



EMFFORCE

MIT Aero/Astro

- [Introduction](#)
- Controls
- Metrology

Formation Flight Subsystem Plan

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Control Team Deliverables

MIT Aero/Astro

- Introduction
- **Controls** □
- Metrology

- What we hope to finish by PDR...
 - Model and Control the stable problem
 - Using 62X Setup
 - Model and Control the unstable problem
 - More like what our system will have to do
 - Look into rotation problem's mechanics
 - Familiarity with control tools
 - D-Space, Matlab, Simulink, and lab setup
 - Will be good for future of project!!!

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<BAB>

The purpose of the TARR is explicit in its name, Trade Analysis and Requirements Review. Specifically, the class hopes to review the requirements that have been levied and the trade analyses that have been conducted. The purpose of presenting this to an audience is twofold:

1. To require the class to polish their work by having to make it presentable to an outside audience.
2. To seek outside view of our work as it stands.

The class realizes that we do not have all the answers and hopes that through this exercise we will gain further understanding and new insight into the project.



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Schedule

MIT Aero/Astro

- Introduction
- **Controls**
- Metrology

- 4/11/02 -- Acquire knowledge of Control Theory and helpful Software
- 4/18/02 -- Model of experimental systems and possible control designs
- 4/25/02 -- Gain better understanding (model?) the spin-up/de-spin modes
- 5/2/02 – Demonstrate control of the stable system (at least) and complete preliminary PDR slides

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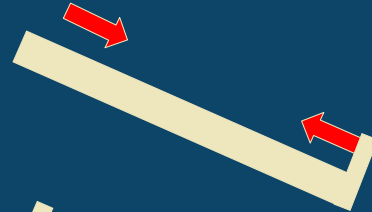
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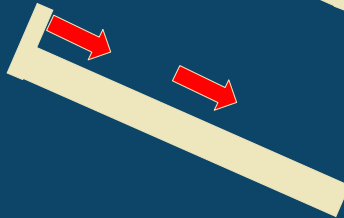
- Introduction
- **Controls** □
- Metrology

• Models of stable and unstable modes



Stable Mode poles:

$$\pm \sqrt{\frac{4c_0 \mu_{AVE}^2}{x_0 m} i}$$



Unstable Mode poles:

$$\pm \sqrt{\frac{4c_0 \mu_{AVE}^2}{x_0 m}}$$



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Completed Tasks ...

MIT Aero/Astro

- Introduction
- **Controls**
- Metrology

- Possible controllers for stable plant have been developed using Matlab's sisotool
 - Cannot be implemented until we are allowed to use 62X's lab setup the 23rd

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Metrology Team Deliverables

MIT Aero/Astro

- Introduction
- Controls
- **Metrology** □

By PDR we hope to have...

- A final design for the metrology system including:
 - Number of each type of sensors
 - Estimated power requirements
 - Estimated processing requirements
- Algorithm to obtain distance and angle data from the sensor input

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Schedule

MIT Aero/Astro

- Introduction
- Controls
- Metrology □

- 4/11/02 – Acquire knowledge of SPHERES metrology system
- 4/18/02 – Complete Preliminary design
- 4/25/02 – Create Algorithm for metrology system
- 5/2/02 – Complete PDR slides and testing for proof of concept (if possible)

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Completed Tasks

MIT Aero/Astro

- Introduction
- Controls
- Metrology □

- Met with SPHERES team members
- Compared various concepts for metrology system
- Decided upon a design for the system

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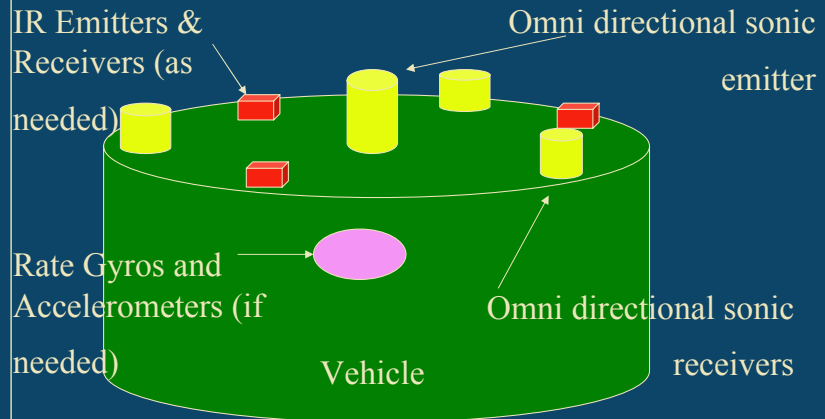
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Completed Tasks

MIT Aero/Astro

- Introduction
- Controls
- **Metrology** □

• Preliminary Metrology system design



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