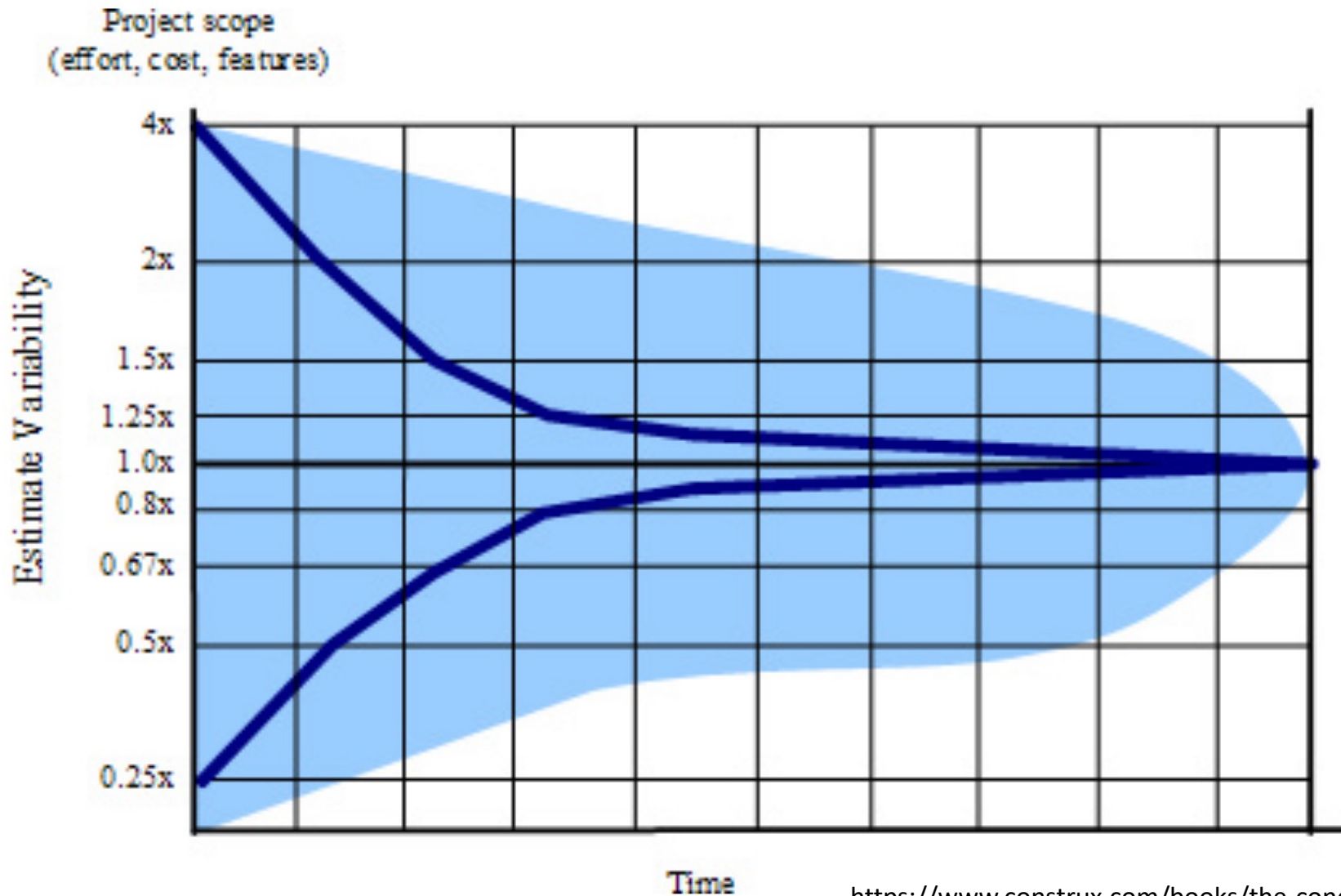


Agile recognizes the “Cone of Uncertainty”



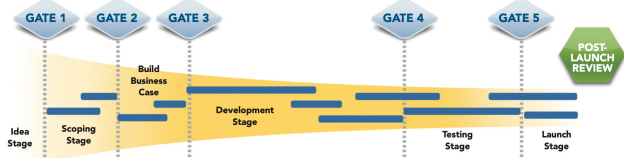
<https://www.construx.com/books/the-cone-of-uncertainty/>

The only effective way to manage “chaos” is through fast-frequent feedback

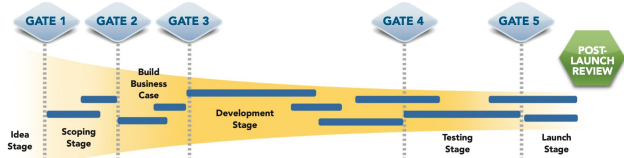
Part

Assembly

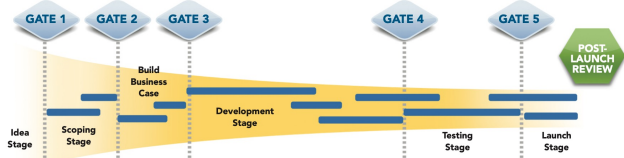
System



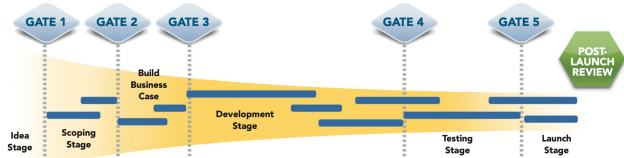
Activities overlap within stages and between stages (across gates).



