REQUEST FOR PROPOSALS

Development of the Address Register Information System

Democracy Programme / Elections
Republic of Moldova

United Nations Development Programme
August 2016

Section 1. Letter of Invitation

<div align="right">

Chisinau, Republic of Moldova

17 August 2016

</div>

RfP16/01285

Subject: Development of the Address Register Information System

Dear Sir / Madam:

The United Nations Development Programme (UNDP) hereby invites you to submit a Proposal to this Request for Proposal (RFP) for the above-referenced subject.

This RFP includes the following documents:

Section 1 – This Letter of Invitation

Section 2 – Instructions to Proposers (including Data Sheet)

Section 3 – Terms of Reference

Section 4 – Proposal Submission Form

Section 5 – Documents Establishing the Eligibility and Qualifications of the Proposer

Section 6 – Technical Proposal Form

Section 7 – Financial Proposal Form

Section 8 – Form for Proposal Security – **Not required**

Section 9 – Form for Performance Security – **Not required**

Section 10 – Form for Advanced Payment Guarantee – **Not required**

Section 11 – Contract for Professional Services, including General Terms and Conditions

Your offer, comprising of a Technical and Financial Proposal, in separate sealed envelopes, should be submitted in accordance with Section 2.

You are kindly requested to submit an acknowledgment letter to UNDP to the following address:

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United Nations Development Programme in Moldova
131, 31 August 1989 Street, MD-2012 Chisinau, Republic of Moldova
Email: sc.md@undp.org
Attention: Procurement Unit

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The letter should be received by UNDP no later than Close of Business, 2 September 2016. The same letter should advise whether your company intends to submit a Proposal. If that is not the case, UNDP would appreciate your indicating the reason, for our records.

If you have received this RFP through a direct invitation by UNDP, transferring this invitation to another firm requires your written notification to UNDP of such transfer and the name of the company to whom the invitation was forwarded.

Should you require further clarifications, kindly communicate with the contact person identified in the attached Data Sheet as the focal point for queries on this RFP.

UNDP looks forward to receiving your Proposal and thanks you in advance for your interest in UNDP procurement opportunities.

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Yours sincerely,

Doina Munteanu,

UNDP Officer in Charge

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Section 2: Instruction to Proposers

Definitions

a)	*"Contract"* refers to the agreement that will be signed by and between the UNDP and the successful proposer, all the attached documents thereto, including the General Terms and Conditions (GTC) and the Appendices.

b)	*"Country"* refers to the country indicated in the Data Sheet.

c)	*"Data Sheet"* refers to such part of the Instructions to Proposers used to reflect conditions of the tendering process that are specific for the requirements of the RFP.

d)	*"Day"* refers to calendar day.

e)	*"Government"* refers to the Government of the country that will be receiving the services provided/rendered specified under the Contract.

f)	*"Instructions to Proposers"* (Section 2 of the RFP) refers to the complete set of documents that provides Proposers with all information needed and procedures to be followed in the course of preparing their Proposals

g)	*"LOI"* (Section 1 of the RFP) refers to the Letter of Invitation sent by UNDP to Proposers.

h)	*"Material Deviation"* refers to any contents or characteristics of the proposal that is significantly different from an essential aspect or requirement of the RFP, and: (i) substantially alters the scope and quality of the requirements; (ii) limits the rights of UNDP and/or the obligations of the offeror; and (iii) adversely impacts the fairness and principles of the procurement process, such as those that compromise the competitive position of other offerors.

"Proposal" refers to the Proposer's response to the Request for Proposal, including the Proposal Submission Form, Technical and Financial Proposal and all other documentation attached thereto as required by the RFP.

i)	*"Proposer"* refers to any legal entity that may submit, or has submitted, a Proposal for the provision of services requested by UNDP through this RFP.

j)	*"RFP"* refers to the Request for Proposals consisting of instructions and references prepared by UNDP for purposes of selecting the best service provider to perform the services described in the Terms of Reference.

k)	*"Services"* refers to the entire scope of tasks and deliverables requested by UNDP under the RFP.

l)	*"Supplemental Information to the RFP"* refers to a written communication issued by UNDP to prospective Proposers containing clarifications, responses to queries received from prospective Proposers, or changes to be made in the RFP, at any time after the release of the RFP but before the deadline for the submission of Proposals.

m)	*"Terms of Reference"* (TOR) refers to the document included in this RFP as Section 3 which describes the objectives, scope of services, activities, tasks to be performed, respective responsibilities of the proposer, expected results and deliverables and other data pertinent to the performance of the range of duties and services expected of the successful proposer.

A.   GENERAL

1.   UNDP hereby solicits Proposals in response to this Request for Proposal (RFP). Proposers must strictly adhere to all the requirements of this RFP. No changes, substitutions or other alterations to the rules and provisions stipulated in this RFP may be made or assumed unless it is instructed or approved in writing by UNDP in the form of Supplemental Information to the RFP.

2.   Submission of a Proposal shall be deemed as an acknowledgement by the Proposer that all obligations stipulated by this RFP will be met and, unless specified otherwise, the Proposer has read, understood and agreed to all the instructions in this RFP.

3.   Any Proposal submitted will be regarded as an offer by the Proposer and does not constitute or imply the acceptance of any Proposal by UNDP. UNDP is under no obligation to award a contract to any Proposer as a result of this RFP.

4.   UNDP implements a policy of zero tolerance on proscribed practices, including fraud, corruption, collusion, unethical practices, and obstruction. UNDP is committed to preventing, identifying and addressing all acts of fraud and corrupt practices against UNDP as well as third parties involved in UNDP activities.

(See http://www.undp.org/about/transparencydocs/UNDP_Anti_Fraud_Policy_English_FINAL_june_2011.pdf

And http://www.undp.org/content/undp/en/home/operations/procurement/procurement_protest/ for full description of the policies).

5.   In responding to this RFP, UNDP requires all Proposers to conduct themselves in a professional, objective and impartial manner, and they must at all times hold UNDP's interests paramount. Proposers must strictly avoid conflicts with other assignments or their own interests, and act without consideration for future work. All Proposers found to have a conflict of interest shall be disqualified. Without limitation on the generality of the above, Proposers, and any of their affiliates, shall be considered to have a conflict of interest with one or more parties in this solicitation process, if they:

5.1   Are or have been associated in the past, with a firm or any of its affiliates which have been engaged UNDP to provide services for the preparation of the design, specifications, Terms of Reference, cost analysis/estimation, and other documents to be used for the procurement of the goods and services in this selection process;

5.2   Were involved in the preparation and/or design of the programme/project related to the services requested under this RFP; or

5.3   Are found to be in conflict for any other reason, as may be established by, or at the discretion of, UNDP.

In the event of any uncertainty in the interpretation of what is potentially a conflict of interest, proposers must disclose the condition to UNDP and seek UNDP's confirmation on whether or not such conflict exists.

6.   Similarly, the Proposers must disclose in their proposal their knowledge of the following:

6.1   That they are owners, part-owners, officers, directors, controlling shareholders, or they have key personnel who are family of UNDP staff involved in the procurement functions and/or the Government of the country or any Implementing Partner receiving services under this RFP; and

6.2   All other circumstances that could potentially lead to actual or perceived conflict of interest, collusion or unfair competition practices.

Failure of such disclosure may result in the rejection of the proposal or proposals affected by the non-disclosure.

7.   The eligibility of Proposers that are wholly or partly owned by the Government shall be subject to UNDP's further evaluation and review of various factors such as being registered as an independent entity, the extent of Government ownership/share, receipt of subsidies, mandate, access to information in relation to this RFP, and others that may lead to undue advantage against other Proposers, and the eventual rejection of the Proposal.

8.   All Proposers must adhere to the UNDP Supplier Code of Conduct, which may be found at this link: http://web.ng.undp.org/procurement/undp-supplier-code-of-conduct.pdf.

B.   CONTENTS OF PROPOSAL

9.   Sections of Proposal

Proposers are required to complete, sign and submit the following documents:

9.1   Proposal Submission Cover Letter Form (see RFP Section 4);

9.2   Documents Establishing the Eligibility and Qualifications of the Proposer (see RFP Section 5);

9.3   Technical Proposal (see prescribed form in RFP Section 6);

9.4   Financial Proposal (see prescribed form in RFP Section 7);

9.5   Proposal Security, if applicable (if required and as stated in the **Data Sheet** (DS nos. 9-11), see prescribed Form in RFP Section 8);

9.6   Any attachments and/or appendices to the Proposal.

10.   Clarification of Proposal

10.1   Proposers may request clarifications of any of the RFP documents no later than the date indicated in the **Data Sheet** (DS no. 16) prior to the proposal submission date. Any request for clarification must be sent in writing via courier or through electronic means to the UNDP address indicated in the **Data Sheet** (DS no. 17). UNDP will respond in writing, transmitted by electronic means and will transmit copies of the response (including an explanation of the query but without identifying the source of inquiry) to all Proposers who have provided confirmation of their intention to submit a Proposal.

10.2   UNDP shall endeavor to provide such responses to clarifications in an expeditious manner, but any delay in such response shall not cause an obligation on the part of UNDP to extend the submission date of the Proposals, unless UNDP deems that such an extension is justified and necessary.

11.   Amendment of Proposals

11.1   At any time prior to the deadline of Proposal submission, UNDP may for any reason, such as in response to a clarification requested by a Proposer, modify the RFP in the form of a Supplemental Information to the RFP. All prospective Proposers will be notified in writing of all changes/amendments and additional instructions through Supplemental Information to the RFP and through the method specified in the **Data Sheet** (DS No. 18).

11.2   In order to afford prospective Proposers reasonable time to consider the amendments in preparing their Proposals, UNDP may, at its discretion, extend the deadline for submission of Proposals, if the nature of the amendment to the RFP justifies such an extension.

C.   PREPARATION OF PROPOSALS

12.   Cost

The Proposer shall bear any and all costs related to the preparation and/or submission of the Proposal, regardless of whether its Proposal was selected or not. UNDP shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the procurement process.

13.   Language

The Proposal, as well as any and all related correspondence exchanged by the Proposer and UNDP, shall be written in the language (s) specified in the **Data Sheet** (DS No 4). Any printed literature furnished by the Proposer written in a language other than the language indicated in the **Data Sheet**, must be accompanied by a translation in the preferred language indicated in the **Data Sheet**. For purposes of interpretation of the Proposal, and in the event of discrepancy or inconsistency in meaning, the version translated into the preferred language shall govern. Upon conclusion of a contract, the language of the contract shall govern the relationship between the contractor and UNDP.

14.   Proposal Submission Form

The Proposer shall submit the Proposal Submission Form using the form provided in Section 4 of this RFP.

15.   Technical Proposal Format and Content

Unless otherwise stated in the **Data Sheet** (DS no. 28), the Proposer shall structure the Technical Proposal as follows:

15.1   Expertise of Firm/Organization – this section should provide details regarding management structure of the organization, organizational capability/resources, and experience of organization/firm, the list of projects/contracts (both completed and on-going, both domestic and international) which are related or similar in nature to the requirements of the RFP, and proof of financial stability and adequacy of resources to complete the services required by the RFP (see RFP clause 18 and DS No. 26 for further details). The same shall apply to any other entity participating in the RFP as a Joint Venture or Consortium.

15.2   Proposed Methodology, Approach and Implementation Plan – this section should demonstrate the Proposer's response to the Terms of Reference by identifying the specific components proposed, how the requirements shall be

addressed, as specified, point by point; providing a detailed description of the essential performance characteristics proposed; identifying the works/portions of the work that will be subcontracted; and demonstrating how the proposed methodology meets or exceeds the specifications, while ensuring appropriateness of the approach to the local conditions and the rest of the project operating environment. This methodology must be laid out in an implementation timetable that is within the duration of the contract as specified in the **Data Sheet** (DS nos. 29 and 30).

Proposers must be fully aware that the products or services that UNDP requires may be transferred, immediately or eventually, by UNDP to the Government partners, or to an entity nominated by the latter, in accordance with UNDP's policies and procedures. All proposers are therefore required to submit the following in their proposals:

a)   A statement of whether any import or export licences are required in respect of the goods to be purchased or services to be rendered, including any restrictions in the country of origin, use or dual use nature of the goods or services, including any disposition to end users; and

b)   Confirmation that the Proposer has obtained license of this nature in the past, and have an expectation of obtaining all the necessary licenses, should their Proposal be rendered the most responsive.

15.3   Management Structure and Key Personnel – This section should include the comprehensive curriculum vitae (CVs) of key personnel that will be assigned to support the implementation of the proposed methodology, clearly defining the roles and responsibilities vis-à-vis the proposed methodology. CVs should establish competence and demonstrate qualifications in areas relevant to the TOR.

In complying with this section, the Proposer assures and confirms to UNDP that the personnel being nominated are available for the Contract on the dates proposed. If any of the key personnel later becomes unavailable, except for unavoidable reasons such as death or medical incapacity, among other possibilities, UNDP reserves the right to consider the proposal non-responsive. Any deliberate substitution arising from unavoidable reasons, including delay in the implementation of the project of programme through no fault of the Proposer shall be made only with UNDP's acceptance of the justification for substitution, and UNDP's approval of the qualification of the replacement who shall be either of equal or superior credentials as the one being replaced.

15.4   Where the **Data Sheet** requires the submission of the Proposal Security, the Proposal Security shall be included along with the Technical Proposal. The Proposal Security may be forfeited by UNDP, and reject the Proposal, in the event of any or any combination of the following conditions:

a)   If the Proposer withdraws its offer during the period of the Proposal Validity specified in the **Data Sheet** (DS no. 11), or;

b)   If the Proposal Security amount is found to be less than what is required by UNDP as indicated in the **Data Sheet** (DS no. 9), or;

c)   In the case the successful Proposer fails:

i.to sign the Contract after UNDP has awarded it;

ii.to comply with UNDP's variation of requirement, as per RFP clause 35; or

iii.to furnish Performance Security, insurances, or other documents that UNDP may require as a condition to rendering the effectiveness of the contract that may be awarded to the Proposer.

16.   Financial Proposals

The Financial Proposal shall be prepared using the attached standard form (Section 7). It shall list all major cost components associated with the services, and the detailed breakdown of such costs. All outputs and activities described in the Technical Proposal must be priced separately on a one-to-one correspondence. Any output and activities described in the Technical Proposal but not priced in the Financial Proposal, shall be assumed to be included in the prices of other activities or items, as well as in the final total price.

17.   Currencies

All prices shall be quoted in the currency indicated in the **Data Sheet** (DS no. 15). However, where Proposals are quoted in different currencies, for the purposes of comparison of all Proposals:

a)   UNDP will convert the currency quoted in the Proposal into the UNDP preferred currency, in accordance with the prevailing UN operational rate of exchange on the last day of submission of Proposals; and

b)   In the event that the proposal found to be the most responsive to the RFP requirement is quoted in another currency different from the preferred currency as per **Data Sheet** (DS no. 15), then UNDP shall reserve the right to award the contract in the currency of UNDP's preference, using the conversion method specified above.

Proposals submitted by two (2) or more Proposers shall all be rejected if they are found to have <u>any</u> of the following:

a)   they have at least one controlling partner, director or shareholder in common; or

b)   any one of them receive or have received any direct or indirect subsidy from the other/s; or

c)   they have the same legal representative for purposes of this RFP; or

d)   they have a relationship with each other, directly or through common third parties, that puts them in a position to have access to information about, or influence on the Proposal of, another Proposer regarding this RFP process;

e)   they are subcontractors to each other's Proposal, or a subcontractor to one Proposal also submits another Proposal under its name as lead Proposer; or

f)   an expert proposed to be in the team of one Proposer participates in more than one Proposal received for this RFP process. This condition does not apply to subcontractors being included in more than one Proposal.

18.   Documents Establishing the Eligibility and Qualifications of the Proposer

The Proposer shall furnish documentary evidence of its status as an eligible and qualified vendor, using the forms provided under Section 5, Proposer Information Forms. In order to award a contract to a Proposer, its qualifications must be documented to UNDP's satisfaction. These include, but are not limited to, the following:

a)   That, in the case of a Proposer offering to supply goods under the Contract which the Proposer did not manufacture or otherwise produce, the Proposer has been duly authorized by the goods' manufacturer or producer to supply the goods in the country of final destination;

b)   That the Proposer has the financial, technical, and production capability necessary to perform the Contract; and

c)   That, to the best of the Proposer's knowledge, it is not included in the UN 1267/1989 List or the UN Ineligibility List, nor in any and all of UNDP's list of suspended and removed vendors.

19.   Joint Venture, Consortium or Association

If the Proposer is a group of legal entities that will form or have formed a joint venture, consortium or association at the time of the submission of the Proposal, they shall confirm in their Proposal that: (i) they have designated one party to act as a lead entity, duly vested with authority to legally bind the members of the joint venture jointly and severally, and this shall be duly evidenced by a duly notarized Agreement among the legal entities, which shall be submitted along with the Proposal; and (ii) if they are awarded the contract, the contract shall be entered into, by and between UNDP and the designated lead entity, who shall be acting for and on behalf of all the member entities comprising the joint venture.

After the Proposal has been submitted to UNDP, the lead entity identified to represent the joint venture shall not be altered without the prior written consent of UNDP. Furthermore, neither the lead entity nor the member entities of the joint venture can:

a)   Submit another proposal, either in its own capacity; nor

b)   As a lead entity or a member entity for another joint venture submitting another Proposal.

The description of the organization of the joint venture/consortium/association must clearly define the expected role of each of the entity in the joint venture in delivering the requirements of the RFP, both in the Proposal and the Joint Venture Agreement. All entities that comprise the joint venture shall be subject to the eligibility and qualification assessment by UNDP.

Where a joint venture is presenting its track record and experience in a similar undertaking as those required in the RFP, it should present such information in the following manner:

a)   Those that were undertaken together by the joint venture; and

b)   Those that were undertaken by the individual entities of the joint venture expected to be involved in the performance of the services defined in the RFP.

Previous contracts completed by individual experts working privately but who are permanently or were temporarily associated with any of the member firms cannot be claimed as the experience of the joint venture or those of its members, but should only be claimed by the individual experts themselves in their presentation of their individual credentials.

If a joint venture's Proposal is determined by UNDP as the most responsive Proposal that offers the best value for money, UNDP shall award the contract to the joint venture, in the name of its designated lead entity. The lead entity shall sign the contract for and on behalf of all other member entities.

20.   Alternative Proposals

Unless otherwise specified in the **Data Sheet** (DS nos. 5 and 6), alternative proposals shall not be considered. Where the conditions for its acceptance are met, or justifications are clearly established, UNDP reserves the right to award a contract based on an alternative proposal.

21.   Validity Period

Proposals shall remain valid for the period specified in the **Data Sheet** (DS no. 8), commencing on the submission deadline date also indicated in the **Data Sheet** (DS no. 21). A Proposal valid for a shorter period shall be immediately rejected by UNDP and rendered non-responsive.

In exceptional circumstances, prior to the expiration of the proposal validity period, UNDP may request Proposers to extend the period of validity of their Proposals. The request and the responses shall be made in writing, and shall be considered integral to the Proposal.

22.   Proposer's Conference

When appropriate, a proposer's conference will be conducted at the date, time and location specified in the **Data Sheet** (DS no. 7). All Proposers are encouraged to attend. Non-attendance, however, shall not result in disqualification of an interested Proposer. Minutes of the proposer's conference will be either posted on the UNDP website, or disseminated to the individual firms who have registered or expressed interest with the contract, whether or not they attended the conference. No verbal statement made during the conference shall modify the terms and conditions of the RFP unless such statement is specifically written in the Minutes of the Conference, or issued/posted as an amendment in the form of a Supplemental Information to the RFP.

D.   SUBMISSION AND OPENING OF PROPOSALS

23.   Submission

23.1   The Financial Proposal and the Technical Proposal Envelopes MUST BE COMPLETELY SEPARATE and each of them must be submitted sealed individually and clearly marked on the outside as either "TECHNICAL PROPOSAL" or "FINANCIAL PROPOSAL", as appropriate. Each envelope MUST clearly indicate the name of the Proposer. The outer envelopes shall bear the address of UNDP as specified in the **Data Sheet** (DS no.20) and shall include the Proposer's name and address, as well as a warning that state "*not to be opened before the time and date for proposal opening*" as specified in the **Data Sheet** (DS no. 24)**.** The Proposer shall assume the responsibility for the misplacement or premature opening of Proposals due to improper sealing and labeling by the Proposer.

23.2   Proposers must submit their Proposals in the manner specified in the **Data Sheet** (DS nos. 22 and 23). When the Proposals are expected to be in transit for more than 24 hours, the Proposer must ensure that sufficient lead time has been provided in order to comply with UNDP's deadline for submission. UNDP shall indicate for its record that the official date and time of receiving the Proposal is the actual date and time when the said Proposal has physically arrived at the UNDP premises indicated in the **Data Sheet** (DS no. 20).

23.3   Proposers submitting Proposals by mail or by hand shall enclose the original and each copy of the Proposal, in separate sealed envelopes, duly marking each of the envelopes as "Original Proposal" and "Copy of Proposal" as appropriate. The 2 envelopes shall then be sealed in an outer envelope. The number of copies required shall be as specified in the **Data Sheet** (DS No. 19)**.** In the event of any discrepancy between the contents of the "Original Proposal" and the "Copy of Proposal", the contents of the original shall govern. The original version of the Proposal shall be signed or initialed by the Proposer or person(s) duly authorized to commit the Proposer on every page. The authorization shall be communicated through a document evidencing such authorization issued by the highest official of the firm, or a Power of Attorney, accompanying the Proposal.

23.4   Proposers must be aware that the mere act of submission of a Proposal, in and of itself, implies that the Proposer accepts the General Contract Terms and Conditions of UNDP as attached hereto as Section 11.

24.   Deadline for Submission of Proposals and Late Proposals

Proposals must be received by UNDP at the address and no later than the date and time specified in the **Data Sheet** (DS nos. 20 and 21).

UNDP shall not consider any Proposal that arrives after the deadline for submission of Proposals. Any Proposal received by UNDP after the deadline for submission of Proposals shall be declared late, rejected, and returned unopened to the Proposer.

25. Withdrawal, Substitution, and Modification of Proposals

25.1 Proposers are expected to have sole responsibility for taking steps to carefully examine in detail the full consistency of its Proposals to the requirements of the RFP, keeping in mind that material deficiencies in providing information requested by UNDP, or lack clarity in the description of services to be provided, may result in the rejection of the Proposal. The Proposer shall assume the responsibility regarding erroneous interpretations or conclusions made by the Proposer in the course of understanding the RFP out of the set of information furnished by UNDP.

25.2 A Proposer may withdraw, substitute or modify its Proposal after it has been submitted by sending a written notice in accordance with Clause 23.1, duly signed by an authorized representative, and shall include a copy of the authorization (or a Power of Attorney). The corresponding substitution or modification of the Proposal must accompany the respective written notice. All notices must be received by UNDP prior to the deadline for submission and submitted in accordance with RFP Clause 23.1 (except that withdrawal notices do not require copies). The respective envelopes shall be clearly marked "WITHDRAWAL," "SUBSTITUTION," or MODIFICATION".

25.3 Proposals requested to be withdrawn shall be returned unopened to the Proposers.

25.4 No Proposal may be withdrawn, substituted, or modified in the interval between the deadline for submission of Proposals and the expiration of the period of proposal validity specified by the Proposer on the Proposal Submission Form or any extension thereof.

26. Proposal Opening

UNDP will open the Proposals in the presence of an ad-hoc committee formed by UNDP of at least two (2) members. If electronic submission is permitted, any specific electronic proposal opening procedures shall be as specified in the **Data Sheet** (DS no. 23).

The Proposers' names, modifications, withdrawals, the condition of the envelope labels/seals, the number of folders/files and all other such other details as UNDP may consider appropriate, will be announced at the opening. No Proposal shall be rejected at the opening stage, except for late submission, for which the Proposal shall be returned unopened to the Proposer.

27. Confidentiality

Information relating to the examination, evaluation, and comparison of Proposals, and the recommendation of contract award, shall not be disclosed to Proposers or any other persons not officially concerned with such process, even after publication of the contract award.

Any effort by a Proposer to influence UNDP in the examination, evaluation and comparison of the Proposals or contract award decisions may, at UNDP's decision, result in the rejection of its Proposal.

In the event that a Proposer is unsuccessful, the Proposer may seek a meeting with UNDP for a debriefing. The purpose of the debriefing is discussing the strengths and weaknesses of the Proposer's submission, in order to assist the Proposer in improving the proposals presented to UNDP. The content of other proposals and how they compare to the Proposer's submission shall not be discussed.

E.   EVALUATION OF PROPOSALS

28.   Preliminary Examination of Proposals

UNDP shall examine the Proposals to determine whether they are complete with respect to minimum documentary requirements, whether the documents have been properly signed, whether or not the Proposer is in the UN Security Council 1267/1989 Committee's list of terrorists and terrorist financiers, and in UNDP's list of suspended and removed vendors, and whether the Proposals are generally in order, among other indicators that may be used at this stage. UNDP may reject any Proposal at this stage.

29.   Evaluation of Proposals

29.1 UNDP shall examine the Proposal to confirm that all terms and conditions under the UNDP General Terms and Conditions and Special Conditions have been accepted by the Proposer without any deviation or reservation.

29.2 The evaluation team shall review and evaluate the Technical Proposals on the basis of their responsiveness to the Terms of Reference and other documentation provided, applying the evaluation criteria, sub-criteria, and point system specified in the **Data Sheet** (DS no. 32). Each responsive Proposal will be given a technical score. A Proposal shall be rendered non-responsive at this stage if it does not substantially respond to the RFP particularly the demands of the Terms of Reference, which also means that it fails to achieve the minimum technical score indicated in the **Data Sheet** (DS no. 25). Absolutely no changes may be made by UNDP in the criteria, sub-criteria and point system indicated in the

Data Sheet (DS no. 32) after all Proposals have been received.

29.3 In the second stage, only the Financial Proposals of those Proposers who achieve the minimum technical score will be opened for evaluation for comparison and review. The Financial Proposal Envelopes corresponding to Proposals that did not meet the minimum passing technical score shall be returned to the Proposer unopened. The overall evaluation score will be based either on a combination of the technical score and the financial offer, or the lowest evaluated financial proposal of the technically qualified Proposers. The evaluation method that applies for this RFP shall be as indicated in the **Data Sheet** (DS No. 25).

When the Data Sheet specifies a combined scoring method, the formula for the rating of the Proposals will be as follows:

Rating the Technical Proposal (TP):

TP Rating = (Total Score Obtained by the Offer / Max. Obtainable Score for TP) x 100

Rating the Financial Proposal (FP):

FP Rating = (Lowest Priced Offer / Price of the Offer Being Reviewed) x 100

Total Combined Score:

(TP Rating) x (Weight of TP, e.g. 60%)

+ (FP Rating) x (Weight of FP, e.g., 40%)

Total Combined and Final Rating of the Proposal

29.4 UNDP reserves the right to undertake a post-qualification exercise aimed at determining, to its satisfaction the validity of the information provided by the Proposer. Such post-qualification shall be fully documented and, among those that may be listed in the **Data Sheet** (DS No.33), may include, but need not be limited to, all or any combination of the following:

a) Verification of accuracy, correctness and authenticity of information provided by the Proposer on the legal, technical and financial documents submitted;

b) Validation of extent of compliance to the RFP requirements and evaluation criteria based on what has so far been found by the evaluation team;

c) Inquiry and reference checking with Government entities with jurisdiction on the Proposer, or any other entity that may have done business with the Proposer;

d) Inquiry and reference checking with other previous clients on the quality of performance on ongoing or previous contracts completed;

e) Physical inspection of the Proposer's offices, branches or other places where business transpires, with or without notice to the Proposer;

f) Quality assessment of ongoing and completed outputs, works and activities similar to the requirements of UNDP, where available; and

g) Other means that UNDP may deem appropriate, at any stage within the selection process, prior to awarding the contract.

30. Clarification of Proposals

To assist in the examination, evaluation and comparison of Proposals, UNDP may, at its discretion, ask any Proposer for a clarification of its Proposal.

UNDP's request for clarification and the response shall be in writing. Notwithstanding the written communication, no change in the prices or substance of the Proposal shall be sought, offered, or permitted, except to provide clarification, and confirm the correction of any arithmetic errors discovered by UNDP in the evaluation of the Proposals, in accordance with RFP Clause 32.

Any unsolicited clarification submitted by a Proposer in respect to its Proposal, which is not a response to a request by UNDP, shall not be considered during the review and evaluation of the Proposals.

31. Responsiveness of Proposal

UNDP's determination of a Proposal's responsiveness will be based on the contents of the Proposal itself.

A substantially responsive Proposal is one that conforms to all the terms, conditions, TOR and other requirements of the RFP without material deviation, reservation, or omission.

If a Proposal is not substantially responsive, it shall be rejected by UNDP and may not subsequently be made responsive by the Proposer by correction of the material deviation, reservation, or omission.

32. Nonconformities, Reparable Errors and Omissions

Provided that a Proposal is substantially responsive, UNDP may waive any non-conformities or omissions in the Proposal that, in the opinion of UNDP, do not constitute a material deviation.

Provided that a Proposal is substantially responsive, UNDP may request the Proposer to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Proposal related to documentation requirements. Such omission shall not be related to any aspect of the price of the Proposal. Failure of the Proposer to comply with the request may result in the rejection of its Proposal.

Provided that the Proposal is substantially responsive, UNDP shall correct arithmetical errors as follows:

a)   if there is a discrepancy between the unit price and the line item total that is obtained by multiplying the unit price by the quantity, the unit price shall prevail and the line item total shall be corrected, unless in the opinion of UNDP there is an obvious misplacement of the decimal point in the unit price, in which case the line item total as quoted shall govern and the unit price shall be corrected;

b)   if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

c)   if there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to the above.

If the Proposer does not accept the correction of errors made by UNDP, its Proposal shall be rejected.

F.   AWARD OF CONTRACT

33.   Right to Accept, Reject, or Render Non-Responsive Any or All Proposals

UNDP reserves the right to accept or reject any Proposal, to render any or all of the Proposals as non-responsive, and to reject all Proposals at any time prior to award of contract, without incurring any liability, or obligation to inform the affected Proposer(s) of the grounds for UNDP's action. Furthermore, UNDP shall not be obliged to award the contract to the lowest price offer.

