LUX PROVIDE

MeluXina's Anniversary

June 2022

14/06/2022

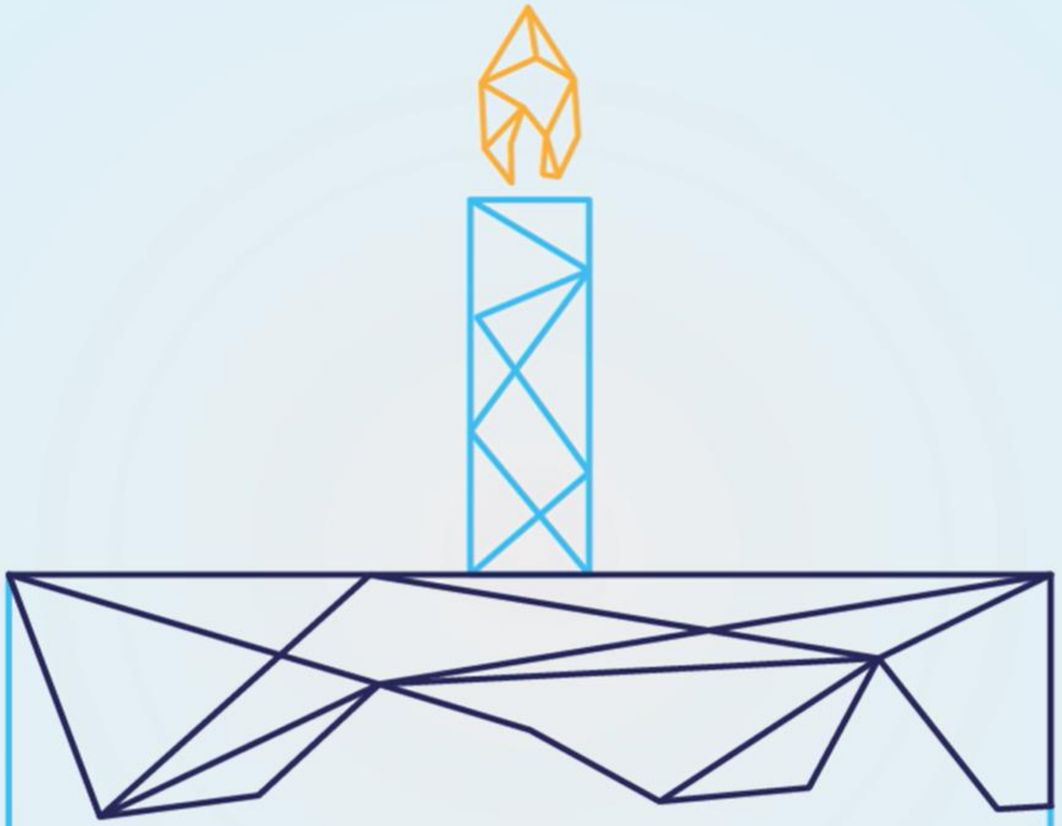
LUX PROVIDE

Franz Fayot

Minister of the Economy

14/06/2022

LUX PROVIDE
high-performance computing center



MeluXina's Anniversary

June 2022

LUX PROVIDE

Roger Lampach

CEO at LuxProvide

14/06/2022

LUX PROVIDE

Ferdinand Kayser

Strategic Advisor to the CEO at SES

14/06/2022

OPTIMISING SES's SATELLITE PERFORMANCE WITH MELUXINA

Presented by
Ferdinand Kayser,
Strategic Advisor to the CEO of SES

Global impact of Luxembourg's technology innovation

Over 35 Years of Success

Luxembourg-grown Player Leading Satellite and Space Innovation Worldwide

VIDEO SERVICES

Broadcasts over 8,400 TV channels to >1 billion people

Reaches 366 million TV households*

Delivers HD & Ultra HD content to any platform, on any device

620+ hours of premium sports & events per day

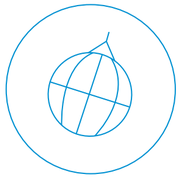
* A trusted partner to the world's leading broadcasters, video platform operators and content owners, including customers such as BBC, CANAL+, Sky and more via the ASTRA satellite system.

