What is systems assurance?

Systems Assurance provides independent credentialled information to reduce uncertainty for decisions based on system quality.

Independent: an unbiased perspective (e.g. not the developer or customer)

Credentialed: (1) based on tangible evidence or process, (2) performed by credible/accredited personnel, (3) direct relation to quality uncertainty

Why is assurance needed?

There is always uncertainty about system qualities:
1. people make mistakes
2. no process is perfect
3. budget/schedule/resource constraints and pressures create quality uncertainties

Value of SA comes from reducing the risk of bad decisions due to uncertainty about quality NOT from reducing risk from defects

Assurance risk example: decision to deliver untested/insufficiently tested areas have potential losses due to late rework, unplanned work, and unexpected malfunctions

SA investigations and interventions identify, reduce, and help manage uncertainty in the qualities decisions depend on.

Some Important Decisions Within the NASA Systems Engineering Lifecycle

Example assurance activities & artifacts

Based on interviews with the SMU developers, DoD customer, and department reviews students selected assurance activities like these …

… to develop assurance plans like these …

Kinect Decision Risk Assurance

Body Positioning and National Movement of Avatar

Facial Detection

Module: Micro Expression Facial Motion Recognition

Shidler MIST students were given three 75min training sessions on the above NASA JPL based assurance approach within a systems Applications Programming course

… and deliver assurance artifacts (“credentials”) like these to:

- Help identify critical project decisions and decision points
- Help prepare developers for reviews (e.g. preliminary design)
- Inspect artifacts and documents (e.g. test plan)
- Perform process/product compliance audits
- Perform trace verifications (e.g. requirements coverage to test)
- Evaluate and prioritize problem/defect reports
- Participate in delivery certification
- Monitor problem closure
- Perform independent risk assessments
- Other duties that pertain to reducing uncertainty for critical decisions

Project: Investigate the applicability and practicality of training and utilizing distributed cross-disciplinary student teams to provide assurance services* on systems engineering projects

*Systems Assurance practice based on NASA JPL’s Product and Process Assurance group (project mentor)

Primary tasks:
- Rapidly educate students on value of SA (SMU, UH)
- Develop SA training modules for use within senior MIS course (UH)
- Pilot using distributed assurance team (UH) on SMU systems engineering projects