



Government of Rajasthan



ORGANIZATION

**Department of Information
Technology & Communication**

LOCATION

Jaipur, India

SOFTWARE

Autodesk® ReCap 360™
Autodesk® ReCap 360™ Pro
Autodesk® InRoads® 360
AutoCAD® Map 3D®
AutoCAD® Civil 3D®
Autodesk® Revit®
Autodesk® Navisworks®
Autodesk® 3ds Max®
Autodesk® Maya®

"Now that we have the Architectural 3D Models and 3D walk-through videos, it will be easy for us to retain the real feel of the city. For example, facades coming up around the heritage monuments can be modelled in-line with them, so as to be in sync with the old world charm,"

—Mr. Y.K. Jain
Jt Director
DoIT&C

Making Rajasthan's Heritage Digital

Heritage structures affected by natural calamities can now be safeguarded with the help of to the scale 3D models.



Rendered image of 3D model- Albert Hall, Jaipur - Image Courtesy: DoIT&C

The Project:

The preservation of heritage assets often involves a unique set of challenges, as one of the most crucial facets of the process is to keep the cultural heritage intact. Several projects have been undertaken across the globe to preserve the culture and heritage. Taking the lead in India, Rajasthan, which is home to princely forts and architectural marvels, plans to preserve monuments and attract more tourists with the help of Architectural Model and 3D walk-through videos.

Backed by the Department of Information Technology & Communication (DoIT&C), this is a first-of-its-kind initiative to recreate heritage structures and the acquisition of all possible data was the first step which contributed to fundamental modelling for documentation.

The project is a progress towards achieving the dream of creating a 3D city. This backed with initiatives like Rajdharaa—created with an aim to establish an effective and integrated GIS Infrastructure of the State to enable good governance, sustainable development and citizen empowerment and to maintain a state-wide standardised GIS Assets, 3D city not a far away dream. With these initiatives, DoIT&C is putting an excellent effort to make the state smart and governance easy.

In-line with the project objectives towards creation of GIS based 3D City, DoIT&C has completed true scale as-built 3D models for

Albert Hall Museum, Jantar Mantar, Hawa Mahal, Udaipur City Palace, Jaipur City Palace, Albert Palace, seven gates of walled City, Jaipur.

And this is just the beginning...

Objective Behind the Project:

- Preserve history: If a natural disaster were to happen, the information can be used to restore the damaged historical monument to its true state.
- City landscaping: Important structures can be modelled in-line with the heritage structures. For example facades of the railway station/ metro rail can be created in-line with the structures to keep the look intact.
- Architectural studies: The data and videos of historical structures, now a click away, will help Architecture students, frequenting Rajasthan from home and abroad, with their projects.
- Heritage studies: The project will help students and citizens across the globe to understand the rich heritage of Rajasthan and spread awareness.
- Boost tourism: 3D videos of monuments would arouse curiosity and lure more tourists to Rajasthan.

3D printing can be used to make the prototype of the affected part. This will help find the right solution and restore the structure in its original character.

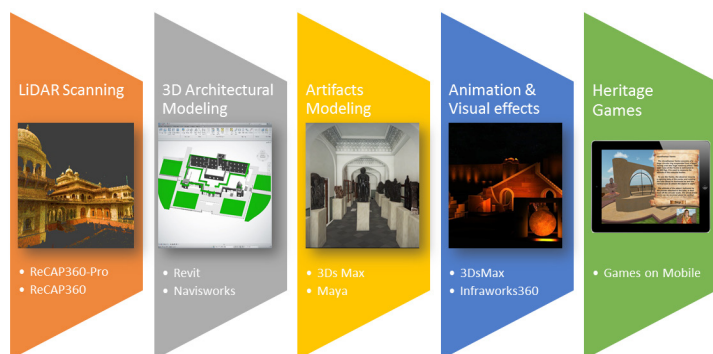
The Challenge:

There were several challenges that DoIT&C faced while working on the project. To begin with, scanning something on such a large scale was quite a difficult task where DoIT&C had to undertake approximately 2500 scans for every monument/palace, which is always crowded by large number of tourists. The department also faced hurdles while restoring palaces digitally with as-built information.

"Executing a project on such a huge level was a challenge for us, but our efforts backed with top technology and software from Autodesk helped us complete the project on time. We now look forward to the next step of this project," **Apresh Dubey**, Jt Director DoIT&C.

Apart from the technical challenges, there were hurdles like getting permission from the authorities of the private properties, heavy tourist footfall and streamlining the traffic while scanning. The size of the BIM file also made it difficult for web usage. Undertaking advance analysis like detailed engineering estimation and damage control created a hindrance too.

