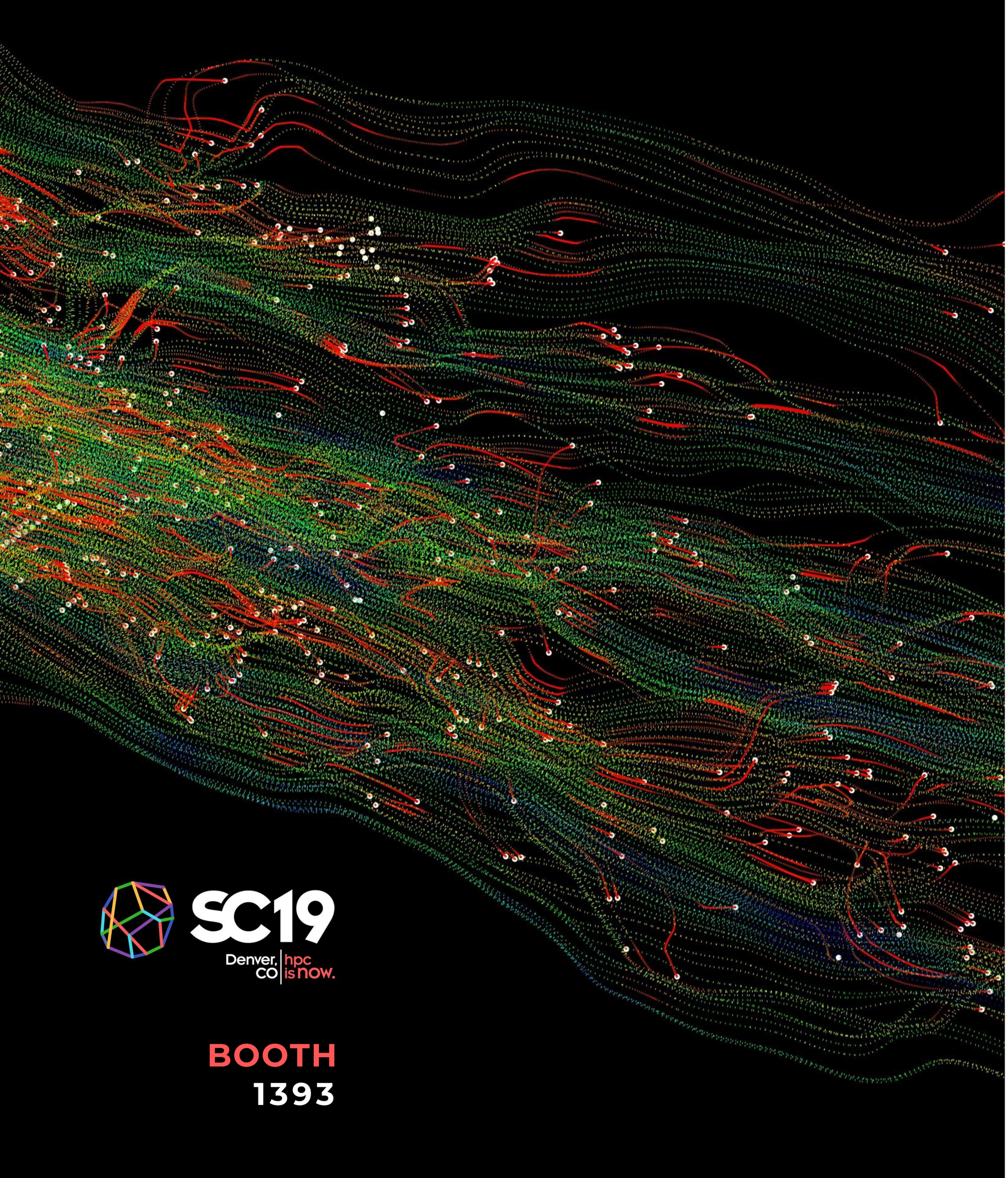


SC19
Denver, CO | hpc is now.

BOOTH
1393

icm

POLAND-SINGAPORE DATA TRANSFER

GLOBAL AIR TRANSPORT OPTIMISER

AI IN BIOMEDICAL IMAGING

GENERIC VISUALIZATION PLATFORM

SUPERCOMPUTING FRONTIERS EUROPE 2020

WARSAW TEAM SCC19

POLAND--SINGAPORE DATA TRANSFER

OVER NEW CAE-1 100G TRANS-CONTINENTAL LINK

ICM

Single DTN server:
2 x 12 core Intel(R) Xeon(R) Gold 6126 CPU @ 2.60GHz
192 GB RAM DDR4 2666
1 x ConnectX-4 (100G Ethernet mode)
2 x ConnectX-4 (FDR IB)
Storage:
2 independent Lustre filesystems (20 OSS each) connected to DTN using FDR IB

A*CRC

Single DTN server:
2 x 8 core Intel(R) Xeon(R) CPU E5-2667 v4 @ 3.20GHz
256 GB RAM DDR4 2400
2 x ConnectX-5 VPI (100G Ethernet mode)
Storage:
Local 8 x Intel NVMe SSD DC P3700 Series 2TB in RAID 0

Agency for Science, Technology and Research
SINGAPORE

COMPLETE SOLUTION

The production trial proved that a complete solution: ***storage + compute + network + data mover software****, for moving data at speed and scale between Central Europe and South-East Asia is now readily available. For this project, the only new infrastructure element is* ***the newly built CAE-1 100Gbps network.*** *Everything else is readily available, including existing hardware and storage.*

