U-SPACE INSIGHT

Survey
On the Perception of U-space

CONCLUSIONS

AW DRONES

Funded By The European Union

In The Context Of The Horizon 2020 Programme

Produced by
Blyenburgh & Co
France

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SURVEY ORGANISATION

This survey has been created and conducted by Blyenburgh & Co, a private company registered with the Chamber of Commerce in Paris, France, and established at 86 rue Michel Ange, FR-75016 Paris, France - Tel.: 33-1-46.51.88.65 - www.rps-info.com & www.rpas-regulations.com.

This survey was carried out in the context of the AW-Drones Project (www.aw-drones.eu), which is co-funded by the European Union (EU). Blyenburgh & Co is a participant in the AW-Drones Project.

SURVEY OBJECTIVE

The objective of this survey was to

- Evaluate the comprehension of U-space and its relevant services in the Single European Sky (SES) Member State area (and the knowledge level & the expectations of the stakeholders)
- Obtain an opinion on the technical standards required to support U-space implementation
- Identify possible bottlenecks & gaps
- Scope the possible pre-occupations of stakeholders concerning U-Space and its implementation
- Check on the U-space implementation status

COUNTRIES CONCERNED

This survey is aimed at the UAS / RPAS / Drone community principaly in the following countries: Albania, Armenia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia,Faroe Islands, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kosovo, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Monaco, Montenegro, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, United Kingdom.

Respondents in other countries were also invited to participate.»

NON-ATTRIBUTION OF RESPONSES

The survey responses supplied will not be nominally attributed to the companies/organisations having supplied them.

RECOGNITION OF CONTRIBUTION

A list of names of all companies & organisations having contributed to the survey, and the countries where they are established, is part of this final report.

PUBLICATION OF RESULTS

The conclusions of this survey are being made publically available on a no-cost basis to all interested parties. They are published on www.rps-info.com & www.aw-drones.eu.

DISSEMINATION

The notification of this survey and the invitations to contribute to it were disseminated by Blyenburgh & Co making use of its database and social media, as well as by specialized blogs (UAS Vision, Unmanned Airspace), and various UAS / RPAS / Drone community stakeholders

CONFIDENTIALITY

Personal contact information provided in response to this survey (hereinafter “Personal Data”) will only be processed for the survey within the limits of the survey’s purpose.

Data processing was performed by Blyenburgh & Co and its staff, which was instructed to observe the rules of this confidentiality clause.

Personal Data will not be transmitted to any entity for any purpose whatsoever. Persons having completed this survey may at all times request Blyenburgh & Co (pvb@rps-info.com) to have their Personal Data deleted from its database for any future use by addressing an email with “Delete from database” in the subject box, and indicating their family name, first name & company/organisation as the message text. Non-personal data shall not be subject to such deletion requests. Persons having supplied their contact details can, at all times, obtain a copy of the information concerning them that is registered by Blyenburgh & Co and rectify it by addressing a simple written request to Blyenburgh & Co, 86 rue Michel Ange, FR75016 Paris, France (pvb@rps-info.com).

This statement is in accordance with the EU General Data Protection Regulation (GDPR), which entered into force on May 15, 2018.

REFERENCE DOCUMENTS

For the convenience of the respondents, the following documents were accessible at each step of the survey:

- U-Space Insight Survey – Terms & Explanations - 210104
- EC Draft EU-923-2012 - SERA.6005 - U-space Amendment - 210303
- EC Draft EU-COM – Implementing Regulation – U-space Act - 210303
- EC Draft EU-COM – Implementing Regulation – U-space Act - Annex - 210303

In the context of the "U-space Insight" survey the following terms and explanations apply.

UAS - (ICAO explanation)
''Unmanned Aircraft System'' (UAS) is an aircraft and its associated elements which are operated with no pilot on board.

UAS Operator - (ICAO explanation)
''UAS Operator'' is a person, organization or enterprise engaged in or offering to engage in an aircraft operation.

U-space - (SESAR JU explanation)
''U-Space'' is a set of new services relying on a high level of digitalisation and automation of functions and specific procedures designed to support safe, efficient and secure access to airspace for large numbers of drones. As such, U-space is an enabling framework designed to facilitate any kind of routine mission, in all classes of airspace and all types of environment - even the most congested - while addressing an appropriate interface with manned aviation and air traffic control. The SESAR Joint Undertaking blueprint proposes the implementation of 4 sets of services to support the EU aviation strategy and regulatory framework on drones:

U1: U-space foundation services covering: e-registration, e-identification, and "pre-tactical" geo-fencing.

U2: U-space initial services for drone operations management: "tactical" geo-fencing, flight planning management, weather information management, tracking, monitoring, drone aeronautical information management, procedural interfacing with conventional air traffic control, emergency management, strategic de-confliction.

U3: U-space advanced services supporting more complex operations in dense areas such as de-confliction (assistance for conflict detection), dynamic geo-fencing, automated detect and avoid functionalities, collaborative interface with ATC, tactical de-confliction, dynamic capacity management.

U4: U-space full services, offering very high levels of automation, connectivity and digitalisation for both the drone and the U-space system.

UAS Geographical Zone - Source: Implementing Regulation (EU) 2020/639 (amending Implementing Regulation (EU) 2019/947), Article 2: Definitions, point (4) ''UAS geographical zone'' is a portion of airspace established by the competent authority that facilitates, restricts or excludes UAS operations in order to address risks pertaining to safety, privacy, protection of personal data, security or the environment, arising from UAS operations.

U-Space Services - Source: The most recent edition of the U-space draft

- **Network Identification Service**
  A network identification service should provide the identity (registration number) of UAS operators and geo-location & serial number of UAS during operations and in contingency situations, and share relevant information with other U-space airspace users.
- **Geo-awareness Service**
  A geo-awareness service should provide UAS operators with the information about the latest airspace constraints and defined UAS geographical zones information made available as part of the common information services.
- **UAS Flight Authorisation Service**
  A flight authorisation service should ensure that authorised UAS operations are free of intersection in space and time with any other notified flight authorisations within the same U-space airspace.
- **Traffic Information Service**
  A traffic information service should alert UAS operators about other air traffic that may be present in proximity to their UAS.
- **Weather Information Service**
  A weather information service should support the UAS operator during the flight planning and execution phases, as well as improve the performances of other U-space services provided in the U-space airspace.
- **Conformance Monitoring Service**
  A conformance monitoring service shall enable the UAS operators to verify whether they comply with the operator requirements and the terms of the flight authorisation. To this end, it shall alert the UAS operator when the flight authorisation deviation thresholds are violated and when the operator requirements are not complied with by the same UAS operator.

Service Providers

There are two types of service providers:

Common Information Service Provider (CISP)

Member States may designate a single Common Information Service Provider (CISP) to supply the common information services on an exclusive basis in all or some of the U-space airspaces under their responsibility. The CISP will support the exchange of information and the coordination between U-space service providers and air traffic service providers, without discrimination, to enable the safe management of unmanned aircraft traffic and segregation of manned aircraft from unmanned aircraft.

U-space Service Provider (USSP)

U-space service providers will act as gateway with U-space for UAS operators, they will provide at least the following minimum mandatory U-space services: a network identification service, a flight authorisation service, a geo-awareness service, and a traffic information service. UAS operators subject to U-space regulation may only operate in U-space airspace if they use the mandatory U-space services that are indispensable to ensure safe, secure and efficient operations.

TARGETED PARTICIPANT CATEGORIES

1. **Aeronautical Information Service** (AIS) **Provider** (e.g. conformance monitoring, geo-awareness, flight autorisation, network identification, weather information)
2. **Air Navigation Service Provider** (ANSP)
3. **ATM/UTM/U-space software development companies** (not supplying services to UAS operators with the software dfeveloped by them)
4. **Common Information Service Provider** (CISP) *(Prospective)*
5. **Communication Service Provider** (e.g. mobile network, satellite communication)
6. **Conformity Assessment Body** (private or public, commercial or not-for-profit entity, national standards bodies, trade association, consumer organisations, organisations that undertake conformity assessment activities (e.g. testing, inspection, certification) in accordance with national regulations
7. **Consultancy specialized in safety risk assessment** (SORA, PDRA, STS), and selling their services to UAS operators, and approved by their national aviation authority (NAA)
8. **UAS Manufacturer / Integrator**
9. **UAS Manufacturer / Integrator & Operator** [commercial – all aircraft types & all flight mission purposes].
10. **UAS Operator [commercial & non-commercial** – all aircraft types - **all flight mission purpose categories (except transport of cargo & persons)**]
11. **UAS Operator** [commercial & non-commercial – all aircraft types - **Transport of cargo & persons**]
12. **General Aviation** (GA) (manned aviation e.g. sport & leisure activities: pilots of balloons, gliders, ultralights; aerial work operators; business aviation; & related associations)
13. **Commercial Manned Aviation** [airlines (passenger & freight carriers; air taxi operators); pilots; related associations).
14. **National Aviation Authority** (NAA) - Regulatory authorities (ministry, directorate, CAA, inspectorate) - National & regional level
15. **Local Authority** (e.g. city/municipality, harbour) & regional authority (e.g. France: department; Germany: Länder; Spain: region; Italy: province/region; Netherlands: province)
16. **Notified Body** (organisation designated by EU country to assess product conformity)
17. **Qualified Entity** (QE) (an entity to which a specific certification task is allocated by and under control of a national aviation authority or EASA)
18. **Standard Development Organisation** (SDO) (national, European, international)
19. **Urban Air Mobility** (UAM) service provider *(Prospective)* [services (incl. infrastructure) required to make the transport of cargo & persons (air taxis) by unmanned aircraft possible in an urban environment]
20. **U-space Service Provider** (USSP) *(Prospective)* (supplying e.g.: network identification service, flight authorisation service, geo-awareness service, traffic information service)

CONCLUSIONS

SUMMARY OF THE PRINCIPLE RESULTS & CONCLUSIONS

- On the average, the survey r**espondents** had significant **knowledge & understanding** of the drone sector (54% with >5 years of experience) and the aviation sector (83% with > 5 years of experience and 66% with >10 years of experience).
- 30% of the respondents are employed by companies/organisations with more than 250 employees. In other words, **70% of the respondents work in SMEs/SMIs**.
- The **principal contributing countries**: Belgium (13%), Germany (13%), France (12%), Spain (10%), Netherlands (7%), Italy (7%)
- Publishing the survey in French, German & Spanish may have resulted in an **increase of 49% of the inputs** to the survey.
- The activity sector segmentation used to categorize the respondents has permitted to **benchmark the drone operations community** and to obtain a **representative & qualified insight** to the views of this community.
- The **top three respondent categories**: UAS Operators (35%), Consultancy Specialized in Safety Risk Assessment (22%), UAS Manufacturer/Integrator & Operator (19%).
- **Less than 50%** of the respondents currently **contribute to standard producing work**.
- The activity sectors with the **largest projected growth**:
  - U-space Service Provider +12%
  - Urban Air Mobility Service Provider +9%
  - Consultancy specialized (safety risk assessment) +6%
  - UAS operator [commercial & non-commercial; All aircraft types - Transport of cargo & persons] +6%
  - UAS manufacturer / integrator & operator [Commercial - All aircraft types & flight missions] +5%
- **Services currently available** in respondent's country (>40% of the positive replies):
  Common Information Service (CIS)
  - ATM Data Service 55%
  - Flight planning 53%
  - Geo-Awareness Data Service 47%
  - UAS Flight Authorisation Service
  - Flight plan/authorisation validation 47%

  Geo-awareness Service
  - Applicable operational conditions 46%
  - Airspace constraints in designated U-space airspace 42%
  - Geographical zones in the designated U-space airspace 41%

