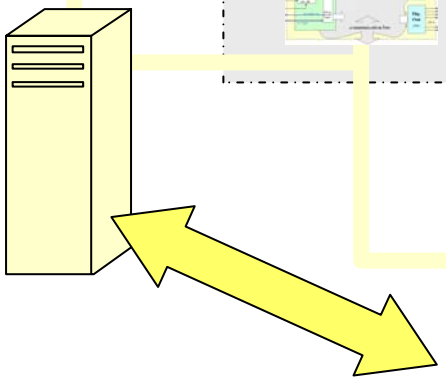
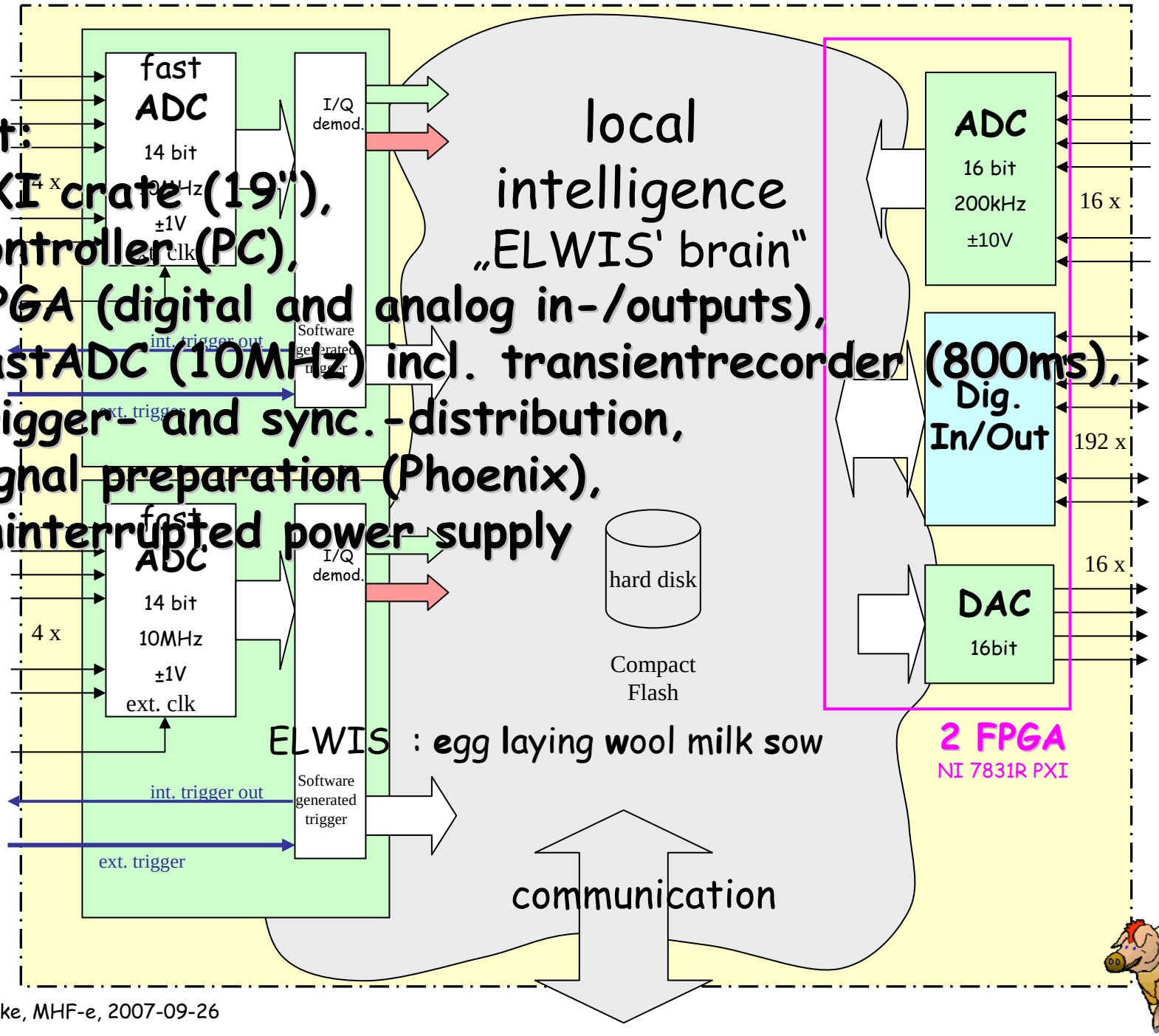
