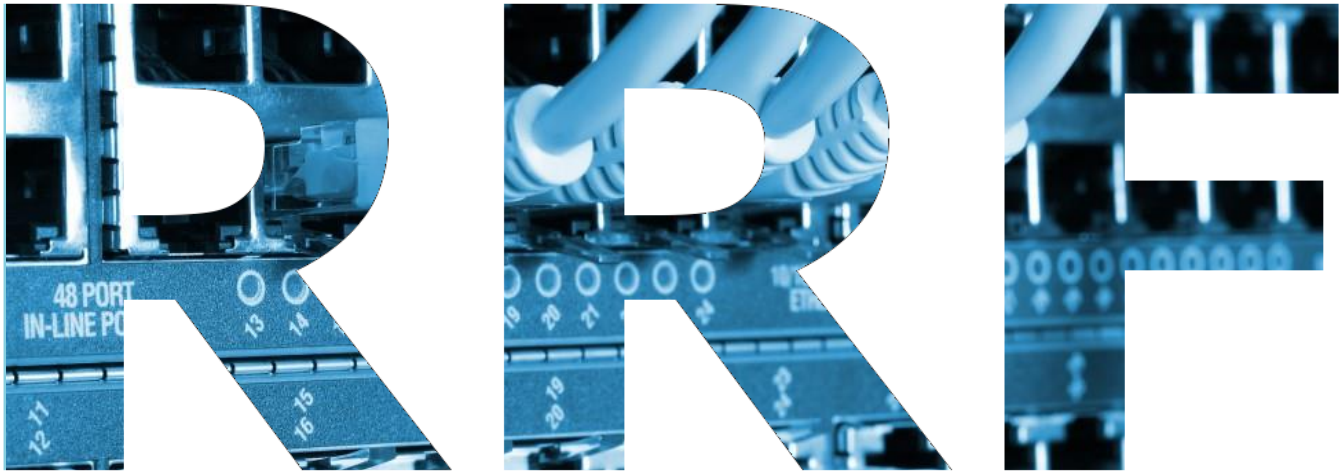


PSCE MADRID 2017

France's Path to PPDR Broadband

Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE
MINISTERE DE L'INTERIEUR

Madrid, 28 November 2017

Police officers, **gendarmes** and **fire-fighters** today use **radio equipment** that was designed for 2G, which is not entirely up-to-date and does not allow, for instance, the transmission of large amounts of data or pictures in real time from the field. Therefore one of the **major sovereign projects** will be the **common high-speed** radio network of the future ("**Réseau Radio du Futur**") for the police, gendarmerie and civil security which will benefit from a **high level of resilience** in case of crisis and the best available digital technologies. It will be a **prominent French and European industrial project** whose **deployment** must be achieved **as soon as possible** and is also subject to a clear financial commitment as part of the **major French investment plan** ("Grand Plan d'Investissement") for the coming years.

Emmanuel Macron, 18/10/2017

France’s Path to PPDR Broadband – Meeting's Agenda

1. Context
2. Objectives and network architecture
3. Roadmap
4. RRF target organization
5. Main issues remaining

The objective of the RRF Project is to move from a 2G network (Tetrapol) to a LTE/4G network shared by all operational groups

Presentation of the Réseau Radio du Futur (RRF) project

Current network (Tetrapol)

- **Multiple networks:** RUBIS/ INPT
- **Dedicated network**
- **Technology:** Tetrapol (equivalent to 2G)
- **Supplier:** Airbus (proprietary technology)
- **Coverage:** 45% (pedestrian), 90% (vehicles) of territory
- **Frequencies:** 80 MHz & 380-400 MHz
- **Bandwidth:** ~0,01 Mbits/s
- **Number of users:** 180 000
- **Functions:** Text and voice messages
- **Investment:** CAPEX oriented strategy

RRF[1)] project

RRF Network

- **Unified network**
- **Hybrid network:** Dedicated + commercial components
- **Technology:** LTE/4G
- **Suppliers:** The whole 4G/LTE ecosystem
- **Coverage:** 95% of territory
- **Frequencies:** 700 MHz (for the dedicated part)
- **Bandwidth:** ~10 Mbits/s
- **Number of users:** +300 000
- **Investment:** OPEX (services) oriented strategy, minimizing CAPEX related to dedicated radio networks
- **Functions:** Text and voice messages ; Video broadcasting and recording ; Instant messaging ; Geo-tracking ; Access to information systems…

1) Réseau Radio du Futur

Source: RRF prefiguration mission, Wavestone, Roland Berger

The concept of tactical networks emerged recently, through the PC STORM project

Origin of the PC STORM project

Events

2015

7th January 2015 :
> Charlie Hebdo terrorist attack

9th January 2015 (at the same time) :
> Kouachi brothers took hostages in a printing plant about 30 km from Paris (DAMMARTIN)
> Coulibaly took hostages in a grocery store in eastern Paris

