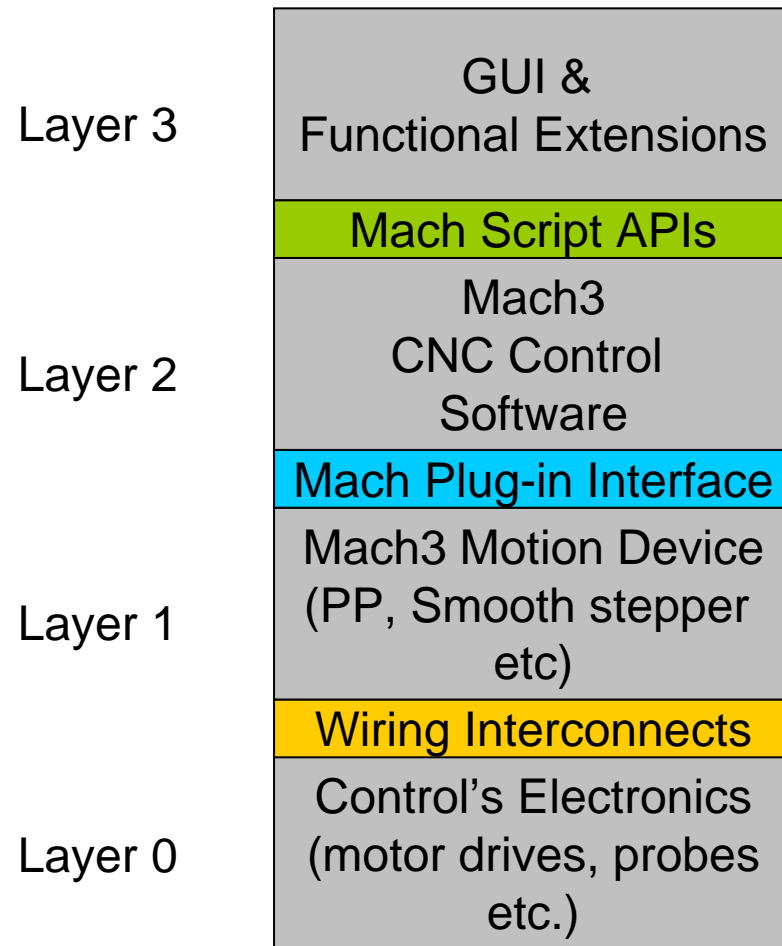


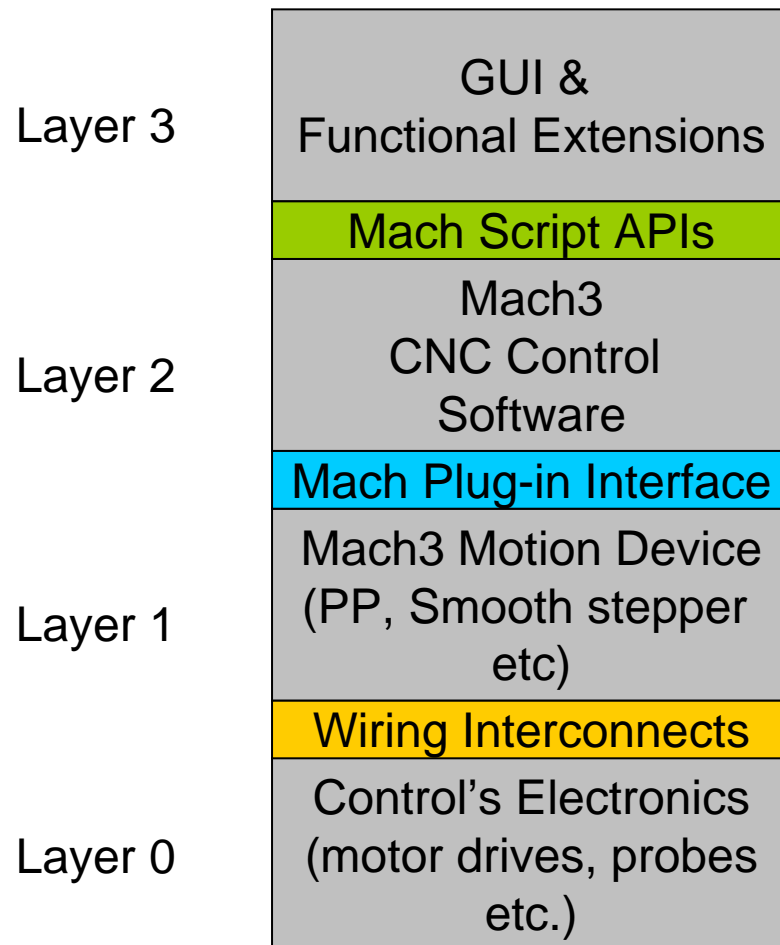
# Mach3's Layered Control System Architecture

