TIMING AND SYNCHRONIZATION SESSION MOM

Meeting Date	08.10.2024	**Time**	14:00-16:45
Meeting Called By	EUSPA	**Location**	Online event
Minutes Taken By	Daan Allaert, EY	**Next Meeting Date**	N/A
Attendees	Valeria Catalano, EUSPA, Session moderator Hector Llorca, GMV, Session Co-modereator Presentations Matteo Sgammini, EC Stefano Ruffini, Calnex Marek Brawanski, Orange Poland Zdenek Chaloupka, Timing Solutions Luis Gonzalez, Adtran Complete list of attendees is in Annex 1.		
Distribution (in addition to attendees)	UCP Plenary, EUSPA, Public		

Agenda Items	Presenter
1. Welcome and introduction to the Time and Synchronisation session	Valeria Catalano, EUSPA
2. UCP and T&S panel	Valeria Catalano, EUSPA
3. Update on Galileo Timing Service and standardization of Galileo Timing Receiver	Matteo Sgammini, EC
4. ITU-T SG15 Q13 view on the use of GNSS in Telecom	Stefano Ruffini, Calnex
5. GNSS for Telecom network synchronisation	Marek Brawanski, Orange Poland
6. New GNSS resiliency concept for Critical Infrastructure	Zdenek Chaloupka, Timing Solutions
7. The role of timing in NG Railways	Luis Gonzalez, Adtran
8. User requirements validation	Hector Llorca, GMV
9. Conclusions and closing remarks	Valeria Catalano, EUSPA

Summary

The Timing and Synchronisation panel of the User Consultation Platform (UCP) 2024 took place on 8th October 2024 as an online event.

The panel gathered around 47 participants coming from industry, T&S managers, research, receiver manufacturers as well as from European Institutions, covering the whole spectrum of the market segment.

Presentations of the EU Space components most relevant to the Time and Synchronization segment were given and concrete usages of Global Navigation Satellite System (GNSS) were also introduced through a series of presentations.

These presentations enabled to initiate interesting interactions with the audience and to discuss main requirements, challenges, needs for R&I activities, market trends and needs for user/market uptake activities.

The most commented topics were the following:

- Synchronization of TLC, energy grids, financial or data centres but also transportation networks require accurate and reliable GNSS timing to enables next generation operation, efficiency and reliability. For example, the rail market has also been shown to take advantage of timing and synchronization services.
- New key requirements related to the integrity of the time solution identified. New requirements have been introduced related to integrity and the features to be provided by the future Galileo timing service. The participants see this service and the features as good features and are happy to include integrity requirements for timing and synchronization. Also, the topics of resilience and robustness have been found to be of great interest to time and synchronization users and is one of their primary concerns.

10. The most common time distribution methods are dependent on GNSS signals and data. Trusted/verified GNSS time and position as the Galileo OSNMA can improve the resiliency of Critical Infrastructure networks. In particular, the T&S community expressed the need to have the OSNMA declared as soon as possible.
11. CEN/CENELEC standard for Galileo Timing Receiver on its way for publication by the end of this year is another important milestone to further foster the use of GNSS for networks synchronization. This standard is a fundamental part of the future Galileo time service, and the participants showed interest in understanding its requirements and expressed that they would need that the standard somehow include all elements of the timing receiver such as the antenna.

1 MINUTES OF MEETING

Agenda Item 1 - Welcome and introduction to the Time and Synchronization session. Valeria Catalano, EUSPA

Valeria Cantalano began the meeting by introducing the detailed agenda. She provided an overview of the European Union Agency for the Space Programme (EUSPA), highlighting its main components which include EGNOS, Galileo, Copernicus, Govsatcom, and SST (Space Surveillance and Tracking). Valeria discussed the role of EUSPA in fostering the development of a new generation of SMEs, start-ups, and innovators within the European Innovation (EI) ecosystem. She discussed the agency's efforts

in enhancing the competitiveness of the EU's space downstream industry and promoting synergies among different components of the EU space programme.

Additionally, Valeria mentioned the importance of the RuR (Report on User Requirements) and encouraged attendees to download it once it is published on the EUSPA website. She briefed the participants on the project related to CEN/CENELEC standards, specifically mentioning the requirement for receivers to process cryptographic data from the Galileo Open Service Navigation Message Authentication.

