# Test Executive Trades (1)

History/Background

- The desire was to implement a "flight proven" COTS product to lower risk to Flt SW and test development
  - The original trades spaces were open source, supported platforms, export control and upfront cost
    - ✓ Candidates were OASIS, OS Comet, SCL, Smart Sockets, ITOS, ASIST
  - Spacecraft Control Language (SCL) was selected for LAT command, control, and configuration
- Flight software baseline is not to use SCL for flight $C^3$
- I&T Online has discovered issues that will require extensive work to support the LAT environment
  - SCL was created for a 16-bit environment and its data transport mechanism is built on 32-bit floating-point numbers (which have only 24 bits of precision)
  - SCL not augmentable to handle arbitrary precision data
  - The LAT hardware contains 32-bit and 64-bit registers
- I&T has decided to reevaluate the Online System architecture

# Test Executive Trades (2)

## Current Situation

- Updating LAT-SS-00456-02 LAT I&T Online Requirements
  - Remove SCL references to focus on requirements
- I&T/Online and LAT subsystems have continued EM development work using Python/Qt/XML (PQX)
  - Python, an interpreted, interactive, object-oriented scripting language used for program tests, calibration, etc.
  - Qt, a graphical user interface toolkit used for command & monitoring
  - XML, Extensible Markup Language, a standard for marking up structured documents used for configuration data, etc.

# Test Executive Trades (3)

## Spectrum Astro Inputs

- SAI has base-lined AstroRT as the observatory I&T test executive

## GSFC Inputs

- GSFC has provided an example trade matrix used by Code 584 for spacecraft control product evaluation
  - An extensive trade matrix, comparing ASIST, EPOCH, and ITOS
  - We have used it as a guideline to address areas that are relevant to LAT
- GSFC has announced the project will pursue an ITOS-based architecture for the MOC and utilized the experience gained from Swift
  - The relevancy of the MOC decision is that the Ops software has potentials to become the observatory's I&T test executive

# Test Executive Flow Recommendation

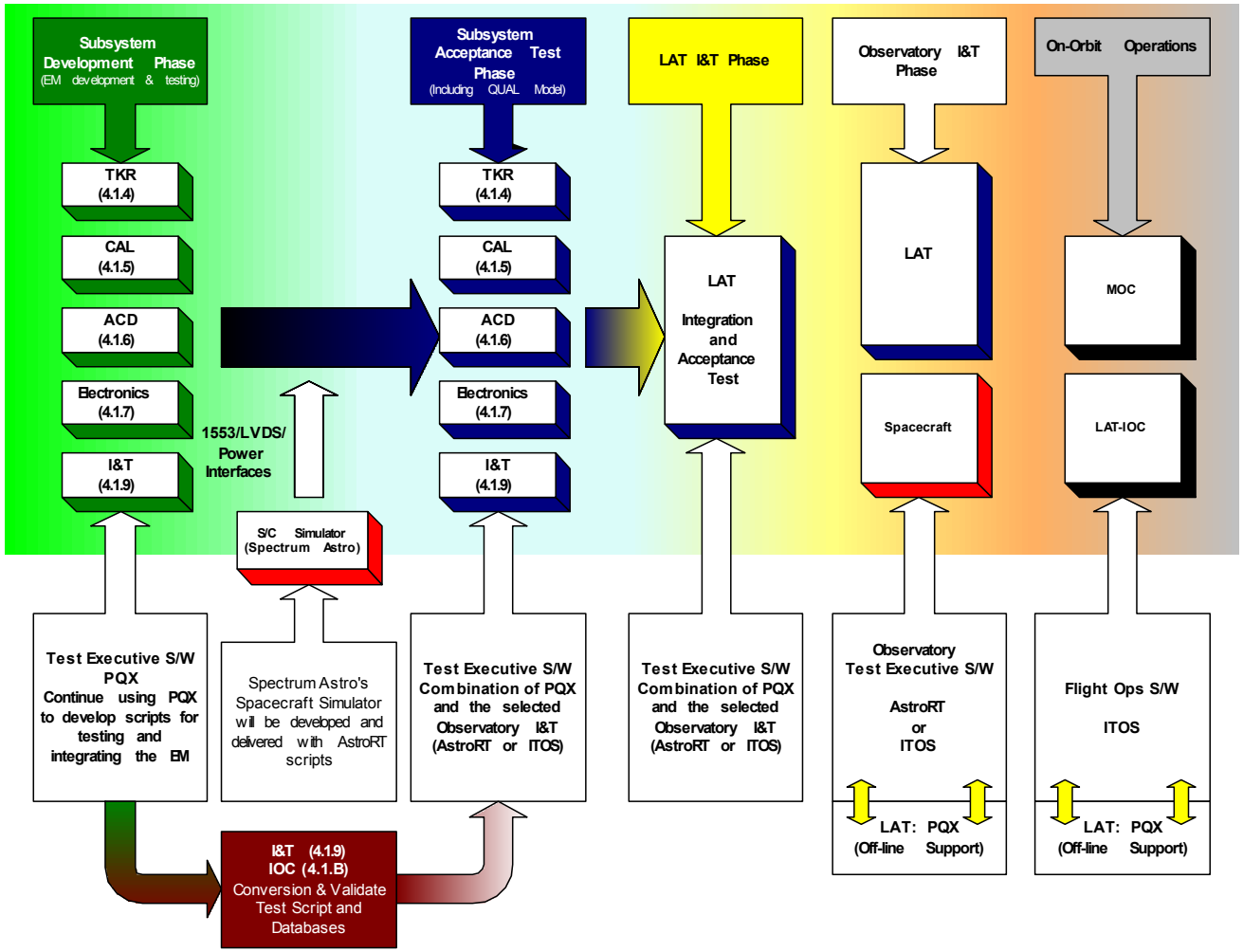
- Use PQX for EM development
- Transition to a combination of PQX and Observatory I&T Test Executive during Subsystem and Instrument Acceptance Test

