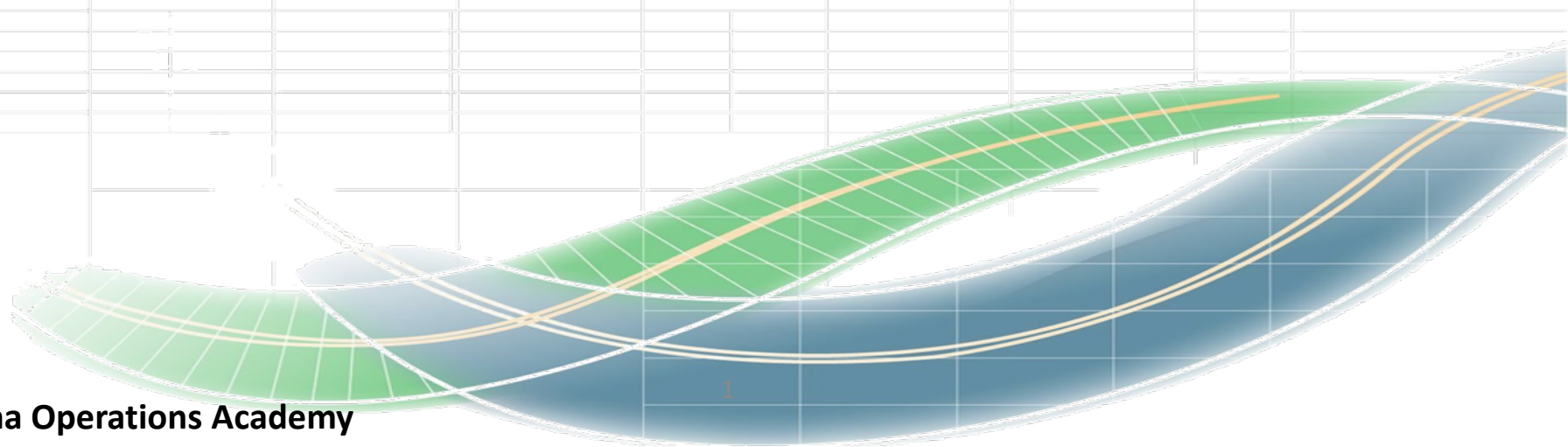




AZTech™

**SO&M Capability Maturity Model
Self-Assessment
Workshop**



Systems Operations and Management

- **Progress to Date:** Phoenix early wins!!. But much SO&M potential remains largely untapped.
- **Barrier:** Not technology or (even) \$\$\$. SO&M not yet a formal “program” with stable processes and formal institutional arrangements essential to effectiveness
- **Solution:** Identify/stage Process & Institutional modifications to put SO&M on path to continuous improvement
- **Target:** The 21st Century Managed Regional System

The Focus: Institutionalizing Continuous Improvement for SO&M

Improving Performance:

- Repeatability
- Effectiveness
- Accountability
- Optimization

PROGRAM EFFECTIVENESS

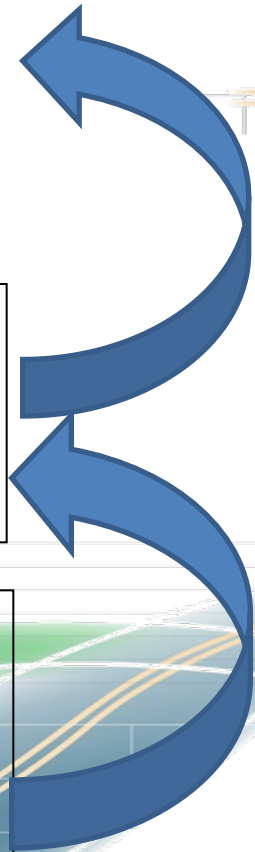
- Needs-basis
- Support ITS Infrastructure
- Field Procedures
- Comprehensiveness

