Project:	"Maritza East 2" TPP
Subproject:	Group control of generators' excitation
Design:	"Start Engineering" JS Co.
Main contractor:	"AMEES" Ltd.
Subcontractors:	Design (hardware and software), delivery of equipment, mounting and putting into operation
Kinds of activities:	Four of the eight generators are completed
Performance:	

Short information concerning the project:

The project was carried out by "Start Engineering" JS Co. specialists – branch Automation and by specialists of the sub-contractor "AMEES" Ltd.

The system is built upon two levels: technological control level and operator and system engineer level. The technological control level consists of PLC Telemechanique TSX 3722 Micro – one for each generator and one in Switchyard, and the operator level – from operator stations, which are placed one in each Control room and one main operator station. The controllers and the operator stations communicate by means of industrial field bus FIPWAY, as well as between the operator stations a TCP/IP network communication is realized.

The following conditions of work are anticipated:

- Autonomous work – conditions, which are normally used when a single generator works via the respective bus system.
  The following criteria for wok are possible to choose in during autonomous conditions:
  - maintenance of permanent cos φ
  - maintenance of permanently generated reactive power Q
  - maintenance of permanent voltage of HV buses, to which the relevant generator is connected
  - maintenance of the minimal possible (to a restrain) produced reactive power
  - maintenance of the maximal possible (to a restrain) produced reactive power.

- Group work – a regime, during which two generators are working in the relevant bus system.
  This regime has for purpose to maintain the voltage on 400 kV buses (220 kV, 110 kV) in a range of ±0,5 from the setpoint of the daily (nightly) schedule.
  In such a case, each generator takes part in the control process, proportionally to its resources, defined out of the following parameters:
  - P, Q diagram
  - Ur
  - Uсн
  - rotor current
  - stator current

  In this way is assured the choice of the generator, which has to be controlled during a concrete disturbance, to be in accordance with the available relative reserve, according to one of the parameters stated above.

The setpoint and the type of work during an autonomous regime are defined by the Engineer on duty and are entered by the operation personnel. The setpoint for group control is given:

