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The Universe will be televised: space, science, satellites and British television production, 1946–1969

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This essay uses material from the British Broadcasting Corporation (BBC) archives to show how space-related technoscientific activities played a key role in the development of BBC television. The essay focuses on a crucial period when this influential cultural institution transitioned away from radio as their primary broadcast medium in the 1930s and 1940s to reluctantly embrace television in the 1950s and 1960s. Space-related activities, including astronomy, cosmology, rocketry, aerospace engineering, astrophysics and interplanetary research, played a key role in the modernization of BBC television broadcasting in two intersecting ways. Space-related material provided informative, yet popular, programmatic material that helped BBC television compete in an increasingly commercialized media market, and, later, space projects supplied technologies that impacted on the mechanics of broadcast production and transmission. The profile and prestige of space as a topic, in particular, its visuality, the drama of exploration it presented, and its association with celebrity scientists like Bernard Lovell and Fred Hoyle, meant that such programming became a crucial business asset for the BBC and a professional asset for ambitious producers who saw its commercial potential. Following the launch of Sputnik in 1957, space technology became further intertwined with the development of British broadcasting as the fields of satellite communications and broadcasting transmissions infrastructure converged. In particular, BBC producers promoted the potential development of communication satellites within their television programming by portraying such satellites as plausible and necessary for the advancement of civilization, and most crucially, as a prospective British Space Race achievement.

Keywords: television production; outer space; communication satellites; popular science; BBC; astroculture

In September 1959, the British Broadcasting Corporation's (BBC) Scientific Advisory Committee, under the ionospheric physicist Sir Edward Appleton, delivered an end-of-decade report to BBC Chairman Arthur fforde. Just less than two years after the launch of the world's first satellite Sputnik, this report was part of a wider 'stock taking' on the part of the BBC designed to summarize the progress made to date and provide recommendations to secure its future. The main conclusion of the report was that the BBC should implement policies that would allow the organization to 'continue to extend its status' in the broadcasting industry.[1] At this time, the BBC, as a public service institution, was under increasing pressures to compete for audiences with commercial television broadcasting rivals both at home and abroad. Space-related technoscientific activities in all forms, including basic scientific research, engineering, applied sciences

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and medicine, would become a crucial resource for BBC television in countering and adjusting to the changes in the broadcasting marketplace in the postwar period on two fronts: by providing informative, yet popular, programmatic material, and by supplying technological developments that impacted upon the mechanics of broadcast production and transmission.

The BBC was formed in 1927, as the British General Post Office constructed a public service monopoly corporation that sought to combine the best of both civil and commercial values.[2] Its first Director-General, the Calvinist and paternalistic Scottish engineer John Reith, oriented its broadcasting policy around three core values: education, information, and entertainment. Reith, who believed that radio programming could be a means of culturally improving the citizenry, favored the tenets of information and education and saw entertainment as an unfortunate necessity.[3] However, from its inception, the operational commitment of the BBC to cultural improvement was continually tested by its need to compete with other media outlets for audiences. In particular, when faced with the onset of private-sector rivals for the attention of listeners on radio in the 1930s and, later, television viewers in the 1950s, BBC broadcasters were being forced to embrace a more pragmatic programming policy that favored entertainment, but which still maintained educational and informative values. The challenge for BBC producers was to devise a strategy that would allow them to compete with commercial outlets for audiences while still fulfilling their public service mandate.[4]

In this paper, we show how space-related technoscientific activities played a key role in the development of BBC television during a crucial time period in which this influential cultural institution transitioned away from radio as their primary broadcast medium in the 1930s and 1940s to reluctantly embrace television in the 1950s and 1960s. Until the 1920s, space-related technoscientific activities primarily consisted of research related to astronomy. During the next 50 years, however, space-related technoscientific activities diversified to include cosmology, rocketry, aerospace engineering, astrophysics, and interplanetary research.[5] In diverse ways and in diverse circumstances, our actors appropriated different aspects of such space-related technoscientific activity to their own ends. In terms of their programming, broadcast producers tended to conflate all space-related material featured in their programming under the monolithic label of 'space science' which we will refer to more appropriately as 'space technoscience.' This term also encompasses satellite communications, which, although comprising many different aspects of space technoscientific activity, was regarded by our historical actors as a technical development in 'broadcast science.' In most cases, contemporary broadcasters within the BBC regarded 'space,' in all its guises, as a potential business asset.

Revealing and examining internal corporate negotiations within the BBC can discern the effect of space technoscience on media culture, which has so far been the subject of rare scholarly attention.[6] In this paper we use material from the BBC archives to argue that space technoscience played a key role in the modernization of British broadcasting at a time of great flux in the marketplace. Programs featuring space-related material provided broadcasters with a flexible tool that allowed producers to respond to changing demands: it had educational, informative and entertaining aspects – especially following Sputnik – that could be emphasized in different proportions depending on pressures to adhere to the public service mandate or, increasingly, to cater to changing audience demands for diversion. The launch of Sputnik also offered a potential avenue by which the BBC could seek to revolutionize methods of broadcasting production and output, particularly television transmission, and maintain their industry leading position. Satellite communications offered broadcasting organizations the potential to cover some of the

major events of the century – such as manned spaceflights – on their own terms and then broadcast these events to new global audiences. In this way, artefactual space developments became entwined with the vested business interests of BBC broadcasters, though the BBC would ultimately suffer in terms of competing in both programming and in infrastructure in an increasingly consumerist industry.

Inevitably, as broadcasters explored the utility of space technoscience as a programmatic resource, the BBC's prominence as a media institution meant that it played a significant role in the popular and cultural definition and meanings of 'space' during the mid-twentieth century. The aspects of space-related activities that were amplified by broadcasters were the result of a number of complex macro and micro production factors. In his work on the visualization of outer space in German newspaper and television coverage, Bernd Mütter argues that astrofuturist ideas, general media tendencies, and geopolitics played important roles in determining the meaning of spaceflight as communicated in the mass media.[7] Our essay complements Mütter's analysis by forensically examining the internal business pressures on a broadcasting organization that influenced the construction of images and representations of space promoted and amplified by BBC television in the mid-twentieth century.

Space historian Alexander Geppert defines 'astroculture' as a 'heterogeneous array of images and artifacts, media and practices that all aim to ascribe meaning to outer space while stirring both the individual and the collective imagination.'[8] We find that it was competition and consumerism that influenced the astrocultural tropes featured by BBC television producers in the 1950s and 1960s when commercialism intensified within the broadcasting industry and television became the dominant medium. One of our goals is to avoid what is a tendency in much cultural analysis to reify the concept of the 'media.' We want to provide agency for broadcast professionals by recognizing that the media is composed of individuals who create cultural products, including astrocultural products, based on their own motivations, constraints and the contingencies of industry and market.

BBC producers regarded space technoscientific material as possessing intrinsic cultural importance and its spectacular, dramatic and, above all, visual, qualities became increasingly valuable in their television programming, particularly astronomy and spaceflight. In addition, as some BBC broadcasters embraced the notion of a global civilization linked by instantaneous space communications, they began heavily promoting the positive and plausible implications of the development of satellite technologies within their programming. For media producers, it was personal and corporate motives that influenced the images and representations they disseminated as astrocultural narratives.

Public-service populism: space technoscience on BBC television, 1946–1956

The BBC's television service resumed its broadcasts in June 1946 following its wartime suspension for defence reasons. Programs on science, technology and engineering were not a regular feature of post-war television schedules. By the end of the 1940s, the only television programs dedicated to such topics were *A Question of Science* and *Inventor's Club*. This conspicuous absence of science on TV was an extension of interwar practices at the BBC in which science, technology and engineering programs were largely confined to the medium of radio where specialized science broadcasters had crystallized into an embryonic profession.[9]

The post-war nationalism associated with the latest British scientific discoveries, such as the origins of meteors at an early manifestation of the Jodrell Bank radio astronomy station and others highlighted by the 1951 Festival of Britain, provided producers at

BBC radio with ample programmatic material and convinced the broadcast organization's executives that radio science programming was a natural and valuable genre.[10] Maurice Gorham, Controller of the new, less highbrow Light Programme, felt that science on the radio was a 'foregone conclusion,' while Archie Clow, a popular historian of chemistry, became a third producer specializing in science programming, and, alongside Cox and Adams, formed the newly formed BBC Science Talks division in 1946.[11] Science broadcasters found that their value as a corporate resource was accordingly increased because of their expertise in producing radio programs that could exploit the newsworthiness of post-war science to capture audience share. Many aspects of space technoscience were promoted and amplified as national showpieces. Astronomy and cosmology formed a foundation of scientific programming matter on the radio because of its significant amateur enthusiast audience and the prominence of celebrity scientists such as Jodrell Bank Director and wartime radar development veteran Bernard Lovell and forthright and sometimes controversial cosmologist and science fiction writer Fred Hoyle.

