# TERMS OF REFERENCE

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| **Name of the service:** | Proctoring system development for testing remote control in the field of public service |
| **Project number and name:** | Support Development Vision Recalibration and Digital Transformation in Kazakhstan, # 00125361 |
| **Location:** | Home-based, with possible 5 business trips to Nur-Sultan |
| **Duration:** | 4 months |

### General information

The Republic of Kazakhstan is currently engaged in improvement process in the civil service, including in procedures for selection of civil servants, applicants for vacant state administrative position and citizens first entering the law enforcement service. Main system of personnel management and personnel potential of civil service of the Republic of Kazakhstan is the "E-kyzmet" Integrated Information System. It is designed to solve the primary tasks of the Agency for Civil Service Affairs (hereinafter – ACSA) and personnel services of state bodies, the development and improvement of personnel management processes. At the same time, work is currently underway to further develop this system by converting it into the iQyzmet Information System and introducing digital technologies in the civil service. One of the key aspects of modernization is the introduction of online selection procedures, which is due to a number of reasons:

1. Accessibility - an applicant from anywhere can pass all the selection stages without having to go to the testing centers;
2. Reducing the load on test centers;
3. Increased control - proctoring system detects violations automatically, consequently reducing the risks of human factor;

To ensure safe and high-quality online selection, it is necessary to implement a proctoring system.

The proctoring system will be part of a system that automates processes in public service sector, in particular, the selection process. Therefore, the necessary input parameters will come from this system.

In addition to the development of technical functionality, there is a need to reengineer business processes for testing, taking into account the commissioning of proctoring system, as well as maintaining the current approach to testing in test centers.

### Purpose and content of services

To create a high-quality system of remote testing for admission to the civil service, UNDP will develop a proctoring system for monitoring the candidates testing (hereinafter - Proctoring System). To achieve the goals and objectives set within these Terms of Reference regarding proctoring system creation, as well as the necessary reengineering of related and newly created processes related to functioning of the remote testing and proctoring, UNDP will attract a competent company that can provide the relevant services (hereinafter - Supplier).

Beneficiaries of this work are the UNDP, Agency for Civil Service Affairs of the Republic of Kazakhstan (hereinafter-ACSA) and the National Center for State Service Personnel Management JSC (hereinafter – NCSSPM) in coordination with the ACSA. Technical and analytical assistance in carrying out the work under the Terms of Reference is provided in partnership with the NCSSPM.

### Tasks

In general, the work can be divided into **3 main components:**

**The first component. Reengineering of testing business processes.** To ensure optimal organization of testing, both in traditional way and through the Proctoring System, the Supplier shall work on the following tasks:

1.  Analysis of the ACSA documentation, as well as external regulations (Rules, programs and organization of testing of administrative civil servants, candidates for administrative public positions, approved by the order of the Chairman of ACSA No. 40 dated February 21, 2017).
    *Expected results:* Review of the ACSA documentation provided, as well as external regulations, and recommendations for making changes to them.
2.  Analysis of the current testing process organization.
    *Expected results:* Description and analysis of the current testing process organization.
3.  Identification and assessment of process risks within the current testing process organization, with the evaluation of design of internal control procedures and the development of recommendations for improving internal controls.
    *Expected results:* Risks and controls matrix of the current testing process organization.
4.  Description of the target testing process organization.
    *Expected results:* Description and flowchart of the business process (as it should be).
    Risks and controls matrix of the target testing process organization.
5.  Determination of the main indicators of business processes within the testing framework.
    *Expected results:* A list of the main indicators of business processes within the testing framework.
6.  Analysis of current job descriptions, including the functions and tasks of participants in testing process, and development of recommendations for their improvement.
    Expected results: Review of current job descriptions and recommendations for improvement.
7.  Preparation of draft regulatory documentation for testing, including detailed step-by-step instructions for personnel actions in various situations during testing; instructions for test takers on registration and testing procedures; instructions for telephone support for consulting test takers.
    *Expected results:* Draft regulatory documents (regulations, job descriptions, rules, etc.).
8.  Forming a roadmap for the implementation of developed recommendations
    *Expected results: Roadmap for the implementation of recommendations*

