ΜΕΤΡΟ ΘΕΣΣΑΛΟΝΙΚΗΣ
ΑΤΤΙΚΟ ΜΕΤΡΟ Α. Ε.

TITLE OF THE TENDER: **"PROCUREMENT AND INSTALLATION OF THE BUILDING AUTOMATION AND CONTROL SYSTEM (BACS) IN THE THESSALONIKI METRO EXTENSION TO KALAMARIA"**

RFP-327/17 Α.Σ. 48966

CLARIFICATIONS DOCUMENT

This Clarifications Document is issued in accordance with the stipulations in paragraph 9.2 of the Invitation to Tender and incorporates responses to question submitted.

The content of the Clarifications Document is viewed as an integral part of the Invitation to Tender.

A. RESPONSES TO QUESTIONS

Question 1
The provided technical information is not sufficient in order to allow a third company other than the manufacturer to approach in technical and financial terms the specific interface. Therefore, we request the provision of key technical information, such as the system's structure and operation, the incorporated materials (make, models, architecture, data transfer chart), as well as the interface options, so as to render possible the preparation of a conceptual design for the Financial and Technical Offer.

Response 1
All the aforementioned items are covered by the responses to the subsequent questions (3-8).

Question 2
As regards the requirements pertaining to the technical competence of the bidders, the following are stated in article 13.3.1 of the Invitation:

13.3.1 *Minimum preconditions for Technical Competence*

> In view of participating in this Tender procedure, the Bidders shall possess **experience similar to** the experience required on the basis of this procurement, during the 2007 – 2017 time period.

> Experience similar to the experience required on the basis of this procurement means the design, supply, construction and commissioning of at least one building automation and control system (BACS) for local and central control in a Metro Project.

The above requirement severely restricts the number of companies that can participate in the tender procedure.

Given that only the Athens Metro project has been constructed and completed in Greece, the candidate Contractors are limited to the respective Contractors of the Athens Metro project, a fact that does not safeguard the public interest, since it decisively restricts the participation and reduces the competition among bidders.

Given that the road and railway tunnels are projects similar to the tendered projects, bidders possessing experience on such projects must not be disqualified from the tender procedure.

Our company has implemented numerous automation projects and it will suffice to briefly present the technical data of the project entitled: **"Egnatia Odos: Development of SCADA/TMS applications and execution of the remaining E/M works in the section Igoumenitsa junction to Ioannina junction", a project with a design budget rising to 10,000,000 €**.

This project was constructed in the period 2010-2013 and contains the following systems in brief:

1. Light signals

2. IP telephones / CCTV

3. Communication systems

4. Tunnel ventilation

5. Control systems

6. Fire detection and lightning protection

The above systems 3, 4, 5 included functions and equipment identical to those of the current supply.

As an example, we cite the following systems:

- Active equipment of communication systems: 50 switches, 18 out of which at 1000Mbps
- 170 km of fiber optic
- Forty two (42) PLC panels with over 4,500 points (D I/O, A I/O) and dozens of serial communication ports with other systems (power switchboards, UPS, generating couples, etc.)

  Seven (7) out of the above 42 PLCs operated with redundancy (twin CPUs).

- Two (2) SCADA systems, each installed in two hot stand-by servers, for supervision, control, operation and data filing for a stretch 70 km long.
- Five (5) local SCADA systems (one in each Tunnel Control Centre) capable of executing ventilation, traffic regulation scenarios, fire scenarios etc.
- PLC software for control of ventilation, lighting and the associated tunnel equipment (Automatic Fire Extinguishing, Fire Detection, Generating Couples, etc.).
  Ventilation scenarios in case of fire, tunnel evacuation, etc.

- Control Software for the Tunnel Control Center Buildings.
- Traffic Management System software for the entire length of Egnatia Odos, for normal and emergency operation conditions using signaling equipment.
- Unification of 3 independent systems at SCADA level (two existing and one new system) using different customization software (WinCC, Genesis).
- The DFD prepared by our company for the project's implementation contained at least 10,000 electrical and communications drawings.

Taking the above into consideration, we see that the tendered project does not have a requirement which is not also a requirement for the Egnatia Odos project, which we constructed and briefly presented to you.

