International Cartographic Association

www.icaci.org

SDI trends and some impacts for cartography

and geoinformatics

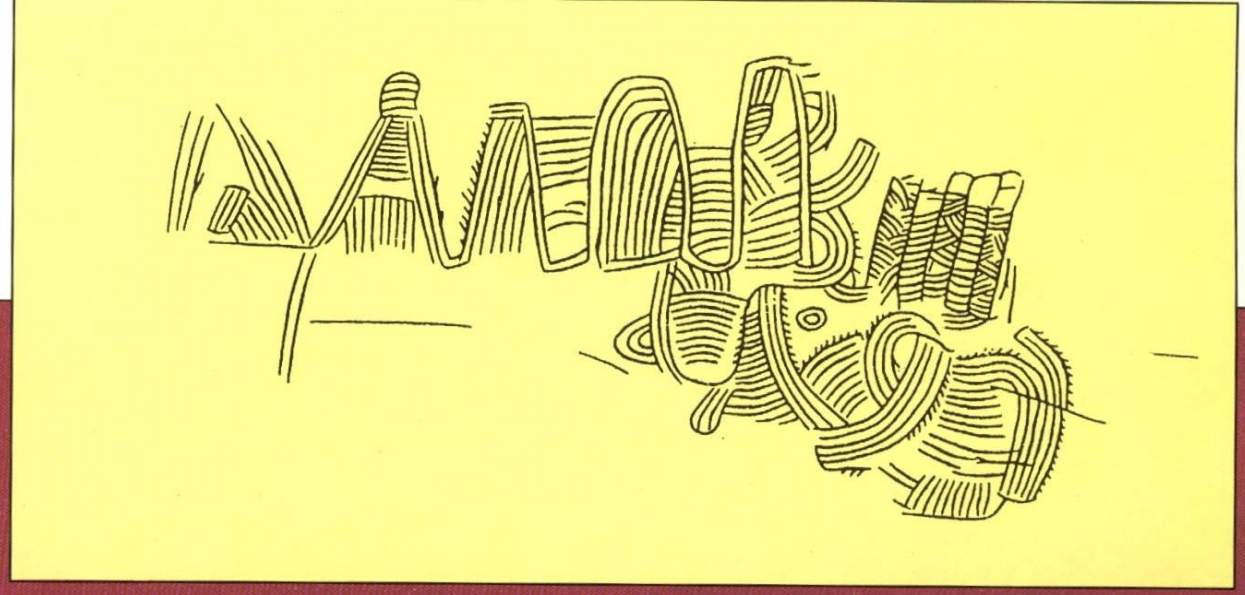
Milan KONECNY

Past-President; International Cartographic Association (ICA)

Vice-President; International Society for Digital Earth (ISDE)

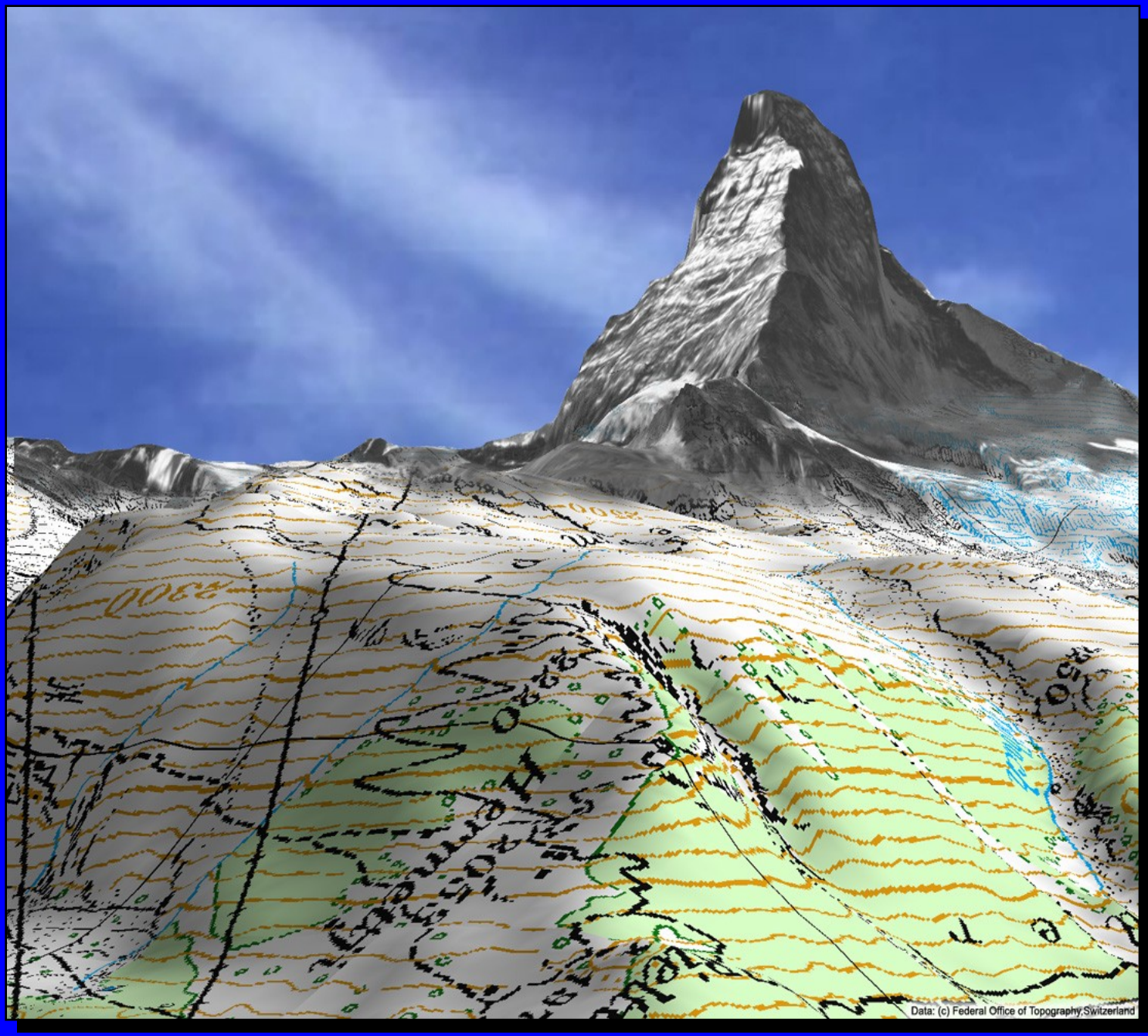
Head; Laboratory on Geoinformatics and Cartography, Institute of Geography, Faculty of Science, Masaryk University, Kotlarska 2, 611 37 BRNO, Czech republic

konecny@geogr.muni.cz

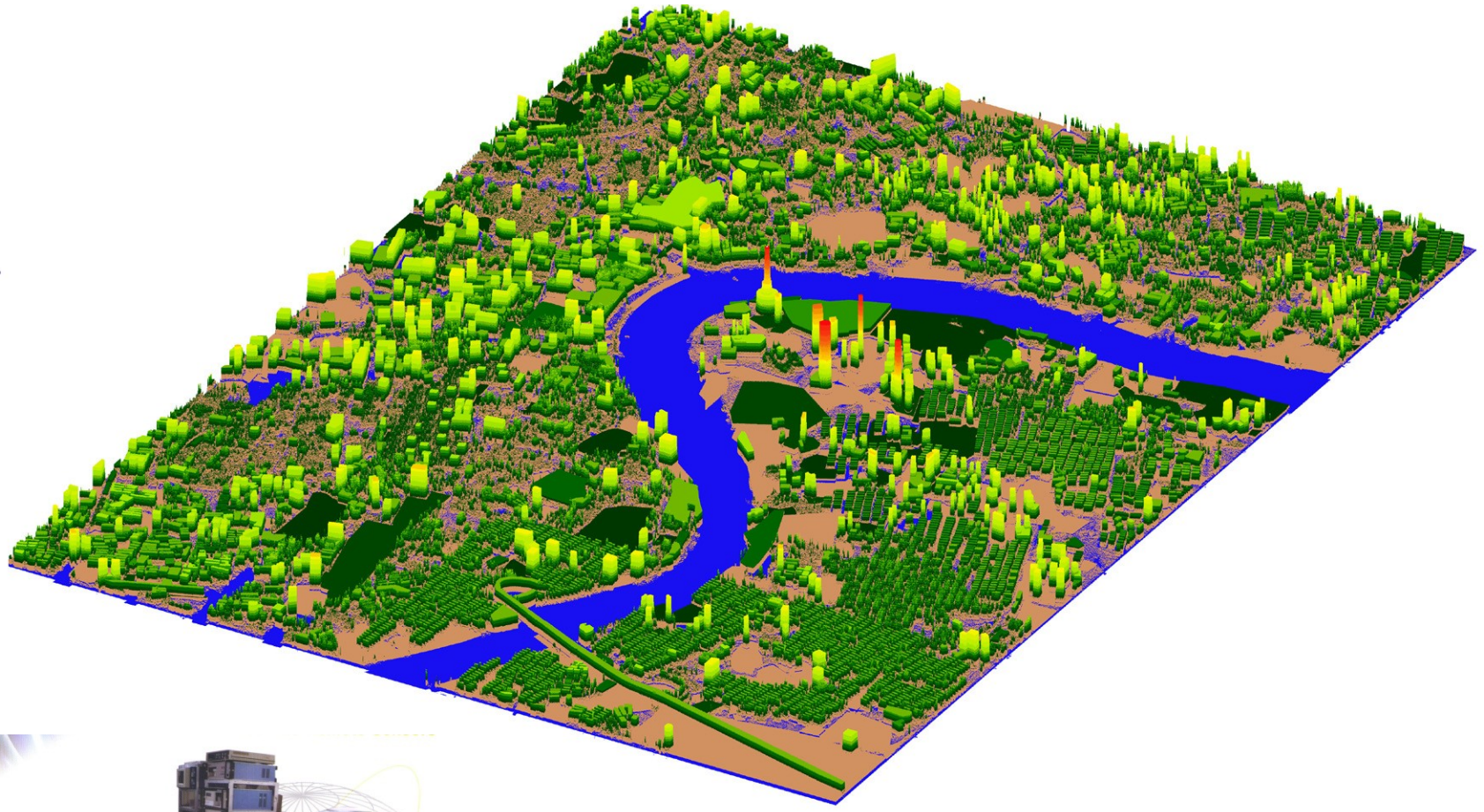


Prehistoric Map,
Pavlov Hills, South
Moravia, **24 000 B.C.**

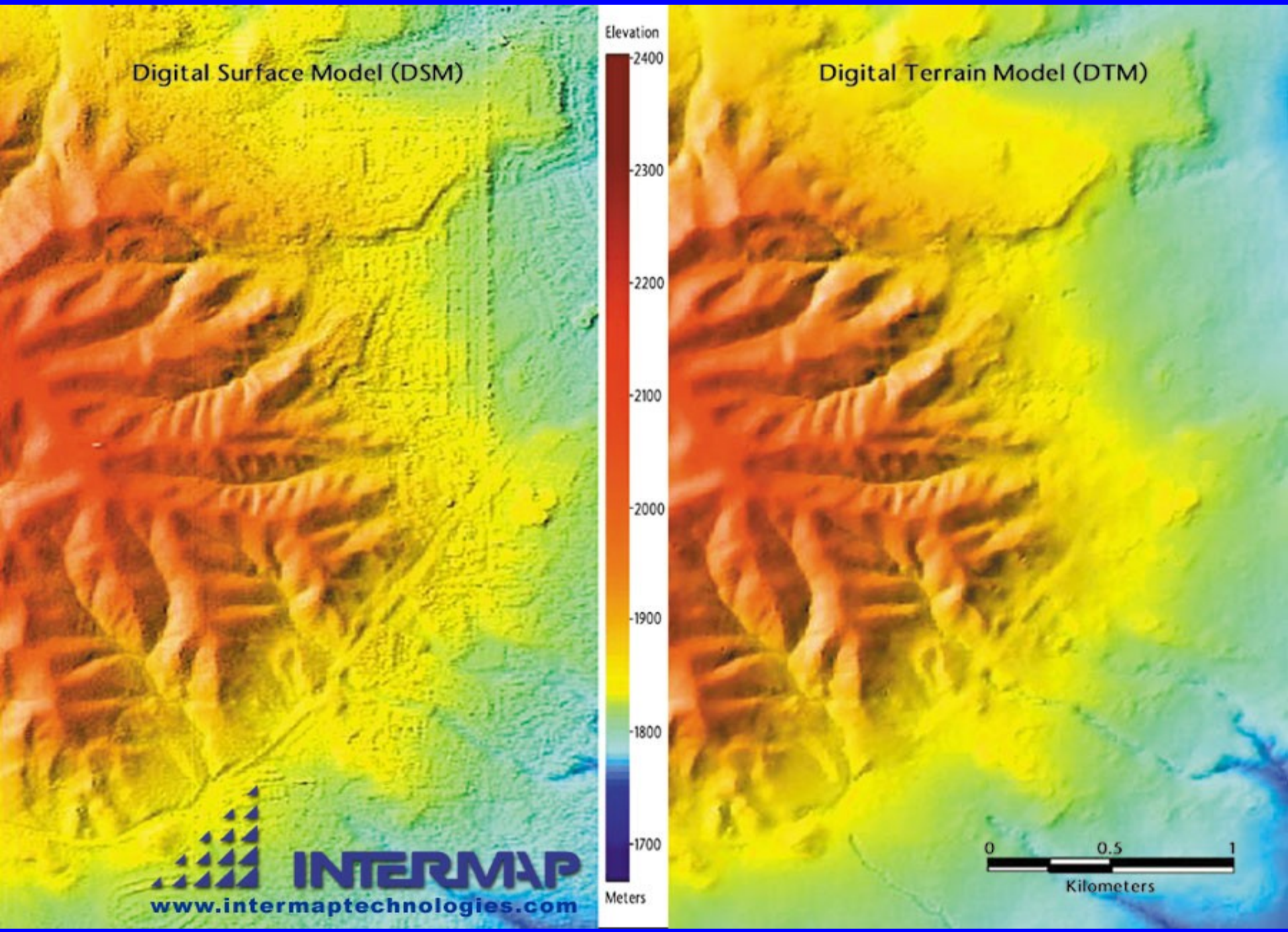

Deblin
Korzim
Byteschka
Raczkowitz
Posoritz
Lischna
Eickhorn
B. Wewarej
Spilberg
Brinn
B. Brno
Kralitz
Rositz
Sfip
Struz
B. Traubsko
Oslowany
Schelschitz
Rogran
B. Reybrad
Gihlawa
flu.
Brschtitz
Ewanczitz
Preles
B. Prawlow
Ruchowan
Kaunitz
Selowitz
Krumlow

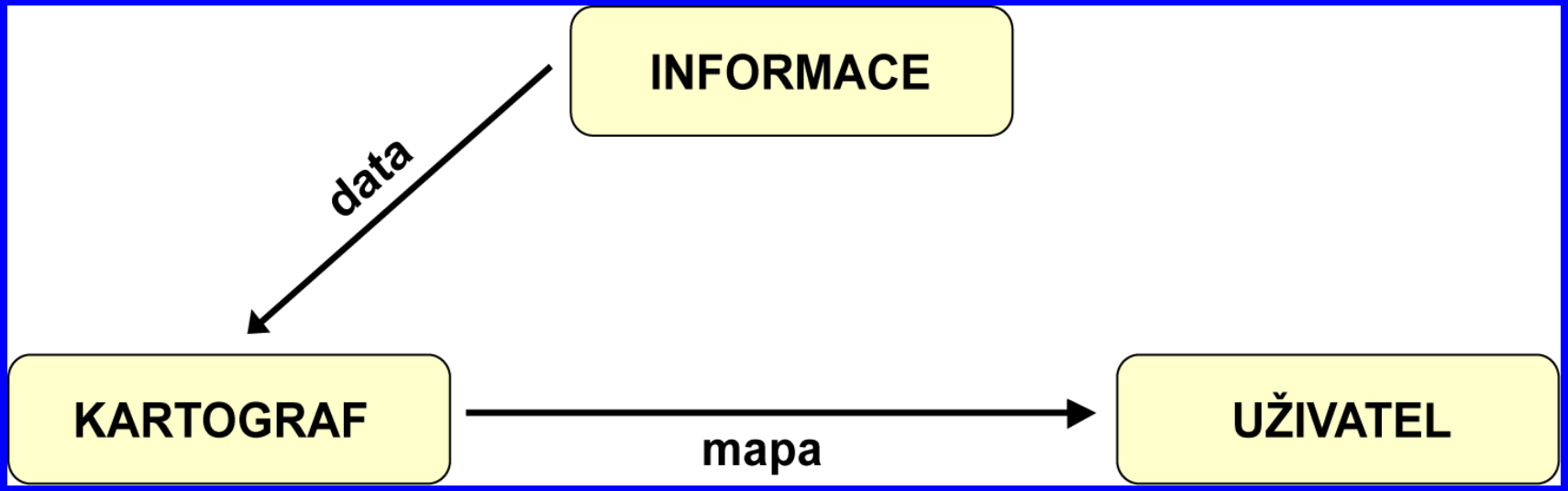

Data: (c) Federal Office of Topography,Switzerland

3-D Image of Pudong Area, Shanghai



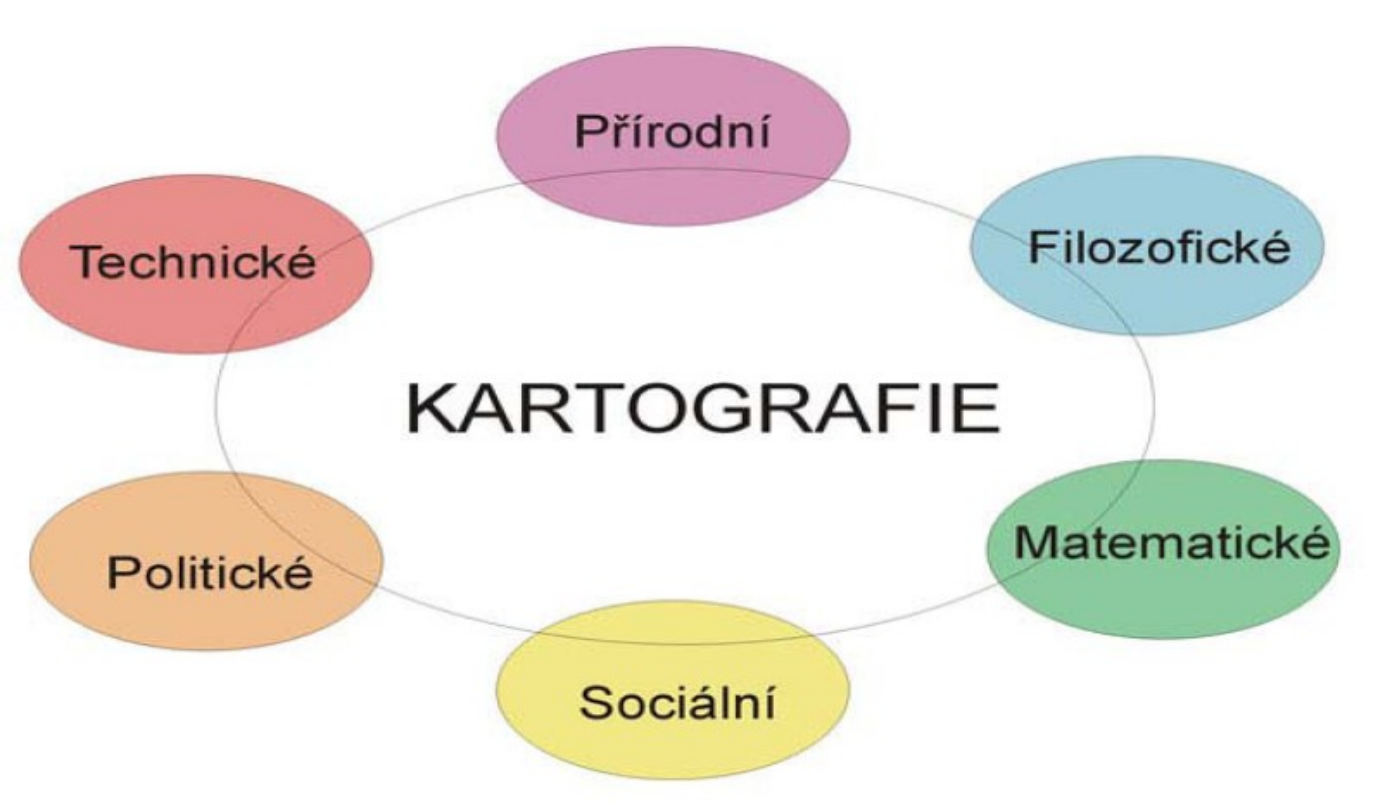
Elevation Map of Buildings Produced from 3-D Imager


Digital Surface Model (DSM)
Digital Terrain Model (DTM)
Elevation
2400
2300
2200
2100
2000
1900
1800
1700
Meters
INTERMAP
www.intermaptechnologies.com
0
0.5
1
Kilometers



Obr. 1. Schéma jednocestné informační koncepce mapy

(sestaveno podle: KOLÁČNÝ, A., 1967)



Obr. 2. Postavení kartografie v systému věd.

If somebody will tell You that cartography does not exist do not believe to him or to her.

Also high positioned people, sometimes with professors titles are saying we are BEYOND cartography, but I am certain that cartography just now can fill up its historical role.

CONTENT

1. World Global Challenges: Sustainable Development Approach
2. Global/Regional/Local Geospatial Projects
3. Cartography and Geoinformatics in SDI World
4. Cartographic Unique Approches
5. Contemporary Cartography
6. Early Warning and Disaster Management Challenges
7. Cartographical responses

1. World Global Challenges:

Sustainable Development Approach

„Information Society” is the term that is used to capture the increasing contemporary influence of information and communication technologies (ICTs).

Knowledge-based society enhances content of the processes based on data, information and knowledge.

1972 - Stockholm, the **urgent need** to respond to the problem of environmental deterioration ,

1992 – Rio de Janeiro, the protection of environment, social and economic development are fundamental to sustainable development; Agenda 21, ***Global Mapping***

2002 – Johannesburgh, World Summit

on Sustainable Development (WSSD)

2003 – Geneva, WS on Information Society

WSSD, Johannesburg 2002
PLAN OF IMPLEMENTATION

Good governance within:
- each country
and
-at the international level

is essential for sustainable development.

Paragraph 47 of Part V.
Sustainable development in a globalizing world says:

Globalization offers opportunities and challenges for sustainable development.

New opportunities: to trade, investment and capital flows and advances technologies, incl. IT for growth of the World economy, development and improvement of the living standards, BUT...

A very important part the role of research and science are **Means of implementation** (part X) - some of the paragraphs:

109. Improve policy and decision-making at all levels through, inter alia, improved collaboration between natural and social scientists, and between scientists and policy makers, including through urgent actions at all levels to:

(a) Increase the use of scientific knowledge and technology and increase the beneficial use of local and indigenous knowledge ..

(b) Make greater use of integrated scientific assessments, risk assessments and interdisciplinary and intersectoral approaches;

(c) Continue to support and collaborate with international scientific assessments supporting decision-making ……

Means of implementation

par. 132 (designed by ISCGM-Bali)

Promote the development and wider use of earth observation technologies, incl. satellite remote sensing (RS), global mapping and GIS, to collect quality data on environmental impacts, land use and land-use changes, incl., Through urgent actions at all levels to:

Cont.

(a) strengthen cooperation and coordination among global observing systems and research programmes for integrated global observations, taking into account the need for building capacity and sharing of data from ground based observations, satellite RS and other sources among all countries;

Cont. 2

(b) Develop information systems that make the sharing of valuable data possible, incl. the active exchange of Earth observation data;

(c) Encourage initiatives and partnerships for global mapping.

Information Society

Sustainable Information Society

The linkage between sustainability
and information society development
is still poorly understood.

Sustainable Development:

a set of the equal important aspects:

- economic,
- ecological,
- technological,
- social,
- cultural,
- ethical.

