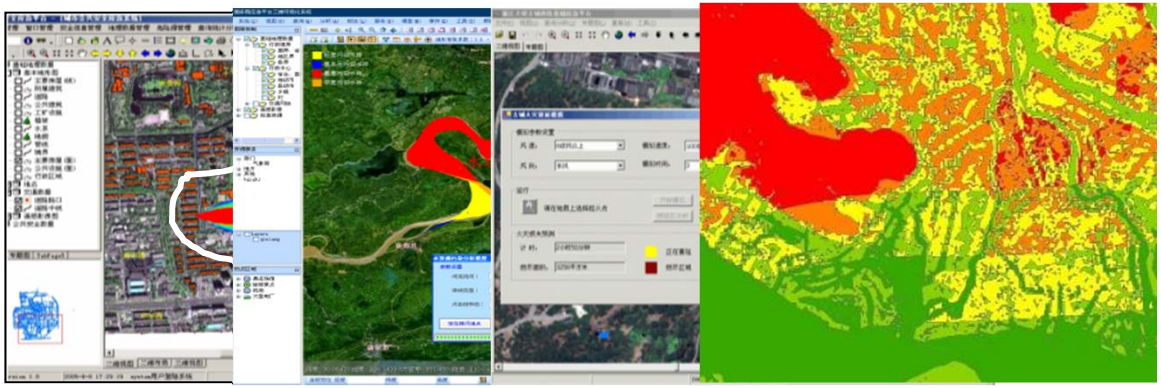
Institute of Public Safety Research
IPSR, Founded in 2003
Multidisciplinary Center

IPSR Plays an Important Role in China

IPSR has conducted several national important projects:

- Framework Design of National Emergency Response Platform
- Software &Database System Development for National ERP
- Integrated Prediction &Early Warning System for National ERP
- Emergency Response System for Sichuan/Yushu Earthquake Command Post





IPSR's Overseas Collaboration

IPSR's overseas collaboration including:

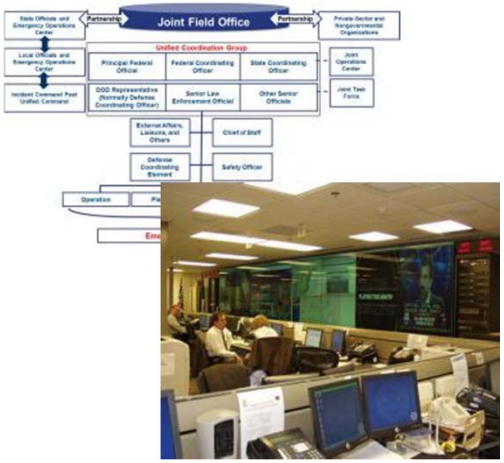
- Academic exchange platform: the Asia-Pacific Public Safety S&T Society
- Tsinghua-United Technologies Corporation(UTC) Research Institute for Integrated Building Energy, Safety and Control Systems
- Tsinghua-Boeing joint research center
- Committee member of ISO/TC223

Tsinghua-Boeing joint research center

The World Emergency Management

USA

Develop from FEMA to DHS, the Federal Government depends on NIMS to Coordinate Emergency Events



HSOC to State EOCs

UK

Integrated EM system, Gold/Silver/Bronze 3 level response

Using Regional operation center to connect the Cabinet Office with shire/county

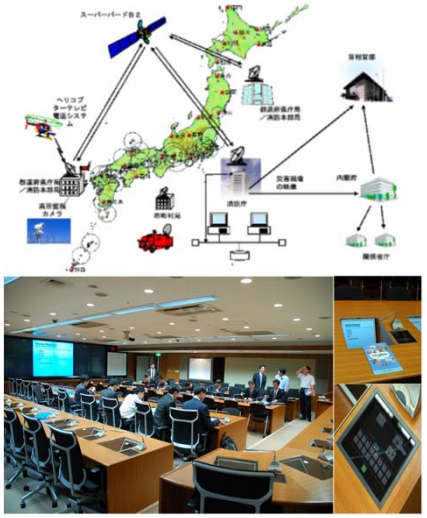
Germany

MOI Initiate deNIS II, Connect the Federal Government with States

Focus on informational network

Japan

DIS covers from capital level to Municipal level



Focus on natural disaster monitoring & early-warning

Background of Emergency Management

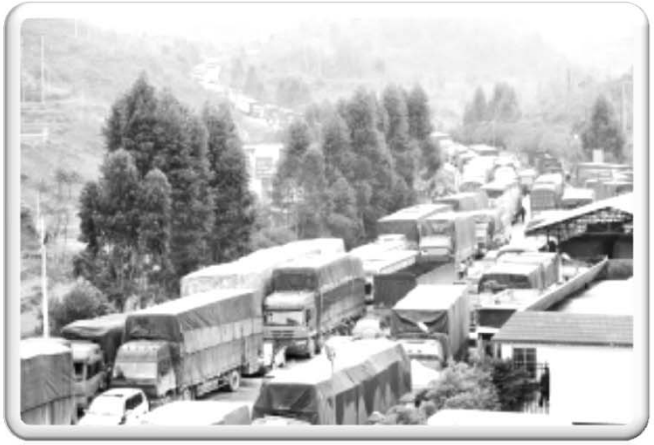
- China is one of few countries that are most severely afflicted by disasters across the world. 328 emergency types!
- 74% of provincial capitals and 62% of municipalities are prone to high-intensity earthquakes, over 70% of large cities and over 50% of the population are vulnerable to meteorological, seismic, geological and oceanic disasters.
- The public safety problems including 4 domains: Natural Disaster, Accidental Events, Public Health Incidents, Social Security Incidents.

Emergency system improvement from disasters response

2003 SARS: Conceive of EM System and EM Platform

2003 Kaixian Hazmat Accident: Utilization of Emergency Technologies

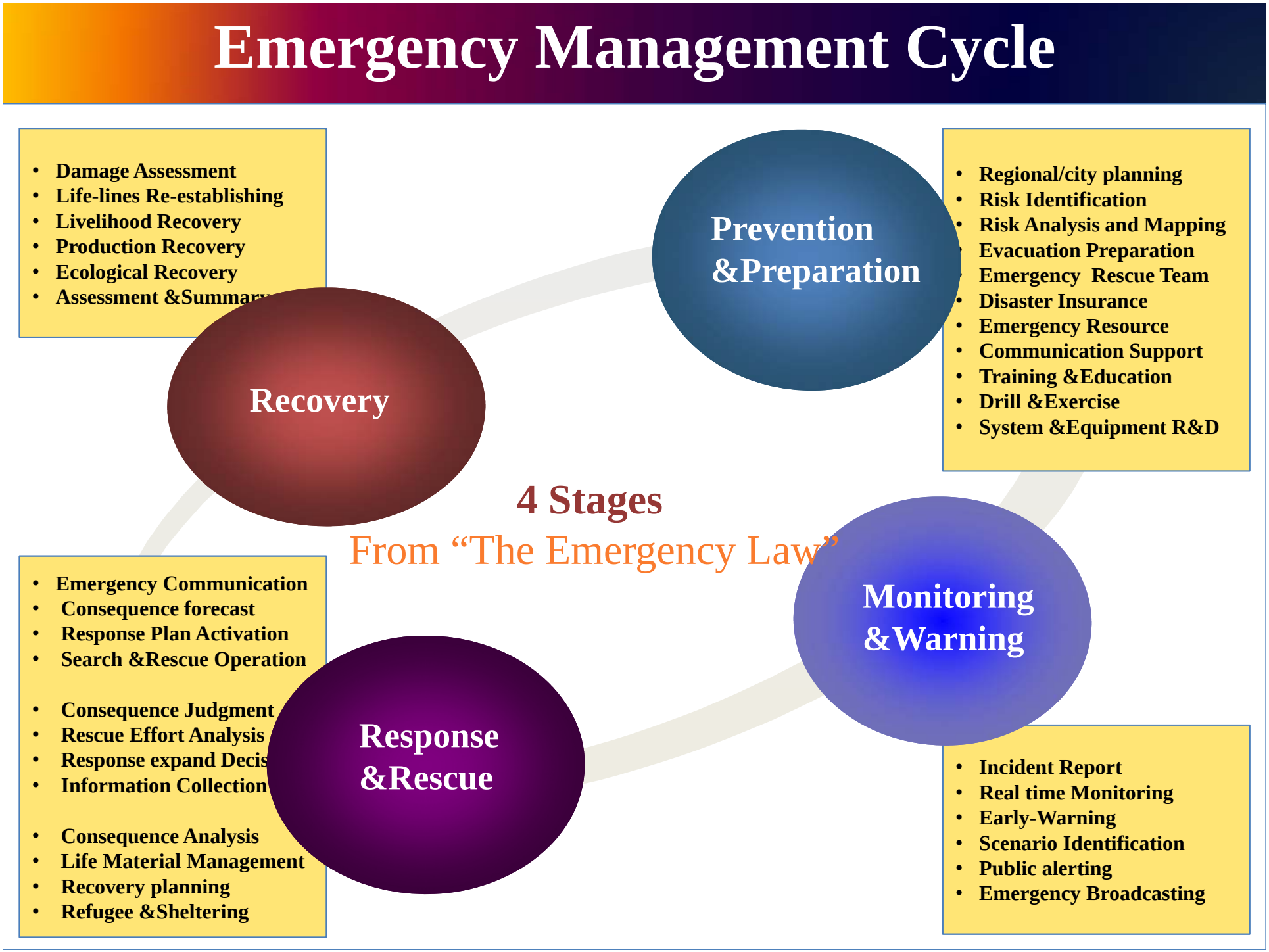
2005 Songhua River Water Pollution: The Importance of the Disaster Chain Rule