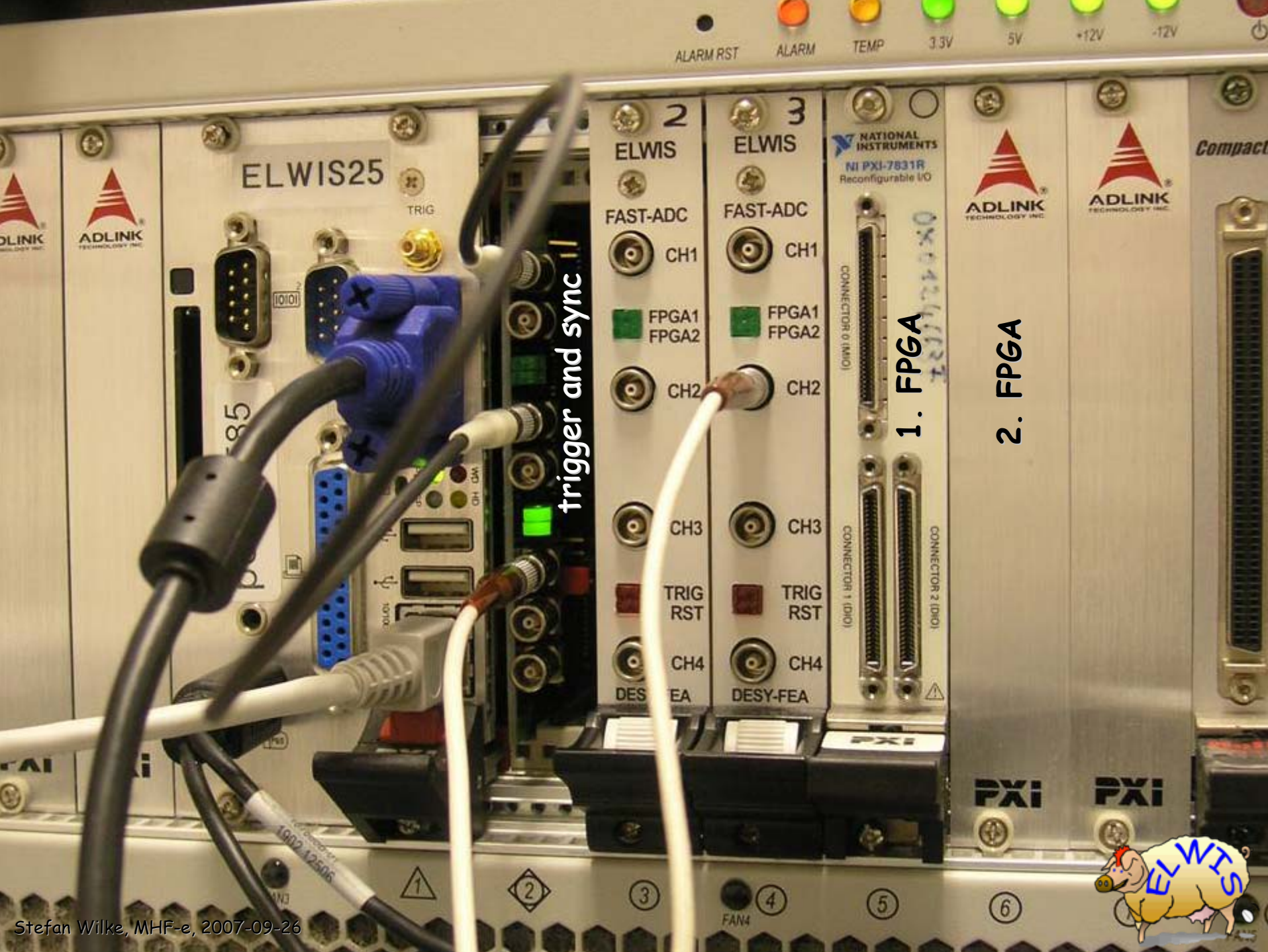
The „ELWIS"-concept of MHF-e for PETRA-III




