

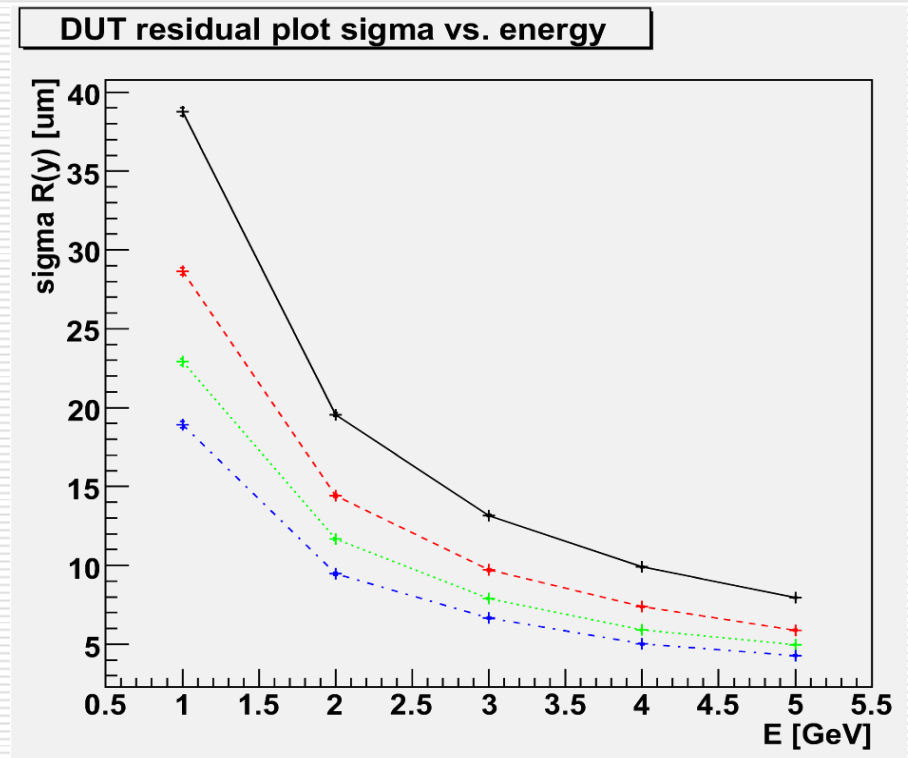
# SiLC Test beams

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# Beams available

- DESY, 1-6 GeV e
  - Good access via EUDET
  - Problem of multiple scattering (track precision  $>10 \mu\text{m}$ )
  - G4 simulation (Prague)
  - Sep 18-22 booked



# Beams available

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- CERN, 20-200 GeV  $\pi, \mu, e$ 
    - High quality beam
    - Helsinki participate in TOTEM, possibility to run in a piggyback mode
    - Schedule for 2006 unsure due to recent magnet failure
  
  - FNAL:
    - beam structure not very convenient
  - SLAC
  - KEK
-

# SiTRA-JRA2 Roadmap

From 18/9/06 to end 06  
DESY 5 GeV e-  
beam, S/N with:  
180nm chip,  
medium & long  
strips ladder

130nm

Fall'07: FNAL (CERN)  
First combined tests  
(small calo, and TPC)  
within B field  
with Si prototypes  
and 128 ch chips

Spring'09:  
FNAL(CERN)  
Combined test with  
final protos of Si  
tracker, calo and TPC,  
within B field  
new foundry FE chips,  
cooling and alignment  
protos

2006

2007

2008

2009

Preparation test beam 07:  
128ch chips & detector protos

Preparation test beam 09:  
new chips & new detector protos,  
cooling & alignment

# DESY September 2006

From 18/9/06 to  
end 06  
DESY 5 GeV e-  
beam, S/N with:  
180nm chip,  
medium & long  
strips ladder

