

200G over Alien Wavelength

Marc Helmus, GasLINE

Moritz Frenzel, Globalways AG

DENO9

Darmstadt, 23rd November 2017

Marc Helmus



- Head of transmission
@ GasLINE
- marc-oliver.helmus@gasline.de
- @marcnetismus

Moritz Frenzel



- Teamlead active networks
@ Globalways AG
- moritz.frenzel@globalways.net
- @momorientes

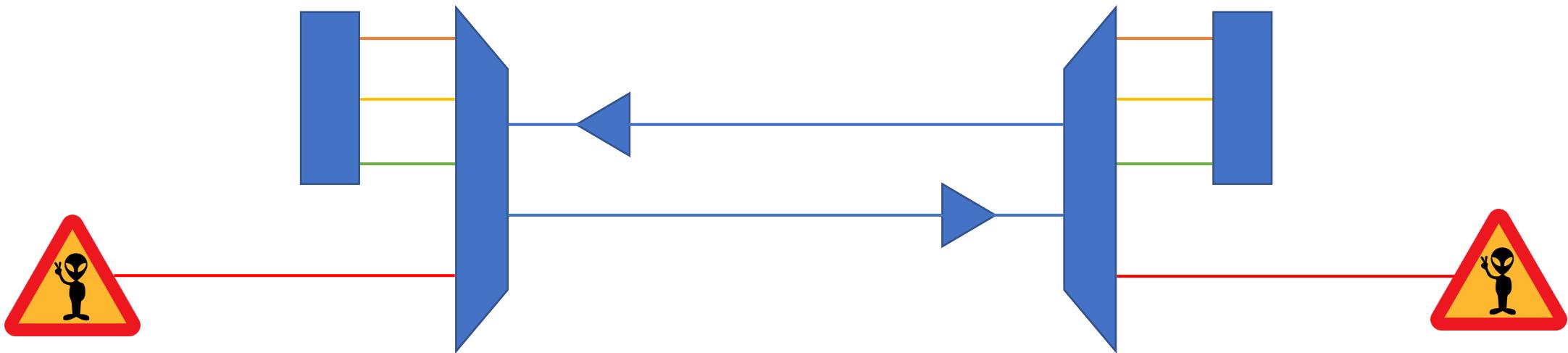
Disclaimer

All experiences shared are from a Proof of Concept.
Neither GasLINE nor Globalways are currently running a 200G Alien
Wavelength in production.

This doesn't imply that we're not going to!

Alien Wavelength aka BlackLink

- Specified within ITU.G698.2
 - For up to 10GBit/s
 - For $\geq 50\text{GHz}$ Channel Spacing
- A single Channel Interface to an (existing) amplified DWDM-Network



The Network, aka the carrier
Marc, GasLINE

The Signal, aka the customer
Moritz, Globalways AG

Motivation - Network



Motivation - Network

- GasLINE is operating a national OTN-Backbone for customers
- Alien Wave is a solution between Dark Fiber and managed bandwidth in the OTN (OTU-X)

Vendors opinions

- Vendors share different opinions
- Selling any DWDM-Hardware except transponders vs. selling nothing
- „Stop that project“ :

