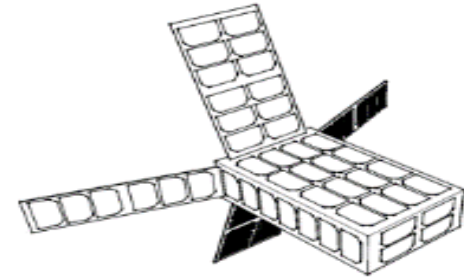




AUBURN UNIVERSITY

SMALL SATELLITE PROGRAM



Managing a Student Operated CubeSat Program

CubeSat Developers Workshop 2017



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The Drivers

- Excitement
- Workforce preparation
- Team building





The Challenges

- Motivation
 - Skills
 - Time
- Turnover: loss of “corporate memory”





Forbes Article

What helps with:

- Higher employee engagement
- Lower turnover
- Increased performance?
- Financial incentives? NO
- *Feeling* of Ownership? YES



Ownership

- Ownership
 - This is *MY COMPANY*
 - Identify with project
- Two essential ingredients for ownership
 - Autonomy (the extent to which an employee can use their own judgments in making decisions and carrying out their work)
 - Task identity (the extent to which a job allows someone to be involved from the beginning to the end of a project)



Our Program

- Research & development of small satellites
 - NSF funded TRYAD project
 - Lifetime: 4 years including one year of OPS in space
- Workforce development program:
 - About 50 students during academic year
 - About 10 students working full time in summer



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HOW AUSSP OPERATES

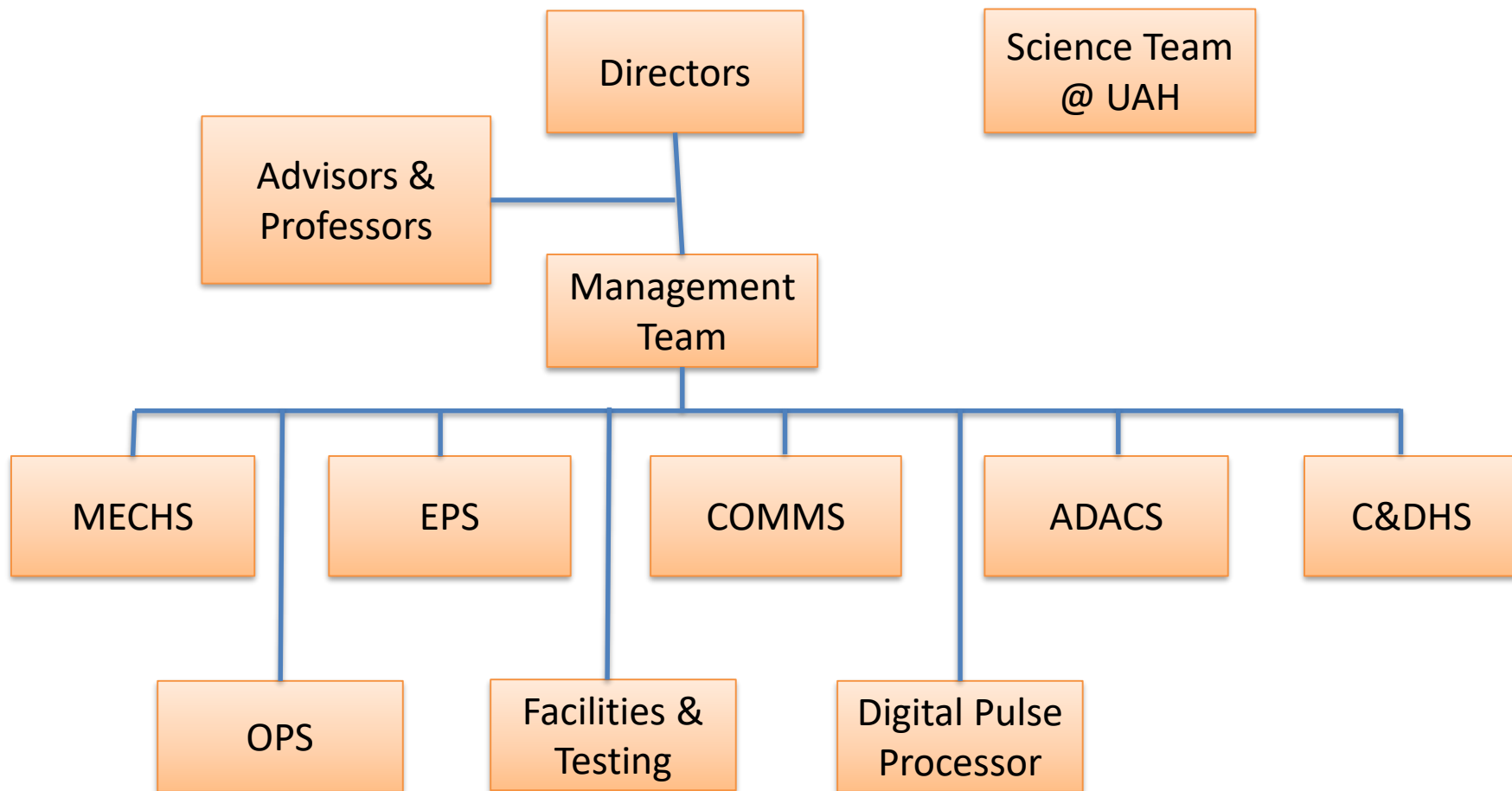


Organization

- Directors set the goals and the MO
- Students operate the program
 - Management Team
 - Technical Teams
- Faculty mentors help guide and support the work of the students

