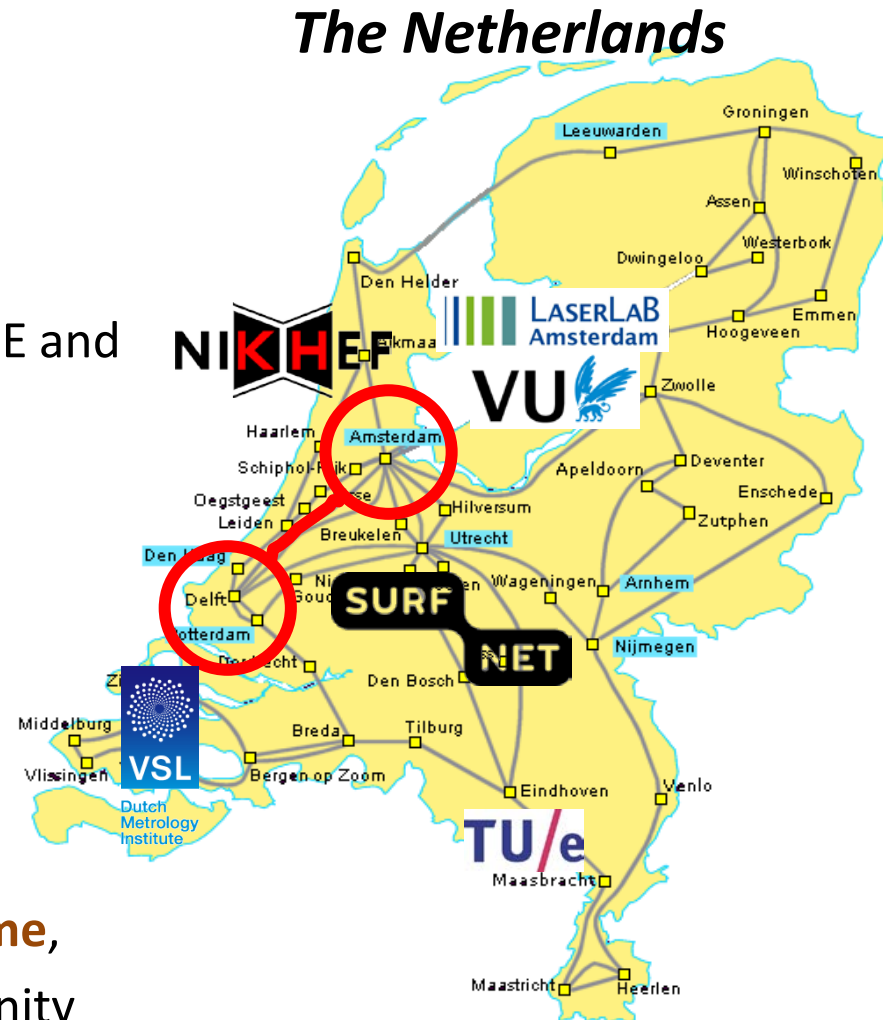


Netherlands: 120 km installed fiber link

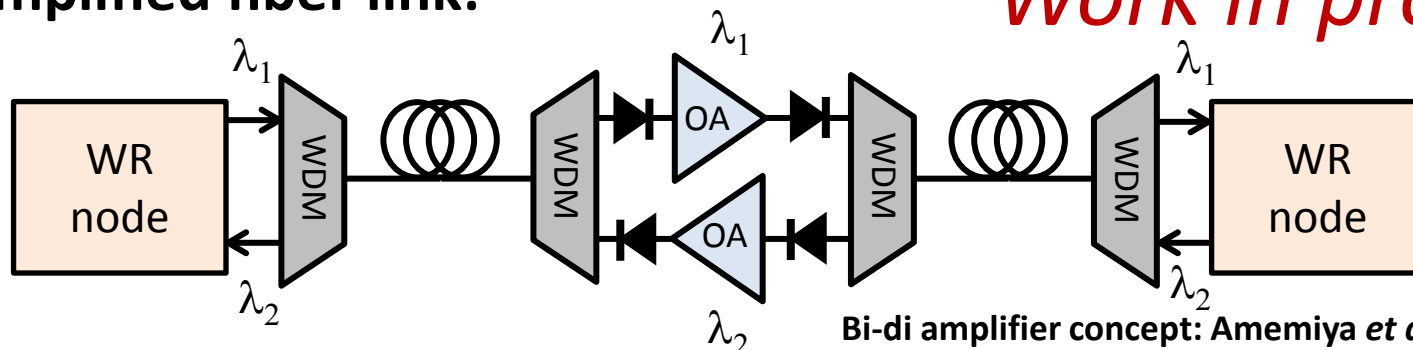
- Collaboration* **VU University/SURFnet/ VSL Delft/TU Eindhoven/ NIKHEF**
- Field trial: long-haul T&F transfer using WRE and bi-di amplifiers through SURFnet network
- Transfer Cs clock signals from **VSL Delft** to **Amsterdam** (120 km)
- Provide optical traceability to SI units of **time**, **frequency** and **length** to academic community



Netherlands: 120 km installed fiber link (2)

- Aim: use WR equipment for long-haul dissemination of Cs clock signals:
 - **Time:** UTC(VSL) accuracy < 0.1 ns
 - **Frequency:** unit Hz 13-14 digits relative accuracy
- Application: optical frequency measurements of atoms and molecules for **tests of fundamental physics**, and searches for **'new physics'** (time-varying fundamental constants etc.)

Amplified fiber link:



Work in progress...

Bi-di amplifier concept: Amemiya *et al.*, IEEE FCSE (2005)