

Meeting of „Help Desk Support Base“ Partners in Geneve in October 4/5

Preliminary risk assessment desktop based tool





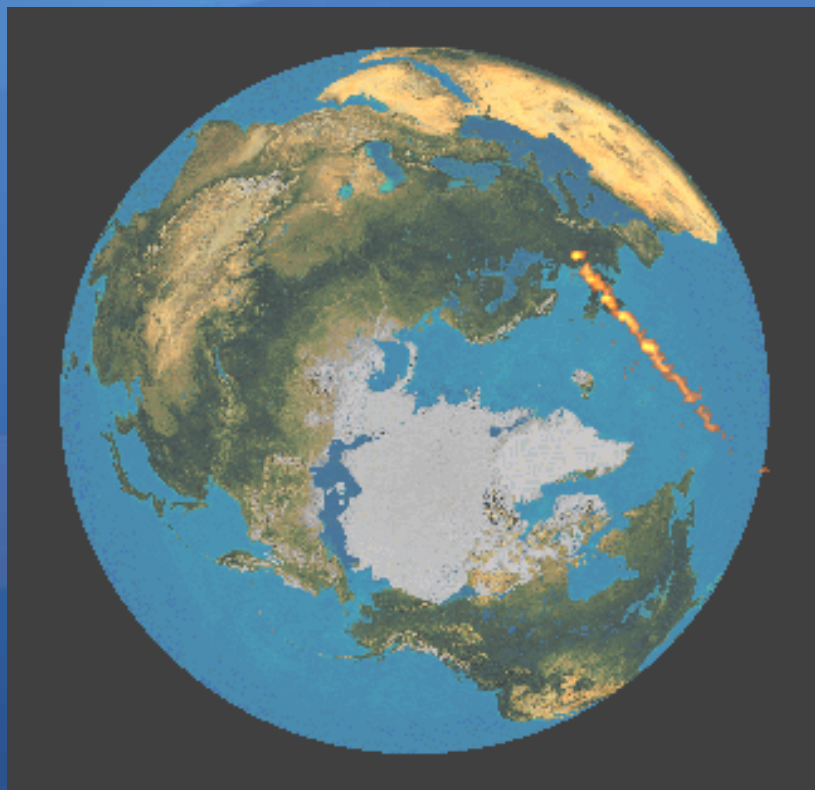
DHI

- **Research based (100 man years own R&D)**
- **800 staff (605 MSc/PhD, 80 tech., 115 support)**
- **Turnover 75 mio. € (75% international)**
- **R&D core funding from Ministry of Science (6%)**
- **Offices in 25 countries (60 pct of staff)**
- **Representation in further 40 countries**
- **Private, no owners, not-for-profit**

Knowledge about Water, Environment & Health



Value and Welfare



- Water in River Basins
- Water in Cities and Industry
- Water in Marine Areas
- Health, Environment and Climate

GLOBAL VISION AND POSITION

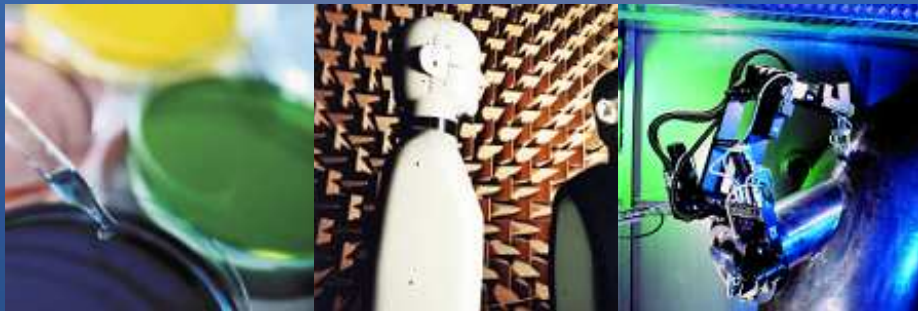
- **Key expertise in Hydroinformatics**
- **Preferred adviser in Flood Risk Management**



GTS – Advanced Technology Group



- The GTS institutes are the core of the Danish technological infrastructure
- GTS is one of Denmark's largest consulting networks.
- Every year we assist approx. 20,000 private businesses and public authorities
- We serve customers in approx. 100 countries



