Disaster Prevention Plans for Telecommunications

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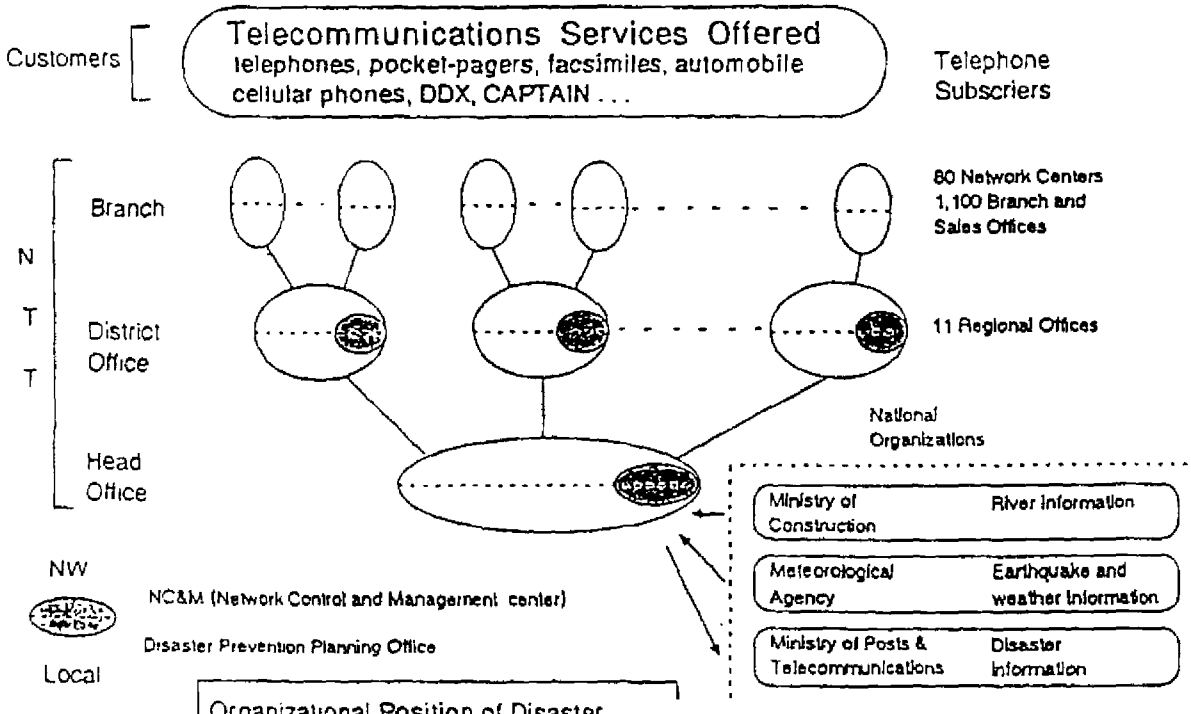
NTT'S TELECOMMUNICATION NETWORK

Telephone Subscriber: 54 Million

Infrastructure of Network

- Telephone Exchange Station.....4,982
- Rural Telephone Exchange Station...2,174
- Radio Relay Station..... 4,110(excluding Cellular)
- Cable length.....1,210,000 Km —Fibre 51,000Km
- Telephone Pole..... 12,780,000
- Duct Network.....610,000 Km
- Telephone Tunnel.....510 Km

