



Alexander Kossiakoff: His Life and Career, Part Two

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The retirement of Dr. Alexander Kossiakoff as Director of APL in June 1980 marked a natural transition of his interests, tremendous energies, and creativity to advancing science and education, exactly as predicted by Dr. Ralph Gibson in the preceding article. Kossy often joked that he had a quixotic affection for attacking the most challenging and daunting windmills, the size or complexity of the problem being as large as possible. Fortunately for APL, the University, and the nation, Kossy was able to devote another 25 years, making extraordinary accomplishments in science and education during his post-retirement career. The following article provides insight into how he made these worthy accomplishments through colleagues who knew his best.

CHIEF SCIENTIST

After stepping down as the Director of APL in 1980, Dr. Kossiakoff was appointed the Laboratory's Chief Scientist. In this role, APL could continue to benefit from his experience and wisdom. Laboratory leaders, including directors, department heads, program managers, group supervisors, and individual technical contributors, routinely sought his guidance in addressing both management and technical issues. Sometimes these consultations might occupy a few hours, while and at other times they could involve projects that would span many months. Of course, one quickly learned that you did not have to extend an invitation to receive Kossy's thoughts and suggestions for how best to address a problem, as he was never hesitant to jump right in when he encountered a challenging issue.

An area where he may have had the greatest impact was serving as an informal mentor to staff members who had reached a stage of transition in their career—from the role of individual contributor to that of supervisor, project manager, or systems engineer. People quickly learned that he not only possessed a thorough understanding of the critical factors in making a successful transition, but also welcomed the opportunity to assist them in the process.

Kossy assumed many responsibilities and continued to play an active role throughout this stage of his career. Examples include his service as Director of the Alfred E. Mann

Fund, an endowment fund of the University used for conducting research and development in the application of advanced technology to medicine. He was also a member of the editorial board of the *Johns Hopkins APL Technical Digest*. In 2000, he was appointed to the newly formed APL Science and Technology Council, where he was active on subteams charged with addressing capabilities assessment, requirements definition, and the establishment of an external science and technology advisory panel.

TECHNICAL MANAGEMENT

APL has had a long-standing interest in education and experienced staff who enjoyed the academic environment. As Director of the Laboratory, Dr. Kossiakoff engaged the APL Advisory Board in maintaining an awareness of the need for more trained managers and engineers. With the prodding of Dr. Steven Muller, then President of Hopkins, the Advisory Board in the spring of 1974 authorized the establishment of a committee to develop a Technical Management Program. The program focused on three areas: organization, direction, and motivation of technical people, the management of research and development projects, and systems engineering and analysis. The program was then, and remains today, based on highly interactive discussions, assignments featuring realistic situations, and extensive use of team or group activities so students could learn from each other as well as from experienced instructors. By 1979, JHU and the Laboratory were ready to commit to fully developing the program as an M.S. degree of The Johns Hopkins University.

Dr. Kossiakoff recognized that this was a new and important area to which he could make a contribution, and as with all projects he undertook, he invested considerable time and attention to getting it right. After initial approvals were gained from the Maryland Board of Education, a pilot cohort was formed from APL staff to take prototype versions of each of the courses that provided feedback and review of the delivery and content of the curriculum. Kossy was involved in every detail, generating new viewgraphs and learning objectives for each lecture. His high standards and requirements to thoroughly explain the material stressed students and faculty alike. Dr. Peter Pandolfini was an early participant:

The Tech Management pilot courses designed by Kossy were tough. He was experimenting to determine how much material could really fit into a semester course; once the course went “public” a trimmer curriculum would be used. . . Homework required reading and thinking in several unfamiliar dimensions as well as several days of reflection to address the material properly. Writing was an all-day Saturday activity—as was editing, editing, and more editing in the following days to sharpen the responses. The twice weekly discussions

with Kossy were the highlight of the program. He was the orchestra leader, and his presence was felt in every class.

