SUNSET - SDCS

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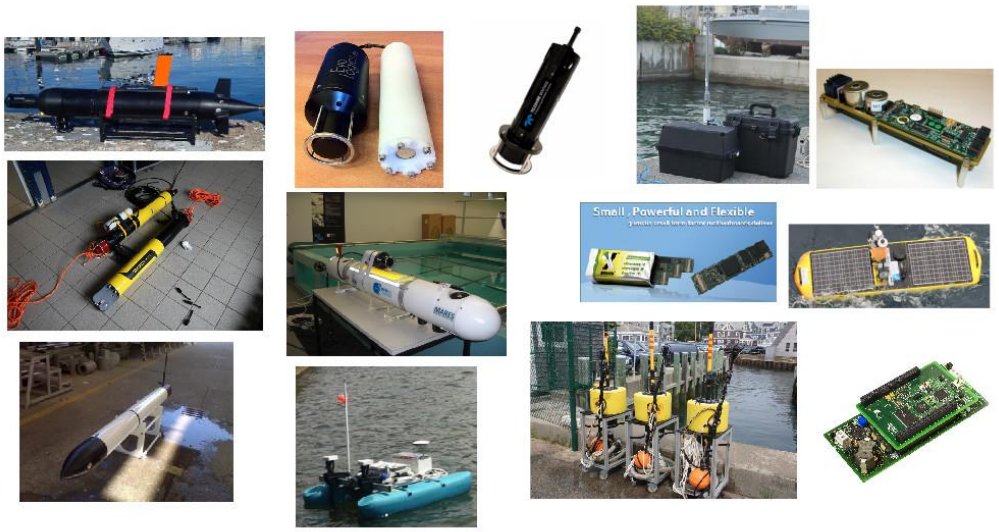
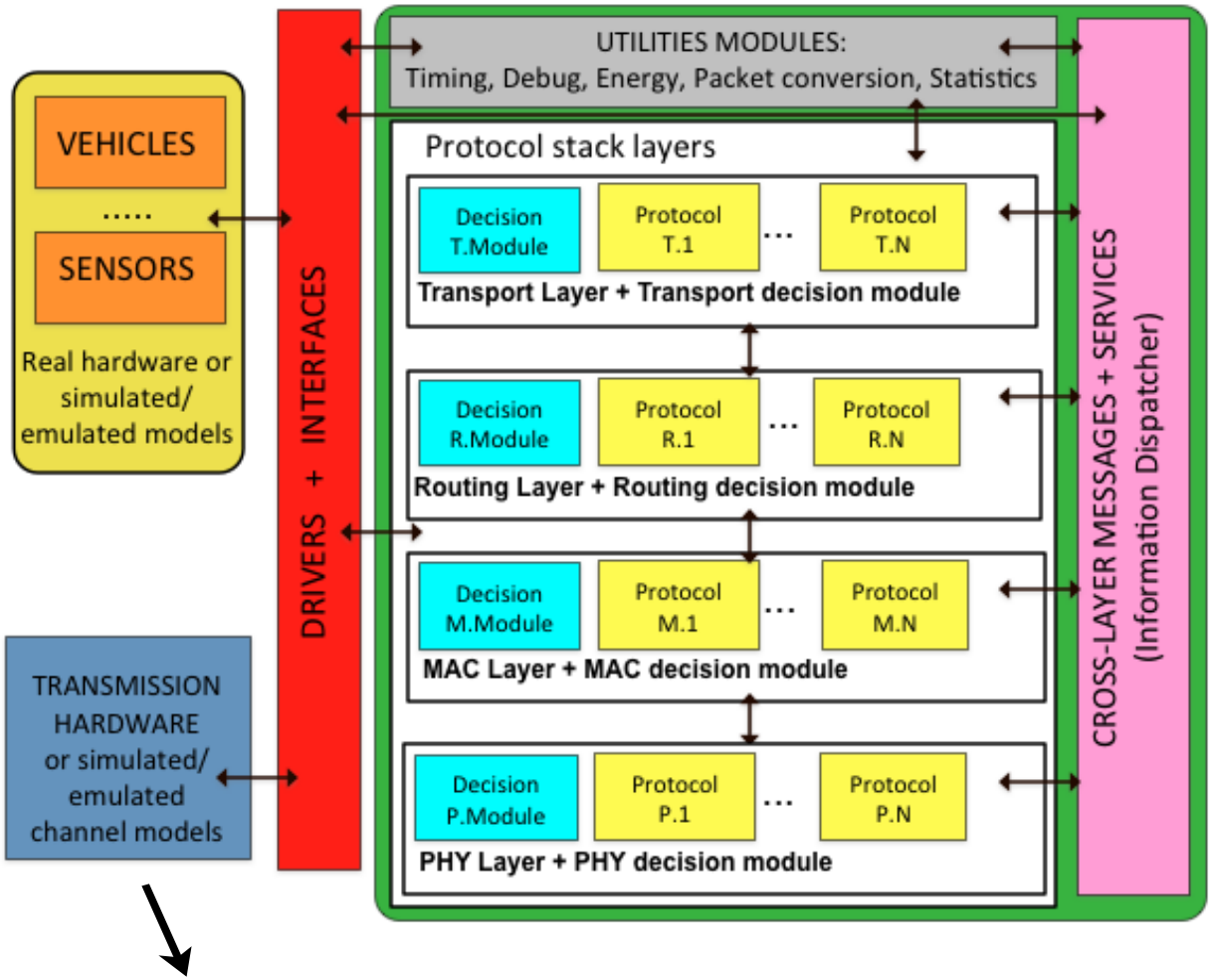
SUNSET – SDCS (S-SDCS)