ENABLING PROCESSES

- Business Processes
- Systems and Technology
- Performance Measurement

SUPPORTIVE INSTITUTIONS

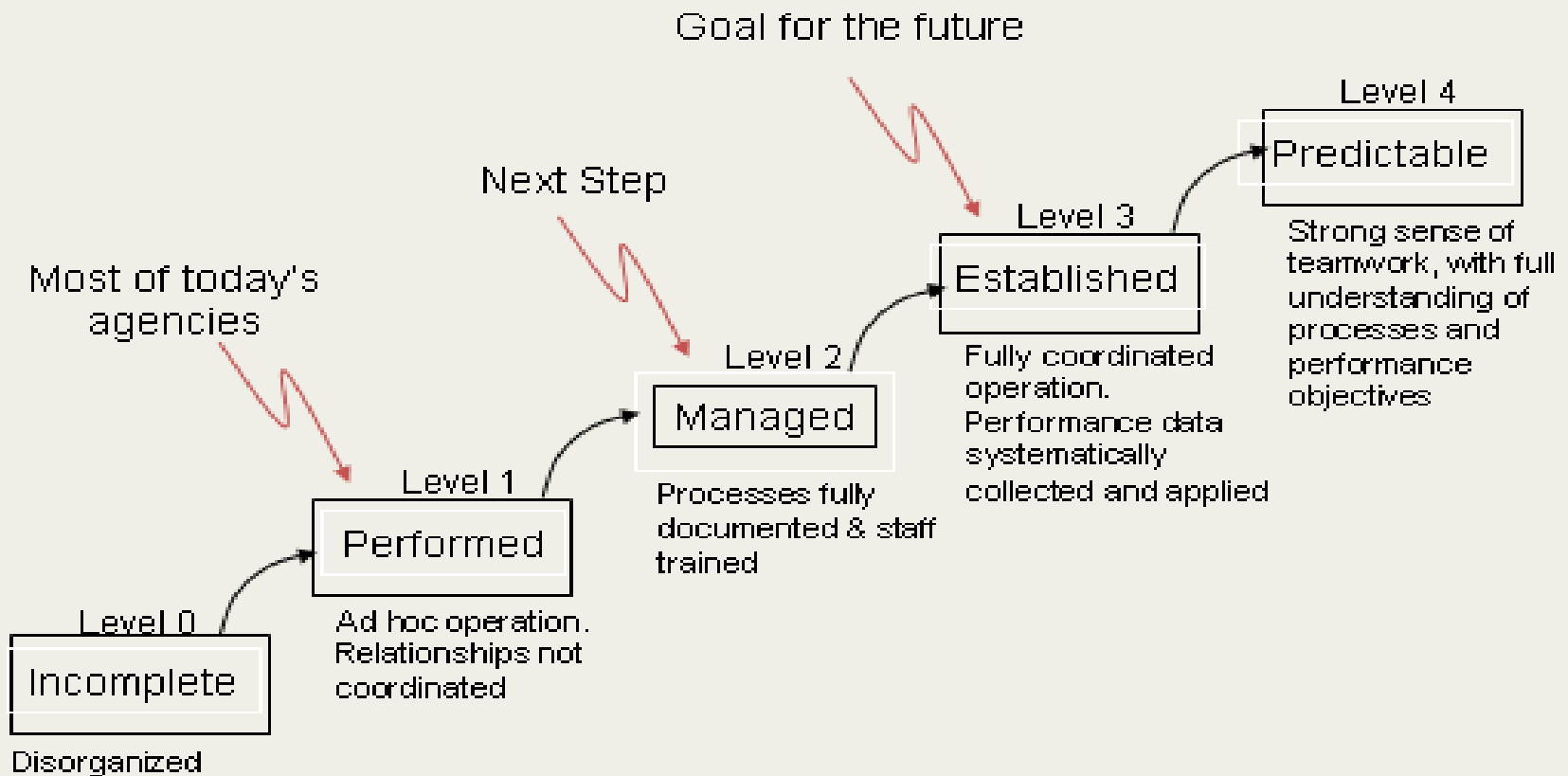
- Performance Culture
- Org & Staff Capacity
- Resource Allocation
- Collaboration



