

# IMPLEMENTATION - USE CASES – ROADMAP (M20)



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Grant Agreement  
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# Use case: BULK traffics

- Why Marathon Trains are interesting ?
  - For heavy bulk classical trains cannot fully use the authorized length with a single TU or even a multiple TU at the head of the train
    - M2O enables to extend a full use of the length which can be extended to 1000m and 6500T with a 1TU at each end
    - For this segment the efficiency in terms of network capacity utilisation reduction is up to 40% per ton transported. The financial impact is linked to the pricing policy of each IM. The staff cost reduction is clear 50% if the train is fully loaded.
    - The impact of these reduction for the tone transported depends on the structure of the infrastructure charges. If it is purely based on network occupancy the reduction per Ton transported may reach 40% for the track accesscharge. But if the charges are based on the tonnage transported the reduction could be 0%. The staff cost is variable between different Rus incumbent and new entrants RUs but from a classical train with a double locomotive at the head of the train the reduction is up to 45% . As regards the energy as they are homogeneous lengthening the train is bringing around 5% less consumption.
    - For such trains and as for DPS trains in general the investments on board are the New radio equipments the DBCU and their integration in the TU system, on the ground it is the lengthening of a certain number of sidings and of tracks on the end terminals or in the hubs. These infrastructure investments linked with the traffic existing on the route of such trains and with number of such new consists will be progressively needed and should not be major investments.
  - The light bulk trains on short distances are not the best cases to benefit from Long DPS train solution .

# Use Case: INTERMODAL

- Why Marathon Trains are interesting ?
  - The market segment still growing rapidly is the intermodal segment
    - Full container trains from ports to dry ports or hubs which are not heavily loaded in average (2,6T) are confronted to longer road gigaliners competition and need more efficiencies. Long DPS train consists are justified if the number of TEUs to be shipped on one train is around 90TEUs. As the frequency is important the coupling of two trains from two different ports is an interesting option. The benefits will be the same as for Heavy Bulk . The advantage will be enhanced if after a decoupling of the subtrains at a long distance Hub there is still another long distance to reach the final destination.
    - If it is a rolling motorway carrying the trailers can weight 28T each and the average weight of the train is up to 3T/m. For specialized wagons like cargo Beamer or Modalohr the cost of the terminals is important and traffics departure must be concentrated with a train as long as possible. At 835M the system is financially balanced and profitable at 1000m with around 3000T of the train weight.



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# Use Case: General cargo; Single wagon load traffics

- For general cargo which comes from various clusters for a long distance trunk travel with various destinations still distant DPS trains is an interesting solution where , after consolidation, and a long trunk travel the train is deconsolidated and runs to several end destinations. This case is the several subtrains consists. The economy of the system relies on the competitiveness of the trunk travel with DPS compared to the consolidation of the part trains to create a complete train to be deconsolidated at the end of the trunk travel.
- This use case may become interesting if each of the subtrains are sufficiently heavy to avoid a consolidation of the wagons in a single train with one driver. In such a case DPS avoids the need of the second Driver at least for the trunk travel and the number of the TUs would be the same as for a classical train .

# Implementation

- M2O has prepared the grounds for the Test campaign establishing the functional requirements and the mitigations to guarantee the safety of the whole consist in nominal and degraded modes.
- The test campaign will confirm the effectiveness of the simulations performed by M2O for these consists which are DPS trains with a TU at the head of the train and a second one at the end of the train.
- Most favourable cases are very heavy bulk traffics in regular shipments sent from a port to an industrial site on a long distance. On these traffics the alignment of the interest of the various stakeholders Shipper or Consignee, RU and IM should be possible if the added value created can be shared properly.



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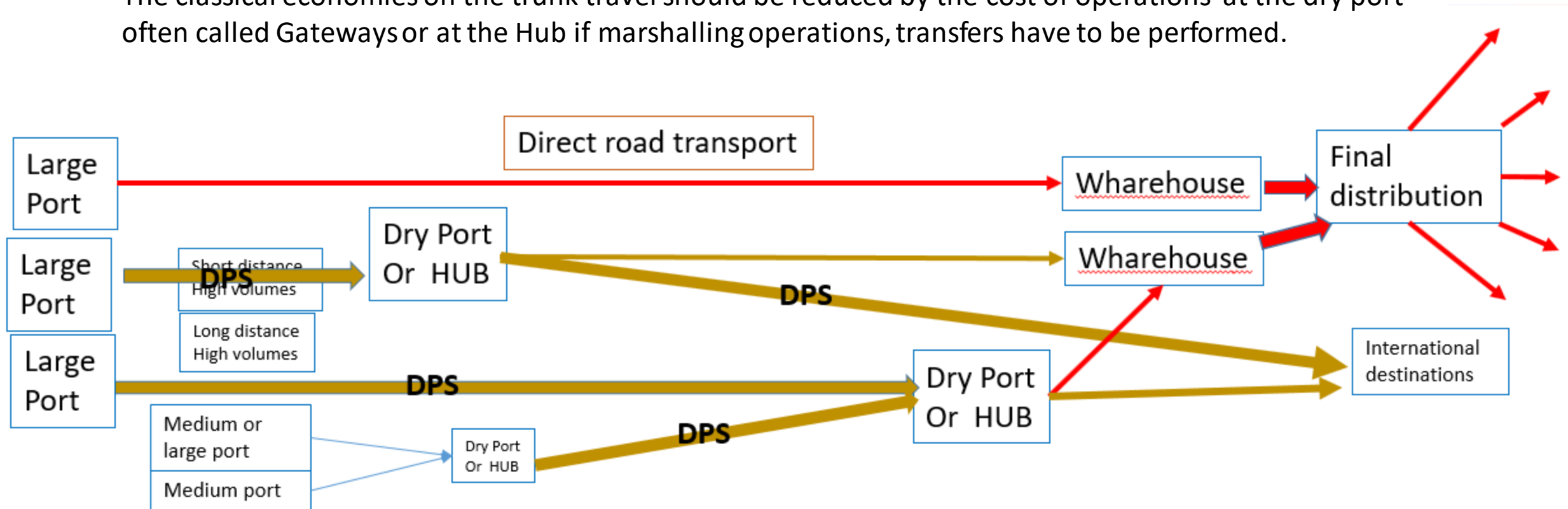


