TRANSPORT INFRASTRUCTURE INTEGRATED WITH LAND USE PLANNING (TIILUP)

A ROADMAP FOR RESEARCH

AN INNOVATION THEME OF THE FOREVER OPEN ROAD ADAPTABLE ELEMENT

APRIL 2013

FOREVER OPEN ROAD
Redefining Road Transport for the 21st Century
FEHRL's Flagship Programme

TIILUP is part of the Adaptable Road element within Forever Open Road, however the focus of TIILUP is on a larger network scale and a longer time frame of adaptation than visualised in the figure above.

© FEHRL 2013
ISBN 9789491749049
D/2013/13.126/1

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EXECUTIVE SUMMARY

The Forum of European Highway Research Laboratories (FEHRL) has initiated the Forever Open Road Programme as the core of its Strategic European Road Research Programme V (SERRP V). The Forever Open Road Programme works towards a next generation of advanced and affordable roads that can be adopted both for maintaining the existing network and building new roads. This will enable future road operators to adopt emerging innovations, whilst overcoming the increasing constraints on capacity, sustainability, reliability and integration. Forever Open Road will also contribute substantially to the way the road transport sector addresses societal challenges.

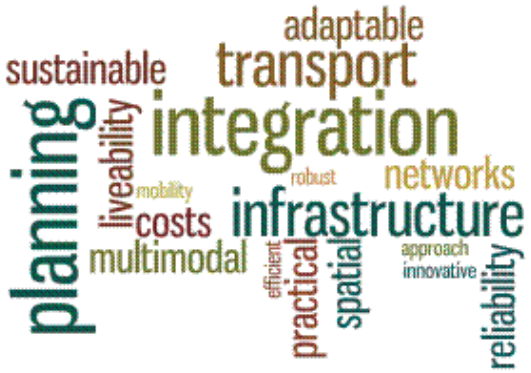
The next generation of roads will require high levels of adaptation, automation and resilience. These three elements will define the next generation of road as follows:

- **The Adaptable Road:** focusing on ways to allow road operators to respond in a flexible manner to changes in the road users' demands and constraints
- **The Automated Road:** focusing on the full integration of roadside intelligence with ICT applications on the user and in the vehicle, the traffic management services and the road operations itself
- **The Climate Resilient Road:** focusing on ensuring adequate service levels of the road network under extreme weather conditions

The innovation themes and associated Roadmaps that would contribute to the Adaptable Element are as follows:

- Future Proof Manufacturing, Design and Construction
- Advanced Sustainable Materials Design, Construction and Implementation Processes
- Flood, Snow and Ice Free Pavements, Tunnels and Bridges
- Powering Vehicles
- Durable and Integrated Pavements, Bridges, Tunnels and Structures
- Advanced Utility, Sensory and Communication Systems
- Low Cost, Rapid and Automated Maintenance Strategies
- Safe Roads
- Asset Management Challenges for Road Networks
- **Transport Infrastructure Integrated with Land Use Planning (TIILUP)**.

In this document, the TIILUP innovation theme and Roadmap for Research is presented. TIILUP is an innovative approach that integrates Land Use Planning with Transport Infrastructure Planning. Concrete cases in the Netherlands, Germany and Austria have shown that such an approach can lead to significant increases in cost efficiency in terms of investment costs, planning process and social/economic revenues, as well as the reliability of the transport system and liveability in the regions involved.



VISION

Within the context of the external trends relevant to accessibility/transport (demographic, lifestyle, mobility, etc.), a shift in paradigm should be made from the current practice of a small scope (ad hoc, technical solution-driven) planning approach towards a new practice that considers a broad/network scope (strategy-driven) planning approach.

APPROACH

The development of the TIILUP approach will be very practice driven, i.e. it will be centred on concrete operational cases which are covered in the practice of infrastructure operators. By analysing the best practices so far, the key elements of the various approaches will be determined and consolidated in a suite of generic draft approaches. In a practical "laboratory", for example, three representative transport corridors linking urban areas

with populations of around 10-15 million (such as Rotterdam-Ruhr, part of the European "Blue Banana" ranging from the West-Midlands to Milan/Turin, the "Golden Banana" coastal rim from Spain to Italy and the Hansa Route), these generic drafts will be tested and evaluated for opportunities for further consolidation into a coherent suite of proven approaches.

OUTCOME

The outcome will be a practical toolbox which enables organisations (such as local, regional and infrastructure authorities) to plan infrastructure more efficiently and to meet policy objectives. The solutions in the toolbox are proven in practice and will be accompanied by common standards, guidelines and specifications as well as disseminated through a sound knowledge transfer process.

SOCIETAL CHALLENGES

As part of the Adaptable Road Element of the Forever Open Road Programme, the TIILUP approach aims to contribute to achieving the societal challenges of decarbonisation, reliability, safety & security, liveability and costs. It focuses especially on:

Reliability > Improving the adaptability of the entire transport system on a system level, rather than on sector planning issues (silos), offers different options of transport modalities when confronted with a traffic jam or accident and is therefore a much more reliable strategy.

Liveability > An integral, strategy-driven approach takes liveability (quality of life) into account from the start to ensure that cost efficiency to society is achieved (instead of what typically is often the case: considering expensive mitigation measures at the end of the process, resulting in less accepted noise and air barriers). Next to concrete environmental issues such as noise and air pollution, it also considers the softer aspects such as appreciation;

Costs > Expert judgment results in cost savings (total cost of ownership) of the TIILUP approach of:

- 10% less investment. By finding smarter and more specific solutions,
- 50% less planning costs by strongly shortening the planning duration, and
- A leverage up to 1:6 depending on specific area and synergetic themes.

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1. INTRODUCTION

1.1 FOREVER OPEN ROAD PROGRAMME

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1.2 ADAPTABLE ROAD ELEMENT AND TIILUP

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1.3 EXTERNAL DRIVERS

Nowadays, many authorities across Europe are facing ever tougher challenges to cope with the need to accommodate increased traffic demand, while minimising congestion and maintaining services in the face of increasing climate change effects, as well as deliver on environmental and societal objectives. Our European economy is becoming steadily more interwoven. To be internationally competitive, we need a good spatial and economic infrastructure that offers an excellent environment for business and knowledgeable workers and hence optimal mobility for our urban regions. Individual mobility and freight transport will continue to grow over the coming decades and our mobility behaviour is rapidly changing. We are becoming more flexible and mobile. Currently we tend to live, work, shop and take our recreation in many different places. There is a growing spatial and economic differentiation. Successful urban regions will continue to grow, while others will soon face the impact of a declining population. Not only does the number of inhabitants and economic attractiveness between cities diverge greatly, but the way in which people move also shows dramatic differences. Climate change is increasing the frequency of extreme weather events and hazards our biodiversity and natural habitats. At the same time, the demand for resources will continue to grow.

Mobility has an important role to play in this issue. This is the time when innovation for infrastructure is an absolute imperative; we need to improve the quality of our infrastructure in a sustainable way while reducing overall costs. Current small-scope solution-driven infrastructure planning is not able to succeed in this. There is a need for a new broad-scope strategy-driven and integrated planning approach. This new innovative approach is known as Transport Infrastructure Integrated with Land Use Planning (TIILUP).

