STU demonstration-commercial mining transportation line

- As per the terms of preliminary agreement between String Transport Systems Pty Ltd and PT Priamanaya Djan International expressed in MOU signed on November 26th 2008 optimized concept of STU mining transportation system was developed suitable for both internal use to maximize ROI on PT Priamanaya’s existing assets and worldwide offer to third parties.

It was decided that in order to generate short term and consistent return on investment associated with development of STU demonstration line to combine demonstration line with commercial Baturaja line with the capacity of 20,000 tons of coal per month

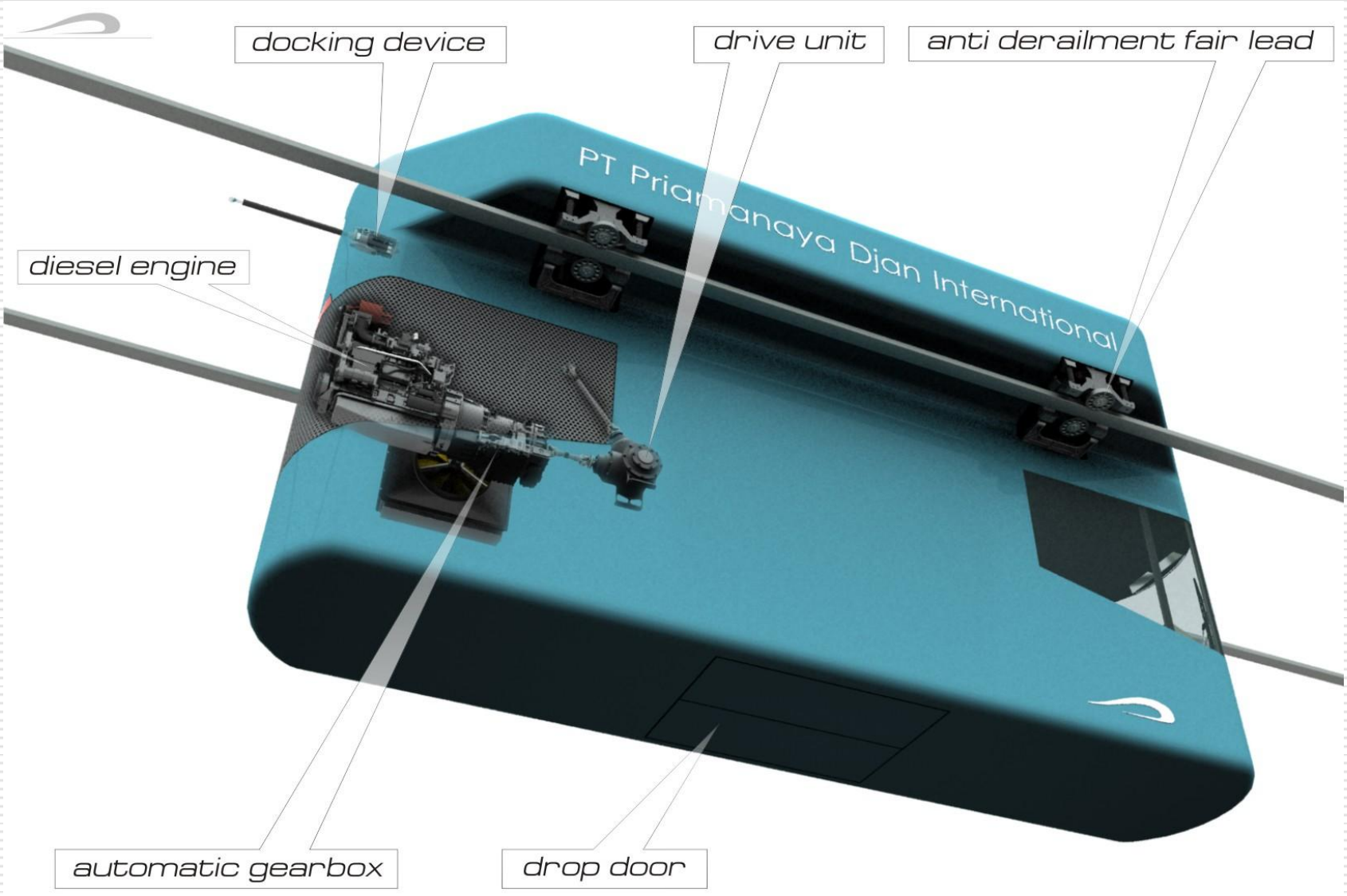
In order to satisfy both objectives (maximum ROI on Priamanaya's assets and maximum worldwide marketability of the system) we have developed extremely high standards that the proposed system must comply with

