

**Lista proiecte (Master, Diploma, R&D)
 2012 - 2013**

| Nr. | Status | Type | General Fields | Project Title | Project Team | Project Management |
|-----|--------|----------------------------|--|--|---|--------------------------------------|
| 1 | Free | R&D/ Diploma/ Master | [Software IDE] [Embedded systems] [Real-time systems] [Power Aware] | INVERTA: INtegrated Visual Environment for Real-Time Application Development | 2 Students: > > | Cristina STANGACIU Razvan CIOARGA |
| | | | | Continues the implementation and the development of the INVERTA integrated visual environment for designing and analyzing real-time applications. Continues the implementation of a real time scheduling simulator by adding among other facilities power-aware real time scheduling support. INVERTA allows the building, specification and visual display of real-time applications, designed as a set of tasks of different types, each task having a characteristic set of parameters (including parameters of time) and a set of control links with other tasks of the application. | R&D Grants "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/) si OPEN-HARTS (http://dsplabs.cs.upt.ro/grants/openharts/). | |
| | | | | Descriere proiect Continuarea si dezvoltarea implementarii mediului vizual integrat INVERTA, destinat proiectarii si analizei aplicatiilor timp-real. Continuarea implementarii unui simulator pentru planificari in sisteme de timp real prin adaugarea de noi facilitati printre care dezvoltarea unui suport pentru planificari de taskuri cu functie de eficientizare a consumului de energie electrica. INVERTA permite construirea, specificarea si afisarea vizuala a unei aplicatii timp-real, conceputa ca set de task-uri de diferite tipuri, fiecare task avand cate un set caracteristic de parametri (inclusiv parametri de timp) si un set de legaturi de control cu celelalte task-uri ale aplicatiei. | Observatii: R&D Grants "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/) si OPEN-HARTS (http://dsplabs.cs.upt.ro/grants/openharts/). | |

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| 2 | Taken | R&D | [Real-time systems] [Communication protocols] [Fieldbus systems] | Multi-Slave FTDMA (Flexible Time Division Multiple Access) implementation of the PARSECS communication system for the WIT | 1 Student: > Victor ADASCALITEI (IV CTI) | Mihai V. MICEA |
| Project description: | | | | Observations: | | |
| <p>PARSECS (Predictable ARchitecture for Sensor Communication Systems) is a real-time communication architecture designed for modular smart sensors, particularly for the WIT intelligent node. The current implementation allows full-duplex communication between a Master board (MotherBoard) and a Slave board (PMBoard). The project aims to interconnect multiple boards within the WIT with the support of the underlying SPI physical interface. Also, the full timeslot paradigm should be implemented and tested.</p> <p>Platform: a WIT prototype exists, consisting of 2 interconnected boards based on the LPC2294 microcontroller (Olimex LPC-H2294 eva-board). This will need to be extended to 3-4 boards.</p> <p>Available HW and SW tools: IDE and compiler (Keil uVision 3.x), debugger (uLINK2 debug tool), 32 channel logic analyzer (LA1032).</p> | | | | <p>R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/).</p> | | |
| Descriere proiect | | | | Observatii: | | |
| <p>PARSECS (Predictable ARchitecture for Sensor Communication Systems) este o arhitectura de comunicatie in timp real, proiectata pentru senzori inteligenti modulari, in particular pentru nodul inteligent WIT. Implementarea actuala permite comunicatie full-duplex intre o placa Master (MotherBoard) si o placa Slave (PMBoard). Scopul proiectului este sa interconecteze mai multe placi componente ale WIT-ului, bazat pe interfata fizica SPI. De asemenea, ideea de full timeslot trebuie implementata si testata.</p> <p>Platforma: exista un prototip de WIT, format din 2 placi interconectate, bazate pe microcontrollerul LPC2294 (placa de evaluare Olimex LPC-H2294). Acesta va trebui extins sa cuprinda 3-4 placi.</p> <p>Unelte HW si SW disponibile: IDE si compilator (Keil uVision 3.x, 4.x), debugger (uLINK2), analizor logic cu 32 canale (LA1032).</p> | | | | <p>R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/).</p> | | |
| 3 | Free | R&D | [Software engineering] [Code analysis] [Compiling techniques] [Real-time systems] | Study and development of a Tool for the WCET analysis of real-time applications for the ARM microcontroller. | 1 Student: > | Mihai V. MICEA, Cristina STANGACIU |
| Project description: | | | | Observations: | | |
| <p>The study of AbsInt Advanced Analyzer, a tool for WCET analysis for ARM7 microcontrollers. Continuation and implementation of a development tool plug-in for the INVERTA environment for WCET analysis for real-time applications tasks written on platforms of type ARM7 TDMI-S.</p> | | | | <p>R&D Grants "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/) si OPEN-HARTS (http://dsplabs.cs.upt.ro/grants/openharts/).</p> | | |
| Descriere proiect | | | | Observatii: | | |
| <p>Studiul unui soft pentru analiza WCET-ului (AbsInt Advanced Analyzer) pentru microcontrolere ARM7.</p> <p>Continuarea si dezvoltarea implementarii unui utilitar de tip plug-in pentru mediul INVERTA, destinat analizei timpului WCET pentru task-urile aplicatiilor timp-real scrise pe platforme tip ARM7 TDMI-S.</p> | | | | <p>R&D Grants "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/) si OPEN-HARTS (http://dsplabs.cs.upt.ro/grants/openharts/).</p> | | |