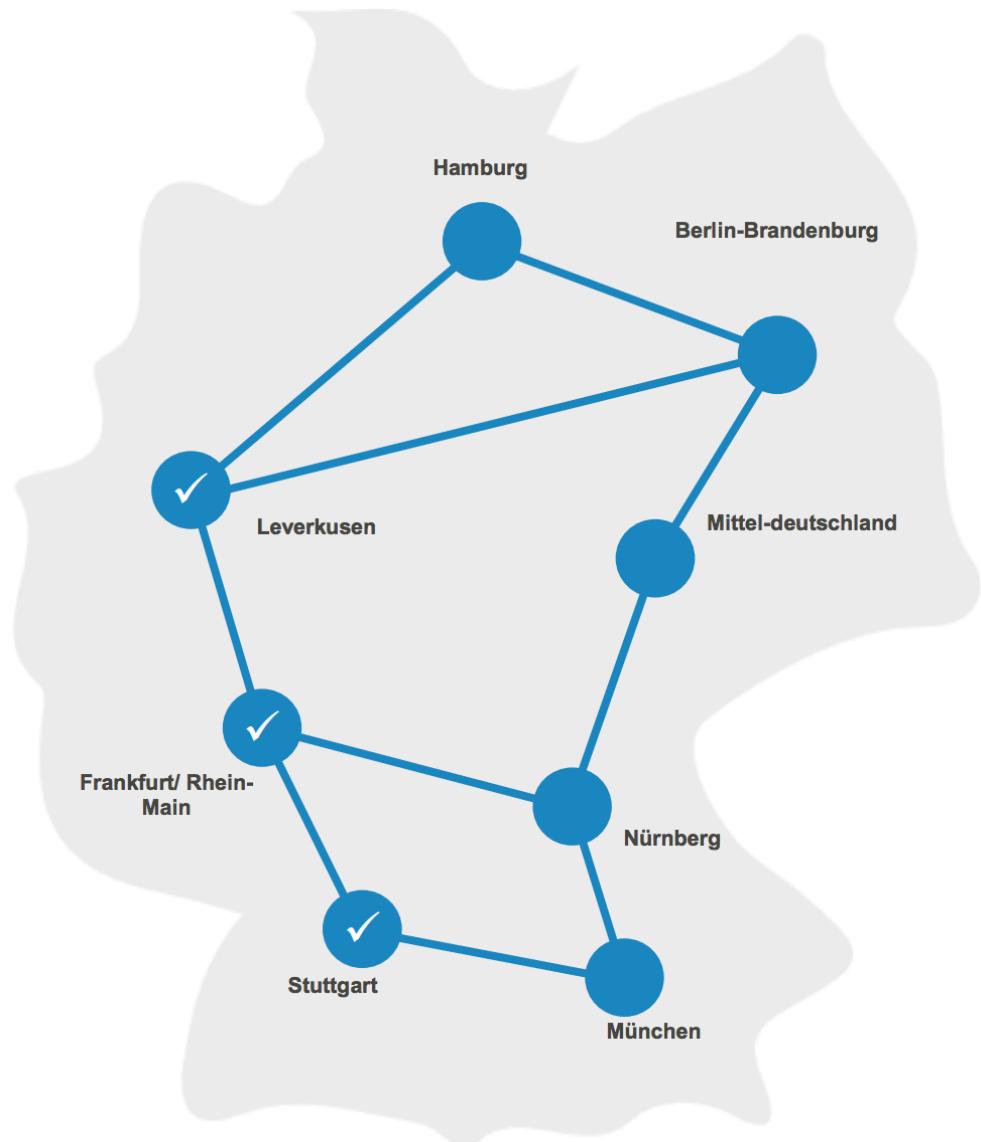
The RND sent me the same document which I sent to you yesterday. So I think the risks and challenges have been described clearly in this document.

I checked the OHV's alien wavelength solution with RND. We think they didn't resolve the issue about monitoring actually, they just supplied some visible path in the NMS.

In my opinion, the market share of the OHV is very small, interconnecting with other vendors in most network is unavoidable for them. So they declare to support alien wavelength to break through the market.

About the license, I confirmed with RND, there is no new function or convenience after you purchase the license. So I suggest don't purchase the license and stop alien wavelength.

Motivation - Signal



Motivation

- Globalways is building and operating DCs all over Germany
- Customers demand 10/100Gbit/s Layer1 DCI
- Operating a dedicated fiber backbone is expensive and not our core-business
- 1x100G Service is cheaper than 10x10G Services
 - Therefore it would only make sense to buy 1x100G and a TD-Multiplexer
 - This would just add costs and add to the complexity



