ISOC Kazakhstan & KBTU

CENTRAL ASIA

INTERNET MEASUREMENT LAB

A proposed independent research laboratory at KBTU

Internet resilience • Routing security • Connectivity • Encryption

Partnership and funding concept | 2027–2029 | November 2026

Why Central Asia needs an independent measurement lab

Infrastructure is changing faster than our shared evidence base.

CONNECTIVITY

New terrestrial, submarine and LEO satellite paths are reshaping regional reachability.

SECURITY

Outages, route leaks, hijacks, DDoS and weak routing hygiene require objective measurement.

PUBLIC VALUE

Independent datasets support operators, regulators, universities and citizens.

Core proposition: measure first → publish reproducible evidence → recommend mitigations.

Mission, scope and operating principles

Five Central Asian countries; internationally comparable methods.

- Kazakhstan, Uzbekistan, Kyrgyzstan, Tajikistan and Turkmenistan
- Monitor connectivity, performance, resilience and routing security
- Build a neutral, reproducible regional Internet observatory
- Publish aggregate findings and practical recommendations
- Train researchers and students through real measurement campaigns

Principles: independence • consent • data minimization • responsible disclosure

Research portfolio: eight measurable workstreams

OUTAGES

Availability, duration, geographic scope

ROUTING

Latency, detours, peering and paths

BGP SECURITY

Leaks, hijacks, origin changes

RPKI

ROA coverage, invalid announcements

CYBERATTACKS

DDoS indicators and network effects

ENCRYPTION

TLS, DNS privacy and HTTPS posture

IPv6 & DNS

Adoption, resolution, reachability

NEW PATHS

Caspian fiber, Freedom, Starlink

Research architecture: from observations to action

Complementary active, passive and partner-provided data streams.

RIPE Atlas

Ping / traceroute / DNS

RIPE RIS + RPKI

BGP streams / ROAs

Partners + sensors

Operator data / opt-in

Ingestion & QA

Python / APIs / ETL

Analytics engine

Baselines / anomaly detection

Open dashboard

Maps / alerts / reports

Ethics, security controls, reproducibility and partner governance apply across the pipeline.

Outage and resilience observatory

Detect, validate and contextualize regional Internet disruptions.

- Baseline reachability from geographically and topologically diverse probes
- Correlate multi-vantage ping/traceroute with BGP withdrawal signals
- Separate access failures, destination failures and transit disruptions
- Measure onset, duration, recovery and affected networks
- Issue verified incident briefs—not automatic attribution

Output: Central Asia outage timeline + monthly resilience indicators

Routing inefficiency, route leaks and RPKI

Translate BGP visibility into operationally useful findings.

PATH EFFICIENCY

Compare RTT, AS paths and likely detours; verify geography before claiming traffic crosses borders.

ROUTE LEAKS

Identify anomalous propagation, unexpected AS paths and policy changes; corroborate before labeling.

RPKI & ROV

Track ROA coverage and BGP origin validity; separately test operator route-origin validation.

Outputs: routing health scorecards, operator workshops, RPKI deployment guidance.

Cyberattack measurement and strong encryption

Observe impact without intrusive testing or unsupported attribution.

DEFENSIVE ATTACK RESEARCH

DDoS-related availability anomalies; public attack telemetry; DNS abuse trends; correlation with routing events; coordinated disclosure.

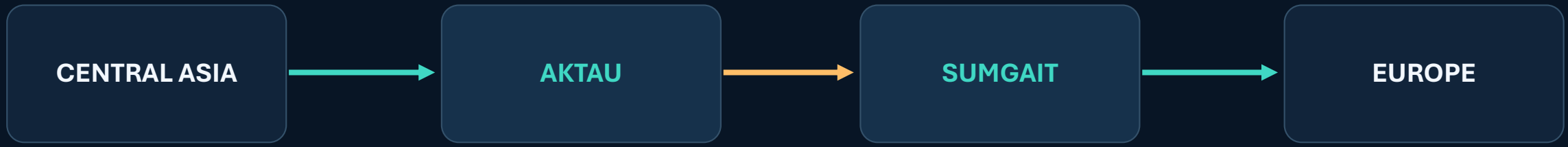
PROTECTION ADOPTION

HTTPS/TLS configuration; modern protocol adoption; DNSSEC; encrypted DNS where measurable; RPKI/ROV and MANRS practices.