Organization, Systems and Operations



Organizational Position of Disaster Prevention Planning Office and NC&M

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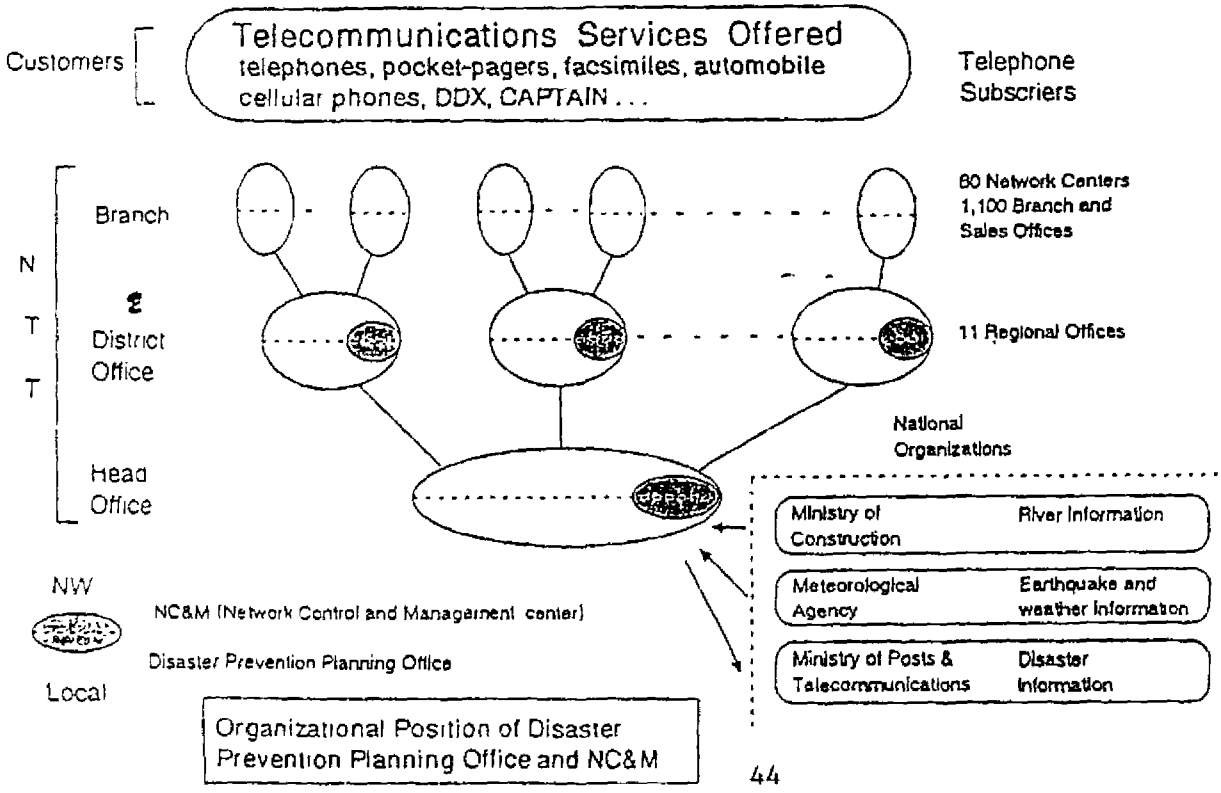


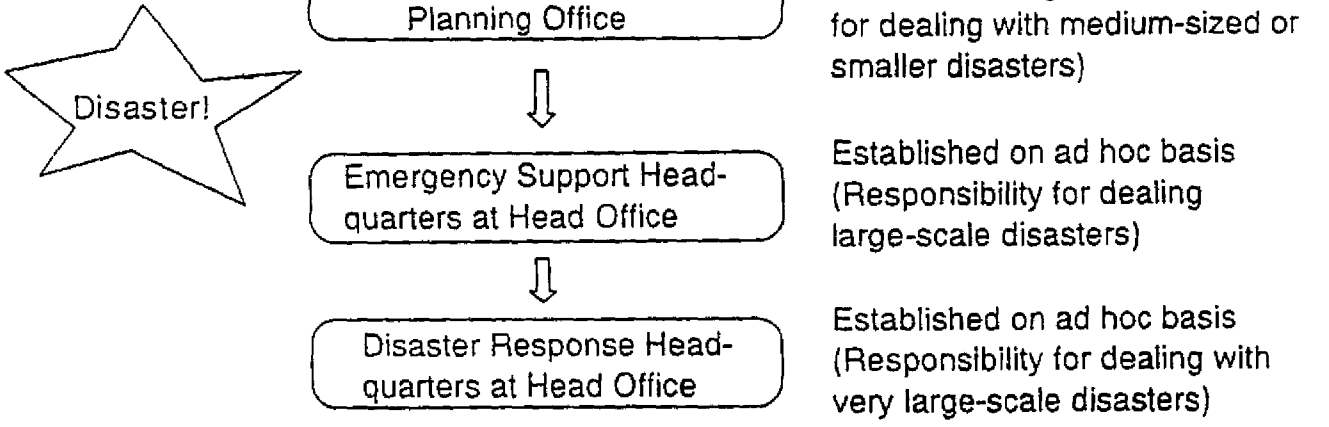
Organizational Position of Disaster Prevention Planning Office and NC&M

