

# Using PVSio-web and SAPERE for rapid prototyping of user interfaces in Integrated Clinical Environments

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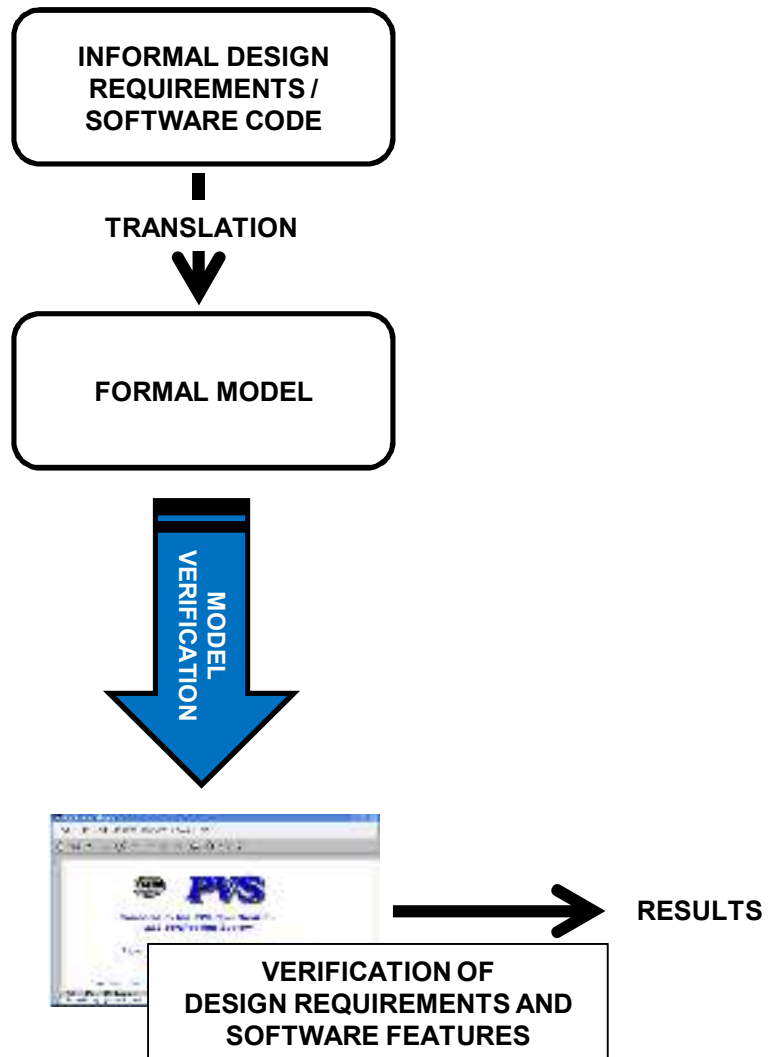
Joint work with