Agenda Item 2 - UCP and T&S panel. Valeria Catalano, EUSPA

The discussion moved to the User Consultation Platform (UCP) and the T&S Panel. Valeria outlined the goal of the UCP as a collaborative space where users convene to discuss their needs for applications that rely on location, navigation, timing, earth observation, and secure telecommunications. She informed the attendees about the new entry for the 2024 edition, which is the development of Cassini. Valeria highlighted that Cassini is currently open for submissions and encouraged participants to contribute their ideas.

Valeria also commented that there is a call for proposals for a grant project to develop Galileo Timing Receivers according to the standard that will be introduced in Matteo's presentation.

Agenda Item 3 - Update on Galileo Timing Service and standardization of Galileo Timing Receiver. Matteo Sgammini, EC

The session provided a comprehensive update on the Galileo Timing Service and the efforts towards the standardization of the Galileo Timing Receiver. The essential role of GNSS timing in modern infrastructure was underscored, with particular emphasis on the critical nature of Galileo's timing for various applications. It was noted that the Galileo Timing Service is indispensable for monitoring purposes and generates a dedicated message for integrity purposes.

The European Union's involvement, throughout the STARLITE project, in advancing the timing receiver standard under CEN/CENELEC was discussed. The standard defines functional and performance requirements, as well as test procedures and pass/fail criteria, to ensure the receivers meet the necessary specifications. These requirements include among others, timing accuracy, the correct processing of the message provided by the timing service and integrity functionalities.

Furthermore, the new Galileo Timing Service Message (TSM) Operational Status Definition (OSD) was introduced to assist manufacturers of Galileo timing receivers. This definition supports testing and describes the TSM format and outlines the processing logic. Attendees were informed that a new version of this document would be available soon.

The meeting concluded with the recognition of several significant advancements in the Galileo Timing Service and the standardization of the Galileo Timing Receiver. The introduction of the Galileo Timing Service was acknowledged as a development, marking a substantial contribution to the field

of GNSS timing for modern infrastructure. The upcoming publication of the CEN/CENELEC standard for the Galileo Timing Receiver by the end of the year was highlighted as a pivotal step towards ensuring compliance with functional and performance requirements.

The Fundamental Element call for the development of a Galileo Timing Receiver was highlighted again remarking that a Galileo Timing receiver will benefit from the end-to-end performance and accuracy of timing services. Moreover, the Joint Research Centre's (JRC) ongoing efforts in recording and replaying test vectors were noted as essential work that contributes to the validation of the Galileo Timing Receiver.

In summary, the session underscored the collective commitment to advancing the precision and reliability of timing receivers, which is key for the continued success and integration of Galileo services into various sectors that depend on accurate and secure timing information.

There was 1 question from the audience:

1. Will the end user with GNSS simulator be able to test the Galileo receiver with OSNMA?

Answer: Yes, you will be able to do so but in the call for proposal you will find all the information for testing activities.

Agenda Item 4 - ITU-T SG15 Q13 view on the use of GNSS in Telecom. Stefano Ruffini, Calnex

The presentation addressed the significance of GNSS in the telecommunications sector. It was noted that GNSS technology is a key component for achieving accurate time synchronization, which is essential for the proper functioning of telecom networks. The Primary Reference Time Clock (PRTC) typically integrates a GNSS receiver to utilize time signals for synchronization purposes.

For achieving the highest accuracy, GNSS can be combined with various types of clocks, including cesium and rubidium atomic clocks. This combination is particularly important for maintaining network-wide enhanced PRTC (ePRTC) time accuracy, even during periods when GNSS signals are unavailable. The clock recommendation relevant to this discussion is ITU-T G.8272.2.

The performance specifications for time error and noise generation are characterized by two main aspects: the constant time error and the amount of phase error. The time error requirements at the output of the ePRTC are a combination of these two aspects. It was clarified that no separate requirement is defined for the constant time error component when considered alone. The performance criteria also apply to the output of the ePRTC.

