Aktuelle rechtliche Rahmenbedingungen für den Drohneneinsatz

10. Navigation Get-Together des OVN, TU Graz

24. Mai 2017

Mag. Raoul Fortner

www.aaig.at/uas – office@aaig.at

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(I) – Exkurs AAI & UAS
Unmanned Aircraft Systems

Arbeitsgruppe
AAI-UAS-WG

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Ziele & Aktivitäten der AAI-Arbeitsgruppe UAS (Unmanned Aircraft Systems – incl. Bodenstation)

Gegründet August 2012 – offen für externe Firmen – tagt quartalsweise

- Austausch mit **nationalen Behörden** (BMVIT, ACG, BMLVS) besonders bei **rulemaking** und **Forschungsförderung**
- **Vernetzung** der wesentlichen nationalen **Betriebe & Forschungseinr.** Brückenschlag groß↔klein / zivil↔militärisch / Industrie↔Forscher
- **Vernetzung & Interessensvertretung** ggü. internationalen Institutionen
- Nach Bedarf auch **gemeinsame Veranstaltungen & Marketing**

- **Rund 35 Mitglieder**:
  - *1/3 ordentliche AAI-Mitglieder (Diamond, Schiebel, AIT, TU Wien, FHJ)*
  - *Rest überwiegend KMUs (Entwickler) und Forschungseinrichtungen*
  - *Partner Org. (Aero-Club, WKO-FAMA: Film and Music Industry Austria)*

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(II) – Rechtliches Umfeld für Drohnen (UAS bzw. RPAS)

international & national

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Aktuelle Diskussionen – Internationale Entwicklung

International

ICAO
UAS Study Group
(RPAS Panel)

2011: ICAO-Circular 328, AN/190 → „UA(S) = aircraft“

Chicago Convention on International Civil Aviation
2012: Amendment 43 to Annex 2 („authorization“)

2015: „Manual on Remotely Piloted Aircraft Systems”
→ „Most topics will take several years” → 2018/2020+

UVS
International

JARUS

Europe & EU

EU (EC)
DG ENTR, MOVE

European RPAS Steering Group (ERSG)

EASA

Basic Regulation EC 216/2008 also relevant for UAS above 150kg MTOM – below national rules (?)

~~2012: EASA-Proposition NPA 2012-10 – 2014: NPA 2014-09~~
COM(2014)207 – 2015: „Riga Declaration“→ „Aviation Package“

EASA-Proposition A-NPA 2015-10
→ „Technical Opinion“ by EASA (Dec 2015)
3 layers of competence – 3 categories (open, specific, certified)
sub-NPA 2017-05 (A), (B) → Open and specific details (May 2017)

EUROCAE
WG 73 (>150kg)
WG 93 (<150kg)

> 150kg

OZB
(Ministry: BMVIT)

LH (Land)
BH (District)

Aero-Club
(specific tasks)

ACG
(Austro Control)

Austrian Aviation Act: UAS-Amendment
Entry into force: 1st Jan. 2014
(1st Revision: August 2015)

Amendment of regulations (ZLLV, LVR)

Airworthiness & Operational Notice 67
(LBTH 67) by Austro Control

AAI-UAS-WG

< 150kg

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(III) – Aktuelle Initiativen und Standpunkte der EU-Stakeholder

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(1) European Commission (EC)
Riga Declaration (6th March 2015)

1. **Drones need to be treated as new types of aircraft with proportionate rules based on the risk of each operation.**
2. **EU rules for the safe provision of drone services need to be developed now.**
3. **Technologies and standards need to be developed for the full integration of drones in the European airspace.**
4. **Public acceptance is key to the growth of drone services**
5. **The operator of a drone is responsible for its use.**

2014: COM(2014)207 → "150.000 new jobs until 2050" ☺

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(2) European Commission (EC) – Council – Parliament Aviation Package (7th December 2015) – STILL A PROPOSAL !!

