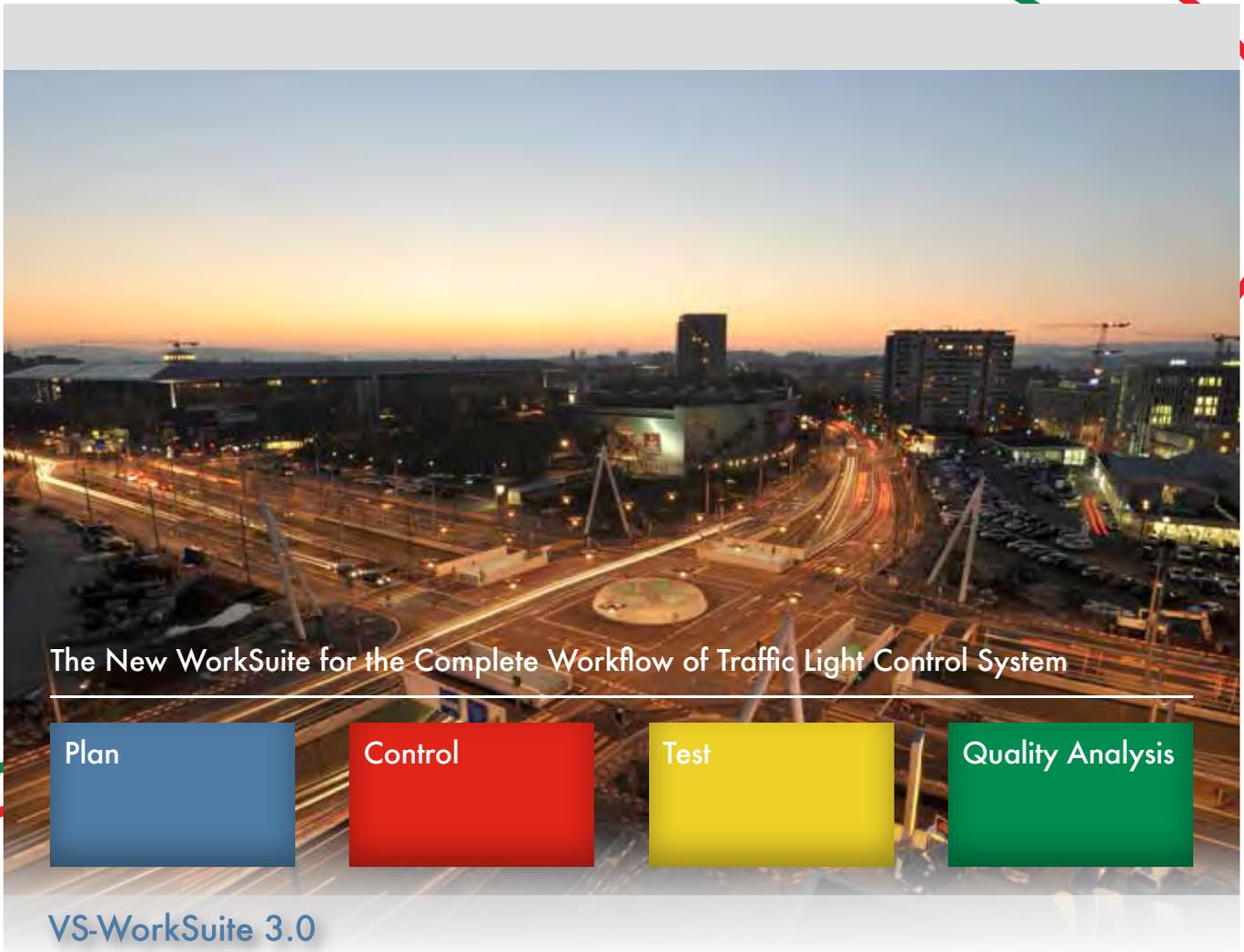
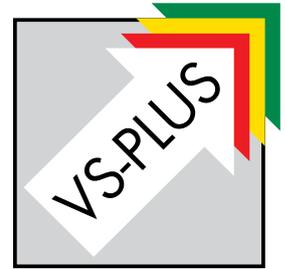


