EagleSat 2:
On-Board Computer Subsystem

David Stockhouse

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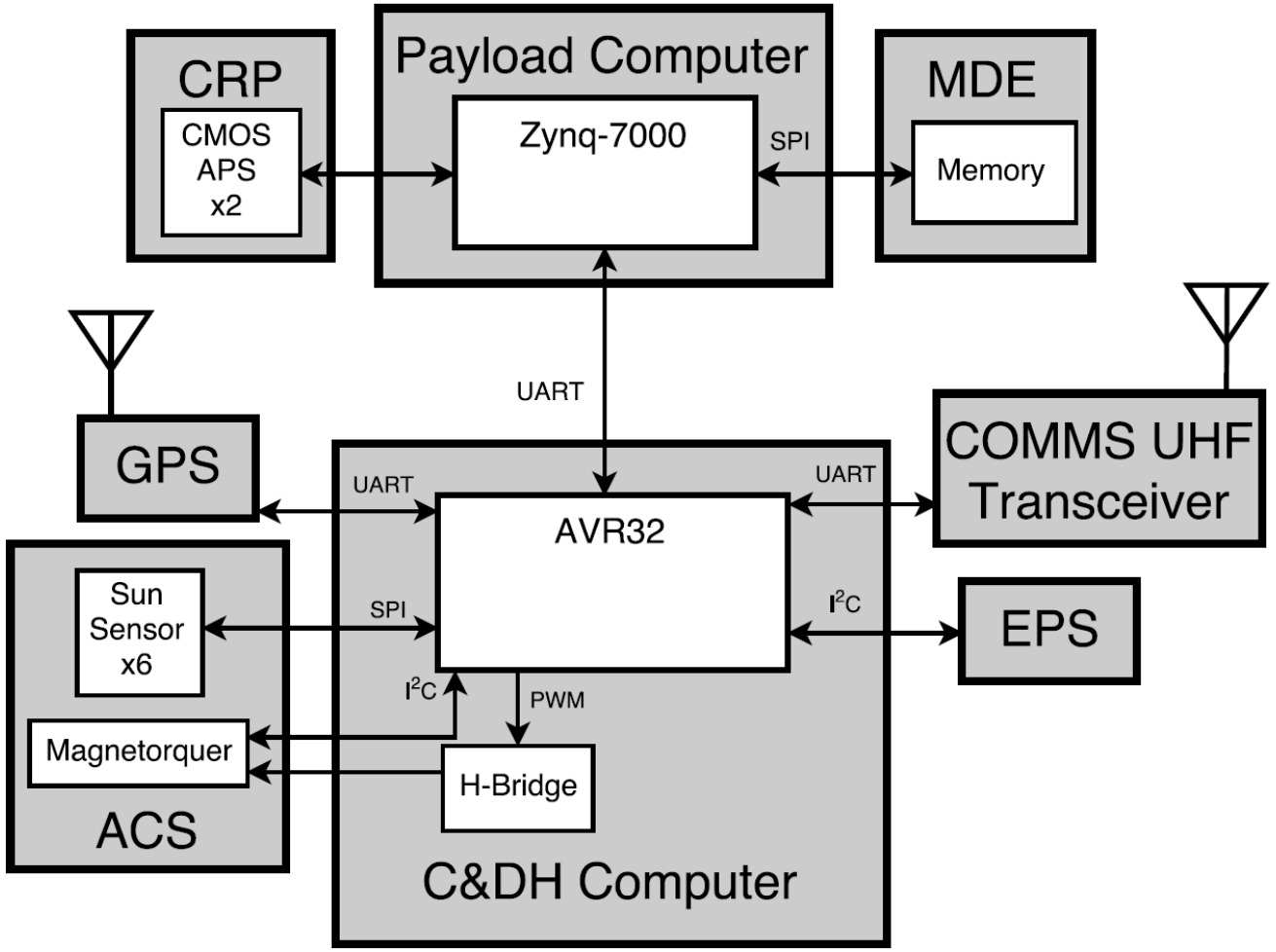
Overview

- System-level description of satellite
- Computational needs for each subsystem
- On-board computer subsystem architecture
- In-depth look at payload prototypes
- Next Steps

System-Level Description



Computational Needs – Bus Systems

- Communications – Command reception and data transmission
- EPS – Power monitoring
- ACS – Attitude telemetry and control
- GPS – Position telemetry