Proof of Concept

The Network

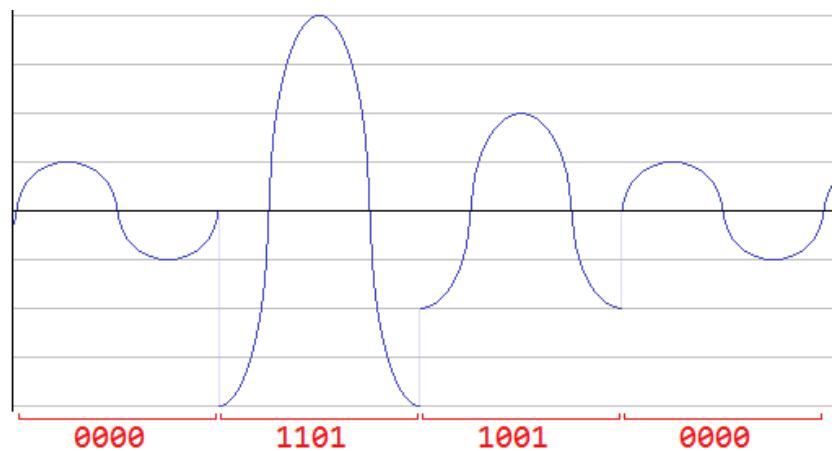
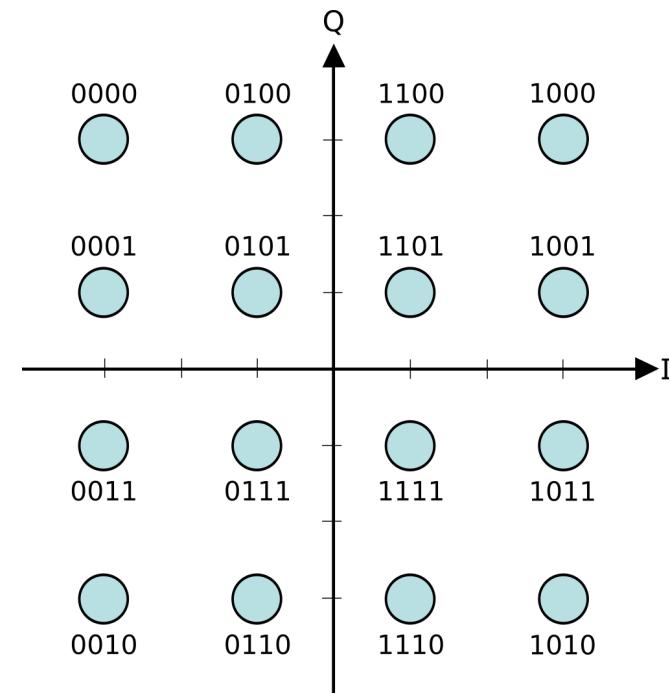
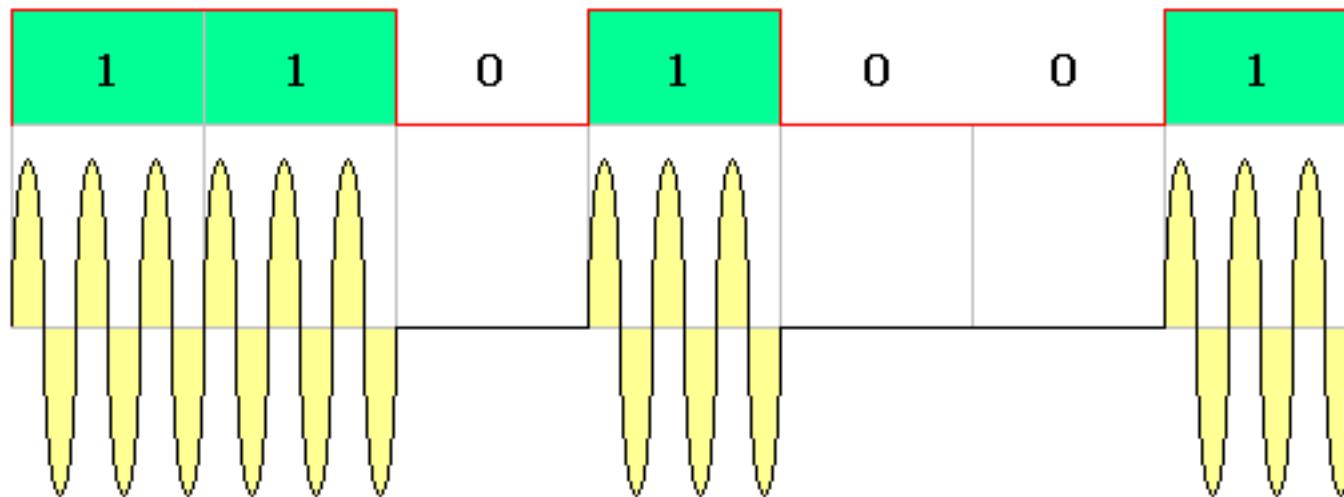


