

Overcoming Barriers to Sustainable Innovation and Program Management within Federal, Aerospace and Defense Markets:

Making Science and Technology, Program and Portfolio Management Real

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Executive Summary

This paper outlines the goals of program portfolio management. It introduces key management principles and provides a best-practice framework for developing a program and portfolio management process.

Program and portfolio management is the process by which organizations manage the prioritization of initiatives and the allocation of resources. This process is a critical discipline that enables the governance of projects entering the development or program pipeline. The decisions faced by federal, aerospace and defense (FA&D) organizations in managing portfolios shape the future of those organizations and drive their innovation agendas. The agendas, in turn, determine the performance and success of innovation programs. FA&D organizations that excel at managing their innovation processes and portfolios launch technologies and programs on time and within budget.

Implementing a portfolio management process effectively is a challenge. Too frequently, when it comes to making difficult portfolio decisions, politics and inertia win the day. Research by the Aberdeen Group found that 59 percent of organizations consider balancing the innovation development pipeline with development capacity a top priority for improvement.¹

The goal of portfolio management is to allocate resources and budgets to projects and initiatives that maximize the value of the portfolio, while maintaining a good balance between short- and long-term projects and high- and low-risk/return projects. Additionally, the process aims to provide objective prioritization with a strong link to strategy.

To achieve these objectives, organizations require a sustainable portfolio management process that defines how the organization collects portfolio data, prioritizes projects, and communicates portfolio decisions across the organization. This process should incorporate five key principles:

- High quality, real-time data;
- Powerful visualization;
- Efficient exploration;
- Insightful scenarios (what-if); and
- Resource commitment.

These principles create a framework for designing and implementing a portfolio management process that allows an organization to better allocate scarce resources and drive sustainable growth.

Federal, aerospace and defense organizations that excel at managing their innovation processes and portfolios launch technologies and programs on time and within budget.

The principles introduced in this paper create a framework for designing and implementing a portfolio management process that will allow an organization to better allocate scarce resources and drive sustainable growth.

Barriers to Sustainable Innovation and Program Management

“Do more without more,” says Ashton Carter, US undersecretary of defense for acquisition, technology and logistics.

Uncertainty in the wake of global recession creates a dual challenge for federal offices, as well as aerospace and defense establishments: reduce costs while enhancing capabilities. As Ashton Carter, US undersecretary of defense for acquisition, technology and logistics, puts it, you must not only “do more without more,”² you in fact need to *do more with less*.

The majority of leaders recognize that innovation provides the most direct path to organic expansion and successful launch of new technologies and programs. To begin with, it promises greater capabilities than incremental extensions. The challenge, then, is to create a *predictable, evergreen* pipeline of ideas for innovative, high-value technologies and competencies, ensuring sustainable capabilities for today, tomorrow and beyond.



Figure 1: Barriers to sustainable market differentiation. In Sopheon’s experience, there are four common barriers to creating sustainable differentiation.

This paper addresses how effectively managing your portfolio of innovation initiatives will allow you to focus investments on those projects that will provide maximum value and enable you to meet your strategic objectives, while avoiding those ‘bad bets’ that are destined to fail.

About Product Portfolio Management

Program and portfolio management is the link between strategy and the actual investments being made in product development. It is the governance process that determines the types of projects that enter into the development pipeline. Portfolio management has four goals:

1. Maximize the value of the portfolio;
2. Establish an appropriate balance of projects;
3. Prioritize initiatives to ensure that resources are allocated to the best projects;
4. Ensure that the portfolio is strategically aligned.³

One practice central to the achievement of these goals is the *regular* review of the portfolio of projects by executives with the authority to make and enforce resource decisions. These decisions require the collection and analysis of key project attributes and metrics, and evaluation of the portfolio against a dynamic, constantly changing set of variables and objectives. Companies that focus only on financial metrics are generally less successful at managing their portfolios than those that focus on a range of attributes such as balance, strategy and value.⁴

Managing a portfolio involves prioritization of projects against strategic objectives and initiatives as well as against other projects. In its most basic form, it amounts to choosing to invest in one project rather than another. The implications of portfolio management decisions are far-reaching, as the allocation of resources is a tangible – and expensive – cost for the organization.

