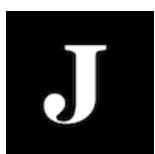# Audi MIB2+
User Testing

TIANCHEN QIANG

October 2017

J

OVERVIEW

When the development of MIB2+ gets to the end, it is a good time to review the current system. By doing the user testing, the Audi HMI designers can have a better understanding on what problems the system has now and what improvements the system can be done in the future.

GOALS

1. Define MIB2+ main problems
2. Generate an overview for MIB2+ each function
3. Summarize design concepts for in-vehicle infotainment system
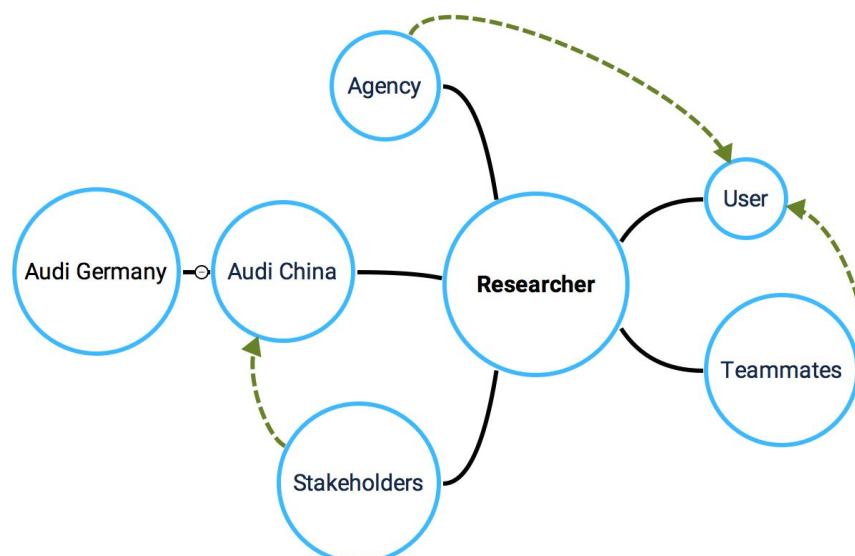
DURATIONS

6 weeks.