The Execution



Standard work-flow followed by using Autodesk technology - Image Courtesy: DoIT&C

"Such initiative will also help us enhance the quality of life in the city. It will be easy to track infrastructure improvement and requirements and help in city surveillance." said **Phani R. Shekhar**, Chief Project Officer, Head SeMT, Government of Rajasthan.

The Outcome

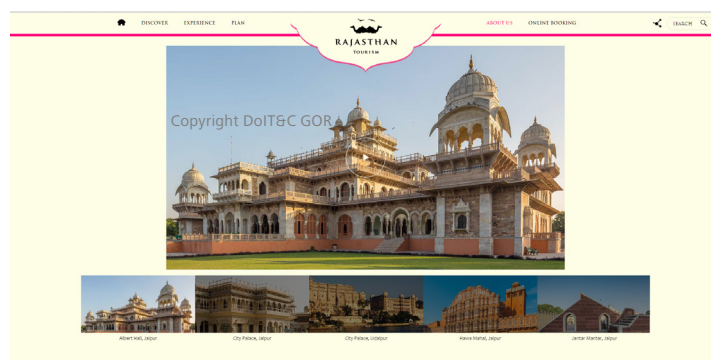
- Heritage structures affected by natural calamities can now be safeguarded with the help of to the scale 3D models.
- 3D printing can be used to make the prototype of the affected part. This will help find the right solution and restore the structure in its original character.
- New buildings, facades coming up around heritage monuments too can be modelled on them, so as to be in sync with the old world charm. As against the regular methods of using modern material custom manufacturing of the components, BIM models provide not only 3D views but also quick quantity calculations or estimation for specific projects.
- Most palaces in Rajasthan offer sound and light shows. For easy decision making on such projects, physical prototyping cost can be saved by creating multiple options in digital format.

- 3D videos of monuments would arouse curiosity and lure more tourists to Rajasthan.

"The 3D walk-through videos will help tourists have a closer look at the old world charm just with a click," said **Rajshree Sankhla**, Deputy Director, DoIT&C.

A sneak peek into the history, the soulful instrumental folk music and these videos can all but fascinate people across the globe to flock to Rajasthan.

"This is a welcome move by the Government of Rajasthan. We are known for our qualitative culture & heritage and such initiatives will help to keep them alive forever." said **Arvind Singh Mewar of Udaipur, Chairman and Managing Trustee**, Maharana of Mewar Charitable Foundation



Rajasthan government made all 3D videos available on tourism website - Image Courtesy: DoIT&C

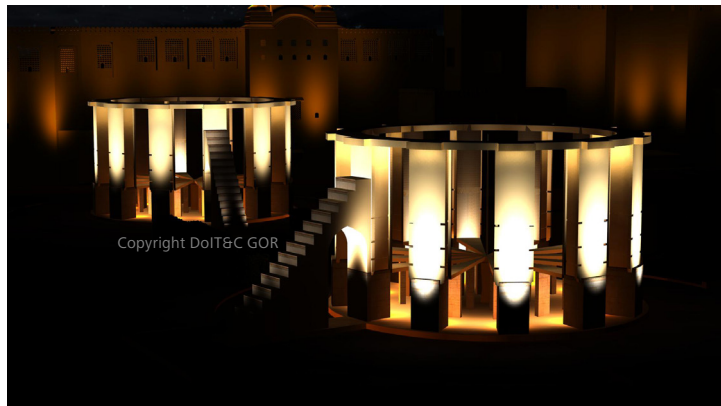


3D model of Jantar Mantar instrument - Image Courtesy: DoIT&C



Digital Prototyping of Sound & Light Show for Jantar Mantar - Image Courtesy: DoIT&C

New buildings, facades coming up around heritage monuments too can be modelled on them, so as to be in sync with the old world charm.



3D Model of Ram Yantra in Sound & Light Show Image - Courtesy: DoIT&C



LiDAR point cloud data of Albert Hall in Autodesk ReCAP 360 Pro - Image Courtesy: DoIT&C



Unified LiDAR data of Jantar Mantar in InfraWorks360 - Image Courtesy: DoIT&C



3D Model of Brihat Samrat Yantra on Left and Kranti Yantra on right - Image Courtesy: DoIT&C

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Digital India at its best!

The Road Ahead

Never before in the world so far a palace has been scanned and recreated digitally on a 1:1 scale from inside and outside. According to the department it is more of a digital preservation on a large scale where BIM modelling will provide accurate measurement of structures.

