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Innovation in Performance Excellence: Eight Paradigms to Performance Excellence (8PPE)

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Abstract
The objective of this paper is to present a framework that describes a performance excellence system. Six Sigma is showcased as the operating system on which performance excellence methods may be launched. The framework for what should preclude Six Sigma is presented as well as what should follow. The integration of this system is discussed as well as a maturity progression. A performance excellence model is presented as well as a skill progression for each category of the model. The progression through the model is presented in eight paradigms. An assessment method is also proposed that would be used to track progression in each category as well as maturation through the paradigms of the model.

Keywords: Performance Excellence, Six Sigma, IMPROVE, Eight Paradigms for Performance Excellence

1. Introduction

Historically speaking, methodologies have a finite life-cycle. Despite the intricacies of each independent cycle, all of these curves have a commonality: decline and ultimately death. This concept may be directly applied to our current understanding of process improvement: Six Sigma; as well as structured innovation: TRIZ. Understanding this progression allows us to be proactive from the perspective of identifying our areas of expertise and involvement in advance of this decline and then death, allowing us to evolve our products or services during a period of financial strength (as opposed to this activity taking place after financial decline has already commenced). We are reacting before we see the "handwriting on the wall". This proactive capability allows us to evolve while preserving our existing business. This ambidextrousness positions the organization for excellence in evolution (becoming something the company has not been based on the strength of its core competencies).

2. Six Sigma in a Vacuum

The application of Six Sigma has allowed many corporations to optimize existing processes and systems. General Electric and Motorola have publicized billion dollar savings from multi-year mature applications of Six Sigma (DMAIC). This success is not always predictable as the application of Six Sigma in a vacuum allows for the possibility of projects that are not aligned with strategies. Optimization may occur without impacting progress towards goals and objectives and ultimately the vision. This alignment is critical for the maximization of Six Sigma results. This alignment comes from the application of fundamental skills that preclude the application of Six Sigma. In this respect, strategic planning plays a vital role. The organization needs to formulate a service mission and an economic mission. Strategies for the attainment of these missions need to be identified as well as prioritized. These prioritized strategies become the driving factors for conversion to a work-plan. This top-down approach insures alignment of the organization with a vision and progress towards meeting the service and economic missions. A bottom-up approach needs to be utilized in order to involve the majority of the workforce but alignment is critical. This opportunity for alignment does not exist unless the strategic plan has been developed form the top and cascaded throughout the organization. A non-optimization constraint limits the system unless this focusing activity takes place.

3. Preservation: The Foundation for Excellence

The creation of a strategic plan allows the organization to focus its activity on those tasks critical for success. The vision is converted to strategies and these are cascaded to the tactical level (see Figure

1.0). Management to these objectives is focused and a balanced scorecard approach may be used to track progress. Progress below target may be selected for cause and corrective action activity. Periodic reviews keep the progression towards excellence on track and allow risk mitigation as necessary.

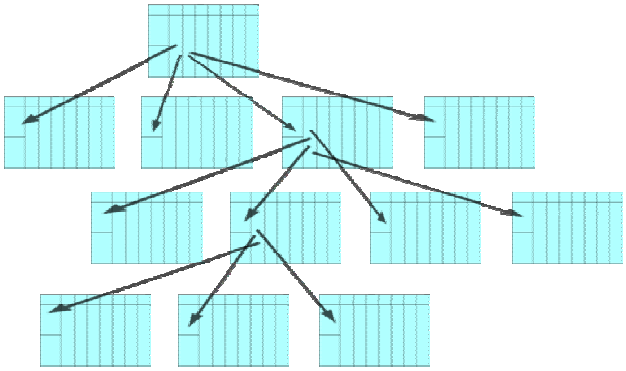

Figure 1.0: Cascading of the strategic to the tactical using Hoshin

The Hoshin allows for the identification of those processes that are critical to the successful attainment of your strategies. These key processes must then be created and mapped using process mapping techniques. An understanding that each process is linked to every other process is embodies in the SIPOC model (see Figure 2.0).

