

# Security in Open RAN

Silke Holtmanns, 24. May 2023



# What is Open RAN / O-RAN?

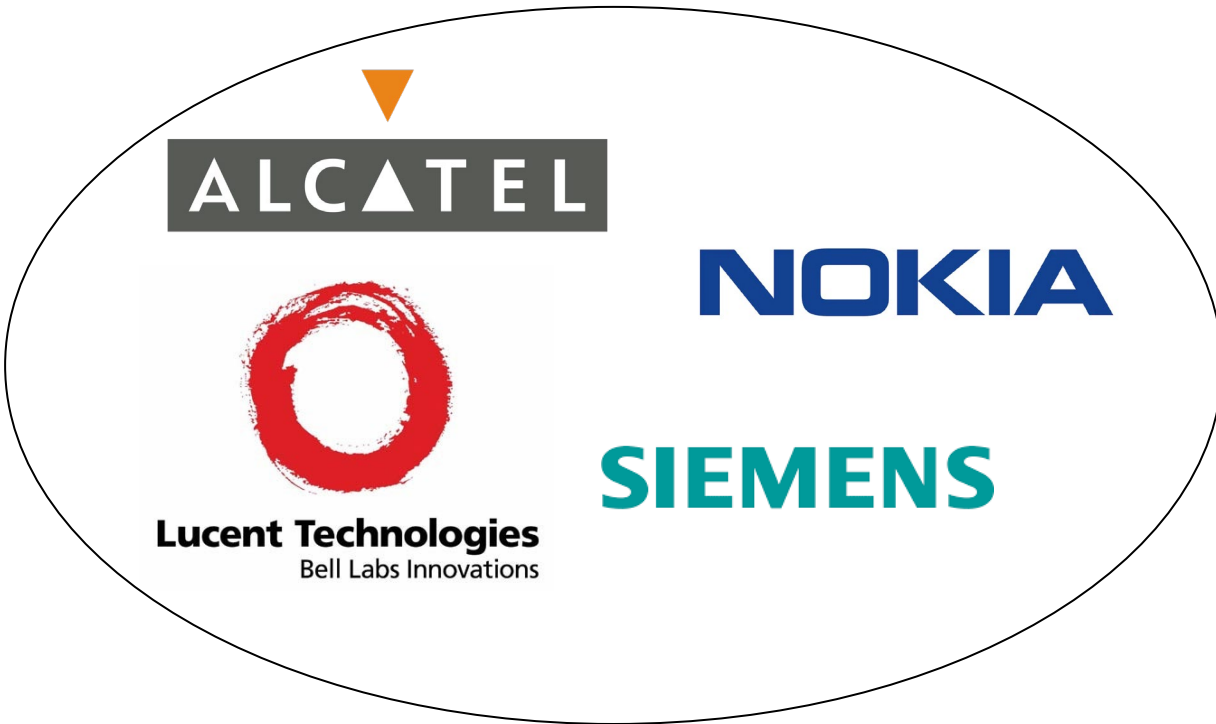


Highly integrated base station "black box" from single vendor



Modular "chunked" base station from many vendors that "fit the purpose"

# Why Open RAN exist? – Market Concentration





# Why Open RAN exist? – Political Concerns

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## Is China's Huawei a Threat to U.S. National Security?

The Chinese telecommunications company faces accusations that Beijing could use its 5G infrastructure for espionage. The outcome of the struggle could shape



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## German government reportedly looks to ban Huawei and ZTE kit

Written by Andrew Wooden | 07 March 2023 @ 12:11



martin tripp associates EXECUTIVE SEARCH

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## THE REAL COST OF REMOVING HUAWEI FROM THE UK 5G ROLL-OUT

Last week the government took the decision to ban Huawei from the UK's 5G network. Whatever the reasons for the decision, no real attempt has been made to count the cost of this move.


We should stress that none of what follows is an argument for the inclusion of Huawei in the 5G network. There are any number of issues around that, from security to ethics. This is just a short attempt to delineate some of the potential economic consequences of the decision to first include, and then exclude, the company from the UK's mobile infrastructure.

We think there are four principal ways of accounting for the economic impact.

- The actual cost of removing and replacing Huawei kit from both existing and future networks.
- The cost to the UK digital economy of an estimated three year delay in roll-out of 5G.
- The likely cost of an out-and-out retaliatory trade war such as China is likely to see.
- The costs to the UK's economy of a weak position in future trade negotiations.

