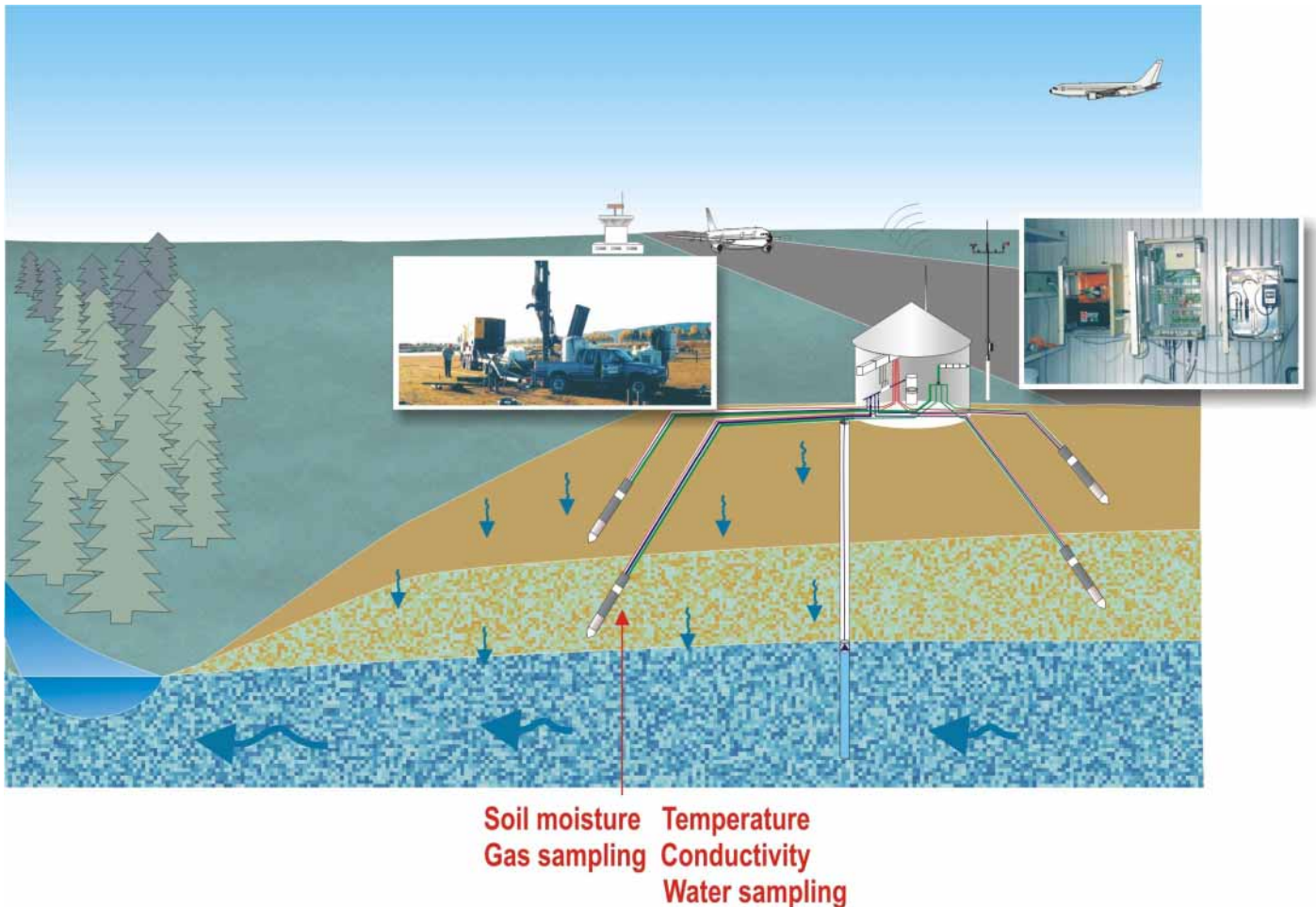


Soilwatch: Technical Specification



Modules

- Combi module (6-in-1) probes for unsaturated zone (soil temperature, soil bulk conductivity and soil moisture content, gas samples and water samples)
- Groundwater wells with sample pump and water level measurement
- Power supply
- Pump and valve unit
- Controller and data acquisition (GENI)
- Soil temperature monitor
- Soil moisture and conductivity monitor (TDR)
- Gas monitor
- Water quality monitor
- Automatic, "intelligent" water sampler
- Communication (two way): cable (network), mobile phone, UHF/VHF radio or satellite
- Central receiving station with data presentation and statistics