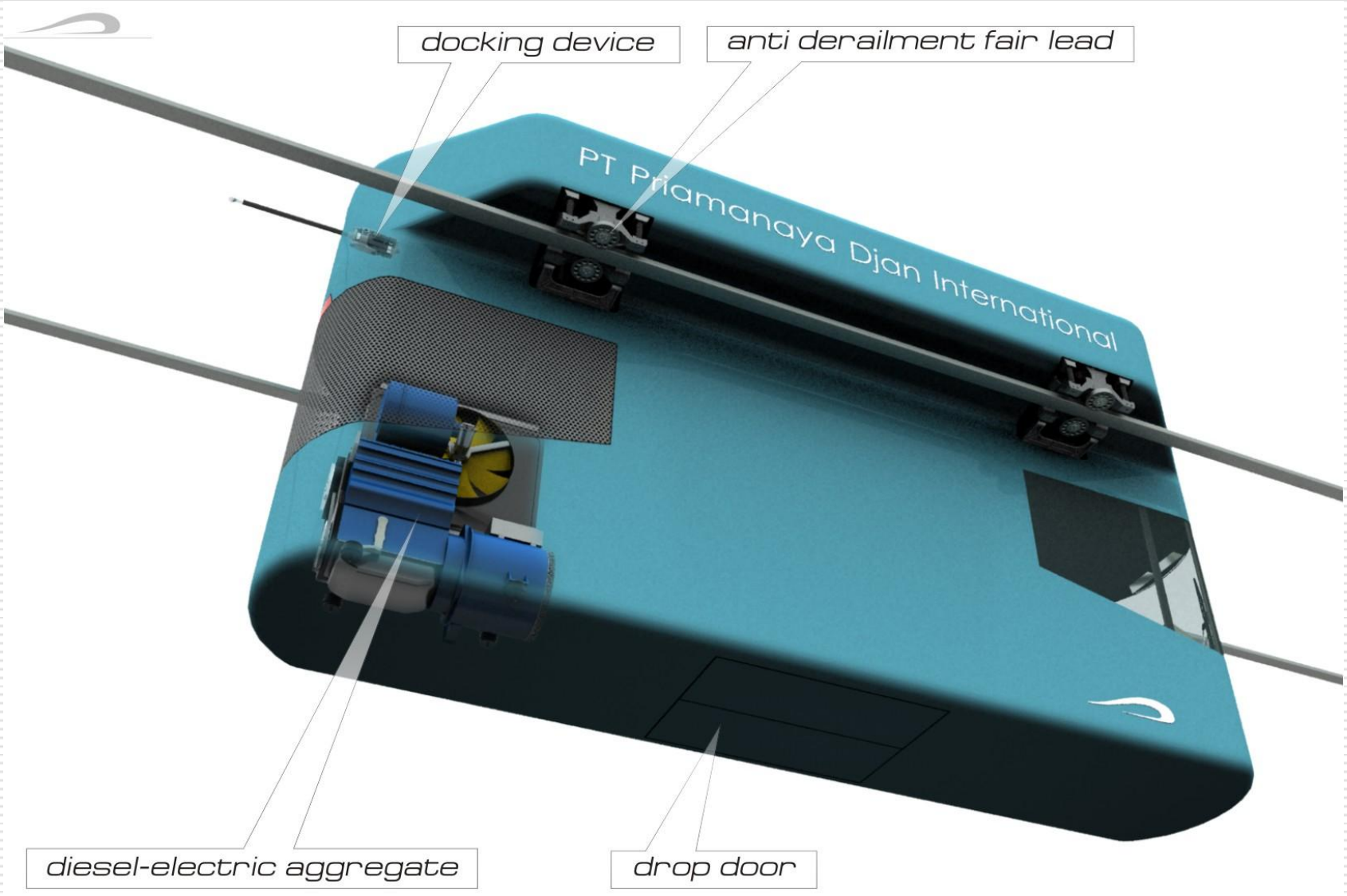
- Specifically:

