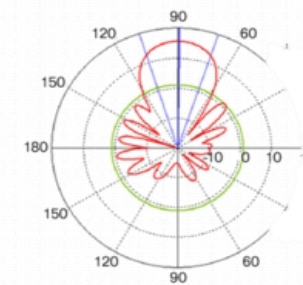
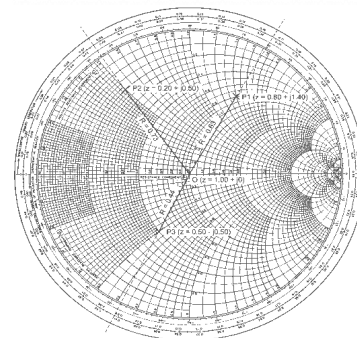
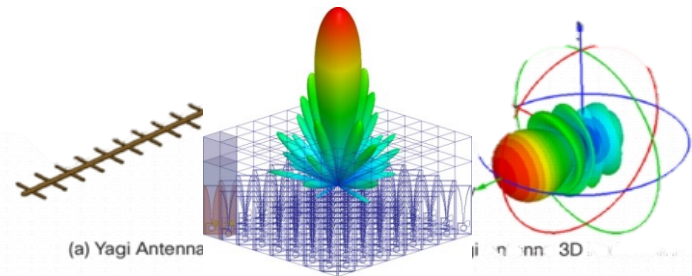


# Success in Engineering

Dr. Mason Nixon, Ph.D.



# Outline

- My academic / career progression
- College success strategies
- Projects I've worked since undergrad
- Awesome people I have met
- Tradeoffs between Gov and Contractor
- Experience I looked for in job candidates
- Opportunities right now
- A day in the life...
- Advice

# My academic / career progression



Auburn Montgomery (AUM) '05-'08



Auburn '08-'11 (3.89 B.S. EE / WE - 1<sup>st</sup>!)



Georgia Tech '11-'13 (3.5 M.S. EE)



**U.S. Army:**



**Space & Missile Defense Command '09-'18**



Univ.AL in Huntsville (UAH) '17-'22 (3.86 Ph.D. EE)



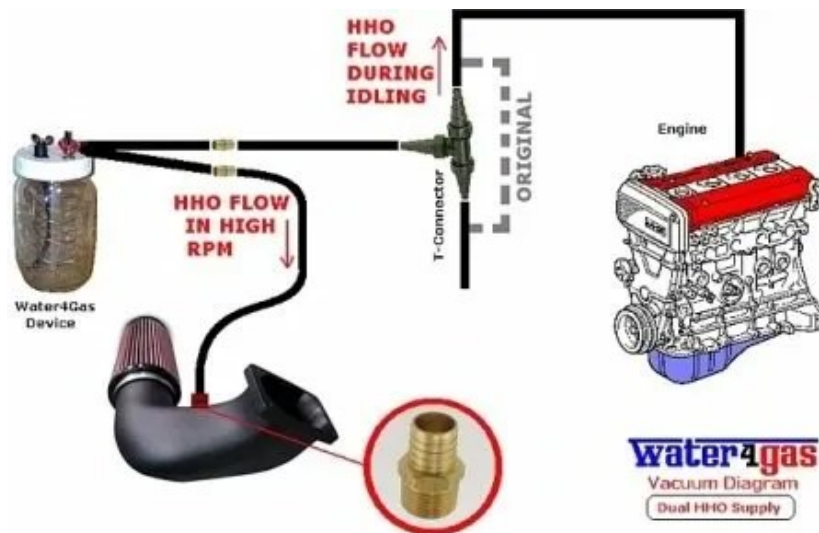
**Leidos (Supporting NASA) '18 - Present**





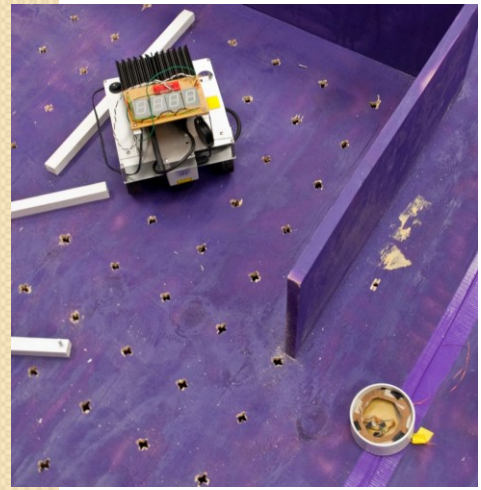
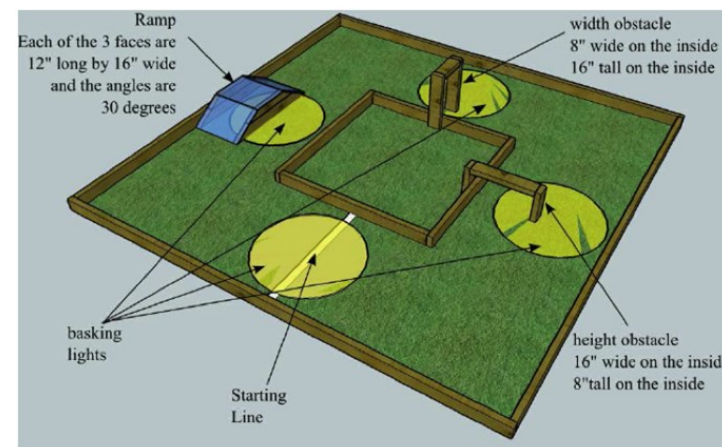
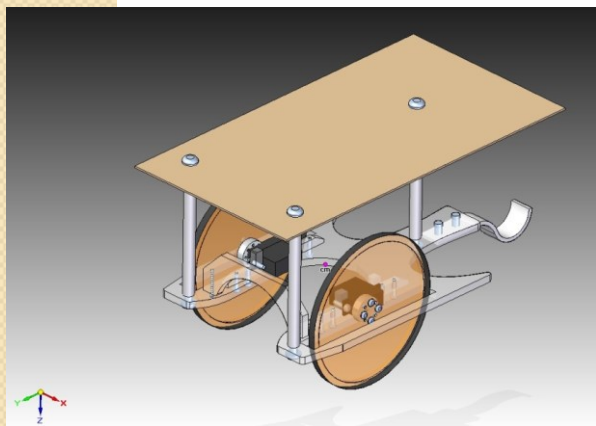
AUBURN  
MONTGOMERY

- Founded First Engineering Club
  - Hybrid Vehicle Conversion for Ethanol and Hydrogen
  - Campus Recycling Program
- Introduction to Engineering – Wifi Antenna Design Team Competition

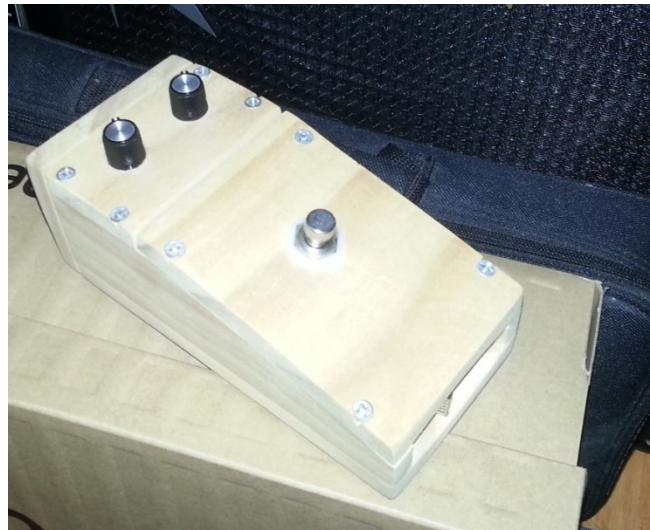
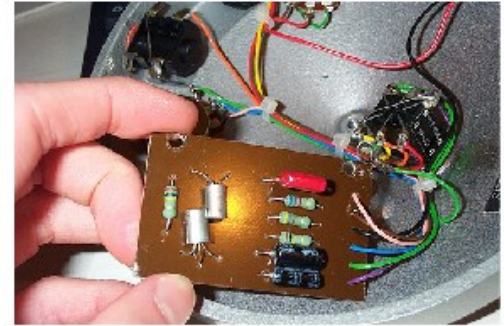




