MicroPilot®

World Leader in Professional UAS Autopilots

trueHWIL^2

True Hardware in the Loop Simulator

MicroPilot's new True Hardware in the Loop (trueHWIL^2) simulator offers UAV integrators and researchers the highest fidelity UAV autopilot simulation available on the market today.

Existing quasi hardware-in-the-loop simulators approximate a UAVs flight by exchange sensor and control surface position information with the autopilot over a serial port or CAN bus. This form of simulation introduces inaccuracies as an autopilot in-flight reads this information directly from its sensors instead of a serial port or CAN bus. MicroPilot's trueHWIL^2 offers a dramatic improvement in simulator fidelity by electrically simulating all sensor outputs using analog-to-digital converter, signal conditioning and PWM interface boards. MicroPilot's trueHWIL^2 allows our customers to replicate the conditions their UAVs experiences in flight offering superior on the ground validation of autopilot setup and integration.

- No additional Matlab libraries or block sets are required.
- Full electrical simulation of all autopilot sensors including gyros, accelerometers and pressure sensors
- Includes a pre-compiled matlab simulator that can be used right out of the box for users who choose not to purchase matlab/simulink/real time workshop.
- Simulator parameters can be monitored and updated from a remote PC allowing customization of the pre-compiled simulator

FIXED WING AND HELI

MicroPilot

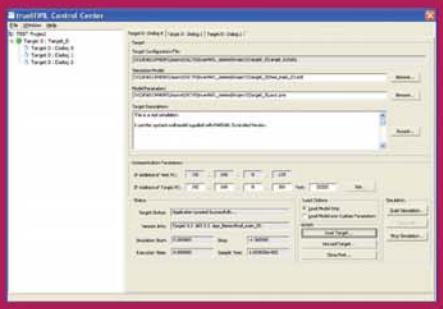
The choice of over 850 clients in 70 countries

HIGHEST FIDELITY

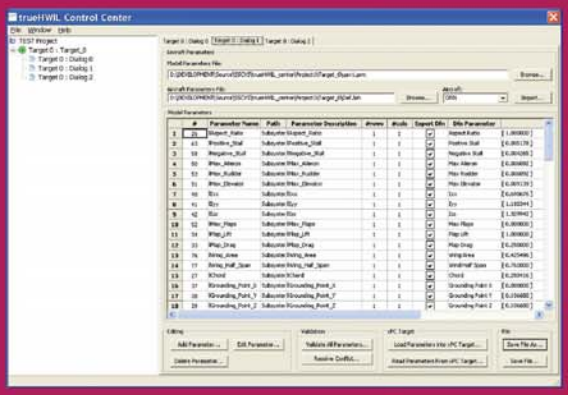
UAV autopilot simulation available on the market today...