**The second component. Development of the Proctoring System main functionality.** To ensure quality control of testing for admission to the civil service, the Proctoring System shall include the following functionality:

1.  Detection of "dishonest" behavior in online testing (cheating, hints, etc.) by collecting and analyzing data during testing, including data on dynamic indicators (tracking actions on the computer, detecting faces and voices, extraneous noise, notifying the proctor, if the indicators deviate from the established norms).
2.  Ability to conduct testing in two types (automatic, synchronous).
3.  Availability of automatic evaluation mode on "trust" of testing. Generating an automatic "trust" score from 0 to 100% based on the following indicators:
    *   changing the screen (switching the focus to a third-party app or browser tab);
    *   browser window is not fully expanded;
    *   webcam is disabled;
    *   no access to screen recording;
    *   turning the head;
    *   absence of the test taker;
    *   substitution of the test taker;
    *   presence of an outsider in the frame;
    *   voice in the frame;
    *   lack of communication;
    *   an additional monitor is connected.
4.  Managing the Proctoring System: setting up notifications, the control toolbar.
5.  Carrying out the verification procedure and identification of the individual. Proctoring System should have the functionality for personal identification and be prepared for integration with

the "Individuals" National Database (INDB). The Supplier shall implement the client part of services that allow integration with the INDB (using the "Service for transferring photo images from current identity documents", presented through the Services Showcase of the Smart Bridge platform (sb.egov.kz)

6. Archive of test data (test protocols) with the ability to filter by parameters.
7. Function of protecting content from copying (copying content with hot keys, copying through the context menu, saving through the print dialog, etc.).
8. Mechanism of automatic communication check, which allows to identify possible problems with the computer and network settings, fixing the open test/exam connection.

In terms of the Proctoring System functionality, the Supplier shall provide for the formation of a report on testing completion, including the following components:

1. List of applicants (sessions). List shall be depersonalized (applicant's full name or IIN shall not be available to the proctor). A trust score is displayed next to each applicant.
2. Video area. Session timeline should be located under the video, which consists of a timeline, the current playback position, and violation labels. Moving along the timeline, you can find violations and play videos of these sections.
3. Event area. Photos from the INDB and photos taken by the Proctoring System for the identification procedure; chat messages; identified violations with timing and screenshots of the screen.
4. Evaluation area. The proctor forms a conclusion (a decision on successful passing of the test or rejection, a comment).

In the case of mass simultaneous testing, the following shall be displayed additionally in the report:
• total number of test takers;
• number of violators;
• number of test takers with fair passing;
• attendance for testing;
• ability to select the report period.
Report formats: *.pdf, .xls, .xlsx.

### Storing results
All audio, video, and text messages, as well as recorded violations, are stored for 1 year.
It is necessary to provide for setting up automatic cataloging with ability to search for such parameters as: testing date and time, full name or IIN of the test taker, test results (completed or was interrupted), type of test/exam being passed, etc.

### Technical requirements for the Proctoring System
### 1. Architecture requirements
• System shall be built on a Client-server architecture;
• System shall be accessed using single sign-on technology;
• All calculations by machine vision algorithms related to processing video or audio streams from examinees should be performed primarily on the data processing server side. The end-user calculations shall be further agreed upon by the Beneficiaries.

### 2. Requirements to IT infrastructure
• System shall be installed at the facilities of the NCSSPM with support for the full system functionality;
• Server capacity to organize test and production environments are provided by NCSSPM;
• In the event of an emergency, the system shall allow it to be transferred to the reserve capacity, including in the event of failure of the system hardware

- System shall provide horizontal scaling (adding application servers for load balancing);
- System shall provide vertical scaling (adding computing resources to improve system performance);

### 3. Requirements for automatic equipment inspection
- checking browser compatibility;
- checking the webcam operation;
- check the microphone operation;
- checking the screen capture capability.