130nm

## Test Beam at DESY in 2006 2.Half

Beam	Responsible	July					August					September					October					November				
	Collaboration/Sub-detector	03	10	17	24	31	07	14	21	28	04	11	18	25	02	09	16	23	30	06	13	20	27	04		
22	Stahl et.al.																									
	ILC/E188	■																								
22	Bruschi																									
	ATLAS/Luminometer					■	■	■	■																	
22	Savoy-Navarro																									
	SITra											■														
22																										
22	SHUTDOWN/																									
	NO BEAM																■									

# DESY Beam Area



# What is needed?

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- Trigger + DAQ + Telescopes
  - Prototype modules + DAQ HW
  - DAQ software
  - Chamber, XY stage
  - Manpower (experts, shifters)
  - Data analysis
-

# Trigger + DAQ+Telescopes

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**ZEUS DESY group telescopes booked:**

## **trigger photomultiplier**

- 3 defining an area of 9x9 mm<sup>2</sup> triggering the readout of the 3 telescope units

## **telescope**

- 3 modules with crossed sensors about 3x3 cm<sup>2</sup>; diode pitch 25 micron, readout pitch 50 micron ("Cern type", Coledani et al., [NIM372\(1996\)379](#) )

## **readout**

- CAEN module 550 and 551 in VME Power PC in the VME crate coincidence, deadtime control,... in a NIM crate in the hut. The VME crate is close to the telescope. Software and data format under investigations
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# SiLC Prototype Modules

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## 30 cm ladders

- 2 new ladders with 3 9-cm CMS sensors each, i.e. 28 cm strip length one equipped with VA1 chips (for a comparison) and the other with SiLC UMC 180 nm chip
- This module will be built in Paris

## Long ladder

- a new prototype with 10 GLAST sensors, i.e. 90 cm strip length equipped with SiLC UMC 180 nm chip
  - This module will be built in Karlsruhe and populated with chips probably in Paris
  - Option with 2 readout chips (UMC+VA) exists
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# DAQ HW+SW

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## Telescopes:

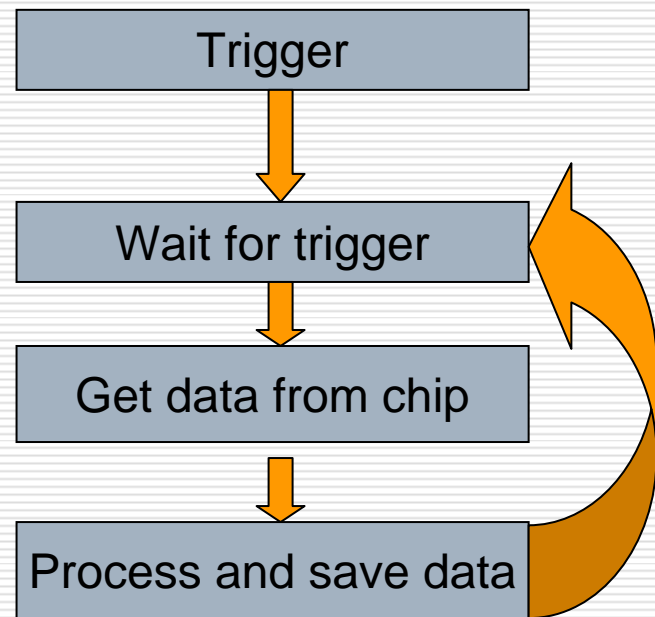
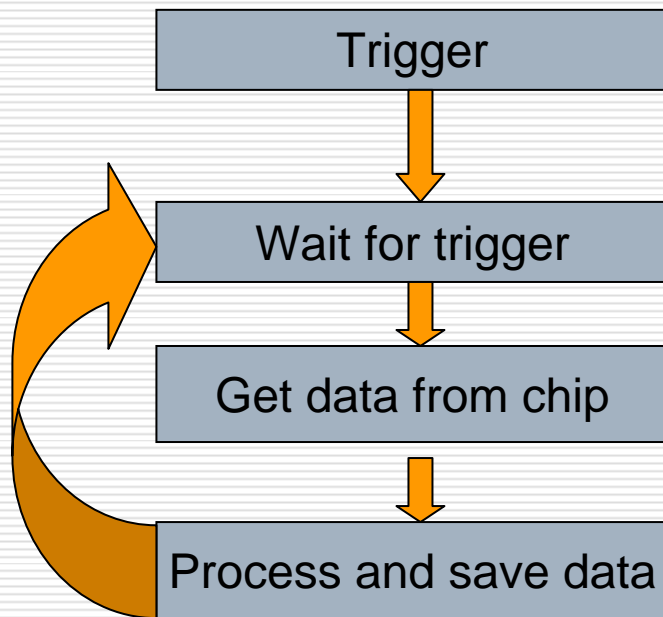
- CAEN VME V550+551 ADC+sequencer
- PowerPC in VME Crate, Lynx OS
- DESY Support promised