There are many ways to evaluate projects and initiatives. The challenge is to identify a few key measures that can be assessed consistently. Areas that are commonly evaluated are:

- **Project justification**
 - How does the project support strategic initiatives?
 - Is there a clear gap in the requirements?
 - What problems are we solving?
- **Financial analysis**
 - What will this cost us?
- **Resource visibility**
 - What resources are required to execute the project(s)?
- **Project status**
 - What are the associated risks?
 - How long will this take?
 - Is the initiative meeting key milestones?

To be truly effective, portfolio management needs to tie strategic planning (roadmapping) into the new technology development process. This allows an organization to connect its long-term strategy with decisions about innovation investments in the here and now. Too often, attention is overly focused on short-term objectives (e.g., achieving current annual objectives) at the expense of longer term initiatives that will provide capabilities for future platforms or requirements. The discipline of technology gap analysis as an aspect of roadmapping forces the organization to expand the horizon of thinking from today into the ‘tomorrow’ and then the ‘beyond’ timeframes. Developing this vision of the future – expressed in terms of technology trends, requirements and technology capabilities – is an important step in the development of a top-performing portfolio process that is strongly linked to strategy.

Strategic Buckets

‘Strategic buckets’ are a fundamental and highly useful tool for translating strategic intent into a set of decisions that align resource investments with the strategic plan.

The first step is to determine what the set of buckets will be. Roadmaps are a good starting point for this process. A bucket may represent different types of projects

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Strategic buckets are a key tool that can be used to translate strategic intent into a set of decisions that align resource investments with the strategic plan.

(e.g., breakthrough vs. incremental) or specific areas of focus for the business (e.g., develop key platform technologies). The organization then decides what amount of investment (resources, capital and expenses) to allocate to each bucket. To help with this determination, some organizations will force themselves to rank the importance of the buckets.

Once the buckets are defined, agreement is reached on the information required to evaluate and prioritize initiatives in each bucket. Next, the initiatives in the buckets are prioritized. Forced ranking can again be very helpful in allocating resources across initiatives, but other prioritization techniques could also be used.

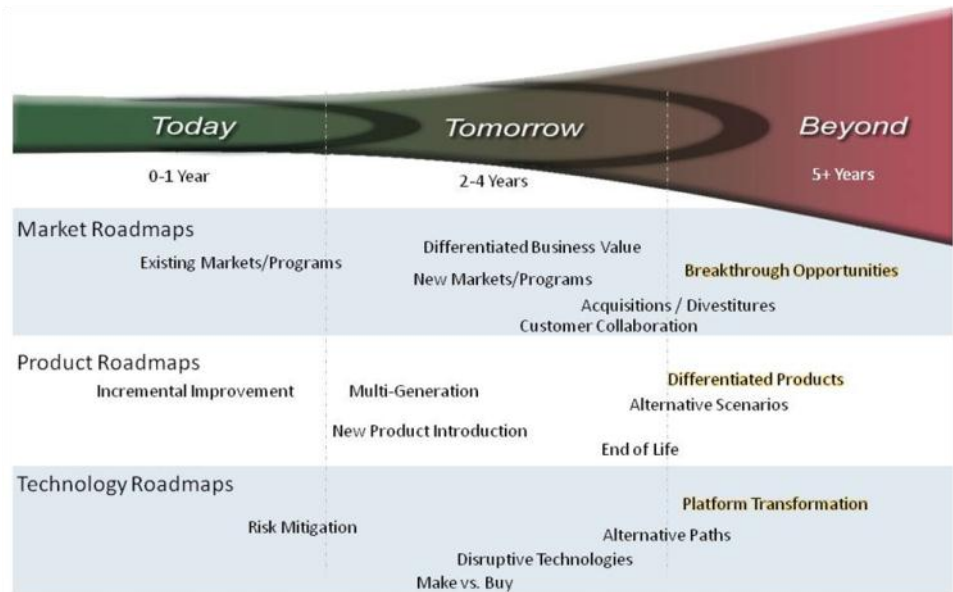


Figure 2: Planning across horizons. Achieving early and ongoing consensus around an integrated, long-term strategy promotes future preparedness and competitive advantage.

