Project Managing the SKA

Peter Baillie

12th February 2016

Computing for SKA Colloquium 2016

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SKA Low Correlator & Beamformer

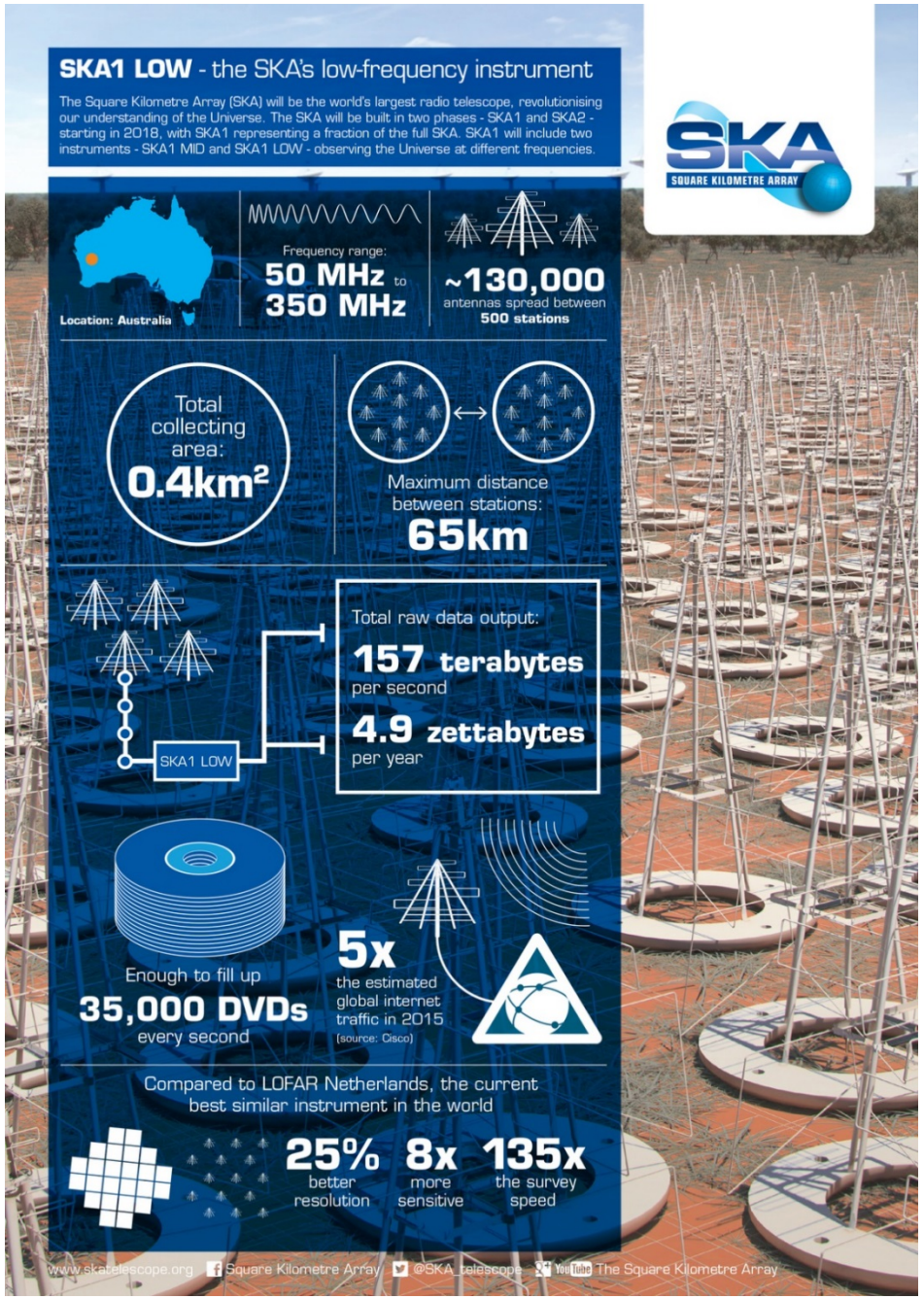
AUT UNIVERSITY
TE WĀNANGA ARONUI O TAMAKI MAKAU RAU

ASTRON

CSIRO

SKA1-Low: Western Australia

Low.CBF sub-element



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LOW.CBF – what's happened recently?

