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Agenda item: B.4.1.8 **INFORMATION PAPER** **WP No:83**
IFATCA'24

Report of the IFATCA Representative on the ICAO Remotely Piloted Aircraft Systems Panel (RPASP)

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SUMMARY

Report on the activities of the IFATCA Representative on the ICAO Remotely Piloted Aircraft Systems Panel (RPASP).

1. INTRODUCTION

1.1. This information paper summarises the activities of the IFATCA Representative on the ICAO Remotely Piloted Aircraft Systems Panel (RPASP). Specifically, it refers to RPASP/22 (23-27 October 2023, Montreal) and RPAS/23 (18-22 March 2024, Montreal).

1.2. The RPASP is developing and amending Standard and Recommended Practices (SARPs) to integrate international IFR RPAS operations into the ATM environment.

1.3. As expected by IFATCA, due to some unclarity on procedures and implications related especially to C2 Link and Detect and Avoid, ICAO has decided to **postpone the applicability date of SARPs related to RPAS from November 2026 to November 2028.** On this aspect, there is only partial information available, and further explanations will be provided to Panel Members at RPASP/23. MAs will be updated in Singapore about the progress.

1.4. At RPASP/19 (21-25 March 2022, Online) IFATCA presented WP/6 – "Facilitation of a global, system-wide, change management assessment to support the safe and efficient integration of RPAS into the aviation operational environment". At RPASP/22 IFATCA presented WP/3 – "Multidimensional matrix to facilitate a system-wide overarching change management assessment supporting the safe and efficient integration of RPAS into the operational environment". At SMP/WGs/8 (31 January – 09 February 2024, Bruxelles) IFATCA has presented IP/08 "Proposal of a multidimensional matrix to facilitate change management processes and safety risk assessment to support safe and efficient integration of RPAS". At RPASP/23 IFATCA has presented WP/9 - "Proposal to progress the management of change activities to support the safe and efficient integration

of RPAS into the operational environment". This report will also describe activities related to these papers.

1.5. A heartfelt thanks to Mrs Sylvie Lemay, Mr Christoph Gilgen, and Mr Nicholus Siele for their hard and continuous work and support. A special thanks to Mrs. Trish Gilbert and Mr. David Guerin for the work done till RPASP22 which is allowing the current IFATCA RPASP group to work in a constructive and professional environment. Thanks also to IFATCA Liaison Officer to the ICAO Air Navigation Commission Mr. Jean-François Lepage for the support in the ICAO ANC and to IFATCA TOC and PLC members for their support in dealing with complex matters as DAA/RWC and C2 Link.

2. DISCUSSION

2.1. This paper will only report the main elements and events that occurred during the period covered by the report. To have full details and understanding of all topics, readers are kindly invited to refer to the full reports available or to contact eugenio.diotalevi@ifatca.org.

2.2. RPASP scope and structure

2.2.1. The Remotely Piloted Aircraft Systems Panel (RPASP) coordinates and develops ICAO Standards and Recommended Practices (SARPs), Procedures and Guidance material for remotely piloted aircraft systems (RPAS), to facilitate safe, secure, and efficient integration of remotely piloted aircraft (RPA) into non-segregated airspace and aerodromes. The RPASP, in collaboration with other ICAO expert groups, undertakes specific studies and subsequently develops provisions to facilitate the safe, secure and efficient integration of RPA into non-segregated airspace and aerodromes while maintaining the existing level of safety for manned aviation. The panel which is part of ICAO's voluntary workforce, is composed of experts, nominated by States and international organizations. The RPASP coordinates their work with the various groups of experts responsible for other Annexes and disciplines, as appropriate (e.g. Airworthiness Panel (AIRP), Communications Panel (CP), Surveillance Panel (SP), Air Traffic Management Operations Panel (ATMOPSP) Flight Operations Panel (FLTOPSP), Flight Recorder Working Group (FLIREC-WG), Dangerous Goods Panel (DGP), Safety Management Panel (SMP), Aerodrome Design and Operations Panel (ADOP), Accident Investigation (AIGP)). These collaborative efforts extend beyond panels of the Air Navigation Commission (ANC) to include the Legal Committee, Committee on Aviation Environmental Protection (CAEP), Aviation Security Panel (AVSECP), Air Navigation Services Economics Panel (ANSEP) and the Aerodromes Economics Panel (AEP).[1]