2. Global/Regional/Local Geospatial Projects

GLOBAL SPATIAL DATA PROJECTS

Global Mapping

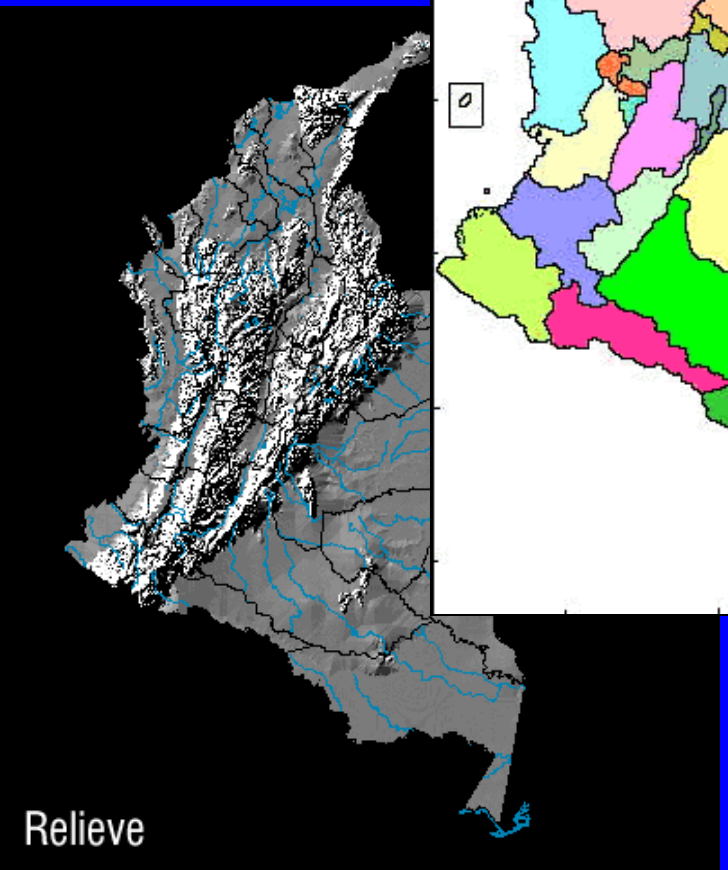
Global Spatial Data Infrastructure (GSDI)

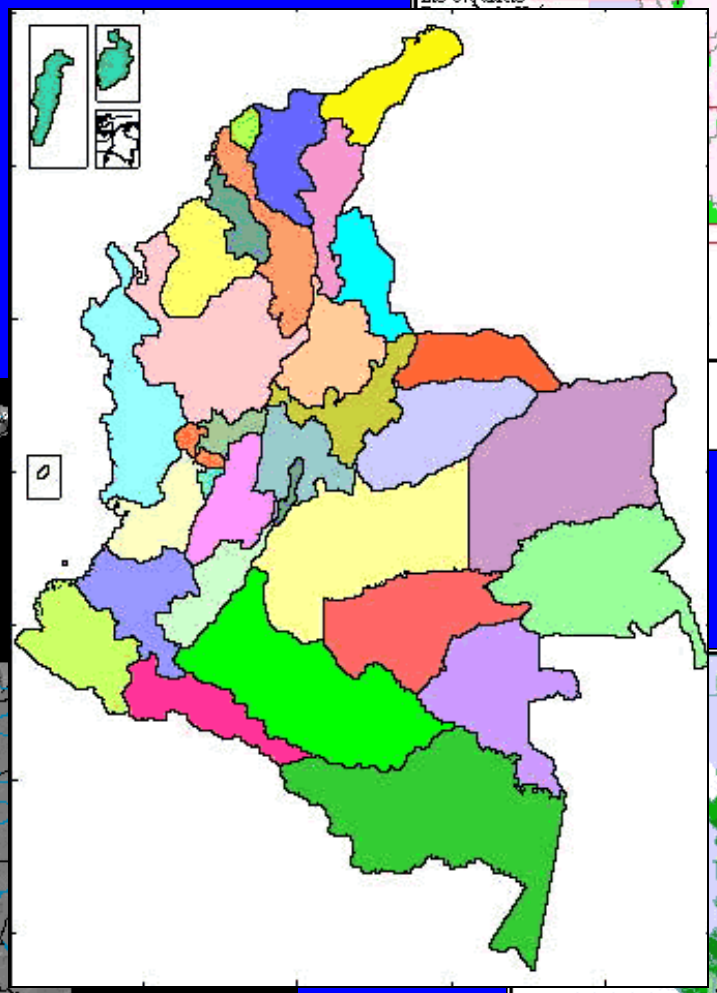
Digital Earth

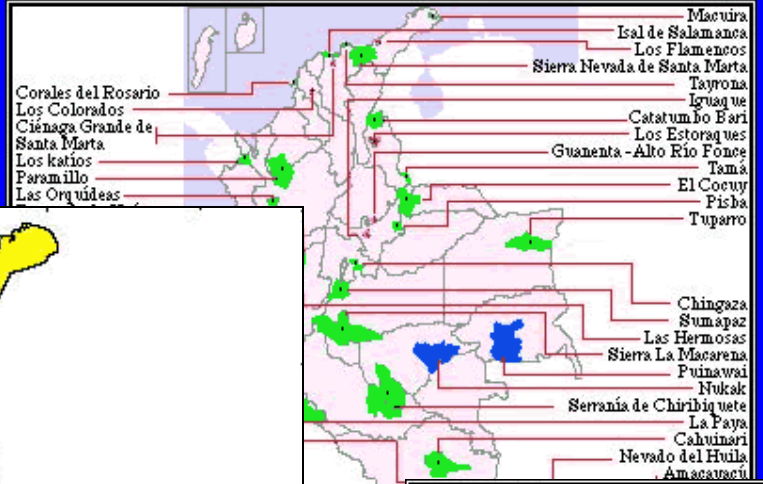
U. N. Geographic Data Base

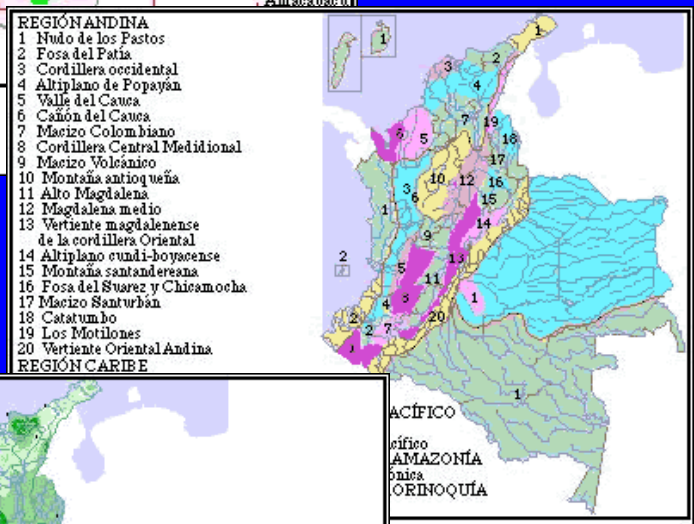
GI for Sustainable Development (GISD) (OGC)

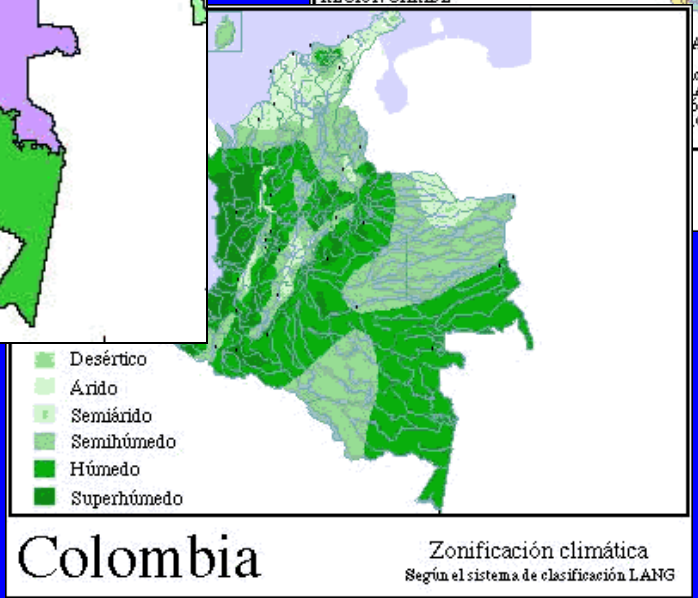
GNSS (EOS, GEOS, GEOSS), FAO..


Relieve




Macuira
Isal de Salamanca
Los Flamencos
Sierra Nevada de Santa Marta
Tayrona
Iguaque
Catatumbo Bari
Los Estoraques
Guanenta - Alto Río Fonce
Tamá
El Cocuy
Pisba
Tuparro
Corales del Rosario
Los Colorados
Ciénaga Grande de Santa Marta
Los katios
Paramillo
Las Orquídeas
Chingaza
Sumapaz
Las Hermosas
Sierra La Macarena
Puinawai
Nukak
Serranía de Chiribiquete
La Paya
Cahuinarí
Nevado del Huila
Amacayacú

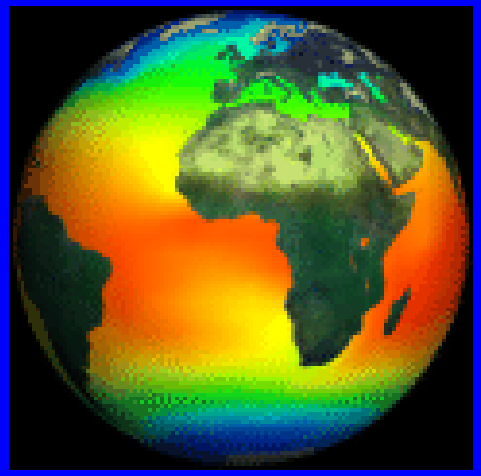

REGIÓN ANDINA
1 Nudo de los Pastos
2 Fosa del Patía
3 Cordillera occidental
4 Altiplano de Popayán
5 Valle del Cauca
6 Cañón del Cauca
7 Macizo Colombiano
8 Cordillera Central Medidional
9 Macizo Volcánico
10 Montaña antioqueña
11 Alto Magdalena
12 Magdalena medio
13 Vertiente magdalenense de la cordillera Oriental
14 Altiplano cundi-boyacense
15 Montaña santandereana
16 Fosa del Suarez y Chicamocha
17 Macizo Santurbán
18 Catatumbo
19 Los Motilones
20 Vertiente Oriental Andina
REGIÓN CARIBE
ACÍFICO
cífico
AMAZONÍA
ónica
ORINOQUÍA
Regiones geográficas


Desértico
Árido
Semiárido
Semihúmedo
Húmedo
Superhúmedo
Colombia
Zonificación climática
Según el sistema de clasificación LANG

Understanding Digital Earth

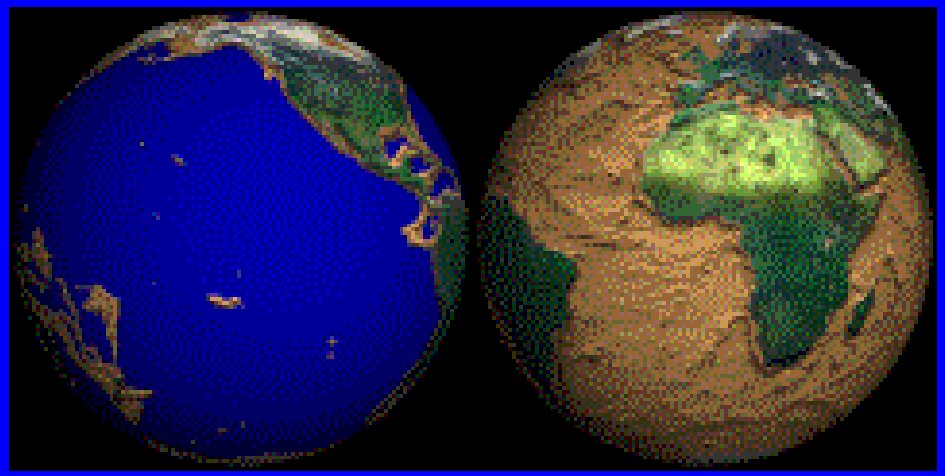
Cloud

El Nino



Sea water temperature

Vegetation



Earth Surface

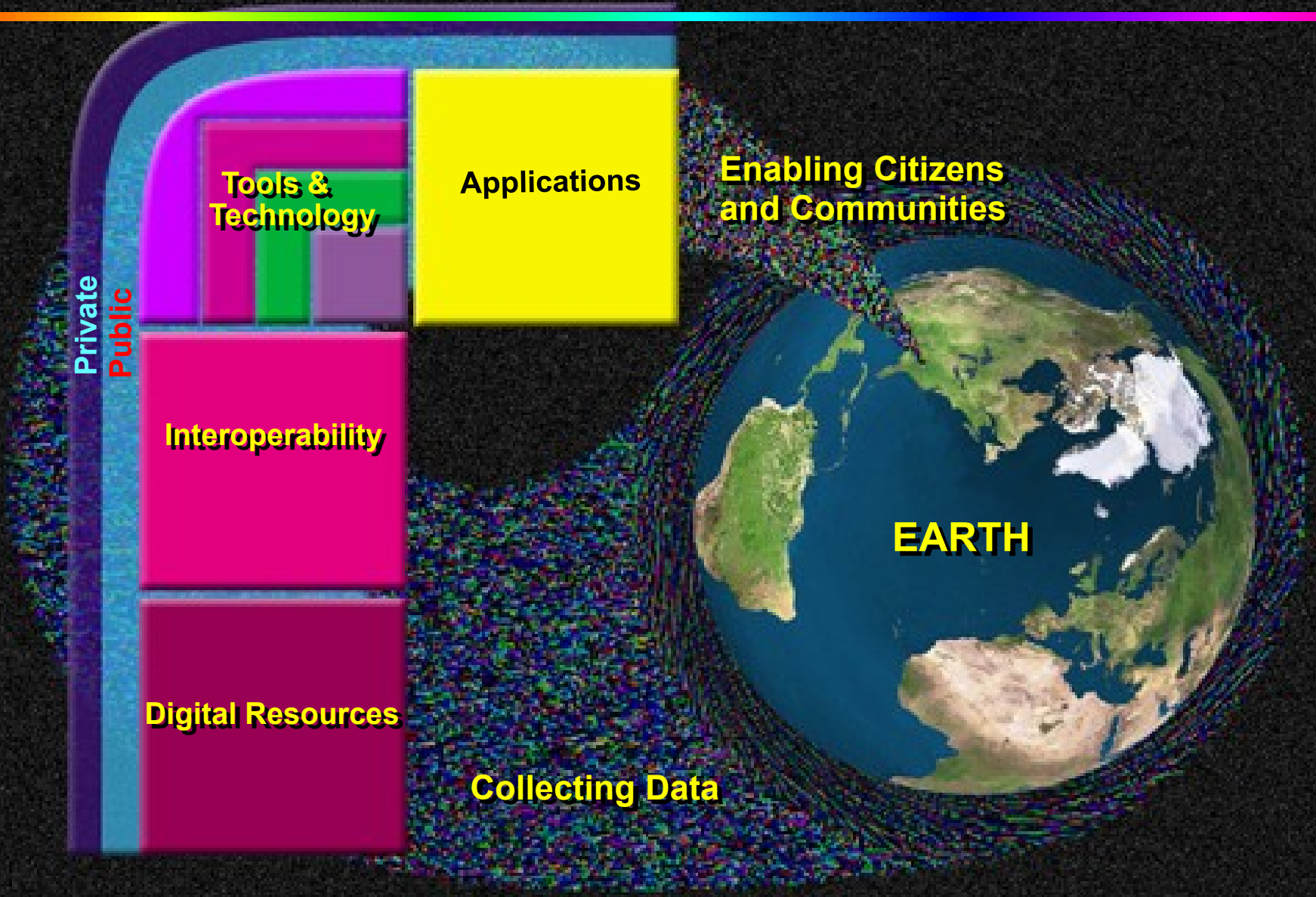
Earthquake

Volcano

Plate Boundary

(http://www.nasm.si.edu/EarthToday)

Understanding Digital Earth



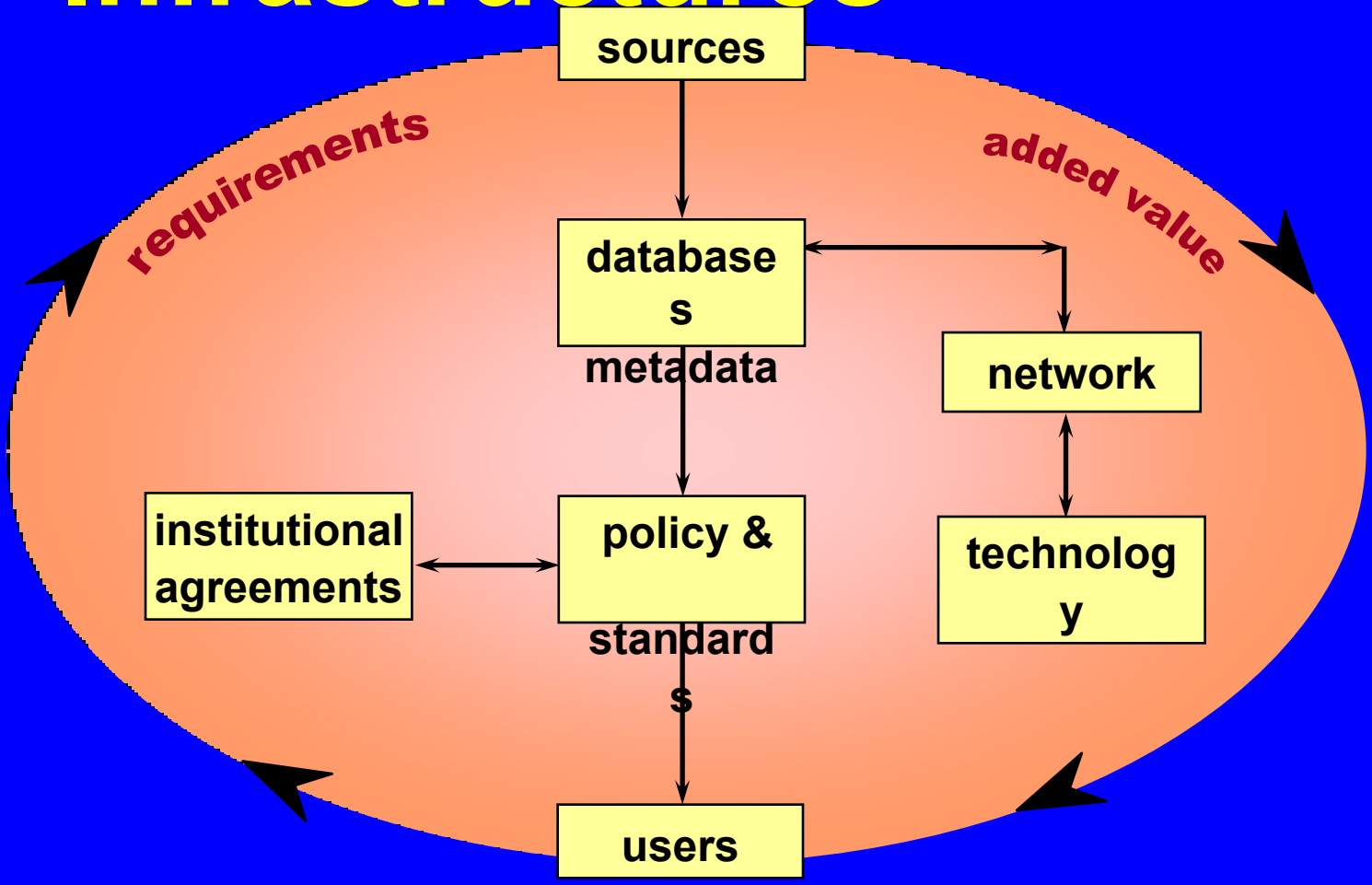
(White paper by NASA Digital Earth office, 2000)

GSDI Cookbook:

"The term "Spatial Data Infrastructure" (SDI) is often used to denote the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data.

The SDI provides a basis for spatial data discovery, evaluation, and application for users and providers within all levels of government, the commercial sector, the non-profit sector, academia and by citizens in general…

Spatial Data Infrastructures



The word infrastructure is used to promote the concept of a reliable, supporting environment, analogous to a road or telecommunications network, that, in this case, facilitates the ***access*** *to geographically-related information using a minimum set of standard practices, protocols, and specifications….*

An SDI must be more than a single data set or database;
an SDI hosts geographic data and attributes, sufficient documentation (metadata), a means to discover, visualize, and
evaluate the data (catalogues and Web mapping), and some methods to provide access to
the geographic data.

Beyond this are additional services or software to support applications of the data. To make an SDI functional, it must also include the organisational agreements needed to coordinate and administer it on a local, regional, national, and or transnational scale…

Although the core SDI concept includes within its scope neither base data collection activities or myriad applications built upon it,

the infrastructure provides the ideal environment to connect applications to data – influencing both data collection and applications construction through minimal appropriate standards and policies….

The creation of specific organisations or programs for developing or overseeing the development
of SDI, particularly by government at various scales can be seen as the logical extension of the long practice of co-ordinating the building of other infrastructures necessary
for ongoing development, such as transportation or telecommunication networks.”

William J. CLINTON, XLII President of USA, 1993-2001

Executive Order 1296: Coordinating Geographic Data Acquisition and Access: The National Spatial Data Infrastructure. April 11, 1994

Geographic information is critical to promote economic development, improve our stewardship of natural resources, and protect the environment. Modern technology now permits improved acquisition, distribution, and utilization of geographic (or geospatial) data and mapping. The National Performance Review has recommended that the executive branch develop, in cooperation with State, local, and tribal governments, and the private sector, a coordinated National Spatial Data Infrastructure to support public and private sector applications of geospatial data in such areas as transportation, community development, agriculture, emergency response, environmental management, and information technology.

Now, Therefore, by the authority vested in me as President by the Constitution and the laws of the United States of America; and to implement the recommendations of the National Performance Review; to advance the goals of the National Information Infrastructure; and to avoid wasteful duplication of effort and promote effective and economical management of resources by Federal, State, local, and tribal governments, it is ordered as follows:

Section 1.*Definitions.*
(a) "National Spatial Data Infrastructure" ("NSDI") means the technology, policies, standards, and human resources necessary to acquire, process, store, distribute, and improve utilization of geospatial data.
Clearinghouse" means a distributed network of geospatial data producers, managers, and users linked electronically.

(b) "Geospatial data" means information that identifies the geographic location and characteristics of natural or constructed features and boundaries on the earth. This information may be derived from, among other things, remote sensing, mapping, and surveying technologies. Statistical data may be included in this definition at the discretion of the collecting agency.

(c) The "National Geospatial Data

Sec. 2.*Executive Branch Leadership for Development of the Coordinated National Spatial Data Infrastructure.* (a) The Federal Geographic Data Committee ("FGDC"), established by the Office of Management and Budget ("OMB") Circular No. A–16 ("Coordination of Surveying, Mapping, and Related Spatial Data Activities") and chaired by the Secretary of the Department of the Interior ("Secretary") or the Secretary's designee, shall coordinate the Federal Government's development of the NSDI.

(b) Each member agency shall ensure that its representative on the FGDC holds a policy-level position.

(c) Executive branch departments and agencies ("agencies") that have an interest in the development of the NSDI are encouraged to join the FGDC.

(d) This Executive order is intended to strengthen and enhance the general policies described in OMB Circular No. A–16. Each agency shall meet its respective responsibilities under OMB Circular No. A–16.

(e) The FGDC shall seek to involve State, local, and tribal governments in the development and implementation of the initiatives contained in this order. The FGDC shall utilize the expertise of academia, the private sector, professional societies, and others as necessary to aid in the development and implementation of the objectives of this order.

Sec. 3.*Development of a National Geospatial Data Clearinghouse.* (a)*Establishing a National Geospatial Data Clearinghouse.* The Secretary, through the FGDC, and in consultation with, as appropriate, State, local, and tribal governments and other affected parties, shall take steps within 6 months of the date of this order, to establish an electronic National Geospatial Data Clearinghouse ("Clearinghouse") for the NSDI.

The Clearinghouse shall be compatible with the National Information Infrastructure to enable integration with that effort.

(b)*Standardized Documentation of Data.* Beginning 9 months from the date of this order, each agency shall document all new geospatial data it collects or produces, either directly or indirectly, using the standard under development by the FGDC, and make that standardized documentation electronically accessible to the Clearinghouse network.

Within 1 year of the date of this order, agencies shall adopt a schedule, developed in consultation with the FGDC, for documenting, to the extent practicable, geospatial data previously collected or produced, either directly or indirectly, and making that data documentation electronically accessible to the Clearinghouse network.

(c)*Public Access to Geospatial Data.* Within 1 year of the date of this order, each agency shall adopt a plan, in consultation with the FGDC, establishing procedures to make geospatial data available to the public, to the extent permitted by law, current policies, and relevant OMB circulars, including OMB Circular No. A–130 ("Management of Federal Information Resources") and any implementing bulletins.

(d) *Agency Utilization of the Clearinghouse.* Within 1 year of the date of this order, each agency shall adopt internal procedures to ensure that the agency accesses the Clearinghouse before it expends Federal funds to collect or produce new geospatial data, to determine whether the information has already been collected by others, or whether cooperative efforts to obtain the data are possible.

(e)*Funding.* The Department of the Interior shall provide funding for the Clearinghouse to cover the initial prototype testing, standards development, and monitoring of the performance of the Clearinghouse. Agencies shall continue to fund their respective programs that collect and produce geospatial data; such data is then to be made part of the Clearinghouse for wider accessibility.

Sec. 4.*Data Standards Activities.* (a)*General FGDC Responsibility.* The FGDC shall develop standards for implementing the NSDI, in consultation and cooperation with State, local, and tribal governments, the private and academic sectors, and, to the extent feasible, the international community, consistent with OMB Circular No. A–119 ("Federal Participation in the Development and Use of Voluntary Standards"), and other applicable law and policies.

(b)*Standards for Which Agencies Have Specific Responsibilities.* Agencies assigned responsibilities for data categories by OMB Circular No. A–16 shall develop, through the FGDC, standards for those data categories, so as to ensure that the data produced by all agencies are compatible.

(c)*Other Standards.* The FGDC may from time to time identify and develop, through its member agencies, and to the extent permitted by law, other standards necessary to achieve the objectives of this order. The FGDC will promote the use of such standards and, as appropriate, such standards shall be submitted to the Department of Commerce for consideration as Federal Information Processing Standards. Those standards shall apply to geospatial data as defined in section 1 of this order.

(d) *Agency Adherence to Standards.* Federal agencies collecting or producing geospatial data, either directly or indirectly (e.g. through grants, partnerships, or contracts with other entities), shall ensure, prior to obligating funds for such activities, that data will be collected in a manner that meets all relevant standards adopted through the FGDC process.

Sec. 5.*National Digital Geospatial Data Framework.*
In consultation with State, local, and tribal governments and within 9 months of the date of this order, the FGDC shall submit a plan and schedule to OMB for completing the initial implementation of a national digital geospatial data framework ("framework") by January 2000 and for establishing a process of ongoing data maintenance.

The framework shall include geospatial data that are significant, in the determination of the FGDC, to a broad variety of users within any geographic area or nationwide. At a minimum, the plan shall address how the initial transportation, hydrology, and boundary elements of the framework might be completed by January 1998 in order to support the decennial census of 2000.

Sec. 6.*Partnerships for Data Acquisition.* The Secretary, under the auspices of the FGDC, and within 9 months of the date of this order, shall develop, to the extent permitted by law, strategies for maximizing cooperative participatory efforts with State, local, and tribal governments, the private sector, and other nonfederal organizations to share costs and improve efficiencies of acquiring geospatial data consistent with this order.

Sec. 7.*Scope.*

(a) For the purposes of this order, the term "agency" shall have the same meaning as the term "Executive agency" in 5 U.S.C. 105, and shall include the military departments and components of the Department of Defense.

(b) The following activities are exempt from compliance with this order:
(i) national security-related activities of the Department of Defense as determined by the Secretary of Defense;
(ii) national defense-related activities of the Department of Energy as determined by the Secretary of Energy; and
(iii) intelligence activities as determined by the Director of Central Intelligence.

(c) The NSDI may involve the mapping, charting, and geodesy activities of the Department of Defense relating to foreign areas, as determined by the Secretary of Defense.

