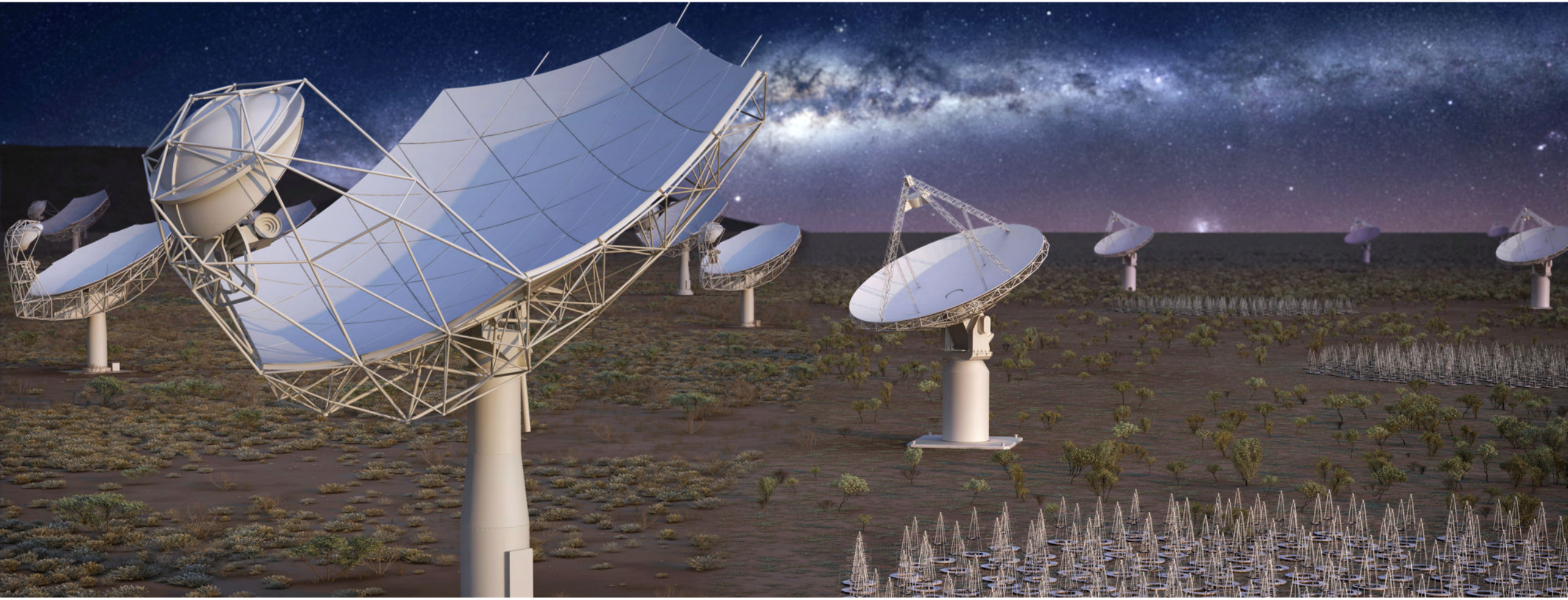
SAFe® status



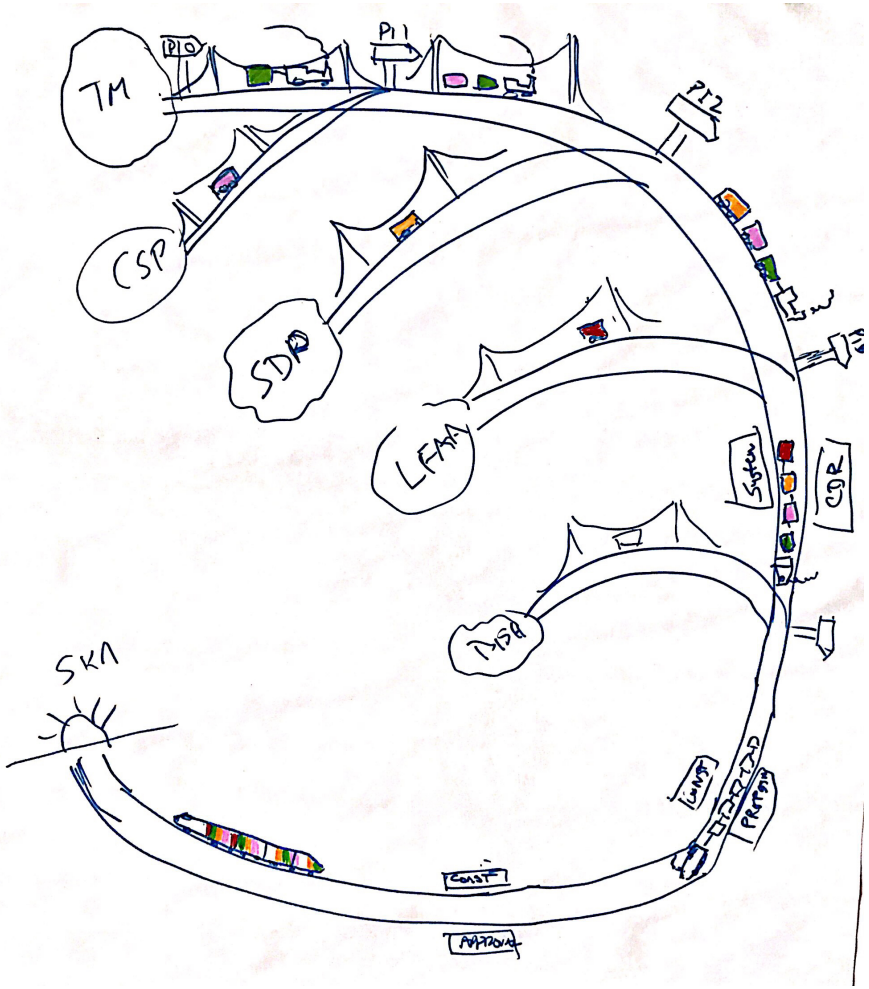
SQUARE KILOMETRE ARRAY

Exploring the Universe with the world's largest radio telescope

Summary

- Introduction
- Metrics
- Tooling
- What is it we do?
- Retrospective

SAFe® bridging vision



- Transition from consortia “islands” to single development “train”
- Program Increment (PI) Planning meetings are mileposts on the way
- Major milestones are ”stations”.

In words:

The SKA Enterprise Objectives over the bridging period is to successfully reach a milestone where construction can begin on a well funded project to build the two SKA telescopes under the guidance of the SKA Observatory. To do this we ***must*** pass the intermediate milestones of:

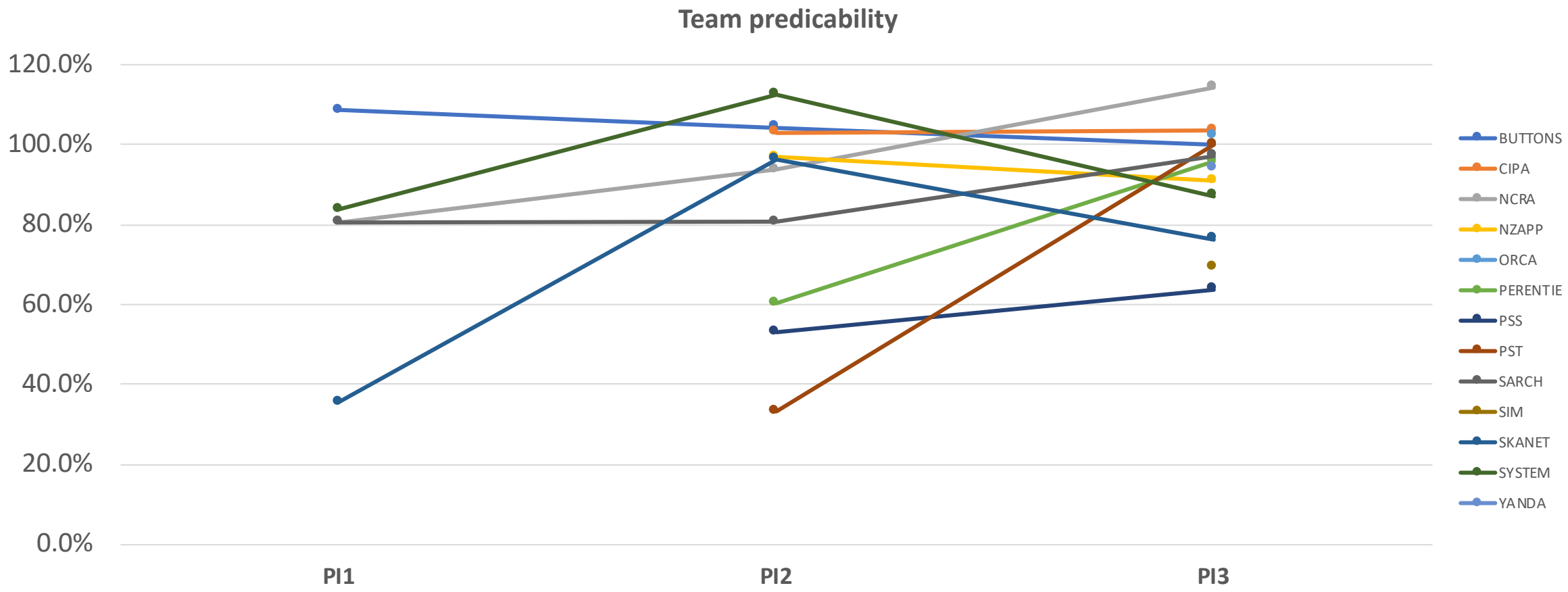
- Presenting a credible design at System CDR - *which serves as a solid foundation for:*
- Submitting a convincing construction proposal - *which serves as the mechanism for:*
- The SKA Observatory Council releasing funds for construction.

This is inherently, and unavoidably, a document based, stage gated process. To be successful we must align this with our vision for software development, which is that: *by the end of the bridging period we will have pivoted from a document based, earned value, stage gated set of processes arranged around pre-construction consortia to a code based, value flow driven, lean-agile set of processes unified around the Scaled Agile Framework.*

From: https://docs.google.com/document/d/1QiSQfh0YiwaCc7A16qQjKj7BuXfBLsMzrrz4eMn3YvY/edit

Metrics

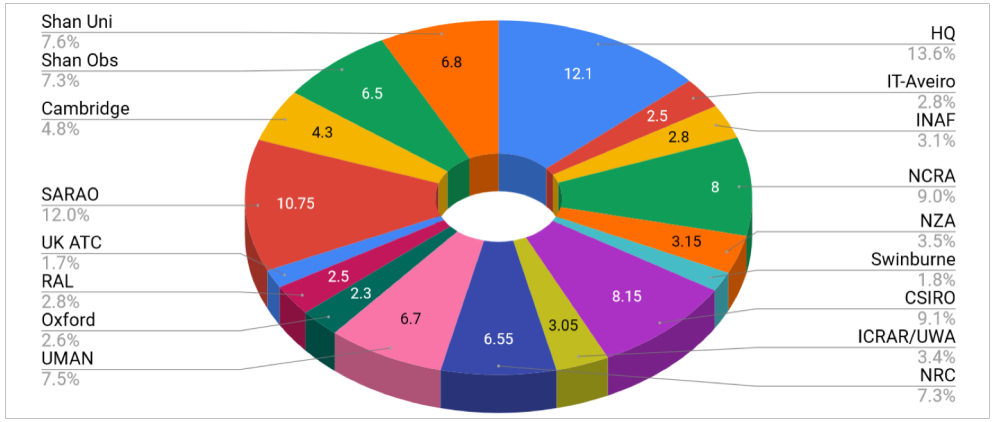
Overall Predicability



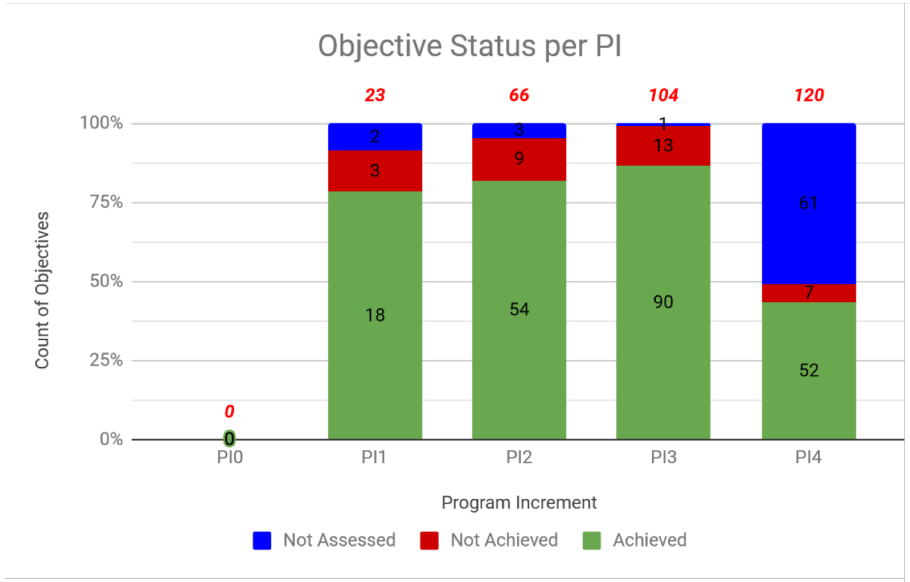
PI#4: Workforce and teams

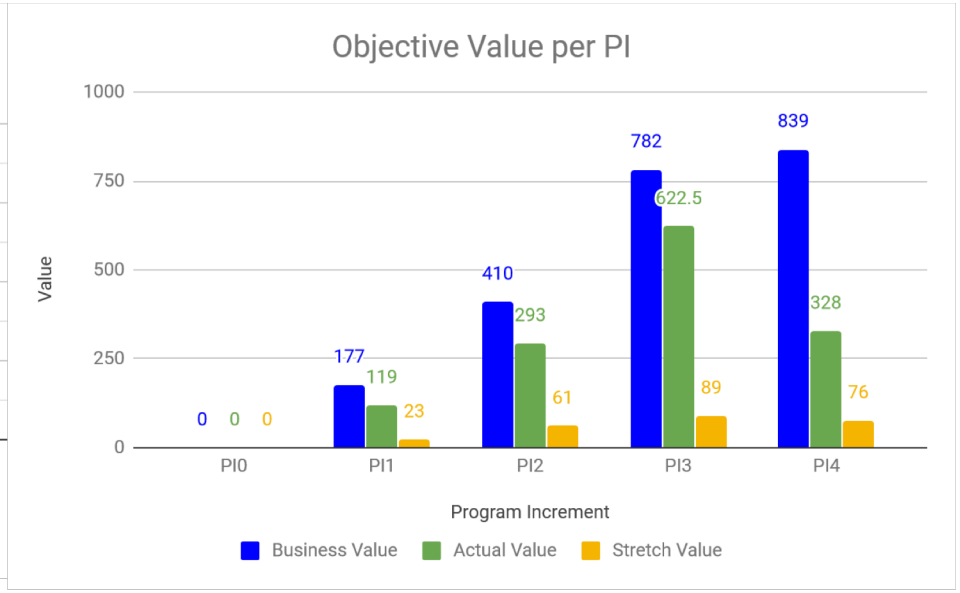
		HQ	IT-Aveiro	INAF	NCRA	NZA	Swinburne	CSIRO	ICRAR/UWA	NRC	UMAN	Oxford	RAL	UK ATC	SARAO	Cambridge	Shan Obs	Shan Uni
	Total Effort	*12.1*	*2.5*	*2.8*	*8*	*3.15*	*1.6*	*8.15*	*3.05*	*6.55*	*6.7*	*2.3*	*2.5*	*1.5*	*10.75*	*4.3*	*6.5*	*6.8*
CIPA	7.05			0.5						6.55								
NCRA	7.4				7.4													
NZAPP	2.45					2.45												
Buttons	5.05		0.75	1.2	0.6						1			1.5				
Perentie	6.05					0.2		5.85										
PSS	6.7			0.5		0.5					4.2	1.5						
PST	1.6						1.6											
SKANET	2.6	0.8						0.3			1.5							
System	4.65	0.5	1.75	0.6											0.8	1		
SIM	7.1	0.5										0.8	2.5			3.3		
Yanda	5.05							2	3.05									
SDP-PTB	6.5																6.5	
SHPAC	3.3																	3.3
S&R	3.5																	3.5
ESCAPEES	2.5	2.5																
X-Files	1.55														1.55			
SARAO	6.5														6.5			
Product Team	9.7	7.8													1.9			

