
The Olympic World Feed Project: Searching, acquiring and preserving the international television signal of the Olympic Games from 1956 to 1988

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Abstract This paper describes the project carried out by the Olympic Foundation for Culture and Heritage (OFCH) to locate, acquire and preserve all official televised coverage (ie the international television signal) of the Olympic Games broadcast between 1956 and 1988. After providing a general overview of the audiovisual archives of the International Olympic Committee (IOC), which are managed and overseen by the OFCH, and outlining the OFCH's mission and challenges in this respect, the paper discusses how the television broadcasting of the Olympic Games has evolved and the impact of these developments on the race to repatriate and preserve this content. The paper goes on to discuss the Olympic World Feed Project, describing the planning that went into recovering more than 3,000 hours of content missing from the IOC's archives, as well as the various steps involved and the numerous challenges faced along the way. In particular, the paper provides a case study of the acquisition of the international television signal produced during the XIV Olympic Winter Games — Sarajevo 1984.

KEYWORDS: international signal, Olympic Games, Olympic movement, digitisation, preservation, heritage, archives, Olympics

INTRODUCTION

Right from the outset, Baron Pierre de Coubertin, the founder of the modern Olympic Games, devised Olympism as a philosophy of life, combining sport, culture, art and education.

The Olympic Foundation for Culture and Heritage (OFCH) is tasked with developing the links between Olympism, culture and education on behalf of the International Olympic Committee (IOC) in Lausanne. As well as running The Olympic Museum and the Olympic Studies Centre, the OFCH is also responsible for managing all of the IOC's patrimonial collections, from acquisition to preservation and documentation, and making these accessible to its internal and external partners. This rich patrimonial compendium serves as the memory of the Olympic Movement and the Olympic Games, from when they were revived at the end of the 19th century until today, and is composed of more than 75,000 artefacts, one linear kilometre of archive documents and vast iconographic and audiovisual collections.

More precisely, these image collections comprise a wide variety of assets: a series of Olympic films by leading directors, many hours of rushes, and more than 800,000 photographs, including some rare and extremely valuable examples, like those of Spyridon Louis winning the marathon at the 1896 Games in Athens. The collections also include more than 9,000 hours of sound archives and almost 50,000 hours of video documents, mainly coverage of the Olympic Games.

In 2007, the IOC launched its pioneering Patrimonial Assets Management (PAM) programme, aimed at safeguarding more than a century of Olympic history. After seven years of meticulous digitisation, thorough restoration and exhaustive cataloguing, all of this digital patrimony was made available to the wider Olympic Movement via the Olympic Multimedia Library application, thus preserving it for future generations.

The award-winning PAM programme (2015 IBC Innovation award, 2015 FIAT/IFTA Best Archive Preservation Project

award and 2017 Focal Award for Best Archive Restoration & Preservation Project) provided an opportunity to assess just how exhaustive and complete the IOC's audiovisual collections were. An in-depth analysis revealed certain gaps in the collections, particularly where the international signal coverage for the Olympic Games between 1956 and 1988 was concerned. It was this finding that led the OFCH to undertake the research project described in this paper.

TELEVISION COVERAGE AND THE 'INTERNATIONAL SIGNAL'

'It is an objective of the Olympic Movement that, through its contents, the media coverage of the Olympic Games should spread and promote the principles and values of Olympism.'

(Bye-law to Rule 48, Olympic Charter, July 2020)¹

Before reviewing the various milestones in the history of television coverage of the Olympic Games, it is important to define what is meant by 'international signal' (also known as world feed, multilateral feed or basic feed), as this form of audiovisual production forms the basis of this study. The term 'international signal' refers to the television coverage of the sports events, medal ceremonies, and opening and closing ceremonies produced by the host broadcaster for each edition of the Olympic Games.