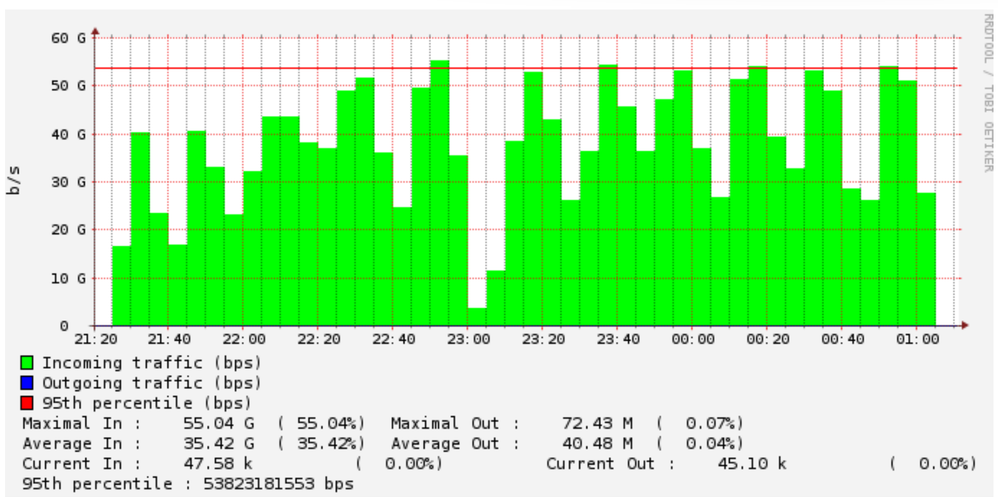
COST-EFFECTIVE

The solution was implemented and work well on older generation hardware and we proved that ***moving 1PB from Warsaw, Poland to Singapore in less than 2 days*** *for example, can be achieved on our production trial infrastructure.*
The ICM Lustre pool consists of two volumes. Each one is built ***using HDDs only*** *and connected to the ICM DTN using an InfiniBand FDR HCA (theoretical upper bound 56 Gbps, 45-50Gbps in practice, 2011 technology). What the trial shows, is that there they can be aggregated transparently.*

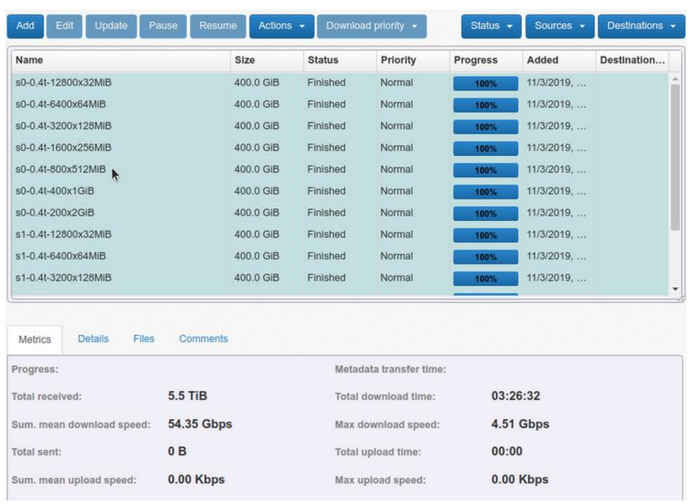
FUTURE PROOF

Everything used in the trial is capable of scaling-out. Lustre is an inherently cluster oriented parallel file system. Zettar zx is one of the only three U.S. DOE funded data mover applications (GridFTP, Argonne, 1996; XRootD, SLAC, 2005, zx, Zettar Inc., 2019) that is cluster oriented.
ICM DTN is done right for this project: it has no internal storage like most demo DTNs do. A true production like two-tier setup, with the DTN strictly as a compute node is used.

100G NETWORK INTERFACE BANDWIDTH USAGE DURING DATA TRANSFER AT 20,000 KM DISTANCE



ZETTAR ZX USER INTERFACE DISPLAYING TRANSFER METRICS



UNIVERSITY OF WARSAW
Interdisciplinary Centre for Mathematical and Computational Modelling
icm.edu.pl

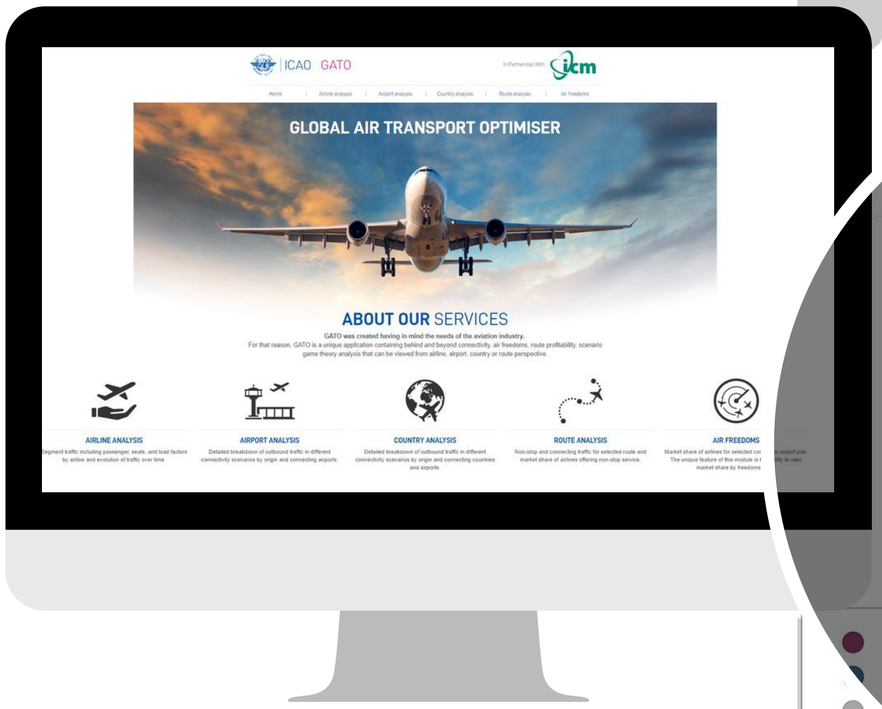
Agency for Science, Technology and Research
SINGAPORE

