



Private 5G & innovation

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Where are we going?

LACK OF FINANCES

HOMOGENOUS

ON LOCATION

DIGITAL

IN SILOS

PLANNED

CONROL



LACK OF PEOPLE

DIVERSE

ANYWHERE

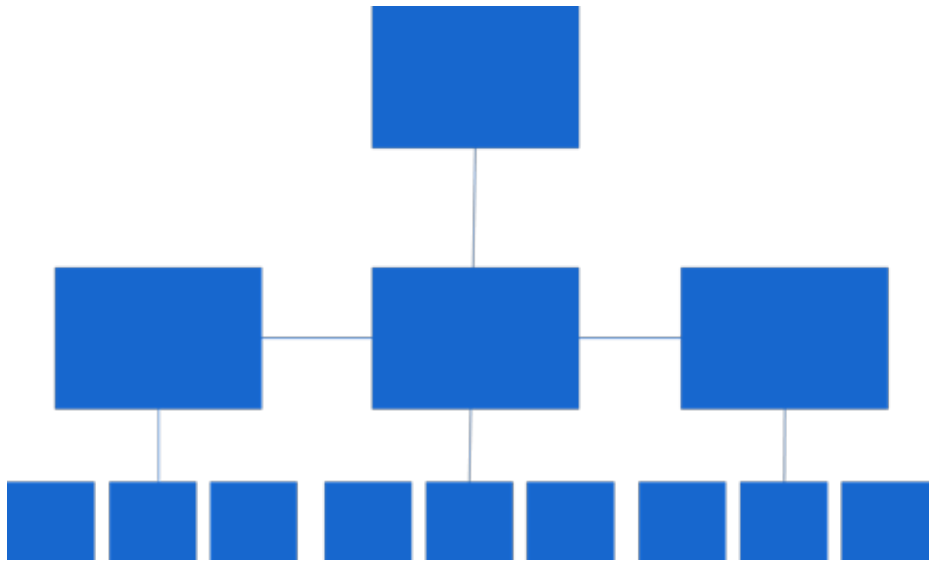
AI-SUPPORTED

ACROSS TEAMS

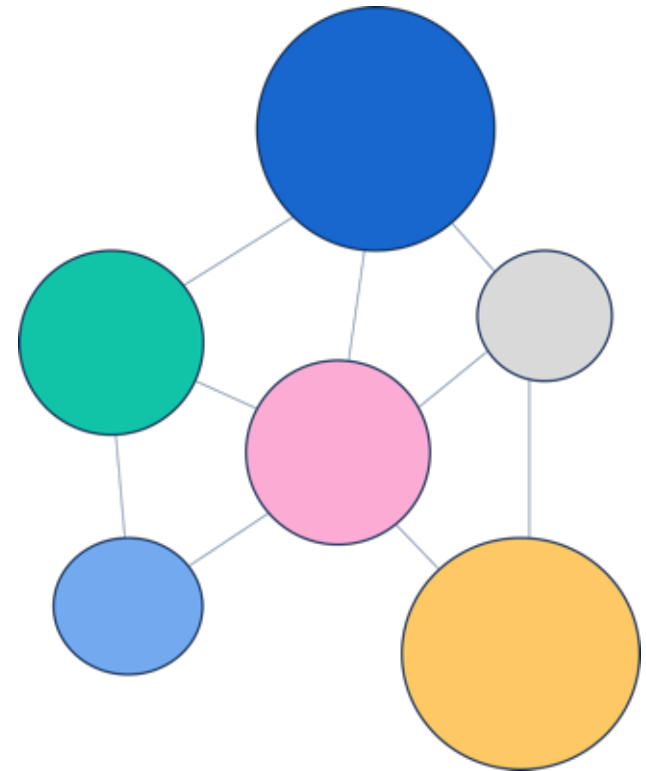
EXPERIMENTAL

FAIL EARLY!