Science programming and the ethos of BBC radio seemed to go hand in hand, but many young producers within BBC television felt that it was not an ideal medium by which to showcase the visuality of science, especially space-related activities. In the late 1940s, however, the technology of television was still rudimentary and BBC executives, including Director-General Sir William Haley, were not keen on encouraging its development. Indeed, they considered television as secondary in importance to radio and they prevented television from having any independent or central status within the BBC.[12] BBC executives were primarily wary of the 'populism' associated with television that went against their mandate as a public service broadcaster.[13] In the early 1950s, though, the politically motivated breaking of the monopoly with the Independent Television Act of 1954, and the associated investment of commercial media outlets in visual broadcasting networks from September 1955 such as Independent Television (ITV), forced BBC executives and producers to move resources away from radio and devote them to the Television Service if they were to continue to compete for audiences.[14] Radio's science programming suffered from the BBC's shift in resources towards television. In 1953, *Journey Into Space* was the last radio science program to attract a bigger audience share than a television science program.

Science broadcasters within BBC television, such as Grace Wyndham Goldie and Aubrey Singer, understood that television science programming could be popular yet temper the populism BBC executives assumed was inherent to the visual medium. These producers had felt isolated by the BBC's neglect of television in favor of the 'spoken word.' They saw science programming as an opportunity to advance professionally internally and to help the BBC modernize to meet the challenge of external rivals. When television producers began to consider science programming they looked to the experiences with science on the radio. Goldie, Singer, and other ambitious television producers singled out space technoscience as an ideal subject for nascent television programming. Indeed, they believed the popular appeal of space technoscience was much better suited to the visual medium of TV rather than the audio platform of radio. They argued that radio was an inadequate medium by which to convey developments in space technoscience and that television – itself an emblem of post-war modernity – could better express and communicate such developments. They felt that television and space technoscience both appealed to Western modernity's focus on visual culture and the frontiers of knowledge.

From the late 1940s, in the earliest manifestations of television science programming, space subject matter regularly featured. Astronomy, in particular, was considered by science broadcasters to be one of the simplest subjects to render on television at this

stage of the medium's development, while, at the same time, being familiar, educational, and visually striking. In the summer of 1949, for example, producer Andrew Miller Jones proposed to Head of Television Programming Cecil McGivern that astronomy could be the source of 'spectacular' visual programs that could not 'fail to fascinate the human mind.'[15] Therefore, rather than profiling the pedantic intricacies of the latest space physics discoveries, he suggested a program visualizing the Moon and solar prominences coming out of work done within the Royal Astronomical Society. Director of Television George Barnes noted to Cecil McGivern, additionally, that there was a 'small though zealous interest among a large range of people in astronomy' that could be exploited.[16] In such programs, a certain amount of research was presented but a major focus for producers was on providing a visual 'wow factor.' Space technoscience, more broadly, also offered television broadcasters a supply of new prominent British celebrity space scientists to add both authority and drawing power to their output, including radio astronomer Lovell and radar and ionospheric physicist Edward Appleton.

Although images from telescopes were fairly easy to televise, representing other aspects of science and space on television was more challenging to realize as the technology of television production and transmissions infrastructure was still developing.[17] For example, in response to a query from Andrew Miller Jones regarding a potential production on astronomy and stargazing in 1950, BBC television drama and documentary filmmaker John Elliot noted that a planetarium would not reproduce well on television but that it should be possible to satisfactorily 'photograph the moon through a telescope' at the Royal Greenwich Observatory.[18] Broadcasting technology, infrastructure, and techniques all improved rapidly in the early 1950s to the extent that science programming could take advantage of the televisual medium. Scientific material was found to be malleable in offering the prospect of being presented in different and new broadcasting genres. Features department producer Nesta Pain recognized the fact that broadcast popular science could be presented in the form of news, features, talks or documentaries.[19] Science was even flexible enough to provide the basis for fictional television dramas.

One BBC division that was particularly eager to exploit these new opportunities was Television Talks, founded in 1953 and headed by Mary Adams, Leonard Miall, and Grace Wyndham Goldie. Within this division, producers such as David Attenborough, Andrew Miller Jones, George Noordhof, Paul Johnstone and James McCloy began to specialize full-time in producing science on television. For many of these producers, space technoscience had enough prestige and televisual appeal to make it an asset for the division and BBC. Indeed, more 'dramatic' aspects of space activity, such as the futuristic imaginings and experiments at the frontiers of space knowledge, could now be showcased and exploited. In some early Television Talks planning discussions, Paul Johnstone suggested that spaceflight's visuality and progressiveness would make it a 'natural as a programme and arouse a good deal of interest and publicity' as well as attracting viewers. Johnstone added that such a production could also play an informative role by helping to 're-adjust the balance in the popular mind between the lurid 'space-ship' nonsense and what is in fact scientifically feasible.'[20] George Noordhof also stressed the entertaining and educational aspects of spaceflight in early meetings by proposing various programs on the 'conquest of space.'[21]

Though the Television Talks team remained the centre for scientific programs in the 1950s, other BBC divisions sought priority to showcase and, thus, exploit new developments in the fields of space technoscience. Executives in the Documentary and Magazines departments, and especially the Outside Broadcasts and Features (OBF) department headed by Aubrey Singer, were also eager to both exploit and foster the prestige and

fascination surrounding space technoscience. Singer and the OBF department would become significant rivals to Television Talks for space technoscience programming in the 1950s and 1960s. Editors in the News Division also encouraged their staff to report on topical scientific matters such as developments with the iconic Jodrell Bank radio telescope.[22]

Television science broadcasters secured their value to the BBC in the 1950s and 1960s by producing programs that attracted and sustained audiences *and* demonstrated a commitment to their public service mandate. Broadcasters reflected and promoted those aspects of space technoscience that were most televisual, and thus, would win ratings, and, in the process, bestowed significant cultural status to those aspects. With the onset of the International Geophysical Year (IGY) in July 1957, and the prominence of space-related activities in other media, including newspapers and radio, television broadcasters were motivated to focus ever more closely on the explorational, scientific, and futuristic aspects of space activity. One episode in James McCloy's and Arthur Garratt's *Frontiers of Science* series focused on high-altitude aviation and space medicine. McCloy himself was pleased with the program's 'interest, integrity, and liveliness on screen.' Of more relevance to the BBC was that the program 'occupied a large percentage of the adult television public who largely enjoyed it more than usual televised talks or documentaries,' despite the difficulties of visualizing space on television.[23] Similarly, OBF productions such as *The Restless Sphere* – the story of the plans for the upcoming IGY heavily featuring Lovell and Jodrell Bank as a flagship contribution even though the telescope was not quite operational – were both big science and big television.[24]

Throughout, space on television became a crucial business asset for BBC television as many producers, such as Singer and Goldie, exploited events that would be both highly topical and culturally important. The extent to which BBC broadcasters sought to utilize the popular interest in space technoscience, while avoiding accusations of populism, was embodied in the introduction of *The Sky at Night* beginning in April 1957. The program was produced by Paul Johnstone and presented by amateur astronomer Patrick Moore. This still-running series exemplified how, and why, space technoscientific programming was an asset to the BBC. Johnstone and Moore pitched the amateur-oriented series to BBC executives as a way to *entertain* lay viewers and *inform* the significant minority with an interest in astronomy.[25] Above all, however, science broadcasters believed that such programming, generally, 'could be made into very good television' if approached with imagination and originality in production.[26] Even the BBC's Board formally acknowledged the importance of science broadcasters to BBC television in satisfying audience demand. Viewer reaction to *The Sky at Night* suggested there was a public 'eagerness' for scientific programming about space that was dramatic but serious.[27]

The BBC was an industry in flux in the late-1940s as it transitioned from a focus on radio to television broadcasting. Space on television helped to modernize the BBC during this time by providing producers with a topic that could attract viewers while maintaining the Reithian ideals of being educational and informative. This acknowledgement of science programming as a competitive resource was echoed and reinforced by McGivern's successor as Controller of Television Programming (or Director of Television), Kenneth Adam. Adam offered to invest more resources in the BBC's science production 'strength,' so as to be able to produce science programs in suitable formats to compete with the increasing quantity of popular science being presented in the print media and by their commercial broadcasting rivals.[28] The News and Current Affairs division also strengthened its specialist expertise when David Wilson joined Aerospace Correspondent Reg Turnill as the first Science Correspondent for BBC Television News, with both acting, for most of the 1960s,

as space correspondents for television and radio respectively, as Director-General Hugh Carleton Greene invested heavily in the News division as the corporation's flagship team.[29]

Just like television itself, science broadcasters saw space-related activities as symbolic of an emerging technoscientific age. Their programs reflected astrocultural advocates' ideas of space as progressive and they presented positive images of an assumed expansional Space Age future, in which it was hoped all humankind would contribute, as with the IGY. These science broadcasters focused mass attention on certain astrocultural narratives in their efforts to extract value from space programming as a corporate tool. Their primary concern was the performance of the BBC as a business, especially as a public service institution adjusting to an increasingly populist marketplace. Space science helped them broadcast 'good television,' and, thus, led to a host of space science related shows into the late 1950s.