- **Section VII – "Unmanned Aircraft" in EASA-Grundverordnung**
- **Article 45: → Wegfall der 150kg-Grenze für nationale Regeln**
  "design, production, maintenance and operation of UAS … shall comply with the essential requirements set out in Annex IX"
- **Article 46:** "Compliance of Unmanned Aircraft" → CE-Marking!
- **Article 47:** "Delegated Powers" → EASA vs. nationale Behörde!
- **Annex IX:** "Essential requirements for unmanned aircraft"

→ Nun Verhandlungen im Dreieck Kommission – Rat – Parlament* → 2017+

ec.europa.eu/transport/modes/air/aviation-strategy/index_en.htm

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(3) EASA

Translation into practice
3 risk categories

OPEN:

Low risk

No involvement of Aviation Authority

Limitations : Visual line of sight, Maximum Altitude, distance from airport and sensitive zones

SPECIFIC

Increased risk

Operations Authorisation with operations manual

Specific qualification of drone, personnel, equipment based on safety assessment

CERTIFIED

Regulatory regime similar to manned aviation

EASA and Authority Certificates

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(3) EASA: A-NPA 2015-10

- ✈ Reflects the principles laid down in the Riga Declaration
- ✈ Risk- and performance-based → **3 Operational Categories**

1) Open Category (low risk): **"Buy & Fly"**
Operational limitations, industry standards compliance (CE!?), minimum of operational rules, enforcement ensured by police

2) Specific Operation Category (medium risk):
Authorisation by National Aviation Authorities (NAAs), maybe with QE
Risk assessment by operator. OPs Manual → risk mitigation measures.

3) Certified Category (higher risk):
Requirements comparable to manned aviation requirements.
→ Oversight by NAA/EASA (production, maintenance, operations, training)
→ Air Traffic Management (ATM) – Air Navigation Services (ANS)

→ Technical Opinion of EASA with 27 concrete proposals (Dec. 2015) → 2017+

www.easa.europa.eu/document-library/opinions/opinion-technical-nature

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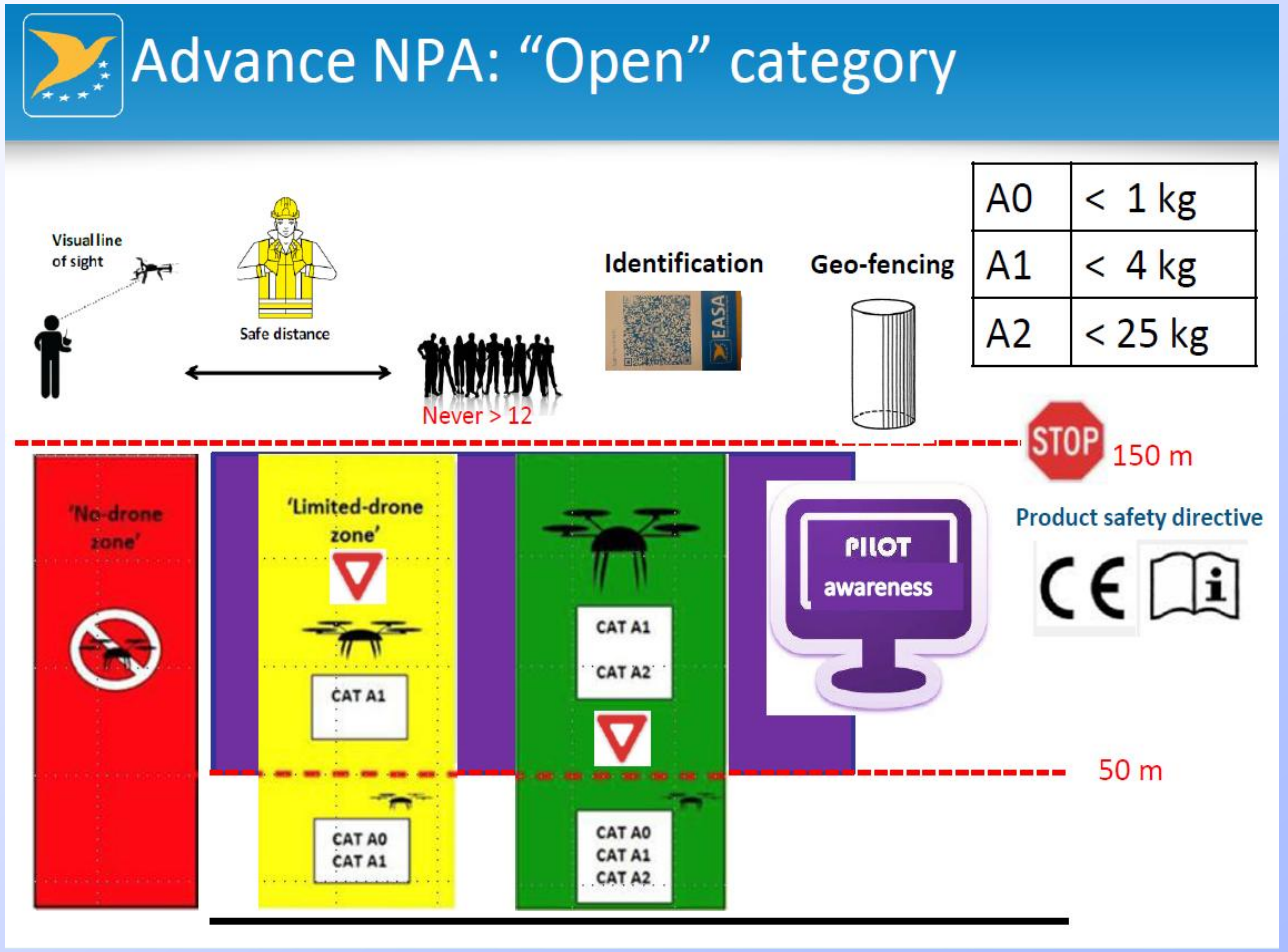
(3) EASA: A-NPA 2015-10



