

## Description of Functional Characteristics

The “Tehzor” Information System is designed to automate expert inspection processes carried out by technical supervision specialists in the course of performing technical oversight of construction projects.

Expert inspection processes refer to activities performed during technical supervision of construction projects, including:

- inspections of construction sites;
- recording of identified violations;
- generating instructions based on inspection results;
- communicating inspection results to relevant construction participants;
- monitoring the elimination of identified violations.

Technical supervision is a set of control and inspection activities ensuring that construction, installation, and finishing works are performed in full compliance with construction norms and regulations, the requirements of the controlling authority, the construction project documentation, within the established deadlines, in the planned scope, and with high quality.

The system includes:

- databases;
- server application;
- web application for users;
- web application for administrators.

The system has a platform-based architecture. The list of modules that constitute integral components of the software, as well as the system’s functionality, is provided in Table 1: **Tehzor IS Modules**.

Components are structural elements that are not deployed or executed as separate entities. The “Tehzor” Information System is a unified environment that contains many interconnected components forming a single cohesive system, enabling a unified information space with complete data on the lifecycle of capital construction assets.

**Table 1. Modules of the Tehzor Information System**

| <b>№</b> | <b>Component Name</b>               | <b>Characteristics</b> | <b>Description of the Component and List of Main Functional Capabilities</b>   |
|----------|-------------------------------------|------------------------|--|
| 1        | Administration Module (client-side) | Core                   | The functionality of the module is designed for flexible configuration of the information workspace according to the customer’s needs and includes a set of sections (independent submodules): |

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|     |                          |      | <ol style="list-style-type: none"> <li>1. <b>Plan management</b> (adding plans, moving them, deleting).</li> <li>2. <b>Plan markup editor</b> for axes and rooms to enable automatic recognition during further localization of violations.</li> <li>3. <b>Generation of a “room matrix” (chessboard)</b> for each project based on room-marked construction plans.</li> <li>4. <b>Checklist management</b> (maintaining the checklist registry, adding checklists, configuring checklist binding parameters, creating a hierarchical checklist structure, adding category and subcategory names, entering additional info for each checklist item, configuring dependencies between categories).</li> <li>5. <b>Workgroup management</b> (maintaining the workgroup registry, adding workgroups, configuring workgroup binding parameters, adding members, setting delegation rules for users and child workgroups, managing workgroup hierarchy).</li> <li>6. <b>Management of finish-type sets</b> (registry of finish types, adding finish-type sets, configuring binding parameters, adding finish types linked to room types).</li> <li>7. <b>Management of work-type sets</b> (registry of work-type sets, filtering, adding new sets, configuring binding parameters, adding work types, setting hierarchy of work types, moving work types).</li> <li>8. <b>Management of violation-label sets</b> (registry of violation labels, adding label sets, configuring binding parameters, adding violation labels).</li> </ol> |
| 1.1 | “Fields” Module          | Core | <p>The module functionality is designed to provide flexible system customization to meet customers’ business needs and includes:</p> <ol style="list-style-type: none"> <li>1. creation and configuration of custom fields linked to specific companies, facilities, and entities;</li> <li>2. management of custom fields (adding, editing, deleting fields, as well as displaying and filtering field sets) in accordance with role-based access settings for the module.</li> </ol>   |
| 1.2 | “Room Indicators” Module | Core | <p>The module functionality also includes:</p> <ol style="list-style-type: none"> <li>1. management of premises indicators (creation, editing, deletion, and viewing of premises</li> </ol>  |

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|   |                              |          | <p>indicator sets; displaying and filtering premises on the premises grid based on custom indicators) in accordance with role-based access settings for the module;</p> <ol style="list-style-type: none"> <li>configuration of premises indicator sets linked to companies and facilities.</li> </ol>  |
| 2 | Neural Networks Module       | Non-core | <p>The module functionality includes:</p> <ol style="list-style-type: none"> <li>Automatic detection of construction axes on plans and drawings.</li> <li>Automatic detection of rooms on plans and drawings.</li> <li>Automatic recognition of texts and symbols on drawings.</li> <li>Splitting a general drawing into individual apartments and detecting their boundaries.</li> <li>Generating axis and room markup for automatic recognition during violation localization.</li> <li>Ability to create templates of typical violations.</li> <li>Automatic detection and classification of typical defects from photos (with no or minimal human involvement).</li> <li>Automatic filling of data for identified typical violations based on automatic classification (using neural networks and predefined violation templates).</li> </ol>   |
| 3 | Construction Projects Module | Core     | <p>Systematization and management of data on construction projects.</p> <p>Functionality includes:</p> <ol style="list-style-type: none"> <li>Maintaining the project registry with hierarchical structure in table and graphical views.</li> <li>Filtering projects by parameters and searching by project name in the registry.</li> <li>Managing the project card: stage timelines (construction, inspection, handover, warranty), photo, counters of violations by status, counters of violation labels.</li> <li>Displaying project stage, number of violations per project, and status legend.</li> <li>Managing the project lifecycle (transition between construction stages, storing and managing all related data).</li> <li>Storing project plans.</li> <li>Maintaining flexible hierarchical classifiers of work types.</li> <li>Managing the project's violation registry.</li> <li>Managing the inspection registry.</li> <li>Managing the verification (check) registry.</li> <li>Managing the internal acceptance registry.</li> <li>Managing the homeowner handover registry.</li> <li>Managing the warranty-claims registry.</li> </ol> |