The eventual assertion that we could participate using borrowed experience is unfounded, because there is a cost involved in borrowed experience; at the same time, we would pay for experience for a project clearly less complex, fewer requirements and less extent compared to the project we have constructed and this would be irrational.

Besides, borrowed experience in combination with article 19 of the Invitation renders meaningless the participation in the Project using borrowed experience.

Whereas:

- Our company has constructed a similar project of high complexity, more extensive and with similar requirements.
- The disqualification of our company from the tender procedure on trivial grounds is harmful to our interests and violates the principle of equal treatment of the bidders.
- For reasons of public interest, it is imperative to have the wider possible participation of bidders in the project, who shall have the essential qualifications to execute the project.

We request:

- To have article 13.3.1 of the Invitation amended in a way that permits our company to participate in the subject tender procedure.
- The second paragraph of article 13.3.1 could be phrased as follows:

  "Experience similar to the experience required on the basis of this procurement means the design, supply, construction and commissioning of at least one automation and control system for local and central control in a Metro or road tunnel Project".

Response 2
In line with article 13.3.1 of the Invitation to Tender: "Experience similar to the experience required on the basis of this procurement means the design, supply,

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construction and commissioning of at least one building automation and control system (BACS) for local and central control in a Metro Project".

In order to ensure the perfect and workmanlike commissioning of the building automation and control system (BACS) in its specialized project, it is AM's standard practice to require participants to possess experience in Metro related Projects.

Therefore, paragraph 13.3.1 of the Invitation to Tender remains as is, taking into consideration that the subject requirement constitutes AM's option and an essential term of the Invitation, which cannot be amended.

Question 3
Please confirm that the controllers of the HVAC and other E/M systems of the Base Project stations are not required to exchange information with the stations of the extension. In case this is not confirmed, please provide details of the relevant equipment, including at least the parts' code, communication protocol and/or protocols, network architecture and anything else required for this communication.

Response 3
The HVAC and E/M PLC of a given station work as standalone and are not required to communicate to adjacent stations.

The BACS equipment (e.g. OTE, BSF, SAF PLCs) which are used for emergency ventilation strategies, based on the Base Project contract requirements, are required to exchange communicate with adjacent stations (to the OTE PLC panel).

The communication is based on Ethernet TCP/IP.

For network structure, please refer to BACS integrated architecture document 1G00PS250R789B. Figure 3-3 Overall BACS and figure 3-5 CBACS hardware architecture.

Question 4
You are requested to inform us on the following data about SCADA Cimplicity:

1. Detailed Version and License scheme.

2. Capacity of the existing Cimplicity.

    2.1 It is expandable, so as to include additional points along the extension to Kalamaria.

3. Installed communication protocols, which can be used immediately without requiring license extension.

Response 4

1. Cimplicity version is the most recent version (v.10).
2. Yes, at OCC the license is HMI Cimplicity UNLIMITED.
3. Depends on the PLC to be installed in the extension. Drivers for main PLC suppliers are already included in the Cimplicity framework, otherwise for small suppliers drivers may need to be purchased.

Question 5

Regarding the SIL2 SCADA of the Base Project, please provide the following information:

1. Detailed data, including as a minimum: its trade name, manufacturer, version, codes of its constituent parts, type and number of licenses, expandability etc.

2. Typical station network architecture.

3. Architecture of the network between the stations and the OCC/ECR.

4. Detailed data concerning the type of controllers implementing the SIL2 scenarios, including as a minimum parts' code, manufacturer etc.

5. Architecture of the network connecting the controllers which implement the scenarios in combination with SIL2 SCADA.

6. Data flow chart with description of the protocols utilized in the following cases:

   6.1 Typical station (SIL2 SCADA and controllers)
   6.2 Between stations N and N+1 (SIL2 SCADA and controllers)
   6.3 OCC/ECR SIL2 SCADA and of stations

7. Which are the supported communication protocols?

8. SIL2 SCADA is capable of communicating with systems, materials, controllers by manufacturers other than the existing ones.

Response 5

1. This is a specific application developed *adhoc* for the Base Project by Engineering SpA based on two operating systems (Windows & Linux) and two frameworks (DotNet & Qt) to adhere to contractual requirements and IEC61508 & CENELEC Standards specification for SIL 2 safety functions.

