SKAO

Enabling Transformational Science

Through Global Collaboration and Innovation

Using the Scaled Agile Framework

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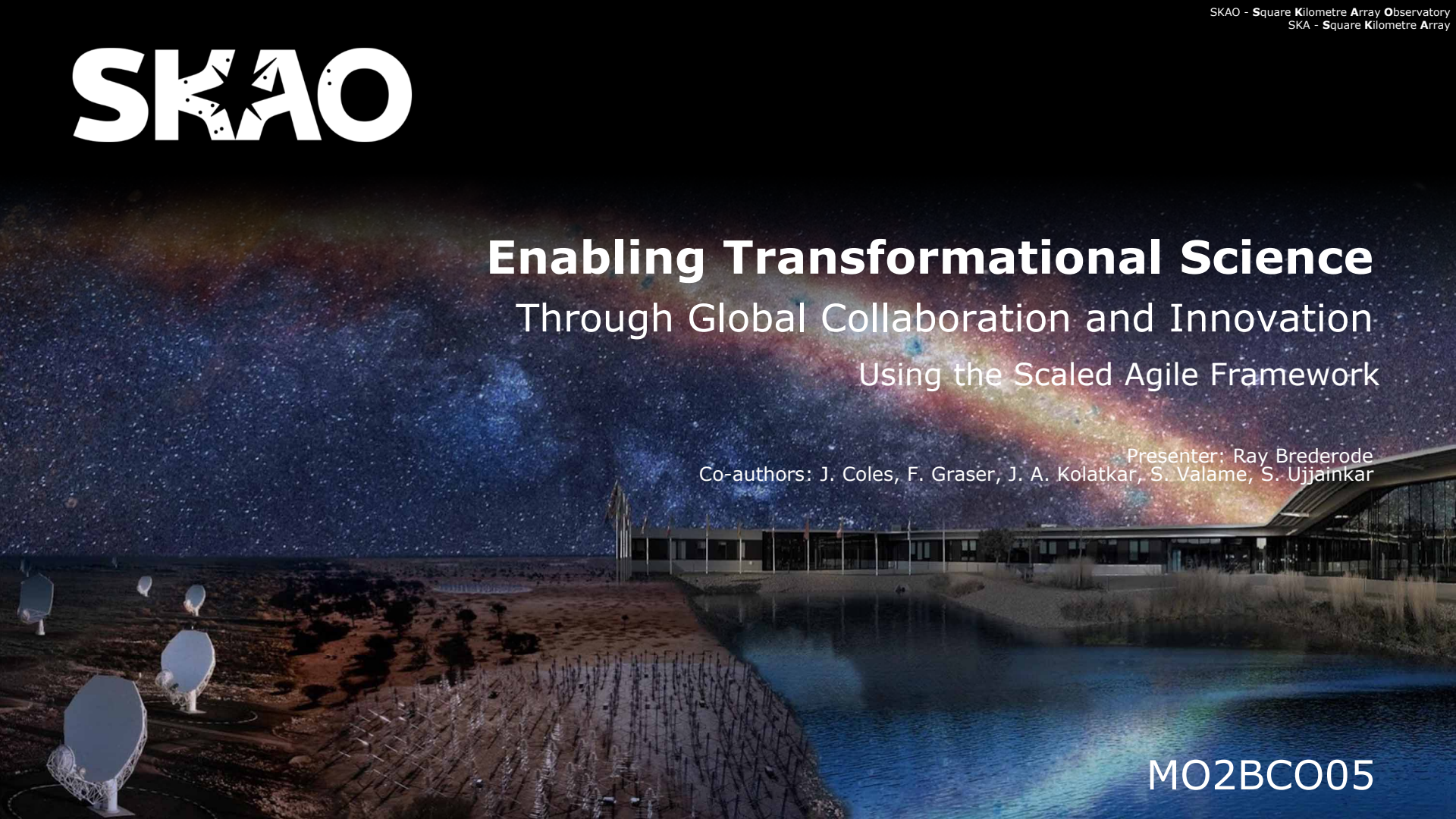

