



IRAM Information Flow

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& Jérôme Pety



May 10th 2023 - Milan

Observation Management System: I. Goals

Handling of IRAM projects

Proposals More than 200 proposals every 6 months.

Observations 24/24 hours, 7/7 days operation on 2 sites.

Archive +40 TiB/yr at NOEMA, +28 TiB/yr at Pico.

History ~ 40 years.

State before OMS

- Various independent prototypes developed by astronomers.
- Much manual housekeeping.

OMS aims

- Optimize the end-to-end handling of science projects.
- Gather and rationalize prototypes with new implementation by software engineers.
- Automate as many tasks as possible.
- **Minimize maintenance and simplify upgrades** ⇒ keep room for innovation.



Observation Management System: II. Overview

Set of independent tools (databases)

- Multi-user environment.
- Factorized tools.
- Web interface with similar look and feel.
- Interfact with GILDAS astronomical engines.

Already in operation

Proposal Management System

- Proposal submission and program committee.
- NOEMA & 30m.

Setup Management System

- Preparation of observing procedures.
- NOEMA.

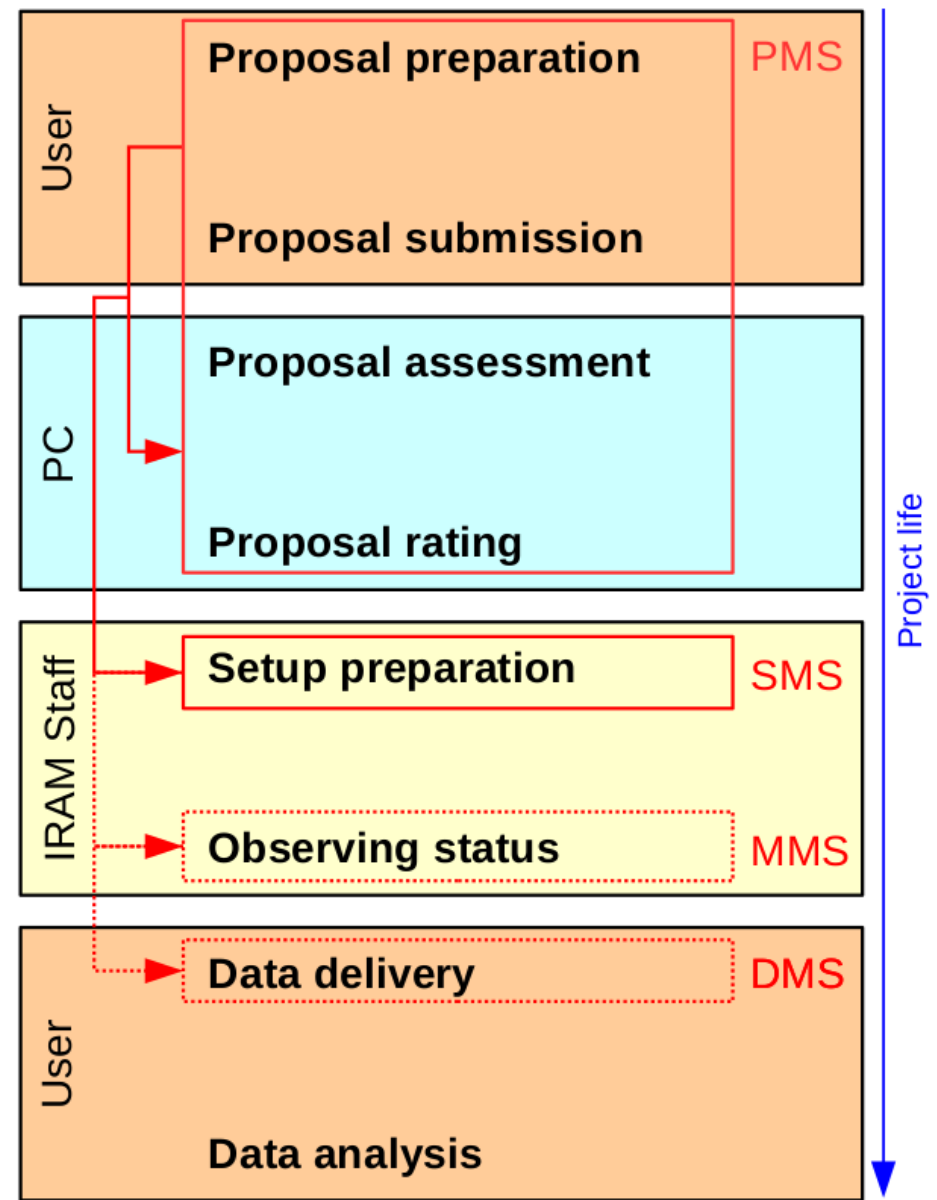
Monitoring Management System

- Schedule and monitor observations.
- 30m.

