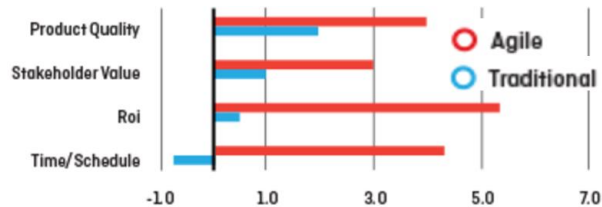




## Earned Capabilities Management

### I. Agile Governance Challenge: Managing Uncertainty Doesn't Eliminate Uncertainty

Agile offers many benefits to organizations for software portfolio management. The greatest benefit is the increase in project success rates. Projects that leverage hybrid or scrum-agile processes are successful more often, and deliver much higher value to business stakeholders. Ambysoft's 2013 survey data from 173 respondents across industries showed that Agile was successful 64% of the time, while Traditional project management was only 49% successful. Even more impressive was the difference in project value, as shown here based on respondents ranking methods from -10 to 10 (image source: <http://clearcode.cc/2014/12/agile-vs-waterfall-method/>).



Agile accomplishes this by enabling projects to learn and adapt scope to achieve the higher-level vision for the project. Often the best solution cannot be pre-determined without building, testing, and rebuilding the software. This allows for exploration of technical solutions, but more importantly it engages users with working software to validate scope. Learning what actually works and is needed for business users is far more crucial than the learning that comes from technical exploration of a problem space – **since the best built software is valueless if no one uses it**. However, by being both incremental and iterative, Agile provides a structure to test both technical solution feasibility and end user adoption.

While these benefits are great for project execution, Agile introduces a significant challenge in knowing what scope or actual software will be delivered. Even more so, how does one know that the project is being efficient in spending and delivering value to the organization?

Traditional project management uses earned value management (EVM) to track scope using integrated master schedules, comparing estimates and actuals. This works when the scope does not change often or quickly. With scope certainty, project baselines remain constant long enough for tracking variance and identifying potential issues when they are small and manageable. However, even these measurements are only as useful as the accuracy of the estimates and the reported project progress. And in all cases, EVM does not measure the impact of the project deliverables to the business, but instead reports the percentage of baselined scope completed. Just as Agile fails to track efficiency, there is no mechanism in EVM to validate if the project deliverables will be useful to the end users.

Summary of the Agile Governance Challenge:

- Agile is a better way to deliver software projects with high uncertainty
- Agile appears to fix schedule (timeboxes) and budget (whole teams), while varying scope (features)
- Agile currently offers no meaningful way to track efficiency or effectiveness
- Traditional project management estimates project efficiency with EVM, but cannot verify it
- Traditional project management fails to validate that scope delivered is valuable to end users

***No popular methods exist to effectively track projects in terms of the return on investment (dollars earned per dollar spent) for projects with high levels of uncertainty.***

## II. **Earned Capabilities Management: A Simple Solution for Controlling Value**

The heart of the Agile Governance Challenge is the lack of connection between project management and a project's purpose: to deliver benefits to the organization. Every project's goal is not the completion of scope, but to improve the organization. This is true whether the project is to increase the skill of the employees, install new IT systems for efficiency, or add a new business line that delivers novel services. The project itself is purely the cost, but the new capabilities delivered by the project add value to the organization.

*Capability – an ability to perform work of a certain quality, capacity, and efficiency*

Only the delivery of *needed capabilities at a reasonable cost* should be considered value when tracking and managing a project. Value can be redefined then as a return on investment, or "ROI." Using this ROI metric, leaders can make strategic decisions on initiating, continuing, changing, intervening, or stopping projects at a portfolio level.

To determine the ROI of capabilities delivered by projects within a portfolio, an organization must perform the following:

- 1) *Set Objectives* – Establish value in fungible terms (e.g. money or units) for business processes
- 2) *Baseline Original Performance* – Measure initial business process costs and throughputs
- 3) *Measure Performance with Capability* – Determine new business process costs and throughputs

For each capability delivered, the *Capability ROI* can be determined as the net profit to the business normalized by the cost; where net profit is the gain in performance minus the cost investment:

$$\text{Capability ROI} = \frac{(\text{New Throughput} - \text{Initial Throughput}) + (\text{Initial Cost} - \text{New Cost})}{\text{Amortized Capability Investment}}$$

