The background of the slide is a dark, reddish-brown field filled with numerous small, bright stars of varying sizes and colors, creating a starry night sky effect. A few larger, more prominent stars are visible, particularly one in the upper left quadrant.

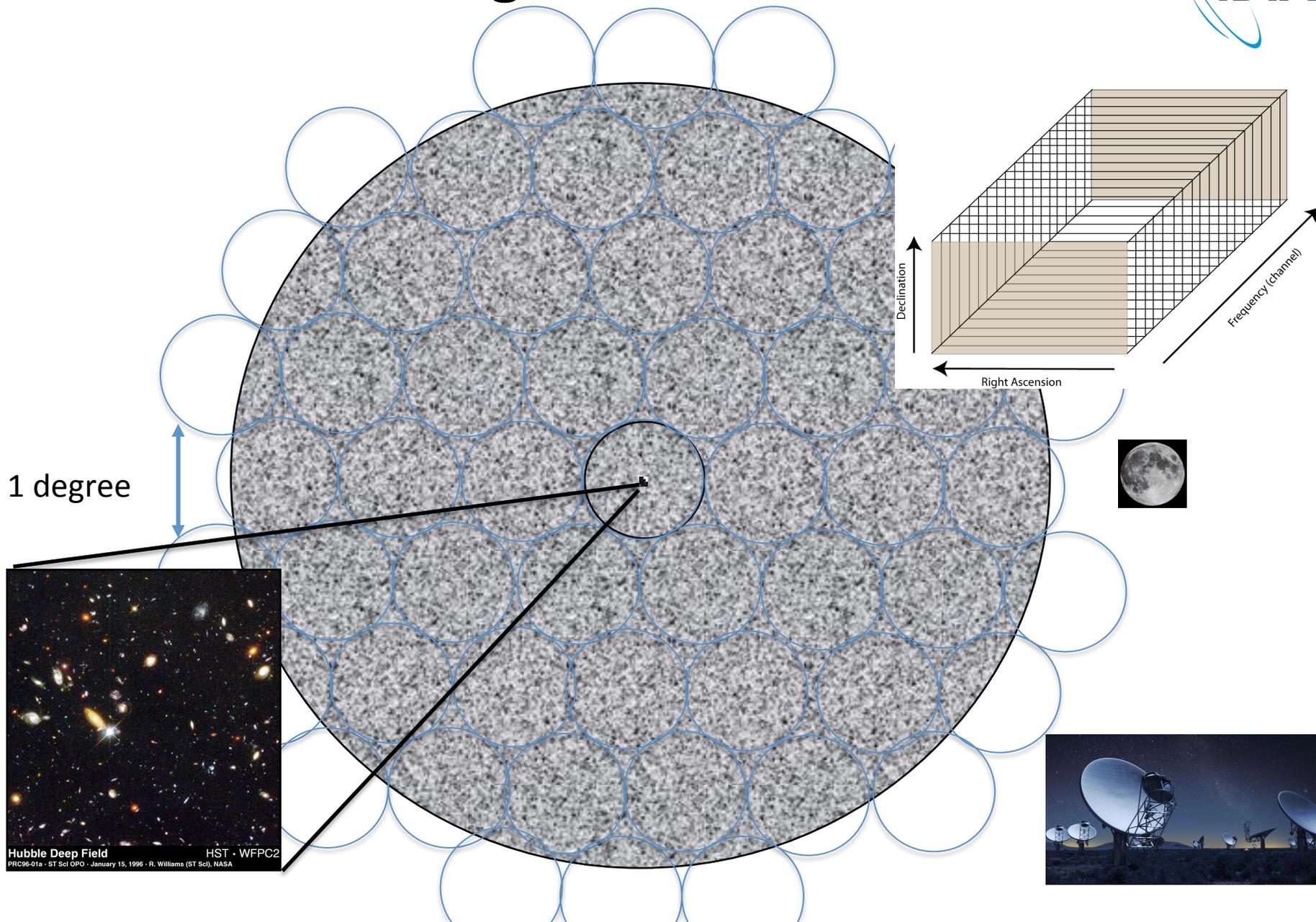
Visual Analytics of Remote Big Data in Astronomy

