



SIS – SIMULATION INTERFACE SOFTWARE

ADD MORE REALITY TO YOUR SIMULATION



AQAI

SIMULATION CENTER MAINZ



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AQAI – The name is an abbreviation: „**A**ngewandte **Q**ualitätssicherung in **A**nästhesie und **I**ntensivmedizin“ – Quality applied to anesthesia and intensive care.

AQAI started at the beginning as an initiative to improve quality in anesthesia and intensive care. For more than 15 years we have hosted an information system on complications and critical incidents, which today is one of the largest databases on these kinds of data in the world.

In the simulation center Mainz this initiative gains advantages from putting theory into practice. We realized that this idea was not only for anesthesia but

also for the entire field of medicine in an interdisciplinary manner. We do trainings for various professions with all types of patient and virtual reality simulators. To enhance the comprehensive training spectrum and to make it more realistic, AQAI developed a package of simulation add on products. Being one of the most important tools AQAI produces the AVS: the ultimate tool for simulation recordings and debriefings.

AQAI SIS – AQAI Simulation Interface Software connects patient simulators to various medical devices. SIS runs several physiological models that expand the functionality of simulators and add high level functions to different scenarios in medical simulation.

SIS supplements ultimate new features to existing educational concepts in the simulation community.



AQAI SIS – OVERVIEW

Simulation Interface Software

SIS is modular – modules can be used stand alone or in any combination to compose the functions needed to achieve the desired educational objective.

- Depth of anesthesia models and BIS™ monitoring
- Intravenous anesthesia, Target Controlled Infusion
- Inhalational anesthesia, real gases, real wash-in and wash-out
- Advanced hemodynamic monitoring, PiCCO™ monitoring
- Interfaces to various simulators:
 - TestChest™ Advanced Lung Simulator
 - Cardiology simulators
 - Endoscopy systems

TYPE OF INTERFACES

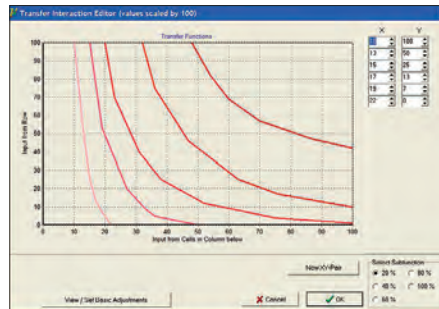
- **IV-Pumps**
 - Alaris
 - Fresenius
 - Braun
 - **BIS Monitor**
 - **Servo-controlled Vaporizers**
 - **PiCCO Monitor**
 - **Simulators**
 - Lung simulators
 - Endoscopy systems
 - Cardiology Systems
- TIVA TCI
 Balanced Anesthesia
 Advanced Hemodynamic Monitoring
 Interdisciplinary Trainings



AQAI SIS

Powerful data exchanger in simulation

The basic SIS module connects to full scale simulators and gains read/write control over certain factors and parameters. Various inputs are linked via configurable transfer functions to different outputs. This technology realizes all kind of functions from linear to highly non linear relationships. As the need arises SIS adds physiological models to the actual simulation situation.





DEPTH OF ANESTHESIA AND INFUSION MODELS

BIS monitoring – IV-pump interfaces



Depth of anesthesia shows the narcotic effect of anesthetic drugs on the central nervous system. The BIS™ monitor measures these effects

clinically as an index between 100 (awake) and 0 (deepest anesthesia). Adequate anesthesia is assumed at BIS levels of 60 to 40. The SIS model analyses all relevant drugs for anesthesia, calculates drug

interactions and generates a simulated BIS index. This value will be displayed on a regular BIS monitor using a special EEG-generating device.

AQAI SIS communicates with all modern syringe pumps and iv-systems. It is fully capable of working together with Target Controlled Infusion



(TCI) models. Using the pump interface together with the depth of anesthesia model the trainee is able to do real anesthesia in simulation:

- select the desired drugs,
- adjust the iv-pumps,
- treat the patient and observe the course of anesthesia on the BIS monitor.



