

**Executive  
Communication**

October 23, 1963

To: Members of the Product Planning Committee

Subject: Four-Wheel Drive Vehicles (0-10,000 GVW)

The purpose of this communication is to review the size and composition of the four-wheel drive vehicle market in the 0-10,000 GVW range, outline possible product actions to improve penetration and profits, and request approval of interim funds for further development of a Ford utility vehicle, code-named Bronco.

Four-Wheel Drive (4x4) Market

The domestic market for 4x4 units is divided by usage into three general segments:

Truck - units such as the F-100 4x4 used primarily as working vehicles.

Station Wagon - units such as the Kaiser Wagoneer used primarily for nonbusiness personnel carrying, and the Chevrolet Carryall and IHC Travelall, used primarily for transporting work crews in industry.

Utility - units such as the IHC Scout and Kaiser Jeep, used as both working and recreational vehicles.

The relative size of these three market segments and the leading vehicle in each are summarized below (detailed volume and price data are shown on Exhibits I and II):

Classification	1959 Actual		1.2 Million Industry 1963 Forecast		1.1 Million <sup>a/</sup> Industry Truck Year		Leading Vehicle
	Volume (000)	%	Volume (000)	%	Volume (000)	%	
Truck	28	65	46	48	40	46	Kaiser Gladiator
Station Wagon	8	19	19	20	16	19	Kaiser Wagoneer
Utility	7	16	30	32	30	35	IHC Scout
Total	43	100%	95	100%	86	100%	

<sup>a/</sup> Current EAIV is 980,000. At this volume, 4x4 sales are estimated to be 77,000 units.



The greatest market growth has been in the utility vehicle segment. Prior to 1961, the Jeep was the only vehicle in this segment. In February of 1961, IHC introduced the Scout - a larger, more stylish version of the Jeep - which met with immediate success. During the first year, Scout sales totaled 25,000 units and are expected to be 20,000 in 1963. The introduction of the Scout expanded both the utility segment and the total 4x4 market. Annual utility 4x4 sales of about 30,000 units are forecast for future years.

Although four-wheel drive truck sales have declined as a per cent of the total 4x4 market, this segment is expected to remain the largest, and sales of 40,000 units are forecast. The Kaiser Gladiator introduced in 1962 and the forward control Jeep truck account for over one-half of these sales. Two basic types of vehicles are sold in the truck segment of the market - 4x4 conversions of existing pickups (such as are offered by Ford, Chevrolet, and IHC), and trucks similar to the Kaiser Gladiator designed primarily as four-wheel drive vehicles. Although Ford outsells Chevrolet in this segment by about 50 per cent, Ford penetration is only 16 per cent.

The station wagon segment, which is expected to account for about 19,000 units in 1963, presently includes IHC, GMC and Chevrolet Carryalls, and Kaiser Wagoneers. The Wagoneer, introduced in the last quarter of 1962, provides the most car-like appearance and function and accounts for 92 per cent of the sales in this segment. Future sales of this segment are expected to be about 16,000 units per year.

Of the three distinct segments of the market, Ford currently has products only in the conventional truck segment. First priority is being given to improving our current products. New product offerings which have been studied to determine additional profit opportunities available to the Company in the other market segments will be discussed later in this paper.

#### Conventional 4x4 Trucks

The current Ford F-100 4x4 model, available only in an 8-foot box length (120" wheelbase), provides satisfactory power and performance. However, the Gladiator J-200, which is available in 120" wheelbase, provides lower loading heights, better riding comfort, and superior off-road operating characteristics, primarily due to its larger ramp break-over angle (Exhibit III). In addition, this new 4x4 has a major appearance advantage over other competitive makes (Exhibit IV). By tailoring the proportions of the body, a vehicle is provided that does not appear to be perched on stilts as is the case with competing 4x4 trucks. The Chevrolet, GMC, and IHC products are equivalent to the present Ford except that additional wheelbase models are available.

To improve Ford penetration in this market segment, an improved 4x4 design featuring a unique coil-spring solid-axle front suspension has been developed which will provide:

- . Off-road operating characteristics superior to all current competition due to:
  - a. Smallest turning diameter.
  - b. Greatest ramp break-over angle.
- . Ride superior to all current competition in both on- and off-road operation.



