Safety 2016 World Conference

12th World Conference on Injury Prevention and Safety Promotion

CO-SPONSOR World Health Organization

18-21 September 2016
Tampere, Finland
#Safety2016FIN

SafetyCube

Developing the European Road Safety Decision Support System

George Yannis, Pete Thomas, Eleonora Papadimitriou, Rachel Talbot, Heike Martensen

Co-funded by the Horizon 2020
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10/11/2016

SafetyCube project

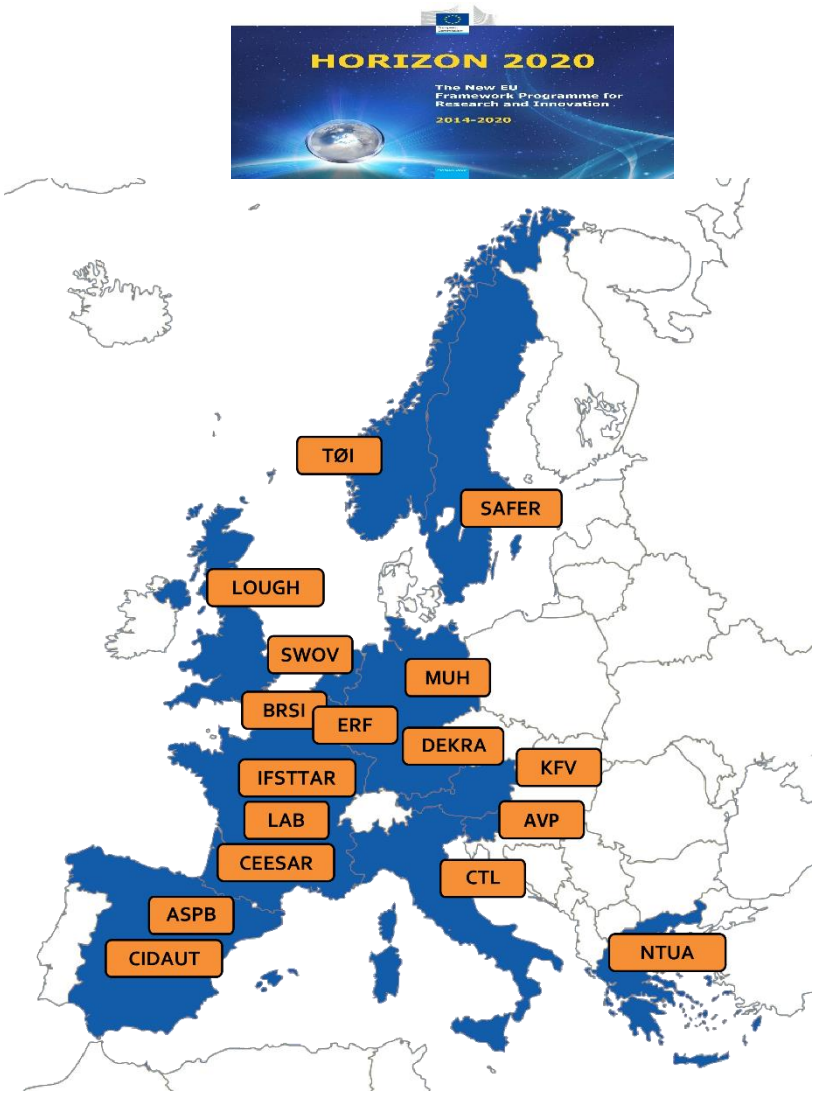
Funded by the European Commission under the Horizon 2020 research framework programme