www.micropilot.com
info@micropilot.com | 1 (204) 344-5558

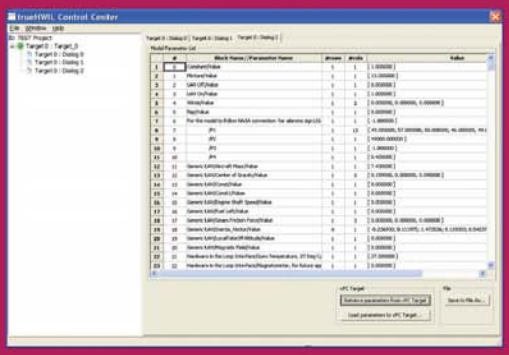
trueHWIL²



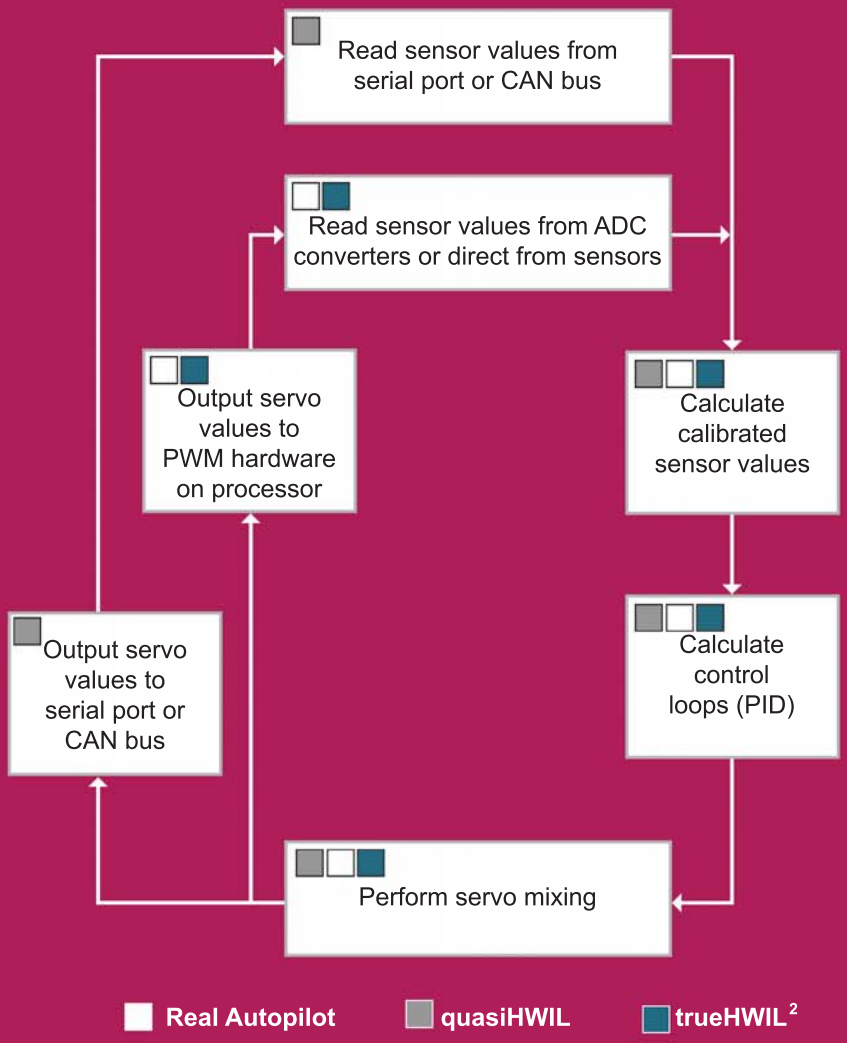
Test in your lab and save the time, expense and weather delays associated with flight testing



Full electrical simulation of all sensors



A valuable tool when the time comes to certify your UAV



MicroPilot's trueHWIL simulators exchange sensor and control surface position data electrically unlike quasi hardware in the loop simulators that exchange this data via CAN bus or serial port. MicroPilot's trueHWIL² allows your autopilot to execute code on the ground exactly as it would in a real flight.

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Board Autopilots	trueHWIL	Triple Redundant Autopilots^{mp}	Horizon Ground Control Station	Enclosed Autopilots
				