## SiLC modules:

- Interface card between UMC/VA chips and ADC
  - NI AD card, 100 MHz, 14 bit (PCI or PXI)
  - LabView DAQ SW tested in lab in Paris
  - Readout speed limitations
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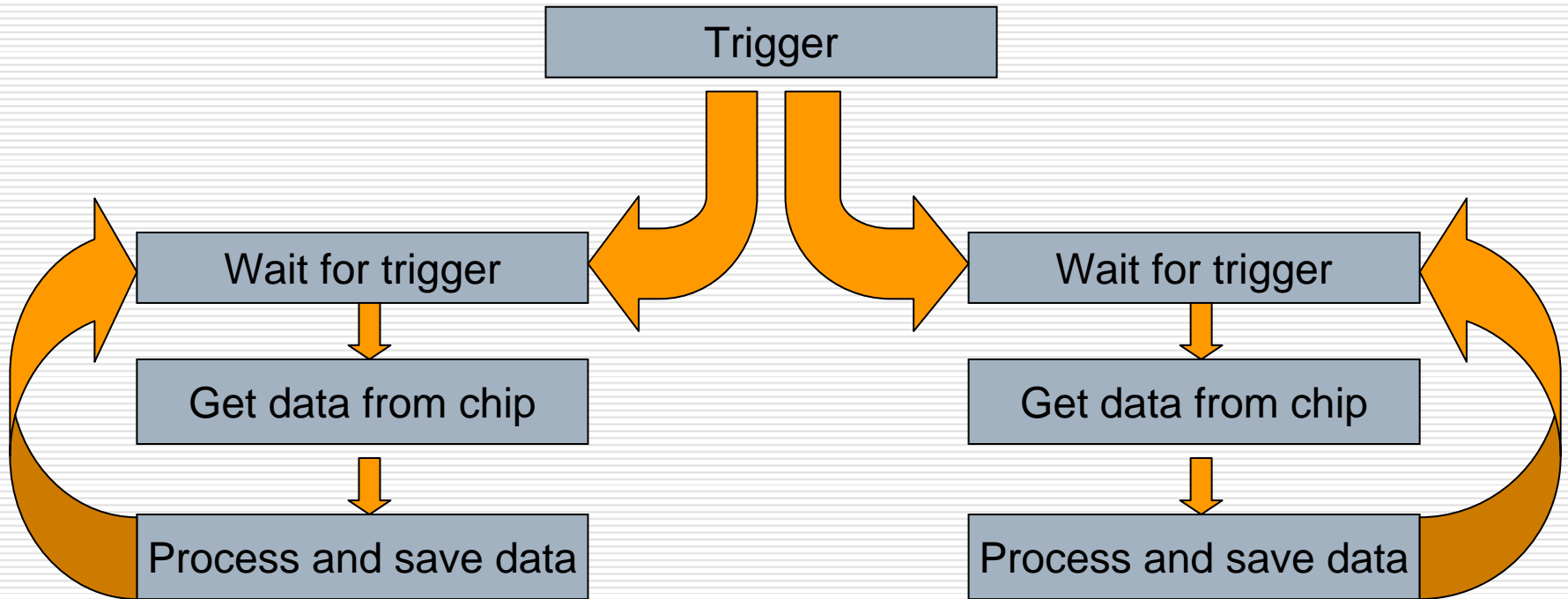
# Standalone Telescope+Proto DAQ

