Auto Air Refresh

(Blue Shield)

Product Requirements Document (PRD)

V1.3

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Contents

1 General Assumptions

1.1 User

The user is assumed to be responsible for:

- Vehicle equipped with AAR feature which includes cabin PM sensor
- User will use Lincoln Way App by adding vehicle to enable AAR on LW app.

1.2 Vehicle

For a vehicle to support the DuerOS related feature, the vehicle must have all of the following:

- PM sensor installed and AAR feature enabled. Compatible AAR related modules including at least the climate control module installed. Modules configured for AAR feature typically via DIDs. VIN associated to G1DAG feature code in backend systems.
- TCU installed and activated
- HMI screen to show PM2.5 status both cabin and outside.

1.3 APP

User will be able to see PM2.5 status both cabin and outside in APP.

2 Auto Air Refesh

2.1 Description

- AAR is a plant-installed solution, to allow the user to monitor cabin and outside PM2.5 values.
- Blue shield is the enhanced version of AAR with some automatic logic on IVI system.

2.2 Assumptions

- IVI has GPS module and must apply shifted GPS
- IVI can get Cabin PM2.5 data via CAN signals.
- IVI can get exterior PM2.5 data from cloud.
- IVI can send Cabin PM2.5 data to cloud and to rear screen if equipped.

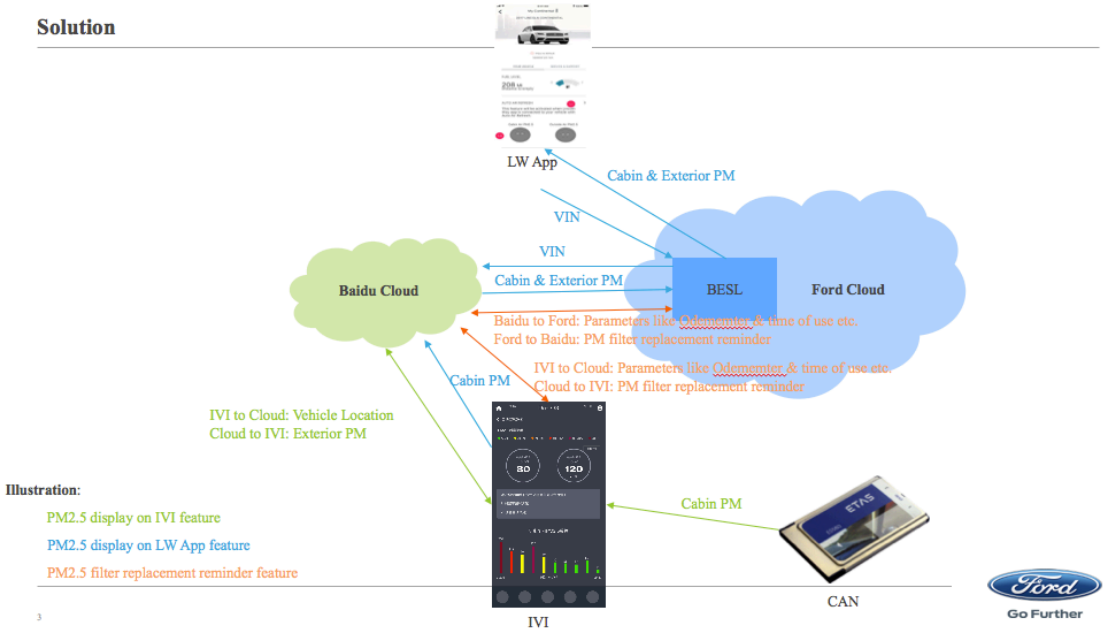
2.3 User stories

User Story ID	User Story
2.3.1	User can see the Cabin PM2.5 data
2.3.2	User can see the exterior PM2.5 data
2.3.3	User can see detail exterior PM station
2.3.4	User can see the Cabin PM2.5 history
2.3.5	User can hear the voice reminder of tips or alerts
2.3.6	User can receive reminder when the PM filter need to be replaced.
2.3.7	Auto Recirc Control Strategy
2.3.8	PM2.5 Auto Climate on when Engine Ignition
2.3.9	High Cabin PM2.5 Alarm

2.4 Requirements

2.4.1 TCU solution flowchart

1. AAR Cloud app in BESL
2. Outside PM data will use Baidu data source



2.4.2 PM 2.5 color information

Should align with the color in Sync as below table:

Levels, Ranges & Colors

[H26g.R003.02] The {PMType} text shall be the PM type on all screens, as configured in the APIM (e.g. {PMType}="PM2.5", if configured for PM2.5): DE07 3 3=0 (PM2.5) or =1 (PM10)
[H26g.R005.01] The colors displayed in the Inside Color Display Areas and and Outside Color Display Area on all screens shall match the {PMType} table information (e.g. if {PMType}="PM2.5" use Table 2).