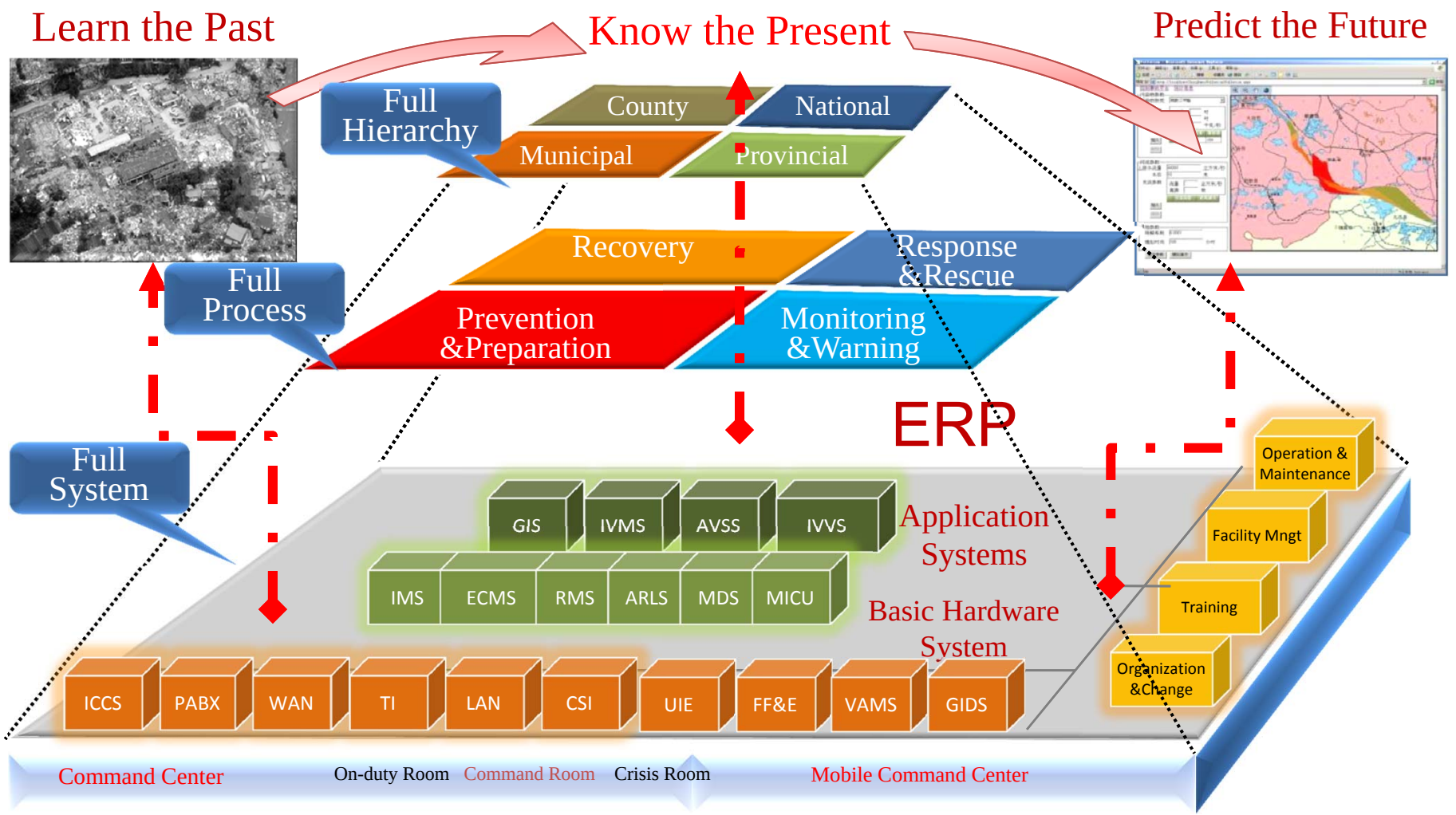
2008 Snow and Freeze Disaster, Sichuan Earthquake: Emergency Management of Unconventional Catastrophe Hazard

