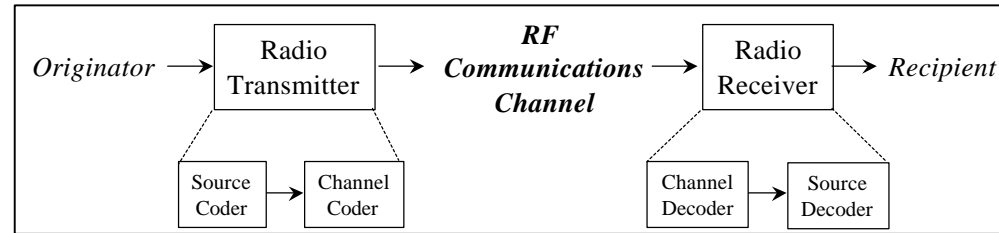


# Software Radio

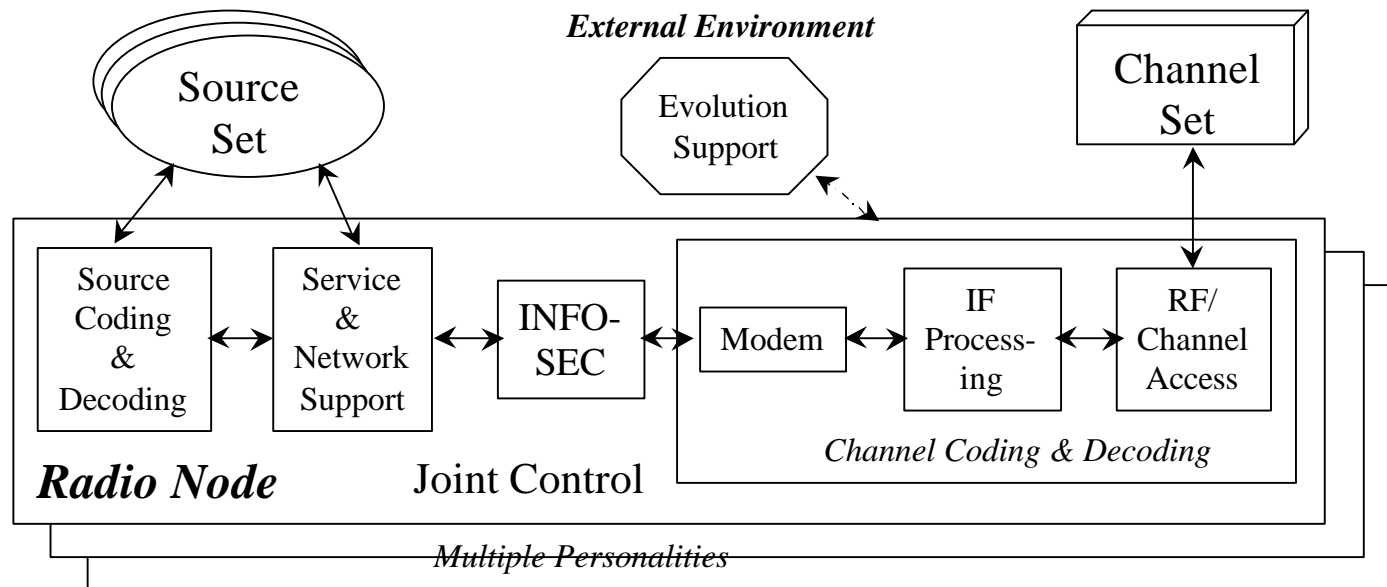
## Architecture and Technology

Joseph Mitola III  
DARPA/ DoD/ Mitre  
[jmitola@jpo.org](mailto:jmitola@jpo.org)

