Abstract: While robot systems become more and more elaborate, the need to simplify programming them grows as well. Regarding the high degree of internal heterogeneity in the sense that different microcontroller platforms, protocols and performance layers are used in a single robot application, it is no longer feasible to have specialists dedicated to each individual task. This motivates the need for tool support that allows an abstract view not only on a robot’s sensors and actuators, but also on the interconnection between the different components. In this work, we present how the model-based development and code generation tool EasyLab can be extended to support programming of all parts of a robot, including the main controller as well as peripheral devices like smart sensors. We show three typical use cases in the context of mobile platforms and also give an outlook on upcoming features such as distributed modeling and support for multi-core architectures.