2010 Yushu Earthquake: On Scene Emergency Equipment and Multi-agency Coordination

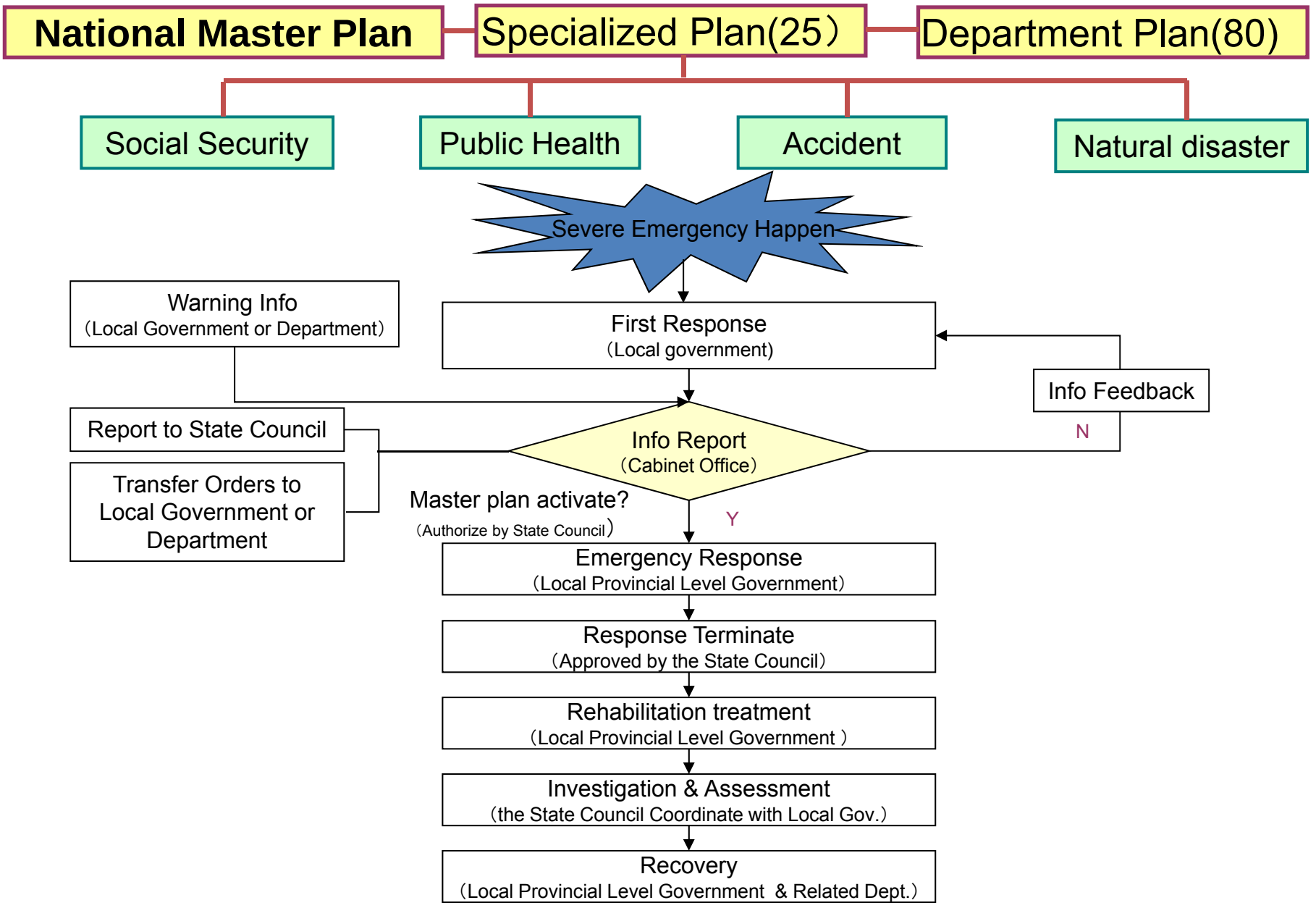
Emergency Management Cycle



Capability of Emergency Response Platform



Emergency Response Plan System



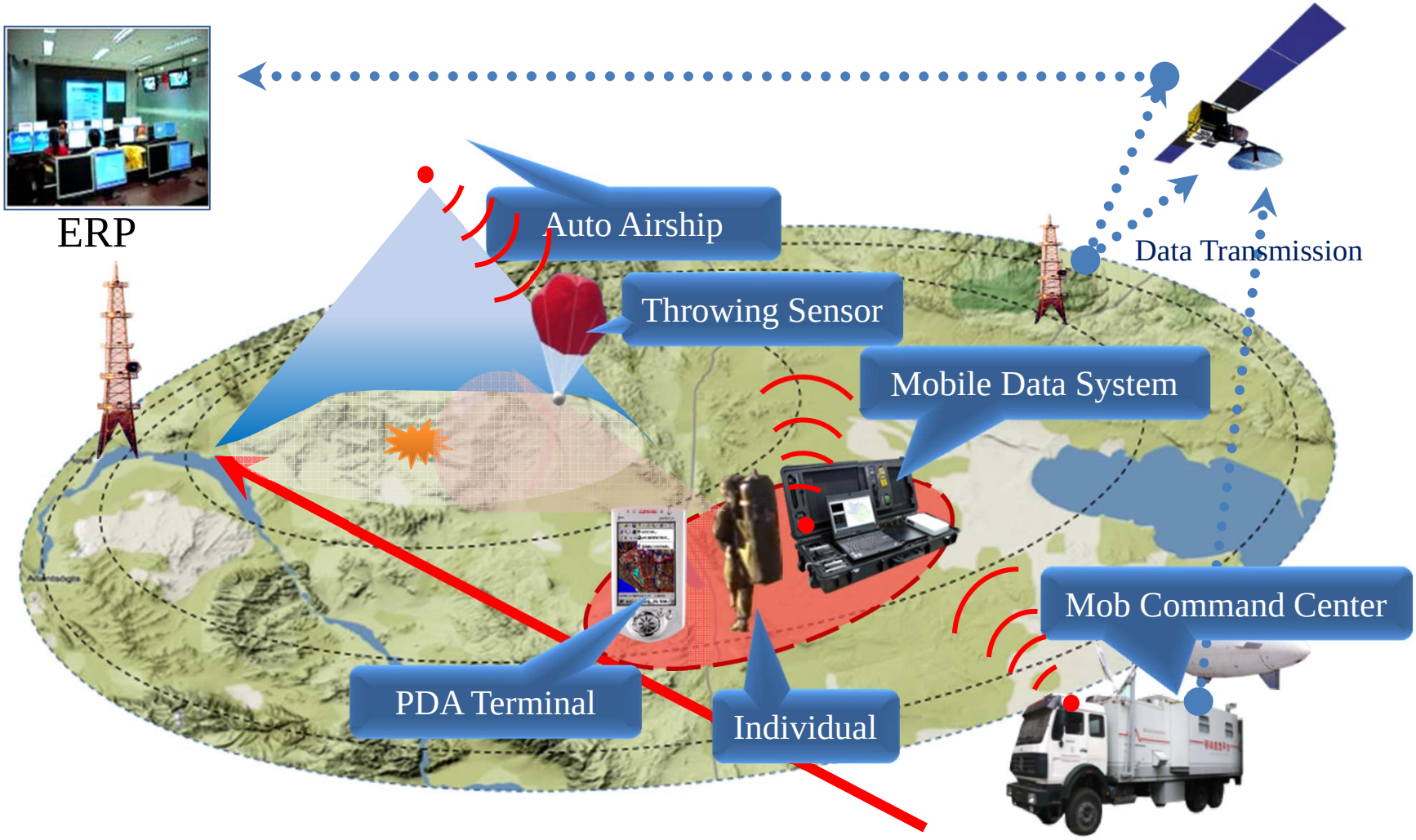
Emergency Operation Equipment

Emergency Operation Team

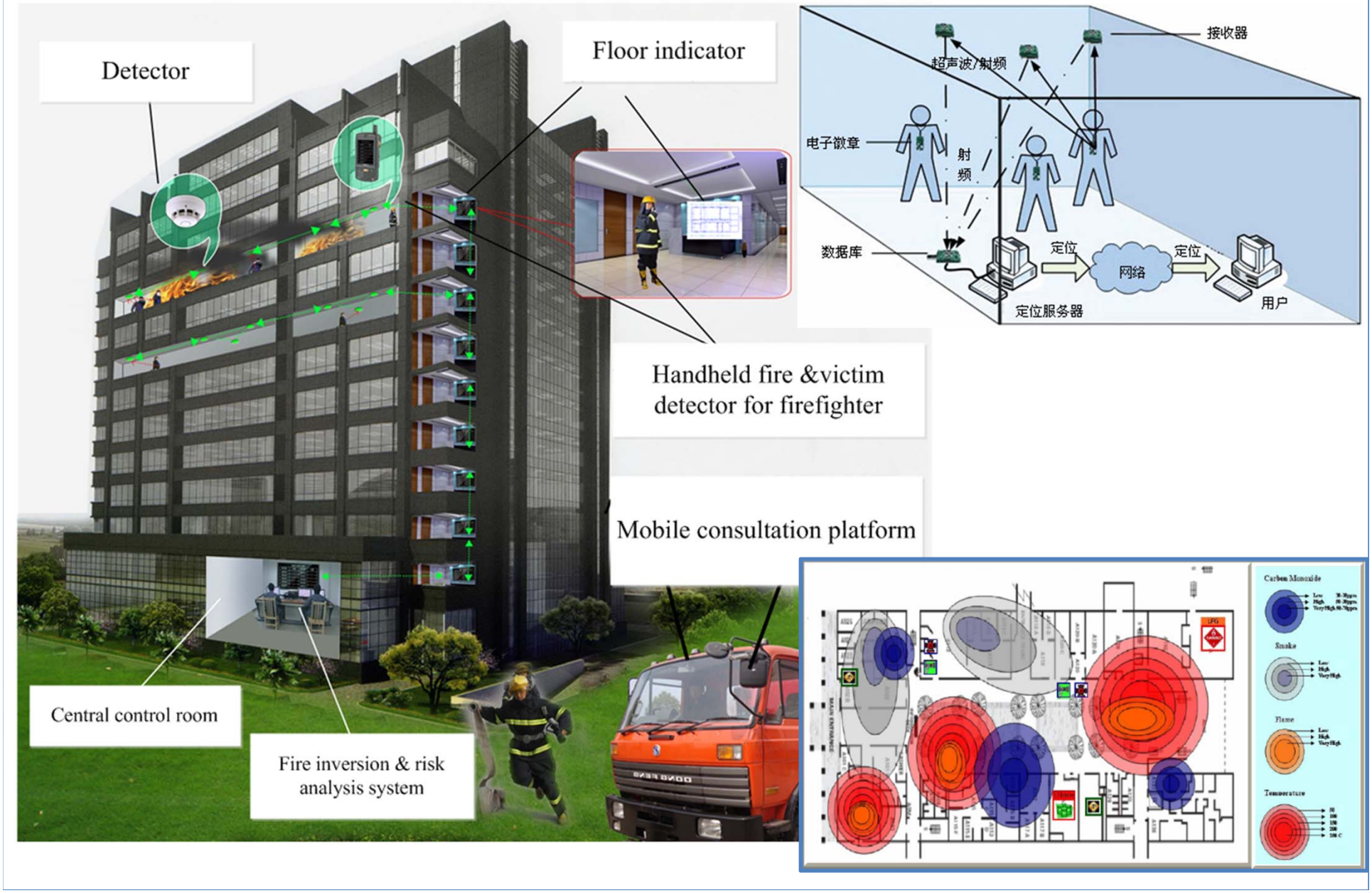
Firefighting Command &Training Systems for Beijing 2008 Olympic Game

