



**Luftfartstilsynet**

# Operasjonsmanual

# Easy Access Rules viser krav til innhold

## AMC1 UAS.SPEC.030(3)(e) Application for an operational authorisation

ED Decision 2018/021/R

### OPERATIONS MANUAL — TEMPLATE

When required in accordance with [UAS.SPEC.030\(3\)\(e\)](#), the OM should contain at least the information listed below, if applicable, customised for the area and type of operation.

0. Cover and contact.
  - 0.1 Cover identifying the UAS operator with the title 'Operations Manual', contact information and OM revision number.
  - 0.2 Table of contents.
1. Introduction
  - 1.1 Definitions, acronyms and abbreviations.
  - 1.2 System for amendment and revision of the OM (*list the changes that require prior approval and the changes to be notified to the competent authority*).
  - 1.3 Record of revisions with effectivity dates.
  - 1.4 List of effective pages (*list of effective pages unless the entire manual is re-issued and the manual has an effective date on it*).
  - 1.5 Purpose and scope of the OM with a brief description of the different parts of the documents.
  - 1.6 Safety statement (*include a statement that the OM complies with the relevant requirements of Regulation (EU) 2019/947 and with the authorisation or the terms of approval of the light UAS operator certificate (LUC), in the case of a LUC holder, and contains instructions that are to be complied with by the personnel involved in flight operations*).
  - 1.7 Approval signature (*the accountable manager must sign this statement*).
2. Description of the UAS operator's organisation (*include the organigram and a brief description thereof*).
3. Concept of operations (ConOps)

For each operation, please describe the following:

  - 3.1 Nature of the operation and associated risks (*describe the nature of the activities performed and the associated risks*).
  - 3.2 Operational environment and geographical area for the intended operations (*in general terms, describe the characteristics of the area to be overflowed, its topography, obstacles etc., and the characteristics of the airspace to be used, and the environmental conditions (i.e. the weather and electromagnetic environment); the definition of the required operation volume and risk buffers to address the ground and air risks*).
  - 3.3 Technical means used (*in general terms, describe their main characteristics, performance and limitations, including UAS, external systems supporting the UAS operation, facilities, etc.*)
  - 3.4 Competency, duties and responsibilities of personnel involved in the operations such as the remote pilot, UA observer, visual observer (VO), supervisor, controller, operations manager, etc. (*initial qualifications; experience in operating UAS; experience in the particular operation; training and checking; compliance with the applicable regulations and guidance to crew members concerning health, fitness for duty and fatigue; guidance to staff on how to facilitate inspections by competent authority personnel*).
  - 3.5 Risk analysis and methods for reduction of identified risks (*description of methodology used; bow-tie presentation or other*).
  - 3.6 Maintenance (*provide maintenance instructions required to keep the UAS in a safe condition, covering the UAS manufacturer's maintenance instructions and requirements when applicable*).

- Noen punkter kan være verdt å merke seg:
  - Security
    - (Beskyttelse mot sabotasje)
  - Guidelines to minimise nuisance and environmental impact
    - (støy, utslipp, hensyn til mennesker og dyr)
  - Personvern

OM er også mannskapets bruksanvisning!

**CONOPS: GUIDELINES ON COLLECTING AND PRESENTING SYSTEM AND OPERATIONAL INFORMATION FOR SPECIFIC UAS OPERATIONS****A.0 General guidelines**

This document must be original work completed and understood by the applicant (operator). Applicants must take responsibility for their own safety cases, whether the material originates from this template or otherwise.

**A.0.1 Document control**

Applicants should include an amendment record at the beginning of the document to record changes and show how that the document is controlled.

Amendment/ Revision/ Issue Number	Date	Amended by	Signed
a, b, c or 1, 2, 3 etc.	DDMMYYYY	Name of the person carrying out the amendment/ revision/ issue number	Signature of person carrying out the amendment/ revision/ issue number

This section is critical to ensure appropriate document control.

Any significant changes to the ConOps may require further assessment and approval by the competent authority prior to further operations being conducted.

