



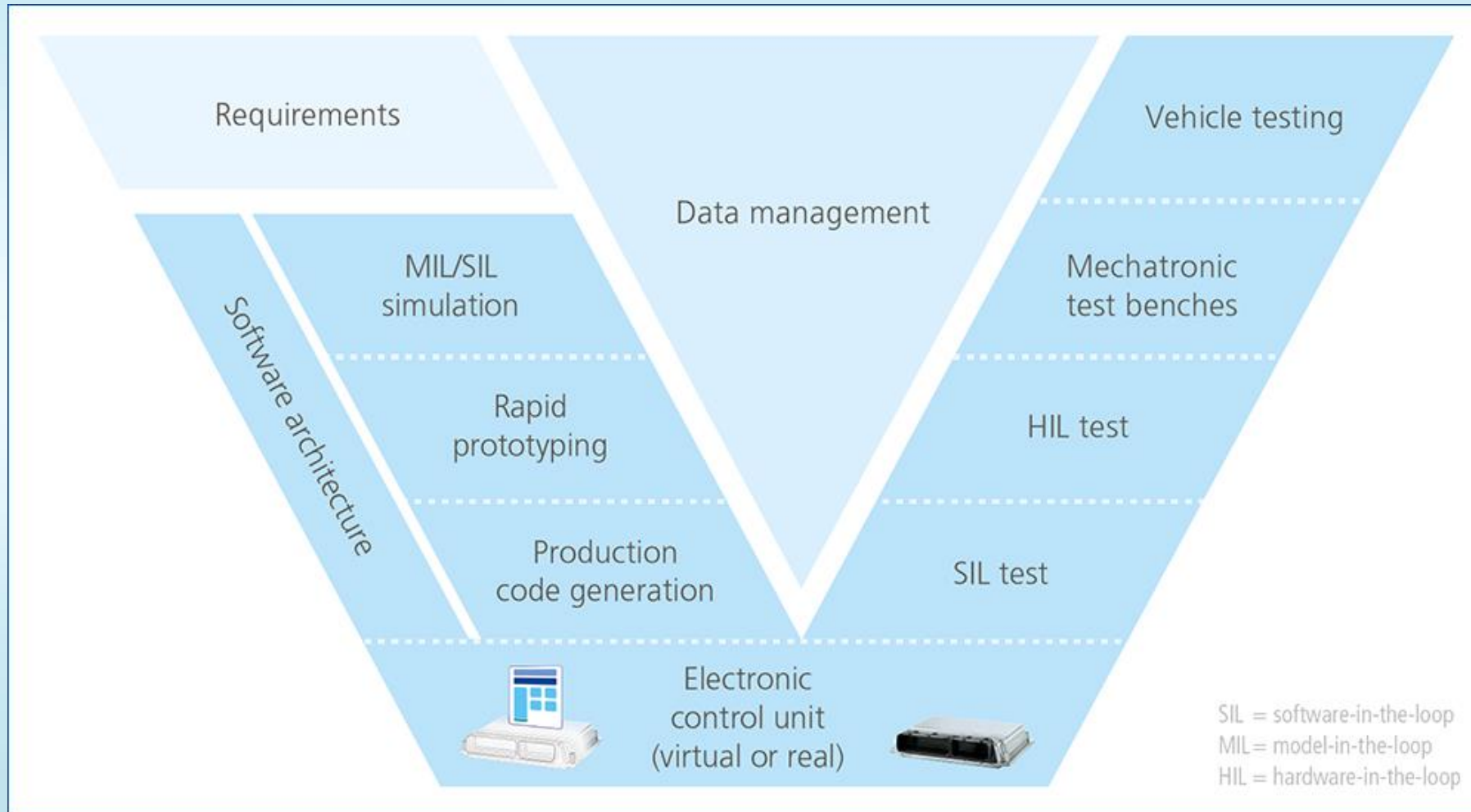
Testování systémů v reálném čase

Tomáš Fridrich fridrich@humusoft.cz

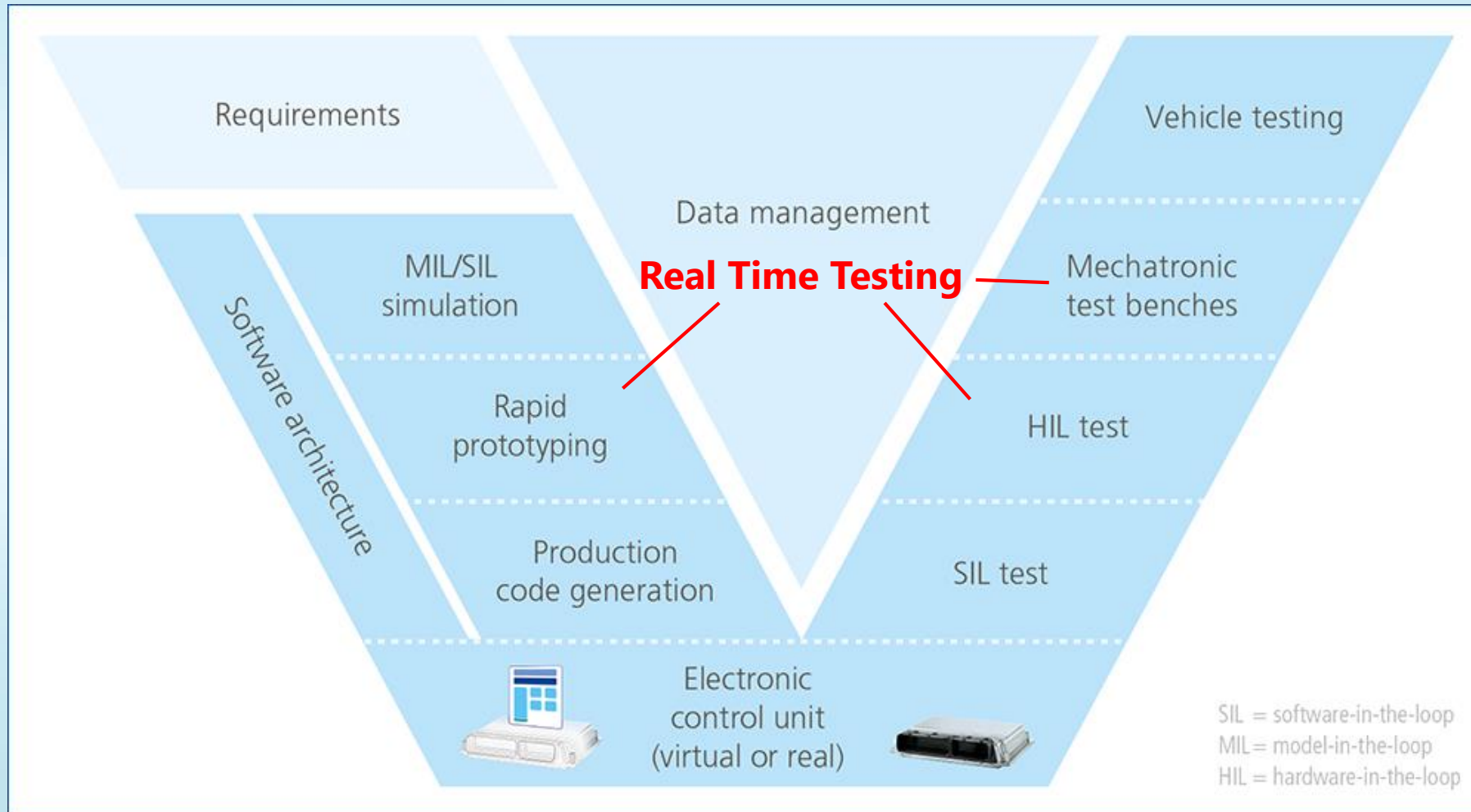
