



SDP Memo: SDP Load List

delta-PDR

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Version	Date of Issue	Prepared by	Comments
	2016-01-29	F Graser	Submitted to SKAO (for
C	2016-03-24	F Graser	delta-PDR submission

ORGANISATION DETAILS

Name	Science Data Processor Consortium
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SKA LOAD LIST

Consortium Name: Science Data Processor
 Unit Description:
 Location:
 Option No.:

Template Rev.: C
 Template Date: 2014-05-16
 Document Number: SKA-TEL-SDP-0000078
 Revision: C
 Date: 24-03-2016
 Status:

No.	Tag No.	Device Name / Description	Ratings		Power Consumption										Source of Data or Estimate		
			Supply Type (AC/DC)	Voltage (Vrms)	Power (W)	Power Factor	Peak Instantaneous (<5 sec)	Max Short Term Ave (5 sec - 10min)	Long Term Ave (>30 min)	Long Term Ave Minus Uncertainty (%)	Long Term Ave Plus Uncertainty (%)	Unit Emergency Power Consumption (W)	Central Emergency Power Consumption (W)	Max. Short Term Duty Cycle (% Over 24h)		Average Thermal Power Dissipation (W)	
1		Compute Islands															
2		Fast Buffer Storage (per PB)			252	1	504	252	252	-25	25	252	0	5	252	Design Calculation & estimation base	
3		Management Island							46380			46380	0		46380		
4		Network							10207			23413	0		10207		
5		Delivery Hardware							3506			3506	0		3506		
6		Long Term Storage (per PB)							12			584	0		12		
7		Medium Performance Buffer (per PB)							346			584	0		346		
8																	
9																	
10																	
11	The SKA load list for SDP is a 2 level hierarchy. The top level for each telescope is made up of 2nd level units that are generic, except for the network. This spreadsheet uses the SDP costed hardware concept as the basis for estimating the power consumption and therefore uses the SDP cost model as input as well as the values calculated in the SDP performance model.																
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20	The master version of this spreadsheet: https://docs.google.com/spreadsheets/d/1q5QEC_DRoviH5S03yLd1t0Kn0X_gPz0UjPcQ-YFsOZ0/																
21																	
22																	
23																	
24																	
25																	
26	total racks																
UNIT MARGIN					N/A	N/A	N/A	N/A	N/A	N/A	N/A				N/A		
Totals:									4108354			4209340	0		4108354		

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emergency Power Consumption (W)	Central Emergency Power Consumption (W)	Central Emergency Power Consumption (W)
#####	4034520	#####	0
5544	5544	5544	0
92760	92760	92760	0
10207	23413	10207	0
3506	3506	3506	0
674	32093	674	0
10368	17505	10368	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

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SKA LOAD LIST

Consortium Name: Science Data Processor
 Unit Description:
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 Option No.:

Template Rev.: C
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 Revision: C
 Date: 24-03-2016
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No.	Tag No.	Device Name / Description	we r Ma turi ty Lev el	Qty	Rack s Requ ired	Ratings			Power Consumption							Source of Data or Estimate		
						Supply Type (AC/DC)	Voltage (Vrms)	Power (W)	Power Factor	Peak Instanta neous (<5 sec (VA)	Max Short Term Ave (5 sec - 10min) (W)	Long Term Ave (>30 min) (W)	Long Term Ave Minus Uncerta inty (%)	Long Term Ave Plus Uncerta inty (%)	Unit Emergen cy Power Consum ption (W)		Central Emerge ncy Power Consum ption (W)	Max. Short Term Duty Cycle (% Over 24h)
1		Compute Islands		145	145						47444			48030	0		47444	
2		Fast Buffer Storage (per PB)		22				252	1	504	252	-25	25	252	0	5	252	Design Calculation & estimation base
3		Management Island		2	2						46380			46380	0		46380	
4		Network		1	6.2						19319			48913	0		19319	
5		Delivery Hardware		1	0.2						3506			3506	0		3506	
6		Long Term Storage (per PB)		170	11.4						12			584	0		12	
7		Medium Performance Buffer (per PB)		100	6.7						346			584	0		346	
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26		total racks			172													
UNIT MARGIN						N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A			
Totals:												7037151			7272618	0		7037151

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emerge ncy Power Consum ption (W)	Central Emerge ncy Power Consum ption (W)	Central Emerge ncy Power Consum ption (W)
6879380	#####	#####	0
5544	5544	5544	0
92760	92760	92760	0
19319	48913	19319	0
3506	3506	3506	0
2084	99195	2084	0
34559	58350	34559	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

