Integrating
Subject Matter Experts
and
Experienced Solo Developers
into
Software Development Teams

LeadDev Berlin 2022

Dr. Theresa Robinson - 2022-11-04

Talk Outline

0 Introduction to Rolls-Royce, Digital Innovation Cell, and me

1 Examples of subject matter experts and experienced solo developers who joined our team

2 How we mentored, coached, and trained them

3 What we should have done better

0

Introduction to Rolls-Royce, Digital Innovation Cell, and Theresa

Rolls-Royce is a company that provides power

Image copyright Rolls-Royce plc

- Largest division manufactures aircraft engines
- About 45000 employees worldwide
- Rolls-Royce Deutschland
  - Focus on regional and business aviation
  - About 3200 employees

Digital Innovation Cell

Product owner plus 8 developers

- Data scientists
- Data engineers
- Front and back-end developers
- "Borrow" employees from other departments for focused development in their areas of expertise

Watercolour by Natalia on Adobe Stock, Standard License

$ Cost | Material | Scenarios | SVRR | API | Feedback

Project Build: BR710 [A2-20-EN138]

42	1	2
Events	Shop Visits	Installations

Aircraft | Sister Engine | Aircraft Contract | Operator | Maintenance
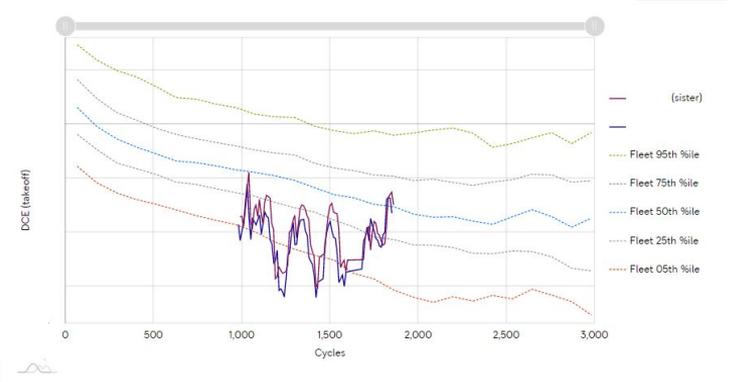
CORPORATE CARE | ON CONDITION

Reference	From	Until	Hours	Cycles
LAST REPORTED	BUILD	2022-09-07	4013.0	1359
CURRENT	BUILD	2022-10-26	4042.92	1369
LAST SV	2019-02-08	2022-10-26	560.02	204
NEXT YEAR	2022-09-07	2023-09-07	~189	~72

Aircraft CO_2 Next Year: 926t

Current Disposition: SERVICEABLE

Last Event: 3635886629

Total Disruption Index: 0.3

Timeline

All

🔔 CAMP IN-FIELD SB EMBODIMENTS 1-2022
2022-01-01 (Event) Hours: 3829.43
Cycles: 1303

🔔 CAMP EHM AND INSPECTION EVENTS -
2022
2022-01-01 (Event) Hours: 3829.43
Cycles: 1303

👥 OSD46903 - A/C 9200 - Mount bushing
inspection
2021-09-01 (Event) Hours: 3824.09
Cycles: 1292

🔔 CAMP IN-FIELD SB EMBODIMENTS 5-2021
2021-05-01 (Event) Hours: 3769.0
Cycles: 1270

👥 OSD43809 - A/C 9200 - RH ENG // Oil
quantity indication dash out
2021-01-26 (Event) Hours: 3763.52
Cycles: 1263

🔔 CAMP EHM AND INSPECTION EVENTS -
2021
2021-01-01 (Event) Hours: 3761.25
Cycles: 1261

🔔 CAMP EHM AND INSPECTION EVENTS -
2020
2020-01-01 (Event) Hours: 3710.55
Cycles: 1229

🔔 CAMP IN-FIELD SB EMBODIMENTS 3-2018

Engine & Sister Engine vs Fleet Tramlines ⓘ

DCE takeoff

(sister)

