OBS

Media Guide

Olympic Winter Games PyeongChang 2018

Welcome

Welcome to the OBS Media Guide for the Olympic Winter Games PyeongChang 2018.

The IOC established Olympic Broadcasting Services (OBS) as its Host Broadcaster in 2001 to ensure a more consistent and continuous service to those broadcast organisations that have purchased the rights to air the Games in their home territories (Rights Holding Broadcasters or RHBs). This guide is designed to give media personnel a primer on who we are, what we do and how we do it, with particular focus on our work here for the Olympic Winter Games PyeongChang 2018.

WELCOME

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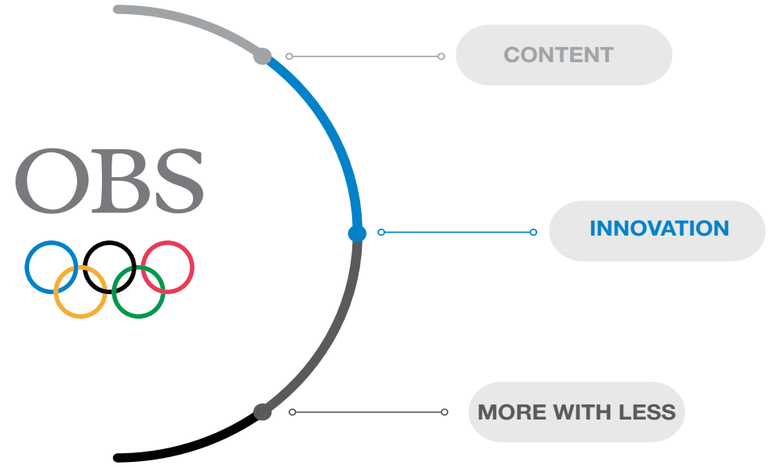
“Images of the two Koreas marching together at the Opening Ceremony sent a message of hope to the millions of people watching around the world. It was the perfect start to the Olympic Winter Games PyeongChang 2018, and we look forward to sharing even more inspiring stories over the 17 days of competition.”

Yiannis Exarchos, OBS CEO

Introduction

Olympic Broadcasting Services (OBS) will be delivering more content, in more formats, through more channels than ever before at PyeongChang 2018.

Our preparations for the Games have been based on three main themes:



By embracing the latest technologies while responding to an increasingly digital broadcast landscape, OBS is poised to make PyeongChang 2018 the most connected Games ever. And by doing “more with less,” OBS has worked closely with the local organisers to reduce the complexity of the Games, resulting in both economic savings for the Organising Committee and a more effective delivery of the Games.

OBS has once again placed the evolving needs of the Rights Holding Broadcasters (RHBs) at the forefront of our planning. We are leveraging the latest in technology, while also implementing new and more efficient ways to enable Broadcasters to access content remotely and in a greater range of formats.

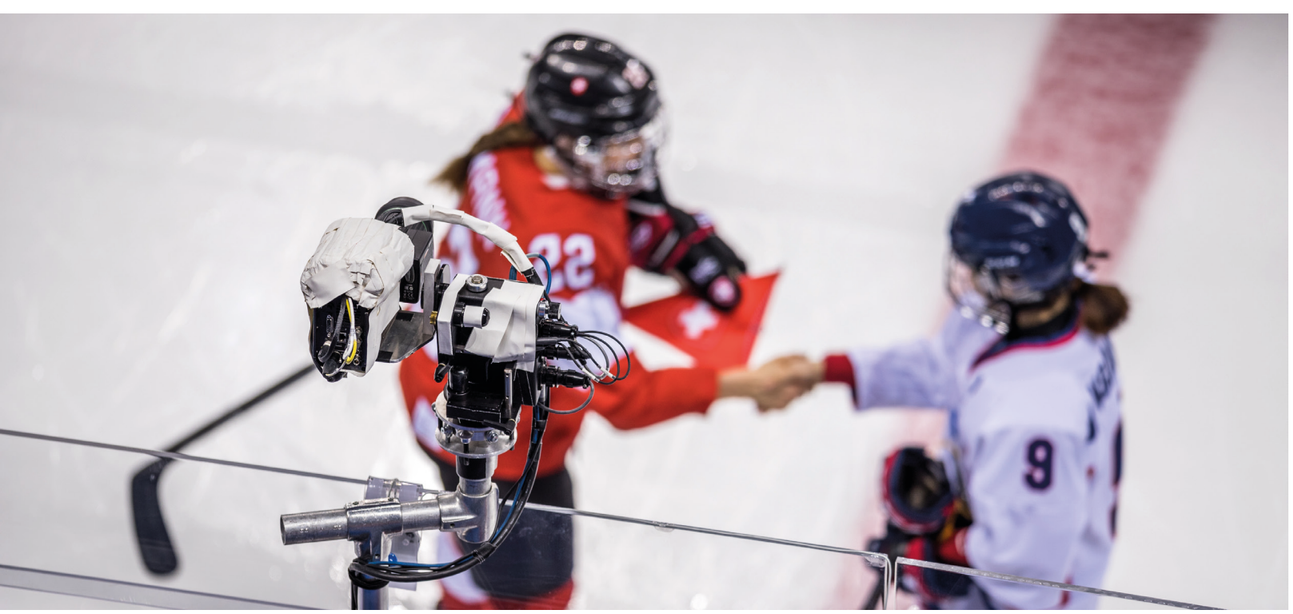
New initiatives in PyeongChang include cloud-based content delivery platform Content+ and native 4K Ultra High Definition (UHD) production, while existing offerings such as our Digital Content Solutions and live Virtual Reality coverage have also been expanded and improved. Details on these initiatives and others can be found in the pages that follow.