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SKA LOAD LIST

Template Rev.: C

Template Date: 2014-05-16

Consortium Name: Science Data Processor
 Unit Description: Compute Island
 Location:
 Option No.:

Document Number:
 Revision:
 Date:
 Status:

No.	Tag No.	Device Name / Description	we r Ma turi ty Lev el	Qt y	Rac s Re qui red	Ratings			Power Consumption							Source of Data or Estimate			
						Supply Type (AC/DC)	Voltage (Vrms)	Power (W)	Power Factor	Peak Instantaneous (<5 sec)	Max Short Term Ave (5 sec - 10min)	Long Term Ave (>30 min)	Long Term Ave Minus Uncertainty (%)	Long Term Ave Plus Uncertainty (%)	Unit Emergency Consumption (W)		Central Emergency Consumption (W)	Max. Short Term Duty Cycle (% Over 24h)	Average Thermal Power Dissipation (W)
2nd level breakdown of a compute island.																			
1		Compute Node		56	1	AC	230	810	1	810	810	810	-25	10	810	0	0	810	Design Calculation based on datasheet
2		Archive Gateway node		2		AC	230	500	1	250	250	250	-25	10	250	0	0	250	Design Calculation based on datasheet
3		Service Node		2		AC	230	500	1	250	250	250	-25	10	250	0	0	250	Design Calculation based on datasheet
4		Remote Service Node		1		AC	230	500	1	250	250	250	-25	10	250	0	0	250	Design Calculation based on datasheet
5		ToR Management Network Switch 56 port		3		AC	230	167	1	167	167	167	-10	10	167	0	0	167	datasheet
6		ToR Data Transport Switch 36 Port 40Gb		2		AC	230	100	1	100	100	80	-10	10	340	0	10	80	datasheet
		ToR Inter Island Switch 36 Port 40Gb		2		AC	230	100	1	100	100	80	-10	10	340	0	10	80	datasheet
7		ToR Archive ToR Switch 56 Port 10Gb		1		AC	230	239	1	239	239	154	-10	10	220	0	10	154	datasheet
8		Power Distribution Unit		4		AC	400	5	1	5	5	5	-25	25	5	0	0	5	guess, no data available. Worst case
9																			
10		Does not include the fast buffer storage as the size of the buffer is specific to the telescope. Fast buffer storage is shown at the top level in order to keep the comp																	
11																			
12																			
13																			
14																			
15																			
16																			
17																			
18																			
19																			
20																			
21																			
22																			
23																			
24																			
25																			
26																			
		UNIT MARGIN				N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Totals:													47444			48030	0		47444

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emergency Power Consumption (W)	Central Emergency Power Consumption (W)	Central Emergency Power Consumption (W)
45360	45360	45360	0
500	500	500	0
500	500	500	0
250	250	250	0
500	500	500	0
160	680	160	0
154	220	154	0
20	20	20	0
0.0	0.0	0.0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

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SKA LOAD LIST

Template Rev.: C
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Consortium Name: Science Data Processor
 Unit Description: Compute Island
 Location: AUS
 Option No.:

Document Number:
 Revision:
 Date:
 Status:

No.	Tag No.	Device			Ratings				Power Consumption							Source of Data or Estimate	
		Name / Description	Weight	Racks	Supply Type	Voltage (Vrms)	Power (W)	Power Factor	Peak Instantaneous (<5 sec)	Max Short Term Ave (5 sec - 10min)	Long Term Ave (>30 min)	Long Term Ave Minus Uncertainty (%)	Long Term Ave Plus Uncertainty (%)	Unit Emergency Consumption (W)	Central Emergency Consumption (W)		Max. Short Term Duty Cycle (% Over 24h)
1		Compute Node	56	1	AC	230	810	1	810	810	-25	10	810	0	0	810	Design Calculation based on datasheet
3		Service Node	2		AC	230	500	1	250	250	-25	10	250	0	0	250	Design Calculation based on datasheet
5		ToR Management Network Switch 56 port	3		AC	230	167	1	167	167	-10	10	167	0	0	167	datasheet
8		Power Distribution Unit	4		AC	400	5	1	5	5	-25	25	5	0	0	5	guess, no data available. Worst case
10																	
11																	
12																	
13																	
14																	
15																	
16																	
17																	
18																	
19																	
20																	
21																	
22																	
23																	
24																	
25																	
26																	
UNIT MARGIN					N/A	N/A	N/A	N/A	N/A	N/A		N/A	N/A			N/A	
Totals:										46380			46380	0		46380	