Russ Taylor

SKA Research Chair

University of Cape Town and
University of the Western Cape

SKA Radio Image

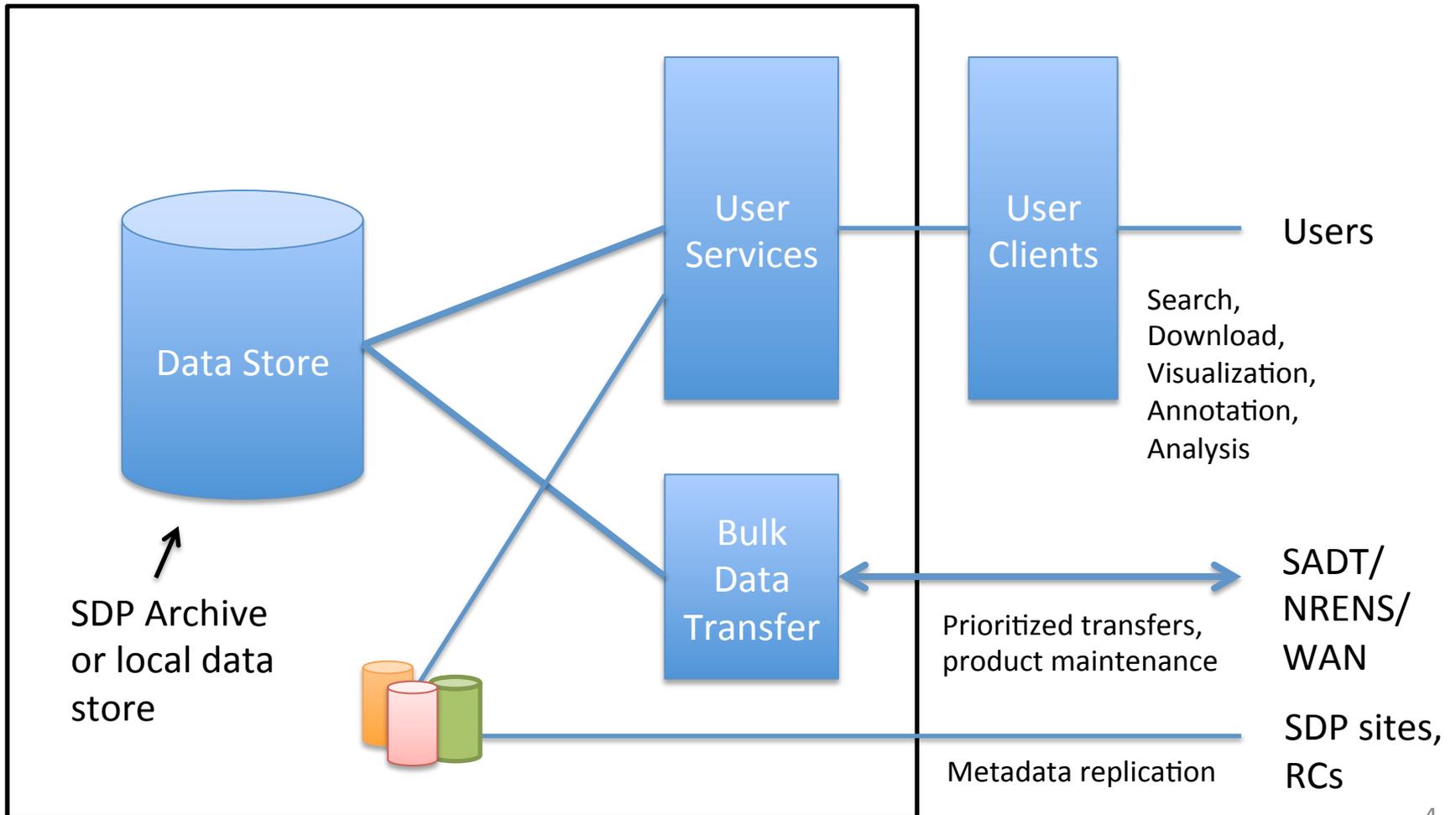


MeerKAT Image Data Sizes

- MIGHTEE
 - Channel width ~ 1 MHz, 1000 channels per band, 2" pixels
 - $(\alpha, \delta, \nu, S) \sim 1$ TB per band
- LADUMA
 - Channel width ~ 2 KHz, 350,000 channels for 770 MHz
 - $(\alpha, \delta, \nu) \sim 6$ TB per band per sq deg.

SKA Data Delivery Design Architecture

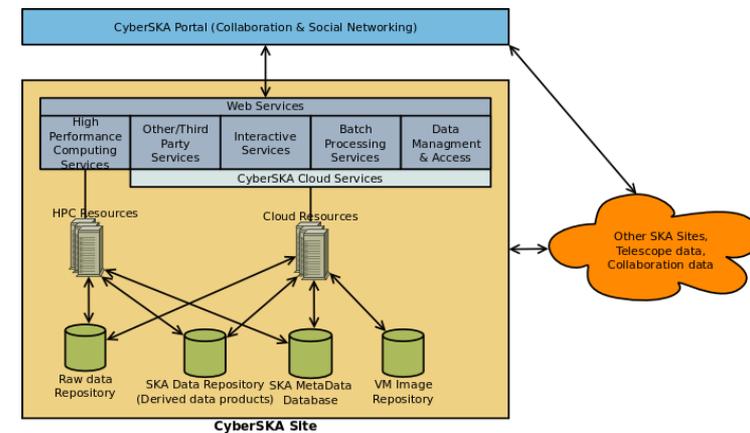
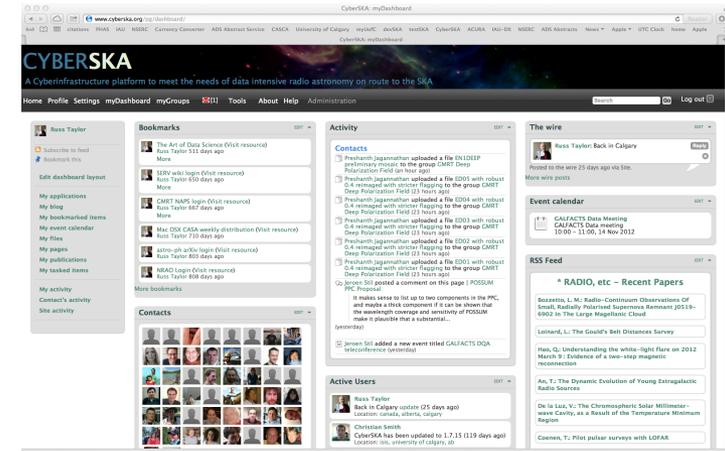
SKA Regional Science Data Centre



CyberSKA: Big Data Collaboration Cloud



- Collaboration
 - Portal built on social networking and sharing technologies
- Data Management
 - Scalable collaborative access, sharing and searching of distributed (BIG) data sets
- Data Processing
 - Framework for executing algorithms and workflows
- Data Visualization and Visual analytics
 - On-line interactive visualization of remote Big Data
- Third Party Applications
 - Community driven site with common API



CyberSKA Usage

- 600 members from around the world
- ~70 project “groups”



CyberSKA User Dashboard



Shared with me - Google Drive PHISCC 2016, Cape Town, February 1-3, 2016... Google Drive - Access Denied https://www.secure.sterkinetor.co.za/payment... Online Banking CyberSKA: Dashboard

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Add widgets

- Blogs
- Bookmarks
- Contacts
- Event Calendar
- Files
- Pages
- Publication
- Tasks
- Wire posts

The Wire

By Russ Taylor just now

Back in Cape Town @ PHISCC meeting

More wire posts

Active Users

- Russ Taylor
- Preshanth Jagannathan
- Chifu Moua

Contacts

Files

More files

Activity

Preshanth Jagannathan is now a contact of Eric Murphy 5 days ago

Indy Leclercq updated a page Summary of make-up Observing Needs in the group GALFACTS Consortium 12 days ago

Roberto Ricci updated a page Summary of make-up Observing Needs in the group GALFACTS Consortium 34 days ago

Roberto Ricci updated a page Summary of make-up Observing Needs in the group GALFACTS Consortium 35 days ago

Indy Leclercq updated a page Summary of make-up Observing Needs in the group GALFACTS Consortium 36 days ago

Indy Leclercq updated a page Summary of make-up Observing Needs in the group GALFACTS Consortium 36 days ago

Christopher John Salter updated a page Summary of make-up Observing Needs in the group GALFACTS Consortium 44 days ago

Bradley Frank is now a contact of Russ Taylor 45 days ago

Bradley Frank joined the group MIGHTEE 45 days ago

Bradley Frank joined the site 45 days ago

Event calendar

PHISCC 2016
12:30, 1 Feb 2016 - 13:30, 2 Feb 2016
Meeting of the HI survey projects

Pages

Comments on Sukhpreet's thesis
Last updated 435 days ago by Russ Taylor

sukhpreet, thesis

Chapter 3. The main content of this chapter should be a description of the conversion of the raw data streams to true Stokes image cubes in units of Kelvin. I will send a scanned annotated copy of chapter 3. Just a couple of broad...

S1 Calibrator run
Last updated 725 days ago by Russ Taylor

Solution with Sukhpreet's U, V leakage applied Number of channels = 3760 Reference Frequency = 1524969984.000000 Processing source S1106-008 Mean flux density over the band = 1.005 Jy Mean...

Draft DQA3 Release notes
Last updated 722 days ago by Russ Taylor

galfacts, dqa3

The third data release for the Data Quality Analysis team occurred on 23 January 2014 and consists initially of I, Q, U and V band 0 data for the S1 field. An average band image as well as image cubes are released for each Stokes I,...

Output of SAD source finding challenge
Last updated 775 days ago by Russ Taylor Comments (1)

source finding, challenge

AIPS SAD was run on the three challenge data images. The run was carried out by Larry. Due to the limit on the number of sources that can be fit, Larry split the challenge 1 and 2 images into east and west portions and ran SAD...

SKA1 Key science in cosmic magnetism
Last updated 810 days ago by Russ Taylor Comments (7)

ska1, science

Hi all, Here is a first cut at characterizing core cosmic magnetism science goals in the SKA1 era. It is based on the submission from a few individuals over the past few days, folded in with my own thoughts. So to some degree this...

