International Civil Aviation Organization

LC/37-WP/2-1
26/7/18

WORKING PAPER

LEGAL COMMITTEE – 37TH SESSION

(Montréal, 4 to 7 September 2018)

Agenda Item 2: Consideration of the General Work Programme of the Legal Committee

REMOTELY PILOTED AIRCRAFT SYSTEMS LEGAL SURVEY

(Presented by the Secretariat)

1. INTRODUCTION

1.1 During the 36th session of the Legal Committee (Montréal, 30 November to 3 December 2015), the Secretariat presented the working paper LC/36-WP/2-4, to which was appended a study undertaken by the Secretariat to determine whether the regime for liability to third parties under the Rome Convention of 1952 and the Montreal Conventions of 2009 left any issues to be addressed with respect to Remotely Piloted Aircraft Systems (RPAS) (the "Liability Study"). The Liability Study concluded that although the propagation of RPAS will likely expose a new evidentiary landscape relating to how the international regime for liability would be applied to RPAS operations and operators, the regime in its current state is legally adequate to accommodate RPAS technology.

1.2 The Liability Study was received with general satisfaction, however, the Committee concluded that legal aspects of RPAS operations other than liability still might need to be addressed and expressed broad support for a survey of Member States, both as a means of gathering information on national RPAS legislation, and as a means to identify potentially relevant international legal issues. This survey (State letter LE 4/63 – 16/77) was distributed on 29 August 2016 and called on States to submit their responses by 31 October 2016, which responses were subsequently analysed by the Secretariat and are reported-on below.

2. BACKGROUND

2.1 According to the *Global Aviation Safety Plan* (GASP 2017-2019), RPAS is one of ICAO's four emerging priorities.[1] ICAO's main goal in the area of unmanned aviation is to provide the fundamental regulatory framework though Standards and Recommended Practices (SARPs), with supporting Procedures for Air Navigation Services (PANS) and guidance material, to underpin routine international operation of unmanned aircraft systems (UAS) throughout the world in a safe, harmonized and seamless manner comparable to that of manned operations.[2] In other words, the introduction of remotely piloted aircraft into non-segregated airspace and at aerodromes should not degrade the safety of manned aviation.

[1] The other three being global flight tracking; space transportation; and risk arising from conflict zones. *Global Aviation Safety Plan* (2017-2019), ICAO DOC. 10004, para. 3.2.1.

[2] *Unmanned Aircraft Systems* (UAS), ICAO Cir. 328 (2011), at ii (Foreword) [hereinafter "Cir. 328"].

2.2 Unmanned aviation has been within the ambit of the Chicago Convention since its inception. In 2007, at an informal ICAO meeting on what were then popularly being referred to as unmanned aerial vehicles (UAVs) (Palm Coast, Florida, 11-12 January 2007), it was suggested that UAVs should instead be referred to as unmanned aircraft systems (UAS), in line with RTCA[3] and EUROCAE[4] agreements.[5] The use of the term Remotely Piloted Aircraft Systems (RPAS) to identify a subset of UAS was then introduced by the Unmanned Aircraft Systems Study Group (UASSG) in 2009.[6] The UASSG concluded that only unmanned aircraft that are remotely piloted could be integrated alongside manned aircraft in non-segregated airspace and at aerodromes; the UASSG therefore decided to narrow its focus from the wider category of all UAS to only those that are remotely piloted.[7] From the beginning it was thus understood that RPAS are but one type of unmanned aircraft,[8] and all unmanned aircraft are subject to the provisions of Article 8 of the Chicago Convention.

2.3 More recently in 2015, ICAO produced the *Manual on Remotely Piloted Aircraft Systems (RPAS)* (Doc 10019), which set out ICAO's vision of RPAS as an equal partner in the civil aviation system, ultimately able to interact with air traffic control (ATC) and other aircraft on a real-time basis. Thus, the focus of the Standards that will be developed over the course of the next 5 to 10 years in this area will primarily be the integration of RPAS operating in accordance with instrument flight rules and at controlled aerodromes. Though visual line-of-sight operations and autonomous unmanned aircraft are not wholly excluded from regulatory consideration, they present unique challenges for inclusion into the ICAO framework. For now, they remain mainly the domain of State regulation, like certain other types of aircraft (e.g., gliders, experimental and model aircraft). In this latter regard, ICAO will continue working to promote and facilitate the international harmonization of States' national regulatory regimes.

3. CURRENT ICAO DEFINITION OF RPAS

3.1 The original text of Annex 7 to the *Convention on International Civil Aviation* (Chicago Convention), signed at Chicago on 7 December 1944, as amended (Doc 7300), defined "aircraft" as "any machine that can derive support in the atmosphere from the reactions of the air." This definition was adapted from the French language text of the definition of "aircraft" in the 1919 Paris Convention ("*Le mot aéronef désigne tout appareil pouvant se soutenir dans l' atmosphere grâce aux reactions de l' air*."). In 1967, amendments to Annex 7 included a new definition of "aircraft" as "any machine that can derive support in the atmosphere from the reactions of the air other than the reactions of the air against the earth's surface," to exclude hovercraft from its scope. However, Annex 7 makes it clear that a remotely piloted aircraft (RPA) is simply one type of unmanned aircraft,[9] and all unmanned (pilotless) aircraft, whether remotely piloted, fully autonomous, or combinations thereof, are subject to the provisions of Article 8 of the Chicago Convention.[10]

[3] RTCA, Inc. is a private, not-for-profit association founded in 1935 as the Radio Technical Commission for Aeronautics. https://www.rtca.org/.
[4] European Organization for Civil Aviation Equipment (RTCA).
[5] Manual on Remotely Piloted Aircraft Systems (RPAS), ICAO Doc 10019, AN/507 (1st ed., 2015) [hereinafter "RPAS Manual"], at para. 1.2.11.
[6] In 2007, an Unmanned Aircraft System Study Group (UASSG) was assembled to embark on legislative efforts toward international cooperation, the development of regulation and manuals, technical specifications and the Standards and Recommended Practices (SARPs). *See* A38-WP/262 LE/7, at para. 2.2.
[7] RPAS Manual (ICAO Doc 10019), *supra* note 5, at para. 1.2.14
[8] See *Annex 7* to the *Convention on International Civil Aviation: Aircraft Nationality and Registration Marks* (6th ed., 2012).
[9] *See Annex 7 to the Convention on International Civil Aviation: Aircraft Nationality and Registration Marks*, at 2 (6th ed., 2012) [hereinafter "*Annex 7"*].
[10] *Id*.

3.2 In 2003, the Eleventh Air Navigation Conference (ANConf/11) endorsed the global air traffic management (ATM) operational concept which contains the following text: "[a]n unmanned aerial vehicle is a pilotless aircraft, in the sense of Article 8 of the Convention on International Civil Aviation, which is flown without a pilot in-command on-board and is either remotely and fully controlled from another place (ground, another aircraft, space) or programmed and fully autonomous." This understanding of unmanned aerial vehicles (UAVs) was endorsed by the 35th Session of the ICAO Assembly in 2004 (A35-14).

3.3 More recently Circular 328 AN/190 *Unmanned Aircraft Systems (UAS)* and the *Manual on Remotely Piloted Aircraft Systems* provided the following descriptions:

a) *Unmanned aircraft* [UA]. An aircraft which is intended to operate with no pilot on board.

b) *Unmanned aircraft system* [UAS]. An aircraft and its associated elements which are operated with no pilot on board.

c) *Remotely piloted aircraft (RPA).* An unmanned aircraft which is piloted from a remote pilot station.

d) *Remotely piloted aircraft system (RPAS).* A remotely piloted aircraft, its associated remote pilot station(s), the required command and control links and any other components as specified in the type design.

4. STATE RESPONSES TO SURVEY

4.1 Sixty-one States (or almost one third of ICAO's membership) responded to the survey and responses were notably received from States in all of the ICAO Regions; however, not all 61 respondents addressed all of the questions presented. The survey was comprised of five main parts: "Definitions"; Part A: Legal Framework for "Small" Unmanned Aircraft Systems (UAS); Part B: Legal Framework for Remotely Piloted Aircraft Systems (RPAS); Part C: International legal problems presented by RPAS integration; and Part D: Other Comments.

4.2 In the first part of the survey on "Definitions", respondents were invited to elaborate on the definitions applicable to RPAs in their own domestic legislation.