ADVANCED HEMODYNAMIC MONITORING

PiCCO™ monitoring

PiCCO™ is a tool for advanced hemodynamic monitoring. It uses transpulmonary thermodilution and pulse contour analysis to derive various parameters of the cardiovascular system. AQAI SIS models all relevant hemodynamic values (e.g. Global Enddiastolic Volume, Extravascular Lung Water) on the basis of the actual patient findings. Communication to the PiCCO monitor allows all regular user interac-

tions on the monitor. Finally the hemodynamic situation can be analyzed and treated by the trainee.

THIS MODULE INCLUDES SEVERAL SCENARIOS AND PATIENTS LIKE VOLUME LOSS, SEVERE SEPSIS, ARDS AND IS COMBINED WITH APPROPRIATE LEARNING MODULES.



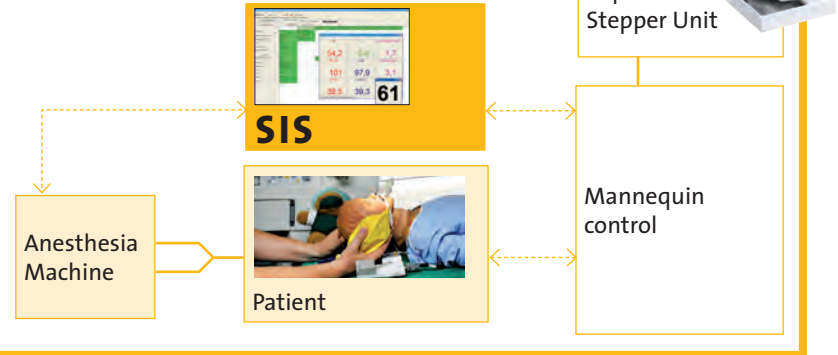


INHALATIONAL ANESTHESIA

Real wash-in and wash-out kinetics

AQAI SIS supports balanced anesthesia with inhalational vapors by providing a servo-controlled interface to drive standard vaporizers. Using this technology together with the lung model in the patient simulator and a real anesthesia machine, all anesthetic agents (including Desflurane with its low boiling point) can be applied to simulation. As a result the gas monitor displays real gas concentrations – the user can learn how to induce inhalational anesthesia (wash-in) and how to recover from anesthesia (wash-out). Once more this system adds a realistic environment to the simulator OR.

OVERVIEW ABOUT THE INTERFACE TO USE REAL INHALATIONAL GASES IN SIMULATION

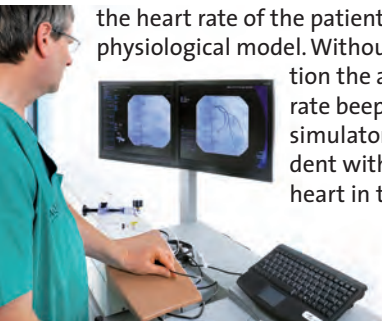




AQAI SIS FOR INTERDISCIPLINARY SIMULATORS

Combining skill trainers with patient simulators

AQAI SIS is a flexible software system to a variety of interdisciplinary simulators. In Cath-Lab simulations it synchronizes the heart rate of the cardiac simulator with the heart rate of the patient simulators physiological model. Without this connection the audible heart rate beep of the patient simulator is not coincident with the moving heart in the virtual real-



ity X-ray monitor. These functions can be adapted to almost any cath-lab simulators.

TestChest™ is a high end artificial lung simulator with its own models on lung mechanics and gas exchange. AQAI SIS combines both: the precise mechanical and physiologic properties of TestChest with the basic lung models as well as the gas exchange and heart lung interactions with the simpler lung models of patient simulators. With this combination ad-

vanced simulation in artificial ventilation and intensive care medicine can be done, that is not possible on the basis of today's simulators.



SIS IS A GROWING TECHNOLOGY. AQAI CONTINUOUSLY DEVELOPS NEW APPLICATIONS TO MAKE SIMULATION MORE REALISTIC.