In Partnership With

GÉANT PIONIER SingAREN

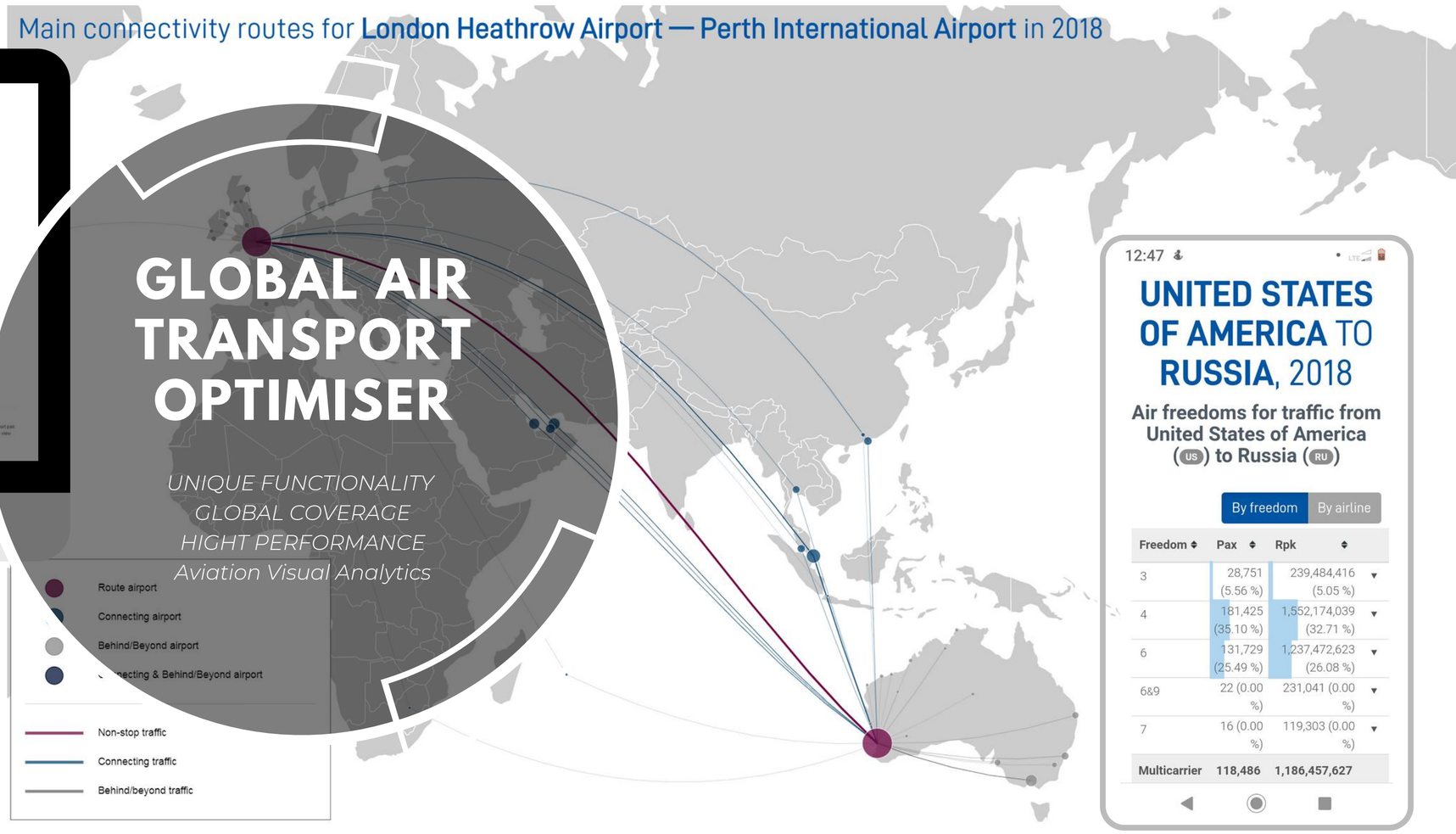
ACKNOWLEDGEMENTS

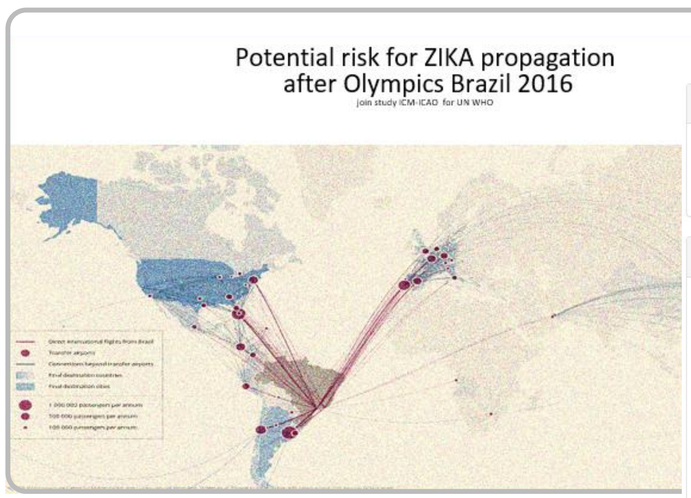
A*CRC: *Dr. Liou Sing-Wu, Tan Geok Lian, Dr. Dominic Chien*
ICM: *Dr. Marek Michalewicz, Marcin Semeniuk, Jaroslaw Skomial*
SingAREN: *Prof. Francis Lee Bu Sung*
Zettar: *Chin Fang, Alexander Nazarenko, Igor Solovyov*
PSNC: *Tomasz Szewczyk, Artur Binczewski*