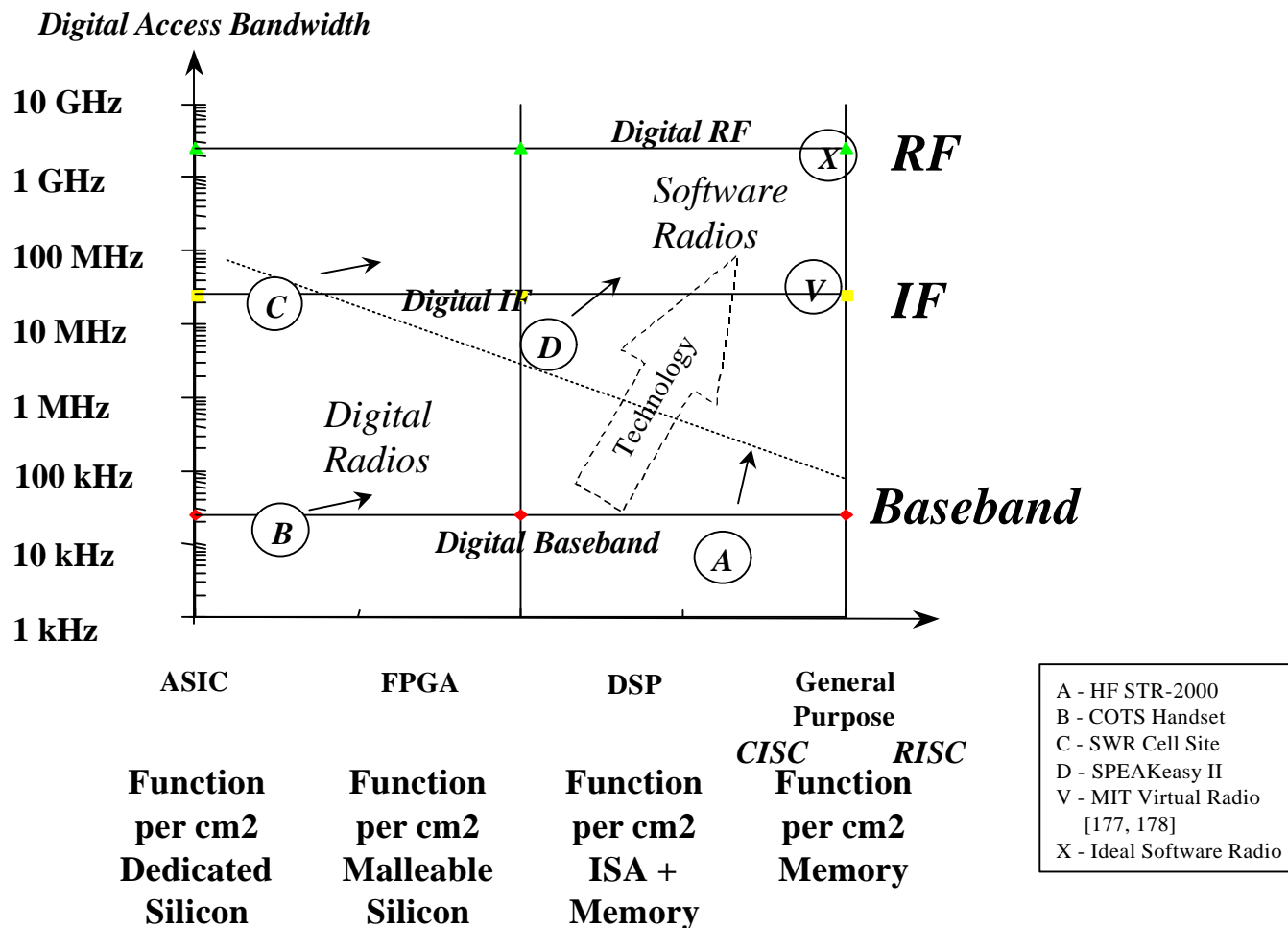
*Then ...*



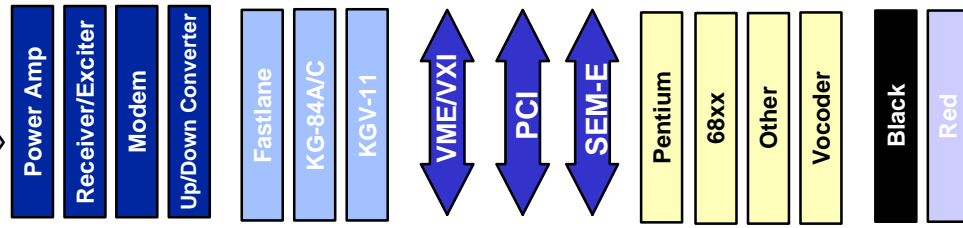
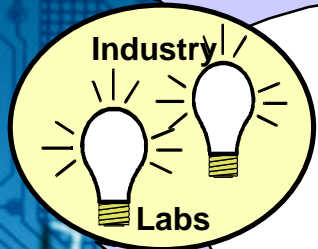
*Now ...*



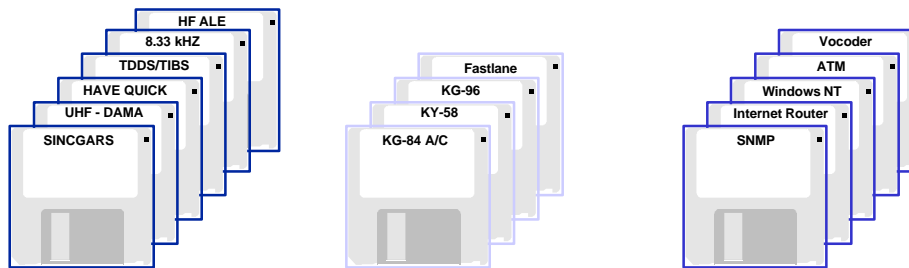
# Software Radio “Phase Space”



# Joint Tactical Radio Architecture?



*Which Industrial "Partner" Will Get There First?  
How Can DoD Keep Open Architecture without  
Becoming Integrator?*