kit:
PXI crate (19"),
controller (PC),
FPGA (digital and analog in-/outputs),
fastADC (10MHz) incl. transientrecorder (800ms),
trigger- and sync.-distribution,
signal preparation (Phoenix),
uninterrupted power supply
fast ADC
14 bit
10MHz
±1V
ext. clk
4 x
I/Q demod.
Software generated trigger
int. trigger out
ext. trigger
local intelligence
„ELWIS' brain"
ADC
16 bit
200kHz
±10V
16 x
Dig. In/Out
192 x
DAC
16bit
16 x
hard disk
Compact Flash
ELWIS : egg laying wool milk sow
2 FPGA
NI 7831R PXI
communication



Stefan Wilke, MHF-e, 2007-09-26

implementation I

- 28 ELWIS-moduls (PXI crates, 19 inch)
- Microsoft Windows XP
- LabVIEW (LV) 8.0 from National Instruments (NI)
- programming of NI-FPGA-cards in LabVIEW (no VHDL-knowledge necessary!)
- communication in TINE (ethernet)
- each ELWIS module differ only in software (modularity, CF)
- radiationtest in DORIS (one FPGA fault at 45 Gy)
- control of steppermotors (tuner in cavity) implemented in FPGA code written by us
- the 8 channels of fast ADC (10MHz I/Q) includes transientrecorders (800ms)