Key figures 2005-2009

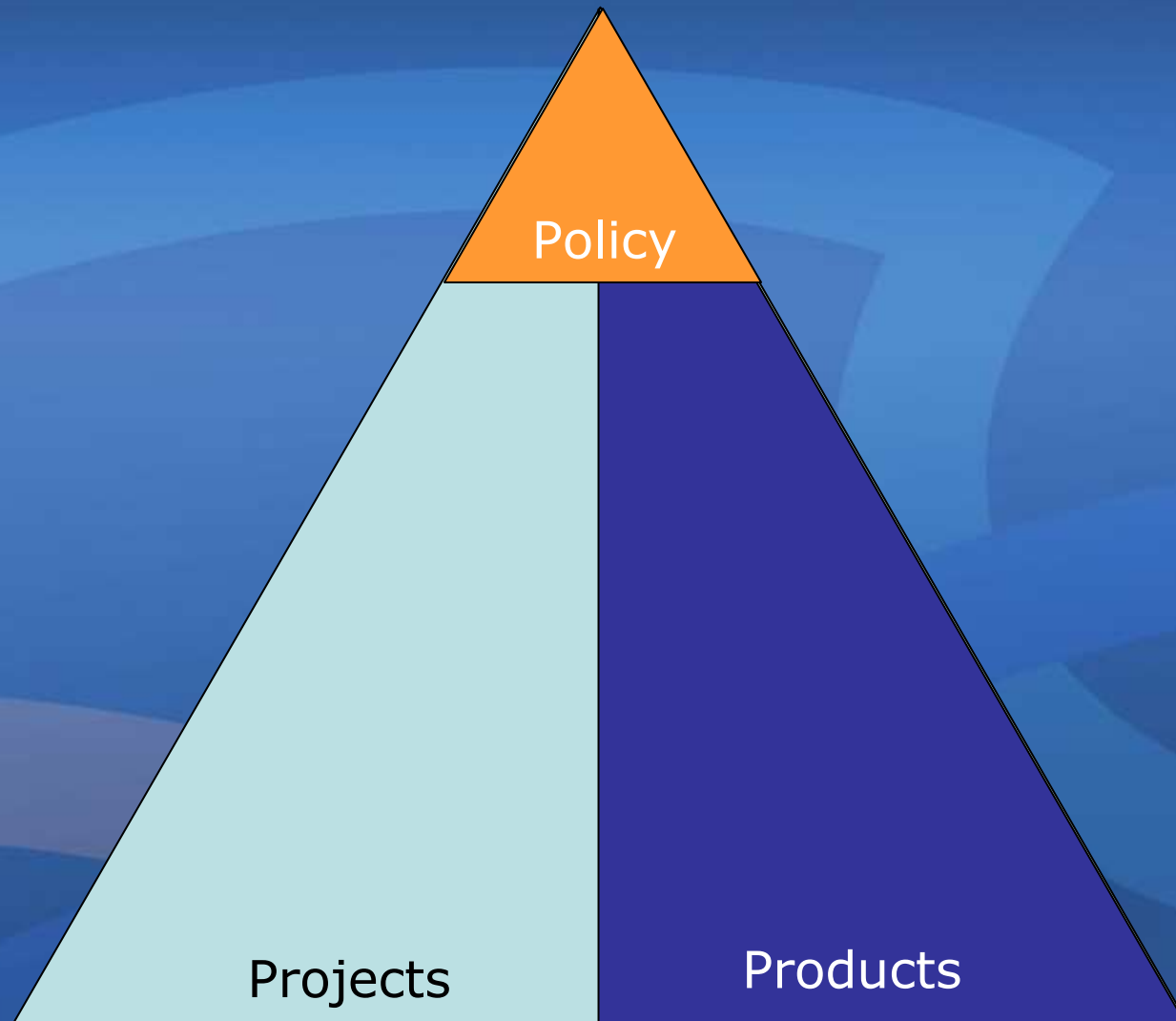
Total turnover: 307 million euro

Human resources: 3.000 employees

R&D activities: 33.6 million euro

Special facilities: 161.3 million euro

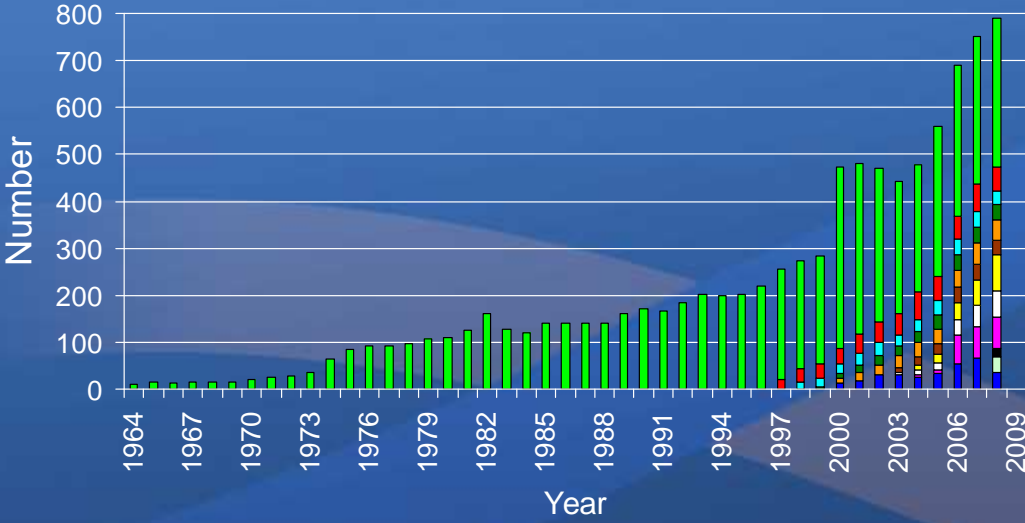
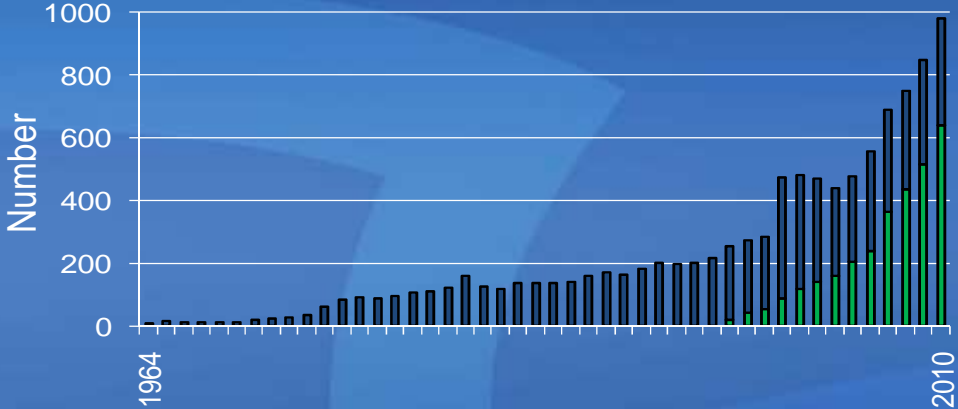
MAIN AREAS