Hierarcical



Network of teams



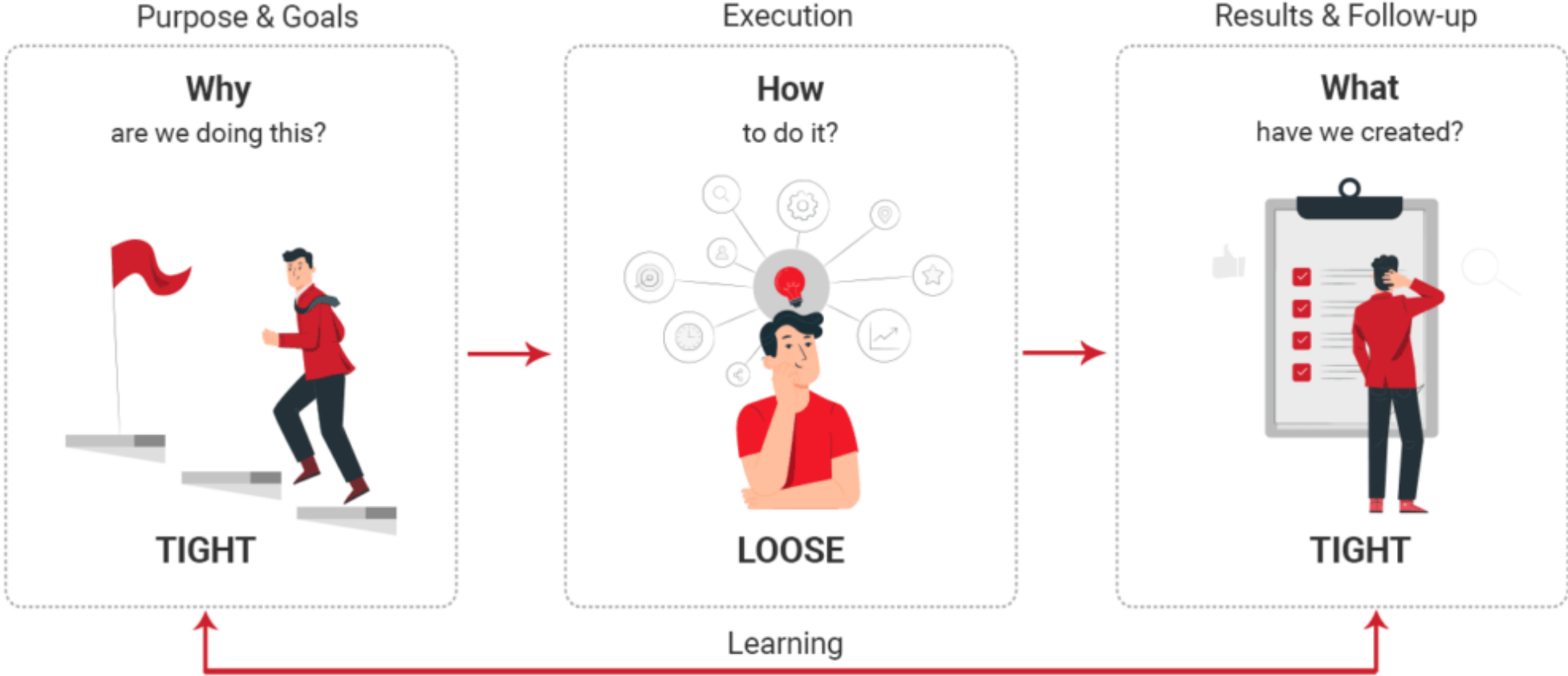


Management knows best



Team knows best

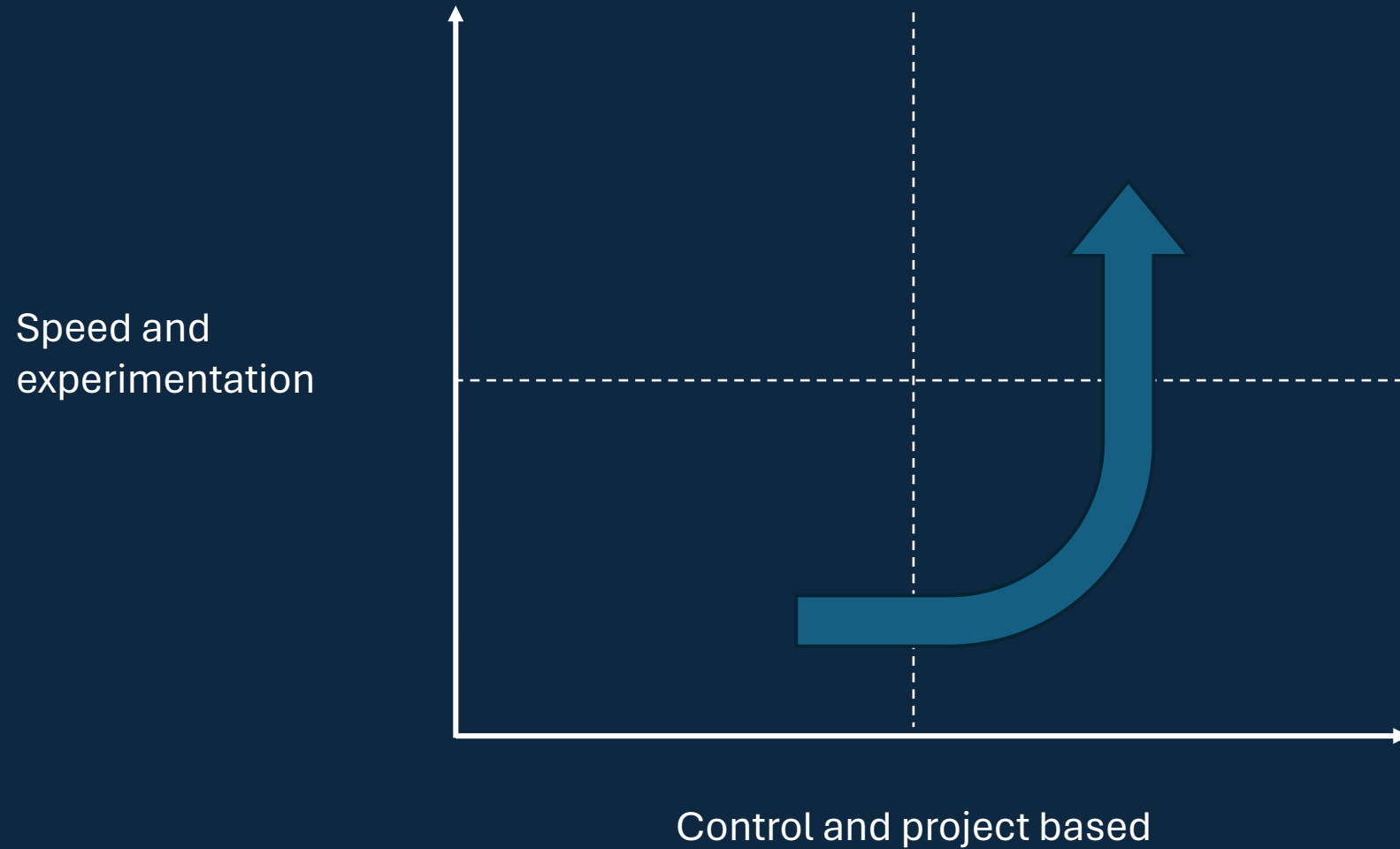
... with help from external teams



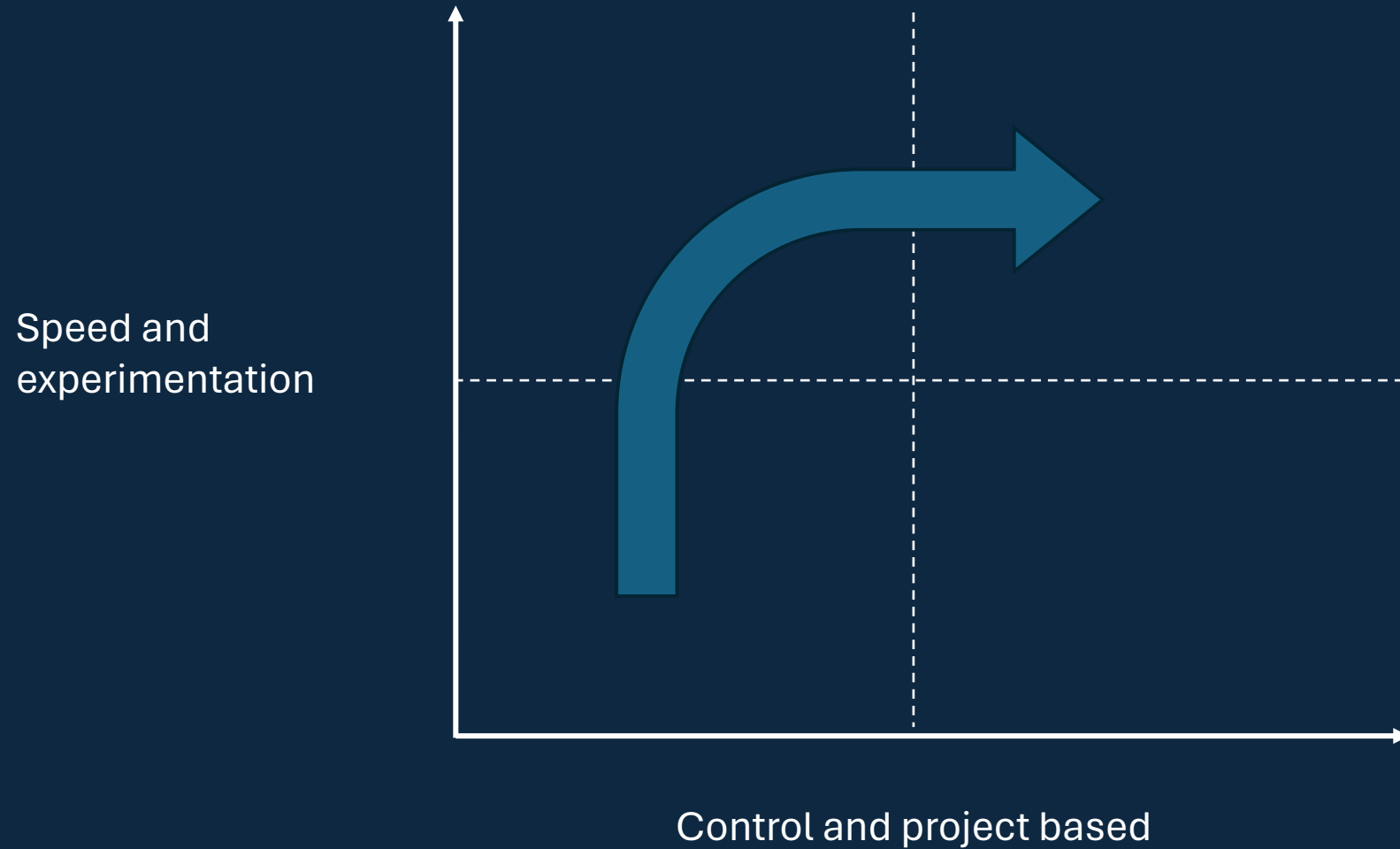
Innovasjonsdager



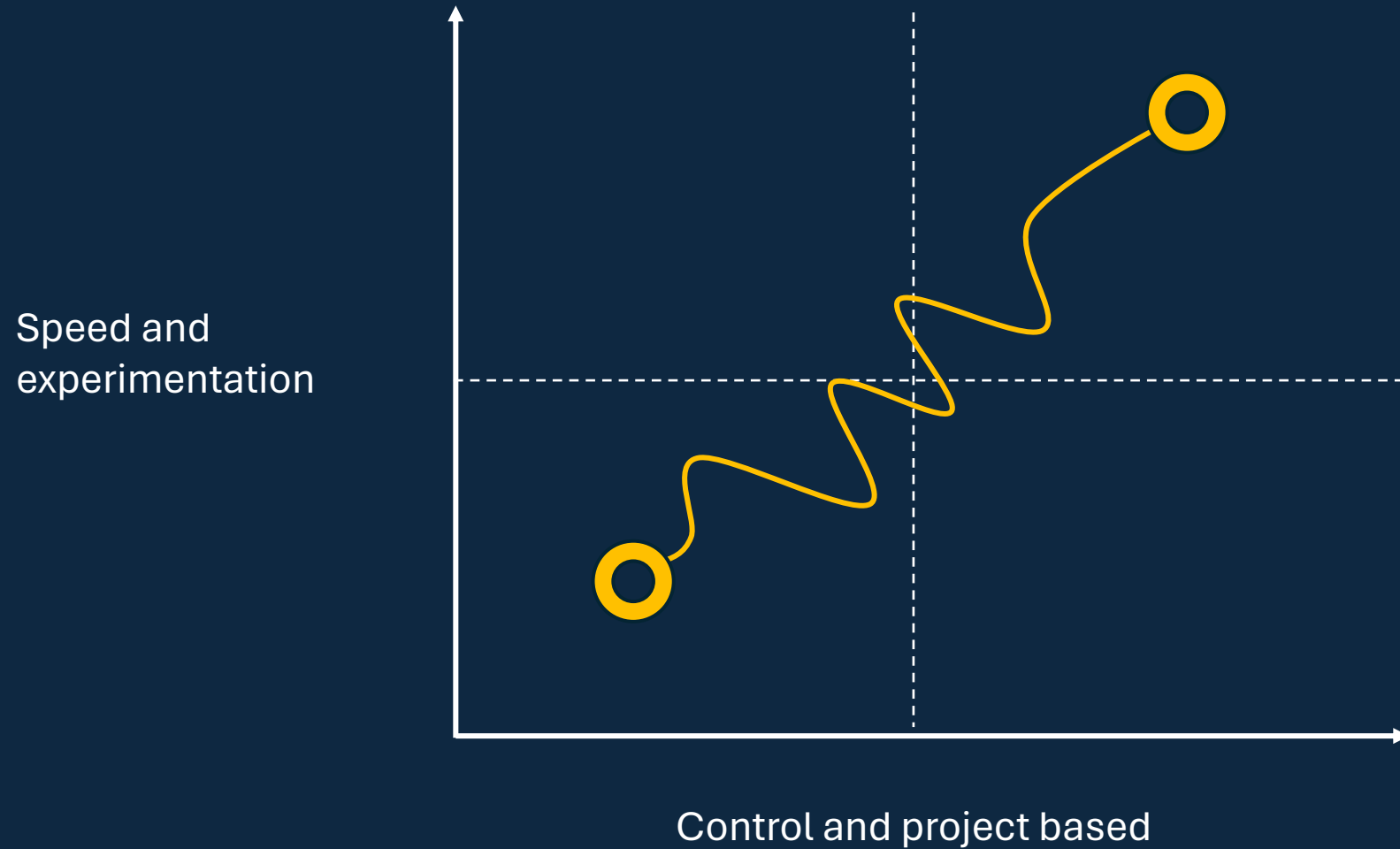
Finding the right balance?



Finding the right balance?



Finding the right balance?









Dagsrevyen

Russland har invadert Ukraina

nrk Nyheter

§ 23 NRK has responsibility for preparedness

Enable the government to reach out to the population in the event of national crises and disasters

INSIDTELSE

KA-SAT

Satellitt-eier om utfall i Europa: – Vi tror det ble forårsaket av en cyberhendelse

Viasat tror en cyberhendelse var grunnen til at bredbåndssatellitten KA-SAT falt ut samtidig som Russland begynte invasjonen av Ukraina sist uke. Selskapet jobber nå å finne årsaken.

– Flere titusen terminaler er skadet

Viasat er rammet av et omfattende cyberangrep som har satt «flere titusen» terminaler ut av spill, melder det franske forsvar.

Et år senere er sikkerhetsberetning av cyberspionasje, som skal ha vært et av alle angrep av KA-SAT satellittens nettsikkerhetsprosjekt.

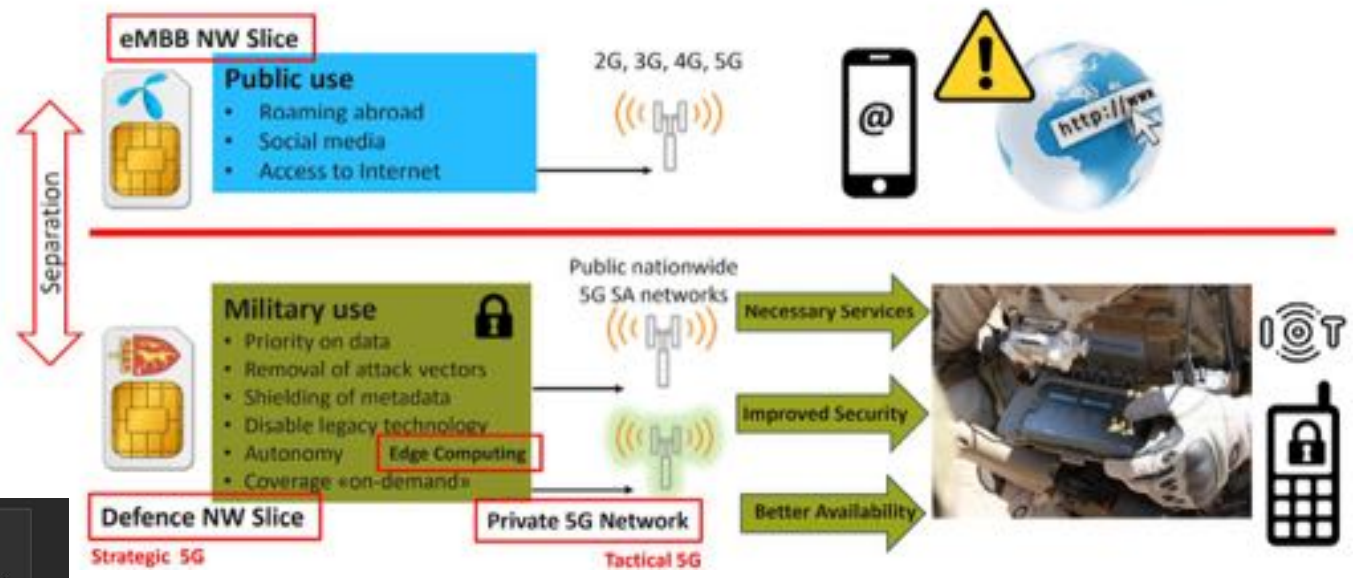
Russland styrker vaktstyrkene i Ukraina

Den franske generalløytnanten Pierre-Henri Mangin er med på en konferanse for franske og britiske sikkerhetsmyndigheter, som har ledet til en rekke nye sikkerhetsforanstaltninger.





Network Slicing to separate Public and Military traffic



Edge Computing - The extended cloud





Wireless  IP





«normal» production

VS

Crisis, emergency, catastrophe



Contribution vs Production

Contribution Scenario (existing)

- Primarily for "News Gathering" today
- Key Requirements
 - Increased Flexibility, reduced setup-time
 - Variable quality and high latency acceptable

(local) Production Scenarios

- Usage of multiple cameras & devices simultaneously
- Planned confined area (sometimes moving)
- Key Requirements
 - No compromise on quality and latency
 - Time Synchronization between cameras & devices