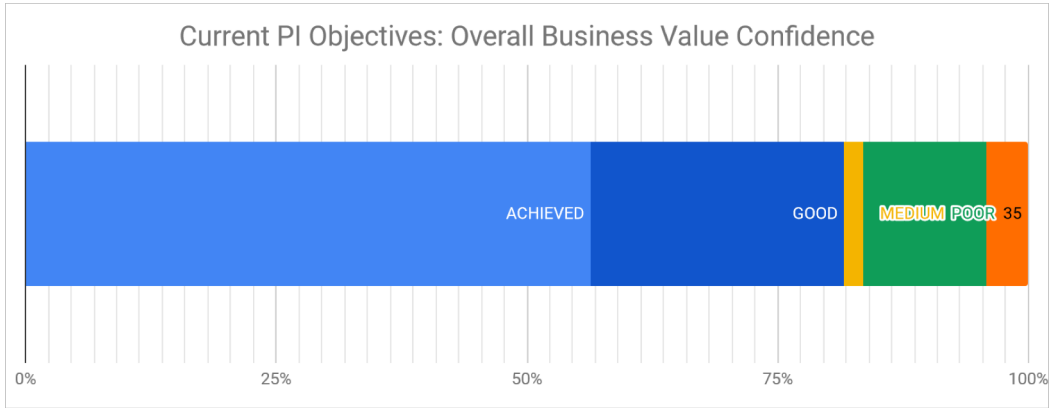
- 16 Agile Teams ~4.7 FTE Average team size
- ~89 FTE committed from ~150 people (average commitment ~60%)
- ~13% of the effort from the SKA Office



Objectives analysis

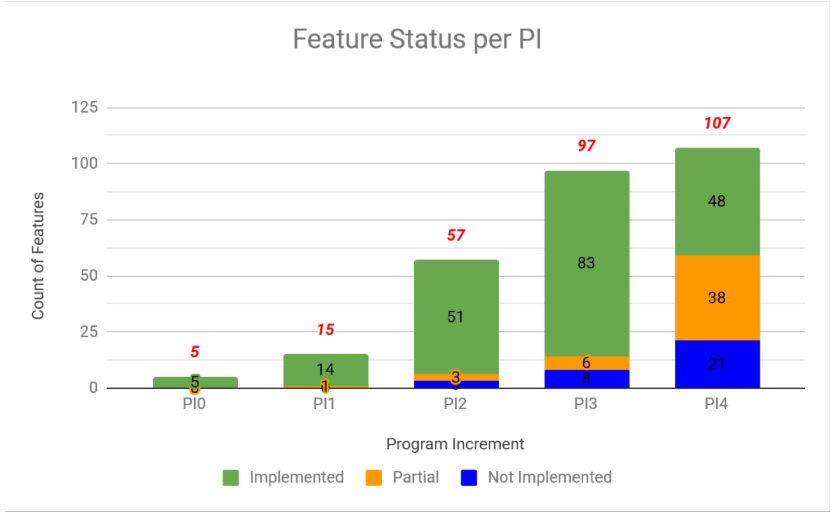


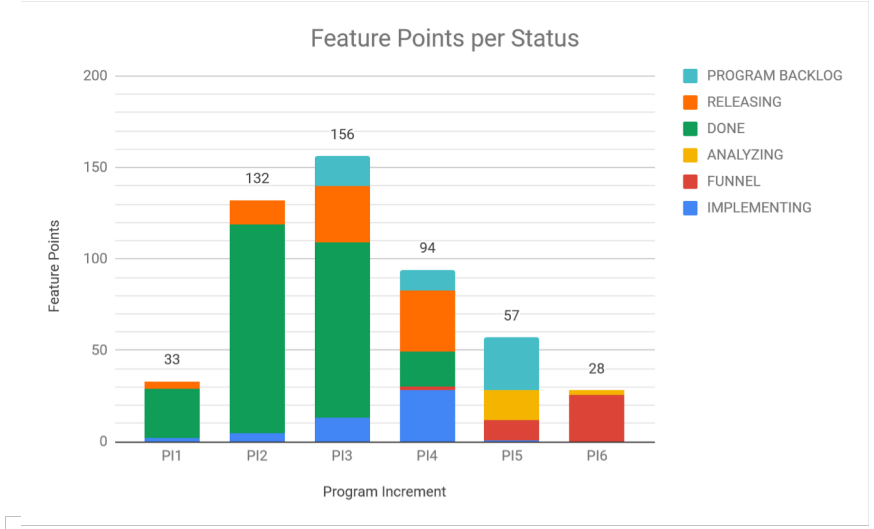


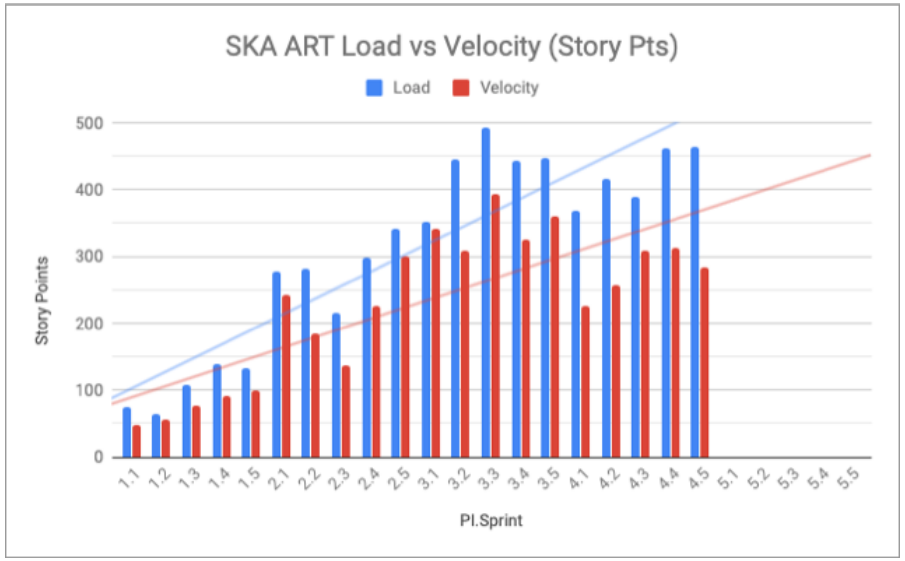


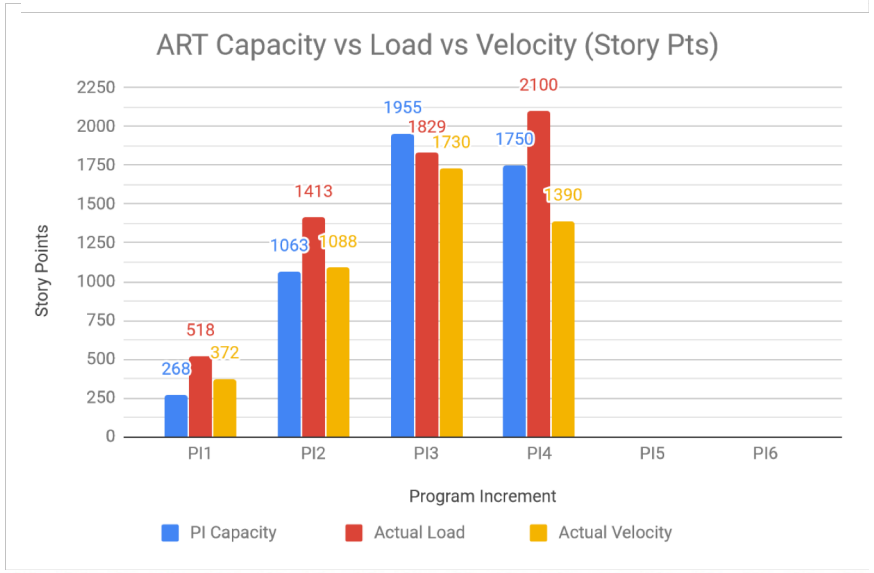
PI4 still ongoing, therefore the results are still preliminary.