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# Implementation for Combined transport trains

- Coupled combined trains to reach a long distance dry port or HUB with subsequent long distance routings for each sub-train should be favourable.
- The classical economies on the trunk travel should be reduced by the cost of operations at the dry port often called Gateways or at the Hub if marshalling operations, transfers have to be performed.




# Support to implementation

In the following slides a support for implementation is provided on the basis of an example

- From your specific need in the three main segments of traffics
- For specific examples which have already been simulated
- Including some suggestions to enlarge the possibilities of efficient solutions
- More details will be found in D5.2

# Example for Bulk traffics

- To help users to implement
  - First step see if it may fit to one of these cases 
  - Second step: see if one of these cases below suits your need

	Unique destination LONG Distance	Unique destination MEDIUM Distance	Unique destination SHORT Distance	Multiple destination LONG Distance	Multiple destination MEDIUM Distance	Multiple destination SHORT Distance									
<b>BULK</b> Large quantity															
1 per DAY	Green	Orange	Brown	Green	Orange	Brown									
>1 per WEEK	Green	Orange	Brown	Yellow	Yellow	Yellow									
SPOT	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow									
<b>MEDIUM</b> QUANTITY															
1 TRAIN per DAY	Green	Brown	Brown	Green	Yellow	Yellow									

Trains with 2 Tus, 100Km/h, homogeneous flat wagons with bogies, 6,6T/m average load almost uniform loading ; all wagons with LL shoes; train running in nominal mode; maximum length of consist 1000m

For all trains simulated the brake regime is G mode (but for the last one)

TU	Wagons	Wagons	Wagons	Wagons	Wagons	Wagons	Wagons	TU
960m 6500T	820m 5500T	720m 4500T	620m 3500T	TU BR187 Train Length 0-500m and mass 2501T-4000T running in P brake mode with a radio communication LTE			Direction "----->"	
GSM-R	GSM-R	GSM-R	GSM-R	LTE				

If Your need is different other options are possible.



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# Proposal for a roadmap towards implementation

- The first step is to list the stakeholders involved:
  - Decision makers (shippers, forwarders, Shipowners, maritime agents...)
  - Combined transport operators, Ports, Logistics operators, terminal operators
  - Railway undertakings (incumbents and new entrants)
  - Infrastructure managers
- The second step is to identify their type of interests for a better efficiency
  - Cost reduction
  - Flexibility, Reliability
  - Capacity increase

# DPS impacts

- Positive impacts
  - Global cost reduction enlarge the hinterland
  - Increase railfreight market share
  - Increase sustainability
  - Enhance volume flexibility
  - Increase Network capacity
- Drawbacks
  - For decision makers: change their simple logistics road scheme
  - For infrastructure managers and terminal operators to invest in infrastructure
  - For RUs to invest in onboard equipment

# Aligning various actors' interests is the major challenge

- Lengthening trains is a burden for terminal operators unless traffic increases
- Infrastructure managers see the capacity increase but fear constraints on other traffics
- Rus are balancing the costs of modifications on TUs with the benefit brought by the DPS
- **WHAT can be the first step?**
- Facing these difficulties, the roadmap will start with standard DPS trains with one TU at each end bringing immediate benefit to Shippers, Rus (as the investment on board is limited and even more limited with new TUs). IMs will have to refrain policies of catching most of the added value, but Authorities should take into account the sustainability to limit new infrastructure taxes by supporting IMs investments and terminal investments

# Next steps

The strongly demanding market is the intermodal where growth is substantial but for conventional combined transport and Rolling motorways

Two fields are to be investigated in a first phase

- The long-distance trains on European corridors where due to concentration of traffic flows the capacity is a crucial point (clearly appeared during the Rastatt incident on Corridor 1) for which large investments have been implemented in the Rhine valley which could be even enhanced with DPS trains
- The heavy rolling motorway trains which finds their viable business model beyond 835m .
- These fields could be tackled rapidly and efficiently as the market uptake will not be sudden but progressive inducing a progressive adaptation. In this field CEF projects could be a good support for launching a large implementation demonstration.
- For other markets involving logistics chains consolidating smaller shipments in a terminal of a logistic cluster DPS trains may develop later in long distance inter-hubs transfer allowing large volume flexibility



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# Final steps

- Very soon 5G –FRMCS will provide extended field of possibilities for DPS trains with easier on-board implementation on new generation TUs
- The successful examples of the first steps and the more and more stringent constraints on road transport should boost the interest in competitive RailFreight transport which COVID 19 crisis has shown as more resilient than the other ground transportation modality.
- M2O has delivered the tool ready to be used for quick future developments