Dr. Keith Peacock was a graduate of the first cohort and later became an instructor in the Communications in Technical Organizations course for over 20 years:

This course, more than any of the others, represents the true essence of Kossy. It deals with the interaction among people so it has an immediate application to everything we do in our professional and private lives. . . Working with Kossy has been easy. He listens and makes suggestions and recommendations, and an amicable discussion leads to agreement. But he can also be very persuasive and showed it is an enormous benefit when you can resolve differences in ideas with a person in a way that does not cause any stress or deterioration to the relationship.

The curriculum content was vitally important to Kossy. He recognized that this was the basis for educating the future generation of technical managers and that their problems would be more complex and challenging. Every



discussion question and topic was subject to debate. Kossy would endlessly edit material right up to class time, and this was before the advent of modern computer desktop tools to make the changes. The courses were sequentially offered to the public after prototyping and a careful vetting between 1981 and 1984.

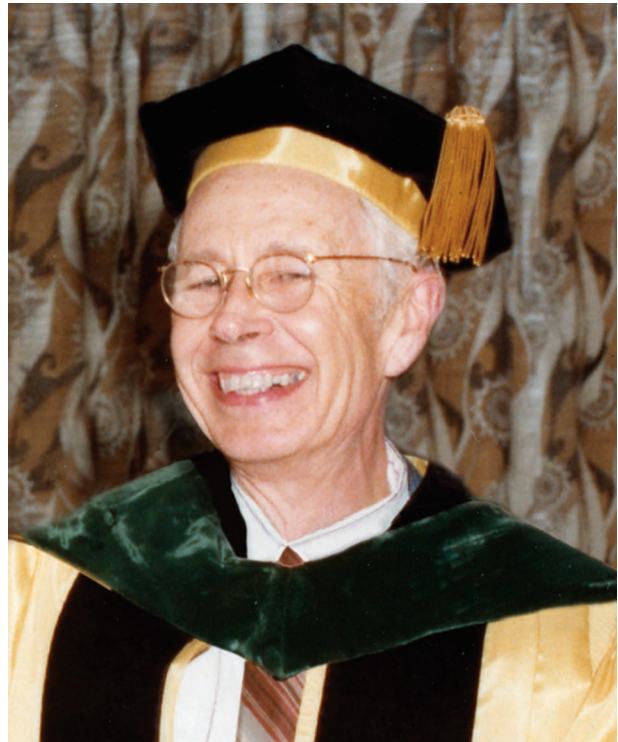
By 1985, word had already reached several local industries and organizations about the relevance and value of the new JHU Technical Management Program. Kossy nervously accepted the invitation of the Montgomery County Council to establish a graduate education program in Rockville, Maryland. The new program was growing and needed experienced faculty, additional teaching locations, and new students to be nurtured. It was important to maintain the quality and reputation of the program in the new initiatives, and Kossy was “hands-on” in every step. He recruited and interviewed potential instructors and gained support to teach first at Montgomery Community College and then in a local Ramada Inn, before JHU opened up its own center in Montgomery County in 1988.

Over succeeding years, the Technical Management Program has evolved, with instructors incorporating topical materials, scenarios and case studies, and lectures. The original curriculum changed when Kossy sensed the need for students to follow course concentrations more suited to their work environment that could either be on the project or the line side of the career ladder, a typical differentiation in a “matrix” structured organization. The Technical Management Program was then organized so that students could select course sequences with a concentration in either Project Management or Organizational Management. A combination of the two was also available that included 10 required courses.

The history of the program development and the courses developed by Kossy are thoroughly documented in other issues of the *Technical Digest*.¹⁻³

SYSTEMS ENGINEERING

Dr. Kossiakoff's vision of an effective Technical Management Program included three elements: organizational management, project management, and systems engineering. The initial curriculum of the master's degree in Technical Management focused only on the first two of these elements. After the successful implementation of the Technical Management Program, development of a systems engineering curriculum became the focus of Kossy's energies. In the 1985–1987 timeframe, Westinghouse Electric Corporation approached the Laboratory with a proposal to support the development of a systems engineering education curriculum that was needed for staff development. Thus began a collaborative effort to create a series of courses that would prepare scientists and engineers to learn to think as systems engineers.³ One of the Westinghouse representatives, Dr.