- IEEE Southeast Con

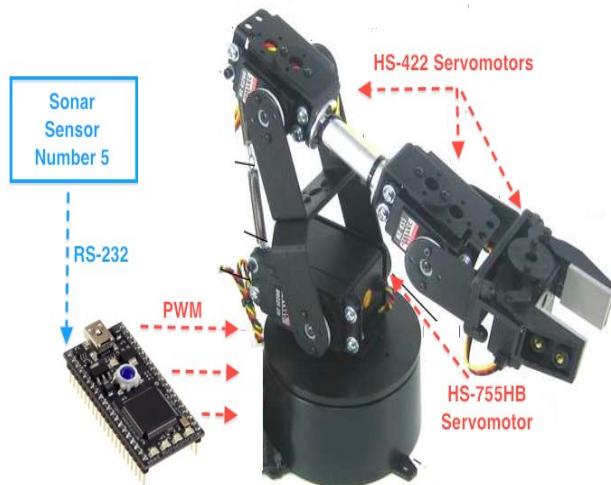
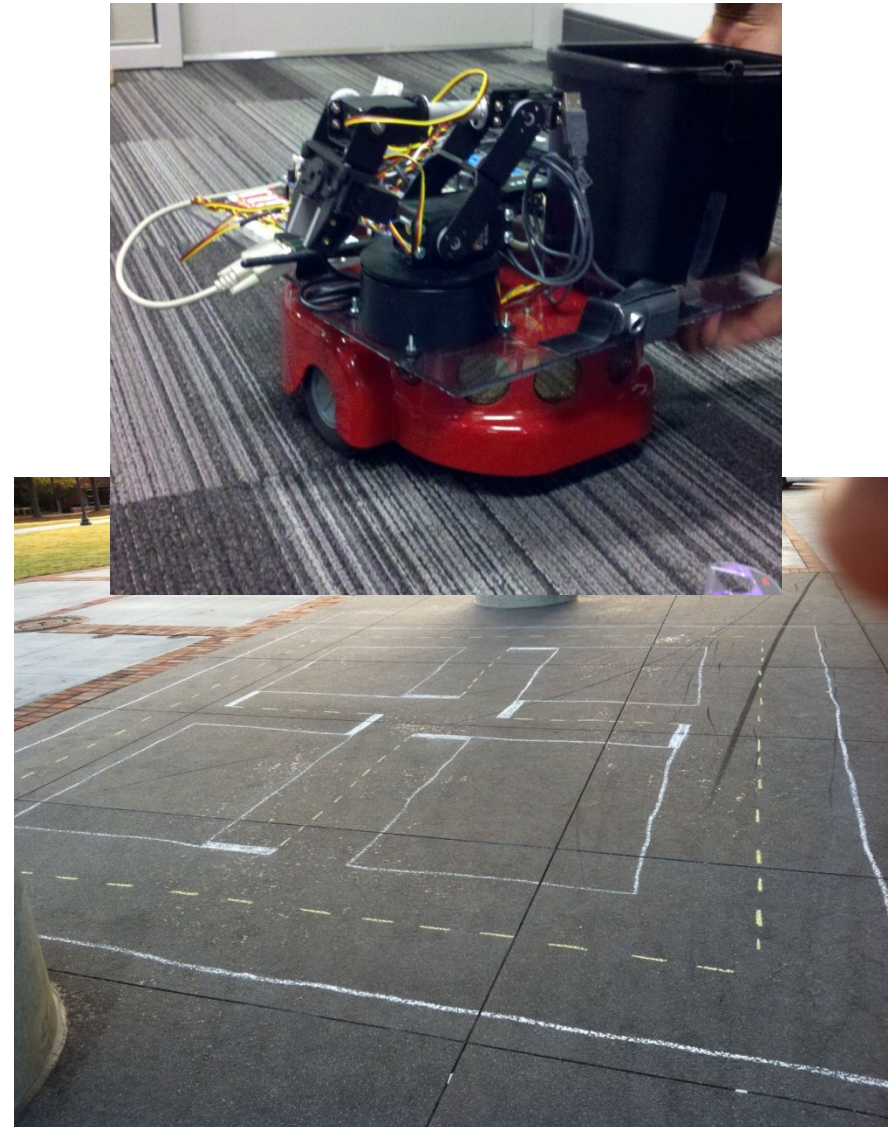
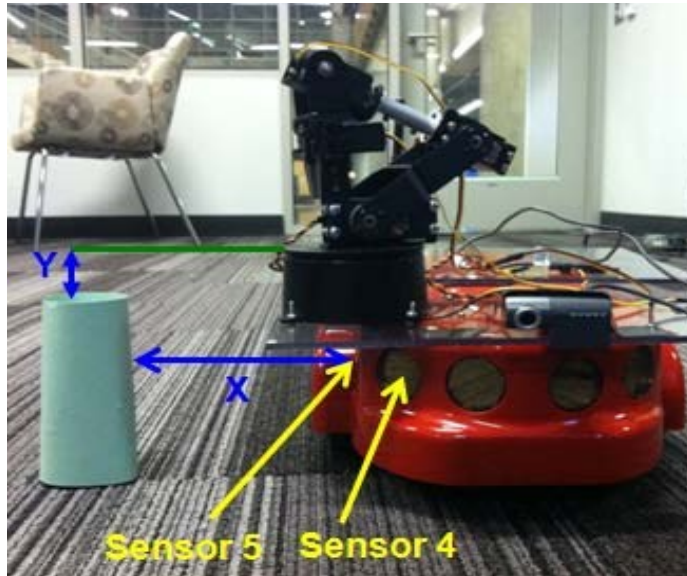


# Jimi Hendrix Fuzz Face Distortion Clone





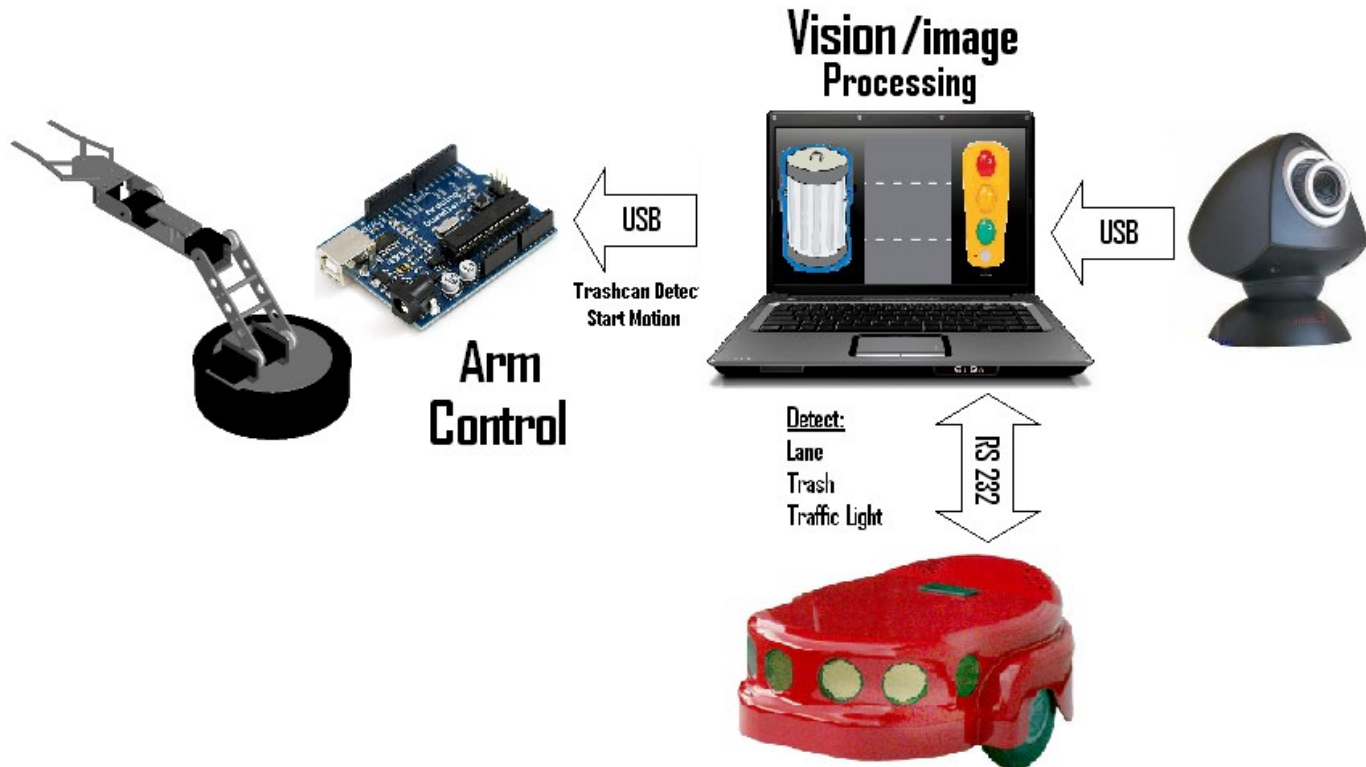
# Autonomous Robotic Systems





# Autonomous Robotic Systems

Sense	Think	Act
Identify Lanes (camera)	Camera Algorithms	Trash Collection
Identify Trash Bins (camera)	Object Avoidance Algorithms	Avoid Objects
Identify Signs/Signals (camera)	Path Planning	Deliver Trash to Landfill
Identify Unforeseen Obstacles (sonar)	Group Coordination/Optimization	





# College success strategies

## Learning

- E.g. teach others (tutoring, group study, etc.)