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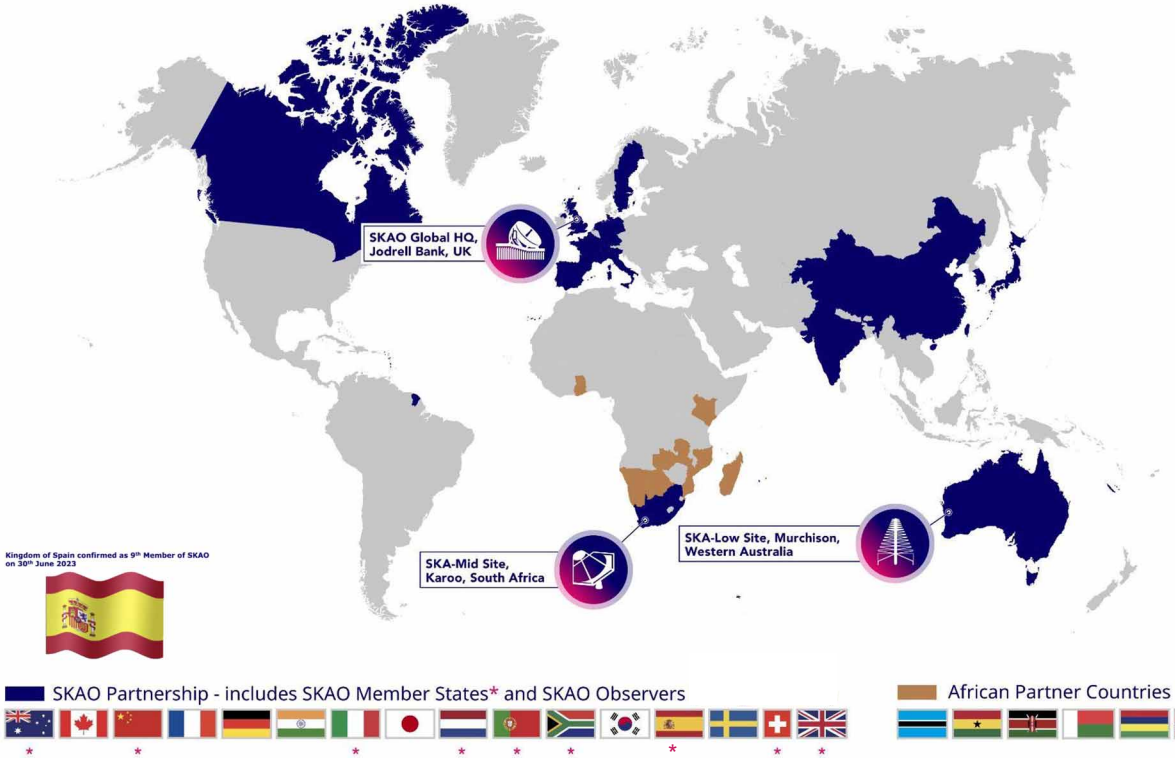
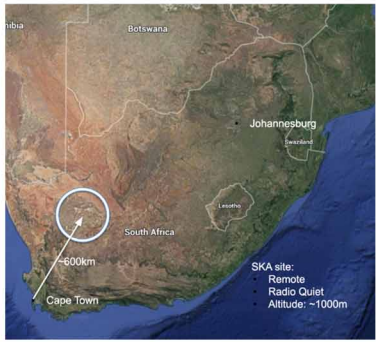
One Observatory, Two Telescopes





"Software Telescopes"

Skill Requirements*:

- Platform Developers
- Database Developers
- Monitor and Control Dev
- User Experience
- Data Scientists
- High Performance Computing Engineers
- High Performance Analysis Algorithm Engineers