- 280km
- RTD: 3.17ms (incl. DCM)
- OSNR FRA: 20.8dB
- OSNR STR: 21.0dB
- Path:
 - Leinfelden (ROADM)
 - Karlsruhe (FOADM)
 - Gernsheim (FOADM)
 - Frankfurt Kleyerstr. (ROADM)
 - Frankfurt Hanauer Landstr. (ROADM)
- Local Loop to Globalways

The Signal

- 200Gbit/s OTU4C-2
- QAM16 -> max. OSNR ~20dB
- ADVA CloudConnect with QuadFlex Linecard
- ECI Appollon with TM400-EN Linecard
- PreAmps and Boosters to account for local Loops

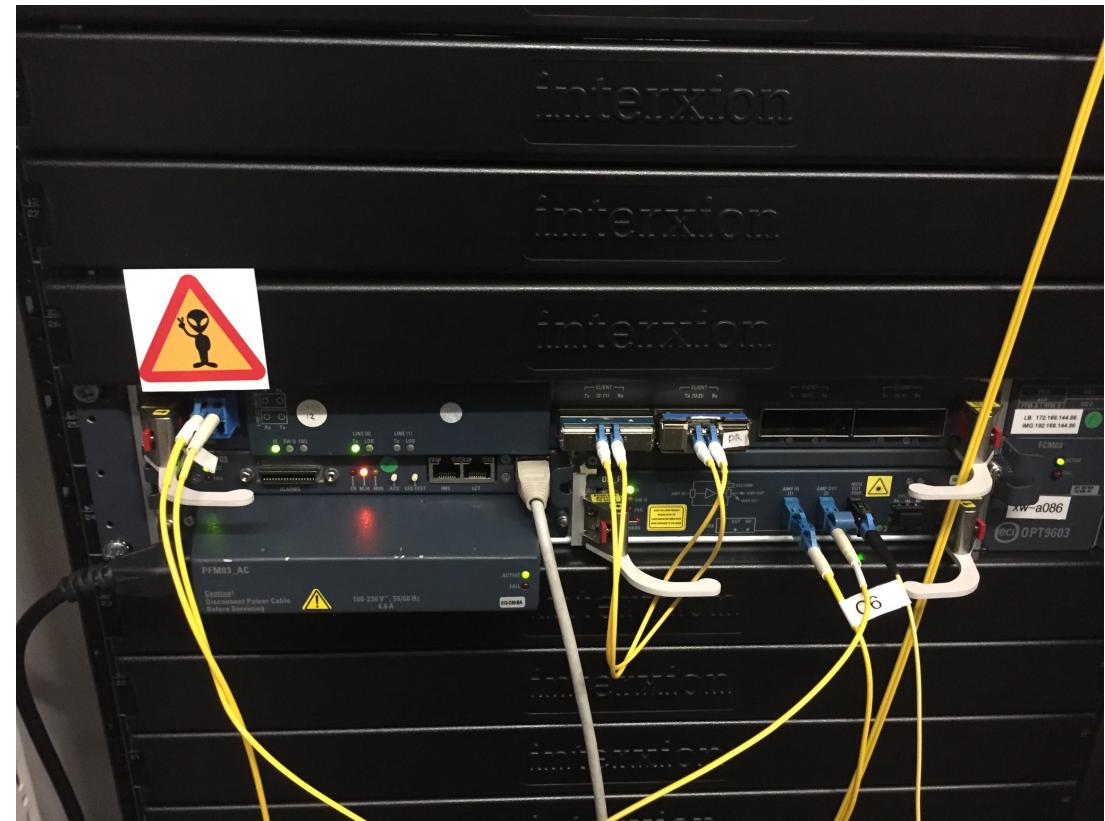
10G NRZ vs 200G at QAM16





POC with ECI

Globalways AG GasLINE



POC with ADVA



Globalways AG GasLINE





Results

- First Tests with ECI only had a Booster and no PreAmp
 - 200G Link came up, but wasn't stable due to uncorrectable bit-errors
 - 100G with DQPSK did work reliably
 - We will come back for 200G
- We took our findings from the ECI POC and applied them to ADVA
 - And were greeted with a stable link

We even did some science!