  Network Identification Service
  - Data for authorized users 69%

  Traffic Information Services 40%
  Weather Information Services 61%
- Respondents' **preference** or **expression of needs**:
  - Prefer Integration to Segregation 76%
  - Need for further specifications of rules & guidelines in the U-space regulation (e.g. de-conflicting processes) 83%
  - Need for clarification of the roles & responsibilities of Air Navigation Service Providers, Common Information Service Providers, U-space Service Providers 64%
  - Business & financial aspects of U-space should be referred to in the regulation 53%
  - Business & financial aspects of U-space should be a national implementation matter 50%
- The majority of the respondents indicate that the **U-space is not mature** and that the **available information/ documentation** is insufficient.
- Respondents with an **above average or total comprehension** of the following topics:
  - The U-space concept 74%
  - Relations between service suppliers 56%
  - Data supplied by each service provider 41%
  - To whom the data is supplied 37%
  - Legal responsibilities & liabilities of service providers 29%
  - How the data is supplied 22%
  - Format of the supplied data 18%
- The **10 most urgently required services**:
  - Flight Authorisation Request Processing 56%
  - Geo-graphical Zones in the Designated U-space Airspace 48%
  - Geo-Awareness Data Service 47%
  - Authorization Request Service 45%
  - Applicable Operational Conditions 45%
  - Supply of Flight Authorisation 44%
  - Flight Plan/Authorisation Validation 42%
  - Airspace Constraints in the Designated U-space Airspace 42%
  - Weather Information Service 42%
  - Dynamic Airspace Restrictions 40%
- The majority of respondents (>50%) **do not know when the required services will be available** in their countries.
- Principal currently **missing U-space-related aspects** are:
  - Required technical standards 73%
  - Required operational standards 69%
  - Detailed additional information on U-space 62%
  - Detailed additional regulatory information 57%
  - Costing aspect of U-space services 56%
  - Responsibilities & liabilities relative to U-space services 55%
  - Definition of «dynamic reconfiguration of the airspace» concept 48%
  - Defined communication interface between ANSP & USSP 38%
  - Defined communication interface between CSP & USSP 37%
  - Defined communication interface between CSP & ANSP 35%
  - Definition of «Notified Body» & applicable criteria/standards 28%

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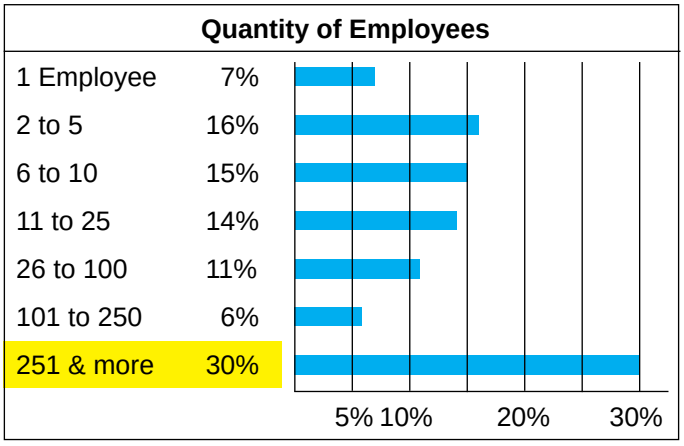
- The **principal concepts** that are considered **based on immature or non-existent technologies**:
  - Detect & Avoid 80%
  - Collaborative interface with ATC 51%
  - Surveillance & communication technology for manned aviation VLL flights 51%
  - Dynamic geo-fencing 47%
  - Tactical de-confliction 47%
  - Communication methods – 5G 41%
  - Procedural interface with ATC 40%
  - Strategic de-confliction 40%
- The **principally required European-wide standards**:
  - Pilot Training & Qualification: Theoretical 85%
  - Detect & Avoid 84%
  - Electronic conspicuity methods (UAS position transmission) 82%
  - Pilot Training & Qualification: Practical 81%
  - Command & Control integrity 78%
  - Cybersecurity 78%
  - Drones for Transport - Cargo/Goods 77%
  - Drones for Transport – Persons 76%
  - Population density definition/calculation 67%
  - UAS «black box» recorder (on aircraft) 60%
  - Person-identifiable imagery 55%
- 80% of the respondents indicate that **E-registration is available in their country**.
- 61% indicate that **E-registration is free-of-charge**.
- The **minimum age** is principally 16 or 18 years.
- France, Italy & Spain have 3 classes: 14, 16 & 18 years
  Denmark has 2 classes: 15 & 16 years
  Germany has 2 classes: 16 & 18 years
- 65% of the respondents indicated that **geo-zones had been established in their country**.
- The responsibility for **management of the Geo-zones** and **Geo-awareness Service Provision** belongs to:
  - National aviation authority 76%
  - Governmental agency 38%
  - Regional authority 25%
  - Municipal authority 14%
  - Independent company 14%
- The majority of the respondents indicate that a **Geo-awareness Service Provider** should have a **designated accountable geo-awareness manager**.

Fig. 1 - SECTOR INVOLVEMENT

	Quantity of Years				
	<1	1-2	3-5	5-10	>10
Respondent organisation's involvement with drones	4%	12%	30%	34%	20%
Respondent's personal involvement with drones	5%	10%	26%	27%	33%
Respondent's personal involvement with aviation	3%	3%	11%	17%	66%

Fig. 2- SIZE



< 251 employees = SMEs/SMIs

Fig. 3 - PARTICIPATING COUNTRIES

		%
1	Albania	0,83
2	Australia	1,65
3	Austria	2,48
4	Belgium	13,22
5	Bulgaria	2,48
6	China	0,83
7	Czech Rep.	0,83
8	Denmark	2,48
9	Estonia	0,83
10	Finland	4,96
11	France	11,57
12	Germany	13,22
13	Ireland	0,83
14	Italy	6,61
15	Jamaica	0,83
16	Kenya	0,83
17	Lithuania	0,83
18	Netherlands	7,44
19	New Zealand	0,83
20	Norway	0,83
21	Poland	2,48
22	Portugal	0,83
23	Spain	9,92
24	Sweden	1,65
25	Switzerland	2,48
26	Ukraine	0,83
27	United Kingdom	2,48
28	U.S.A.	4,96
	Total	100

Fig. 4 - LANGUAGE USED TO COMPLETE SURVEY

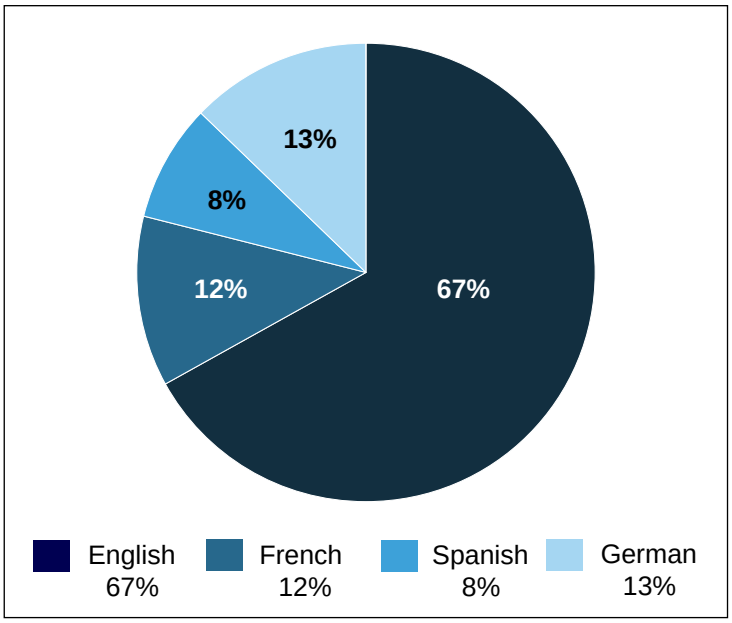
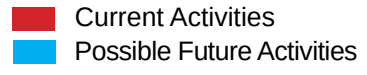


Fig. 5 - CURRENT & POSSIBLE FUTURE RESPONDENT ACTIVITIES

Activity Sectors

Multiple Replies were possible



	Activity Sectors	Current Activities	Possible Future Activities
1	**Aeronautical Information Service** (AIS) **Provider** (e.g. conformance monitoring, geo-awareness, flight autorisation, network identification, weather information)	5%	6%
2	**Air Navigation Service Provider** (ANSP)	7%	7%
3	**ATM / UTM / U-space software development companies** (does not supply services to UAS operators with the developed software)	13%	15%
4	**Provider of Common Information Service** (CISP) *(Prospective)*	5%	9%
5	**Communication Service Provider** (e.g. mobile network, satellite communication)	1%	2%
6	**Conformity Assessment Body** (private or public, commercial or not-for-profit entity, national standards bodies, trade association, consumer organisations, organisations that undertake conformity assessment activities (e.g. testing, inspection, certification) in accordance with national regulations	7%	10%
7	**Consultancy specialized in safety risk assessment** (SORA, PDRA, STS), and selling their services to UAS operators, and approved by their national aviation authority (NAA)	22%	28%
8	**UAS Manufacturer / Integrator**	17%	18%
9	**UAS Manufacturer / Integrator & Operator [commercial – all aircraft types & all flight mission purposes].**	19%	24%
10	**UAS Operator [commercial & non-commercial – all aircraft types - all flight mission purpose categories (except transport of cargo & persons)]**	35%	33%
11	**UAS Operator [commercial & non-commercial – all aircraft types - Transport of cargo & persons]**	13%	19%
12	**General Aviation** (GA) (manned aviation e.g. sport & leisure activities: pilots of balloons, gliders, ultralights; aerial work operators; business aviation; & related associations)	10%	9%
13	**Commercial Manned Aviation** [airlines (passenger & freight carriers; air taxi operators); pilots; related associations).	2%	5%
14	**National Aviation Authority** (NAA) - Regulatory authorities (ministry, directorate, CAA, inspectorate) - National & regional level	7%	9%
15	**Local Authority** (e.g. city/municipality, harbour) & regional authority (e.g. France: department; Germany: Länder; Spain: region; Italy: province/ region; Netherlands: province)	2%	2%
16	**Notified Body** (organisation designated by EU country to assess product conformity)	1%	4%
17	**Qualified Entity** (QE) (an entity to which a specific certification task is allocated by and under control of a national aviation authority or EASA)	3%	7%
18	**Standard Development Organisation** (SDO) (national, European, international)	2%	5%
19	**Urban Air Mobility** (UAM) **Service provider** *(Prospective)* [services (incl. infrastructure) required to make the transport of cargo & persons (air taxis) by unmanned aircraft possible in an urban environment]	12%	21%
20	**U-space Service Provider** (USSP) *(Prospective)* (supplying e.g.: network identification service, flight authorisation service, geo-awareness service, traffic information service)	12%	24%

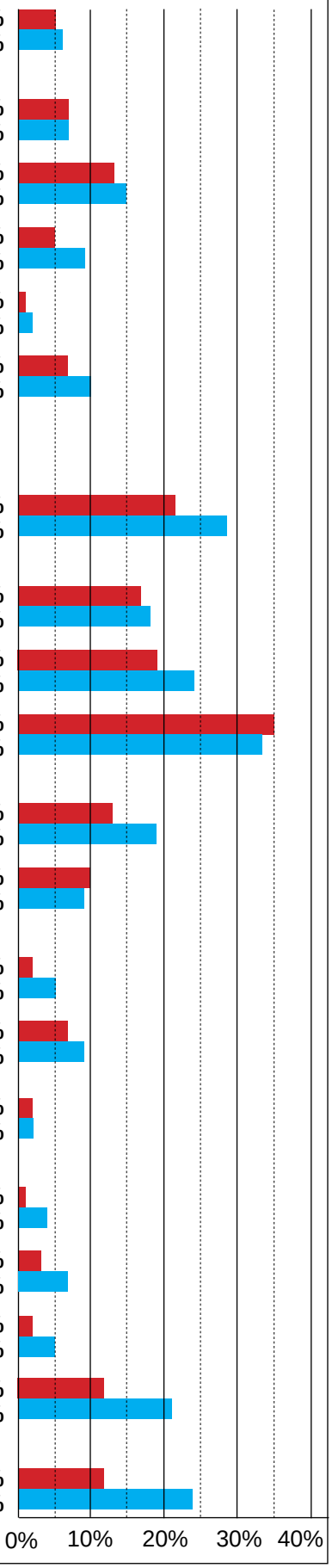


FIG. 6 - GENERAL COMPREHENSION

	Not at all	Slightly	Partially	Above Average	Completely
Is the general concept of U-space clear to you?	1%	3%	22%	**46%**	28%
Are the relations between the service suppliers clear to you?	4%	12%	27%	**45%**	11%
Is it clear what data is supplied by each service provider?	7%	10%	**41%**	34%	7%
Is it clear in what format the data is supplied?	21%	16%	**46%**	16%	2%
Is it clear to whom the data is supplied?	11%	12%	**40%**	30%	7%
Is it clear how the data is supplied?	18%	11%	**48%**	20%	2%
Are the legal responsibilities & liabilities of the service providers clear to you?	15%	13%	**43%**	23%	6%
Is the 5G mobile network coverage in your country sufficient to supply the data?	27%	25%	**30%**	15%	2%