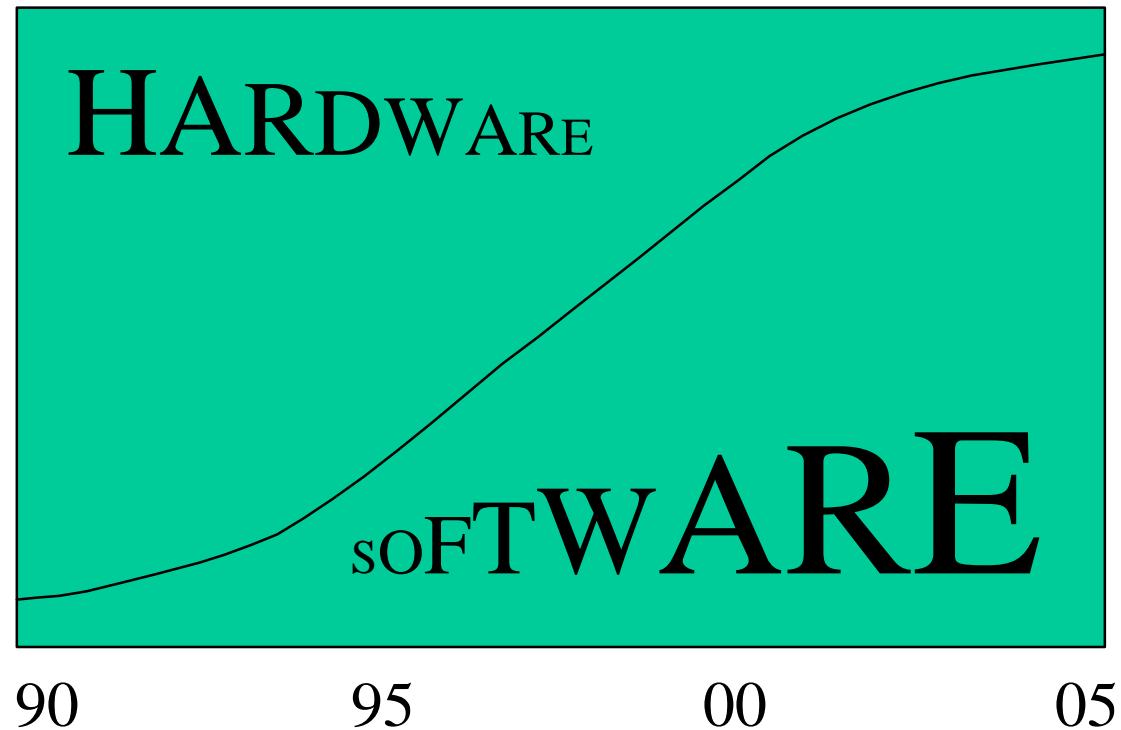


- JTRS Consistent with PMCS IPT Guidance Document
- Implements Open Systems Architecture for all DoD Radios
- Eliminates Stovepipe Radio Buys and Enhances Interoperability
- (Future Value-Added Software-Only Capabilities?) © DoD

# Third Generation Drivers

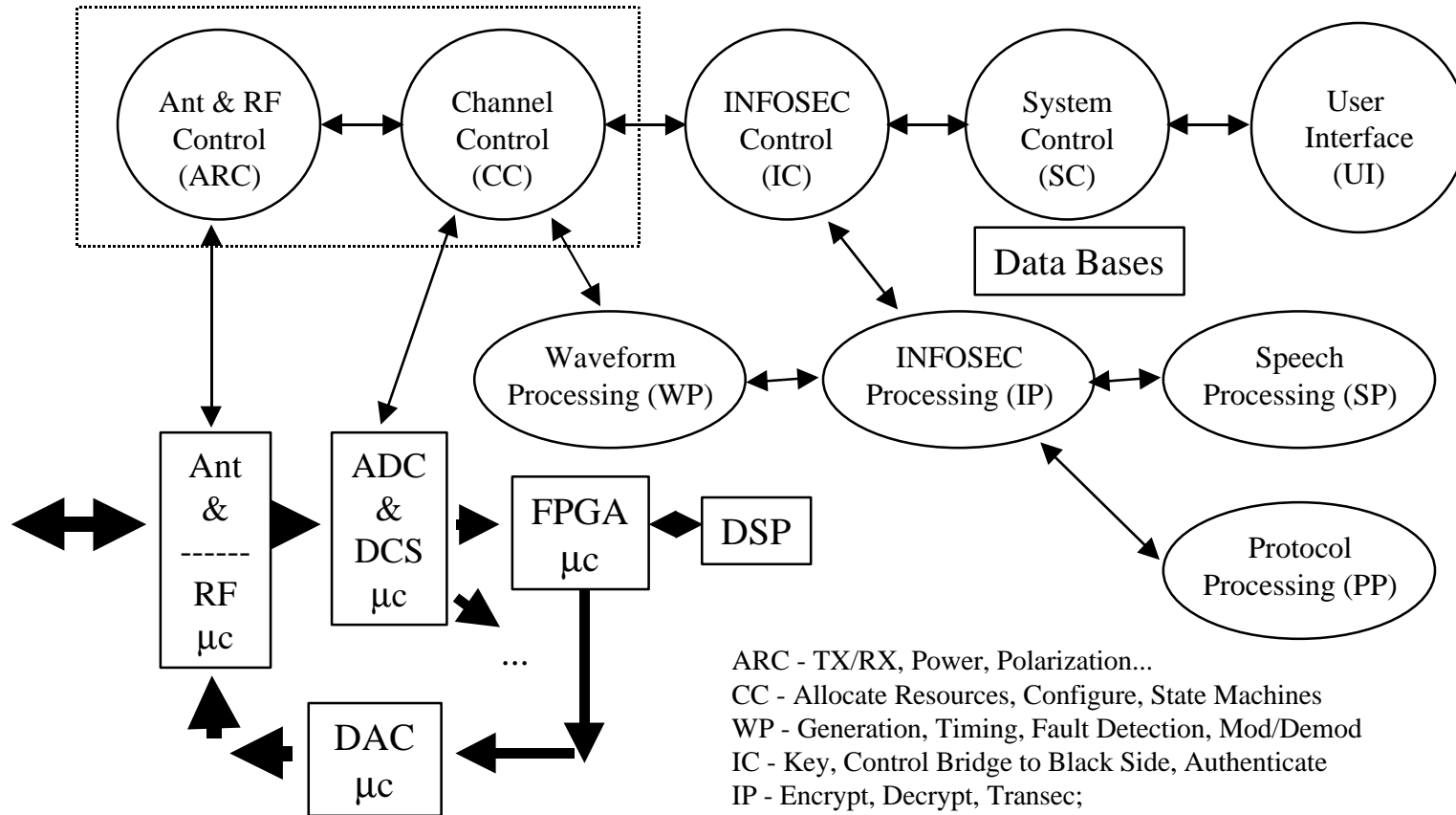
- Wireline Quality
  - Mode Control, Error Control, Equalization
- Mobile Information
  - Highways, Shopping, Entertainment, Internet
- Tailored Node Capabilities
  - Downloads (Vocoder, Power Control...)
  - Software-based Deployment

