



# ITU Interactive Transmission Maps

**ITU-EC Regional Conference for Europe  
Broadband Services and Infrastructure Mapping  
11-12 April 2016**

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# Regional Initiative: Development of Broadband Access and Adoption

- **Objective:** Due to significant differences in European countries, there is an urgent need to take steps and assist administrations in every aspect of the practical implementation and development of high-speed networks.
- **Expected results:** Assistance to the countries in need
  1. Creation of new legislative paradigms fostering broadband development, including cost-effective solutions for remote and rural areas and models for infrastructure-sharing including applications of smart grids
  2. Establishment of national and local/regional broadband roll-out plans and monitoring of the implementation and elaboration of relevant cross-sectoral policies and strategies, including setting up national coordination mechanisms
  3. Development of plans for broadband infrastructure roll-out, including in remote and rural areas
  4. **Mapping of broadband infrastructure across the region**
  5. **Monitoring of the quality of services and consumer protection**



# Regional Initiative: Development of Broadband Access and Adoption

- Continued development of ITU Interactive **Transmission Map**
- **Case Studies**: Portugal: New Legislative Paradigms Fostering Broadband Development (Presented at INFOFEST) / Case Study on Montenegro: Implementation of National IXP
- Review of **Broadband Plans** and Strategies in SEE
- **Regional meetings** at INFOFEST 2015
  - International Regulatory Conference on Broadband, Montenegro
  - Workshop on IXP, Montenegro
- Regional Workshop for Europe "New issues in QoS measuring and monitoring", Nov 2015, Bologna, Italy (More than 10 countries presented the national case studies / Capacity of more than 50 participants / Review of ITU Quality of Service Training Programme
- Contribution to the **Steering Committee and Technical Review Panel** of the European Monitoring Platform for Mapping of QoS and QoE
- ITU-EC **Regional Conference** on Mapping Broadband Infrastructure and Service, Warsaw, Republic of Poland (In partnership with UKE, Poland)
- **Twinings**: Albania-Slovenia: Assistance to Albania in preparation of Tender Documentation for Broadband Infrastructure Map
- Regional meetings at INFOFEST 2016: International Regulatory Conference, Montenegro / Capacity building workshop on IXP
- Trainings by **Centres of Excellence under ITU Academy**
  - 5 Trainings in 2016
  - ITU Quality of Service Training Programme



# ITU Interactive Transmission Maps

ITU Interactive Transmission Map  
TIES version



Welcome to the ITU Interactive Transmission Map. Select map layers below and navigate using the icons in the map window.

For help using this application please refer to the Sources & Help section below.

Alternatively, visit the [Public 2D version of the Map](#) or the public [Google Earth - 3D version](#)

#### Base Layer

- UN Map
- Natural Earth
- Population Density

#### Overlays

- Range to Nodes
- Asian Highway
- Trans-Asian Railway
- Validation Status

#### Legend

#### Validation and Feedback

#### Sources & Help

#### Legal Notice and Copyright

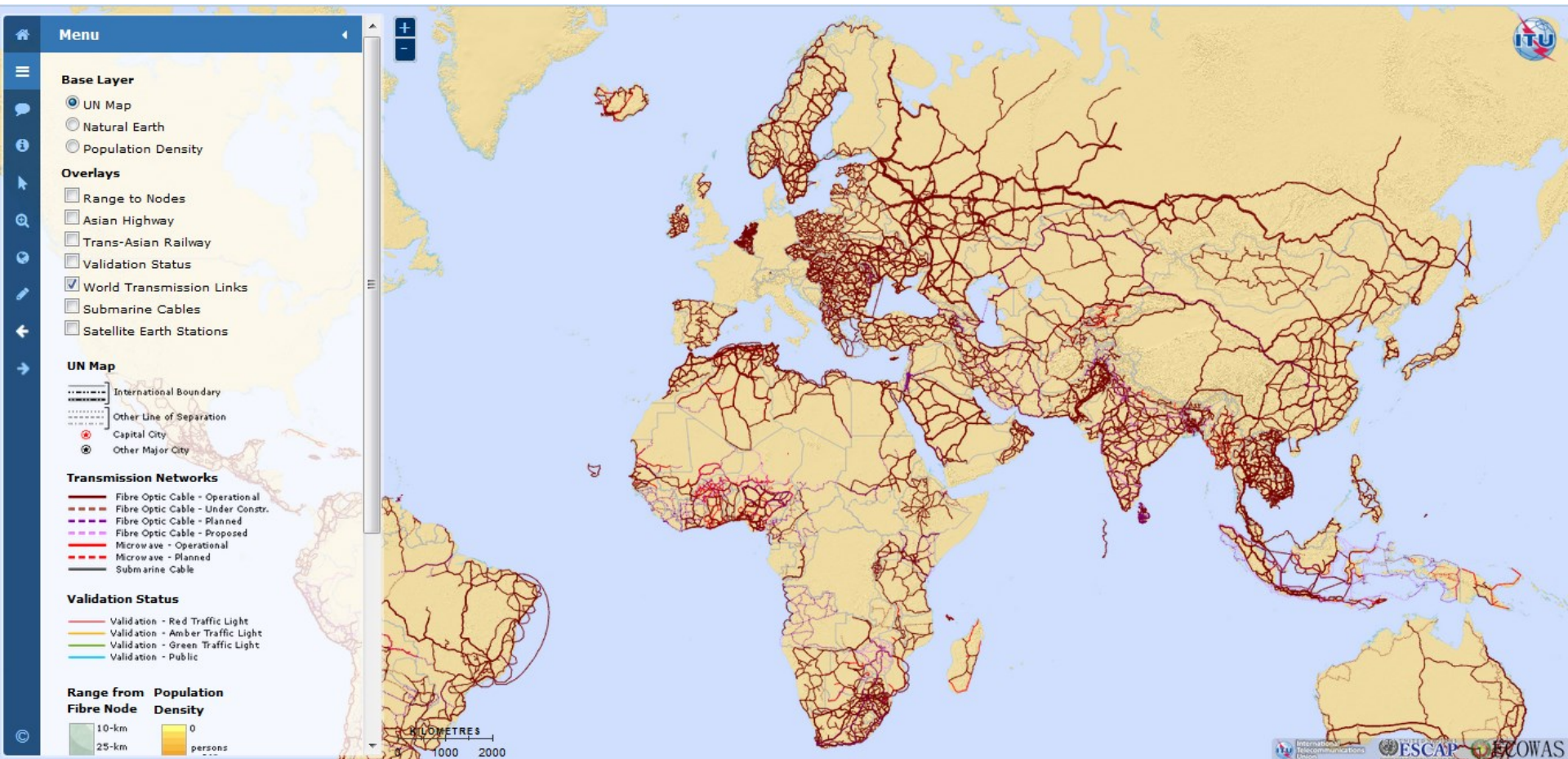


**UNCS Disclaimer:** The designations employed and the presentation of material on this map do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted line represents approximately the Line of Control in Jammu and Kashmir agreed upon by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. Final boundary between the Republic of Sudan and the Republic of South Sudan has not yet been determined. Final status of the Abyei area is not yet determined. A dispute exists between the Governments of Argentina and the United Kingdom of Great Britain and Northern Ireland concerning sovereignty over the Falkland Islands (Malvinas).

**NOTES:** [Data Sources](#) The base map for this infographic is based on the United Database of the United Nations Cartographic Section. The UNDB is prepared at a scale of 1:1,000,000. UNDB is being updated on a continuous basis. [Transmission Map Data](#) The data for building the infographic have been collected through primary sources. Reply to an official request for information (RFI) documents the best effort to all regions covering the purpose of the project for operators, indicating what level of detail is required, and what format the data is to be submitted. Secondary sources: On average, around 28 to 40% of the data was readily available in the public domain, from operator websites, annual reports, company presentations, and presentations at industry conferences. Partnership: A number of organizations do already research and produce transmission network maps for particular countries or regions, for various technical reasons. Whenever possible, partnerships with these organizations were established, to seek permission to display their network maps work through the ITU world transmission map. The collection of data as well as their validation from concerned Operators/Administrations is currently a work in progress. The source for the Asian Highway and Trans-Asian Railway networks is the ESCAP Secretariat. [Submarine Cables](#) Data concerning submarine cables are provided by Teledatography. The data for submarine cables displayed in this map are dated 11 March 2015 and it will be constantly updated with new data available at Teledatography's ODPLE account (<https://ostlab.com/teledatography/omni-submarinecables.com/>). For more information: <http://www.submarinecables.com>