OBS is ready to deliver Olympic content from PyeongChang in the most compelling way possible, across multiple channels, relying on many innovative solutions, to allow Broadcasters to share these unique Games with their audiences around the world – anytime, anywhere, on any device.

OBS at a Glance

The International Olympic Committee (IOC) established OBS in 2001 to serve as the permanent Host Broadcaster for the Olympic Games, Olympic Winter Games and Youth Olympic Games, eliminating the need to continually rebuild the broadcast operation for each new edition.

> *"The IOC takes all necessary steps in order to ensure the fullest coverage by the different media and the widest possible audience in the world for the Olympic Games."*
>
> Olympic Charter



Prior to the creation of OBS, the financial responsibility of the Host Broadcaster was with the local organising committee. This responsibility now falls with the IOC, which has significantly eased the financial burden on the host Organising Committee.

SO WHAT EXACTLY IS THE ROLE OF OBS AT AN OLYMPIC GAMES?

OBS is responsible for for producing the images and sounds from all competition events and Ceremonies, which capture the imagination of billions of viewers worldwide, and delivering it in a variety of ways to RHBs to share with their audiences around the world.

Our remit includes:

- Producing the **International Television and Radio (ITVR) signals** of the Games;
- Designing, building, installing, operating and then dismantling the **International Broadcast Centre (IBC)**;
- Designing and operating the necessary **broadcast and technical facilities and equipment** at the competition venues and the IBC;
- **Assisting the Organising Committee** in the design and building of infrastructure required at the venues to accommodate the requirements of OBS and the RHBs;
- **Representing the needs of the RHBs** to the Organising Committee regarding a variety of facilities and services, as an important constituent of the success of the Games;
- Producing **various features** and maintaining an **Olympic archival service** during Games-time; and
- Continually adapting to meet the requirements of **new technology**.

The desire for excellence is what drives the OBS team forward when it comes to the production of the Olympic Games. Capturing the drama and excitement of each Olympic sport, as well as highlighting the unique aspects of every host country, remains the ultimate goal of OBS as Host Broadcaster.

Who We Are

OBS is headquartered in Madrid, Spain. The location is an ideal base of operations because it provides an excellent pool of experienced broadcast professionals and serves as a convenient logistical hub. Currently, OBS employs 162 full-time staff, representing 32 different nationalities.

Members of the OBS Management Team have an average of more than six Olympic Games experience each, having contributed to nearly 150 Games collectively. Combined, the OBS permanent staff has worked across more than 650 Games in total.

During Games-time, OBS employs additional broadcast freelancers who perform duties in areas such as engineering, production, logistics, broadcaster support, information, etc. For the coverage of the 2018 Olympic Winter Games, OBS has hired some of the best and most experienced broadcast professionals from around the globe to ensure the proper delivery of the multilateral coverage plan for each of the 15 sports/disciplines.

Yiannis Exarchos, OBS Chief Executive Officer

Yiannis Exarchos is the current Chief Executive Officer (CEO) of OBS. He was appointed CEO following the Olympic Games London 2012. Specialising in the management of global sports events, he has served as a top executive for all Olympic Host Broadcasters since Athens 2004. His background in print media, radio, television, music and film brings a comprehensive perspective to the planning and management of major events. In 2015 he was also named Executive Director of Olympic Channel Services (OCS), the corporate entity charged with creating and operating the IOC's Olympic Channel. His in-depth media experience and leadership have earned him numerous recognitions. These include five Emmy Awards, an award from the Greek National Olympic Committee (NOC) for long-term contribution to the Olympic Movement and the Great Wall Friendship Award, in acknowledgment of his contribution to Beijing's progress and development.

BROADCAST TRAINING PROGRAMME (BTP)

The total Games-time staff for PyeongChang 2018 is 4,325 and includes 680 Broadcast Training Programme (BTP) students. The BTP, in collaboration with select universities, provide college students with paid, on-the-job training at the Olympic Winter Games in various broadcast positions such as audio assistants, camera assistants, commentary system operators and liaison officers.

Now strongly established as a human legacy from the Host Broadcaster to every Games' host city, the OBS BTP has trained more than 10 thousand of students since its initial introduction in Los Angeles 1984, many of whom have pursued successful broadcast careers in the sports industry. The BTP is leading the way in preparing the next generation of broadcast professionals, by offering an integrated learning approach and a unique opportunity for students to be part of the largest broadcasting operation in sports, an experience they can take with them when they embark on their professional careers.

"As the Olympic Games' Host Broadcaster, OBS is committed to training tomorrow's broadcast professionals and transferring its expertise and the unique experience of the Olympic Games to future generations."

Yiannis Exarchos, OBS CEO

Innovation

PyeongChang 2018 embarked on its Olympic journey with a vision of "New Horizons" in an effort to expand winter sports in Asia and transform Gangwon Province into a new winter sports and tourism destination.

OBS, meanwhile, has been embracing new technological horizons for well over a decade in order to drive advancements and provide the leading techonologies – all for the benefit of RHBs and their audiences around the globe.