Impacts of motion control  
implementations on Mach3  
application layers.

# Mach3 CNC Control Stack

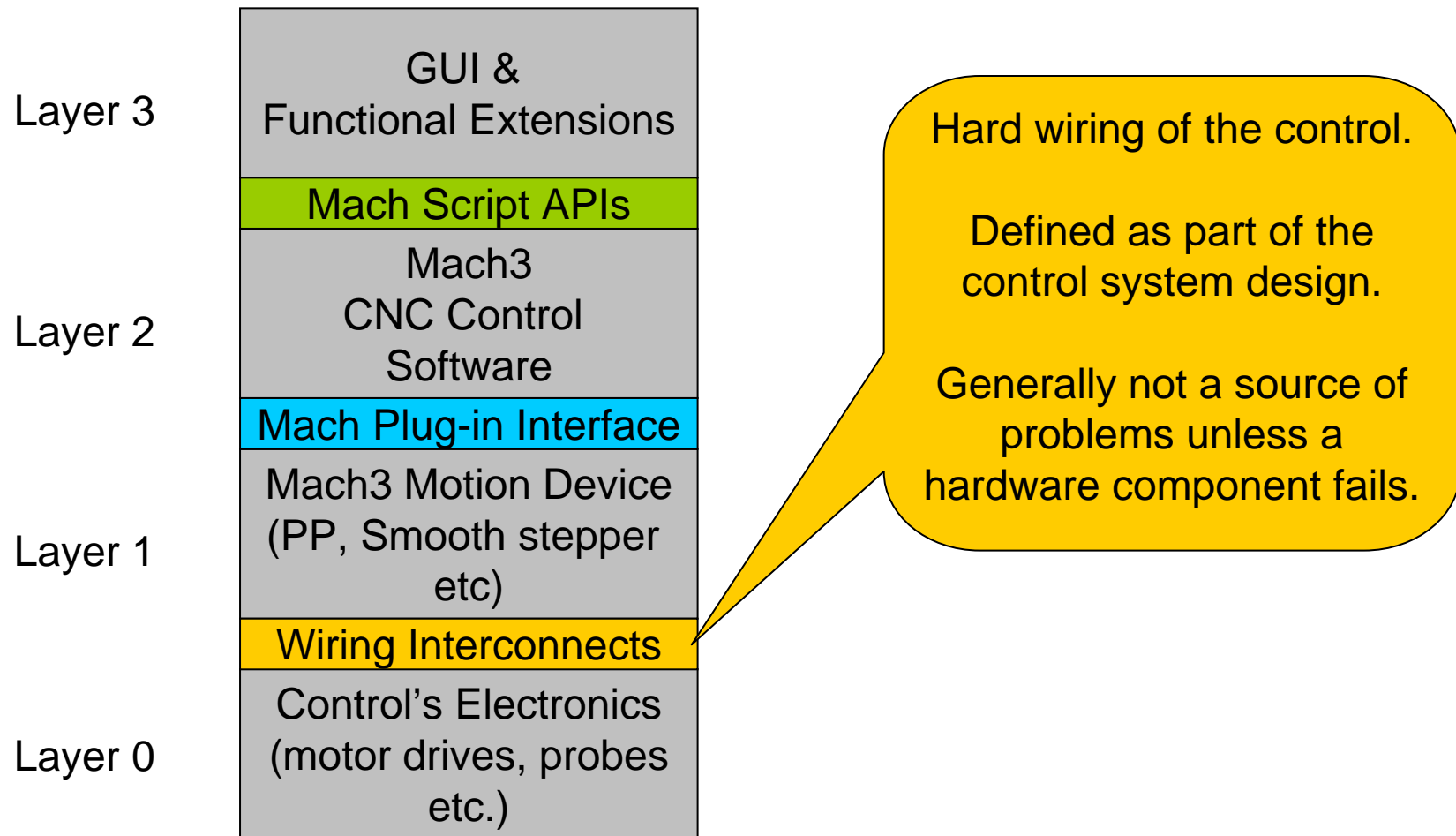


# Mach3 Control Layers

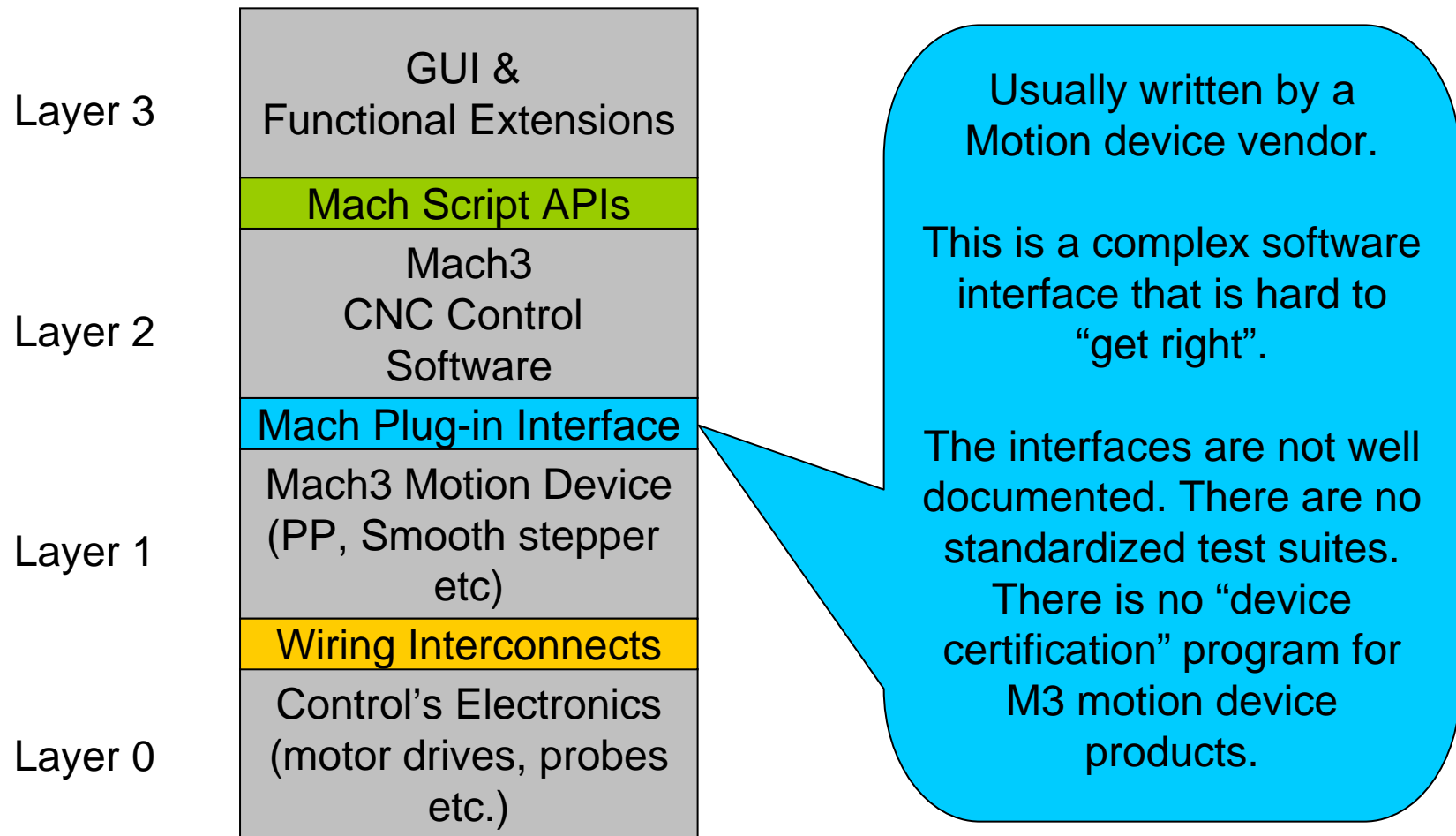


- Mach is a layered architecture control system
- The system only works correctly if EVERY layer implements it's functions correctly.
- Each layer is dependent on all lower layers!