* Subset of skill requirements

Product Breakdown Structure*

Contains Software

*Subset of PBS with focus on LOW Telescope

Summary	Lvl	Telescopes	Config
000-020000 - SKA-Low Telescope User System	1	LOW	Software, Hardware, Networking
500-000000 - SKA-Low Infrastructure	2	LOW	Hardware
100-000000 - SKA-Low Telescope	2	LOW	Software, Hardware, Networking
141-000000 - Synchronisation and Timing (SAT) LOW	3	LOW	Software, Hardware, Networking
105-000000 - Networks LOW	3	LOW	Networking
103-000000 - Telescope Monitoring and Control (TMC) LOW	3	LOW	Software, Hardware
103-000007 - Telescope Monitoring and Control (TMC) LOW Hardware	4	LOW	Hardware
712-000000 - Telescope Monitoring and Control (TMC) Software	4	MID, LOW	Software
104-000000 - Science Data Processor (SDP) LOW	3	LOW	Software, Hardware
104-000001 - SDP Compute Hardware LOW	4	LOW	Hardware
104-000002 - SDP Preservation Hardware LOW	4	LOW	Hardware
701-000000 - SDP Software	4	MID, LOW	Software
102-000000 - Central Signal Processor (CSP) LOW	3	LOW	Software, Hardware
110-000000 - CSP Local Monitoring and Control (LMC) LOW	4	LOW	Software, Hardware
113-000000 - CSP Pulsar Search Engine (PSS) LOW	4	LOW	Software, Hardware
113-030000 - CSP Pulsar Search Engine (PSS) LOW Hardware	5	LOW	Hardware
713-000000 - CSP Pulsar Search Engine (PSS) Software	5	MID, LOW	Software
114-000000 - CSP Pulsar Timing Engine (PST) LOW	4	LOW	Software, Hardware
114-080000 - CSP Pulsar Timing Engine (PST) LOW Hardware	5	LOW	Hardware
714-000000 - CSP Pulsar Timing Engine (PST) Software	5	MID, LOW	Software
111-000000 - CSP Correlator and Beamformer (CBF) LOW	4	LOW	Software, Hardware

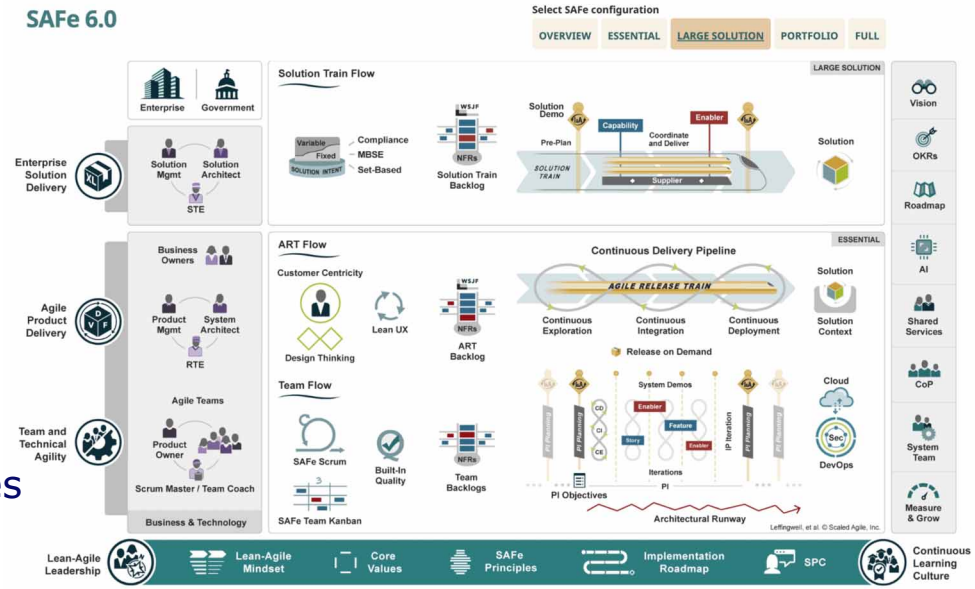
How do we Scale Development?

Considered Five alternatives:

- Disciplined Agile Delivery (DAD)
- Dynamic Systems Development Method (DSDM)
- Large Scale Scrum (LeSS)
- Modular Framework for Scaling Scrum
- Scaled Agile Framework (SAFe™)

Chose SAFe™ because:

- Covers large project, non-software issues typically seen in traditional System Engineering
- Documentation and Training courses a huge asset to help roll this out world-wide
- Largest market share so suppliers know about it and there is a big community



https://scaledagileframework.com

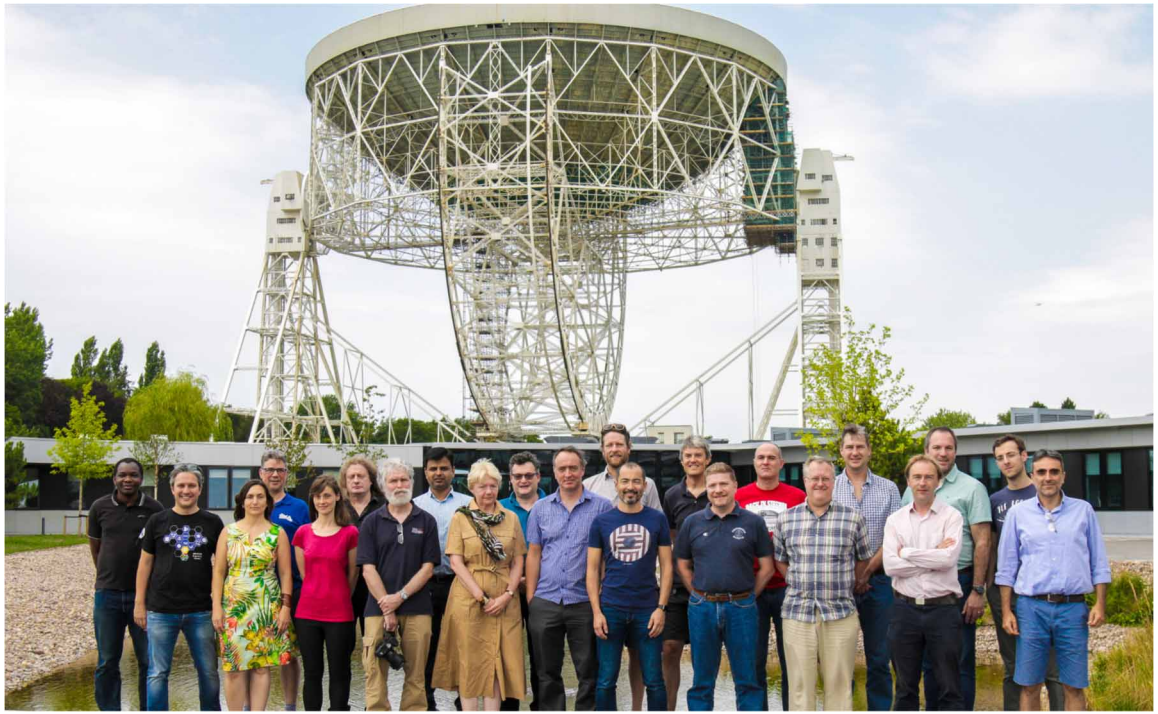
SAFe™ Implementation Roadmap

Jul - Dec 2018

- Train Change Agents
- Train Leadership
- Organise Around Value
- Train Everyone
- Launch an Agile Release Train

Dec 2019

- Launch 2nd Agile Release Train
- Accelerate



Change agents attending the inaugural SAFe™ Practice Consultants (SPC) training at Jodrell Bank (UK) in 2018

SAFe™ - **S**caled **A**gile **F**ramework
ART - **A**gile **R**elease **T**rain (a team of teams)
PI - **P**lanning **I**ncrement (held quarterly)

