

ALPR REQ. tracking

- CR : Customer Requirement

- SR : Security Requirement derived from Threat Analysis

- RS : Requirement Specification

target	No	category	preliminary Requirement	RS #	component	Requirement Specification	category	priority	inspection result
client application	CR1	Non-Functional	The system shall allow an officer to access the ALPR system through a secure web interface.	RS1	client	The client application communicates with the ALPR server through a secure web interface.	technical constraint	Essential	approved
client application	CR2	Functional	The system shall allow an officer to login and authenticate users locally and to the backend license plate database lookup. The system must use two factor authentication for sign on and user credentials must be protected.	RS2	client	The client application must provide a login function for user authentication and use ID, password, and OTP for user authentication.	System level	Essential	approved
				RS3	client	After logging in to the client application, the user can view the ilegal license plate screen and the license plate history screen.	System level	Essential	approved
				RS4	client	User credentials are not stored in the client.	Software level	Essential	approved
client application	CR3	Non-Functional	Lost or compromised credentials must be handled in a reasonable way.	RS5	client	user credentials are ID, password and OTP. If the password or OTP input fails three times together, it is determined to be lost or leaked and the password and OTP of the ID must be reissued.	System level	Essential	approved
client application	CR4	Functional	The system should allow a law enforcement officer to select and save retrieved information locally.	RS6	client	In the client application, the user can select the SAVE function. If SAVE is selected, it is saved as a file in the local repository.	System level	Conditional	approved
client application	CR5	Functional	The system should allow a law enforcement officer to send retrieved information to a mobile device, such as a mobile phone to use in the field.	RS7	client	The client application provides a function of transferring license plate information recognized by an user as a mobile device.	System level	Optional	approved
				RS8	client	Information transmitted to the mobile device is encrypted.	Software level	Optional	approved
				RS9	mobile client	The mobile application should provide a login function for user authentication.	System level	Optional	approved
				RS10	mobile client	The mobile application displays information received from the laptop client application	System level	Optional	approved
client application	CR6	Non-Functional	The system should provide secure communication between the client application and to the backend license plate database lookup system.	RS11	client	The client application communicates with the ALPR server via HTTPS.	Software level	Essential	approved
client application	CR7	Non-Functional	The system should read images from the vehicle camera or a playback file and identify license plates for evaluation.	RS12	client	The client application must read the image through the vehicle camera or playback file to identify the license plate.	System level	Essential	approved
client application	CR8	Non-Functional	The system should perform the ALPR function in real-time while maintaining a frame rate of at least 25fps.	RS13	client	In terms of web interface performance, the client is stable in recognition of a video file of about 10 fps frame rate.  The client application converts the input video to about 10 fps and executes it.	Software level	Conditional	approved
client application	CR9	Non-Functional	The system should query the backend license plate server for details about the vehicle. The user must be alerted for vehicles that are stolen, the owner is wanted (criminal), or if it is a vehicle of interest (expired registration, unpaid tickets, owner is missing). Alerts must contain reason and vehicle make, model and color along with the isolated plate image and the recognized license plate number for operator comparison.	RS14	client	The client application requests details of the vehicle from the server. The client application alerts the user if the vehicle details contain the following: 1) stolen 2) the owner is wanted (criminal) 3) expired registration 4) unpaid ticket 5) owner is missing The alert information shall include the following : 1) recognized license plate number 2) isolated plate image 3) alert reason 4) vehicle make 5) model 6) color	System level	Essential	approved
client application	CR10	Non-Functional	If a license plate does not generate an alert, then the user interface must display the last recognized plate image, the recognized license plate number and vehicle make, model and color so the operator can visually check if the plate matches the vehicle if desired.	RS15	client	If the client application is not an alert, the contents below should be shown in the UI. 1) the last recognized plate image 2) recognized license plate number 3) vehicle make 4) model 5) color	System level	Essential	approved
client application	CR11	Non-Functional	The system should provide an area in the user interface that always contains the current camera /playback view.	RS16	client	The client application must have an area in the UI that shows the current camera image or video screen.	System level	Conditional	approved
client application	CR12	Functional	The system should allow officers to configure computed camera / playback frames per second, average time per frame, jitter and frame number.	RS17	client	The client application supports the authenticated user to configure the following values. 1) computed camera/playback frames per second 2) average time per frame 3) jitter 4) frame number	System level	Optional	approved
client application	CR13	Functional	The system should allow the officer to choose between using a live camera and playback file in the UI.	RS18	client	The client application allows the user to choose whether to use live camera or video file in the UI.	System level	Essential	approved

