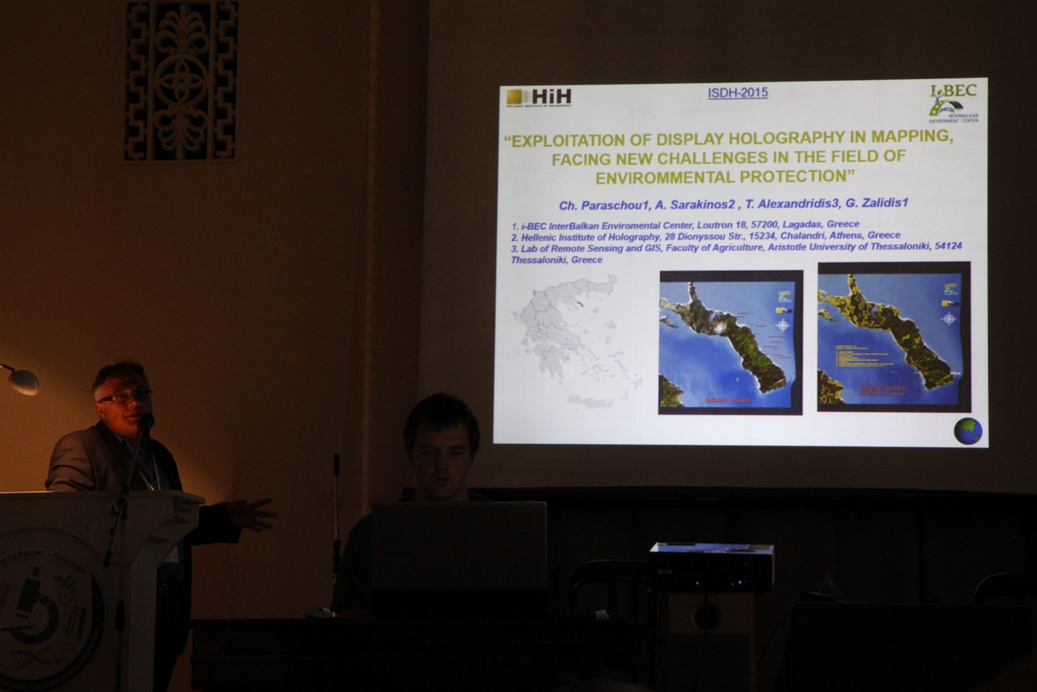
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"EXPLOITATION OF DISPLAY HOLOGRAPHY IN MAPPING, FACING NEW CHALLENGES IN THE FIELD OF ENVIROMMENTAL PROTECTION"
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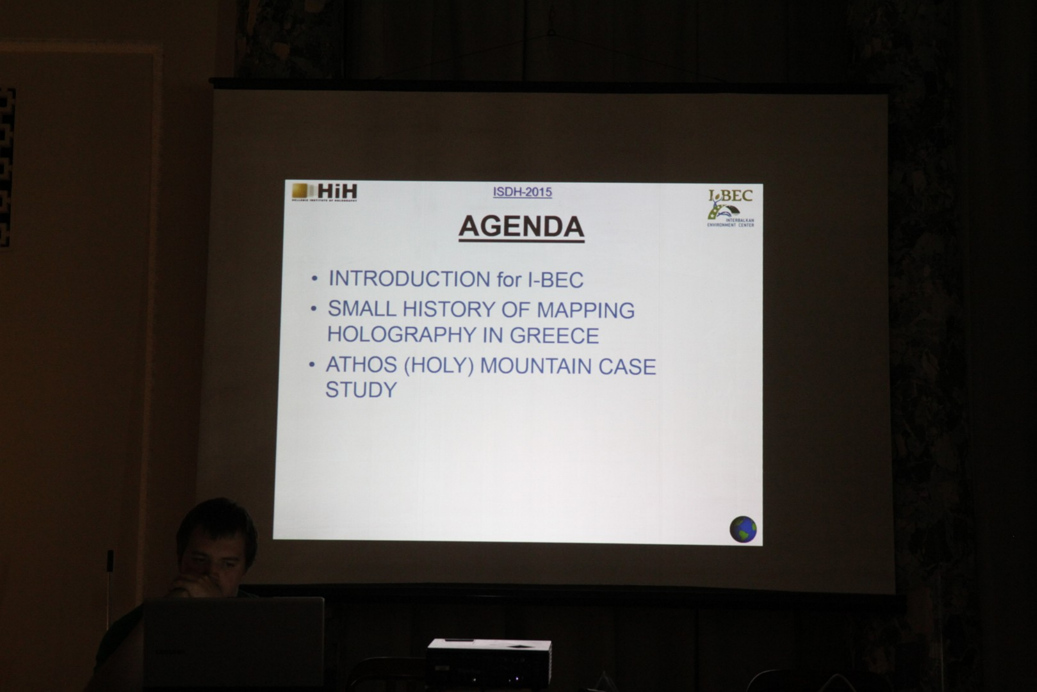
2. Hellenic Institute of Holography, 28 Dionyssou Str., 15234, Chalandri, Athens, Greece
3. Lab of Remote Sensing and GIS, Faculty of Agriculture, Aristotle University of Thessaloniki, 54124 Thessaloniki, Greece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AGENDA
• INTRODUCTION for I-BEC
• SMALL HISTORY OF MAPPING HOLOGRAPHY IN GREECE
• ATHOS (HOLY) MOUNTAIN CASE STUDY


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FIRE RISK INDEX
ASSESSING OF SOIL EROSION
BURNED AREA
WATER QUALITY PARAMETERS
PRECISION
LAND COVER MAPPING


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I-BEC is International Organisation
i-BEC acts through a global network in cooperation with governmental organizations, research institutes and the private sector
PARTICIPATING ORGANISATION
GEO GROUP ON EARTH OBSERVATIONS
eurisy
acting collectively to bridge space and society
nereus
GOFC-GOLD
GEO
GLOBAL SOIL PARTNERSHIP
si-cluster
KEMEA
i-BEC's role as an international CLUSTER of new technologies and innovation links together the public and private sectors for Environment and protection of Natural Resources
i-BEC is a Participating Organisation in GEO
• Member of the GEO High Level Working Group)
• Member of several prestigious National & International Organisations