Existing prototypes that still need to be collected in the same professional framework.

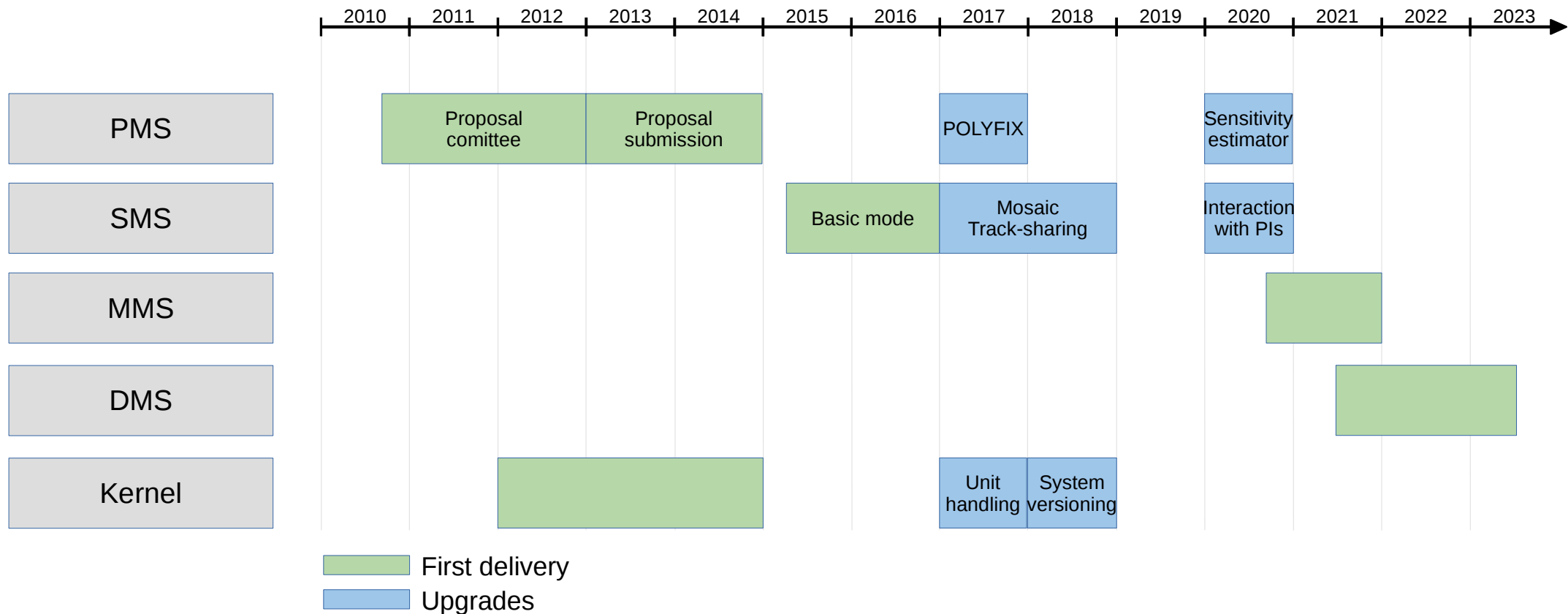
Data Management System

- Database of actual observations and associated calibration reports.
- Import and expand the searchable index on all completed observations currently existing at CDMS (Strasbourg).