Launch - Planning Event PI#1

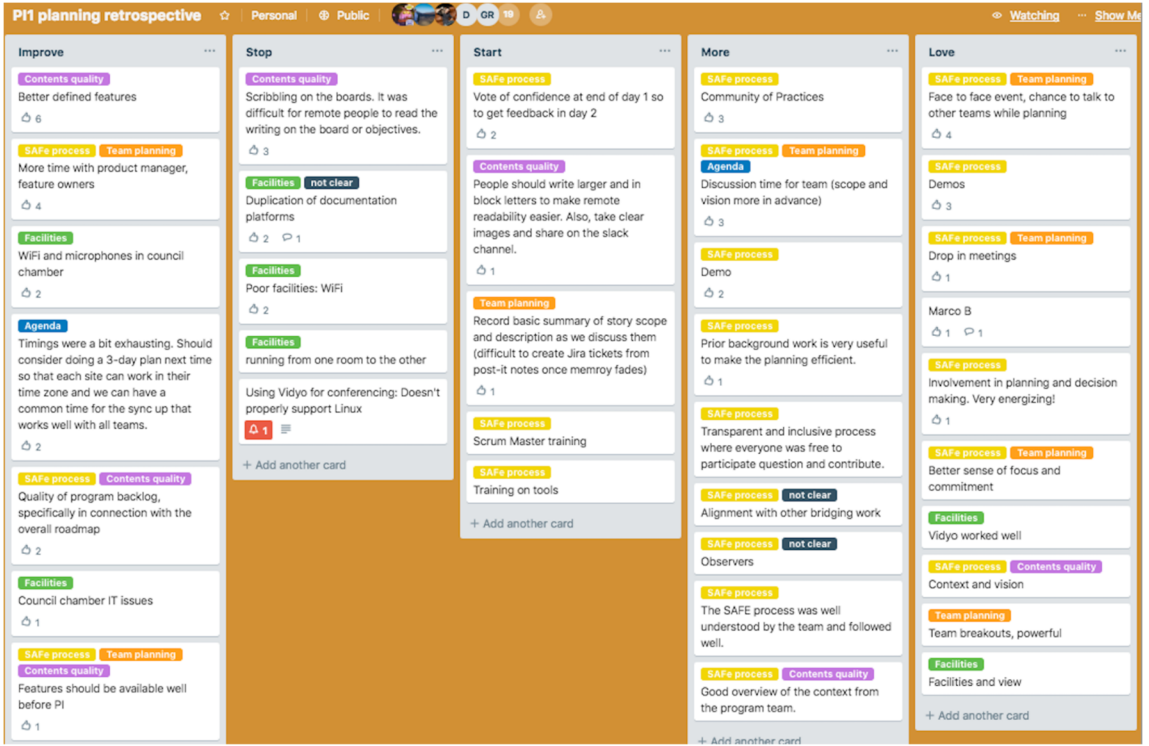
- 1 x Agile Release Train
- 5 x Agile Teams
- ~40 People largely face-to-face
- Time zones India - UK

Positive Feedback

- Transparent and Inclusive
- Focus and Commitment
- Context and Vision
- Involved in Decision Making

Negative Feedback

- Exhausting Planning Schedule
- Poor Experience for Remote Participants
- Poor Definition of Features (inputs)



Retrospective Board following the Inaugural Planning Event at Jodrell Bank (UK) in Dec 2018

ART - **A**gile **R**elease **T**rain (a team of teams)
PI - **P**lanning **I**ncrement (held quarterly)

One Year Later…PI#5

- 2 x Agile Release Trains
- 14 x Agile Teams
- ~120 People (86 onsite, 34 remote)
- Time zones: New Zealand to Canada !

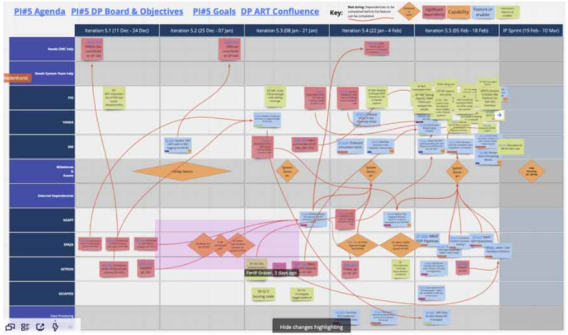
Positive Feedback

- Good interactions onsite
- Miro collaborative white boarding tool a big success

Negative Feedback

- Poor Experience for Remote Participants
- Sessions too early for some, just right for others (time zones)
- Features (inputs) too big, need to be socialised earlier

Group photo of onsite delegates participating in the PI#5 planning event, Dec 2019



Feature (left) & Planning Board (right) using stickies and MIRO respectively, Dec 2019

SAFe™ - **S**caled **A**gile **F**ramework
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Almost 5 years later…PI#20

- 4 x Agile Release Trains (soon to be 6)
- 40 x Agile Teams
- ~300 People, 40 Organisations
- Countries: 15 (Australia to Canada)

Successes

- Scaling Work and Teams
- Transparency and Trust
- Relentless Improvements

Impediments / Challenges

- Alignment
- Communication
- Sustainability

Pune, India

Trieste, Italy

Collocated teams in regional centres (Trieste and Pune) during the PI#20 Planning Events in Sep 2023.