**Paul Curzon (QMUL), Francesco L. De Angelis (Univ. of Geneva)  
& Giovanna Di Marzo Serugendo (Univ. of Geneva)**

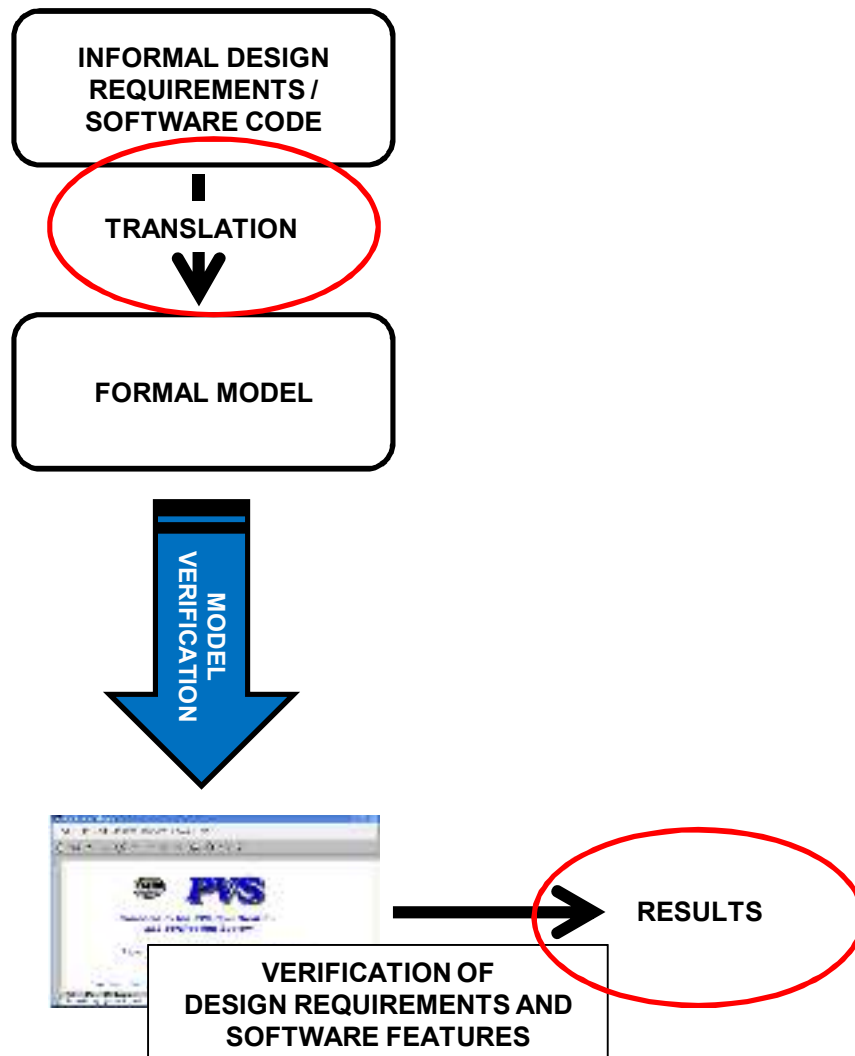
# Contribution

- **Toolchain for exploring and validating design requirements in interactive (human-computer) systems**
- **Example based on NextGen healthcare system**
  - » Integrated Clinical Environment (ICE)

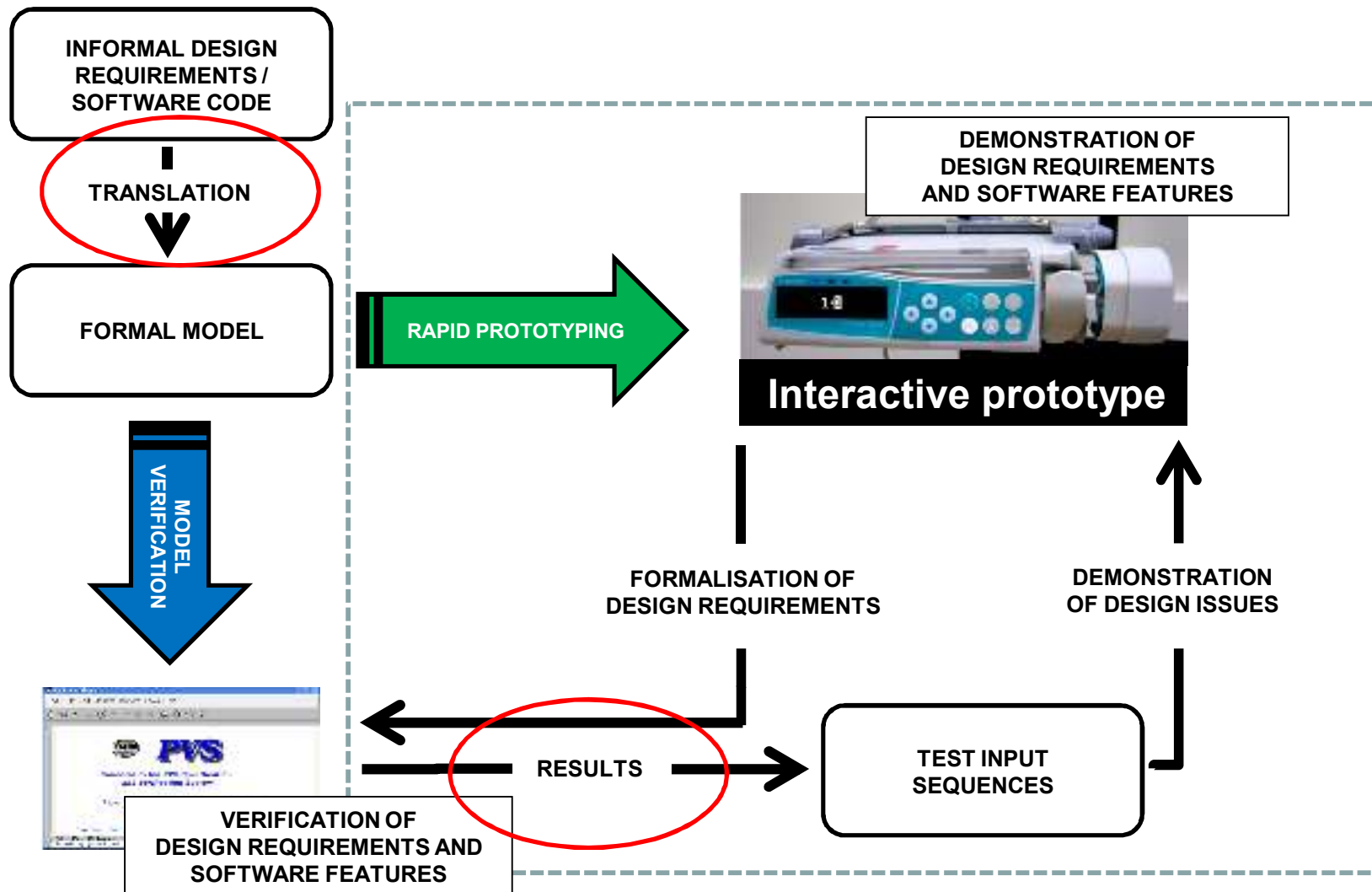
# Formal verification (workflow)