DATA SERVICES

Supports telcos with networks roll-outs and connecting remote areas

Delivers high-performance connectivity for Governments*

Connects over 300 customers in 130 countries on planes, ships, oil rigs



Helps restore connectivity after natural disasters

* Government and institutional customers are served via the Defence, Security & Institutions team and affiliates including GovSat (PPP with the Luxembourg Government) and SES Techcom.

World’s Only Multi-orbit Fleet

Revolutionising Space with Unique Combination of MEO and GEO

GEOSTATIONARY EARTH ORBIT (GEO):
Unparalleled reach

4 GEO High-Throughput Satellites (HTS)

- Improving value proposition for **data applications**

8 More GEO to come

45 GEO widebeam

- Reaching **millions of** TV households worldwide
- Providing comprehensive reach to deliver **data connectivity**

MEDIUM EARTH ORBIT (MEO):
Fibre-equivalent data connectivity

20 MEO HTS

- **High** throughput, **lowest** latency

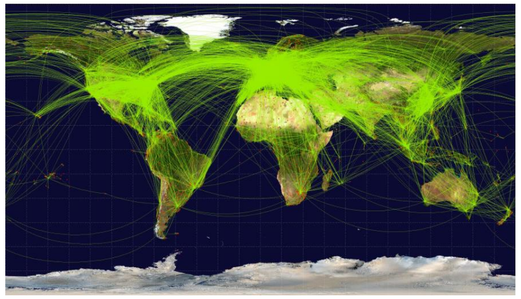
11 O3b mPOWER (upcoming)

SES: Adapting to Growing User Demand

Increasingly More Flexibility, Power and Bandwidth Needed

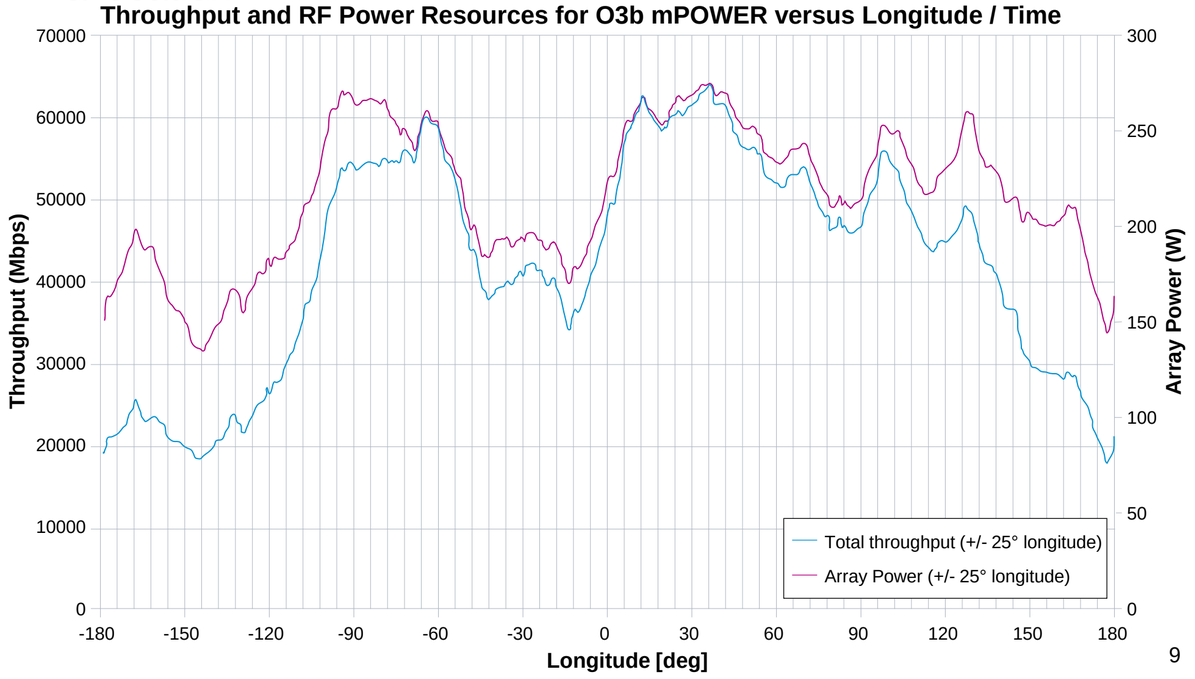
Addressing the customer needs

- Demand for power and bandwidth growing (for telco, aero, government, mobility and more)
- User traffic and mobile terminal position change over time, with increasing adoption of connectivity on the move and cloud



