BROWSER-BASED VISUALIZATION FRAMEWORK TRACER FOR OUTREACH & EDUCATION

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On behalf of ATLAS Education & Outreach

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- TRACER is the browser-based Visualization Framework of the ATLAS Detector developed by the Georgian Technical University

- TRACER is non-commercial and freeware software application never requires third-party authorization for work

- TRACER accessible in all browsers by the link https://tracer.web.cern.ch compatible with all hardware and never requires the installations

- Visualization applications play an important role in Outreach & Education. Modern AR/VR/MXR technologies enable to study detectors, events, organizing public and cognitive events

- Outreach & Education sets basic requirements to visualization applications to be extensive, easily accessible, and compatible with the majority of the hardware and the operating systems, simple in use, with a well-developed user framework

- Browser-based applications created on gaming engines can fit these requirements

A. Sharmazanashvili: BROWSER-BASED VISUALIZATION FRAMEWORK TRACER FOR OUTREACH & EDUCATION   vCHEP2021 17-21 May 2021
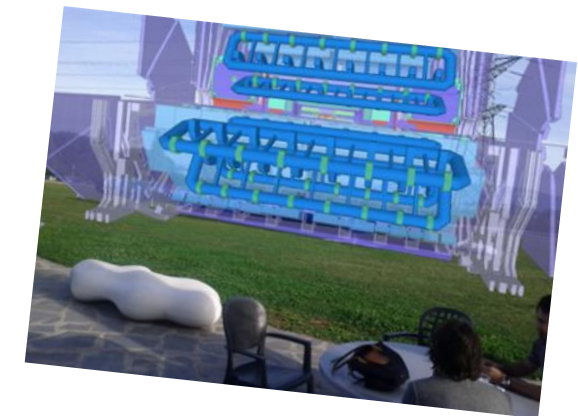
- Gaming engines are growing rapidly. There are > 500 engines

- Tracer is built on the base of WebGL/three.js gaming engine

- The main challenge in the development of Browser-based visualization application for the HEP Outreach & Education is to reach high PERFORMANCE and QUALITY of 3D scene

- TRACER use the special developments to ensure high performance – optimized loaders and so-called fast geometries