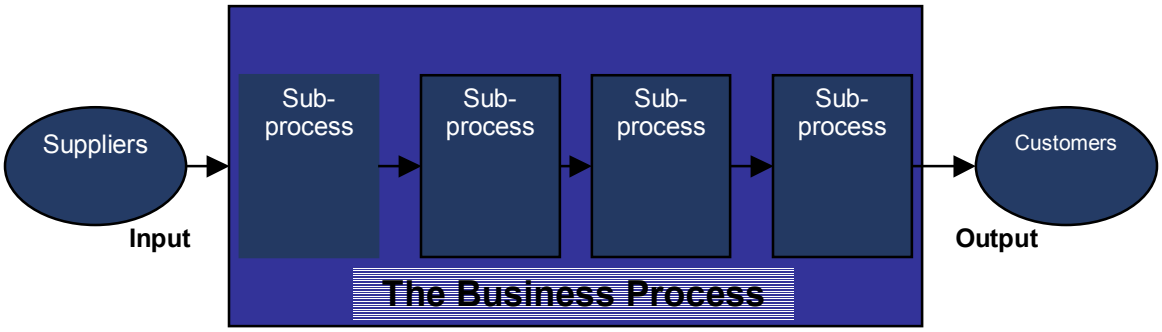

Figure 2.0: SIPOC, supplier, input, process, output, customer-a model used to describe the interactivity in a complex multi-model system where each output becomes a subsequent input.

Once the key processes are identified, the interrelationships must be identified. An enterprise process model (EPM) needs to be created so that cross process impacts are understood and controlled. This progression brings us to the application of lean principles. Non-value added operations need to be eliminated and flow and throughput optimized. As waste is targeted and removed the process is becoming prepared for process improvement through the application of Six Sigma (DMAIC). This optimization process provides the impetus for driving performance to the six sigma level (or whatever level is appropriate given cost and safety considerations). This progression from Strategic Planning, to Process Management, to Lean, and then Six Sigma is the necessary evolution of the organization at the fundamental level. This means those skills necessary for survivability.

4. Evolution: Becoming Something You Aren't

Once process performance has reached entitlement, design activity must take place in order to evolve performance to new and previously unattainable levels. This Design activity at the highest level of maturity is Design for Six Sigma (DFSS at the macro-level and DMADV at the micro-level). DFSS allows the

organization to develop at a high level of performance while meeting or exceeding all critical-to-customer (CTC) requirements with little risk of late-stage failure. Research and Developmental skills enable the organization to respond to societal needs in unforeseen ways. The transition from the closed innovative system to the open innovative system is promoted as well as an increased reliance in structured innovation (TRIZ). See Figure 3.0 for the complete Performance Excellence Model (Total Performance Improvement Model (TPIM)). The ability to focus on Preservation and Evolution simultaneously is described as the organization being Ambidextrous.

Figure 3.0: Version of the TPIM used as a means of articulating the integrated nature of multiple disciplines and methodologies.

5. The Model (see Figure 4.0)

The model is comprised of various elements: foundation (those elements below the facing triangle that are represented by the blocks), base (assessment methodology: IMPROVE[1]), and then a progression of increasing sophisticated and complex methodologies: strategic planning, process management, lean, process improvement, design, and research & development. The triangle is supported on each side by: innovation on the left and change leadership on the right. It is understood that a maturity in each level is possible as is a progression upwards to those methods that increase in sophistication and complexity. This model is an excellent visual representation of the concept but must be modified and enhanced in order to be practically applied as a business practice.

[1] The IMPROVE assessment is comprised of various phases: I: Investigate the details of the organization in question, M: create Matrices that indicate the performance level for each of the progressions through the 8PPE, P: identify Pathologies that are represented by the matrices, R: identify a Recovery plan that should alleviate the indicated pathology, Observe the recovery plan in action, Validate that the recovery plan has had the intended impact on the pathology, and if it has, Enterprisation follows.