The CMM Approach

- **Institutionalizing continuous improvement** is objective
- **Effectiveness = performance** (used to tune activities)
- **Evidence-based research** determined CMM framework
- **Dimension relationships:** processes for programs; institutional arrangements for processes
- **Levels of capability** – criteria representing improvement steps supporting specific levels of effectiveness
- **Self-evaluation** --determines levels. Next level defined by criteria (how to get there)

The Capability Maturity Model : Elements & Levels



“Rules” of the Operations Capability Maturity Model

- **Performance driven** -- dependent on key elements re process and institutional arrangements
- **Continuous improvement** -- requires managed, consistent processes & supportive institutional structure
- **Incremental** -- Levels cannot be skipped as they are the basis of the next level of improvement
- **Lowest first** -- Even harder elements are essential and must be addressed. Lowest level dimension is usually the principal constraint

DIMENSION: Planning/Programming/Resources

| | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
|--|---|---|---|---|
| | Each jurisdiction doing its own thing according to individual priorities and capabilities | Consensus regional approach developed regarding SO&M goals, deficiencies, C/B, networks, strategies and common priorities | Regional program integrated into jurisdictions' overall multimodal transportation plans with related staged program | SO&M integrated into jurisdictions' multisectoral plans and programs, based on a formal continuing planning processes |
| <i>Staff evaluation of program maturity</i> | <ul style="list-style-type: none"> • ITS capital investments closely tied to regional planning and Regional ConOps that have been developed • Planning limited to transportation entities: Public safety agencies (PSAs) not integrated • No transparent investment criteria or formal benefit/cost evaluation -- or basis for comparison with capacity investments • Planning doesn't include transit | | | |
| <i>Staff identification of Strategies to get to the next level</i> | <ul style="list-style-type: none"> • Hold Operations Summit to establish role of SO&M • Bring PSAs into the formal programming and planning processes for operations to align budgeting, resource allocation • Develop tools to evaluate operations improvements on the same level as capacity improvements and show trade-offs • Gain equal level of participation from all players (especially the larger ones) • Attach recurring costs to the capital investment they must support • Relate planned investment level to specific objectives and payoffs • Ensure new capacity/reconstruction includes ITS infrastructure as standard operation procedure | | | |

*Explanation of tables listed in Appendix A

DIMENSION: Systems and Technology

| | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
|--|--|--|--|---|
| | Ad hoc approaches to system implementation without consideration of systems engineering and appropriate procurement processes | Regional conops and architectures developed and documented with costs included, appropriate procurement process employed | Systems & technology standardized and integrated on a regional basis (including arterial focus) with other related processes | Architectures and technology routinely upgraded to improve performance; systems integration/interoperability maintained on continuing basis |
| <i>Staff evaluation of program maturity</i> | <ul style="list-style-type: none"> • Systems Architecture/concepts of operations in place • Lack of standardization of systems/technology = interoperability relationships among jurisdictions • Inconsistent technology, operations along inter-jurisdictional corridors • Legacy systems upgrade cost burden (ADOT) • Regional procurement contracts in place -- set up through ADOT • Variation in staff technical capabilities among jurisdictions | | | |
| <i>Staff identification of Strategies to get to the next level</i> | <ul style="list-style-type: none"> • Develop systems engineering checklist in conjunction with FHWA • Document systems for future development • Improve interoperability among systems (signals, Integrated corridor management) across jurisdictions • Develop approaches to increase level of shared operational control (after hours) • Communicate lessons learned in systems engineering, technology to all participants | | | |

