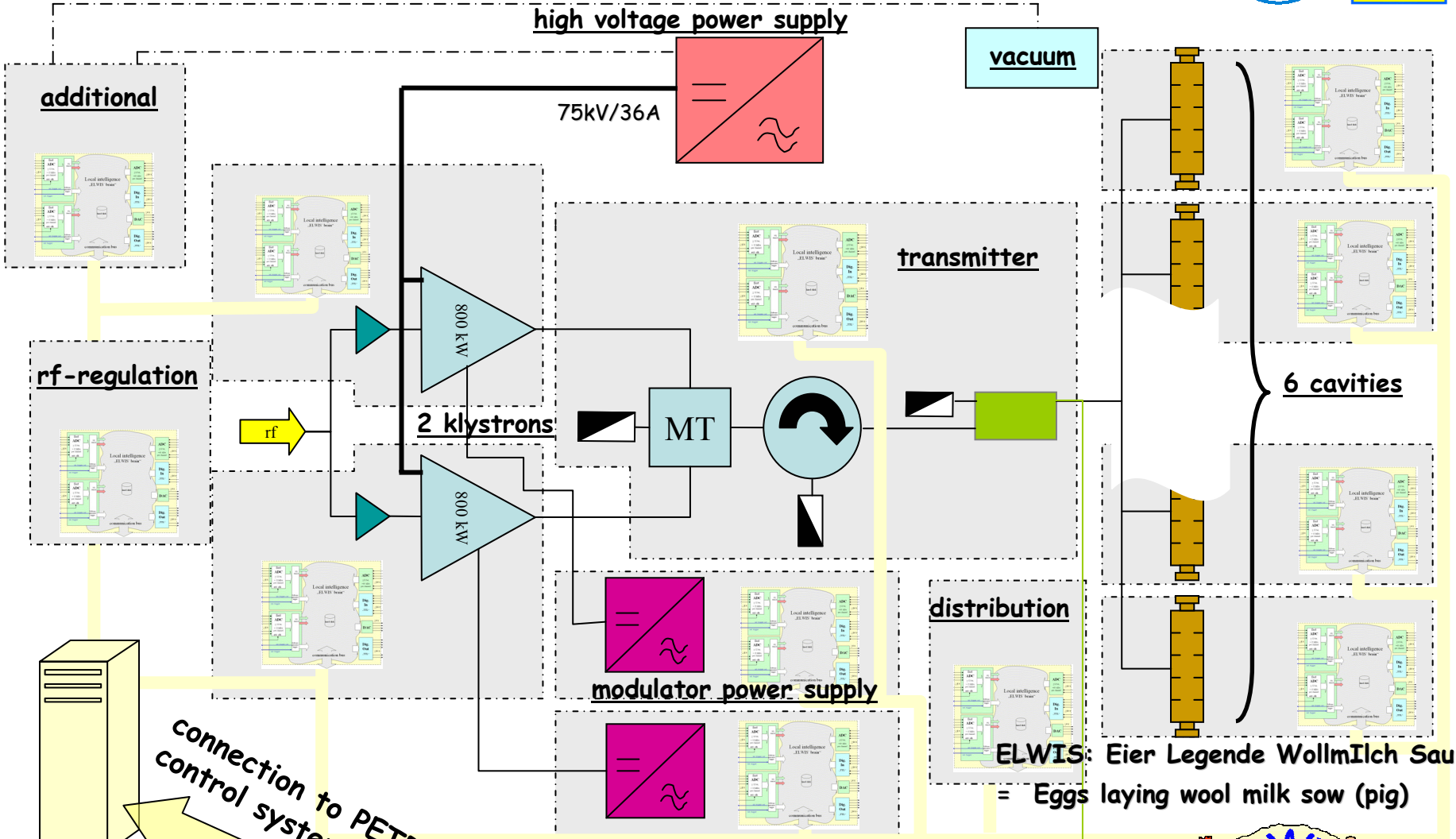


The „ELWIS“-concept for PETRA-III



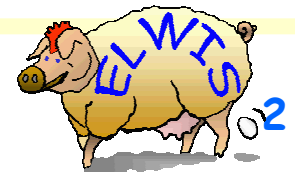
connection to PETRA-III
control system

11th ESLS RF Meeting
October 5th, 2007 at SOLEIL

Stefan Wilke, DESY MHF-e



to 2. transmitter



number per transmitter	6	2	2	1	1	1	1	28
ELWIS	cavity	modulator	klystron	transmitter	additional	distribution	rf-regulation	sum
fast analogue inputs :	7	5	5	8	0	8	6	84
(slow) analogue inputs :	16	4	13	8	0	2	2	142
DAC out	0	2	4	0	0	0	2	14
digital inputs :	12	0	12	10	8	2	3	119
digital outputs :	11	4	12	4	0	0	4	106
per ELWIS	46	15	46	30	8	12	17	
per type at 1 transmitter	276	30	92	30	8	12	17	465
whole system								930