Table 2

{PMType} PM2.5 Information

Level	Cabin Color Range & Outside Color Range		Color Examples	R	G	B	States transmitted to the rear display (e.g.via the PmCabnLvl_D_Stat signal)
	Default Color Range Threshold (Low Value)	High Value					
	PmCabn_Conc_Actl >500		Grey	130	130	130	NotKnown (default)
6	{251}	500 for Cabin; 999 for Outside	Maroon	126	0	35	Pm_Level_6_Worst
5	{151}	Level 6 Low Value -1	Purple	153	0	76	Pm_Level_5
4	{116}	Level 5 Low Value -1	Red	255	0	0	Pm_Level_4
3	{76}	Level 4 Low Value -1	Orange	255	126	0	Pm_Level_3
2	{36}	Level 3 Low Value -1	Yellow	255	255	0	Pm_Level_2
1	0	Level 2 Low Value -1	Green	0	228	0	Pm_Level_1_Best

Table 2a

{PMType} PM10 Information

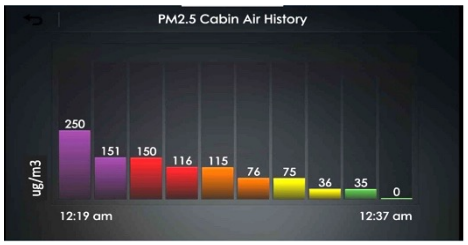
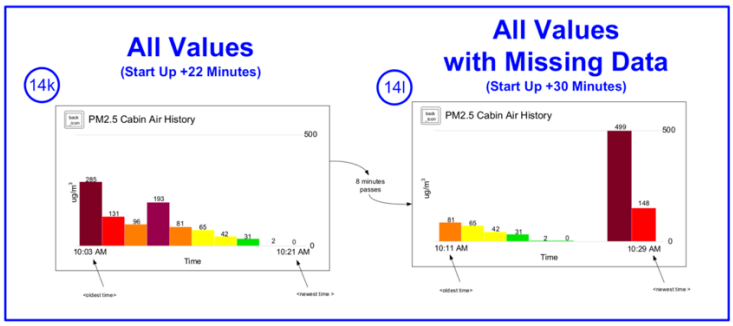
Level	Cabin Color Range & Outside Color Range		Color Examples	R	G	B	States transmitted to the rear display (e.g.via the PmCabnLvl_D_Stat signal)
	Default Color Range Threshold (Low Value)	High Value					
	PmCabn_Conc_Actl >500		Grey	130	130	130	NotKnown (default)
6	421	500 for Cabin; 999 for Outside	Maroon	126	0	35	Pm_Level_6_Worst
5	351	Level 6 Low Value -1	Purple	153	0	76	Pm_Level_5
4	251	Level 5 Low Value -1	Red	255	0	0	Pm_Level_4
3	151	Level 4 Low Value -1	Orange	255	126	0	Pm_Level_3
2	51	Level 3 Low Value -1	Yellow	255	255	0	Pm_Level_2
1	0	Level 2 Low Value -1	Green	0	228	0	Pm_Level_1_Best

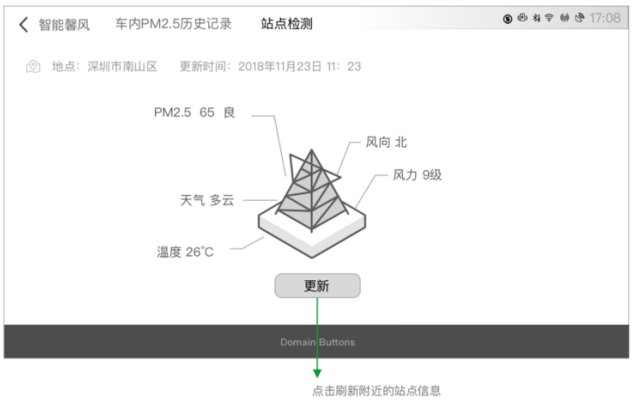
2.5 User Cases

2.5.1 On HMI

Use Case ID	2.5.1.1
Use Case	User can see the Cabin PM2.5 data on HMI
Pre-Conditions	1. Ignition on
Trigger	
Expected Behavior	User can see the Cabin PM2.5 data on HMI on below scenarios: 1. On Launching screen, weather page  2. FOR CX482, AAR status icon with cabin PM2.5 data exist on the bottom status bar 3. AAR button on AC screen 4. AAR status in notification scroll bar.
Post Conditions	When user tap the above area, it will lead to AAR screen. 
Exceptions	If no data condition, value should not be displayed (“--”).

Use Case ID	2.5.1.2
Use Case	User can see the exterior PM2.5 data on HMI
Pre-Conditions	1. Ignition on 2. GPS enabled
Trigger	User can tap the AAR button on HMI on below scenarios to see the outside PM 2.5 data: 1. On Launching screen, weather page i.  2. FOR CX482, AAR status icon with cabin PM2.5 data exist on the bottom status bar 3. AAR button on AC screen 4. AAR status in notification scroll bar.
Expected Behavior	User can see the Exterior PM2.5 data on HMI 
Post Conditions	/
Exceptions	1. If no data condition, value should not be displayed.

Use Case ID	2.5.1.3
Use Case	User can see the Cabin PM2.5 history on HMI
Pre-Conditions	1. Ignition on
Trigger	User tap the AAR button on HMI
Expected Behavior	User can see the Cabin PM history on HMI 1. The Air Quality History bottom time scale shall be 10 data points 1) the <oldest time> to the left 2) The <newest time> time to the right 2. The time displayed for a bar is the time at the END of the 2 minute duration for that respective bar  
Post Conditions	/
Exceptions	If no data condition, ‘No information available’ should be displayed.

Use Case ID	2.5.1.4
Use Case	User can see the detail exterior PM station info on HMI
Pre-Conditions	2. Ignition on 3. GPS enabled
Trigger	User tap the exterior PM buton on HMI
Expected Behavior	User can see the detail info of exterior PM station on HMI 1. Location/update time/other weather info ~~2. Display in a map view (it's not available for baidu API now, but they will support map view in later enhancement)~~ ~~3. Display the PM data of all the stations in the map (it's not available for baidu API now, but they will support map view in later enhancement)~~  ~~New design – display in a map view (it's not available for baidu API now, but they will support map view in later enhancement)~~ 
Post Conditions	/
Exceptions	1. If no data condition, 'No information available' should be displayed.