client application	CR14	Non-Functional	The ability to detect network connectivity issues with the backend server within 5 seconds and automatically resolve the communication issue if possible.	RS19	client	The client application detects the network connectivity issue with the server within 5 seconds.	Software level	Conditional	approved
client application	CR15	Non-Functional	The system should alert officers of any communication errors or failures.	RS20	client	The client application notifies the user as soon as it detects the occurrence of a communication error/failure with the server.	System level	Essential	approved
				RS21	client	The client application checks the communication status with the server using the API provided by the server.	Software level	Essential	approved
client application	CR16	Non-Functional	The system must fetch vehicle information in no more than 10 seconds as officers are often making queries in real time.	RS22	client	After the client application sends a query to the server, the information shall be received within 10 seconds. - 10초 이내에 차량 정보를 받지 못한 경우에는, ????????	System level	Essential	approved
server application	CR17	Functional	Support license plate queries.	RS23	server	- The server support license plate queries. - best or partial plate number	Software level	Essential	approved
server application	CR18	Non-Functional	Ensure secure communication with the client applications.	RS24	server	- The server should support secure communicates with a client application. - e.g. HTTPS	Software level	Essential	approved
server application	CR19	Functional	Authenticate remote laptop users.	RS25	server	- The server support authentication of a remote laptop user. 1) ID/password 2) OTP number  - If a user input wrong password or OTP 3 times, a new password should be sent to the user by email registered.	System level	Essential	approved
server application	CR20	Non-Functional	Support multiple users.	RS26	server	- The server allows multiple users unlimitedly.	System level	Essential	approved
server application	CR21	Non-Functional	Return the best match license plate if there is not an exact match that includes a configurable minimum confidence threshold to support a partial match.	RS27	server	- best match : whole string from client matched. - partial match : a part of string from client matched. - The input from client should be validated against untrusted request	Software level	Essential	approved
server application	CR22	Non-Functional	Track the average number of queries per second for each user and overall queries per second, for all users.	RS28	server	- The query statistics should be written in the text file, allowing only admin to read on the admin page. - No encryption required.	Software level	Essential	approved
server application	CR23	Non-Functional	Track the number partial matches and no matches for each user and all users	RS29	server	- The match result statistics should be written in the text file, allowing only admin to read on the admin page. - No encryption required.	Software level	Essential	approved
server application	CR24	Functional	Support configurable values via a configuration file.	RS30	server	- The followings should be configurable using a configuration file.  1. matched string position for partial match 2. Session management key 3. key for creating a user authentication token 4. DB encryption key 5. SMTP key for mail transfer. 6. The email information of the admin 7. Location of DB	Software level	Essential	approved
common	CR25	information	Ensuring that all software in both applications are architected and coded to be secure and free of vulnerabilities.	RS31	n/a	- 개발은 secure coding rule 을 적용한다. rule은?????? - vulnerability 점검은??????? open source scanning, fuzz, pen	business constraint	Optional	approved
common	CR26	information	Conduct proper fault/error detection, recovery and reporting.	RS32	n/a	- 도출된 요구 사항 검증 test case 를 작성하고 수행 - bug report - bug fix 및 patch 반영	business constraint	Essential	approved
common	CR27	information	Ensure the developed software adheres to the company coding standard and quality standards.	RS33	n/a	- company coding rule	business constraint	Optional	approved
common	CR28	information	Ensure the developed software is adequately tested.	RS34	n/a	- 도출된 요구 사항 검증 test case 를 작성하고 수행 - secure coding rule 점검 - open source sw scanning	business constraint	Conditional	approved
server application	SR1	Non-Functional	All users accessing the DB of the system must be authenticated.	RS35	server	server authentication is commonly performed by submitting a username or ID and OTP of private information that only a given user should know.	System level	Essential	approved
server application	SR2	Non-Functional	The DB of the system must be encrypted	RS36	server	Use 128-bit AES to encrypt data in the user DB and the driver/car Information DB.	Software level	Essential	approved
server application	SR3	Non-Functional	User permissions to access DB should be classified and managed.	RS37	server	only allow Read permission - Ensure that least-privileged accounts are used to connect to Database server - Sysadmin role should only have valid necessary users	System level	Essential	approved
server application	SR4	Non-Functional	The server must be capable of responding to a large number of queries.	RS38	server	Immediate recovery Deploy server as a container (fault tolerance)	Software level	Essential	approved
server & client	SR5	Non-Functional	Communication history management using communication channel between client and server should be performed.	RS39	server & client	Ensure that auditing and logging is enforced on the application The client application records and saves requests sent to the server in a file.	Software level	Essential	approved