# ITU Interactive Transmission Maps 2.0





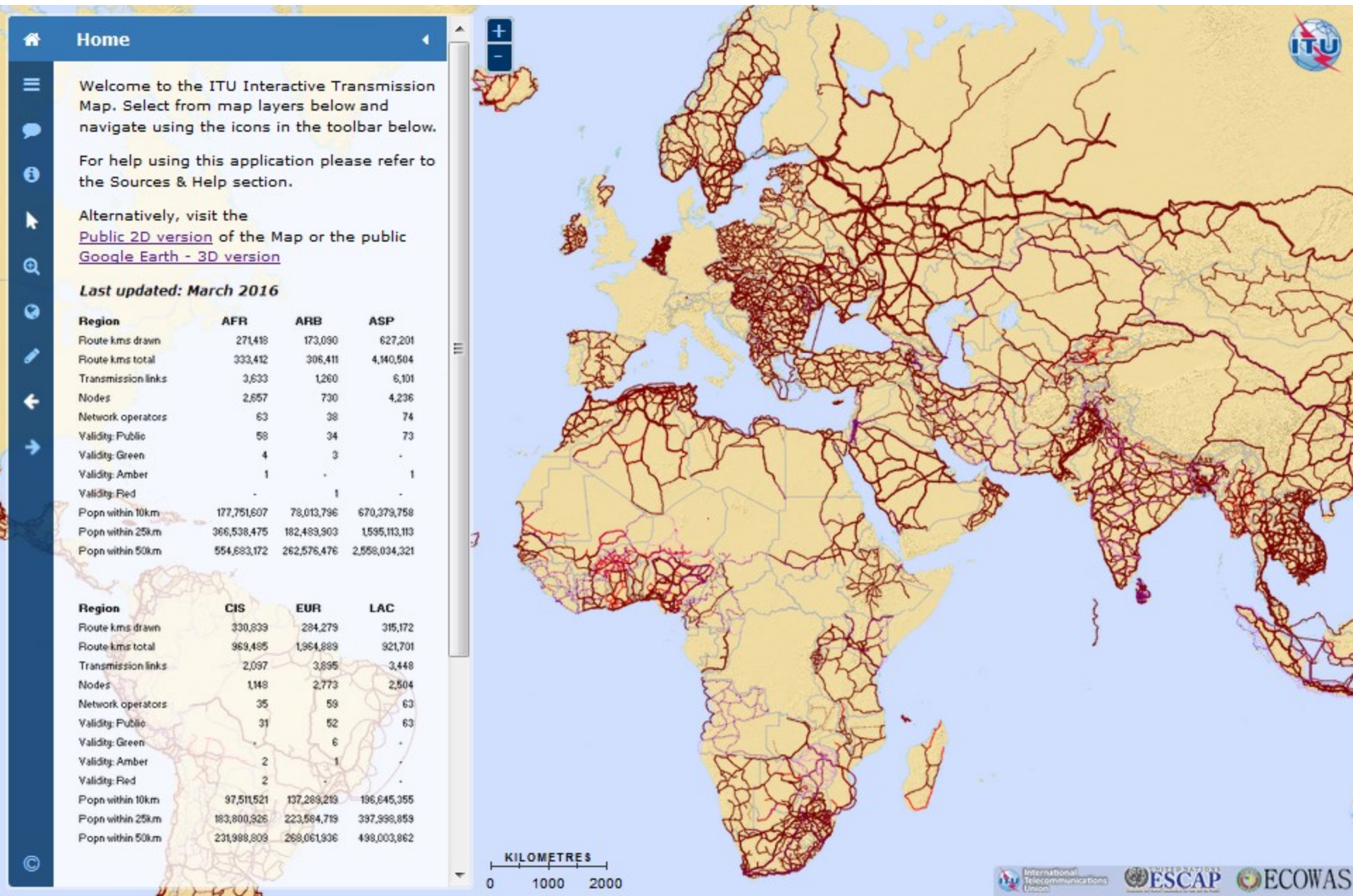


## ITU Interactive Transmission Map Research Status: March 2016

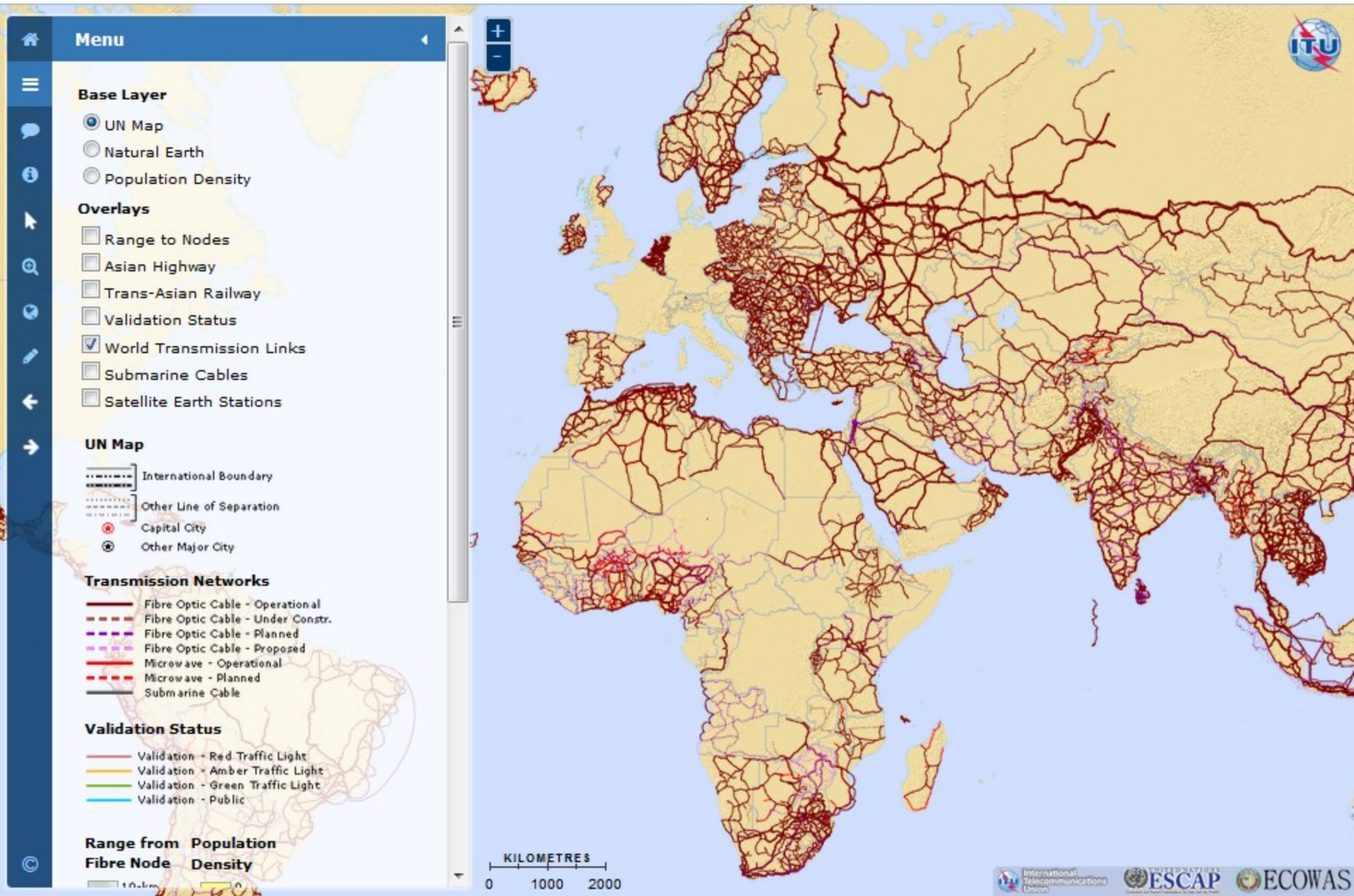
Region	CIS	ARB	AFR	ASP	LAC	EUR	Total
<b>Countries</b>	12/12	18/23	35/44	32/39	32/35	27/43	<b>156/196</b>
<b>Operators</b>	35	38	63	74	63	59	<b>332</b>
- Public	31	34	58	73	63	52	<b>311</b>
- Green	0	3	4	0	0	6	<b>13</b>
- Amber	2	0	1	1	0	1	<b>5</b>
- Red	2	1	0	0	0	0	<b>3</b>
- Pending	2	0	0	2	2	31	<b>37</b>
<b>Links</b>	2,097	1,260	3,633	6,101	3,448	3,895	<b>20,434</b>
<b>Nodes</b>	1,148	730	2,657	4,236	2,504	2,773	<b>14,048</b>
<b>Indicator 1: Transmission Network Length (Route-Kms), Mar 2016</b>							
- Drawn	330,839	173,090	271,418	627,201	315,172	284,279	<b>2,001,999</b>
- Total	969,485	306,411	333,412	4,104,504	921,701	1,964,889	<b>8,636,402</b>
<b>Indicator 7a: Population within range of operational fibre node (%), Dec 2015</b>							
- 10-km	34.4	20.5	19.1	16.5	20.0	21.9	<b>18.7</b>
- 25-km	64.9	48.0	39.4	39.2	40.4	35.6	<b>40.5</b>
- 50-km	81.9	69.0	59.6	62.8	50.5	42.7	<b>60.1</b>
<b>Indicator 7b: Population within range of operational fibre node (millions), Dec 2015</b>							
- 10-km	97.5	78.0	177.8	670.4	196.7	137.2	<b>1,357,591.3</b>
- 25-km	183.8	182.5	366.5	1,595.1	398.0	223.6	<b>2,949,526.0</b>
- 50-km	232.0	262.6	544.7	2,558.0	498.0	268.1	<b>4,373,348.6</b>

