



Innovative R&D by NTT

ILE Implementation: CYBER TELEPORTATION TOKYO at SXSW

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Want to see a music live here on the other side of the world ?

<https://www.youtube.com/watch?v=8U2AVSruCI4>

CYBER TELEPORTATION TOKYO was selected in the shortlist of Innovation and Music.

Innovation Shortlist 2017



Title	Advertiser/Client	Product/Service	Entrant Company	Country
A01 Innovative Technology				
COGY WHEELCHAIR	TESS CO., LTD.	COGY	TBWA\HAKUHODO, Tokyo	JAPAN
KNOW YOU AGAIN		BAIDU AI GLASSES FOR THE ALZHEIMER'S DISEASE	BAIDU, Beijing	CHINA
A02 Applied Innovation				
AAMI SMARTPLATES	SUNCORP	AAMI INSURANCE	OGILVY AUSTRALIA, Melbourne	AUSTRALIA
AIR-INK	HEINEKEN ASIA PACIFIC PTE. LTD.	TIGER BEER	HEINEKEN ASIA PACIFIC, Singapore	SINGAPORE
THE LIFE-SAVING FURNITURE	BHUMISIRISUK CO.,LTD	FIRE EXTINGUISHER	DENTSU X, Bangkok	THAILAND
CYBER TELEPORTATION TOKYO	NTT	CYBER TELEPORTATION TOKYO	NIPPON TELEGRAPH AND TELEPHONE CORPORATION, Yokosuka	JAPAN
THE BREAST CANCER SCREENINGS	SKY TELEVISION NEW ZEALAND	RIALTO CHANNEL	DDB GROUP NEW ZEALAND, Auckland	NEW ZEALAND
ROADS THAT HONK	HPCL	HP LUBRICANTS	HINDUSTAN PETROLEUM CORPORATION LTD, Mumbai	INDIA
SOUND IN SILENCE	INTEL	HYPER-SENSE MUSIC SHIRT	mcgarrybowen, Shanghai	CHINA
A04 Early-stage Technology				
SMILE LOCK OUTLET	TOYOTA	TOYOTA I-ROAD	DENTSU INC., Tokyo	JAPAN

CYBER TELEPORTATION TOKYO at SXSW



JAPAN FACTORY

CYBER TELEPORTATION TOKYO

Feel the Synchronicity between Tokyo and Austin!

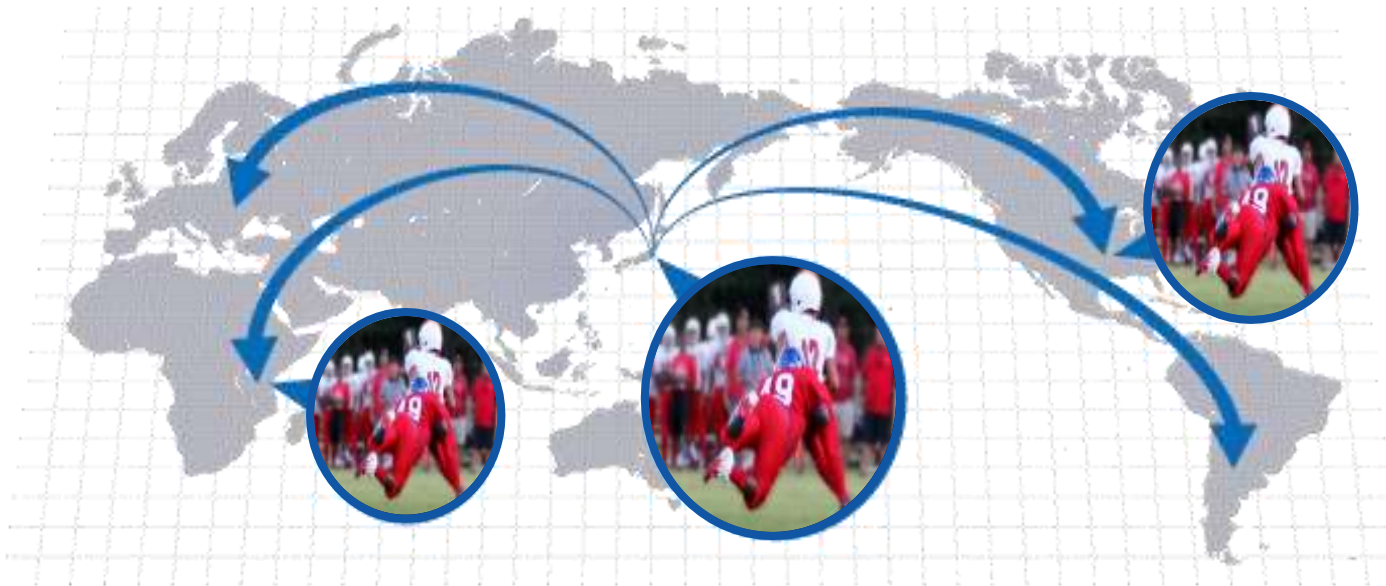


- One of the Immersive Live Experience (ILE) implementations.
 - TOKYO-AUSTIN: 6543miles via Shared NW (Bandwidth 1Gbps, Latency 75ms, Packet loss ~0),
 - Movie: 5 x HD(H.264), Sounds: 3 x AAC 320kbps synchronized with MMT,
 - Real-Time Image Extraction, Transparent Screens.

