

SFERA Webinar – 04/06/2020

Questions & Answers

This document contains all the questions sent through the chat and live during the SFERA webinar of 04/06/2020.

1. General / Introductory topics

In the presentation of the SFERA Stakeholder Workshop in Paris on 05/11/2018 there were 4 tests defined and performed with Live trains for the DAS on Thalys trains (Slides 20/21). Is there any additional information available about the outcomes?

Answer: We did the test on a Thalys from Paris to Amsterdam (and back) where we tested both a scenario in which the train is early and a second run where it was running late. This test was done in three countries (France, Belgium, Netherlands) with two different existing DAS systems (French & Dutch). Data needed for the run over the three countries were translated into SFERA format, assembled and preloaded in the tools, which were thus used as stand-alone DAS. All systems were functioning fine without interruption when crossing the borders.

When we talk about C-DAS producing advice for the driver, exactly what kind of outputs would be presented to the driver? Are they mere advice or would they imply the TMS to automatically adapt the train speed in real time?

Answer: The data that is displayed is an implementation of the DAS supplier, and is not handled by SFERA. SFERA would deliver the information to show speed, but also rolling or braking info is possible. This can be different depending on country rules.

What is the expectation regarding suppliers' level of absorbing SFERA protocols, i.e. can proprietary formats remain (after translation) or does it not matter?

Answer: Suppliers that deliver solutions that are compliant to the SFERA protocol will become more interesting for customers. Though it is not a mandatory standard (yet), Infrastructure Managers might restrict their TMS interface to "SFERA only" to avoid different parallel proprietary solutions for different Railway Undertakings. This might remain as an option in the IM-RU setup as the interface between RU server and DAS; note however that some countries may restrict their system to the IM-Train setup, where the on-board device must "speak" SFERA nevertheless.

There is no intention of imposing SFERA for information exchanged inside the elements provided by a given supplier. However, care must be taken so that the translation between SFERA and the proprietary format doesn't introduce loss of information or precision that would degrade performance of the overall system.

2. Use Cases

Is the following scenario included: A train equipped with C-DAS-O moves into an IM area equipped with C-DAS-C. Then is the advice from C-DAS-C or from C-DAS-O?

Answer: The IM chooses to implement C-DAS-C and/or C-DAS-O in the IM DAS-TS. The RU chooses to implement C-DAS-C and/or C-DAS-O in the DAS-OB (and the RU DAS-TS in the IM-RU setup). Upon handshake, both systems inform each other of the available function(s). The mode that will be used is whichever common functionality is available, with a priority given to C-DAS-O.

C-DAS-O is the main goal of SFERA as it is coherent with ATO GoA2 over ETCS. C-DAS-C has been provided to help existing networks who already have invested in C-DAS-C to continue using this mode until they can transition to C-DAS-O. Some IMs of the SFERA group plan only on providing C-DAS-O.

Do you see a SFERA standardisation for journey logging?

Answer: This use case wasn't studied in SFERA, and therefore the IRS doesn't give guidelines on this subject. In the SFERA scope, we included only the information that is needed for the operational use between the DAS and the TMS. The RUs can log this data using the SFERA protocol, either by transmitting the data from the DAS-OB to an RU log server on the ground, or by using the RU DAS-TS in the IM-RU setup.

Extending the scope of SFERA to include specific additional payloads for logging for post-operational use could be a change request for the maintenance phase.

3. Data Structure

In the document "Appendix G - SUBSET126_0.0.16-SFERA_071 Compatibility", is there an inconsistency? Within the Journey Profile Request Packet the excel cell G39 is not SFERA mandatory. But within the Journey Profile Packet the excel cell G52, the same data object - NID_TP, is SFERA mandatory.

Answer: This is a difference between a Journey Profile Request and the Journey Profile itself. In SFERA, it is possible but not mandatory to add the specification of a NID_TP (i.e. a Timing Point ID) in the Journey Profile request. This means that the on-board DAS/ATO is requesting the Journey Profile starting from that Timing Point. If no Timing Point ID is specified, the whole JP is requested.

On the other hand, a Journey Profile sent from ground to board must include at the very least one Timing Point, otherwise the journey will not have any boundaries on timing. Therefore, a SFERA message sending a Journey Profile must contain at least one TP.

