



Client: Various

Plant: Tunnel

SUPERVISION & CONTROL MARINASCO TUNNEL (Genoa)

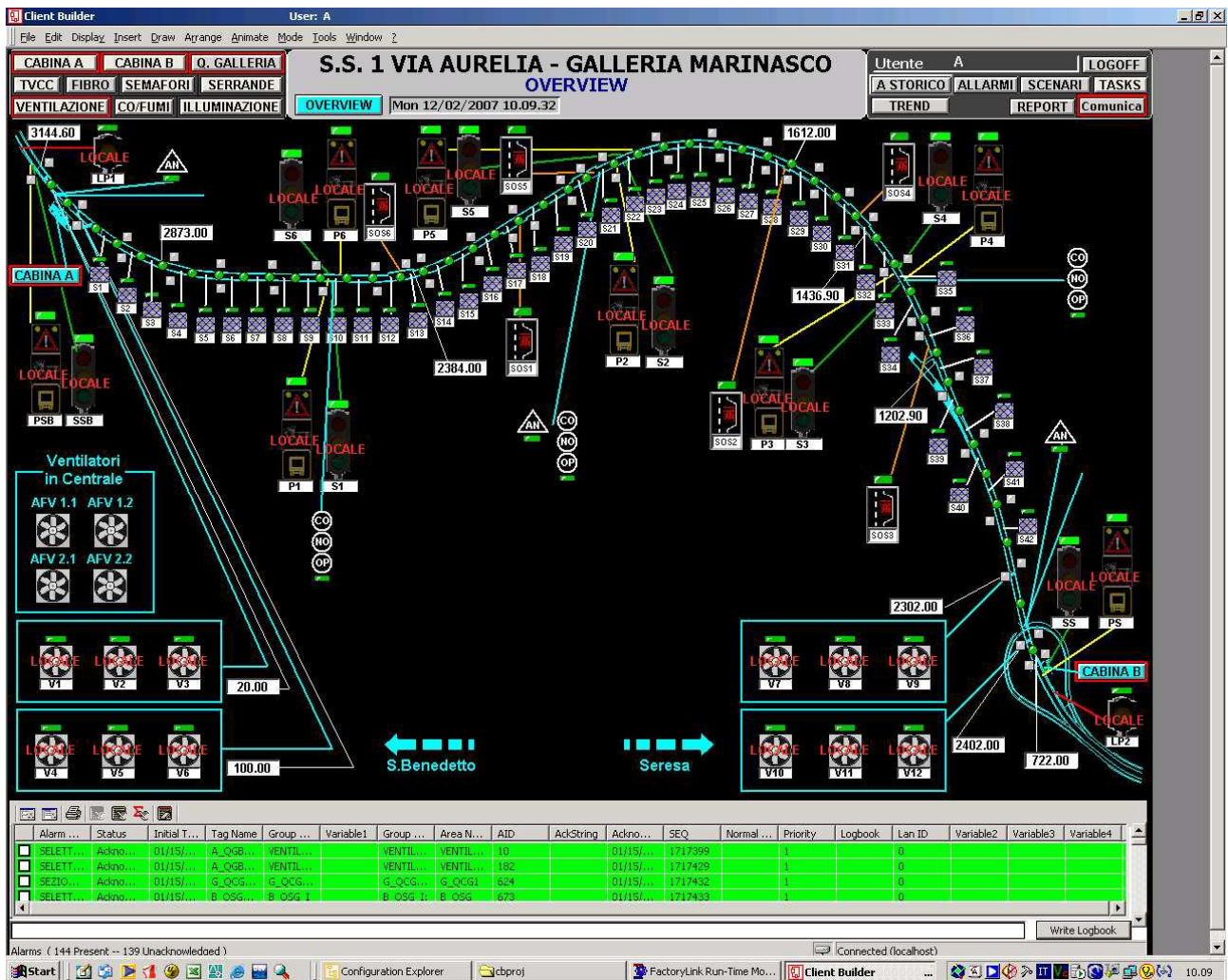


Figure 1: Snapshot Overview of Supervisor PC

System architecture and configuration

- Network: Ethernet
- Supervision: Factory Link
- DataBase SQL Server
- PLC Schneider



Functional specifications

The system entails the management and supervision of a control and monitoring system for the Marinasco tunnel near Genova - La Spezia.