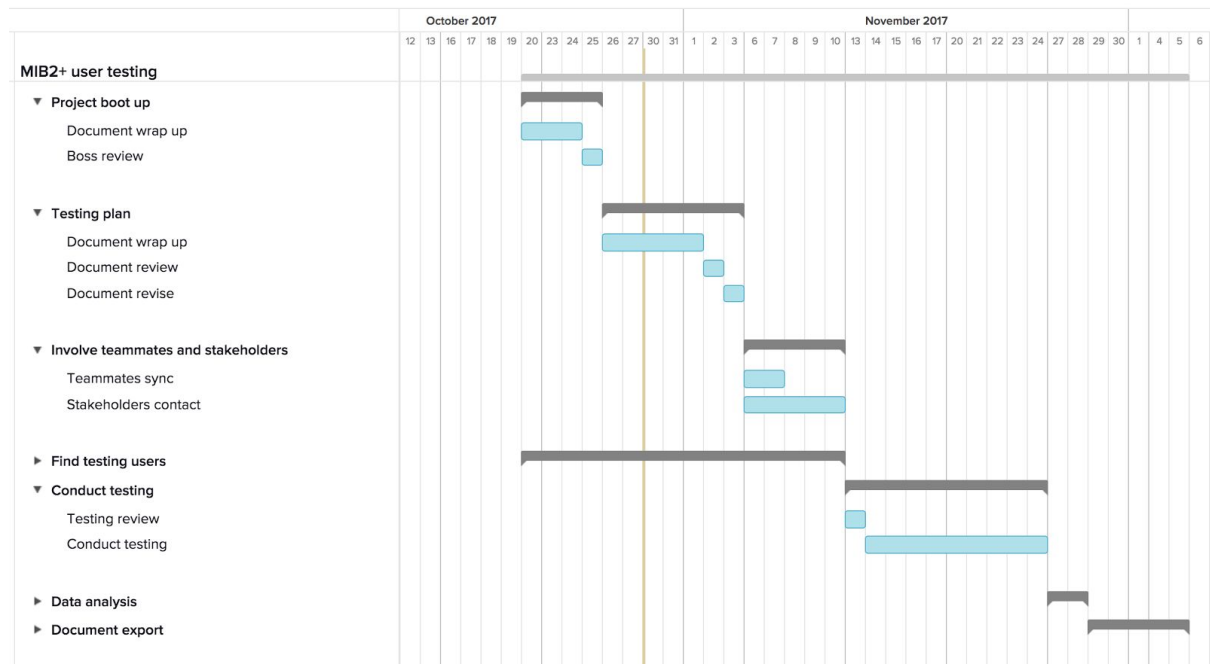## PARTICIPANTS NUMBER

10 people.

PEOPLE RELATIONSHIPS

Key Points:
1. Chinese customer's ideas
2. Function owner's ideas

3. Agency's cost fee
4. Manager's ideas
5. Stakeholder(VW)'s ideas

GANTT CHART

Key Points:
1. Testing location confirmation
2. Testing people schedule confirmation
3. Testing car booking
4. Testing document editing
5. Testing process recording
6. Testing report writing

MILESTONES

Project Boot Up - 10.25

Apply money from manager for this project. Confirm the agency which helps us to find 10 users. Consider potential risks for postponing the project.

Testing Plan - 11.3

When and where users will meet interviewers. Prepare the testing document. Involve teammates and managers to improve the document.

4 Navigation

To be added

U4.1: Please setup your NAVI to 国家图书馆

Speech

Find Testing People - 11.10

Finalize interviewing time and people. Think of back-up plan in case exceptional things happen.

Conduct Testing - 11.23

Conduct testing and collect all data that we need for later analysis. Prepare car and camera.

Document Export - 11.30

Analyze user feedback and export analysis document to achieve project goal.

TESTING GUIDELINE EXCERPTS

Guideline Version 20171014

Participant ID 被访者编号，姓名	
User Category 被访者类型	
Test Sequence 测试顺序	
购买时间	
车内配置	
Start Time 开始时间	
Date 日期	
Interviewer 访问员	

Part 1	Warm up / Pre-interview 前期访问	~ 20 min	Venue 场地
Part 2	User experience evaluation - static 静态评估	~ 60 min	In car 在车里
Part 3	User experience evaluation - dynamic 动态评估	~ 30 min	In car 在车里
Part 4	Post Interview/Final evaluation 最终评估	~ 10 min	At suitable location 在合适地点

Summary:

P1: Warm up	-	-
P2: Static	AC	U1.1
		U1.2
		U1.3
	MFL	Q2.1
		Q2.2
		Q2.3
		U2.4
		U2.5
	MMI in general	Q3.1
		Q3.2
		Q3.3
		Q3.4
		U3.5
		U3.6
	Navi	
	SDS	
	Audi connect	
	xxx	
	xxx	
	xxx	
P3: Dynamic	xxx	
	xxx	
	xxx	
	xxx	
	xxx	
	xxx	
	xxx	
P4: Post Interview		

Section I: Warm up / Pre-interview (20min) 前期访问（20 分钟）

0. Introduction of the interviewer / the institute: 访问员自我介绍

INT Please provides the following information:

My name is …and I work for Audi China…… We are conducting this usability study 自我介绍姓名，此次研究目的

I am looking forward to talking to you about a very interesting topic in the next two hours. The focus of this study lies on the evaluation of future in-car system, and it will help us to improve them in the future. 接下来两个小时会和您讨论一个有趣的话题:我们会来评价一下现有车内的功能，以帮助我们未来的开发。

0.1 Description of the process: 描述流程

INT Please provides the following information:

The interview will consist of three parts: 访问分为三部分:

Part 1 includes the introduction and contains preparatory questions (20 min) 第一部分：简介和一些初步询问的问题（20 分钟）

Part 2 we will sit in test car and have you experience the different in-car system (60 min) 第二部分：在测试车内完成指定的测试项目（60 分钟）

Part 3 you will do a test drive on the specified route and perform some further tasks, our interviewer will guide you the direction of diving. (30 min) 第三部分：在指定的 线路上驾驶，同时完成一些测试项目；我们的访问员会指引您驾驶的路径。

Part 4 will include your final evaluations and some other topics (15 min) 第四部分：事后评估和一些其它相关话题（10 分钟）

The Interview will be audio- and video-recorded for analysis purposes only. The legal obligations regarding data protection and anonymity wHI be ensured. 告知录音录像，隐私保护相关内容。

Please tell us everything that comes to mind during the interview. Think out loud, there is no "right" and "wrong" answer Your feedback will help us to improve future cars. 在整个访问过程中大声说出自己当时的想法，没有对错之分，您的想法会帮助我们改造我们的产品，请畅所欲言。

0.2 Demographics / Vehicle Statistics

Person related data 个人相关数据

a) Age 年龄 _____ 岁

b) Gender 性别

1☐	Male 男
2☐	Female 女

c) Marriage status: Are you married? 您的婚姻状况是？

1☐	Married 已婚
2☐	Single 单身

d) Kids in household: How many kids (below 18 years) currently live in your household?

1☐	No kids 无小孩	
2☐	1 kid: _____	Age
3☐	2 kids: _____	Age
4☐	3 kids: _____	Age

e) Years of driving 驾龄: _____ 年

f) Profession 职业: _____

0.3 Vehicle usage 车辆使用

Average driving time every day _____ .平均一天您驾驶时间

1☐	<30 minutes
2☐	30-60 minutes
3☐	60-90 minutes
4☐	90-120 minutes
5☐	>2 hours

Section II: Static user experience evaluation - Intuitive impression and operation静态评估-直观感受和操作

ACT -> Please take the respondent to the Audi vehcle. 带被访者区车辆（静态测试）

ACT -> Please check the folloing: 检查：

1. Make sure all the systems are reset. 确保系统已重置。
2. Make sure the display is main menu. 确保在主菜单。
3. Make sure the smartphone is turned on and with power source. 确保手机开机并充电
4. Make sure the video recording system is power on and working properly. 确保视频录像设备已打开并正常工作。

ACT -> Please enter the car: 入车：

4. Power on the car 打开点火开关
5. Interviewer sits in the passenger seat 访问员坐在副驾驶座位
6. Remind respondent not to operate anything in the car untial interviewer told. 告知受访者先不要操作车内的任何设备，直到访问员要求开始操作。
7. Please adjust the seat to your most comfortable position, just like what you did in your own car.现在请您调节座椅，按照您平时开车时最喜欢的姿势来调节。

Please provide this information：请向被访问者说明：

- Now we would like to test some of the functions of the in-car system. I will ask you to perform individual tasks in a sequence.现在我们想要测试，下系统的一些功能。我会要求您按顺序完成一些单项任务。
- As mentioned earlier, there is no right or wrong when you perform these tasks. We are not testing your skills; only the vehicle's operating system is being tested here. 正如之前提到的那样，在您进行操作的时候不存在正确或者错误的操作，我们并没有在测试您的技巧，这里仅仅是在测试车辆的操作系统。
- Very important: When you execute these tasks, please think out loud and express everything that comes to mind, whether it is negative or positive.非常重要的一点是，在您 进行这些任务的时候，请说出所有您脑海中思考的内容，无论是正面的还是负面的。

1 AC

1.1 U1.1: Turn on AC / Adjust temp. 打开空调 / 设定温度

"Please activate the air conditioning and adjust the temperature to a certain degree of your choice." "请打开空调，并调到您选择的温度。"