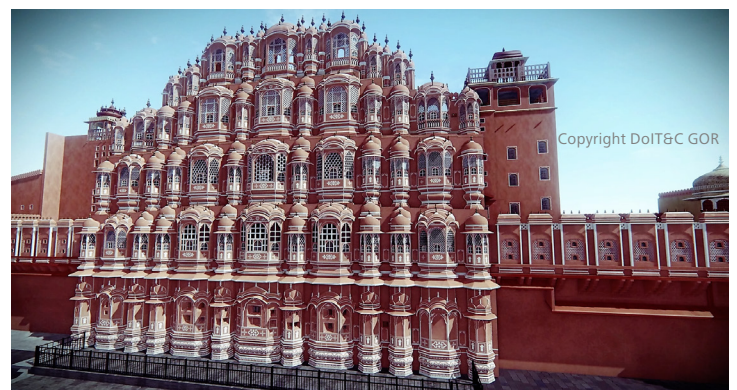
Going forward, DoIT&C also plans to create an interactive gaming app focusing on the heritages sites. According to the officials, these games will help students and history lovers to know more about the beautiful culture and heritage of Rajasthan in a fun way.

"This project was the first step towards creating a 3D model city which can help from a planning perspective. Urbanisation will be much efficient when one can get the actual ground condition and act accordingly. In fact, there are huge opportunities if a 3D city is in place," **Sanjay Bhattacharya**, Principal Consultant to DoIT&C.

With the National Heritage City Development and Augmentation Yojana (HRIDAY) scheme too working towards holistic development of heritage cities, the DoIT&C initiative just got a boost-up.

About DoIT&C

Department of Information Technology & Communication (DoIT&C) is working to put technology to its highest and best use throughout Rajasthan Government Departments/ Autonomous Bodies to improve the administration of State programmes and services. Providing guidance on technical matters to Departments, vetting IT projects and taking Department on achieving IT Road Map are the basic jobs of Department of Information Technology & Communication (DoIT&C).



3D Model of Hawa Mahal, Jaipur - Image Courtesy: DoIT&C

"DoIT&C required software that would help meet the challenges of creating this first-of-its-kind project in the country keeping in mind the standards. Autodesk's software like ReCAP 360, Revit and 3ds Max helped us create this unique project in record time,"

— **Arun Chauhan**
Addl. Director, DoIT&C

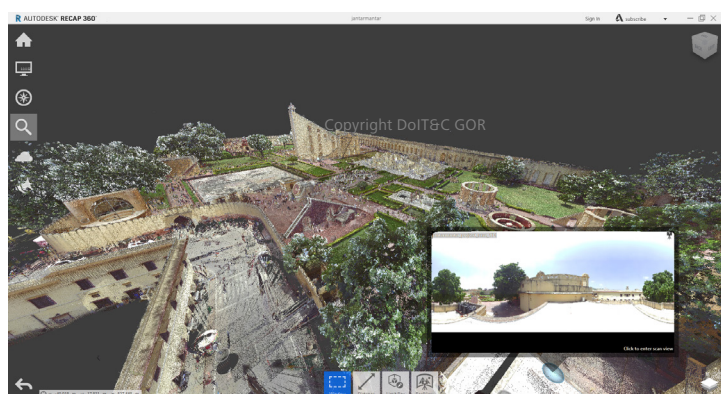
Most palaces in Rajasthan offer sound and light shows. Digital modelling, animation can be created on these models to run digital prototyping first rather than investing and damaging monuments for physical prototyping.



3D Model of Udaipur City Palace - Image Courtesy: DoIT&C



3D Model of Jaipur City Palace - Image Courtesy: DoIT&C



Point Cloud Data with panoramic view images of Jantar Mantar. The same can be viewed in ReCAP 360 on web portal as well for internal use - Image Courtesy: DoIT&C

"This is a welcome move by the Government of Rajasthan. We are known for our qualitative culture & heritage and such initiatives will help to keep them alive forever."

— **Arvind Singh Mewar of Udaipur, Chairman and Managing Trustee**, Maharana of Mewar Charitable Foundation

"The 3D walk through videos have captured the true essence of our culture and heritage. I appreciate the efforts taken by the Government of Rajasthan to come up with such a unique initiative."

— **Lakshyaraj Singh Mewar of Udaipur, Trustee**, Maharana of Mewar Charitable Foundation

"The 3D Modelling Initiative for heritage structures of Rajasthan under Rajdharaa Portal is a very welcome tool to document historic buildings and heritage sites. It will enable accurate restoration in case of disaster such as fire, flood or earthquake. It also has great potential as a research tool, to chart changes to buildings over time. I congratulate the Govt of Rajasthan on this initiative."

— **Dr. Giles Tillotson, Consultant Director of Research**, Publications and Exhibitions, Maharaja Sawai Man Singh II Museum, The City Palace, Jaipur