Immersive Live Experience (ILE)



- Viewing experience which provides users high-realistic sensation on public viewing site.
- Expecting that audiences anywhere in the world can cheer their favorite sport teams or artists at remote sites even if they are not in the event venue, and they can feel a sense of togetherness and get passionate as if they were in the event venue.

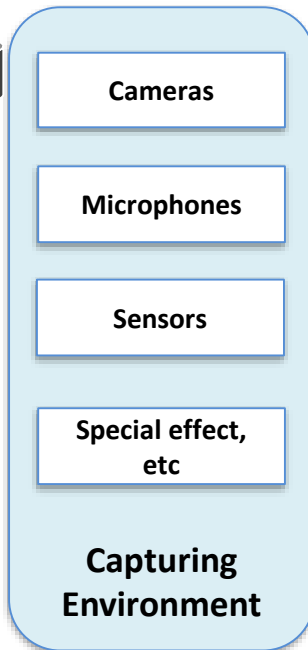
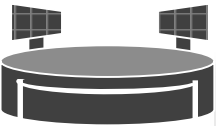


- Reconstructing event sites virtually with presentation of real-sized objects and sound direction by transmitting environmental information together with audio and video streams.
- Needed technologies;
 - High-definition video coding (e.g. H.265),
 - High-realistic audio coding (e.g. MPEG4-ALS),
 - Extended media transmission (e.g MMT),
 - Optical illusion,
 - Reconstruction sound and light fields,
 - Adaptive object extraction,
 - etc.

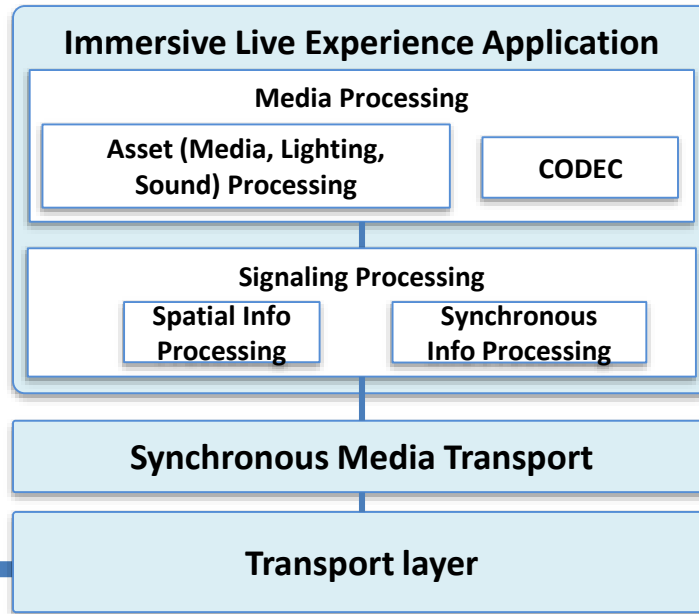
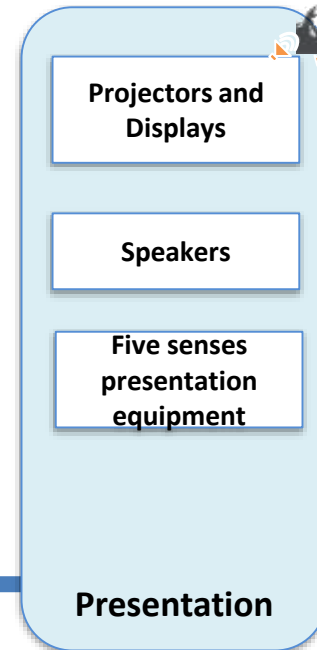
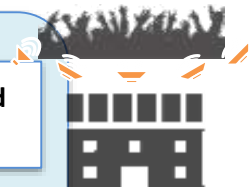
Framework for ILE



Source Sites (Stadiums, Halls, etc)



Viewing Sites (Halls, Theaters, etc)





- NTT has researched and developed Kirari!® as an ILE technologies and service.
- Feeling as if they are experiencing the atmosphere of the sporting venue, wherever they are.

Feeling “speed”, “height”, “strength”



Kirari!