The following concerns 26% of the respondents

Why is U-space not clear to you?	
- Have not read all the relevant information	**39%**
- The U-space documents were not detailed enough	**34%**
- My English was insufficient to understand the documents	4%
- U-space documents were not available in my native language	3%
- Other (including no answer supplied)	20%

FIG. 7 - PARTICIPATION IN STANDARD PRODUCING ORGANISATIONS

Multiple answers possible

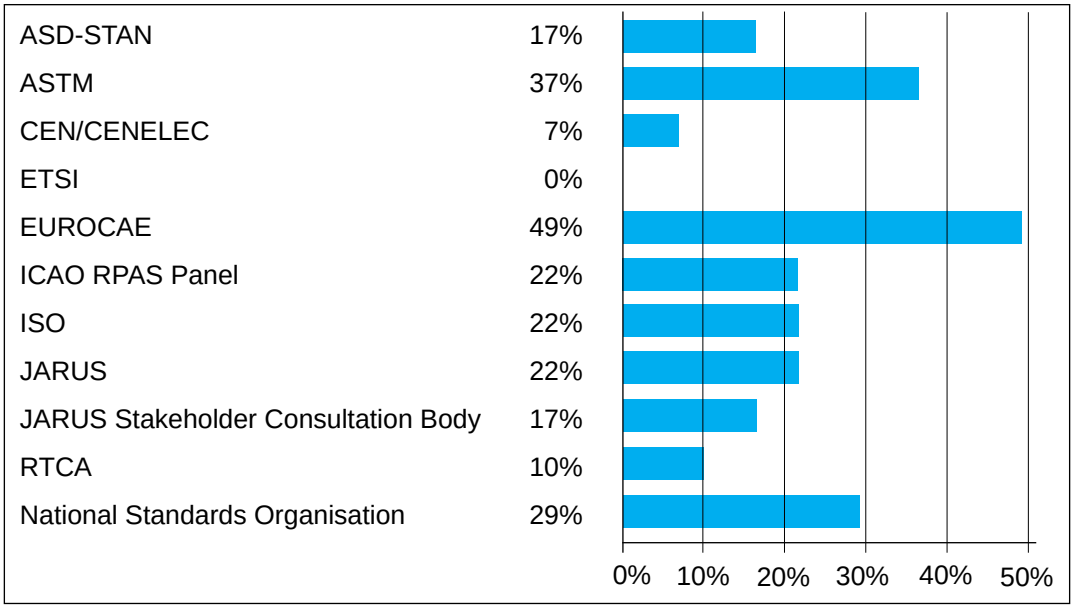


FIG. 8 - THE RESPONDING COMPANIES & ORGANISATIONS

- 5D Konsulterna AB, Sweden
- ADSE Consulting & Engineering, Netherlands
- Advanced Protection Systems, Poland
- AED, France
- Aero Enterprise GmbH, Austria
- AéroTronique EIRL CROZE V., France
- AESA, Spain
- Airial Robotics GmbH, Germany
- Albadron shpk, Albania
- Almende B.V., Netherlands
- Ampell Consultores Asociados, Spain
- ANRA Technologies UK, United Kingdom
- ANS CR, Czech Republic
- ANWB Medical Air Assistance, Netherlands
- Archiflight, Belgium
- Asociacija DRONEA, Lithuania
- ASTM International, United States
- BP SOLUTIONS, France
- BULATSA, Bulgaria
- BVdrone Oy, Finland
- CAA, Jamaica
- CAA, New Zealand
- CAA, Poland
- Capgemini, France
- Lanseau, France
- CIRA, Italy
- Clearance, France
- Cognitive Technologies and Services, Italy
- Delta Aadvise GmbH, Germany
- Distretto Tecnologico Aerospaz, Italy
- DJI, China
- DJI, Denmark
- DJI, Germany
- dlapilota.pl Sp. z o.o., Poland
- Drone Class, Netherlands
- Drone Manufacturers Association Europe (DMAE), Belgium
- DroneQ Aerial Services, Netherlands
- Droniq GmbH, Germany
- Dronotique, France
- EDA, Belgium
- ENAIRE, Spain
- ENAIRE, Spain
- ENAIRE/CRIDA, Spain
- ESSP-SAS, Spain
- EUROCONTROL, Belgium
- European Commission, Belgium
- EuroUSC Italia ltd, Italy
- Everis Aerospace and Defense, Spain
- FACIL'ETIC, France
- FH Joanneum, Austria
- FlyingBasket, Italy
- Flyover di Vania Di Francesco, Italy
- FLY-R, France
- flyXdrive GmbH, Germany
- Freelance Operator, Kenya
- General Atomics aeronautical Systems, United States
- Globe UAV GmbH, Germany
- Goldy Aviations, Belgium
- Griff Aviation AS, Norway
- GUTMA , Belgium
- Haw Trade & Consulting GMBH, Germany
- HELISEO SAGL, Switzerland
- HEMAV, Spain
- Holding The Drones, Netherlands
- IATA, Germany
- Icarus Aerospace, United States
- ICTD Bulgaria, Bulgaria
- Individual Expert, Germany (not on behalf of employer)
- Individual Expert, Finland (not on behalf of employer)
- Individual Expert, France (not on behalf of employer)
- ITG, Spain
- KNVvL, Netherlands
- Landesluftfahrtbehörde Hamburg, Germany
- Leitek Innovative Solutions, Portugal
- Leonardo, Italy
- Linköping University (LiU), Sweden
- Local Police Belgium, Belgium
- Naviair, Denmark
- Nokia, Finland
- NUAIR, United States
- OUAS, Urban Air Mobility Oulu, Finland
- Pilgrim Technology, France
- Poladrone, Malaysia
- RadarBasedAvionics, Netherlands
- Rigi Technologies SA, Spain
- Ripper Corporation, Australia
- RMIT University, Australia
- SAAU, Ukraine
- SDIS de Seine-et-Marne, France
- senseFly, Switzerland
- SGS, Germany
- sicherfliegen.com, Germany
- SkeyDrone, Belgium
- SkeyDrone, Belgium
- Skycorp OÜ, Estonia
- Skydio, Inc., Germany
- SkyeBase BV, Belgium
- SOGITEC, France
- stsi², France
- Stüker Consult, Denmark
- Survey Drones Ireland, Ireland
- Tecnofly Canarias, S.L., Spain
- Toni Eiser Innovation, Austria
- Topview SRL, Italy
- Traficom, Finland
- TruWeather Solutions, United States
- TruWeather Solutions, United States
- UAS Consulting, Belgium
- UAV+, Netherlands
- UAVDACH-Services, Germany
- UIC2, Germany
- Unifly, Belgium
- Unifly, Belgium
- Unifly, Belgium
- Unmanned Systems Bulgaria, Bulgaria
- UPC, Spain
- VIVES University - DroneLab, Belgium
- Volocopter GmbH, Germany
- Volocopter GmbH, Germany
- VTOL Technologies Ltd, United Kingdom
- Wing Aviation Finland Oy, Finland

Remarks: Companies/organisation indicated more than once = More than one person completed the survey.
12 Respondents interrupted the survey completion and did not resume it (not included in list above).
5 Respondents submitted incorrect respondent information and were disqualified.

FIG. 9 - RESPONDENT ORGANISATIONS & RESPONDENTS - REVIEW

Respondent Experience (>5 years)

Organisation's involvement in drone sector	54%
Personal involvement with drones	60%
Personal involvement with aviation	83%

Quantity of Employees

1 - 25	52%
26 - 250	18%
<251 (SMEs/SMIs)	70%
>250	30%

Participating Countries

European Union	17
EU-associated	4
Other	7

Language Used to Complete Survey

English	67%
German	13%
French	12%
Spanish	8%

Respondents' Principal CURRENT Activities (>10%)

UAS Operator [commercial & non-commercial - all aircraft types - all flight mission purpose categories (*Except transport of cargo & persons*)]	35%
Consultancy specialized in safety risk assessment	22%
UAS Manufacturer / Integrator & Operator [commercial - all aircraft types & all flight missions]	19%
UAS Manufacturer / Integrator	17%
ATM / UTM / U-space software development companies	13%
UAS Operator [commercial & non-commercial – all aircraft types - *Transport of cargo & persons*]	13%
Urban Air Mobility (UAM) Service Provider	12%
U-space Service Provider	12%
General (Manned) Aviation	10%

Respondents' Principal FUTURE Activities (>10%)

UAS Operator [commercial & non-commercial - all aircraft types - all flight mission purpose categories (*Except transport of cargo & persons*)]	33%
Consultancy specialized in safety risk assessment	28%
UAS Manufacturer / Integrator & Operator [commercial - all aircraft types & all flight missions]	24%
U-space Service Provider (USSP)	24%
Urban Air Mobility (UAM) Service Provider	21%
UAS Operator [commercial & non-commercial - all aircraft types - *Transport of cargo & persons*]	19%
UAS Manufacturer / Integrator	18%
ATM / UTM / U-space software development companies	15%
Conformity Assessment Body	10%

COMMENTS

A significant majority of the survey participants had the required experience, expertise and competence.

70% of the respondents are Micro & Small/Medium-sized companies.

U-space is followed outside of the EU.

The majority of the survey participants (67%) master English.

Less than 50% of the survey respondents currently contribute to standard producing activities.