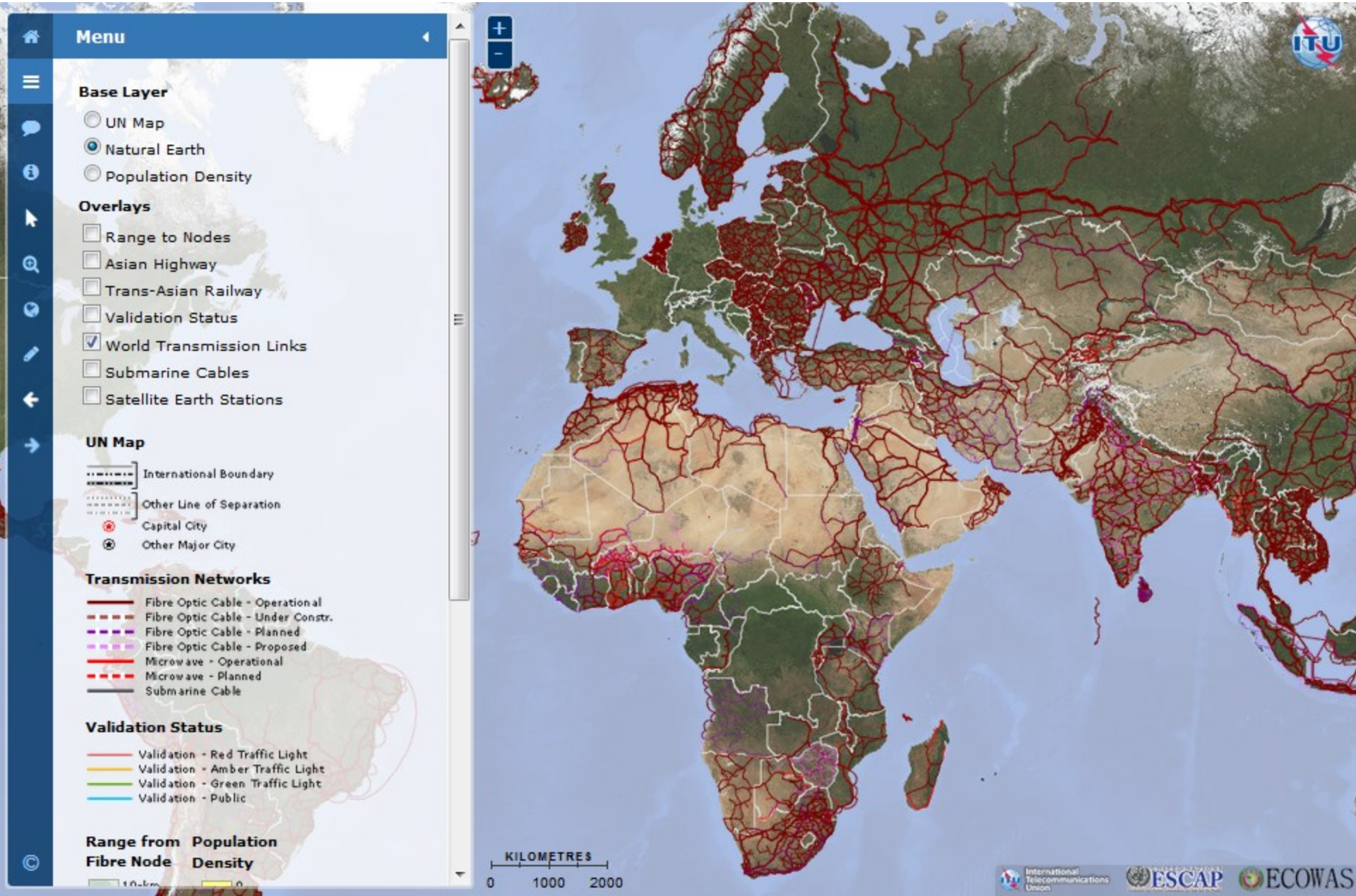
KILOMETRES  
0 1000 2000

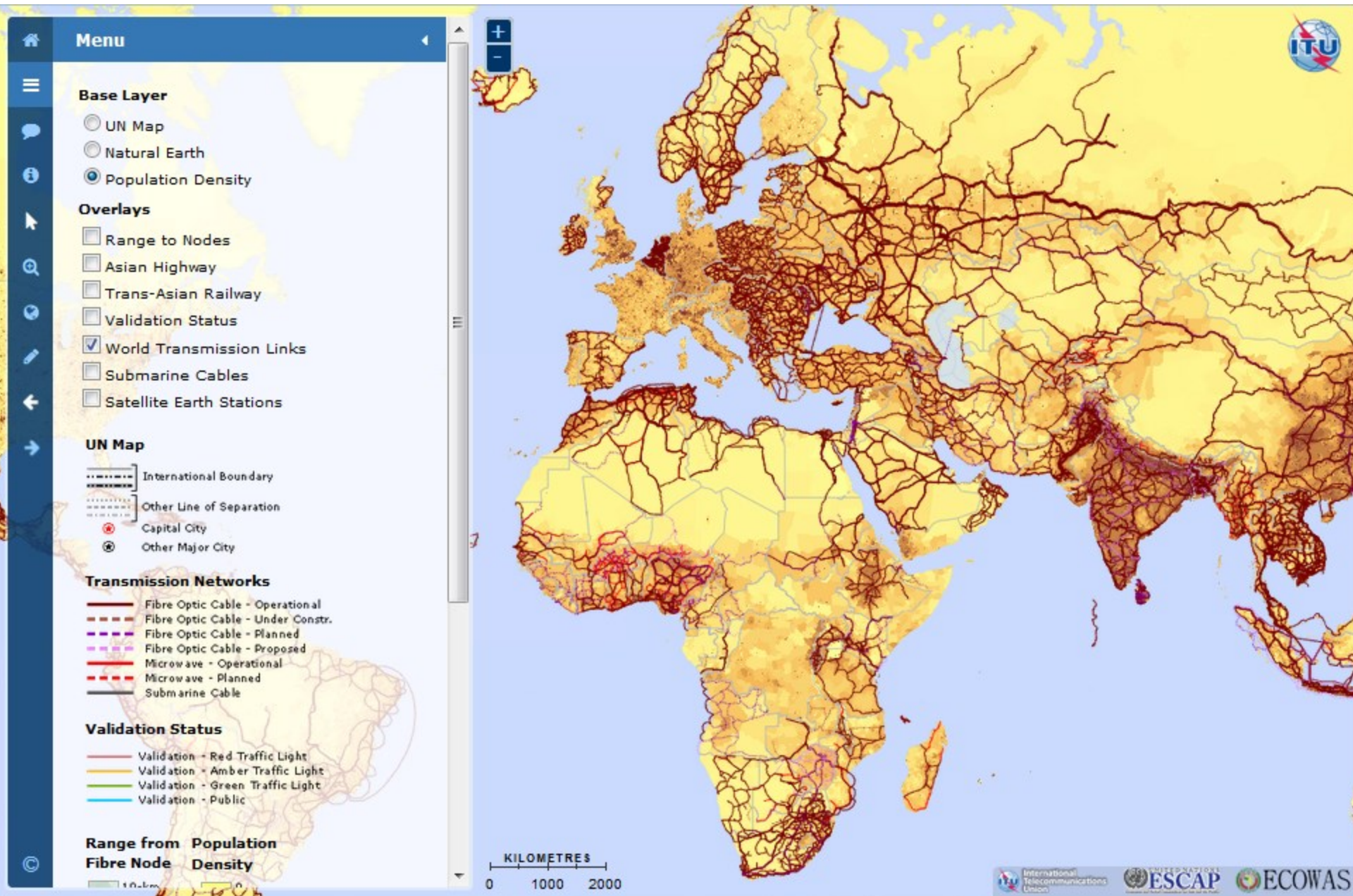


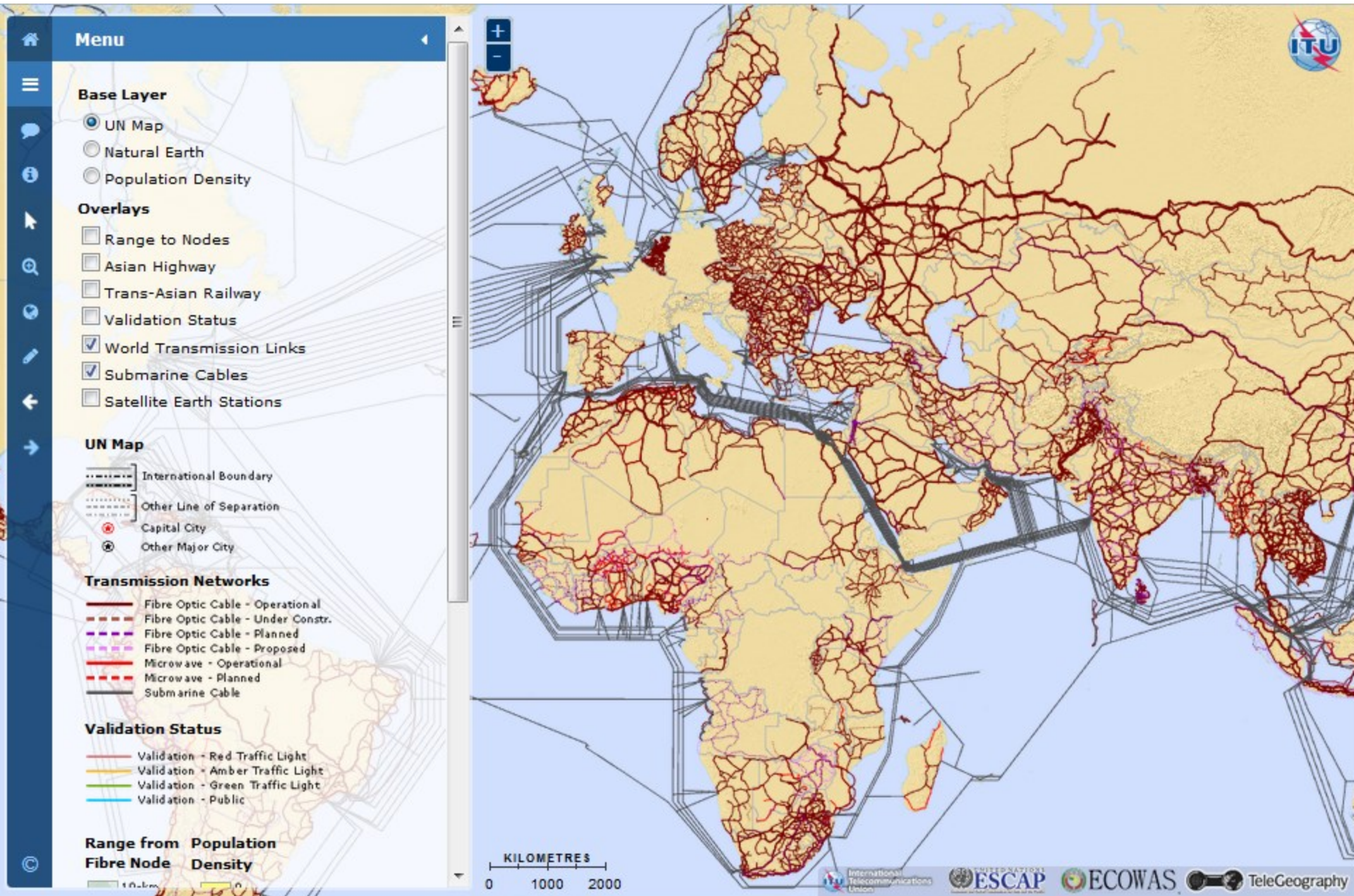


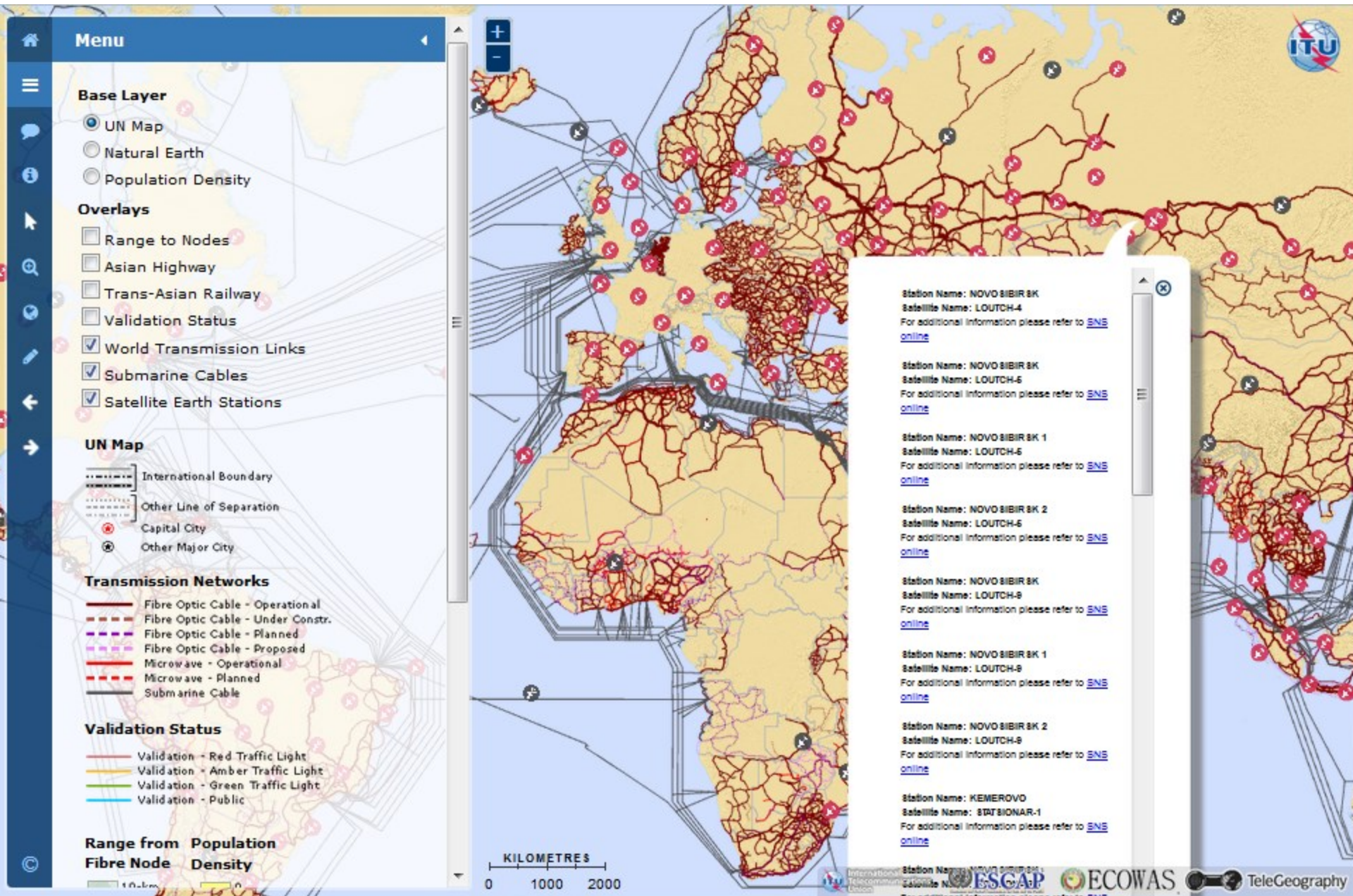












# TIES Password Protected Map and Validation Framework

## ITU Interactive Transmission Map - Validation

VALIDATION HOME

TRANSMISSION MAP

LATEST ACTIVITIES

INDICATORS

RESEARCH STATUS

### Validation Procedure

A simple traffic light system is used to indicate the validation status of each piece of network infrastructure shown in the map. In order to see the current status of any line on the map, select the 'Validation Status' checkbox in the map layers panel. Each transmission line falls under one of the four categories: RED, AMBER, GREEN or PUBLIC. The objective of the validation exercise is to engage network operators and administrations to verify the accuracy and integrity of the data, whilst it remains visible (albeit protected) behind TIES. As the validation status will progress from either RED, AMBER or GREEN through to PUBLIC, for a detailed description of this classification, please scroll to the bottom of the page.

Type the name of operator or country into the search box



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Navigate by country

### To change validation status

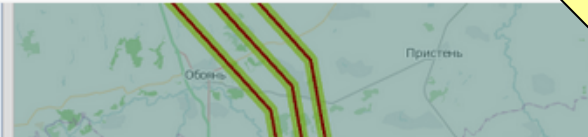
**1. Check your network on the map.** Go to the [ITU Interactive Transmission Map](#) and check the information shown for your network. The map layer called Validation Status indicates whether this network is classified as RED, AMBER, GREEN or PUBLIC (see below). If you hover your mouse over any line, a small image of the source material used to create the map appears in the left hand side. Click this image to go through to the homepage of the operator.

Navigate by Validation Status

Or navigate by Region

#### Overlays

- Population density
- Range to Nodes
- Validation Status
- World Transmission



## ITU Interactive Transmission Map – Validation

To validate the information shown in the map, leave a comment or any other feedback, just click the **Leave a Reply** link.

TRANSMISSION MAP    LATEST ACTIVITY    USER GUIDE    INDICATORS    RESEARCH STATUS

Liechtenstein: Liechtensteinische Kraftwerke

[Leave a reply](#)

Source: [Liechtensteinische Kraftwerke \(LKW\)](#), 2013.

