

# Nu Link

Wireless Technology and Solutions



## SMART PRIVATE 5G NETWORK



**▶ PROOF OF CONCEPT**

**CASE STUDY**

**FIS WOMEN SKI WORLD CUP 2022  
LENZERHEIDE  
5-6 March 2022**



**NuLink DEPLOYED THIS PoC SWISSCOM  
EVENTS & SOLUTIONS TO PRESENT TO FIS,  
SUNRISE, NEP, FIFA, SSR-SRG HOW TO  
PRODUCE A LIVE ENTOURAGE BROADCAST  
WITH A 5G PRIVATE NETWORK AND  
5G AUDIO-VIDEO-DATA DEVICES**

## **PRIVATE 5G NETWORK (STAND ALONE VERSION)**

**PRESENTATION TO SWISSCOM – FIS – SUNRISE – NEP – FIFA – SSR-SRG**

### **Deployment**

- ✓ TDD channel in band 42 (50 MHz channel bandwidth)  
150Mbps UL et 100Mbps DL
- ✓ 5G Handheld CX-350 NDI Camera (NDI-HX at 16 Mbits)
- ✓ 5G Tripod CX-350 NDI Camera (NDI-HX at 16 Mbits)
- ✓ 5G PTZ 100 NDI Cameras (NDI-HX at 16 Mbits)
- ✓ 5G CX-4000 Camcorder (HEVC ULL at 10 Mbits)
- ✓ 5G Audio-video Reporter (microphone / N-1 headset / return video)
- ✓ 5G Loudspeaker
- ✓ 5G TV Monitor
- ✓ 5G Nikon D6 Still Camera for photographer
- ✓ 5G Intercom with 4 smartphones (Unity system)
- ✓ 5G Private Network with 250 mW (TX power)
- ✓ Coverage 300 meters from main 5G Antenna



## **PRIVATE 5G NETWORK (STAND ALONE VERSION)**

**PRESENTATION TO SWISSCOM – FIS – SUNRISE – NEP – FIFA – SSR-SRG**



**5G Handheld  
CX-350 Camera**



**5G PTZ Camera**



**5G Tripod  
CX-350 Camera  
With Prompter  
and Return Video**



# **PRIVATE 5G NETWORK (STAND ALONE VERSION)**

**PRESENTATION TO SWISSCOM – FIS – SUNRISE – NEP – FIFA – SSR-SRG**



**5G Still Camera  
5G Reporter Audio-video Set  
5G Loudspeaker**



**5G Commentary  
Position**



**5G Return Video**

## ▶ PROOF OF CONCEPT

### CASE STUDY

PARIS-2024 OLYMPICS

PULSE

1 June 2022

The Orange logo, consisting of the word "orange" in white lowercase letters with a trademark symbol, set against a solid orange square background.

**NuLink DEPLOYED THIS PoC FOR ORANGE EVENTS TO PRESENT TO IOC, OBS, P2024, RIGHTS HOLDER BROADCASTER AND PRESS AGENCY HOW A PRIVATE 5G NETWORK DEPLOYED ON OLYMPIC VENUES COULD DELIVER INNOVATIVE WIRELESS SERVICES**



# PRIVATE 5G NETWORK (STAND ALONE VERSION)

PRESENTATION TO IOC – OBS – PARIS-2024 – BROADCASTERS – PRESS AGENCIES



▶ PROOF OF CONCEPT

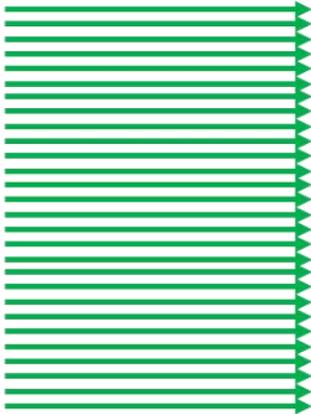
**ib** EXHIBITION  
IBC-2022  
AMSTERDAM RAI  
9–12 September 2022

**NuLink SHOWCASED ITS 5G STAND ALONE  
PRODUCT LINE FOR PMSE AT IBC-2022.  
IT WAS THE UNIQUE END TO END SOLUTION  
PRESENTED AT THE SHOW, INTEGRATING ALL  
THE DEVICES A VENUE NEEDS TO DEPLOY  
FOR A LIVE COVERAGE**



# PRIVATE 5G NETWORK (STAND ALONE VERSION)

PRODUCT LINE FOR PMSE



28 Frequencies (UHF / SHF) needed to operate all these equipment with existing wireless solutions.



Only a single 5G Full Duplex TDD Channel (100 MHz) to operate all these equipment