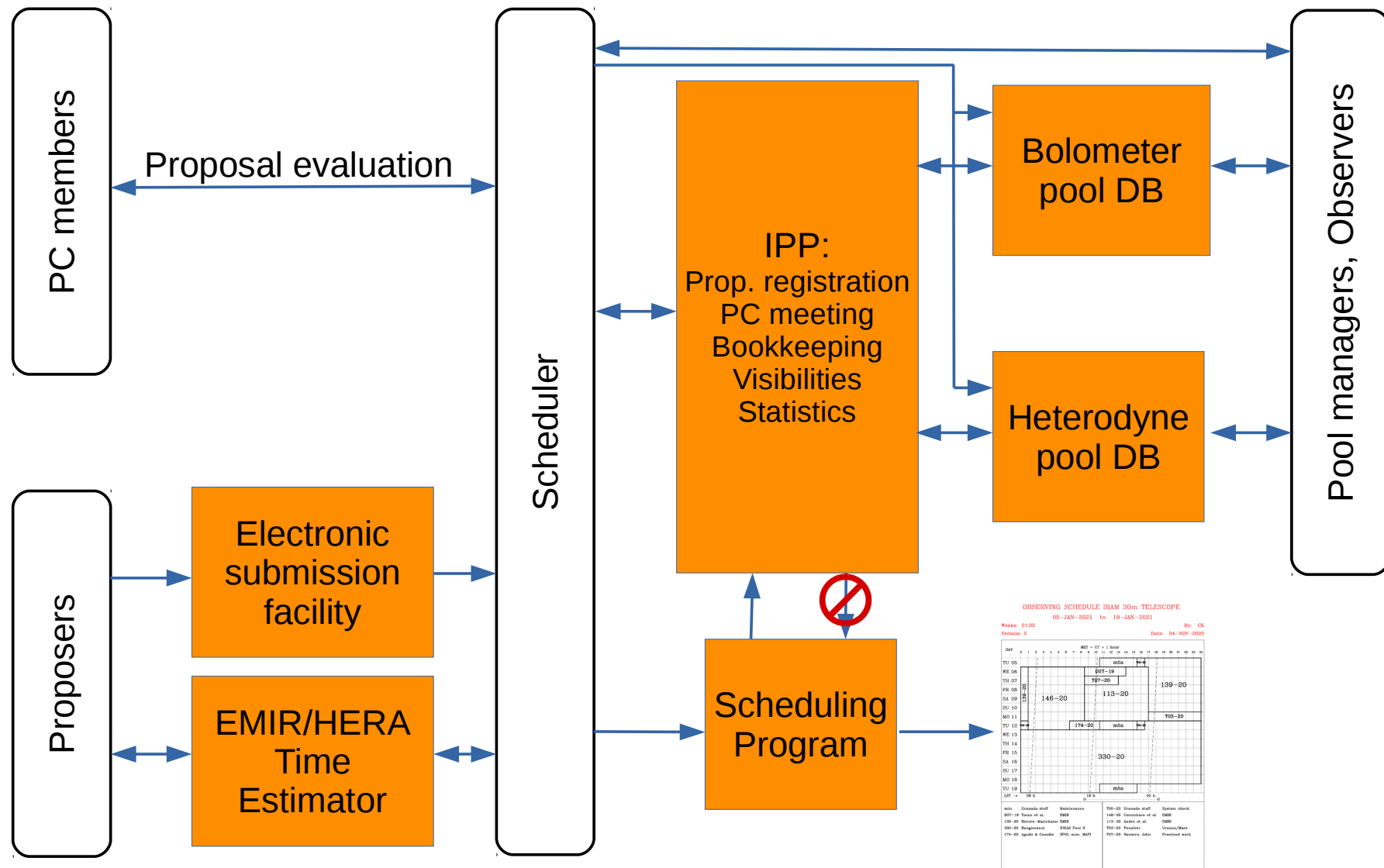


Observation Management System:

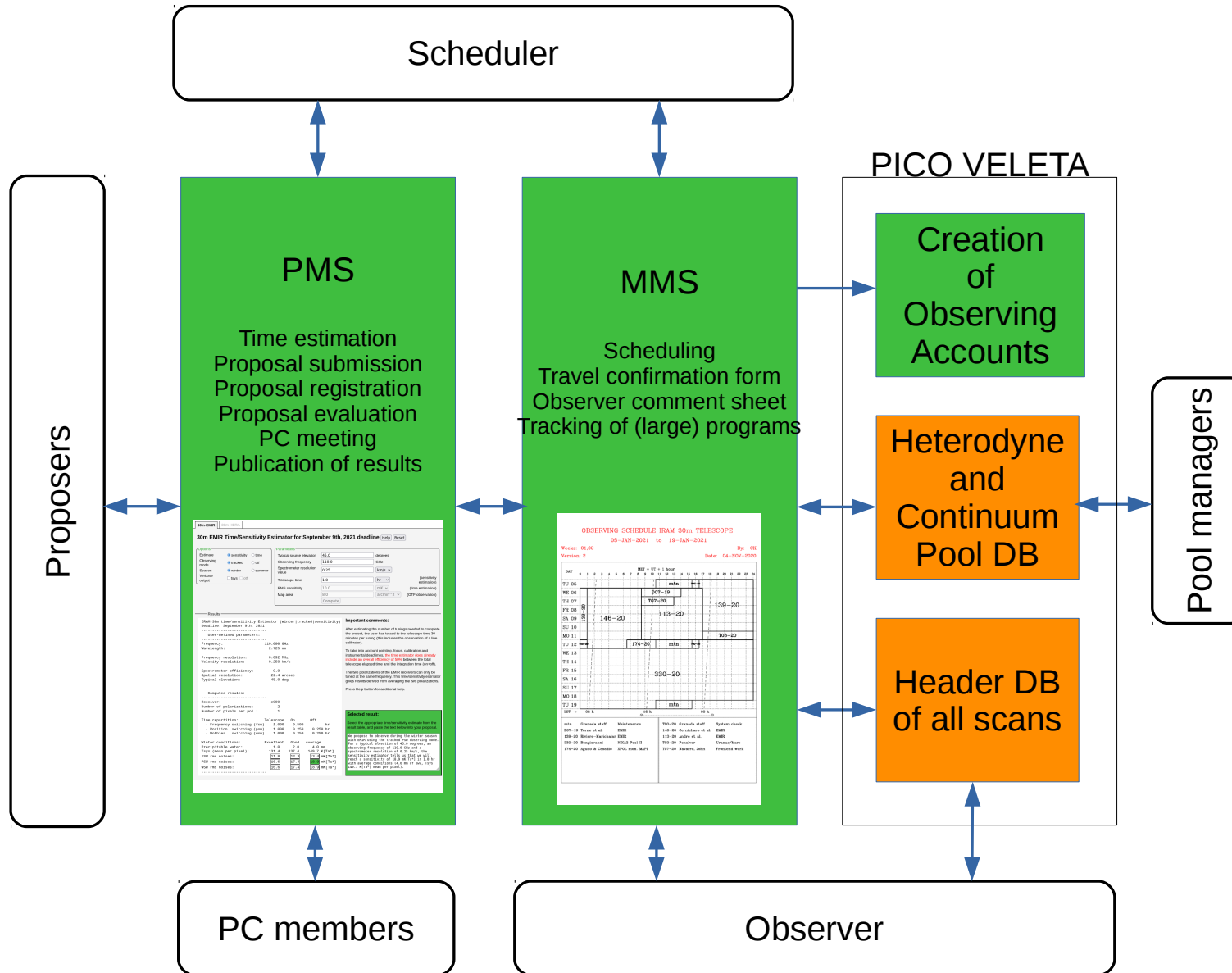
III. Timescales



30m status before OMS, ie, before 2010



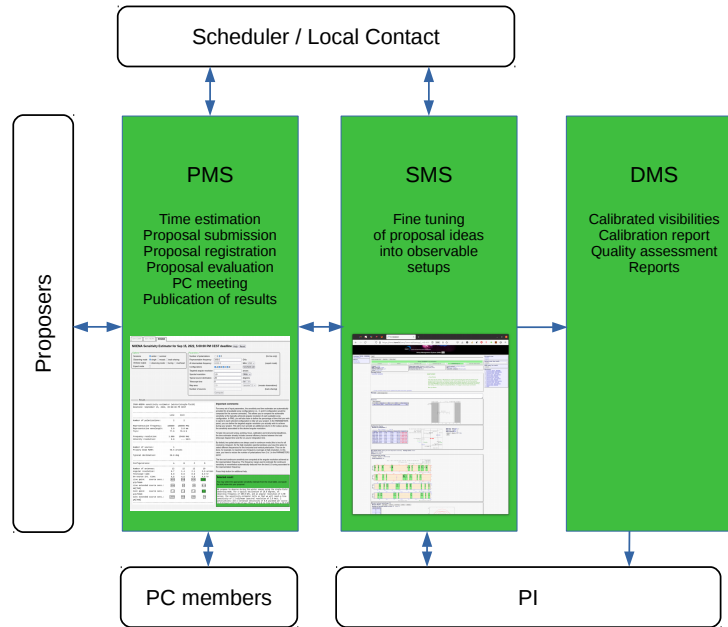
30m status at end of 2021



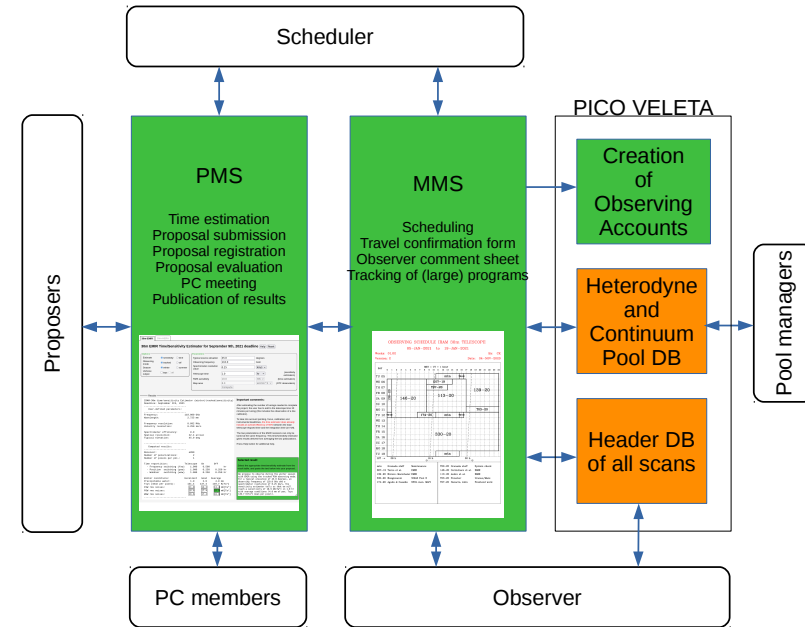
Two imbricated workflows

Project

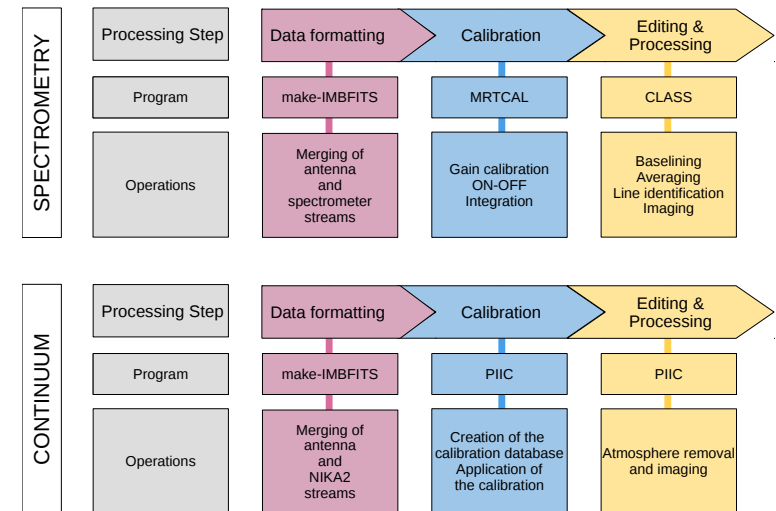
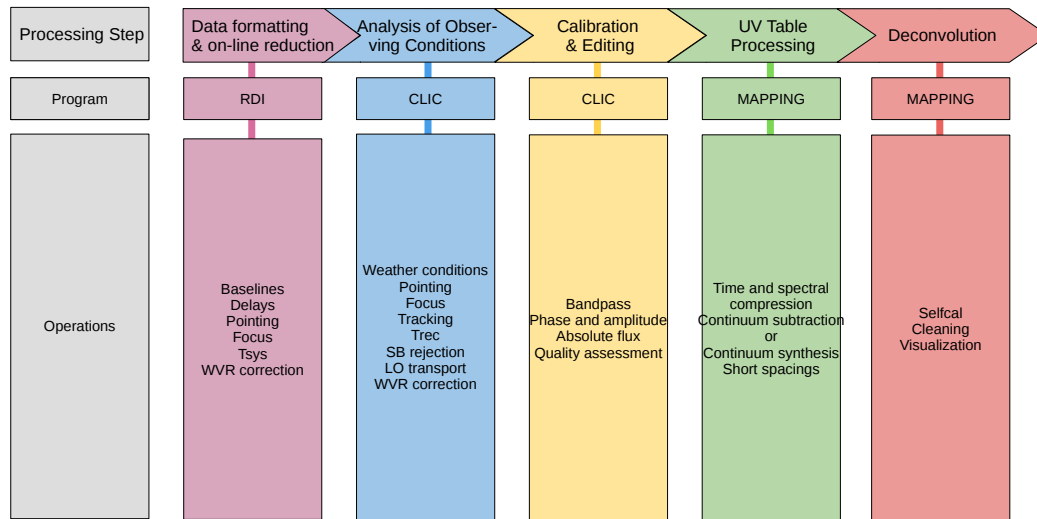
NOEMA



30M



Data



Data formats

All calibrated data can still be read today!
We are going towards using only FITS for science-ready data products.

Metadata

IRAM has documented and standardized metadata.
IRAM ensures that all instruments comply with these standards.

Identification

All data are tagged by their unique project number.
IRAM recommends that the community cite the project number in publications.
This number is not (yet) a digital object identifier (DOI).

Data quality

Once the raw data is stored, it is never edited to preserve integrity
(Additional metadata are archived in different data files).
At NOEMA, quality assessment is applied to all calibrated data and (only) good visibilities
with detailed reports on the calibration and filtering are distributed to the PI.
At the 30m, all observation comments are stored in a database.