Image 1: Ringway Utrecht. By accepting a broad-scope – strategy-driven – planning approach that integrated Infrastruture and Land Use Planning, the planning process in this project has been accelerated and issues regarding the economic investment climate are also included.

TIILUP is a planning approach that integrates land use planning with transport infrastructure planning. It strives for an adaptable, sustainable and robust transport network, offering users an optimal mobility chain, with good connections between the various networks via multi-modal hubs, and close coordination of infrastructure and spatial development. This can lead to more efficient planning in terms of investment costs, a planning process that leads to higher social/economic revenues, as well as reliability of the transport system and liveability in the regions involved.

This TIILUP Roadmap is practice-driven. By analysing best practices, key elements of the approach will be discerned. In a practical "laboratory situation", these elements will be tested and formed into a coherent approach. The outcome will be a practical toolbox which enables organisations (such as infrastructure authorities) to plan infrastructure more efficiently, meet policy objectives in a timely fashion and raise quality.

2. SCOPE

This TIILUP Roadmap:

- Focuses on innovative coordinated planning of transport infrastructure and other land uses (housing, working, recreation, nature, water management etc.);
- Includes the complete planning cycle; from strategic policy development, to programming, project development, construction, operation & (asset) management, renewal, redevelopment;
- Relates to a broad range of (public) stakeholders, representing the different spatial functions that are included in area-oriented plans and designs for infrastructural issues;
- Applies a multi-modal approach. The starting point is the relationship between transport infrastructure and land use planning, which will be broadened to the integration of mobility by taking into account accessibility. The final objective is a fully integrated transport planning in which mobility, infrastructure and land use planning are integrated.

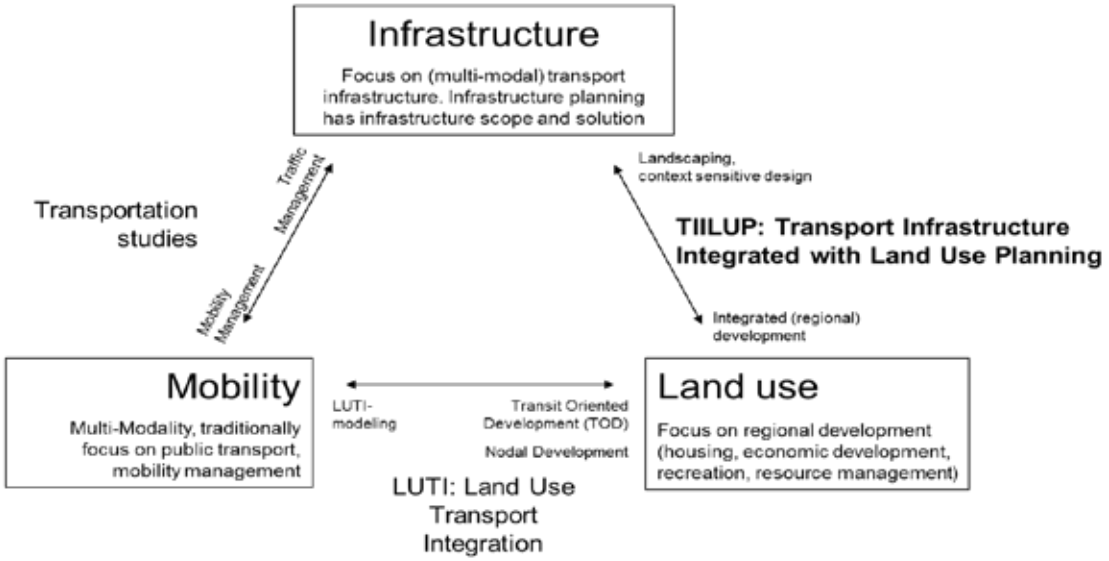


Figure 1: TIILUP focuses on the synergy between transport infrastructure and land use planning. In this approach, first of all the link between infrastructure and land use will be investigated, since there is little knowledge available. In subsequent steps, full integration with all aspects (mobility, infrastructure and land use) will be considered.

2.1 ISSUES TO BE ADDRESSED

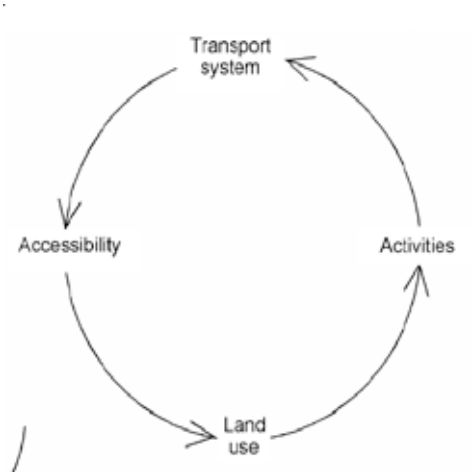
So far, various characteristics of the current practice which are hindering the coordination and integration of transport infrastructure planning have been identified. These include:

- Inefficiencies of investments in terms of social/economic return on investment;
- Competing interests for limited space;
- Limited support for new development projects;
- Slow and costly planning and decision-making;
- Limited funding;
- Incomplete life-cycle approach;
- Difficulties to comply with (EU) environmental regulations;
- Unsustainable land-uses;
- Sector planning barriers (silos);
- Non-coordination in planning processes (incompatibilities of models, of procedures, in timing etc.).

2.2 BASICS OF TIILUP

New definition of accessibility > Accessibility is often confused with speed: as long as there are no traffic jams, accessibility is optimal. However, people do not want to get from a standard A to a coincidental B, they want to travel to a place where they can work, shop or socialise. Hence, it is crucial to view accessibility in a broader sense: the amount of jobs, shops and facilities/amenities which you can access within a certain amount of travelling time, with as many different transport modalities as possible. This definition also sheds new light on the relation between transport infrastructure and land use.

Land Use Transport Feedback Cycle (Wegener and Furst)



The basics are simple: improvement in the transport system causes places to be more accessible. The improved accessibility of places will result in developers altering the land use of such a place by providing residential, commercial and recreational facilities. This has the effect of attracting people to live, work, shop and socialise in these new accessible areas. Because their activities are bound to different places, people have to travel from one place to the other. This can result in the need the further enhance the transport system, forming the start of a new circle.

Figure 2: Wegener and Furst Cycle

New definition of multi-modality > Traffic engineers and policy makers normally define multi-modality as the possibility to transfer from one transport modality to the other. However, multi-modal nodes are not always points of transfer; every place that is accessible by airport, car, public transport, bicycle or foot is multi-modal. This interpretation clarifies why multi-modal nodes are attractive as locations for offices, schools, shops and dwellings, as well as for cafes, galleries and leisure parks. Multi-modal nodes offer people the freedom of choosing their preferred mode of transport and provide alternatives in cases of disruption to their preferred choice.