(d) This order does not impose any requirements on tribal governments.

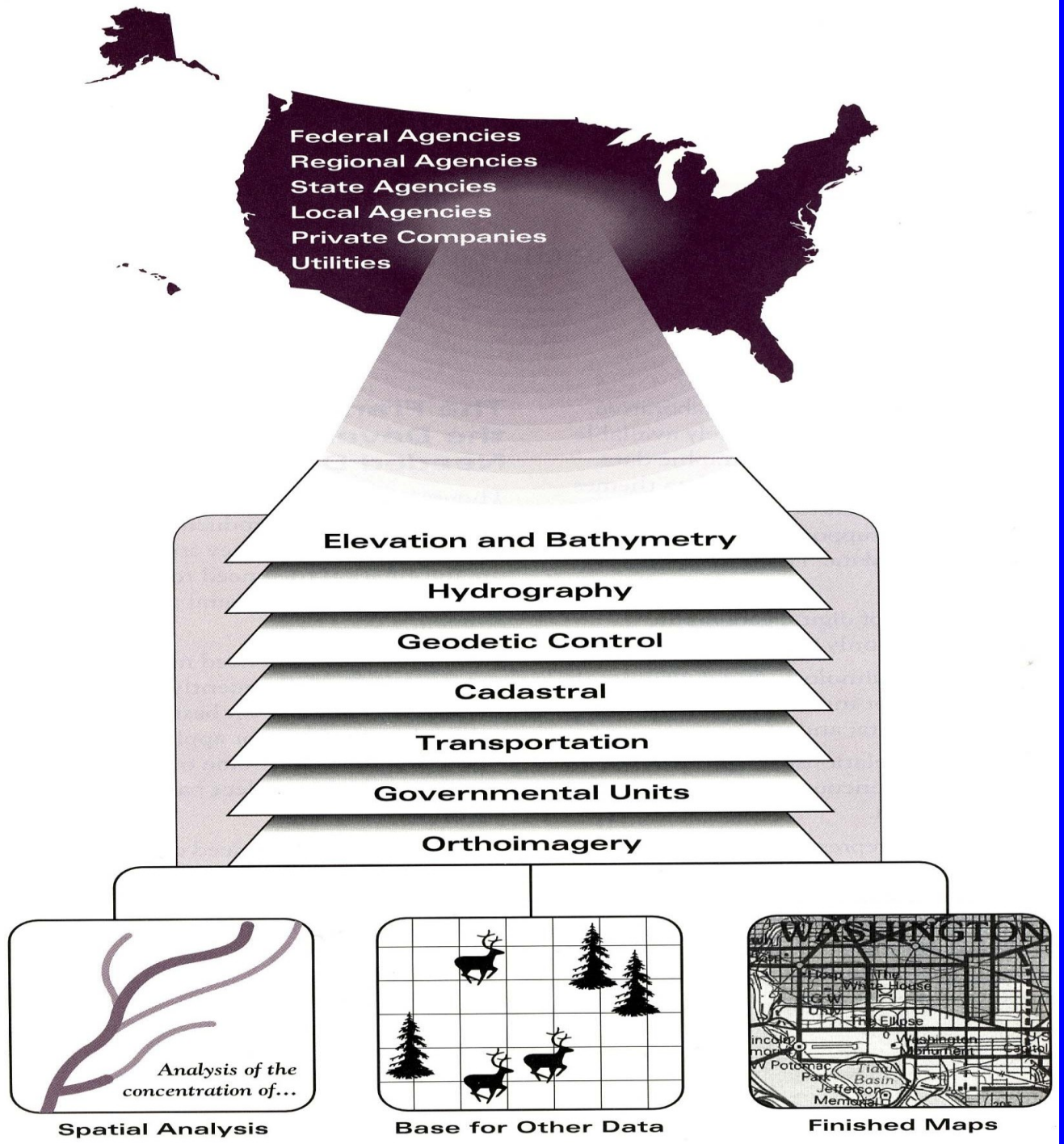
(e) Nothing in the order shall be construed to contravene the development of Federal Information Processing Standards and Guidelines adopted and promulgated under the provisions of section 111(d) of the Federal Property and Administrative Services Act of 1949, as amended by the Computer Security Act of 1987 (Public Law 100–235), or any other United States law, regulation, or international agreement.

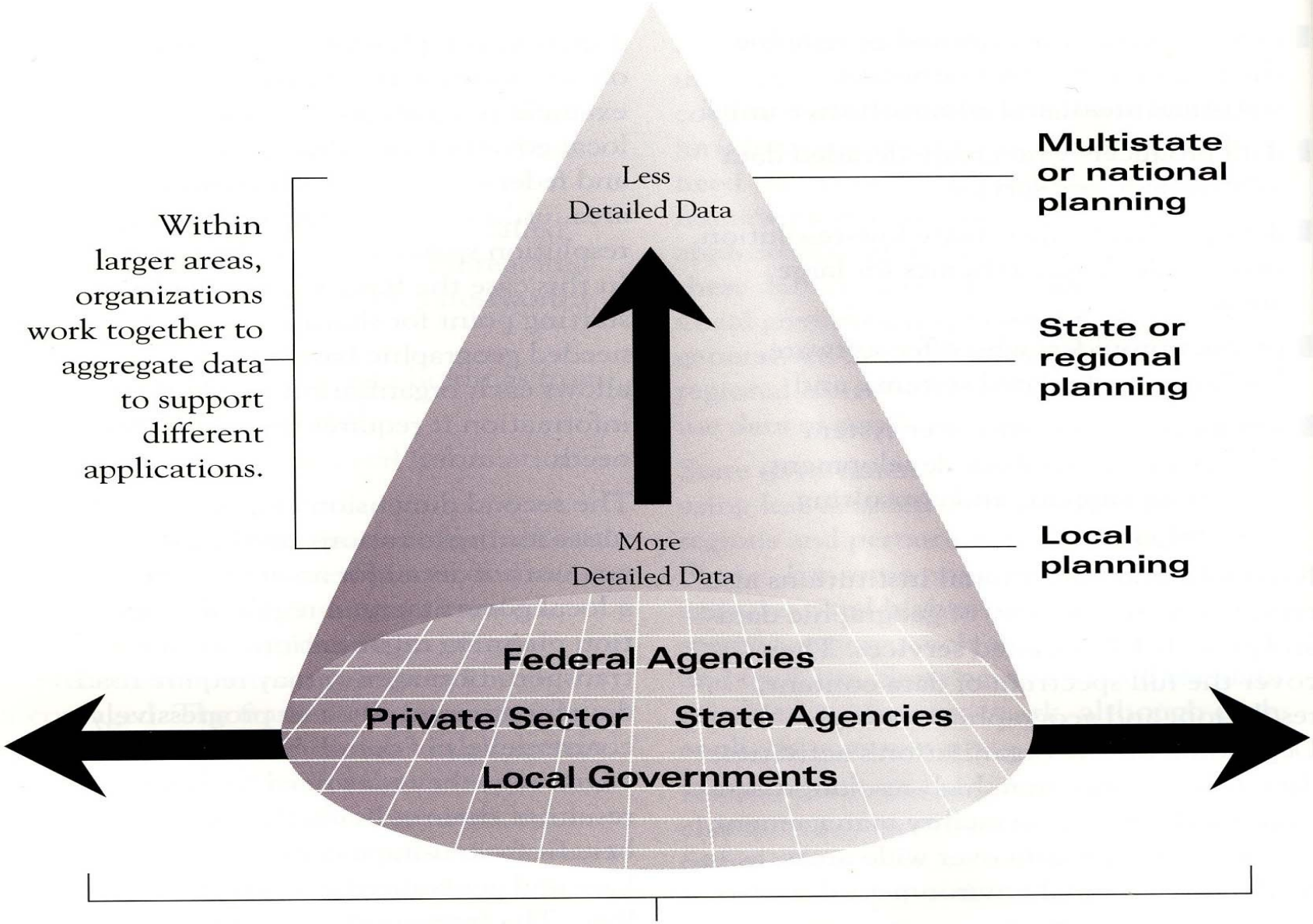
Sec. 8.*Judicial Review.* This order is intended only to improve the internal management of the executive branch and is not intended to, and does not, create any right to administrative or judicial review, or any other right or benefit or trust responsibility, substantive or procedural, enforceable by a party against the United States, its agencies or instrumentalities, its officers or employees, or any other person.

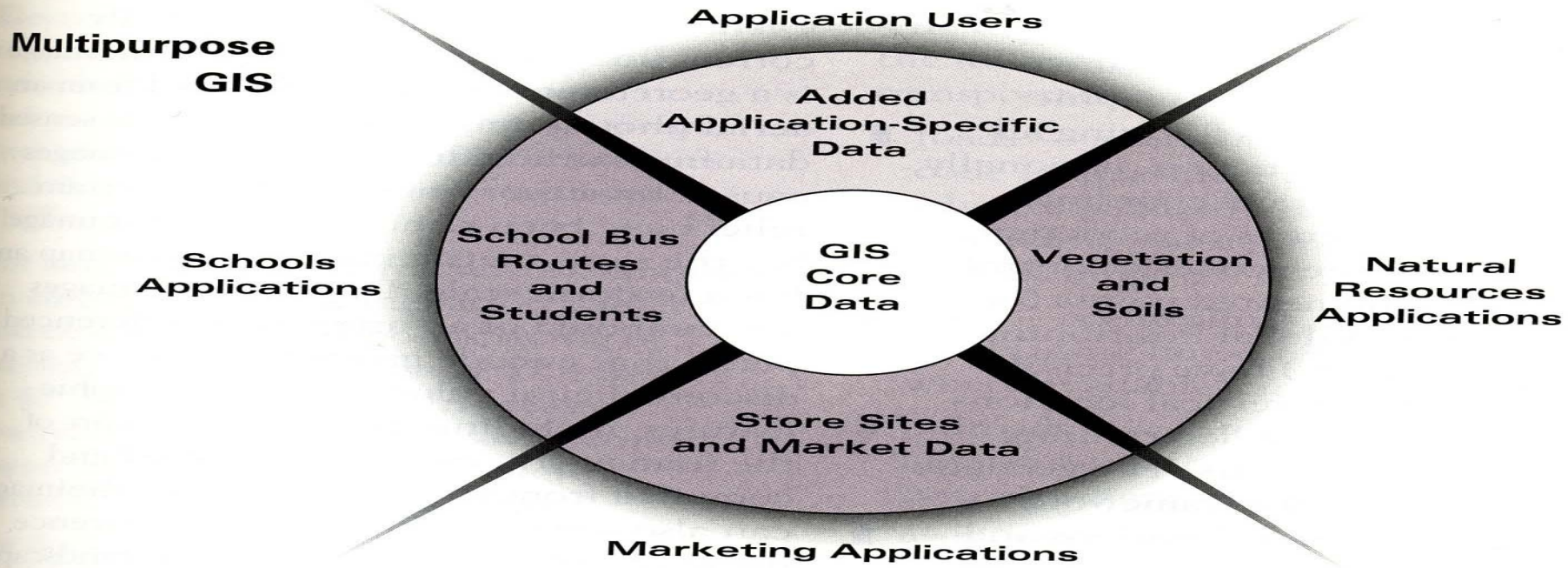
William J. Clinton

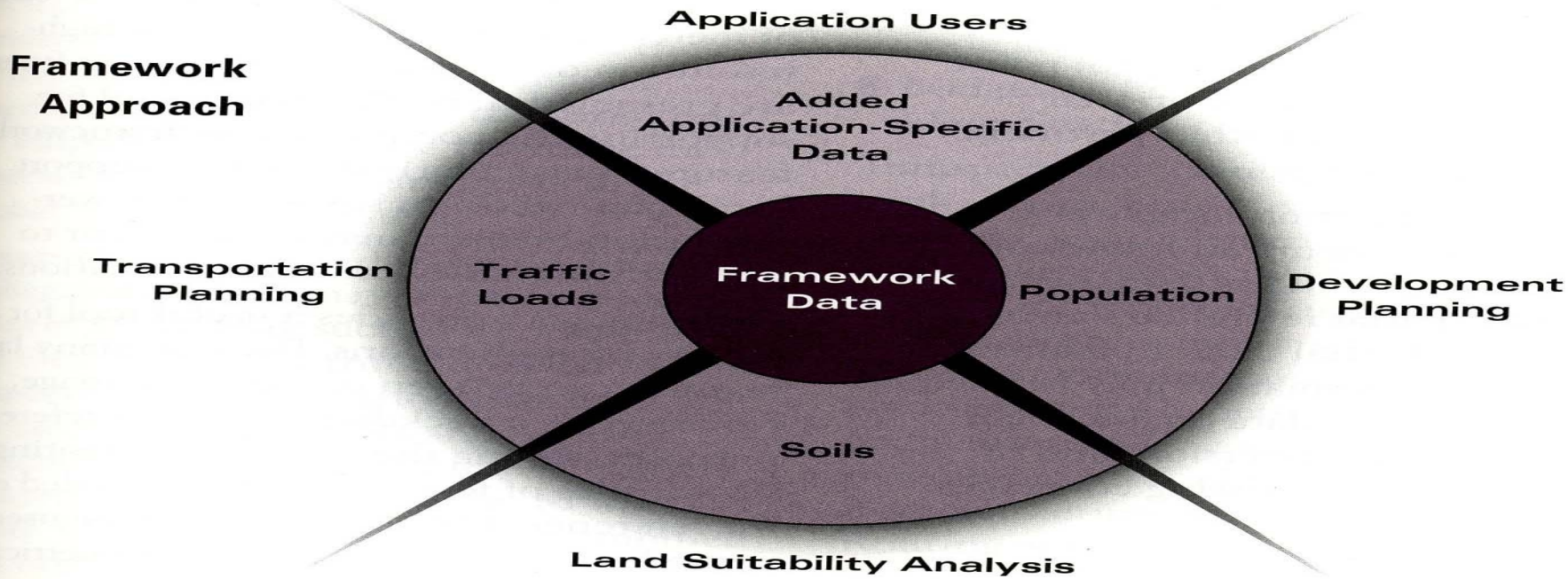
The White House,

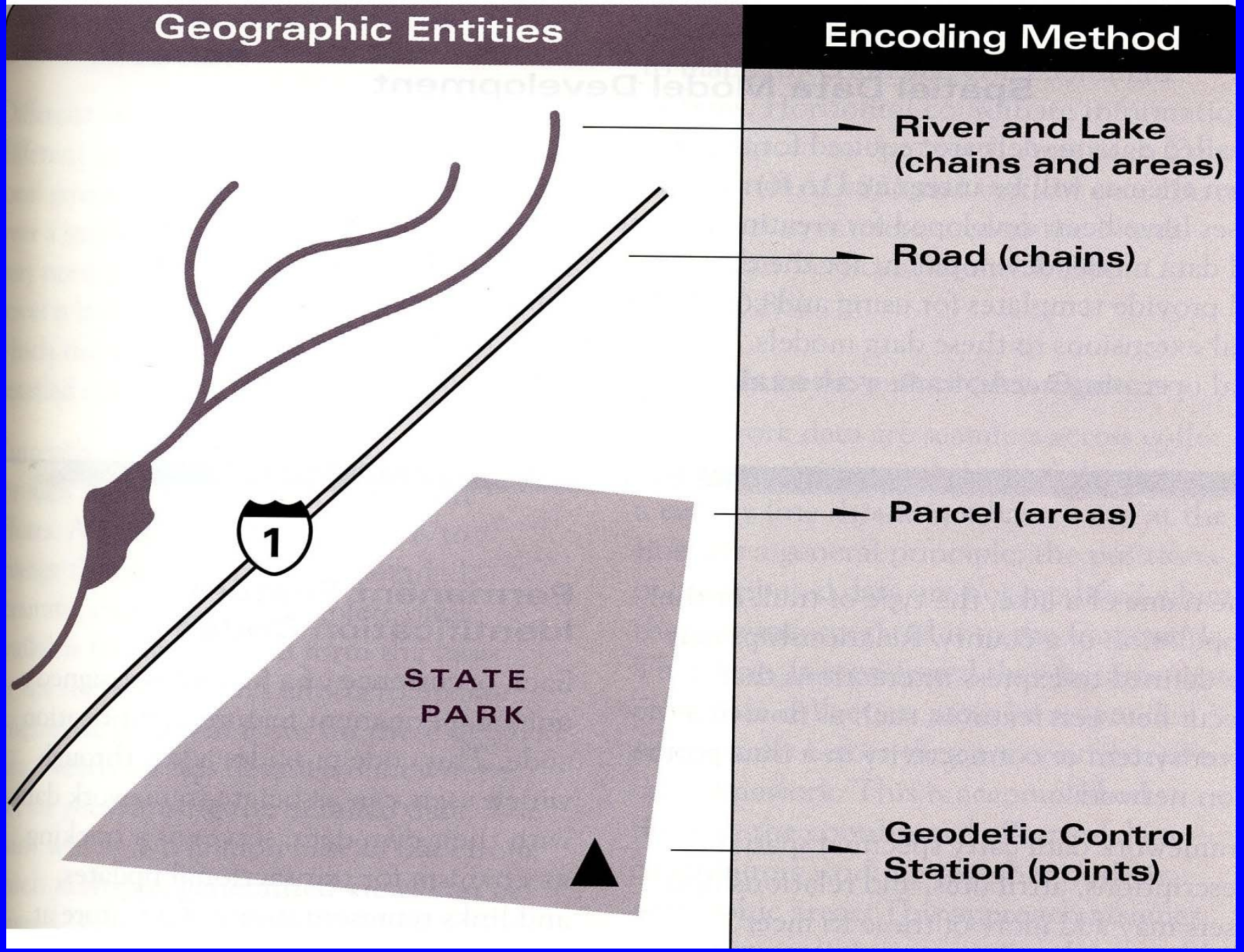
April 11, 1994.

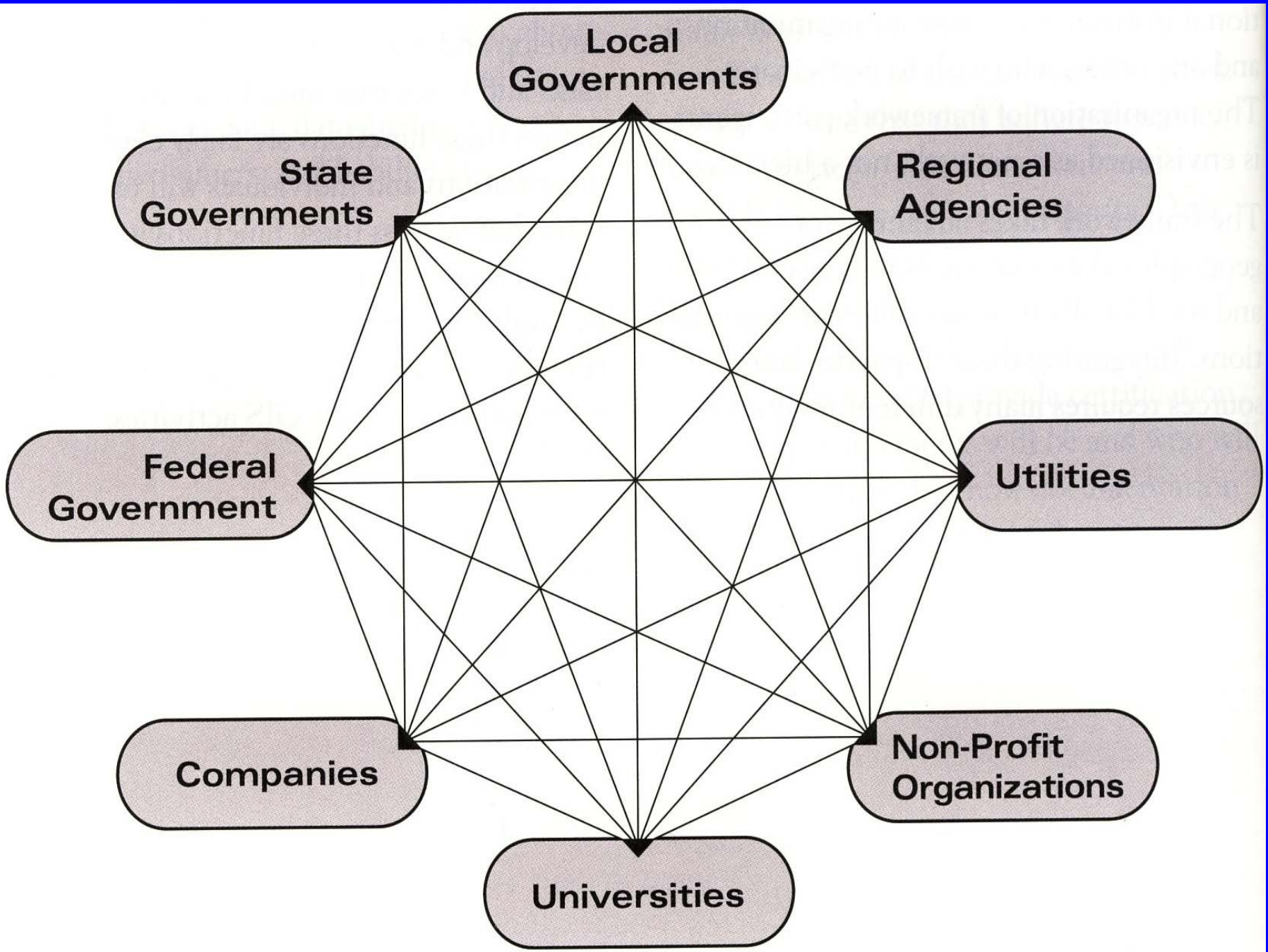

Federal Agencies
Regional Agencies
State Agencies
Local Agencies
Private Companies
Utilities
Elevation and Bathymetry
Hydrography
Geodetic Control
Cadastral
Transportation
Governmental Units
Orthoimagery
Analysis of the concentration of...
Spatial Analysis
Base for Other Data
WASHINGTON
Finished Maps


Less
Detailed Data
More
Detailed Data
Within larger areas, organizations work together to aggregate data to support different applications.
Multistate or national planning
State or regional planning
Local planning
Federal Agencies
Private Sector
State Agencies
Local Governments
In a local area, organizations work together on large-scale data.


Multipurpose GIS
Application Users
Added Application-Specific Data
School Bus Routes and Students
GIS Core Data
Vegetation and Soils
Schools Applications
Natural Resources Applications
Store Sites and Market Data
Marketing Applications

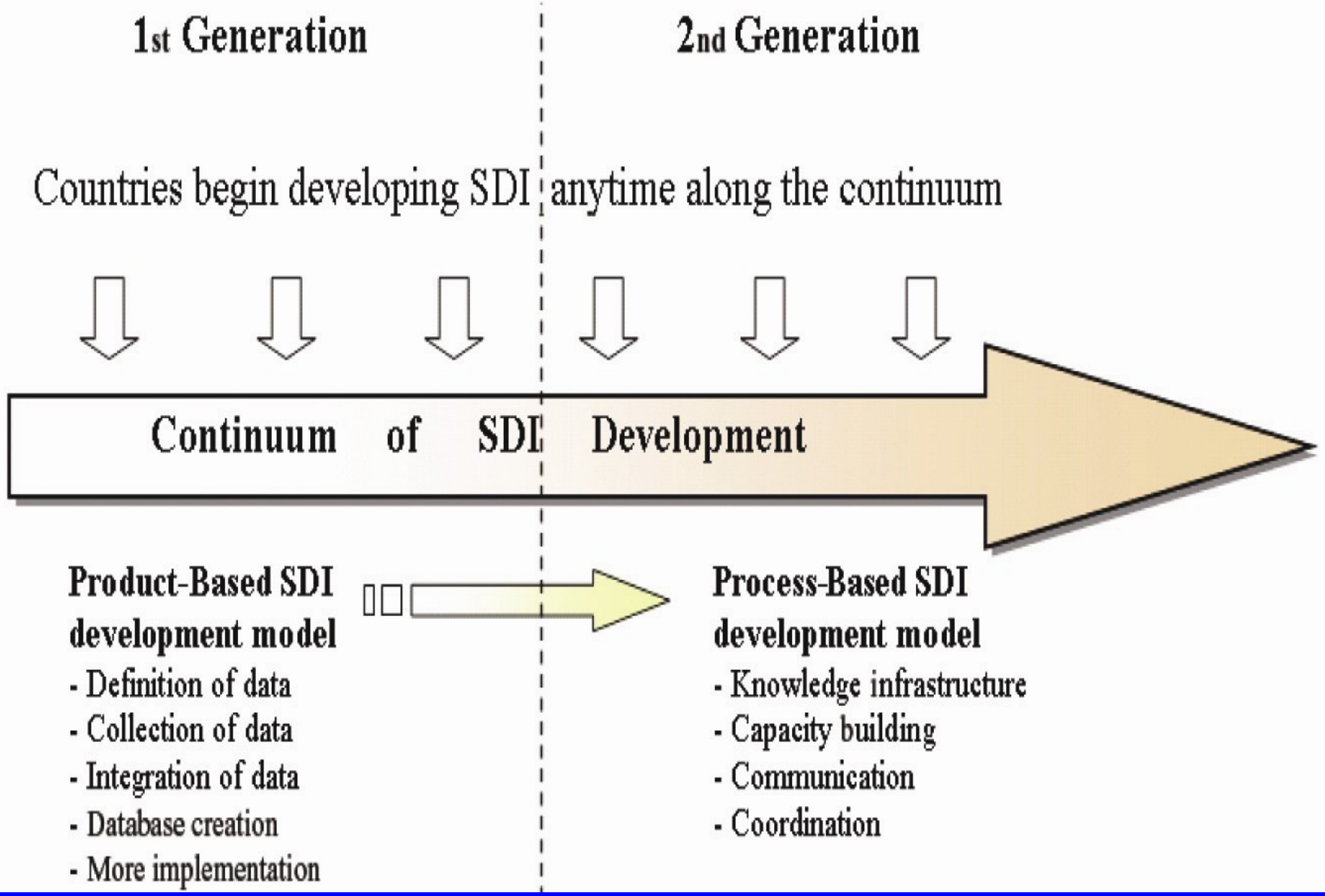

Framework Approach
Application Users
Added Application-Specific Data
Traffic Loads
Framework Data
Population
Transportation Planning
Development Planning
Soils
Land Suitability Analysis


