Autonomous Vehicle GNC

- Introductions
- Overview
- **Autonomous GNC**
  - Basic Control
  - ION Robotic Mower
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- **GNC issues for autonomous vehicles (Mikel - 20 min)**
  - **Basic Control**
- **ION Robotic Lawn Mower – (Jade – 40 min)**
  - **Miami University's Approach**
- **A Global Challege (Carrie and Casey – 1 hour)**
- **Mindstorm Robots at de Universite de Cocody (30 min)**

An Example of Control System: Open-Loop Control

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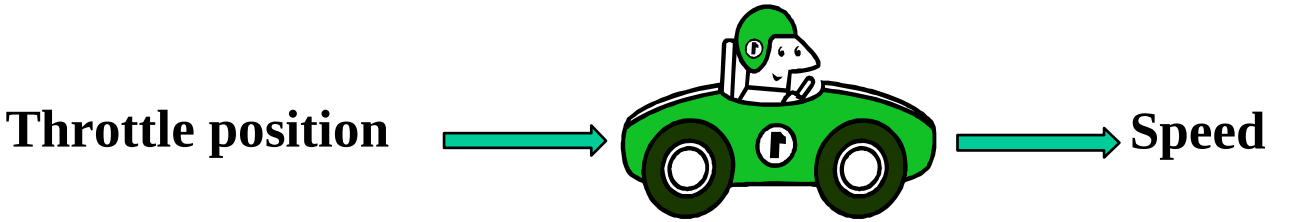

How much input is needed to get the desired output?

Input ⟷ **Output**

Calibration

Problems with open loop control:
Calibration results are invalid when *environment/system* changes

Slopes, vehicle mass, wind, tire pressure, gas quality, road surface, engine wear, ...

An Example of Control System: Closed Loop

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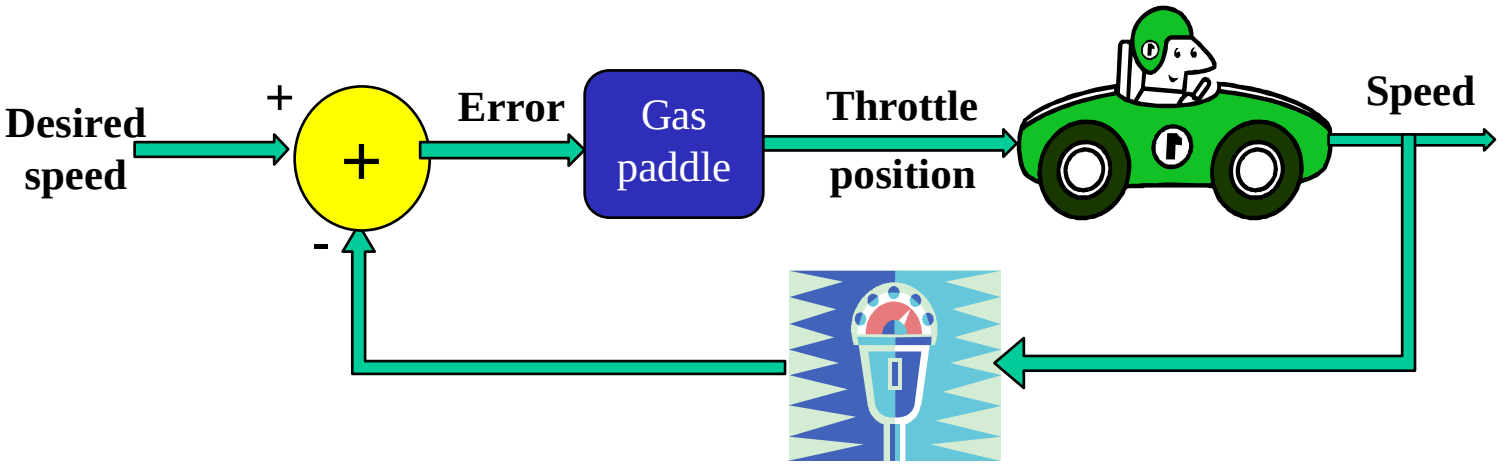

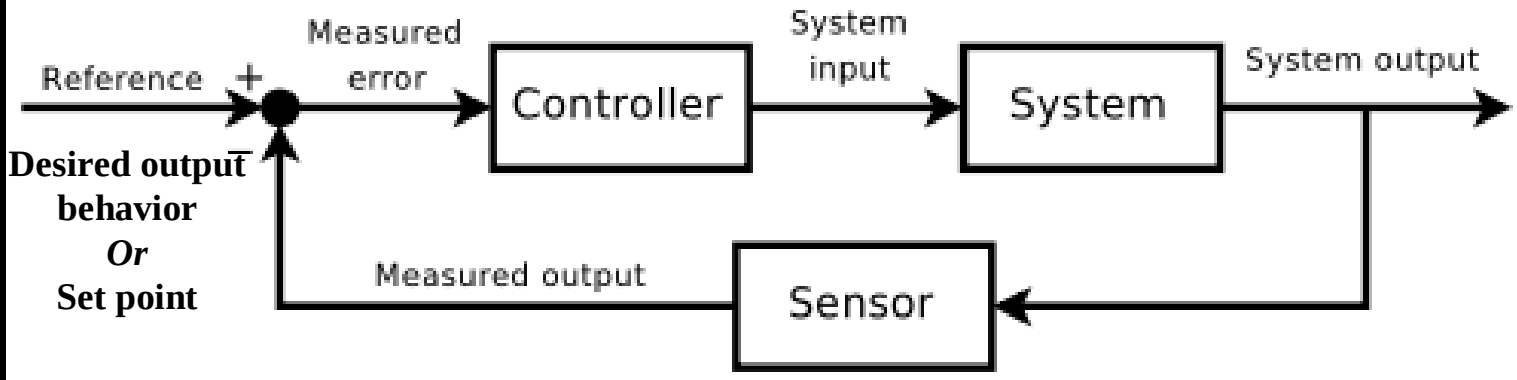

Can you think of a closed-loop feedback control system in practice?

