

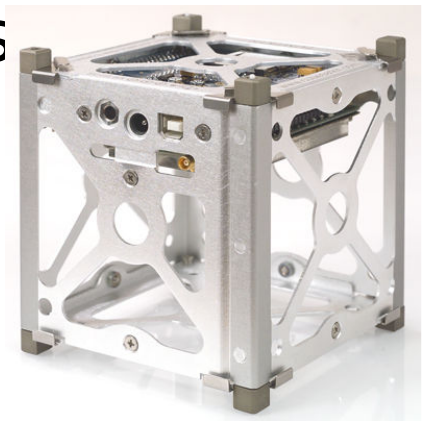
Study of the Small:

POTENTIAL FOR OPERATIONAL MILITARY USE OF CUBESATS



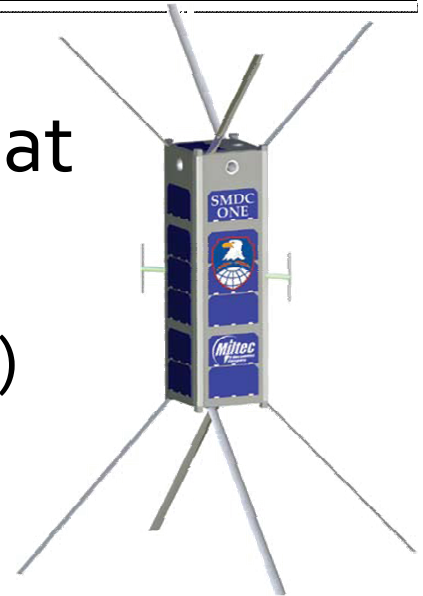
Overview

- Growing military interest in CubeSats
- CubeSat Development Partners
- Meeting Military Mission Areas
 - Space Situational Awareness (SSA)
 - Intelligence, Surveillance, Reconnaissance (ISR)
 - Communications (COMM)
 - Offensive & Defensive Counterspace Operations (OCS) (DCS)
- Future CubeSat Capabilities of Value to DoD



Growing Military Interest

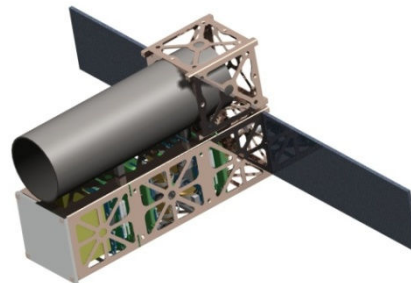
- Increase in Military Sponsored CubeSat Initiatives
 - Space Experiments Review Board (SERB) Experiments
 - CubeSat Specific Programs
 - CubeSat Technology Development



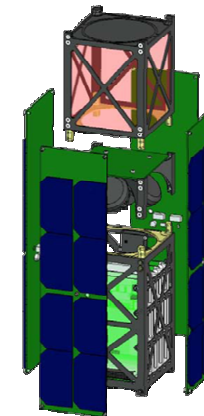
SMDC-ONE



NRO COLONY I



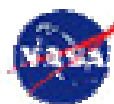
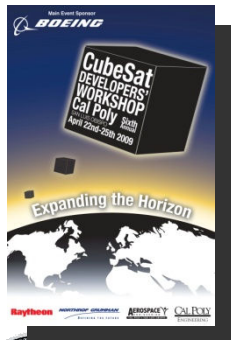
NPS-TINYSCOPE
(SERB)



SDL PEARL
BUS &
REACTION
WHEELS

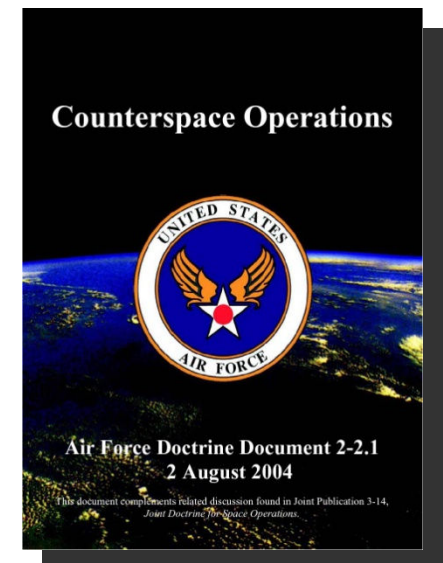
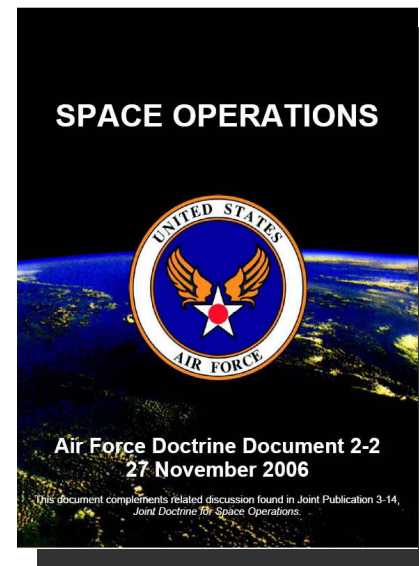
CubeSat Development Partners

- DoD: NRO, AFRL, SMC/XR, Navy, Army, Academies (USAFA, NPS, USNA)
- DoE: Los Alamos National Labs, Sandia National Labs
- NASA: ARC, KSC, MSFC
- Other: NSF, Boeing, COSMIAC, SDL, Universities



Meeting Military Mission Areas

- AFDD 2-2: Space Operations
- AFDD 2-2.1: Counterspace Operations
 - SSA
 - ISR
 - SEM
 - DCS
 - OCS



Future Capabilities of Value

- Accurate 3 Axis Pointing
- Propulsion
- Proximity Operations
- 20 Watt + On Orbit Average Power
- Crosslink Communications
- Multispectral Imaging
- Hardware Encryption
- Software Reconfigurable Radios
- Dedicated Ground Network
- Dedicated Small Launch