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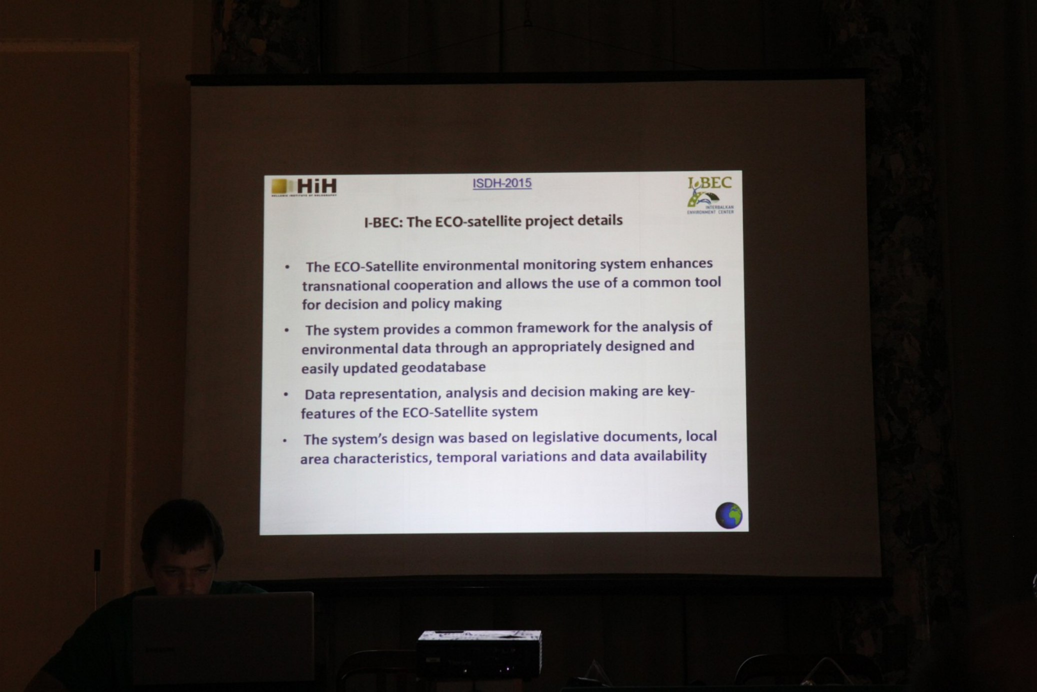
The Eco-Satellite Project
ECO-Satellite
Development of a common intraregional monitoring system for the environmental protection and preservation of the
Black Sea
ECO-Satellite
Black Sea
The main scope of ECO-Satellite is the creation of a common intraregional environmental monitoring system, elaborating on the technological assets provided by satellite Earth Observation and Geomatics in order to transfer knowledge to the Black Sea stakeholders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I-BEC: The ECO-satellite project details
• The ECO-Satellite environmental monitoring system enhances transnational cooperation and allows the use of a common tool for decision and policy making
• The system provides a common framework for the analysis of environmental data through an appropriately designed and easily updated geodatabase
• Data representation, analysis and decision making are key-features of the ECO-Satellite system
• The system's design was based on legislative documents, local area characteristics, temporal variations and data availability