2.2.2. The RPASP meets twice a year with the following schedule:

[1] This paragraph is captured from the ICAO website at this link. Consulted on March 6, 2024

RPASP Meeting	Date	WP/IP Deadline
RPASP/22	23-27 October 2023	22 September 2023
RPASP/23	18-22 March 2024	16 February 2024
RPASP/24	23-27 October 2024	20 September 2024
RPASP/25	17-21 March 2025	14 February 2025
RPASP/26	23-27 October 2025	September 2025

2.2.3. The RPASP is composed by working groups (WGs), task forces (TFs), ad hoc working groups (AHWGs) and, due to the cross-panel nature of RPAS, joint task forces (JTFs). The detailed structure and IFATCA's participation are reported in the following table:

	Name	**IFATCA member**
WG1	Airworthiness	
WG2	C2 Link	Eugenio Diotalevi, Sylvie Lemay
WG3	Detect and Avoid	Christoph Gilgen, Nicholus Siele
WG4	Personnel Licensing	
WG5	RPAS Operations	
WG6	ATM Integration	Eugenio Diotalevi, Sylvie Lemay
WG7	Human In The System	
WG8	RPAS Manual	
AHWG-A	Ad Hoc Working Group on Assumptions	Eugenio Diotalevi
AHWG-OSP	Ad Hoc Working Group on Oversight Of Service Provision	
RA-JTF	RPASP and ATMOPSP Joint Task Force	Eugenio Diotalevi, Rick Taylor (ATMOPSP, co-rapporteur of the RA-JTF)
RLP-TF	Required Link Performance Task Force	Eugenio Diotalevi
RPASP/SMP-JTF	RPASP and SMP Joint Task Force	Eugenio Diotalevi
RPASP/ADOP-JTF	RPASP and ADOP Joint Task Force	Nicholus Siele

RPASPTF-I	RPASP Interception Task Force	Eugenio Diotalevi (co-rapporteur TF-I)

2.3. IFATCA proposal for a global change management assessment

2.3.1. At RPASP19, IFATCA proposed WP/6 “Facilitation of a global, system-wide, change management assessment to support the safe and efficient integration of RPAS into the aviation operational environment”. It was (and it is) the IFATCA RPASP representative‘s opinion that States and service providers would take advantage of assessing any aviation system changes prior to adopting SARPs. The paper was in general well received and the panel agreed to create a dedicated expert group (AHWG-A Ad Hoc Working Group on Assumptions) to assess and analyse possible gaps between the RPAS-related SARPs/PANS and the RPAS Panel assumptions. The RPASP Assumptions’ gap analysis work took about 9 months and results were presented at RPASP 21 (13-17 March 2023) with WP/5. Several changes have been made to the original Assumptions list, some major and several minor. This is to confirm that IFATCA’s concerns about possible deviations from that list were concrete. In endorsing the conclusions of WP/5, IFATCA recommended the Assumptions review process become structural to the Panel’s working activities and the Panel agreed on that.

2.3.2. As a way forward to the global, system-wide, change management assessment, at RPASP/22 IFATCA and Israel presented WP/3 – “Multidimensional matrix to facilitate a system-wide overarching change management assessment supporting the safe and efficient integration of RPAS into the operational environment”. The scope of the proposed matrix was to propose a standardized method capable, on the one hand, of verifying the absence of gaps within and the consistency of all SARPs developed for RPAS and, on the other hand, of providing guidance to States for the implementation of RPASP operations (the Multidimensional matrix is available in Appendix I to this IP). Despite highlighting the absolute necessity to perform such exercises, RPASP Members were cautious about addressing WP/3 because of uncertainties related to the workload connected to the matrix. On the contrary, the paper was very well received by the ICAO Safety Management Panel Chief who was attending the discussion and proposed to support IFATCA in improving the proposed matrix and in searching for alternative safety methodologies to conduct the analysis. As a conclusion of the discussion, the Panel asked IFATCA to liaise with the ICAO SMP to validate the matrix and, as an alternative, to provide different methodologies to continue the management of change process.