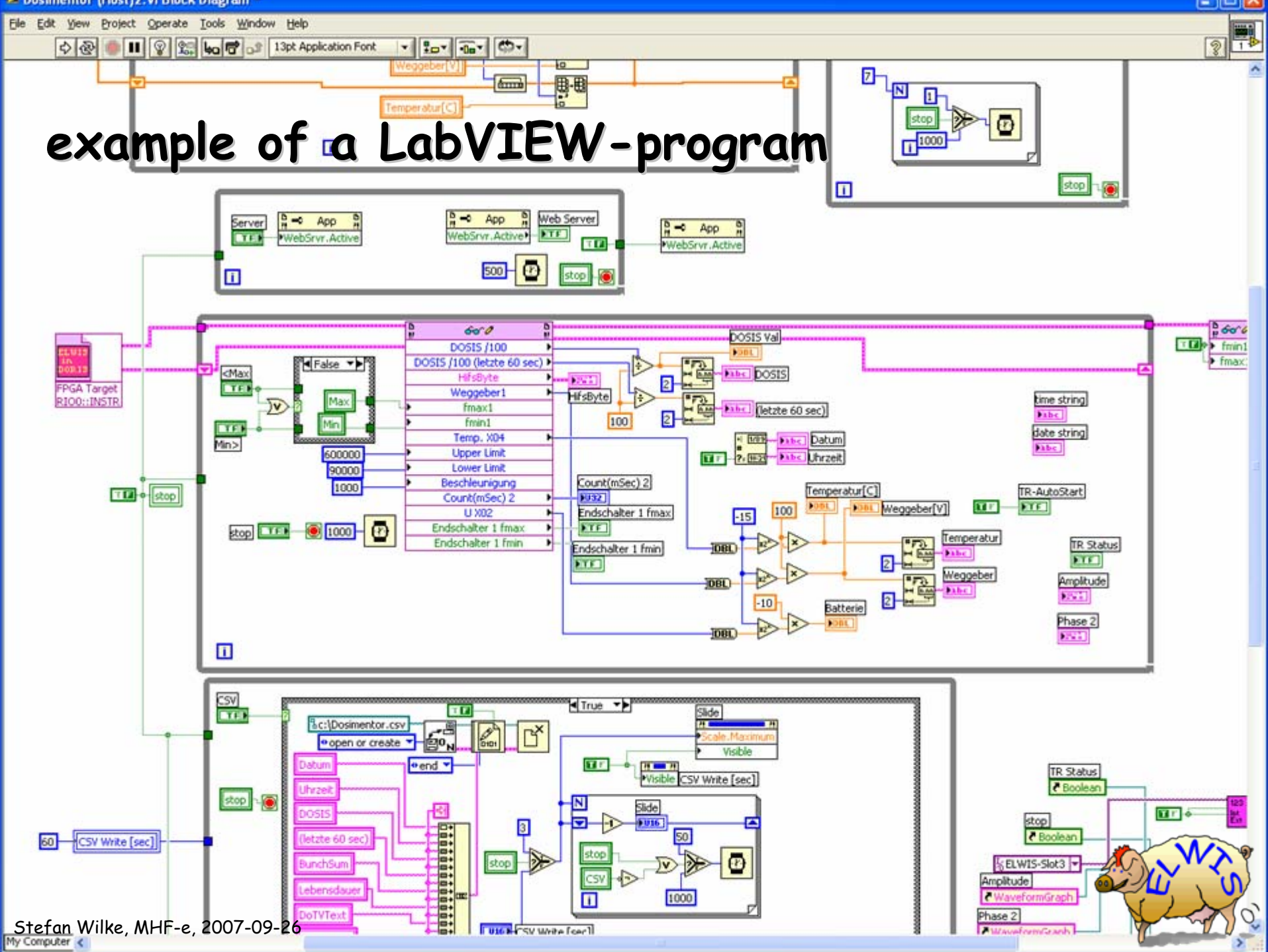
implementation II

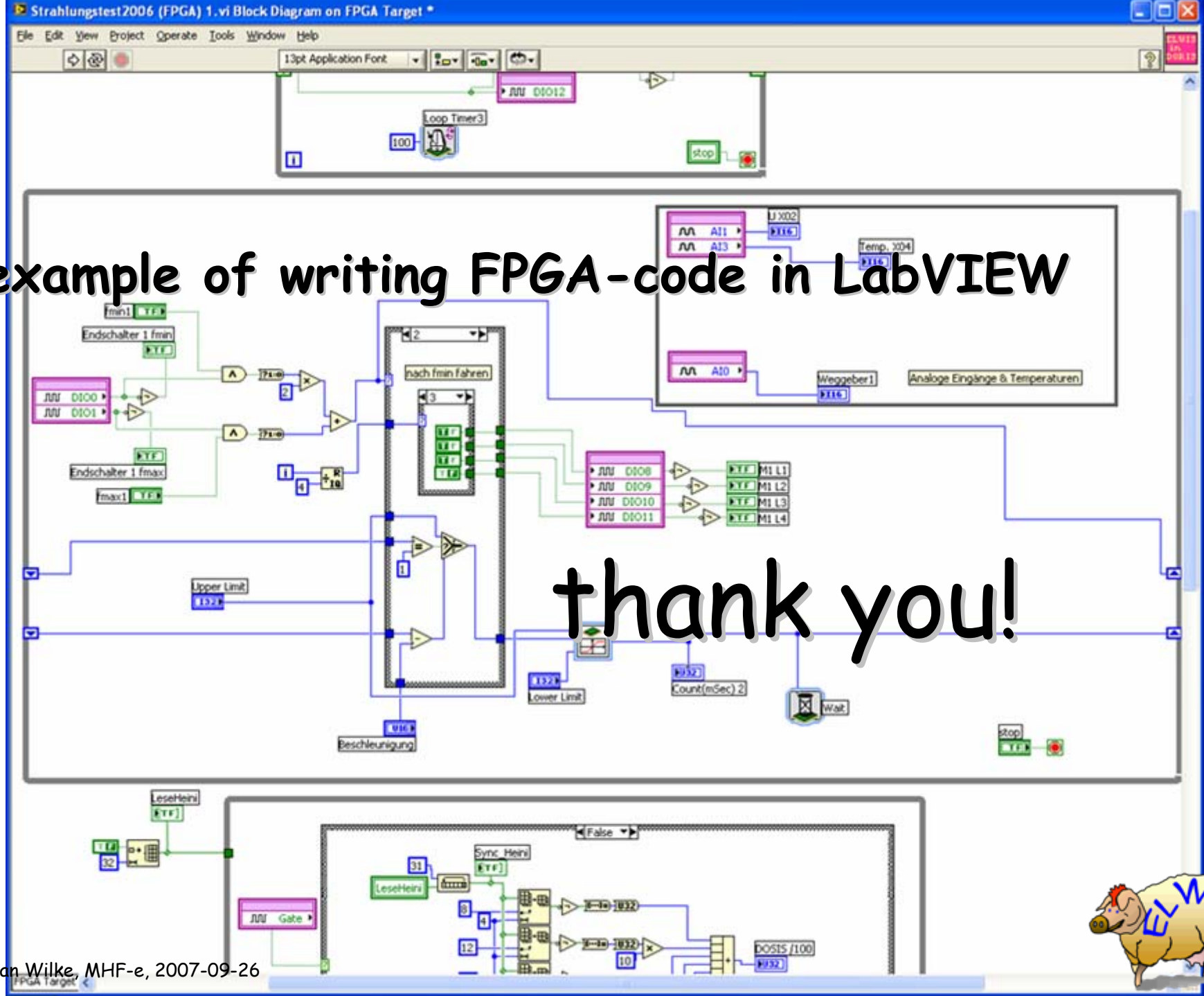
- LV is a simple grafic software running in data flow model, at DESY in many groups often used. Without spezial knowledge we reach in teams of many colleagues (no computer scientist, but technician and engineers) pragmatic results.
- Very good TINE support at DESY.
  Many TINE-VIs ready for LabVIEW.
- number of signals: ca. 1000
- security: paranoid-naive isolated net. authorization of active switching will manageTINE
- stability:
  example: since 2007-03-21 in DORIS-tunnel
  http://mhfexpelwis03.desy.de/Dosimentor.html

