INDIGENOUS 5G IN INDIA: ON A NON-ALIGNED TECHNOLOGICAL TRAJECTORY?

Internet Research Task Force, RG Human Rights Protocol Considerations

Maxigas, critical infrastructure lab, 2025-03-21

MAXIGAS

"How infrastructural ideologies turn into digital materialities?"

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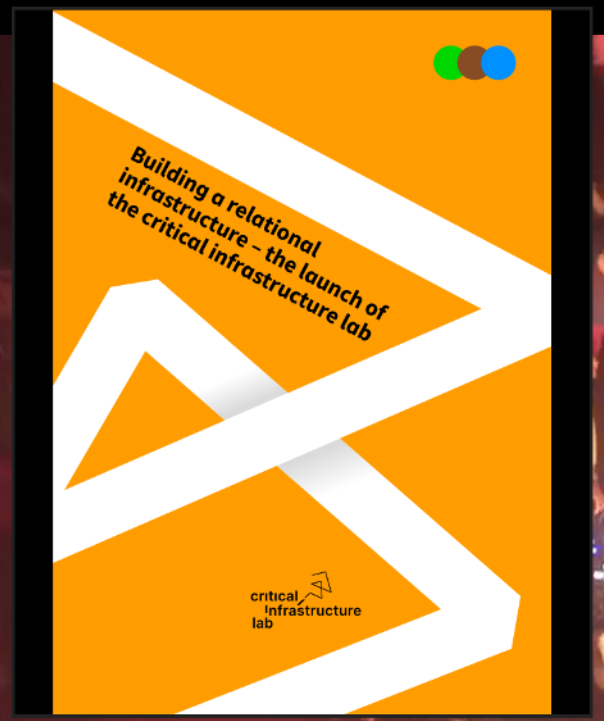
Co-PI critical infrastructure lab
Lead of the track on industrial standards
https://criticalinfralab.net/

Johan Söderberg and Maxigas. 2022. ***Resistance to the Current: The Dialectics of Hacking***. Foreword by Richard Barbrook. Information Policy series. Cambridge, MA: MIT Press. https://mitpress.mit.edu/books/resistance-current


2023
Q3
Q4
social innovations
2024
Q1
Q2
Q3
Q4
2025
Q1
Q2
Q3
Q4
Fall
ISM project Kalkeman
US Rejoins UNESCO
digital safe spaces
Spring
2024-06-06/09 EUROPEAN PARLIAMENT ELECTIONS
US PRESIDENTIAL ELECTIONS
dutch design week intervention
GDPR update proposal
AI ACT GETS ADOPTED
ELECTIONS IN POLAND
Dutch election
Work on the collective brain
Green Screen catalyst fund
COP
Chaos Communication Camp
4S ANNUAL MEETING
OPEN FUTURE FELLOWSHIP CALL
END project
DEBCONF (DEBIAN CONFERENCE) @INDIA
Successfully wrap up Project W
End of PhD Beginning of a new chapter
Explore more new experiences.
AI ACT
+1.0 C°
50 gigatonnes
8
1.601
1
+1.25 C°
53 gigatonnes
8.06
2.24
3
0.75
0.5
SURFACE TEMPERATURE RISE (C°)
CARBON EMISSIONS GLOBALLY (GT)
World population billion
5G mobile subscription billion
Private 5G network market million $
GLOBAL STORAGE CAPACITY zettabytes
PROJECTED LITHIUM DEMAND (BAU) thousand gigawatt-hours
STAPLES


Dr. Corinne Cath
critical Infrastructure lab


Building a relational infrastructure – the launch of the critical infrastructure lab
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Shifting terrain: "Standards, Protocols, Ecosystem" Report on a round-table discussion
Maxigas & Alek Tarkowski
OPEN FUTURE
critical Infrastructure lab