**A.0.2 References**

- (a) List all references (documents, URL, manuals, appendices) mentioned in the ConOps:

#	Title	Description	Amendment/ Revision/ Issue Number
[1]			
[2]			

**A.1 Guidance for the collection and presentation of operationally relevant information**

The template below provides section headings detailing the subject areas that should be addressed when producing the ConOps, for the purposes of demonstrating that a UAS operation can be conducted safely. The template layouts as presented are not prescriptive, but the subject areas detailed should be included in the ConOps documentation as required for the particular operation(s), in order to provide the minimum required information and evidence to perform the SORA.

**A.1.1 Reserved****A.1.2 Organisation overview**

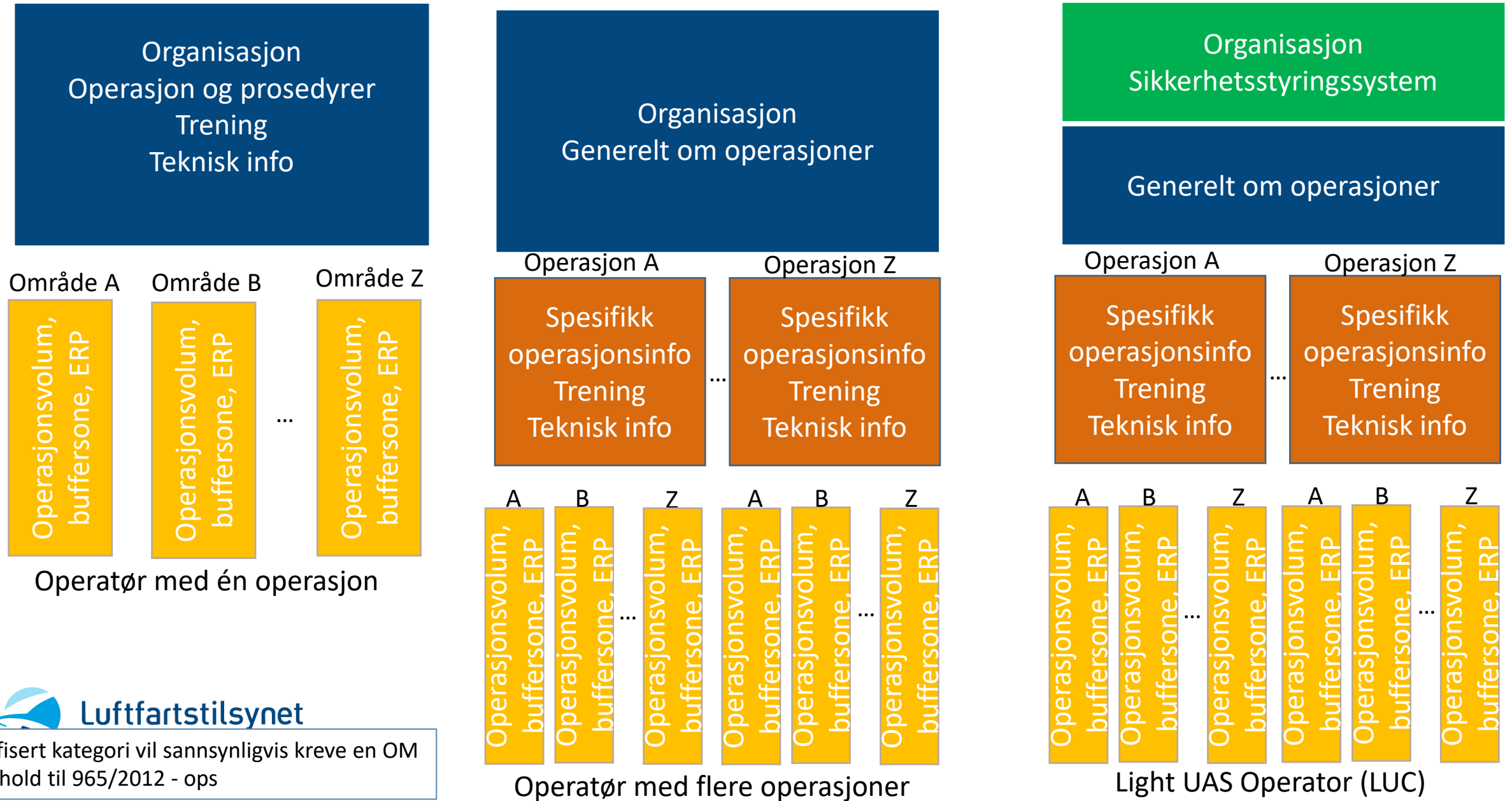
- (a) This section describes how the organisation is defined, to support safe operations. It should include:
- (1) the structure of the organisation and its management, and
  - (2) the responsibilities and duties of the UAS operator.