1.1.1 Observations 观察

Complete 完成情况	□ Instant Success 一次成功 □ Success 成功 □ Failed 失败
Attemps 尝试 路径 (3 max)	
Observation 访问员观察 评分	Rating 访问员评级： 1☐ No problems 没问题 2☐ Irritation 有点犹豫 3☐ Minor errors 小错误 4☐ Massive errors 大错误 5☐ Help from RA 需要访问员帮助 Problems can be tracked back to (MA)...问题的原因是（可多选）：

	1☐	System 系统_____
	2☐	Human c 操作者_____
	3☐	No differentiation possible 无法区分

1.1.2 How would you rate your satisification of the functions tested? 您会如何评价对此项设置的满意度？

-2 Not satisfied at all 一点也不满意	-1 不太满意	0 中立	1 比较满意	2 Very satisfied 非常满意
☐	☐	☐	☐	☐

1.1.3 Did you experience any difficulties? Please name obstacles and difficulties. What exactly needs to be improved? 您师傅遇到困难或者不方便的地方？请说出遇到的障碍和困难，或者改进的意见。

1.2 U1.2: Set to inner cycle / adjust wind direction 设置内循环 / 风向调节

"Now please use the Air inner cycle. Afterwards adjust the wind flow to the foot area." "现在请使用空气内循环。之后调节至脚部出风。"

1.2.1 Observations 观察

Complete 完成情况	□ Instant Success 一次成功 □ Success 成功 □ Failed 失败

Attemps 尝试 路径 (3 max)	
Observation 访问员观察 评分	Rating 访问员评级： 1☐ No problems 没问题 2☐ Irritation 有点犹豫 3☐ Minor errors 小错误 4☐ Massive errors 大错误 5☐ Help from RA 需要访问员帮助 Problems can be tracked back to (MA)...问题的原因是（可多选）： 1☐ System 系统_____ 2☐ Human c 操作者_____ 3☐ No differentiation possible 无法区分

1.2.2 How would you rate your satisification of the functions tested? 您会如何评价对空调设置的满意度？

-2 Not satisfied at all 一点也不满意	-1 不太满意	0 中立	1 比较满意	2 Very satisfied 非常满意

☐	☐	☐	☐	☐

1.2.3 Did you experience any difficulties? Please name obstacles and difficulties. What exactly needs to be improved? 您师傅遇到困难或者不方便的地方？请说出遇到的障碍和困难，或者改进的意见。

1.3 U1.3: Check the AQI / Close AC / 查看空气质量指数 / 关闭空调

"Now please check the AQI and then close AC" "现在请尝试查阅空气质量指数，之后关闭空调。"

1.3.1 Observations 观察

Complete 完成情况	□ Instant Success 一次成功 □ Success 成功 □ Failed 失败
Attemps 尝试 路径 (3 max)	
Observation 访问员观察	Rating 访问员评级：

评分	1☐	No problems 没问题
	2☐	Irritation 有点犹豫
	3☐	Minor errors 小错误
	4☐	Massive errors 大错误
	5☐	Help from RA 需要访问员帮助

Problems can be tracked back to (MA)...问题的原因是（可多选）:

1☐	System 系统_____
2☐	Human c 操作者_____
3☐	No differentiation possible 无法区分

1.3.2 How would you rate your satisification of the functions tested? 您会如何评价对此项设置的满意度？

-2	-1	0	1	2
Not satisfied at all				Very satisfied
一点也不满意	不太满意	中立	比较满意	非常满意
☐	☐	☐	☐	☐

1.3.3 Did you experience any difficulties? Please name obstacles and difficulties. What exactly needs to be improved? 您师傅遇到困难或者不方便的地方？请说出遇到的障碍和困难，或者改进的意见。