   For configuration of new workstations at OCC and SMR level, instructions and manuals will be provided at the end of DFD to configure e.g. new points, alarms, etc. that are unique for each station.

Note that, in any case, the generic application must be configured and parameterized for each station.

In the OCC there are two workstations (one is Linux, one Windows). For the SMRs there is a local application that manages the specific station based on a framework alternating from one station on the next (e.g. in one of the line is Linux + Qt, in the adjacent is Windows+DotNet).

However, please note that any new development must be compatible with the SIL 2 assessment performed for the Base Project. In other words, validation tests (regression testing) need to be repeated and finally delta SIL 2 assessment must be performed for the Complete Line (Base Project + Extension).

This assessment requirement, due to modifications on an existing and already assessed system, is always valid for the extensions for both COTS-based and custom applications.

2. Please refer to 1G00PS250R789B, 1G00PS250C702 and 1G00PS258C702.

3. Please refer to 1G00PS250R789B, 1G00PS250C702 and 1G00PS258C702.

4. For tunnel ventilation scenarios, the PLCs are Schneider Electric M580 family Safety.

5. Please refer to 1G00PS250R789B and 1G00PS258C702.

6. For available information, please refer to 1G00PS250R789B and 1G00PS258G105.

7. Please refer to the Architecture specification document that describes the characteristics of the safety protocol: 1G00PS258G105.

8. For the Base Project, it is configured to communicate with Schneider Electric PLC M580 (certified for SIL 3 applications), for which a driver has been developed.

   To use other PLC, you have to either buy or develop the specific driver, in order for the system to be able to communicate.

Question 6
Paragraph 4.1 of the Technical Description for the Base Project states the following:

All Tunnel Ventilation Systems are controlled via the SCADA system with the trade name Cimplicity by the company GE. However, it is necessary to use the Tunnel Ventilation Systems in order to activate the emergency scenarios which are managed by the independent SIL2 SCADA system.

1. Please clarify the way in which the 2 control systems interact with the same equipment.

2. Is there communication between the 2 SCADA systems?

Response 6
1. In case of different commands coming from SIL 2 BACS and SIL 0 BACS, the field PLC will assign higher priority to the SIL 2 BACS. The field PLC inhibits and discards (as SIL 3 safety function) commands from SIL 0 BACS to ensure a safe segregation as highly recommended by IEC61508 and CENELEC EN50128 for the safety-related systems.

2. No, to ensure the safe segregation as dictated by IEC61508 and CENELEC.

Question 7
Point 1.3, page 5/87 of the Document entitled "Design, Performance, Material and Workmanship Specifications" states that "the scope of this Project shall include all necessary upgrading, modifications – to the extent required - to the existing BACS systems destined to be installed in the Base Project".

Moreover, paragraph 6.2 of the "Design, Performance, Materials and Workmanship Specifications" states that two SCADA software shall be used in the Base Project BACS system.

Finally, paragraph 6.2 of the "Design, Performance, Materials and Workmanship Specifications" requires the Contractor to interface the equipment in stations and tunnels with the original "Cimplicity" control and surveillance system, as well as with SIL2 SCADA.

Kindly clarify the precise number, time, architecture and releases of the installed BACS software for the Base Project, as well as the other hardware equipment both at OCC & ECR level, as well as at stations level.

Response 7
Please refer to 1G00PS250R789B, 1G00PS250C702 and 1G00PS258C702.

Question 8
IPage 17/85 of the "Design, Performance, Material and Workmanship Specifications" chapter 6.1 states that the Station Master Room (SMR) (and respectively the OCC) is fitted with PLC, PLC panel and workstation for monitoring and activation of emergency scenarios.
Please clarify whether it is necessary to install an additional PLC in the Station Master Room (and in the OCC) to connect with the PLC Panel, given that the PLC Panel shall be capable to be directly interfaced with the offered PLCs of the BACS control panels.

Response 8

In the Base Project, the implementation of Safe BACS workstation requires a Safe PLC (Schneider Electric M580 family Safety), which has two main functions:

1. To check the workstation computer to ensure safety integrity level (SIL 2) for the HMI;
2. To communicate with the field PLCs.

B. FILES ATTACHED HERETO

- 1G00PS250C702A

- 1G00PS250R789B

- 1G00PS258C702A

- 1G00PS258G105A