MOPAC | MAYOR OF LONDON
OFFICE FOR POLICING AND CRIME

PART 2 – CONFIDENTIAL DECISION, FACTS AND ADVICE

Reference:	**PCD 915**
Title:	**Retrospective Facial Recognition System**

Information may have to be disclosed in the event of a request under the Freedom of Information Act 2000 (FOIA). In the event of a FOIA request for information contained in this report, please consult the Head of Governance and Risk for advice.

Part 2 Decision:

The Deputy Mayor for Policing and Crime is recommended to:

1. Approve this request to go to the commercial market via CDW, the MPS approved Software Reseller, for a Retrospective Facial Recognition system. This will allow the MPS to identify a suitable product and vendor and is a compliant route to market.

Facts and Advice

- Retrospective Facial Recognition (RFR) will be integral to help the way the MPS delivers the violence reduction strategy and services.
- The RFR search capability will not only support a huge number of overt policing enquiries as they currently exist but cannot be fully serviced, [redacted]
- [redacted]
- In the current situation there is an underutilisation by the MPS of both image and video data sources that means that the MPS does not fully exploit the information it has available to it when seeking to prevent and detect crime.
- Whilst RFR searching is not new, [redacted] the rising demand for a new RFR system with modern capabilities (and performance levels) is due to the ever-increasing growth [redacted] if used effectively and efficiently, offers the MPS significant opportunities to effectively advance policing investigations.

[redacted]

- The MPS has invested substantial time and effort in running several rapid assessment trials and proofs of concepts (POCs) to gain greater understanding of RFR technology and how each of the different systems perform. The validation of the technology and capabilities has happened over three years. Widespread consultation has taken place with external researchers (such as [redacted], evaluation and verification of other large scale and independent research programmes (such as NIST testing). This was alongside the engagement of other law enforcement bodies including the [redacted]

[redacted] The focus on this work has been on algorithmic accuracy of RFR tools, as well as usability and the application of the technology across a variety of use cases within MPS.

- An RFP (request for proposal exercise) will be conducted utilising the Framework with the intention to award to a single supplier who can offer competitive pricing and compliance with the MPS specification of requirements. The RFP exercise is in place of the direct award option, via the Framework Agreement, it will reduce external/internal challenges and risks at Board level or from unsuccessful Framework Agreement supplier/s etc. The RFP exercise will ensure that the MPS have conducted a fair, open and transparent competition process.
- As part of the RPF and during the assessment of products the MPS shall:
    - [redacted]
    - assess the statistical accuracy and demographic performance of product including comparisons between products considered for use.
- By undergoing a further competition exercise, it will help ensure the MPS obtains value for money. Furthermore, the project will implement an evaluation weighting of 70 (quality):30 (price). This split is a balance between obtaining value for money and ensuring the MPS procures a quality technology that is fit for purpose. Broadly, a higher quality ratio (e.g. 80/20) could be expected to favour technical excellence and innovation whereas a higher price ratio (e.g. 60/40) could be expected to drive value for money. The split of 70:30 can therefore be seen as appropriate in the context of RFR.

It is recommended that the information in the Part 2 form not be published since if a request for this information was made under the FOIA, it is likely that it would be exempt from disclosure under the following sections for the FOIA:

- Data Protection Section 40,
- Commercial Interest Section 43
- Legal Professional Privilege Section 42
- Law Enforcement Section 31

Date at which Part 2 will cease to be confidential or when confidentiality should be reviewed: after any contract has been awarded.

Head of Governance and Risk: I have been consulted on this form and agree with the above recommendation.

Signature: 	**Date: 27/03/2023**

Business Justification

Retrospective Facial Recognition System

Freedom of Information Act Publication Scheme	
Protective Marking	Official - sensitive
Publication Scheme Y/N	N
Title	Retrospective Facial Recognition System
Version	1.1
Summary	This paper proposes the provision of Retrospective Facial Recognition capability that will allow the MPS to more effectively use its image libraries to identify persons of interest and thereby enable the more effective prioritisation of work when dealing with image and video material.
(B)OCU or Unit, Directorate	Digital Policing / MO3
Run/Change	Run and Change
Author(s)	[redacted]
Date Issued	2nd December 2020

Purpose of this document

This is the standard MPS template for the production of business cases where a business decision is required by departmental COGs, corporate or project/programme Boards. Although it follows a broadly similar structure, it is distinct from the SOP/SOC/OBC/FBC templates which are only used as part of the MOPAC/MPS Investment Appraisal process to pass through the required 'Gates'. This template should be used for all other business decisions which require management or corporate approval, in particular where a number of options are available for achieving the required outcome or funding considerations apply. It is designed to ensure that all relevant considerations are taken into account when significant business decisions are required.