PC STORM Project

Encountered issues

Interoperability

Three different forces were deployed during those attacks, using different PPDR networks :
> **RAID** *(INPT network)*
> **BRI** *(INPT network)*
> **GIGN** *(Motorola network)*

Function

Lack of functions :
> *Absence of video sharing from the field with authorities*
> *Difficulties were encountered to coordinate two operations at the same time (due to limited information transmission)*

Output

1. **Every force should use the same interoperable networks**
2. **PPDR networks should allow the use of broadband data and video services**
3. **PPDR networks must use standard technologies**

Source: RRF prefiguration mission, Wavestone, Roland Berger

PC Storm was created in the wake of these events to provide a tactical PPDR network

Presentation of the PC STORM project

Target

> PC STROM project was set up to respond to the lack and difficulties faced during the terrorist attack of 2015

> The aim of PC STORM project is to develop a tactical ("projectable") PPDR network which uses standard LTE/4G technology

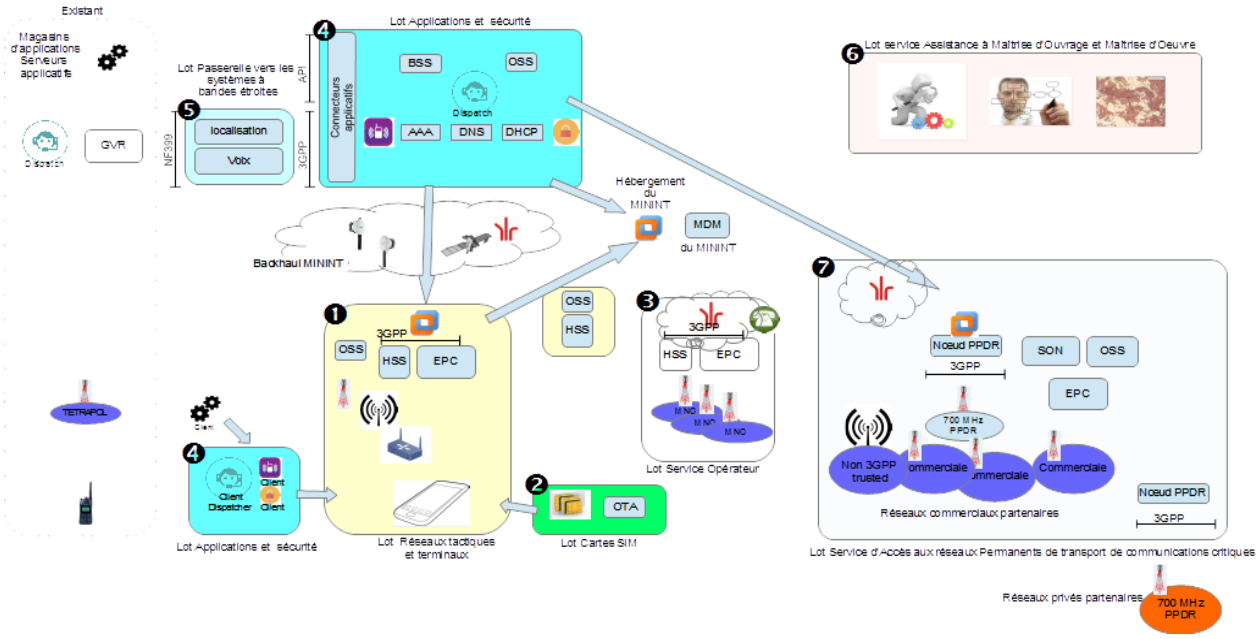
Composition of the project

PC STORM project is divided into 7 lots:

> Deployable networks
> SIM cards
> Operator services
> Applications and security
> Gateways
> Infrastructures
> Technical support