### 4. Availability and performance requirements
- System operation mode: the system functionality shall be available to users around the clock, except for maintenance periods;
- If the system hardware fails, it shall be able to restore the data and full operation with recovery requirements: 16 or more hours;
- Maximum number of concurrent users: 3000;
- Time interval prior to the crash for which data loss is allowed: 2-8 hours.

**The third component. Development of the Proctoring System mobile version and reporting.**

The Supplier will develop the Proctoring System mobile version to use the corresponding functionality via smartphone.

Also, as part of the work on the third component, the Supplier will provide for development of the following Proctoring System functionality:

1. Formation of an interactive protocol (report) on the testing result with a controlled test status (evaluation) for the proctor and timeline of violations (a special timeline with the current playback position). Function of protecting content from copying.

**Creating a PDF protocol**

Function of generating a PDF protocol for any session stored in the database shall be provided. It shall contain:

- The applicant data (Full name, IIN, photo from INDB, photo taken during the identification stage);
- Testing data (date, time, job parameters);
- Test results;
- Trust assessment;
- Data about proctor;
- Data on detection of events during a session (list, time, the screenshots).

2. Dual proctoring: ability to connect a mobile device as an additional camera for capturing the desktop during the exam. For authorization in the mobile version, a scanned QR code is used.

**Documentation**

The Supplier shall develop the following operational documents:
- System general description (GOST 19.402-78);
- User Manual (ST RK 1087-2002);
- Administrator Guide (GOST 19.503);
- System Installation Guide (GOST 2.601-2006, GOST 2.610-2006).

Set of operational documents is provided for negotiation and approval to the Beneficiaries in 2 hard copies in Kazakh and Russian. After approval, one copy of the set of documents will be returned to the Supplier.

**General requirements for developing Proctoring System**

The Supplier shall provide the service in accordance with the applicable regulatory legal acts and standards of the Republic of Kazakhstan, including:

1) Law of the Republic of Kazakhstan No. 418-V "On Informatization" dated November 24, 2015;

2) ST RK 34.014-2002. Information technology. A set of standards for automated systems. Automated systems. Terms and definitions;

3) ST RK 34.005-2002. Information technology. Basic terms and definitions;

4) ST RK 34.019-2005. The life cycle processes of software systems.

Proctoring System should be designed as a web application in a three-tier architecture. The client part should be implemented as a module of the online testing system and implemented using the same libraries and/or frameworks: ReactJS, MaterialUI. Server part can be developed in any programming language, but using an Open Source platform. An open relational, object-relational, or document-oriented solution should also be used as a Database Management System.

Supported client-side web browsers:
• Google Chrome version 86 and higher;
• Mozilla Firefox version 81 and higher.

Supported interface languages:
• Kazakh,
• Russian.

Proctoring System should be developed on the basis of an Open Source platform.

### Results of the work and terms

| No. | Results | Terms of execution | Approval | Payment |
|---|---|---|---|---|
| 1 | **Reengineering of testing business processes** Completion form and documents: Report on the results of conducted business process reengineering that includes: <br>• Review of the ACSA documentation as well as external regulations, and recommendations for making changes to them; <br>• Description and analysis of the current and target testing process organization. <br>• A list of the main indicators of business processes within the testing framework. <br>• Review of current job descriptions and recommendations for improvement. <br>• Draft regulatory documents and Roadmap for the implementation of recommendations | 2 months from the date of signing the contract | UNDP and NCSSPM | 20% |
| 2 | **Development of the Proctoring System** Completion form and documents: developed software, operational documents (System General Description; User Manual; Administrator Guide; System Installation Guide) | 3 months from the date of signing the contract | UNDP and NCSSPM | 40% |
| 3 | **Development of the Proctoring System mobile version and transferring of the developed software** Completion form and documents: Developed mobile version of software; presentation of software to UNDP and NCSSPM and *transferring to the NCSSPM | 4 months from the date of signing the contract | UNDP and NCSSPM | 40% |

* The exclusive intellectual and proprietary rights to software and documentation for the

Proctoring System belong to UNDP and NCSSPM. The Supplier shall also provide a guarantee for the elimination of possible defects in operation of the system or mobile version within 12 months from the date of official transfer of the developed software to the NCSSPM balance.