4.2.1 The 43 responses to this question showed significant divergence in the respective States' definitions of RPAS and/or UAS. Only 17 States professed the use of definitions that were the same or similar to those established by ICAO. Additionally, though the survey invited States to consider "small UAS" to be those *weighing 25 kg or less* for purposes of the survey itself and the responses indicate that States commonly classify RPA based on weight, the responses also suggest that States' categorization of RPA and/or UA based on weight, from the micro-size to the very large, wildly differs. In fact, only 7 of the 43 States' responding to this question themselves actually identified "small UAS" as those weighing of 25 kg or less, as did the survey.

4.2.2 Aside from weight classifications, other noteworthy criteria used by respondents to categorize RPAS and/or UAS included the risk level of the operations the aircraft is performing, the type or purpose of the flight (e.g., "agriculture"; "recreational" versus "non-recreational"; and "military" versus "civil"), the measures and dimensions of the aircraft, and the altitude of the flight. Other less common criteria were also mentioned, including the duration of flight and flight speed.

4.3 Parts A and B of the survey solicited information about the nature and general substance of States' legal frameworks for "Small" Unmanned Aircraft Systems (UAS) and Legal Framework for Remotely Piloted Aircraft Systems (RPAS), respectively. States' non-textual responses to the questions posed in Parts A and B are summarized in Appendix.

4.3.1 States' responses to Parts A and B reveal that significantly more respondents have established legal and/or institutional frameworks governing small UAS (25 kg or less) than have established RPAS legal frameworks, and that these small UAS frameworks generally cover the same basic aspects of UAS operations. On the other hand, in addition to fewer States having established RPAS legal frameworks, States' responses show there is far less consistency with regards to which aspects of RPAS operations are covered.

4.3.2 These results appear to reflect, and are perhaps a direct product of, ICAO's two-pronged approach to RPAS/UAS regulation, whereby ICAO is in the lead and developing a comprehensive regulatory regime with respect to RPAS, while taking a scaled "risk-based" approach to UAS, which puts States in the lead, with ICAO promoting and facilitating the international harmonization of States' national regulatory regimes. Indeed, the significant degree of consistency among States' small UAS frameworks, combined with indications of States seemingly adopting a "wait and see" attitude with respect to RPAS regulation, strongly suggests that ICAO's current approach is, in fact, working as intended and should continue unabated.

4.4 Part C of the survey concerned international legal problems presented by RPAS integration; States' non-textual responses to the questions posed in this Part are likewise summarized in Appendix.

4.4.1 Responses to Part C indicate that the number of States currently impacted by international RPAS operations is limited, as less than half of respondents affirmed having even received a request from a foreign RPAS operator for "special authorization" (per Article 8 of the Chicago Convention) to operate a civil remotely piloted aircraft within its territory in the last two years. At the same time, for those States engaged in international RPAS operations during this period, the current legal landscape does not appear to be a hindrance, as over 80% of these requests were approved, and in only three instances were requests denied for reasons other than State sovereignty, operational safety, national or aviation security, or domestic laws or regulations.

4.4.2 While recalling the conclusion of the "Liability Study" that the current international liability regime is legally adequate to accommodate RPAS technology, it is noteworthy that 90% of survey respondents also indicated that within their territories liability for damage done by foreign aircraft (including RPAS) to third parties on the surface of the earth is affixed according to domestic law.

4.5 Lastly, Part D of the survey invited respondents to comment on international air law issues related to RPAS, particularly those that could best be tackled by ICAO.

4.5.1 *Issue of categorization.* Some States indicated that there is a lack of clarity as to the applicability of the Chicago Convention to "small UAS". Of course, as explained above, the survey suggests there is indeed a lack of consensus among States with respect to the distinction between RPA and UA. However, the Annex 7 definition of aircraft is clear; and there is no exemption from ICAO SARPs established for RPA that are below a certain weight limit.[11] Thus, the expressed uncertainty does not *per se* relate to the applicability of the Chicago Convention. Rather, it appears to stem from a lack of a clear understanding of the "operation-centric, risk-based" approach ICAO is taking to unmanned aircraft, whereby RPA are envisaged as operating alongside manned aircraft and ICAO is, therefore, developing the full regulatory framework for RPAS to conduct operations in controlled non-segregated airspace;

[11]RPAS Manual (ICAO Doc 10019), *supra* note 5, at para. 6.1.3

whereas the ICAO work stream relative to other UAS is scaled down to the level of risk posed to others and is primarily focused on assisting States with the development of their own national regulations in harmonization with those of other States.

4.5.2 *Technical specification and standards.* A number of States expressed concerned about a lack of common criteria for technical specifications, classification of the types of operations, remote pilot training and certification requirements, and altitude limitations applicable to RPAS. Similarly, some States mentioned the need for ICAO standards to be compatible with those of the EU. However, as noted previously, ICAO is currently working on SARPs related to airworthiness, operations, operator certification, air traffic management, detect and avoid, security and environment. SARPs on licensing and Procedures for training have been completed. Therefore, many of the concerns mentioned by States are mainly technical, as opposed to legal, and are either already addressed in existing guidance material, such as the *RPAS Manual*, newly adopted SARPs on licensing or will be addressed by SARPs that are currently in development.

4.5.3 *Swarming and liability*. Some States raised concerns about liability for RPAS operations when, for example, one remote pilot operates more than one RPA at the time and/or when a number of remote pilots located in different States control one RPA and transfer control between the remote pilots. Again, however, such concerns were addressed by the Liability Study, which examined the current liability regime and concluded it is legally adequate to accommodate RPAS technology, while noting that the propagation of RPAS will likely expose a new evidentiary landscape insofar as the international liability regime is applied to RPAS operations and operators.

4.5.4 *Other concerns: privacy, security, safety*. Finally, a few States raised concerns about small UA when it comes to privacy, security, ground safety, enforcement procedures and/or the imposition of sanctions or penalties. However, certain of these matters (e.g., privacy) are not readily susceptible to international regulation, while the others, consistent with ICAO's scaled "risk-based" approach to UAS, are more properly and effectively addressed by domestic laws and regulations.

5. HIGH SEAS AIRSPACE

5.1 At the outset of ICAO's development of a regulatory framework necessary to support integration of RPAS (then encompassed under the broader rubric of "unmanned aircraft systems" or "UAS") into non-segregated airspace and at aerodromes, the UASSG noted what was then paragraph 2.2 of Annex 2, Appendix 4 – *Unmanned Free Balloons*, of the Chicago Convention—whereby light unmanned free balloons used exclusively for meteorological purposes receive the equivalent of a "blanket authorization" to operate over the territory of other States—for possible relevance to RPA (AN-WP/8525). Though there was agreement that the Appendix as a whole could potentially serve as a guide for developing a more extensive Appendix tailored to RPA, the UASSG did not consider RPAS operations to be of sufficiently low risk such that pre-authorizations were not required. To the contrary, the UASSG's view was that all RPA flights would require authorization; thus, instead of a "blanket authorization" for RPA, ICAO adopted Standards for the content of authorization requests for RPA to operate over the territory of other States made pursuant to Article 8 of the Convention.

5.2 However, as ICAO continues to focus on the development of a regulatory framework and SARPs for RPAS, while promoting its "risk-based" approach to regulation of other UAS, issues have surfaced relative to airworthiness documentation requirements for UAS operating in high-seas airspace, particularly those involving UAS transiting between the territorial air space of the coastal State and high-seas airspace (for example, to service off-shore oil/gas and other platforms in the high seas including ships), without flying over the territory of another State.

5.3 To avoid an unnecessary disruption of the Organization's "two-pronged" approach to its work in this area, while at the same time affording certain low-risk, high-seas UAS operations the chance to continue consistent with the Chicago Convention, the Air Navigation Bureau (ANB) and the Legal Affairs and External Relations Bureau (LEB) are together formulating a proposed amendment to Annex 2. The object of the proposed amendment will be to give a blanket approval to UAS operations in high-seas airspace that conform to a pre-specified, low risk, operational envelope, *provided* they are also approved by, and meet the requirements of, the State of the Operator and/or the State of Registry. The proposed blanket approval will thus efficiently and effectively bring these UAS operations legally and, most importantly, *safely* within the ambit of the Convention, as ICAO continues to integrate RPAS into international civil aviation and oversee global harmonization of States' domestic UAS regulations.

