



# Information & Knowledge Management at ESO La Silla – Paranal Observatory

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# Agenda

- Goal, vision and principles
- Diagnosis
- IKM program
- KPIs for Information and Knowledge Management
- Conclusions





# *Goals, vision and principles*

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Goals, vision and principles of the ESO Information and Knowledge Management Programme

# Goal

To allow every employee at LPO find the right information at the right time

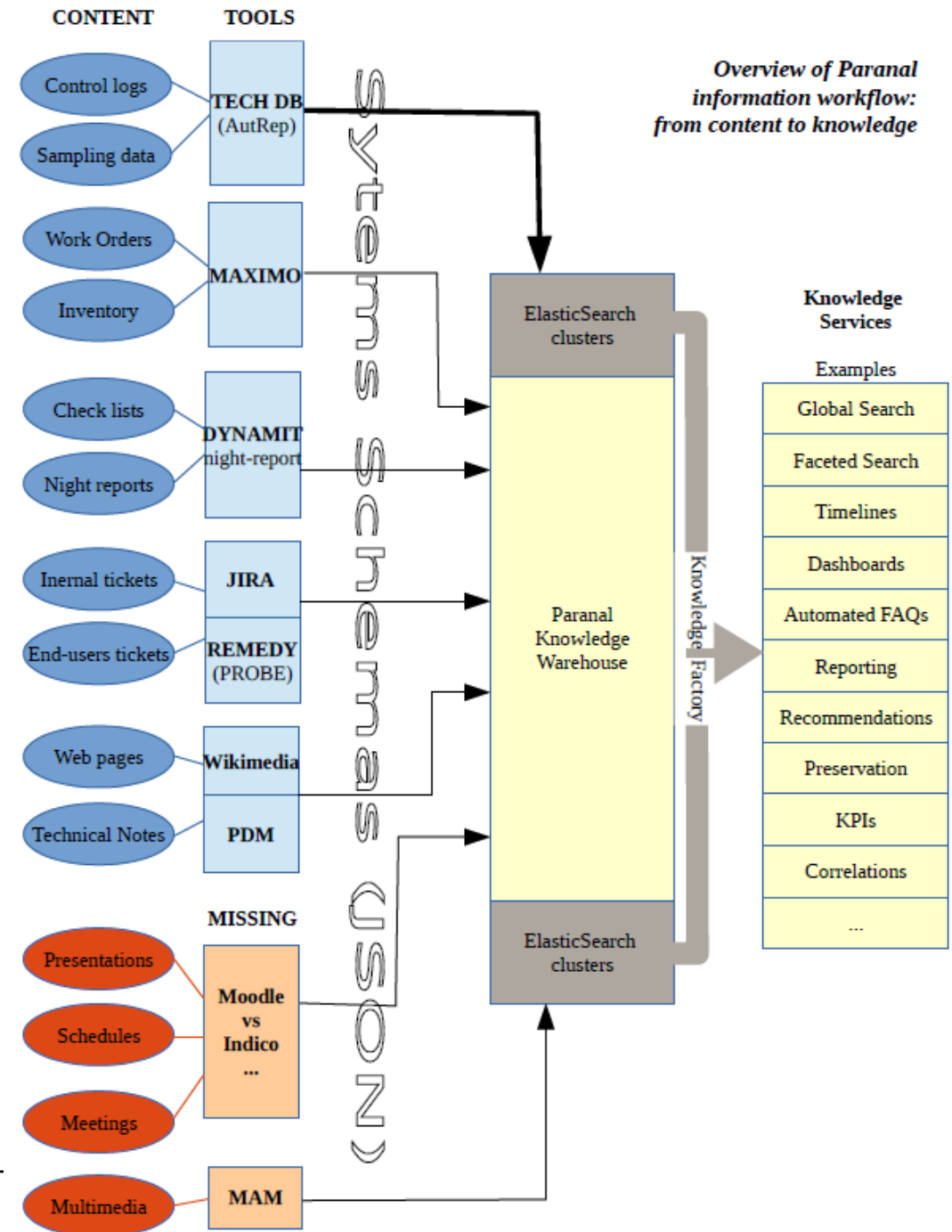




# Vision

## Information workflow

- Content (user & automatic generated)
- Tools (storing and making content available)
- Knowledge warehouse + ElasticSearch clusters
- End-user knowledge services
  - Global search
  - Timelines
  - Dashboards
  - ...





# Principles

## Findability

Improve the visibility of information and knowledge across ESO



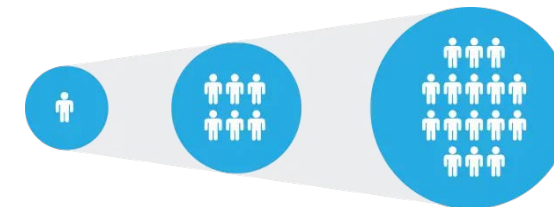
## Reuse

Avoid duplication of effort, using existing tools and knowledge



## Scalability

Think globally, act locally





# *Diagnosis*

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Assessment of status and maturity of IKM practices

# Past working groups

- ❑ Conclusions, some areas need improvement
  - Interconnection among tools
  - One single entry point to information
  - Better guidelines and training to tools
  - Place to store high level “knowledge” like emails or presentations
  - Lessons learned to be part of the culture
  - ...