Safety rule: passive / authorized measurements only; no offensive scans or exploitation.

Trans-Caspian fiber: a new corridor to measure

Officially launched 15 October 2026; 380 km between Kazakhstan and Azerbaijan.



Research hypothesis — not yet a measured outcome:

- Do paths and latency change after the new route enters service?
- Does path diversity improve during upstream disruptions?
- Which networks and destinations actually use the corridor?

Sources: Akorda, 15 Oct 2026

Freedom Telecom: a changing competitive topology

New backbone investment offers a natural experiment in domestic and regional routing.

VERIFIED DEVELOPMENT

Kazakhstan reported 2,341 km completed (58%) on Freedom Telecom's West–East backbone in mid-2026. Freedom describes expansion of telecom and cloud services.

LAB MEASUREMENT AGENDA

Compare intercity latency and path diversity; track ASN and peering changes; assess IPv6 and RPKI adoption; publish neutral operator comparisons.

Do not infer market share, completed coverage or performance gains without measured evidence.

Sources: Kazakhstan PM Aug 2026; Freedom Holding filing Jun 2026

Starlink and LEO satellite connectivity

A new access layer for remote communities and resilience research.

REGIONAL STATUS

Starlink officially launched in Kazakhstan in 2025; 2026 expansion includes Kyrgyzstan and Tajikistan.

EXPERIMENTS

With consenting hosts, compare satellite and terrestrial RTT, jitter, loss, IPv6, outages and failover.

QUESTIONS

Where does traffic exit? How stable are paths? Can LEO diversify connectivity during terrestrial faults?

Research must account for weather, congestion, terminal placement and changing gateway routes.

Sources: Interfax Aug 2025; ITU Sep 2026

Lab infrastructure and partnership model

Conceptual design: start lean, grow through distributed collaboration.

KBTU core

Research lead, server/storage, secure data pipeline, public dashboard

Distributed sensors

RIPE Atlas probes / anchors and consenting partner vantage points

Research stack

Python, time-series storage, BGP parsers, visualization, Git

External partners

RIPE NCC, operators, IXPs, CSIRTs, regional universities

Support requested: access to vantage points, anonymized telemetry, technical mentoring, equipment and research grants.

Three-year roadmap and measurable outputs

2027 foundation → 2028 regional scale → 2029 sustained impact

2027 | LAUNCH

Governance and ethics framework; first 5-country baselines; initial sensors; quarterly briefs.

2028 | EXPAND

More partner ASNs and vantage points; automated outage and BGP alerts; joint papers.

2029 | SUSTAIN

Open regional observatory; annual state-of-Internet report; operator training and grants.

KPIs: measurement coverage • reproducible datasets • validated incidents • publications • partner adoption

Partnership invitation and primary sources

Establish KBTU with cooperation of Kazakhstan Research and Education Network Association (KazRENA) as a neutral measurement partner for Central Asia.

NEXT STEPS

- Agree founding partners and scientific advisory group
- Secure initial probe hosts and data-sharing agreements
- Approve 2027 pilot workplan and seed funding
- Launch first regional baseline and public dashboard

VERIFIABLE SOURCES

1. Trans-Caspian launch — https://www.akorda.kz/en/kassym-jomart-tokayev-and-ilham-aliyev-participate-in-launch-of-trans-caspian-fiber-optic-line-1594542

2. Kazakhstan infrastructure update — https://primeminister.kz/en/news/government-implements-the-head-of-states-instructions-national-projects-deliver-results-in-key-sectors-31794

3. Freedom Holding filing — https://ir.freedomholdingcorp.com/quarterly-reports/content/0000924805-26-000047/frhc-20260630.htm

4. Starlink regional status (ITU) — https://www.itu.int/en/ITU-D/Regional-Presence/CIS/Pages/News/20260912.aspx

5. RIPE Atlas / RIS — https://www.ripe.net/analyse/internet-measurements/ripe-atlas/