Use Case ID	2.5.1.5
Use Case	User can hear the voice reminder or receive messages of Tips or alerts
Pre-Conditions	1. Ignition on 2. GPS enabled 3. Switch of Voice reminder of AAR is ON
Trigger	Edge cases: (Will be subdivided into different sub-cases)
Expected Behavior	User can hear voice alerts or tips accordingly: (see below sub-cases) *user experience : Do not remind again in 30 minutes (TBD?)
Post Conditions	/
Exceptions	/

Use Case ID	2.5.1.5.1
Use Case	User can hear the voice reminder of Tips or alerts – subcase 1
Pre-Conditions	1. Ignition on 2. GPS enabled 3. Switch of Voice reminder of AAR is ON
Trigger	Condition1 – if (Exterior PM > 75) AND Condition2- if (35<CabPM < Exterior PM) AND Condition3- About situation continue more than 6 minutes AND Condition4- if (AC is in fresh air mode)
Expected Behavior	User can hear voice alerts or tips accordingly: Voice reminder – “Do you want to change to recirc mode?”
Post Conditions	-If user answer “yes”, IVI should change the mode from “fresh air mode” to “Recirc Air mode” -If user answer “no”, no change needed
Exceptions	/

Use Case ID	2.5.1.5.2
Use Case	User can hear the voice reminder of Tips or alerts – subcase 2
Pre-Conditions	1. Ignition on 2. GPS enabled 3. Switch of Voice reminder of AAR is ON
Trigger	Condition1 – if (Exterior PM <20) Condition2- if (CabPM – Exterior PM > 30) Condition3 – above situation continues more than 120 seconds Condition4- if (AC is in recirc mode) Condition5 – Doors and windows are closed
Expected Behavior	User can hear voice alerts or tips accordingly: Voice reminder – “Do you want to change to fresh air mode?”
Post Conditions	/
Exceptions	/

Use Case ID	2.5.1.5.3
Use Case	User can receive reminder when the PM filter need to be replaced on IVI.
Pre-Conditions	1. Ignition on
Trigger	PM filter need to be replaced IVI get status from Cloud (check logic on cloud) There are 2 phases for the filter checking logic for backend: Phase A: Reminder calculated without DMS maintenance record, no DMS integration required. Condition: time > 1 year or odometer > 15000 KM Phase B: Reminder calculated with DMS maintenance record.
Expected Behavior	User can see a highlight in HMI to remind user to replace the filter. If switch of Voice Reminder is ON THEN user can hear voice alert accordingly: “Please replace the PM filter” *** The reminder(pop up alert) and notification could not be too often. It should be limited to total 3 times every life circle and the same alert or notification should be be sent again within 30 minutes
Post Conditions	~~May link to any business solution? (TBD : Online Mall if it is available)~~
Exceptions	/

Use Case ID	2.5.1.5.4
Use Case	User can reset PM filter status on IVI.
Pre-Conditions	1. Ignition on 2. PM filter status is need to be replaced
Trigger	When user tap the filter status(replacement) button, there will be a pop up of advisement for the user to replace the filter. There is a reset button on the pop up. When user tap the reset button, there should a double confirm information to make the user sure that if he/she tap the 'reset', the filter status will be changed. After the 'reset' button is finally tapped, the reset function will be triggered.
Expected Behavior	On HMI, the filter status will be changed to NORMAL. The reset info should be sent to Cloud for further use.
Post Conditions	/
Exceptions	/

Use Case ID	2.5.1.6
Use Case	User can turn on/off the voice reminder in HMI
Pre-Conditions	/
Trigger	User tap the configuration button or other entrance in HMI
Expected Behavior	User can see the existing setting status (on or off) of voice reminder of AAR User can change the configurable choice in HMI to turn on/off of voice reminder.
Post Conditions	If the user change the setting (from on to off or from off to on), the value should be sent to Cloud
Exceptions	/

Use Case ID	2.5.1.7
Use Case	User can start Cabin Refresh
Pre-Conditions	1. Ignition ON
Trigger	User tap the ‘Cabin Refresh” button -- FORD: on AAR Screen Lincoln: on AC Screen
Expected Behavior	If AC is ON: turn to recir mode for 90s If AC is OFF: turn ON AC and change to recir mode
Post Conditions	User can tap the ‘cabin refresh’ button to turn off this feature during 90s
Exceptions	/

ID	
Use Case	User can see different AAR status in IVI
Pre-Conditions	1. Ignition on
Trigger	/
Expected Behavior	1. AAR status icon will always displayed in IVI status bar 2. AAR status icon will be changed according to different status as below:

Icons

[H26g.R004.02]The {air quality}_icon on all screens shall be per Table 1, and shall be transmitted to the Rear Climate (Display) Module.
[H26g.R043.01] Filtering On = Climate Control System On and Filtering Off = Climate Control System Off (see rule 44).
Reference Tables 2 and 2a for the Level 1 information.

