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SECTION A02 – FA24

# DELIVERABLE C: DESIGN CRITERIA

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## INTRODUCTION

Following the Deliverable B, this document focuses on extracting Design Criteria from the requirements expressed by the organization **Les Services Partagées du Canada**. This deliverable consists of a table listing the needs interpreted in Deliverable B and their assigned design criteria. Another table categorizing these criteria into 3 categories: Functional Requirements, Non-Functional Requirements, and constraints. Furthermore, this document also offers a neutral benchmarking review of three contemporary available managements in the market, which helps with establishing target specifications for the project.

### INTERPRETED NEEDS CONVERTED INTO DESIGN CRITERIA

<b>Number</b>	<b>Needs</b>	<b>Design Criteria</b>
1	The system has a simple and user-friendly interface	Interface
2	The system can operate independently of human intervention	Autonomy
3	The system is precise	Reliability
4	The system keeps track of entry and exit for articles	Access Tracking
5	The system includes traceable smart chips	Spatial Localisation
6	The system includes modern methods for digital addition and deletion	Digital Manipulation
7	The system approves data fully and rapidly	Data Approval Efficiency
8	The system notifies its users of any inventory modification	Alert
9	The system can identify items through video recognition	Video Recognition
10	The system can operate for a long duration of time	Longevity (Months)
11	The system is affordable	Cost (\$ CAD)
12	The system can detect items from a long distance	Detection range (m)
13	The system is customisable	Adaptability
14	The system is portable and extremely light	Weight (lb)




## TECHNICAL DESIGN SPECIFICATIONS

	Design Criteria	Relation (=, < or >)	Value	Units	Verification Methods
	<b>Functional Requirements</b>				
1	Longevity	>	12	Months	Analysis
2	Detection range	>	50	m (meters)	Tests
3	Frequency	=	30x10	Hz (Hertz)	Tests
4	Signal type	=	Radio	N/A	Tests
5	Transmission speed	<	30	ns (nanoseconds)	Analysis
	<b>Non-Functional Requirements</b>				
6	Attachment	=	Adhesive	N/A	Tests
7	Video Recognition	=	No	N/A	N/A
8	Alert	=	Yes	N/A	Tests
9	Reliability	>	Yes (~95)	%	Tests
10	Interface	=	Yes	N/A	Code debugging tools
11	Autonomy	=	Yes	N/A	Tests and code debugging tools
	<b>Constraints</b>				
12	Cost	<	50	\$ (CAD)	Estimation and checks
13	Dimensions	<	20x20x5	mm (millimeters)	Analysis
14	Weight	<	0.50	oz (ounces)	Analysis

Due to the high priority of the tracking functionality in this project, and the fact that all of the other components related to it are to be customized and specifically-tailored, we find that the element that requires an in-depth market study, is in the field of tracking devices and chips, to provide tracking features to our clients. This process calls for a comparison, both in user reviews and in technical properties, of various existing items in the market. Here is a comparison of existing tracking technologies based on user reviews :

AirTag	RFID	NFC
<p>"The AirTag worked every time I tried it. One of the AirTag's few flaws is that you can't use it to ping your linked iPhone or iPad. Competing trackers do offer this feature."  <a href="http://www.pcmag.com">-www.pcmag.com</a></p>	<p>"RFID is an emerging technology that is increasingly being used in supply chain management. It plays an important role in supporting logistics and supply chain processes because of their ability to identify, trace and track information throughout the supply chain. The technology can provide suppliers, manufacturers, distributors and retailers precise real time information about the products."  <a href="http://www.sciencedirect.com">-www.sciencedirect.com</a></p>	<p>"It does not require search and pair procedures like bluetooth and other methods to establish connectivity. [...] It can only works in shorter distances which is about 10-20 cm." -  <a href="http://www.rfwireless-world.com">www.rfwireless-world.com</a></p>

## COMPARISON OF VARIOUS TECHNICAL PROPERTIES OF EXISTING TRACKING CHIPS/TECHNOLOGIES ON THE MARKET

Type of tracking tag	AirTag 	RFID tag 	NFC tag 
Productor	Apple (Foxconn)	~Variable~	~Variable~
Mean Cost	~30.00\$	~112.50\$	~1.00\$
Operational Distance	~10 m	~10 m - ~100 m (up-to ~460 m for sophisticated chips)	~0.05 m
Dimensions	31.9 x 31.9 x 8 mm	-Minimum (read-only): 3 mm -Maximum (read and diffuse): 5 cm	-Minimum: 6 mm -Maximum: 85 mm x 55 mm
Signal Type	Bluetooth	Radio	Radio
Frequency	2.4 GHz	125 KHz - 30 MHz	125 KHz - 30 MHz
Weight	0.39 oz	0.06 oz	0.01 oz
Longevity	1 Year	20-50 years	10-50 years
Attachment	Straps	Adhesive	Adhesive

NB: The dimensions, longevity, frequency and operational distances of RFID and NFC tags are largely variable, depending on the specifications of the particular system ( antennae, diffusion and reading devices).

### CONCLUSION

In this deliverable, we translated our problem statements into design criteria, providing a detailed description of how the solution should be categorized into functional requirements, non-functional requirements, and constraints. Furthermore, our benchmarking review of solutions and target specifications ensured that our solution is aligned with the customer expectations, while remaining competitive in the market.