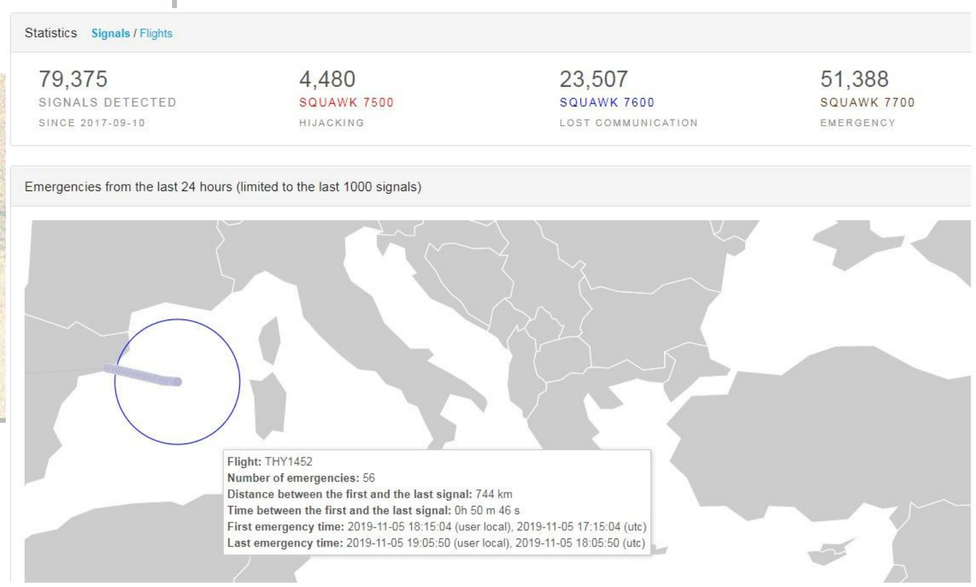


GLOBAL AIR TRANSPORT OPTIMISER

UNIQUE FUNCTIONALITY
GLOBAL COVERAGE
HIGHT PERFORMANCE
Aviation Visual Analytics







EMERGENCY SQUAWK DETECTION SYSTEM

The goal of the application is to monitor and collect distress signals sent by aircraft are collected ***(in particular squawks 7500, 7600 and 7700).***
The system downloads ADS-B data from FlightAware in a real-time manner and stores filtered, normalized and aggregated records at ICM data repository.
An API in a form of RESTful web services is provided with a feed of ***current in-flight emergencies, including their importance, geographic features and time trends, as well as a query interface for past events.***
In addition, the system filters out false positives.
The alerts related to current emergencies can be also actively fed to interested external parties (such as CAAs and ANSPs, etc).

