

# Concept Sketches and Target Specifications

## Team GM2

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# Ranked Needs List (Primary & Secondary Needs )

Need (Primary in Bold, Secondary not)	Importance	Need	Importance
<b>1. The table is unintrusive.</b>		<b>3. The table provides functionality (cont'd)</b>	
Unnoticeable to front seat passenger	●●●●●	Supports book in comfortable reading position	●●
Doesn't restrict the comfort of the backseat passenger	●●●●●	Has smooth surface for writing / drawing	●●●●●
Allows passenger movement while deployed	●●●●	Offers illumination of work area during use	●●●
Useful for talking to other passengers	●	<i>D. Aids in eating.</i>	
Is compatible with car seats	●●●●	Can accommodate a beverage container	●●●●
Is removable	●●	<i>E. Useful for other functions.</i>	
Does not change the amount of leg room	●●●●	Is useful for putting on makeup	●●
Allows access to the vehicle floor while deployed	●●	Is useful for sleep	●
<b>2. The table is aesthetically pleasing.</b>		Is personalizable with pictures or images	●
Will maintain or enhance the look of the interior	●●●●●	<b>4. The table is easy to use.</b>	
<b>3. The table provides functionality.</b>		Operable with one hand	●●●●
<i>A. Works with personal electronics.</i>		Easy to deploy	●●●●●
Provides power source	●●●	<b>5. The table is safe to operate*</b>	
Provides storage for small electronics	●●●●	Does not snag, pinch, or harm the user	●●●●
Useful for working on a laptop	●●●●●	<b>6. The table is easy to maintain.</b>	
Useful for talking on the phone	●●●	Is sturdy	●●●●●
Useful for Listening to music	●●●	Is durable	●●●●●
<i>B. Useful for entertaining children.</i>		Cleans easily	●●●●●
Useful for playing cards	●●●	<b>7. The table protects items placed on it</b>	
Useful for coloring	●●●●	Retains items on it during travel	●●●●
<i>C. Useful for reading and writing.</i>		Is stable under rough road conditions and turns	●●●●
Useful for reading a book/magazine	●●●●	<b>8. The table fits a wide range of body sizes</b>	

# Critical Needs and Target Specifications

Critical Need #1: The tray-table doesn't restrict the comfort of the backseat passenger

- Target height from floor – 24 inches
- Knee-height from floor while seated is 23.7" for the 95th percentile worst-case male population. (source: Anthropometric Source Book Volume II: A Handbook of Anthropometric Data, 1978). Since our target audience is looking to be children, we are aiming for the lowest possible height with some usability for most adults.

Critical Need #2: The tray-table will maintain or enhance the look of the interior

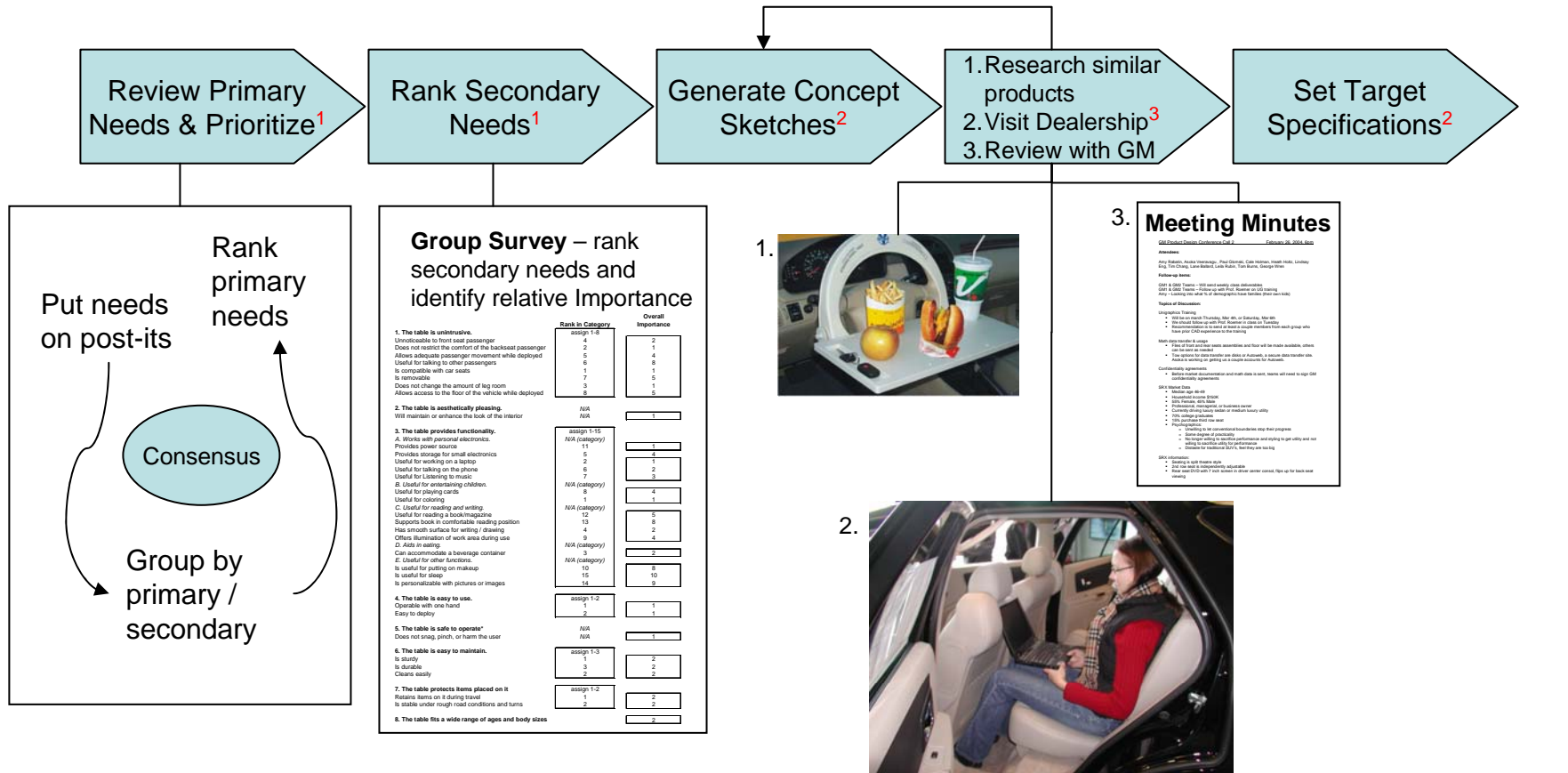
- This is a subjective need. The team will discuss it on a concept by concept basis. We don't want to restrict ourselves during the initial creative process.

