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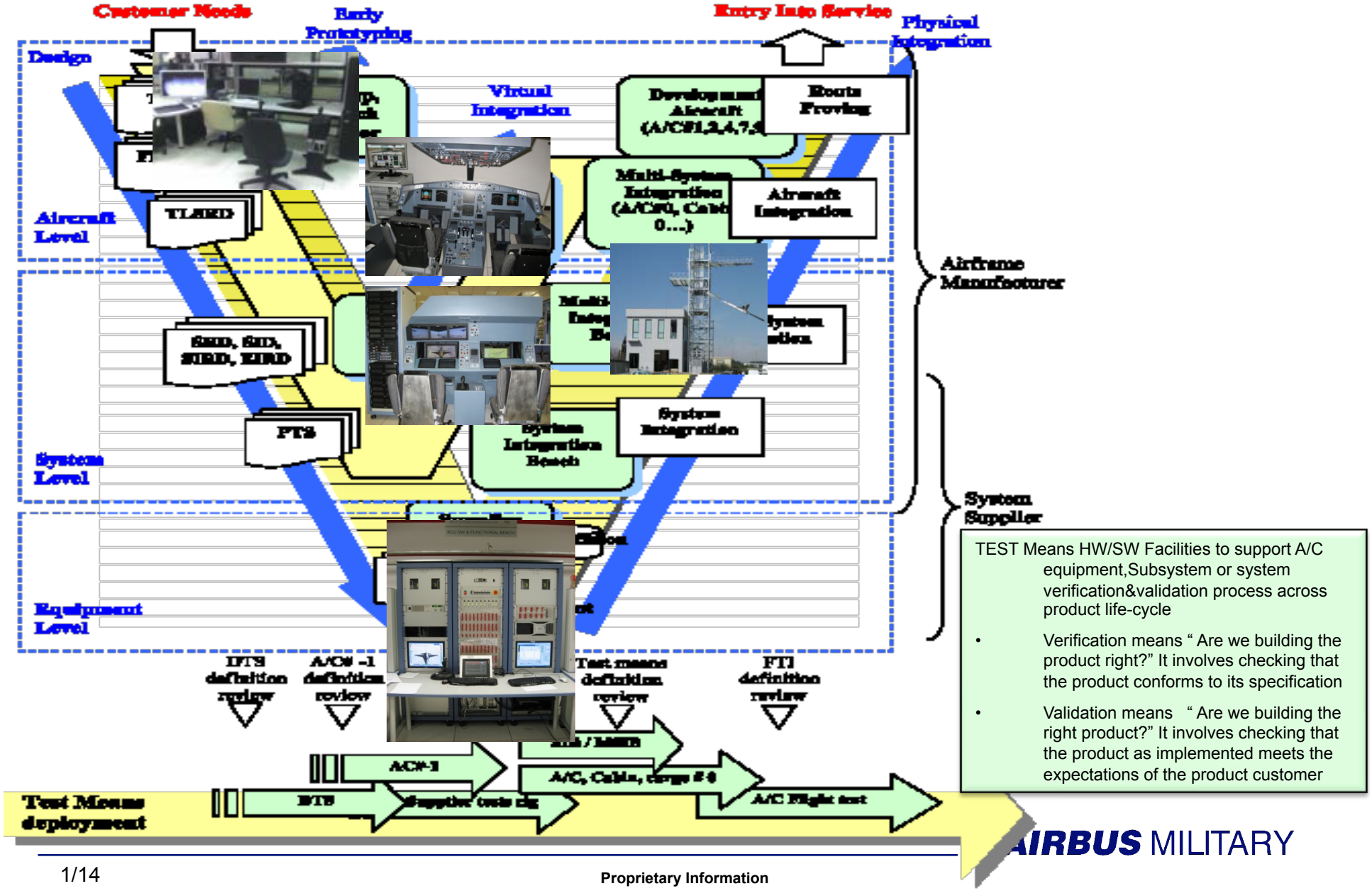
Ada95 and GNATPRO in AIM generic TEST SYSTEM



B.Lozano

A/C electronics systems life cycle



TEST Means HW/SW Facilities to support A/C equipment,Subsystem or system verification&validation process across product life-cycle

- Verification means " Are we building the product right?" It involves checking that the product conforms to its specification
- Validation means " Are we building the right product?" It involves checking that the product as implemented meets the expectations of the product customer

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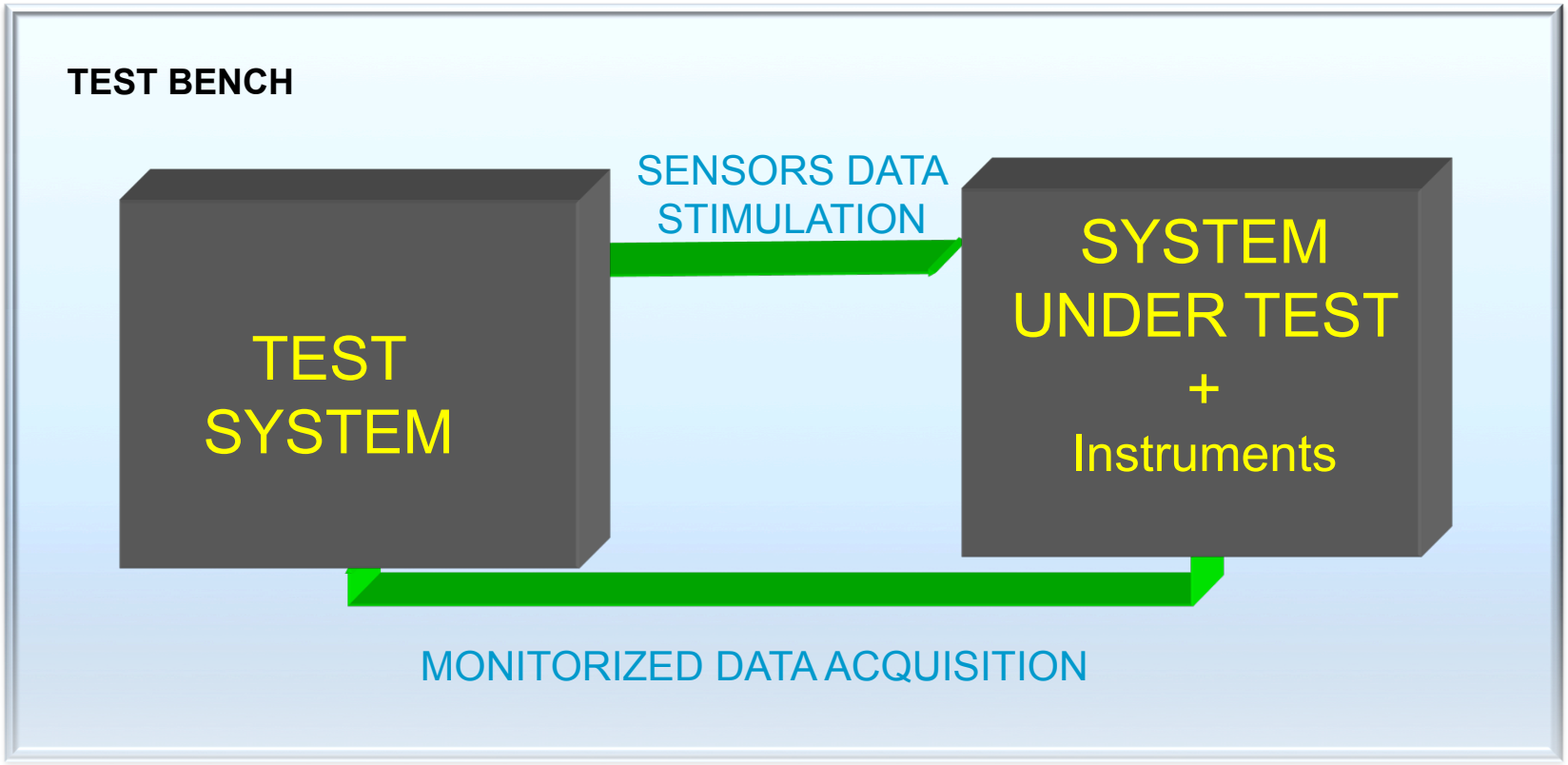
SEAS Overview