Basic Feedback Controller

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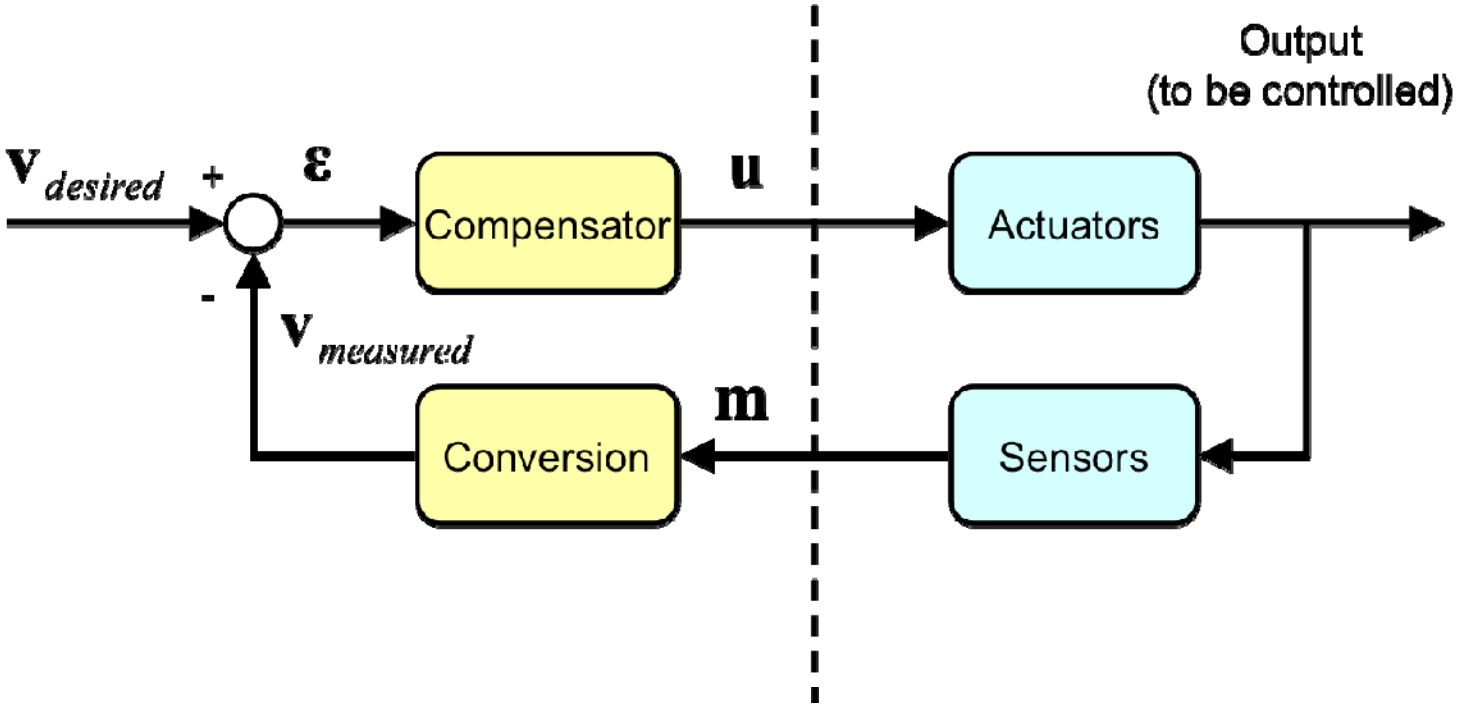
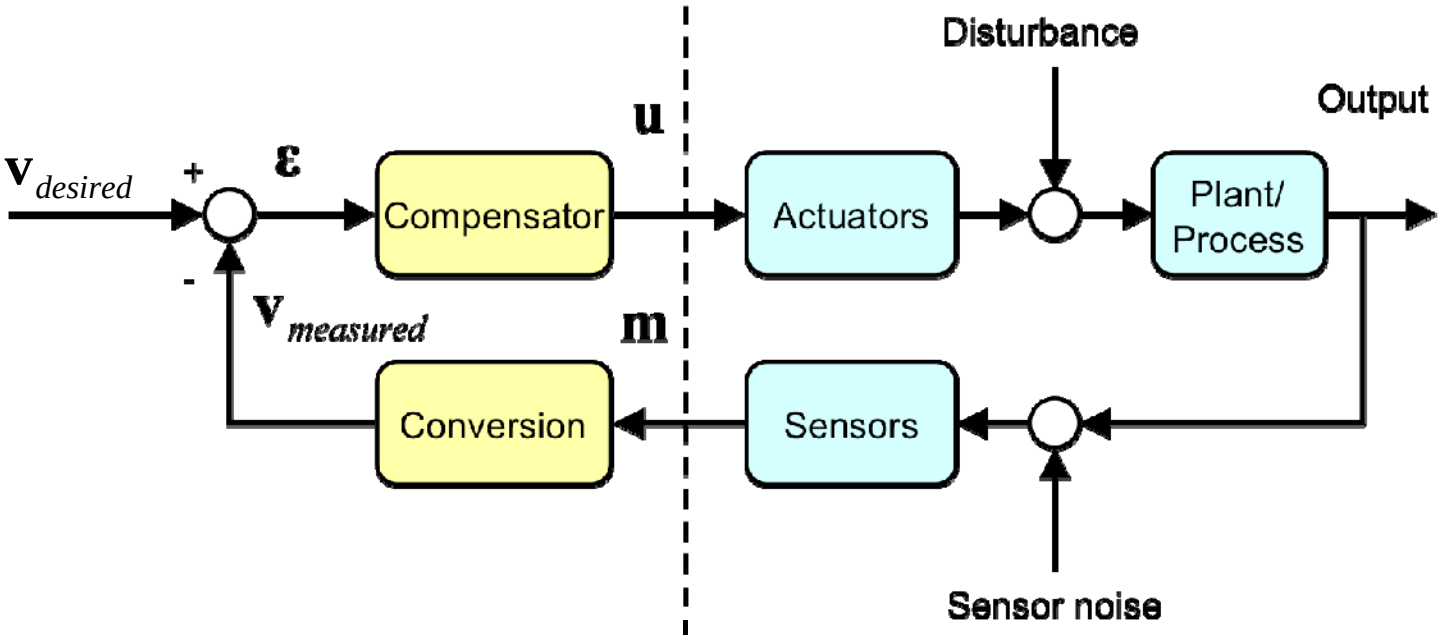
In general