Re-baseling by SKAO early 2015 lead to changes in consortium deliverables: CSIRO won to lead the Low.CBF

Three significant meetings:

- **Jul'15: Edinburgh – CSIRO meet ASTRON to form**
- **for new collaboration, understand approaches**
- **Sep'15: San Francisco – Kickoff / Icebreaker**
  - **Engineers meet and options tabled**
- **Nov'15: Sydney – Downselect / Delta-PDR**
  - **Major design decisions made**
  - **Commenced writing documentation for Delta-PDR submisssion**
  - **for end-Jan'16**

Work Breakdown structure for pre-construction 2016

- **A Work Breakdown Structure has been defined down to its lowest level work packages**
- **The highest level is represented by eight streams:**
  - **Project Management**
  - **System Engineering**
  - **Design Documentation**
  - **Hardware Development**
  - **Firmware Development**
  - **Monitoring and Control**
  - **Prototype Testing**
  - **System Modelling**

Current LOW CBF Team

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CSIRO

- Grant Hampson
- John Bunton
- Andrew Brown
- John Tuthill
- Tim Bateman
- Daniel George
- Yuqing Chen
- Mia Baquarian

ASTRON

- Andre Gunst
- Hajee Pepping
- Eric Kooistra
- Agnes Mika
- Koos Kegel
- Gijs Schoonderbeek

NZ

- Peter Baillie
- David Wilson

CSIRO (ex-Curtin)

- Steve Ord

Low.CBF team


CENTRAL SIGNAL PROCESSOR
Low CBF Team (and reports)
Systems Engineering CSP
Marco Caiazzo
Engineering Project Manager (CSP & LFAA)
Philip Gibbs
CSP Project Manager
David Stevens
Domain Specialist (Signal Processing)
Wallace Turner
Group Leader
John Tuthill
Work Package Lead
Grant Hampson
DSP, System Engineering
Steve Ord
Architect
John Bunton
Group Leader
Andre Gunst
Project Manager
Peter Baillie
Software Developer
Andrew Ensor
Management
Agnes Mika
Firmware Engineering
Hajee Pepping
Firmware Engineering
Eric Kooistra
System Engineering
Koos Kegel
Hardware / Firmware
Andrew Brown
Modelling
David Wilson
Hardware / Firmware
Gijs Schoonderbeek
Firmware / Testing
Leon Hiemstra
Firmware / Software
Daniel George
Firmware / Software
Tim Bateman
System Engineering
Yuqing Chen

Current LOW CBF Team resource allocation

	ASTRON	CSIRO	NZA-AUT
Hardware	176.0	44.0	0.0
Firmware	374.0	308.0	0.0
Software	66.0	44.0	0.0
Management	44.0	0.0	176.0
System Engineering	66.0	110.0	0.0
DSP	88.0	198.0	0.0
QA review	0.0	0.0	22.0
Modelling	0.0	0.0	33.0
System Design	198.0	176.0	0.0
	1012	**880**	**231**
FTE	**4.6**	**4**	**1.05**
FTE Total	**9.95**		

Resource Gaps

LOW CBF LMC Software

- **Tango/GUI layers skill low**

CSP LOW Scientist required now

- **Steve Ord left**
  - **Some possible options being investigated**

CSP LOW System Engineer

- **Steve Ord departing; replaced by John Bunton, is coming up to speed**

LOW CBF Meetings and Workshops

- **23 Feb to 4 Mar: Delta-PDR & Prototyping Workshop**
  - **Delta-PDR review at ASTRON with SKAO present**
  - **Requirements review**
  - **Ver A - Board discussion - Components, software training, downselects**
  - **Progress on Firmware Demos & Framework**

- **TIM#5 – April 2016**

- **Further meetings before CDR submission (Sept/Oct) is likely**

Internal Communications: Low.CBF

- **Weekly team meetings:**
  - **Covering both Management and Technical issues, scheduled between CSIRO / NZ / ASTRON**
  - **Videoconferences using Vidyo**
- **Face-to-face meetings (physical): CSIRO / NZ / ASTRON team**
  - **Topical, one to two week long working meetings with a frequency of 3 to 4 months**
- **Visits:**
  - **Some CSIRO and ASTRON team members will be stationed for longer periods at the partner institutes to work on specific topics and exchange knowledge**

Time zones!

