

**STC Serves in  
Space & Other  
Information**

# The Planetary Settlement – Bio for Karl W Guenther

- At 17 having mastered all Civil Air Patrol courses, repaired and taught use of the Link Instrument trainers at O'Hare AFB. As Captain, second highest rank as Illinois Wing Communications Commander he was awarded the Jet Orientation Course and Congressional Dinner.
- His brother, a pioneer in Cryogenics, & Karl took Engineering Physics at the University of Illinois
- Midway joined the US Army; trained in Nike/ Hercules Air Defense, Soldiers of Quarter, 5<sup>th</sup> Army, was trained in Chemical Biological & Radiological Warfare amongst other assignments.
- After service switched to the Illinois Institute of Technology, Changed Majors to a BS Industrial Engineering, later completed ½ of credits for his MBA
- Link Belt did time study and improving methods in Fabrication and in their Foundry
- Cinch Manufacturing, Licensed as a Instructor at University of Michigan in Methods Time Motion setting up one of the first clean room operations, new plants, also responsible for the design and final approval of automation equipment.
- Officer in the Society of American Value Engineers Chicago
- Commercial Cam – Automation machinery, took it and later 4 other companies to extreme growth by implementing a total framework for process and cost control including two computer installations.
- Purchased by Emerson Electric as a training organization & rated the top two in growth & profit
- Own business buying and selling manufacturing equipment, Purchased a marina ending in a design Build Machining operation. Sold assets and incorporated into Sky Train in 1995.
- When “Space was targeted” our design – has been selected to be built at MOSI as a Space settlement – Was Supported by Florida government for the acquisition of \$2,000,000 to start the MOSI project

# Space Has Been With Us So Long & STC Has Solutions Which Must Be Put Into Perspective!



Shown; the author a presenter in the Lunar Panel in 2005 & 2006. Safety, maintenance, multiple uses, connectivity, and cost needs to be considered for the Moon-Mars habitat.

**None of the above is real - needs verification and costing!**

# The Lunar Settlement

- A village powered & threatened by solar rays & radiation
- Here progress is limited by available occupant hours
- Items delivered must serve multiple uses & goals
- The “Heavy Rover” **instantly** changeable to a transporter
- **A solution for immediate emergencies** improves health, efficiency of operations &, also functions to do robot tasks
- Naturally using wireless communications & control
- Power, airflow, people movement and water distribution in a protected easy accessible conduit is provided
- A demo site, the Museum of Science & Industry, next slide
- Florida **Funding for \$2 & 8 million request:**

