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1 PUBLIC ABSTRACT

The User Needs Analysis was prepared as part of DEMETRA a H2020 funded project. The document provides the results of an unbiased analysis of the timing needs of legitimate end-users in the following key market sectors:

- Agriculture
- Energy
- Finance
- Media
- Science
- Surveying
- Telecommunications
- Transport

Emphasis on finding 'legitimate' end users is present throughout the analysis to ensure that those who will play a crucial role in shaping the global demand are contacted. Firstly the analysis is in agreement with other studies [RD.02] that a 'time and synchronisation' market segment is present that concentrates all of the relevant stakeholders under one banner. The analysis has found that those who would fuel the time and synchronisation market segment and those that will drive it are not always the same groups of people. The best examples are those who are responsible to design network architecture and those who go on to procure and install timing equipment in the energy sector. Time correctness and services to ensure that are not currently considered, especially the latter. Two important factors are being driven by organisations at a different level who are concerned with *a)* security in society and *b)* the evolution of information in society.

On *a)* organisations will start to consider risk when procuring and installing timing equipment looking at resilience as an important factor. Legitimate end-users, those who procure and install timing devices will be mainly concerned with performance and not with the type of technology that is used. There is concern of how the selection, installation and maintenance of time and frequency sources, that are relied upon by critical infrastructures, is uncontrolled and systems remain susceptible to failure. The Department for Homeland Security produced a guide on "Best Practices for Improved Robustness of Time and Frequency Sources in Fixed Locations".¹

On *b)* organisations will consider what systems they will need to bring their traditional systems into the next generation of systems. Issues were cited with "Acquisition to information", the fact that a lot of data can be collected but to make it useful it has to be converted to information, too much information without knowing what to do with it.

Online research and interviews with key organisations operating within these sectors with interests in synchronisation were conducted. Data was collected, consolidated and analysed with the aim of reporting on the current use of time in industry, the current needs of legitimate end-users and to

¹<https://ics-cert.us-cert.gov/sites/default/files/documents/Best%20Practices%20-%20Time%20and%20Frequency%20Sources%20in%20Fixed%20Locations.pdf>



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identify what is important to be done to meet their needs. Simultaneously the GSA released their GNSS Market Report 2015 [RD.02] which corroborates the findings included in this analysis.

Synchronisation allows systems to operate in a time-coordinated way and facilitates collaboration amongst themselves and with physical world events. The requirement for synchronisation in some industries is not new but the growing level of attention that is being paid to it as a result of expanding system complexity is unprecedented. It has become a market segment in its own right, "Time and Synchronisation" with several decades already dedicated to addressing it. Every market sector industry studied has a relationship with synchronisation to a greater or lesser extent. The implications of not having a focused and co-ordinated approach to its development across all market sectors are better understood now than ever before.

An uncoordinated approach has led to critical infrastructures in society i.e. Power, Telecommunications, Transport, Public services, Emergency services etc. using, and therefore relying on a single, potentially unreliable, source of time to synchronise their systems. More importantly, many organisations are not aware how reliant they are on synchronisation and the impact of losing synchronicity to their business operations.

The importance of synchronisation is set to continue growing along with the movement towards: greater precision requirements (agriculture, surveying), expanding networks that need to be monitored and controlled in real-time (energy, media), increased vigilance on rapid financial transactions (finance), bigger data global sets to co-ordinate (science), ever increasing endpoints connected to the internet (telecoms), safety-critical systems (transport, telecoms), etc.

It has been found that apart from the telecommunications sector, there is a general lack of understanding on the importance of synchronisation. On the other hand there is strong developed voice on the subject of Resilient Positioning Navigation and Timing (RPNT), that is 'promoting' the importance of synchronisation from the point of view that relying solely on GNSS solutions is a mistake that harbours a serious risk to society. It is recognised that end-user needs actually come from *a)* organisations gearing up for a new future where everything is connected to everything and big IT Systems and Networks companies lead the way to informing legitimate end-users what they need and *b)* organisations pre-empting the standards and regulations that are on their way to be implemented and *c)* organisations that will start to consider risk when procuring and installing timing equipment looking at resilience as an important factor.

According to a recently released NIST TN [RD.04] an emphasis should be put on delivering Time as a Service. The DEMETRA project aims to address issues raised with the transfer of time by defining 'Timing Services'. With a recognised departure from technology based criteria for selecting time solutions to performance based criteria including risk, the following performance criteria and features have been identified as of importance:

- Accuracy at point of consumption
- Service continuity
- Security
- Verification



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- Latency
- Service provision support

This report will be used to ensure that the services being demonstrated by the DEMETRA project will match as best as possible the synchronisation needs of today's society regardless of the methods used.