6. CONCLUSIONS

Based on the results of the RPAS Legal Survey, it appears to the Secretariat that there are currently no international legal issues that urgently need to be addressed through the development of new treaties or protocols. The Legal Committee may, however, evaluate whether there are other legal issues that need to be considered

7. ACTION BY THE COMMITTEE

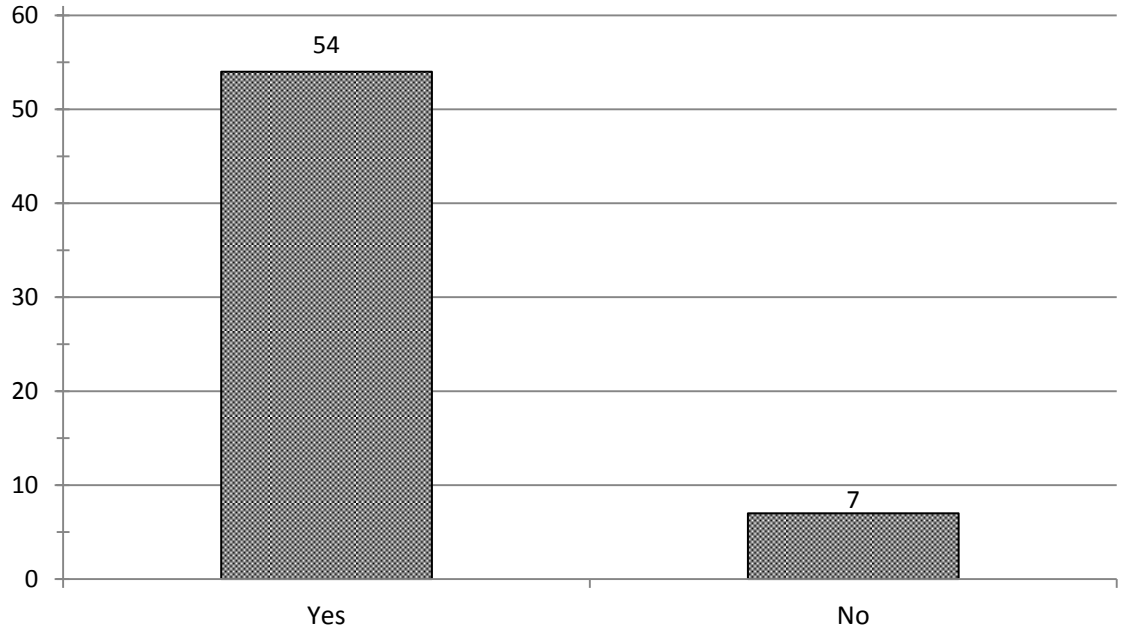
7.1 The Legal Committee is invited to consider this working paper and to take any action it deems necessary.

— — — — — — — —

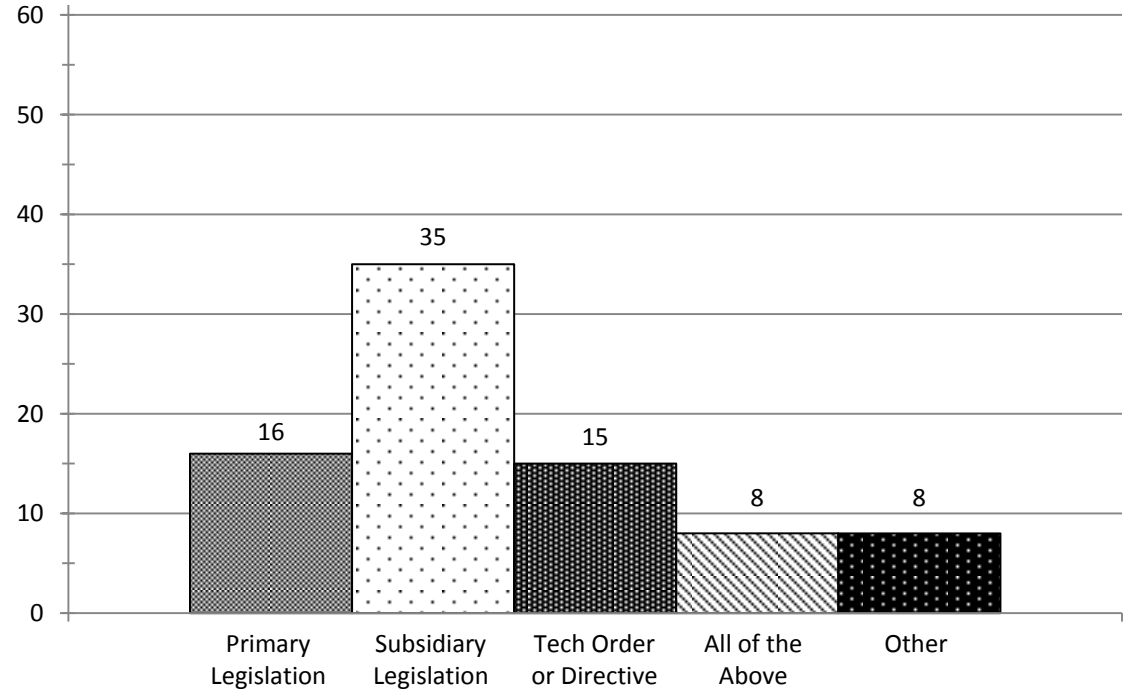
APPENDIX

PART A: Legal Framework for "Small" Unmanned Aircraft Systems (UAS)

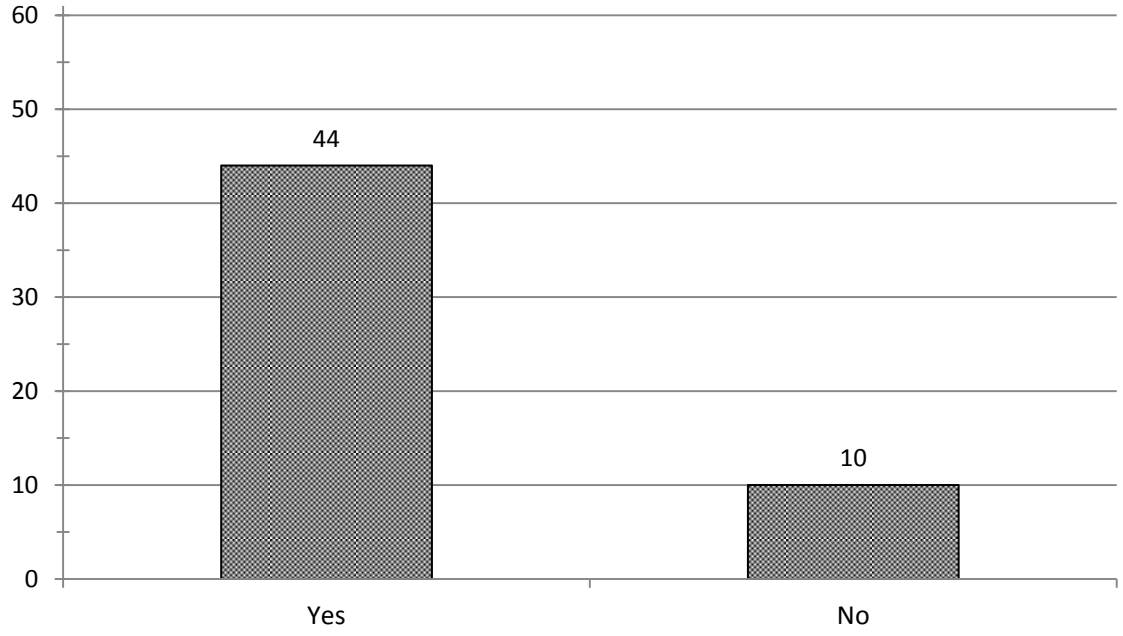
1. Has the State established a legal and/or regulatory framework for small unmanned aircraft systems (UAS) operations?