Raymond M. Schulmeyer, who continues to teach in the program, has provided the following recollection of this endeavor:

Dr. Kossiakoff led the meetings. The meetings were democratic, but it became clear to all of us that Kossy knew where we were going and how we were going to get there. . . All the time put into the development of the Systems Engineering curriculum was above and beyond normal work tasks. Yet Kossy's energy was boundless. . . Kossy's critiques were sometimes difficult. He and his team helped us all become excellent teachers. He was very involved in the class exercises, the exams, and the homework exercises. . . The result was totally worthwhile— directed and formulated by a truly unique, honest, intelligent, and great leader.

After many years of teaching these courses as a concentration in the Technical Management master's degree program, a separate master's degree in Systems Engineering was implemented in 1997. This program has attracted significant interest among students and employers involved in the development of complex systems, particularly in the defense and space arenas.

Dr. Kossiakoff saw it as an obligation of the University and the Laboratory to make these educational programs available to all who could benefit. Thus, if the current teaching locations were not readily accessible to communities of students who were interested and needed this education, Kossy felt that we needed to fix the problem. Consequently, as a result of the Base Realignment and Closure Act in the mid-1990s, and the move of the Naval Air Systems Command to the Patuxent Naval Air Station in Southern Maryland, the program began

at that location in 1997. Then, through arrangements with the Naval Sea Systems Command (NAVSEA) in Crystal City, Virginia, the Systems Engineering Program was introduced at that site in 1999 to serve employees of that organization and their contractors.

Despite his desire to extend the offerings regionally, Kossy had severe reservations about responding to the invitation of BAE Systems (formerly, the Sanders Corporation, a Lockheed Martin Company) based in Nashua, New Hampshire. Nevertheless, he agreed to meet with representatives to hear their proposal, although privately expressing his doubts. However, Mr. James Fasoli of BAE Systems was most persuasive, and the result has been a highly successful collaboration. Mr. Fasoli recalls that initial meeting, and the resulting benefits to the company:

Dr. Kossiakoff listened intently and was keenly interested in our problem. We quickly came to a solution with a custom offering of the SE Certificate and Masters Program. Under his leadership, we formally forged a partnership to strengthen the systems engineering capability at BAE Systems and stretch JHU's off-campus program. . . Throughout the initial planning, Dr. Kossiakoff remained strongly attentive to the program as we piloted the first course. He was present and participated in the graduation of our first and subsequent four cohorts. . . The program remains an essential element of our endeavor for excellence.

Having opened the door to partnering with employers to offer the Systems Engineering Program, other companies expressed interest. In 2002, an arrangement with the MITRE Corporation in Bedford, Massachusetts, was reached to teach the master's degree at that location. The following year, the program was introduced at the McLean, Virginia, MITRE location. The MITRE representative at Bedford, Dr. Robert Swarz, offers the following thoughts:

After a MITRE survey of graduate systems engineering around the country, it was decided that JHU had the program with the best pedigree. I sent an email to Kossy, who I had never met, and asked if he'd be willing to discuss bringing a program to MITRE in Bedford, Massachusetts, and he answered promptly, politely, and with great enthusiasm. The first meeting eventually led to successful programs at two MITRE campuses. Kossy was always firm but flexible, energetic, professional, and a joy to work with.

The extensive efforts taken by Dr. Kossiakoff in developing the individual course lectures and materials found their way into the courses in a collection of papers that was known as the "Blue Book" from the blue binder provided to each student. Each semester the binder grew as another section was added, and as the number of students and offerings grew, Kossy recognized that the unique systems engineering programs approach of an integrated set of courses and the detailed content that existed would benefit the entire systems engineering community. He began then the laborious task of

compiling the material in the form of a book that was published in January 2003 and is now used in many colleges and universities across the country.⁴ He enlisted the help of one of the SE faculty members, William Sweet, in the process.