# Neuralgic points



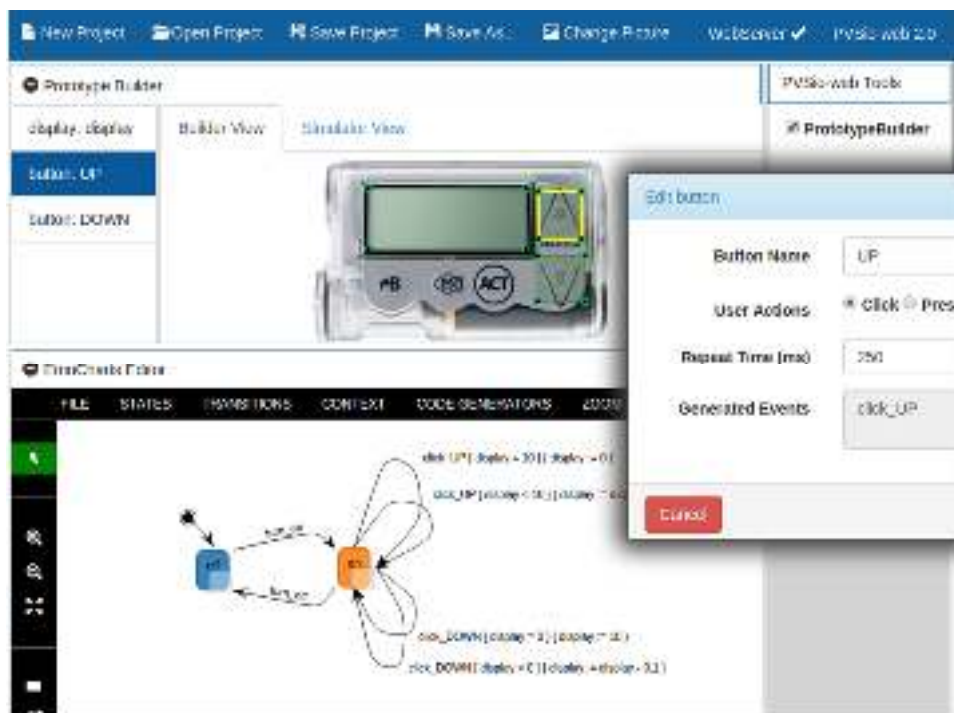
# Demonstrations based on interactive prototypes



