How do we define what we do?

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CubeSat key Characteristics

- SMALL
- LOW COST
- COTS PARTS
- HIGHLY INTEGRATED
- MANY LAUNCHES
- FAST SCHEDULE
- RISK TOLERANT

- Not Independent Characteristics
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Revolution or Evolution?

• Evolution: Smaller Spacecraft
• Revolution: New Way of Doing Space
  — Higher Risk Tolerance
  — More Flexible Launches
  — Higher Numbers
  — Lower Cost / Complexity
  — Standardization
  — COTS Electronics
• This is not a new thing
  – Surrey, AmSat, Shuttle Gas Can, . . .

• CubeSat took it too new level
  – Standardization
  – Worldwide Interest
  – Electronics Revolution
  – Very High Performance/cost ratio
Problem:

• How do we describe this “new way” of doing space?

Popular definition:

Small Spacecraft
Problem:

• How do we describe this “new way” of doing space?

Popular definition:

Small Spacecraft

– No Philosophical Approach
– Leads to Confusion
Easy Definition at the Extremes

- BIG
Easy Definition at the Extremes

- BIG
Easy Definition at the Extremes

- Small
Easy Definition at the Extremes

- Small
Harder to Define in Between
Match/Exceed Performance with Lower Mass

- Higher risk posture
- Use of High performance COTS components
- Constellations/Swarms

Interesting Area
Realization

• Size is not the key defining factor
• Key factor is development philosophy
  – Need new definition

Proposals:

*New Space*

*Agile Space*

*Lean Space*
Widely Used Lean Concept

- Lean Manufacturing, Lean Management, Lean Enterprise, Lean s/w Development, . . .
- Lean Concepts:
  - Eliminate Waste
  - Increase Efficiency
  - Maximize Value
  - Reduce Cost
- Fits well with our approach
Next Step:
Better Define *our* Philosophy

- Involve Global Community
  - Mostly Small Sat Groups
  - Academic, Industry and Gov.
- Develop Specific Processes
  - IAA Study Group
  - ISO Small Sat testing Standard
Conclusions

• CubeSat community demonstrated new philosophy for space development
  – More important than size
• Small Spacecraft is not a good way to define our approach
• Need new terms to describe Development Philosophy
  – Lean?
Thank You

Questions?