Document edit history

Version	Date	Additions/Modifications	Prepared/Revised by
Version 0.1	27/10/2020	New	[redacted]
Version 0.4	29/10/2020	Review	[redacted]
Version 0.5	3/11/2020	Comments from MO3 and Commercial	[redacted]
Version 0.6	4/11/2020	Feedback from Finance	[redacted]
Version 1.0	08/11/2020	Review following FRT Strategic Board meeting	[redacted]
Version 1.1	24/11/2020	Feedback inclusion	[redacted]
Version 1.2	26/11/20	Feedback inclusion	[redacted]
Version 1.3	02/12/2020	Feedback inclusion	[redacted]

Internal consultation and assurance

The following people have either:

- assured this proposal as subject experts, by considering its impact on their area of expertise; or
- been consulted as a representative of a part of the organisation affected by the proposal.

Their opinions have been incorporated in the paper.

Directorate / Dept.	Name & Job Role	Date consulted/ assured
[redacted]	Director of Intelligence	8/11/2020
[redacted]	Chief Digital and Technology Officer	3/11/2020
[redacted]	Director of Technology & CTO, Digital Policing	3/11/2020
[redacted]	Director of Commercial Services	02/12/2020
[redacted]	Strategic Finance Business Partner	24/11/2020
[redacted]	Commercial Director	3/11/2020
[redacted]	[redacted] Senior Technologist	3/11/2020
[redacted]	Legal Services (TLT solicitors)	3/11/2020
[redacted]	DI Operational Lead LFR	24/11/2020
[redacted]	Senior Lawyer MPS Directorate of Legal Services	08/11/2020
[redacted]	[redacted] customer	06/11/2020
[redacted]	[redacted] customer	06/11/2020
[redacted]	[redacted] customer	06/11/2020

1 Decisions Required

The purpose of this Business Justification Paper is to seek permission from PIB to go to the market to identify a suitable product and vendor to enable the MPS to purchase an updated Retrospective Facial Recognition (RFR) System to support policing across London.

Things to Consider:

The Board is asked to support the following recommendations:

1) Approve this request to go to the commercial market – this will allow the MPS to identify a suitable product and vendor. It will be made clear to all vendors that this project is not one that is currently funded.
2) Submit this proposal to the Investment Advisory and Monitoring (IAM) meeting on 15th Dec 2020.
3) Return a fully costed BJP to PIB in early 2021 to allow a decision to be made by Management Board with regards to the purchase of an updated RFR system once a suitable product and vendor has been identified.

The key issues the Board are asked to take account of are:

- Retrospective Facial Recognition (RFR) will be integral to help the way the MPS delivers the violence reduction strategy and services.
- The RFR search capability will not only support a huge number of overt policing enquiries as they currently exist but cannot be fully serviced, [redacted]
- [redacted]
- In the current situation there is an underutilisation by the MPS of both image and video data sources that means that the MPS does not fully exploit the information it has available to it when seeking to prevent and detect crime.
- Whilst RFR searching is not new, [redacted] the rising demand for a new RFR system with modern capabilities (and performance levels) is due to the ever-increasing growth [redacted] if used effectively and efficiently, offers the MPS significant opportunities to effectively advance policing investigations.

This capability will support the following Met priorities:

- Focus on what matters most to Londoners
- Achieve the best outcomes in the pursuit of justice and in the support of victims
- Seize the opportunities of data and digital tech to become a world leader in policing
- Learn from experience, from others, and constantly strive to improve
- Be recognised as a responsible, exemplary and ethical organisation

2 Strategic Case

2.1 Need for Change

Retrospective Facial Recognition

The MPS will benefit from an updated RFR search capability to enable a more effective use of images and image frames from video data across all types of investigations. In parallel it will enable the MPS to effectively exploit those investigative opportunities that have occurred with the sharp growth in these image data sources. Rapid and ongoing advancements in this field of technology would, if seized, now allow the MPS opportunities that were not previously available to support the detection and matching of faces even when processing lower quality images and videos.