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The ECO-Satellite test sites
A Romanian Danube Delta
B Ukrainian Danube Delta
C Loudias – Aksios – Aliakmon Delta
(A),(B)
(C)
Black Sea
Caspian
Sea
TURKEY
IRAN
I-BEC
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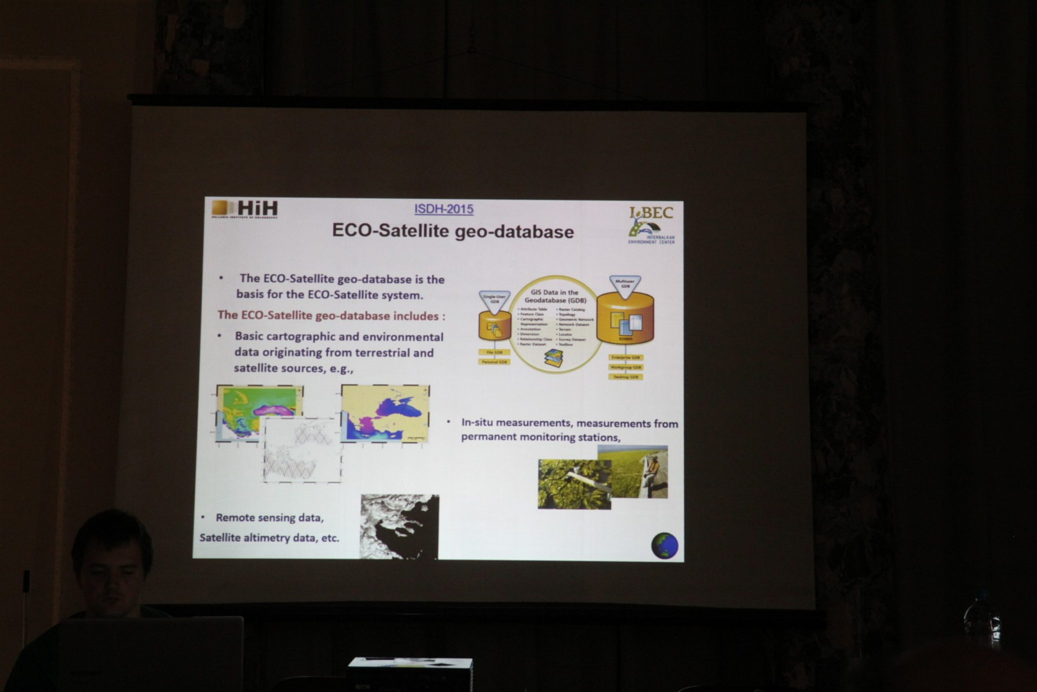
esri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ECO-Satellite geo-database
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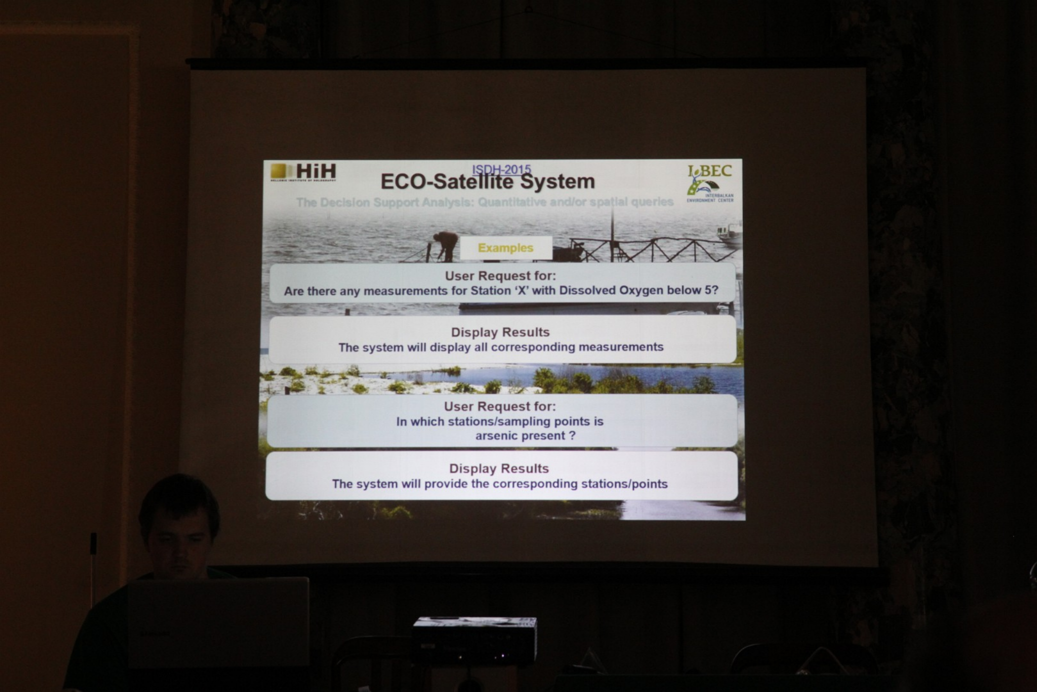
• The ECO-Satellite geo-database is the basis for the ECO-Satellite system.
The ECO-Satellite geo-database includes :
• Basic cartographic and environmental data originating from terrestrial and satellite sources, e.g.,
Single-User GDB
GIS Data in the Geodatabase (GDB)
• Attribute Table
• Feature Class
• Cartographic Representation
• Annotation
• Dimension
• Relationship Class
• Raster Dataset
• Raster Catalog
• Topology
• Geometric Network
• Network Dataset
• Terrain
• Locator
• Survey Dataset
• Toolbox
Multiuser GDB
RDBMS
File GDB
Personal GDB
Enterprise GDB
Workgroup GDB
Desktop GDB
• In-situ measurements, measurements from permanent monitoring stations,
• Remote sensing data,
Satellite altimetry data, etc.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ECO-Satellite System
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The Decision Support Analysis: Quantitative and/or spatial queries
Examples
User Request for:
Are there any measurements for Station 'X' with Dissolved Oxygen below 5?
Display Results
The system will display all corresponding measurements
User Request for:
In which stations/sampling points is
arsenic present ?
Display Results
The system will provide the corresponding stations/points


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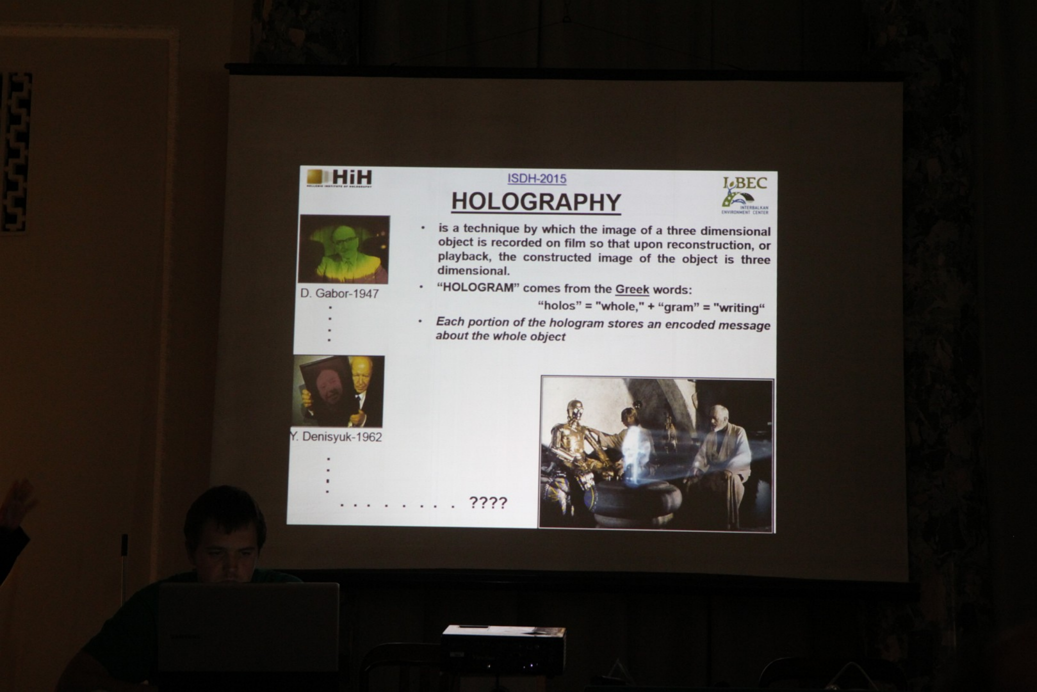
ECO-Satellite Website
Visit:
http://www.eco-satellite.eu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HOLOGRAPHY
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D. Gabor-1947
Y. Denisyuk-1962
. . . . ????
• is a technique by which the image of a three dimensional object is recorded on film so that upon reconstruction, or playback, the constructed image of the object is three dimensional.
• "HOLOGRAM" comes from the Greek words:
"holos" = "whole," + "gram" = "writing"
• Each portion of the hologram stores an encoded message about the whole object