Concerns were raised regarding the metrics used in the European Norm (EN) standard, such as maximum tolerable errors, which may not be fully consistent with existing ITU-T recommendations. A clear relationship between the EN metrics and the ITU-T metrics is currently lacking. For the first release of the prEN 16605 standard, direct feedback from Q13/15 participants was not feasible. However, the initial contact was deemed important as it may facilitate future development and

harmonization. For example, service level 3 (not specified in the first release of the EN16605 standard) could be of interest for ITU-T PRTC-B/ePRTC/cnPRTC.

The conclusion of the discussion on ITU-T SG15 Q13's view on the use of GNSS in Telecom emphasized the ongoing importance of synchronization as networks and applications continue to evolve. The audience recognized that while GNSS technology remains a key component for achieving accurate time synchronization in telecom networks, the need for increased resiliency is becoming more pronounced. This includes enhanced security measures, improved synchronization monitoring, and reliable holdover capabilities to maintain network performance even during GNSS outages.

Furthermore, the audience acknowledged the emerging synchronization needs in mobile networks, particularly as the industry moves towards the evolution of 5G, and the support required for connected applications in sectors such as industrial automation and data centres.

The presentation highlighted the necessity for future EN standards on Galileo receivers to be fully consistent and harmonized with the relevant ITU-T recommendations. This alignment is essential to ensure that synchronization within telecom networks remains robust and reliable amidst the new challenges presented by network evolution and application demands. The initial contact between the prEN 16605 standard developers and Q13/15 participants, although limited for the first release, was seen as a crucial step towards facilitating future development and harmonization efforts.

There were 2 questions from the audience:

1. Is there any schedule to include antenna performances in a future standard? The system is very dependent on that, is it not?

Answer: The current standard includes guidelines with relevant information for the antenna and the calibration; however, its scope is exclusively focused on Galileo receiver chipset. Future revisions of the standard could extend the scope but currently there is no specific date for the future revision.

2. How do you see the applicability of Galileo's PRS (Public Regulated Service) and / or HAS (High Accuracy Service) to support the needs of grid operators (electricity transmission and distribution) in their digitalization efforts?

Answer: The topic of PRS will not be covered in today's discussion. For information and guidance on the use of PRS, it is necessary to consult with the designated PRS authorities.

3. Is ITU-T considering including any requirement or recommendation for authentication?

Answer: Different levels of resiliency are contemplated and services like OSNMA may fit in one of them. However, requirements are introduced by ITU members so it is needed that any member propose such requirement for considering it.

Agenda Item 5 - GNSS for Telecom network synchronisation. Marek Brawanski, Orange Poland

Marek Brawański addressed the assembly on the pivotal role of GNSS in telecom network synchronization. He began by affirming that GNSS is the first choice for network time reference due to its reliability, with substitution presenting significant challenges. He noted that GNSS is a cost-effective fallback for frequency in telecom networks.

The discussion then shifted to T&S applications within the telecom sector, which are driven by the need for event timestamping, the synchronization requirements of 4G/5G radio networks, IoT security, and quality control measures. Marek underscored the importance of quality control and monitoring, highlighting the use of portable synchronization test devices, stationary synchronization probes, service quality assessments, and one-way delay measurements. He also mentioned the relevance of GNSS in site location and drone navigation.

Marek touched upon the support Galileo provides for GNSS hardware and firmware, including new GNSS module features such as dual and triple frequency, jamming, and security enhancements, which are becoming increasingly affordable. The telecom industry's concern regarding potential additional expenses for updating existing systems to incorporate these security enhancements was raised.

He pointed out that despite advancements, there are still shortcomings in the provision of basic parameters like group delay for antennas, splitters, and amplifiers, with some parameters not being published at all. This leads to questions about the expected T&S performance. Marek reassured that, as of today, a 1.500-nanosecond error in relation to a common reference is sufficient.

From the operator's perspective, Marek emphasized that it is not feasible to deliver synchronization at any arbitrary point within the limits; the holdover time is inversely proportional to the time error in the locked state at the network end. He clarified that the 1.500-nanosecond limit for 5G does not imply that the network can operate close to this value without risks. This limit contributes to the time budget for the operator's reaction time, and operating too close to the limit increases the risk of exposing end users to issues if a synchronization break occurs in the network.