The activity sectors with the largest projected growth are:
- U-space Service Provider (USSP) +12%
- Urban Air Mobility (UAM) service provider + 9%
- Consultancy specialized in safety risk assessment + 6%
- UAS operator [commercial & non-commercial - all aircraft types - Transport of cargo & persons] + 6%
- UAS manufacturer / integrator & operator [commercial - all aircraft types & all flight missions] + 5%

COMPREHENSION

Percentage of the respondents indicating that they have an **above average** or **total** comprehension of the following:

The U-space concept	74%
Relations between service suppliers	56%
Data supplied by each service provider	41%
Format of the supplied data	18%
To whom the data is supplied	37%
How the data is supplied	22%
Relevant legal responsibilities & liabilities of service providers	29%

FIG. 10 - CURRENT AVAILABILITY IN RESPONDENT'S COUNTRY

Common Information Service (CIS)	**Yes**
ATM Data Service	55%
Geo-Awareness Data Service	47%
Autorisation Request Service	
Communication Service (infrastructure for)	
Conformance Monitoring Service	27%
UAS Flight Authorisation Service	
Flight planning	53%
Flight autorisation request processing	
Flight plan assistance	
Flight plan processing	
Flight plan/authorisation validation	47%
Priority management	18%
Strategic de-confliction	16%
Supply of flight authorisation	
Geo-awareness Service	
Applicable operational conditions	46%
Airspace constraints in the designated U-space airspace	42%
Geographical zones in the designated U-space airspace	41%
Dynamic airspace restrictions temporarily limiting the area in the designated U-space airspace	26%
Network Identification Service	
Continuous processing of the remote identification of the UA throughout the whole duration of the flight	23%
Remote identification of the UA (Open category) to authorised users	23%
Data (operator registration nr, unique serial number, geographical position & flight alt. of UA, route course, geographical position pilot or take-off point, UA emergency status, time stamp) for authorized users	69%
Traffic Information Services	40%
Weather Information Services	61%

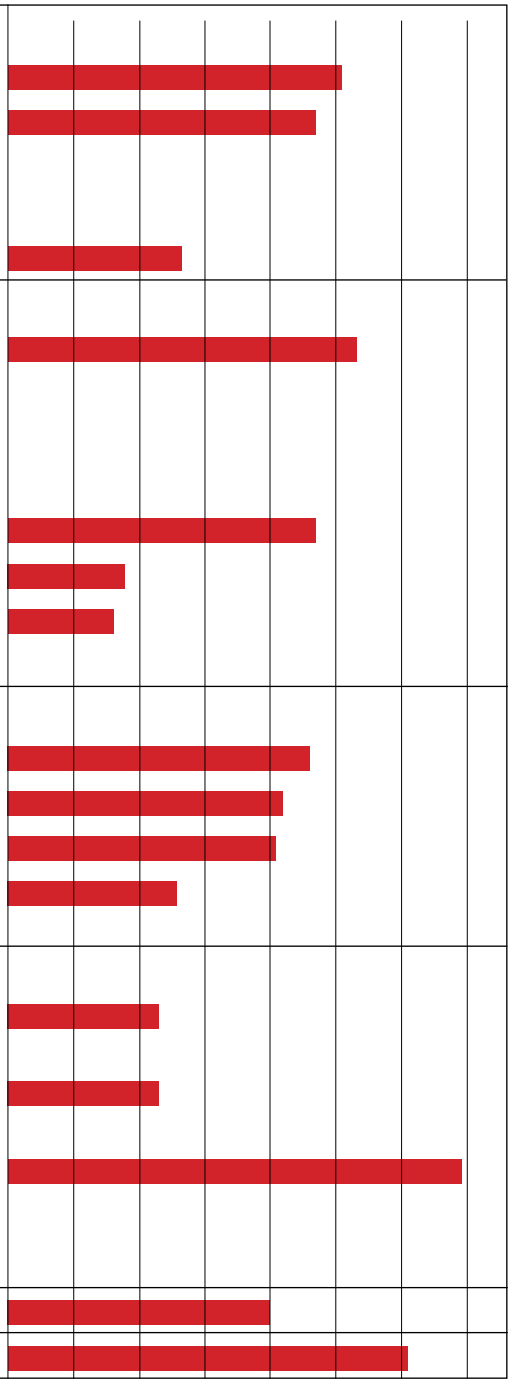


FIG. 11 - SERVICES CURRENTLY SUPPLIED BY RESPONDENTS

Common Information Service (CIS)	
ATM Data Service	45%
Geo-Awareness Data Service	68%
Autorisation Request Service	55%
Communication Service (infrastructure for)	18%
Conformance Monitoring Service	36%
UAS Flight Authorisation Service	
Flight planning	71%
Flight autorisation request processing	71%
Flight plan assistance	71%
Flight plan processing	71%
Flight plan/authorisation validation	46%
Priority management	21%
Strategic de-confliction	46%
Supply of flight authorisation	29%
Geo-awareness Service	
Applicable operational conditions	65%
Airspace constraints in the designated U-space airspace	70%
Geographical zones in the designated U-space airspace	61%
Dynamic airspace restrictions temporarily limiting the area in the designated U-space airspace	48%
Network Identification Service	
Continuous processing of the remote identification of the UA throughout the whole duration of the flight	63%
Remote identification of the UA (Open category) to authorised users	75%
Data (operator registration nr, unique serial number, geographical position & flight alt. of UA, route course, geographical position pilot or take-off point, UA emergency status, time stamp) for authorized users	63%
Traffic Information Services	33%
Weather Information Services	36%