Notification expected:
1st quarter 2018

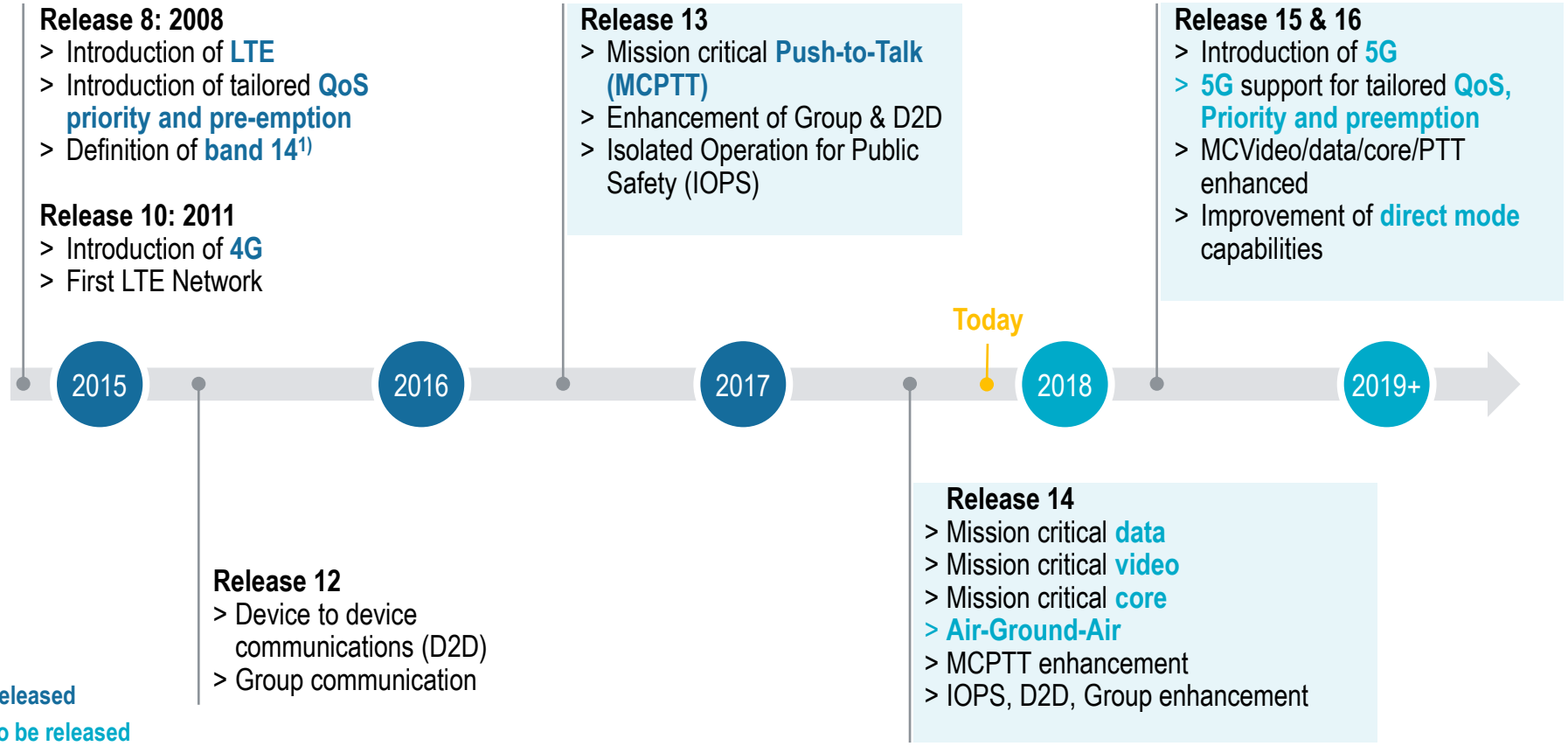
PC STROM project refers to the second and third levels of resilience



Source: RRF prefiguration mission, Wavestone, Roland Berger

There is a consensus towards LTE as the technology for PPDR services but the required standards were defined only recently

Contribution of 3GPP releases to PPDR needs : the road to broadband public safety



1) 2x10 MHz in 758-768 & 788-798 MHz used by Firstnet

Source: 3GPP, Roland Berger

The « NEO » project

Professional applications over commercial networks
No MCXXX
Specific operating system and VPN
NEO devices expected to be first RFF devices

TETRAPOL

MC PTT

Commercial Network

NEO

Only for police and gendarmerie

Data
Telephony

Fire brigades and health services use local solutions

RRF Network

MC PTT
MC Data
MC Video
For all PPDR users

Source: RRF prefiguration mission, Wavestone, Roland Berger

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Several key principles serve as a basis in the French PPDR Broadband request for information procedure

Key principles of the RFF request for information

> The **respect of the 3GPP standard** remains a **priority** objective.

> Objective for the Ministry of Interior (MoI) to **minimize** the **CAPEX related to dedicated radio networks** in order to use only radio network **services** (excluding terminals and tactical networks). **Resilience** is ensured by the multiplicity of networks used.

> The **recommended market period after winning the tender offer** is **4 years**. Therefore, the idea is to make all efforts to minimize the investments in infrastructure. Every potential demand of market extension will have to be justified by real amortization difficulties, **which will have to be supported by figures**, as a national security issue isn't considered as an acceptable justification. It will be possible to give this justification within the request for information procedure.

> Considering schedule by 2021-2022, it is important for the RRF to **include as of now prospective topics** in the request for information (e.g. 5G and IoT developments).

> The **securing of spectrum resources** should lead to a **fair business** for all parties involved. For this reason, the request for information procedure will ask about the economic model suggested.

> **Separation of professional services from current telephony services:** the RRF is a supplier of **prioritized critical communications**, based notably on group communications. It doesn't supply standard telephone services which is the exclusive competency area of MNOs[1)].