*You never **really know something until you teach it** to someone else.*

— John C. Maxwell

## Studying

- My study guide method
- Goal is deep understanding during lectures and with homework, but understanding + memorization is key to success by exam time.
- Use ChatGPT to  
“Explain it like I’m 5...”



## Time-Management

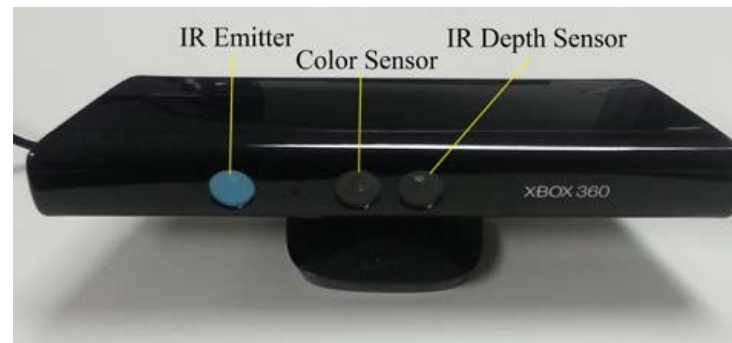
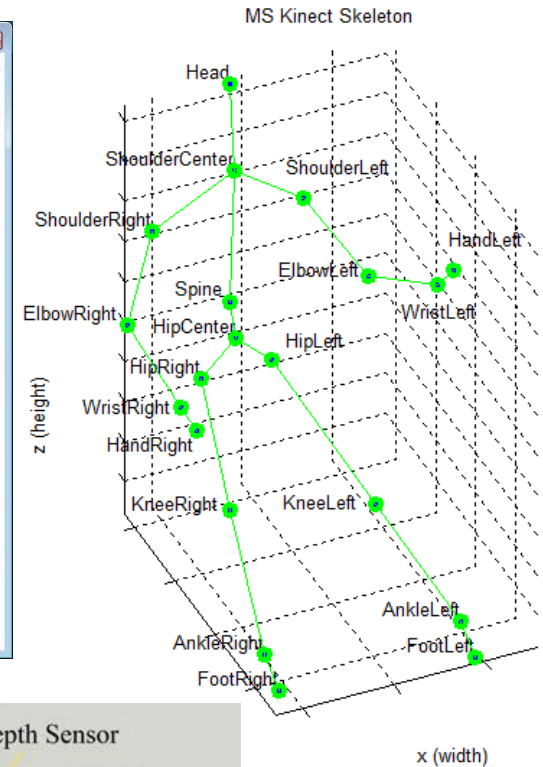
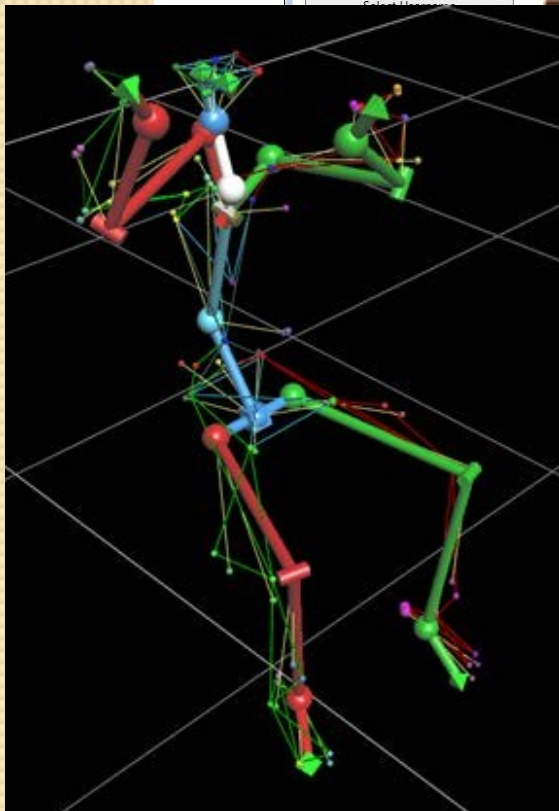
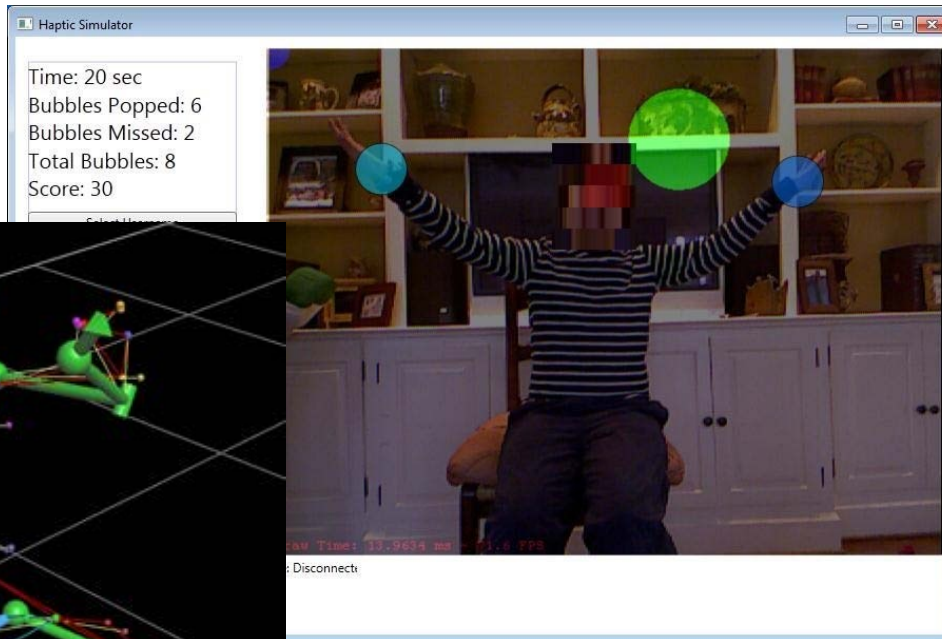
- Extracurriculars to force focus and alleviate procrastination

# Projects Since Undergrad

- Master's Thesis
- SMDC
  - Radar
  - Kestrel Eye
  - ACES RED
- Ph.D. Dissertation

# Master's Thesis

## UTILIZATION OF AUDITORY CUES TO ENHANCE THERAPY FOR CHILDREN WITH CEREBRAL PALSY





# SMDC

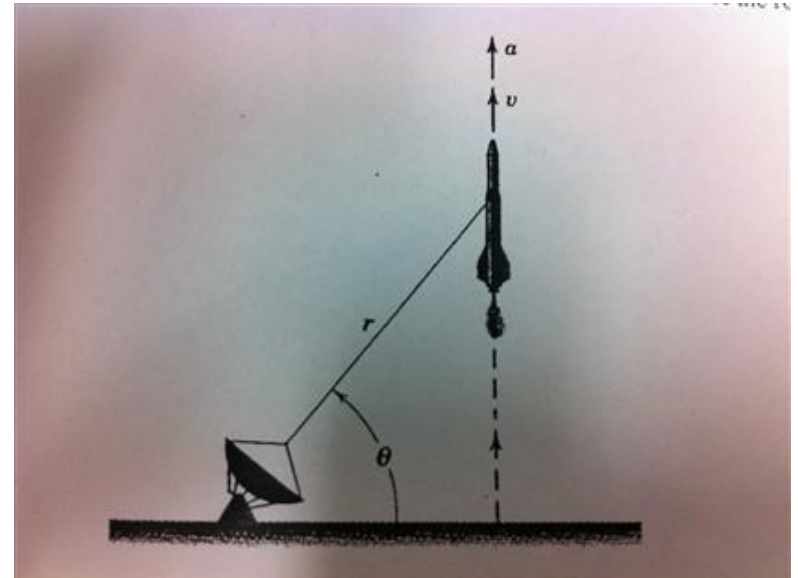
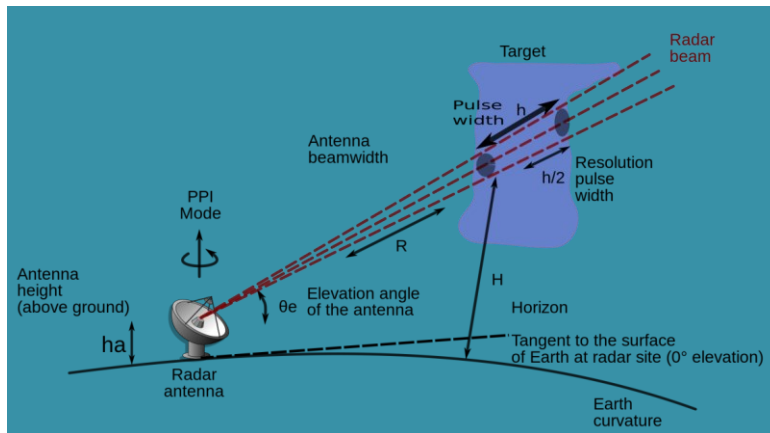
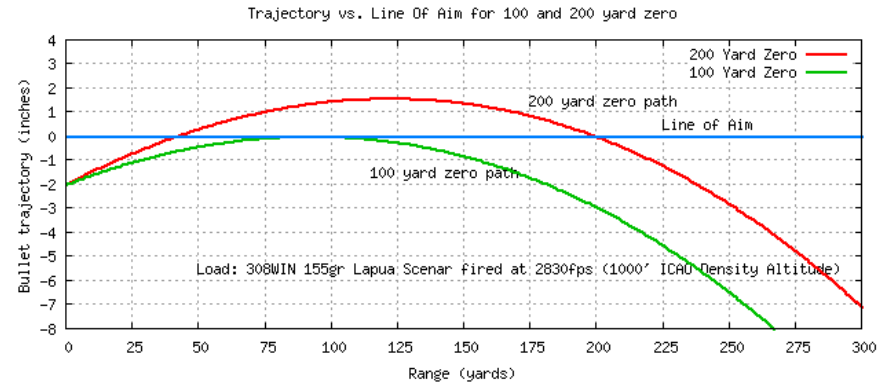


