



# Drones in warfare

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# Outline

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- Introduction
- War History
- Case Study
- Conclusion
- Reference



# Introduction

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- **Unmanned Aerial Vehicle(UAV)/Unmanned Aircraft System(UAS)**
- **Uses of Drone**
  - Military
  - Scientific research
  - Entertainment
  - Agriculture
  - Emergency rescue

# War History

## ■ World War I, 1914-1918

- Aerial Target, 1917
- Kettering Bug, 1918



# War History

## ■ World War II, 1939-1945

- Queen Bee, 1935
- Curtiss N2C-2, 1937
- Radioplane OQ-2, 1939

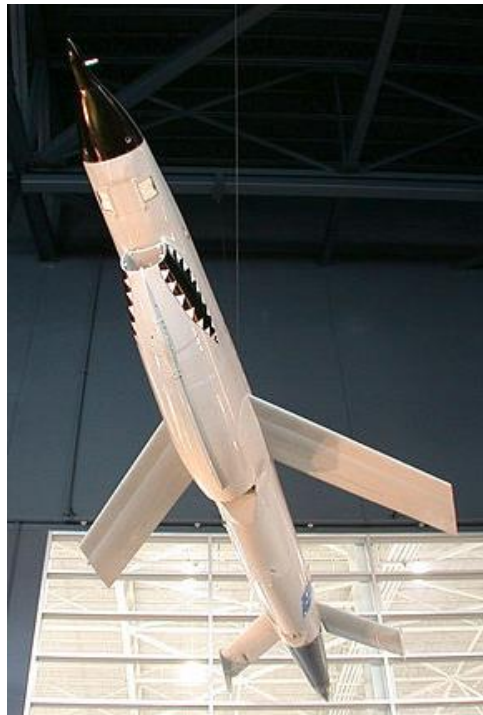


# War History

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## ■ Vietnam War, 1955-1975

### ■ Ryan Model 147 lightning Bug, 1962



# War History

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## ■ Gulf War, 1990-1991

### ■ AAI RQ-2 Pioneer

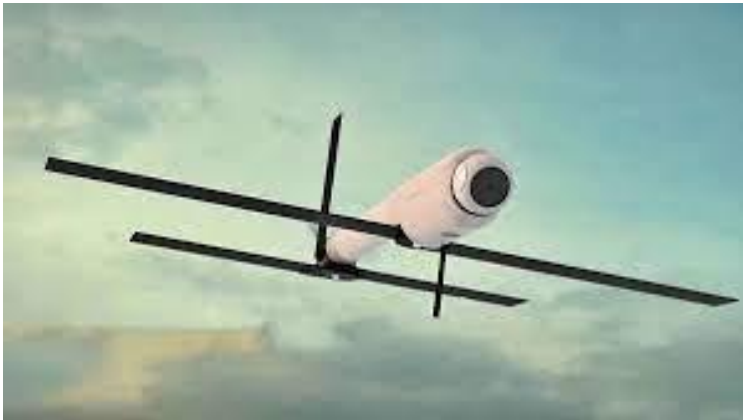


# War History

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## ■ Afghanistan War, 2001-2021

- AeroVironment Switchblade
- MQ-1 Predator





# War History

## ■ Russo-Ukrainian War, 2022

- HESA Shahed-136
- Punisher
- Bayraktar TB2



# Case Study

## ■ MQ-9 Reaper

- Length: 11m
- Wingspan: 20m
- Height: 3.81m
- Weight: 2223kg(empty), 4760kg(max takeoff)
- Powerplant: 1\*turboprop
- Speed: 482km/h(max), 313km/h(cruise)
- Range: 1900km
- Endurance: 36hr
- Service ceiling: 16km
- Altitude: 7500m





# Case Study

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## ■ Variant about MQ-9 Reaper

- MQ-9 Block 5
- SkyGuardian
- SeaGuardian
- Protector

# Case Study

## ■ Albatross I

- Length: 5.3m
- Wingspan: 8.6m
- Height: 1.6m
- Weight: 317kg
- Speed: 180km/h
- Range: 150km
- Service ceiling: 0.4km
- Endurance: 12hr
- Altitude: 4000m