Disaster Prevention Planning Office	• Collecting and communicating information nationwide regarding typhoons, heavy rains and floods, earthquakes, tidal waves, volcanic eruptions, etc. • Collecting information at times of disaster, as well as providing notification and guidance to pertinent NTT operating divisions • Collecting information regarding large-scale telecom service interruptions from facilities faults, as well as providing necesary guidance • Cooperating with pertinent governmental organs
NC&M (Network Control & Management Center)	• Unified monitoring of nationwide telecom traffic • Carrying out rerouting and otherwise regulating the network when irregularities occur in parts of the network due to disasters, failures, etc.; generally assuring network reliability. – 24-hour-a-day manned operations

Operations of Disaster Prevention Planning Office and NC&M

This involves several measures, including:

- Preventive establishment of wide-area support coverage for response in large urban and other wide areas at times of disaster
- Organizing efficiently to ensure quick response
- Establishing a disaster-response headquarters
- Gathering together necessary technical experts
- Developing disaster-prevention equipment and facilities on a nationwide basis



Approach to Establishing Disaster Response Headquarters

DISASTER PATTERNS

Disaster Pattern	Examples of Damage to Communications	Examples of Countermeasures Employed
Earthquake	•Communications cut off due to movements in the positions of microwave towers •Start up impossible due to in the positions of communications facility engines	• Multiple routing of transmissions • Fortification of anti-seismic structures (buildings,external facilities, internal facilities)
Flood	•Water damage to telephone office submersion •Long-term commercial power failure	• Construction of seawalls • Raising of grounds • Boosted capacity for storage batteries
Fire	•Fire in the telephone office •Fire in the cables inside tunnals	•Installment of hallon extinguisher •Fireproof cable
Accident	•Airplance crash	• Communications measures for districts without phone service (portable MBS)

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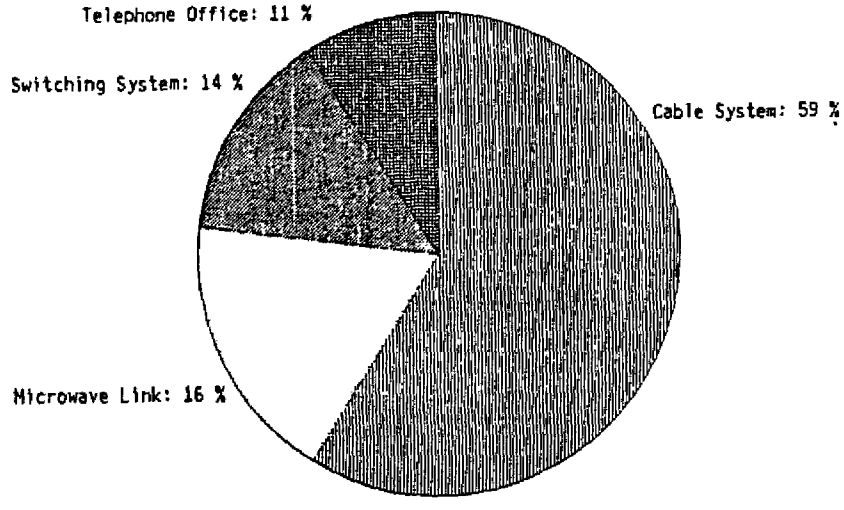
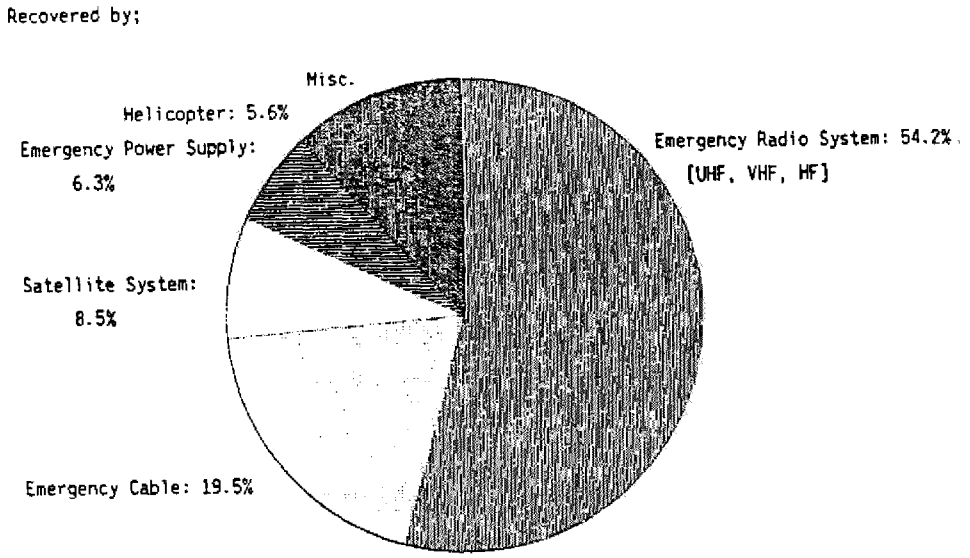
DISASTERS IN LAST 20 YEARS