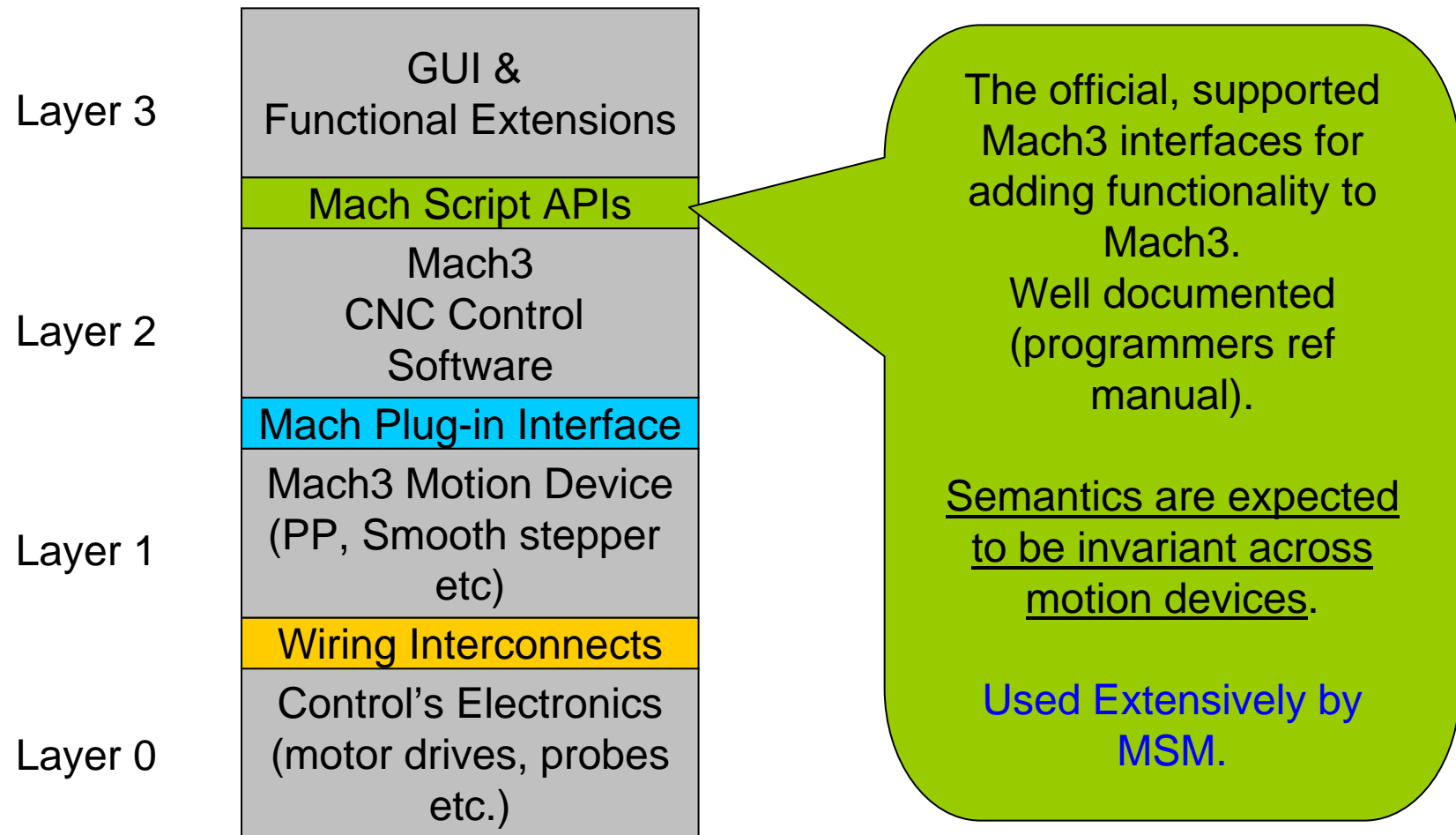
# Layers 0-1: Electronics Module Wiring



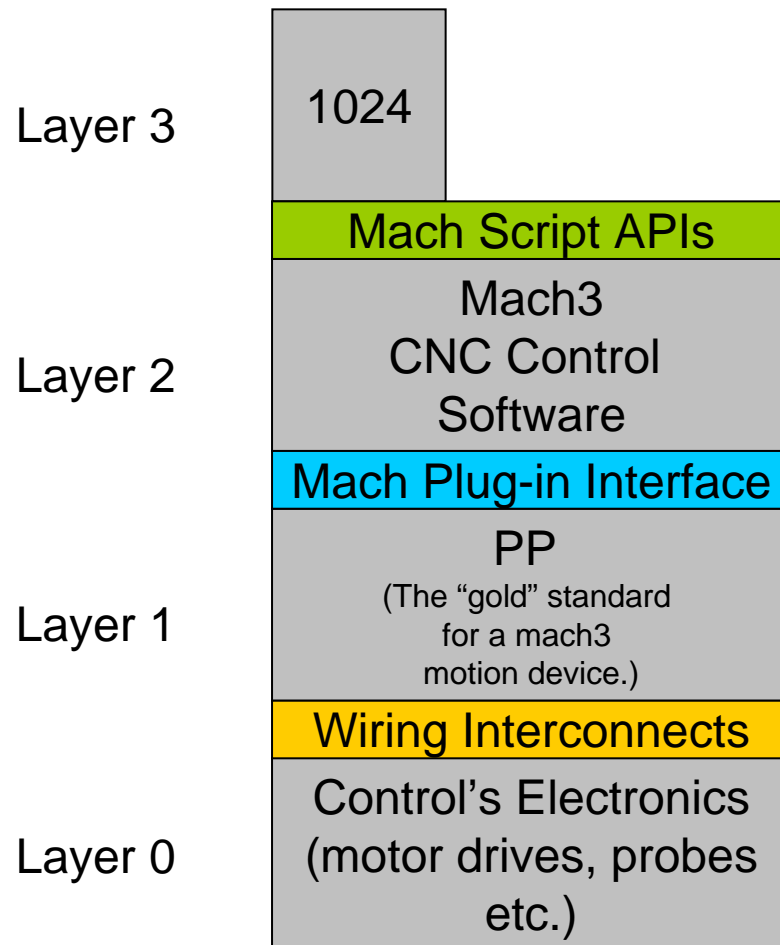
# Layers 1-2: Mach Plug-in Drivers



# Layers 2-3: Mach3 