

Executable files, src folder

Description of executable files ([git ver. /download-gitver/](#) and [Thomas' ver. /download-thomasver/](#)) used to run [alibava data analysis](#) is presented here.

Converter and Convert-ped steps

Both entitled steps require following files to be executed

AlibavaConverter.cc -> [git ver.](#) and [Thomas' ver.](#)

AlibavaConverter.h -> [git ver.](#) and [Thomas' ver.](#)

remark: both ver. of this code was written by Eda, the versions are called like that for the sake of consistency

Differences between the ver. code

Thomas' code(old)	git ver. (new)
<i>the sensor's temperature is <u>being treated</u></i> by reading it from the alibava data's header	<i>the sensor's temperature is <u>not being analyzed</u></i>
<i>the DUT's inclination angle <u>is</u> being set to the header</i>	<i>the DUT's inclination angle <u>is not</u> taken to account</i>
reverse <i>beetle reading order is allowed</i>	reverse <i>beetle reading order is <u>not</u> allowed</i>

Pedestal and pedestal2 steps

Requires the files :

AlibavaPedestalNoiseProcessor.cc

AlibavaPedestalNoiseProcessor.h

Differences between the ver. code

Thomas' code(old)	git ver. (new)
<i>the sensor's temperature is <u>not being analyzed</u></i>	<i>the sensor's temperature is <u>being analyzed</u></i> via filling corresponding histos with the use of AlibavaEventImpl.cc

Commonmode and reco steps

Clustering-1 step

Parameters	Thomas' code: AlibavaClustering.cc	git ver. (new) AlibavaSeedClustering.cc+AlibavaCluster.cc
<p>Seed selection criterion</p> <p>A strip is being selected as the seed if its signal-to-noise ratio exceeds this cut:</p>	SeedCut	SeedSNRCut
<p>Cluster selection criterion</p> <p>A set of strips are being selected as clusters with the seed selected with the parameter above if their signal-to-noise ratios exceed this cut</p>	ClusterCut	NeighbourSNRCut
<p>Cluster size</p>	MaxClustersize MinClustersize	

<i>Cross-talk (signal retardation) noise correction and FIR (finite impulse response) filter (see details in p. 5.3 of Thomas' thesis)</i>	<p>Allows to correct the charge per channel distr. for the <u>signal retardation (cross-talk) noise</u>.</p> <p>_initcoefficient1 and _initcoefficient2 - the cross-talk noise coefficients, they are being defined on the header step;</p> <p>_readcoefficient1 and _readcoefficient2 - the FIR correction coefficients, they are being defined on the header step;</p> <p>_initcoefficient1, readcoefficient1 shows which fraction of the alibava <i>ch.[i]</i> signal was transferred from the <i>ch.[i-1]</i>,</p> <p>_initcoefficient2, readcoefficient2 shows which fraction of the alibava <i>ch.[i]</i> signal was transferred from the <i>ch.[i-2]</i>.</p>	<u>Doesn't allow to correct the charge per channel distr. for the signal retardation (cross-talk) noise</u>
<i>Missing coordinate estimation</i>	Calculated the missing y (or x) alibava clusters' coordinates from t	

AlibavaCluster.cc calculates all parameters of the cluster e.g.

Changes implemented by Dmitry:

The following histograms were added to the git ver.:

1. Numb. of entries vs. the cluster signal-to-noise ratio, called **hClusterSNR_chip_x**. It should be used for setting the proper NeighbourSNRCut.
2. Numb. of entries vs. the seed signal-to-noise ratio, called **hSeedSNR_chip_x**. It should be used for setting the proper SeedSNRCut.
3. Numb. of entries vs. the cluster signal-to-noise ratio, called **hClusterChargevSTDC_chip_x**. It should be used for setting the proper TDC cut borders (it's being set for the **AlibavaTimeCutProcessor**).

(where *x* is the number of beetle chip, either 0, or 1)

Merge step

Thomas' ver. and git ver. codes are presented

Thomas' code	git ver.
The <i>correlations plots</i> between the telescope planes' and alibava's clusters or hits <u>are being plotted</u>	<u>No histograms filling and plotting at all</u>
Four options to save <u>the merged data</u> collection(s) for a certain event: <ol style="list-style-type: none"> 1. Both merger input collections must have clusters/hits 2. Only alibava input collection has clusters/hits 3. Only telescope input collection has clusters/hits 4. Write out the output collections regardless presence of data in the input collections 	Write out the <i>output collections</i> <u>regardless presence of clusters in the input collections</u> , but the <i>input collections must be available</i> in the input file (i.e. no collection header corruptions etc.)
includes two parameters for total events number difference between the alibava and telescope data arrays, but they're not in use - <u>doesn't allow events alignment</u>	allows to <u>align the events</u> , i.e. to compensate the difference of the total event numbers between the input alibava and telescope event arrays
allow to <u>merge either just hits, either clusters</u>	<u>mergers clusters</u> of both, sparse and pulse, collections. It's very useful for us, because sparse collections containing clusters seed's coordinates and clusters sizes is filled with zeros for the telescope collection

Remarks to the code:


Thomas' code	git ver.
unclear how reading of the alibava file is happening: name of the alibava input file is defined and stored, but this variable is never being used in the code or transferred to another code.	I've added the counter of events which contain clusters on each, telescope+DUT+CMSPixRef, planes to check whatever the data losses come from merger or prev. steps. This events fraction is presented on the <u>plot</u> .

Methods are in use:

EUTelEventImpl is being used to create a matrix of the telescope event's data collections
AlibavaEventImpl is being used to create a matrix of the telescope event's data collections

Output: database

This processor

Thomas' code	git. ver
<i>preAlign</i> processor - EUTelPreAlignment.cc. Processor's src was fully changed via used methods modification, logic is the same though	
#include "EUTelSparseCluster2Impl.h", #include <TrackerHitImpl2.h> - these files don't exist in the current git. ver: def. method is EUTelAPIXSparsePixel	#include "EUTelGeometryTelescopeGeoDescription.h" def. method EUTelAPIXSparsePixel is EUTelGenericSparsePixel
<i>CombinedHitMaker</i> processor (its code was written by antonio.bulgheroni@gmail.com)	
EUTelHitMaker.cc - has more functions, allows to calculate more parameters, but cannot be used due to lack of some src and header files in the new EUTel ver.	EUTelProcessorHitMaker.cc - contains 6 functions for definition and calling input parameters, ref hits definition/collection function,
EUTelVirtualCluster.h EUTelEtaFunctionImpl.h EUTelSparseCluster2Impl.h gear/GearMgr.h gear/SiPlanesParameters.h AIDA/IHistogram3D.h TrackerHitImpl2.h	EUTelGeometryTelescopeGeoDescription.h EUTelSimpleVirtualCluster.h
Calculates the eta distr.	doesn't calculate eta distr.
	uses Tel pulse collection as an input, but it's contained by zeros if one looks by <i>dumpevent</i>  an idea for workaround is to use <i>sparse collection</i> instead and convert the hits coordinates (not only the seeds coordinates) from the local frame to the global frame.
	CellIDEncoder<TrackerPulseImpl> outputEncoder(EUTELESCOPE::PULSEDEFAULTENCODING, filteredCollectionVec) - on the telescope clustering stage, it's exactly where the seeds coordinates are being filled to output pulse collections which are unfortunately being shown as zeros after dumpevent.

Alignment step

EUTelAlign.cc