



Section 10. Summary

- **Counterproductive Approaches to System Acquisition**
- **Summary — Maintaining Balance and Perspective**



**IF ORGANIZATIONS ARE SUCCESSFUL,
LET'S ENCOURAGE THEM**

- **If we really want to reduce cost, we should ensure that those organizations that have been successful in doing so have the opportunity to continue**

A litmus test for any new approach, regulation, or policy intended to reduce cost should be: Would it encourage or discourage participation by groups such as NRL, Aero-Astro, U. of Surrey, the JPL Pluto team, or AMSAT?

- **Approaches which fail this test run the risk of institutionalizing potentially less efficient processes and cutting out those organizations that have been most aggressive and successful in reducing cost**
- **Example: cost-sharing (or risk-sharing) as a means of reducing cost**
 - **Creative, low-cost organizations rarely have excess internal funds to carry additional burden or risk — implies they can not share in program cost**
 - **Organizations that are willing to cost-share typically plan to recover that cost plus any prior cost-sharing activity not ultimately funded plus additional return due to cost-sharing risk**
- **Implies that we can construct a list of potentially counterproductive “cost-cutting” approaches that have a high potential of increasing, rather than decreasing cost**



POTENTIALLY COUNTERPRODUCTIVE APPROACHES TO REDUCING SPACE COST

Approach	Potential Benefit	Negative Impact
1. Consolidated, Centralized Acquisition for Multiple Programs	Provides greater accountability; gives appearance of reducing waste	Restricts competition; likely to force out small organizations and innovative approaches; likely to institutionalize the high cost approaches
2. Contractor Sharing of Development Costs	Reduces cost to the government if the major customer base is the private sector (e.g., personal computer development)	Forces out the small player; acquisition will be driven by investment economics — will require very large ROI, since the government is a high-risk customer
3. Contractor Cost Sharing in Up-Front Studies	Reduces study cost	Forces out the small, innovative contractor; contractor costs will be recovered in higher indirect rates
4. Cost Guarantee on R&D Programs	Limits government cost commitment; good for achieving accountability, but not cost reduction	Forces out the small contractor and doesn't permit taking risks that could dramatically reduce cost
5. Doing Work In-House	Eliminates subcontracting cost; can be effective if the group has experience with low-cost efficient production	May drive up costs due to lack of efficiency and knowledge; may be largely an excuse to maintain a large infrastructure
6. Reducing the Amount of Up-Front Systems Engineering	Shortens program schedule and avoids over — engineering a strawman design	Ignorance is rarely of value in reducing cost or improving performance; principal problem is not adequately addressing alternatives

- **While these are simple top level procedures, they are also important first steps to getting a full-scale cost reduction program underway**



SUMMARY —
(1) KEEPING BALANCE AND PERSPECTIVE

- Different organizations reduce cost in different, frequently contradictory, ways
 - Some use the latest software tools and structured methodology; others create a small, strong team and proceed promptly with the design
 - Some do the work in-house; others subcontract to efficient organizations
- There is no single right answer for all missions or right policy to ensure that we can both reduce cost and increase quality
 - We need to look for solutions that work within the environment and constraints of each individual program
- There are three key ingredients to dramatic cost reduction:
 - State **what** you want to achieve and not **how** it is to be achieved
 - “Wanted: low-cost, high-reliability transportation to LEO” will be far more effective than “Development needed for light-weight turbo-pump technology”
 - Allow and incentivize innovative, creative individuals and organizations to find ways to reduce cost and enhance performance
 - Keep the trade space open and look seriously at alternatives

**Dramatic cost reduction is possible, but rarely easy.
It means truly changing the way we do business in space.**



SUMMARY —
(2) DRAMATIC COST REDUCTION IS POSSIBLE

- Dramatic cost reduction is possible for virtually all types of missions, all mission aspects, and all categories of sponsoring organizations
 - Spacecraft, launch, ground segment, and operations
 - Science, communications, military, test, and observation system
 - Government, commercial, and academic programs
- The reliability of the small, low-cost satellites is comparable to or better than that of the traditional high-cost approaches
- Even modest application of cost reduction methodologies should be able to reduce cost by several billion \$ per year; far greater savings are possible
- Key requirements:
 - Learn from what others have done
 - Encourage innovative people & groups that can think and perform “low-cost”
- The *Reducing Space Mission Cost* book is a start, but much more needs to be done
 - We still don't have enough knowledge about **how** organizations reduce cost

The goal of the *Reducing Space Mission Cost* book project is to create the initial recipe for dramatic cost reduction.

We need your input, feedback, wisdom, and perception.