

FAR FUTURE (D4)  
Space Elevators and Tethers (2)

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ANALYSIS OF POSSIBLE CHANGES IN SPACECRAFT DESIGN DUE TO THE USAGE OF A  
SPACE ELEVATOR FOR TRANSPORTATION

**Abstract**

Most current publications assessing the benefits of a hypothetical space elevator focus mainly on the reduction of transportation cost. A more detailed assessment of the complex interactions between the used space transportation system and the design of the spacecraft is still missing. This interaction is crucial for evaluating a possible cost reduction in this area, which has a much higher impact on the overall space mission cost than the raw transportation cost. In order to conduct the analysis, an idealized space elevator is chosen as a baseline, which primarily diminishes the mass and volume restrictions of current transportation systems. First, immediate consequences on the spacecraft design are evaluated for different types of current spacecrafts. Second, scenarios for possible future evolutions in the design of spacecrafts are developed. In order to supplement the analysis, a pre-phase A study for a geostationary telecommunication satellite is presented, which was designed under the premise of the existence of an idealized space elevator.