Network paradigms and infrastructural ideologies: Standards and protocols in a geopolitical context
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Workshop report October 6th 2023
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Down with Data Centres: Developing Critical Policy
Fieke Jansen & Corinne Cath
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Towards a Dutch Approach to Standard-Setting
by Niels ten Oever, Fieke Jansen and Maxigas
critical Infrastructure lab


critical Infrastructure lab
we research power and contest
transnational media infrastru
the critical infrastructure l
to create space to co-develop
alternative infrastructural f
that center people and planet
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and developing actionable pol

INDIGENOUS 5G IN INDIA

THEORETICAL FRAMEWORK: INFRASTRUCTURAL IDEOLOGY

The co-production of political subjects and technological sovereignty:

- in second, flexible, liquid modernity;
- through media and control infrastructures;
- which structure space & time;
- to distribute power.

→ Subjects are produced by infrastructural effects depending on a symbolic order and material configurations that serve partial interests.

TECHNOLOGICAL SOVEREIGNTY

Megatrends driving technological sovereignty as industrial policy:

- digitalisation;
- decarbonisation;
- deglobalisation.

→ “Indigenous 5G” is proposed in this context.

WHY 5G?

The network paradigm after Internet and cellular:

- Geopolitical fetish (cf. Sputnik / moon landing)
- Convergence of internetworking and telecommunications
- Programmable infrastructures (cf. end-to-end)

→ *Protocological control reconfiguring power relations.*

ANALYTICAL FRAMEWORK

Standardisation	ITU, 3GPP	Release-16, …	→standard
Implementation	Huawei, Ericsson, Telecom Infra Project	OpenRAN, Open5GS, …	→products
Deployment	AT&T, KPN, Jio, …	Bijlmer ArenA, Nehru Place, …	→sites

INDIAN CONTEXT

- 2nd largest market (scale)
- Industrialist families (structure)
- Make in India (ambition)

- “Battles of telecoms”
- Market consolidation
- Government participation

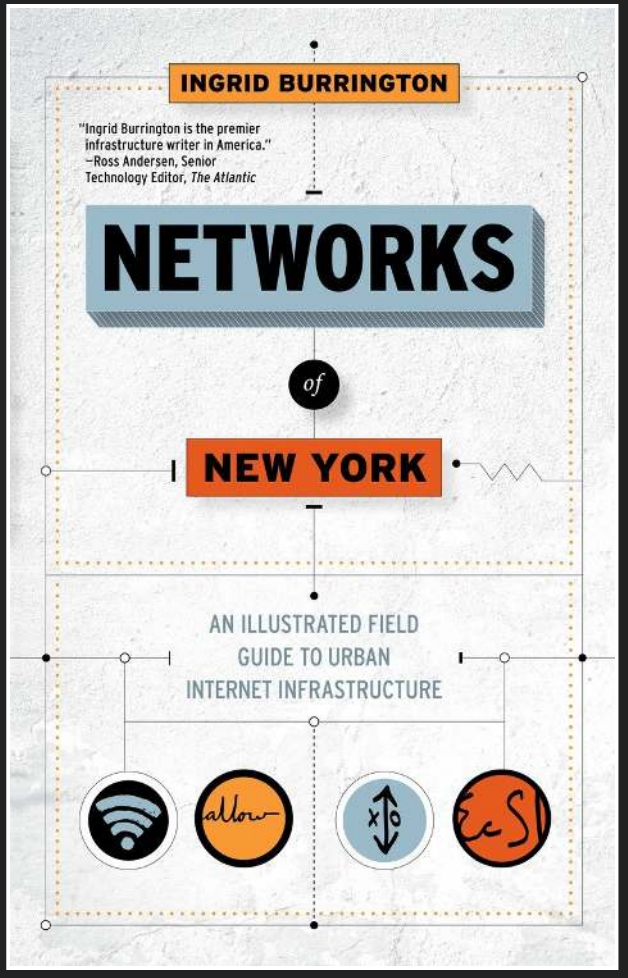
→ *Ethno-nationalist state shapes markets and supply chains.*

FIELDWORK METHODOLOGY

Infrastructure walk

- Psycho-geography
- Visual observation
- Measurements
- Desktop research
- Public engagement

"…not a substitute for
class struggle
but a tool
for class struggle."
— Steward Holme



FIELDWORK AGENDA

What is the technological substance of indigenous 5G networks? How one 5G differs from another? How 5G can serve the public interest better?