**Hope to make user’s eyes
twinkle**



CYBER
TELEPORTATION
TOKYO

ARTIST

starRo



AyaBambi



Cheeky
Parade

RyoFu

Taichi
Mukai




TOKYO

6,543
MILES


AUSTIN

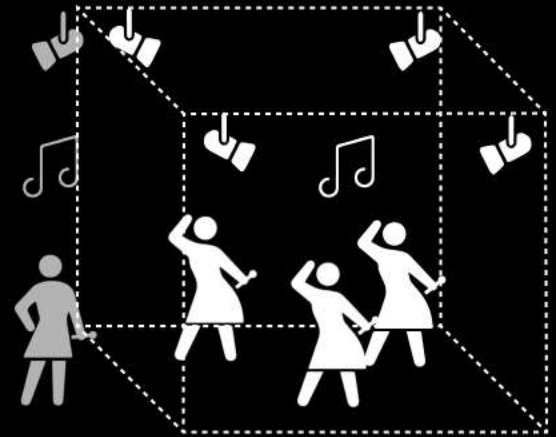
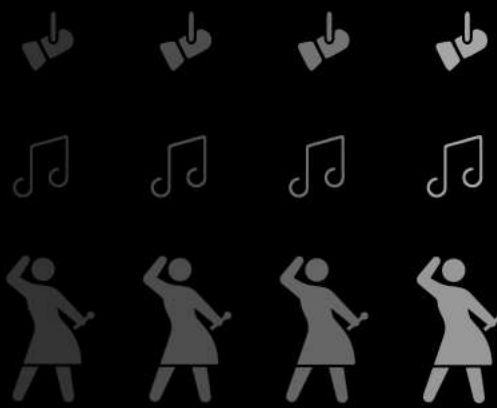
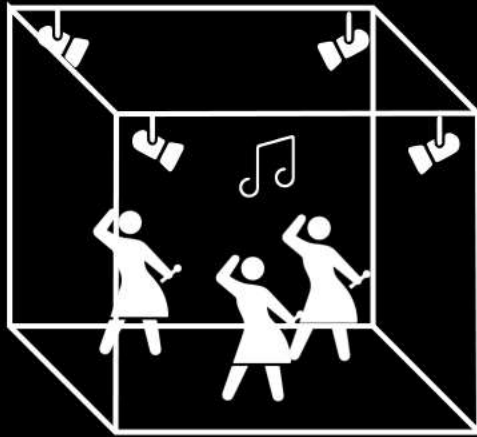


Kirari!®

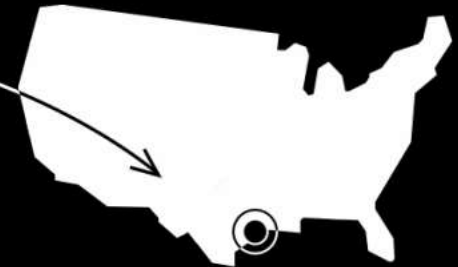
Extract

Transmit

Reproduce

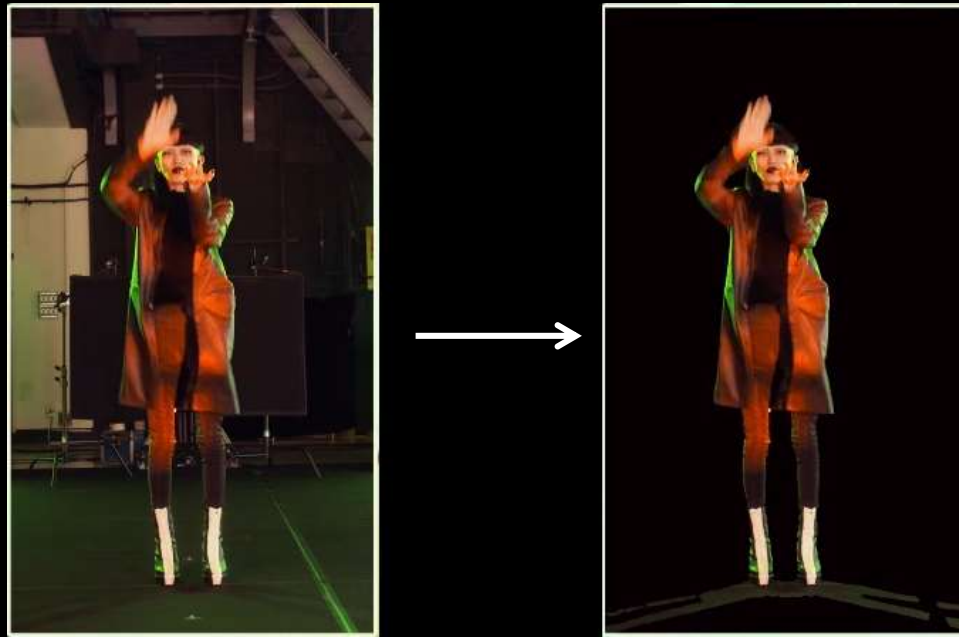


TOKYO



AUSTIN

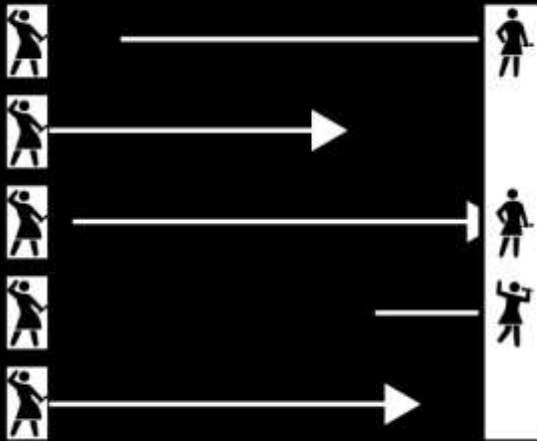
Real-Time Image Extraction Technology For Any Background



