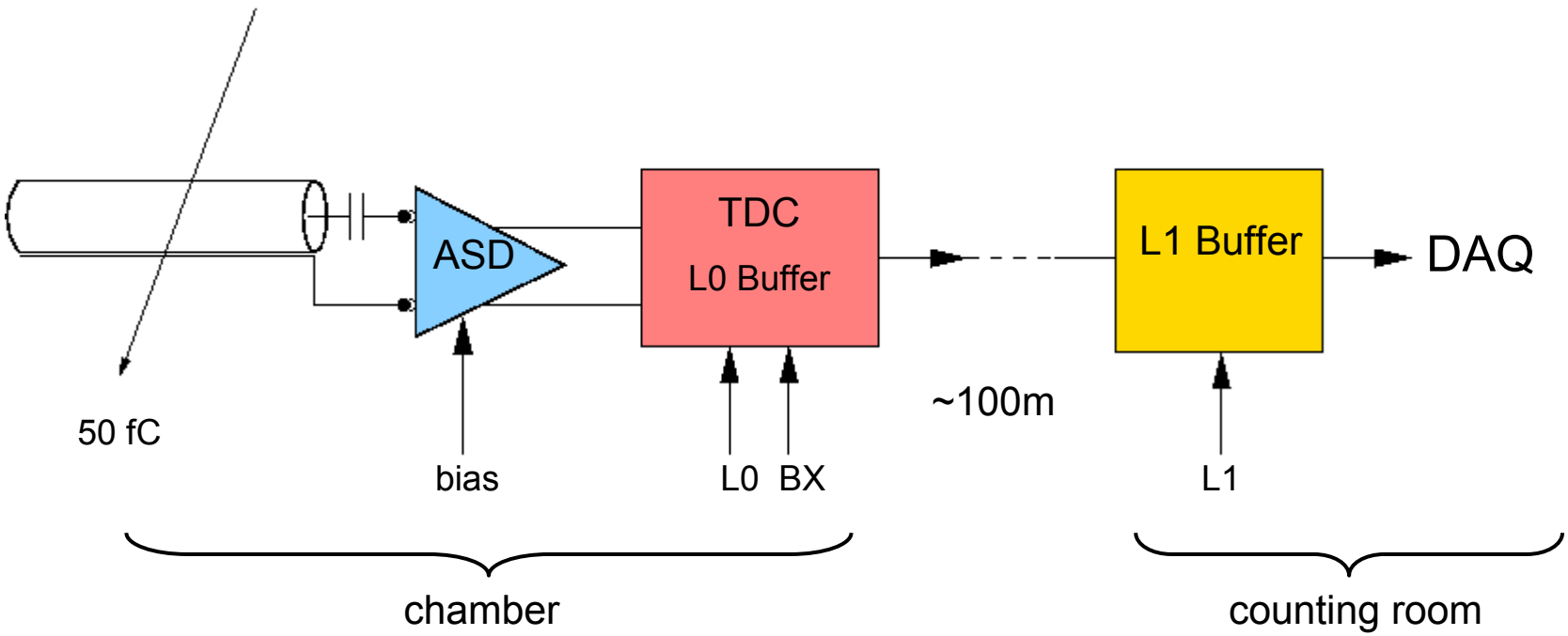
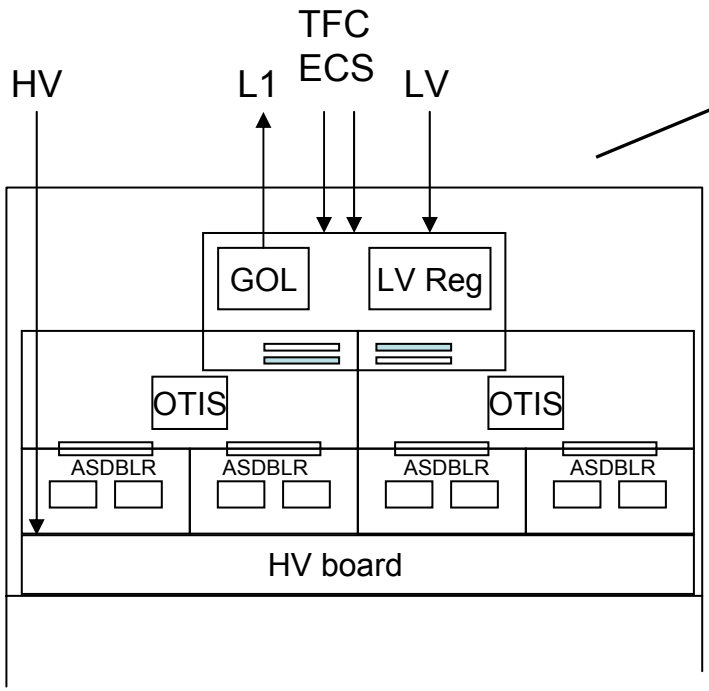