Primed for Sputnik: science broadcasting moves into the Space Age, 1957–1969

In the autumn of 1957, Leonard Miall charged his Television Talks team with generating ideas and topics for forthcoming programs in the *Frontiers of Science* series to ensure that the BBC continued to compete for the popular interest in science. James McCloy, a trained zoologist who was now the most prolific and expert science broadcaster within the BBC, responded to Miall's call for ideas:

> I am going to do rockets and space travel. There has been a great deal of talk and writing about space travel and people are confused about the scientific possibilities. I think the programme can be both (sic) entertaining, interesting and responsible.[30]

His timing was fortuitous, for in October that year the Soviets placed the world's first artificial satellite Sputnik I into orbit. Given their previous work on space programs, BBC television science broadcasters were primed to capitalize on the demand for related programming following Sputnik, as the technological surprise caught the world off guard and changed international relations for years to come.[31] Competition between the superpowers to demonstrate their technological superiority by undertaking scientific, technological and engineering activities in space offered the potential for science broadcasters and the BBC to find new professional and competitive edges. Many producers within the BBC felt these activities outside the bounds of the Earth – at first, satellites, and, later, spaceflight – were intrinsically topical, political, and cultural, as well as dramatic and entertaining. McCloy, for example, reacted quickly following Sputnik, producing a program exploring the possibilities of human space travel featuring astronomer Patrick Moore less than a week after the satellite's launch. In addition, the 19 October 1957 edition of the recently developed *Sky at Night* program featured Moore bringing the latest news of the Soviet satellites. Audience research suggested that the majority of people found the program 'especially interesting,' though, of course, the reaction was neither representative nor unanimous.[32]

As controllers of an increasingly powerful and ubiquitous medium, television broadcasters played a significant role in popularly constructing Sputnik and its aftermath as a pivotal moment in the Cold War – the 'opening of the Space Age.' In the process, science broadcasters shaped contemporary astroculture by focusing on orbital activities as a business resource. Indeed, producers somewhat mirrored space advocates like the British Interplanetary Society (BIS) in selectively presenting images and representations of space research and activities in such a way that glorified space technoscience, especially featuring the role of the nation's experts in these endeavours.[33] The Jodrell Bank radio

astronomy telescope was in the final stages of construction and testing when the Soviets launched Sputnik. Within a week the telescope wass hastily pressed into action to confirm the orbital status of the satellite by tracking its carrier rocket, though it was far from the first to do so. BBC producers were quick to exploit this British accomplishment. Lovell and the beleaguered project's supporters were also happy to work with these producers to promote the demonstration as proof of the telescope's world leading capabilities. In the process, television broadcasters overemphasized the contribution of British radio astronomy and astronomers to the events and elevated Lovell and the Jodrell Bank observatory to iconic status within Britain which secured the telescope's future.

Sputnik enhanced a direction the BBC were already going with their science coverage towards space technoscience. Television producers in the Talks division, for example, told the BBC's Board that they felt that their 'planned emphasis on [Soviet] science and technology during this period was given point and impetus by the launching' of Sputnik.[34] By this point, BBC executives were convinced of the value of science broadcasting and science programming as a key corporate resource. Director of Television Kenneth Adam was a particular champion of science programming. Adam had been motivated by Fred Hoyle's early 1950s criticisms in *The BBC Quarterly* of broadcast science and was 'determined to see the popularization of science take a big, planned leap forward.'[35] Adam was convinced by the high profile and prestigious nature of space technoscience in the post-Sputnik age that programs focusing on such space-related events could play a key role in allowing the BBC to compete with ITV in entertaining audiences yet not be accused of abandoning the Reithian ideals of being educational and informative. The popularity of Lovell's 1958 Reith lectures, *The Individual and the Universe*, also showed him that stories about space science could attract large audiences.[36] Adam was also drawn to the visual splendour present in space-related activities like rocketry and astronomy. Several complex OBF productions, such as the 1958 show *Breakthrough* following the story of rocketry and satellites, included live footage from Jodrell Bank which was seen to be a 'natural' television studio.[37] Photographs transmitted by the Russian *Lunik III* from the far side of the Moon were included in the October 1959 edition of *The Sky at Night* further demonstrating that science programming based on the latest events in space could be invaluable to television broadcasters.

Although there was a demand for space focused programming post-Sputnik, and an eagerness among specialist producers to actively address this demand, BBC science broadcasters still found that the technological complexity of producing space programs remained. These difficulties meant that television science productions required a considerable expert staff and was a time consuming and expensive business. The BBC, with its restricted public budget, was unable to allocate sufficient resources for the necessary transmissions infrastructure to cover many of the Space Age events on television. Radio coverage, such as of the Mercury program, was still often easier to realize until the mid-1960s even though it was not as attractive for the presentation of space activities. Still, space-related programming on television remained an excellent way for the BBC to attract viewers and, as BBC producers believed, maintain a focus on educational programming in the late 1950s and early 1960s. However, the influential 1962 Pilkington Committee Report on Broadcasting called into question this perception that programs devoted to space technoscience were inherently informative and educational.[38] The Pilkington Committee expressed a concern that television had become trivialized and prone to American-type commercialism. Although supportive of science programming on BBC television in general, the Pilkington Report was critical of the fact that much of the BBC's science programming exploited the dramatic nature of the 'Space Race' rather

than focusing on the educational merits of space technoscience. Coming on the back of new budgetary constraints, this political pressure to re-emphasize the public service tenets at the heart of the BBC's mandate further restricted broadcasters' abilities to compete for viewers with commercial rivals.

In response to this criticism, the BBC sought to institute more programming highlighting the progressive work done in space technoscience especially within Britain and particularly focusing on the work of British astronomers. It was a symbolic shift away from the dramatic in science programming but it was also a shift from news to documentary programming that was more within the BBC's budgetary means. For example, the 1963 television series *The Cosmologists* was designed to capitalize on the strong public appeal of cosmology as a subject and the contributions of British scientists to this field.[39] The series format was semi-personal interviews with celebrity astronomers such as Lovell and Hoyle, with a complementary visual element provided by film of astronomical data images and equipment, such as helicopter shots of the Jodrell Bank telescopes.[40] The extensive use of interviews made the series relatively cheap and filming at Jodrell Bank was now routine and certainly much easier than trying to compete for footage of the latest American or Soviet rocket breakthroughs. The producer of the series Philip Daly, was delighted that the general viewing audience warmly praised the broadcasts.[41] That is not to say that broadcasters overlooked the more topical and newsworthy Space Race events. Despite post-Pilkington Report changes at the BBC, the focus and enthusiasm of broadcasters quickly returned to the dramatic elements of the Space Race because the industry was ultimately governed by viewer demand despite such conservative efforts to counter the spread of populism.

Partly as a result of lack of resources and partly because of institutional mandate, then, there were limitations placed on the BBC's coverage of space-related events. As a result, internal rivalry among BBC television departments developed as producers competed for the responsibility of showcasing this professionally valuable televisual material. The desire of several BBC departments to be the centre of science programming expertise in the late 1950s had already led to frequent clashes over which department would cover space-related activities. Interdepartmental rivalry was particularly strong between the Television Talks and OBF departments. For example, both departments concurrently produced competing broadcast programs on satellites in November 1958. The OBF team produced the aforementioned *Breakthrough: The Story of Rocketry and Satellites* while the Television Talks team produced an episode of *The Sky at Night* on the subject. With the growing importance of the Space Race to global affairs in the Cold War, the News and Current Affairs departments also sought to claim authority over science programming through the reporting of the latest space news.[42] Under the leadership of Aubrey Singer, the OBF department even manoeuvred to change its name in 1961 to Outside Broadcasts, Features and Science (OBFS) in order to establish internal priority for science on television (with the Talks and recently divested Current Affairs divisions similarly merging at a comparable time in many ways to combat the increasing internal and external importance and resources accorded to the News division by Director-General Greene, including its remit to report on newsworthy 'factual' events). Scientific integrity became a weapon in these interdepartmental debates over control of science programming. Singer often sought to undermine the output of OBFS's departmental rivals by questioning its scientific veracity. In one instance, he argued to BBC executives that *The Sky at Night* tended to be inaccurate on matters other than astronomy, and that the OBFS's *Horizon* researchers should have had the 'responsibility for *reporting* on [rocket launches]' (emphasis in original).[43] Interestingly, this is one of the few instances where

BBC television producers acknowledged the differences between basic scientific research like astronomy and applied sciences like aeronautics. Singer's complaints in this case went unheeded. At this point BBC executives considered Moore an expert on all of space technoscience, regardless of his background as an amateur astronomer, and Singer's team was 'scooped' when *The Sky at Night* program's production followed the launch of *Mariner IV* to Mars.