This is an example of the **Distributed Colocation** model for planning events where teams collocate in regional centres, while the rest of the event is hosted virtually.

SAFe™ - **S**caled **A**gile **F**ramework
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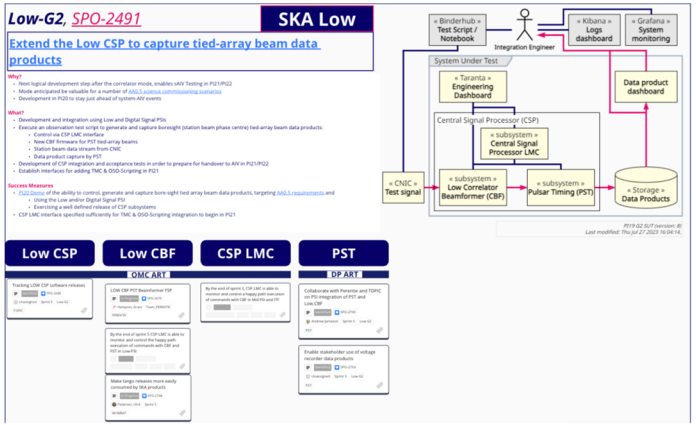
Successes: Scaling Work & Teams

- Started with Essential Configuration
  - Minimal implementation

- Now Large Solution Configuration
  - Cross ART Alignment Workshops
  - Cross ART Syncs

  - Goals* (~12)
    - Features / Enablers (~125)
      - Stories / Enablers (~1500)
    - Team Objectives (~100)
  - Aggregated PI Objectives (~12)

  - Solution Team* (x1) drive Goals
    - Program Teams (x4) drive Features / Enablers
      - Agile Teams (x40) drive Stories / Enablers



One of ~ten top level Solution Goals identified as an input to the PI#20 planning events, Sep 2023

Goals are supported by ~125 Feature / Enabler backlog items shown on PI#20 planning boards across 3 (out of 4) Agile Release Trains, Sep 2023

Successes: Transparency & Trust

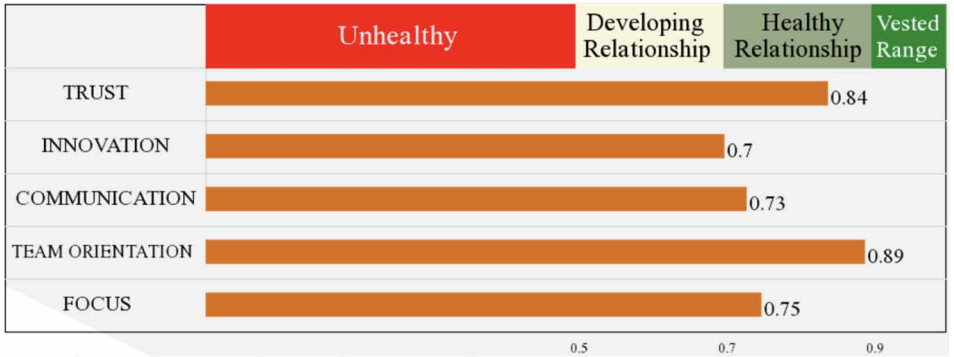
Transparency is a SAFe™ Core Value

- Open system demonstrations
- Collaborative problem-solving workshops
- Product, progress and process related metrics
- Open spaces/projects on all major collaboration platforms

Transparency is an enabler of Trust

Relational Contracting Model with Suppliers (for development resources) based on guiding principles of:

- Equity, Reciprocity, Loyalty, Honesty, Autonomy, Integrity



Results of a Trust and Compatibility survey conducted by an independent consultant within the Software and Computing Ecosystem, Feb 2023