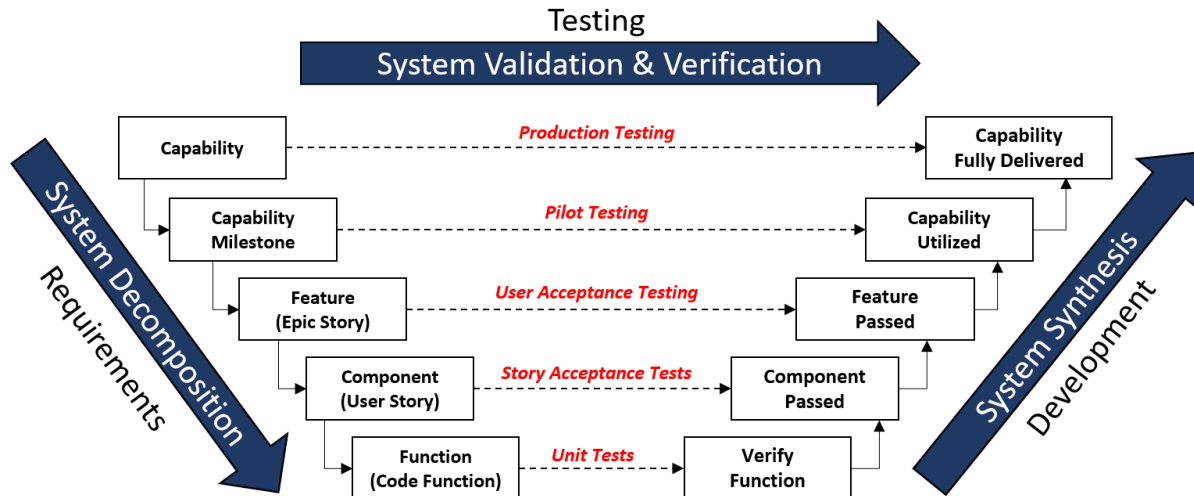
*Notes: "New Cost" includes the Amortized Capability Investment (planning, development, O&M) as well as the total resources needed to operate the business with the new capability installed. This ensures the topline is net profit, or gains (higher throughputs and lower costs) minus the investment. All values should be amortized (e.g. annual) to normalize across differences in economic life and rates of return. Reference: <http://www.investopedia.com/terms/r/returnoninvestment.asp>.*

**Agile offers a unique ability to validate and verify the Capability ROI equation during execution.** By delivering early versions of working software, leadership can continuously learn the following answers:

- Is this software useful? If not, will it be? Why?
- Will this lower our costs? If not, can we afford it?
- Will this increase our throughput (or at least capacity for now)? What are the constraints?
- Does this new system have a positive ROI now? Will it in the future?
- What are the barriers to success on this project? Can they be removed?

Answering these questions provides leadership the information needed to decide whether to exercise the next option year of investment or stop the project and recover the remaining funds.

**Addressing Long Release Trains.** For long release cycles, Agile projects should use the V-Model of product verification and validation (V&V). This process requires that each capability in the project is defined by what tests will be used to measure performance with the capability at every build level. The V-Model aligns with Agile's extreme programming (XP) roots with test-driven development, where every function has a test defined prior to development that must be passed before it's considered "done:"



***The V-Model offers an on-demand method for starting and tracking the completion of capability, while not requiring a complete and integrated master plan.*** During project initiation or early planning, each capability should be decomposed into planned milestones based on business, technical, and testing dependencies. Then the Agile team can select an available capability milestone to begin work on. The team must decompose the work by describing at minimum the Epics and User Stories that are “must-have” requirements to deliver the capability. Tests are defined at each level before work begins, and when work is complete testing is performed by the appropriate stakeholders (Dev Team, IV&V, and/or End Users) bottom-up.