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| 4 | Free | R&D/ Diploma/ Master | [Robotic systems] [Embedded systems] | Mobility platform/daughterboard for the CORE-TX WIT | 2 Students: > > | Dan CHICIUDEAN, Mihai V. MICEA |
| Project description: | | | | Observations: | | |
| The project is aimed to develop a solution for WITs mobility. The mobility platform has to offer a set of movement primitives such as motor speed control, position and orientation control of the WIT. The platform should use electrical DC motors with optical encoders or hall sensors. Controlling algorithms should provide antislip movement of the wheels (starting ramp + stopping ramp). Power management for Li-Ion accumulators battery (used only for mobility platform) must be provided (excessive discharge protection, charge profile). | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | | |
| Descriere proiect | | | | Observatii: | | |
| Scopul proiectului este de a pune la punct o solutie care sa ofere WIT-urilor posibilitatea de a naviga indoor (sau nu numai). Platforma va oferi un set minim de comenzi de miscare (de exemplu: mergi inainte x cm cu viteza y m/s, roteste platforma cu z grade). Se recomanda folosirea motoarelor electrice de curent continuu, cu reductor si traductor optic de rotatie. Algoritmii de control ai miscarii trebuie sa tina cont efectul de alunecare a rotilor si sa incerce minimizarea acestor probleme. Se va asigura gestiunea acumulatorilor Li-Ion folositi pentru alimentarea placii de mobilitate (incarcare/descarcare). | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | | |
| 5 | Free | R&D/ Diploma/ Master | [Software IDE] [Embedded systems] [Real-time systems] [Power Aware] | Modeling the energy consumption at PCB level for various embedded devices | 2-3 Students: > Maria HORVATH (I Master) > > | Cristina STANGACIU |
| Project description: | | | | Observations: | | |
| Defining an energy consumption model at the system level for a series of devices (like sensor nodes and other embedded devices). Classifying of a series of devices and developing a set of architecture/software specifications. Modeling the consumption at the component and system level for those devices. | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | | |
| Descriere proiect | | | | Observatii: | | |
| Conceperea unui model de consum de energie la nivel de sistem pentru o serie de clase de dispozitive definite în prealabil. Definirea unor clase principale de dispozitive și dezvoltarea unui set de specificații atât la nivel de arhitectură cât și la nivel de operare pentru aceste clase. Definirea unor modele de consum la nivel de componente, pentru toate componentele uzuale întâlnite în clasele definite în pasul anterior si a unui model unitar la nivel de placă pe baza modelelor definite la pasul anterior. | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | | |

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| 6 | Free | R&D/ Diploma/ Master | [Software IDE] [Embedded systems] [Real-time systems] [Power Aware] | Development of a framework for the measurement and evaluation of the energy consumption at device level, for embedded systems | 1-2 Students: > Andrei STOICA > | Cristina STANGACIU |
| Project description: | | | | | Observations: | |
| Defining a framework (hardware+software) for energy consumption evaluation and estimation at the component level for a series of embedded devices. Validating the model and providing some benchmarks and metrics for the energy consumption evaluation of those devices. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |
| Descriere proiect | | | | | Observatii: | |
| Dezvoltarea unui mediu hardware și software și a unei metodologii aferente, pentru evaluarea consumului la nivel de componentă pentru o serie de dispozitive incorporate. Validarea modelor de consum la nivel de dispozitiv. Furnizarea unor metrice și referințe pentru evaluarea consumului pentru diferite clase de dispozitive. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |
| 7 | Partially Taken | R&D | [Wireless sensor networks] [Data fusion and processing] [Embedded systems] | Implementation of the BRAIN (Background Robotic Activity Induction Node), including the activity induction mechanisms | 2-3 Students: > Adrian Oaida (IV CTI) > David NICOLA (IV CTI) > | Razvan CIOARGA, Mihai V. MICEA |
| Project description: | | | | | Observations: | |
| Integrating the eBML (Emergent Behavior Modelling Language) language in a WIT's (Wireless Intelligent Terminal) system: - the WIT receives the eBML source code and verifies it based on a XML file (lexical analyzer); - interprets and translates based on another XML file (syntactic analyzer); - compiles the newly created code and launches it into execution; - it is necessary to develop the eBML interpreter in the C language for embedded platforms. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |
| Descriere proiect | | | | | Observatii: | |
| Integrarea limbajului eBML (Emergent Behavior Modelling Language) in sistemul WIT (Wireless Intelligent Terminal): - WIT-ul primește codul sursă eBML în care este descris modelul de comportament dorit; - parcurge textul sursă primit și îl verifică pe baza unui fișier XML (analizor lexical); - interpretează și traduce pe baza unui alt fișier XML (analizor sintactic); - compilează codul nou creat și îl lansează în execuție; - este necesară dezvoltarea interpretorului de eBML direct în C pentru sist. embedded. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |

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| 8 | Free | R&D/ Diploma/ Master | [Wireless sensor networks] [Data fusion and processing] [Embedded systems] [AnyLogic] | Integration of Anylogic into BRAIN, as a simulator for the WITs | 2 Students: > > | Razvan CIOARGA |
| | | | | Project description: The study of the use of Anylogic as a simulator for the WITs (creating a new library in Anylogic for this purpose) and its the integration in the BRAIN framework (possibly through socket connections). | Observations: R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |
| | | | | Descriere proiect Studiul folosirii Anylogic ca un simulator de WIT-uri (crearea unei biblioteci specializate in Anyloc pentru acest scop) si integrarea acestuia in arhitectura BRAIN (posibil folosind comunicarea prin socket-uri). | Observatii: R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |
| 9 | Free | R&D/ Diploma/ Master | [Robotic collectives] [Emergent behavior] [Robotic movement] | Emergent Movement in Collective Robotic Environments Based on the Study of Ants Movement | 2 Students: > > | Razvan CIOARGA |
| | | | | Project description: Further projects to study emerging movement of robots, using LEGO Mindstorm NXT kits, using emergent behavior patterns inspired by the movement of ants in ant colonies. | Observations: | |
| | | | | Project description: Continuarea proiectelor pentru studiul miscarii emergente a robotilor, cu ajutorul kit-urilor LEGO Mindstorm NXT, folosind tipare de comportament emergent preluate din miscarea furnicilor. | Observations: | |

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| 10 | Taken | R&D/ Diploma/ Master | [Embedded systems] [Real-time systems] [Wireless communication] | Synchronization in wireless sensor networks and robotic environments | 1 Student: > Zsolt BIRO (IV CTI) | Valentin STANGACIU, Dan PESCARU, Mihai V. MICEA |
| Project description: | | | | | Observations: | |
| The synchronization of the real time system clock between the nodes of a real time wireless sensor network is crucial. Many routing and real time wireless communication techniques depend on it. This task aims at synchronizing the real time clock within the hard real time operating systems that execute within each node of the wireless network. The real time operating system is HARETICK and the platform is ARM7TDMI-S. The work for this project implies implementing a successfully simulated algorithm designed to synchronize the real time system clocks of the nodes in a wireless sensor network on the ARM7 platform running HARETICK OS. Also another task is to test and evaluate the implemented algorithm. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |
| Descriere proiect | | | | | Observatii: | |
| Sincronizarea ceasului real time intern al nodurile unei retele de senzori wireless este extrem de importanta. Multi algoritmi pentru rutarea informatiei precum si algoritmi pentru comunicarea in timp real in cadrul retelelor de senzori wireless depind de aceasta sincronizare. Acest proiect presupune sincronizarea ceasului in timp real din cadrul sistemului de operare hard real time ce ruleaza pe fiecare nod din reseaua de senzori. Sistemul de operare ce ruleaza pe fiecare nod este HARETICK iar platforma este ARM7TDMI-S. In cadrul proiectului se doreste implementarea unui algoritm de sincronizarea timpului in sisteme embedded in timp real, deja simulat cu success. Implementarea se face pe platforma mai sus mentionata, pe sistemul de operare HARETICK. De asemenea se cere si testarea si evaluarea performantelor algoritmului implementat. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). | |