Adapting technology to growing demand

- A real-time software needs to optimise the network configuration continuously to operate efficiently
- Algorithms are increasingly more complicated seeking a fast solution for best possible power, bandwidth and beam allocation



SES's Answer

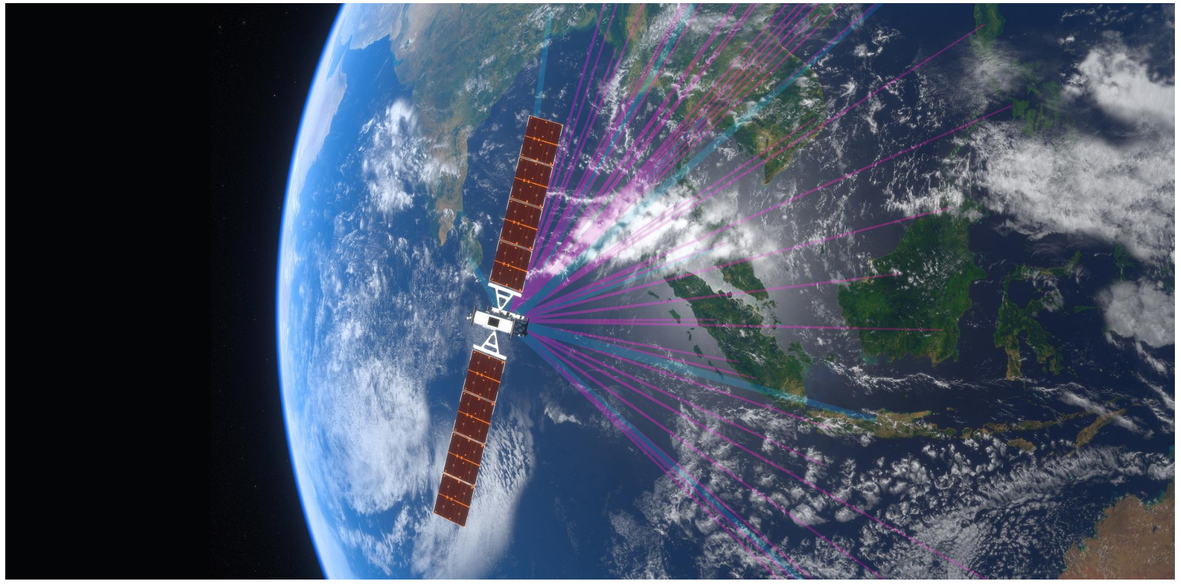
Next-generation High-performance Multi-orbit Systems

SES-17

- Geostationary Earth Orbit
- ~200 user beams, fully configurable capacity
- Bandwidth and power fully adaptable to user beams

O3b mPOWER

- Medium Earth Orbit
- Configurable communication beams
- Flexible bandwidth, power and beam location



O3b mPOWER: Reimagining Satellites

Terabit-level System for Cloud Everywhere on Earth

O3b MEO Constellation

- 20-satellites
- 10 user beams per satellite
- Up to 1.6 Gbps per beam
- 9 SES data gateways globally

O3b mPOWER Constellation

- 11-satellites
- Thousands of beams per satellite
- From tens of Mbps to multiple Gbps per beam
- Flexible data gateways

MeluXina: Superpower of Supercomputer

Advanced Modelling and Testing for Next-generation Satellites Operations

MeluXina enables modelling of real-time satcom scenarios

- Efficiency: complex bandwidth and power allocation - simultaneously and for multiple beams - to avoid satellite service interruption
- Computational power: twice as fast as typical cloud computer resources
- Reliability: secure environment for sensitive customer data
- Flexibility: scalable to large network sizes
- Access: Europe-based, accessible on short notice
- Leading performance: among world's top supercomputers
- Green ranking: recognised as some of the most environmentally friendly supercomputers