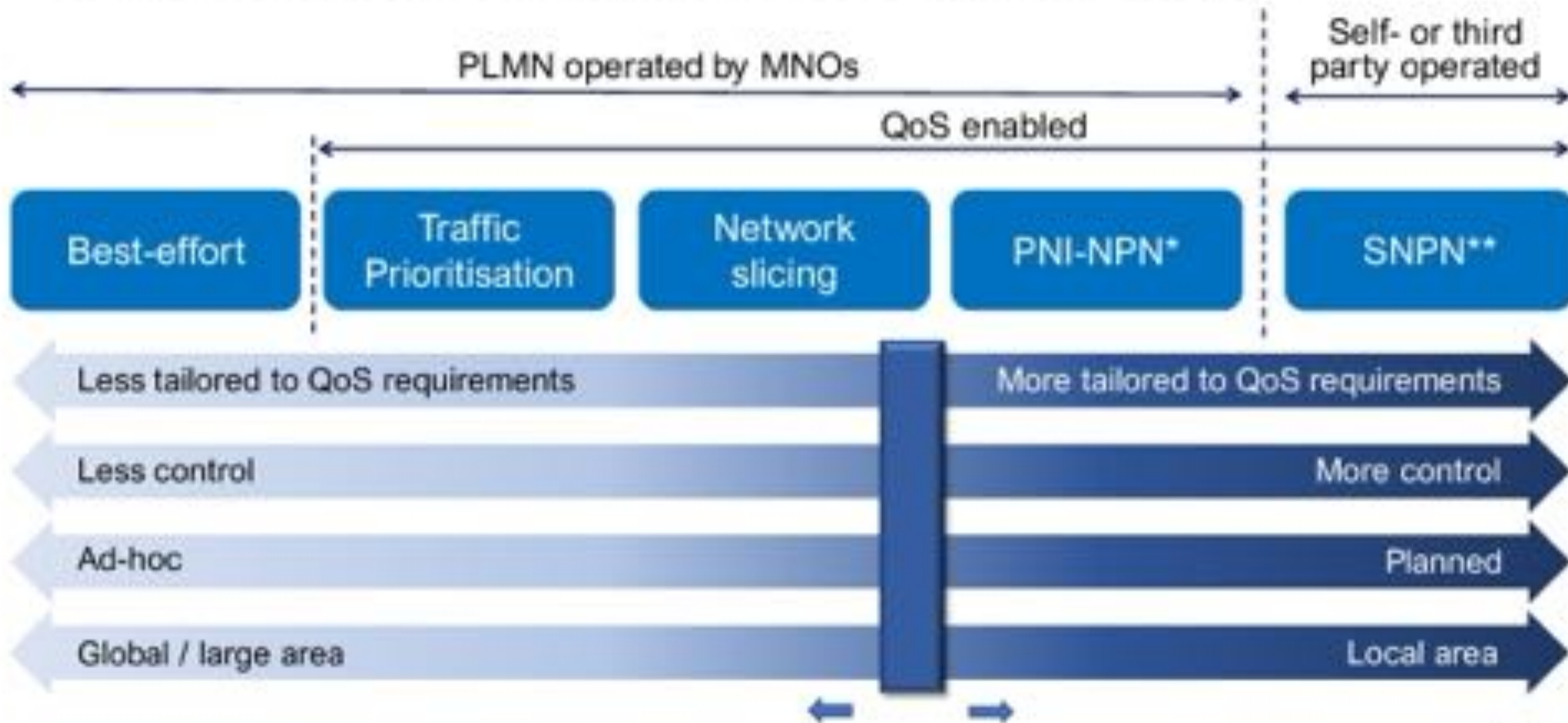
Contribution: Individual Cameras / Devices



Production: multiple Cameras / Devices



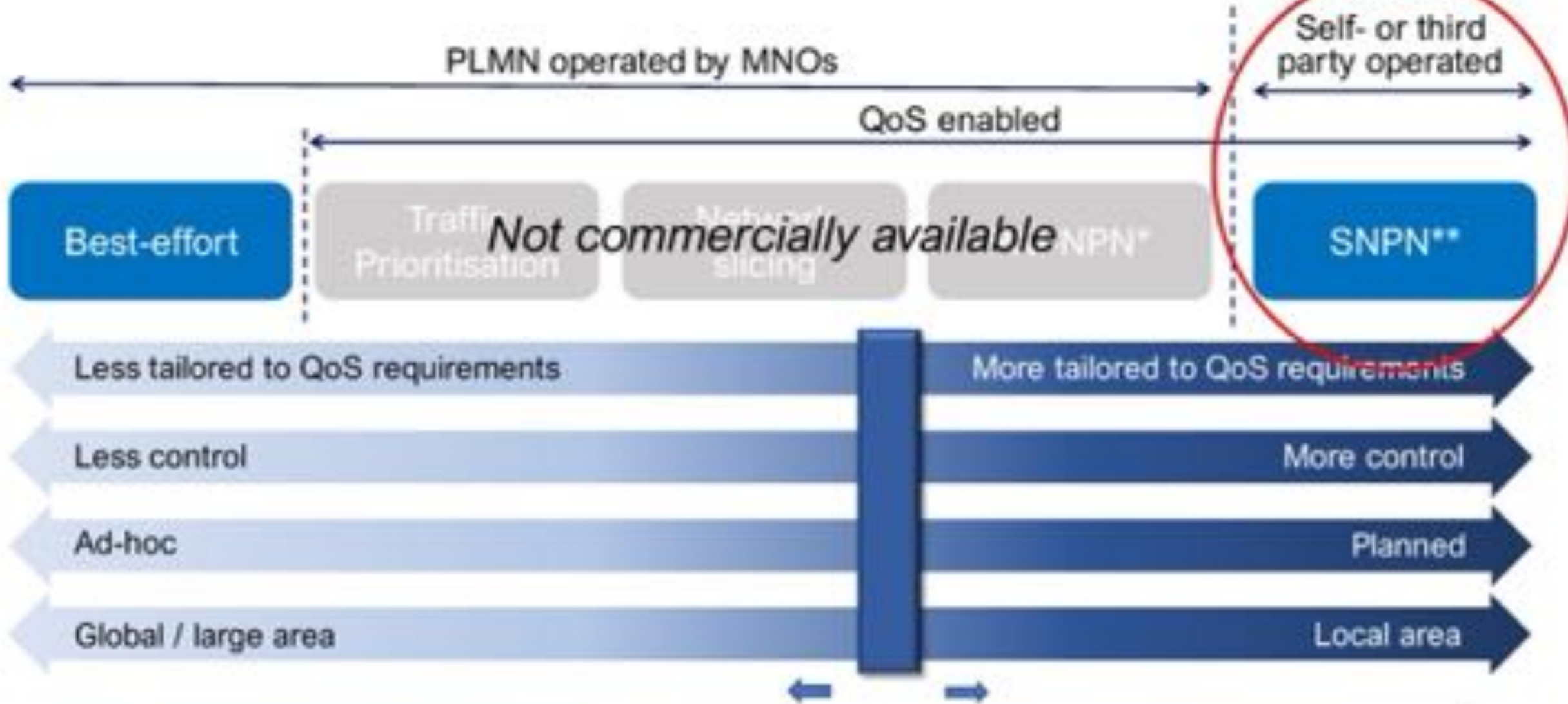
5G NETWORK CONFIGURATIONS IN CONTENT PRODUCTION



* PNI-NPN - Public Network Integrated Non-Public Network.

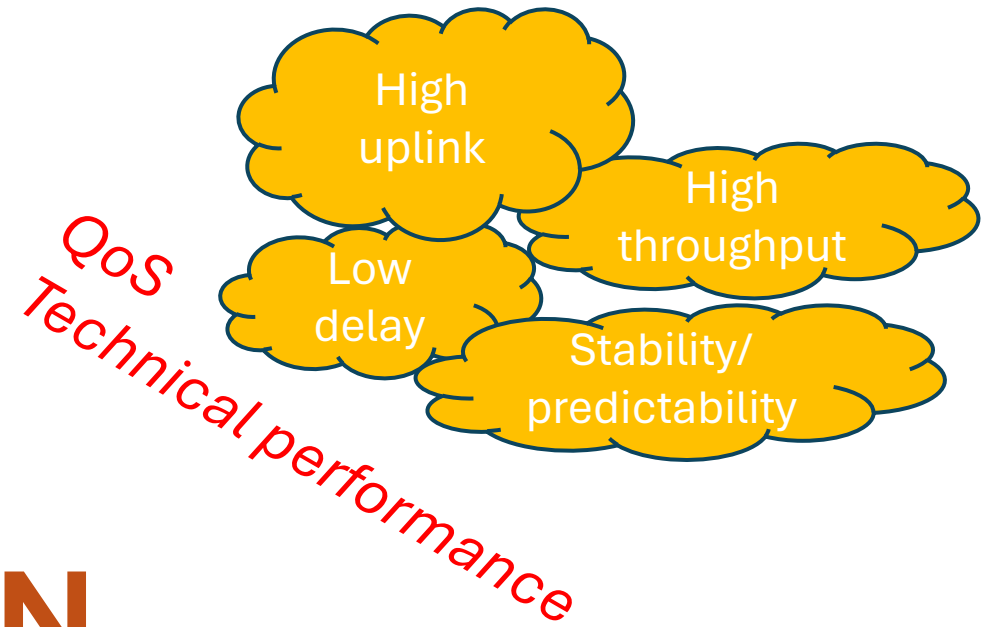
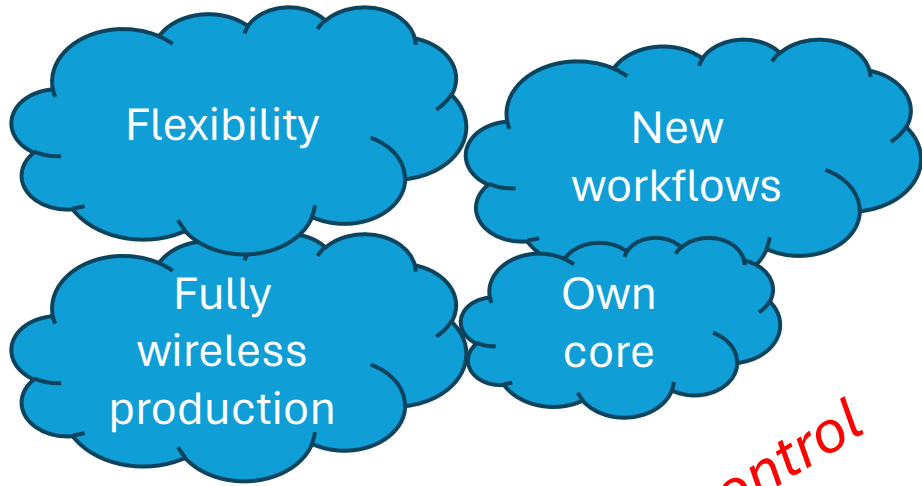
** SNPN - Standalone Non-Public Network.

5G NETWORK CONFIGURATIONS IN CONTENT PRODUCTION

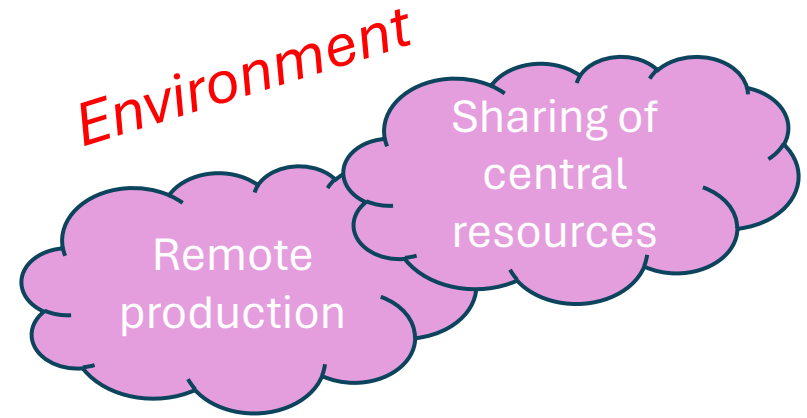
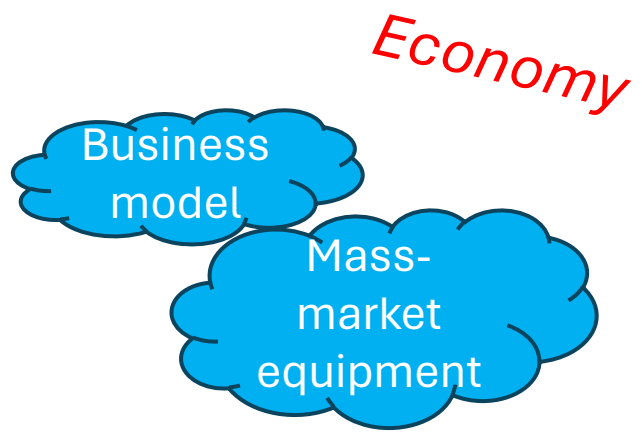
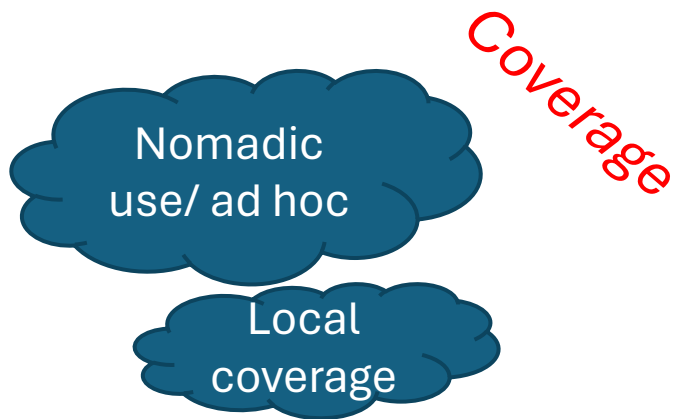