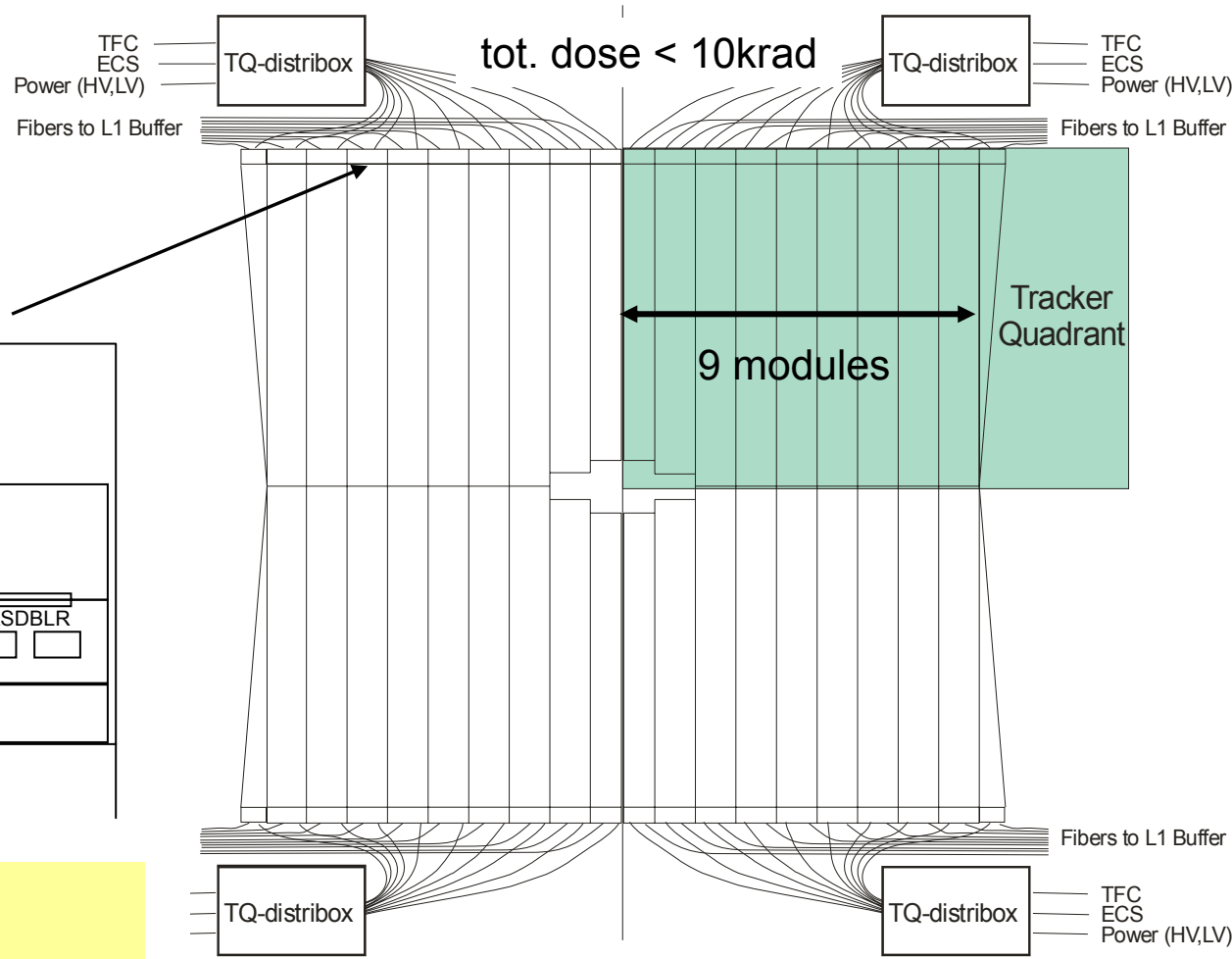
Ulrich Uwer
University of Heidelberg