UNDP shall also verify, and immediately reject their respective Proposal, if the Proposers are found to appear in the UN's Consolidated List of Individuals and Entities with Association to Terrorist Organizations, in the List of Vendors Suspended or Removed from the UN Secretariat Procurement Division Vendor Roster, the UN Ineligibility List, and other such lists that as may be established or recognized by UNDP policy on Vendor Sanctions.

(See http://www.undp.org/content/undp/en/home/operations/procurement/procurement_protest/ for details).

34.   Award Criteria

Prior to expiration of the period of proposal validity, UNDP shall award the contract to the qualified Proposer with the highest total score based on the evaluation method indicated in the **Data Sheet** (DS nos. 25 and 32).

35.   Right to Vary Requirements at the Time of Award

At the time of award of Contract, UNDP reserves the right to vary the quantity of services and/or goods, by up to a maximum twenty five per cent (25%) of the total offer, without any change in the unit price or other terms and conditions.

36.   Contract Signature

Within fifteen (15) days from the date of receipt of the Contract, the successful Proposer shall sign and date the Contract and return it to UNDP.

Failure of the successful Proposer to comply with the requirement of RFP Clause 35 and this provision shall constitute sufficient grounds for the annulment of the award, and forfeiture of the Proposal Security if any, and on which event, UNDP may award the Contract to the Proposer with the second highest rated Proposal, or call for new Proposals.

37. Performance Security

A performance security, if required, shall be provided in the amount and form provided in Section 9 and by the deadline indicated in the **Data Sheet** (DS no. 14), as applicable. Where a Performance Security will be required, the submission of the said document, and the confirmation of its acceptance by UNDP, shall be a condition for the effectiveness of the Contract that will be signed by and between the successful Proposer and UNDP.

38. Bank Guarantee for Advanced Payment

Except when the interests of UNDP so require, it is the UNDP's preference to make no advanced payment(s) on contracts (i.e., payments without having received any outputs). In the event that the Proposer requires an advanced payment upon contract signature, and if such request is duly accepted by UNDP, and the said advanced payment exceeds 20% of the total proposal price, or exceed the amount of USD 30,000, UNDP shall require the Proposer to submit a Bank Guarantee in the same amount as the advanced payment. A bank guarantee for advanced payment shall be furnished in the form provided in Section 10.

39. Vendor Protest

UNDP's vendor protest procedure provides an opportunity for appeal to those persons or firms not awarded a purchase order or contract through a competitive procurement process. In the event that a Proposer believes that it was not treated fairly, the following link provides further details regarding UNDP vendor protest procedures: http://www.undp.org/procurement/protest.shtml.

Instructions to Proposers

DATA SHEET

The following data for the services to be procured shall complement, supplement, or amend the provisions in the Instruction to Proposers. In the case of a conflict between the Instructions to Proposers, the Data Sheet, and other annexes or references attached to the Data Sheet, the provisions in the Data Sheet shall govern.

DS No.	Cross Ref. to Instructions	Data	Specific Instructions / Requirements
1		Project Title:	Democracy Programme / Elections
2		Title of Services/Work:	Development of the Address Register Information System
3		Country / Region of Work Location:	Republic of Moldova
4	C.13	Language of the Proposal:	☒ English
5	C.20	Conditions for Submitting Proposals for Parts or sub-parts of the TOR	☒ Not allowed
6	C.20	Conditions for Submitting Alternative Proposals	☒ Shall not be considered
7	C.22	A pre-proposal conference will be held on:	Time: **11:00 (Moldova local time)** **Date: 24 August 2016** Venue: UN House Conference Room, 131, 31 August 1989 Street, MD-2012 Chisinau, Moldova The UNDP focal point for the arrangement is: Eleonora Mocanu, Democracy Programme / Elections Procurement Assistant Telephone: +373 (60) 68 00 87 E-mail: eleonora.mocanu@undp.org
8	C.21	Period of Proposal Validity commencing on the submission date	☒ 90 days
9	B.9.5 C.15.4 b)	Proposal Security	☒ Not Required
10	B.9.5	Acceptable forms of Proposal Security	N/A
11	B.9.5 C.15.4 a)	Validity of Proposal Security	N/A
12		Advanced Payment upon signing of contract	☒ Not allowed
13		Liquidated Damages	N/A
14	F.37	Performance Security	☒ Not Required
15	C.17, C.17 b)	Preferred Currency of Proposal and	☒ United States Dollars (USD)

		Method for Currency conversion	Reference date for determining UN Operational Exchange Rate: September 2016
16	B.10.1	Deadline for submitting requests for clarifications/ questions	3 (three) days before the submission date.
17	B.10.1	Contact Details for submitting clarifications/questions[1]	Focal Person in UNDP: **Diana Zaharia**, Senior Project Officer Address: Vasile Alecsandri 119 Str., Chisinau, Moldova E-mail address dedicated for this purpose: diana.zaharia@undp.org
18	B.11.1	Manner of Disseminating Supplemental Information to the RFP and responses/clarifications to queries	☒ Direct communication to prospective Proposers by email or fax, and Posting on the website http://www.undp.md/tenders/index.shtml
19	D.23.3	No. of copies of Proposal that must be submitted [if transmitted by courier]	Original: 1 Copies: 1
20	D.23.1 D.23.2 D.24	Proposal Submission Address	UNDP Moldova 131, 31 August 1989 Street MD-2012 Chisinau Republic of Moldova Attention: Registry Office/Procurement
21	C.21 D.24	Deadline of Submission	Date and Time: **19 September 2016, 15:00 (GMT+2)**
22	D.23.2	Allowable Manner of Submitting Proposals	☒ Courier/Hand Delivery ☒ Electronic submission of Bid
23	D.23.2 D.26	Conditions and Procedures for electronic submission and opening, if allowed	☒ Official Address for e-submission: tenders-Moldova@undp.org ☒ Free from virus and corrupted files ☒ Format: PDF files only, password protected ☒ Password <u>must</u> not be provided to UNDP until the date and time of Bid Opening as indicated in No. 24 ☒ Max. File Size per transmission: 5 MB ☒ Max. No. of transmission: 5 (five) for technical proposal and 1 (one) for financial proposal ☒ No. of copies to be transmitted: 1 (one) ☒ Mandatory subject of email for the Technical Proposal: **Technical Proposal for RfP16/01285: "Development of the Address Register Information System"** ☒ Mandatory subject of email for the Financial Proposal: **Financial Proposal for RfP16/01285: "Development of the Address Register Information System"** ☒ Time Zone to be Recognized: Moldova (GMT+2:00)
24	D.23.1	Date, time and venue for opening of Proposals	N/A

[1] *This contact person and address is officially designated by UNDP. If inquiries are sent to other person/s or address/es, even if they are UNDP staff, UNDP shall have no obligation to respond nor can UNDP confirm that the query was officially received.*

25	E.29.2 E.29.3 F.34	Evaluation method to be used in selecting the most responsive Proposal	☒ Combined Scoring Method, using 60%-40% distribution for technical and financial proposals, respectively, where minimum passing score of technical proposal is 70%
26	C.15.1	Required Documents that must be Submitted to Establish Qualification of Proposers (In "Certified True Copy" form only)	☒ Company Profile, which should not exceed fifteen (15) pages, and product catalogues relevant to the goods/services being procured including a brief and clear description of implemented projects of similar complexity (title, period of project implementation, project objectives, and beneficiary); ☒ Portfolio of clients whom services similar to those requested under this RFP have been delivered to over the past 5 years; ☒ Certificate of Registration of the business, including Articles of Incorporation, or equivalent document if Bidder is not a corporation; ☒ Official Letter of Appointment as local representative, if Bidder is submitting a Bid on behalf of an entity located outside Moldova; ☒ Consortium agreement (in case of Consortium with a local company) in the Republic of Moldova, if the bidder is a foreign company. ☒ Valid Certificate on information security management ISO 27001. In case of Consortium, all companies participating in Consortium must provide a valid ISO 27001 certificate. ☒ Other specialized certificates, accreditations, awards and citations received by the Bidder (if any); ☒ Latest Audited Financial Statement (Income Statement and Balance Sheet) including Auditor's Report for the past 2 years; ☒ Statement of Satisfactory Performance from the Top 2 Clients in terms of Contract Value the past 3 years; ☒ All information regarding any past and current litigation during the last five (5) years, in which the bidder is involved, indicating the parties concerned, the subject of the litigation, the amounts involved, and the final resolution if already concluded; ☒ Detailed CVs of Key Personnel comprising information requested in the Terms of Reference (ToR) RfP Section 3;
27		Other documents that may be Submitted to Establish Eligibility	N/A
28	C.15	Structure of the Technical Proposal (only if different from the provisions of Clause 15)	☒ In case the Service Provider is a consortium of companies, the application should contain a clear distribution of tasks among the consortium members and subcontractors, including a clear division of tasks for the personnel of the companies participating in the consortium and a clear division of deliverables to be provided. The leading company should fulfill at least 65% of all deliverables; ☒ If the Bidder subcontracts activities of obtaining any deliverable, then it shall submit the Work Package attached to these activities in a form signed by both the Bidder as well as proposed Subcontractor and shall contain: date, responsible person (including CV, qualifications supported

			by Certificates), description of the work package, description of deliverables that are part of the working package, quality-checking methods to be used, level of resources to be allocated, date of commencement and finalization, constraints, reporting method.
29	C.15.2	Latest Expected date for commencement of Contract	18 October 2016
30	C.15.2	Expected duration of contract (Target Commencement Date and Completion Date)	October 2016 – March 2017
31		UNDP will award the contract to:	☒ One Proposer only
32	E.29.2 F.34	Criteria for the Award of Contract and Evaluation of Proposals	(See Tables below) **Minimum Qualification criteria** *(failure to comply with these requirements will constitute a reason for disqualification)* ☒ Company must have permanent branches in the Republic of Moldova (in case the bidder is a foreign company) or an equal local Consortium Partner (not Subcontractor); ☒ Valid certification in ISO 27001 (in case the bidder is a consortium, all the companies that are part of the consortium must hold a valid ISO 27001 Certificate);
33	E.29.4	Post-Qualification Actions	☒ Verification of accuracy, correctness and authenticity of the information provided by the bidder on the legal, technical and financial documents submitted; ☒ Validation of extent of compliance to the RfP requirements and evaluation criteria based on what has so far been found by the evaluation team; ☒ Inquiry and reference checking with Government entities with jurisdiction on the bidder, or any other entity that may have done business with the bidder; ☒ Inquiry and reference checking with other previous clients on the quality of performance on ongoing or previous contracts completed;
34		Conditions for Determining Contract Effectiveness	☒ Others: signing the contract by both parties
35		Other Information Related to the RFP[2]	Further information, instructions and/or amendments to the solicitation documents shall be published at the UNDP Moldova tenders website: http://www.undp.md/tenders/index.shtml

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[2] *Where the information is available in the web, a URL for the information may simply be provided.*

Summary of Technical Proposal Evaluation Forms		Score Weight	Points Obtainable
1.	Expertise of Firm / Organization	20%	200
2.	Proposed Methodology, Approach and Implementation Plan	55%	550
3.	Management Structure and Key Personnel	25%	250
Total			1000

Technical Proposal Evaluation Form 1		Points obtainable
Expertise of the Firm/Organization		
1.1	Reputation of Organization and Staff / Credibility / Reliability / Sustainability of previously developed information systems	30
1.2	General Organizational Capability which is likely to affect implementation - financial stability (*up to 15 pts.*); - project management controls (*up to 10 pts.*); - project financing capacity (*up to 10 pts.*).	35
1.3	Extent to which any work would be subcontracted (subcontracting carries additional risks which may affect project implementation, but properly done it offers a chance to access specialized skills.)	20
1.4	Quality assurance procedures, warranty	15
1.5	Relevance of: - Minimum 5 years of working experience in developing IT systems (*5 years – 25 pts., each additional year – 5 pts., up to max. 35 pts.*); - Minimum 1 system on spatial data infrastructure (GIS) developed (*1 system – 30 pts., each additional system – 5 pts., up to max. 40 pts.*); - Past experience in the development of information systems, like address register (excluding development of webpages) for central public authorities of the Republic of Moldova or other countries in the region would be an advantage (*No – 0 pts., to some extent – up to 10 pts., extensive – up to max. 20 pts.*); - Diversity through adherence to the core values of the United Nations; in particular, is respectful of differences of culture, gender, religion, ethnicity, nationality, language, age, HIV status, disability, and sexual orientation, or other status confirmed by presented CVs, other doc's (*additional 5 pts.*)	100
Total Form 1		200

Technical Proposal Evaluation Form 2		Points Obtainable
Proposed Methodology, Approach and Implementation Plan		
2.1	To what degree does the Proposer understand the task?	60
2.2	Have the important aspects of the task been addressed in sufficient detail?	70
2.3	Is the proposed conceptual framework and system architecture compatible to the requested task?	120
2.3	Are the different components of the project adequately weighted relative to one another and point to a qualitative preparation of documentation?	60
2.4	Is the division of work, human and time resources properly estimated (e.g. Work Plan in MPP)?	80
2.5	Is the scope of task well defined and does it correspond to the TOR?	80
2.6	Is the presentation comprehensive and convincing, and is the sequence of activities and the planning logical, realistic and promise efficient implementation to the project?	80
Total Form 2		550

Technical Proposal Evaluation	Points

Form 3			Obtainable
Management Structure and Key Personnel			
3.1	**Project Manager/ Business Analyst**		**60**
	Master degree or equivalent (or 5 years university education) in ICT *(5 pts.);*	5	
	Minimum 5 years of experience in the proposed position (5 years – 10 pts., every additional year – 2.5 pts., up to max 15 pts.);	15	
	Experience in ICT proven through the implementation of at least 2 information systems (the information systems in which the person was involved should be detailed explicitly in his/her CV) *(2 information systems – 10 pts., each additional system – 2.5 pts., up to max. 15 pts.);*	15	
	Experience of working in IT system development methodology for the government sector of the Republic of Moldova or other countries in the region would be an advantage *(No – 0 pts., Yes – 5 pts.);*	5	
	Minimum 1 Web based GIS system implemented (the information system(s) in which the person was involved should be detailed explicitly in his/her CV) *(1 Web system – 5 pts., each additional system – 2.5 pts., up to max. 10 pts.)*	10	
	Proven certification in Project Management (Prince, PMI, etc.) would be a strong asset *(1-2 certificates – 2 pts., each additional certificate – 1 pt., up to max.4 pts.);*	4	
	Excellent knowledge of Romanian, Russian and English languages. (each language – 2 pts., up to max 6 pts.);	6	
3.2	**Technical Leader/ System Architect**		**45**
	Licensed in ICT (master degree will be an advantage) (University degree – 5 pts., Master degree – 10 pts.);	10	
	Minimum 4 years of experience in system architecture (4 years – 10 pts., every additional year – 2.5 pts., up to max 15 pts.);	15	
	Experience in ICT proven through the design of system architecture for at least 1 Web based GIS system (the system(s) in which the person was involved should be detailed explicitly in his/her CV) *(1 Web System – 5 pts., each additional system – 2.5 pts., up to max. 10 pts.);*	10	
	Experience of working in IT system architecture for the government sector of the Republic of Moldova or other countries in the region would be an advantage *(No – 0 pts., Yes – 4 pts.);*	4	
	Excellent knowledge of Romanian, Russian and English *(each language – 2 pts., up to max. 6 pts.);*	6	
3.3	**System Analyst**		**40**
	Licensed in ICT (master degree will be an advantage) *(University degree – 5 pts., Master degree – 10 pts.);*	10	
	Minimum 4 years of experience in IT systems business analysis *(4 years – 10 pts., every additional year – 2.5 pts., up to max 15 pts.);*	15	
	Experience in ICT proven through the development of documentation based on the national legislation and standards on state registers (SMV ISO CEI 15288) *(No – 0 pts., to some extent – up to 5 pts., extensive – up to max. 9 pts.);*	9	
	Excellent knowledge of Romanian, Russian and English *(each language – 2 pts., up to max. 6 pts.);*	6	

3.4	**Senior Developer**		**40**
	Licensed in ICT (master degree will be an advantage) *(University degree – 5 pts., Master degree – 10 pts.)*	10	
	Minimum 4 years of experience in the IT systems senior programming *(4 years – 10 pts., every additional year – 2.5 pts., up to max 15 pts.)*;	15	
	Experience in ICT proven through the development of at least 2 information systems on GIS (the information systems in which the person was involved should be detailed explicitly in his/her CV) *(2 information systems – 5 pts., each additional information system – 2 pts. up to max. 9 pts.)*;	9	
	Excellent knowledge of Romanian, Russian and English (each language – 2 pts., up to max. 6 pts.);	6	
3.5	**Developer**		**35**
	Licensed in ICT (master degree will be an advantage) *(University degree – 5 pts., Master degree – 10 pts.)*	10	
	Minimum 3 years of experience in IT system programming *(3 years – 5 pts., every additional year – 2.5 pts., up to max 10 pts.)*	10	
	Working experience in technologies related to GIS *(No/less than 2 years – 0 pts., 2 years – 3 pts., each additional year – 1 pt. up to max. 5 pts.)*	5	
	Proven active certification in DBMS and web development would be an advantage *(No – 0 pts., to some extent – up to max. 4 pts.)*	4	
	Knowledge of Romanian, Russian and English languages *(each language – 2 pts., up to max. 6 pts.)*;	6	
3.6	**QA Engineer**		**30**
	Licensed in ICT (master degree will be an advantage) *(University degree – 5 pts., Master degree – 10 pts.)*	10	
	Minimum 2 years of experience in testing IT systems *(2 years – 5 pts., every additional year – 2.5 pts., up to max 10 pts.)*	10	
	Proven active ISTQB or equivalent certification will be an advantage *(No – 0 pts., Yes- 4 pts.)*	4	
	Knowledge of Romanian, Russian and English *(each language – 2 pts., up to max. 6 pts.)*;	6	
			250

Section 3: Terms of Reference (TOR)
Development of the Address Register Information System

PROJECT TITLE

"Improving the Quality of Moldovan Democracy through Parliamentary and Electoral Support" (Democracy Programme / Electoral Component)

PROJECT DESCRIPTION

UNDP Moldova Democracy Programme/Elections (further referred as Programme) is a multiyear institutional development project that aims to support the institutional consolidation of the Central Electoral Commission (CEC) as well as the modernization of the Moldovan electoral process towards:

1. Improving the capacity of CEC to meet European gender and human rights standards and of the approved Strategic Development Plan of the CEC;

2. Improving the institutional environment for electoral management bodies that can deliver inclusive and modern electoral processes;

3. Improving the electoral and public registration process of the Republic of Moldova citizens with the right to vote.

I. BACKGROUND INFORMATION

Based on the strategy on address system implementation and legislative framework, currently under endorsement by Parliament, this project aims the development of *Address Register Information System* (*ARIS*) for the Republic of Moldova, under the *Agency of Land Relations and Cadaster* (ALRC) and *State Enterprise "Cadastru"*.

In this regard, *Address Register Information System* is a component part of the National Geographic Information System and represents a register that contains classifiers of administrative-territorial units of Republic of Moldova (districts, cities (municipalities), villages (communes), localities, including disbanded cases) and basic elements of urban infrastructure (streets, segments, buildings, entrances, isolated premises) qualified as addresses of physical objects.

ARIS shall contain the identifier for objects of evidence and their basic characteristics (name, formation date, liquidation date, etc.), as well as borders of administrative-territorial units, streets axial lines and buildings outlines, entrances position and exact address localization.

ARIS is intended for identifying elements of urban and rural infrastructure, considered physical objects, which are objects of evidence for departmental and interdepartmental information systems and that establish links with postal address system, used by information systems, as well as juridical and physical persons in daily life.

Along with information from National Geospatial Data Fund (http://www.geoportal.md) and from automated information system "Cadastrul bunurilor imobiliare", *ARIS* shall ensure spatial localization and identification of any kind of object of the address in the basic spatial Model of the terrain.

By developing *Address Register Information System* the following objectives are aimed:

■ development of organizational and informational base for a centralized evidence of administrative-territorial units and for localities address plans;

■ providing public authorities with timely, veridical and complex information for conduction of operative and multilateral researches, evaluation and argumentation of administrative acts;

■ granting aid to central and local public authorities in promoting efficiently state policies in administrative-territorial organization of the country;

■ streamline decision-making procedure, that can provide answers to inquiries and spatial data analysis functions, which present analysis results in a concrete and suitable for viewing form;

■ development of an integrated platform for departmental and interdepartmental information systems;

■ reduction of volume of data that is permanently stored, by optimizing structures of textual and graphic information.

Direct beneficiaries of *ARIS* will be central and local authorities, public institutions, business environment and citizens, that by virtue of their activity and objective requirements, must have access to an accurate and updated database on address system of Republic of Moldova.

The address register will provide official address data to all public and private institutions to ensure uniformity of data, based on the principle of "single registration (source) - multiple use" of data. The address data from the official address register must be supplied to the *State Register of Population*, the *State Register of Business Entities,* the *State Register of Voters*, the *Emergency Centre 112*, banks, utility companies and other stakeholders as well as open public.

Present document, intended for elaboration of *ARIS*, defines goals, tasks and functions of IT solution, organizational structure, regulatory and legal constraints, functional and nonfunctional requirements necessary for development and operation of the information system.

Address Register Information System is an IT solution that will have an immediate positive impact on the activity of public authorities, institutions and business environment of Republic of Moldova. It is an IT solution aimed towards providing necessary information and informational needs of actors whose activity depends directly on the quality of address data of Republic of Moldova. *ARIS* is a key informational resource of *Agency of Land Relations and Cadaster* and that shall expose access interfaces for all relevant information systems of Republic of Moldova (*State Population Register, State Register of Legal Entities, Fiscal Register, State Register of Voters*, as well as for some specific information systems of business environment) in order to provide data in accordance with law.

Terminology

The totality of Acronyms and Abbreviations used in this document are defined in Table 1.1.

Table 1. Acronyms and Abbreviations used in the Document

No.	Abbreviation/Acronym	Description
1.	ARIS	Address Register Information System
2.	ALRC	Agency of Land Relations and Cadaster
3.	BPMN	Business Process Model and Notation
4.	CEC	Central Election Commission
5.	CPA	Central Public Authority
6.	CSW	Catalog Service for the Web
7.	DB	Database
8.	GIS	Geographical Informational System
9.	IT	Information technology
10.	ITC	Information technology and communications
11.	ITS	IT system
12.	KPI	Key performance indicators
13.	LPA	Local Public Authority
14.	NFC	National Fund of Cartography
15.	OLAP	Online Analytical Processing
16.	RDBMS	Relational Database Management System

No.	Abbreviation/Acronym	Description
17.	SAISE	State Automated Information System "Elections"
18.	SDD	Software design document
19.	SDI	Spatial Data Infrastructure
20.	S.E. "Cadastru"	State Enterprise „Cadastru"
21.	SRS	Software Requirements Specification.
22.	SRV	State Register of Voters
23.	TLS/SSL	TLS Protocol or its predecessor, SSL Protocol, are cryptographic protocols that ensure reliable communication between two hubs of the computer network.
24.	WMS	Web Map Service
25.	WFS	Web Feature Service

All terms frequently used in this document are displayed and explained in Table 1.2.

Table 2. Definitions of notions used in the Document

No.	Term	Description
1.	Address	Totality of words, numbers, orthographic signs, placed in a certain order, indicating the exact geographic position of the addressable object
2.	Credentials	A set of symbols that establish the users' and systems identity and authentication within information systems.
3.	Data	Elementary information units about people, subjects, facts, events, phenomena, processes, objects, situations, etc. presented in a way that enables their notification, commenting and processing.
4.	Database	A collection of data organized as per the design structure describing the basic characteristics and relation among entities.
5.	Data integrity	Data status when they maintain their content and are interpreted unambiguously in cases of random actions. It is deemed that the data maintained their integrity if they have not been altered or deteriorated (deleted).
6.	Information and Communications Technology	Common term that includes all technologies used for information exchange and processing.
7.	Information object	Virtual representation of existing tangible and intangible entities.
8.	Information system	A system for information processing along with the associated organizational resources such as human and technical resources, which deliver and disseminate the information.
9.	Information resource	Set of documentary information in the IT system, maintained as per the requirements and legislation in force.
10.	IT system	The totality of software and hardware that ensures data automatic processing (the automated component of the information system).
11.	Logging	A function of recording the information on events. The records about events entered into the information systems include details about the date and time, user, and action carried out.

No.	Term	Description
12.	Metadata	The way of assigning semantic value to the data stored in the database (data about data).
13.	Reliability of data	Level of correspondence of data stored in computer memory or documents to the actual condition of system objects mirrored by these data.
14.	Software design document	IT System guidance document comprising detailed description of the following visions: data structures and their constraints, IT System architecture covering all concepts of the IT System, IT System interface comprising the design of all components of the IT System user interface, IT System functionalities covering a detailed description of all IT System implementation scenarios.
15.	Software Requirements Specification	A document that contains detailed descriptions of all scenarios of users' interaction with the IT application.

References and Legal Aspects for the IT Subsystem Development

The processes concerning the creation, implementation and operation of *ARIS* shall not contravene the field-related regulatory acts in effect regarding the *S.E. „Cadastru"* activity and the development of IT solutions intended for the Moldovan public authorities.

This category comprises the following legal and regulatory acts:

1. *Concept of the State Automated Information System „Address Register".*

2. *The Address Register of the Republic of Moldova*, draft version of Law.

3. *Government Decision No. 1518 of 17.12.2003 on creation of automatized information System "State Register of administrative-territorial units and streets from the territory of Moldova"*, "Monitorul Oficial al Republicii Moldova" No. 1-5 of 01.01.2004.

4. *Government Decision No. 710 of 20.09.2011 on approving the Strategic Program for Technological Modernization of Governance (e-Transformation)*, "Monitorul Oficial al Republicii Moldova" No. 156-159 of 23.09.2011.

5. *Government Decision No. 656 of 05.09.2012 on approving the Interoperability Framework Program*, "Monitorul Oficial al Republicii Moldova" No. 186-189 of 07.09.2012.

6. Government Decision No. 1090 of 31.12.2013 on electronic governmental service of authentication and access control (MPass), "Monitorul Oficial al Republicii Moldova" No. 4-8 of 10.01.2014.

7. Government Decision No. 405 of 02.06.2014 on integrated electronic governmental service of digital signature (MSign), "Monitorul Oficial al Republicii Moldova" No. 147-151 of 06.06.2014.

8. Government Decision No. 708 of 28.08.2014 on electronic governmental service of logging (MLog), "Monitorul Oficial al Republicii Moldova" No. 261-267 of 05.09.2014.

9. Government Decision No. 916 of 06.08.2007 on the Concept of Governmental Portal, "Monitorul Oficial al Republicii Moldova" No. 127-130/952 of 17.08.2007.

10. Government Decision No. 330 of 28.05.2012 on creation and administration of single governmental portal for public services, "Monitorul Oficial al Republicii Moldova" No. 104-108 of 01.06.2012.

11. *Law No. 133 of 08.07.2011 on Protection of Personal Data*, Official Gazette No. 171-175 of 14.10.2011.

12. *Government Decision No. 1123 of 14.12.2010 on approving the Requirements for the assurance of personal data security during their processing within the information systems of personal data*, Official Gazette No. 254-256 of 24.12.2010.

13. Government Decision No. 701 of 25.08.2014 on approval of Methodology of publishing open governmental data, "Monitorul Oficial al Republicii Moldova" No. 256-260 of 29.08.2014.

14. *Law No. 264-XV of 15.07.2004 on electronic document and digital signature*, "Monitorul Oficial al Republicii Moldova" No. 132-137/710 of 06.08.2004.

15. *Government Decision No. 945 of 05.09.2005 on Centers for Certification of Public Keys*, "Monitorul Oficial al Republicii Moldova" No. 123-125 of 16.09.2005.

16. *Government Decision No. 320 of 28.03.2006 on approving the Regulation on applying digital signatures in public authority electronic documents*, "Monitorul Oficial al Republicii Moldova" No. 51-54 of 31.03.2006.

17. *Government Decision No. 735 of 11.06.2002 on Special Telecommunications Systems of the Republic of Moldova*, "Monitorul Oficial al Republicii Moldova" No. 79-81 of 20.06.2002.

18. *Law No. 467-XV of 21.11.2003 on Informatization and state information resources*, "Monitorul Oficial al Republicii Moldova" No. 6-12/44 of 01.01.2004.

19. Standard of the Republic of Moldova SMV ISO CEI 15288:2009, *"Systems and Software Engineering. Processes of the system life cycle"*.

20. *Technical Regulation "Processes of software life cycle" RT 38370656-002:2006*; "Monitorul Oficial al Republicii Moldova" No. 95-97/335 of 23/06/2006.

21. Other laws, regulatory acts and standards in force in the ITC area.

The international guidelines and recommendations listed below should be implemented in order to define *ARIS* concept and ensure its further development:

■ *INSPIRE Metadata Implementing Rules: Technical Guidelines based on EN ISO 19115 and EN ISO 19119*, http://inspire.ec.europa.eu/documents/Metadata/MD_IR_and_ISO_20131029.pdf

■ *INSPIRE Data Specifications on Address Data Model: D2.8.I.5 Data Specification on Addresses - Technical Guidelines*, http://inspire.ec.europa.eu/documents/Data_Specifications/INSPIRE_ DataSpecification_AD_v3.1.pdf

■ INSPIRE Download services, View services, Discovery Services, Transformation services, http://inspire.ec.europa.eu/index.cfm/pageid/5

■ Michael O. Leavitt, Ben Shneiderman, *Research-Based Web Design & Usability Guidelines*, U.S. Government Printing Office, http://www.usability.gov/guidelines/guidelines_book.pdf

■ *Recommendations of the World Wide Web Consortium (W3C)* (http://www.w3c.org) on the quality of websites, the possibilities to have proper information visualization, using widely used Internet WEB browsers, and compatibility with different IT platforms;

■ *Recommendation of the W3C* (http://validator.w3.org) on website testing. All pages generated by *ARIS* shall be tested as per these recommendations.

