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RNP

Use of subfluvial optical cable in a region without land-based infrastructure
A project to deploy advanced communications in the Amazon region

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Agenda

- Brief Overview of the RNP
  - RNP international connections
  - RNP national backbone – the *Ipê* network
- Some examples of the use of sub-aquatic optical cables as an alternative around the world
- Existing long-distance optical infrastructure in the Brazilian Amazon region
- A project to deploy optical cable in the Brazilian Amazon region
- Conclusions

Brief Overview of the RNP

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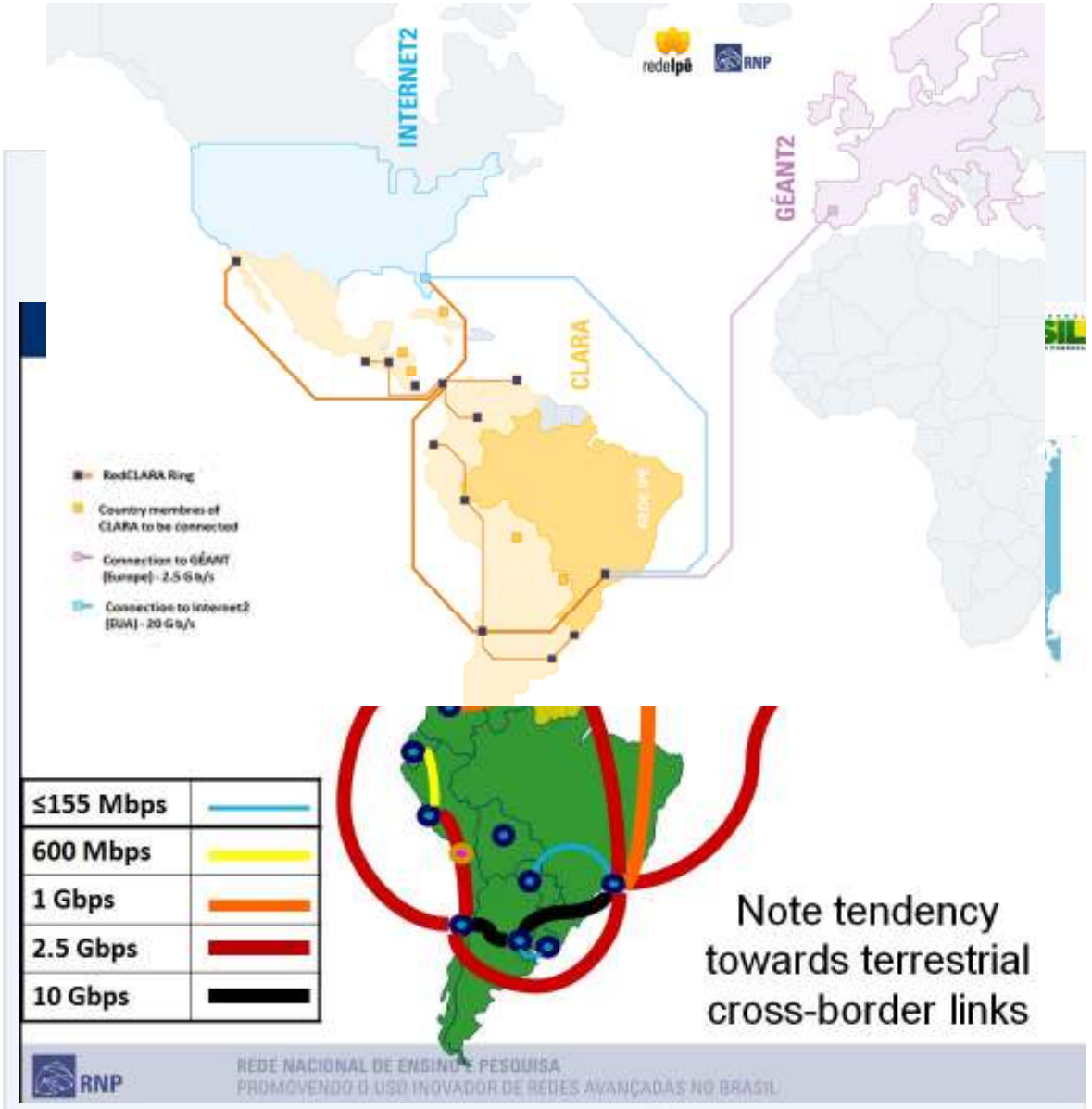
- RNP – Rede Nacional de Ensino e Pesquisa
- Brazilian NREN
  - Created as a project in September 1989 by the Ministry of Science, Technology and Innovation (MCTI),
  - Became a non-profit institution in 1999
- Serves more than 300 organizations nationwide,
  - Over 130 public universities & 30 public and private research centers.
  - More than 800 campi connected