* PNI-NPN - Public Network Integrated Non-Public Network

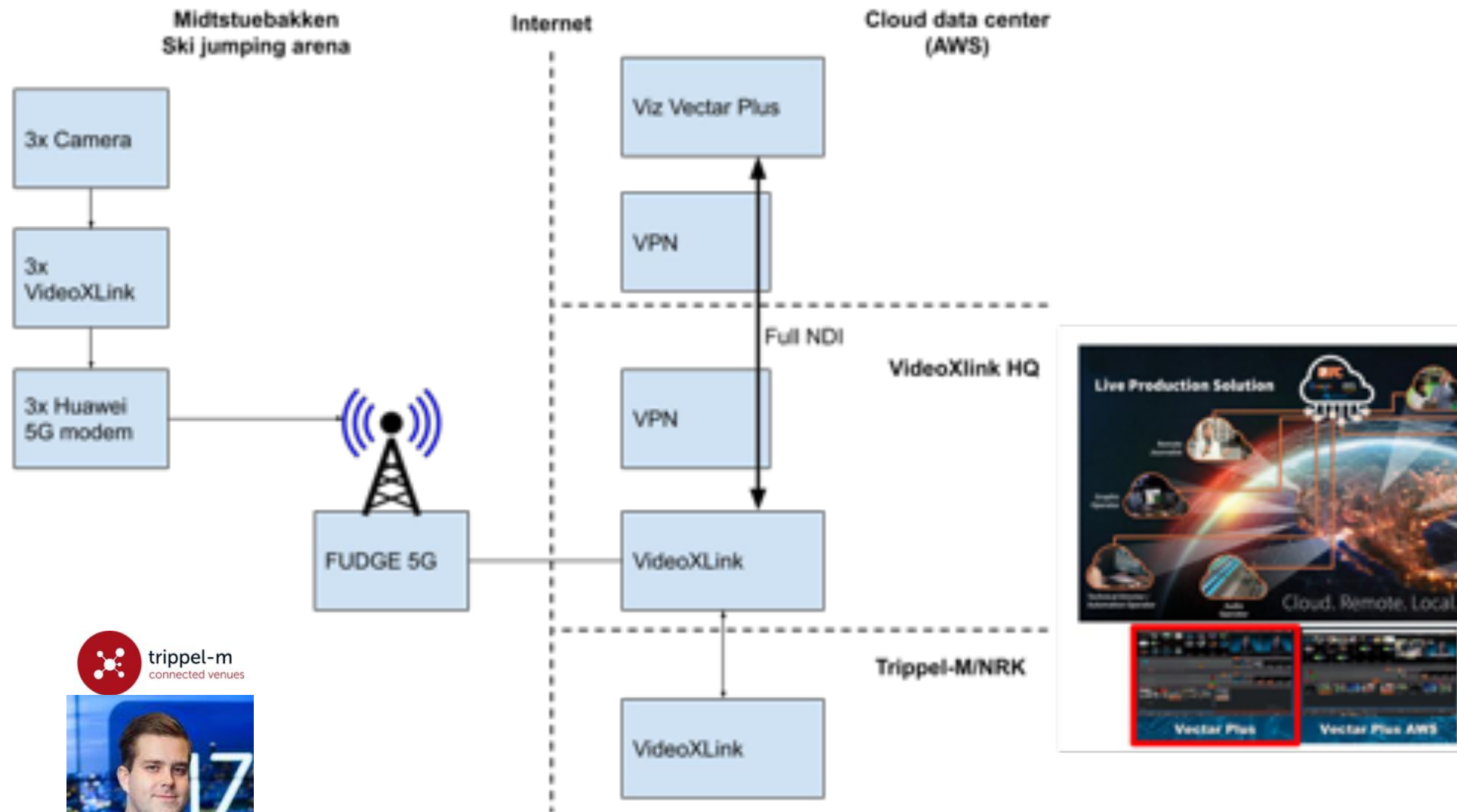
** SNPN - Standalone Non-Public Network



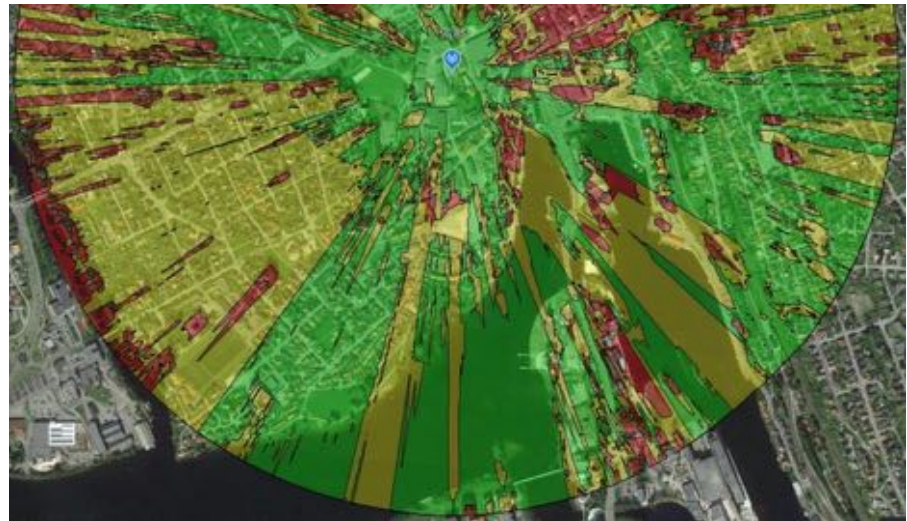
5G SNPN

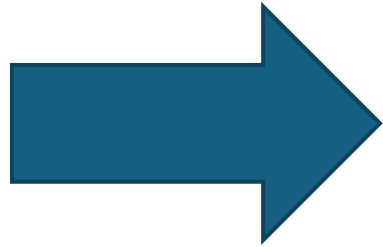








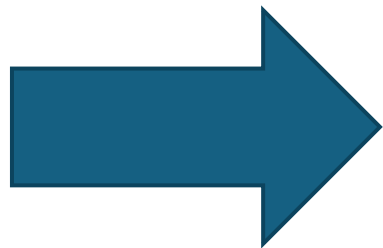




telenor

Size & weight decreased: **1800 kg on wheels** -> 50 kg suitcase

Uplink part increased: **20%** -> **30%** -> **60%** -> **77,8%** -> **88,9%**?

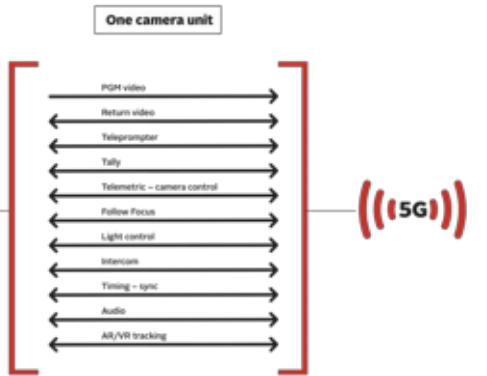
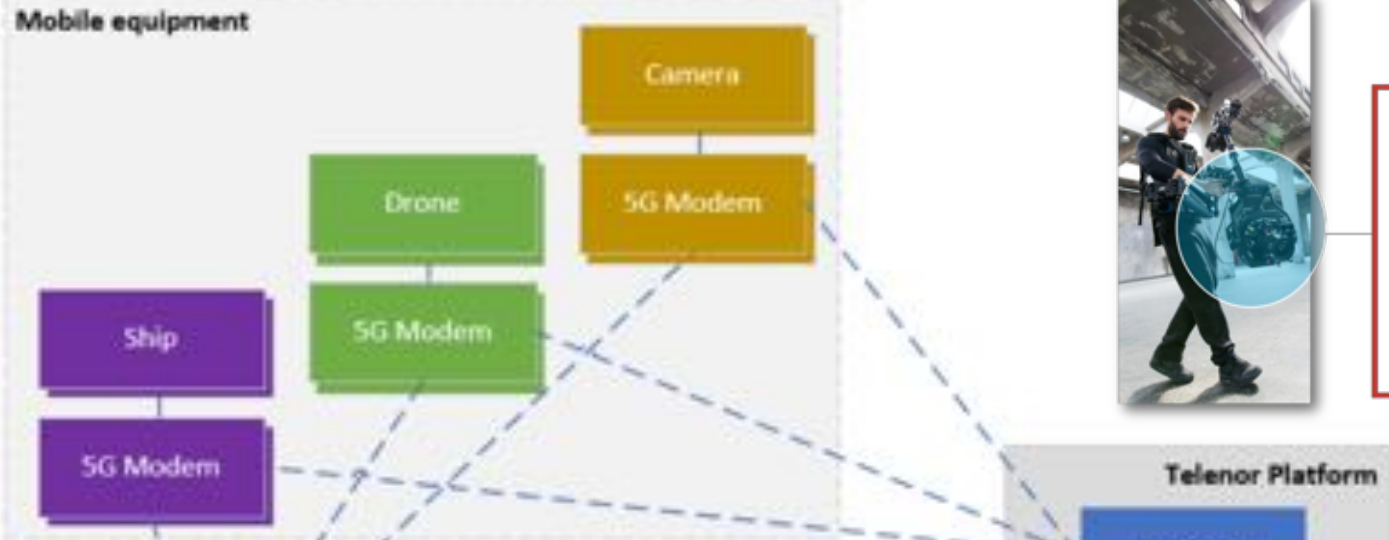


R&D

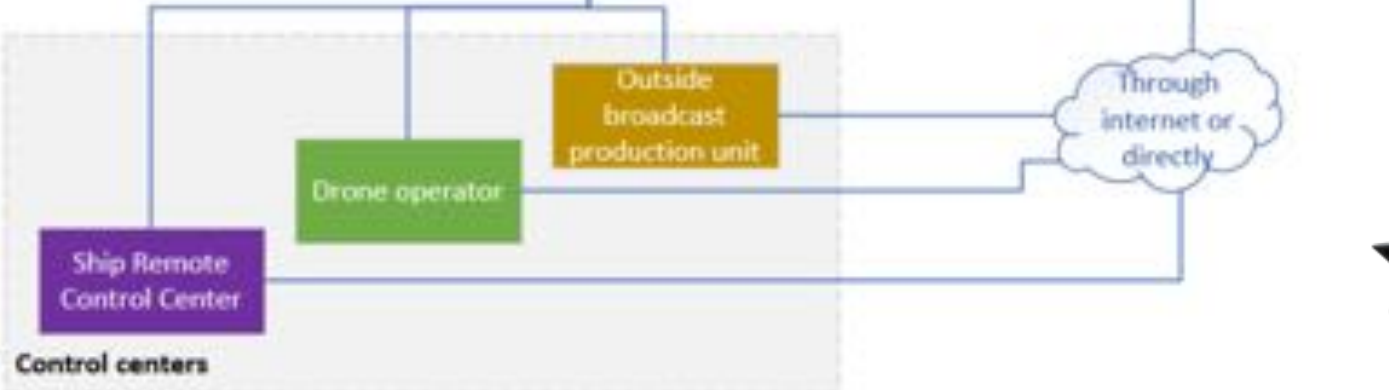
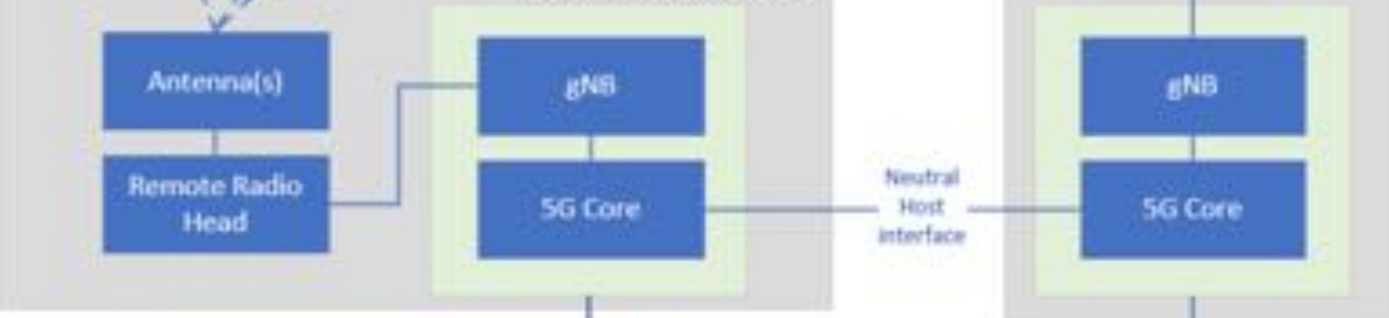




Mobile equipment



Neutral Wireless Network-in-a-box (NIB)