Basic Principles of the IT System

In order to ensure the attainment of the objectives set for the IT solution, the following general principles shall be taken into account while designing, developing and implementing *ARIS*:

■ **Principle of Legality**: implies the establishment and operation of Information Systems in compliance with the national legislation in effect and with the international rules and standards recognized in this area;

■ **Principle of split-level architecture**: involves independent design of *ARIS* components in compliance with interface standards between levels;

- **Principle of service-oriented architecture (SOA)**: involves dividing the application operation into smaller and distinct units – called services – that can be assigned into a network and can be used together to create applications designed to the implementation of IT System business functions.

- **Principle of reliable data**: stipulates that data shall be entered into the system through authorized and authenticated channels only;

- **Principle of information security**: implies ensuring an adequate level of integrity, selectivity, accessibility and efficiency to protect the data against losses, alteration, deterioration and unauthorized access.

- **Principle of transparency**: implies designing and implementing as per the modular principle, having used transparent standards in the area of IT and telecommunications;

- **Principle of expansibility**: stipulates the possibility to expand and supplement the Information System with new functions or improve the existing ones;

- **Principle of first person/single center priority**: implies the appointment of a high-rank responsible person who has sufficient rights to take decisions and coordinate the activities aimed at Information System establishment and operation;

- **Principle of scalability**: implies ensuring constant IT performance when increased volume of data and stress for the Information System;

- **Principle of usage simplicity and complacency**: implies the design and implementation of all applications, hardware and software resources available to the System users, based exclusively on visual, ergonomic and logical principles of design;

- **Principle of data integrity, fullness and reliability**: implies the implementation of mechanisms that enable preserving the data content and their clear interpretation under cases of accidental influence, and elimination of data distortion or accidental liquidation, delivery of data volume sufficient to perform the IT System business functions and ensure advanced matching of data with the real status of objects they represent and belong to a specific sector of the IT System.

In particular, the following essential principles shall be complied with by the Information System Architecture:

- implementing a WEB based client-server solution with authorized access to interface and data;

- ensuring adequate security for the Information System to protect the information and subsystem components against their illegal use or disclosure of personal data or of information with limited access;

- recognizing information as an asset and ensuring its proper management;

- developing and implementing Information Systems that enable their use for other processes or ensure opportunities for developing new functionalities;

- minimizing the number of various technologies and products that offer the same or similar functionalities as per their purpose (reuse of technologies already implemented within the *S.E. „Cadastru"*);

- ensuring high-speed processing of service requests/inquiries addressed to the *S.E. „Cadastru"* or of other *LPA* or *CPAs* requiring services;

- ensuring recovery capacities following disasters (ensuring physical and logical security) as a component of the implementation plan.

II.   SCOPE OF SERVICES, EXPECTED OUTPUTS AND TARGET COMPLETION

The main purpose of „ARIS" is to produce a performance platform for creation, storage, modification, visualization and providing address data. Solution that will serve as a single address book for Moldova based on the principle of a unique storage and free distribution on necessity.

Given solution provides a state-level interoperable environment that corresponds to the principles and ideas promoted by e-Government Center.

The development of "ARIS" will contribute to achieve the following aims:

- Implement a unique state-level evidence of data on addresses;

- the development of a unique mechanism to add, modify, delete data for all territorial administrative units;

- the development of a unique high performance repertoire of address data provision;

- create an interoperability framework among the *S.E. „Cadastru"* IT applications, external IT Systems that provide and use *ARIS* data;

- implement an efficient collaboration mechanism among all actors involved in registration and management procedures on addresses data;

- reduce the required time and the laboriousness of the process of collecting, processing and managing the data addresses of the Republic of Moldova;

- ensure data access control and maximum security and confidentiality to data collections and users;

- provide informational support to filed-related analysis, forecast and research activities.

IT System Architecture

ARIS shall provide a WEB interface that is accessible through a widely-used Internet browser (*Microsoft Internet Explorer, Mozilla FireFox, Opera, Google Chrome* or *Safari*). From the functional standpoint, it is envisaged to develop a reliable and scalable solution both for the increased number of competitor users and for the increased volume of information managed by it based on *MVC*-type architecture.

It would be opportune to build the ARIS using open, non-proprietary (and portable) solutions specific for WEB applications (*XML*, *XSL*, *XHTML*, *WSDL*, *SOAP*, *LDAP*, *J2EE*, etc.), which would allow easy development of components for portal-type systems.

As *ARIS* is not an isolated IT solution and it would interact with external IT Systems, the developed application shall offer support for its integration with other IT subsystems (SOA architecture).

In order to ensure an adequate information security level, the delivered application shall enable the implementation of secured connections amongst client stations and application server to grant safe information transfer (via VPN channels and TLS/SSL sessions).

The IT solution shall be developed on the basis of advanced Internet/Intranet technologies. The interaction of all IT Subsystem actors and hubs is displayed in Figure 2.1.
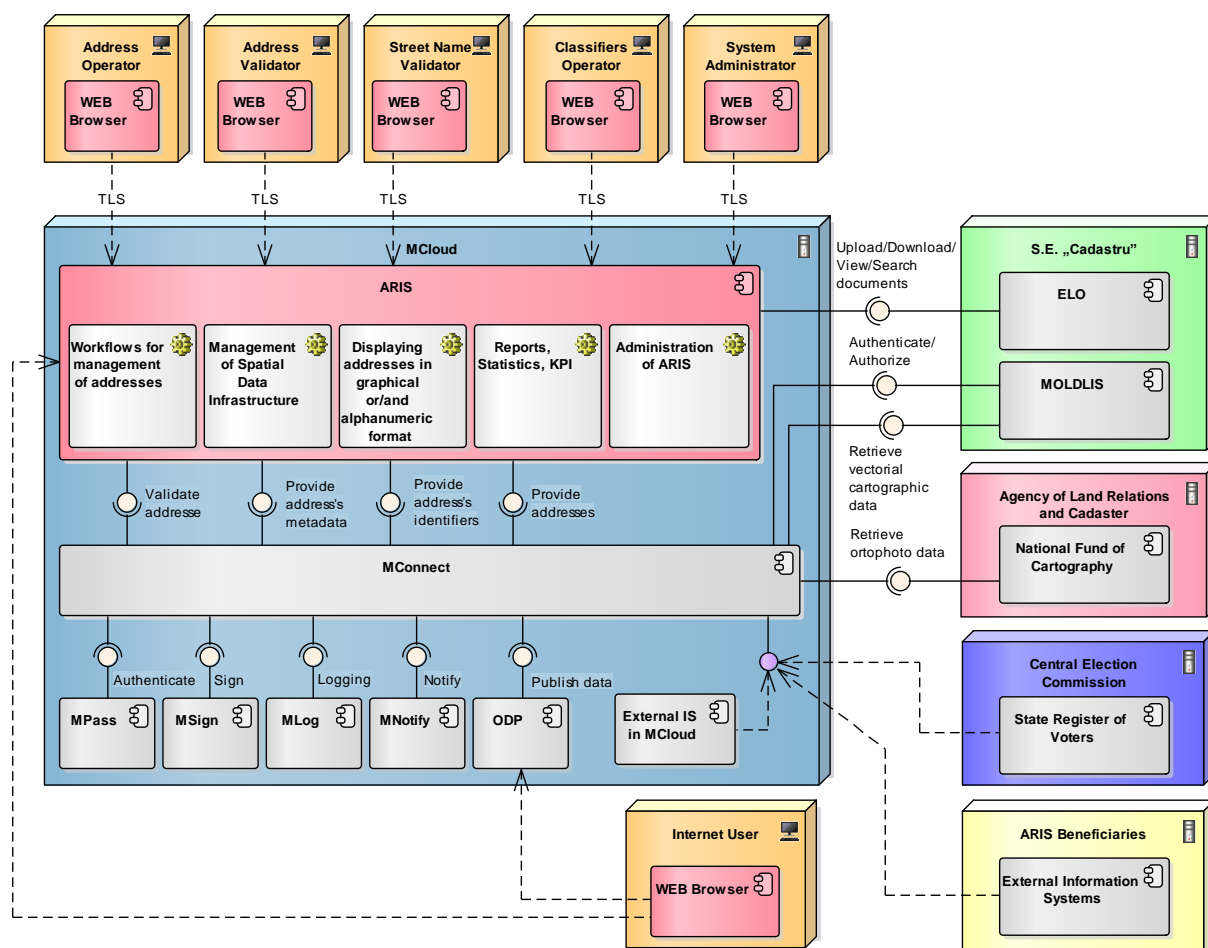
Figure 2.1. ARIS Architecture.

According to Figure 2.1, the solution of pooling the resources aiming to ensure *ARIS* functionalities comprises 6 categories of distinct nodes:

- **MCloud** – ICT infrastructure of the joint governmental technological platform that builds up the governmental cloud (*MCloud*), hosting a series of IT Systems with which *ARIS* should interact or which services would be used by *ARIS* (*MPass, MSign, MLog, MNotify etc.*). The inclusion of *MConnect* service bus in the architecture would enable integration with the services of other IT systems hosted outside the *MCloud*. The technologic platform will host *ARIS*.

- **S.E. „Cadastru" Data Center** – data center infrastructure of *S.E. „Cadastru"* hosting the totality of information systems that *ARIS* will interact to achieve its functional objectives (*MOLDLIS* – for vector cartographic data retrieving and implementation of the security module and *ELO* – for implementation of files management mechanism).

- **CEC Data Center** – the CEC ICT infrastructure that hosts *SRV* with which *ARIS* should interact with the aim to receive address data.

- **ALRC Data Center** – data center infrastructure of *Agency of Land Relations and Cadaster* hosting the totality of information systems that *ARIS* will interact to achieve its functional objectives (*National Cartographic Data Fund* – for cartographic orthophoto data retrieving).

- **ARIS Beneficiaries** – technical infrastructure of beneficiaries of *ARIS* hosting information systems that will retrieve data from *ARIS* through exposed services provided by *ARIS.* These information systems will be hosted both by own data centers (*e.g. Fiscal Register, State Register of Population, State Register of Legal Entities,* etc.) and by common governmental infrastructure *MCloud*.

- **Client Computers** – computers from where the users (depending on their rights and roles) shall be granted access to *ARIS* functionalities.

In order to have access and use *ARIS*, client computers shall use as client applications at least two of the most popular Internet web browsers (compatibility with *Microsoft Internet Explorer* is mandatory). The interface and functionalities assigned to each individual user will depend on the user's level, rights and roles.

From the functional standpoint, there are 6 generic categories of system users, namely *System Administrator*, *Address Operator*, *Address Validator*, *Street Name Validator*, *Classifiers Operator* and *Internet User*. Regardless of the users' access level, all connections of users to *ARIS* (except for *Internet users*) shall be carried out via safe means.

In order to ensure optimal functionality, *ARIS* will use the following categories of interfaces delivered by *MCloud* and *MConnect* platform services:

1. **Authenticate Service**, which interacts with the governmental platform service *MPass* applied to implement users' authentication procedures via the digital certificate;

2. **Sign Service**, which interacts with the governmental platform service *MSign* designed to apply and validate the digital signature, including mobile signature.

3. **Logging Service**, which interacts with the governmental platform service *MLog* designed to log the critical business events of *ARIS*.

4. **Notify Service**, which interacts with the governmental platform service *MNotify* designed to notify *ARIS* actor about critical business events of *ARIS*.

5. **Publish Data Service**, which interacts with the governmental open data portal designed to publish public data and reports provided by *ARIS*.

6. **Upload/Download/ View/Search documents**, which interacts with ELO document management system of *S.E. „Cadastru"* designed for implementing the mechanism of document workflow of *ARIS*.

7. **Authenticate/ Authorize**, which interacts with MOLDLIS designed for implementing Security procedures implemented by *S.E. „Cadastru"* through *MOLDLIS*.

8. **Retrieve vector cartographic data**, which interacts with *MOLDLIS* managed by *S.E. „Cadastru"* to retrieve vector cartographic data of addressable objects.

9. Retrieve orthophoto data, which interacts with *National Fund of Cartography* managed by *Agency of Land Relations and Cadaster* to retrieve orthophoto data of addressable objects.

Because *ARIS* is an information system that will be intensely used by majority of state owned information systems and by business environment, which deals with addresses, it will expose a list of services. For providing textual informations, SOAP services shall be created. For providing graphical informations – WFS/WMS/WCS services. Web services shall be secured. Access control shall be managed by *System Administrator*.

Viewing of web services via catalogue of web services will be used by other information systems (e.g. MODLIS in S.E. „Cadastru" or 112 Emergency Center).

Query/Process/Transformation of web services will be done via *MConnect Enterprise Service Bus* for further provisioning of services to other information system in Republic of Moldova. Implementation of standards-based web-services in order to assure compatibility with *MConnect* ESB (WSO2).

Web portal for searching of address data will be provided for the usage by open public or external commercial organizations. As ARIS would interact with other national Computer Subsystems or with external IT solutions, the developed application shall offer the necessary support for integration with other computerized subsystems through secured GIS and alphanumerical web services.

ARIS shall expose the following WEB services:

1. **Validate address** – WEB service provided to external information systems for checking the availability and status of address objects relevant to external business activity.

2. **Provide address's metadata address** – WEB service provided to external information systems for accessing nomenclature of address objects in order to reuse data in own business activities.

3. **Provide address's identifiers** – WEB service provided to external information systems for delivering identifiers' lists of address objects. After interrogation registration data of objects of addresses or geospatial data will be used.

4. **Provide addresses** – WEB service provided to external information systems for delivering address registering details (including geospatial registering data). After interrogation registration data of address objects or geospatial data will be used. This is the key service of *ARIS* that shall provide a detailed level of address objects depending upon concrete requests of external information systems.

As shown in figure 2.1. *ARIS* shall provide to its users the following functionalities:

MODULE FOR ADDRESS MANAGEMENT includes the following basic components:

o **Flows and forms for creation of address objects** will provide the totality of necessary functionalities for perfecting electronic forms for adding new address objects and workflows intended for processing and approval of requests for adding objects of new addresses.

o **Flows and forms for modification of address objects** will provide the totality of necessary functionalities for perfecting electronic forms for modifying existing data of address objects in *ARIS* and workflows intended for processing and approval of requests for modifying of existing data of address objects in *ARIS*.

o **Flows and forms for removal of address objects** will provide the totality of necessary functionalities for perfecting electronic forms for removal of address objects in *ARIS* and workflows intended for processing and approval of requests for removal of address objects in *ARIS*.

o **Flows and forms for adding names of streets** will provide the totality of necessary functionalities for perfecting electronic forms for adding new street names and workflows intended for processing and approval of requests for adding new street names.

o **Flows and forms for modifying street names** will provide the totality of necessary functionalities for perfecting electronic forms for modifying existing street names in *ARIS* and workflows intended for processing and approval of requests for modifying of existing street names in *ARIS*.

o **Flows and forms for removal of street names** will provide the totality of necessary functionalities for perfecting electronic forms for removal of existing street names in *ARIS* and workflows intended for processing and approval of requests for removal of existing street names in *ARIS*.

o **Primary data validation component** will provide a mechanism of primary check of correctitude of data perfected by local public authorities within electronic forms related to address business events.

o *ARIS* **authorized user's dashboard** will deliver the necessary functionalities for providing a dashboard mechanism and from which, based on roles, users, according to their duties, shall receive, notify and access details of *ARIS* business events.

MODULE FOR SPATIAL DATA INFRASTRUCTURE MANAGENEMT includes the totality of necessary functionalities for retrieval and usage of vector cartographic data and orthophoto retrieved from relevant external information systems. Also, this component of *ARIS* shall deliver functionalities intended for introducing of geospatial data for created and / or modified address objects to authorized users.

MODULE FOR PRESENTING ADDRESS SYSTEM that includes the following components:

- WEB Services for data exchange with external information systems. The service shall provide the totality of alphanumeric and GIS data related to requested address objects by authorized external information systems.

- **Interface for viewing the Address system in textual format** will be used by the anonymous users for defining search and filtering criteria in order to get lists of relevant address objects.

- **WEB GIS interface** represents a mode of presenting information from *ARIS* on an interactive map, accessible for authorized users in order to perform business events relevant to address objects and anonymous users, for exploring address objects of Republic of Moldova.

MODULE FOR GENERATION OF REPORTS AND STATISTICS ensures functionalities for generation and saving in DOCX, XLSX, PDF, etc. formats of reports and statistics. Information system shall deliver mechanisms for generation of system reports (necessary for informational audit and for anticipating possible security issues) and reports related to implemented business processes (necessary for analysis and monitoring of administration processes of address system of Republic of Moldova). A particular case of reports and statistics represents outputs generated by GIS mechanisms.

MODULE FOR DISSEMINATION OF PUBLIC INFORMATION ensures automatic export on Open Public Data Portal (http://www.date.gov.md) of reports, statistics and nomenclatures of public character provided by *ARIS*. Another option is represented by public interface of *ARIS* that shall publish documents of public character generated by *ARIS* and a WEB GIS solution of dynamic exploring of address system of Republic of Moldova.

MODULE OF INFORMATION SYSTEM MANAGEMENT includes the following basic components:

- **Component of global configuration of the information system** - general parameters of functioning of information system will be configured.

- **Component of management of resources of the information system** - it will be possible to manage all functional components of the application, defining of status, transitions of resources that may occur (dynamic configuration of workflows under which electronic forms of *ARIS* shall be perfected and processed), defining of access rules based on users groups and configuration of logging rules of business events.

- **Component of management of users** shall ensure the management of all users profiles with access rights to information system resources which are involved in processes of management of address objects. Information system will allow the dynamic configuration of users' access to information system resources through a mechanism of dynamic defining of rights and users roles (dynamic defining of access rules to users interface facilities and to data).

- **Component of management of users groups** ensures configuration of users groups based on their specific available functionalities and on roles within workflows implemented in *ARIS*.

- **Component of management of nomenclatures and classifiers (metadata)** will consist of a mechanism that will allow administration of structure and content of a complex nomenclature system (national and internal of *ARIS*) that allows referencing of contained information in the database and adapting the database content and reports on legislative or procedural modifications intended for management of address system of Republic of Moldova.

- **Component of management of notifications** will deliver the totality of functionalities for automatic notification via Email or internal mechanisms of *ARIS* to authorized users or entities that take part in business processes implemented in *ARIS*.

- **Component of dashboard management** will deliver the totality of functionalities for calculations and real-time displaying of key performance indicators to users of *ARIS* and ensure quick access to critical records related to position's duties of authorized users.

- o **Component of monitoring activities of users.** Through logging modules of the users activity events. This is intended for ensuring some elementary measures of security and for anticipating some possible problems in this domain. The mechanism of logging of users activity records the following events:

    i. connection to the system;

    ii. disconnection from the system;

    iii. adding / modifying of data;

    iv. data accession;

    v. data suppression.

- o **Component of generation of Database backups of information system** that shall allow creation of automatic backups of dataset of *ARIS* for ensuring physical security of data.

MODULE OF DOCUMENTATION ARIS shall provide functionalities for displaying information system usage documentation in an accessible and convenient manner. This shall not be different by its principles from Help mechanisms, integrated in well-known desktop solutions.

III. INVOLVED PARTS AND ROLES OF THE IT SYSTEM

3.1. IT System Business Roles

The following entities are interested or shall be involved in the process of *ARIS* development and operation:

- **UNDP Project "Improving the Quality of Moldovan Democracy through Parliamentary and Electoral Support"** – as an institution that would finance and monitor *ARIS* development and implementation activities.

- **S.E. „Cadastru"** – as an institution that will administrate *ARIS* and will coordinate activities of designing, developing and publishing of information system. *S.E. „Cadastru"* will be the Owner and Possessor of *ARIS*, using it to keep records and manage all mobilization resources of the Republic of Moldova.

- **Agency of Land Relations and Cadaster** – as an institution that implements state policies in the domain of land relations, cadaster, geodesy, cartography, geo-informatics. Is the owner of National Cartographic Data Fund and will provide *ARIS* with the totality of orthophoto information necessary for the functioning of Register.

- **Academy of Sciences of Moldova** – as an institution that will have authorized access and will use *ARIS* for validating street names, proposed by local public authorities and requested to be used in national system of addresses.

- **Central Election Commission** – as a permanent public authority established to implement the electoral policy and ensure sound organization and conduct of elections. The *CEC* key IT resource – *SAISE* – will interact with *ARIS* to automatically receive and use the data on addresses of voters to assign them to polling stations.

- **Local Public Authorities** – as the registrar of *ARIS*. Local public authorities will be the key institution that will request approval of operation of creation, modification and removal of address objects situated on its geographic area of competence.

- **S.E. "Center for Special Telecommunications"** – as an entity that administers the *MCloud* common government platform that will hosts *ARIS* and IT systems with which *ARIS* would interact or platform services implemented under *ARIS*.

- **E-Government Center** – as a body empowered to develop and implement the e-Transformation policy, *MCloud* platform and interoperability framework *MConnect* applied for the interaction of *ARIS* with external IT systems.

- **Ministry of Information Technology and Communications** – as the main body of policy and rules regarding the development and implementation of state information resources.

- **Central Public Authorities, Public Institutions, business environment and their information systems** – as consumers of data on addresses of Republic of Moldova for exercising their functional objectives.

- **Citizens of Republic of Moldova** – as anonymous users of *ARIS* and indirect beneficiaries of the Register as a result of public services that depends on veridical data on addresses of Republic of Moldova quality improvement.

3.2. IT System owner

The owner of Address Register Information System will be *Agency of Land Relations and Cadaster*. *Agency of Land Relations and Cadaster* is a central public authority body subordinated to Government of Republic of Moldova that implements state policies in the domain of land relations, cadaster, geodesy, cartography and geo-informatics. In address system domain, *Agency of Land Relations and Cadaster* runs the following activities:

- develops and implements state policies in the area of addresses;

- develops and ensures the implementation of regulations and instructions in the area of addresses;

- coordinates at the central level the activities related to the establishment and development of the State Register of Addresses;

- provides the local public authority with an up-to-date mapping data, which is necessary for establishing the *Address Register Information System*;

- ensures the financing of maintaining and developing the *Address Register Information System*.

3.3. IT System holder

S.E. „Cadastru" shall be the IT solution holder that would provide the technical administration of *ARIS*. As owner of *ARIS*, S.E. „Cadastru" will perform activities intended for administration and ensuring the veracity of data collection on addresses of Republic of Moldova and will ensure the proper functioning of the information system.

3.4. IT System Purchaser

The Address Register Information System will be purchased by the UNDP Project "Improving the Quality of Moldovan Democracy through Parliamentary and Electoral Support" on behalf of the S.E. „Cadastru". Although S.E. „Cadastru" is the direct Beneficiary of the IT solution, the ICT consultants contracted by the UNDP Project "Improving the Quality of Moldovan Democracy through Parliamentary and Electoral Support" will be involved at all ARIS development stages, its commissioning and final acceptance.

3.5. IT System Registrar

The capacity of Registrar of the *ARIS* will be assigned to all users holding the role of *Address Operator* designated by relevant subdivisions of the Level 1 Local public Authority and Level 2 Local Public Authority. As registrar of *ARIS*, local public authorities of all levels have the following powers regarding address system:

- name, rename the circulation routes and/or areas of public circulation within the borders of the administrative-territorial unit;

- appoint address numbers to the addressable objects located within the borders of the administrative-territorial units;

- register the names, renames and address numbers of the circulation routes and/or areas of public circulation in the *Address Register Information System*;

- update the data in the *Address Register Information System*;

- set, replace and maintain the street indicators.

3.6. Users and their roles within the IT System

Human roles or IT systems that interact with *ARIS* are displayed in Figure 3.1. As can be seen in this Figure, 6 main categories of human actors and 2 categories of IT Systems would be interacting under this application.

1. **Internet User** – human actor who accesses the public web interface of *ARIS* directly or via Open Data Portal (http://www.date.gov.md) to explore address system of the republic of Moldova. This category of actors has the following distinct roles:

   - accesses reports, statistics, KPI of public character generated by *ARIS*;

   - formulates interrogations to the database and extracts registered data of address objects;

   - use WEB GIS interface of *ARIS* in order to formulate interactive interrogations on map or visualization of address object location.
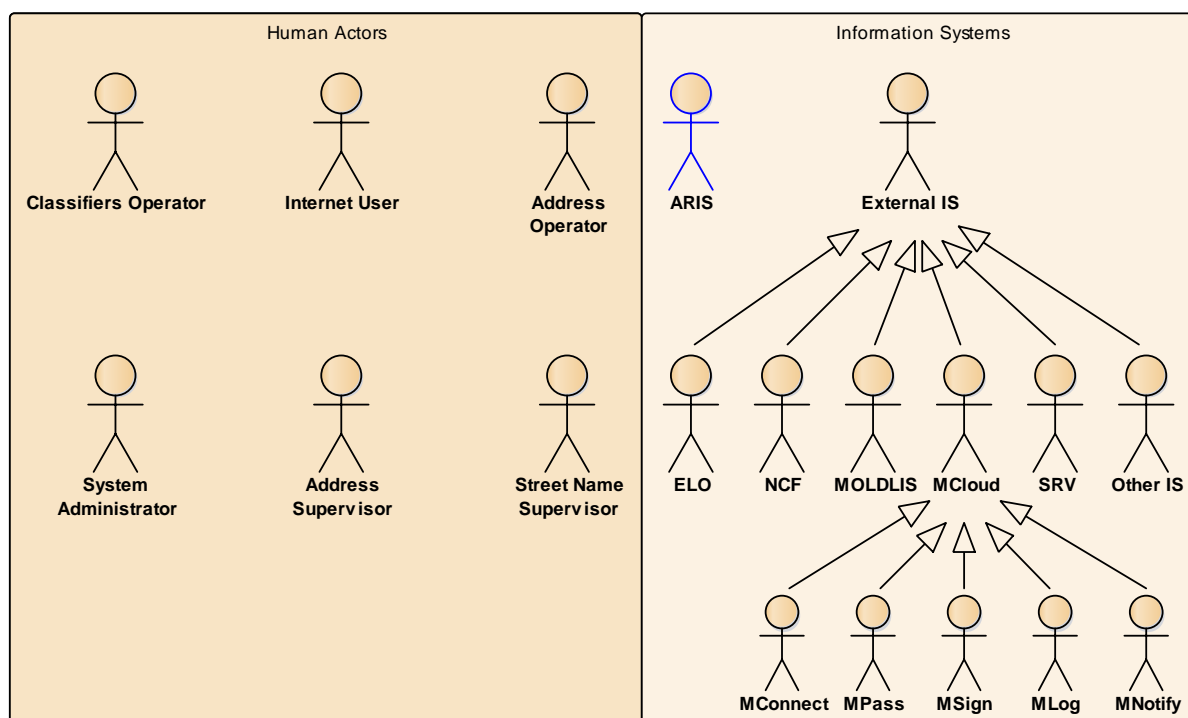
Figure 2. The actors of ARIS.

2. **Address Operator** – human actor who perfects the totality of requests of adding, modifying or removal of address objects and who defines geospatial parameters of these objects. Managed objects depend upon the level of local public authorities of *Address Operator* (Level 1 LPA or Level 2 LPA). This category of actors has the following roles:

   - has access to Internet User functionalities;

   - has access to personal dashboard for monitoring and accessing notifications addressed to his role,;

   - perfects business events regarded to addresses (fills electronic forms of requests for adding / modifying / removal of address / address name, defines geospatial data of address objects, etc.);

   - generates standard documents based on electronic data forms perfected;

   - manages documents on business events of address objects;

   - generates reports and statistics relevant to his own access rights and user interface.

3. **Address Supervisor** – human actor who approves the totality of requests of adding, modifying and removal of address objects perfected by users with the role of *Address Operator.* This category of actors has the following roles:

   - has access to Internet User functionalities;

   - has access to personal dashboard for monitoring and accessing notifications addressed to his/her role,

   - approves / rejects requests of *Address Operator*.

   - generates standard documents based on electronic data forms perfected;

   - manages documents on approval of business events of address objects;

   - generates reports and statistics relevant to his own access rights and user interface.

4. **Street Name Supervisor** – human actor who approves the totality of requests of adding, modifying and removal of street names perfected by users with the role of *Address Operator*. This category of actors has the following roles:

- has access to Internet User functionalities;

- has access to personal dashboard for monitoring and accessing the totality of notifications directed at his address;

- approves / rejects requests on street names perfected by *Address Operator*.

- generates standard documents based on electronic data forms perfected;

- manages documents related to approval process of business events of streets;

- generates reports and statistics relevant to his own access rights and user interface.

5. **Classifiers Operator** – human actor who manages metadata system of ARIS. This category of actors has the following roles:

- has access to Internet User functionalities;

- manages classifiers content of *ARIS*;

- manages nomenclatures content of *ARIS*;

- manages configuration variables content of *ARIS;*

- manages the metadata totality of *ARIS.*

6. **System Administrator** - human actor, assigned to manage the system users, monitor the system operation, configure the *ARIS*, start/stop/restart the IT System components. If the technological environment has sufficient capacity to perform administration works, then their implementation into the system is optional. This category of actors shall have the following distinct roles:

- use unconditionally all functionalities of the IT System, except for amending the logging files;

- generate reports, statistics and performance indicators designed to monitor the system, support the analysis, forecast and decision-making processes;

- manage and configure roles, rights of access and profiles of the IT System authorized users;

- carry out system configurations, including workflows, electronic forms and document templates based on which the information stored in the database is exported;

- manage the *ARIS* metadata (configurations, ways of access, credentials for accessing external services, Nomenclatures, Classifiers, Variables, etc.);

- administer the application server;

- administer the database in production;

- make database back-ups.

The *ARIS* implementation implies the interaction of six categories of information systems as follows:

1. **ARIS** – IT System intended to keep records on the addressable objects of the Republic of Moldova which is the subject of development and implementation of this document.

2. **External IT Systems** – represent all external IT systems that belong to public authorities, state institutions and business entity of the Republic of Moldova delivered by primary data ARIS. This category comprises the following IT Systems:

   A. **ELO** – a document management platform of *S.E. „Cadastru"* applied for implementing the ARIS document workflow operations (search, storage, extract, visualize).

B. **NFC** *(National Fund of Cartography)* – information system of *Agency of Land Relations and Cadaster* that provide all relevant orthophoto data for *ARIS* needs.