Verkehrs-Systeme AG

NEUTRAL, INDEPENDENT, STANDARDIZED



The New WorkSuite for the Complete Workflow of Traffic Light Control System

Plan

Control

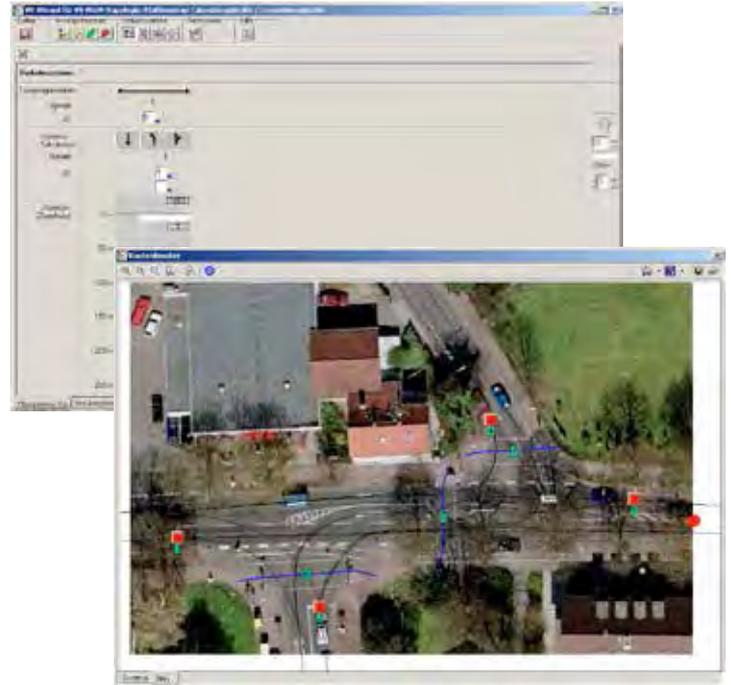
Test

Quality Analysis

VS-WorkSuite 3.0

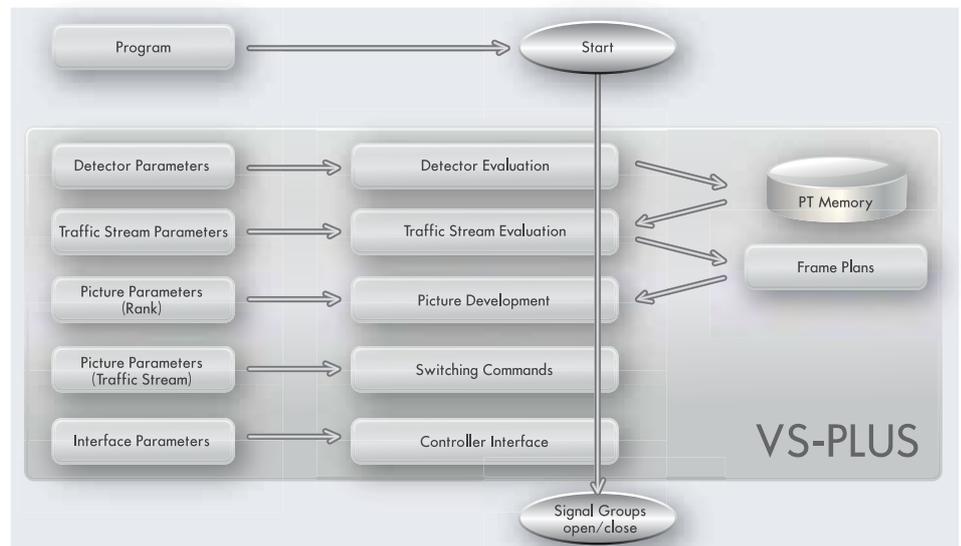
VS-Wizards Make Your Work Much Easier

In order to simplify and speed-up planning and parameterization, the new VS-Wizards support different subtasks and hide unnecessary complexities. They guide the user intuitively through the design process: first, the **Topology Wizard** is responsible for topology input and correct geometry design of the intersection, it then further defines the signal groups and places the detectors. Secondly, with the **Fixed Time Wizard**, stages are created that are then used for developing the signal plans. Subsequently, the **VS-PLUS Wizards** enable the user to assign the traffic streams and its functionalities. Based on the signal plans and the related stage sequences, the frame signal plans can be developed as well as the corresponding major and minor streams. The frame signal plan can also be adjusted manually. Finally, the generation of the VS-PLUS parameter sets for the controller is as easy as a click on a button that supplies a complete traffic-actuated control program.