DHI OFFICES



NUMBER OF EMPLOYEES – 1964 - 2010



- Other subs
- DHI IND
- DHI FRA
- DHI DEU
- DHI CHN
- DHI SGP
- DHI AUS/NZ
- DHI MYS
- DHI US/CAN
- DHI SWE
- DHI CZE
- DHI DNK

TECHNOLOGY DIFFERENTIATORS

- **Monitoring**
- **Laboratories**
- **Hydroinformatics**

DHI



WATER • ENVIRONMENT • HEALTH

Preliminary Flood Risk Assessment

Flood Hazard Mapping

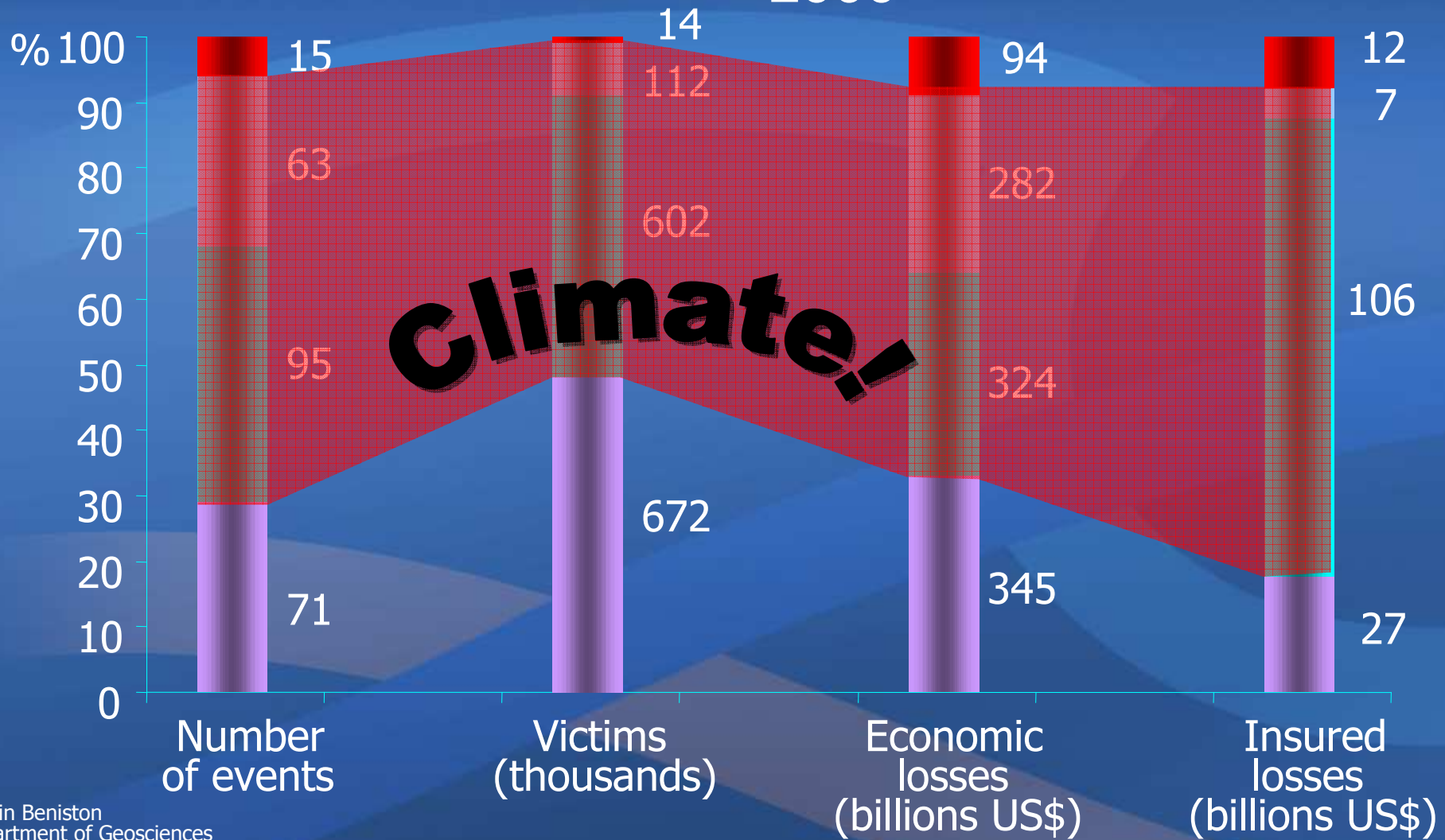
Flood Risk Mapping

Flood Risk

Management/Disaster Risk
Management



MunichRe billion-dollar hazards, 1961-2000



Martin Beniston
Department of Geosciences

University of Fribourg,
Switzerland

Preliminary assessment

Member States must carry out a **preliminary assessment of risks** for each river basin district or part of a district located in their territory.

Gathering information on the boundaries of river basins in the district concerned, floods that have occurred in the past, the likelihood of future floods and the estimated consequences.

