Advance Quantum Networks (A-QNET) Kickoff

Cristián Peña
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A-QNET Vision

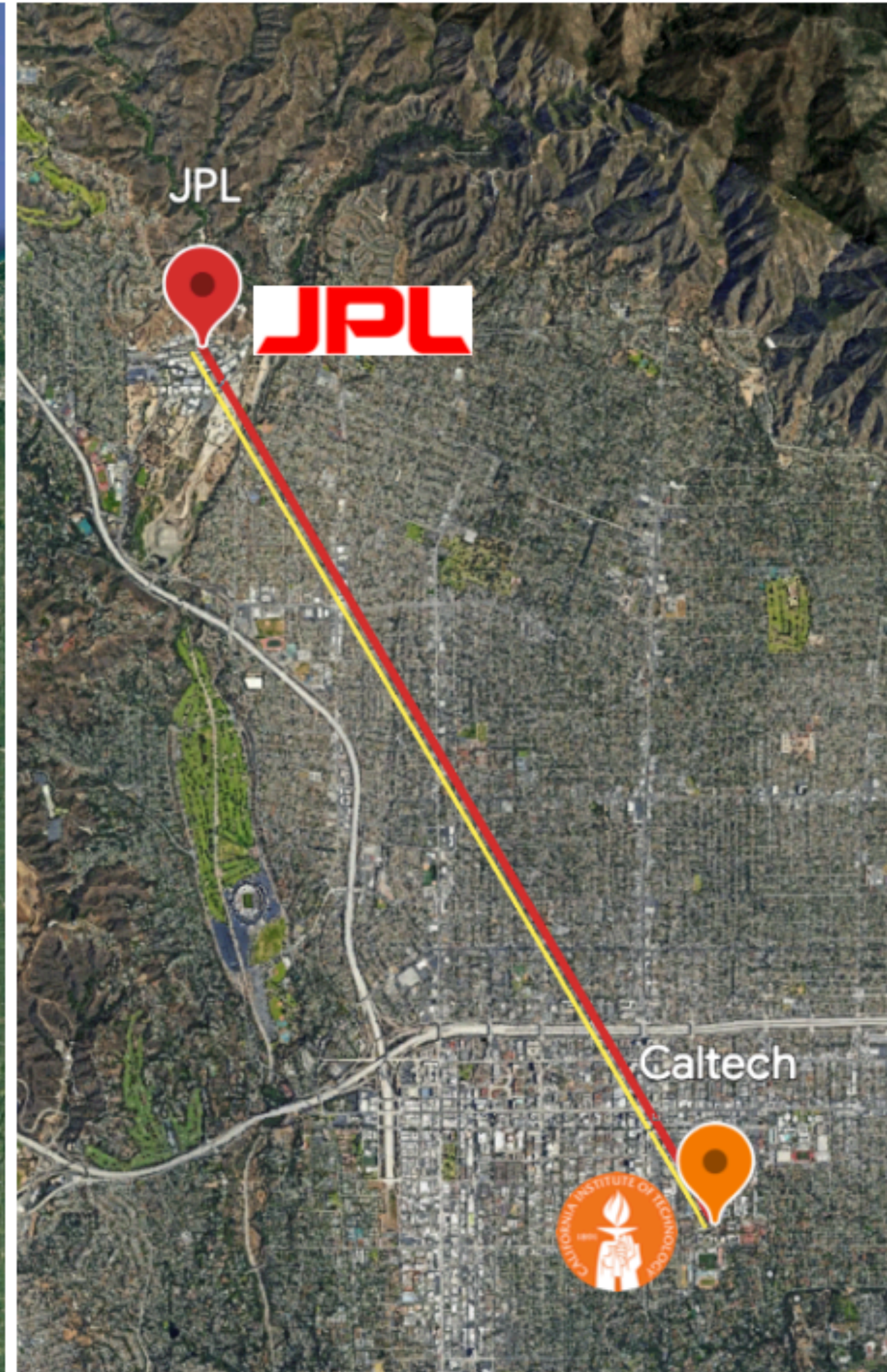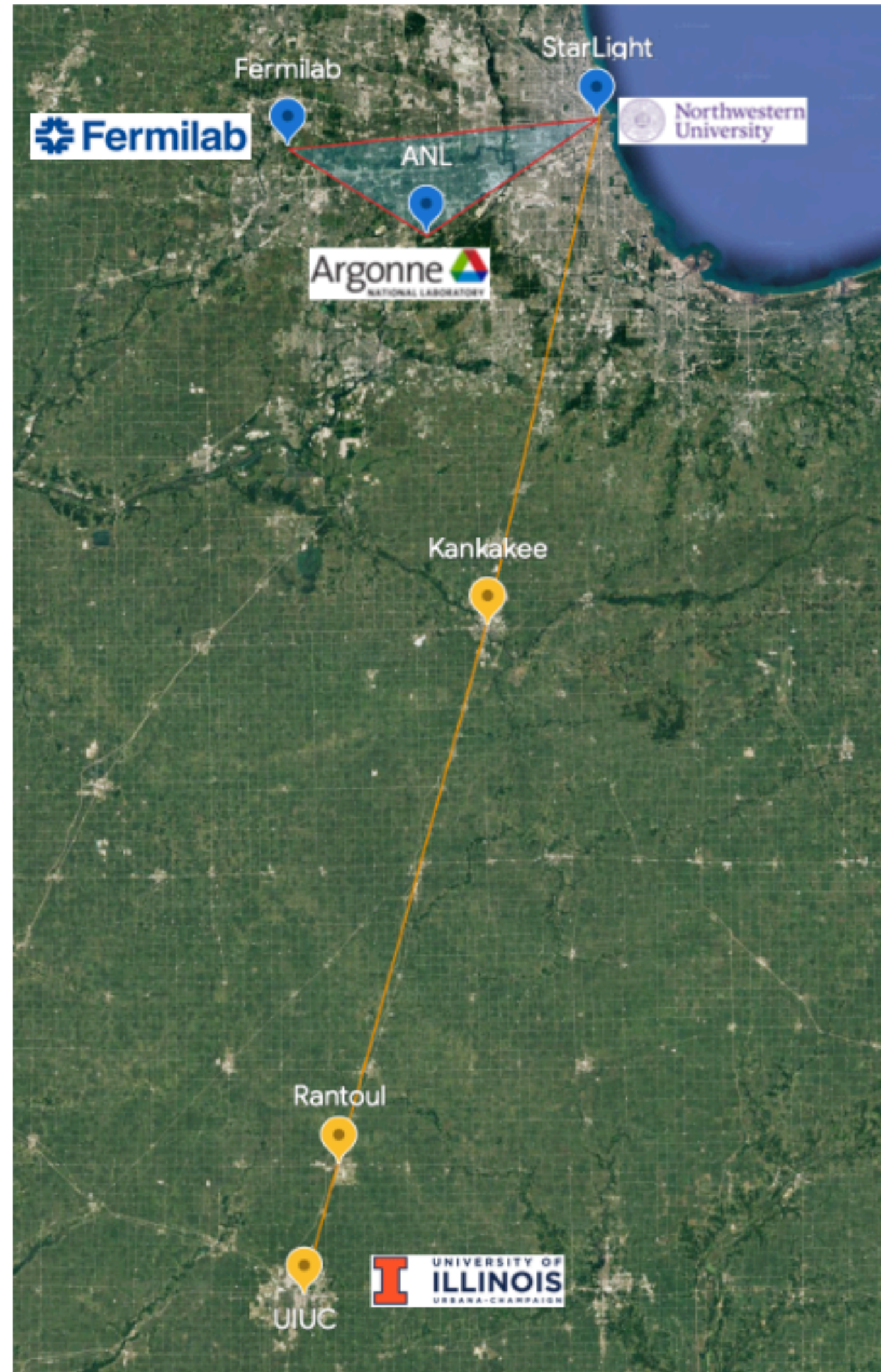- Building upon existing capabilities and infrastructure and increase QNode capabilities

