Muon calibration Interfaces

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M. Gaug, Site characterization activities for La Palma, CTA consortium pre-meeting Liverpool, September 14th, 2015

Muon calibration Interfaces

All interfaces are available (and editable) on the sharepoint interfaces database:

https://portal.cta-observatory.org/WG/Central Systems Engineering/Lists/Interface Database/List of items no detail.aspx

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Reference	Product 1	Product 2	Interface Title	Modified	Approval Status
I-DATA-COM-3262	DATA	COM	Inter- and Cross-Calibration of the telescopes timing using cosmic ray images	29/07/2015 08:12	Pending
I-DATA-COM-3231	DATA	COM	Alternative flat-fielding of the camera pixels using muon images	29/07/2015 09:53	Pending
I-DATA-COM-3101	DATA	COM	INFN LIDAR	23/09/2015 12:18	Pending
I-DATA-COM-3234	DATA	COM	Monitoring of the telescope PSF using muon images	11/10/2015 00:38	Pending
I-DATA-COM-3232	DATA	COM	Monitoring of individual mirror reflectivities using muon images	11/10/2015 00:40	Pending
I-DATA-COM-3233	DATA	COM	Calibration of the overall optical throughput using muon images	11/10/2015 00:46	Pending
I-DATA-COM-3221	DATA	COM	Muon image reconstruction	23/10/2015 09:26	Pending
I-DATA-COM-3201	DATA	COM	Cherenkov Transparency Coefficient (CTC)	23/10/2015 11:15	Pending
I-DATA-COM-3271	DATA	COM	Inter- and Cross-Calibration of the optical throughput of telescopes using the CTC	23/10/2015 11:15	Pending

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Interface Database - I-DATA-COM-3221

View

Edit Item | Version History | Manage Permissions | Delete Item | Alert Me | Approve/Reject

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Reference	I-DATA-COM-3221
Product 1	DATA
Product 2	COM
Interface Title	Muon image reconstruction
Explanation	

1 Interface: I-DATA-COM-3221: Muon image reconstruction

I-DATA-COM-3221: Muon image reconstruction - version: 1.0	
Information provided by:	
Name	WP sub-project
Teresa Mineo	CCF
Raquel de los Reyes	DATA-PIPELINES
Interface status: editing	

Table 1: List of DATA-COM interfaces

Muon calibration Interfaces

Tasks covered during the interface (DATA sub-project responsible):

1. Construct data infrastructure (DM/ARCH)
2. Implementation of algorithms (PIPE-Cal/ARCH)
3. Integrate algorithms (PIPE-Cal)
4. Test algorithms on partial array (PIPE-Cal)

1.1 Description of Data Interface

I-DATA-COM-3221: Muon image recostruction	
Data Interface: Muon image reconstruction	
Description	The muon ring parameters are getting reconstructed twice (from DL0 and from DL1 data) in this step and provide twice muon image parameters
Operation/information level	per telescope

Muon calibration Interfaces

Q: Do the data coming from CCF need to be processed by DATA pipelines? (Y/N)

- If **Y**: Y

In this case, for the devices, DATA assumes that will receive CAL0/AUX0 from ACTL and process it. For the inter-calibration methods and muon it is expected you will answer "Y" since you need already DATA processed data levels (DL2, DL3,...) as input for your method (e.g. calibrated Cherenkov images or even cleaned images or Hillas parameters, ...)

I-DATA-COM-3221: Muon image reconstruction	
Input data Rate (for DATA)	depends on camera server, between 0.1 and 10 Hz

Input variables (for DATA)	• Header
	  ◦ parameters which were used to flag the event as muon.
	  ◦ parameters of the ring reconstruction in the camera server if available (ring center, radius and chi2).
	• Variables
	  ◦ all FADC slices of all pixels, if existing, for the algorithm that reconstructs the ring on DL0 data.
	  ◦ pixel charge and time of all pixels, for the algorithm that reconstructs the ring on DL1 data.

Will the data processing be implemented by CCF?	yes
If CCF will develop the code: which framework do you need from DATA and when?	DL0 and DL1 data camera display would be nice to have and graphical interface and histogramming possibilities

Muon calibration Interfaces

Output/results from the method	• Header
	  ○ ..
	  ○ ..
	• Variables
	  ○ 3 times the following parameters:
	  ○
	  ○ Ring center,
	  ○ Ring radius
	  ○ Ring width
	  ○ Ring size
	  ○ Chi2 of ring fit
	  ○ Covariance matrix of ring parameters
	  ○ Impact parameter
	  ○ Chi2 of impact parameter fit
	  ○ Covariance matrix of impact parameters
	  or alternatively: full 5x5 covariance matrix for
	  ○ the complete fit (ring + impact)
	  ○ Completeness of ring
	  ○ Number of pixels participating in ring
	  ○ COG
	  ○ Off-ring size
	  ○ raw muon efficiency
	  ○
	  ○ For all pixels which participate in the ring:
	  ○ Charge
	  ○ Time

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Results application to the DATA Pipelines	will be input for I-DATA-COM-3231 and I-DATA-COM-3232 and I-DATA-COM-3233
Experts access (data variables and file format)	all output variables
Data summary	camera display of ring centers camera display of COGs display of off-ring size and muon size vs. time display of chi2s vs. time
Data Quality limits	
Data Quality alerts	
Alternative method	2 different ring and impact parameter fit algorithms
Other observations	
The rest of questions only concerns CCF devices.	
Number units	
Device output format (ASCII, FITS,...)	
Do you provide the I/O libraries?	
Do you need your algorithms to run on-site?	yes

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That’s all, don’t be afraid to contact Raquel!