



Dedicated to innovation in aerospace

**Jointly improve RPAS and Helicopter
flight safety**

9th Rotorcraft Symposium **Joost Vreeken & Matthijs van Essen, NLR**

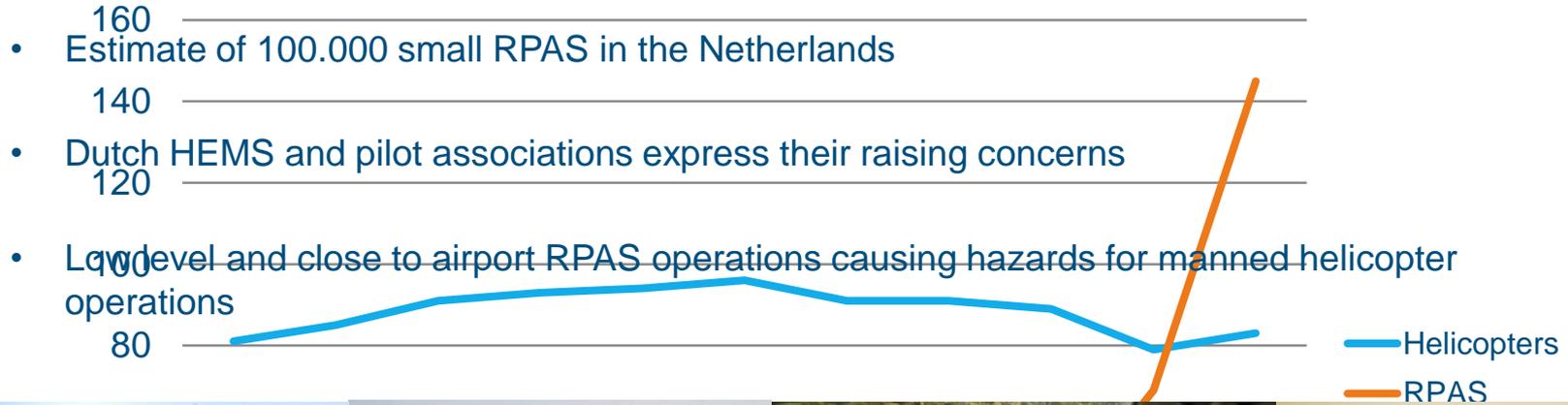


Contents

- Introduction & Outline
- Incidents in The Netherlands
- Components vulnerable for RPAS strike
- Concerns & Recommendations

Introduction & Outline

- Significant increase of RPAS in the Netherlands (based on civil certificate of registration)



2005



2007



2011



2013

2015

Introduction & Outline (2)

Dutch Helicopter Safety Day 16th of October 2015

- Presentation topics:
 - RPAS and manned helicopter operations
 - Integration and certification
 - Incidents
- Participants:
 - Manned and unmanned helicopter pilots and operators
 - Government and aviation authorities (military and civil)
 - Air traffic control
 - Other stakeholders



Incidents in The Netherlands

- 36 incidents reported to CAA in the Netherlands (2012 – 2014) (source: www.ilent.nl)
- Most incidents are reported internally only
 - Bystanders taking aerial pictures of landed VIP helicopter (30-40 times a year according to small NL helicopter operator)
 - Police helicopter encountered a model aircraft at 700ft
 - HEMS helicopter circles extra observation maneuvers due to possible RPAS
 - HEMS helicopter waited 3 extra min before receiving take-off clearance due to RPAS flights in the vicinity of the airport
 - RPAS operations ceased due to manned aircraft
 - 19 RPAS spotted at one afternoon during ship event in the Netherlands, despite airspace restrictions



Incidents in The Netherlands



Components vulnerable for RPAS strike

H/C component	Hazard classification
Main and Tail rotor	Hazardous to Catastrophic
Transmission	Minor
Engine (inlet)	Hazardous to Catastrophic
Canopy	Hazardous to Catastrophic
Fuselage	Minor
Tailboom	Hazardous to Catastrophic
Landing Gear/Skid	Minor
External System components	Major to Hazardous
Consequential damage	Major to Catastrophic