1. Construction and maintenance costs lower than any other system used for mining transport applications (dump tracks, railroad, and conveyor)
2. Lowest possible energy requirements
3. Lowest possible personnel requirements
4. Full scalability (adaptation to any desired capacity)
5. Minimal technical risk (reliance on tried and proven technologies, methods, materials etc.)
6. Absolute adoptability (to any climatic and geographical conditions)
7. Be easily bankable (financed with either debt or equity)

Number of technical solutions were developed and examined; including piloted modules with either diesel-electric or diesel-

hydraulic running gear


docking device
drive unit
anti derailment fair lead
diesel engine
PT Priamanaya Djan International
automatic gearbox
drop door


docking device
anti derailment fair lead
PT Priamanaya Djan International
diesel-electric aggregate
drop door

Both these variants while technically feasible and highly efficient were found to be not optimal for the specific task due to the following reasons:

- Poor scalability
- High personnel requirements
- Higher cost than optimally desirable

The ultimate system that satisfies all 7 principals was developed – coupler cable drive STU mining system

How the coupler cable drive STU mining system satisfies all 7 requirements applied to the ideal system

1. Construction and maintenance costs lower than any other system with equal capacity used for mining transport applications (dump tracks, railroad, and conveyor)

- In serial production cost of an **automated STU mining transportation line will be** 250,000 USD/km for the capacity of 1 mln. ton per annum (MTA).

- When higher capacity is required each additional 1 MTA will increase cost per kilometer by 50,000 USD e.g. a line for 15 MTA will cost: 250,000 + 14x50,000 = 950,000 USD /km.

2. Lowest possible energy requirements

- Energy requirement for specific Baturaja line application is 12 kWt
- Energy requirement per ton of freight is approx 3 times lower than railway the most energy efficient conventional transport

3. Lowest possible personnel requirements

- System is semi-automated and specifically designed to be run by a small team of operators

4. Full scalability (adaptation to any desired capacity)

- System is fully scalable to any required capacity 1 MTA +
- System's capacity is increased by simply increasing capacity of dump-cars, supports, string tension etc. This makes the system unique. Railway for instance is only feasible for large capacity projects. Where STU can be offered to prospective purchasers only requiring or able to finance a relatively inexpensive system

5. Minimal technical risk (reliance on tried and proven technologies, methods, materials etc.)

- The system is essentially as simple and reliable as a conventional elevator. Every single component is tried and tested in multitude of engineering applications

6. Absolute adoptability (to any climatic and geographical conditions)

- The system is easily adaptable to any climatic conditions. Being fully elevated the system has low sensitivity to specific terrain. The system is not sensitive to floods, earthquakes, hurricane wind and other extreme conditions. This enables to pursue projects in all countries and all continents.

7. Be easily bankable (financed with either debt or equity)

- Being the most cost effective system enables to finance projects with debt, equity or combination of both. This is especially important to emerging mining companies with valuable assets but no present cashflow.

