

# Underground Logistics Systems – the freight transport mode for 21<sup>st</sup> Century Supply Chains.



**Dr Roger Miles - Mole Solutions Ltd IPIC2019 – London**



# Underground Logistics Systems (ULS) – *Executive Summary*

- Road freight dominates 21<sup>st</sup> century supply chains - globally
- Road freight is affected by, and a major cause of congestion effecting productivity, the environment and safety
- Mole Solutions (MSL) have developed and demonstrated a disruptive technology that offers major reductions in congestion caused by road freight
- MSL are currently perceived as global leaders in the concept of Underground Logistics Systems (ULS)
- Opportunities in the UK and Europe are mainly retrofit
- New transport infrastructure in China, India and ROW offers major opportunities
- Electric propulsion – rotary and Linear Motors – simple, reliable and energy efficient
- Integrated system from TEU to pallet to tote with wide range of applications
- Sustainable, safe, low socio-environmental impact and cost effective freight system
- Attractive infrastructure investment at low utilisation



# Mole Solutions – Trucks cause and are affected by congestion



## Facts:

- Location motorway near Heathrow
- Accident at 0530 on a July Friday between small car and 44t truck
- Road closed for 13 hours
- Apart from the loss of time thousands of holiday makers missed their flights
- In the picture there are 19 trucks that could be delivering goods  
NOTE at least 33% will be empty
- The impact on road space that transferring the goods to a ULS laid under the road is shown here ...



# Mole Solutions – *THE ULS IMPACT on infrastructure capacity*



In the 21<sup>st</sup> century we have the technology to transfer goods from trucks to ULS laid beside or under existing or new transport infrastructure.

Prizes include:

- Economic
- Social
- Environmental
- Sustainable

**UNDERGROUND LOGISTICS SYSTEMS ARE THE SMART, 21<sup>ST</sup> CENTURY SOLUTION TO DELIVER THE GOODS.**



# Underground Logistic Systems - Applications

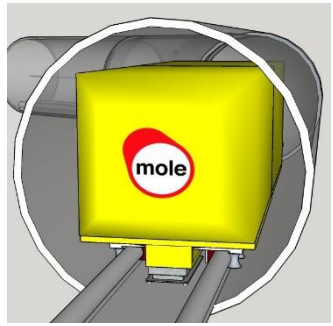


Bulk (mining)cargo  
1.3m dia - 5 Tonne

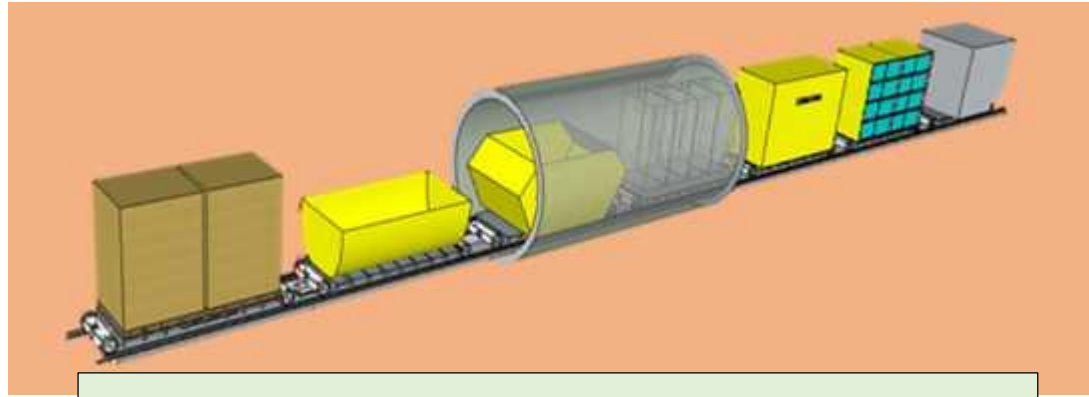
Pallets – Urban  
2.4m dia - 2x 1Tonne



Shipping containers  
4.5m dia  
40ft, 30 Tonne



**Mini-Mole  
Tote Bin System for  
Home Delivery**



Multi applications in 2.4m dia. pipe



# Mole Solutions – Comparison of ULS, Rail and Road

## Data from Mole Solutions tests and Feasibility studies.

Factor	ULS	Rail	Road
Capital (£M/km)	1.0	1.9	2.8
Energy (Kj/tonne/km)	1.0	8.5	37
Carbon Dioxide	1.0	2.3	12.5
Congestion Cost	1.0	5.0	20.0
Safety	0	Low	High
Shipment unit*	Single piece	Mass	Batch

\* Enables full JIT benefits to be achieved: space, stock financing, etc.



- Progress to date
- Global interest specifically by the world leaders of the concept adoption – China
- Technology
- Benefits, costs







## Conclusions:

- Liquid and gas pipelines are accepted as the most cost effective, safe, sustainable and low environmental impact mode of freight transport
- The Mole system is designed to provide the same benefits to the Physical Internet for unitised goods: TEUs, pallets & totes
- Uses proven technologies in an innovative manner
- International feasibility studies of the technical, financial and socio-environmental viability have been completed for all applications
- Global market



Questions: Interactive panel discussion and questions after all speakers

Question: ***potential role for underground logistics systems within EU?***



**THANK YOU**