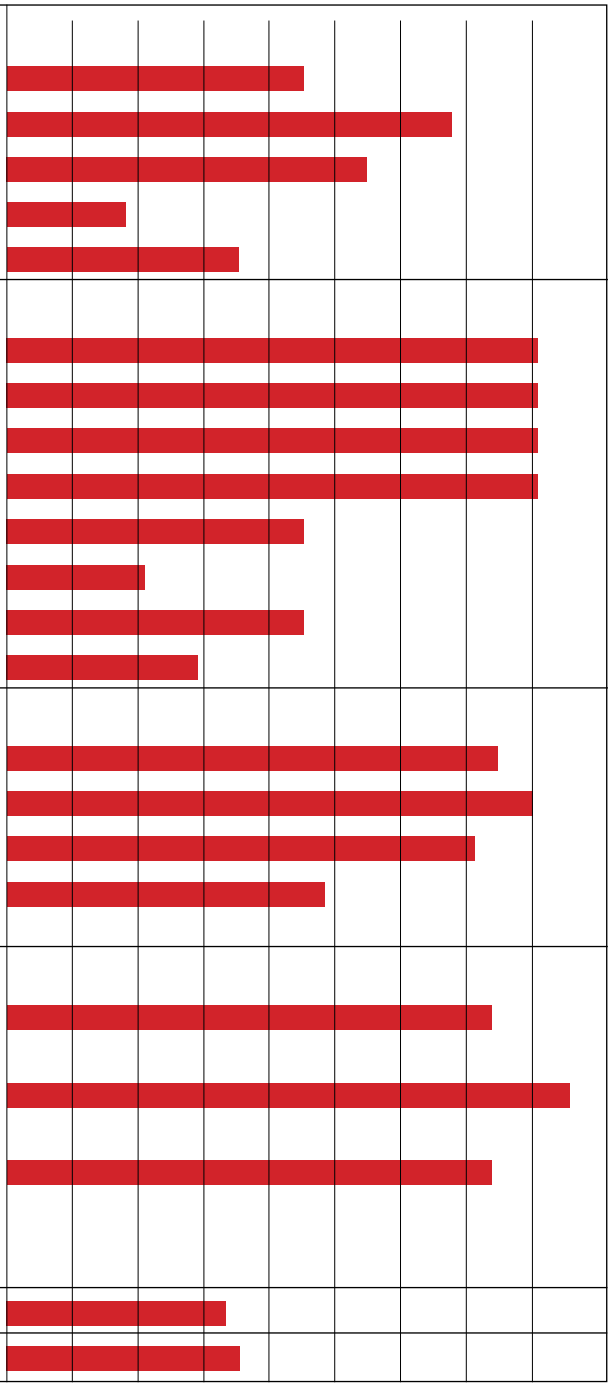


FIG. 12 - SERVICES MOST URGENTLY REQUIRED

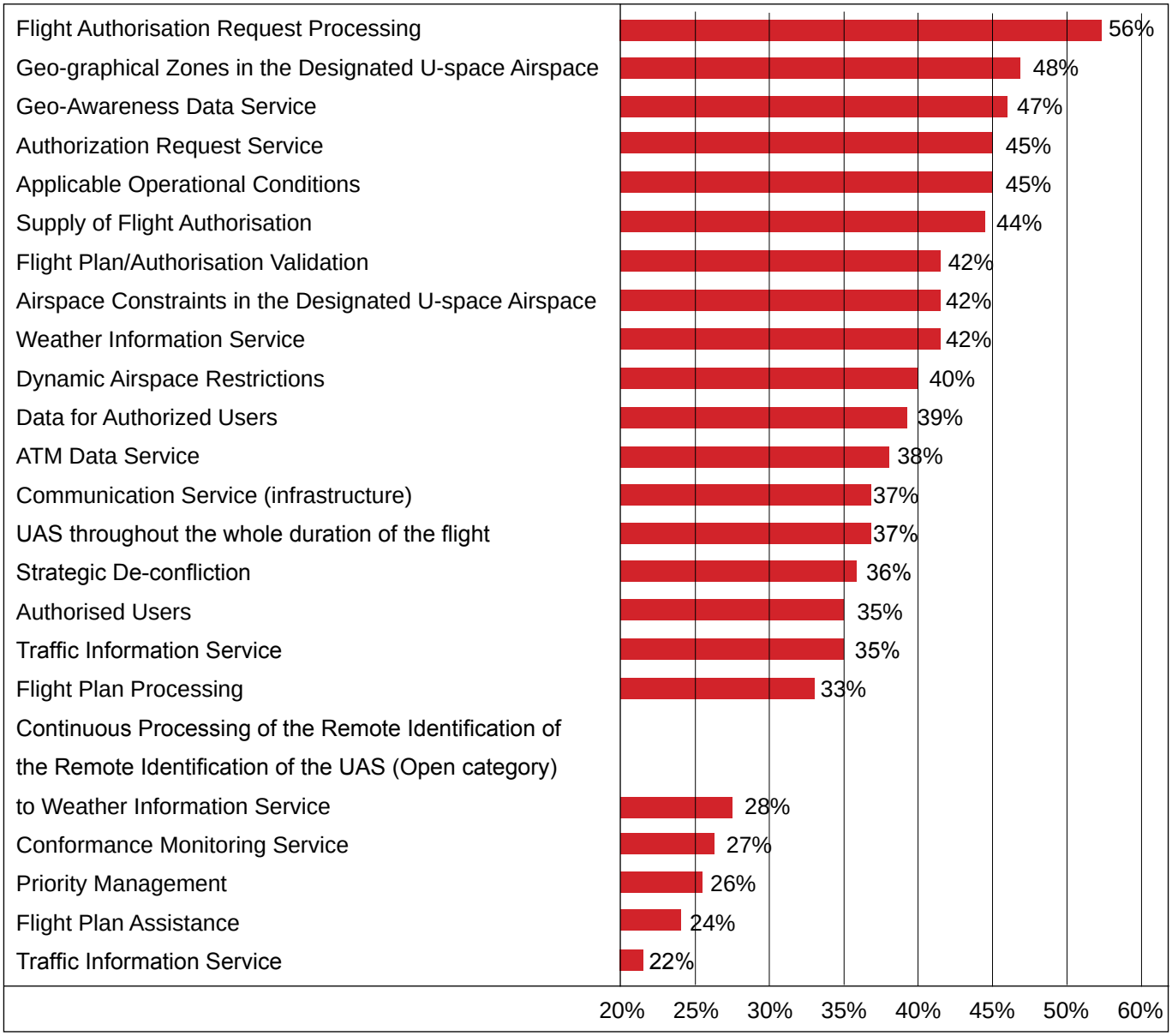


FIG. 13 - WHEN WILL THE FOLLOWING SERVICES BE AVAILABLE IN YOUR COUNTRY

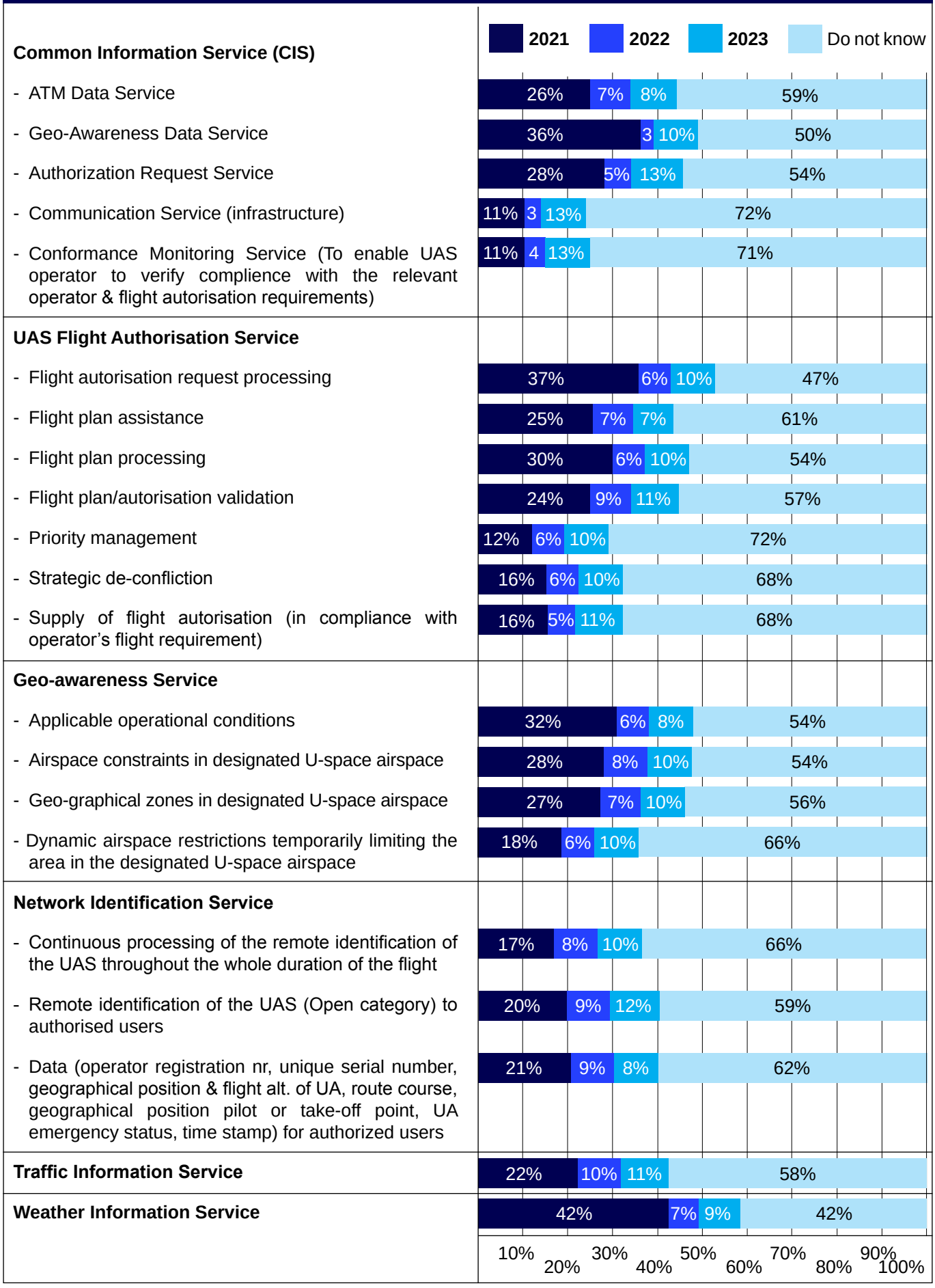


FIG. 14 - DESIRED URGENCY TO MAKE SERVICES AVAILABLE

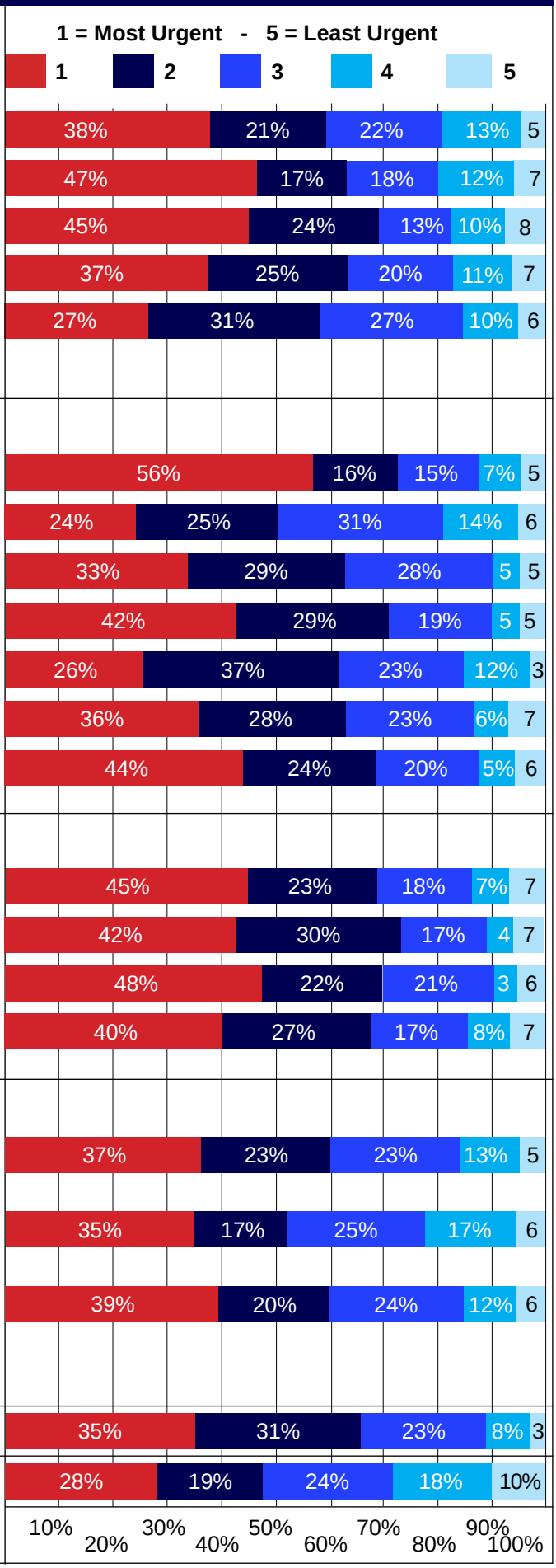


FIG. 15 - PREFERRED AIRSPACE RECONFIGURATION CONCEPTS

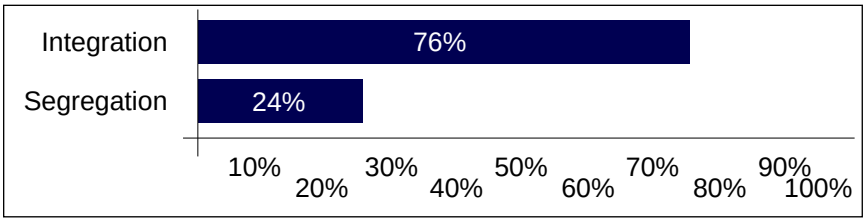


FIG. 16 - RULES & REGULATIONS - NEED FOR SPECIFICATIONS

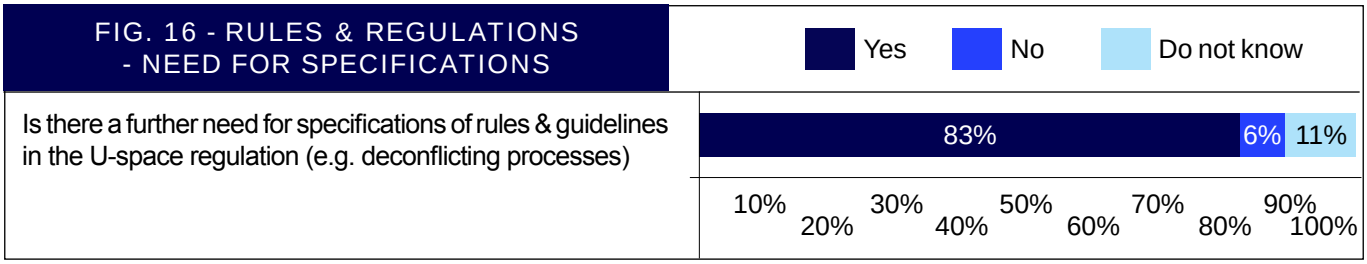


FIG. 17 - ROLES & RESPONSIBILITIES - NEED FOR CLARIFICATION

