Report on kick-off meeting
D6.2

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<table>
<thead>
<tr>
<th>Number</th>
<th>Date</th>
<th>Author(s)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>23/06/2015</td>
<td>Ken Gavin (KG), Carla Soriano (CS)</td>
<td>First Draft sent to MR for review</td>
</tr>
<tr>
<td>02</td>
<td>25/06/2015</td>
<td>Michael Robson (MR)</td>
<td>MR returns First Draft with his comments</td>
</tr>
<tr>
<td>03</td>
<td>26/06/2015</td>
<td>Ken Gavin (KG), Carla Soriano (CS)</td>
<td>Final version is complete</td>
</tr>
</tbody>
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1. Outline of the DESTinationRAIL project kick-off meeting

1.1 Introduction

The kick-off meeting of the DESTinationRAIL was organised on May 19th and 20th, 2015 in Dublin, Ireland. The General Assembly (meeting of all participants) was preceded by a face to face meeting of the Executive Board, in a dedicated meeting (between 1 pm and 2pm) on May 19th. The general assembly meeting began at 2pm. The Executive Board Meeting focussed on aspects of the overall management of the project, such as the reports’ templates, the project website and the frequency of meetings. There were also decisions on other pending matters. The first day of the General Assembly allowed every Work Package leader to present their WPs, task by task, with the intent of identifying particular needs and requirements and help solving any issues. Decisions were made for each WP and there’ll be follow-ups on their progress through the Milestones and Deliverables’ reports. On the second day dedicated work package meetings were held.
### 2.2 Attendance list

<table>
<thead>
<tr>
<th>Person</th>
<th>Participant organisation name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kenneth Gavin</td>
<td>Gavin and Doherty Geosolutions (GDG)</td>
</tr>
<tr>
<td>Karlo Martinovic</td>
<td></td>
</tr>
<tr>
<td>Ruth O’Brian</td>
<td></td>
</tr>
<tr>
<td>Luke Prendergast</td>
<td></td>
</tr>
<tr>
<td>Cormac Reale</td>
<td></td>
</tr>
<tr>
<td>Cathal Mangan</td>
<td>Irish Rail (IE)</td>
</tr>
<tr>
<td>Vijay Ramdas</td>
<td>Transport Research Laboratory (TRL)</td>
</tr>
<tr>
<td>Jonathan Sharpe</td>
<td></td>
</tr>
<tr>
<td>Michael Robson</td>
<td>Robson’s International Rail Consultancy (RIRC)</td>
</tr>
<tr>
<td>Mario Bacic</td>
<td>University of Zagreb (UZ)</td>
</tr>
<tr>
<td>Professor Meho Sasa Kovacevic</td>
<td></td>
</tr>
<tr>
<td>Danijela Maric</td>
<td></td>
</tr>
<tr>
<td>Marijan Car</td>
<td></td>
</tr>
<tr>
<td>Lovorka Libric</td>
<td></td>
</tr>
<tr>
<td>DeanMatovic</td>
<td>Croatian Railways (HŽ)</td>
</tr>
<tr>
<td>Velimir Sporcic</td>
<td></td>
</tr>
<tr>
<td>Janja Groš</td>
<td></td>
</tr>
<tr>
<td>Sanja Vučić</td>
<td></td>
</tr>
<tr>
<td>Bernhard Lechner</td>
<td>Technical University of Munich (TUM)</td>
</tr>
<tr>
<td>Karmen Fifer Bi</td>
<td>Slovenian National Building and Civil Engineering (ZAG)</td>
</tr>
<tr>
<td>Amir M Kaynia</td>
<td></td>
</tr>
<tr>
<td>Karin Norén-Cosgriff</td>
<td>Norwegian Geotechnical Institute (NGI)</td>
</tr>
<tr>
<td>Elias Kassa</td>
<td>Norwegian National Technical University (NTNU)</td>
</tr>
<tr>
<td>Irina Stipanovic</td>
<td>University of Twente (UT)</td>
</tr>
<tr>
<td>Timo Hartmann</td>
<td></td>
</tr>
<tr>
<td>Tiedo Tinga</td>
<td>Open Track Railway Technology (OTRT)</td>
</tr>
<tr>
<td>Andreas Schoebel</td>
<td></td>
</tr>
<tr>
<td>Alan O’Connor</td>
<td>Roughan O’Donovan Innovation Solutions (ROD)</td>
</tr>
<tr>
<td>Mark Tucker</td>
<td></td>
</tr>
<tr>
<td>Lorcan Connoly</td>
<td></td>
</tr>
<tr>
<td>Bryan Adey</td>
<td>Eidgenoessische Technische Hochschule Zurich (ETH)</td>
</tr>
<tr>
<td>Gordana Tesic</td>
<td>Slovenian Railways (SZ)</td>
</tr>
</tbody>
</table>
2.3 Meeting Agenda