- fast analogue signals:
 - down sampled rf-signals (500 to 2.5 MHz)
 - high resolution dc-signals
- digital output:
 - example: stepper motor

requirements



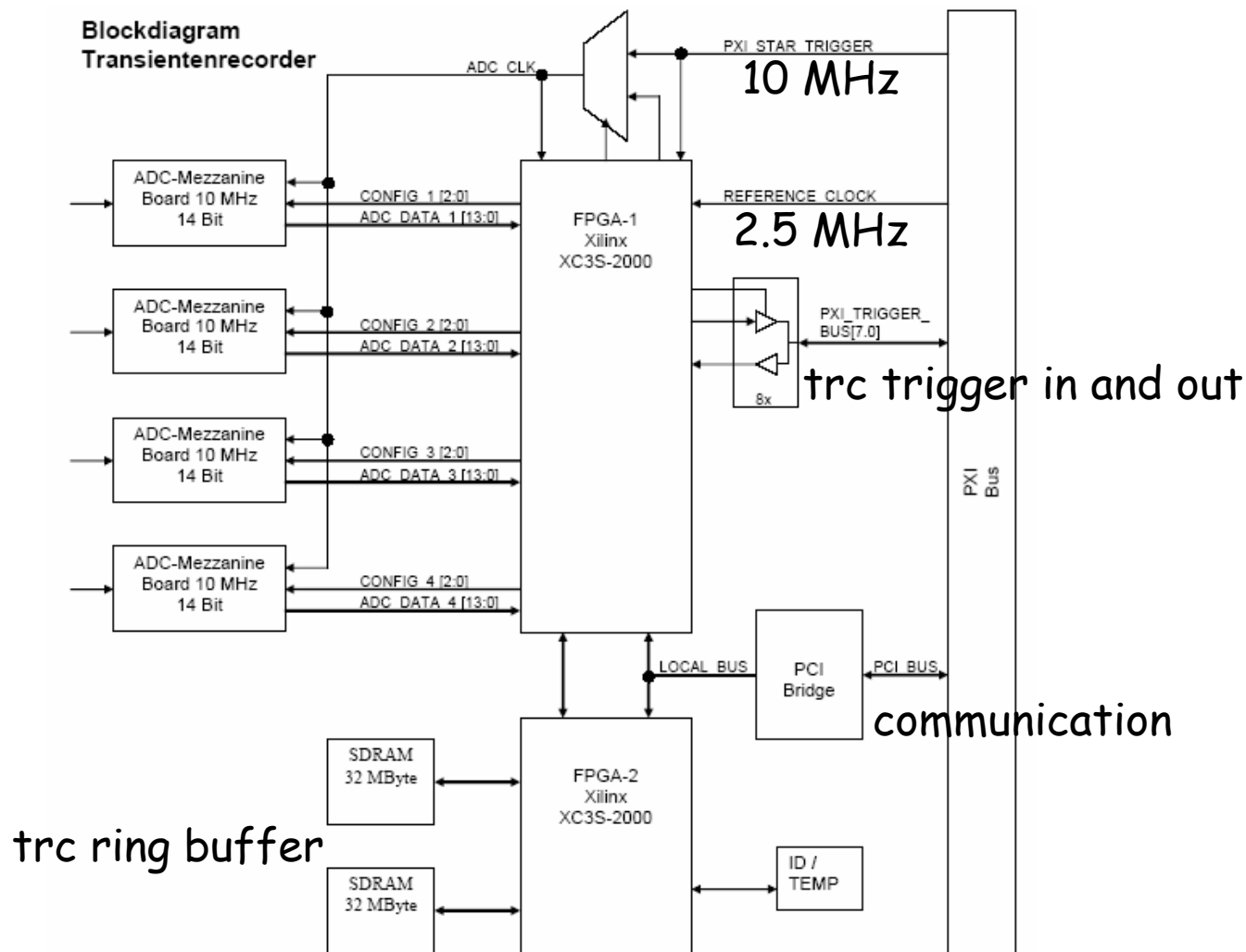
- only one sampling point (amplitude, phase, transient recorder, interlock) per signal (calibration!),
- I/Q demodulation,
- internal and external clock,
- 5 - 10 MHz sampling rate,
- min. 12 bit resolution,
- trc: transient recorder (min. 200ms, each channel),
- internal and external trc stop trigger,
- ca. 100 channels needed (max. 8 per ELWIS),
- compact (PXI, best 4 channels per card),
- low cost,
- option to run in radiation environment,
- easy to operate (software interface),
- permanent support of firmware.