11.4.2024

Humusoft, s.r.o. · Pobřežní 20 · 186 00 Praha

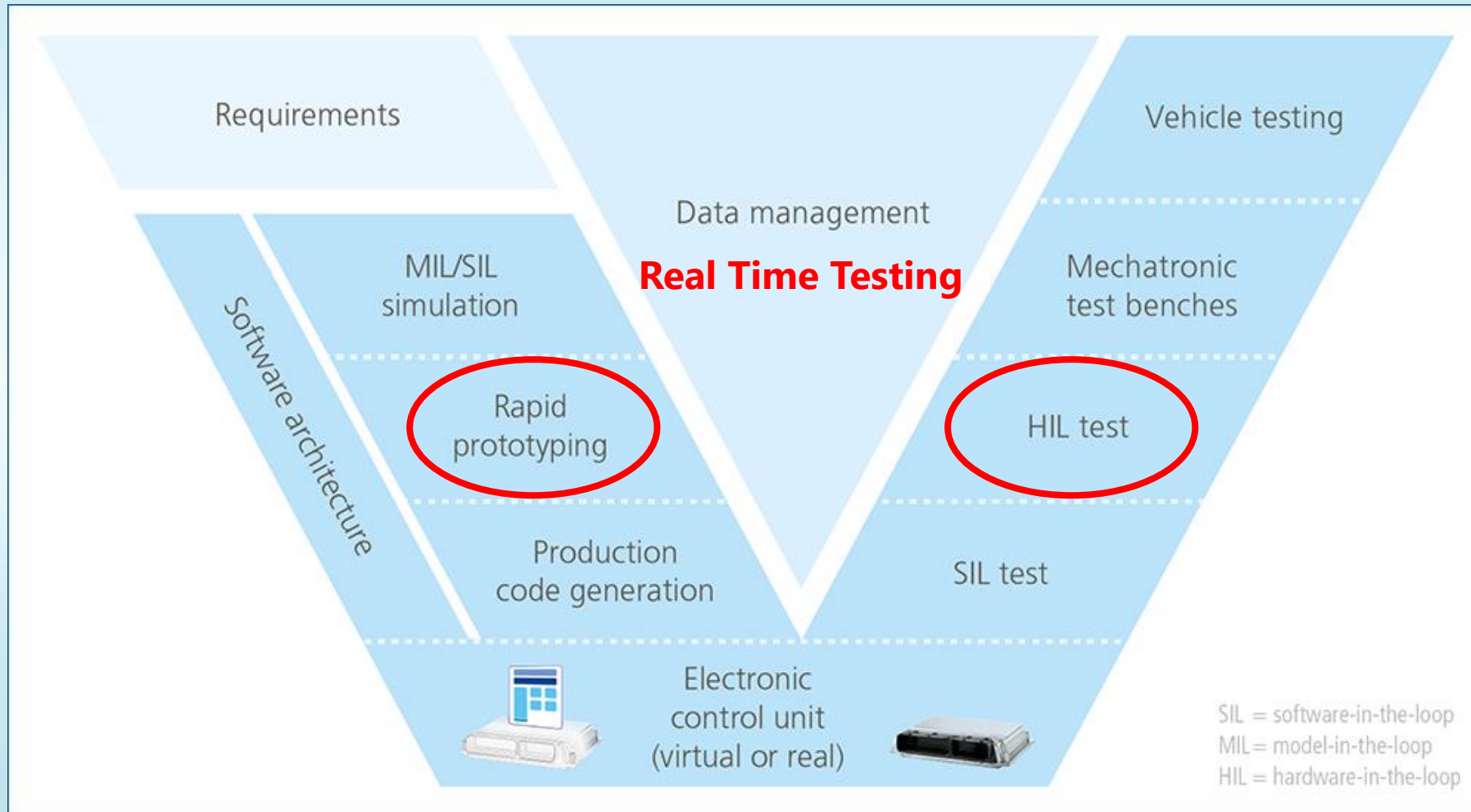
V-model



V-model



V-model

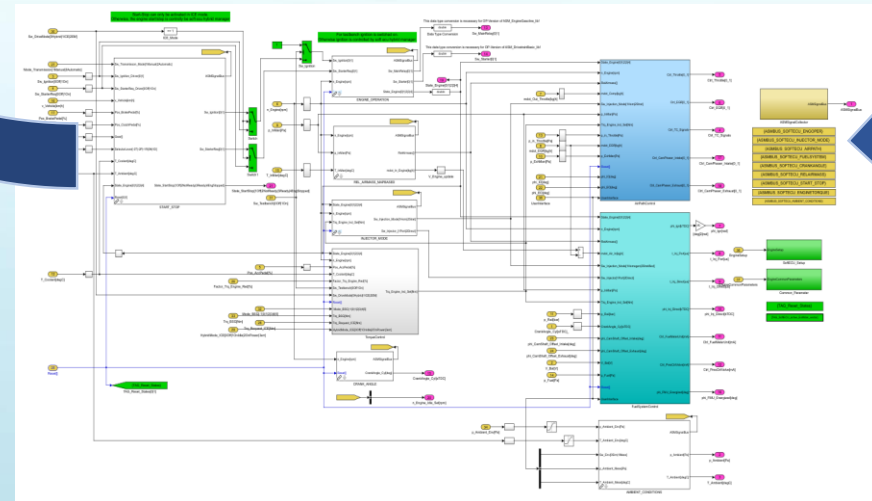