Critical Need #3: The tray-table will be sturdy

- Target weight bearing capacity – 15 lbs. Capable of holding 3 to 4 average size textbooks (4 lbs.), laptop (5 lbs. + 5 lbs. user force), with margin of safety.
- Maximum deflection at tray edge – ¼" under the predicted max 10 lbs. normal usage weight.

The critical needs and their target specifications will be reviewed in parallel with the concept selection process.

# Process Review– Concept Sketches and Target Specifications



## Notes:

1. Sample of survey for ranking primary and secondary needs is in Appendix
2. Concept sketches and target specifications developed according to Ulrich & Eppinger, Product Design and Development, 3rd Edition, McGraw-Hill, 2004
3. Dealership observations listed in Appendix

# Process Comments

## **Group Meeting – 2/24/2004**

- Discussed general concept categories – various attachment points for the tray, deployment technologies, tray dimensions, etc.
- Reviewed list of needs from interviews, and members stressed the needs they believed to be critical – those that should be addressed in the sketches.
- Identified the “sketch-capable” team members – others would forward their ideas/initial sketches to them for representation.

## **Group meeting – 2/26/2004**

- To begin the session all identified needs were placed on board using post-it notes. The entire group then began grouping needs into eight categories using consensus. After about 30 minutes the group had agreed upon the categories of needs. The group then came up with a central need each group addressed.
- In preparation for concept-sketching, the team discussed the needs in more depth. Important needs were pointed out, to make sure team members keep them in mind while generating concepts.
- It was decided to survey the importance of the needs. Each team member would collect feedback from respondents that previously stated their needs in order to assess their importance (sample survey in Appendix).

## **GM Conference Call – 2/26/2004**

- Discussed Unigraphics training, math data transfer and usage, confidentiality agreements, SRX Market Data and general information, Escalade market data, deliverable forwarding to GM, seating buck, and questions and general discussion

## **Dealership Tour – 3/1/2004**

- Several team members visited a local Cadillac dealership to look at the vehicle first-hand. They took digital photos, took dimensions, and discussed the project with the sales associates. Much insight was gathered this way regarding the market for the Escalade and SRX and the willingness of customers to purchase various features. The team members wrote emails with their impressions to the rest of the GM1 and GM2 teams (observations in Appendix).
- With this information, we hope to further tailor our concept generation to the constraints of the vehicles and market.

## **Process Reflection:**

- We discussed possible attachment points / deployment options in the initial meeting, before we began with concept generation. While this might have restricted our solution space, we believed a team debate was worthwhile for identifying benefits and limitations of solution directions. Saving time and converging on viable solutions motivated us to do so.
- Selecting our 3 critical customer needs for this deliverable proved to be quite an involved task. In identifying and grouping primary and secondary needs, the process of putting all of the customer needs on post-it notes was especially useful in reaching consensus.
- Also, as the project becomes more involved and complex, we have found it not only useful to “divide and conquer” but also to overlap resources so that team members are leading some tasks and supporting several others.