The main purpose of RFR searching is to assist in identifying suspects from still images or specific images extracted from video. These images will need to be lawfully held by the MPS. The may be images that have been captured by cameras at burglaries, assaults, shootings and other incidents. [redacted] or submitted by members of the public. As well as assisting in preventing and detecting crime, RFR searching could also be used to help in the identification of missing or deceased persons.

RFR has a number of similarities to Live Facial Recognition (LFR) – notably the processing of biometric information and the use of a facial recognition algorithm. The LFR system detects the faces of everyone passing the camera and then compares those facial images to a specific and pre-determined watch list of subjects sought by police. Where an alert is generated, at least one police officer needs to then evaluate that alert and make an immediate decision as to whether or not to engage with the person in question.

However the RFR use case is different to LFR and related to seeking to help officers identify persons from media of events that have already happened. As such it would be a tool that helps aid the investigative process, by analysing still images or images that have been specifically extracted from a media source. The result of this analysis will present investigators with additional leads to consider but in the knowledge that the results cannot be taken as evidence of the fact that a match proposed by the RFR system is a conclusive evidence of identity.

RFR, like LFR, is not designed to make decisions about people or automate the decision-making process. Human-in-the-loop decision is a critical aspect of the RFR proposal and will be embedded into RFR processes.

2.2 Current situation

[redacted]

MPS capability: [redacted]

[redacted]

National capability: Available to all UK policing is the Police National Database (PND). This system also has a capability for face matching from images and uses the national custody image database to search against. [redacted]

2.3 The future

Whilst a modern RFR capability has a wide-reaching demand from across the MPS, to ensure that it is adopted and integrated in a careful and controlled way, [redacted]

Following a successful integration to these business areas there will be an evaluation period and further consultation with other suitable MPS user groups to establish their operational requirements for this technology and to capture the cost reduction benefits and performance increases this technology would potentially bring to them.

Following wide external engagement we have looked to other law enforcement partners with a RFR capability to verify the substantial operational performance increases and the substantial cost savings that are made from utilising a modern RFR capability. The results of this engagement have allowed us to understand the usage made by others in a city of a comparable to London in terms of both size and demographics. It has shown a clear use for the technology and the strong operational and financial benefits that can be realised from RFR. For example, usage figures show in one police area show:

Searches per year:	[redacted]
Confirmed matches of interest:	
This helped in the identification of:	
• [redacted]	

We have also seen compelling evidence from another police force, within the UK, who are actively and consistently benefiting from using their own up to date, accurate RFR system. This UK forces have seen a consistent positive return rate of 40% on the images they are submitting to their custody image dataset. [redacted]

[redacted]

[redacted] If this saving is replicated and scaled to the size of the MPS this would mean cost savings in excess of £2 million every year.

[redacted] mean there is inevitably a heavy reliance on other areas of business to help identify SOIs. This is costing the MPS both financially and in terms officer and staff time.

Purchasing a new up to date and highly accurate RFR systems means the MPS would be able to quickly realise the benefits meaning staff resource and finance could be released back to support other investigations. This would include returning analysts to support other violence focussed operations, reducing the cost of forensic submissions where we have been able to identify a subject of interest from imagery obtained at a crime scene, [redacted]

[redacted]

[redacted]

- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]
- [redacted]

[redacted]

the vast amount of media that is now available to help with investigations. The vast majority of the video product received by the MPS is CCTV related. [redacted]

2.4 Proofs of concept & assessments

The MPS has invested substantial time and effort in running several rapid assessment trials and proofs of concepts (POCs) to gain greater understanding of RFR technology and how each of the different systems perform. The validation of the technology and capabilities has happened over three years. Widespread consultation has taken place with external researchers (such as [redacted] evaluation and verification of other large scale and independent research programmes (such as NIST testing). This was alongside the engagement of other law enforcement bodies including [redacted] The focus on this work

has been on algorithmic accuracy of RFR tools, as well as usability and the application of the technology across a variety of use cases within MPS.

2.4.1 *Facial Recognition Algorithm Rapid Assessment –* [redacted]

[redacted] rapid assessment evaluations were performed by [redacted] Technology, Research & Innovation team, on the [redacted] products. The scope and purpose of these rapid assessment trials was to provide an evidence base of the current MPS RFR algorithm [redacted] performance against the latest algorithms available from [redacted] These two algorithms were selected for evaluation because:

[redacted]

The NIST tests are the most widely respected large-scale independent facial recognition search tests and provide a baseline for comparable algorithm performance, as well as transparency against a number of factors.