TIILUP relates to:

- Land use transport integration modelling (LUTI)
- Transit/transport-oriented development (TOD)
- Integrated regional planning (IRP)
- Area-oriented approaches to infrastructure planning (AAIP)
- Context sensitive design of infrastructure (CSD)
- European Spatial Development Perspective (ESDP)

3. OBJECTIVE

The TIILUP approach is part of the Adaptable Road element of the Forever Open Road Programme. Therefore, it aims to contribute towards achieving the Programme's general ambition (decarbonisation, reliability, safety & security, liveability and costs – see Figure 3). It focuses especially on:

Reliability > Improving the adaptability of the entire transport system on a system level, rather than on sector planning issues (silos), offers different options of transport modalities when confronted with a traffic jam or in general to shift traffic for discharging-purposes. Integrated transport chains matched to the particular key benefits of each transport system according to time and area.

Liveability > An integral, strategy-driven approach takes liveability (quality of life) into account from the start to ensure that cost efficiency to society is achieved (instead of what typically is often the case: considering expensive mitigation measures at the end of the process, resulting in less accepted noise and air barriers). Next to concrete environmental issues such as noise and air pollution, it also considers the softer aspects such as appreciation and spatial quality.

Costs > Expert judgment results in cost savings (total cost of ownership) of the TIILUP approach of:

- 10% less investment by finding smarter and more specific solutions,
- 50% less planning costs by strongly shortening the planning duration, and
- A leverage up to 1:6 depending on specific area and synergetic themes.

Societal challenge	Indicator	Guiding objective	Adaptable	Automated	Resilient
Decarbonisation	Energy-efficiency of passenger and freight transport (in kWh)	+10%-20%*	●	●	●
	Energy consumed by road operatiors	Net zero	●	●	●
	Energy embodied in materials	-25%*	●	○	●
Reliability	Failure frequency and duration	-35%*	●	●	●
	Time lost to maintenance, repair, reconstruction and incidents	-50%*	●	●	●
Safety & Security	Fatalities and severely injured	-35%*	●	●	●
	Goods lost to theft and damage	-40%*	●	●	●
Liveability	Air quality, noise, natural habitat	Policy compiliance	●	●	●
Cost	Total cost of ownership	-30%*	●	●	●

* vs a best practice baseline ● a strong contribution ● a moderate contribution ○ insignificant contribution

Figure 3: Societal challenges to be addressed by the Forever Open Road Programme

More specifically, the TIILUP approach contributes to the following objectives:

- Better coordinated planning. This regards spatial functions (synergy), actors (co-creation, co-financing, public support), stages (full life-cycle, supply chain), faster and more efficient project delivery;
- More robust mobility networks (resilience);
- Optimised functioning of transport infrastructure, networks, regions;
- Higher environmental and spatial quality (sustainability, C2C1[1]);
- Higher return on societal investments (funds, health, safety, environment, accessibility - freedom of choice between modalities);
- Creating an appealing investment climate, social-economic development potential (inclusive growth), value creation, multiplier, and finally;
- Sustainable transport land use system

1 Cradle to Cradle (C2C) Network project:http://www.c2cn.eu

4. APPROACH

The implementation of this TIILUP Roadmap is practice driven. There are many examples from around Europe that show that an innovative approach in infrastructure and spatial planning is possible and fruitful (see also the various illustrations in this Roadmap and the Annex). By analysing these best practices, vital elements will be identified that make the practice more successful in being adaptable, reliable, sustainable, payable and user-friendly. These key elements will be inventoried, organised and structured.

Image 2: Basel Nordtangente. Improving the connection of the Swiss A2/A3 to the French A35 and German A5, combined with the re-development of the Nordtangente is part of a large urban development plan, using up to now €60 million revenue from real estate development, development of IAK – inter-departmental platform for integral urban development project. The SBN (Urban De-velopment Basel North) defines the spatial quality of the project and the Kanton Basel is responsible for the public space.

In a practical "laboratory situation", these elements will be tested using a range of different scenarios. Europe is becoming more and more differentiated economically and demographically and investments in infrastructure, and accordingly spatial development, will generate different revenues. The corridors studied in this practical laboratory are therefore thought to be representative of the different challenges faced in infrastructure planning across Europe. The TEN-T core network will form the fundamentals. Here, a distinction can be made between upgrading mature networks (for example, North-West Europe) and expanding emerging networks (South-East Europe) – "Brownfield" versus "Greenfield" development.

A first quick-scan results in the following three corridors:

- **The Mediterranean coastal corridor from Valencia, through Genoa to Milan >** The Mediterranean region is the birthplace of European culture, a key world maritime route with 30% of worldwide traffic and also the world's leading tourist destination. The coast from Valencia to Milan could be interpreted as one big interconnected urban region, containing the large ports of Genoa, Marseilles, Barcelona and Valencia. The region is a growing information technology centre. Famous and beautiful TEN-T routes like the E-15 and E-80 connect these cities. It is sometimes also called "the golden banana" (because of its sunny orientation) in the Europe 2000 report from the European Commission in 1995, analogous to the so-called Blue Banana. As a consequence of the sunny location, the road networks have to deal with many tourists travelling in peak periods of the year.
- **The Hansa Route >** This historical trading route connects cities such as Cologne, Arnhem, Deventer, Bremen, Hamburg, the former capital Lübeck, Rostock, Gdansk, Kaliningrad, Riga, Talinn and Stockholm stretching from the North Sea to the Baltic. It was an economic alliance of trading cities that dominated trade along the coast of northern Europe. While the Hansa league collapsed by the late 16th century, these days it forms potentially an important economic corridor in northern Europe, connecting many high-density historical European cities.
- **"The Blue Banana" (West Midlands – Milan/Turin) >** As the corridor that connects the central economic regions of Europe, this Blue Banana, the freight corridor from Rotterdam to the Ruhrgebiet, is very important with respect to freight transport and is interconnected and interdependent. Rotterdam and the Ruhrgebiet are in many aspects very similar. They are both urbanised in a scattered somewhat suburban manner, they both have to deal with the disappearance of industry, a shrinking economy and demography, but they are also both very important in terms of production and freight traffic. Based on the discussions within the core group, it can be concluded that interesting segments of this Blue Banana mega-corridor could be the Rotterdam-Ruhr corridor and the trans-Alp corridor between Munich-Milan.

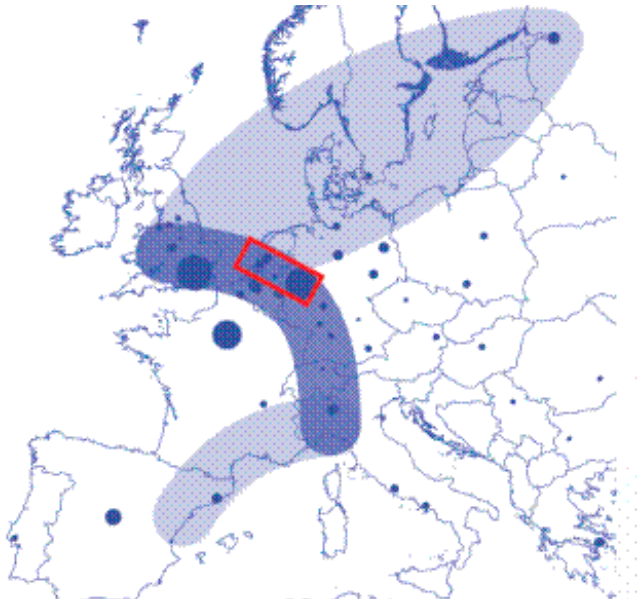


Image 3: Golden Banana, Hansa Route and Blue Banana. The Blue Banana (also known as the Hot Banana, Bluemerang, European Megalopolis or European Backbone) is a discontinuous corridor of urbanisation in Western Europe, with a population of around 110 million. The curvature of this corridor (hence the "banana" in the name) covers one of the world's highest concentrations of people, capital and industry. Spatial planning and infrastructure plays a vital role in the economic development in this area and connecting it to other developing European networks.