FUDGE-5G Use Cases



Fraunhofer
FOKUS



telemor
group

ABB

FUDGE-5G

Nomadic 5G - as a service



Telia

Telia tactical networks | Antenna systems

1 Telescopic mast on tripod

- Light weight
- Modular
- Flexible antenna setup

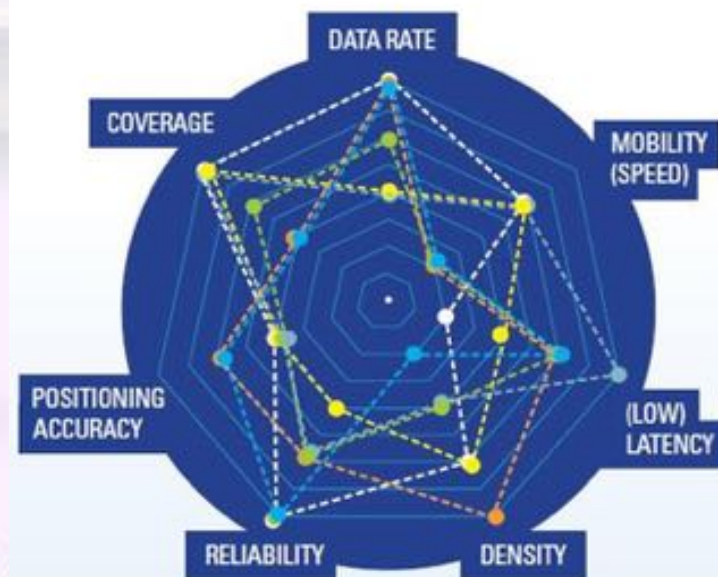
2 Vehicle mounted

- Telescopic mast mounted on vehicle
- Flexible antenna setup

3 Tethered drone

- Antenna element or radio module lifted by drone
- Power supply on ground

MEDIA & ENTERTAINMENT



- Ultra high fidelity media
- On-site live
- User/Machine generated content
- Immersive and integrated media
- Cooperative media production
- Collaborative gaming

Nomadic 5G - as a service

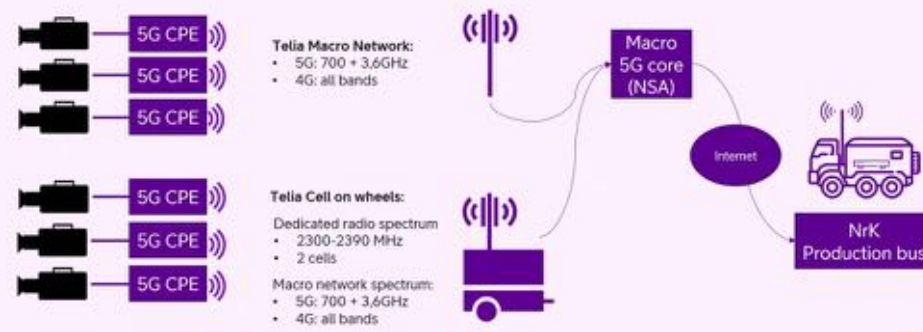




Conceptual set-up 1 | On site TV production

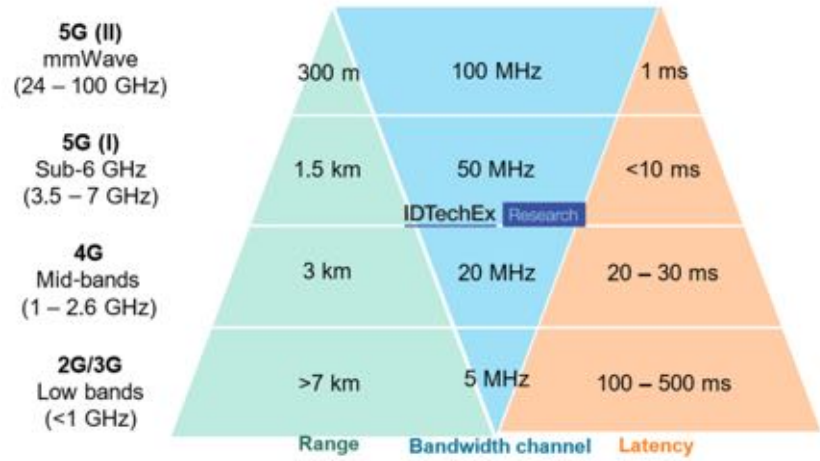


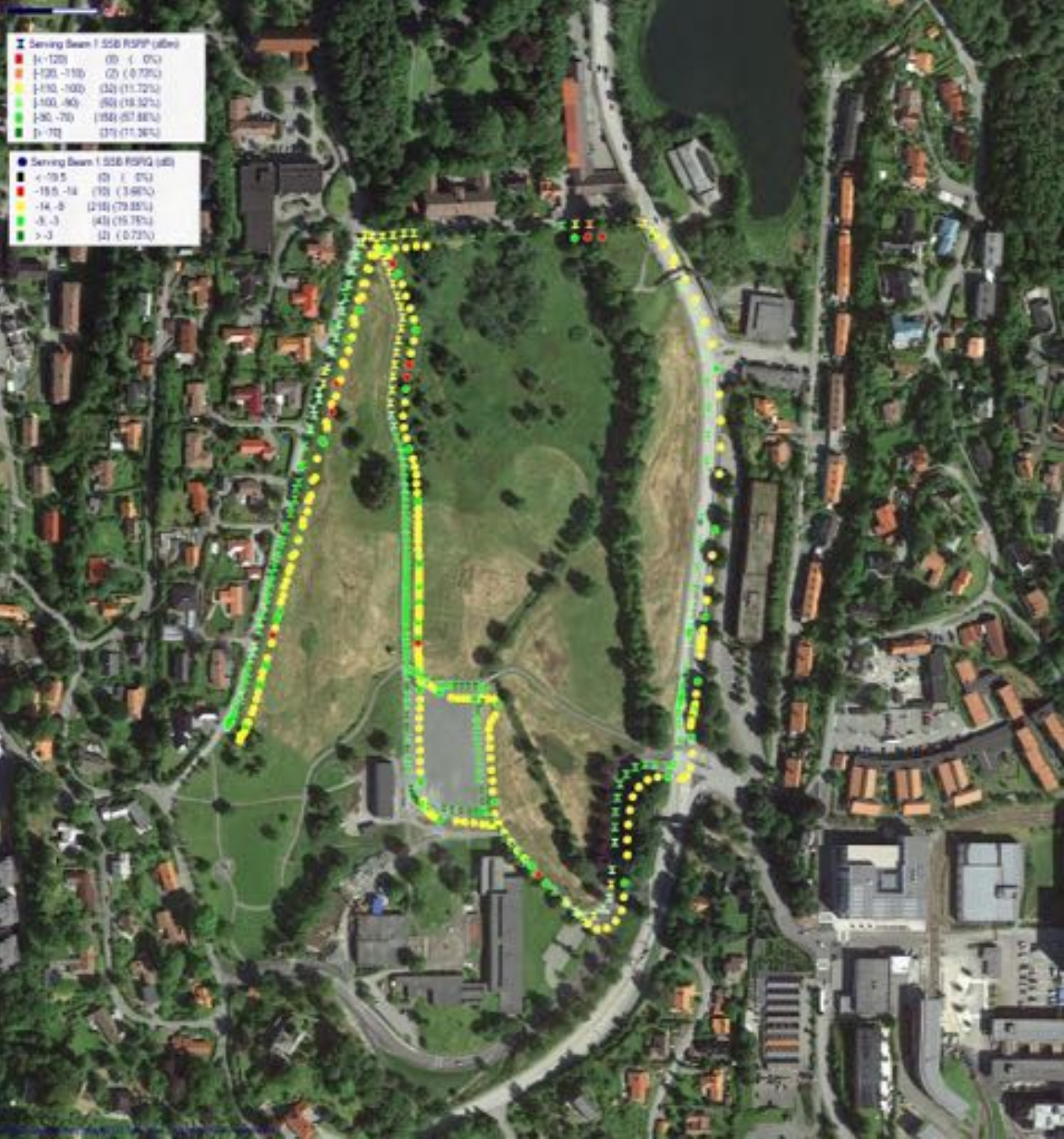
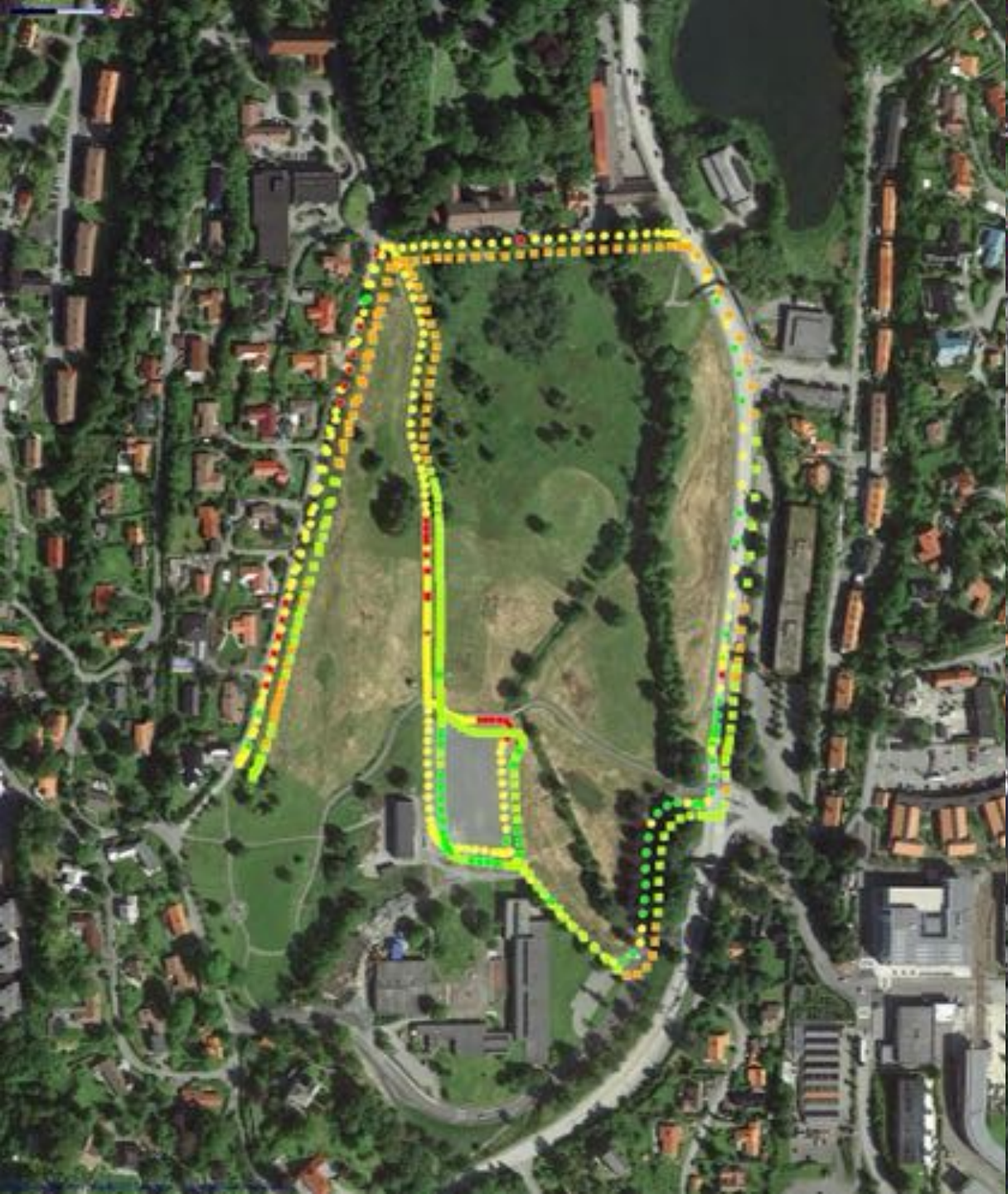
Conceptual set-up 2 | On site TV production