Basic Feedback Controller

However, in reality



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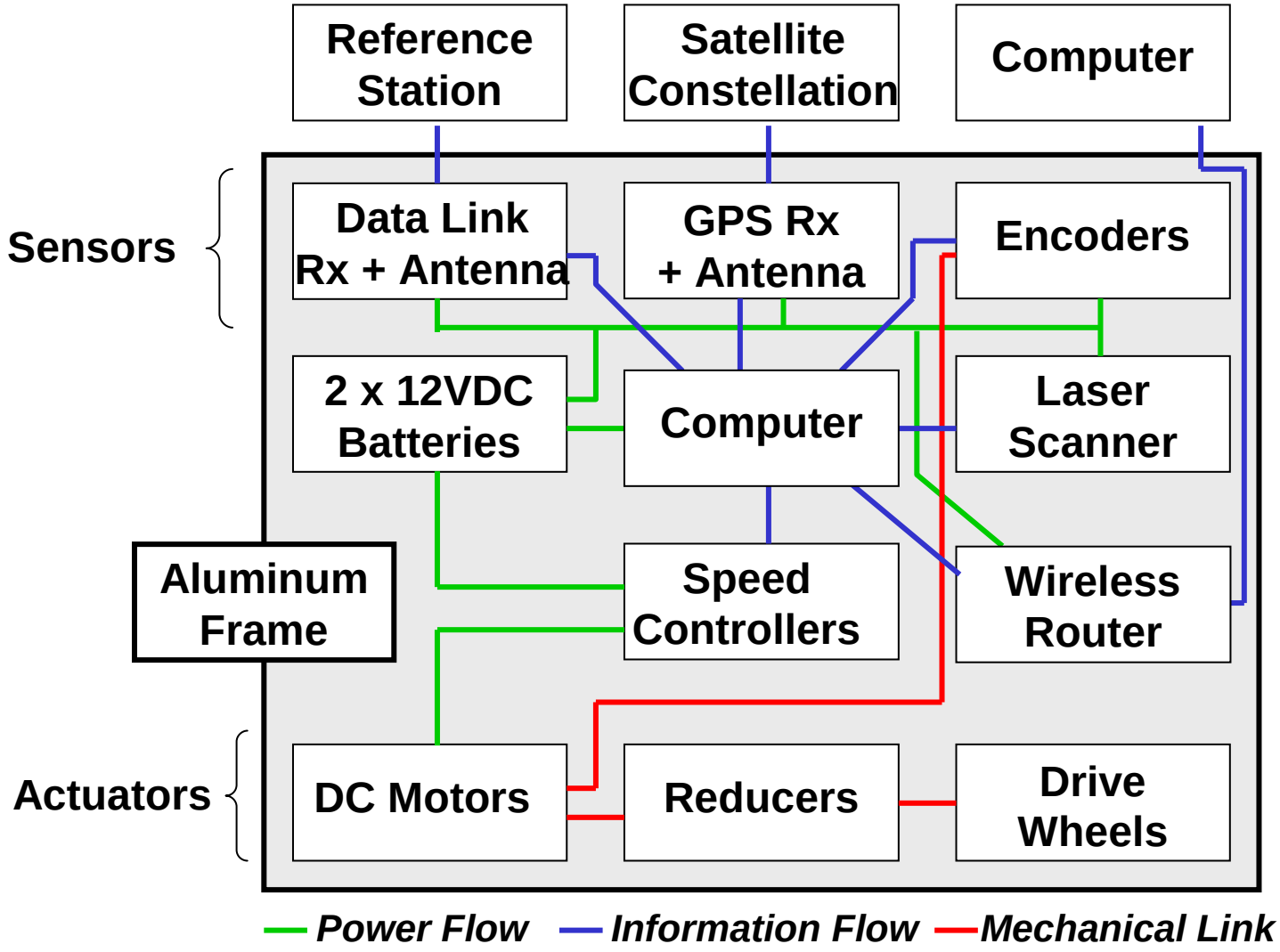