By researching these three different corridors, we will learn what elements are of generic value in every situation, and what are more specific to a certain area. In this manner, we are able to construct a set of tried and tested generic planning approaches, to be tailored to the site in specific situations.

RESEARCH FRAMEWORK

A first overview of the relevant best practices shows that the following ingredients are likely to be key factors in a successful TIILUP approach:

- Combining the systems engineering approach of infrastructure and traffic planners with the typological approach of architects and spatial planners into a scenario driven approach testing different models;
- Working on all (geographical) scale levels and connecting those scale levels in an iterative manner;
- The important role of design, not in an aesthetic manner but in developing creative integral solutions, bringing involved parties together, informing participants and showing the consequences of policy choices;
- From a mitigation and compensation approach to a spatial adaptive strategy;
- An integral, sustainable approach taking society, economy and ecology into account.

The outcome will be a practical toolbox which enables organisations (such as local, regional and infrastructure authorities) to plan infrastructure and spatial development coherently. By using integral strategies on all levels of scale, authorities are enabled to plan infrastructure more efficiently and to meet policy objectives in a more timely fashion. The solutions in the toolbox will be proven in practice and be accompanied by common standards, guidelines and specifications. This product will be disseminated through a sound knowledge transfer process.

5. WORK PACKAGES & MILESTONES

5.1 INTEGRATED DEVELOPMENT STRATEGY

It is proposed to carry out seven Work-Packages based on six themes and the development of a framework (see figure 4), which will be executed partly in parallel but continuously integrated. In order to come to well-defined topics, these research questions are inevitably isolated within their own knowledge field. However, the value of the TIILUP approach lies especially in the synergetic integration of multi-disciplinary knowledge.

In accordance with the practical laboratory approach and prior to the issue of detailed Work Packages associated with the themes, a prologue exercise will be carried out for the Rotterdam-Ruhr (Alps) corridor. This will illustrate the potential of the TIILUP research programme. The aim is to scope further for the six thematic Work Packages and also produce a "hotspot-map" for the selected corridor and highlight issues, which need to be addressed in developing the practical toolbox.

The insights gained from the prologue will result in an elaborated implementation plan. Knowledge will be disseminated in the EU context by means of an international symposium in November 2013.

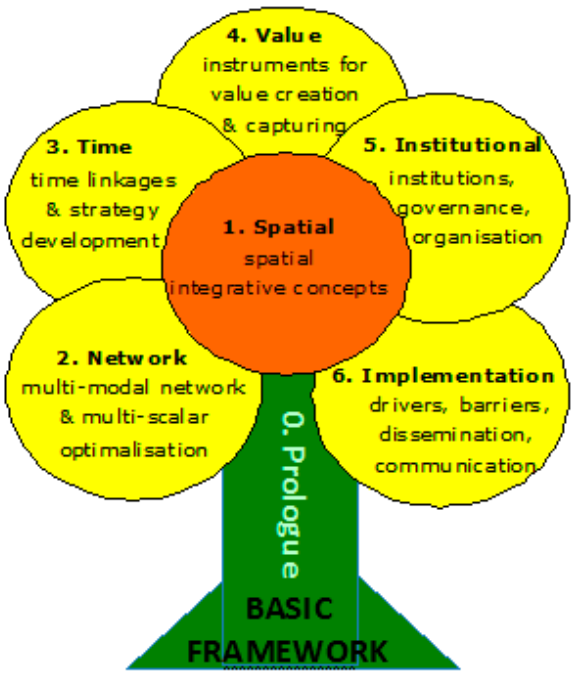


Figure 4: TIILUP is an integrated and practice-driven approach. The integration will be covered during the development by a prologue pilot corridor.

5.2 DESCRIPTION OF TIILUP WORK PACKAGES AND THEMES

5.2.1 TIILUP Spatial dimension: spatial concepts with synergetic effects on accessibility

Critical aspects of this theme will be the ability to deal with scale issues, the role of transport analysis and spatial design as a strategic and operational tool. This will be achieved by examining integrative spatial agglomeration and transport concepts.

Output

- Inventory study which results in an overview of the 'state of the art' regarding spatial concepts available related to agglomeration and transport issues. Well-known examples are Transit Oriented development (TOD), Multi-modal Corridors, Nodal Development, Area Oriented Approach.
- Inventory of practical cases where these concepts have been applied with attention for commonalities, complementarities, gasp in knowledge, SWOT-analysis of concepts.

Research type: desk study state of the art, analysis best practices, analysis and categorisation on scale (developing a catalogue of relevant concepts).

Image 4: 4-gleisiger AusbauDaglfing – Johanneskirchen. Here, a TIILUP approach for the S-Bahn to München Airport has generated an alternative with significant lower investment cost (€200million instead of €700million), higher spatial quality, higher return on investment in a more resilient mobility system.

5.2.2 TIILUP NETWORK DIMENSION:

MULTI MODAL NETWORK OPTIMISATION AT VARIOUS SPATIAL SCALES

Establish the main parameters of specific transport systems (multi-modal, LUTI – land-use transport integration) in relation to spatial functions and spatial density. Transport systems and multi-scalar issues will be analysed and reviewed in relationship to accessibility and spatial development.

Output

- Inventory and analysis of relationships between transport networks (at different scales).
- Development of a catalogue of different spatial functions/land-uses (patterns, typologies at different scale levels).

Research type: desk study, analysis and review of state of the art, application to corridor in order to illustrate impact and use as ingredient for concepts in catalogue (see description under Work Package 1 – 5.2.1).

5.2.3 TIILUP TEMPORAL DIMENSION:

TIME LINKAGES AND SHIFT TO STRATEGY DRIVEN PLANNING

Linking stages in a full life-cycle of places (this also relates to renewal, redevelopment, circular economy/cradle-to-cradle (C2C) and asset management).Examining paradigms and temporal changes associated with changing lifestyles and linkages to mobility and accessibility. Analysis and review of time linkages for strategy development – regarding the analysis of development of transport infrastructure systems, transitions to multi-modality.

Output

- Inventory of short-term, long-term issues, intermediate steps in transitions of transport networks (for different modalities, at different spatial scales), temporary land-uses/transport uses.
- Development of concepts (phasing, structuring) dealing with a transition from an ad-hoc approach to a strategic approach (developments paths from static/project oriented to dynamic/area oriented approaches).

Research type: desk study, analysis and review of state of the art, application to corridor in order to illustrate impact and use as ingredient for concepts in catalogue (see Work Package 1 – 5.2.1).

Image 5: Marseille, public-private venture infrastructure project (M55 highway).This project is part of larger urban project (Euromediterrane), whose development consists of offices, housing, retail, new train station.

5.2.4 TIILUP VALUE DIMENSION: COMBINED VALUE CREATION AND CAPTURING

Overview of state of art of models and approaches to create value (including accessibility) and capture value in combined infrastructure and spatial development (projects). Examining instruments for value creation and capturing.