In typical Kossy fashion, he insisted our writing be technically accurate, understandable to students, and most importantly, convey the somewhat intangible spirit of what systems engineering was all about. We felt that APL had a special insight into this knowledge because of many years of work experience at the systems level and unique leadership roles APL had played during the development of complex systems. In doing this enjoyable and challenging work with Kossy, it is clear he was a great man who always had time to help others . . . He was an indisputable scholar, a warm individual, and always a gentleman.

Dr. Kossiakoff did not limit his involvement in systems engineering to APL and University endeavors, but also was an active member in the International Council on Systems Engineering (INCOSE). His participation is described by James Chism, an active member of the Hopkins' systems engineering faculty and past president of the Chesapeake Chapter of INCOSE:

Dr. Kossiakoff was one of the original and highly valued members of the Object-Oriented Systems Engineering Method Working Group of INCOSE. . . His sage advice was always right on target. Kossy was particularly interested in improving training courses on object-oriented methods, and using them to instruct students in the Johns Hopkins Systems Engineering programs. Kossy taught the members to stay intellectually curious and professionally active, not just as a professional necessity, but as a labor of love. He taught us how to improve our people skills by really listening first and then commenting in a beneficial way to the task that was placed on the table for discussion. . . Kossy had unflinching intellectual energy, curiosity, and completely reliable enthusiasm that he manifested at all our meetings. Frequently we would see him go into his office to continue working after our Saturday morning meetings.

In 2004, Dr. Kossiakoff was selected as a Fellow by INCOSE for his contribution as a practitioner, researcher and teacher of systems engineering.

COMPUTERS AND INFORMATION TECHNOLOGY

As part of Dr. Kossiakoff's long-standing interest in computers and software engineering, he saw a great need to maintain the awareness of the Laboratory's managers about the applications of this technology to their work. Along with these extremely busy individuals carrying out their day-to-day responsibilities, he was concerned that the task of staying current with the wide variety of new developments in the field could be overwhelming. As we know, he was a problem solver, so he convened an ad hoc Information Technology Committee to address this problem. Three members of the group, Robert Grossman, Scott Osborne, and Michael Dykton, describe Kossy's approach:



Kossy with his wife Arabelle Davies Kossiakoff.

Kossy knew that the relationship of APL with its sponsors has always depended on a keen understanding of technology in general and information technology in particular. . . Kossy set up a war room with storyboards where tutorial articles, taxonomies, and notes were posted, organized, moved around, and reorganized in an effort to classify and organize information about the body of knowledge from an APL viewpoint. . . Kossy was an ardent proponent of distributing articles on paper rather than electronically. His reasoning was that paper is more portable so it can be carried to airports, sponsor offices and even on vacation trips. Paper has also proven to be harder to delete or ignore . . . each article was given a teaser paragraph to briefly describe the topic of the article and how it might relate to the manager or Laboratory . . . Kossy carried the combined respect, persuasiveness and dedication to education to make the project a success.

In 2001, Kossy served as a member of a cross-Laboratory team chartered to recommend a course of action as to what direction APL should undertake in support of software engineering and software development. Here he contributed through his systems

engineering expertise and his recognition of the major challenge of applying the systems engineering process to software-intensive complex systems.

HONORS

Kossiakoff Conference and Education Center

On 18 March 1983, a new building was dedicated to Dr. Kossiakoff on the APL campus, consisting of a 500-seat auditorium, classrooms, and dining areas. Of all his honors and recognition, having a building named after him was Kossy's highest source of pride. Among the many dignitaries speaking at the dedication, Vice Admiral E. P. Travers cited the long association among the Navy, the University, and APL:

We have made a partner between the sailor and the scientist a reality where the intellectual curiosity and insight of the University is transformed into the pragmatic and real world of our nation's defenses . . . Many things have changed and many more will come, but the one constant is the quality and dedication of the people at APL. There is probably no better example of this dedication or personification of scientific excellence than Alexander Kossiakoff.

Dr. Kossiakoff added that

The naming of the Kossiakoff Conference and Education Center is a great personal honor to me. . . I am profoundly sympathetic to the purposes of this Center. It represents a grand capability to enhance communication, exchange ideas, acquire knowledge, and conduct a variety of social occasions. These are fundamental to the society at APL. We have done things well; we now have the capability to do them even better.