- Army Space and Missile Defense Command
  - Space and Cyber Technology Directorate
    - Concept Analysis Lab





# Radar!

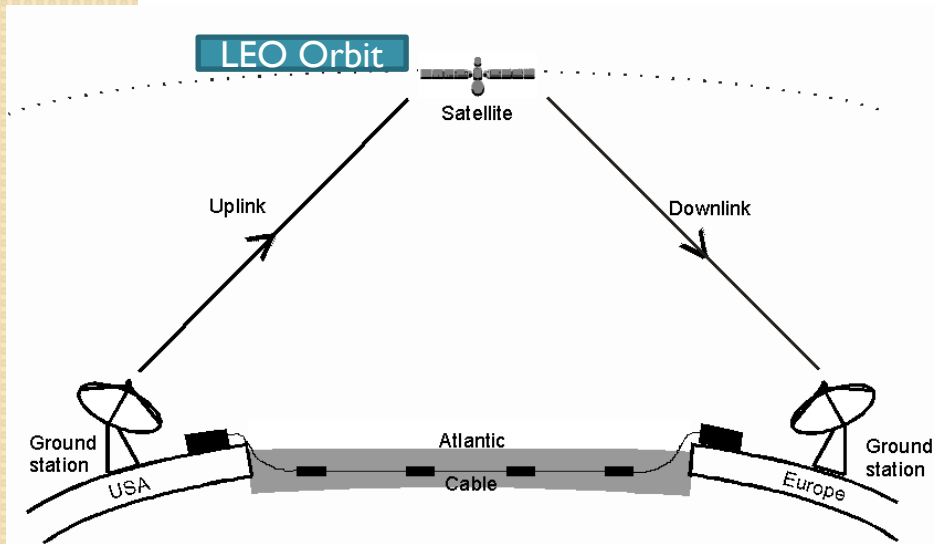




# Satellites!

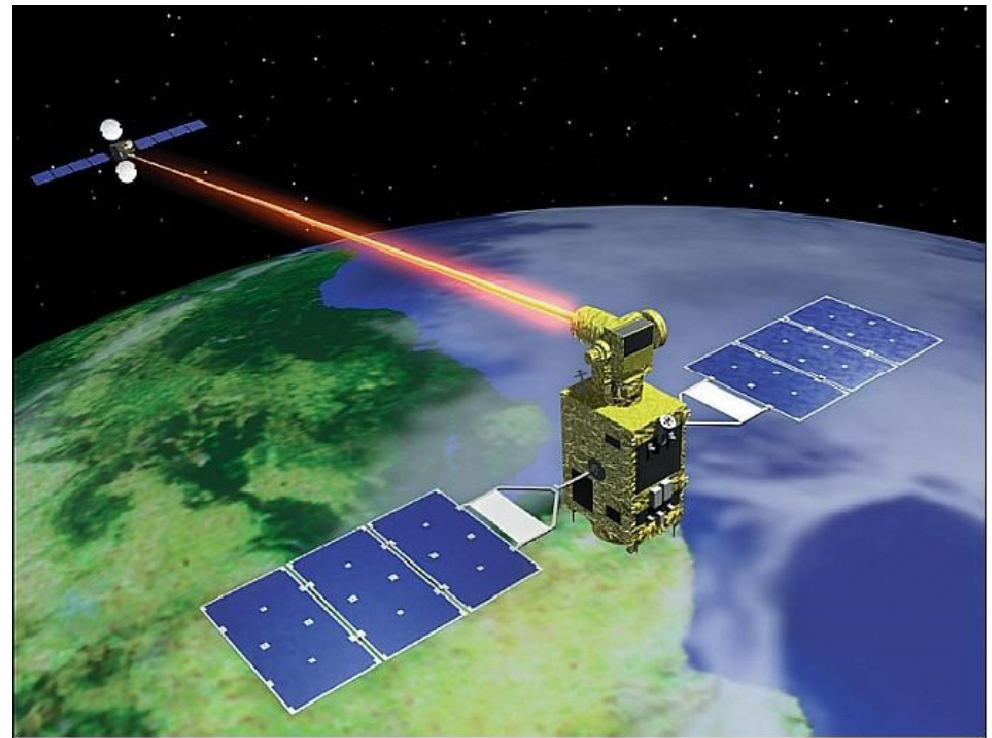


- SMDC-ONE





# Lasers on Satellites!!!

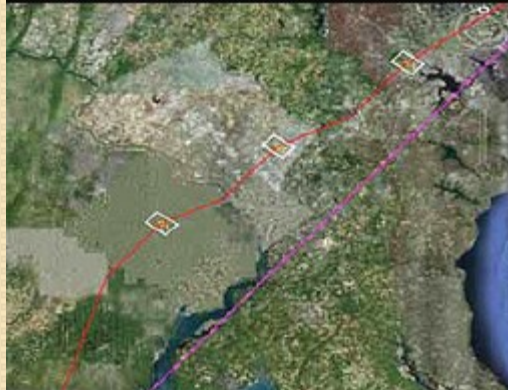
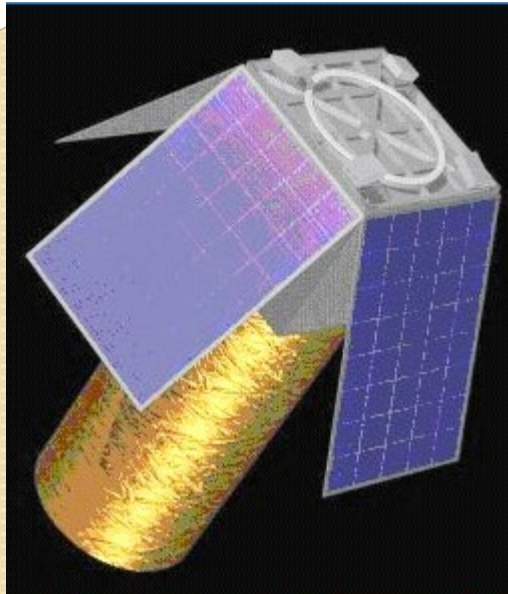




# Electro-Optical Imager



- Kestrel Eye (i.e., Space Camera)