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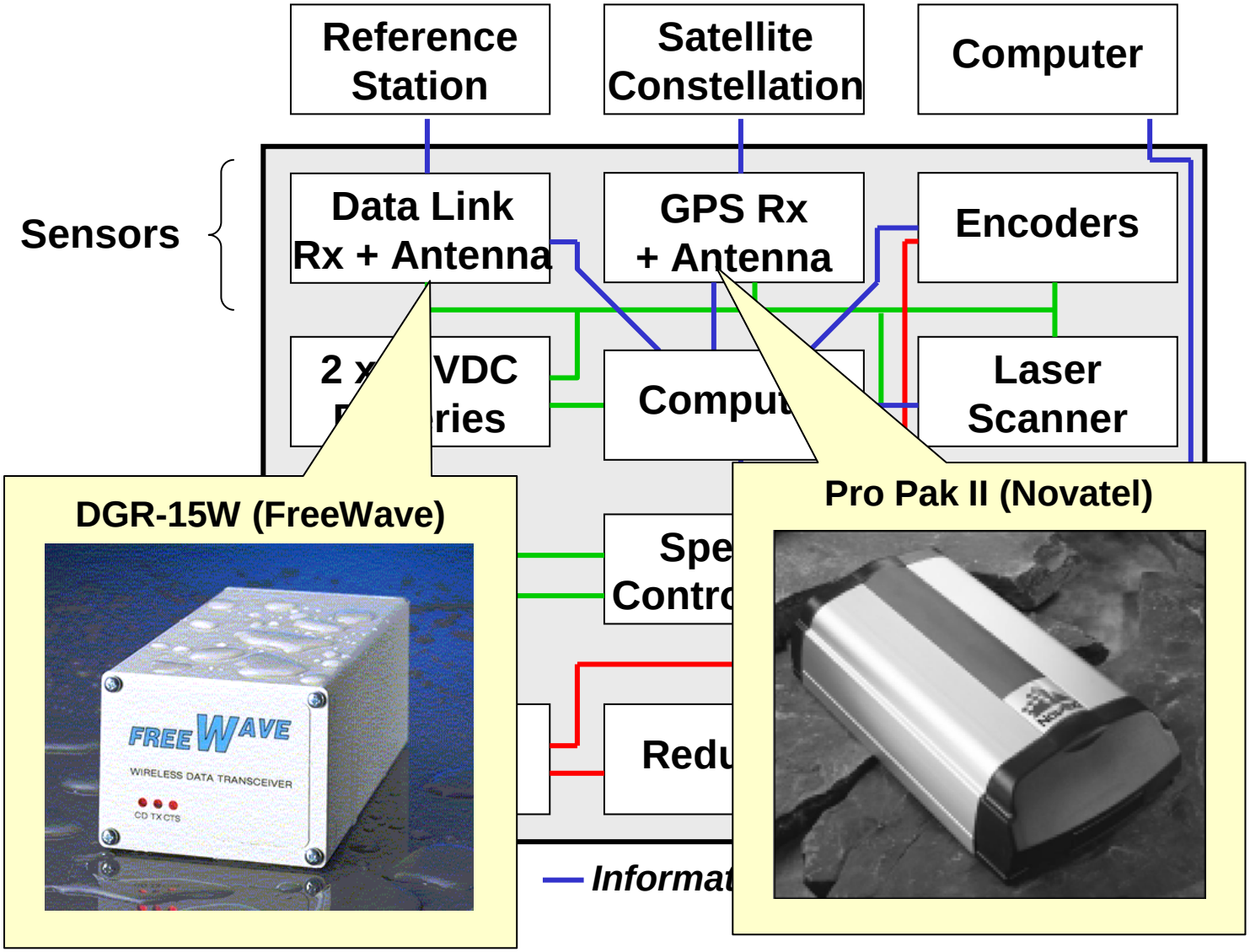