C. **MOLDLIS** – information system of *S.E. „Cadastru"* used for implementing procedures of authentication / authorizing *ARIS* (security module implemented by *S.E. „Cadastru"*) and receiving cartographic vector data, necessary for proper functioning of *ARIS*.

D. **MCloud** – a common governmental ICT infrastructure (where *ARIS* will be hosted), which is operated based on "Cloud Computing" technology that makes available the interoperability framework for *ARIS* to integrate the following services and IT Systems hosted in *MCloud*:

   o **MConnect** – the interoperability governmental framework supporting the interaction with other applications – data providers or receivers, which are consolidated and managed in *ARIS*.

   o **MPass** – governmental platform service used to exercise control on the access to information systems hosted in *MCloud* and ensure the authentication procedures via a digital certificate or mobile identity.

   o **MSign** – governmental platform service used when applying and validating the digital signature, including mobile signature.

   o **MNotify** – governmental platform service used for notifying *ARIS's* actors on business events.

   o **MLog** – governmental platform service used for logging critical business events of *ARIS*.

   o **ODP** (*Open data portal)* – governmental portal for open data through which *ARIS* will publish data of public nature.

E. **SRV** (*State Register of Voters*) – Central Electoral Commission information system that directly responsible for creation of the voters lists and distribuit of the voters to corresponding polling stations. *SRV* should have access to an efficient system of address management for a correct assignation of voters to polling stations.

F. **Other IS** – external information systems of public authorities, public institutions and business environment (*e.g. Fiscal Register, State Register of Populations, S.E. Moldtelecom,* etc.) that need access to registration data of address objects in order to achieve their operating objectives.

4.1. Informational Objects of ARIS

Having analyzed the modeled domain (automation of the management and registration processes of addresses) it is possible to present all informational objects to be taken into account in the process of *ARIS* development. Figure 4.1 presents the informational objects which serve as bases for designing and developing the *ARIS*.
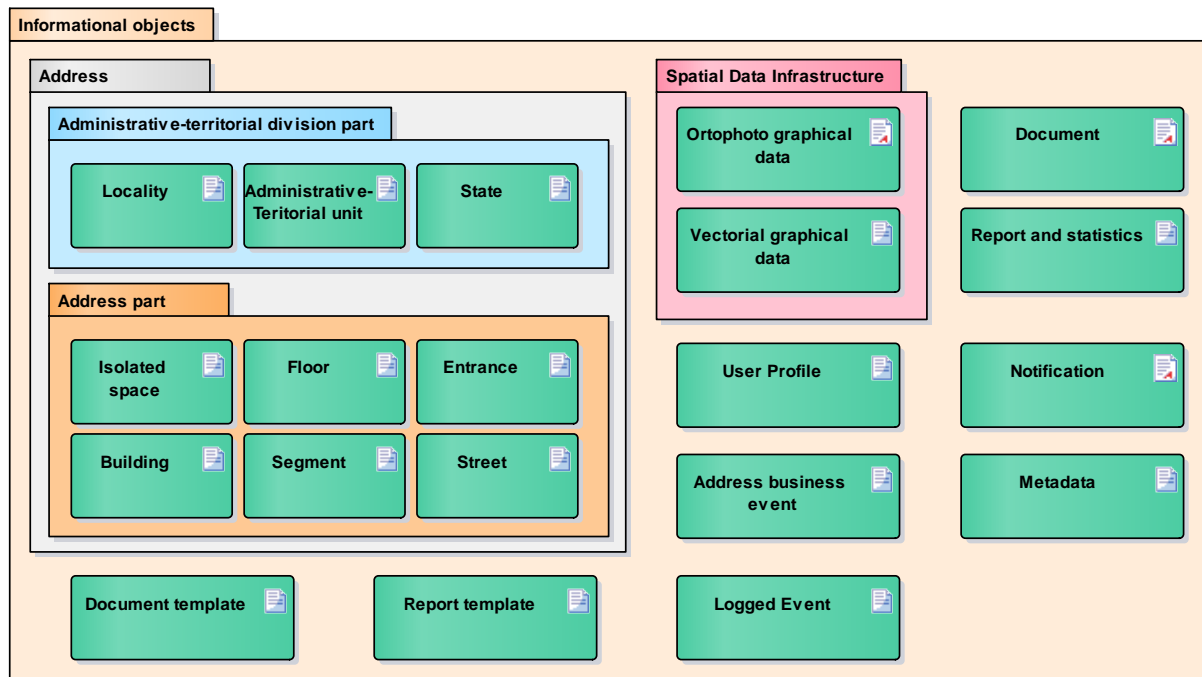
Figure 3. ARIS Informational Objects.

According to Figure 4.1, the IT solution comprises 11 categories of informational objects, of various complexities, to be taken into account in the process of *ARIS* design and implementation (nomenclature of information objects may be supplemented or amended during the writing of the tehchical project of *ARIS*):

1. Address.
2. Profile.
3. Spatial Data infrastructure.
4. Address business event.
5. Document.
6. Report and statistics.
7. Notification.
8. Metadata.
9. Document template.
10. Report template.
11. Logged event.

Objects shall be identified within the IT System by using, for each of them, a single identification number.

1. Address.

This is a central complex informational object, which contains all information related to the addresses of the Republic of Moldova. The informational object Address comprises 2 categories of complex informational objects: *Administrative-territorial Division part* and *Address part.*

1.1. Administrative-territorial Division part and Address part

The administrative-territorial division of the country is represented as spatial objects, with related nomenclature tables. The administrative-territorial division consist of state boundary, administrative-territorial unit (with possibility to add other layers in the future, in accordance with law) and localities.

1.1.1. Locality

Represents an informational object that contains the totality of information on locality component regarding address. *ARIS* shall contain the following categories of data on locality:

- o identifier of the locality;
- o locality level ID;
- o CUATM code of the locality;
- o name of the locality;
- o parent ID;
- o status of locality;
- o GIS data;
- o activation date;
- o deactivation date;
- o other relevant data.

1.1.2. Administrative-territorial unit

Represents an informational object that contains the totality of information on the component of administrative-territorial unit regarding address. Information system shall allow entering of a dynamic hierarchy of administrative-territorial units (e.g. district, county, development region, etc.) *ARIS* shall contain the following categories of data on administrative-territorial units:

- o identifier of the administrative-territorial unit;
- o administrative-territorial unit level ID;
- o complete name of the administrative-territorial unit (e.*g. Unitatea Teritorial Administrativă Găgăuz-yeri*);
- o short name of the administrative-territorial unit (e.g. *UTAG*);
- o parent ID;
- o status of administrative-territorial unit;
- o GIS data;
- o activation date;
- o deactivation date;
- o Other relevant data.

1.1.3. State

Represents an informational object that contains the totality of information on state component regarding address. *ARIS* shall contain the following categories of data on state.

- o identifier of the state;
- o name of the state;
- o oficial identifier of state;
- o GIS data;
- o Other relevant data.

1.2. Address part

The address information is represented as spatial object, with related alpha-numerical data and nomenclature tables. Address information consist of Isolated space, floor, entrance, building, segment, street and other data.

1.2.1. Isolated space

Represents an informational object that contains the totality of information on Isolated space component regarding address. It is a compartment of address that needs to be filled only in case of buildings with isolated spaces. *ARIS* shall contain the following categories of data on Isolated space:

- o identifier of Isolated space;
- o isolated space level ID;
- o name / numbering of Isolated space;
- o parent ID;
- o status of Isolated space;
- o activation date;
- o deactivation date;
- o Other relevant data.

1.2.2. Floor

Represents an informational object that contains the totality of information on floor component regarding address. It is a compartment of address that needs to be filled only in case of multi-levels buildings. *ARIS* shall contain the following categories of data about the floor:

- o identifier of floor;
- o floor level ID;
- o name / numbering of floor;
- o parent ID;
- o status of floor;
- o activation date;
- o deactivation date;
- o Other relevant data.

1.2.3. Entrance

Represents an informational object that contains the totality of information on entrance component regarding address. A building may have one or multiple entrances. *ARIS* shall contain the following categories of data on entrance:

- o identifier of entrance;

- o entrance level ID;

- o name / numbering of entrance;

- o parent ID;

- o status of entrance;

- o GIS data;

- o activation date;

- o deactivation date;

- o Other relevant data.

1.2.4. Building

Represents an informational object that contains the totality of information on building component regarding address. In some cases the address is identified with the building (*e.g. individual houses*). *ARIS* shall contain the following categories of data on building:

- o identifier of building;

- o building level ID;

- o name / numbering of building;

- o parent ID;

- o status of building;

- o GIS data;

- o activation date;

- o deactivation date;

- o Other relevant data.

1.2.5. Segment

Represents an informational object that contains the totality of information on segment component regarding address. *ARIS* shall contain the following categories of data on segment:

- o identifier of segment;

- o name / numbering of segment;

- o identifier of the street that segment belongs to;

- o status of segment;

- o GIS data;

- o activation date;

- o deactivation date;

- o Other relevant data.

1.2.6. Street

Represents an informational object that contains the totality of information on street component regarding address. In some cases the street may be absent (*e.g. small villages*). Street names shall be retrieved from a common thesaurus approved in advance by the user with the role of *Street Validator. ARIS* shall contain the following categories of data on street:

- o identifier of the street;

- o steet level ID;

- o complete name of the street;

- o short name of the street (*e.g. Acad. S. Rădăuțanu* for *Academician Sergiu Rădăuțanu*);

- o parent ID;

- o status of street;

- o activation date;

- o deactivation date;

- o Other relevant data.

2. Profile of ARIS authorized user.

This is a complex informational object comprising all data related to subjects and entities, which interact with *ARIS* or are the object of management and registration processes through the *ARIS*. 2 categories of profiles can be identified:

It represents an informational object that contains all data related to the authorized users of the IT System who have the right of access to user interface within the limit of their roles and rights assigned under the *ARIS*.

To this end, the informational object shall contain the following categories of information:

> user identifier;
> user IDNP code;
> user last name;
> user first name;
> user's address;
> E-mail;
> contact phone;
> login;
> password;
> authentication strategy (user + Password, Digital Certificate, Mobile Identity etc.);
> subdivision/entity where he works;
> status of account (active/inactive);
> access validity period;
> user's roles;
> other relevant data.

3. Spatial Data Infrastructure.

Complex informational object that provides the totality of geospatial data applicable by *ARIS*.

ARIS Spatial data infrastructure consists of 2 categories of informational objects: *Orthophoto graphical data* and *graphical vector data*. For its functionality *ARIS* will retrieve in totality *Orthophoto graphical data* from *National Fund of Cartography*. In the case of *graphical vector data,* used for defining outlines and the location through vector means, a part will be retrieved from *MODLIS* and another part will be created within *ARIS* through UC02.

3.1. Orthophoto graphical data.

This informational object represents the totality of images obtained by satellite or airplane photography retrieved from *National Fund of Cartography* used for addresses and elements representation as layers.

3.2. Graphical vector data.

This informational object represents the totality of vector images retrieved from *MOLDLIS* or shaped by means of *ARIS* used for localization and representation of addresses, taking into account contained geospatial data.

4. Address business events.

This is an informational object that corresponds to the totalities of electronic forms prepared through UC02 use case under the processes of address registration and management. The information content of these forms is different, depending on the prepared business event.

ARIS shall provide a sufficient set of electronic forms capable to register the following events related to informational object of *ARIS*:

creation of new addresses (including massive creation of addresses);

removal of addresses, including massive removal of addresses (deactivation or physical removal);

modification of addresses (including massive modification of addresses);

filling of geospatial data related to managed addresses:

- o registering of geospatial position of address object;

- o defining of outlines of address object, etc.

5. Document.

This is an informational object that covers all documents attached to the address business event forms or prepared through facilities delivered by UC02 and UC03 under the registration and management processes of addresses. Any informational object of *Document* type contains a minimal set of data designed for its identification and registration:

document identifier;

document type;

issuing authority/person identificator;

document registration number;

document registration date;

document content (scanned text/image).

6 Report and statistics.

This represents a complex informational object comprising all predefined Reports (physically incorporated) or generated instantly by *ARIS*, designed for all types of authorized users with the aim to register and manage addresses objects or manage and monitor the activity of all authorized users of the IT system. It is possible to present the following categories of reports implemented under *ARIS*:

Predefined complex reports on the basis of predefined templates:

Generated documents on the basis of predefined templates:

Statistics and KPIs of *ARIS* (aggregated values retrieved from the information content of the *ARIS* database);

*ARIS s*ystem reports:

Taking into account their type, the reports will be accessible from interfaces with restricted access for the authenticated and authorized users. This informational object is described by the following categories of attributes:

identifier;

report title, KPI;

reference period;

report content, KPI.

7. Notifications.

This represents a category of complex informational objects used for notification with or without confirmation of *ARIS* authorized users. A notification shall comprise the following specific information:

identifier of notification (order number assigned automatically by the *ARIS*).

business event related to the notification;

reference of access to the business event (file, form or document) that sent the notification (where appropriate);

timestamp of the notification delivery;

notification delivery strategy (E-mail or internal messenger, *ARIS* application);

subject of the notification;

content of the notification;

sender of the notification;

recipient of the notification;

other relevant data.

8. Metadata.

This represents a category of complex informational objects comprising all Classifiers, Nomenclatures and Metadata used under *ARIS*. It shall comprise the following categories of data:

external classifiers/nomenclatures (fully retrieved from external institutions or external information systems);

ARIS internal classifiers/nomenclatures:

configuration variables for *ARIS* (ways of access, global variables, etc.);

configurations of access to external WEB services;

other categories of metadata.

9. Document template.

This is a complex informational object designed to store a standard structure, predefined for the documents applied in the management and registration processes of mobilization resources. Based on the predefined templates it would be possible to generate and print out all documents prepared through UC11.

The informational object *Document template* is described by the following categories of attributes:

template identifier;

template name;

version;

status;

parameters of document layout.

parameters for inserting the document content.

10. Report template.

Complex informational object intended for data processing, extraction and displaying the contained data from *ARIS* database. Contains the totality of rules for data processing, extraction and displaying of information from *ARIS* in a convenient / user-friendly way.

The informational object *Report template* is described by the following categories of attributes:

template identifier;

template name;

version;

status;

parameters of report layout.

parameters of processing and insertion of report content.

11. Logged event.

This is a complex informational object designed to conduct the ICT audit and implement the information security policy. Any accessing or change of data: creation, updating, deletion, changing the status, etc. shall be logged in a special log file, with the recorded timestamp, the application, the event and the user who carried out the action. When the change does not involve physical removal of data for each registration, it would be possible to see the name of the user who made the last change.

Logging events shall have the following data:

identifier of the logged event;

document id of the event;

identifier of the user who generated the event;

category of the logged business event;

timestamp of event logging;

component of IT application (module) that generated the business event;

record affected by the business event;

details of the event.

4.2. Functionalities of the IT System

The functionalities provided by *ARIS* and the actors who can benefit from them are displayed in Figure 4.2. According to Figure 4.2, *ARIS* actors have access to 15 use cases that provide the following functionalities:

UC01: View addresses and public data

Use case provided to anonymous users through which users will access functionalities of reaching reports, statistics and KPI of public character regarding address system of Republic of Moldova.

Public access interface will allow Internet Users to formulate search / filter criteria on address objects and receiving, based upon selected criteria, lists of address objects requested (e.g. districts, localities, streets, certain addresses, etc.)

Public interface will offer a WEB GIS solution through which Internet Users will have the possibility of searching, visualizing, exploring addresses on interactive maps.

Use case UC01will be provided via 2 alternatives:

A dedicated public interface provided by *ARIS*;

Open Data Portal.

In the case of Open Data Portal, *ARIS* will automatically publish files that contains data of public character on address system of Republic of Moldova (reports, nomenclatures, etc.).

UC02: Address business event management

This is a complex use case that will deliver all electronic forms necessary to document all business events related to the registration and management processes of addresses. *ARIS* will not allow any direct replacement of data in the database. Any change shall be carried out through a specialized electronic form. Depending on their entitlements and roles, the IT System users will have access to the relevant set of electronic forms.

The use case UC02 is a feature characteristic for the role of *Address operator* that represents one of the most important feature of the system. *Address operator* is a base level actor that taking into account legislation is represented by local authorities: has the basic role of adding primary information to *ARIS*, also to maintain this Register (modifying, address

canceling). The primary recorded information will serve as a unique source of addresses for other organizations, institutions and other information systems. *Address operator* will interact with population in order to offer documents needed for address legalization, e.g. certificates.
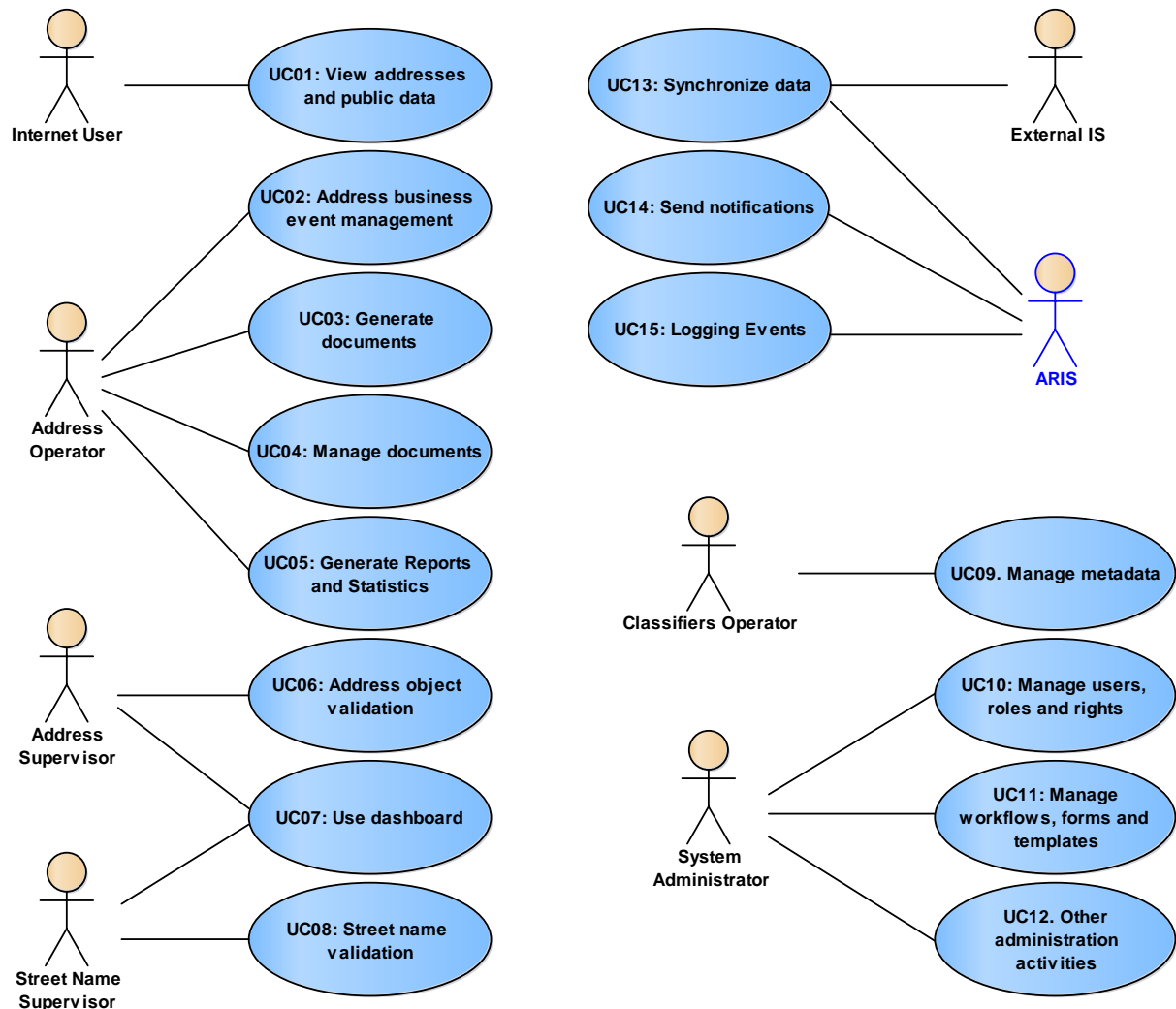
Figure 4. Use cases of ARIS.

The most common operations of address data are:

Address informational object adding – is based on a document confirming the legality of the conduct of operation. The document is attached in electronic format, where for a certain geospatial location is created a new unique address. Besides legal document, textual attributive information of address and address geospatial location is needed. Lack of any of these three conditions will not allow storage of the object in Register or will allow storage of the object in Register with a status of "*object in work*"

Address informational object modifying – is based on a document confirming the legality of the conduct of an operation. The document is attached in an electronic format. This operation is required because of the need of modifying the textual attributive information and / or the geospatial location of the addressable object. All previous information on address will be kept in the system and when required past reports shall be generated and information about the object shall be available

Address informational object cancelling or Address informational object elimination - is based on a document confirming the legality of the conduct of operation. The document is attached in an electronic format. Address informational object cancelling may be applied when for e.g. a house is demolished and there is no more need of address storage. Any operation of address informational object cancelling is a logical operation in *ARIS* application, changing only the status without elimination of the object from Register. All previous information on address will be kept in the system and when required reports from past shall be generated and information about the object shall be available.

Elimination of the incorrect address informational object - is based on a document confirming the legality of the conduct of operation. The document is attached in an electronic format. Elimination of the incorrect address has the purpose of addressable object elimination from the Register, operation that may be only logical. Eliminated object shall not appear in past reports. More frequently, this operation will be used when address operators made an error.

Upon insertion and / or change of addressable objects, a number of validations in the system defaults textual data will be done, in order to rule out operator errors such as, address number should not contain specific symbols e.g.: „@#$%^. At the level of geospatial data is required to include a verification of objects topology such as for current level and for other levels. The system shall include a classifier managed by a *Classifiers Operator*, which will specify the set of rules for topology checking between different levels. For example, geospatial location of localities cannot overlap, but at the same time a street cannot be part of two or more localities.

UC03: Generate documents

This functionality is available to users with the role of *Address Operator, Address Supervisor, Street Name Supervisor, Classifier Operator* and *System Administrator* through which all documents shall be generated on the basis of predefined templates with data populated from the *ARIS* DB content.

ARIS will provide functionalities for download of the generated documents in printable format or editing format, ensuring the storage mechanisms in ELO, as well as applying the digital signature.

UC04: Manage documents

Use case that aims to create interface for adding, extraction, modification or removal of documents relevant to business events or addressable objects. The document management must have the following minimum requirements:

Create: capture, identification and classification of documents.

Maintain: documents controls and security; documents versioning and long term preservation;

Disseminate: search, retrieve and render functionality;

This functionality will allow the effective operation with documents from different storage systems. ELO platform of *S.E. „Cadastru"* will be used as a document management mechanism.

UC05: Generate report and statistics

It is a functionality characteristic for the roles: *Address operator*, *Classifier operator*, *Address supervisor*, *Street names supervisor*, which will facilitate quick access to a grouped set of information, following a number of conditions. It is necessary to set out the following options of reports:

Static – reports with fields with input parameters and a default output data format. Actor can access the report, input parameters (that may be or may be not) and receives the generated report results according to a predetermined template. Static reports are used most frequently and have the role for a quick access to visualization data, printing or exporting in open formats.

Dynamic – report generator easily configurable for simple users. These users, in specific cases, depending on the need will create their own report where will define input parameters and output report format. Configured report will be saved for users / user groups for a subsequent access. Dynamic reports have the role for a quick access to visualization data, printing or exporting in open formats.

Internal – static and dynamic reports, created for analysis of processes carried out, the informational base of the system, analysis of the activity of authorized users. This kind of report is accessible for system Administrator with the possibility for visualization, printing or export.

Security and audit reports by configurable criteria, including history of objects changed and reports on data usage;

Statistical report on ARIS web services usage;

Logging report – to keep a log of all created reports, issued data, indication to who was presented, when and for what purposes and the user who generated the report.

Reports are generated for geospatial and textual information with the possibility to modify and configure style of symbols, texts names and other components (header / body / footer) colors / styles thickness and geospatial data visualization etc.

It is necessary to provide a system for storing and accessing the reports depending on the access rights. The result reports can be viewed, printed or exported to formats such as Open Office, xml, pdf, Google KML, GML, etc.

UC06: Address object validation

It is a functionality characteristic for the *Address supervisor* for checking of newly created or modified objects. It is a necessary operation especially in the first period of the life cycle of *ARIS* in order to avoid operator errors.

Address supervisor will have a graphical interface where the system will display the list of new or modified objects. When accessing an addressable object, attributive textual information, geospatial, documents attached to this object and a report on the accuracy of the data generated by the system will be displayed. When saving an addressable object, a data validation is ongoing, approved results will be available later in the report generated by the system.

The role of *Address Supervisor* has a predefined independent role, but if necessary can be offered to *Address Operator*, depending on further requirements of *ARIS* holder.

UC07: Use dashboard

This represents a functionality through which the authorized user of the *ARIS* will be warn and be able to view and access rapidly all business events related to his interactions with the IT system and job duties (system notifications, workflow events, etc.).

Likewise, he will have direct access to functionalities related to the notified business events (accessing directly the business event form, printing out the documents generated as a result of received changes, etc.). The user interface of the *ARIS* main page would serve as a Dashboard where user-related elements and notifications would be displayed.

UC08: Street name validation

It is a functionality characteristic for *Street Names supervisor* which provides verification, acceptance or rejection of new or changed street names. According to Draft Law: *Academy of Sciences* is the responsible body for final approval of street names.

Without the approval of *Street names supervisor*, the street will have an undetermined status and will be not available for use by address operator. Totality of rules for the validation of street names is described in Draft Law.

UC09: Manage metadata

This is a use case that provides all functionalities intended for the *Classifiers Operator* through which he administers all Nomenclatures, Classifiers and configurations that form the *ARIS* metadata system (including the Metadata that define the *ARIS* user interface configuration).

UC10: Manage users, roles and rights

It describes the functionalities intended for *System Administrator* through which they administer profiles and roles of IT System authorized actors, including the external actors who review and insert data for which the authentication is done on the basis of user name + password + IP address, digital certificate or mobile identity, of external IT systems etc.

Likewise, this Use Case will deliver all functionalities necessary to define the users' rights of access to user interface components or Data Base content and specify the component peculiarities of user interface components in their interaction with the authorized users.

UC11: Manage workflows, forms and templates

This represents a use case intended for IT *System Administrators*, which describes all functionalities available to them to update workflows, electronic forms and standard document templates usable for each type of input or output document (configure the heading zone, footnotes, static and dynamic contents, formatting, graphical aspects, etc.).

A document template shall comprise an inserted beacon through which it could be populated with content information extracted from the database.

UC12. Other administration activities

This represents a use case intended for *Administrator*, which describes all functionalities accessible to them designed to administer and audit the *ARIS*: maintaining the list and integrity of users' credentials who have access to the administration space, retrieval of reports from the system logs to be subject to review and tracking potential logical and physical security issues of the *ARIS*, using the procedures for backup/restore etc.

The *ARIS* administration Use Case will implement all functionalities aimed at ensuring the IT System viability and integrity.

UC13: Synchronize data

Use case through which *ARIS* will execute upon request or automatically with a certain periodicity the launch of procedures of retrieval or delivery of data necessary for functioning or regarding address system of Republic of Moldova. *ARIS* will use external interface for retrieval of data necessary for implemented business processes (orthophoto data, vector graphics and document management) and will provide interfaces through a third-part informational services that requests data on address objects from Republic of Moldova. Interaction with external information systems will be realized through interoperability framework platform *MConnect.*

UC14: Send notifications

This is a use case through which the *ARIS* authorized users will be notified (internal messenger or E-mail) on the occurred business events that might affect them. The users shall receive notifications through their personal dashboard and E-mail messenger. The *Address Register Information System* will ensure functionalities of direct access to business event details (electronic file, electronic form or document to be printed out) directly from the notification.

UC15: Logging Events

This is a use case through which the business events generated by the *ARIS* functional components will be logged. Any event generated under business processes implemented in *ARIS* will be logged and saved in the corresponding tables of the database. The logging mechanism shall be developed on the basis of standards and best practices implemented in the industry. The IT System will deliver functionalities to configure the strategy for logging of business events, including: business events subject to logging, logging calendar (determined period for logging or undetermined). The logging mechanism shall integrate with *MLog* to logging sensible business event. The developer will conceptualize and validate the totality of workflows of *ARIS* at the stage of information system projection and technical project conceptualization.

The following indicative workflows needs to be conceptualized:

- Workflow intended for address objects creation that will deliver the totality of necessary functionalities for perfecting electronic forms designed for adding of new address objects.

- Workflow intended for address objects modification that will deliver the totality of necessary functionalities for perfecting electronic forms designed for modification of existing addresses in *ARIS*.

- Workflow intended for address objects removal that will deliver the totality of necessary functionalities for perfecting electronic forms designed for removal of existing addresses in *ARIS*.

- Workflow intended for approval / rejection of requests of adding / modification / removal of address objects.

- Workflow intended for requests on adding street names that will deliver the totality of necessary functionalities for perfecting electronic forms designed for adding of new street names.

- Workflow intended for modification of street names that will deliver the totality of necessary functionalities for perfecting electronic forms designed for modification of existing street names in *ARIS*.

- Workflow intended for removal of street names that will deliver the totality of necessary functionalities for perfecting electronic forms designed for removal of existing street names in *ARIS*.

- Workflow intended for approval / rejection of requests on adding / modification / removal of street names.

- Workflow intended for interactions between *ARIS* and external information systems for WEB interfaces exposal designed for delivery of data on address objects contained in *ARIS.*

4.3. User Interface of IT System

ARIS shall offer an ergonomic interface, intuitive and accessible to all types of users via a web browser optimized for the resolution of 1360x768. The System shall have an agreeable, balanced and distinct graphical design, responsive to all devices used (desktop PC, notebook, tablet, Smartphone). For users' simplicity, the IT solution shall have a system of online contextual help at the level of each WEB interface.

Depending on the user category (their rights and roles) the IT system will deliver a personalized interface to each category of users.

Users of the IT system shall have at least 7 basic levels of access to user interface (sets of rights and roles assigned to them, and the IT System Administrator would be able to configure the optimal number of access groups through system mechanisms delivered by the application):

- **Access Level for Internet User** – characteristic access level for anonymous users of *ARIS* that shall have access to the totality of information of public character through *Open Data Portal* or accessing public interface of *ARIS*. Public access means also access of data in GIS format, with browsing addresses on map.

