<Hurdy>

This robot is a bowed bass instrument with two strings of equal length, covering a range of nearly four octaves. The construction of the bow mechanism is a further development of our first designs in this direction, implemented in [<Flex>](), our singing saw. The bowing speed, and consequently the loudness, can be controlled as well as the direction of rotation. Bow pressure can also be controlled independently for both strings. The time plot shown further below gives the details of the control possibilities. Rosin is continuously applied to the bow material through a rosin holder wherein the bottom wheel of the bow mechanism rotates. The frets are realized with strong electromagnets equipped with tangents. They are moveable, such that the instrument can be prepared to play in different tuning systems, including just intonation. The resonators for the strings are constructed from thin stainless steel pots, welded on a heart shaped sound board. The metallic and harsh sound the instrument produces when bowed was intended. Softer sounding, almost etheric string sound, including all flageolets, can also be produced using the e-drive mechanism. This machine is fully programmable and can work under midi control.

As it turned out, <Hurdy> proved to be an excellent test- and demonstration tool for classes in the acoustics of musical instruments. Particularly the theory of inharmonicity of strings can be perfectly well demonstrated and proved. The e-drive mechanism provides excitation at a mathematically exact 'harmonic', yet one can easily show that maximum resonance for that overtone only occurs if the string is retuned a bit for every 'harmonic'! It proves clearly that 'harmonic' overtones rather belong to the realms of religion than to those of physics. We used these scientific facts as the underlying compositional base for our composition ['Religionszwang'](), a solo piece for <Hurdy>. Another version of the same piece is called 'Scientia Vincere Tenebras', using calculations and empirical data for real inharmonic spectral components. These two pieces have been released on our 'Lonely Robots' CD.