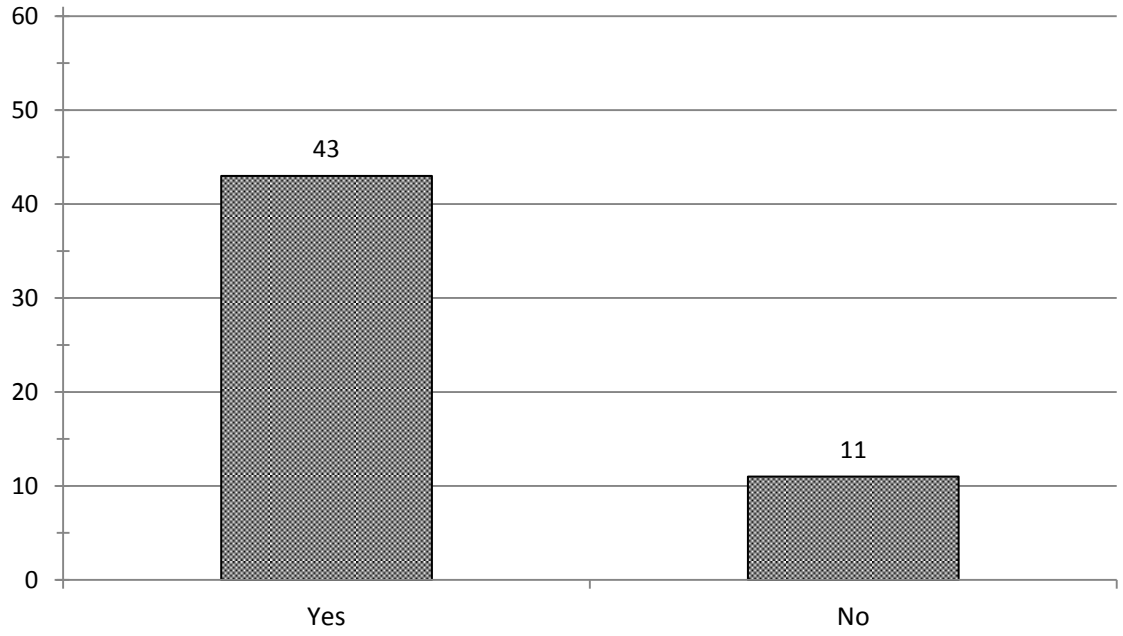
2. If the answer to Question 1 is yes, what is the form of the framework for small UAS?



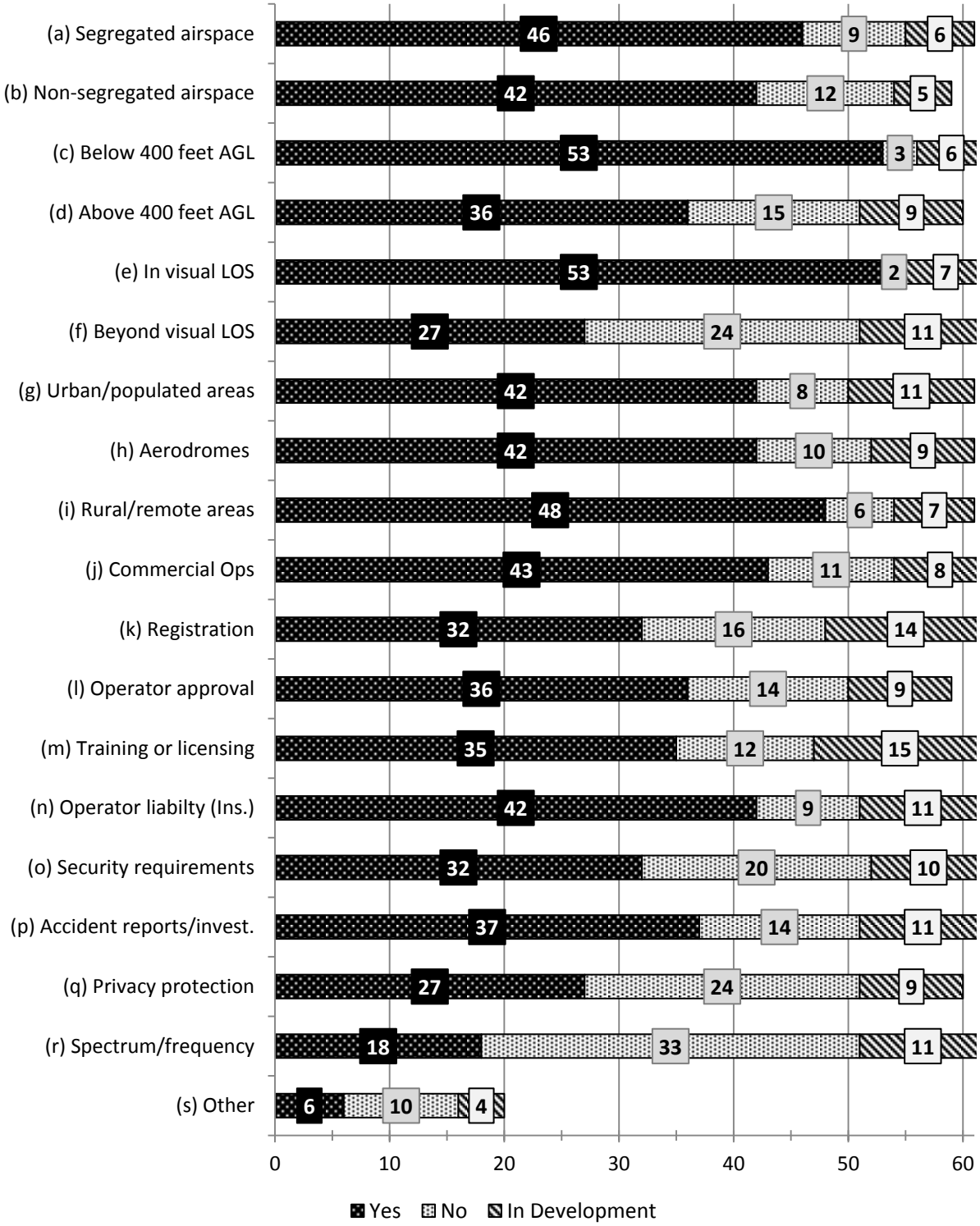
3. If the answer to Question 1 is yes, does the State's small UAS framework allow an operator from another State to conduct small UAS flights within its territory?



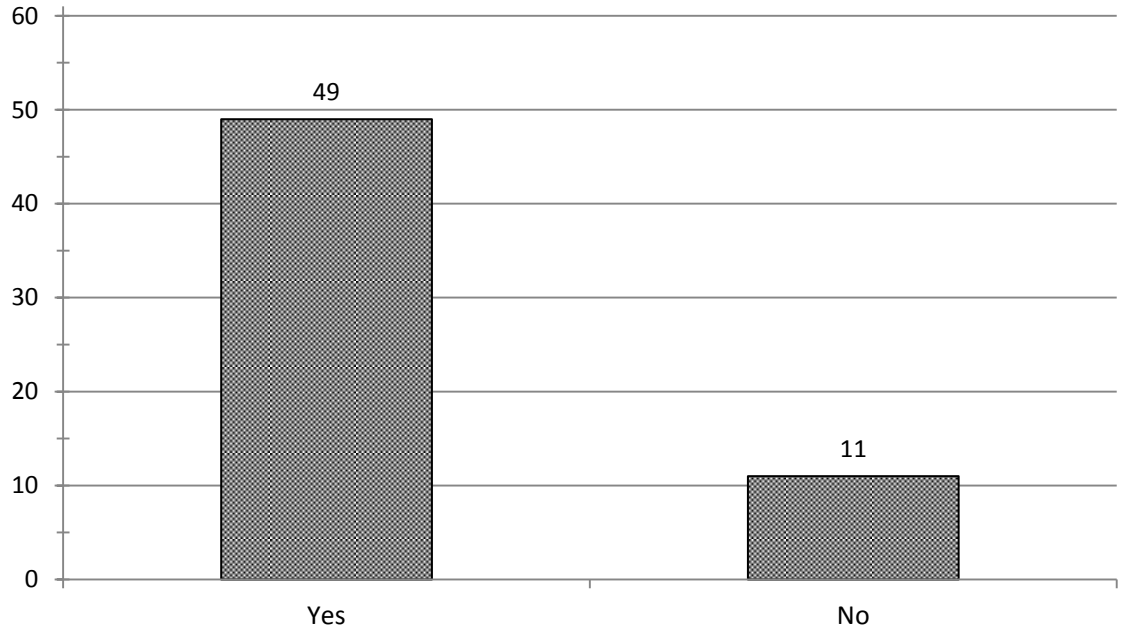
4. If the answer to Question 3 is yes, does the State's small UAS framework require an operator from another State to obtain prior approval to conduct small UAS flights within its territory?