# The PVSio-web toolkit

<http://www.pvsioweb.org>

## Prototyping Environment



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## Formal Analysis Tools



Y  
2013



MathWorks

2014



2015

Interoperability Extension

# The concept

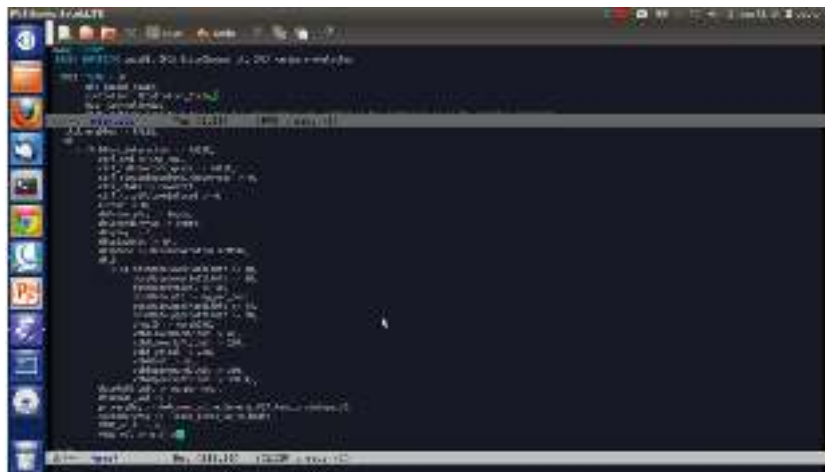


**Interactive picture**

User actions translated  
into interpreter commands



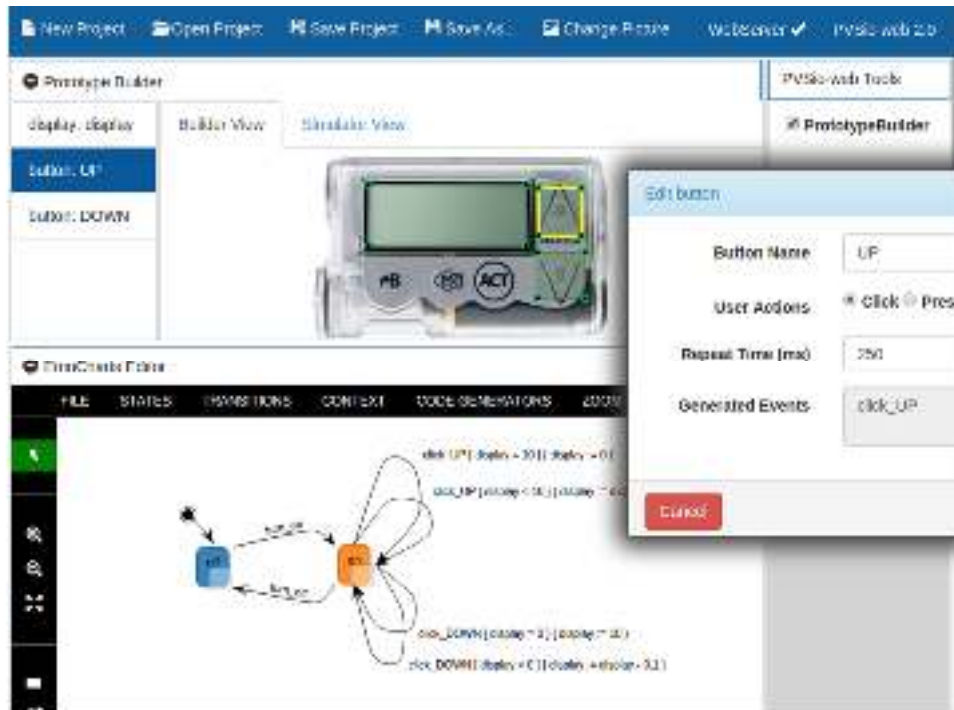
Interpreter responses rendered  
on the prototype displays