A reduction of the model to a Category Matrix including expansion of the skill progression for each level:

	Basic			Intermediate	Advanced			
R&D	Trial and Error	Derivative Development	Incremental Development	Closed Innovation	Open Innovation	Disruptive Technologies	Structured Innovation	
Design	Design by Specification	GD&T	Tolerance Analysis	Robust Design (DOE)	DFSS (DMADV)			**Enterprise Evolution**
Process Improvement	Quality System	SPC	TQM (PDCA)	Capability	Robust Manufacturing (DOE)	Six Sigma (DMAIC)		
Lean Principles	Visual Factory and 5S	Elimination of Muda	DFX	Takt Time	Level Loading	Demand Flow Technology		**Drive to Six Sigma**
Process Management	Establish Processes	Independent Divisional Models		Model Interdependencies	Enterprise Process Management			
Strategic Planning	Vision	Goals and Objectives	Management by Objective	Balanced Scorecard	Hoshin			**Fundamental**

Figure 4.0: Total Performance Improvement Model (TPIM)

The Category Matrix is divided in several ways: vertically it is divided into three categories: basic, intermediate, and advanced. Horizontally the matrix is divided into: fundamental, drive to six sigma, and enterprise evolution. The colored differentiations indicate which elements of the, matrix belong to which enterprise excellence paradigm: red = I, yellow = II, green = III, blue = IV, light purple = V, dark purple = VI, gray = VII, and brown = VIII. The paradigms have been identified in order to produce a flow through the fundamental category at the basic level to the enterprise evolution category at the advanced level. The methodologies depicted are considered to be inclusive from right to left – this means for example, that an adoption of Hoshin would contain those elements found in vision, goals and objectives, MBO, and usage of the Balanced Scorecard. The ability of an enterprise to adopt an intermediate or advanced methodology without progressing through the predecessory elements will be predicated on (but not limited to): maturity of the workforce, ability to foster and maintain cultural change, leadership capabilities, economic viability, and development of supporting infrastructure. It is possible and probable that an enterprise would be more advanced in some categories over others. Unequal maturity in the paradigms is also to be expected. Highly disproportionate cross-paradigm development will be discouraged as it will yield the inability to produce balanced and sustainable results in the enterprise. Therefore, the Capability Maturity Model (CMM) will be employed in order to assist the equal development of categories and paradigms.

The IMPROVE assessment methodology will be applied primarily to determine an organizations maturity level for each of the categories: Strategic Planning (SP), Process Management (PM), Lean Principles (LP), Process Improvement (PI), Design Methods (DM), and Research and Development (RD). Weaknesses and opportunities for the infusion of advanced applications and structured innovation will be identified. The infusion of innovation into each category will be of concern. The Investigative stage will be conducted in order to collect relevant information so that the presence and maturity level of each category may be qualitatively determined. In conjunction with this, an assessment of management's ability to lead and support cultural change will be conducted. The output of the Investigative stage will be radar plots (Matrices) indicating the presence and maturity of various key elements of each category. Deficiencies and inefficiencies in the Matrices will yield recognizable Pathologies. The response data may be superimposed on the Category Matrix in order to visually represent an enterprise's evolution through the 8PPE. The CMM will be used to establish the equalization efforts necessary in order to balance cross-paradigm maturity. A Recovery plan will be developed in order to evolve each category to the maximum level that management and enterprise culture are able to support and sustain.

The expansion of each category will include those skills and methods that are historically and critically pertinent to the category. The progression will be right-to-left inclusive meaning that skills in the category

to the right will include the necessary elements of skills listed to the left. A top level radar plot will be created for each category. The points on the plot will be those necessary skills that are sub-sets of the main category element (for example: the category would be Strategic Planning, the main element in question would be the Balanced Scorecard, the necessary Balanced Scorecard elements would be: vision, goals and objectives, decomposition of goals and objectives to activity that is measurable, verification of causal relationship of metrics to goals and objectives, etc.). A questionnaire needs to be developed for each main element so that maturity may be determined. It is also possible that an enterprise may select a mature element in a category for adoption without achieving maturity in the elements to the left of the selected element. This needs to be taken into consideration as this model is developed. Also, some elements may not be included in a more mature adoption and special attention should be paid to these instances.

The pathologies and recovery plans will be cross-correlated using a matrix. The practitioner will be able to look-up pathologies (single or compound) and find recovery plans). The model will start as a theoretical construct and then be modified as experience dictates. The category questionnaires will drive the input for the I and M phases of IMPROVE. These questionnaires will also drive the construction of the main, secondary, and tertiary radar plots.