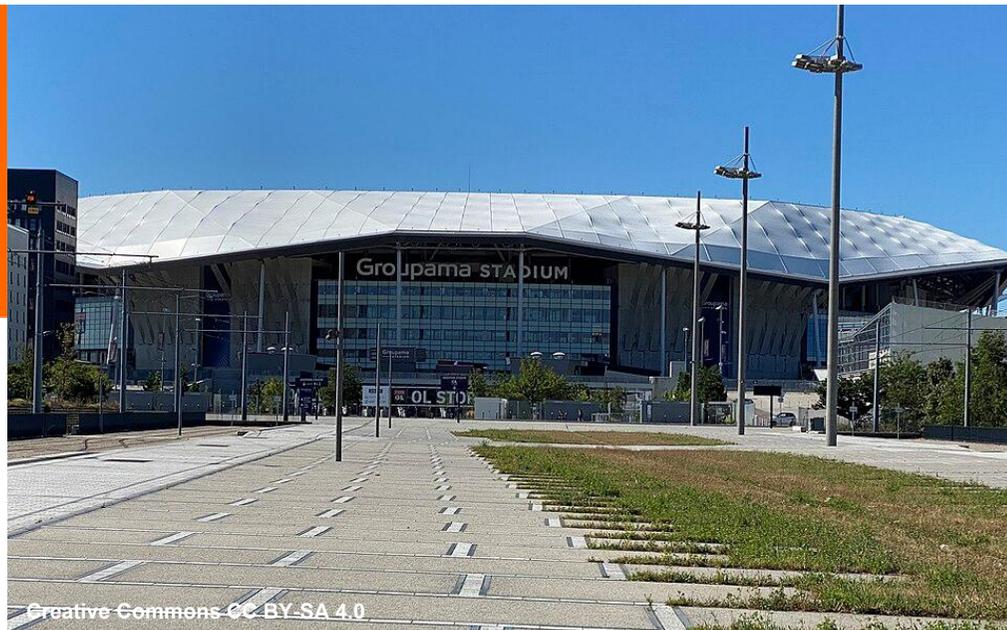
## ▶ PROOF OF CONCEPT

### CASE STUDY

PARIS-2024 OLYMPICS  
LYON GROUPAMA STADIUM  
7 October 2022

The Orange logo, consisting of the word "orange" in white lowercase letters with a trademark symbol, is positioned on an orange rectangular background.

**NuLink DEPLOYED THIS PoC FOR ORANGE  
EVENTS TO PRESENT TO IOC, OBS, P2024,  
RIGHTS HOLDER BROADCASTER AND PRESS  
AGENCY HOW A PRIVATE 5G NETWORK  
DEPLOYED ON OLYMPIC VENUES COULD  
DELIVER INNOVATIVE WIRELESS SERVICES**



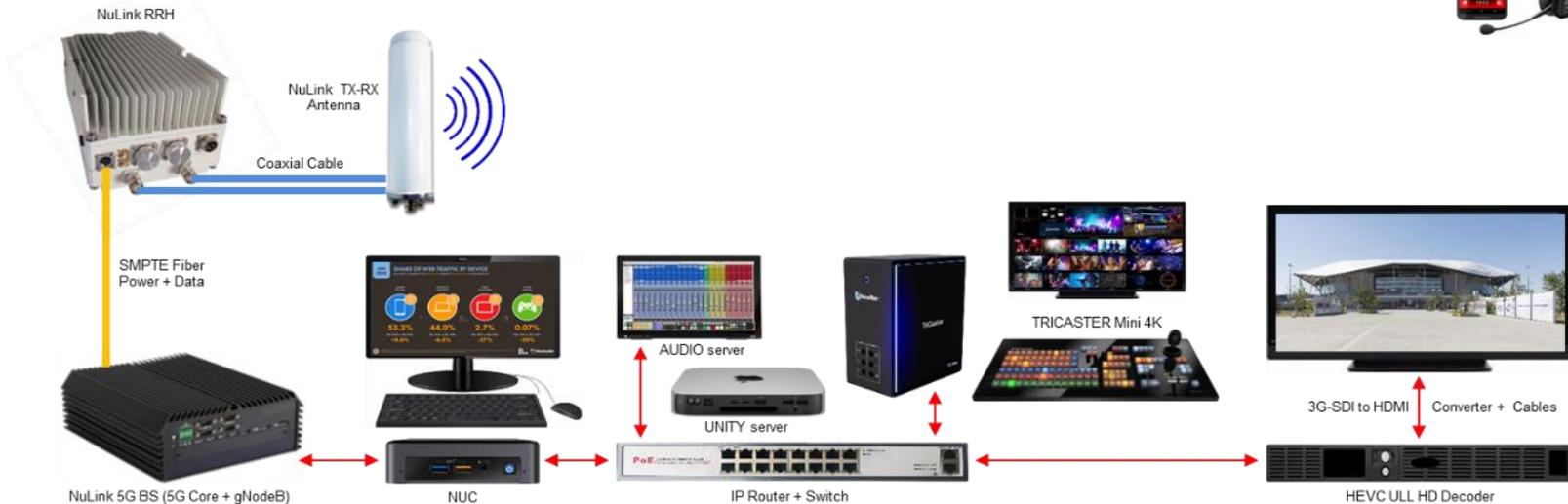
# PRIVATE 5G NETWORK (STAND ALONE VERSION)