In fact, these interdepartmental rivalries for production territory regarding space technoscience programming were becoming destructive and impacting upon the BBC's bid to compete with external rivals for audiences by affecting production coherence. Singer and his OBFS team, in particular, were aggressive in claiming the authority and expertise for broadcasting space-related events, especially following the successful launch of the division's science, technology and medicine magazine shows *Horizon* and *Tomorrow's World* in 1964. Singer regarded satellites, spaceflight and astronomy, among other matters, as the most 'spectacular' material for demonstrating the expertise of the OBFS team in producing science programming of 'value.'[44] The editors of *Tomorrow's World* were explicit in revealing that the aims of the OBFS department was to position itself as best placed to cover the prized Space Race events, despite the expense and effort of such specials. One magazine program editor told BBC-1 Controller Michael Peacock that eventually something unexpected would happen on a spaceflight, and the *Tomorrow's World* team wanted to make preparations so as to be able to go on the air with 'a crash programme should anything sensational develop.'[45] Likewise, a fellow team editor argued to Singer that *Tomorrow's World* should position itself as best placed to remedy the Corporation's deficiency in coverage of Soviet space activity.[46]

On occasion, the OBFS's enthusiasm to become the BBC's prime contractor for science programming in the Space Age overstepped the bounds of professionalism. Ronnie Noble of Current Affairs had to warn OBFS producer and *Horizon* editor Robin Reid that the zealousness of his staff to secure Space Race material had breached the rules of professional ethics. Noble told Reid that *Horizon* staff had sought the 'first print' of a spaceflight film by denying that Peter Ryan of Current Affairs worked for the BBC.[47] BBC executives ruled on such disputes to try and keep each department happy with its level of Space Race coverage. Peacock told Singer in one case that if an October 1966 unmanned Apollo splashdown occurred on a Wednesday, then the Head of Current Affairs Paul Fox would be glad to make this material available for a *Tomorrow's World* special. However, if the event fell on any other day it would be handled as a *24 Hours* special as had been the case in previous shoots. Singer told Peacock that he felt the decision was 'puzzling, disappointing and worrying,' especially given the responsibility for science programming supposedly bestowed upon them in terms of their departmental name, but reluctantly accepted that demarcation lines had to be made somewhere with regard to the incoherence of science programming and that space material transcended the traditional broadcasting genres.[48] Indeed, space technoscience appeared in whatever genre was most valuable to the BBC at that particular time.

The newsworthiness of the Apollo missions led to a détente within the BBC on which department controlled coverage of space-related activities. BBC executives encouraged cross-departmental cooperation as one way of overcoming the corporation's limitations for covering US and Soviet space missions, even though such productions were complex, unreliable and expensive.[49] Producers in rival divisions largely collaborated on providing comprehensive BBC news, current affairs, features, talks, documentary and magazine reportage of the lunar flights, in particular, that would seek to capitalize on the 'great public interest' and capture a significant audience share.[50] Executives were eager to ensure

that the BBC performed 'better on the big occasions,' especially with ITV investing heavily in their flagship science broadcasts.[51] Yet, even before Neil Armstrong walked on the Moon, BBC executives realized that the intense public interest in space events that had shaped their science coverage since the mid-1950s and throughout the 1960s would be coming to an end as its news value peaked.[52] In fact, the value of science programming to the BBC in general had waned with audience research showing a diminishing demand. Thus, broadcasters would have to reconsider the future of science on television. In 1967, for example, *Tomorrow's World* editors struggled to justify its prime time slot, with BBC-1 Controller Peacock warning Singer that his show was impacting negatively on their ratings competition against ITV.[53] The following year, it was noted that on the 'balance of audience interests and demands' it was clear that science programming, even news of the Space Race could no longer justify prime schedule space.[54]

Science broadcasters for television found their expertise was less in demand when popular ambivalence meant that the ratings value of science programming lessened and science broadcasters knew they were subject to the 'mercy of fashion' as with any other genre.[55] However, space technoscience programs had been a competitive tool in the 1950s and 1960s when BBC television was developing as a broadcasting institution. By broadcasting images and representations of some of the century's most momentous events and 'beaming' them to millions of listeners and viewers, the BBC had played a central role in how astroculture developed in the 1950s and 1960s. Space was presented and promoted on television variously as a showpiece of nationalist modernity, the force that would shape a new society and evolution in humanity in the universe, and as a key component of geopolitical and ideological Cold Warfare, with differing aspects variously emphasized depending on prevailing political and popular demands on BBC broadcasters. Broadcasters were motivated to amplify certain astrocultural narratives, particularly those that would fulfil their public service mandate yet appeal to the demands of audiences, though the images and representations were also impacted by internal politics and, by association, which genre they were disseminated in. However, their ability to exploit the prestige of postwar science and space developments in programming was limited by their inability to compete with more commercial rivals in terms of resources and their constraints as a public institution. This was to be a familiar theme for the BBC as they explored other options for competing with overseas organizations, in particular, for audience attention. Following Sputnik, the space technology of satellite communications was developed, offering the promise of creating new global audiences. But the BBC's embracing of satellite broadcasting, and their promotion of this idea in their programming, would only exacerbate the organization's and British broadcasters' corporate woes.

Promoting the potential of satellite broadcasting in Britain, 1957–1969

The most high profile development of Cold War technoscientific progress in the 1950s was the orbit of the artificial satellite Sputnik in October 1957. Despite its symbolic value as a representation of Soviet advancement, Sputnik and subsequent US and UK upper atmosphere balloons and satellites, such as *Project SCORE*, *Explorer* and *Ariel*, were also rudimentary demonstrations of communication and transmission of information via space. Most scholarly works on the effects of satellite communications on broadcast media ignore the first 25 years after Sputnik, instead concentrating on engineering minutiae, international legal aspects, or the 1980s when cable and services broadcasting direct to the home were developed.[56] We follow the example of Lisa Parks and Shanti Kumar in historicizing the development of global television in terms of audience, industrial, and

textual practices, practices that were embedded from the earliest moments of broadcasting as producers, executives, scientists, technicians, and engineers in different parts of the world competed to progress broadcasting as a medium.[57] Our concern in this section is not to discuss the history of satellite development. Rather, we are interested in how this feat of space engineering – motivated by military, ideological and technoscientific concerns – impacted the BBC as an organization and, in particular, its programming decisions.

We find that our actors within the BBC appropriated the development of space communications and transmissions as a technical development within 'broadcasting science and engineering' as the fields converged, and, importantly, they saw it as a potential business asset for the BBC. British broadcasters quickly made the connection between potentially transmitting information globally and potentially broadcasting programs to new global audiences. BBC producers sought to play an important role in the development of satellite communications through pro-satellite imagery and rhetoric in their programming designed to encourage developments in space technology. In the process, these astrocultural artefacts represented by the culturally dominant BBC were elevated in importance in popular and cultural imaginings of outer space, especially as harbingers of a global consumerist society.

Almost immediately after Sputnik's launch, satellite-minded broadcasters at the BBC and the Independent Television Authority (ITA) established contact with relevant scientific centres in order to consolidate and pursue the links between space technoscience and broadcasting technology. The hope was to encourage the application of developments in space communications in order to pursue new commercial avenues. In particular, the BBC placed a lot of faith that the radio astronomy work at Jodrell Bank could lead to a British satellite broadcast system. BBC broadcasters frequently approached Jodrell Bank's Bernard Lovell for advice on developing satellites for broadcast television, especially given the media's focus on the role of the retrospectively named 'Lovell' telescope in confirming the orbit of Sputnik. Not one to turn away a chance at promoting his institution, Lovell encouraged the notion that Jodrell Bank might bring about new developments in satellite communications. In responding to a query from an ITA representative, for example, Lovell stated that, although Jodrell Bank's ionospheric work was not 'specifically directed to the problems concerned with television transmissions,' it could be regarded as part of the fundamental research effort on such problems.[58] This confusion between the astronomy research done at Jodrell Bank with the applied science and engineering required to develop broadcast satellites was typical of BBC broadcasters' monolithic conflation of space-related activities.

Despite numerous and significant technical hurdles, BBC broadcasters quickly attempted to explore the opportunities provided by Sputnik to galvanize public interest in satellite communications. Producers used their public service constraints and audience demand for space programming to emphasize the broadcasting applications of satellite technology in their science programs. Astronomer Patrick Moore, for example, exploited Sputnik to discuss the potential capacity of using space relays to transmit information across the globe via space rather than via cable in his 19 October 1957 edition of *The Sky at Night*.[59] In one of Lovell's 1958 Reith lectures for the BBC, the Jodrell Bank telescope was used to bounce 'hellos' off the Moon. Special equipment was built at the observatory that allowed a recorded voice to be transmitted to the moon with the telescope listening, as was its primary function, for the echoes. In breaking the standard of 'radio quiet,' producers foregrounded an experiment in space communications that the telescope was not designed for, but was an experiment which demonstrated the possibilities for the future

of broadcasting. When the lectures were repeated on the Overseas Service the following year, producer Margaret Lyons even persuaded Lovell to extend his discussions to the implications of the work of Jodrell Bank for the future of broadcasting.[60] As Lisa Parks has noted, satellites became spectacles in popular media and culture, and this included programs on the BBC.[61] Broadcasters at the BBC further sought to focus attention and effort on satellite communications in order to encourage their development.