Infrastructure organization

Confidentiality/Ethics

- Access to databases needs authentication. It is based on role (PI, local contacts, AODs, schedulers, ...)
- No other sensitive data.

Expert advise

- SAC.
- CDS advise for VO port started in the framework of ESCAPE.

Continuity access

- IRAM partner agreement up to 2034.

Governance and business model

- IRAM has resources to acquire, process, and archive data.
- No complete business model yet for the FAIR distribution of data. But
 - One additional software engineer will be recruited.
 - IRAM participates in ACME proposal to next EU infrastructure call.

Sensitivity Estimation

30m-EMIR
30m-HERA
NOEMA

NOEMA Sensitivity Estimator for Sep 9, 2021, 5:00:00 PM CEST deadline

Help
Reset

Options

Sessions winter summer

Observing mode single mosaic track-sharing

Verbose output observing mode tuning overhead

Expert mode

Parameters

Number of polarizations 1 2 (for line only)

Representative frequency GHz

At intermediate frequency MHz (expert mode)

Configurations A C D

Targeted angular resolution arcsec

Spectral resolution MHz

Typical source declination degrees

Telescope time hr

Map area arcmin² (mosaic observations)

Number of sources (track sharing)

Results

IRAM-NOEMA sensitivity estimator (winter|single-field)
Deadline: September 09, 2021, 05:00:00 PM CEST

	Line	Cont
Number of polarizations:	2	2
Representative frequency:	100000	100000 MHz
Representative wavelength:	3.0	3.0 mm
Tsys:	77.6	76.9 K
Frequency resolution:	1.000	15488 MHz
Velocity resolution:	3.0	--- km/s

Number of sources:	1
Primary beam FWHM:	49.5 arcsec
Typical declination:	20.0 deg

Configurations:	A	C	D
Number of antennas:	11	11	11
Angular resolution:	1.0	2.0	3.9 arcsec
Telescope time:	8.0	8.0	8.0 hr
On-source int. time:	4.6	4.6	4.6 hr
Line point source sens.:	1000	1000	1000 μ Jy/beam
Line extended source sens.:	120	30	8.0 mK[Tmb]
Cont point source sens.:	7.9	7.9	7.9 μ Jy/beam
Cont extended source sens.:	970	240	64 μ K[Tmb]

Important comments:

For every set of input parameters, the sensitivity and time estimates are automatically provided for all available array configurations (i.e., C and D configuration would be computed for the summer semester). This allows you to compare the achievable sensitivity at the typically achieved angular resolution of each available array configuration. In PMS, you will also have to define the percentage of time that you wish to spend in each selected configuration to fully set your project. In the PARAMETERS panel, you can define the targeted angular resolution you actually wish to achieve during your project. This will in turn provide an additional column in the output, giving the sensitivity associated to this desired angular resolution.

To take into account tuning, pointing, focus, calibration and instrumental deadtimes, the time estimator already includes several efficiency factors between the total telescope elapsed time and the on-source integration time.

By default, two polarizations are always used in continuum mode (this is true for all receivers). However, for the high resolution spectral windows you have the option to select different frequencies for the horizontal and vertical polarization. This can be done, for example, to maximize your frequency coverage at high resolution. In this case, you have to reduce the number of polarizations from 2 to 1 in the PARAMETERS panel.

The line and continuum sensitivity are computed at the angular resolution achieved at the representative frequency. The frequency range used to estimate the continuum sensitivity is nevertheless automatically deduced from the best LO tuning associated to the representative frequency.

Press Help button for additional help.

Selected result:

You may select the appropriate sensitivity estimate from the result table, and paste the text below into your proposal.

We propose to observe during the winter season using the single-field observing mode. For a typical declination of 20.0 degrees, an observing frequency of 100.0 GHz, and an angular resolution of 3.90 arcsec, the sensitivity estimator tells us that we will reach a line sensitivity of 1000 μ Jy/beam (spectral resolution of 3.0 km/s, 2 polarizations) and a continuum sensitivity of 7.9 μ Jy/beam per source in 8.0 hours with 5 mm of pwv (Tsys = 77.6 K in line and Tsys = 76.9 K in continuum).

