The UAV ecosystem in Denmark – new strategies and regulation for future growth

/ Michael Larsen, Head of UAS

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Agenda – new strategies and regulation...

// Flashback 2011-2016
// Who we are
// Current "UAV climate" in Denmark
// New regulation
// National strategy
// Fast track project
// Nordic cooperation
Introduction

- Michael Larsen, Head of UAS
- UAS Test Center Denmark @Hans Christian Andersen Airport (EKOD)
- 2010, Project Initiated
- 2012, Defense agreement
- 2013, UAS Denmark and UAS Test Center established
- 2014, Followed by business park and first companies moving in
- 2015, First BVLOS flight by Boeing/Insitu
- 2015, First large RPAS flight by Schiebel
- 2015, Delegated responsibility for operator approvals, by Danish Transport and Construction Agency (NAA).
Introduction

- RWY 06/24 2000 meters
- UAS verification facility for photogrammetric and radiometric test
- 30 UTM/WGS84 Control Points
Ownership & activities

Odense & CO (Odense Municipality)

Hans Christian Andersen Airport

Odense & Nordfyns Municipality

UAS Test Center Denmark

- Staff Development funds (4 year program)

Activities
- Airspace
- Business Park
- Flight Academy
- Qualified Entity (operator approvals)
- Research Projects

Ownership and facilities

Odense & Nordfyns Municipality

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UAS Test Center Denmark

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POTENTIAL PARTNERS in Denmark

90 members

Research Institutions

Independent Danish research & technology organisations

Hardware & Software Developers

Consultancies & Operators

(Public) End-Users

Source: UAS Denmark
WELCOME TO ODENSE!
More than 85 companies, more than 10 institutes working with knowledge and research, more than 30 higher education programs and more than 10 clusters and networks in Odense Robotics form a strong ecosystem within the field of robotics. The new Odense Robotics Startup Hub will continuously add new companies to the cluster.

UAS Denmark is the Danish industrial network for unmanned aircraft systems with more than 80 members. Based in Hans Christian Andersen Airport the UAS Test Center Denmark is ideal for testing drones. Here you can get: Approved airspace, verification facility, workshop facilities, hangar facilities and business park.

A cluster within health and care innovation. With Odense at the center, Region of Southern Denmark is a national growth driver in the field, and Odense Health brings together the organizations’ individual strengths in an ecosystem that supports and propels innovation, growth, and synergy for both private companies, public organizations, and students.
Current UAV climate in Denmark

// OPERATIONS
Regulation: Works well but exemption based. 300 operators, up 1/day.
Only Denmark regulation: Limitation for operators. Language barrier for foreign operators.
Government agencies eager to implement new technology

// R&D
Favourable conditions. All universities, several public/private technological consultancies and cluster organizations have started activities.
Earmarked funding 2014+15 & raise expected in 2017 -> R&D infrastructure roadmap under consideration.

// Public & political awareness
Broad political support > new regulation & national strategy
Special challenges for geodata operations

// Max. 100 m altitude AGL (especially mapping higher buildings)

// Guidelines too unclear about what can be flown and how to keep people out of operation areas

// Visual-line-of-sight limit a barrier for many business cases
Status of Danish regulations

Danish regulation BL 9-4 (Extract)
- Security distance 150 m to urban areas and major roads
- Security distance to civil public Airport/Airfield > 5 km
- Security distance to military Airport/Airfield > 8 km
- Max 100 m altitude (AGL)
- 7-25 kg only on model aircraft field
- 7-25 kg, Liability insurance is mandatory
- > 25 kg, National rules of the air is applicable, exemptions are possible

Additional AIC B 08/14 – Exemptions from BL-9-4 are possible for commercial use or test/research purpose (Extract):
- Approved Operators Handbook is required
- Cat. 1A (Max 1,5 kg and Kinetic energy < 150 J) - VLOS
- Cat. 1B (1,5-7 kg and Kinetic energy < 1.000 J) - VLOS
- Cat. 2 (Over 7 kg) - VLOS
- Cat. 3 (BVLOS) – Segregated airspace
- Over 25 kg: Type certificate needed – but exemption might be possible
- Refer to AIC B 08/14 for specific details.

Additional regulations:
> 150 kg: EC 218/2008 is applicable according to Annex II (i).
Coming regulations

Danish regulations are about to be updated

- New revision is expected this year
- Will include national regulation for RPAS
- Extract of expected RPAS pilot license and requirements (will replace need for exemption and mandatory operations manual):

<table>
<thead>
<tr>
<th>Licence</th>
<th>Weight</th>
<th>Education</th>
<th>Experience</th>
<th>Test</th>
<th>Medical</th>
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<tbody>
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<td>-</td>
<td>&lt; 0,250 Kg</td>
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<td>A</td>
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<td>&gt;15 Flights Non-Urban</td>
<td>Theoretical, Practical (Category)</td>
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<td>B</td>
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<td>C</td>
<td>7,0 – 25 Kg</td>
<td>Theoretical, Practical</td>
<td>&gt;15 Flights Non-Urban</td>
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<td>D</td>
<td>&lt; 25 Kg BVLOS</td>
<td>Theoretical, Practical</td>
<td>&gt;50 Flights Non-Urban Within 1 year</td>
<td>Theoretical, Practical (Category and Model specific)</td>
<td>LAPL</td>
</tr>
</tbody>
</table>

Categories are: (I) Fixd wing/ Glider, (II) Helocopter/ Multi-rotor, (III) Airship/ Balloon, (IV) Powered-lift, (V) Special

- Hobby: Central registration, online test, insurance mandatory
National strategy for drones coming in Denmark

- R & D – research, technological consultancies, test possibilities
- Education
- Internationalisation
- Standardisation
- Public use and procurement
- Funding?
- Organisation/implementation?
BVLOS fast track

- CONOPS for standard Beyond-Visual-Line-Of-Sight operations
- 3-4 limited scope cases (agriculture, offshore, inspection)
- University of Southern Denmark (lead), Aalborg University, UAS Test Center Denmark, NAA (aviation authorities), companies
  - NAA financed
  - Companies participating without compensation
- Results (2016!?) will be available for the international community
The Nordics

- Year long track record for commercial UAV operations – app. 2,000 operator companies (NO, SVE, FI, DK)
- Similar but so far different legislation (as in Europe)
- BVLOS operations – FI, NO with early experience, DK accelerating
- Relatively few manufacturers
- Similar challenges
- Culture and language (partly!) close
- Small nations
- Country associations work on expanded cooperation, e.g.
  - “Grandfather rights” for operators
  - Magazine
  - Insurance
  - European cooperation
  - Business development
  - “Benchmarking”
- *Nordic UAS Event (2016 – 1-3 June Odense, Denmark)*
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The future is in the air!