



# TOWARD A CERN VIRTUAL VISIT SERVICE

SHARING SCIENTIFIC DISCOVERY GLOBALLY

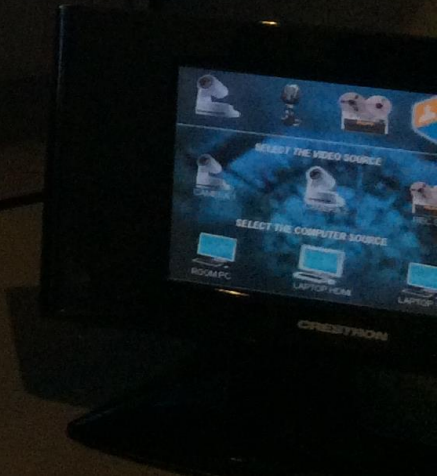
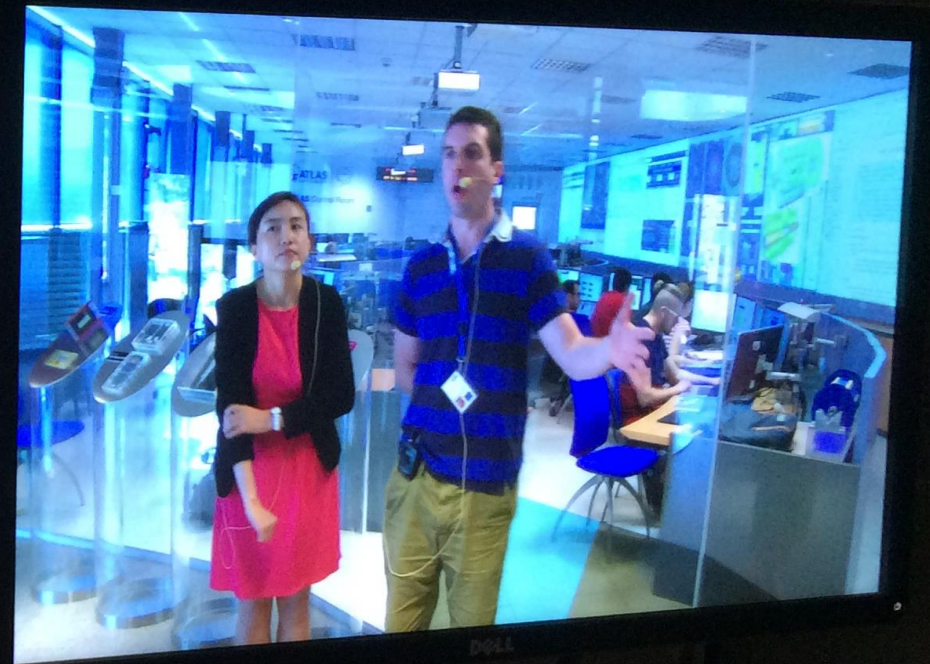
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# WHAT IS A VIRTUAL VISIT?

- A live conversation, in the participants' preferred language, connecting the public (typically classrooms) with scientists at their experimental sites.
- Required Components
  - Videoconference
  - Captivating, Relevant Location
  - Informative Researcher and Inquisitive Audience
- Potential Add-Ons
  - Simultaneous Webcast
  - Recording
  - Virtual Walk-Through of Detector and/or Site







Guide for Operators



# WHO GIVES VIRTUAL VISITS?

- CERN and the LHC Experiments
  - CERN has been connecting with remote classrooms for decades (project-based)
  - ATLAS built dedicated system at Point 1 in 2010, using equipment from First Physics
  - CMS built remote system in 2011 to bring audiences underground
  - ALICE used laptop underground and control room since 2013 and is now developing a dedicated system
  - LHCb installed a dedicated system in 2011 in the control room; new control room has a dedicated system, also underground, for Dedicated Masterclass sessions
  - CCC and Computing Centre are looking into installing systems (perhaps only temporary setups)
- Outside CERN (that I know of)
  - Fermilab looking into it
  - LIGO, IceCube in connection with CERN