Hochschule Düsseldorf
University of Applied Sciences



Fachbereich Elektro- und Informationstechnik
Faculty of Electrical Engineering and Information Technology

Analyse der planerischen, kommerziellen und betrieblichen Aspekte der Alien Wavelength

Vorgelegt durch: David Martin-Perez
Studiengang: Kommunikations- und Informationstechnik
Erstprüfer: Prof. Dr. phil. Dr.-Ing. Jürgen H. Franz
Zweitprüfer: Dipl.-Ing. (FH) Michael Groß

Analyzing the planning, commercial and operational aspects of an alien wavelength
Bachelor Thesis of David Martin-Perez in cooperation with GasLINE

So is this something new?

NO

NEW TOYS – 200G DWDM IN JUNIPER QFX10000



av Fredrik "Hugge" Korsbäck den 16 Aug 2017

VOODOO IN SUNETC

[Products](#) [Innovation](#) [Newsroom](#) [Resources](#) [About us](#)

. ADVA FSP 3000 CloudConnect™ in 200G Joint Trial

[Press releases](#)

Telefónica Germany Uses ADVA FSP 3000 CloudConnect™ in 200G Joint Trial

ADVA Optical Networking's OpenFabric™ Technology Creates Simple, Flexible Optical Cross-Connect in Live Disaggregated Network

27 September 2017

ADVA Optical Networking announced today that it has joined the Science-Based Targets initiative (SBTi). As part of the SBTi, the telecommunications technology supplier has committed to set goals for reducing its carbon emissions based on climate science. These science-based targets will align with internationally agreed efforts to keep global warming below the dangerous 2°C threshold. ADVA Optical Networking has two years to set its targets, which will be closely reviewed and validated by SBTi experts. Meeting the targets will officially demonstrate its continuing commitment to sustainability and corporate social responsibility. The company is one of the first 200 organizations worldwide to join the global initiative.

<https://www.advoptical.com/en/newsroom/press-releases/2017/20170928-telefonica-germany-uses-adva-fsp-3000-cloudconnect-in-200g-joint-trial>
<https://www.sunet.se/blogg/new-toys-200g-dwdm-in-juniper-qfx10000/>



FREDRIK "HUGGE" KORSBÄCK

Network architect and chaosmonkey for AS1653 and AS2603. Fluent in BGP
hugge@nordu.net