# Hardware Software Mix



Gansler, J, Defense Management Journal, 1976

# Typical System Data Flow Diagram



ARC - TX/RX, Power, Polarization...

CC - Allocate Resources, Configure, State Machines

WP - Generation, Timing, Fault Detection, Mod/Demod

IC - Key, Control Bridge to Black Side, Authenticate

IP - Encrypt, Decrypt, Transec;

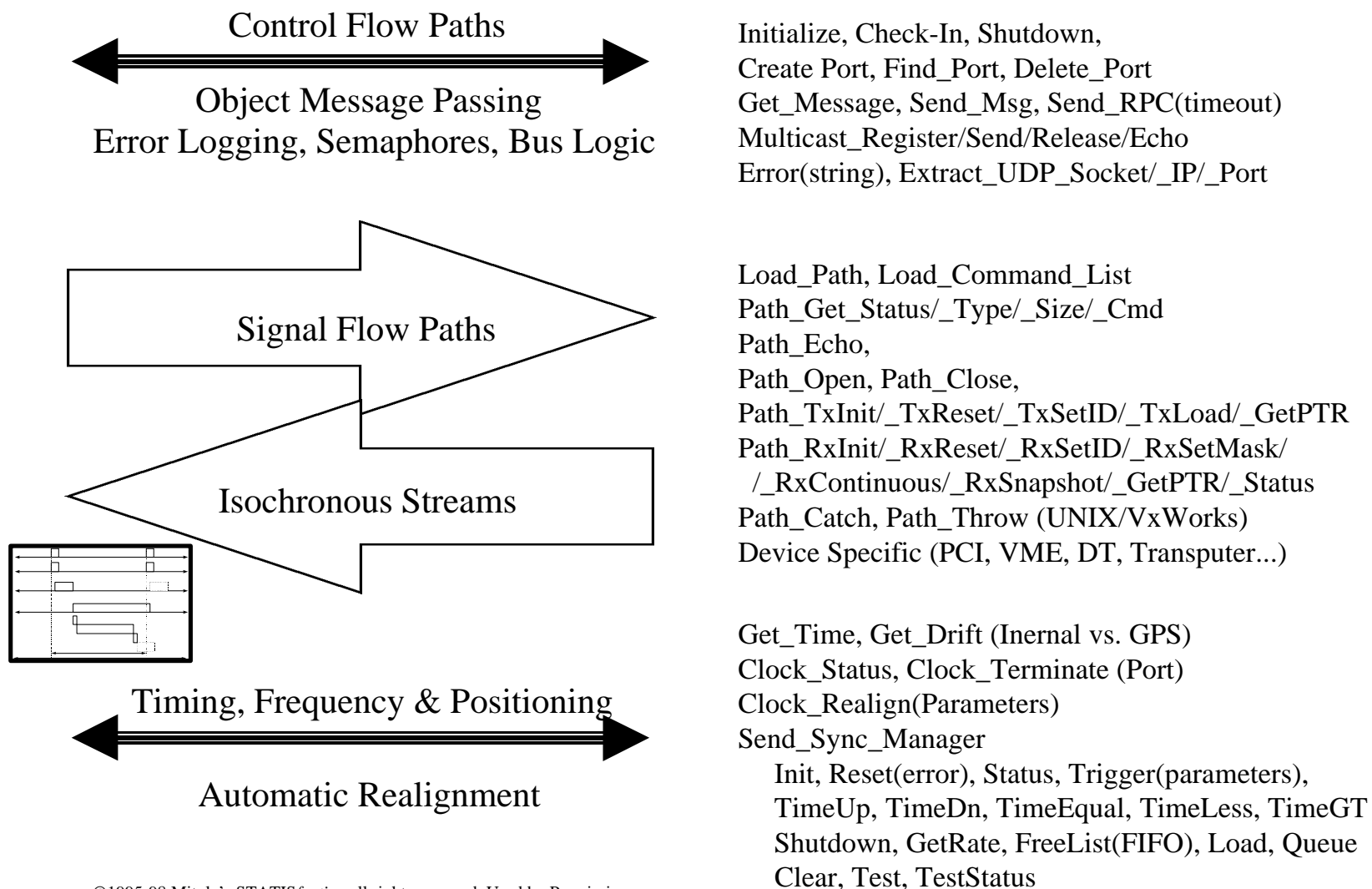
SC - Initialize/ Shutdown, Test, System Status