Fleet 95th %ile
Fleet 75th %ile
Fleet 50th %ile
Fleet 25th %ile
Fleet 05th %ile

Engine Life Trajectory

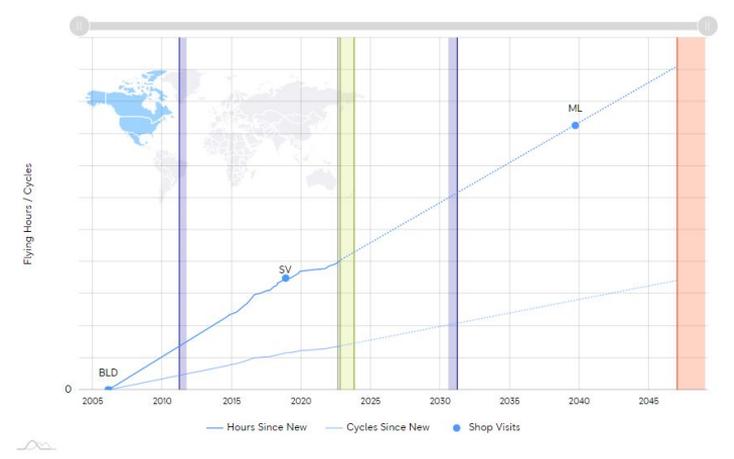Hours Since New | Cycles Since New | Shop Visits

Photo: Andreas Gohr

I am myself a person who moved from subject matter expert/solo developer to full-time programmer

Dr. Theresa Robinson

- PhD in Aerospace Engineering

- Background in numerical optimization and robust design

- Experience in Rolls-Royce in nacelle design and numerical risk assessment

- Joined digital cell as a data scientist

- Now the technical lead

- Digital cell has doubled in size since joining it, mostly by bringing in solo developers from other parts of the company

1

Example Team Members

The hare

Experienced Solo Developer Used to Working Directly with Stakeholders

- Expert developer with strong knowledge of the programming language and some parts of the tech stack

- Extremely customer-focused

- Frustrated with anything that slows down development

  - Agreeing new features with the product owner

  - Architecture and coding style standards

  - Pull request process

  - Writing documentation

  - Communication with the team in general

Photo by Vincent van Zalinge on Unsplash

The butterfly

Solo Programmer for whom programming or data science is one of many interests

- Expert in a non-software field (or two, or three…)
- Self-taught in data science
- Self-directed and motivated to learn new things
- Many interests
- Unconcerned with unit tests or programming standards
- Sometimes doesn't focus on what the product owner has prioritized

Photo by Alfred Schrock on Unsplash

The owl

Subject Matter Expert from another field with little experience in programming

- Long experience in a technical role in a non-software department

- Brought onto the team to contribute advice as we moved into their technical area

- "Dabbled" in coding in order to accelerate their "day-job"

- Missing significant software engineering context
  - Version control
  - Unit tests
  - Static analysis
  - Coding standards

- Eager to learn

Photo by Zdeněk Macháček on Unsplash

2

How we mentored and coached the new team members

Provided clear documentation and coaching on missing skills, some of which were

- Version control usage changes when working on a team

- Release management
  - Developing for a target machine which is not the development machine

- Communication with project and product managers

- Coding standards

- Communication about intent of code

- Reading code written by other people

- Responding to code reviews

Drawing by Andreas Gohr

Teamwork and communication are skills just as important as technical skills

- Evaluate them in your interview process

- Trainable: find ways to improve

- Give clear feedback on progress of teamwork and communication skills

- Don't let people get away with being the silent genius

Photo by Francesco on Unsplash

Pair programming with people of very different skillsets can result in the best of both worlds

Use pairing intelligently: Pair people up with different sets of missing skills and different working styles

Image generated by Dall-E from a photo from Unsplash

Could have done better

- Put as much emphasis on teamwork and communication as on coding skills in the hiring process
- Find out skill gaps proactively rather than in an ad-hoc way
  - Don't wait until missing skills cause an issue
  - In future use a checklist to see what people do and do not know
- Adapt coaching and mentoring to the team member, considering individual skills, context and personality

Photo by Denny Luan on Unsplash

Key Takeaways

- Subject matter experts and experienced solo developers need different treatment from junior developers

- Teamwork and communication are skillsets that can be developed

- Pay attention to the person in front of you

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