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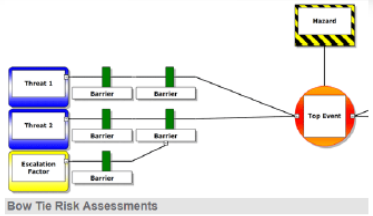
(3) EASA: A-NPA 2015-10

Specific category – SORA Elements
(Specific Operation Risk Assessment)

- Area of Operation
- Airspace
- UA Design
- Operational Procedure
- Pilot Competence
- Organizational Factors
- Effect on Environment



Risk Assessment

Operation Authorisation (OA)

Limitations	Limitations
Speed	MTBM
...	

Improvements Needed

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(3) EASA: A-NPA 2015-10

"Certified" category

Implementing rules included in existing rules for manned aviation

Drone and components

- Type Certificates (Full / Restricted)
- Certificates of Airworthiness
- European Technical Standard Order Approvals (ETSO) (option)

Organisations

- Design Organisation Approval
- Production Organisation Approval
- Maintenance Organisation Approval
- Training Organisation Approval

Personnel

- Licensed pilot
- Remote Operator Certificate (ROC)

Certification Specifications

- Safety Objectives
- Complemented by Technical Standards
- Standard for Operational aspects
- Standard for Licencing aspects

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(3) EASA: sub-NPA 2017-05 (A),(B)

UAS subcategory/ class	UAS MTOM (AIS)	Distance from people	Maximum height of the operation	Remote-pilot competence	Age of the remote pilot	Main technical requirements (CE marking)	Electronic identification, geofencing
A0/Class 0	< 250 g	No flight over open assemblies of people	50 m	None	No limitation	First-person-view (FPV)/ follow-me mode, Directive 2009/48/EC, maximum height 50 m	No
A1/Class 1	< 80 J or 900 g			Familiarisation	14 years	FPV/follow me mode, maximum height 50 m	Yes, marked with operator ID
A2/Class 2	900 g to 4 kg	20/50 m distance from uninvolved persons[55]	150 m	Certificate of competence after theoretical and practical test	16 years	Geofencing, auto-return home, lost-link mamagement	Yes, marked with operator ID, unique hardware number
A3/Class 3	< 25 kg					Geofencing, auto-return home, lost-link, management, no critical single failure	Yes, marked with operator ID, unique hardware number
A4/Class 4	< 25 kg	Only in remote areas				N/a	Yes, marked with operator ID