EU Member States must **categorise river basins** according to whether or not they have a significant potential flood risk.

This assessment and the resulting categories assigned to river basins must be published and must be reviewed **every six years**.

Flood Directive 2007/60/EC



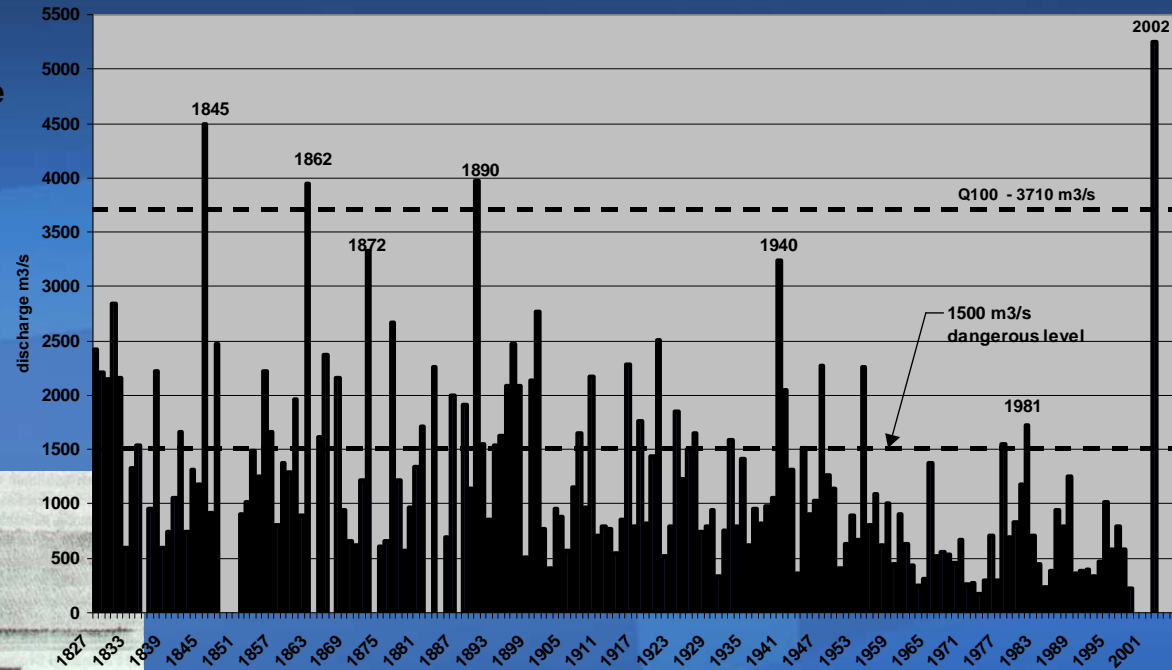
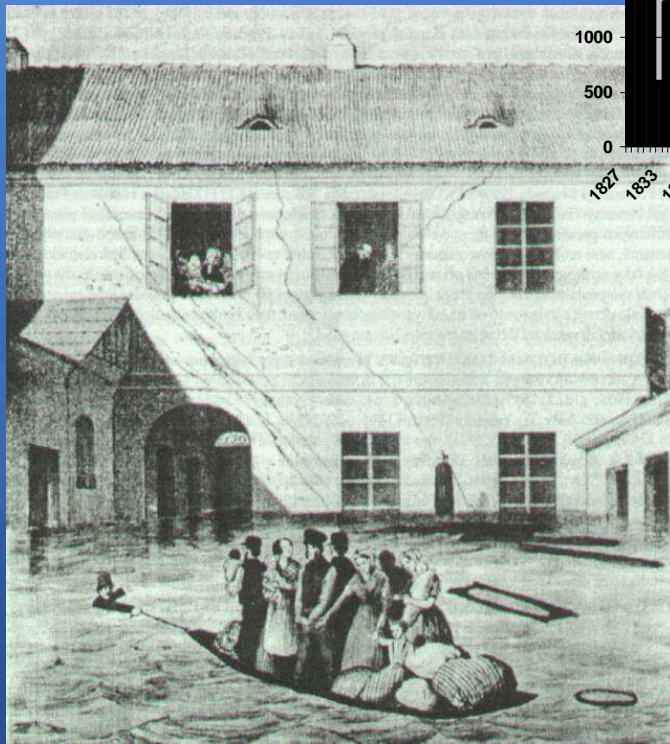
Preliminary flood risk assessment :

- (a) a **map of the river basin district** including the borders of the river basins, subbasins and where appropriate associated coastal zones, showing topography and land use;
- (b) a **description of the floods which have occurred in the past;**
- (c) a **description of flooding processes and their sensitivity to change**, including the role of flood plain areas as a natural retention/buffer of floods and flood conveyance routes now or in the future;
- (d) a **description of development plans** that would entail a change of land use or of allocation of the population and distribution of economic activities resulting in an increase of flood risks in the area itself or in upstream or downstream regions;
- (e) an **assessment of the likelihood of future floods** based on hydrological data, types of floods and the projected impact of climate change and land use trends;
- (f) a **forecast of the estimated consequences** of future floods to human health, the environment and economic activity taking into account long-term developments including climate change.