---

2 Multi-steering wheel 多功能方向盘

2.1 Q2.1: Now let us focus on the streering wheel; please try to describe to me the function of each button according to your understanding. 现在我们讨论一下方向盘，请根据您的理解描述每一个按键的功能。

Item	Understand correctly? (Y/N) 是否理解？	If not correct, record the respondents' understanding, and then explain the right function description. 如理解错误，记录被访者的理解，并解释正确功能。
1		仪表盘，切换选项
2		仪表盘视图显示切换
B		返回，上一级菜单
4		调出选项菜单
5		旋转/选择功能，按压确认
6		电话功能，通话.结束通话，迎话列表

7		语音对话 SDS
8		调节音，按下 MMI 静音
9		上一个/下一个曲 H
10 (* 自定		方向盘加热 *自定义键
11		重复上一次导航播报（确认）

2.2 Q2.2: Most used buttons/features 最常用的三个键/功能

1. _____
2. _____
3. _____

2.3 Q2.3: Which feature do you need to put on the steering wheel but currently is not available? 你最想放在方向盘上的操作/功能，而目前上面没有提供的是？

_____

2.4 U2.4 Please set the "*" key with function daylight nightlight map. 请尝试通过方向盘或者MMI设置方向盘上的自定义按键*键的功能为日间地图夜间地图切换。

2.4.1 Observations 观察

Complete 完成情况	☐ Instant Success 一次成功
	☐ 2nd time success 成功
	☐ 3rd time success 成功
	☐ Failed 失败
Attemps 尝试 路径 (3 max)	1）长按*键选择
	2）车辆 --> settings&service --> steering wheel buttons

Observation 访问员观察评分	Rating 访问员评级：
	1 ☐ No problems 没问题
	2 ☐ Irritation 有点犹豫
	3 ☐ Minor errors 小错误
	4 ☐ Massive errors 大错误
	5 ☐ Help from RA 需要访问员帮助

Problems can be tracked back to (MA)…问题的原因是（可多选）：

1 ☐	System 系统_____
2 ☐	Human c 操作者_____
3 ☐	No differentiation possible 无法区分

2.4.2 How would you rate your satisification of the functions tested? 您会如何评价对空调设置的满意度？

-2 Not satisfied at all 一点也不满意	-1 不太满意	0 中立	1 比较满意	2 Very satisfied 非常满意
☐	☐	☐	☐	☐

2.4.3 Did you experience any difficulties? Please name obstacles and difficulties. What exactly needs to be improved? 您师傅遇到困难或者不方便的地方？请说出遇到的障碍和困难，或者改进的意见。

2.5 U2.5 Please activate the map in kombi and zoom in and our on the map. 请在虚拟座舱屏幕（液晶仪表盘）上打开地图界面，然后将地图放大或者缩小。

2.5.1 你是否有虚拟驾驶舱？

　　a.　有
　　b.　没有

2.5.2 Observations 观察

Complete 完成情况	☐ Instant Success 一次成功 ☐ 2nd time success 成功 ☐ 3rd time success 成功 ☐ Failed 失败
Attemps 尝试 路径 (3 max)	
Observation 访问员观察评分	Rating 访问员评级：
	1 ☐ No problems 没问题
	2 ☐ Irritation 有点犹豫
	3 ☐ Minor errors 小错误
	4 ☐ Massive errors 大错误
	5 ☐ Help from RA 需要访问员帮助