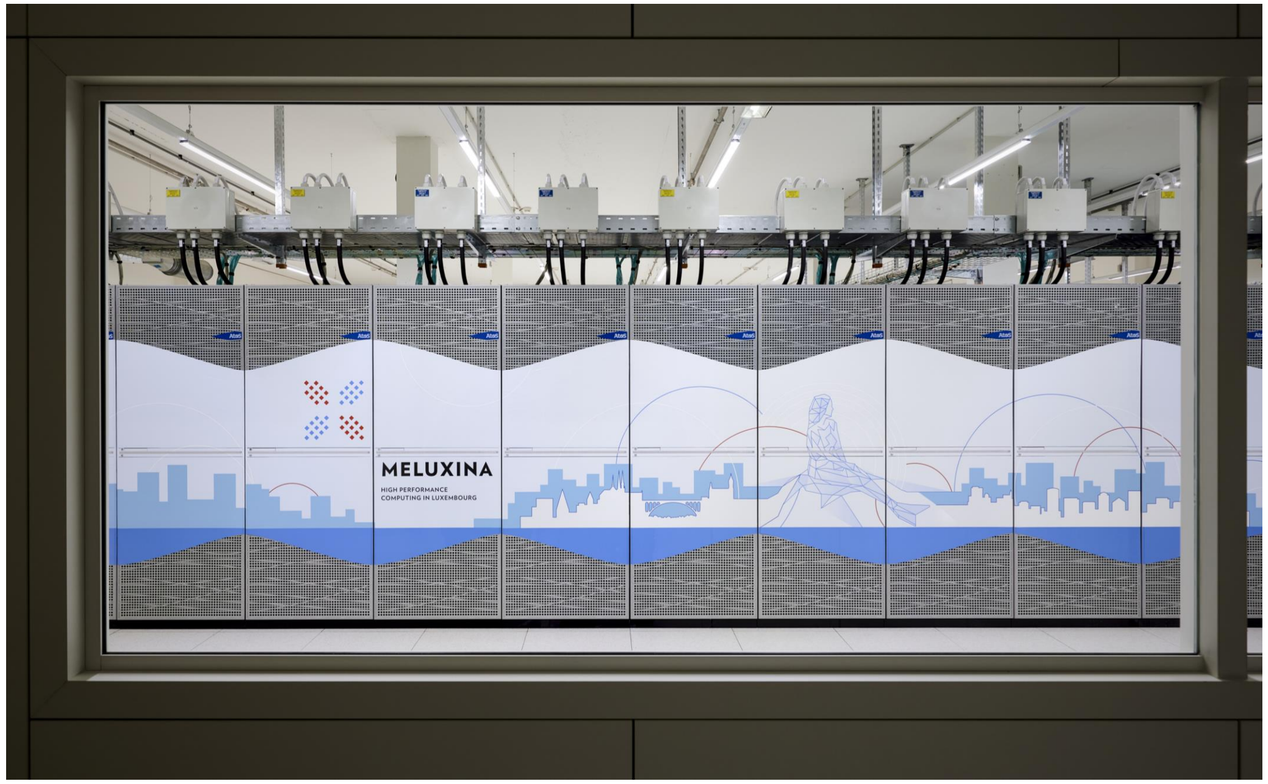
Early Access Project

Advanced Satellite Comms Optimisation Tests by SES and Research Partner SnT

Leveraging innovation for industry-wide impact:

- Project focus: resource allocation for satellite communications
- Team: researchers at SES and long-term partner, University of Luxembourg's Interdisciplinary Centre for Security, Reliability and Trust (SnT)
- Why MeluXina: supercomputer capabilities allow to calculate real scenarios ahead of the satellite launch
- Objective: modelling and optimising performance and radio spectrum usage for broadband satellite communications systems
- Benefits: saving time, providing valuable knowledge ahead of the service launch, supporting technology sustainability vision
- Meaningful impact: SES's software-defined and automated satellite systems set the innovation path for the whole industry and the end users around the world

Joint Team:



THANK YOU

LUX PROVIDE

Guy Schumann

Founder and CEO at RSS-Hydro

14/06/2022

RSS-Hydro

GEOSPATIAL SERVICES FOR A SUSTAINABLE FUTURE

Presented by Guy Schumann, Founder & CEO at RSS-Hydro

THE ERA OF CLIMATE CHANGE IMPACT

Climate Change is the challenge of our times:

- More frequent & severe disaster events (like **floods**)
- Economic impact & loss of life