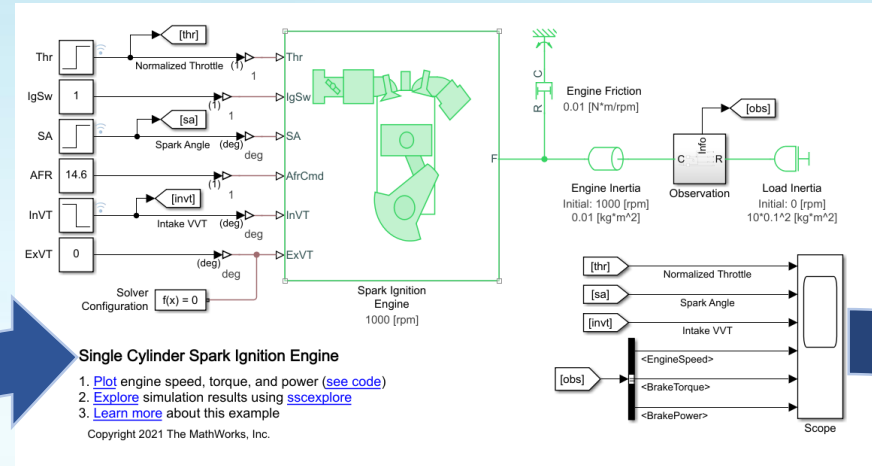


Model In the Loop

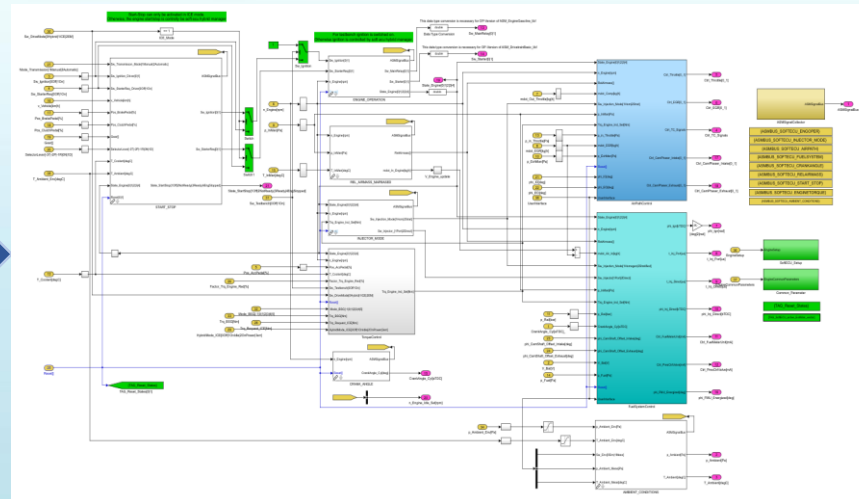
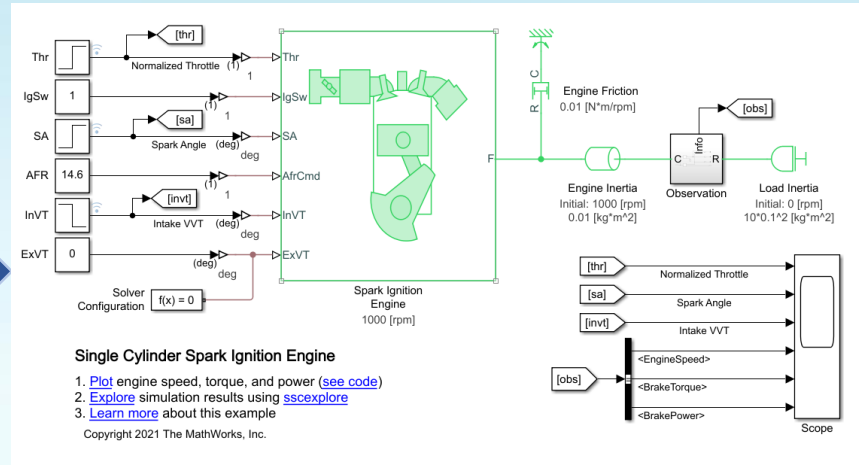
Soustava