**\$ 3.5bn**

The first of these is not too significant. The government estimates the removal of Huawei will cost £7bn. The Economist, citing Strand Consult, estimates that it would cost about \$3.5bn, or around \$7 per user of mobile networks: not so bad. This is the only cost the government has so far acknowledged, but there are far greater



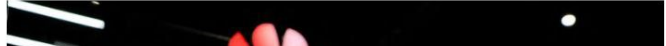
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## Telecom Huawei, ZTE Face German 5G Ban Over 'China Backdoor' Fears

March 7, 2023

The ban could include components already built into the networks, requiring operators to remove and replace them




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**ARGUMENT** An expert's point of view on a current event.

## China Isn't the Only Problem With 5G

The network has plenty of other security weaknesses, including ones the United States doesn't want to fix since they help its own surveillance efforts.

By Bruce Schneier, a security technologist and lecturer at the Harvard Kennedy School.



# Why Open RAN exist? – The Technical Side

5G is designed for businesses with many different requirement on:

- Latency
- Amount of devices
- Bandwidth
- Usage patterns
- Mobility patterns
- Different kind of RAN behaviour needed

Intention to create an ecosystem (including RAN apps using AI/ML) that offers for each use case the right solution



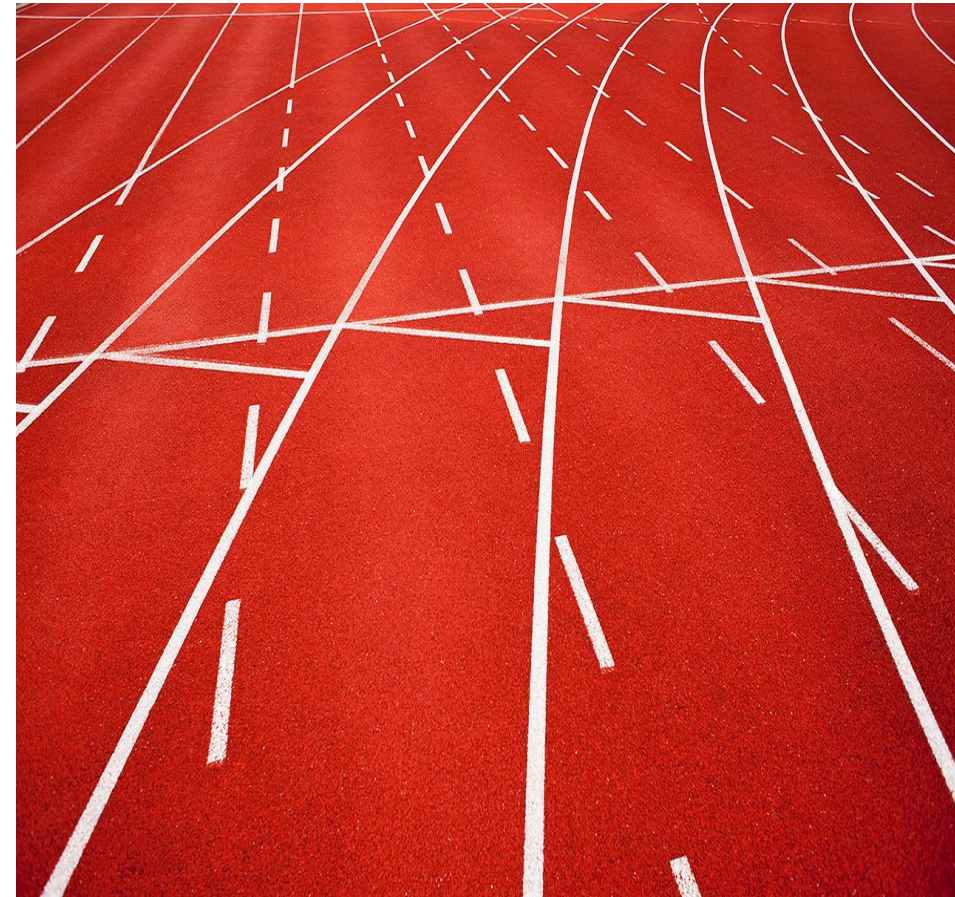


# O-RAN Development under Time Pressure – Fast & Furious

EU member states closed **2018 with 138 trials of 5G networks in 35 cities.**

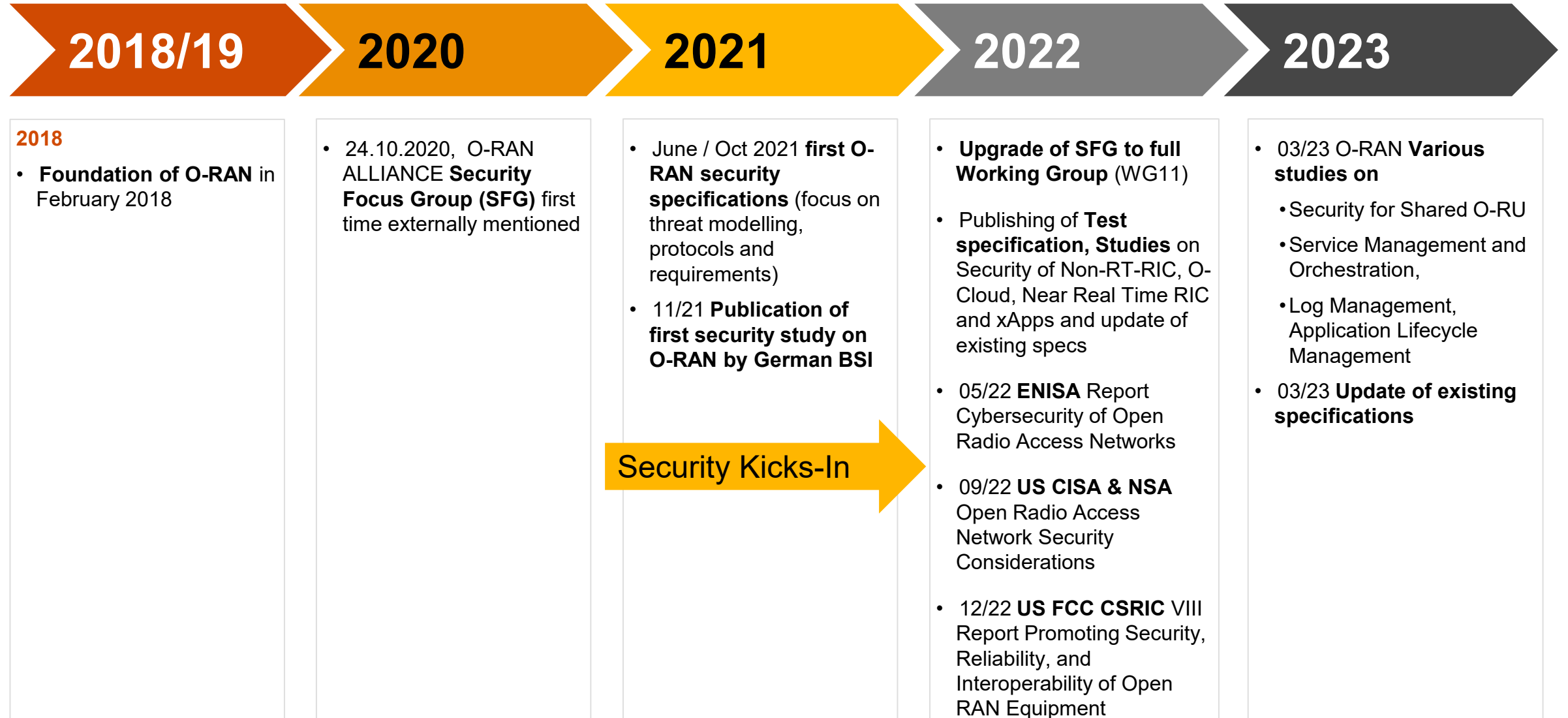
Finnish operator **Elisa Oy launched commercial 5G network in 2018.**

**Further deployments in 2019 and 2020** from operators including the U.K.'s Vodafone Group PLC, BT Group-owned EE, France's Orange SA, Germany's Deutsche Telekom AG in 2019 ahead of full commercial service in 2020.



Source: <https://www.spglobal.com/marketintelligence/en/news-insights/trending/ZiQiFaN9Tnr7Dwf6pQmTw2>

# History of O-RAN Security



# Status of the Specifications

## What is there (normative):

- Security Requirements
- Threat Modelling and Remediation
- Security Protocols
- Test Specifications

## What is there (study of the issue):

- O-Cloud Security
- Security of Log Management
- Security for Service Management and Orchestration (SMO)
- Security for Application Lifecycle Management
- Security for Shared Open Radio Unit (O-RU)
- Security for Near Real Time RAN Intelligent Controller (Near RT RIC) and xApps
- Security for Non Real Time RAN Intelligent Controller (Non RT RIC)