International Connections

- Links to Europe
  - w/ RedClara :
  - 1 X 2.5G
- Links to US
  - RNP: 2x 10G
    S Paulo – Miami
  - (W) direct (SAM - Telefonica)
  - (E) via Rio de Janeiro & Fortaleza (SAC - LaNautilus)
    (+ redundant terrestrial)
- Links to Argentina
  - w/ RedCLARA:
  - 10G Porto Alegre - Buenos Aires



RNP national backbone

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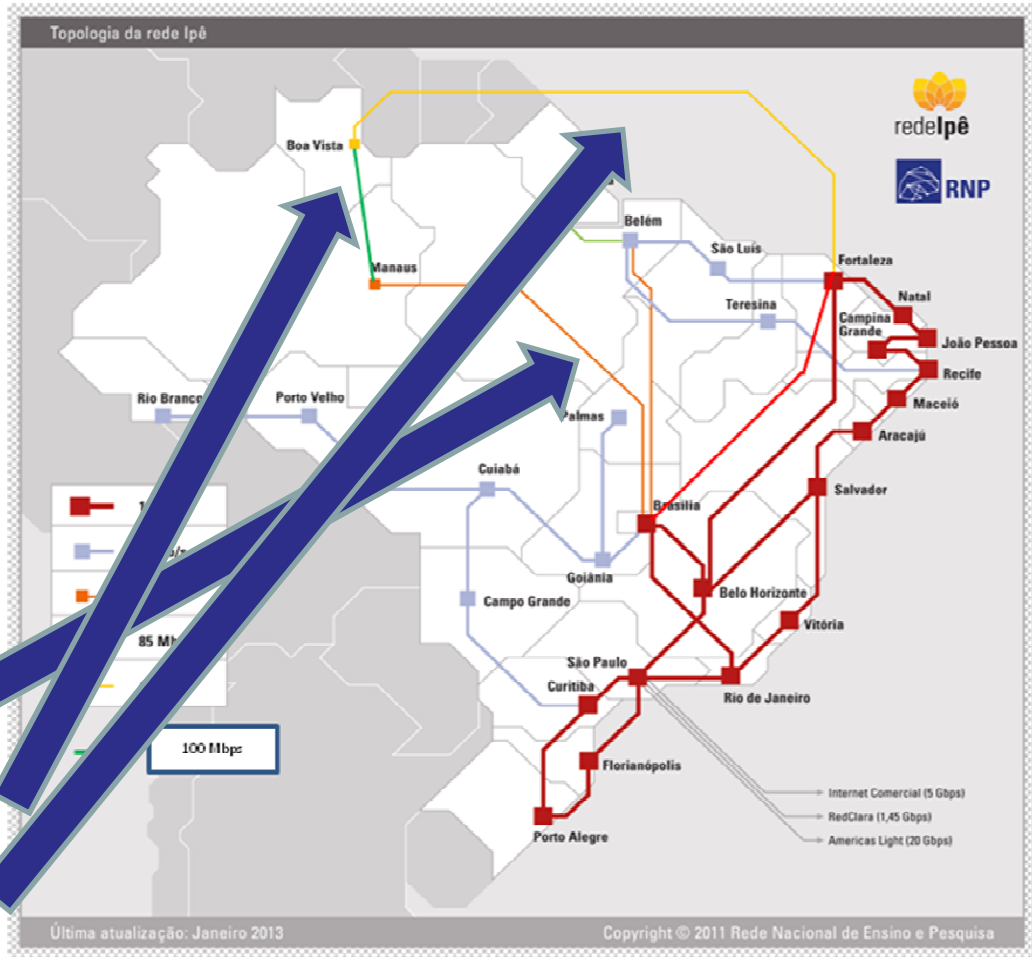
- RNP national backbone – *Ipê* network
  - Links of 3 e 10 G
- Amazon Region:
  - 1 G Manaus - Brasilia
  - 100 M Manaus – Boa Vista
  - 40 M Boa Vista – Fortaleza, across Venezuela