The Portfolio Management Process

The operational process of managing portfolios should be placed within an overall innovation governance framework. The reason is that there are certain elements of portfolio planning that tie into higher-level planning cycles, while other elements relate to the governance processes driving development and ideation. Portfolio management should be integrated into gate meetings (gates are key to ensuring quality data is being developed) and strategic planning (both annual planning and strategic planning). The participants in the portfolio management process should be explicitly identified, and their roles and responsibilities defined. Decision-making and communication processes should also be clearly laid out. An example of the timing, or cadence, of the overall innovation governance process is shown in Figure 3 below.

For a more in-depth discussion of innovation governance, refer to the Sopheon paper entitled [Innovation Governance: Aligning Strategy, Ideation and Execution for Better Business Results](#).

Portfolio management should be integrated into gate meetings and strategic planning (both annual planning and strategic product planning).



Figure 5: A typical cadence for an innovation governance process.

Common Challenges in Managing Portfolios

During our many years of working with organizations on their innovation processes and practices, we have consistently heard about five specific issues that underlie the challenge of effectively managing portfolios.

1. We lack accurate, real-time data.

Access to ‘good’ information cannot be taken for granted. Too often, organizations don’t have an inventory of their projects. Or when they do, the project information is either incomplete or of low quality. Some organizations take up to 90 days to pull together the information required for portfolio reviews, only to find that by the time the business discussion is held the data is already out-of-date.

2. How do I turn all this data into knowledge that I can base decisions on?

Even when the data is current and of good quality, it is often complex and overwhelming in its abundance. This makes it difficult to grasp the big picture and answer even simple questions such as “What is in the development pipeline?” and “What are the criteria we should use to prioritize projects and make project selections?”

3. We can’t assess the implications of different investment scenarios.

All too often, FA&D decision-makers have difficulty assessing the impact of alternative scenarios. Examples include, “If I add or remove a project from the portfolio, what are the implications to my plan? How will it affect my resource constraints or strategy? And is it even possible to complete the project in the timeframe we want?” In many instances, these questions cannot be answered clearly; sometimes it’s hard to even know what the questions should be.

4. Our portfolio decisions are disconnected from our resources.

Even when portfolio teams make good decisions, there is often a delay. Worse, there is often a disconnect between new priorities and the commitment of

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resources required to implement them. How many times have you found yourself with too many projects for the limited resources that are available?

5. **We still need to achieve goals even though we are resource-constrained.**

Many of the organizations we work with are heavily resource-constrained and are challenged to look beyond that limitation to find new ways to achieve their objectives. When we first come to them, they often have poor visibility into the innovation projects in their portfolio, the potential value of those projects, and how those projects are impacting resource capacity. As a result, these organizations have trouble singling out the high-value projects and ensuring that those projects have the resources needed for them to be successful.

Portfolio planning and resource planning are so intertwined that they cannot be considered in isolation of one another.

Five Principles of Effective Portfolio and Resource Planning

Resources are the lifeblood of project execution, whether financial, people, facilities or equipment. Sopheon subscribes strongly to the view that portfolio planning and resource planning are so intertwined that they cannot be considered in isolation of one another. Figure 4 illustrates what we believe to be the essential principles of effective portfolio and resource planning.



Figure 4: Principles of effective portfolio and resource planning. These principles meet the needs of both generalists and specialists, who require different views of the same data and at various levels of detail in order to make optimal decisions. Team leaders and executives may require only occasional portfolio views, allowing some level of exploration. Portfolio and functional managers, on the other hand, are specialists and require deep ‘what-if’ capabilities to support sound resource decisions.

I. High Quality, Real-Time Data

The foundation of all portfolio planning activities lies in rich, robust data from cross-functional sources that is always up-to-date. Acquiring this data is, however, one of the most challenging aspects of portfolio planning, since it typically ‘lives’ in many places and is owned by many different people.

The key to good portfolio data lies in *cross-functional* input from directors of innovation and strategic planning, functional managers, financial analysts, R&D scientists, operations managers, program managers and project managers, among others.