Table 1

Conditions						Result			mments
Ignition Status (Ignition_Status from BCM)	CCM Xmitted Power Button CAN Data	CCM Power Button State	CCM xmitted Sensor CAN Data	Sensor PM Concentration Information from PmCabn_Conc_Actl signal/Interpreted by SYNC	Sensor Diagnostic State from PmSnsCabn_D_Stat signal / Interpreted by SYNC	{air quality}_icon Displayed	Sample Graphic	State transmitted to the rear display module (e.g. via the PmCabn_D_Stat signal)	
!=Run or !=Start	All conditions					None (Blank)		NotKnown	
=Run or =Start	Missing (Wake Up)	Unknown	All conditions			None (Blank)		NotKnown	1. See Rulle 45. 2. SYNC display is "blank" and RACM_RICM is "NotKnown", due to no CAN state for "blank".
	Present	On	Missing	Unknown	Unknown	on _icon		Filtering_On	See rule 9
	Present	On	Present	501-509	Any				See rule 9
	Present	On	Present	Level >1	Any				
	Present	On	Present	No_Data_Exists or Faulty	Blank the Field				See Table 3
	Present	On	Present	No_Data_Exists or Faulty	Initializing				See Table 3
	Present	On	Present	No_Data_Exists or Faulty	no_issue				This case would be a programming error.
	Present	On	Present	Level = 1	Any	on & clean _icon		Filtering_Complete	
	Present	Off	Missing	Unknown	Unknown	off _icon		Filtering_Off	See rule 9
	Present	Off	Present	501-509	Any				See rule 9
	Present	Off	Present	Level >0	Any				
	Present	Off	Present	No_Data_Exists or Faulty	Blank the Field				See Table 3
	Present	Off	Present	No_Data_Exists or Faulty	Initializing				See Table 3
	Present	Off	Present	No_Data_Exists or Faulty	no_issue				This case would be a programming error.
	Present	On	Present	No_Data_Exists or Faulty	Sensor Blocked, Replace Sensor Environmental Limit	error _icon		NotKnown	See Table 3
	Present	Off	Present	No_Data_Exists or Faulty	Sensor Blocked, Replace Sensor Environmental Limit				See Table 3
	Missing (After initially received)	Unknown	All conditions						See rule 45.

Level 1 see table in 2.4.2

3. When the status changes, IVI will receive message in message center. And user can tap the message to enter AAR main screen.

Post Conditions	
Exceptions	/

Use Case ID	2.5.1.9
Use Case	User can see different text display in different condition
Pre-Conditions	1. Ignition on
Trigger	By checking the CAN signal state, different state for different text displayed.
Expected Behavior	ta Table 3

Ignition Status (Ignition_Status from BCM)	No data signal state (PmSnsCabn_D_Stat)	[no data text]
!=Run or !=Start	All Conditions	"blank"—do not display anything in the [no data text] field
=Run or =Start	Initializing	Initializing
	Clean_Sensor	Sensor Blocked
	Replace_Sensor	Replace Sensor
	Intermittent_Inhibit	Environmental Limit
	Blank_Field	"blank"—do not display anything in the [no data text] field
	No_Issue (Note: this is a fault condition that should not occur. This signal state should not occur while PmCabn_Conc_Actl CAN signal equals 510 or 511)	"blank"—do not display anything in the [no data text] field
	Missing message while PmCabn_Conc_Actl CAN signal equals 510 or 511	"blank"—do not display anything in the [no data text] field