- **Access Level for the Address Operator of Level 1 LPA** – characteristic access level for local public authorities of level 1 users that shall pass authentication using user name and password, or using digital certificate / mobile identity and will have authorized access to the totality of functionalities of perfecting forms for creation, modification or removal of address objects located in the area of jurisdiction of local public authorities of level 1, that operator is responsible for. Also, this category of users shall have access to functionalities for generating documents and relevant reports on address system and business events of local public authorities of level 1.

- **Access Level for the Address Operator of Level 2 LPA** – characteristic access level for local public authorities of level 2 users that shall pass authentication using user name and password, or using digital certificate / mobile identity and will have authorized access to the totality of functionalities of perfecting forms for creation, modification or removal of address objects located in the area of jurisdiction of local public authorities of level 2 (setting of borders of local public authorities of level 2, setting of borders of local public authorities of level 1 that are component part of authorities of level 2, etc.) Also, this category of users shall have access to functionalities for generating documents and relevant reports on address system and business events of local public authorities of level 2.

- **Access Level for the Address Supervisor** – characteristic level of access for authorized users of *S.E. „Cadastru"* that shall pass authentication using user name and password, or using digital certificate / mobile identity and will have authorized access to the totality of functionalities for approval / rejecting of requests forms on addresses perfected by users with the role of *Address Operator.* Also, this category of users shall have access to functionalities for generating documents and relevant reports for own access rights.

- **Access Level for the Street Name Supervisor** – characteristic access level for authorized users of *Academy of Science,* that shall pass authentication using their user name and password, or using digital certificate / mobile identity and will have authorized access to the totality of functionalities for approval / rejection of request forms on adding street names in *ARIS.* Also, this category of users shall have access to functionalities for generating documents and relevant reports for own access rights.

- **Access Level for the Classifiers Operator** – characteristic access level for authorized users of *S.E. „Cadastru"* that shall pass authentication using user name and password, or using digital certificate / mobile identity and will have authorized access to the totality of functionalities for administration of *ARIS* metadata system (classifiers, nomenclatures, variables of configuration, etc.)

- **Access Level for the System Administrator** – a level of access common for the user with the highest level of access to the IT System resources. This level, due to its role to administer the IT solution smooth operation, will ensure access to all functionalities of user interfaces and to the database content delivered by the user interface.

ARIS shall deliver a user interface in Romanian language. The data content of the IT system will be input in 3 language versions: Romanian, English and Russian. The procedures of searching information and records shall be performed via simple search (specification of search series) or via more complex search forms allowing filtering the information (QBE forms). Regardless of the type of searched information, the user shall utilize the same method of queries and retrieval of information for any section of the IT system.

In addition to the searching module implemented based on QBE principle, which would offer the possibility to define visually sophisticated queries, the interface shall offer the possibility to refine the search results by ensuring the possibility to filter the data in the list containing the search results.

The IT system user interface shall ensure filtering the records that match the search criterion presented by users depending on their rights of access.

Indexed values (values from Classifiers, Nomenclatures) shall have the option to be filtered by picking up the value from predefined lists. For numerical types of fields or calendar data there should be the possibility to filter as per the exact value of the searched characteristic (*example: 23.09.2016– all records with the specified date*) or by logical criteria (*example: <01.04.2015 – all records with the date older than 01.04.2015, >07.06.2013 – all records with the date more recent than 07.06.2013*).

Also, it should be granted the possibility to filter the result according to the mask (for example, filtering by address identifier) as per the sample: **258151224*** – all the records that begin with the series of characters " **258151224**", ***CEL MARE** – all the records that end with the series of characters "**CEL MARE**" or ***MARII ADUN*** – all the records that comprise the series of characters " **MARII ADUN**" in their contents.

The content of any table with results or electronic format, depending on the type of information comprised, shall have the possibility to be exported in any of the following format: CSV, RTF and PDF.

ARIS shall provide to relevant users a WEB GIS interface. The Web GIS *ARIS's* component will have several layers of access: for power users (e.g. ALRC, SE "Cadastru"), for key government stakeholders and for the open public:

- The web GIS component for power users must integrate all functionality for data entry, data quality control, queries and analysis;

- The web GIS component for key government stakeholders must integrate all visualization, query and analysis functionality; Part of the web GIS application is public API(s) to enable integration within systems;

- The web GIS component for the open public must integrate visualization functionality with basic search capabilities for address search based on key address attribute data (e.g. Localities, settlements, street names, street numbers, etc.).

The web GIS visualization functionality must include basic functionality for map display and map navigation (pan, zoom in, zoom out, center map display, zoom to full extend), basic tools such measure line, polygon, must have a map legend for all layers of symbols, switch on/off layers functionality, printing functionality, scale bar, quick navigation functionality with a drop down list of localities, etc. Must have option to save current user layout (as a map template) to be opened in the next session or to share it.

4.4. Reporting, Audit and Statistics Mechanism of the IT System

The IT System should have implemented functionalities designed to auditing/logging widely used in this area. This is configurable for logging technical and business events. The IT System shall deliver a mechanism to generate predefined and ad hoc reports capable to ensure a pertinent review or assessment of the management and registration processes of mobilization resources.

ARIS shall deliver an OLAP mechanism intended for dynamic generation of various and ad hoc reports where to configure the cubes for data analysis, including the configuration of the data aggregation method (average, median, maximum, minimum, element quantification, etc.).

The *ARIS* reporting system shall define 4 categories of reports:

- **Analyze reports** – a category of reports (as a rule, implemented physically in the IT System content) aimed to audit and analyze the *ARIS* information content. Given reports will be generated based on configurable templates. The Developer shall integrate at least 25 categories of such reports, which layouts would be granted at the time of performing the business analysis.

- **Documents generated on the basis of a predefined template** – a template is created for each type of documents to be populated with information relevant for the document (*e.g. request of adding street name, request of adding / modification / removal of address, etc.*);

- **Performance Indicators** – a set of KPIs based on which the performance of mobilization resources management and registration could be assessed (assessment indicator of the country level of provision with human and material mobilization resources);

- **Monitoring reports** – a category of reports designed for users with decision-making roles to assess the interaction methods of authorized users with the *ARIS*. This category of reports will organize and display the content of log files based on which the IT system vulnerabilities could be reviewed and prevented;

The reporting mechanism peculiarities are described in a series of sections of this Document, such as:

- Section 4.1. (informational object Reports);

  Section 5.1.3. (functional requirements set for use case UC03: Generate documents);

  Section 5.1.5. (functional requirements set for use case UC05: Generate Reports and Statistics);

- other Sections of this Document.

V.   REQUIREMENTS FOR THE IT SYSTEM

5.1. Functional Requirements for the IT System

UC01: View addresses and public data

The functional requirements related to the component of public access on *ARIS* are defined in Table 5.1.

Table 1. Functional requirements set for use case UC01

Identifier	Mandatory	Functional Requirement Description
FR 01.01	M	*ARIS* shall provide anonymous access (public) to its compartments via two options: dedicated public interface of *ARIS;* Open Data Portal (http://date.gov.md).
FR 01.02	M	Information of public character includes: reports, statistics and KPI registration data of address objects.
FR 01.03	M	The public *ARIS* interface will deliver 3 regimes of data exploration: downloading of reports, statistics and generated by *ARIS* documents; registration data of address objects exploration in alphanumeric format; registration data of address objects exploration through WEB GIS interface.
FR 01.04	M	Public interface shall provide mechanisms for data search via a module for searching / filtering (choosing values from a predefined nomenclature or global search), the result should be in alphanumeric format.
FR 01.05	M	Public interface shall provide mechanisms for data searching via geospatial data (choosing values from a predefined nomenclature or defining relevant areas on map), the result should be presented on map.
FR 01.06	M	The web GIS visualization functionality must include basic functionality for map display and map navigation (pan, zoom in, zoom out, center map display, zoom to full extend), basic tools such measure line, polygon, must have a map legend for all layers of symbols, switch on/off layers functionality, printing functionality, scale bar, quick navigation functionality with a drop down list of localities, etc. Must have option to save current user layout (as a map template) to be opened in the next session or to share it.
FR 01.07	M	*ARIS* shall ensure functionalities of exporting the results in an editable format (*e.g. the export of a list of street names that correspond to selected search criteria*).

UC02: Address business event management

The functional requirements related to the mechanism for preparing electronic forms related to business events of the registration and management processes of addressable objects are defined in Table 5.2.

Table 2. Functional requirements set for use case UC02

Identifier	Mandatory	Functional Requirement Description
FR 02.01.	M	*ARIS* shall provide mechanisms of searching address objects via a module for searching / filtering (choosing values from a predefined nomenclature or global search), the result should be in alphanumeric format.
FR 02.02.	M	*ARIS* shall provide mechanisms for data searching via geospatial data (choosing values from a predefined nomenclature or defining relevant areas on map), the result should be presented on map.
FR 02.03.	M	*ARIS* will deliver electronic forms designed to record business events related to addressable objects.
FR 02.04.	M	As business events related to addressable object could serve acts, orders, dispositions and other categories of documents involving the change of registration data and records addressable objects.
FR 02.05.	M	All updates operated to registration data and records on addressable objects will be prepared exclusively through UC02.
FR 02.06.	D	The statuses and transitions through which an electronic form for preparing a business event related to addressable objects could go through are configured via use case UC11.
FR 02.07.	M	*ARIS* will ensure access to authorized users to the list of electronic forms designed to record business events related to addressable objects depending on the roles they hold.
FR 02.08.	M	Any electronic form designed to prepare a business event related to addressable object will have associated a document template to be configured through UC11 and populated on the basis of data comprised by the form.
FR 02.09.	M	The IT System will enable inserting in the electronic form several addressable objects at the same time (mass register, mass change etc.).
FR 02.10.	M	The following are part of the category of addressable objects: buildings, including the unfinished and the future ones (if the address had been attributed before the entry into force of the present law); main entries into buildings; isolated premises, including the future ones; parks; public markets; recreation or rest areas; sport fields; authorized car parking lots; other authorized objects where human activity can be carried out.
FR 02.11.	M	The system should have a flexible mechanism for creating the address line based on a predetermined template. The user should have the possibility for each concrete case to decide to add or not an element to the address. The address of the object shall contain the following elements: name of the state; name of the administrative-territorial unit of the second level; name of the administrative-territorial unit of the first level; name of the village (in case of communes);

Identifier	Mandatory	Functional Requirement Description
		name of the circulation route or name of the area of public circulation to which the addressable object has an exit;
		distance of object location on a certain road (for the objects located outside the built-in area of localities);
		the number of building and number of the entrance (condominium entrance) (for addresses attributed before the entry into force of the present law) or the number of entry (for addresses attributed after the entry into force of the present law);
		number of premises.
FR 02.12.	M	The system will allow the adding, modifying and cancelling of all component parts of an address: state; administrative-territorial unit of the second level; administrative-territorial unit of the first level; name of the village (in case of communes); name of circulation route or name of the area of public circulation to which the addressable object has an exit; distance of object's location on a certain road; the number of building or the number of entry. The data has to be in compliance with data specification for INSPIRE spatial data theme Addresses. Mappings between the system and INSPIRE application schema for each applicable feature type have to be indicated.
FR 02.13.	M	The system will leave the possibility to configure of component parts and interdependent parts of an address, without the need of a special configuration by programmers. For example the change of "raion" into "judeţ" – a new layer will be added in the Register. It will be necessary only to configure the system.
FR 02.14.	M	The system will deliver a unique interface for editing of textual and graphical information of addressable object
FR 02.15.	M	The system will allow the defining of access rights for users depending on their geographical area of activity and will exclude the possibility of accessing data from other geographical areas
FR 02.15.	M	The history for each addressable object will be preserved. A service for accessing a certain moment from the past shall be developed, in order to check information about the object, or that there was not such object in the system.
FR 02.16.	M	The system will allow adding of past objects, before the creation of addressable object, in this manner the possibility of recovering information about a past address is created. Example: *str. Ştefan cel Mare* was registered on 01.01.2000, before 90's it was named *str. Lenin*. In such way the historical information can be stored.
FR 02.17.	M	Any electronic form designed to prepare a business event related to addressable object will define following types of operations with addressable objects: create objects; modifying objects; cancelling objects;

Identifier	Mandatory	Functional Requirement Description
		elimination of incorrect object.
FR 02.18.	M	Each operation of editing of an addressable object shall be possible only if a scanned or electronic document is attached to electronic form of business event related to addressable object.
FR 02.19.	M	Taking into account the actual configuration of the data collection, pre-processing, quality control work-flows and database structures the data input on the addressable objects business events must have the following minimum requirements: a) Manual data entry into the databases via on-line interfaces (customized web applications) with main functional capabilities implemented on them: Web interface for manual entry of data (on-line forms), for both geographic and attribute information, including point, line and polygon features. The web interface for the attribute information must be based on predefined nomenclature list (drop down /search menus) of street names, street number, floors, Isolated spaces, etc. If the data is available in the database user can select from the drop down/search list: Select/Enter settlement name (e.g. village); Select/Enter street names, assigned to the selected village; Select/Enter building number, assigned to the selected street; Select/Enter floor number, assigned to the selected entrance number; Select/Enter Isolated space number, assigned to the selected floor number. If data is not available, the user can edit the nomenclature list, add missing data and then select the newly added data and assign it to a new address. b) The web interface for geographic data must support at least the follow operations: Add/edit features – add/edit features manually by indicating coordinates, by draw on the map or by the import of geographic data generated in other GIS based software (one or more objects at the same time); Clipping features – used to cut out a piece of object; Merging features – create possibility to merge two or more objects from the same layer; Intersecting – integrate two spatial data sets while preserving only those data common for both objects; Buffering graphics and features; Querying attributes and geographic data; Topology – topology had to be supported for objects from the same layer and/or from different layers; Web interface for entering metadata records (as database attributes or XML documents); Web interface for attaching documents, related to address information. All documents must be stored and integrated with the existing document management system in SE "Cadastru". The DMS in SE "Cadastru" is ELO (http://www.elo.com/) and all necessary licenses will be provided by the Contracting Authority.

Identifier	Mandatory	Functional Requirement Description
		c) In addition to the above-mentioned customized web interfaces, it is also possible to establish a password-protected multi-user access to DBMS and Web Service Catalog with a variety of standard software applications (e.g. QuantumGIS). Loading data queries into such powerful applications could provide not only an interactive data editing functionality, but also a wide range of analytical functions, including statistical analysis, data summarizing and creation of sophisticated graphical outputs.
FR 02.20.	M	All operations involving addressable objects shall be logged.
FR 02.21.	M	Database software (DBMS) of the system must have full RDBMS capabilities of storing both GIS data objects and attribute data tables, as well as support of OGC standards and functions for password-protected multi-user data access and editing of attributes and GIS objects (standard EPSG projections, internal topology support for vector objects, spatial indexing and spatial queries, geo-processing functionality) along with SQL querying and replication capabilities.
FR 02.22.	M	A set of rules for checking of inputted information quality (textual / geospatial data) shall be developed in SRS.
FR 02.23.	M	When a graphical object is edited, an automatic check of the quality of introduced data and a report shall be created.
FR 02.24.	M	Editing of an addressable object is complete when there are no errors approved by *Address supervisor*.
FR 02.25.	M	Elimination of an approved addressable objects is a logical operation, physically the object will remain in the database with all its characteristics. This operation cannot be completed, if in present there are active links of other informational objects.
FR 02.26.	M	Placing or modifying of addressable objects with time data that is intersecting is not possible. Example: "str. Stefan cel mare 45" cannot be identified for the date 01.01.1992 as "str. Lenin 45" is the name of the street for that date During geospatial information editing, it will be checked the type of object: point, line, polygon and multi-polygon. Objects other than this set will not be saved.
FR 02.27.	M	For geospatial data, the topology of object shall be checked.
FR 02.28.	M	The visualization of all historical versions of an object shall be developed, including all attributive textual and graphical information, and all legal documents.
FR 02.29.	M	The system must support versioning of informational objects, classifiers and other information.
FR 02.30.	M	The system must support continuity and "no deletion" of informational objects and classifiers
FR 02.31.	M	The system shall have the option of exporting graphical information about the objects in open source formats, e.g. Google KML, ShapeFile, etc.
FR 02.32.	M	When modifications are cancelled by "Address supervisor", the system will return all the information in the initial form.

Identifier	Mandatory	Functional Requirement Description
FR 02.33.	M	The system allows validation of topological objects. First, new objects are validated between them and after that are validated with existing objects from Register.
FR 02.34.	M	The form will include content-related constraints and restriction to limit mechanical errors.
FR 02.35.	M	On the basis of content information from the electronic form for recording the business event related to addressable objects, *ARIS* will enable generating a file in editable format to print out a hard copy of the act related to the form.
FR 02.36.	M	The IT System will deliver a mechanism for checking the accuracy of preparing the electronic form for recording the business event related to addressable objects (obligation of data content, accuracy of inserted type of data, integrity of entered data, etc.).
FR 02.37.	M	Electronic form for recording the business event related to addressable objects must have front end validation on a field level, with a proper notification for the user. Additional server-side validations must be developed when saving the data. Validations can include: obligatory fields, drop down menus, spatial validation of addresses within building boundaries etc.
FR 02.38.	M	*ARIS* must provide topological validation of geometry of all point, line and polygon features into the system.
FR 02.39.	M	*ARIS* must generate automated reports for quality control, based on geographical or attribute selection.
FR 02.40.	M	Only an electronic form for recording the business event related to addressable objects that passed successfully the procedure for checking the accuracy of its preparation will be sent to the *Address Supervisor* or *Street Name Supervisor* for approval.
FR 02.41.	M	The IT System will deliver functionalities for applying the *Address Operator* digital signature on the electronic form for recording the business event related to addressable objects prepared by him according on national legislation on registries.
FR 02.42.	M	*MSign* service of the joint governmental platform *MCloud* will be used as a mechanism for applying the digital signature.
FR 02.43.	M	*ARIS* will deliver functionalities for sending the electronic form for recording the business event related to addressable objects to the *Address Supervisor* or *Street Name Supervisor* for approval.
FR 02.44.	M	*ARIS* shall notify automatically the *Address Supervisor* or *Street Name Supervisor* on receiving an electronic form for recording the business event related to addressable objects for consideration and approval (the form shall be approved through UC14).
FR 02.45.	M	An electronic form for recording the business event related to addressable objects can be edited repeatedly when it was rejected by the *Address Supervisor* or *Street Name Supervisor*.
FR 02.46.	M	Once the electronic form for recording the business event related to addressable objects has been signed and approved, *ARIS* shall spread relevant adding, changes or deletion to specific addressable objects.
FR 02.47.	M	In case of a form that includes several addressable objects, changes will be spread in object.

Identifier	Mandatory	Functional Requirement Description
FR 02.48.	M	The IT System will ensure logging of the totality business events on editing and processing the electronic form for recording the business events related to addressable objects.

UC03: Generate documents

The functional requirements related to the component of generating standard documents on the basis of data comprised by the *ARIS* are defined in Table 5.3.

Table 3. Functional requirements set for use case UC03

Identifier	Mandatory	Functional Requirement Description
FR 03.01.	M	*ARIS* will deliver to authorized actors a mechanism for generating standard documents populated with data from the *ARIS* database.
FR 03.02.	M	The IT System will enable generating documents related to the business events on addressable objects.
FR 03.03.	M	The IT System will enable generating documents on the basis of the electronic form content of business events prepared through UC11.
FR 03.04.	M	The documents to be printed out will be generated on the basis of templates configured through UC11.
FR 03.05.	M	The amount/totality and the format of documents will be approved on elaboration of design stage
FR 03.06	M	*ARIS* will enable automatic generation of documents related to notifications received by relevant users (*example: notifications sent to the Street Name Validator to approve street name*).
FR 03.07.	M	*ARIS* shall generate at least PDF, MS WORD documents with digital signature applied.
FR 03.08.	M	Authorized users will have access to categories of documents that may be generated based on own access rights and own role.
FR 03.09.	M	*ARIS* will ensure logging of all events for document generation and printing.

UC04: Manage documents

The functional requirements related to the mechanism of reports retrieval specific for *ARIS* are defined in Table 5.5.

Table 5. Functional requirements set for use case UC05

Identifier	Mandatory	Functional Requirement Description
FR 04.01.	M	The Document Management module will be used for searching, retrieving, viewing and printing documents, as well as give the possibility of editing metadata and properties of the actual documents.
		All registered documents are searchable from document archive by document ID. Searching for documents shall also be possible from all systems using search in documents metadata and from the search list, selection of actual documents.
		The document storage will be managed by the Document archive

Identifier	Mandatory	Functional Requirement Description
FR 04.02.	M	All generated documents will be stored in electronic archive, but not directly in *ARIS*.
FR 04.03.	M	The storage of documents must be document archive of *S.E. „Cadastru"* developed on ELO document management platform.
FR 04.04.	M	*S.E. „Cadastru"* is responsible for license, in case ELO Document Management solution will be selected.
FR 04.05.	M	*ARIS* shall use services provided by ELO platform of *S.E. „Cadastru"* for uploading, downloading, searching, visualizing managed documents.
FR 04.06.	M	Document Management subsystem is responsible of data crash and data recovery information
FR 04.07.	M	The system shall provide functionalities to electronic signing of the documents.

UC05: Generate Reports and Statistics

The functional requirements related to the mechanism of reports retrieval specific for *ARIS* are defined in Table 5.5.

Table 5. Functional requirements set for use case UC05

Identifier	Mandatory	Functional Requirement Description
FR 05.01.	M	The IT System must be able to offer a number of management, statistic and ad hoc reports, so that the relevant roles could manage and keep records on address system.
FR 05.02.	M	Reports are generated for geospatial and textual information with the possibility to modify and configure style of symbols, texts names and other components (header / body / footer) colors / styles thickness and geospatial data visualization etc.
FR 05.03.	D	The reporting mechanism will contain an *OLAP* solution designed to configure the dynamic generation of ad hoc reports.
FR 05.04.	M	The System shall put at the disposal of administrative roles a standard number of configurable reports and it must be easy to authorize the production of ad hoc reports when needed.
FR 05.05.	M	The System shall create reports based on different parameters or filters from available data. Dynamic queries based on selection of layer/table, selection of one or more attribute fields, selection of operator (>, <, <>, >=, <=), entry of data values. The user must have the functionality to save a query within his own profile for later usage.

FR 05.06.	M	*ARIS* shall include a configurable reporting mechanism regarding Address Objects, User events, Audit trails. The report tool shall allow:
		     to select objects included in the report;
		     to store templates of reports for use by other users;
		     to select textual and geospatial data displayed in reports;
		     to dynamically select the layout of data (table, lines, fields);
		     to indicate summarizing or grouping functions for data in tables;
		     to indicate on page layout the location place of textual and graphical data;
		     to define a map area to be printed together with textual data;

Identifier	Mandatory	Functional Requirement Description
		to define map layers, labels and legend to be printed in report.
FR 05.07.	M	Reports shall contain functionalities of exporting information in different formats of data, at least: csv, xls, xml, Google kml, GML, pdf, ShapeFile.
FR 05.08.	M	Reporting system of *ARIS* must support a thematic maps creation for representation of spatial and attribute vector and raster data, with support for export in TIFF, JPEG and PDF formats.
FR 05.09.	M	Reporting system of *ARIS* must support min following spatial analysis functionality: selection of objects from one layer, located within objects from another layer; selection of objects from one layer located outside objects from another layer; selection of objects from one layer within a certain distance from objects of another layer(s); overlay / intersect / clip of two (or more) object layers in order to identify cross-sections.
FR 05.10.	M	Reporting system of *ARIS* must support functionality for identification of an object, based on point, line, polygon drawing.
FR 05.11.	M	Reporting system of *ARIS* must create and execute queries in the form of a report builder or configurator, created by users without any programming.
FR 05.12.	M	Reporting system of *ARIS* must support object version history with the possibility to add old historical data for current objects (ex: add history data available before address register starts to work for object which is currently registered).
FR 05.13.	M	Reporting system of *ARIS* must support querying based on date/time on history data.
FR 05.14.	M	*ARIS* shall allow to store all reports and documents in the archiving system, with a link to the information on objects included in the documents.
FR 05.15.	M	The system shall provide functionality to create tasks to generate reports at specific time with specific parameters. The generated documents shall be sent via email to a specified list of email addresses.
FR 05.16.	M	For long term period, system reports shall be done in background.
FR 05.17.	M	The ARIS shall allow to generate flexible, multiple filters for selection of data, to store this filters and to select data using these filters. The reporting tool shall display any columns from: technical parameters, calculated values, values per unit of area.
FR 05.18.	M	The reporting tool shall allow to define page setup and to print report or to export them with possibilities of application of digital signature.
FR 05.19.	M	The Developer will implement up to 20 predefined reports on the addressable objects requested by the *S.E. „Cadastru"*.
FR 05.20.	M	The System shall offer a number of management, statistic and ad hoc reports that the administrative roles could monitor the system operation and status.
FR 05.21.	M	The reports managed through in UC16 are intended for the functions of IT audit and do not include reports related to the *S.E. „Cadastru"* business activities.

Identifier	Mandatory	Functional Requirement Description
FR 05.22.	M	This reporting is necessary for the entire system, including: 　　nomenclatures and classifiers; 　　　entries; 　　　user activity; 　　　permissions of access and security.
FR 05.23.	M	The reports will be generated on the basis of the following logged categories of events: 　　　successful authentication of users; 　　　unsuccessful authentication of users; 　　　notifications sent; 　　　actions on data (access, add, change, delete).
FR 05.24.	M	The System will enable the aggregated retrieval of reports or their detailing per individual user, institution, subdivision or per certain groups of users.
FR 05.25.	M	The Developer will implement up to 10 predefined reports for the IT audit requested by the *S.E. „Cadastru"*. For the audit reports that can be generated through the system means, it is not required to be implemented into the *ARIS* user interface.
FR 05.26.	M	The System shall have a mechanism to define the set of reports and data available to each category of users.

UC06: Address object validation

The functional requirements related to the mechanism for validation of the address objects of *ARIS* are defined in Table 5.06.

Table 6. Functional requirements set for use case UC06

Identifier	Mandatory	Functional Requirement Description
FR 06.01.	M	*ARIS* P will provide specific interface with functionalities for checking, approving or declining changes of addressable objects
FR 06.02.	M	*Address Operator* shall use the set of electronic forms necessary for developing action projects on address objects (creation, modification, removal) based on use case UC 02.
FR 06.03.	M	Once *Address operator* has changed addressable object, the system automatically will check the changes in order to detect errors and will generate a report about it.
FR 06.04.	M	The system shall notify *Address Supervisor* about the request (new event, address object modification that needs validation) via email and in the Dashboard.
FR 06.05.	M	*Address Supervisor* will have the option to verify generated reports, all textual, graphical information and all documents attached
FR 06.06.	M	*Address Supervisor* will have the option to accept or reject requests and to specify the reason for the reject, in case he declined changes of addressable object
FR 06.07.	M	The approval or rejection implies preparing a Note, selecting the status (*Approved* or *Rejected*), its confirmation and applying the digital signature of the user with the role of form approval/rejection (*Address Supervisor*).

Identifier	Mandatory	Functional Requirement Description
FR 06.08.	M	The IT System will implement the governmental service *MSign* for applying the digital signature when approving/rejecting an address object change.
FR 06.09.	M	Address object will be finally added/changed/deleted in *ARIS* only after approval of *Address Supervisor*.
FR 06.10.	M	The IT System will ensure logging of all business events on validation of address objects.

UC07: Use dashboard

The functional requirements related to the Dashboard intended for the users authenticated and authorized to use *ARIS* are defined in Table 5.7.

Table 7. Functional requirements set for use case UC07

Identifier	Mandatory	Functional Requirement Description
FR 07.01.	M	The IT System will deliver to authorized users a Dashboard through which they will be notified on important business events and have rapid access to event details.
FR 07.02.	M	It is possible to list the following categories of business events displayed on the Dashboard: system notifications; notifications on the need to involve the user in ARIS workflow activities; notifications on the forms or documents waiting to be approved by decision-making roles. other relevant events.
FR 07.03.	M	The Dashboard of the *ARIS* user will display only business events related to the roles and data available to the user.
FR 07.04.	M	The Dashboard of the user with the role of *System Administrator* will display all business events related to *ARIS* functionalities (all notifications displayed on the Dashboard of all *ARIS* users and notifications dedicates exclusively to the user with the role of *System Administrator*).
FR 07.05.	M	The Dashboard will group the business events, having displayed them as indicators with aggregated values (*example: Unread system notifications – 20; Street Names for approval – 5; Address Objects for approval – 4; etc.*), which will comprise hypertext reference for accessing the details.
FR 07.06	M	*ARIS* will display detailed records of the Dashboard in specialized windows or zones on the main page of user interface, which will comprise hypertext reference for accessing the details.
FR 07.07.	M	When accessing hypertext reference related to aggregated values or detailed records of the Dashboard, ARIS will ensure access to detailed information related to them or to the requested functionality (*example: business event of address object form, direct approval/rejection of forms sent for consideration and approval etc.*).
FR 07.08.	M	The Dashboard of the *ARIS* will comprise a specialized zone (favorite) where the user shall display references to content information he is working with. Such content information can be of two types: address objects;

Identifier	Mandatory	Functional Requirement Description
		prepared electronic forms.
FR 07.09.	M	*ARIS* shall offer functionalities to each user for individual configuration of the Dashboard aspect and content.

UC08: Street name validation

The functional requirements related to the mechanism for validation of the street names of *ARIS* are defined in Table 5.08.

Table 8. Functional requirements set for use case UC08

Identifier	Mandatory	Functional Requirement Description
FR 08.01.	M	*ARIS* P will provide specific interface with functionalities for checking, approving or declining changes of street name
FR 08.02.	M	Address operator will make a request through the user interface of *ARIS* to create or change a street name
FR 08.03.	M	The system shall notify *Street name supervisor* about the request via email and in the Dashboard.
FR 08.04.	M	*Street Name supervisor* will have the option to accept or reject requests and to specify the reason for the reject, in case he declined changes of addressable object
FR 08.05.	M	The approval or rejection implies preparing a Note, selecting the status (*Approved* or *Rejected*), its confirmation and applying the digital signature of the user with the role of form approval / rejection (*Street Name Supervisor*).
FR 08.06.	M	The IT System will implement the governmental service *MSign* for applying the digital signature when approving/rejecting an address object change.
FR 08.07.	M	Street name will be finally added/changed in *ARIS* only after approval of *Street name supervisor*.
FR 08.08.	M	The IT System will ensure logging of all business events on validation of street names.