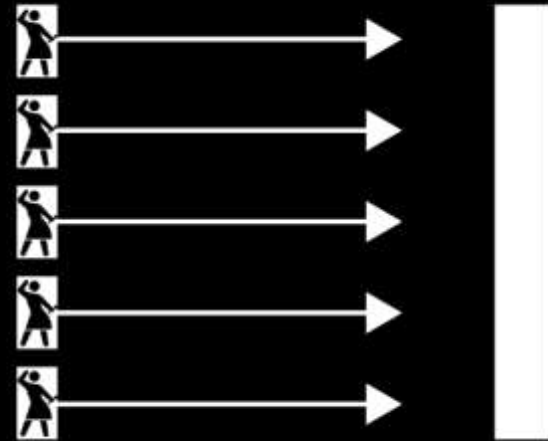
- ✓ Robustness : Any background
- ✓ Fineness : Details like individual hairs of 4K image
- ✓ Real-time : 3 -5 frame delay @ 60fps (~80ms)

Low Delay Media Synchronous Transmission Technology

Existing technologies

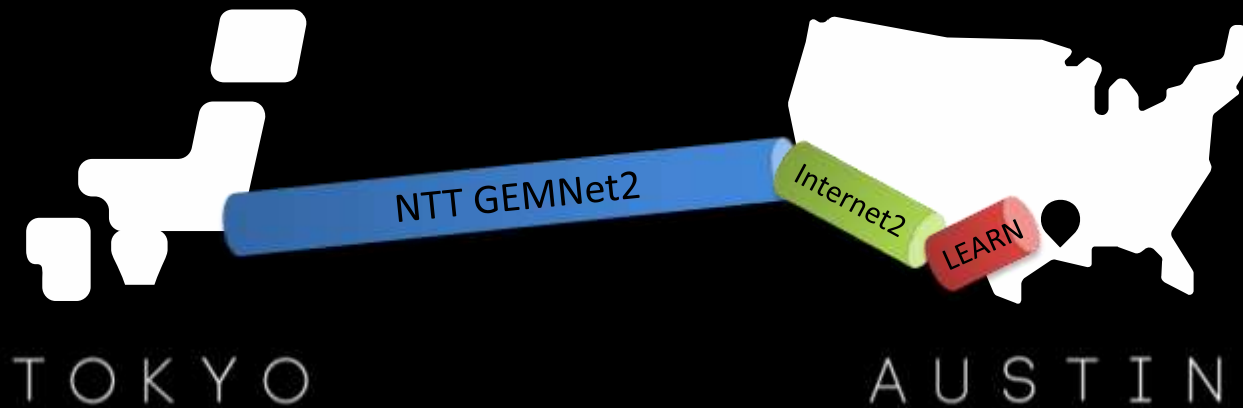


Advanced MMT



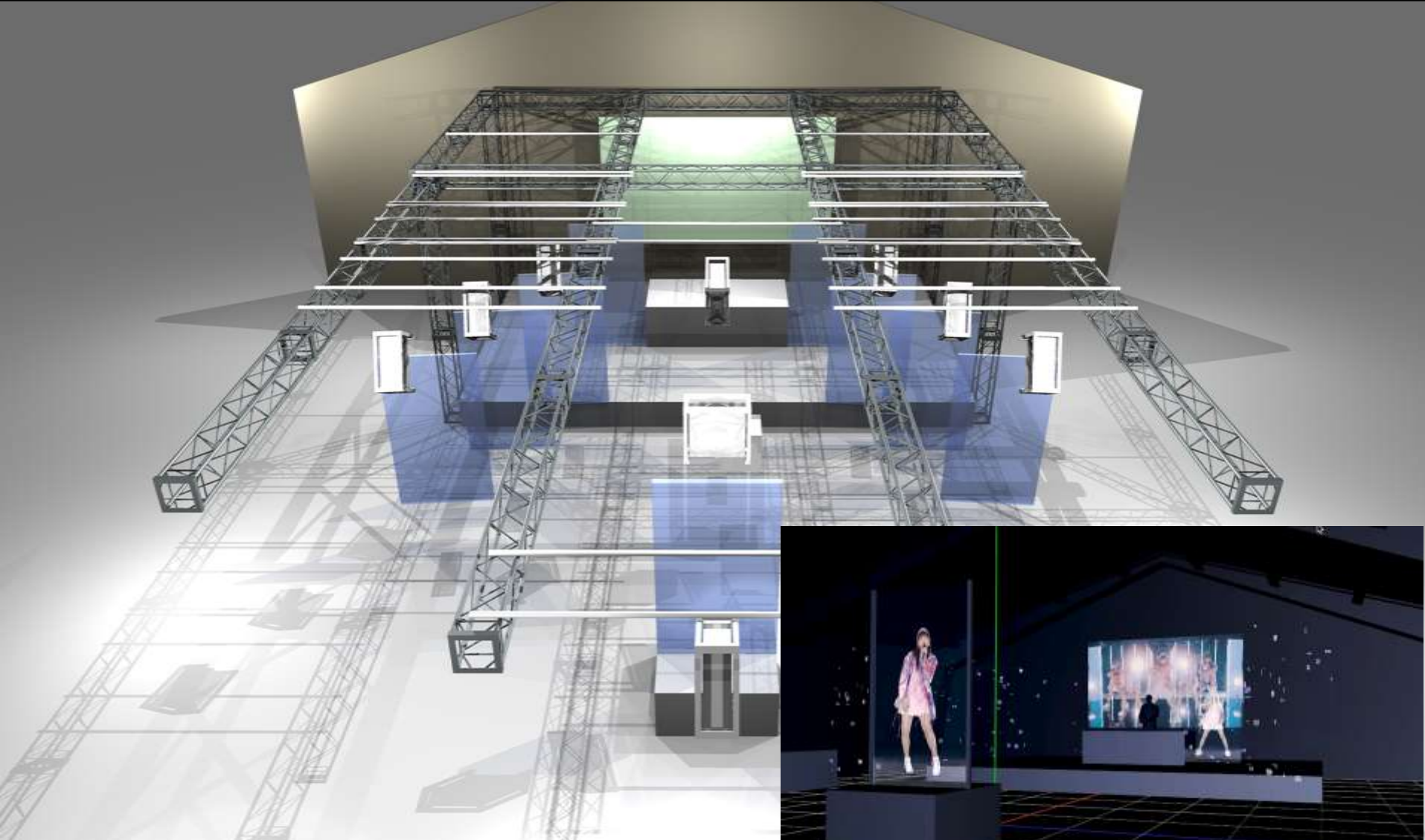
- ✓ Movies : 5 x HD (H264)
- ✓ Sounds : 3 x AAC 320kbps
- ✓ Real-time : 550ms delay including NW latency

Ultra-Low Latency Global High Speed Communication Network



- ✓ Bandwidth : 1 Gbps
- ✓ NW latency : 75 ms
- ✓ Packet loss : ~zero

Reproducing Venue and Display





Thank you!

CYBER TELEPORTATION TOKYO

Powered by

Kirari!



NTT Laboratories
Creative Research



AOI Pro.



Innovative R&D by NTT

supplemental resources:

Technologies for Kirari!®

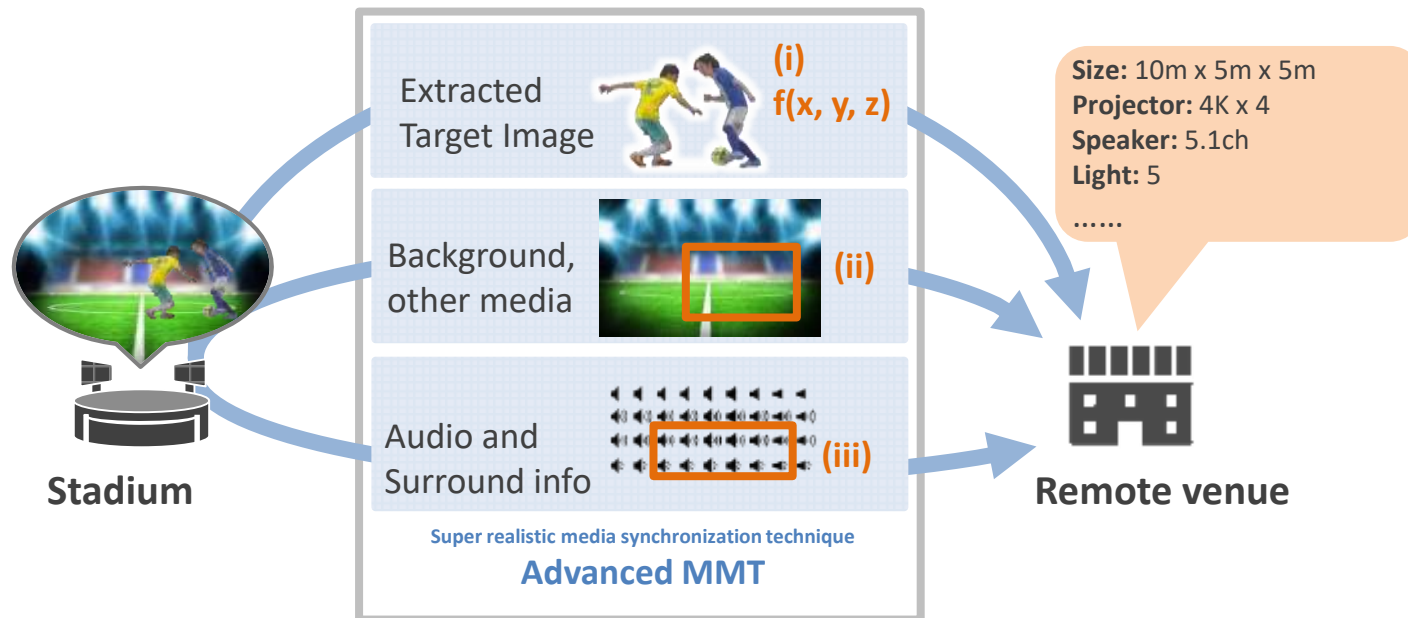


- CYBER TELEPORTATION TOKYO at SXSW2017 [full]
<https://www.youtube.com/watch?v=qFbvxBtplm8>
- CYBER TELEPORTATION TOKYO at SXSW2017 [digest]
<https://www.youtube.com/watch?v=8U2AVSruCI4>
- CYBER TELEPORTATION TOKYO at SXSW [tether]
<https://www.youtube.com/watch?v=N8dey5-y9aY>
- NTT Press Release
<http://www.ntt.co.jp/news2017/1703e/170307a.html>
- SXSW 2017 Web site
<https://www.sxsw.com/news/2017/cyber-teleportation-tokyo-at-sxsw/>
- Spikes Asia 2017
<https://www.spikes.asia/winners/2017/innovation/entry.cfm?entryid=700&award=99&order=0&direction=1>

Challenges for Kirari!



- Media acquisition part (what do we need to capture?)
- Media processing part (a part of making kirari! contents)
- Media delivery part (we use MMT but is not limited to use other)
- Media presentation part (how to use pseudo 3D image effectively?)

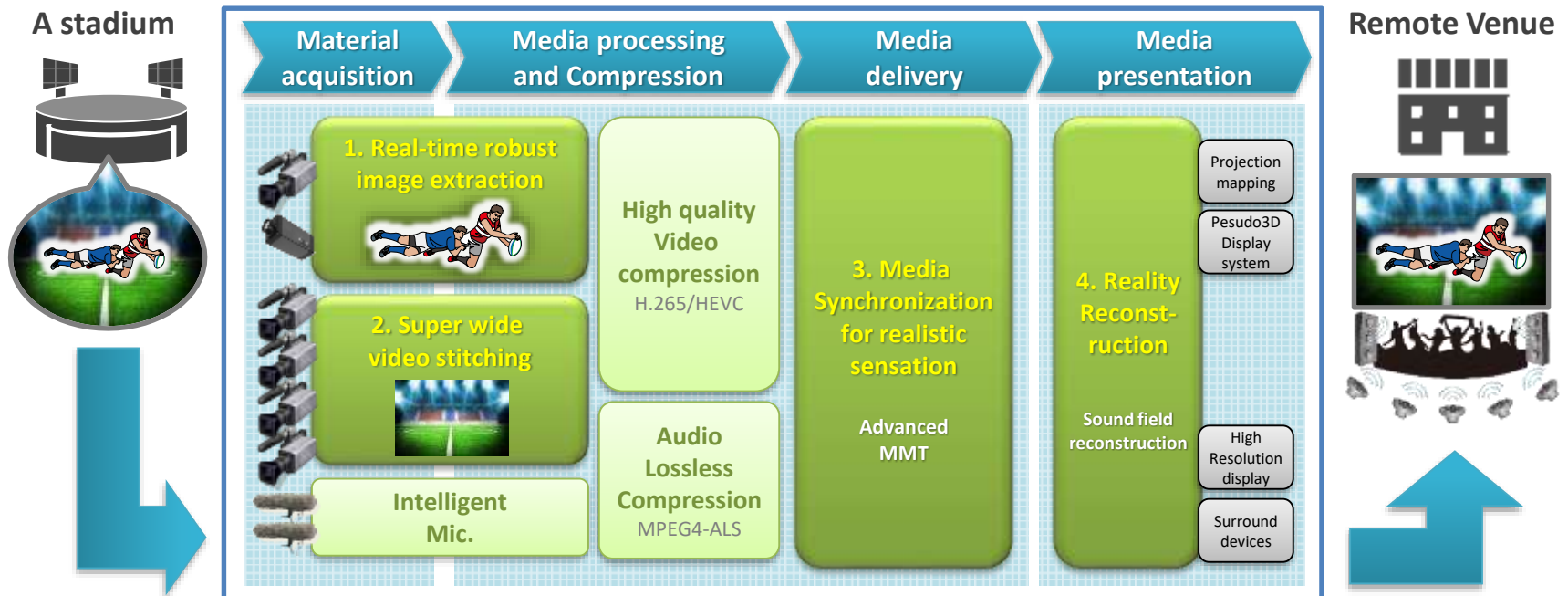


Current status of technologies for Kirari!