The Traffic-Actuated Control Algorithm VS-PLUS

Traffic-actuated control by VS-PLUS is suitable for fully traffic-actuated single intersection control as well as for coordinated networks with partly traffic-actuated control. Due to its frame signal plan technology, VS-PLUS also qualifies for adaptive network control. Its parameter technology makes the use of VS-PLUS particularly efficient and comprehensible at all times. Without any programming effort, the VS-PLUS control behavior can be adapted to changing traffic situations through simple parameter adjustments. For highly specific control requirements, VS-PLUS FreeStyle is a tool that offers additional free programming and can be combined with the standard VS-PLUS functionality.



VS-PLUS is clearly structured with a modular design. Its overall functionality consists of individual, easily understandable function modules. According to their individual and self-contained tasks, each module processes a number of specific objects. This structuring scheme is maintained at all times, regardless of whether VS-PLUS controls a large, medium or small signalized intersection. The VS-PLUS parameters are segmented accordingly and clearly assigned to their specific function groups. Therefore the clarity of VS-PLUS is always maintained.

The VS-PLUS traffic engineering workplace VS-WorkSuite features an integrative and user-friendly environment for the planning, development, testing and quality management processes. The environment allows these four major tasks in one and the same work environment.

Any traffic control must be thoroughly tested before implementation on the intersection. Traffic-actuated control programs might show weaknesses or defects which have to be detected as early as possible.

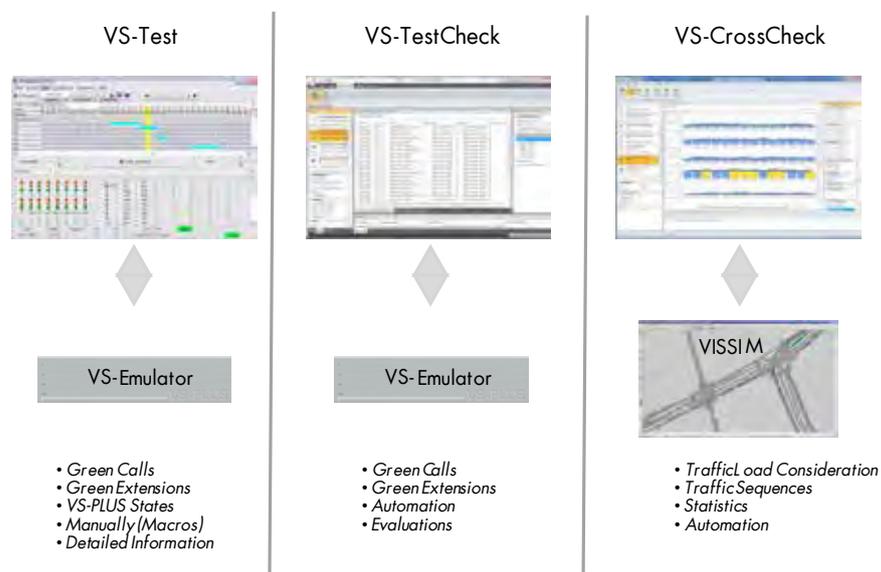
Therefore, VS-WorkSuite puts particular emphasis on the

integration of test, simulation and quality analysis.

Some of the new modules are able to run systematic and extensively automated tests on traffic light control schemes and programs. This is done by means of emulators or simulation environments, where the test results are processed

and evaluated at the same time, enabling a comprehensive quality analysis with a minimum of additional effort.

Control quality management within VS-WorkSuite is structured hierarchically into three levels: the 1st level consists of the VS-Test module where manual testing of the control program takes place, thereby also revealing the inner states of the control. On the 2nd level is the VS-TestCheck module with the task to automatically simulate and evaluate a vast number of constellations. Finally, the VS-CrossCheck module for automated control scheme testing in a micro-simulation environment (VISSIM) is applied on the 3rd level.