SOILWATCH station

- Up to 9 combi module (6-in-1) probes for unsaturated zone (standard, up to 15 on special request)
- Up to 2 groundwater wells (or 1 well and 10

- combi module (6-in-1) probes)
 - Max 30m cable and tube length for 6-in-1 probes (standard), i.e. one station covers a circle with diameter ~50m (longer cables and tubes on special request)
 - Max well depth 20m (standard, solution for deeper wells on special request)
 - High quality water sampling (all water tubes in PTFE)
 - All instrumentation could be placed in a manhole with diameter 2m and height 2.1m
 - Water tubes protected against freezing if necessary
 - Typical measurement frequency 2-4 times per day

Power supply

- 12V battery charged from mains (230VAC) or solar panels
- Converters to 5 and 24VDC
- Lightning and transient protection

Controller and data acquisition

- Controller/microprocessor
- Data logger; 120MB hard disk (flash)
- Real time operation system



- Serial and analogue lines
- Low power consumption
- Communication unit (two ways)

Pump and valve unit

- Diaphragm compressor and vacuum pump; 12V, 8A, 96W
- Max vacuum -780mbar
- Max pressure 2.4bar
- Max flow 34l/min (at 0bar)
- Gas control valves (max 10)
- Pressure/vacuum (air) valves for water probes (max 10)
- Pressure/vacuum (air) valves for well pumps (max 2)
- Pump protection (emergency stop when water in gas/air tubes)
- Pressure/vacuum transducers for compressor and vacuum-pump operation
- Total installed effect/power approx. 120W 10A

Combi module (6-in-1) probes

- Combi module probes for monitoring soil temperature (Pt 100), soil bulk conductivity and soil moisture content (TDR) in situ, hydrophobic filter for

extracting soil gas, hydrophilic filter for extracting soil water and storage volume for extracted water

- Probe diameter 38mm, up to 30m cable and tube (standard)
- Standard installation procedure with quartz slurry
- Longer cables and tubes can be provided on special request

Gas monitor

- Measure gas composition; oxygen, carbon dioxide and volatile organic carbon (VOC)
- Automatic calibration against air filtered through an active carbon filter
- Methane sensor can be added on request

Automatic water sampler

- Samples welded in water and diffusion tight foil
- "Unlimited" number of samples (a new "bag" is welded on the site for each new sample)
- Intelligent sampling (the controller can trig the sampler when high or low levels on one or several gas and/or water parameters)
- 24VDC

Parameters	Range	Resolution	Accuracy	Comments
In situ:				
soil temperature	0-25°C	0.025°C	±0.1°C	-5 to 55°C
soil bulk conductivity (impedance)		0.1		
soil moisture content	dry air - saturation	0.1%	±1%	
ground water level	0-20m	±0.005m or ±0.025% FS		
Gas composition:				
oxygen	0-25vol%	0.1%		repeatability ±1%
carbon dioxide	0-5vol%	0.01%	±2% FS	
VOC	0-3vol%	0.01%	±10%	repeatability ±2% or ±2ppm
Water quality:				
water temperature	0-25°C	0.2°C	±0.2°C	other range on request
pH	0-14	0.01	0.01	
conductivity	0-1999µS/cm	1µS/cm	±2% FS	other range on request
dissolved oxygen	0-15mg/l	0.1mg/l	±1%	
nitrate	10 ⁻⁶ -0.1M		(±10%)	experimental
Metal (Cu, Pb, Hg, Al, Mn, Fe, Ag, +evt.Cd and Zn)				

Other parameters can be added on request.

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