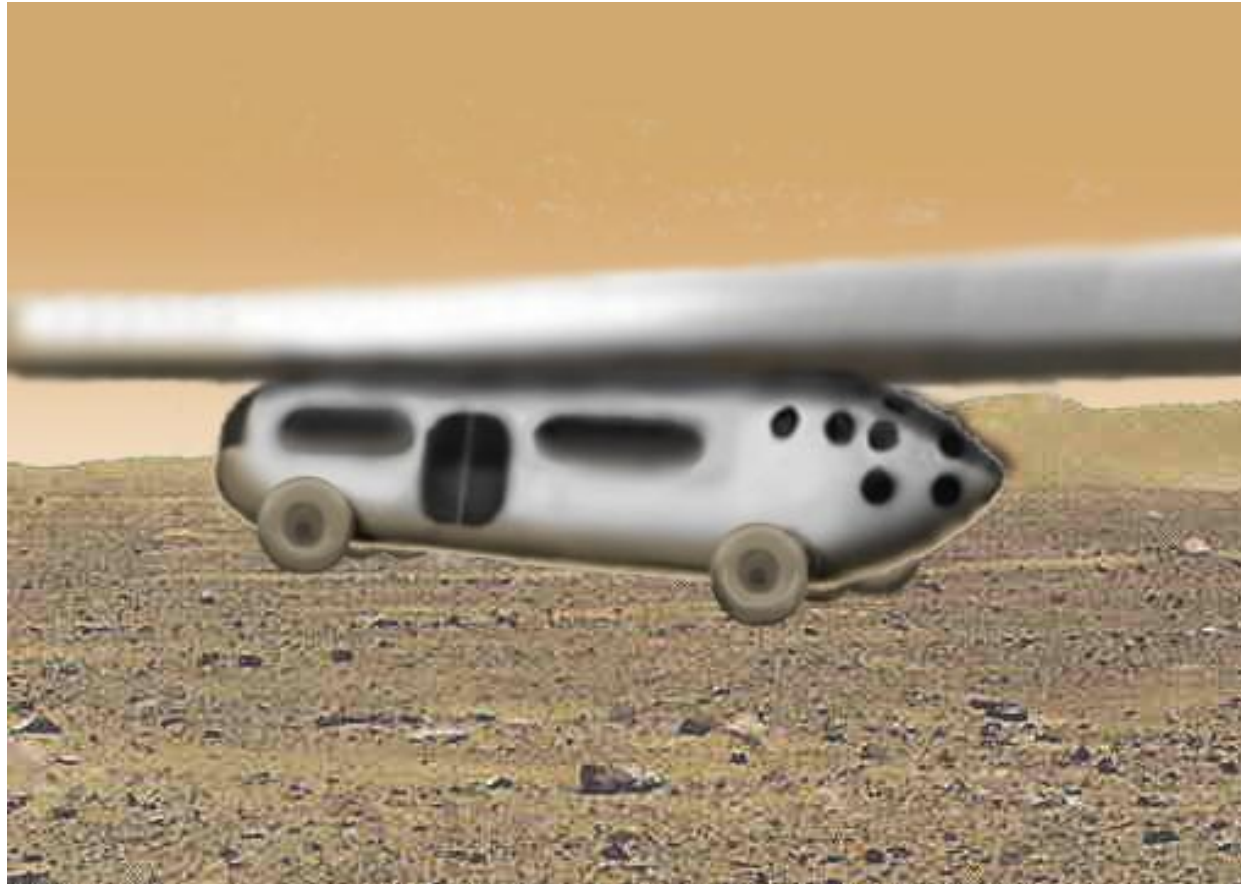
[http://www.flsenate.gov/data//Publications/2007/senate/reports/budget\\_issues/SENReq1247FY0607.htm](http://www.flsenate.gov/data//Publications/2007/senate/reports/budget_issues/SENReq1247FY0607.htm)

# Architects Concept of the Moon Monorail





# Train & Rover-Serves on Planets



## Transporter

A Linear robot & Excavator

Versions Type 1 through 3 patented



Funded in part by Florida's Technological Research & Development Authority

# Mission - an Interdisciplinary Project

- A habitat that is limited in “use-space” where safety requirements and the possibility of resulting loss of habitat is anticipated
- Intellectual disciplines must interface, quantifying and supporting logical solutions
- Equipment must have multiple functions toward uses
- Pollution and hazardous materials must be reduced, labeled & substituted with beneficial or available components
- The step after definition is to find better substitutes through Value Engineering etc., example; use water as hydraulic fluid
- A newly formulated value set defining the mission is suggested:  
Transport = \$; Repairable = support tool\$; Human time = automation
- **Sharing technology & information to the funding public = payback!**

# Presenting the Heavy Rover

A Robust Vehicle conforming to the nose cone of launch vehicle



Launched with a companion habitat Lander

A space rendezvous, combining the two vehicles

Loading for the mission

Adding the crew and fuel prior to landing

Landing on the planet or moon to be populated

Self offloading from the Lander by use of the robot arm



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# Heavy Rover Mission - Features

After using its main robot arm and unloading itself

A space walk might be necessary to orient features

Features wheels, a crane arm or arms used for:

- Earth samples and deep mining operations

- To orient the colony modules shipped previously

- As a short term or emergency habitat

- To harvest plants from growth pods

Connect and plumb most features of colony

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# Heavy Rover Mission - Surveying

Upon landing to scout and survey the terrain

To finalize plans based on previous findings

To verify minerals locations and quantity

Be a mobile laboratory & emergency rescue vehicle

To be a mobile airlock and decontamination unit

Designed to dock with other modules & tuna cans

House crews for verification of final colony layout

Be the prime mover to build trenches and footings

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# Heavy Rover Mission - Colony