Coordinator: Pete Thomas, Loughborough University

Start: May 2015

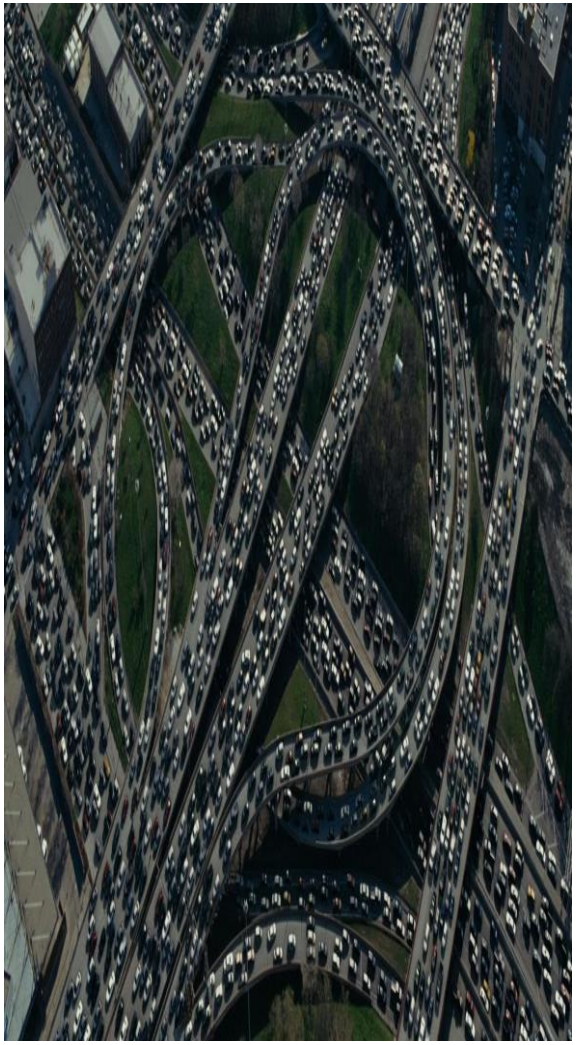
Finish: April 2018

17 partners from 12 EU countries



SafetyCube concept

- Problem
  - *Evidence based road safety policies are becoming more usual and there is much better availability of national data and state of the art knowledge*
  - *Effective road safety policies need good information about accident risk factors and about measures*
- SafetyCube will meet this need by generating new knowledge about accident risk factors and the effectiveness of measures relevant to Europe
- It will structure this information so it can be incorporated in the European Road Safety Observatory

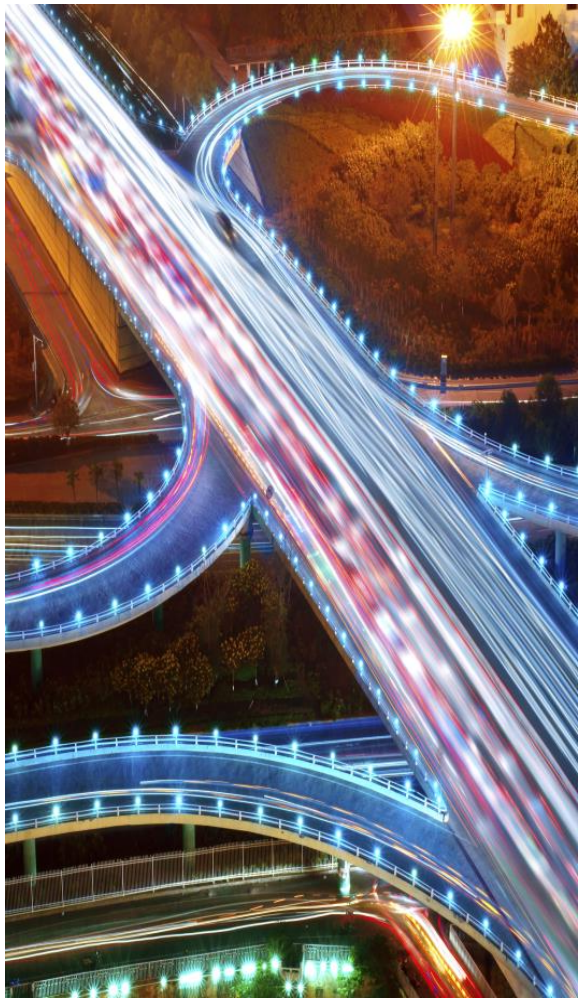


Vision

- To develop **an inventory of evaluated road safety measures related to human behaviour, road infrastructure and vehicle**, with results from accident risk factors analysis and measures cost-efficiency assessment, to be integrated in the European Road Safety Decision Support System (DSS)

Objectives

- Description the background, methodology and design principles of the European DSS within the SafetyCube project
  - *comprehensive common methodology is designed and applied in existing and new studies of road safety measures effectiveness evaluation*
  - *extensive consultation of road safety stakeholders is carried out, by means of several workshops, in order to define the user needs for the DSS*
  - *presentation of the structure and the functioning of the DSS together with the first results of the application of the common methodology for the evaluation of road safety measures effectiveness*



Methodology-A taxonomy of risk factors and measures

- Complete taxonomy of 3 categories: human behaviour, infrastructure and vehicle.
- Specific risk factors and measures were assigned to the respective category.
- More than **90 risk factors** and **95 measures** in **infrastructure** areas, more than **115 risk factors** and **250 measures** for **behaviour**, more than **60 risk factors** and **60 measures** for the **vehicle** area have been identified.
- A **detailed and recorded literature research** is carried out so that key studies are identified (at each detailed level of the taxonomy, i.e. for each specific risk factor or measure)

Example: taxonomy of infrastructure risk factors and measures

More than 90 risk factors and 95 measures in 15 infrastructure areas

Exposure
Traffic flow
Traffic composition

Road safety management
Road safety audits, inspections etc.
Blackspots treatment
Speed management

Horizontal alignment
Road curvature (curve radius, curve frequency, transition curves etc.)