1) As a consequence, it is not planned that critical communications systems supply IMS functions. Concerning the access to telephone services via RFF resources, a gateway system is now preferred

Source: RRF prefiguration mission, Wavestone, Roland Berger

The use of tactical devices enhancing the network's resilience varies according to the coverage level in the area

Complementary levels of resilience

Coverage from operated networks

1. National roaming and priority/ pre-emption

2. Deployment of vehicular or individual tactical networks[1)]

3. Deployment of an infrastructure tactical network[1)]

4. Support from a regalian infrastructure network

Lack of coverage from operated networks

1. National roaming and priority/ pre-emption

N/A

2. Deployment of vehicular or individual tactical networks[1)]

3. Deployment of an infrastructure tactical network[1)]

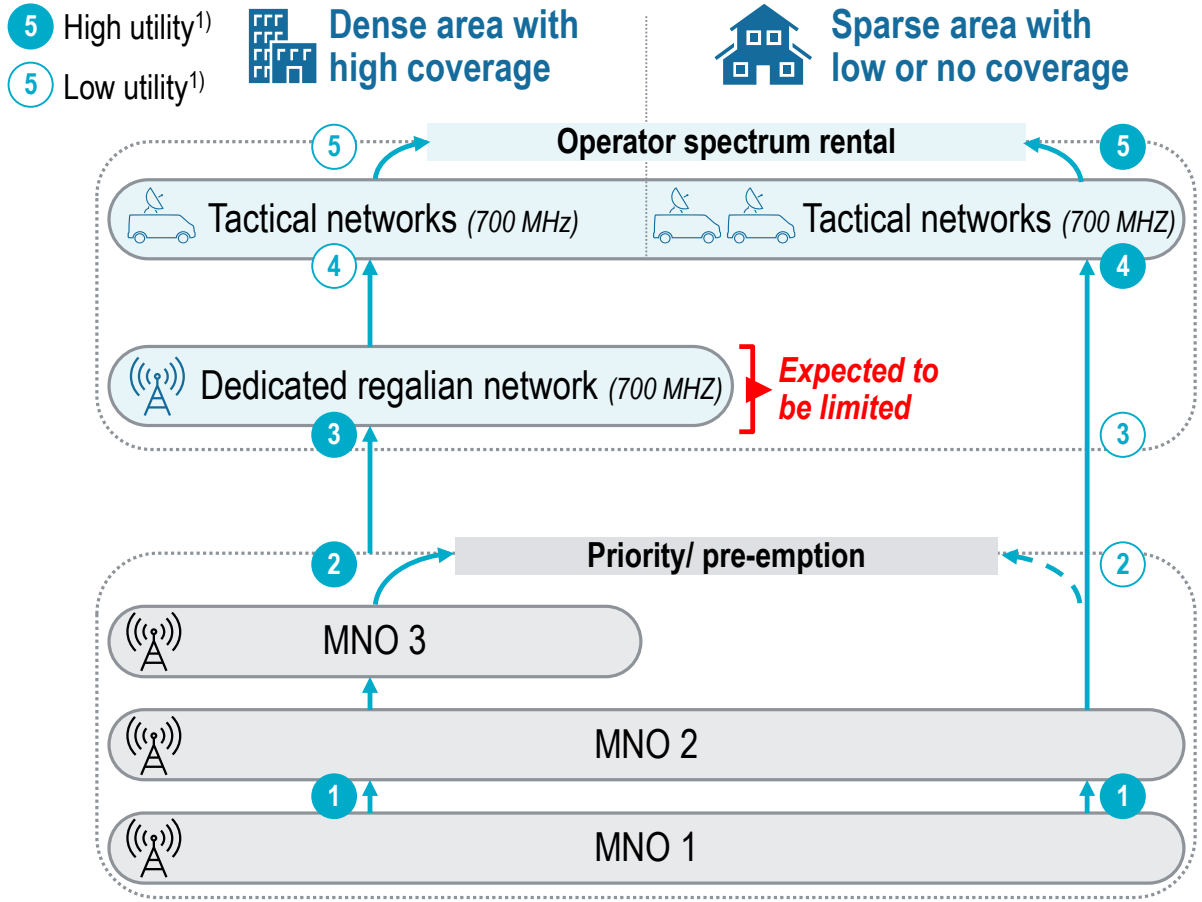
4. Support from a regalian infrastructure network

1) See appendix regarding PC STORM project

Source: RRF prefiguration mission, Wavestone, Roland Berger

The resilience is multilayered and the ways to implement it depend on the type of intervention area