Satellite-minded producers at the BBC bought into and fueled 'one world' astrocultural rhetoric and they slowly integrated satellites into the heart of the organization's business plan. Despite excitement over the potential of satellite broadcasting, neither the BBC nor the ITA had formulated any specific policy to develop of satellite broadcasting because of the minimal technical progress in the field. Then, in 1959 the BBC Scientific Advisory Committee's (SAC) report claimed that British broadcasters were in danger of no longer being leaders in broadcasting development. The report stated that the BBC's pioneering work in developing broadcasting techniques and technology had been of 'great national importance.' The report added that it was 'no exaggeration' to say that the technical development of broadcasting, thus far, was 'largely the technical development of the BBC itself' through its scientific and engineering staff. However, the SAC statement ended with a warning that advances in space technoscience as applied to broadcasting were now progressing outside of the BBC and Britain. The report's author, Edward Appleton, recommended that BBC administrators act immediately on broadcast satellite development so as to enable the BBC to remain a broadcasting pioneer and retain its pre-eminent broadcasting status in a global, commercial and populist marketplace.[62] Appleton's conclusions encouraged satellite advocates in the BBC to focus their efforts towards positioning the BBC as an unsurpassed source and supplier of the major space events via satellite on their own terms and to reinforce Britain's claim to house the world's pre-eminent media company. Even if Britain would not be able to send its own astronauts to explore space, it could still be seen as a communications leader in the Space Age through its development of broadcast technologies to chronicle the latest spaceflights and satellite missions. Appleton's recommendations ultimately match what James Schwoch identified as an discursive shift in astrocultural narratives in the 1960s towards global citizenship as the superpowers searched for ways to strategically exploit the electronic communications and television media to extend their diplomatic influence beyond traditional borders in the Cold War.[63] British broadcasters mirrored this shift in order to actively seek an extension of their influence beyond their traditional borders. In the process British broadcasters both fostered and pursued the connection between global media and global capitalism, reinforcing images and representations of astroculture that inherently encouraged and advocated the significance of satellites.[64]

Certain BBC producers and executives were motivated by the SAC report to try and broadcast dramatic Soviet and US manned exploration efforts live using their own resources, facilities and infrastructure, rather than relying on cabled or ground-relayed feed from external partners. OBFS Head Singer, for example, was eager to explore the potential of relaying his department's programs to wider audiences via satellite. For example, Singer wrote to Lovell in April 1961 hoping that the researchers and their equipment at Jodrell Bank would be able to help him and the BBC 'surmount the last geographical frontier' in receiving a television picture from the USA. Despite his earlier critique of Patrick Moore's expertise being limited to astronomy, Singer again showed his own lack of discrimination between the various aspects of space technoscience by assuming that a radio astronomy observatory could assist in the development of satellites. Rather than admit that Jodrell Bank was not in the business of developing satellites, Lovell hedged his answer by reporting to Singer that there remained extensive technical

hurdles in making global broadcasting via space satellites a reality.[65] Satellite-minded producers and executives were also not universally supported within the BBC and they encountered pessimism among their colleagues regarding the administration of satellite broadcasting when, and if, advances brought about the possibility. George Norman, Assistant Foreign Editor in the News team, for example, raised the issue of the legalities of satellite broadcasting from space.[66] Editor Anthony Jay argued to satellite proponent Grace Wyndham Goldie, Head of Television Talks and Current Affairs, that it would be 'impossible for global television to be anything more than a phrase,' apart from link-ups for big events. Jay, like many of his colleagues who were pessimistic about whether sufficient British resources would ever be devoted to developing global networks, based this judgment on the basis of the network conflicts encountered by BBC administrators within the European Broadcasting Union.[67]

In early 1962, BBC science correspondent David Wilson was charged with strengthening the in-house space communications technology expertise and evaluating its potential value in terms of improving and extending the BBC's programming.[68] As science correspondent, Wilson would seem to be an ally for proponents of satellite broadcasting within the BBC, but he dampened any ambitious expectations by stressing the heavy costs and complexity of transmissions via space and, worse still, their unpredictability and unreliability. Wilson recommended against the BBC constructing satellite systems to cover events such as space launches on their own terms, because it would be exceedingly expensive and could potentially detract from the quality of current programming and audience retention. Wilson concluded that adequate administration and infrastructure was not yet in place for satellite broadcasting to become cost-effective or viable, and that the BBC should continue to cover news, such as of the *Mercury* program, by purchasing broadcasts from overseas networks that could be cabled or ground-relayed across.[69] BBC executives endorsed Wilson's report and subsequent coverage of the US spaceflight program was conducted according to his recommendations. For John Glenn's historic *Friendship 7* (Mercury–Atlas 6 mission) orbital spaceflight in February 1962 and Scott Carpenter's follow-up flight in May 1962, Wilson anchored BBC coverage for television and Reg Turnill, the aerospace correspondent, for radio, both in London studio shows.[70] This strategy paid dividends, though, as *Tonight* programs devoted to the missions captured 13 million viewers because of the new live footage from US networks relayed and incorporated into the productions.[71]

Despite Wilson's report that the BBC was unlikely to ever be able to allocate sufficient resources to be able to build up the required infrastructure, many science producers within the organization remained enthusiastic to have the BBC develop their own satellite capabilities. Goldie was unwavering in her enthusiasm and challenged her staff in Talks and Current Affairs to identify ways to advance the cause of satellite broadcasting through their programming. Goldie's request led to an explicit narrative focus on satellite broadcasting in the science programming coming out of her department, in order to domesticate the notion with audiences who would then, hopefully, demand its political and technical realization. For example, the June 1961 Home Service program *The British in Space* profiled the BIS. In this program, both BBC producers and BIS representatives had a vested interest in promoting British space policy expansion but for different reasons. BIS Fellows hoped to bring about extensive space exploration, while the producers were happy for contributors to emphasize that satellite spin-offs from such space efforts would 'open a new field of achievement for BBC engineers and, not forgetting to appeal for popular support, would offer more immediate news services for audiences.'[72] This focus on promoting the benefits of an active British satellite policy continued in the

major joint OBFS, News, Talks and Current Affairs production *Space Communications* which celebrated the success of *Ariel 1*, Britain's first satellite, launched in April 1962.[73] This production included radio and television coverage from the Goonhilly tracking station, outside broadcasts of the launch from the Cape, and interviews with Harrie Massey, the scientist in charge of the mission, and Lord Hailsham, the Minister for Science whose department had funded the mission, as well as supplementary in-depth feature programs.[74] A subsequent May 1962 program *The History and Future of Television* also promoted the potentially advantageous implications of the British development of satellite broadcasting claiming that satellites will have 'revolutionary implications.' The program drew on the links forged between Goldie's satellite advocating Television Talks and Current Affairs department and the Institute of Electrical Engineers regarding exploring the application of transmissions technology to advances in broadcasting.[75] With *Ariel* in orbit the program's producer Paul Stone felt confident that satellite broadcasting would soon be a reality as producers focused on the spectacle and implications for broadcasting of satellites, as much as Ariel's Cold War newsworthiness and scientific, technological and engineering feats, in such programming.[76]

Later the same year, on 10 July 1962, *Telstar 1* was launched into orbit by the USA. Telstar was the world's first commercial and multinational satellite and the first satellite to be capable of relaying information, rather than reflecting or transmitting pre-recorded data. Telstar was designed to develop experimental satellite communications over the Atlantic Ocean, with the General Post Office (GPO) coordinating the British infrastructure, especially at Goonhilly, and the BBC heavily involved in creating and defining standards and conversion equipment. Those individuals and divisions within the BBC that had sought to encourage the development of broadcast satellite technology hoped to take advantage of the Telstar experiment by creating programs that celebrated the British engineering contribution to the project and by emphasizing the importance of satellite communications to contemporary and future British society.

