The reconciliation between irregular stratigraphic grids and regular seismic grids can be done in two ways for two different objectives:

1) Seismic modelling for 4D feasibility, 4D modelling as an help for 4D interpretation or geophysical validation of the static geomodel.
2) Integration of seismic attributes into the geomodel.

In the first case, the input geomodel is a geological model or a reservoir model, which spatial cell size is coarse and irregular (~100m*100m) and the vertical cell size is fine and irregular (2 to 10 m). To perform seismic modelling, elastic parameters (Rhob, Vp, Vs) are computed according to an irregular grid and resampled to a regular bin (~12.5m*12.5m). For this purpose, each bin node is considered as a pseudo-well, where we extract all elastic parameters contained in the shot cells. No vertical resampling is performed, we keep all layers values. So at this stage, we obtain a regular grid in X and Y, and an irregular grid in Z. Then, the wavelet filtering process allows to obtain, from the fine depth sampling, a seismic model at the sampling rate of the wavelet. So, the final grid cell size is regular in X, Y and time dimensions.

In the second case, the objective is to integrate the seismic attributes into the geomodel in order to use the seismic information for facies or petrophysical infilling. First, we have to put the geomodel and the seismic attributes in the same domain (time or depth). For this purpose, we perform time to depth or depth to time conversion using 3D fine velocity models. Then, the seismic attributes are averaged inside the irregular stratigraphic cell, by taking into account all seismic points contained in a reservoir cell. But to perform this work, the vertical sampling of seismic data must be close to the vertical sampling of a reservoir grid, which is possible in case of 3D high resolution seismic data. Otherwise, the seismic information is dense in X and Y, but poor in Z; while reservoir grids are coarse in X and Y, but dense in Z. Therefore lateral upscaling of seismic attributes is good but not sufficient: a vertical downscaling of seismic information has also to be performed. Furthermore, the stratigraphic grid geometry must be coherent with seismic data. For this purpose, future work including reservoir grid deformation in order to fit the seismic information will be undertaken.