



### Key achievements

- High accuracy, non-intrusive monitoring of iconic University buildings
- Automated 24-hour vibration monitoring of sensitive structures.

#### The Project

The redevelopment of Oxford University's Hertford College, upgrading the library, archive, study and meeting spaces of the college. The redesign includes a new basement extension into the old quadrangle that will contain new student facilities as well as archive, reading and seminar rooms. The library will be expanded and connected to the neighbouring buildings.

#### The Challenge

The specification requires structural monitoring of building movement and vibration monitoring to measure the impact of demolition and excavation works. Later stages of the project will require deformation monitoring of the basement walls during excavation. The monitoring scheme needs to provide detailed, non-intrusive monitoring of the historically significant buildings.

#### The Solution

GEO-Instruments' monitoring scheme combines manual 3D surveys undertaken weekly with Manual Inclinator readings and automated 24-hour vibration monitoring.

For a complete picture of Three-Dimensional movement of the structure, more than 150 Retro-reflective targets were placed on the walls of the exterior of the college and the interior courtyard. The targets are measured manually via a Total Station survey. Retro-reflective targets were chosen as they can be attached to the structure without damaging the building's façade by drilling. For vibration monitoring, five C22 automated vibration sensors are installed at key areas inside the college.

These highly sensitive instruments are self-contained units containing a long-lasting battery and automated data transfer. The C22s were installed using specialised plates to ensure level placement and good transfer of vibration from the installed surface.

#### Application

Building Renovation  
Basement Construction

#### Technique

Manual 3D Surveys  
Vibration Monitoring

#### Market

Buildings

#### Client

Beard Construction  
Oxford University

#### Project Duration

2 Years

#### Instrumentation

Total Station  
C22 Vibration Sensor

#### Keller companies

GEO-Instruments