Emergency Operation Equipment

On-Scene Mobile System



Emergency Operation Equipment

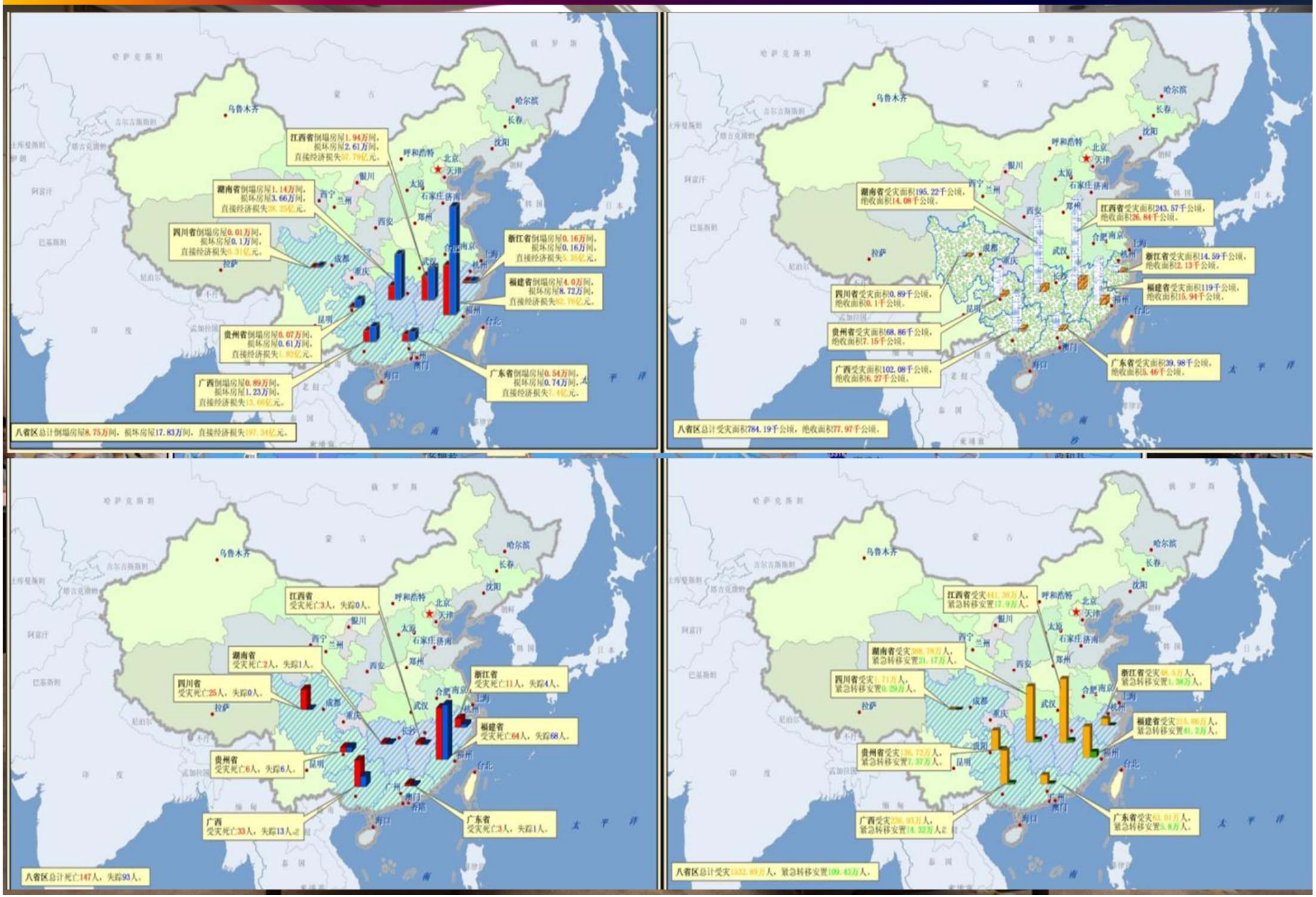


Emergency Resource Guarantee Capability

Physical Reserve ⟷ Funds Reserve ⟷ Capability Reserve ⟷ Agreement Reserve

中国自然灾害分布图

Typical Application in Flood Relief



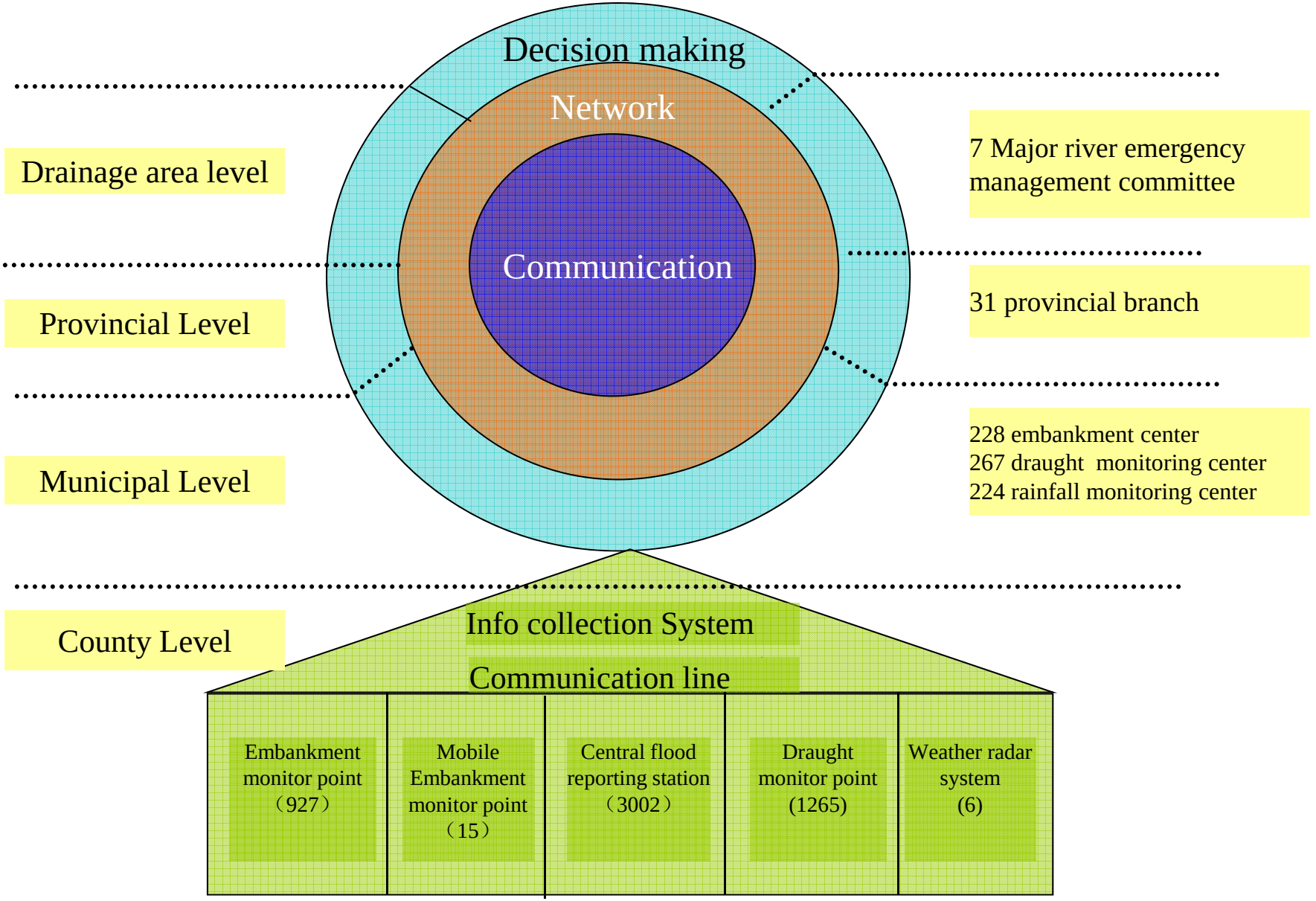
Typical Flood Prevention Process

Flood Prevention Decision Making Process-4 Phase

Information ⇨ Prediction ⇨ Planning ⇨ Decision

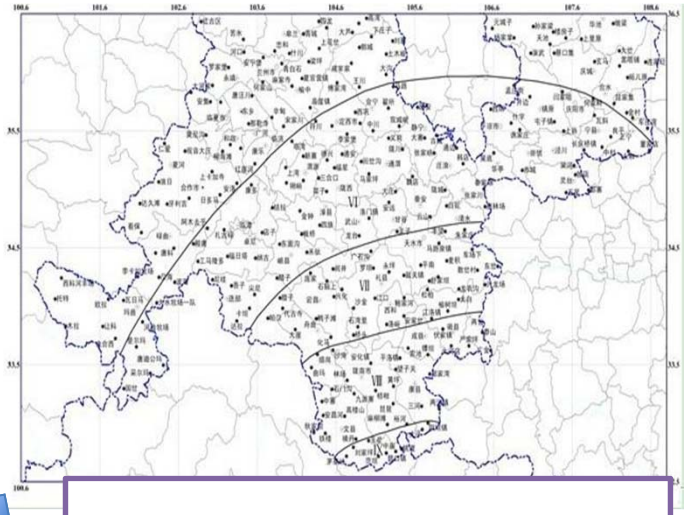
Information	Prediction	Planning	Decision
Meteorological info	**Rainfall forecast**	**Flood control plan**	**Flood warning release**
Rainfall info	**Flood level predict**	**(water yield dispatch**	**Embankment usage plan**
Reservior /Flood storage	**Embankment risk predict**	**plan +embankment**	**Resource deployment**
&retention area info	**Flood evolution predict**	**protection &repair plan)**	**Evacuation plan**
Embankment info	**Flood plain area &loss**	**Flood prevention and**	**Loss evaluation**
Disaster info	**predict**	**mitigation plan**	**Other emergency measure**
	Flood prevention analysis		