"The PyeongChang 2018 Games aim to be the most connected Games in the history of Olympic Broadcasting. By embracing new advanced technologies, OBS will offer viewers around the world an opportunity to experience the Games more intensely and closer than ever before, hopefully inspiring future generations of sports fans and athletes."

Yiannis Exarchos, OBS CEO

Virtual Reality

For the first time, viewers around the world will be able to enjoy the excitement of the Olympic Winter sports in high-definition Virtual Reality (VR), offering an unrivalled front-row experience.

A wide range of sports will be available live in VR, including Alpine Skiing, Curling, Figure Skating, Ice Hockey, Short Track, Ski Jumping, Skeleton, Snowboarding (Big Air and Halfpipe), as well as the Opening and Closing Ceremonies. Overall, more than 55 hours of live sport coverage from PyeongChang 2018 will be produced in VR, supplemented with on-demand replays and daily highlights packages.

Following a successful VR/360 service at the Olympic Games Rio 2016, OBS has made significant improvements and adjustments to the service to meet the needs of the RHBs and their viewers. In PyeongChang, OBS will utilise an immersive, stereoscopic VR platform that will create a 360/180-degree virtual reality environment for viewers to get closer to the action than ever before.

55+ hours of live coverage offered in 180-degree format

Highlights and other VOD features in a mix of 180- and 360-degree

10 RHB organisations subscribed to the service, representing more than **80 territories**

Up to **6** fixed, custom-developed cameras

almost **3x** the number of countries that received live VR for Rio 2016 from OBS

In cooperation with Intel, the new Olympic technology partner and OBS' technical service provider for the end-to-end service, OBS will be providing the VR experience as an option for RHBs to add to their digital portfolio.

Looking forward, VR is expected to play a growing role in the viewing experience of the Olympic Games, especially as great investments are being made in this area to make production less costly and more user-friendly. OBS will continue to keep abreast of these advancements in VR and continue exploring the technology.

5G Technology in Video Acquisition

In collaboration with KT Corporation, our Broadcast Telecommunications partner, OBS will be exploring the latest wireless systems during PyeongChang 2018, utilising a wireless onboard point of view (POV) camera as part of its coverage of the Bobsleigh event. This POV camera will be transmitted using 5G technology, marking the first time such technology will be used at an Olympic Games. This trial will help OBS evaluate how this technology could potentially be used in the coverage of other sports in the future.

Next Generation Standards

360+ estimated hours of coverage produced in 4K UHD (native and side-by-side production)

70+ hours of 8K Super Hi-Vision (SHV) live coverage

+ Daily Highlights programmes

2 8K SHV production vans to cover live the Opening Ceremony, Figure Skating, Short Track Speed Skating, Ski Jumping, and Snowboard Big Air

8K feeds transmitted to Japan; also down-converted to 4K HDR and 4K SDR and distributed to participating RHBs

22.2 surround sound

In PyeongChang, OBS is taking the Olympic viewing experience to an even higher level. For the first time, certain sports events and the Ceremonies, together with scenic footage from six beauty cameras, will be produced natively in Ultra High Definition (4K UHD), providing participating subscribers with a pixel resolution four times that of High Definition (HD) – the current standard.

For the live UHD coverage of the Opening and Closing Ceremonies, OBS will be using two helicopters, fitted with six-axis gyrostabilised mounts and UHD-native three-chip cameras featuring x42 lenses. The live reception of the signals will be at multiple geographically diverse reception points that provide diversity. The signals will be delivered over fibre to the IBC for monitoring and on-pass to the PyeongChang Olympic Stadium for RHBs to use in their programming.

Furthermore, other events will be produced in 8K Super Hi-Vision (SHV) through our continuing partnership with Japan's public service broadcaster, NHK. Up to 10 cameras, including 8K Super Slow Motion (SSM) cameras, will be deployed for live production, twice the number used at Rio 2016. Additionally, NHK will incorporate High Dynamic Range (HDR) and Wide Colour Gamut (WCG) standards into its 8K production to produce the highest attainable picture quality, easily surpassing existing formats, even those used in high-end cinematic productions.

These cutting-edge technologies will help bring a richer, more immersive viewing experience to audiences around the world, setting the tone for the future of Olympic broadcasting.

SO, WHAT ELSE IS NEW ON THE TECHNOLOGY FRONT?

The bulk of the Olympic telecommunications load is being handled by a bespoke system of more than 500km of underground fibre optic cables, distributed across the different venues. This network will carry all produced signals (fully uncompressed multilateral; unilateral; commentary; communications etc.) to the IBC providing the maximum level of quality and resilience.

MAXIMUM RESILIENCE FULL OPTIC FIBRE CONTRIBUTION NETWORK

With more and more broadcasters having remote operations at the Games, OBS has moved our network towards IP-based technology for video transport. For PyeongChang 2018, RHB data service requests have doubled compared to previous Games operation.

MORE DATA CONNECTIVITY THAN EVER BEFORE

MORE FLEXIBLE FILE DELIVERIES TO THE BROADCASTERS

By providing file transfer delivery solutions and global video injection services for RHB unilateral operations, OBS aims at delivering content in a more flexible way than ever before. RHBs can send content via accelerated transfer to their home countries, not only faster, but also in more formats and in a more secure way than before.

PYEONGCHANG
2018

MORE EFFECTIVE TECHNICAL SUPPORT

Having established an infrastructure allowing remote access to the venues, OBS will provide RHBs with 24/7 technical support during Games-time to facilitate their unilateral operations.