- Hybrid free-space to fiber

- Long-range swapping (with coexitance)

- Protocols towards error correction: hyper entanglement and purifications

- Error mitigation and Controls (QICK)

- Transduction & Memories

- Theory & Simulation

- Adding the SoCal QNET

A-QNET Deliverables & Organization

Exciting, ambitious and large number of topics and deliverables

Topic/deliverable	Institutions
Ultra-low jitter SNSPD deployment	FNAL/Caltech/JPL
high-rate entanglement sources	FNAL/Caltech/JPL
QICK controls	FNAL
FNAL-ANL swapping	FNAL-ANL
Coexistence	Northwester/FNAL/Caltech
public quantum node	UIUC/FNAL

Topic/deliverable	Institutions
Hyper Entanglement & Memories	Caltech/UIUC
Error correction protocols & demos	UIUC/FNAL/Caltech
Hybrid free-space to fiber	UIUC/Caltech/JPL/FNAL
Transduction protocols and demo	FNAL/Caltech
Entanglement purification demo	UIUC/Caltech/FNAL

A-QNET Deliverables & Organization

Exciting, ambitious and large number of topics and deliverables

- To improve organization and provide ample time for technical discussions, we will create two "Topical Areas":

  - **Topical Area 1** (Si Xie): Ultra-low jitter SNSPD deployment, high-rate entanglement sources, QICK controls, FNAL-ANL swapping, coexistence, public quantum node

  - **Topical Area 2** (Raju Valivarthi): Hyper entanglement and memories, error correction protocols, entanglement purification demos, hybrid free-space to fiber demos, transduction protocols & demos

A-QNET Deliverables & Organization

- We will have bi-weekly meetings which will focus on one of the Topical Areas

- Topical Area 1 and Topical Area 2 will alternate. Effectively each topical area will meet once every 4 weeks

  - Each group is expected to present — **with slides** — the progress on each deliverable during the corresponding Topical Area meeting

- Slides will be posted on INDICO: to help us maintain a record and history of our progress. Requested by the PM

A-QNET Deliverables & Organization

In person kickoff & General Meeting

- Current proposal: in person kickoff at Fermilab: Week of December 11.

  - One day event with visits to Fermilab facilities and in-depth discussion about the project. Cristian will organize.

    - Need to know your availability ASAP

- Additionally, every 2 months we will have a general meeting. Overview of project status with the whole team.