PRESENTATION TO IOC – OBS – PARIS-2024 – BROADCASTERS – PRESS AGENCIES



## NuLink Setup

- ✓ 1x BS (5G Core + gNodeB + RRH + antenna)
- ✓ 1x GRASS VALLEY HD camera (HEVC ULL)
- ✓ 1x PANASONIC HD PTZ camera (NDI-HX)
- ✓ 1x NIKON still camera
- ✓ 1x REPORTER audio set
- ✓ 1x LOUDSPEAKER audio set
- ✓ 3x OPPO smartphone (UNITY intercom)
- ✓ 1x TRICASTER Mini 4K + Keyboard + Monitor
- ✓ 1x NUC + keyboard + monitor + 1x Apple Mini PC (UNITY server)
- ✓ 1x HEVC ULL HD decoder + TV Monitor (OE)



# **PRIVATE 5G NETWORK (STAND ALONE VERSION)**

**PRESENTATION TO IOC – OBS – PARIS-2024 – BROADCASTERS – PRESS AGENCIES**

**DEMONSTRATION POWERED  
BY NULINK EQUIPMENT**



## ▶ PROOF OF CONCEPT

### CASE STUDY

**PRESS CONFERENCE BY  
CHRISTEL HEYDEMANN  
CEO OF ORANGE  
PARIS – LA SEINE  
11 October 2022**



**NuLink SUPPLIED TO ORANGE EVENTS  
A PRIVATE 5G NETWORK FOR THIS PRESS  
CONFERENCE PRESENTING THE IMPLICATION OF  
ORANGE AS UNIQUE SUPPLIER OF THE WHOLE  
TELECOM / CONNECTIVITY INFRASTRUCTURE  
(INCLUDING PRIVATE 5G NETWORK) TO BE  
DEPLOYED ON PARIS-2024 OLYMPIC VENUES**

# PRIVATE 5G NETWORK (STAND ALONE VERSION)

PRESS CONFERENCE BY CHRISTEL HEYDEMANN / CEO OF ORANGE



## ▶ PROOF OF CONCEPT

### WPM PARIS-2024

PARIS-2024 OLYMPICS  
ORANGE EVENTS  
ARCHIVES BUILDING  
17-18 October 2022

**NuLink DEPLOYED THIS PoC FOR ORANGE EVENTS TO PRESENT AT THE WORLD PRESS MEETING ORGANISED BY P2024, HOW A PRIVATE 5G NETWORK DEPLOYED ON OLYMPIC VENUES CAN OFFER A RELIABLE AND FAST TRANSFER OF PHOTOS TO THE SERVERS OF NEWS AGENCIES**



# PRIVATE 5G NETWORK (STAND ALONE VERSION)

## WPM - PRESENTATION TO PRESS AGENCIES



## ▶ PROOF OF CONCEPT

### SSR-SRG SHOWROOM 2022

SFR ZÜRICH  
6-7 December 2022

SRG SSR



**AT THE REQUEST OF SSR-SRG, NULINK  
PRESENTED ITS 5G PROTOTYPES TO ALL  
SSR-SRG RADIO-TV CHANNELS DURING  
A SHOWROOM ORGANISED BY SRF**

## ▶ 5G DEMO TRAILER

# PRIVATE 5G NETWORK IN A TRAILER

July 2023

**TO SUPPORT ITS DEMONSTRATIONS  
TO POTENTIAL CUSTOMERS, NuLink HAS  
DEVELOPED A 5G MOBILE PRODUCTION  
UNIT INTEGRATED INTO A TRAILER.**



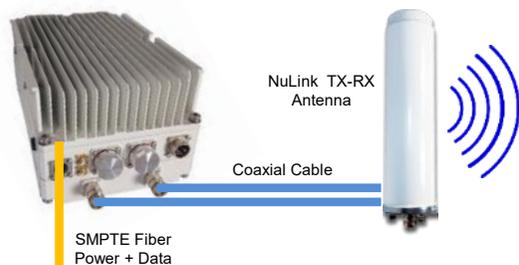
# PRIVATE 5G NETWORK IN A TRAILER

## 5G STUDIO WITH LIVE STREAMING OVER STARLINK CAPABILITY

### Setup

- ✓ TDD channel in band 40
- ✓ Full duplex connectivity
- ✓ Intercom with smartphones
- ✓ AV Return channel
- ✓ TX power at 500 mW
- ✓ Coverage 300 meters around Base Station
- ✓ Streaming over STARLINK or Fiber

NuLink 5G Radio Head



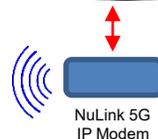
NuLink 5G Base Station



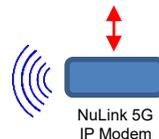
PANASONIC  
AW-HE40 with ND1JHX  
Connected to a NuLink  
LTE IP Modem



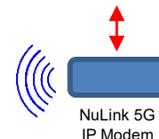
PANASONIC  
AW-HE100 with ND1JHX  
Connected to a NuLink  
LTE IP Modem