FASTER AND MORE RELIABLE WORLDWIDE DISTRIBUTION

OBS has established an International Transport Network connecting the IBC to six international points-of-presence (PoPs), which are located in Seoul, Singapore, Los Angeles, New York, London and Frankfurt, to enable faster and more reliable distribution. Each PoP is connected to the IBC using both terrestrial and submarine cables around the globe. The network has an overall capacity of 400 Gbps.

MORE CONTENT, MORE DIGITAL, MORE FORMATS

The International Television and Radio (ITVR) signals will be delivered for the first time in four Video and Audio (VandA) packages:

- **Standard VandA** including the high-definition (HD) multilateral coverage
- **VandA+** including additional Multi Clips Feeds (MCFs) from 11 different disciplines
- **Ultra High Definition (UHD) VandA** including the 13 UHD signals
- **IP VandA** comprised of compressed signals following IP protocols (ST 2022-2) and delivering the signals in two different resolutions (18-22 Mbps and 6-8 Mbps)

GLOBAL ACCESS TO OBS MEDIA SERVER

RHBs can access the OBS Media Server (the Games-time archives) remotely, from anywhere in the world. For the first time in an Olympic Winter Games, the mixed zone athlete interviews will be processed in a raw form quickly and made available to RHBs via the OBS Media Server.

Production Highlights

IOC President Thomas Bach recently said: “If we do not drive change ourselves, others will drive us to it. We want to be the leaders of change, not the object of change.” It is this philosophy that drives OBS’ willingness to be open to change and improvements to what we have done in the past, provided it introduces new dimensions and clear benefits to the coverage.

The Production Plan for the Olympic Winter Games PyeongChang 2018 will include more broadcast hours than ever before. OBS will use more than 450 cameras to produce a record-breaking amount of coverage from the Games – approximately 5,000 hours (approximately 20 per cent more than in Sochi four years ago) – including live sport, select official trainings and Ski Jumping trials; the Opening and Closing Ceremonies; the daily Medals Plaza Victory Ceremonies; the Olympic Channel News (OCN); digital content (Virtual Reality, Content+); and other additional production material.

Storytelling

While advancements in new technologies have markedly improved the user experience of the Olympic Games, one premise has remained constant throughout the history of Olympic broadcasting: Storytelling is still king. We are not driven simply by technology, but use innovations in each field as a source for improvement in our coverage.

In fact, it is arguably more important than ever with so many competing voices clamoring for attention. Innovation, in and of itself, is no longer a means to an end. To be heard over the din, the content has to be delivered in a way that deeply engages the audience, and good, well-crafted storytelling is the way to do it.

“Whereas with VR the storyteller is the viewer him or herself, as they alone decide what to focus on, in the 2D world it is up to us, the producers, to tell the audience the story, to make the Games more relatable. Everyone loves a good human-interest story, it’s in our DNA, and nowhere is this more raw and emotional than sport, especially at its pinnacle, the Olympic Games.”

Mark Wallace, OBS Chief Content Officer

Capturing the Games

- **14 two-point and four-point aerial cable systems** in total will be used to cover PyeongChang 2018, including four-point systems for the first time at Ice Hockey, Figure Skating and Short Track Speed Skating
- **Nearly 50 High Speed Slow Motion (HSSM) and Super Slow Motion (SSM) cameras** will be deployed across the different competition venues
- **More than 120 4K Ultra High Definition (UHD)** cameras and a total of **10 8K Super Hi-Vision (SHV) cameras** will be used for the broadcast of the Games
- Up to **six Virtual Reality (VR)** custom-developed cameras will be used to create live VR experiences from the Ceremonies and the Olympic competition venues
- **Rail-cam tracking systems** (horizontal, vertical and overhead applications) and **mini-tracking systems** have been installed, including an inverted rail-cam system at the Olympic Sliding Centre to cover the Bobsleigh and Skeleton events
- **12 Beauty Cameras** provide RHBs with unique panoramic views of PyeongChang, Gangneung and Seoul, while also capturing the general atmosphere and essence of the Olympic Winter Games. Six of these Beauty Cameras will be in full 4K for the first time.
- **Athletes' Point-of-View (POV)** cameras, including mini HSSM cameras, will help capture the Olympic competition "from the athletes' eyes" at Freestyle Skiing and Snowboard Cross events to offer unique insight into the action
- **More than 40 jibs, cranes and polecams** of various sizes and complexity will help enhance OBS coverage
- **Special pop-up cameras** have been mounted in the ice at the Olympic Sliding Centre, which can be remotely lowered with the ice surface
- For the first time, OBS will place an **onboard POV camera at Bobsleigh** on the front part of the sled, giving viewers the pilot's perspective of the track
- OBS will use **two drone cameras** to cover Slopestyle, but will also rely on aerial drone technology for the first time to cover the Cross-Country Skiing Mass events, as well as the Ceremonies and the newly-introduced Snowboard Big Air events, in order to offer unique and original angles. These drone cameras are expected to show angles of the performances that would otherwise be unattainable and provide a variety of highly creative shots for both the Multilateral Signal and Multi Clips Feeds (MCFs). Furthermore, **two helicopters** will also provial aerial coverage during the Games.
- **New data-driven and immersive technology replay systems** will provide deeper, multi-angle analysis of key moments of select sports, which will be used when editorially relevant and as part of the supplementary content provided in the MCFs. For instance, at the Gangneung Ice Arena, one hundred SLR cameras have been placed above the stands on the South side of the ice rink to provide replay videos in 360-degree time slice effect. A combination of video replay and graphic elements will be used for the first time in Ice Hockey to analyse team tactics and track and highlight key athlete movements during a play.
- The audio signals from PyeongChang will be provided in stereo and discrete 5.1 surround. Three dimensional modern sound design, as well as the use of the latest technologies in monitoring speakers systems, will ensure a smooth audio experience. **More than 3,500 microphones** in 35 different configurations will be used for sound production of the PyeongChang 2018 Games. No less than 18 stageboxes are required at Alpine Skiing to connect the microphones and other sound equipment. At Figure Skating, microphones have been placed under the ice rink to help pick up such details as the sound of the blade tip stabbing the ice prior to a jump.