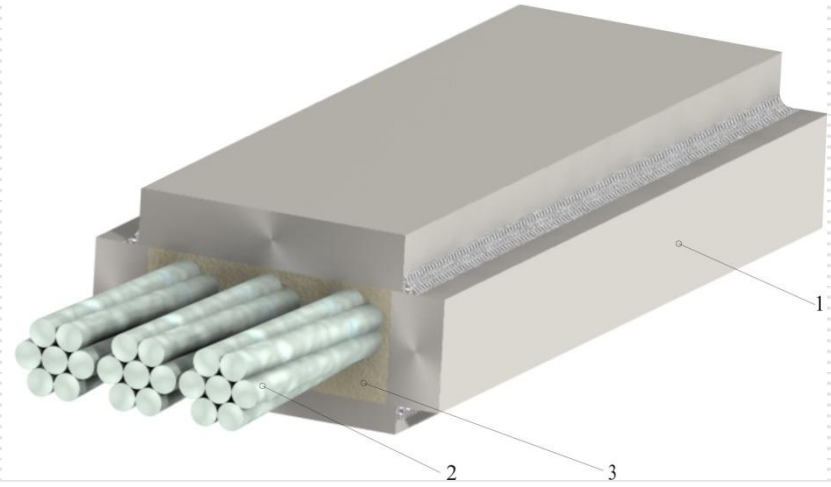
Description of coupler cable drive STU mining system

Components of coupler cable drive STU mining system

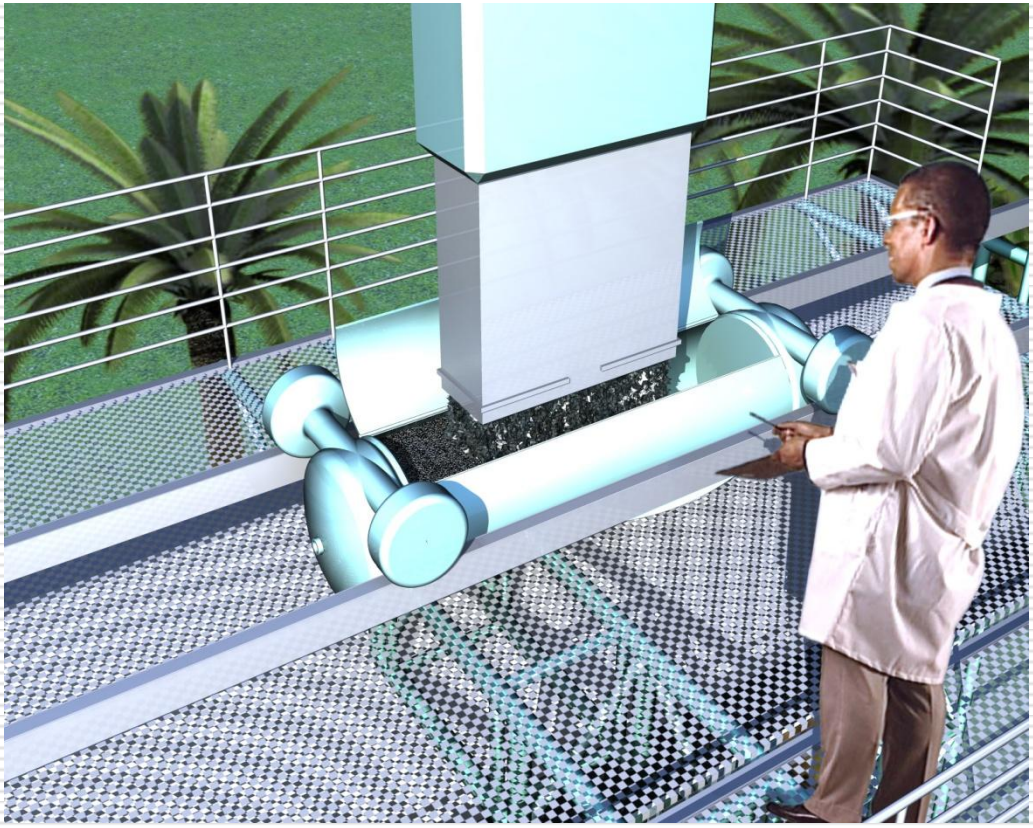
- String-rail two way track structure for suspended rolling stock;
- Loading terminal;
- Unloading terminal;
- Rolling stock (highly aerodynamic suspended modules dump-cars);
- Drive system (coupler steel cable);
- Line’s control system.

