



Complexity Management

By Tom Burbage

Complexity Management as an emerging body of knowledge, continues to be a “New Frontier” in terms of understanding and managing the full effects of complexity. There is a sense that these programs may require new skill sets and often do not respond to traditional program management tools, processes and techniques, no matter how charismatic the leadership team may be. There is a growing recognition of the impact of complexity as a management challenge as complex ventures rarely achieve the performance expectations established in original plans. Manifestation of risk associated with complex programs is often non-traditional and the second and third order effects pose a new set of challenges for Program Managers. As Will Rogers once said-“it ain’t what you don’t know that hurts you, it’s what you do know that ain’t so”.

“Complexity” as a new descriptive term can be characterized by a few fairly well defined criteria.

- First is the number of masters (or actors) a program is expected to respond to. Some call these stakeholders and there are varying impact levels across this community.
- Second is the “non linearity” of critical effects among elements of the program. In a program like F-35, some may be technical, some may be programmatic, and some may be political. Non-linear in this context means that very small disturbances produce disproportionately large effects that are irreversible and not repeatable. Complex programs defy reductionism and principles of superposition. We cannot break a problem down into sub-elements because the complexity of interactions and non-linearities means that only the integrated whole is meaningful.

This may be the key discriminator between “complicated programs” and “complex programs”. A complicated program can normally be broken into discrete pieces which have linear relationships and are responsive to traditional management techniques. A complex program does not.

- The third major attribute of a complex project is the presence of social / political factors that are inherently within and must be accommodated internally to the program. These factors are completely independent from any logical systems engineering management techniques. An F-35 example of this is the impact of Congressional and Parliamentary processes that adjust program parameters annually. In aggregate, the combined effect of this activity is unpredictable and

non-linear. It often creates very difficult secondary effects on supply chain dynamics, program execution, and stakeholder trust and confidence.

So what does all this mean? It means we are entering a new frontier for developing effective techniques and competencies in program management. Traditional tools and processes are now often only marginally effective.

Zealots who believe a single management focus is king need to heed Will Roger's warning above. What now dominates our thinking is much more strategic in nature.

How do we rapidly adapt program focus and responsibilities to a changing environment?

How do we implement transparent communications across critical boundaries?

How do we promote trust among major stakeholders when we have so many critical resources tied up?

How do we turn a diverse global community into a multi-site, globally connected high performance team that exhibits neural network behavior free of hierarchical constraints?

How do we lead turn challenges that we know are coming but have no legacy answers to fall back on?

Perhaps most challenging, how do we overcome the inertia in bureaucratic processes designed for a much less complex world than the one we now find ourselves in?

Programs like F-35 are truly pathfinders in this New World Order. There's never been a better time for creative thinking than now.