

Visiting CMS from your living room (virtually!)

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CMS Virtual Visits allow thousands of people each year to experience CMS from the comfort of their own homes or schools. These visits are hosted online, where people interact with CMS scientists as they are shown the experimental areas in Cessy, France, often in their own language! Not everybody can visit the site in person, but this should not be a barrier to experiencing everything CMS has to offer and creating excitement for our audiences. Since its inception in 2006, we have created a system for running the virtual visits for many different audiences and languages. We will take you through the history of this initiative, how they are run today, the feedback we have received, and the exciting possibilities this online visit format can have in the coming years for CMS and other outreach teams.

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1. Introduction

The CMS (Compact Muon Solenoid) experiment at CERN is one of the two general-purpose detectors at the Large Hadron Collider (LHC). In addition to performing research, one of the main responsibilities is to inform society about the work done at the experiment. In this paper, we describe how we perform CMS Virtual Visit, which is an organic project of CMS communication.

2. History of CMS virtual visit

In a classroom in Budapest [1], more than 10 years ago, a teacher, Zsuzsa, reached out to us to find a solution to bring her kids to CERN without physically visiting the institute since the school had no possibility to organize many days of excursion to Geneva for the students. That time the videoconferencing was accessible; therefore, we agreed to try to make a virtual visit of the CMS experiment. We were prepared that these kids usually cannot concentrate for more than 45 minutes, but this first virtual visit lasted more than an hour. We decided after this experience that we could develop something that can be streamlined, which is accessible, interactive, flexible, multilingual, makes the possibility to talk to a real scientist, gets in contact with an inspirational and relatable guide, and is inclusive. Since then, we performed more than 500 virtual visits at the CMS experiment.

3. What is a virtual visit?

Guided virtual tours through the CMS experiment facility, showcasing the detector and its components with the help of a videoconferencing system (nowadays Zoom webinar [2]). In addition to the physical guided tour, virtual visitors can visit those places that are not allowed for visitors but safe for workers.

The technical requirement for the organizer is that in case people are connecting from one place (there is a venue), to establish a good audio/video connection, the place needs to be equipped with a high-speed wired internet connection, a projector or big display, a noise-canceling microphone(s), and a good quality camera.

In case there is no venue, people can join the room individually; in this case, there is only one-way audio/video connection. The connected persons are not able to talk or send video feeds for security. But even in this case we can keep the interactivity thanks to the Q&A panel of the Zoom webinar where the attendees can ask their questions. In this type of visit, we usually ask to have at least one convener, i.e., we establish a 2-way audio/video connection with the local organizer.

To have a smooth virtual visit, we organize a technical test and discussion with the local organizers, where we can test the equipment of the organizer and we can discuss the details of the visit and tailor it to the organizer's needs.

3.1 From the request to the visit

The local organizer can request a virtual visit from the CMS virtual visit webpage [3]. We ask to request a visit for more than about ten expected visitors. In case we receive a request from below this number, we channel them to the open virtual visit, which we organize regularly.

The back office of the CMS virtual visit creates a customized persistent indico page [4] for each visit. We can include here information about the local organizer. People can find source materials about the CMS experiment, which can help the organizer prepare the audience. The connection parameters and information about the virtual visit guides can be found there.

We record the virtual visits and make them publicly available on the CMS virtual visit YouTube channel [5], only if the local organizer and the visitors agree. The local organizer must make sure that people who appear in the camera view on their site agree to be filmed. We respect privacy and concerning rules.



Figure 1: Image collection from CMS experimental cavern during virtual visit

The virtual visit is operated by two technical experts and two virtual visit guides. The surface team has a fixed safe connection somewhere from an interesting place of CMS experiment, which can be the control room or the assembly hall at the life-size CMS poster. Guides are not required to have special access; instead, they should be able to convene the visit and answer questions. They can go anywhere at the CMS experiment site, and the guide must possess all access rights to the experimental cavern and should be up to date with the detector status.

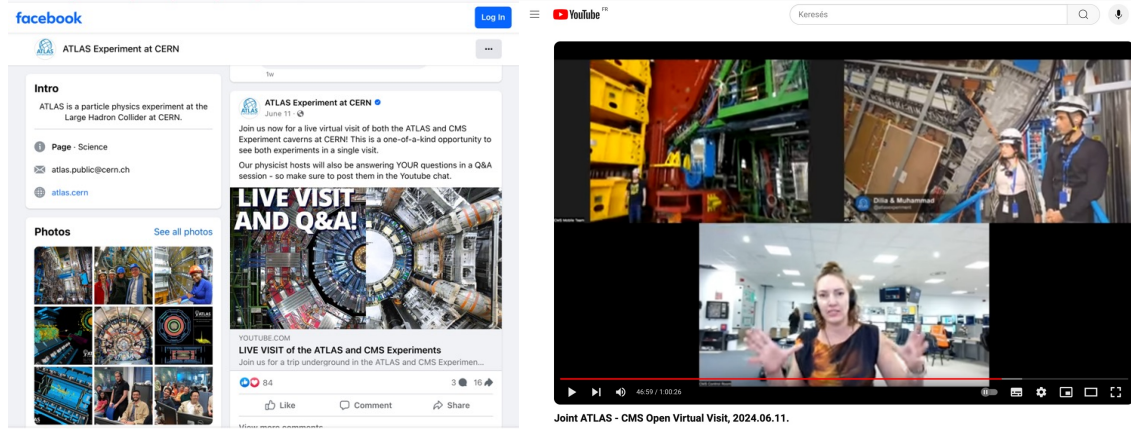


Figure 2: First ATLAS & CMS joint open virtual visit

The format of the virtual visit is highly flexible; we served school classes and events, science festivals, fairs, and European Researchers' Night. We performed full online virtual visits (no school room, no venue), multi-experiment virtual visits (ATLAS, IceCube, LIGO [6]), multipoint virtual visits (many schools and institutes connect), and open virtual visits to serve small groups or individuals. We organized the first ATLAS & CMS joint open virtual visit on 11. June 2024. The length of the visit is usually one hour, but we can accommodate the requestor's wish.

3.2 Experiences

The number of visitors varies usually between about 20 and 500 people per visit depending on the geographical location and the type of the visit or event. We serve usually 50 virtual visits per year, which is about 3000 visitors per year. Peak times are usually during the school teaching period (February-May and October-November). We always receive positive feedback from the visitors via the local organizers.

4. Conclusions and Future

The CMS outreach has a wide spectrum of complementary activities to reach the public, and the virtual visit is one of them (site visit, masterclass, VR, 360, social media posts, blogs, etc.). We plan to continue to make more joint virtual visits with other experiments and other institutes; we also plan to continue to organize more open virtual visits and make them regularly.

CMS has performed this outreach activity for more than a decade. We have a very flexible format to best accommodate the requestor's needs. We organized more than 500 visits so far and served more than 20,000 visitors so far. Having a standardized technical tool and technical experts next to them allows the guides to concentrate on the visit content only.

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