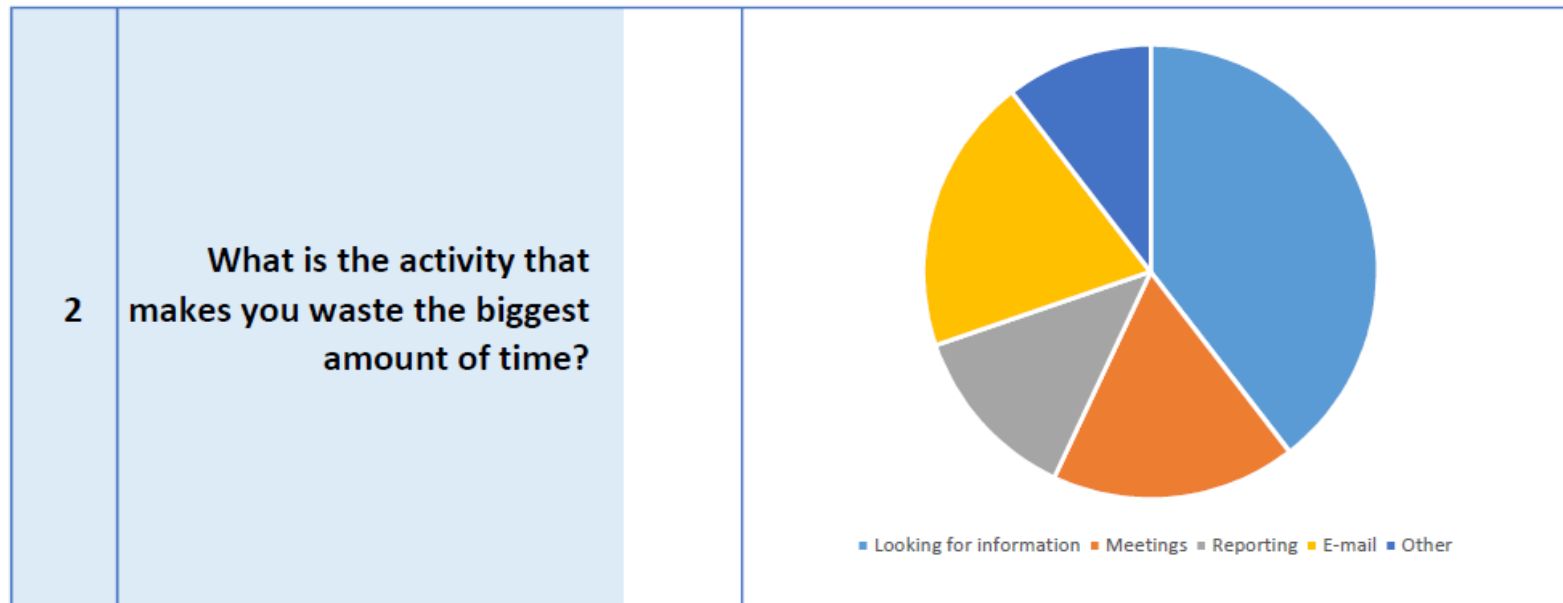


# First IKM survey - results

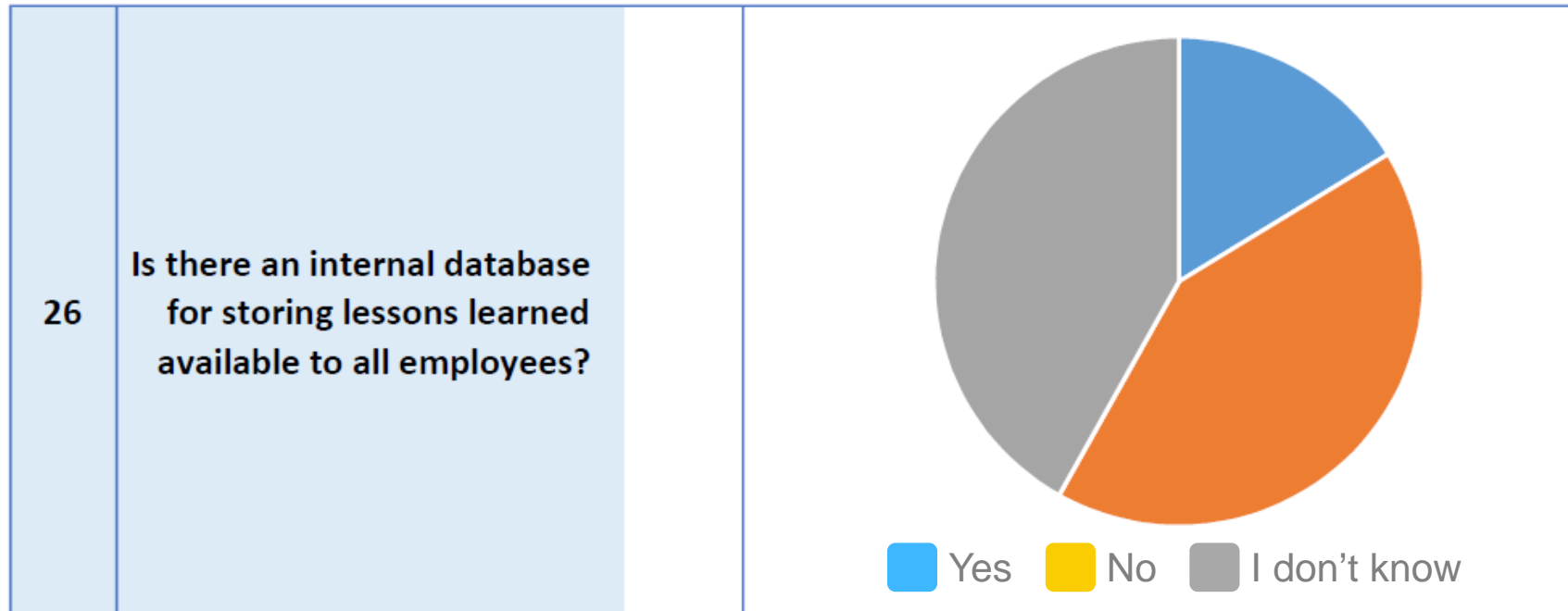




# First IKM survey - results

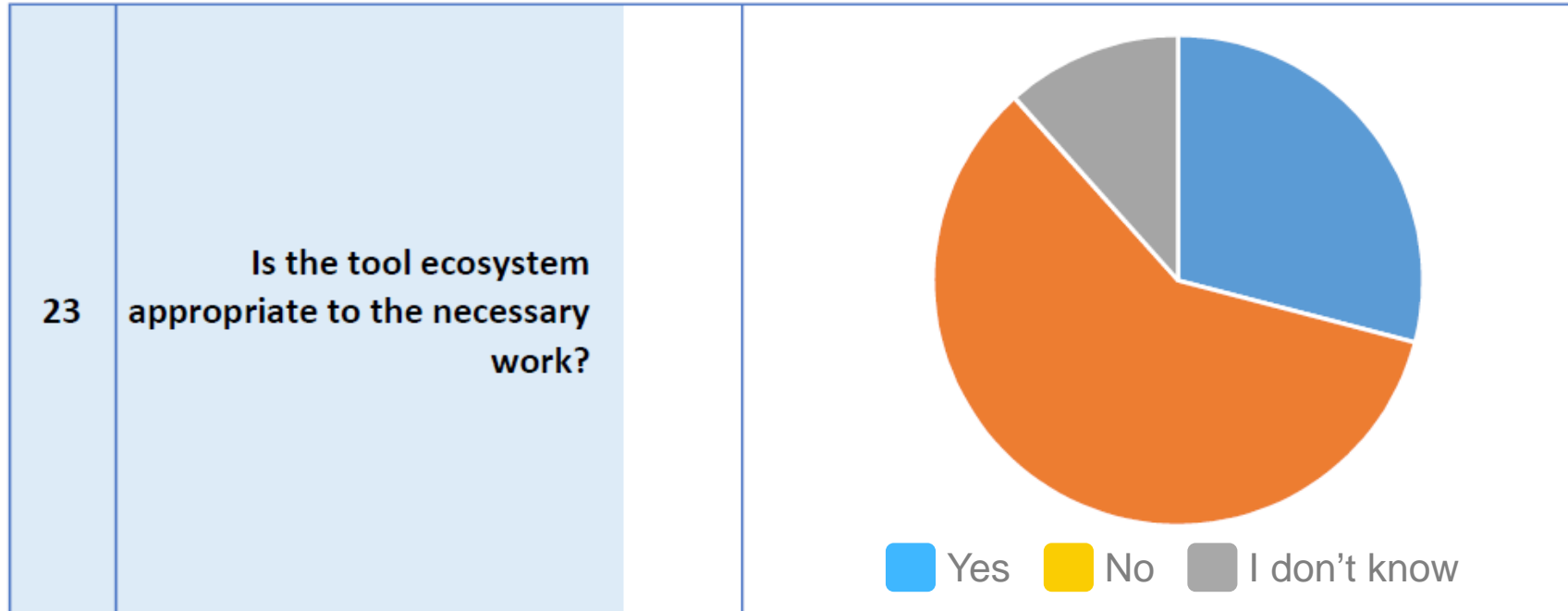


# Lessons learned



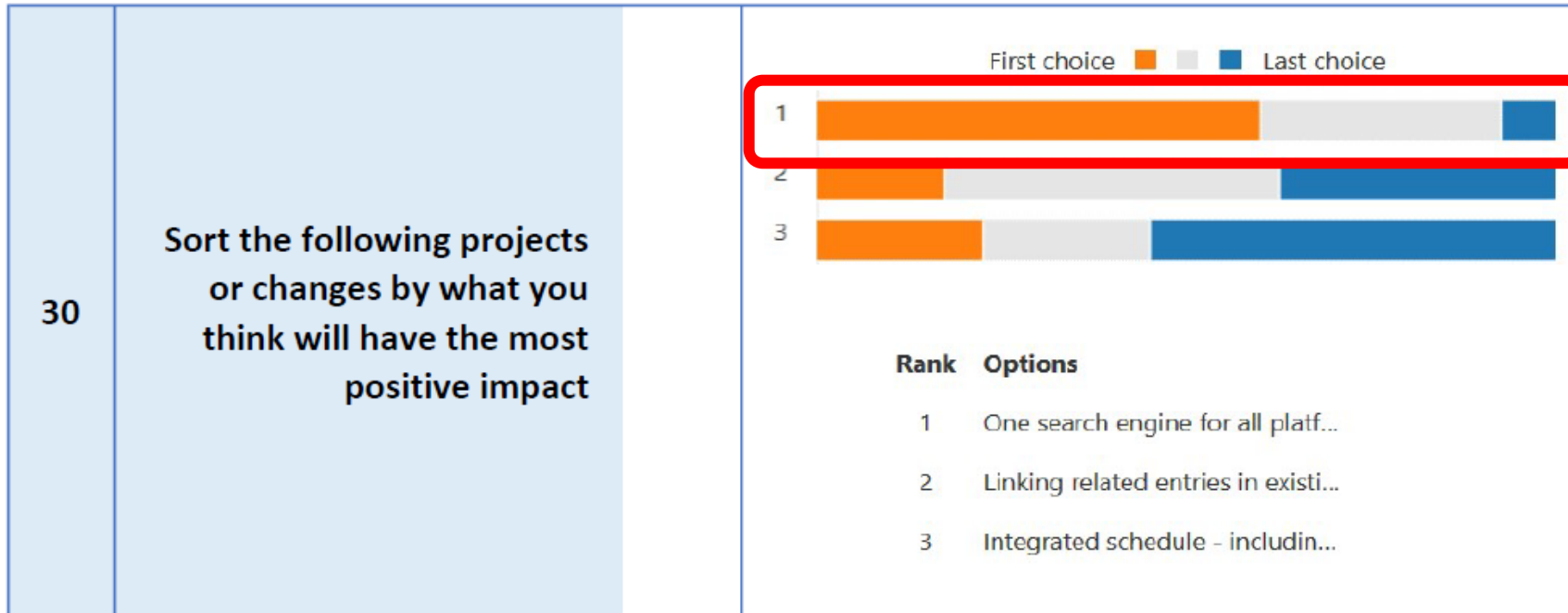
[SQA wiki](#) > [Quality Assurance](#)