CM  
S



ATLAS Virtual

The Jordanian Astronomical Society, and Nepal Astronomical Society

Share on



### Jordan Nepal

7 August 2015 - 11:00 am CET in English

Thanks to the initiative and connections of DSEA Group (Discover Science, Engineering, and Arts), an non-profit organisation that organizes STEM events, this virtual visit will connect CERN and amateurs from: \* The Jordanian Astronomical Society (JAS), founded in September 1987, is located in Amman, the Capital of Jordan. 250 Members develop their astronomical hobby through the exchange of data, information, and observational expertise. Lectures (astronomical or general scientific ones), events like this one and weekly observation of the sky aim at spreading astronomical culture and allied sciences in every-day life, in relationship with all fields of knowledge. \* In Nepal, the program coordinator of the Nepal Astronomical Society will connect with about 140 students of the Saint Xavier's College in Maitighar, Kathmandu. Founded in 1988 by the Society of Jesus (Jesuits), this private educational institution counts today over 3000 Plus Two, A- Level, undergraduate and graduate students from all 75 districts of Nepal.



ATLA  
S



LHCb

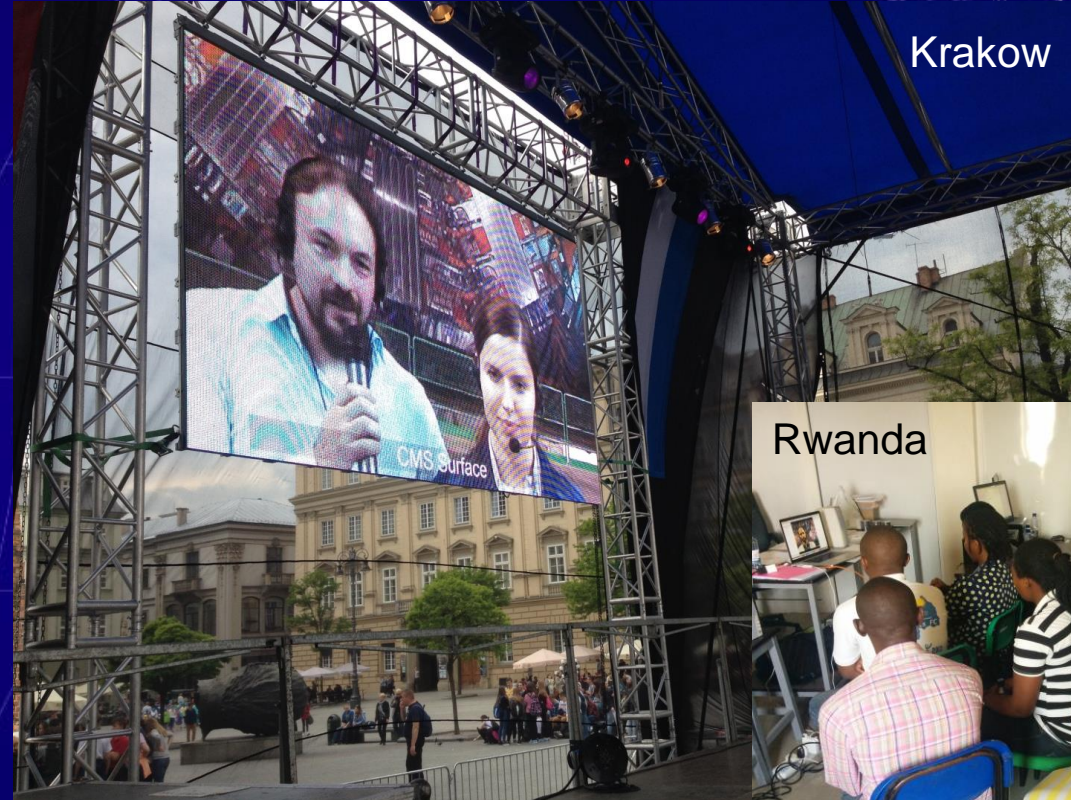


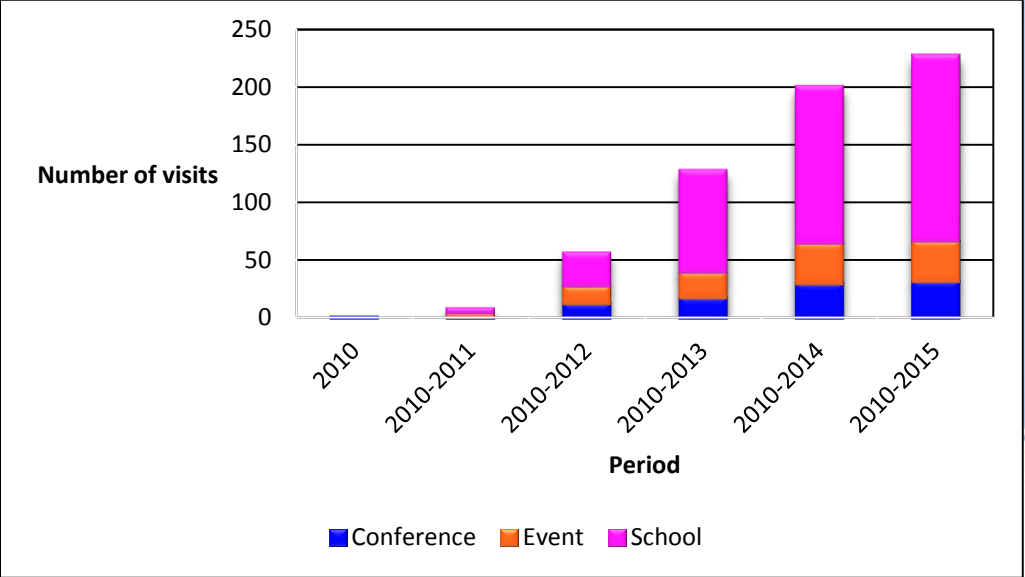
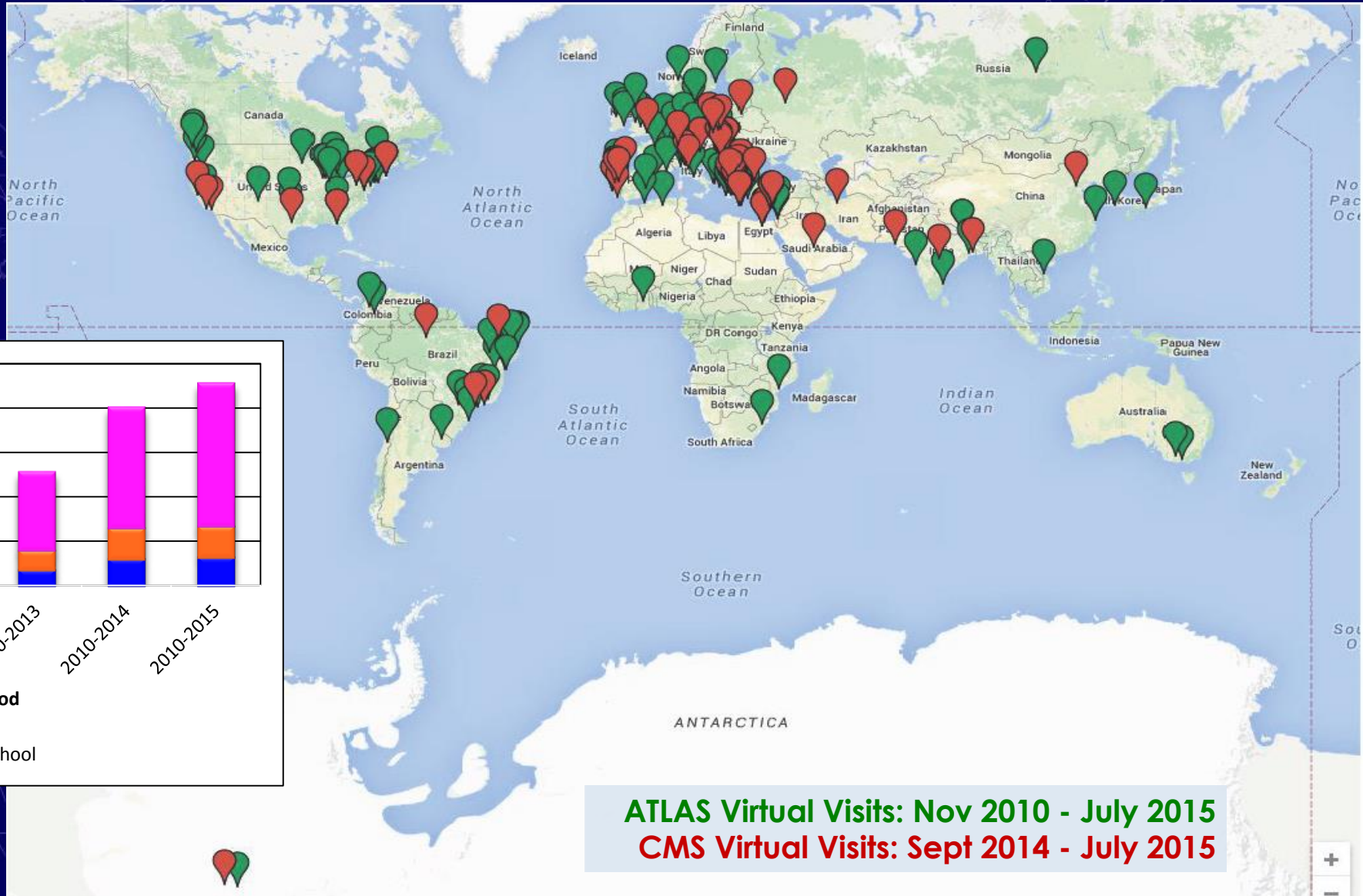
ALICE