<table>
<thead>
<tr>
<th>Time</th>
<th>Event Description</th>
<th>Presenter/Department</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tuesday 19th May</strong></td>
<td></td>
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</tr>
<tr>
<td>12-1.00 pm</td>
<td>Executive Board Meeting</td>
<td>Executive Board</td>
</tr>
<tr>
<td>1 pm</td>
<td>Registration &amp; Lunch</td>
<td>TBC</td>
</tr>
<tr>
<td>1.15 pm</td>
<td>Welcome</td>
<td>Dr. Kenneth Gavin Co-ordinator</td>
</tr>
<tr>
<td>1.20 pm</td>
<td>Introduction to DESTINATION RAIL – Project Overview</td>
<td>Dr. Irina Stipanovic (UT)</td>
</tr>
<tr>
<td>1.35 pm</td>
<td>Project Management/ Technical Reporting</td>
<td>Administrative Manager</td>
</tr>
<tr>
<td>1.50 pm</td>
<td>WP 1 - FIND</td>
<td>Dr. Ken Gavin (GDG)</td>
</tr>
<tr>
<td>2.10 pm</td>
<td>WP 2 – ANALYSE</td>
<td>Prof. Alan O’Connor (RODIS)</td>
</tr>
<tr>
<td>2.30 pm</td>
<td>WP 3 – CLASSIFY</td>
<td>Dr. Vijay Ramdas (TRL)</td>
</tr>
<tr>
<td>2.50 pm</td>
<td>Coffee</td>
<td>Mr. Michael Robson (RIRC)</td>
</tr>
<tr>
<td>3.00 pm</td>
<td>WP 4 – TREAT</td>
<td>Dr. Vijay Ramdas (TRL)</td>
</tr>
<tr>
<td>3.20 pm</td>
<td>WP5 Integration and Dissemination</td>
<td>All / WP Leaders</td>
</tr>
<tr>
<td>3.30 pm</td>
<td>Summary and Discussion</td>
<td></td>
</tr>
<tr>
<td>4.00 - 5.00</td>
<td>Work Package 1 Breakout meeting</td>
<td>Work Package 1 Participants</td>
</tr>
<tr>
<td>8.30 pm</td>
<td>Dinner in City Centre</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fire Restaurant, Mansion House, Dawson Street</td>
<td></td>
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<tr>
<td></td>
<td>Dublin 2</td>
<td></td>
</tr>
<tr>
<td><strong>Wednesday 20th May</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.00 am</td>
<td>Work Package 2</td>
<td>Prof. Alan O’Connor (RODIS)</td>
</tr>
<tr>
<td>10.00 am</td>
<td>Work Package 3</td>
<td>Dr. Irina Stipanovic (UT)</td>
</tr>
<tr>
<td>11.00 am</td>
<td>Coffee</td>
<td>Dr. Vijay Ramdas</td>
</tr>
<tr>
<td>11.15-12:00</td>
<td>Work Package 4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Close</td>
<td></td>
</tr>
</tbody>
</table>
2. General Issues and Actions

The meeting was organized according to the Agenda previously agreed with all participants. The issues discussed and the actions arising can be seen on the table below:

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Description</th>
<th>Action/Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Executive Board Meeting</strong></td>
<td><strong>19/05/15 12:00 – 13:00</strong></td>
</tr>
<tr>
<td>1a</td>
<td>Decisions from the last teleconference EB meeting have been repeated and agreed. Reporting will be done at 6 month intervals using template from FP7 RAIN project. Each WP will appoint two experts that will review deliverables, not being obliged to attend every Advisory Board meeting. A smaller, higher-level advisory group will be appointed to provide guidance to project.</td>
<td>KG to prepare reporting template. WP leaders to select WP reviewers</td>
</tr>
<tr>
<td>1b</td>
<td>The Consortium Agreement and Grant Agreement were presented and accepted. IS noted that only final Grant Agreement is to be used, as some deliverables’ delivery times have been moved. KG and IS to check those deliverables.</td>
<td>KG and IS to check deliverable months</td>
</tr>
<tr>
<td>1c</td>
<td>KG to prepare a template for Deliverables and Milestones. AOC mentioned that a list of deliverables sorted by months would be beneficial</td>
<td>KG to prepare templates, and deliverable list by months</td>
</tr>
<tr>
<td>1d</td>
<td>Project’s website should be active very soon. EC prefers project websites not being part of other institutions’ websites, and suggests using .eu domain.</td>
<td>SL to establish the website</td>
</tr>
<tr>
<td>1e</td>
<td>Executive Board shall meet every 2 months by teleconference and face-to-face as part of every 6M consortium meeting</td>
<td></td>
</tr>
<tr>
<td>1f</td>
<td>Future consortium meetings might be organised jointly with relevant conferences, possibly including special session. Proposed conferences are CETRA (Zadar, HR, May 2016), ICRT (Cagliari, IT, April 2016), additional ideas are encouraged. It was agreed that the Project’s aim is to publish conference papers on project’s findings widely</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td><strong>General meeting</strong></td>
<td><strong>19/05/15 13:00 – 16:00</strong></td>
</tr>
<tr>
<td>2a</td>
<td>CM from Irish Rail welcomed the participants. KG made a short introduction to project and communicated the EB conclusions.</td>
<td></td>
</tr>
<tr>
<td>2b</td>
<td>WP leaders made a brief overview of their WPs. More in-depth discussion will ensue after WP breakdown sessions. KG highlighted that task leaders (first participant name in parenthesis) are responsible for organising the task rather than WP leaders.</td>
<td>All participants to send pictures and other material to MR</td>
</tr>
</tbody>
</table>
| 2c | Definitions of commonly used terms are agreed to be input in the Project Handbook (Del6.1)  
KG proposed that the leaders of 4 other projects funded under the same call and Brian Bell could form the core of Advisory Board, with the addition of 2 reviewers per WP. |
<table>
<thead>
<tr>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>2d</td>
<td>All participants to prepare a breakdown list of their Person Months per each task and send it to co-ordinator and WP leaders</td>
</tr>
<tr>
<td>All: to send breakdown of PMs per task</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>WP1 meeting</td>
</tr>
<tr>
<td>19/05/15 16:00-17:00</td>
<td></td>
</tr>
</tbody>
</table>
| 3a | Discussion of work plan of WP1, task by task.  
Infrastructure Managers to send initial problem list, broken down by asset type (incl. retaining walls).  
UZ is free to expand the scope of T1.2 (on tunnels) – that goes as a general advice to all participants.  
KG to spread Mainline reports to all partners.  
GDG to organize sub-task meeting with Elias Kassa from NTNU and NGI. |
| IMs to send problem lists.  
KG to spread mainline reports to WP1 partners |
| 4. | WP2 meeting |
| 20/05/15 09:00-10:00 |  |
| 4a | Discussion of work plan of WP2, task by task.  
Monitoring of Boyne bridge to be organised soon.  
WPs 1 and 2 are relatively stand-alone in the project. |
| 5. | WP3 meeting |
| 20/05/15 10:00-11:00 |  |
| 5a | Discussion of work plan of WP3, task by task.  
IE to send IAMS attribute list to TH (UT). TH to create additional questionnaires.  
To find a definitive decision whether to use Irish Rail network or some of larger Central European Ten-T networks for demonstrating Decision Support Tool.  
Task “Facilitating Information” should be between Tasks 3.3 and 3.4 |
| IE to send IAMS attribute list to Timo Hartmann (UT). |
| 6. | WP4 meeting |
| 20/05/15 11:00-12:00 |  |
| 6a | Discussion of work plan of WP4, task by task.  
Work plan divided in two separate strands, minimum interdependencies. |
D6.2 Report on kick-off meeting
DESTinationRAIL – Decision Support Tool for Rail Infrastructure Managers