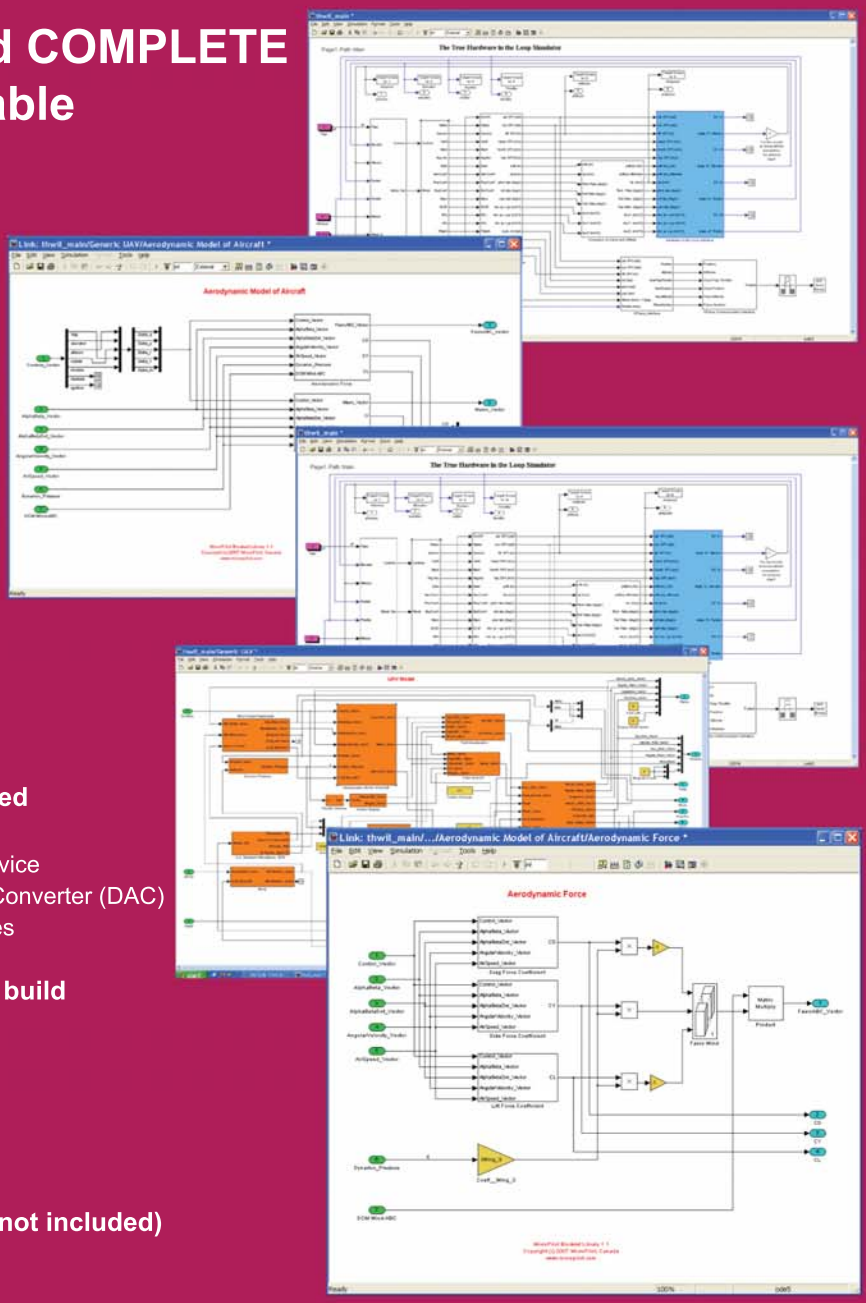
trueHWIL Interface (Analog)

Rear View Front View

trueHWIL Interface (Digital)

Rear View Front View

The most ACCURATE and COMPLETE UAV validation tool available



MicroPilot Interface Hardware (included)

- MicroPilot trueHWIL^2 Interface Box (Analog Option)
- MicroPilot trueHWIL^2 Interface Box (Digital Option)
- MicroPilot trueHWIL^2 SPI Interface Board
- MicroPilot Analog Acquisition Board

MicroPilot Sensorless Autopilot

- MP2128^{HELI} Sensorless Autopilot

  - or -
- MP2128^{LRC} Sensorless Autopilot

  - or -
- MP2128^{3X} Sensorless Autopilot

MicroPilot Software (included)

- Matlab Reference simulator
- Pre-compiled xPC UAV simulator
- trueHWIL^2 control center
- MicroPilot Matlab simulation block set

Customer Supplied Interface Hardware required for trueHWIL^2 (not included)

- National Instruments NI PCI-6602 Counter/Timer Device
- National Instruments NI PCI-6703 Digital to Analog Converter (DAC)
- National Instruments NI SH68-68-D1 Shielded Cables

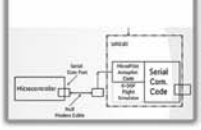
Customer Supplied Software only required to build custom UAV models (not included)

- Matlab release R2007z
- Simulink Coder
- xPC Target
- Microsoft Visual C++, Standard Edition

Other Optional Customer Supplied Software (not included)

- Laminar Research X-Plane (Used for Visualization)