Description of resilience mechanisms + mobile tactical networks



Functioning of the multilayered resilience

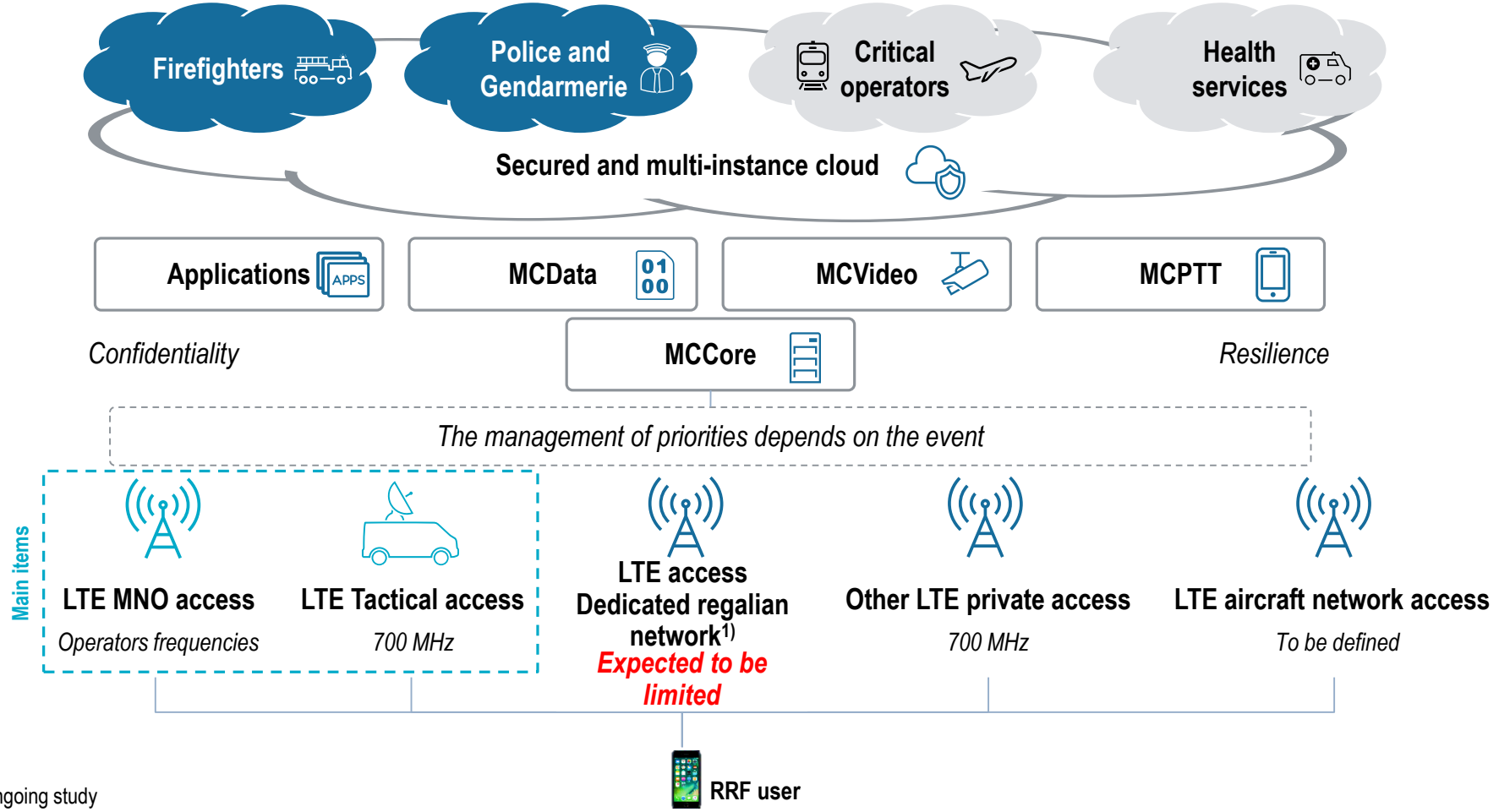
1. **The multi-roaming** enables to change operator networks in case of failure/ lack of coverage
2. **Priority/ pre-emption mechanisms** are used to fully allocate the use of MNO networks to PPDR in case of network overload (e.g. consumption peaks)
3. **The dedicated regalian network** provides complementary coverage (ex: indoor) and secures the most sensitive areas in case of major damage among MNOs' networks
4. **The mobile tactical networks** can be deployed on demand in case of damage/ absence of MNO network, excluding dedicated regalian network
5. **Spectrum rental** enables to meet the additional needs of the PPDR in terms of bandwidth when they operate out of MNO networks or when these networks are considered as unreliable (network monitoring)

1) The utility concept depends on the frequency of use of these means in case of moderate crisis ; in case of major crisis all the means would be mobilized in order to function in a complementary manner (in particular the mobile tactical networks and dedicated regalian network with Spectrum rental)

Source: RRF prefiguration mission, Wavestone, Roland Berger

The hybrid architecture is supported by a private network of telecom operators as well as mobile tactical networks