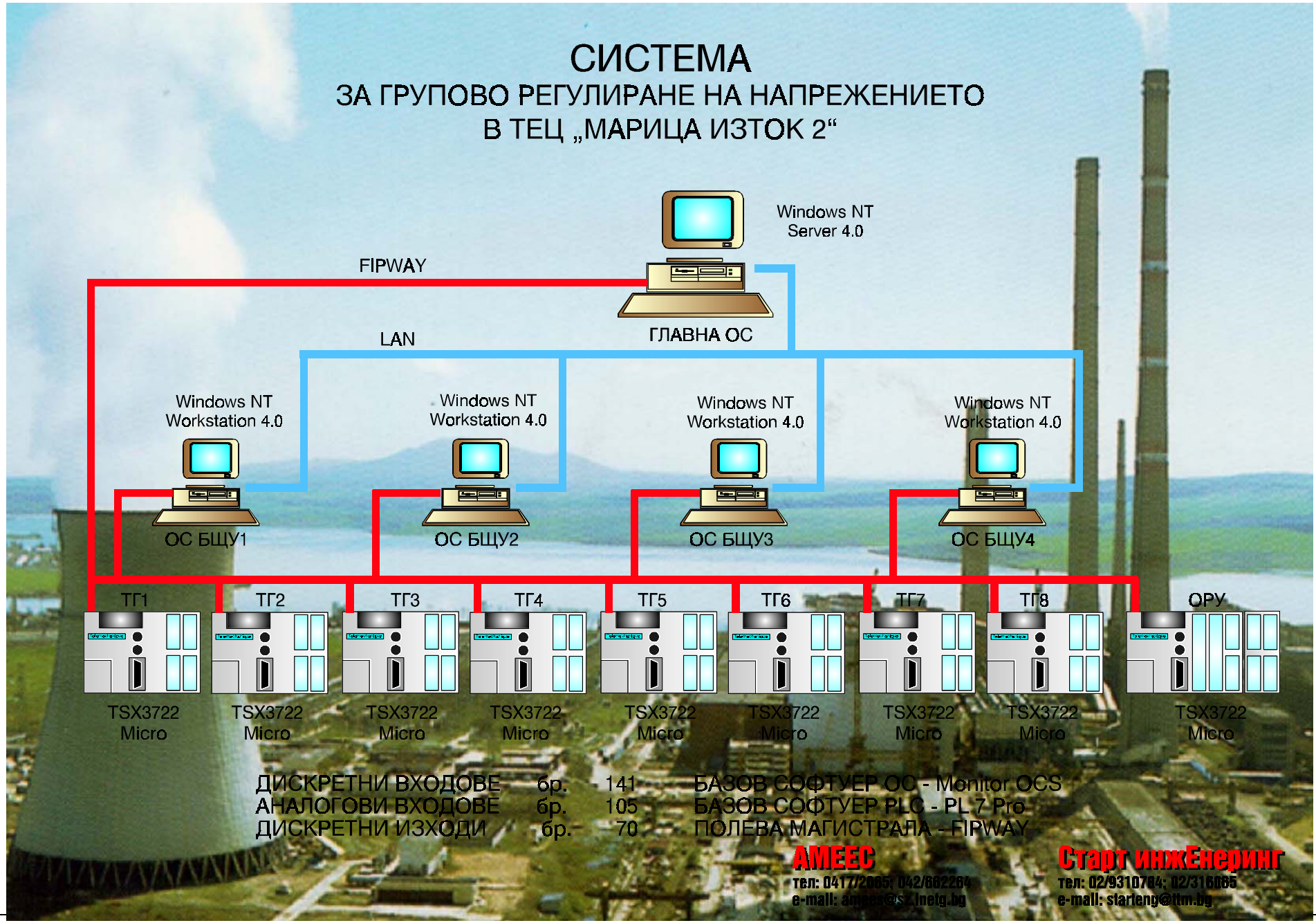
- by the Engineer on duty
- by the CDM (Central Dispatch Management) – by means of a tele-channel

As a result, the Central Dispatch Management can:

- give a setpoint for the voltage of HV buses, which should be maintained in "Maritza East 2" TPP
- check if the Group control of generator's excitation system works according to the dispatch setpoint (or the one of the Engineer on duty)
- find out when a condition for restriction of the Group control of generator's excitation system has entered the system
- give an account of the momentary values of the bus system voltage.

The application software for the Group control of generator's excitation, realized in the system generates database-files, in which, on every 10 seconds the values of the following discrete and analogue constants are registered and are visualized in trends. Furthermore, all the diversions from the normal work of the system, as well as the considerable events and the operators' action that took place, are brought out in mnemonic schemes with messages and are kept in text files for further analysis of the work of the generators and the adequate intervention of the operating personnel.