Presentation following the launch of the project

Work packages discussion

Work packages discussion
3. Annexes

3.1 DESTinationRAIL kick-off meeting presentation – Project Officer
Presentation given by Dr. Ken Gavin (GDG) on behalf of Mr. Michal Klima (INEA)
1. INEA presentation
2. Context of Horizon 2020 & transport 2015 work programmes
3. INEA’s expectations regarding the project
4. Contractual and administrative issues

1. Innovation and Networks Executive Agency

- From 1 January 2014 – TEN-T EA (Trans-European Transport Network - Executive Agency) **became** INEA
- INEA started with TEN-T EA’s 100 staff, and now has an **organisational structure which will reach 318** staff by 2020 (Approximately 160 today)
- 4 parent DGs – **MOVE, ENER, RTD, CNECT**
### INEA Programmes

<table>
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<tr>
<th>Programme</th>
<th>Amount</th>
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<tr>
<td>H2020</td>
<td>€ 6,421 m</td>
</tr>
<tr>
<td>CEF</td>
<td>€ 30,014 m</td>
</tr>
<tr>
<td>TEN-Transport</td>
<td>€ 3,270 m</td>
</tr>
<tr>
<td>Marco-Polo</td>
<td>€ 210 m</td>
</tr>
</tbody>
</table>

- Part of the “Energy” Challenge
- Part of the “Transport” Challenge
Mobility for Growth
Areas addressing mode-specific Challenges:
• 1. Aviation; 2. Rail; 3. Road; 4. Waterborne
Areas addressing transport integration specific challenges:
Areas addressing Cross-Cutting Issues:
9. Socio-economic and behavioural research and forward looking activities for policy-making

Green Vehicles
• It includes research, technological developments, innovation and demonstration in support of improvements in energy efficiency of road transport vehicles and the use of new types of non-conventional energies in road transport such as electricity, CNG and LNG, renewable and tailored fuels.

Small Business and Fast Track Innovation for Transport

2. H2020 - Smart, Green and Integrated Transport
• This Challenge aims to boost the competitiveness of the European transport industries and achieve a European transport system that is:
  • resource-efficient
  • climate-and-environmentally-friendly
  • safe and seamless
3. Expectation of INEA regarding the project

1. Objectives of the project:
   1. providing solutions for common infrastructure problems encountered in diverse regions of Europe
   2. development of management tools based on scientific principles for risk assessment

2. Expected Impacts
   1. indicative surge in the utilisation of capacity within a range 70-90%
   2. reduction in the recurrent costs of rail operations within a range of 25-45%
   3. reductions in the power supply operational and maintenance costs (~25%), reductions in transmission and distribution losses (~20%) and increases in reliability of operation (~20%)
   4. contribution to the objectives of Shift2Rail joint undertaking

4. Contractual and administrative issues

A. Grant Agreement Structure
B. Third parties and sub-contractors
C. Consortium agreement
D. Amendments
E. Guarantee Fund
F. Reporting and payments
G. Implementation of the GA management
Administrative details of the project

- Grant Agreement signed on 17/04/2015
- Entry into force of the GA: 17/04/2015
- Start of project: 01/05/2015
- Duration: 36 M
- Maximum EU grant: EUR 2,997,000
- Reporting periods: 2
- Coordinator: GAVIN AND DOHERTY GEOSOLUTIONS LTD
- Number of participants: 15

Range of Contractual Agreements

- Coordinator
- Contract
- Beneficiary x
- Beneficiary y
- Beneficiary z
- Subcontractor
- Consortium Agreement
- Contract
- Subcontractor
Role of the Coordinator

- Central Contact Point for the Commission regarding reporting and payments
- Represents all beneficiaries towards the Commission
- Administers the Community financial contribution regarding its allocation between beneficiaries, keeps records and financial accounts and informs the EC of the distribution of funds
- Reviews the reports to verify consistency with the project tasks before submitting them to the COM
- Monitors the compliance by the beneficiaries with their obligations under the GA

Role of Beneficiary

- Carry out the work to be performed, as identified in the Annex I
- Provide all data requested by the EC (financial statements, progress of work)
- Inform the EC (through the Coordinator) of any event that might affect the implementation of the project
- Etc.

Role of INEA's Project Manager

- Central Contact Point for project
- Monitor fulfilment of contractual obligations
  - Via deliverables, periodic reports, on-site reviews, etc.
  - Check financial statements
A. Grant Agreement Structure

- Chapter 1: General subject of the agreement
- Chapter 2: Action
  - Title of action, start date, duration and budget
- Chapter 3: Grant
  - Grant amount, reimbursement rates, eligible costs
- Chapter 4: Rights and obligations
- Chapter 5: Division of beneficiaries’ roles
  - Obligations of beneficiaries and coordinator, consortium agreement
- Chapter 6: Rejection of costs, reduction of the grant, recovery of undue amounts, penalties, liability for damages, suspensions, termination, force majeure
- Chapter 7: Final provisions
  - Communication, amendments, accession, applicable law, disputes

Annex 1: Description of the action part A & B
Annex 2: Estimated budget
Annex 3: Accession forms of beneficiaries
Annex 3a: Declaration joint liability of third parties
Annex 4: Model financial statements
Annex 5: Model certificate on financial statements
Annex 6: Model certificate on the methodology
B. Third parties and sub-contractors

- Linked third parties
  - Affiliated entities
  - Third parties with a legal link
- Subcontractors