Output

- Inventory and review of topics such as value creation: design approaches, value engineering, value assessment / appraisal approaches, Environmental Impact Assessment, Cost-Benefit Analysis, Life-Cycle Costing, rating systems (BREEAM, LEED, CEEQUAL), value capturing, cost-savings, business models, transaction costs, financing/funding models.
- Inventory resulting in a categorisation study resulting in a toolbox of instruments for value creation, appraisal and capturing.

Research type: desk study, state of art, application to corridor in order to illustrate impact and use.

5.2.5 TIILUP INSTITUTIONAL DIMENSION: GOVERNANCE FOR INTEGRATED PLANNING

Examine and analyse existing organisation, institutional frameworks which leads to an overview of governance approaches at all levels for the implementing toolbox.

Output

- Inventory of concepts related to institutional embedding, issues of institutional capacity, culture and setting, governance models at all institutional levels. Development of governance approaches for different situations (transport-land-use combinations, at different scales – see Work Package 1 – 5.2.1) related to partnerships: inter-governmental cooperation (public-public partnerships), market involvement (public-private partnerships), stakeholder engagement (citizens, interest groups), and governance of organisational networks.
- Development of a framework for coordination between (urban) regional management and (multi-modal transport) network management.

Research type: desk study, state of art, application to corridor in order to illustrate impact and use.

5.2.6 TIILUP IMPLEMENTATION DIMENSION:

IMPLEMENTATION DRIVERS FOR INTEGRATED PLANNING

A critical aspect is the implementation of a framework developed. This item will be to make an inventory of implementation issues, drivers in order to tackle implementation barriers.

Output

- Examine requirements for development capabilities and training
- Study the availability of instruments and data
- Development of forms of dissemination, communication aspects and implementation strategy formulation

Research type: desk study, state of art, application to corridor in order to illustrate impact and use.

5.2.7 TIILUP BASIC FRAMEWORK: INTEGRATING THE WORK-PACKAGES INTO A FRAMEWORK

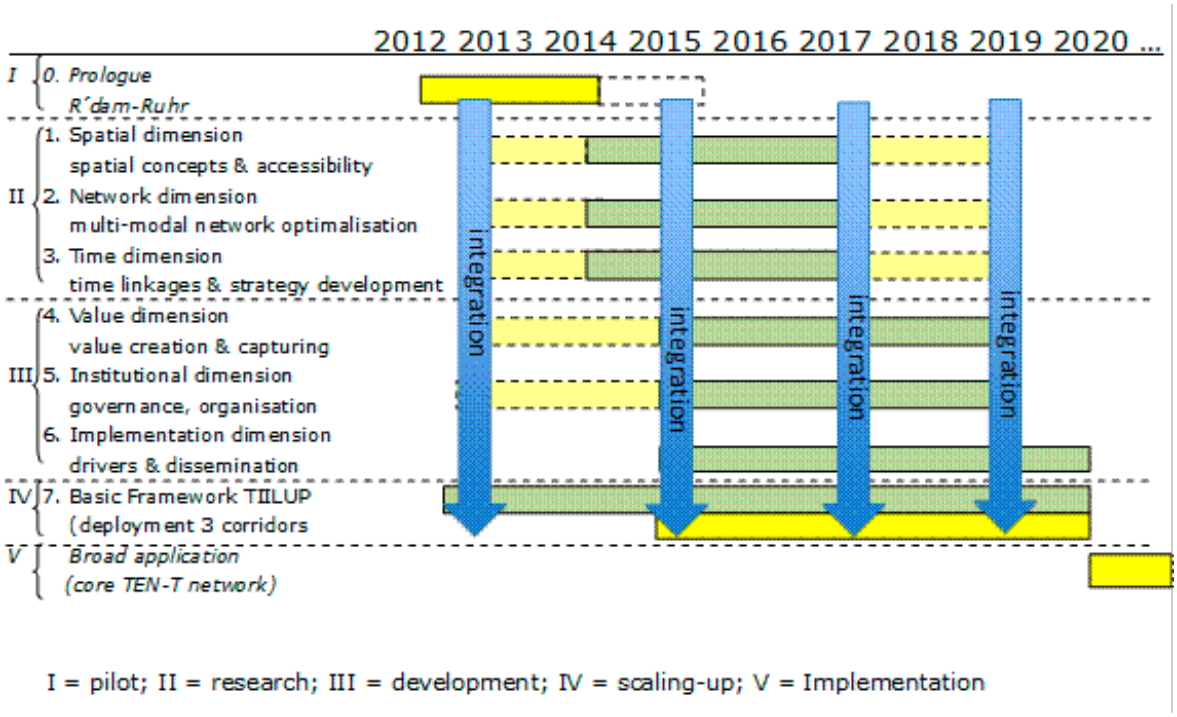
The development of a Basic Framework requires continuous integration of the themes/Work Packages. This will be done in a continuous testing process which commences with the pilot corridor (prologue) and then will be extended to other relevant transport corridors.

Output

- The synergy between the Work Packages will be filtered to ensure the development of first guidance for planning and design (including governance and financing) for Integrated Transport Infrastructure and Land-Use Planning (see Figure 1)
- First application (deployment) for spatial design concepts will be for three key European transport links – e.g. Rotterdam-Ruhr-Alps, Hansa Route (North Sea-Baltic), Mediterranean corridor (Valencia-Genoa/Milan).
- This would involve the evaluation of experiences (do's and don'ts), benchmarking, sharing of lessons learned/ good practices and subsequently finalising the framework.

Research type: practical laboratory of concepts developed in Work Packages 1-6 applied to corridors in order to detect synergies and illustrate impact and usefulness, resulting in a tested TIILUP framework.

Figure 5: Planning for the TIILUP Work Package programme



6. RELEVANT CASES

In order to identify successful elements of the TIILUP approach, best practices will be analysed. Preliminary interesting cases that have been identified include:

- Southern Ringway Groningen, the Netherlands
- Ringway Utrecht, the Netherlands
- Regional Master plan and Design Manual A40/Ruhr, Germany
- S-Bahn München, Germany
- Plateau de Kirchenberg, Luxembourg
- Cité de la Méditerranée, France
- Norwegian highway architecture, Norway
- Nordtangente Basel, Swiss
- Aspern Vienna's Urban Lakeside, Austria
- Co-financing ASFING, Austria
- Interconducts, Austria
- Brainport Avenue Eindhoven, the Netherlands
- The West Swedish Infrastructure Package, Sweden
- Southern lin Stockholm, Sweden
- Herning Highway / A15, Denmark
- Silkeborg, Denmark
- Architectural design, Austria
- Crosslinking traffic carriers/intelligent roads, Austria
- Transport revolution, Finland
- Tallinn ring road, Estonia
- Mäo bypass
- Suur Strait accessibility study
- Barcelona Olympic games/B20 Ronda de Dalt, Spain
- Central artery Boston, USA
- Rio Project Madrid, Spain
- pArk 12, The Netherlands
- La Defense Paris, France
- San Francisco Doyle Drive, USA
- Santos Valongo Waterfront Regeneration, Brazil
- Yongsan International Business District
- Hongkong and Shanghai
- Aging population mobility, Japan
- Cycle highway Ruhr area, Germany
- North-south highway Ruhr area, Germany
- Via Baltica highway E67, Baltic States

More information on the cases can be found in Annex 1.