Ipê = IP =

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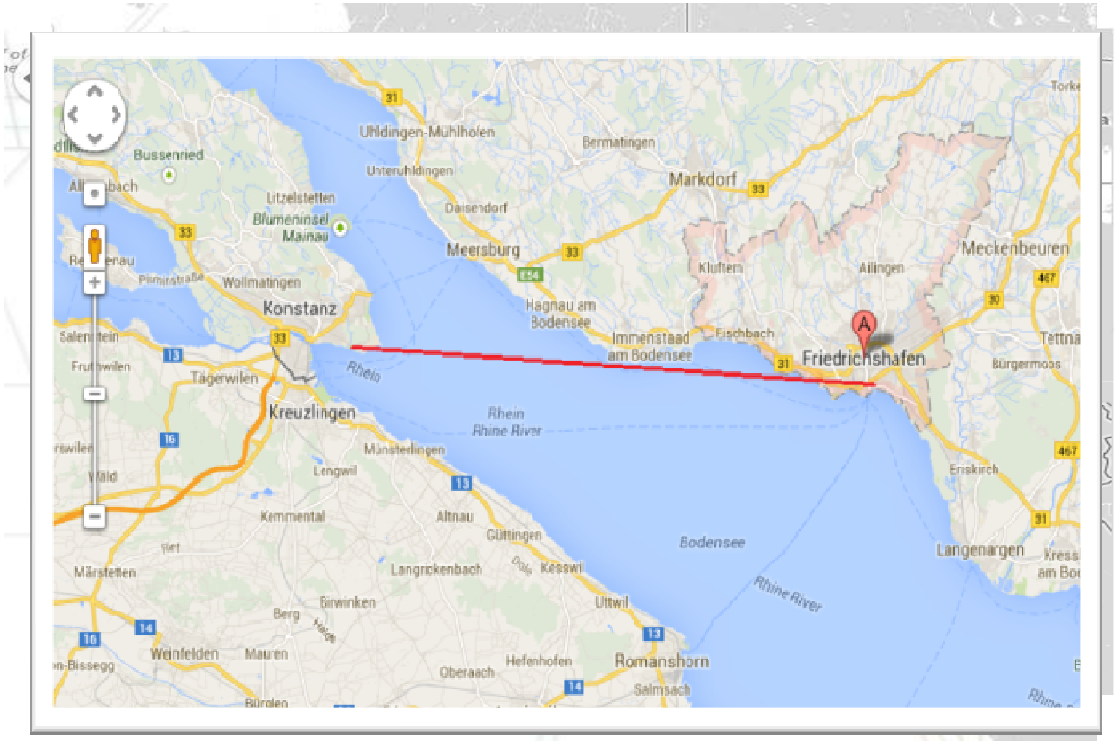
Some examples around the world

- Use of sub-aquatic optical cables as an alternative to overland optical routes
  - Not so ordinary / not so easy to meet examples
- Some examples:
  - ADONES – Angola Domestic Network System
  - AKORN –Alaska Oregon Network
  - Optical cable under Lake Constance, Germany



Existing infrastructure

- Existing long-distance optical infrastructure in the Brazilian Amazon region
  - Belem - Manaus and Manaus – Boavista have just been completed
  - Macapá - Manaus ends this year.
- Does not reach the majority of the population
  - Provides access mainly the endpoints (large cities, hydroelectric plants, gas centres, …)
  - Majority lives along the main rivers of the region

The project

- A project to deploy sub-aquatic optical cable in the Amazon region
  - Complete project: 7,784
  - 6 routes,
  - Estimated cost: US$ 500 million
- First stage
  - Route “A”: 2,100 km of
  - Estimated cost: US$ 200 million.
  - Interconnects Belém, Macapá and Manaus, capitals,

Population that can be served

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- Population and the numbers of university and research institution campi (RNP clients) that can be served by this project

State	Pará	Amazonas	Amapá	Rondônia	Roraima	TOTAL
Total population near to routes	3,198,418	2,997,309	633,919	443,058	342,344	7,615,048
Total population along the routes	2,947,076	2,872,946	562,219	443,058	342,344	7,167,643
% population served on routes	92%	96%	89%	100%	100%	94%
Cities	22	33	7	1	5	68
Total number of cities along the routes	13	26	5	1	5	50
% cities along the routes	59%	79%	71%	100%	100%	74%
Total number of RNP clients along routes	13	12	3	0	1	29