Stimulation,Acquisition and Simulation System (SEAS)

is a modular generic distributed HW/SW items used to build test facilities
(Engineering Simulator, SW Benches, Functional test benches and Target Rigs)

SEAS MOSA principles

•Modular, Open, distributed and scalable architecture widely used with minimal changes from Desk Top Simulators to target rigs

• Reconfigurability,Portability,Interoperability,Reusability, Scalability, Reliability and Maintainability

•Simulation environment multi-platform and multi-OS

•*Generic SW components are written in Ada95 to improve reliability*

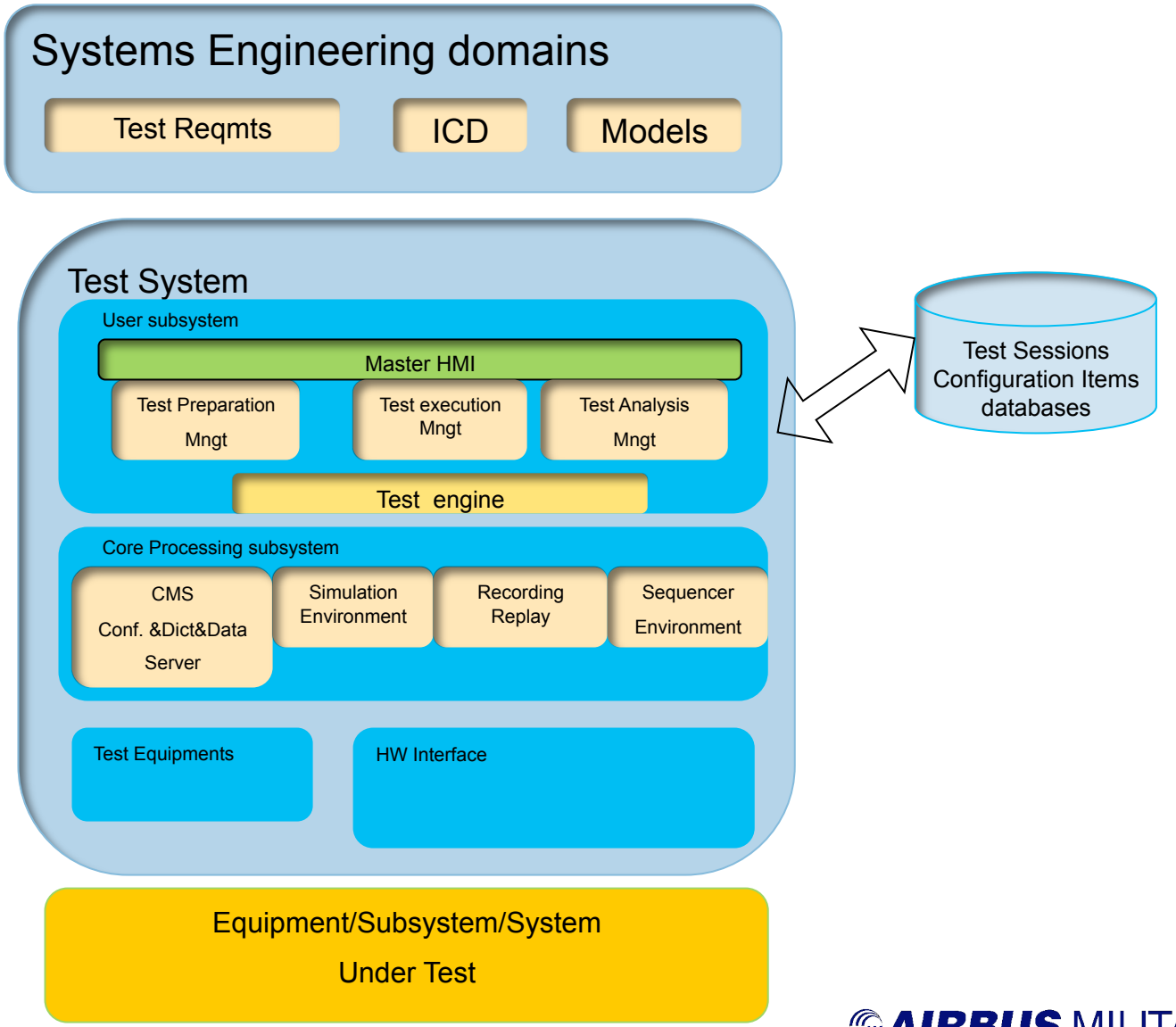
• Multi-language support for simulations and bench specific SW (Ada95, C,C++,Java,VB,Fortran,..)

