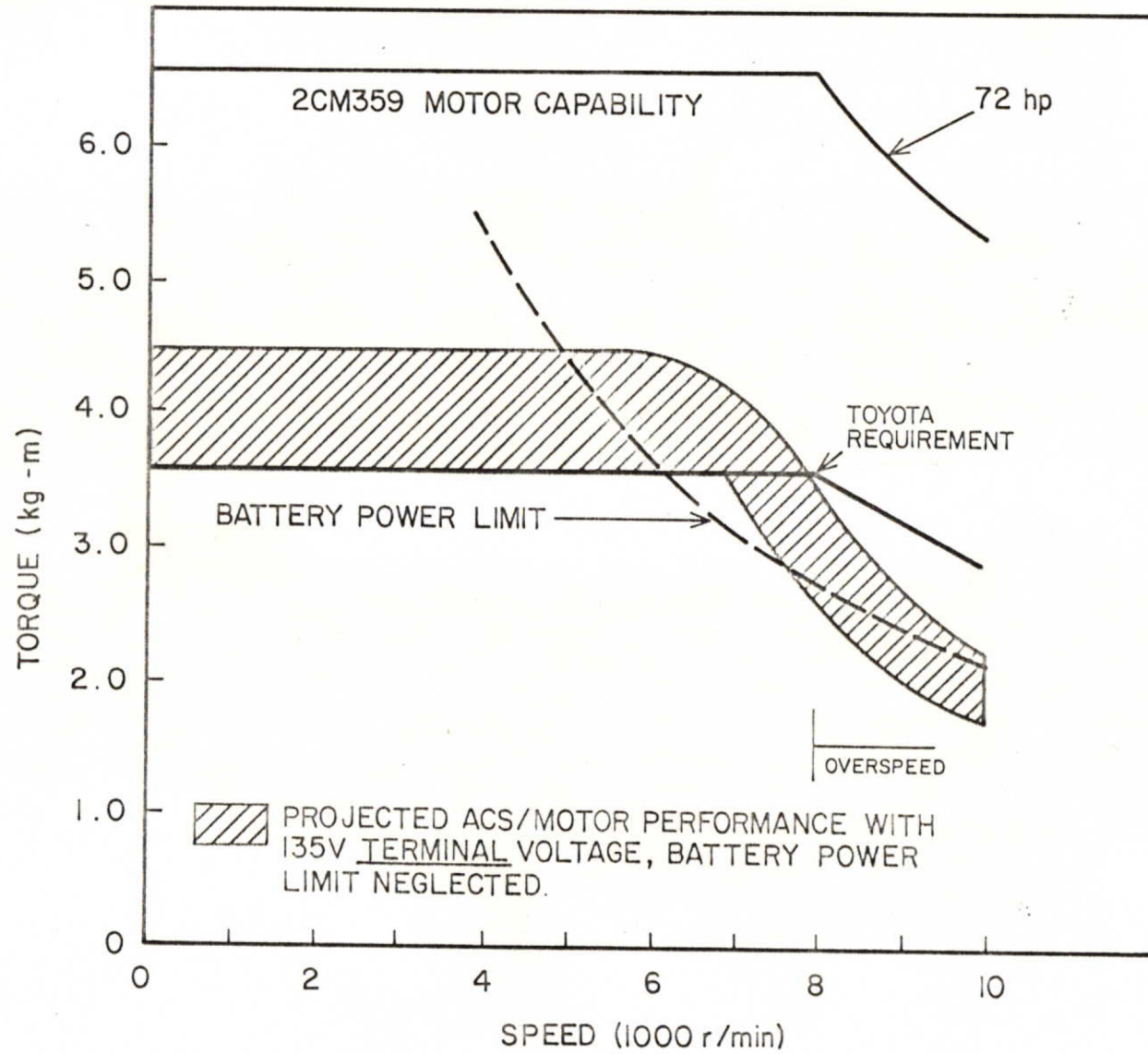


## TOYOTA-RELIANCE AC HYBRID MILESTONE SUMMARY

- 10 / 79 TOYOTA APPROVED JOINT DEMONSTRATION PROGRAM. SECOND GENERATION ACS DESIGN INITIATED.
- 1 / 80 EEI APPROVED JOINT PROGRAM.
- 2 / 80 ACS/MOTOR DYNAMOMETER TESTING INITIATED. ACS COOLING CAPACITY INCREASED.
- 3 / 80 ALL ACS ACTIVITIES TRANSFERED TO RELIANCE ELECTRIC CO., COMMITMENT TO JOINT PROGRAM CONFIRMED.
- 4 / 80 LOCKED-ROTOR TORQUE  $>5.0\text{kg}\cdot\text{m}$  DEMONSTRATED WITH HYBRID CORDOBA MOTOR. BATTERY TERMINALS MODIFIED AS A RESULT OF HIGH DISCHARGE TESTING.
- 5 / 80 USING HYBRID CORDOBA MOTOR, REQUIRED TORQUE PRODUCED UP TO 7,000 r/min. RELIANCE AGREED TO PROVIDE MOTOR COOLING, LUBRICATION, AND TO DEVELOP SIMPLE POWER MIXING CONTROL.
- 6 / 80 ACS CONTROLS DEMONSTRATED FOR:  
MOTORING, GENERATING, OVERSPEED, LOW BATTERY VOLTAGE AND OVER TEMPERATURE.  
2CM359 AC MOTOR RECEIVED AND MODIFICATIONS BEGUN

