

Preliminary Design

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Contents

1	Introduction	1
2	Conceptual Design	1
3	Preliminary Design	1
3.1	Weight Buildup	1

1 Introduction

This document outlines the conceptual and preliminary design considerations for the pigeon. The conceptual part will encapsulate the description of the aircraft and its intended purposes. The preliminary design is meant to begin to give values behind the desired descriptions. This is done in two steps:

- Estimate aircraft maximum takeoff weight
- Determine wing area and engine thrust simultaneously

2 Conceptual Design

3 Preliminary Design

3.1 Weight Buildup

The total weight is composed of different components of the aircraft.

$$W_{TO} = W_{PL} + W_A + W_B + W_E \quad (1)$$

Which are the total weight, payload weight, battery weight, and the empty weight. This can be rearranged into

$$W_{TO} = \frac{W_{PL} + W_A}{1 - \frac{W_B}{W_{TO}} - \frac{W_E}{W_{TO}}} \quad (2)$$