- **Europe difficult, further complicated by NZ**
- **7pm Sydney (most home)**
  9pm Auckland (its late)
  9am Dwingeloo (family time)
- **Limits amount of communications time**
  - **Only telecon – prefer videocon**
  - **May require a once per month 4 hour videocon interaction**

UTC-time	Sydney	Auckland	Amsterdam
Friday, 13 November 2015 at 11:00:00	Fri 10:00 PM *	Midnight Fri-Sat *	Fri 12:00 Noon
Friday, 13 November 2015 at 12:00:00	Fri 11:00 PM *	Sat 1:00 AM *	Fri 1:00 PM
Friday, 13 November 2015 at 13:00:00	Midnight Fri-Sat *	Sat 2:00 AM *	Fri 2:00 PM
Friday, 13 November 2015 at 14:00:00	Sat 1:00 AM *	Sat 3:00 AM *	Fri 3:00 PM
Friday, 13 November 2015 at 15:00:00	Sat 2:00 AM *	Sat 4:00 AM *	Fri 4:00 PM
Friday, 13 November 2015 at 16:00:00	Sat 3:00 AM *	Sat 5:00 AM *	Fri 5:00 PM
Friday, 13 November 2015 at 17:00:00	Sat 4:00 AM *	Sat 6:00 AM *	Fri 6:00 PM
Friday, 13 November 2015 at 18:00:00	Sat 5:00 AM *	Sat 7:00 AM *	Fri 7:00 PM
Friday, 13 November 2015 at 19:00:00	Sat 6:00 AM *	Sat 8:00 AM *	Fri 8:00 PM
Friday, 13 November 2015 at 20:00:00	Sat 7:00 AM *	Sat 9:00 AM *	Fri 9:00 PM
Friday, 13 November 2015 at 21:00:00	Sat 8:00 AM *	Sat 10:00 AM *	Fri 10:00 PM
Friday, 13 November 2015 at 22:00:00	Sat 9:00 AM *	Sat 11:00 AM *	Fri 11:00 PM
Friday, 13 November 2015 at 23:00:00	Sat 10:00 AM *	Sat 12:00 Noon *	Midnight Fri-Sat
Saturday, 14 November 2015 at 00:00:00	Sat 11:00 AM *	Sat 1:00 PM *	Sat 1:00 AM
Saturday, 14 November 2015 at 01:00:00	Sat 12:00 Noon *	Sat 2:00 PM *	Sat 2:00 AM
Saturday, 14 November 2015 at 02:00:00	Sat 1:00 PM *	Sat 3:00 PM *	Sat 3:00 AM
Saturday, 14 November 2015 at 03:00:00	Sat 2:00 PM *	Sat 4:00 PM *	Sat 4:00 AM
Saturday, 14 November 2015 at 04:00:00	Sat 3:00 PM *	Sat 5:00 PM *	Sat 5:00 AM
Saturday, 14 November 2015 at 05:00:00	Sat 4:00 PM *	Sat 6:00 PM *	Sat 6:00 AM
Saturday, 14 November 2015 at 06:00:00	Sat 5:00 PM *	Sat 7:00 PM *	Sat 7:00 AM
Saturday, 14 November 2015 at 07:00:00	Sat 6:00 PM *	Sat 8:00 PM *	Sat 8:00 AM
Saturday, 14 November 2015 at 08:00:00	Sat 7:00 PM *	Sat 9:00 PM *	Sat 9:00 AM
Saturday, 14 November 2015 at 09:00:00	Sat 8:00 PM *	Sat 10:00 PM *	Sat 10:00 AM
Saturday, 14 November 2015 at 10:00:00	Sat 9:00 PM *	Sat 11:00 PM *	Sat 11:00 AM
Saturday, 14 November 2015 at 11:00:00	Sat 10:00 PM *	Midnight Sat-Sun *	Sat 12:00 Noon
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2016 Prototyping Activities

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New hardware

- **Version A of the node**

FW Demos

- **Working demonstrations of PTP, 100GbE, Optics, HMC, partial reconfiguration**