Live Production

OBS has contracted 10 suppliers to provide 38 HD and UHD broadcast vans and auxiliary trucks for the coverage of the Games in PyeongChang. Thirty-six came from Europe and two from China. OBS has also secured three local trucks to provide 4K UHD coverage, and seven light-production units – five from the United States to cover Curling and the press conferences at the Main Press Centre (MPC), and two from France to cover the Opening and Closing Ceremonies, as well as the Medals Plaza Victory Ceremonies.

Multi Clips Feed (MCF)

For PyeongChang 2018, OBS will continue facilitating the distribution of supplementary clips to the Broadcasters by providing Multi Clips Feeds (MCFs) not only for Alpine events, as in Sochi 2014, but for a total of 11 sports/disciplines: Ice Hockey, Figure Skating, Short Track Speed Skating, Alpine Skiing, Ski Jumping, Freestyle Skiing, Nordic Combined (Ski Jumping phase only), Snowboard and all Sliding events. The MCFs include unseen competition clips and angles, primarily from HSSM, SSM and POV cameras, to help RHBs enhance their post-production – more than 530 hours of additional content (estimated) to enhance second screen programming.

Additionally, for the first time, the MCFs will also carry an extended range of enhanced graphics and analytical content for use in post-competition analysis. For instance, the MCF for Ice Hockey will offer a combination of video replay and graphic elements to analyse team tactics, track and highlight key athlete movements during a play, show athlete positions, document the distances between them, and provide the relative speeds of the athletes and the puck.

Multi-channel Distribution Service (MDS)

1,920+ » + 456 hours of Olympic Channel News (OCN)

8 channels available, including **7** sports channels with English commentary + OCN

2 » satellites covering Asia and EMEA regions

56 RHB organisations subscribed to the service

180 countries and territories reached in Rio 2016

The Multi-channel Distribution Service (MDS) has become one of the leading ways to distribute television coverage of the Olympic Games to the world. It offers RHBs a cost-effective turnkey solution to deliver the Games to their viewers through fully programmed, ready-to-air channels. This service has changed the way RHBs operate at the Games, allowing them to send fewer resources and personnel to the host city, and giving them the option to work from their home countries.

For PyeongChang 2018, OBS has extended its MDS offering and will deliver seven sports channels (with English commentary), as well as one relaying the Olympic Channel News (OCN), via encrypted satellite distribution to participating subscribers.

A team of 22 international commentators will further engage global audiences with expert analysis and background information.

Olympic Channel News (OCN)

OBS provides Broadcasters with a ready-to-air 24/7 channel, the Olympic Channel News (OCN), that offers a complete and continuous review of the Games. It offers an additional source of 'clip' material that RHBs can use within their own programming – including interviews, sports highlights, media conference coverage and feature packages on Games-related matters both inside and outside of the Olympic venues.

The OCN will also provide new video material such as b-roll footage and all mixed zone interviews in raw format via the OBS Media Server. It is similar to a 24-hour rolling sports news service, but one that concentrates solely on the Olympic Games in question and how those Games impact the host city. For the first time, Broadcasters will also be able to access some of this material from Content+.

456 » hours of programming

including athlete interviews from the Mixed Zone at each venue

ready to air **24** hour-a-day channel

24 » camera crews on the ground

OCN also films and produces the OBS 'Behind the Scenes' documentary and the special end of the Games Highlights programme called the 'Summary of the Games'

"The Olympic Channel News was created to ensure that Broadcasters can get a simple, fully produced TV channel, giving a comprehensive and contemporaneous review of the Games. We produce a short package of sports highlights that is fully voiced and fully edited and features from inside and outside venues. We have crews around PyeongChang telling the story of how proud the Koreans are to be hosting the Games. Our job is to relay that pride and passion they have for the Games."

Grant Coleman, OBS Director of News Services

Digital

The rise of digital technologies has fundamentally reshaped sports broadcasting and viewing habits. Storytelling coverage is key to engagement in the digital arena and OBS has been significantly enhancing its offerings in this area.