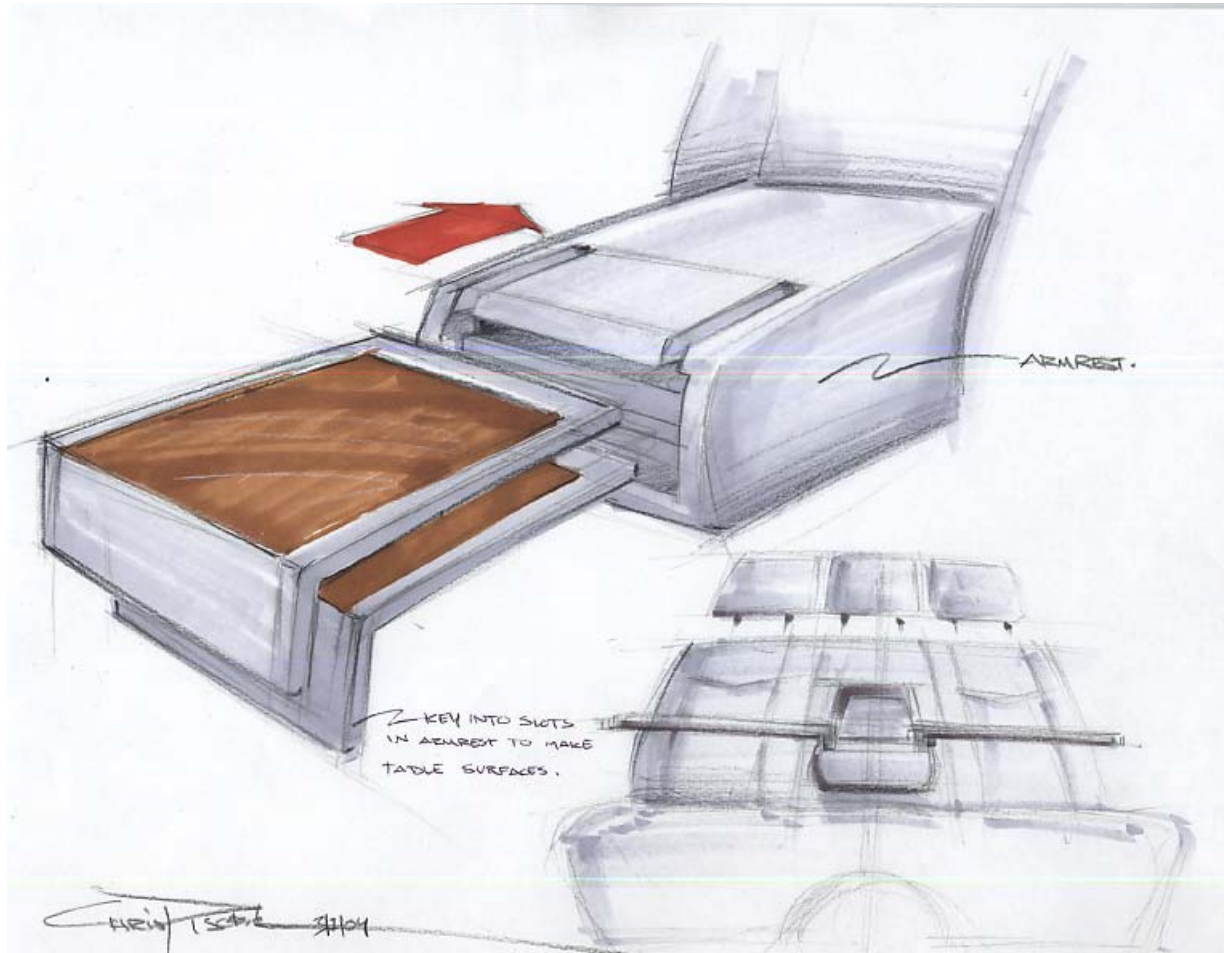
# Appendix

- Sample needs ranking team survey
- Cadillac dealership observations

# Sample needs ranking team survey

<b>THE LOWER THE NUMBER, THE MORE IMPORTANT THE NEED</b> Fill in only boxed areas and/or replace question marks	<b>Rank in Category</b>	<b>Assign 1 (very important) to 10 (not important)</b>	<b>Mark "X" for 3 needs you believe are critical, and add a few target specs for each in the boxes next to them</b>
<b>1. The table is unintrusive.</b> Unnoticeable to front seat passenger Does not restrict the comfort of the backseat passenger Allows adequate passenger movement while deployed Useful for talking to other passengers Is compatible with car seats Is removable Does not change the amount of leg room Allows access to the floor of the vehicle while deployed	assign 1-8 4 2 5 6 1 7 3 8	2 1 4 8 1 5 1 5	x
<b>2. The table is aesthetically pleasing.</b> Will maintain or enhance the look of the interior	N/A N/A	1	
<b>3. The table provides functionality.</b> <i>A. Works with personal electronics.</i> Provides power source Provides storage for small electronics Useful for working on a laptop Useful for talking on the phone Useful for Listening to music <i>B. Useful for entertaining children.</i> Useful for playing cards Useful for coloring <i>C. Useful for reading and writing.</i> Useful for reading a book/magazine Supports book in comfortable reading position Has smooth surface for writing / drawing	assign 1-15 N/A (category) 11 5 2 6 7 N/A (category) 8 1 N/A (category) 12 13 4 ~	1 4 1 2 3 4 1 5 8 2 4	x x