Features analysis









Up to the minute status information in Jira

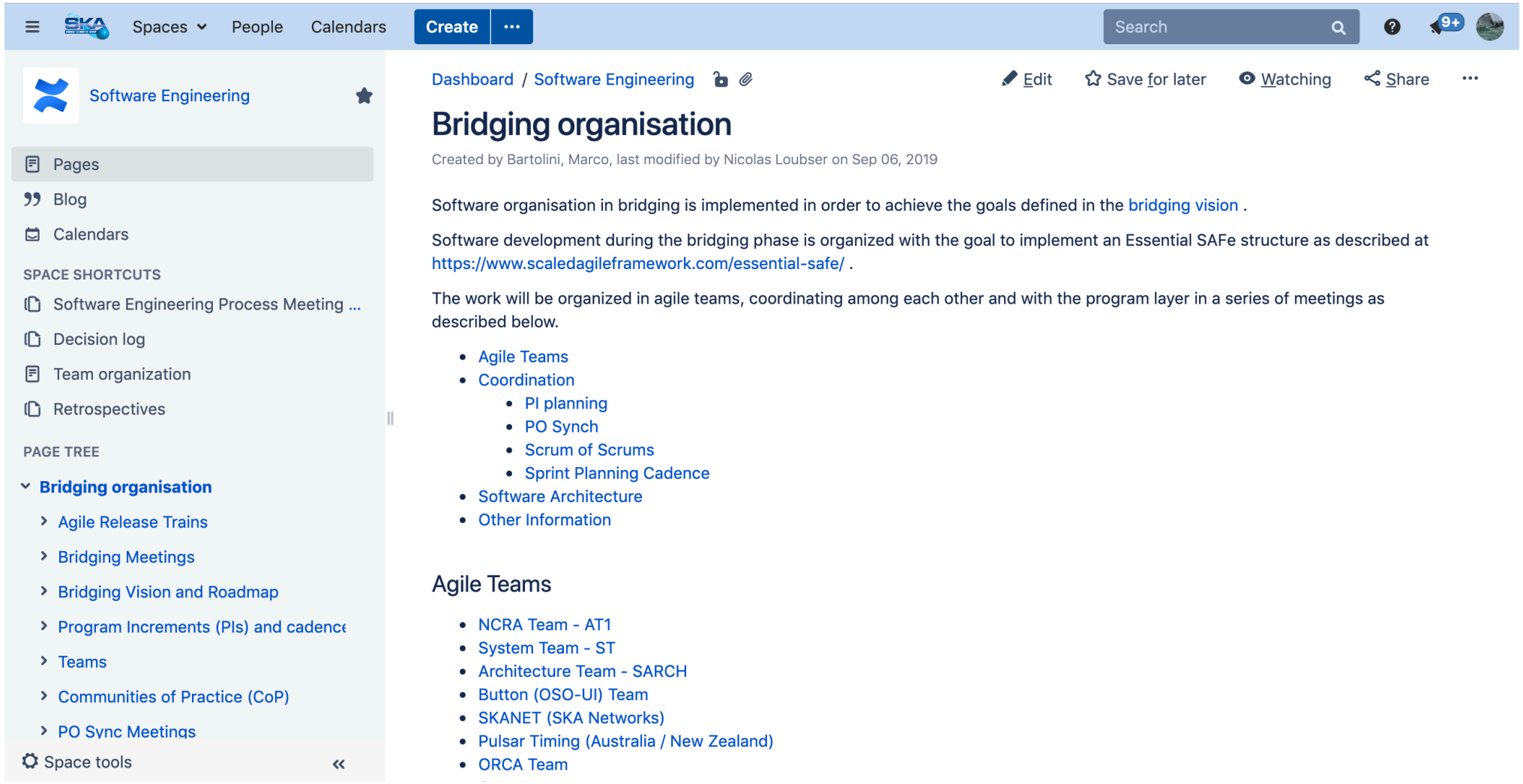
Perentie Cranial Map

Basic view*

	Key	Summary	Status	Progress
		PI4 - SAFe program increment #4		
✔	SPO-212	Fix bugs or refactor Perentie hardware, firmware, software and documentation to ensure quality and reliability is maintained - Refactored code, tested code	ACHIEVED	
	SP-536	Refactor Firmware Software - Refactor the Perentie firmware and software: add a build version date, fix bug in HBM memory download, control LFAA interfa	RELEASING	
✔	AT6-208	Add a build version number to each FPGA accessible from Gemini - Add a build version number to each FPGA accessible from Gemini. Modify ARGs t	DONE	
✔	AT6-209	Change MACE/ICL to read the FPGAs version number and load the appropriate fpgamap file.	DONE	
✔	AT6-211	Control the rate at which the LFAA emulator sends data - Control the rate at which the LFAA emulator sends data, so as not to overrun the bandwidth o	DONE	
✔	AT6-232	Investigate and refactor Gemini Tango Device based on Pogo	DONE	
	SP-535	Refactor Hardware & Docs - Refactor the Perentie hardware: update the subrack backplane, install optical circuit, find leak sensor connector bulkhead, cont	IMPLEMENTING	
✔	SPO-215	Implement custom 25G communications firmware between FPGAs to enable multi-LRU systems in preparation for optical circuit	NOT ACHIEVED	
	SP-540	Operational Optical Comms - Add 25G optical interfaces (QSFP) to the interconnect module to connect the Gemini to the Xilinx HBM Eval board	PROGRAM BACKLOG	
	AT6-226	Implement 25G inter-FPGA communications firmware - Implement 25G inter-FPGA communications firmware module and integrate into firmware	TO DO	
	AT6-227	Add QSFP to two development boards - Add QSFP to two development boards and connect with the appropriate pigtails of an optical breakout cable	TO DO	
	AT6-228	Basic testing of communications firmware in FPGA functions as expected over the optical link	TO DO	
✔	SPO-210	Integrate the Fine Corner Turner and Correlator to prepare for integration into the PISA signal path - Simulation results	ACHIEVED	
✔	SPO-209	Make the Correlator Coarse Corner Turner and Filterbank operational to further progress the PISA signal chain - Verification report	ACHIEVED	

Tooling

Confluence


Spaces
People
Calendars
Create
Search
Software Engineering
Pages
Blog
Calendars
SPACE SHORTCUTS
Software Engineering Process Meeting ...
Decision log
Team organization
Retrospectives
PAGE TREE
Bridging organisation
Agile Release Trains
Bridging Meetings
Bridging Vision and Roadmap
Program Increments (PIs) and cadence
Teams
Communities of Practice (CoP)
PO Sync Meetings
Space tools
Dashboard / Software Engineering
Edit
Save for later
Watching
Share
Bridging organisation
Created by Bartolini, Marco, last modified by Nicolas Loubser on Sep 06, 2019
Software organisation in bridging is implemented in order to achieve the goals defined in the bridging vision .
Software development during the bridging phase is organized with the goal to implement an Essential SAFe structure as described at https://www.scaledagileframework.com/essential-safe/ .
The work will be organized in agile teams, coordinating among each other and with the program layer in a series of meetings as described below.
Agile Teams
Coordination
PI planning
PO Synch
Scrum of Scrums
Sprint Planning Cadence
Software Architecture
Other Information
Agile Teams
NCRA Team - AT1
System Team - ST
Architecture Team - SARCH
Button (OSO-UI) Team
SKANET (SKA Networks)
Pulsar Timing (Australia / New Zealand)
ORCA Team

