SLAVA GEROVITCH, **Soviet Space Mythologies: Public Images, Private Memories, and the Making of a Cultural Identity**. Pittsburgh: University of Pittsburgh Press, 2015. Pp. 256. ISBN 978-0-8229-6363-9. $27.95 (paperback).
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This very readable book provides a new insight into the Soviet space programme and the way in which it has been presented to the world, both at the time and subsequently. As with so much in the USSR, the space programme was shaped for propaganda purposes, with failures painted quietly out of history. The book is not so much a straightforward factual account of Soviet achievements in space (that can be found elsewhere) but a study of image and the manipulation of collective memory.

Following an introduction featuring a discussion on the nature of memory, Chapter 1 begins the book proper by considering the practical ways in which the enduring myths about the Soviet space programme were crafted: through, for example, the removal of military personnel from photographs in order to give the impression of an entirely peaceful civilian endeavour. We learn about the idealization of famous figures, and the use of ghostwritten biographies of cosmonauts that cast them in the same mould as the Soviet heroes of aviation of an earlier generation. The overall theme is that 'memories' of the space programme were presented as they 'ought to have been', rather than how they actually were. 'Countermemories' were largely confined at this stage to the diaries of the people involved.

Many of the figures of the heyday of Soviet spaceflight came to look back on the Stalin era as a 'golden age of rocketry', for reasons outlined in Chapter 2. The collective memory of the Stalin era was one of discipline, responsibility and organization, in contrast to the conditions of the decentralized Khrushchev-era space programme. The shaping of this view is presented as having arisen in part from the interplay of two processes: the development of the space industry, and the formation of a professional culture of space engineers as a bona fide subset of the Soviet intelligentsia during the 1950s and 1960s. The disorganization that was often present during the Khrushchev era led to a nostalgia for Stalin's times.

A major theme of the book is the conflict of views between the cosmonauts and the space engineers as to the role that the cosmonauts were to fulfil during space flights. The cosmonauts, being test pilots in many cases, were keen to have some control over their craft, whereas the space engineers, mostly particularly Chief Designer Sergei Korolev himself, viewed a cosmonaut merely as a further component in a carefully crafted machine – and the least reliable component at that. The cosmonauts, and their champion, the head of cosmonaut selection and training, Nikolai Kaminin, had to fight for the slightest degree of manual control, not only in the interests of keeping the cosmonauts occupied during flights, but also simply to enable them to act in the case of a failure of the automated systems. This stands in stark contrast to the way in which the cosmonauts were presented in the Soviet media (as described in Chapter 3) as dynamic pilots and heroes, representative of the 'New Soviet Man', citizens of a future communist state.

Chapter 4 presents the story of Gagarin's historic space flight through a sequence of documents, with the goal of stripping back the myths to find the reality: the documents used are in their original forms, rather than the edited versions given out for public consumption, or indeed for those higher up the Party hierarchy, from which all errors and minor glitches were removed to present a picture of an entirely smooth operation. More generally, Gagarin's flight is used 'as a window into the world of Soviet cosmonautics' (p. 69). Moving from the first cosmonaut to cosmonauts generally, Chapter 5 revisits the issue of automation versus manual control, and the tensions that remained between pilots and engineers, particularly when the way was opened up for the latter to go into space themselves. As a consequence, and in contrast to the US situation, no single clearly defined idea of a 'cosmonaut' was able to develop: instead, a fragmented profession consisting of 'pilot–cosmonauts', 'engineer–cosmonauts' and, later, 'scientist–cosmonauts' was the result.

Nevertheless, the Soviet state remained able to exploit the hero status of cosmonauts for propaganda purposes (as outlined in Chapter 6), laying a heavy burden of public engagements and of high moral expectations on the cosmonauts. With the foundering of the Soviet lunar programme, however, it became less beneficial for Soviet politicians to appear with cosmonauts, and so the latter gradually became less visible in public life.

Chapter 7 brings the book full circle by returning to the questions of collective memory discussed at the beginning. Here we consider the way in which cosmonaut images and myths are used nowadays to bolster the Russian state, and perhaps also to compensate for the country's loss of superpower status. Latter-day politicians find it expedient to invoke this shared heritage, and the modern Russian space industry anticipates the financial rewards of playing along. Thus, just as in the Soviet era, myths about space history may be more beneficial than the truth. The cultivation of such myths, of course, continues to this day, and is not simply a matter of history, but this fascinating book shows how techniques for the careful manipulation of this particular element of Russian cultural heritage have their origins in the Soviet era.

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Erik M. Conway, **Exploration and Engineering: The Jet Propulsion Laboratory and the Quest for Mars**. Baltimore: Johns Hopkins University Press, 2015. Pp. 416. ISBN 978-1-4214-1604-5. $34.95 (hardback).
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Erik Conway, who is best known for his work on *Merchants of Doubt* (2010), used to be the in-house historian at NASA's Langley Research Center in Virginia and moved to become historian of NASA's Jet Propulsion Laboratory in California in 2004. It is this laboratory, federally funded and managed by Caltech for NASA, that the current book focuses on. Although the book is about NASA's activities in the exploration of Mars, it is a view, as Conway says, from a specific centre responsible for 'advocating, managing, designing, testing, and operating' spacecraft, not from headquarters (p. 8). The book focuses on the work carried out at the Jet Propulsion Laboratory, giving a mission-by-mission view of the centre's work. The book is concerned with the evolution of engineering and management knowledge. It focuses on the managers and engineers at the Jet Propulsion Laboratory who designed and oversaw NASA's robotic missions to Mars from 1996 to 2004. Conway illuminates many engineering challenges in detail in order to demonstrate how different interests interacted and how learning passed – or failed to pass – knowledge from one spacecraft to another.

Conway sets out to treat both successful and failed missions 'as symmetrically as possible', a symmetry that is possible – and indeed is especially valuable – because the actors analysed failure and changed their actions explicitly as a consequence of the knowledge gained from previous missions (p. 193). Because it was not clear even at launch which spacecraft would successfully fulfil their mission and which would mysteriously disappear (prey to the 'great galactic ghoul'), there is documentation of all the missions no matter what their outcome (p. 62).

Exploration and Engineering is not really a book about Mars science, but because scientists are constantly involved in mission design – indeed one of Conway's conclusions is that communication between the scientific teams that design missions and the engineering teams that build the machines to carry them out is crucial to a successful mission – they are present throughout the book. Conway pays attention to the interests of scientists, but, as he concludes, 'Scientists' desires were one driver of Mars exploration strategy, but not the only one' (p. 330). Ironically, as Conway mentions, the public enthusiasm for Mars, which makes possible exploration now, culminates in enthusiasm for human habitation. So this enthusiasm will ultimately pit scientists interested in a pristine planet to study against the public that funds their work.