

Space and Missile Systems Center



MONA Framework for Leading Change: The Small Satellite Paradigm

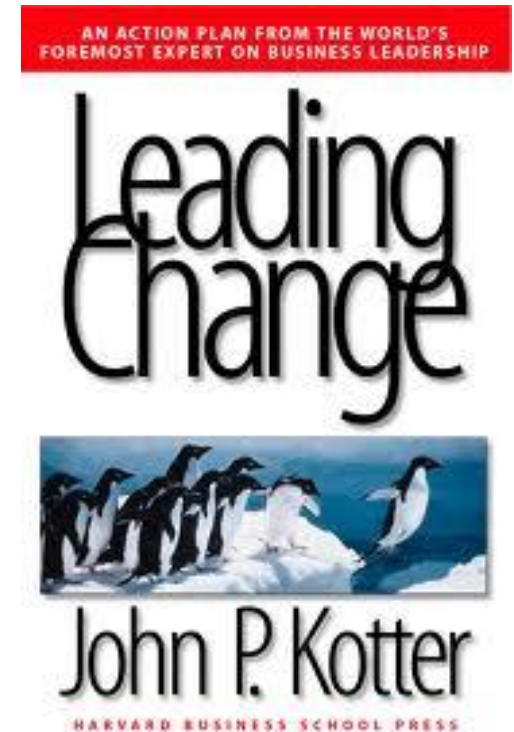
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Leading Change

- Establish a Sense of Urgency
- Developing a Vision and Strategy
- Create the Guiding Coalition
- Communicating the Change Vision
- Empowering Broad Based Action
- Generating Short Term Wins
- Consolidating Gains and Producing more Change
- Anchoring New Approaches in the Culture



Establish Sense of Urgency

USAF Chief Scientist

Development is drawn out, creates expensive programs

Tightly integrated, one-of a kind systems further expensive to upgrade

Poor ability to integrate different platforms and systems developed over time

Low Technical Agility/Resilience

Policy and LAW

DoDI 5000.02: "Operation of the Defense Acquisition System"

DoDD 8320.02: "Data Sharing in a Net-Centric DoD"

CJCSI 6212.01F: "Net Ready KPPs"

WSARA 2009

Better Buying Power 2.0 Release (2013) OSD

GAO

GAO Report: Assessments of Selected Weapons Programs, Mar 2007

GAO Testimony Before US Senate Subcommittee : Space Acquisitions , March 2008 (SBIRS)

GAO Report: 09-326SP Defense Acquisitions Assessments of Selected Weapons Programs

GAO Report 10-477T DoD Persistent Challenges Remain in Developing Space Systems

GAO Report 13-651: Defense Acquisitions: "DOD Efforts to Adopt Open Systems..."

**The acquisition community has failed at delivering projects that meet cost, schedule and performance baselines:
Acquisitions of Major Systems Must Change**

Developing a Vision and Strategy



- MONA Vision: M->O->N Progression
 - Leverage Existing Investments in physical/electro mechanical **M**odularity
 - Grow **O**peness through carefully chosen interfaces and subsequent standards
 - Transition natl investments in **N**etworked/IT systems for more rapid modernization
- “Step-In/Step Out” Strategy
 - Adopt and Tailor rather than re-invent
 - Join the consensus building and where appropriate nudge the process
 - Get onto the leading edge with DoD Architectural Concepts and Needs
 - Coordinate and Consult with Industry
 - Monitor Market Progress including civil, commercial and international
 - Then government “step out” and let industry “run with it”. Industry shall:
 - Develop and Maintain the Standards
 - Develop and Provide the Enabling Components
 - Develop and Provide the service to confirm MONA components adhere to stds

Create the Guiding Coalition

- Government Investments brought down the bulk of the NRE:
 - AFRL SPA/MONARCH (2004... ~\$130M)
 - ORSO's MSV (2006...~\$50M)
 - DARPA F6 (2007... ~\$ 70M)
- Natl Security Space coordination and collaboration through SUMO
 - Leveraging ~\$2M in business case/ROI, architecting , standards
 - Business cases close with margin
- Industry working/steering groups
 - In formulation stage
- Professional societies for standards development and training
 - Working with AIAA and NASA CII approaches/strategy

Pulling together a group with enough power to lead change and getting them to work as a team

Communicating the Change Vision



- Workshops/Conferences/Associations
 - MONA/SNAP Workshops
 - AIAA SPACE 2014
 - Architecting Conferences (Ground Systems Architecture Workshops....)
 - Natl Defense Industry Association
- “Role Models”
 - ORS MSV
 - HPO HPIU
 - UAV/UAS/RPA /FLEX (Air and Munitions)
 - Possible Space Test Program option with SIV (modular developmental test)

Empowering Broad Based Action

Physical Modularity

- Expandable
- Add future capability

Open

- License free standard
- Full insight into workings
- Improves interchangeability



Software Modularity

- Hardware independent
- Adapts to changes with electronic ICDs
- Standard interfaces
- Fully reusable modules
- Software applications support different missions & payloads

Networked

- Decouples software from physical location
- Packetized (easy translation)
- Enables security auditing
- MLS Foundation

**Encourage Ideas, Activities and Actions
and Lower Barrier to Entry Across these 4 Fronts**

Generating Short Term Wins



- MSV: Validating viability of MONA bus architectures for DoD space applications (ORS Program)
- F6: Validating MONA for inter-platform and payload interface applications (DARPA Program)
- SUMO: Validating business case for MONA and establishing a transition process (ODNI and Aerospace Corp Program)
- SNAP: Developing a MONA payload interface proof-of-concept demonstration (SMC XR with SDL Program)
- SUMO (Space Universal MOdular Standards) Industry Day in conjunction with National Space Symposium April 9-11

Consolidating the Gains and Producing more Change

MONA Gains

Technology for MONA is becoming available—Boeing Phantom Phoenix and NG Eagle M

Government has ability to incentivize or influence MONA—creating a new market

Industry is beginning to see cost savings and competitive advantages emerging with a MONA or similar approach

MONA approach enables reduced timelines and costs savings

- **Encryption/Information Assurance solutions**
 - F6 residuals: MLS development
 - AFRL R&D and SBIRs
 - Potential SMC/XR-HPO SNAP follow-on effort
- **Power management/control**
- **Develop additional enabling components called out in SUMO**
- **Standards development for Key Interfaces**
 - Government Incentivized
 - Industry Developed
- **Provide Training Through Professional Societies/Open Forum**

Developing the People with Additional Projects

Anchoring New Approaches in the Culture: The Small Satellite Contribution



- Continue MONA socialization
 - Small satellite builders join and influence CSIS
 - Lead the data and software architecture standards development
 - Attack the 4 Fronts
- Continue technology infusion
 - Consciously scale the effort for larger applications
 - Be at the forefront of tech demos, flight demos
 - Become the leader in developing the APPS layer
 - Broad collaboration of the small satellite form factor teams with: SMC/XR, HPO, ORSO, AFRL, DARPA, NRO, NASA, Industry
- Target operational on-ramps
 - Flight technology demonstrations/validations 2017+
 - Space environment monitoring
 - Space Situation Awareness Infrastructure
- Gives industry ample time to prepare to compete

Questions?



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