## ■ Albatross II

- Range: 250km



# Case Study

## ■ Teng Yun

- Length: 8m
- Wingspan: 18m
- Height: 1.6m
- Weight: 1590kg
- Powerplant: 1\*turboprop
- Speed: 463km/h(max), 296km/h(cruise)
- Range: 1000km
- Endurance: 24hr





# Case Study

## ■ Rainbow-5

- Length:11m
- Wingspan:20m
- Height:3.8m
- Weight:3000kg(max takeoff)
- Speed:350km/h(max)
- Range:3500km
- Endurance:40hr
- Service ceiling:9km
- Altitude:7500m



# Case Study

## ■ GJ-11 Sharp Sword

- Length: 12m
- Wingspan: 14m
- Height: 2.7m
- Weight: 6350kg(empty), 20215kg(max takeoff)
- Speed: 1000km/h(max)
- Range: 4000km
- Altitude: 12500m





# Conclusion

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## ■ Pros

- Safety
- Cheap
- Time
- Speed

## ■ Cons

- Utility
- Emergency
- Interference





# Reference

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- <https://builtin.com/drones>
- <https://zh.m.wikipedia.org/zh-tw/%E7%84%A1%E4%BA%BA%E8%88%AA%E7%A9%BA%E8%BC%89%E5%85%B7>
- <https://www.iwm.org.uk/history/a-brief-history-of-drones>
- <https://academy.wedio.com/history-of-drones/>
- [https://en.wikipedia.org/wiki/Kettering\\_Bug](https://en.wikipedia.org/wiki/Kettering_Bug)
- [https://en.wikipedia.org/wiki/Radioplane\\_OQ-2](https://en.wikipedia.org/wiki/Radioplane_OQ-2)
- [https://en.wikipedia.org/wiki/Ryan\\_Model\\_147](https://en.wikipedia.org/wiki/Ryan_Model_147)



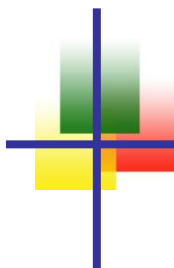
# Reference

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- <https://kknews.cc/zh-tw/military/leq30xe.html>
- [https://en.wikipedia.org/wiki/AAI\\_RQ-2\\_Pioneer](https://en.wikipedia.org/wiki/AAI_RQ-2_Pioneer)
- [https://en.wikipedia.org/wiki/AeroVironment\\_Switchblade](https://en.wikipedia.org/wiki/AeroVironment_Switchblade)
- [https://en.wikipedia.org/wiki/General\\_Atomics\\_MQ-1\\_Predator](https://en.wikipedia.org/wiki/General_Atomics_MQ-1_Predator)
- <https://interestingengineering.com/innovation/a-brief-history-of-drones-the-remote-controlled-unmanned-aerial-vehicles-uavs>
- [https://en.wikipedia.org/wiki/Punisher\\_\(drone\)](https://en.wikipedia.org/wiki/Punisher_(drone))



- [https://en.wikipedia.org/wiki/Baykar\\_Bayraktar\\_TB2](https://en.wikipedia.org/wiki/Baykar_Bayraktar_TB2)
- [https://en.wikipedia.org/wiki/HESA\\_Shahed\\_136](https://en.wikipedia.org/wiki/HESA_Shahed_136)
- [https://en.wikipedia.org/wiki/General\\_Atomics\\_MQ-9\\_Reaper](https://en.wikipedia.org/wiki/General_Atomics_MQ-9_Reaper)
- <https://zh.wikipedia.org/wiki/%E9%8A%B3%E9%B3%B6%E7%84%A1%E4%BA%BA%E6%A9%9F>
- <https://zh.wikipedia.org/wiki/%E9%A8%B0%E9%9B%B2%E7%84%A1%E4%BA%BA%E6%A9%9F>
- <https://zh.wikipedia.org/zh-tw/%E5%BD%A9%E8%99%B9%E4%BA%94%E5%8F%B7%E6%97%A0%E4%BA%BA%E6%9C%BA>



- <https://baike.baidu.hk/item/%E5%BD%A9%E8%99%B9-5%E7%84%A1%E4%BA%BA%E6%A9%9F/18554677>
- [https://en.wikipedia.org/wiki/Hongdu\\_GJ-11](https://en.wikipedia.org/wiki/Hongdu_GJ-11)
- <https://sites.google.com/site/zixunwangludiyizu/home/you-que-dian>