Regulátor



Software in the Loop

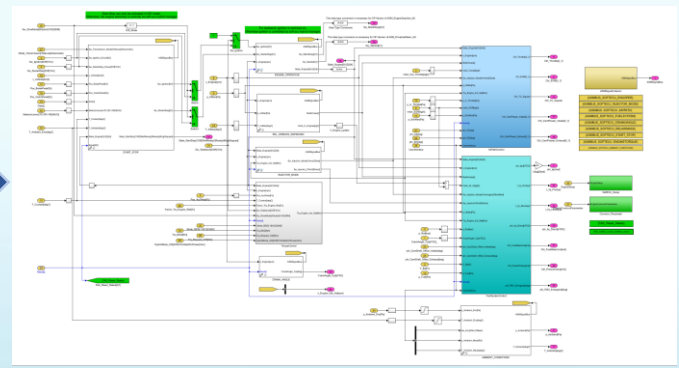
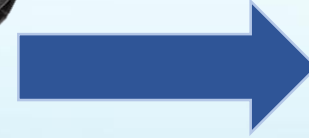
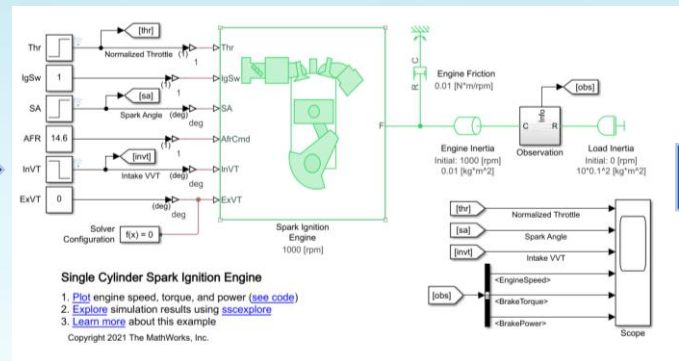