Outer Tracker Electronics







Module End:

128 channels

16 ASDBLR chips

4 OTIS TDC chips

1 optical link: 1.28 Gbit/s

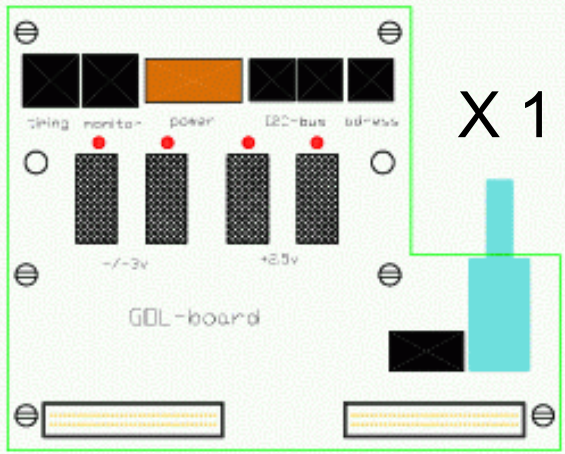
Outer Tracker: T1…3

56000 channels

432 optical links

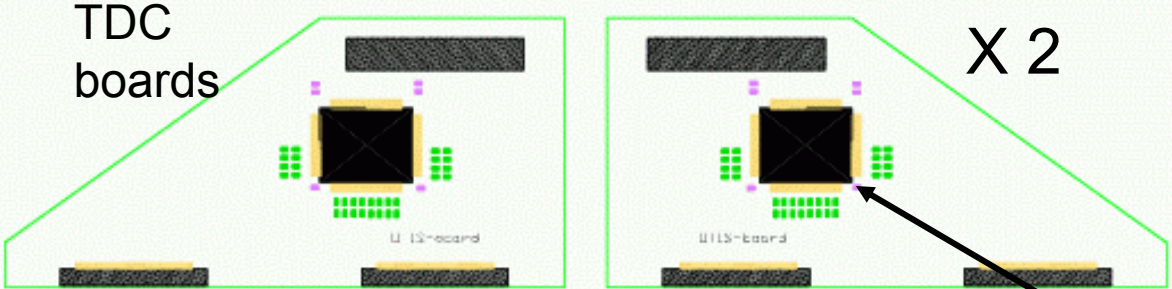
Front-end boards:

GOL/Aux Board



X 1

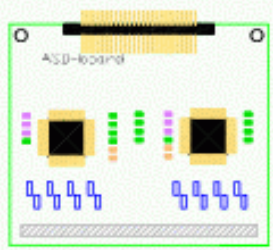
TDC boards



X 2

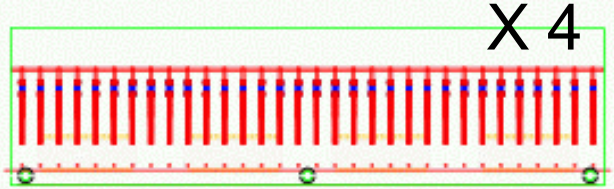
boards	number
GOL/Aux	432
TDC	1732
ASD	3456
HV	1728

ASD boards



X 8

HV boards



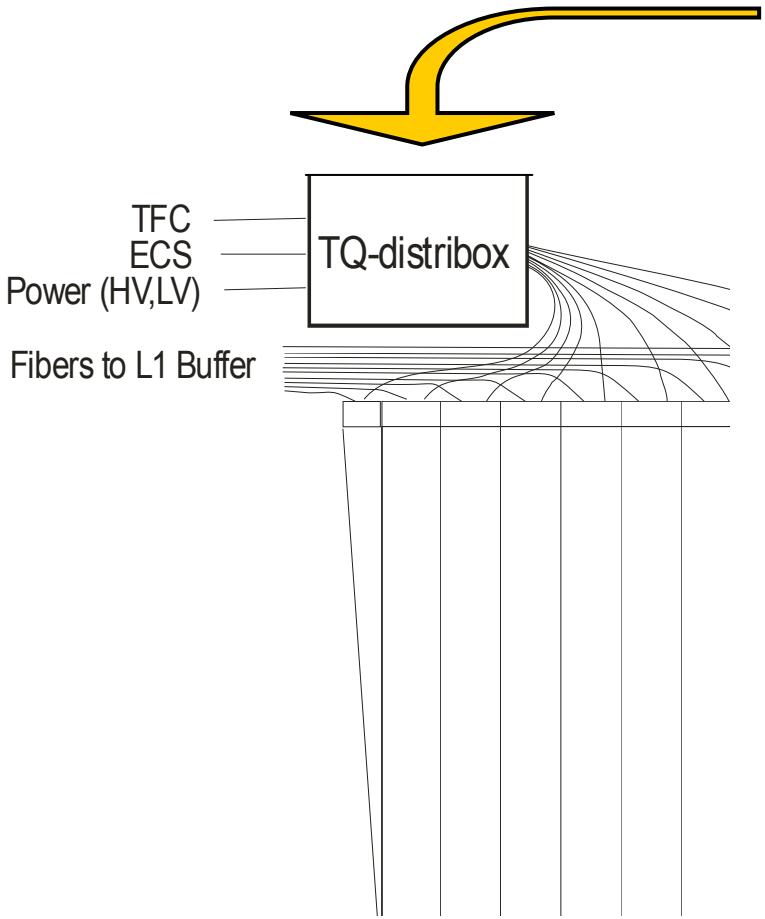
X 4

OTIS TDC chip

H.Deppe
U.Stange

A.Berkien

Services:



Service Box

TFC:

TTCrx + Rst Decoder → LVDS Signals → modules

ECS:

SPECS Slave → I2C bus lines → modules

→ JTAG → ADCs → LV sensing

Low Voltage:

passive +/- 5V distribution → modules

High Voltage:

passive distribution → 2 connections/modules

1 service box / 2-stereo-layer quadrant:

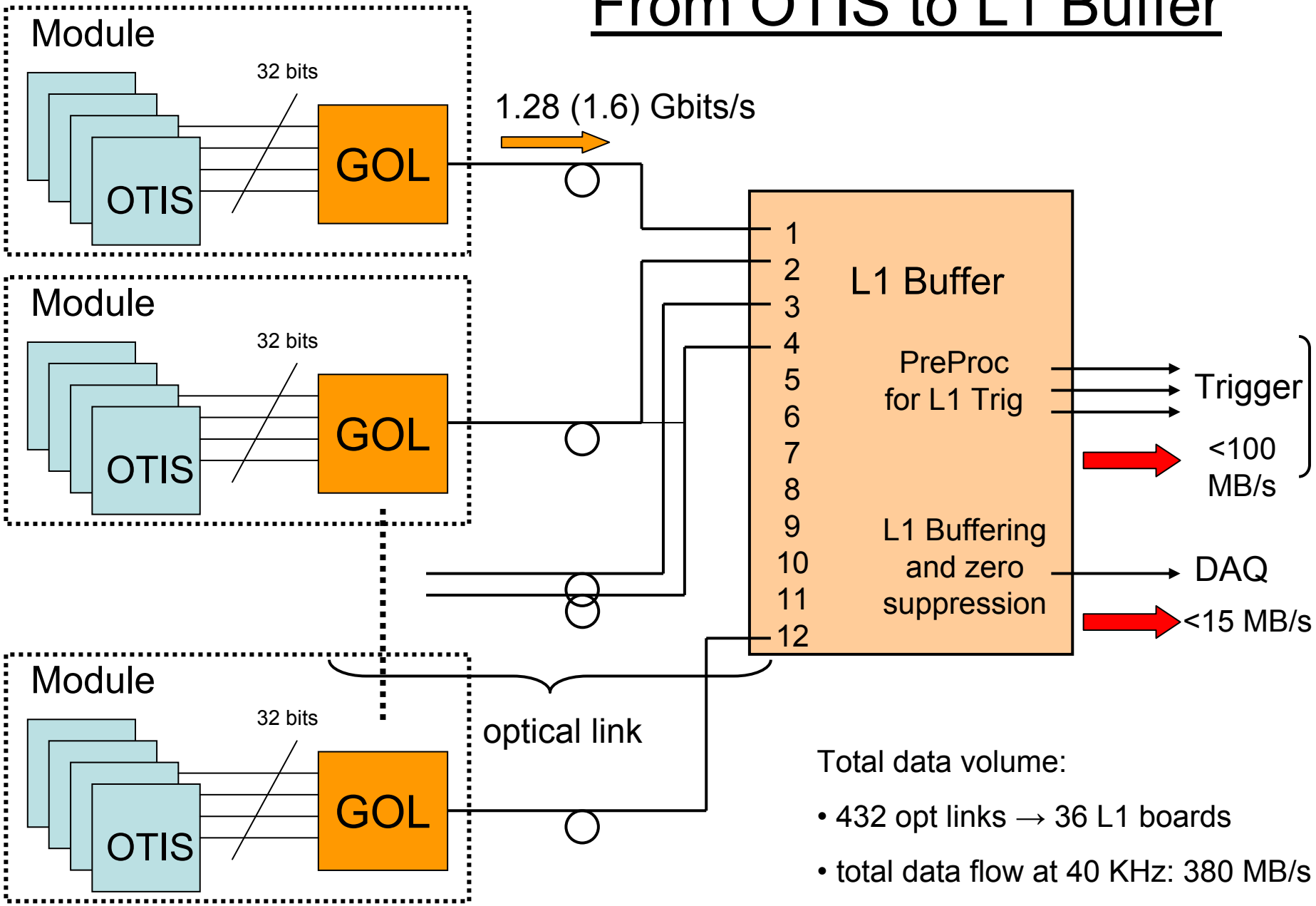
→ 4 x 2 x 3 = 24 Service Boxes