More than half a year before Telstar's launch, Douglas Stuart, a BBC News team foreign correspondent stationed in America, had been tasked with researching the logistics of Telstar. Stuart's report revealed an unprecedented opportunity for broadcasters to demonstrate the application of satellite technology to broadcasting. In the report Stuart urged his British executive and production colleagues to exploit the devotion of a limited proportion of Telstar's relay time to a transatlantic television experiment.[77] The aim of this special program was to highlight the potential of satellite broadcasting and encourage a national effort to be directed towards placing Britain at the forefront of the new and developing industry, especially with the US reacting more quickly both commercially, with AT&T pushing to launch an experimental international satellite communications system, and politically, with 1962 seeing the legislation that allowed for the incorporation of the Communications Satellite Corporation (COMSAT), a government regulated global telecommunications organization intended to develop such a system, in the following year.[78] BBC engineers placed their expertise at the disposal of technicians at the Goonhilly receiving station to ensure that the appropriate infrastructure was in place to facilitate what was assumed to become regular satellite broadcasts.[79]

The GPO, ITA, and BBC formed a joint satellite committee to coordinate the British contribution to the historic program *Across Europe by Live Television* to be broadcast in Europe and the USA via Telstar on 23 July 1962.[80] However, the capacity for BBC delegates to extract maximum value from the experimental television program was limited by the caution of their partners' representatives on the joint committee. Peter Bale in the BBC's Bristol office, for example, was frustrated that the GPO only regarded the

upcoming experiment as a technical or infrastructural testing exercise, rather than appreciating its significance as a world news story both as a 'political weapon and a scientific achievement' in advancing the cause of satellite broadcasting through dramatic yet serious television programming. Bale was convinced that 'enthusiasts may be willing to stay up all night to catch the first pictures' of the program and that this popular enthusiasm should be capitalized upon to gather support for their satellite broadcasting ambitions.[81] The BBC's Peter Dimmock, who would largely facilitate the European contribution to the program, warned his ITV counterpart, Bill Ward, that lack of ambition, such as whether to attempt color television with the Telstar experiment, could 'prejudice' the British presence in a global broadcasting future.[82]

However, it was becoming clear to even the most strident satellite supporter in the BBC that the lack of resources and available investment, associated with institutional conservatism and a publicly funded budget, provided formidable obstacles to any potential development of broadcast satellites by the BBC. It was for this reason that the BBC's supplementary programming to the *Across Europe by Live Television* broadcast rhetorically encouraged expansive policies towards the development of broadcast satellites in Britain. Producers focused on the potential of British broadcast satellites for reasons related to the global expansion of the BBC, rather than for reasons related to Cold War nationalist scientific prestige. One 1962 program, *Project Telstar*, for example, included a discussion between Dr George Burt, Head of the Space Department at the Royal Aircraft Establishment, and the science correspondent of the *Guardian*, John Maddox. This discussion criticized governmental space policy indifference, emphasized the expertise of British engineers and scientists in space matters, and advocated for the development of a European satellite system.[83] On 26 July 1962 the BBC program *Telstar Calling: Story of the First Communications Satellite* hailed 'the brilliant first exchange of live television.' The program showed technicians at Goonhilly station waiting for the Telstar images with the voice over narration emphasizing Britain's role by pointing out that 'all the equipment you see here was built from scratch here in *this* country' (emphasis in original). This current affairs talk invoked Britain's communications heritage, especially in cables to the Empire and Commonwealth, in a call to arms to British broadcasters and policymakers not to allow the USA to become 'the pioneer and ourselves a junior partner' in satellite broadcasting, as another blow to a fading 'Great Power.'[84] Being a supplier rather than consumer, as with ground-relayed programs, depended on control of the infrastructure. British broadcasters hoped to emulate the capability of the USA and USSR in launching satellites, of being able to both create and supply the news, but this was to be a forlorn dream despite the optimistic narratives depicted in BBC programs.

The joint satellite committee for the *Across Europe by Live Television* program placed considerable importance on national reaction to both the transatlantic experiment and the supplementary television programs broadcast around it. Most broadcast delegates considered that the feedback and publicity they had received was 'worldwide and excellent.'[85] The bid to take advantage of Telstar to demonstrate the viability and desirability of satellite broadcasting had succeeded by their standards. The science journalist Anthony Michaelis spoke for many of his contemporaries when, in reporting on Telstar, he predicted that worldwide television was now less than a decade away.[86] The venerable British science writer Ritchie Calder also worked with Singer on a number of BBC productions that spoke to his thoughts on how satellites were one of the pinnacles of human achievement and how such developments were creating a truly global Space Age society, the next step in the evolution of mankind.[87] The seeds of a satellite broadcasting future had been successfully planted in the British public, but it was unclear what role British

broadcasters would play in this era of worldwide television, especially given that, as Michaelis also noted, competition for audiences would only get fiercer. For the BBC, satellite broadcasting offered the tantalizing potential of vast programming audiences and revenue, but the costs and complexity of constructing an infrastructure to be able to tap this potential effectively was, ultimately, prohibitive.

Representatives of both the BBC and the ITA continued to be optimistic about the potential for British broadcasters to be creators and suppliers of satellite broadcasting but they did not have the commercial or political backing to develop a cost-effective satellite infrastructure that British broadcasters could utilize to claim a central place in a new broadcasting era. The concerns of GPO technicians that broadcasters' were only interested in 'communications demonstrations' in the name of ambition and prestige rather than in rigorously testing such satellite systems meant that 'only items of international news interest,' such as Wally Schirra's *Sigma 7* (Mercury–Atlas 8) flight in October 1962, were broadcast live via satellites for the time being.[88] Despite the value of, and popular enthusiasm that greeted, such occasional items, BBC and British broadcasting satellite advocates, such as Singer, Controller of Programme Planning Joanna Spicer, and Controller of Programming on Television Stuart Hood, were limited in their capacity to realize their ambitions.[89]

Ultimately, there was a vicious circle that prevented British broadcasters from gaining a central place in a global satellite broadcasting marketplace.[90] Slow developments in complex space technology and communications infrastructure meant that satellite broadcasts were not cost-effective. This lack of cost-effectiveness prevented British policymakers and broadcasting executives from committing to active policies and investment that would have fostered technical progress and, thus, improved the cost-effectiveness of satellite broadcasting. The BBC as a publicly funded institution could not afford to buy into the satellite broadcasting marketplace as a supplier, even in partnership with national or European allies keen to challenge the US commercial networks' dominance.[91] The optimism of British broadcasters about the future of satellite broadcasting reflected in their television programming was waning as the BBC struggled to maintain a corporate and infrastructural presence in the global competition for audiences. Joanna Spicer noted that it was expected from 1965 that there would be a broadcast satellite facility in place, but that it would be internationally administered and dominated by the USA.[92]

As Spicer predicted, such a commercial facility came into existence in April 1965 in the form of *Intelsat I* (nicknamed Early Bird). Early Bird, the first satellite launched by the intergovernmental consortium INTELSAT (of which COMSAT was majority owner) dedicated to providing international broadcast services, was placed in a geosynchronous orbit and was able to provide near-continuous telephone and television transmissions capability between Europe and America.[93] It became clear for British broadcasting policymakers that it would be easier, cheaper and more effective for organizations such as the BBC to purchase satellite coverage of events such as the Apollo program from a system overseen by US suppliers than to seek to provide coverage of the events to viewers by investing heavily in their own satellite infrastructure. This attitude was a business decision reflecting a market that was shifting beyond the means of British broadcasters, as external factors overcame internal and corporate motivations.

The July 1969 live Moon landing pictures provided a dramatic and symbolic reminder of the potential of space communications. The BBC used pictures of the astronauts' television transmissions from the costly satellite links as an element within their own terrestrial broadcasting. A *Panorama* special, titled the 'British Space Programme,' marked the historic events. Unlike the optimistic satellite focused programs of the early 1960s, this

program revealed a sense of lost opportunity and frustrated optimism among broadcasters who had assumed and actively pursued the notion of a world served by universal live BBC television. By featuring Val Cleaver of the BIS and Rolls Royce rocket division, and Geoffrey Pardoe, a consultant engineer for Hawker Siddeley's Space Division, the producers knew that there would be an advocates' critique of the inhibition of British satellite policy. The program's discussants argued that while European governments had been 'making up their minds,' the Americans, building on British pioneering and leadership, had already got the world satellite broadcasting system and market sewn up.[94]

Post-Apollo, the cost-effectiveness of satellite broadcasting remained prohibitive for the BBC. In addition, space events had been deemed less newsworthy and less likely to attract audiences, and, in turn, less necessitating live footage. Thus, the BBC and other British broadcasting organizations would become mere consumers of satellite broadcasting until the 1980s, as US space activities and broadcasting institutions both created and supplied the programming that would demonstrate the true potential of satellite broadcasting. Satellite-minded broadcasters at the BBC had bought into and fostered, through its broadcast images and representations, an astrocultural narrative that focused on the importance and inevitability of a global society linked by satellites and satellite programming. However, eventually the BBC was actually undermined as a business by pursuing the dream it had promoted in its programs as it was not able to invest in the necessary technological and infrastructural resources to compete after that dream was realized by the USA.

Conclusion

More than being merely contemporaneous, developments in space technoscience and developments in BBC broadcasting culture were intertwined during the quarter decade following the end of the World War II. Our research shows that space-related activities played a key role in the modernization of BBC broadcasting during a crucial transitional period, a period that was defined by a shift in resources from radio to television and increased competition associated with the spread of television as a commercial medium. Adaptation was not easy for the publicly funded institution whose conservative executives feared the populist aspects of television. Several ambitious television producers recognized that one way for the BBC to compete for viewers without being accused of pandering to populism was through the development of the science programming genre. British broadcasters frequently produced programs featuring space-related material as a means to compete for audiences and to maintain the Reithian ideals of being entertaining, informative and educational. Given the increasing power and reach of television as a medium and the BBC as a cultural institution, such images significantly influenced how the meanings of astroculture were negotiated and defined.