Open source codes and configuration files on electronic/optical media shall be transmitted on a CD-ROM according to the Acceptance Certificate.

### Operation period

The selected Supplier is expected to complete the work within 4 months from the date of signing the contract.

### Place of service provision

*Home-based, with 5 business trips (per 3 working days each, including travel days, for 2 people) to Nur-Sultan, if the Bidder is not located in Nur-Sultan, to carry out work on business process reengineering, approval and transfer of the Proctoring System.

*Subject to Covid-19 related travel restrictions. If any, the amount of transportation services will be deducted from the contract amount.*

### Responsibility and accountability

The Supplier is fully responsible for the accuracy of information provided and for the timely provision of results of the work. Also, the Supplier:

- is fully responsible for the accuracy and legality of information provided and for the timely submission of reports;
- ensures full compliance with the information security policies and procedures of the Beneficiaries;
- coordinates its actions with the Beneficiaries;
- cooperates with project partners upon prior agreement with UNDP;
- the Contractor may not provide the results of study to third parties without prior approval from the UNDP;
- the work shall be performed efficiently and in a timely manner, in unconditional compliance with the requirements of the contract and these Terms of Reference. In case of poor quality of the Supplier's work, UNDP reserves the right to terminate the contract unilaterally;
- UNDP reserves the right to change the terms of reference of no more than 20%, which does not affect the cost of performing services;
- The Supplier agrees to perform the scope of work specified in these Terms of Reference without violating the law of the RK on copyright and other legal acts;
- Due to the COVID-19 pandemic, the Supplier undertakes to provide all necessary means of protection for their staff and comply with all norms and recommendations of WHO and local authorities for performing work during a pandemic. The service provider is responsible for the proper and timely provision of their employees engaged in this Terms of Reference with all necessary personal protective equipment in accordance with the current WHO recommendations (masks, gloves, sanitizers, passing the COVID-19 test (if necessary) for the entire duration of the assignment.

Payment shall be made only after the relevant types of work have been completed and with the approval of the UNDP and the NCSSPM, according to the section "Expected results and Terms".

### Requirements for the design and presentation of work results

Results shall be (depending on the requirements of the Terms of Reference) submitted in hard copy and in electronic form in Kazakh and Russian. Requirements for the text report: font – Times New Roman, KZ Times New Roman, size –14, spacing – single.

### Qualification requirements

The service provider may be a company/organization that is duly registered and meets the following requirements:

1. 5 years of experience in software development/ modification/ modernization/ maintenance;
2. Availability of minimum 3 contracts for provision of services of similar nature (software development)
3. Experience working with government and/ or quasi-government entities.
4. Experience working with international organizations will be an advantage.
5. Availability of qualified personnel with experience in the field of information technology (at least 7 specialists) with the following profiles and competencies:

- **A project manager:** Higher education in IT or relevant field, Master's degree or PhD will be an advantage, certification in project management, 5 years of experience in the IT field.
- **Three software developers:** Higher education in IT or relevant field, Master's degree or PhD will be an advantage. Two of three developers must be experienced in Java technologies or .Net and have certificate in MCPD and/or OCP and/or OCA level. The third developer must be experienced in technologies for developing the client side of React.js, Redux applications. Work experience for all is at least 5 years in the software development.
- **Business Process Reengineering Expert:** Higher education in IT or relevant field, Master's degree or PhD will be an advantage; availability of certificate on process modeling in the BPMN 2.0 standard; required work experience - 5 years in analysis and optimization of business processes.
- **Software test specialist:** Higher education in IT or relevant field, Master's degree or PhD will be an advantage, availability of certificate/training in software testing; required work experience - 5 years in software testing.
- **Database management system administrator:** Higher education in IT or relevant field, Master's degree or PhD will be an advantage; Certification of Oracle Database 12c level not lower than OCP / Oracle Certified Expert, Oracle Database 12c: RAC and Grid Infrastructure Administrator. The certificates must be issued by the software platform manufacturer based on passing of relevant exam (with verification possibility on request). Required work experience - 5 years in database management.