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| 11 | Free | R&D | [Embedded Systems] [Real time systems] [Real time wireless communication] [Digital signal processing] | Sensor network communication using wireless modules | 2-3 Students: > > > | Valentin STANGACIU, Dan PESCARU |
| Project description: | | | | | Observations: | |
| Implementation of libraries capable of using several wireless modules in wireless communication and the study of the time penalties present within wireless communication. The project has 2 main parts: implementing a C library for each wireless module capable of minimal configuration of the wireless module and offering transmission and reception features. The second part consists in measuring the time penalties within wireless communication and identifying their time components. The wireless modules used in this project are: Texas Instruments CC2420, Texas Instruments CC2500, Hope RFM. The platforms used: ARM7, AVR. | | | | | | |
| Descriere proiect | | | | | Observatii: | |
| Realizarea unor biblioteci pentru gestionarea unor module wireless in vederea studiului penalitatilor de timp ce apar in comunicarea wireless. Proiectul presupune in primul rand realizarea unei biblioteci C cu functionalitate minima care sa poata configura modulele wireless si sa poata realiza minimal operatiile de transmisie si receptie. In al doilea rand se urmareste masurarea penalitatilor de timp din cadrul comunicarii precum si identificarea componentelor de timp ale acestora. Modulele wireless in cauza sunt: Texas Instruments CC2420, Texas Instruments CC2500, Hope RFM. Arhitecturile folosite sunt ARM7, AVR. | | | | | | |

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| 12 | Free | R&D/ Diploma | [Embedded systems] [Data acquisition systems] [Real-time systems] | Data acquisition module for the WIT (CORE-TX Wireless Intelligent Terminal) | 2 Students: > > | Andrei STANCOVICI, Sinziana INDREICA |
| Project description: | | | | | Observations: | |
| The design, implementation and testing of data acquisition mode for WIT. The development of driver software for this module. The module will be equipped with sensors: ultrasonic sensor, temperature sensor, humidity, accelerometer. Optional, can be attached: smoke sensor, pollution sensor, compass, motion sensor, GPS, microphone, cricket laser and others. It has to use analog-digital converter incorporated in the ATXmega microcontroller family, and a main LPC2000 family processor that will run the OS. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/) | |
| Project description: | | | | | Observations: | |
| Proiectarea, executarea si testarea modului de achizitie de date pentru WIT. Punerea la punct a driverului soft pentru acest modul. Modulul de perceptie este echipat cu senzori: senzor de ultrasunete, senzor de temperatura, umiditate, accelerometru. Optional, mai pot fi atasate si alti senzori: senzor de fum, senzor de poluare, busola, senzor de miscare, GPS, microfon, cricket laser etc. Se are in vedere utilizarea convertorului analog-numeric incorporat in procesoarele din familia ATXmega, si a unui procesor principal din familia LPC2000, care va rula sistemul de operare. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/) | |
| 13 | Free | R&D/ Diploma | [Robotic systems] [Embedded systems] [Digital signal processing] | Mobile robot alignment based on ultrasound signals and distance measurements | 1 Student: > | Andrei STANCOVICI, Sinziana INDREICA |
| Project description: | | | | | Observations: | |
| The objective of the work is finding and implementing solutions to align a mobile robot. The chosen alignment method must be faster than the existing methods. Must find an optimal alignment algorithm based on an existing algorithm. Each robot is equipped with an ALVIDI development module and a module of perception. The role of the perception module is to transmit and to receive ultrasonic signals. The main task will be the study of a stereo sonar, observing the received signal for different configurations. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). Use of the ultrasound modules and the electronic compass for the robot alignment: http://www.youtube.com/watch?v=ADMgJhLZXt4 | |
| Descriere proiect | | | | | Observatii: | |
| Obiectivul lucrarii constituie gasirea si implementarea a unei solutii de aliniere a robotilor mobili. Metoda de aliniere aleasa trebuie sa fie mai rapida decat metoda existenta. Trebuie gasit un algoritm optim de aliniere pornind de la algoritmul deja existent. Fiecare robot este echipat cu un modul de dezvoltare ALVIDI si un modul de perceptie. Rolulul modulului de perceptie este de a transmite si de a receptiona semnale ultrasonice. Principala activitate va fi studiul unui sonar stereo in acest context, observand semnalul receptionat pentru diferite configuratii. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). Utilizarea modulelor ultrasonice si compas electronic pentru alinierea robotilor. http://www.youtube.com/watch?v=ADMgJhLZXt4 | |