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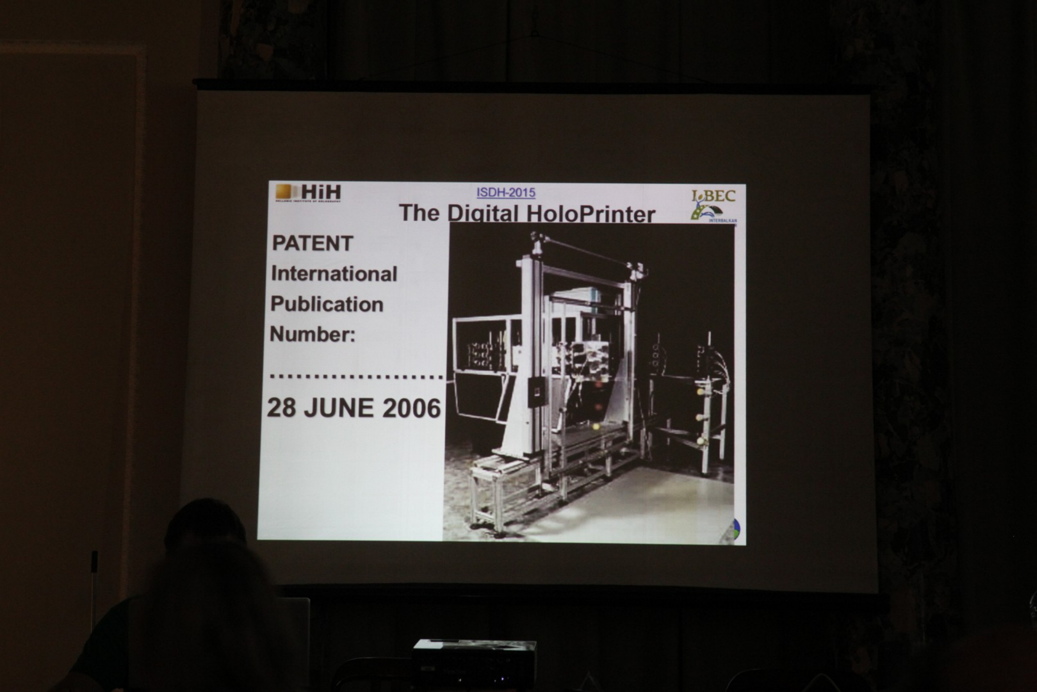
2010: 1st HOLOGRAPHIC MAP in Greece
• Common Project between:
TO CUT THE GORDIAN KNOT
NATO Deployable Corps GREECE
HiH
HELLENIC INSTITUTE OF HOLOGRAPHY
Dr. Andreas SARAKINOS
LtC Charalampos PARASCHOU

The Workflow

- 1. Acquire DEM data and Satellite image of an area (Same pixel size or resampling to the same pix size)
- 2. Co-register them with accuracy LTH 1 pixel!
- 3. Import DEM and Satellite image into a 3D editor (3dsMax, Maya etc.).
- 4. Create a 3d terrain using the DEM data in the 3d editor.
- 5. Overlay the satellite image on top of the 3d terrain
- 6. Overlay in various layers other important data

(These layers are stacked vertically on different heights relative to the mapped area).

- 7. Create a virtual camera and set correct properties.
- 8. Animate the camera relative to the 3d scene and set number perspective views to render.
- 9. Render the views
- 10. Input the perspective views of step 9 to the digital holographic printer.
- 11. Print the final hologram.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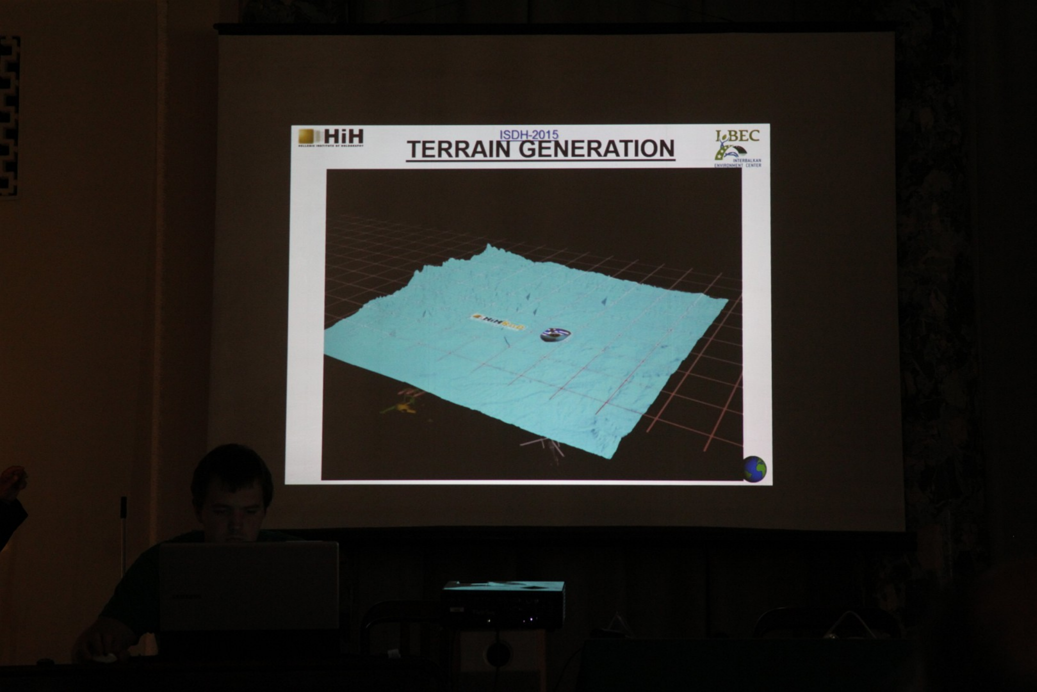
The Digital HoloPrinter
IBEC
INTERBALKAN
PATENT
International
Publication
Number:
28 JUNE 2006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TERRAIN GENERATION
INTERBALKAN
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SATELLITE IMAGE OVERLAYED