UC09: Manage metadata

The functional requirements related to the mechanism for managing the *ARIS* Classifiers, Nomenclatures and Metadata are defined in Table 5.09.

Table 9. Functional requirements set for use case UC09

Identifier	Mandatory	Functional Requirement Description
FR 09.01.	M	The System shall have a mechanism to manage the Nomenclatures, Classifiers comprised by all *ARIS* metadata.
FR 09.02.	M	The System of metadata will cover all system configurations, parameters and constant values necessary for the *ARIS* operation.
FR 09.03.	M	The metadata of *ARIS* will be multilingual (Romanian, Russian and English as minimum).

Identifier	Mandatory	Functional Requirement Description
FR 09.04.	M	Subsystem classifiers are a system-wide used codes, which shall provide services of access / placing / deactivation codes to the dictionary. It is managing the history of the classifiers as well; inactivated but earlier used classifiers are available too. Most of codes which are used in other subsystems shall be managed by subsystem Classifiers, accessible by web services.
FR 09.05.	M	A classifier may be the status of an addressable object (information taken from current system, it is not a must to be used in the new system): Project entry; Active entry; Extinct entry; Incorrect entry. This information is common for addressable objects and any change of records in the classifiers will influence the change of attributive information on addressable objects.
FR 09.06.	M	Information from *ARIS* has close ties with the period when it was valid. For each classifier will be created a history of changes with values for a defined period of time. For example, a street classifier has: 1) str. - street 2) bd. - boulevard 3) str-la – lane; for the date 01.01.2000, in Address Register is registered str. Stefan cel Mare 54; all documents that were offered at that point of time is address: str. Stefan cel Mare 54, when the classifier is changed into "strada" the record will be "strada Stefan cel Mare 54" for the present time, but for 01.01.2000 will remain „str. Stefan cel Mare 54". The history of the object will be saved.
FR 09.07.	M	It is necessary to display classifiers of historical records.
FR 09.08.	M	References on classifiers shall be maintained according to updated version of the classifiers, in a manner that a field of an active record has one single reference to classifiers
FR 09.09.	M	It shall be possible to display the classifiers of historical records, but it shall not be possible to select any obsolete classifier
FR 09.10.	M	*ARIS* shall totally integrate classifiers and external nomenclatures delivered by *NBS* and external information systems (*MOLDLIS, ELO* and *National Fund of Cartography*)
FR 09.11.	M	The rights of operating changes will be limited for official and external metadata. For this category of metadata, the changes will be operated only when they are done by the CPAs which administer them.
FR 09.12.	M	The System will not allow deleting any category of metadata if it is used at least by one database record.

UC10: Manage users, roles and rights

The functional requirements related to the component of user administration, configuration of access to user interface and content of *ARIS* database are defined in Table 5.10.

Table 10. Functional requirements set for use case UC10

Identifier	Mandatory	Functional Requirement Description
FR 10.01.	M	The IT System will have a mechanism for dynamic definition and management of users, their roles and rights.
FR 10.02.	M	The IT System will contain a default category of users created by the Developer and credentials for it are provided upon delivery for the category of Super user.
FR 10.03.	M	The IT System will enable blocking/activating the user access.
FR 10.04.	M	*ARIS* will deliver its own solution for authentication through the mechanism of user name + password and will enable the alternative use of *MPass* service for the authentication with the digital certificate or mobile identity.
FR 10.05.	M	The IT System will enable defining the way of connecting the user to the system (digital certificate, mobile identity, user name + password, IP address or their combinations).
FR 10.06.	M	The following categories of data will be managed under the users' profiles: user name; user surname; Email; contact phone; login; password; authentication strategy (user + password, digital certificate); status (active/deactivated/blocked); access validity period; user's roles; other relevant data.
FR 10.07.	M	*ARIS* will deliver a mechanism to define, for users, the rights of access to data depending on the categories or types of electronic forms prepared and the geographical area of addresses.
FR 10.08.	M	A user account can be physically deleted only when there is no logged event produced by the deleted user or data introduced or modified by him.
FR 10.09.	M	The mechanism for administering the users' rights and roles will enable establishing the principles of access to user interface and to the information content of the IT System for each individual user or group of users.
FR 10.10.	M	*ARIS* will display user interface and the DB content only on the basis of rights and roles held by the users.
FR 10.11.	M	The IT System will enable configuring an unlimited number of roles.
FR 10.12.	M	A role is defined by a generic title, short description, active/inactive status and list of privileges. The inactive roles are not displayed when configuring the rights of access to the application or the users' rights.
FR 10.13.	M	Once introduced and activated, the role will be available to be applied in users' management modules (attachment of roles to users) and management of *ARIS* components (attachment of roles with access to user interface components (resources) and configure the way of access for them).
FR 10.14.	M	*ARIS* will not allow deleting a role if it is attached at least to one user or to a user interface component.

Identifier	Mandatory	Functional Requirement Description
FR 10.15.	M	Historical List of created and issued roles and use time frame should be kept in historical logs and accessible by security reports.
FR 10.16.	M	*ARIS* will deliver a mechanism to record user interface components (resources) to deliver a mechanism for defining the users' rights of access to user interface. As component shall be considered any modular entity of the application (form, menu, menu option, field, etc.), which degree of details is sufficient for configuring the rights of access, transitions of workflows and actions accessible to users.
FR 10.17.	M	*ARIS* will enable configuring the hierarchy of user interface components, at the root level being placed the application basic modules, while the subordinated levels shall not be limited in their depth, the hierarchy being determined by their architecture.
FR 10.18.	D	Any component of the *ARIS* user interface will contain data on their generic title, short description, actions available to users (business events they can generate) and roles with access to user interface component or action.
FR 10.19.	M	Any component of the *ARIS* user interface will contain data on the statuses through which the data managed via components could pass, transitions through component statuses (workflow configuration).
FR 10.20.	M	The IT System will be able to define permissions related to actions (business events) available to users with access to user interface components. *ARIS* will enable configuring the following categories of actions available to users: view records; add records; change records; delete records; other relevant actions.
FR 10.21.	M	The IT System will enable configuring the strategy for logging business events generated by each component (resource) of the user interface.
FR 10.22.	D	*ARIS* shall be prepared to be integrated with Security module of *MOLDLIS* for a centralized management by *S.E. „Cadastru"* of users, roles and rights.

UC11: Manage workflows, forms and templates

The functional requirements related to the component of configuring workflows, electronic forms designed to insert data and document templates to be populated with data and generated by *ARIS* are defined in Table 5.11.

Table 11. Functional requirements set for use case UC11

Identifier	Mandatory	Functional Requirement Description
FR 11.01.	M	*ARIS* will deliver a mechanism to configure workflows for all scenarios related to the processes of preparing and processing the electronic forms related to address management.
FR 11.02.	M	The workflow management shall be carried out by using the system graphical interface where the user usually works.
FR 11.03.	M	The workflows shall be defined through the specification of statuses through which the electronic form should go and the processing steps (workflow stages or transitions) realized by users with specific roles.

Identifier	Mandatory	Functional Requirement Description
FR 11.04.	M	A workflow shall be designed as a sequence of activities.
FR 11.05.	M	The number of steps to be included in a workflow shall not be limited. In this way the IT solution will be adjustable to changes of work methodology of address business processes.
FR 11.06.	D	A workflow shall have associated a coordinator (supervisor). The Coordinator shall be able to receive warning messages (notifications) generated by the unrolled flow. The user who launches a form for processing under a workflow shall be able to specify who the flow supervisor is.
FR 11.07.	D	The System will offer a mechanism to configure the electronic forms necessary for preparing the documents related to the business processes for addresses management.
FR 11.08.	M	The System will offer mechanisms to configure document templates related to the acts generated on the basis of electronic forms prepared (templates will have a well-defined structure to allow changing the aspect of the retrieved document).
FR 11.09.	M	The System will have an exclusively visual mechanism to configure statuses and transitions through which the electronic forms could go.
FR 11.10.	M	The Developer will configure and implement templates to generate all documents specific for address management business processes (up to 20 documents).

UC12. Other administration activities

The functional requirements related to *ARIS* administration activities are defined in Table 5.12.

Table 12. Functional requirements set for use case UC12

Identifier	Mandatory	Functional Requirement Description
FR 12.01.	M	The System shall allow the *System Administrator* role to retrieve, display and reconfigure the *ARIS* parameters and system settings.
FR 12.02.	M	The System shall allow the *System Administrator* role to: allocate functions to users and roles; allocate one or more users to one role.
FR 12.03.	M	*Administrator* shall access system logs (view, search, export etc.).
FR 12.04.	M	*Administrator* shall prepare back-ups and restore the system functionality on the basis of such back-ups;
FR 12.05.	M	*Administrator* shall carry out all activities to secure the IT System proper functioning.
FR 12.06.	M	The System shall allow the *System Administrator* role to create topological rules between one or more than one layers with different geometries (points, lines and polygons). Topological rules must meet the requirements of the data model and must have functionality to generate errors as violations of the errors and tools to correct the identified errors.

UC13: Synchronize data

Functional requirements of procedures for the synchronization of *ARIS* database with the databases of external IT systems are defined in Table 5.13.

Table 5.13. Functional requirements set for use case UC13

Identifier	Mandatory	Functional Requirement Description
FR 13.01.	M	*ARIS* shall use and expose services for the interaction with external information systems.
FR 13.02.	M	*ARIS* will perform actions to synchronize with the *MOLDLIS* to retrieve vector graphical data needed to represent address objects on the map.
FR 13.03.	M	*ARIS* will perform actions to synchronize with the *MOLDLIS* to use security module implemented in *MOLDLIS* (needed for authentication and authorization processes).
FR 13.04.	M	*ARIS* will perform actions to synchronize with the Document Management System of *S.E. „Cadastru"* (ELO) needed to manage *ARIS* documents.
FR 13.05.	M	*ARIS* will perform actions to synchronize with the *National Fund of Cartography* to retrieve Orthophoto graphical data needed to represent address objects on the map.
FR 13.06.	M	*ARIS* will provide metadata on address objects to external information systems via specialized WEB services (administrative-territorial units, localities, streets, buildings, entrances, etc.)
FR 13.07.	M	*ARIS* will provide mechanisms of validation of address to external information systems via specialized WEB services (admissibility check or address existence)
FR 13.08.	M	*ARIS* will provide address identifiers corresponding to search criteria requested by external information systems via specialized WEB services.
FR 13.09.	M	*ARIS* will provide addresses corresponding to search criteria requested by external information systems via specialized WEB services.
FR 13.10.	M	*ARIS* will provide geospatial data corresponding to search criteria requested by external information systems via specialized WEB services.
FR 13.11.	M	All synchronization events described by the functional requirements FR 21.02 - FR 21.09 will be logged.

UC14: Send notifications

The functional requirements related to the mechanism for *ARIS* notification are defined in Table 5.14.

Table 14. Functional requirements set for use case UC14

Identifier	Mandatory	Functional Requirement Description
FR 14.01.	M	The IT System will offer 3 strategies for notification: notification via E-mail; notification via the user's Dashboard. notification via both categories mentioned above.
FR 14.02.	M	The authenticated users (regardless of their roles) will have the opportunity to configure their preferred notification means.
FR 14.03.	M	The authorized users will receive notifications on business events related to their job duties (need to approve a form, changes in the addresses, approval/rejecting a business event form etc.).

Identifier	Mandatory	Functional Requirement Description
FR 14.04.	M	Notifications stored in the user's Dashboard will have reference of direct access to the file/ form/document related to notifications.
FR 14.05.	M	*ARIS* shall notify the System Administrator on all issues affecting the performance and availability of the IT System.
FR 14.06.	M	Administrator will have functionalities for preparing a form to draft and send notifications to a group of persons.
FR 14.07.	M	Those physical or legal persons, whose information is stored in the ARIS, will be able to receive notifications at their Email in case of some business events prepared through UC11 (when are mentioned in the prepared form) or in case of customized notifications prepared by the *Administrator*.

UC15: Logging Events

The functional requirements related to the mechanism of logging the events into the *ARIS* are defined in Table 5.15.

Table 5.15. Functional requirements set for use case UC15

Identifier	Mandatory	Functional Requirement Description
FR 15.01.	M	The IT System will contain a mechanism for logging all business events related to the use of the system.
FR 15.02.	M	The *System Administrator* will be able to configure all logging strategies related to business events through use case UC10.
FR 15.03.	M	The *ARIS* shall keep logs of user actions – record time and action made by the user. It shall be configurable (e.g. per user, object, etc.) with several levels of auditing of user actions.
FR 15.04.	M	Depending on the component accessed by the user (data to configure it), *ARIS* will deliver the rules for logging the business events generated by a specific component of the Application.
FR 15.05.	M	In case of usage of own log system is important to foreseen the integration with service provided by electronic governmental solution MLog. The recommended way is to keep both log system to work together.
FR 15.06.	M	The ARIS shall keep the logs of use of internal and external web-services
FR 15.07.	M	*ARIS* must keep a log of error messages and warnings. All data from disparate modules shall drain into a single, centralized log with automatic processing and analysis. Messages should be informative, structured, contain all the necessary data on the location of the error, the time of an operation, include text SQL query, and the values of the variables passed in cases where this is possible The system shall keep a log of all changes to the databases, including: database transactions made by the ARIS system; database changes made by Database Administrator.
FR 15.08.	M	No user can change the log, not even Database Administrator, except for authorized person.
FR 15.09.	M	The following categories of events shall be logged: user authentication; user disconnection; add/change/delete/access a record;

Identifier	Mandatory	Functional Requirement Description
		business events specific for the ARIS (add address, modify address, delete address, approve address, approve street name, generate a document, accessing specific data, etc.); generate/access a report; query the database; other specific business events.
FR 15.10.	M	The logged event will save the following categories of data (depending on the type of the logged event: identifier of the user who generated the event; category of the logged event; timestamp of event logging; resource of the IT application that generated the business event; record affected by the business event; action performed by the user.
FR 15.11.	M	The system shall keep logs for at least 6 months and then archive it.
FR 15.12.	M	The IT System will deliver a mechanism to generate reports related to logged events.

5.2. Non-functional requirements of the IT System

General requirements and performance requirements

General system requirements and performance requirements are defined by the policies and strategies developed and adopted in the Republic of Moldova. It is worth mentioning that these acts are stemming from the industry best practices and comprise both organizational and technical measures. General system requirements specific for *ARIS* are defined in Table 5.16.

Table 5.16. The totality of general system requirements specific for ARIS

Identifier	Mandatory	Description of requirements
TGEN 001	M	The system interface shall be Multilingual (Romanian, Russian and English) with mechanism to add new language without reprogramming, through attachable resource files.
TGEN 002	M	The content of the database will be inputted in Romanian, Russian and English.
TGEN 003	M	The user's Interface shall be optimized to 1360x768 resolution.
TGEN 004	M	*ARIS* shall have the possibility to adjust the user's interface (shall deliver a responsive interface) depending on the device used (*notebook, netbook, desktop PC, tablet*).
TGEN 005	M	The system offers an accessible and intuitive interface to human users.
TGEN 006	M	The user's Interface elements shall comply with Level A of *Web Content Accessibility Guidelines (WCAG) 2.0*.
TGEN 007	M	*ARIS* will ensure functionalities necessary to use the digital signature and mobile signature for all categories of actors.
TGEN 008	M	The IT System shall have integrated functions for searching and filtering after Metadata files/documents, profiles of mobilization resources or of

Identifier	Mandatory	Description of requirements
		authorized users (search records, documents, notifications, acts, etc.), search by the calendar, search by business events of mobilization processes, etc.). The procedures of information and records retrieval shall be performed via simple search (specification of search series) or via more complex search forms allowing filtering the information (QBE forms). Regardless of the type of searched information, the user shall utilize the same method of queries and retrieval of information for any section of the software.
TGEN 009	M	In addition to the searching module implemented based on QBE principle, which would offer the possibility to define visually sophisticated queries, the user interface shall offer the possibility to refine the search results by ensuring the possibility to filter the data in the list containing the search results.
TGEN 010	M	The IT system user interface shall ensure filtering the records that match the search criterion presented by users depending on their rights of access.
TGEN 011	M	The content of any table with search results shall have the possibility to be exported in any of the following format: XLS, CSV and PDF.
TGEN 012	M	*ARIS* shall offer API interfaces to interact with external IT systems.
TGEN 013	M	*ARIS* will ensure compatibility with *W3C XForms standard*.
TGEN 014	M	The IT system shall be optimized in the minimum data transfer between the client computer and server (*e.g. implement AJAX with JSON*), having focused on avoiding the redundant requests as much as possible.
TGEN 015	M	*ARIS* shall have at its basis at least a three-level architecture (with a distinct level for data) based on SOA.
TGEN 016	M	The ARIS potentially variable information (parameters, ways if data storage, ways of connection with external services, etc.) shall be configurable and would not require solution recompilation or direct interventions into the DB.
TGEN 017	M	The IT System shall use open standards for formats and communication protocols.
TGEN 018	M	The services exposed to the public by *ARIS* shall be technologically neutral (Operation System, Internet Explorer, etc.).

Specific performance requirements of *ARIS* are defined in Table 5.17.

Table 5.17. Performance requirements set for the IT System

Identifier	Mandatory	Description of Performance Requirements
PERF 001	M	The average server reply time shall not exceed 3 seconds at system load indicated in (PERF 002, PERF 003). Replay time shell be logged for several time consuming events. List of such events shell be elaborated at design stage with beneficiar.
PERF 002	M	The system must be capable to allow activity of over 1100 authorized users of category *Administrator*, *Level 1 LPA Operator*, *Level 2 LPA Operator*, *Address Validator, Street Validator and Classificatory Administrator*. Number of service consumers and appropriate load for each consumer will be defined at analytical and design stage with beneficiar.

Identifier	Mandatory	Description of Performance Requirements
PERF 003	M	The System shall enable the competing activity of at least 200 concurrent users and servicing of at least 300 simultaneous queries with constant response time indicated in PERF 001.
PERF 004	M	Data collection of the information system will host more than 2 million of addresses and will perform annually more than 20 000 transactions of addresses update.
PERF 005	M	Prior to the delivery of IT solution, *ARIS* performance test shall occur.
PERF 006	M	Performance testing shall include at least two components: *system load testing* and *system stress testing*. Test cases shell be elaborated by contractor in coordination with beneficiar. Test system shell be loaded with data conform PERF 004.

5.3. Security and Protection Requirements

The System shall comply with the technical requirements imposed on Information Systems by the Moldovan Standard SMV ISO/CEI 27002:2014 Information technology — Security techniques — Code of practice for information security controls (second edition).

ARIS also shall comply with Requirements for the assurance of personal data security during their processing within information systems of personal data approved by Government Decision No. 1123 of 14.12.2010 on approving the Requirements for the assurance of personal data security during their processing within the information systems of personal data, Official Gazette No. 254-256 of 24.12.2010.

The IT solution shall comply in full with the security requirement defined in Table 5.18.

Table 5.18. Requirements for ARIS security and protection

Identifier	Mandatory	Description of Security and Protection Requirement
SR 001	M	The IT System guarantees full storage and integrity of *ARIS* DB content.
SR 002	M	Public information is made available to anonymous users.
SR 003	M	Access to functions granted to unauthorized and non-authenticated users shall be monitored using protection means against overstressing the service by one or several network hubs.
SR 004	M	The Security subsystem shall provide functionality for single sign on, users' rights, password registry, etc. for all users of the system. The sub-system is also available for all other subsystems to check in the system for authorization rights.
SR 005	M	ARIS shall include a comprehensive security framework
SR 006	M	ARIS shall include security related data transmission, including: Service endpoint (respondent) authentication; Client principal (initiator) authentication; Message integrity; Message confidentiality; Replay detection.
SR 007	M	ARIS shall adopt means which will make possible the encryption of data in database, messages and communication channels.

Identifier	Mandatory	Description of Security and Protection Requirement
SR 008	M	ARIS shall provide monitoring functions based on unified methods to monitor user interactions regarding use of services and data manipulation.
SR 009	M	ARIS shall ensure a regular review of user information on access. At least every 6 months, Security unit reviews information on access in order to disclose any unauthorized access or data leaking.
SR 010	M	Access to editing of information objects and generation of documents from the system shall be limited by the objects identified in the application submitted by client. This should not limit viewing access of different objects.
SR 011	M	All users (including end-users, administrators, developers) shall have a unique identifier (user ID), which must not contain signs of user access level.
SR 012	M	The user ID administration shall include: recognition of each user; the authentication of each user; obtain authorization from the responsible manager to issue of the user ID; ensuring that the user ID is issued specifically to a certain person; cancelling user account after a specified time period of inactivity (idle for no more than 2 months); implementation of backup copies of user Ids; setting the organizational structure of users. (Creating of organizational structure: the formation of lists of users and roles, departments and organizations; access control features (Setting permissions).
SR 013	M	Before granting access to the system, users should be informed that the use of information (especially personal data) is monitored and that their unauthorized use can be prosecuted in accordance with applicable law.
SR 014	M	All users of ARIS are responsible for their ID's and passwords: users can choose and change their own passwords; users are unable to access account after 5 incorrect authentication attempts; previous user passwords are stored and re-use is prevented; passwords are not visible on the screen; passwords are stored in encrypted form, using one-way encryption algorithm (function hash).
SR 015	M	*ARIS* shall include a mechanism for restoring lost passwords.
SR 016	M	*ARIS* working session regarding registers and personal data shall be logout automatically after more than 15 minutes of user inactivity, which prevents any further access until the user unlocks the session by repeating the procedure of identification and authentication.
SR 017	M	All fields of forms filled in by users must be validated by type of both the client and server.
SR 018	M	When the system communicates with other systems digital certificates shall be used for identity.
SR 019	M	For sensible transactions, immediately after their execution, will be used the time stamping service.

Identifier	Mandatory	Description of Security and Protection Requirement
SR 020	M	The System shall be secured against *OWASP Top 10 vulnerabilities*.
SR 021	M	The System shall ensure confidentiality of data transmitted-received via communications channels. System data exchange is done only via secure channels.
SR 022	M	Access to the *ARIS* shall be monitored.
SR 023	M	Interaction with IT Systems shall be performed through an authentication procedure using the digital certificate.
SR 024	M	Access to functions for non-anonymous users shall be granted by their authentication, using user + Password or digital certificate (via *MPass*).
SR 025	M	The System will deliver strong mechanisms to secure the procedure safety for users' authentication and authorization.
SR 026	M	All users' actions shall be recorded into electronic logs.
SR 027	M	The System shall make a periodic signal that tells about its functional status.

5.4. Software, Hardware and Communication Channel Requirements

The Developer shall state the cost of licensing of the suggested software components (which the *S.E. „Cadastru"* does not have), as well as the sum of licensing costs for:

doubling the number of users;

doubling the number of processing units (CPU or CPU kernels);

doubling the number of similar nodes.

Table 5.19 contains the requirements for software, hardware and communications technology assurance of *ARIS*.

Table 5.19. Requirements for software, hardware and communications technology assurance of ARIS

Identifier	Mandatory	Description of requirements for software, hardware and communications technology solutions
SHC 001	M	The System shall have the possibility to be installed on both dedicated servers and on virtual solutions.
SHC 002	M	The system architecture should be in line with the Cloud First strategy promoted by the e-Government Center.
SHC 003	M	It is necessary to demonstrate the capacity of virtualization via the delivery of a system image to the Beneficiary that could be uploaded and become operational with minimum configurations on one of the virtualization solutions available on the market.
SHC 004	M	The System shall be accessed through communication channels of at least 128kbps.
SHC 005	D	The system shall be implemented using open source license to the maximum possible extent,
SHC 006	M	The Developer shall state explicitly in the offer the software platform based on which the *ARIS* has been built and the software platform required for the *ARIS* functioning.
SHC 007	M	If the software platform used to develop and operate the *ARIS* is based on commercial IT solutions, requiring license procurement, the Developer will include in the price offer the delivery of all licenses required for *ARIS*

Identifier	Mandatory	Description of requirements for software, hardware and communications technology solutions
		development and operation (the Developer shall purchase on behalf of the *S.E. „Cadastru"* all licenses required for the development and operation of the IT System).
SHC 008	M	If the software platform used to develop and operate the *ARIS* is based on commercial IT solutions, requiring license procurement, the Developer will include in the price offer the overall amount charged for licensing when: doubling the number of users; doubling the number of processing units (CPU or CPU kernels); doubling the number of server application hubs/DB.
SHC 009	M	All software must be provided with unlimited duration license(s), allowing upgrading to new versions of third party products during warranty period.
SHC 010	M	All software must be provided with an unlimited number of concurrent users (e.g. Web based)
SHC 011	M	All software must be provided for an unlimited number of users for any infrastructure component (i.e. application server, plug-in, etc.) needed for full operation.
SHC 012	M	The system shall have a modular architecture, which shall follow n-layer architectural pattern with clear separation between layers. System components shall be loosely coupled and have clear communication interfaces
SHC 013	M	The system shall expose its functionality as API through Web Services. The API shall be clearly and comprehensively documented.
SHC 014	M	The system implements public available parts of the service as Web Parts to be integrated in Government Portal.
SHC 015	M	The system shall be logically decoupled through abstract interfaces from modules implementing functionalities such as logging, notifications, authentication, scheduling if such modules are in scope of current system. These modules will work also with *MCloud* shared platform level modules.
SHC 016	M	The system must be highly configurable and shall not be tied in any way to specific physical resources, such as locations on disks or types of devices. The configuration shall allow changes of important parameters preferably without the need to restart the running system
SHC 017	M	The Contractor must license all software to the Beneficiary allowing designated personnel to perform diagnostics, installation, update / upgrade and repair / debug activities without any external assistance. Beneficiary should receive support for at least for three years from Contractor in any part of the system.
SHC 018	M	The System shall be tolerant to errors by offering support for clustering and fail over for the whole platform and own components.
SHC 019	M	It is advisable to ensure that the service parts exposed to the public are technologically neutral.
SHC 020	M	The WEB Explorer is the recommended generic software for the operation and interaction with ARIS.
SHC 021	M	The System shall be compatible with at least 2 the most recent versions of the following WEB browsers: *Microsoft Internet Explorer, Mozilla Firefox, Google Chrome, Safari* and *Opera*.

Identifier	Mandatory	Description of requirements for software, hardware and communications technology solutions
SHC 022	M	Compatibility with Microsoft Internet Explorer is mandatory.
SHC 023	M	*ARIS* shall incorporate a Heart-beat service to periodically communicate the system normal work status.
SHC 024	M	The System shall include configurable means for technical logging.
SHC 025	M	The System shall be able to produce at least the following levels of technical logging: info; warning; critic; error.
SHC 026	M	The Developer shall list the means to be used for system troubleshooting.
SHC 027	M	The Developer shall prepare means that facilitate the system administration functions: starting the system components; stopping the system components; restarting the system components, creating a DB back-up, recovery of data using the indicated back-up, refreshing the system operational memory.
SHC 028	M	The System shall operate in TCP/IP networks and, especially, in HTTPS.
SHC 029	M	The Developer shall suggest other network services and utilities necessary for system operation.

5.5. Spatial Data Infrastructure requirements

The requirements set for Spatial Data Infrastructure implemented in *ARIS* are defined in Table 5.20.

Table 5.20. Requirements for RDBMS

Identifier	Mandatory	Description of the accepted initiative
SDI 001	M	SDI of *ARIS* must support ISO19139:2007 metadata dataset collections profile compatible with the INSPIRE Metadata Implementing Rules guidance based on ISO 19115 / ISO 19119.
SDI 002	M	SDI of *ARIS* must support INSPIRE Data Specifications on Address Data Model
SDI 003	M	SDI of *ARIS* must support INSPIRE Download services, View services, Discovery Services, Transformation services.
SDI 004	M	*ARIS* must support SDI services, as defined by the OGC Standards with support for minimum: Web Map Service (WMS) v1.1.1 (or later); Web Feature Service (WFS) v1.1.0 (or later); Web Coverage Service (WCS) v1.0.0 (or later); Catalog Service Web Profile (CSW) v2.0.0 (or later).
SDI 005	M	*ARIS* must provide a password-protected access to WMS and WFS for desktop-based or web-based GIS software clients.
SDI 006	M	*ARIS* must support SDI services web-based management interface with min support for:

Identifier	Mandatory	Description of the accepted initiative
		Setting up different levels of access for different categories of users for CSW service;
		On-line editing of metadata and uploading of metadata files in XML format for CSW service;
		On-line metadata search and discovery by using an attribute (search) query interface and spatial query (web map search interface) for CSW service;
		On-line set-up and configuration of WMS, WFS and WCS services;
		On-line preview and retrieval of SDI datasets in the form of GIS data files (for WMS, WFS and WCS) with support for min SHP and GML as vector layer(s) file formats and min GeoTIF as raster layer(s) file formats.
SDI 007	M	*ARIS* must support Web Map Publishing (WMP) with min support for:
		managing and portrayal of SDI services and datasets with support for standard web technologies (e.g. JavaScript, XML, etc.);
		authentication and authorization services with user, group and service administration capabilities using web-based user interfaces;
		web-based management interface for web mapping content and design of customized web mapping applications.
SDI 008	M	SDI of *ARIS* must provide services for integration with other external systems throughout *MConnect*.

5.6. RDBMS requirements

The requirements set for Relational Data Base Management System used for *ARIS* are defined in Table 5.21.