To align the colony components for best function

To create the most efficient safest habitat

Available as a removable long distance rescue vehicle

To actually connect the modules and growth pods instead of a tunnel

Erect the solar arrays, airflow tubes and power lines

Relocate a nuclear power plant from original landing spot

With mission complete, erect an overhead structure

Re-movably connect itself to it to become a transporter

# Support Structure Construction

- The transport vehicles support structure will not need to be as sturdy as on the earth.
- The main problem is the transportation of structural members to the Lunar site and their erection with robot labor or space walks
- We are considering aluminum alloys for systems here on earth
- On the moon build with even lighter (more expensive) alloys
- This system can be used here on earth as an efficient means to move people and freight as described in our patent and literature.
- The lighter weight design can be used to transport the structures into remote park areas eliminating roads

# Transporter Safety Features

Serving as a control chamber, some modifications to systems are required to turn a guide way vehicle into a space vehicle

- Docking port(s) and a decontamination section
- Air makeup units and reserve air tanks
- A dual entry quick close hatch, to seal it from the main compartment if a chamber is breached
- A patching system to seal meteor and other puncture holes
- Roof shielding and the overhead structure are other means of deflecting missiles while reducing radiation exposure
- Transfer of most piping and electrical connectors from the Lunar surface into the Vehicles support structure

# Terrestrial Scout

Boarded from the “Heavy” refueled by the structure



- Space exploration will be conducted when needed with some comfort level
- Without suits and by simply boarding the vehicles at the Scout Pool carried to and with direct connection by the Heavy Rover
- The Rover will be a roving cargo, person shuttle, and portable tool shed
- Doing heavy mining a compartment or added towed vehicle(s) will move material from mine to the Space Elevator or lift vehicles

With permission from: Art Dula, Heinlin Prize Trust



# Energy Transfer

- **Electrical energy conservation and transfer, to be demonstrated at MOSI's interactive system, allows integrated operation of the moon-mars colony:**
- **Flexible solar collectors will provide a covering on the ground or structures managed by Ultracapacitors (DOE grant 2008)**
- **At some stage of populating a nuclear reactor will provide power for hydroponics, oxygen, water reclamation and mining operations connected into the transverter grid**
- **At MOSI we envision a Ford ICE® hydrogen piston engine generator for air conditioning stations - producing water**
- **Flywheel or capacitor energy storage and grooming will allowing minimum sizing of conductors and absorption of surges due to reclamation of same**
- **Superconductor wire will be effective in cold space environments able to increase current transfer ten times per wire diameter without resistance losses, reducing motor size by ten**
- **A solar collector and other devices are coordinated by the newly patented transverter and would be used on the transit system at MOSI**

