

ASPP TigerEye®



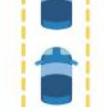
Advanced Sensor Perception Processing

The visual organs of a tiger are located on the front of the head and not on the side, thus enabling a three-dimensional view; the pair of eyes looks directly forward.

The **LAKE FUSION Technologies' (LFT)** product **ASPP TigerEye®** (Advanced Sensor Perception Processing) is a modular SW suite for processing LiDAR data. It is based on LFT's experience in LiDAR data filtering, segmentation and classification in the aerospace industry and uses only classical deterministic algorithms. Accordingly, they do not need to be trained like AI-based procedures. By reducing the amount of data already in early processing phases, the computing time required is low. **ASPP TigerEye®** consists of 8 main modules which together comprise the complete LiDAR data processing chain for environmental perception and monitoring.



The modules are:

TE-1:		Sensor filters	LiDAR sensor data filtering to remove weather or sensor related artifacts (false pixels) from LiDAR depth images
TE-2:		Free space detection	This application uses LiDAR data to determine first the ground area and then the free space in front of the vehicle
TE-3:		Lane detection	I.e. the derivation of lanes from the LiDAR image
TE-4:		3D object tracking	Segmentation, clustering and tracking of raised 3D objects
TE-5:		Offline / online calibration	SW for online calibration / calibration verification of LiDAR sensors
TE-6:		LiDAR detection performance monitoring	Live monitoring of the current visibility of the sensor system (sensor pollution detection / detection of different types of degradation)
TE-7:		Detection of relevant small obstacles	LiDAR sensor data are used to detect small obstacles (e.g. tires, wooden pallets), which can be difficult or impossible to detect by today's camera systems
TE-8:		Dynamic collision warning	Dynamic objects trajectory prediction for collision avoidance

ADFS MentisFusion®



Advanced Data Fusion System

Mantis directs all processes, precisely, to an "action" (the catching of prey).

This is the merging and processing of fragmented and sometimes contradictory sensor data into an overall picture that can be understood by humans in real time.

The **LAKE FUSION Technologies' (LFT)** product **ADFS MentisFusion®** (Advanced Data Fusion System) consists of deterministic, rule-based algorithms and SW packages for data fusion that accept pre-processed inputs as 2D and 3D objects as well as segmented 3D data points from the various data sources. Data sources are e.g. the processed camera, LiDAR and database information (including cloud based information) as well as RADAR information.

The purpose of sensor data fusion is to compensate for systematic gaps in the individual technologies by combining different sensors and thus to cover the entire environment with the same quality over the widest possible range of applications. In order to meet the high requirements for data integrity, the data is first calculated in independent functional chains and only then merged. Mutual monitoring and support ("Doer - Checker" principle) of the multiple sensor functional chains with different technologies is thus an important part of data fusion.



The modules are:

MF-1:		Lane-marker-fusion	The first feature of MentisFusion software combines road marking information coming from one or more sensor branches
MF-2:		Freespace-fusion	The second feature of MentisFusion software combines information on the accessible road area from the semantic segmentation of camera data with LiDAR data-based polygons of the obstacle-free road (see TE-2)
MF-3:		Object-fusion	The third feature of MentisFusion software combines object information derived from the semantic segmentation of camera data, from LiDAR and from RADAR data (see TE-4)
MF-4:		Combined tracking of objects	The fourth feature of MentisFusion software is based on the object fusion of different sources, which is the basis of MF-3, and tracks these objects over time