
FRAUNHOFER IFF MAGDEBURG

INFRASTRUCTURE PLANNING AND ACCEPTANCE

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Magdeburg, June 22th, 2017



AGENDA

- Fundamentals
- Energy and Virtual Reality – Exemplary applications
- Acceptance analysis in large scale projects
- Integrated planning in site projects
- Summary

Fundamentals

Virtual Spatial and Structural Development



- Virtual Reality is a computer-generated 3d (virtual) environment in which one or more users may interact in real time.
- Virtual environments support different levels of immersion.



Multisensory channels

Visual

Auditory

Tactile



Energy and Virtual Reality

Exemplary applications



Acceptance analysis in large scale projects

- E.g. overhead lines and wind farms
- Photorealistic 3d models with simulation results
- Communication of planning with residents, decision makers, environmentalists
- Creation of acceptance among the population



Integrated planning in site projects

- Industrial parks and regions
- Connection of vivid 3d models with relevant planning parameters
- Integrated planning and interdisciplinary communication

Acceptance analysis in large scale projects

Concept in brief

Specifics of today's major projects:

- Increasing complexity, interdisciplinary questioning
- Long term impact for large parts of the population
- Affected population claims competence

Virtual Reality benefits

- Effective presentation of complex and interdisciplinary projects
- Innovative analysis and evaluation of variations of solution with interactive tools
- Best solution based on a broad acceptance

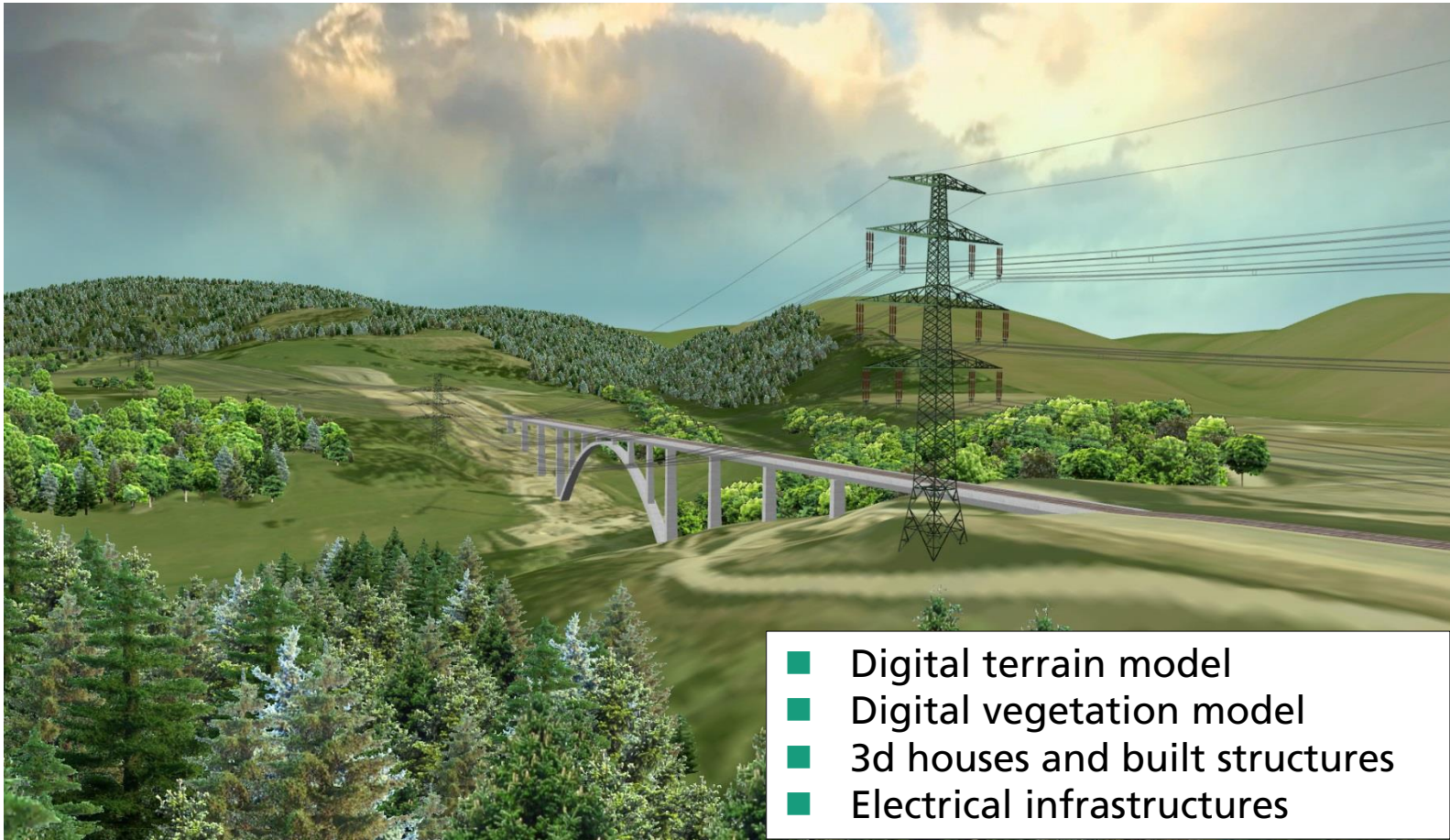
Practical use and outlook

- Early public participation becoming a standard (VDI 7000)
- VR is a standard method in large size project communication