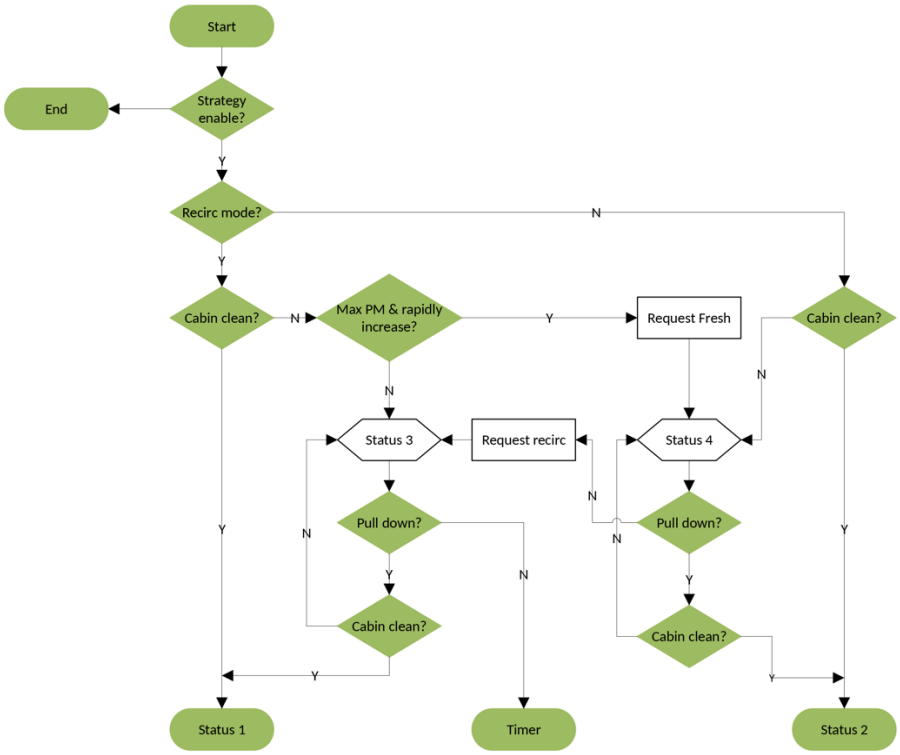
Post Conditions	/
Exceptions	/

Use Case ID	2.5.1.10
Use Case	User can enable/disable PM2.5 Auto Recirc Control Strategy
Pre-Conditions	1. Ignition on
Trigger	On AAR screen, user tap the enable/disable button of Auto Recirc Control.
Expected Behavior	1. If the previous status is ON: only Disable button displayed 2. If the previous status is OFF: only Enabe button displayed After user tap the button, the configuration will be changed to enable or disable accordingly. **If strategy is implemented in DuerOS system, customer should get HMI to disable / enable this strategy. If both DuerOS system and RCCM has this strategy, DuerOS system should honor RCCM output, and show RCCM control result in HMI for customer. But when customer choose to disable this strategy in DuerOS HMI, it means this strategy disabled in both DuerOS and RCCM. Flag name — state — Effect AAR_ActivatePM2.5BaseRec — 0 / 1 — Enable / disable the PM2.5 auto recirc When AAR_ActivatePM2.5BaseRec is 1, DuerOS system activate this strategy; When AAR_ActivatePM2.5BaseRec is 0, this control strategy will be disabled.
Post Conditions	/
Exceptions	/

Use Case ID	2.5.1.11
Use Case	PM2.5 Auto Recirc Control Strategy
Pre-Conditions	1. Ignition on 2. Strategy enabled 3. Precondition of PM2.5 Auto Recirc strategy: (AND conditions) 1) VehState = NORMAL_RUN OR REMOTE START; 2) The selected climate control air flow mode (AMC_AirDistrModeDrState) is not WS or WS/FL; 3) The front or rear windscreen heat is off (HblMirrIndRq and HwsStat equals off); 4) The compressor request (CompsrOnRq) "HvacAirCond_B_Rq" is on; 5) PM2.5 sensor reading is available;

Trigger

Checking logic by IVI as below diagram



1. Input

VehState: Vehicle operation state
AppRdc_AqsEngRunWS : Engine start running timer
AMC_AirDistrModeDrState: Requested air distribution mode position, PN, FL, WS
AmbTe_Err : Error flag for OAT CAN signal
PmCabn_Conc_Actl: Cabin PM2.5 number

Historical Data:

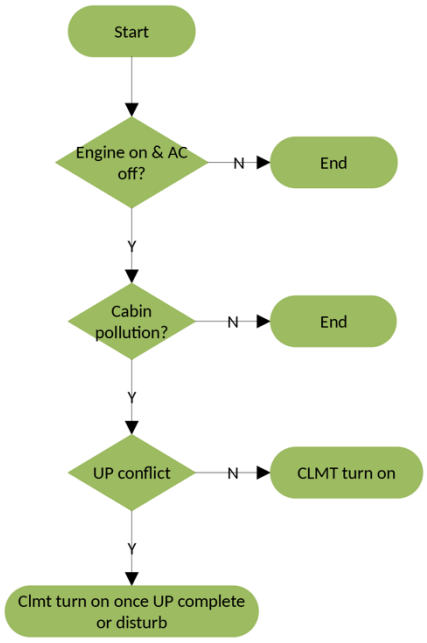
PmCabn02Mnte_Conc_Actl	PmCabn04Mnte_Conc_Actl
PmCabn06Mnte_Conc_Actl	PmCabn08Mnte_Conc_Actl
PmCabn10Mnte_Conc_Actl	PmCabn12Mnte_Conc_Actl
PmCabn14Mnte_Conc_Actl	PmCabn16Mnte_Conc_Actl
PmCabn18Mnte_Conc_Actl	PmCabn20Mnte_Conc_Actl

2. output

AR_PM2.5RecDrState Requested Recirc door position by DuerOS system;

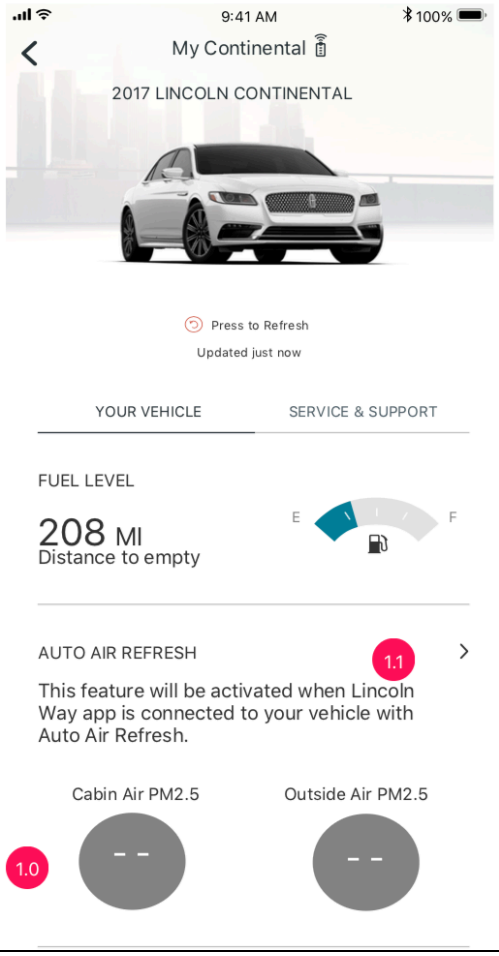
Expected Behavior	3. Status Status 1 - Cabin clean at recirc; Status 2 - Cabin clean at fresh; Status 3 - Pull down at recirc; Status 4 - Pull down at fresh; 4. Some definitions • IF Cabin PM2.5 is increasing, when Cabin PM2.5 > 30 means not clean. IF Cabin PM2.5 is decreasing, when Cabin PM2.5 < 24 means clean. • rapid increase: If cabin PM2.5 reading increase 150 within 30 sec, then judge cabin PM2.5 is rapidly increasing. • Cabin Max PM : last two PM2.5 reading above 250 ; at Max PM status, system choose to fresh mode to introduce outside air flow to pull down cabin PM2.5; The reason is that pollution may come from cabin inside like smoking. • Cabin pull down - comparing 2min average PM2.5 reading, if decease by more than 20%, then judge system is under "pull down". If system is at status 4, wait at least 7 min to make the judgment. • In Status1/2, IF Cabin PM2.5 > 30, system should jump out the current status and start from recirc mode checking.
Post Conditions	/
Exceptions	/