Vertical alignment
Gradient
Vertical curvature (sight distance)

Cross-section
Superelevation, cross-slopes
Lanes (number, type, width)
Shoulder (type, width)
Median / barrier

Roadside
guardrails, obstacles, visibility
Sidewalks, cycle lanes

Road type

Road surface
Friction
Uneven surface
Oil, leaves, ice, snow etc.

Junctions alignment
Roundabouts
Interchanges & ramps
At-grade junctions
Channelization (left turn lanes, traffic islands)
Rail/road crossings

Traffic control
Speed (speed limits, section control, speed humps)
Traffic signs
Delineation and Road markings
Traffic signals (installation, timing)
ITS (VMS, V2I)

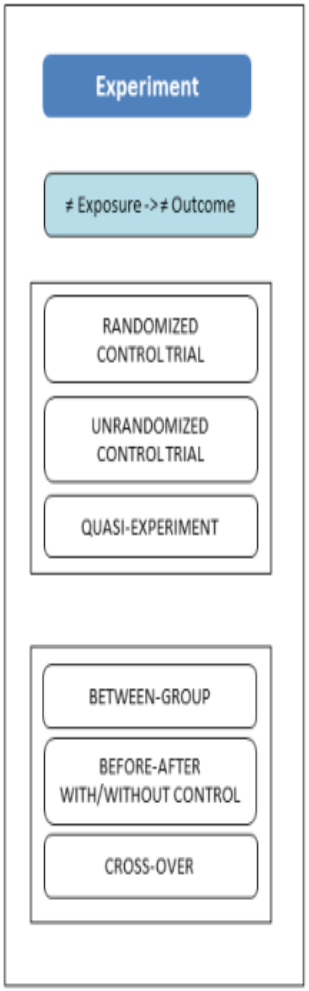
Lighting

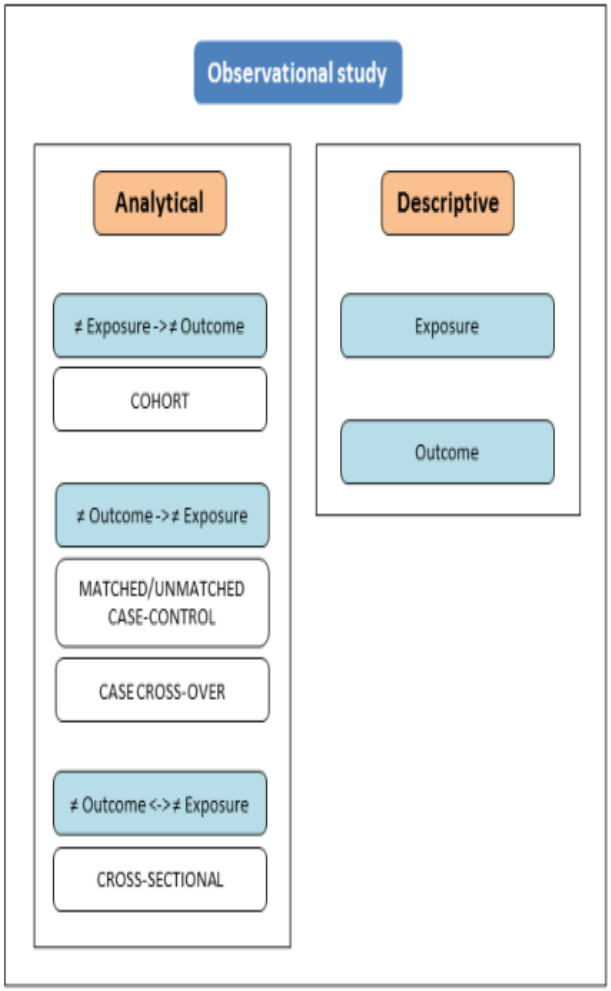
Weather

Workzones

Methodology-Guidelines and tools

- A **taxonomy of study designs**
- Different estimators of **effects**
  - *Crash Modification Factor (CMF)*
  - *Absolute difference*
  - *Regression coefficient / slope*
  - *Odds ratios*
  - *Accident rates ratios*

