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GPR prospecting and 3D virtual model of the St. John Co-Cathedral,
Valletta (Malta)

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This work is based on several geophysical measurements performed to investigate the flooring of the co-Cathedral
of St. John in Valletta, Malta, in order to identify and map possible burial sites and/or passages never investigated
or documented before. This study can also provide information about possible structures beneath the whole
marble floor, which is made of an entire series of tombs that do not always hide a burial site. In fact, several
knights were buried outside Malta and over the years the position of the tomb slabs have changed without proper
documentation. The GPR data have been gathered with a commercial pulsed Ris Hi-System and a prototypal
reconfigurable stepped frequency system [1], implemented by IBAM-CNR. The data have been taken along
orthogonal grids with interline step 30 cm and processed using the Reflexw software. With regard to the Ris-Hi
mode system (that is equipped with a dual antenna at 200 and 600 MHz), the data at 600 MHz are considered here.
With regard to the reconfigurable system, the data with the high frequency antenna is considered here (the centre
of the band is at about 520 MHz). The processing consisted of a zero timing, a time cut, a subtracting average or
a background removal (depending on the room), a gain vs. the depth with a consequent a subsequent Butterworth
filter. Finally, the data have been migrated with a propagation velocity heuristically evaluated on the basis of the
sequential migrations method [2]. The results show strong anomalies most of which ascribable to burial sites. The
floor of the Co-Cathedral is constituted by adjacent funerary inscriptions, but the GPR has revealed that we do
not have a corresponding continuous of tombs under the inscriptions. We have identified surely many tombs, but
they do not correspond in all the tomb slabs. Moreover, the tombs in general do not appear to have the same size
neither of the same depth, and we also deem that not in all cases the positions of the tombs coincide with those
of the upper-lying mosaic inscriptions. Finally, a 3D model of the monument was constructed and data integrated
into virtual reality products.

References
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