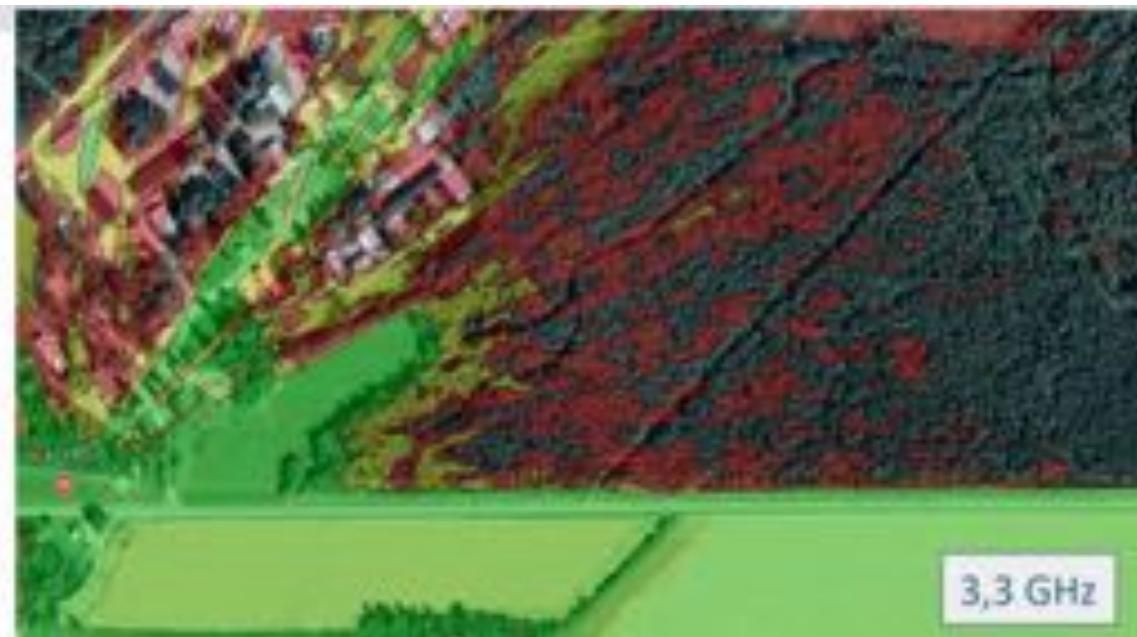
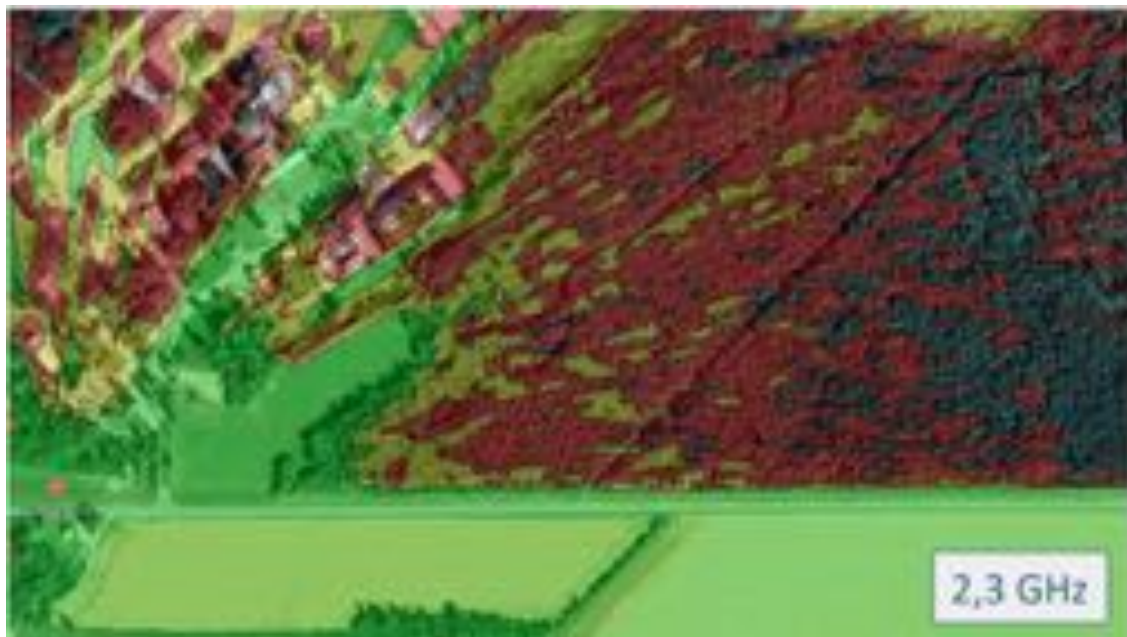


Recommended CPE: Peplink BR1 Pro 5G

NM TERRENG







	<1GHz	3GHz	4GHz	5GHz	6GHz	24-30GHz	37-50GHz	64-71GHz	>95GHz
600MHz (2x35MHz) (B41m41)	800MHz (2x35MHz) (B41m41)	3.1-3.45GHz 3.45-3.55GHz (3.7, 4.9)	3.55-3.7GHz (3.98GHz)	4.99GHz (5.9-7.1GHz)		24.25-24.45GHz 24.75-25.25GHz 27.5-28.35GHz	37-37.6GHz 37.6-40GHz 47.2-48.2GHz	57-64GHz (64-71GHz)	>95GHz
600MHz (2x35MHz)		3.475-3.65 GHz	3.65-4.0GHz			26.5-27.5GHz 27.5-28.35GHz	37-37.6GHz 37.6-40GHz	57-64GHz (64-71GHz)	
700MHz (2x30 MHz)		3.4-3.8GHz		5.9-6.4GHz		24.5-27.5GHz		57-66GHz	
700MHz (2x30 MHz)		3.4-3.8GHz				26GHz		57-66GHz	
700MHz (2x30 MHz)		3.4-3.8GHz				26GHz		57-66GHz	
700MHz (2x30 MHz)		3.46-3.8GHz				26GHz		57-66GHz	
700MHz (2x30 MHz)		3.6-3.8GHz				26.5-27.5GHz		57-66GHz	
700MHz	2.5-2.6GHz (B41m41)	3.3-3.6GHz		4.8-5GHz		24.75-27.5GHz	40.5-43.5GHz		
700/800MHz	2.3-2.39GHz	3.4-3.42GHz 3.42-3.7GHz 3.7-4.0GHz		5.9-7.1GHz		25.7-26.5GHz 26.5-28.9GHz 28.9-29.5GHz	37GHz	57-66GHz	
700MHz		3.6-4.1GHz	4.5-4.9GHz			26.6-27GHz 27-29.5GHz	39-43.5GHz	57-66GHz	
700MHz		3.3-3.6GHz				24.25-27.5GHz 27.5-29.5GHz	37-43.5GHz		
700MHz		3.4-3.7GHz				24.25-29.5GHz	39GHz	57-66GHz	



