New AASPI Algorithms: September 2017				
Application Name	**Application Description**	**Location**	**Software Documentation**	**AASPI References**
zgy_write_batch and zgy_read_batch	(Windows operating system only) Convert to and from Petrel ZGY-format files and AASPI-format files, thereby avoiding generation of a intermediate SEGY-format files.	currently application found under aaspi_util/Other Utilities - aaspi_util GUI will be reworked by December 2017 to be cleaner	precious few parameters to choose. More detailed documentation will be generated with new version of aaspi_util	http://mcee.ou.edu/aaspi/documentation/Data_Conversion-Converting_postack_data_from_ZGY_to_AASPI_formats.pdf
cigar_probe	Allow unlimited input attributes and wells. Algorithm now runs faster, especially for vertical wells. Currently only works with well trajectories (well segments not implemented yet). Request guidance from user-community on formats that define irregular well paths.	under aaspi_util > Attribute Correlation Tools tab	http://mcee.ou.edu/aaspi/documentation/Attribute_Correlation-cigar_probe.pdf	http://mcee.ou.edu/aaspi/publications/2017/Xuan_AAPG_2017.pdf
fault_connectivity	uses coherence or other edge-sensitive attribute as a proxy for fluid connectivity between a reservoir and an assumed aquifer	under aaspi_util > Image Processing tab	http://mcee.ou.edu/aaspi/documentation/Image_Processing-fault_connectivity.pdf	http://mcee.ou.edu/aaspi/publications/2017/Rafael_Pires%20de%20Lima_SEG_Absrtact_Fall_2017_Quntifying%20fault%20connectivety%20drilling%20hazards%20through%20simple%20flow%20computations.pdf
gmm3d	A Gaussian Mixuture Model classification algorithm. When applied to multiple 3D volumes, this algorithm provides results that are similar to, but more adaptive than kmeans3d classification, but less definitive than som3d or gtm3d projections. Our intial applications are to define "optimal" clusters in the 2d latent space of SOM projections.	under aaspi_util > Volumetric Classification tab	http://mcee.ou.edu/aaspi/documentation/Volumetric_Classification-gmm3d.pdf	http://mcee.ou.edu/aaspi/upload/AASPI_Theses/2017_AASPI_Theses/hardisty_thesis.pdf

instantaneous_attributes	Classical instantaneous attributes including envelope, frequency, and phase, to facilitate their use in clustering or to compare to more sophisticated attributes such as spectral decomposition. The amplitude volume technique (AVT) is in this package; like spec_vmd, the AVT appears to provide information lower than the measured seismic spectrum. Future research will determine if this "rhythm of the data" is real or just a visual apparition.Sweetness is included in this package, which provides tool for sand estimation. Unwrapping phase is also in this package, which produces continuous phase information.	under aaspi_util > Single Trace Attributes tab	http://mcee.ou.edu/aaspi/documentation/Single_trace_attributes-Instantaneous_attributes.pdf	Classical algorithms by others
pseudo3d	Generate pseudo3d from a suite of 2D lines and reverse. Also allow users to import an unlimited number of SEGY 2D lines, each with its own file, at once.	under aaspi_util > Other Utilities	http://mcee.ou.edu/aaspi/documentation/Other_Utilities-2D_seismic_utilities.pdf	Seismic Interpretation of the Exmouth Plateau, North Carnarvon Basin, Australia: An Application of Data Conditioning, Seismic Attributes, and Self-Organizing Map on 2D Data
similarity_prestack	Computes coherence, amplitude gradients, and other attributes on each azimuthal or offset component. Computes multioffset and multiazimuth coherence and amplitude gradients by summing the covariance matrix	under aaspi_util_prestack > Data Analysis tab	http://mcee.ou.edu/aaspi/documentation/Volumetric_Attributes-similarity3d.pdf	http://mcee.ou.edu/aaspi/publications/2017/qi%20et%20al.%202017%20Multiazimuth%20coherence_Volumetric_attributes

spec_vmd	Variational mode decomposition - an algorithm that uses spectral components of the measured data as the carrier wave, where the "signal" is lower frequency - perhaps lower than the bandwidth of the seismic data. The analogy is a 540 kHz radio station carrying a human voice with frequencies ranging from 0.3 to 3.4 kHz. We are currently working on the interpretational value of such measures, which is not unrelated to the low frequency (lower than the measured spectrum) features seen in the AZT attribute available under instantaneous_attributes.	under aaspi_util > Spectral Attributes tab	Documentation under construction.	http://mcee.ou.edu/aaspi/publications/2017/Tao_Fangyu_SOM_VMD_2017.pdf ; http://mcee.ou.edu/aaspi/publications/2017/Fangyu_vmd_2017.pdf
volume_combine and volume_separate	Simple utilities to combine multiple volumes (e.g. azimuthally-limited migrated stacks) that may come from a contractor into a single 4D volume (t, phi, cdp_no, line_no) that can serve as input for similarity_prestack, sof_prestack, and other algorithms. Volume separate breaks a 4D or 5D volume back into multiple 3D volumes	under aaspi_util_prestack > Prestack Utilities	Documentation under construction.	Simple utility. No paper needed.