FW Framework

- **Common library, M&C system, register file, board support package**

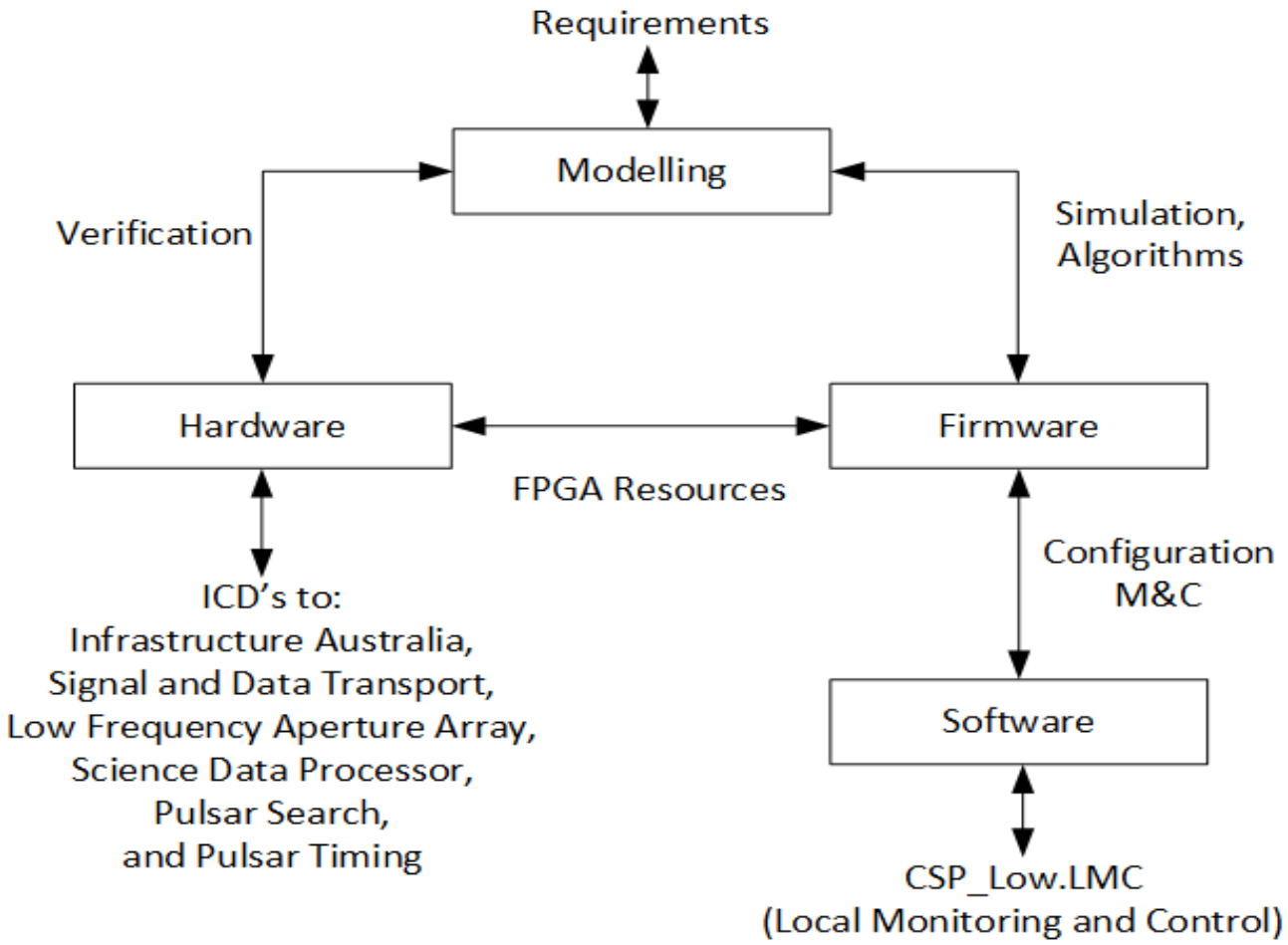
Signal Processing

- **Resource estimates, some development of high risk parts**

Version A Board

- **April – June 2016, Andrew Brown @ ASTRON**
- **Gijs and Andrew – co-design and implementation**
- **Name is TBD**