6. What does the framework for small UAS cover?

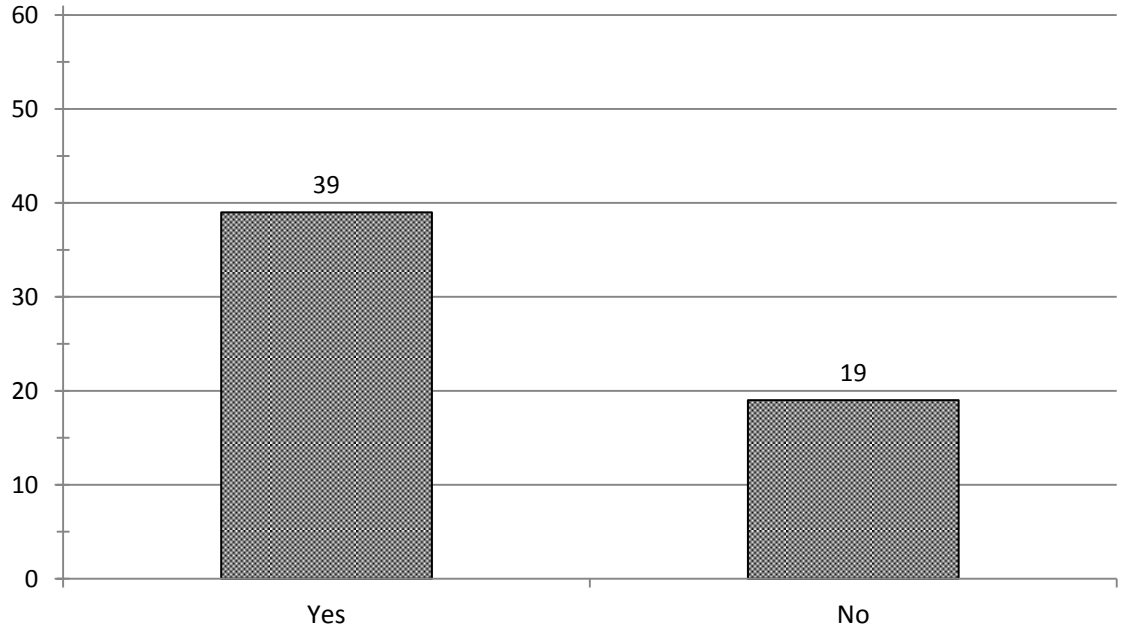

(a) Segregated airspace
46
9
6
(b) Non-segregated airspace
42
12
5
(c) Below 400 feet AGL
53
3
6
(d) Above 400 feet AGL
36
15
9
(e) In visual LOS
53
2
7
(f) Beyond visual LOS
27
24
11
(g) Urban/populated areas
42
8
11
(h) Aerodromes
42
10
9
(i) Rural/remote areas
48
6
7
(j) Commercial Ops
43
11
8
(k) Registration
32
16
14
(l) Operator approval
36
14
9
(m) Training or licensing
35
12
15
(n) Operator liabilty (Ins.)
42
9
11
(o) Security requirements
32
20
10
(p) Accident reports/invest.
37
14
11
(q) Privacy protection
27
24
9
(r) Spectrum/frequency
18
33
11
(s) Other
6
10
4
0
10
20
30
40
50
60
Yes
No
In Development

7. Does the State's small UAS framework have an enforcement process, including civil and/or criminal penalties?

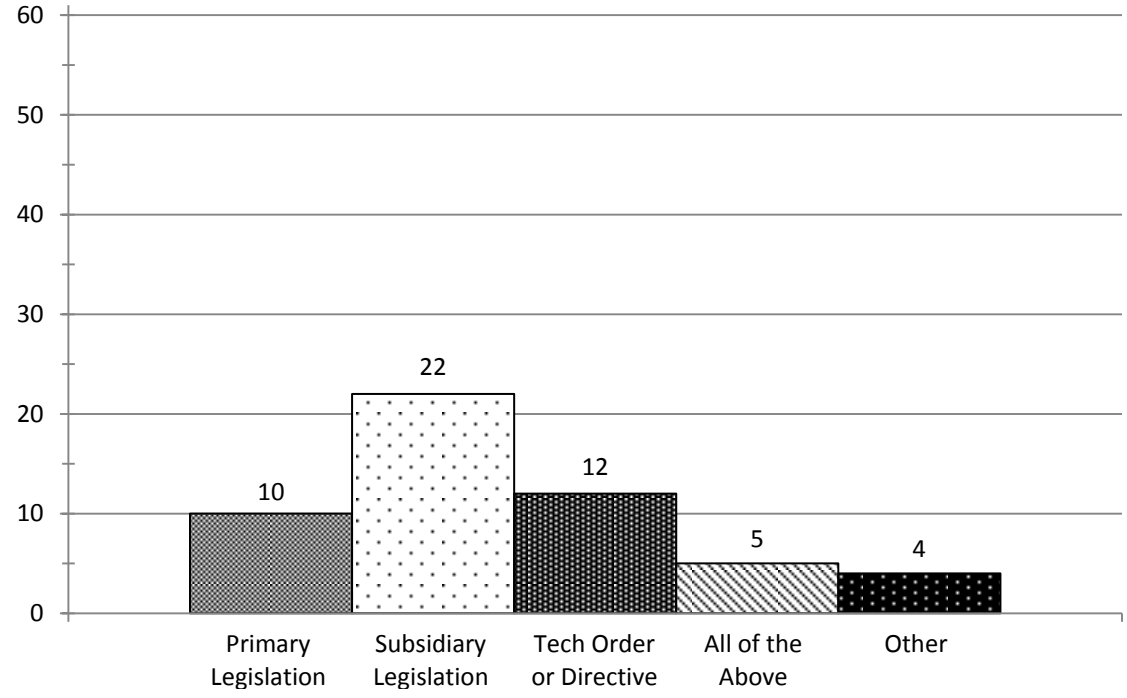


PART B: Legal Framework for Remotely Piloted Aircraft Systems (RPAS)

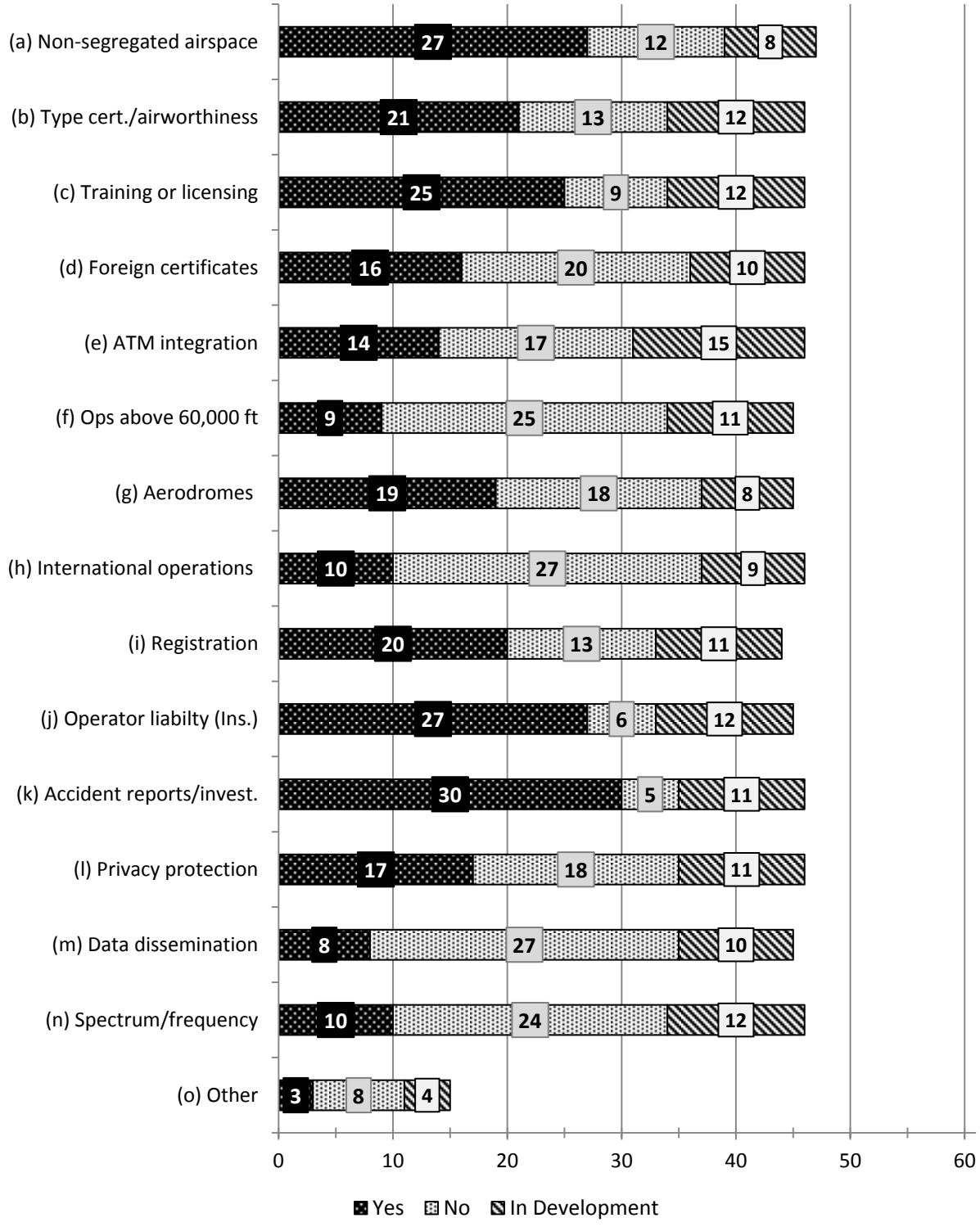
9. Has the State established a legal and/or regulatory framework for remotely piloted aircraft systems (RPAS) operations?