- Implements the concept of Software defined Communication Stack
- The same code can be used in simulation, in lab emulation and to in-field tests.
- Its architecture design allows the easily integration with different hardware and software (acoustic modems, computer boards, AUV and ASV control systems, sensing platforms, etc.)
- Allows for real-time monitoring, data collection, control and interaction with underwater devices
- Is lightweight enough to run on PCs or embedded devices.



S-SDCS Architecture



- Separation of protocol stack from additional components
- Layered structure
- Multiple solutions at each layer
- Possibility to share information among the different layers
- Additional modules to make transparent to the user moving from simulation to at sea tests
- Additional modules for pre-deployment tests and parameter tuning

S-SDCS features

- **Extended cross-layering** all-over the protocol stack layers
- Coexistence of multiple networking solutions with open and proprietary modules (**MAC, routing, DTN, security, compression, encoding,** etc.)
- **Policy engines to dynamically and autonomously** change the protocol adopted in the stack according to the environment and application scenarios
- Sensor Networks Support for:
  - **Heterogeneous communication solutions**
  - **Cooperation of different underwater nodes**

Design and implementation of pre-deployment and deployment toolkits to evaluate the performance of the complete system (**modeling, simulation, emulation, hardware-in-the-loop, in-field tests**)

Improvements to current underwater systems

- **Increase in reliability and performance of acoustic underwater modems**
  - More than point-to-point communications
  - Multi-hop communications with cooperation and interaction of multiple heterogeneous devices

- **Advanced support for mobile vehicle operations**
  - More than just preloaded mission
  - Remote real-time control of the vehicle via single-hop and multi-hop transmissions

- **Innovative underwater sensor operations**
  - Avoiding limited interaction and control
  - Remote real-time control of the network and each single device to collect the required measurements periodically, on-demand or in case of specific events (e.g., alarm)

SUNSET evaluation and validation

- **ACommsNet2010** [MAC, routing tests]: 3 moored nodes, 1 gateway buoy, CRV Leonardo – WHOI Micro-Modem
- **ACommsNet2011** [MAC, routing tests]: 5 moored nodes, 2 RHIBs with mantas - WHOI Micro-Modem + Evologics
- **CommsNet12** [MAC, routing + remote & real time control system + channel probing]: 4 moored nodes, 1 gateway buoy, 2 RHIBs with mantas, 3 eFolaga AUVs, 1 Wave Glider, NRV Alliance - WHOI Micro-Modem + Evologics
- **Evologics Test** [MAC, routing + remote & real time control system]: 5 static nodes, Evologics Modem
- **CLAM Test** [MAC, routing + remote & real time control system]: 5 static nodes on the sea bottom, 1 gateway buoy, 1 mobile node, Kongsberg cNode Modem
- **CommsNet13** [MAC, routing + remote & real time control system + channel probing]: 4 moored nodes, 1 gateway buoy, 2 RHIBs with mantas, 3 eFolaga AUVs, 1 Wave glider, NRV Alliance - WHOI Micro-Modem + Evologics + Teledyne Benthos
- **REP14** [Routing + Localization + remote & real time control system with support for vehicles]: 2 LAUVs, 2 eFolaga AUVs, 2 Wave Gliders, 1 gateway buoy, NRV Alliance – Evologics

FIRE

Future Internet Research and Experimentation