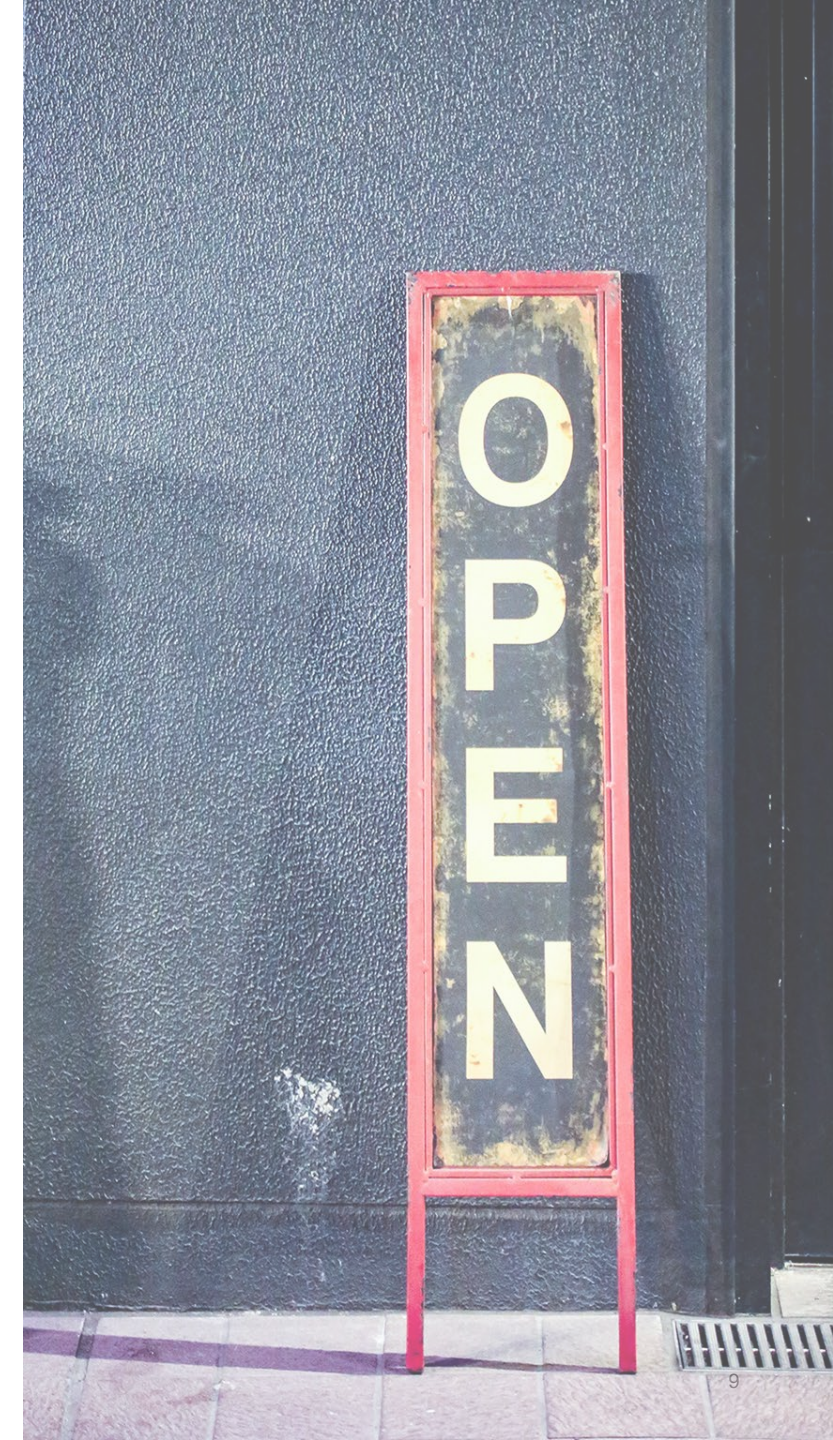
# Open Issues (beside Interoperability)

## Issues without detailed solutions:

- Studies are issues and high level requirement e.g.,
  - “Control-10: Integrity Protection for Data at Rest” -> but no details on how
- Details controls for security for:
  - O-Cloud
  - Log Management
  - Service Management and Orchestration (SMO)
  - Application Lifecycle Management
  - Shared O-RU (Open RAN Radio Unit)
  - Near Real Time RAN Intelligent Controller (RIC) and xApps
  - Non Real Time RAN Intelligent Controller (RIC)

## Not yet touched:

- **Application layer filtering** for messages e.g., from xApps/rApps or between core and RAN
- Usage of **secure hardware** for cloud and O-RAN security e.g., secure updates
- **Software Bill of Material (SBOM)** guidelines for O-RAN
- **Secure Ecosystem Management** for trusted xApps/rApps
- **OAuth Authorization** Details





# Work to be done

# Thank you

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