The manner in which BBC science producers crafted astrocultural narratives was determined by professional and departmental ambition, personal idiosyncrasy, and by the business pressures faced by the BBC in seeking to compete with commercial rivals for broadcasting audiences. Analysts often neglect such factors in cultural studies in favor of external factors, with the reality that actors are subject to the contingencies of both spheres. BBC public service broadcasters increasingly had to pander to populism, so science producers tended to reflect and amplify certain prevailing astrocultural tropes rather than challenge them or seek to set agendas. As popular interest built, broadcasters were inclined to reinforce the prominence of more dramatic and visual aspects of space activity as well as notions of progress and national prestige. Programs tended to portray

astronomy, spaceflight, and satellites, in particular, as both significant and necessary for the advancement of civilization, especially as it was of advantage to the broadcasting industry. Essentially, broadcasters viewed space technoscience as a useful tool with which to counter the overarching trend in the industry towards increased competition, especially for the BBC which saw its monopoly undermined both nationally and internationally. Developments in space-related fields offered both a seemingly endless supply of programmatic material and potentially advantageous applications to the mechanics of broadcasting production and transmission. In this postwar period, BBC producers extensively explored the corporate value of 'space' to the organization in terms of preserving its audience share and status as a media leader.

The importance of science broadcasting as a corporate resource lay in the malleability of the programmatic matter. The popular and cultural aspects of science could be variously emphasized. Space technoscience offered BBC broadcasters in the 1950s and 1960s a stream of entertaining and, yet, specialist material with numerous stories of dramatic scientific breakthroughs, spectacular visuals of technological modernity, and celebrity personae that could be moulded into output of commercial value, especially by specialist science producers, but also by colleagues in competing departments who challenged their professional identities. Space based programming may have met the Reithian ideals of being entertaining, informative and educational in the 1950s and 1960s, but in the 1970s the topic suffered a reduction in its commercial profitability.

More than seeking to entertain, inform, and educate worldwide audiences with their trans-global programming, certain BBC broadcasters in the 1960s also had a vested interest in promoting and driving the development of space science, technology, and engineering for the benefit of British broadcasting. Satellite communications offered the potential to revolutionize the technology of broadcast media in terms of production and distribution and to create and reach new audiences. If the BBC was to broadcast the latest Space Age events it would need to develop its own satellite infrastructure. Britain would not be able to put people on the Moon, but if the BBC developed satellite broadcasting Britain could at least stake a claim as to having the world's leading media organization. Soon after the 1962 launch of Telstar, Marshall McLuhan coined the phrase 'the medium is the message' in his 1964 book *Understanding Media*.[95] Never was McLuhan's observation more appropriate than in the case of the BBC's desire to develop satellite broadcasting. The medium of satellite broadcasting literally became the message in BBC programs of the early 1960s as satellite-minded producers and executives within the BBC tried to drum up public support for the development of satellite broadcasting by creating television programs touting the potential of satellite communications. British broadcasters, thus, both drove the prominence of satellites as astrocultural artefacts and fostered tangible infrastructural developments in the artefacts themselves, even if they were, ultimately undermined by, rather than able to benefit from, such progress in a fiercely consumerist global marketplace.

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Notes

1. BBC WAC File R6/185/2: SAC 4th Report, September 1959.
2. Crisell, *Introductory History of British Broadcasting*, 19.

3. Cain, *The BBC*, 10–19.
4. Elliot, 'Media Organisations and Occupations,' 143, 164–69.
5. Massey and Robins, *History of British Space Science*, xix, 1, 9.
6. Some exceptions include Makemson, *Media, NASA*, and Telotte, *Disney TV.*
7. Mütter, '*Per Media Ad Astra?*'
8. Geppert, *Imagining Outer Space*, 8.
9. Farry, 'Far more to it than appears on the surface.'
10. For more on the functions of the Festival, see Forgan, 'Festivals of Science and the Two Cultures' and Macauley, 'Crafting the Future.'
11. BBC WAC File R51/523/5: Cox to Gorham, April 30, 1946.
12. For more on the organizational, cultural and policy primacy of radio in the BBC, see Briggs, *The BBC*, 243–57, 271.
13. Briggs, *The BBC*, 243–57, 271–74, 291.
14. For a history of the ITA, see Currie, *History of British Television.*
15. BBC WAC File T32/256: Miller Jones to McGivern, 7 June 1949, Griffiths to Murray, August 15, 1949.
16. BBC WAC File T32/57: Barnes to McGivern, February 8, 1952.
17. Boon, *Films of Fact*, 184.
18. BBC WAC File T32/57: Elliot to Miller Jones, November 9, 1950.
19. Simon, *BBC from Within*, 171–85.
20. BBC WAC File T32/330/4: Johnstone to Miall, November 24, 1953.
21. BBC WAC File T32/330/5: Noordhof to Miall, September 22, 1954.
22. BBC WAC File T32/330/5: Voss-Bark to various, November 10, 1954.
23. BBC WAC File T32/627/1: McCloy to Miss McCallum undated programme blurb, Audience Research Department Report, February 8, 1956; File T32/626/1: Film retention form, June 1957.
24. JRUL SC JBA File CS3/19/1: Lovell memo, June 21, 1957.
25. Moore, *Patrick Moore*, 28–36, 150–52.
26. BBC WAC File T32/1184/1: Angeloglou to Goldie, May 2, 1957.
27. BBC WAC File R34/851/7: Report from Dr J.R. Simons to Miss L.C. Cohn.
28. BBC WAC File T32/1184/1: Adam to Miall, April 17, 1957.
29. DWC (Misc.): H. Casey to Wilson, December 16, 1955, Contract for employment with BBC, February 28, 1958, N.S. Holmes to Wilson, May 25, 1959, Denis Morris to Wilson, May 28, 1959, Asst. Admin Officer, News (Sound) to Wilson, February 14, 1963, Tony Ashton to Wilson, February 14, 1963, Wilson to AAON (S), February 18, 1963, Undated proposal 'A Television Evening Paper.'
30. BBC WAC File T32/626/1: McCloy to Miall, September 18, 1957.
31. Launius, *Reconsidering Sputnik.*
32. BBC WAC File T32/1859/1: Report, November 4, 1957.
33. McQuaid, 'Sputnik Reconsidered.'
34. BBC WAC File R34/851/7: Anon 'Material for Board Report September–November 1957.'
35. DWC (Misc.): Newspaper cutting, February 10, 1971 by Adam.
36. BBC WAC Script File Cards: Astronomy and Astronomers: November 9–30, 1958.
37. BBC WAC File T32/626/1: Goldie to Singer, June 9, 1958. JRUL SC JBA File CS3/19/1: Singer to Lovell, September 18, 1958, first draft of script, transmission November 12, 1958.
38. For a history of the Pilkington Committee, see Milland, 'Courting Malvolio.'
39. BBC WAC File T14/1475/1: Heckmann to Daly, December 26, 1962.
40. BBC WAC File T14/1472/: undated memo by Daly; File T14/1475/1: Daly to Profs Heckmann and Burbidge's, December 21, 1962.
41. BBC WAC File T14/1478/1: Secretary to Daly to Mrs Fraser (publicity), January 31, 1963; File T14/1475/1: Daly to Heckmann, April 30, 1963.
42. As well as the BBC and other broadcasters, newsreels were also interested in and favored space technoscience for the same reasons, not least its visuality. For example, see the *British Pathé* films of November 7, 1957 and November 16, 1959.
43. BBC WAC File T14/3290/1: Singer to Cave, December 4 and 11, 1964.
44. BBC WAC File T14/2950/1: Ryan to Singer, October 11, 1965; Jones to Baxter, April 28, 1966.
45. BBC WAC File T14/2950/3: Cave to Peacock, March 4, 1966.