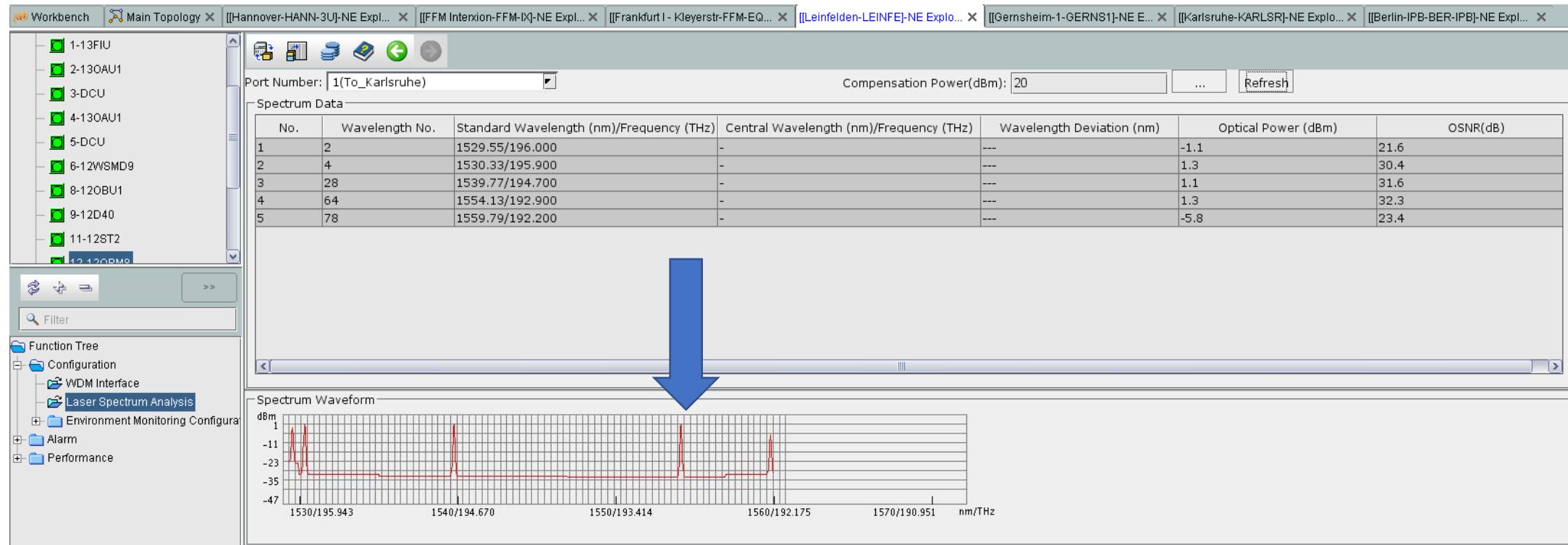
SLA

- The interesting part is that the network is alien to the customer and the signal is alien to the vendor
- In order to operate an Alien Wavelength customer and vendor need to agree on a SLA describing the DWDM
- This should at least include:
 - Maximum OSNR
 - Maximum RX-Power at the Network
 - Minimum TX-Power from the Network
 - Restoration time on **both** sides

Extract from service description

- The passive transfer unit provided by GasLINE is equipped as standard with an interface as per the wavelength according to ITU-T G 694.1 and a connector type (LC/PC) to be agreed with the customer. A transfer is only possible as single mode.
- To implement an OptiNET Connect Alien Wave connection, GasLINE will specify the parameters for :
 - wavelength,
 - channel spacing / channel bandwidth, and
 - transmission level.
- The parameters will be communicated by GasLINE during the planning phase and agreed with the customer in the technical data sheet. The customer will ensure that the agreed parameters are met.