Activities:

- Industry press
- Infrastructure walks
- Trade fair

Stakeholders:

- Digital rights activists
- Community networkers
- Journalists & consultants
- Policy makers & regulators
- Standards bodies officials
- Academics running 5G labs
- Tower installation workers
- Managers of firms & startups
- Software developers
- Hardware designers


Canon
COST TO COST
13, DEEPAK BLDG.
Indian Overseas Bank
logitech
CP PLUS
LAPTOP REPAIR

anchar.gov.in/EMFPortal/SiteFinder/SiteFinder

tarang sanchar

हिंदी में

This Site is EMF Compliant

Mtnl - 2G, 3G

MADHUBAN BLDG,NEHRU PLACE SHOPPING COMPLEX Delhi 110019, India

0

Additional Information?

1. Site is certified by all tenant Telecom Service Providers
2. DoT field unit (LSA) conducts test / measurements for the esites in the LSA on Sample Basis

Ground based | Roof top | Wall Mounted

Keyboard shortcuts Image may b


IMC24
H4
Ground Floor
KEEP YOUR BADGE READY FOR
SCANNING
Exhibition Hall
Rest Room
Staircase
Drinking Water
IMC 24
EMPOWERING INDIA'S TECH REVOLUTION
REGISTRATION
First Floor

Comprehensive Portfolio of Radios for Coverage & Capacity

TEJAS NETWORKS

Single / Dual Band RU

DB 4T4R RRH
4G / 5G
4T4R / 2x2T2R
4x40W (160W)
FDD/TDD
Bands B/n : 1 / 3 / 5 / 8 / 28 / 40 / 41 / 1+28 / 3+28 / 5+28

SB 4T4R RU

SB 8T8R RU

OB 4T4R RU

Massive MIMO

PRELIMINARY FINDINGS: TECHNOLOGY ASSESSMENT

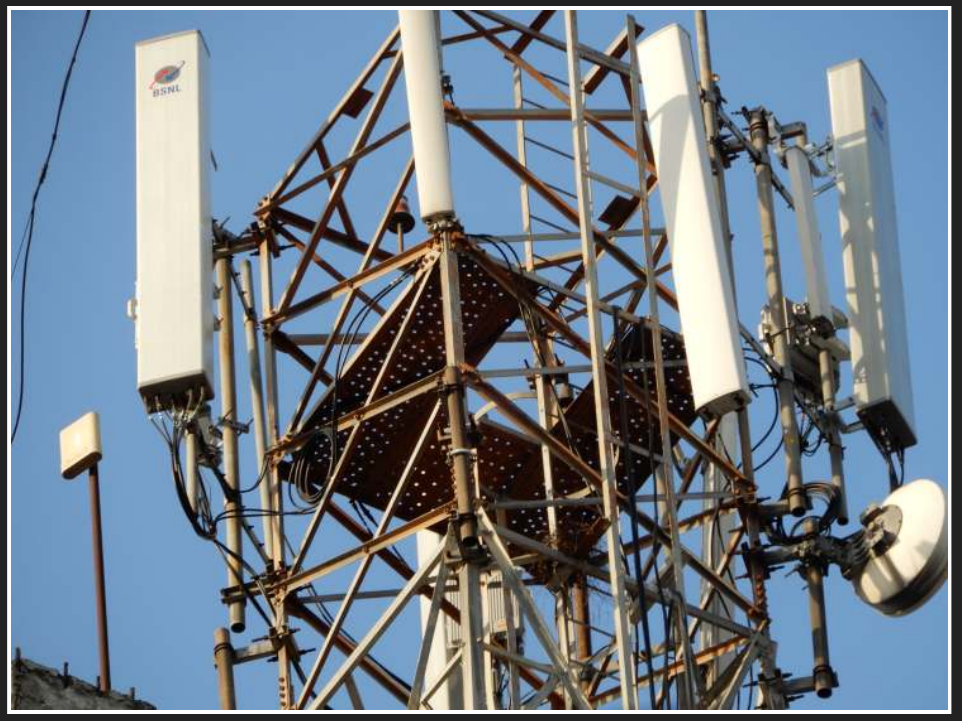
Indigenous 5G on a non-aligned technological trajectory:

- Strategy is to climb up the supply chain
- The ecosystem for indigenous 5G exists
- There is mandate but no real deployment

→ *Strategic window of opportunity for intervention!*

WHY NON-ALIGNED TECHNOLOGICAL TRAJECTORY?

“the national independence, sovereignty, territorial integrity and security of non-aligned countries [for] struggle against imperialism, colonialism, neo-colonialism, racism, and all forms of foreign aggression, occupation, domination, interference or hegemony as well as against great power and bloc politics.” (Castro, Havana Declaration, 1979)



Non-aligned antennas for public values in a majority world

POLICY INTERVENTION

Barriers of entry for community networks

- 2024: Government-owned telco receives mandate, equity and spectrum to deploy indigenous 5G over 70% of Indian service areas.
- ***How can the network be developed, configured and customised to better serve the public interest?***

→ Stakeholder engagement

- DOT: department of telecommunication
- TRAI: telecom regulatory authority
- TSDSI: telecom standards development organisation

- BSNL: telecommunications service provider
- TCS: systems integrator and operator
- Tejas: antenna (radio unit) supplier
- Potential 5G core/RAN suppliers:
  - TCS: consulting company
  - C-DOT: telecom research centre
  - IOS-MCN: open source initiative

- DEF: community networks NGO
- CES: digital rights activist network
- SFLC: digital rights organisation

OPPORTUNITIES / POSSIBILITIES

Indigenous 5G on a non-aligned technological trajectory:

- Infrastructure sharing could enable smaller actors
- Community networks could manage slices on public networks
- Implementation/deployment could be aligned with public values

→ *Strategic window of opportunity for intervention!*

RISKS / LIMITATIONS

Indigenous 5G on a non-aligned technological trajectory:

- Indian implementation of Chinese-dominated 5G standards
- Slices could be used for more precise information control
- Limited interest in public benefits from vendors & policy makers

→ *Strategic window of opportunity for intervention!*

SCENARIO: INTERNET SHUTDOWN WITH 5G

- India has been leading in the frequency of internet shutdowns
- Ethno-nationalist agenda justifies repression
- 5G enables more (government) control over network

SCENARIO: INTERNET SHUTDOWN WITH 5G

- Dedicated slice for government and ecommerce
- Application-layer exposure of positioning from beam forming (CAMARA)
- Radio access network as a sensor array for urban radar

SCENARIO: COMMUNITY NETWORKS ON 5G

- Appropriate technology movement a local precedent
- India has a thriving community network scene
- 5G enables more (civil society) control over network

SCENARIO: COMMUNITY NETWORKS ON 5G

- Carrier-grade FLOSS solutions for “open” RAN (IOS-MCN)
- Rotate eSIM cards and/or other identifiers (PGPP/Invisiv)
- Network slicing enables VPN and mix network-like functions

CONCLUSION

RESEARCH DESIGN

"How infrastructural ideologies turn into digital materialities?"

- **Research object:**
  - 5G networks developed for technological sovereignty
- **Theoretical framework:**
  - Infrastructural ideologies and network paradigms
- **Methodology**:
  - Infrastructure walk and ethnography of infrastructure
- **Empirical material**:
  - Indian telecom market and industrial ecosystem

→ Through a supply chain shaped by industrial policy.