*Explanation of tables listed in Appendix A

DIMENSION: Performance Measurement

| | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
|--|---|--|--|--|
| | Some outputs measured and reported by some jurisdictions | Output data used directly for after-action debriefings and improvements, data easily available and dashboarded | Outcome measures identified (networks, modes, impacts) and routinely utilized in common for objective-based program improvements | Performance measures reported internally for utilization and externally for accountability and program justification |
| <i>Staff evaluation of program maturity</i> | <ul style="list-style-type: none"> • Some output measures (i.e. incident management) done well by some jurisdictions - but not utilized to improve operational procedures • Current measures used not standardized • Very limited customer-related performance measures (outcome measures such as travel time) available • No outcome measures utilized to communicate SO&M payoffs to decision-makers, general public • No outreach regarding current performance (dashboards) • Limited after-action debriefing, reporting and feedback | | | |
| <i>Staff identification of Strategies to get to the next level</i> | <ul style="list-style-type: none"> • Define performance measure strategy, including utilization and audiences (tap national state of the practice) • Increment towards outcome measures (travel time) of interest to customers - and use on DMS, 511, etc. • Capitalize on commercial data sources of travel time • Build on REACT experience and extend to additional participants • Establish consistency across jurisdictions on basic levels of measurement including public safety agencies | | | |

*Explanation of tables listed in Appendix A

DIMENSION: Culture/Outreach

| | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
|--|--|--|---|---|
| | Individual Staff heroes promote SO&M - varying among jurisdictions | Jurisdictions' senior management understands SO&M business case (champion-independent) and educates decision makers/public | Jurisdictions' mission identifies SO&M and benefits with formal program and achieves wide public visibility/understanding | Customer mobility service commitment accountability accepted as formal, top level core program of all jurisdictions |
| <i>Staff evaluation of program maturity</i> | <p>Evaluated level: depends on the agency/jurisdiction; overall 1.8</p> <ul style="list-style-type: none"> • Some jargon/terminology confusion ("operations") • Outward reflections of SO&M activity not visible outside of MPO (websites, annual reports) • Region has good champions/leaders • Statewide initiatives have been discouraging (e.g., removal of traffic cameras) may indicate a lack of respect for professional engineering judgment • Leadership turnover - negative impact on forward momentum in program improvement • Sense of program vulnerability -- budgets for operations have been reduced. job security weakened • Business case not made for SO&M. Lack of upper management appreciation for SO&M benefits • Anecdote re article criticizing ramp metering had positive comments showing the public understands its benefits • Success is contagious - can be communicated to others • AZTech has taken lead on public outreach -- Broadcasters summit forum for discussion on helping on another • ITS-Arizona also effective | | | |
| <i>Staff identification of Strategies to get to the next level</i> | <ul style="list-style-type: none"> • Encourage executive-level attendance at the Operations Summit • Define what operations is (make business case) - a description of what difference SO&M will make, why should leaders care, how it can be a tool • Capitalize on examples of success among participants • Definition needed for operations and to make a distinction between management and maintenance • Make Comparisons between "building new" and applying ITS - before-and-after demonstrations with performance measures would help make such comparisons • Consider audiences: example: customer survey data shows Bell Road project was appreciated • Observe what happens without ITS tools in place (e.g. photo enforcement) | | | |

*Explanation of tables listed in Appendix A

DIMENSION: Organization/ Staffing

| | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
|--|--|--|--|--|
| | SO&M added on to units within existing structure and staffing - dependent on technical champions | Organizational concept developed within/among jurisdictions with core capacity needs identified, collaboration takes place | SO&M Managers with direct report to top management; Job specs, certification and training for core positions | SO&M senior managers at equivalent level with other jurisdiction services and staff professionalized |
| <i>Staff evaluation of program maturity</i> | <p>Evaluated level: depends on agency (MCDOT 2-3, Phoenix 3); overall regionally 1.5</p> <ul style="list-style-type: none"> • Limited opportunity for external recruitment -- staff is "stolen" from one another • Uneven level of technical capacity among agencies • Conditions of employment - no job specs, no clear career path for operations staff • ADOT has TOC Operator certification program and stipend (additional salary upon completion) • Some jurisdictions vulnerability to layoffs and freezes. ADOT operators exempt from furloughs and hiring freeze | | | |
| <i>Staff identification of Strategies to get to the next level</i> | <ul style="list-style-type: none"> • Develop good position descriptions to achieve equivalency across jurisdictions • Need for cooperative training -- among jurisdictions - and with public safety agencies (MPO function?) • Outreach to HR departments, improve their understanding of operator functions and develop appropriate position descriptions • Consider outsourcing of TMCs to gain technical capacity and reduce staffing burden and turnover | | | |