One of the closest earliest references to a host broadcaster can be found in the Olympic Charter of 1979, which defined it as 'the television authority responsible for ensuring the production of the basic coverage of the Games, electronically or on film, and making it available to all television broadcasters of the world and to answer their local needs'.² This 'basic coverage', which was to include background sound but no commentary, needed to be neutral and not give preferential treatment to any athlete or country in

particular, so that it could be distributed among all the rights-holding broadcasters (RHBs) that had purchased the broadcasting rights to the Games in their respective territories ahead of the event. The host broadcaster was also required to have the necessary technical means (audiovisual material, commentary booths, etc) to meet the specific requirements of each RHB based in the International Broadcast Centre (IBC), the central hub for receiving and distributing the international signal. It was from the IBC that each RHB would pick up the signal and tailor it, using graphics, commentary and even unilateral coverage, to its local audience.

Until 2001, the role of host broadcaster was assigned by the Organising Committee

for the Olympic Games (OCOG) and needed to obtain the approval of the IOC. Table 1 provides the list of host broadcasters for the various editions of the Games in the period under examination.³

Germany’s live broadcast of the Opening Ceremony during the Berlin 1936 Olympic Games marked the first live televised transmission of an Olympic event.⁴ The closed-circuit live coverage, led by the Reich Broadcasting Company, was sent to 25 public viewing halls in the Berlin area.⁵ When the Olympics returned after the Second World War, the television signal produced by the BBC during the London 1948 Games marked the second time that television had been used to broadcast the event (Figure 1).

Table 1: List of host broadcasters between 1956 and 1988

Year	Winter/Summer	Host city	Host Broadcaster
1956	Winter	Cortina d’Ampezzo (Italy)	Radiotelevisione Italiana (RAI)
1956	Summer	Melbourne (Australia)	*
1960	Winter	Squaw Valley (USA)	Columbia Broadcasting System (CBS)
1960	Summer	Rome (Italy)	Radiotelevisione Italiana (RAI)
1964	Winter	Innsbruck (Austria)	Österreichischer Rundfunk (ORF)
1964	Summer	Tokyo (Japan)	Japan Broadcasting Corporation (NHK)
1968	Winter	Grenoble (France)	Office de Radiodiffusion Télévision Française (ORTF)
1968	Summer	Mexico City (Mexico)	Telesistema Mexicano (Televisa)
1972	Winter	Sapporo (Japan)	Japan Broadcasting Corporation (NHK)
1972	Summer	Munich (Germany)	Deutsche Olympic Zeitung (DOZ, a partnership between ARD & ZDF)
1976	Winter	Innsbruck (Austria)	Österreichischer Rundfunk (ORF)
1976	Summer	Montréal (Canada)	Olympics Radio and Television Organization (ORTO, created by the Canadian Broadcasting Corporation)
1980	Winter	Lake Placid (USA)	American Broadcasting Company (ABC)
1980	Summer	Moscow (Russia)	USSR State Committee for Television and Radio Broadcasting (Gosteleradio SSSR)
1984	Winter	Sarajevo (Yugoslavia)	Jugoslovenska Radio-Televizija (JRT)
1984	Summer	Los Angeles (USA)	American Broadcasting Company (ABC)
1988	Winter	Calgary (Canada)	CTV
1988	Summer	Seoul (South Korea)	SORTO 88 (KBS and MBC)

*XVI Olympiad Melbourne 1956 Official Report does not mention a host broadcaster but says that local television stations in Melbourne were allowed to broadcast daily.



Figure 1: BBC camera operator at the Olympic Stadium — London 1948 Olympic Games

© 1948/IOC/RÜBELT, Lothar

‘The BBC signal was delivered to about 80,000 televisions owned primarily by individuals in the vicinity of London’.⁶ For this reason, these first two cases are not included in the scope of the project described in this paper.

In the mid-1950s, the IOC’s growing interest in covering and broadcasting the Games — not only as a source of revenue, but also as a tool to promote Olympism, as outlined in the Olympic Charter — combined with improvements in technology and telecommunications, signalled the start of a new era, in which television would become a fundamental aspect of the Games.