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Need for standards and criticality

		Open Category		Specific Category			Certified Category	
	Market Regulations	Operation	"standard scenario"	"safety assessment"	"BVLOS"	"local"	National IFR	"ICAO"
Product safety toys		n/a	n/a	n/a		n/a	n/a	n/a
Product safety consumer		n/a	n/a	n/a		n/a	n/a	n/a
Product safety professional		n/a				n/a	n/a	n/a
Geographical limitation systems			n/a	n/a		n/a	n/a	n/a
map format							n/a	n/a
data-Exchange							n/a	n/a
Identification								
Registration								
Low Level ATM	n/a						n/a	n/a
Performance based rules	n/a						n/a	n/a
"ATM" Data link	n/a						n/a	n/a
Vehicle Performance Standard	n/a						n/a	n/a
"Airspace" rules	n/a						n/a	n/a
Pilot competence	n/a							
C2/Remote control								
Specific standard scenarios	n/a	n/a		n/a	n/a	n/a	n/a	n/a
Small drone standard	n/a	n/a						n/a
Design and production		n/a						
UA airworthiness standards	n/a	n/a	n/a	n/a	n/a			
Detect and Avoid	n/a	n/a						
Recovery Systems	n/a	n/a						
Automatic Take off/landing	n/a	n/a						
Ground Control Station	n/a	n/a	n/a	n/a				
Pilot Workplace	n/a	n/a	n/a	n/a				
Handover Process	n/a	n/a	n/a	n/a				
CPDLC	n/a	n/a	n/a	n/a				
Operation&Oversight	n/a	n/a	n/a	n/a				

	on track due to: existing basis or productive working group
	quite on track due to agreed principles and running working group or only supportive standard
	less critical compared to orange or due to existing alternatives
	critical due to; challenging task, absent of coordinated working group, lack of international agreement
	highly Critical due to: extremly urgent need, absent of appropriate drafting body, lack of technological solution, controversial

(4) JARUS

- JARUS deliverables becoming more important for harmonised regulation → own JARUS secretariat in Brussels (Eurocontrol)
- JARUS now dominated by EASA → Intense discussions ongoing

jarus-rpas.org/publications

Web publication number	Doc	WG	Doc number	Title	Status	Status	Date published
JAR doc 01	JAR-DEL	WG3	01	Certification Spec for LURS			30/10/2013
JAR doc 02	JAR-DEL	WG5	02	RPAS C2 Link RCP			10/10/2014
JAR doc 03	JAR-DEL	WG1	03	FCL Recommendations			09/09/2015
JAR doc 04	JAR-DEL	WG6	04	AMC RPAS 1309 (package)			01/11/2015
JAR doc 05	JAR-DEL	WG6	05	CS-LUAS		Inter Cons	
JAR doc 06	JAR-DEL	WG3	06	SORA		Inter Cons	
JAR doc 07	JAR-DEL	WG5	07	CPDLC		Ext Cons	
JAR doc xx	JAR-DEL	WG1	08	FCL Guidance material	Draft	Inter Cons	
JAR doc xx	JAR-DEL	WG1	09	FCL CRD	Draft	Inter Cons	
JAR doc xx	JAR-DEL	WG4	10	D&A	Draft		
JAR doc xx	JAR-DEL	WG7	11	RPAS Operational Categorization	Draft		
JAR doc xx	JAR-DEL	WG 2	12	Low risk Operations	On hold		
JAR doc xx	JAR-DEL	WG 2	13	OPS	For 2017		
JAR doc xx	JAR-DEL	WG 2	14	ORG	For 2017		
JAR doc XX	JAR-DEL		15	CONOPS – C2 Link	draft		
JAR doc XX	JAR-DEL		16	CONOPS – ATM	draft		
JAR doc XX	JAR-DEL		17	CONOPS – D &A			