server & client	SR6	Non-Functional	The query statement through the communication channel between the client and the server must be verified.	RS40	server & client	Perform input validation and filtering on all string type Model properties All the input parameters must be validated before they are used in the application to ensure that the application is safeguarded against malicious user inputs. Validate the input values using regular expression validations on server side with a allowed list validation strategy. Unsanitized user inputs / parameters passed to the methods can cause code injection vulnerabilities.	Software level	Essential	approved
server & client	SR7	Non-Functional	The communication channel between the client and the server must be encrypted.	RS41	server & client	Enable HTTPS - Secure Transport channel The application configuration should ensure that HTTPS is used for all access to sensitive information.	Software level	Essential	approved
server & client	SR8	Non-Functional	The client system can only use digitally signed queries.	RS42	server & client	Apply authentication token	Software level	Essential	approved
client application	SR9	Non-Functional	The client user should use a strong password.	RS43	client	client application support Proper Password Strength Controls. - Password limit: 8 to 20 characters - Password string limit: Must contain at least one lowercase letter, uppercase letter, and number - Password special characters: ~!@\$%^&*(),<.>/?]+	System level	Essential	approved
server application	SR10	Non-Functional	The server must manage the digital signature.	RS44	server	Change the token generation key periodically.	Software level	Essential	approved