# Tool ecosystem





# One search engine



# Individual interviews: 36 identified projects

	<b>Admin information repository</b> A common repository to store relevant information to all LPO example, cards with important contacts, or other information a nuggets" not immediately or easily accessible via regular means.		<b>ParaNav - Single entry point to information</b> <b>PARAnal NAVigator</b> - The top layer of the "knowledge services", the single entry point to all IKM tools within Paranal, which must be a intuitive interface linking to all relevant tools and knowledge.		<b>Integrated schedule</b> Scheduling is a key aspect of work at Paranal, and yet there are many schedules that are not integrated. Double-checks, misalignments and potential rework are a consequence of this situation. Hence, it would be positive to integrate all calendars in one. A potential tool to host this unified calendar is the ERP, though this must be discussed with all stakeholders.
	<b>CCB process update</b> Define an updated process for the Change Control Board.		<b>Personal dashboard</b> A web-based application where anyone can see at a glance the various they are involved in, such as: - CCB tickets (PROJ, CRE, MCR) assigned to me and deadline. - PPRS tickets assigned to me and status. - TTR assigned to me and dates. - WO assigned to me with execution date and status. - Department prototype projects assigned to me and deadline. - Maybe an open field to write up other activities not already in another tool but part of the yearly objectives, for example. A prototype would be this one: <a href="http://wgsmse.pl.eso.org/ts/kanban.html">http://wgsmse.pl.eso.org/ts/kanban.html</a>		<b>Web interface for visiting astronomers</b> Astronomers to enter their data via a standard web form, which is sent automatically to the ERP/AT systems and facilitates the logistics process.
	<b>CCB tool update</b> Create a working platform to support the new version of the CCB				<b>Wiki best practices</b> Define a guide on how to create relevant content and when to update/remove obsolete one. For example, discourage the upload of PDFs, instead linking to source (PDM, shared drive...).
	<b>Cultural change</b> Set of activities to create awareness of the importance of know and sharing, and to foster a culture towards an organization learning.				<b>Wiki interface</b> Improve the current wiki interface.
	<b>Data visualization</b> New and better visualizations of data, such as, time loss instrument basis (at the moment time loss is aggregated as a KPI visualized as such).		<b>PDM group lifecycle</b> Creation of a "Group lifecycle" in PDM. This would make the app more agile and avoid the "eternal draft" culture, in which many processes in draft due to the bottleneck imposed by having the Head of Department to approve all documents.		<b>Wiki structure</b> Unify the content structure of the wiki pages across groups and departments.
	<b>Findability in PDM</b> Improve the search engine within PDM.		<b>Standard templates</b> Creation of ESO-wide templates for procurement contracts, SoWs, etc.		<b>Wiki information validation</b> Define a governance and process to facilitate the validation and ensure the accuracy of the information in the wiki pages.
	<b>Knowledge capture</b> Define the procedure to ensure the retention of knowledge leaving their post.		<b>Tickets best practices</b> Definition of a standard structure and terminology for the creation of tickets, well as, recommended best practices for better readability and find tickets.		<b>Communication plan</b> Definition of a plan to systematize communication activities concerning the IKM program.
	<b>Lessons learned</b> Define guidelines and a procedure, if necessary, in order to capture factors or critical elements learnt in solved tickets or past projects them into account in future ones. An important focus should learning from the databases of solved problems and to curate them can be reused and helpful for the future. Existing procedures can serve as a baseline or inspiration.		<b>Timeline</b> Create a dashboard with timelines of events configurable per instrument, telescope, or any other criteria. This would need a connection to Remedy Maximo.		<b>ESO academy</b> Coordination with HR and/or other groups to ensure the creation of a training academy for ESO employees.
	<b>On-field access to information</b> Improve access to information for employees working on the install new terminals in the telescopes themselves with proper access to the regular tools and not constrained by the old version nor the control network firewall.		<b>Timelog</b> Include the option to assign individual tickets to the <b>Timelog</b> tool. The new function should allow to create a tickets coming from Remedy. The automation that is, the employee would type a keyword tickets with that keyword exist.		<b>Expert directory</b> Implementation of an organigram of all employees, including some metadata about the area where they work, competencies and indexable in the search engine.
	<b>One search engine</b> Development of a single user interface and the connectors for information systems at Paranal.		<b>Tool connectivity</b> Activities aimed to link and connect content or JIRA.		<b>Expert talks</b>
	<b>Paranal reporting</b> For different activities and periods, reporting is required in many organization. We have found, however, that the ways to report heterogeneous not following a common pattern or repository, some instances the duplication of effort (e.g. sending an email via...)		<b>Tracking of instrument evolution</b> Creation of guidelines and update of the...		<b>Publication from E-mail</b> Mechanism enabling employees to publish any content from their inbox, just by sending an email to an special email address. Such a feature would be useful to particular reports, which are sent first via E-mail to a distribution list and only after, copy-pasted into a particular Wiki sites.
	<b>Metadata schema</b> Definition of a common metadata schema via which all content across ESO shall be structured, in order to facilitate content and tool interoperability.				<b>Recommended ticket engine</b> This activity would focus on creating a recommendation system for tickets opened in Remedy, so similar items are presented, which may help the engineers on new tickets that present problems that were already solved.
					<b>Tool catalogue</b> Creation of an inventory of all tools in Paranal. This must be integrated within the one search engine so the user is able to find and filter tools in the search results.
					<b>Wiki tagging system</b> Improve the system of categories and tags, so the same article can be found by filtering or navigating from different parts of the wiki site.

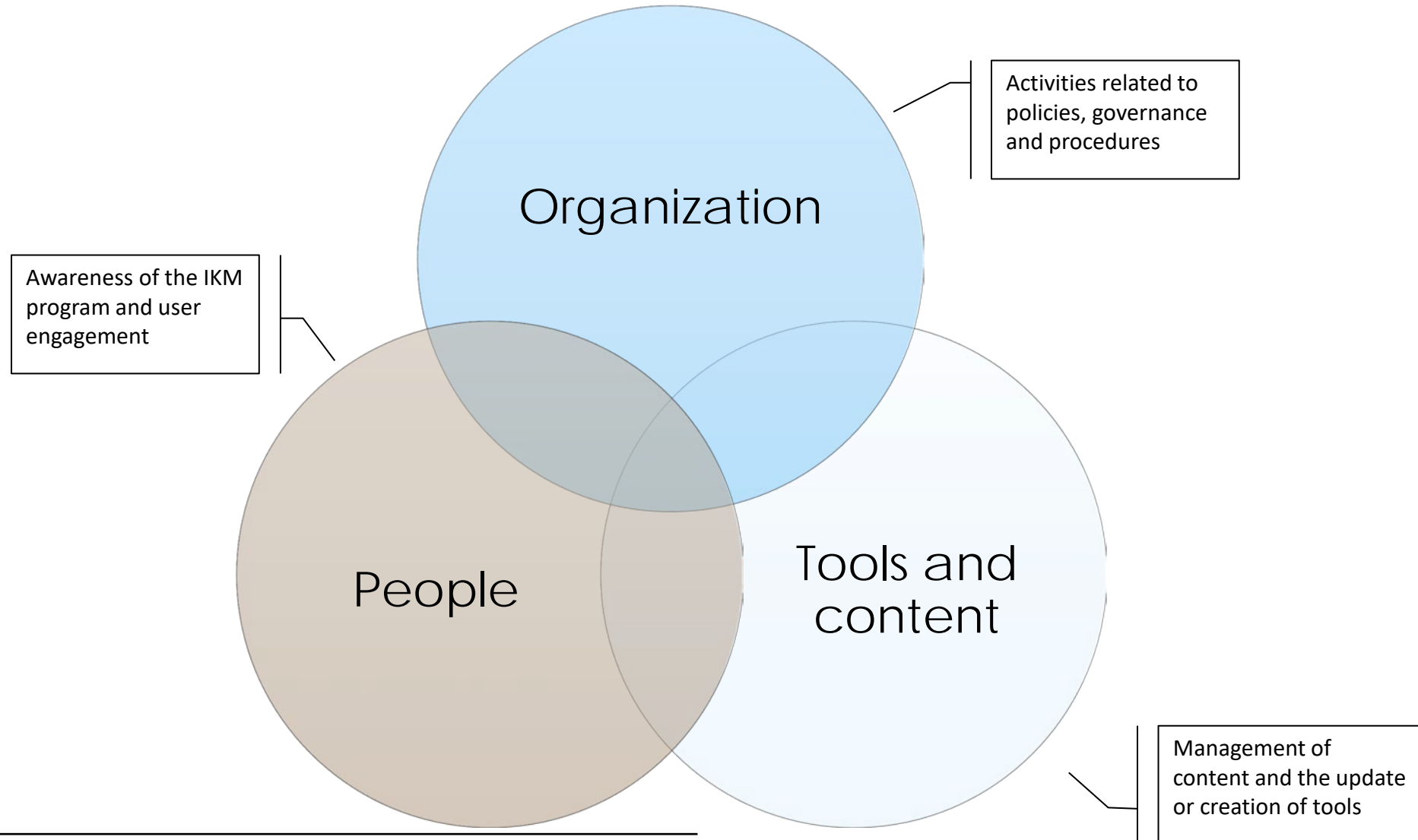


# *IKM programme*

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Activities and projects delivered in the context of the IKM programme