# AC HYBRID ELECTRIC DRIVE PERFORMANCE



PROPRIETARY

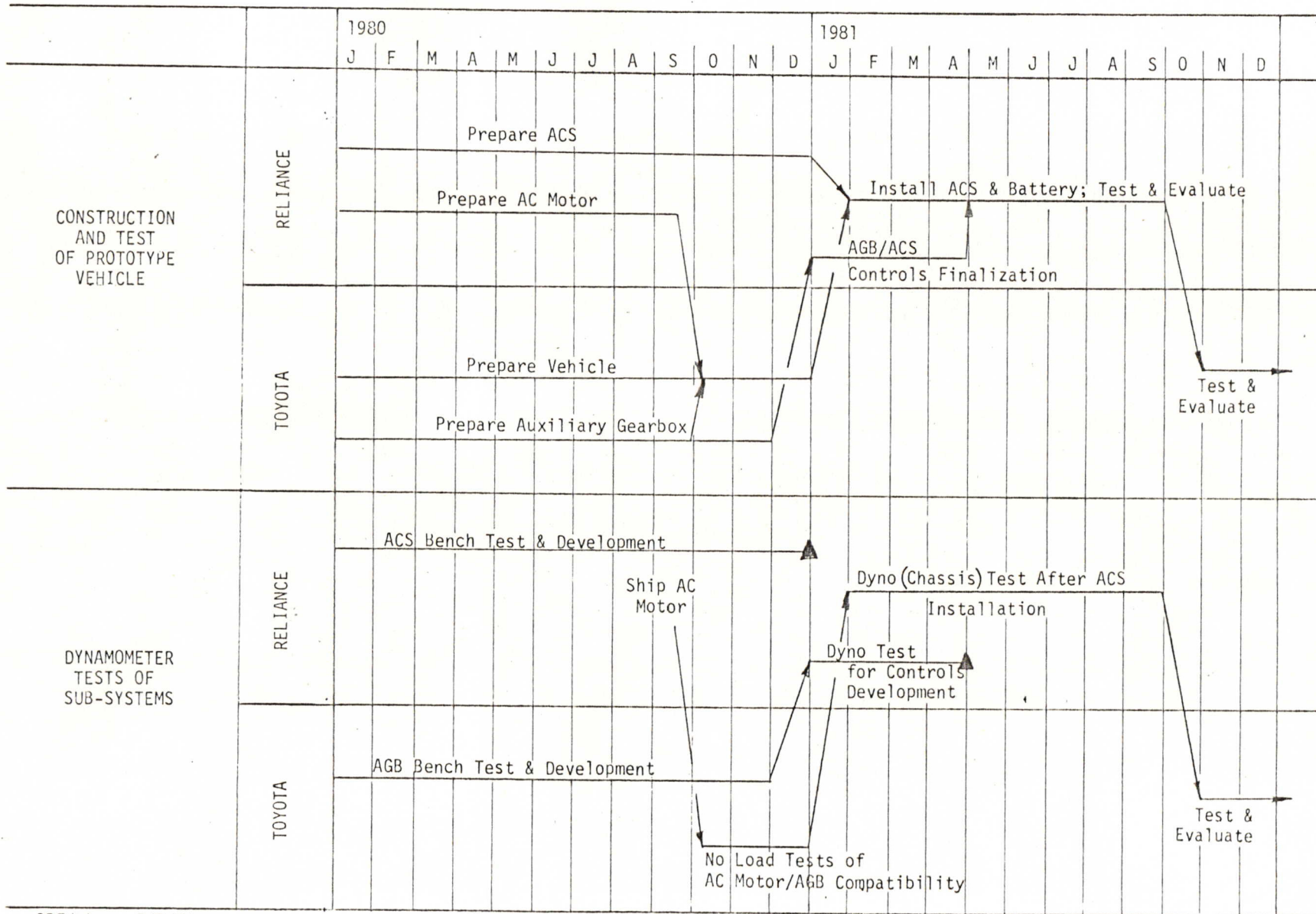
JOB ALLOCATION  
HYBRID VEHICLE CONTROL SYSTEM

	<u>PRODUCED OR DEVELOPED BY</u>	<u>ASSEMBLED BY</u>
SYSTEM FOR POWER MIXING SCHEDULE INCLUDING SELECTION OF POWERING/GENERATION MODE	RELIANCE ELECTRIC	RELIANCE ELECTRIC
CLUTCHING CONTROL SIGNAL GENERATION UNIT	TOYOTA	TOYOTA <sup>1</sup>
CLUTCHING SYSTEM	TOYOTA	TOYOTA
AUX. GEAR BOX	TOYOTA	TOYOTA
MOTOR /GENERATOR <sup>2</sup>	RELIANCE ELECTRIC	TOYOTA
MOTOR SPEED SENSOR	RELIANCE ELECTRIC	RELIANCE ELECTRIC <sup>3</sup>
MOTOR COOLING SYSTEM	RELIANCE ELECTRIC	RELIANCE ELECTRIC <sup>4</sup>
ACS AND ACS CONTROL CIRCUIT	RELIANCE ELECTRIC	RELIANCE ELECTRIC
BATTERY	RELIANCE ELECTRIC	RELIANCE ELECTRIC
HEAT ENGINE	TOYOTA	TOYOTA
ALL OTHER COMPONENTS FOR VEHICLE	TOYOTA	TOYOTA

NOTES:

1. WAS TOYOTA OR RELIANCE ELECTRIC.
2. MOTOR/GENERATOR WILL BE SUPPLIED TO TOYOTA WITH APPROPRIATE AGB FITTINGS AND SUPPORT BEARING. MOTOR LUBRICATION SYSTEM NOT REQUIRED.
3. WAS TOYOTA
4. WAS TOYOTA

## Proposed Schedule For Joint Hybrid Vehicle Demonstration



• PROGRAM MILESTONE •