The “Tunnel” system manages the control and supervision of the plant assets and events that are current or that may occur inside the Marinasco Tunnel. The system oversees the following areas:

- Lighting
Automatic management of all lighting elements and signaling of permanent lights, strengthening, semaphores.
- Ventilation
Automatic or Manual Programmed management of all ventilation apparatus (shutters, central ventilators, booster ventilators).
- Scenarios
Programmed management of event sequence management of all lighting, ventilation apparatus against current event status or occurrence.
- Electrical
Visual of all assets controlled in the tunnel with electrical drawing layout.

Plant specifications

Il sistema realizzato si occupa del controllo e della supervisione delle seguenti aree/sistemi:

- TVCC: Supervision TVCC status
- SEMAPHORES: Control e supervision of SEMAPHORES
- CO/FUMES Supervision CO/FUMES status
- FIBROLASER: Supervision FIBROLASER status
- SHUTTERS: Control and supervision SHUTTERS status
- LIGHTING Control and supervision LIGHTING
- VENTILATION Control and supervision VENTILATION
- TUNNEL SWITCHBOARD Control and supervision TUNNEL SWITCHBOARD
- SCENARIOS Control and supervision SCENARIOS
- ROOM A Control and supervision ROOM A
- ROOM B Control and supervision ROOM B

Tunnel system

The “Gallery system” reacts to pre-determined scenarios or upon specific events taking place.

In the presence of specific scenarios of alarms/events the system reacts with the relevant response arranging specific functionality to all assets which are evolved and related to the specific scenario.



Ventilation System_ atmosphere, traffic and fumes evacuation control

The entrance to the tunnel is equipped with a ventilation unit which in case of heavy traffic renews the environment by pulling in fresh air and pushing out the stale one.

In normal conditions the central ventilators send fresh air in the tunnel through servo controlled shutters.

The system also controls:

- **Induction fans**
Induction fans, positioned near the entrance to the tunnel control the longitudinal speed of the air so as to have, in case of fire, extraction of fumes coming from where the fire has developed.
Longitudinal Speed measuring is done by anemometers located at the entrance of the tunnel.
- **Shutters**
Shutters, positioned at the vertex of the tunnel are maneuvered, in case of fire, by the fumes extraction control system or used to introduce fresh air in normal conditions. Test drills are periodically made to insure functionality.
- **Atmospheric control and regime ventilation regulation**
E' previsto un sistema di controllo atmosferico (Co, NO, opacità dell'aria OP, velocità dell'aria in galleria) e di misura del traffico entro la galleria, utilizzato per la regolazione dei regimi di ventilazione nelle diverse condizioni di traffico al fine di mantenere la concentrazione degli inquinanti sotto i valori di soglia.
- **Tunnel air amount and throughput control**
Air quantity and throughput are regulated by fan speed, can be programmed and is automatic on the basis of defined threshold values.
- **Definition of Ventilation Rules**
Ventilation rules are programmable and can be widely grouped in context: Night or low traffic, Normal, Health, Fire.

Every ventilation regime takes place when respective conditions are met, albeit with activation priorities which are:

- **Fire** : in case of fire; top priority on any other scenario
- **Health / Fumes bottleneck** s: activates the scenario for ventilation and pollution control take the FIRE scenario has not taken priority.
- **Day / Night**: does not represent any emergency scenario and regulation is substantially done exclusively on the basis of traffic flow and time bracket.



Lighting system

Visibility inside the tunnel is achieved with three different lighting schemes.

- Permanent lighting to enable visibility inside the tunnel;
- Re enforcing light at the entrance to compensate internal external light shift;
- Emergency lights to maintain minimum visibility even in case of blackout.

General specifications

- System security: Every section of the SCADA is profile-protected and every user is associated to one or more safety profiles. User identification is achieved by a USERID and Password given by the system administrator. The access level is totally configurable (from only visual to full control).
- Asset management: Every asset of the system is presented graphically. Asset selection opens a POP UP containing specific information pertaining to the asset itself besides functional buttons that manage and control its functionality.
- Trends management and display: The trend pages display how the plant values change in time and their historical values. Trend display can be performed for all analogical entities which at defined intervals are stored and re-displayed according to given parameters. Pen style and color matching are operator-definable.