The trick is to capture the data without creating additional work for people who are already busy. You do this by ensuring that the portfolio management tool you use is tightly integrated with your existing innovation and technology development processes. It will then capture the data whenever and wherever it is created. This is the main reason why ‘one-off’ systems that require double data entry are simply not sustainable and may thwart adoption of any portfolio management system.

Not only is it important to collect and maintain quality data, it is also important to share and provide value back to those providing the data that reflects the role they play in the organization.

- The executive management team takes a holistic view of the organization’s strategic objectives. They require a ‘big picture’ presentation in order to prioritize and select projects for further investment.
- Project managers and/or team leaders want to monitor project status and risk.
- Program managers need to understand the impact of individual projects on their strategies and goals.
- Team members need to view and review the details of their day-to-day tasks and activities.

Everyone, and not only executives, should be afforded the opportunity to view the data in a form that is meaningful to them—concept dashboards for idea managers, status and risk dashboards for project managers, resource dashboards for program managers, and views for team members that allow them to examine their project data. This provides value to each contributor and helps them to understand the value of contributing good data and keeping it up to date.

2. Powerful Visualization

Once an organization has confidence in its data, it must turn that data into knowledge. People must be able to use it to gain insights into the current state of their programs and projects (what-is), assess technical risks, and make decisions during their regular reviews. The data must provide answers to the critical portfolio questions used to understand the business and strategic impact of existing projects and initiatives. This effort can range from gauging the risks associated with technology development and insertion to measuring the current sufficiency of the portfolio, to mapping initiatives to the strategic plan.

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Everyone, and not only executives, should be afforded the opportunity to view the data in a form that is meaningful to them.

One of the best ways to support analysis of the data is to turn the lists and numbers into meaningful graphic representations.

Views that are useful in portfolio reviews include: a simple inventory of project status and risk; high-level views of timelines, cost and reward; and portfolio risk vs. reward.

Decision-makers and team leaders need to be able to drill down from dashboard views for more detailed program data.

One of the best ways to support this analytical activity is to turn the lists and numbers comprising the data into meaningful graphic representations. Dashboard-style views can help people quickly get the big picture (spotting trends, identifying red flags before they create significant difficulties for the organization, and confirming that projects and initiatives are aligned with strategies) and help ensure that the resulting decisions contribute to maximizing success and value of the projects and program needs.

Examples of the different views that are useful in portfolio reviews include:

- *A simple inventory of project status and risk.* The most basic level of visualizations, this dashboard enables senior leaders who conduct operational reviews of the portfolio, often on a monthly basis, to assess risk.
- *High-level views of timelines, cost and reward.* This dashboard, useful during quarterly executive-level portfolio reviews, will answer such questions as “Are our investments aligned with our innovation strategy?”, “Do they maximize value?” and “Are they balanced across multiple risk dimensions?” It helps assess the degree to which current investments are balanced across different stages of the program life cycle. For example, “Do we have sufficient investments at the front end of the cycle to ensure success in the long term?” Alternatively, you could look at the pipeline against calendar timelines to view the key phases of investment for each release, and when each product or technology will be introduced to market, thus providing revenue and profit streams. From a *balance* standpoint, this view will also tell you if roll outs are sufficiently spread out, or if they are stacked up during a narrow time period in a way that will likely cause problems.
- *Portfolio risk vs. reward.* It is no surprise that high-value projects often entail significant levels of risk. As leaders push the organization toward more innovative capabilities it is important to not place all of your eggs in one basket. This view helps ensure that the mix of investments is appropriately weighted toward high-value projects, but with reasonable risk levels.

3. Efficient Exploration

While the high-level presentation of information discussed earlier plays a vital role in the decision-making process, it should be noted that once good data is in place it will probably also be put to use well beyond standard review meetings. Decision-makers and team leaders need to be able to drill down on demand for more detailed data relevant to a program, project, initiative, or point in time. It should be easy to explore the data dynamically, without developing code or creating new views or dashboards. For example, if a high-level dashboard indicates a disproportionate investment in a particular technology or capability, one should be able to easily explore the more detailed underlying data to view and better understand the issues at play before any decisions are made on corrective action.

Whatever portfolio management tool you employ, it should serve as a ‘trampoline’ by allowing you to ‘bounce up and down’ between the high-level and lower-level views required at different stages and by different roles in the portfolio management process.