IRAM Information Flow

J.Pety, 2023

Proposal Management System

History → Data Management System / Show programs / ORION-B / 124-16

Print Save as PDF Resubmit this proposal

Proposal 124-16 (pdf)

Title: ORION B: The anatomy of a Giant Molecular Cloud

PIs: Jérôme Pety, Maryvonne Gerin

CoIs: Emeric Bron, Viviana Guzman Veloso, Jan Orkisz, Sebastien Bardeau, Javier R. Goicoechea, Pierre Gretler, Franck Le Petit, François Levrier, Harvey Liszt, Karin Öberg, Nicolas Peretto, Evelyne Roueff, Albrecht Sievers, Pascal Tremblin

Total requested time: 550.0 (Emir)

Continuation: 019-13, 022-14, 145-14, 122-15, 018-16

Proposal history:

The proposal committee granted us about 300 hours of IRAM 30-meter time to map slightly more than 1.5 square degree in the western edge of the Orion B molecular cloud (projects 019-13, 022-14, 145-14, 122-15, and 018-16) from 72 to 80 GHz and 84 to 116 GHz, i.e., almost all the 3 mm band. A first set of 4 papers analyzing the data set acquired in 2013 and 2014 are either published or submitted. The first results were presented in the ISM symposium in Zermatt on September 2015, SWASS on July 2016, Exceter on August 2016, and we will continue to advertise them in the coming year. These works made high use of the number of detected species and the high spectral resolution. The region mapped up to now is strongly illuminated in far UV with a mean $G_0 = 45$ (ISRF, Habing 1968), since massive stars illuminate the molecular cloud both from the outside and from the inside. The reached conclusions are thus biased towards such conditions. In order to broaden our conclusions, we now propose to observe the same frequency ranges in both filamentary structures (1.5 square degree) and translucent gas (another 1.5 square degree) that are in much quieter regions with a typical $G_0 \sim 4$. This will help improve our understanding of the chemistry and physics at stake in the Orion B molecular cloud.

Abstract:

Molecular emission often provides the best and sometimes only constraints on the physical processes that govern star formation. Common molecules like CO (isotopologues), HCO+, HCN, H2H+, CH3OH, H2CO, DCO+, N2D+, DCN provide constraints on density, temperature and illumination structures. The utility of these molecular probes is currently limited, however, by lack of comprehensive data sets that connects emission patterns with small and large-scale physical structures quantitatively. To address this we have acquired a 3 mm spectral-image cube of the UV illuminated western edge of the Orion B molecular cloud. We here propose to extend the spatial coverage from 15 to 45% of Orion B, in order to sample the full range of physical conditions characterizing high-mass star forming regions, instead of being biased towards the high UV illumination of the western edge. The ultimate goal of this project is to develop Orion B as a template for galactic and extra-galactic studies by correlating chemical and physical structures across the full 3mm band. This will allow us to calibrate popular molecular probes, developing their full potential as tools to understand star formation, near and far.

Sources and setups

Sources: [Download sources](#)

Id [?]	Epoch	RA	DEC	Vlsr (km/s)
Horsehead	J2000	05:40:54.270	-02:28:00.000	10.5

Technical sheets:

Emir								Rec. time	Grade	
<input checked="" type="checkbox"/> Time: 550.00 hours Frontend/Backend setups:								550.0	A	view
Setup	Band [?]	Species/Transition	Frequency [?] GHz	Receiver band [?]	T _A * [?] mK	Rms [?] mK	ΔV [?] km/s	Backends [?]		
1	E0 (3mm)	Any	76.5	LI	> 300.0	120.0	0.764	FTS200		
2	E0 (3mm)	Any	90.0	LI	> 300.0	103.0	0.65	FTS200		
3	E0 (3mm)	Any	97.5	LI	> 300.0	102.0	0.6	FTS200		
Observing parameters:										
Setup	Observing mode	Size X	Size Y	Switch mode	PWV [?] mm	Time [?] hours	Repetition [?]	Remark		
1	OTF	103.9	103.9	PSW	4	130.0	1			
2	OTF	103.9	103.9	PSW	4	180.0	1			
3	OTF	103.9	103.9	PSW	4	220.0	1			
Number of receiver tunings: 40										

Session: Winter **Proposal category:** Large program **Scientific category:** High-mass star formation, Intermediate-mass star formation, Low-mass star formation, Pre-stellar cores, Infra-Red Dark Clouds (IRDC), Astrochemistry, Inter-Stellar Medium (ISM)/Molecular clouds, Photon-Dominated Regions (PDR)/X-Ray Dominated Regions (XDR), HII regions

Scheduling constraints:

We definitely need stable weather and we thus ask to avoid foggy spring afternoons when the snow melts.

PI note:

This project is part of the PhD thesis of Jan Orkisz under the direction of Jérôme Pety and Maryvonne Gerin. Emeric Bron and Viviana Guzman are two post-docs who devote a significant fraction of their time on the project.