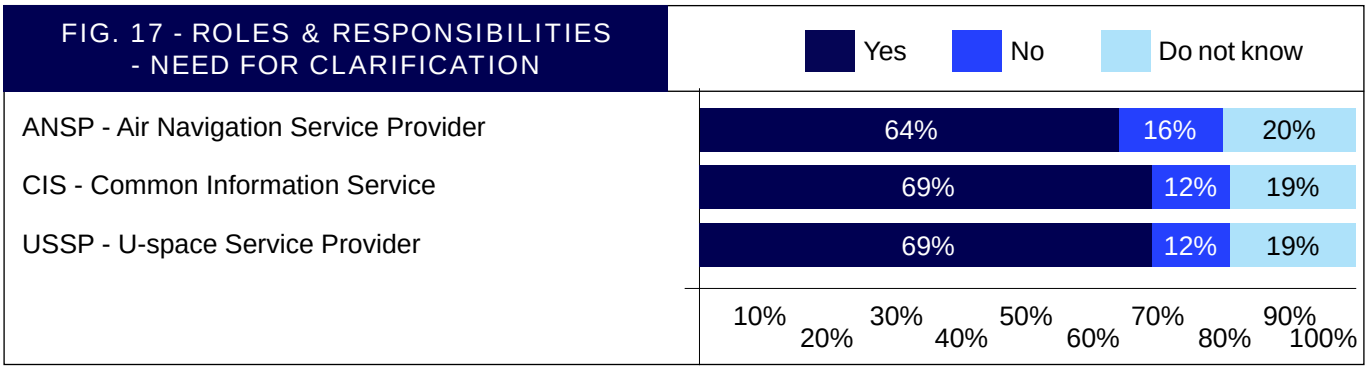


FIG. 18 - BUSINESS & FINANCIAL ASPECTS

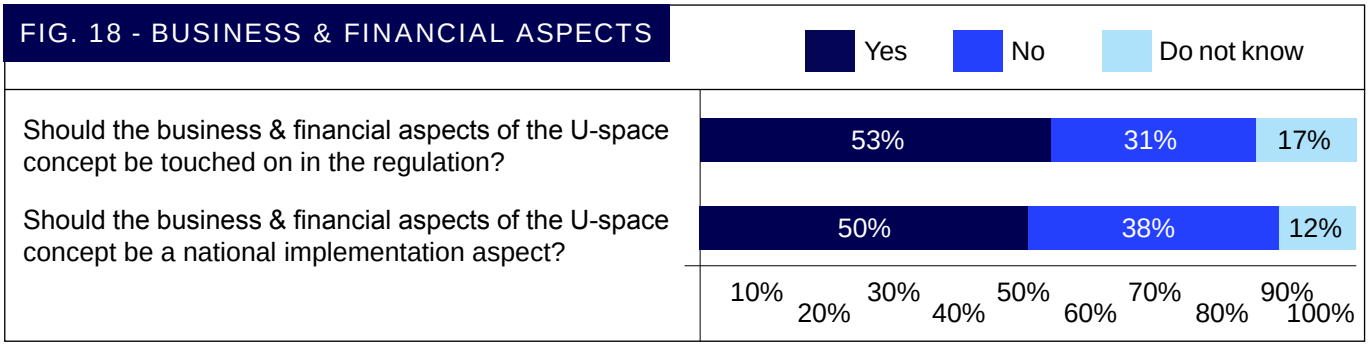


FIG. 19 - THE U-SPACE CONCEPT - DEGREE OF MATURITY

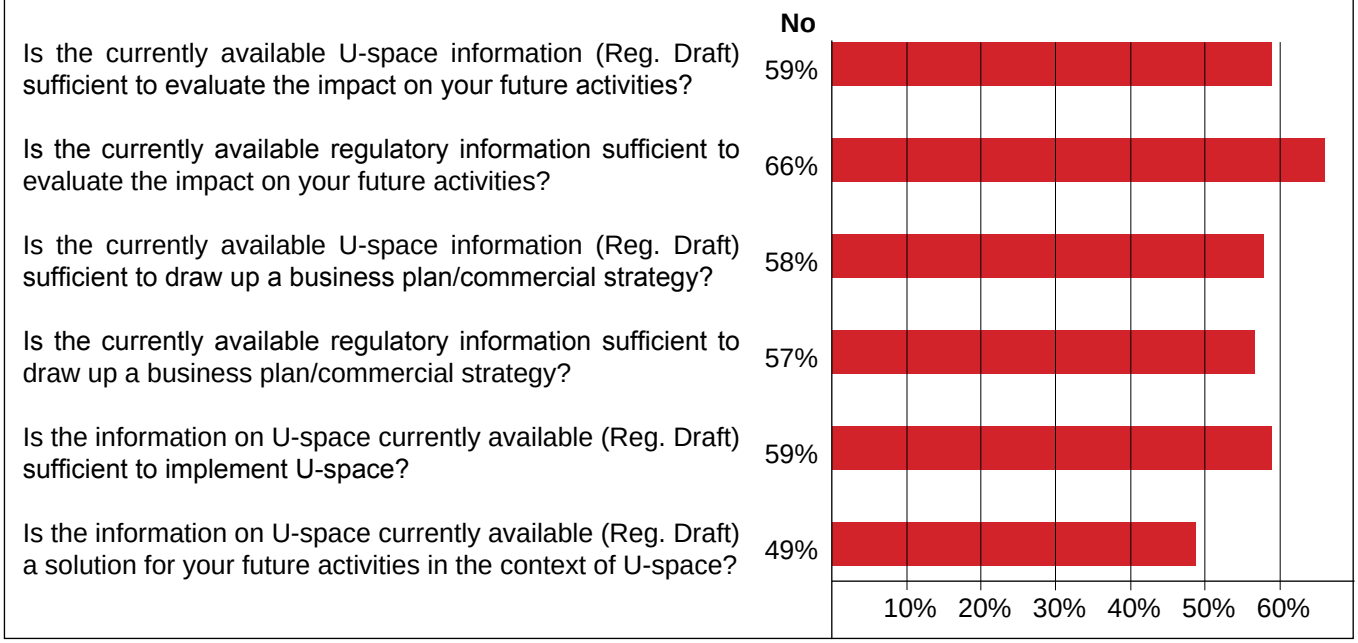


FIG. 20 - THE U-SPACE CONCEPT - WHAT IS CURRENTLY MISSING?

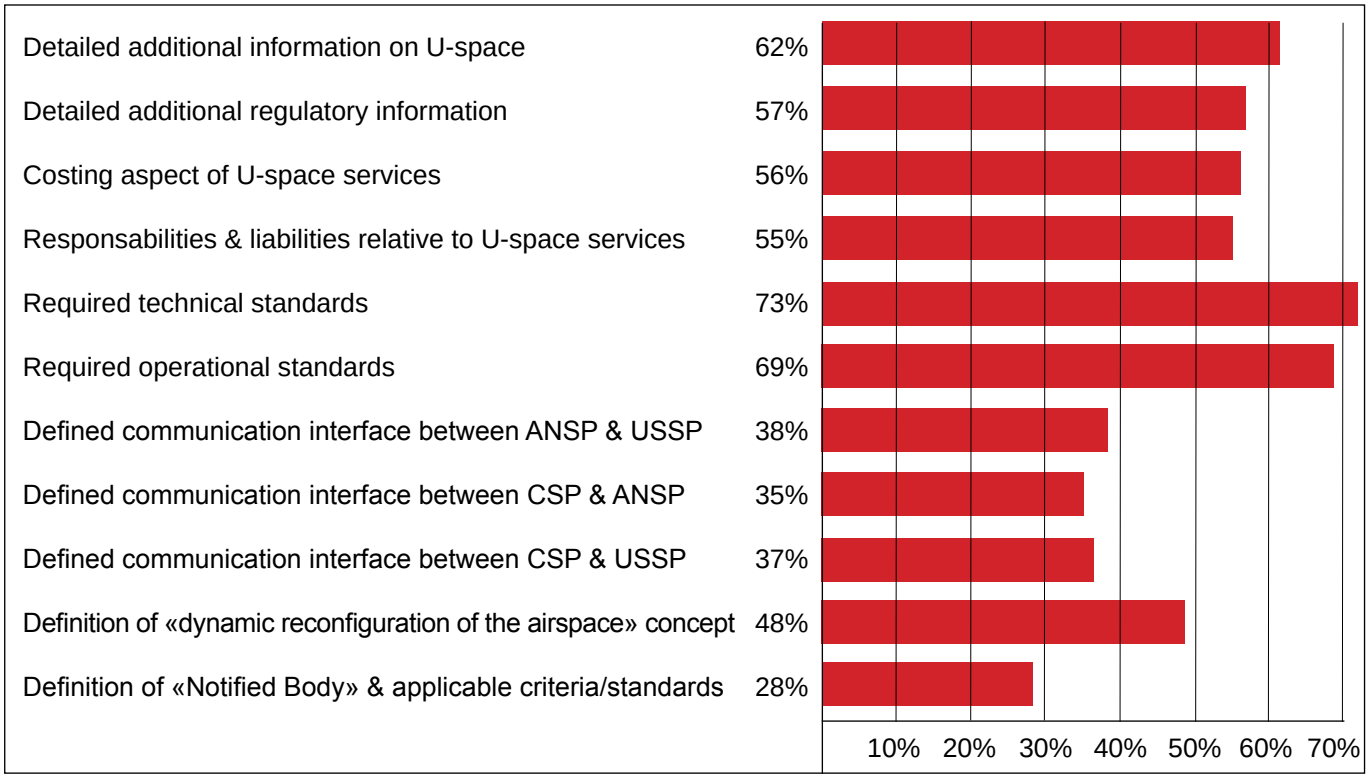


FIG. 21 - CONCEPTS BASED ON IMMATURE OR NON-EXISTENT TECHNOLOGIES

(Multiple answers were possible)

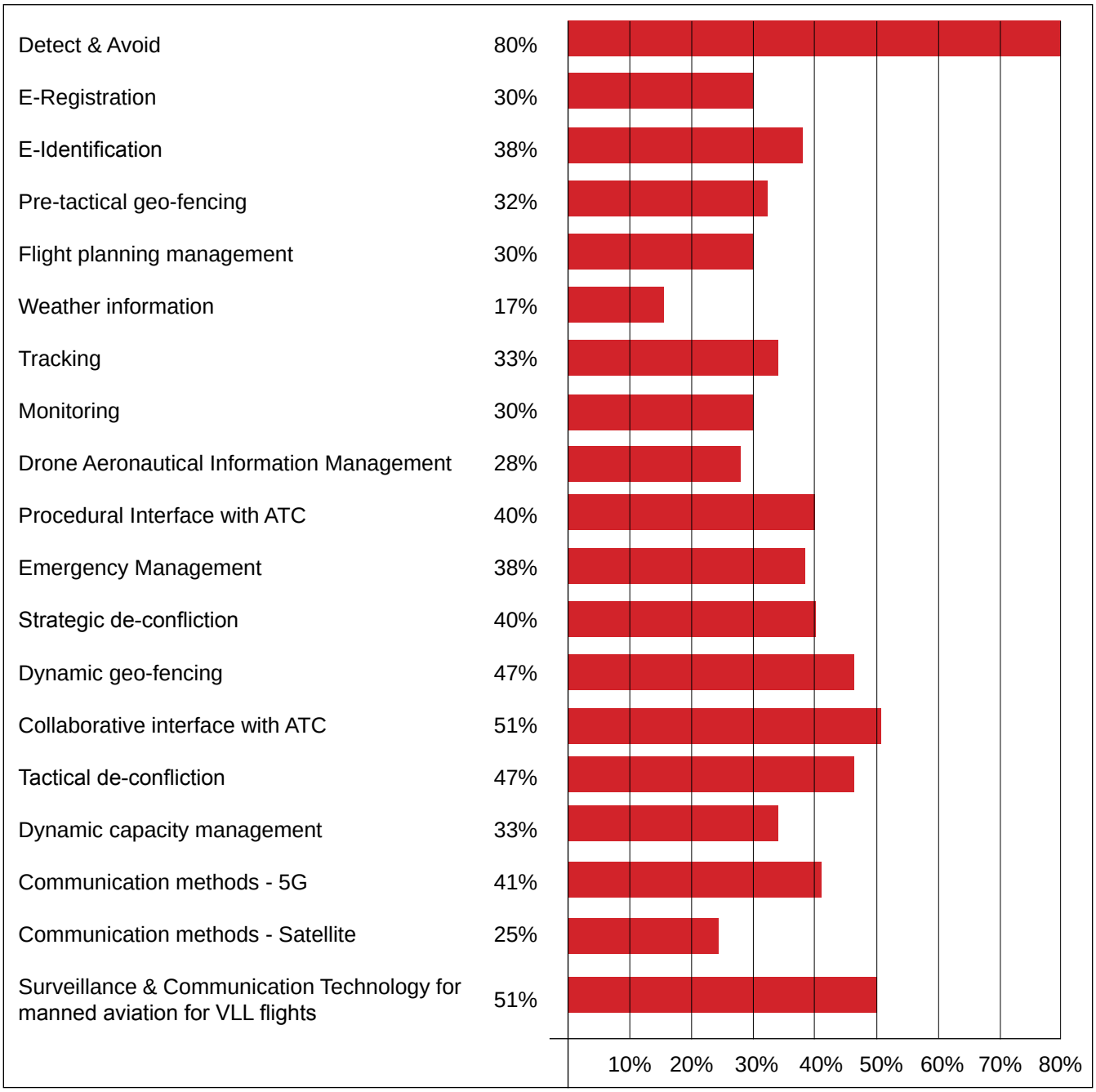


FIG. 22 - STANDARDS - POSSIBLE PARTICIPATION

Work relative to the definition of the following standards is currently ongoing.