- Similar to FP7 Special Clause 10
- Must be identified in the GA
- Separate tasks / budget
- Same cost eligibility criteria like beneficiaries
- NEW: COM or Agency may request them to accept joint and several liability for their EU contribution
  - Article 14 GA

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- Ensure best value for money and avoid any conflict of interests
- Estimated costs and tasks must be identified in the budget and Annex 1
- NEW: if not identified in Annex 1, Commission may still approve them (beneficiary bears the risk of rejection)
  - Article 13 GA
Third parties and sub-contractors: others

- For the purchase of goods, works or services
- Ensure best value for money and avoid any conflict of interests
  - Article 10 GA
- Free of charge or against payment are eligible costs if they meet the eligibility conditions
  - Must be set out in Annex 1
  - New: if not identified in Annex 1, Commission may still approve them (beneficiary bears the risk of rejection)
  - Articles 11 & 12 GA

C. Consortium agreement

- Compulsory unless otherwise stated by the call text
- The European Commission IS NOT PART of it
- Must exist once the Grant Agreement enters into force

Key issues addressed in the Consortium Agreement:

- Management
- Distribution of funds
- Internal organisation of work, internal reporting
- Evolution of the consortium
- IPR (to be decided before signature of contract)
- Risk management / collective responsibility
- Decision-making process
D. Amendments to GA

See Article 55

- Request in writing
- Only the Coordinator may submit an amendment request
- Amendments must not have the purpose of making changes to the agreement which might call into question the decision awarding the grant.
- Enlargement of the consortium to new contractors and new activities may be foreseen
- No change of the GA needed for the following cases:
  - changes in beneficiaries’ data (address changes, authorised representatives)
  - Transfer of budget between different activities and between themselves as long as the work is carried out as foreseen in Annex I
- A guide to amendment should be soon available through the participant portal.
- Talk to the PM first!

E. Guarantee Fund

- Participant’s Guarantee Fund is established amounting to 5% of total EC contribution
- The Guarantee Fund belongs to all beneficiaries of grant agreements under H2020
- Financial interests generated by the Guarantee Fund will serve to cover against financial risks
- The amount contributed to the Fund will be reimbursed at the end of the final payment after the end of the project
F. Reporting and payments

Reporting schedule (36 months)

Periodic Report

Financial Statements (forms C)

Final Report

Project Months

Reporting

See Articles 17-21

- Periodic reports to be submitted by coordinator within 60 days after end of reporting period
  - Overview of progress of the work, including a publishable summary report; Overview of project objectives for the reporting period; Work progress and achievements during the period; Deliverable and milestones tables; Project management
  - Use of the resources and
  - Financial Statement (Form C) from each beneficiary
  - All C forms have to be encoded by the beneficiaries via the Participants Portal:
- Final report to be submitted by coordinator 60 days after end of project
  - Publishable summary report, conclusions and socioeconomic impact,
  - Covering wider societal implications and a plan on exploitation
- The reports have to be submitted through the participant portal
- For the final period two reports need to be submitted: The final report as described above and also a periodic progress report.
6.2 Report on kick-off meeting

DESTinationRAIL – Decision Support Tool for Rail Infrastructure Managers

Reporting

- Commission has 90 days to evaluate and execute the corresponding payment
  - No tacit approval of reports
- After reception Commission may:
  - Approve
  - Suspend the time-limit requesting revision/completion
  - Reject them giving justification, possible termination
  - Suspend the payment (in whole or in part)

Payments modalities

<table>
<thead>
<tr>
<th></th>
<th>Time-to-Pay</th>
<th>From</th>
</tr>
</thead>
<tbody>
<tr>
<td>One Pre-financing</td>
<td>30 days</td>
<td>10 days before starting date or entry into force</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interim Payments</td>
<td>90 days</td>
<td>From reception of periodic report</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Payment of the Balance</td>
<td>90 days</td>
<td>From reception of final report</td>
</tr>
</tbody>
</table>

- New: Audit certificates for final payment per beneficiary or third party only needed if total requested EU contribution ≥ €325,000 for reimbursement of actual & unit costs
Forms of costs

Actual costs
- Costs actually incurred, identifiable and verifiable, recorded in the accounts, etc. see Article 6 GA
- NEW: non-deductible VAT is now eligible

Unit costs
- A fixed amount per unit determined by the Commission
  Example: for SME owners not receiving a salary
- For average personnel cost (based on the usual accounting practices with possible certificate on the methodology)

Flat rate
- A percentage to be calculated on the eligible costs
  Example: 25% flat rate for indirect costs

Reimbursement of eligible costs
- Subject to approval of technical reports
- Stated costs must be reasonable compared to work
- Actual (or follow the rules e.g. unit costs)
- Incurred during duration of project
- In accordance with beneficiary’s usual accounting and management principles
- Recorded in the accounts of beneficiary
- Used for the sole purpose of achieving the objectives of the project
Reimbursement of eligible costs

- Staff working on the project must keep time records (hours they spend on the project; regularly (daily, weekly); countersigned by a supervisor
- You must declare costs based on the actual amounts spent (MGA Article 5, Article 6(1)): Personnel Costs based on actual staff costs; Other direct costs based on actual costs for the project (MGA Article 6,2 D); Depreciation costs for assets; Real costs of consumables
- You cannot, under any circumstances, sub-contract to a project partner (MGA Article 13)
- Don’t charge costs incurred before the starting date of the action

G. The GA management

- Sub-contracting:
  - Shall be identified in Annex I
  - Can cover only limited part of the project
  - Shall be awarded according to the best price-quality ratio
  - If not identified in Annex I: only services for assistance for minor tasks
- Suspension of the project: See Articles 47-49
  - At the initiative of the coordinator (force majeure)
  - At the initiative of the Commission
- Confidentiality:
  - During the project and for a period of 5 years after completion
Information and communication:

See Article 29

- Community support shall be highlighted
  - European logo to be displayed
  - Disclaimer to be added on any communication (publicity reflects the author’s view and the Community is not liable of any use ...)