Successes: Relentless Improvement

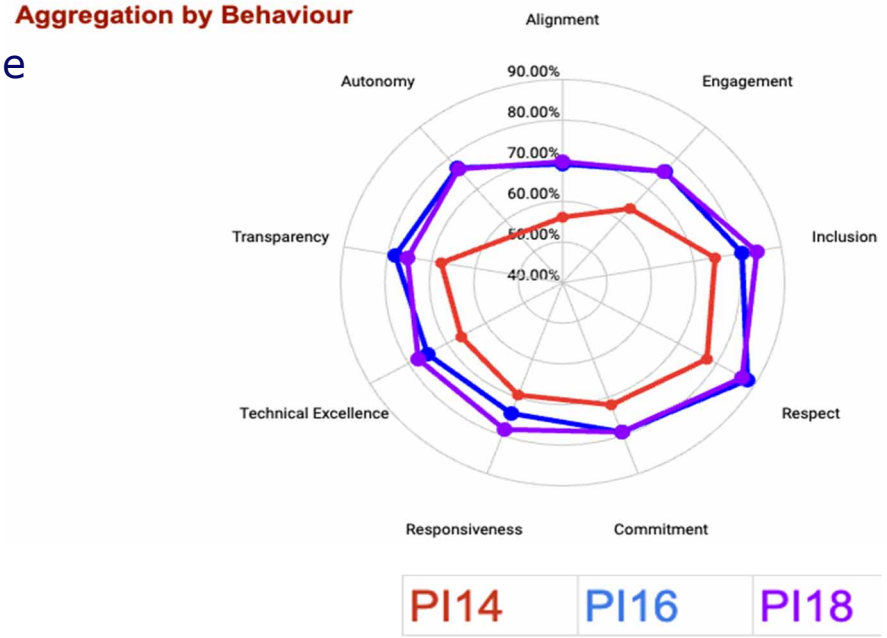
Relentless Improvement is a SAFe™ Core Value

Identification of Improvements

- Retrospectives per iteration
- Inspect and Adapt Workshops per increment
- Surveys
  - Happiness every 6 months
  - Team and Technical Agility
  - Compatibility and Trust annually

Implementation of Improvements

- Capacity for "Indirect Value" each increment
- "Push" improvements onto the backlogs
- Survey analysis and action plans
- Improvement Roadmaps



Percent = 100% if all Super Happy, 0% if all Rubbish, and scaled inbetween Super Happy = 4, Pretty Happy = 3, I can live with it = 2, Not feeling good = 1, Rubbish = 0

Challenges: Alignment

Alignment is a SAFe™ Core Value

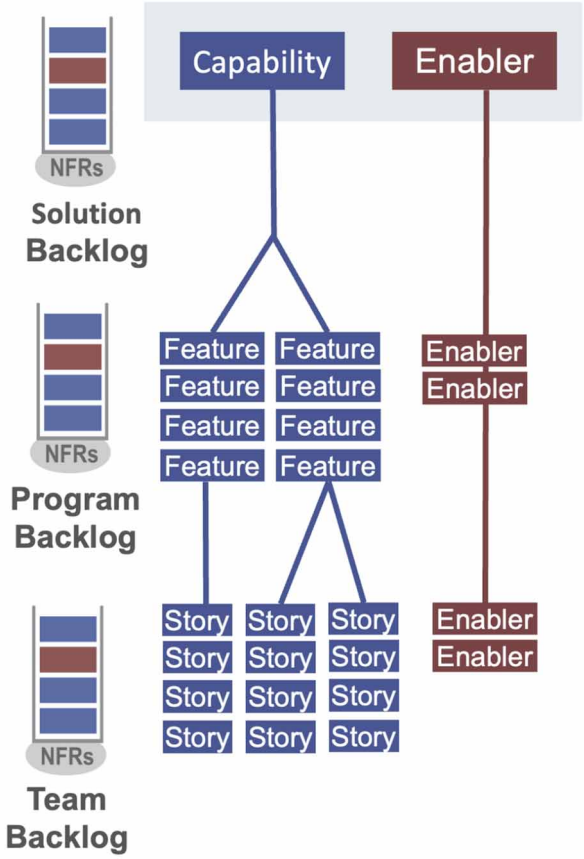
- Alignment to a Value Stream
- Need "right" balance between Alignment and Autonomy

Misalignment to Value Streams

- Leads to inefficient communications
- Dependencies across Agile Release Trains
- Difficulties engaging key stakeholders

Too much alignment around the Features/Enablers (~125)

