

***Skybus Metro System of our country requiring no investment from State, is the only answer to de-congest your city for all time to come! With the tested and proven Skybus system, the international metro systems are obsolete!***

Congested cities need urgent solution in terms of creating transport infrastructure for people, goods and house keeping functions of the city- without burdening the road infrastructure. No road based solution/ nor rubber-tyred solutions will work for mass transit of people and goods in the city. Only rail-based solution, railway technology is needed.

However, inflexibility to follow roads causes tremendous strain on the city infrastructure as railways would demand land and buildings to be disturbed for setting up their systems. Further derailments in the middle of city with falling trains from the overhead bridge structure, used in elevated metro rail, can be disastrous and cannot be wished away. It will kill many on the roads.

Skybus technology solves this problem of railway by providing positive connection between the railway tracks and the coaches, in such a way that no derailment can take place, as well as no capsizing can occur in the railway. That means the proven railway technology is further improved in the Skybus technology and is the solution to the problems faced by the railway technology in all these 150 years.

Those railway experts who try to say Skybus is unproven, are actually saying in effect, the railway technology is not proven! In fact the established lobby of old style railway manufacturing industry has a threat from the new innovation from our country. So it can be understood why

so much anxiety prevails in railway lobbies to prevent Skybus system from seeing the light of the day.

Further Skybus technology provides for 20m radius of turning and vertical lift arrangements- again based on proven turn-table and lift and EoT crane technologies- which makes the Skybus the ideal solution for the city because no more buildings or land be disturbed. So Skybus is the much needed rail-based solution to a city overcoming the the limitations faced by old railway technology.

Skybus Metro system is the new generation technology invented by Mr. B. Rajaram ( Former MD/ Konkan Railway Corporation, belonged to Indian Railway Service of Engineers) to address the problem of transportation of people, goods as well as provide support to municipal house keeping functions of a city. USA granted patents and the World's First running Skybus test track at Goa, which Mr Rajaram constructed and conducted the trial runs, proved all the required safety parameters to be of international standard.(2004-05)

Advantages of Skybus over existing options like light/heavy metro rail or mono-rail systems:

1. Performance:

- a. Skybus Metro can be scalable to handle 20,000 passengers per hour per direction to 80,000. Mono-rail cannot and Skybus Metro though light, performs as heavy metro rail.
- b. Skybus Metro handles cargo for the city- in containers as well as trucks as a whole lifted and delivered to specific points. So

truck pollution is eliminated. Existing Metro rails cannot. Mono-rail cannot be even considered for comparison.

- c. Speeds are same as for Railways- 100kmph to 110kmph- depending on the inter-station distance. Acceleration/ deceleration values are 1.3m/sec/sec.

## 2. Safety:

- a. Skybus is derailment proof and by design can never get separated from the railway tracks- so there is no capsizing of coaches. World's safest system. Conventional Metro rails do not have this technology advantage- people risk lives, not only in the Metro coach but those traveling on the roads too! Hence Skybus is more suitable to go on the roads.
- b. Skybus is protected from collisions, using the patented "Anti-collision Devices" ( Patents of Mr. Rajaram, and adopted in Indian Railways). Others Metro rail do not have this technology.

## 3. Land & protection to existing buildings:

- a. Skybus has short stations of 50m length, adequate for next 100 yrs of traffic growth, and combines with local bus stop. Occupies only the road divider with 1m wide pillars, the Skybus, traveling about 6m above the roads. Can be designed to take 20m radius curvature- hence no buildings will be affected- follows existing roads. Can go where a bus goes. This is because Skybus unit of 20m length can carry 300 to 430 passengers while other metros cannot. Least land