• VME, PCI, PCI-e form factors support for processors , I/O boards and USB for multimedia devices

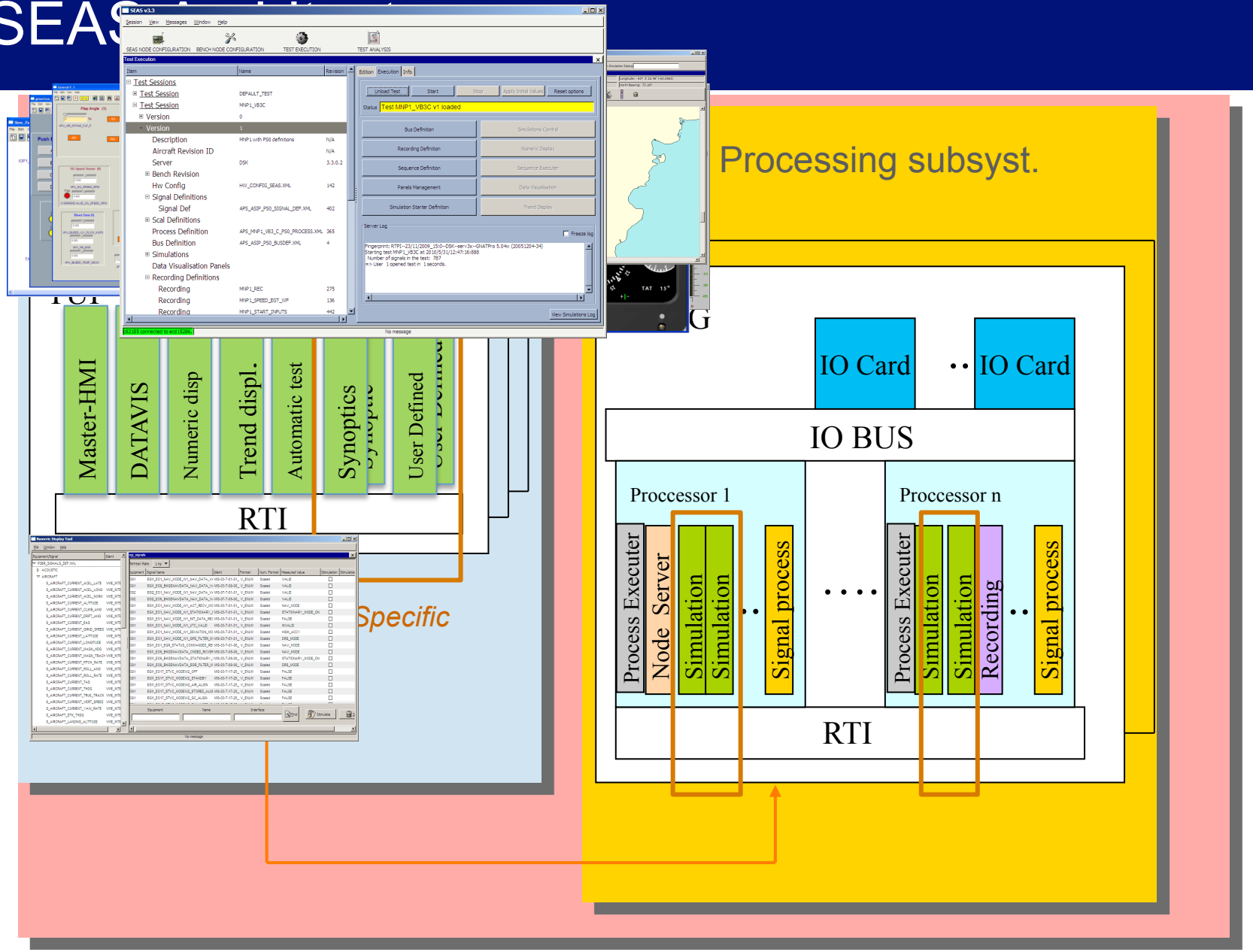
•Open integration to:

- •COTS industrial test tools by flexible adapters
- •COTS Avionics and non-avionics I/F cards (A429,AFDX, 1553,EFEX, CAN, Analogues, Digital, Discretes, Ethernet, Shared Memory, High Speed data links)
- •COTS processors
- •COTS HMI tools (GTKADA,VI, process control…)
- •COTS multimedia products
- •COTS instruments (PXI, LXI, Ethernet)

SEAS Context Diagram



SEAS



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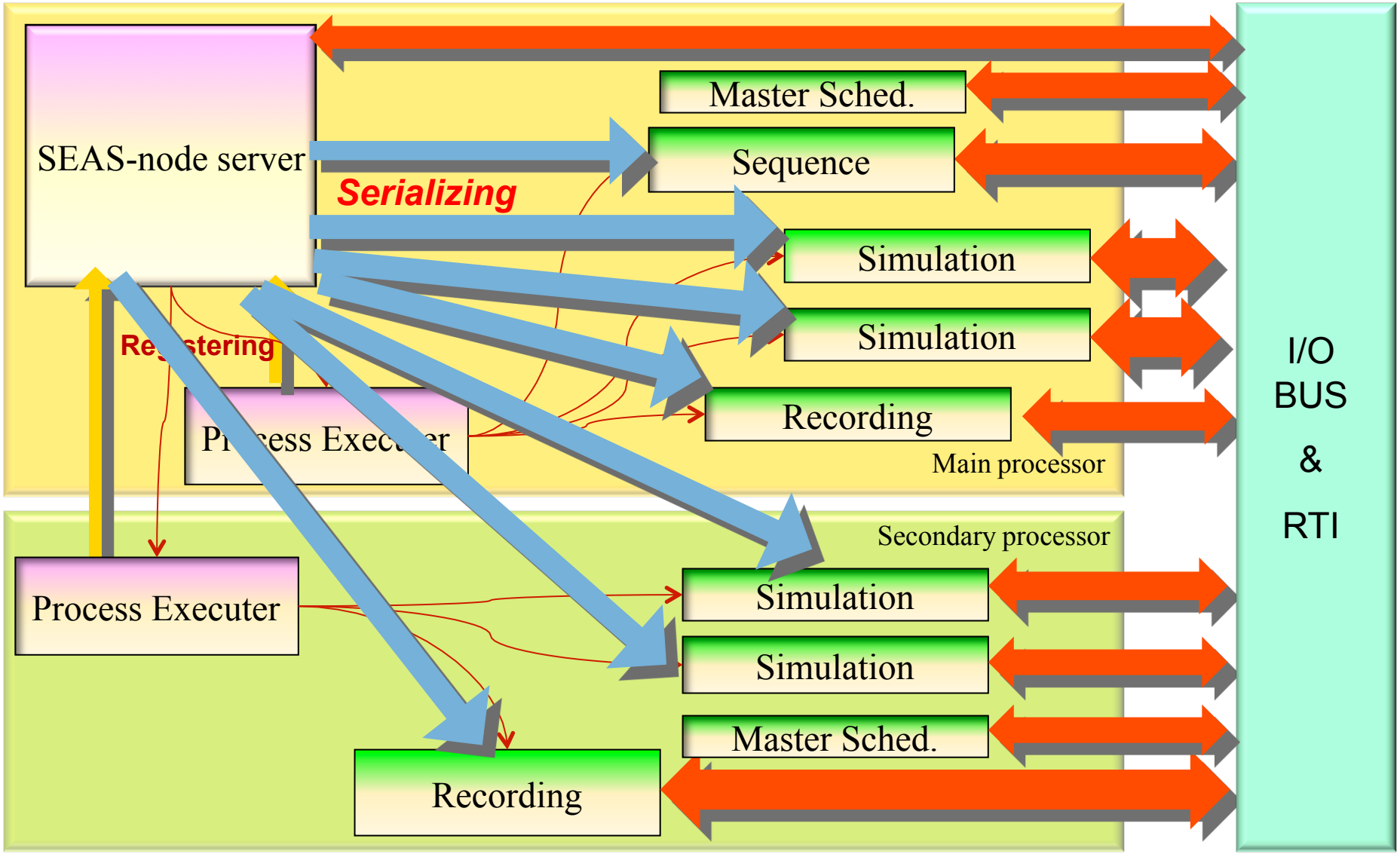
SEAS Signal Process Management