Efficient workflows for filebased and live



カメラ / プロフェッショナルカムコーダー等

FTPサーバー / クラウド
ライブストリーミングサービス等

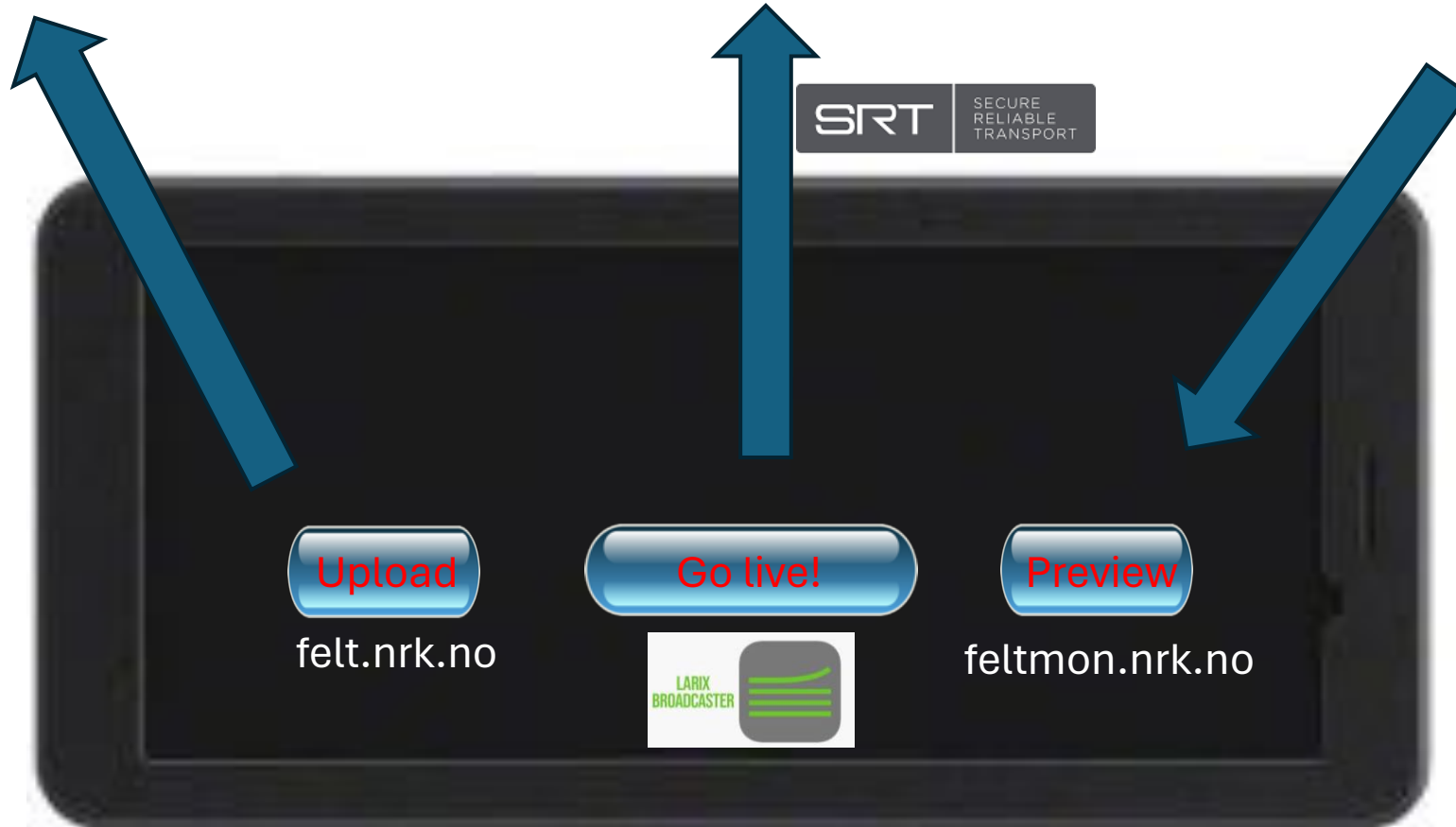


PDT-FP1



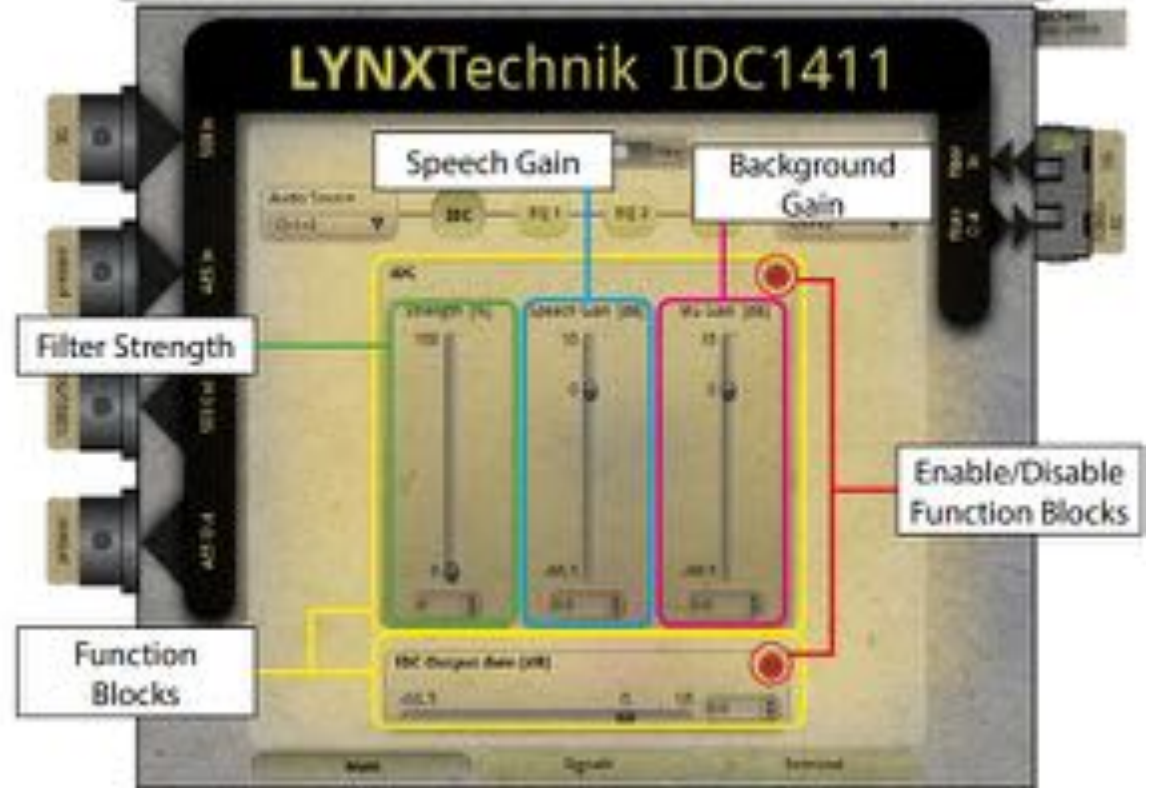
CBK-RPU7





MPK

Low latency preview with clear dialogue

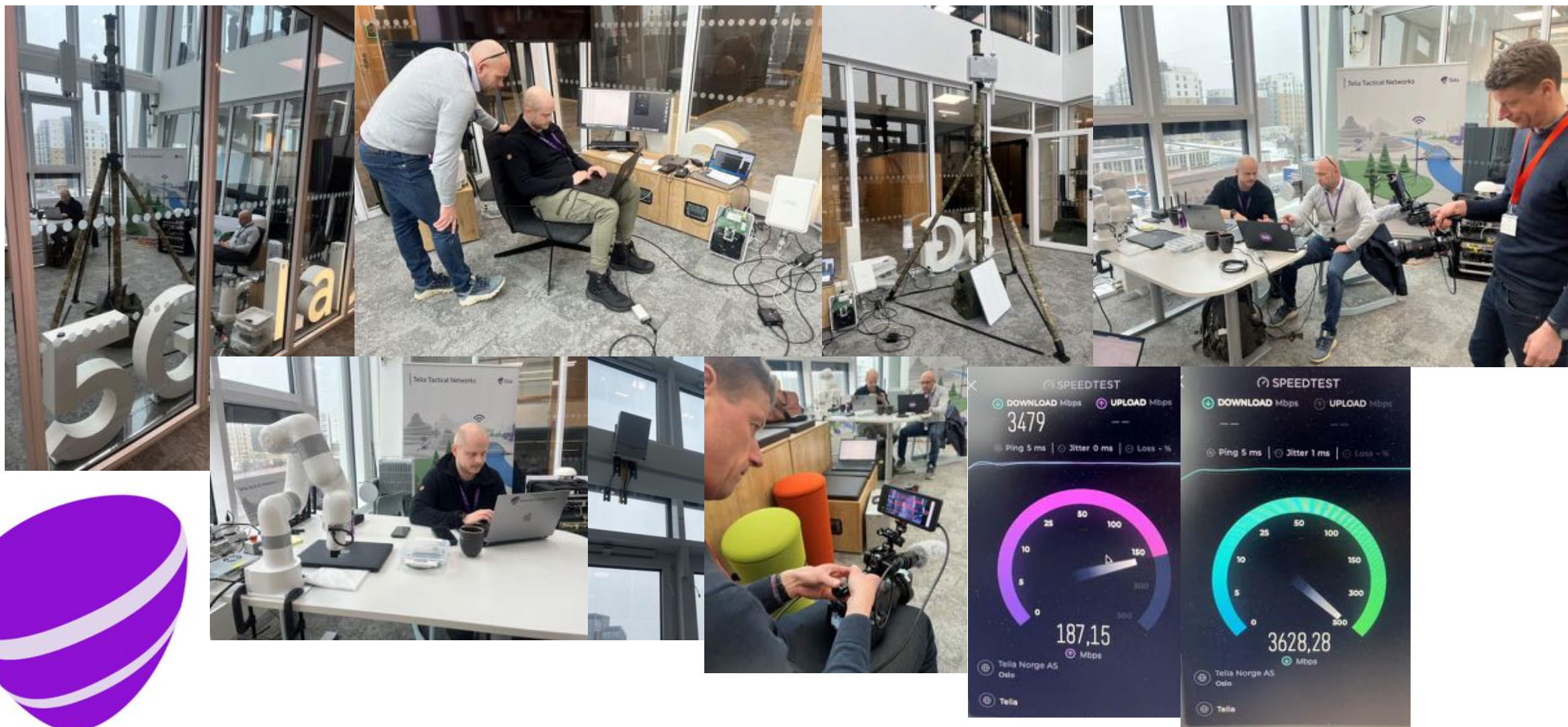


 OvenMediaEngine

Web  RTC



Test of mmWave on Telia's 5G lab

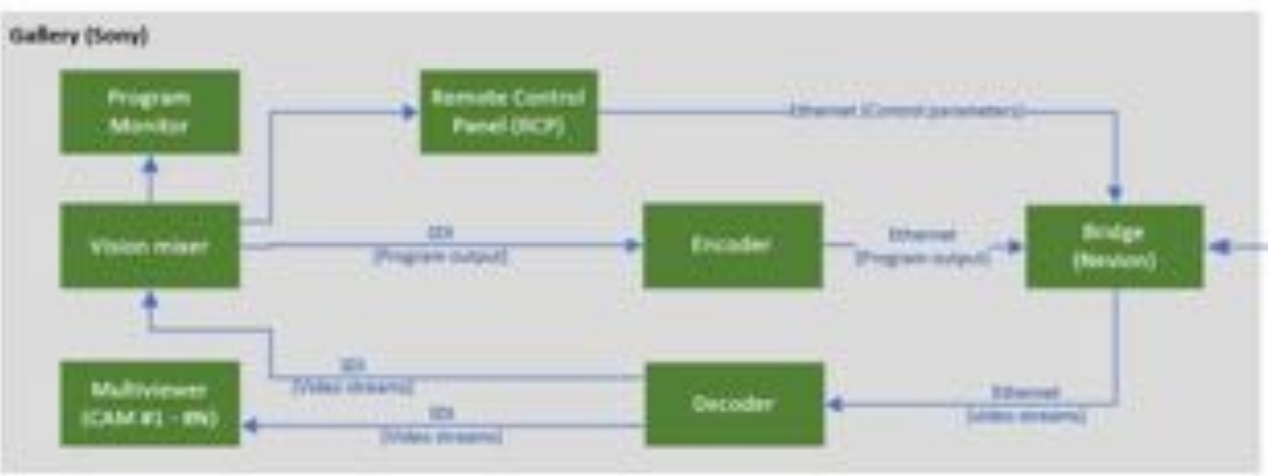
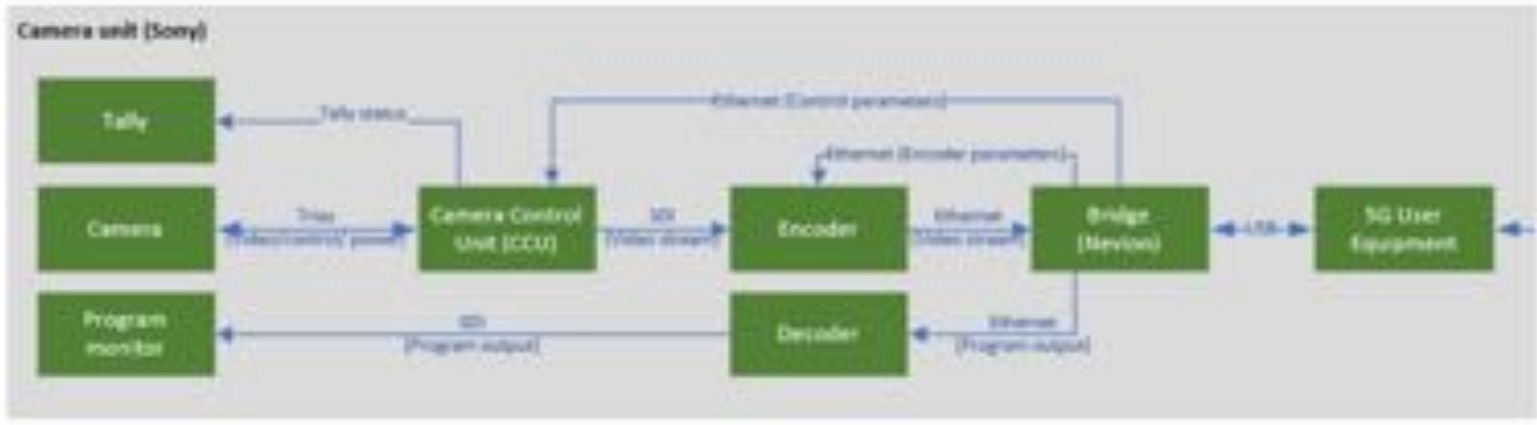