Status of the project

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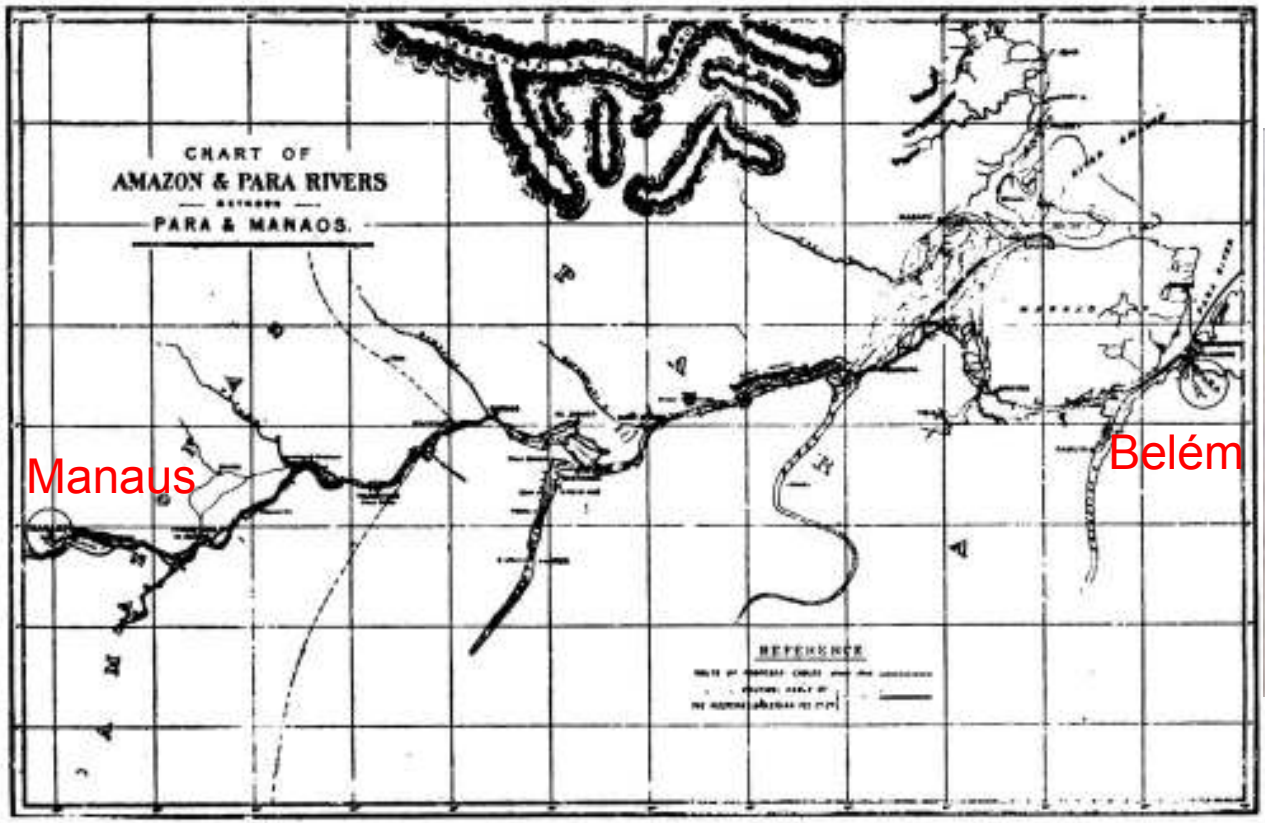
- Being elaborated together with Padtec (www.padtec.com.br),
  - Brazilian manufacturer of optical systems,
- Submitted to Ministry of Communications
  - Seeking close alignment with the intentions of the Brazilian government, especially with respect to the National Broadband Plan.
- Garnering support from state governments in the region
  - Mainly the state of Amazonas

This is not an original idea!