T.Sluijk, A.Zwart

ECS: Expected Data Volume

I2C:	OTIS Initialization	8 Byte/OTIS	at start-up
		32 Byte/module	
		576 Byte/service-box	
	GOL Initialization	4 Byte/GOL	at start-up
		72 Byte/service-box	
JTAG:	LV/Tmp readout	4 (20) Byte/ADC	~1/min (start)
	18 ALICE ADCs	72 (360) Byte/service-box	

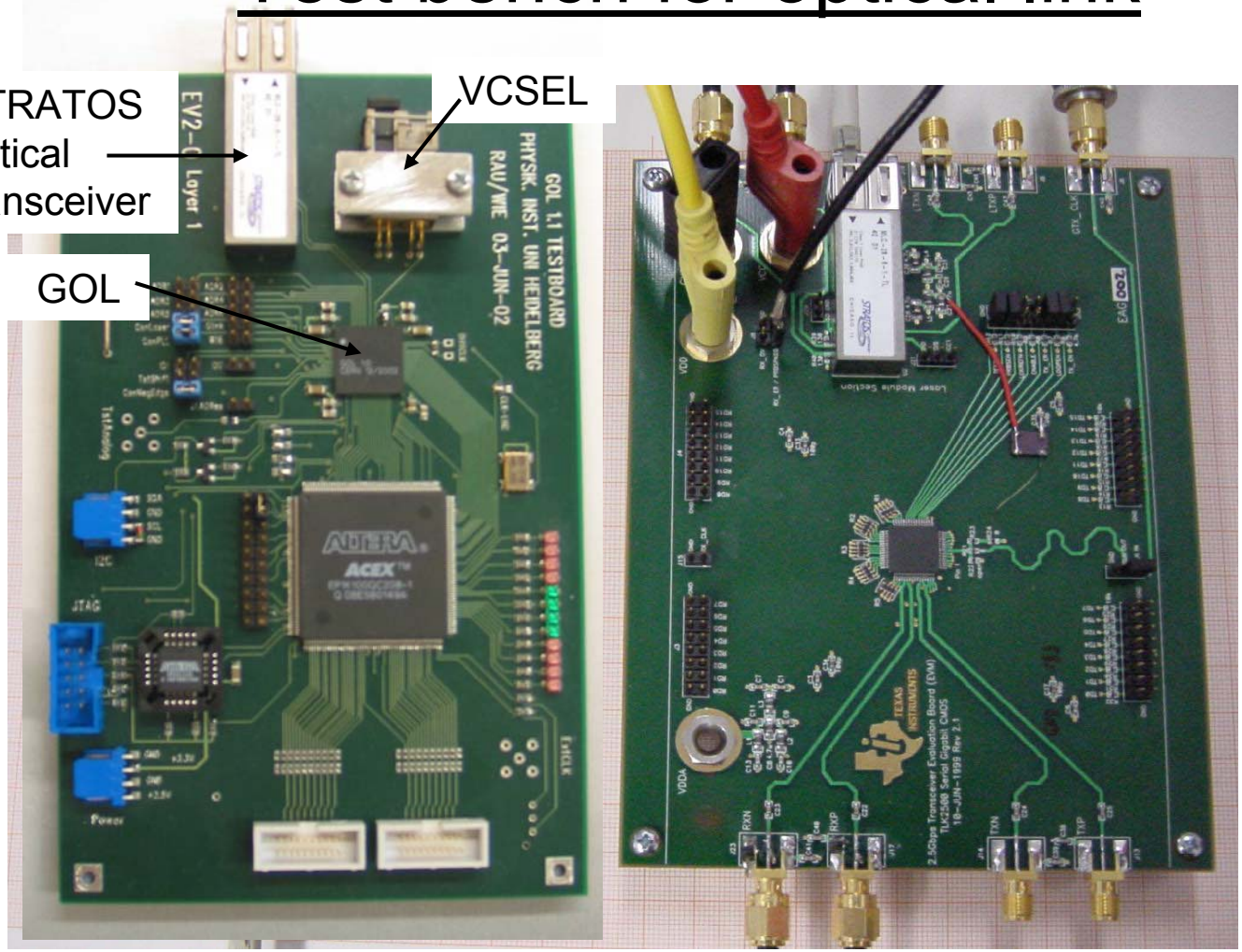
From OTIS to L1 Buffer



Total data volume:

- 432 opt links → 36 L1 boards
- total data flow at 40 KHz: 380 MB/s

Test bench for optical link



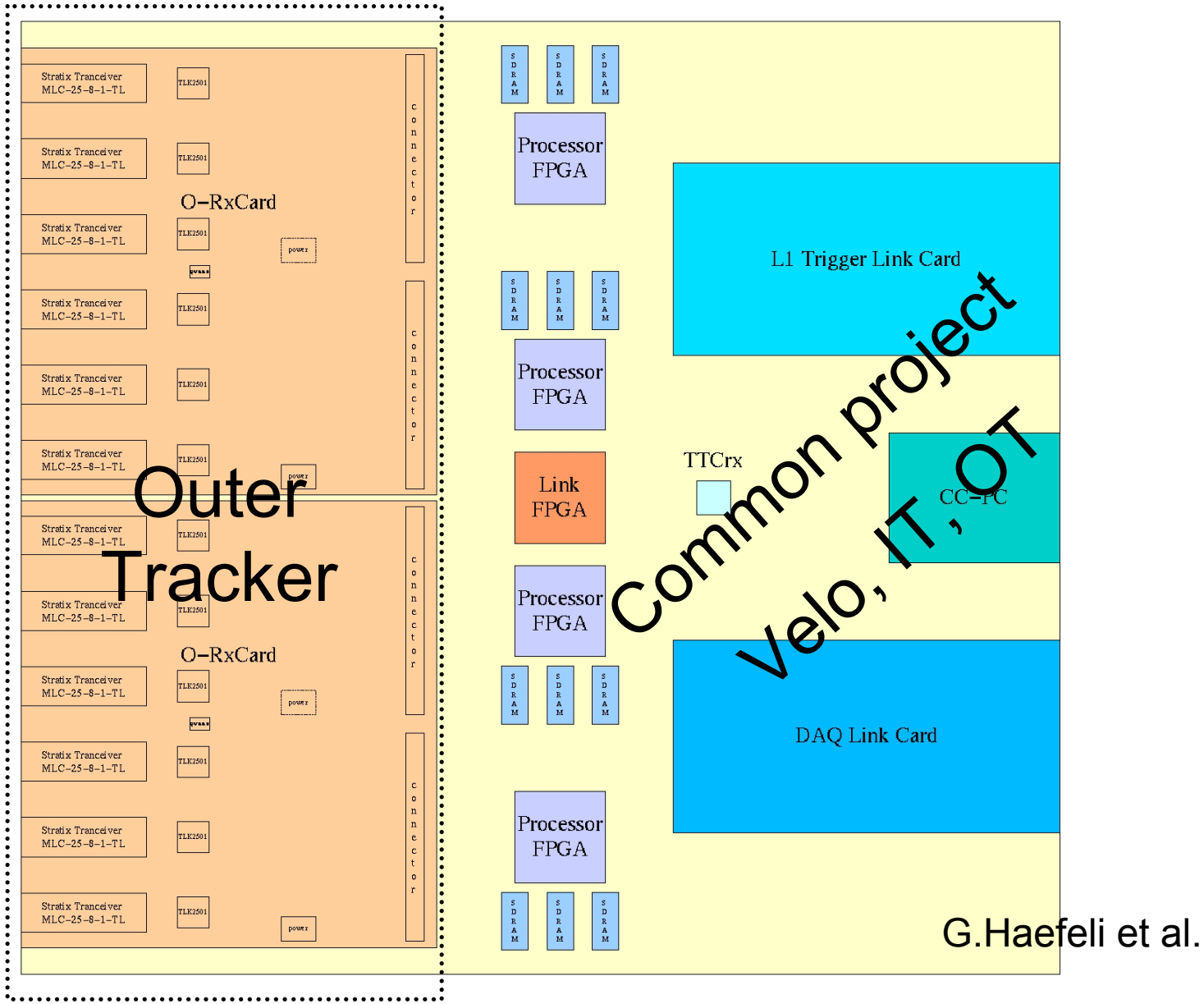
GOL Test board: GOL + VCSEL