Geographic Entities
Encoding Method
River and Lake
(chains and areas)
Road (chains)
1
STATE
PARK
Parcel (areas)
Geodetic Control
Station (points)

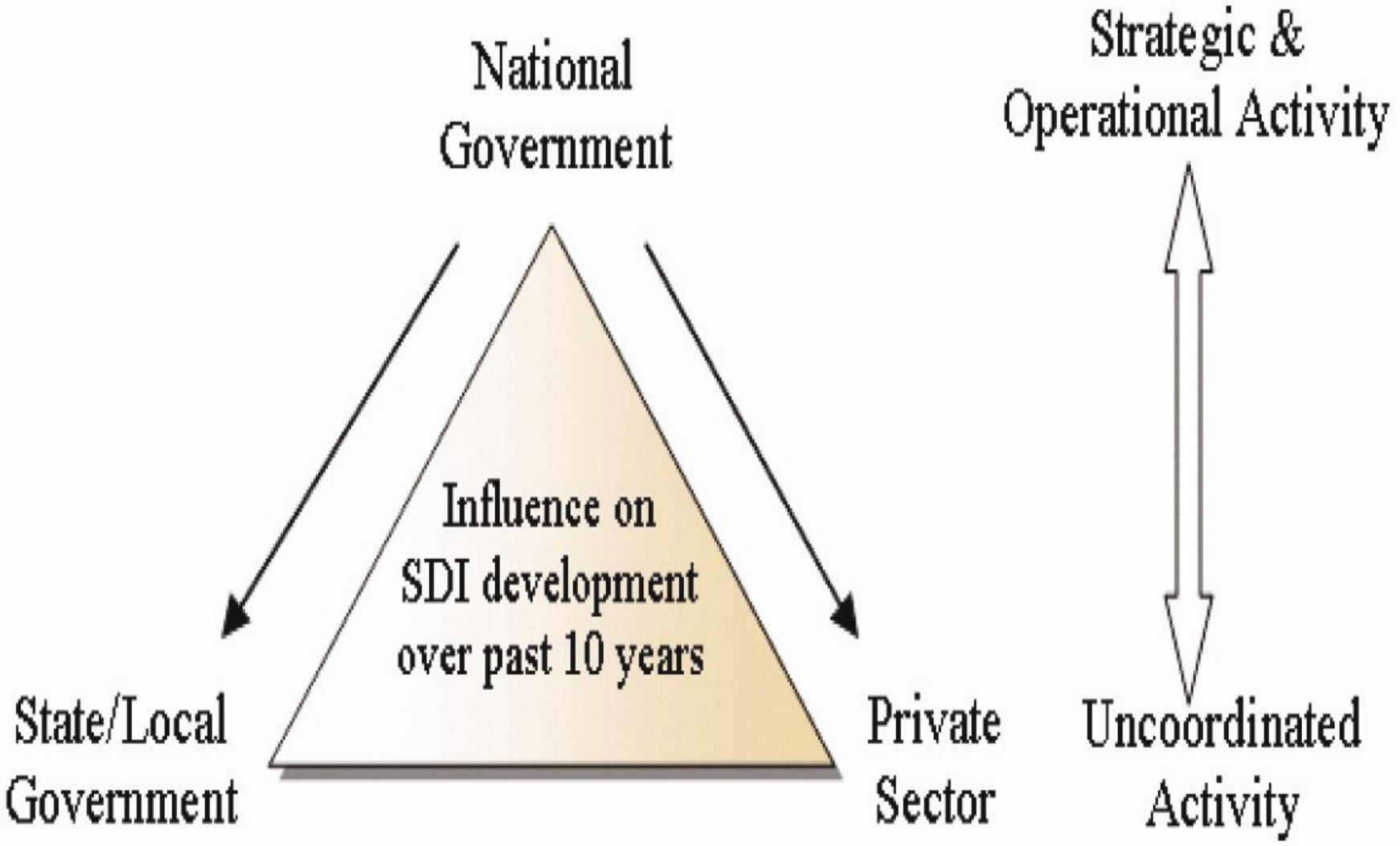

Local Governments
State Governments
Regional Agencies
Federal Government
Utilities
Companies
Non-Profit Organizations
Universities

Santiago Borrero (PAIGH SG): importance of *non-technical variables* in SDI building in Developing Nations.

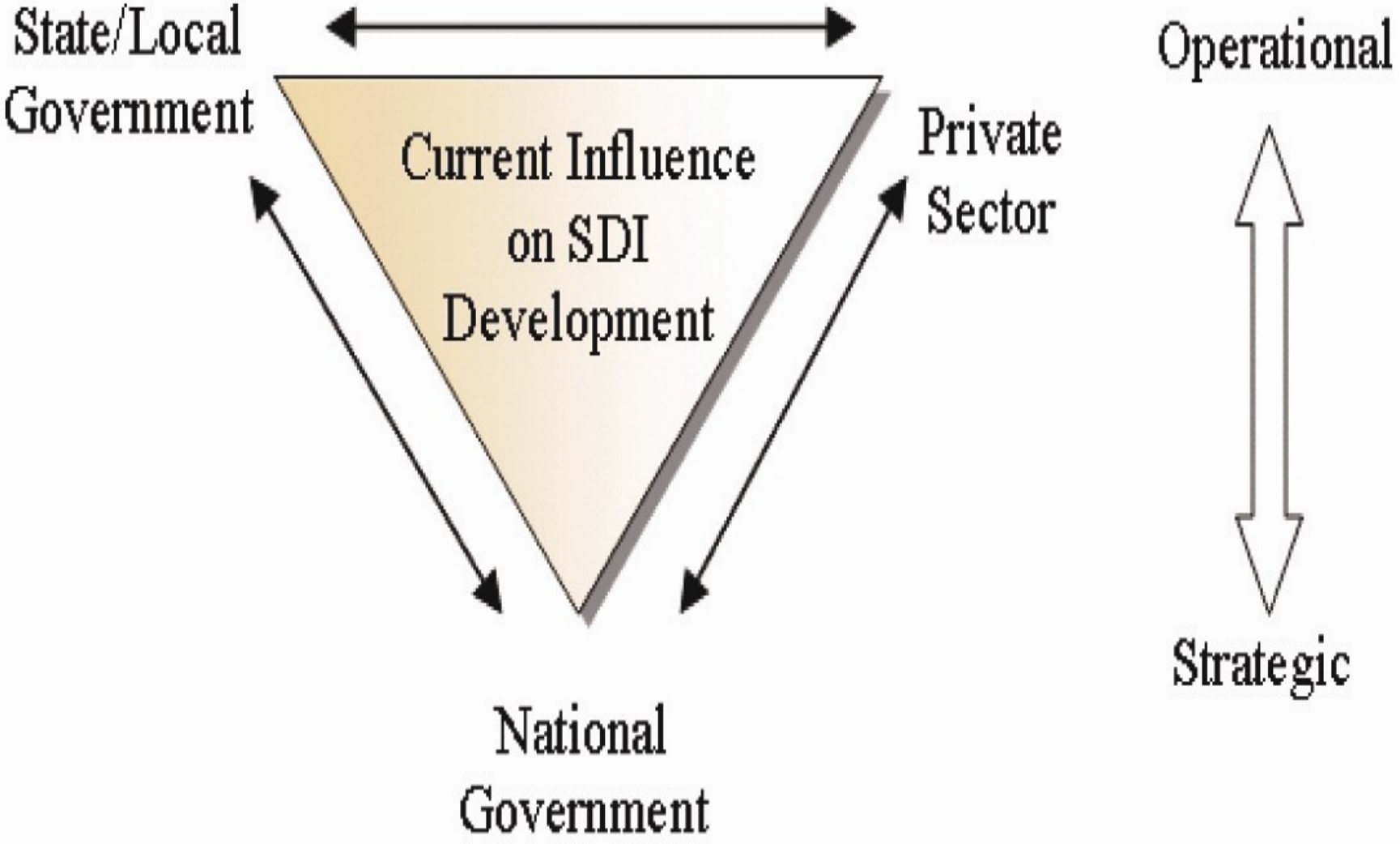
“Culturally speaking, particularly, there is a problem of attitude and a history of isolation, ill-defined ideas, language barriers, and financial challenges. In every country SDI will reflect local social and economic conditions, cultural aspects and elements related to national identity“.



Relationship between the first and second generations of SDIs. (by Williamson Rajabifard, Binns, 2007, reprinted from Rajabifard at al.2006 with permission of the International Journal of GIS)



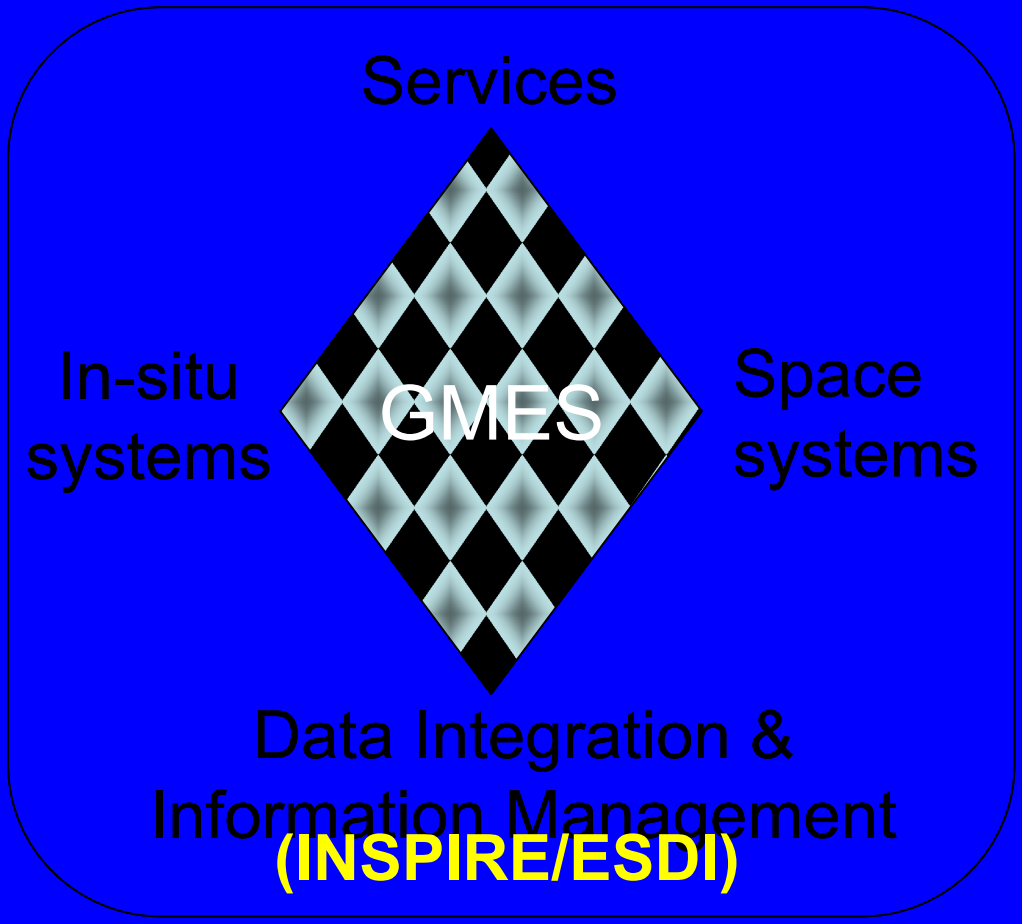
Roles of national governments, subnational governments and the private sector in SDI development over the part decade.(by Williamson Rajabifard, Binns, 2007 reprinted from Rajabifard at al.2006 with permission of the International Journal of GIS)



Current roles of national governments, subnational governments, and the private sector in SDI development (by Williamson Rajabifard, Binns, 2007, reprinted from Rajabifard at al.2006 with permission of the International Journal of GIS).

GMES/ COPERNICUS and INSPIRE

Global Monitoring for Environment and Security



INSPIRE

Infrastructure for Spatial Information in Europe

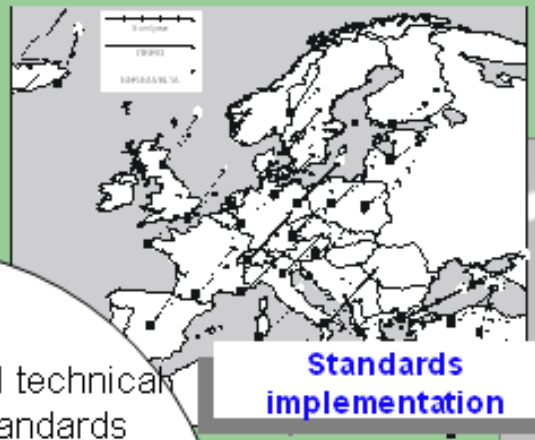
The INSPIRE concept:

Availability	Existence dat
Accessibility	Dostupnost
Legislation rules.	Pravidla přístupu.

Infrastructure for Spatial Information in Europe

Different Policies and standards

Technical Support to GI policy development



Standards implementation

Europe is moving 3cm/ year

Different sea level in Europe

GI Institutional framework

GI technical standards

Spatial Data Infrastructure

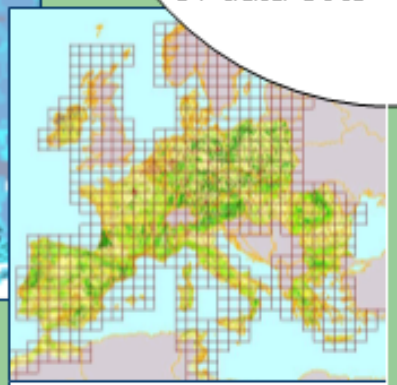
Fundamental GI data sets

Spatial Information Services

Catchments

Technical Support To data set creation

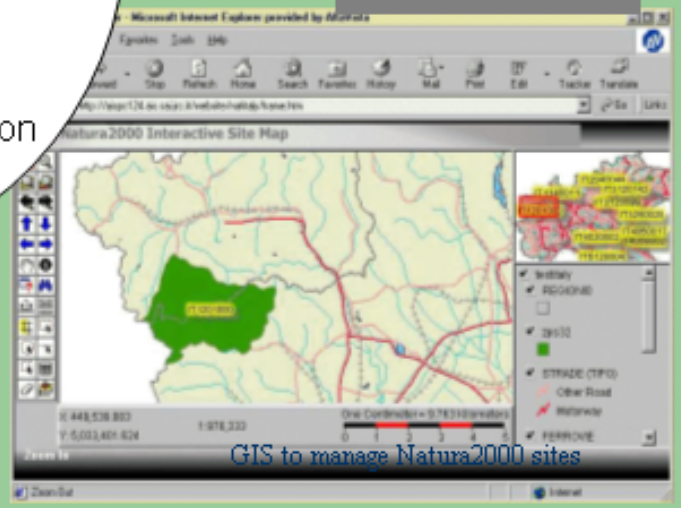
Meteo data



Land Cover

Needs to create european spatial data sets

GIS for Natura 2000



GIS to manage Natura2000 sites

eEurope : eGovernement on line

Towards an Infrastructure for Spatial Information

From discovery to Full Interoperability

Standardisation

- Metadata
- Discovery Service
- Data Policies
- Licensing Framework
- Coordinating structures
- …

Harmonisation

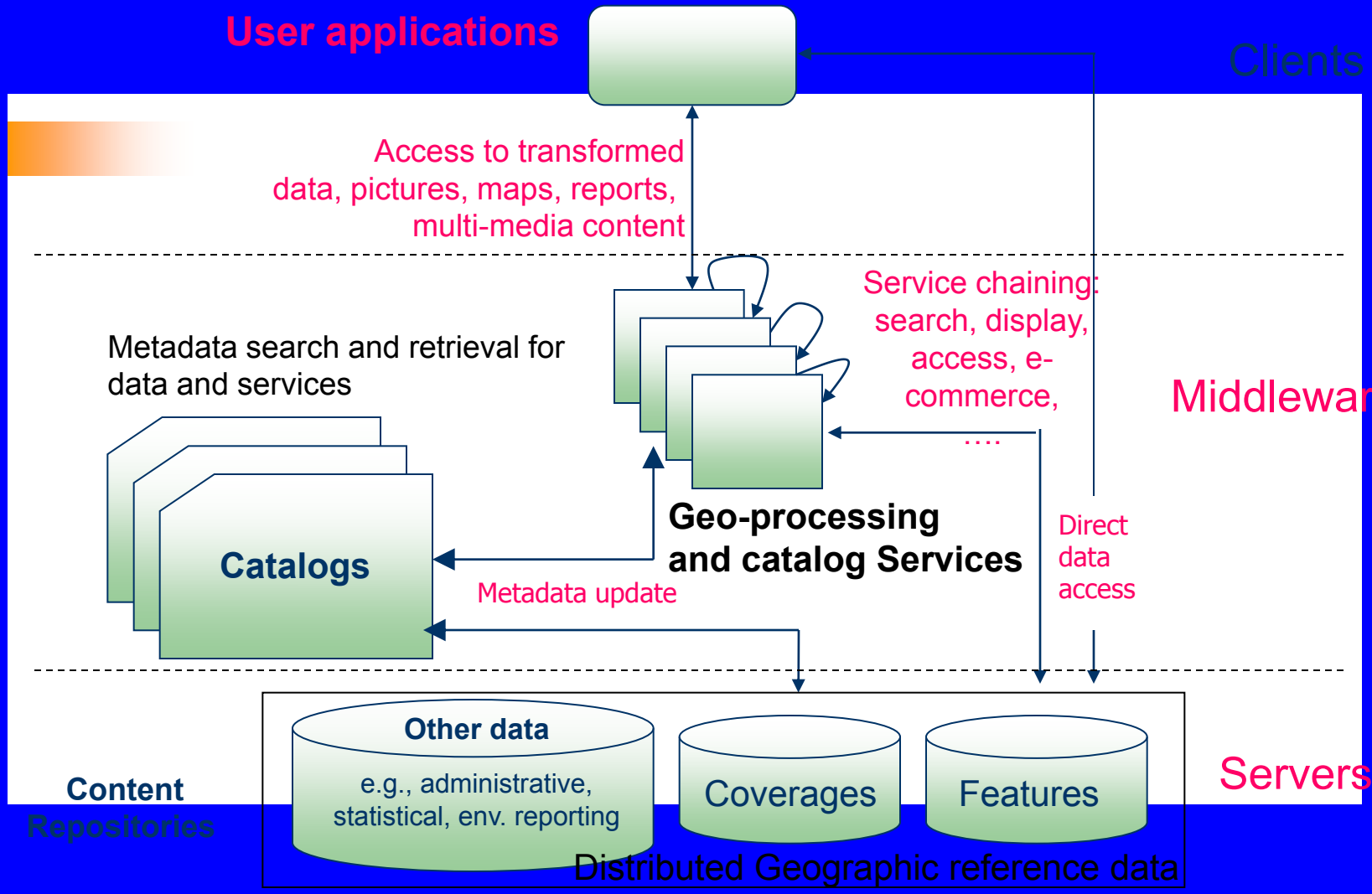
- Geodetic Framework
- Seamless data
- Quality insurance
- Certification
- Updating
- Data model
- …

Integration

- Catalog Services
- View Service
- Query Service
- Object Access Service
- Generalisation Services
- Geo-Processing services
- …

Current status

Architecture model



After the Digital Earth Reference Model

GALILEO

NAVSTAR

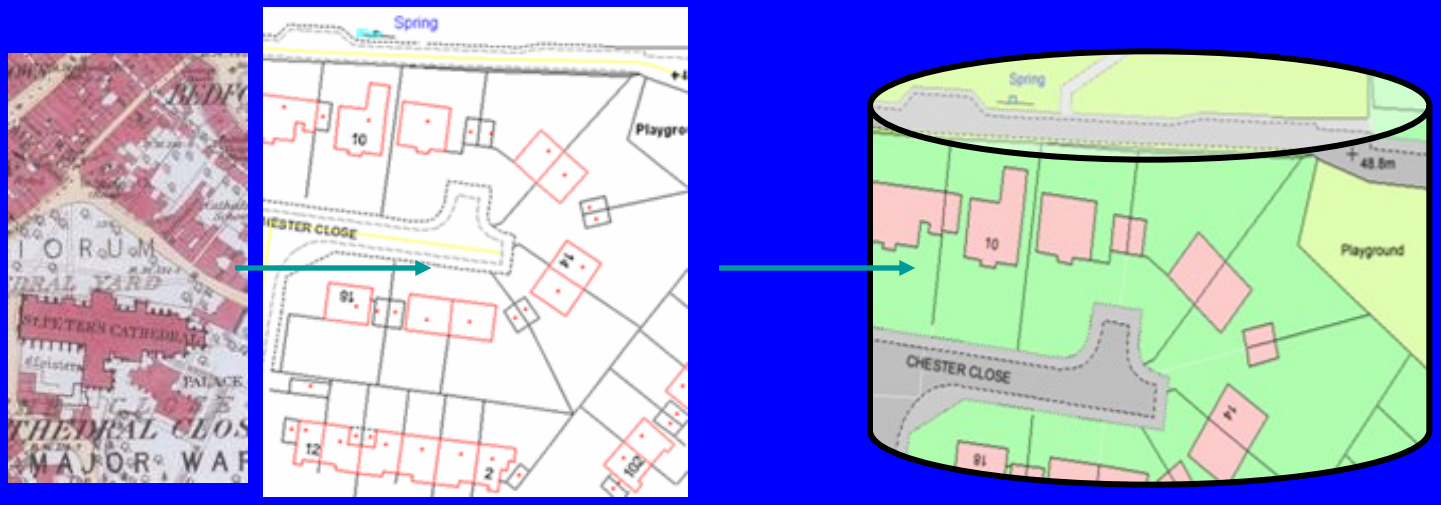
GLONASS


H. HAUBOLD
M. CAPORALE

“i2010 – A European Information Society for growth and employment”

COM(2005) 229 final
COMMUNICATION FROM THE COMMISSION TO THE COUNCIL, THE EUROPEAN PARLIAMENT, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS
Brussels, 31.05.2005
(Text with EEA relevance)

Changing models of geographic information



Paper map

Digital data file

Spatial database

OS MasterMap:

a definitive digital map of Great Britain, providing detailed geographic information for a wide range of business and government purposes.

OS MasterMap underpins a huge range of commercial services used by millions of people every day.

4. Cartographic Unique Approches

Where SDIs end, cartography begins?

Geographer Ptolemy first developed the idea of atlases: how to subdivide the world into 26 parts, how to portray the world in its entity and in parts. We are still using his ideas of subdividing the world, in parts from north to south and from west to east.

Ortelius Atlas

Mercator Atlas


Spectandum dedit Ortelius mortalib. orbem,
Orbi spectandum Gallicus Ortelium. Pegius

We are refining these ideas;

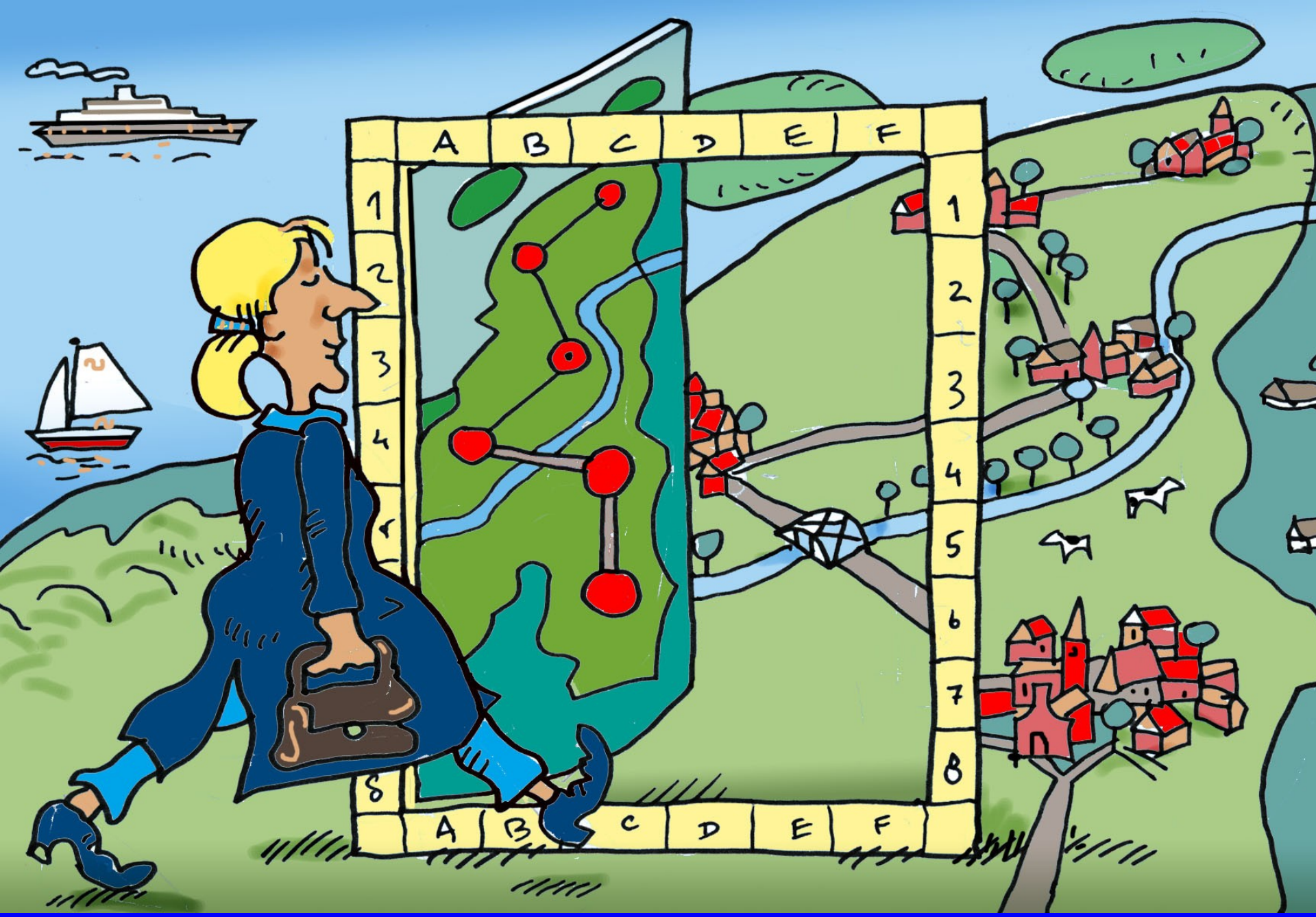
In another geodata revolution, in the 19th century, we used national atlases, Finland was first one;

The next geodata revolution at the end of the 20th century led us to digital atlases.

