



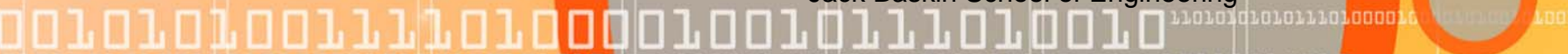
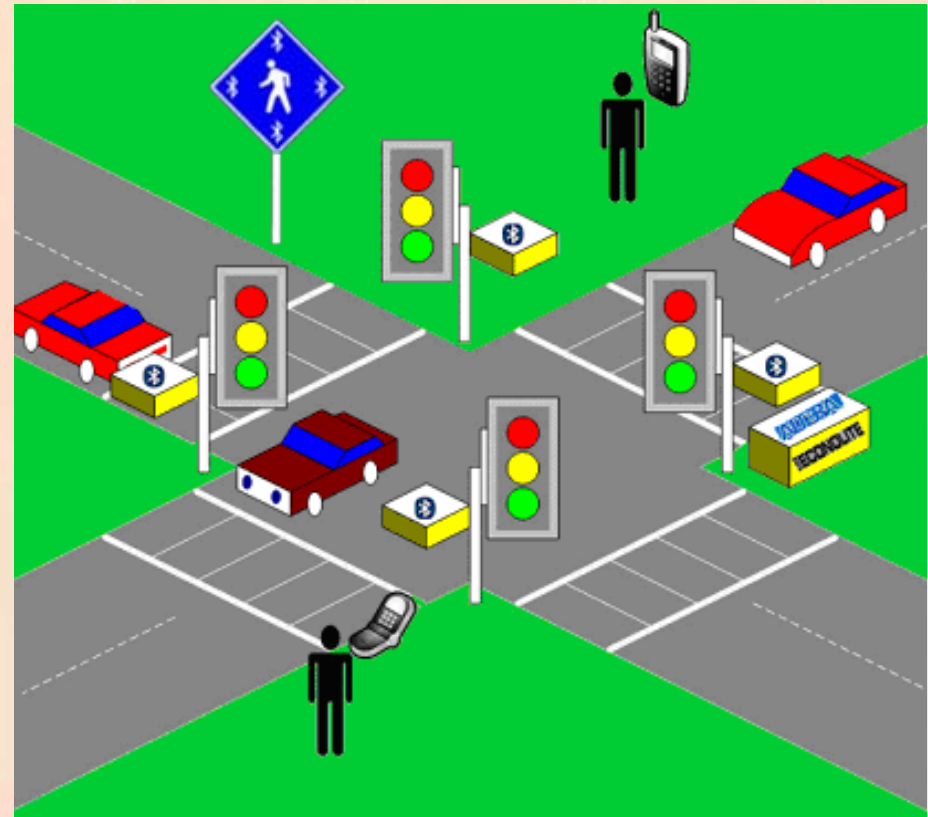
Universal Real-time Navigational Assistance

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Concept

A typical intersection with crosswalks and traffic lights

- Bluetooth transceivers installed at each of the four corners atop ped-heads.
- Information including traffic light status and street name information is relayed to Bluetooth-capable mobile phones