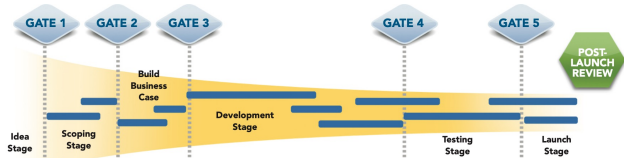
Activities overlap within stages and between stages (across gates).



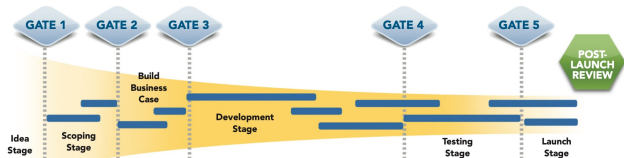
Activities overlap within stages and between stages (across gates).



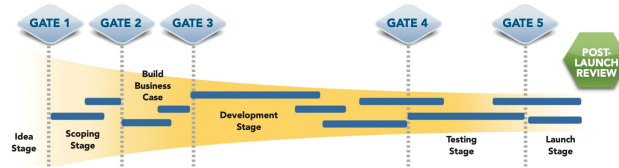
Activities overlap within stages and between stages (across gates).



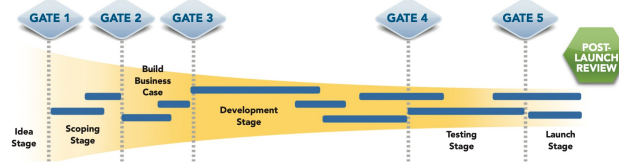
Activities overlap within stages and between stages (across gates).



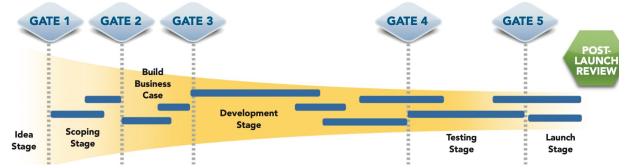
Activities overlap within stages and between stages (across gates).



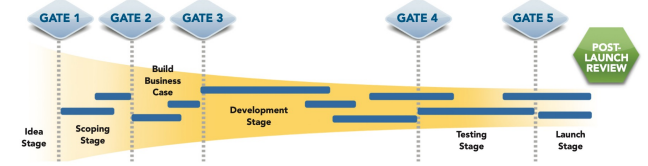
Activities overlap within stages and between stages (across gates).



Activities overlap within stages and between stages (across gates).

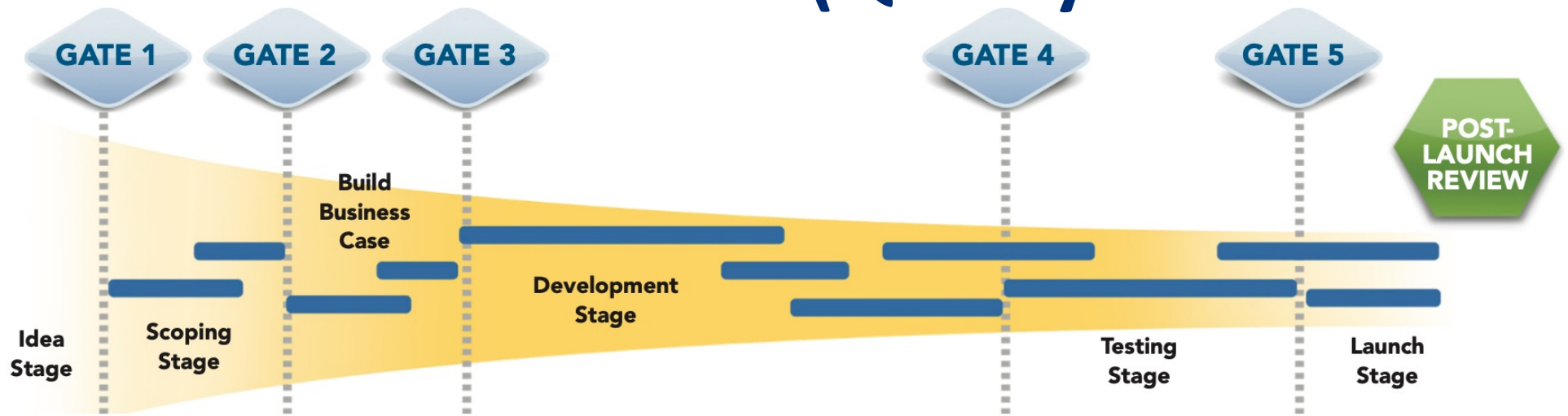


Activities overlap within stages and between stages (across gates).