Such interest first became evident at the 1956 Olympic Winter Games in Cortina d’Ampezzo when, for the first time in the history of the Games, the national public broadcaster — Radiotelevisione Italiana (RAI) — became the host broadcaster and showed some of the competitions live. RAI’s live broadcasts were televised by Eurovision in eight countries.⁷ This, however, landmark development could not be repeated a few months later during the Melbourne 1956 Olympic Summer Games, when the live television signal from Melbourne was

exclusively local as satellite transmission would not be operative until the 1960s.⁸

The 1960s marked the start of a new chapter in the television coverage of the Olympic Games, thanks to two major technological advances.

Firstly, the emergence of the video tape recorder (VTR), which made it possible to record images on magnetic tape and play them back immediately. It is worth recalling that, until this point, the only way to preserve and, more importantly, play back images captured via a television camera had been with a kinescope (using a film camera to shoot the live programme displayed on a television monitor onto 16-mm or 35-mm film). The Rome 1960 Olympic Games were the first at which the Quadruplex two-inch video tape recorder was used (Figure 2).⁹ This fact alone meant that tapes could be sent by plane to the USA and broadcast with just a few hours’ delay. In terms of audiovisual preservation, the emergence of the VTR and magnetic tapes marked a turning point because of the fidelity and accuracy of the images preserved.

Secondly, developments in telecommunications meant that the Tokyo



Figure 2: RAI camera operator filming the Olympic Stadium — Rome 1960 Olympic Games

© 1960/IOC

1964 Olympic Games featured the first intercontinental broadcast in the history of the Games. The Tokyo 1964 Games were broadcast live thanks to the Syncom 3 satellite, allowing for multilateral transmission of the international signal in the USA and Canada. This time, it was Europe that had to settle for having the tapes recorded — in Montreal — and transported by plane, so that delayed coverage of the Games could be shown.¹⁰ The Tokyo 1964 Games were also the first in history to broadcast the Opening Ceremony, as well as eight sports events, in colour.¹¹

Four years later, the Mexico City 1968 Games were organised with the intention of being broadcast throughout the world. This was possible thanks to the NASA-owned ATS-3 satellite,¹² which enabled images to be broadcast live from the Americas to Europe. Some of the major innovations at this edition included more widespread colour broadcasting, the use of mini mobile videotape recorders and the latest slow-motion videotape machine.¹³ Colour broadcasting of the Games would not become the norm until Munich 1972, when high-band videotape recorders were used for the first time to record in colour.¹⁴

In some cases, the inherent challenge in producing blanket coverage of the Games, the technical demands and the global

audiovisual production scale led the host broadcaster to work with other national or international broadcasters in order to produce an audiovisual signal of the highest calibre. During the Mexico City 1968 Games (Figure 3), because public broadcaster Telesistema Mexicano (now known as Televisa) did not have the means to take on the work alone, a production pool was set up, composed of ABC (USA), NHK (Japan), TSM (Mexico) and the EBU (Figure 4).¹⁵

In Munich, for example, a consortium of the two West German public broadcasting companies — ARD and ZDF — created an *ad hoc* corporation called Deutsches Olympia-Zentrum (DOZ) to produce the international feed.¹⁶ For the Montreal 1976 Games, the Canadian Broadcasting Corporation signed a contract with the Organising Committee to become the host broadcaster and create an independent entity, the Olympics Radio and Television Organization (ORTO), to that end. ORTO's function was to set up the technical facilities and all the radio, television and film services required to cover the 21 sports on the Olympic programme (Figure 5), as well as the Opening and Closing Ceremonies.¹⁷

In 1980, during the Lake Placid Winter Games, one-inch VTRs (BCN type) were used for the first time in Olympic history.¹⁸ Until that point, events had mainly been



Figure 3: Television crew filming at the Olympic Stadium — Mexico City 1968 Olympic Games

© 1968/IOC/Kishimoto



Figure 4: NHK and Telesistema Mexicano OB vans — Mexico City 1968 Olympic Games

© 1968/IOC/Kishimoto

recorded on two-inch tape and 16-mm film. This had been the case for Mexico City 1968, Grenoble 1968, Munich 1972 and Montreal 1976, and would even happen again for Moscow 1980. The use of one-inch VTRs became the norm during the Sarajevo 1984 Winter Olympics (1 inch — type B) and the Los Angeles 1984 Games (1 inch — type C) and were used till the early 1990s.