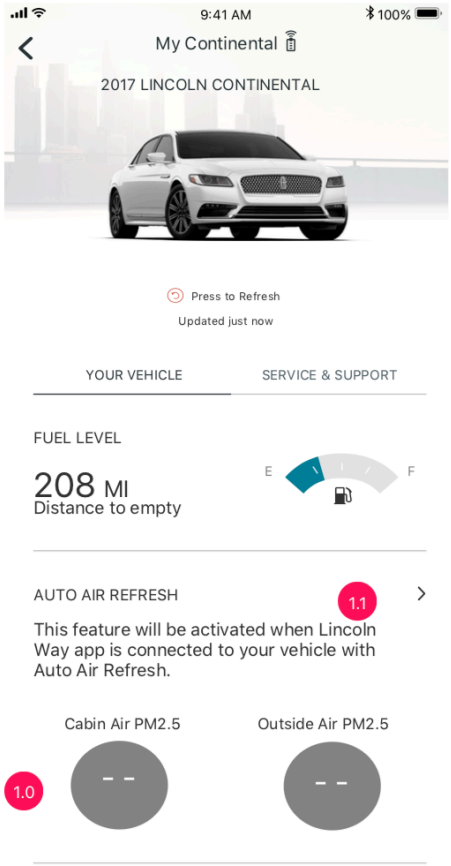
Use Case ID	2.5.1.12
Use Case	User can enable/disable 'PM2.5 Auto Climate on when Engine Ignition' logic
Pre-Conditions	Ignition on
Trigger	On AAR screen, user tap the enable/disable button of Auto Climate on when Engine Ignition
Expected Behavior	1. If the previous status is ON: only Disable button displayed 2. If the previous status is OFF: only Enabe button displayed After user tap the button, the configuration will be changed to enable or disable accordingly. ** This strategy can be disabled / enabled in DuerOS system, customer should can get HMI to disable / enable this strategy. Flag name state Effect AAR_ActivatePM2.5Base 0 / 1 Disable / Enable the PM2.5 auto AC on When AAR_ActivatePM2.5Base is 1, DuerOS system activate this strategy; When AAR_ActivatePM2.5Base is 0, this control strategy will be disabled.
Post Conditions	/
Exceptions	/

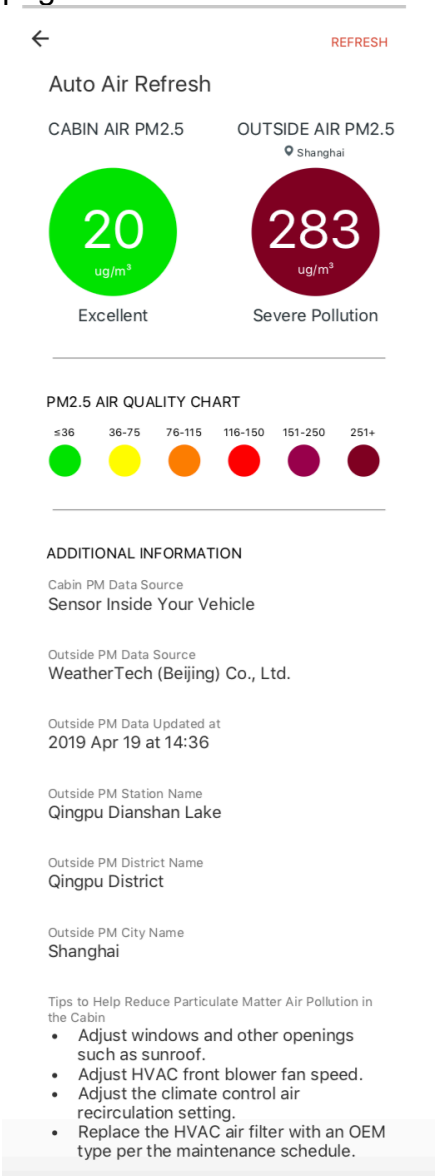
Use Case ID	2.5.1.13
Use Case	PM2.5 Auto Climate on when Engine Ignition
Pre-Conditions	Logic enabled
Trigger	Checking logic by IVI  Input • VehState: Vehicle operating state • PmCabn_Conc_Actl Cabin: PM2.5 number • CC_Fr_Btn_User_Adj: UFC status, ox11 Active/0x12 Complete/0x13 Interrupt Output • AAR_ClmtStateOnPM2.5: Requested to turn on climate system through DuerOS system;
Expected Behavior	• When vehicle state (VehState) transit from Off to Normal Run, this strategy will be start. If initial cabin PM2.5 is polluted, and climate system is off, then DualOS system will request to turn on climate. • HMI will show note in screen to customer which may say "AAR system is going to turn on AC system in 10 sec". HMI offer a button in the note to allow customer to stop this strategy.
Post Conditions	When climate system is turn on, system will be set to auto mode directly. This request will be transfer to CCH / RCCM.
Exceptions	If there is UFC function conflict, system will be turn on to auto mode just after UFC function complete or disturb.