# Electro-Optical Imager

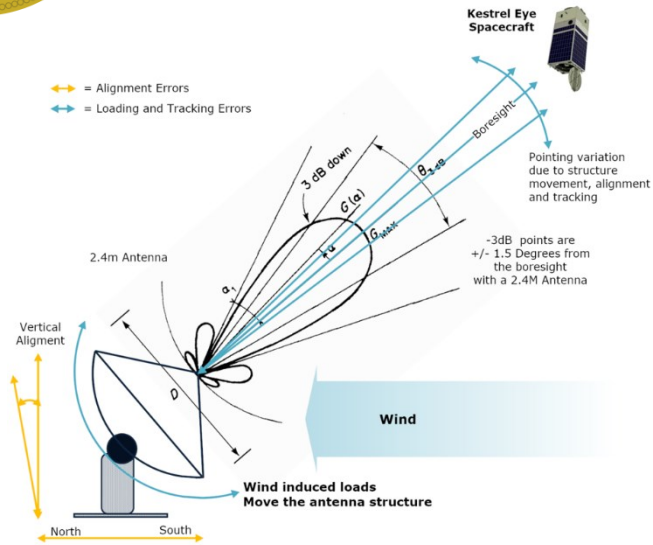


- Kestrel Eye



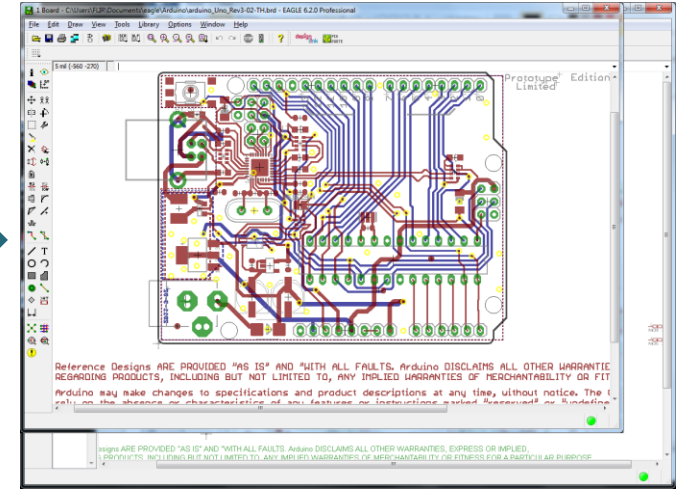
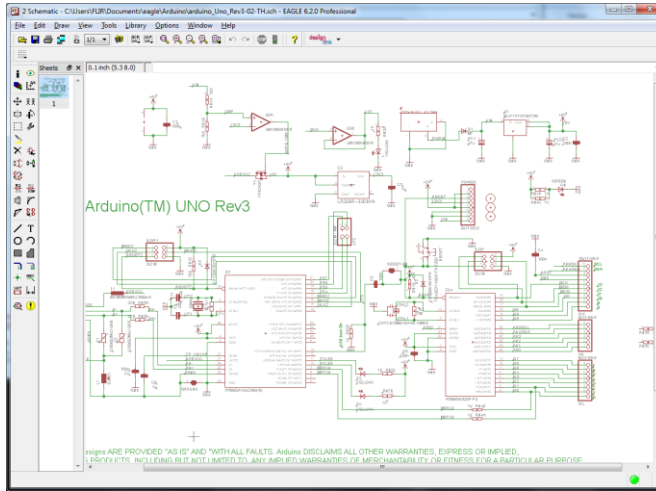


# Antenna Tracker

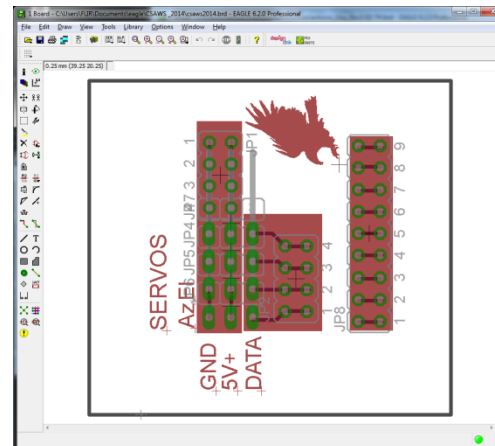




# Circuit Design

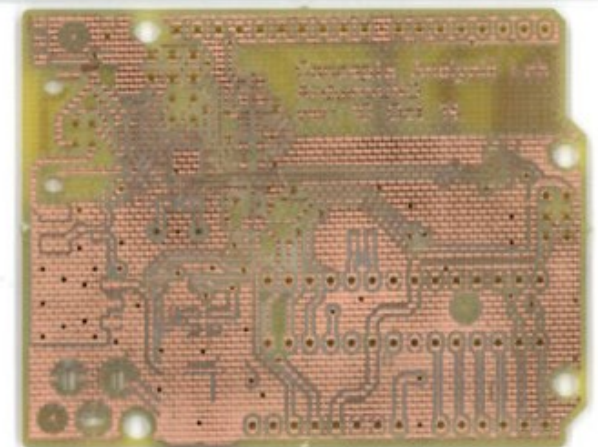
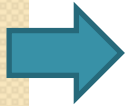
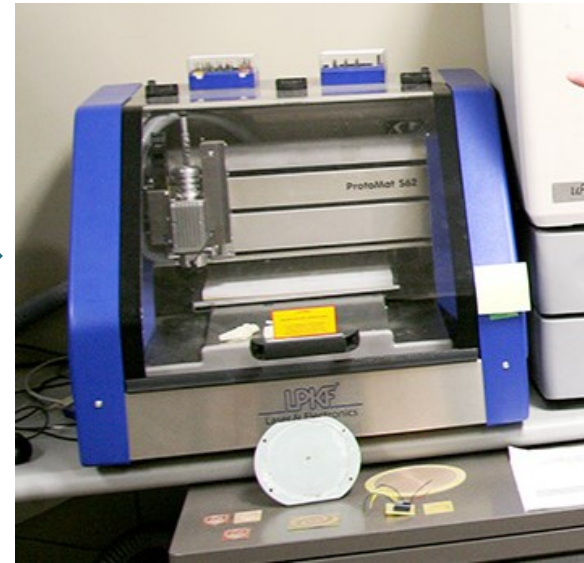
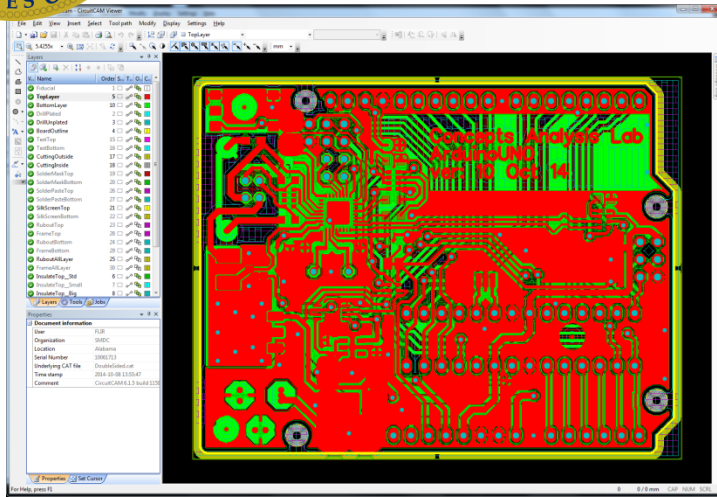


OR



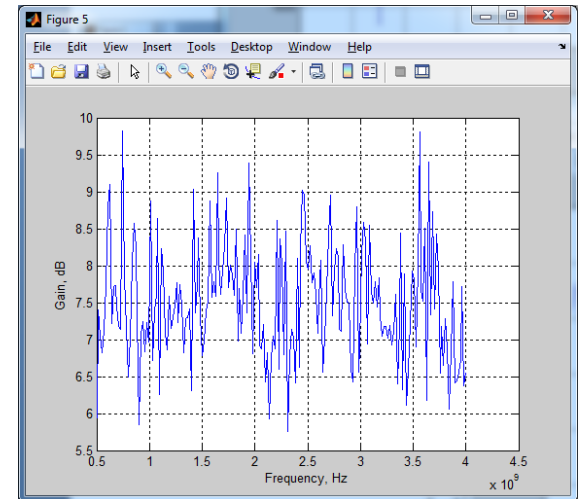
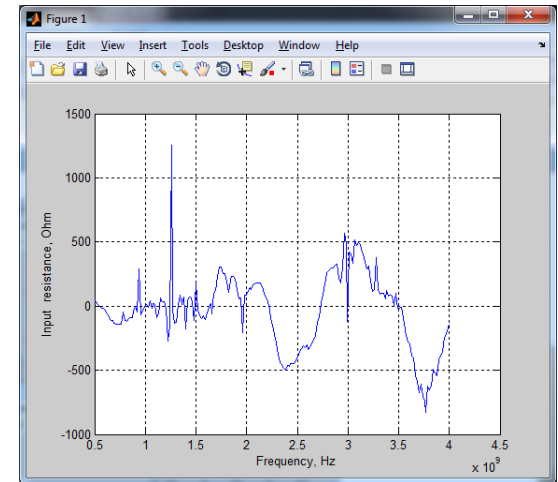
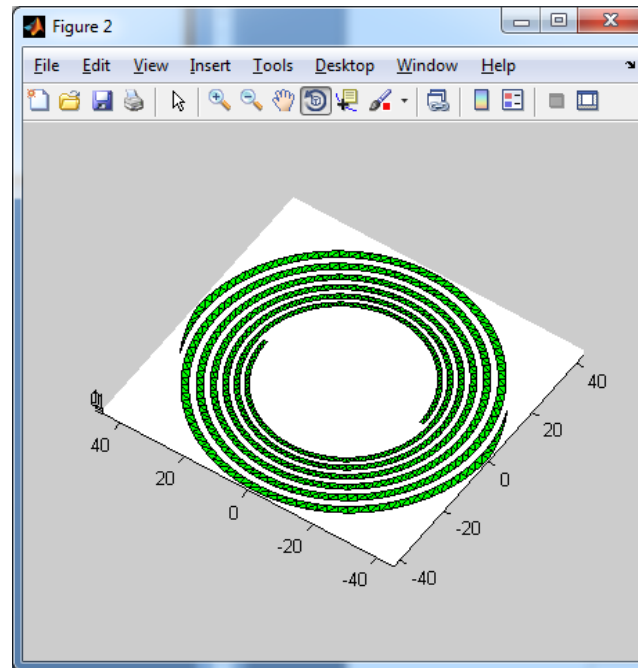
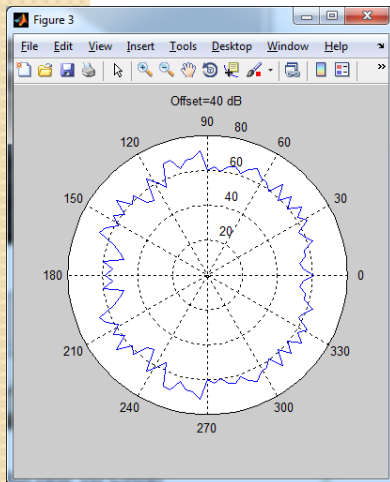