Los Angeles 1984 marked another turning point in Olympic television coverage. As far as blanket coverage was concerned, ABC, in its role as host broadcaster (Figure 6), produced live television signals for 17 out of the 21 sports on the Olympic programme (for the four sports not covered live — archery, modern pentathlon, shooting and yachting — summaries were prepared and taped).



Figure 5: ORTO television crew filming a rowing event — Montreal 1976 Olympic Games
© 1976/IOC



Figure 6: ABC host broadcaster camera crew filming Joan Benoit (USA), first women's Olympic Games marathon champion — Los Angeles 1984 Olympic Games
© 1984/IOC/Kishimoto

From a technology standpoint, it is worth noting the efforts made by ABC in facilitating RHBs to book unilateral camera positions in the venues.¹⁹ These opportunities allowed broadcasters to add dedicated coverage, if desired, and better fulfil the expectations of their respective audiences.

Towards the end of the 1980s, as the number of disciplines on the Games programme continued to grow and the demands of broadcasters increased, it became impossible for a single broadcaster to produce the whole international signal. To address this situation, starting with the 1988 Games, each OCOG set up its own radio

and television organisation (RTO).²⁰ For Seoul 1988, the Seoul Olympics Radio and Television Organisation (SORTO) (Figure 7) was jointly formed by KBS and MBC, South Korea's first and second largest broadcasting groups at the time. The creation of these RTOs, and their affiliation with the various OCOGs between 1988 and the end of the 1990s, helped the IOC's Archives recover the international signal after the Games and preserve it in its audiovisual archives.

In May 2001, in order to maintain the high audiovisual production levels at each Games edition, the IOC Executive Board decided to create a permanent organisation to serve as the host broadcaster for all future Games.²¹ This saw the establishment of Olympic Broadcasting Services (OBS), IOC's own radio and television structure, which began operations at the Beijing 2008 Olympic Games and continues to fulfil its role as host broadcaster to this day. As the host broadcaster organisation for all editions of the Olympic Games, Olympic Winter Games and Youth Olympic Games, the mission of OBS 'is to produce unbiased images and sound for all the competition events and ceremonies ... and to ensure

that overall broadcasting efficiencies and consistency are achieved between Games'.²² With the arrival of OBS, archiving and preserving the international signal have been fully integrated in the production chain of Olympic Games television coverage. Since then, prior to each edition, a dedicated ingest workflow is defined jointly by OBS and the OFCH Heritage team to avoid any loss of content and ensure that the Games images will be safeguarded for future generations.

RETRIEVING THE MISSING WORLD FEED

Coinciding with the end of the IOC's PAM programme, an inventory of the total volume of international signal television coverage archived for each edition of the Olympic Games was carried out towards the end of 2016. This analysis revealed the significant content gaps in the IOC's Archives, in particular from 1956 to 1984. The editions from 1988 onwards (the Winter Games in Calgary and the Summer Games in Seoul) seemed to reflect a new trend, as most of the world feed coverage for these editions had been repatriated and was stored in the



Figure 7: The SORTO one-inch VTR room at the International Broadcast Centre – Seoul 1988 Olympic Games

© 1988/IOC/STRAHM, Jean-Jacques

archives. This may have been due to the establishment of the aforementioned RTOs, which were institutionally linked to the OCOGs, and so could have facilitated the transfer of all the archives during the normal post-Games OCOG dissolution process.

Figure 8 shows the number of hours produced by the various host broadcasters (based on the information provided in the Games Official Reports).