Use Case ID	2.5.1.14
Use Case	High Cabin PM2.5 Alarm- When vehicle is driving, IVI will remind customer to turn on climate system
Pre-Conditions	Ignition on during driving (normal driving for 15 mins)
Trigger	Cabin PM2.5 data > 35？ AND climate system not work
Expected Behavior	User can see text alert or reminder on HMI to ask if user wan to turn on the climate system. If Voice is enabled, Voice reminder will also be heard. *** The reminder(pop up alert) and notification could not be too often. It should be limited to once every ignition circle.
Post Conditions	According to user's choise to turn on climate or do nothing.
Exceptions	/

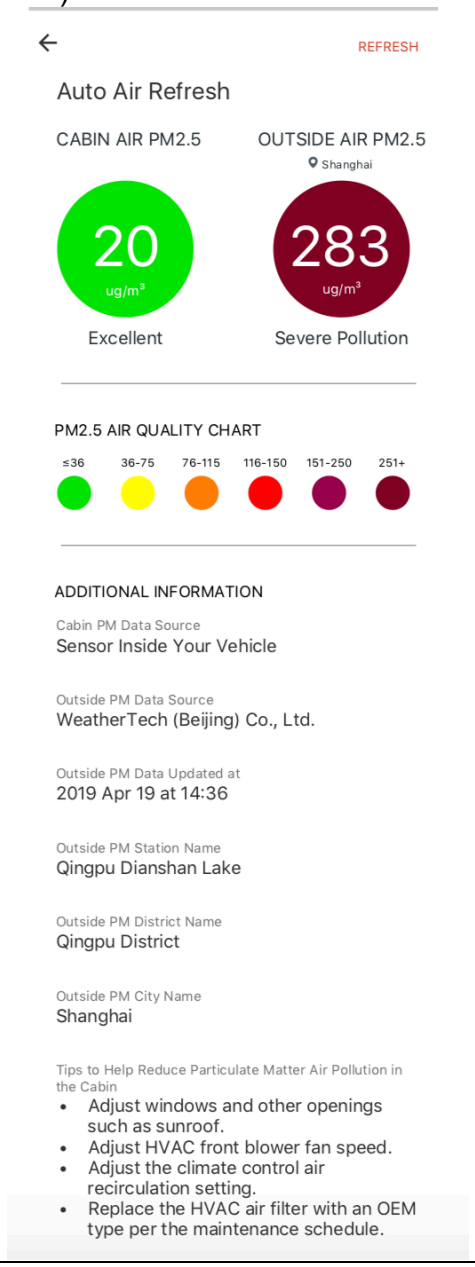
2.5.2 On LincolnWay/FordPass App (not implemented)

Use Case ID	2.5.2.1.
Use Case	User can see the AAR section with latest PM data in My Vehicle screen in LW app
Pre-Conditions	1. Vehicle added in LW App 2. Vehicle has AAR feasibility 3. GPS enabled on device 4. TCU authorized 5. Vehicle is ignition on
Trigger	User enter the My vehicle screen
Expected Behavior	User can see the Auto Air Refresh section in the screen with Cabin/Exterior PM2.5 data The PM Data is the latest data with timestamp. “Updated by 2018-10-10 12:00:00” 
Post Conditions	/
Exceptions	If no data condition, value should not be displayed.

Use Case ID	2.5.2.2
Use Case	User can see the AAR section with last known data in My Vehicle screen in LW app
Pre-Conditions	1) Vehicle added in LW App 2) Vehicle has AAR feasibility 3) GPS enabled on device 4) TCU authorized 5) Vehicle is ignition OFF
Trigger	User enter the My vehicle screen
Expected Behavior	User can see the Auto Air Refresh section in the screen with Cabin/Exterior PM2.5 data. The PM Data is last known data with timestamp. “Updated by 2018-10-10 12:00:00” (last updated time in cloud) 
Post Conditions	/
Exceptions	If no data condition, value should not be displayed.

Use Case ID	2.5.2.3
Use Case	User can see the Cabin/Exterior PM2.5 data on AAR page in LW app
Pre-Conditions	1. Vehicle added in LW App 2. Vehicle has AAR feasibility 3. GPS enabled in device 4. TCU authorized
Trigger	User tap the chevron of AAR section in My Vehicle page
Expected Behavior	User can see the detail Cabin/Exterior PM2.5 data on AAR detail page 
Post Conditions	/
Exceptions	If no data condition, value should not be displayed.

Use Case ID	2.5.2.4
Use Case	User can see the Exterior PM2.5 data on a map view in LW app
Pre-Conditions	1. Vehicle added in LW App 2. Vehicle has AAR feasibility 3. TCU authorized
Trigger	User tap the chevron of AAR section in My Vehicle page
Expected Behavior	User can see the detail Exterior PM2.5 data in a map view AAR detail page (map view is not available for the first lauch as Baidu API not support for now. The map view will be implemented after Baidu updating their API)



Post Conditions	/
Exceptions	If no data condition, value should not be displayed.