PANASONIC  
CX350 with ND1JHX  
Connected to a NuLink  
LTE IP Modem



PANASONIC  
CX350 with ND1JHX  
Connected to a NuLink  
LTE IP Modem



NuLink 5G IP Intercom System



Studio AV Return Channel



LIVE Streaming



**▶ PROOF OF CONCEPT**  
**CISCO INNOVATIVE 5G BASED EVENT DELIVERY**



**EXHIBITION**  
**IBC-2023**

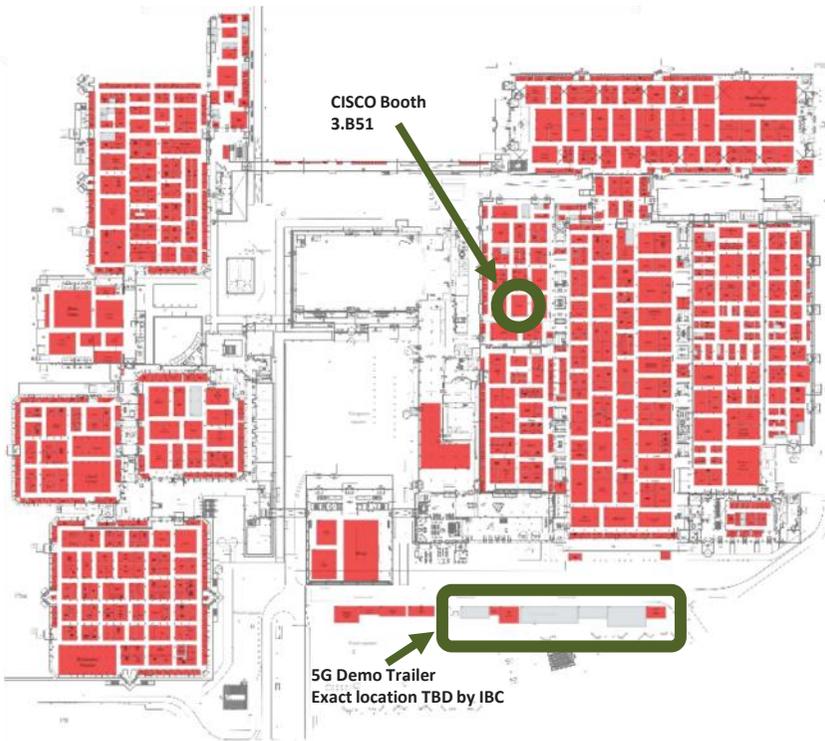
**AMSTERDAM RAI**  
**15-18 September 2023**

**FOLLOWING ON FROM IBC ACCELERATOR 2022, NuLink, IN PARTNERSHIP WITH CISCO AND ITS EQUIPMENT SUPPLIERS (GRASS VALLEY, PANASONIC AND NIKON), PRESENTED ITS 5G MOBILE PRODUCTION UNIT INTEGRATED INTO A TRAILER.**

**ALL THE DEVICES CONNECTED TO THE 5G PRIVATE NETWORK DEPLOYED BY THE TRAILER WERE OPERATED IN REMOTE PRODUCTION FROM THE CISCO BOOTH.**



**▶ PROOF OF CONCEPT**  
**CISCO INNOVATIVE 5G BASED EVENT DELIVERY**  
**IBC-2023**



1x NEWTEK  
TRICASTER  
PRODUCTION UNIT  
(NDI-HX)



## **PROOF OF CONCEPT**

### **BLUE LIGHTS**

**BABS – MSK PROJECT  
LIVE DEMO  
25 October 2023**

**NuLink DEPLOYED THIS PoC FOR SPECIALISTS  
IN CRISIS COMMUNICATION.**

**LIVE TRANSMISSION VIA 4G/5G TELECOM  
PUBLIC NETWORKS AND 5G PRIVATE  
NETWORKS FROM POLICE CAR, POLICEMEN,  
AMBULANCE AND FIREFIGHTERS WERE  
DEMONSTRATED**

**DDPS-BABS / PROJET CMS-MSK  
PRESENTATION OF THE RESULTS OF THE NPR  
PROJECT OF THE CANTON OF NEUCHÂTEL**



## DDPS-BABS / CMS-MSK PROJECT

### PRESENTATION OF THE RESULTS OF THE NPR PROJECT OF THE CANTON OF NEUCHÂTEL

#### 5G TACTICAL BUBBLE PROJECT

"Deployment of a 5G tactical communication bubble as part of the first aid of the canton of Neuchâtel"



Presentation of audio-véo-photo-data-Intercom solutions



Presentation of prototypes



Presentation of PRIVATE 5G NETWORKS



Demonstration directed by Steve Christin



Presentation of integration in police car



Networking

# CANTONAL 4G/5G TACTICAL BUBBLE

## CONNECTION VIA PUBLIC TELECOMMUNICATIONS NETWORKS

PONE DEMO  
IN COLLABORATION  
WITH

**police**  
NEUCHÂTELOISE



ALL COMMUNICATIONS FROM  
THIS DEMONSTRATION PASSES  
VIA PUBLIC TELECOMMUNICATIONS  
NETWORKS

Police car N°1 :