- almost nothing compared to others is needed – Skybus is city friendly- does not cause pain to existing city dwellers.
- b. Even the depot areas etc, Skybus can make use of space above existing Bus depots- without fresh land acquisition.
  - c. Skybus is a railway with flexibility like bus- other metro rails cannot do this.
4. Creation of precious urban space: Skybus adds precious commercially exploitable urban space all along the route- Skytop over the railway track: 9000 sqm per km between stations. Metro Rail/mono-rail cannot do this. So if you have a 10km Skybus route the city gets 90,000 sq.m of additional urban space in prime location!
5. Capital & running costs:
- a. The capital cost per km of double line route, including all rolling-stock and train control is Rs 50 cr on average +/-10%. Depending on local foundation conditions and the fly-overs to be negotiated.( The test track at Goa with rolling-stock units two traversers, a station, very difficult expensive foundation conditions, was constructed at average cost of less than Rs 36 cr. Per km. within 6 months at Yr.2004 prices!) Compare this with what Metro rail in Delhi spent on elevated Metro: Rs 120 cr!
  - b. Maintenance costs are much lower in the Skybus- structures are smaller, tracks are maintenance-free, the coach bodies are designed to be maintenance-free. The energy costs form

the bulk of expenditure. Same as for Metro rail. But energy in Skybus, is used to carry more people than in Metro Rail, which carries more dead loads.

#### 6. Construction:

- a. Skybus uses factory produced pre- fabricated technologies with post tensioning and causes least disturbance to the daily life of city during construction.
- b. It takes only 24 months to complete because of minimum problems of land and parallel activities of pre-fabricated structures. Other metro rails take 5 to 7 years!

#### 7. Charges:

- a. At Rs 250 per person per 500 km of air-condition travel anywhere to anywhere, in a month, it is affordable for regular city commuter.
- b. Minimum entry charges of Rs 5 will apply and floating or occasional users will be charged at Rs 2 per km.
- c. Other metro rails become bankrupt at these fares. No BOT operator can do conventional metro without pumping in Govt money in substantial manner.

#### 8. Financial Viability:

- a. Fare-box collections coupled with the commercial exploitation of the additional urban space created by the Skybus Metro, produces a 15 to 20% return to the investor, and in about 7 to 10 years capital can be recovered after debt servicing at 12%, provided debt is about 60 to 70%. This is for Skybus Metro-

but the Elevated Metros prove to be financial disasters-  
Governments will have to pump in money regularly.

- b. A 20 year period of concession should satisfy a BOT operator to address all the revenue risks and construct the Skybus Metro **without Government funding component.**

9. Who supports this innovative Skybus Metro technology?

- a. Bharat Ratna Dr Abdul Kalam
- b. Padmabhushan Dr Anil Kakodkar (Chairman AEC Govt.of India)
- c. Padmabhushan Dr Ramarao ( Former Vice Chancellor Univ.of Hyderabad)
- d. Commissioner of Railway Safety ( Sri Sudhir kumar/ and Chief Commissioner of Railway Safety Sri Garg- who prescribed the norms to be satisfied for safety- and these were satisfied.)
- e. Prof. CK Prahlad who on visit to Skybus, called it the world class technology!
- f. More than 34 industries of our country and Captains of Business houses like bemi, Tatas, Grasims, ACC, Essars, M/s Elin EBG Austria, Bajaj Electricals,Fedders Lloyds to name a few. All participated with their own funding in prototype manufacture and testing.
- g. Department of Science & Technology and IIT Bombay partipated with their own funding to make the Skycoaches and BARC did advanced vibration testing.
- h. Research Designs and Standards Organisation ( Min. of Railways) sent their test team to measure all the parameters in Dynamic conditions as independent recorder of facts.

10. Opportunity for your city & State in particular to make India the leader in technology for common man:

- a. The Skybus redefines the balance of forceful lobbies in Metro world, placing India in the forefront, to make the urban transport economical and eco-friendly. More important is, comfortable less than a minute waiting for service given by the Skybus cannot be matched by any other metro- and it is for common man on the street, that the advantage goes.
- b. Your Capital has everything to gain, get Skybus Metro for free, and within 24 months- one can experience the revolutionary service within one's own tenure! Other Metro rails have long gestation periods.