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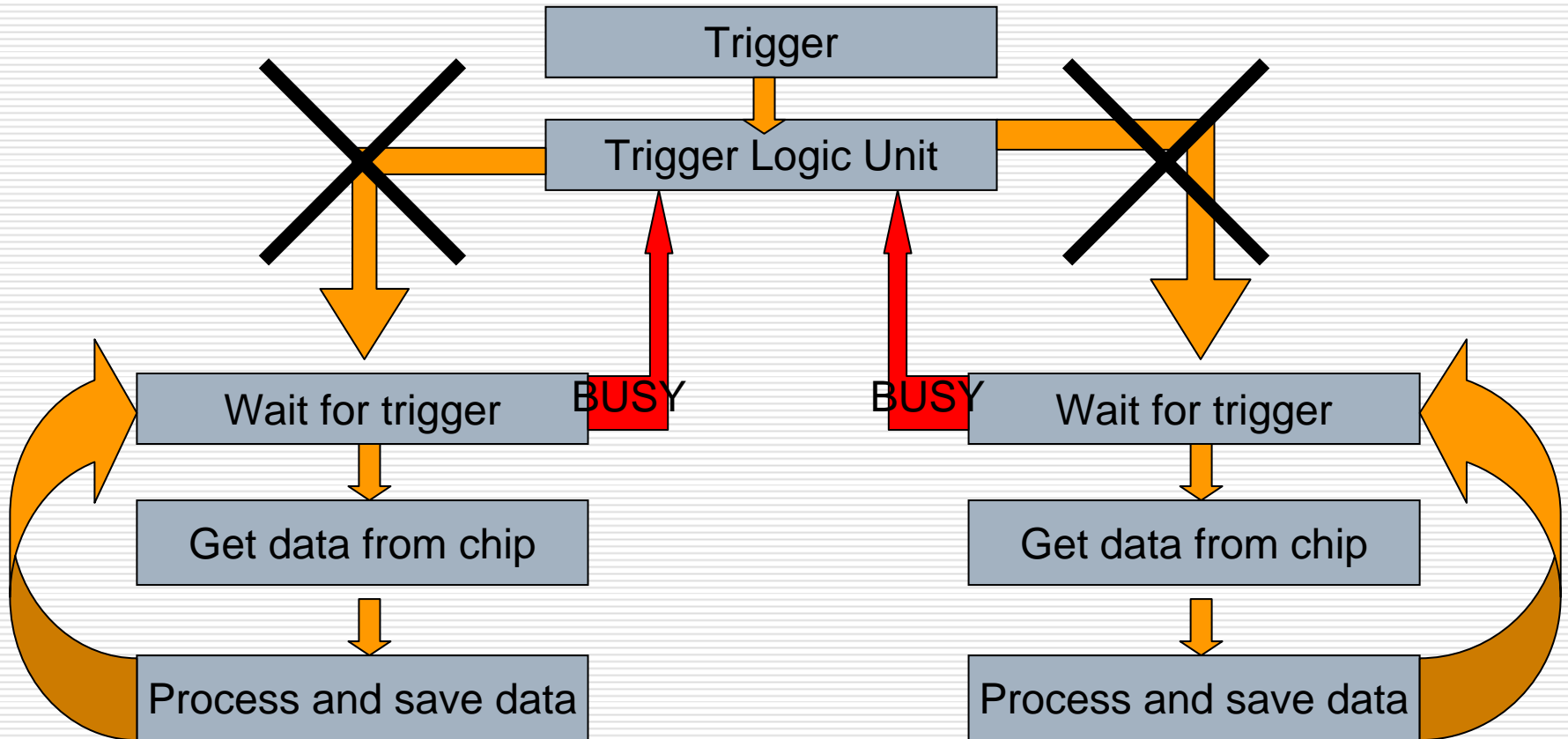
# Synchronised Telescope+Proto DAQ