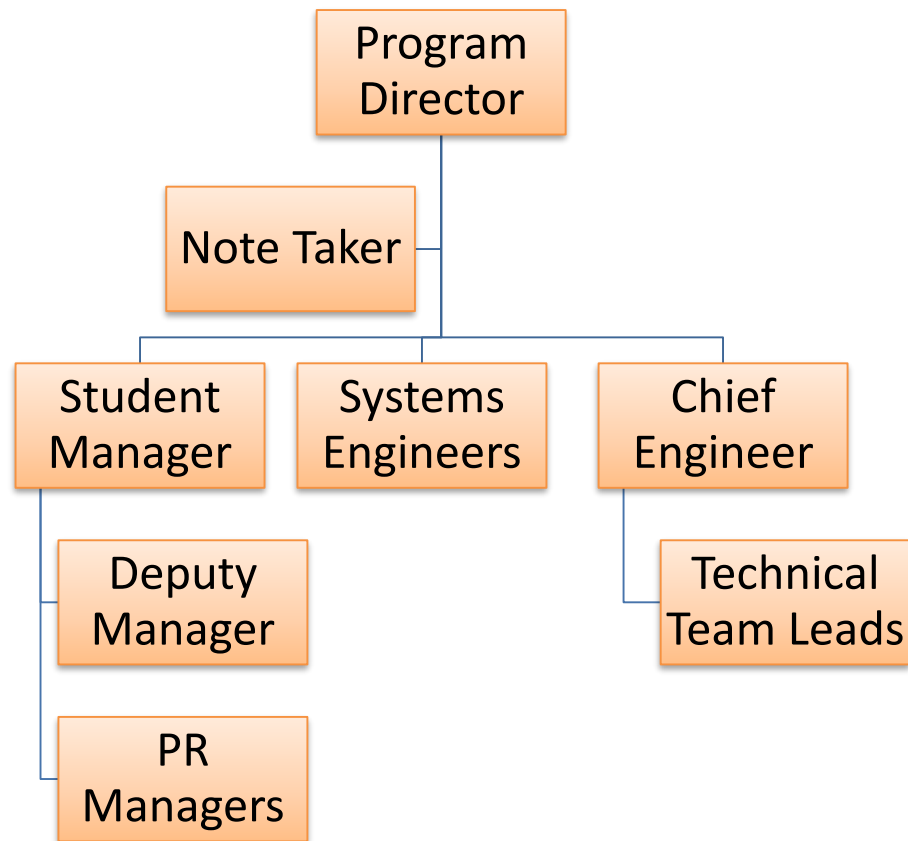


TRYAD: how are we organized?





Management Team





What We Manage

- Emphasize good management
 - Project Management Plan (PMP)
 - Systems Engineering Management Plan (SEMP)
- Our managers take ownership and are proud to run the program
- What we manage:
 - Scope of work
 - Schedule
 - Personnel
 - Performance
 - Risk
 - Budget

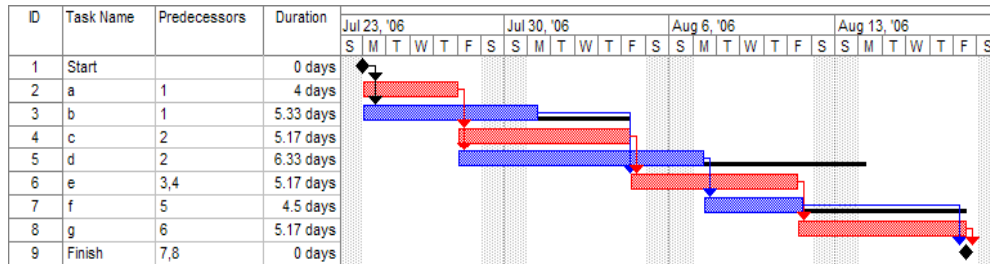


Modus Operandi

- Define SMART goals for semester for each team: director with managers and team leads
- Establish high level Gantt chart for semester with milestones
- Operate cyclically on weekly level:
 - Define a weekly Sprint for each team.at Sunday meetings
 - Results provided in a weekly status report COB Fridays
- Decisions:
 - No decisions in a vacuum: all tech decisions made as a full team
 - Importance of constant communication: weekly all hands meetings
- Importance of documentation
 - Configuration management