If there is one source of truth for route data, who holds and maintains this data? Gradients are important and won't change, but line speeds and new stations will be an annual update, who will keep and update the data?

Answer: The infrastructure data is the responsibility of the Infrastructure Manager. This data can be sent for each train run, but also in bulk for e.g. S-DAS operation.

Regarding unique train ID: Did you address the question of how it can be ensured that the train ID / train running number is unique on an international level?

Answer: Train identification in SFERA can be made either with TAP/TAF ID or with OTN. In both cases, the identifier contains the railway company ID (UIC RICS Code). It is up to the company to make sure to provide unique train IDs within their company (and therefore also at international level, in combination with their RICS Code).

Does SFERA support Passenger or Freight mode for a service? How is it indicated in the schema?

Answer: SFERA supports freight and passenger trains. There is the possibility to specify in the Train Characteristics whether the train is a freight (P/G) or passenger train, following the Train Category (NC_TRAIN) defined in SUBSET-026. Note that the right brake force curve(s) in the Train Characteristics must be sent considering the braking mode that is supposed to be used by the train. Many other train characteristics (e.g. length, weight, rollout coefficients) can also be specified.

Where DAS is used in conjunction with signalling systems where the status of the signals ahead is not made available to other onboard systems, does SFERA support the dynamic provision of signal status to the DAS onboard? This would be useful to suppress the provision of advisory information to the driver when the train is approaching a red signal.

Answer: First, an additional interface to a driver input device or a signal identification system is independent from SFERA. Furthermore, as signals are different in the various countries, the SFERA philosophy is to communicate the impact of signals on the DAS algorithms in terms of speed profiles/speed restrictions, instead of communicating actual signal aspects.

SFERA concentrates on providing the anticipated information necessary for the calculation of the driving advice, and that could be anticipated by a TMS. In that context, giving the aspect of a signal (e.g. double red) was not considered necessary.

Additional elements that brought the SFERA Working Group to decide against an expansion of the scope of SFERA:

- The group decided that providing real-time signalling information to be transmitted from ground to board could lead to safety difficulties. Drivers could inadvertently start relying on this information, which could be problematic in the many situations where the data connection can be lost (GSM coverage).
- Current DAS implementations use other functions to cover that risk.

The reaction of the DAS on signalling is dependent from national rules and the “foreseeability” of the distant signal in warning status.

Case 1: If the TMS foresees that a signal is in warning status, the current journey profile could either end at the distant signal (or the brake intervention point) or the time window at the corresponding main signal is so late that braking is the only physical possibility to reach it.

Case 2: If the TMS foresees that the signal is open and in fact it is in warning status, drivers must react themselves on the warning signal.

Case 3: If the TMS foresees that the driver will need to stop at a signal that will be encountered at danger, a stop of “non-commercial safety” type can be generated.

Is the SFERA data exchange standard also based on the ONTIME project? ONTIME = Optimal Networks for Train Integration Management across Europe (start 2011 and end 2014).

Answer: The ONTIME project was one of the basic information for the SFERA project. The C-DAS-C is partly derived from ONTIME – with some additions gathered from first practical experience in Germany.

4. Communication Mechanisms

“Authorisation” sounded like “authentication” for how it was described during the webinar.

Answer: Of course, the documents describe the mechanism in more detail and both authentication and authorisation are covered by the standard. Authorisation is meant at the level of the train.

Communication layer will be assured mainly by 5G protocol, can we have more information?

Answer: Any connection supporting IP should be possible (e.g. 3G, 4G, 5G...).

Is an integration of a TLS PKI infrastructure required and/or planned to secure the data communication?

Answer: Securing data communication has different aspects. For protecting data in transit against eavesdropping and manipulation TLS is required for the MQTT connection, with server verification, not client verification. For authentication/authorisation, JSON web tokens are used with asymmetric key signing. This requires the exchange of public keys between RU and IM.

SFERA does not prescribe the way how certificates/public keys are exchanged, either through a common PKI, public PKI or manual process.

5. Maintenance and UIC processes

How to have more info about the maintenance group?