Model

Kód v C

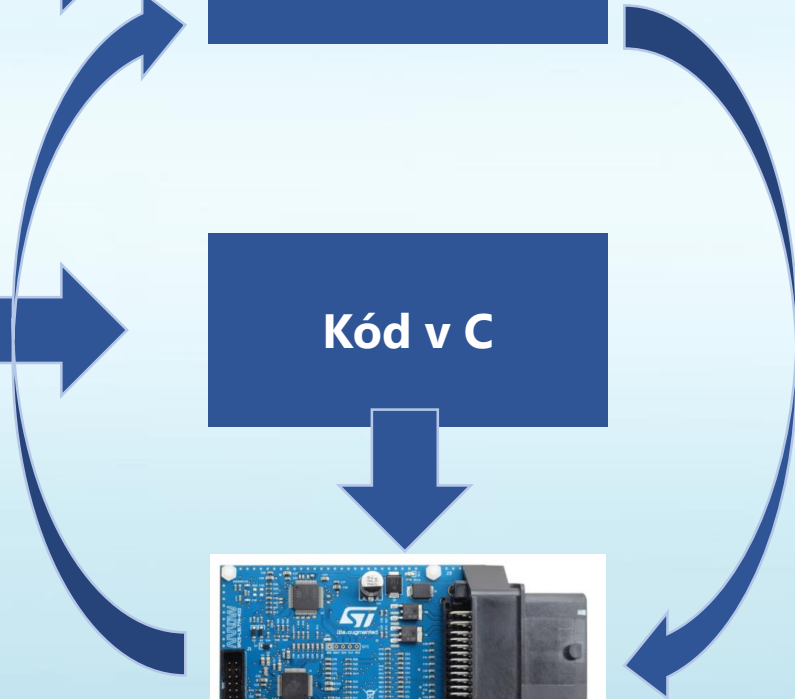


Processor in the Loop



Model

Kód v C



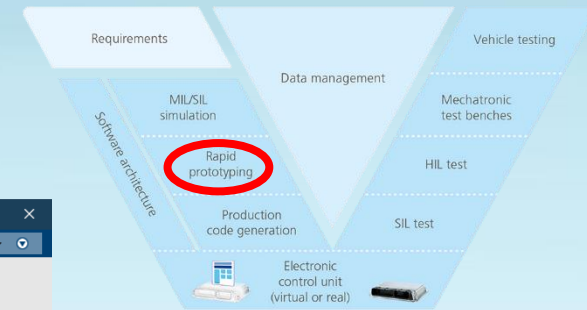
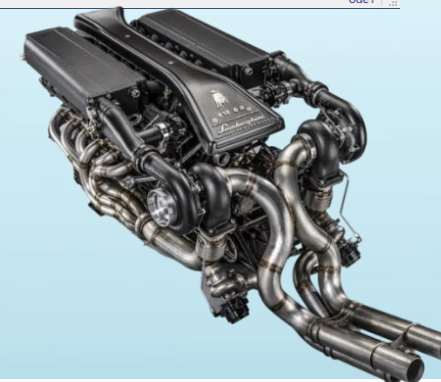
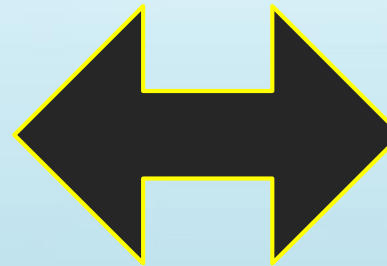
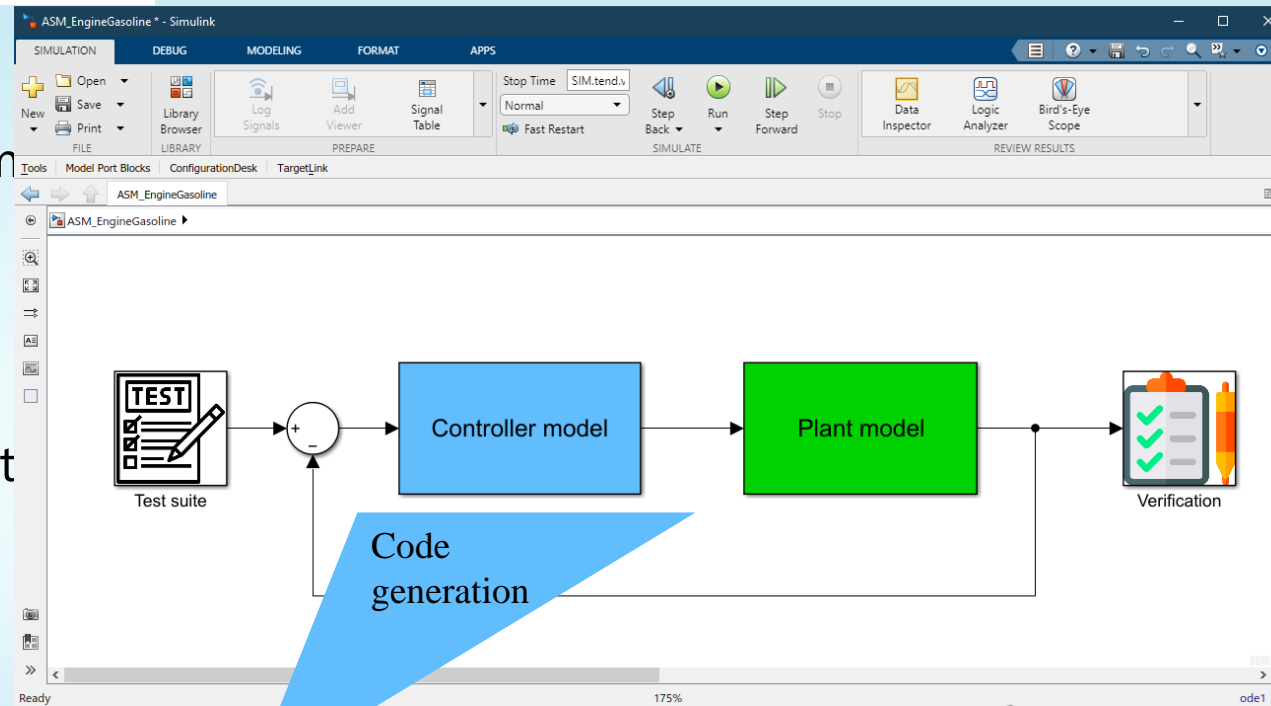
Real Time

- Simulace běží shodnou rychlostí jako skutečný čas na hodinkách.
- Model musí splňovat základní parametry
 - Diskrétní model
 - Fixní krok simulace
- Celkový čas potřebný na vyřešení vnitřních stavových rovnic a funkcí reprezentující systém. Musí být menší než je krok simulace!