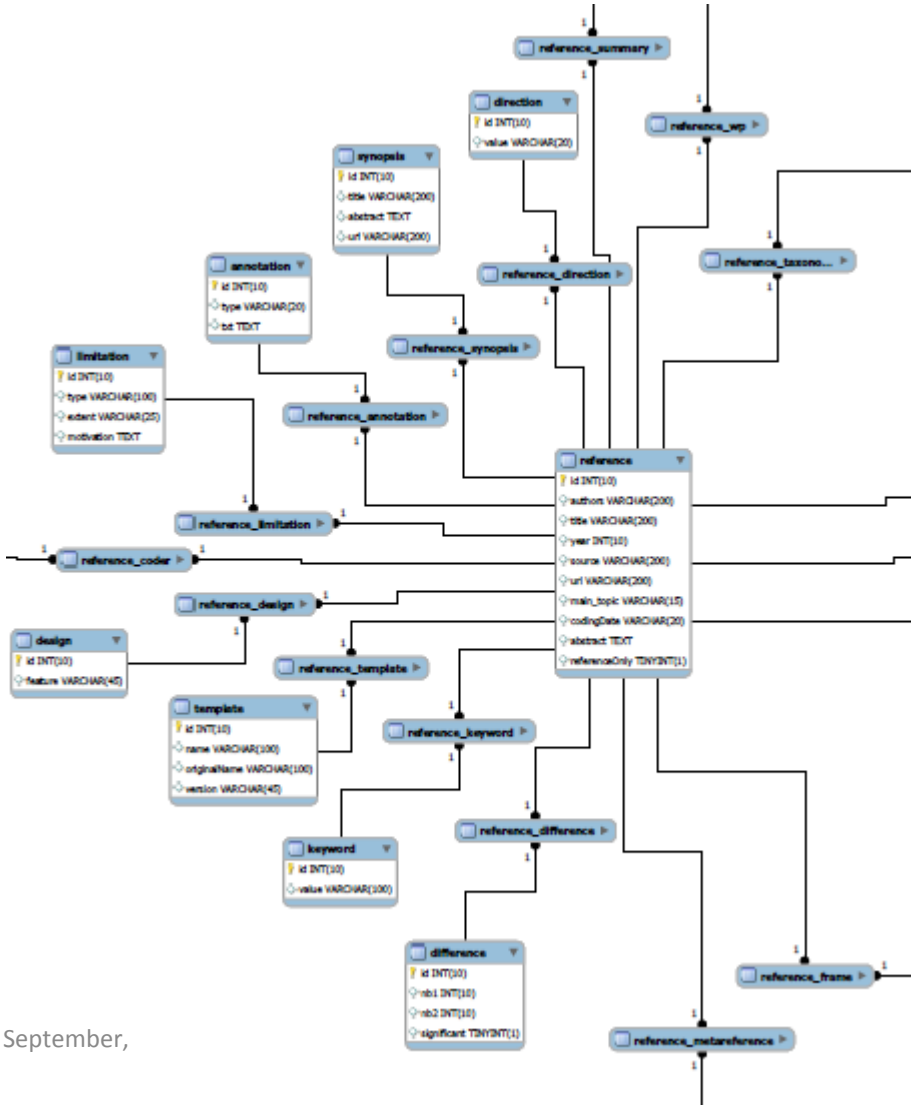




Coding template and database

- A **template for coding research studies** and existing results (excel)
- A **template for summarising results** / meta-analysing

- The templates of **coded studies** will undergo a thorough checking and debugging process, in order to be eventually stored in a **relational database**, which will serve as the back-end of the DSS