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# ITU Interactive Transmission Map - Validation

- VALIDATION HOME
- TRANSMISSION MAP
- LATEST ACTIVITY
- USER GUIDE
- INDICATORS
- RESEARCH STATUS**

## Research Status

This table shows the research, production and validation status of each network operator. Filter the map by clicking on the up and down arrows to sort by research, production or validation status. This table is updated at the end of each month. Last Updated: **1 April 2016.**

The Research Status table is updated at the end of each month

Show  entries

Search:

COUNTRY	RE-GION	OPERA-TOR	DATA	PUB-LIC	RFI	ADDED	MAP	STA-TUS	VALID
Albania	EUR	<a href="#">ALBtelecom</a>	Y	Y	0	Y	Y	Public	N
Albania	EUR	<a href="#">ATU</a>	Y	Y	0	Y	Y	Public	N
Austria	EUR	<a href="#">Tele2</a>	Y	Y	0	N	N	Pending	N
		<a href="#">Mobistar</a>	Y	Y	0	Y	Y	Public	N
		<a href="#">Syntigo</a>	Y	Y	0	Y	Y	Public	N
		<a href="#">GCN</a>	Y	Y	0	Y	Y	Public	N
Bulgaria	EUR	<a href="#">Neterra</a>	Y	Y	0	Y	Y	Public	N
Bulgaria	EUR	<a href="#">Novatel</a>	Y	Y	0	Y	Y	Public	N

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Click link here to go through to the operators homepage

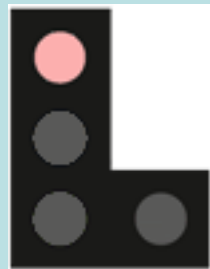




Each link in the map is given a validation status.

We use a simple traffic light system:

- Validation - Red Traffic Light
- Validation - Amber Traffic Light
- Validation - Green Traffic Light
- Validation - Public



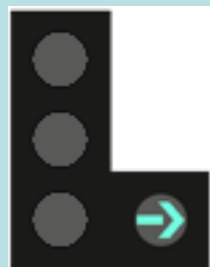
**Red:** Information was sourced from a restricted document (for example on TIES), a potentially unreliable publicly available source (such as a third party), may contain information which is confidential or regarded as sensitive by the network operator, and/or is very old and could be out of date (if it is more than 3-5 years old). Information must be validated by network operator or stakeholder to provide clearance that the information is correct, up-to-date, and is not confidential.



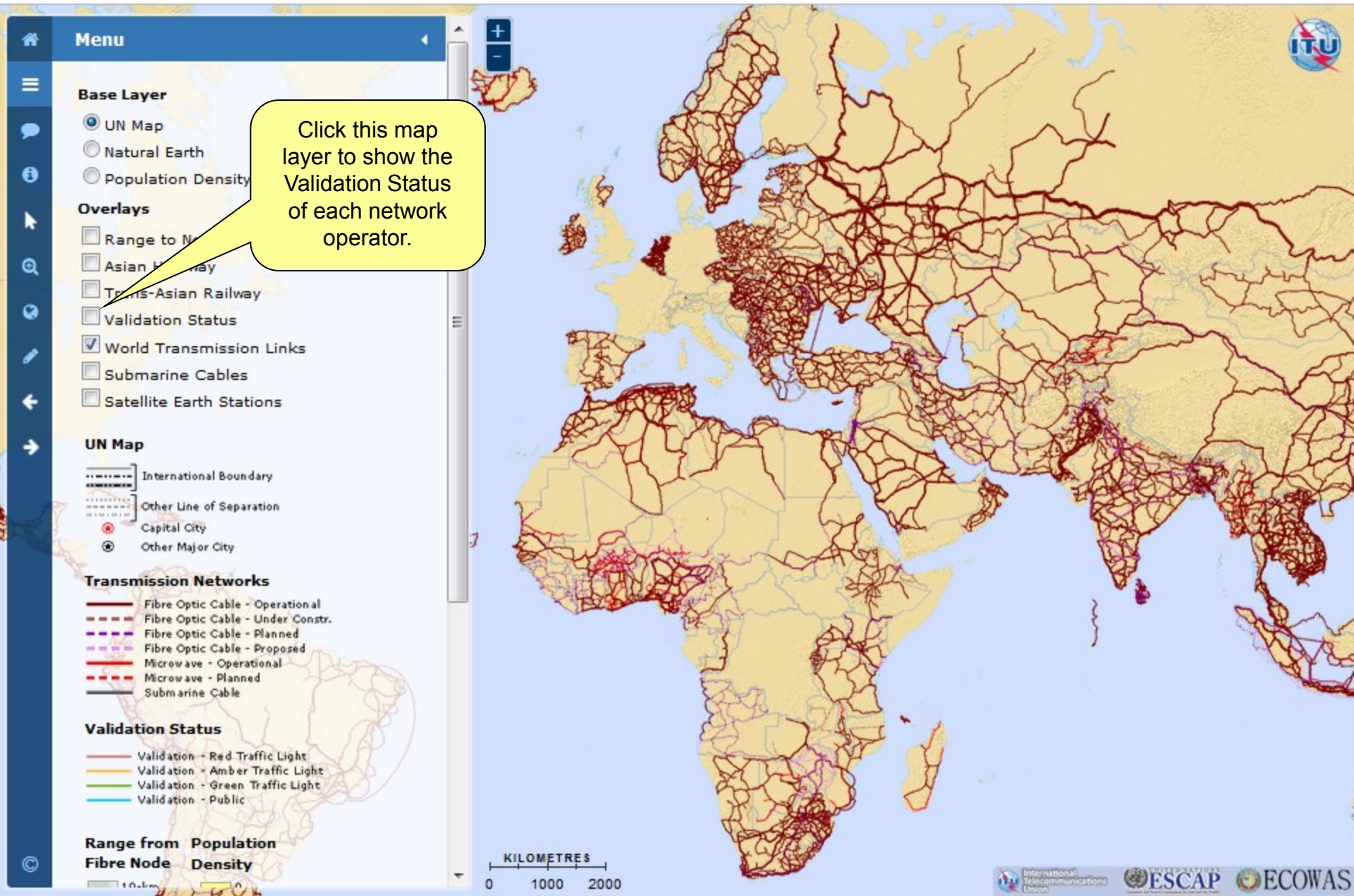
**Amber:** Information was not taken from a publicly available source, may be unreliable because of difficulties reading or interpreting the source material, and/or may be old and out of date. Operator is asked to provide clearance that the information is correct, up-to-date, and is not confidential.