### Evaluation criteria

**Technical Proposal (70%, maximum 1000 points, minimum passing score 700 points)**

☒ Expertise of the Firm [30%]
☒ Methodology, Its Appropriateness to the Condition and Timeliness of the Implementation Plan [20%]
☒ Management Structure and Qualification of Key Personnel [50%]

**Financial Proposal (30%) max. 428 points**

| | Evaluation Criteria / Sub-Criteria | Maximum Score |
|---|---|---|
| **1** | **Expertise of the Firm (30%)** | **300** |
| 1.1 | 5 years of experience in software development/ modification/ modernization/ maintenance | 150 |
| 1.2 | 3 contracts for provision of services of similar nature (software development) | 70 |
| 1.3 | Experience working with government and/ or quasi-government entities | 50 |
| 1.4 | Experience working with international organizations will be an advantage | 30 |
| **2** | **Methodology, Its Appropriateness to the Condition and Timeliness of the Implementation Plan (20%)** | **200** |

| 2.1 | Understanding the nature and scope of services provided by the Supplier. It is required to provide a description of the approach to the implementation of the work, taking into account the specifics of the service. The supplier, in particular, must show that the chosen approach will ensure the effective implementation of the project within the established time frame. | 100 |
|---|---|---|
| 2.2 | Compliance of the scope of services offered with the requirements of the Terms of Reference (the availability of a work plan, the description of the distribution of responsibilities and tasks, justification of the choice of proposed tools for each sub-task) | 100 |
| **3** | **Management Structure and Qualification of Key Personnel (50%)** | **500** |
| 3.1 | **Project Manager – 70 points** | |
| | Higher education in IT or relevant field, master's degree or PhD will be an advantage | 20 |
| | Certification in project management | 20 |
| | 5 years work experience in IT area | 30 |
| 3.2 | **Software developer #1 – 70 points** | |
| | Higher education in IT or relevant field, Master's degree or PhD will be an advantage | 20 |
| | Certification of MCPD and/or OCP and/or OCA level | 25 |
| | 5 years work experience in software development | 25 |
| 3.3 | **Software developer #2 – 70 points** | |
| | Higher education in IT or relevant field, Master's degree or PhD will be an advantage | 20 |
| | Certification of MCPD and/or OCP and/or OCA level | 25 |
| | 5 years work experience in software development | 25 |
| 3.4 | **Software developer #3 – 70 points** | |
| | Higher education in IT or relevant field, Master's degree of PhD will be an advantage | 20 |
| | Experience with technologies for developing the client side of React.js, Redux applications | 25 |
| | 5 years work experience in software development | 25 |
| 3.5 | **Business Process Reengineering Expert – 80 points** | |
| | Higher education in IT or relevant field, Master's degree or PhD will be an advantage | 20 |
| | Certification on process modeling in the BPMN 2.0 standard | 30 |
| | 5 years work experience in analysis and optimization of business processes | 30 |
| 3.6 | **Software test specialist – 70 points** | |
| | Higher education in IT or relevant field, Master's degree or PhD will be an advantage | 20 |
| | Certificate/training in software testing | 25 |
| | 5 years work experience in software testing | 25 |
| 3.7 | **Database management system administrator – 70 points** | |
| | Higher education in IT or relevant field, Master's degree or PhD will be an advantage | 20 |
| | Certification of Oracle Database 12c level not lower than OCP / Oracle Certified Expert, Oracle Database 12c: RAC and Grid Infrastructure Administrator | 25 |
| | 5 years work experience in database management. | 25 |

Prepared: _____ *Eldar Idiyatov* _____

Eldar Idiyatov

Project Manager

Date: _ 24-Mar-2021 _

Approved: _____ *konstantin Sokulskiy* _____

Konstantin Sokulskiy

GLD Head

Date: _ 24-Mar-2021 _