



**CMM for SW Process
Improvements**

AVIONIC SYSTEMS DIVISION

Robert Ling

December 6, 2000

Capability Maturity Model (CMM) for Software Process Improvements

Robert Ling
December 6, 2000



CMM for SW Process Improvements

AVIONIC SYSTEMS DIVISION

Robert Ling

December 6, 2000

Space Shuttle Onboard Software

- NASA's Space Shuttle Onboard Software is a CMM high-maturity example
- Details are provided in Chapter 6 of the textbook titled "The Capability Maturity Model Guidelines for Improving the Software Process"
- Space Shuttle Onboard Software is currently maintained by a CMM level-5 organization



CMM for SW Process Improvements

AVIONIC SYSTEMS DIVISION

Robert Ling

December 6, 2000

CMM-related Work in EV

- EV3 began interested in CMM (January 98)
- EV3 branch members were trained on CMM-based SW Process Improvement (February 98)
- EV3 decided to follow CMM for SW Process Improvement (March 98)
 - ◆ Defined mission statement
 - ◆ Set CMM level 3 as the goal
- Self-assessment completed (April 98)
 - ◆ Weaknesses identified: Software quality assurance and Software cost estimates
 - ◆ Software Quality Assurance Training (April 98)
 - ◆ SW Cost Estimate Training (August 99)



CMM for SW Process Improvements

AVIONIC SYSTEMS DIVISION

Robert Ling

December 6, 2000

CMM-related Work in EV (Continued)

- Pre-assessment (March 2000)
 - ◆ Conducted by an expert in CMM and SW process improvements
 - ◆ Recommended using a simpler cost model for SW estimates

- EV's WI for SW development
 - ◆ EV's software development follows GFE SW Design Development Test & Evaluation Work Instruction (JSC 27291)
 - ◆ JSC 27291 Rev. G is CMM Level 2 compatible
 - ◆ JSC 27291 Rev. H is in work. Rev. H will be CMM Level 3 compatible



CMM for SW Process Improvements

AVIONIC SYSTEMS DIVISION

Robert Ling

December 6, 2000

CMM- Related Activities at NASA Headquarters

- Following is a statement from Mr. Goldin to the Committee on Science, House of Representatives on June 20, 2000: “NASA has begun an initiative to improve the quality and safety of software. ... Each NASA Center is developing plans for improving their software engineering processes including plans for attainment of Carnegie Mellon University Capability maturity Model (CMM) Level 3 ratings by those organizations producing critical software.”

- Following is a statement in the letter from AE/Deputy Chief Engineering for Systems Engineering to NASA Center Directors on October 5, 2000: ”We are getting ready to start the detailed plans to lead the Agency goal of achieving a Capability Maturity, consistent with the SEI at Carnegie Mellon University CMM Level 3, for software development

- NASA Software Working Group (SWG) is holding weekly telecon to
 - ◆ Develop NPG 2820.1 NASA Software Guidelines
 - ◆ Support and help guide the establishment of CMM levels at Centers



CMM for SW Process Improvements

AVIONIC SYSTEMS DIVISION

Robert Ling

December 6, 2000

Benefits of Using CMM to Improve SW Process

- Strengths of CMM
 - ◆ Five maturity levels help an organization prioritize its improvement efforts
 - ◆ Introduce many small, evolutionary steps rather than revolutionary innovations
- Significant improvements in quality and schedule have been reported by organizations adopting CMM
- Changing mind set between level 1 and level 2 is the most difficult but produces the highest payback