Management Tools



High level Gantt chart

- **Weekly status reports**
 - What was due
 - What was done
 - Issues encountered
 - What is due next week

Meeting Agendas
Meeting Minutes
Logs: Action Items
and Decisions



Systems Engineering

- Follow the NASA SE Handbook (2007)
 - Emphasize requirements and their verification

Risk Rating = Likelihood x Severity

S e v e r i t y	Catastrophic	5	5	10	15	20	25
	Significant	4	4	8	12	16	20
	Moderate	3	3	6	9	12	15
	Low	2	2	4	6	8	10
	Negligible	1	1	2	3	4	5
				1	2	3	4
			Improbable	Remote	Occasional	Probable	Frequent
			Likelihood				

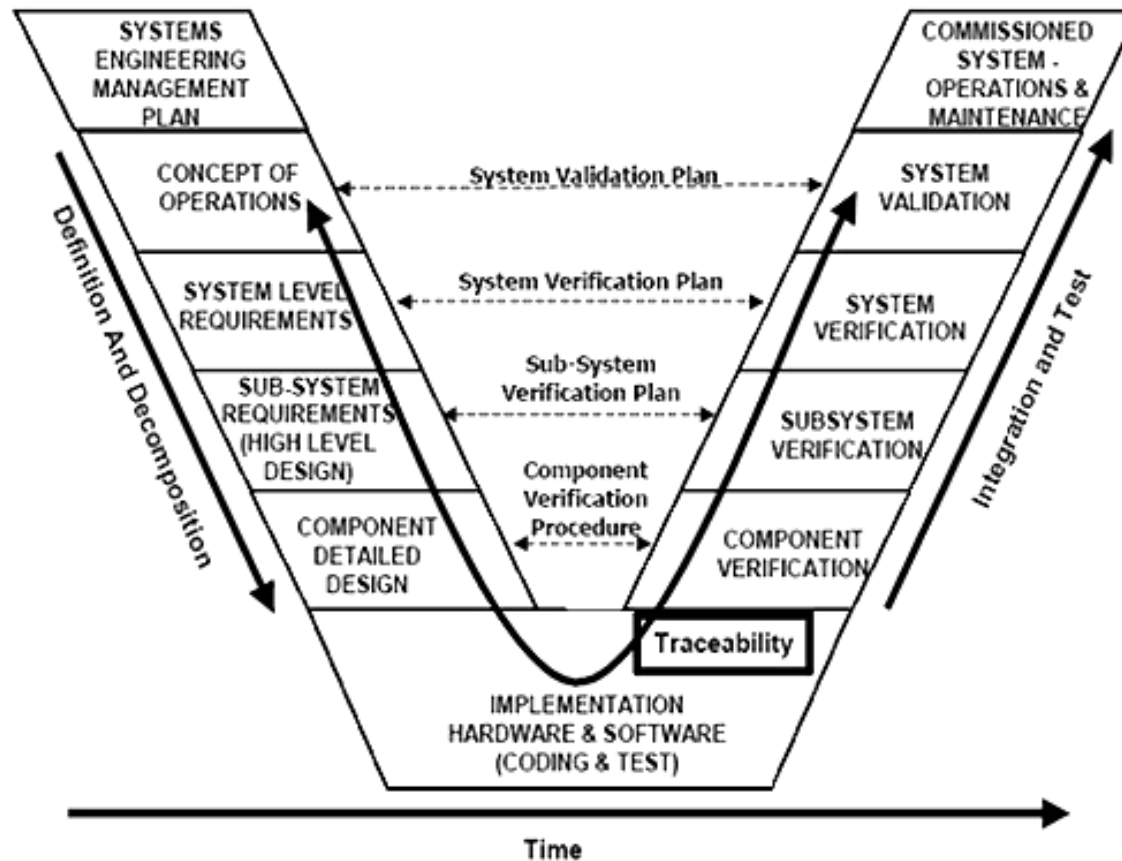
Catastrophic	STOP
Unacceptable	URGENT ACTION
Undesirable	ACTION
Acceptable	MONITOR
Desirable	NO ACTION

CHANGE

DATA CHANGER
Data Configuration Management



Vee-Diagram





Meetings

- Management team meets Sunday for 2 hours
- Team leads meet Sunday for 90 minutes with management team
- Team leads meet with their members in the lab weekly to get work done
- All hands meeting for 1 hour in an Engaged Active Student Learning room



Program Leads

- Team leads have great latitude in running their teams
 - Train new students
 - Groom next team lead
 - Distribute work
 - Responsible for progress and work quality
 - Report to Chief Engineer
 - Each team has a deputy team lead
- Chief Engineer
 - Chief Engineer reports to manager
- Program Director works weekly with full management team in collegial atmosphere



Conclusion

- Define and follow a PROCESS
- OWNERSHIP

The planning cycle