Comments on Preshanth's thesis
Last updated 896 days ago by Russ Taylor Comments (2)

Introduction This still needs a lot of work. It needs substantial fleshing out. Note that you need to recall that your thesis will be read by a non-astronomer. So you cannot assume the reader is familiar with astronomical jargon...

More pages

Bookmarks

CyberSKA Groups (projects)



cyberska.org

CyberSKA: All groups | www.ast.uct.ac.za/~sarbylyth/PHIS... | ADASS - Google Drive | CyberSKA FitsViewer | Dropbox - CARTAv0.5.mp4 | CyberSKA: All groups

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Groups

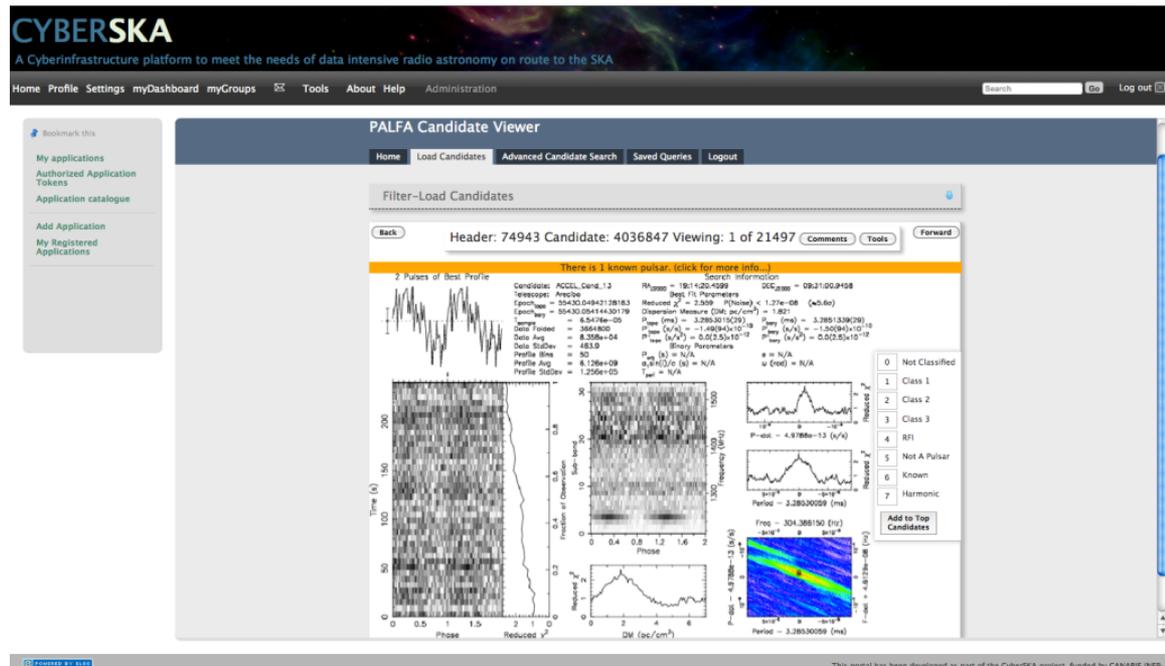
Groups Create a new group

Newest My groups **Popular** Latest discussion Open Closed Alphabetical Suggested

- PALFA Survey Group**
PALFA Survey Collaboration closed group 110 members Make featured
Subgroups:
PALFA Executive Committee (PEC)
Tier 1
- NRC, MDA, STFC-ATC led SKA.TEL.CSP Consortium** closed group 96 members Make featured
Subgroups:
SKA1-SURVEY Hybrid PIP
SKA1-LOW 'Hardware' PIP
- GBNCC**
Green Bank North Celestial Cap Survey (GBNCC) for radio pulsars. open group 76 members Make featured
- GALFACTS Consortium**
GALFACTS Consortium Group closed group 60 members Make featured
Subgroups:
GALFACTS Early Science
GALFACTS Data Quality Team
GALFACTS Pipeline
GALFACTS Management
GALFACTS Technical Team
- SKA Digital Platform Study Group** closed group 52 members Make featured
Subgroups:
PowerMX platform working group
- Cyber SKA**
Collaborators on the CANARIE Cyber SKA Project closed group 44 members Make featured
Subgroups:
CyberSKA Sys Admins
Cyber SKA Executive
- GALFACTS Technical Team**
GALFACTS project technical development team closed group 34 members Make featured
Parent Group: GALFACTS Consortium
- Tier 1** open group 34 members Make featured

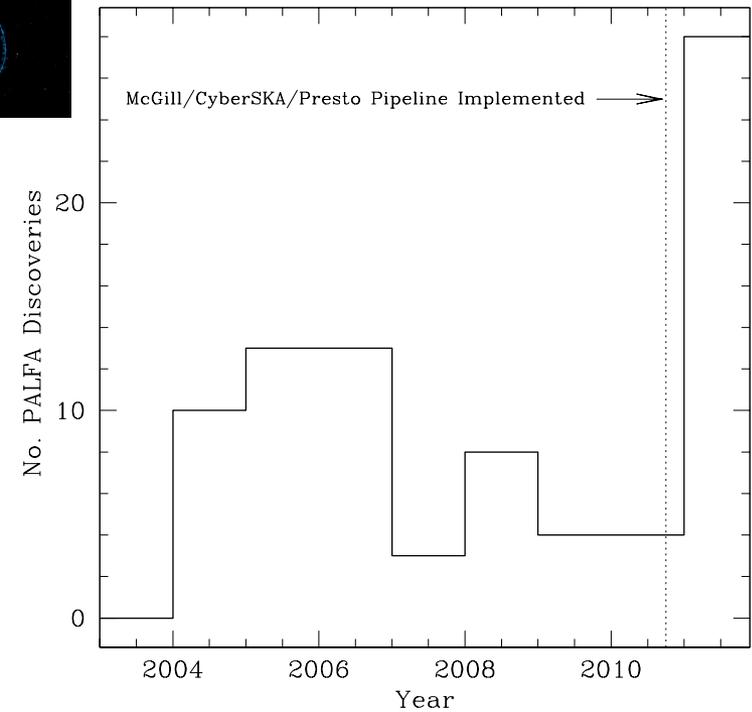
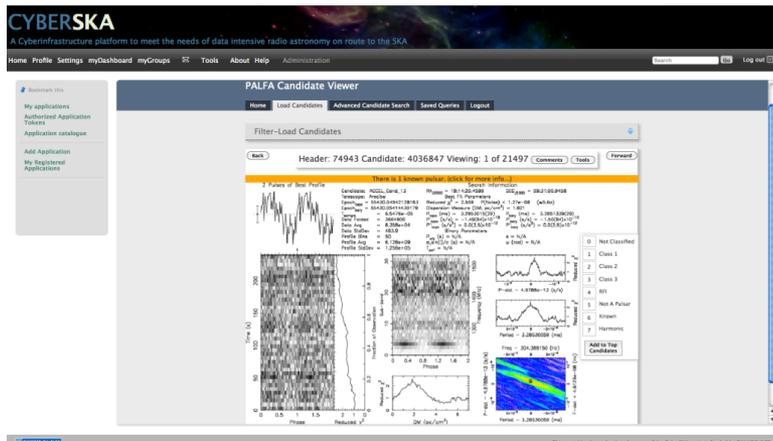
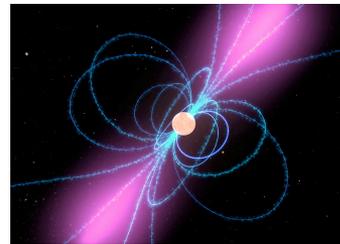
Third Party Application Interface

- API for integrating third party / “remote” server applications
- Single sign-on to applications enabled using Oauth
- Push/pull information and data to/from portal
- Current applications include PALFA Candidate Viewer, PALFA Top Candidates, PALFA Observation Scheduler, PALFA Diagnostics Tool, GALFACTS Processing Pipeline, Visibility Data Processing Pipeline, Source Counts, ...