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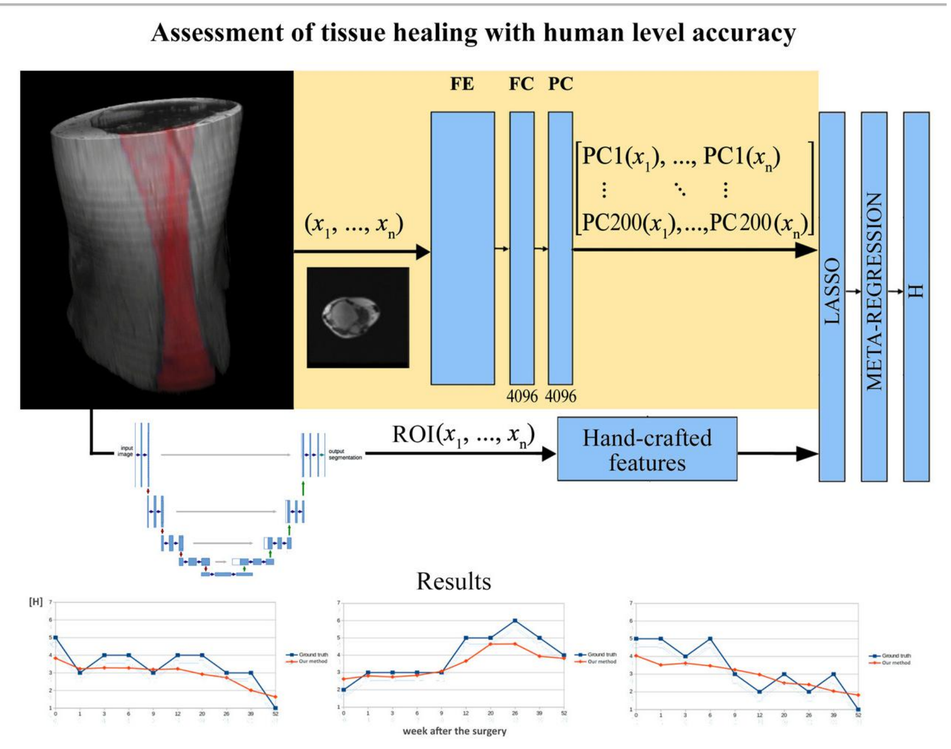
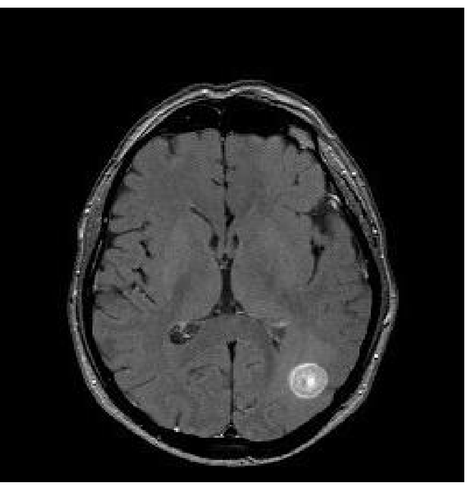
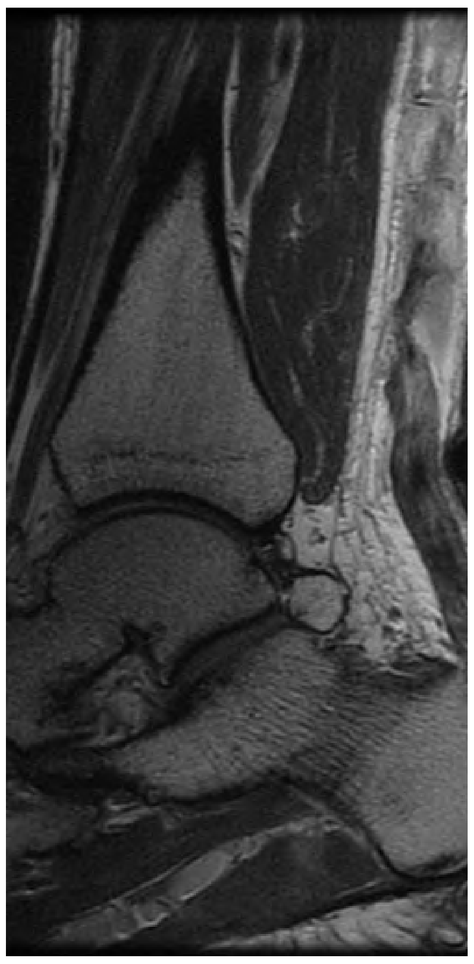
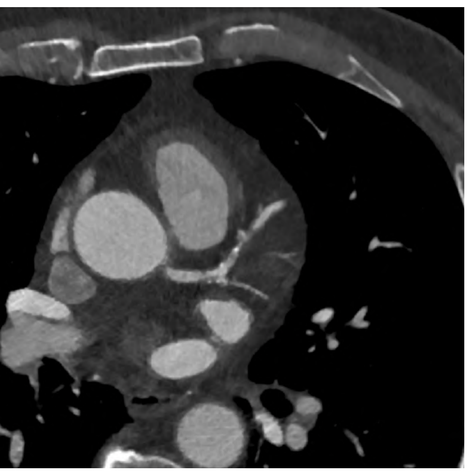
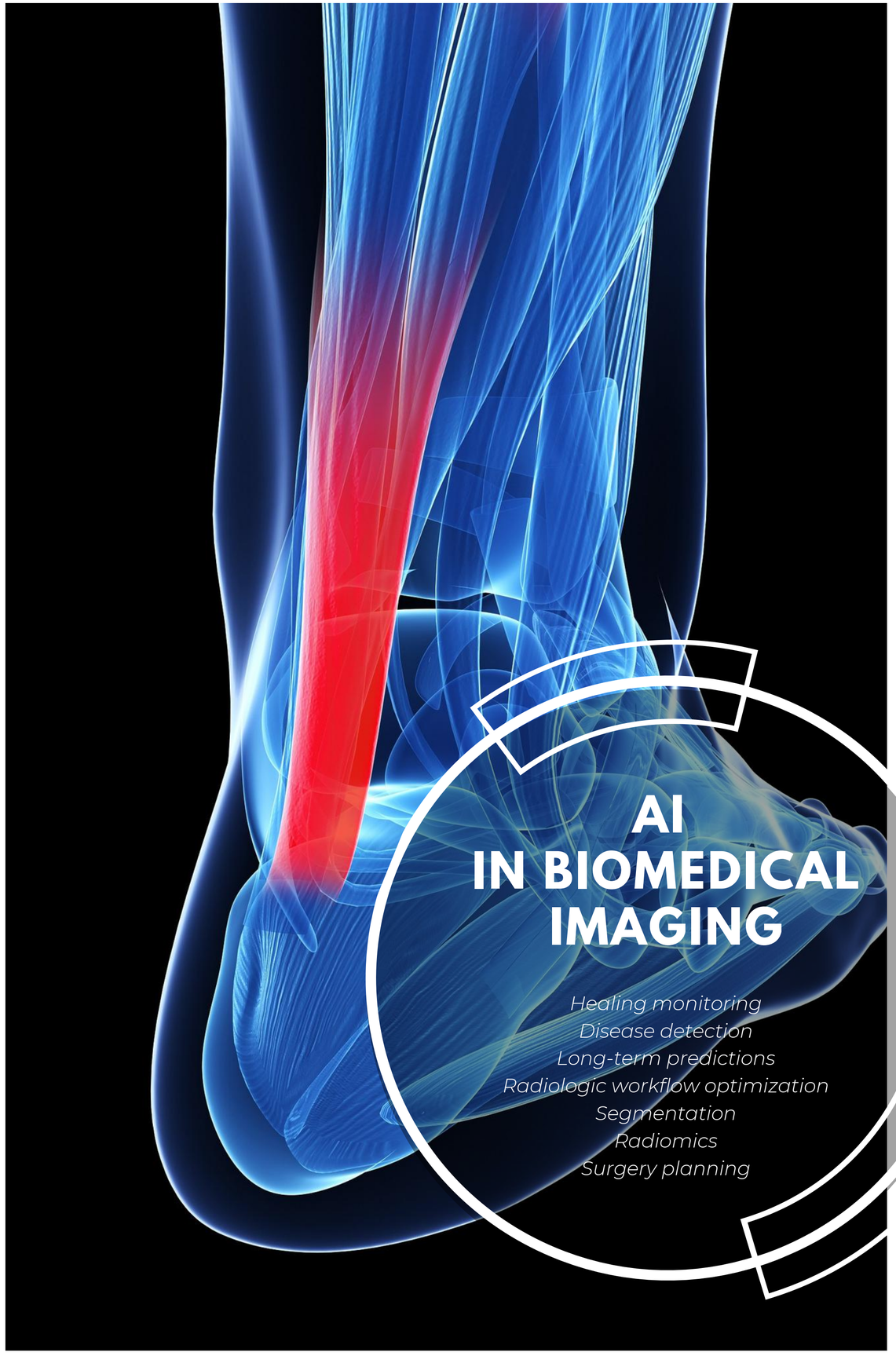
https://gato.icm.edu.pl/reports/