Use Case ID	2.5.2.5
Use Case	User can receive reminder when the PM filter need to be replaced.
Pre-Conditions	1. Vehicle added in App 2. Vehicle has AAR feasibility 3. TCU authorized
Trigger	PM filter need to be replaced IVI get status from Cloud (check logic on cloud) There are 2 phases for the filter checking logic for backend: Phase A: Reminder calculated without DMS maintenance record, no DMS integration required. Condition: time > 1 year or odometer > 15000 KM Phase B: Reminder calculated with DMS maintenance record.
Expected Behavior	User can seen an pop up or highlight in AAR page and hear voice alert accordingly: “Please replace the PM filter” *** The reminder and notification could not be too often. It should be limited to total 3 times every life circle and the same alert or notification should be be sent again within 30 minutes.
Post Conditions	~~May link to any business solution? (TBD : Online Mall or …)~~ In the alert, use can choose to reset the filter.
Exceptions	/

Use Case ID	2.5.2.6
Use Case	User can reset PM filter status on IVI.
Pre-Conditions	1. Vehicle added in App 2. Vehicle has AAR feasibility 3. TCU authorized 4. Ignition on 5. PM filter status is need to be replaced
Trigger	When user tap the filter status(replacement) button, there will be a pop up of advisement for the user to replace the filter. There is a reset button on the pop up. When user tap the reset button, there should a double confirm information to make the user sure that if he/she tap the 'reset', the filter status will be changed. After the 'reset' button is finally tapped, the reset function will be triggered.
Expected Behavior	On App AAR screen, the filter status will be changed to NORMAL. The reset info should be sent to Cloud for further use.
Post Conditions	/
Exceptions	/

Use Case ID	2.5.2.7
Use Case	User can turn on/off the voice reminder in App
Pre-Conditions	/
Trigger	User tap the configuration button in App
Expected Behavior	User can see the existing setting status (on or off) of voice reminder of AAR User can change the configurable choice in App to turn on/off of voice reminder.
Post Conditions	If the user change the setting (from on to off or from off to on), the value should be sent to Cloud
Exceptions	/

Use Case ID	2.5.2.8
Use Case	User can receive the reminder of Tips or alerts (text or voice)
Pre-Conditions	1. Ignition on 2. AAR feasibility is enabled 3. GPS enabled 4. Switch of Voice reminder of AAR is ON
Trigger	Edge cases: (Will be subdivided into different sub-cases)
Expected Behavior	User can receive alerts or messages (text or voice) tips accordingly: (see below sub-cases) *user experience : Do not remind again in 30 minutes (TBD?)
Post Conditions	/
Exceptions	/

Use Case ID	2.5.2.8.1
Use Case	User can receive alert when outside PM2.5 is very high
Pre-Conditions	1) Ignition on 2) AAR feasibility is enabled 3) GPS enabled 4) Switch of Voice reminder of AAR is ON (for voice reminder only)
Trigger	When: Outside PM2.5 > 150 1) App receive notification when the outside PM2.5>150 in the vehicle location area. 2) The same alert or notification only once per day.
Expected Behavior	User can receive alerts or messages (text or voice) tips accordingly: “Outside PM2.5 is very high (XXX). Please use recirc mode and better to use remote control to help reduce the Cabin PM2.5 before you enter your vehicle.” *user experience : the same alert once per day
Post Conditions	/
Exceptions	/

Use Case ID	2.5.2.8.2
Use Case	User can receive notification when cabin filter complete
Pre-Conditions	1. User use remote control to remote start the vehicle and AC 2. AAR feasibility is enabled 3. GPS enabled 5) Switch of Voice reminder of AAR is ON (for voice reminder only)
Trigger	When: Cabin PM2.5 < 35 3. App checks the cabin PM2.5 data after remote start every 30 seconds. 4. The same alert or notification only once.
Expected Behavior	User can receive alerts or messages (text or voice) tips accordingly: "We have purify the cabin air for you. Now the cabin PM2.5 is good for you to enter your vehicle." *user experience : only once
Post Conditions	/
Exceptions	/

3 Classification Key

Classification	Notes
Proprietary	Information created or obtained in the normal course of business and not classified as Secret or Confidential
Confidential	Information that provides the Company with a competitive advantage, that supports its technical or financial position, and which, if disclosed without authorization, could cause damage to the Company.
Secret	Information of a strategic or highly sensitive nature that, if disclosed without authorization, would cause substantial, severe, or irreparable damage to the Company or its relationships.

4 Document Status Key

Status	Notes
DRAFT	Document currently being worked on. Shall not be used as a solid reference to information included in this document.

AFR	Available For Review. Document information is not eligible for changes. Approving manager will revise this document and if all the information is found to be completely valid, then the document will change to REL status. If the document is found to have errors, the document will change to DRAFT status.
REL	Released. Document is completely valid at time of review, and is now available to be used as a solid reference of information.

5 Terms, Acronyms and Definitions

Term or Acronym	Definition

6 Changes

Author	Date (YYYY/MM/DD)	Status	Notes
Stella	2018/10/18	DRAFT	Version 1.0 - Initial draft at compiling all use cases, available information and existing requirements
Stella	2018/10/24	DRAFT	1. More info displayed on IVI AAR screen with history cabin PM data 2. Display Outside PM data on a map view
Stella	2019/2/21	DRAFT	Update the reminders.
Stella	2019/10/14	DRAFT	Update the reminder limit in 2.5.1.5.3 & 2.5.2.5
Stella	2019/12/12	DRAFT	Update the blueshield auto logic

7 Contacts

For assistance or correction, please contact any of the following:

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8 Appendix

“AAR Gen2 Strategy V3.pdf” from Harold Li of Climate Control Team