

GM Presentation

Cadillac DTS Door Closer

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Mission Statement

Product description

System for enabling easy closure of a Cadillac DTS side door by a person seated inside the vehicle.

Secondary product use is a door opening system if our design is conducive to this operation.

Key Business Goals

Wide appeal to the luxury market – 20% of DTS buyers purchase this option within 2 years of introduction

Option sales must cover at least 50% of the cost
Easily integrated into the manufacture of existing product (some doors will still be manual and must be built on same production line)

Assumptions and Constraints

Operator-attended system
Traditional front hinge door
Traditional door frame

Market analysis

Primary Market

Buyers of the Cadillac DTS

Average customer age is 55yrs, 150K annual income

This luxury car sells about 80,000 units a year (relatively high volume in this segment)

Secondary Market

Customers using other GM vehicles

Other GM owned large vehicles such as the Hummer

Car customization businesses

Project Stakeholders

GM

Car owners and users

Resellers

Mechanics

American Association of Retired People

(AARP)

Customer needs

Closes at least to within reach

Operates quickly

Does not close on hands/limbs

Can be manually operated

Operates when parked on an incline

Controls are easy to understand and use

Controls are arthritic friendly

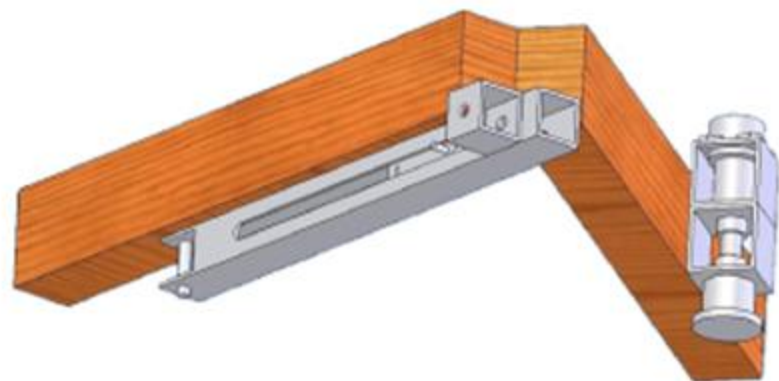
Controls are not inadvertently activated

Functions in adverse weather conditions

Operates when car is off

Is Modular (optional equipment)

Original Ideas...



Hydraulic Cylinder Door Actuator

driver side door (closed)



hydraulic cylinder unextended

3/4 back view

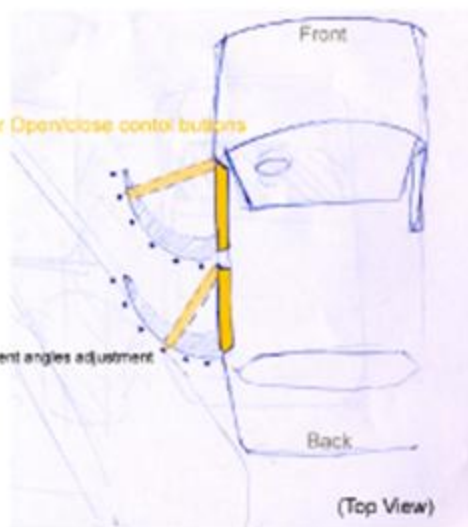
driver side door (opened)



hydraulic cylinder

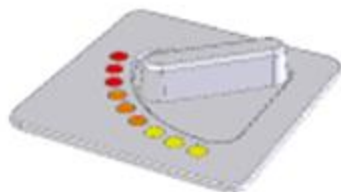
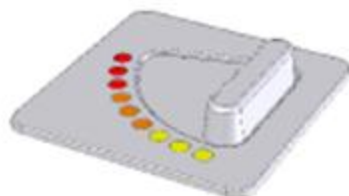


Door Open/close control buttons



Different angles adjustment

(Top View)



Financial assumptions

Demand Assumptions

Number of DTS sold/yr	80,000
Quarterly growth rate	1%
Penetration rate in Q1	5%
Quarterly growth rate	20%
Number of doors puchsed	1.8

GM Benchmarks

Profit margin	
Payback period (years)	50%
	1

Other Assumptions

GM Discount rate	10%
Supplier gross margin	30%
Transportation costs	10%
(% of price paid to supplier)	
Marketing expense to promote adoption	
year 1	\$1,500,000
year 2	\$1,000,000
year 3 onward	\$500,000
Service cost per incident	\$100
(% of installed based needing service)	2%