# IKM program: overview



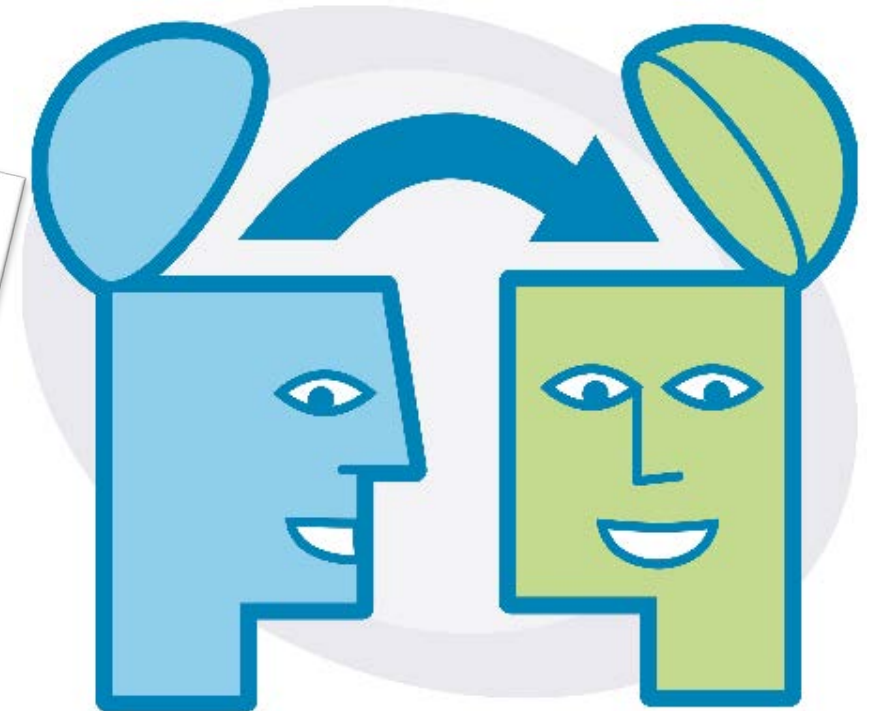


# Potential IKM projects

Organization	Tools and content	People
Knowledge transfer	One search engine	ESO academy
Lessons learned	Integrated schedule	
Paranal reporting	__ People schedule	
	__ Other schedules	
	Timelog	Cultural change
	Tool connectivity	
	Timeline	
Standard templates	PARANAV - Single entry point to information	Communication plan
	Recommended ticket engine	
	Findability in PDM	
Tickets best practices	Web interface for visiting astronomers	
	Wiki interface	Expert talks
Tracking of instrument evolution	On-field access to information	
	Data visualization	
	PDM group lifecycle	
Wiki best practices	Wiki structure	
	Expert directory	
	Publication from E-mail	
Wiki information validation	Tool catalogue	
	Wiki tagging system	
	Metadata schema	
KPIs for IKM	Admin information repository	
	CCB tool update	
CCB process update	Personal dashboard	

# Knowledge transfer procedure

- ❑ Proactively address knowledge transfer when:
  - Employee retire
  - Employee changes their position

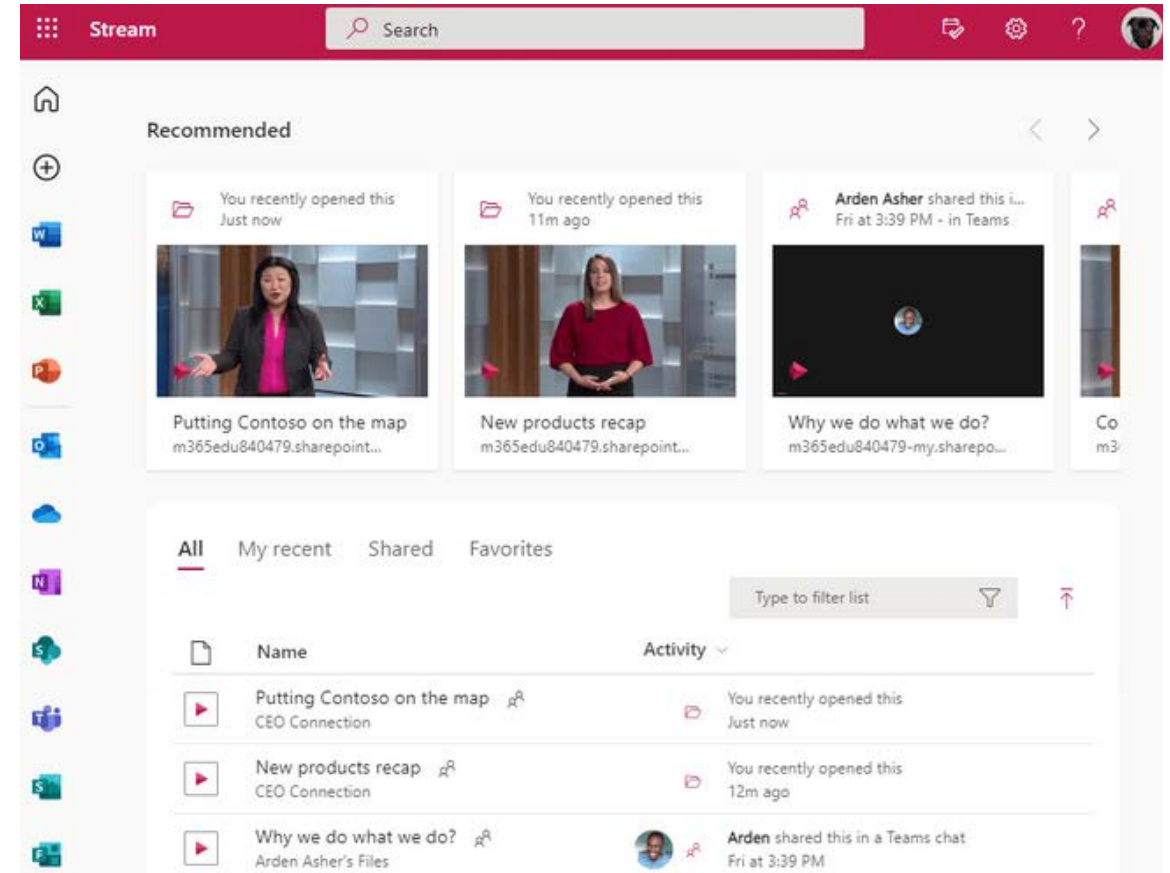


# Video archive

Leveraging on Microsoft Stream

Collected, uploaded and transcribed dozens of videos

Searchable by text in the MS Stream platform



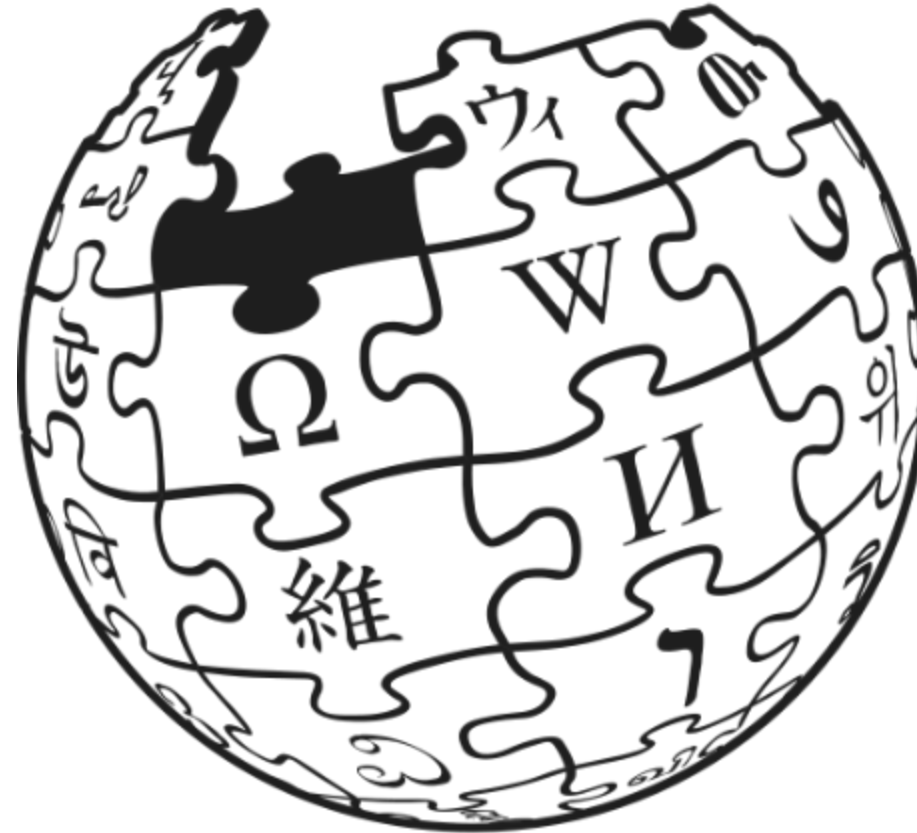
# Collaboration: wiki best practices

[page](#)
[discussion](#)
[edit](#)
[edit source](#)
[history](#)

## Wiki best practices

**Contents**



- 1 [Guidelines](#)
- 2 [Creation and edition \(by user\)](#)
  - 2.1 [Table of contents and page structure](#)
  - 2.2 [Files and links](#)
  - 2.3 [Links](#)
  - 2.4 [Outdated pages](#)
- 3 [Continuous maintenance \(by wiki admin\)](#)
  - 3.1 [Health check](#)
    - 3.1.1 [Old pages](#)
    - 3.1.2 [Orphaned pages](#)
    - 3.1.3 [Wanted pages](#)
  - 3.2 [Promote visibility of existing content](#)
    - 3.2.1 [Identify most linked-to pages](#)
  - 3.3 [Classification of content into categories](#)
    - 3.3.1 [Create meaningful categories](#)
    - 3.3.2 [List all categories](#)
    - 3.3.3 [Creating Category pages](#)
    - 3.3.4 [Assign categories to a wiki page](#)
    - 3.3.5 [Wanted categories](#)
    - 3.3.6 [Uncategorized pages](#)






# Information and Knowledge Nuggets

## Information and Knowledge Management [ edit | edit source ]

- About the Information and Knowledge Management program at Paranal
- IKM Survey Results- Q2 2019 
- Knowledge Transfer Procedure 
- Information and Knowledge Nuggets - online learning resources



The screenshot shows a Wikipedia page with a blue header containing navigation tabs: 'page', 'discussion', 'edit', 'edit source', 'history', 'move', and 'unwatch'. The main title is 'Information and Knowledge Nuggets'. Below the title is a paragraph: 'This section gathers a set of links and online resources on a variety of topics that may be of relevance to our work in Paranal in particular, or at ESO in general.' To the left of the text is an icon of a lightbulb above an open book. Below the icon is the text 'Icon made by Freepik from www.flaticon.com'. To the right of the paragraph is a list of three items:

- IBM Data Science Professional Certificate --> <https://www.coursera.org/specializations/ibm-data-science-professional-certificate> 
- Machine Learning, by Stanford --> <https://www.coursera.org/learn/machine-learning> 
- Here is a playlist of lectures given at ESA on machine learning --> <https://www.youtube.com/watch?v=FXYPDyoR1o0&list=PLjai7zNYchWMJuV46s6XOIURPA3dDkooG> 

## Information and Knowledge Management [\[ edit | edit source \]](#)

- [About the Information and Knowledge Management program at Paranal](#)
- [IKM Survey Results- Q2 2019](#)
- [Knowledge Transfer Procedure](#)
- [Information and Knowledge Nuggets - online learning resources](#)



<http://director.pl.eso.org>

La Silla  
Paranal  
Director's  
office

**Navigation**

- [ESO Main Page](#)
- [Paranal Main Page](#)
- [Paranal Intranet](#)
- [Paranal Internal Main Page](#)
- [SciOps Public Page](#)

**Paranal**

- [Director's Office Wiki](#)
- [Change Control Board Wiki](#)
- [IT Chile Wiki](#)
- [Safety Wiki](#)
- [Paranal System Engineering Wiki](#)
- [COE Wiki](#)
- [MSE Department Wiki](#)
- [SQA Wiki](#)

[page](#)
[discussion](#)
[edit](#)
[edit source](#)
[history](#)
[move](#)
[unwatch](#)

### Information and Knowledge Management program

The Information and Knowledge Management program at La Silla Paranal Observatory started in May 2019 with the incorporation of the Information and Knowledge Management program. As agreed with the Director of Operations, the high-level goals of this program are:

- In the context of PAO's 2025 operations including the ELT and CTA (and, as much as possible, extension to LPO as a whole)
  - Improve coherence, interconnection (or integration) and systematic usage of information management and related systems
  - Improve capture, creation and distribution of knowledge in order to support high-performing continuous operations in a shift
- Reach awareness and maturity level of PAO staff with respect to IKM according to existing international standards or scales, and
- Promote the necessary culture change towards knowledge sharing within the PAO, removing silos of knowledge and integrating knowledge across the organization
- Serve as the first stepping stone towards the evolution of ESO as a learning organization, by proposing an IKM program scaled to the needs of the organization

During the initial months of the program, the main effort was focused on the diagnosis of the situation concerning information and analysis of previous related work at ESO.

The conclusions of this activity have been included in the "[IKM diagnosis report](#)

- Lack of tools interconnectivity, which make many day-to-day tasks more cumbersome than necessary. For example, in certain cases, the lack of facilitating interfaces among tools that use the same or related info.
- Lack of a proper configuration management system. One cannot be sure that the documents stored in the PDM contain the latest information.
- Critical information is spread in many places. E.g. calendars and schedules.
- Lack of "best practices" or ways in which information can be written for an optimal retrieval. Examples would be "how to write a document"

# Root cause analysis dashboard (Timeline)



# Personal dashboard

Information and Knowledge Management > General ...

Conversations Files Projects Wiki IKM plans IKM Sharepoint PP Prototype 1 PP Prototype 2 Notebook test Issues +

Board Charts Schedule Filter (0) Group by Bu

**PPRS**

+ Add task

- Embedding of functional check in Startup Script for CRIRES  
Link to Remedy  
10/01 1 ...  
RC Raul Cano
- While logged in as "lpcpcb", it is not possible to report a workload for the mechanical group in PRJ-0080  
Link to Remedy  
10/01 1 ...  
GS Giulio Starace
- Prepare workstation for UT2 TCS (wt2tcs) VLT2016 upgrade  
Link to Remedy  
10/01 1 ...  
GS Giulio Starace
- THIS IS A TEST!! (Please Ignore!!) - Some control characters in the @subject line??  
Link to Remedy  
10/01 1 ...

**CCB**

+ Add task

- Urgent increase RBScheduler java heap in VLTi Pipeline - Fast approval  
Link To Remedy  
08/26 1 ...  
GS Giulio Starace
- Preparation of NEAR for Science Demonstration Campaigns  
Link To Remedy  
08/24 1 ...  
GS Giulio Starace
- Disable Keepalive on Uplinks in Paranal Control Networks  
Link To Remedy  
09/03 1 ...  
RC Raul Cano
- Installation of new Apical Server in VLTi Computer Room  
Link To Remedy  
09/02 1 ...  
GS Giulio Starace

**Maximo**

+ Add task

- Sample Ticket  
Maximo Link  
08/30 1 ...  
GS Giulio Starace
- Sample Ticket 4  
Maximo Link  
08/28 1 ...  
GS Giulio Starace
- Sample Ticket 2  
Maximo Link  
09/07 1 ...  
RC Raul Cano
- Sample Ticket 3  
Maximo Link  
08/23 1 ...  
RC Raul Cano

Show completed 1

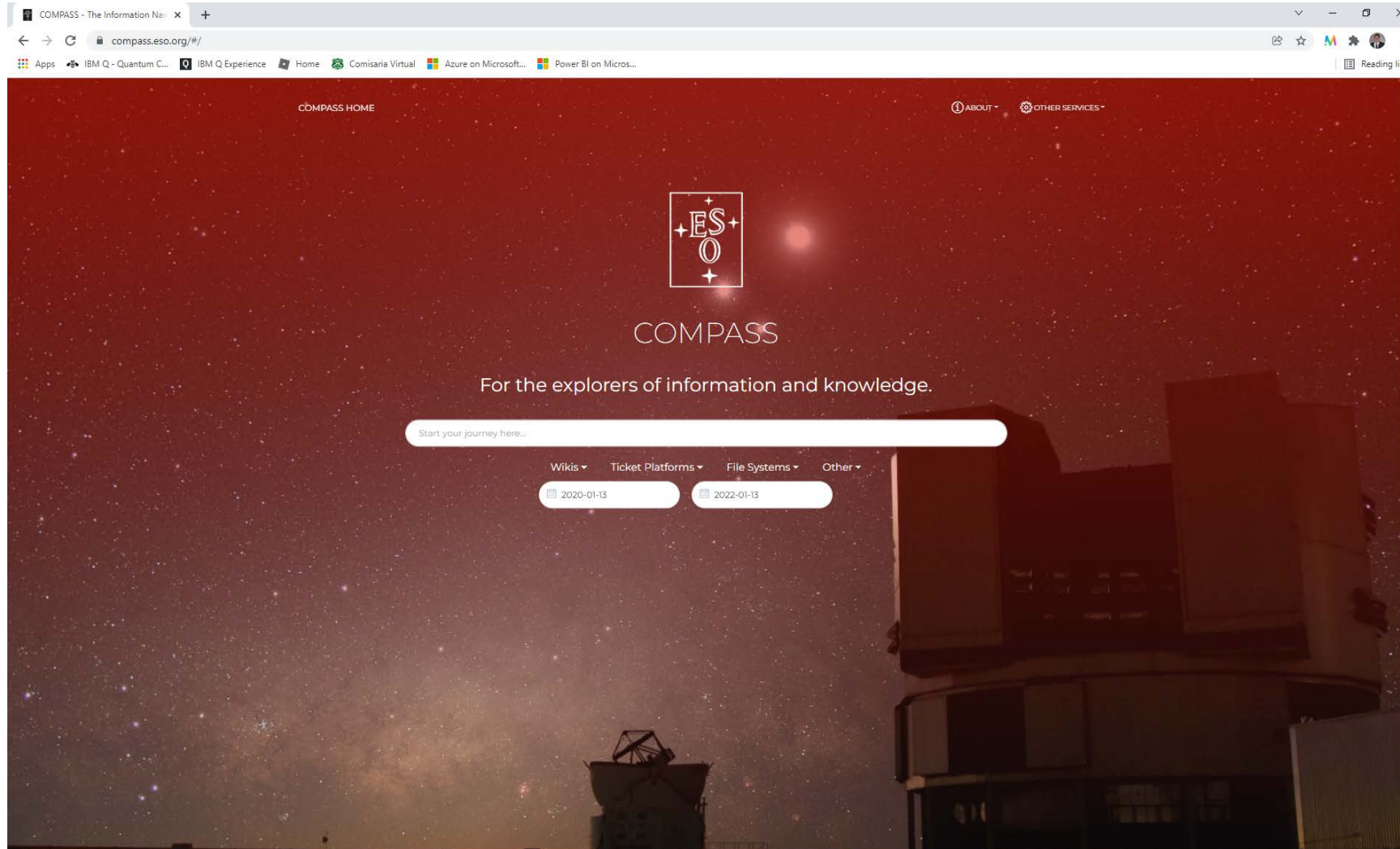
**TTR (Technical Time Requests)**

+ Add task

- Sample Project  
08/30 1 ...  
GS RC
- Re-alignment of CIAO#3 on-axis using the AOMS  
08/30 1 ...
- ESPRESSO RED LFC Corrective maintenance Mission : fiber injection repari and alignment.  
09/17 1 ...
- A new ACROMAG board to be tested in an operational LCU  
08/10 1 ...
- Testing new Sensor Arm Reference Light board in an Adapter rotator to be defined by SCIOPs.  
08/04 1 ...



# COMPASS: more than a search engine





# COMPASS main sections



The Knowledge Navigator at Paranal.