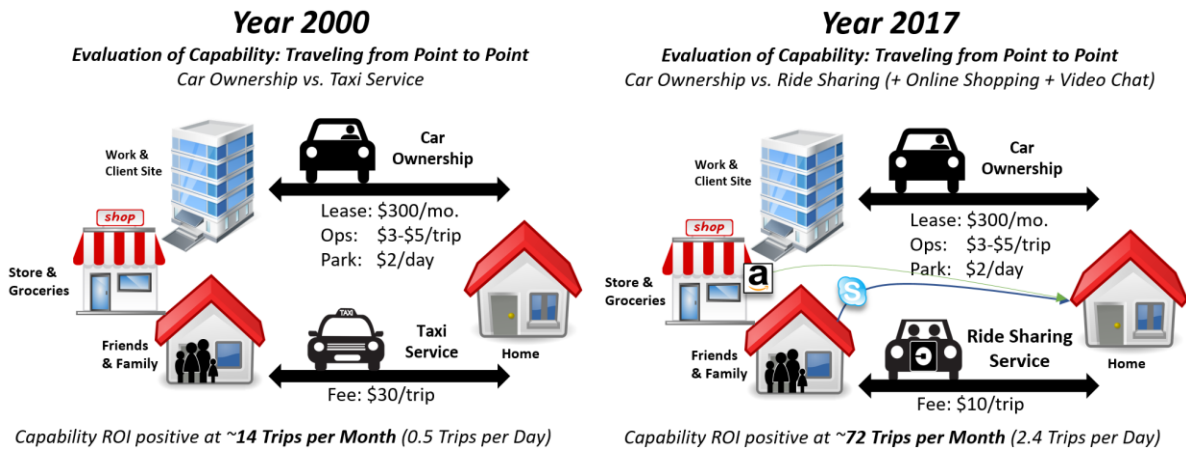
Before any new Capability is started there must be a business case for beginning development. This includes setting the objective function and baselining the performance of the business. Based upon expected capability improvements and the planned must-have Epics and User Stories, the Capability ROI can be estimated and managed during development prior to end user validation (Pilot and Production Testing).

These approaches constitute a new process, called ‘Earned Capabilities Management.’ At a project level, it is a radical change from “Earned Value Management” used to track and manage large procurements. Instead of actively managing proposed cost against actual cost (both budget and schedule), the new controlling function is to manage the ROI of a project. The focus becomes on delivering timely capabilities that are the true “value” a project provides an organization.

***Earned Capabilities Management focuses leadership’s attention on changes in a project’s timely delivery of capabilities with positive ROI, independent of a project’s original scope.***

### **III. Example of Timing Impacts on Capability ROI: Buying a Car in the Age of Uber**

Consider a car as a personal example of this separation of cost and value. It costs money and time to buy, drive, store, and maintain a car. However, for years it has been worth the costs to have the capability to transport oneself from point-to-point quickly. Going to work, picking up groceries, and seeing family all required this capability. However, today those same activities can be delivered by Uber (ride sharing), Amazon.com (online shopping), and Skype (video chat). Many more people are going “carless” today as the activities are completed in new ways as services, while being much cheaper.



Does this change the value of the car? If someone employs these new alternative services, then yes it does change how much value the car can provide that person. This is because the car provides little to no additionally *needed capability*. **The marginal gain of a car became less than the marginal cost**, and the Capability ROI becomes zero or even negative.

*Summary:* The ROI of a capability is always changing as the business process changes. As discussed when defining the Agile Governance Challenge, if no one uses the best built software then the software is useless. Or building on our car example in this section, a project started in the year 2000 to build and sell a better car to millennials in the year 2020 may just waste resources because of ride sharing (e.g. Uber). However, if that car is delivered with half the performance improvements by 2005 then it will provide great value even without meeting all desired specifications.

***Earned Capabilities Management emphasizes fast delivery of capabilities while they are still useful to the enterprise to ensure positive Capability ROI.***

#### **IV. Example of Scope and Capability Independence:** *Lighting Projects in Modern Facilities*

Take for example a project to reduce energy costs of facility lighting as an example of scope and capability independence. The original project scope is to replace old incandescent bulbs with light emitting diodes (LEDs) that last twenty years and consume a fraction of the energy. The result is the same light level (if properly designed), and the project takes time, money, and management focus to execute. On the day of completion, the project has used resources of the organization and is now over with no immediate benefit to the organization *except* that the organization now has a new capability of “economical lighting.” After about six months to a year, the total cost and time savings of installing the “economic lighting” capability (LEDs) are earned back when baselined against the “original lighting” capability (incandescent bulbs). The remaining 19 years before replacement are pure net profits.

The light replacement example is a simple means of showing how even the most agreeable projects are pure cost until the new capabilities (economical lighting) are delivered. This new capability adds value to the organization when compared to the baseline of doing nothing to change the organization. Based on these *marginal gains* and the *amortized project cost* (installation, operations, and maintenance) the project is either beneficial or not.