# ConOps er grunnlaget for SORA prosessen

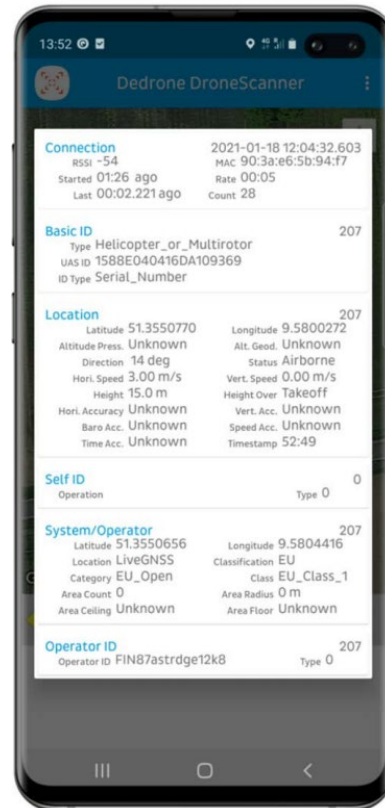
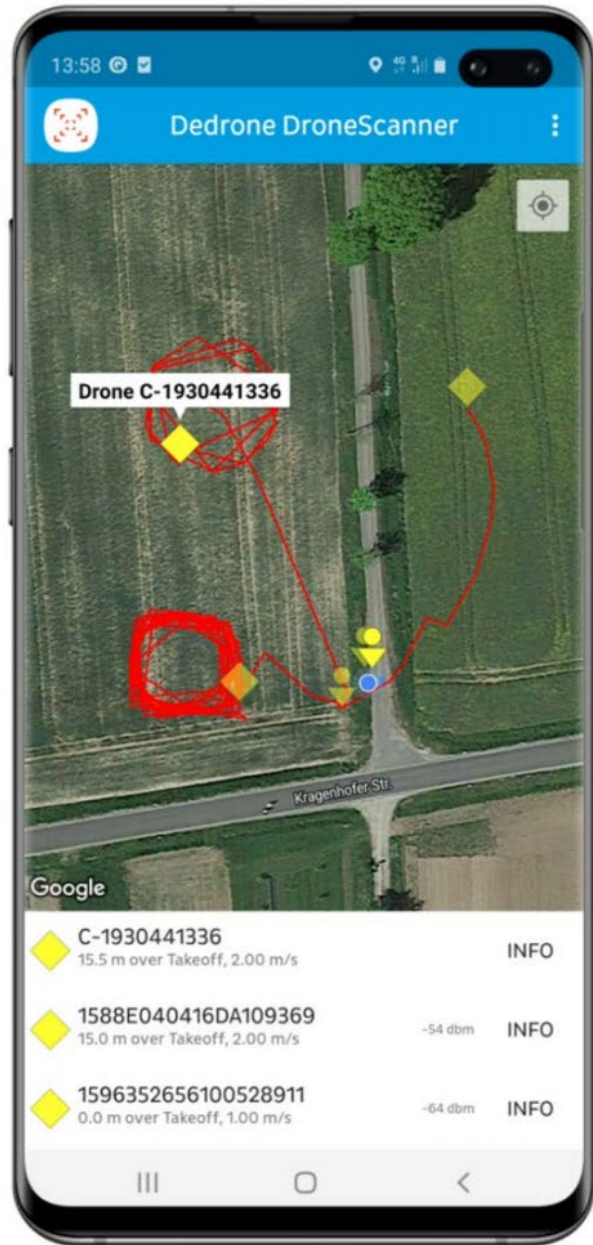
Består av to hoveddeler:

1. Operasjonsbeskrivelse
2. Teknisk om dronesystemet

# Operasjonsmanual kan bygges opp modulbasert



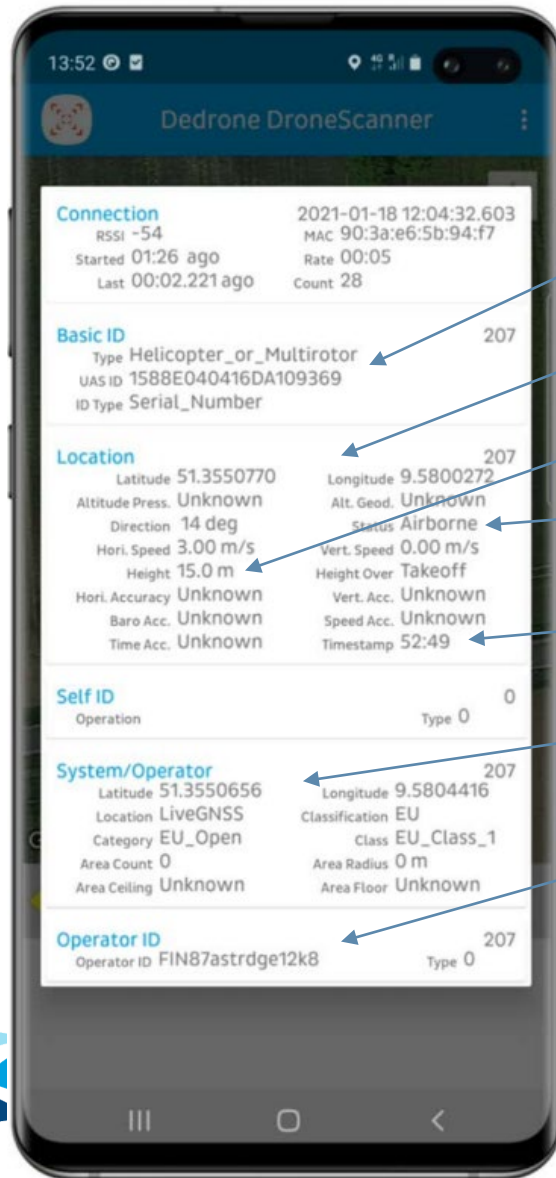
# Husk nye krav fra 1. juli 2022



- Grønt blinkende lys i mørket
- Remote ID i spesifikk
  - + alle C-merkede droner unntatt C0 og C4



# Direct remote ID sender ut et fast datasett



- Enhetens unike serienummer (ANSI/CTA-2063-A)
- Dronens posisjon, retning og fart
- Dronens høyde over bakken eller avgangssted
- Status
- Tidsstempel
- Pilotens posisjon
- Operatørnummer



