

Simulation. Visualization. Communication.





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Simulation. Visualization. Communication.



Parachute Training Systems

Higher Performance, Safer Landing



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SOKOL[™] - Präsentation InSiTa 2019



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- SOKOL Präsentation
 - Militärische Version
 - 💮 HAHO, HALO











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SOKOL[™] - Training Areas

- Static line training
- Free fall training
- Emergency procedures
- Group jump training
- Turbulence
- Transition from freefall to canopy ride
- Collisions
- Emergency procedures
- Malfunctions

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SOKOL[™] - Structure







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SOKOL[™] - Virtual Training Environments



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Contains standard landscape types as well as geo-typical terrains such as:

Plains

- Hilly terrains
- Mountains
- Urban environments
- Deserts
- Forests





SOKOL[™] - Virtual Training Environments



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Variable weather conditions, namely:

Time of day

Wind layers

Storm and turbulences

Cloud layers

Rain, snow and lightning









SOKOL[™] - Virtual Training Environments



Various visual effects can be produced in SOKOL[™] such as:

Smoke

Windsock

Flares

Landing Targets (influenced by wind)









Malfunctions

Parachutes

Devices

Virtual jumpers

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The 18 most common malfunctions can be implemented, such as:

Broken steering lines

- Broken canopy
- Bag lock
- Slider hang up
- Bi plane
- Down plane









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Malfunctions

Devices available are:

Parachutes



Virtual jumpers

Altimeter

Audible altimeter

AAD (Automatic Activation Device)

- GPS
- Compass
- Night vision goggles



Malfunctions

Parachutes

Devices

Virtual jumpers

sigma

To facilitate group jumping virtual jumpers can be assigned and customized. You can define:

Types of malfunctions

- Parachute type
- Route and target
- Number of jumpers



SOKOL[™] - Simulation Equipment



The display has an integrated head tracker sensor as well as free fall tracking.

A generic harness is provided with each unit with the option to customize based on a customer's specific requirements.

Trackers and cameras capture hand movement during freefall allowing the jumper to simulate correct freefall position.





SOKOL[™] - Feedback from real military training

The course starts with the theoretical phase (lectures + rigging the parachute). The ground phase is the next phase, including training with simulators, followed by the jump phase and the graduation. During the ground phase, a student spends about 1 hour on the simulator in three training sessions. Advantages of the simulator training:

1. Space awareness is visibly recognizable from the first real jumps. Students do not need instructors guidance, as it was before the simulators were introduced, to maneuver in accordance with the cone, zigzag pattern. They can easily avoid collision course with other jumpers – not the case before.

2. Accuracy landing is amazing to compare to the "before simulators era." Students correctly execute the landing pattern and touch down with the acceptable accuracy up to 50m from the target (the cross). Before the accuracy ranged to hundreds meters and it happened that jumper landed down wind, which does not occur after the simulator training.

3. Students show less symptoms of unrest before the first jumps than they demonstrated without the simulator training. It is confirmed by the blood pressure measurements.

4. An instructor can be positive that students can recognize any malfunction and that they will react correctly. It was not a case before.

2

5. A suspended harnesses training apparatus could be completely opted out of due to the training complexity provided by the simulator.



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SOKOL[™] - Feedback from real military training

Issues to be solved to improve the simulator training:

• A jumper has still problem to correctly estimate altitude while the final landing phase.





SOKOL[™] - Feedback from various exhibitions/presentation























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SOKOL[™] - Feedback from various exhibitions/presentation

Wind simulation	М	н
Touch Screen	М	н
Static line and malfunction simulator	н	н
moving object in sceen	L	
people on ground	L	
Help for proper steering	М	
Chute collsion malfunctions	н	
Definition of own chute	М	
Cargo drops	L	
better landing feeling	М	
larger FOV	М	





Simulation. Visualization. Communication.



ROADMAP

Higher Performance, Safer Landing



01 Free-fall Tracking

higher hand tracking accuracyand realiability

- calibration NOT required
- more sophisticated hand movements possible







02

Wind

4pcs of powerfull wind blowers

Realistic wind experience
 during canopy ride and freefall.







03

Flashman

 New free-fall position which allows forward speed acceleration







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04 Landing

More realistic experience during the landing.

- Ground contact
- Improved 3D impression
 - (3D grass, etc.)







Solution Sol



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3D googles



Trivisio SXGA62 Resolution: 1200 x 1024 diagonal FOV: 43 – 45 degrees



HP Reverb Resolution total: 2160 x 2160 per eye diagonal FOV: 114 degrees



VIVE Cosmo Resolution total: 2880 x 1700 at 90 Hz diagonal FOV: 100 degrees



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Hypobaric Parachutist Training

06

🝚 Realistic High Altitude

Training

- Low pressure
- Low temperature
- Realistic equipment
- Hypoxia (loss of
 - color vision, altitude

sickness)





Flight <u>Me</u>dicine Test

07

- Spatial Disorientation
 - Simulated night

jumps

False Horizon

Black Hole

Approach

Autokinesis







Static line and malfunction version

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08

Wew cost effective mobile parachute simulator for static line training.

Customer can use his
 own harness, sensors
 part of HW set



Optional with 3D

Goggles

Static line and malfunction version - Monitor version -

08









Static line and malfunction version - HMD version -

08







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09 Static line and malfunction version

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SW Version only

- lith Basic HW set
 - 🍚 Wago box
 - Steering lines
 - Sensors
- Specification of IT HW HW

needed

Customer can use his own

harness











08/09 Static line and malfunction training system

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- Static line functionality
- Steering the canopy (real parachute kinematics)
- Malfunction training incl. collisions with other jumper or building
- Round canopy and RAM
- Networking, Group jumping
- Virtual jumper
- 3D Databases
 - Devices (Altimeter, Automatic Activation Device, GPS, Compass)
- Options:
 - customer specific drop zones
 - 3D Goggles
 - Customer specific harness
- NO:
 - 🍚 Free-fall
 - Force feedback
 - Wind effect







Thank you for your attention!

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