## What is PARANAV?

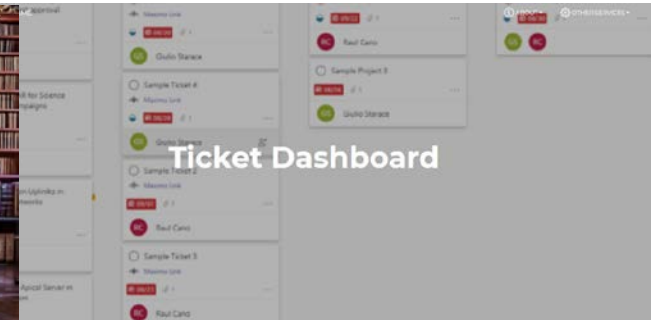
PARANAV aims to be a single-entry point to information and knowledge within Paranal. There are many tools around Paranal and it is sometime daunting to find the right one, so with Paranal we want to facilitate getting the right information to the right person at the right time.



Information and Knowledge Management

## What is the goal of the IKM program?

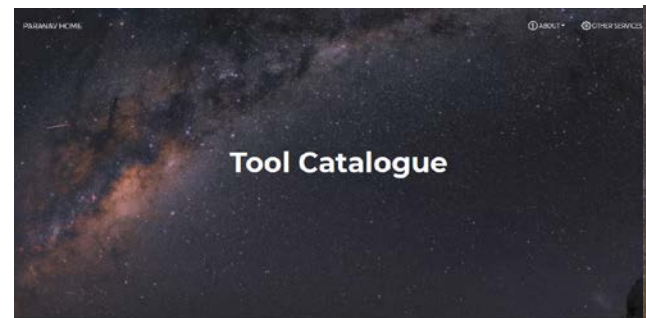
The main goal of the IKM program is to allow every employee at LPO find the right information at the right time.



Ticket Dashboard

## What is the Ticket Dashboard?

A visual dashboard embedded as an app in Teams where group members can see in one place the various activities they are involved in, whether they come from PPRS, CCB, TTR or Maximo.



Tool Catalogue

## What is the Tool Catalogue?

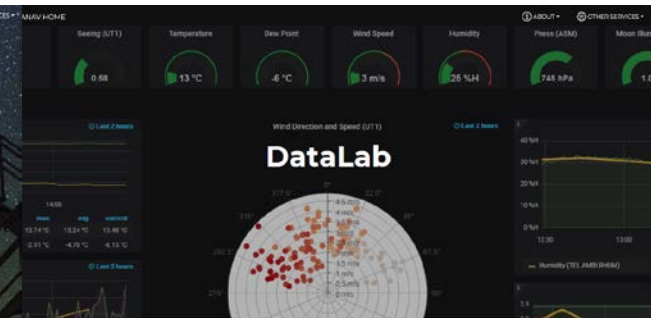
An inventory of software platforms used across the observatory. This catalogue will help you find the right tool for your work by indexing all the existing ones, so you don't need to create a new tool every time.



MSE Experts

## What is a MSE Expert?

This role was created in April 2014 during the department restructuring. An expert role is also discussed ESO-wide since July 2014 to help fulfilling the organization's mission and to enable people continuing their career path in technical areas. [More info in this MSE Wiki page.](#)

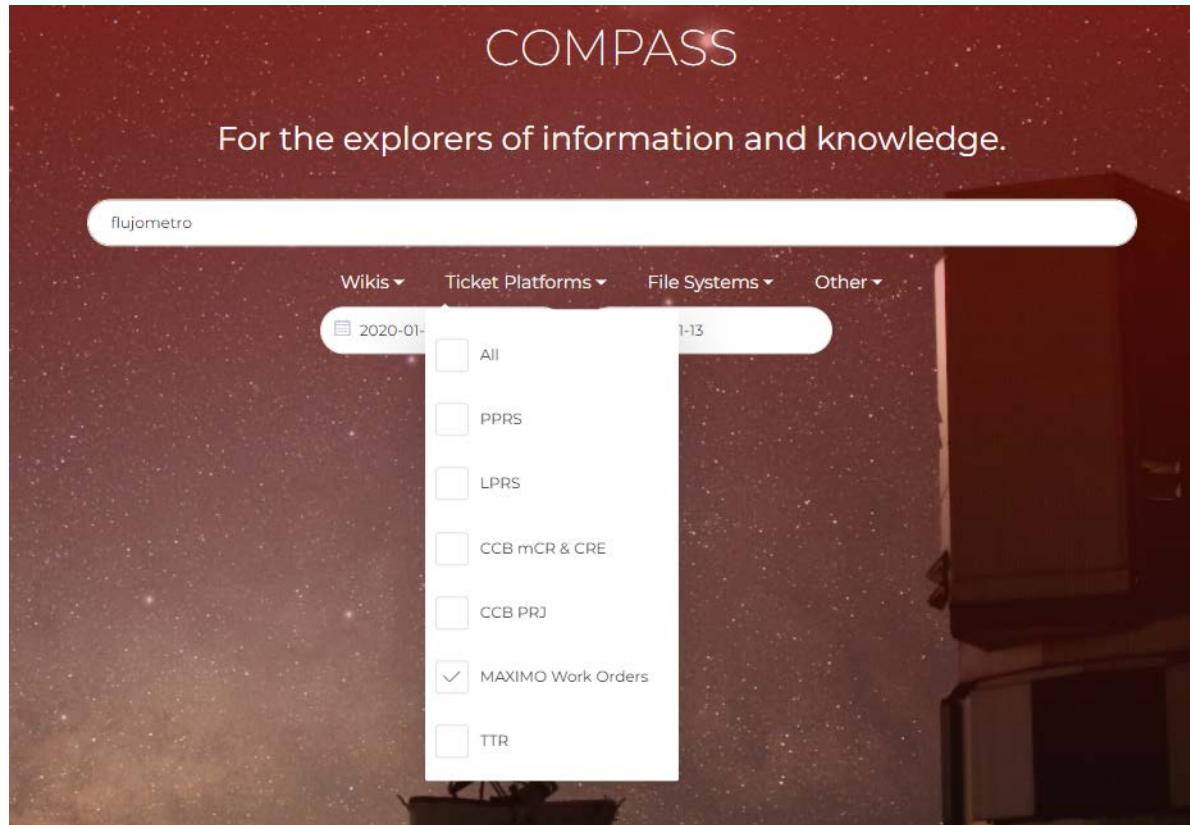


DataLab

## What is DataLab?

The Paranal DataLab is an integrated suite of tools and systems designed to deal with all the technical and operational data produced by the Paranal telescopes and its instruments.

# COMPASS search



## Search results for 'cooling'

### PPRS 2737 Results From This Source

The data source "remedy" returned 2737 results for the search "cooling"; only showing the first 100

### CCB 132 Results From This Source

The data source "ccb" returned 132 results for the search "cooling"; only showing the first 100

### CCB-0002402 :: New CUNO filtering system for UTs 1, 2 and 3

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Change+Request+Form&server=wlporem&id=CCB-0002402>

Eloy Fuenteseca :: Dear CCB: Here a very important Change request (from my point of view). This improvement in the cooling filtering system will provide enormous reliability against the cooling leak battle into the telescopes. As always the techni...

### PPRS-064618 :: Cooling Flow too low alarms during the night

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-064618>

Many cooling Flow too low alarms during the night (audible alarm): 2016-03-03 06:47:51 GLOBAL <alias>DCS\_Services.coolingFlow 0 serious Cooling Flow too low 2016-03-03 06:51:51 GLOBAL <alias>DCS\_Services.coolingFlow 0.1449275 serious...

### PPRS-032256 :: Maintenance In Vimos

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-032256>

Perform electronic maintenance in Vimos

### PPRS-018102 :: Cooling

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-018102>

2005-12-19 9:21:04 PM rcastill Cooling flow too low in the Isaac CCC compressor.

### PPRS-024840 :: Metrology problems in DL6 please Check

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-024840>

Metrology problems on DL6 please Check ASAP. J Haddad

### PPRS-053792 :: CCC and Cabinet 5 Cooling Alarms

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-053792>

Dear Mechanical Team, Last night the following alarms were triggered in KMOS: CCC1,2,3 cooling alarm around 12:30 UT - 18.11.2013 Cabinet 5 cooling alarm around 8:00 UT - 18.11.2013 which probably active the siren alarm at the telescope. Apparently, t...

### PPRS-017154 :: secondary cooling circuit

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-017154>

2005-09-07 5:20:27 PM psangas PSA on 07/09/05 : due to a problem in the cooling of the CONICA cryocompressor, the secondary cooling circuit is set at 3 deg C ( primary cooling circuit was set at 1 deg C ) ,which should allow to run the compressor safel...

### PPRS-041279 :: Tests in Cooling Circuit of Visir He Compressors

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-041279>

Due to instability we have had in temperatures of Isaac, and since cooling Isaac He Compressor is connected to Visir Cooling, some temporal trial basis changes in Visir Cooling Control Loop were done in order to figure out what is the cause of temperature...

### PPRS-015438 :: icbConfigSet PLC COOLING sensor

<https://wlporem.sc.eso.org/arsys/servlet/ViewFormServlet?form=Paranal+Problem+Reporting+Sys&server=wlporem&id=PPRS-015438>

2005-03-12 11:09:26 AM nkorwei The cooling PLC in VISIR Ivics2 has been configured as a COOLING sensor device, rather than a special device (PLC). COOLING sensors have a name length limit of 5 characters and as all the PLC sensors have names longer tha...