# De tre symbolene etter operatørnummeret er hemmelig



flydrone.no

Informasjon

Pilotkompetanse

Operatørinformasjon

Betaling

Pilot

+

## Operatørinformasjon

Forsikring og vilkår knyttet til deg som operatør

Operatørnummer

NORh9evuebsac4rg-ueb

Gyldig til 01.01.2022

- Operatørnummer

- 3 hemmelige sifre

- Beskytter mot at operatørnummeret ditt misbrukes av andre som remote ID

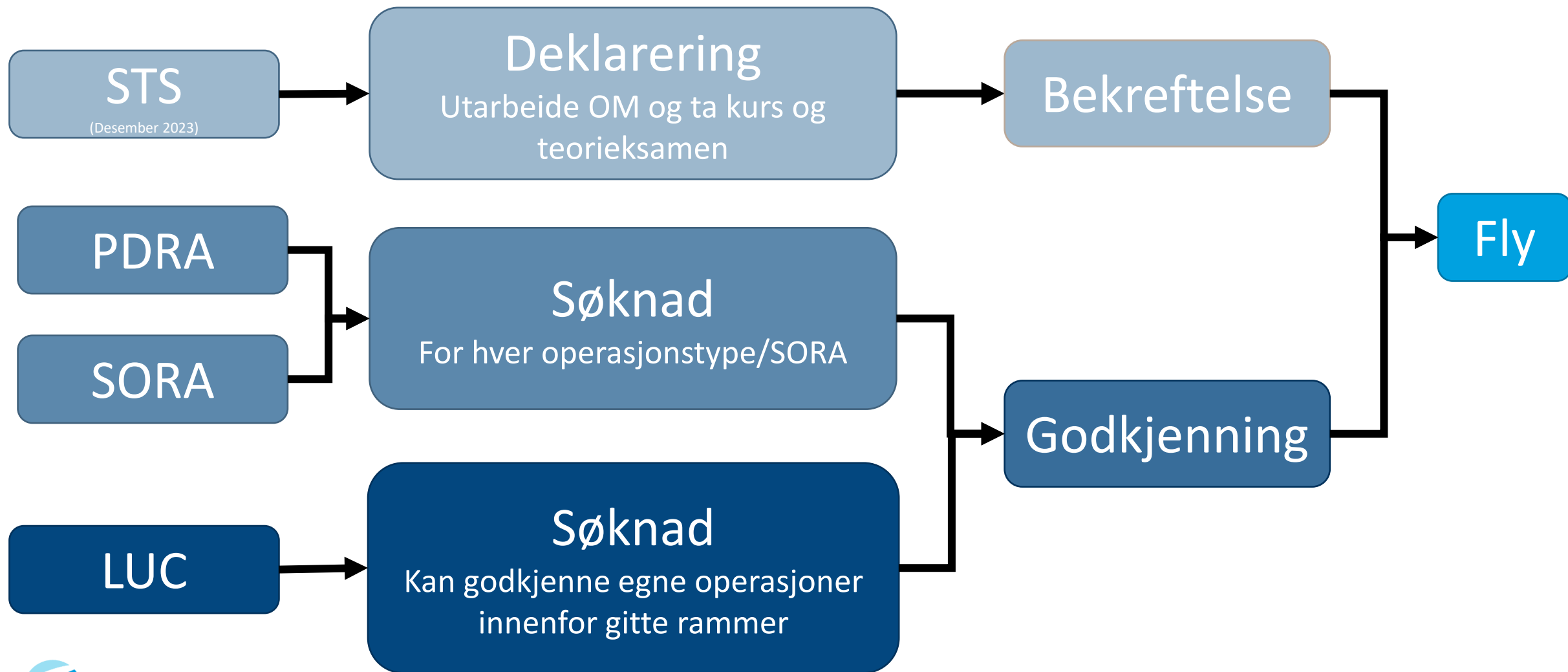




# Spørsmål før vi fortsetter med PDRA

# PDRA

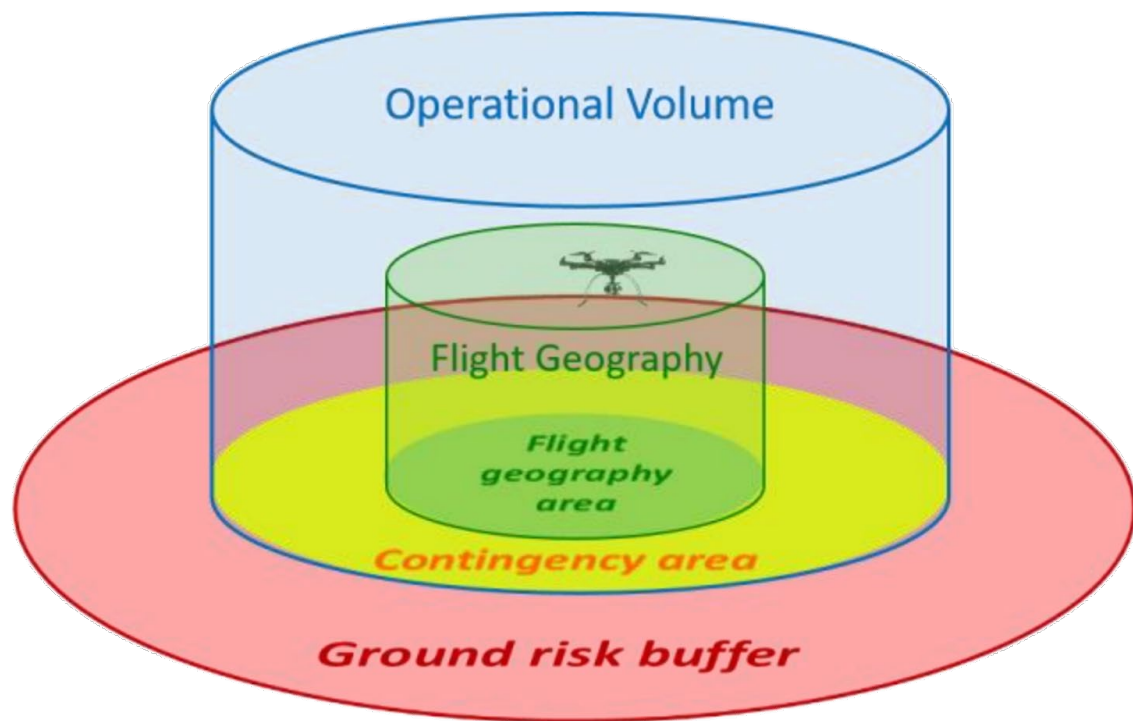
# Spesifikk kategori – 3 varianter for operatørene