2.3.3. Via the RPASP/SMP-JTF (RPASP and SMP Joint Task Force) IFATCA presented the methodology with IP/08 at the SMP/WGs/8 meeting. It was considered “innovative and appropriate with regard to the dimension and impact of the RPAS introduction in the long run” and the SMP was in general supportive of the idea of further developing the methodology.

2.3.4. Considering results from the SMP consultation, IFATCA has drafted a new working paper for RPASP/23 (WP/9) proposing, in coordination with the ICAO SMP Secretariat, the creation of dedicated working groups to conduct hazards analysis and to draft guidance materials. MAs will be updated at the Singapore Conference on the progress of the paper.

2.4. DAA and C2 Link Manuals

2.4.1. Manuals on C2 Link is still under development. Instead, the Manual on DAA will be presented to the Panel for endorsement at RPASP/23.

2.5. RLP-TF (Required Link Performance Task Force)

2.5.1. The Required Link Performance concept is the basic concept on which the C2 link has been developed so far by the WG2. The RLP expresses the safety parameters State Competent Authority requires to be met by the RPAS Operator for operations in specific portions of airspace. Eugenio Diotalevi (IFATCA) represents RPASP WG6 (ATM integration) in the RLP-TF.

2.5.2. The RLP-TF has met (remotely) 19 times since April 2023 and Eugenio Diotalevi (IFATCA) represents RPASP WG6 (ATM integration) in the RLP-TF.

2.5.3. The RLP-TF has reached a consensus on 4 principles governing the RLP concept related to the Target Level of Safety of the airspace and the possibility of using telecommunication parameters (i.e. continuity, availability, latency, corruption) in determining the RLP value. Several aspects need to be developed: one overall is how to represent the RLP values and how to connect them with the airspace portion the RPAS is flying into.

2.5.4. IFATCA has notified several times RLP-TF rapporteurs about its impression the TF is working too in isolation and there is the risk that once the concept is ready it will be inapplicable because of conflicting with other well-established procedures (separation standards are the main one). IFATCA has always suggested involving other ICAO Panels in the work, starting from the ICAO SASP (Separations and Airspace Panel). Now that the key principles are ready and that several other members of the TF have supported IFATCA in asking for external support, RLP-TF Co-rapporteurs are keener to consider this engagement.

2.5.5. The RLP-TF will meet in person during the next RPSP/23. Updates on the evolution of the RLP concept will be provided to MAs during Singapore Conference.

2.6. RPASPTF-I (RPASP Task Force Interception)

2.6.1. The interception by military/state aircraft of an unmanned aircraft (UA) is a transversal issue because of the unique characteristic of not having the pilot on board. This issue requires clarification and SARPs to ensure a consistent approach is facilitated. Current Annex 2 — Rules of the Air provisions present significant challenges for UA interception as they place heavy reliance on visual signals from both the intercepting and intercepted aircraft to confirm intent, etc. It is further noted that the DAA system of the intercepted aircraft could trigger avoidance manoeuvres upon detection of the intercepting aircraft. RPASP-WGWHL/1 (22 - 26 June 2020) agreed on establishing a dedicated Task Force (RPASPTF-I) to facilitate a multi-disciplinary approach to this issue.

2.6.2. Despite TF-I has formally concluded its task at RPASP21, there are still several elements related to DAA and C2 Link affecting interception procedures that are not available yet. For this reason, the Panel has agreed that the RPASTF-I should continue to work on maturing up the proposals for amendment. The TF-I has recently received comments from the ICAO ATMOPSP and the ICAO FLTOPS on the work developed and such comments will be discussed at RPASP/23. MAs will be updated at the Singapore Conference on the progress of the work.

2.7. ICAO State Letter AN 11/61-22/70 “Proposed new Annex 6, Part IV” (23 August 2022)

2.7.1. The Air Navigation Commission (ANC), at the tenth meeting of its 219th Session held virtually on 17 March 2022, considered a preliminary review of the proposed new “Annex 6 — Operation of Aircraft, Part IV — International Operations — Remotely Piloted Aircraft Systems” as endorsed by RPASP 18 (25-29 October 2021).