Problems can be tracked back to (MA)…问题的原因是（可多选）：

1 ☐	System 系统_____
2 ☐	Human c 操作者_____
3 ☐	No differentiation possible 无法区分

2.5.3 How would you rate your satisification of the functions tested? 您会如何评价对空调设置的满意度？

-2 Not satisfied at all 一点也不满意	-1 不太满意	0 中立	1 比较满意	2 Very satisfied 非常满意

☐	☐	☐	☐	☐

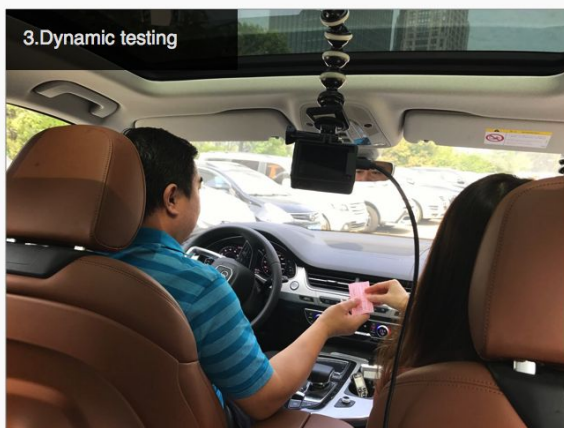**2.5.4 Did you experience any difficulties? Please name obstacles and difficulties. What exactly needs to be improved? 您师傅遇到困难或不方便的地方？请说出遇到的障碍和困难，或者改进的意见。**

TEST RECORDING

TBD. Testing process see following example.

1.Pre-testing interview

2.Static testing

3.Dynamic testing

4.Post-testing interview

5.Group research
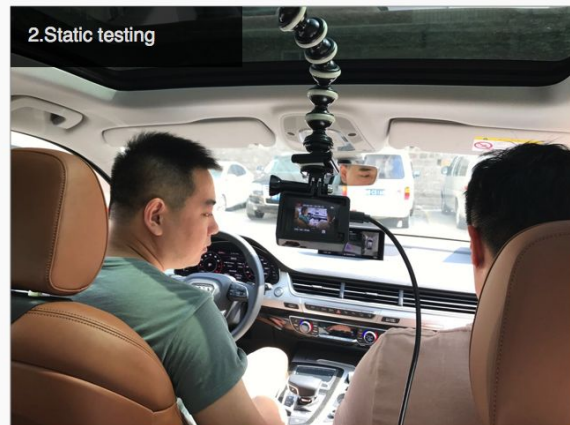
DATA ANALYSIS

TBD.

DOCUMENT EXPORT

TBD. Document format see following example.

User Research Report for NDF and Free-search Functions on MIB2+

Researcher: Tianchen Qiang

tianchen.qiang@audi.com.cn

Participants: Wentao Li, Yishi Yang, Shanshan Li, Qin Li, Liang Bai

CONCLUSION

After carefully conducting the user research for the NDF and free-search functions on MMI2+, most users only use free-search. From the usability aspect, the author hold the opinion that, for the purpose of designing for the next generation HMI navigation system, **it is better to remove NDF**.

ARGUMENTS

- It takes less time for users to finish search tasks by using free-search than by using NDF[1].
- Users' search performance has smaller variance for free-search than NDF[2].
- Few users actively choose to search destination by using NDF.
- Users has accustomed to free-search mental model and is unfamiliar with NDF search logic and NDF interface.
- Audi's NDF currently has a low performance with many user experience problems.

RESEARCH PROCESS

1.BACKGROUND

Since the rapid development of IVI, the navigation system has improved a lot as well. To compete with the mobile navigation user experience, IVI updated its original search method form NDF to free-search, the one-click search method. Moreover, to keep former user's behaviors consistent, IVI saves the NDF entry. However, currently we want to do research to figure out do IVI still needs to keep the NDF entry for Asia market.

2.GOALS

Does NDF still need to be kept for MIB3 and future IVI?

3.RESEARCH QUESTIONS

- How do people use search function in car?
- What do users like about each method (NDF and free-search)?
- What are improvements users want for each method (NDF and free-search)?

4.METHODOLOGY[3]

1. Separate users into 2 groups: A and B. Each group does the following two tasks (TaskA and TaskB) in the same way except the TaskA's order is opposite.
2. Warm up session: ask several general questions to make users ease and build rapport with them. For example, how do users use navigation normally? Also, remember to ask users to play the IVI for a while and tell them that our purpose is only for testing the IVI, not their behaviors?