But still we keep these cartographic ideas of making sense of the world.

Examples of the atlas concept – atlases as ways of storage of geospatial information we have learned to deal with – are for instance *emergency-atlases.*

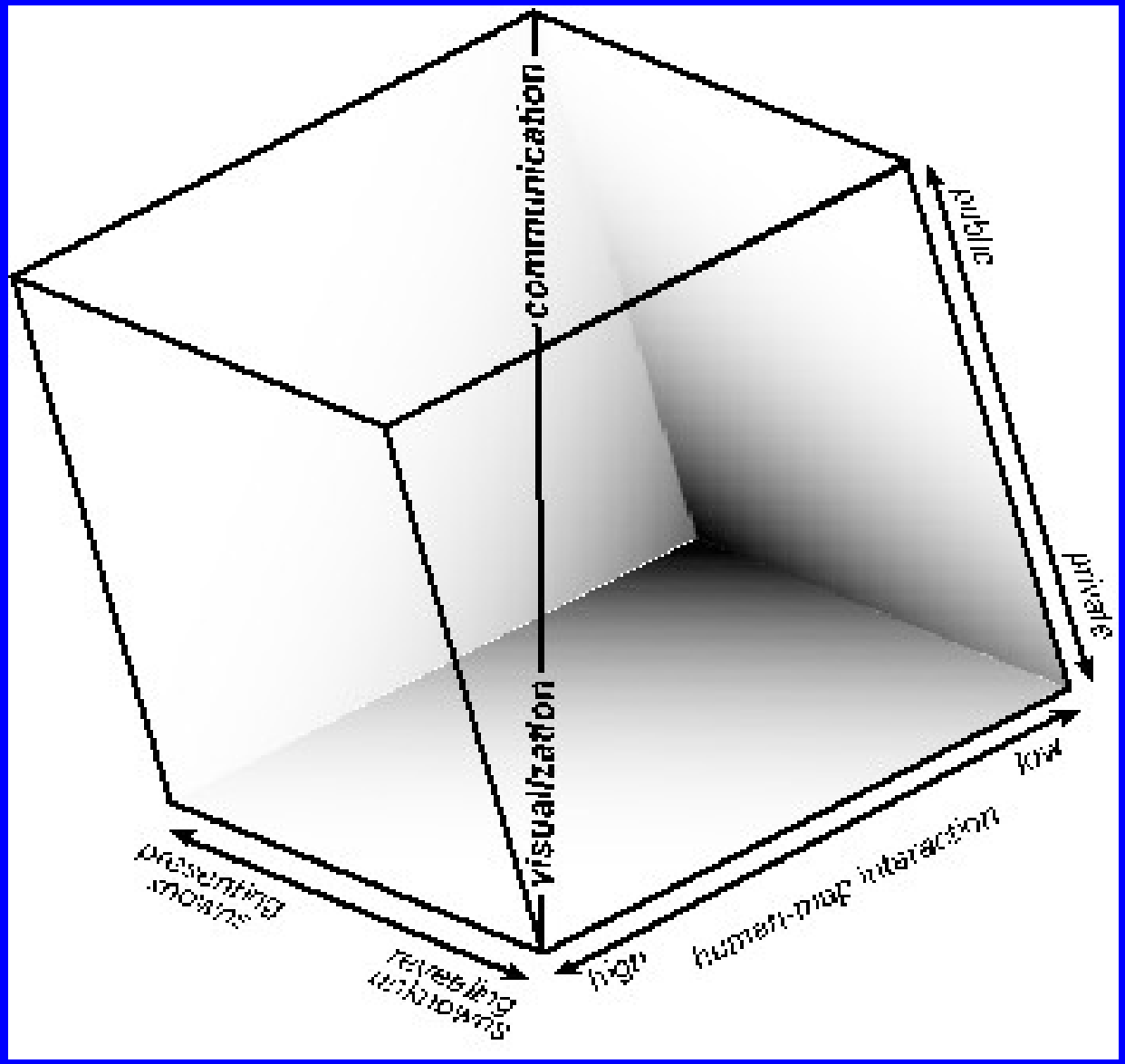
Here in the first place atlases allow us access to the area involved, the atlas opens the door to that area, and allows also people faraway to understand its problems.


A B C D E F
1 2 3 4 5 6 7 8
A B C D E F
1 2 3 4 5 6 7 8

5. Současný stav kartografie

Kartografie pod vlivem ICT vstoupila do nového, revolučního období svého vývoje.

Moderní přístup chápe mapování jako schopnost vytvořit **znalostní rámec určitého prostředí v prostoru.**



Krychle využití map ukazující čtyři formy vizualizace pro výzkum, analýzu a prezentaci. (A.M. MacEachren)

V ČEM JE DNEŠNÍ KARTOGRAFIE JINÁ?

Je schopná vytvářet vhodné mapy podle

specifických a individuálních požadavků.

Namísto pouhého *využívání map* vytvořených někým v předstihu, dovolují nové vědecké technologie *jednotlivcům*

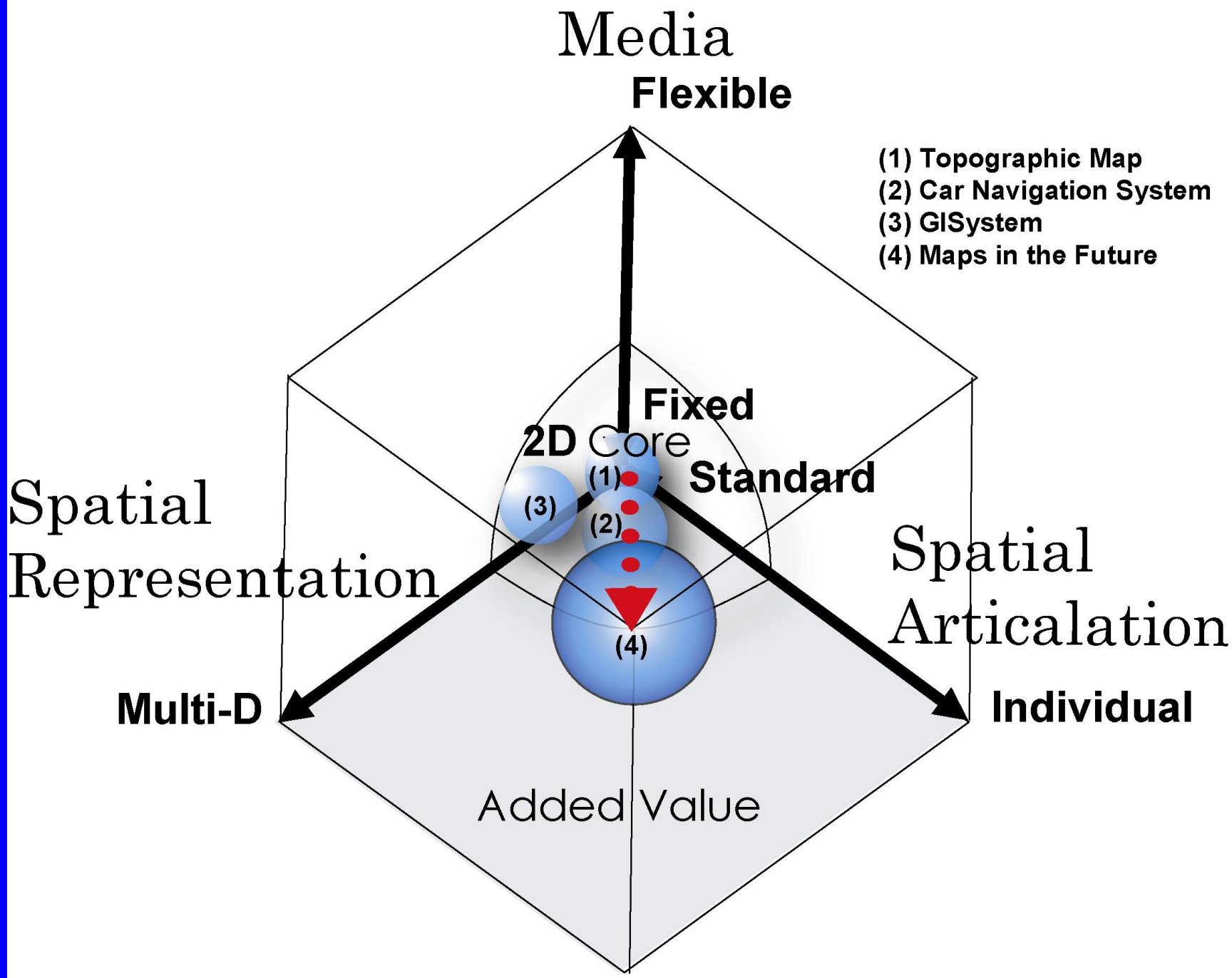
využívat kartografii *interaktivně, podle základních individuálních uživatelských požadavků*, pro studium a prezentaci prostorových informací.

Nejdynamičtější proudy

v kartografii:

1. Kartografická vizualizace (ICA komise pro vizualizaci a virtuální prostředí).
2. Ubiquitous mapování (všude, v každé situaci)
3. Internetové mapy
4. Využití map
5. Sensorová kartografie

www.icaci.org


Media
Flexible
(1) Topographic Map
(2) Car Navigation System
(3) GISystem
(4) Maps in the Future
Fixed
2D Core
Standard
(1)
(2)
(3)
(4)
Spatial Representation
Multi-D
Spatial Articalation
Individual
Added Value

Ubiquitous mapping

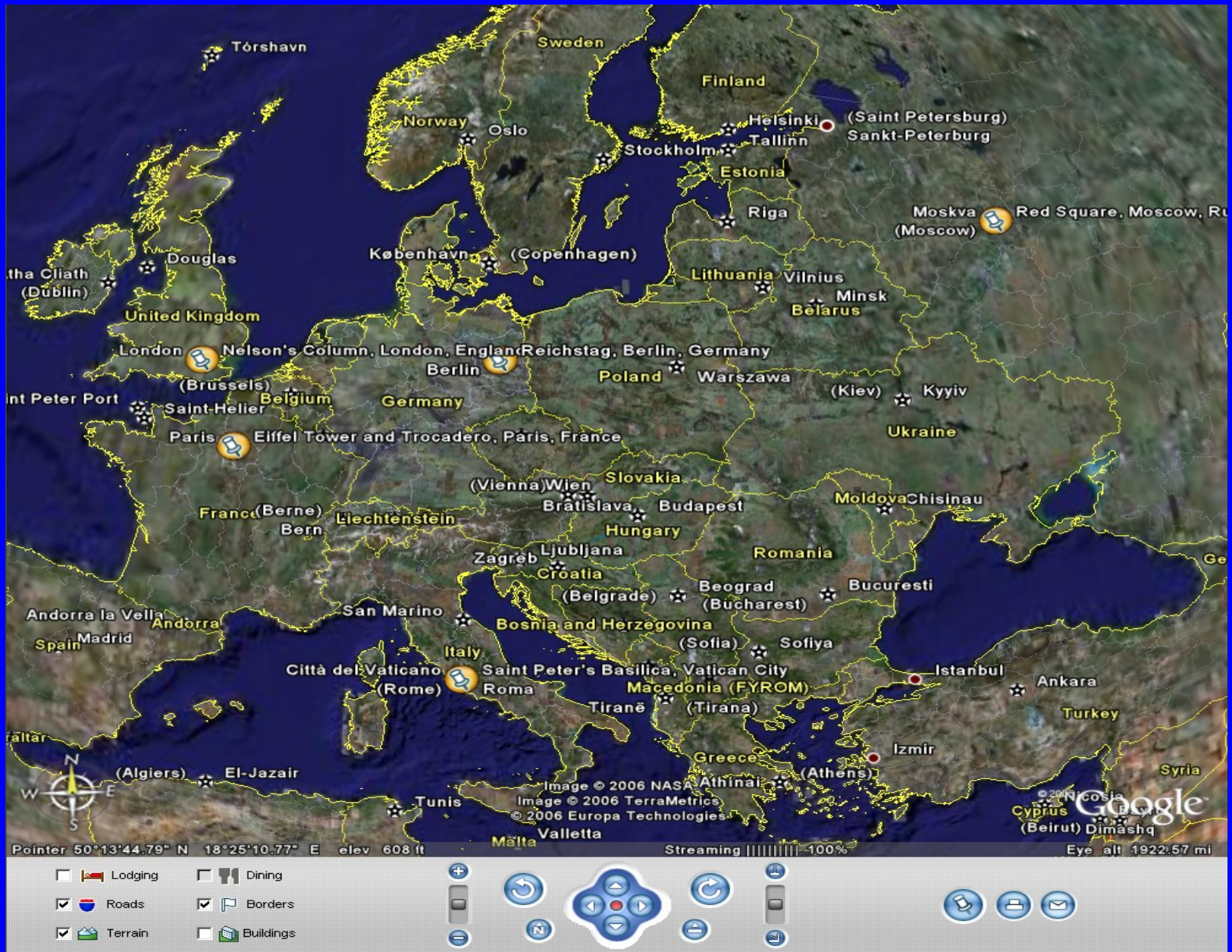
Mobile Internet / TeleCartography
Map based LBS
Navigation systems

Working fields:

Mobile
Adaptabile
SENSOR Cartography

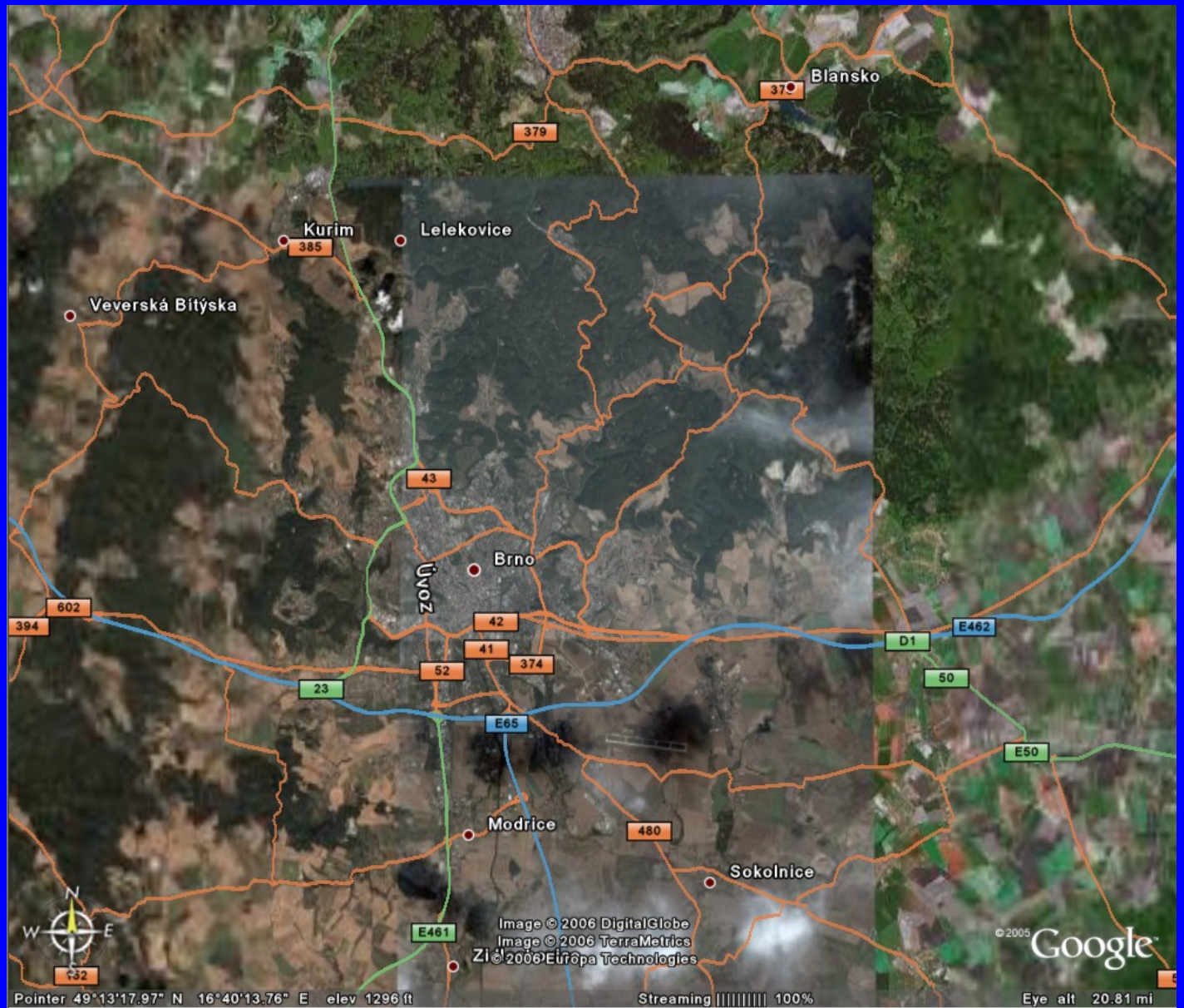
Google Earth

Easy navigation



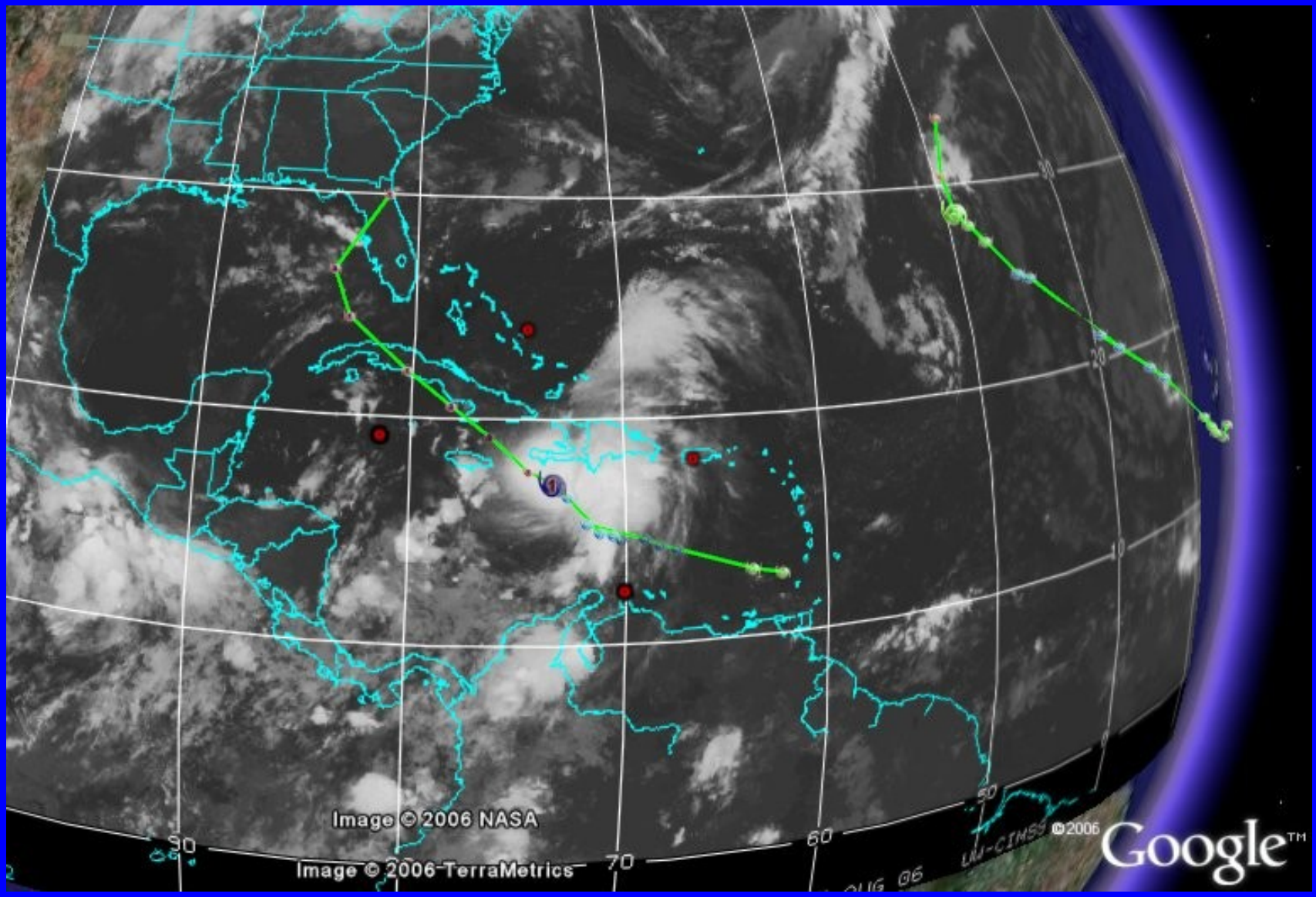
Various quality of images

Inaccuracy in local names

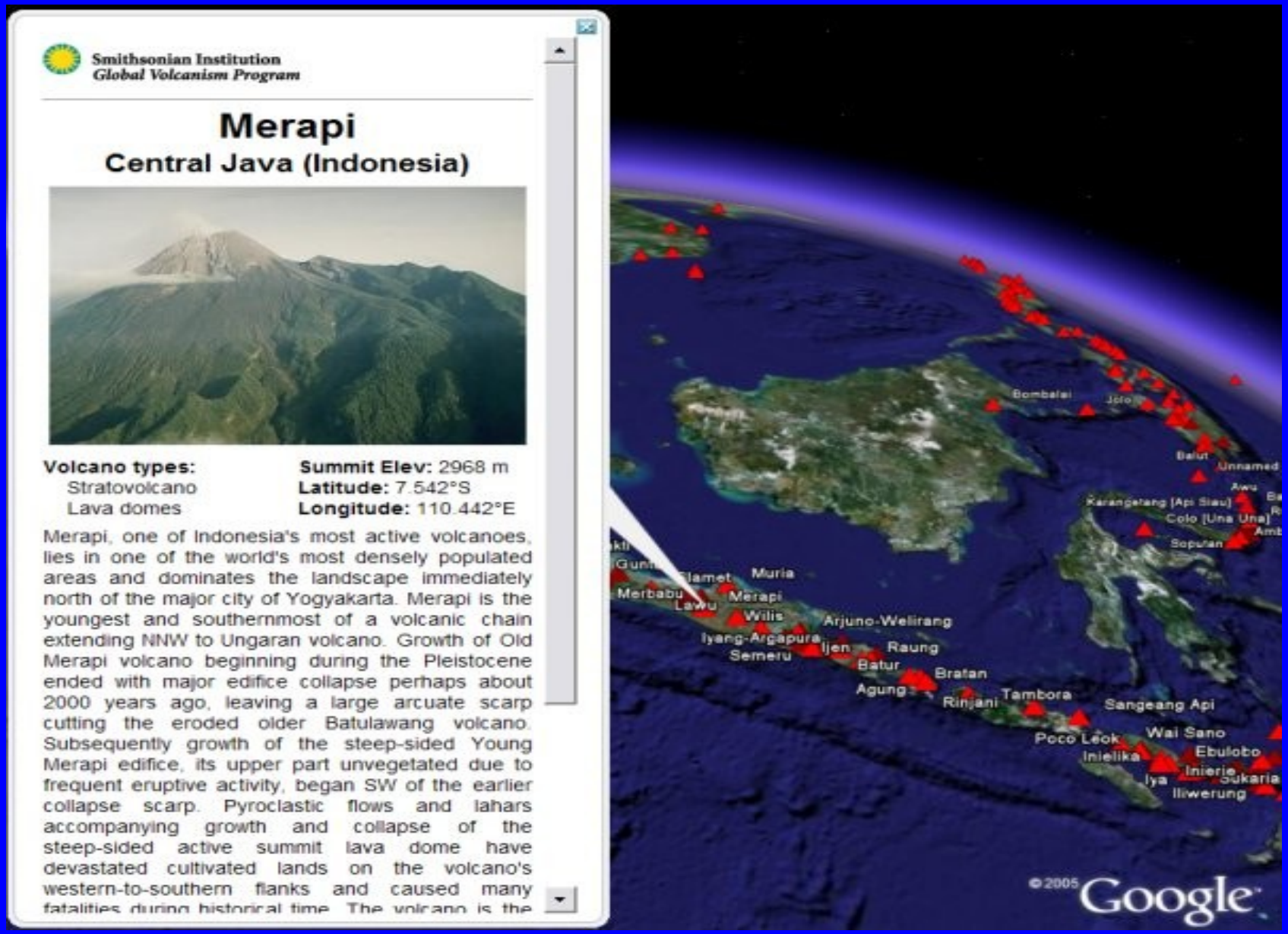


Adds by Google.