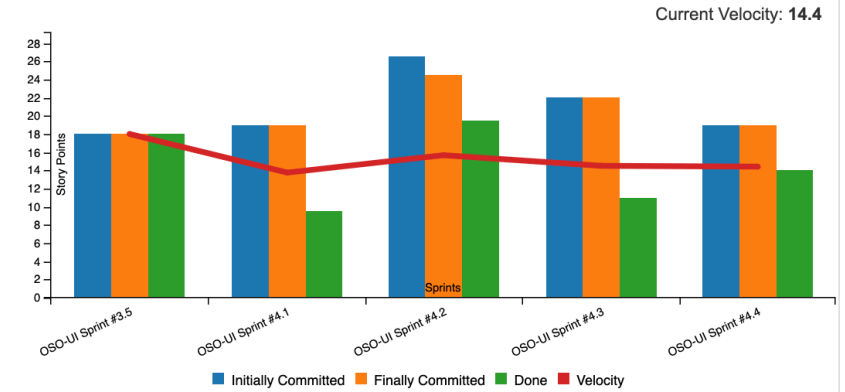
Jira

Buttons Feature and Stories

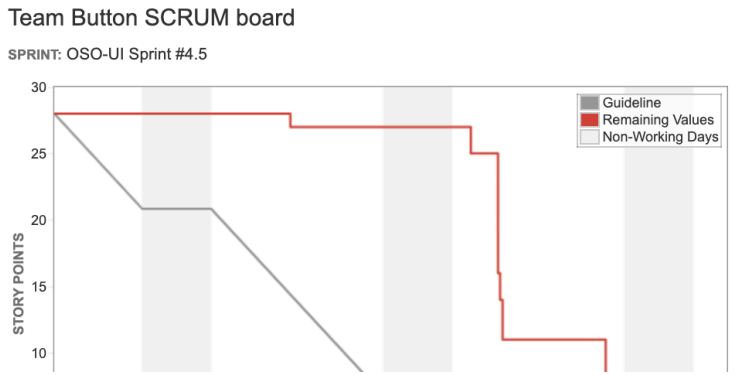
Filter Results: BUTTONS - Active PI Objectives

T	Key	Summary	Due Sprint ↑	Current Confidence	Business value	Actual Value	Links	Stret
	SPO-265	O:Identify profiling tools and learning how to profile Webjive front-end and back-end. KR: Buttons team know how to measure the performance of frameworks similar to Webjive	Sprint 1	2 - ACHIEVED	2	2	~~SP-296~~	
	SPO-276	O:Analyse the Webjive profiling results and identifying the top 2-3 bottlenecks KR: Confirmation on webjive performance and key bottlenecks if any	Sprint 2	2 - ACHIEVED	10	10	~~SP-296~~, ROAM-57	
	SPO-273	O: Measure and analyse the performance of Webjive in order to define the	Sprint 2	2 - ACHIEVED	2	2	~~SP-296~~	

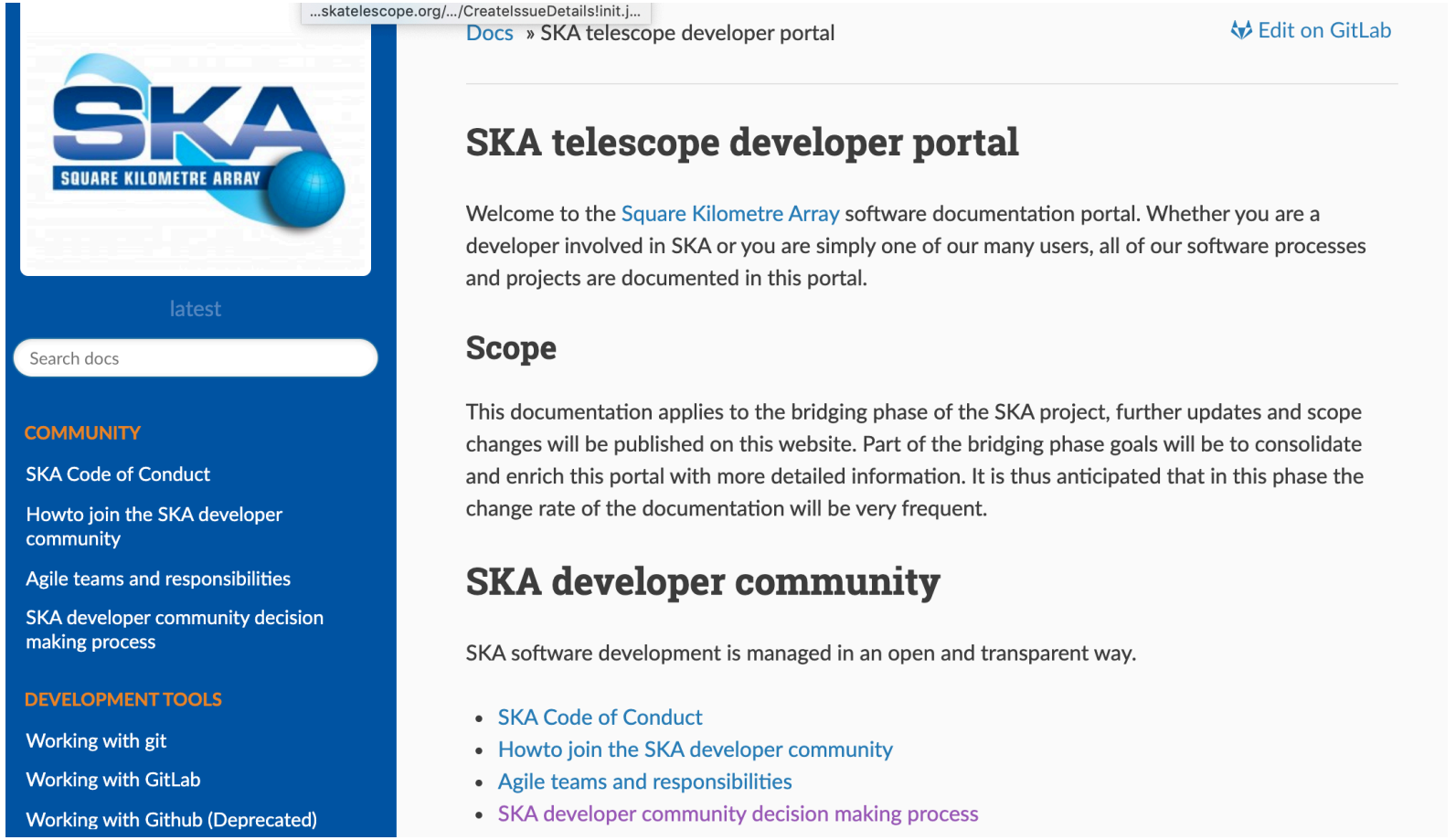
Team Velocity-Gadget



Sprint Burndown Gadget



Developer portal for documentation



Code repository

ska-telescope > tmc-prototype > **Details**

T

tmc-prototype
Project ID: 10749136

Star 0 | Clone

861 Commits | **15** Branches | **5** Tags | **3.9 MB** Files

Setting up CI Pipeline for tmc-prototype.

pipeline running | last build 2019/11/22 09:36:58 | tests failures 0 | tests errors 0 | tests total 38 | lint errors 0 | lint failures 0 | lint tests 0
coverage 84.20%