UI - Commands & Displays

SP - Codecs; Echo Cancellation, Voice Channel Modems...

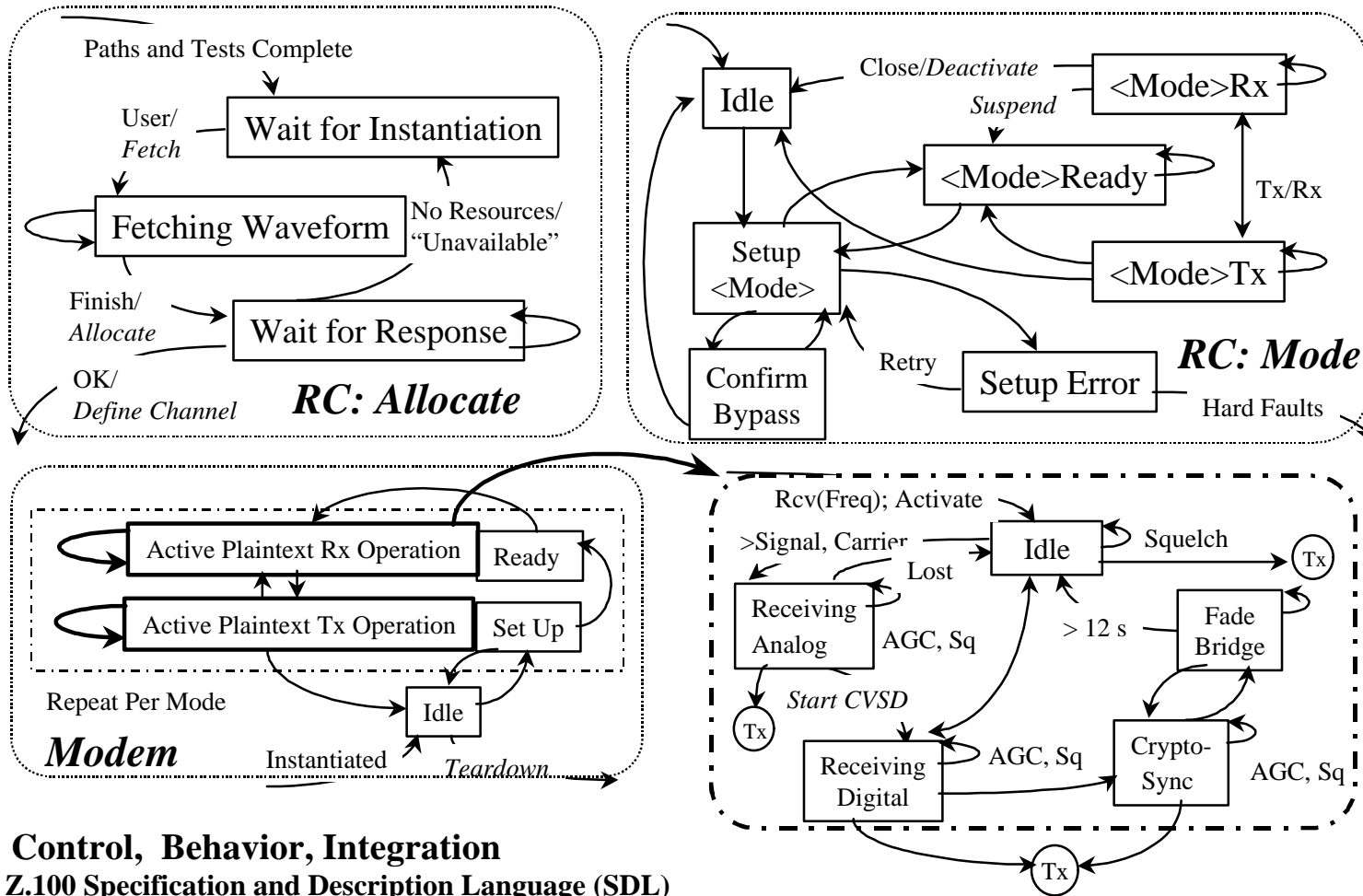
PP - Packetization, Routing ...