Production Costs

Mechanical system

Motor	\$124.00	
Door Bearing Box	\$5.00	
Car Bearing Box	\$5.00	
Coupling Box	\$5.00	
Door Bearing Box Bracket	\$3.00	
Car Bearing box Bracket	\$3.00	
1/2" Rod	\$2.00	
3/8" Rod	\$1.00	
1/2" Flange Bearings	\$5.00	
3/8" Flange Bearings	\$6.00	
Spiral Spring	\$20.00	
Spider Coupling	\$18.00	
Subtotal	\$197.00	\$39.40

Control System

Pushbutton Switch	\$2.79	\$0.20
Limit Switch	\$2.69	\$0.20
DPDT Relay	\$8.39	\$0.50
Wire	\$5.99	\$0.10
Subtotal	\$19.86	\$1.00

Beta Prototype

Sensors		\$30.00
Soft-close		\$3.00
Subtotal		\$33.00

Production subtotal	\$216.86	\$73.40
Carrying cost of inventory (% of production cost)		5%
Supplier's Production TOTAL COST		\$77.07
Supplier Gross Margin		30%
Supplier Sales Price (GM COGS)		\$110.19

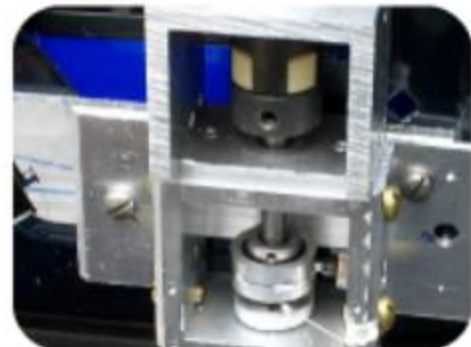
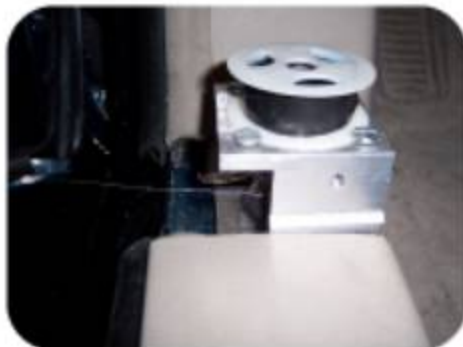
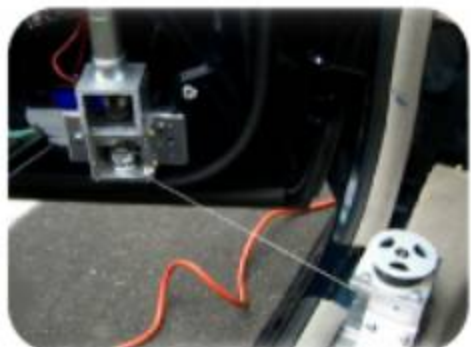
Financial model

GM Financial Model (\$ in thousands)

NPV \$4,573
IRR 31%

	2006	2007	2008	2009	2010	
CAPEX						
Production development						
Supplier tooling/cells						
GM tooling/cells						
Income Statement						
Revenue						
DTS Sales		81,208	84,505	87,937	91,507	
Penetration rate on new sales						
Quarterly penetration growth rate						
Total new door customers						
Installed base of total customers		5,461	17,246	34,833	53,134	
avg # of doors purchased						
Total Doors Purchased		9,830	21,212	31,657	32,943	
avg price per unit						
Total Revenue		\$3,539	\$7,636	\$11,397	\$11,859	
COGS						
Price Paid to Supplier		\$985	\$2,125	\$3,172	\$3,301	
Transportation Cost		\$98	\$213	\$317	\$330	
% of installed base needing service						
Service Cost (\$100 per incident)		\$18	\$97	\$225	\$370	
Total COGS		\$1,102	\$2,435	\$3,714	\$4,000	
Gross Profit		\$2,437	\$5,202	\$7,682	\$7,859	
Gross Margin		68.9%	68.1%	67.4%	66.3%	
Marketing Expense		\$1,500	\$1,000	\$500	\$500	
OPERATING CASH FLOW		\$937	\$4,202	\$7,182	\$7,359	
FREE CASH FLOW		(\$500)	(\$563)	\$4,202	\$7,182	\$7,359
CUMULATIVE CF (used for payback period)		(\$500)	(\$1,063)	\$3,139	\$10,321	\$17,680

Component photos



Production Version vs. prototype

- More customer testing
- Safety Sensors – Pinch & Proximity
- Smaller, more concealable components
- Retraction Mechanism
- Silent operation
- Larger Motor
- Infinite Linkage
- Design for manufacturing

Q & A

Thanks GM!!