СИСТЕМА
ЗА ГРУПОВО РЕГУЛИРАНЕ НА НАПРЕЖЕНИЕТО
В ТЕЦ „МАРИЦА ИЗТОК 2“



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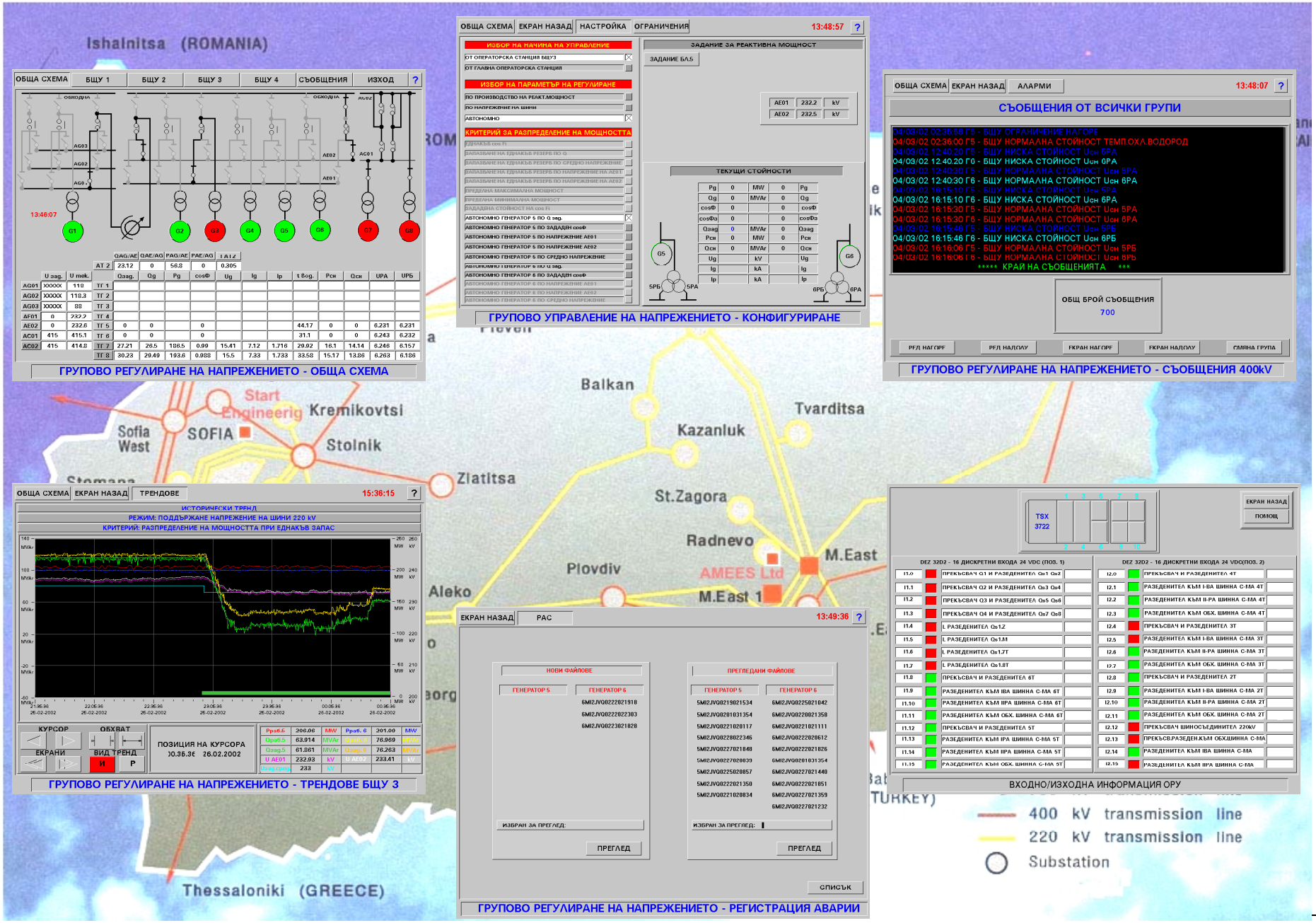
Ishalnitsa (ROMANIA)
ОБЩА СХЕМА
БЩУ 1
БЩУ 2
БЩУ 3
БЩУ 4
СЪОБЩЕНИЯ
ИЗХОД
ГРУПОВО РЕГУЛИРАНЕ НА НАПРЕЖЕНИЕТО - ОБЩА СХЕМА
ЕКРАН НАЗАД
НАСТРОЙКА
ОГРАНИЧЕНИЯ
ИЗБОР НА НАЧИНА НА УПРАВЛЕНИЕ
ЗАДАНИЕ ЗА РЕАКТИВНА МОЩНОСТ
ИЗБОР НА ПАРАМЕТЪР НА РЕГУЛИРАНЕ
КРИТЕРИЙ ЗА РАЗПРЕДЕЛЕНИЕ НА МОЩНОСТТА
ТЕКУЩИ СТОЙНОСТИ
ГРУПОВО УПРАВЛЕНИЕ НА НАПРЕЖЕНИЕТО - КОНФИГУРИРАНЕ
АЛАРМИ
СЪОБЩЕНИЯ ОТ ВСИЧКИ ГРУПИ
04/03/02 02:35:58 Г6 - БЩУ ОГРАНИЧЕНИЕ НАГОРЕ
04/03/02 02:36:00 Г6 - БЩУ НОРМАЛНА СТОЙНОСТ ТЕМП.ОХЛ.ВОДОРОД
04/03/02 12:40:20 Г6 - БЩУ НИСКА СТОЙНОСТ Uон 6РА
04/03/02 12:40:20 Г6 - БЩУ НИСКА СТОЙНОСТ Uон 6РА
04/03/02 12:40:30 Г6 - БЩУ НОРМАЛНА СТОЙНОСТ Uон 6РА
04/03/02 16:15:10 Г6 - БЩУ НИСКА СТОЙНОСТ Uон 6РА
04/03/02 16:15:10 Г6 - БЩУ НИСКА СТОЙНОСТ Uон 6РА
04/03/02 16:15:30 Г6 - БЩУ НОРМАЛНА СТОЙНОСТ Uон 6РА
04/03/02 16:15:30 Г6 - БЩУ НОРМАЛНА СТОЙНОСТ Uон 6РА
04/03/02 16:15:46 Г6 - БЩУ НИСКА СТОЙНОСТ Uон 6РБ
