Application of CMMI process in the project:

SRHC – Smart Robot House Cleaner

Ana Bajic

Nikola Dimitrijevic

Strahinja Stanojevic

Beograd, decembar 2017.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CMMI level | Project area | Specific objective | Specific rules | Work product or artifact | Description of rule application in the project to date, possible improvements, references to other documents |
| 1 | Requirements initialization | - | - | Conceptual  solution | This project’s intent is to design and develop software and hardware for  autonomous robot whose purpose is to clean and maintain the floors in  houses instead of people. Also, it will be able to clean other surfaces  above the floor level, maintain its own garbage bag, and go to the charging  station when needed. |
| 2 | Requirements  Management | Managing requirements | Obtain requirements agreement |  | It’s needed to generalize customer requirements and our ideas. (uniformly) |
| Obtain commitment towards requirements |  | Enabling all functionalities of the SRHC and website. |
| Managing requirements changes |  | Notice timely, and react on time to all changes of conditions and environment. |
| Maintain bidirectional traceability of requirements |  | Enable requirement traceability between prototype product and final work products. |
| Ensure Alignment Between Project Work and Requirements |  | It’s needed to notice all contradictions timely, with the least possible cost, and resolve them. |
| Standardize managing process | Establish organizational rules |  | Design a set of guidelines and instructions so that managing is as good as possible. |
| Plan the processes |  | Write a detailed plan in ProjectLibre. |
| Ensure resources | Project plan | Ensure work places and equipment for employees. |
| Assign responsibilities | Project plan | Decentralize tasks on all team members. |
| Train staff | Training plan and project plan | Organize seminars to perfect the knowledge that will be used in system realization. |
| Manage configurations | Planned config. Management | Organize meetings after every phase to ensure agreement and manage the consistency of configurations. |
| Identify and include valuable participants |  | Make reports and needed documentation for all stakeholders so that they see the progress.f |
| Process control and monitoring |  | Introduce mini test on meetings after end of each phase of project to determine if all requirements for that phase are met. |
| Objectively evaluate ideas |  | Consider ideas of all stakeholders, objectively and unbiased. |
| Perform a status revision with higher level management |  | Realize financial inspection and checkup of state of resources, as well as the flow of system development. |
|  |  |  |  |  |
| Project Planning | Establish estimates | Define project domain |  | Project will be defined on a global level. |
| Define estimates of working products and tasks |  | Determine the evaluation criteria of all artifacts created in previous phases |
| Define the project’s lifespan |  | Lifespan of the project is while it is profitable and useful, evaluated at 15 |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | years, and more with added improvements. |
| Define evaluation of the necessary effort and price |  | Defined in conceptual solution. |
| Develop a project plan | Consolidate budget and schedule |  | Budget that is defined in conceptual solution needs to be distributed on all phases and teams. |
| Identify project risks |  | Risk of oversaturation, cost of goods |
| Data management plan |  | Collected data are delivered to data manager. |
| Project resource plan |  | Create a call center with customer support operators that will be available 24/6, as well as needed space, resources and conditions for the staff. |
| Plan for needed knowledge and skills |  | Knowledge and skills of a candidate are determined whilst interviewing. |
| Participation plan |  | Division of roles. |
| Determine project plan |  | Based on conceptual solution, the project plan is written with more detail. |
| Obtain a commitment to the plan | Carry out a revision of project’s plan |  | Include in the new version of project plan every idea that is accepted. |
| Reconcile work activities and available resources |  | Ensure maximal use of all available resources and arrange them chronologically by needs of all teams. |
| Outline the obligations prescribed by the plan |  | Strictly adhere to the defined project plan in order to avoid defects. |
| Project Monitoring and Control | Monitor the Project Against the Plan | Monitor Project Planning Parameters |  | Localize the changes of project plan, for the sake of its improvement. |
| Monitor Commitments |  | In ProjectLibre, monitor all activities of project participants. |
| Monitor Project Risks |  | Monitor all risks and document them. |
| Monitor Data Management |  | Monitor if database is in a consistent state and if all data is valid. |
| Monitor Stakeholder Involvement |  | In ProjectLibre, also monitor activities of stakeholders. |