String-rail two way track structure for suspended rolling stock

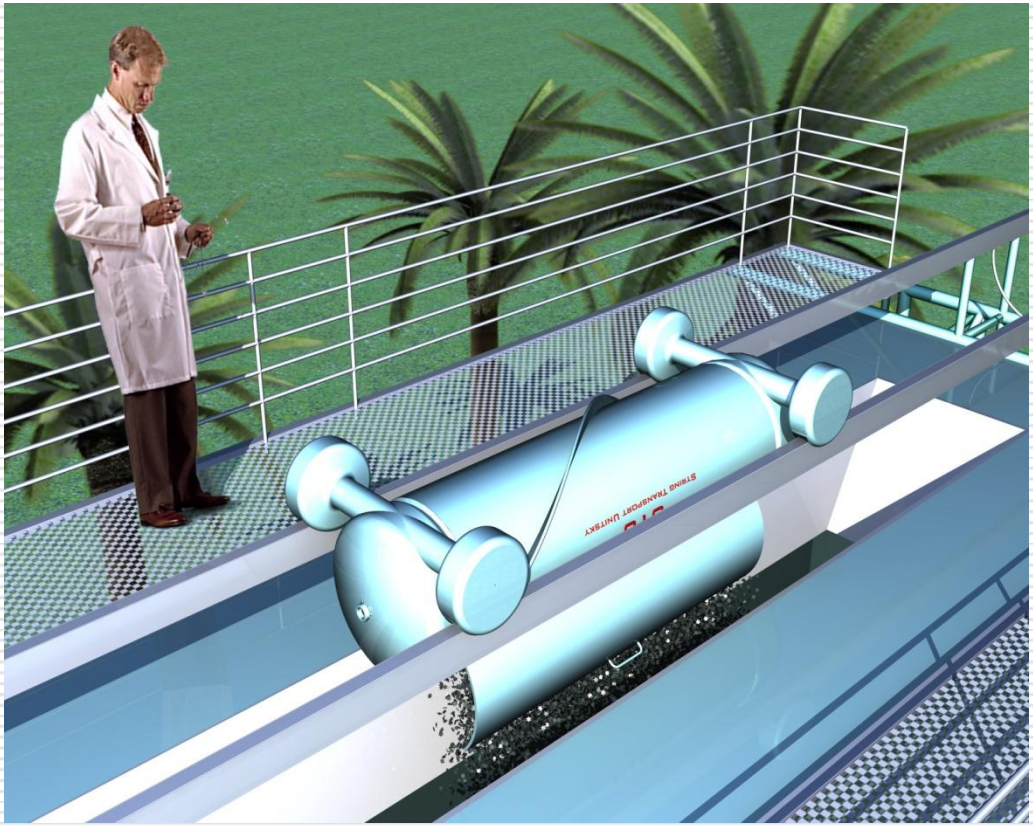
String-rail is conventional steel reinforced beam additionally reinforced with tensioned high strength wires. String-rail technology enables to achieve the lowest material consumption and as the result the lowest cost for elevated structure. Additionally the beam is combined with rail into one component.