- Right for the EC to publish information on the project
  - The consortium shall ensure that all necessary authorisations for such publications have been obtained

Controls & Sanctions

See Articles 42-50

Controls:
- Financial audits and controls
- Technical audits and reviews
- These audits can be carried out by the Commission or by outside reviewers or auditors

Sanctions:
- Liquidated damages (if overstatement of expenditures)
- Financial penalties (if false declarations)
  - Between 2% and 10% of the EC contribution
Termination of the Grant Agreement or of the participation of one beneficiary

See Article 50

- At the initiative of the consortium

- At the Commission’s initiative in case of:
  - Non accession of a beneficiary
  - Non-performance or poor performance
  - Deliberate negligence or irregularity
  - Contravention of ethical principles
  - Force majeure
  - Etc.

THANK YOU FOR YOUR ATTENTION

Contact: Michal.Klima@ec.europa.eu
Visit our website:
http://ec.europa.eu/research/transport/index_en.htm
http://inea.ec.europa.eu/
http://ec.europa.eu/research/participants/portal
3.2 DESTinationRAIL Work Packages presentations

3.2.1 Overview

3.2.2 Work Package 1
Partner Contributions

<table>
<thead>
<tr>
<th>Partner number and short name</th>
<th>WPI effort</th>
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<tr>
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<tr>
<td>2 - IARNROD EI</td>
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<tr>
<td>5 - UNIZAG-GF</td>
<td>18.00</td>
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<tr>
<td>6 - HZ INFRA</td>
<td>1.00</td>
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<td>7 - TUM</td>
<td>5.00</td>
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<tr>
<td>8 - ZAG Ljubljana</td>
<td>14.00</td>
</tr>
<tr>
<td>9 - NGI</td>
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<tr>
<td>10 - NTNU</td>
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<tr>
<td>12 - UNIVERSITEIT TWENTE</td>
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<td>15 - SZ-Infrastruktura, d.o.o.</td>
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<td>Total</td>
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Task 1.1 Inventory of Problems

(GDG, IE, UZ, HZ, TUM, ZAG, NGI, NTNU, UT, SZ)

A review of key problems faced by Railway IM’s case histories (e.g. slope instability, bridge scour, switches and tracks and structures will be compiled. Consideration will be given to how changes in use (increased speed and/or loading), climate change etc. might affect the performance of infrastructure and cause increased incidence of existing or new or heretofore unseen problems. This will ensure that the relevant issues are covered in a robust manner in the Destination Rail project.)
Task 1.2

Task 1.2 Location of Hotspots (UZ, GDG, NGI, NTNU)

- for linear networks which are spread over thousands of km, there is a need to identify which critical sections of railway should be monitored.

- methods of interrogating data collated over large sections of the network to provide markers for hot spots are investigated.

---

Task 1.2

- in focus – multichannel Ground Penetrating Radar system
- why multichannel? → different frequencies mean different penetration depth and resolution

structure, boundaries, animal burrows, water content

ballast fouling
Task 1.2

- currently in process of making → custom-made GPR cart
- provides more flexibility in terms of using different antennas and investigation of smaller portions of railway lines (to develop methodology)

Antennas
Control Unit + multiplexer
Cart

---

Task 1.2

- In order to obtain better insight in geological-engineering condition of embankments, it is proposed to supplement GPR data with seismic methods. This will allow, in the post-processing phase, overlapping of images obtained with different methods where limitations of one method will be compensated with other method and vice versa.

P-waves seismic method (seismic refraction)
S-waves seismic methods (SASW, MASW, CSWS)
Task 1.2

- overlapping of images will be accompanied by standard in-situ measurements techniques to verify this evaluation methodology.

- techniques to verify this evaluation methodology, which will be proven on a 100 km section of the Croatian Rail line.

Task 1.4

Task 1.4 Monitoring of Earthworks (UZ, GDG, NTNU, NGI)

- inspection, collection, systematization and analysis of information on the state of the railway lines

- ‘standard’ means of visual examination is walking along the railway and noticing irregularities

- in the case of high or steep slope embankments, important information can easily be overlooked
Task 1.4

In recent times, for the purpose of photogrammetric recording and mapping using of UAV’s (Unmanned Aerial Vehicle) is becoming more affordable, accurate and safer.

These can be monitored remotely or fly autonomously using a pre-programmed flight plan.

Task 1.4

Monitoring, collection, systematization and analysis in real time.

EUROPEAN COMMISSION
Decision Support Tool for Rail Infrastructure
EU Project No. 636235
Task 1.4

- Instabilities and excessive deformation of embankment on railway line L103 from km 23+000 to km 23+050

Task 1.4

- Landslide above the track due to inadequate drainage
- Typical cross section for calculations
- Clogged drainage channel
- Deformation of the existing rail supports (bord train rails and wooden sleepers) due to slipping
Bridge monitoring

• Current practice
  – Periodic inspection of critical locations → intervals often conservative
  – Sometimes hot-spot monitoring (∼ load monitoring)
• Drawbacks
  – No info on evolution / degradation of health
  – Maintenance decisions based on limited amount of info
  – Limitations current monitoring strategies
  – How to translate hot-spot info to other locations?
  – Only detection of damage → localization / quantification requires inspection

Advanced Structural Health Monitoring

• Smart Autonomous Wireless Sensor Networks (FP7 Wbrate)
• Functions
  – Global monitoring of structure (detection)
  – Local monitoring in case of damage
    • Localization (where?)
    • Quantification (how severe?)
Wireless sensor networks

• Already applied
  – Temporary measurement campaigns
  – Focus on loads (strain, vibration threshold)

• Additions in this project
  – Embedded sensors – continuous monitoring
  – Autonomous sensors – self-supporting (energy)
  – Smart network – switch between passive and active interrogation (global – local)

Objectives

• Develop advanced Structural Health Monitoring systems
  – Applicable for steel / concrete / composite bridges + structures
  – Selection based on relative cost / inavailability numbers from practice

• Improve predictive maintenance concepts
  – Improved predictability of failures and assessment of structural health enables optimization of maintenance activities (risk-based)
Bridge Scour Monitoring

GDG and NGI will extend existing models to consider non-linear stiffness and dynamic effects.