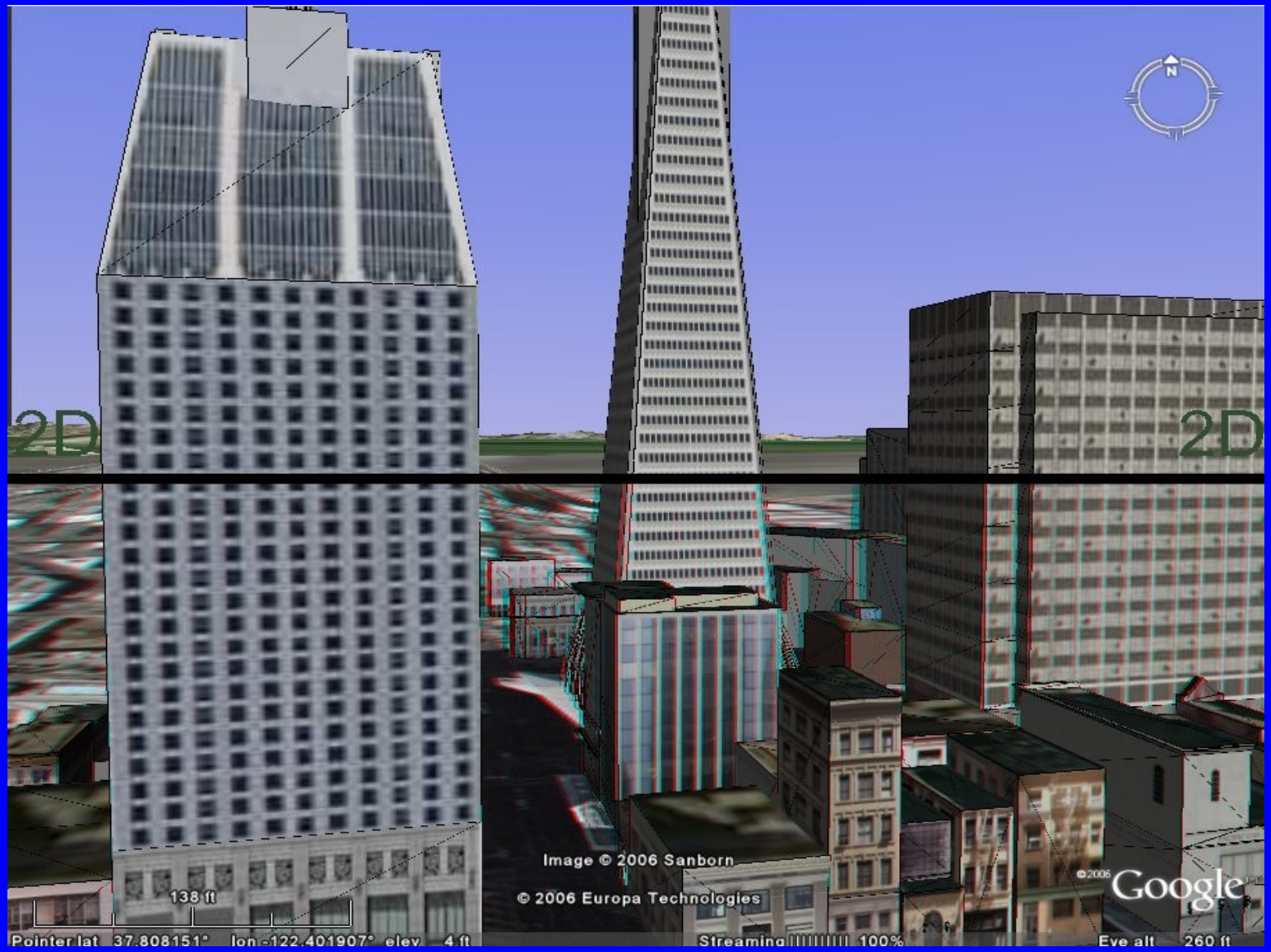
Hurricane tracking



Educational Uses with Google Earth



TriDef Visualizer - Dynamic Stereoscopic Viewing in Google Earth (showing San Francisco 3D buildings)



6. Early Warning and Disaster Management Challenges

Zkušenosti získané z řešení krizových situací.

The World Conference on Disaster Reduction, Kobe from 18-22 January 2005

Hyogo Deklarace:

Je nezbytné vytvořit k**ulturu** prevence před katastrofami a snížení jejich důsledků,

ale také s nimi spojených *předkatastrofických strategií (včasné varování),* jež musí být funkční na všech úrovních od individuální po mezinárodní. Lidská společnost se musí naučit žít s rizikem katastrof přírodního (i jiného) původu.

Byly definovány klíčové aktivity pro realizaci a naplnění úkolů pro snížení rizik na národních a lokálních úrovních, mj.:

vytvořit, periodicky aktualizovat a dávat k dispozici široké veřejnosti **mapy rizik** a k nim vztažené nezbytné informace pro rozhodovatele, širokou veřejnost a společenství rizikem ohrožená, a to ve vhodné formě.


EWC III
Third International Conference
on Early Warning
From concept to action
27 – 29 March 2006, Bonn, Germany

Bill CLINTON, EW III Conference, Bonn, March 27 urges:

„Risk Reduction Become a Global Priority“

„Hazards are not disasters by definition. Hazards only become disasters when lives and livelihoods are swept away. Making communities safer – by better managing the risks of natural hazards – must become a global priority“.

Clinton continues-1:

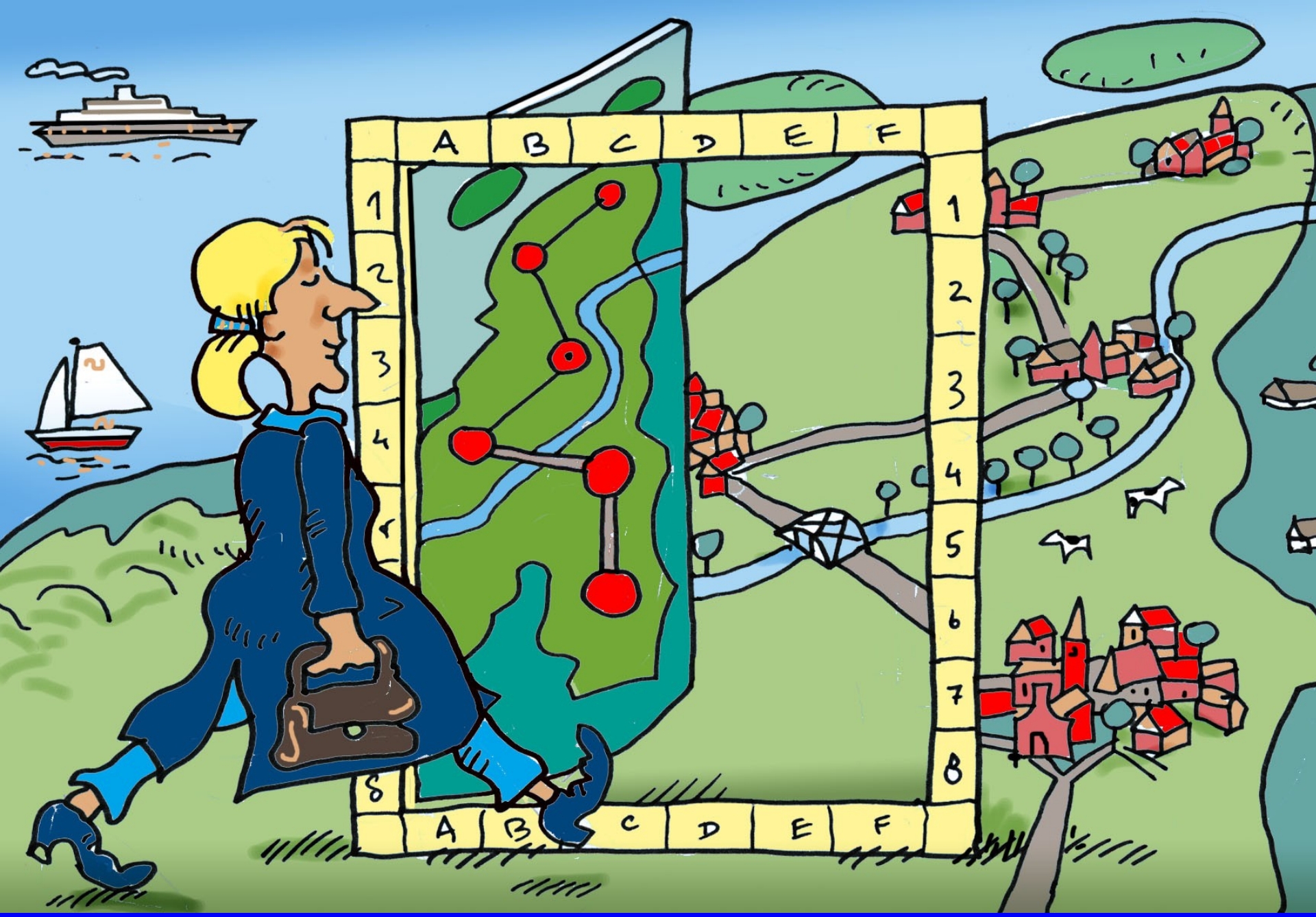
We need implementation of well known but under-applied measures to reduce risk.

E.g. encouraging the practice of *Hazard Mapping* to identify areas of extreme vulnerability, better enforcement of uniform building codes to prompt safer construction, the expansion of access to insurance to help survivors recover and education to increse awarness.

Atlasová koncepce – atlasy jako způsob ukládání geoprostorové informace; musíme se učit s nimi pracovat – například atlasy pro situace ohrožení (*emergency-atlases).*

V prvé řadě nám umožňují *přístup* do zájmové oblasti, atlas otevírá dveře a poskytuje komplexní informace a umožňuje jeho uživatelům chápat nastolené problémy.

7. Cartographical responses


A B C D E F
1 2 3 4 5 6 7 8
A B C D E F
1 2 3 4 5 6 7 8

Unique contribution of cartography is allowing people to visualize the geospatial context.

As a member of Geospatial Community we would like to further develop this unique contribution and adapt it to ICT (ambient) technologies.

Výzkumný záměr

Pro podporu včasného a dobrého rozhodování v mimořádných/krizových situacích je potřeba **aktuálních informací**, jejich přehledné členění a rychlý a snadný **přístup** k nim.

Většina těchto informací je územně vázána.

Významnou roli pro orientaci uživatele hraje **kartografická vizualizace.**

Vizualizace není izolovanou složkou procesu přenosu informací, ale je závislá na:

-stavu zdrojových databází,

-modelech pro podporu rozhodování a chování vlastního uživatele.

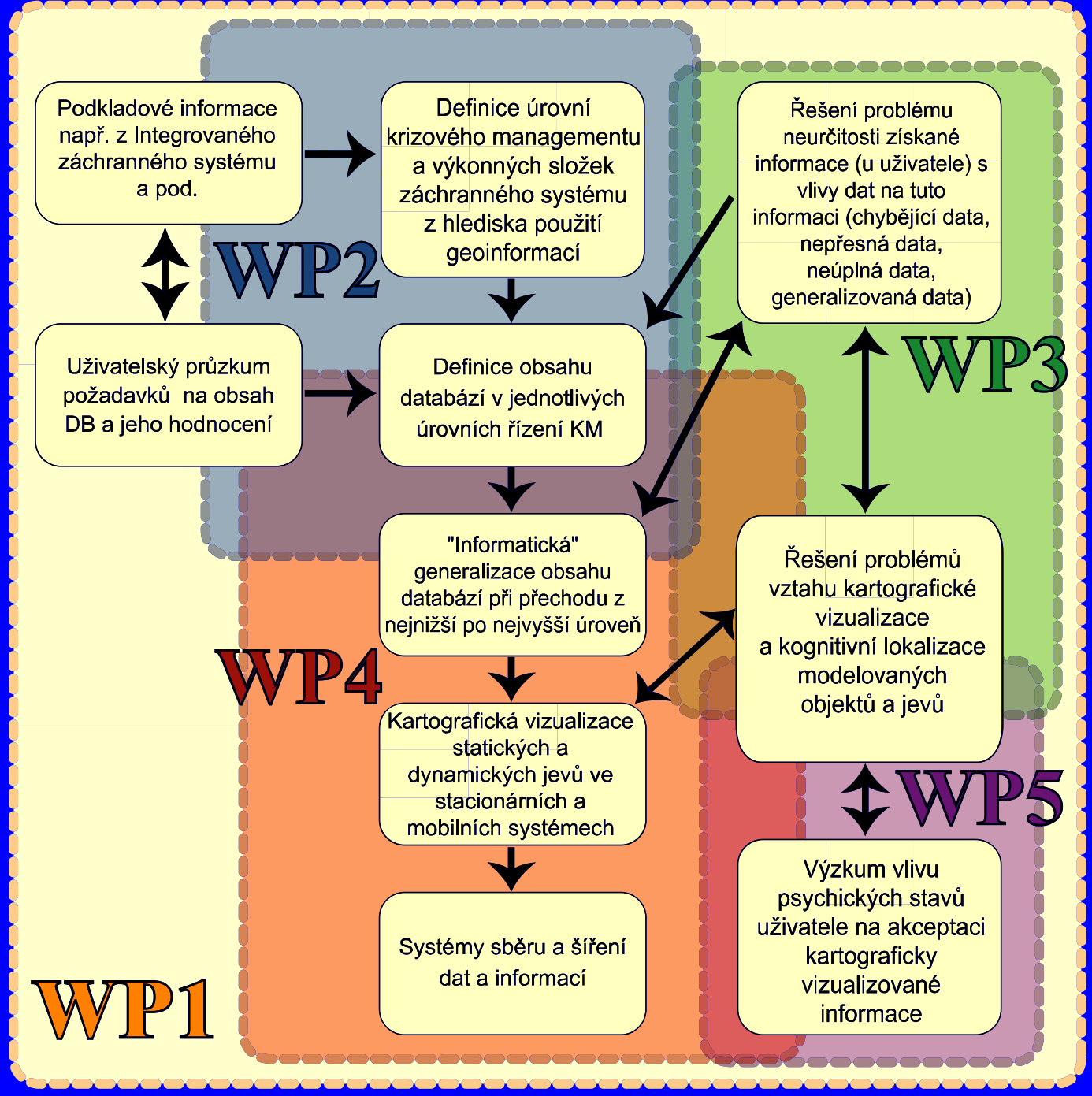
Dosavadní řešení krizového managementu používají obecné statické kartografické vizualizace vycházející *z předzpracovaných modelů* krizových situací.

Projekt je zaměřen na výzkum dynamických vizualizací *nad modely generovanými v reálném čase.*

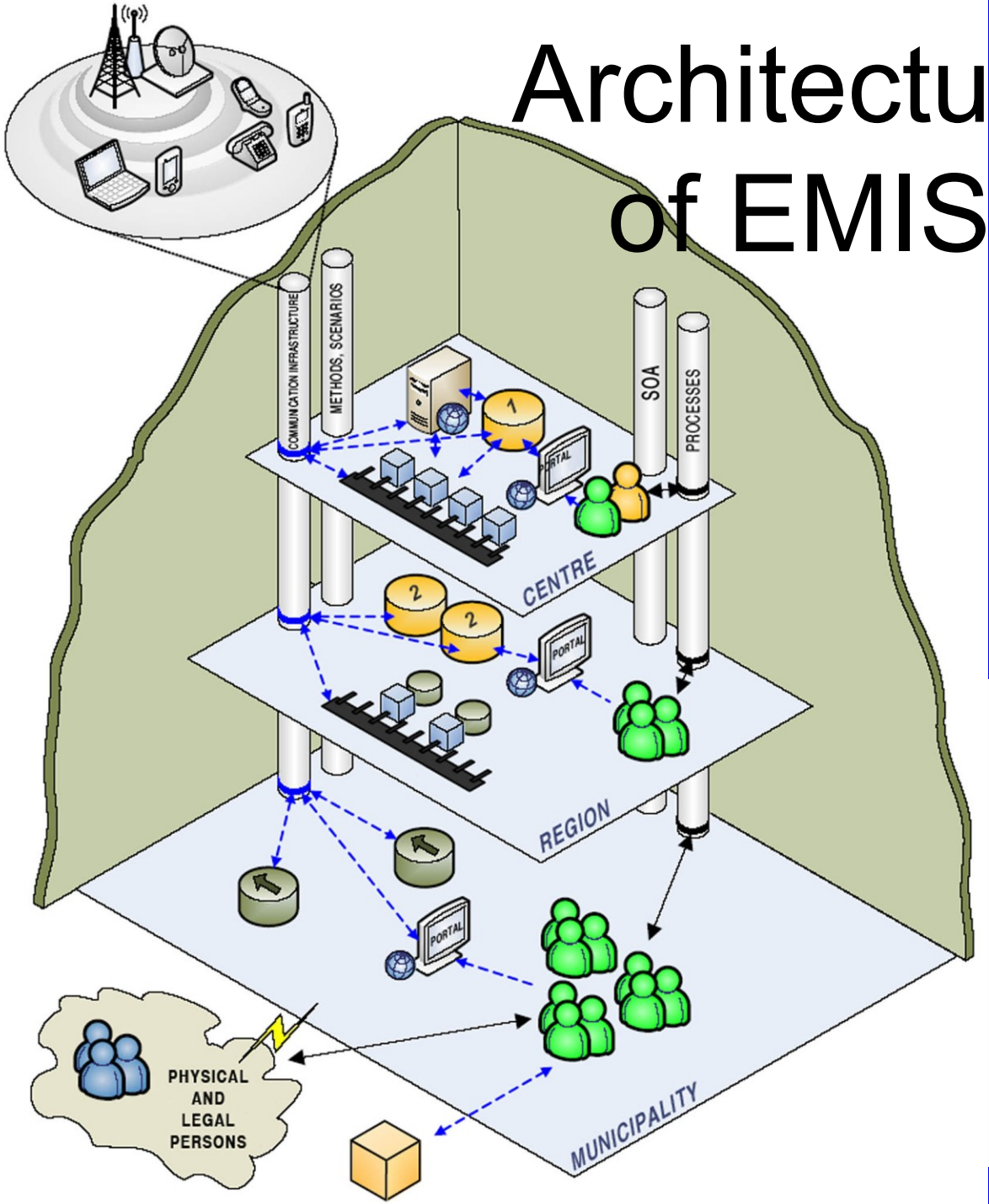
Dynamická kartografická geovizualizace

je variabilni vizualizace geografických dat kartografickými prostředky, která se adaptuje na měřítko, rozsah a kontext vizualizovaných dat.

Kontextem se rozumí kombinace zobrazovaných dat, hardwarové prostředí a požadavky na situační pozadí a prostředí uživatele.


Podkladové informace např. z Integrovaného záchranného systému a pod.
Definice úrovní krizového managementu a výkonných složek záchranného systému z hlediska použití geoinformací
Řešení problému neurčitosti získané informace (u uživatele) s vlivy dat na tuto informaci (chybějící data, nepřesná data, neúplná data, generalizovaná data)
WP2
Uživatelský průzkum požadavků na obsah DB a jeho hodnocení
Definice obsahu databází v jednotlivých úrovních řízení KM
WP3
"Informatická" generalizace obsahu databází při přechodu z nejnižší po nejvyšší úroveň
Řešení problémů vztahu kartografické vizualizace a kognitivní lokalizace modelovaných objektů a jevů
WP4
Kartografická vizualizace statických a dynamických jevů ve stacionárních a mobilních systémech
WP5
Systémy sběru a šíření dat a informací
Výzkum vlivu psychických stavů uživatele na akceptaci kartograficky vizualizované informace
WP1

Architecture of EMIS



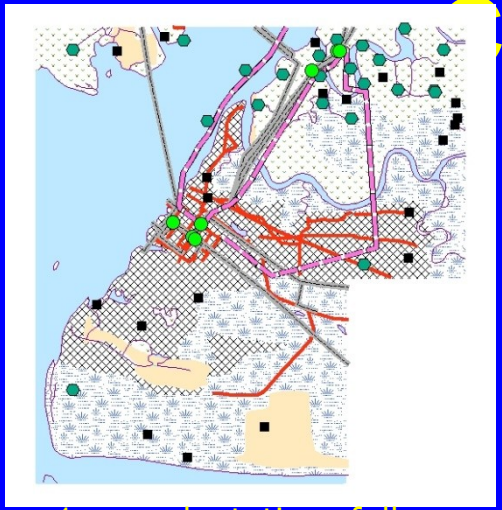
- Web Services Server
- Central DB
- Regional DB
- Web Service
- Relevant Agenda
- Portal
- Current Application
- Administrator
- EMIS User
- Legal of Physical Person
- Data flow
- Personal Interaction
- Cross-border EMIS
- Data Inputs

Možnosti dynamické kartografické vizualizace

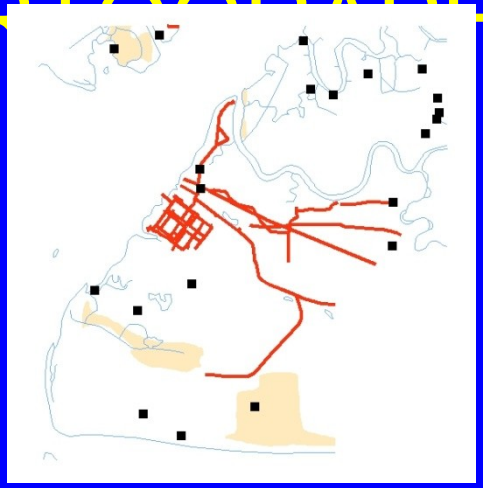
Současný krizový management:

- Analogové mapy nebo statické digitální zdroje.
- Nefunguje kartografická podpora krizového managementu v reálném čase.
- Nedostatečná srozumitelnost kartografických podkladů v určitých situacích ohrožení.
- Mapy jsou potřebné pro uživatele (ne uživatel pro mapy)=personalizace kartografického výstupu.

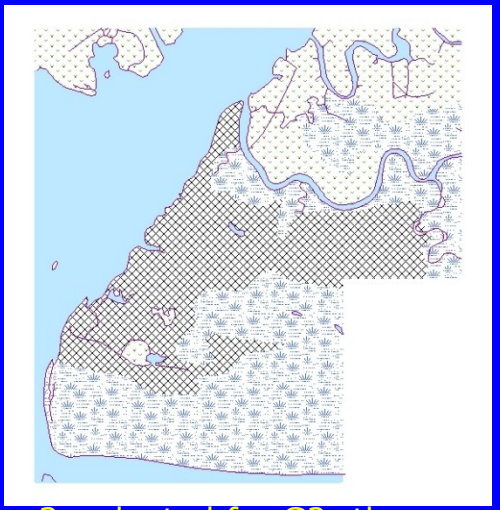
MOBILE AND ADAPTIVE CARTOGRAPHY



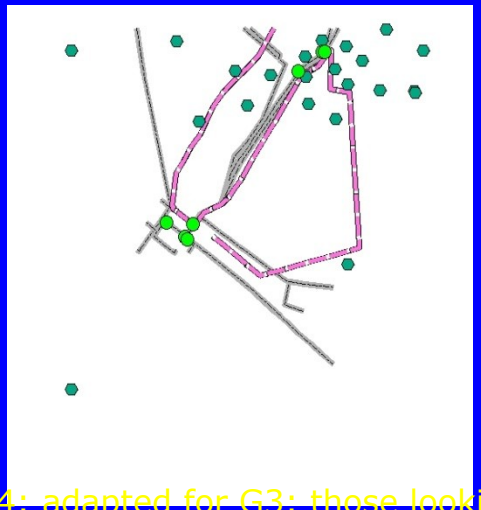
1: no adaptation: full dataset



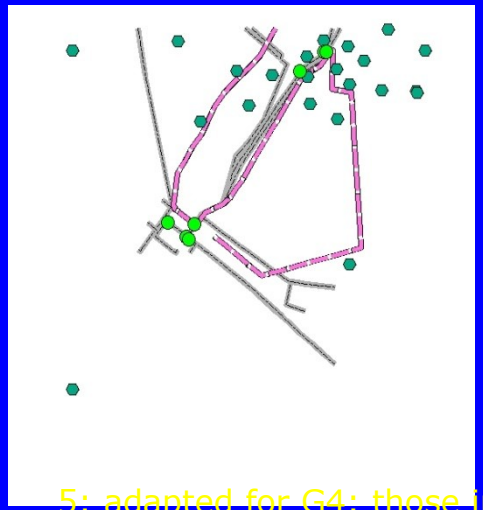
2: adapted for G1: those in charge of human evacuation



3: adapted for G2: those looking to protect biological sites



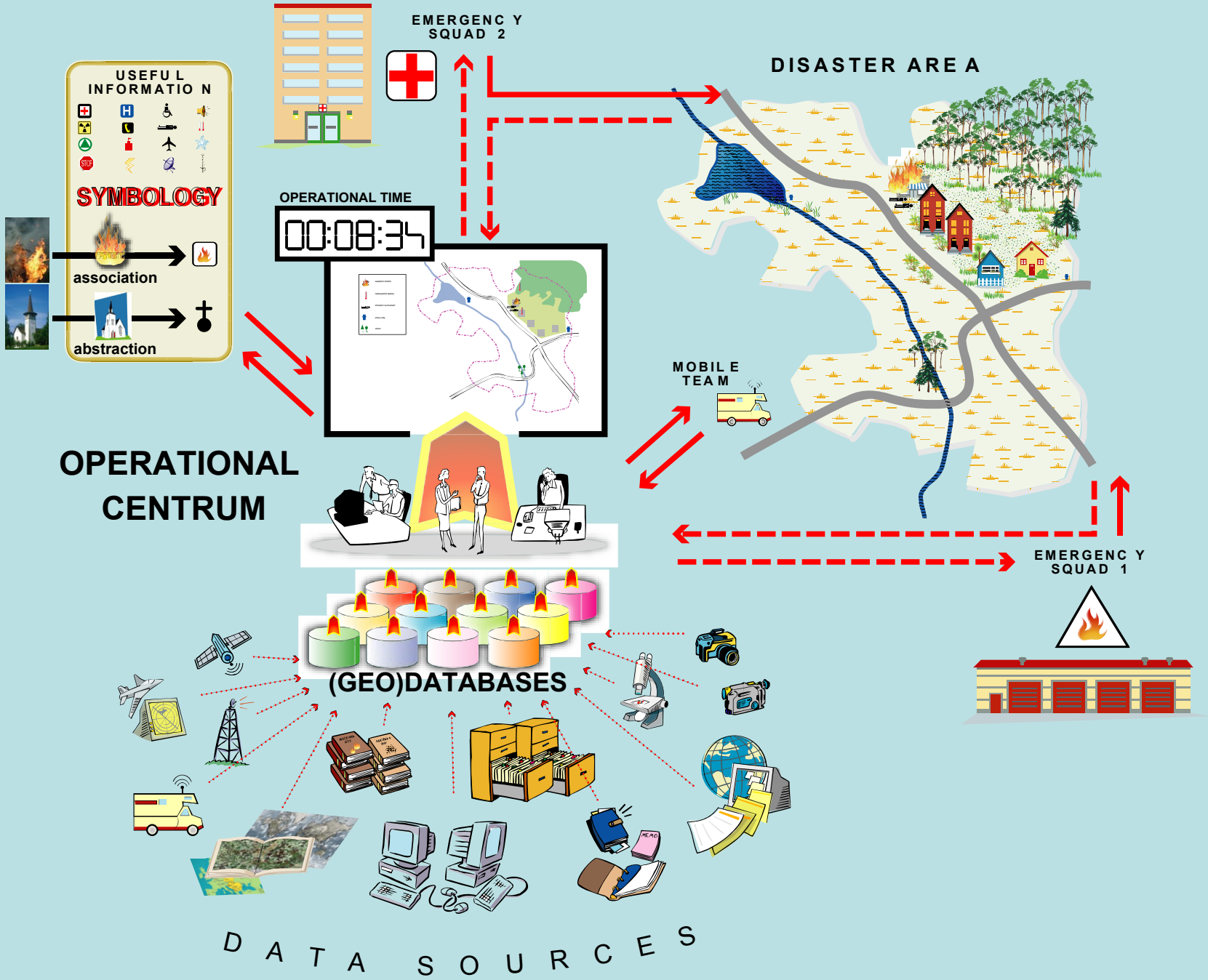
4: adapted for G3: those looking to recover some of the spilled oil



5: adapted for G4: those in charge of repairing the leak to the oil pipeline

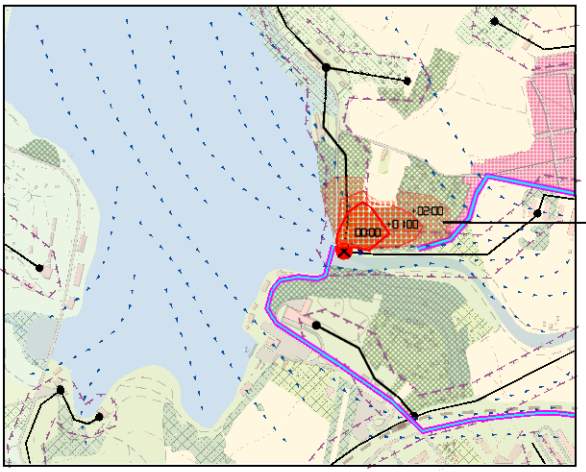
Společné datové zdroje

- Interoperabilita datových zdrojů na různých úrovních KM − společný protokol, existence metadat, thesaury, gazetteery (INSPIRE)
- Pružná a transparentní legislativa
- Jednotné informační centrum (dotazový makléř).


