

17 - One Thousand Little Lights

Displays with drones are the new fireworks shows, but more creative and sustainable. A swarm of drones can perform a coordinated light-show resulting in an audio-visual spectacle that captivates the audience. However, current drones used for these displays cannot perform in both indoor and outdoor shows and only carry one fixed payload, which limits their lifetime. This is where project 'One Thousand Little Lights' wants to make a difference.

Mission Objective

The mission of 'One Thousand Little Lights' is to revolutionize the airborne, audio-visual entertainment industry by 2025. This will be accomplished by designing an economically competitive, safe and sustainable drone for indoors and outdoors light shows in 10 weeks, for the company Anymotion Productions. We proudly present to you the drone 'Starling'.

Starling's Design

Starling is optimized for sustainability and easy operations. This means it can be assembled before the show with different interchangeable payloads. During the flight, Starling is able to perform complex manoeuvres, as verified by a dynamic simulation. After the show the drones are again able to be disassembled, after which they can be mass-transported and stored until the next show. The drones utilize state-of-the-art GPS positioning to autonomously land on the landing pad and restore energy for the next flight via conductive charging, which can increase the length of future shows.

Starling is able to perform outdoor shows with swarms of more than 300 drones. Another unique feature of the design is the ability to also perform indoor shows. This is possible due to advanced Ultra-Wide Bandwidth positioning technology. When it comes to flight time, the design outperforms Intel™ light shows by a factor of 2, with a stunning flight time of 20 minutes when carrying a light. In addition, Starling can carry innovative payloads up to 600 grams and 20 W of power consumption, such as lasers, megaphones or pyrotechnics. Starling's interchangeable landing gear accommodates any future payload module up to 20x20x20cm. Therefore Starling outperforms conventional drones who have a fixed payload configuration.

Starling also has easily removable propellers and battery, which greatly improves its main-

tainability. The frame is made of polypropylene, commonly used in food packaging plastics, which allows for more than 80% of the drone mass to be recycled. These design choices set the drone ahead of its competition in terms of sustainability. Starling is able to fly at least 1000 flight hours in its lifetime. Because safety is the most important aspect during a show, safety features have been implemented: the choreography is fully programmed into its memory before the show, but manual control is always possible. The drone is highly modular and easy to handle. Any employee can perform maintenance after only one day of training.

Starling is the perfect platform for drone-show companies to enhance their artistic capabilities and amaze audiences around the world in a sustainable way.

