

Orbiter Lander Device 軌道降落器

Context

A lander is a spacecraft that descends towards and comes to rest on the surface of an astronomical body. In contrast to an impact probe, which makes a hard landing that damages or destroys the probe upon reaching the surface, a lander makes a soft landing after which the probe remains functional.

Application

Students were tasked to study, design and create an orbital lander that will be able to safely land on the planet of their choosing. These landers had to ensure that all astronauts were kept safe during descent and eventual landing. During this project the students learned about how to speed up and slow down certain objects as they fall, we also tested various materials to see which will make the best landing gear to create a soft spring like landing.

Testing and results

When the time came for testing, the students were very excited. We tested their landers from different heights: 1m, 2m and 3m. The goal was to land the lander upright with the "astronauts" still safe inside, and with the device still standing upright and not breaking. During the initial testing, several groups were successful from the 3m mark and were very excited! This project was a great example for the engineering design process as it emphasized collaborative brainstorming, testing, observation, and critical thinking.

背景

降落器是一種向天體表面下降並停在天體表面的航空器。撞擊式探測器在到達表面時進行直接降落會破壞探測器，相比之下軌道降落器會進行安全性降落，之後探測器仍可正常運作。

應用

學生的任務是研究、設計和製作一個能夠安全降落在他們選擇的行星或月球上的軌道降落器。這些降落器必須讓所有飛行員在下降和最終降落期間都保持安全。在這個專題中，學生學習如何使物體在下降時加速和減速，我們測試了各種材料以得知哪種材料可以創造出最好的起落架，像彈簧一樣柔軟降落著陸。

測試及結論

到了學生們興奮不已的測試時間！我們從一公尺、兩公尺以及三公尺的不同高度測試降落器。目標是讓降落器直立降落，且「太空人」在裡面仍然安全。在最初的測試中，有幾個小組都成功地從三公尺降落開始測試，且非常興奮！這項專題是工程設計過程中一個很好的例子，因為它強調相互合作、腦力激盪、測試、觀察和批判性思考。

1 ASK + IMAGINE 提問 + 創思



We investigated gravity, air resistance, and different landers to discover which bodies and landing gear were the best. 我們研究了重力、空氣阻力和不同的降落器，以找出最好的機身和起落架。

4 CREATE 創造



We worked collaboratively to build our landing devices. 我們相互合作以建造我們的降落器。

6 PRESENT 展現

We recorded the results from testing and shared them with the class. 我們記錄測試結果並與班上同學分享。



3 PLAN 計畫



We drew a detailed design of our idea for the best landing device. 我們繪製我們認為最佳降落器的想法的詳細設計。

5 IMPROVE 改進



We helped each other test and improve our designs. 我們相互協助並修正我們的設計。