Virtual infrastructure planning

Virtual 3d model components

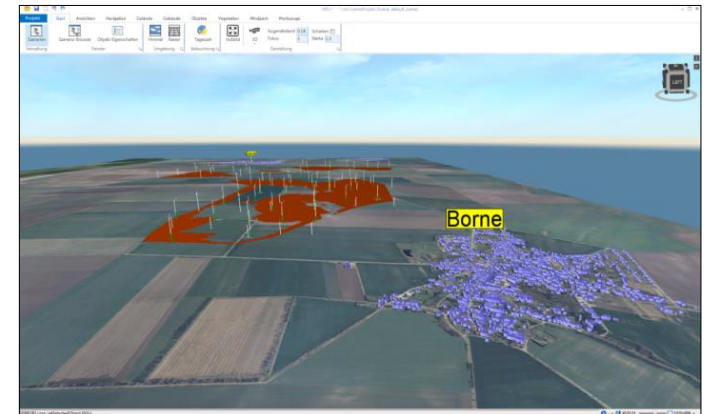
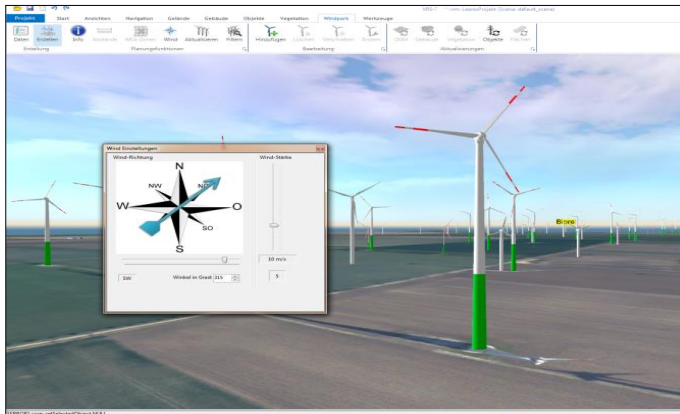
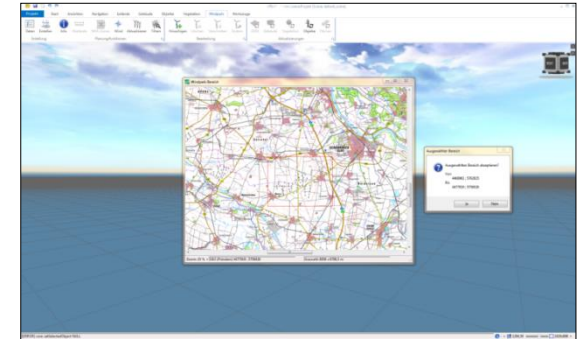


Acceptance analysis and discussion in large scale projects

Initial data and automatic generation of 3d model

Automatically generated virtual environments

- Efficiently use of existing geo data
 - Source: land surveying office, government
- Easy access: standard web services to geo data sources
- Easy use: no assistance from computer experts needed
- Sample project: "Virtual Wind Power Saxony Anhalt"
 - Directly applicable on 20.500 km² area



Acceptance analysis in large scale projects

Initial data and automatic 3d model generation

Planning in Virtual Reality

- Interactive design of infrastructures
- 3d object library – parameterized objects
- Interactions create automatically effects the environmental model
- Physics model (e.g. transmission line sagging)



Visualization – not directly visible planning aspects

- Increased plausibility – stronger argumentation
- electromagnetic fields
- Visibility of infrastructure in landscape
- New understanding and quantification – impact from infrastructure to local areas



Visibility test – color encoded 3d model

Integrated planning in site projects

Concept in brief

- Virtual industrial park: realistic impression of existing and planned structures
- 3d models enriched with planning parameters (e.g. spatial and energy)
- spatial and energy model in one virtual platform
- Effects from interaction on the 3d objects are processed automatically
- Leads to integrated design of spatial and energy concepts



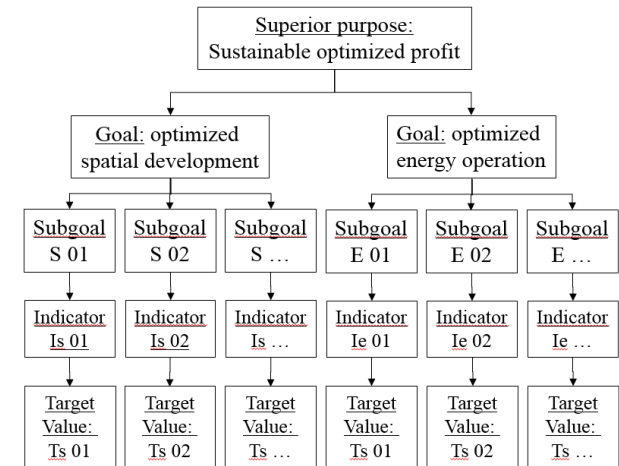
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Integrated planning in site projects – spatial and energy

Interactive planning and assessment

Multi-criteria assessment

- Spatial and energy parameter in VR
- development aims and priorities defined
- Options are known (potential new settlements)
- Intuitive interactions:
 - information retrieval
 - investment planning
- Assessment: Analytic Hierarchy Processing:
 - Holistic ranking of development options
 - Considering all relevant parameters and priorities
- New and effective support for holistic and sustainable development in industrial parks



Summary

Virtual Spatial and Structural Development

- Today Virtual technologies support developing, operating and communicating in a new way
- Significant benefits especially in complex working tasks
- Best solutions – multi criteria decision making
- High-efficient solutions for communication
 - Interdisciplinary projects
 - General public
- Recent technology improvements (computer performance, internet speed etc.) open new opportunities for Virtual Reality



Thank you
for your attention!