The floods were, are and will be

Floods on the Vltava river in Prague

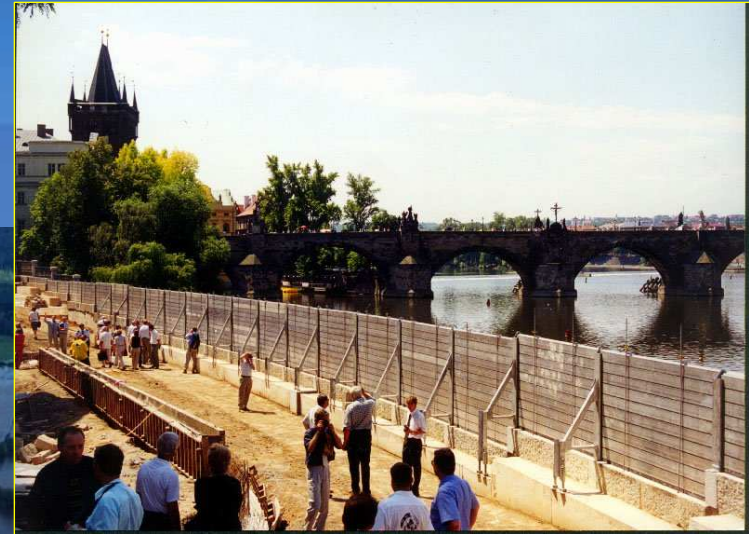
Prague – Karlín, 1845



Prague – Karlín, 2002



**We cannot stop them,
we have to live with them**



Therefore we need a lot of information to prevent maximum damages and losses



DHI – a member of SBP



Expertise offered :

- Climate change impact
- Flood Hazard mapping project expertise
- Flood Risk Mapping project expertise
- Disaster Risk Management
- Preliminary Flood Risk Mapping
- Training trainers –Hydroinformatics centers in Universities

Preliminary Flood Risk Mapping

The assessment of consequences of stream/open channels floods is based on FD 2007/60EC

1. Flood prone areas
 - Flood history map.
 - Generating flood plain area (GIS tool/Flood Tool Box).
2. Flood situation and sensitivity of land use.
3. Economical consequences
4. Human being in risk
5. Environmental risk in case of flooding
6. Cultural heritage

Fluvial – Input data



- **Land use** (industrial, residential, commercial, agriculture, recreation, cultural heritage, unclassified)
- **DTM**
- **River basin**
- **Depth of flooding**
 - Given or Generating floodplain based on historical data (height water marks, flood extent) using what if scenario mapping for different heights
 - Precise floodplain delineation is the job for DHI tools

Scoring for PFRM



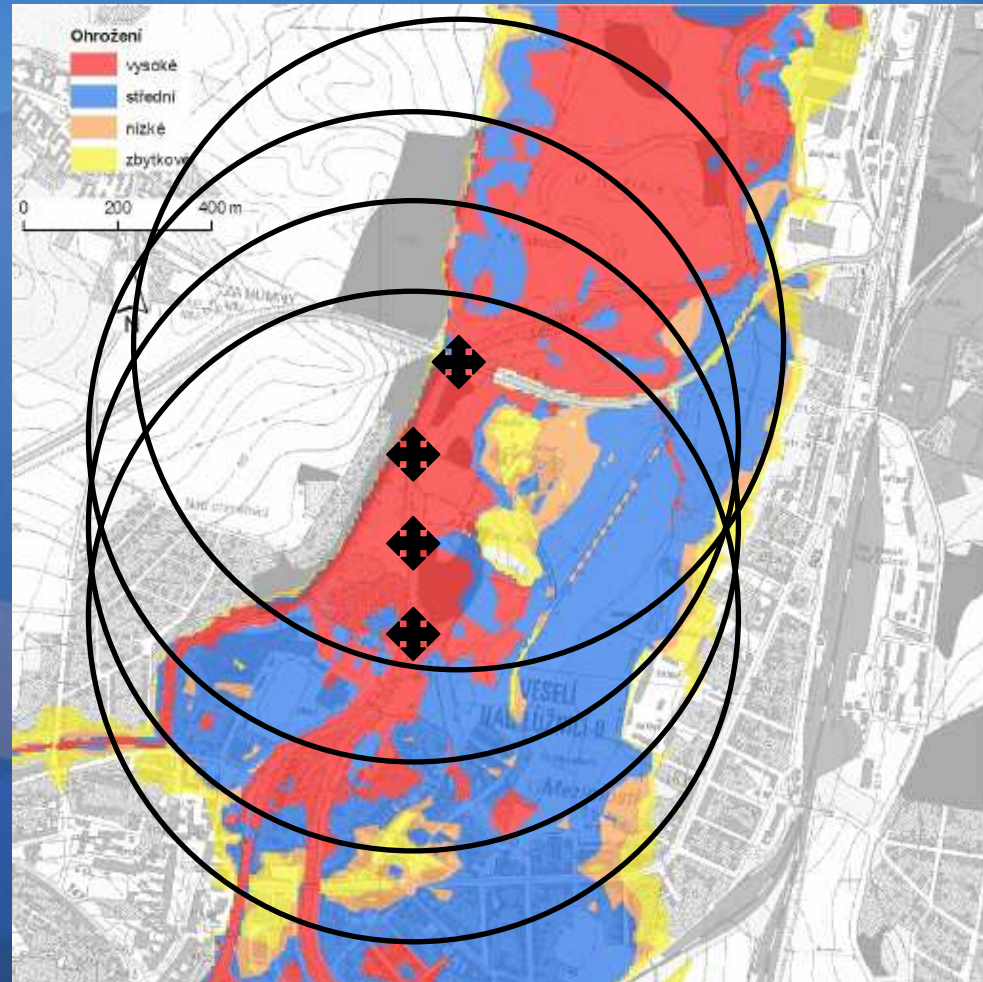
- Scoring: the scoring is based on two parameters depth of flood and Land use
- The relation of economical consequence to depth is not linear, close to step function (user can change the matrix) based on client requirements, rating [0-3]

Depth	<0.2m Low flooding (High probability)	>0.2m - <3m Moderate flooding	>3m Severe flooding
Industrial	0	2	2
Residential	0	1	2
Commercial	0	2	2
Agriculture	0	1	1
Local hazard source	3	3	3
Unclassified	0	0	0

Scoring for PFRM



Calculating the total score within a circular area that moving along the river.