EMERGENCY SQUAD 2
USEFUL INFORMATION
SYMBOLOGY
association
abstraction
OPERATIONAL TIME
00:08:34
DISASTER AREA
MOBILE TEAM
OPERATIONAL CENTRUM
EMERGENCY SQUAD 1
(GEO)DATABASES
DATA SOURCES

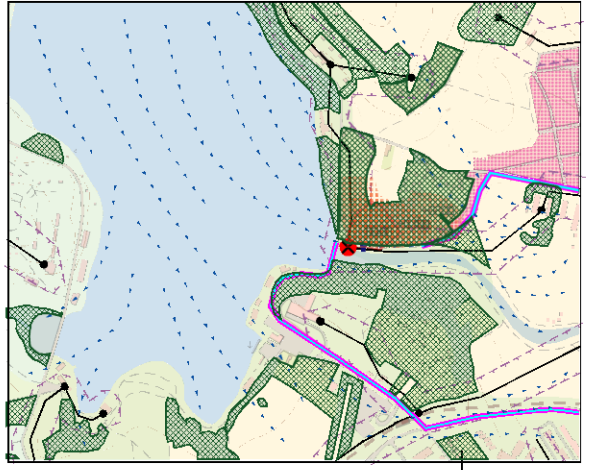
Přizpůsobivost kartografické reprezentace

1. **Uživatelské zázemí –různá edukační vyspělost a zvyky při využívání map.**
2. **Tematická významnost – různé charakteristiky v mapovém obsahu a jejich různý význam v měnících se situacích ohrožení.**
3. **Nové jevy – nové charakteristiky odrážející stav ohrožení musí být nepřetržitě vkládány do map.**
4. **Interakce nástrojů a prostředí – jsou využívány rozmanité elektronické vizualizační nástroje jež jsou také v interakci s prostředím, jehož stav ovlivňuje viditelnost a množství využívané informace.**



TOP INFORMATION

TIME AND AREA
OF SPREADING
OF AN EVENT

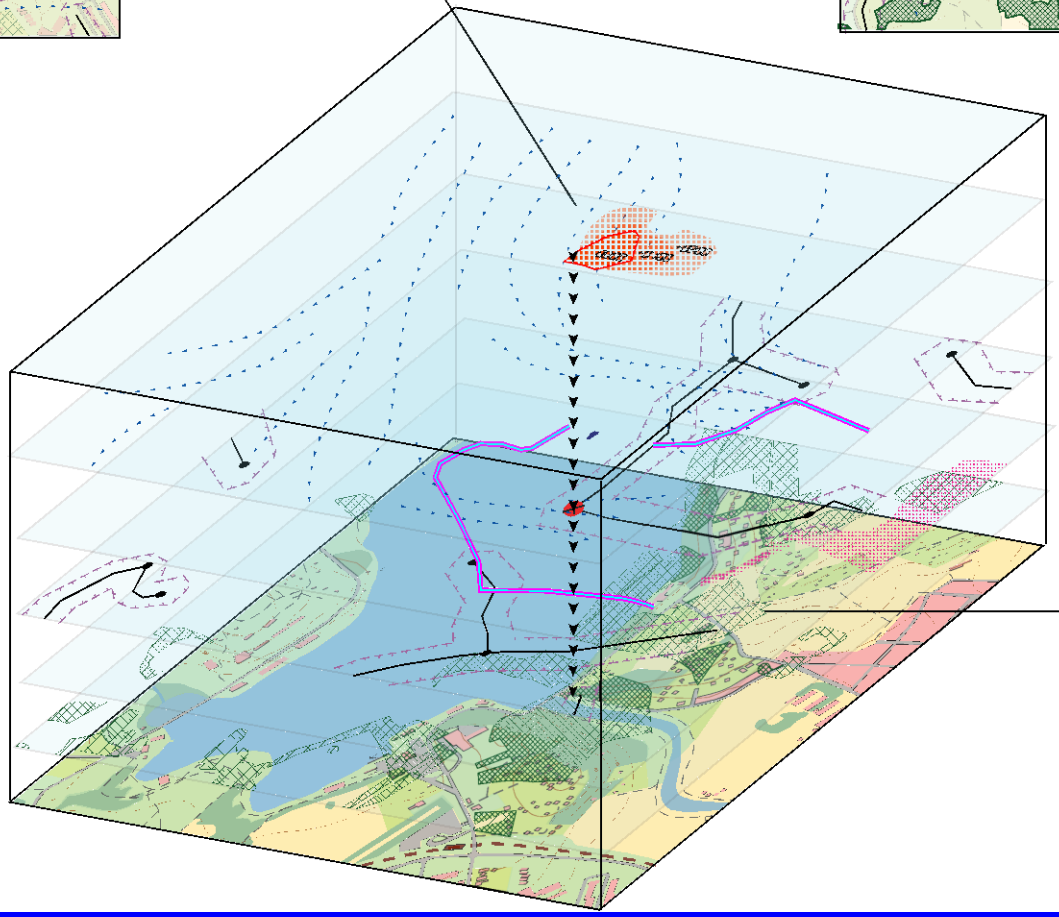


TOP INFORMATION

FORESTS

TO THE TOP

- forest
- medow
- garden
- field
- water
- building
- road
- path
- tram
- contour line
- port
- connected vegetation
- connected build-up area
- fire spread - time 0:00
- fire spread - time 1:00
- fire spread - time 2:00
- access path
- electric line
- safety zone
- wind direction
- event
- hydrant
- elektricity distribution point



Adaptivní soubor symbolů

Shora zmíněné parametry + nový faktor STRES.
Percepce je v situacích ohrožení různá.

OGC
specifikace

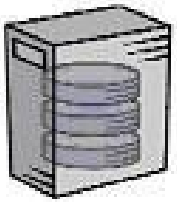
Letecké přístroje

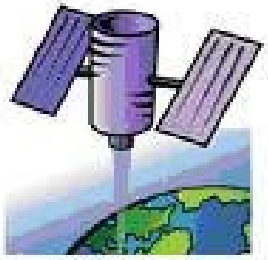
Monitorování průmyslových procesů

Monitorování životního prostředí

Monitorování dopravy

Datové záznamy senzorů



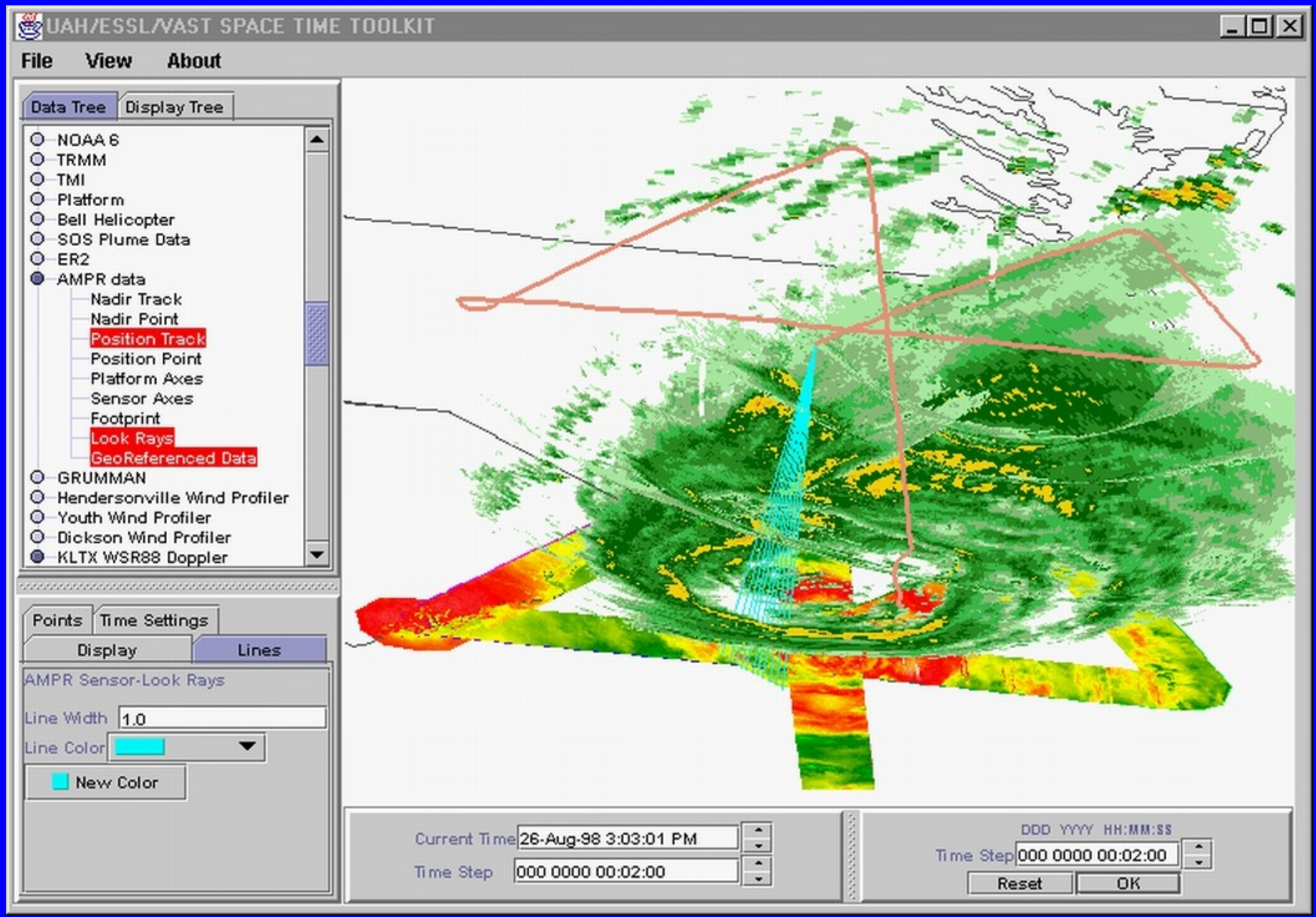


Satelitní přístroje

Měřicí čidlo

Webcam

Zdravotní stav


UAH/ESSL/VAST SPACE TIME TOOLKIT
File
View
About
Data Tree
Display Tree
NOAA 6
TRMM
TMI
Platform
Bell Helicopter
SOS Plume Data
ER2
AMPR data
Nadir Track
Nadir Point
Position Track
Position Point
Platform Axes
Sensor Axes
Footprint
Look Rays
GeoReferenced Data
GRUMMAN
Hendersonville Wind Profiler
Youth Wind Profiler
Dickson Wind Profiler
KLTX WSR88 Doppler
Points
Time Settings
Display
Lines
AMPR Sensor-Look Rays
Line Width
1.0
Line Color
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Current Time
26-Aug-98 3:03:01 PM
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DDD YYYY HH:MM:SS
Time Step
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Reset
OK

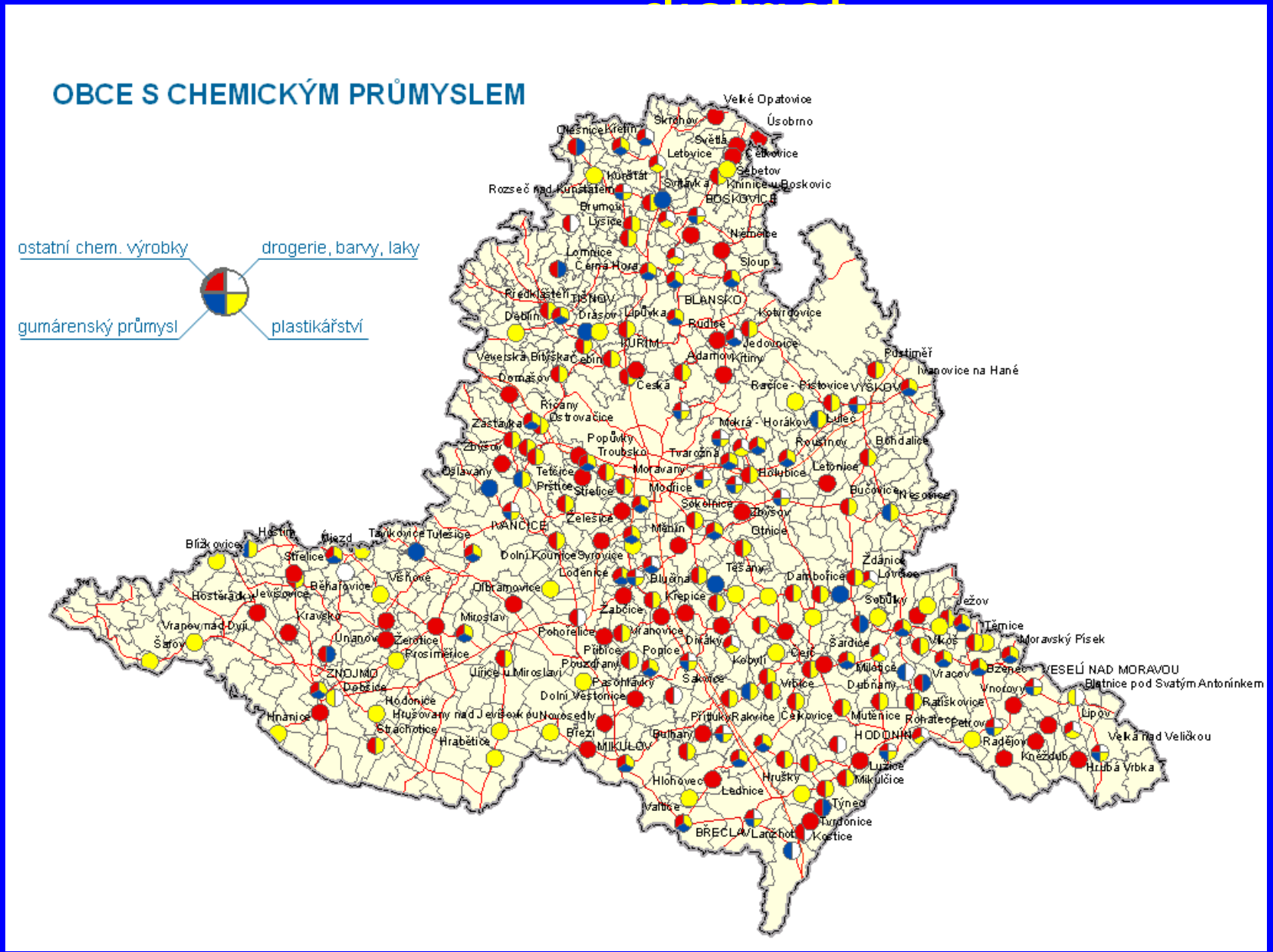
SCENARIO:

Adaptabile cartographic visualization of emergency substancies transport

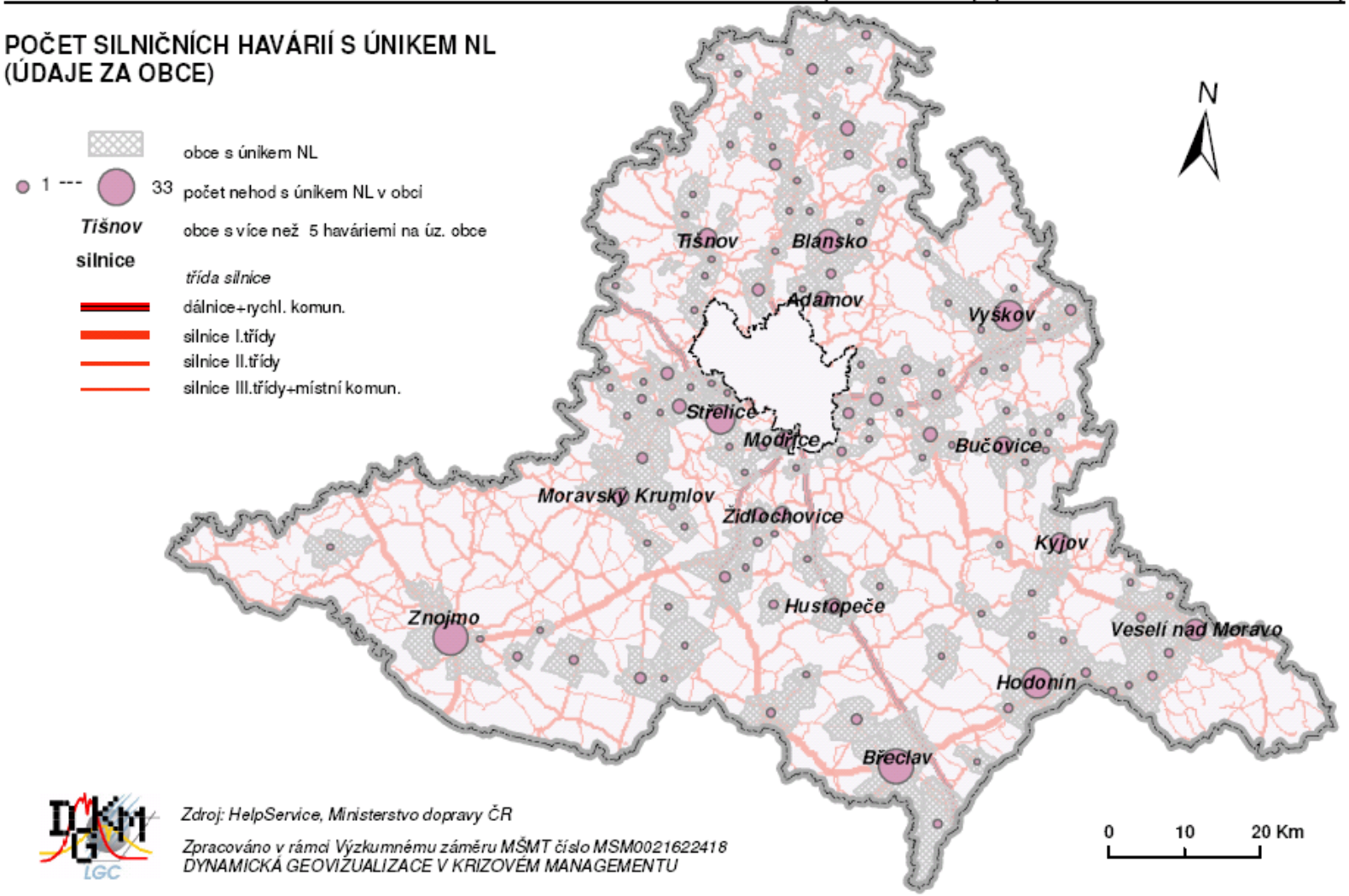
Scenario Objectives

Administration bodies need to **monitor movement** of vehicles transporting emergency substanties and **fast, competent intervention** in the case of crash or emergency of inhabitants, critical infrastructure, and environment initiated by transported emergency substitutes.

Chemical industry in Jihomoravský district



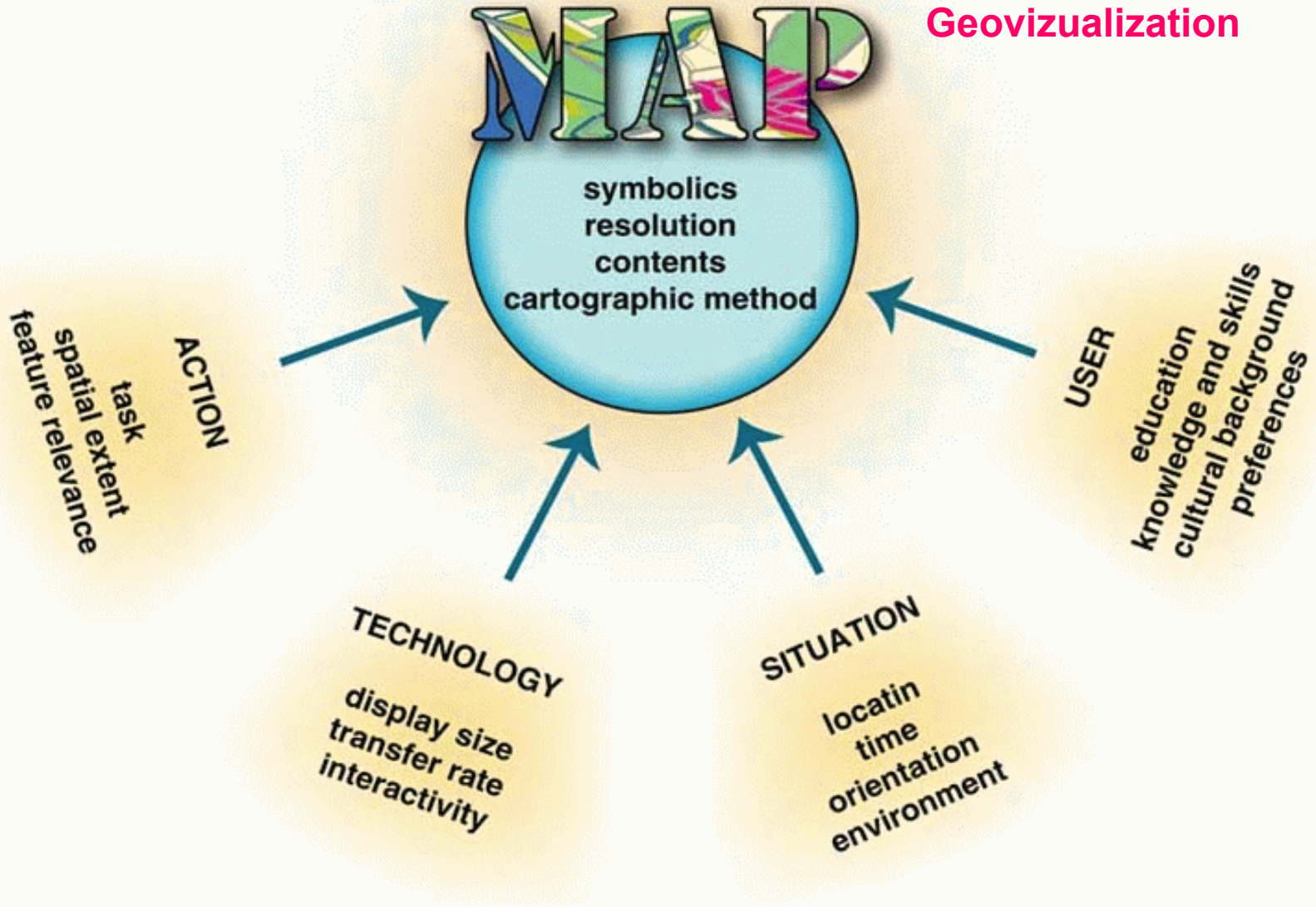
CRASHES at JmK



Targets of Pilot experiment

- Test of the functions of ICTs proposed as a components of GEOKRIMA system
- Test of various categories of GPS receivers
- Coordination with Department of crises management and defence of JmK and others departments of JmK úřadu (GIS,…)
- Test of performance team members and ability of coordination of project activities

Adaptabile Geovizualization



Proposal of Basic Functionality

1) Normal traffic

1a) Monitoring of the substantials movement (general view)

- Present location of vehicles
- Route identification
- Identification of cargo (symbol)
- Potencial risks of transported ES

Proposal of Basic Functionality - 2

1b)Information about surroundings of moving vehicle (possibly of all transport route)

- geographical characteristics of surroundings
- critical transport infrastructure
  - Infrastructure
    - Settlements and big concentration of people
    - Limitations (opening hours, trafic)
    - Social structure (schools, hospitals, petrol stations)
- Presence of others vehicles transporting emergency substanties.