## Advantages:

- Early integration of Observatory level test executive – which may be the MOC Ops SW
- All LAT test scripts will be validated by Instrument delivery

## Dis-advantages

- Increased reliance on S/W that has ITAR issues
- Scripts developed for EM will need to be compatible with selected test executive



# Test Executive Flow – Backup Option

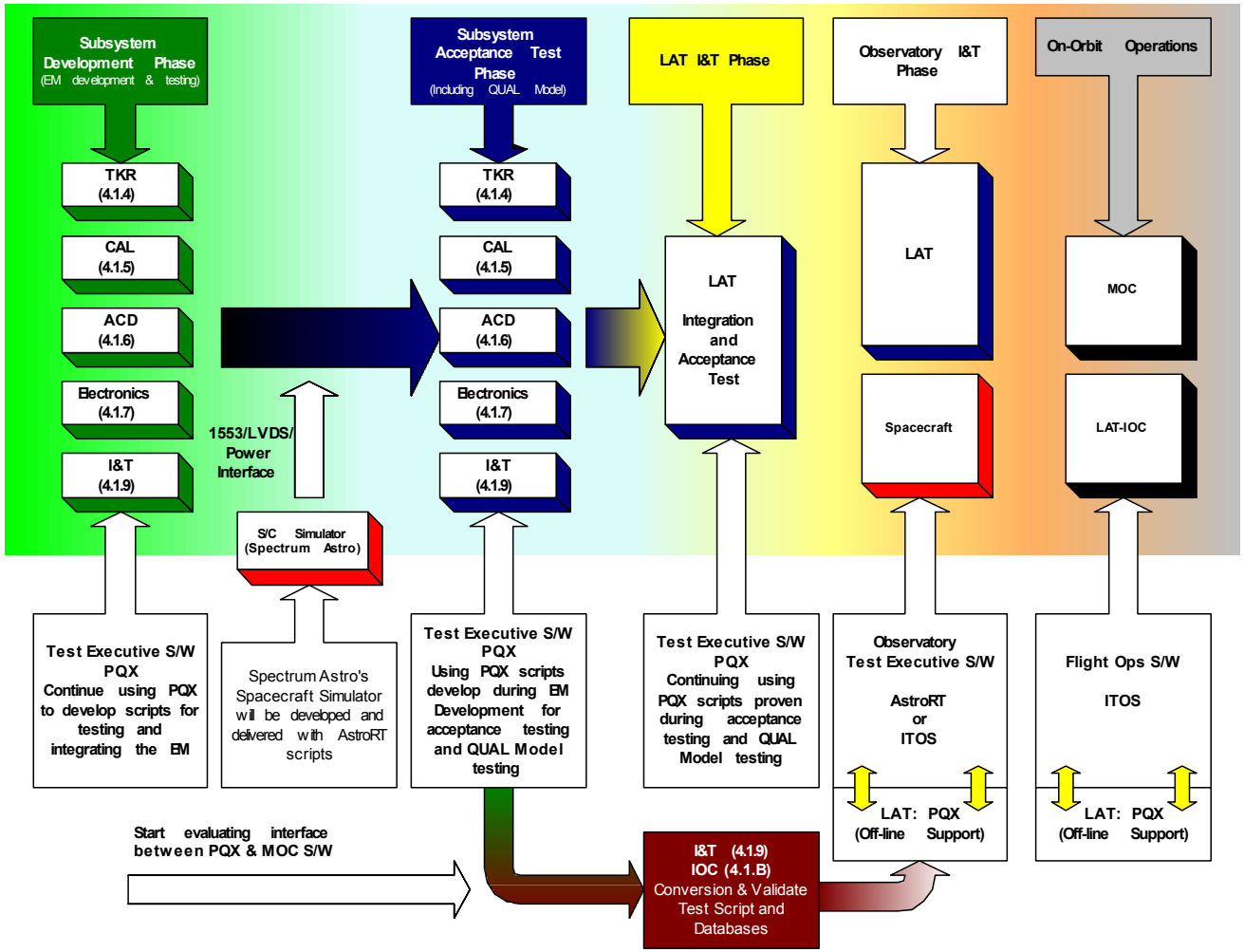
- Use PQX from development through LAT I&T
- Transition to Observatory I&T test executive prior to instrument delivery

