ATLAS Virtual Visits: bringing the world into the ATLAS control room

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Abstract

ATLAS Virtual Visits is a project initiated in 2011 for the Education & Outreach program of the ATLAS Experiment at CERN [1]. Its goal is to promote public appreciation of the LHC physics program and particle physics, in general, through direct dialogue between ATLAS physicists and remote audiences.

A Virtual Visit is an IP-based videoconference, coupled with a public webcast and video recording, between ATLAS physicists and remote locations around the world, that typically include high school or university classrooms, Masterclasses, science fairs, or other special events, usually hosted by collaboration members.

Over the past two years, more than 10,000 people, from all of the world's continents, have actively participated in ATLAS Virtual Visits, with many more enjoying the experience from the publicly available webcasts and recordings. We present an overview of our experience and discuss potential development for the future.

Keywords: ATLAS, LHC, CERN, Education, Outreach, Communication, Virtual, and Visits

1. Introduction

ATLAS Virtual Visits [1] is a project born of the need to provide tools promoting the interaction of LHC physicists with students, media and the general public. Communication experts agree that the best means of communication is through discussion and interaction between the involved parties. That such interaction can occur on a large scale and from remote locations has been proven in the past few decades with the development and proliferation of collaborative tools, such as video conferencing, as well as the explosion of the popularity of Web 2.0 tools and social media.

The primary aim of ATLAS Virtual Visits is to integrate these tools in a manner that can support the communication goals of today's LHC experiments: to entice, inform and educate students, educators, decision makers, media and the general public of the goals and accomplishments of the LHC at CERN. This is achieved by employing a combination of web-based video conferencing, webcasting and non-invasive audio-video hardware to effectively bring groups of visitors inside the ATLAS Control Room, allowing them to hold a one-on-one conversation with a host representative of the collaboration. A short visit to the control room is concluded and highlighted by a question and answer session, which typically takes up the majority of the visit, allowing students and the general public to satisfy their curiosity, and to share their thoughts, ideas and concerns with a researcher from the experiment.

2. Virtual Visit Procedure

The most common example of a Virtual Visit is that of a classroom of students, typically following the completion of an introduction and exercise, such as an LHC Masterclass [3]. The complete procedure from

initial contact to publication of the recording is as follows:

An organizer contacts info@atlas-live.ch to request a visit, negotiate a date/time, and determine guides, often based on relation to visiting institute or language.

A web interface is designed, including a brief description of the event and an embedded viewer for watching the webcast.

A test session is organized by the Virtual Visit technical operator with a technician from the visiting site – this is primarily for testing hardware and connection, but can be used for organizing content presentation.

On the day of the visit, shifters in the ATLAS control room are informed of the visit and of their right to remain out of camera view, if desired.

Videoconference, webcast and recording are started up before the visit, for last-minute tests and preparations.

The guide gives a brief description of the LHC and ATLAS, primarily as a form of orientation, then describes the various shift desks, screens, responsibilities, etc. The camera operator follows the guide on this visit, switching between two camera views.

Fig 1. Visit from Birzeit University, Palestine (top); ATLAS members from Cracow hosting a Virtual Visit in the control room (bottom). Photos: ATLAS Experiment © 2014 CERN.

A significant portion of the visit is reserved for questions and answers – this is typically about 50% of the visit (and can be more).

Following the visit, the recording is processed and edited, then uploaded to a permanent archive on the CERN Document Server (CDS) [4], which is then embedded on the visit web interface, replacing the webcast viewer. The visitors are informed when the recording is published.

It is important that the guide keep in mind that interaction with the students is far more valuable than lecture time. The latter can occur in the classroom, anytime. The event, rather, is a unique chance for the students to have a conversation with someone who is involved with current, fundamental research.

There are several variations to the visit, as the video conferencing software allows multiple participants and the automatic sharing of content. One common addition is to add a videoconference room located at Point 1, from which additional physicists (often from the same institute) talk about their research and perhaps share some images or video. During long shutdowns, ATLAS Guides could connect via a laptop or tablet, to talk directly from the experiment hall or other interesting locations around the CERN campus.

Photographs from two different virtual visits can be seen in Figure 1.

3. Virtual Visit Strategy

Virtual Visits have rapidly become an integral component of the ATLAS Education & Outreach strategy. The platform is particularly important as it provides access to an audience that might not have the opportunity to visit CERN physically, due to economic, social, or geographical reasons. It is preferable not to neglect these audiences, as they can be key to targets to ATLAS communication, in particular in supporting a pro-active globalisation strategy.

Target audiences for ATLAS visits include the general public, policy makers, VIPs, students, and teachers. Although the vast majority of Virtual Visits take place with classrooms, the webcasts and recordings are public, and can be viewed by a much larger public audience. In addition, visits from public events, such as museum exhibit openings or major science fairs, directly reach out to policy makers or VIPs, several of whom have voiced strong interest in having these visits available to constituents [6].

For the first two years of the project, no structured strategy was employed to seek out targets for ATLAS Virtual Visits. Rather, the primary effort was on

keeping up with a growing demand (from 6 visits in 2011 to 65 visits in 2013) and on testing and improving the equipment and procedures. Guides and operators were identified and trained during that time, however, and the international nature of the collaboration naturally led to the development of a very globally distributed program. In fact, all seven continents of the planet have participated in visits (including two visits from the physicists located at the IceCube experiment [7] on the South Pole).

Currently, efforts are underway to coordinate visits with colleagues from other LHC experiments, such as CMS, and also to reach schools in a variety of locations. Grouping visits improves the efficiency of effort by operators and guides, but also allows students in different countries to interact and possibly create lasting relationships. Visits are given in the native language of the students or in a shared common language, typically English.

4. The Future of Virtual Visits

ATLAS has recently upgraded its Virtual Visit infrastructure, improving the audio and video quality, and augmenting the functionality of the equipment to include high-resolution video recording, camera pre-sets and simple content sharing. Usage of a Crestron® touch-controller has simplified operations, making it possible for a single person to guide and operate a visit, albeit with somewhat restricted activities.

With other experiments at CERN becoming more involved in virtual visits, it is natural to consider the possibility of creating a CERN-wide service. Such a service could handle the booking of visits and their operations, centrally, in a more efficient manner than the experiments on their own. The service would mimic somewhat the current CERN Visits Service, which coordinates the booking and operations of physical visits in coordination with the experiments, allowing them to run their own specific visits, as needed.

Concerning the functionality of the visits, one technical area that could be greatly expanded is the web interface. Currently, the interface only provides a brief description of the school or event, a window that is alternatively used for viewing the webcast, followed by the recording, and several links to useful resources.

In our opinion, this interface could be developed into a much more interesting and richer educational platform. Communication tools, such as interactive chat or social media streams, to be used before or during the visit would allow public input to an otherwise passive environment. Educational lessons and other material prepared by the teacher can also be shared on the page. Making it possible for the teacher to have the rights to manage content on the page would facilitate this. Example tools for developing lessons based on an educational video can be seen on the TED Ed lesson sites [10]. One could also imagine the development of an instantly translating chat and comment facility, allowing students from around the globe to share their experiences and to build lasting relationships in their shared love of science.

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