Disasters	
Earthquake	4
Flood	15
Fire	2
Accident	1



DISASTER RECOVERY METHOD



Laws Related to Securing Communications in a State of Emergencies, such as Disasters

Telecommunications are Important ⇨ **Regulated by law**

- Telecommunications Act
- Executive Orders Related to the Telecommunications Act
- Wireless Telegraphy Act (Radio Act)
- Self Defense Forces Act

- Communications must be maintained should natural disasters,etc.
- Reasons and causes must be reported stoppage of operations, a major accident occur.
- Defense communications must be maintained

- Basic Law Regarding Countermeasures Against Natural Disasters
- Disaster Relief Act
- Police Act
- Flood Defense Act

Preventive Measure Plans

Subjects	Measures to be taken
1. Enhancement of the System Reliability	• Dispersion of trunk exchanges • Multiple routing • Expanded use of satellite communications system • Measures to maintain vital communications
2. Prevention of Service Interruption	• Transportable radio system (TZ-60) • Radio telephones (TZ-41) • Telecommunications satellites (SC-31)
3. Quick Recovery	• Emergency transportable telephone exchange equipment • Power supply vehicles • Portable radios • Emergency cables • Plans for emergency situations

MEASURES TO MAINTAIN TRAFFIC IN VITAL COMMUNICATIONS

Main Points in Maintaining Traffic

- Classify users (General Telephones,Priority Telephones)
- Designate 10% of the Circuits Owned by Major Institutions as Priority telephones.
- Limit Communications from Regular telephones During Disasters

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Telephones Having Priority in a State of Disaster