# COMPASS Small Data Sets

“I keep that in ~~a spreadsheet a document~~ **COMPASS**”

We all do it. We all have a table or two of important information related to our jobs that we keep either in a spreadsheet or a Word document. But what if that information is something that other people in the organization could benefit from? How do you share it and make it available?

The collage shows three different data representations:

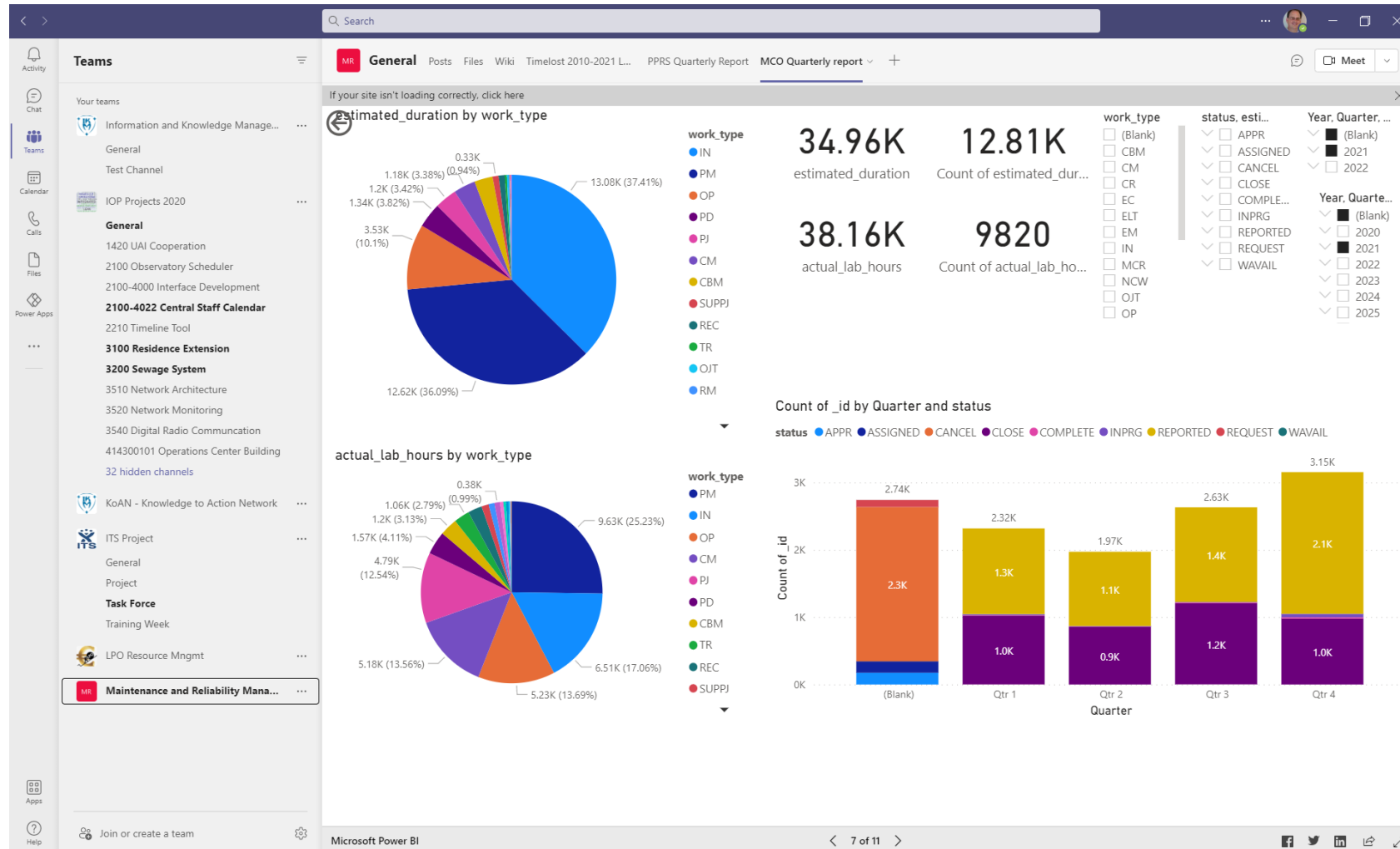
- Spreadsheet:** A table with columns for ID, Date Logged, Title, Due Date, Recommendation / Action Status, Expected Benefit, and Justification for Closure. It contains three rows of data related to fire alarm system maintenance and emergency brigade roles.
- Lessons Learned Dashboard:** A web interface titled 'Lessons Learned' showing a list of events and lessons. It includes details for a lesson about 'Maintenance of My Substation DB, CT, CB, and TA' and another about 'Breaker won't operate'.
- Catalogue of ESO Tools and Applications:** A web interface titled 'Catalogue of ESO Tools and Applications' showing a list of tools. It includes details for tools like 'A-Test' and 'CCB'.







# COMPASS API for dashboards





# Other IKM activities

## Communication activities

COMPASS naming contest (announcements + surveys)

Collection of feedback for COMPASS, ticket dashboard, timeline

## Trainings

Compass

Timeline

Tool catalogue

## Working groups

Information Systems Working Group

Information Technology User Group

ITS Task Force





# *Key Performance Indicators*

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Establishing a method to measure the success and impact of the IKM programme

# Key Performance Indicators

## Organizational IKM index

**INAKI** (INformation And Knowledge Index)

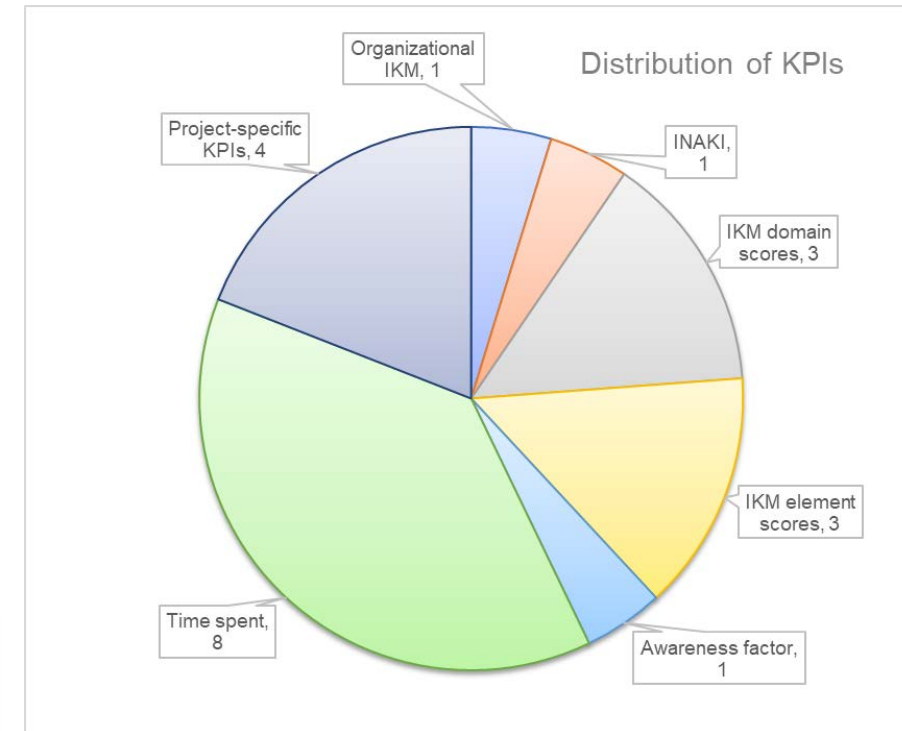
**IKM domain scores** [ 3 KPIs ]

**IKM element scores** [ 3 KPIs ]

**IKM organizational awareness factor**

**Time spent** [ 8 KPIs ]

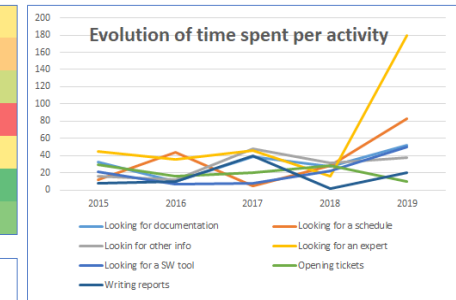
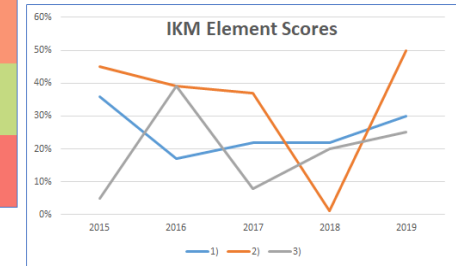
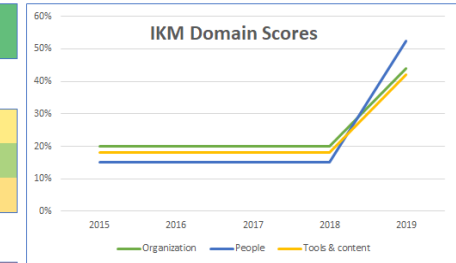
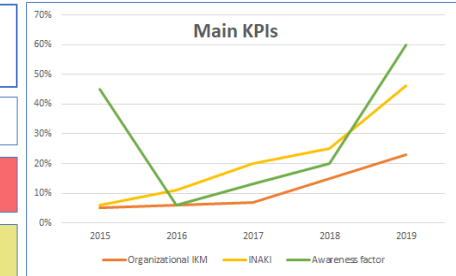
**Project specific KPIs** [ 4 KPIs ]