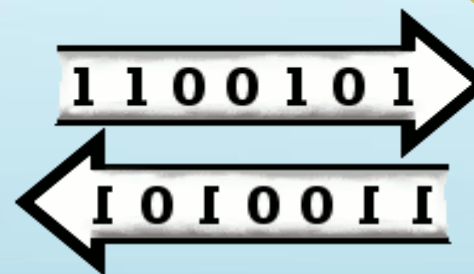
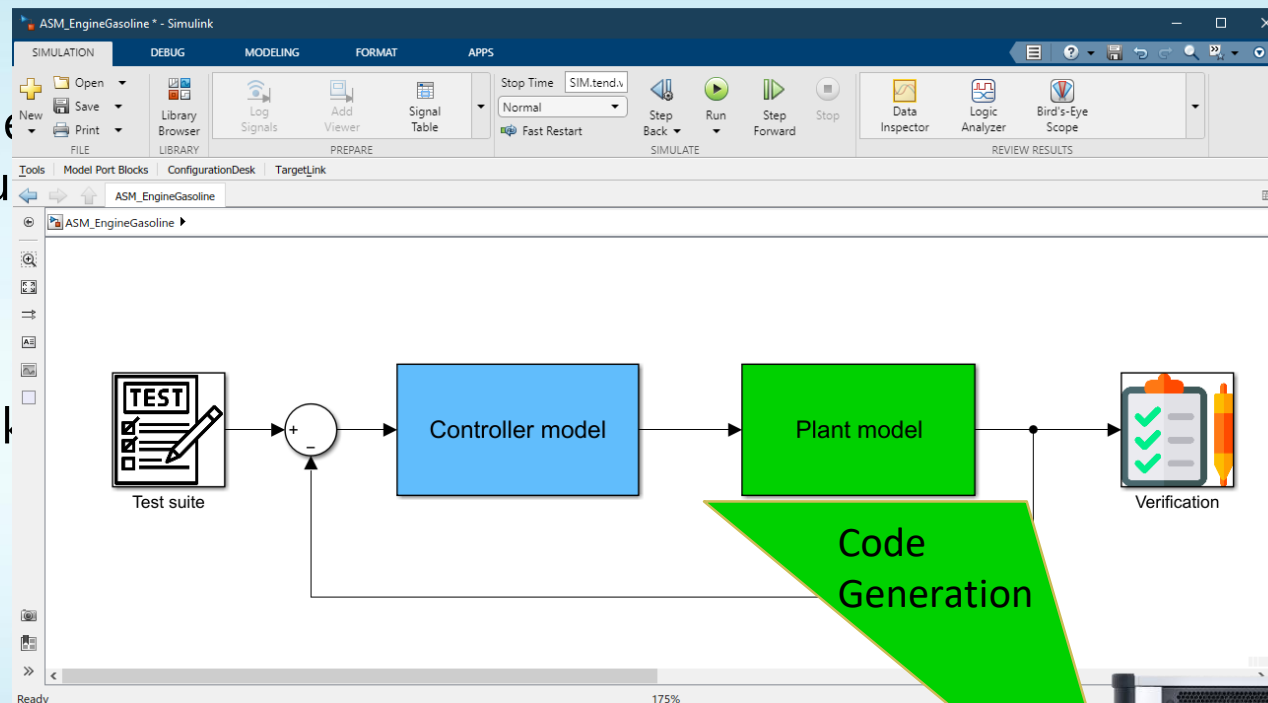
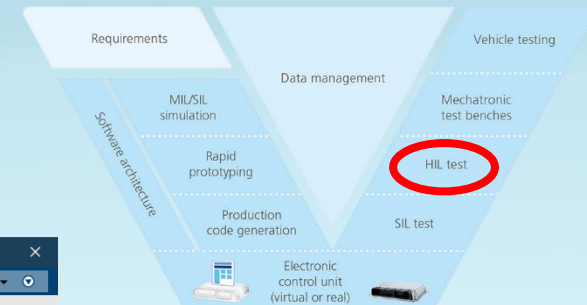
Rapid Control Prototyping

- Vývojový proces, který umí hardwarovou platformu.
- Mám reálné zařízení (mot time platformou)