7. CORE GROUP & CONTACTS

7.1 TIILUP CORE GROUP

- Jos Arts, Strategic Advisor Rijkswaterstaat, University Groningen (Netherlands)
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- Kelly Shannon, Professor AHO Oslo, Professor Urbanism University Leuven (Norway/Belgium)
- Henrik Sander,Director orange edge, research groupinfra_structures+ at HafenCity University(Germany)
- Peter Frost-Möller,Head of department at NIRAS, University Aalberg (Denmark)
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- Vincent O'Malley,Head of Environment, National Roads Authority (Ireland)
- Andrea Gebhard,President BundDeutscherLandschafsarchitecten, Director Mahl-GebhardKonzepteMunchen (Germany)
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- HeikkiKalle,CEO Hendrikson&Ko (Estonia)
- Tara Spain, Senior Policy Advisor Planning, National Roads Authority (Ireland)

Image 6: TIILUP core group meeting 27th June 2012

Image 7: TIILUP core group meeting 8th November 2012

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ANNEX 1: RELEVANT CASES – PRELIMINARY LONG LIST

1. RING GRONINGEN, THE NETHERLANDS

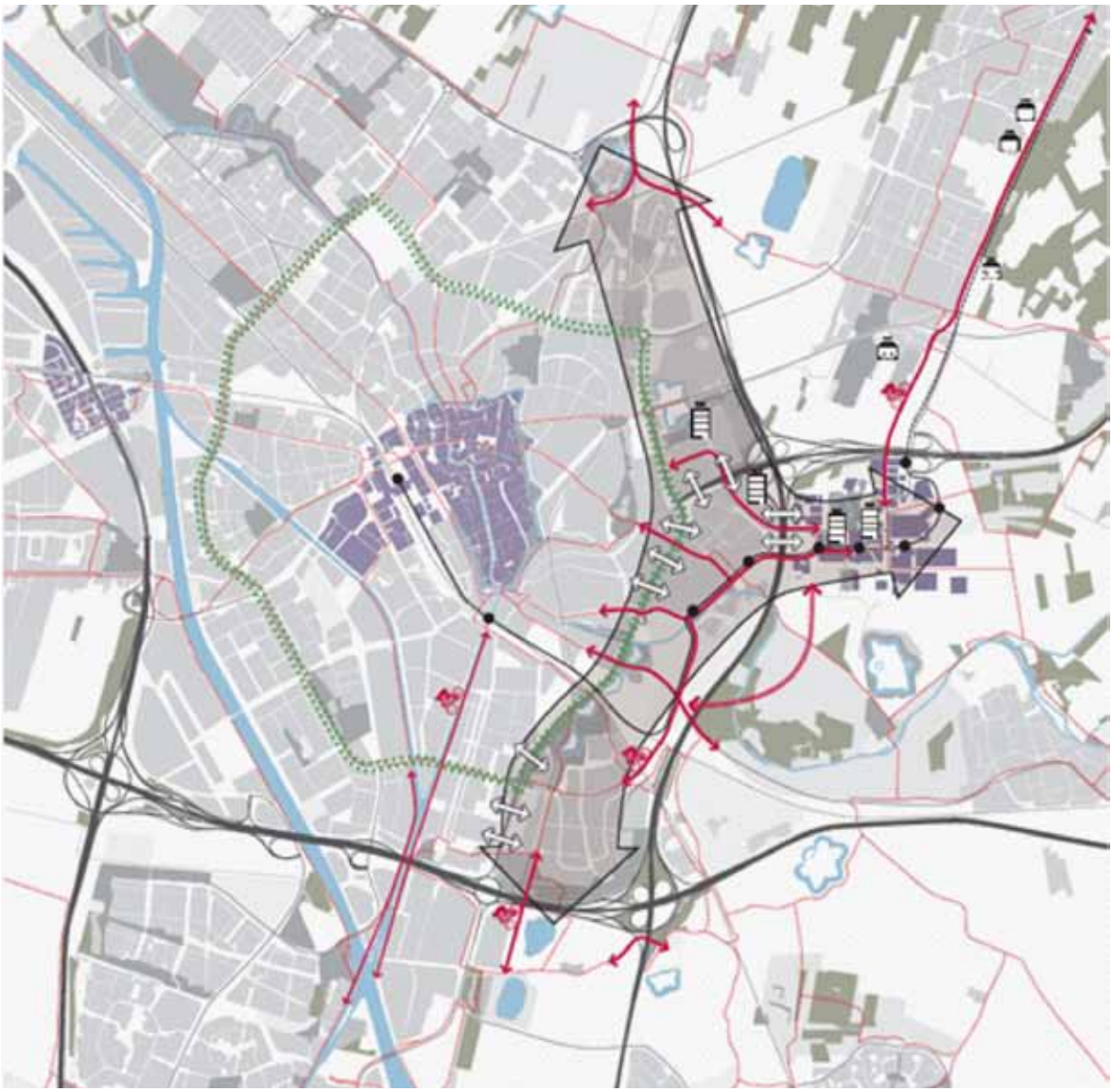
About: The development of the Southern highway of Groningen, connecting the A28 with the A7.

Relevant aspects: National and regional economy, connection between city and landscape, highway expansion, governance, quality team, cooperation between national, provincial and local governments, integral strategy driven approach, multimodal strategy

2. RING UTRECHT, THE NETHERLANDS

About: The expansion of the ring highway around the city of Utrecht, focal point in the transport network in the Netherlands.

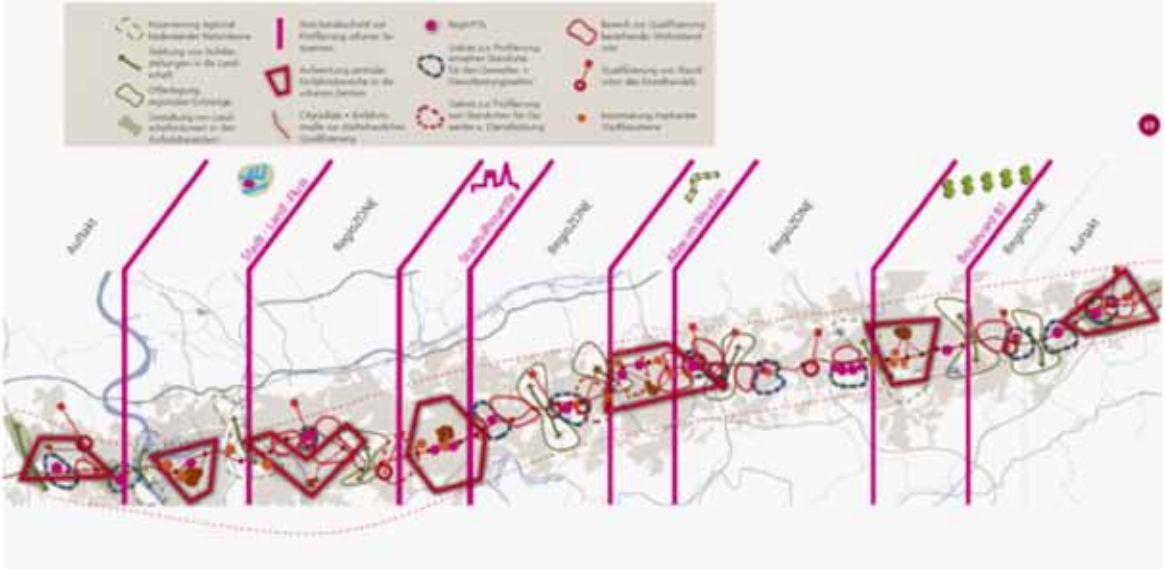
Relevant aspects: National and regional economy, campus development, connection between city and landscape, highway expansion, governance, quality team, cooperation between national, provincial and local governments, integral strategy driven approach, multimodal strategy



3. REGIONAL MASTER PLAN AND DESIGN MANUAL A40/RUHR, GERMANY

About: Integrated strategy for a regional development combined with a re-design of an existing highway, raising efficiency of public investments, coordination of traffic and urban planning, creating regional identity.