However, here are three alternative scenarios that illustrate achieving the same objective capability, “economic lighting,” but with real-world adjustments to scope:

*Cheaper Alternative:* Small halogens or compact fluorescent lightbulbs (CFLs) could be cheaper, given the right market conditions, and offer the same economic benefits as LEDs. LED shortages have spiked prices before, and there is no shortage of analogies to other re-world sourcing scenarios (steel, oil, people, etc.). Here, the project team uses the best available resources to complete the project.

*Competing Objectives:* What if in some areas LEDs are installed and in other areas with poor lighting conditions halogens are used (because halogens are brighter)? Making many employees who earn hundreds of thousands of dollars more productive must be worth the extra costs of using a different light fixture. Here, the project team knows the constraints are to ensure proper lighting to employees which maximizes the ROI of the project, by reducing negative impacts to business process throughput.

*Novel Solutions:* What if, upon inspection, it was clear the whole organization was working in facilities with twice the lighting needed, and the goal was to reduce light energy consumption in half? “De-lamping” (removing bulbs) could be done by one person per building and the goal could probably be met in a day or two. The organization would even gain piles of bulbs ready for spot replacements. Once achieved the organization could choose whether to replace the remaining lights with LEDs. Here the project team keeps the goal in mind, and learns quickly by doing (a significant benefit of Agile).

In all scenarios, the capability “economic lighting” is delivered. In the first case, a change is made due to resourcing uncertainty (CFLs being cheaper than LEDs in lifecycle cost). In the second case, scope is adjusted due to higher priority goals (employee productivity is higher priority over energy savings). In the third case, a completely novel and cheaper solution is identified that can be completed quickly at a fraction of the cost.

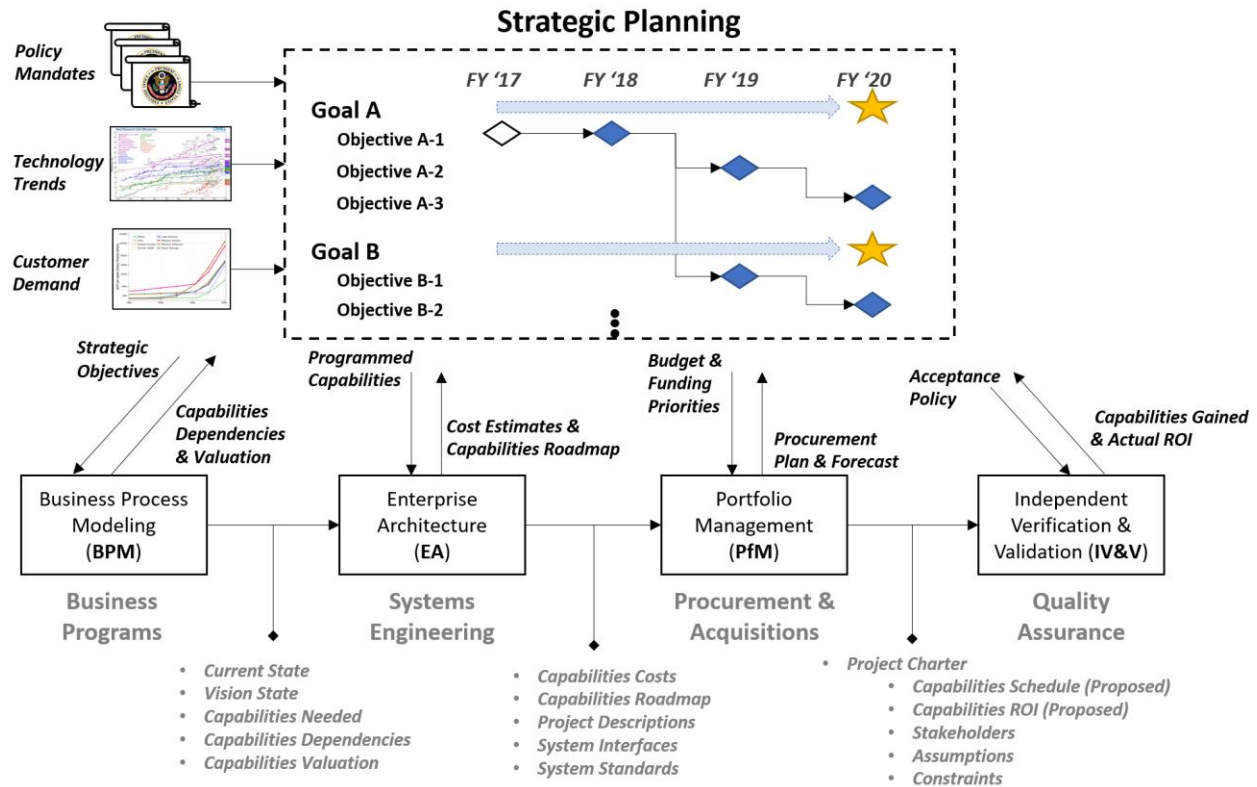
Summary: Capabilities can be delivered in many ways, meaning that scope does not constitute capability. However, the Capability ROI is sensitive to the final scope delivered, just as shown in the three alternative solutions to the LED project (CFLs, Halogens, and de-lamping). The decisions to achieve the Capability and maximize the Capability ROI is almost always best left to the project teams with ground-level knowledge. However, management should track and intervene when large, negative changes are proposed or when scope deviates from the project constraints and standards needed for enterprise integration.