FPGA

Anzahl pro Sender	6	2	2	1	1	1	1	
ELWIS	Cavity	Modulator	Klystron	Sender	Spalt	Verteilung	HF-Regelung	Summe
Fast Analog Eingänge :	7	5	5	8	0	8	4	84
Analog Eingänge :	16	4	13	8	0	2	2	142
Digital Output :	0	2	4	0	0	0	2	14
Digital Eingänge :	12	0	12	10	8	2	3	119
Digital Ausgänge :	11	4	12	4	0	0	4	106
pro ELWIS	46	15	46	30	8	12	17	
pro Typ bei 1 Sender	276	30	92	30	8	12	17	465
Gesamtanzahl								930

example of a LabVIEW-program

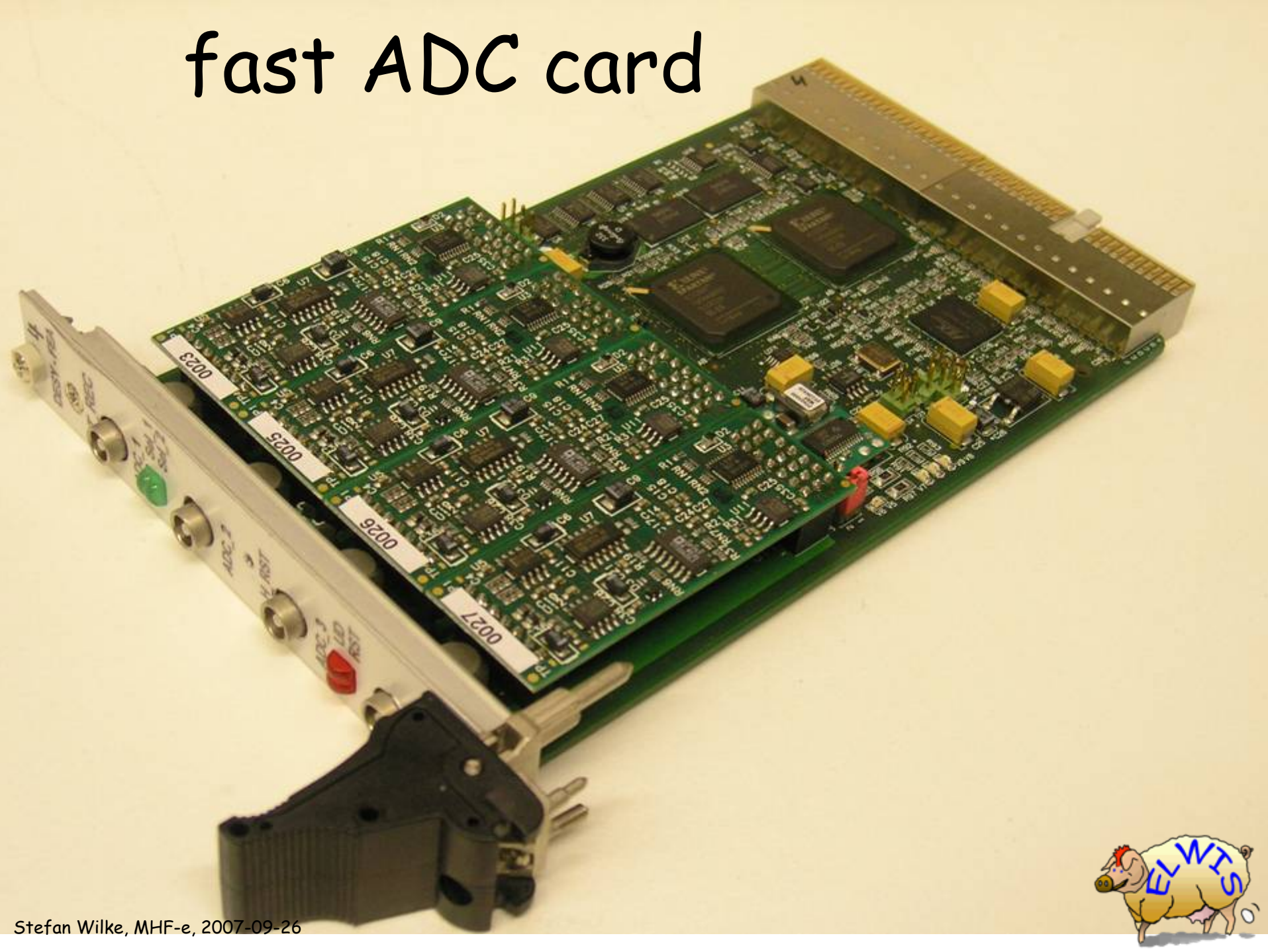




example of writing FPGA-code in LabVIEW

thank you!

fast ADC card



test of a cavity-ELWIS