- . Cab package superior to Gladiator and competitive with Chevrolet.
- . Improved appearance and better loading due to lowering the vehicle 3 inches.
- . Additional wheelbase coverage (106 inch wheelbase 5-foot box and 114.8 inch wheelbase 6 $\frac{1}{2}$ -foot box models).
- . A new, quieter Dana one-speed transfer case with simplified controls.

Preliminary estimates indicate that an expenditure of \$2.3 million will be required to provide the new F-100 4x4 vehicles (Exhibit V). Company variable cost is expected to be about \$46 lower than comparable current Ford F-100 four-wheel drive units, primarily due to replacing the three-speed transmission and two-speed transfer case with a four-speed transmission and one-speed transfer case.

Based on an annual FPV of 4,500 units, it is expected that the adoption of this proposal will decrease Company accounted profits \$0.1 million per year over the 1966-1970 period (Exhibit VI). Because of the major product improvements and expanded coverage, the Division believes that an additional 3,000 sales will be achieved. These incremental sales will increase annual accounted profits to \$1.7 million.

It is planned to include the F-100 4x4 proposal in the 1966 truck program to be presented to the Product Planning Committee in December, 1963. The F-250 4x4 which is designed to carry greater loads will be carried over into 1966.

#### Station Wagons

The stylish Wagoneer, which has sold 14,000 units in the first nine months since its introduction (over twice as many 4x4 wagons as the industry had sold previously), demonstrates that there is a market for a station wagon that provides acceptable styling as well as four-wheel drive traction.

Preliminary advanced engineering work done on a 1962 Ranchero has indicated that an independent front suspension four-wheel drive version of either the present or proposed Fairlane wagon could be introduced. This design concept incorporates an engine-mounted differential which drives the front wheels by means of open axle shafts and universal joints. To maintain a low over-all height - two to four inches over the standard wagon - the right axle shaft passes through the engine oil pan. Because of the more severe type operation to which 4x4 vehicles are subjected, further development work would be required to determine the adequacy of the basic passenger car structure (Exhibit VII).

Investment is estimated at \$3.7 million and piece cost at \$320 over the base wagon. Based on a price equivalent to the Wagoneer and an FPV of 5,000 units, the introduction of a 4x4 option for the Fairlane wagon would decrease Company profits \$0.2 million per year over the 1966-1968 period. However, it is estimated that with expected incremental sales of 4,000 units, Company accounted profits would be increased \$4.1 million per year.

Since this preliminary study indicates potential profit improvement, further advanced engineering work will be carried out to determine feasibility in conjunction with the 1966 through 1968 cycle Fairlane wagon.



## Utility Vehicles

Interviews conducted with both Scout and Jeep owners indicated that they do not consider their vehicles to be either trucks or cars. Rather, these units are felt to be especially designed vehicles that can carry nominal loads over all types of terrain. The combination of a high degree of maneuverability and a four-wheel drive feature provides an ideal vehicle for use by campers, service station operators, loggers, rangers, and others desiring transportation under adverse conditions.

The Scout appeals to a wider range of owners than does the Jeep, primarily because it has more power and provides a more comfortable, roomier interior without appreciable loss in maneuverability. A hard core of Jeep oriented owners remain. These tend to be hunters, who require maximum maneuverability and ruggedness for use in the mountains, service station and snow removal operators requiring narrow width and maximum maneuverability, and those who feel that the name "Jeep" is synonymous with 4x4's.

Almost all Jeep and Scout owners interviewed indicated that a conventional 4x4 truck was not suitable for their needs.

### MUTT

In view of the present Company plan to reduce the cost of the military MUTT, the Division has considered the advisability of offering a commercial version of this unit. Although the MUTT ride and durability are superior to the Jeep, its top speed on the highway, loadspace, and package dimensions are not competitive with the Scout. The MUTT would, therefore, compete primarily with the Jeep which represents 33% of the 4x4 utility vehicle market.

The Company material cost of the previous military version of the MUTT was \$2391 compared to only \$860 for an F-100 4x2, a differential of \$1531. It is anticipated that this differential over the F-100 can be reduced to \$482 by redesigning to commercial specifications, at a fixed cost of \$2.1 million, and resourcing some of the components (Exhibit VIII). However, at a price competitive to Jeep and Scout, the Company economic profit of this vehicle would be only \$26 (Exhibit IX). For this reason, the Division is planning no further study of a commercial version of the MUTT.