[redacted]

[redacted] Both the [redacted] user interfaces along with their latest commercially available algorithms were subsequently demonstrated by way of video conference presentation by each of the respective vendors to MPS staff from [redacted]

2.4.2 *POC1 –* [redacted]

The first proof of concept was based on the [redacted]

Outcome: This proof of concept gave the opportunity to try several RFR tools via one platform and see how RFR could work in the context of other AI tools. At the same time it highlighted some challenges in having a generic user interface and not being designed specifically for facial recognition.

This product was subsequently discounted as realistic options for the provision of RFR capability to the MPS

2.4.3 *POC2 –* [redacted]

The second proof of concept was based on the [redacted] While [redacted] did not offer a readymade

user interface, it's 'apps' based approach opens opportunities for more bespoke use of RFR by individual teams and could lead to a more successful adoption of RFR tools.

Outcome: This proof of concept gave us insight into machine learning and how to tailor RFR to individual business scenarios. It highlighted the importance of a front end in addition to algorithmic performance.

This product was subsequently discounted as realistic options for the provision of RFR capability to the MPS

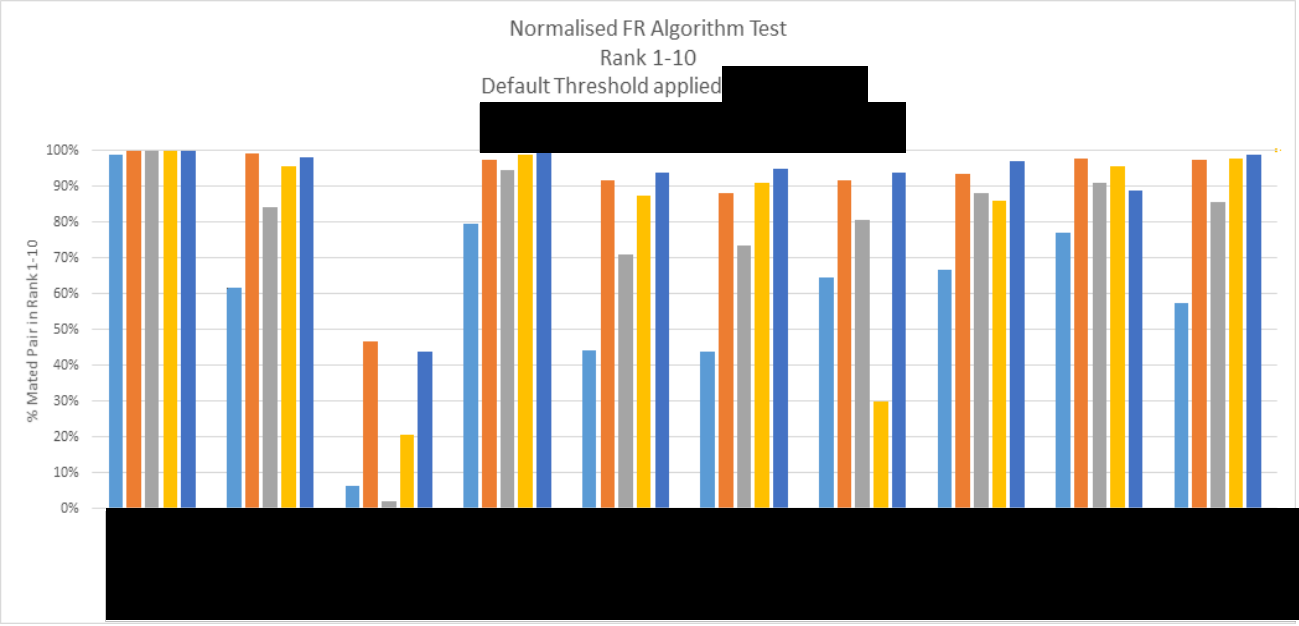
2.4.4 POC3 – [redacted]

This product has been specifically designed with policing in mind and enables subject identification as well as large scale search on image and video sources. The tests conducted included face matching from videos and images, exploring functionality available to end users and testing performance improvements such as adjustments to thresholds or parallel processing of video sources.

Outcome: This proof of concept showed us 'the art of possible' in terms of user experience, speed of processing and facial recognition in challenging conditions such as low quality images or facial occlusion.

2.4.5 Accuracy

To get a more objective view on the accuracy of RFR search tools, some of the trials were conducted using the same data. The diagram below shows the results for [redacted], across 10 different source images. Whilst the threshold values means it is not readily possible to compare between the vendors, these results do show that with high quality data the RFR technology is capable of achieving accuracy over 90% accuracy levels.