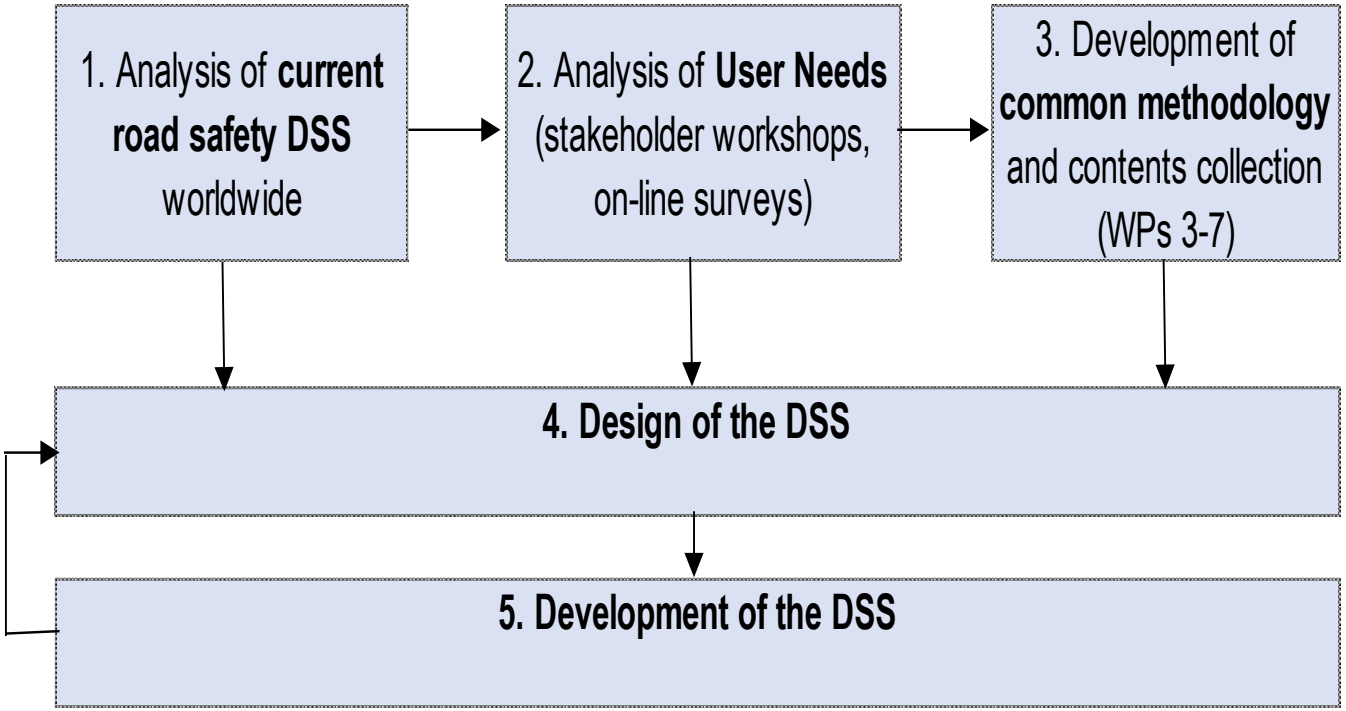
DSS-Analysis of user needs

- Stakeholders from government, industry, research, and user associations.
- 3 workshops
  - *June 2015, Brussels*
  - *October 2015, Ljubljana*
  - *February 2016, Brussels*
- The DSS should be suitable for use by a wide range of end users, not be limited to EU policy makers, but also local authorities.
- The DSS should have the following characteristics:
  - *include robust data which allow for critical analysis and transparency*
  - *access to the studies used and to all results as well*
  - *information of the best quality studies and recommendations*