Having identified more than 3,000 hours of missing coverage, a large-scale project was launched to identify, retrieve, preserve and give access to this important part of the Olympic audiovisual heritage.

The project involved three different stages:

- Identifying the host broadcasters:* The project started with a holistic approach to identify all the broadcasters from the period under examination. This represented a total of 15 broadcast archives and two national heritage institutions as well as several other archives that could potentially hold part of the international signal coverage. To
- carry out this task, the OFCH archivists established contact with the various broadcasters to confirm the existence of the recordings in their respective archives. During this phase, the broadcasters were asked to share inventories of their Olympic collections to determine how much of the international signal coverage had been preserved. In most cases, there were significant discrepancies between the number of hours located in the archives and the number of hours documented in the Official Reports, due to a lack of consistency in the way these hours were taken into account. At the end of this stage, OFCH archivists were able to map where the international signal was being preserved outside the IOC.
- Determining the state of preservation of the collection:* Having ascertained that the content existed, the next step was to determine the state of preservation of the various collections. Discussions were then initiated between the various broadcaster archive teams and the OFCH Heritage

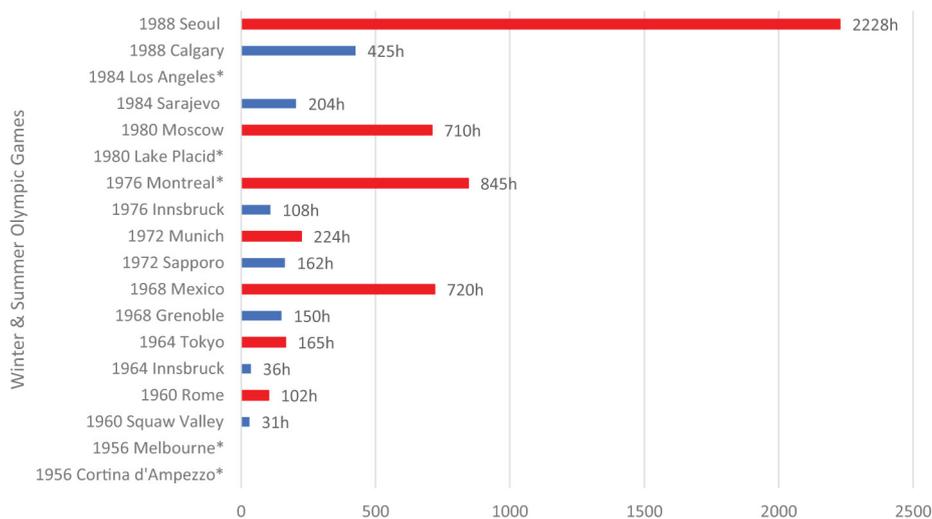


Figure 8: Number of hours of international signal television coverage produced by host broadcasters per edition of the Games

*Official reports of Los Angeles 1984, Lake Placid 1980, Melbourne 1956 and Cortina 1956 do not include the TV coverage expressed in number of hours. This is also the case for Montreal 1976. In this latter case, the figure (845 h) corresponds to the number of hours identified and acquired after this edition was concluded.

team to establish whether the content had been digitised; whether they had kept the original tapes or reels; when the digitisation process had been carried out; and what digital master file had been chosen to preserve the audiovisual assets. As outlined in the IOC Archives' acquisition policy, the aim was to recover a digital copy of the same quality as the original format, avoiding any loss of information. To achieve this, it was crucial to obtain the details of the digitisation process and ascertain whether it would be possible to gain access to the original carrier, so that a new digital copy could be produced if necessary.

- *Building and implementing customised projects for each edition of the Games:* The markedly different circumstances (broadcaster resources, digitisation format, preservation status, etc) between each of the Olympic Games under examination meant that every edition had to be treated as an individual project, in which time, budget and methodology were tailored to the specific situation.

During these various stages, the OFCH Heritage team faced several challenges.