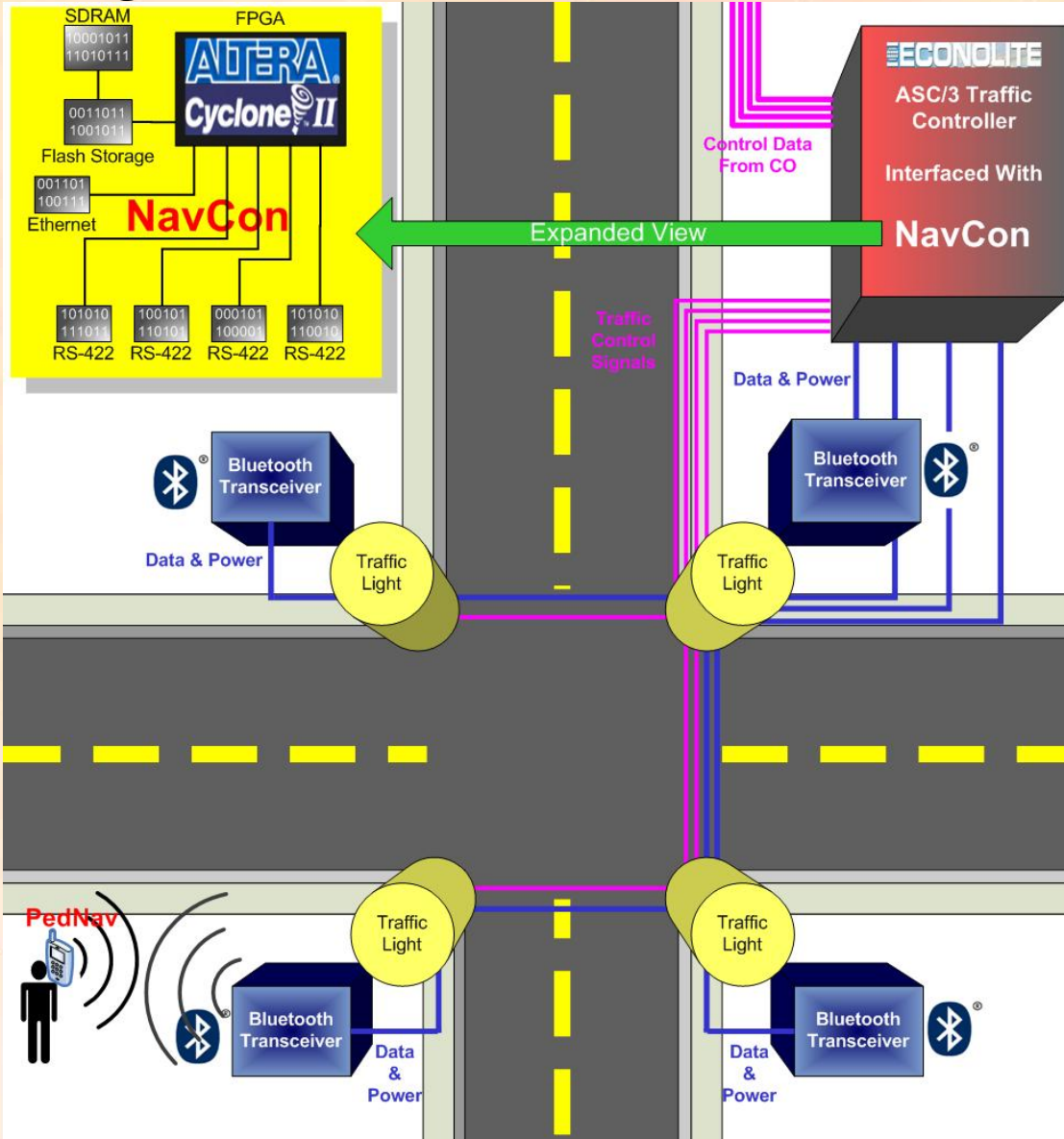


Project Objective

- Be able to alert a user of status of both directions, e.g., North-South and East-West for our simulated intersection
- User-friendly interface for the phone (PedNav)
- Finish in time to have a visually impaired person try out the system and give feedback for improvements/changes



System Architecture



NavCon

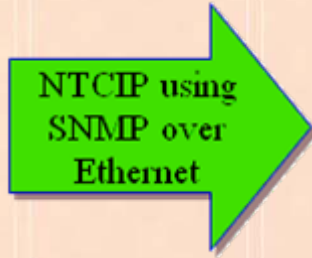
- Altera Cyclone II FPGA Core
- Interfaces with ASC/3 traffic controller and Bluetooth transceivers