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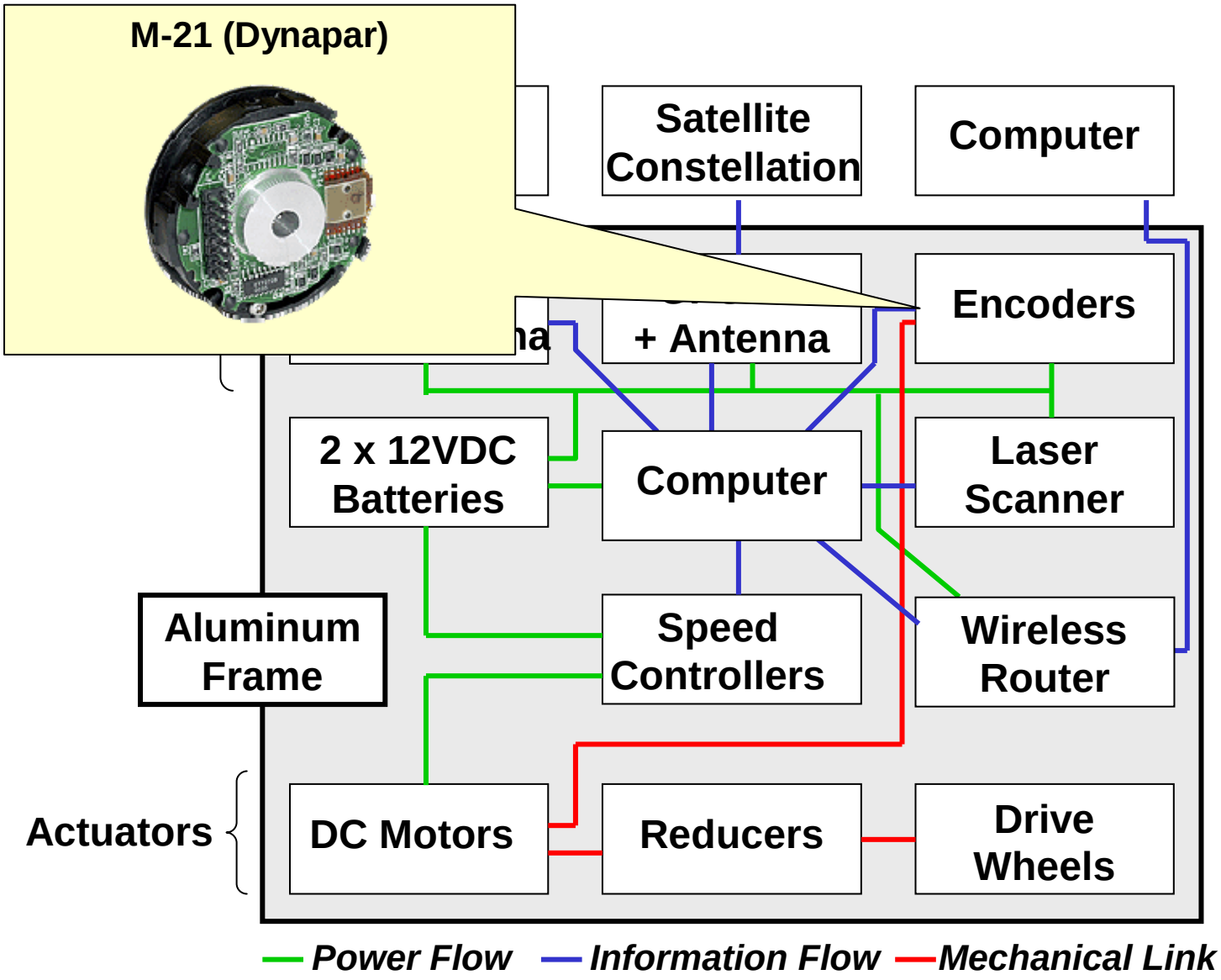

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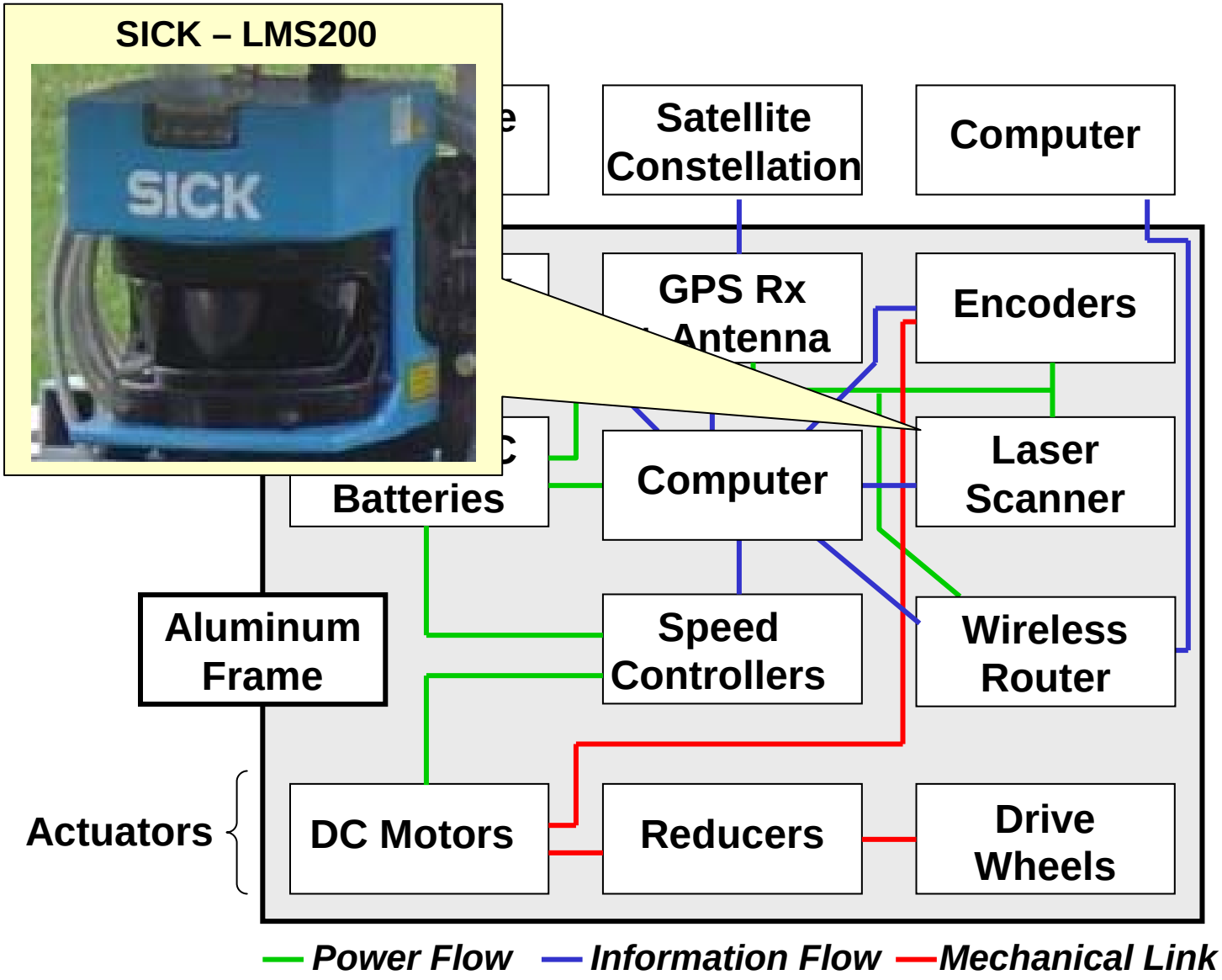