Real need to improve preparedness & resilience with:

- Better flood prediction
- More frequent **flood risk analysis** & **maps**

OUR TEAM

Guy Schumann

Founder |
Water Risks

Paolo Tamagnone

Flood Modeler |
Flood Hazard

Ben Suttor

Geoinformatics |
IT

Laura Giustarini

Environmental Engineer |
Remote Sensing

Ben Gaffinet

Scientist | **AI/ML**

Livio Loi

Flood Risk |
Vulnerability Assessments

OUR ACTIVITIES

We are building on scientific advances in remote sensing, Earth Observation, drones & computer models for a more sustainable, resilient & fair world

- **Geospatial Services**

  Advanced computer models and cutting-edge remote sensing technologies
- **Drone-based Services**

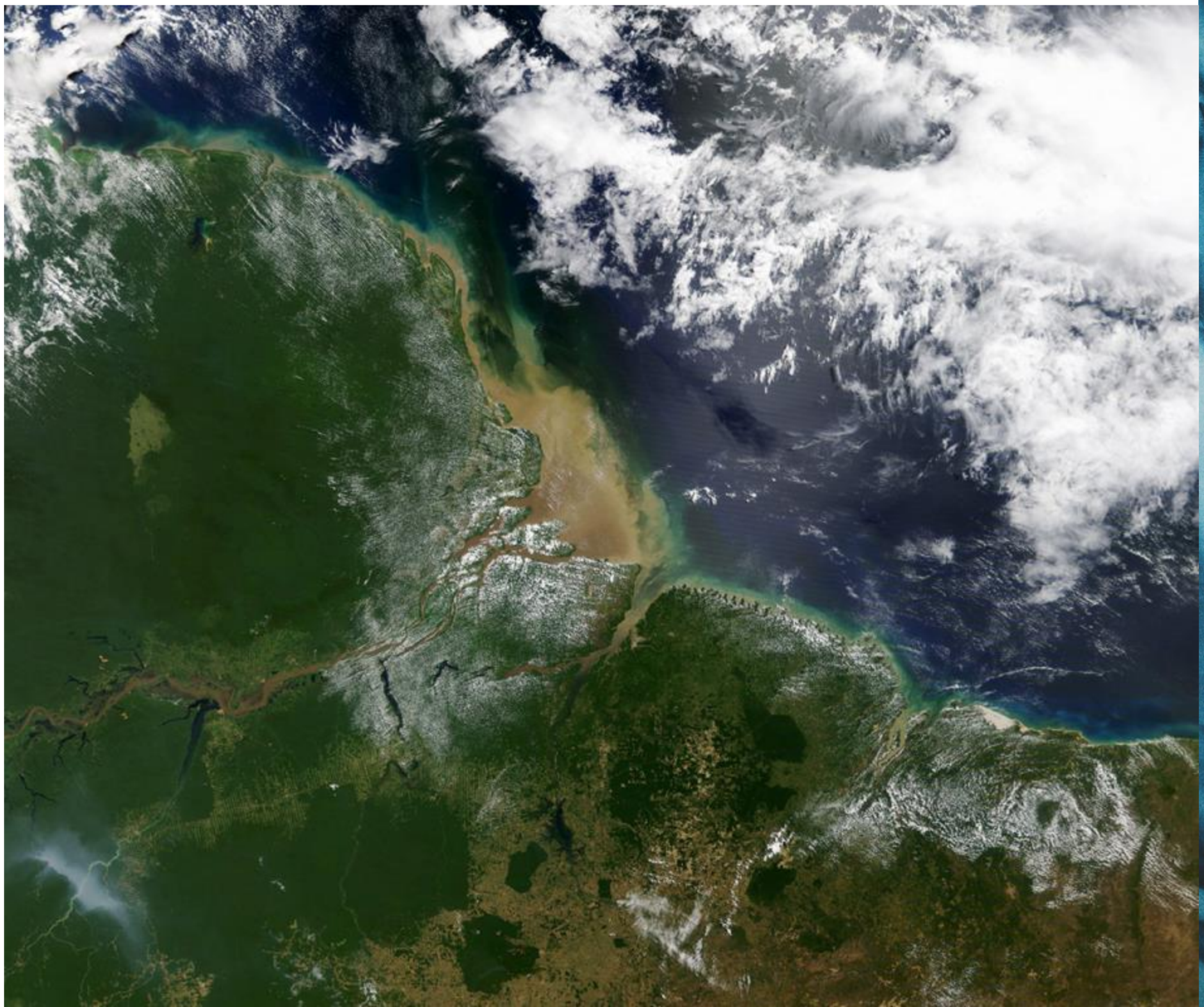
  High-end drones with the newest sensor technologies to respond to real challenges
- **Applied Research**