Throughout the identification phase, one of the main hurdles was the lack of precise inventories sufficiently well documented (length and description of content, technical metadata, history of migration, etc) for the OFCH Heritage team to confirm whether the content was indeed the international signal; assess the comprehensiveness of the collection; and determine the state of preservation. In some cases, the issues around this lack of information were resolved by on-site visits to examine part of the content first-hand, or by means of viewing files.

Another issue encountered during the project was the multitude of preservation methods in the various archives, depending on the original carrier and the respective preservation policies. The feeds for editions such as Grenoble 1968, Munich 1972,

Innsbruck 1964 and 1976, and Montreal 1976 were fully digitised. The digital preservation format, however, differed from one set of archives to the next. The diversity of the output digital formats (from lossy formats such as MPEG2/D10 to lossless JPEG2K) could have been addressed by re-digitising the master copies using a single digital format selected for the purposes of the project. However, it was not always possible to recover the master tapes to re-digitise them, either because the tapes had been destroyed after the first migration, or because the benefits of obtaining a new digital version of this content did not outweigh the effort expended in the past by the broadcasters. As a result, the decision was taken to acquire broadcasters' output digital formats and re-encode them into the IOC Archives' mezzanine format (AVC-Intra 100Mbs) before ingesting the files into the media assets management tool.

A new digitisation would be possible from the existing analogue copies from editions such as Mexico City 1968 and Moscow 1980, even though they have been partially digitised. Other editions, such as Sarajevo 1984, were still archived in the master tapes. The last part of this paper is dedicated to the work performed to recover the international signal for the Sarajevo 1984 Olympic Winter Games.

The diversity of native formats (16-mm film, two-inch quad, one-inch, U-matic, etc) further complicated the project. For one thing, much of the international signal captured electronically between 1960 and 1968 had been recorded via kinescope, rather than on the two-inch quad tapes available at the time, possibly because the cost of quad machines and blank tape was extremely high back then.²³ Editions for which part of the video archives were kinescope recordings included Rome 1960, Innsbruck 1964 (Figure 9), Grenoble 1968 and Mexico City 1968. The 16-mm film kinescopes had been transferred to a video format using telecine machines. In most cases, this resulted in a



Figure 9: Video file produced from a kinescope recording — Innsbruck 1964 Winter Olympic Games, international signal

poor-quality, grainy and distorted image. One of the options that could be considered nowadays to restore these kinescope recordings would be to go back to the 16-mm recordings and use a film scanning process including advanced digital restoration tools to obtain an image as close as possible to the original.

In other instances, the only carriers found were copies on analogue or digital videotape formats such as one-inch or DigiBeta. This was the case for the international signal from the Mexico City 1968 Olympic Games, where the two-inch master tapes were migrated in the mid-1980s to one-inch tapes. Unfortunately, it was common practice among broadcasters back then to discard master tapes after having migrated to other tape formats.

In addition to these technical hurdles, discussions with the various archive teams were not always straightforward. In many cases, the numerous toing and froing between the broadcaster's different departments slowed the project down considerably. That said, these exchanges were necessary to ensure that all parties involved in the acquisition process were aligned, helping to build projects based on mutual understanding.

Finally, it is worth highlighting the substantial amount of interest vis-à-vis the international signal among the IOC Archives' stakeholders. Demand for this type of historical content has increased exponentially in recent years, requiring the OFCH Heritage team to continue making solid headway in its bid to acquire the international signal and complete the collection.

CASE STUDY: RECOVERING THE INTERNATIONAL SIGNAL OF THE XIV OLYMPIC WINTER GAMES — SARAJEVO 1984

Sarajevo 1984 was the first Olympic Games edition to be successfully completed after launching the Olympic world-feed acquisition programme in early 2017. Before going into the details of this specific project, it is worth providing some background to the nature of the television coverage of these Games.

The preparations for the radio and television coverage of the XIV Olympic Winter Games began in 1978,²⁴ shortly after Sarajevo was elected as the host city, beating candidatures from Sapporo and Gothenburg.

