SYMPOSIUM ON VISIONS AND STRATEGIES FOR THE FAR FUTURE (D4)
Space Elevator Design and Impact (3)

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THE BABEL TOWER: A SUPER-TALL STRUCTURE WITH A SUB-ORBITAL ELEVATOR

Abstract

The idea of reaching the heavens has captivated humans throughout the ages. Rockets have proved extremely inecient in overcoming this challenge, and constructing a "Centrifugally Extended Carbon Nano-Tube Tether Space Elevator" (CECNTTSE) presents unsolved technological challenges. We conclude that to eciently achieve the goal of unrestricted movement away from Earth's gravitational pull; both the current state of the art and the proposed method for a Space Elevator should be reinvented. Therefore, we propose the "Buoyant Advanced Building Elevator Lightweight" (BABEL) Tower, a new concept of "a oating tower" capable of reaching up to the Karman Line and beyond, while providing the structural support to a sub-orbital elevator and oering a better launching platform for space vehicles, with built-in rocket engines, directed specifically to LEO but also beyond. Using a (hybrid) LTA and electromagnetically driven elevator car, this super-tall tower could lift tremendous amounts of cargo (and passengers) while avoiding problems associated with space elevators, and could be more feasible in a shorter time. This concept combines characteristics of the Skylon Tower (of London) and the Burj Khalifa (of Dubai) into a ared tensegrity structure with buoyant platforms, "linked" every 2.5 km and tethered to the ground. This anchor-mooring system will support a beam-stalk like buoyant shaft. The estimated aspect ratio (2.5:100) for each wing of its "Y-shaped footprint" will be 2500 meters wide at sea level. The platforms and the shaft "must be built" following a modular principle. Its buoyancy will be generated using a perfect vacuum inside its cells, thus becoming; lighter than air, free from the scarce availability of helium, and safe from hydrogen's reactiveness. Because its foundations would have to resist the up-thrusting forces that the buoyant structure will produce (instead of the compressive forces caused by weight), the engineering of this buoyant tower is structurally comparable to a maritime spar platform for deep-water oil-extraction. This concept will have a high potential eciency in reducing the cost per kilogram to be in transit to orbital insertion. In providing an infrastructure of planetary scale, this tower could provide the requisite platforms for other uses such as astronomical observation, clean solar energy distribution (by laser beaming), space tourism, telecommunications, research laboratories, aerosols dispersion, carbon and methane sequestration, airship hub terminals, etc.