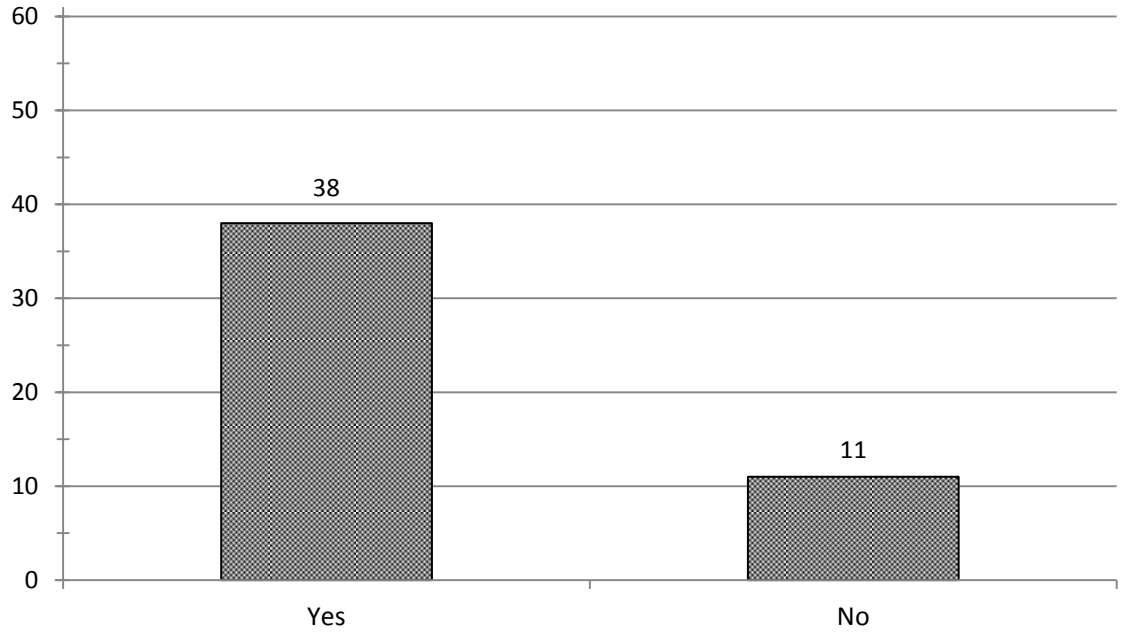
10. If the answer to Question 9 is yes, what is the form of the RPAS framework?



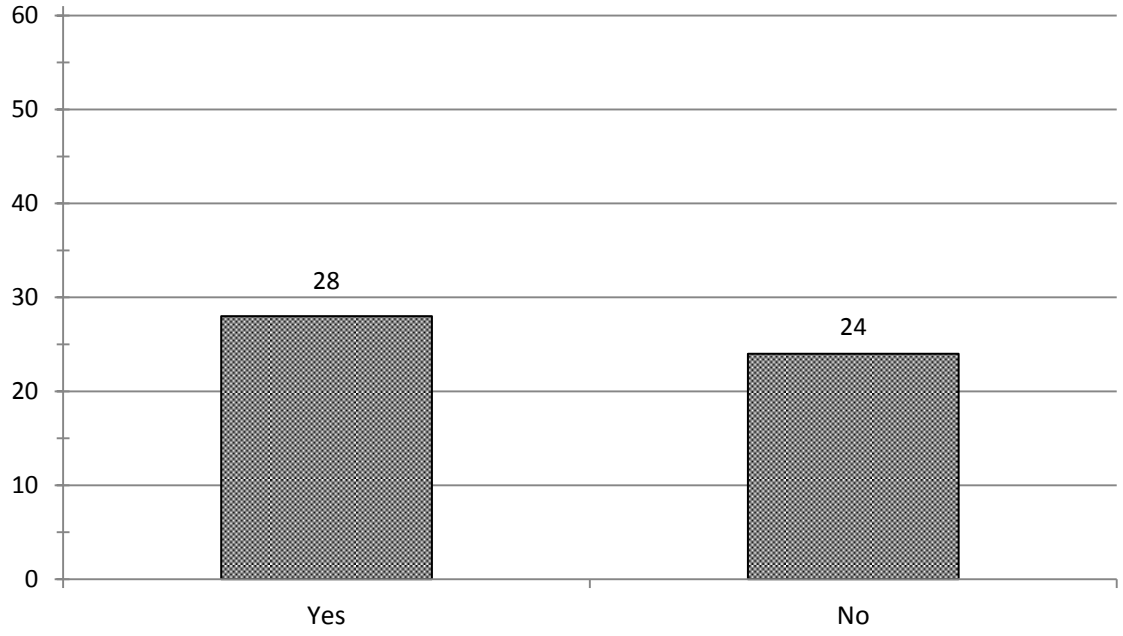
11. What does the RPAS framework cover?



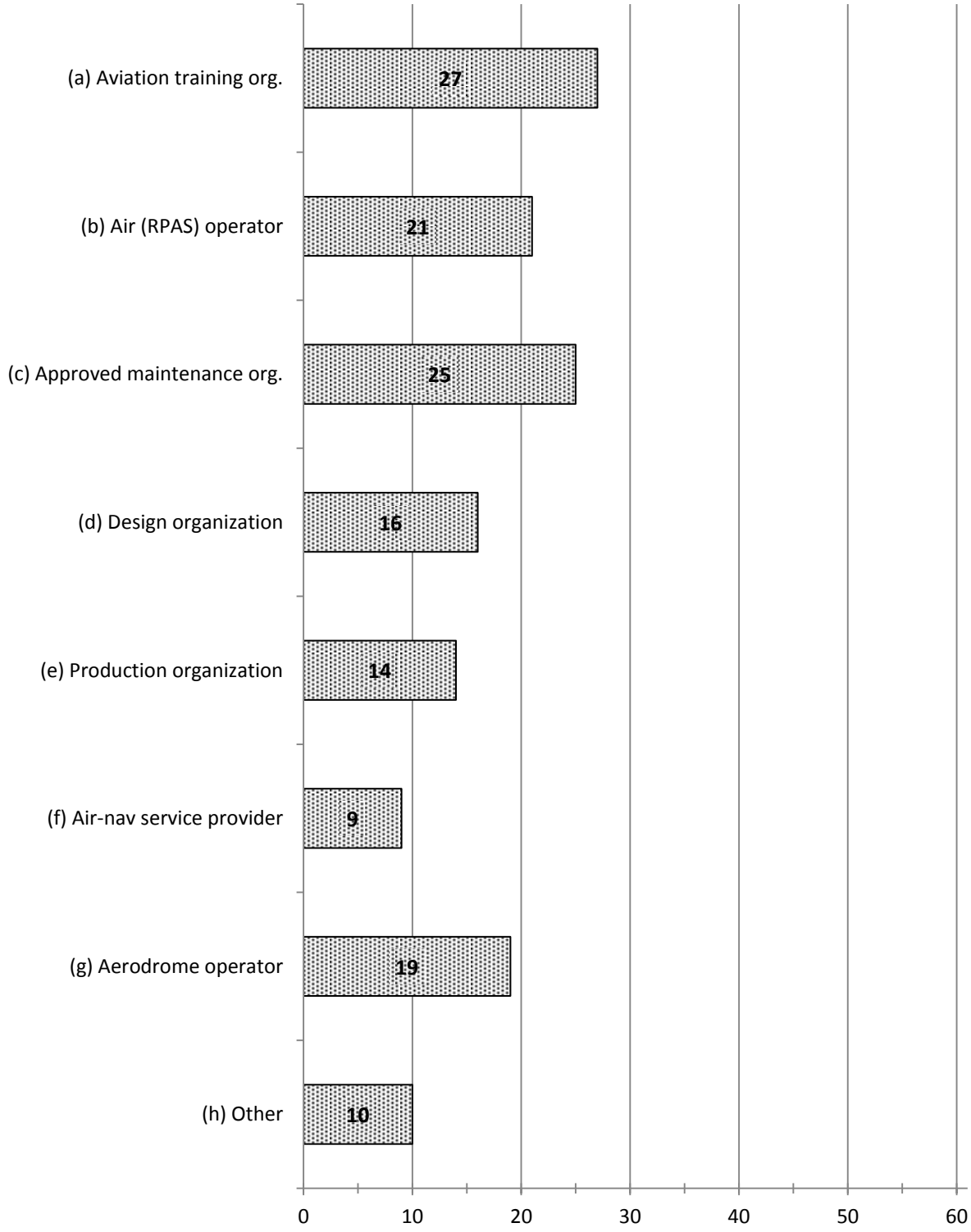
12. Does the State's RPAS framework have an enforcement process, including civil and/or criminal penalties?