- 1x SIM SUNRISE
- 1x SIM SWISSCOM

Ambulance :

- 1x SIM SUNRISE
- 1x SIM SWISSCOM

Police drone :

- 1x SIM SUNRISE
- 1x SIM SWISSCOM

Smartphone Policemen N° 1/2

- 1x SIM SUNRISE



VOITURE DE POLICE N°1  
4 IMAGES TRANSMISES  
DE CAMERAS FIXES



PATROUILLEUR N°1  
1 IMAGE TRANSMISE  
DE SON SMARTPHONE



LANCEUR D'ALERTE  
1 IMAGE TRANSMISE  
DE SON SMARTPHONE



PATROUILLEUR N°2  
1 IMAGE TRANSMISE  
DE SON SMARTPHONE

## LOCAL 5G TACTICAL BUBBLE CONNECTION VIA PRIVATE 5G NETWORK



DEMONSTRATION ON  
THE STADIUM FORECOURT  
IN COLLABORATION  
WITH



ALL COMMUNICATIONS FROM  
THIS DEMONSTRATION PASSES  
VIA THE LOCAL PRIVATE 5G NETWORK

### Command Unit Setup

The 5G private network is composed of the following equipment:

- 1x 5G core network
- 1x radio band n40 (2300 MHz – 2400 MHz)
- 1x 6 meters mast
- 1x TX-RX antenna band n40
- 1x STARLINK system

Main parameters:

- Up to 100 MHz channel
- 80% upload / 20% download
- 1W in TX

Easily integrated into any type of command vehicle

## LOCAL 5G TACTICAL BUBBLE CONNECTION VIA PRIVATE 5G NETWORK



### Intervention Manager

- ⇒ Images transmitted to the engagement centre by the camera installed on his helmet.  
The 5G modem is attached to the headset (prototype with more TX power than a smartphone).
- ⇒ PTT communication on smartphone.
  
- ⇒ Display allowing the display of images from other firefighters' cameras, drones, a whistleblower, the engagement center, surveillance cameras, a FOTOKITE, or any other source...

## LOCAL 5G TACTICAL BUBBLE CONNECTION VIA PRIVATE 5G NETWORK



### Fire Brigade

- ⇒ PTT communication on smartphone. The camera of the same smartphone transmits images to the engagement center. These images can then be sent back to one or more recipients.

# PARIS-2024 OLYMPIC AND PARALYMPIC GAMES

March 2020 – October 2024

**Laurent ZWAHLEN**

Senior Project Manager  
Mobile & Radio Infrastructures for Road Events  
5G Private Network Deployment  
DVTM Opening Ceremony

Direction de la TEC

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Paralympiques de Paris 2024

46 rue Proudhon, 93200 Saint-Denis – FRANCE

[paris2024.org](http://paris2024.org)



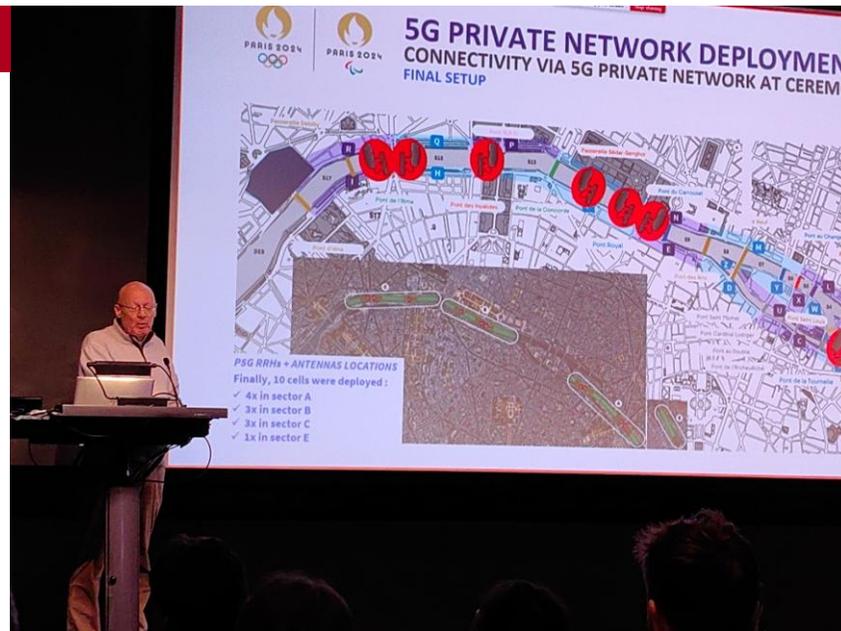
## ▶ PROOF OF CONCEPT

### SSR-SRG

Workshop at RTS GENEVA  
6 March 2025

**FOR THIS WORKSHOP, NuLink DEPLOYED ITS PRIVATE 5G NETWORK AT RTS TO SHOWCASE HOW THIS NEW SOLUTION COULD REVOLUTIONISE LIVE BROADCASTING, REDUCING COST AND DEPLOYMENT TIME. NuLink ALSO PRESENTED THE PRIVATE 5G NETWORKS DEPLOYED ON PARIS-2024 OLYMPIC OPENING CEREMONY AND VENUES.**