TI TLK2501 evaluation board

⇨ Error rate < 10^{-13}

A.Rausch,
D.Wiedner

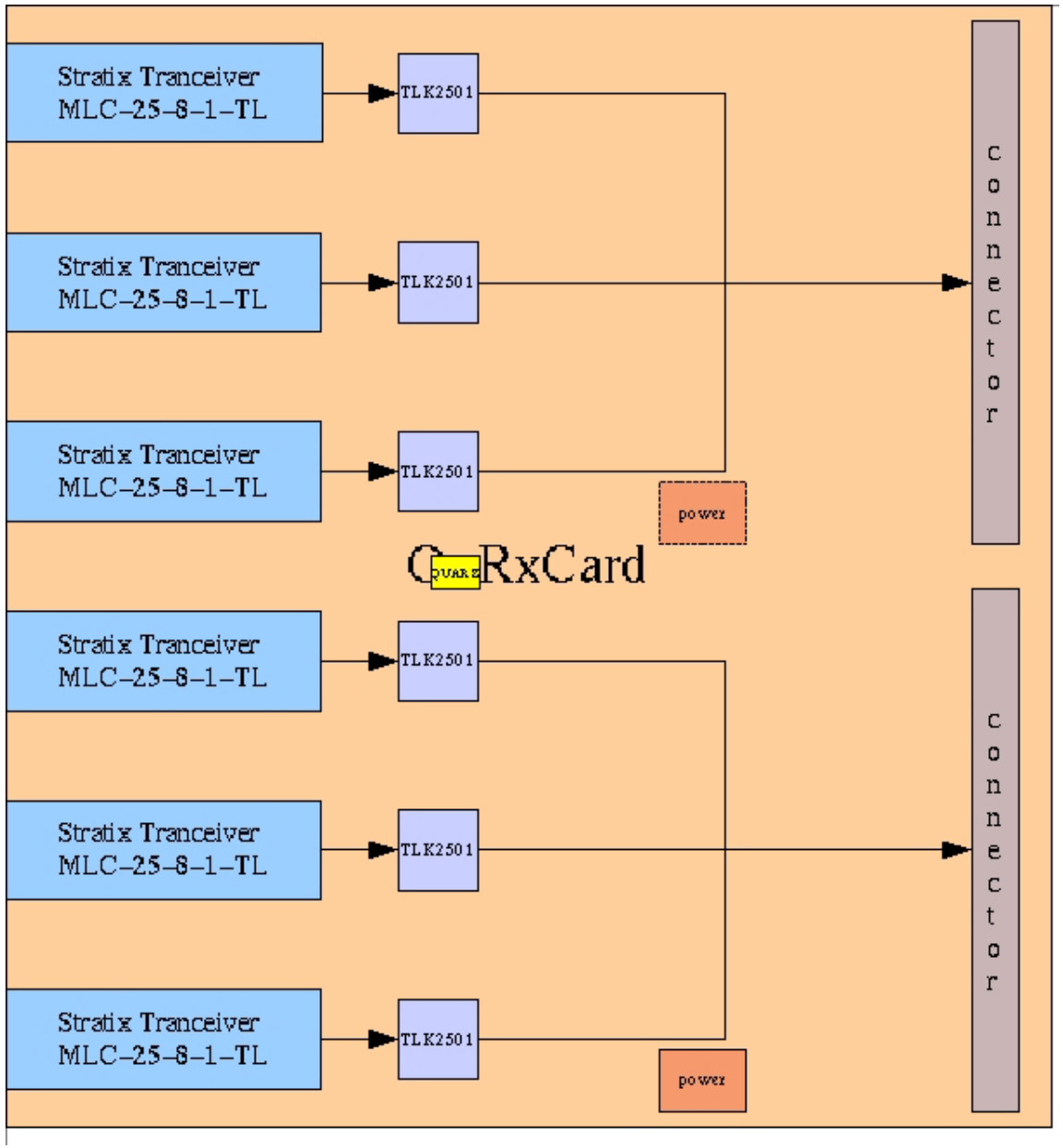
L1 Buffer Board:



G.Haefeli et al.