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[1] 56:19, details see Appendix A
[2] 19.33:5.62, details see Appendix A

[3] Flowchart see Appendix B

3. TaskA: randomly collect 3 destinations[4]. Ask them to search each address by using NDF and then by using free search (See Figure 1).
4. TaskB: ask users to freely choose one method (See Figure 2), NDF or free search, to visit 3 destinations[5].
5. Take notes when notice useful information. Answer users' questions if they ask when getting confused. Record task-finishing-time for TaskA.
6. Ask users to fill a questionnaire[6] (See Figure 3) to collect qualitative information.
7. Analyze TaskA's task-finishing-time to collect quantitative information (See Figure 4).
8. Review the recording video[7] to collect useful information for improvements on IVI navigation.
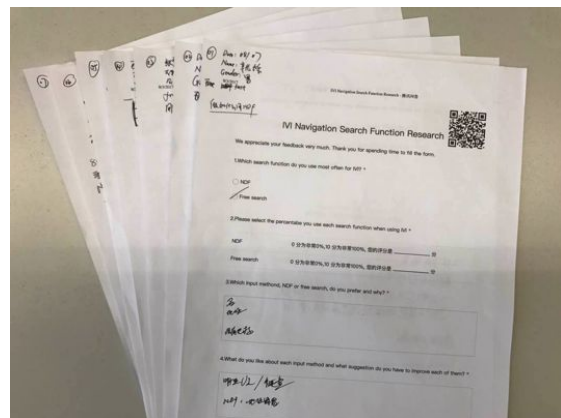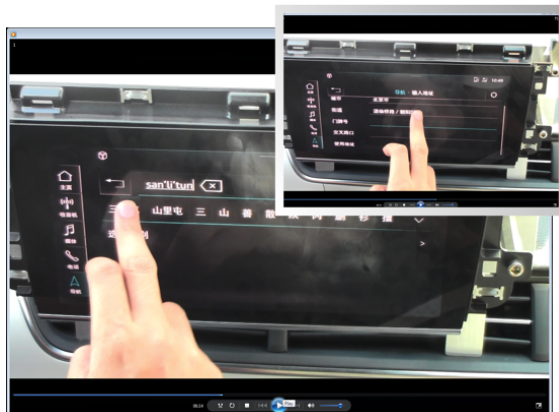

Figure 1.TaskA

Figure 2.TaskB

Figure 3.Questionnaire

Figure 4.Finishing time

5.SUBJECTS

7 people. 4 men and 3 women.
These are the primary characteristics of the study's participants:

---

[4] See Appendix C
[5] See Appendix C
[6] See Appendix D
[7] See Appendix E

- Audi employees
- Don't know much about MMI
- Aged between 20s-30s

6. TESTING ENVIRONMENT
- Audi Q7
- Audi MIB2+
- Online free-search
- Onboard NDF

7. SCHEDULE
- Recruiting: August 4
- Rehearsal methodology: August 4
- Study day: August 7
- Results delivery: August 8

8. SCRIPTS
- Find the subjects
- Know where is the car
- Recording camera works
- Online free-search works
- Users allow to select keyboard mode
- Print questionnaire out
- Chat with users first
- Keep the testing condition comfortable (sun, temperature, rain)

9. SYNTHESIZE
- Calculate the mean and variable for the task-finishing-time of TaskA.
- Algorithm for mean: after removing the smallest and biggest numbers, $M = SUM / n$
- Algorithm for variable: $D(X) = SUM(X_n - M)^2 / n$

10. ADMISSION
- Limited number of subjects
- Testing device is only MIB2+
- Testing tasks could be more various

REFERENCE
[1] Julia DeBlasio Olsheski, Bruce N. Walker. IVAT (In-Vehicle Assistive Technology): Multimodal Design Issues for TBI Drivers. Sonification Lab, Georgia Institute of Technology. 2001.
[2] James Chudley.Effectively Planning UX Design Projects. 2017.
https://www.ceros.com/blog/effectively-planning-ux-design-projects/