Test of mmWave on Ice's outdoor network



Network Exposure Function (NEF) & the Next Phase of 5G

NEF: Priority when camera is on air



SONY



telenor



neviON



Network Exposure Function (NEF) & the Next Phase of 5G

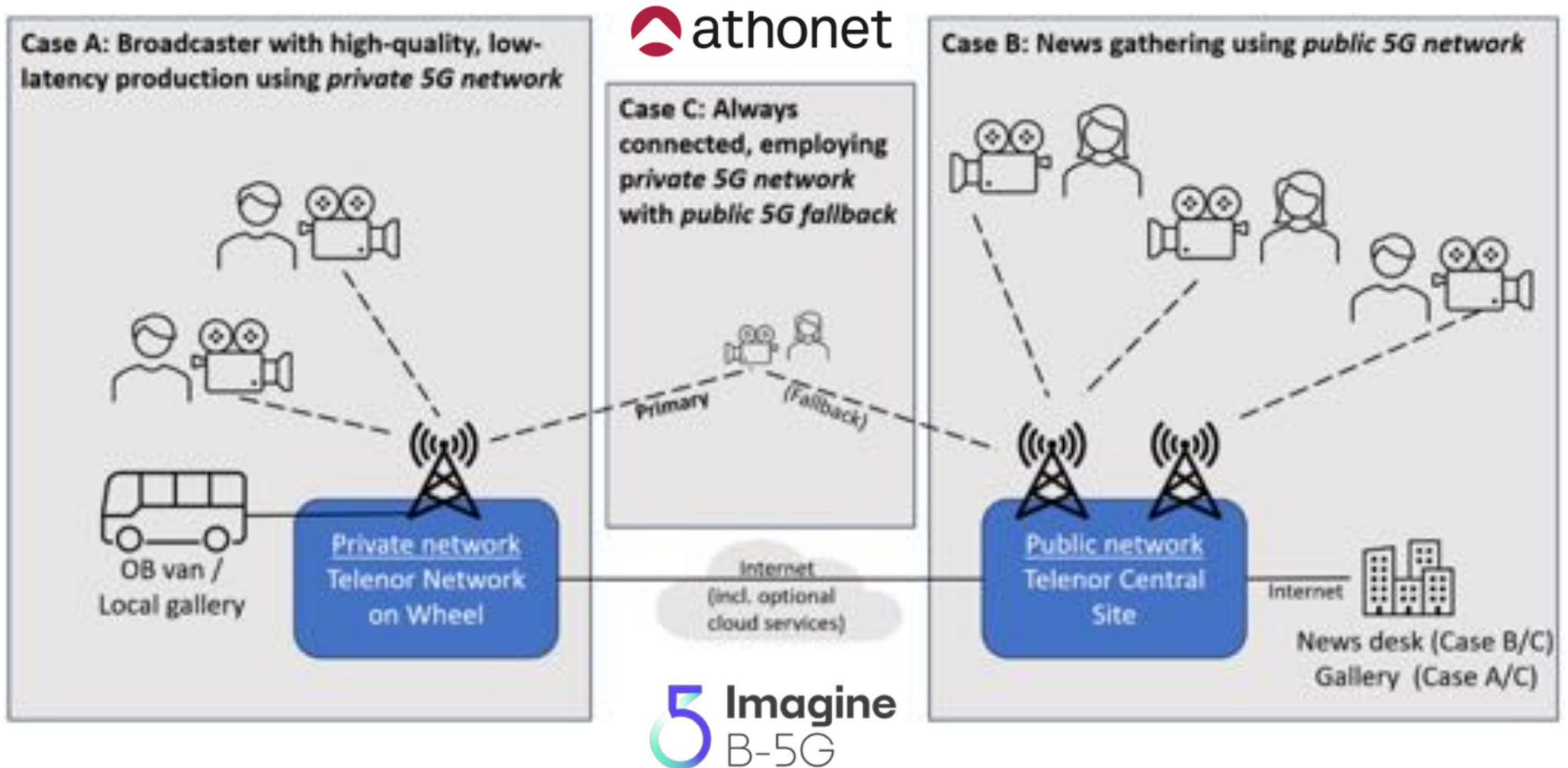


PRIORITY



SONY
neviON

PNI-NPN: Seamless transition between public and private 5G



Nomadic 5G: Creating coverage in remote locations fast

Telia tactical networks | Antenna systems



1 Telescopic mast on tripod

- Light weight
- Modular
- Flexible antenna setup



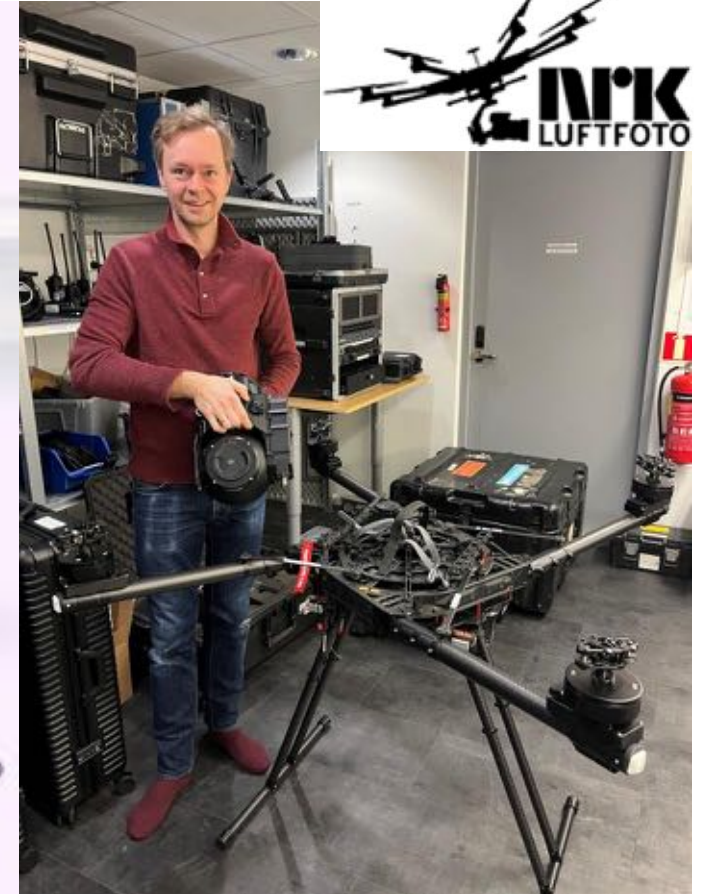
2 Vehicle mounted

- Telescopic mast mounted on vehicle
- Flexible antenna setup



3 Tethered drone

- Antenna element or radio module lifted by drone
- Power supply on ground



Why move to IP?



Centralise content production

The content must be at the forefront of the production and publishing chain – not where or when, or by whom it is published.



Allow NRK to be present and available at different locations

NRK is less location-dependent and will be able to be present more easily and take productions out to the public and draw on the whole of NRK in productions from anywhere.



Increased ability to change

A modernized production platform gives NRK opportunity to dispose of technical debt and prepare for both the known and the unknown future, and increase funding for content production, increased flexibility, and new opportunities.

Hype Cycle for Artificial Intelligence, 2022



Plateau will be reached:

○ less than 2 years

● 2 to 5 years

● 5 to 10 years

▲ more than 10 years

⊗ obsolete before plateau

As of July 2022

[gartner.com](https://www.gartner.com)

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Gartner.

Hype Cycle for Artificial Intelligence, 2022



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Generative AI

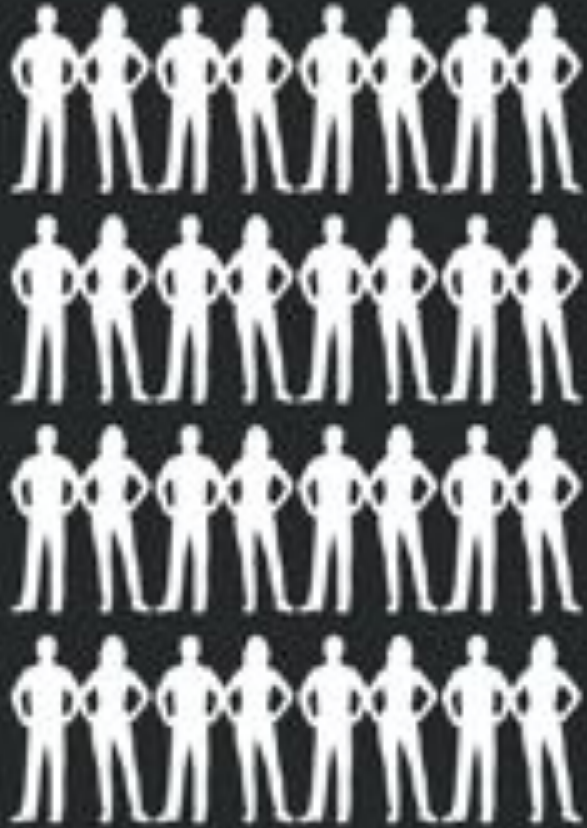


Midjourney version 1
June 2022



Midjourney version 5
June 2023

AI



Most people see the possibilities



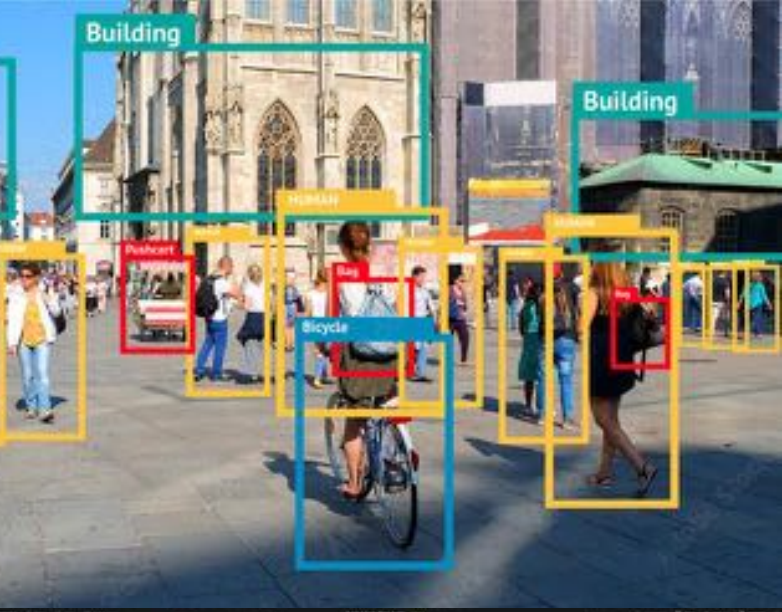
Very few know how it's done

No one knows the consequences

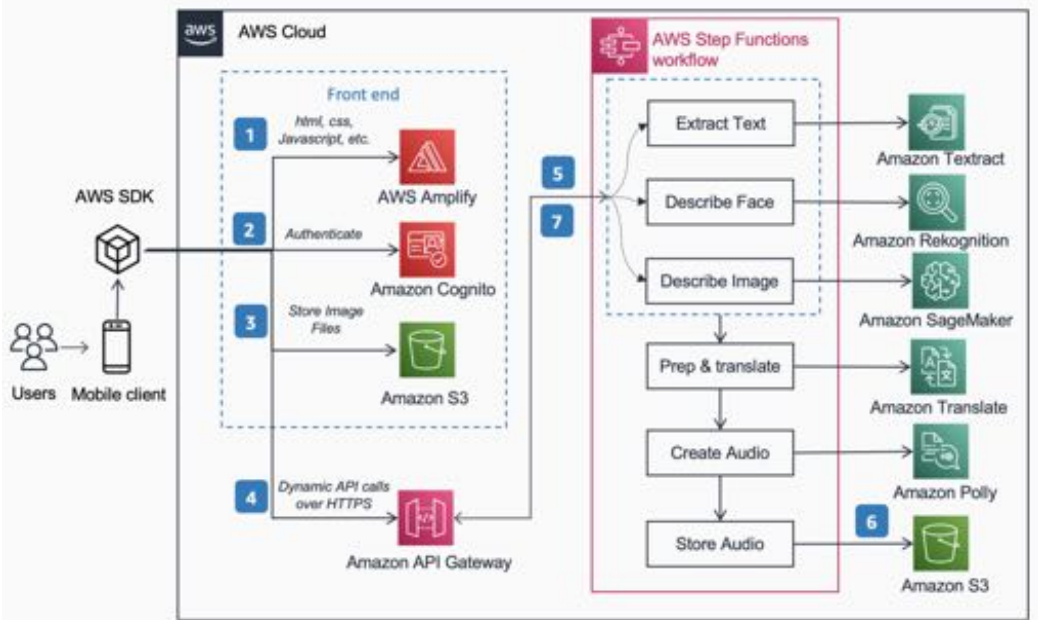


How AI is Revolutionizing the Film Industry

ARE YOU PREPARED FOR THE FUTURE?



More efficient workflows with AI support



Audio Transcription



Video Transcription



Real time transcription: Search text based and publish fast!

File

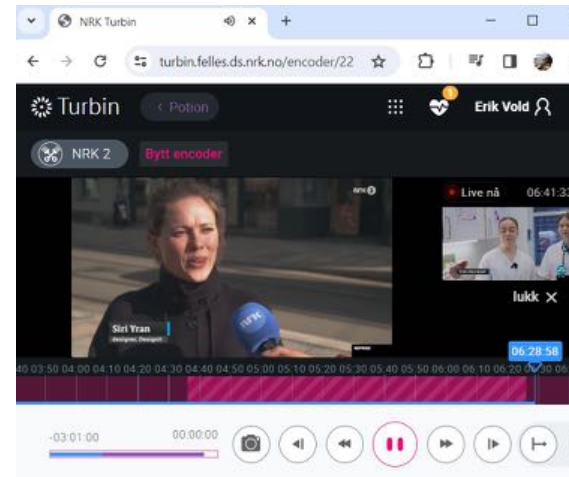


SKVALDER

Pr
Text-Based Editing
Powered by Adobe Sensei



Live

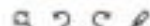


Live2VoD

Start 00:00:00

Lengde 00:07:25 / 00:47:22

Høyde



Lindmo

00:00:04

Hjertelig velkommen til en fredagskveld i særdeles godt selskap. Skulptører Henrik Mørstvedt søker på de små tingene som gir stor lykke. Ingrid Håvik froner pop-subkulturen, Highasakilla, men synes skyer er skummelt og hele verden følger med når Magnus Midtbo boltrer seg i kibrevæggen.

Lindmo

00:00:08

NRK-kollega Mooky Ramen har hatt stor suksess med å kombinere sport og komedie, og har vist oss at våre store stottshelter gjerne er med på å sjuske litt. Nå har Mooky gjort en litt ny retning og er klar med en humorserie der han selv spiller rollen som en litt felle i langrennsløypa.

Lindmo

00:00:09

Mooky, hyggelig å ha deg her.

Ramen

00:00:10

Takk for at jeg fikk komme.

Lindmo

00:00:20

Du, Olympiatoppen er altså nevnet på dette nye prosjektet, og jeg vil gjode litt høyde nå for å ha de som ofte ganske mye for kunsten.

Ramen

00:00:19

Ja, det var ikke pent, men forhåpentligvis verdt det.

Lindmo

00:00:19

For julestemning rett og slett.

Ramen

00:00:19

Den måtte det. Jeg foretok jo tidlig at jeg ville bruke en såkalt P som dekker hele leasen, men det ble for dyrt. Så da var et litt pers for for meg. Og så jeg var nå den et par uker til, for vi driver å finne serien nå. Ja, det er greit.

Lindmo

00:00:20

Ekstra applaus for å ofte høst.

Ramen

00:00:20

Ja, takk, takk for det.

Lindmo

00:00:42

Denne serien har den, du har skrevet den, du spiller i, den du holder på å redigere den, og jeg ser deg også i NRK-komediene til alle de gamle tidene og så samtidig så lenge jeg står her ut hvem som er lenge på det.

Ramen

00:02:04

Ja.