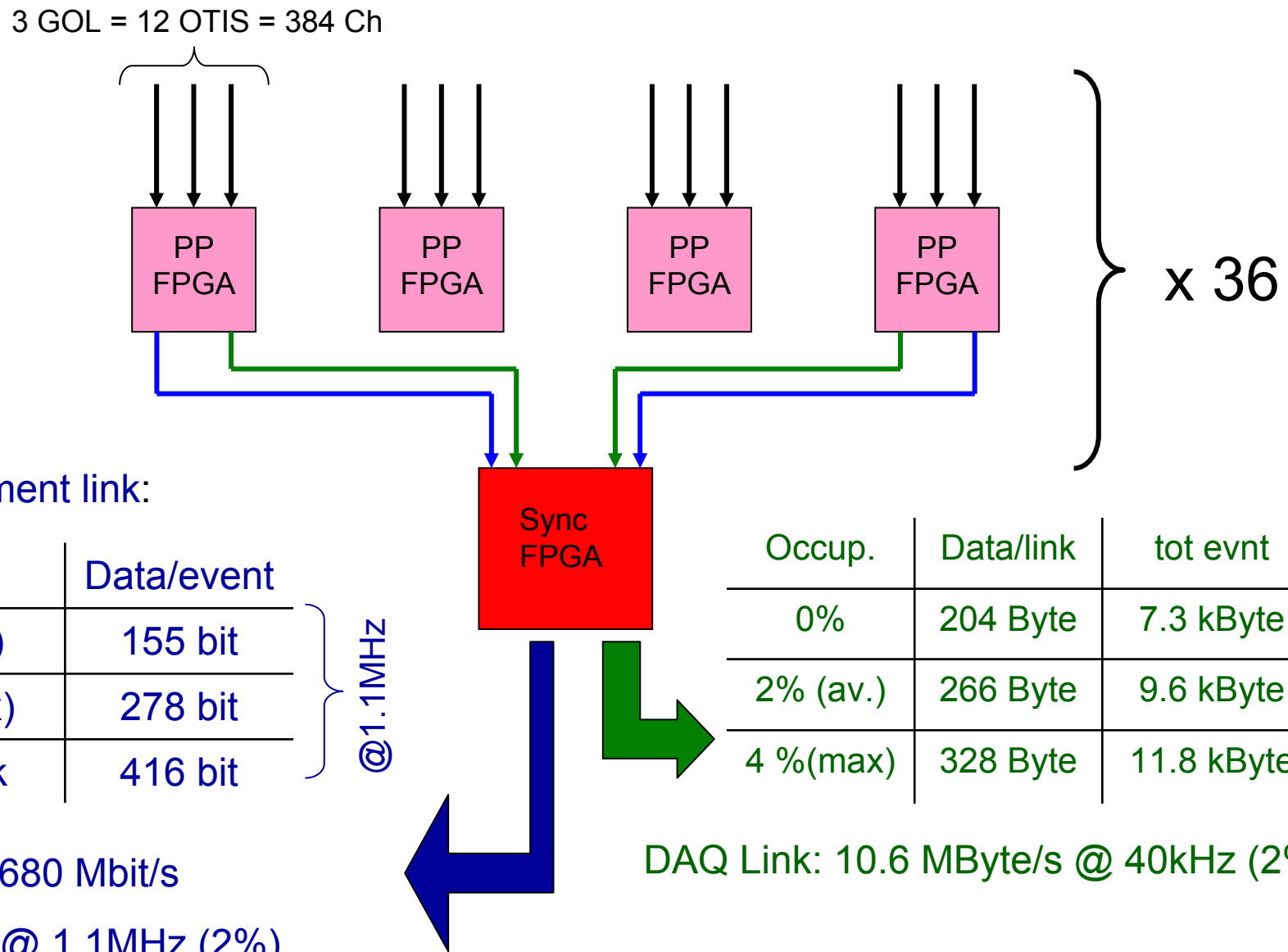
OT Receiver:

O-RxCard



A.Rausch,
D.Wiedner

L1T/DAQ Data size:



L1T fragment link:

Occup.	Data/event
2% (av.)	155 bit
4% (max)	278 bit
Hit mask	416 bit

@1.1MHz

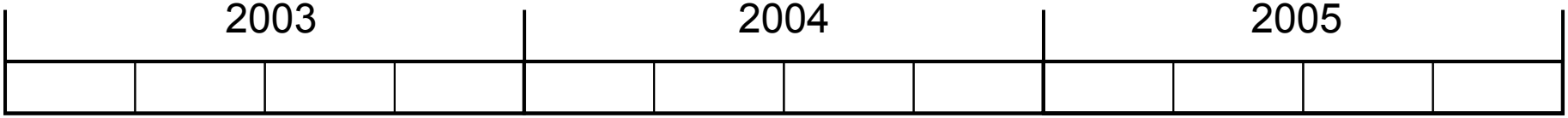
Occup.	Data/link	tot evnt
0%	204 Byte	7.3 kByte
2% (av.)	266 Byte	9.6 kByte
4 %(max)	328 Byte	11.8 kByte

L1T Link: 680 Mbit/s

@ 1.1MHz (2%)

DAQ Link: 10.6 MByte/s @ 40kHz (2%)

Outer Tracker Electronics: Time Schedule



07/03 Validation of OTIS baseline

10/03 Delivery of OTIS1.1

03/04 Start pre-series production

06/04 Pre-series finished: start mounting

01/05 Delivery of OTIS1.2

03/05 Start Mass Prod