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emergency Consumption (W)	Central Emergency Consumption (W)	Central Emergency Consumption (W)
45360	45360	45360	0
500	500	500	0
500	500	500	0
20	20	20	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

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DOCUMENT HISTORY			
Rev	Date	ECN	Comments



SKA LOAD LIST

Template Rev.: C
 Template Date: 2014-05-16

Consortium Name: Science Data Processor
 Unit Description: Networking Equipment
 Location:
 Option No.:

Document Number:
 Revision:
 Date:
 Status:

No.	Tag No.	Device Name / Description	Ratings			Power Consumption											Source of Data or Estimate	
			we r Ma turi ty Lev el	Qt y	Rac ks Re qui red	Supply Type (AC/DC)	Voltage (Vrms)	Power (W)	Power Factor	Peak Instanta neous (<5 sec - 10min) (VA)	Max Short Term Ave (5 sec - 10min) (W)	Long Term Ave (>30 min) (W)	Long Term Ave Minus Uncerta inty (%)	Long Term Ave Plus Uncerta inty (%)	Unit Emerge ncy Power Consum ption (W)	Central Emerge ncy Power Consum ption (W)		Max. Short Term Duty Cycle (% Over 24h)
1																		
2		Data Transport switches 32 port 100GbE	48	1.1	AC	230	100	1	100	100	80	-10	10	340	0	10	80	datasheet
3		Archive Network switches (64 port) - 1	11	0.3	AC	230	239	1	239	239	154	-10	10	220	0	10	154	datasheet
5		low latency interconnect switches (648 port sp	1	0.7	AC	230	1000	1	1000	1000	1000	-10	10	1000	0	10	1000	datasheet
6		Management Core switches - 10GbE	1	0.4	AC	230	3673	1	3673	3673	3673	-10	10	3673	0	10	3673	datasheet (Force10 E600i)
7																		
8																		
9																		
10																		
11																		
12																		
13																		
14																		
15																		
16																		
17																		
18																		
19																		
20																		
21																		
22																		
23																		
24																		
25																		
26		total racks		2.5														
UNIT MARGIN					N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				N/A	
Totals:										10207				23413	0		10207	

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emergency Power Consumption (W)	Central Emergency Power Consumption (W)	Central Emergency Power Consumption (W)
0	0	0	0
3840	16320	3840	0
1694	2420	1694	0
1000	1000	1000	0
3673	3673	3673	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

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SKA LOAD LIST

Template Rev.: C
 Template Date: 2014-05-16

Consortium Name: Science Data Processor
 Unit Description: Networking Equipment
 Location:
 Option No.:

Document Number:
 Revision:
 Date:
 Status:

No.	Tag No.	Device Name / Description	Maturity Level	Qty	Racks	Ratings				Power Consumption								Source of Data or Estimate		
						Supply Type (AC/DC)	Voltage (Vrms)	Power (W)	Power Factor	Peak Instantaneous (<5 sec)	Max Short Term Ave (5 sec - 10min)	Long Term Ave (>30 min)	Long Term Ave Minus Uncertainty (%)	Long Term Ave Plus Uncertainty (%)	Unit Emergency Consumption (W)	Central Emergency Consumption (W)	Max. Short Term Duty Cycle (% Over 24h)		Average Thermal Power Dissipation (W)	
1																				
2		Data Transport switches 32 port 100GbE	109	2.6	AC	230	100	1	100	100	80	-10	10	340	0	10	80	datasheet		
3		Archive Network switches (64 port) - 1	19	0.5	AC	230	239	1	239	239	154	-10	10	220	0	10	154	datasheet		
5		low latency interconnect switches (648 port sp	4	2.8	AC	230	1000	1	1000	1000	1000	-10	10	1000	0	10	1000	datasheet		
6		Management Core switches - 10GbE	1	0.4	AC	230	3673	1	3673	3673	3673	-10	10	3673	0	10	3673	datasheet (Force10 E600i)		
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26		total racks		6.2																
UNIT MARGIN						N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			N/A				
Totals:													19319			48913	0		19319	

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emergency Power Consumption (W)	Central Emergency Power Consumption (W)	Central Emergency Power Consumption (W)
0	0	0	0
8720	37060	8720	0
2926	4180	2926	0
4000	4000	4000	0
3673	3673	3673	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