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| 14 | Taken | R&D/ Master | [Embedded systems] [Real time systems] [Data acquisition systems] [ZigBee protocol] | Ad-Hoc Orienting and Localizing for Indoor Robots (Location management model and simulation) | 1 Student: > Sinziana INDREICA | Sinziana INDREICA Andrei STANCOVICI |
| Project description: | | | | | Observations: | |
| The most popular system to get orientation is the GPS. I could mention here the Loran, RNAV and GLONASS, but all this are applicable for outdoor requirements. In analogy with outdoor systems, there are many indoor localization systems which based on multiple fixed nodes. Such of that system are: Cricket Indoor Localization System, Building Positioning System and Hagisonic StarGazer. In proposed project I want to improve the indoor localization system for the robotic applications. Some robotic applications are oriented for discovering a new zone where the fixed nodes are not present. In this way I want to propose a Process of Orientating and Localizing Ad hoc Robots as an Indoor System (POLARIS). Using the POLARIS process the robots can determine the orientation and location reported to the group of robots without to need fixed nodes. The POLARIS process is based on the inter-robot alignment algorithm and the CTOF (Combined Time-of-Flight) distance measurement technique. | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). R&D Grant "MELISSEVS" (http://dsplabs.cs.upt.ro/grants/melissevs/). Use of the ultrasound modules and Xbee wireless communication module for distance measurement. http://www.youtube.com/watch?v=ADMgJhLZXt4 | |
| Descriere proiect | | | | | Observatii: | |
| Cel mai popular sistem pentru a obtine orientarea este GPS. As putea mentiona aici Loran, RNAV si GLONASS, dar toate acestea sunt aplicabile pentru necesitati in aer liber. In analogie cu sistemele in aer liber, exista mai multe sisteme de localizare in interiorul cladirilor, care se bazeaza pe mai multe noduri fixe. Astfel de sisteme sunt: Cricket Indoor Localization System, Building Positioning System si Hagisonic StarGazer. Proiectul propus are ca scop imbunatatirea sistemului de localizare din interiorul cladirilor pentru aplicatii cu roboti. Unele aplicatii robotizate sunt orientate spre a descoperi o zona noua, in care nodurile fixe nu sunt prezente. In acest fel, vreau sa propun un proces de orientare si localizare pentru roboti ad hoc, functional in interiorul cladirilor (POLARIS din eng.). Prin intermediul procesului POLARIS robotii pot determina orientarea si locatia raportat la grupul de roboti, fara sa aiba nevoie de noduri fixe. Procesul POLARIS este bazat pe algoritmul de aliniere dintre doi roboti si tehnica de masurare a distantei CTOF (Combined Time-of-Flight). | | | | | R&D Grant "CORE-TX" (http://dsplabs.cs.upt.ro/grants/coretx/). R&D Grant "MELISSEVS" (http://dsplabs.cs.upt.ro/grants/melissevs/). Se vor utiliza modulele ultrasonice achizitionate si modulele de comunicare wireless Xbee. http://www.youtube.com/watch?v=ADMgJhLZXt4 | |
| 15 | Free | R&D/ Diploma | [Embedded systems] [Access control systems] [Security systems] | Access control system based on fingerprint recognition | 1 Student: > | Adrian OAIDA |
| Project description: | | | | | Observations: | |
| Development of a system for access and logging based on a fingerprint reader. There is already an installed version that is up and running for two years. Based on the current system, we want to implement a redesigned system. | | | | | | |
| Descriere proiect | | | | | Observatii: | |
| Realizarea unui sistem de acces si logging bazat pe un cititor de amprenta. Exista deja o versiune instalata, care functioneaza de 2 ani. Bazandu-se pe sistemul existent, se doreste implementarea unei noi solutii. | | | | | | |

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For further information or if you have any questions, please visit our website or contact us at the following addresses:

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