

16.895 Book Review Assignment

Space Age Management: The Large Scale Approach by Jim Webb

“Management is doing things right; leadership is doing the right things.”
-Peter F. Drucker

There has been much said about the unique challenges that NASA’s Program Apollo faced and overcame in its efforts to ensure that the United States of America was to meet President Kennedy’s goal: “before this decade is out, of landing a man on the moon and returning him safely to the earth.”¹ The engineering and scientific difficulties were manifold, with a diverse and supremely talented workforce assembled to themselves devise a complex system with millions of synchronous components and interdependent processes, little time or resources to exhaustively test every possible scenario, and even less margin for error. To have succeeded at all, much less in so comprehensive a fashion, much less while always “pushing the edge of the envelope”, much less while prevailing over unexpected and tragic setbacks, speaks highly of American global technical superiority during the height of the Cold War.

Less widely acclaimed, though equally deserving of any and all credit given the rocket scientist wizards who literally charted our path to the cosmos, are the men charged with the less celestial though arguably as or more critical roles of managing such a behemoth enterprise and seeing it to achievement. These men were the taskmasters, slavedrivers, and horsetraders who to the highest degree not only guarded the bustling and star-spangled sanctum of the engineers from the earthly impediments that often did not share the same political priorities and objectives, but also kept a project of immense proportions, staffed by people of incredible talent and creativity, moving in the same direction with the sights always set firmly on our nearest heavenly neighbor. These men made Apollo possible, with the right people in the right places at the right time.

It is easy, and human nature, to assume after the triumphant realization of a hard-earned goal that the outcome, though it was challenged from time to time by inconvenient obstacles on its way, was never truly in doubt. This is especially true for second-hand observers, decades after the fact, in whose mindset the accomplishment has always had existed. A revealing view about the “certainty” of NASA’s success in Project Apollo can be found, therefore, in a tome

¹ Kennedy, John Fitzgerald. “Special Message to the Congress on Urgent National Needs.” Joint Session of the United States Congress. Washington, D.C. 25 May 1961.

about the project's management, and the managerial values by which NASA calibrated its approach, composed right in the midst of the program.

Space Age Management: The Large Scale Approach, by NASA's second Administrator Jim Webb, offers such a perspective. The book, written in 1968 and published in 1969, was prepared for the McKinsey Foundation Lecture Series and was sponsored by the Graduate School of Business at Columbia University. These dates, it should be noted, fall after the successful culmination of Projects Mercury and Gemini, and after the tragic Apollo 1 fire, but before any Apollo hardware is even launched, much less safely on the surface of the moon. The work must be interpreted and understood from the historical position of the author, who in terms of time must have written it in a relatively short period with little time for the historical significance of his period in office to become apparent, and who in terms of position was no longer at the head of NASA, after leaving the organization following the conclusion of his internal investigation into Apollo 1.

Less of a scholarly look into the root and foundational issues faced by NASA's brass, and more of a motivational speech-style segmentation of core leadership dilemmas than any manager of a large-scale project might face, Webb draws upon his considerable experience in governmental and civilian enterprise to seek out the commonalities universally found in large-scale projects everywhere. Ranging in focus from doctrine vs. best practices, to society and the democratic process, to management and leadership in changing conditions, to the virtues of a flexible and adaptive organizational structure, Webb peppers his general musings on these topics with stories from his own career to illustrate his thoughts and evidence these examples as microcosms of his broader points. He naturally writes a good deal about NASA, still only 10 years old at the time, but other programs featuring prominently in his oratory. He discusses as a large-scale complex system the lead-up planning for World War II and notes that the organization and coordination of a war on a mass scale, and the subsequent advances by America during that time, are indicative of our "government by crisis", perhaps a condition inherent in a democracy. While Apollo and the space program in general may have been midwived by the Sputnik and Gagarin crises of American technical confidence, it would have been exhausting to conduct the entire decade-plus of the program in a state of extreme alert and panic; rather, according to Webb, a "multidisciplinary, large-scale effort" must be "more deliberate, more carefully planned, and more interrelated to a multitude of important activities than crisis

conditions permit.” He also spends considerable lines considering the lessons garnered from the Polaris missile program, the New Deal’s Tennessee Valley Authority, the Marshall Plan for post-WWII reconstruction, and the postwar revamp of the State Department to better serve the nation in the face of a complex and changing world. In these examples, he evokes remarkably modern and complex theories of management, speaking in turn about “feedback” and “closed-loop” systems thinking and good government stemming from good practices.

Of course the most interesting parts of the text are where Webb describes his experience in forming the leadership structure at NASA. From the first glance, the scope of the Apollo program by just the numbers is staggering. In five years’ time, NASA had to ramp up from a workforce of 75,000 employees to one of 420,000 employees, with a “level of annual outlay [that] has averaged less than half of Sears, Roebuck; one-third that of Ford; one-third that of Standard of New Jersey; and considerably less than that of General Electric, Chrysler, Mobil Oil, Texaco, U.S. Steel, IBM, and others.” As such, it was incumbent upon Webb to craft a leadership structure that was responsive and flexible, and that held as its watchword an unprecedented degree of collaboration with industry and universities.

After mulling the characteristics of the National Aeronautical Space Act, passed the Congress in 1958, Webb details the process through which NASA built as flat a hierarchy as would be possible in such a large effort. Asserting that the quick buildup of NASA was possible *because of*, rather than *despite* the democratic process, Webb extols the value of dissent in an organization that does not operate under a “Soviet-type arrangement” where decisions made upon high are binding and unquestionable. Indeed, if there were any question that Apollo was a symbol for the Cold War struggle, Webb says in plain, “we are, whether we like it or not, in the midst of a crucial and total technological contest with the Soviet Union.” The decision to include collaborators from all across the country was necessary to prove the openness of the American space program, assure a broad spectrum of support for the project’s long continuation by political time measurements, and simply to gather enough technical expertise to be able to actually complete the mission.

In a system of “continuing vote-taking”, and with the space program being a completely open one for all its failures and successes for the public and world to see, the best ideas would necessarily rise to the top and strengthen the organization. This would be an interesting claim to those who would half-jokingly suggest that the centralized NASA decision-making process

indeed proved the superiority of the Soviet political system, but it no doubt has its merits. Though, for example, John C. Houbolt did have to work through extraordinary means and use unconventional channels to promote his ideas about Lunar-Orbit Rendezvous, the fact that the idea did end up being championed at the highest levels does suggest an unusual degree of flexibility and merit-based anti-stodginess in an organizational structure. Such relatively novel measures would be necessary in what has been called “by far the largest program of its kind ever undertaken by a democratic society in peace time.”²

This is a book about management of large-scale projects, one of which might be space-related, rather than a book about the space program and how management may be a component. While it has references to work by C.S. Draper, the majority of the authors referenced are names such as de Tocqueville, Toynbee, Ambrose, and the Bureau of Budget. In Launius’s categorization, this would probably fall under “Policy History and Analysis” but really is a look all its own into the assuredness before affirmation into the right way to lead an organization to break new ground, and do so based in American principles and values.

word count: 1484

² Wolff, Harold. “The Impact of Science on Society.” American Behavioral Scientist, Volume X, Number 9 (May 1967): pp. 5