

# SPSCC

## Advanced Remote Experiments

### Remote Engineering

Solve complex tasks from distant sites with real and virtual components.

Take advantage of a highly dynamic and reconfigurable setting for remote experimentation.

*Challenge Students.*

### Cost Oriented Technology

A major design aspect was to rely on low-cost technology. To make it widely useable only standard Browser plug-ins were used.

It is based on:

- C# and .NET 2.0 (Server)
- HTML & Flash (Front-end)
- Conrad C-Control 1 PLC (< 100€)
- Additional experiment Hardware

*Affordable Technology.*

### e-Learning

SPScC offers a tool for remote experiments using a programmable logic controller (PLC). It can be easily integrated into a learning platform, e.g. Moodle and takes advantage of the media Internet.

*Integrate.*

See also:

- [moodle.arteclab.uni-bremen.de](http://moodle.arteclab.uni-bremen.de)

### Compile, Edit, Debug at Runtime

Write your code in Step 5 or IEC 1131 and update the real PLC.

Check your software within a Mixed Reality simulation environment.

*Dynamic.*

#### Step5

```
; XOR
O(
  UN E 0.0
  U E 0.1)
O(
  U E 0.0
  UN E 0.1)
= A 0.0

; Start cooling if
; temperature is too high
L EB 6
L KB 60
>=F
= A 0.0
```

#### IEC 1131 Instruction List

```
PROGRAM iecTest
VAR
  F1 AT %I1.0 : BIT
  F2 AT %I1.1 : BIT
  LED AT %Q1.4 : BIT
END_VAR

LD( F1
  ANDN F2
)
OR( F2
  ANDN F1
)
ST LED

END_PROGRAM
```

### Mixed Reality

Learn using real hardware with additional virtual simulations.

SPScC is part of our Mixed Reality Learning Environment which smoothly integrates real equipment using our HyperBond technology. It supports full hardware in-the-loop functionality.

*Mixed Reality Learning Environment.*

See also:

- [lab.artec.uni-bremen.de](http://lab.artec.uni-bremen.de)
- [www.marvel.uni-bremen.de](http://www.marvel.uni-bremen.de)
- [www.derive.uni-bremen.de](http://www.derive.uni-bremen.de)

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