# WHO ARE THE VIRTUAL VISITORS?

- Target Audiences
  - Classrooms & Masterclasses
  - Teacher Groups
  - Public Events, Open Days
  - Policy Makers
- Example Statistics
  - CMS: 15,800 participants in 2 years
  - ATLAS: >300 visits since 2010
  - 7 Continents





**ATLAS Virtual Visits: Nov 2010 - July 2015**  
**CMS Virtual Visits: Sept 2014 - July 2015**



# WHY DO WE BOTHER?

“Nurturing curious minds is one of CERN’s goals, and education and training are among our core missions.”

- *Fabiola Gianotti*

- Primary Virtual Visit Goals
    - Reach audiences that would not normally have a chance to come to CERN
    - Promote dialogue between scientists and the public
    - Train our scientists to communicate
- Often the first step towards further involvement



... You might not have been able to see it during the tour, but my students were **very excited**. And during my presentation to them the day before the tour and after the tour, they asked the most **insightful questions**...

This has created quite a lot of excitement and I hope that we can keep this momentum with the **master classes** offered at the University of Cape Town as well as entry into the **Beamline 4 Schools** competition.

Itumeleng Molefi (science teacher, Carnarvon, South Africa)

This way of **gaining knowledge** is way **more attractive** and interesting, because it let us gather information **directly from CERN workers** on how one of the most important laboratories in Europe works.

13-year-old student from Poland

What **surprised me** today is the fact that I didn't know the people were trying to find the answer about **how the universe was made**. I have always thought about that.

11-year-old student from Los Angeles CA, USA



# CURRENT STEP-BY-STEP PROCEDURES

(NOT ALL PRACTICED BY ALL EXPERIMENTS)

1. Receive Visit Request / Booking
2. Explain Technical Requirements
3. Select Date
4. Identify Guide
5. Identify Operator
6. Schedule Test
7. Build Web Page (webcast / recording)
8. Put Visit on Indico Agenda
9. Communicate Upcoming Visit
10. Visit: Start Vidyo, Webcast, Recording
11. Visit: Operate Cameras
12. Visit: Push Content
13. Visit: Close Systems
14. Edit and Publish Recording
15. Send Link of Recording, Souvenirs
16. Request Feedback, Evaluation
17. Collect Best Comments from Visitors
18. Collect Best Q&A Clips



# WHY DEVELOP A CERN-WIDE SYSTEM?

- Common Infrastructure, Operations, Services
  - But each experiment handled separately
- Non-Optimal Usage of Human Resources
  - Scientists acting as operators, administrators
- Limited Guide Pool
  - Could benefit from training, incentives
- Limited Visibility
  - Could help to alleviate CERN Visit requests if known by public
- Limited Scalability
- Could Use Infrastructure for Special Events, Periodic Communications

# GUIDANCE FROM EXISTING MODELS

- CERN Visits Service
  - Common Operations (Booking, Infrastructure, Services, etc.)
  - Trained, **Paid** Guides
  - Partnership with Experiments
- CERN IT CDA Videoconference Agreements
  - Similar, but Independent Infrastructure, Common Service
  - Bi-Lateral Agreements with Experiments
    - Experiments pay for infrastructure (installed and maintained by IT)
    - IT provides services