6. Conclusion

In order for an organization to excel from conceptualization to commercialization a number of core competencies must be present. Not only do these capabilities need to be present but they need to be fully integrated. Also, the maturity levels need to be fairly homogenous to minimize constraints on the system. The ability to evolve the capabilities of the system should be focused on while sound process management allows the fundamental operations of the organization to proceed with little oversight or influx of corrective energy.

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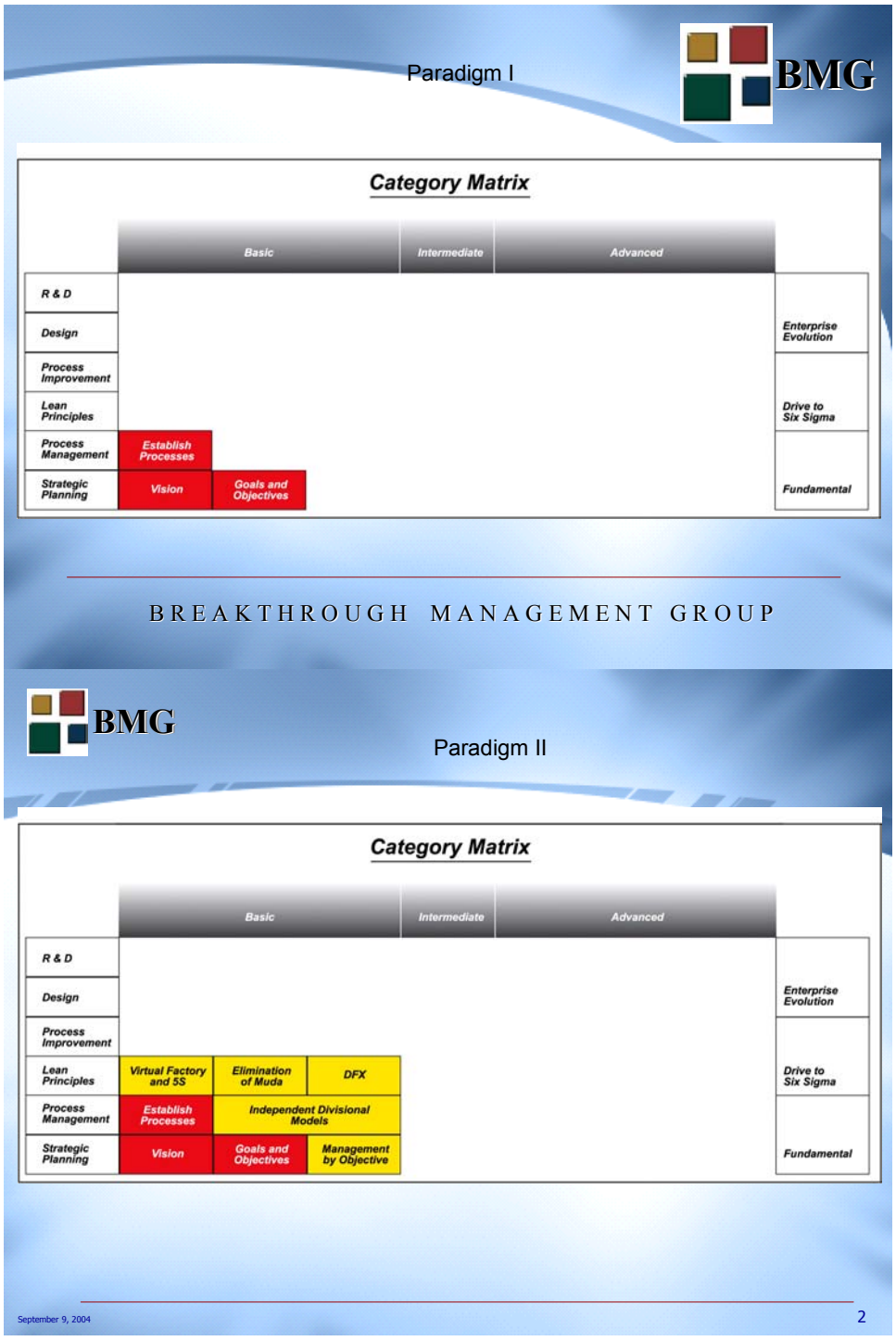
8. Appendix: Eight Paradigms to Performance Excellence