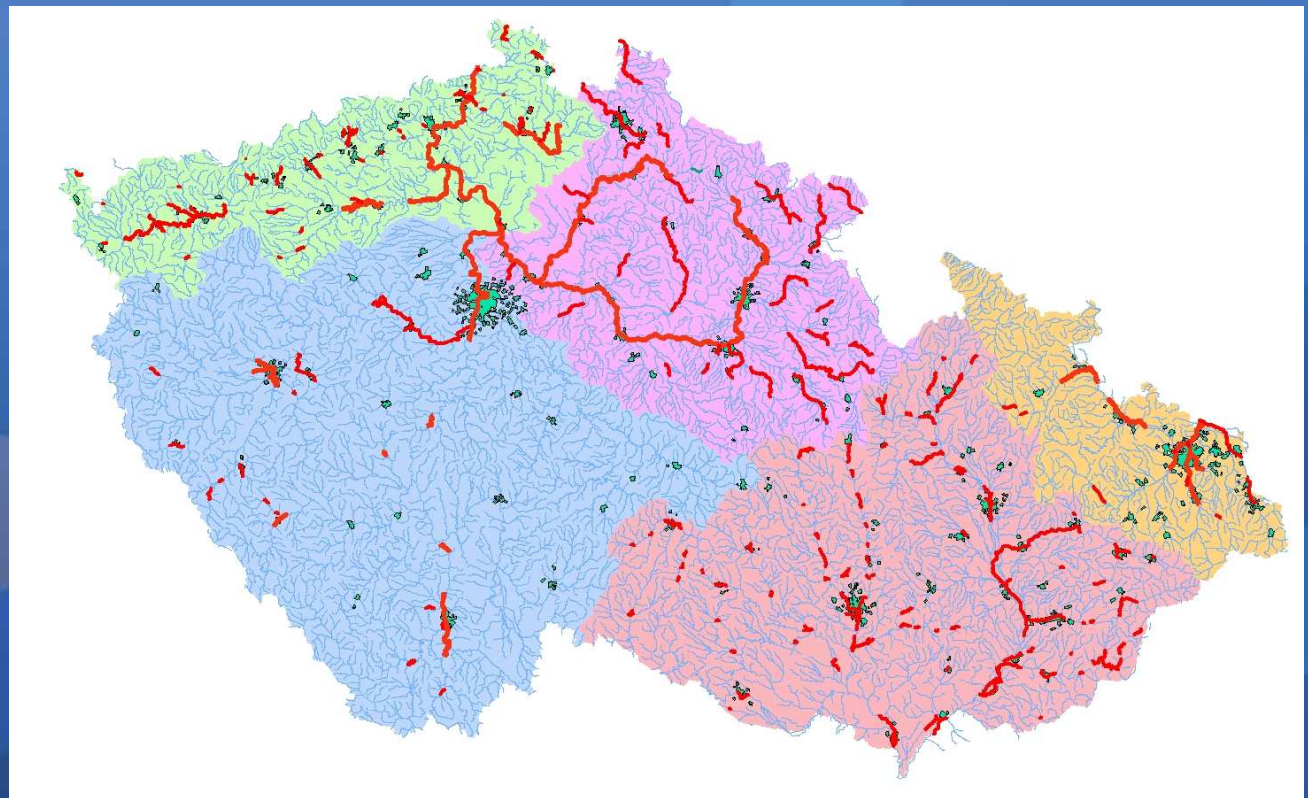
Scoring for PFRM



After normalizing the river scoring to [0-1]

Score	>0.0-0.25>	>0.25-0.50>	>0.50-0.75>	>0.75-1.0>
Overall Preliminary Risk Rating	Not significant	Low	Moderate	Server

result will be similar to:



– Technology

- The Preliminary Risk Assessment Tool will be developed as ArcMap extension
- User needs ESRI ARcGIS with ArcToolbox (Spatial Analyst tools)
- Similar approach as used in Flood Toolbox simplifies integration between tools if decided

– Business Model

- Using within DHI projects and DHI Tool box for Floods
- Might be offered to WMO supported „client“ networks via Web based application.