| Conduct Progress Reviews |  | Hold meetings after the completed model to exchange impressions and  To identify potential changes. |
| Conduct Milestone Reviews |  | At the turning points, document all revisions. |
| Manage Corrective Action to Closure | Analyze Issues |  | All obstacles in the development of the system should be immediately reported to the supervisor. |
| Take Corrective Action |  | In the shortest possible time, correct the obstacles found above. |
| Manage Corrective Actions |  | Document those corrections. |
| Configuration Management | Establish Baselines | Identify Configuration Items |  | Ustanoviti vrstu razvoja sistema, npr. Inkrementalni. |
| Establish a Configuration Management System |  | Imenovana osoba, koordinator, će biti nadležna za sve timove i nadgledati  rad i razvoj. |
| Create or Release Baselines |  | Pošto predlažem inkrementalni tip razvoja, testirati module što pre. |
| Track and Control Changes | Track Change Requests |  | Nadležna osoba treba obaveštavati vođe timova o promenama u drugim  timovima. |
| Control Configuration Items |  | Koordinator će voditi svoju dokumentaciju. |
| Establish Integrity | Establish Configuration Management Records |  | Obezbediti potrebna sredstva. |
| Perform Configuration Audits |  | Proceniti konfiguraciju sistema i evidentirati to u dokumentaciji koja će |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  |  |  | potom biti isporučena vođama timova. |
| Supplier Agreement  Management | Establish Supplier Agreements | Determine Acquisition Type |  | Nabaviti opremu potrebnu za bezbedan i brz transport organa. |
| Select Suppliers |  | Formirati tender za izbor najbolje organizacije za transport. |
| Establish Supplier Agreements |  | Po završetku tendera potpisati pravno obavezujući ugovor sa izabranom  organizacijom. |
| Satisfy Supplier Agreements |  |  |  |
| Execute the Supplier Agreement |  | Uposliti tim pravnih lica koji će sastaviti ugovore za obe strane. |
| Accept the Acquired Product |  | Obezbediti plaćanje po dobijenoj fakturi. |
| Ensure Transition of Products |  | Transport je u nadležnosti isporučioca. |
| Measurement and  Analysis | Align Measurement and Analysis Activities | Establish Measurement Objectives |  | Ustanoviti referentne vrednosti. |
| Specify Measures |  | Definisati tačno određene standarde za merenje i analizu. |
| Specify Data Collection and Storage Procedures |  | Podaci će se čuvati u bazi podataka. |
| Specify Analysis Procedures |  | Osmisliti načine merenja i analize projekta. |
| Provide Measurement Results | Obtain Measurement Data |  | Sve rezultate dokumentovati i sačuvati u odgovarajućim tabelama baze  podataka. |
| Analyze Measurement Data |  | Uporediti rezultate sa referentnim vrednostima i izvršiti verifikaciju. |
| Store Data and Results |  | U bazi. |
| Communicate Results |  | Napraviti relacioni model BP. |
| Process and Product  Quality Assurance | Objectively Evaluate Processes and Work Products | Objectively Evaluate Processes |  | Svi procesi moraju biti u skladu sa propisanim standardima. |
| Objectively Evaluate Work Products |  | Proizvodi i servisi moraju odgovarati specifikaciji. |
| Provide Objective Insight | Communicate and Resolve Noncompliance Issues |  | Utvrditi rizike i način njihovog razrešenja. |
| Establish Records |  | / |
| 3 | Risk Management | Prepare for Risk Management | Determine Risk Sources and Categories |  | Izvor rizika je korupcija i crno tržište. |
| Define Risk Parameters |  | Najznačajniji parametar je uzimanje novčane naknade za uticanje na  određivanje pacijenta koji će dobiti organ. |
| Establish a Risk Management Strategy |  | Obezbediti apsolutnu privatnost i poverljivost svih korisnika. |
| Identify and Analyze Risks | Identify Risks |  | Ugrožena bezbednost donatora. |
| Evaluate, Categorize, and Prioritize Risks |  | Od velike je važnosti fizička bezbednost svih korisnika. |
| Mitigate Risks | Develop Risk Mitigation Plans |  | / (jer je nedopustivo da dođe do ovakvog razvoja situacije) |
| Implement Risk Mitigation Plans |  | / |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Product Integration | Prepare for Product Integration | Establish an Integration Strategy |  | Odrediti rok da se svi moduli integrišu u jedan i voditi računa o kvalitetu  integrisanog modula. |
| Establish the Product Integration Environment |  | Obezbediti resurse. |
| Establish Product Integration Procedures and Criteria |  | Dokumentacija o svakom modulu kao deo procedure integracije. |
| Ensure Interface Compatibility | Review Interface Descriptions for Completeness |  | Ako se u toku implementacije menjao i početni zahtev, uskladiti interfejs. |
| Manage Interfaces |  | Držati se početno specificiranog dizajna sistema. |
| Assemble Product Components and Deliver the Product | Confirm Readiness of Product Components for Integration |  | Testirati pojedinačne module pre integracije. |
| Assemble Product Components |  | Proces integracije. |
| Evaluate Assembled Product Components |  | Povezati sve module i proveriti da li je sve u skladu sa početnim zahtevima- |