SRG SSR



# SSR-SRG / PRIVATE 5G NETWORK WORKSHOP AT RTS GENEVA

## PRESENTATION OF EQUIPMENT FOR LIVE PRODUCTION USE CASES



PARIS-2024 Olympics use cases



Presentation of audio-vidéo 5G Equipment



Networking



Presentation of 5G Production Room

## ▶ PROOF OF CONCEPT

### AMPVISUALTV

24H Le Mans  
12-15 June 2025

**AMPVISUALTV DEPLOYED AT THIS EVENT  
A NuLink PRIVATE 5G NETWORK TO  
EVALUATE IF SUCH SOLUTION COULD  
HELP THE PRODUCTION OF MASSIVE LIVE  
CONTENT NEEDED TO BROADCAST  
THE RACE.**



# 24H LE MANS / EVALUATION OF PRIVATE 5G NETWORK SOLUTION

## TEST OF EQUIPMENT FOR LIVE CONTENT CREATION



**PRIVATE 5G NETWORK installed on crane**



**Test of PANASONIC NDI camera**



**TEST of HAIVISION Pro-460**



**Test of SAMSUNG S24 + MoJoPro app**



**Global Production Room**



**5G Control Room**

▶ PROOF OF CONCEPT

# ORANGE EVENTS REPORTAGES

Tour de France 2025  
1-13 July 2025

**ORANGE EVENTS REPORTAGES DEPLOYED AT THIS EVENT A NuLink PRIVATE 5G NETWORK TO EVALUATE IF SUCH SOLUTION COULD HELP THE PRODUCTION OF MASSIVE LIVE CONTENT NEEDED TO BROADCAST THE STAGES.**



# TOUR DE FRANCE 2025 / EVALUATION OF PRIVATE 5G NETWORK SOLUTION

## TEST OF EQUIPMENT AND COVERAGE FOR LIVE CONTENT CREATION



**PRIVATE 5G NETWORK** installed on crane



**PRIVATE 5G NETWORK** installed on tripod  
to cover the Team Bus area



**5G PTZ camera** shooting FRANCE TV VELO CLUB studio

# TOUR DE FRANCE 2025 / EVALUATION OF PRIVATE 5G NETWORK SOLUTION

## TEST OF EQUIPMENT AND COVERAGE FOR LIVE CONTENT CREATION



5G replaces UHF audio transmission



Test of 5G Live Studio operated in Remote Production from the Broadcaster's office