# Det er publisert 4 predefined risk assessments flere kommer

- PDRA-S01
- PDRA-S02
- PDRA-G01
- PDRA-G02

# To PDRA-er speiler STS-ene for å kunne fly uten C-merking

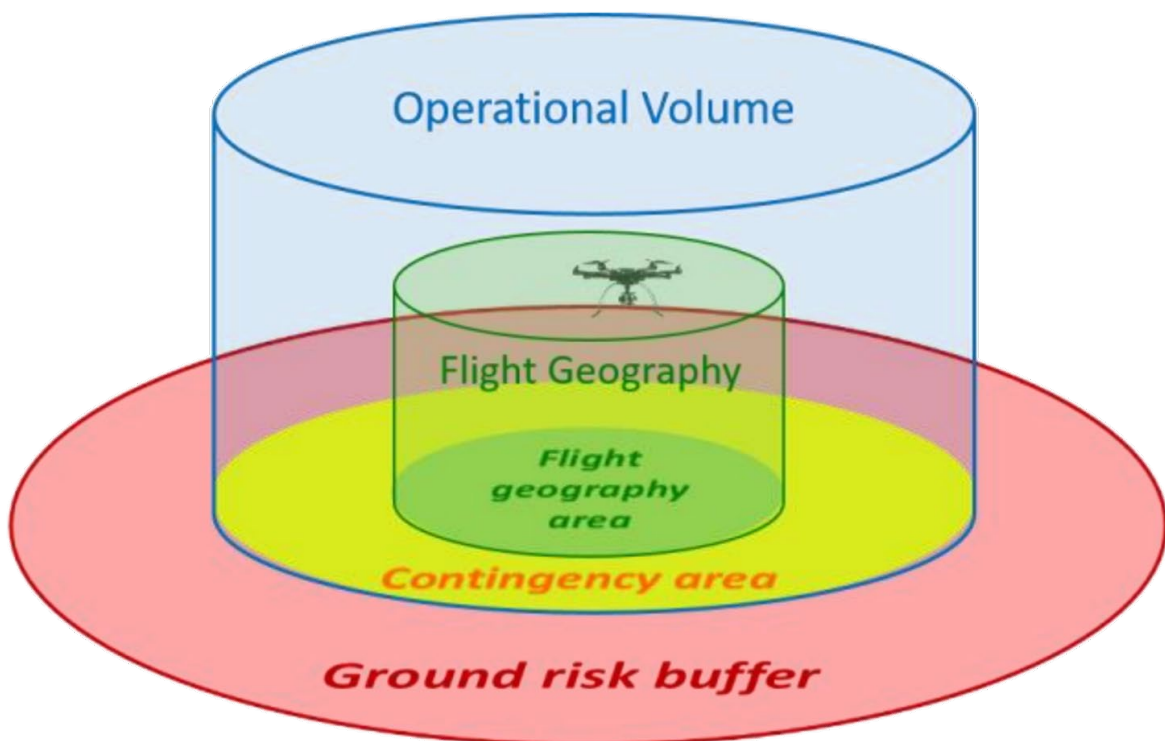


- **PDRA-S01 - «tung A2»**

- VLOS
- Under 120 meter
- Maks hastighet 5 m/s
- Ingen utenforstående i operasjonsområdet
- Sikkerhetsvolum 10 m (contingency)
- Krav til buffersone:

Maximum height above ground	Minimum distance to be covered by the ground risk buffer for untethered unmanned aircraft	
	with an MTOM up to 10 kg	with an MTOM above 10 kg
30 m	10 m	20 m
60 m	15 m	30 m
90 m	20 m	45 m
120 m	25 m	60 m

# To PDRA-er speiler STS-ene for å kunne fly uten C-merking



## • PDRA-S02

- BVLOS med luftromsobservatør
- Under 120 meter
- Avgang og landing må skje VLOS
- Minst 5 km sikt
- Dronen kan flys maks 1 km fra piloten (2 km med luftromsobservatør)
- Maks 1 km fra nærmeste luftromsobservatør
- Spredt befolket område

**Samme som standardscenariene,  
men ikke krav til C-merket drone**

# Bakkeområdet defineres etter en kvalitativ vurdering

- Under kontroll - Controlled ground area
  - Operatøren kan sørge for at det er ingen utenforstående i området
- Folkemengde
  - Folk står så tett, at det ikke er rom for å hoppe unna en fallende drone

# Bakkeområdet defineres etter en kvalitativ vurdering

- Befolket område - populated area
  - Områder som i vesentlig grad brukes til bolig, næring industri, eller rekreasjon.
- Spredt befolket
  - Alle andre områder



# PDRA-G01 og -G02 definerer BVLOS operasjoner

## • PDRA-G01

- Største dimensjon 3 m og kinetisk energi opp til 34 kJ
- BVLOS med luftromsobservatør
- Maks 120 m høyde
- Minst 5 km sikt
- Dronen kan flys maks 1 km fra piloten (**lengre med luftromsobservatør**)
- Maks 1 km fra nærmeste luftromsobservatør
- Avgang og landing VLOS eller fra en sikker plass
- Spredt befolket område

## • PDRA-G02

- Største dimensjon 3 m og kinetisk energi opp til 34 kJ
- BVLOS i **fareområde**
- Ingen høydebegrensning
- Innenfor radiorekkevidde
- Avgang og landing VLOS eller fra en sikker plass
- Spredt befolket område

# Operatøren foreslår treningsprogram for PDRA-G01 og -G02

- Operatøren er ansvarlig for trening
- Treningsprogrammet godkjennes av Luftfartstilsynet som en del av søknaden
- Praktisk trening og vurdering kan gjennomføres av:
  - Den enkelte operatør
  - «Recognised entity» eller deklarerert operatør

## Treningskrav

- Appendix A to AMC2 Article 11 (side 128 i [Easy Access Rules for Unmanned Aircraft Systems](#))

# Hvordan søke

- Søknadsskjema
- Operasjonsmanual
  - Skal underbygge at kravene oppfylles
- Se [Easy Access Rules for Unmanned Aircraft Systems](#) fra side 124.