46. BBC WAC File T14/2950/1: Morgan-Witts to Singer, 12 September 1966.
47. BBC WAC File T58/565/1: Noble to Reid, late July 1966.
48. BBC WAC File T58/565/1: Peacock to Singer, October 19, 1966, Singer to Peacock, October 21, 1966.
49. BBC WAC File T14/2950/3: Cave to Peacock, March 4, 1966, NASA press release to Singer, July 11, 1966, Morgan-Witts to Singer, October 24, 1966; File T58/563/1 US Space Flights 1965–68; File T14/2950/1: Ryan to Singer, October 11, 1965, Jones to Baxter, April 28, 1966; File T58/565/1: Peacock to Singer, October 19, 1966, Singer to Peacock, October 21, 1966.
50. BBC WAC File T58/565/1: Noble to Fox and Scott, May 6, 1969.
51. BBC WAC File T47/85/1: News and Current Affairs meeting extract, January 10, 1969.
52. Gregory and Miller, *Science in Public*, 119.
53. BBC WAC File T14/2950/3: Peacock to Singer, December 12, 1966.
54. BBC WAC File T47/222/1: Minutes, November 8, 1968.
55. BBC WAC File R78/76/1: Minutes, May 29, 1964.
56. Sterling, 'Satellite Communications History.' Parks' *Cultures in Orbit* is an exception, showing how satellite technology supported an expanded global definition of television, though this study concentrates on the post-1967 period. Allen's *Live from the Moon* is also an exception which points out the parallel development of space and media technologies and the interdependencies between visualization and the politics of space technoscience.
57. Parks and Kumar, *Planet TV.*
58. JRUL SC JBA File CS7/39/5: Miss Miller (Sec. to Mansfield Cooper) to Lovell, January 8, 1959.
59. BBC WAC File T32/1859/1 *The Sky at Night*: November 1957, script.
60. JRUL SC JBA File CS3/19/1: Lyons to Lovell, May 25, 1959.
61. Parks, 'Technology in the Twilight.'
62. BBC WAC File R6/185/2: SAC 4th Report, September 1959.
63. Schwoch, *Global TV.*
64. Herman and McChesney, 'The Rise of the Global Media.'
65. JRUL SC JBA File CS3/19/1: Singer to Lovell, March 10, 1961.
66. BBC WAC File R34/1118: undated memo by Norman.
67. BBC WAC File T32/1184/5: Jay to Goldie, June 6, 1961.
68. BBC WAC File R34/1118: Rooney Pelletier to various, February 26, 1962, memo by Singer, May 18, 1962.
69. BBC WAC File R28/309/1: Wilson to various, February 27, 1962.
70. BBC WAC File R28/309/1: Norman to sound executives, February 22, 1962; File R44/836/1: Margaret Bayley memo, January 25, 1962.
71. BBC WAC File R44/836/1: Tony (Reuters) to Carleton Greene, February 21, 1962, George Campey to John Cawley, March 9, 1962.
72. BBC WAC File R19/2091/1: Script; Transmission, June 27, 1961, Home Service; René Cutforth to Mr Chabot, July 5, 1961; Carter recommendations, June 12, 1961, Francis Dillon to Miss E Wakeham, June 26, 1961 (contracting).
73. *Ariel 1*, also known as UK-1 and S-55, was the first British satellite, and the first in the *Ariel* program. Its launch made the UK the third country to operate a satellite, after the Soviet Union and the USA. It was constructed and launched in the USA by NASA and stayed in orbit for 14 years.
74. BBC WAC File R28/309/1: Wilson to various, February 22, 1962. Goonhilly Satellite Earth Station is a telecommunications site located on Goonhilly Downs on the Lizard peninsula in Cornwall. Owned by BT Group plc, it was at one time the largest satellite Earth station in the world, with more than 25 communications dishes in use and over 60 in total. The site also links into undersea cable lines. It ceased satellite operations in 2008.
75. BBC WAC File T32/1184/6: Miall to McCloy, January 30, 1962.
76. BBC WAC File T32/1184/6: Stone to Goldie, May 7, 1962.
77. BBC WAC File T32/1184/5: Stuart to various, December 15, 1961.
78. Whalen, 'Communications Satellites.'
79. BBC WAC File R34/1118: Rooney Pelletier to Singer, February 26, 1962.
80. BBC WAC File T10/16/1: joint press release, April 26, 1962, Minutes, June 5, 1962.
81. BBC WAC File T38/19: Bale to Rooney Pelletier, February 6, 1962.

82. BBC WAC File T10/16/2: Dimmock to Ward, July 19, 1962.
83. BBC WAC File T38/18: TV programme overview and shape, July 1962.
84. BBC WAC Script File Cards: SC, July 26, 1962.
85. BBC WAC File T38/19: Minutes, July 27, 1962.
86. Michaelis, 'Science Today.'
87. RCP NLS MC Dep. 370/5: *Go and Catch a Falling Star.*
88. BBC WAC File T38/19: Minutes, July 27, 1962; File T38/22: Spicer to Hood, November 5, 1962.
89. BBC WAC File T38/22: Spicer to Hood, November 5, 1962.
90. For more on British attempts at broadcast satellite development, see Slotten, *Communications Satellites.*
91. For an analysis of European space cooperation, including projects such as the European Launcher Development Organisation (ELDO), see Krige, *American Hegemony.*
92. BBC WAC File T10/16/2: Spicer to Dimmock, June 15, 1964.
93. INTELSAT was, from 1964 to 2001, the International Telecommunications Satellite Organization, incorporated to manage an assumed constellation of communications satellites, and which now trades as Intelsat, Ltd., a communications satellite services provider.
94. BBC WAC File T58/410/1: 'British Space Programme – 24 hours.'
95. McLuhan, *Understanding Media.*

Archival Sources

British Broadcasting Corporation, Written Archives Centre, Caversham (BBC WAC).
David Wilson Collection, private holdings of Clare Poulter, Warrington (DWC).
Jodrell Bank Archive, John Rylands University Library, Special Collections, University of Manchester (JRUL SC JBA).
Ritchie Calder Papers, National Library of Scotland, Manuscripts Collection (RCP NLS MC).

References

Allen, Michael. *Live from the Moon: Film, Television and the Space Race.* London: IB Tauris, 2009.
Boon, Tim. *Films of Fact: A History of Science in Documentary Films and Television.* London: Wallflower Press, 2008.
Briggs, Asa. *The BBC: The First Fifty Years.* Oxford: Oxford University Press, 1985.
Cain, John. *The BBC: 70 years of Broadcasting.* London: BBC, 1992.
Crisell, Andrew. *An Introductory History of British Broadcasting.* London: Routledge, 2002.
Currie, Tony. *A Concise History of British Television, 1930–2000.* Tiverton, UK: Kelly Publications, 2004.
Elliot, Philip. 'Media Organisations and Occupations: An Overview.' In *Mass Communication and Society,* ed. James Curran et al., 142–73. London: Open University Press, 1979.
Farry, James. '"Far more to it than appears on the surface:" An Historical Investigation of the Interface between Space Science and the British Mass Media,' PhD Thesis, University of Manchester, 2011.
Forgan, Sophie. 'Festivals of Science and the Two Cultures: Science, Design and Display in the Festival of Britain, 1951.' *British Journal for the History of Science* 31, no. 2 (1998): 217–40.
Geppert, Alexander C.T., ed. *Imagining Outer Space. European Astroculture in the Twentieth Century.* Basingstoke: Palgrave Macmillan, 2012.
Gregory, Jane, and Steven Miller. *Science in Public: Communication, Culture and Credibility.* New York: Plenum, 1998.
Herman, Edward S. and Robert McChesney. 'The Rise of the Global Media.' In *Planet TV: A Global Television Reader,* ed. Lisa Parks and Shanti Kumar, 21–39. New York: New York University Press, 2003.
Krige, John. *American Hegemony and the Postwar Reconstruction of Science in Europe.* London: MIT Press, 2006.
Launius, Roger, John M. Logsdon, and Robert W. Smith, eds. *Reconsidering Sputnik: Forty Years Since the Soviet Satellite.* London: Routledge, 2002.

Macauley, William R. 'Crafting the Future: Envisioning Space Exploration in Post-War Britain,' *History and Technology* (this issue).

Makemson, Harlen. *Media, NASA, and America's Quest for the Moon*. New York: Peter Lang, 2009.

Massey, Harrie, and Mark Robins. *History of British Space Science*. Cambridge: Cambridge University Press, 1986.

McLuhan, Marshall. *Understanding Media: The Extensions of Man*. Cambridge, MA: MIT Press, 1994.

McQuaid, Kim. 'Sputnik Reconsidered: Image and Reality in the Early Space Age.' *Canadian Review of American Studies* 37, no. 3 (2007): 371–401.

Michaelis, Anthony. 'Science Today: Closed Circuit,' *Guardian*, September 25, 1962: 4.

Milland, Jeffrey. 'Courting Malvolio: The Background to the Pilkington Committee on Broadcasting, 1960–62.' *Contemporary British History* 18, no. 2 (Summer 2004): 76–102.

Moore, Patrick. *Patrick Moore: The Autobiography*. Stroud: Sutton Publishing, 2005.

Mütter, Bernd. '*Per Media Ad Astra*? Outer Space in West Germany's Media, 1957–1987.' In *Imagining Outer Space. European Astroculture in the Twentieth Century*, ed. Alexander C.T. Geppert, 149–69. Basingstoke: Palgrave Macmillan, 2012.

Parks, Lisa. *Cultures in Orbit: Satellites and the Televisual*. Durham, NC: Duke University Press, 2005.

———. 'Technology in the Twilight: A Cultural History of the First Earth Satellite.' *Humanities and Technology Review* 16 (Fall 1997): 3–20.

Schwoch, James. *Global TV, New Media and the Cold War, 1946–69*. Chicago, IL: University of Illinois Press, 2009.

Simon, Lord Ernest. *The BBC from Within*. London: Victor Gollancz, 1953.

Slotten, Hugh. 'Communications Satellites: Globalization and the Cold War.' *Technology and Culture* 43, no. 2 (April 2002): 315–50.

Sterling, Christopher H. 'CBQ Review Essay: Satellite Communications History.' *Communication Booknotes Quarterly*, 36, no. 2 (2005): 79–94.

Telotte, J.P. *Disney TV*. Detroit, MI: Wayne State University Press, 2004.

Whalen, David J. 'Communications Satellites: Making the Global Village Possible.' NASA Historical Reference Collection, History Office, NASA Headquarters, 1988.