Protocol Flow

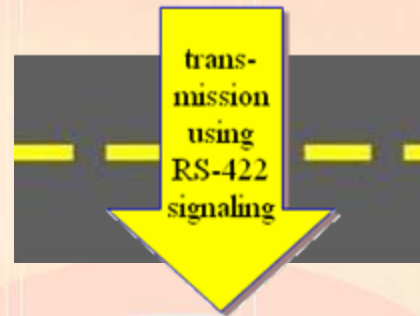


Traffic Controller

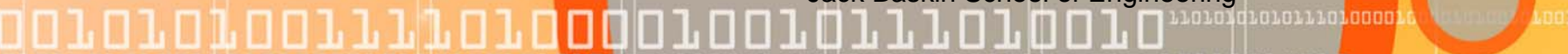


NavCon PCB

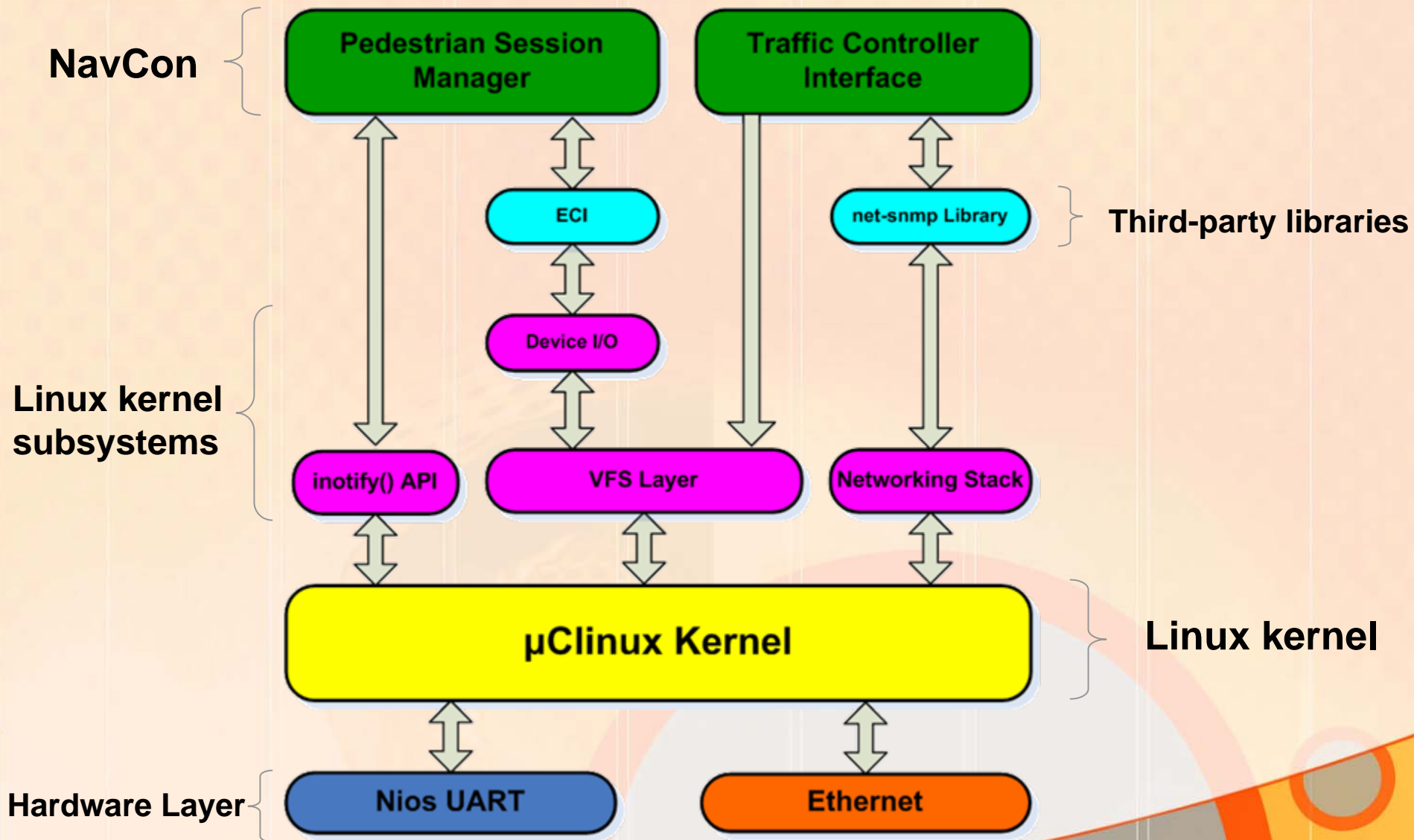
SNMP
to PedNav Protocol
in uCLinux on
FPGA