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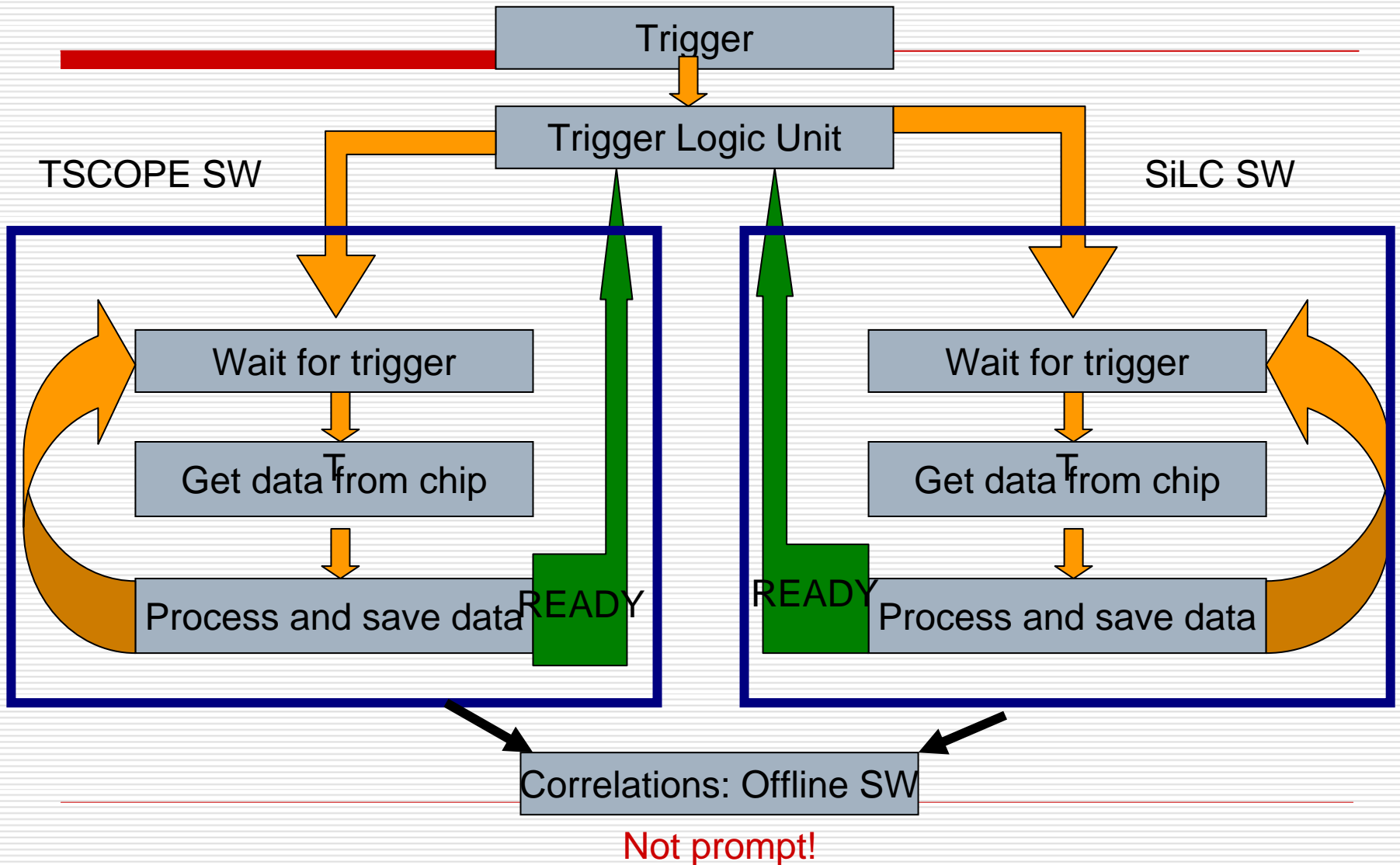


# Synchronised Telescope+Proto DAQ

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# Synchronised Telescope+Proto DAQ



# Synchronised Telescope+Proto DAQ

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Telescopes VME PowerPC readout, Lynx