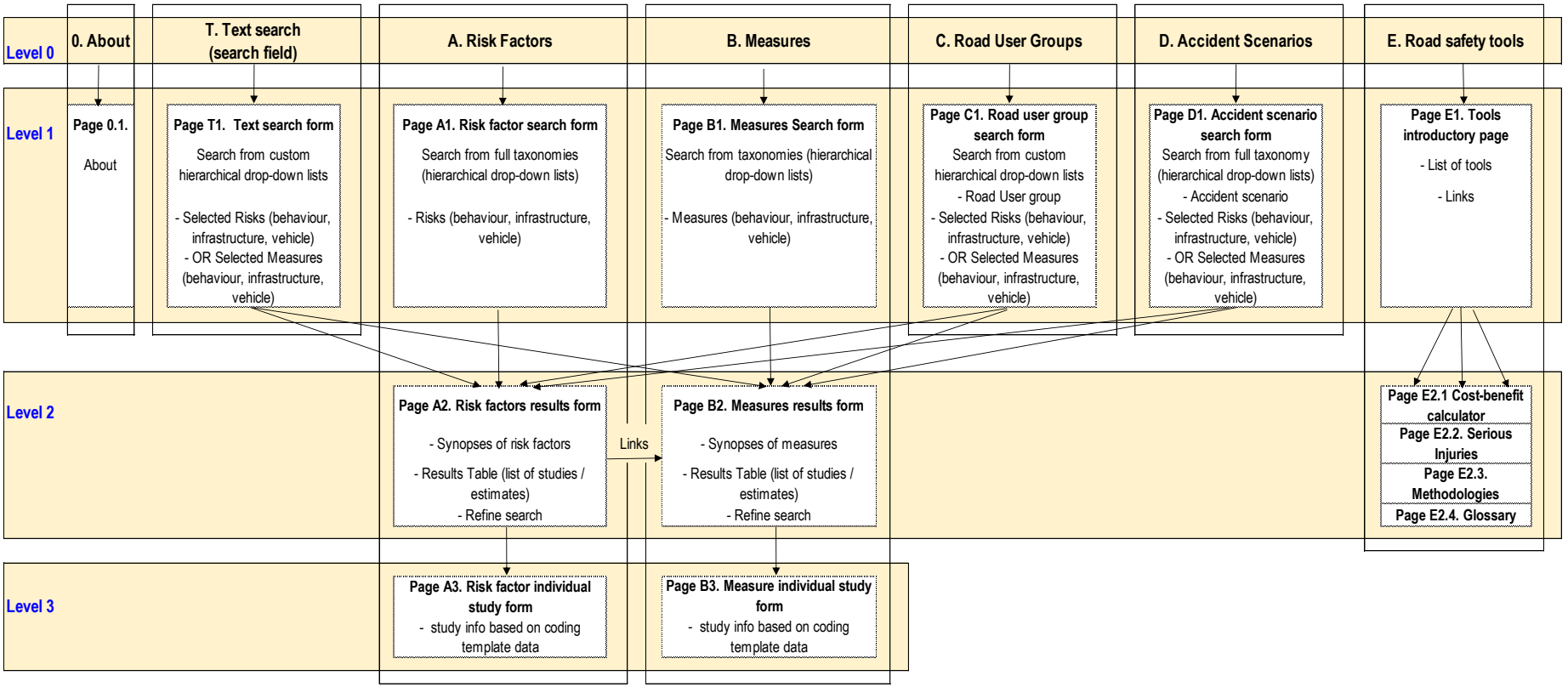
DSS design principles and inclusion criteria

- Design Principles
  - *A Modern web-based tool*
  - *High Ergonomic interface*
  - *Simple structure*
  - *Powerful Search Engines*
  - *Fully Documented information*
  - *Easily Updated*
  - *SafetyCube DSS Website: a strong and easily found address*
- Inclusion Criteria
  - *Quantitative results required*
  - *Information completeness*
  - *A set of priority criteria*
  - *Meta-analyses are preferred over simple analyses*
  - *Methodological soundness and high clarity (adequate sample size, appropriate statistical methods)*
  - *Recent studies are preferred*

DSS development-Methodology



DSS User Interface Design (1)



DSS User Interface Design (2)

- **Home Page**
  - *Five entry points: Risks / Measures / Road User Types / Accident scenarios / Text search*
- **Search Pages:**
  - *Search from list of risk factors and / or measures (Level 1)*
- **Results Pages: Risk factors / Measures**
  - *Refine search criteria (e.g. countries, road user types, road types, accident types)*
  - *Results in Table form with synopses and studies - several items (Level 2)*
  - *Individual study results form - one item (Level 3)*
- **Tools pages**
  - *CBA calculator*
  - *Serious Injuries*
  - *Methodology, Glossary*

DSS Search Engine

- Fully **linked** search
  - *search a road safety problem alone or through the measures*
  - *search a measure alone or through the road safety problems*
- Fully **detailed** search
  - *search by any parameter in each data table (road safety problems, measures)*
- Fully **flexible** search
  - *adjust search according to results*
- Fully **documented** search
  - *access background information at any stage (links, etc.)*

Progress to date

- **Wealth of risks, countermeasures and studies** related to behaviour, road infrastructure and vehicle (CMF approach).
- Already analysed approx. **500 studies**, and many more in progress.
- Updated more than **20 existing meta-analyses**, about 65 more in progress.
- The **design of the DSS** is finalized and the first static prototype of the DSS is available.
- The **DSS testing phase** (with test tables) is ready till the end of 2016.
- The **DSS Pilot Operation** is starting on January 2017.
- The **final opening of the DSS** is starting on September 2017 and will be constantly updating from April 2018 and onwards.

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