Proposal of Basic Functionality - 3

2) In the case of vehicle crash – context visualization

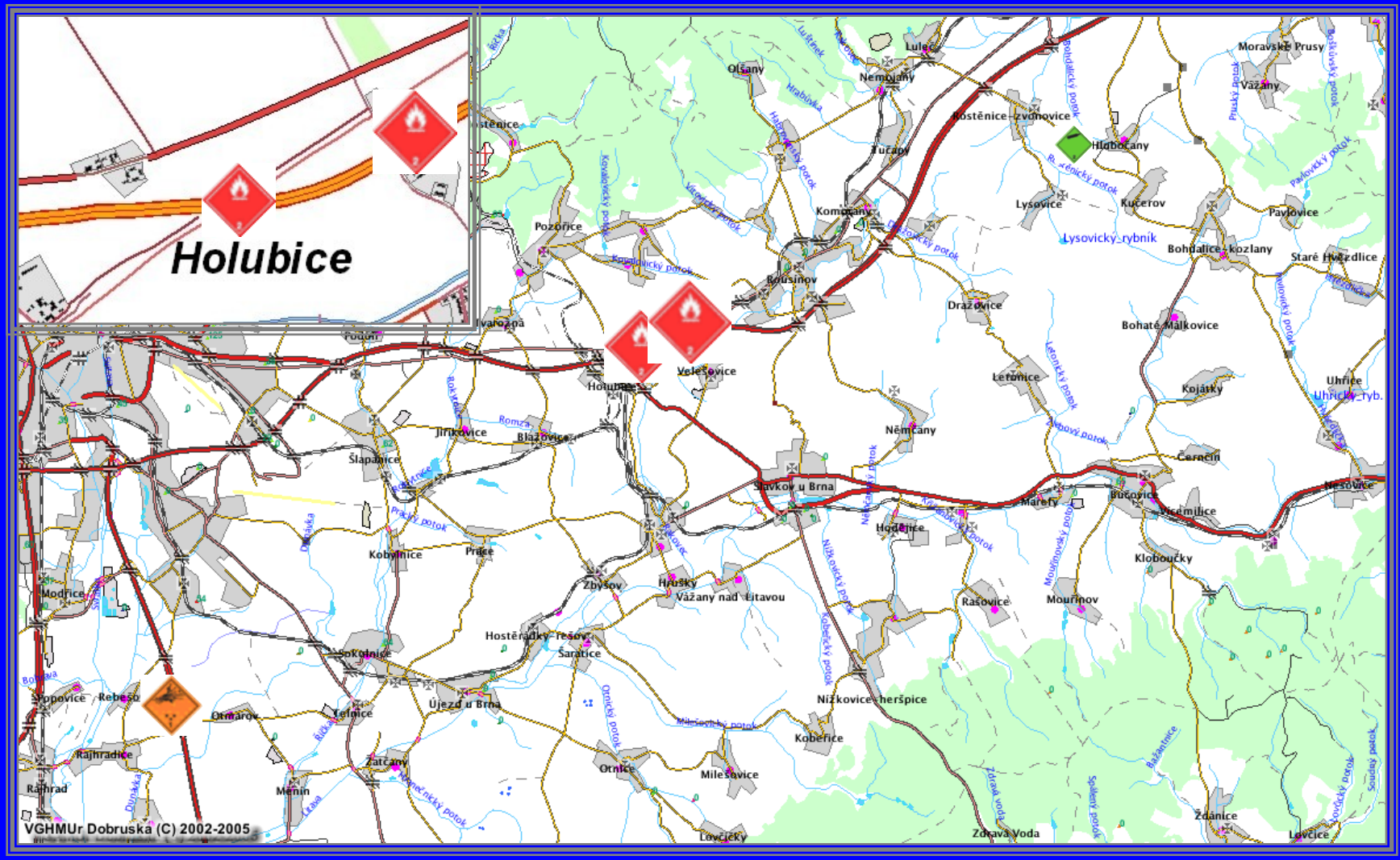
Starting point are prepared scenarios of solutions – interview with other participants

- Overview of the roles in the crash solutions
- Overview of cartographic groundworks of information necessary for managment of certain actions - scenarios, portrayal of the context according to needs of decion makers, users profiles.

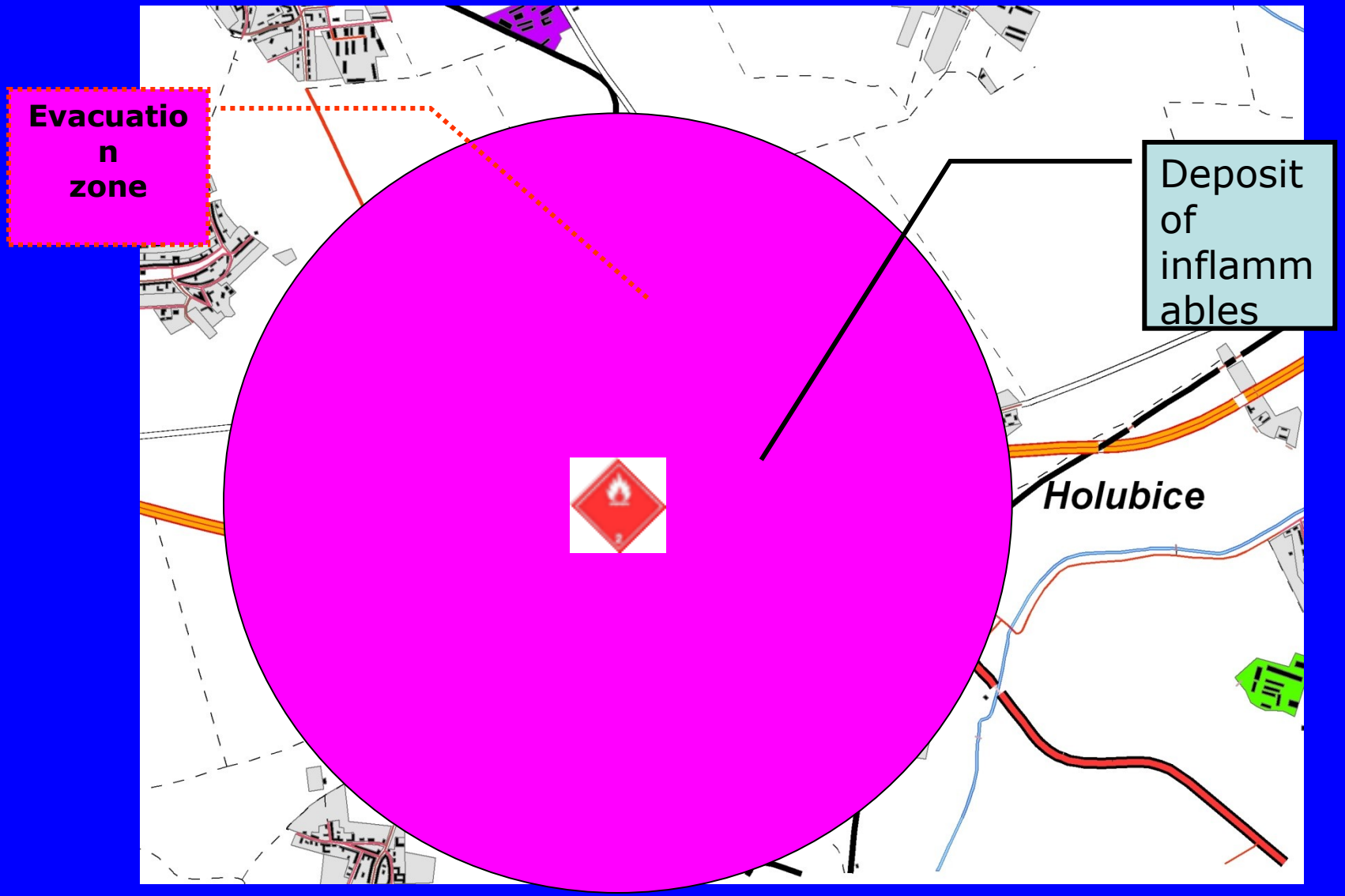
Basic Data

- **geodetical reference system – WGS84**
- **Cartographic projection – UTM**
- **topographic groundworks – DTM, RETM**
- **special levels - shp**
  - HSZ, PČR, ZZS acts areas
  - critical locations on the routes
  - ecological levels
  - chemical manufactures
  - other critical transport infrastructure

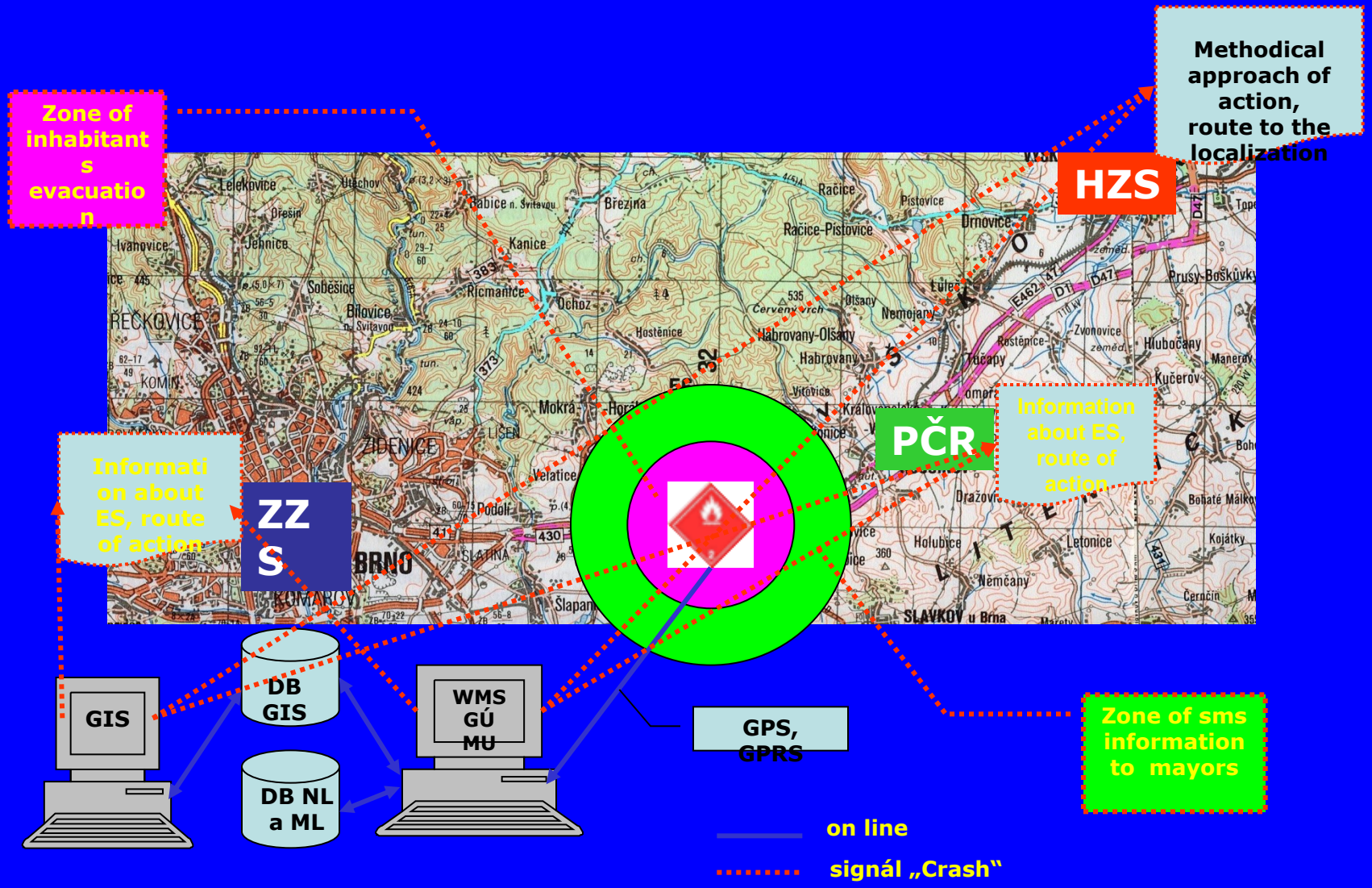
Standard situation – monitoring of vehicle with emergency substitute movement



„CRASH“

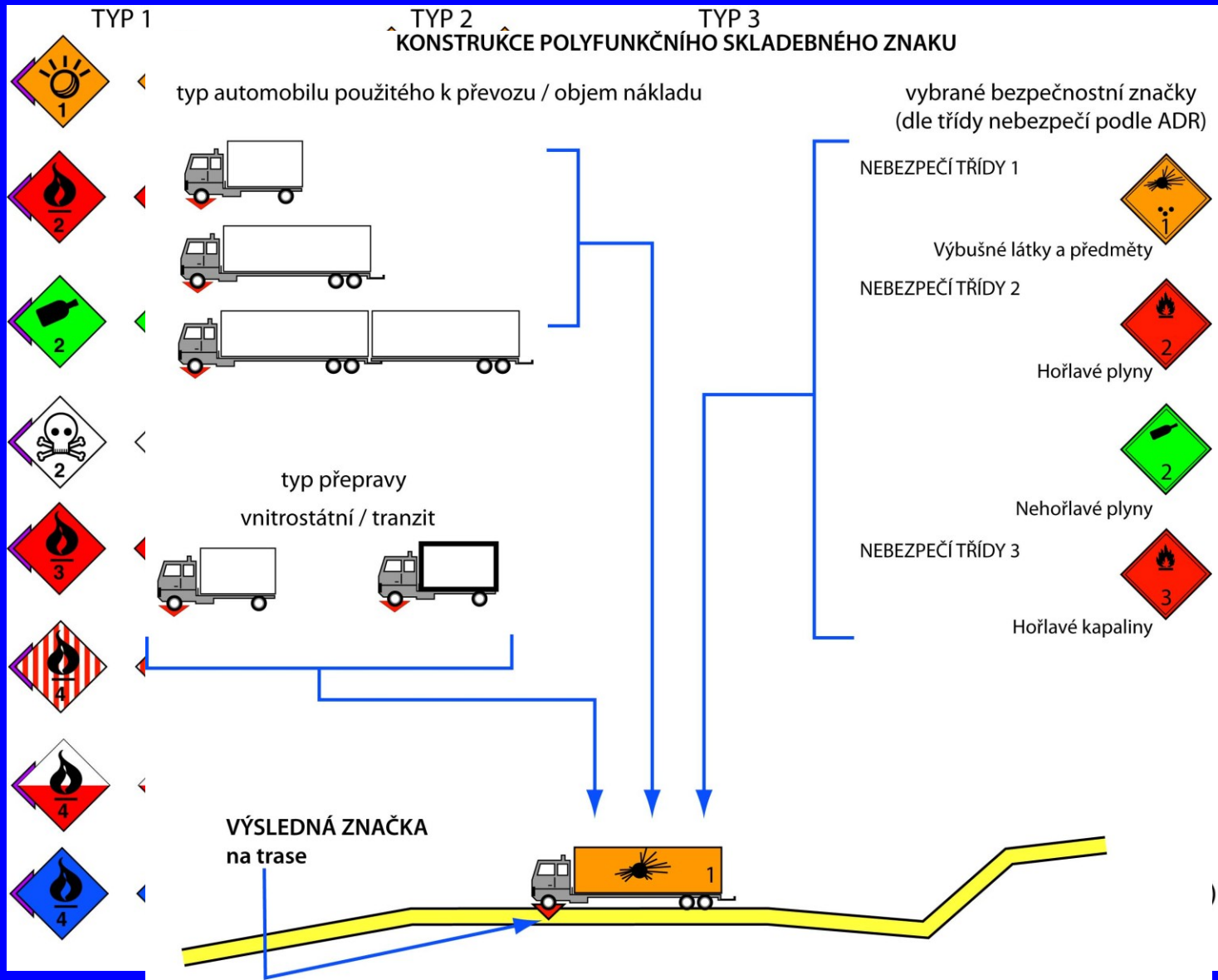


Used procedures



Visualization by symbols

- ADR symbols
- Original form, structure and colours Polyfunctional composed symbols



Context portrayal

Three map fields

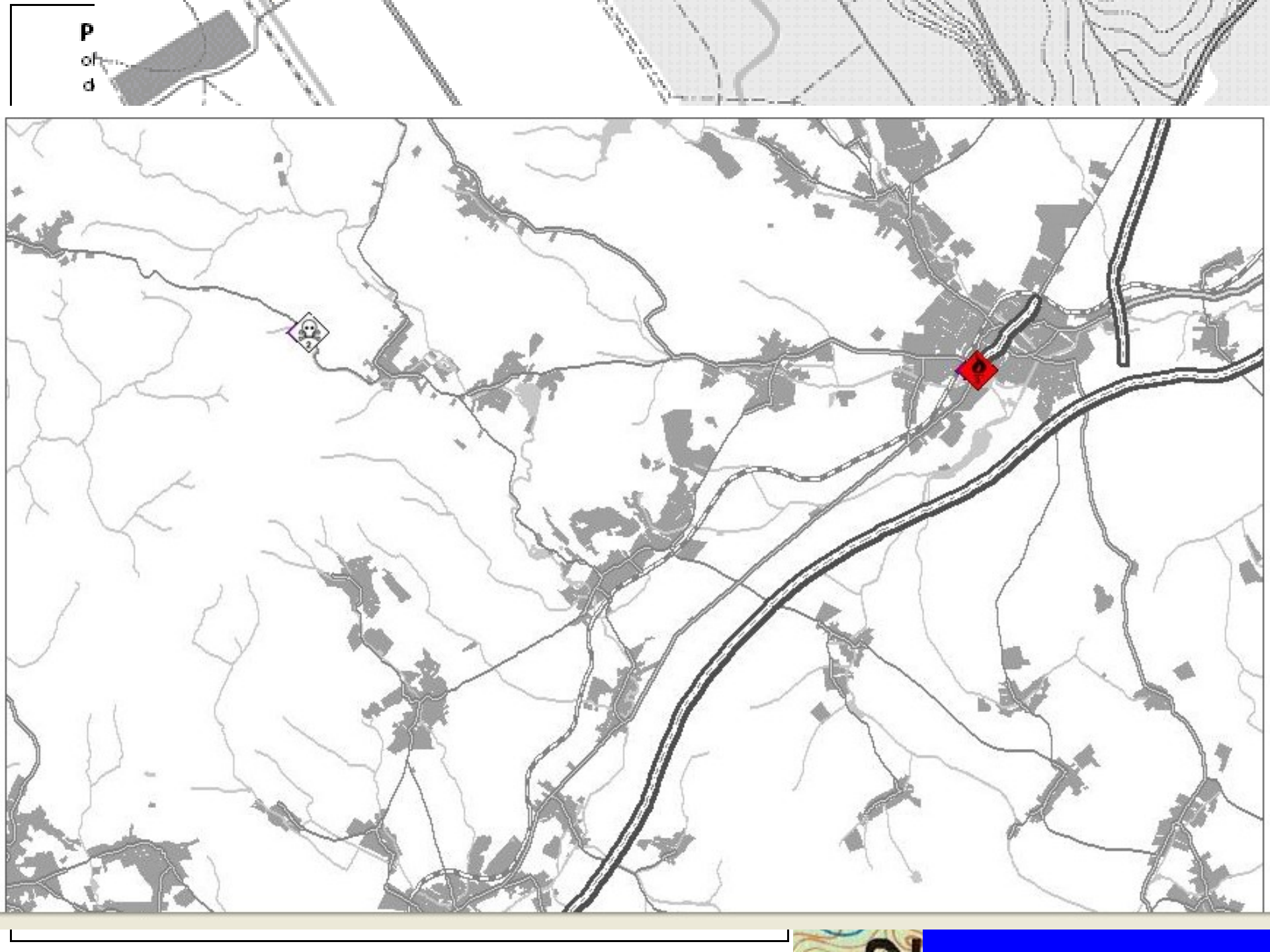
- **Basic overview – administration units and area of active map field**
- **Overview about vehicles – vehicle movements, risk measure**
- **Vehicle surroundings – vehicle and objects in danger**

A1 – Base Topo

Inicial context of map field,

Context divided into:

1. **Topographic content (obligatory and elective), which visualized as shadow fundament.**
2. **Thematics, including sensitive critical infrastructure, moving cargo (according to ADR) and measure of transport risks. Thematic elements in colour tones for better visual user perception.**



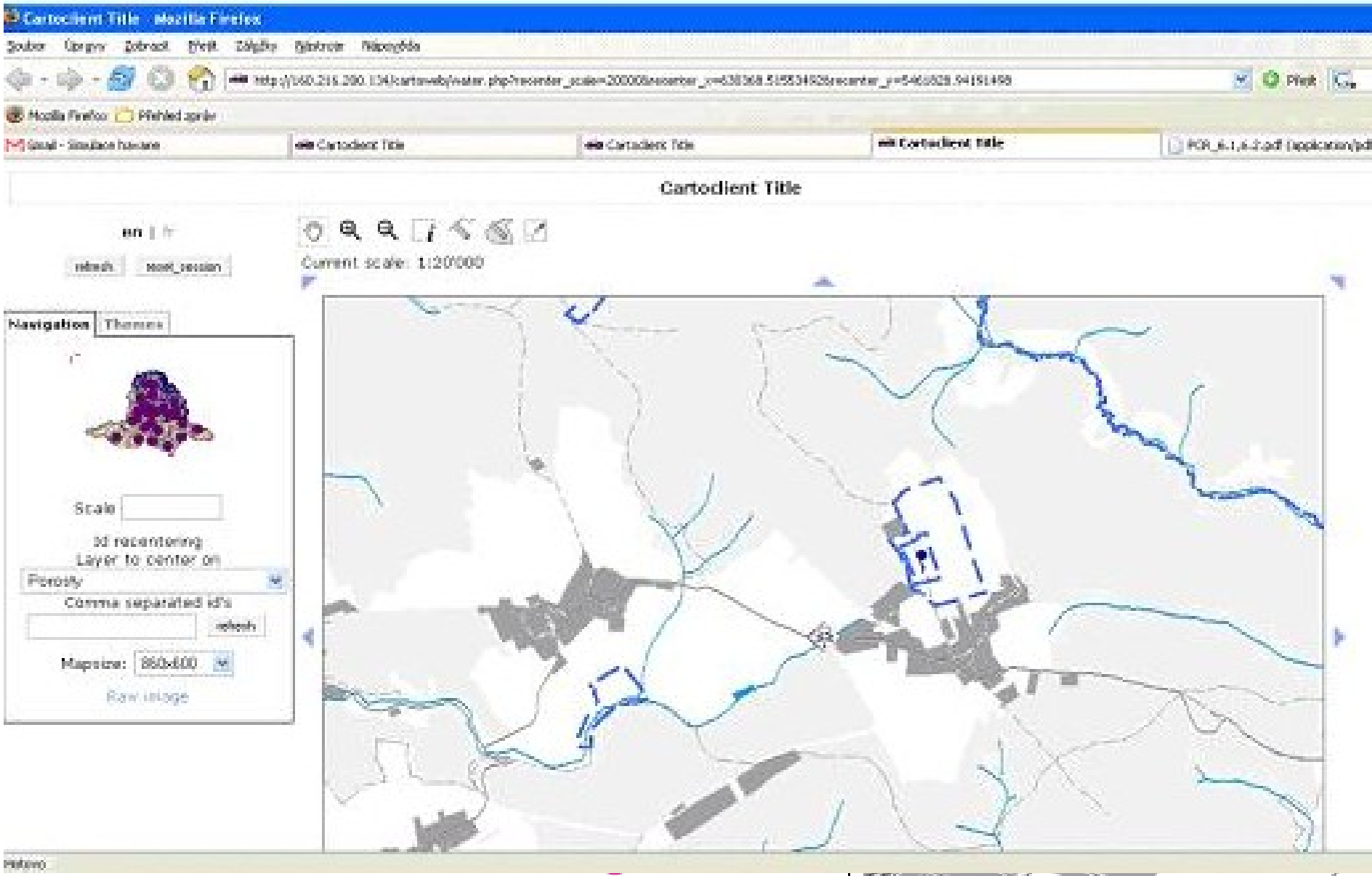
B Crash MONITORING

Includes obligatory and elective topographic content in shadow tones. Thematics is representd by location crashed vehicle by colour symbol according to ADR.

- **B1** Water **- risk of soak emergency substitute. Colour symbols aded by specifics thematics in relation to the risk factor.**
- **B2** Air – **risk of air polution**
- **B3** Fire **- risk of fire**
- **B4** Blast **- risk of explosion**

ZM25 - WATER

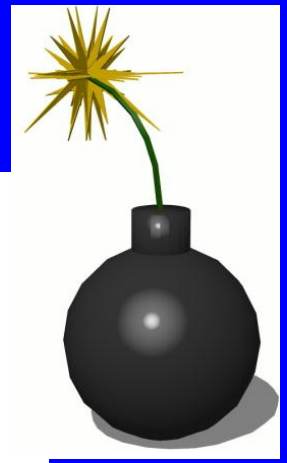
(1b = 0,353mm)



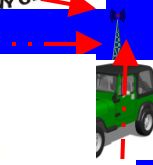
výplň: barva 245 / 130 / 190
obrys: barva 200 / 20 / 135, síla 3b

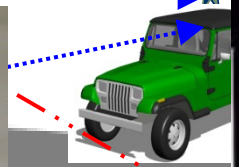
výplň: barva 245 / 130 / 190
obrys: barva 200 / 20 / 135, síla 3b

Příklady nasazení



Ilustrační foto – **mini AVAX**





miniAVAX

- Monitoring
- Scanning
- Aplication
- Retranslation

EMOFF SmartTerminal

MOBILE CARTOGRAPHY DEVICES

Rozšířená realita

Mapping opportunities

Nature, January 2004

Scientists who can combine geographic information systems with satellite data are in demand in a variety of disciplines.

Vr. 2004, the US Department of Labor identifikoval **geotechnologie jako jednu ze tří nejvíce důležitých a rozvíjejících se (nových) oblastí**, spolu s nanotechnologiemi a biotechnologiemi.

Požadavky na geoprostorové dovednosti rostou celosvětově, ale současně odráží specifiky regionů, historii mapování a politickou agendu.

The “Millennial Students” now moving into the Workplace

- Based on the research of Neil Howe and William Strauss.
- Newest books –***Millennials Rising – the Next Great Generation*** and ***Millennials Go to College: Strategies for a New Generation on Campus***
- *“The Millennials say they want to use technology. They want to use the web as a means to access information and one another.They want to work on solving problems that matter and they want to do this in collaborative teams.”*

Požadavky na budoucí geoprostorové služby?

Musí být…

- rychlé
- anonymní
- odbornostně věrohodné
- doručované právě včas "Just-in-Time"
- snadné pro jejich sdílení s přáteli a kolegy.

Cartography for everyone and for you

XXIII International Cartographic Conference

4-10 August Moscow 2007, Russia

KIITOS

Xie, Xie

THANK YOU
VERY
MUCH !!!!!
Kammsa Hamida
SHUKRAN
Aligator
SPASIBO
DĚKUJI (in Czech)