# Software Radio Infrastructure

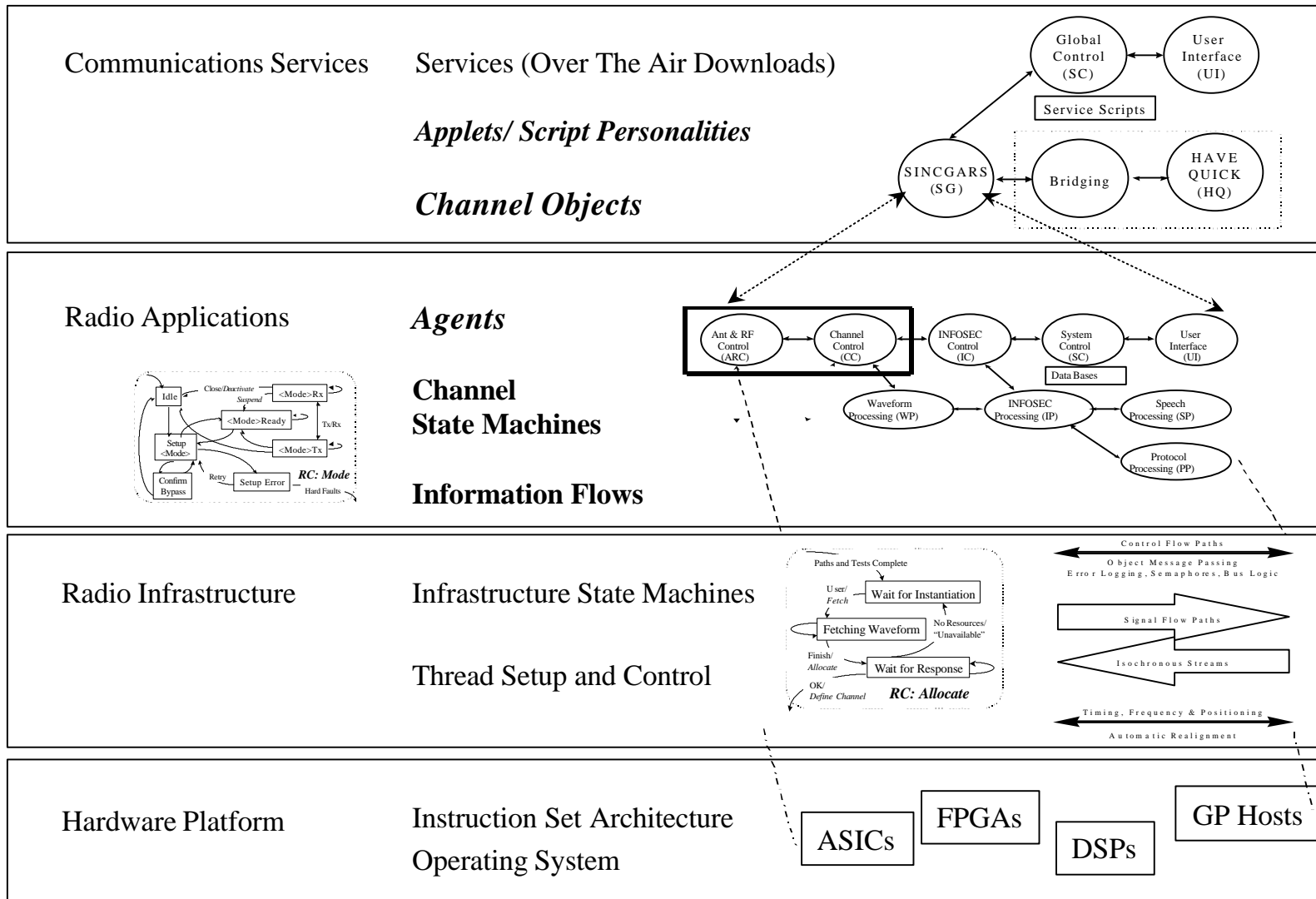




# Distributed State Machines

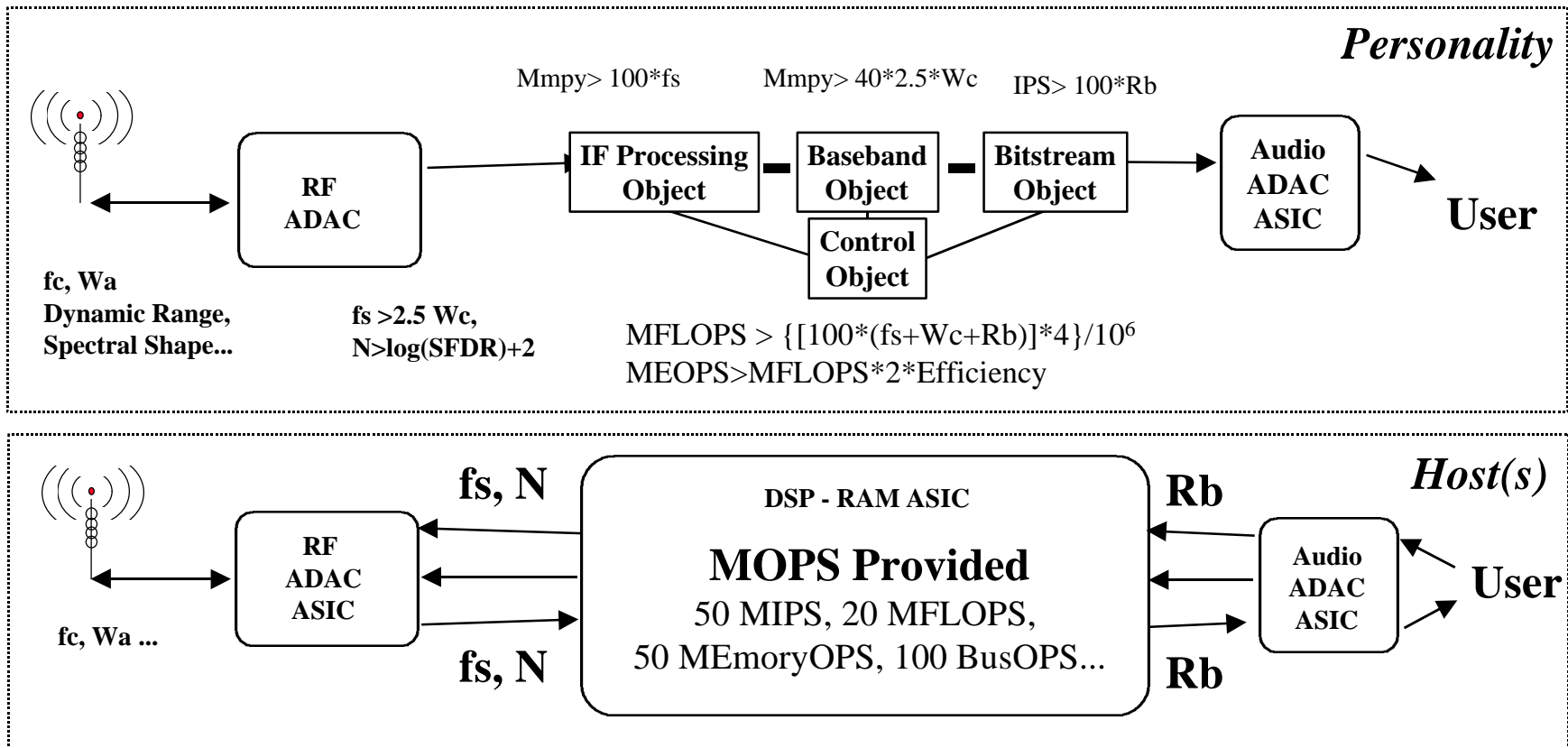