# TOUR DE FRANCE 2025 / EVALUATION OF PRIVATE 5G NETWORK SOLUTION

## TEST OF EQUIPMENT AND COVERAGE FOR LIVE CONTENT CREATION

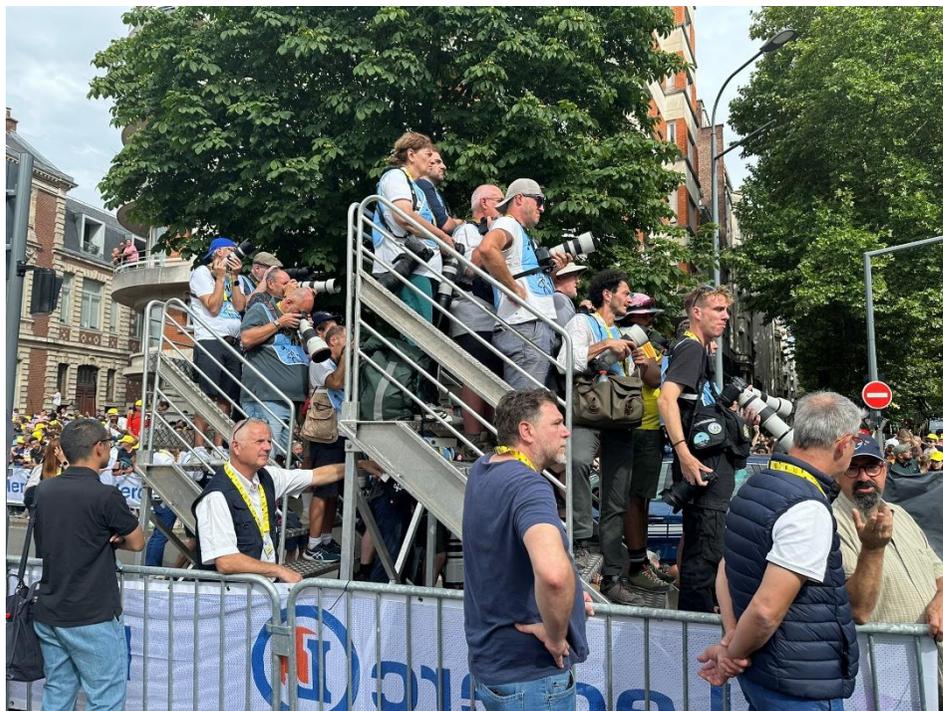


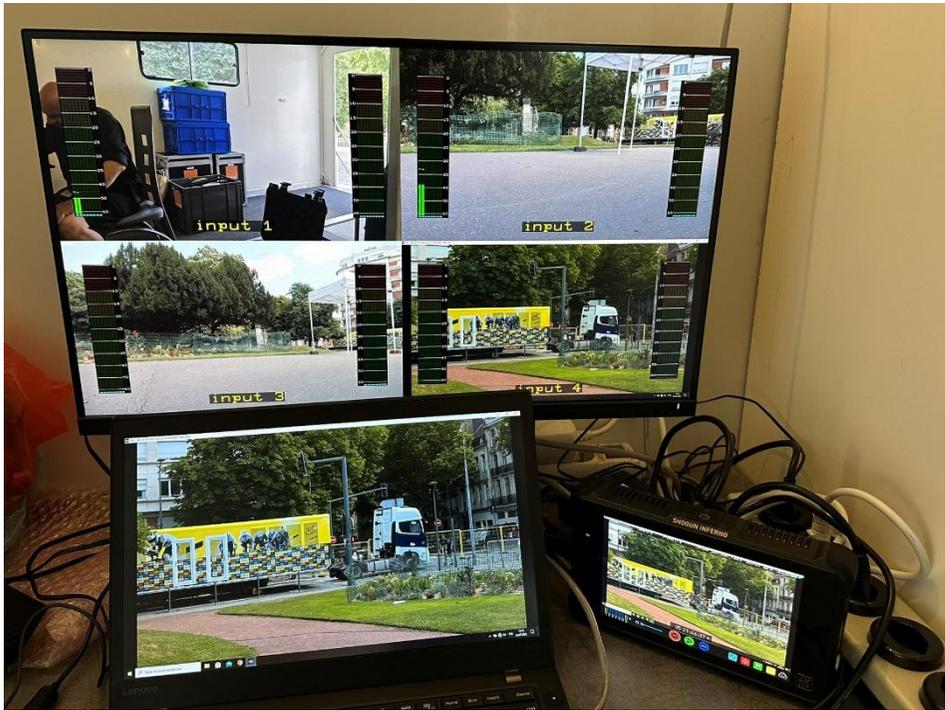
Photo reporter position on the finish line



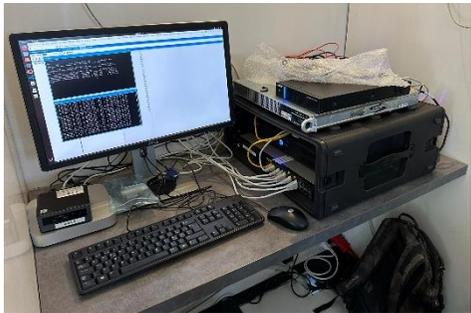
Photo reporter still camera equipped with a 5G modem to upload photos wirelessly from the finish line to the clouds of the press agencies