# Circuit Design



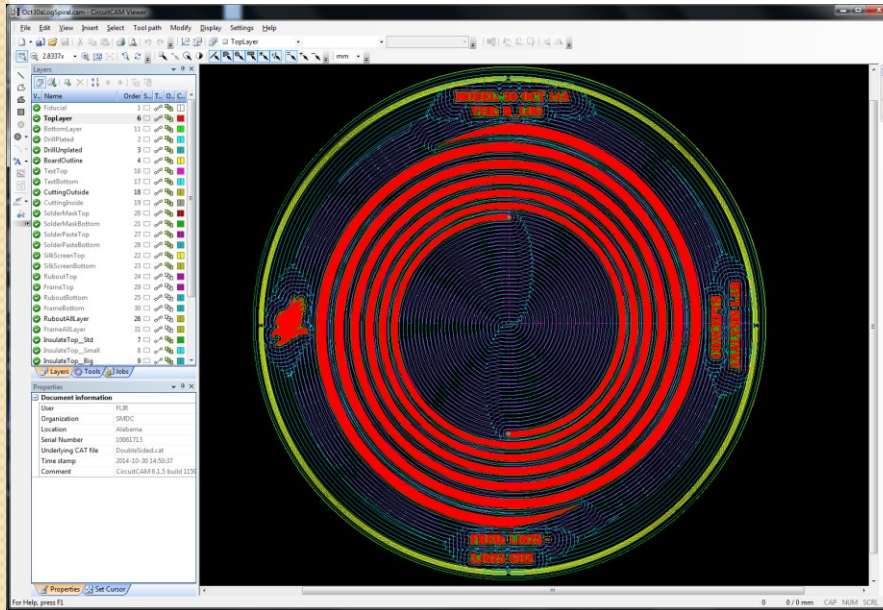


# Antenna Design



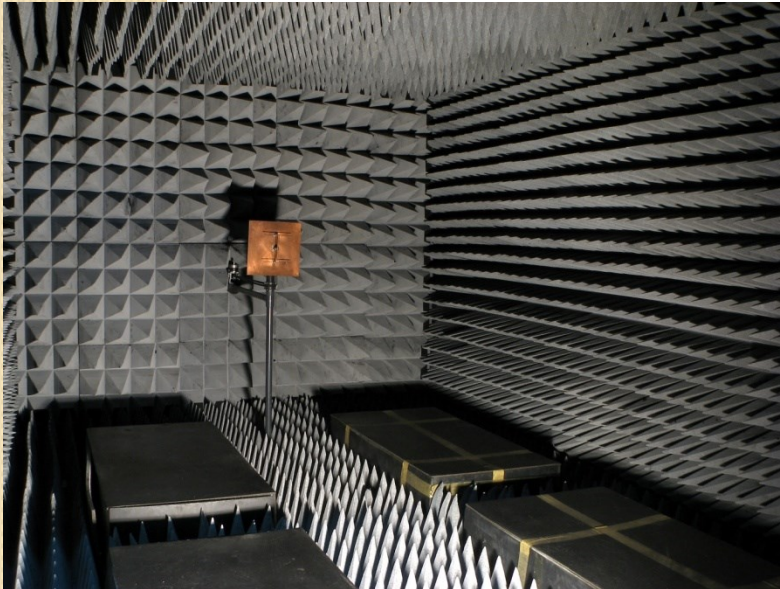
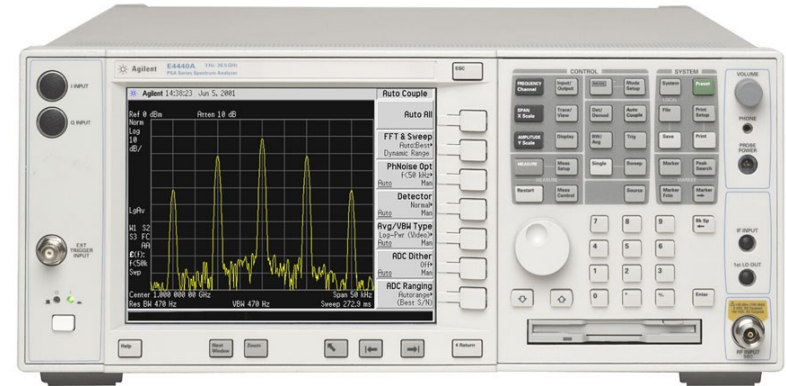
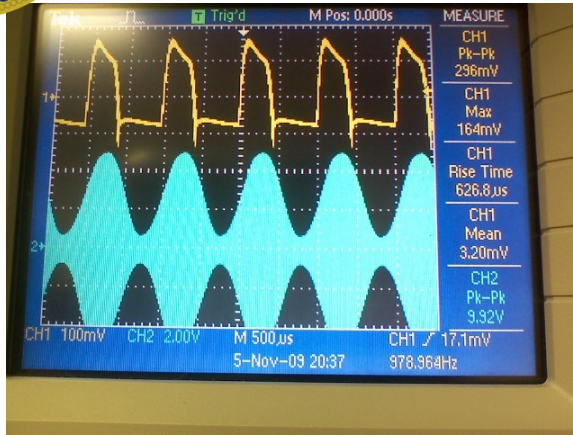