11. Safety Certification:

- a. Basically the Skybus Metro System is a modified railway improving the safety parameters: the center of gravity of mass carried by wheels is brought closer to the railway wheel-rail guidance support point as compared to railway. Since we use the same railway bogie on the same railway track used for metros in the world, the same rules for dynamic safety will apply while the system is in motion- that is:
  - i. The peak accelerations in vertical/lateral/longitudinal directions should not exceed the norms fixed for the metro rail systems in the world.
  - ii. The ride index values used by Indian railways for their suburban systems used as the upper limits for performance

- iii. Since this is coaching stock with 8 wheel configuration, and limits are based on human comfort, automatically the safety requirement of Derailment Coefficient being within safe limits is assured.
- iv. The above position is confirmed by the Chief Commissioner of Safety for Railways in India.
- v. The same rules for opening railways can be effectively used in this case too.
- vi. The fixed structure dimensions and the moving dimensions permissible are derived by using the existing clearances provided for rolling stock in our own country. Further from the test track these values can be re-confirmed and validated.
- vii. The principles used for operating and controlling the railways in metro suburban system are used for Skybus too. The apprehension that this may not give throughput , by some railway experts is unfounded. The secret is "train" here is 20m long and because of superior electrical braking the braking distances are of the order of 150 to less than 200m as compared to 5 to 10 times in conventional railway working and hence conventional railway experience of the fearing experts does not have technical basis. Also we carry 300 to 430 persons within 20m length in Skybus, which is not so for conventional railway, which is the Metro rail.

viii. Now "Certification" is a legally based document which can be issued by a person / or commission so authorized under the law of the land. If Railway Act is applied, then Commissioner for Railway safety can issue the same, once the laid down norms are satisfied. A third party independent agency takes the measurements for the performance norms, which are compared with standards prescribed by the rules made under the Act , and after completing the work only before opening for public the certificate is issued. Since Ministry of Railways do not want to classify Skybus under Railway Act, then center has no authority on the safety issue- tramway act under the constitution applies and State Govt becomes the rule making authority, even though all the rules are similar to the railway rules only, for the Skybus too- because it is a 100% railway technology based system- only improved to avoid derailments/ and collisions which routinely occur on conventional railway systems.

12. Obligation from State Govt:

- a. The old central Act but, transferred to States to operate after Independence, the Tramway Act 18XX existing, can be straightaway adopted by the State or The Skybus Metro Act has to be passed, since Ministry of Railway has categorized

the Skybus Metro System as “not railway” under Railway Act 1989.

- b. Since the test results satisfy the international norms, once the Act is passed by a state, it becomes a state subject , the safety commissioner under the Act will certify to the same norms used for the railway vehicles, either by India or by Europe, with third party test results.
- c. Right of Way has to be granted to the BOT operator under the Act- The draft is already prepared by an experienced Supreme court advocate and a former Member law commission.
- d. Invitation to discuss and finalise a concession agreement with the BOT operator.
- e. It is there for your asking, the Skybus Metro system- this new millennium’s gift of our country to the world, in the words of Bharat Ratna Dr Abdul Kalam.
- f. It will be a historic day when the Skybus Metro gets commissioned within 24 months of financial closure, expected to happen in 4 months, and open the new Metro for public use in 2007- touching lives of hundreds thousands of ordinary common struggling people, who will eternally be grateful to the Government!

Konkan Railway Corporation Ltd., a Government of India Company,the BOT operator who are funding and the State will have to execute a MOU to make the above a reality.

Proir to advent of Skybus Metro technology there was no alternative for mass transit system other than simple railway –as the Delhi metro. But with improved railway technology as used in Skybus available, it is not rational to still build older generation systems.

***It is height of convoluted thinking and gross abuse of position of trust granted to our old generation railway experts, to say less efficient and accident prone railway technology is preferable, while the same railway technology, improved to prevent accidents and be more efficient, which is Skybus, is sought to be wantonly compared with some monorail or rubber tyred systems, to confuse the administration and mislead without giving any technical basis.***

It makes no sense even to think of old, conventional not-so-safe-metro rail systems like Delhi metro- an obsolescent sytem spending precious public money when you have our own country's gift to the world Skybus, performing better and costing nothing to the public funds except non-financial legal faciliatation for private funders, to present your city with the new Skybus metro within 24 months of financial closure!

**Er. B. Rajaram** M.Tech.,FIE.,FNAE

Former MD/Konkan Railway Corporation Ltd..

Inventor & Technology developer of Anti Collission Devices/ Skybus Metro Systems.

Representing Interests of Konkan Railway Corporation & public interest.

Object: Common man should get the benefit of technology break through.