***Earned Capabilities Management encourages rethinking the original scope to deliver cheaper alternatives, adjust for competing objectives, and discover novel solutions.***

## ***V. Enterprise Capabilities Management: Controlling the Capability Lifecycle***

Agile and Earned Capabilities Management alone doesn’t plan and manage capabilities across the organization. To manage projects effectively together, organizations should use “Enterprise Capabilities Management,” which consists of:

- 1) *Strategic Planning* – elaborates mission and vision as goals with a series of strategic objectives
- 2) *Business Process Modeling (BPM)* – identifies capabilities needed to reach strategic objectives
- 3) *Enterprise Architecture (EA)* – estimates costs of capabilities and manages system interfaces
- 4) *Project Portfolio Management (PPM)* – programs and controls projects to achieve objectives
- 5) *Independent Verification & Validation (IV&V)* – provides actionable feedback to PPM processes



The five processes of Capabilities Management work together to move the organization forward with valuable (high ROI) capabilities. Each can be owned by different departments or whole business lines within the organization.

**Strategic Planning** – usually owned by the executive leadership, this process involves identifying a clear actionable path to accomplish the mission of the organization, while transforming it to become the vision at a set point in the future. Leadership evaluates the market and mandates to establish goals that elaborate the vision state. These goals are then broken down across a timeline as objectives which state the expectations of what will be needed at what time to achieve these goals. Then the objectives are iteratively assessed to determine what business capabilities are needed, the dependencies and costs of those capabilities, and finally potential projects that could deliver those capabilities. The result is a Project Roadmap that must be monitored, controlled, and updated to achieve the strategic vision.

**Business Process Modeling (BPM)** – usually owned by the business program, this process involves evaluating the critical path of work through an organization. This path of work is then assessed for pain points (places of high resource use) and gain points (where internal work can become externalized value). These pain and gain points can then provide a basis for a prioritized and phased set of capabilities needed to achieve higher levels of performance (e.g. strategic planning objectives). The outputs are a Process Model (Current & Vision State), and Needed Capabilities (Dependencies & Valuation).

**Enterprise Architecture (EA)** – usually owned by the systems engineering team, this process takes in the Process Model and Needed Capabilities, and evaluates the technical feasibility and requirements. By evaluating existing systems and available technology, the EA team can estimate costs, define interfaces, and establish required standards for managing the delivery of the Capabilities over time. This can also



involve defining new “Enabling Capabilities” needed for technical or shared requirements across business lines. The output is a Capabilities Roadmap and Cost Estimates. These outputs can be captured in a Concept of Operations (CONOPS) that includes system interfaces and standards; as well as a series of recommended Project Descriptions to deliver the capabilities.

*Portfolio Management (PfM)* – usually owned by Procurement & Acquisitions with support business programs and systems engineering, this process takes in the project descriptions, budget, and funding priorities to generate a series of funded projects. The projects are described by their Project Charter, which captures the proposed Capabilities Schedule, expected Capability ROIs at each delivery milestone, and the essential project information (Stakeholders, Assumptions, and Constraints). This level of detail sets clear expectations of what capabilities the project must deliver, to who, and when they are needed. However, it does not specify scope or “how” the project will be delivered. Any type of project management methodology can be used; from Waterfall with Stage-Gate controls and EVM, to fast Scrum-Agile with regular end user validation of earned capabilities, or even Scaled Agile Frameworks (SAFe) methods that use the V-Model for earned capability management across long release cycles (i.e. release trains).