# Concept Sketches

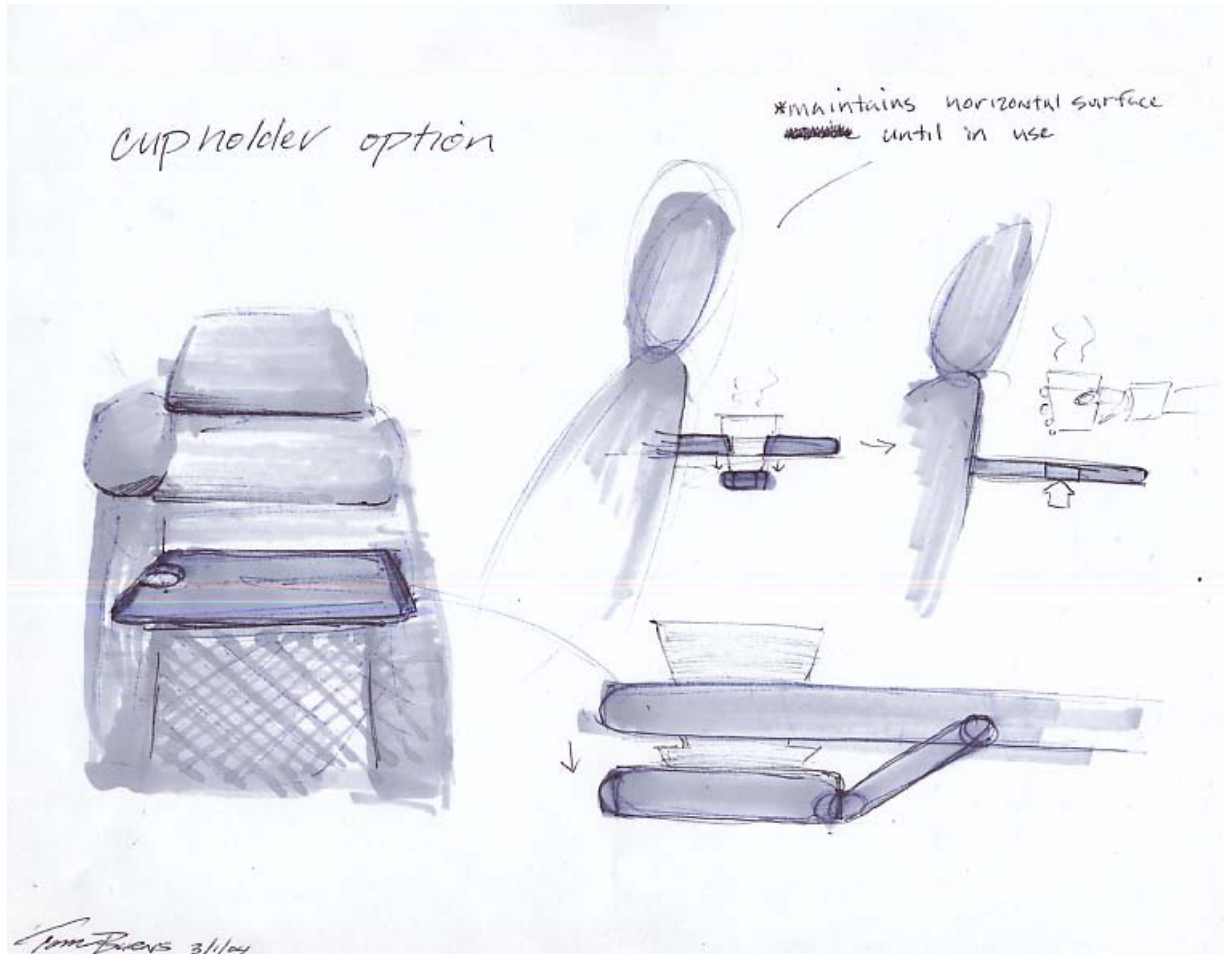




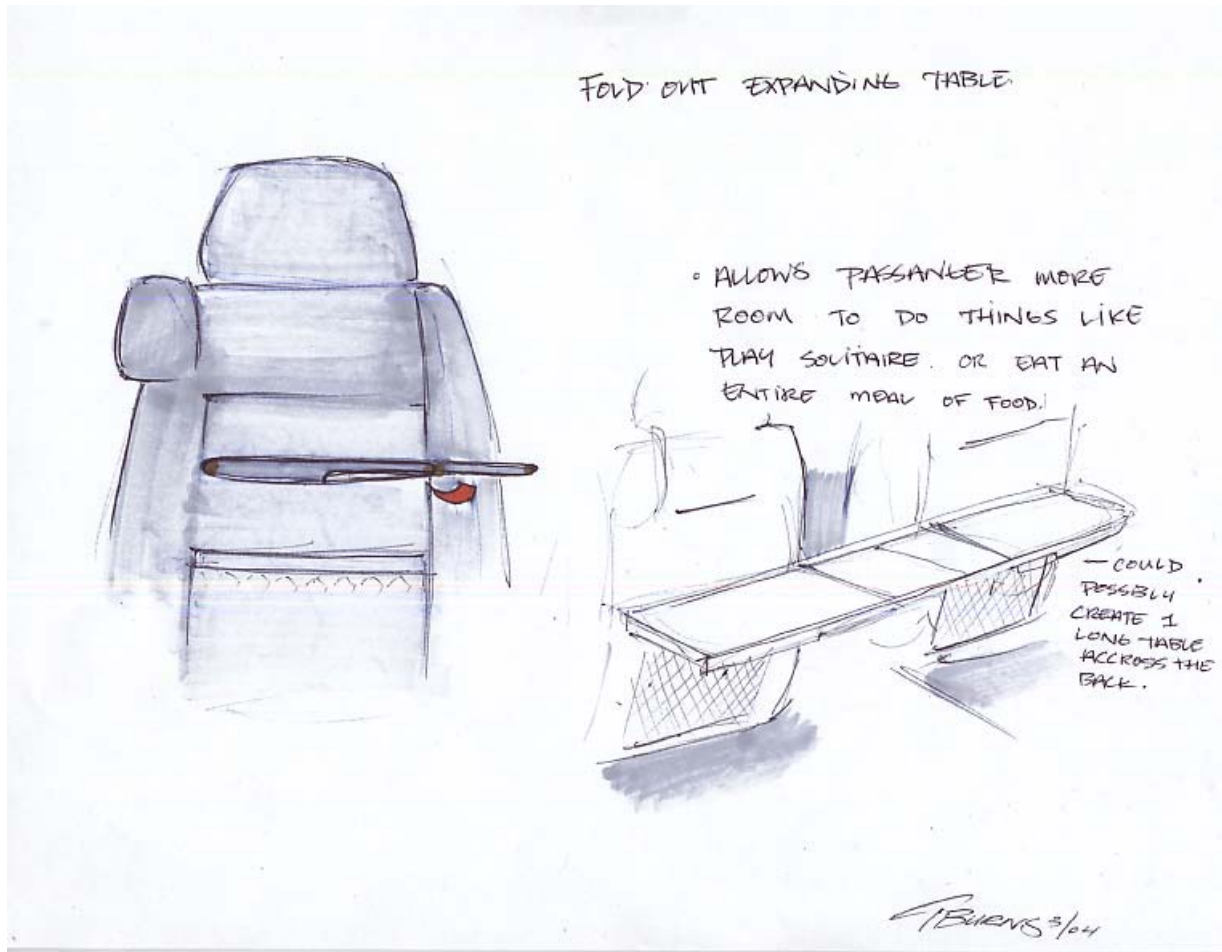
# Concept Sketches



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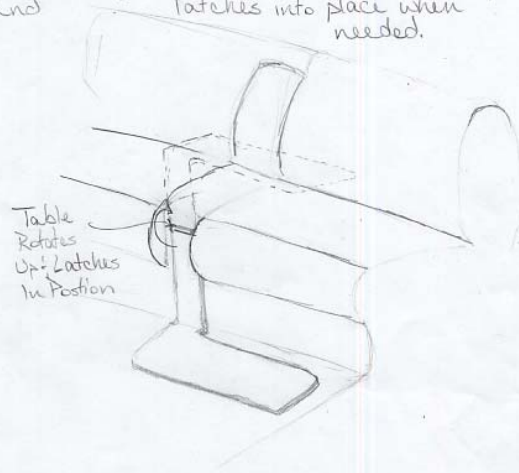


# Concept Sketches

Floor Space Table

3/2/04

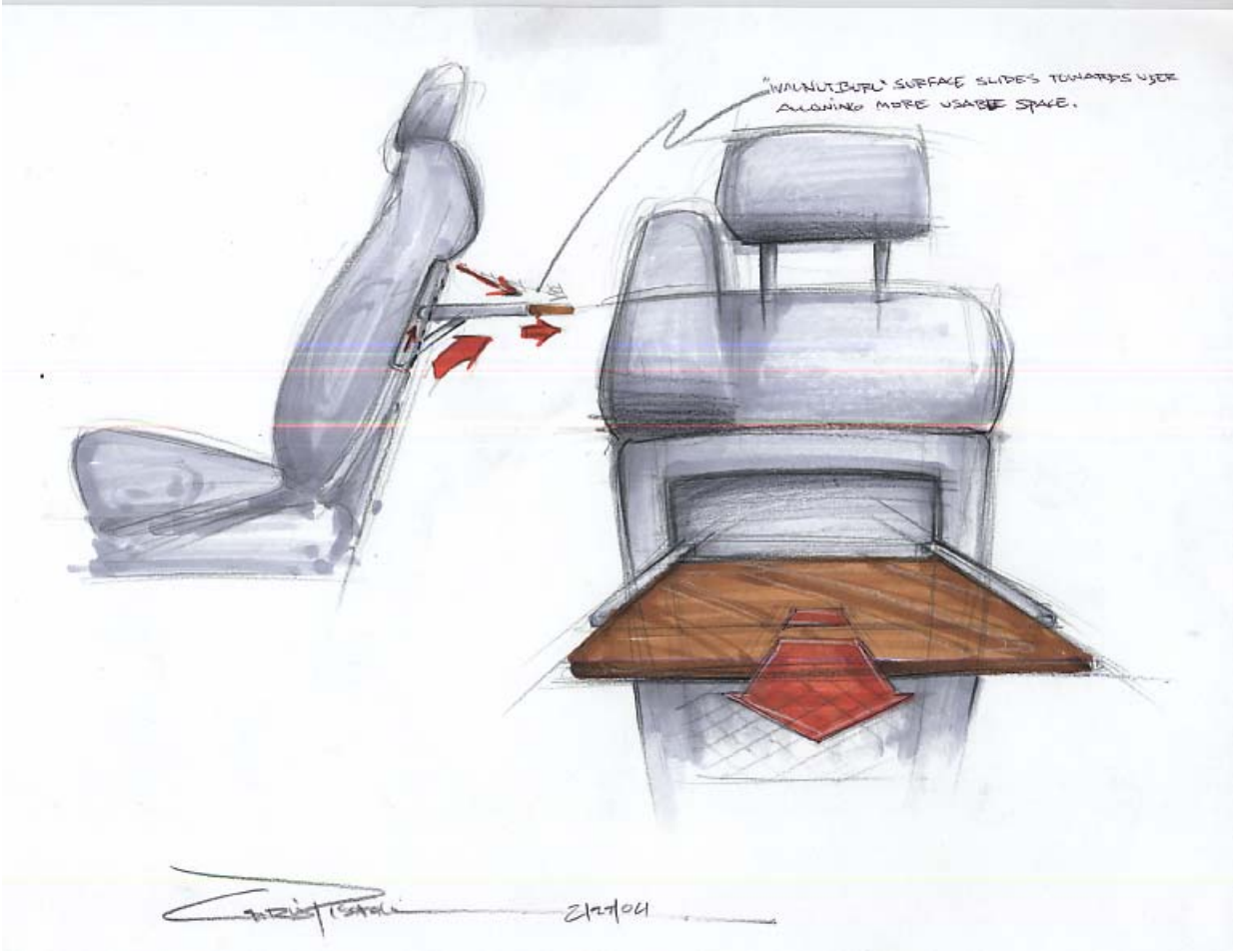
Idea: Rigid table that is stored under the feet of passengers when not in use. Rotates up and latches into place when needed.