# Antenna Design





# Antenna Design

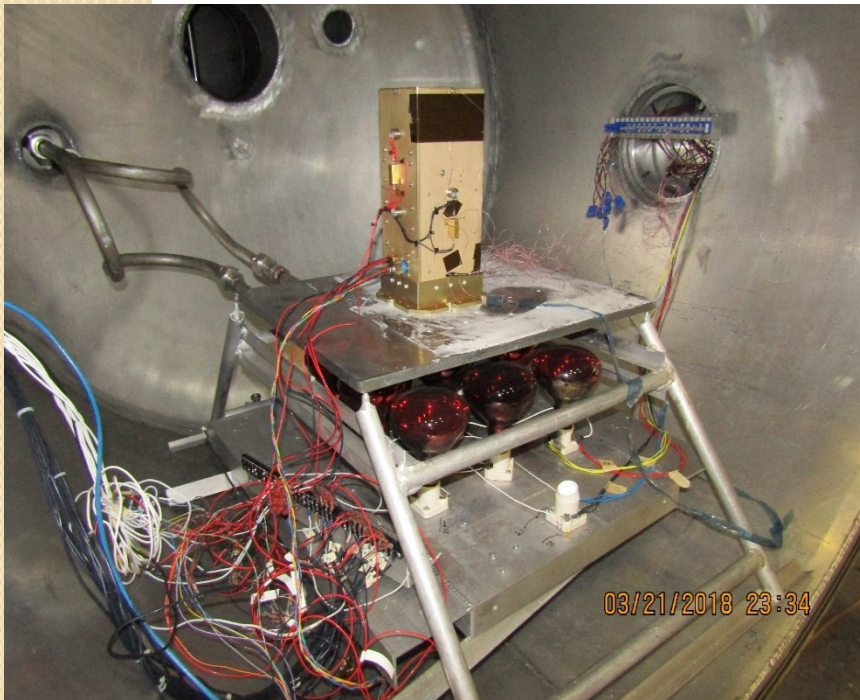


# ACES RED





# ACES RED Testing



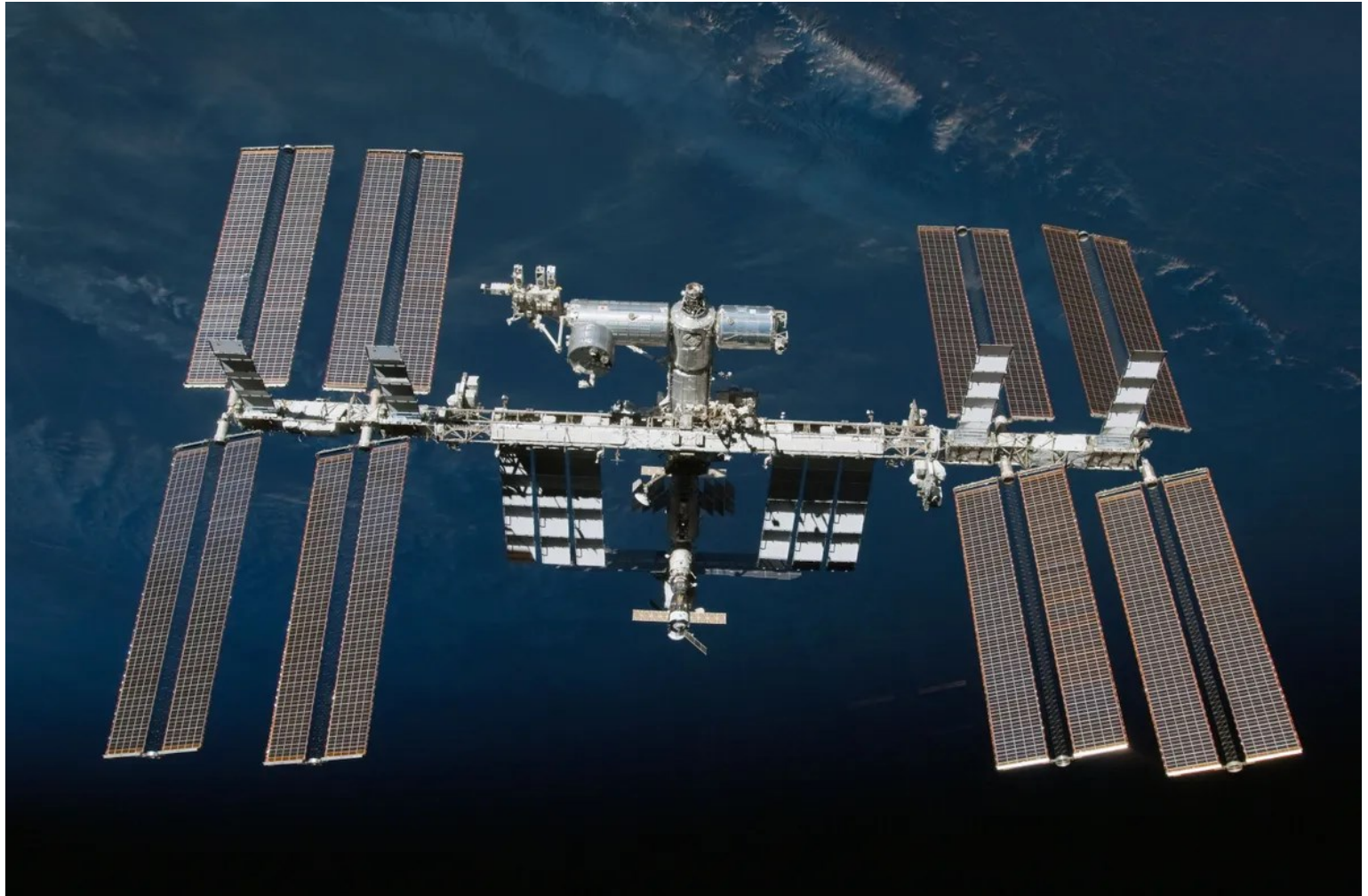
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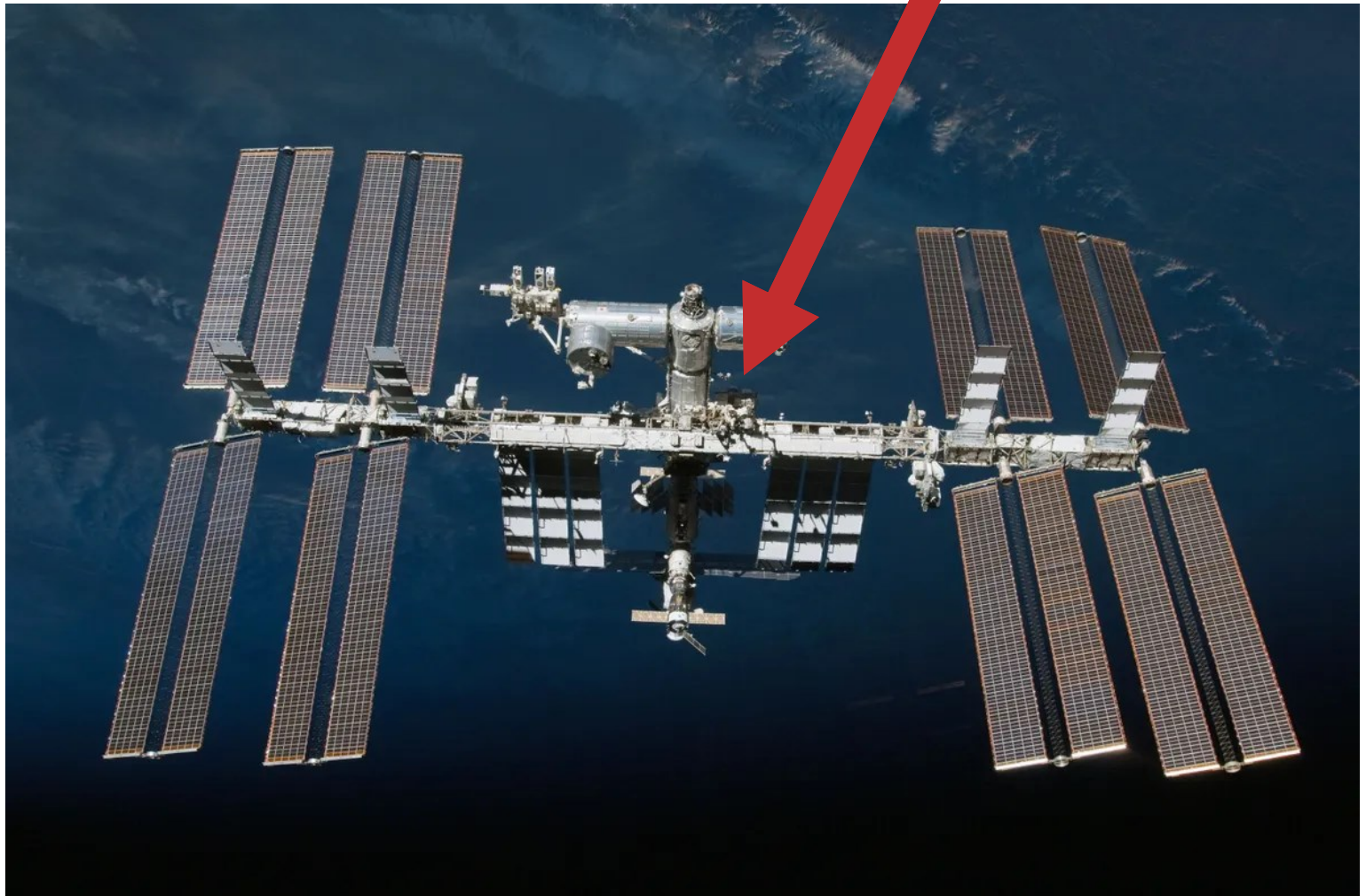
Vibe



# ACES RED on ISS



# ACES RED on ISS





Working for the Government...



# Awesome people I've met and worked with

Army Astronauts Mark Vande Hei & Shane Kimbrough



4-star General Raymond Odierno



# Awesome people I've met



Buzz Aldrin!



# Trade-offs Working Gov / Contractor

## Government

### Pros

- Leave & healthcare benefits
- **Very stable**
- Access to CEOs, etc.
- Many learning opportunities
- Good complement to academic career path

### Cons

- Bureaucracy!
- Project management (i.e., low technical)
- **Low pay**
- National politics DO effect you (e.g., debt ceiling debates, vax mandates, etc.)

## Private Sector (“Contractor”)

### Pros

- Varying company size
- **High pay** (potential)
- Competitive in-job
- High technical or mgmt. path
- Competitive between companies (higher pay)

### Cons

- Leave & healthcare benefits
- **Lay-offs**
- Less academic focus
- For gov, national politics can still effect you.