The Games were held from 8th to 19th February, 1984. At the time, Sarajevo was the

capital of the Socialist Republic of Bosnia and Herzegovina, one of the constituent federal states of the Socialist Federal Republic of Yugoslavia.

The audiovisual production of the international signal was managed by Yugoslav Radio Television (JRT), the national public broadcaster in what was then Yugoslavia. As had been the case for many previous host broadcasters, this role was the most ambitious project JRT had ever undertaken, both from a production and a technical standpoint. To meet the challenge, JRT pooled the technical and human resources from the various radio and television centres based in the capitals of the eight constituent republics of Yugoslavia (RTV Beograd, RTV Ljubljana, RTV Novi Sad, RTV Skoplje, RTV Pristina, RTV Sarajevo, RTV Titograd and RTV Zagreb).

To record the various events from the different venues, broadcasting duties were split between JRT's eight channels to ensure the broadest possible coverage. All the video and audio signals were sent to the International Radio and Television Centre

(IRTVC), based in Sarajevo (Figure 10). The IRTVC officially opened just before the start of the Olympic Winter Games, and its main responsibilities included:

- receiving all the radio and television signals from the various venues and distributing them internationally among the RHBs via three multilateral programmes; and
- offering technical assistance to produce unilateral programmes by the various RHBs that had travelled to Sarajevo and were based in the IRTVC.

On the seventh floor of the building was the VTR centre, equipped with 24 one-inch type BVTR machines and two three-quarter inch U-matic machines, which were used to record and archive the international signal.

According to the Official Report, by the end of the Games, JRT had made 111 worldwide broadcasts, with a total duration of 204 hours.²⁵



Figure 10: The International Radio and Television Centre (IRTVC) in Sarajevo
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The Games were staged without any major issues, and they were mostly considered a great success among the press.²⁶

The geopolitical context that had provided the backdrop to these Games changed radically in the early 1990s, with the break-up of Yugoslavia, the subsequent formation of new republics and the series of armed conflicts that followed, including the Bosnian War. During this conflict, the city of Sarajevo and the Olympic facilities themselves were subject to violent attacks. Virtually all the city's infrastructure was severely damaged. As a result, the possibility that some of the archives might have disappeared during the war was a primary concern of the OFCH Heritage team.

Initial investigations centred on identifying the host broadcaster. Unlike with other editions, the host broadcaster at the time was no longer in operation — JRT had ceased to exist with the break-up of Yugoslavia. The emergence of new,

independent republics had also led to the creation of new national television broadcasters. In 1992, RTV Sarajevo became RTV BiH (Radio Television of Bosnia and Herzegovina), before being restructured as BHRT a few years later. Its headquarters remained in the building that had housed the International Radio and Television Centre during the Games.

The International Federation of Television Archives (FIAT/IFTA) network was a significant source of help in tracking down broadcasters in different countries in the Balkans region who were potentially in possession of these Olympic assets. After several months of exchanges with FIAT/IFTA colleagues and various broadcasters in the region, the Head of the BHRT archives confirmed that 64 one-inch tapes type B (Figure 11) had been preserved at their premises, holding part of the international signal coverage from the Olympic Winter Games. Following a number of e-mail



Figure 11: Ampex one-inch master tape featuring the men's giant slalom competition — Sarajevo 1984 Olympic Games

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exchanges and an on-site visit in 2016, OFCH Heritage team was able to confirm the existence of the content. It transpired that, for 35 years, some of the original international broadcast tapes from the Sarajevo Games had been kept in the BHRT archives. They had not been digitised but were in a perfect state of preservation. This discovery marked the starting point of the collaboration project with BHRT.

From a technical point of view, the main issue was to determine where the 64 tapes could be digitised. Doing so on site in Sarajevo did not seem like a viable option. BHRT had two one-inch VTR machines (Bosch BCN-51), but neither was operational, with both requiring technical repairs. Unfortunately, a lack of financial and technical resources meant that the BHRT team was unable to get the equipment back into working order. In addition, the inability to play the tapes was not the only hurdle: BHRT was also without a tape-cleaning machine, a thermal convection oven to bake the tapes prior to digitisation, or indeed any other IT equipment needed to convert the analogue signal into a digital one.