Bluetooth PCB



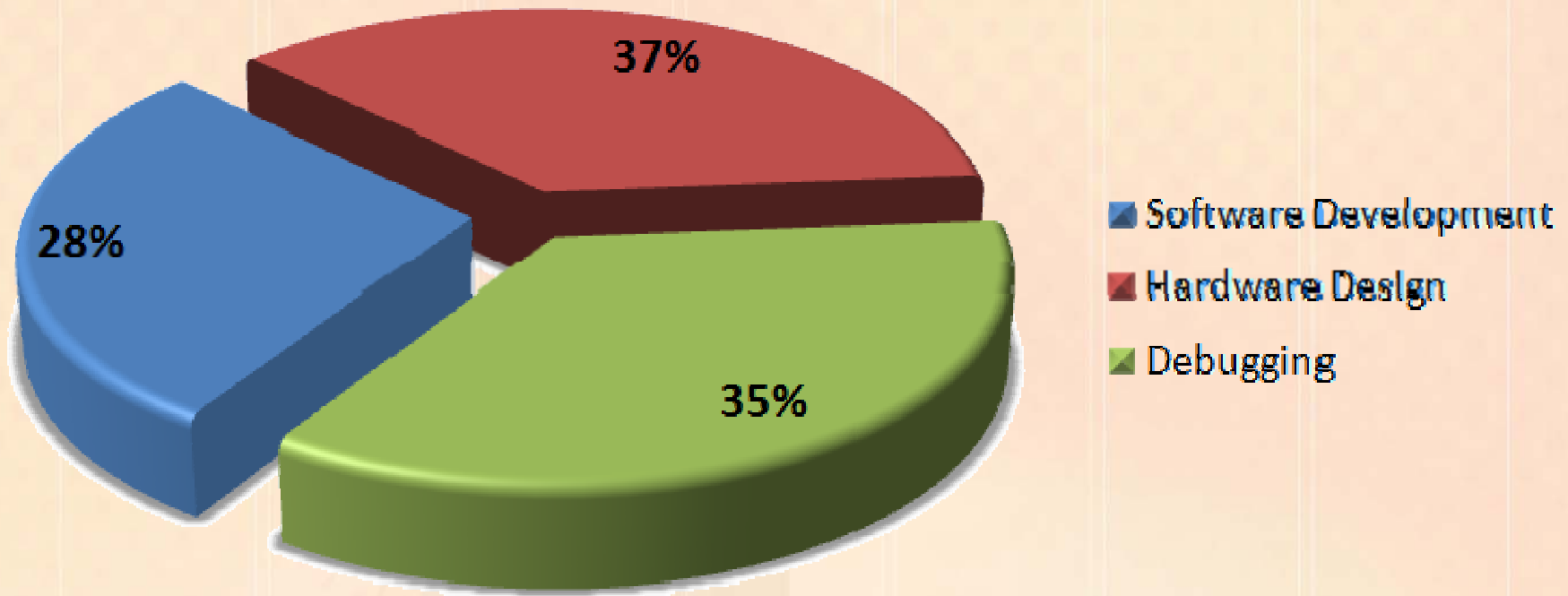
Software Architecture



- Security implementation
 - Cryptographic chain of trust (PKI)
 - Performance degradation due to encryption
- Multiple Bluetooth device support
- Power consumption during high-speed bursts
- Overlapping beacon coverage areas
 - Custom antenna design
 - Power limiting
 - Restricting FHSS channels



Time Spent To Date



- Software Development
 - uClinux
 - NavCon PSM
 - NavCon TCI
- Hardware Design
 - Bluetooth PCB
 - NavCon PCB

- Debugging
 - Quartus II
 - Nios II dev board
 - uClinux Kernel



Our Sponsors



- Professor Roberto Manduchi
 - <http://www.soe.ucsc.edu/~manduchi/>
- Econolite Control Products, Inc.
 - <http://www.econolite.com/>
- Altera Corporation
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- Gelcore
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Questions?



For more information visit <http://urna.projects.unoc.net/>