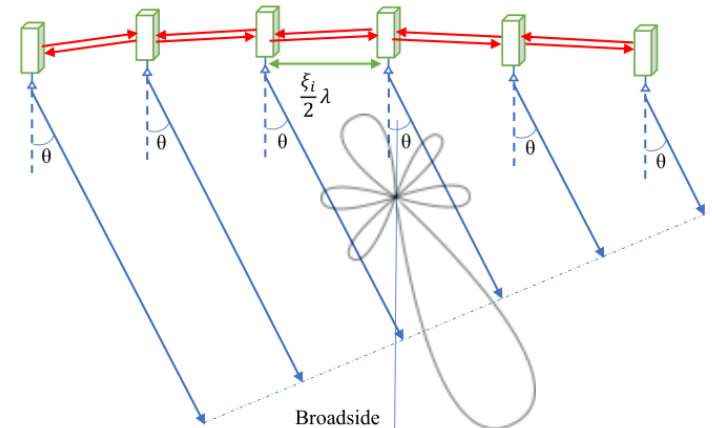
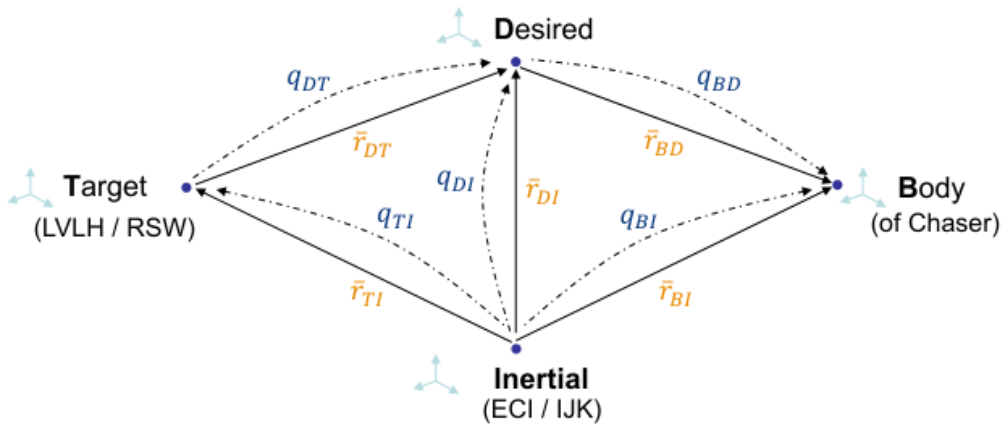
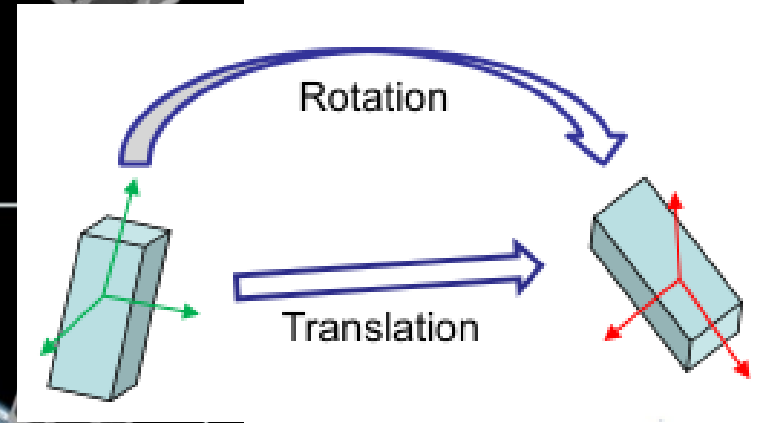
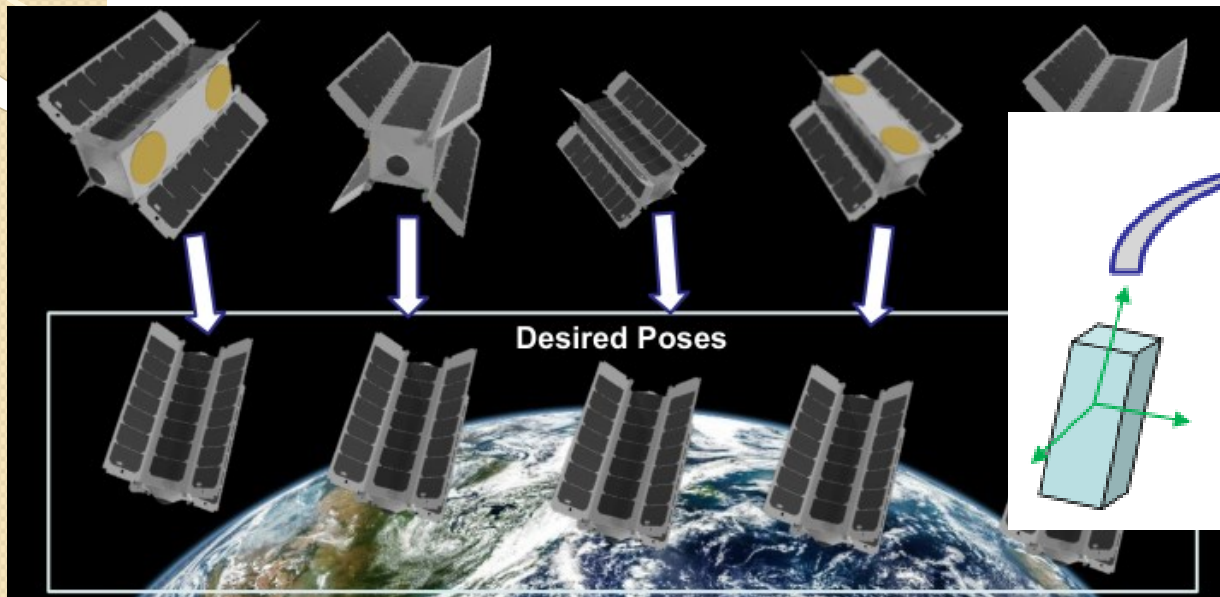
You don't know what it's like out there. I've worked in the private sector...



**They expect results!**

# Dissertation

## ADAPTIVE SLIDING MODE CONTROL OF SMALL SATELLITES IN FORMATION FOR DISTRIBUTED BEAMFORMING APPLICATIONS



# A day in the life...

- 6:30am Arrive, check emails, plan the day
- 7:30am Catch-up with coworkers and start TODOs
- 8:30am Morning meeting
- 9:30am Begin working meetings or start daily tasks. For me, this can be doing a multitude of reviews (SRR, PDR, MRR, etc.), writing/debugging (lots of) software, developing solutions to a whole host of problems
- 11am Lunch or coffee break
- 11:30am Continue squashing TODOs
- 4:30pm Go gyming

# Opportunities right now

(things I wish I had taken advantage of)

- Career shadowing or even just visiting / talking to professionals
- Mentorship (both be a mentor and find a mentor)
- The Mises Institute!



# Experience I looked for in job candidates

- Engineering team experience
- “Real work” experience
- Interesting and challenging projects
- Cross-disciplined

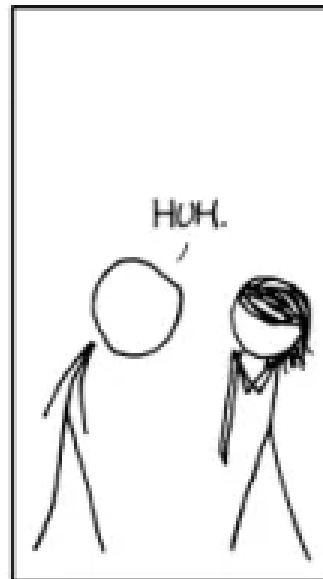
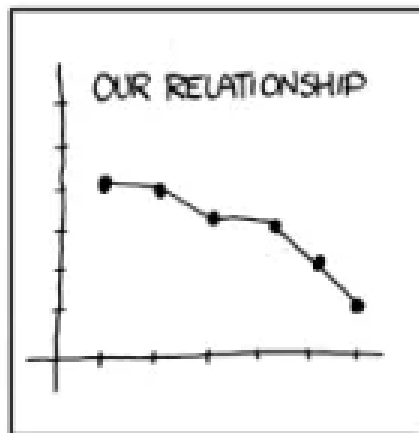
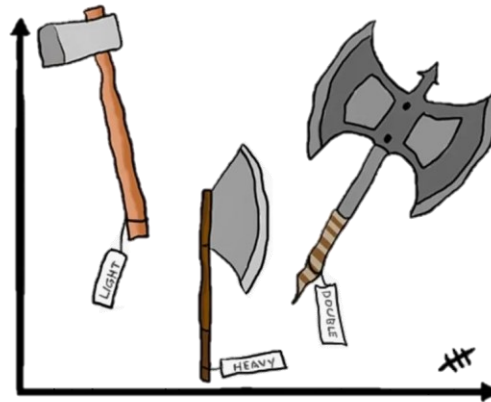
# Advice

1. Always put in your best effort, in every single thing you do. You never know who might be watching.
2. Learn “soft skills” (Dale Carnegie book).
3. Learn the tools of the trade now. Don’t wait. Be multi-disciplined.
4. Never stop learning.
5. Read “The Road to Serfdom” by Bastiat.

# Last Bit of Advice

✦ Always label your axes and always show your units!!!

**Always label your axes**



# Thank you!

Dr. Mason E. Nixon, Ph.D.

*Senior Guidance, Navigation, Control, &  
Communications Engineer, Leidos, Inc.*

masonnixon7@pm.me

