

Enhanced AASPI Algorithms: March 2020

Application Name	Application Description	Location	Software Documentation
instantaneous_phase	added COS(instantaneous_phase), average frequency, and instantaneous bandwidth, where the latter two use the more accurate formula describe by Barnes (2016)	under aaspi_util > Single Trace Attributes	http://mcee.ou.edu/aaspi/documentation/Single_trace_attributes-instantaneous_attributes.pdf
spec_cmp, spec_cwt	added COS(phase) for all spectral components	under aaspi_util > Spectral Attributes	http://mcee.ou.edu/aaspi/documentation/Spectral_Attributes-spec_cmp.pdf
pca3d	added decimation to accelerate construction of the covariance matrix; added option to reconstruct the input data using the first n_eigen eigenvectors	under aaspi_util > Volumetric Classification	http://mcee.ou.edu/aaspi/documentation/Volumetric_Classification-pca3d.pdf
kmeans, gmm3d, pnn3d	added input attribute scaling within the Machine Learning Toolkit framework	under aaspi_util > Machine Learning Toolbox	
gtm3d	rewrite to require significantly less core memory	under aaspi_util > Volumetric Classification	http://mcee.ou.edu/aaspi/documentation/Volumetric_Classification-gtm3d.pdf
dip3d_gst	reworked to handle severe mutes and no permit zones that gave rise to curvature artifacts. Output samples that do not centered in a fully populated analysis window are now muted.	under aaspi_util > Geometric Attributes	http://mcee.ou.edu/aaspi/documentation/Geometric_Attributes-dip3d.pdf
dip3d_gst	Added a multispectral capability	under aaspi_util > Geometric Attributes	http://mcee.ou.edu/aaspi/documentation/Geometric_Attributes-dip3d.pdf
azimuthal_fault_density	Reworked to handle input aberrancy and fault probability vectors in addition to curvature vectors	under aaspi_util > Attribute Correlation Tools	http://mcee.ou.edu/aaspi/documentation/Attribute_Correlation-azimuthal_fault_density.pdf
interpolate	Modified algorithm to accurately interpolate P-impedance and other volumes with non-zero mean	under aaspi_util > Other Utilities	http://mcee.ou.edu/aaspi/documentation/Other_Uilities-interpolate.pdf

SEGY to AASPI conversion, AASPI to SEGY conversion, and all geometric and spectral attribute	Modified algorithms and defaults to allow processing of depth-migrated data whose vertical axis is in m or ft in addition to km and kft	Multiple programs	
All programs	Documentation now has a consistent format.	All programs	
Most programs	Explicit listing of output file naming convention in 60% of programs	Multiple programs	
pca3d integrated into machine learning toolbox	New principal component analysis algorithm, replacing our previous stand-alone program pca3d, now incorporated into the machine learning toolbox	under aaspi_util > Machine learning toolbox > analyze input, create model, and perform classification algorithms	http://mcee.ou.edu/aaspi/documentation/Machine_Learning_Toolbox-analyze_input.pdf
pnn3d algorithm integrated into machine learning toolbox	Probabilistic neural network incorporated into the new machine learning toolbox, supporting different data transformation schemes	inside machine learning toolbox's analyze input, create model, and perform classification GUI	http://mcee.ou.edu/aaspi/documentation/Machine_Learning_Toolbox-analyze_input.pdf