Presentation of the network architecture

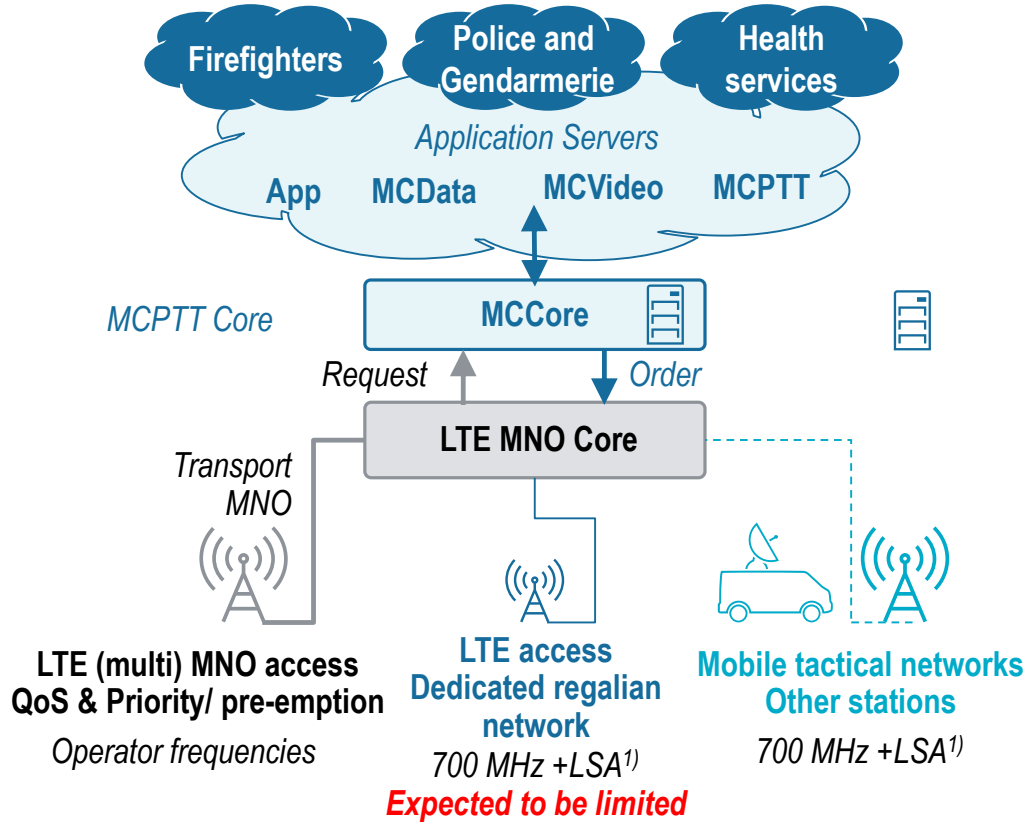


1) Ongoing study

Source: RRF prefiguration mission, Wavestone, Roland Berger

The RRF uses both mobile tactical networks and the multi-MNO to maximize the network resilience (+ potential dedicated network)