14. Is the State involved in civil aviation activities or services in support of civil RPAS operators?



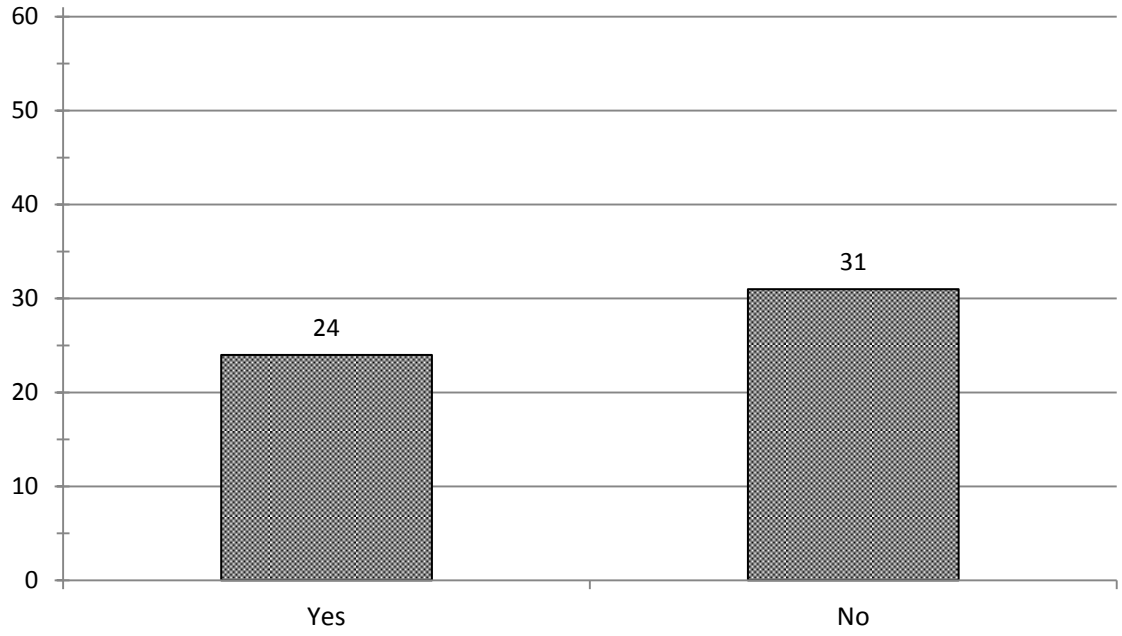
15. If the answer to Question 14 is yes, which activities or services is the State involved in?



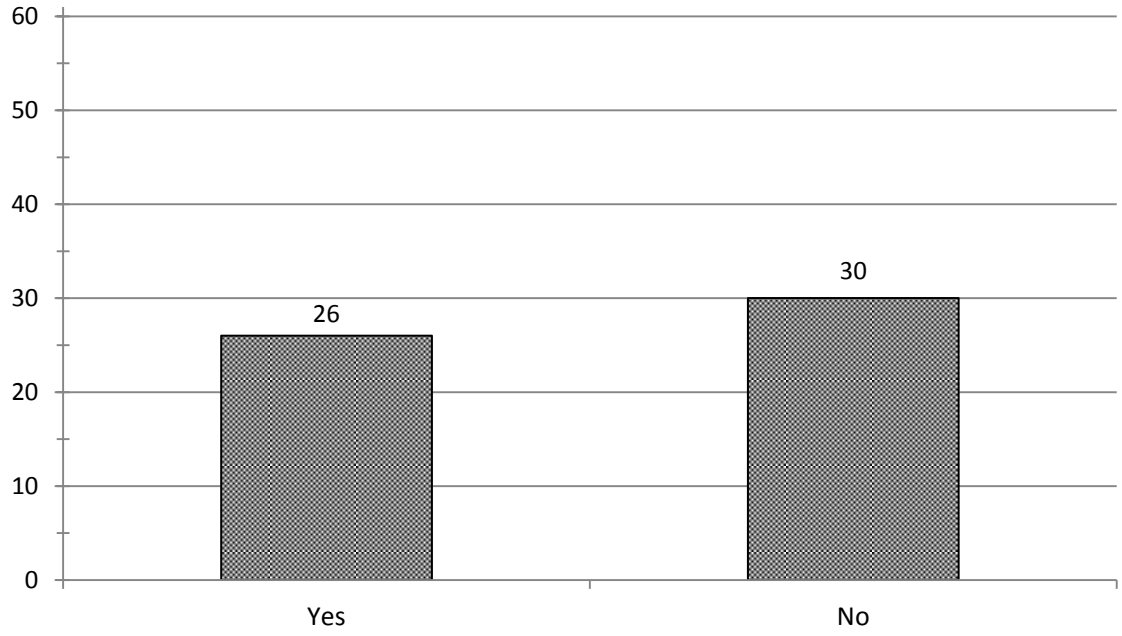
PART C: International legal problems presented by RPAS integration

16. In the last two years, has the State received a request from an RPAS operator for a "special authorization" to allow a civil remotely piloted aircraft to operate within its territory, as required by Article 8 of the Chicago Convention:

(a) From a domestic RPAS operator?

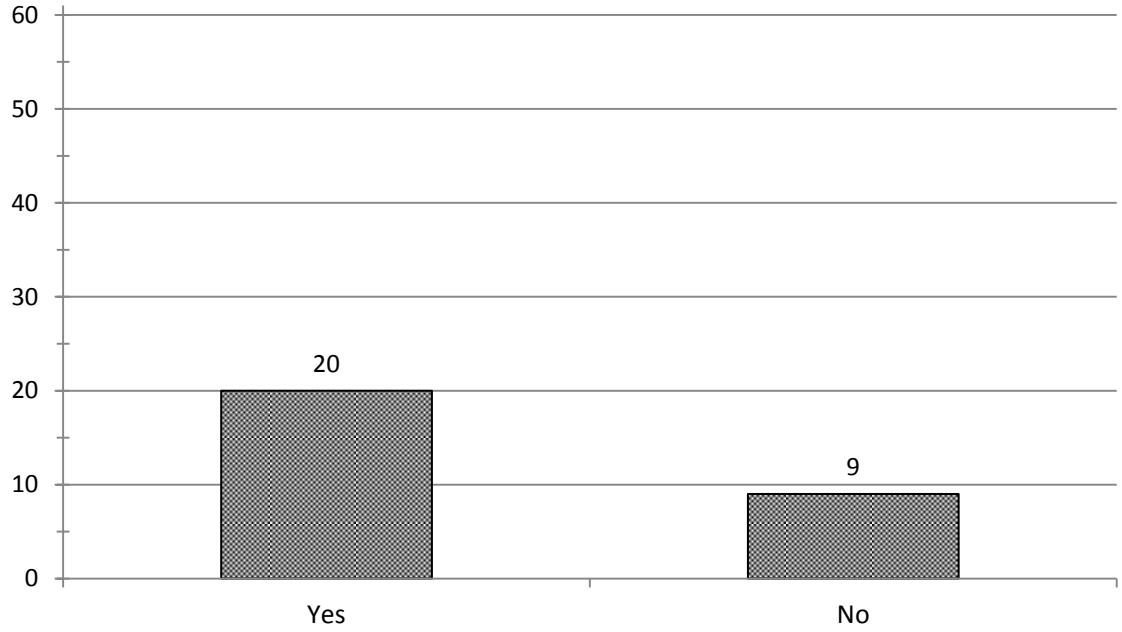


(b) From an RPAS operator from another State?

