Project management at scale

Alastair Basden

Durham University
Institute for Computational Cosmology

DiRAC
High Performance Computing Facility

ExCALIBUR 10

Introduction

- What is project management?
  - Application of knowledge, skills, tools and techniques to develop a solution to a problem or need
- Project management experience
- Types of projects
- Examples:
  - Software projects
  - Telescope instruments
  - Telescopes / Space-based
  - Computing

Alastair Basden
DiRAC / Durham University

Scale

- Changes everything related to project management
- Small projects vs scaled projects
- Common growing pains
  - Coordination overhead
  - Communication overhead
  - Tooling limitations

Alastair Basden
DiRAC / Durham University

Core challenges for large projects

- Complexity increases rapidly
- Dependencies multiply
- Visibility of achievements blurs
- Accountability blurs
- Agility needs balancing with governance

Alastair Basden
DiRAC / Durham University

Frameworks and approaches

- Agile, SAFe (Scaled Agile Framework), Waterfall, SCRUM, LeSS (Large Scale SCRUM), Spotify, PRINCE2, etc
- Traditional vs hybrid approaches
- When should each approach be used?
  - What is the context?
  - Who is involved?
    - And how much are they involved?

Alastair Basden
DiRAC / Durham University

Organising for scale

- Team structure
  - Feature teams, component teams
- Clear roles and responsibilities
- Decision making models
  - Centralised, decentralised
  - Where should blame lie?

Alastair Basden
DiRAC / Durham University

Communication at scale

- From all-to-all to structured channels
- Alignment tools
  - Dashboards, roadmaps, charts
- Communication channels
  - e.g. email, Slack, Teams, etc
- Rituals: Stand-ups, PI planning sessions, cross-team synchronisation, whole team meetings

Alastair Basden
DiRAC / Durham University

Dependencies

- Need management
  - Mapping dependencies visually
  - Understanding at all scales
  - Risk management at scale
  - Escalation paths
  - Governance structures

Alastair Basden
DiRAC / Durham University

Tooling and technology

- Project management tools that scale
  - JIRA, Confluence, Asana, MS Project, etc
- Automation and dashboards
  - Capturing dependencies
- Integration of engineering and business tools

Alastair Basden
DiRAC / Durham University

Culture and leadership

- Empowering teams
  - Enable ground-level decisions (bottom-up)
  - While maintaining alignment
- Transparency and trust
  - Support from management levels
- Removal of blame culture
- Appropriate management styles

Alastair Basden
DiRAC / Durham University

Metrics

- Select measurements that matter
  - e.g. not lines of code written
- Measure outcomes
  - Not just outputs
- Indicators of success
  - Including of lag
- Visibility at different scales

Alastair Basden
DiRAC / Durham University

Best practice and advice

- Do:
  - Lots of communication
  - Set up tools early
  - Scale processes gradually
- Don’t:
  - Force-fit frameworks
  - Lose sight of the value/goal
  - Create too much bureaucracy

Alastair Basden
DiRAC / Durham University

Future of management

- AI likely to play a large part
  - AI-assisted project management
- Remote and hybrid scaling considerations
- Continuous adaption

Alastair Basden
DiRAC / Durham University

Examples: software codes

- Who is the customer? You/your project?
- Are there deadlines?
  - Are they realistic?
- Are you well funded? Unlikely.
- Are there career implications?

Alastair Basden
DiRAC / Durham University

Telescope instruments

- Key to understand the interfaces with the telescope
  - These should be clear and well defined

Alastair Basden
DiRAC / Durham University

Space instrumentation

- A whole other level of project management usually required
  - Is it overkill?
  - Why are they often over budget and off schedule?

Alastair Basden
DiRAC / Durham University

Telescopes

- e.g. E-ELT
  - Continual redesigns and cost pressures

Digital research infrastructure

- Much shorter lifetime
- Important to get it right first time
- Lower development risk
  - What level of management is necessary?

Alastair Basden
DiRAC / Durham University

Case study: COSMA8

- £10m HPC procurement
- Multiple stages:
  - Specification, design, procurement, build, test, production
  - Rapid progress from procurement onwards
    - Short imposed timescales
  - Flexible and experimental approach required
    - Knowledgeable team essential

Conclusions

- Key insights:
  - Prepare for scale
  - Have tooling in place
  - Don’t over do it
  - Don’t underestimate management effort
    - Hire a good project manager
  - Don’t set up a blame culture