

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
RESEARCH QUARTERLY PROGRESS REPORT
 MR-6068 (REV.2/93)

1. TITLE Development of an Advanced Snowplow Driver Assistance System (ASP-II)				2. FEDERAL STUDY NUMBER			
3. OBJECTIVE To continue R&D of the ASP Driver Assistance System to provide Collision Warning, Lane Position, and Lane Departure information. Goals include enhanced functionality, robustness, and quantitative evaluation				2a. CONTRACT NUMBER 65A0054			
				4. EA (DIV-UNIT-EA)			
5. PRESENT WORK PLAN APPROVED ON July 27, 1999		6. ORIGINAL START July 15, 1999		7. ESTIMATED COMPLETION June 30, 2000		8. TIME ELAPSED 100 %	
9. PROJECT COMPLETED TO DATE 100 %							

10. List specific major steps or phases to accomplish the objective.
 Use the following symbols to indicate planned progress.
 Circle symbol when actually accomplished.
 S = Starting Date, C = Estimated Completion Date
- List of Tasks:
- Update Human-Machine Interface (HMI) Design
 - Enhance Collision Warning System (CWS)
 - Sensing System Refinement
 - ASP Hardware & Software Improvements
 - Develop Measures of Effectiveness
 - Data Analysis & Reporting

Qtr.	FISCAL YEAR												Byrd.
	2000				2001				2002				
	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th	
Prior	Jul Sep	Oct Dec	Jan Mar	Apr Jun	Jul Sep	Oct Dec	Jan Mar	Apr Jun	Jul Sep	Oct Dec	Jan Mar	Apr Jun	
	(S)			(C)									
	(S)		(C)										
	(S)		(C)										
	(S)			(C)									
	(S)	(C)											
			(S)	(C)									

1. EXPLAIN WHAT WAS DONE THIS QUARTER AND HOW IT COMPARES WITH WHAT WAS PROPOSED IN BLOCK 12 OF THE LAST QUARTERLY REPORT. DESCRIBE ANY UNANTICIPATED PROBLEMS THAT AROSE THIS QUARTER OR ANY RECENT IMPLEMENTATION.
 See attached

2. BRIEFLY DESCRIBE THE WORK PLANNED FOR THE NEXT QUARTER ALONG WITH ANY PROJECTED DEVIATIONS FROM THE WORK PLAN OR ANTICIPATED MODIFICATIONS TO THE COST ESTIMATE OR THE WORK SCHEDULE.
 See attached
 NOTE: Fund expenditures in Item 13 are based on best information available as of date of this progress report.

3. Approved Total Funding		THIS FISCAL YEAR	TOTAL PROJECT	AS EXPENDED TO DATE	14. Contractor Name	
		\$ 416,342	\$ 416,342		UC Davis	
Funds Expended To	Date 6/30/2000	\$ 416,000	\$ 416,000	100 %	15. Responsible Unit New Technology and Research	
Approved Caltrans PYS	Date	PYS	\$		16. Date 8/28/2000	Quarter Q4, 99/00
PYS Expended To	Date	PYS		%	17. PI Signature (and Contract Monitor Initials) <i>Bahram J...</i>	

ASP Quarterly Report Attachment for Block 11 and Block 12

Quarter 4, 1999 – 2000 (4/1/2000 – 6/30/2000) (Final Quarterly Report)

Block 11: Explain what was done this quarter and how it compares with what was proposed in block 12 of the last quarterly report. Describe any unanticipated problems that arose this quarter or any recent implementation.

HMI Design/Development

- Documented HMI software development. Detailed documentation report, electronic format includes hyperlinks to code.

CWS Development

- Developed algorithm and code for False Warning Suppression System (FWSS) to improve performance on curved roads. Need for this was reinforced upon examining video from Arizona testing. AZ road is much narrower, with more curves, than the CA test site. Significant false alarms from roadside items (e.g. trees) are a performance issue. FWSS algorithm uses curvature information (e.g. yaw rate, steer angle) to filter out items from outside the roadway. Software implemented, initial testing done on Lumina. Results are very encouraging. Further testing expected over Summer 2000. In addition, will look at sensor fusion of yaw rate, steer angle, and curvature from magnet coding, to further improve performance. Current implementation is magnet-independent, which is useful in all areas; for areas with magnets, performance would be improved, particularly in transition into and out of curves.
- Documented CWS software development. Detailed documentation report, electronic format includes hyperlinks to code.

Sensing Refinements

- Continued (in conjunction with Caltrans survey group) development of GPS base station for Donner Summit test site. Expect to obtain a fixed-frequency license somewhere in the 400 – 500 MHz range some time in Summer 2000. Will switch Real-Time Kinematic (RTK) radio receiver in plow (7005 or RoadView plow) and other GPS test vehicles in order to support RTK transmitter installed by Caltrans Department of General Services, once precise frequency has been determined.
- Continued lab development and testing of new magnetometer sensing system. Developing plans for use in future ASP / RoadView / ARP and commercial systems.
- Continuing revision of hardware design for new sensors.

H/W and S/W

- Continued hardware and software maintenance on as-needed and preventive basis. Repaired broken simulation/operation switch.

MOE Development

- Continued development of system-level MOE plan. As of 6/30/2000, awaiting draft MOE document from PATH. Will review internally, revise, then submit to our partner research organization within the IVI Specialty Vehicle Partnership (University of Minnesota) for their review and feedback. Once receive that, will incorporate document into final version of report.

Data Analysis / Reporting

- Continued data collection for revised sensor design.
- Lab-testing of revised sensor design.
- Preparation for vehicle testing of sensor design during Summer 2000.
- Draft final report completed, submitted to AHMCT committee, as well as representatives of the IVI Specialty Vehicle Partnership (FHWA, MnDOT, VA-DOT, University of Minnesota, 3M) and ASP-II partners (ADOT).

Unexpected Developments / Delays

No significant delays introduced since previous progress report.

Completion of MOE development will occur beyond end of contract, to allow cooperative development with the Minnesota team. Delay is based on the late start (approximately April 2000) of their contract.

Block 12: Briefly describe the work planned for the next quarter along with any projected deviations from the work plan or anticipated modifications to the cost estimate or the work schedule.

Project is complete as of 6/30/2000. Draft final report is being reviewed by AHMCT committee, as well as representatives of the IVI Specialty Vehicle Partnership (FHWA, MnDOT, VA-DOT, University of Minnesota, 3M) and ASP-II partners (ADOT). Upon receipt of all reviews, final version of report will be completed and submitted to funding agencies.

MOE Development

- Will complete development of system-level MOE plan. This work will continue beyond the end of our contract, in order to support cooperative development with University of Minnesota, based on late start (April 2000) for their contract. Cooperative MOE set will be useful for independent and unbiased evaluation of CA, MN, and other similar vehicles.
- Beyond development of our MOE section for the final report, continue to work cooperatively with UM to refine the joint MOE set (working document) that will be used to provide a basis for comparison of project results between California and Minnesota systems.

Data Analysis / Reporting

- Complete revision of draft final report and submit final report.

Anticipated Modifications to Cost Estimate or Work Schedule

None.