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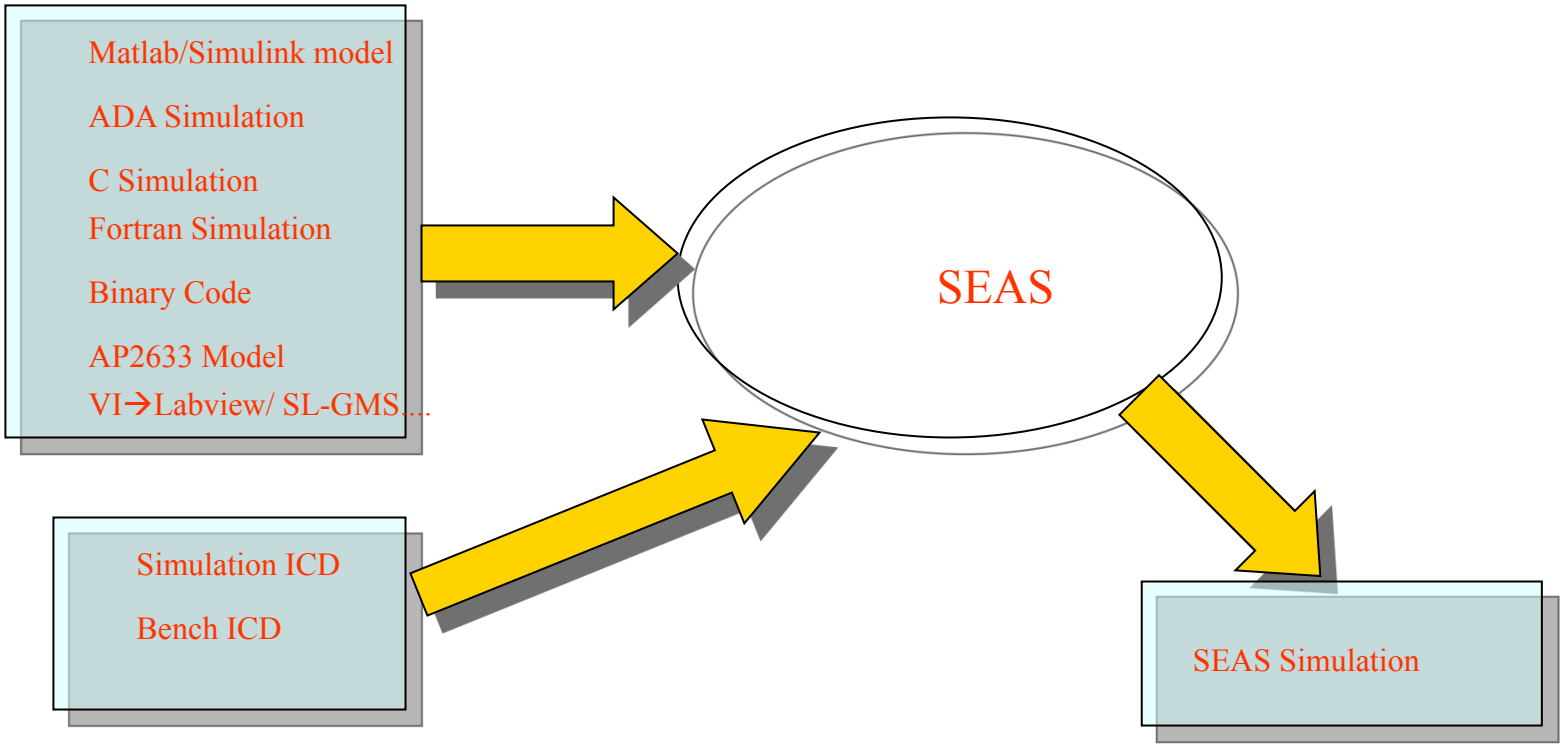
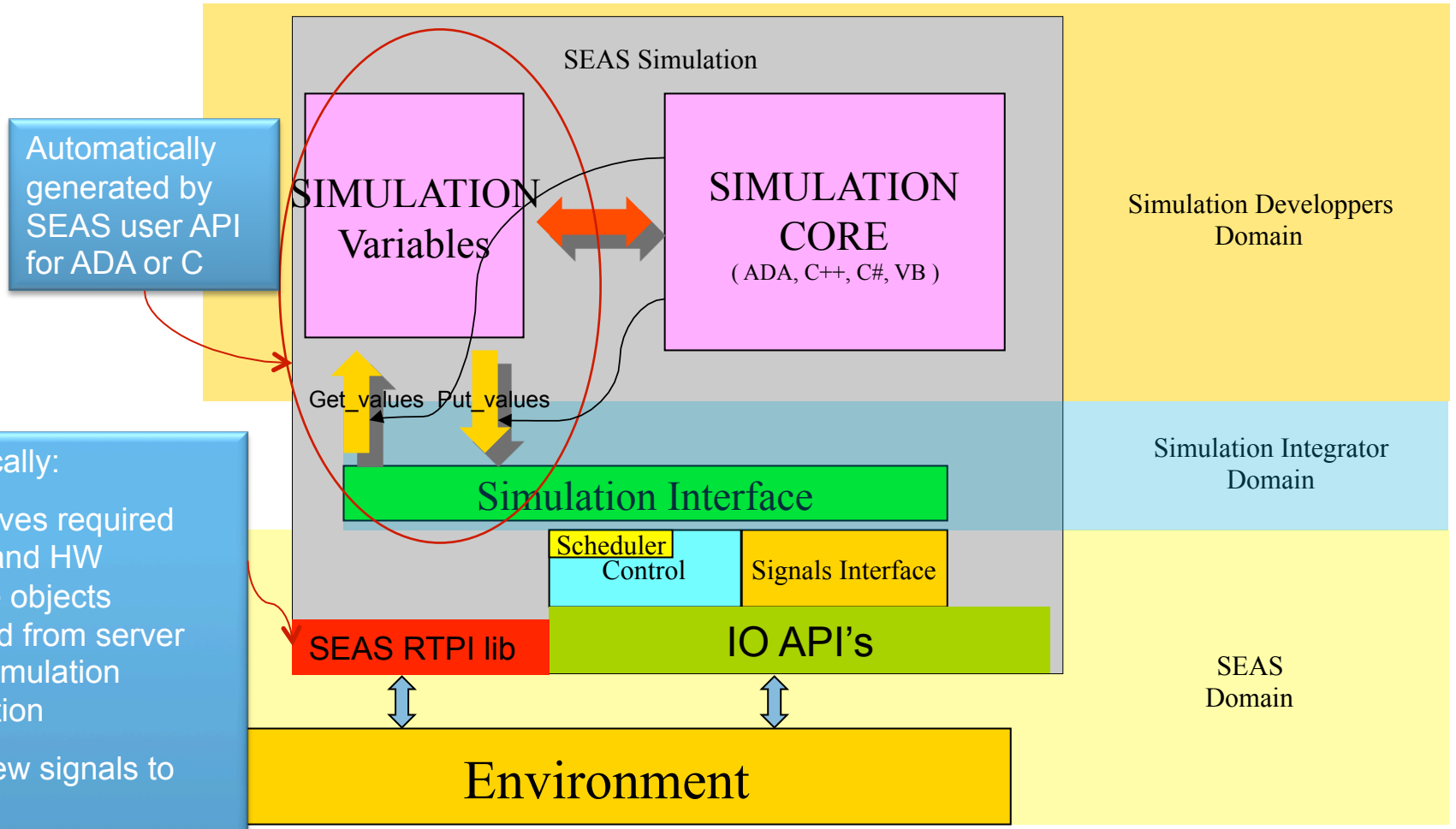
Simulations Build