2.4.6 Performance

The speed and volume needs of the MPS have been explored to ensure the solution will improve both accuracy and productivity whilst meeting MPS user need. MPS users were all unanimous in their requirement to primarily have a system that is highly accurate. Their user requirements were identified and broken down into 4 key areas:

User requirement priorities are:

1. Identification of subjects of interest from wide range of still image sources (1:N)
2. Identification of specific subjects of interest from short videos/media (1:N)
3. The linking of individuals together when they are either known or unknown (M:N)
4. To identify if a specific person has occurred within a video (N:1)

2.4.7 Usability

The usability of the solutions explored highlighted the need for an intuitive user interface that requires minimal training. In addition, it was identified that the presentation of results needs to be simple to understand and ideally supported with user-initiative ways to record human decision making as why a person reviewing results concludes a match has been made or not (between the probe image and the image drawn from the reference library)

2.4.8 Vendor criteria comparison

			Criteria	Comments:
			User requirements	Will be scored and fully assessed during commercial process. A full set of requirements has now been completed, reviewed and validated by the business group SME's who will be using this tool on a day to day basis.
			Pricing	Indicative costing were received based on basic user requirements, number of images to within the database and number of licence potentially required. Full costing to be submitted following assessment of product and completion of commercial scoring process.
			Performance	The 3 products were all subjected to processing the same dataset to assess basic performance levels. This performance will be rigorously examined in detail in the next phase of the process.
			Strategically Aligned Processing data, Public Sector Equality Duty.	After examination of vendor literature and product demonstrations we able to note how the systems performed in relation to data minimisation principles, how vendors could provide evidence of how they identify and minimise any bias within their systems. What independent evidence can be supplied by them to support those claims.

3 Economic Case

3.1 Options

There are a number of options for the way forward.

Option 1: Do nothing

[redacted] The MPS would therefore not be able to take full advantage of the algorithm improvement that are now available and would not be able to exploit the huge number of intelligence and investigative opportunities that arise as a result of the number of images and moving data material the police currently receive. Where manual processes are in place for analysing images and videos, the respective teams would likely run into capacity problems as the volume of image and video material increases. [redacted]

Option 2: Extend existing LFR solution to RFR

The MPS is already using NEC/Northgate solution for Live Facial Recognition (LFR) and therefore could procure their RFR module as well. If this product meets the required functionality of the MPS, addresses the full range of use cases, and meets the performance required then this is an option. Of note: [redacted]

Option 3: Procure a new specialist RFR tool

This option will allow the MPS to select a 'best bread' RFR tool that most closely matches the validated business requirements that have been identified by its users. This option would also allow for this solution to be applied, in future, to an increasing number of other business groups.

Option 4: Procure a combined tool for RFR and other algorithms

There are tools on the market that offer a combination of algorithms to provide a more holistic analysis of the imagery or video material. For example RFR could be combined with object recognition and other video analysis tool. These hybrid technologies are at the stage where this would mean a compromise on the accuracy, demographic performance and the speed of facial recognition itself.

3.2 Recommendation

The recommendation to the board is that the MPS adopts Option 3 and proceeds with the procurement of a new specialist RFR search tool that is suited for both: highly accurate face identification and the ability to search for subject of interest in images and video.

The key business requirements for an RFR solution include:

Wide application	Suitable for diverse range of scenarios, [redacted]
Usability	User friendly interface that enables users to improve their productivity by a simple face matching process and getting the results in immediately useable format that aids human-in-the-loop decision making. The tool should only be used by staff who have received training on how an RFR system and the algorithm within it performs.
Flexibility	Ensuring the users get most out of the tool in different business scenarios, e.g. dealing with poor quality material or the ability to narrow/widen the search results.
Ethics	This is an Artificial Intelligence (AI) tool trained by machine learning (ML), which carries its own risks. The Met will take all reasonable steps understand the algorithm selected and to satisfy itself that the product selected allows it the MPS to ethnically and lawfully use the RFR capability.
Legal compliance	The product needs to support compliance with the law, including the PSED and data protection legislation.