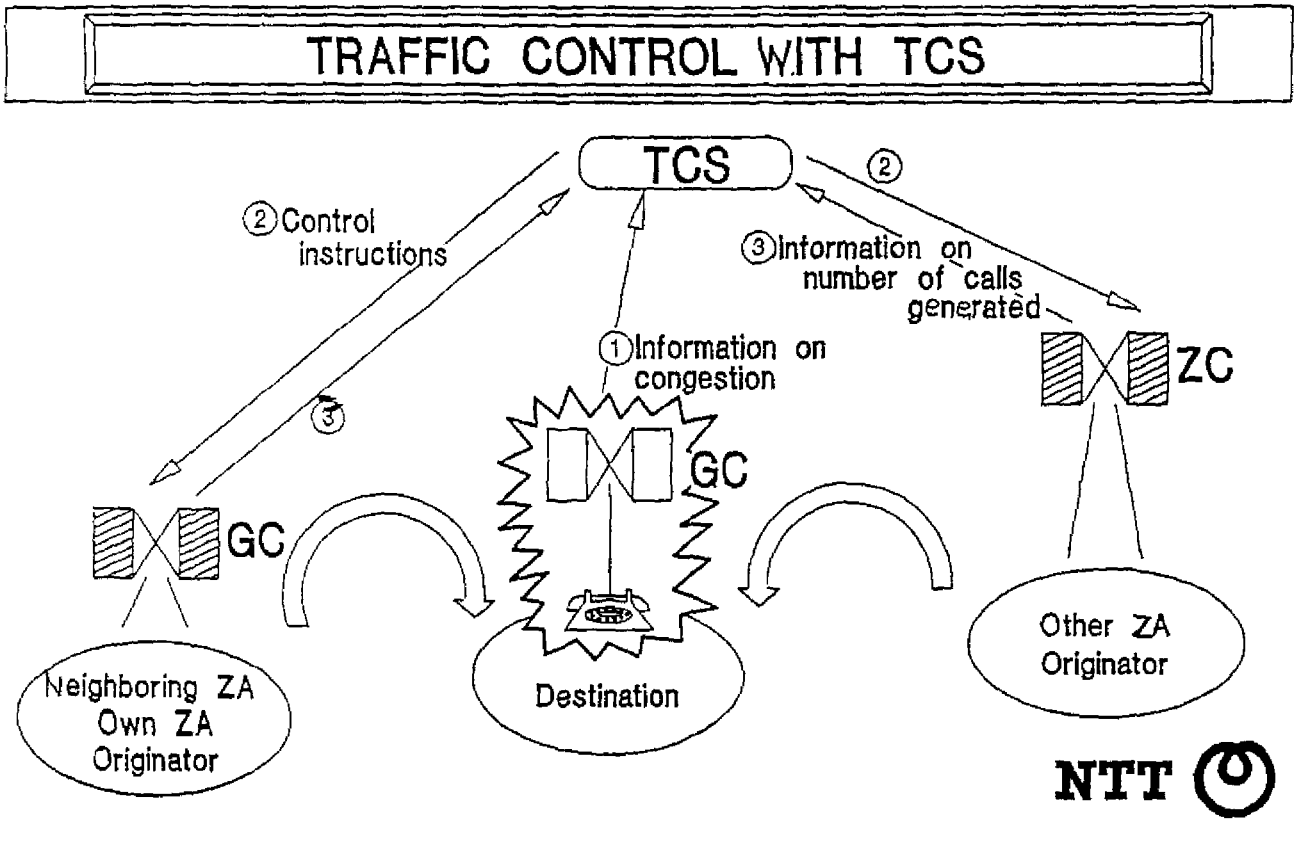
a) About 10% of subscriber telephones installed at the following sites are designated as telephones with priority:

Meteorological agencies; flood defense organizations; fire defense organizations; disaster relief organizations; police; defense organizations, organizations related to securing transportation, communications, power supply, gas supply, and water supply.

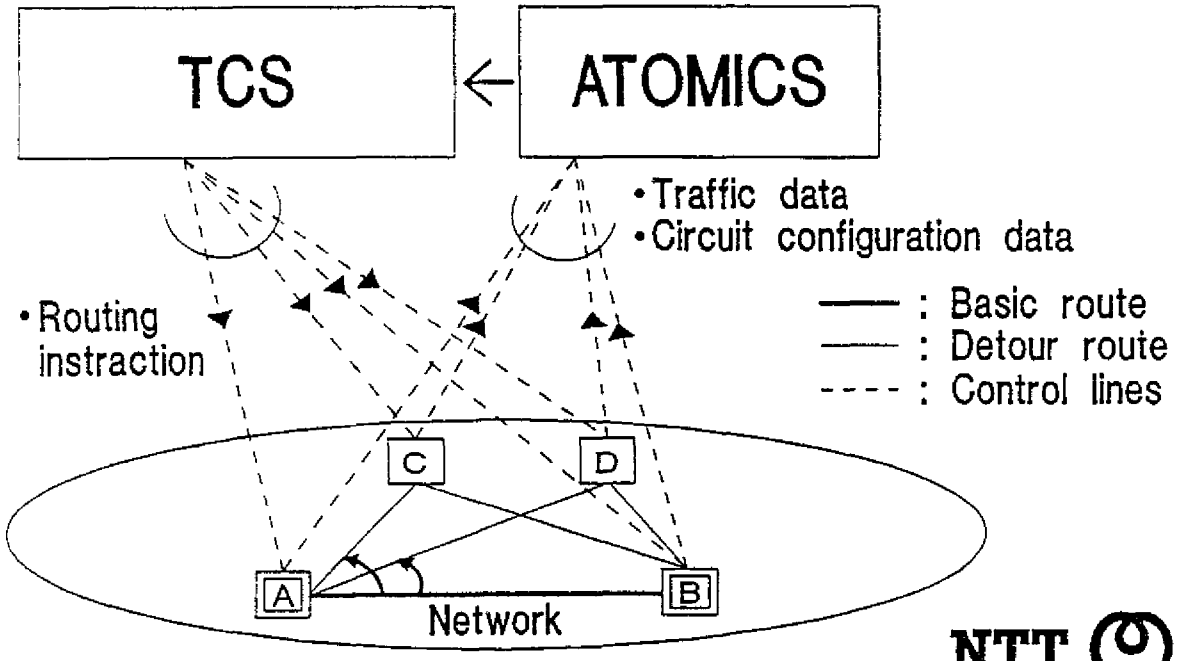
b) Outdoor public telephones (green, yellow, blue)