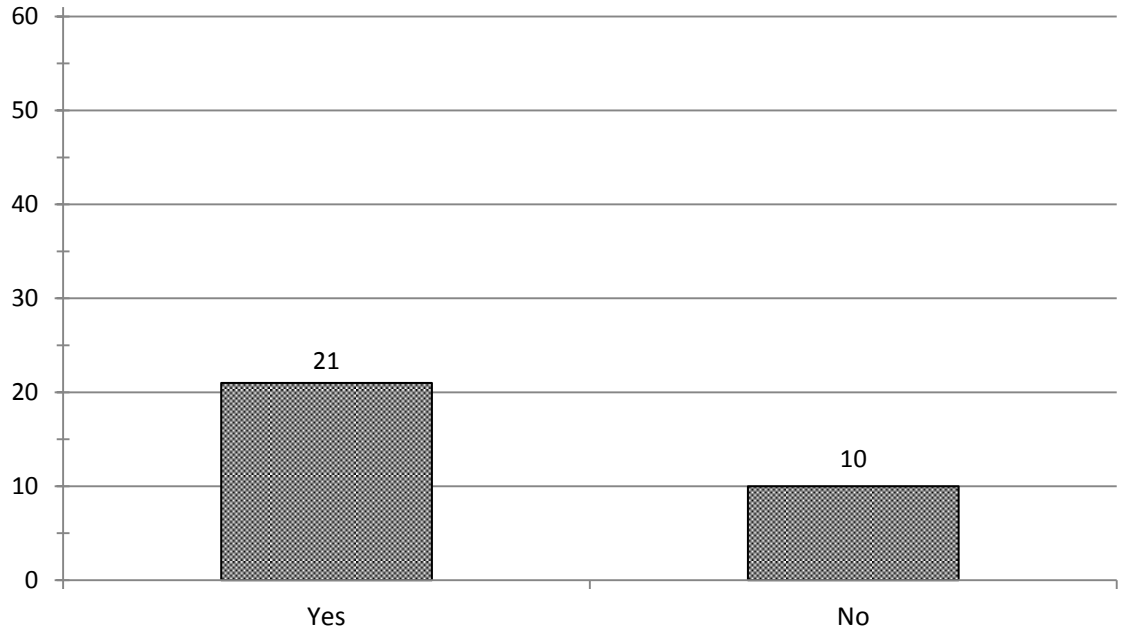


17. If the answer to either Question 16 (a) or (b) is yes, was the request granted?

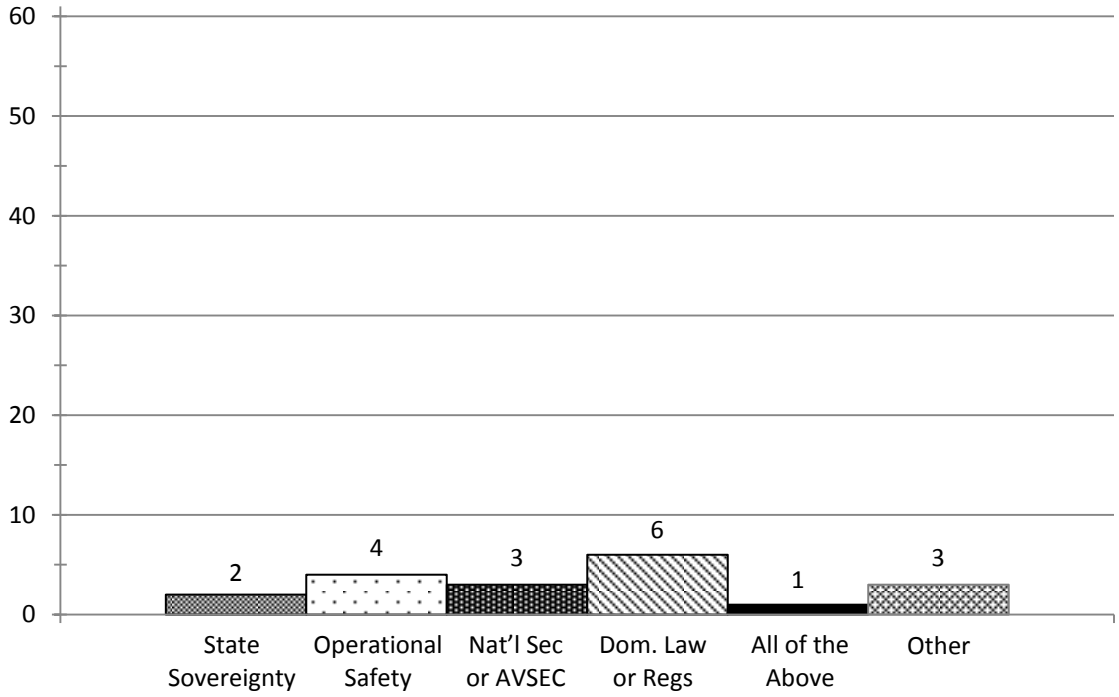
(a) From a domestic RPAS operator?



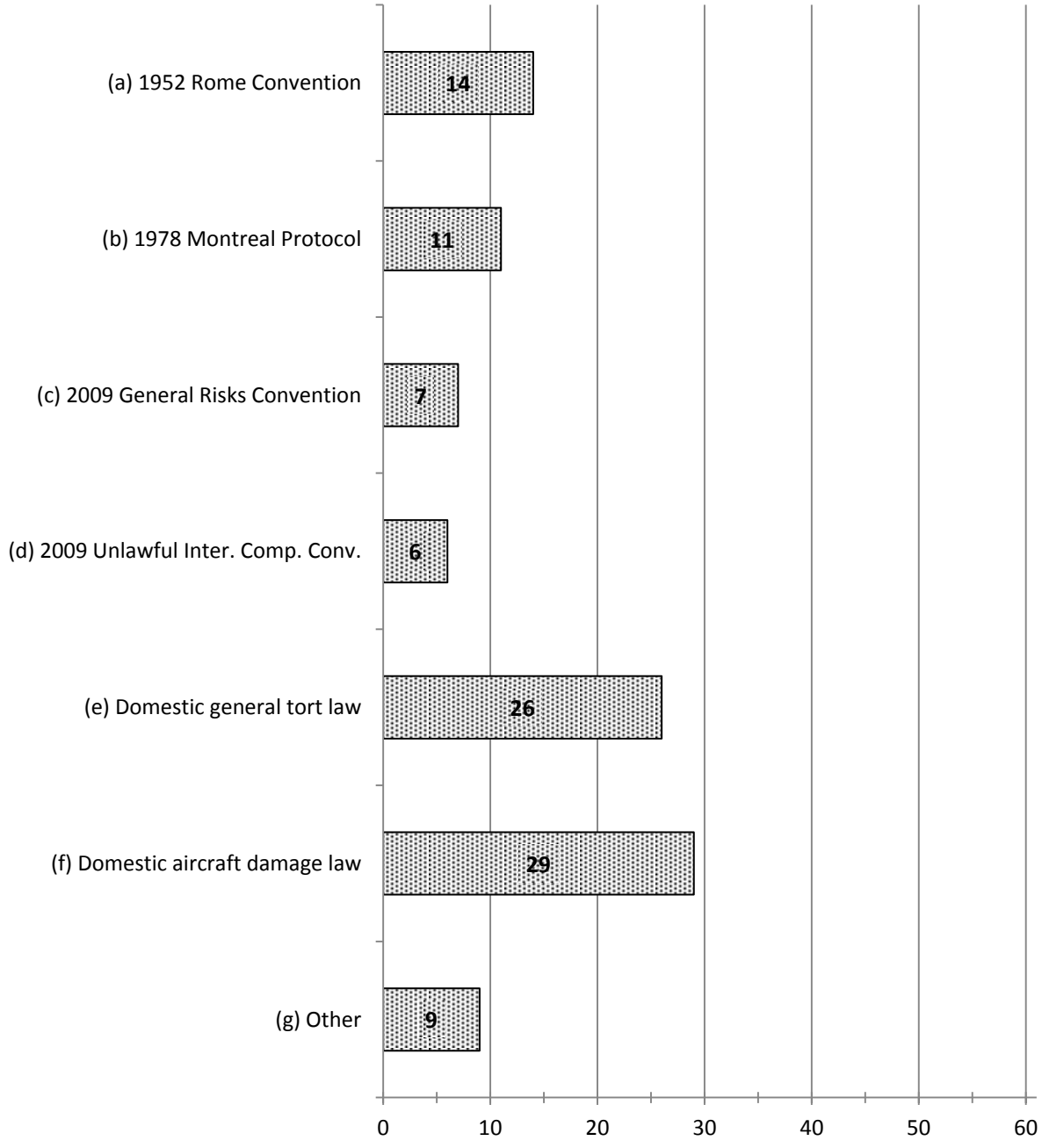
(b) From an RPAS operator from another State?



18. If the answer to either Question 17 (a) or (b) is no, what best describes the basis for denying the request?



19. What best describes the State's current legal regime for affixing liability for damage done by foreign aircraft (including RPAS) to third parties on the surface of the earth?



— END —