Table 5.21. Requirements for RDBMS

Identifier	Mandatory	Description of the accepted initiative?
DBMS 001	M	RDBMS must be delivered under open source license (*GNU Public License or similar*), which must also apply to all database custom code (SQL scripts, types, functions, triggers, packages etc.) provided during supply delivery and created during customization and integration
DBMS 002	M	RDBMS must support remote connectivity options (connectors, drivers, etc.) for direct read/write access by external desktop-based or web-based software client(s)
DBMS 003	M	Native 64-bit RDBMS version supporting native 64-bit Server OS environment must be installed
DBMS 004	M	RDBMS must support a full-scale automatic replication
DBMS 005	M	RDBMS must support full-scale back up/recovery capabilities using standard SQL data format(s) as well within native internall functionality.
DBMS 006	M	RDBMS must support full-scale self-maintenance capabilities with min support for automatic re-indexing, clean-up of temporary records and recovery of storage space.
DBMS 007	M	RDBMS native GIS application extension compliant with the OGC Simple Features Specifications for SQL must be installed (*e.g. PostGIS*)

Identifier	Mandatory	Description of the accepted initiative?
DBMS 008	M	RDBMS and RDBMS native GIS application extension must provide a back-end support for the introduction and implementation of the SDI, supporting min CSW, WMS and WFS services.
DBMS 009	M	RDBMS must support clusterization with load balancing.
DBMS 010	M	RDBMS must support internal audit capabilities to manage and control users' actions and use of privileges.
DBMS 011	M	RDBMS must support data protection capabilities such as SSL and data encryption. In some cases data encryption equivalent shell be supplied by developer.

5.7. IT related aspects and field-related initiatives

The requirements set for IT related aspects and field-related initiatives currently in force on the territory of the Republic of Moldova are defined in Table 5.22.

Table 5.22. Requirements for IT related aspects and field-related initiatives

Identifier	Mandatory	Description of the accepted initiative
INI 001	M	*ARIS* will run on the *MCloud* platform
INI 002	M	The IT System will use the *MPass* service as a mechanism for users' authentication and authorization.
INI 003	M	The IT System will use the *MSign* service as a mechanism for digital signature application and validation.
INI 004	M	The IT System will use the *MLog* service as a mechanism for logging for the critical business events.
INI 005	M	The IT System will use the *MNotify* service as a mechanism for notifying the authorized users.
INI 006	M	The IT System will use the interoperability platform *MConnect* as an interaction mechanism with IT systems of other Moldovan authorities.
INI 007	M	*ARIS* will use PKI services offered by the single technological platform *MCloud*.
INI 008	M	*ARIS* will identify a set of at least 10 performance indicators which will be automatically published by the single technological platform monitoring services.

5.8. Documentation requirements of the IT System

The IT solution shall be accompanied by a full package of documentation of the IT system (according *Technical Regulation "Processes of software life cycle" RT 38370656-002:2006*) comprising the sections included in Table 5.23.

Table 5.23. Documentation requirements of ARIS

Identifier	Mandatory	Description of documentation requirements of ARIS
DOC 001	M	The Developer shall prepare and publish interactive guidance materials included in the user's Interface of the *ARIS*.
DOC 002	M	The Developer shall prepare and deliver the IT System Technical Design (SRS+SDD).
DOC 003	M	The Developer shall prepare pre-acceptance and final acceptance test scenarios plan.
DOC 004	M	The Developer shall prepare and deliver user's Manual.
DOC 005	M	The Developer shall prepare and deliver Administrator's Manual.
DOC 006DOC 005	M	The Developer shall prepare and deliver the Guide on system installation and configuration (to include at least guidelines for code compilation, installation of application, hardware and software requirements, platform description and configuration, application configuring, and disaster recovery procedures).
DOC 007	M	The Developer shall prepare and deliver the System Architecture Documentation with the description of models in UML language, to include a sufficient level of details in terms of Architecture in several cross-sections (including the data logical and physical model).
DOC 008	M	The Developer shall prepare and deliver API documentation exposed to be integrated with other IT Systems.
DOC 009	M	The Developer shall deliver all electronic mediums necessary to describe and validate the interfaces in WSDL language.
DOC 010	M	The Developer shall deliver the source code for applications and components developed under the Project.
DOC 011	M	The Developer shall deliver the *Administrator' Manual* that describes administration functions, including the functions exposed directly from the system, as well as the manual procedures necessary to maintain and secure proper functioning of the IT application.
DOC 012	M	The Developer shall deliver the *user's Manual* that describes the IT solution parts exposed for different roles of human users.
DOC 013	M	The Developer shall deliver interfaces for automatic interoperation with external systems specified (technically) and documented (in human text).
DOC 014	M	All documentation must be in Romanian language.

5.9. Maintenance Requirements of the IT System

The Developer shall ensure post-delivery maintenance period and technical support comprising the sections included in Table 5.24.

Table 5.24. Maintenance period and technical support of ARIS

Identifier	Mandatory	Description of maintenance period and technical support
GMS 001	M	The Developer shall offer maintenance and technical support the warranty period (12 months following the acceptance of the IT System).
GMS 002	M	Support covers system software and data issues.

Identifier	Mandatory	Description of maintenance period and technical support
GMS 003	M	The maintenance period and technical support for the warranty period shall meet the National Standard SM ISO/CEI 14764:2005 - Information Technology. Software Maintenance.
GMS 004	M	The Developer shall provide the Beneficiary with a Help Desk service available in all business days throughout the year.
GMS 005	M	The Beneficiary will be able to call the Help Desk service at a national phone number (matching the numbering of contact phones in the Republic of Moldova).
GMS 006	M	The communication language of Help Desk service is Romanian.
GMS 007	M	The Beneficiary shall report all technical issues that could occur through a ticketing mechanism, E-mail or instant message.
GMS 008	M	The Developer shall ensure support to document the technical issues and their traceability for the Beneficiary.
GMS 009	M	Help Desk shall be implemented via three-level support regime: 1st level support, by a super-user who can give rapid help to users at *S.E. „Cadastru"* who experience a problem with the system. This requires a person who has very good knowledge of the system, who can understand the problem and give advice on what to do. 2nd level support by an analyst who can analyze problems that cannot be solved by the experienced user, or analyze the need for improved functionality in depth and prepare related specifications for subsequent changes to the source code; 3rd level support by a developer who can make changes to the source code for correction of errors and for new functionality.
GMS 010	M	The deadline for reaction and remedy for the reported issues should be at most 8 working hours following their reporting.
GMS 011	M	For major complexity issues the remediation period shall not exceed 72 hours.
GMS 012	M	The Developer shall prove its ability to provide post-delivery technical support in compliance with the requirements of GMS 001-GMS 010.

VI. FINAL PRODUCT AND DELIVERABLES

The final product (*State Register of Addresses*) is composed of software artefacts and system documentation, as well as of knowledge transfer to the system Owner and Administrator.

Artefacts related to the *ARIS* deliverables are displayed in Table 6.1.

Table 6.1. Deliverables for ARIS

Identifier	Mandatory	Deliverable Brief Description
DELIV 001	M	Technical design (SRS+SDD).
DELIV 002	M	Complete source code of modules and components necessary to compile the delivered software. The source code must be well documented with comments, buildable, with all plugins, libraries, development environment, etc.
DELIV 003	M	Final product packed for easy installation in the proposed technological environment.
DELIV 004	M	Migration of existing data of Address Register.
DELIV 005	M	Document on system configuration and deployment (guidelines for deployment).
DELIV 006	M	User's Manual.
DELIV 007	M	Administrator's Manual (including a contingency plan).
DELIV 008	M	Training documentation (designed to trainers who would train the *S.E. „Cadastru"* and *LPA* in operating the IT solution).
		Training materials must be provided on min 1 (one) electronic media and in min 1 (one) duplex printed bonded hard-copy per trainee.
		Training materials must be delivered in adequate quantities for all trainees at least three days before the training begins
		Training materials must include min training syllabus overall description, detailed description of theory (lectures) and step-by-step instructions (exercises), training sample data if needed (electronic media only).
DELIV 009	M	Technical specifications for the published and used interfaces.
DELIV 010	M	Special libraries and tools necessary for the compilation of system components (Developer will demonstrate the possibility of compiling the source code on the platform offered in *MCloud*).
DELIV 011	M	Test plan and the results of internal (functional, performance, security) testing.
DELIV 012	M	All the diagrams (UML diagrams, BPMN diagrams, Entity relationships diagrams etc.) producing during the development processes of *ARIS* shall be deliverd in an Sparx Enterprise Architect .EAP file format (http://www.sparxsystems.com/products/index.html).
DELIV 013	M	Totality of artefacts copied on electronic medium (CD or DVD).

The requirements for existing data migration are indicated in Table 6.2.

Table 6.2. Data migration requirements

Identifier	Mandatory	Artefact Brief Description
MIGR 009	M	The objective of the Data migration process is to migrate, convert and test all existing data that is necessary for testing and for the operation of the new application.
MIGR 010	M	The Contractor shall develop a Migration Strategy which identifies sources and targets of the data migration and describes an overall approach to migrate, convert and test all existing data. The Migration Strategy shall address all important issues, e.g.: checking and testing data migration; migrating of historical data; inconsistency among data import; managing fractional, corrupt, etc. data records; converting of the classifiers in new system; indicating status of the migrated data to distinguish them from new records.
MIGR 011	M	The developer shall study the existing data models in all systems from which data shall be migrated and the new data model and shall propose a detailed design of module for data migration.
MIGR 012	M	The Contractor shall develop a Migration Plan which describes the method of the data migration, identifies software tools and defines and schedules stages and activities of the migration.
MIGR 013	M	The Contractor shall develop the necessary software tools, e.g. scripts to implement the migration. These tools provides the following functionality: transfer data from existing system to ARIS; checks quality (consistency, completeness, etc.) of the migrated data; create statistical reports – number of objects before and after migration; control numbers, areas; stores data quality attributes at ARIS; create reports; the readiness status of each migration process is traceable by operators.
MIGR 014	M	The Contractor shall elaborate manuals for IT professionals regarding the use of migration tools.
MIGR 015	M	The Contractor shall train IT professionals regarding the approach to migration and use of migration software tools.

Besides the artifacts related to the *ARIS* deliverables, all the services needed for knowledge transfer indicated in Table 6.3. will be provided.

Table 6.3. Knowledge transfer services deliverables

Identifier	Mandatory	Artefact Brief Description
DELIV 009	M	Training of users and Administrators (20-40 hours for each user category): 2 System Administrators; 2 Classifiers Operator

Identifier	Mandatory	Artefact Brief Description
		2 Address Validators; 2 Street Validators; 20 LPA Level 1 Address Operators; 10 LPA Level 2 Address Operator.
DELIV 010	M	Bidder will be solely responsible for provision of all training related services, products, equipment and documentation
DELIV 011	M	Assistance during the system pilot testing period.
DELIV 012	M	Assistance in testing the system acceptance.
DELIV 013	M	Assistance in system bringing in the production.
DELIV 014	M	Solving the deficiencies identified during the pilot period and acceptance testing.
DELIV 015	M	Post-implementation technical support (after the system bringing into the production) for a 12-month period, including corrective, adaptive and preventive maintenance, in compliance with ISO/IEC 14764.

VII. IMPLEMENTATION STAGES OF THE IT SYSTEM

The designing, building, testing and implementation of *ARIS* must be done in accordance with the following schedule:

1. **IT System development stage**, which shall be subdivided into phases coordinated with the *S.E. „Cadastru"* as follows:

   a. The Developer performs business analysis, drawing up and description of business processes in BPMN 2.0.

   b. The Developer proceeds with analyzing the Terms of Reference, domains of activity and with due approval of the direct Beneficiary (*S.E. „Cadastru"*) proposes its vision with regards to developing the information system bearing on a technical Project composed of two documents: SRS and SDD (*1 month*);

   c. The Developer proceeds with developing a program code and integration of modules developed into a prototype version of the information system (the first presentation to the involved parties shall follow meant to demonstrate existence of all functionalities described in the Scope of work), which subsequently will be improved until signing of the final acceptance of the information subsystem. This stage will not exceed *4 months*;

   d. The developer will transfer the totality of existing data from current version of information system designed and implemented for address management by *S.E. „Cadastru".* This stage will not exceed *1 months*;

   e. The Developer proceeds with testing the system in laboratory mode (in-house testing) and prepares a set of accompanying documentation (presented shall be the functionalities of the system complete with corrections and adjustments made during the previous sub-stage; also presented shall be a set of technical documentation, etc.). The duration of the stage in question shall be *2 weeks*. The testing procedure shall mandatory comprise the following stages:

      o joint verification of all test scenarios to meet of the functional requirements of the IT System;

      o stress and load testing scenarios will be applied to the *ARIS* with the purpose of checking the level of its compliance with the *S.E. „Cadastru"* expectations;

      o based on the test results, where appropriate, the required adjustments and changes will be operated, having prepared an improved version of the IT System.

2. **ARIS Implementation Stage** will begin with the approval of the Minutes of acceptance by the owner of the IT system in the submitted variant and the signing of the statement of acceptance in experimental operation. Implementation of the IT solution shall last for maximum *1.5 months.*

3. **Training stage** shall start concomitantly with the implementation of the IT solution and shall cover training of 2 system users assigned to act as *Administrators*, 2 system users assigned to act as *Address Validator*, 2 system users assigned to act as *Street Validator*, 20 system users assigned to act as *LPA Level 1 Address Operator* and 10 users assigned to act as *LPA Level 2 Address Operator*.

4. **Commissioning of the ARIS** begins with the signing of the IT System Commissioning Statement and starting of its operation.

5. **ARIS maintenance stage** is the period during which the system Developer is assuming the obligation relative to the Owner to grant assistance in maintaining the capacity of the information system to provide services as well as in upgrading the software, while maintaining its integrity. In case of *ARIS* we believe that the initial 12-month period shall be sufficient.

VIII. MANAGEMENT ARRANGEMENTS

The contractor will work under the guidance of the IT Department of the SE "Cadastru" and in close cooperation with UNDP Democracy Programme/Electoral Component for both substantive and administrative aspects of the assignment and under the direct supervision of the Electoral Specialist, Democracy Programme/Elections, Senior IT Project Officer and UNDP IT Strategic Adviser.

All deliverables shall be coordinated with the Beneficiary and accepted by UNDP Democracy Programme Electoral Specialist and Programme Manager if these meet the requirements of the Terms of Reference. The project will require at least 5 days to review the outputs, provide comments, approve or certify acceptance of outputs.

The payment for services provided will be made on a lump-sum basis upon the service delivery and acceptance by the beneficiary and UNDP Democracy Programme / Elections according to the timeframes indicated in Technical Requirements.

Language

All discussions with the beneficiaries of the project will be conducted in Romanian and Russian. All the relevant documentation, information solution interface and training and technical support will be conducted in Romanian.

Key Deliverables of the Work

The final product is composed of software artefacts, system documentation, and knowledge transfer to the holder and the system administrator.

The system's artefacts include:

	Deliverables	Tentative timeframe
1.	**Work Plan submitted, discussed and accepted by the Beneficiary**	24 October 2016
2.	**Business analytics, drawing up and description of business processes**	24 November 2016
3.	**Technical design (SRS+SDD) discussed and accepted by the Beneficiary**	10 January 2017
4.	**ARIS development stage accepted by the Beneficiary:** • ARIS is deployed and fully functional in MCloud; • delivered pre-acceptance test scenarios; • positive results of pre-acceptance testing (signed minutes of pre-acceptance testing); • delivered complete source code of modules and components necessary to compile the delivered software at the current stage.	25 March 2017

IX. ELIGIBILITY

<u>Successful bidder must meet the following qualification requirements for the company:</u>
- Company must have permanent branches in the Republic of Moldova (in case the bidder is a foreign company) or an equal local Consortium Partner (not Subcontractor!). The leading Company will ensure the fulfilment of at least 65% of the deliverables;
- Minimum 5 years of working experience in developing IT systems;
- Minimum 1 system on spatial data infrastructure (GIS) developed;
- Valid certification in ISO 27001 (in case the bidder is a consortium, all the companies that are part of the consortium must hold a valid ISO 27001 Certificate);

<u>Criteria for the evaluation of the corporate competencies:</u>
- The experience in the development of information systems, like address register (<u>excluding development of webpages</u>) for central public authorities of the Republic of Moldova or other countries in the region would be an advantage.

The bidder shall submit the technical bid with clear CVs (based on the template indicated in the present RfP) of the project staff and the qualifications of each staff proposed. The staff holding the following key positions shall be presented explicitly:

- 1 Project Manager/ Business Analyst, in case the bidder is a foreign company, this specialist must be local ;
- 1 Technical Leader/ System Architect, in case the bidder is a foreign company, this specialist must be local;
- 1 System Analyst;
- 1 Senior Developer;
- 1 Developer;
- 1 QA Engineer;

<u>Qualifications and requirements of proposed staff:</u>

Project Manager/ Business Analyst:
- Master's degree or equivalent (5 years university education) in ICT;
- Minimum 5 years of experience in the proposed position;
- Experience in ICT proved through the implementation of at least 2 information systems (the information systems in which the person was involved should be detailed explicitly in his/her CV);
- Experience of working in IT system development methodology for the government sector of the Republic of Moldova or other countries of the region would be an advantage;
- Proved working experience with GIS standards and infrastructure, also in technologies related to GIS: minimum 1 Web based GIS system implemented (the information system(s) in which the person was involved should be detailed explicitly in his/her CV);
- Proved certification in Project Management (Prince, PMI, etc.) would be a strong asset;
- Excellent knowledge of Romanian, Russian and English languages.

Technical Leader/ System Architect:
- Licensed in ICT, Master's degree would be an advantage;
- Minimum 4 years of experience in IT systems architecture ;
- Experience in ICT proved through the design of system architecture for at least 1 Web based GIS system (the system(s) in which the person was involved should be detailed explicitly in his/her CV);
- Experience of working in IT system architecture for the government sector of the Republic of Moldova or other countries in the region would be an advantage;
- Excellent knowledge of Romanian, Russian and English languages.

System Analyst:
- Licensed in ICT, Master's degree would be an advantage;
- Minimum 4 years of experience in the proposed position;
- Experience in ICT proven through the development of documentation based on the national legislation and standards on state registers (SMV ISO CEI 15288)
- Excellent knowledge of Romanian, Russian and English languages.

Senior Developer:
- Licensed in ICT, Master's degree would be an advantage;
- Minimum 4 years of experience in the proposed position;
- Experience in ICT proved through the development of at least 2 information systems on GIS (the information systems in which the person was involved should be detailed explicitly in his/her CV);
- Excellent knowledge of Romanian, Russian and English languages.

Developer:
- Licensed in ICT, Master's degree would be an advantage;
- Minimum 3 years of experience in the proposed position;
- Proved working experience in technologies related to GIS;
- Proved certification in DBMS and web development would be an advantage;
- Knowledge of Romanian, Russian and English languages.

QA Engineer:
- Licensed in ICT, Master's degree would be an advantage;
- Minimum 2 years of experience in the proposed position;
- Proved ISTQB or equivalent certification will be an advantage;
- Knowledge of Romanian, Russian and English.

The UNDP Moldova is committed to workforce diversity. Women, persons with disabilities, Roma and other ethnic or religious minorities, persons living with HIV, as well as refugees and other non-citizens legally entitled to work in the Republic of Moldova, are particularly encouraged to apply.

Section 4: Proposal Submission Form[3]

[*insert: Location*]
[*insert: Date*]

To: [*insert: Name and Address of UNDP focal point*]

Dear Sir/Madam:

We, the undersigned, hereby offer to provide professional services for [*insert: title of services*] in accordance with your Request for Proposal dated [*insert: Date*] and our Proposal. We are hereby submitting our Proposal, which includes the Technical Proposal and Financial Proposal sealed under a separate envelope.

We hereby declare that:

a) All the information and statements made in this Proposal are true and we accept that any misrepresentation contained in it may lead to our disqualification;
b) We are currently not on the removed or suspended vendor list of the UN or other such lists of other UN agencies, nor are we associated with, any company or individual appearing on the 1267/1989 list of the UN Security Council;
c) We have no outstanding bankruptcy or pending litigation or any legal action that could impair our operation as a going concern; and
d) We do not employ, nor anticipate employing, any person who is or was recently employed by the UN or UNDP.

We confirm that we have read, understood and hereby accept the Terms of Reference describing the duties and responsibilities required of us in this RFP, and the General Terms and Conditions of UNDP's Contract for Professional Services.

We agree to abide by this Proposal for [*insert: period of validity as indicated in Data Sheet*]

We undertake, if our Proposal is accepted, to initiate the services not later than the date indicated in the Data Sheet.

We fully understand and recognize that UNDP is not bound to accept this proposal, that we shall bear all costs associated with its preparation and submission, and that UNDP will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the evaluation.

We remain,

Yours sincerely,

Authorized Signature [*In full and initials*]: _____
Name and Title of Signatory: _____
Name of Firm: _____
Contact Details: _____

[Please mark this letter with your corporate seal, if available]

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[3] *No deletion or modification may be made in this form. Any such deletion or modification may lead to the rejection of the Proposal.*

Section 5: Documents Establishing the Eligibility and Qualifications of the Proposer

Proposer Information Form[4]

1. Proposer's Legal Name: *[insert Proposer's legal name]*
2. In case of Joint Venture (JV), legal name of each party: *[insert legal name of each party in JV]*
3. Actual or intended Country/ies of Registration/Operation: *[insert actual or intended Country of Registration]*
4. Year of Registration: *[insert Proposer's year of registration]*

5. Countries of Operation	6. No. of staff in each Country	7. Years of Operation in each Country

8. Legal Address/es in Country/ies of Registration/Operation: *[insert Proposer's legal address in country of registration]*
9. Value and Description of Top three (3) Biggest Contract for the past five (5) years
10. Latest Credit Rating (if any)
11. Brief description of litigation history (disputes, arbitration, claims, etc.), indicating current status and outcomes, if already resolved.
12. Proposer's Authorized Representative Information Name: *[insert Authorized Representative's name]* Address: *[insert Authorized Representative's address]* Telephone/Fax numbers: *[insert Authorized Representative's telephone/fax numbers]* Email Address: *[insert Authorized Representative's email address]*
13. Are you in the UNPD List 1267.1989 or UN Ineligibility List? ☐ YES or ☐ NO
14. Attached are copies of original documents of: ☐ All eligibility document requirements listed in the Data Sheet ☐ If Joint Venture/Consortium – copy of the Memorandum of Understanding/Agreement or Letter of Intent to form a JV/Consortium, or Registration of JV/Consortium, if registered ☐ If case of Government corporation or Government-owned/controlled entity, documents establishing legal and financial autonomy and compliance with commercial law.

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[4] *The Proposer shall fill in this Form in accordance with the instructions. Apart from providing additional information, no alterations to its format shall be permitted and no substitutions shall be accepted.*

Joint Venture Partner Information Form (if Registered)[5]

1. Proposer's Legal Name: *[insert Proposer's legal name]*	

2. JV's Party legal name: *[insert JV's Party legal name]*

3. JV's Party Country of Registration: *[insert JV's Party country of registration]*

4. Year of Registration: *[insert Party's year of registration]*

5. Countries of Operation	6. No. of staff in each Country	7.Years of Operation in each Country

8. Legal Address/es in Country/ies of Registration/Operation: *[insert Party's legal address in country of registration]*

9. Value and Description of Top three (3) Biggest Contract for the past five (5) years

10. Latest Credit Rating (if any)

11. Brief description of litigation history (disputes, arbitration, claims, etc.), indicating current status and outcomes, if already resolved.

12. JV's Party Authorized Representative Information Name: *[insert name of JV's Party authorized representative]* Address: *[insert address of JV's Party authorized representative]* Telephone/Fax numbers: *[insert telephone/fax numbers of JV's Party authorized representative]* Email Address: *[insert email address of JV's Party authorized representative]*

14. Attached are copies of original documents of: *[check the box(es) of the attached original documents]* ☐ All eligibility document requirements listed in the Data Sheet ☐ Articles of Incorporation or Registration of firm named in 2. ☐ In case of government owned entity, documents establishing legal and financial autonomy and compliance with commercial law.

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[5] *The Proposer shall fill in this Form in accordance with the instructions. Apart from providing additional information, no alterations to its format shall be permitted and no substitutions shall be accepted.*

TECHNICAL PROPOSAL FORMAT

INSERT TITLE OF THE SERVICES

Note: Technical Proposals not submitted in this format may be rejected. The financial proposal should be included in separate envelope.

Name of Proposing Organization / Firm:	
Country of Registration:	
Name of Contact Person for this Proposal:	
Address:	
Phone / Fax:	
Email:	

SECTION 1: EXPERTISE OF FIRM/ ORGANISATION

This section should fully explain the Proposer's resources in terms of personnel and facilities necessary for the performance of this requirement. All contents of this section may be modified or expanded depending on the evaluation criteria stated in the RFP.

1.1 Brief Description of Proposer as an Entity: Provide a brief description of the organization / firm submitting the proposal, its legal mandates/authorized business activities, the year and country of incorporation, types of activities undertaken, and approximate annual budget, etc. Include reference to reputation, or any history of litigation and arbitration in which the organisation / firm has been involved that could adversely affect or impact the performance of services, indicating the status/result of such litigation/arbitration.

1.2. Financial Capacity: Provide the latest Audited Financial Statement (Income Statement and Balance Sheet) duly certified by a Public Accountant, and with authentication of receiving by the Government's Internal Revenue Authority. Include any indication of credit rating, industry rating, etc.

1.3. Track Record and Experiences: Provide the following information regarding corporate experience within the last five (5) years which are related or relevant to those required for this Contract.

Name of project	Client	Contract Value	Period of activity	Types of activities undertaken	Status or Date Completed	References Contact Details (Name, Phone, Email)

SECTION 2 - APPROACH AND IMPLEMENTATION PLAN

This section should demonstrate the Proposer's responsiveness to the TOR by identifying the specific components proposed, addressing the requirements, as specified, point by point; providing a detailed description of the essential performance characteristics proposed; and demonstrating how the proposed methodology meets or exceeds the requirements.

2.1. Approach to the Service/Work Required: Please provide a detailed description of the methodology for how the organisation/firm will achieve the Terms of Reference of the project, keeping in mind the appropriateness to local conditions and project environment.

2.2. Technical Quality Assurance Review Mechanisms: The methodology shall also include details of the Proposer's internal technical and quality assurance review mechanisms.

2.3 Implementation Timelines: The Proposer shall submit a Gantt Chart or Project Schedule indicating the detailed

sequence of activities that will be undertaken and their corresponding timing.

2.4. Subcontracting: Explain whether any work would be subcontracted, to whom, how much percentage of the work, the rationale for such, and the roles of the proposed sub-contractors. Special attention should be given to providing a clear picture of the role of each entity and how everyone will function as a team.

2.5. Risks / Mitigation Measures: Please describe the potential risks for the implementation of this project that may impact achievement and timely completion of expected results as well as their quality. Describe measures that will be put in place to mitigate these risks.

2.6. Reporting and Monitoring: Please provide a brief description of the mechanisms proposed for this project for reporting to the UNDP and partners, including a reporting schedule.

2.7. Anti-Corruption Strategy: Define the anti-corruption strategy that will be applied in this project to prevent the misuse of funds. Describe the financial controls that will be put in place.

2.8. Partnerships: Explain any partnerships with local, international or other organizations that are planned for the implementation of the project. Special attention should be given to providing a clear picture of the role of each entity and how everyone will function as a team. Letters of commitment from partners and an indication of whether some or all have successfully worked together on other previous projects is encouraged.

2.9 Statement of Full Disclosure: This is intended to disclose any potential conflict in accordance with the definition of "conflict" under Section 4 of this document, if any.

2.10 Other: Any other comments or information regarding the project approach and methodology that will be adopted.

SECTION 3: PERSONNEL	

3.1 Management Structure: Describe the overall management approach toward planning and implementing this activity. Include an organization chart for the management of the project describing the relationship of key positions and designations.

3.2 Staff Time Allocation: Provide a spreadsheet will be included to show the activities of each staff member and the time allocated for his/her involvement. (Note: *This spreadsheet is crucial and no substitution of personnel will be tolerated once the contract has been awarded except in extreme circumstances and with the written approval of the UNDP. If substitution is unavoidable it will be with a person who, in the opinion of the UNDP project manager, is at least as experienced as the person being replaced, and subject to the approval of UNDP. No increase in costs will be considered as a result of any substitution.*)

3.3 Qualifications of Key Personnel. Provide the CVs for key personnel (Team Leader, Managerial and general staff) that will be provided to support the implementation of this project. CVs should demonstrate qualifications in areas relevant to the Scope of Services. Please use the format below:

Name:	
Position for this Contract:	
Nationality:	
Contact information:	
Countries of Work Experience:	
Language Skills:	
Education *(years and obtained degree)*	
Other Qualifications and/ or Certifications *(copies must be attached)*:	

Summary of Experience: *Highlight the past 10 years of experience in the region and in similar projects.*

Relevant Experience (From most recent):

Period: From – To	1) Title of the Project; 2) Name of the Beneficiary; 3) Name of the Funding Organisation, if applicable:	Job Title and Activities undertaken/Description of actual role performed:
e.g. June 2004-January 2005		
Etc.		
Etc.		
References no.1 (minimum of 3):	*Name Designation Organization Contact Information – Address; Phone; Email; etc.*	
Reference no.2	*Name Designation Organization Contact Information – Address; Phone; Email; etc.*	
Reference no.3	*Name Designation Organization Contact Information – Address; Phone; Email; etc.*	

Declaration:

I confirm my intention to serve in the stated position and present availability to serve for the term of the proposed contract. I also understand that any wilful misstatement described above may lead to my disqualification, before or during my engagement.

_____   _____

Signature of the Nominated Team Leader/Member   Date Signed

Section 7: Financial Proposal Form[6]

The Proposer is required to prepare the Financial Proposal in an envelope separate from the rest of the RFP as indicated in the Instruction to Proposers.

The Financial Proposal must provide a detailed cost breakdown. Provide separate figures for each functional grouping or category.

Any estimates for cost-reimbursable items, such as travel and out-of-pocket expenses, should be listed separately.

In case of an equipment component to the service provider, the Price Schedule should include figures for both purchase and lease/rent options. UNDP reserves the option to either lease/rent or purchase outright the equipment through the Contractor.

The format shown on the following pages is suggested for use as a template in preparing the Financial Proposal. The format includes specific expenditures, which may or may not be required or applicable but are indicated to serve as examples.