Some functional restrictions exist, such as being unable to use pre-paid cards in the event of outage.

Emergency calls (dial 110, 119) can be made even in such conditions.



SYSTEM CONFIGURATION FOR DYNAMIC ROUTING



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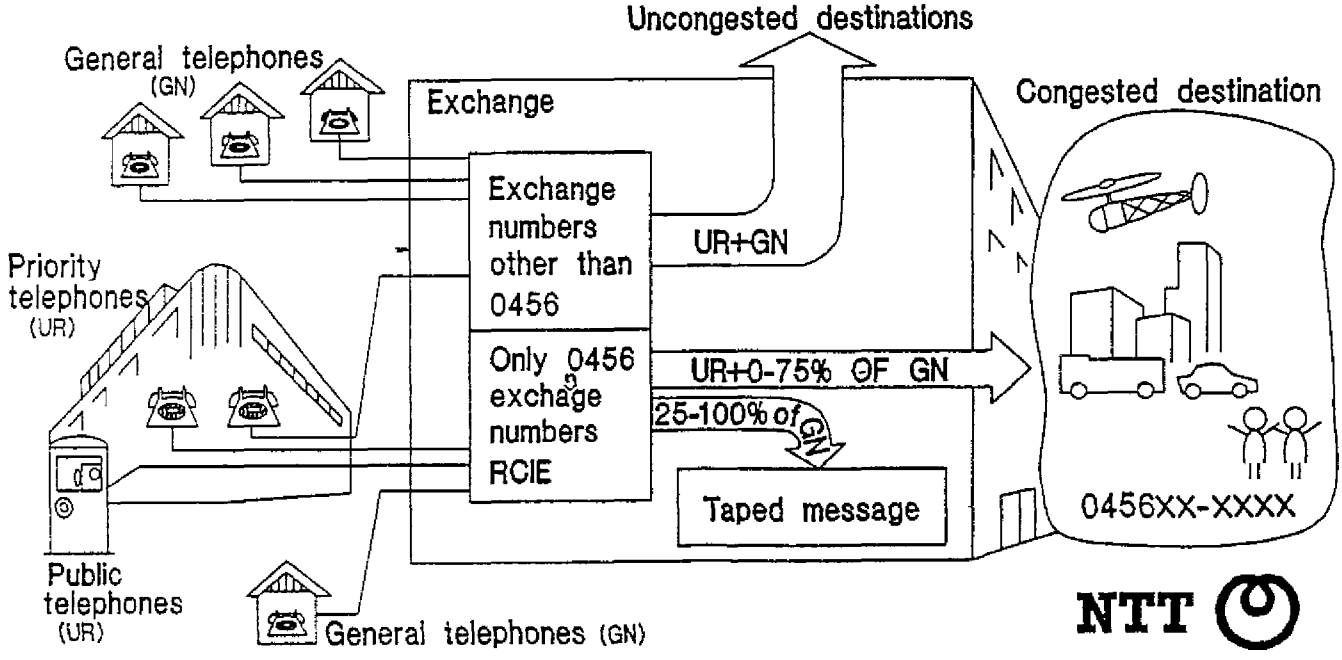
CONCEPTS FOR CONNECTION REGULATION

Regulation of Calls to Specific Destinations



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PREVENTING COMMUNICATIONS FROM BEING CUT OFF

- PREVENT ISOLATION OF COMMUNITY (TZ-60)
- MAINTAIN COMMUNICATIONS WITH LOCAL DISASTER PREVENTION INSTITUTIONS (TZ-41)
- EXPAND USE OF TELECOMMUNICATIONS SATELLITES (SC-31)