# Conservation

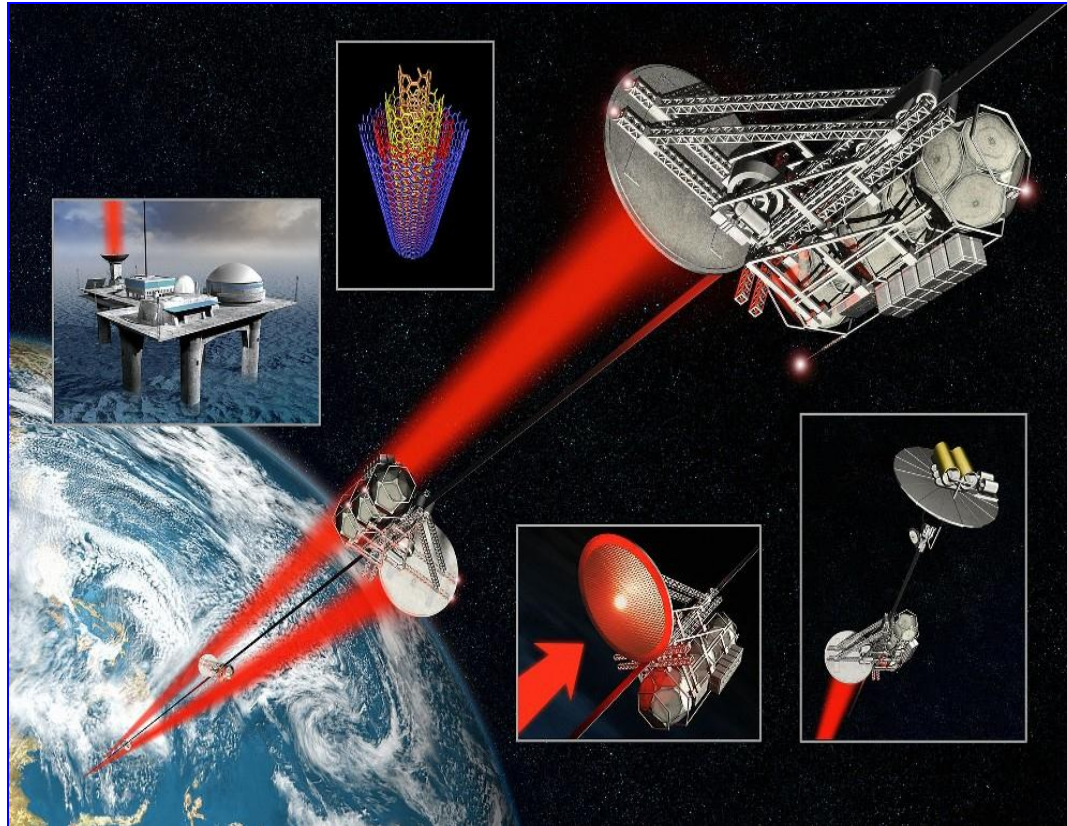
- To pump air is costly, conserving air in transferring between vehicles, Scouts, or to the outside airless environment is a must
- Time lost for suit up and danger for astronauts to expose themselves to an airless environment will effect productivity
- For the docking of two adjacent vehicles pressurized to full atmospheric pressures will require over 4,000 lbs clamp pressure to seal one 3 foot diameter mutual port surface, this, in order to prevent the loss of air
- The transporter and its structure would be a conduit to circulate air to the habitat, rovers on the surface and dock to with them.
- NASA and Space-Robotics Inc. are investigating Hydroponics' plant farm pods for use on planets or space habitat
- Structure plumbing will also feed nutrients and change air in these pods

# Mining Operations

- Mining operational needs are new to the planets.
- The 17% gravity means that a 5000 lb load, a huge truckload of soil, weighs only around 850 lbs
- We can move huge amounts with a very light vehicle
- Counterweighted vehicles will not be available since we will not be able to bring such heavy vehicles cheaply to the moon
- It means that mining based on the pressures of bulldozers, backhoes or jackhammers will be ineffective since they will lift
- Initially the Heavy Rover later as a transport vehicle, one end and bottom will act as a mining/lift arm adaptor while locked onto it's overhead structure which is the conduit for, air, CO2, electricity, water etc.
- The transporter will also be used to scrape and load soil

# Space Elevator How Loaded?

## Proposed System: Overview



With permission from: Dr. Brad Edwards - Carbon Designs, Inc.

- First Earth elevator: 20 ton capacity (13 ton payload)
- Lunar Payload almost (100 earth Tons) of volume
- Constructed with existing or near-term technology
- Cost (US\$10B) and schedule (15 years)
- Operating costs of US\$250/kg to any Earth orbit, moon, Mars, Venus, Asteroids
- Smaller Practical system on moon or Mars = lower costs
- STC also suggests pump regolith in a pipe

# Interactive Teaching



- Sky Watch Planetarium - WFLA News channel 8 nightly at 11
- IMAX Theater – Exclusive to Tampa, Florida
- CS whY – Live Forensic Laboratory & Youth teaching programs
- It also became the USA's Largest Interactive Children's museum
- History of 3 years of a \$2,000,000 Budget Request



# Conclusion: Heavy Rover into a Transporter System

- This presentation omits many details to preserve patenting
- The Heavy Rover, a removable rescue vehicle, saves energy
- We are ready to build at multiple locations hopefully also for NASA, not just MOSI, extending them as transit systems
- This system can then be revised for space. These can be substituted and life-cycle tested for performance at MOSI
- Sky Train's systems were approved for funding, by TRDA, NASA e-Florida and other National & Florida agencies
- **This is an opportunity for NASA to give the taxpayers an immediate payback operating at the USA's largest Children's Interactive Museum of Science and Industry**



# ECO Depot Display Showing Model in Operation

## Located Permanently for Lectures on Sustainability



# Overhead-Suspended Light Rail (OSLR) Back To Earth!