Activities overlap within stages and between stages (across gates).

HW Definition of Done (Quality Built-in Gates)



Activities overlap within stages and between stages (across gates).

Exploration

Innovation Cycle
(repeat until converged on scope of initial release)

- Concept documentation with version control
- Prototypes Built
- Extensive structured customer interviews
- Top problems identified to incorporate in next prototype questions from

LtWt Business Case (as rq'd)

- Business Outcome Hypothesis
- Largest assumptions / risks identified
- Leading metrics that will validate hypothesis
- Acceptance Criteria
- Rough Estimate of work "Team-PIs"
- High Volume Product Material Fabrication and Assembly Cost simulated

Development

- Design Review
- Relevant FMEA
- Critical issues remediated
- Design and Build documentation under revision control
- Safety tests passing
- Manufacturability tests passing
- Supportability tests passing
- Engineering standards
- Reg tests passing

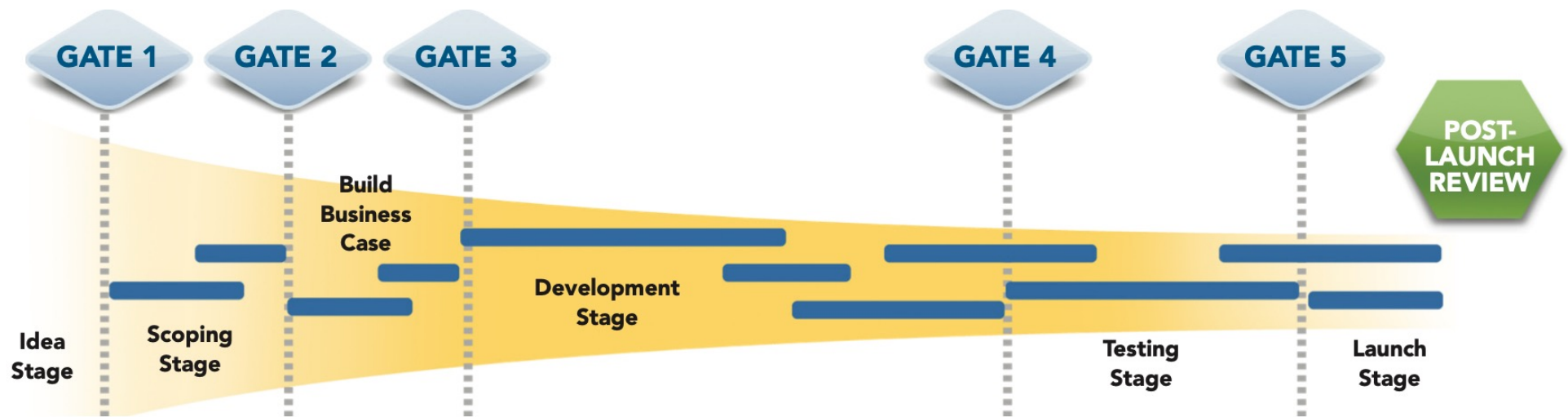
Integration Tests Passing

- xFMEA
- Safety
- Functional
- Manufacturability
- Serviceability
- Performance
- Usability
- ...

Release

- Final Documentation reviewed and approved
- Manufacturing sign off
- Supply sign off

Methodology



Activities overlap within stages and between stages (across gates).

For Each Gate:

- Start with white sheet of paper
- Identify largest risks as part of planning
- Risk acceptance criteria become gate checklists
- Risk reduction as Sprint goals and stage objectives

Risk Areas:

- Business Risk
- Technical Risk
- Knowledge Risk
- Financial Risk
- Quality Risk
- Social Risk
- Schedule Risk

APPENDIX

About the Author

Robert G. Cooper has spent more than 30 years studying the practices and pitfalls of 3,000+ new-product projects in hundreds of companies. His contributions include the Stage-Gate Idea-to-Launch Process, now implemented by almost 80 percent of North American companies. He has published more than 120 academic articles and 11 books, including the best-selling “Winning at New Products” (Basic Books, 2011). He is a Professor Emeritus of Marketing and Technology Management at the Michael G. DeGroote School of Business at McMaster University in Ontario, Canada and Distinguished Research Fellow at the Institute for the Study of Business Markets at Penn State University in Pennsylvania. He can be reached at robertcooper675@gmail.com.