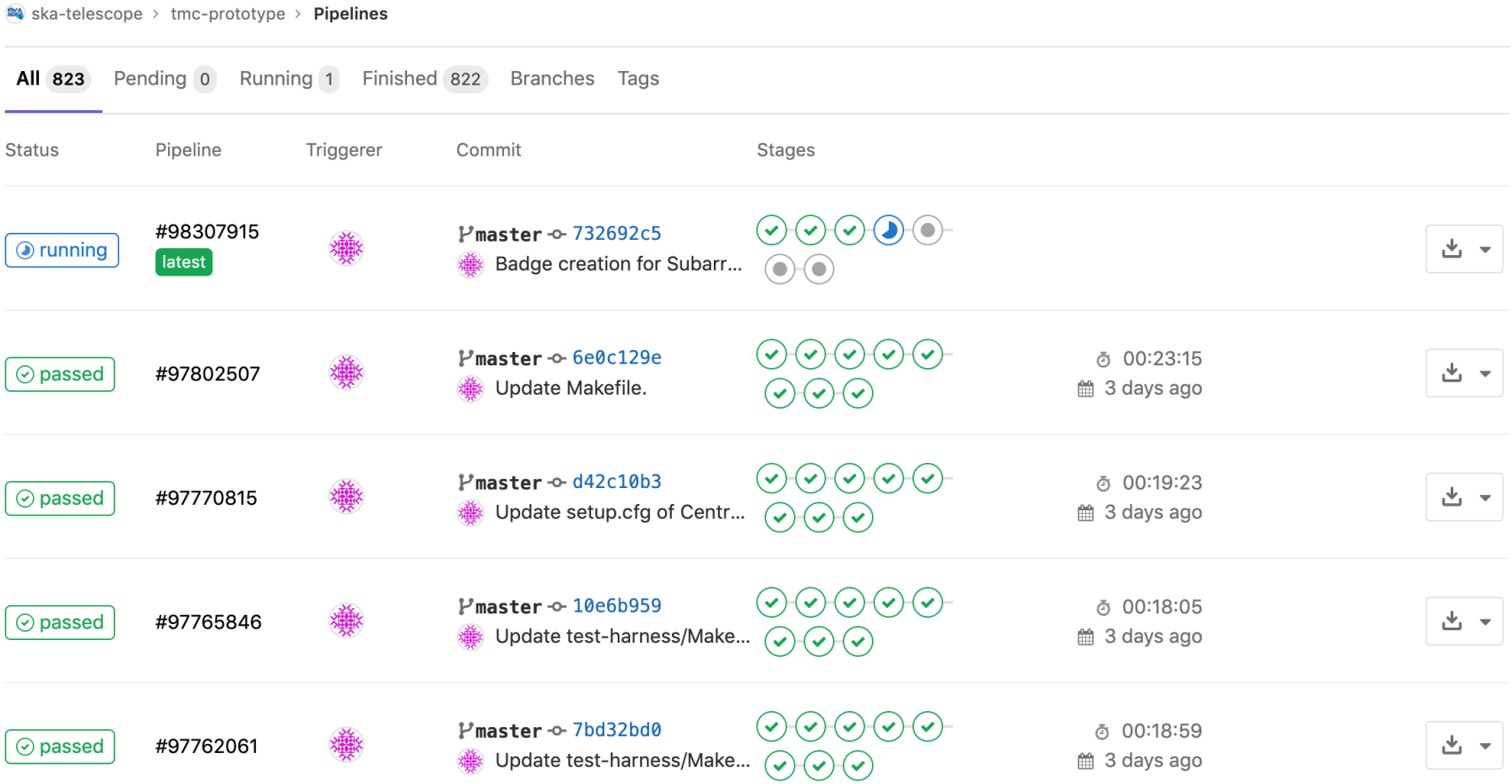
master | tmc-prototype | History | Find file

Badge creation for SubarrayNode. Update setup.cfg file for all the tmc devices.
JayantKumbhar authored 25 minutes ago | 732692c5

README | BSD 3-clause "New" or "Revised" License | CHANGELOG | CI/CD configuration

Name	Last commit	Last update
.make	Merge branch 'code_cleanup' into 'master'	6 days ago
data	story_AT1-358: Commented activity message of Health...	2 weeks ago
docker-compose	story_AT1-377: Update tmc docker compose file to add ...	2 weeks ago
docs	AT1-283: Update a test case of CspSubarrayLeafNode. ...	3 months ago

Test history



Languages

- Supported languages:
  - Python
  - C/C++
  - Javascript
- Also working on:
  - CUDA
    - Requires access to GPU platforms for automation tests
  - VHDL
    - Requires FPGA platforms for automated tests (e.g. PSI environments)
    - Developing infrastructure for automatic comparison of outputs with test vectors

What is it we do?

Process

- Towards the end of one 3 month program increment the program team team comprdevelop goals and features for the next PI.
- Done in consultation with the project directorate and the Telescope Delivery Teams, relevant Product Delivery teams and team Product Owners.
- Features are prioritied based on size, risk/opportunity, estimated value and time criticality.
- Teams select features they want to do at the planning session
- Teams can also add features or their own, with the agreement of the program team.

Demos

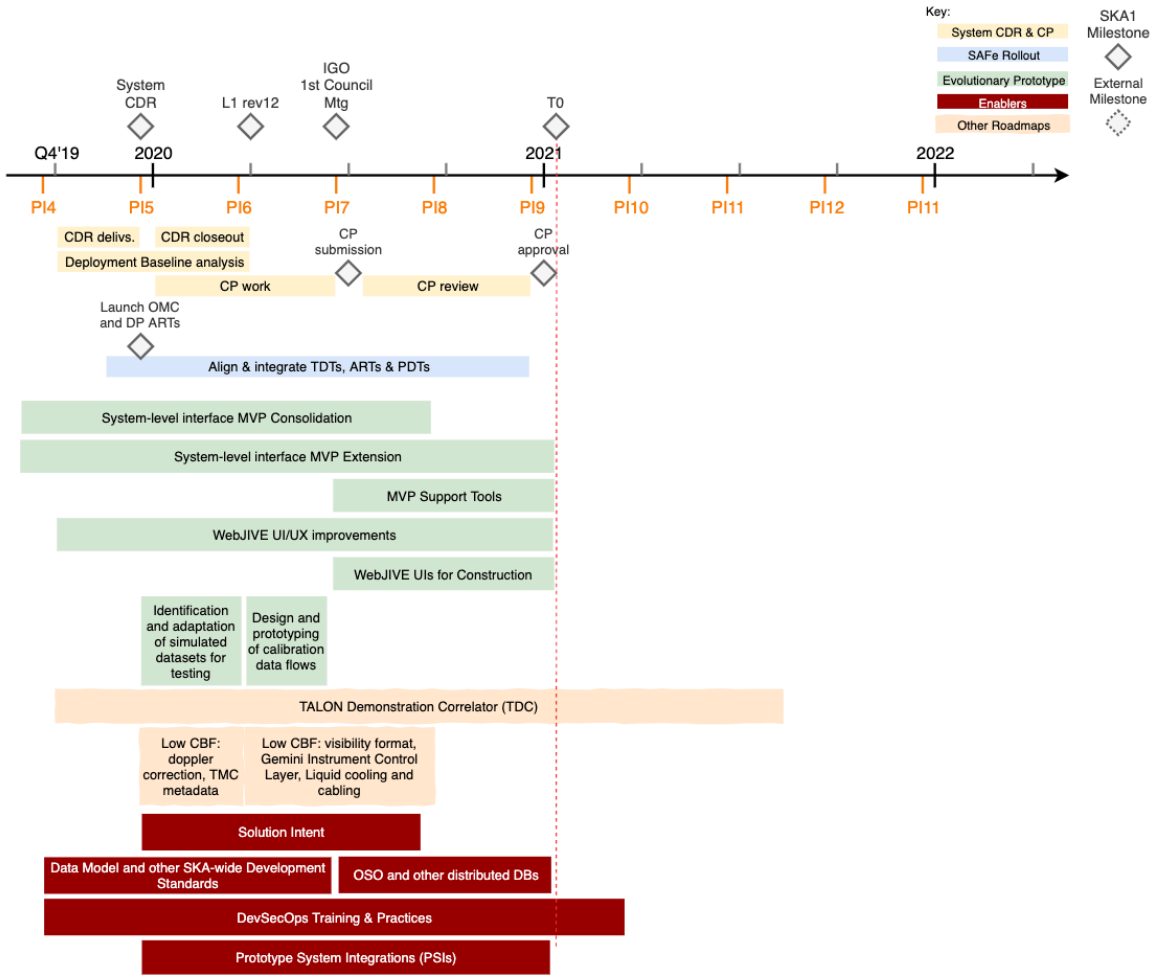
- How we visualize software progress
- Held every two weeks and at PI planning.
- This week's demo is at left - you are welcome to join
  - Thursday from 9-11 UTC
  - https://skatelescope.zoom.us/j/2939114038