A.   **Cost Breakdown per Deliverables***

SN	Deliverable	Number and category of staff involved in this deliverable	Total number of WDs allocated per deliverable (also in %)	Price per deliverable (lump sum, all inclusive)

1	**Work Plan submitted, discussed and accepted by the Beneficiary**	e.g. PM/ BA – 1
		  Technical Leader – 1
		  System Analyst – 1
		  Total: 3 staff
			e.g. 24 WDs (10 %)	

2	**Business analytics, drawing up and description of business processes**			
3	**Technical design (SRS+SDD) discussed and accepted by the Beneficiary**			
4	**ARIS development stage accepted by the Beneficiary:** • ARIS is deployed and fully functional in MCloud; • delivered pre-acceptance test scenarios; • positive results of pre-acceptance testing (signed minutes of pre-acceptance testing); • delivered complete source code of modules and components necessary to compile the delivered software at the current stage.			
	Total	**%**		**USD....**

*Basis for payment tranches

B.   **Cost Breakdown by Cost Component:**

The Proposers are requested to provide the cost breakdown for the above given prices for each deliverable based on the following format. UNDP shall use the cost breakdown for the price reasonability assessment purposes as well as the calculation of price in the event that both parties have agreed to add new deliverables to the scope of Services.

Description	Total number of staff of this	Number of working days for	Total working days for each	Cost per one working day for each category	Total cost for all working days (in

---

[6] *No deletion or modification may be made in this form. Any such deletion or modification may lead to the rejection of the Proposal.*

	category	each staff	staff	of staff (in USD)	USD)
Personnel Services					
Project Manager/ Business Analyst	e.g. 1	e.g. 90 WDs	e.g. 90 WDs	e.g. 10 USD	e.g. 900 USD
Technical Leader/ System Architect	e.g. 1	e.g. 50 WDs	e.g. 50 WDs	e.g. 8 USD	e.g. 400 USD
System Analyst	e.g. 2	e.g. 30 WDs	e.g. 60 WDs	e.g. 6 USD	e.g. 360 USD
Senior Developer	e.g. 2	e.g. 20 WDs	e.g. 40 WDs	e.g. 5 USD	e.g. 200 USD
Developer					
QA Engineer					
Total	**6**	**n/a**	**240 WDs**	**n/a**	**1,860 USD**

Description	Number of items	Cost per one item	Total cost of items
Out of Pocket Expenses			
Transportation Costs			
Communications			
Reproduction			
Equipment Lease			
Others			
Total			
Other related costs			
Total			

Section 11: Contract for Professional Services

[THE .PDF VERSION OF THE CONTRACT FOR PROFESSIONAL SERVICES AND THE GENERAL TERMS AND CONDITIONS ARE PROVIDED ON THE FOLLOWING PAGES]

Date _____

Dear Sir/Madam,

Ref.: _____/ _____/ _____ **[INSERT PROJECT NUMBER AND TITLE OR OTHER REFERENCE]**

The United Nations Development Programme (hereinafter referred to as "UNDP"), wishes to engage your [**company/organization/institution**], duly incorporated under the Laws of _____ **[INSERT NAME OF THE COUNTRY]** (hereinafter referred to as the "Contractor") in order to perform services in respect of _____ **[INSERT SUMMARY DESCRIPTION OF THE SERVICES]** (hereinafter referred to as the "Services"), in accordance with the following Contract:

1.   Contract Documents

1.1   This Contract is subject to the UNDP General Conditions for Professional Services attached hereto as Annex I. The provisions of such Annex shall control the interpretation of this Contract and in no way shall be deemed to have been derogated by the contents of this letter and any other Annexes, unless otherwise expressly stated under section 4 of this letter, entitled "Special Conditions".

1.2   The Contractor and UNDP also agree to be bound by the provisions contained in the following documents, which shall take precedence over one another in case of conflict in the following order:

        a)   this Letter;

        b) the Terms of Reference [ref. ......dated........], attached hereto as Annex II;

        c) the Contractor's Proposal [ref......, dated ....]
        d) The UNDP Request for Proposal [ref......, dated......]

1.3   All the above shall form the Contract between the Contractor and UNDP, superseding the contents of any other negotiations and/or agreements, whether oral or in writing, pertaining to the subject of this Contract.

2.   Obligations of the Contractor

2.1   The Contractor shall perform and complete the Services described in Annex II with due diligence and efficiency and in accordance with the Contract.

2.2   The Contractor shall provide the services of the following key personnel:

        Name   Specialization   Nationality   Period of service

        ....
        ....

2.3   Any   changes   in   the   above   key   personnel   shall   require   prior   written   approval   of _____ **[NAME and TITLE],** UNDP.

2.4   The Contractor shall also provide all technical and administrative support needed in order to ensure the timely and satisfactory performance of the Services.

2.5   The Contractor shall submit to UNDP the deliverables specified hereunder according to the following schedule:

        [LIST DELIVERABLES]   **[INDICATE DELIVERY DATES]**

        e.g.

Progress report	../../....
....	../../....
Final report	../../....

2.6   All reports shall be written in the English language, and shall describe in detail the services rendered under the Contract during the period of time covered in such report. All reports shall be transmitted by the Contractor by _____ **[MAIL, COURIER AND/OR FAX]** to the address specified in 9.1 below.

2.7   The Contractor represents and warrants the accuracy of any information or data provided to UNDP for the purpose of entering into this Contract, as well as the quality of the deliverables and reports foreseen under this Contract in accordance with the highest industry and professional standards.

OPTION 1 (FIXED PRICE)

3.   Price and Payment

3.1   In full consideration for the complete and satisfactory performance of the Services under this Contract, UNDP shall pay the Contractor a fixed contract price of _____ **[INSERT CURRENCY & AMOUNT IN FIGURES AND WORDS]**.

3.2   The price of this Contract is not subject to any adjustment or revision because of price or currency fluctuations or the actual costs incurred by the Contractor in the performance of the Contract.

3.3   Payments effected by UNDP to the Contractor shall be deemed neither to relieve the Contractor of its obligations under this Contract nor as acceptance by UNDP of the Contractor's performance of the Services.

3.4   UNDP shall effect payments to the Contractor after acceptance by UNDP of the invoices submitted by the Contractor to the address specified in 9.1 below, upon achievement of the corresponding milestones and for the following amounts:

MILESTONE	AMOUNT	TARGET DATE
Upon		../../..
		../../..

Invoices shall indicate the milestones achieved and corresponding amount payable.

OPTION 2 (COST REIMBURSEMENT)

3.   Price and payment

3.1   In full consideration for the complete and satisfactory performance of the Services under this Contract, UNDP shall pay the Contractor a price not to exceed _____ **[INSERT CURRENCY & AMOUNT IN FIGURES AND WORDS]**.

3.2   The amount contained in 3.1 above is the maximum total amount of reimbursable costs under this Contract. The Breakdown of Costs in Annex _____ **[INSERT ANNEX NUMBER]** contains the maximum amounts per cost category that are reimbursable under this Contract. The Contractor shall reflect in his invoices the amount of the actual reimbursable costs incurred in the performance of the Services.

3.3   The Contractor shall not do any work, provide any equipment, materials and supplies, or perform any other services which may result in any costs in excess of the amount under 3.1 or of any of the amounts specified in the Breakdown of Costs for each cost category without the prior written agreement of _____ **[NAME and TITLE]**, UNDP.

3.4   Payments effected by UNDP to the Contractor shall be deemed neither to relieve the Contractor of its obligations under this Contract nor as acceptance by UNDP of the Contractor's performance of the Services.

3.5   The Contractor shall submit invoices for the work done every _____ **[INSERT PERIOD OF TIME OR MILESTONES]**.

<div align="center">OR</div>

3.5.   The Contractor shall submit an invoice for _____ **[INSERT AMOUNT AND CURRENCY OF THE ADVANCE PAYMENT IN FIGURES & WORDS]** upon signature of this Contract by both parties and invoices for the work done every _____ **[INSERT PERIOD OF TIME OR MILESTONES]**.

3.6   Progress and final payments shall be effected by UNDP to the Contractor after acceptance of the invoices submitted by the Contractor to the address specified in 9.1 below, together with whatever supporting documentation of the actual costs incurred is required in the Breakdown of Costs or may be required by UNDP. Such payments shall be subject to any specific conditions for reimbursement contained in the Breakdown of Costs.

4.   Special conditions

4.1   The responsibility for the safety and security of the Contractor and its personnel and property, and of UNDP's property in the Contractor's custody, rests with the Contractor.

4.2   The advance payment to be made upon signature of the contract by both parties is contingent upon receipt and acceptance by UNDP of a bank guarantee for the full amount of the advance payment issued by a Bank and in a form acceptable to UNDP.

4.3   The amounts of the payments referred to under section 3.6 above shall be subject to a deduction of _____ **[INSERT PERCENTAGE THAT THE ADVANCE REPRESENTS OVER THE TOTAL PRICE OF THE CONTRACT]** % (... percent) of the amount accepted for payment until the cumulative amount of the deductions so effected shall equal the amount of the advance payment.

4.4   Owing to [..........................], Article(s) [.........] of the General Conditions in Annex I shall be amended to read/be deleted.

5.   Submission of invoices

5.1   An original invoice shall be submitted by mail by the Contractor for each payment under the Contract to the following address:

5.2   Invoices submitted by fax shall not be accepted by UNDP.

6.   Time and manner of payment

6.1   Invoices shall be paid within thirty (30) days of the date of their acceptance by UNDP. UNDP shall make every effort to accept an invoice or so advise the Contractor of its non-acceptance within a reasonable time from receipt.

6.2   All payments shall be made by UNDP to the following Bank account of the Contractor:

_____ **[NAME OF THE BANK]**

_____ **[ACCOUNT NUMBER]**

_____ **[ADDRESS OF THE BANK]**

7.   Entry into force. Time limits.

7.1   The Contract shall enter into force upon its signature by both parties.

7.2   The Contractor shall commence the performance of the Services not later than _____ **[INSERT DATE]** and shall complete the Services within _____ **[INSERT NUMBER OF DAYS OR MONTHS]** of such commencement.

7.3   All time limits contained in this Contract shall be deemed to be of the essence in respect of the performance of the Services.

8.   Modifications

8.1   Any modification to this Contract shall require an amendment in writing between both parties duly signed by the authorized representative of the Contractor and _____ **[NAME AND TITLE]** UNDP.

9.   Notifications

For the purpose of notifications under the Contract, the addresses of UNDP and the Contractor are as follows:

For the UNDP:

Name
Designation
Address
Tel. No.
Fax. No.
Email address:

For the Contractor:

Name
Designation
Address
Tel. No.
Fax. No.
Email address:

If the above terms and conditions meet with your agreement as they are typed in this letter and in the Contract Documents, please initial every page of this letter and its attachments and return to this office one original of this Contract, duly signed and dated.

Yours sincerely,

[INSERT NAME AND DESIGNATION]

For **[INSERT NAME OF THE COMPANY/ORGANIZATION]**

Agreed and Accepted:

Signature   _____
Name: _____
Title: _____
Date: _____

UNDP
GENERAL CONDITIONS OF CONTRACT FOR SERVICES

1.0   LEGAL STATUS:

The Contractor shall be considered as having the legal status of an independent contractor vis-à-vis the United Nations Development Programme (UNDP). The Contractor's personnel and sub-contractors shall not be considered in any respect as being the employees or agents of UNDP or the United Nations.

2.0   SOURCE OF INSTRUCTIONS:

The Contractor shall neither seek nor accept instructions from any authority external to UNDP in connection with the performance of its services under this Contract. The Contractor shall refrain from any action that may adversely affect UNDP or the United Nations and shall fulfill its commitments with the fullest regard to the interests of UNDP.

3.0   CONTRACTOR'S RESPONSIBILITY FOR EMPLOYEES:

The Contractor shall be responsible for the professional and technical competence of its employees and will select, for work under this Contract, reliable individuals who will perform effectively in the implementation of this Contract, respect the local customs, and conform to a high standard of moral and ethical conduct.

4.0   ASSIGNMENT:

The Contractor shall not assign, transfer, pledge or make other disposition of this Contract or any part thereof, or any of the Contractor's rights, claims or obligations under this Contract except with the prior written consent of UNDP.

5.0   SUB-CONTRACTING:

In the event the Contractor requires the services of sub-contractors, the Contractor shall obtain the prior written approval and clearance of UNDP for all sub-contractors. The approval of UNDP of a sub-contractor shall not relieve the Contractor of any of its obligations under this Contract. The terms of any sub-contract shall be subject to and conform to the provisions of this Contract.

6.0   OFFICIALS NOT TO BENEFIT:

The Contractor warrants that no official of UNDP or the United Nations has received or will be offered by the Contractor any direct or indirect benefit arising from this Contract or the award thereof. The Contractor agrees that breach of this provision is a breach of an essential term of this Contract.

7.0   INDEMNIFICATION:

The Contractor shall indemnify, hold and save harmless, and defend, at its own expense, UNDP, its officials, agents, servants and employees from and against all suits, claims, demands, and liability of any nature or kind, including their costs and expenses, arising out of acts or omissions of the Contractor, or the Contractor's employees, officers, agents or sub-contractors, in the performance of this Contract. This provision shall extend, inter alia, to claims and liability in the nature of workmen's compensation, products liability and liability arising out of the use of patented inventions or devices, copyrighted material or other intellectual property by the Contractor, its employees, officers, agents, servants or sub-contractors. The obligations under this Article do not lapse upon termination of this Contract.

8.0   INSURANCE AND LIABILITIES TO THIRD PARTIES:

8.1   The Contractor shall provide and thereafter maintain insurance against all risks in respect of its property and any equipment used for the execution of this Contract.

8.2   The Contractor shall provide and thereafter maintain all appropriate workmen's compensation insurance, or the equivalent, with respect to its employees to cover claims for personal injury or death in connection with this Contract.
8.3   The Contractor shall also provide and thereafter maintain liability insurance in an adequate amount to cover third party claims for death or bodily injury, or loss of or damage to property, arising from or in connection with the provision of services under this Contract or the operation of any vehicles, boats, airplanes or other equipment owned or

leased by the Contractor or its agents, servants, employees or sub-contractors performing work or services in connection with this Contract.

8.4   Except for the workmen's compensation insurance, the insurance policies under this Article shall:
8.4.1   Name UNDP as additional insured;
8.4.2   Include a waiver of subrogation of the Contractor's rights to the insurance carrier against the UNDP;
8.4.3   Provide that the UNDP shall receive thirty (30) days written notice from the insurers prior to any cancellation or change of coverage.

8.5   The Contractor shall, upon request, provide the UNDP with satisfactory evidence of the insurance required under this Article.

9.0   ENCUMBRANCES/LIENS:

The Contractor shall not cause or permit any lien, attachment or other encumbrance by any person to be placed on file or to remain on file in any public office or on file with the UNDP against any monies due or to become due for any work done or materials furnished under this Contract, or by reason of any other claim or demand against the Contractor.

10.0   TITLE TO EQUIPMENT: Title to any equipment and supplies that may be furnished by UNDP shall rest with UNDP and any such equipment shall be returned to UNDP at the conclusion of this Contract or when no longer needed by the Contractor. Such equipment, when returned to UNDP, shall be in the same condition as when delivered to the Contractor, subject to normal wear and tear. The Contractor shall be liable to compensate UNDP for equipment determined to be damaged or degraded beyond normal wear and tear.

11.0   COPYRIGHT, PATENTS AND OTHER PROPRIETARY RIGHTS:

11.1   Except as is otherwise expressly provided in writing in the Contract, the UNDP shall be entitled to all intellectual property and other proprietary rights including, but not limited to, patents, copyrights, and trademarks, with regard to products, processes, inventions, ideas, know-how, or documents and other materials which the Contractor has developed for the UNDP under the Contract and which bear a direct relation to or are produced or prepared or collected in consequence of, or during the course of, the performance of the Contract, and the Contractor acknowledges and agrees that such products, documents and other materials constitute works made for hire for the UNDP.

11.2   To the extent that any such intellectual property or other proprietary rights consist of any intellectual property or other proprietary rights of the Contractor: (i) that pre-existed the performance by the Contractor of its obligations under the Contract, or (ii) that the Contractor may develop or acquire, or may have developed or acquired, independently of the performance of its obligations under the Contract, the UNDP does not and shall not claim any ownership interest thereto, and the Contractor grants to the UNDP a perpetual license to use such intellectual property or other proprietary right solely for the purposes of and in accordance with the requirements of the Contract.

11.3   At the request of the UNDP; the Contractor shall take all necessary steps, execute all necessary documents and generally assist in securing such proprietary rights and transferring or licensing them to the UNDP in compliance with the requirements of the applicable law and of the Contract.

11.4   Subject to the foregoing provisions, all maps, drawings, photographs, mosaics, plans, reports, estimates, recommendations, documents, and all other data compiled by or received by the Contractor under the Contract shall be the property of the UNDP, shall be made available for use or inspection by the UNDP at reasonable times and in reasonable places, shall be treated as confidential, and shall be delivered only to UNDP authorized officials on completion of work under the Contract.

12.0   USE OF NAME, EMBLEM OR OFFICIAL SEAL OF UNDP OR THE UNITED NATIONS:

The Contractor shall not advertise or otherwise make public the fact that it is a Contractor with UNDP, nor shall the Contractor, in any manner whatsoever use the name, emblem or official seal of UNDP or THE United Nations, or any abbreviation of the name of UNDP or United Nations in connection with its business or otherwise.

13.0   CONFIDENTIAL NATURE OF DOCUMENTS AND INFORMATION:

Information and data that is considered proprietary by either Party, and that is delivered or disclosed by one Party ("Discloser") to the other Party ("Recipient") during the course of performance of the Contract, and that is designated as

confidential ("Information"), shall be held in confidence by that Party and shall be handled as follows:

13.1   The recipient ("Recipient") of such information shall:

13.1.1   use the same care and discretion to avoid disclosure, publication or dissemination of the Discloser's Information as it uses with its own similar information that it does not wish to disclose, publish or disseminate; and,

13.1.2   use the Discloser's Information solely for the purpose for which it was disclosed.

13.2   Provided that the Recipient has a written agreement with the following persons or entities requiring them to treat the Information confidential in accordance with the Contract and this Article 13, the Recipient may disclose Information to:

13.2.1   any other party with the Discloser's prior written consent; and,

13.2.2   the Recipient's employees, officials, representatives and agents who have a need to know such Information for purposes of performing obligations under the Contract, and employees officials, representatives and agents of any legal entity that it controls, controls it, or with which it is under common control, who have a need to know such Information for purposes of performing obligations under the Contract, provided that, for these purposes a controlled legal entity means:

13.2.2.1 a corporate entity in which the Party owns or otherwise controls, whether directly or indirectly, over fifty percent (50%) of voting shares thereof; or,

13.2.2.2 any entity over which the Party exercises effective managerial control; or,

13.2.2.3 for the UNDP, an affiliated Fund such as UNCDF, UNIFEM and UNV.

13.3   The Contractor may disclose Information to the extent required by law, provided that, subject to and without any waiver of the privileges and immunities of the United Nations, the Contractor will give the UNDP sufficient prior notice of a request for the disclosure of Information in order to allow the UNDP to have a reasonable opportunity to take protective measures or such other action as may be appropriate before any such disclosure is made.

13.4   The UNDP may disclose Information to the extent as required pursuant to the Charter of the UN, resolutions or regulations of the General Assembly, or rules promulgated by the Secretary-General.

13.5   The Recipient shall not be precluded from disclosing Information that is obtained by the Recipient from a third party without restriction, is disclosed by the Discloser to a third party without any obligation of confidentiality, is previously known by the Recipient, or at any time is developed by the Recipient completely independently of any disclosures hereunder.

13.6   These obligations and restrictions of confidentiality shall be effective during the term of the Contract, including any extension thereof, and, unless otherwise provided in the Contract, shall remain effective following any termination of the Contract.

14.0   FORCE MAJEURE; OTHER CHANGES IN CONDITIONS

14.1   In the event of and as soon as possible after the occurrence of any cause constituting force majeure, the Contractor shall give notice and full particulars in writing to the UNDP, of such occurrence or change if the Contractor is thereby rendered unable, wholly or in part, to perform its obligations and meet its responsibilities under this Contract. The Contractor shall also notify the UNDP of any other changes in conditions or the occurrence of any event that interferes or threatens to interfere with its performance of this Contract. On receipt of the notice required under this Article, the UNDP shall take such action as, in its sole discretion; it considers to be appropriate or necessary in the circumstances, including the granting to the Contractor of a reasonable extension of time in which to perform its obligations under this Contract.

14.2   If the Contractor is rendered permanently unable, wholly, or in part, by reason of force majeure to perform its obligations and meet its responsibilities under this Contract, the UNDP shall have the right to suspend or terminate this Contract on the same terms and conditions as are provided for in Article 15, "Termination", except that the period of notice shall be seven (7) days instead of thirty (30) days.

14.3 Force majeure as used in this Article means acts of God, war (whether declared or not), invasion, revolution, insurrection, or other acts of a similar nature or force.

14.4 The Contractor acknowledges and agrees that, with respect to any obligations under the Contract that the Contractor must perform in or for any areas in which the UNDP is engaged in, preparing to engage in, or disengaging from any peacekeeping, humanitarian or similar operations, any delays or failure to perform such obligations arising from or relating to harsh conditions within such areas or to any incidents of civil unrest occurring in such areas shall not, in and of itself, constitute force majeure under the Contract.

15.0 TERMINATION

15.1 Either party may terminate this Contract for cause, in whole or in part, upon thirty (30) days notice, in writing, to the other party. The initiation of arbitral proceedings in accordance with Article 16.2 ("Arbitration"), below, shall not be deemed a termination of this Contract.

15.2 UNDP reserves the right to terminate without cause this Contract at any time upon 15 days prior written notice to the Contractor, in which case UNDP shall reimburse the Contractor for all reasonable costs incurred by the Contractor prior to receipt of the notice of termination.

15.3 In the event of any termination by UNDP under this Article, no payment shall be due from UNDP to the Contractor except for work and services satisfactorily performed in conformity with the express terms of this Contract.

15.4 Should the Contractor be adjudged bankrupt, or be liquidated or become insolvent, or should the Contractor make an assignment for the benefit of its creditors, or should a Receiver be appointed on account of the insolvency of the Contractor, the UNDP may, without prejudice to any other right or remedy it may have under the terms of these conditions, terminate this Contract forthwith. The Contractor shall immediately inform the UNDP of the occurrence of any of the above events.

16.0 SETTLEMENT OF DISPUTES

16.1 Amicable Settlement: The Parties shall use their best efforts to settle amicably any dispute, controversy or claim arising out of this Contract or the breach, termination or invalidity thereof. Where the parties wish to seek such an amicable settlement through conciliation, the conciliation shall take place in accordance with the UNCITRAL Conciliation Rules then obtaining, or according to such other procedure as may be agreed between the parties.

16.2 Arbitration: Any dispute, controversy, or claim between the Parties arising out of the Contract or the breach, termination, or invalidity thereof, unless settled amicably under Article 16.1, above, within sixty (60) days after receipt by one Party of the other Party's written request for such amicable settlement, shall be referred by either Party to arbitration in accordance with the UNCITRAL Arbitration Rules then obtaining. The decisions of the arbitral tribunal shall be based on general principles of international commercial law. For all evidentiary questions, the arbitral tribunal shall be guided by the Supplementary Rules Governing the Presentation and Reception of Evidence in International Commercial Arbitration of the International Bar Association, 28 May 1983 edition. The arbitral tribunal shall be empowered to order the return or destruction of goods or any property, whether tangible or intangible, or of any confidential information provided under the Contract, order the termination of the Contract, or order that any other protective measures be taken with respect to the goods, services or any other property, whether tangible or intangible, or of any confidential information provided under the Contract, as appropriate, all in accordance with the authority of the arbitral tribunal pursuant to Article 26 ("Interim Measures of Protection") and Article 32 ("Form and Effect of the Award") of the UNCITRAL Arbitration Rules. The arbitral tribunal shall have no authority to award punitive damages. In addition, unless otherwise expressly provided in the Contract, the arbitral tribunal shall have no authority to award interest in excess of the London Inter-Bank Offered Rate ("LIBOR") then prevailing, and any such interest shall be simple interest only. The Parties shall be bound by any arbitration award rendered as a result of such arbitration as the final adjudication of any such dispute, controversy, or claim.

17.0 PRIVILEGES AND IMMUNITIES:
Nothing in or relating to this Contract shall be deemed a waiver, express or implied, of any of the privileges and immunities of the United Nations, including its subsidiary organs.

18.0 TAX EXEMPTION

18.1   Section 7 of the Convention on the Privileges and Immunities of the United Nations provides, inter-alia that the United Nations, including its subsidiary organs, is exempt from all direct taxes, except charges for public utility services, and is exempt from customs duties and charges of a similar nature in respect of articles imported or exported for its official use. In the event any governmental authority refuses to recognize the United Nations exemption from such taxes, duties or charges, the Contractor shall immediately consult with the UNDP to determine a mutually acceptable procedure.

18.2   Accordingly, the Contractor authorizes UNDP to deduct from the Contractor's invoice any amount representing such taxes, duties or charges, unless the Contractor has consulted with the UNDP before the payment thereof and the UNDP has, in each instance, specifically authorized the Contractor to pay such taxes, duties or charges under protest. In that event, the Contractor shall provide the UNDP with written evidence that payment of such taxes, duties or charges has been made and appropriately authorized.

19.0   CHILD LABOUR

19.1   The Contractor represents and warrants that neither it, nor any of its suppliers is engaged in any practice inconsistent with the rights set forth in the Convention on the Rights of the Child, including Article 32 thereof, which, inter alia, requires that a child shall be protected from performing any work that is likely to be hazardous or to interfere with the child's education, or to be harmful to the child's health or physical mental, spiritual, moral or social development.

19.2   Any breach of this representation and warranty shall entitle UNDP to terminate this Contract immediately upon notice to the Contractor, at no cost to UNDP.

20.0   MINES:

20.1   The Contractor represents and warrants that neither it nor any of its suppliers is actively and directly engaged in patent activities, development, assembly, production, trade or manufacture of mines or in such activities in respect of components primarily utilized in the manufacture of Mines. The term "Mines" means those devices defined in Article 2, Paragraphs 1, 4 and 5 of Protocol II annexed to the Convention on Prohibitions and Restrictions on the Use of Certain Conventional Weapons Which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects of 1980.

20.2   Any breach of this representation and warranty shall entitle UNDP to terminate this Contract immediately upon notice to the Contractor, without any liability for termination charges or any other liability of any kind of UNDP.

21.0   OBSERVANCE OF THE LAW:

The Contractor shall comply with all laws, ordinances, rules, and regulations bearing upon the performance of its obligations under the terms of this Contract.

22.0   SEXUAL EXPLOITATION:

22.1   The Contractor shall take all appropriate measures to prevent sexual exploitation or abuse of anyone by it or by any of its employees or any other persons who may be engaged by the Contractor to perform any services under the Contract. For these purposes, sexual activity with any person less than eighteen years of age, regardless of any laws relating to consent, shall constitute the sexual exploitation and abuse of such person. In addition, the Contractor shall refrain from, and shall take all appropriate measures to prohibit its employees or other persons engaged by it from, exchanging any money, goods, services, offers of employment or other things of value, for sexual favors or activities, or from engaging in any sexual activities that are exploitive or degrading to any person. The Contractor acknowledges and agrees that the provisions hereof constitute an essential term of the Contract and that any breach of this representation and warranty shall entitle UNDP to terminate the Contract immediately upon notice to the Contractor, without any liability for termination charges or any other liability of any kind.

22.2   The UNDP shall not apply the foregoing standard relating to age in any case in which the Contractor's personnel or any other person who may be engaged by the Contractor to perform any services under the Contract is married to the person less than the age of eighteen years with whom sexual activity has occurred and in which such marriage is recognized as valid under the laws of the country of citizenship of such Contractor's personnel or such other person who may be engaged by the Contractor to perform any services under the Contract.

23.0   SECURITY:

23.1 The Contractor shall:
  (a) Put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the services are being provided;
  (b) Assume all risks and liabilities related to the Contractor's security, and the full implementation of the security plan.

23.2 UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this contract. Notwithstanding the foregoing, the Contractor shall remain solely responsible for the security of its personnel and for UNDP's property in its custody as set forth in paragraph 4.1 above.

24.0 AUDITS AND INVESTIGATIONS:

24.1 Each invoice paid by UNDP shall be subject to a post-payment audit by auditors, whether internal or external, of UNDP or the authorized agents of the UNDP at any time during the term of the Contract and for a period of three (3) years following the expiration or prior termination of the Contract. The UNDP shall be entitled to a refund from the Contractor for any amounts shown by such audits to have been paid by the UNDP other than in accordance with the terms and conditions of the Contract. Should the audit determine that any funds paid by UNDP have not been used as per contract clauses, the company shall reimburse such funds forthwith. Where the company fails to reimburse such funds, UNDP reserves the right to seek recovery and/or to take any other action as it deems necessary.

24.2 The Contractor acknowledges and agrees that, at any time, UNDP may conduct investigations relating to any aspect of the Contract, the obligations performed under the Contract, and the operations of the Contractor generally. The right of UNDP to conduct an investigation and the Contractor's obligation to comply with such an investigation shall not lapse upon expiration or prior termination of the Contract. The Contractor shall provide its full and timely cooperation with any such inspections, post-payment audits or investigations. Such cooperation shall include, but shall not be limited to, the Contractor's obligation to make available its personnel and any documentation for such purposes and to grant to UNDP access to the Contractor's premises. The Contractor shall require its agents, including, but not limited to, the Contractor's attorneys, accountants or other advisers, to reasonably cooperate with any inspections, post-payment audits or investigations carried out by UNDP hereunder.

25.0 ANTI-TERRORISM:
25.1 The Contractor agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received under this Contract are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm. This provision must be included in all sub-contracts or sub-agreements entered into under this Contract.

26.0 AUTHORITY TO MODIFY:
Pursuant to the Financial Regulations and Rules of UNDP, only the UNDP Authorized Official possesses the authority to agree on behalf of UNDP to any modification of or change in this Agreement, to a waiver of any of its provisions or to any additional contractual relationship of any kind with the Contractor. Accordingly, no modification or change in this Contract shall be valid and enforceable against UNDP unless provided by an amendment to this Agreement signed by the Contractor and jointly by the UNDP Authorized Official.