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SKA LOAD LIST

Template Rev.: C
 Template Date: 2014-05-16

Consortium Name: Science Data Processor
 Unit Description: Long Term Storage
 Location:
 Option No.:

Document Number:
 Revision:
 Date:
 Status:

Device				Ratings					Power Consumption								Source of Data or Estimate			
No.	Tag No.	Name / Description	we r Ma turity Level	Qty	Racks Requ ired	Supply Type (AC/DC)	Voltage (Vrms)	Power (W)	Power Factor	Peak Instanta neous (<5 sec (VA)	Max Short Term Ave (5 sec - 10min) (W)	Long Term Ave (>30 min) (W)	Long Term Ave Minus Uncerta inty (%)	Long Term Ave Plus Uncerta inty (%)	Unit Emerge ncy Power Consum ption (W)	Central Emerge ncy Power Consum ption (W)	Max. Short Term Duty Cycle (% Over 24h)	Average Thermal Power Dissipati on (W)	Source of Data or Estimate	
1		MAID Storage pod (per PB)		0.673	0.067	AC	230	850	1		850	5	-10	100	850	0	15	5	Design Calculation	
2		ToR Archive ToR Switch 56 Port 10Gb		0.034		AC	230	239	1	239	239	154	-10	10	220	0	15	154	datasheet	
3		ToR Management Network Switch 56 port		0.020		AC	230	167	1	167	167	167	-10	10	167	0	0	167	datasheet	
4		Power Distribution Unit		0.067		AC	400	5	1	5	5	5	-25	25	5	0	100	5		
5																				
6																				
7		This sheet is calculated per PB. 10 storage pods fit into 1 rack. storage capacity per pod =33*45=1,485 TB																		
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
UNIT MARGIN						N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				N/A		
Totals:																				
											12.256				583.5	0		12.256		

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emergency Power Consumption (W)	Central Emergency Power Consumption (W)	Central Emergency Power Consumption (W)
3.367	572.39	3.367	0
5.1852	7.4074	5.1852	0
3.367	3.367	3.367	0
0.3367	0.3367	0.3367	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

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SKA LOAD LIST

Template Rev.: C
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Consortium Name: Science Data Processor
 Unit Description: Long Term Storage
 Location:
 Option No.:

Document Number:
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 Date:
 Status:

Device				Ratings				Power Consumption										Source of Data or Estimate		
No.	Tag No.	Name / Description	we r Ma turi ty Lev el	Qty	Racks Requi red	Supply Type (AC/DC)	Voltage (Vrms)	Power (W)	Power Factor	Peak Instanta neous (<5 sec (VA)	Max Short Term Ave (5 sec - 10min) (W)	Long Term Ave (>30 min) (W)	Long Term Ave Minus Uncerta inty (%)	Long Term Ave Plus Uncerta inty (%)	Unit Emerge ncy Power Consum ption (W)	Central Emerge ncy Power Consum ption (W)	Max. Short Term Duty Cycle (% Over 24h)	Average Thermal Power Dissipati on (W)	Source of Data or Estimate	
1		Storage pod		0.673	0.067	AC	230	850	1		850	500	-25	25	850	0	10	500	Design Calculation	
2		ToR Archive ToR Switch 56 Port 10Gb		0.034		AC	230	239	1	239	239	154	-10	10	220	0	10	154	datasheet	
3		ToR Management Network Switch 56 port		0.020		AC	230	167	1	167	167	167	-10	10	167	0	0	167	datasheet	
4		Power Distribution Unit		0.067		AC	400	5	1	5	5	5	-25	25	5	0	100	5		
5																				
6																				
7		This sheet is calculated per storage pod. 10 storage pods fit into 1 rack. storage capacity per pod =33*45=1,485 TB																		
8																				
9																				
10																				
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UNIT MARGIN						N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A				N/A		
Totals:																				
											345.59	345.59	0	345.59						

Unit Totals Calculation			
Long Term Ave (>30 min) (W)	Unit Emergency Power Consumption (W)	Central Emergency Power Consumption (W)	Central Emergency Power Consumption (W)
336.7	572.39	336.7	0
5.1852	7.4074	5.1852	0
3.367	3.367	3.367	0
0.3367	0.3367	0.3367	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0
0	0	0	0

Name	Designation	Affiliation	Date	Signature
Authorized by:				
Owned by:				
Approved by:				
Released by:				

DOCUMENT HISTORY			
Rev	Date	ECN	Comments