*Explanation of tables listed in Appendix A

DIMENSION: Resource Allocation to SO&M

| | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
|--|--|---|--|--|
| | Ad hoc resources - often external - for occasional major projects | Resource allocation at project or "initiative" level based on deferring jurisdiction commitment | Long-term/annual budget commitments made (and known) driven by transparent criteria on lifecycle needs basis (clear C/B justification) | SO&M as formal, visible, sustainable line item in each agency's budget (capital/ operating/ maintenance) |
| <i>Staff evaluation of program maturity</i> | <p>Evaluated level: 1 (recurring costs); 3 (capital costs)</p> <ul style="list-style-type: none"> Regional budget exists and agencies take it seriously, but it is for capital, not operations ADOT, previously had operations budget, but things have changed recently Prop 400 sales tax extension has its own portion devoted to capital ITS improvements With budget cuts, non-capital operations funding (staffing, maintenance) is constant at best, otherwise reduced Some projects are utilizing capital funding to cover recurring costs on an as-needed basis Freeway Service Patrol levels tied to increasing freeway miles (funded through Prop 400) Degree of formality of budgeting for SO&M varies among jurisdictions | | | |
| <i>Staff identification of Strategies to get to the next level</i> | <ul style="list-style-type: none"> Focus on incorporating ITS into standard capital improvement projects Develop criteria for establishing recurring costs budgets - link capital to operating costs Develop a revenue stream for recurring costs, which will depend on making a compelling argument for why it's critical and should not be cut when resources are tight | | | |

*Explanation of tables listed in Appendix A

| DIMENSION: Collaboration | | | | |
|--|--|--|--|---|
| | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
| | Relationships ad hoc, and on personal basis (public-public, public-private) | Objectives, strategies and performance measures aligned among organized key players (transportation and PSAs) with after-action debriefing | Rationalization/ sharing/ formalization of responsibilities among key player with by co-training, formal agreements and incentives | High level of SO&M coordination among owner/operators (state, local, private) |
| <i>Staff evaluation of program maturity</i> | <p>Evaluated level: 1.5 with PSAs; 3.5 otherwise</p> <ul style="list-style-type: none"> • Relationships with PSAs are the most informal, the weakest link—esp. when staff turns over • Recent restructuring at DPS has led to loss of person connected to AZTech and MPO • Need better understanding of why PSAs make their decision on freeway closures, procedures • State roads have quick clearance law applied • Best practice study done nationally to examine TIM - result was to develop a pilot coalition to engage local police departments, DPS, traffic operators on Loop 101 • Collaboration within cities is at a high level, REACT on arterials • Good relationships with media (3 summits) • DPS CAD and Phoenix Fire pushes data to ADOT and the county | | | |
| <i>Staff identification of Strategies to get to the next level</i> | <ul style="list-style-type: none"> • Implement Loop 101 pilot and advance study of incident management collaboration based on results • Expand collaboration beyond planning to include field protocols (incident command, etc.) • Consider co-training, build on federal requirements (TSA's National Incident Management System) | | | |

*Explanation of tables listed in Appendix A

AZTech CAPABILITY MATURITY SELF EVALUATION - PRIORITIES?

| ELEMENTS | LEVEL 1 PERFORMED | LEVEL 2 MANAGED | LEVEL 3 INTEGRATED | LEVEL 4 OPTIMIZING |
|---------------------------|----------------------|--------------------|-----------------------|-----------------------|
| Planning & Programming | | | | |
| Technology and Systems | | | | |
| Performance | 1 | | | |
| Culture | 2 | | | |
| Organization/ staffing | 3 | | | |
| Resource Allocation | | | | |
| Collaboration | | | | |