Enabling Discovery

- Pulsar Search Project – 83 global collaborators



CyberSKA Project Portal



cyberska.org

PHISCC 2016, Cape Town, February 1-3, 2016 | Google Drive - Access Denied | https://www.secure.sterckinekor.co.za/payment... | Online Banking | CyberSKA: GALFACTS Consortium

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Home Profile Settings myDashboard myGroups Tools Help About

Admin Search Go Log out

GALFACTS Consortium
GALFACTS Consortium Group
Closed group

Subgroups:
GALFACTS Early Science
GALFACTS Data Quality Team
GALFACTS Pipeline
GALFACTS Management
GALFACTS Technical Team

- Group Applications
- Group activity
- Group blog
- Group bookmarks
- Group calendar
- Group discussion
- Group file folders
- Group files
- Group pages
- Group publications
- Group tasks

Edit group settings
Edit widget layout
Invite to group
Mail Members
Manage join requests
Create Subgroup
View Subgroups

Search in this group

Go

Group members

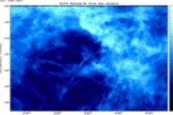
View all members

My status

- Group notifications on
- You own this group

Groups > GALFACTS Consortium

GALFACTS Consortium



Brief description: GALFACTS Consortium Group

Description:
This is the collaboration site for the data analysis and science collaboration for the GALFACTS project.

Tags:
galfacts

website: <http://www.ucalgary.ca/ras/GALFACTS>

Owner: Russ Taylor

Group members: 60

Closed group

Membership criteria:
Members of the GALFACTS Consortium

Subgroups:
GALFACTS Early Science
GALFACTS Data Quality Team
GALFACTS Pipeline
GALFACTS Management
GALFACTS Technical Team

Latest News

Observations for all main fields and zenith strips are complete.
We are now working on make up observations to fill in missing tracks.

Group discussion

[Add discussion topic](#)

Data Release 4.0 goals
Started by Russ Taylor 315 days ago

This is a discussion of goals for data release 4.0. This is meant to be the publication data release and will include two data product, one optimized for diffuse emission and one optimized for point sources. Potential goals for each:

RM Synthesis of GALFACTS cubes
Started by Russ Taylor 1743 days ago Replies (12) Last reply by Russ Taylor 1742 days ago

galfacts, rm synthesis

If the size of the data set is the issue for RM synthesis, the better to cut down spatially rather than spectrally. Is it outside of the bounds of the practical to imagine creating an RM cube from the entire N1 data set? We could adopt the...

Data acquisition - FTP, SCP, etc?
Started by Damon Farnsworth 2022 days ago Replies (4) Last reply by Damon Farnsworth 2020 days ago

Are the data available for download via FTP, SCP, etc?

Group pages

GALFACTS Early Science and Publication Policies
Last updated 1058 days ago by Russ Taylor

The following are policies developed by the GALFACTS Management team for the execution and publication of GALFACTS Early Science projects. Science During the GALFACTS DQA Phase (Early Science) Student Project Policy Publication Policy

GALFACTS Early Science Project Registry
Last updated 424 days ago by Russ Taylor

galfacts, science

This is the GALFACTS main early science project registry. To enter a project click on "Create a sub-page" in the menu at left and create a sub-page describing your project proposal. The title of the page should be the

Event calendar

- Annual EMU/POSSUM/GALFACTS Meeting**
4:20, 1 Dec 2014 - 5:20, 5 Dec 2014
- GALFACTS Data Meeting**
13:00 - 14:00, 22 Jan 2014
GALFACTS Data Meeting
- GALFACTS Data Meeting**
13:00 - 14:00, 16 Oct 2013
GALFACTS data meeting
- GALFACTS data meeting**
10:00 - 11:00, 23 Jan 2013
GALFACTS data meeting

Group activity

- Indy Leclercq updated a page Summary of make-up Observing Needs** 12 days ago
This table summarizes missing data that should be observed in a make-up request. # Field Track LST Range Total Hours Completed Comment Verified on hex with MJD of data directory...
- Russ Taylor updated a page Summary of make-up Observing Needs** 14 days ago
This table summarizes missing data that should be observed in a make-up request. # Field Track LST Range Total Hours Completed Comment Verified on hex with MJD of data directory...
- Russ Taylor updated a page Summary of make-up Observing Needs** 15 days ago
This table summarizes missing data that should be observed in a make-up request. # Field Track LST Range Total Hours Completed Comment Verified on hex with MJD of data directory...
- Russ Taylor updated a page Summary of make-up Observing Needs** 16 days ago
This table summarizes missing data that should be observed in a make-up request. # Field Track LST Range Total Hours Completed Comment Verified on hex with MJD of data directory...
- Russ Taylor updated a page Summary of make-up Observing Needs** 17 days ago
This table summarizes missing data that should be observed in a make-up request. # Field Track LST Range Total Hours Completed Comment Verified on hex with MJD of data directory...

Bookmarks

- GALFACTS Consortium Data

CyberSKA Project Portal



cyberska.org

CyberSKA: All groups | www.ast.uct.ac.za/~sarblyth/PHIS... | ADASS - Google Drive | CyberSKA FitsViewer | Dropbox - CARTAv0.5.mp4 | All GALFACTS Consortium's files

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GALFACTS Early Science
Early science
Closed group
Parent Group: GALFACTS Consortium

- Group Applications
- Group activity
- Group blog
- Group bookmarks
- Group calendar
- Group discussion
- Group file folders
- Group files
- Group pages
- Group tasks
- Related groups

Upload

Edit group settings

Edit widget layout

Invite to group

Search files

tag

go

Files > GALFACTS Consortium

All GALFACTS Consortium's files

list 50 Image Data

All GALFACTS Consortium's files | GALFACTS Early Science's files

- GALFACTS_N1_0263_4023_10chanav_V.fits**
Kevin Thiart 18 hours ago (GALFACTS Data Quality Team) [Manage](#) [Delete](#)
- GALFACTS_N1_0263_4023_10chanav_U.fits**
Kevin Thiart yesterday (GALFACTS Data Quality Team) [Manage](#) [Delete](#)

cyberska.org

CyberSKA: All groups | www.ast.uct.ac.za/~sarblyth/PHIS... | ADASS - Google Drive | CyberSKA FitsViewer | Dropbox - CARTAv0.5.mp4 | GALFACTS_N1_0263_4023_10chan...