Xtender^{mp}



Xtender^{validate}

Custom Hardware/Software Development

Training & Integration Services

100% NON ITAR PRODUCTS ITAR

ISO 9001: 2008 QUASAR REGISTERED

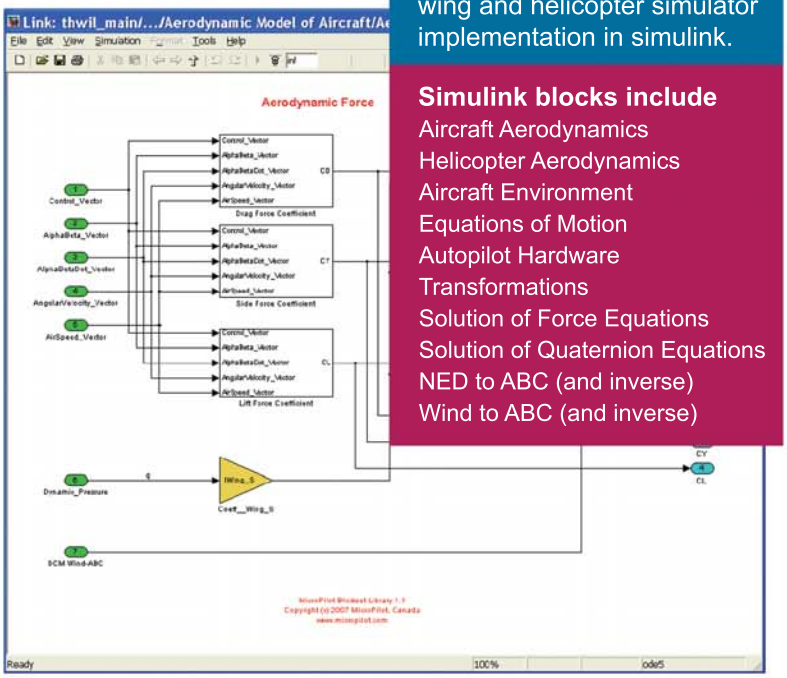
Since 1994

PROGRAMMING ENVIRONMENT

The trueHWIL^2 uses MathWork's MATLAB as a simulation and programming environment.* The model is built using Simulink and MATLAB high-level language programming. The model is then compiled and sent to the xPC Target computer with installed dedicated input/output hardware. This acquisition hardware is connected to the autopilot and reads its outputs and stimulates its inputs. Connection can also be made to other hardware components of the UAV to provide extended functionality of the Simulator. The UAV flight can be controlled and monitored by HORIZON^{mp}. The trueHWIL^2 also provides 3-D visualization of flights using 3rd party products, such as X-Plane.

**Matlab is optional. You do not need it to simulate your UAV. The trueHWIL^{mp} includes a full pre-compiled matlab UAV simulation that allows our customers to access the power of the trueHWIL without the expense of purchasing Matlab. The structure of the simulator is fixed but parameters can be changed using the trueHWIL^2 control center on their PC.*

For those who want full flexibility in their simulation or for those who already have Matlab, MicroPilot provides a full Matlab-based 6-dof flight simulator for use as a basis of simulation.

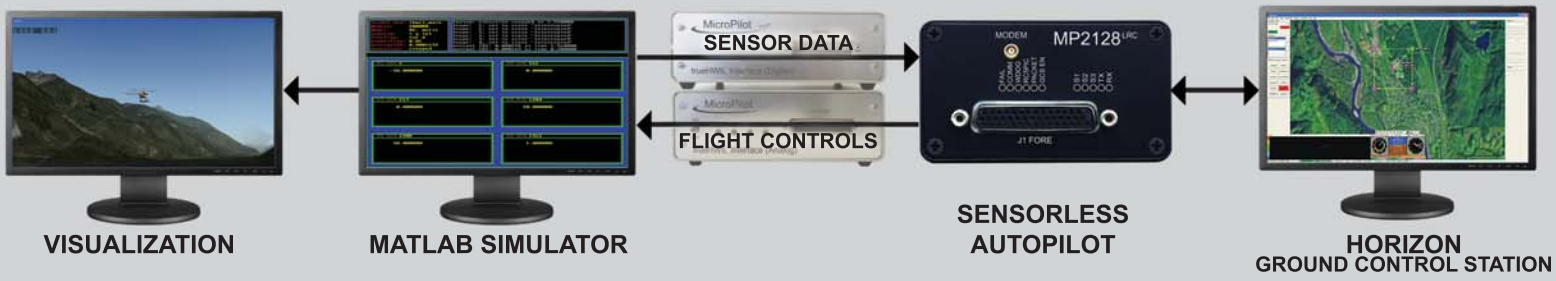


Includes a full simulink fixed wing and helicopter simulator implementation in simulink.

Simulink blocks include

- Aircraft Aerodynamics
- Helicopter Aerodynamics
- Aircraft Environment
- Equations of Motion
- Autopilot Hardware
- Transformations
- Solution of Force Equations
- Solution of Quaternion Equations
- NED to ABC (and inverse)
- Wind to ABC (and inverse)

trueHWIL Block Diagram



trueHWIL^{3X}

Contact MicroPilot
for more information

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