2.7.2. In responding to the State Letter presenting the document above, IFATCA has highlighted 2 main items:

a) the new Annex 6 Part IV leaves the possibility for a single remote pilot to simultaneously control more than one RPA. IFATCA has recommended that the so-called 1:1 principle (1 Remote pilot to 1 RPA) has to be mandatory.

b) the new Annex 6 Part IV identifies the Detect and Avoid functions as a service. This means that this service can be provided by external sources from the RPAS Operator and, more importantly, that equipment to detect possible threats might not be physically on board the RPA. IFATCA has recommended that the RPA has to be able to automatically execute DAA functionalities without external support.

2.7.3. IFATCA RPASP Member is proud and happy to communicate that our concerns on the 1:1 principle have been supported by other States and Organisations and the ANC has agreed to modify it. Discussion on DAA as a service is still ongoing. A special thanks to the IFATCA Liaison Officer to

the ICAO Air Navigation Commission Mr. Jean-François Lepage for his endless support and hard work in promoting our position within the ANC.

2.8. Cooperations with IFATCA TOC, PLC and RPATF

2.8.1. IFATCA TOC and PLC have always supported all requests made from the IFATCA RPASP Representative. This year, in particular, support have been requested to further develop the DAA concept and to support activities related to the safety paper proposed to the ICAO SMP.

3. CONCLUSION

3.1. The work on RPAS is continuing at a pace of two panels per year. Despite this, applicability date of SARPs related to RPAS has been postponed from 26 November 2026 to November 2028.

3.2. IFATCA has always proposed and supported a comprehensive management of change process. Thanks to the work of IFATCA, such process is continuing, and further developments are expected from the next RPASP/23.

3.3. C2 link and Detect and Avoid (DAA) are still the most complex and discussed items. Several policy statements to cover these areas have been developed in cooperation with IFATCA TOC, PLC and RPATF.

3.4. IFATCA team is working really hard, and members are involved in several working groups and task forces. Volunteers interested in joining the RPAS activities are requested to contact eugenio.diotalevi@ifatca.org or jf.lepage@ifatca.org.

4. RECOMMENDATIONS

4.1. It is recommended that this report is accepted.

APPENDIX I

(This appendix is an extract from RPASP/23-WP/3. If reference are missing and/or concepts are not clear, you're kindly invited to contact eugenio.diotalevi@ifatca.org for clarifications)

MULTIDIMENSIONAL MATRIX

The methodology proposed in this WP is to conduct tabletop exercises in anticipated operating conditions[2], simulating a flight under different scenarios. Performances, roles, requirements, and responsibilities must be benchmarked against current manned aviation performances to identify possible hazards (and mitigation) and ensure safe RPAS integration into the operational environment.

Information obtained during the analysis can be grouped into a matrix in accordance with specific parameters. Conversely, a list of specific parameters can ease the tabletop exercise, providing guidance and standardizing the process.

The multidimensional matrix can be approached from two different perspectives:

a) Panel perspective: to fill the matrix with valuable information for the users and to ensure, through this process, no unidentified areas remain.

b) User perspective: to extract useful information related to actions, roles, and responsibilities to support RPAS operations from the matrix.

Entry fields that are proposed for the matrix are:

- Scenario
- Phase of operation
- RPAS elements
- Overflown state
- Organisation

a) Scenario: The RPAS ConOps and RPASP/ADOP JTF ConOps describe a series of possible scenarios for RPAS operations. Further details are available in Appendix B.

b) Phase of operation: Four main phases are proposed:

General: This section has to analyze the general needs in terms of certification, procedures, reports, and licences required to allow any RPAS operation (i.e., certification of C2CSPs, general and special Lost C2 Link procedures, remote pilot licenses, definition of competent authorities, RLP values).

Strategic: The general phase is completed. During this phase, the operation is defined in terms of feasibility and requirements (defining both nominal and contingencies situations), the authorization process is completed in accordance, and service level agreements with the service provider are defined.

Pre-tactical: The strategic phase is completed. This phase anticipates the execution of the operation, and all outcomes of the strategic phase are checked

[2] ICAO Annex 8, thirteen edition, July 2022

against possible new and unforeseen conditions (i.e., airspace restrictions, weather forecast, limitations) to verify that the operation is still within the parameters and to amend such parameters if necessary. The pre-tactical phase ends with acknowledging the Filed Flight Plan (FPL).