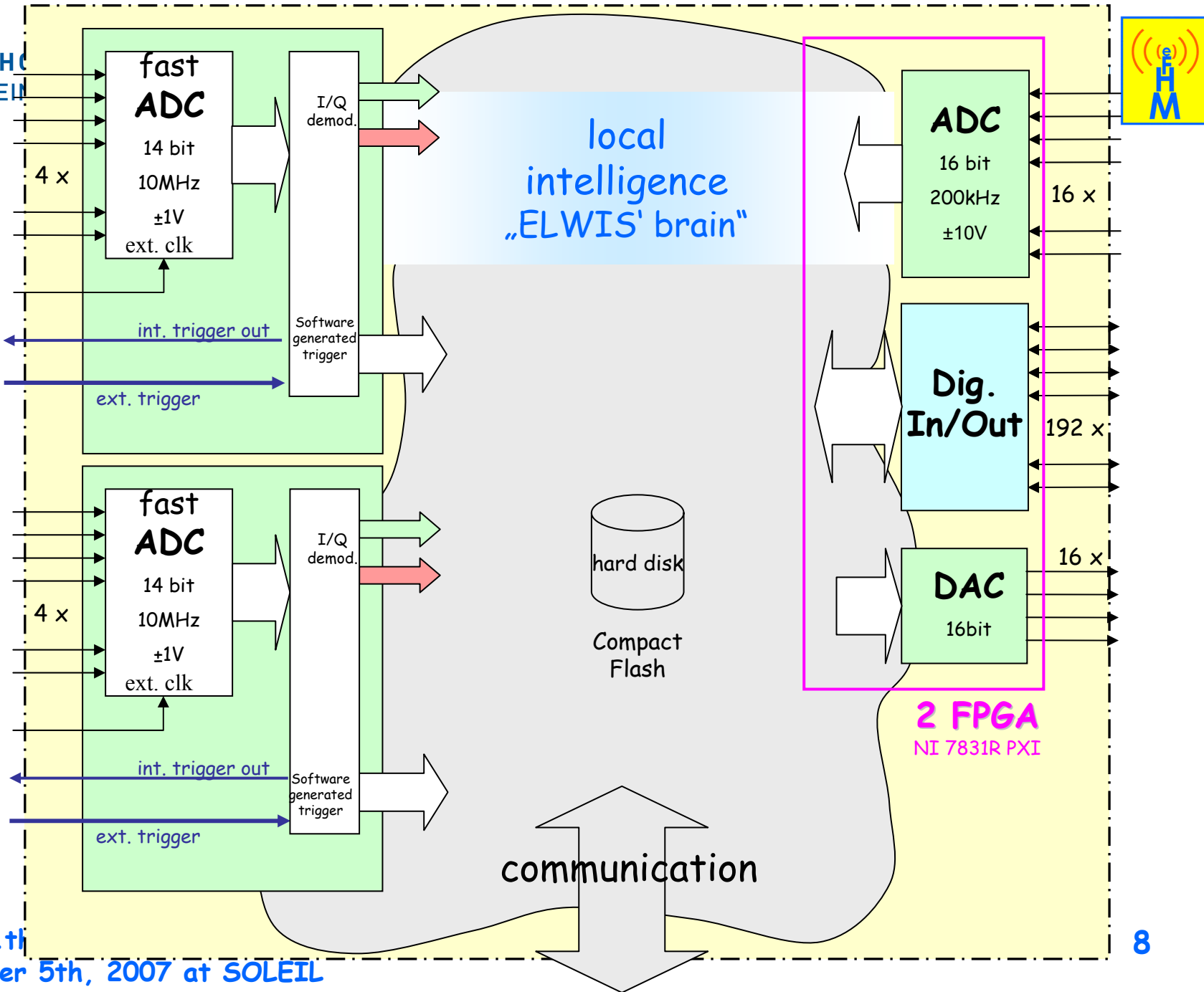


- in 2004 industry was not able to satisfy our wishes (one company offers us to buy twice cards, one for signal sampling and one for trc for price of one card),
- in summer 2004 we ask our electronic development group at DESY (this was their first PXI project),
- first prototypes in autumn 2005,
- trc algorithms on fpga (firmware),
- cost: <1000€ (?) per card.

- development and support at DESY,
- 3U PXI,
- 4 channels (simultaneously) per card,
- 14 bit adc, $\pm 1V$, piggy back,
- 10 MHz sampling rate,
- I/Q (2.5 MHz reference),
- intern or extern clock (for dc- or rf-signals),
- 800ms transient recorder (trc),
- trigger generation for trc, different algorithms,
- low pass filter (adjustable),
- successful radiation test,
- VISA interface (easy for LabVIEW).

a short view inside





kit:

- PXI crate (19"),
- controller (PC, Windows XP, LabVIEW, Compact Flash),
- FPGA (digital and analogue in-/outputs),
- fast ADC (10 MHz) incl. transient recorder (800 ms),
- trigger- and synchronisation-distribution,
- signal preparation (Phoenix),
- uninterrupted power supply.