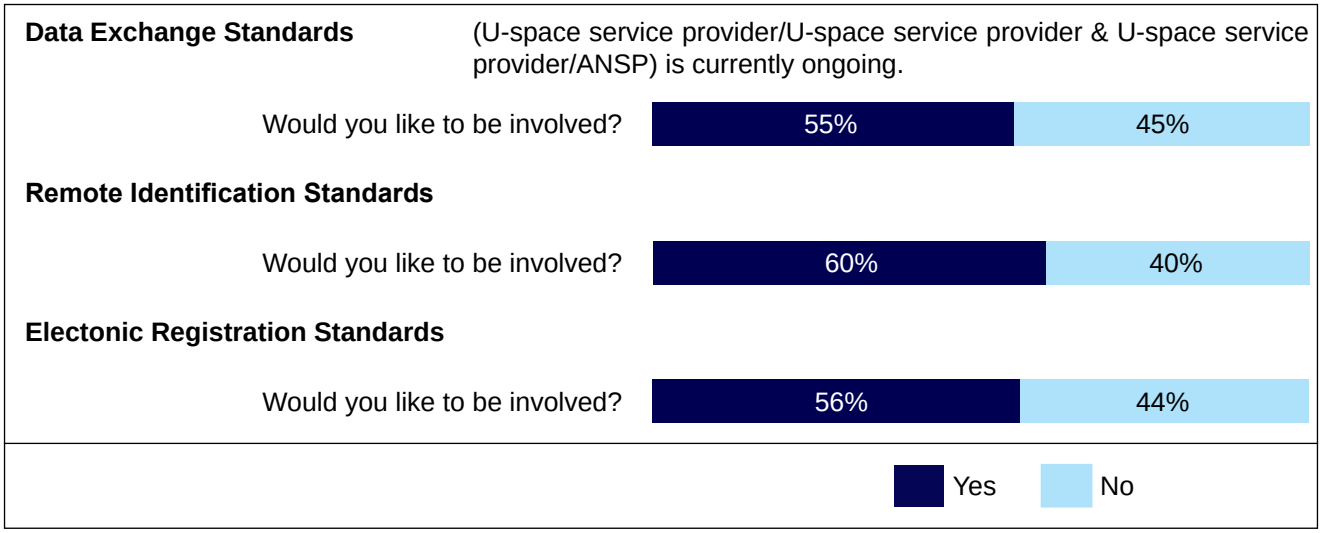


FIG. 23 - GENERAL STANDARD-RELATED MATTERS

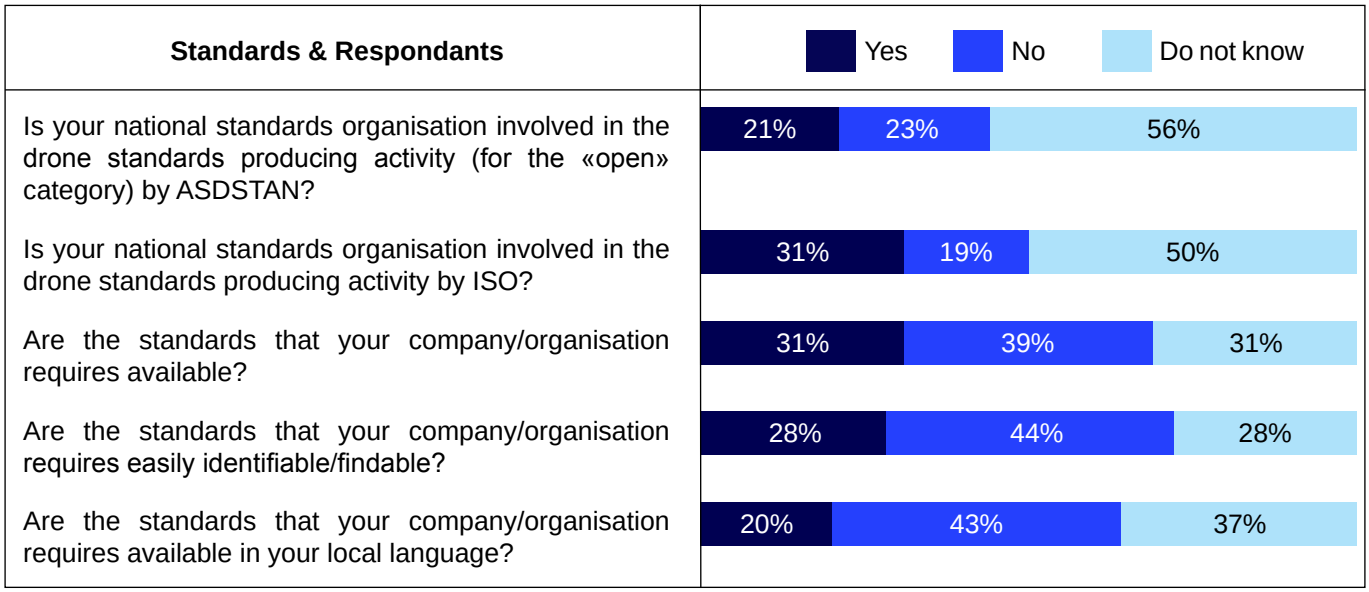


FIG. 24 - DO THE REQUIRED STANDARDS FOR THE FOLLOWING SERVICES EXIST?

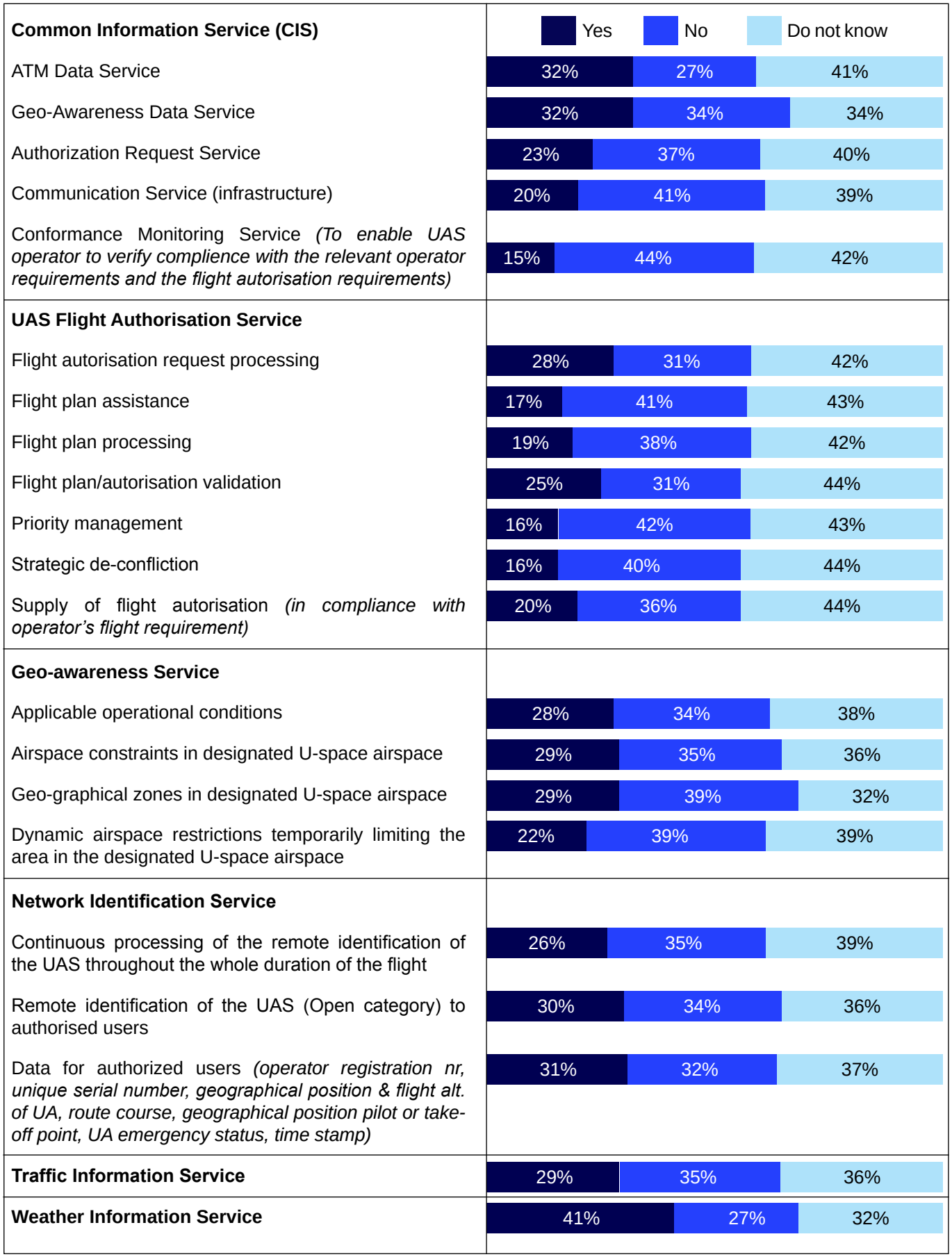


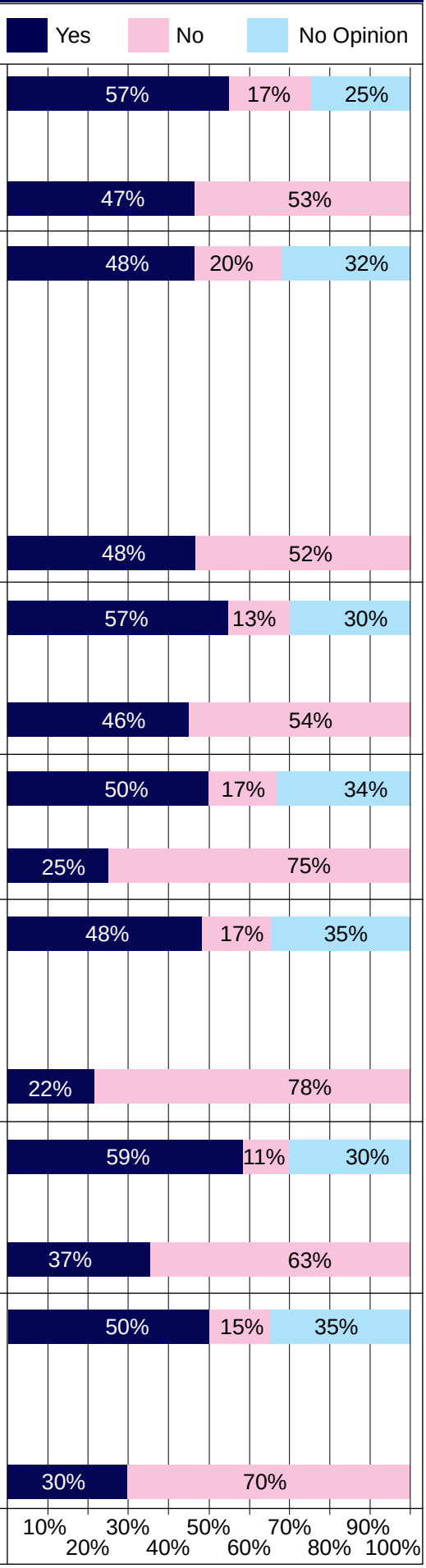
FIG. 25 - STANDARDS - REQUIREMENTS

Are European-wide standards required for the following?	Yes	No	Do not know
Pilot Training & Qualification: Theoretical	85%	4	11%
Pilot Training & Qualification: Practical	81%	6%	13%
Person-identifiable imagery	55%	17%	28%
Population density definition/calculation	67%	13%	20%
UAS «black box» recorder (on aircraft)	60%	17%	23%
Electronic conspicuity methods (UAS position transmission)	82%	7%	11%
Detect & Avoid	84%	7%	8%
Command & Control integrity	78%	8%	14%
Cybersecurity	78%	8%	14%
Drones for Transport - Cargo/Goods	77%	9%	14%
Drones for Transport - Persons	76%	9%	15%
Other	23%	16%	61%

FIG. 26 - SUGGESTED ADDITIONAL EUROPEAN-WIDE STANDARDS

1 Accident/incident reporting
2 All the 30 UTM services in ISO 23629-12.
3 Area of Buffer dynamic calculation
4 ATS/ATC service provided by ANSP to UAS/U-space entities
5 ATM/UTM communications
6 ATM/UTM contingency management Radio emission power
7 Cross-border Interoperability or systems (avoiding national implementations)
8 Data exchange from different sources
9 Drone-to-Drone communication
10 Drone-to-Infrastructure Communication
11 eInsurance Card
12 ePilot Licence
13 GNSS use for drones (in particular EGNOS)
14 Human-Autonomy Teaming and Human-Machine Interactions
15 Night operations ie. lights
16 SMS communications
17 Surveillance observation
18 System design
19 UTM integration

FIG. 27 - IS THERE A REQUIREMENT FOR THE FOLLOWING *(CURRENTLY NON-EXISTENT)* STANDARDS UNDER CONSIDERATION BY ISO?



Collaborative Interface with ATC (CIA)
Objective: Provide automated digital means (e.g. app) for UAS crews to communicate with ATS, different from VHF radiotelephony, when flight is in controlled airspace.

Would like to be involved in the standard production process

Dynamic (airspace) Capacity Management (DCM) Service
Objective:
a) Calculate the traffic accommodation capacity in the Designated Operational Coverage (DOC) based on the UTM services availability, taking into account aspects that are specific to the relevant operational area [e.g. flight near airports, protected airspace, near hospitals) and environmental constraints (e.g. visual & noise pollution)], and provide this information to FCS, vertiport operators and to authorised UTM users.
b) Activate and deactivate temporary segregated areas or other airspace structures in its DOC.

Would like to be involved in the standard production process

Tactical Conflict Management Service (TCM)
Objective: Provide management of conflicting flights in the UTM DOC at tactical level (after take-off), based on real time information provided by other UTM services, such as CMS, NIS and TRS.

Would like to be involved in the standard production process

Communication Coverage Information Service (CCI)
Objective: Provide information on UTM COM coverage (excluding VHF radio-telephony coverage)

Would like to be involved in the standard production process

Electro-Magnetic Interference Information Service (EMS)
Objective:
a) Provide information on known electro-magnetic interferences to radio navigation signals or other signals supporting safe flight in its DOC, during the flight planning phase and during the flight; and
b) Provide any issued EM alerts to LRS Provider.