In conclusion, Marek stated that the telecom industry is content with the current accuracy of GNSS. However, he acknowledged that when it comes to security, one can never be too cautious. The telecom sector has developed solutions to survive long GNSS outages, but these solutions come with significant costs. He mentioned that LEO systems appear to be a promising supplement to the GNSS service portfolio, yet they bring additional operational expenses. Overall, while the industry is satisfied with GNSS performance, the pursuit of enhanced security and the exploration of supplementary services continue to be areas of focus.

Following Marek Brawański's presentation, Valeria addressed the meeting, emphasizing that Marek has participated in a EUSPA project as a part of a consortium which goal is to develop a telecom solution that includes also a timing receiver dedicated to the synchronization of telecom networks. Valeria recommends that for those interested in applying to EUSPA calls it is important forming a consortium with a well-balanced mix of expertise, including the crucial involvement of an end user. She pointed out that having an end user as part of the consortium is a clear indication of the market's demand for the product and significantly enhances the likelihood of the project's success. Valeria encouraged the creation of consortia that are not only well-rounded in terms of expertise but also inclusive of end users.

In response to Valeria's remarks, Marek Brawański highlighted a specific concern regarding the current market's range of antennas, which often lack proper characterization. He suggested that it could be advantageous to start a project in which a laboratory would perform detailed characterizations of these antennas and make the data available publicly. Marek's proposal was acknowledged as a valuable contribution, and the meeting agreed to consider the feedback from PR and integrate it into future considerations.

There was 1 question from the Audience:

1. OSNMA has been considered as a significant security feature. It has been expected to be released for service for a long time now. Is there any estimation when we will see the service announcement?

Answer: We are eagerly awaiting the official announcement, but in the meantime, you are welcome to use and test the OS NMA signal. Should you require any support with this, please be aware that the EUSPA Service Centre is available to assist you. The team there offers support not only for the OS NMA but also for other Galileo services. If you need additional information, help, or guidance, please do not hesitate to reach out to the EUSPA Service Centre.

SESSION BREAK

Agenda Item 6 - New GNSS resiliency concept for critical infrastructure. Zdenek Chaloupka, Timing Solutions

Zdenek Chaloupka took the floor to present a novel concept aimed at bolstering the resiliency of GNSS within critical infrastructure sectors. His presentation commenced with appreciation to EUSPA for facilitating a platform where professionals can exchange valuable insights on the evolving needs in the timing field.

The core of Zdenek's presentation was around the growing dependency of various critical infrastructure sectors—including telecommunications, energy grids, transportation, and financial data centres—on GNSS signals for accurate timing and distribution. He shed light on the industry's increasing awareness of the risks posed by an over-reliance on GNSS and the consequent drive towards establishing more resilient and secure timing sources.

Delving deeper into the subject, Zdenek shared insights into a collaborative initiative with the National Standards Authority of Ireland (NSAI) and the National Metrology Laboratory in Dublin. This partnership has given rise to a national timing grid, an innovative network of loosely connected atomic clocks across Ireland, which serves as a benchmark for measuring time against the primary source, UTC NSAI. He emphasized the strategic importance of this grid in providing a reliable timing

reference and discussed the ongoing efforts to develop a terrestrial backup for the timing distribution grid, as well as exploring alternative timing sources such as low Earth orbit signals.

A significant highlight of the presentation was the introduction of a service designed to verify GNSS data and signal streams. This service leverages the national timing grid to provide real-time monitoring and verification of GNSS data against UTC NSAI, thereby enhancing trust and resiliency in the timing data utilized by critical infrastructure. Zdenek elaborated on the benefits of this service, including the provision of verified GNSS data to various industries via the internet, which not only improves trust in the data but also opens up new business opportunities and offers legal protection.

Zdenek concluded his presentation by discussing the broader implications of the verified GNSS data service for mobile network operators, location-based services, and the measurement of ePRTC devices. He underscored that while this solution does not address all GNSS-related challenges, it represents a significant advancement towards a more resilient and trustworthy timing infrastructure.

In his closing remarks, Zdenek expressed optimism for the future of timing solutions and their role in safeguarding critical infrastructure against timing disruptions. He thanked the attendees for their attention and concluded his presentation, leaving the audience with a deeper appreciation for the importance of GNSS resiliency and the innovative approaches being developed to ensure the stability and security of critical infrastructure timing systems.

There were no questions from the audience.

