Development of an adjustable lidar sensor carrier

Relevance to the Automotive Industry:	Perception sensors are crucial for the realization of automated driving. Next to camera and radar, lidar seems to be a promising sensor technology for the detection of the surrounding. The Technische Universität Darmstadt Institute for Automotive Engineering (FZD) owns multiple lidar sensors that it uses for its <i>Simultaneous Localization and Mapping</i> (SLAM) research. Hence an adjustable lidar sensor carrier is desired to facilitate reconfiguration for different research projects.
Research Location:	Technische Universität Darmstadt
Homonago (Engl.):	Institute for Automotive Engineering (FZD)
Faculty Mentor:	Prof. DrIng. Steven Peters
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Project Description:	The Technische Universität Darmstadt Institute for Automotive Engineering (FZD) is participating in multiple projects focusing on active perception sensors. This NSF REU project will be concerned with the development of an adjustable lidar sensor carrier for an automotive test vehicle used in these projects.
May 30 - Aug 06, 2022 (10 weeks, 40 h/week)	The objective for the NSF REU student will be to use the engineering product development process to design this adjustable lidar sensor carrier: Identify the requirements, develop plausible concepts, analyze these concepts, select the best solution, and creating the corresponding CAD model.
	PHASE A (2 weeks): During this introduction phase, the NSF REU student will review relevant research and sensor carrier designs, investigate existing hardware, and identify the requirements.
	PHASE B (3 weeks): Next, the NSF REU student will perform a morphological analysis, develop plausible concept solutions, analyze these solutions relative to the requirements, identify the best solution based upon this analysis, and document this work.
	PHASE C (3 weeks): Then, the NSF REU student will perform detailed design of the chosen solution, described in the form of a CAD model and associated technical drawings.
	PHASE D (2 weeks): Finally, the NSF REU student will document the research performed, prepare a written report, and deliver an end-of-summer presentation on the research performed.
Target publications:	 IEEE Sensors 2023, 22nd IEEE Conference on Sensors, late-October/early- November 2023, Vienna, Austria. <u>https://2022.ieee-sensorsconference.org/</u>
Necessary Skills/ Knowledge:	Experience with the NX CAD system
Desirable Skills/ Knowledge:	Experience with the engineering product development process
Additional Online Resource(s):	

NSF REU Students must have completed at least two semesters of engineering studies prior to the proposed summer research, and they must have at least one semester remaining before they can earn their BS in Engineering.