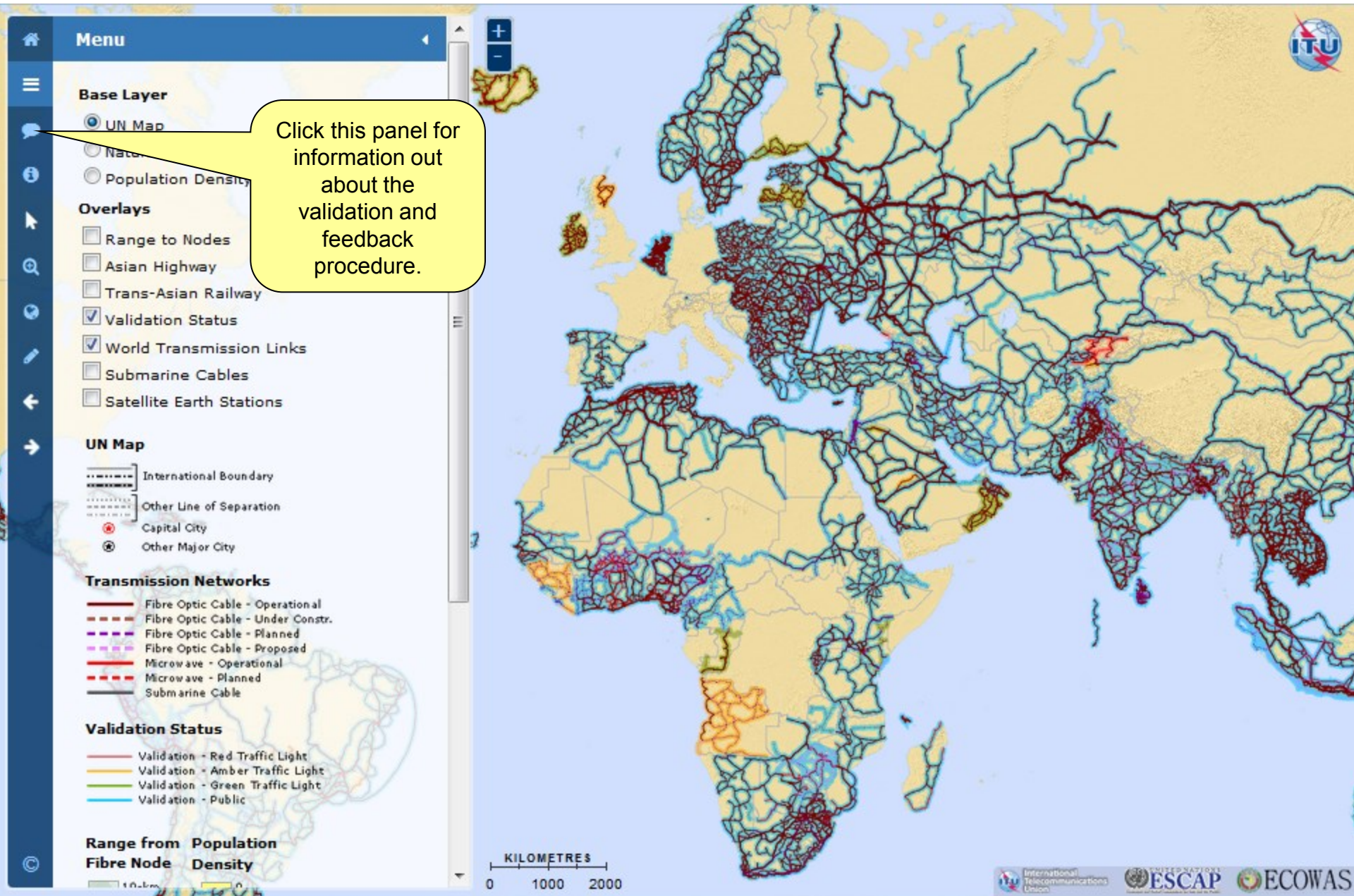


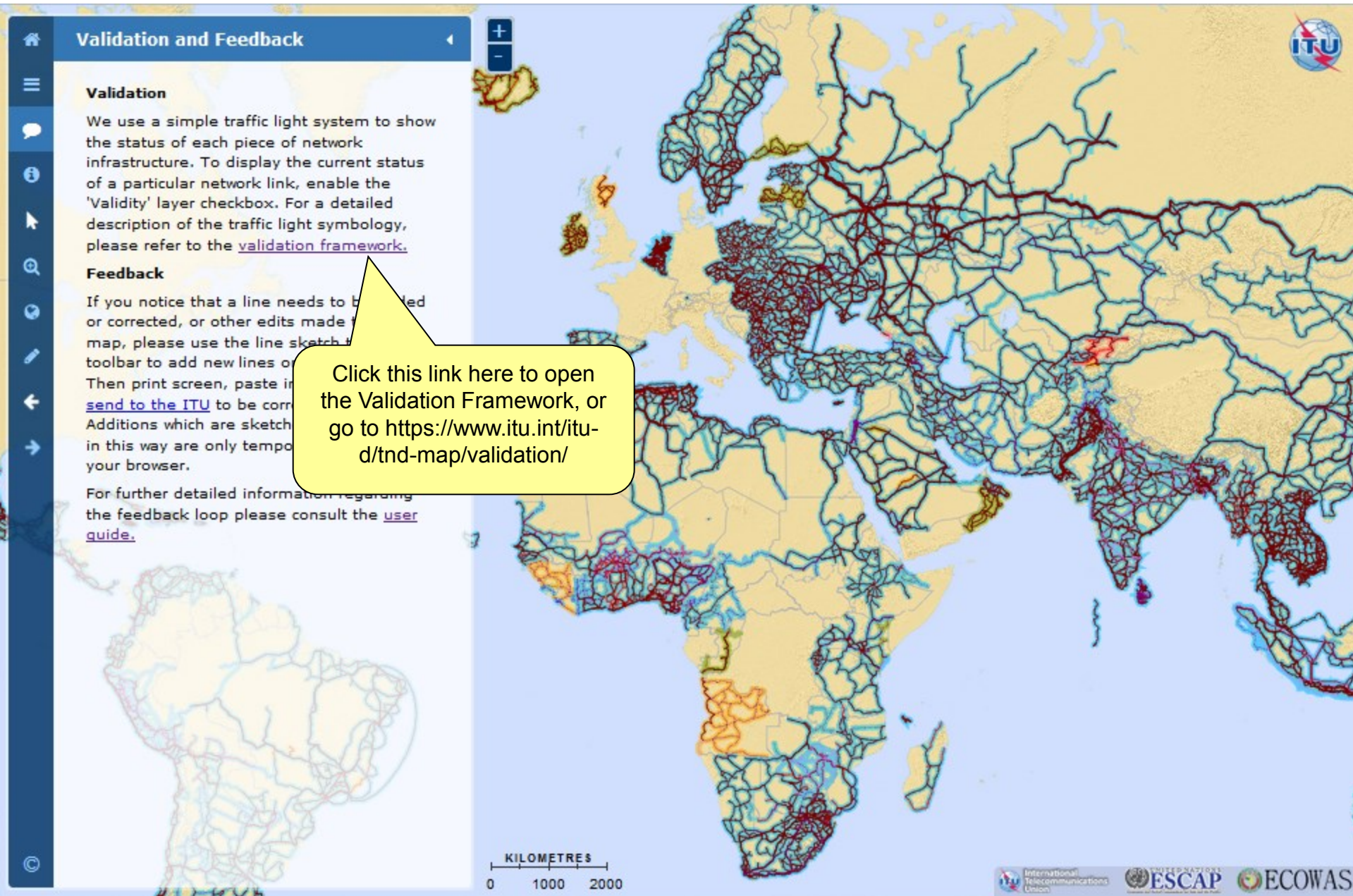
**Green:** Information was sourced from an authentic, reliable publicly available source (such as a company website, annual report, presentation, or other publication), and has been deliberately put into the public domain by the network operator or administration (it is therefore not confidential). The information is current and correct, and there is no reason why a public version could not be put into the public domain.



**Public:** Information has been actively checked and validated by stakeholder through the TIES interactive web map platform, specifically granting permission for this information to be put into the public domain.







**Validation and Feedback**

**Validation**

We use a simple traffic light system to show the status of each piece of network infrastructure. To display the current status of a particular network link, enable the 'Validity' layer checkbox. For a detailed description of the traffic light symbology, please refer to the [validation framework](#).

**Feedback**

If you notice that a line needs to be updated or corrected, or other edits made to the map, please use the line sketching toolbar to add new lines or correct existing ones. Then print screen, paste in the feedback form, and click [send to the ITU](#) to be corrected. Additions which are sketching in this way are only temporary in your browser.

For further detailed information regarding the feedback loop please consult the [user guide](#).

Click this link here to open the Validation Framework, or go to <https://www.itu.int/itu-d/tnd-map/validation/>

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0 1000 2000

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### Indicators



#### Broadband Capacity Indicators

[Indicator 1: Transmission network length \(Route kilometres\)](#)

[Indicator 7a: Population within reach of transmission networks](#)

[Indicator 7b: Area within reach of transmission networks](#)

#### Indicator Definitions

##### Indicator 1: Transmission network length (Route kilometers)

**Definition:** *Transmission network length* refers to the physical length of fibre optic cable in a network irrespective of the number of optical fibres contained within the constituent cables of that network (see Indicator 5: Cable structure), and can also be applied to microwave terrestrial networks. It is expressed in route kilometres (route-kms).