Interaction between Prototyping Activities



Prototyping De-Risk Matrix

Prototyping Activity	Risks Addressed	TPM benchmark
Signal processing model	Changing requirements (#101), resources not available (#405), model to large, takes too long to simulate (#154)	Completeness of test vector generator, models, result analyzer
Signal processing firmware	Changing requirements (#101,#109), resources unavailable (#405), insufficient time (#307), changing ICDs (#102)	Completeness of resource estimation for each model and estimation error %
Interface firmware	Devices don't meet specifications (#134,#135), difficult bugs in hardware (#149), delay of hardware (#133)	Completeness of interface firmware modules, as well as interface performance
Framework firmware	Resources to establish FW framework (#302), configuration management (#418)	Completeness of build environment and design integration
Hardware processing node	Availability of parts (#133), availability of resources (#405), collaboration doesn't work (#415)	Completeness of the board components, schematic and layout
Hardware packaging	MTBF of cooling solution (#128), adequate cooling of electronics (#141)	Completeness of the solution, cooling performance, relative cost of solution, power requirements
Software Monitor and Control	Time to implement (#405), partial reconfig issues (#135), distribution of knowledge (#302)	Completeness of solution, transfer rate, reliability of communications
LMC Software	Experienced resources not available (#302), changing TM/LMC requirements (#102), Tango not capable (#145), SW developed independently (#126)	Completeness of solution, data transfer rate, level of functionality

Risks

CSIRO /ASTRON System Engineers' own the technical risks, categorising and rationalising into the Risk Register

Team reviewed risks and risk register updated.

List of over 40 risks have been compiled from various sources

- **Risks identified in key document deliverable for Delta-PDR: Prototype Plan.**

Project Data and Tracking

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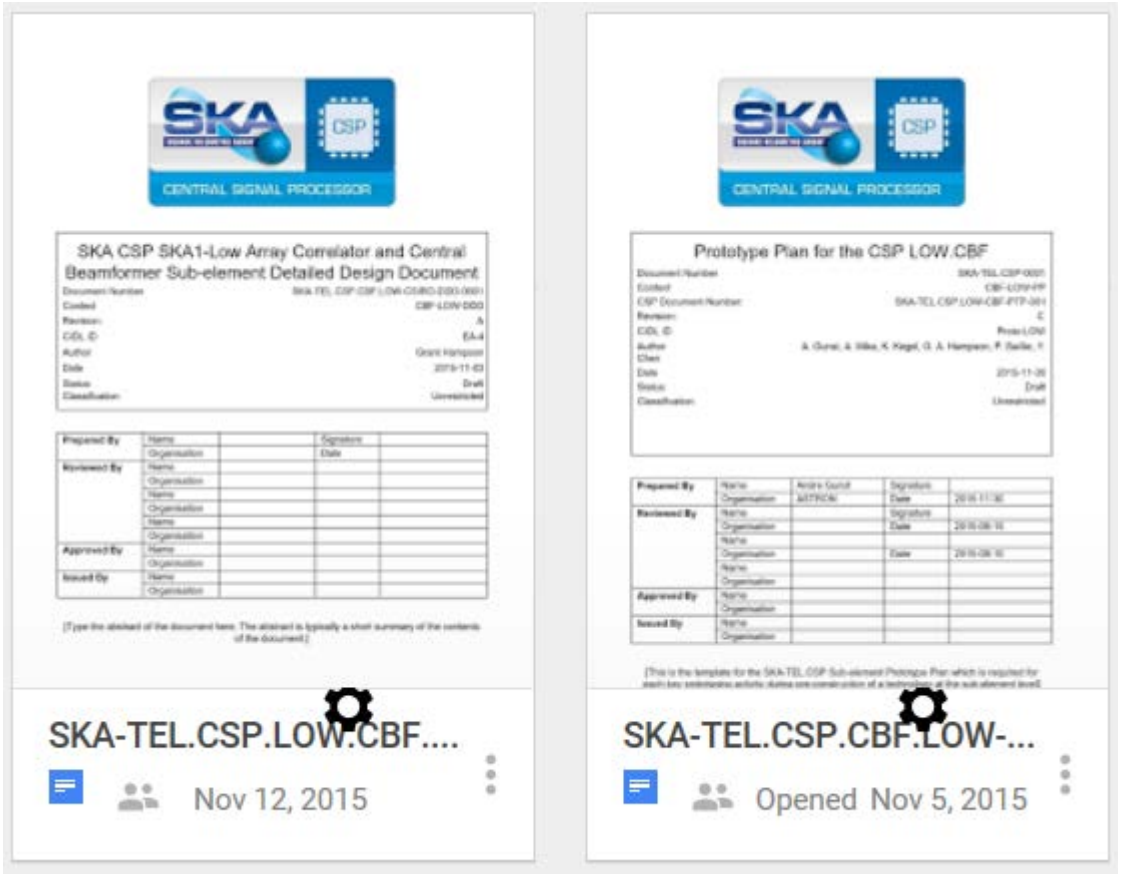
Docushare
- **All documentation**