- Control, Behavior, Integration
- Z.100 Specification and Description Language (SDL)



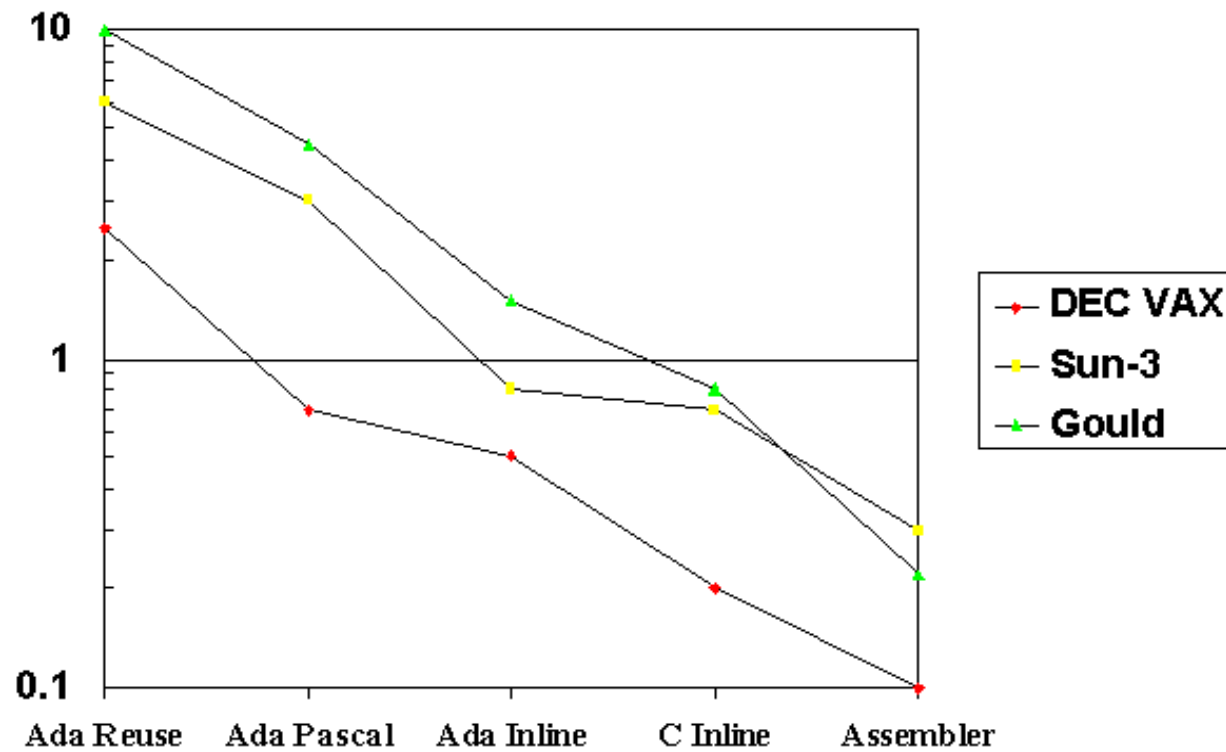
## *Distributed Layered Virtual Machine*