SEAS Simulations layers

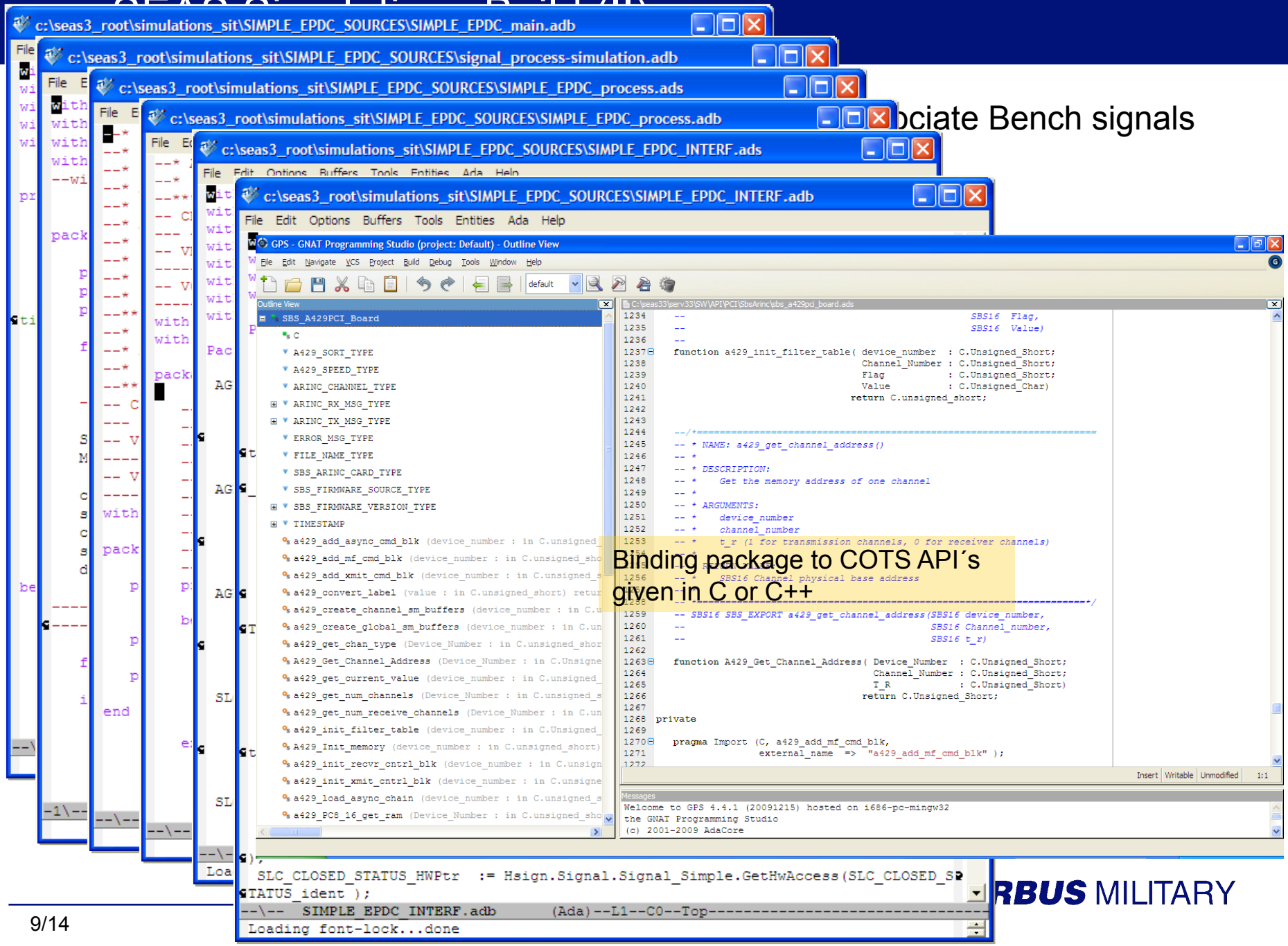


Automatically generated by SEAS user API for ADA or C

Dynamically:

- It Receives required signals and HW interface objects serialized from server during simulation initialization
- Add new signals to server
- Create Bundle signals

SEAS 3 Simulation Build (II)



