Managing a Student Operated CubeSat Program

CubeSat Developers Workshop 2017
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
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?

- Directors
  - Advisors & Professors
  - Management Team
    - MECHS
    - EPS
    - COMMS
      - Facilities & Testing
      - Digital Pulse Processor
    - ADACS
    - C&DHS
  - Science Team @ UAH
  - OPS
Management Team

- Program Director
  - Note Taker
    - Student Manager
    - Systems Engineers
    - Deputy Manager
    - PR Managers
  - Chief Engineer
    - Technical Team Leads

Auburn University
Small Satellite Program
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**

- 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

  - Emphasize requirements and their verification

Risk Rating = Likelihood x Severity

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Likelihood: Improbable, Remote, Occasional, Probable, Frequent

Colors:
- Catastrophic: Red
- Unacceptable: Orange
- Undesirable: Yellow
- Acceptable: Green
- Desirable: Blue

Actions:
- STOP
- URGENT ACTION
- ACTION
- MONITOR
- NO ACTION
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