*Independent Verification & Validation (IV&V)* – usually owned by Quality Assurance, this process takes in the Project Charter and coordinates the measurement of Capability ROI throughout the project lifecycle. Measuring Capability ROI includes testing of lower-level components (e.g. User Stories), as well as coordinating the End User Testing, Pilot Testing, and Production Testing for validation of new capabilities. To reduce the risk of low or no-ROI projects, IV&V must continue to validate the Capability is needed by the business line using simulation, automation, and performance testing.

***It is important to note that the Enterprise Capabilities Management is very similar to but much lighter than the government’s planning, programming, budgeting, and execution processes (PPBE).*** This is because the same principles apply in terms of focusing long-range business planning on the future needs, while adding detail and cost trade-off considerations at the programming and budgeting points of the process. Too often the PPBE process is mired by a fixation on scope, the one constant in traditional project management. Now that Agile approaches are helping to illuminate the disconnection between capability and scope, enterprises can reduce the effort required to form comprehensive strategies and project roadmaps. Instead a lighter, more true Capability Roadmap can guide investments and ensure projects always deliver value (or are terminated early enough to minimize waste).

Together, these five processes manage the capability lifecycle to ensure that executive leadership can identify, defend, and maximize the return on the organization’s investment to meet strategic goals. At each level and each stage of the planning pipeline there is a clear separation of concerns that focuses on the priorities. First and foremost are the mission and vision that set the direction for planning transformational change. Then through deliberate planning to meet objectives, projects can be defined not by scope, but by the needed capabilities they deliver to the organization.

***Earned Capabilities Management defends and maximizes the return on organization budgets, by always tying the capability lifecycle back to achieving the mission and vision***

## About Softek

Softek is a Minority-Owned Small Business providing technology solutions to government clients since 2007. We specialize in evolving business systems using Agile, DevOps, and Cloud technologies to deliver working solutions faster for your most critical IT challenges.

Softek has a proven track record of delivering these cutting-edge technologies at scale. Key past performance includes building DevOps solutions for CMS (Medicare & Medicaid), a Google-like discovery platform for NARA (National Archives), and migrating mainframe batch jobs to use Big Data technologies for SSA (Social Security).

*Services* – Softek uses a unique technical approach to adapting government business systems through service-oriented architecture (SOA), DevOps, and Cloud technologies:

- **SOA** – Innovative Service-Oriented Architectures (SOA) maximize reuse of existing systems.
- **DevOps** – Continuous delivery drives technical validation and end-user engagement.
- **Cloud** – Virtualization minimizes infrastructure requirements and maximizes processing power.

*Staffing* – Softek also supports government and prime vendors with technical leaders and experienced professionals who are highly valued for providing quality services:

- **Validated** – Architects are screened for experience, innovation, and delivery excellence.
- **Leadership** – Softek's Architects take responsibility for delivery and ensuring project success.
- **Reach-Back** – Architects also provide reach-back expertise across Softek engagements.

With Softek you get better value by reusing your existing working business systems and applying the technical expertise to leverage Cloud and DevOps technologies. This leads to more project success and lower total procurement costs as you build, test, and manage new transformational technologies.

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## About ClearPlan

ClearPlan is a federally recognized small business that provides Earned Value Management (EVM) and program planning & control services to large federal and other Fortune 100/500 companies nationwide. ClearPlan is committed to the federal industry as an active member of the National Defense Industrial Association (NDIA); Department of Energy Facility Contractors Group (EFCOG); and sponsor of the College of Performance Management (CPM), the world leader in supporting federal EVM policy and industry to government communication.

ClearPlan brings a systems engineering approach to our projects, focusing on the program and business requirements to drive a systematic process to bring the highest value, individually customized solution to each of our clients.

- **Designs** based upon specific requirements and compliance
- **Develops** world class integrated management systems
- **Deploys** in the most challenging, high profile environments
- **Runs** large, complex management systems
- **Leads** in the Project Management Industry

ClearPlan's team is comprised of industry experts in designing, building, integrating, and running efficient, compliant Federal Earned Value, program planning, and other Management and Control Systems. ClearPlan is an established industry leader in emerging project management techniques. In 2015 ClearPlan presented the well regarded "The Art of Planning" presentation, which describes strategies for utilizing program planning as a problem-solving management tool. ClearPlan utilized its industry leading expertise in creating integrated cost and schedule models of complex development engineering projects. This presentation was showcased at EVM World and other locally-hosted nationwide events. ClearPlan has also been leading an effort to document the keys to successfully integrating agile software development processes into a compliant EVM System.

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