- Difficult to relate to stakeholders
- Largely siloed per team
- Risk losing sight of larger constructs (Goals)
- Struggle with visibility of progress across team boundaries



Look to leverage larger SAFe Capabilities and Features/Enablers in future PIs

Challenges: Communication

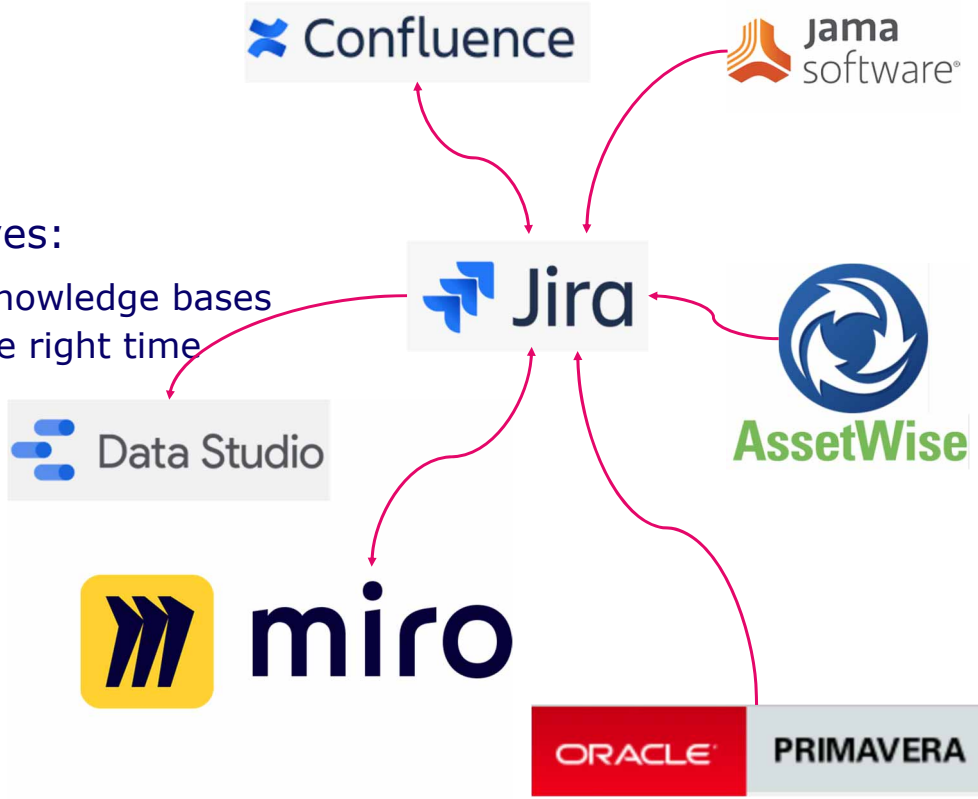
Communication at scale is hard!

Systemic problems identified in retrospectives:

- Struggling to find relevant information in vast knowledge bases
- Struggling to engage with the right people at the right time
- Confusion due to insufficient guidance
- Duplication of information and inconsistencies

Steps to improve:

- Improve meeting guidelines and templates
- Leveraging shared calendars
- Introduced asynchronous and hybrid meetings
- Performing regular content curation workshops
- Integration and synchronisation of key collaboration tools



Jira is a key communication & collaboration tool, integrated with a range of other tools.

Challenges: Sustainability

The Perfect Storm…every quarter

Closing out the current increment

- Review Feature/Enabler Outcomes
- Assess Team PI Objectives and Goals
- Identify & Analyse Systemic Problems

Prepare the next increment planning events

- Feature preparation, prioritisation and socialisation
- Plenary Preparations
- Feature Board, Program Board setup
- Managing Logistics for Face-to-Face gatherings

Strive for improved delegation models, more collaboration, and better flow

Conclusion

One Observatory, Two Telescopes, Three Continents
Represents an Extraordinary challenge !

Basis of the Scaled Agile Framework (Lean, Agile, DevOps) is solid

The details of the implementation matter

SKAO needs to stick to the principles, but continue to tune the practices to our context

Questions

We recognise and acknowledge the Indigenous peoples and cultures that have traditionally lived on the lands on which our facilities are located.

SKAO

www.skao.int