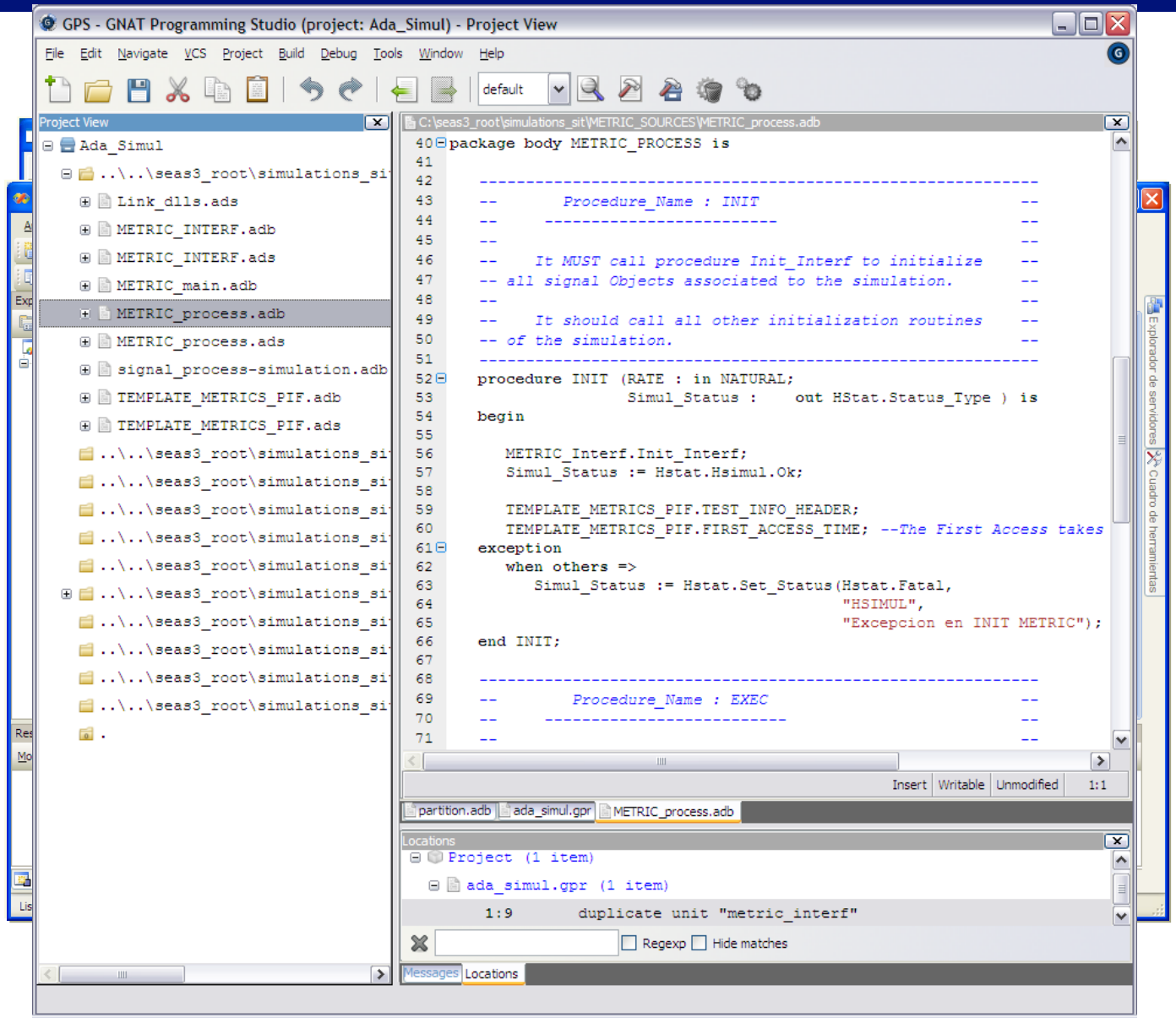
ociate Bench signals

SEAS Simulation IDE

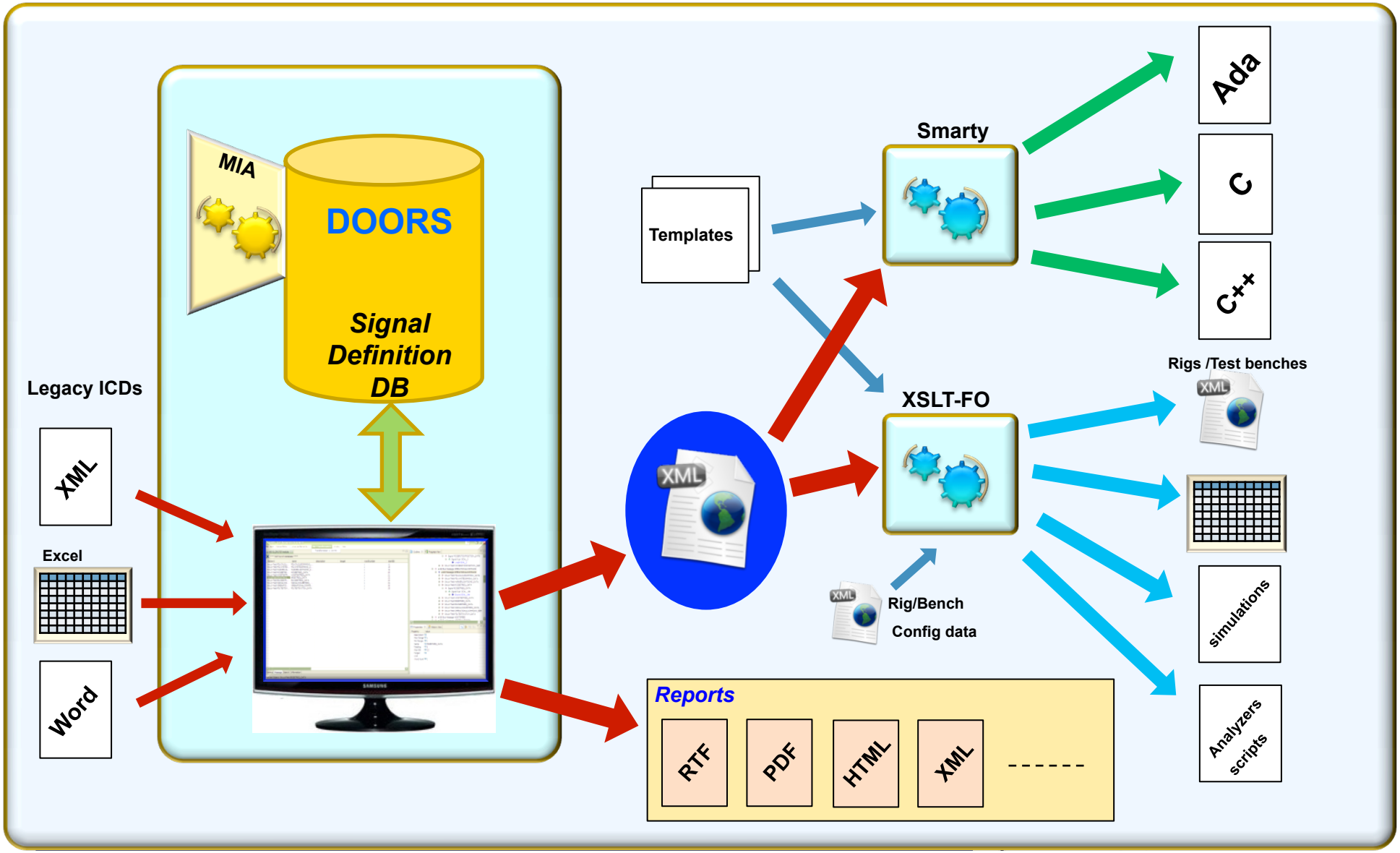
SEAS connect to native IDE for simulations and specific test tools

For Ada and C Code, generating a GPS project and launching GPS

… Or for Visual C source code, generating a Visual C project and launching Visual Studio Application