### BRONCO

A new Ford designed utility vehicle is being developed to provide a vehicle that combines the best features of both the Jeep and the Scout plus desirable extras, such as superior ride and NVH, greater performance, better maneuverability, and improved ground clearance. Product comparison data shown on Exhibit III are summarized below:

	<u>Bronco</u>	<u>Scout</u>	<u>Jeep</u>
Over-all Length - Inches	147.5	154.0	135.5
Over-all Width - Inches	68.8	68.6	59.9/71.9 <sup>a/</sup>
Turning Diameter - Feet	35.3	43.7	36.8
Loadspace Length - Inches	59.2	60.0	39.8
Engine Displacement - Cu. In.	170	152	134
Ground Clearance-Ramp Break-Over Angle	30.0°	21.0°	30.0°
Curb Weight - Pounds	2700	3000	2614
Payload - Pounds	900	900	1136
Theoretical Gradeability <sup>b/</sup> - %	80.0	88.5	69.0
Top Speed - MPH	75	70	65

<sup>a/</sup> 59.9 without spare tire; 71.9 with side mounted spare.

<sup>b/</sup> Maximum practical gradeability is 60%.



The unique coil-spring solid-axle front suspension proposed for the Ford utility vehicle (the same type suspension proposed for use on the new F-100 4x4 pickup) provides superior ride and handling. In addition, by eliminating leaf spring interference with tires, the turning angle of the front wheel can be increased, by incorporating a new Dana axle, to 37° to provide a turning diameter that is smaller than either Jeep or Scout.

Domestic industry utility vehicle sales currently forecast to be 35,000 units (including 5,000 4x2's) for Jeep and Scout are expected to increase if Ford or General Motors were to enter the market. Based on the market expansion that occurred when the Scout was introduced in 1961, the Division conservatively estimates that this market would increase another 20 per cent to 42,000 units. It is expected that, because of the broader coverage of the Ford dealer organization and the Bronco's superior product features, the Bronco priced at the Scout level will outsell Jeep and Scout and account for 40 to 45 per cent of this market, compared to 33 per cent Ford penetration in total light trucks where Chevrolet is the major competitor. This would result in an estimated 18,000 annual sales.

Since Ford has no entry in this market and Jeep and Scout buyers are generally not interested in conventional trucks, it is believed that a large percentage of these sales would be incremental.

The table below shows the 1966-70 average annual profit effect at various levels of incremental and substitution sales based on an estimated investment of \$10 million to introduce the Bronco:

<u>Incremental Sales</u>	<u>Substitution Sales</u>	<u>Profit Effect At Actual Volume 1966-70 (Millions)</u>
5,000	13,000	\$(0.1)
7,000	11,000	0.9
9,000	9,000	1.9
11,000	7,000	2.9
13,000	5,000	3.9

The breakeven point for this program is approximately 5,000 incremental units per year. At 50 per cent or 9,000 incremental sales per year, which the Division believes is conservative, Company profits are increased \$1.9 million per year. This is exclusive of estimated incremental export sales of 2,000 units (estimated Scout export sales are 1,500), which would improve annual profits an additional \$1.0 million (Exhibit VI).

This program would result in a loss of \$2.5 million at financial planning volume of 9,000 units per year (25 per cent penetration of existing market) assuming 100 per cent substitution.



The following steps have been taken to minimize fixed investment for this proposal:

1. The side panels, tailgate, end caps, floor pan, and wheelhouses of the F-100 pickup box are being utilized with minor modifications. Other existing shelf components will be used in a similar manner wherever possible.
2. Engineering design services for body-in-white, seats, trim, and body electrical are being provided by the Budd Company, Philadelphia, who will also tool and supply the body-in-white.
3. MSD Engineering has set up a self-contained three-man group that will give technical direction to the Budd Company and monitor, control, and release the program outside the normal MSD channels.
4. Engineering prototypes will be made from production tools to avoid expenditures for kirksite dies.

To permit development of final fixed expenditure and piece cost estimates, it is recommended that clay models be completed and structures be developed prior to requesting program approval. In order to meet a Job #1, 1966 introduction date without use of kirksite dies for engineering prototypes (an estimated fixed cost saving of \$0.3 million), clay model approval will be required by November 22, 1963, prior to the planned February, 1964, Product Planning Committee meeting for program approval. Approval of interim funds of \$290,000 for engineering and initial long lead tooling items is requested in addition to the \$260,000 which has been authorized in previously approved advanced engineering and styling funds.

/s/

L. A. Iacocca