SiLC NI AD card (PCI or PXI), LabView DAQ SW

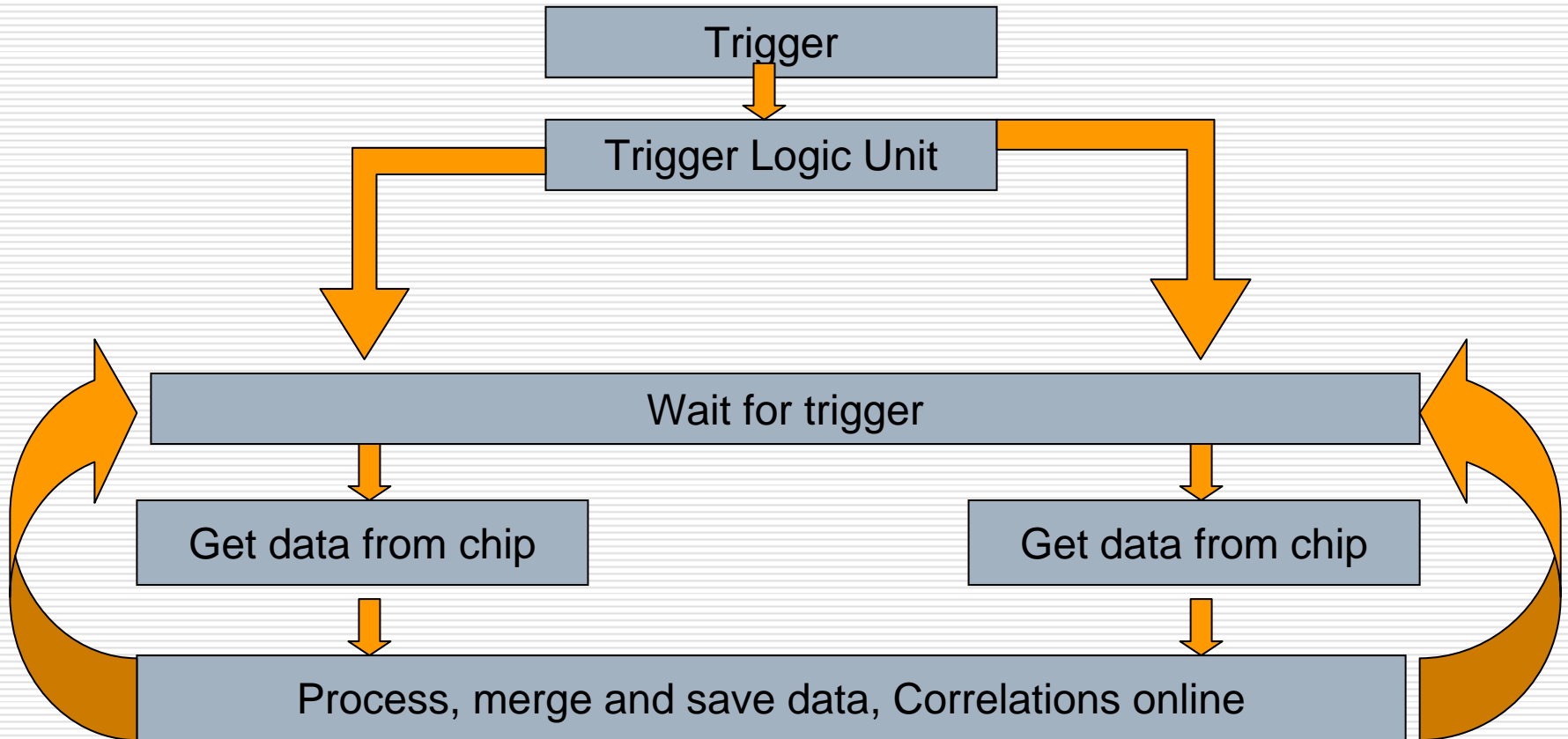
Synchronisation might be time consuming!