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|   |  |      | <p>14. Managing the “room matrix” (chessboard) by violations and checklists.</p> <p>15. Managing room information.</p>  |
| 4 | Construction Control Module                      | Core | <p>Designed for operational control management at the construction stage and includes:</p> <ol style="list-style-type: none"> <li>1. Maintaining the registry of checks.</li> <li>2. Managing aggregated entities — checks that contain violations and inspections.</li> <li>3. Adding descriptions and attaching documents to created checks.</li> <li>4. Recording the date and author of creation and editing.</li> <li>5. Counter of the number of checks.</li> <li>6. Filtering and sorting the checks registry.</li> <li>7. Moving checks between projects.</li> <li>8. Adding violations and inspections into checks.</li> <li>9. Adding checks in offline mode.</li> </ol>  |
| 5 | Work Acceptance Module (by structures and rooms) | Core | <p>Designed to manage the acceptance process of completed work volume (from subcontractor to contractor, from contractor to general contractor).<br/>Functionality includes:</p> <ol style="list-style-type: none"> <li>1. Maintaining the registry of work acceptances.</li> <li>2. Managing aggregated entities — work acceptances tied to specific work fronts (structures or rooms).</li> <li>3. Linking acceptance to a checklist.</li> <li>4. Recording information on identified violations.</li> <li>5. Recording inspection information.</li> <li>6. Recording added tasks.</li> <li>7. Adding description, work type, acceptance deadline, accepting party, contractor, planned volume (percentage and physical units).</li> <li>8. Attaching files to acceptances.</li> <li>9. Adding comments and official responses (including attachments).</li> <li>10. Recording acceptance results, including actual volume (percentage/physical units).</li> <li>11. Recording creation and modification timestamps and authors.</li> <li>12. Counter of acceptance records.</li> <li>13. Filtering and sorting the acceptance registry.</li> <li>14. Managing acceptance statuses.</li> <li>15. Filtering acceptances by status, acceptance type, work front type, deadline, overdue marker, responsible parties, work types, author, and date added.</li> </ol> |
| 6 | Internal Room Acceptance Module                  | Core | <p>Designed to manage internal handovers of construction objects within a company.<br/>Functionality includes:</p> <ol style="list-style-type: none"> <li>1. Maintaining the registry of internal acceptances.</li> </ol>   |

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|   |                                 |      | <ol style="list-style-type: none"> <li>2. Managing aggregated entities — internal acceptances containing violations and inspections tied to specific rooms.</li> <li>3. Adding descriptions and attaching documents.</li> <li>4. Recording creation and editing timestamps and authors.</li> <li>5. Counter of internal acceptances.</li> <li>6. Filtering and sorting the registry.</li> <li>7. Adding violations and inspections.</li> <li>8. Recording violation data.</li> <li>9. Recording inspection data.</li> <li>10. Adding internal acceptances in offline mode.</li> </ol>  |
| 7 | Homeowner Handover Module       | Core | <p>Designed to manage the stage of transferring construction units to property owners and includes:</p> <ol style="list-style-type: none"> <li>1. Maintaining the homeowner handover registry.</li> <li>2. Managing aggregated entities containing violations tied to rooms.</li> <li>3. Adding owner data and owner decisions, attaching documents to handover records.</li> <li>4. Recording creation and editing timestamps and authors.</li> <li>5. Counter of handover records.</li> <li>6. Filtering and sorting the registry.</li> <li>7. Adding violations.</li> <li>8. Recording violation data.</li> <li>9. Managing the lifecycle of handovers (status changes).</li> <li>10. Adding handovers in offline mode.</li> </ol>                              |
| 8 | Warranty Service Module         | Core | <p>Designed to automate audit processes and post-sale service of real estate objects.</p> <p>Functionality includes:</p> <ol style="list-style-type: none"> <li>1. Maintaining the warranty-claims registry.</li> <li>2. Managing aggregated warranty entities containing violations tied to rooms.</li> <li>3. Attaching documents and materials.</li> <li>4. Recording creation and editing timestamps and authors.</li> <li>5. Counter of warranty claims.</li> <li>6. Filtering and sorting the registry.</li> <li>7. Adding violations.</li> <li>8. Recording violation data.</li> <li>9. Managing lifecycle (status changes).</li> <li>10. Moving warranty claims between objects and rooms.</li> <li>11. Adding warranty claims in offline mode.</li> </ol> |
| 9 | Technical Administration Module | Core | <p>Designed for use by the product developer's technical support team:</p> <ol style="list-style-type: none"> <li>1. Maintaining the company registry.</li> <li>2. Adding new companies (name, employees, contractors).</li> <li>3. Maintaining the project registry (filtering, sorting).</li> </ol>  |