4. Insightful Scenarios (What-if)

At certain points in the planning cycle, leaders need to evaluate multiple planning scenarios to resolve existing problems or to anticipate and avoid future hurdles. For example, they may need to address which projects in the portfolio could be prioritized or put on hold to close an identified gap between actual and desired portfolio value. Or, they may have to resolve a resource bottleneck created by over-allocation of resources.

Insightful ‘what-if’ analysis of real-time portfolio data enables powerful assessment of investment options, and planners must be able to visualize tradeoffs across a number of factors such as cost, reward, risk, resources, and timing.

In defining potential scenarios for a given portfolio, decision-makers should prioritize initiatives using:

- Project data (financials, schedule, risk assessments);
- Scoring models; and
- Techniques to align the portfolio with strategic plans, such as the strategic buckets discussed earlier.

Decision-makers should look to determine the impact of adding, removing or delaying projects in the portfolio on the achievement of both long- and short-term business objectives and plans. Scenarios to maximize value or to minimize overall risk can be defined and compared with other possible portfolio decisions.

5. Resource Commitment

Without commitment of resources no project or initiative plan will succeed. The slightest misallocation of resources can create conflicts that lead to project delays and inefficiencies and, ultimately, lengthen and increase the costs of new innovation development cycles.

As its portfolio management practices mature, an organization will increasingly incorporate resource planning information into decision-making processes. This, in turn, will improve its ability to explicitly use prioritization to ensure that it is executing the ‘right’ projects. When teams are ready to commit to a revised ‘plan of record’ they must make certain that required human and financial resources are available. An effective resource commitment process ensures that resources are secured and aligned to execute on new plans.

Ideally, FA&D program managers should aim to:

- Improve the visibility of resource requests and related product planning dependencies;
- Centrally track and evaluate resource deployments and decisions;
- Dynamically adjust allocations to keep resources focused on high-priority projects; and
- Streamline the communication between team leaders and resource managers for innovation planning.

Insightful ‘what-if’ analysis of real-time portfolio data enables visualization of tradeoffs across factors such as cost, reward, risk, resources, and timing.

Views that are useful in portfolio reviews include: a simple inventory of project status and risk; high-level views of timelines, cost and reward; and portfolio risk vs. reward.

Incorporating resource planning information into decision-making processes improves an organization’s ability to prioritize projects, ensuring that it is executing the ‘right’ projects.

Keep the planning process simple by collecting the minimum amount of resource information required to manage the portfolio against organizational resource constraints.

We can offer practical assistance in executing and maturing your portfolio practices. Contact us on info@sopheon.com to learn more.

The major challenge in incorporating resource planning into portfolio management is to make sure that the planning process is simple and scalable. It is all too easy to overly complicate this process by demanding data that is too granular or by focusing on actual resource utilization vs. forward-looking resource plans. The objective should be to collect the minimum amount of resource information required to manage the portfolio against organizational resource constraints. A typical approach is to use resource pool planning methodologies and appropriate tools.

How Sopheon Can Help

There are a number of ways in which Sopheon can offer practical assistance for the development and execution of your program and portfolio management processes. For instance, we can help you establish the baseline of how your organization compares to commercial and federal organizations considered best-in-class in innovation.