**Formal model animated  
within verification tools**

# Our new extension: Network Controller

## Prototyping Environment



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## Formal Analysis Tools



Y  
2013



2014



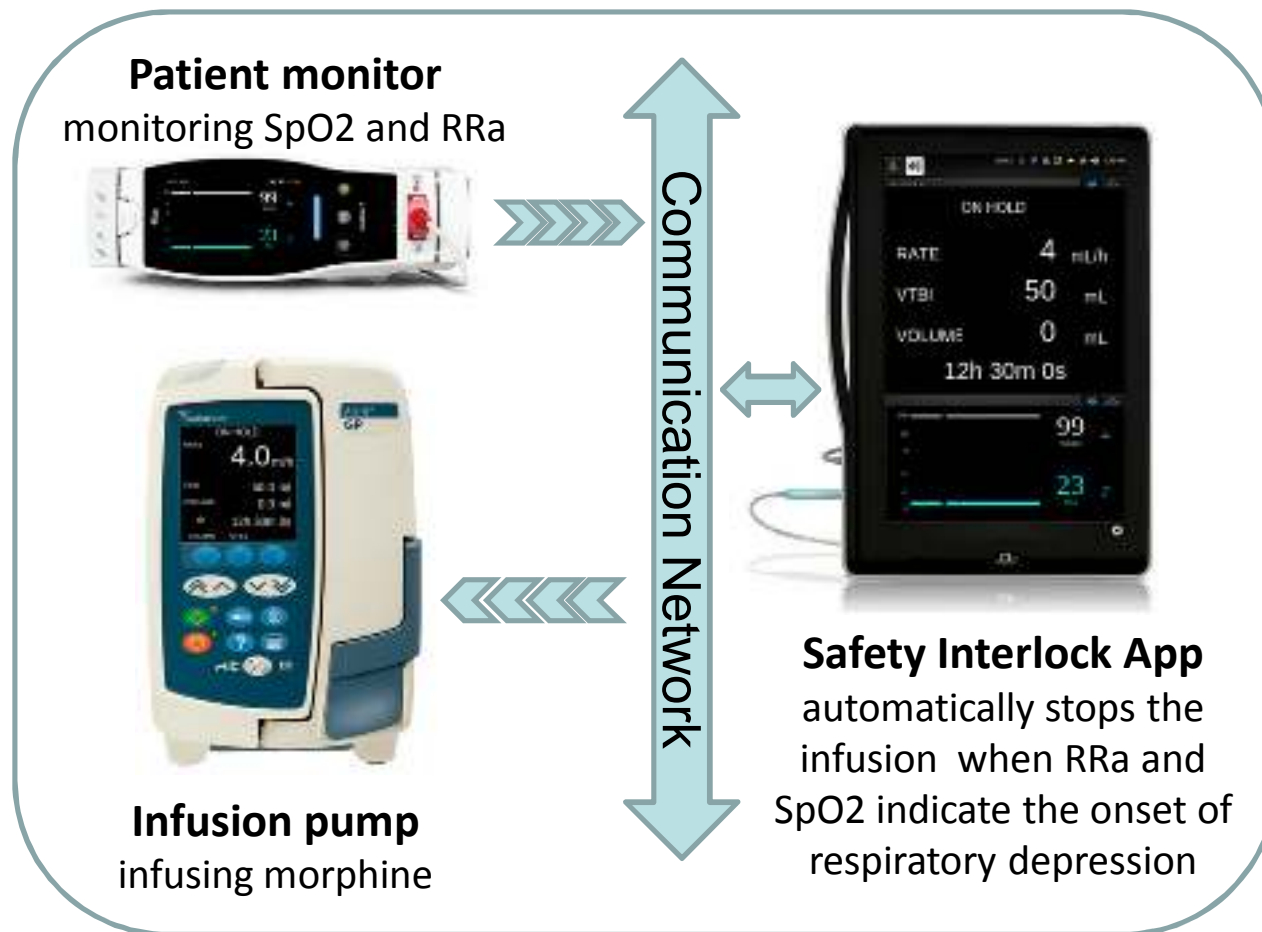
2015

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**PVSio-web  
Network Controller**



# Example prototype generated using the PVSio-web Network Controller



# Impact stories

- **Healthcare**

- Regulators and hospitals are using our toolkit to develop training material and during seminars to raise awareness about design issues in medical systems



- **Avionics / Aerospace**

- NASA wants to use PVSio-web to demonstrate next-gen TCAS protocols to pilots and domain experts



# On going work

- **Code Generators**
  - ADA, MISRA-C, Javascript, ...
- **Libraries**
  - Modelling Templates, Co-simulation
- **Support for additional formal tools**
  - SAL, KeYmaera, ...

**Come and see us on Weds!**

CAV Short Paper Presentation

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CAV Poster @ Conference Banquet