Hybrid architecture of the reference scenario

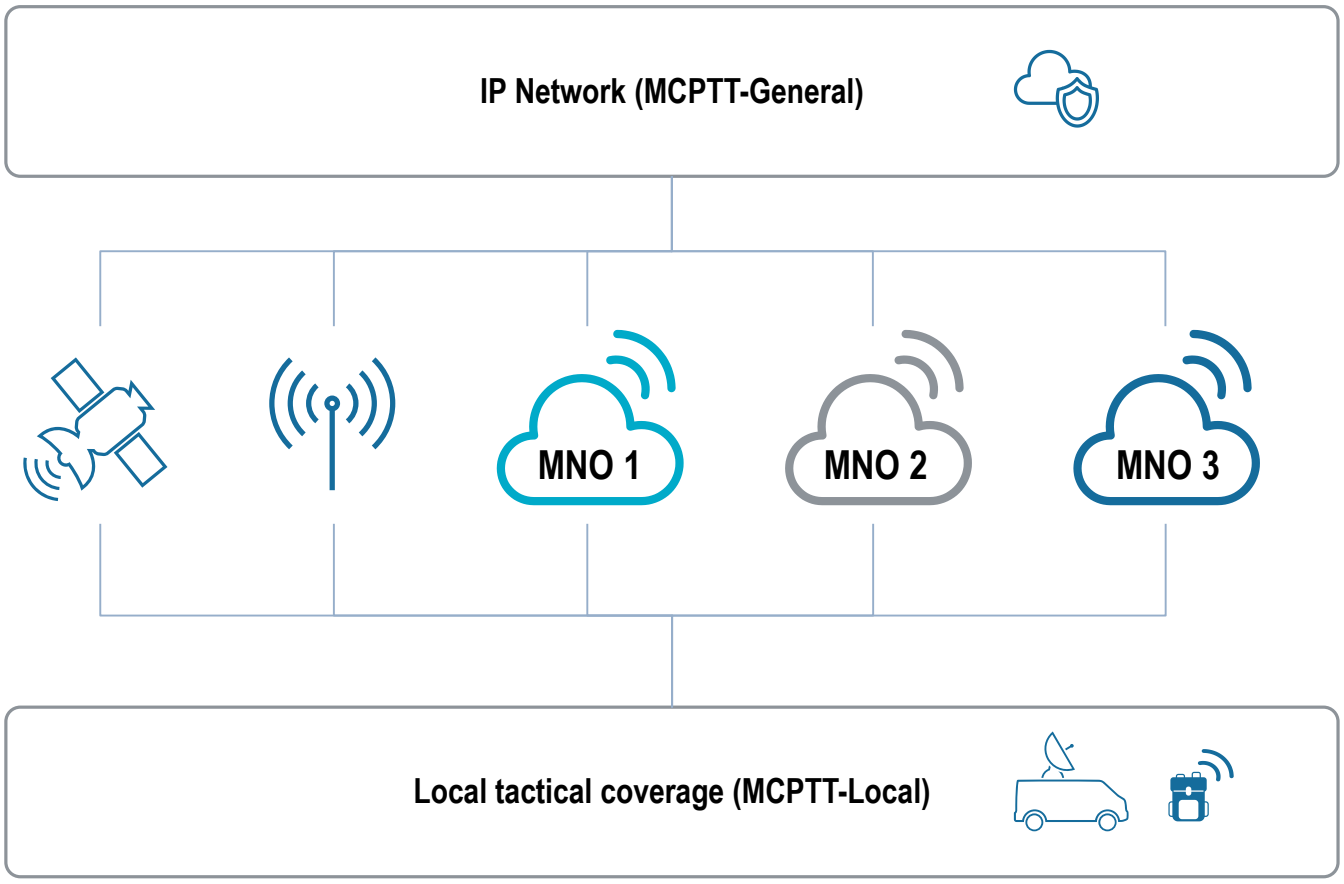


1) Licensed Shared Access : MNO spectrum rental but on RRF tactical network

Source: RRF prefiguration mission, Wavestone, Roland Berger

Mobile tactical networks would use several MNO in national roaming for backhaul connections

Presentation of the backhaul architecture on tactical network



Tactical network principles

> Flexible backhaul

> Multi-operator national roaming

> Open strategy on frequencies
  – Dedicated spectrum
  – Shared spectrum

Source: RRF prefiguration mission, Wavestone, Roland Berger

International Interoperability

Technical and organisational issues

> The **respect of the 3GPP standard** and its **evolution for interoperability of MCXXX servers** remain an issue.

> International cooperation with **SEC04** project implementing the **SpiceNet** architecture designed in the **BroadMap** project, PCP and PPI may offer interesting technical and financial solutions

> The **recommended market period after winning the tender offer** is **4 years**. The procurement that **SEC04** will allow completely meets this requirement..

> Considering schedule by **2021-2022**, the technical solutions from SEC04 should be available

> The **SpiceNet** architecture is only a **technical solution**, **organisational issues** between partner countries have to be solved