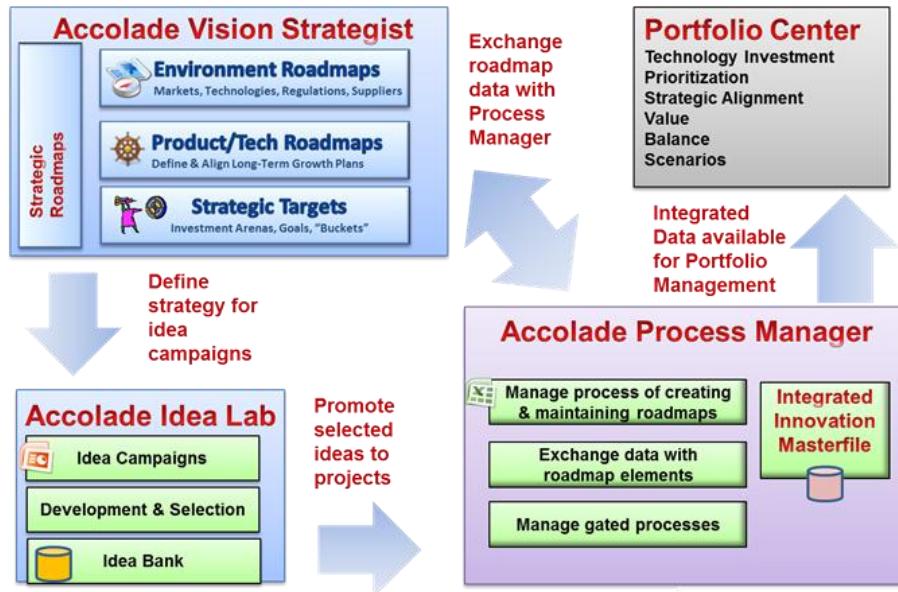
We recognize that organizations vary greatly in the maturity and sophistication of their innovation and portfolio management practices. Regardless of where your organization stands in these areas, we can demonstrate how our Accolade® solution will enable you to **visualize, explore, prioritize, and resource** your portfolios with confidence. Among other benefits, Accolade will allow you to:

- Increase the ‘batting average’ of your portfolio investments, achieving success rates of 80% or more;
- Bring high-value technologies to programs on a timely basis;
- Focus limited resources on the greatest opportunities;
- Enable secure, real-time monitoring of portfolios at strategic and operational levels;
- Reduce the effort required to create and manage portfolio data; and
- Ensure your portfolio and resource plans and processes can be adapted as your needs evolve.

Accolade is the only solution on the market today that can enable you to tightly integrate portfolio data collection into your existing innovation processes, ensuring high-quality decision support. Its capacity to provide ‘shirt-size’ resource models based on the complexity of your projects is unique, and greatly reduces the amount of time required to create resource plans for new projects. Accolade Process Manager™ translates Sopheon’s years of exclusive focus on innovation process optimization into embedded, proven best practices that dramatically increase the effectiveness of program portfolio management. Accolade Process Manager’s advanced support for ‘what-if’ analysis allows you to explore scenarios from nearly every angle, right down to the individual resource level.

We encourage you to engage us in further discussion on how we can assist you in executing and maturing your portfolio practices. Although effective portfolio and

resource planning and management are challenging to achieve, their benefits are both significant and attainable. Successful implementation will ensure you are well positioned to reach new levels of sustainable innovation and program management.



Sopheon offers an end-to-end solution for full governance of your innovation pipeline.

Figure 5: Sopheon's end-to-end solution set. Sopheon offers an integrated solution for full governance of your innovation pipeline, comprising Accolade Vision Strategist™ for strategic roadmapping, Accolade Process Manager for innovation process executions and portfolio management, and Accolade Idea Lab™ for idea generation and development.

Reference Notes

¹ ABERDEEN GROUP (2006) *The Product Portfolio Management Benchmark Report*.

² Ashton Carter made this statement at a press briefing in September 2010 outlining a new US Department of Defense strategy to change how the Defense Department contracts goods and services. This was a move aimed at creating greater efficiency and productivity in defense spending.

³ COOPER, R.G. and EDGETT, S.J. *New Problems, New Solutions: Making Portfolio Management More Effective* (Reference Paper #9).

⁴ COOPER, R.G., EDGETT, S.J. and KLEINSCHMIDT, E.J. (2001) *Portfolio Management for New Products: Second Edition*, Perseus Publishing.

About the Authors

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About Sopheon

Sopheon is a worldwide provider of software and services for program lifecycle management. Our Accolade® software suite is the first in the industry to provide end-to-end support for strategic planning, ideation and innovation process execution. It enables our commercial, military, and government clients to synchronize strategic roadmapping and program and innovation planning execution by aggregating data from multiple, disparate sources. The result is more informed decision making, faster time-to-market, and more successful new products.

Our customers in the federal, aerospace and defense sectors include BAE Systems, Honeywell, USMC, Bell Helicopter, US Army, Northrop Grumman, and NASA.

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