  Cutting-edge R&D projects on natural disasters, Earth Observation in partnership with national & international organizations

We are determined to make the world a more sustainable & resilient place, including **SDGs** 1, 2, 6, 13, 15, 17 in our mission & activities

RESEARCH & EDUCATION DEPARTMENT (RED)

Cutting-edge research projects in partnership with national & international organizations



RSS-DRONES – FLYING TO INNOVATE SUSTAINABILITY

Trained pilots | Compliant with EU Regulations

Drone-powered solutions to address the problems of our times under a changing climate

MODULAR DRONES:
Aerial Survey | 3D Mapping | LiDAR Point Clouds | Precision Viti- and Agriculture | Disaster Relief | River & Flood Risk Mapping

OUR REVENUE STREAMS

SafeCity Package

The package for municipalities

- Flood maps showing:
  - Current risk & climate change
  - Buildings & people's vulnerability
- Communication
- Benefits:
  - Klimapakt incentives
  - Urban planning & disaster management
  - Up-to-date maps (new ppl, buildings & flood events)

InsureCity Package

The package for insurances

- Flood maps showing:
  - Current risk
  - Risk under climate change
  - Buildings exposure
- Benefits:
  - Future urban development - city simulations (international partners)
  - Helps you to be compliant with EU regulations

R&D

- R&D projects with international partners (i.e. *ESA*, *EC*, *LuxDev*)
- RED: **Research and Education Department** accredited by *MECO*