# SUGGESTED REQUIREMENTS

- Technical Infrastructure
  - Robust, High Quality Videoconferencing with Recording Capability (a la existing rooms)
  - Wireless Microphones, Remote Cameras, Mixers (as requested)
  - Simultaneous Public Webcast including Remote & Local Views, Sound, Material
  - Compatibility with PC or Phone-Based Systems (Skype, Google Hangout, etc.)
    - Key for communication events or programs
- Technical Support
  - Installation / Periodic Testing / Maintenance of Installations
  - Tests with Remote Sites
  - Start / Stop of Equipment (Normally Remotely)
  - Recording, Editing, Publication to CDS

# SUGGESTED REQUIREMENTS (2)

- Guide Organisation
  - Communication Training Similar to Physical Visit Guides
  - Site-Specific Training
  - Recognition / Compensation for Contributions
- Common Booking Form
  - On Public Web Pages, near Physical Visit booking
  - Specify experiment (or no preference), visit date, testing date, technical requirements, contact info
  - Information flow: **Form → Virtual Visit Service → Experiment & Technical Service → Guides & Technicians**
- Web Interface
  - Host Webcast, Recording, Related Material for Each Visit (Potential for Educational Platform)
  - Maintain Visitor Statistics and Feedback



# HOW TO SHARE THE EFFORT

- Experiments (Locations):
  - Provide Monetary Resources for Equipment & Maintenance (Bi-Lateral MoU)
  - Provide Guides
  - Coordinate with CERN Service for Usage of Sites (a la current Visits Service agreements)
- IT-CDA:
  - Install, Maintain, Operate Equipment
  - Host Required Services and Provides Support (a la current Collaborative Tool agreements)
- IR-ECO
  - Develop and Maintain Web Interface and Booking System
  - Train, Coordinate, and Compensate Guides
  - Edit and Publish Visit Recordings

# SUMMARY

- Independent Virtual Visit programs run by the LHC experiments have successfully hosted hundreds of sites (thousands of visitors) from around the world for several years
- Potential demand is beyond our capabilities
- We propose developing a CERN-wide system that would:
  - Facilitate booking through the CERN Public site
  - Move operations from scientists to technical experts, as requested by experiments
  - Provide guide training and compensation, similar to the existing Visits Service
  - Develop a permanent infrastructure for public communication
- We believe the resources required are modest and easily shared
- We believe the potential for gain in terms of audience reach is too important to ignore



# REFERENCES

## LHC Public Sites and Virtual Visit Portals

ATLAS Public	<a href="http://atlas.cern">http://atlas.cern</a>
ATLAS Virtual Visits	<a href="http://cern.ch/atlas-virtual-visits">http://cern.ch/atlas-virtual-visits</a>
CMS Public	<a href="http://cms.web.cern.ch">http://cms.web.cern.ch</a>
CMS Virtual Visits	<a href="http://cms.web.cern.ch/content/virtual-visits">http://cms.web.cern.ch/content/virtual-visits</a>
ALICE Public	<a href="http://aliceinfo.cern.ch/Public/Welcome.html">http://aliceinfo.cern.ch/Public/Welcome.html</a>
LHCb Public	<a href="http://lhcb-public.web.cern.ch">http://lhcb-public.web.cern.ch</a>

## Publications on Virtual Visits

EPS-HEP 2015	<a href="http://pos.sissa.it/archive/conferences/234/349/EPS-HEP2015_349.pdf">http://pos.sissa.it/archive/conferences/234/349/EPS-HEP2015_349.pdf</a>
ICHEP 2014	<a href="http://dx.doi.org/10.1016/j.nuclphysbps.2015.09.465">http://dx.doi.org/10.1016/j.nuclphysbps.2015.09.465</a>
CHEP 2013	<a href="http://iopscience.iop.org/article/10.1088/1742-6596/396/6/062008/meta">http://iopscience.iop.org/article/10.1088/1742-6596/396/6/062008/meta</a>
CERN Bulletin	<a href="https://cds.cern.ch/journal/CERNBulletin/2012/16/News%20Articles/1439942">https://cds.cern.ch/journal/CERNBulletin/2012/16/News%20Articles/1439942</a>
ALICE Matters	<a href="http://alicematters.web.cern.ch/?q=ALICE_virtualvisit">http://alicematters.web.cern.ch/?q=ALICE_virtualvisit</a>
CMS Blog	<a href="http://cylindricalonion.web.cern.ch/blog/201411/cms-open-virtual-visits-your-school-science-festival-or-exhibition-centre">http://cylindricalonion.web.cern.ch/blog/201411/cms-open-virtual-visits-your-school-science-festival-or-exhibition-centre</a>