President's Medal

Dr. Kossiakoff's life-long contributions to The Johns Hopkins University was recognized by the award on 16 November 2004 of the President's Medal by JHU President Dr. William Brody:

It is a pleasure to have the chance to join the JHUAPL Principal Staff in recognizing some of the achievements of the past year. There is, however, one special achievement that I



would like to personally recognize this evening. For that purpose at this time I would like to ask Dr. Alexander Kossiakoff to join me at the podium.

Alexander Kossiakoff received his Ph.D. in Chemistry from Johns Hopkins early in the term of the University's fifth President, Isaiah Bowman. I am now the University's 13th President, which suggests just how much history Dr. Kossiakoff has seen and been part of in the 66 years since he received his degree. We could make a very long evening of this if I were to begin to list all of Dr. Kossiakoff's contributions and achievements in his 58 years of service to the Applied Physics Lab. The very fact that we are meeting in the Kossiakoff Center—the gateway building to the APL campus—says most emphatically what I could only hope to say: APL today would not be the tremendous organization it has become were it not for Alexander Kossiakoff.

During his 11 years as Director of APL from 1969 to 1980, and in the nearly quarter century since spent helping Johns Hopkins train the next generation of technical leaders as Chief Scientist and Chair of the Technical Management and Systems Engineering Management programs, Dr. Kossiakoff has led, excited, and inspired thousands. His work has helped defend our nation, enhance the capabilities of our Navy, push technology in new and exciting directions, and bring successive new generations to an understanding of the unique challenges and opportunities of systems engineering. In recognition of these and many other contributions, it is my great pleasure this evening to present Dr. Alexander Kossiakoff with a special recognition of his importance in the history of Johns Hopkins.

The President's Medal of The Johns Hopkins University is an honor extended by the University to individuals who have achieved unusual distinction. It has been awarded to heads of state, members of the United States Congress and Supreme Court, diplomats, literary figures, scientists, corporate chief executives, and others of great achievement.

Among the recipients of this award are Secretary of State Colin Powell, former President of the Philippines Corazon Aquino, Supreme Court Justice William Brennan, Toyota Corporation Chairman Soichiro Toyoda, Baltimore Mayor William Donald Schaefer, pianist Leon Fleisher, novelists Tom Clancy and Leon Uris, and the crew of space shuttle Discovery.

Today we are especially pleased to include Alexander Kossiakoff among the recipients of this honor. Let me read the dedication that accompanies this medal:

“The Johns Hopkins University President's Medal, presented with gratitude and esteem to Alexander Kossiakoff for extraordinary contributions to The Johns Hopkins University Applied Physics Laboratory, beginning with his guided missile development work in the 1940s, through his tenure as Laboratory Director (1969–1980), and continuing today in his role as APL's

Chief Scientist and as a University leader in engineering education.”

Dr. Kossiakoff, in recognition of your many outstanding accomplishments and your exceptional dedication to the Johns Hopkins Applied Physics Laboratory, and to our nation's defense, I am pleased and privileged to present you with the President's Medal of The Johns Hopkins University.

MEMORIAL TRIBUTE

On 30 October 2005, a Memorial Tribute was held in the Kossiakoff Center for friends, colleagues, and family members to remember and honor Kossy for his friendship and life contributions. Speakers from JHU, directors of the Laboratory, academic peers, and Navy sponsors were represented. The following are excerpts from the many tributes that were given.

Kossy made a significant contribution to every activity in which he was engaged. He provided strong scientific and technical leadership as well as dealing effectively with problems in administration and management. And he did it continuously for a career that spanned some 70 years, a prodigious accomplishment! When he was faced with some daunting technical or programmatic issue, he gathered his most knowledgeable colleagues and worked the problem until he was sure that they had found the best available solution. Problem-solving meetings could easily develop into marathon sessions. He seemed absolutely tireless, and relentlessly thorough. While he had a clear vision of the overall problem, he was quite willing to work on the details as well. He admitted to some satisfaction in working at that level, and I have some appreciation of that as well. You can't always be directing; sometimes you have to be doing. (Dr. Carl Bostrom, retired Director of APL, 1980–1992)



APL Directors, past and present. From left: Kossy, Carl Bostrom, Garry Smith, Eugene Hinman, and Rich Roca.