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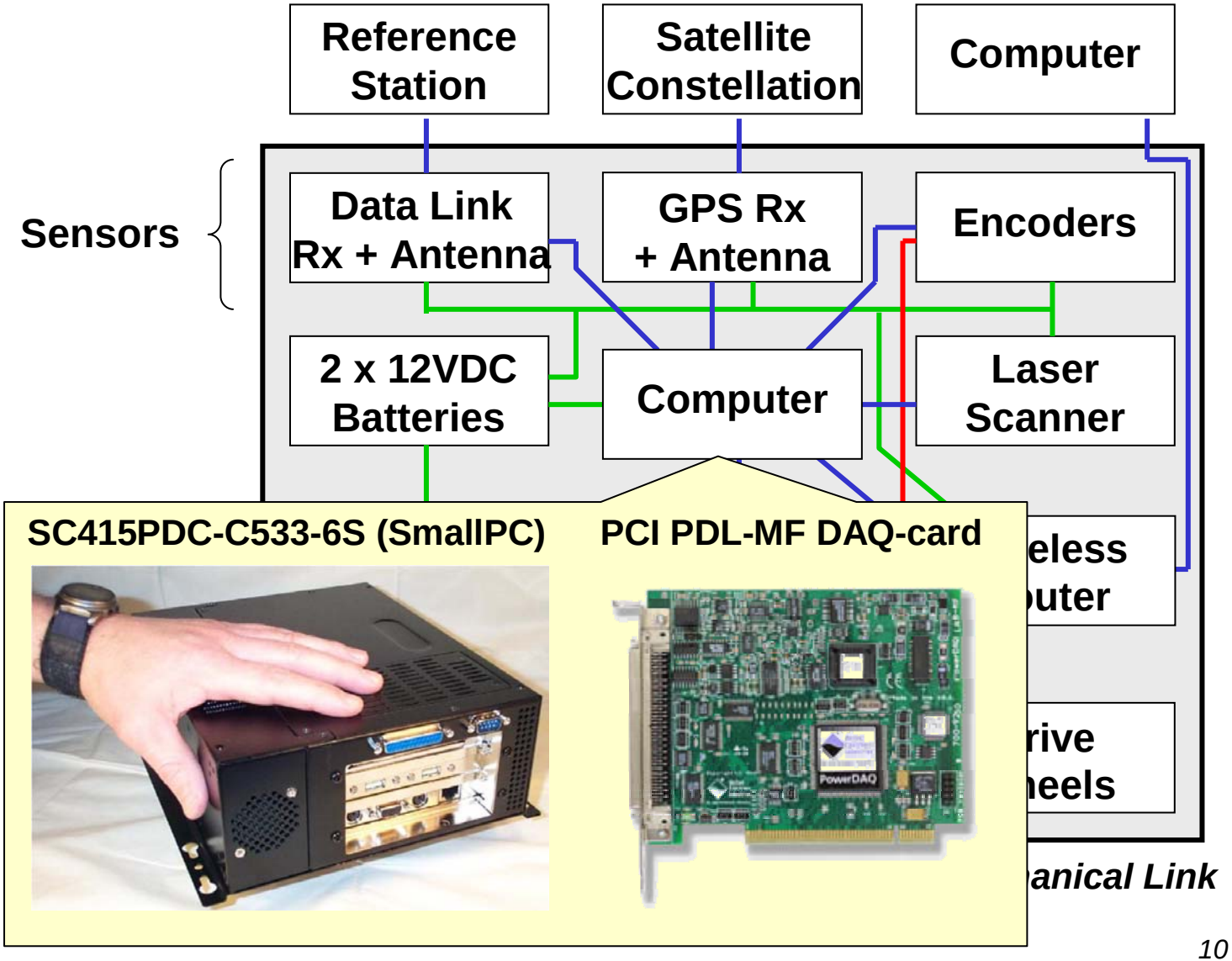