| Package and Deliver the Product or Product Component |  | Poslati na integraciono testiranje timu koji je predviđen za to. |
|  | Verification | Prepare for Verification | Select Work Products for Verification |  | Integrisani sistem i početni projektni plan. |
| Establish the Verification Environment |  | Obezbediti potrebne resurse neophodne za proces verifikacije. |
| Establish Verification Procedures and Criteria |  | Proveriti da li se dobijeni sistem slaže sa zahtevima iz početno definisanog  plana. |
| Perform Peer Reviews | Prepare for Peer Reviews |  | Formirati tim za ovu fazu. |
| Conduct Peer Reviews |  | Tim treba da evaluira sistem koji je razvijen. |
| Analyze Peer Review Data |  | / |
| Verify Selected Work Products | Perform Verification |  | Realizovati planiranu verifikaciju. |
| Analyze Verification Results |  | Dokumentovati sve uočene nepravilnosti prilikom verifikacije i predvideti  korekcije. |
|  | Verification | Prepare for Validation | Select Products for Validation |  | Integrisani sistem i početne potencijalne želje korisnika. |
| Establish the Validation Environment |  | Obezbediti potrebne resurse neophodne za proces validacije. |
| Establish Validation Procedures and Criteria |  | Proveriti da li se dobijeni sistem slaže sa zahtevima iz početno definisanih  potencijalnih želja korisnika. |
| Validate Product or Product Components | Perform Validation |  | Realizovati planiranu validaciju. |
| Analyze Validation Results |  | Dokumentovati sve uočene nepravilnosti prilikom validacije i predvideti  korekcije. |
|  | Organizational Training | Establish an Organizational Training Capability | Establish Strategic Training Needs |  | Obuka korisnika kako bi pravilno koristili sistem. |
| Determine Which Training Needs Are the Responsibility of the Organization |  | Ispravno korišćenje sistema od strane korisnika je od velike važnosti kako bi  korisnik postavljao ispravne informacije na ispravan način. |
| Establish an Organizational Training Tactical Plan |  | Seminari, edukativna predavanja, radionice. |
| Establish a Training Capability |  | Pronaći odgovarajuće sale i termine. |
| Provide Training | Deliver Training |  | Detaljno obučiti ljude koji će sprovoditi dalju obuku. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | Establish Training Records |  | / |
| Assess Training Effectiveness |  | Utvrditi odziv i produktivnost obuke. |
|  | Organizational Process Definition | Establish Organizational Process Assets | Establish Standard Processes |  | Podela učesnika na timove određivanje vođa i unutrašnje strukture timova |
| Establish Lifecycle Model Descriptions |  | / |
| Establish Tailoring Criteria and Guidelines |  | / |
| Establish the Organization’s Measurement Repository |  | Predvideti obavezni kvalitet sistema i vršiti komparaciju tokom razvoja. |
| Establish the Organization’s Process Asset Library |  | / |
|  | Organizational Process Focus | Determine Process Improvement  Opportunities | Establish Organizational Process Needs |  | Definisati izgled krajnjeg proizvoda i težiti tome. |
| Appraise the Organization’s Processes |  | Utvrditi strategiju za poboljšavanje sistema. |
| Identify the Organization’s Process Improvements |  | Dokumentovati svaku ideju pošto se ona razmotri kao ispravna i bude  odobrena od strane ostatka tima. |
| Plan and Implement Process Actions | Establish Process Action Plans |  | Treba napraviti detaljan plan izvršenja i validacije akcija za poboljšanje. |
| Implement Process Action Plans |  | Sprovesti u delo gore pomenuti plan. |
| Use improvements and favorable actions |  | Pronađena poboljšanja za sistem primeniti u korist dobijanja bolje verzije. |
| Incorporate Experiences into Organizational Process Assets |  | Svako stečeno iskustvo podeliti sa ostalim timovima da bi i oni izvukli korist |
|  | Integrated Project Management | Use the Project’s Defined Process | Establish the Project’s Defined Process |  | Nadležni će vršiti inspekciju svih timova. |
| Use Organizational Process Assets for Planning Project Activities |  | Uposliti vođe timova da na sastancima izlažu dosadašnji napredak timova  kako bi nadležni imali uvid. |
| Integrate Plans |  | Formirati superplan, tj. strukturiran skup svih planova. |
| Manage the Project Using Integrated Plans |  | Držati se unapred definisanog plana. |
| Contribute to Organizational Process Assets |  | / |
| Coordinate and Collaborate with Relevant Stakeholders | Manage Stakeholder Involvement |  | Voditi dokumentaciju o svim sponzorima. |
| Manage Dependencies |  | Obezbediti reklamu u zavisnosti od veličine sponzorstva. |
| Resolve Coordination Issues |  | Ukoliko dođe do problema u rukovođenju, identifikovati uzroke i u što  kraćem roku ih ukloniti. |
|  | Decision Analysis and Resolution | Evaluate Alternatives | Establish Guidelines for Decision Analysis |  | Odrediti načine izmene odluka u odnosu na promene u razvoju sistema. |
| Establish Evaluation Criteria |  | Kriterijum za procenu sistema je jednostavnost i pristupačnost sistema. |