Source: RRF prefiguration mission, Wavestone, Roland Berger, PSCE

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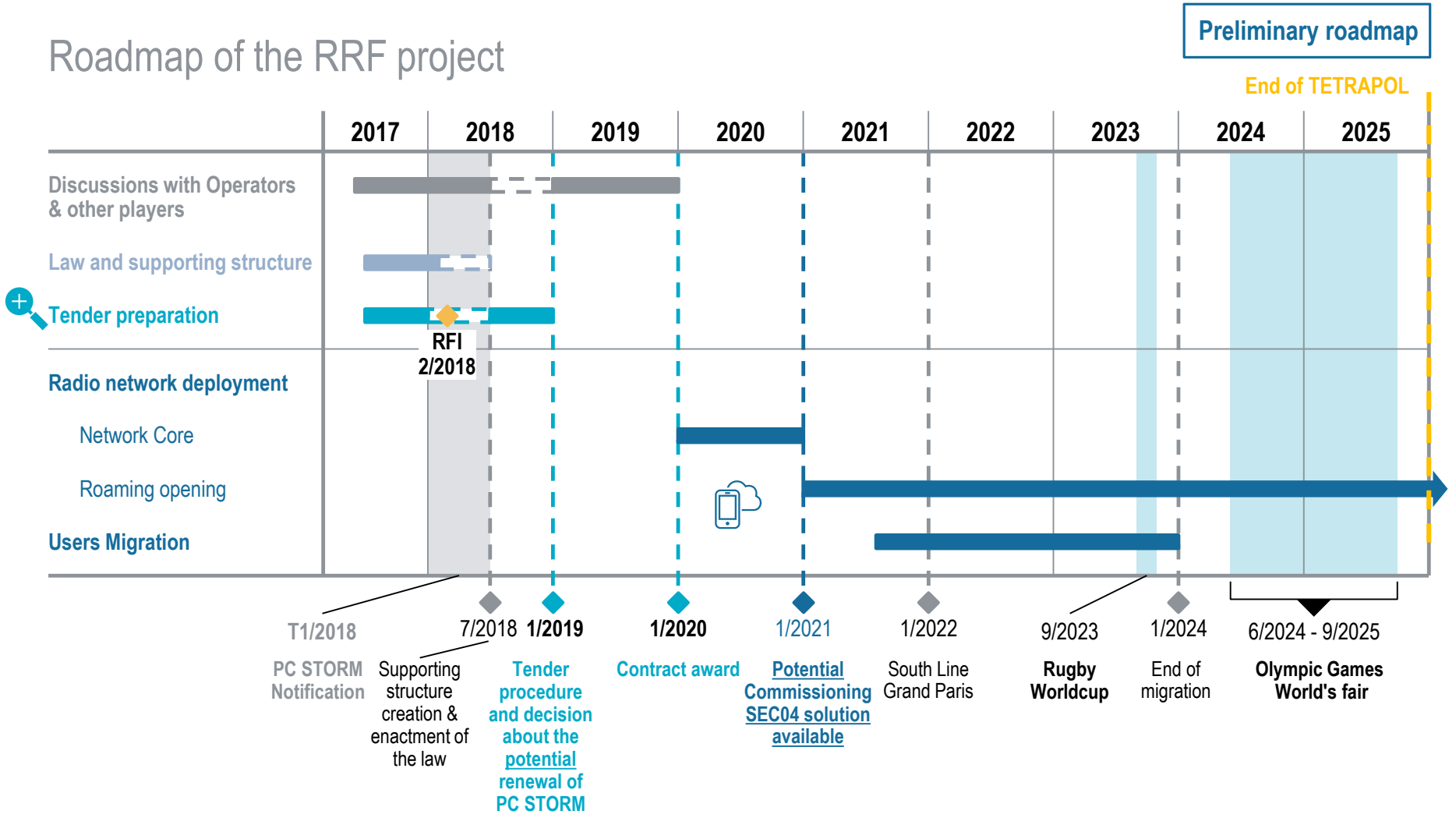
The global schedule of the RRF project plans a launch of tender offer procedure in early 2019 and an implementation in 2021

Roadmap of the RRF project



Note : RRF will be cautious not to interfere with the PC STORM notification scheduled for Q1 2018 with the launch of its RFI procedure (planned afterwards)

Source : Mission de préfiguration RRF, Wavestone, Roland Berger

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In addition to technical topics, 3 main work axes were identified as essential to build future French PPDR broadband target organization

Main axes to build RRF target organization

1. RRF project governance and legal structure creation

Objectives

> Define the organization essential principles
> Validate / complete the principles retained to define the core structure role

Key output

> **Legal creation** of a core supporting structure ("EPA") **scheduled** for the **beginning of 2018**

2. RRF overall organization and missions

> Allocate various tasks and missions across the complete organization between the Core Structure, the other MoI services and the Users
> Evaluate resources needed to carry out efficiently all the RRF missions and tasks

> Move **from several networks to a unified one** comprising **Firefighters**, **Police** and **Gendarmerie**
> **Definition** of the **organization missions** and **FTE[2] needs**, **involving** many **Ministry of Interior services** in the decision process

3. RRF target model and financials

> Measure the financial impact of dedicated and operated approaches
> Build a financial model to assess Capex and Opex

> **Construction** of a **financial model** to assess the **project vs. statu quo** over coming years

1) Etablissement à Caractère Administratif 2) Full-time equivalent

Source: RRF prefiguration mission, Wavestone, Roland Berger

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Four key issues still need to be resolved: working with operators, securing spectrum, control rooms and air-ground-air communications

Main issues remaining for Broadband PPDR

1. Working with Operators

- > **Commercial operators** have significant **challenges** to enter the critical communications market
- > **Additional needs** must be taken into account in a **sustainable** way
- > **Financial aspects** and **business optimization** need to be carefully studied

2. Securing Radio Resources

- > **LTE bands** are sold without constraints to commercial operators, leaving **public safety** with **limited spectrum resources**: 2x3 MHz in band 28 and 2x5 MHz in band 68
- > Considering **usage constraints** on these bands, **new strategies need to be defined for tactical networks** (e.g. Spectrum rental to MNOs with financial compensation)

3. Control Rooms

- > **Broadband** critical communications services need to be **available in control rooms**
- > **Simultaneous access** to **multimedia group communications** can be implemented through standards developed in 3GPP providing a minimum service
- > Critical communications should be envisioned as a whole information system able to **automatically use communications applications**

4. Air-Ground-Air Communications

- > Considering **financial constraints** and **communication technologies' constant evolution** French Ministry of Interior will **preferably purchase services** for transport as for terrestrial network

Source: RRF prefiguration mission, Wavestone, Roland Berger

RRF

QUESTIONS

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