Deliverables

<table>
<thead>
<tr>
<th>Deliverable Number</th>
<th>Deliverable Title</th>
<th>Lead beneficiary</th>
<th>Type</th>
<th>Dissemination level</th>
<th>Due Date (in months)</th>
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<tr>
<td>D1.1</td>
<td>Report on common problems faced by rail infrastructure</td>
<td>1 - GDG</td>
<td>Report</td>
<td>Public</td>
<td>6</td>
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<td>D1.2</td>
<td>Guideline on methods to find hot-spots on rail networks</td>
<td>5 - UNIZAG GF</td>
<td>Report</td>
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<td>18</td>
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<td>D1.3</td>
<td>Report on monitoring Switches and Crossings</td>
<td>10 - NENU</td>
<td>Report</td>
<td>Public</td>
<td>24</td>
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<td>D1.4</td>
<td>Report on the use of remote monitoring for slope stability assessments</td>
<td>5 - UNIZAG GF</td>
<td>Report</td>
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<td>Implementation of a complete vibration monitoring system on Irish Rail bridge</td>
<td>13 UNIVERSITEIT TWENTE</td>
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</table>
3.2.3 Work package 2

**DESTination RAIL – WP 2: Assessment and Modelling**

Prof. Alan O’Connor
Roughan and O’Donovan Innovative Solutions (RODIS)

---

**Introduction**

- Current assessment methods
  - Rely on visual inspections and
  - Deterministic Approaches
- Work Package 2
  - Goal to “provide Rail Owners/Managers with best practice tools and methodologies for risk assessment of critical infrastructure elements, such as bridges, slopes, tunnels and tracks.”
    - Develop a safety evaluation framework
    - Incorporate information from SHM in safety computation
    - Analyse structural safety, slope stability and track integrity
WP 2 – Assessment & Modelling

WP2 Tasks

Task 2.1: Development of Probabilistic Basis for Multi Criteria Performance Optimisation of Railway infrastructure (ROD-IS, GDG, UT, ETH)

Task 2.2: Statistical Performance Updating from Measurements (ROD-IS, GDG)

Task 2.3: Assessment of Structures (ROD-IS, GDG, UT)

Task 2.4: Assessment of Earthworks (GDG, NGI, IE, UZ, NGI)
Task 2.1: Probabilistic Basis for Multi Criteria Performance Optimisation of Railway infrastructure

Deterministic Assessment
Define required Reliability Index $\beta_t$
Model variables stochastically
Increase Allowable Load?
$\beta < \beta_t$?
Is $\beta = \beta_t$?
$\beta < \beta_t$?
$\beta = \beta_t$?

Classification Achieved
Sensitivity Analysis
Incorporate Updated / Additional Information
Task 2.1: Probabilistic Basis: Reliability index

Consider alternative form of performance function \( g(x) \):

\[
FOS = \frac{\text{Capacity}(C)}{\text{Demand}(D)}
\]

\[
g(x) = C - D
\]

If \( C - D \leq 0 \Rightarrow \) limit state failure

The \( \beta \)-index represents the mean of the performance function, divided by the number of standard deviations between the mean and origin.

---

Task 2.2: Statistical Performance Updating from Measurements

- Apply site-specific data in a robust manner
Task 2.2: Statistical Performance Updating from Measurements

- Statistical modelling of info relating to load, strength, deterioration etc.

Task 2.3(a): Assessment of Structures

- Boyne Viaduct, Co. Louth, Ireland.
- Application of algorithms from Tasks 2.1-2.2.
- Deterministic & Probabilistic analysis to identify “Hot Spots”.
- Monitoring of structure (Task 1.5) used to update & inform reliability analysis.
- Implications of load evolution, deterioration and alternative rehabilitation strategies assessed.
Task 2.3(a): Assessment of Structures

- Additional Information reduces uncertainty
- 50% reduction in uncertainty of Strength increased $\beta$ by 75%

![Graph showing uncertainty reduction](image1)

Task 2.3(b) – Soil-Structure Interaction

Diagram showing interaction between track, train model, and foundation model.
Task 2.3(b) – Soil-Structure Interaction

- Site specific data to calibrate soil response?

Cyclic load-disp model

P [kN]

k₀

ksec

kur

d [m]

Task 2.3(b) – Soil-Structure Interaction

Cone Penetration Test (CPT)

qc (MPa)

Depth (m)

Step 1: Saturation of Core Tip Centring
Step 2: Failure of Full Length
Step 3: Determine Coefficient of Friction
Step 4: Determine Weight of Cone Penetration

Step 1: Insertion of Cone
Step 2: Apply Load
Step 3: Record Load

Site specific data to calibrate soil response?
Task 2.4 Assessment of Earthworks: Aims

- Apply Reliability Theory and Probabilistic approaches to slope stability for railways.
- Account for different failure mechanisms and climatic effects
- Use monitoring data from WP1 to develop appropriate statistical distributions and employ said distributions in analyses.

Stability is affected by rainfall

As rain falls, suctions reduce. A wetting front develops as the ground becomes almost saturated from the top down.
Traditional Analysis

\[ \text{in theory} \quad \begin{align*} \text{Calculated FOS} &= 1.53, 1.41, 1.34 \\ c' &= 8 \text{ kPa} \\ \phi' &= 36^\circ \quad \text{1-in-10 year GW} \end{align*} \quad \text{in practice} \]

- Homogeneous layers
- Saturated soil parameters
- Well-defined GW level
- ‘Reliable’ calculated FOS

- Heterogeneous material
- Variable soil parameters
- Complicated GW condition
- Unreliable calculated FOS

Proposed Probabilistic Analysis

- Invariant system reliability analysis
- Account for rainfall effects
- Analyse slopes using multi-modal techniques
- Allow for multiple failure mechanisms

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Decision Support Tool for Rail Infrastructure
EU Project No. 636285
Incorporate WP1 Data

- Soil water content data
- Climate Data
- Soil Suctions

- Use to update parameter distributions and provide up to date feedback on structural integrity of slope.