NTT Developed:

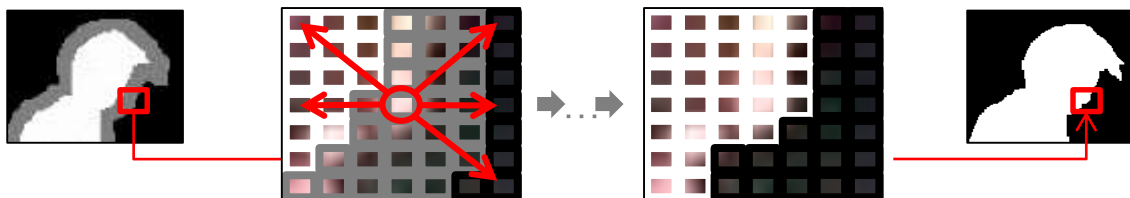
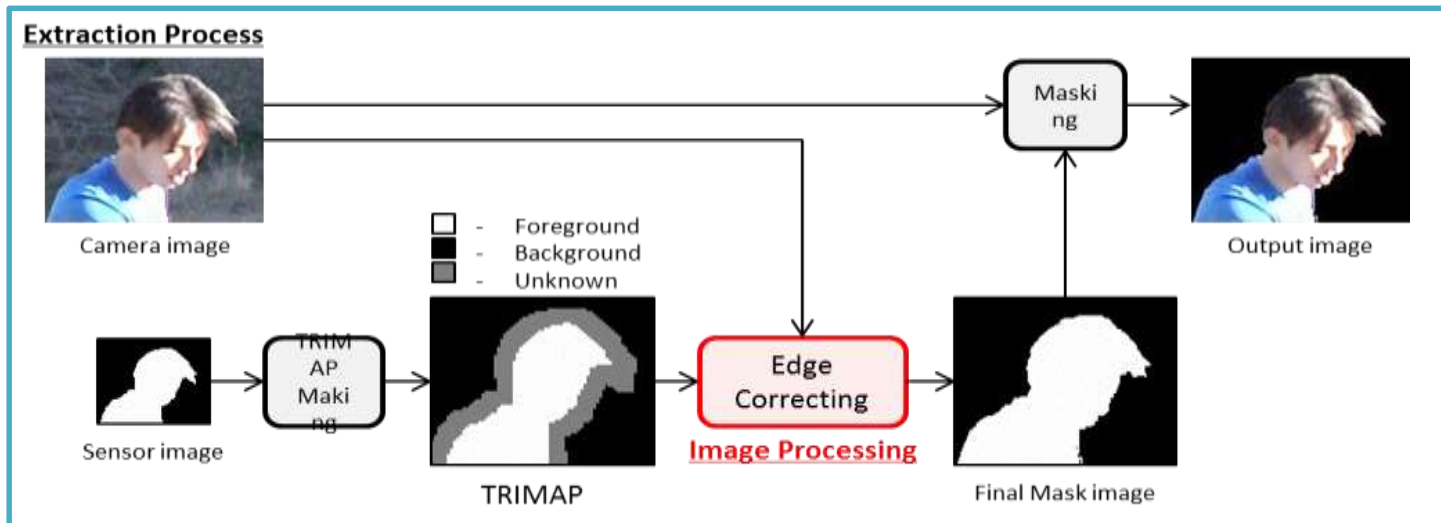
1. Real-time image extraction technology for simple background and for a few target images,
2. Real-time distortion correction and stitching technology for video captured by multiple 4K cameras,
3. Synchronized transmission technology for spatial information (such as size of target image positional relationship, and direction of sounds, etc) , as well as audio/video,
4. High-realistic images and sounds field reconstruction technologies.