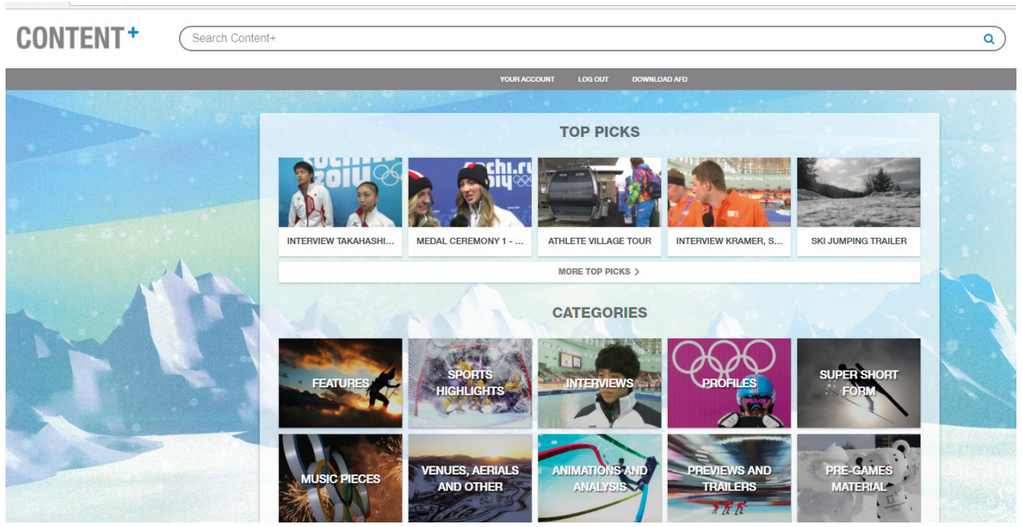
Operating in the digital world differs in significant ways from linear broadcasting. OBS is tailoring its services to address such an evolution by ensuring digital content is delivered rapidly. It is immediately engaging, while at the same time short enough for easy retrieval and consumption.

In the past, traditional television used to receive far greater attention than digital platforms. These days, however, the two worlds are fully aligned, giving audiences, in particular the younger generation, a much greater choice of viewing options and experiences.

Cloud Services

One of the biggest changes to OBS' operations in the last decade has been the continuing shift to cloud services, allowing for more efficient content management and distribution. By considerably reducing download times and providing greater reliability through global redundancy, our cloud services create a much-improved user experience for the RHB community.

CONTENT+



At PyeongChang 2018, OBS will launch a new cloud-based content delivery platform known as Content+. Footage will be uploaded to Content+ in PyeongChang that will be automatically replicated in different parts of the world, from Asia to Europe and the Americas, making the Olympic content instantly available from any location.

Content+ will provide fully produced short-form content (varying from 10 seconds to slightly longer pieces of three minutes) for RHBs to use on their digital and social media platforms. The Olympic Channel News (OCN) and Multi-channel Distribution Service (MDS) will contribute to the production of content, but it will be a dedicated Content+ team led by social media editors who will, for the first time at an Olympic Games, be on the ground to provide footage from both Olympic Villages. The Content+ team will also produce material at the Opening and Closing Ceremonies and the Victory Ceremony Medals Plaza. The result will yield an an exciting mix of behind-the-scenes footage and features.

"The idea behind Content+ is not only to deliver content to traditional Broadcasters, but to get it quickly to their digital teams who tend to remain back at their headquarters during Games-time. This platform offers them an opportunity to see a clip as soon as it is produced and upload it onto their social media platforms."

Karen Mullins, OBS Director of Production Management

Digital Content Solutions

In keeping with changing demands, OBS has expanded the digital portfolio it offers RHBs. In addition to the Olympic Video Player (OVP), which was introduced at Sochi 2014 as a white-label advanced video player for desktops, tablets and smartphones providing live streaming and video-on-demand (VOD) of every competition session, OBS now provides individual digital components that can be integrated directly into an RHB's digital products, giving Broadcasters greater control and flexibility over the content.

For example, GPS solutions for certain sports such as Cross-Country Skiing are now individually available. Athletes fitted with GPS will allow users to view each race on a map, both live or on demand after the race. The users can also receive detailed data about the athletes' current and/or average speeds.

Also in response to the needs of the RHBs, every element from the OVP such as the live video streaming, results sections, medals table, schedule, video highlights, etc. can now be embedded within any RHB website via widgets.

"Keeping pace with an increasingly connected audience, and maintaining relevance to the younger generations, are some of the driving forces behind the future of sports broadcasting."

Sotiris Salamouris, OBS Chief Technology Officer

More with Less

With the approval in 2014 of Olympic Agenda 2020, the IOC's strategic roadmap of reforms for the future of the Olympic Movement, further emphasis has been placed on easing the financial burden on future Host Cities of the Olympic Games.

In response, OBS has informally adopted a "more with less" policy and implemented a number of initiatives in this regard. This includes reductions in the number of observer seats to allow the Organising Committee to sell them to the general public, the size of compounds (where possible), and the size of platforms (where possible, i.e. when it does not impact OBS or RHB operations).

In PyeongChang, operational optimisation at the IBC has had a significant impact. While original plans called for two floors, OBS limited it to one and further lessened its height, thereby reducing required construction.

Optimisation has led to a 30 per cent reduction in the total footprint of the main electrical switchgear of the building compared to previous Olympic Winter Games. In addition, 55 per cent of the cable recovered from Rio 2016 is being re-used. OBS Tech has also found ways to offer more services (VR, Content+, 4K/8K production, etc.) using roughly the same size space (5,200sqm) as that at Sochi 2014.

The external studios were built in a way that allows for better sharing between Broadcasters of important services with the IBC itself such as power, security, transportation, catering, etc.