Google docs
- **Prototype plan and DDD**

Redmine
- **Issue and task tracking**
- **Divided by work package**



Subversion
- **Captures firmware code / MATLAB models code/files accessed via Redmine**
- **All software and hardware source files**

Deliverables to Delta-PDR

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Low CBF Delta-PDR Deliverables Schedule															
		Week ending													
	Deliverables	6-Nov	13-Nov	20-Nov	27-Nov	4-Dec	11-Dec	18-Dec	25-Dec	1-Jan	8-Jan	15-Jan	22-Jan	29-Jan	29/01/201
EA-1	SKA CSP SKA1-Low Array Correlator Sub-element Requirement Specification (EA-1)								Delta-PDR Draft 95% complete	Australia / NZ holidays	Australia / NZ holidays			Delta-PDR completed submisison	100%
EA-7	SKA CSP SKA1-Low Array Correlator Sub-element Signal Processing Matlab Model (EA-7)														50%
EA-4	SKA CSP SKA1-Low Array Correlator Sub-element Detailed Design Document (EA-4); includes ILS/RAMS spreadsheet (Low CSP_LRU_Level_FMECA_Analysis)				20%	40%	60%	80%							50%
PM-1 LOW CBF	SKA CSP SKA1-Low Correlator and Beamformer Sub-element Project Management Plan														100%
EA-5	SKA CSP SKA1-Low Correlator and Beamformer Sub-element Development Plan														50%
Proto-LOW	Prototype Plan for LOW CBF				20%	40%	60%	80%							100%
EA-6	SKA CSP SKA1-Low Correlator Sub-element Development and Operational Cost spreadsheet (EA-6)														50%
	Compliance / Traceability Matrix														100%
	Risk Register														100%
	Technical Performance Measures (TPMs)														50%
	Contributions/Reviews complete														
SE-6a	Interface Control Document CSP to INFRA (SE-6a)														100%
SE-7b	Interface Control Document LMC to CSP Sub-elements (SE-7b)														100%
SE-7e	Interface Control Document Low Correlator and Beamformer to Low PST (SE-7e)														100%
SE-7f	Interface Control Document Low Correlator and Beamformer to Low PSS (SE-7f)														100%
	Interface Control Document Low Correlator and Beamformer to SDP														100%
	Interface Control Document Low Correlator and Beamformer to SaDT														100%
	Interface Control Document LFAA to Low Correlator and Beamformer														100%