# Resource Parameters

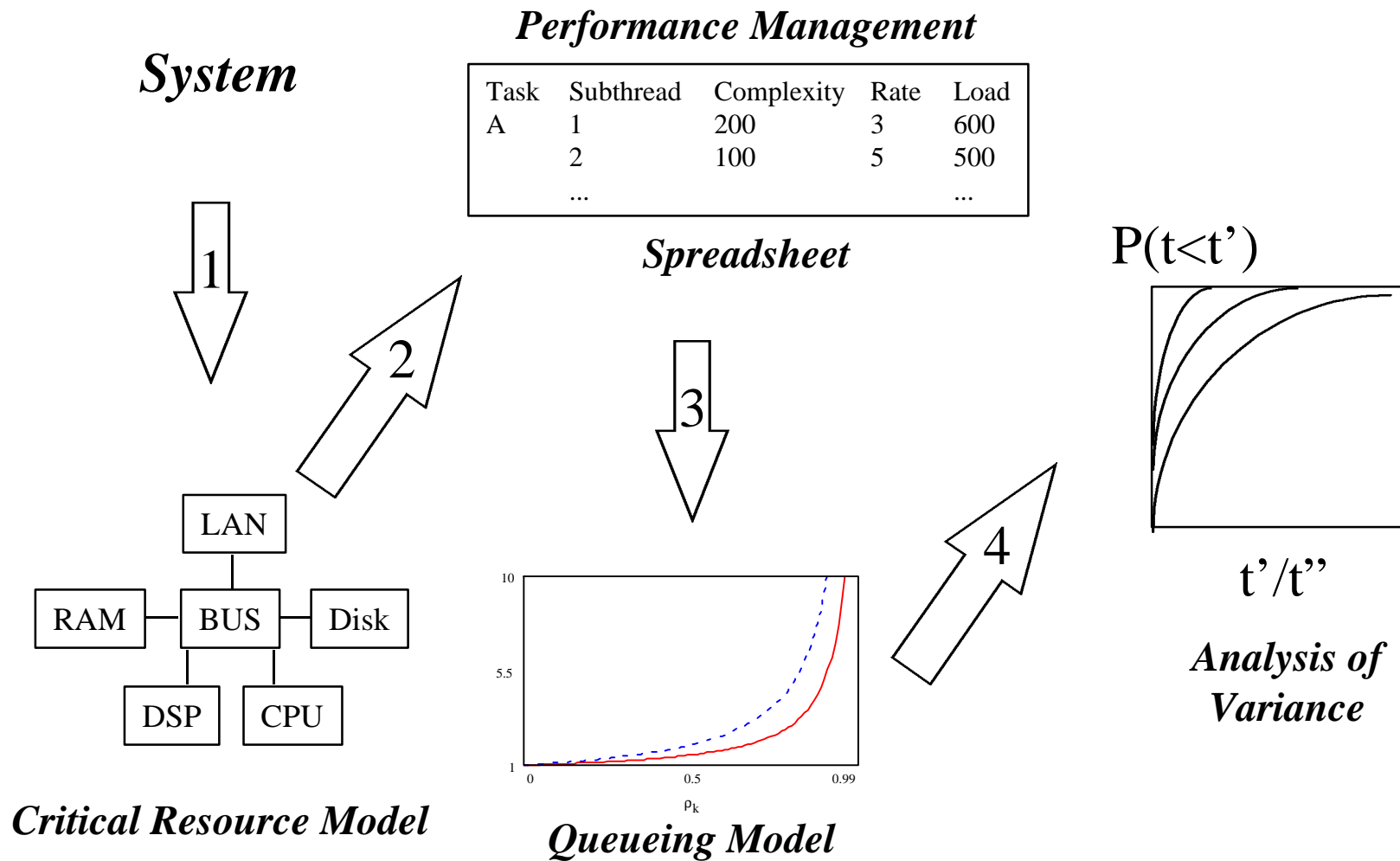


Resource Models Inform Top-Level Tradeoffs  
Identifying Simulation, Prototyping, Design and Download Issues

# T1 Multiplexer Benchmark



# Performance Management Process





# Conclusion



- Leverage the Commercial Sector
- Partitioning, Layering, Software Reuse
- Dynamic Resource Management
- Manage The (R) Evolution to Software