Another important feature of the IBC in PyeongChang is its improved design with respect to HVAC requirements. Being a facility that houses an extensive framework of dedicated broadcast and IT technical systems, there is customarily a need for massive cooling capacity. However, by taking advantage of the very low temperatures of the mountainous location, it has been possible to develop a cooling system that relies mostly on an external air source.

For the fit-out of the IBC, OBS re-used the modular construction structures that were recovered from the IBC from Rio 2016. To make OBS operations more efficient from Games to Games, these pre-fabricated panels were specially developed to be used for at least two editions of the Games. When the life cycle of panels ends, the materials will be fully recyclable, representing a major sustainable improvement compared to previous methods.

Finally, unlike previous Olympic Winter Games, a secondary broadcast centre was not required. In the past, a satellite facility has been installed in a separate location to act as a smaller version of the IBC (usually in the mountains if the IBC has been located closer to the host city or indoor venues). However, for PyeongChang, OBS has been able to make the most of the location of the IBC within the mountain region and eliminate the need for a coastal broadcast centre, thereby reducing the broadcast footprint and overall impact on the Host City.

INTERNATIONAL BROADCAST CENTRE

International Broadcast Centre

Olympic Winter Games

PyeongChang 2018

RHBs

- Number of RHB organisations with IBC broadcast space: 45 (16 of them are RHBs, the rest are sublicensees)
- At its peak, the IBC will house between 6,000-8,000 broadcast personnel

CONSTRUCTION

- A total of 6,700 tonnes of steel was used in the construction of the IBC
- Supporting the structure are 616 foundation bearing piles
- For the fit-out of the building, OBS re-used the modular structures that were recovered from the IBC at Rio 2016
- Total cable length: 904km
- Total bus duct length: 14,5km
- Total Air Handing Units (AHU): 13,6km
- Power: 14,400 kVA

LOCATION

- Purpose-built facility in heart of the Mountain Cluster in Alpensia Resort
- Close to four Olympic venues and Olympic Plaza, home of the Olympic Stadium, Medals Plaza and Cauldron
- All Olympic venues within 46km-radius
- Unlike previous Games, IBC is separate from MPC, located 1km away

SIZE

- 290m long, 139m wide: the IBC is roughly the same size as five football fields side by side
- Appx 28,5m high
- Total area (gross): 51,000sqm
- Footprint: 34,000sqm of functional space distributed on one floor, housing a variety of technical and administrative facilities for both OBS and RHBs, including edit suits, control rooms, studios and offices.
- OBS Tech including production and technical facilities: appx 5,200sqm
- Nine TV studios (one double and eight individual) built on the roof, as well as stand-up positions for live reporting

BROADCAST HUB

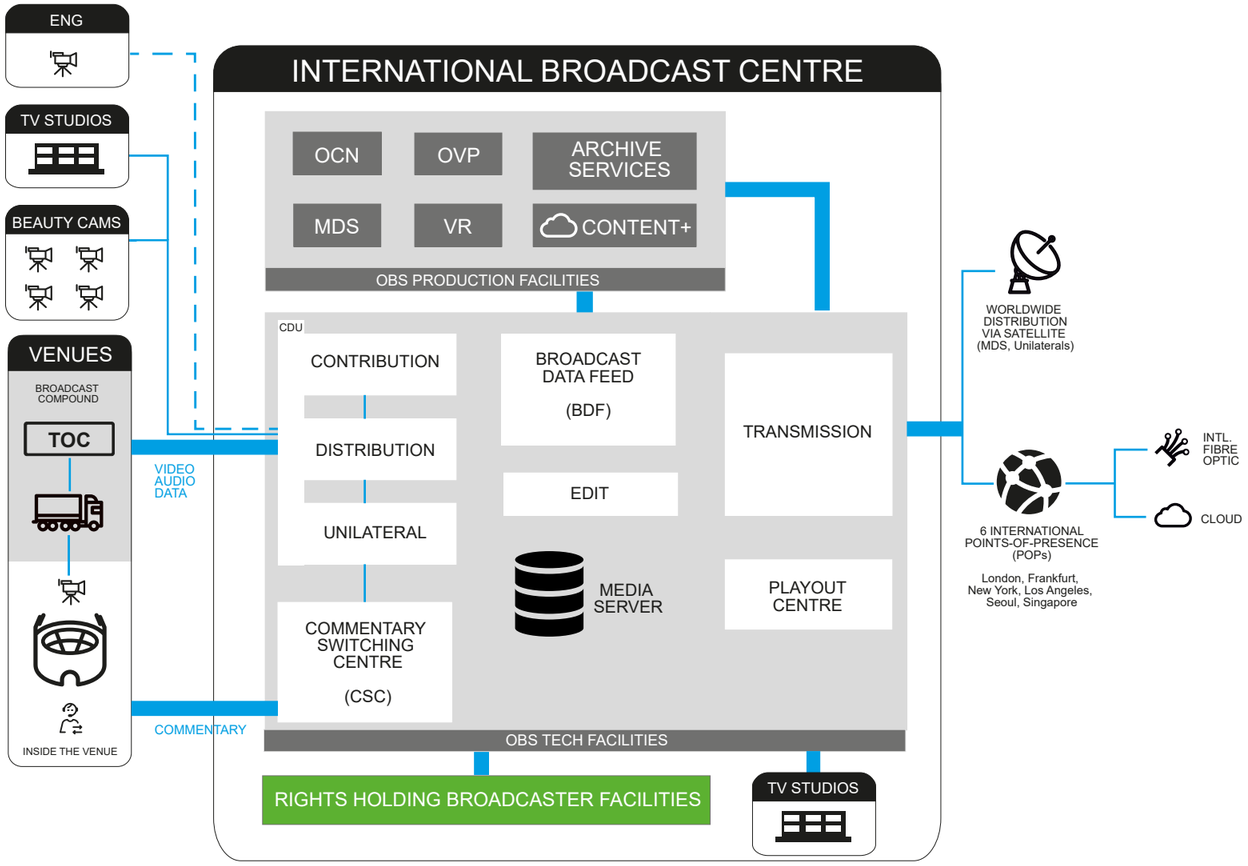
- 20 High Definition (HD) Multilateral Feeds (sports feeds, beauty cameras, press conferences, Olympic Channel News)
- 13 Ultra High Definition (UHD) Feeds (7 sports feeds, 6 beauty cameras)
- 18 Mixed Zone Feeds
- 9 Multi Clips Feeds (MCFs)
- 131 RHB Unilaterals
- 212 Gbps of data exchange between venues and IBC
- Storage capacity of the OBS Media Server: 7,000h HD, 340h UHD (vs 4,000h in Sochi)
- The OBS Media Server can record simultaneously up to 93 HD ingest channels and 10 UHD ingest channels
- Connected to six international points-of-presence (PoPs)