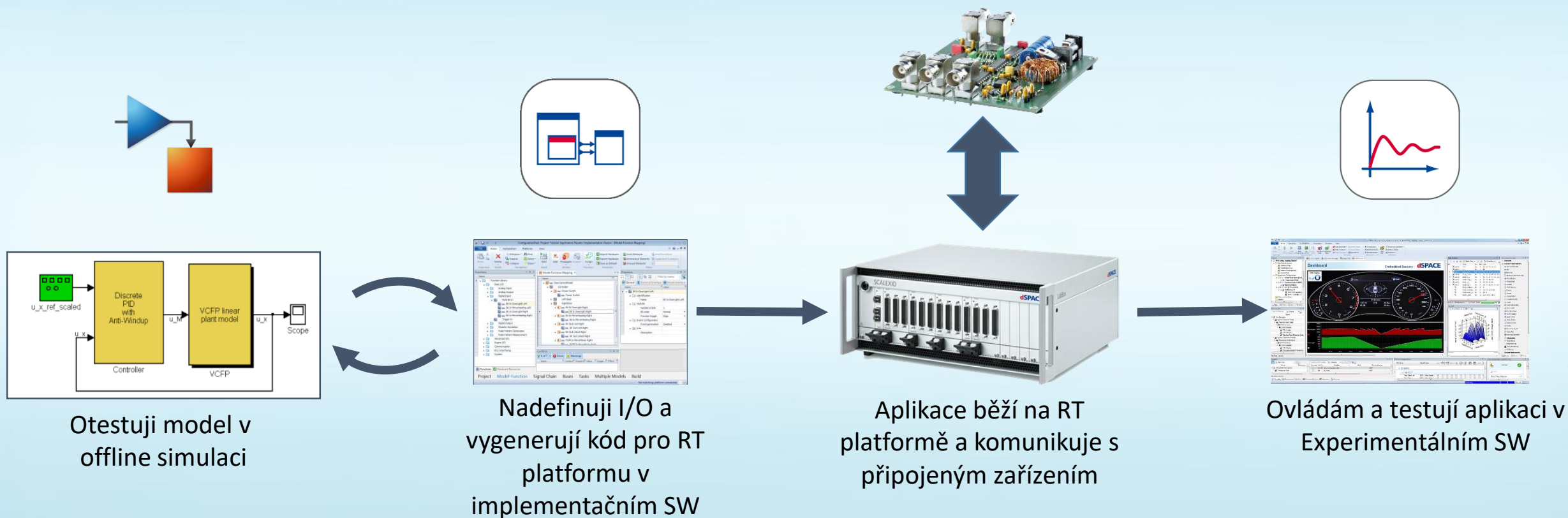


Hardware in the Loop

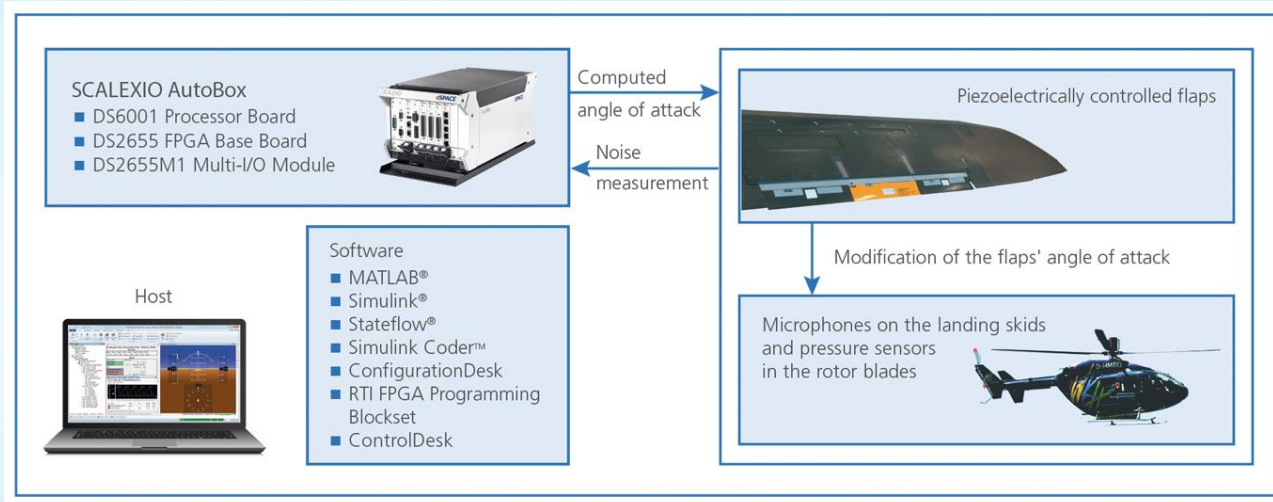
- Vývojová metoda, při níž je se komponenty, které jsou
- Mám reálný ovládací prvek



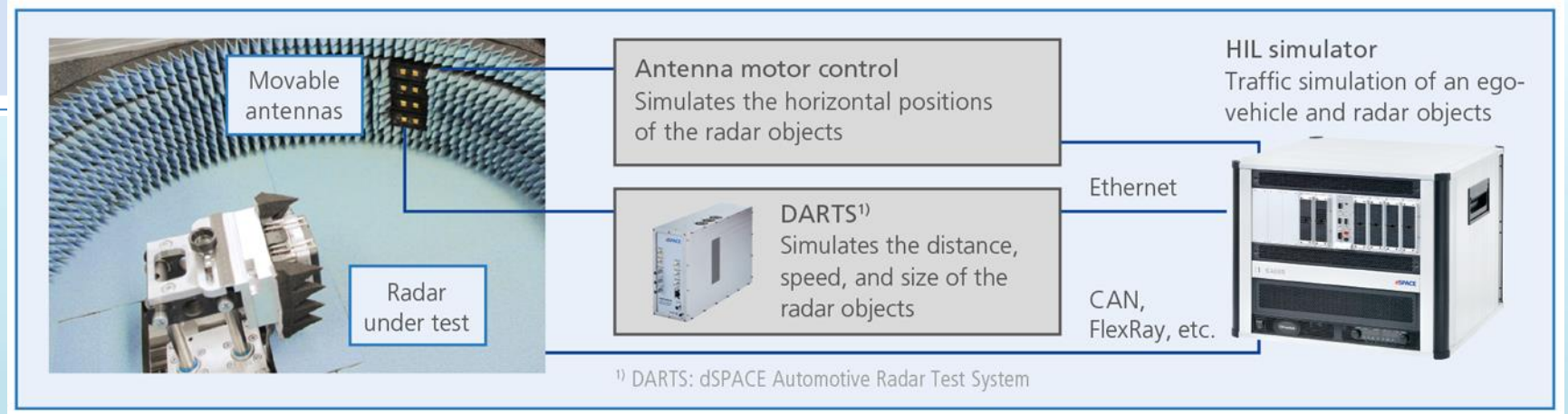
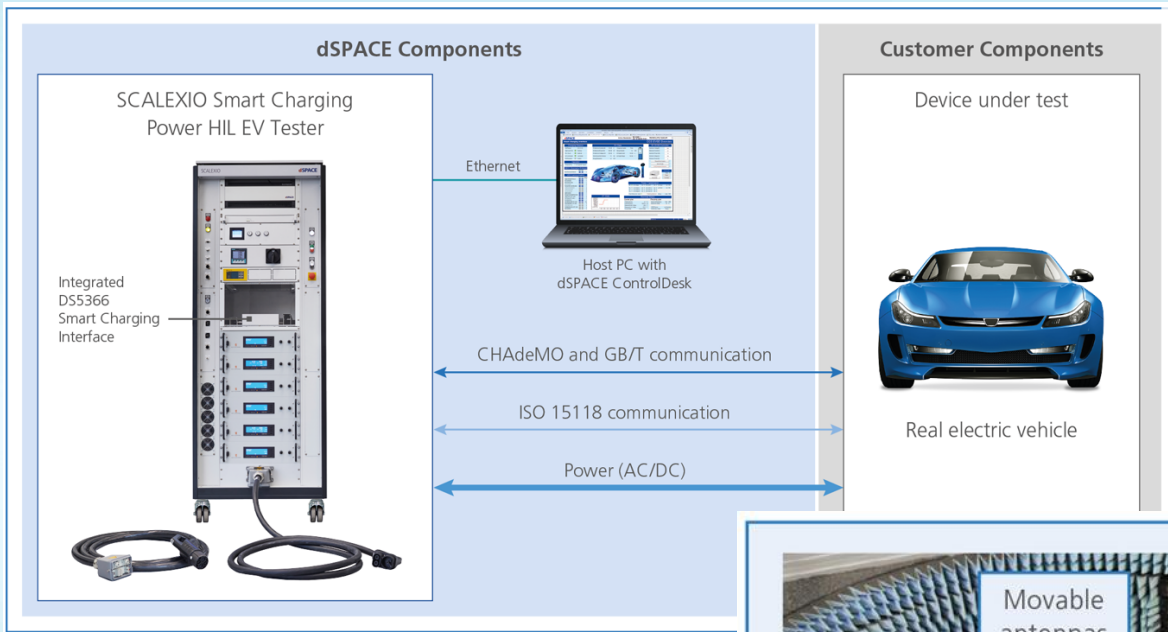
Postup při tvorbě aplikace pro RT platformy