# ALPR REQ QnA with David

Target	No	Initial Requirements	Questions	Answers
client application	1	The system shall allow an officer to access the ALPR system through a secure web interface.		
client application	2	The system shall allow an officer to login and authenticate users locally and to the backend license plate database lookup. The system must use two factor authentication for sign on and user credentials must be protected.	Does the client do nothing if it's not logged in?	The client has access to an offline version of the database. In this case, the client is still using the system, just 'offline'.
client application	3	Lost or compromised credentials must be handled in a reasonable way.	What do you mean by reasonable way of handling? Could you elaborate it?	This may be a quesiton for Dan, but what would you expect to happen if your credentials for a system were lost / stolen? Notification? Ability to reset.
client application	4	The system should allow a law enforcement officer to select and save retrieved information locally.	What do you mean by retrieved information? Is it the vehicle information received from the server? Or are you referring to video information captured by the client?	This could be either or both, depending on your implementation.
client application	5	The system should allow a law enforcement officer to send retrieved information to a mobile device, such as a mobile phone to use in the field.	Do we need to make separate clients that run on the on-board computer and run on the mobile device? What kind of communication channel do you want between them?	I believe that this requirement is speaking to mobile access in addiition to the standard access. This can be a simple implementation, like a web browser on the mobile device.
client application	6	The system should provide secure communication between the client application and to the backend license plate database lookup system.		
client application	7	The system should read images from the vehicle camera or a playback file and identify license plates for evaluation.	What does evaluation mean? Are you referring to actions including recognition and inquiry to the server?	Yes, that is what this refers to.
client application	8	The system should perform the ALPR function in real-time while maintaining a frame rate of at least 25fps.	How would you like to handle video with a frame rate higher than 25fps? How would you like to handle video with a frame rate lower than 25fps?	The requirement here means that the frame rate stays above 25fps. It is up to your implementation to determine what happens when the frame rate is too low.
client application	9	The system should query the backend license plate server for details about the vehicle. The user must be alerted for vehicles that are stolen, the owner is wanted (criminal), or if it is a vehicle of interest (expired registration, unpaid tickets, owner is missing). Alerts must contain reason and vehicle make, model and color along with the isolated plate image and the recognized license plate number for operator comparison.	Should multiple alerts stay on screen? Do we need to have a separate view for alerts?	These are implementation considerations for you to decide.
client application	10	If a license plate does not generate an alert, then the user interface must display the last recognized plate image, the recognized license plate number and vehicle make, model and color so the operator can visually check if the plate matches the vehicle if desired.	It looks like you need 3 views. Do you want to put all of these on the screen altogether? Live view, Last recognized plate image, Alert view	These are implementation considerations for you to decide.
client application	11	The system should provide an area in the user interface that always contains the current camera /playback view.		
client application	12	The system should allow officers to configure computed camera / playback frames per second, average time per frame, jitter and frame number.	Why is Jitter needed as a configurable item? Do you need the ability to store configure items on the client? Does this item need to be set in real time?	Investigate jitter and this may make more sense. What does it mean to be 'set in real time'?
client application	13	The system should allow the officer to choose between using a live camera and playback file in the UI.		
client application	14	The ability to detect network connectivity issues with the backend server within 5 seconds and automatically resolve the communication issue if possible.	Does resolve automatically means to retry connection? How many times do you want to try?	Yes, it appears is if you should retry until the communication has been resolved. See how long it takes to retry a connection and then modify / adjust your retry count accordingly.
client application	15	The system should alert officers of any communication errors or failures.		
client application	16	The system must fetch vehicle information in no more than 10 seconds as officers are often making queries in real time.	The previous requirement is 5 seconds and here it is 10 seconds, which criterion should we meet?	The previous requirement was in regard to connectivity issues. This requirement is for database lookup / retrieval.
server application	17	Support license plate queries.	Does DB need encryption?	
server application	18	Ensure secure communication with the client applications.		
server application	19	Authenticate remote laptop users.		
server application	20	Support multiple users.	How many users do we need to support?	This can be a small group of users. basically the size is the number of officers using the system in a given precinct (20 ?)
server application	21	Return the best match license plate if there is not an exact match that includes a configurable minimum confidence threshold to support a partial match.	If there are multiple partial match results, does the server decide and send only one of them?	The server will need to have a method of determining confidence. If multiple partial matches are returned, the server will decide which one has the higher confidence and send tha tone.
server application	22	Track the average number of queries per second for each user and overall queries per second, for all users.	Is logging accessible only by administrators and requires encryption?	I'm not sure if logging will require encryption. This type of data is usually kept hidden from normal users and only accessible to users with administration credentials.
server application	23	Track the number partial matches and no matches for each user and all users		
server application	24	Support configurable values via a configuration file.		

# REQ. inspection checklist

No	Secure Requirement Checklist
1	Can it be further segmented into multiple requirements?
2	Can we define the acceptance criteria for this requirement?
3	Clearly state the assumption you have made on this requirement. Check if the assumption is conflicting with any other assumption/requirement made so far.
4	Is any requirement clashing with any other requirement?
5	Are all similar and related requirements grouped together?
6	Are all requirements uniquely identified?
7	Are all the requirements validated and verified?
8	Are computer resources (hardware, operating system, database, network software, test software) identified?
9	Are interface requirement to other major functions and external entities are identified?