Journey Towards Joy (IN MEASUREMENT OF ITERATIVE DEVELOPMENT)

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Evolving Landscape

Defense Science Board Report on Design & Acquisition

- Software Factory Efficacy
- Continuous Iterative Development
- Risk Reduction & Metrics
 - Sprint Burndown
 - Epic & Release Burndown
 - Velocity
 - Control Charts for Cycle Times
 - Cumulative Flows
- Hybrid Models for Current Programs, Immediate Transition for "Legacy" Programs
- Develop Workforce
- Software Sustainment
- Machine Learning for V&V

INSIGHTS INTO PROGRESS, VALUE STREAM

Defense Authorization Act for FY 2018

- Streamlined Processes
- Outcome-based Planning
- Oversight Aligned with Agile R&R
- Metrics
 - Delivery Relative to Roadmap
 - Pace of Work
 - Goals for Each Iteration
 - Product Quality
 - Completeness of Scope of Testing

MAINTAIN PRODUCT INSIGHTS



DEPARTMENT OF DEFENSE DEFENSE SCIENCE BOAR DESIGN AND

ACQUISTION OF SOFTWARE

FOR DEFENSE SYSTEMS

One Hundred fifteenth Congress

of the United States of America

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tary activities of the Department of Defi

SECTION 1. SHORT TITLE

Evolving Landscape

- Progress Against Plan / Roadmap
 - Increment / Iteration Objectives & Goals, Scope
 - Sprint, Epic, Release Forecast
- Value Stream Efficiency
 - Velocity, Business Value, Scope
 - Cycle Time SW, HW, Pipeline, Structures
 - Planning & Execution Integrity
- Intrinsic Product Attributes
 - Product Quality, Performance Measures/Parameters







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DESIGN AND ACQUISTION OF SOFTWARE

FOR DEFENSE SYSTEMS

TRENDS

CORRELATIONS,

PREDICTIVE INSIGHTS

Progress Against Roadmap

• Increment / Iteration Objectives & Goals, Scope





COMPREHENSIVE SUITE OF INSIGHTS



• Sprint, Epic, Release Forecast





Value Stream Efficiency

• Velocity, Business Value, Scope





Pace of Work

• Cycle Time – SW, HW, Pipeline



• Planning & Execution Integrity





/elocity Trend vs. Baseline (current)

ity Trend vs. Baseline

COMPREHENSIVE

Product Attributes

Product Quality







COMPREHENSIVE SUITE OF INSIGHTS

Performance Measures/Parameters

Product Quality







Backlog: Sustainability (of Teams and Agile Enterprise)

- Defense Innovation Board (DIB) Metrics Recommendations
 - Number and skill level of developers
 - Level of user engagement.
- Cycle Time
 - Progression across stages
 - Feedback Loops
 - Communication Loops
- Additional Metrics to Track Intrinsic Team Characteristics
 - Team happiness
 - Team Stability
 - Pulse

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• Net Promoter Score







Graphics for illustration purposes only, actual metrics TBD

Additional Metrics in Backlog

- **Customer Business Value**
 - Tracking Value at Program Epic level
 - Focus Value Stream on Value-Add Activities
 - Informed Trade-offs •
 - Value Velocity
- Product Defect/Issues
 - Defect Detection and Closure (Integrated Views)
 - Cycle Time for Closures, Phase Containment
- Code Coverage, Test Coverage
- 0 34 © Code Smells 0.0% Coverage on 0.0% O 0.0%
- Additional Plan Integrity Measures







Graphics for illustration purposes only, actual metrics TBD

Defense Information Board Recommended Software Development Metrics

		Target value (by software type) ⁱ				Typical
#	Metric	COTS ⁱⁱ apps	Custom -ized SW [™]	COTS HW/OS ^{iv}	Real-time HW/SW ^v	DoD values for SW
1	Time from program launch to deployment of simplest useful functionality	<1 mo	<3 mo	<6 mo	<1 yr	3-5 yrs
2	Time to field high priority fcn (spec \rightarrow ops) or fix newly found security hole (find \rightarrow ops) ^{vi}	N/A <1 wk	<1 mo <1 wk	<3 mo <1 wk	<3 mo <1 wk	1-5 yrs 1-18 m
3	Time from code committed to code in use	<1 wk	<1 hr	<1 da	<1 mo	1-18 m
4	Time req'd for full regression test (automat'd) and cybersecurity audit/penetration testing ^{vii}	N/A <1 mo	<1 da <1 mo	<1 da <1 mo	<1 wk <3 mo	2 yrs 2 yrs
5	Time required to restore service after outage	<1 hr	<6 hr	<1 day	N/A	?
6	Automated test coverage of specs / code	N/A	>90%	>90%	100%	?
7	Number of bugs caught in testing vs field use	N/A	>75%	>75%	>90%	?
8	Change failure rate (rollback deployed code)	<1%	<5%	<10%	<1%	?
9	% code available to DoD for inspection/rebuild	N/A	100%	100%	100%	0%
10	Complexity metrics	#/type of specs structure of code #/type of platforms		# programmers		Partial/
11	Development plan/environment metrics			#/skill level of teams #/type deployments		manual tracking
12	"Nunn-McCurdy" threshold (for any metric)	1.1X	1.25X	1.5X	1.5X each effort	1.25X Total \$

Communication

- ✓ Unified Locations for Metrics
 - ✓ Interactive
 - ✓ Tailored to Relevant Program/Epic
 - ✓ Pull Model
- ✓ Information Radiators The Technology
 - ✓ SpinetiX DiVA Digital Signage Player
 - ✓ Create Content & Display Instantly from Web Browser
- ✓ Team Focused Dashboards
- Video Walls
- Interactive Information Kiosks











Criteria for Evaluating Metric Candidates

All metrics **SHALL**:



Support the defined goals







Value Added Must Justify Time Spent Must automate / use existing capability



Be Reviewed with a Defined Tempo and Venue

SPEND TIME WORKING, NOT REPORTING