Information



Information exchange between agencies

Weather Bureau

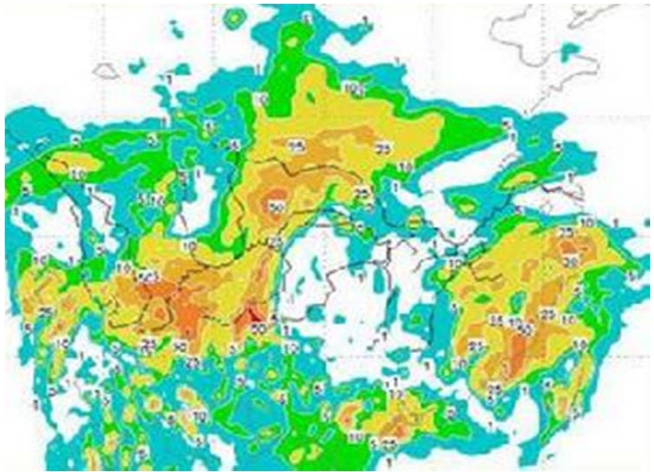


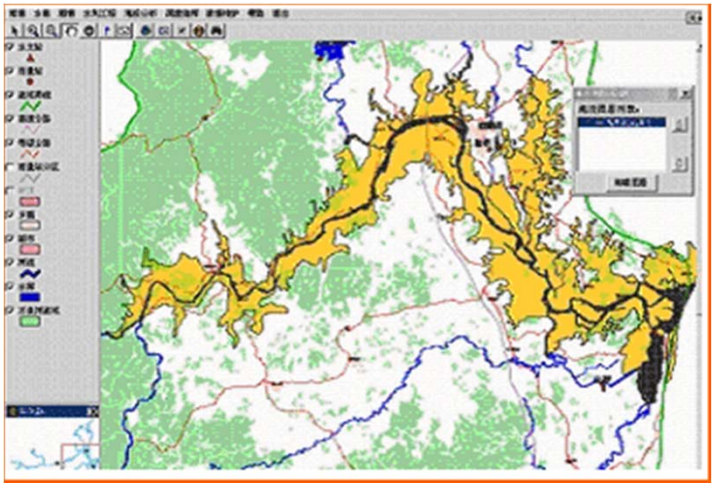
Ministry of Land Resource

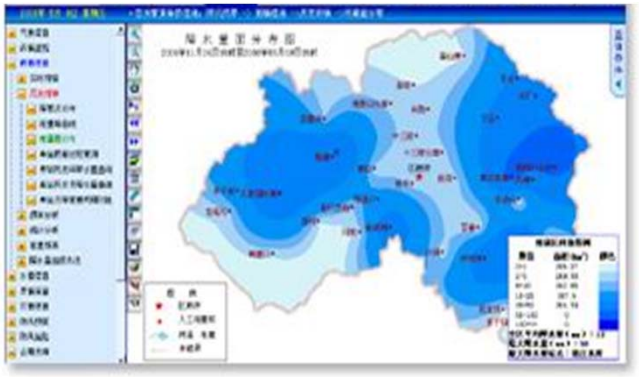
Office of Flood Control &Relief

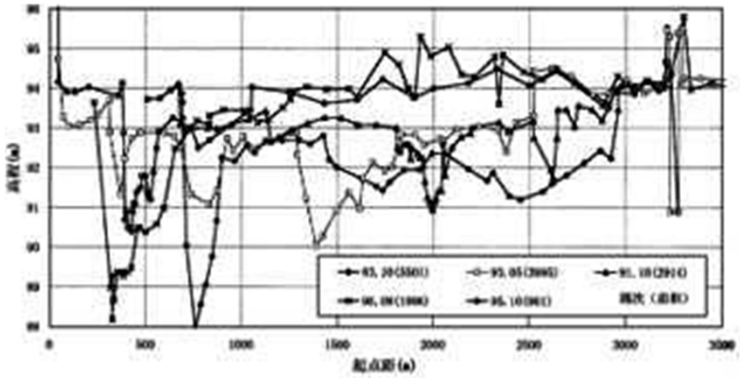
Power Grid

Prediction







