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Introductory Chapter: Drones

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Θρόναξ Laconic, Κηφήν Hesychius, Καφάν Doric, Θόρναξ Temple of Apollo Laconic, Minyan hEllenopelasgic Mother of Gods, Θρόναξ Jensius > dröna Swedish > dröhnen German > dreunen Dutch > drān, dræn Old English > drone, male bee > Unmanned Aircraft.

Αγίαρχος Διοκλής, Diocles

1. Introduction

Would you explain how this prehistoric word of unknown chronology, initially meaning the Divine male bee, ended up being equivalent to unmanned aircrafts? The mother of drones was symbolised >4000 years ago in many ways, such as the one presented in **Figure 1**.

In nature, drones are male bees with no stingers. They are not responsible for collecting nectar and pollen; the female worker bees do that. Their purpose is to mate with a fertile queen bee. This is how the term drone was introduced to the public, to signify a remotely controlled aircraft for battleship weapon's target practice. The Fairy Queen and the de Havilland Queen Bee target aircrafts were introduced in the 1920s and 1930s, respectively. The DH.82 Queen Bee is presented in **Figure 2**.

Subsequent models were named in a similar manner, such as Airspeed Queen Wasp and Miles Queen Martinet. Drones were first flown during the First World War. They were launched by a catapult and flown using radio-controlled technologies. Their mission objectives have constantly been increasing. Reconnaissance drones were also heavily employed during the Vietnam War. Common missions include decoy actions during missile launching, actual combat and leaflet dropping during psychological war. The United States and Great Britain were the first countries to introduce state-of-the-art technologies into recent drone developments. The



Figure 1. Laconic/Minoan mother of drones >1900 BC (Aegina) (British Museum, London).

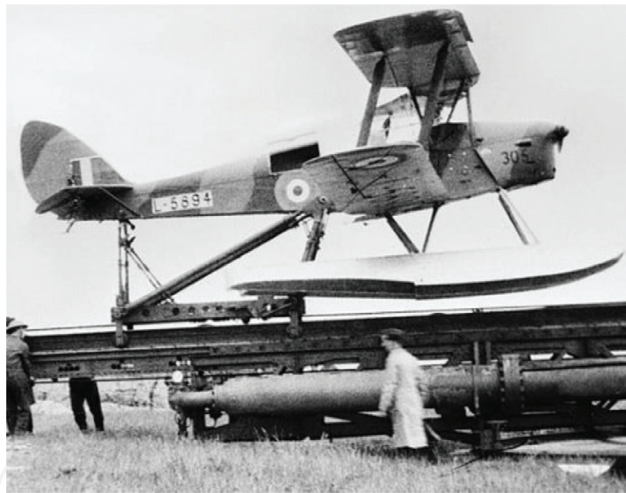


Figure 2. Launch of a DH.82 Queen Bee (mother of drones) target drone (1941).

new level of sophistication, endurance, maintenance of higher altitudes, solar-based models and better fuel consumption to achieve longer flights are few of the increased specifications offered by the latest models.

Drones are currently being used in many applications, such as weather monitoring, search and rescue operations, managing natural catastrophes, aerial photography, delivery of goods, atmospheric research and other areas, such as the ones presented in this book.

Drone technology is a constantly developing field of science that today may involve international scientific collaborations. It is also the title of this publication. The aim and structure of the book are presented in the following section.

2. Aim of the book and organisation

The presentation of recent research results and state-of-the-art developments in the broader area of drone technologies is the aim of this book. The collective effort of distinguished international researchers has been incorporated into one textbook suitable for the broader audience interested into this scientific field.

Chapter 2 is dedicated to drone history.

The main historical milestones of drone development and deployment for common civilian applications are presented. Emphasis is given by the authors to drone civilian applications in Indonesia.

Chapters 3–5 present recent research results in drone design.

- Chapter 3 presents a drone project proposal for future measurements of the various weather indices using a smart Arduino sensor-integrated drone.
- Chapter 4 presents a generalized control allocation scheme for multirotor UAVs.
- Chapter 5 presents the development of an object-based algorithm for analysing survey images obtained by drones.

Chapters 6–9 present recent research results obtained by modern drone applications.

- Chapter 6 presents modern techniques employed into urban search and rescue operations using drones.
- Chapter 7 presents how risk management techniques can be utilised by the construction industry through the usage of drones.
- Chapter 8 presents how land-use information quick mapping and transfer learning can be achieved using drones.
- Chapter 9 presents how magnetic surveys can be performed using drones.

3. Conclusion

Drone technologies have constantly been developing for over 100 years. The latest models exhibit a previously unseen set of specifications available to the end users. In this book, recent research results are presented in the areas of drone design and drone applications. We hope

this book will be advantageous to researchers and also inspire the younger generations into pursuing studies and careers within the drone industry.

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