The basic testing of traffic-actuated control takes place within the **VS-Test** module, using a virtual controller, the VS-Emulator. The different tests (1) validate functionality, (2) verify reactions on different orders of traffic events and (3) validate the resulting traffic engineering quality. All necessary data is automatically sent to the VS-Test module that is provided. It offers different visualizations for displaying traffic light control states online. Macro and recording functions support such testing operations. Traffic controller visualizations can also be created directly via an OCIT-IPD interface.

The new **VS-TestCheck** module offers even more support for automatic systematic tests using VS-TestCheck, increasing vastly the 'test sample space'. With only a few clicks, VS-Test enables the user to test and evaluate hundreds or even thousands of combinations of detector demands, green time extensions and PT calling point sequences.

The test tool **VS-CrossCheck** offers simulation-based quality analysis. It increases the value or VISSIM by the possibility of automated generation, execution and statistical evaluation of simulation runs. Thanks to this tool, characteristic traffic flow quality values according to HBS 200 1 and improvement potentials for traffic-actuated functionalities can be derived. This is achieved by recording and analyzing traffic and process state data within the VISSIM simulation environment under real traffic conditions.



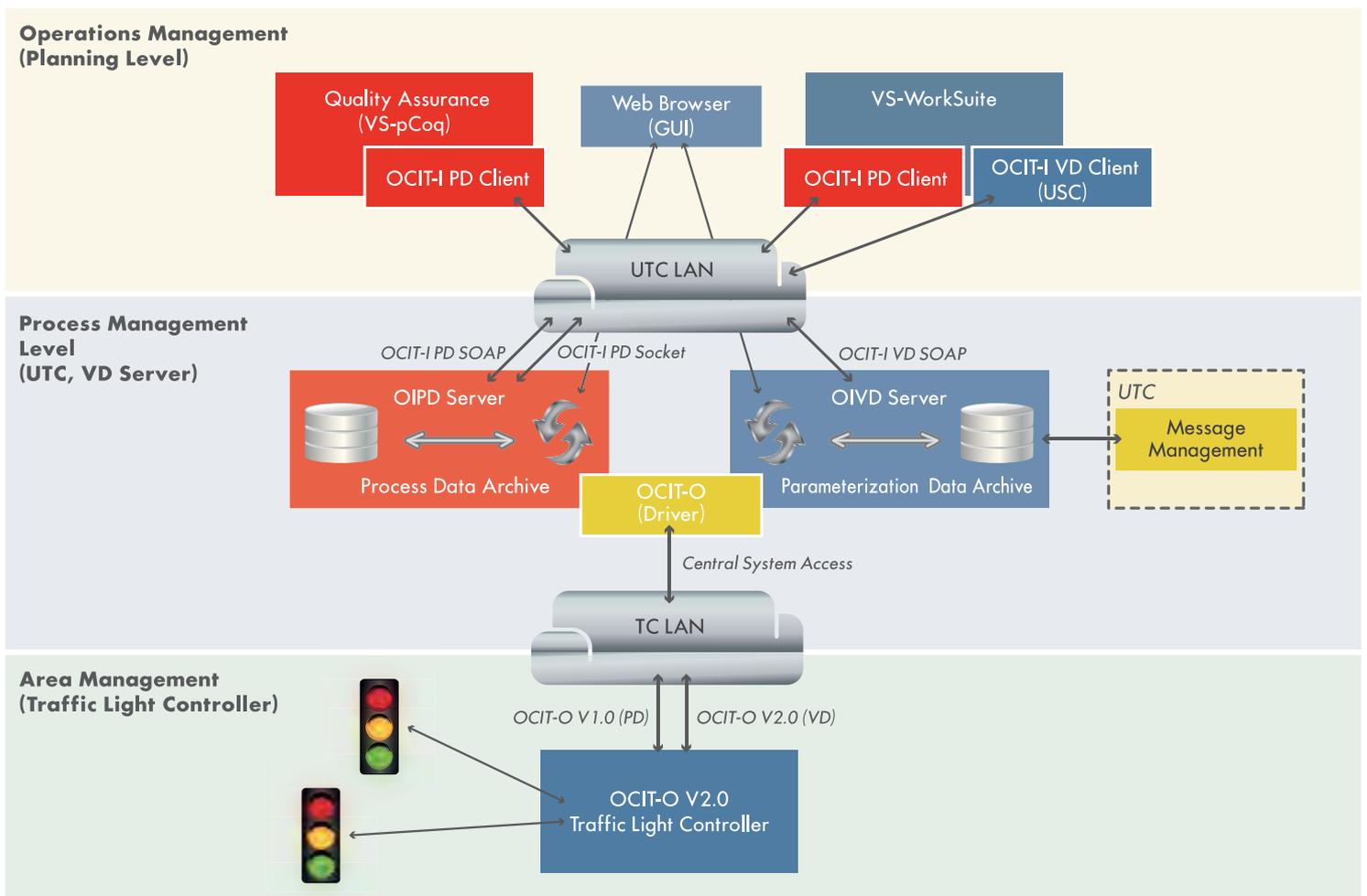
System Integration: A Communication All-rounder with a Big Circle of Friends