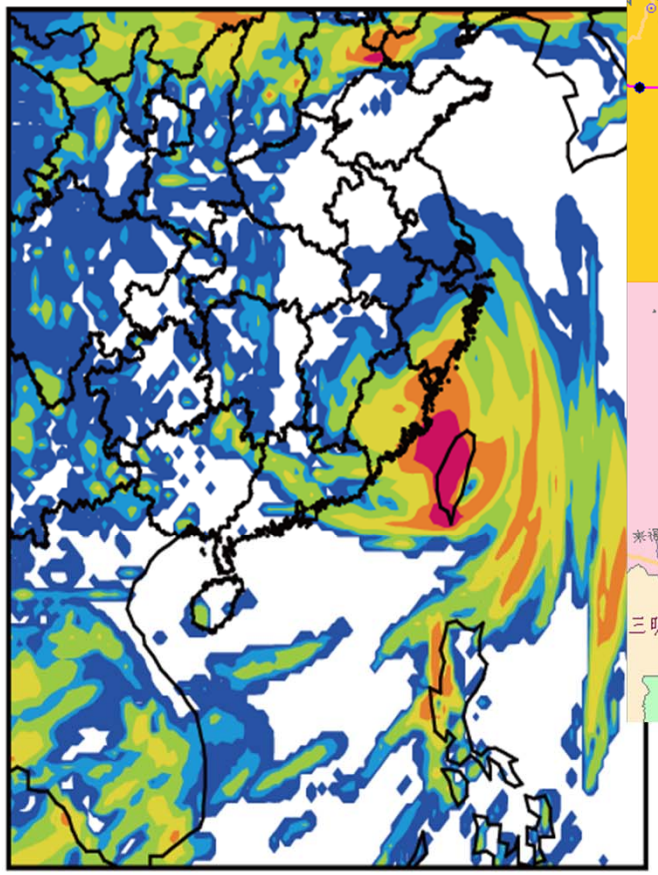


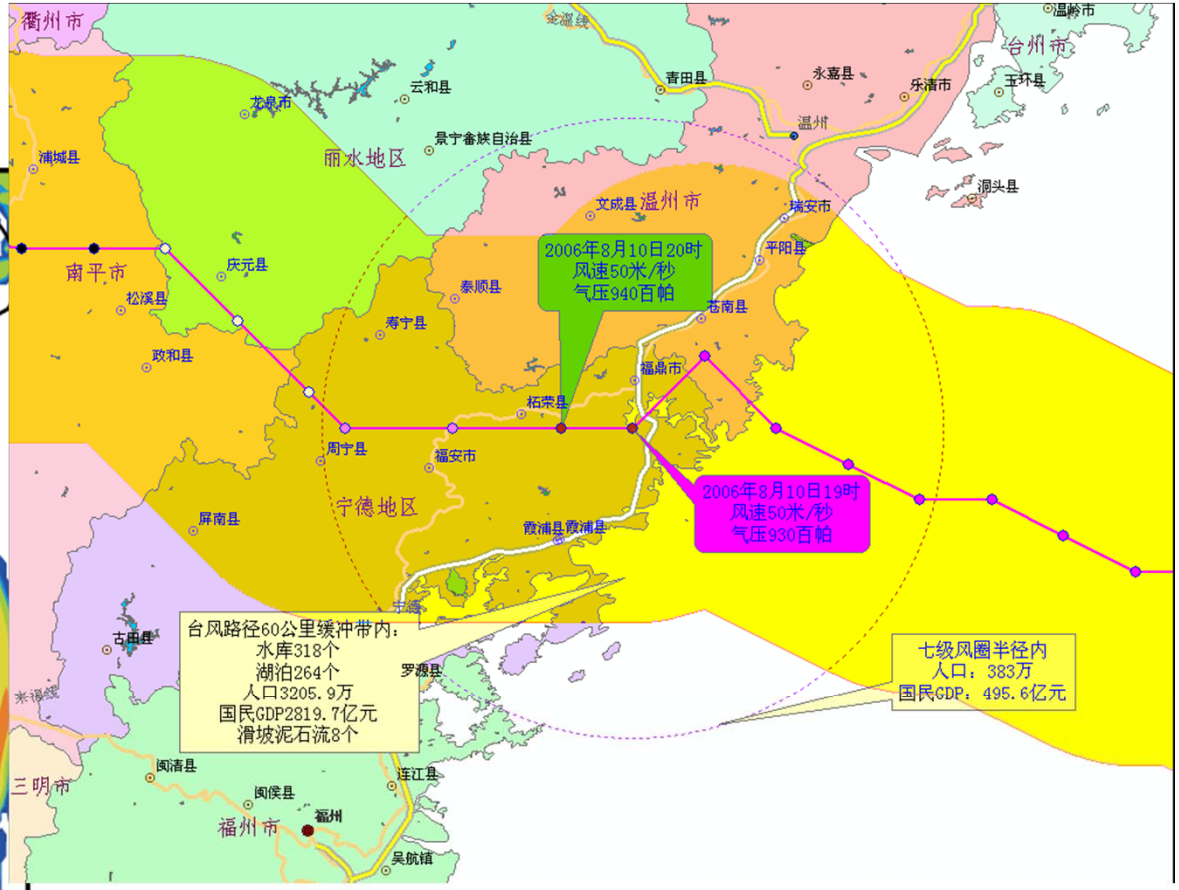
Floodplain Covering Area, Position of Flood Peak, Flood Depth, Flood evolution situation, ……

Prediction

Flood induced disaster chain analysis(Landslide, Mud, Dambreak,…)

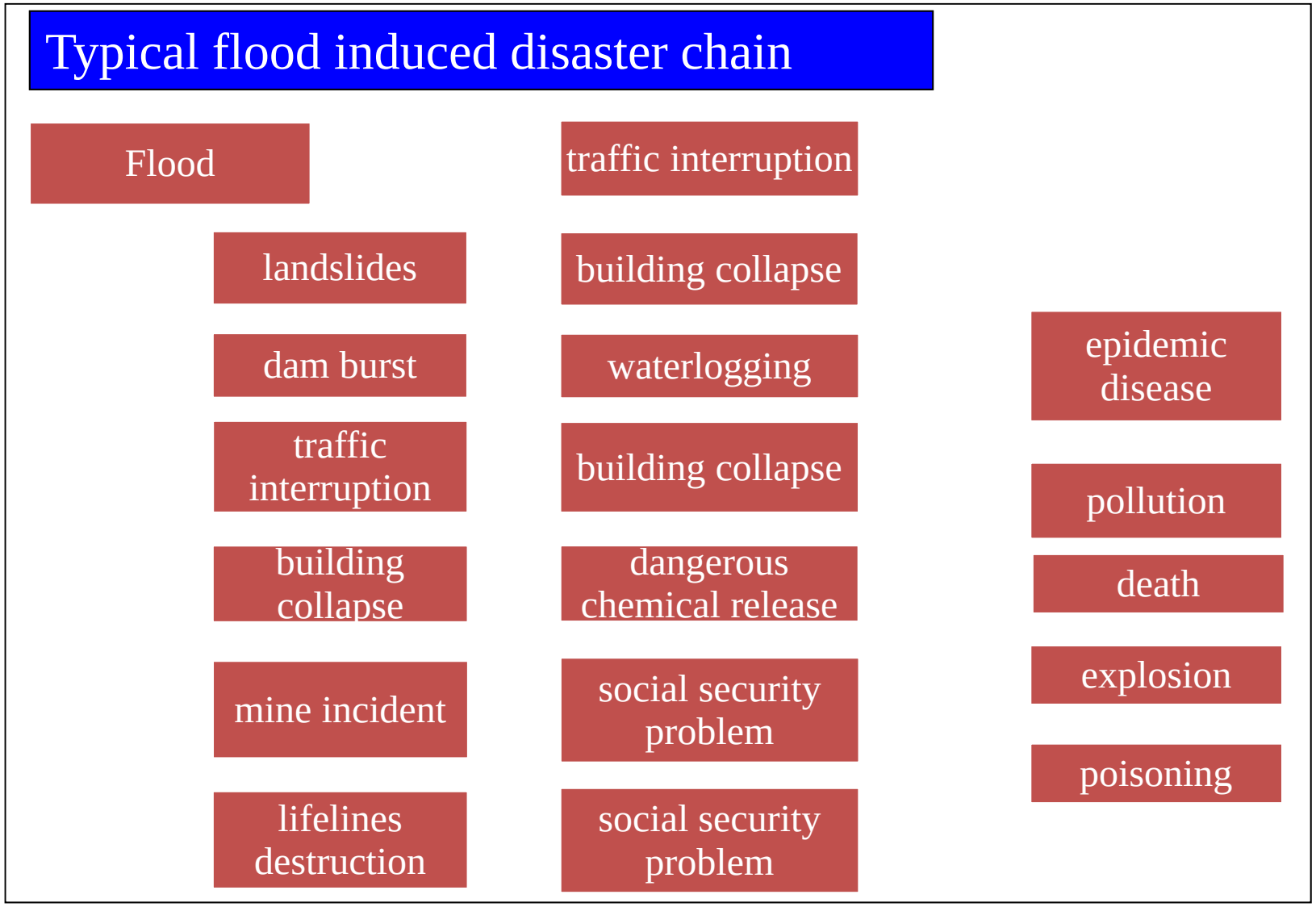
- Tracking the storm
- Predicting rain falls