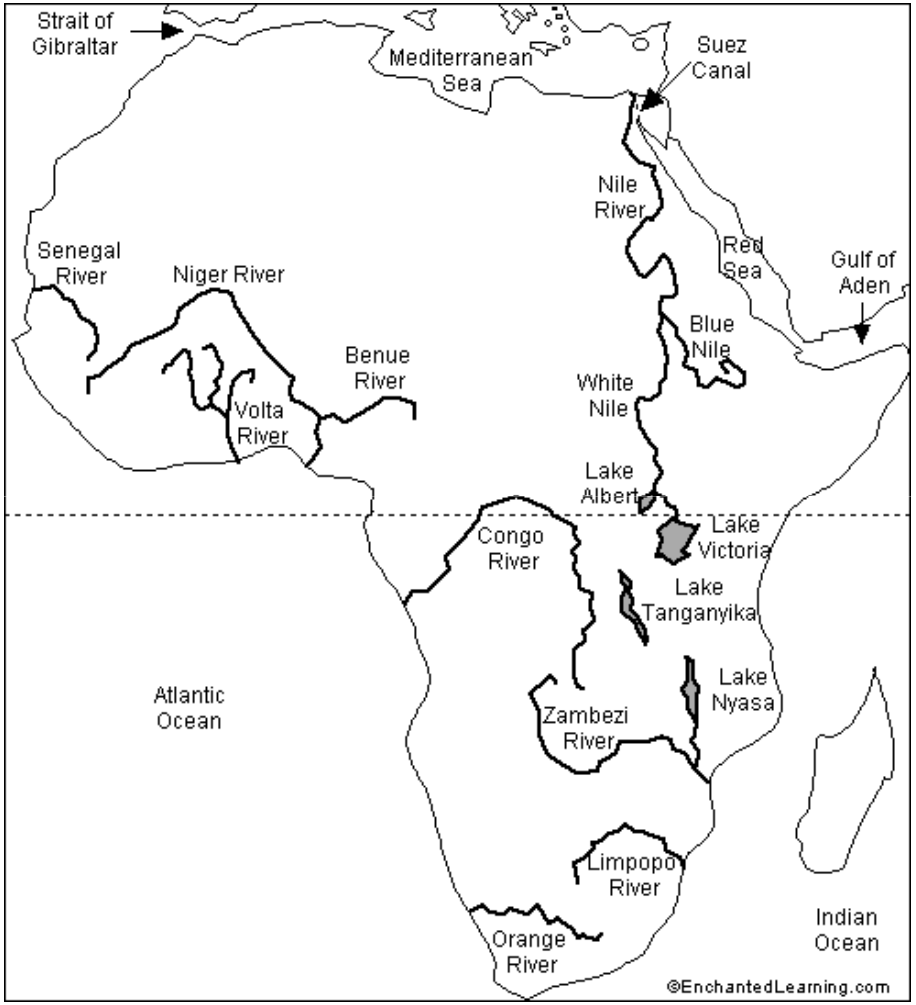
- Between 1895 and 1896, Siemens Brothers of London deployed a subfluvial telegraph cable along almost the identical route between Belém and Manaus (Route “A”)
- http://www.atlantic-cable.com/Cables/1895ParaManaos/



What about Africa?

- Large river systems are also found in Africa, many of them crossing international borders.
- Might any of these be useful for subfluvial cables?

www.enchantedlearning.com/africa/rivers/outlinemaplabeled/map.GIF



Conclusions

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- The courses of the great rivers of the Amazon region are a natural choice for deploying subfluvial optical cables
  - Riverside communities are the largest part of the population and the greatest beneficiaries
- Benefits to the academy community :
  - High-capacity connectivity for research and education institutions,
  - Use of Advanced Services provided by RNP, such as videoconferencing, video-classes and other high bandwidth applications;
  - Same conditions to use the Internet as their colleagues from other regions of the country;
- Present stage
  - To conclude the technical and economic feasibility study, gaining familiarity with the hydrodynamic mechanisms of the Amazon basin,.
  - To include it among the priority projects of the Government

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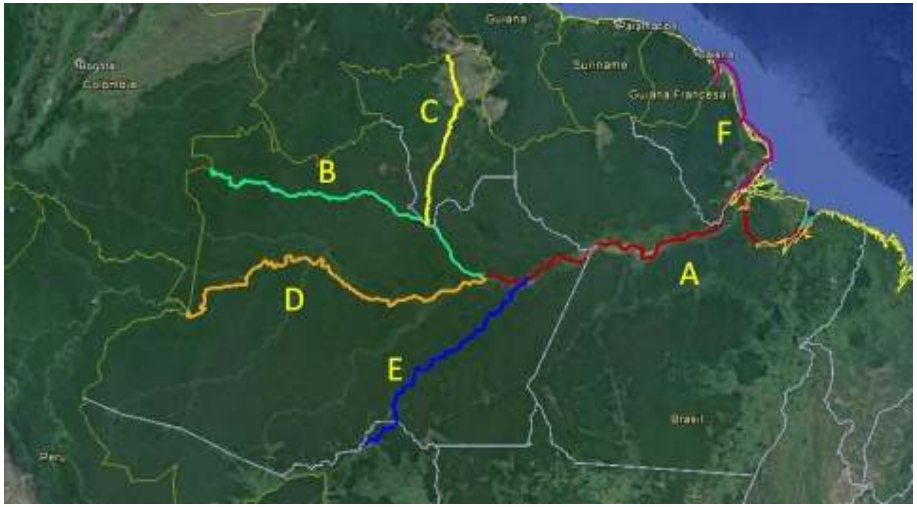
Conclusions



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Thank you! (“obrigado”)

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