**Clarifications and scope:** Transmission network length (Route kilometers) can also be applied to microwave terrestrial transmission networks in order to enable comparison on a like-for-like basis, even though the number of microwave 'hops' is also used (a 'hop' is the point-to-point link between one microwave radio antenna and the next. for example there are four 'hops' between

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## Indicator 1: Route Kilometres



### Indicator 1: Transmission network length (Route kilometres)

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Search:

COUNTRY	RE-GION	ROUTE KMS 2013	ROUTE KMS 2014	ROUTE KMS 2015	OPERATORS
Bosnia and Herzegovina	EUR	n.a.	n.a.	n.a.	
Bulgaria	EUR	n.a.	8,923	8,923	GCN, Neterra, Novatel
Croatia	EUR	n.a.	-	3,300	HEP, Unitel
Cyprus	EUR	n.a.	865	865	CYTA, Primetel
Czech Republic	EUR	n.a.	12,626	12,626	CR, Dial Telecom, GTS, Level 3
Denmark	EUR	n.a.	-	40,586	Nianet, TDC
Estonia	EUR	n.a.	5,371	5,371	ELA
Finland	EUR	n.a.	-	10,000	Cinia

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### Indicator 7a: Population within reach of transmission networks



#### Indicator 7a: Population within reach of transmission networks 2015

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Search:

COUNTRY	RE-REGION	10-KM	25-KM	50-KM	10-KM	25-KM	50-KM
Czech Republic	EUR	69.8	98.5	100.0	7,517,286	10,618,623	10,777,060
Denmark	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Estonia	EUR	86.9	99.2	100.0	1,112,721	1,270,053	1,280,171
Finland	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
France	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Greece	EUR	43.2	80.4	94.8	4,810,995	8,945,547	10,550,060
Hungary	EUR	60.9	98.1	100.0	6,031,092	9,721,828	9,911,396

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### Indicator 7b: Area within reach of transmission networks



#### Indicator 7b: Area within reach of transmission networks 2015

Show  entries

Search:

COUNTRY	RE- GION	10-KM	25-KM	50-KM	10-KM	25-KM	50-KM
Czech Republic	EUR	44.8	96.2	100.0	84,521.8	181,411.0	188,612.9
Denmark	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Estonia	EUR	47.8	96.8	100.0	80,072.9	162,247.0	167,625.3
Finland	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
France	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Germany	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Greece	EUR	12.1	54.7	90.6	26,601.0	120,505.7	199,535.1
Hungary	EUR	35.2	96.1	100.0	70,927.8	193,641.5	201,411.8
Ireland	EUR	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

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## Research Status

This table shows the research, production and validation status of each network operator. Filter the map by clicking on the up and down arrows to sort by research, production or validation status. This table is updated at the end of each month. Last Updated: **1 April 2016.**

The Research Status table is updated at the end of each month

Show  entries

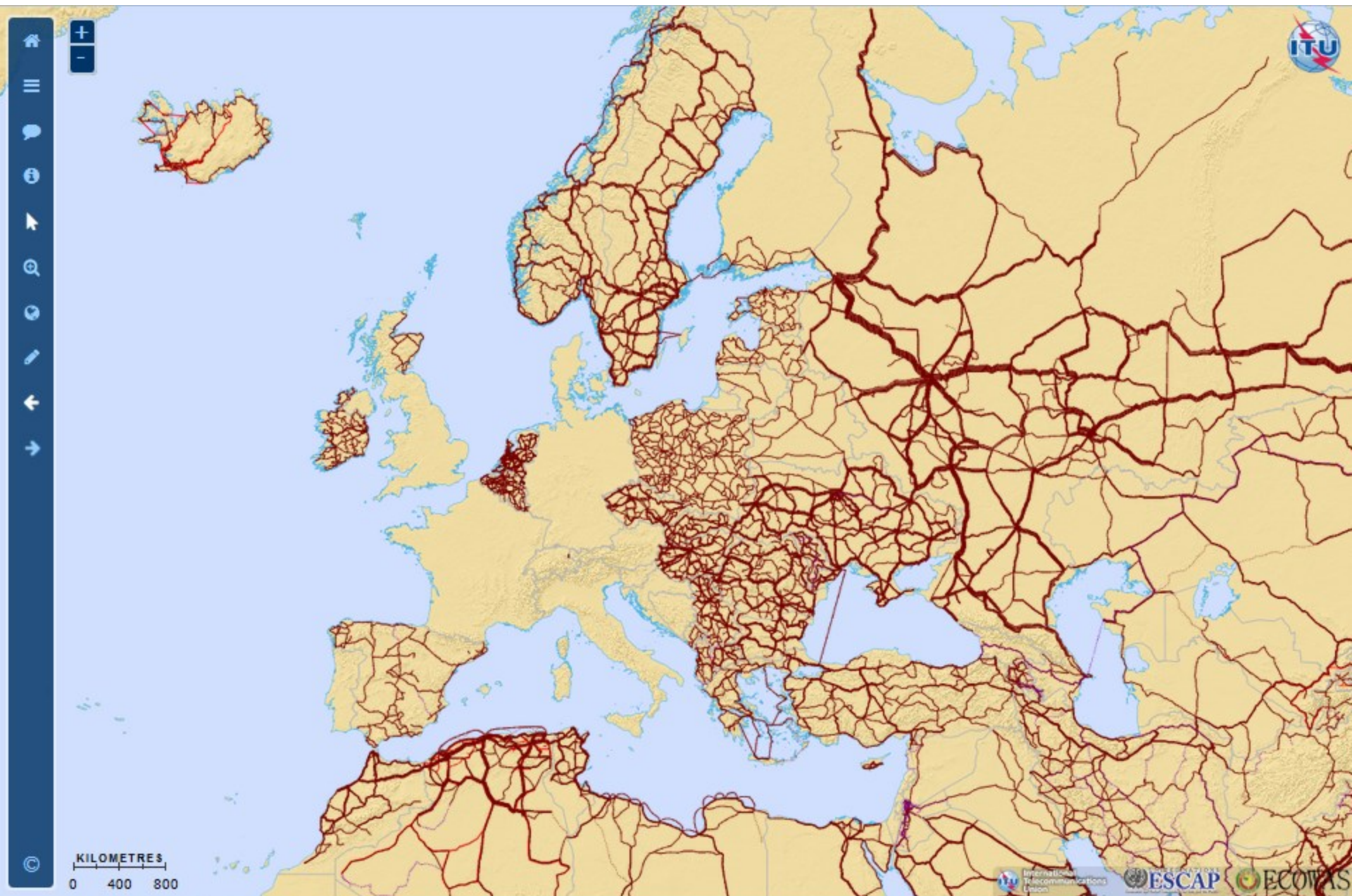
Search:

COUNTRY	RE-GION	OPERA-TOR	DATA	PUB-LIC	RFI	ADDED	MAP	STA-TUS	VALID
Albania	EUR	<a href="#">ALBtelecom</a>	Y	Y	0	Y	Y	Public	N
Albania	EUR	<a href="#">ATU</a>	Y	Y	0	Y	Y	Public	N
Austria	EUR	<a href="#">Tele2</a>	Y	Y	0	N	N	Pending	N
		<a href="#">Mobistar</a>	Y	Y	0	Y	Y	Public	N
		<a href="#">Syntigo</a>	Y	Y	0	Y	Y	Public	N
		<a href="#">GCN</a>	Y	Y	0	Y	Y	Public	N
Bulgaria	EUR	<a href="#">Neterra</a>	Y	Y	0	Y	Y	Public	N
Bulgaria	EUR	<a href="#">Novatel</a>	Y	Y	0	Y	Y	Public	N

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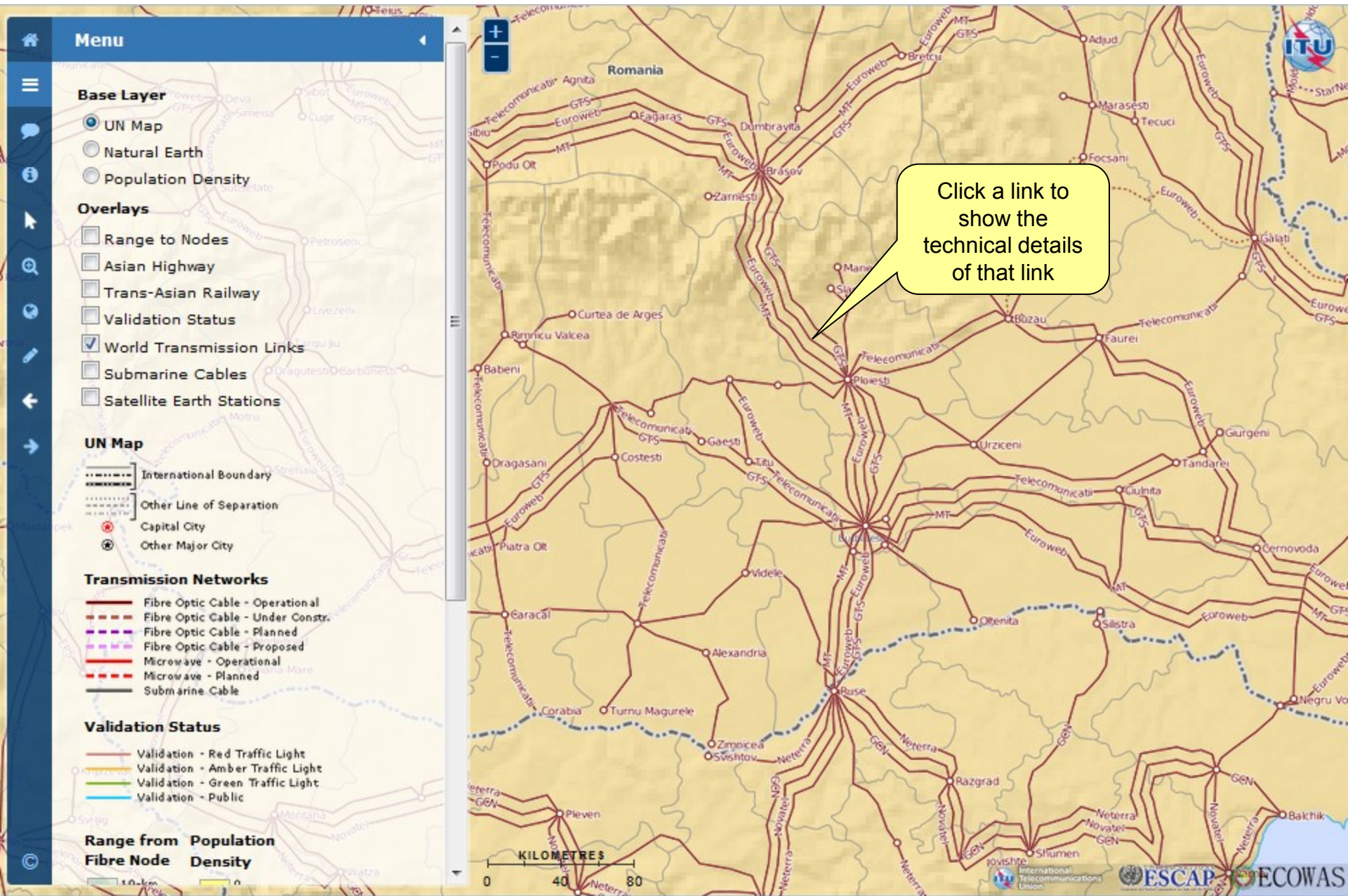
Click link here to go through to the operators homepage