Computational Needs – Payloads

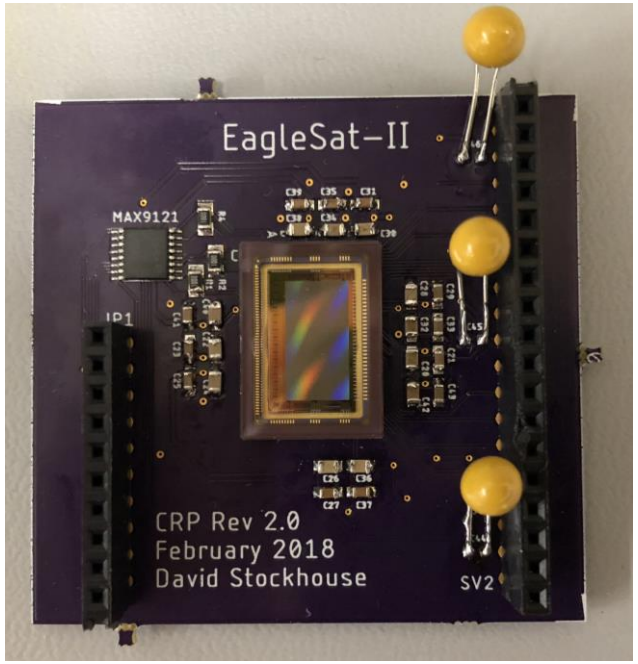
- Cosmic Ray Payload (CRP)
  - Interfacing with CMOS image sensor
  - Image processing to determine energy and trajectory of particle events observed
- Memory Degradation Experiment (MDE)
  - Interfacing with several SPI memory chips
  - Identifying and characterizing memory errors

OBC Subsystem Architecture

- Two separate computer systems
- Payload Computer
  - Interfaces to payload hardware and processes data
  - Will be designed and built in-house based on Zynq-7000 SoC
- Command and Data Handling Computer
  - Interfaces to other subsystems and status telemetry instruments
  - Commercial off the shelf GOMSpace Nanomind A3200

Payload Prototype – CRP

- Developed on Avnet Zedboard
  - Zynq-7000 contains both ARM processor system and FPGA programmable logic
  - Xillybus interface between processor and FPGA
  - Xillinux Linux distribution with application code on processor system
  - FPGA design integrated with Xillybus IP
- Uses CMV2000 CMOS image sensor
  - Breakout board designed in-house
  - Complete system design and testing is ongoing



Payload Prototype – MDE

- Developed on Texas Instruments TM4C123GXL
- Memory board developed in-house
- Testing ongoing since February

Next Steps

- Miniaturizing CRP prototype
- High altitude balloon test flight
- Payload prototypes on fully custom PCBs
- More capable flight hardware

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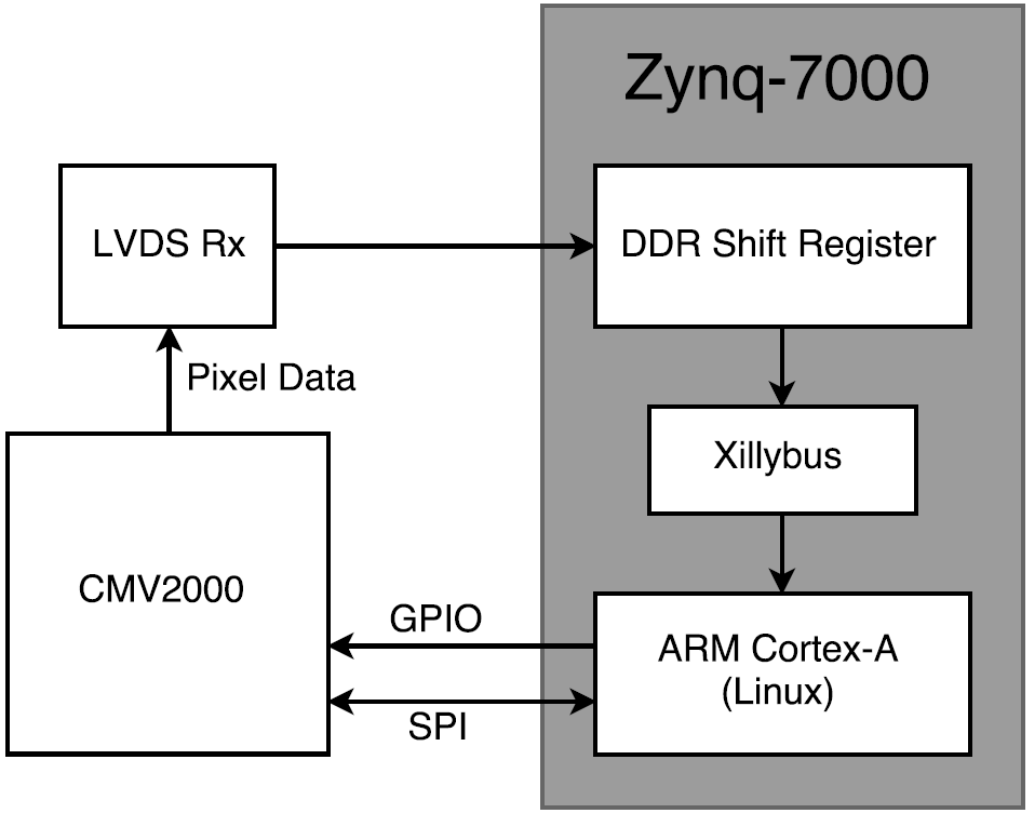
David Stockhouse
EagleSat 2 On-Board Computer Lead
stockhod@my.erau.edu

Questions?

Backup Slide



CRP Prototype Block Diagram