## Advantages:

- Reduced reliance on S/W that has ITAR issues, such as AstroRT and ITOS
- Scripts developed for EM can be used through LAT test program

## Dis-advantages

- Need to perform conversion and validation of test scripts late in the program cycle
- Increased risk and cost late in the project cycle



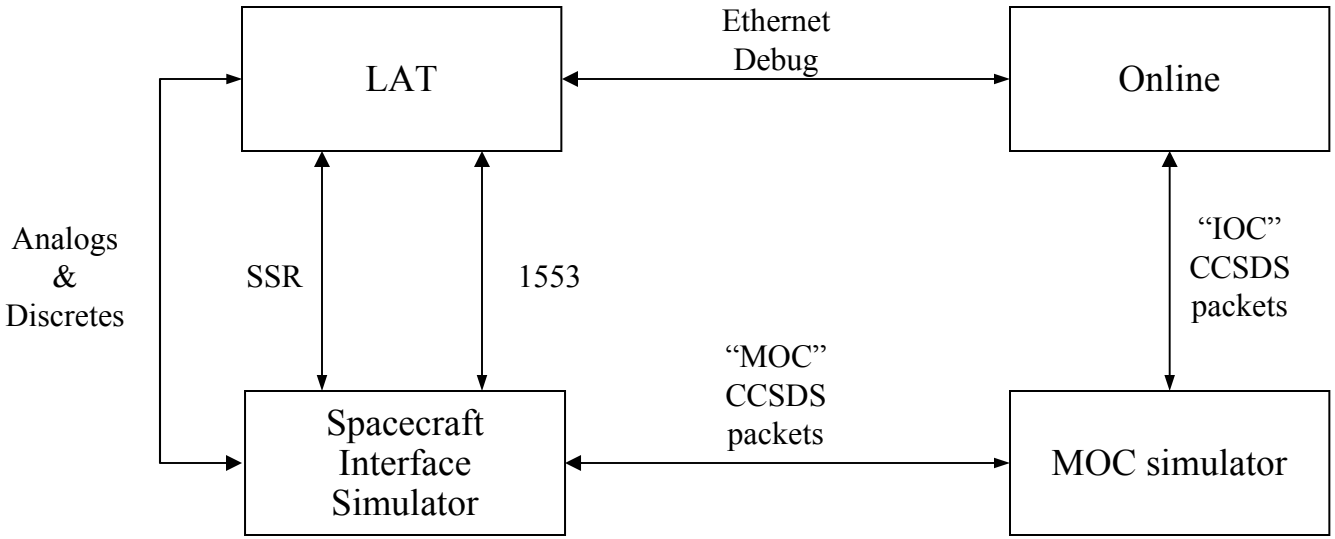
# Recommendation

- **Current Path**
  - **Continue to use the Python/Qt/XML (PQX) for EM development**
  - **Establish and identify interfaces to AstroRT or ITOS test executives**
    - ✓ **Evaluating ITAR impacts**
- **Primary and backup paths to ensure a smooth transition from LAT instrument to observatory to on-orbit operations (IOC)**

# Back-Up Slides

## Block Diagrams

# System Block diagram



# Command Model