Agenda Item 7 - The role of timing in NG Railways. Luis Gonzalez, Adtran

Luis Gonzalez from Adtran, a company with a long-standing history in the synchronization and timing industry, took the opportunity to discuss the evolving role of timing in next-generation (NG) railways. He expressed his gratitude for the chance to present on this topic, noting that some of his colleagues had previously shared similar material at the International Timing & Sync Forum (ITSF).

Luis provided a brief background on Adtran, highlighting its 75-year history in developing oscillators and timing systems. He then transitioned to the main subject of his presentation, emphasizing the efficiency of railways as a mode of transportation and their significance in future mobility.

He outlined the ongoing modernization process within the railway industry, which includes digitalization and the integration of new technologies. This evolution is akin to transformations seen in other sectors such as telecom and energy. A key driver for the introduction of stricter synchronization in railway systems has been the shift from traditional TDM (Time-Division Multiplexing) networks to packet networks like MPLS (Multiprotocol Label Switching)..

Luis touched on the replacement of GSM-R, the current communication platform for railways based on 2G technology, with a 5G-based infrastructure known as the Future Railway Mobile Communication System (FRMCS). This shift brings the railway industry's requirements in line with those of the telecom sector, particularly in terms of synchronization.

The presentation also covered various services and applications tied to timing and synchronization that could enhance railway efficiency through automation and the use of artificial intelligence. These improvements include better tracking of train locations, sharing of tracks, and the implementation of autonomous trains.

Luis emphasized the importance of coherence across all timing requirements, regardless of the level of accuracy needed. The objective is to enable multiple systems to work together, processing data to improve the overall efficiency of the railway system.

He discussed the challenges associated with GNSS vulnerabilities, the need for visibility and security in timing systems, and the critical role of standardization. Luis also mentioned the improvements in GNSS services, such as OSNMA, and the potential of LEO constellations and terrestrial alternatives to provide backup and redundancy.

To illustrate the progression in railway systems, Luis used examples from Deutsche Bahn's project presented at ITSF, showing how the industry is not replacing but rather evolving from existing systems to accommodate new functionalities and requirements.

In conclusion, Luis highlighted the next steps for the industry, which involve growing a core infrastructure that supports both 5G and legacy TDM equipment. This infrastructure will serve as the foundation for meeting the upcoming needs of the railway industry, ensuring improved efficiency, reliability, and synchronization coherence.

There was 1 question from the Audience:

1. Do you have an idea why FRMCS is entering so slowly in the rail market?

Answer: There are no technical limitations impeding the adoption of FRMCS; the delay in investment can be attributed to the planned phase-out of GSM-R by 2035. Rest assured, the technical specifications for FRMCS, which will be based on 5G new radio, have already been established, and we are steadily progressing towards its implementation.

Agenda Item 8 - User requirements validation. Hector Llorca, GMV

Hector Llorca from GMV initiated the discussion on user requirements validation with an informative background on the segmentation of timing and synchronization needs across various reports. He noted that the requirements were categorized under three distinct sectors: energy and raw materials, infrastructure, and insurance and finance. Hector set the stage for the session by stating the objective was to refine and clarify the existing timing and synchronization requirements, as well as to identify any potential new requirements that might emerge from the evolving user needs.

He explained that the requirements had been compiled from feedback gathered during the User Consultation Platform (UCP) and that the session was an opportunity for stakeholders to contribute further to this evolving document. The goal was to ensure that the requirements accurately reflected the current and future needs of the industries represented. Hector emphasized the importance of

this collaborative effort, as it would directly influence the accuracy and reliability of timing and synchronization services across these critical sectors.

The session aimed to interact with participants to gather feedback on specific timing requirements across various sectors. Hector presented a series of Slido questions to the audience, prompting responses to refine the user requirements. The questions covered various aspects of timing and synchronization, such as accuracy, availability, continuity, update rate, resilience, traceability, security, integrity, and any additional requirements that may have been overlooked.