FIT4 START

OUR COMMERCIAL SOLUTION

Administration des services de secours

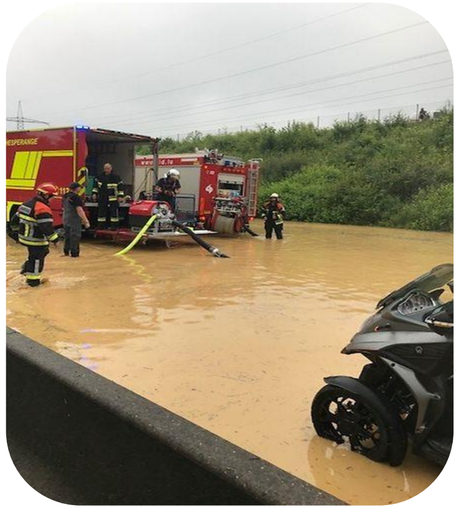
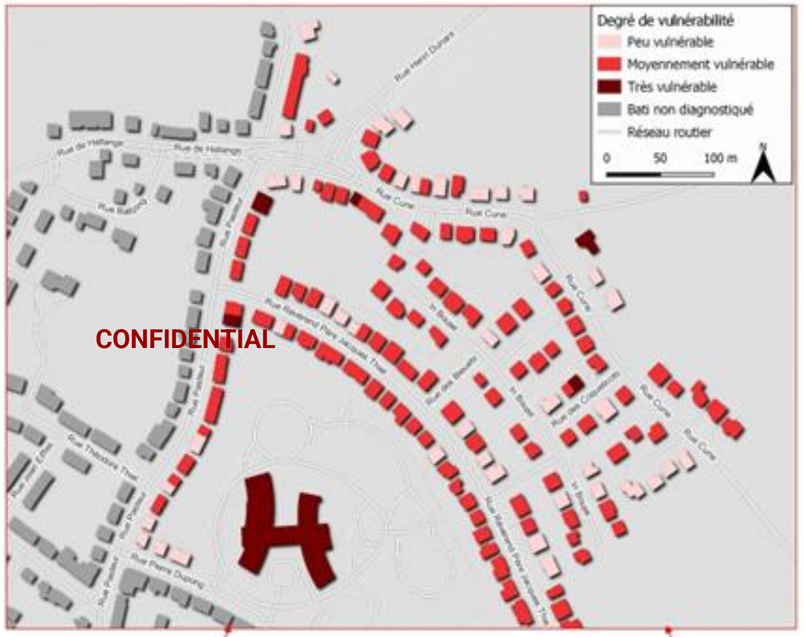
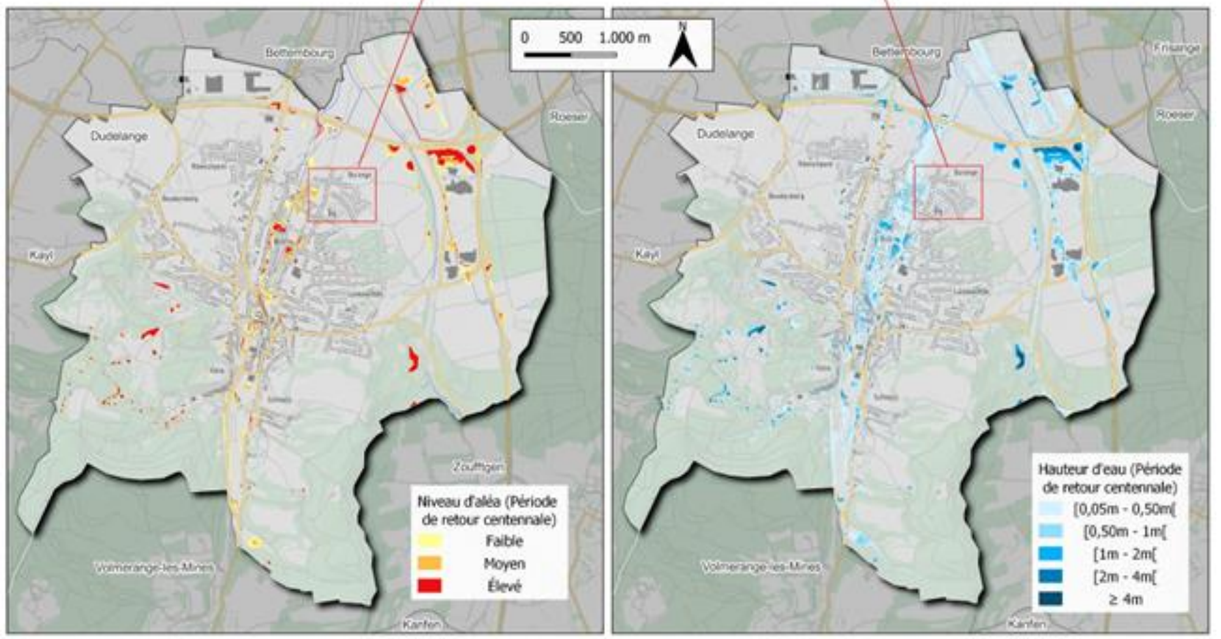


Photo: Laurent Blum

Exemple de diagnostic de vulnérabilité



CONFIDENTIAL



Sources : BD - L - TC / ACT, 2015 ; Lidar 2019 / ACT, 2019

OUR COMMERCIAL FLOOD DEPTH MAPS

Climate change-aware risk analysis

Flood risk commercial maps from:

- 3rd party Earth Observation data
- 2-D flood modeling (+ HPC)

Showing flooding risk likelihood of **today** + including **climate change effects**:

- Likelihood 1:10
- Likelihood 1:100
- Likelihood 1:1000
- Customized

MADE IN LUXEMBOURG

DIDDELENG
VILLE DE DUDELANGE

MELUXINA
HIGH PERFORMANCE COMPUTING IN LUXEMBOURG

LUX PROVIDE

FIT4 START

RSS-Hydro & MeluXina

MELUXINA
HIGH PERFORMANCE
COMPUTING IN LUXEMBOURG

HPC compatible & working well

Current status

- ✓ Onboarding process done (we can run models on MeluXina)
- ✓ Troubleshooting remaining model setup problems & benchmarking CPU and GPU with HPC mentor Farouk Mansouri
- ✓ We are getting a 10x speed up with our CPU model version on MeluXina GPU nodes
- ✓ **Some model runs for production already submitted on MeluXina**
- ✓ **Finalizing GPU model test runs**
- ✓ **Production phase of our commercial solution has started in June**

THANK YOU

RSS-Hydro

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