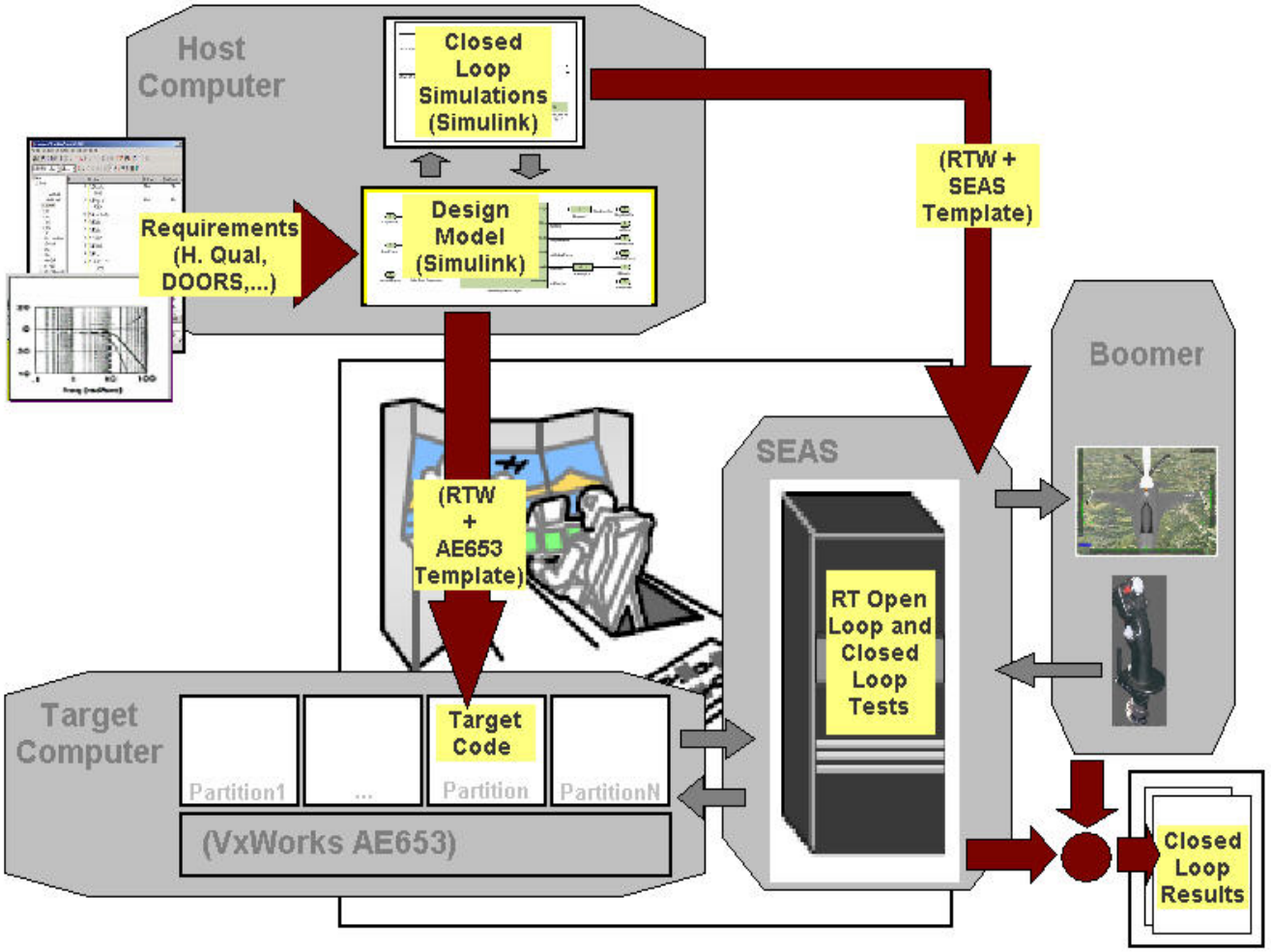


A/C ICD's Management

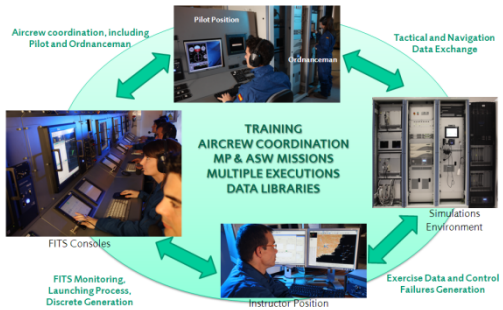


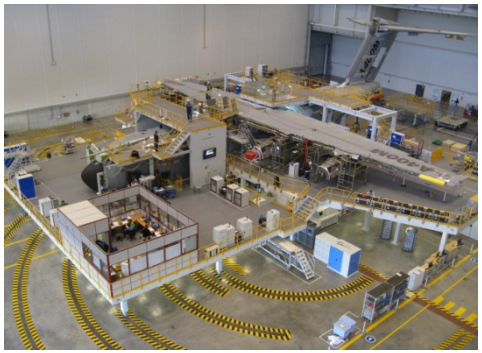
Matlab Simulink models to SEAS Route

ARBS aplication



Test Facilities





•The maturity, robustness and reliability of the system have been demonstrated throughout hundreds of test facilities in use with this common test environment including Engineering Simulators for Aircraft Refuelling Boom System, System Integration Benches for Multirole Tanker Aircrafts, A400M, Lights&Medium Transport Aircraft, Full Integrated Tactical Systems and Aircraft Interface Modules for Final Assembly Lines of A400M, Multirole Tanker Aircrafts and L&MT aircrafts.

•Proved with up to 350.000 signals per system integration bench

Conclusion

Test System built around GNATPRO-Suite :

- •Ada95 for SEAS Core SW using class wide programming for Processes, Signals, HW Interfaces, Scaling
- • Ada95 for Mission System simulations repertoire
- •GTKADA for HMI and for special synoptic like mission scenarios, radar display simulations
- •XMLADA for test system definitions Bench HW/SW definition
- •Distributed Ada for shared memories, RPC , data, types and objects distribution
- •GPS to create simulations
- •High Flexibility for integration of non Ada SW like FORTRAN,C, C++ API's

We consider using the provided solution by GNATPRO suite, as the core to develop such complex hybrid systems, with large life cycle like test systems for A/C V&V, offered big advantages.