Hector asked 15 questions to the audience:

1. Which group do you belong to?

Answer: 70% Telecom, 10% Energy, 20% Finance

2. What are the main barriers that could prevent the user uptake of space-based applications?

Answer:

- There should not be one at this time. It is readily available. Guaranteed services may be the right answer for some highly sensitive applications.
- Less information than necessary
- I don't see any significant barriers – GNSS is taken and employed in all sectors
- Needing equipment from a particular provider, so provider lock-in
- Standardization
- Security, cost, availability
- Trustability

3. Freq. Sync Accuracy for DCN is commented to be 1 E-12 according to G.811.1. Do you agree? Any values for Data Centre and Small Cells?

Answer:

- Small Cells are mostly FDD (Frequency Division Duplex)
- No standardized requirement for data centres regarding frequency and accuracy. It is dimensioned from resulting holdover performance related to availability in case of threat disruption
- It would be necessary to distinguish between absolute sync (to UTC) and relative sync among elements in a network among neighbouring base-stations, etc.
- Agree

4. At previous UCP there was no particular view on the duration (normalization) period to compute the 99.9% availability. Is there a period of time usually taken for the computation of availability of the applications you are familiar with?

Answer:

- Not that I am aware of. I think it would be highly dependent on the application. Also with new resilient architecture, I am not sure if there is a need for a specific value, but 99,9% might be acceptable.
- My understanding applies to SLA – the time period in question is long – 30 days or similar
- Datacentre availability is computed over 1 year usually

5. Is continuity a requirement parameter confirmed? Does it apply to all sectors? Which would be a desirable value for each sector/application? And what is the associated duration for the operation?

Answer:

- Continuity is an important feature
- The availability in time domain is slightly more complicated. Short breaks may not be counted at all and breaks that exceed certain threshold shall be taken into account.
- In the concept of aPNT and Zero trust, I think the parameters of availability are based on the overall solution and not a single service

6. If the oscillator can keep the time with an accuracy good enough for a few seconds, an update rate of 1 Hz is typically good enough. Do you agree? Can the requirement be modified to: The Timing & Sync system shall provide an update rate of 1Hz?

Answer:

- I assume that update rate contributes to such parameters as convergence time, etc, so it may be not so easy to answer
- 1Hz is ok for noncritical applications
- Agree
- Single update rate 1 Hz is ok
- 1 Hz is good enough. Higher update rate (at least in some testing) did not improve synchronisation, accuracy.

7. Resilience is typically achieved with a mix of technologies. Which would be the preferred technologies to achieve resilience for the different applications? Do you have further requirements for resilience?

Answer:

- Recovery after incident is important, but true security is the ability to "wake up" during incident (restart capability "under fire" and provide correct time)
- ePRTC, and systems to detect Timing Measurements and GNSS attacks
- Using mix of network cross check with GNSS receiving points would be optimized. However, resilience definition can be harmonized with IEEE P1952 definitions.
- To be resilient will be enough

- Generic answer would be to get the best value for money and what is available on the market. Not all type of technology is provided by all device vendors, etc.
- Internet + GNSS + SATCOM, is probably enough
- In our typical proposals, we think it needs 3 independent sources or 4 preferable. GNSS, other over the air solution, land based and atomic clock.

8. According to our current understanding, trustability in the T&S financial sector requires three time sources to be available. Do you think this requirement apply to other segments or only Financial?

Answer:

- Can be applied also to other fields, such as TELECOM and ENEGRY - depending on the need and supplier
- Energy and trusted communications also, and navigation
- it is generally true (regardless of reality)
- Apply to all sectors
- would apply to other segments
- Three independent timing sources is ideal, but maybe not achievable in every sector.

9. A)What is meant as security in terms of user needs? B) Can security translate in authentication? C) Or do you need more? D) Is there a need for security certification? E) Or compliance with security standards?

Answer:

- Authentication can be used for several applications, but for infrastructure we need more security mechanisms
- Authentication should be good enough, but there are many things to do in terms of jamming, spoofing
- Security for GNSS is evolving according to threats. Standards are good to have, but they need to be updated regularly
- Security certification is necessary and compliance to security standards, especially on dual-use technologies in order to achieve a high level of protection.
- A) be sure info are trustable B) not only C) need of certification E) yes standards
- Security is critical but, in most cases, causes delays. Multiple sources allow looser security as compromised source can be identified.
- Security is not only authentication, but also any protection against disruption of service (physical or digital)
- I believe we may need more than OSNMA

10. Our feedback is that the duration between successive authentications depend on the

application and the oscillator, but the order of magnitude is between 5 and 10 seconds. Do you agree? Could you provide values for the different segments/applications?