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Paradigm III

Category Matrix

	Basic			Intermediate	Advanced	
R & D						Enterprise Evolution
Design						
Process Improvement	Quality System	SPC	TQM (PDCA)	Capability		
Lean Principles	Virtual Factory and 5S	Elimination of Muda	DFX	Takt Time		Drive to Six Sigma
Process Management	Establish Processes	Independent Divisional Models		Model Interdependencies		
Strategic Planning	Vision	Goals and Objectives	Management by Objective	Balanced Scorecard		Fundamental

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Paradigm IV

Category Matrix

	Basic			Intermediate	Advanced	
R & D						Enterprise Evolution
Design	Design by Specification	GD & T	Tolerance Analysis	Robust Design (DOE)		
Process Improvement	Quality System	SPC	TQM (PDCA)	Capability	Robust Manufacturing (DOE)	
Lean Principles	Virtual Factory and 5S	Elimination of Muda	DFX	Takt Time	Level Loading	Drive to Six Sigma
Process Management	Establish Processes	Independent Divisional Models		Model Interdependencies		
Strategic Planning	Vision	Goals and Objectives	Management by Objective	Balanced Scorecard		Fundamental

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Paradigm V

Category Matrix

	Basic			Intermediate	Advanced		
R & D							
Design	Design by Specification	GD & T	Tolerance Analysis	Robust Design (DOE)			Enterprise Evolution
Process Improvement	Quality System	SPC	TQM (PDCA)	Capability	Robust Manufacturing (DOE)		
Lean Principles	Virtual Factory and 5S	Elimination of Muda	DFX	Takt Time	Level Loading		Drive to Six Sigma
Process Management	Establish Processes	Independent Divisional Models		Model Interdependencies	Enterprise Process Management		
Strategic Planning	Vision	Goals and Objectives	Management by Objective	Balanced Scorecard	Hoshin		Fundamental