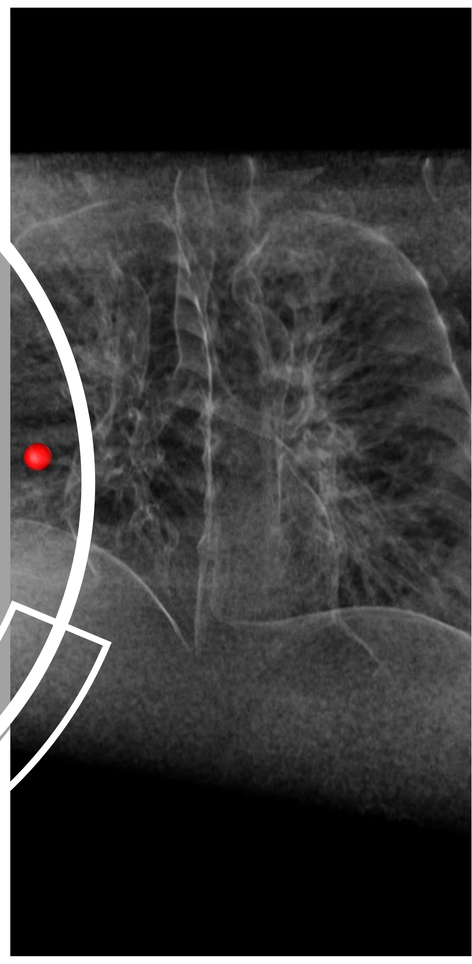

Assessment of tissue healing with human level accuracy
FE
FC
PC
$(x_1, ..., x_n)$
$[PC1(x_1), ..., PC1(x_n)$
$PC200(x_1),...,PC200(x_n)]$
4096
4096
LASSO
META-REGRESSION
H
ROI$(x_1, ..., x_n)$
Hand-crafted features
Results
[H]
week after the surgery