Tactical: Pre-tactical phase is completed. This phase comprises the execution of the operation and can be described using the flight phases reported on the ATM ConOps - DOC 9854 (see Appendix C).

c) RPAS elements: RPA, RPS, C2 Link, and other components (as specified in the type design).

d) Overflown state: States have different roles regarding the certification, oversight, and authorization of RPAS operators and service providers. This array should contain a departure state, landing state, planned state (to overfly), unplanned state (to overfly), and a high seas section.

e) Organisation: States (regulator, state of the operator, state of the service provider, competent authority), operators, manufacturers, service providers (e.g., C2 Link communications service providers (C2CSP), ANSPs, remote pilot station (RPS) service providers).

Entry fields can be divided into two categories:

f) *Static Entry Fields*: Scenario, Phase of operation, RPAS element.
These fields are used to detail the operation and remains unchanged until the analysis has been completed using the dynamic fields.

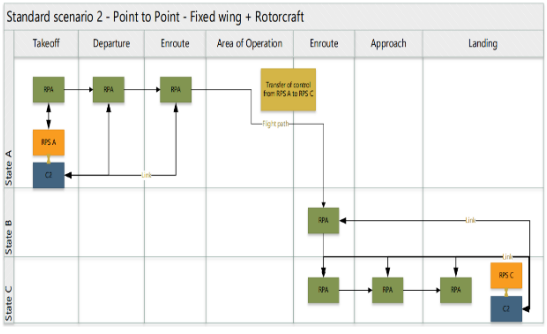
g) *Dynamic Entry Fields*: Overflown State, Organisation
These fields are the fields where pieces of information are collected and, considering a set of static entry fields, they analyze all possibilities elements connected to Overflown State and Organisation

Selecting the entry field as necessary to fulfil the specificities of the operation, the outcomes of the matrix should express requirements, actions, roles, and responsibilities of the overflown state and the organization selected related to the specific scenario, the phase of the operations and the element of the RPAS.

Example (from panel perspective):

Static phase

Step 1: Select scenario → SS2: point to point – fixed wing
This scenario describes an operation fixed-wing RPAS from ADEP (State A) to ADES (State B) via State C with a change in C2CSP and RPS in the enroute phase over State B.



Step 2: Select phase of operation → Tactical
The tactical phase implies the operation is live and all previous phases have been successfully

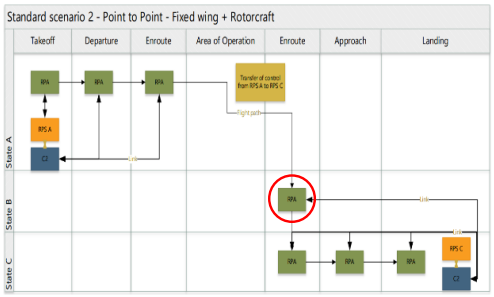
completed. All authorizations have been received, Service Providers have been contracted, and an ATC clearance has been received.
Step 3: Select RPAS element → C2 Link
C2 Link is the logical connection, however, realized, used for exchanging of information between the remote pilot station and the remotely piloted aircraft to enable the remote pilot to safely integrate the remotely piloted aircraft system into the global aviation, communications, navigation, and surveillance operational environment.

Dynamic phase

Step 3 concludes the static part of the matrix. The dynamic part is e where roles, responsibilities, and requirements should be listed based on different Overflown States and Organisations. General questions, not intended to be exhaustive, are proposed to identify such data:

a) What is the role of the state/organization in the selected scenario and phase of operations? Which actions are required?
b) What are the responsibilities, if any, related to the selected RPAS element?
c) What are the responsibilities, if any, related to other States/organizations?
d) Are references to ICAO documents available?
e) Have gaps, hazards, and mitigation measures been identified?
f) …

Step 4: Select Overflown State → State B
As the standard scenario describes, State B is a planned state where a handover between different RPSs and a switchover between different C2CSPs occur.