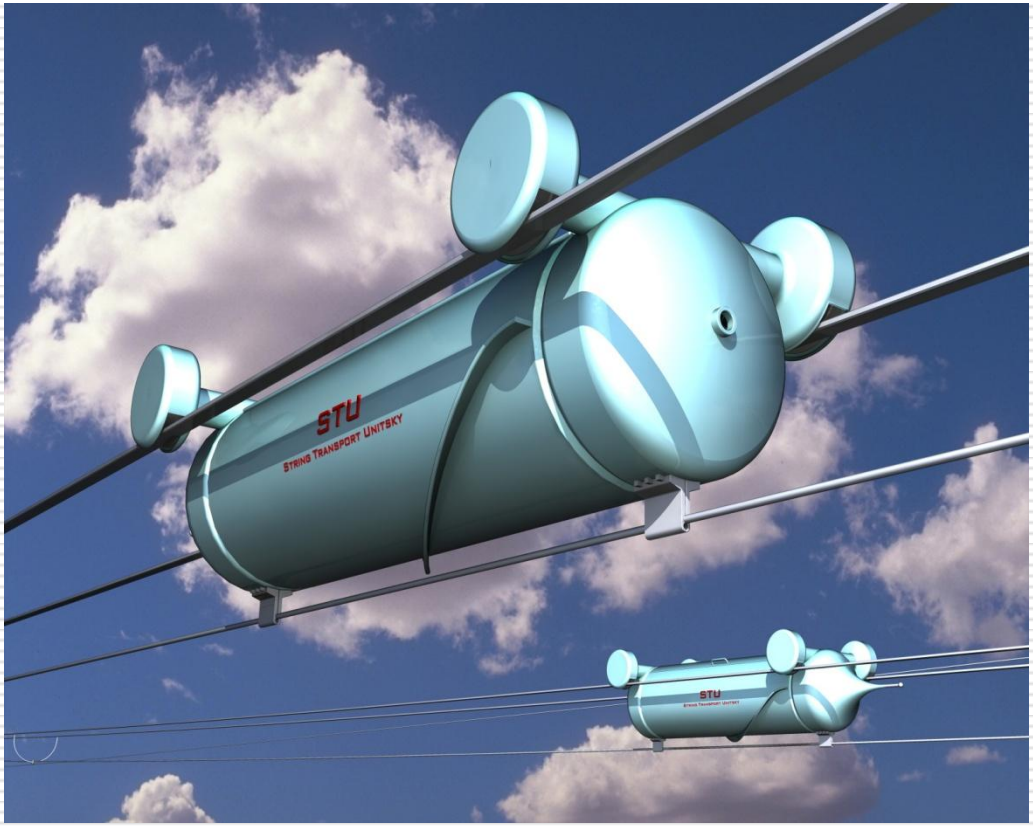
Loading terminal is used to load the coal into dump-cars the process is facilitated mechanically and is therefore absolutely reliable



Unloading terminal is used to unload coal into designated dump area. Just like with loading it is mechanical. Unloading and loading are facilitated via single hatch. The dump-car's body is rotating to achieve this.



Rolling stock is highly aerodynamic dump-cars. These dump cars are inexpensive non self propelled vehicles, much like railway cars.



The most important innovation which insures low cost, reliability and scalability of the system is introduction of coupler cable drive to propel dump-cars. Coupler cable performs few functions which enables to reduce cost and increase reliability of the system, specifically:

- - Enables to forgo self-propelled modules and autonomous electric motors in every dump-car in favor of a single electric motor in every anchor support. This generates saving of at least 50,000 USD/km for light system;
- - Enables to forgo expensive and unreliable contact network. This generates saving of at least 100,000 USD/km for light system;
- - Enables to forgo complex and expensive automated control system that monitors movements of dozens of dump-cars. Coupler drive cable is inexpensive and enables to use much simpler and more reliable control system. This generates saving of at least 150,000 USD/km for light system;
- - Enables to forgo expensive and unreliable electric-mechanical breaking system in favor of single break on electric drive of the coupler drive cable. This generates saving of at least 50,000 USD/km for light system.

The most important innovation which insures low cost, reliability and scalability of the system is introduction of coupler cable drive to propel dump-cars. Coupler cable performs few functions which enables to reduce cost and increase reliability of the system, specifically:

- Coupler cable drive STU mining system is extremely efficient mode of bulk freight transport.
- Its efficiency exceeds that of a railway. Unlike railway however, coupler cable drive STU mining system is fully scaleable, has low dependence on terrain or weather conditions, is insensitive to elevations and represents the “turn key” system.
- Coupler cable drive STU mining system is the best possible transportation solution for either PT Priamanaya internal use or for selling to other mining-logistics companies.