Would like to be involved in the standard production process

Geospatial Information Service (GIS)
Objective: Provide UTM users and other UTM SPs geospatial information, including terrain, buildings and other obstacles, useful to plan operations before submission of the operation plan.

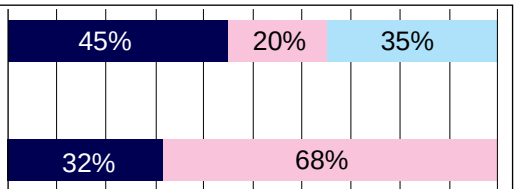
Would like to be involved in the standard production process

UTM Communication Service (LCS)
Objective: Provide communication services for UTM purposes connecting all UTM users, UTM SPs and involved aircraft with the UTM Platform, through links or networks among fixed points on the ground and through terrestrial or satellite mobile communication services with aircraft.

Would like to be involved in the standard production process

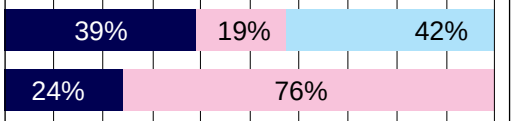
UTM Route Design Service (URD)
Objective: Design, document, validate, maintain and periodically review air routes necessary for the safety, regularity and efficiency of air navigation of unmanned aircraft in the UTM context.

Would like to be involved in the standard production process



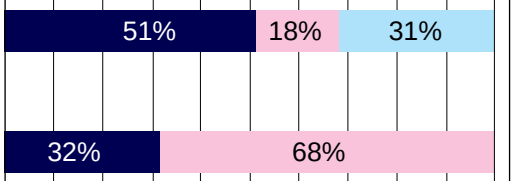
Navigation Coverage Information Service (NCI)
Objective: Provide information on coverage of radio navigation signals.

Would like to be involved in the standard production process



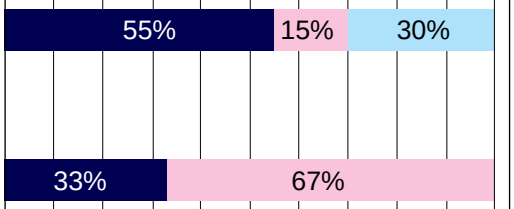
Population Density Information Service (PDI)
Objective: Provide UAS operators, other UTM Service Providers (SPs) and competent authorities with static or dynamic maps on the density of population in each portion of its DOC.

Would like to be involved in the standard production process



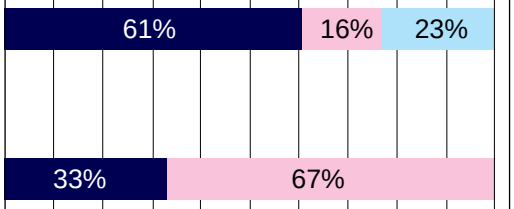
Procedural Interface with ATC (PIA)
Objective: Provide automated digital means (e.g. app) for UAS crews to communicate with ATS, different from VHF radiotelephony, when flight intends to enter controlled airspace, between submission of the operation plan and take-off.

Would like to be involved in the standard production process



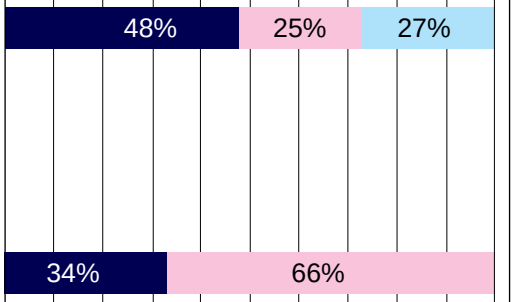
Accident and Incident Reporting Service (ARS)
Objective: Provide web-based tools to facilitate mandatory and voluntary reporting of safety, security or privacy related occurrences and transmits these reports to the involved organisation and to competent authorities.

Would like to be involved in the standard production process



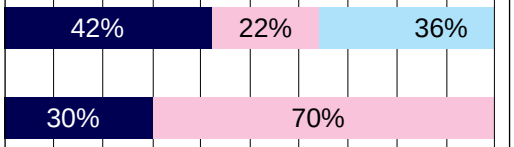
Digital Logbook Service (DLB)
Objectives:
a) Provide UAS operators and their crews, web-based tools to log, as minimum, the information required by law or regulations to record the activity; and
b) Collect and stores the logged information; and
c) Distribute this information to involved operators, crews or competent authorities.

Would like to be involved in the standard production process



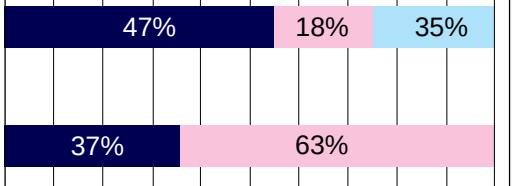
Maintenance Management (MMN)
Objective: Provide UAS operators with web-based tools to support development & application of UAS Maintenance Programmes.

Would like to be involved in the standard production process



Operational Plan Preparation (OPP)
Objective: Based on information provided by other UTM SPs, provide web-based tools to UAS operators for
preparation and optimisation of the operation plan before submission.

Would like to be involved in the standard production process



Risk Analysis Assistance (RAA)
Objective: Provide to UAS operators and to civil aviation authorities web-based tools to support development and evaluation of risk assessments prior to operations.

Would like to be involved in the standard production process

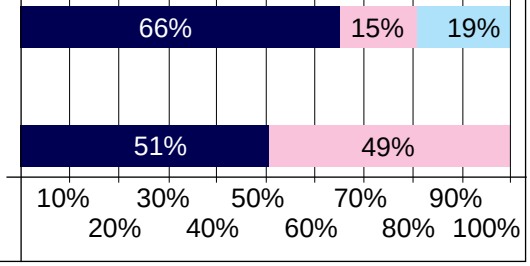


FIG. 28 - AVAILABILITY & COST

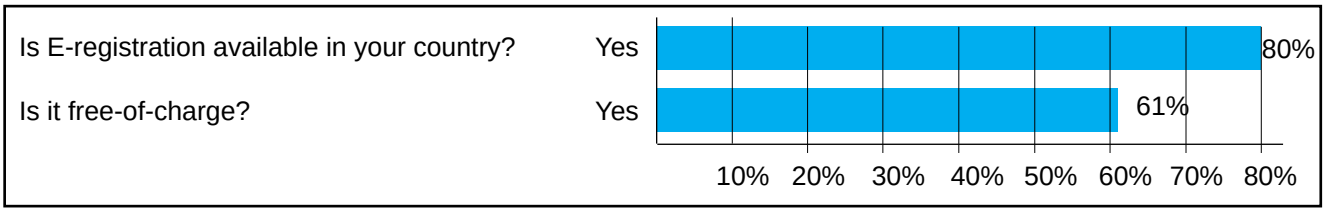


FIG. 29 - ANNUAL COST IN €

Albania	30 €
Austria	31,20 €
Belgium	100 €
Denmark	10 €
Finland	30 €
Italy	6 / 24 / 98 €
Jamaica	Not Applicable
Kenya	200 €
Lithuania	10 €
Malaysia	45 €
Netherlands	10 / 25 / 70 €
New Zealand	Not Applicable
Norway	18 €
Spain	50 €
UK	10 €
USA	4,20 €

7 Respondents did not know
4 Respondents indicated that E-registration was not applicable in their country
Respondents from 6 countries did not reply

FIG. 30 - MINIMUM AGE

Albania	16
Australia	18
Austria	18
Belgium	16
Bulgaria	16
China	12
Czech Rep.	18
Denmark	15/16
Estonia	16
Finland	18
France	14/16/18
Germany	16/18
Italy	14/16/18
Jamaica	Not Applicable
Kenya	18
Lithuania	16
Malaysia	18
Netherlands	16
New Zealand	Not Applicable
Norway	18
Poland	16
Portugal	16
Spain	14/16/18
Sweden	16
Switzerland	18
UK	16
USA	16/18

21 Respondents did not know
2 Respondents indicated that a minimum age was not applicable in their country

FIG. 31 - EXISTING GEO-ZONES

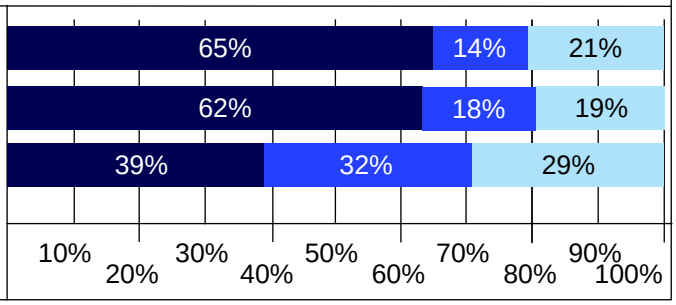


FIG. 32 - RESPONSIBILITY - MANAGEMENT OF GEO-ZONES & GEO-AWARENESS SERVICE PROVISION

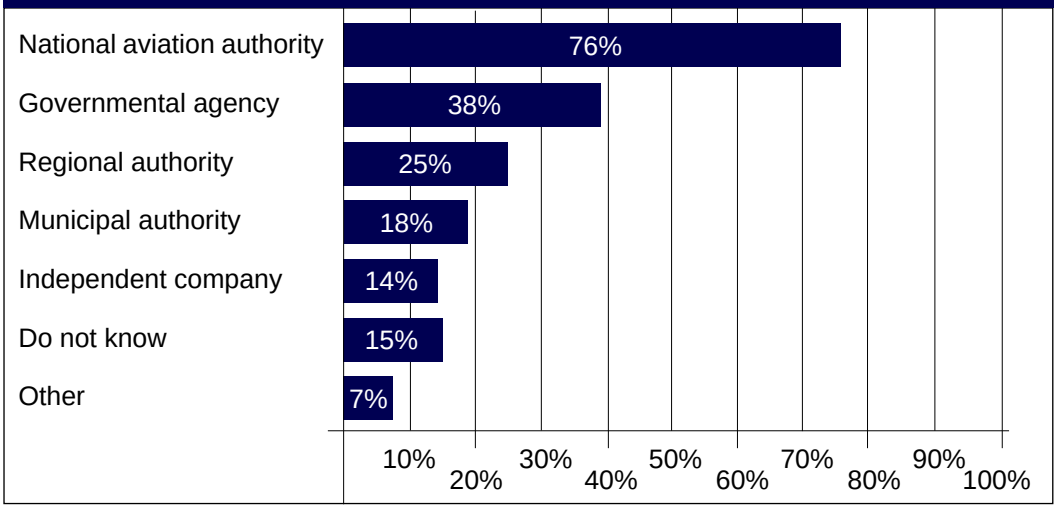


FIG. 33 - ACCOUNTABLE GEO-AWARENESS MANAGER

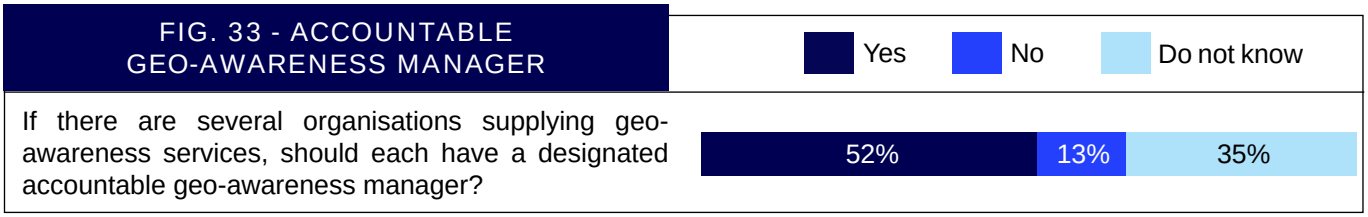


FIG. 34 - IS THERE A CHARGE FOR THE GEO-AWARENESS SERVICE?