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EARLY RECOVERY OF TELECOMMUNICATIONS SERVICE

- Emergency Portable Exchange Equipment
- Emergency Power Supply Equipment
- Portable Radios
- Truck-Loaded Satellite Stations
- Emergency Cables
- Formulate Plans for Emergency Situations

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EMERGENCY SWITCHING SYSTEM IN NTT

	C23-K	KD20	D10-K	DMS10
Switching Type	LS	LS/LMS	LS/CES	LS/TS/TLS
Switching Cap.	66.7 Erl.	800 Erl.	4,500 Erl.	LS: 240 Erl./ TS: 700 Erl.
Subscriber Ter.	800	10,000	30,000	2,400
Basic Config.	1 Box	3 Box	Not Transportable	4 Box(TLS)
W ×L ×H [m]	2.4 ×6.1 ×2.6	2.4 ×6.1 ×2.6		2.0 ×3.0 ×2.6
Weight [ton]	8/Box	11/Box		2/Box
Transport	Tractor	Tractor	Tractor/Truck	Truck/Helicopter
Recovery Time	2 days	7 days	21 days	LS: 4 days TS: 5 days TLS: 5 days
Deployment	38 42 Major Regional Office	4 Tokyo/Osaka/Kumamoto/ Sapporo	2 Tokyo/Osaka	4 Tokyo/Hiroshima/Sapporo

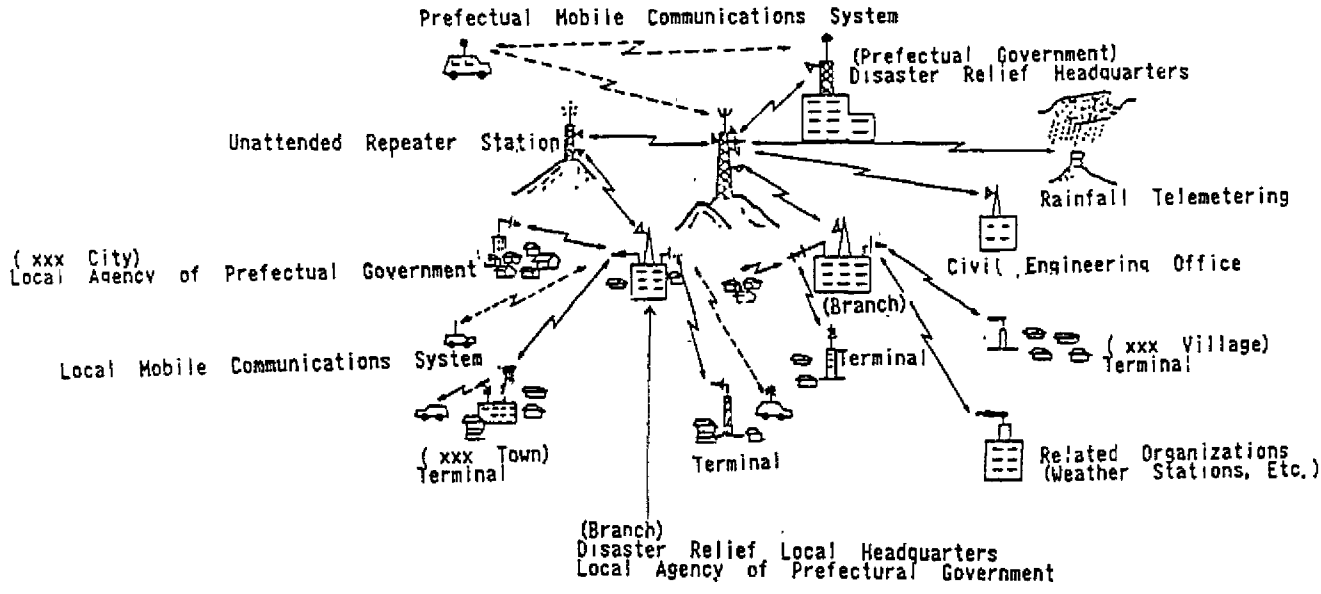
Disaster Prevention Telecommunications for National and Local Governments

The following systems are constructed to quickly collect and convey accurate disaster-related information and to implement powerful and smooth measures in the event of a disaster.