- TRACER geometries have special topology and minimal amount of triangles ensuring a high quality of the 3D scenes and high performance
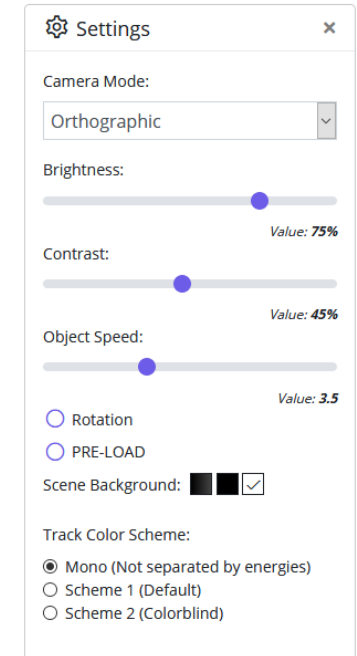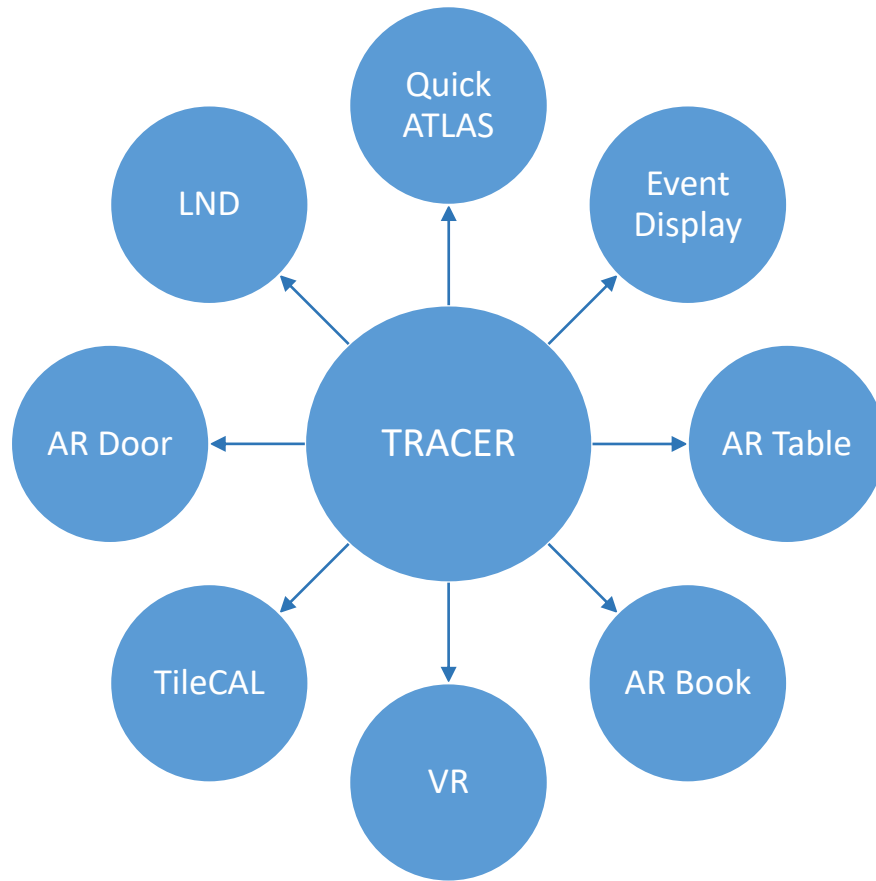
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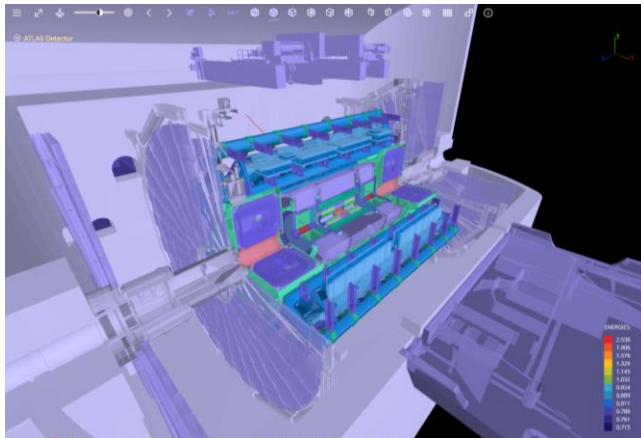
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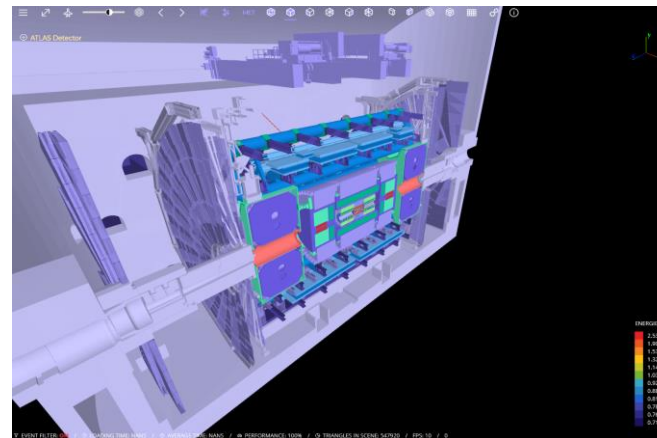