Příklady užití Rapid Control Prototyping



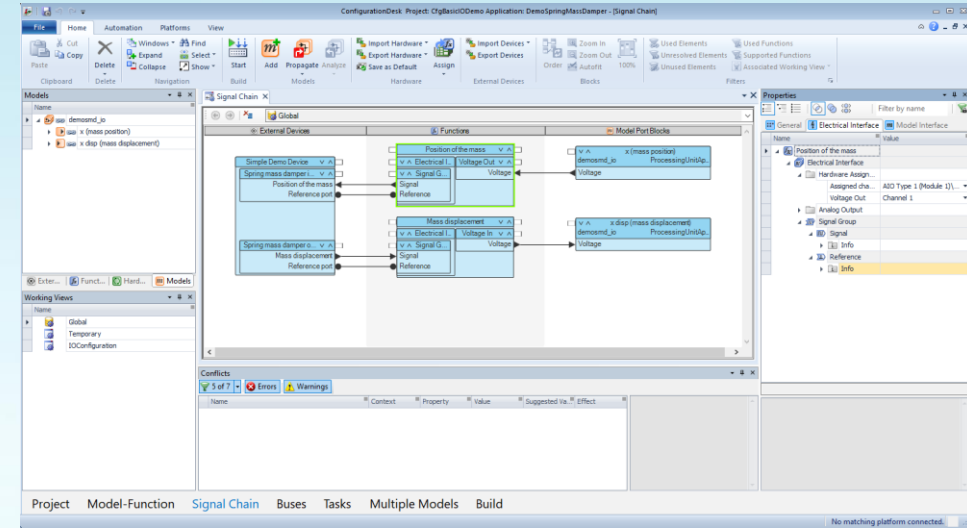
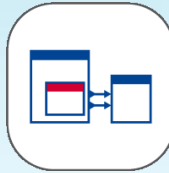
Příklady užití Hardware in the loop



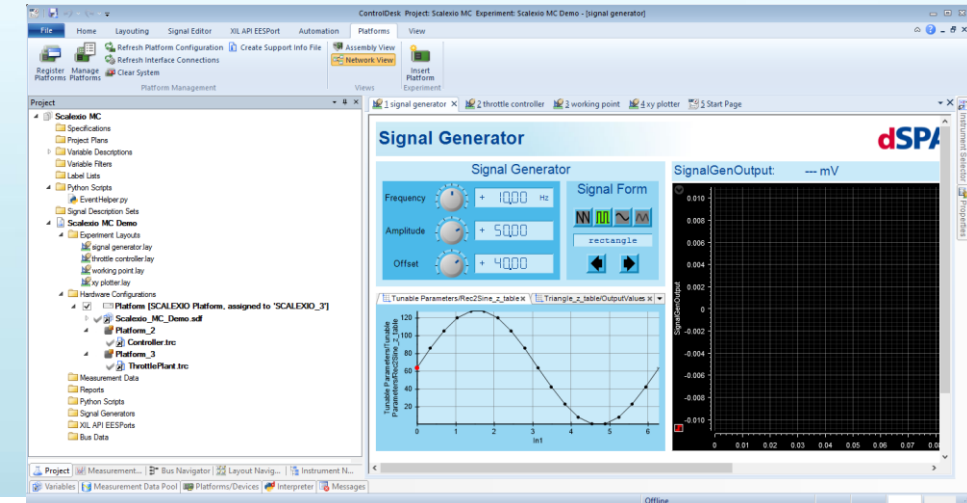
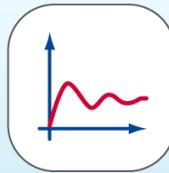
Děkuji za pozornost

Software

- ConfigurationDesk
 - Vytvoření aplikace
 - Konfigurace I/O
 - Build



- ControlDesk
 - Ovládání projektu
 - Nahrání aplikace do RT platformy
 - Měření



SCALEXIO – Systems

**SCALEXIO
Desktop**



Off-the-shelf

**SCALEXIO
Rack Version**



Off-the-shelf

**SCALEXIO
Rack Version**



Customized

Mechatronic Benches



Customized