THANK YOU FOR YOUR ATTENTION

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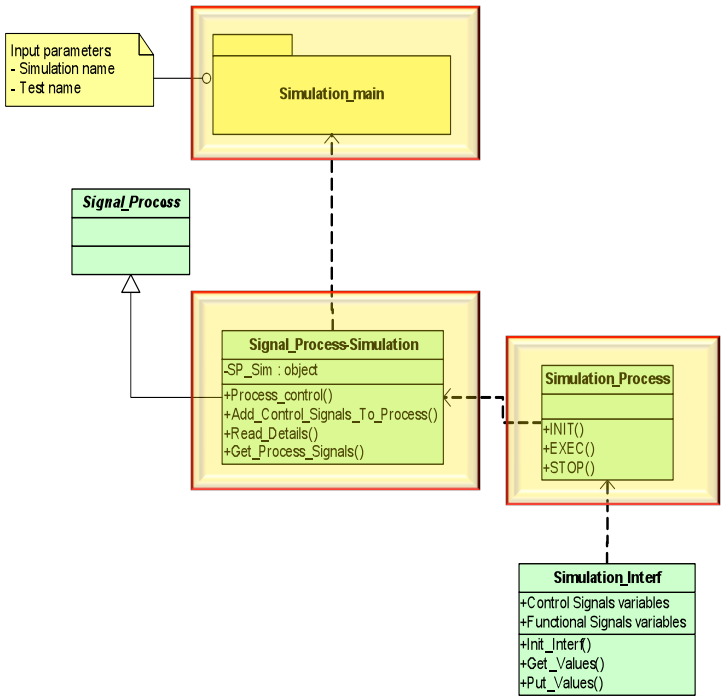
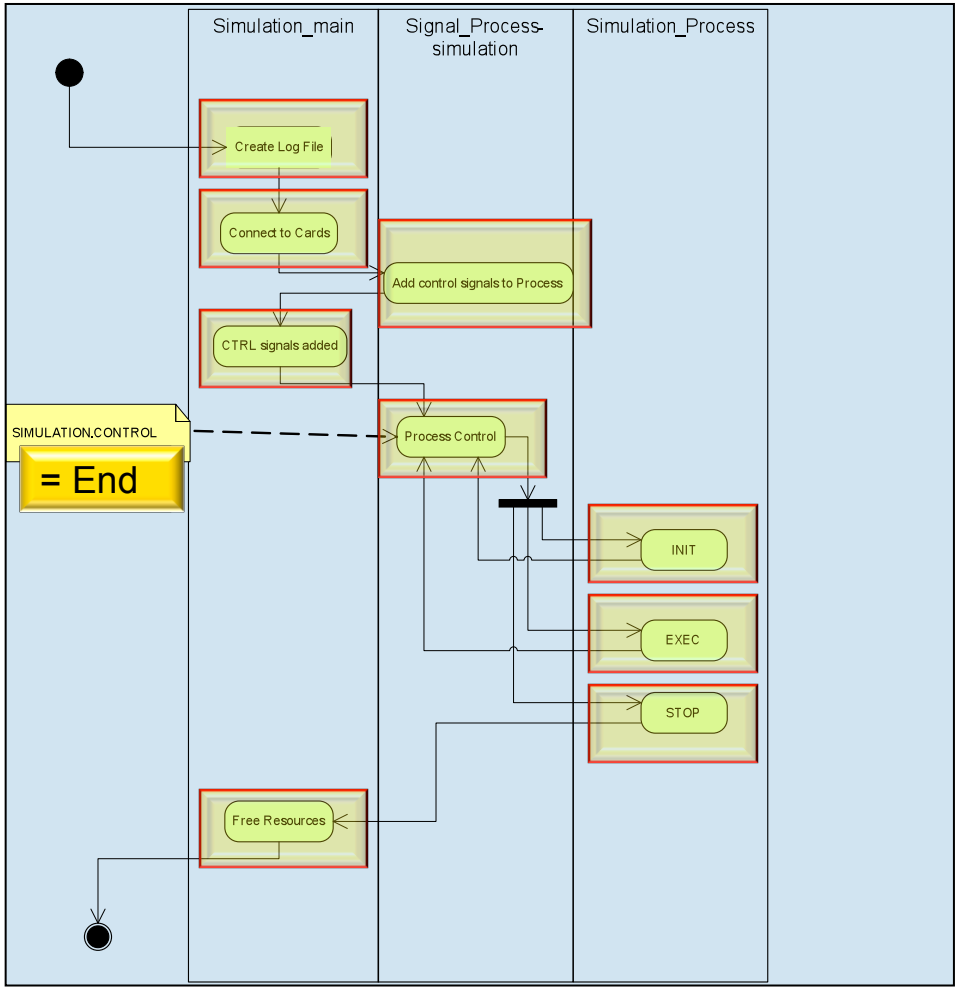
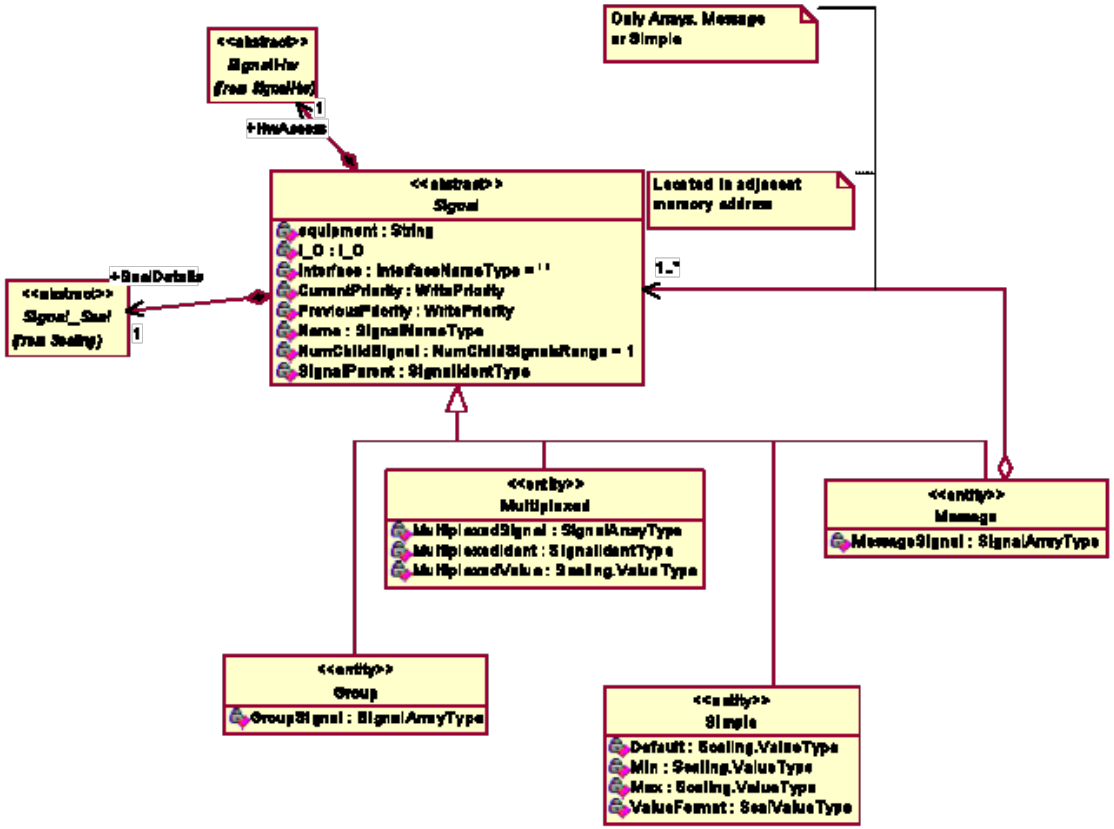
Seas Simulation class and activity diagram





Seas Signal class



Seas Signal class