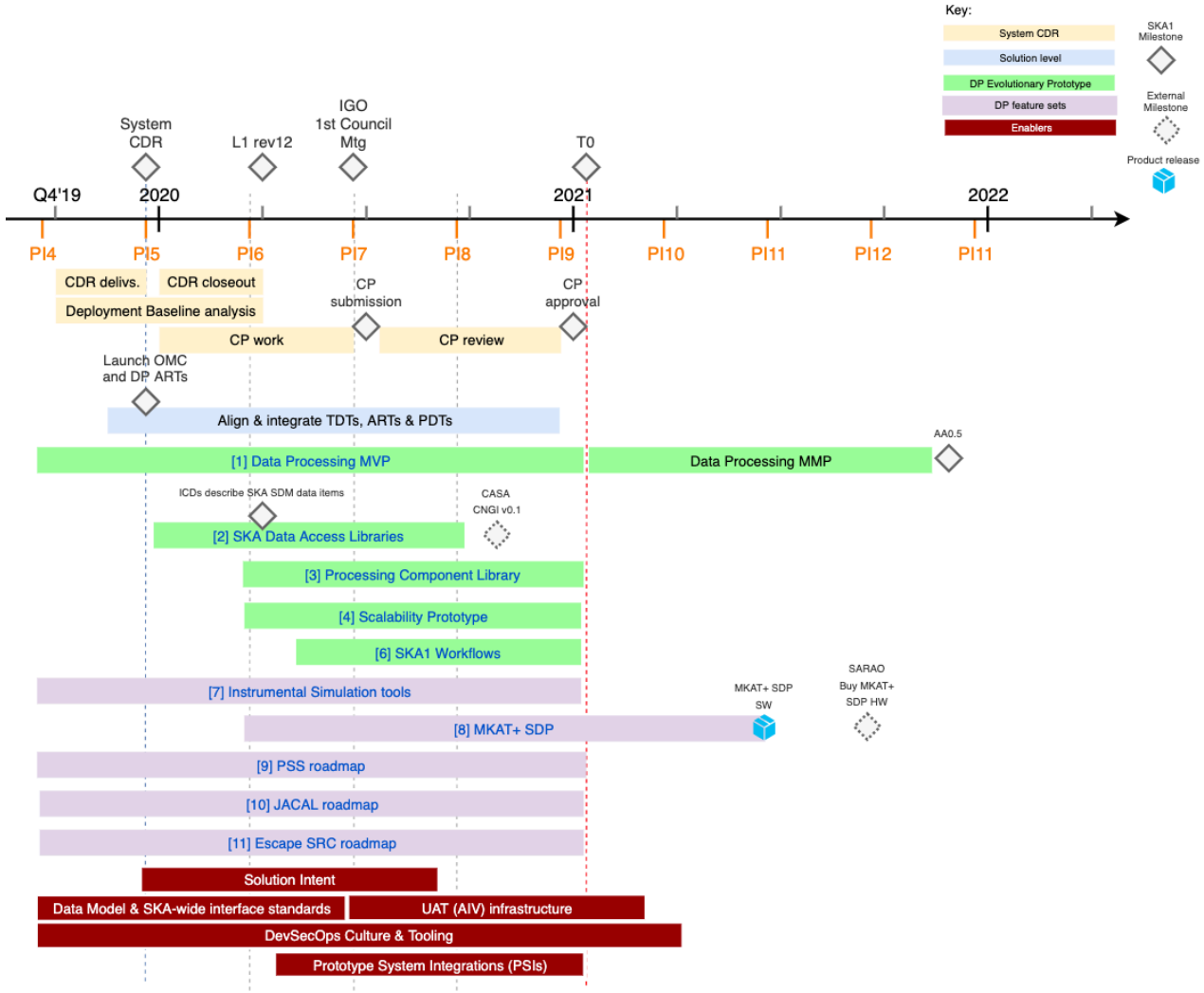
This System Demo will focus on:

- Gain calibration and improved quality, maintainability, reusability
  - SPO-230 - Enhance the imaging pipeline with a gain calibration step to allow integrated imaging/calibration hardware-accelerated testing IN PROGRESS
    - SPO-229 - Refactor the imaging evolutionary prototype into a controllable and modular pipeline to improve quality, maintainability and reusability IN PROGRESS
- SKA1-scale Ingest Pipeline on Summit, and Data Storage
  - SPO-251 - To replay the large scale ingest and imaging SUMMIT demo at the Shanghai SKA Engineering meeting and make the data products available for post processing READY FOR ACCEPTANCE
    - SP-453 - SKA1-scale Ingest Pipeline on Summit RELEASING
    - SP-470 - Data Storage Pilot for Summit Replay RELEASING
- Subarray fault isolation
  - SPO-232 - Investigate the subarray fault isolation capability of the TMC architecture. Key Result: Report capturing TMC architecture's behavior and possible architectural gaps if identified during fault conditions for an going observation IN PROGRESS
    - SP-478 - Investigate sub array isolation: Fault containment IMPLEMENTING
- CI metrics and/or SKAMPI deployment (to be confirmed)
  - SPO-258 - Support teams' adoption of the CI tooling so that metrics can be collected uniformly across all repositories READY FOR ACCEPTANCE
  - SPO-327 - Deploy the SKAMPI prototype into the k8s cluster on E-SKA infrastructure automatically and run smoke test so that each team can confidently deploy new images IN PROGRESS
- Demonstrate Automated Mass Software Deployment
  - SPO-309 - Improve software distribution and upgradability for SKA prototype hardware IN PROGRESS
    - SP-568 - Improve software distribution and upgradability for SKA prototype hardware RELEASING

See: https://confluence.skatelescope.org/display/SE/2019-11-28+System+Demo+%235

Roadmaps


Key:
System CDR & CP
SAFe Rollout
Evolutionary Prototype
Enablers
Other Roadmaps
SKA1 Milestone
External Milestone
System CDR
L1 rev12
IGO 1st Council Mtg
T0
Q4'19
2020
2021
2022
PI4
PI5
PI6
PI7
PI8
PI9
PI10
PI11
PI12
PI11
CDR delivs.
CDR closeout
Deployment Baseline analysis
CP work
CP review
CP submission
CP approval
Launch OMC and DP ARTs
Align & integrate TDTs, ARTs & PDTs
System-level interface MVP Consolidation
System-level interface MVP Extension
MVP Support Tools
WebJIVE UI/UX improvements
WebJIVE UIs for Construction
Identification and adaptation of simulated datasets for testing
Design and prototyping of calibration data flows
TALON Demonstration Correlator (TDC)
Low CBF: doppler correction, TMC metadata
Low CBF: visibility format, Gemini Instrument Control Layer, Liquid cooling and cabling
Solution Intent
Data Model and other SKA-wide Development Standards
OSO and other distributed DBs
DevSecOps Training & Practices
Prototype System Integrations (PSIs)


Key:
System CDR
Solution level
DP Evolutionary Prototype
DP feature sets
Enablers
SKA1 Milestone
External Milestone
Product release
System CDR
L1 rev12
IGO 1st Council Mtg
T0
Q4'19
2020
2021
2022
PI4
PI5
PI6
PI7
PI8
PI9
PI10
PI11
PI12
PI11
CDR delivs.
CDR closeout
Deployment Baseline analysis
CP work
CP review
CP submission
CP approval
Launch OMC and DP ARTs
Align & integrate TDTs, ARTs & PDTs
AA0.5
[1] Data Processing MVP
Data Processing MMP
ICDs describe SKA SDM data items
CASA CNGI v0.1
[2] SKA Data Access Libraries
[3] Processing Component Library
[4] Scalability Prototype
[6] SKA1 Workflows
[7] Instrumental Simulation tools
MKAT+ SDP SW
SARAO Buy MKAT+ SDP HW
[8] MKAT+ SDP
[9] PSS roadmap
[10] JACAL roadmap
[11] Escape SRC roadmap
Solution Intent
Data Model & SKA-wide interface standards
UAT (AIV) infrastructure
DevSecOps Culture & Tooling
Prototype System Integrations (PSIs)