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|    |                              |      | <ol style="list-style-type: none"> <li>4. Adding new projects.</li> <li>5. Maintaining the user registry (filtering, sorting).</li> <li>6. Adding new users (profile info, role assignment, content, session history).</li> <li>7. Maintaining role registry.</li> <li>8. Adding new roles (name, company binding, configurable permissions and notification subscriptions).</li> <li>9. Maintaining violation-template registry.</li> <li>10. Adding new templates (name, binding to company, description, work type, reference, deadline, criticality indicator, instruction, stage, moderation status).</li> <li>11. Reference database of regulatory documents.</li> <li>12. Action log with filtering, sorting, and detailed view.</li> </ol>   |
| 10 | User Personal Account Module | Core | <p>Designed for personal system settings:</p> <ol style="list-style-type: none"> <li>1. Viewing and editing user information, changing password.</li> <li>2. Enabling/disabling offline work mode.</li> <li>3. Enabling/disabling email notifications.</li> </ol>  |
| 11 | Cross-System Functionality   | Core | <p>Applies to multiple modules:</p> <ol style="list-style-type: none"> <li>1. Maintaining registries of violations and inspections.</li> <li>2. Recording creation and editing timestamps and authors.</li> <li>3. Counters of violations and inspections.</li> <li>4. Filtering and sorting.</li> <li>5. Exporting document templates with download/email options.</li> <li>6. Adding violations and inspections into aggregated entities.</li> <li>7. Recording full violation information (description, work type, deadline, criticality indicator, regulatory reference, location with automatic axis recognition, floor, workgroup assignment with delegation rules, labels, prescriptions, media attachments, photo editor).</li> <li>8. Recording inspection information (description, location with automatic axis recognition, floor, media attachments, photo editor).</li> <li>9. Managing violation lifecycle (status changes, official responses, auto-delegation, overdue warnings, actual resolution date, first-view tracking, history of delegation and card changes, plan-color updates).</li> <li>10. Adding violations and inspections offline.</li> <li>11. Managing room information.</li> <li>12. Managing room lifecycle.</li> <li>13. Graphical and table display of the “room matrix” by violations, checklists, construction stages, room types, and sections.</li> </ol> |

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|    |                            |          | <ul style="list-style-type: none"> <li>14. Room-matrix legend display.</li> <li>15. Filtering rooms and reversing floor order.</li> <li>16. Displaying alternative room numbers.</li> <li>17. Counters of violations by status in the matrix.</li> <li>18. Counters of rooms by type and by filters.</li> <li>19. Room-status reports with filtering.</li> <li>20. Automatic checklist binding based on stage, project, room type, finish type.</li> <li>21. Full checklist interaction (status management, adding violations, adding tasks, counters, filtering).</li> <li>22. Checklist-ready pop-up on matrix hover.</li> <li>23. Moving violations within aggregated entities.</li> <li>24. Storing external room IDs for integrations.</li> </ul> |
| 12 | Pre-Sale Inspection Module | Non-core | <p>Introduces a new entity within the acceptance stage, enabling periodic inspection of property condition before transfer to the owner.</p> <p>Functionality includes:</p> <ul style="list-style-type: none"> <li>1. Maintaining a separate information space for pre-sale condition monitoring.</li> <li>2. Managing pre-sale inspections (add, view, edit, delete).</li> </ul>  |
| 13 | Legal Entities Module      | Non-core | <p>Stores all necessary information about clients, contractors, subcontractors including their organizational and banking details, appointment orders, etc.:</p> <ul style="list-style-type: none"> <li>1. Creating a “Legal Entity”.</li> <li>2. Viewing, editing, deleting legal entity data.</li> <li>3. Adding banking details.</li> <li>4. Adding authorized persons.</li> <li>5. Uploading documents.</li> <li>6. Viewing legal entity registry.</li> <li>7. Registry filters.</li> </ul>  |
| 14 | Contracts Module           | Non-core | <p>Automatically links contracts to violation cards based on project, stage, and work type, and auto-fills data in documents — speeding up document flow.</p> <p>Functionality includes:</p> <ul style="list-style-type: none"> <li>1. Creating and deleting a “Contract” entity.</li> <li>2. Viewing and editing contract information.</li> <li>3. Uploading contract documents.</li> <li>4. Maintaining the contract registry.</li> <li>5. Registry filters.</li> </ul>  |