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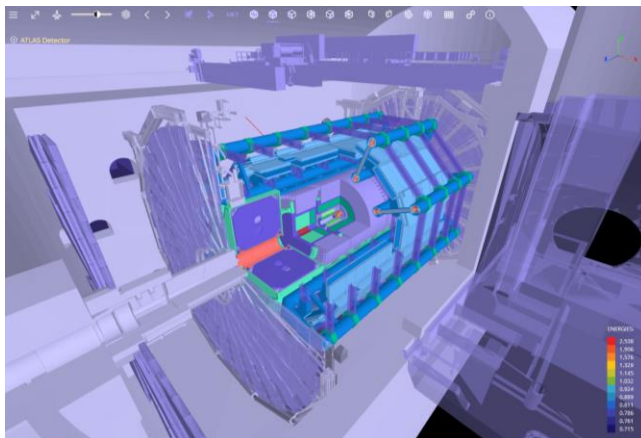
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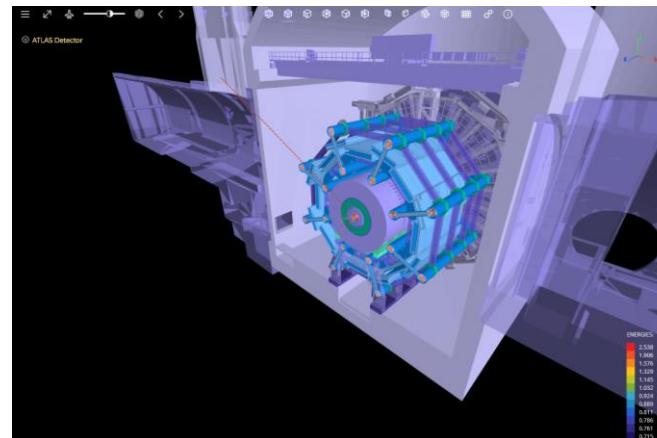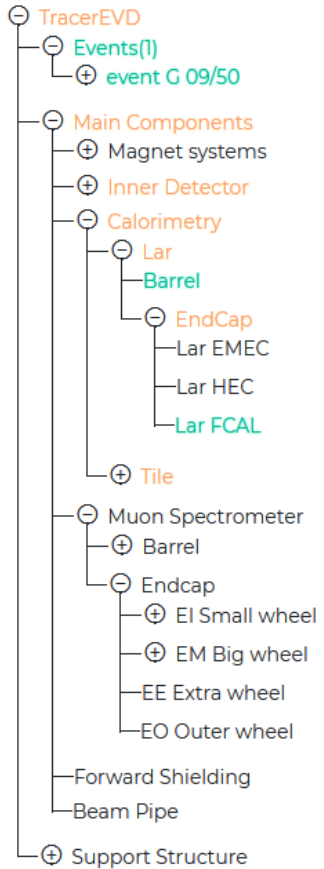
1. Expandable project tree enables to set up of various configurations of the detector and events. There are 5 hierarchical levels of detalisation of the components