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Home Profile Settings myDashboard myGroups Tools Help About Admin Search Go Log out

Files > GALFACTS Data Quality Team > GALFACTS_N1_0263_4023_10chanav_U.fits

GALFACTS_N1_0263_4023_10chanav_U.fits

[View gallery](#)

Kevin Thiart
yesterday (8.7 GB) Access: Group: GALFACTS Data Quality Team

[Download](#) [Launch Viewer](#) [Preview next-gen viewer \(alpha version\)](#)

Image Header

```
FILETYPE= FITS /Flexible Image Transport System
SIMPLE = T /Standard FITS file
BITPIX = -32 /IEEE 4-byte float
NAXIS = 3 /Number of image dimensions
NAXIS1 = 5385 /Size of 1st dimension in pixels
NAXIS2 = 1074 /Size of 2nd dimension in pixels
NAXIS3 = 376
OBJECT = GALFACTS_N1 Stokes U /Object name
CTYPE1 = RA---CAR /1st axis type
CRVAL1 = 62.875 /Reference pixel value
CRPIX1 = 2693.0 /Reference pixel
CDELT1 = -0.0166667 /Pixel size in world coordinate units
```

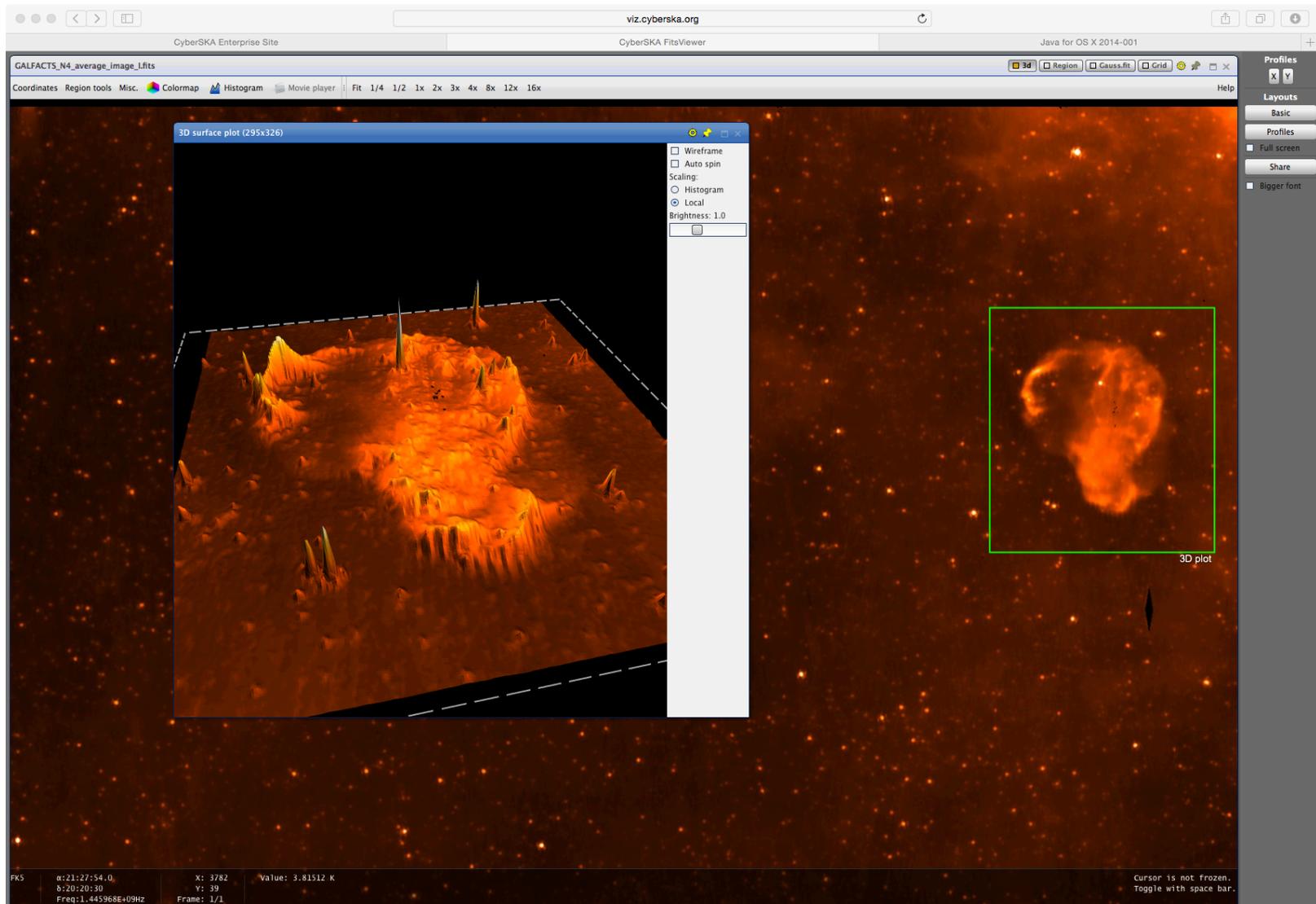
Share [Manage](#) [Delete](#)