| Identify Alternative Solutions |  | Nema alternativa. |
| Select Evaluation Methods |  | Procena se vrši na osnovu test uzorka ljudi – potencijalnih korisnika. |
| Evaluate Alternatives Solutions |  | Obaviti procenu sistema. |
| Select Solutions |  | Odrediti koje je rešenje najbolje za unapređenje starog rešenja. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Organizational  integration Environment |  |  |  |  |
| People management | Establish balancing mechanisms  odgovornosti |  | Postaviti odgovornost koje svaki vođa tima mora da poštuje. |
| Select processes |  | Razviti strategije za motivisanje članova tima. |
| Establish process performance measures |  | Uvesti sankcije za nepoštovanje planova i dogovora. |
| 4 | Organizational Process Performance | Establish Performance Baselines and Models | Select Processes |  | Select a set of processes and subprocesses to which to apply techniques. |
| Establish process performance base lines |  | Determine baselines of selected organization’s process performance |
| Establish process performance models |  | Establish the process-performance models based on the organization’s set of standard processes and the organization’s process-performance baselines. |
| Establish Quality and Process-Performance Objectives |  | Define the organization’s quantitative objectives for quality and process performance. |
| Establish Process-Performance Measures |  | Select measures that provide appropriate insight into the organization’s quality and process performance |
| Quantitative Project Management | Prepare for Quantitative Management | Establish the Project’s Objectives |  | Write a document to establish and maintain the project’s quality and process performance objectives. |
| Compose the Defined Process |  | Using statistical and other quantitative techniques, create a defined process that enables the project to achieve its quality and process performance objectives. |
| Select Subprocesses and Attributes |  | Select subprocesses and attributes critical to evaluating performance. |
| Select Measures and Analytic Techniques |  | Identify common measures from the organizational process assets that support quantitative management. |
| Quantitatively Manage the Project | Monitor the Performance of Selected Subprocesses |  | / |
| Manage Project Performance |  | / |
| Determine the cause of defects |  | / |
| Perform Root Cause Analysis |  | / |
| 5 | Causal Analysis and  Resolution | Determine Causes of Defects | Select Outcomes for Analysis |  | Determine which outcomes to analyze further and formally define the scope of the analysis. |
| Analyze Causes |  | Analyze what led to those defects, and if that cause is repeated thoroughly change those functionalities. |
| Address Causes of Selected Outcomes | Implement Action Proposals |  | Analyze the action proposals and determine their priorities. Then  select action proposals to be implemented. |
| Evaluate the Effect of Implemented Actions |  | Measure and analyze the change in process performance of the project’s affected processes or subprocesses. |
| Record Causal Analysis Data |  | Document done work and analysis data. |
| Organizational Performance Management | Manage Business Performance | Analyze Process Performance Data |  | Perform a thorough analysis on gathered process performance data. |
| Identify Potential Areas for Improvement |  | Identify potential improvement areas based on the analysis of process performance shortfalls, their documentation, and apply them. |
| Maintain Business Objectives |  | Maintain business objectives based on an understanding of business strategies and actual performance results. |
| Select Improvements | Elicit Suggested Improvements |  | Sakupiti sva potencijalna poboljšanja sistema i proslediti ih odgovarajućem  timu. |
| Analyze Suggested Improvements |  | Odgovarajući tim će analizirati predloge u pogledu performansi, koliko će  se promeniti početni zahtev i koliko će poboljšanje pomoći sistemu. |
|  | Validate Improvements |  | Ustanoviti da li se menja zahtev korisnika značajno u odnosu na početni. |
| Select and Implement Improvements for Deployment |  | Odabrati koje ideje će biti realizovane i raspodeliti ih po timovima koji će to |
|  |  | Deploy Improvements | Plan the Deployment |  | Plan a newly obtained system with all improvements, and prepare it for  deployment. |
|  |  |  | Manage the Deployment |  | For all improvements, it is necessary to keep proper records in the form of  documentation. |
|  |  |  | Evaluate Improvement Effects |  | Assess how much these improvements have contributed to the system. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  |  |  | razmeštanje |  | i obaviti. |
| Sprovesti poboljšanja | Planirati razmeštanje |  | Isplanirati novodobijeni sistem sa svim poboljšanjima i unapređenjima, i  takav pripremiti za isporuku. |
| Upravljati razmeštanjem |  | Za sva poboljšanja potrebno je voditi odgovarajuću evidenciju u vidu  dokumentacije. |
| Proceniti efekte poboljšanja |  | Proceniti koliko su ova poboljšanja doprinela sistemu. |