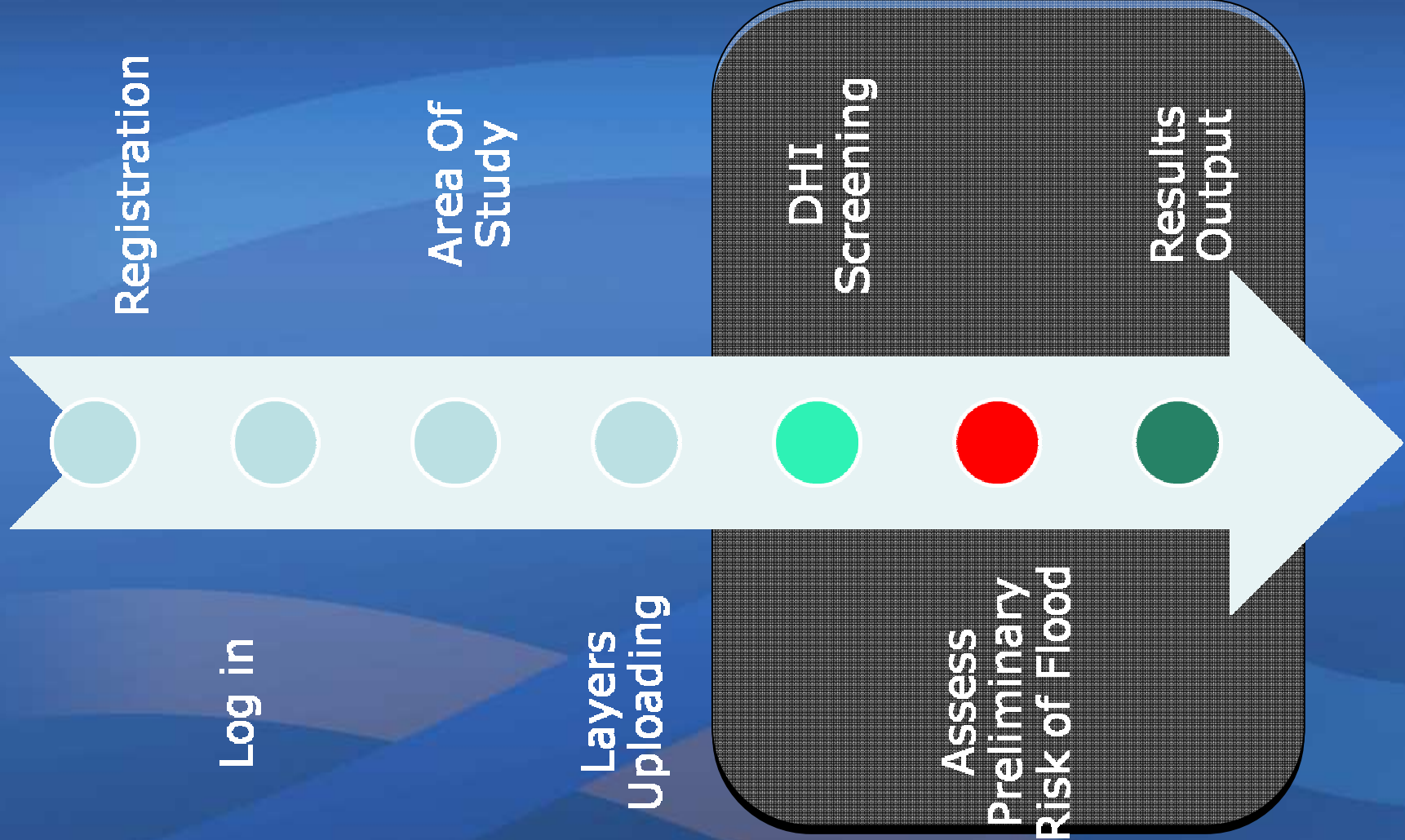
Preliminary Flood Risk Assessment

Data Collection Tool

- data upload channel
- communication platform (status, check list, time frame)
- result viewer



Preliminary Flood Risk Assessment



Registration



- Registration form referenced to the WMO program
- Client get access after WMO&DHI agreement

http://localhost:1696/ClientRegistration.aspx - Windows Internet Explorer

http://localhost:1696/ClientRegistration.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientRegistration.aspx

Flood Risk Assessment - Data Collection Tool

Registration

Organization Name:

WMO Program:

Program ID:

Address

Street:

City: State/Province:

Postal Code: Country:

Phone:

Fax:

E-mail:

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IČO : 64948200 · DIČ : CZ64948200

Firma je zapsána v obchodním rejstříku vedeném Městským soudem v Praze, oddíl B, vložka 3604

Log In



http://localhost:1696/CLientRegistration.aspx - Windows Internet Explorer

http://localhost:1696/CLientRegistration.aspx

File Edit View Favorites Tools Help

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Flood Risk Assessment - Data Collection Tool

Log In

Enter your user name and password.

Username:

Password:

[Lost Password?](#)

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Area of Study



Every study area will be uploaded separately
Client can attached PDF/DOC

http://localhost:1696/ClientRegistration.aspx - Windows Internet Explorer

http://localhost:1696/ClientRegistration.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientRegistration.aspx

Flood Risk Assessment - Data Collection Tool

Title	Study Area (area, main towns, population ..)
Description	<input type="text"/>
Attached File	<input type="text"/>
<input type="button" value="Upload"/>	

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Uploading



- Client select input data type
- The data form appears after uploading
- Successfully uploaded file is added to the list

http://localhost:1696/ClientUploadPage.aspx - Windows Internet Explorer

http://localhost:1696/ClientUploadPage.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientUploadPage.aspx

Select input data type

- Flood zones maps
- Flood zones maps
- Geology and Topography maps
- Historical Flooding maps
- Land use maps
- Main River and Hydrology Deetail
- Scoring table
- DTM
- Flood defenses
- River network
- Cross section details
- Time series

Flood Risk Assessment - Data Collection Tool

Title	<input type="text"/>
Description	<input type="text"/>
Input	<input type="text"/>
<input type="button" value="Upload"/>	