As I look back, to me he was like a conductor of a major orchestra, overseeing the hiring and proper arrangement of the individual players, selecting the music they would play, organizing and rehearsing them individually and in groups and constantly striving to ensure that each performance was “world-class.” However, unlike a conductor, he had no need to be out front. He preferred to let the players do their thing once he was sure they had properly prepared. . . . When people were asked by Kossy to help, they couldn’t say no because they knew he would always be there to help them when they needed it. . . . This Laboratory, this University, and this nation are deeply in his debt. And those of you still actively engaged in APL’s service to our nation have the challenging task of continuing to live up to his expectations. (Dr. Gary Smith, retired Director of APL, 1992–1999)

Kossy has left an indelible imprint on APL, devoting all his energies to the Laboratory. He was a persistent world-class problem solver and instilled this culture at APL. My time with Kossy was a fraction of his 91 years . . . but I do know that when I arrived at APL, I was uncertain how it was going to feel being the Director of an institution with a former Director—one might say, *the* former Director—present on a day-to-day basis. Would there be cheerleading from the sidelines, coaching, or something else? From the start it was clear that this kindly, experienced man would support me as I wished: coaching when that was needed and cheerleading when that was called for. No leader has ever been better served by a predecessor than I was by Kossy. (Dr. Richard Roca, Director 2000–present)

Occasionally, an individual will come along who not only leads an organization, but also becomes, by virtue of his achievements and personal qualities, an embodiment and ambassador of all the best qualities the organization represents. Such is the enduring legacy of Alexander Kossiakoff, known to so many with a mixture of fondness and awe, as

“Kossy.” Kossy will long be remembered and honored as the individual who gave shape and direction to the Applied Physics Laboratory as we know it today. Under his leadership, APL developed advanced systems for radar, air defense, strategic communications, submarine operations and spacecraft to advance national security and space science. Dr. Kossiakoff led, excited, and inspired thousands. His work helped defend our nation, enhance the capabilities of our Navy, push technology in new and exciting directions, and bring successive new generations to an understanding of the unique challenges and opportunities of systems engineering. But more than that, Alexander Kossiakoff was dedicated to the core competencies that are the bedrock values of APL: love of country; belief in the value of science and technology; commitment to engineering excellence; openness to new approaches and new ideas; enthusiasm for innovation; and a willingness always to be amazed, excited and captivated by the ideas of others. These attributes helped Kossy build not only a great research laboratory, but also just as importantly, a great circle of friends and admirers who deeply mourn his passing. His many contributions to the Lab, and to the nation that became his home, will be remembered and honored for years to come. (Dr. William Brody, President, The Johns Hopkins University)

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THE AUTHORS

Samuel J. Seymour received a B.S. in chemistry from the Rochester Institute of Technology in 1968 and a Ph.D. in physical chemistry from the University of Illinois. Since joining APL in 1973, Dr. Seymour has conducted research and managed programs in the Submarine Technology and Strategic Systems departments. He became the Laboratory Business Coordinator in 1991 and also serves as the Business Area Executive for Emerging Business, Deputy Chief Quality Officer, and facilitator for the Business Review Committee. Dr. Seymour has taught management and systems engineering courses in the JHU Engineering Programs for Professionals for more than 20 years and serves as the student programs advisor and coordinator of the partnership programs. He was appointed Vice Chair of the Technical Management and Systems Engineering programs in 1998. **James L. Teesdale**, a member of the Principal Professional Staff, is the Director of the APL Education Center. He is a graduate of MacMurray College and joined the Laboratory in 1969. He has contributed to APL’s internal training and development programs as well as the graduate education programs offered in partnership with the JHU Whiting School of Engineering. He serves on the APL Science and Technology Council and the JHU Committee on Part-Time Education. For further information on this subject e-mail Dr. Seymour at sam.seymour@jhupl.edu.



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