At least, we have a chance to permanently monitor the entire spectrum



Special Thanks

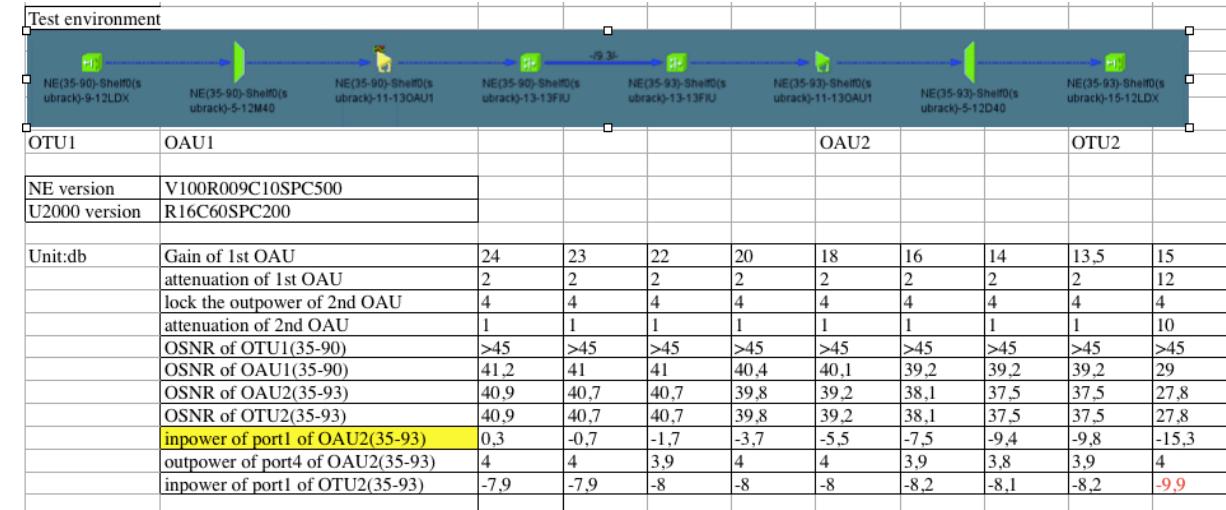
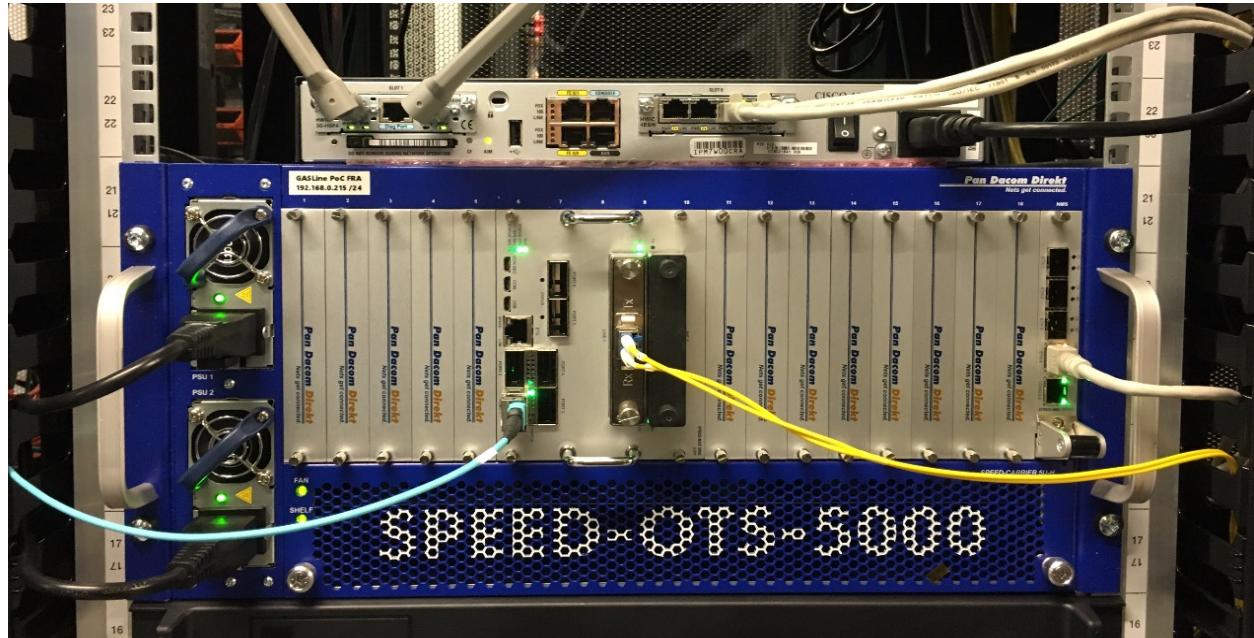
ADVA – Andreas Reinert, Oliver Otto, Oliver Zellin

ECI – Ulrich Hildebrand, Rüdiger Zander

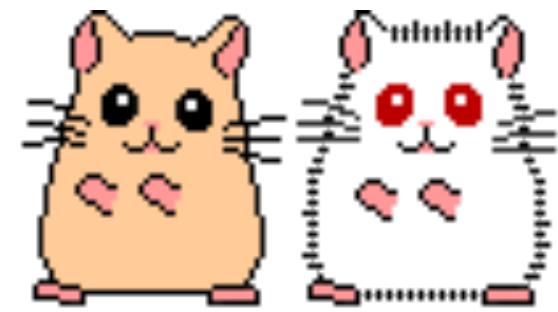
Our Teams – Michael(GL), Lars(GL) and Joachim(GW)

Next steps

- Another running POC in progress with Pan Dacom Direct between Frankfurt and Munich (OTU4 without 3R, eQPSK), results to be reported on request
- Developing an power-limiter either as an eVOA or a preinstalled amplifier with power-locking
- 34C3



Questions?



Thank You!

Backup Slides

Security Considerations

Tom Eichhorn

12 May 2017 at 09:54

TE

To: Marc Helmus, denog@lists.denog.de
Re: Alien Wave aka Black Link ITU698.2



Das macht doch kein ernst zu nehmender Carrier, wenn er ein stabiles Netz haben will...

Gruß,
Tom

No serious carrier would provide this service if he's aiming for a stable network