Leave a comment

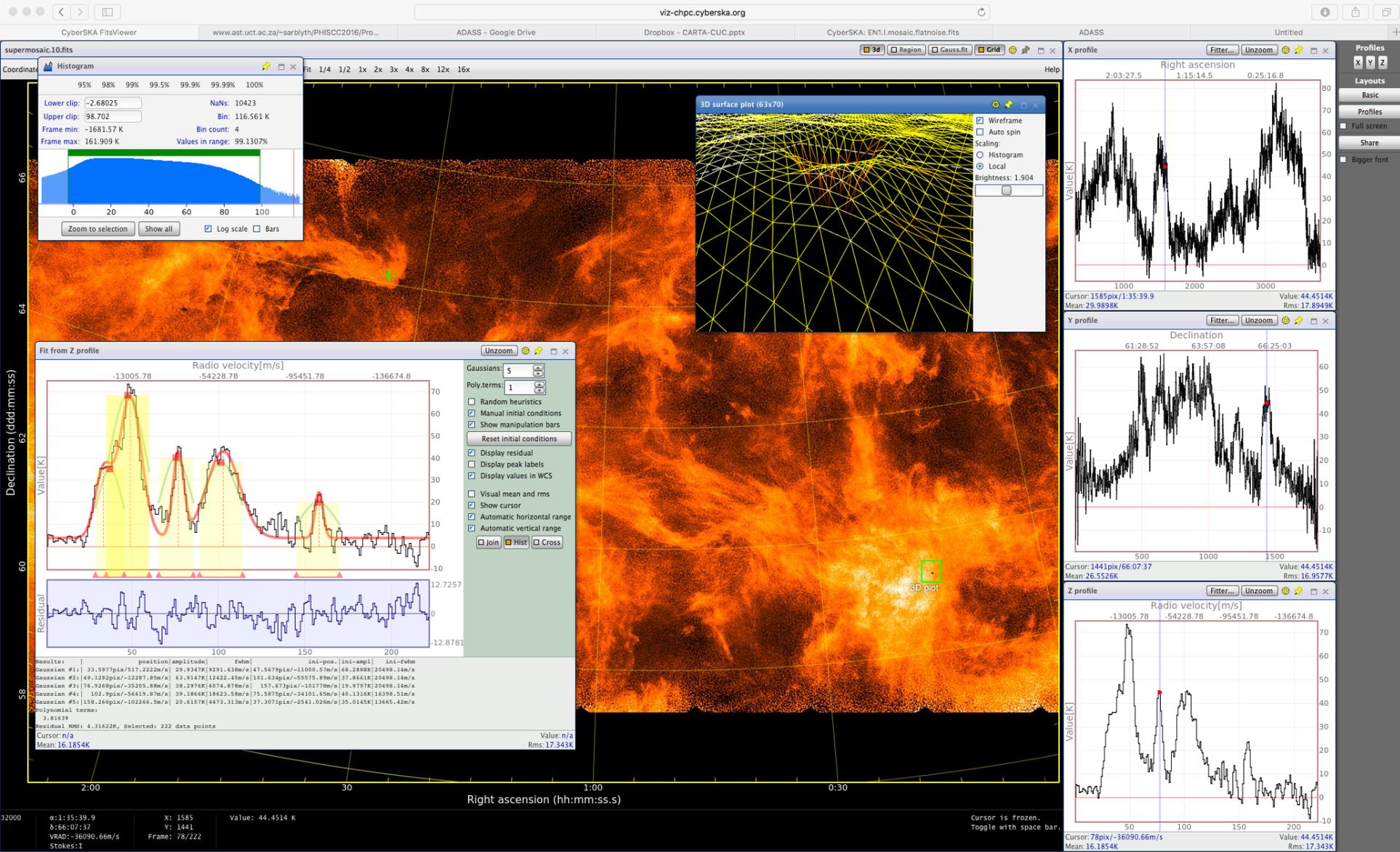
Embed content Remove editor

B *I* U **A** **B** Font Family Font Size

CyberSKA: GALFACTS Image



CyberSKA Visual Analytics Tool

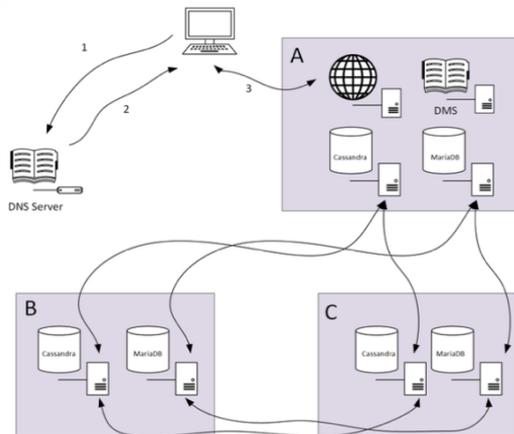


Federated CyberSKA Platform

Integrating Globally Distributed Resources into the CyberSKA Platform

David Aikema, Rob Simmonds and Russ Taylor – info@cyberska.org

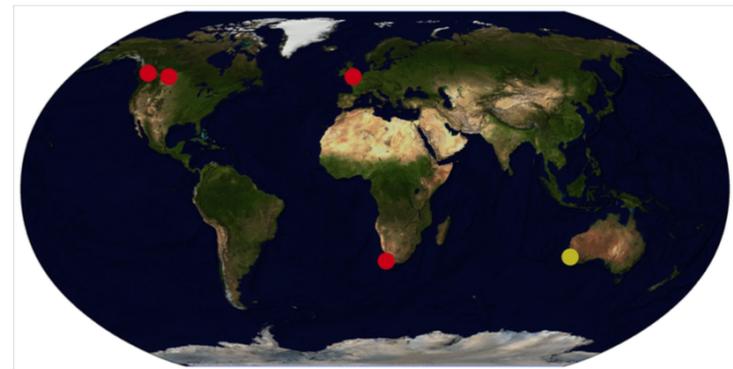
Restructuring for a globally-distributed system



- DNS based geolocation used to connect to the nearest CyberSKA instance – Region A in this case.
- Metadata describing files in the DMS instances in each region is stored in Apache Cassandra database that provides eventually consistent replication of this metadata between regions.
- MariaDB using multi-master replication with global transaction ID support is used to distribute portal configuration and account information.

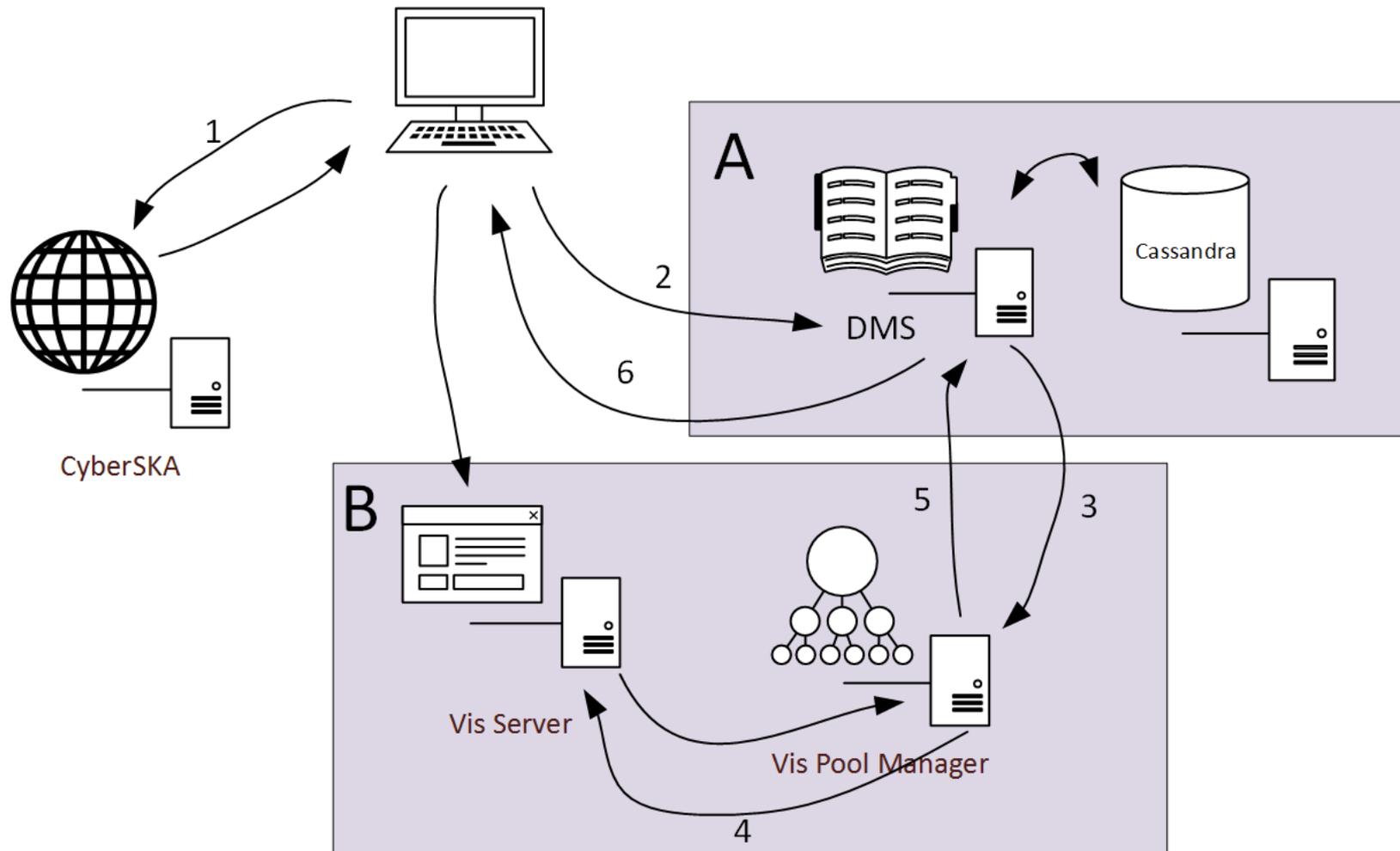
CyberSKA operates two platforms - one for production use and another for experimental purposes. This poster outlines some of the developments in our experimental testbed.