## PDRA characterisation and provisions

### 1. Operational characterisation (scope and limitations)

Level of human intervention	<p>1.1 No autonomous operations: the remote pilot should have the ability to maintain control of the UA, except in case of loss of the command and control (C2) link.</p> <p>1.2 The remote pilot should operate only one UA at a time.</p> <p>1.3 The remote pilot should not operate from a moving vehicle.</p> <p>1.4 The remote pilot should not hand over the control of the UA to another command unit.</p>
UA range limit	<p>1.5 <u>Launch/recovery</u>: at VLOS distance from the remote pilot, if not operating from a safe prepared area. <i>Note: 'safe prepared area' means a controlled ground area that is suitable for the safe launch/recovery of the UA.</i></p> <p>1.6 <u>In flight</u>:</p> <p>1.6.1 <u>If no AOs are employed</u>: the UA is not operated further than 1 km (or other distance defined by the competent authority) from the remote pilot. <i>Note: The remote pilot's workload should allow the remote pilot to continuously scan the airspace.</i></p> <p>1.6.2 <u>If AOs are employed</u>: the range is not limited as long as the UA is not operated further than 1 km (unless a different distance is defined by the competent authority) from the AO who is nearest to the UA.</p>
Areas overflown	1.7 UAS operations should be conducted over sparsely populated areas.
UA limitations	<p>1.8 Maximum characteristic dimension (e.g. wingspan, rotor diameter/area or maximum distance between rotors in case of a multicopter): 3 m</p> <p>1.9 Typical kinetic energy (as defined in paragraph 2.3.1(k) of <a href="#">AMC1 Article 11</a> of the UAS Regulation: up to 34 kJ</p>

# Oversikt over predefined risk assessments i dag

PDRA#	Maks størrelse	Syns-vidde	Område	Maks avstand	Luftrom	Maks høyde
S01 (A2+)	3 m og 25 kg	VLOS	Ingen utenforstående	VLOS	Lav risiko	120 m
S02	3 m og 25 kg	BLVOS	Ingen utenforstående	2 km fra pilot, 1 km fra observatør	Lav risiko	120 m
G01	3 m og 34 kj	BVLOS	Spredt befolket	1 km fra observatør	Lav risiko	120 m
G02	3 m og 34 kj	BLVOS	Spredt befolket	Innenfor rekkevidde av link	Reservert	Reservert



Luftfartstilsynet

- Ingen autonom flyging – piloten skal kunne ta kontroll

# Flere PDRA er på vei

PDRA#	Maks størrelse	Syns-vidde	Område	Maks avstand	Luftrom	Maks høyde
G04 (inspeksjon)	3 m og 34 kJ	BVLOS	Spredt befolket	Innenfor rekkevidde av link	ARC-a Segregert eller under 30 m	30 m
G05	3 m og 34 kJ	BLVOS	Spredt befolket	Innenfor rekkevidde av link	ARC-b (ukontrollert)	120 m - Krav til deteksjon av bemannet trafikk

# Flere PDRA er under utvikling

	Range (from RP)	Overflowed Area	Airspace	Max. flight height	UAS technical requirements	Application	Notes
PDRA-06	VLOS	Controlled ground area	ARC-b/c	Operational volume up to 150 m	≤3 m (≤ 34 kJ)	Prototype UAS which exceed Open Category/spraying	Expected to be little effort
PDRA-07	VLOS	Controlled ground area	ARC-b/c	Operational volume up to 150 m	≤3 m (≤ 34 kJ)	Swarming	SORA does not address multiple UAS, will see how far we can progress
PDRA-08	VLOS/BVLOS	Controlled ground area/populated area in airport	ARC-d	TBD	≤3 m (≤ 34 kJ)	Runway inspection, airport operations	ECTL/EASA has done extensive evaluation/work, but many challenges remain
PDRA-09	VLOS	Controlled ground area	ARC-b/c	Operational volume up to 300 m	≤3 m (≤ 34 kJ)	Ops above 150 m	Expected to be little effort
PDRA-10	BVLOS	Sparsely populated/populated area	ARC-a	Operational volume up to 1000 ft	≤3 m (≤ 34 kJ)	Mapping (Africa)	Will lead to a high SAIL

- Utarbeides av [JARUS](#) – Joint Authorities for Rulemaking on Unmanned Systems

# Spørsmål



# Luftfartstilsynet

Takk for oppmerksomheten.