Missing data:

- What is the relation between State B and the state of the RPAS Operator, the state of registration, the State of C2CSPs Provider, and others? Does this relation require actions, or does it imply responsibilities for State B? (It is to be noted that all general, strategic, and pre-tactical phases of operations have been completed)

Step 5: Select Organisation → RPAS operator
The RPAS operator is responsible for the safety of the operations[3].
Considering specifically the C2 Link in the tactical phase, the RPAS Operator is responsible:

- to ensure that the RPA and RPS always remain within the C2 Link service area (Annex 10 Vol. VI, 2.4.2)
- for monitoring that the C2 Link service provision QoSD meets the QoSR, including its security (Annex 6, Part IV, 3.6.3.8)
- to develop procedures for the handover of control of an RPA from one RPS to another (Annex 6, Part IV, 4.4.12.2)
- …

[3] Provisions contained in ICAO Annex 2, 6, 8 and 10 should be listed and referenced in the matrix.

Once completed with references already present in ICAO Annex 2, 6, 8, and 10 (to name the ones with specific RPAS sections), the tabletop exercise might continue adding details, ensuring that the RPAS operator, overflying State B, can comply with operative actions foreseen in the anticipated operating conditions.

For example, can the RPAS operator ensure compliance with ATC clearances in terms of manoeuvrability? can the Remote pilot comply with an ATC instruction to proceed directly to a point or to fly an assigned heading?

ICAO Annex 10 Vol VI - Communication Systems and Procedures Relating to Remotely Piloted Aircraft Systems C2 Link (First Edition, July 2021) reports:

> *C2 Link service area[4]. The area within the C2 Link coverage area where the C2 Link QoSD meets the QoSR.*

and

> *2.4 C2 LINK SERVICE AREA*
> *2.4.1 The C2 Link service area shall be compatible with the planned areas of operation (including contingency operations) of the RPA and the location of all of the RPS involved in the operation.*
> *2.4.2 The RPA and RPS shall always remain within the C2 Link service area.*
> *2.4.3 Recommendation.— To ensure the QoSR is always met, a margin to account for the expected worst-case propagation fluctuations in the received signal level should be included when determining the C2 Link service area.*

It is RPAS operator responsibility to ensure the aforementioned provisions are respected by contracting the appropriate services (strategic phase), and it is still RPAS operator's responsibility to determine the area where such services have to be provided in accordance with the planned operations. A possible (and simplified) configuration of the C2 Link Service Area solution can be similar to the one described in Figure 1. The corridor width should at least ensure the respect of RNP provisions, and all the increments can be considered as a safety margin introduced by the operator.

Within the so-designed Service Area and in the Nominal C2 Link State, the RPAS shall be able to comply with ATC clearances and instructions transmitted by the Air traffic Controller following the standard phraseology reported in DOC 4444 PANS-ATM Chapter 12[5].

Consequently, the Remote Pilot cannot comply with ATC clearances that can (potentially) lead the flight outside the C2 Link Service Area. This option is also valid when the Remote Pilot has to manoeuvre to avoid weather phenomena (Figure 2). Additional limitations might be introduced by completing the RLP concept (Figure 3) still under development.

[4] The definition is under review by WG2
[5] Standard phraseology can be used to add details to the tabletop exercise

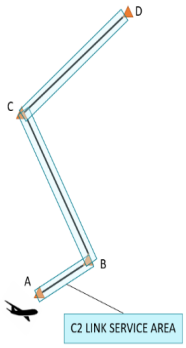


Figure 1

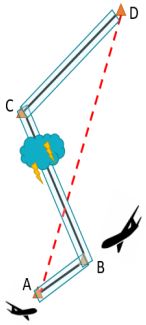


Figure 2

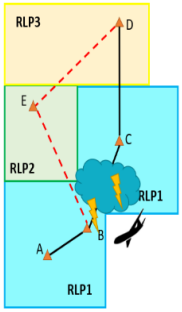


Figure 3

Vectors and direct routing are constantly used by ATC to provide separations and to ensure a safe and expedited flow of traffic. The possibility of reducing the effectiveness of such a control method has an extremely high impact on air traffic controllers' workload, primarily if such limitations are not known in advance.

The event described above can be considered a gap, and hazards are represented by an increased workload for ATCOs and the Remote Pilot. This gap has to be considered during the general and strategic phase of operations and should be added in the proper section of the matrix.

Question: Can any possible mitigations be proposed at Panel level?

Would it be possible to suggest:

- A standard minimum width of the corridor along ATS route (all stakeholders would know that)?
- In the case of free route airspace, can the entire FIR be contained in the C2 Link Service area?
- Standard procedure to establish the C2 Link Service area in case of foreseen adverse weather phenomena?

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