TIMELINE

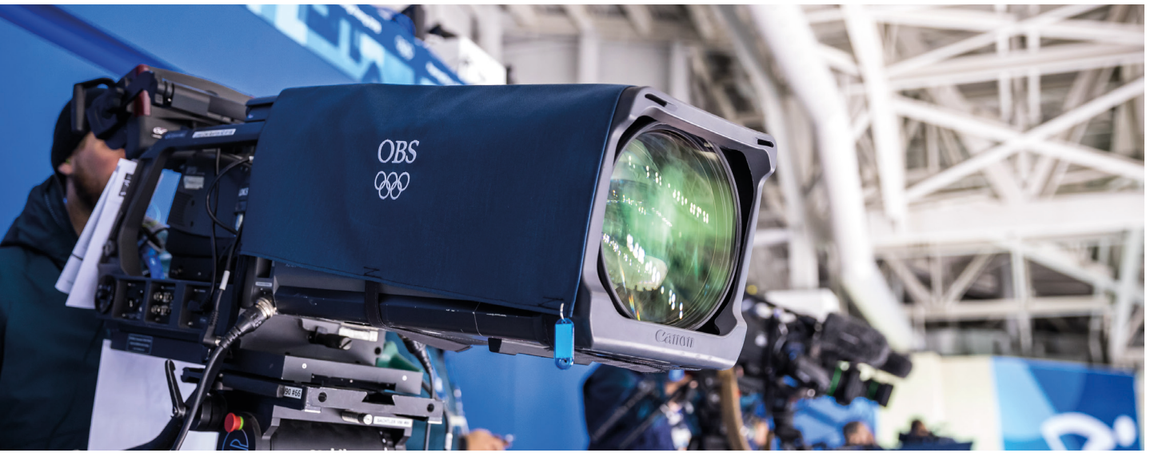
- Start of the construction of the building shell: December 2015
- Handover of the shell to OBS: June 2017
- Fit-out by OBS: June-November 2017
- IBC Soft Opening: 9 January 2018. At this point, the IBC becomes a 24/7 facility until the end of the Games.

FROM PYEONGCHANG 2018 TO THE WORLD

The signals generated at the different venues around PyeongChang will flow through the OBS Technical facilities at the IBC, where they are quality-controlled and stored before being sent to the Broadcasters for distribution to their audiences around the world.



Facts and Figures



2 satellites covering Asia and EMEA regions for MDS distribution, with more than **240** demodulators deployed across more than **60** different countries

4,000+

OBS staff (including **680** BTP students) from **75** nationalities

502

Commentary Positions

268

Commentary Circuits

45 RHB Announce Positions at Competition Venues

14 RHB organisations have subscribed to Content+

5,000+

tons of equipment and broadcast systems were freight forwarded to PyeongChang via air and sea, representing a total of **590** containers. For the first time, an IoT (Internet of Things) solution was used to test smart real-time asset tracking.

600+ Fibre optic strands are being used in the Contribution Network connecting the Venues to the IBC, corresponding to a total length of more than **20,000** kilometres

212

Gigabits per second (Gbps) RHB Data Services

850+ hours of live sports coverage, including official training and jump trials

5,000+

total hours of coverage (live sport, Ceremonies and additional production material)

6 points-of-presence (PoPs), with an overall capacity of **400** Gbps

20 Gbps total Internet traffic in Seoul, Singapore, Amsterdam and Madrid

20 High Definition (HD) Multilaterals

13 Ultra High Definition (UHD) Multilaterals

9

Multi Clip Feeds (MCFs), providing appx **530+** additional hours of content to the RHBs

450+

Camera Systems

18 Mixed Zone Feeds

7,200+

accredited RHB personnel from **67** countries

3,500 microphones

23 RHB organisations have purchased the rights for PyeongChang 2018

105

Broadcasters transmitting the Games, including **45** with a presence at the IBC

214 RHB Mixed Zone Positions **169** TV & **45** Radio

345 Unilateral Camera Positions

131 Unilateral Feeds

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