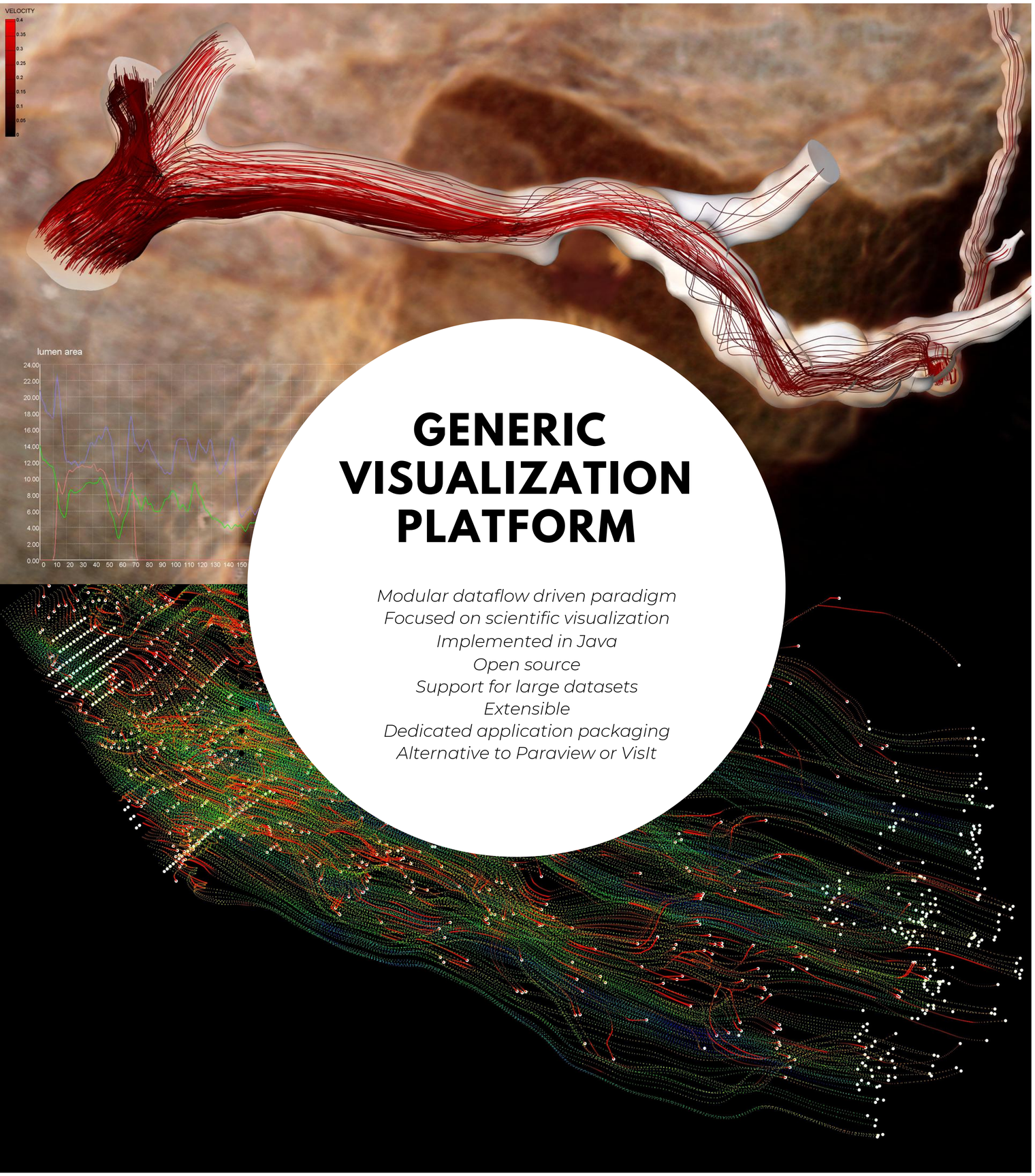






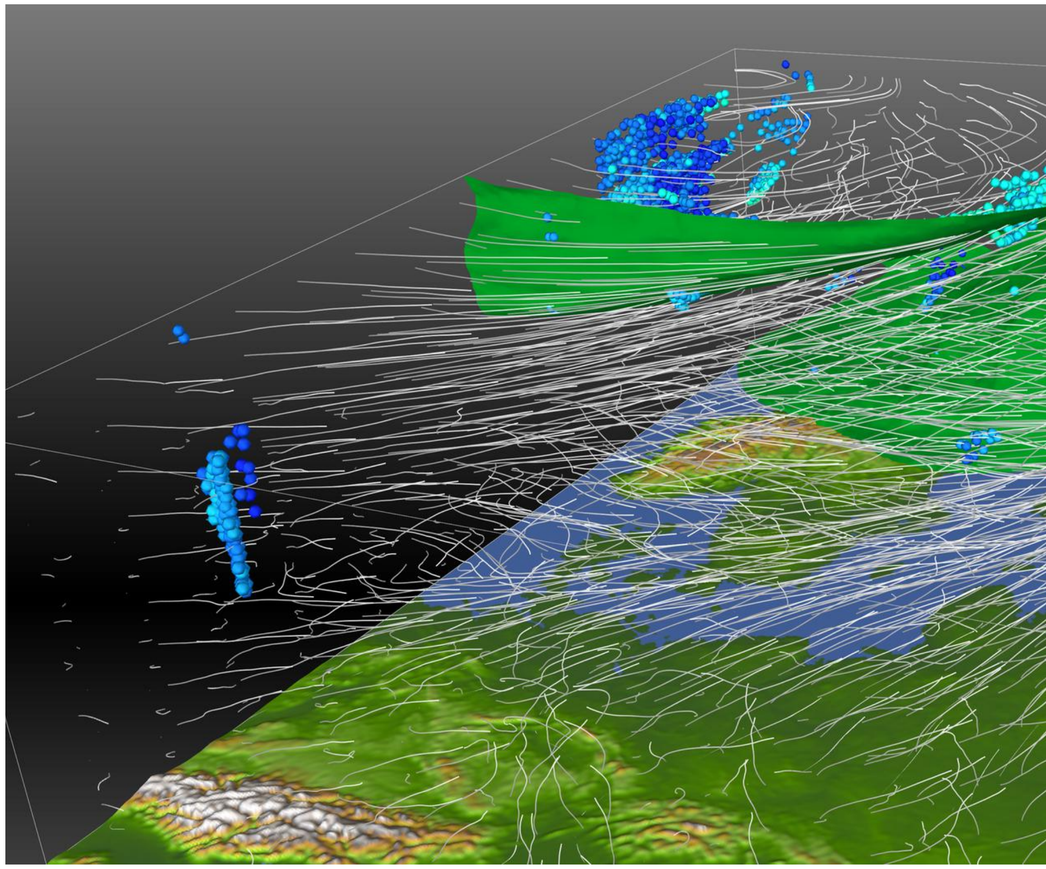

AI
IN BIOMEDICAL
IMAGING
Healing monitoring
Disease detection
Long-term predictions
Radiologic workflow optimization
Segmentation
Radiomics
Surgery planning