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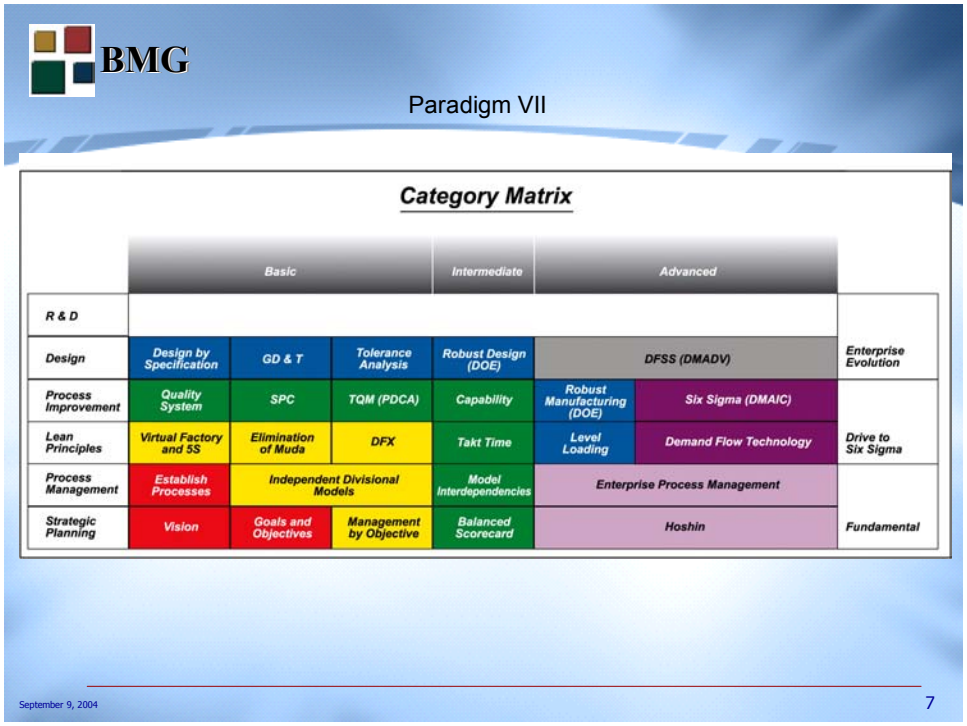
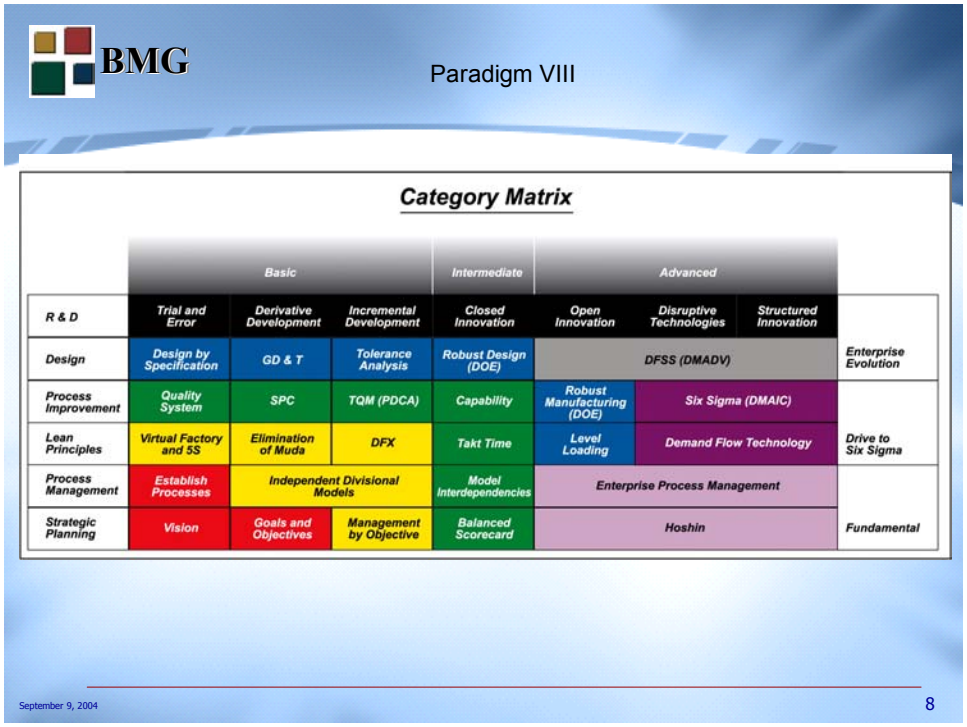
Paradigm VI

Category Matrix

	Basic			Intermediate	Advanced		
R & D							
Design	Design by Specification	GD & T	Tolerance Analysis	Robust Design (DOE)			Enterprise Evolution
Process Improvement	Quality System	SPC	TQM (PDCA)	Capability	Robust Manufacturing (DOE)	Six Sigma (DMAIC)	
Lean Principles	Virtual Factory and 5S	Elimination of Muda	DFX	Takt Time	Level Loading	Demand Flow Technology	Drive to Six Sigma
Process Management	Establish Processes	Independent Divisional Models		Model Interdependencies	Enterprise Process Management		
Strategic Planning	Vision	Goals and Objectives	Management by Objective	Balanced Scorecard	Hoshin		Fundamental





9. About the Author

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With over 14 years of research and development experience at ITT Space and Special Projects and the U.S. Army Military Intelligence, Dr. Michael Slocum has become an expert in Problem Solving, Research and

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Dr. Slocum studied at the U.S. Army Intelligence School and Trinity College where he earned his Ph.D. in Physics. He was an Adjunct Professor and a member of the Graduate Faculty at North Carolina State University where he developed and taught a graduate course on the Theory of Inventive Problem Solving. Dr. Slocum is an editor of the TRIZ Journal (www.triz-journal.com). Dr. Slocum was the founding editor of "Izobretenia" (Journal for the Altshuller Institute for TRIZ Studies), is a member of the ETRIA Global Coordination Group, Fellow of the Royal Statistical Society in London, member of the New Technology Review Panel of the National Food Processors Association, Sigma Xi, Institute of Food Technologists, Society for Plastic Engineers, New York Academy of Sciences, Association for the Advancement of the Sciences, American Physical Society, American Material Society, American Chemical Society, and ISSSP Dr. Slocum has authored over 90 scientific papers and was the technical editor for TRIZ: The Right Solution at the Right Time.