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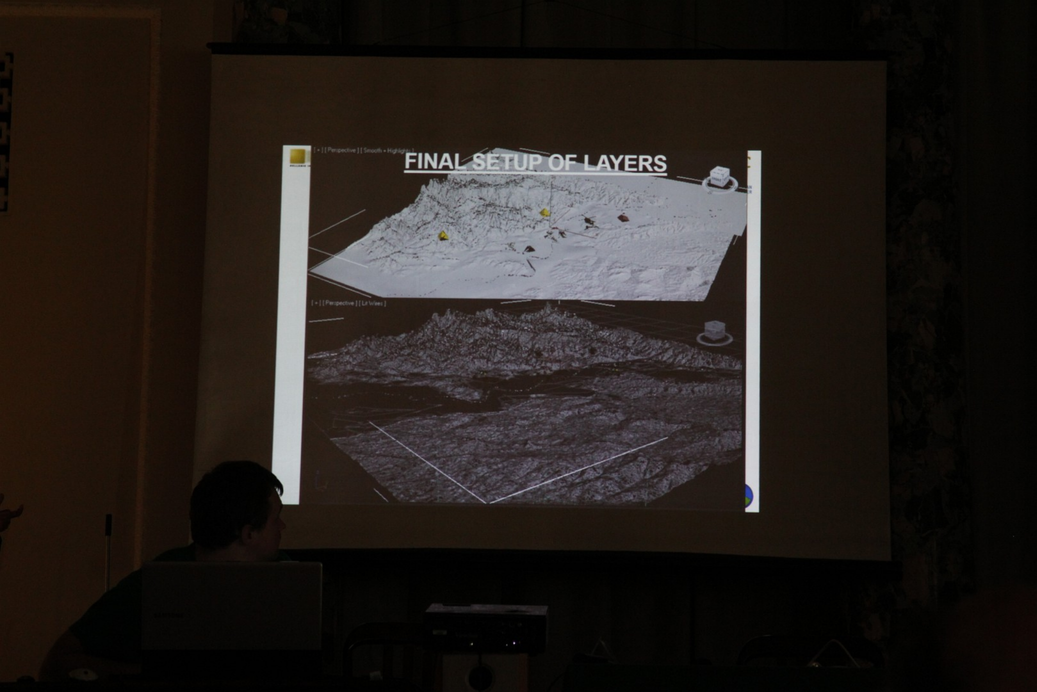
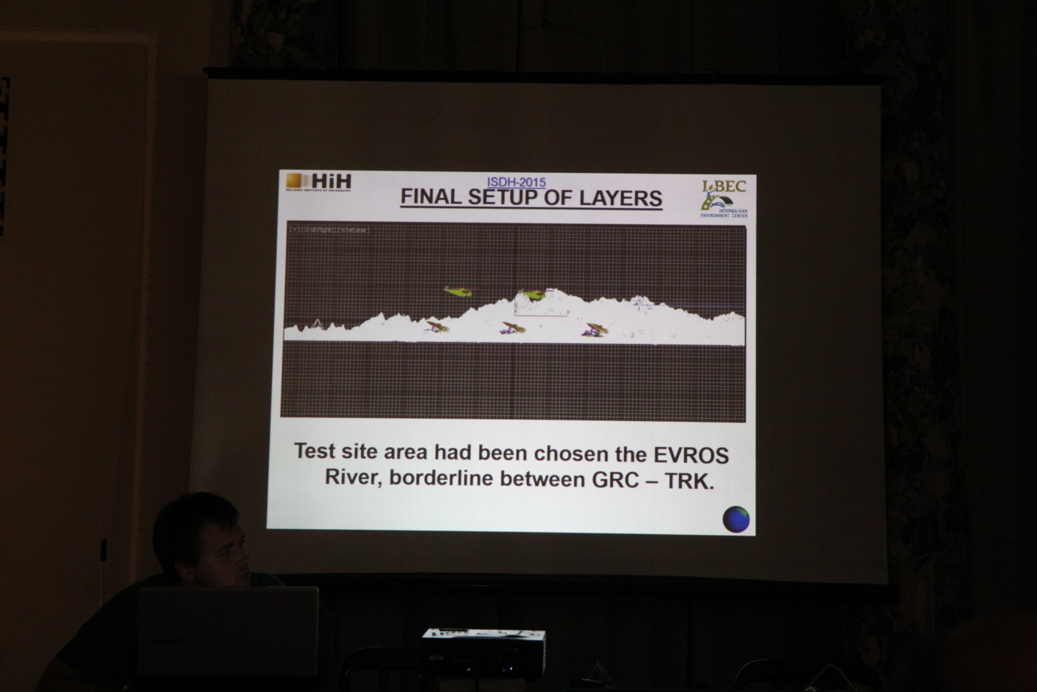
FINAL SETUP OF LAYERS
INTERBALKAN


FINAL SETUP OF LAYERS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FINAL SETUP OF LAYERS
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Test site area had been chosen the EVROS River, borderline between GRC – TRK.