Real-time Image Extraction



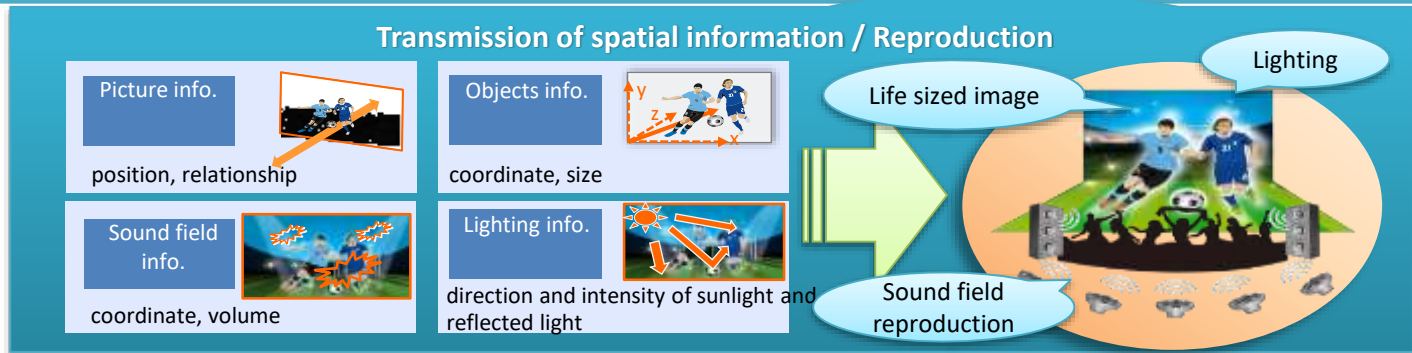
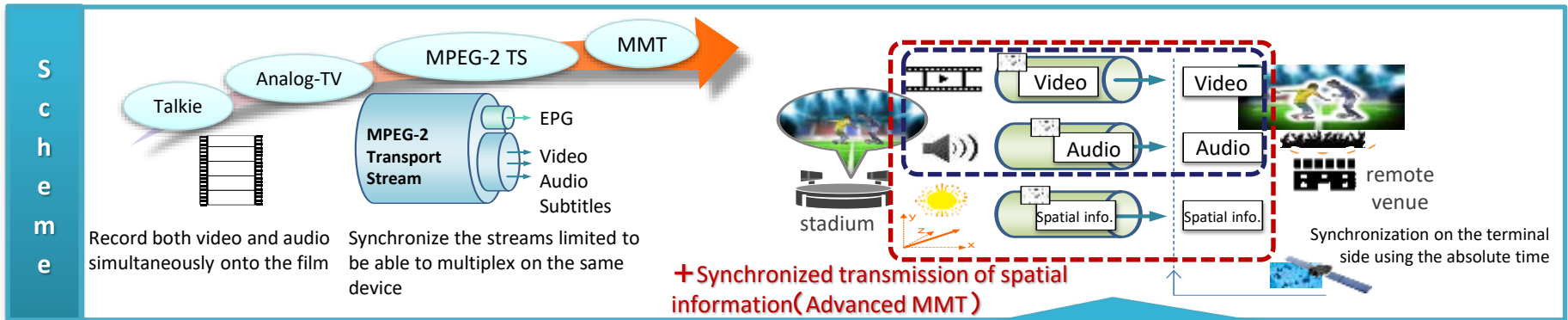
- Extracted only objects in real time for any background.
- Developed a new object segmentation algorithm using multiple sensor data and color information of pictures.



Synchronized Transmission



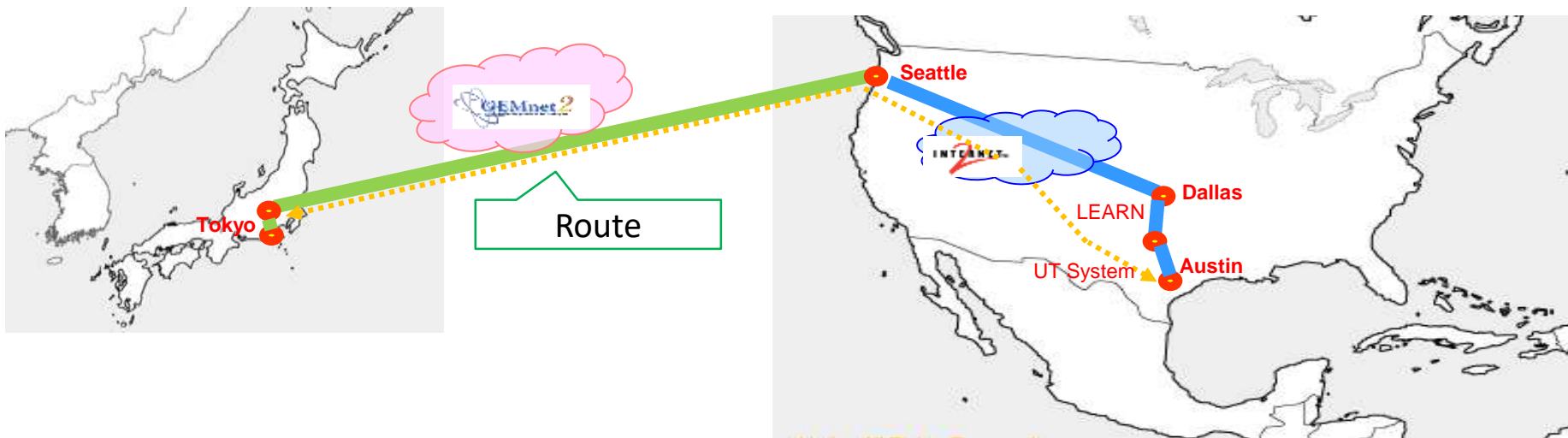
- Delivering synchronized spatial environmental information as well as picture/audio to remote venues over IP-network by Advanced MMT.
- Sharing excitement between Tokyo and Austin by synchronized transmission and reproduction of every information.



*1 MMT(MPEG Multimedia Transport):

Media transport standard that established by international standards associations such as ISO / IEC JTC1 / SC 29 / WG 11 MPEG

Global High Speed Communication Network



Route	Studio in Tokyo – Commercial Ethernet - GEMnet2 - PW - Internet2 – LEARN - UT System - Wireless network by RightRound – Venue in Austin
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PW:Pacificwave
 LEARN:Lonestar Education and Research Network
 UT System:University of Texas System