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3.3 Business benefits

There are powerful examples of application of RFR that would make a significant difference:

[redacted]

[redacted]

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3.3.1 Non-financial benefits (qualitative)

This is a brief summary of non-financial benefits of RFR, contributing to better outcomes:

1	Faster crime resolution due to more timely information, in particular when there is a large volume of material that officers need to sift through.
2	Crime prevention by analysing data sources. Extracting persons of interest from those sources and alerting officers to the presence of individuals who present a high level of risk
3	Mitigation of threat to health or public safety
4	More successful crime resolution by being able to generate a greater number of leads by analysing image/video material.
5	Greater success rate and speeding up the process of finding a missing person, which can be potentially life-saving.
6	Faster intervention in detecting vulnerable people within video material, such children at risk of sexual exploitation, trafficking or gang involvement, as well as adults with mental health conditions.
7	More successful person identification in challenging conditions, such as low quality CCTV or facial occlusion.
8	Clearer communication between teams using the facial recognition reports produced by the tool

3.3.2 Financial benefits

Deployment of RFR will also deliver large and tangible efficiency savings. While these savings can be expressed in financial terms, they would be most likely non-cashable, i.e. a greater amount of the investigators time will be freed up to complete other tasks, enabling them to achieve more within the same timescales. Where it is possible to accumulate the time savings from a larger group of officers, these could be made cashable.

1	Time saving in crime investigation by efficient subject identification and searching for subjects in image and video material.
2	Time saving in intelligence work by actioning the results obtained following the sifting through vast amount of digital images and moving data material.
3	Time saving by reducing the potential for investigative work to be repeated following the hand overs between teams if the tool is made widely available to BCU and not just specialist teams.
4	Reduction in resources need for finding missing person.

4 Commercial Case

4.1 Route to the market

The MPS will utilise the existing CDW Value Added Reseller (VAR) IT Framework Agreement (the Framework) with the East Midlands Strategic Commercial Unit (EMSCU) to conduct a request for

proposal exercise (RFP) / mini-competition. The Metropolitan Police Service/MOPAC is a named police force on the Framework Agreement and (as confirmed by TLT Solicitors) this is therefore a recognised compliant route to market.

4.2 Product and supplier selection

An RFP (request for proposal exercise) will be conducted utilising the Framework with the intention to award to a single supplier who can offer competitive pricing and compliance with the MPS specification of requirements. The RFP exercise is in place of the direct award option, via the Framework Agreement, it will reduce external/internal challenges and risks at Board level or from unsuccessful Framework Agreement supplier/s etc. The RFP exercise will ensure that we have conducted a fair, open and transparent competition process.

As part of the RPF and during the assessment of products the MPS shall:

[redacted]

- assess the statistical accuracy and demographic performance of product including comparisons between products considered for use.

By undergoing a further competition exercise, it will help ensure the MPS obtains value for money. Furthermore, the project will implement an evaluation weighting of 70 (quality):30 (price). This split is a balance between obtaining value for money and ensuring the MPS procures a quality technology that is fit for purpose. Broadly, a higher quality ratio (e.g. 80/20) could be expected to favour technical excellence and innovation whereas a higher price ratio (e.g. 60/40) could be expected to drive value for money. The split of 70:30 can therefore be seen as appropriate in the context of RFR.

5 Financial Case

The table below shows the indicative costs for procurement and implementation of RFR over a 4 year period (2 year contract +1year +1 extension) that will be used as an upper limit in the procurement process. A full financial case will be completed when the further paper is submitted to Management Board.

Indicative cost	
Deployment cost	[redacted]
Application cost over 4 years	
TOTAL	**£3,403,800**

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6 Management Case

6.1 Delivery approach

Digital Policing will deliver the technical implementation in collaboration with the selected supplier. There will be a dedicated project manager appointed to ensure the project is delivered in a controlled manner, as well as a business lead to ensure effective collaboration with business areas involved in initial rollout. The project governance will be operating in the form of the existing Facial Recognition Technology board chaired by the Director of Intelligence and includes representatives from the Data Office and DLS.

In the initial phase, the project will deliver:

- The RFR platform for Met wide use with [redacted] icences initially.
- [redacted]

The subsequent rollouts to other business areas will be defined and costed separately and may require purchase of additional licences.

The project will ensure compliance with the Data Protection Act 2018, Equality Act 2010, Human Rights Act 1998 and undertake a Data Privacy Impact Assessment (DPIA) and Equality Impact Assessment (EIA. The DPIA will be undertaken in close collaboration with DLS and the Information Rights Unit (IRU).

Since RFR is an Artificial Intelligence tool, the project will pay regard to the national guidelines for AI as issued by the Information Commissioner's Office (ICO).