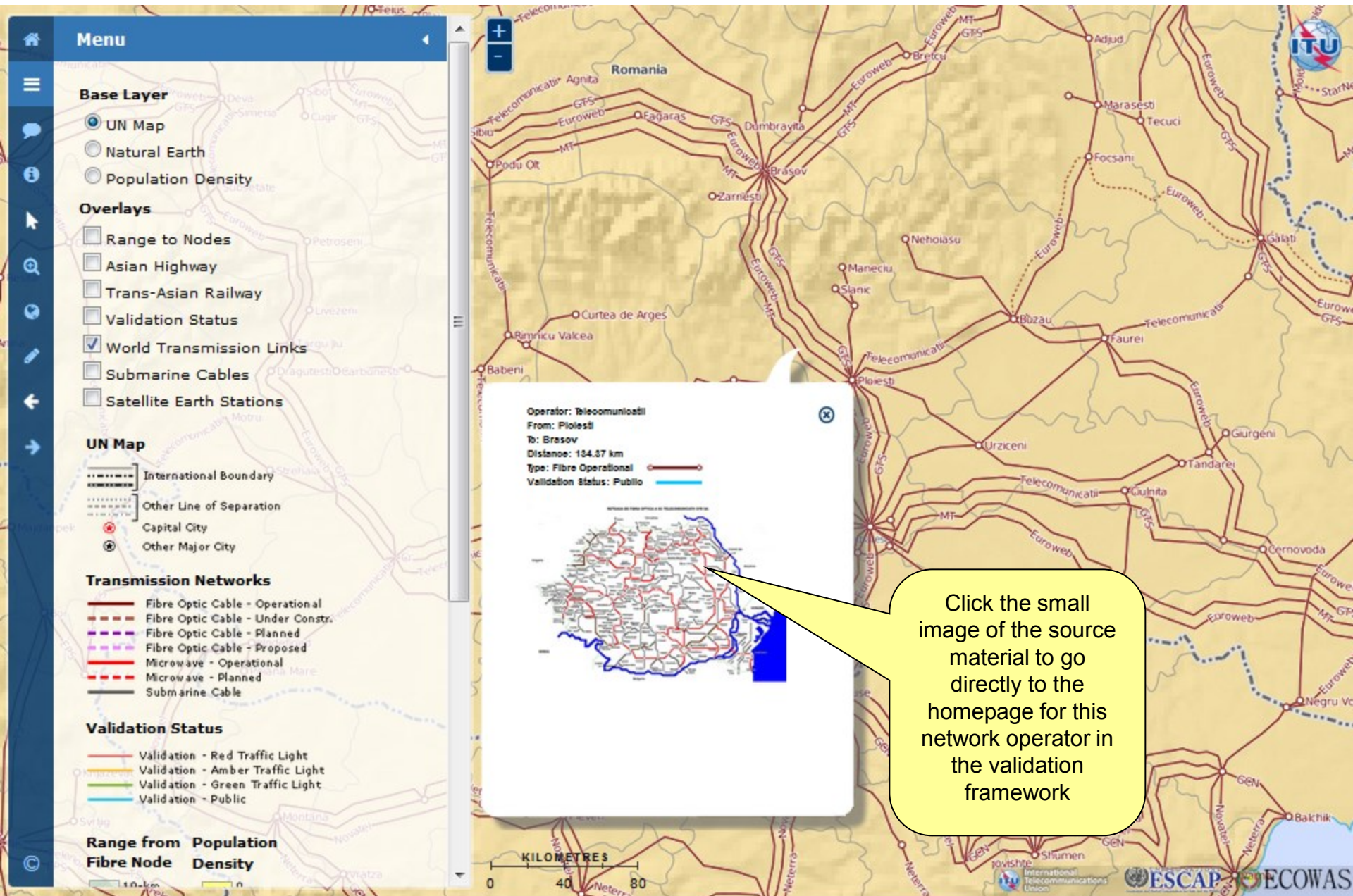




<http://www.itu.int/itu-d/tnd-map-public/>







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 TAG ARCHIVES: ROMANIA
 

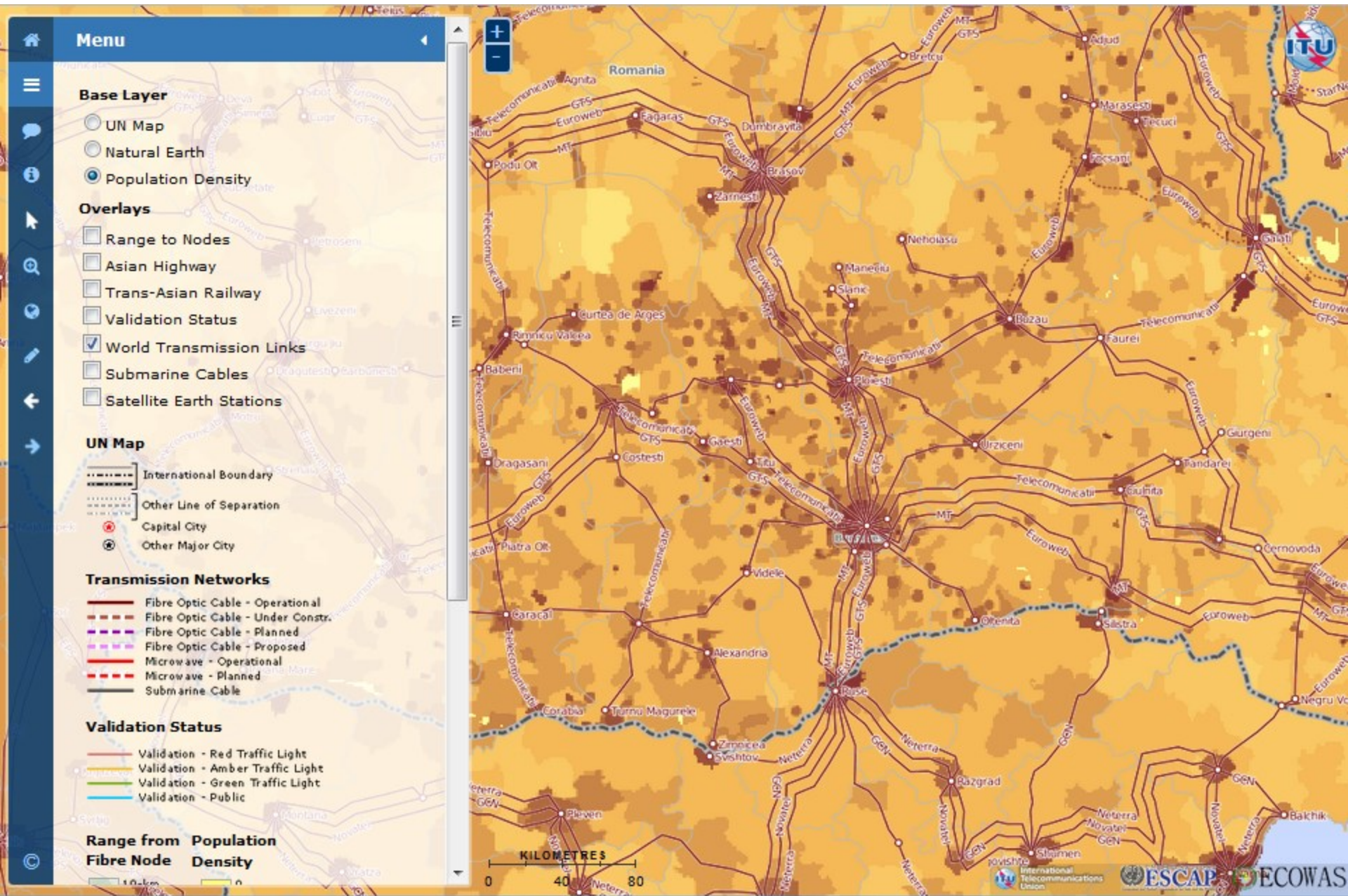

### Romania: SC Telecomunicatii CFA SA

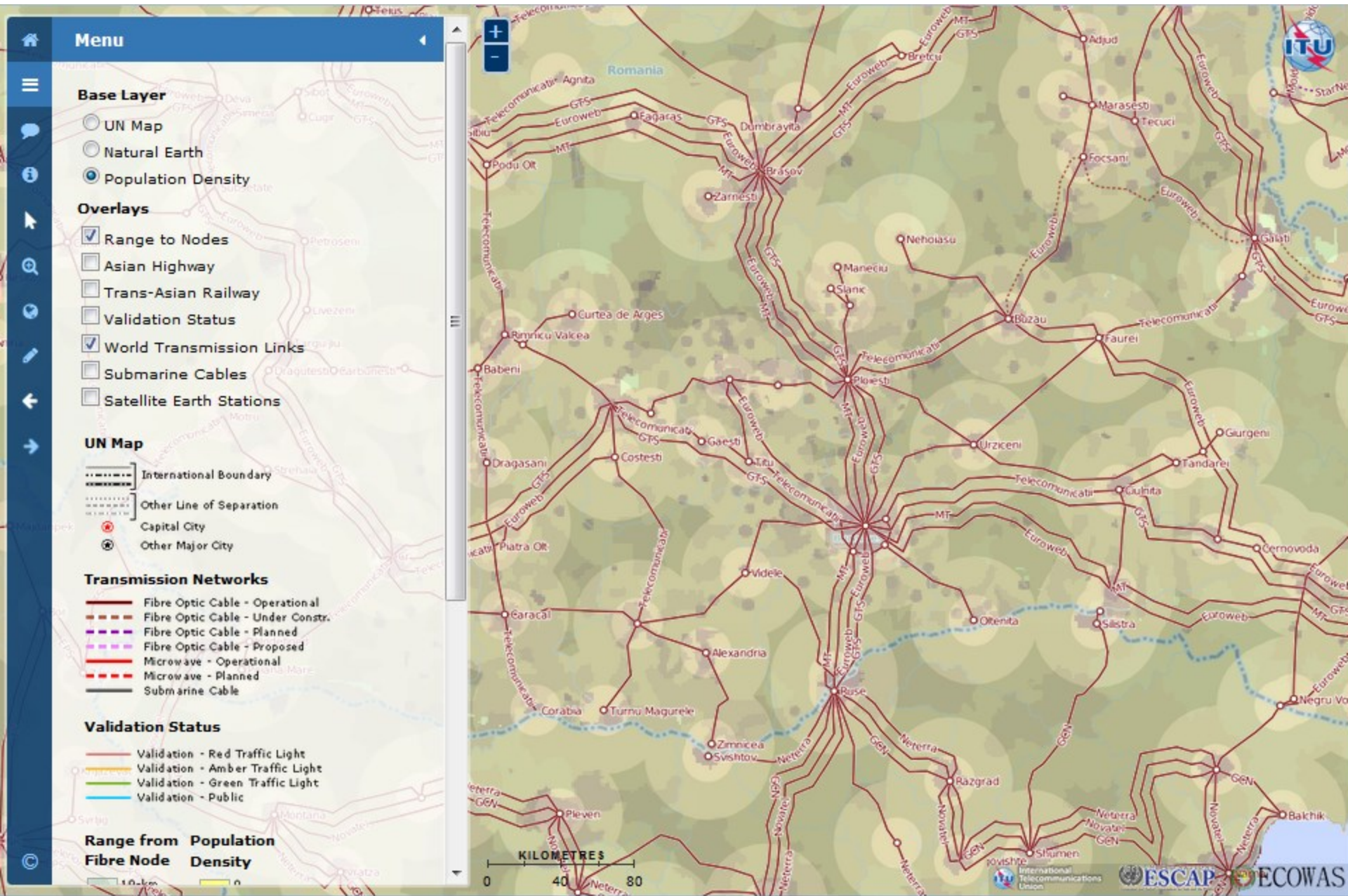
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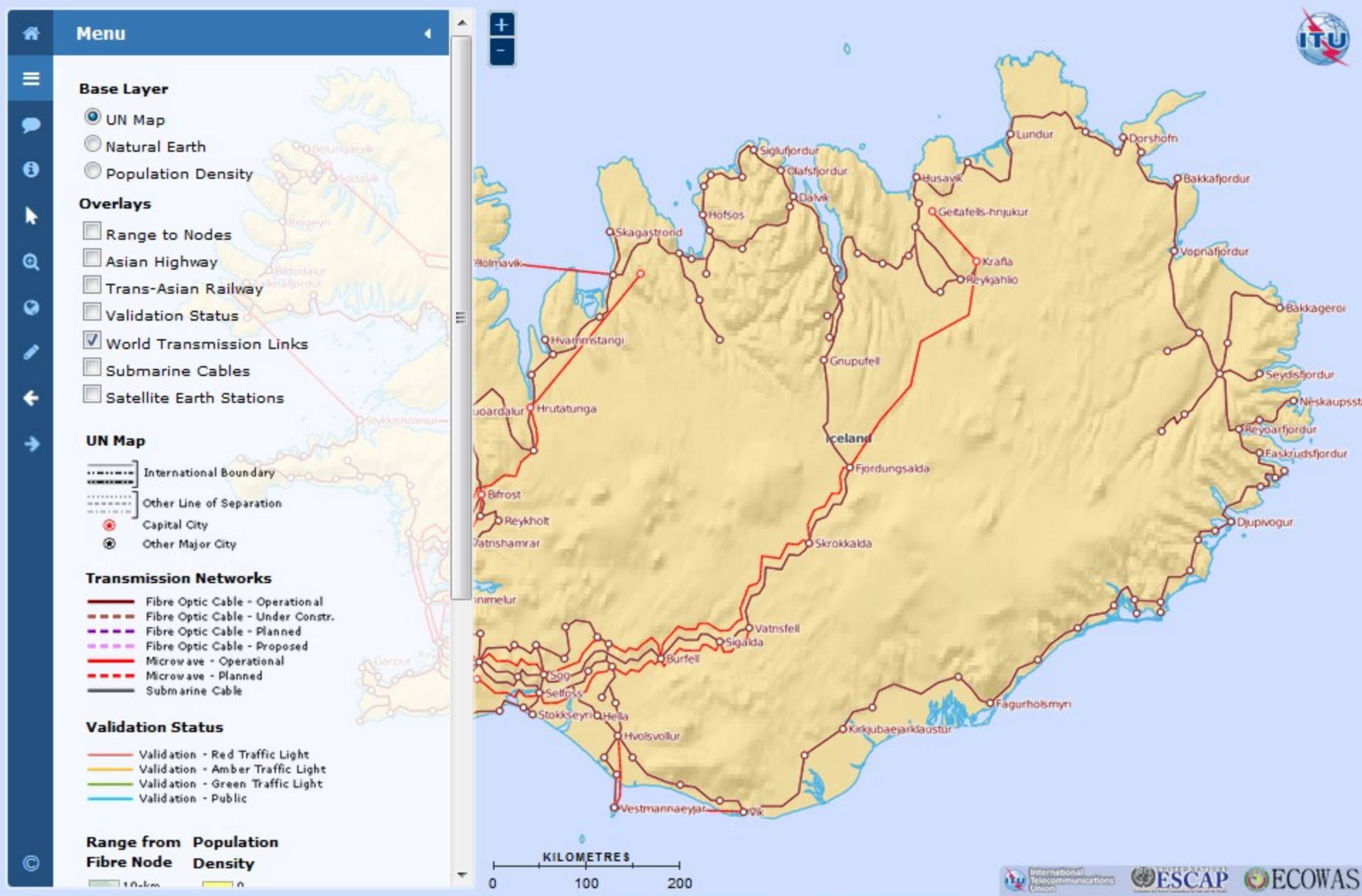
 Source: [SC Telecomunicatii CFA SA](#), 2014. <http://www.tccfr.ro/index-4.html>


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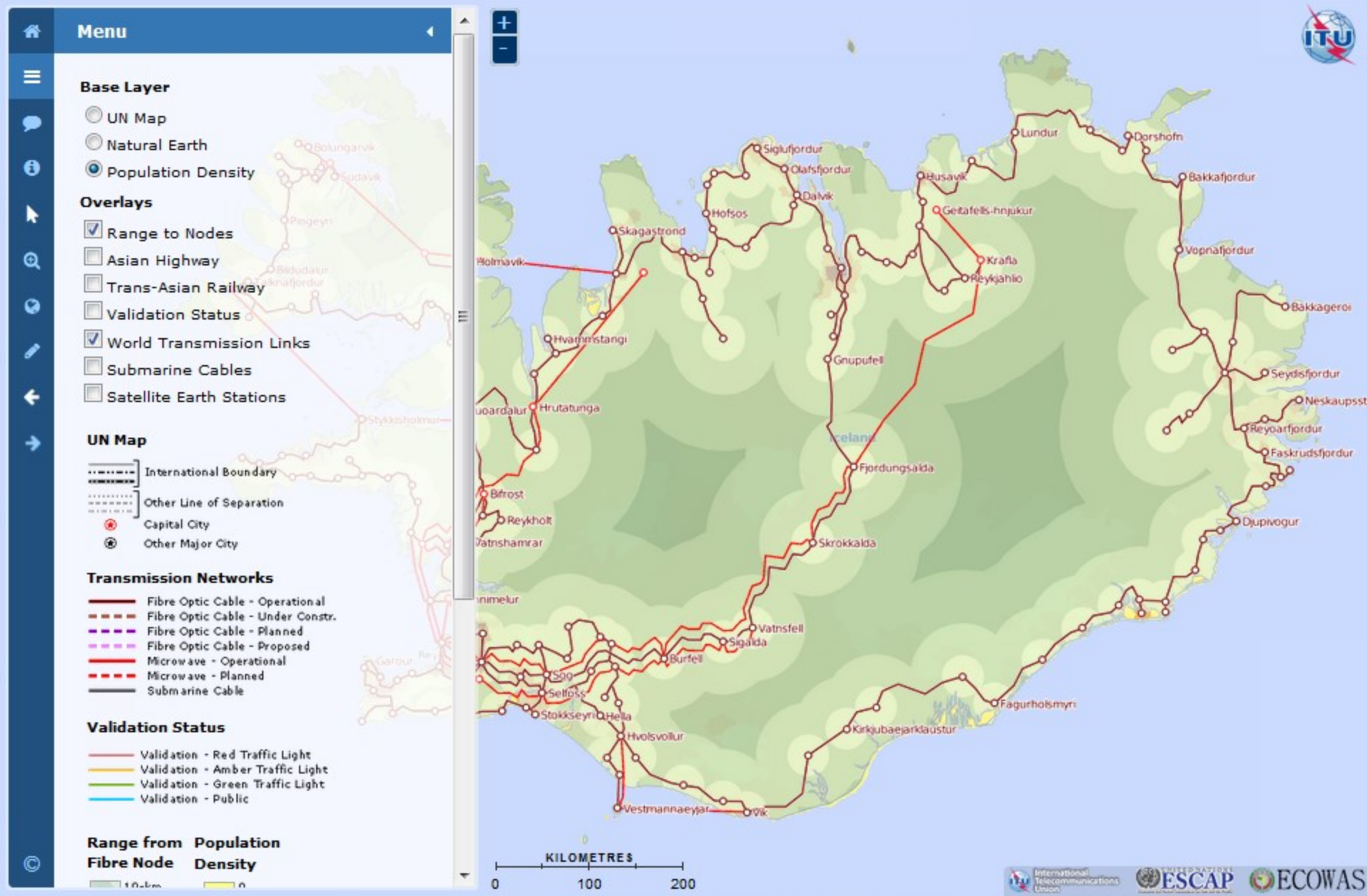












# Thank You

We value your feedback and contributions. Please log in using your ITU TIES username and password, to submit comments, feedback and to validate the information shown in the map through the Validation Framework.

Project homepage

<http://www.itu.int/en/ITU-D/Technology/Pages/InteractiveTransmissionMaps.aspx>

ITU Interactive Terrestrial Transmission Map

<https://www.itu.int/itu-d/tnd-map-public/>

ITU TIES Interactive Terrestrial Transmission Map

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ITU TIES Validation Framework

<https://www.itu.int/itu-d/tnd-map/validation/>

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