CyberSKA Testbed Resource Locations



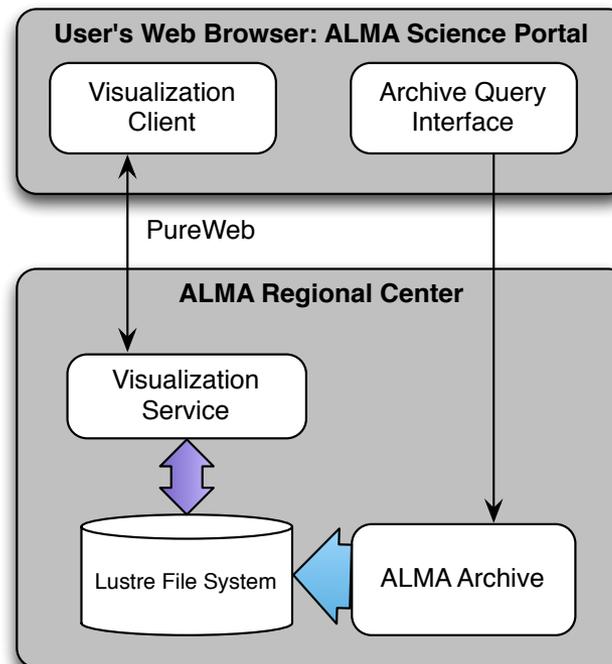
Red indicates currently active resources in the testbed whereas yellow indicates resources awaiting integration

Visualization in Distributed Platform



Next Generation Viewer

- Collaboration with US National Radio Astronomy Observatory, University of Alberta, SKA SA (Big Data Africa)
- Next generation visualization system for radio astronomy (to be implemented at ALMA Regional Science Centres and integrated into cyberSKA)

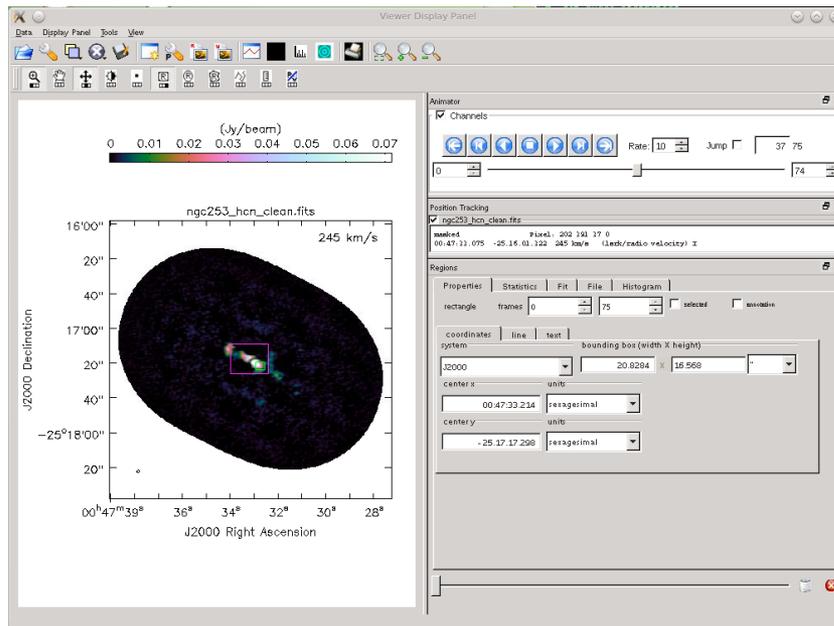


ALMA at Chajnantor
(Courtesy NAOJ)

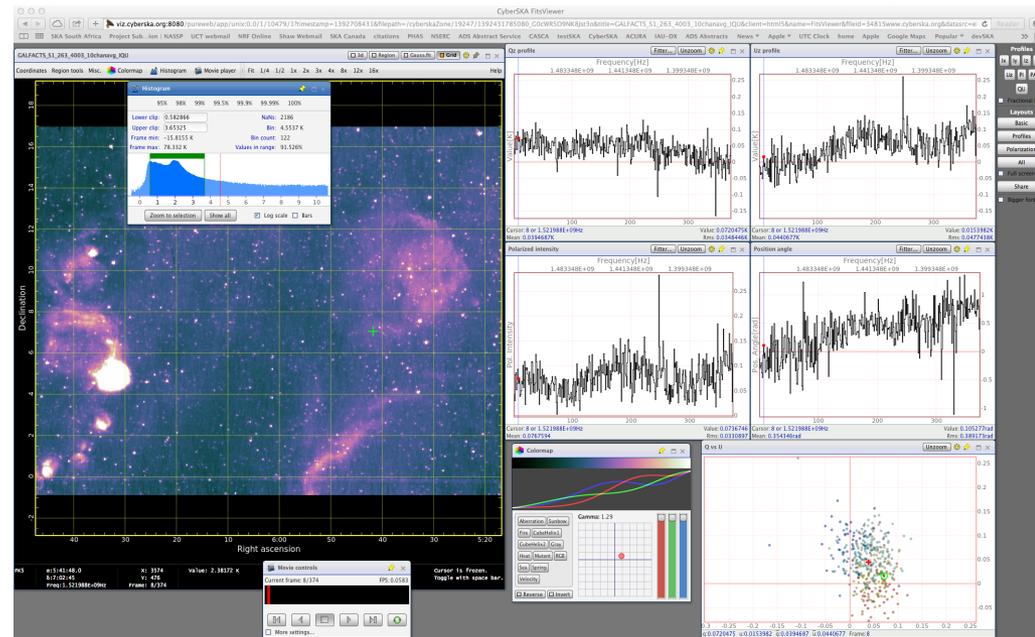
ESO PR Photo 14-01 (6 April 2011)