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Flood Hazards/Zones maps



Flood Hazards/Maps/Zones (at least three layers for Low, Medium, High Probability Flood)

http://localhost:1696/ClientUploadPlage.aspx - Windows Internet Explorer

http://localhost:1696/ClientUploadPlage.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientUploadPlage.aspx

Select input data type
Flood zones maps

Flood Risk Assessment - Data Collection Tool

List of uploaded data
Flood Flood Zones maps

Title	Flood Zones [Low, Medium, High] Probability
Description	
Attached Layer	
<input type="button" value="Upload"/>	

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Geology and Topography Maps



Geology and Topography (elevations, slopes, rocks)

http://localhost:1696/ClientUploadPage.aspx - Windows Internet Explorer

http://localhost:1696/ClientUploadPage.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientUploadPage.aspx

Select input data type
Geology and Topography map:

Flood Risk Assessment - Data Collection Tool

List of uploaded data
Flood Flood Zones maps
Geology and Topography maps

Title	Geology and Topography (soil types, permeability, elevations, slopes, rocks, geological periods ...)
Description	<input type="text"/>
Attached File	<input type="text"/>
<input type="button" value="Upload"/>	

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Historical Flooding maps



Historical Flooding(flood events, historical flood outlines, ...)

http://localhost:1696/ClientUploadPage.aspx - Windows Internet Explorer

http://localhost:1696/ClientUploadPage.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientUploadPage.aspx

Select input data type

Historical Flooding maps

List of uploaded data

- Flood Flood Zones maps
- Geology and Topography maps
- Historical Flooding maps

Flood Risk Assessment - Data Collection Tool

Title	Historical Flooding (flood events, historical flood outlines)
Description	
Attached Layer	
<input type="button" value="Upload"/>	

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Land use maps



Land use maps

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http://localhost:1696/ClientUploadPage.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientUploadPage.aspx

Select input data type

Land use maps

Flood Risk Assessment - Data Collection Tool

List of uploaded data

- Flood Flood Zones maps
- Geology and Topography maps
- Historical Flooding maps
- Land use maps

Title	<input type="text"/>
Description	<input type="text"/>
Input	<input type="text"/>
<input type="button" value="Upload"/>	

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Main River and Hydrology Details



Information about main river, canals, floodplain, tributaries, Catchments area

http://localhost:1696/ClientUploadPage.aspx - Windows Internet Explorer

http://localhost:1696/ClientUploadPage.aspx

File Edit View Favorites Tools Help

http://localhost:1696/ClientUploadPage.aspx

Select input data type
Main River and Hydrology Details

Flood Risk Assessment - Data Collection Tool

List of uploaded data
Flood Flood Zones maps
Geology and Topography maps
Historical Flooding maps
Land use maps
Main River and Hydrology Details

Title	Main Rivers and Hydrology (main river, canals, floodplain, tributaries, catchment area ...)
Description	<input type="text"/>
Attached File	<input type="text"/>
<input type="button" value="Upload"/>	

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Scoring table



Client needs to fill scoring table for each land use class

http://localhost:1696/ClientUploadPlage.aspx - Windows Internet Explorer

http://localhost:1696/ClientUploadPlage.aspx

File Edit View Favorites Tools Help

★ Favorites http://localhost:1696/ClientUploadPlage.aspx

Select input data type
Scoring table

Flood Risk Assessment - Data Collection Tool

List of uploaded data
Flood Flood Zones maps
Geology and Topography maps
Historical Flooding maps
Land use maps
Main River and Hydrology Deatails
Scoring table

Title	Import Scoring Table																						
Description																							
	<table border="1"><thead><tr><th>Depth</th><th>Low flooding</th><th>Moderate flooding</th><th>Severe flooding</th></tr></thead><tbody><tr><td>Industrial</td><td>0</td><td>2</td><td>2</td></tr><tr><td>Residential</td><td>0</td><td>1</td><td>2</td></tr><tr><td>Commercial</td><td>0</td><td>2</td><td>2</td></tr><tr><td>Localhazardsource</td><td>3</td><td>3</td><td>3</td></tr></tbody></table>	Depth	Low flooding	Moderate flooding	Severe flooding	Industrial	0	2	2	Residential	0	1	2	Commercial	0	2	2	Localhazardsource	3	3	3		
Depth	Low flooding	Moderate flooding	Severe flooding																				
Industrial	0	2	2																				
Residential	0	1	2																				
Commercial	0	2	2																				
Localhazardsource	3	3	3																				

Upload

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Available Data Collection Forms



- Land use (industrial, residential, commercial, agriculture, recreation, cultural heritage, unclassified)
- DTM
- Flood Zones maps
- Geology and Topography maps
- Historical Flooding
- Main River and Hydrology Details
- Scoring table
- Flood depth maps
- Flood defenses
- River network
- Cross section details
- Time Series

DHI as a partner of SBP



- ❑ Offers expertise in Flood Risk Mapping and Disaster Risk Management via agreed experts, (such as the seminar in Istanbul 2010) within the limits agreed,**
- ❑ Concept for Web based application focused on Preliminary Flood Risk Assessment – the details must be discussed,**
- ❑ Experts within the agreed frame for new guidance as members of teams (such as Climate change impact, Flash Floods etc.) it has to be agreed individually,**
- ❑ Available materials and papers,**
- ❑ Train trainers – Hydroinformatic centers in Universities focused on IFM segment**

Thank you for your kind
attention

Evžen Zeman, Dr.
DHI