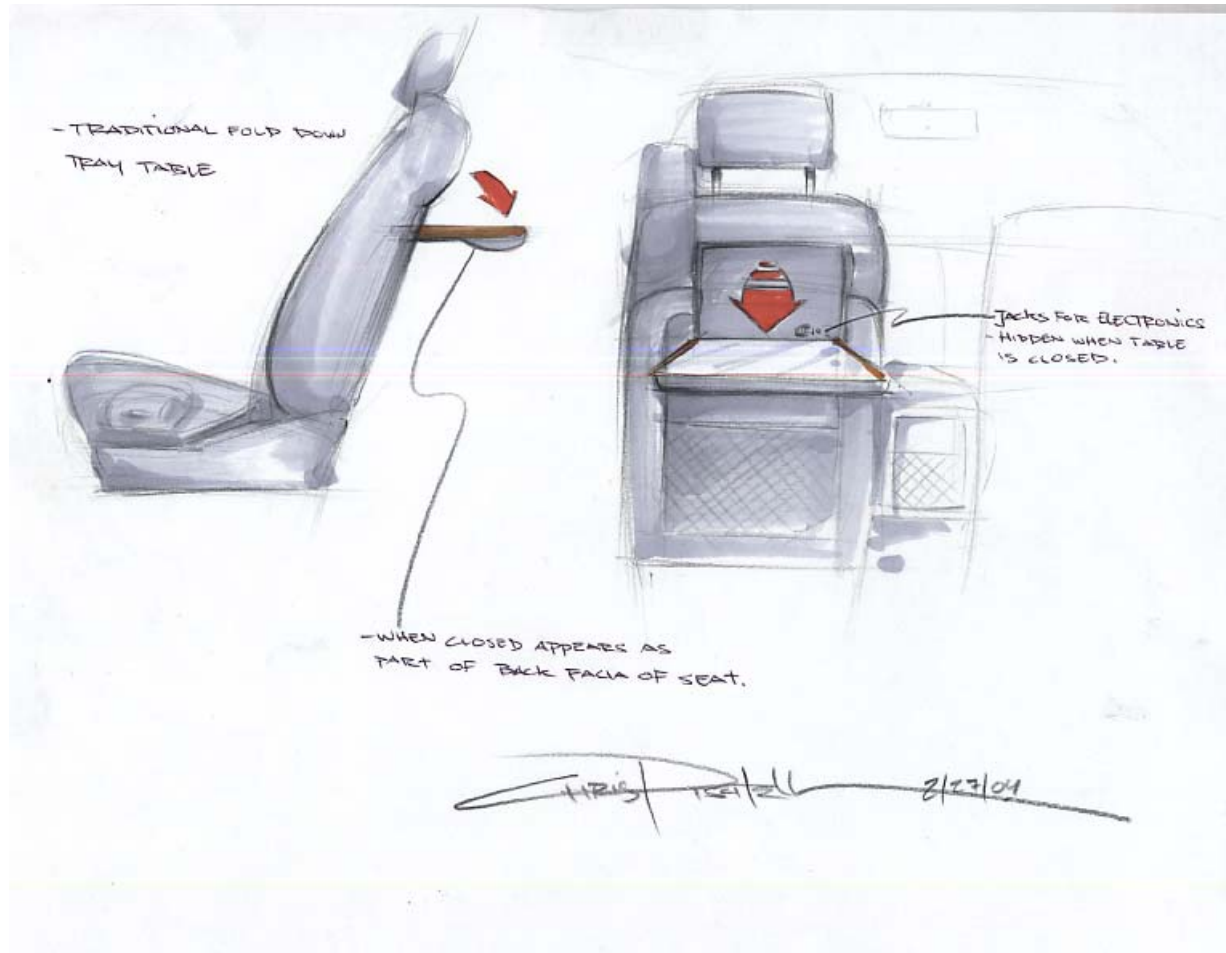
Needs Addressed:

1. Unnoticeable to front seat passenger.
2. Useful for working with a laptop.
3. Is sturdy.

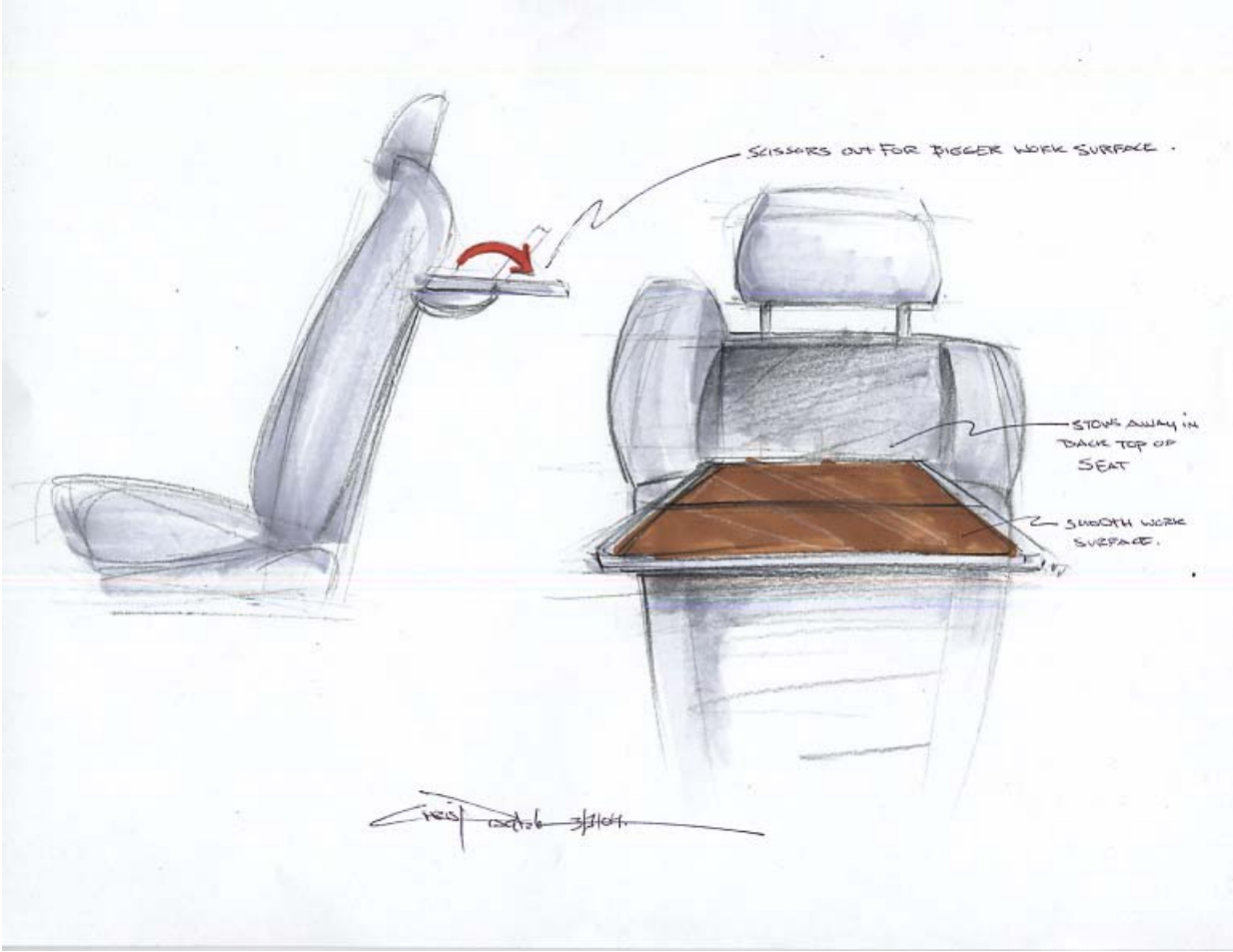
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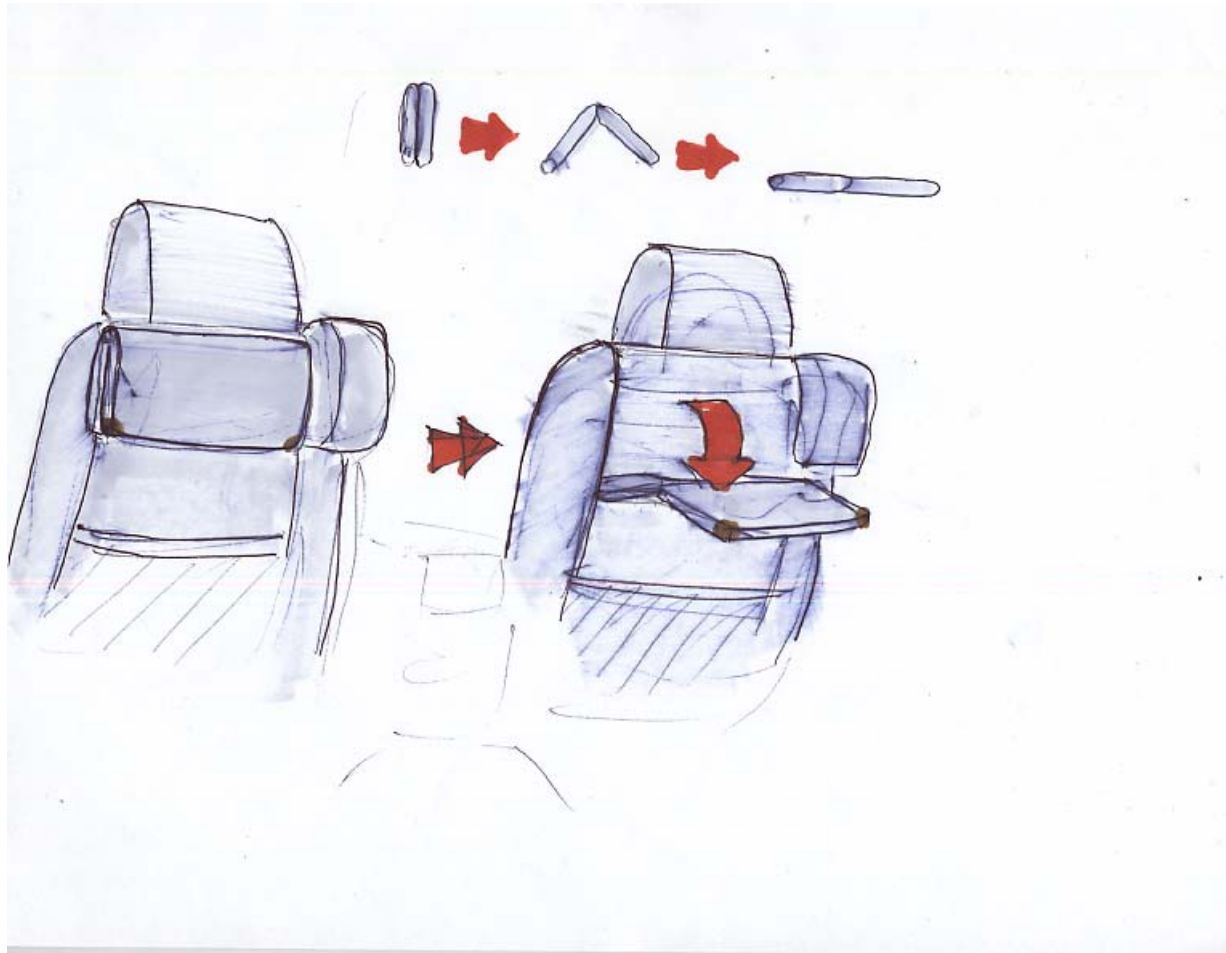
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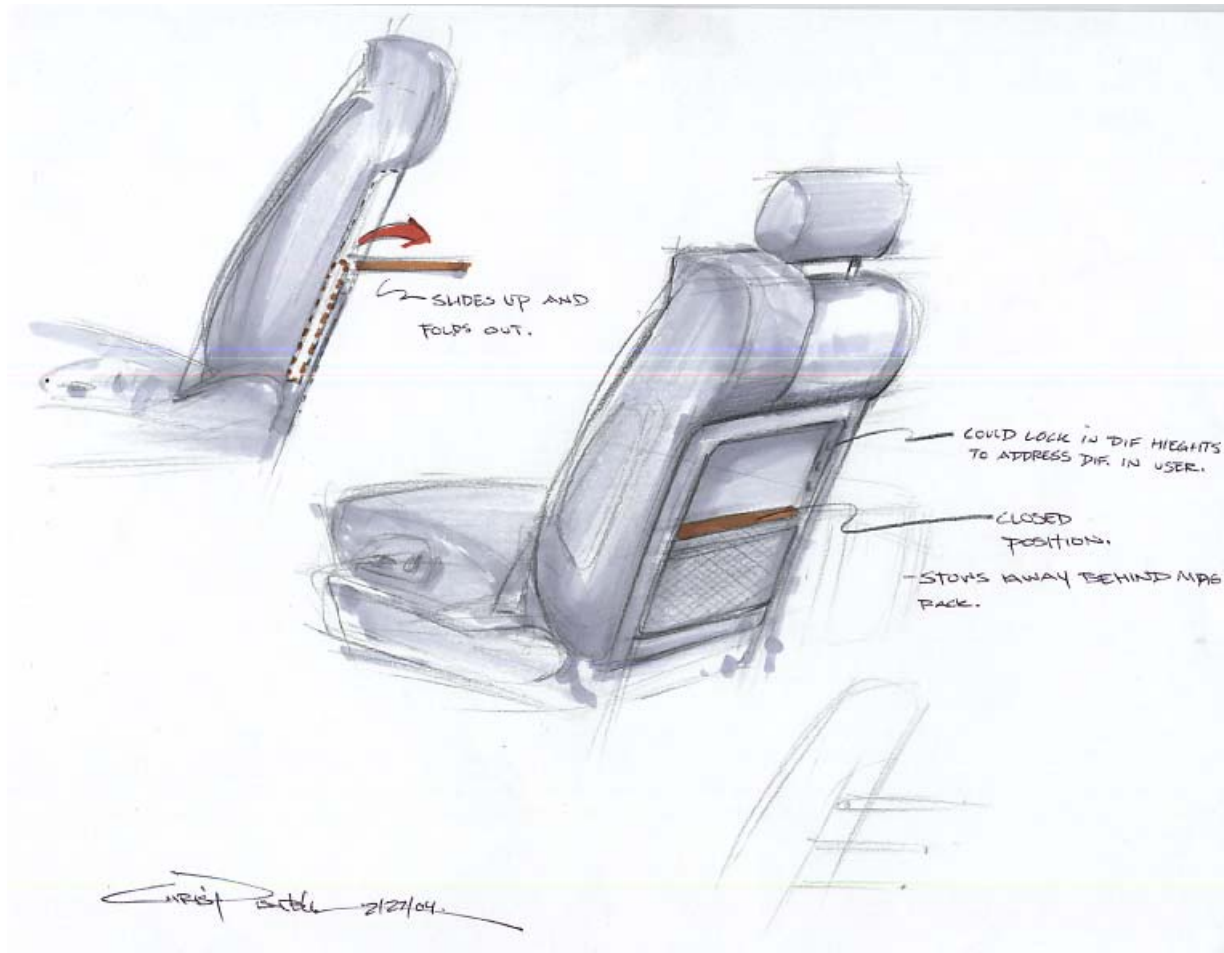