Task 2.5: Assessment of Tracks

- **Aim:** Understand train-track/track-substructure interaction using numerical simulations informed by data
- Track Stiffness and Damping,
- An integrated FEM-MBS
- The models will be used to study the design requirements for new track infrastructures for mixed train traffic.
Deliverables

- D2.1 Guideline for Probability Based Multi Criteria Performance Optimisation of Railway Infrastructure (M24)
- D2.2 Report on Assessment of Bridges (M 30)
- D2.3 Report on Assessment of Earthworks (M28)
- D2.4 Report on Assessment of Tracks (M30)

Milestones

- M2.1 Interaction between WP1 & WP2 to identify optimum sensor locations for infrastructure. (M10)
- M2.2 Instrumentation of Boyne Viaduct (M15)
- M2.3 Reliability based assessment framework for earthworks (M12)
- M2.4 Case study Selection for train-track modelling (M6)
Conclusion – Objectives of WP2

• “Provide Rail Owners with best practice tools and methodologies for risk assessment of critical infrastructure elements, such as bridges, slopes, tunnels and tracks.”
• Incorporate information from SHM in safety computation
• Analyse structural safety, slope stability and track integrity
• Provide data to inform Risk Assessment (Task 3.2), Risk Ranking (Task 3.3), Life Cycle Analysis (Task 4.4) and ultimately the Decision Support Tool (Task 3.4).

3.2.4 Work package 3

WP 3 Classify – Risk Assessment

M 3 – M36
UT, ETH, GDG, IE, TRL, UZ, ROD
### Tasks

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
<th>Partners</th>
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<tbody>
<tr>
<td>3.1</td>
<td>Information management system</td>
<td>UT, ETH, TRL, IE</td>
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<tr>
<td>3.2</td>
<td>Risk Assessment</td>
<td>ETH, UT, GDG, IE, UZ, RODIS</td>
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<td>3.3</td>
<td>Risk Ranking</td>
<td>ETH, UT, GDG, TRL, UZ, RODIS</td>
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<tr>
<td>3.4</td>
<td>Decision Support Tool</td>
<td>UT, ETH, GDG, ROD, TRL</td>
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### Task 3.1 Information Management System

- **Objective:**
- to develop an Information Management System (IMS) to store and manipulate construction records, performance monitoring, etc. for each asset.
Task 3.1 Steps

- Collect data from sensors and visual inspections, and existing database systems
- Provide semantic and actionable information → SMART OBJECTS:
  - smart physical objects - highly instrumented structures
  - smart virtual object - in interaction with physical objects; trained system (machine learning methods)
- Develop IMS based on smart objects
Task 3.2 Risk Assessment

- Objective:
- to develop a risk assessment methodology that takes into consideration the probability of hazard occurrence and infrastructure resilience based on a combination of qualitative and quantitative data obtained through different inspection/monitoring strategies, e.g. regular visual inspections, regular non-destructive testing.

Task 3.3 Risk Ranking

- Objective:
- to develop a risk ranking methodology that takes into consideration the role of the object in the network, the states/conditions of the other objects in the network, and the ability to either manage these risks while ensuring that minimum threshold levels (e.g. for safety) are not breached.
Task 3.4 Decision Support Tool (DST)

Objective:

- to develop Decision Support Tool (DST) which will help infrastructure managers in decision making process in the context of dealing with a number of previously identified and ranked risks
- Visualization of risks

DST will integrate outputs from WP 1 Inspection adn Monitoring, WP 2 Modeling and WP 4 WLCA and traffic flow model

The tool will be tested on several scenarios for selected railway sections

DST will be used to support robust development measures (integration of probabilistic WLCA to develop maintenance and rehabilitation strategies)
**Decision Support System**

- Boundary Objects (Star & Griesemer 1989)
- Epistemological Objects (Ewenstein & Whyte 2009)
  If generated and used right:
  - Integrate existing and proposed
  - Integrate physical and social
  - Allow for joint knowledge work
  - Focus on “important information”

---

**Visualization**

![Visualization Diagrams]
DESTination RAIL will develop an information management system (IMS) based on **smart objects**. The IMS will hold all the data relating to an individual asset and the network.

- manage relationships between *information items*
- keep track of changes within these *information items*
- aggregate and disaggregate information across different scales: sub-object, complete object, object network raw sensor based data stream to semantically rich information descriptions, levels of detail.
BUT how to make informed decisions about:
- What is an object
- How are objects decomposed (scales)
- What are an objects’ properties (and at what detail are they represented)
- How does an object behave over time (e.g. are its properties update/ are objects deleted)

THAT MAKE EVERYBODY IN THE PROJECT HAPPY?

BUT Performance:
- Reduce complexity by modularity (service oriented architecture)
- Cloud:
  Use distributed data storages
  load sharing
- Innovative database models:
  Graph based database
  No-SQL database

BUT Security,
BUT ..., 
BUT ..., 
BUT ...
Possible sources of data to develop the information model:

- Catalogues and other documents available at rail management partner organizations
- Existing database schema in use at rail management organizations
- Information models in development
- Text-books about rail maintenance
- Interviews with technical and maintenance experts at the rail management organization
- Interviews with researchers and experts in the area (other consortium partners)
- Cognitive mapping exercises … data cube for identifying relations between different dimensional taxonomies

Ethnographic Action Research Method

- Phenogrammetric, Ethnographic Observation
- Identification of Knowledge, Perspectives, and Innovation Potential
- Development of an Organizational, Procedural, or Technological innovation
- Rigorous test in the living lab context itself
Milestones

- M3.1 Risk assessment framework: M12
- M3.2 Selection of a case study: M14
- M3.3 Decision Support Tool in function: M20
- M3.4 Integration of WLCA model into the Decision Support Tool (interaction with WP 4): M20