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INTERBALKAN ENVIRONMENT CENTER
HOLO MAP


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2011: 2nd HOLOGRAPHIC MAP in Greece
• Common Project between:
ΓΕωΓΡΑΦΙΚΗ ΥΠΗΡΕCΙΑ CΤΡΑΤΟΥ
1889
HiH
HELLENIC INSTITUTE OF HOLOGRAPHY
Dr. Andreas SARAKINOS
HMGS:Hellenic Military Geographical Service


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2011: 2nd HOLOGRAPHIC MAP in Greece
(It is at present a permanent exhibit at the Museum of the Military Geo-Services in Athens)
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ΟΛΟΓΡΑΦΙΚΟΣ
ΟΡΘΟ-ΦΩΤΟ-ΧΑΡΤΗΣ
ΝΗΣΟΥ ΚΩ

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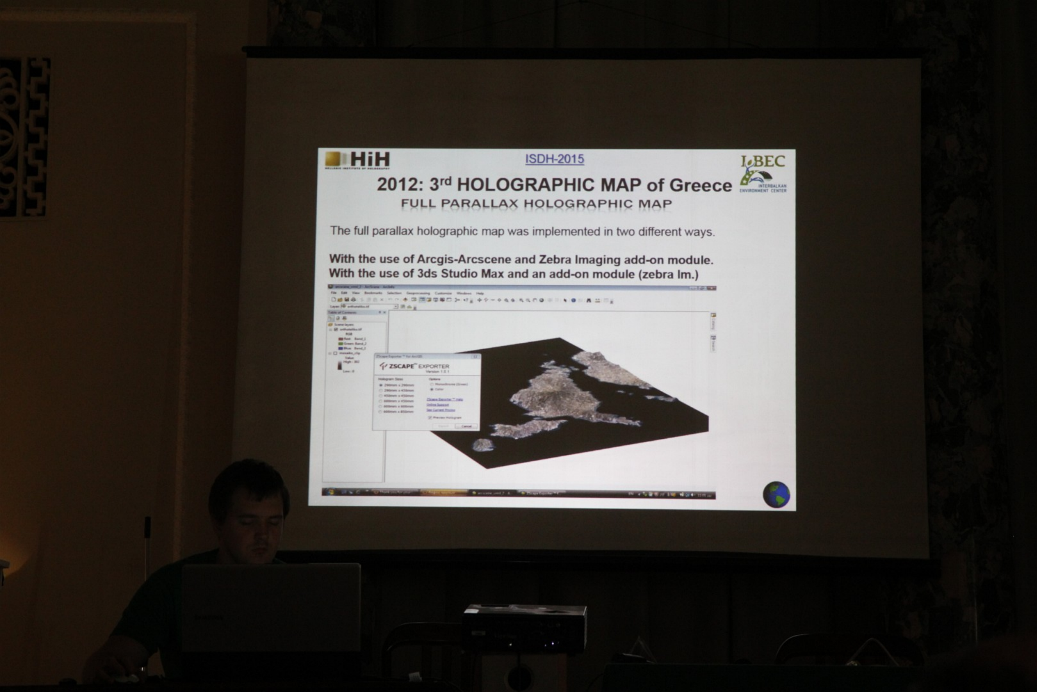
INTERBALKAN ENVIRONMENT CENTER
2012: 3rd HOLOGRAPHIC MAP of Greece
•Common Project between:
ΠΟΛΥΤΕΧΝΕΙΟΝ
HiH
HELLENIC INSTITUTE OF HOLOGRAPHY
Dr. Andreas SARAKINOS
NTUA: National Technical University of Athens
Prof. Andreas GEORGOPOULOS
Dimitrios GOULAS, Surveying Eng.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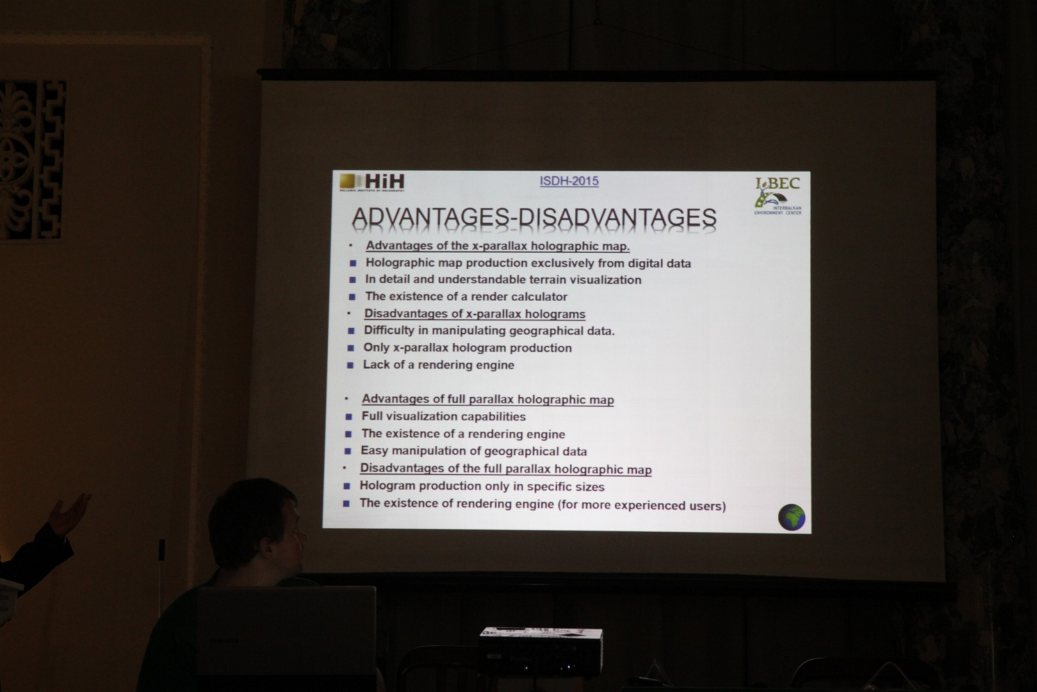
2012: 3rd HOLOGRAPHIC MAP of Greece
FULL PARALLAX HOLOGRAPHIC MAP
The full parallax holographic map was implemented in two different ways.
With the use of Arcgis-Arcscene and Zebra Imaging add-on module.
With the use of 3ds Studio Max and an add-on module (zebra Im.)
ZSCAPE EXPORTER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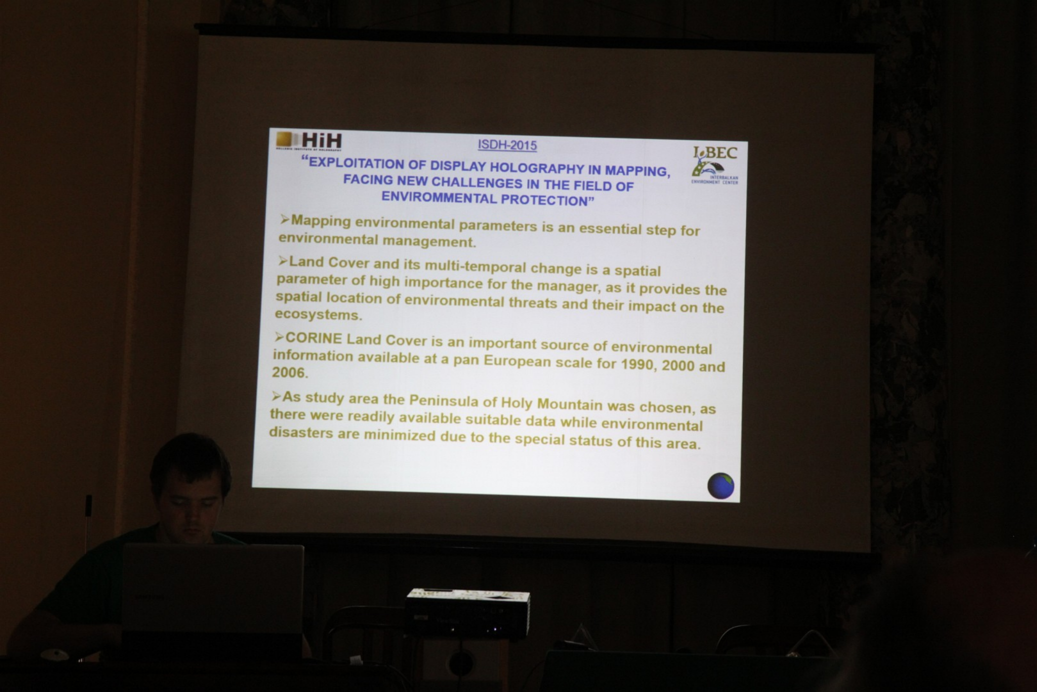
ADVANTAGES-DISADVANTAGES
Advantages of the x-parallax holographic map.
Holographic map production exclusively from digital data
In detail and understandable terrain visualization
The existence of a render calculator
Disadvantages of x-parallax holograms
Difficulty in manipulating geographical data.
Only x-parallax hologram production
Lack of a rendering engine
Advantages of full parallax holographic map
Full visualization capabilities
The existence of a rendering engine
Easy manipulation of geographical data
Disadvantages of the full parallax holographic map
Hologram production only in specific sizes
The existence of rendering engine (for more experienced users)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"EXPLOITATION OF DISPLAY HOLOGRAPHY IN MAPPING, FACING NEW CHALLENGES IN THE FIELD OF ENVIROMMENTAL PROTECTION"
➢Mapping environmental parameters is an essential step for environmental management.
➢Land Cover and its multi-temporal change is a spatial parameter of high importance for the manager, as it provides the spatial location of environmental threats and their impact on the ecosystems.
➢CORINE Land Cover is an important source of environmental information available at a pan European scale for 1990, 2000 and 2006.
➢As study area the Peninsula of Holy Mountain was chosen, as there were readily available suitable data while environmental disasters are minimized due to the special status of this area.