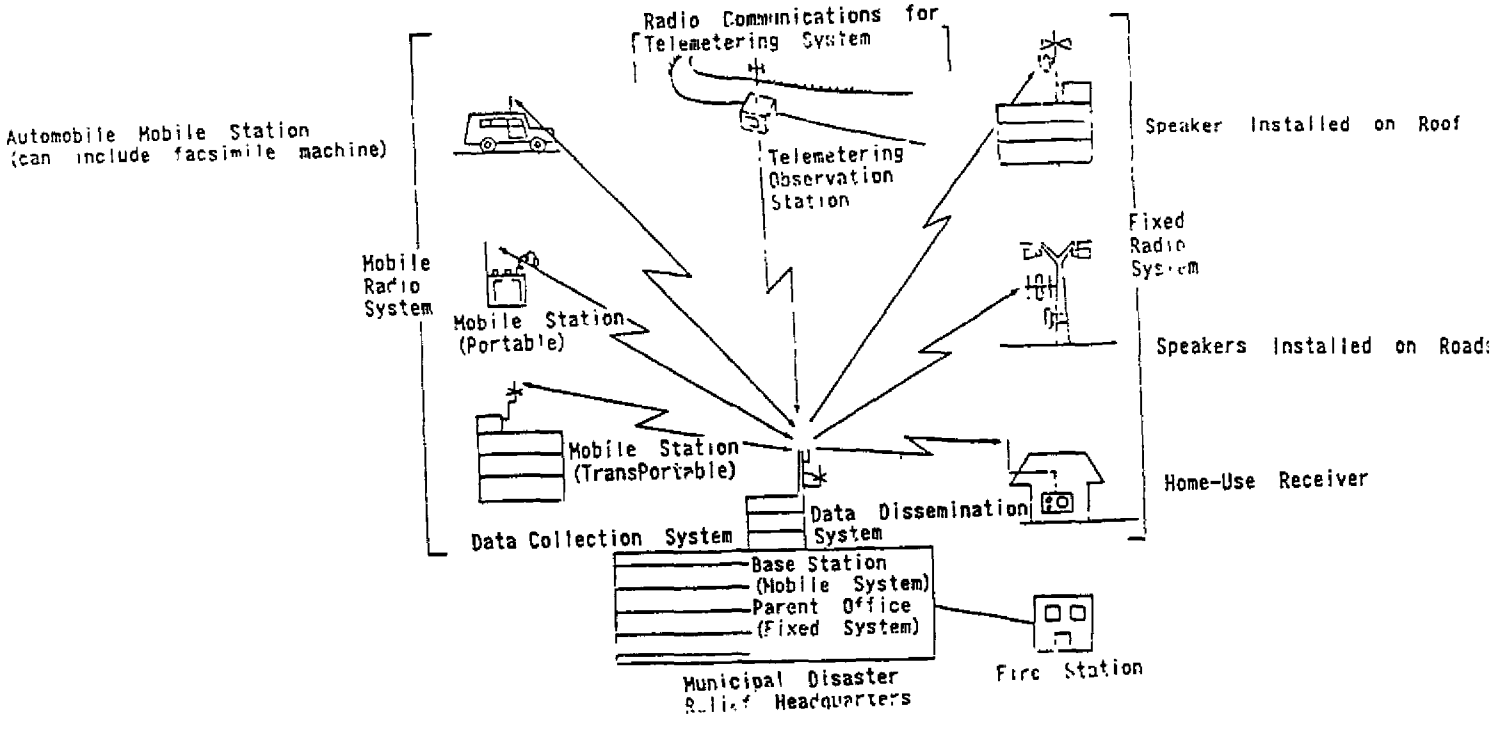
1) Central disaster prevention radio network connecting the National Land Agency to central government agencies.

2) Fire defense radio network connecting the Fire Defense Agency to each prefecture.

3) Disaster prevention administrative radio network used for collection and dissemination of disaster information by municipalities and prefectures (prefectural disaster prevention radio system, municipal disaster prevention radio system).



Prefectural Disaster Prevention Radio System Configuration



Municipal Disaster Prevention Radio System Configuration