Deliverables

- D3.1 Information Management System framework (or class model): M8
- D3.2 Report on risk assessment methodology: M12
- D3.3 Report on Decision Support Tool: M24
- D3.4 Proof-of-concept on case study: M30
D6.2 Report on kick-off meeting
DESTinationRAIL – Decision Support Tool for Rail Infrastructure Managers

WP 3 effort – 100 MM

- UT, ETH, GDG, IE, TRL, UZ, ROD
- 31, 36, 12, 1, 10, 6, 4

Generally

- We want to demonstrate high impact case scenarios ....
- We pave the way forward...
- We want a market to pick up the mechanisms then ...
3.2.5 Work package 4

WP4 - TREAT

TRL Limited

WP4 - Treat

• Objective: provide Rail Owners/Managers with new capabilities for optimising their maintenance strategies at a network level

• Partners involved:
  – TRL (WP Leader)
  – ZAG Ljubljana
  – ORT
  – ETH Europe
  – RODIS
  – GDG
  – TUM
  – IARNROD IE
  – SZ-Infrastruktura
  – NGI
WP4 - Treat

Strand 1:
• 4.1- Construction techniques for tracks and earthworks (ZAG)
• 4.2 - Construction techniques for bridge abutments (ZAG)

Strand 2:
• 4.3 - Traffic flow model (OTRT)
• 4.4 - Probabilistic model for network-level whole life cycle analyses (TRL)

Timings
- All Tasks scheduled to start in M3 (Aug. ‘15)
- Tasks 4.1 and 4.2 (Strand 1) completes in M18 (Nov. ‘16) --> D4.1
- Task 4.3 completes in M20 (Jan. ‘17) --> D4.2
- Task 4.4 runs to the end of the project (May ‘18) --> D4.3 (M30)
WP4 - Treat

- Milestones
  - M4.1 Approval of case studies (T4.1, M4)
  - M4.2 Selection of bridge case study (T4.2, M5)
  - M4.3 Collected traffic input data (T4.3, M8)
  - M4.4 Testing of traffic flow model (T4.3, M16)
  - M4.5 Selection of WLCA input data (T4.4, M7)
  - M4.6 Demonstration of beta model (T4.4, M12 and M18 workshops)

WP4 - Treat

- Interdependencies

Decision Support Tool [Task 3.4]

Probabilistic WLCA Model [Task 4.4]

Information Management System [Task 3.1]

Probabilistic Optimisation [Task 2.1/2]

Risk Modelling [Task 3.2/-3]

Traffic Flow Model [Task 4.3]

Horizons [Task 1.1/2]

Monitoring [Task 1.3/4/5]

Assessment [Task 2.3/-4/5]

Construction Techniques [Task 4.1/2]
WP4 - Treat

Strand 1 – Construction:

- **Objective**: Development of novel and innovative maintenance and construction techniques
- **4.1**: Construction techniques for tracks and earthworks
  - Ability of geosynthetic-reinforced soil to improve the performance of embankments
- **4.2**: Construction techniques for bridge abutments
  - Structural improvements of bridge abutments, using large-scale laboratory testing and FEA

---

WP4 - Treat

Strand 2 – Modelling:

- **Objective**: Development of modelling tools to optimise and prioritise maintenance by cost, risk, and operational impact
- **4.3**: Traffic Flow Model
  - Microscopic model for railway traffic to demonstrate benefits of improved operations and optimised maintenance
- **4.4**: Probabilistic WLCA Model
  - Combines traffic flow modelling with stochastic deterioration and risk models from WP2 and WP3
WP4 - Treat

• Discussion points
  1. “Plug and play” architecture?
  2. Review existing models?
  3. What is our ‘target market’ – who will use the tool? Which organisations?
  4. Should we form a consultation group now?

WP4 - Treat

• Discussion points
  5. What portion of the network are we focusing on (individual assets, lines, geographical areas)?
  6. Which asset types (switches, crossings, tracks, earthworks and bridges implied elsewhere)?
  7. Environmental impacts included as well (some references in proposal but not in the WP4 description)?
3.2.6 Work package 5

**DESTination Rail**

Dublin Kick Off Meeting
19 May 2015

**Introduction**

- 39 years working in the UK rail industry
- 7 years working in Brussels
- 4 years as Secretary General of the European Rail Infrastructure Managers
- Consultancy set up in June 2010
- Good network of contacts amongst IMs and political groups
- Regular chairman and presenter at conferences across Europe
What WP5 needs to Deliver

- Dissemination Plan
- Implementation Plan
- Awareness of the project
- Successful Advisory Board
- Buy in of Infrastructure Managers
- Opportunities for members to demonstrate and market the results

What I can do for you

- Ensure that the project is seen by the various audiences using different forms of media
- Open doors to Infrastructure Managers and Opinion formers
- Professionally represent the project at events
- Feedback to you on what the end users think
- Put an interesting group together on Linked in
- Feed into the website
- Sell the project
What I will need help with:

- Please take at least one group photo of each of your working sessions
- Please take a photo of the group working
- Please take photos of any field visits
- Please include a brief summary of each meeting in the notes of the meeting when they are uploaded to Project Place.
- Please upload all presentations made to external bodies along with a brief note of the reactions/attendees at the presentation

Some Website Ideas:

- Calendar of all events associated with the project
- Folder of Deliverable documents
- Folder for each work package
- Folder for presentations by event
- Folder for papers delivered showing a web link
- Front page description of the project and any EU requirement
- Links to other media
- Flash showing next public event
Newsletters; Some thoughts.

- No 1 to be an introduction to the project
- Each to contain a Project Co-ordinator corner
- Each to contain an overview of progress from each Work Package plus photos
- No 2 to 5 to feature each Work Package in order
- No 6 to be a summary of what has been achieved and include the highlights of the final conference.
- Links to any papers published/presented

In Summary

- I can only disseminate what the project produces
- I am reliant on information supplied by project members
- I will help you all I can however deadlines need to respected
- Websites/Project Place are great if they are uploaded on a regular basis
- I am here to help you successfully disseminate and exploit the results
Thank you for your attention

Michael Robson
Email maralnwick@yahoo.co.uk
www DESTination Rail