Appendix A - Task Finishing Time Analysis

NUMBER	NDF			MEAN	FREE SEARCH			MEAN
01	80	35	89	68	30	34	23	29
02	195	30	43	89	20	16	10	15
03	50	35	48	44	15	16	21	17
04	40	50	40	43	20	21	15	19
05	55	24	74	51	5	20	23	16
06	30	34	29	31	10	15	16	14
07	56	43	88	62	18	33	24	25
08								
09								
10								
			OVERAL MEAN	56			OVERAL MEAN	19
			VARIABLE	19.33			VARIABLE	5.62

Appendix B - Methodology Flowchart
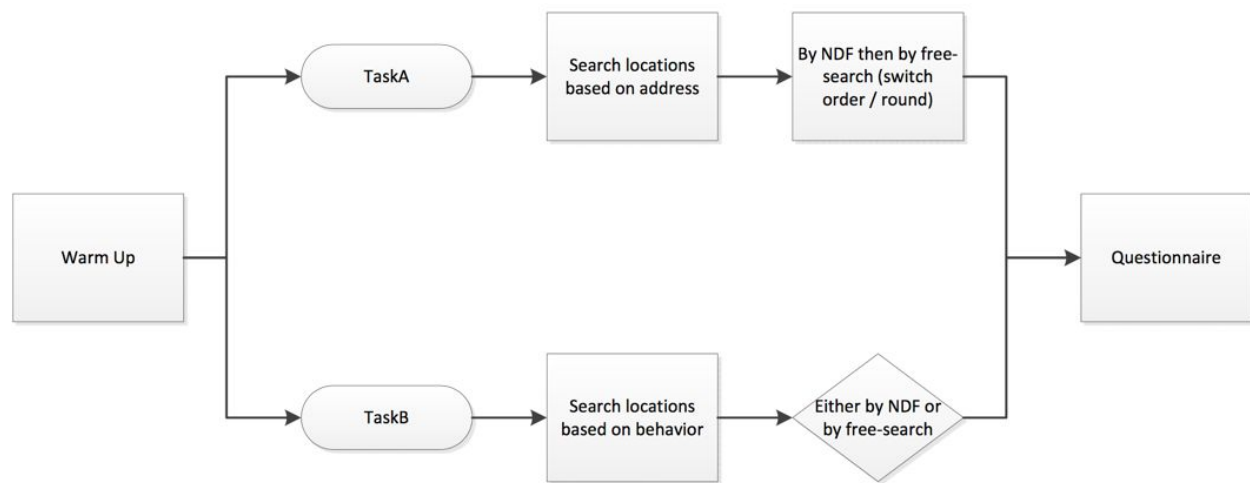
Appendix C - TaskA and TaskB Destination List

TaskA Destination	奥迪中国：北京市朝阳区酒仙桥路4号	三里屯优衣库：北京市朝阳区三里屯路19号	天津大学：天津市南开区卫津路92号
TaskB Destination	Home	Beijing University	IKEA

Appendix D - Questionnaire

IVI Navigation Search Function Research

We appreciate your feedback very much. Thank you for spending time to fill the form.

1.Which search function do you use most often for IVI? *

○ NDF

○ Free search

2.Please select the percentabe you use each search function when using IVI *

NDF	0 分为非常0%,10 分为非常100%, 您的评分是 _____ 分
Free search	0 分为非常0%,10 分为非常100%, 您的评分是 _____ 分

3.Which input methond, NDF or free search, do you prefer and why? *

4.What do you like about each input method and what suggestion do you have to improve each of them? *

5.Do you have any ideas for the research? We appreciate your feedback to improve our next time reserach. *

Appendix E

Please contact the author for research video files by email: tianchan.qiang@audi.com.cn