Among the strengths of VS-PLUS and VS-WorkSuite are their openness and their independency from any kind of planning philosophy, administrative organization and execution as well as from tools and traffic light controllers of other manufacturers. Due to its OCIT ability, the VS-PLUS world is able to adapt entirely for every system environment; in other words, it is neutral and independent from traffic engineering workstations, from all kinds of test and simulation environments, and from traffic light controllers and their manufacturers. The following three main interfaces are supported:

OCIT-Instations VD and **OCIT-C VD**: these bi-directional interfaces allow data exchange between databases of other workstations and the VS-WorkSuite. Furthermore, the entire supply chain can be ensured both via the so called central and via the local system access point.

OCIT-Outstations: this interface offers direct access to the traffic light controller. With one simple download of a VS-PLUS parameter set, a whole or a partial control program can be sent online into the traffic light controller, put into operation, maintained and analyzed for quality.

OCIT-Instations PD: some of the VS-WorkSuite components for function control and quality analysis require this interface. A range of similar proprietary interfaces is also supported. Such interfaces provide all traffic light controller operating states and traffic light process data, including traffic-actuation control data.



A Summary of VS-WorkSuite 3.0 New Features

The new traffic engineering workstation tool environment "VS-WorkSuite" covers the **Complete** traffic light control **Workflow**, including planning, development, test, simulation, operation and quality management. This enables the traffic engineer to work consistently within one and the same familiar environment of tools. The individual control and test modules are most compatible with our standard traffic control program, VS-PLUS. The quality management tools are independent tools.

The **planning tools** include an extensive variety of efficient procedures by CROSSIG algorithms. They feature all necessary modules for intersections, road sections and networks. Now available are additional functions such as intergreen time calculation, traffic load-based signal plan calculation, intersection capacity calculation according to HBS, calculation and optimization of traffic light control coordination (Green Waves), etc.

An additional outstanding feature of VS-WorkSuite 3.0 is the **Wizards** integration. The Wizards cover different work routines in order to minimize the user's work effort and to hide unnecessary complexities. With the help of the Wizards, simple control designs and complete traffic-actuated VS-PLUS control programs can easily be created.

A particular emphasis of VS-WorkSuite is placed on the sections **test, simulation and quality analysis**. These new tool modules are able to run systematic and extensively automated tests on traffic light control programs by means of emulators or simulation environments and to process and evaluate test results in the same integrated environment. Therefore a comprehensive quality analysis becomes possible with a minimum of additional effort.

The new **project organization** of the VS-WorkSuite allows for flexible presentation of data sets in configurable data trees, and even geographic navigation within a map window. Its highly flexible version management with its multi-user support allows synchronized working of several users on the same data pool (e.g. kept on a server).

The VS-WorkSuite comes in a new and modern layout. The user interface is based on the look-and-feel of current Microsoft products, featuring workspaces, ribbons, etc. The input tables are now diversely configurable, and print-outs can be processed at the user's request as MS-Word or PDF files.

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