# TOUR DE FRANCE 2025 / EVALUATION OF PRIVATE 5G NETWORK SOLUTION

## TEST OF EQUIPMENT AND COVERAGE FOR LIVE CONTENT CREATION



5G Production Room



Portable PRIVATE 5G NETWORK



5G monitoring of connected devices

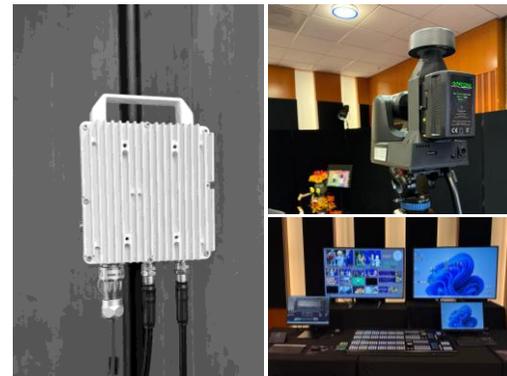
▶ **PROOF OF CONCEPT  
PANASONIC INNOVATIVE 5G/NDI-HX2  
STUDIO CAMERA**



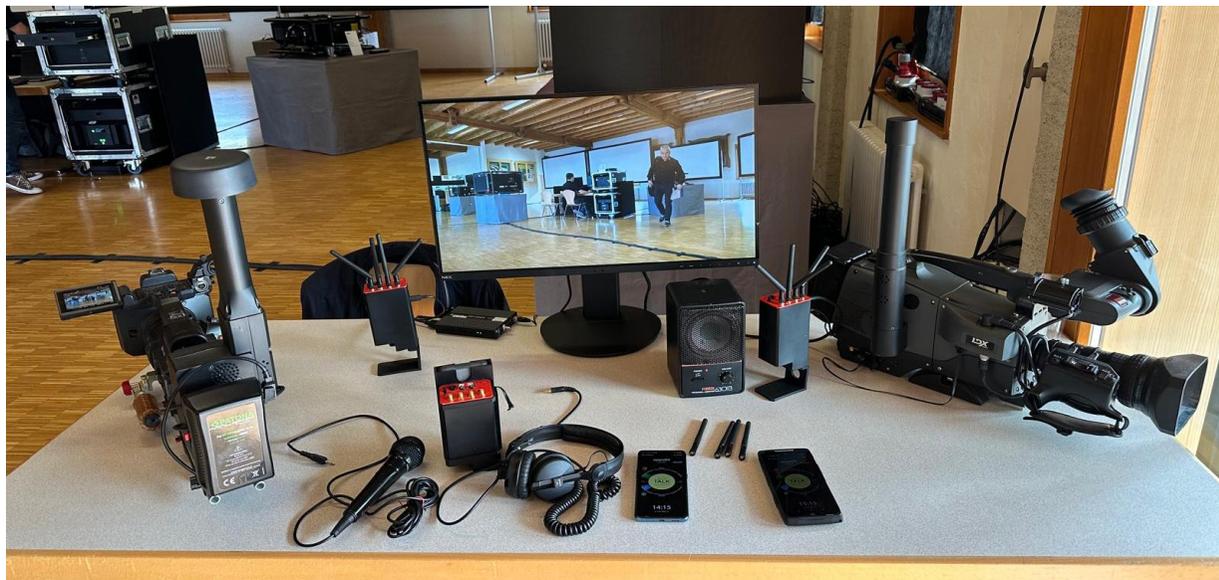
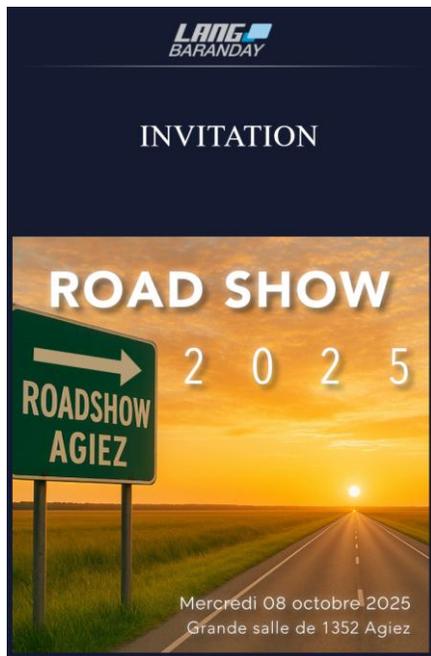
**EXHIBITION  
IBC-2023**

**AMSTERDAM RAI  
12-15 September 2025**

**PANASONIC AND NuLink UNVEILED  
AT IBC STATE-OF-THE-ART 5G/NDI-HX2  
STUDIO CAMERA.  
THIS INTEGRATION PRESENTED A  
REVOLUTIONARY CAMERA THAT WILL  
TRANSFORM LIVE PRODUCTION  
WORKFLOW THANKS TO NDI-HX2  
COMPRESSION AND TRANSMISSION  
VIA NuLink's INTEGRATED PRIVATE  
5G NETWORKS.**



## ▶ LANG BARANDAY ROADSHOW 5G PRODUCTION STUDIO WITH PANASONIC EQUIPMENT



**PANASONIC AND NuLink PRESENTED A FULL 5G BASED LIVE PRODUCTION SETUP, INCLUDING 5G CAMERAS, 5G AUDIO, 5G INTERCOM AND 5G RETURN-VIDEO.**

▶ **RTL+ GERMANY**  
**PRESENTATION OF 5G EQUIPMENT**

**R T L + Panasonic**

**KOLN**  
**25–26 November 2025**

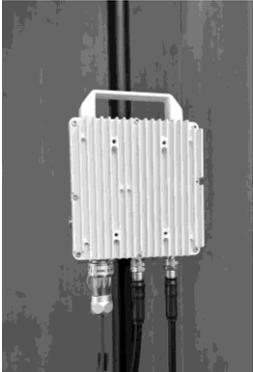
**PANASONIC AND NuLink DEMONSTRATED AT RTL+ GERMANY VARIOUS 5G EQUIPMENT THAT WILL TRANSFORM LIVE PRODUCTION WORKFLOW THANKS TO NDI-HX2 COMPRESSION AND TRANSMISSION VIA NuLink's INTEGRATED PRIVATE 5G NETWORK.**



**▶ PROOF OF CONCEPT  
PANASONIC INNOVATIVE 5G/NDI-HX2  
STUDIO CAMERA**



**BARCELONA FIRA  
2-6 February 2026**



**PANASONIC AND NuLink UNVEILED AT ISE STATE-OF-THE-ART 5G/NDI-HX2 STUDIO CAMERA (UCX100) AND PTZ (UE160). THESE INTEGRATIONS PRESENTED TWO NEW CAMERAS THAT WILL TRANSFORM LIVE PRODUCTION WORKFLOW THANKS TO NDI-HX2 COMPRESSION AND TRANSMISSION VIA THE LAST GENERATION OF NuLink's PRIVATE 5G NETWORKS.**



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 **FOR ANY QUESTION, PLEASE CONTACT US**

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