Resouce Assignment Matrix for Delta-PDR Deliverables

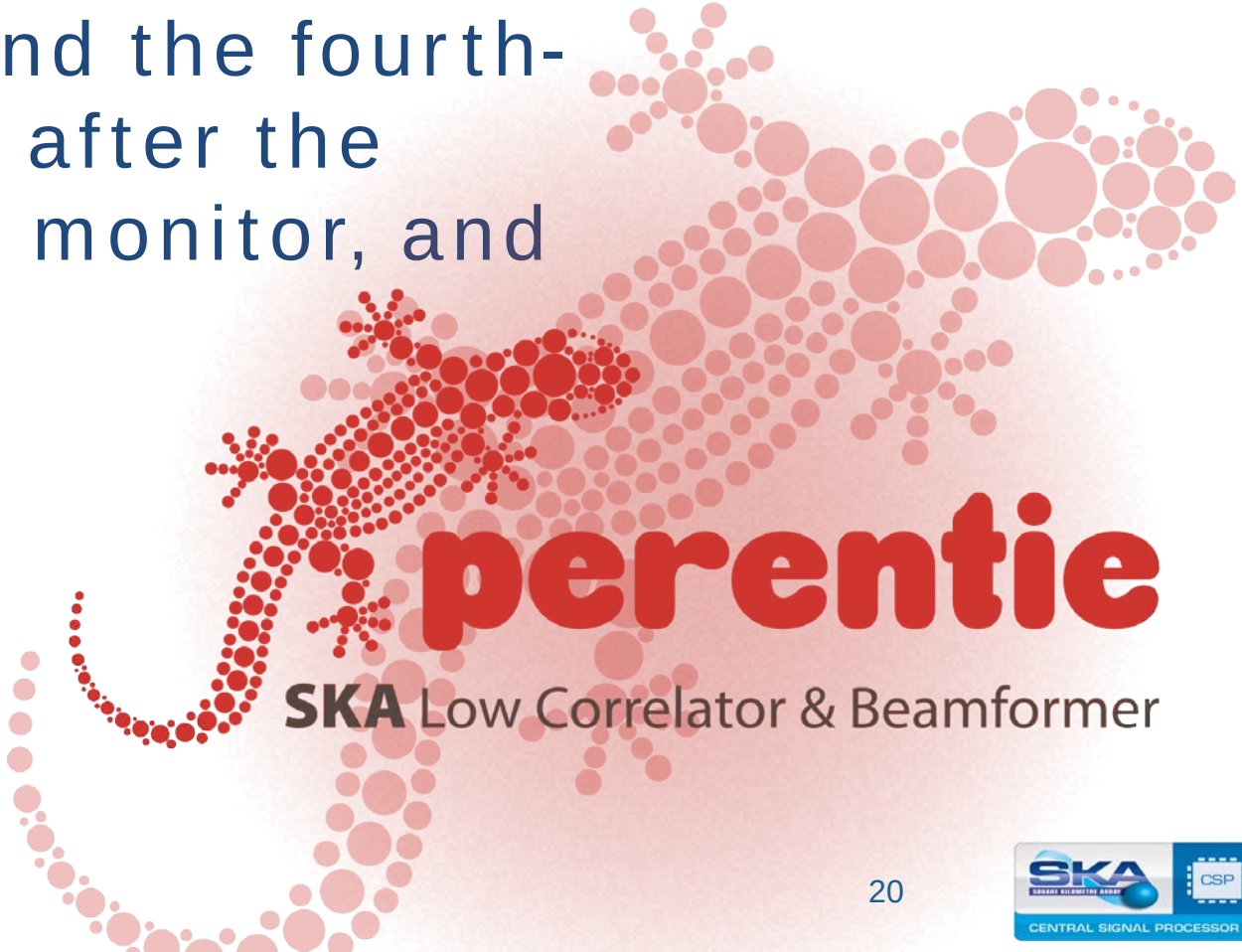
CIDL	Deliverable document	Grant Hampson	Andre Gunst	John Bunton	Steve Ord	Peter Baillie	Agnes Mika	John Tuthill	Andrew Brown	Hajee Pepping	Eric Kooistra	Gijs Schoonderbeek	Koos Kegel	Yuqing Chen	David Wilson
EA-1	SKA CSP SKA1-Low Array Correlator Sub-element Requirement Specification (EA-1)			R	A							R	R		
EA-7	SKA CSP SKA1-Low Array Correlator Sub-element Signal Processing Matlab Model (EA-7)			R	A									R	
EA-4	SKA CSP SKA1-Low Array Correlator Sub-element Detailed Design Document (EA-4); includes ILS/RAMS spreadsheet (Low CSP_LRU_Level_FMECA_Analysis)	A	R	R	R	R	R					R	R		
PM-1 LOW CBF	SKA CSP SKA1-Low Correlator and Beamformer Sub-element Project Management Plan					A	R								
EA-5	SKA CSP SKA1-Low Correlator and Beamformer Sub-element Development Plan		R	A			R					R	R		
Proto-LOW	Prototype Plan for LOW CBF	A	R			R	R					R	R		
EA-6	SKA CSP SKA1-Low Correlator Sub-element Development and Operational Cost spreadsheet (EA-6)		R	A			R					R	R		
	Compliance / Traceability Matrix				A							R	R		
	Risk Register			R								R	A		
	Technical Performance Measures (TPMs)	R		R				R	R	R		A	R		
	Contributions required														
SE-6a	Interface Control Document CSP to INFRA (SE-6a)	R		A											
SE-7b	Interface Control Document LMC to CSP Sub-elements (SE-7b)							A		R					
SE-7e	Interface Control Document Low Correlator and Beamformer to Low			R	A										
SE-7f	Interface Control Document Low Correlator and Beamformer to Low			R	A										
SE-ICD-001 Low	Interface Control Document Low Correlator and Beamformer to SDP			R			A								
SE-ICD-001	Interface Control Document Low Correlator and Beamformer to SaDT	R		A											
LFAA-SE-1C	Interface Control Document LFAA to Low Correlator and Beamformer		A	R	R					R					

SKA1-Mid.CBF

SKA-Low.CBF

The Perentie is the largest monitor lizard or goanna native to Australia, and the fourth-largest living lizard on earth, after the Komodo dragon, Asian water monitor, and the crocodile monitor.

Aimed to fit with local indigenous environment



Questions?