Answer:

- 5-10 seconds to be the default values, no less than 5 second, but optional to be able to set values greater than that
- frequency can be 5 or 20 secs. Applications must be capable of detecting high variations between authentications, if not, definitely multisource solutions would be required.
- Depends on whether you authenticate GNSS data or signal. For data, 5-10 seconds even more is ok. For signal authentication this should probably be continuous.
- With accurate enough oscillator it can extends 30s and longer if necessary.

11. Could you identify the needed Probability of Failure (or Integrity Risk) for Timing applications?

Answer:

- Yes

12. Do you agree with these requirements? The Timing & Sync system shall provide a warning if the Timing Error is larger than the Maximum Tolerable Error specified.

Answer:

- Yes
- Yes, very useful
- Now the question is how this warning will be provided

13. In the non-desirable case of the Timing solution being incorrect (either obtained with GNSS or otherwise), which should be the Time to Alert relevant for your operations/applications and why?

Answer:

- asap, being realistic 30 seconds is a fantastic result
- really can't say. Very dependent on how much is the error and the receiver.
- Maximum 30s and coherent with OSNMA sequence

14. In the non-desirable case of the Timing solution being incorrect, which would be the max duration of an incorrect solution which can be acceptable in the apps in your sector? Or for how long? Could you make a distinction?

Answer:

- time to alert is highly dependent upon alarming rules, so trade of between "nervous" and "conservative" response need to balance.
- If it is notified by alert, it can be few minutes.

- time-critical applications less than 1s, non-critical applications 10s
- For the case of personal mobile services, 30 sg is enough (navigation, communications…)
- In some cases 20 min

15. Are there any other requirements that you think might be needed for Timing and Synchronization applications?

Answer:

- Usable for future quantum systems

The session concluded with Hector expressing his appreciation for the active participation of all attendees who engaged with the Slido questions. He acknowledged the importance of their contributions, which would play a significant role in refining the user requirements for timing and synchronization. The feedback collected during the session was to be meticulously reviewed by the team, with the promise of follow-up discussions to resolve any unclarities or to delve deeper into specific suggestions.

The organizers brought the meeting to a close by thanking the participants for their valuable insights and for the lively interaction that took place during the session. The organizers highlighted that the collaborative nature of the meeting was instrumental in driving the industry forward and ensuring that the timing and synchronization services would continue to meet the high standards required by the various sectors. With a final note of gratitude, the meeting was adjourned, marking the end of a productive session dedicated to enhancing the user requirements for timing and synchronization.

Agenda Item 9 - Conclusions and closing remarks. Valeria Catalano, EUSPA

Valeria concluded the session with thanking all participants, acknowledging the speakers and Hector Llorca for their contributions to the meeting's success. She commended the timing and synchronization community for their participation and engagement in the series of events dedicated to this specialized field. Emphasizing the key theme of 'resiliency' discussed throughout the day, Valeria assured attendees that the feedback collected via Slido would be instrumental in refining the user requirements for timing and synchronization.

Valeria announced that the team would soon share the presentations from the meeting, and in the following weeks, the minutes and revised user requirements documents, segmented into infrastructure, energy, and finance, would be published. These documents would reflect the collaborative input from the community, addressing current and future needs.

2 OTHER NOTES & INFORMATION

With the contribution of:

3 ANNEXES & ATTACHMENTS

Annex 1: List of Attendees

Attachment 1: 'UCP 2024 Timing and Synchronisation' slides, EUSPA
Attachment 2: 'Update on Galileo Timing Service and standardization of Galileo Timing Receiver' slides, EC
Attachment 3: 'ITU-T SG15 Q13 view on the use of GNSS in Telecom' slides, Calnex
Attachment 4: 'GNSS for Telecom network synchronisation' slides, Orange Poland
Attachment 5: 'New GNSS resiliency concept for Critical Infrastructure' slides , Timing Solutions
Attachment 6: 'The role of timing in NG Railways' slides, Adtran
Attachment 7: 'UCP 2024: T&S User Requirements Validation slides, GMV

4 ANNEX 1: LIST OF ATTENDEES

#	Name	Organization
1		
2		

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