- Assessment damage (building and economics)
- Warning secondary threats

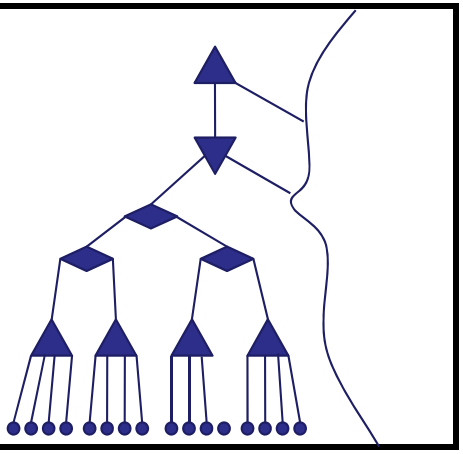
Prediction

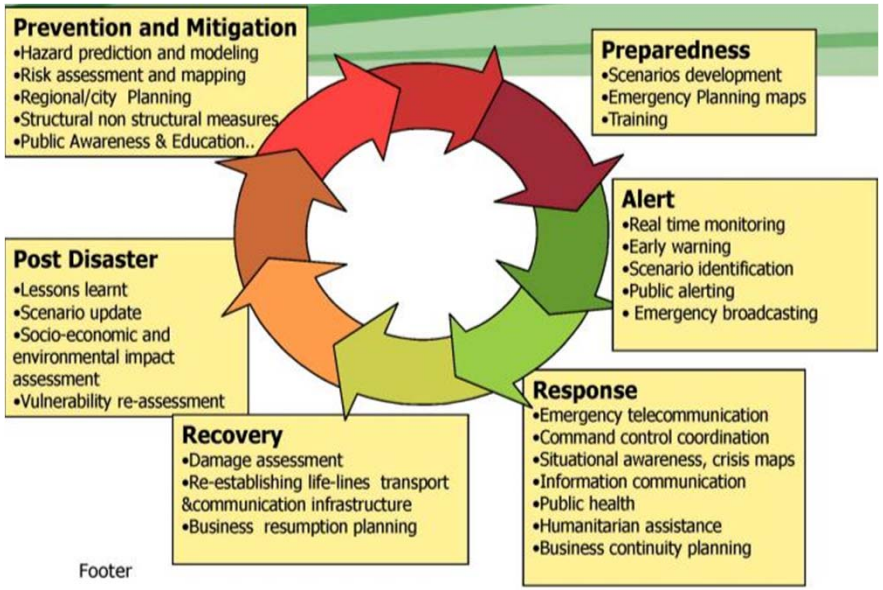

Typical flood induced disaster chain
Flood
landslides
dam burst
traffic interruption
building collapse
mine incident
lifelines destruction
traffic interruption
building collapse
waterlogging
building collapse
dangerous chemical release
social security problem
social security problem
epidemic disease
pollution
death
explosion
poisoning

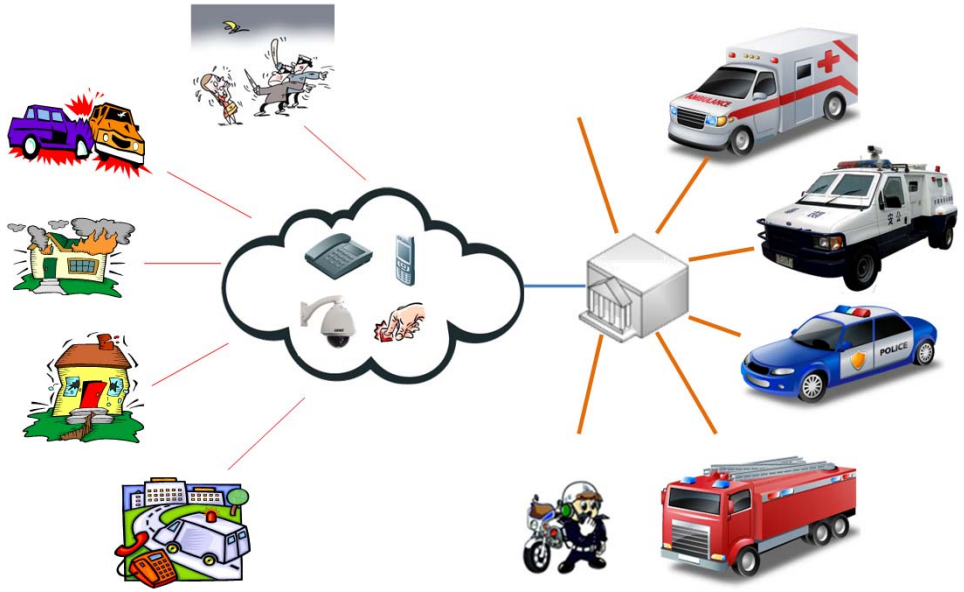
Suggestions for Emergency Management

- Suggestion1: Emergency Response Plan Optimization

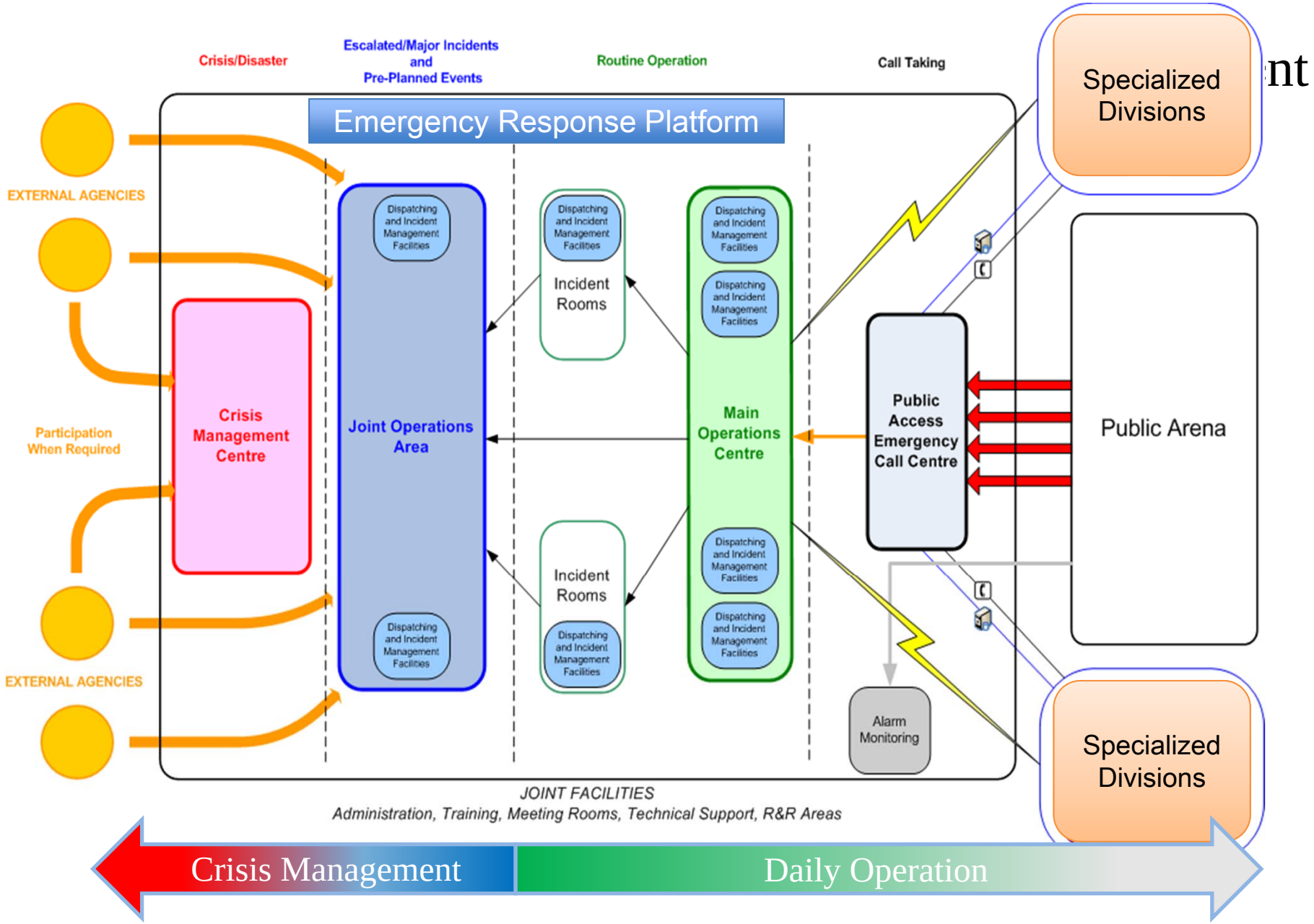
V	National
IV	Provincial
III	Municipal
II	County/Community
I	Enterprise