Repatriating the tapes to the project's digitisation provider in Brussels was not an

option either due to BHRT's reluctance to send the tapes by plane, given the potential logistical risks inherent to transport.

These constraints meant the project needed to be tailored accordingly, with a view to achieving two objectives.

The first aim was to digitise the 64 tapes, in Sarajevo, thanks to the collaboration of the digitisation provider selected for the project. This required a digitisation line to be set up in the BHRT offices (Figure 12), consisting of two extra VTR machines, an oven, a tape-cleaning machine, a rack for monitoring and quality control purposes, and a range of IT equipment. All this material was transported from Brussels to Sarajevo by road. A digitisation technician and a VTR expert also travelled from Brussels to Sarajevo to oversee the equipment installation and perform all the technical work.

This initial part of the project was completed in ten days, with no major technical issues. A total of 55 hours of content were digitised, of which only 28 featured the international signal. Unfortunately, in some cases, tapes had been reused to record other programmes. After digitisation, the tapes returned to the BHRT stacks, and an uncompressed digital



Figure 12: Digitisation line installed at BHRT premises

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version (v210YUV 4:2:2 wrapped in a mov container) was sent to the IOC Archives. In addition, during this initial phase, thanks to the expertise and knowledge of the VTR expert, BHRT's players were inspected, cleaned and repaired, leaving them fully operational.

The second objective was to provide BHRT with the necessary knowledge and basic technical equipment for their teams to continue digitising the remainder of the one-inch tapes in their archives. According to the Head of the BHRT archives, Sead Bajric, the BHRT vaults contain more than 10,000 hours of footage recorded on one-inch video tapes. To this end, the OFCH provided BHRT with a digitisation line composed of a laboratory-standard thermal convection oven, a broadcast monitor, a complete post-production station, an HD/SD synchroniser, an LTO 7 drive and LTO cartridges. Two OFCH audiovisual technicians made the trip to the BHRT offices to install the equipment and provide local staff with two days of training on digital storage (Figure 13).

The content recovered accounts for 58 per cent of the events held during the

Sarajevo 84 Games. Some of this was kept on master tapes in the form of full competitions, and the rest just as summaries. Given that 204 hours of footage are mentioned in the Official Report XIV Olympic Winter Games, it would appear that there is still some way to go in terms of preserving the full coverage of these Games. From a heritage perspective, however, the project reached another goal: demonstrating how collaboration among heritage institutions with common goals, and the exchange of best practices among teams with diverse backgrounds and levels of expertise, can lead to successful achievements. Overall, the project embodied the firm commitment of the Olympic Foundation for Culture and Heritage to preserve and safeguard an audiovisual heritage of unique value both for the Olympic Movement and for the legacy of Sarajevo.

CONCLUSION

The project to recover the Sarajevo 1984 Games archives was a success from a technological, archival and patrimonial



Figure 13: OFCH audiovisual technician and BHRT staff during the workshop on digital storage

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standpoint. Moreover, it was a wonderfully enriching human adventure that transcended language barriers and historical unknowns and demonstrated the essence of the Olympic spirit and values even outside Games time.

The OFCH is continuing its project to track down the missing international signal for the Games so that the content can be added to the IOC's patrimonial collections. The basic feed for several editions has already been incorporated into the IOC's archives, including the Montreal 1976 feed, thanks to the collaboration of Société Radio-Canada and Library and Archives Canada in Ottawa, and the feeds for the Innsbruck 1964 and 1976 Winter Games, through close cooperation with Austrian national broadcaster ORF. The COVID-19 pandemic has caused the project's progress to stall somewhat, but the ambition to conclude this endeavour over the next few years remains, with the ultimate aim being for the IOC to have complete, comprehensive Olympic Games archives for the benefit of future generations.

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