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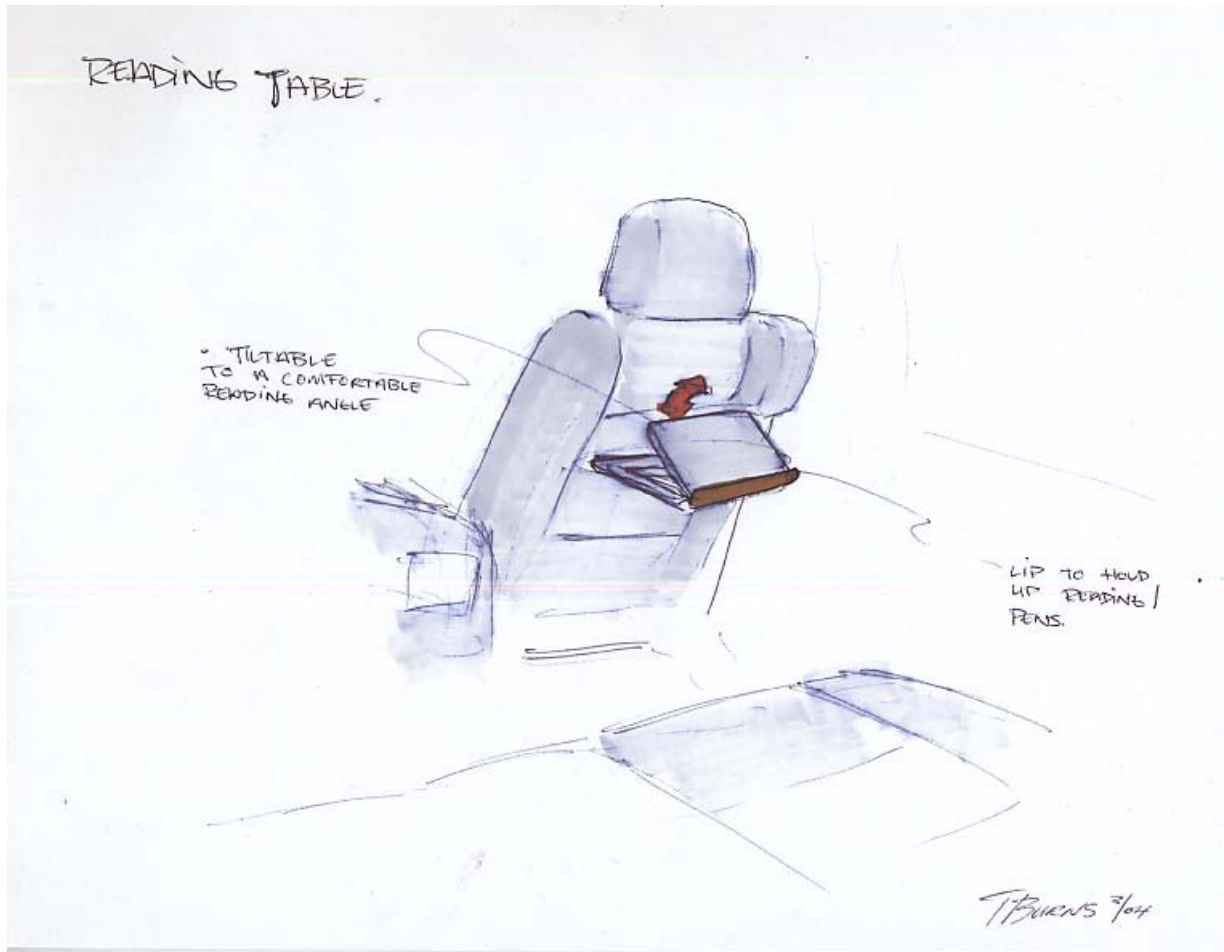