© European Southern Observatory 

Fusing Two Approaches

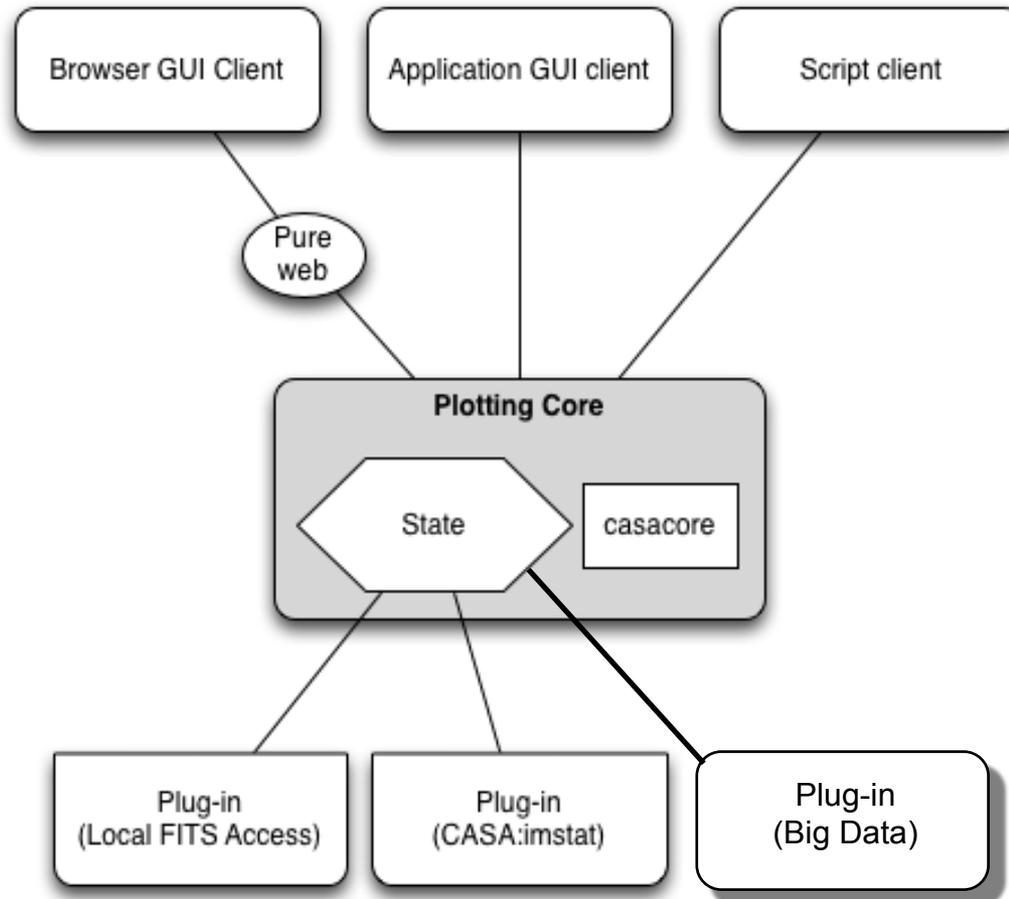


CASA Viewer

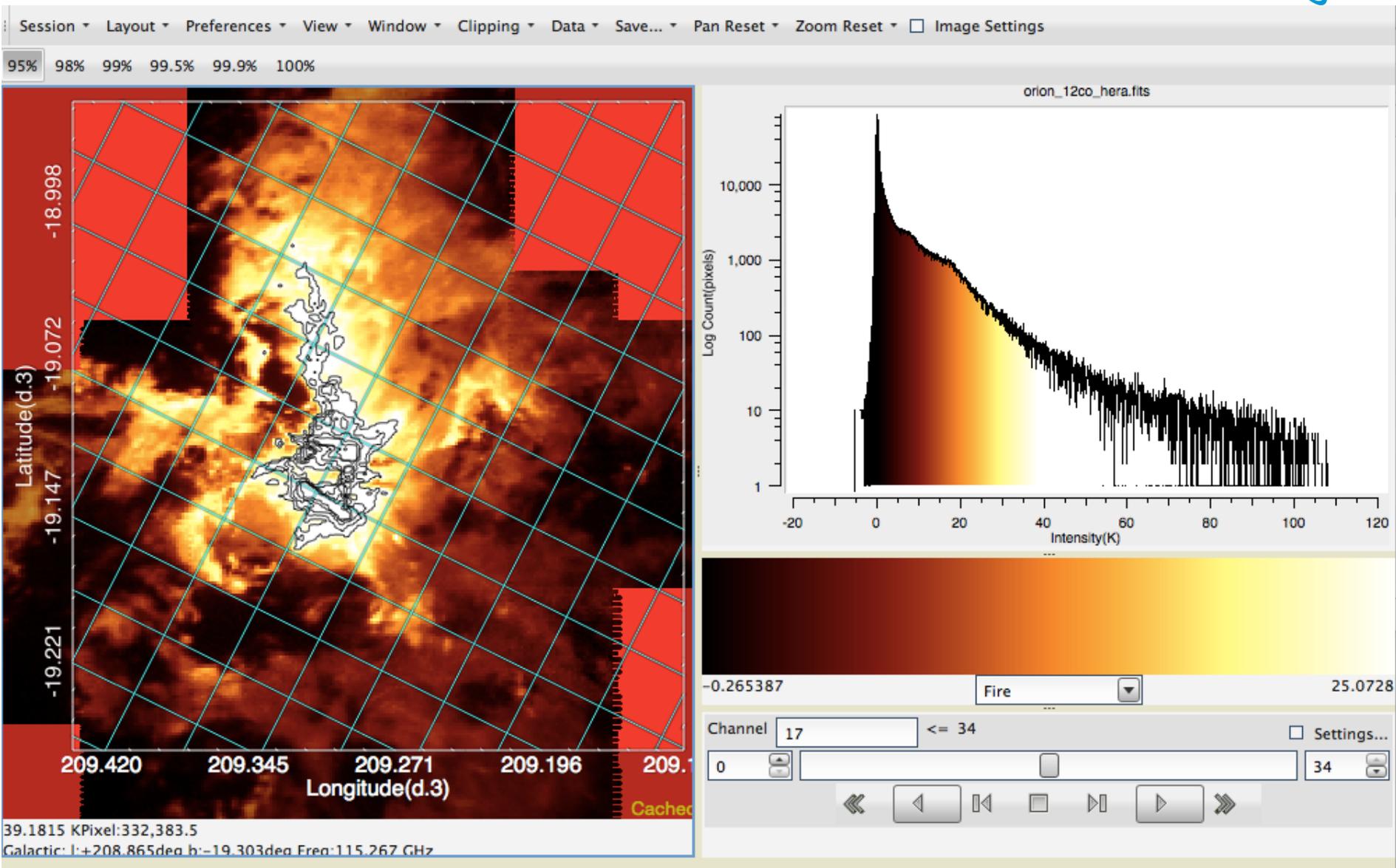


CyberSKA Viewer

Re-Architecture



alpha Release v0.4





IDiA

Inter-University Institute
for Data Intensive Astronomy

from big data to big ideas



NORTH-WEST UNIVERSITY
YUNIBESITHI YA BOKONE-BOPHIRIMA
NOORDWES-UNIVERSITEIT

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UNIVERSITY of the
WESTERN CAPE

IDIA Launched September 3, 2015



IDIA Launched September 3, 2015



IDIA Major Facility Purchase Plan

Data-centric high performance computing system

- Data-centric computing facility with tiered data storage, high memory capacity CPU nodes, and GPU enhanced nodes
- Platform for data science projects by IDIA researchers and MeerKAT LSP data systems.
- Connected/integrated into African Data Intensive Research Cloud for connectivity among IDIA institutes and ARC collaboration
- Development platform for Big data research solutions
 - Gateway technologies, processing, analytics, visualization, cloud interface to HPC, e-science,...