Goals for PI#5

- Shared Goals:
  - Create a culture for sharing information across developers, and create a documentation set for developers of software for SKA systems which is discoverable via the developer portal, is tailored to their needs, and can continually evolve.
  - Promote and improve a culture of DevOps and automated testing, which ultimately supports running all demos from an Integrated Test environment.
  - Demonstrate the ability for users to easily specify behavioural tests for Features and Stories, and trace them to architectural features, components, and requirements in the Solution Intent.
- OMC Goals:
  - Enhance the MVP to make it possible to configure it in order to run multiple scans which support multi-mode observations, across different subarrays, and in a single subarray.
  - Users/developers of TANGO systems are able to create and persist their own WebJive dashboards, and run demos from them.
  - Demonstrate the Observability and Testability of the OMC MVP
- DP ART Goals:
  - Provide enough tooling to run simple batch processing blocks in the DP MVP
  - Create an initial prototype for a SKA Data model library to be used within the DP MVP
  - Gradually incorporate simulation models/tools into a reusable toolset run from the standard test/integration environment

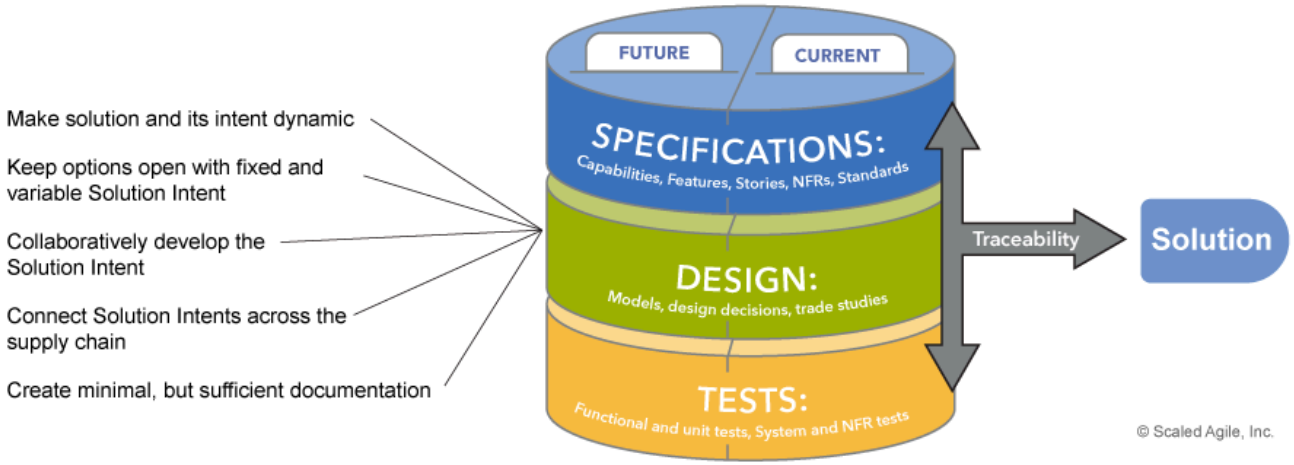
Keeping the train on the tracks

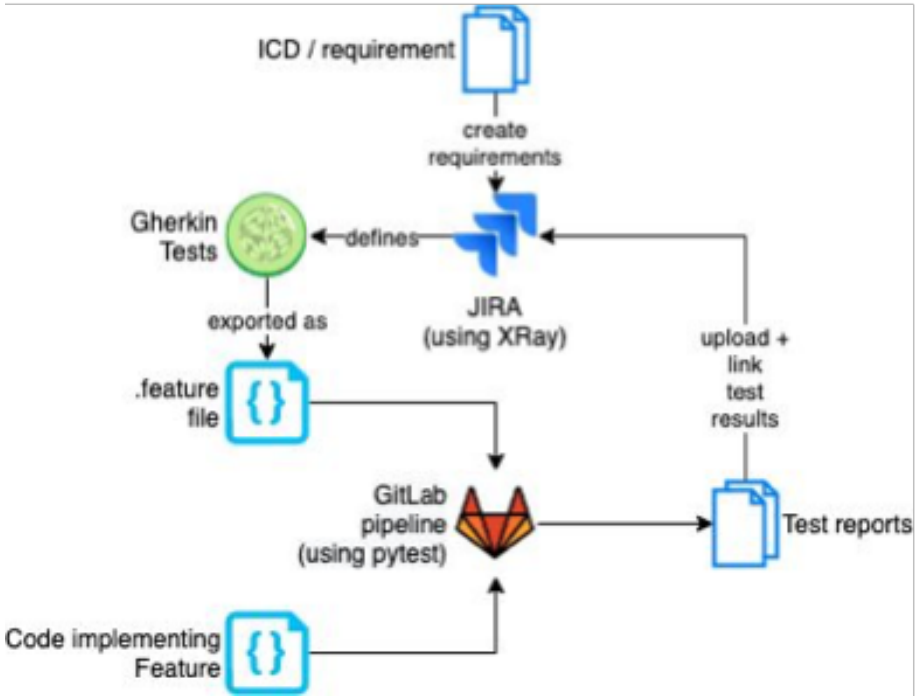
- Weekly:
  - PO synch meeting focusing on content delivery.
  - Scrum of Scrums focusing on process, impediments etc.
- These also act as communities of practice in these areas.

- Communities of practice:
  - Testing
  - Tango
  - Feature Owners
    - Largely office staff responsible for accepting content.
    - Somewhat sporadic meetings
  - Architecture
    - Still in development

Solution intent

- SAFe® term for all system engineering artefacts.
  - Dynamic database reflecting current state and history
  - Working to link it into the automation tools





Retrospective

Generating Value

- Any agile process requires a clear and well understood concept of value
  - Value in a large science project is sometimes difficult to judge
- Looking at setting up a permanent operations room based on simulations
  - To allow even better visualization of software delivered.
- Planning to use precursors and pathfinders as ways to help in bridging
  - Developing a usable SKA SDP for MeerKAT+ extension
  - Similar goal with ASKAP and Rialto project
  - Would be great if we could do this with LOFAR as well
  - PST and PSS prototypes (MeerTrap) being used on MeerKAT.
- I would like to extend this into construction and so align a lot of radio astronomy software with SKA.
  - We are just the first with the scaling problem, but others will encounter it soon.
  - Will requires extra resource from outside the project, but should be a win-win.

Highs and lows

- Highs:
  - Delivery performance of teams
  - Behaviour/acceptance of teams
  - Openness of community
    - Great support from Persistent in India
    - Great help from Deutsche Bank
    - Great support from commercial tooling
    - Observers turning up to our PI planning events.
  - FPGA community fit
  - Adoption by others
    - SKA ESCAPEES SRC team
  - Building a great team.
    - Just offered the DevOps position to a great candidate.
  - Developing relationships
    - All the teams, but also others like AstroPy, NRAO, Max IV synchrotron, Tango community

- Lows
  - Still quality gaps – DoD not uniformly enforced.
  - Some teams haven't turned up yet
  - Some may find the culture difficult
  - We are still working on aligning the TDT's
    - Forcing the cadence is difficult
  - Some countries still having difficulty visualizing how it works in construction.

Find out more:

- Bridging confluence:
  - https://confluence.skatelescope.org/display/SE/Bridging+organisation
- Developer portal:
  - https://developer.skatelescope.org
- GitLab organization:
  - https://gitlab.com/ska-telescope
- SKA Jira:
  - https://jira.skatelescope.org/
  - Lots of links on the Confluence Dashboard pages:
    - https://confluence.skatelescope.org/display/SE/Dashboards
- Slack:
  - https://skasoftware.slack.com