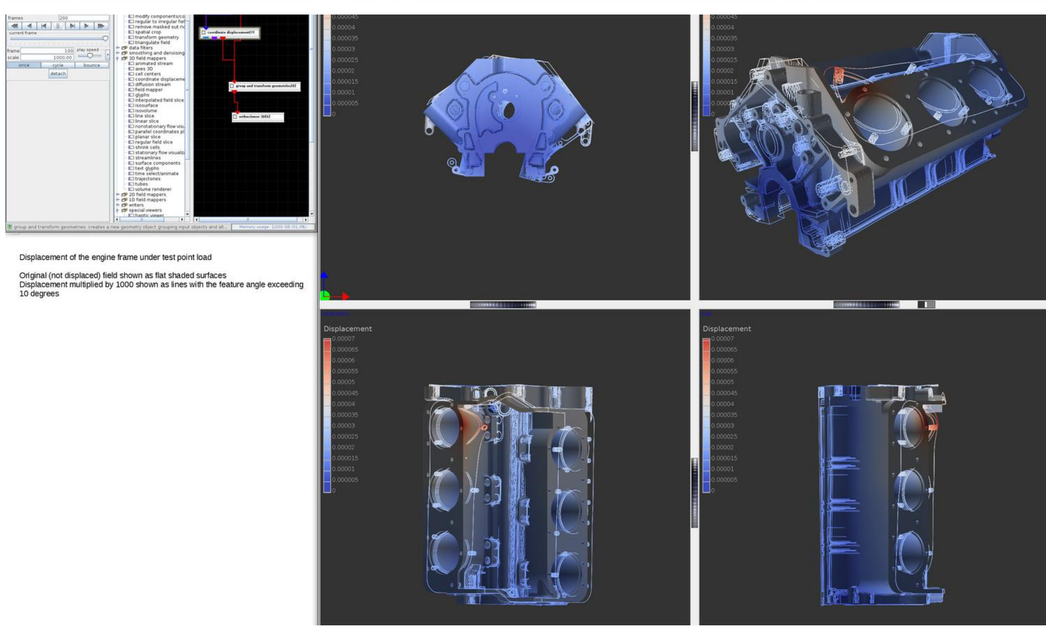


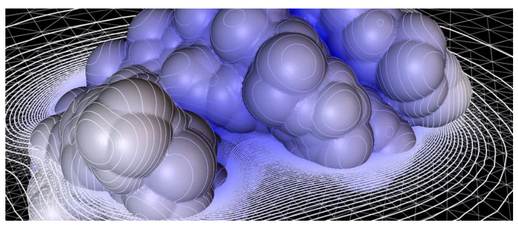


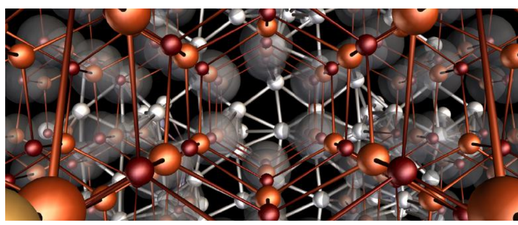
GENERIC VISUALIZATION PLATFORM

Modular dataflow driven paradigm
Focused on scientific visualization
Implemented in Java
Open source
Support for large datasets
Extensible
Dedicated application packaging
Alternative to Paraview or VisIt



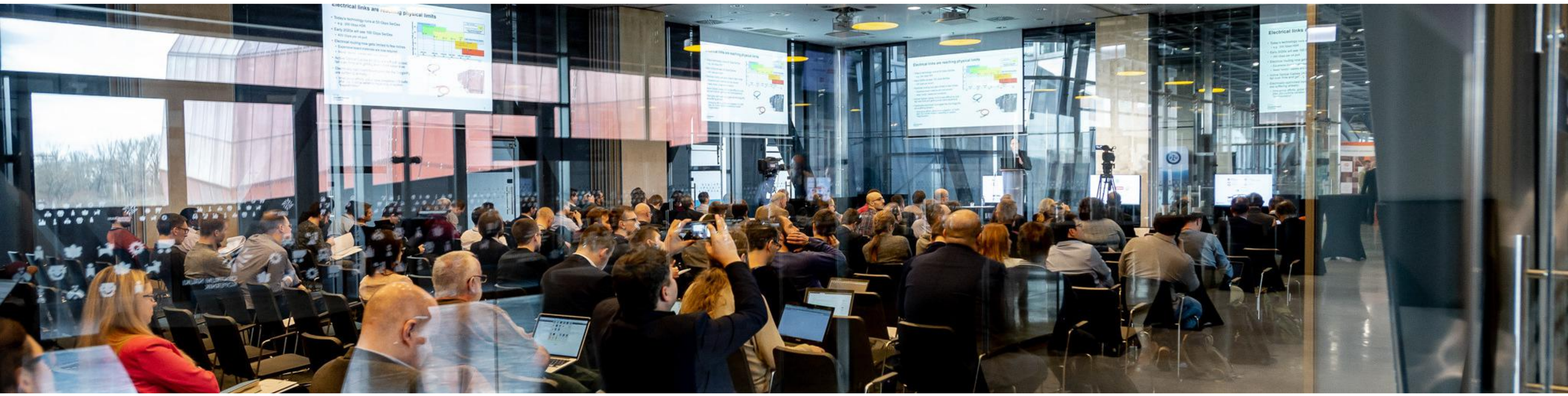






VISNOW

http://visnow.icm.edu.pl



SUPERCOMPUTING FRONTIERS EUROPE 2020

WARSAW, MARCH 23 – 26, 2020

KEYNOTE SPEAKERS 2019

PAUL MESSINA

RUPAK BISWAS

LEON O. CHUA

KEYNOTE SPEAKERS 2018

WHITFIELD DIFFIE

DIMITRI KUSNEZOV

KARLHEINZ MEIER

THOMAS STERLING

https://supercomputingfrontiers.eu/2020/

STUDENT CLUSTER COMPETITION

SC19, DENVER, BOOTH 1299L

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