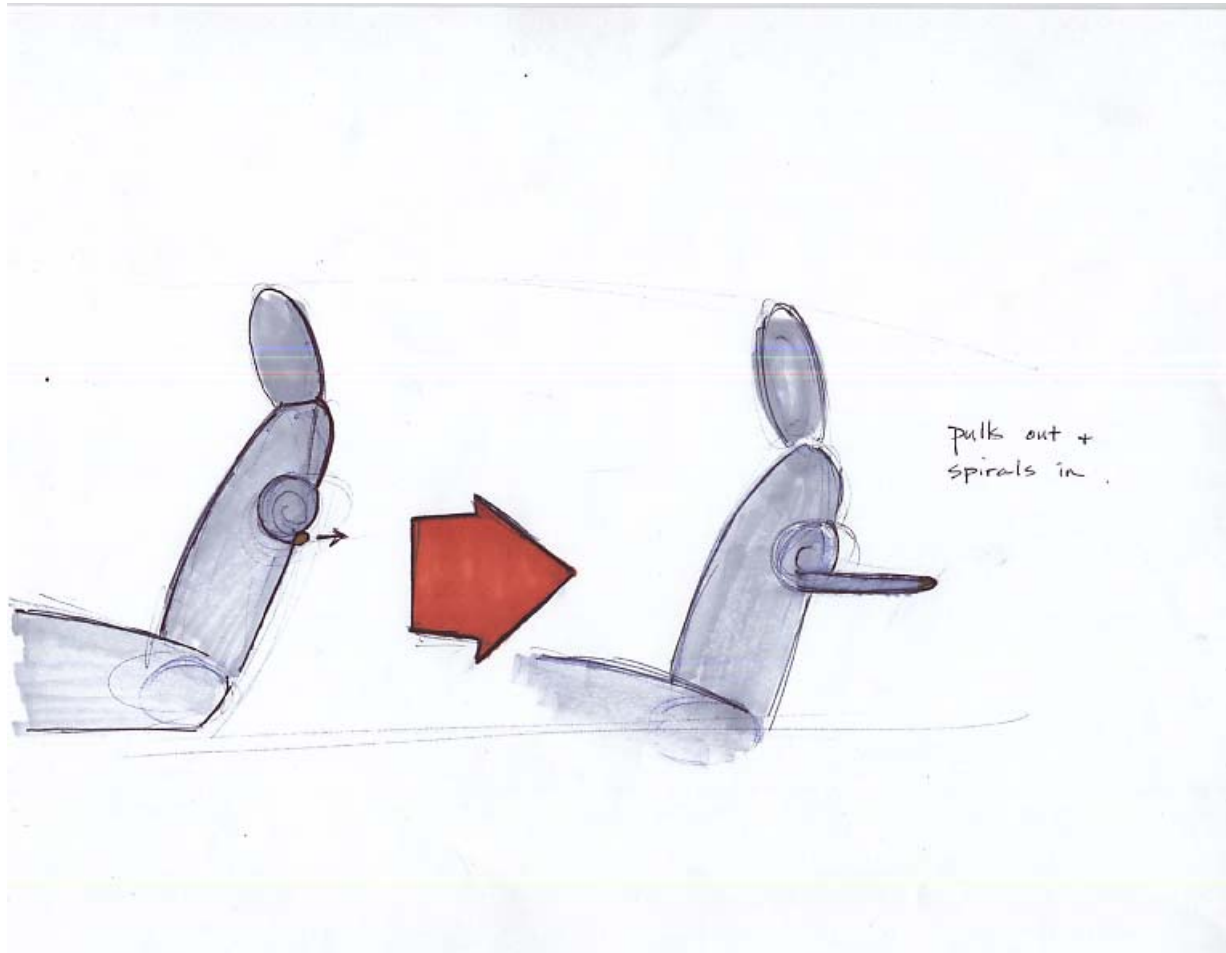
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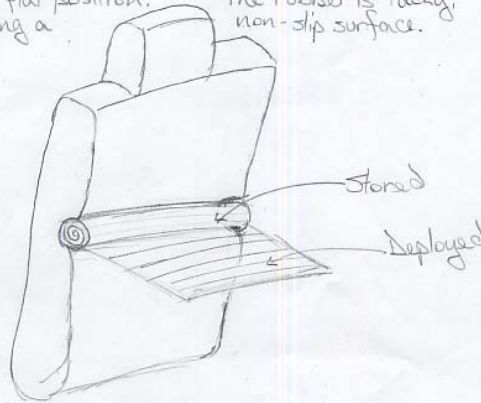


# Concept Sketches

## Segmented Stiff Mat

3/2/04

Idea: A mat made of rubber coated steel is rolled into a pocket in the front seat when the mat is unrolled, the slats interlock, stiffening the mat in a flat position. The rubber is tacky, providing a non-slip surface.



### Needs Addressed:

1. Easy to deploy.
2. Retains items on it during travel.
3. Cleans easily.

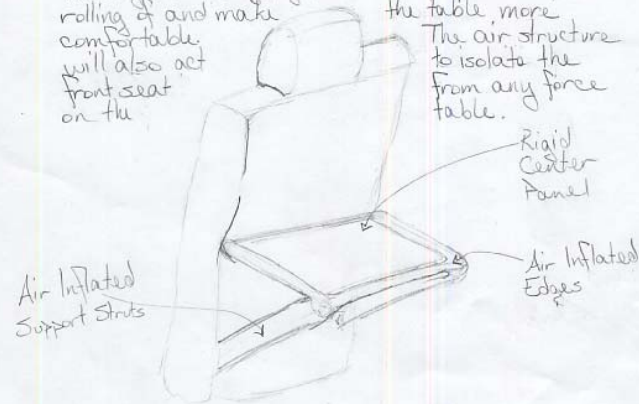


# Concept Sketches

## Inflated Bumper Table

3/2/04

Idea: An electrical pump inflates a balloon-type structure that contains a rigid center panel. The edges are slightly thicker to keep items from rolling off and make the table more comfortable. The air structure will also act as a front seat on the table. The air structure will also act as a front seat on the table. The air structure will also act as a front seat on the table. The air structure will also act as a front seat on the table.



### Needs Addressed:

1. Easy to deploy.
2. Unnoticeable to front seat passenger.
3. Retains items on it during travel.

# Concept Sketches



# Concept Sketches



# Concept Sketches