PROGRAM: HYBRID TOYOTA CRESSIDA - RELIANCE SCHEDULE  
 OBJECTIVE: \_\_\_\_\_

REPORT DATE \_\_\_\_\_  
 PREPARED BY 6-5-80

TASK DESCRIPTION	1980							1981								
	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUNE	JULY	AUG	SEPT
AC MOTOR:																
ELECTRICAL MODIFICATIONS, FITTING + BEARING	▽	▽														
TESTS - POWER + EFF., STRENGTH, + TEMP LIMITS		▽			▽											
SHIP TO TOYOTA					▽											
ACS DEVELOPMENT:																
MOTOR CONTROLS DEV.	▽			▽												
TESTS - POWER + EFF.				▽		▽										
ACS/MOTOR DYNW TEST					▽			▽								
ADJUDICARY GEAR BOX:																
RECEIVE FROM TOYOTA								▽								
SHIFT CONTROL DEV.								▽								
TESTS - POWER + EFF.								▽		▽						
CRESSIDA PROTOTYPE:																
RECEIVE FROM TOYOTA									▽							
INSTALL ACS + CONTROLS									▽							
CONTROLS DEVELOPMENT AND TEST												▽				
POWER + EFFICIENCY TEST																
SHIP TO TOYOTA																▽

CONFIDENTIAL

COMMENTS \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

LEGEND  
 ▽ MILESTONES  
 ▽ COMP MILESTONES  
 \* COMMENTS