04/03/02 16:15:46 Г6 - БЩУ НИСКА СТОЙНОСТ Uон 6РБ
04/03/02 16:16:06 Г6 - БЩУ НОРМАЛНА СТОЙНОСТ Uон 5РБ
04/03/02 16:16:06 Г6 - БЩУ НОРМАЛНА СТОЙНОСТ Uон 6РБ
***** КРАЙ НА СЪОБЩЕНИЯТА ***
ОБЩ БРОЙ СЪОБЩЕНИЯ
700
ГРУПОВО РЕГУЛИРАНЕ НА НАПРЕЖЕНИЕТО - СЪОБЩЕНИЯ 400kV
Balkan
Tvarditsa
Kazanluk
Start Engineering
Kremikovtsi
Sofia West
SOFIA
Stolnik
Zlatitsa
St.Zagora
Radnevo
M.East
Plovdiv
AMEES Ltd
M.East 1
Aleko
Thessaloniki (GREECE)
TURKEY
ОБЩА СХЕМА
ЕКРАН НАЗАД
ТРЕНДОВЕ
ИСТОРИЧЕСКИ ТРЕНД
РЕЖИМ: ПОДДЪРЖАНЕ НАПРЕЖЕНИЕ НА ШИНИ 220 kV
КРИТЕРИЙ: РАЗПРЕДЕЛЕНИЕ НА МОЩНОСТТА ПРИ ЕДНАКЪВ ЗАПАС
КУРСОР
ОБХВАТ
ЕКРАНИ
ВИД ТРЕНД
ПОЗИЦИЯ НА КУРСОРА
ГРУПОВО РЕГУЛИРАНЕ НА НАПРЕЖЕНИЕТО - ТРЕНДОВЕ БЩУ 3
ЕКРАН НАЗАД
РАС
НОВИ ФАЙЛОВЕ
ПРЕГЛЕДАНИ ФАЙЛОВЕ
ГЕНЕРАТОР 5
ГЕНЕРАТОР 6
ИЗБРАН ЗА ПРЕГЛЕД:
ПРЕГЛЕД
СПИСЪК
ГРУПОВО РЕГУЛИРАНЕ НА НАПРЕЖЕНИЕТО - РЕГИСТРАЦИЯ АВАРИИ
TSX 3722
ЕКРАН НАЗАД
ПОМОЩ
DEZ 32D2 - 16 ДИСКРЕТНИ ВХОДА 24 VDC (ПОЗ. 1)
DEZ 32D2 - 16 ДИСКРЕТНИ ВХОДА 24 VDC(ПОЗ. 2)
ВХОДНО/ИЗХОДНА ИНФОРМАЦИЯ ОРУ
400 kV transmission line
220 kV transmission line
Substation