2. Wireframe and Solid representations with selectable transparency brings various visualization scenarios

3. Components are selectable. The project tree enables to set up the various configurations of the detector

4. Responsive CSS5 screen for all type of devices
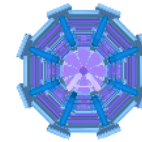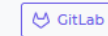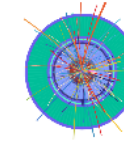
5. Toolbar menu activates commands

https://tracer.web.cern.ch

TracerEVD

3-Dimesional Event
Display Application

Go to Application

- TracerEVD is the ATLAS event display application with extended functionality and features

- Application ensure the high Performance and Quality of the 3D scenes together with the standard functionalities of other ATLAS event displays

https://tracer.web.cern.ch/tracer/subsystem/evd/r2.0/index.html#

TracerVR

Virtual Reality application for the realistic representation of the digital content of Detector in the 3D

Go to Application

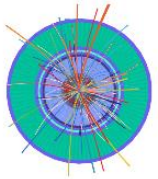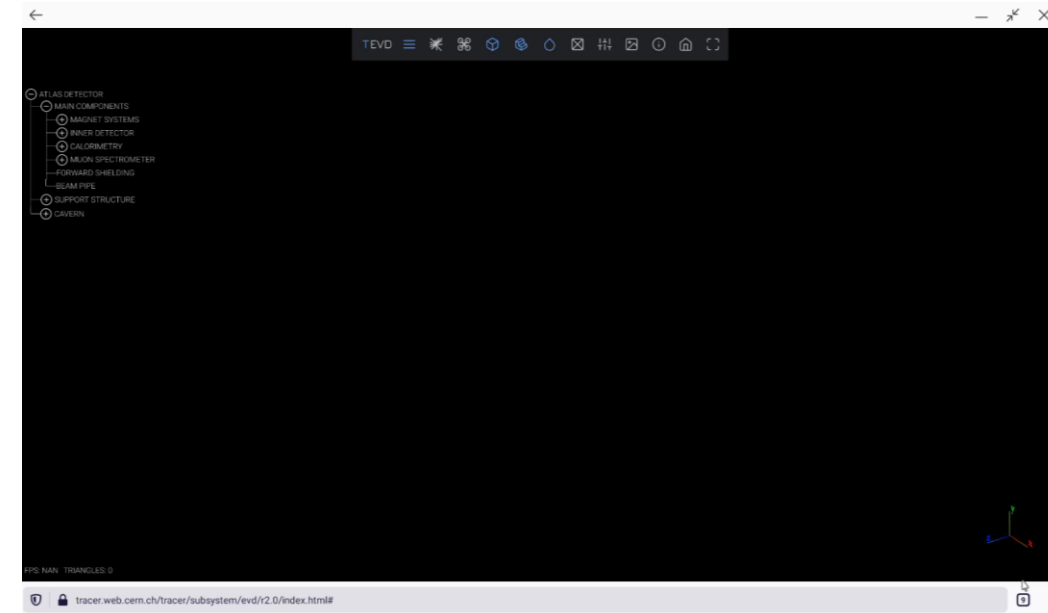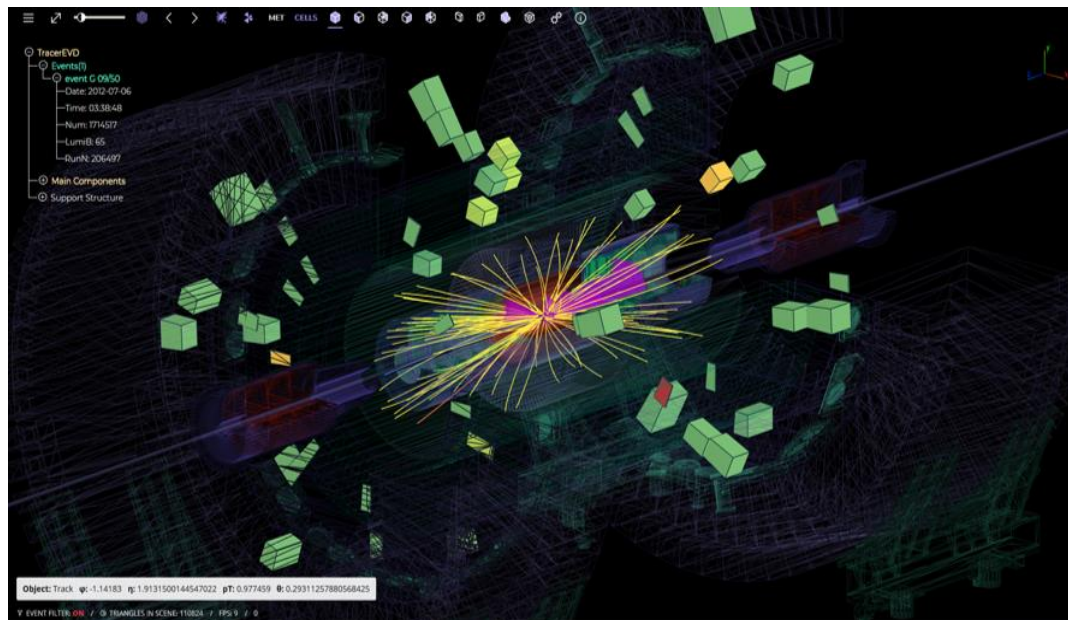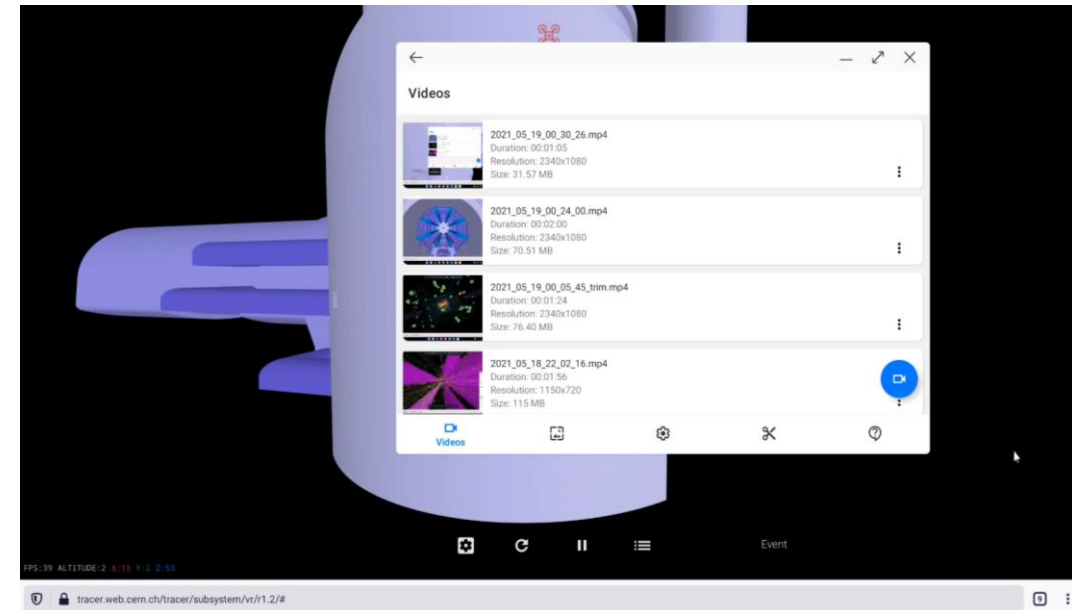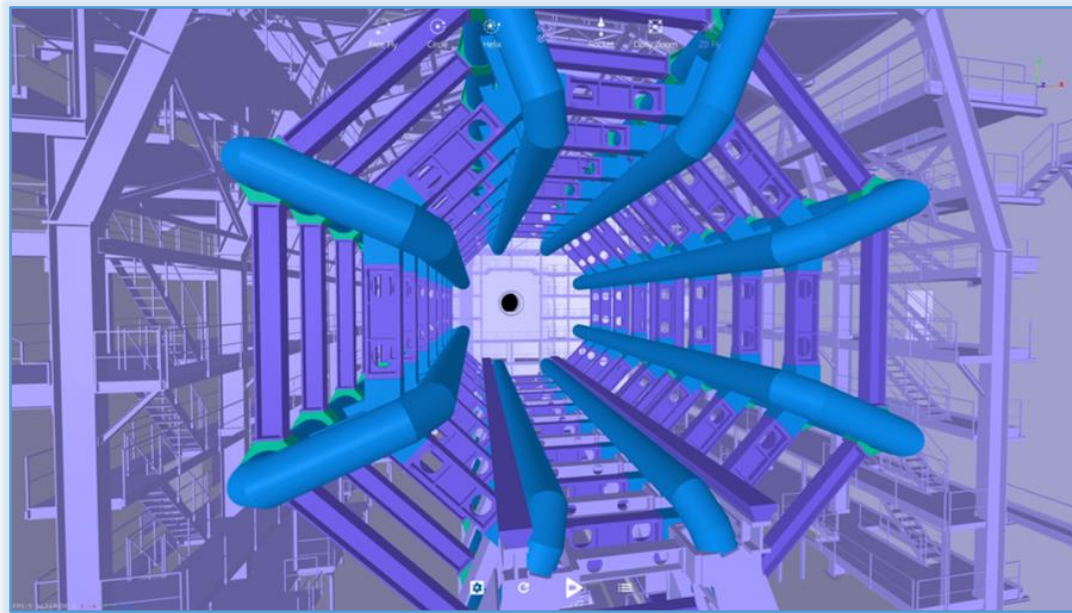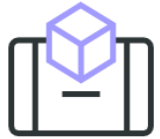- The Virtual Reality Application for realization of the ATLAS virtual tours
- Application running in browsers, using average power mobile phones and 10 euro Google cardboards
- No special hardware, engines or super notebooks!
- Drone flying modes -