# Sample KPI report



Information and Knowledge Management Program					
Key performance indicators					
Reporting period	2015	2016	2017	2018	2019
Organizational IKM	5%	6%	7%	15%	23%
INAKI	6%	11%	20%	25%	46%
Organizational Awareness Factor	45%	6%	13%	20%	60%
<b>IKM Domain Scores</b>					
Organization	20%	20%	20%	20%	44%
People	15%	15%	15%	15%	53%
Tools & content	18%	18%	18%	18%	42%
<b>IKM Element Scores</b>					
1) Are there regular communications about processes, tools and other elements concerning how information and knowledge are (or should be) managed at ESO?	36%	17%	22%	22%	30%
2) Is the tool ecosystem appropriate to the necessary work?	45%	39%	37%	1%	50%
3) Is the official information repository in your area a reliable source?	5%	39%	8%	20%	25%
<b>How long is spent on a regular day in the following ?</b> (average minutes per person, per working day)					
Looking for documentation	32	10	39	27	53
Looking for a particular schedule	12	44	5	28	83
Looking for other information (e.g. tickets, reports, ...)	16	12	48	31	38
Looking for a person that could help me	45	36	46	16	180
Looking for a SW tool that could help me	21	7	8	22	50
Opening tickets	29	16	20	28	10
Writing reports	8	10	40	2	20
<b>Biggest waste of time</b>	Meetings	Meetings	Email	Looking for information	Meetings





# *Conclusions*

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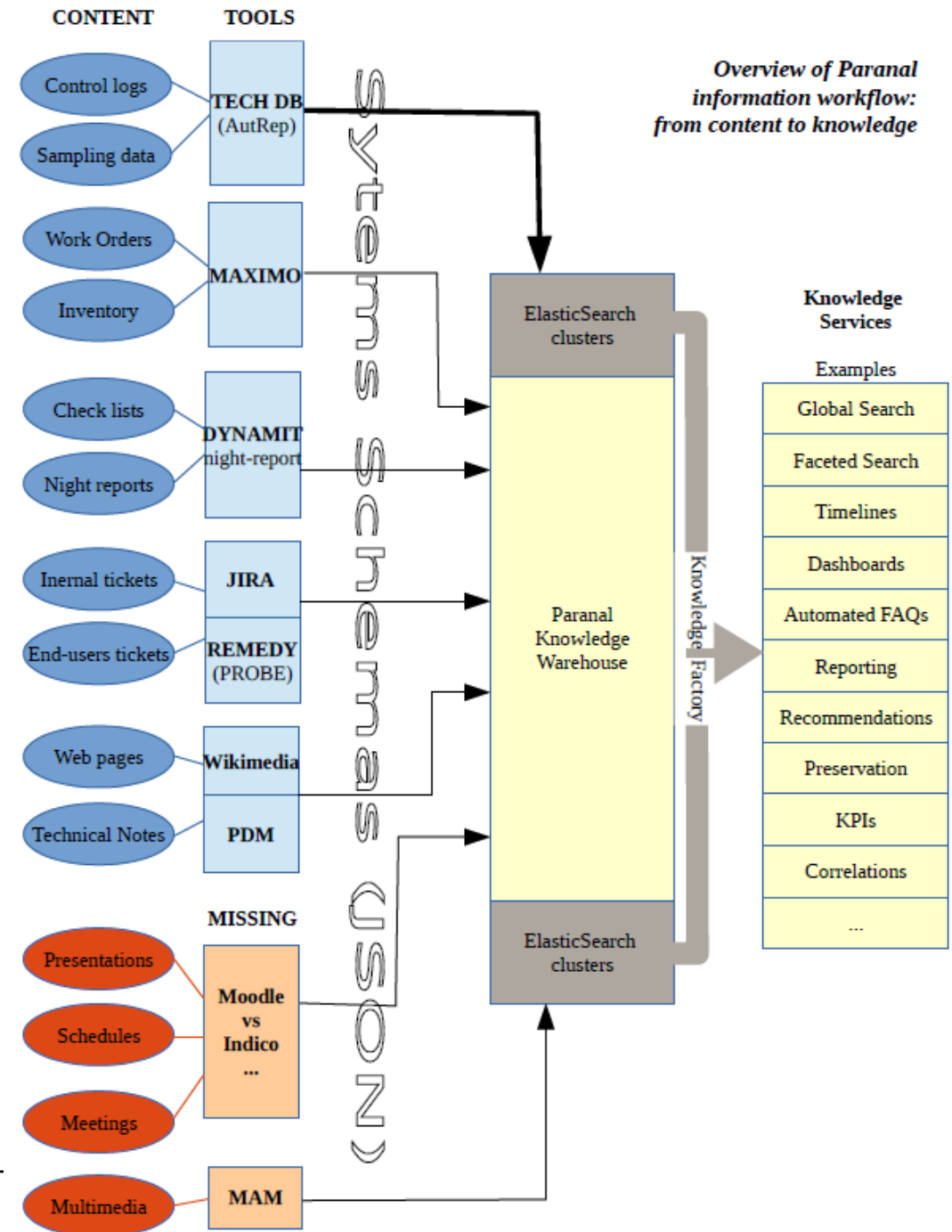
Results after almost 3 years running the IKM programme at ESO LPO



# Vision

## Information workflow

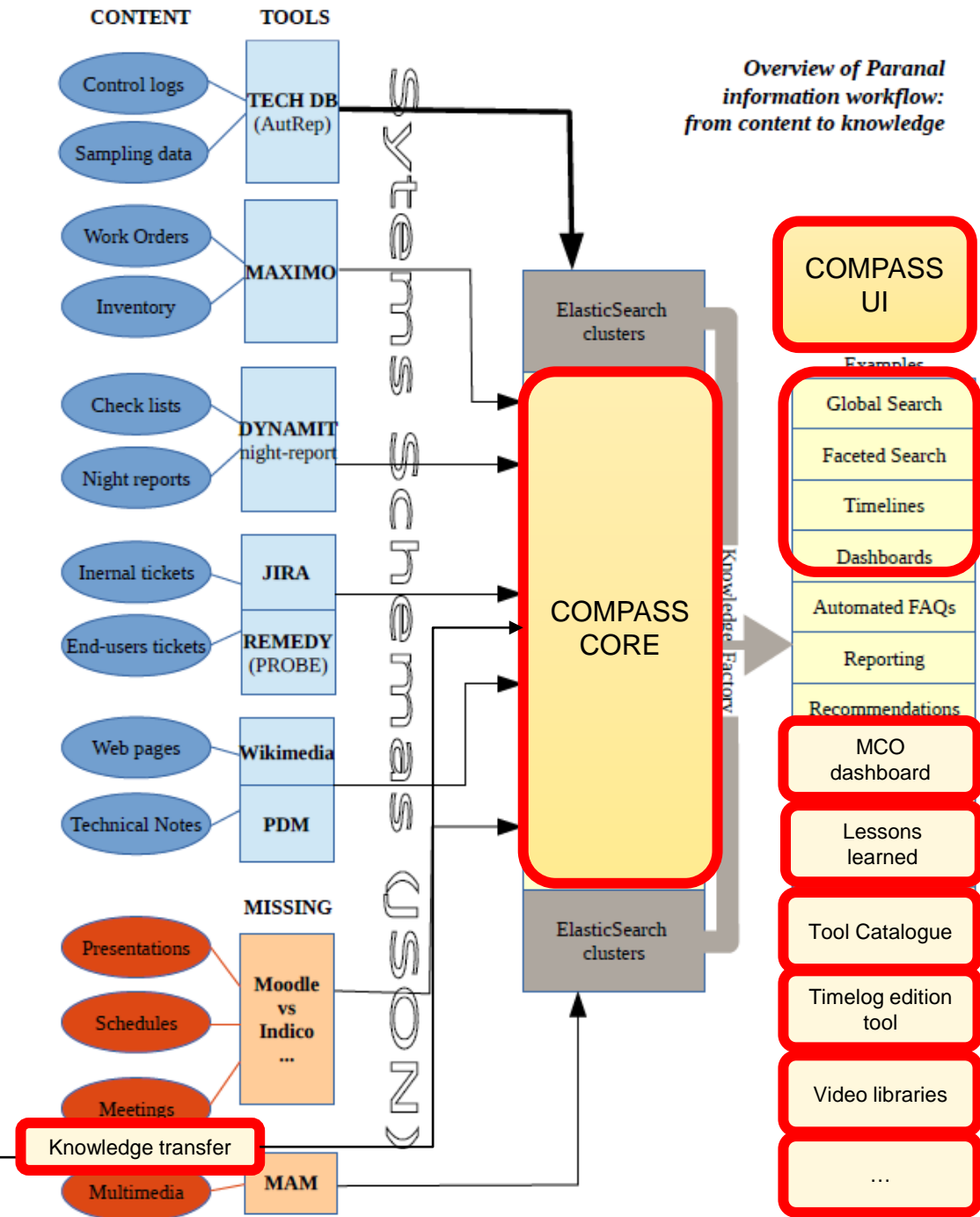
- Content (user & automatic generated)
- Tools (storing and making content available)
- Knowledge warehouse + ElasticSearch clusters
- End-user knowledge services
- Global search
- Timelines
- Dashboards
- ...



# Vision vs achievements

## Information workflow

- Content (user & automatic generated)
- Tools (storing and making content available)
- Knowledge warehouse + ElasticSearch clusters
- End-user knowledge services
- Global search
- Timelines
- Dashboards
- ...





# Thank you!

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