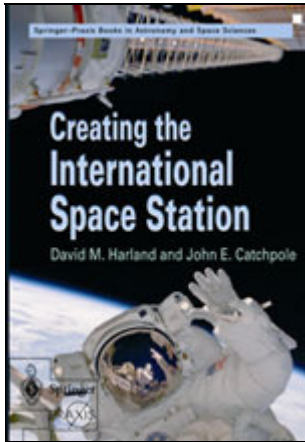


by David M. Harland and John E. Catchpole Springer-Praxis Books in Astronomy and Space Sciences. Published in 2002. 395 pages.

Review by Dr. Franz Newland



In this 2002 addition to the Springer-Praxis series on Space Science, Harland and Catchpole provide a fascinating account of the scientific, technological and political roots and development of the international space station from its early designs post-Skylab through to the first space station utilisation flight with Expedition 4.

In light of the changes to the space station development program following the Columbia tragedy, it may seem that the text has been superseded by events. In practice, however, the text's publication shortly prior to the loss of Columbia and her crew mark it historically. With hindsight, it is clear to see from this text the effects both of budgetary pressure and the growing complacency of the Shuttle as an operational, rather than research, vehicle. This is captured in references to events such as the Kraft panel review of Shuttle costs, part of NASA's overall cost-cutting exercise to find the budget for the station. It is also present in the oversights, such as the lack of discussion of the Shuttle as a potential single-point failure in the critical path of the ISS development.

As a historical document, it traces shuttle faults such as the external tank explosive bolt problems as seen in flight STS-106 (which was amongst those criticised in the Columbia Accident Investigation Board's report as insufficiently investigated following detection), and sits them in the context of the time. There is even reference to the once-considered proposal for Columbia to have been decommissioned and cannibalised to produce a single-module space station core, to allow the complete station to be assembled in a mere 10 flights. The rejection of this proposal could be added to the long list of twists of fate that may have changed the course of recent history.

What comes across particularly clearly is how remarkable the current achievement of the station is, following the number of political and financial hurdles faced throughout its history. It shows that whatever the technological and scientific arguments for or against the station, its reason for being has always first and foremost been a political tool, whether as a demonstration of strength or as a peace offering and means of promoting goodwill. The project's cutbacks and near-cancellations are equally attributed to the same fickle political masters. As has been said about the shuttle before it, the nature of major redesigns of otherwise potentially sound technical bases for a space station, for mostly political motivations, has resulted in a project that in little way resembles the original plan. Perhaps this is one of the most important reasons why this book is relevant for all space engineers and scientists, as a clear example of the need to work with political and financial groups and to express technical and scientific need in clear and compelling terms to achieve success.

Despite, or maybe in addition to, this political background, the relevance of the text for spacecraft operators is manyfold. The strength and importance of flexibility in operations planning is shown by the successful operations by the Russians over their many years of dominance in the field. This includes both technical and more recently financial motivations for replanning as demonstrated by their success in commercialising their space expertise. The initial difficulties but ongoing ingenuity and ultimate success of US designers for mapping technology to the changing needs of their political masters is equally shown, providing a number of useful lessons for operators for combining and translating technically or scientifically-sound arguments to politically and financially acceptable ones. In cataloguing the list of contingencies addressed both by Russian and American teams over the lifetime of manned space stations, the robustness and maturity of the technology and the ingenuity of the people involved to address the crises is well presented. Finally, a sufficient level of detail of the technical problems encountered is provided, presenting design and operations solutions and contingency scenarios still relevant for implementation and training today.