Answer: How the maintenance will work is described in the IRS. Requests for more details & inquiries can be sent to either the UIC Project Manager or to sfera@uic.org and will be processed.

How to join the UIC Maintenance group and does it cost us to join?

Answer: This happens through the project management team at UIC, but an e-mail can be sent to sfera@uic.org for support on transferring the request and fulfilling the steps for opting in.

The first step for UIC members is to show interest in an opt-in project. UIC proposes a global budget that will be used for this project; the budget will then be split among all opt-in members showing interest, based on the size of the company and its activity. This is done in almost the same way as the calculation for the UIC member fee.

UIC members who have shown interest will be able to have a final say on whether to join the project before the end of September. By the end of September, the SFERA maintenance group will be created.

How to join the User Group? Are there already plans for the organisation of this group? Is UNIFE also involved in the User group?

Answer: There is a network of stakeholders which has been involved in workshops (including this webinar). This is in practice the “User Group”. It will just be a new name for this stakeholder group: the User Group is anyone who wants to give feedback to the SFERA protocol and submit change requests or implementation feedback. The SFERA Maintenance Group (made by the UIC members that have opted in) can work on your feedback. The UIC SFERA Maintenance Group and the SFERA User Group will always interact to keep the SFERA protocol (IRS and Appendices) up to date.

Will there be a bulletin board and / or zoom meetings for the user group as well, to exchange experiences?

Answer: UIC is thinking of the best, modern, way to support the implementation and further development of the Standard. For example, a Wiki with active contributions and source code examples.

Is the maintenance group also open to DAS suppliers?

Answer: The SFERA maintenance group is restricted to UIC members. DAS suppliers will be able to take part in the User Group to improve the IRS 90940 and share experiences.

Are you planning to provide a mapping between RailML and SFERA?

Answer: Yes, it’s already done. We are in the process of verification of this conversion table with RailML. It will be publicly available.

6. ATO over ETCS

What is ERA's view on SFERA - do they support its use for AoE applications?

Answer: This is a question that should be addressed to ERA. There is no formal statement so far, but the SFERA WG is in contact with ERA.

Could the C-DAS interface with ATO? Is ATO over SFERA technically possible or planned?

Answer: The communication that we have developed in SFERA can be used to communicate with ATO. It depends on how the device itself is connected with the train, if ATO is possible. The same information that is used in SUBSET-126 will be used in SFERA, but we have extended the data so it's possible to use it for ATO also on Class B lines. This can be done if it's sufficiently safe to run (that has to be assessed independently of the protocol). NS is planning an ATO test over a Class B line by the end of 2020 using SFERA.

Is an exchange/synchronization planned between TWG Train ARCHI and SFERA Project?

Answer: This is not planned at the moment.

Can you provide us the projects where you intend to operate ATO (GoA2) over the class B system?

Answer: SFERA will probably be used mostly on communication with DAS and in many cases on tablets, so not in ATO mode. But it can also be that a train equipped with ATO is also running a big part of the trajectory or very frequently on lines without ETCS; in those cases, it might be better to use SFERA. Using ATO on Class B systems, then that Class B system must have a security level similar to ETCS FS. NS is planning an ATO test over a Class B line by the end of 2020 using SFERA.

How will GoA2 over class B work with ATO over ETCS?

Answer: It is indeed difficult to use SUBSET-126 for GoA2 over class B. According to SUBSET-125 and SUBSET-126, the ATO is disengaged while leaving ETCS FS (not all operational conditions are fulfilled). The SUBSETs developed under the ATO over ETCS project are designed for the situation of an ATO on a train equipped with ETCS FS running on lines with ETCS FS. It is even intended to be a future version of EVC able to communicate with ATO on-board using SUBSET-130. Obviously, supplier-specific implementation is possible with older EVC.

But extra data needed to be able to operate GoA2 over class B is out of scope for ATO over ETCS. The SFERA protocol has the elements needed to include other data needed for other ATP systems. But obviously GoA2 won't be possible on most other ATP systems (including ETCS LS). A safety assessment is needed before starting to operate GoA2 over class B.

We want to investigate during the next years if ATO over class B systems is indeed possible while using the SFERA protocol. Some initiatives have already started. Outcomes and learnings will be communicated within the SFERA users group.