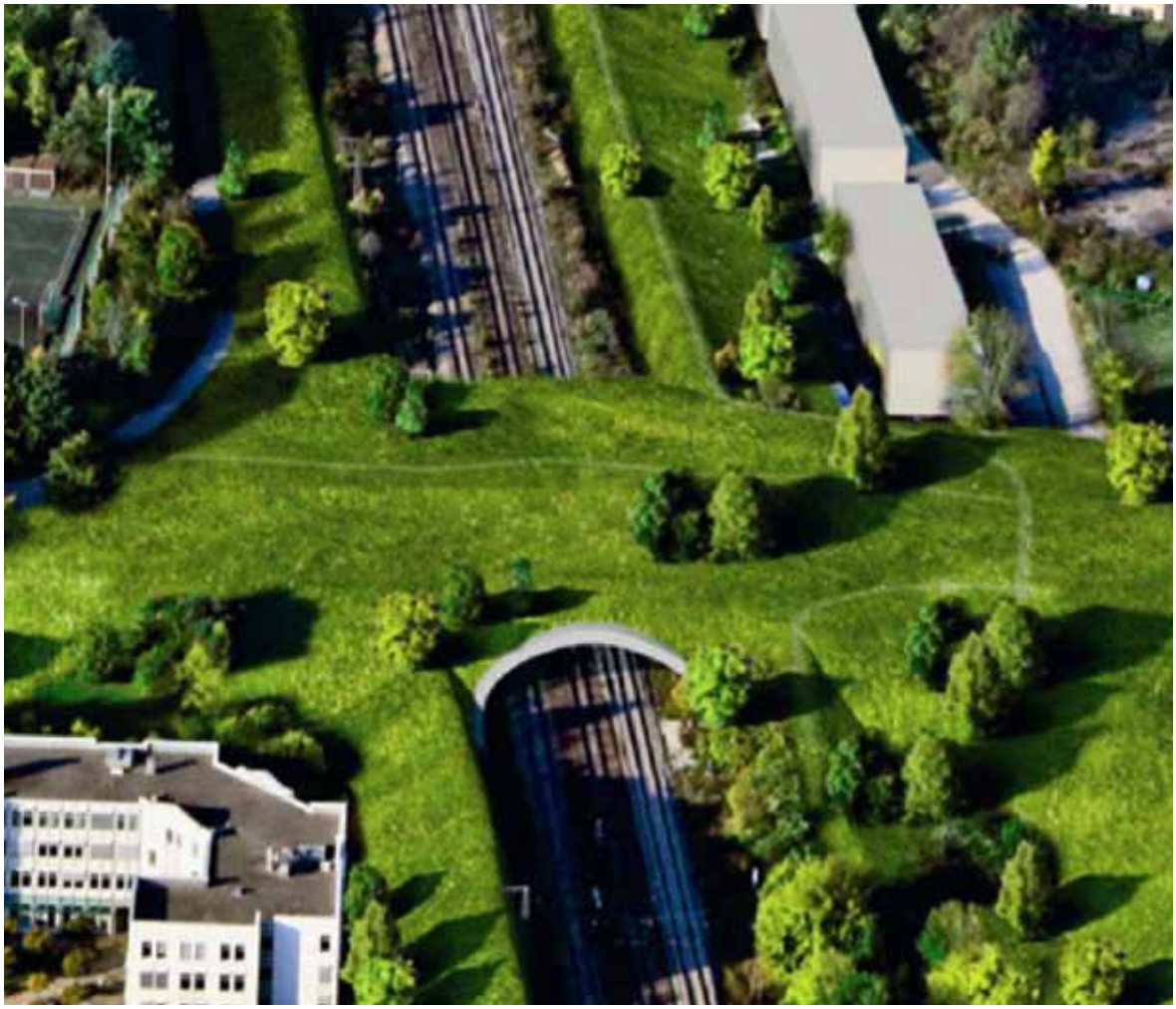
Relevant aspects: National and regional economy, integral regional strategy, transformation of industrial heritage, economic and demographic shrinkage, participation.



4. S-BAHN MUNCHEN, GERMANY

About: S-Bahn München connecting the airport with the city centre.

Relevant aspects: Integral strategy, multimodal node development, cost savings, civilian participation



5. PLATEAU DE KIRCHBERG, LUXEMBOURG

About: Transformation of a highway as the local J.F. Kennedy boulevard (three-lane road with separate lanes for public transport, bicycles and pedestrians), private fund renounces a monotonous office development and aspires a mix of functions: development of 120,000 m^2 offices, combined with 36,000 m^2, commercial centre, hotel, 45 ha dwellings and facilities.

Relevant aspects: Integral area development, mixed functional development, Public-Private Partnership.

6. CITÉ DE LA MÉDITERRANÉE, FRANCE

About: Tunnelling 1 km of the M55 highway, widening the parallel quay road with extra 45 metres, infrastructure project part of larger urban project Euromediterrane, development consists of 600,000 m^2 offices, 400,000m^2 housing, 200,000m^2 retail, new train station, master plan urbanism competition, organisation project with joint venture structure EPAEM.

Relevant aspects: Integral area development, Joint Venture Public Private Partnership, mixed functional development

7. NORWEGIAN HIGHWAY ARCHITECTURE, NORWAY

About: The Norwegian national road agency is in the midst of a $1.6 billion project that attempts to lure tourists to this often over-looked area by highlighting the landscape with architecture -- in the shape of viewpoints, rest stops, benches, winding foot bridges and stairs leading you to the sea. It has already hired more than 45 mostly young architects, landscape architects and artists to create these eye-catchers. And you do not need a car to enjoy it, some of the projects include resting shelters for bicyclists.

Relevant aspects: Aesthetic road design, opening up the landscape by infrastructure, parkway, young architects and artists

8. NORDTANGENTE BASEL, SWISS

About: Improving the connection of the Swiss A2/A3 to the French A35 and German A5, the redevelopment of the Nordtangente is part of a large urban development plan, until now €60 million revenue from real estate development, development of IAK – interdepartmental platform for integral urban development project, SBN defines the spatial quality of the project, Kanton Basel responsible of the public space.