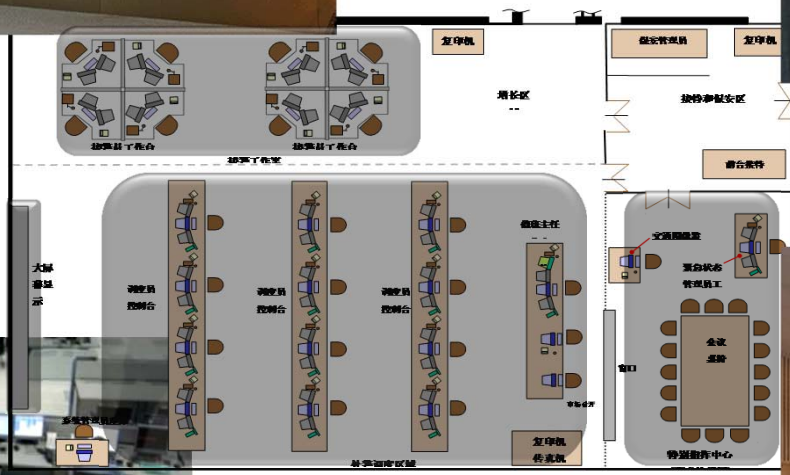
Suggestions for Emergency Management



Suggestions for Emergency Management

Screen Display

Call-Taking Room

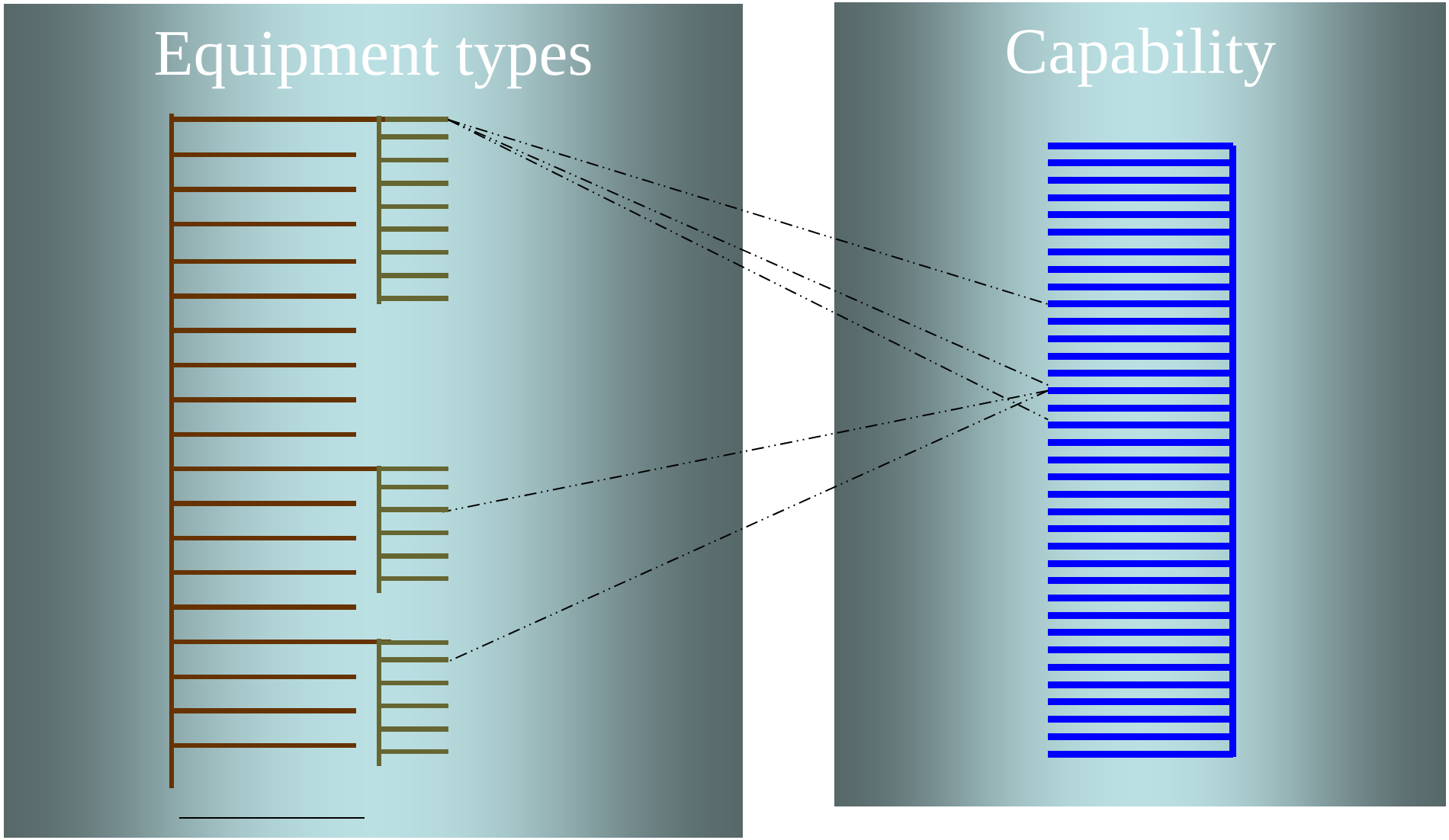


Dispatch Room

Crisis Room

Suggestions for Emergency Management

- Suggestion 3: Emergency Equipment

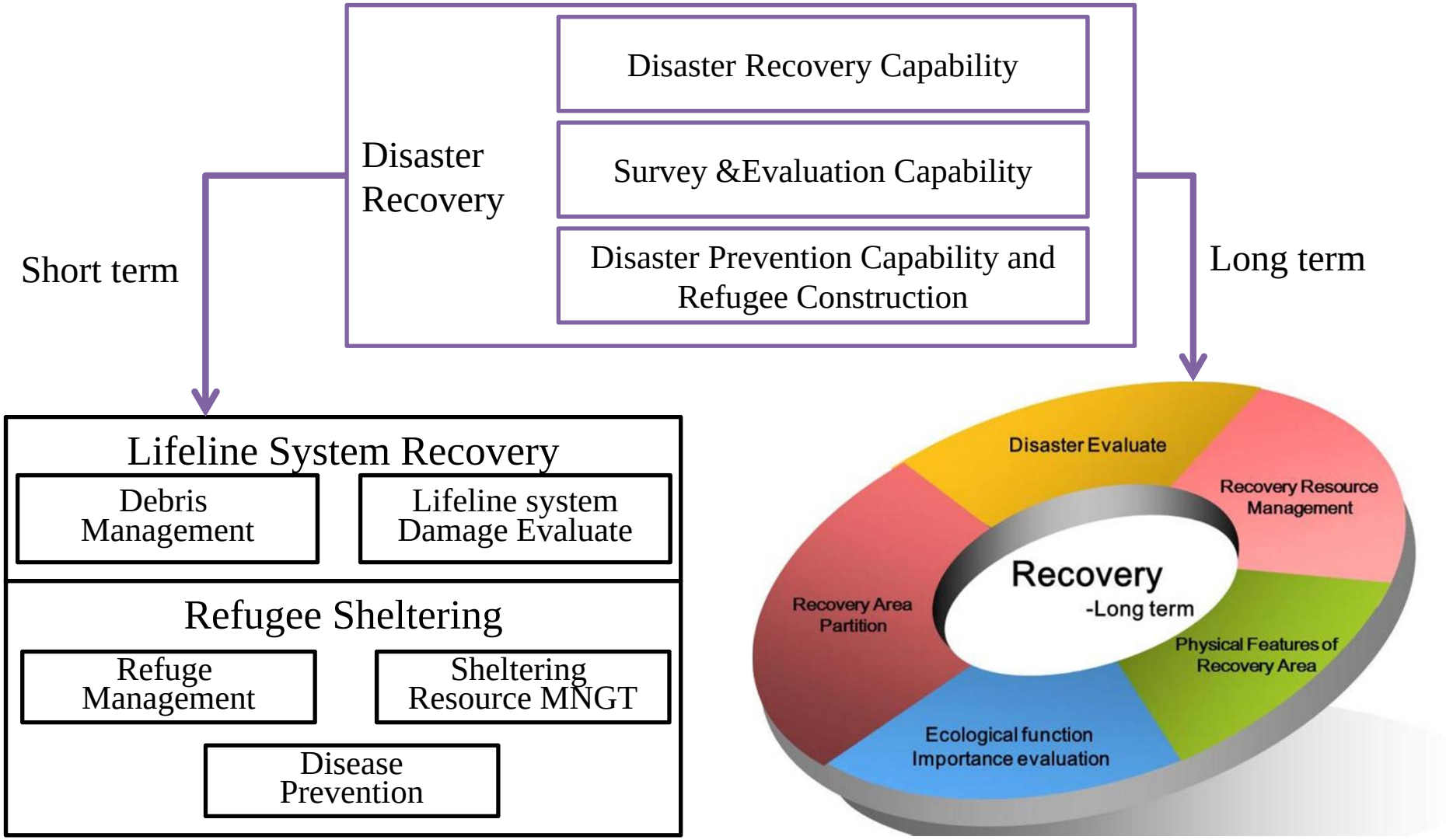


Suggestions for Emergency Management

- UAV:
  - Diameter: 0.90m
  - Flight duration: ≥45min
  - Speed: 0~ 60Km/h
  - Flight Height: 0~600m
- Equip with:
  - Mini Camera;
  - Microwave transmitter;
  - Mini auto-balance instrument;
  - Mini laser ranging sensor;
  - GPS module, gyroscope, etc.

Suggestions for Emergency Management

- Suggestion 4: Disaster recovery capability



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