Application Programming Interfaces

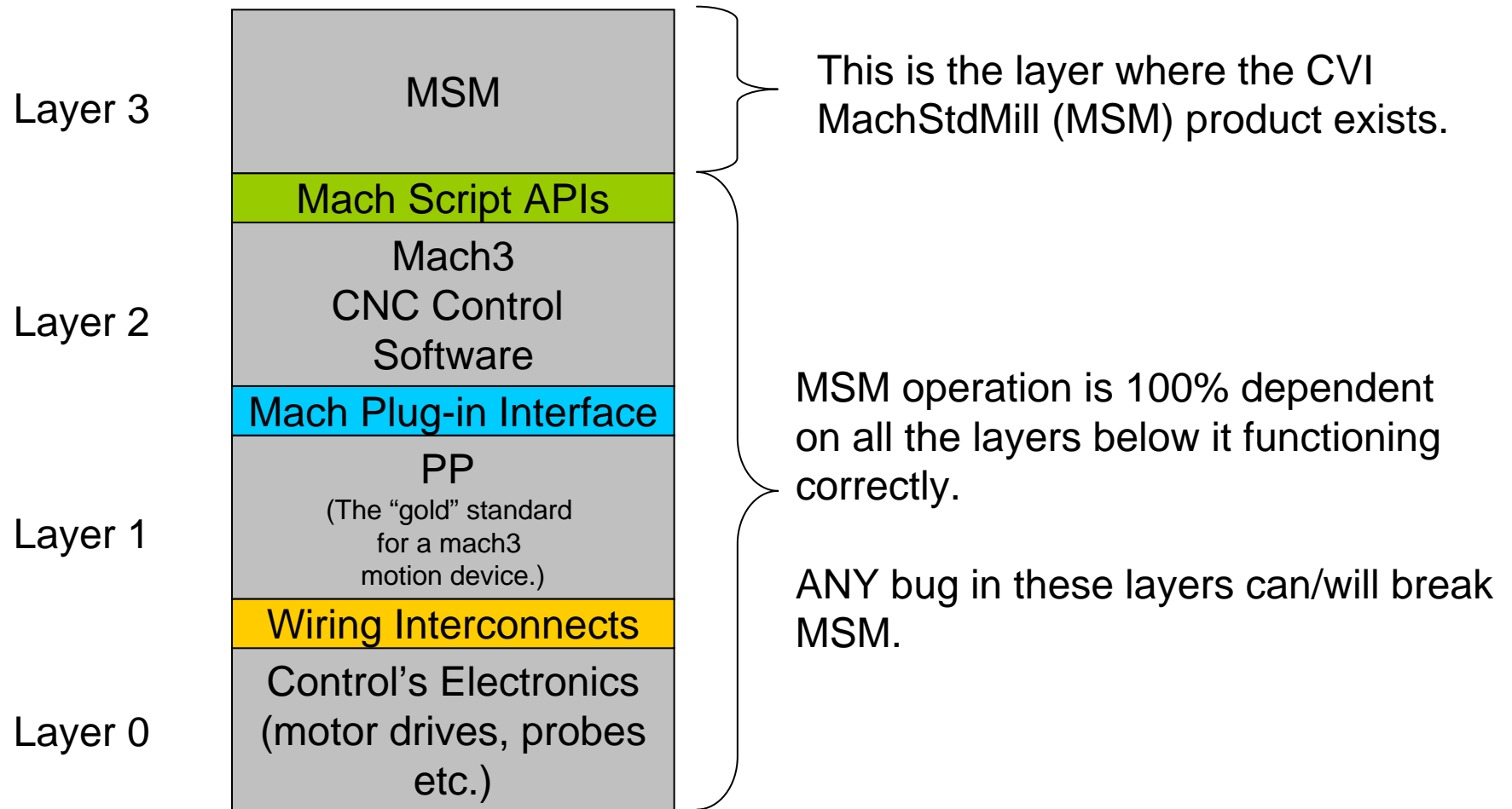


# Mach3's Standard Stack (1024 + Mach3 + PP)



- This is the “gold / reference standard” for Mach3 operation.
- This defines the “correct” Mach3 system behavior.
- If you change a component (layer 0 or 1) and the system’s actions change, the new component is, by definition, faulty.