Free Fly   Circle   Helix   Rocket   Dolly Zoom   Z0 Fly

https://tracer.web.cern.ch/tracer/subsystem/vr/r1.2/

http://tracer.web.cern.ch

https://tracer.web.cern.ch/tracer/subsystem/art/index.php
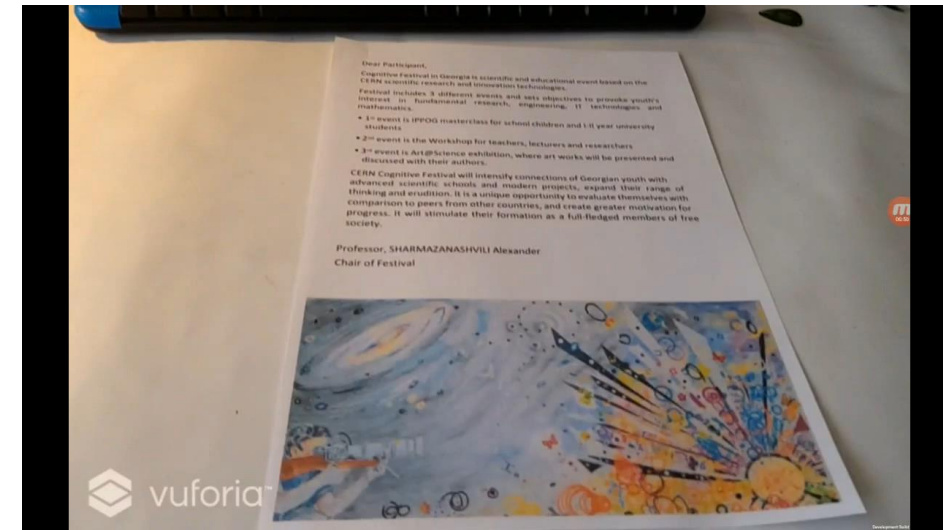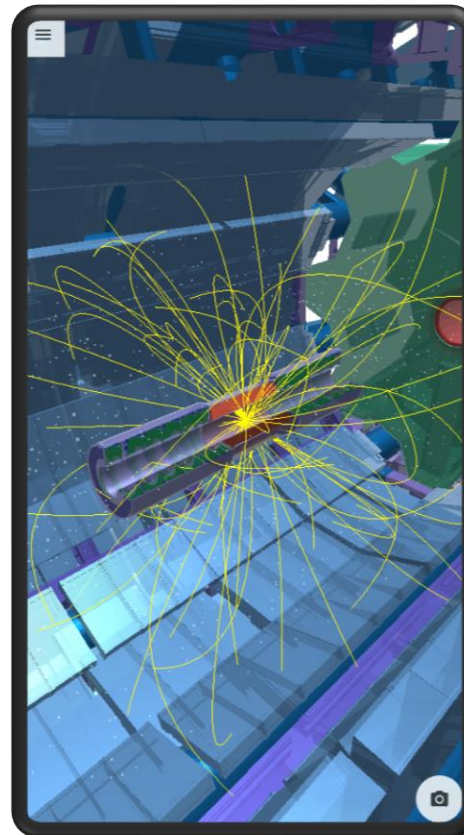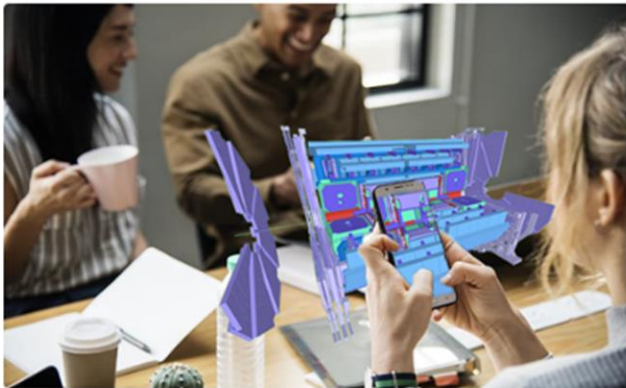
CONCLUSIONS:

1. TRACER is ready to use and well-developed application

2. TRACER is a unique application, which brings detailed descriptions of full ATLAS infrastructure in browser and ensures at the same time the high performance

3. The main advantages which separate TRACER from the other similar applications are:

   1. Detailed and Realistic geometries of all components of the ATLAS detector

   2. Realistic geometric cuts

   3. High performance

   4. CAD-like interface which is rare for the browser-based applications

4. TRACER use special solutions for high performance - specially developed fast geometries and optimized loaders with smart management of RAM and CPU

5. Application consists of 320Mb size 246 geometry models; 76 JavaScript modules with >32K code strings

6. TRACER development was started by GTU in 2015 and 37 releases in total have been developed

Thanks for the attention!

მადლობთ ყურადღებისთვის!