Hard to test in advance, but need to be prepared:

- data formats
  - readout logic
  - source codes
-

# Common Telescope+Proto DAQ

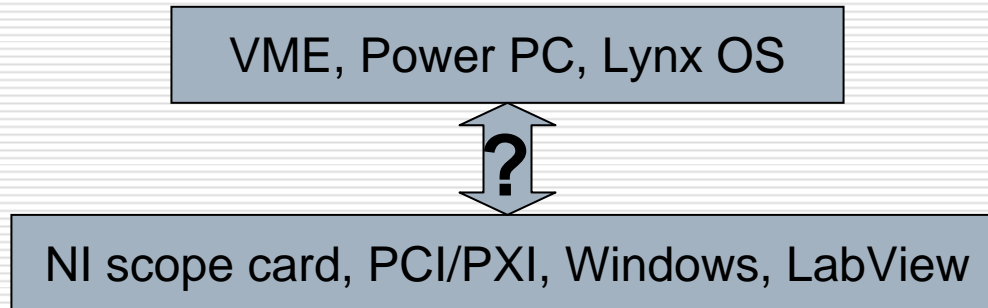
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# Common Telescope+Proto DAQ

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- Hardware?
  - Operating system?
  - SW Platform?
  - Perspective?
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# Common Telescope+Proto DAQ

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Operating system?

- Telescopes: VME can be read with a different communication board (NI PCI-VME) under Win or Linux
  - SiLC
    - No need to leave Windows
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# Common Telescope+Proto DAQ

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SW platform?

- ❑ LabView: 'easy', but slow
  - ❑ Windows MSVC++: fast, can use dll from vendors for PCI/PXI, VME + ROOT GUI + plots
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# Common Telescope+Proto DAQ

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Perspective?

- Telescopes:
    - The same for DESY beams
    - Hopefully similar or identical for CERN/FNAL beams
    - New EUDET for 2008+ with common DAQ?
  - SiLC
    - R/O mode change with 130 nm (end of 2006): digital readout
    - Simpler DAQ HW will be needed
    - Keeping SW/HW functionality for 180 nm/VA desirable for crosscheck
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# Common Telescope+Proto DAQ

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## Proposal

- ❑ September 2006: stay with 2 standalone synchronised systems
- ❑ 130 nm (end of 2006): attempt to create common TB software

## Who?

- ❑ Prague: MSVC++ + ROOT,
  - ❑ Other proposals, participations
  - ❑ Prerequisites: all info on communication protocols, chip configuration sequences, etc.
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# Common Telescope+Proto DAQ

The image displays a complex DAQ control system interface with several windows:

- CAHAC DAQ**: A control panel with buttons for PAISF and STOP.
- RUUI interface to Win32**: Multiple windows containing various control options like Expertise-tator, Path Data, Data File Name, DAC/Transmitter, Self Test Period, Driver Selection, Time for Data Saving, Fatal Abn. To File, Comments, Path to Scopes, Driver Simulation, DAC/Random Simulation, Terminal Type, Write Type, DAC Inscr. Max., DAC Event. Max., Folder of Exp. In. To. Std., Experimentator, Main Path, Path Data, Data File Name, Base Address, Enable J12, J12, DAC simulation, DAC Random Simulation, Terminal Type, Write Type, DAC Time Max., Packet of Events To Read, Merge to show, Hide Dec Maximum, DAC Scan LAM Look, and \*AQ Set - DAQ.
- TOF, PSD, QT, QD Deriving For All Detectors - Profile NDFull**: A window showing a grid of plots for data derivation.
- Scatters For All Detectors - Profile NDFull**: A window displaying a grid of scatter plots.
- Preview of All Variables & Settings - Profile NDFull**: A window providing a summary of system settings and statistics.

The **Preview of All Variables & Settings** window includes the following data:

Run 6 - Event 38700 - DAQ Time 10.39 - Fri Sep 06 09:40:06 2002	
Self Test Errors: 0 From 2 (simulations)	
<b>DAQ Sequencer</b>	<b>Event Monitor</b>
Profile: NDFull	No. of Events: 38700
Path: C:\Program Files\Root\bin\root.exe	AD413A_0 (4k)
Path: C:\Program Files\Root\bin\root.exe	TDC414_0 (8k)
Path: C:\Program Files\Root\bin\root.exe	3880 5330 3880 5330
Path: C:\Program Files\Root\bin\root.exe	602 262 602 262
Path: C:\Program Files\Root\bin\root.exe	AD2249A_0 (12k)
Path: C:\Program Files\Root\bin\root.exe	602 262 602 262
Path: C:\Program Files\Root\bin\root.exe	0 0 0 0
Path: C:\Program Files\Root\bin\root.exe	HL2305_0_0 (4k)
Path: C:\Program Files\Root\bin\root.exe	15023 15023 15023 15023
Path: C:\Program Files\Root\bin\root.exe	HL2305_1_0 (4k)
Path: C:\Program Files\Root\bin\root.exe	1203 80 307 436
Path: C:\Program Files\Root\bin\root.exe	HL2305_2_0 (4k)
Path: C:\Program Files\Root\bin\root.exe	0 0 0 0

The **Statistics Monitor** table is as follows:

	Value	Area	Scalers	Scalers	Scalers
	in range	ratio	sum/bt	swt/Sec	average
Alpha:	20839	0.54	882	300.6k	267.8k
Det n 0:	23614	1.42	11360	9139.1k	11161.3k
Det n 1:	23614	1.00	11360	9139.1k	11161.3k
Det n 2:	23614	1.00	11360	9139.1k	11161.3k
Det n 3:	23614	1.00	11360	9139.1k	11161.3k
Events:	38700	Eff: 5.68	\$365442	\$36556.2k	\$44847.6k
Ev/Sec:	3723.44	Clock:	341.61	367597.26	277302.95
DAQ time:	10.39 s	Coin.csd:	0.00	0.00	0.00

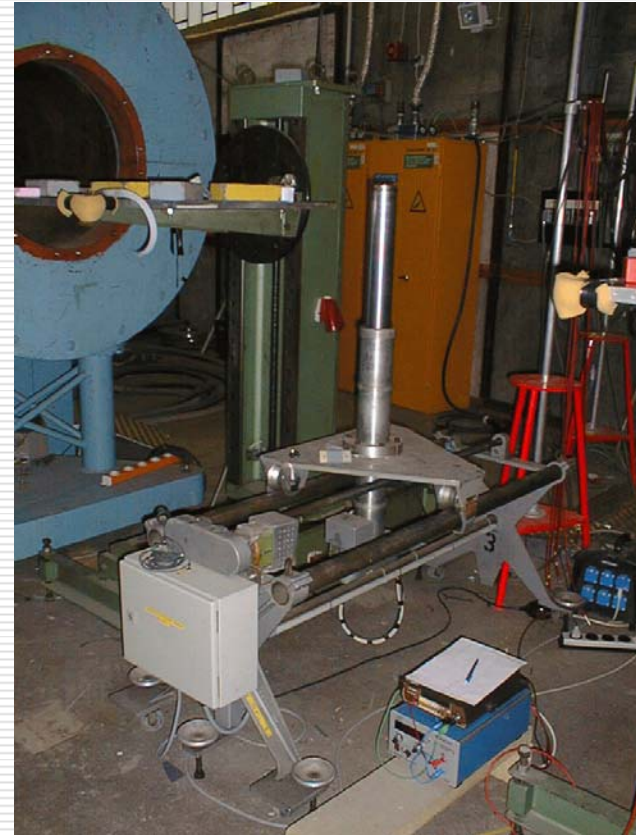
# Chamber, supports, XY stage

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- Concrete blocks, tripod available on site
  - 30 and 1000 kg XY stages with a remote control exist at DESY
  - 30 kg XY stage booked
  - Chambers?
  - Dry nitrogen: to be checked
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# Chamber, supports, XY stage

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# Responsibilities

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## Telescopes, trigger...

- Prague
- Obninsk
- DESY

## Prototypes+ test setup

- Paris
- Karlsruhe

## Mechanics, chambers

- Obninsk
- DESY
- Paris
- Karlsruhe

SiLC test beam page: [www-ucjf.troja.mff.cuni.cz/ilc](http://www-ucjf.troja.mff.cuni.cz/ilc)

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## Readout

- Prague
- Paris
- DESY

## Offline analysis

- Prague

## Shifts

- All (who?)

## Data analysis

- Prague
- Everyone interested