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Zusammenfassung

- EU-Kommission hat große Ambitionen (150.000 neue Jobs)
- Internationale & Europäische Regelungen (Harmonisierung) lassen aber noch auf sich warten → ICAO, JARUS/EASA
- Aktueller EU-Vorschlag „3 x 3“:
  - Drei Schichten-Modell für Zuständigkeit
  - Drei Kategorien für Betrieb von UAS je nach Risiko
- Entscheidend:
  - Weitere JARUS-Entwicklung (organisatorisch!)
  - Kompetenzfrage(n) auf EU-Ebene (unter 150kg)
  - Belastbare Ergebnisse nicht vor 2018+
- Österreich sollte bis dahin nationale Entwicklung forcieren

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(IV) – Aktuelle Entwicklung in Österreich

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Legal & regulatory changes in Austria from 1st January 2014

- **Three unmanned classes in the law (above „toy limit“ of 79 Joule):**
  - **Model Aircraft :** *„recreational“ – „purpose: only flight itself“*
  - **Commercial: UAV Class 1 (VLOS) – UAV Class 2 (BVLOS)**
- **Authority: Austrocontrol (UAV Class1, 2) – Aeroclub (Model Aircraft)**
- **Further regulations and details for operations:**
  - **BMVIT (Ministry): Amendment of ZLLV, LVR**
  - **Austrocontrol: LBTH 67 (AON 67)**

    „Airworthiness and Operational Notice for Unmanned Aircraft below 150kg“
  - **Currently only technical, operational and personnel requirements for UAV Class 1 (VLOS)**
  - **BVLOS (Beyond Visual Line of Sight) still open**

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unbemannte Fluggeräte = Drohnen

... und was Sie darüber wissen müssen

entscheidend sind
Zweck des Einsatzes bei
unmittelbarer **Sichtverbindung**

unter 79 Joule
bis 30 m über Grund
Spielzeug

keine Betriebsbewilligung erforderlich

Filmen und Fotografieren ohne luftfahrtrechtliche Bewilligung erlaubt

über 79 Joule
Flugmodell

Betrieb **unentgeltlich** im Freizeit in einem Umkreis bis zu *500 m* und ausschließlich zum Zweck des Fluges selbst

unter 25 kg
keine Betriebs-bewilligung erforderlich

Achtung: Haftpflicht-versicherung notwendig

über 25 kg
Betriebs-bewilligung erforderlich

Betriebsbewilligung durch den **Österreichischen Aero-Club** *erforderlich*

www.aeroclub.at

unbemanntes Luftfahrzeug der Klasse 1

Betrieb in einem Umkreis von mehr als *500 m*

oder

Fotografieren *oder*

Filmen *oder*

Transportieren *oder*

zu kommerziellen Zwecken / gegen Entgelt

Betriebsbewilligung durch **Austro Control** *erforderlich*

www.austrocontrol.at

Achtung: Bei allen Flügen ist die Gefährdung von Personen und Sachen u.a. von bemannten Luftfahrzeugen (zB Helikopter, Flugzeuge) auszuschließen! Beim Filmen und Fotografieren ist der Datenschutz zu beachten!

bmvit

Quelle: Bundesministerium für Verkehr, Innovation und Technologie, 2/2016

austro CONTROL	Lufttüchtigkeits- und Betriebstüchtigkeitshinweis Nr. 67
Abteilungen AOT und LSA	Lufttüchtigkeits- und Betriebstüchtigkeitsanforderungen für unbemannte Luftfahrzeuge bis 150 kg

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Ergebnis des Konsultationsverfahrens

Categorisation of UAS Class 1 (VLOS) by Austrocontrol (LBTH 67)

see: www.austrocontrol.at/en/aviation_agency/licenses__permissions/flight_permissions/rpas

- ✈ **Four categories (A to D), depending on weight and area of operation**
- ✈ **Light UAS in unpopulated areas face easier rules (certific./operation)**
- ✈ **Heavier UAS or UAS flying above populated areas face stricter rules**

	UAS Class 1 (VLOS) – Area of Operation			
	I undeveloped (no buildings)	II unpopulated	III populated	IV densely populated (except crowds)
MTOW up to and including 5 kg	A	A	B	C
MTOW up to and including 25 kg	A	B	C	D
MTOW above 25 kg and up to and including 150 kg	B	C	D	D

