



Project Title:

Re-designing Landing Gear part for Unmanned Aerial Vehicle (UAV)

Challenge Title:

ASPIRE Aeronautics Challenge 2021

Team Name:

Team AEROgeek

Team Members:

Team Leader:	Murteza	ABC Secondary School
Team Members:	Clarice	ABC Secondary School
	Johnson	ABC Secondary School

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1.1 Introduction

Give us a brief introduction on why you are embarking on this project and what interest you.

Light-weight polymers and carbon-fibre reinforce polymers are dominating the Unmanned Aerial Vehicle (UAV) industry as they are capable of increasing flight time. These drones are best used for recreation purposes however not used in extreme conditions. Aluminium Alloys are widely used in the aerospace industry. They have excellent thermal stability and mechanical properties.

In this project, we will be focusing on applying a multi-purpose protective coating on an Aluminium Alloy landing gear of an UAV which will be used in environments that has a purpose of aiding rescuers to locate survivors. Rescue missions such as sea rescue, snow rescue, mountain rescue, forest fire, to missions that requires urban surveillance for example, a large area which has been flooded or a home that is on fire.

1.2 Literature Review

Conduct a brief research on your project. This is to gain understanding of existing research on your project.

Taking reference and inspiration from the newly developed Swiss Air Rescue (REGA) drone that is developed by REGA and specially designed for snow and mountain rescue [1]. When rescuers are climbing a mountainous terrain to find survivors, the REGA drone flies up to locate the survivors. It locates by pinging a survivor's phone and the exact location is then determined through, the on-board camera that is controlled by the drone operators. The information is then passed through to the rescuers. This cuts down the time spent on finding survivors drastically.

Being a rescue drone that operates in extreme conditions, REGA uses the conventional helicopter landing skid that can go through wear and tear very quickly as can be seen in the figure 1 below. Hence, our purpose of this project will be designing a new landing gear that can withstand landings on rough mountainous terrains and maintain good grip whilst grounded on a muddy surface. The landing gear will be made of Aluminium Alloy 7075 which then, the protective coating can be applied to further strengthen and reduce the wear on the landing gear. This will be an advantage as cost on maintaining the landing gear for the operator will be reduced. The REGA drone being 2m long and its propeller being 1m, can take-off with a max payload of 10kg. With the development of our new landing gear, we can see the future of drones, not only limited to REGA, being able to land so that it can deliver supplies to survivors that are awaiting rescue.



Figure 1

1.3 Conclusion

Conclude your proposal. Summarise your project and suggest steps that will be taken in the later stage.

In conclusion, the aim of this project is to design a landing gear that is suitable for rough environments. Environments that are mountainous containing loose materials. Furthermore, areas where the surface is covered in snow or ice. This landing gear has to work in an urban environment where floods occur and there are hidden underground electrical power lines.

The protective coating must work hand-in-hand with the design of the landing gear. For example, the protective coating is scratch-resistance and non-slip, this will be an advantage when a UAV lands on a mountainous or icy surface. Hence, the purpose of the landing gear has to also be designed in such a way that it is suitable for the terrain. The segment of the landing gear which will come into contact with the surface has to have a large surface area. It can also contain studs imbedded into the landing gear to further maintain grip when the UAV is grounded. The landing gear must be light weight so that it can have the capabilities of carrying additional cargo, such as water or first-aid kits to survivors.

1.4 References

Lastly, do not forget to add references!

1. Swiss Air Rescue (REGA). "Annual Media Conference" rega.ch [Online]. Available <https://www.rega.ch/en/media/annual-press-conference.aspx> [Accessed: 3 October 2019].