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MOUNTAIN ATHOS – THE HOLY MOUNTAIN
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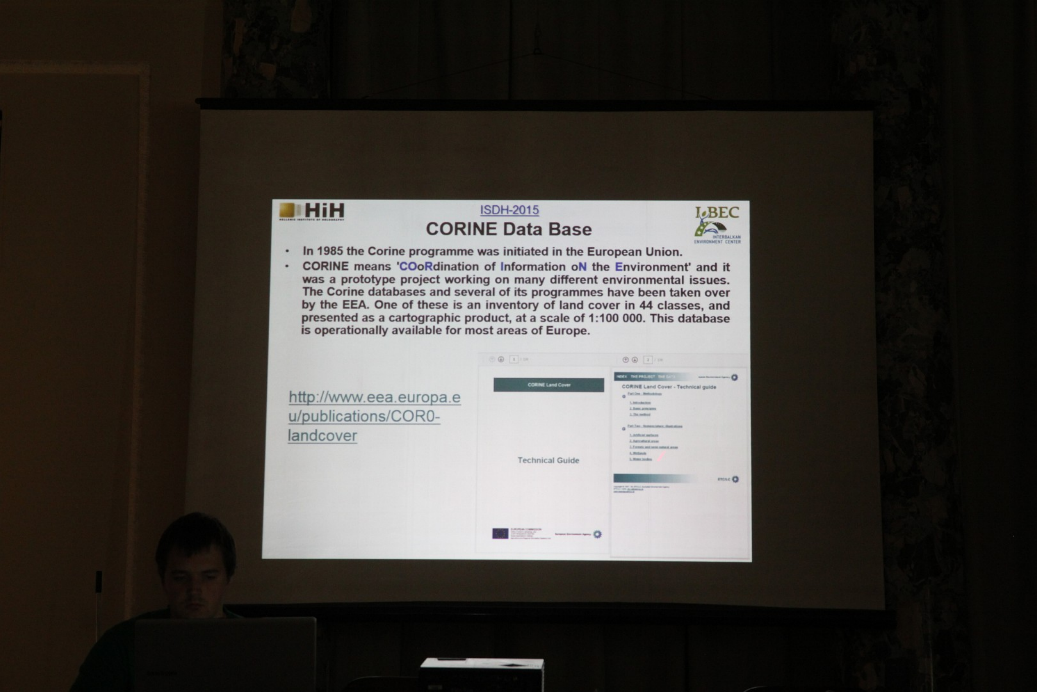
MOUNT ATHOS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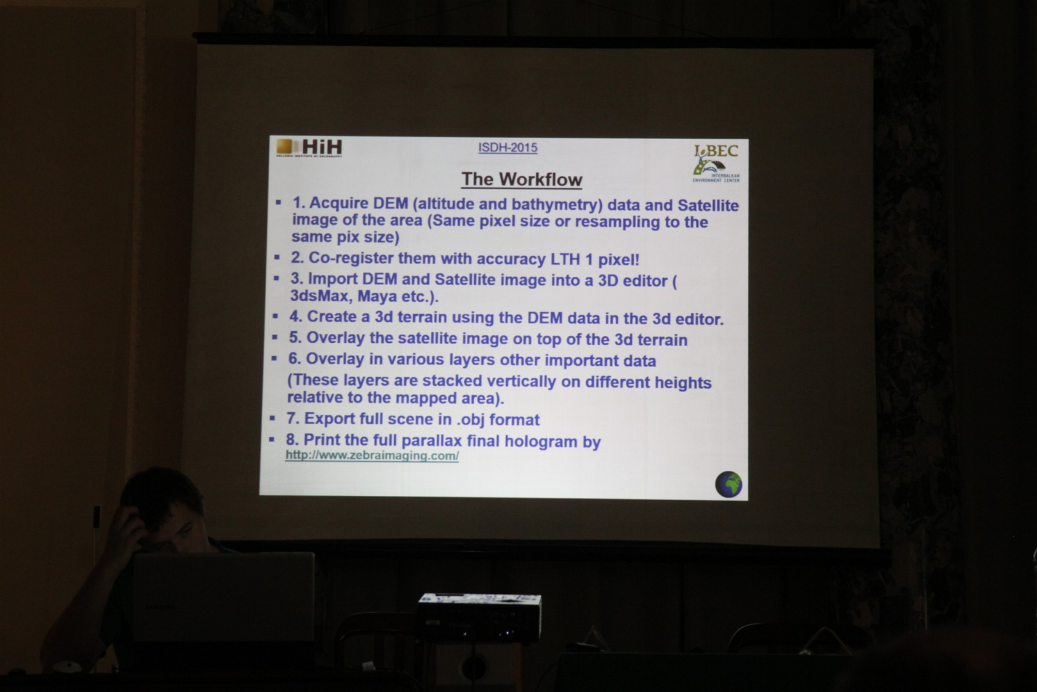
CORINE Data Base
• In 1985 the Corine programme was initiated in the European Union.
• CORINE means 'COoRdination of Information oN the Environment' and it was a prototype project working on many different environmental issues. The Corine databases and several of its programmes have been taken over by the EEA. One of these is an inventory of land cover in 44 classes, and presented as a cartographic product, at a scale of 1:100 000. This database is operationally available for most areas of Europe.
http://www.eea.europa.eu/publications/COR0-landcover
CORINE Land Cover
Technical Guide
CORINE Land Cover - Technical guide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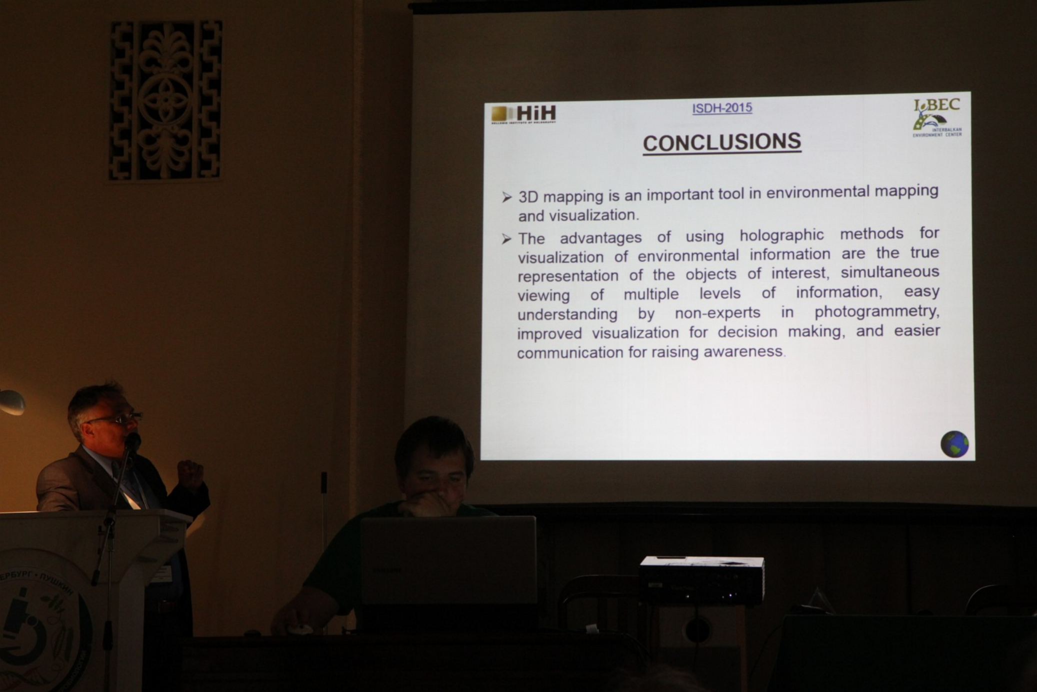
The Workflow
1. Acquire DEM (altitude and bathymetry) data and Satellite image of the area (Same pixel size or resampling to the same pix size)
2. Co-register them with accuracy LTH 1 pixel!
3. Import DEM and Satellite image into a 3D editor (3dsMax, Maya etc.).
4. Create a 3d terrain using the DEM data in the 3d editor.
5. Overlay the satellite image on top of the 3d terrain
6. Overlay in various layers other important data
(These layers are stacked vertically on different heights relative to the mapped area).
7. Export full scene in .obj format
8. Print the full parallax final hologram by
http://www.zebraimaging.com/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CONCLUSIONS
➢ 3D mapping is an important tool in environmental mapping and visualization.
➢ The advantages of using holographic methods for visualization of environmental information are the true representation of the objects of interest, simultaneous viewing of multiple levels of information, easy understanding by non-experts in photogrammetry, improved visualization for decision making, and easier communication for raising awareness.