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17.312/ESD.85/STS.461  
September 25, 2005

Response paper: *Rescuing Prometheus*

While I have enjoyed Hughes' other works, I found *Rescuing Prometheus* a bit of a bore. The message of the book that stands out is, in Hughes' own words, "engineers and scientists managing the projects have often found that management has presented more difficult challenges than research and development... the present-day preeminence of the United States in the creation of large systems arises in large part because of its managerial prowess." (5) With apologies to the engineers in the class, that's not news. When several engineers recommended this book in the spring as descriptive of what "systems engineering" is all about, and indicative of how engineers approach the world, I found this revelation painfully obvious. There is, after all, an entire building across the street filled with Sloanies who ostensibly dedicate their studies to this important concept of 'management'. The community resistance problems that Hughes refers to with the Big Dig, any political scientist could have predicted with their eyes closed—wouldn't you protest and sue someone if your house started sinking? Upon further reflection, perhaps what this book reveals is that this discovery of the importance of management was not so obvious to engineers, a fact that in itself can tell us a lot about engineers, or at least those that Hughes writes about. Certainly the engineers I have encountered in my life, whether those of my parents' age or those of my generation, have found the notion of management being important to project success as obvious as I do, which makes me wonder if the engineering-egghead stereotype is perhaps just that, a stereotype, and a bit of an endangered species to boot.

The rationalization of project management, with quantification and prediction (future-oriented approach) based on models and theories (and less on trial-and-error as in the earlier

Atlas and SAGE projects), and a computer to crunch those numbers, seems to be the main focus of systems engineering as described by Hughes. To this political scientist, it smacks a bit of Taylorism applies to projects, with a dash of McNamara and the Whiz Kids' style of analysis. The notion that people from multiple fields, rather than a single branch of the military or a single company, might be needed – per Hap Arnold's realization that defending against future threats by developing ICBMs and jet bombers required the continued involvement in military R&D of the nation's top non-military scientists and engineers -- was, as Hughes notes, far-sighted. But again, that's nothing new or earth-shatteringly brilliant: not only the German V-2 project, but the US's own Manhattan project just a few years earlier had amply demonstrated that fact.

I found it interesting that all of the projects were large-scale, government-funded projects, and that Hughes compares these to the pyramids, Europe's cathedrals, and the Middle Eastern irrigation projects. (Are the first two valid comparisons, since they weren't for national defense and used slave/ corvée labor?) Why only government-funded projects? Is it simply because only government projects get that big, or because only the government has that much money to throw around? I found it particularly noteworthy that Hughes' assessment of the main benefits of the SAGE and ARPANET projects was the spillover effect – not that the project goal itself worked particularly well, but that having that much money and talent sloshing around for an extended period built up a cadre of human capital that would later go on to do big things.

Would a large-scale industrial project be suited to such an analytical/ management approach, assuming one could find a non-government project that large? Or could “systems engineering” also be applied to a smaller project? Why are three of four of them military projects? (And I suppose, since much of the Big Dig is funded under Eisenhower's Interstate Highway Act on grounds of national defense infrastructure, that's technically a military project, too.) Does it

make a difference if the main consumer is civilians, since it will lead to more fingers in the pie, more publicity and thereby more political scrutiny? The bureaucratic infighting and power-grabbing between all the alphabet-soup agencies described in the Big Dig chapter read like standard bureaucratic politics with a skillful bureaucratic player to me, nothing overly surprising or insightful. Why do so many of them involve the military-industrial-academic complex? It seems to me that a project could involve an equally large number of actors who are not in those categories, and yet still be equally complicated. Does it make a difference if the project uses non-military contractors? Does the flattened management structure and style of the ARPANET apply more to certain types of organizations or projects than others, and if so, which kinds?

Overall, I'm not sure if this book leaves me wanting more or less. Less, for sure, if it's to be more of the same. Hughes is a good writer and has clearly done his research, and he has chosen several important projects. However, as it stands, it reads like an accumulation of interesting stories about some major projects, without too much new information.