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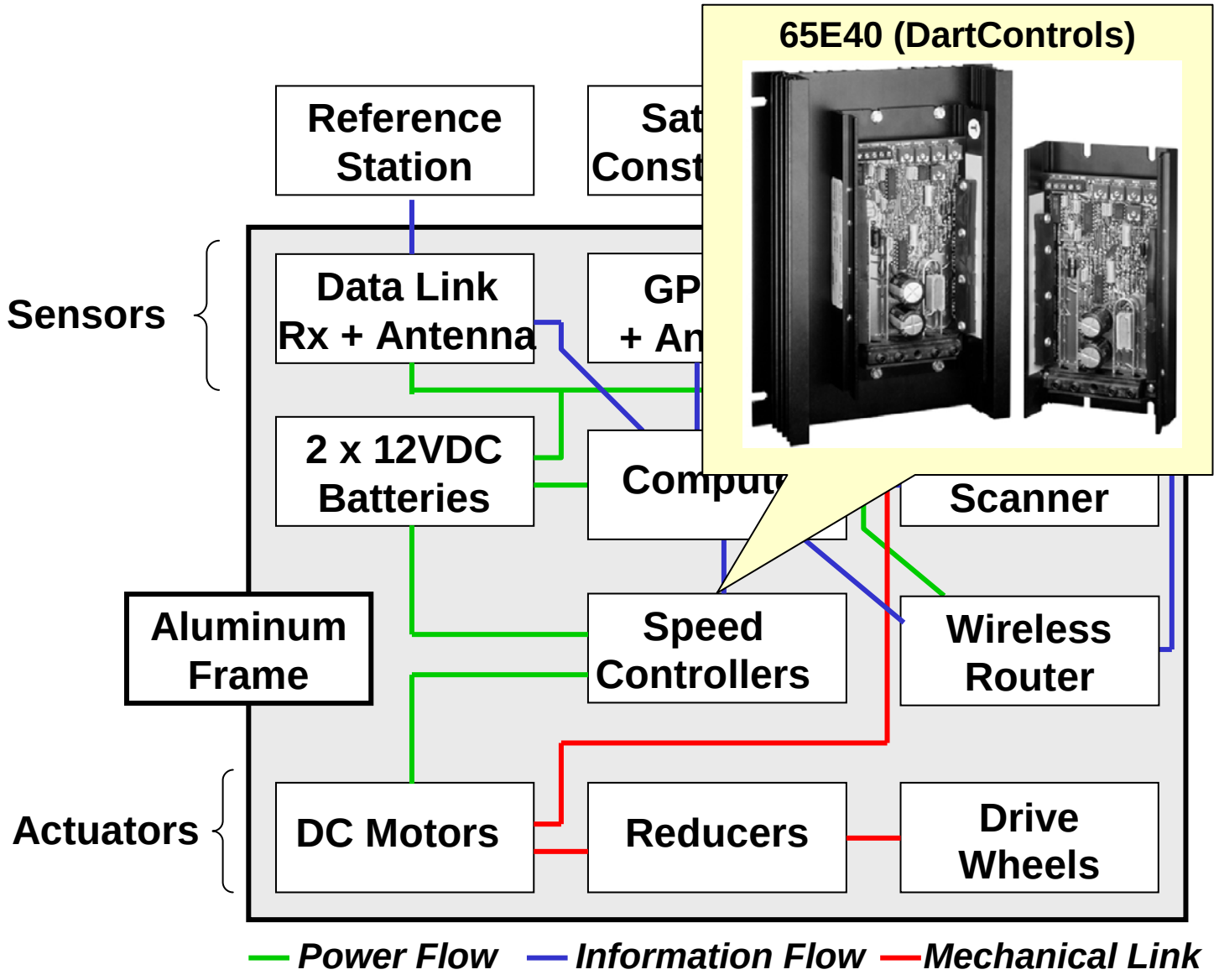

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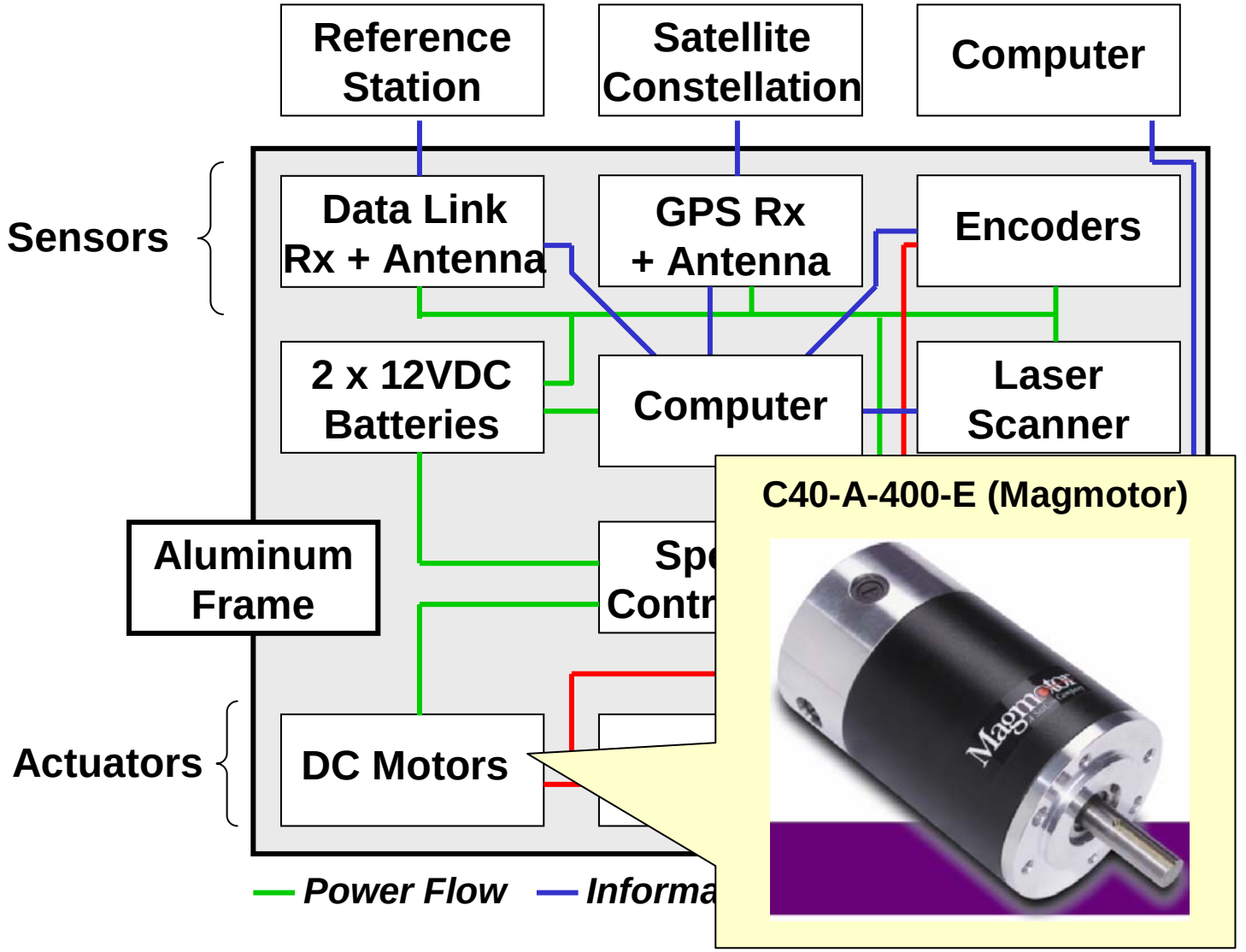