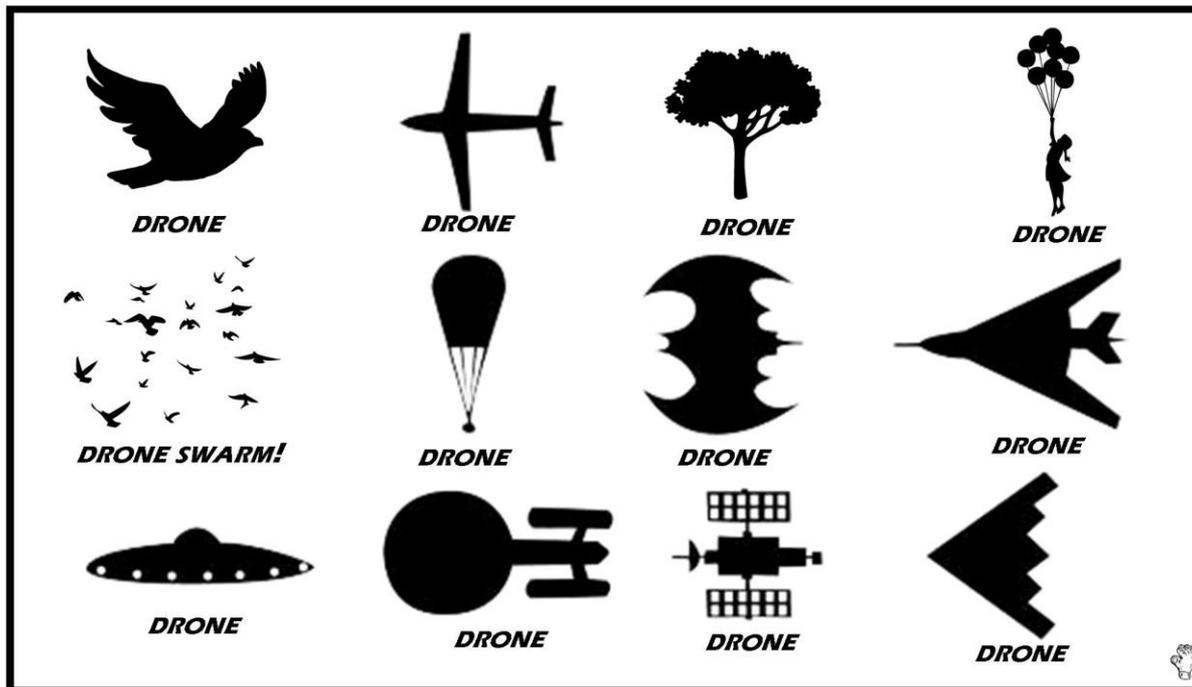


Concerns & recommendations

- Not all RPAS pilots familiar with aviation principles
 - **Rec: Basic training (including recreational pilots)**
 - **Rec: Focus on RPAS airmanship and safety culture**
- Shared areas of operation (low level)
 - **Rec: Know eachother's operations (National safety days)**
- Knowing RPAS might be around increases pilot workload
 - **Rec: Find effective means of coordination (NOTAM might be ineffective)**
 - **Rec: Include risk of RPAS/Helicopter proximity in pre-flight risk assessment**
- Incident statistics does not match reality
 - **Rec: Report two way incidents to the appropriate authority**
- Probability and consequence of RPAS strike unknown (RPAS ≠ Bird)
 - **Rec: Research needed to assess effect (challenge is generalization of test results)**
- Detect and Avoid solely based on see and avoid
 - **Rec: Research needed for affordable, lightweight, reliable Detect and Avoid technology**

Be aware for 'drone-itus'

AIRCRAFT IDENTIFICATION GUIDE FOR AIRLINE PILOTS





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Fully engaged

Netherlands Aerospace Centre



NLR Amsterdam
Anthony Fokkerweg 2
1059 CM Amsterdam

p) +31 88 511 3113 f) +31 88 511 3210
e) info@nlr.nl i) www.nlr.nl

NLR Marknesse
Voorsterweg 31
8316 PR Marknesse

p) +31 88 511 4444 f) +31 88 511 4210
e) info@nlr.nl i) www.nlr.nl