Relevant aspects: Integral area development, mixed functional development, Public Private Partnership, cooperation between national, provincial and local governments

9. ASPERN - VIENNA'S URBAN LAKESIDE, AUSTRIA

About: Development of a new urban area connected by an underground line. The original plan of a motorway connection between two motorway-branches was replaced by combination of a centre averted motorway connection and a dominating public transport concept. Aim: a new multi-functional urban area for Vienna – with residential units, spaces for offices and service companies and a centre for industry, science, research and training.

Relevant aspects: Integral area development, mixed functional development, Public Private Partnership

10. CO-FINANCING ASFING, AUSTRIA

About: ASFINAG implemented an internal guideline, which has to be applied for all new junctions. Each junction is assessed by its overall economic benefits taking into account beneficiaries, which have to co-finance unless the project in itself is profitable for ASFINAG in terms of induced traffic. Case: A4 Exit Commercial park Parndorf – Co financed new exit. Project Year: 2011. Location: motorway A4 Neusiedl/ Parndorf

Relevant aspects: Guidelines, Co-financing, Public Private Partnership, Cost-splitting between state/commercial park/ ASFINAG according to benefits.

11. INTERCONDUCTS, AUSTRIA

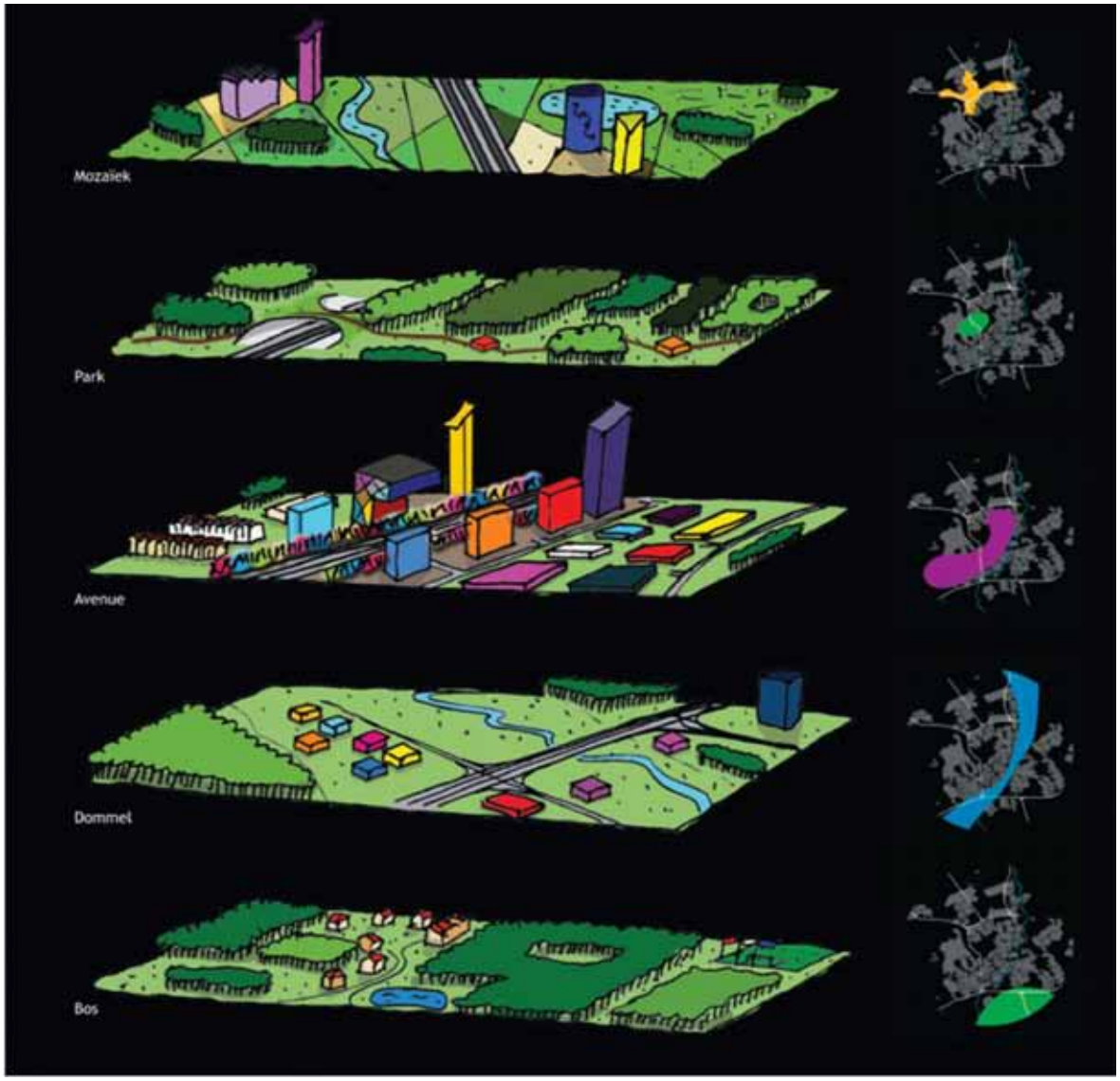
About: Existing solutions: on several stages; depends on the intensity of game-crossings. Problem: in some cases, local spatial planning does not take care of a demand for game-crossing and permits building areas that actually prohibit game crossing via the dedicated corridor. Strategic concept: Cooperation with"Naturschutzbund" to fix several interconducts on existing network for approximately the next five years. For new (planned) road sections, interconducts are compulsory, due to Environmental Impact Assessment.
Case: Interconduct S1 to ensure game-crossing, agricultural traffic and cross linking of recreation facilities. Project Year: 2006. Location: motorway S1 Vienna-Outerring.

Relevant aspects: Cooperation with different disciplines, Environmental Impact Assessment, cross-linking of recreation facilities and agricultural traffic. interconduct; connection between city and landscape; prevent dissection of agricultural production areas; cross linking for regional game corridors.

12. BRAINPORT AVENUE, EINDHOVEN

About: Integral strategy to develop the area around the A2 and A67 around Eindhoven. Promoting itself as 'Brainport, the smartest region in the world', a regional cooperation of public parties develops mixed use, office, housing, recreational and ecological projects around the further developing highway following one coherent vision.

Relevant aspects: Integral planning, regional economy, spatial quality, public – private cooperation



13. TALLINN RING ROAD, ESTONIA

About: Project involved seven municipalities and the lesson was that within the same corridor study the project "behaved" differently according to the administrative ability and practice/ planning capability/ activity of local stakeholders of particular municipality. The comparative study would show pattern of best practice in joint land use and transportation planning process management.

Relevant aspects: Cooperation with different disciplines, Environmental Impact Assessment, cross-linking of recreation facilities and agricultural-traffic.

14. MÄO BYPASS

About: Interesting example where the road planning was coinciding by ongoing municipal master planning and therefore the results were well balanced form accessibility but also sustainability point of view.

15. SUUR STRAIT ACCESSIBILITY STUDY

About: Interesting example where local scale technical study showed weaknesses and unsolved issues on strategic level and ended up in regional scale analysis with surprising outcomes and better involvement of stakeholders. Also involved several levels of public administration and serves as a good example what happens to the plan when it becomes and attribute to the election campaign.

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