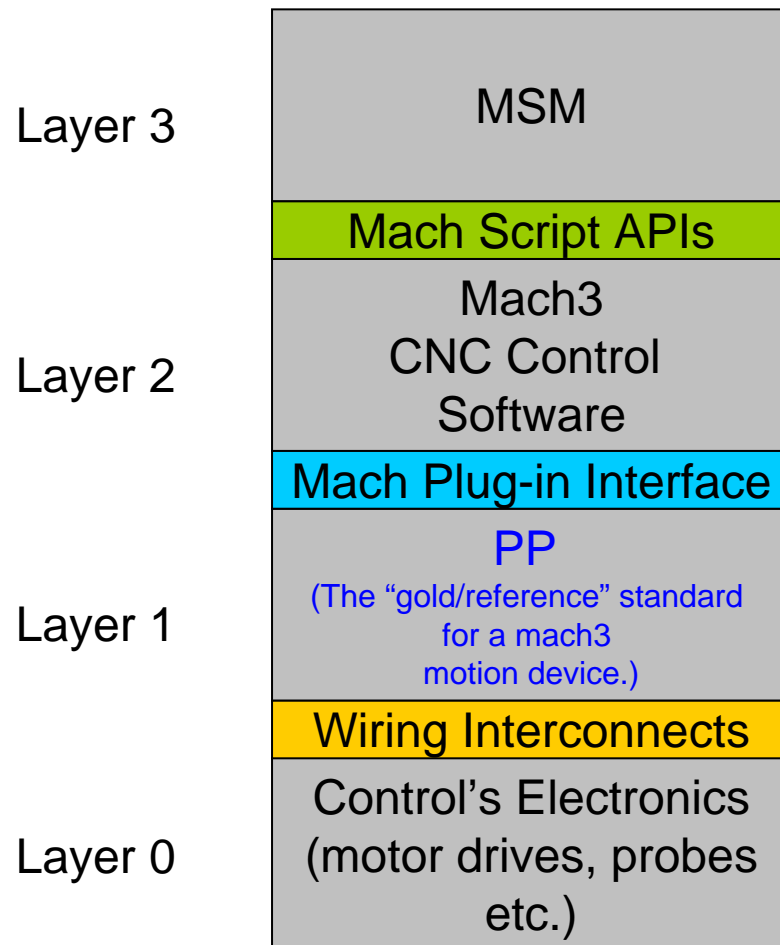
# MSM + Mach3 + PP





# MSM Supported Stacks

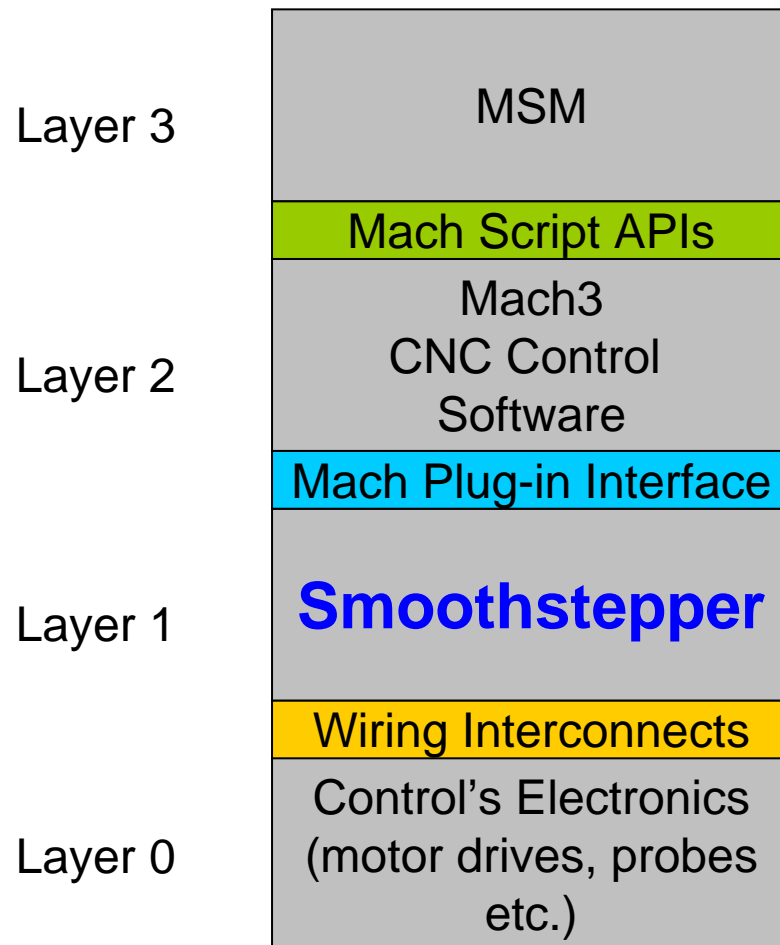
## MSM + Mach3 + PP



- MSM uses much more of the L3/L2 API than the 1024 screen set.
  - MSM was designed in close collaboration with ArtSoft.
- CVI supports MSM using Mach3 with the PP motion device layer.
  - There are unfixed bugs in Mach3 that can impact MSM operations.
  - CVI documents these Mach3 errata in the MSM release notes.

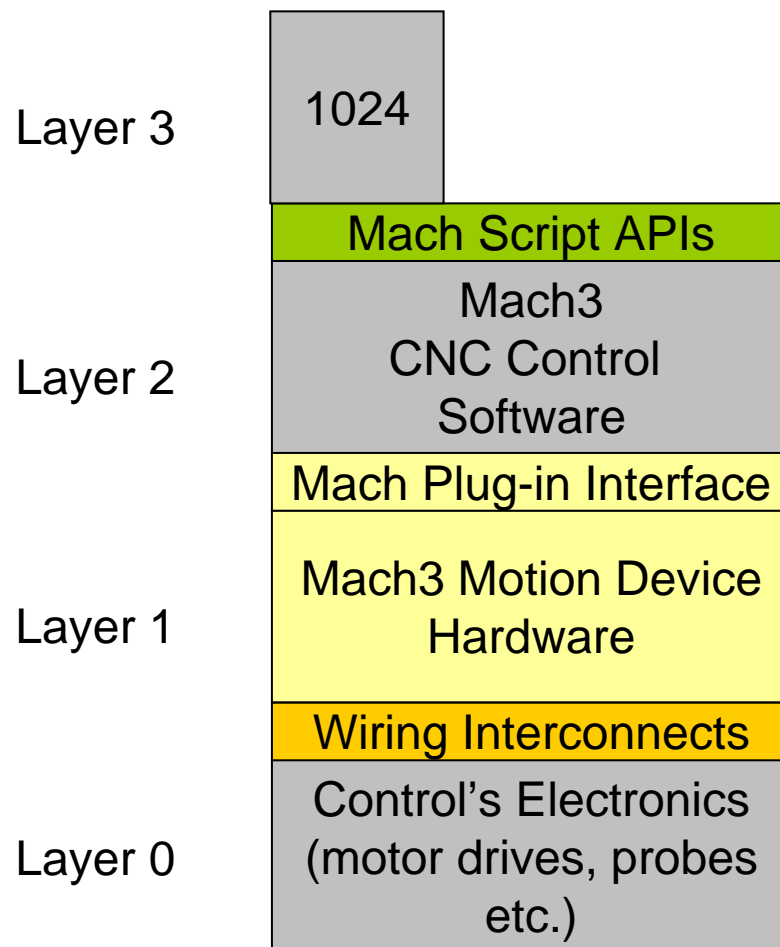
# MSM Supported Stacks

## MSM + Mach3 + SmoothStepper



- Over time the SmoothStepper motion control products have proven to be very close to 100% compatible with the Mach PP motion device.
- Because of the quality of the product, and the positive technical attitude of Warp9TD, CVI has also chosen to support MSM with the Smoothsteppers.

# Poorly implemented motion control devices are being marketed.



- The implementation quality of motion devices for mach3 varies greatly.
  - There is no test or certification program for Mach motion devices.
- Effectively, some vendors are making the Mach end user responsible for testing of motion devices.
  - Users don't know (and should not be expected to know) the internal relationship between the layers that make up a Mach control stack.
- CVI regularly receives questions about problems that are caused by poorly implemented motion controllers.
- Therefore: CVI only supports MSM on proven, 100% compatible motion devices that are offered by companies that have also demonstrated they will rectify technical problems if they arise.