Austrian RPAS Regulations

The extent of the technical investigation is determined by the category and ranges from self declaration to a sample inspection

	Category A	Category B	Category C	Category D
Airworthiness Requirements	State-of-the-art technology	tailored CS for model aircraft (self declaration)	tailored CS for model aircraft (self declaration)	Case-by-Case basis (CS-LURS, CS-LUAS, …)
Continuing Airworthiness	Pre-flight check	Pre-flight check	Maintenance by check list	Maintenance by check list
Control System	Non complex manual control	Non complex with stabilization	Complex with stabilization and automation	Complex with stabilization and automation and navigation
Record Keeping	Date, time, duration, pilot…	Date, time, duration, pilot…	Date, time, duration, pilot…	Date, time, duration, pilot…
Failure Tolerance	none	FMEA	FMEA	FMEA

https://www.austrocontrol.at/luftfahrtbehoerde/lizenzen__bewilligungen/flugbewilligungen/unbemannte_lfz

Source: Austrocontrol / Glatzl

UAS Class 1 – New Developments 2015

- First Revision of LBTH 67 (AON 67) by Austrocontrol
- Entry into force: August 2015
- Only minor changes:
  - no noise measurement for electrical UAVs below 5kg
  - new certification specification also for multicopter UAS
  - formal flight programme for pilots qualification tests
  - role of technical experts assessments (especially Aeroclub)

- Federal Transport Ministry (BMVIT): Decree in December 2015
- Aero-Club gets the official authority to prepare „expert opinions“ (Sachverständigengutachten) about UAS Class 1 for Austrocontrol
- Implementation between Austrocontrol and Aeroclub ongoing
- Austroncontrol still issues permissions, Aeroclub (FAA) supports

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Experiences up to now – Challenges

- **Legal Discussions about boundary between „model aircraft“ and UAS (Class 1, 2) → especially for camera flights (FPV, etc.)**
- **Problem: „If certification is too complicated we will fly illegally“** (Statement by photo/film-maker during an event with Austrocontrol)
- **Therefore: Thousands of „illegal“ private drones with cameras …**
- **Suspense about future EU/EASA regulation → Structure, Content**
- **Data Protection/Privacy → Public acceptance vital**
- **Radio Frequencies (Command & Control Link, Data Link)**
- **Next Steps – B(V)LOS: Regulations (Sense&Avoid, Semi-Auton.) Tests with BLOS developments – test areas**

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Current Challenges in UAS research

- Sense & Avoid (Detect & Avoid)
  (“crucial” for Class 2: BLOS, autonomous)
- “Anti-Drone-Systems” against unlawful flights
- Radio Frequencies, C2 (Command & Control), Data Link, Satcom
- Positioning/Localisation (GPS-Alternatives)
- Certification Specifications (CS)
  individual for different UAS-Types? Acceptance by CAAs
- Contingency (e.g. loss of link)
  → semi-autonomous or fully-autonomous
- EU: Connection with SESAR (Single European Sky)

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Nützliche Weblinks

- ICAO (International Civil Aviation Organization): www.icao.int
- EU-Kommission, DG ENTR
  ec.europa.eu/growth/sectors/aeronautics/rpas/index_en.htm
- EASA (European Aviation Safety Agency)
  https://www.easa.europa.eu/unmanned-aircraft-systems-uas-and-remotely-piloted-aircraft-systems-rpas
- BMVIT – OZB (Oberste Zivilluftfahrtbehörde)
  www.bmvit.gv.at/verkehr/luftfahrt/behoerden/index.html
  www.bmvit.gv.at/verkehr/luftfahrt/drohnen/index.html
- ACG (Austro Control)
  www.austrocontrol.at/luftfahrtbehoerde/luftfahrzeuge
- JARUS (Joint Authorities for Rulemaking on Unmanned Systems)
  www.jarus-rpas.org
- EUROCAE (European Organization for Civil Aviation Equipment) – WG 73 & 93
  www.eurocae.net/wgs/active/
- UVS International
  www.uvs-international.org

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