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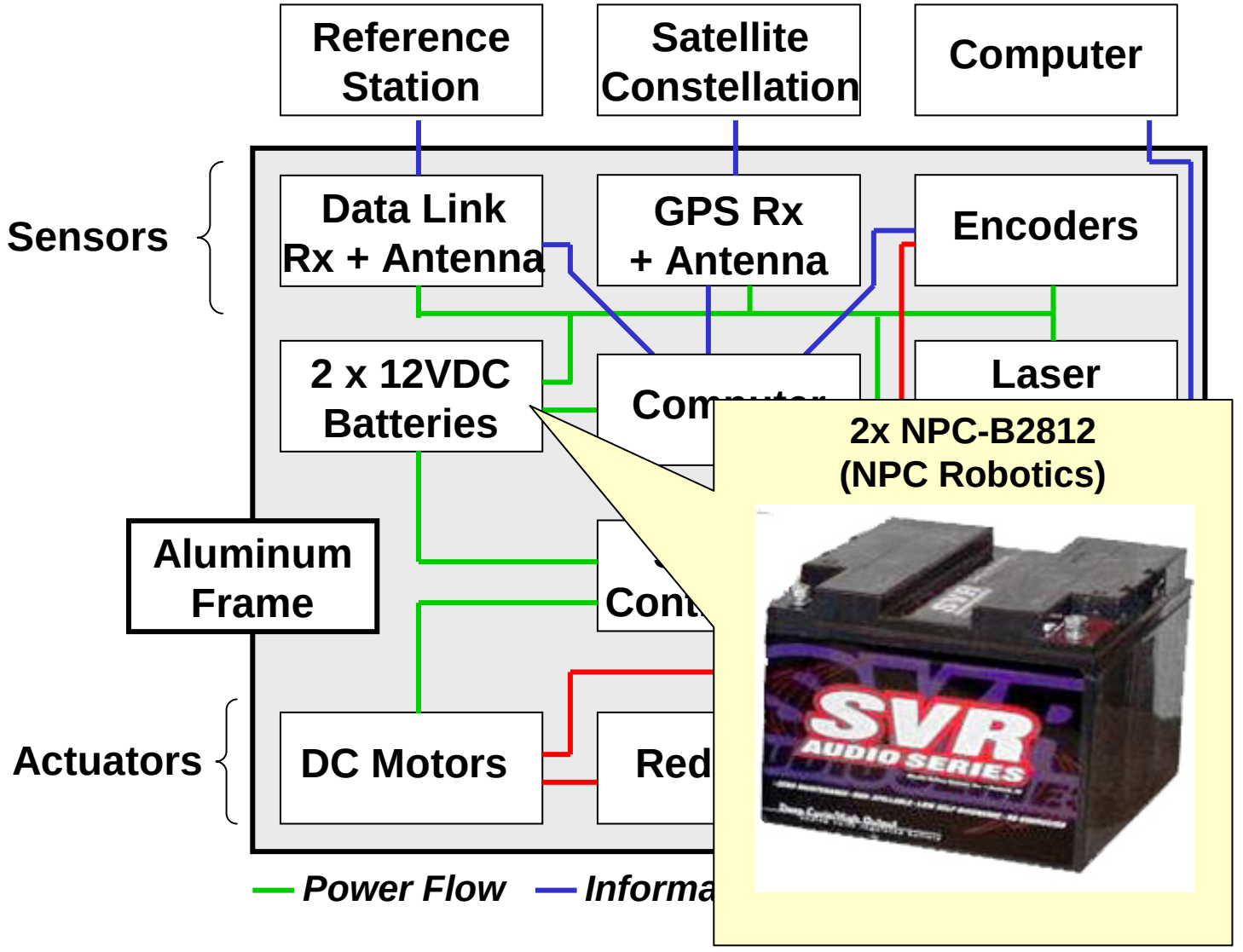

Ohio University System Design

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