Date: 2016-09-15 12:26:36

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Monitoring Management System: Scheduling a two-weeks period

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[Create a scheduling unit](#)
[Add a marker](#)
[Update public version](#)
[Refresh graphic](#)
[Edit](#)

Sep 28 - Oct 12, 2021

From: 2021-09-28 10:30:00

To: 2021-10-12 10:30:00

Semester: Summer 2021

Comment: Imported from data/mms/sched30m/21/wk39v1.dat

Missing hours: 0.0

OBSERVING SCHEDULE IRAM 30m TELESCOPE

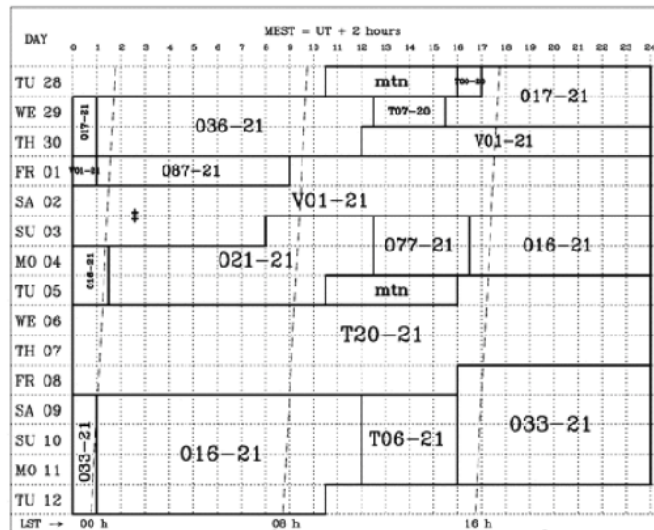
28-SEP-2021 to 12-OCT-2021

Weeks: 39,40

By: CK

Version: 1

Date: 29-SEP-2021



017-21	Chi Yan	EMIR	min	Granada staff	General Maintenance
T00-20	Granada staff		T07-20	Granada staff	
036-21	Riviere-Marichalar	EMIR	V01-21	UNKNOWN	UNKNOWN
087-21	Agudo, Casadio	EMIR	021-21	Ferrer Asensio	EMIR
016-21	Hily-Rient	EMIR	077-21	Jaehym	EMIR
T20-21	Granada staff		039-21	Yan	EMIR
T06-21	Granada staff				

Scheduling units

Edit slots[?]:

Project↑	Unit	Hours	Status [?]	Observer	Observing mode	Funding	Mission sent [?]	
mtn	on Tuesday 28 (from 10:30 to 16:00)	5.5	Validated				<input type="checkbox"/>	edit/delete
	on Tuesday 5 (from 10:30 to 16:00)	5.5	Validated				<input type="checkbox"/>	edit/delete
016-21	from Sunday 3 (16:30) to Tuesday 5 (01:30)	18.0	Validated				<input type="checkbox"/>	edit/delete
	from Saturday 9 (01:00) to Tuesday 12 (10:30)	42.5	Validated				<input type="checkbox"/>	edit/delete
017-21	from Tuesday 28 (17:00) to Thursday 30 (01:00)	17.5	Validated				<input type="checkbox"/>	edit/delete
021-21	from Sunday 3 (08:00) to Tuesday 5	24.5	Validated				<input type="checkbox"/>	edit/delete

Setup Management System: Fine tuning

Instrumental tuning

Set frequency Import ASTRO script
 Show script Display lines List lines
Tolerance[?]: 10.0 MHz **Fixed frequency[?]:**

Band 3 REST: 265.886 GHz (LSR: 265.886, RF: 265.898) IF1: 8886 MHz USB 01-SEP-2021 00:00:00.0
 LSR Frequency (GHz) **New Velocity₁**
 $V_{LSR} = .0 \text{ km s}^{-1}$
 $V_{Dop} = -13.6 \text{ km s}^{-1}$
 $V_{LSR} = -12.100 \text{ km s}^{-1}$

SPW coverage for C2021A1 June ($V_{LSR} = -12.100 \text{ km s}^{-1}$)

Time settings

Representative REST frequency[?]: 265.886 GHz → **corresponding observed frequency:** 265.886 GHz
Spectral resolution[?]: 0.200 km/s (min. 0.070 km/s) → **that is:** 0.177 MHz

Requested time fraction per configuration[?]:
C[?]: % **D[?]:** % **or Any[?]:** 100.0 %

Requested telescope time[?]: 4.00 hours
 → **On source time:** 2.1 h
 → **Typical declination[?]:** 53.5 deg
 → **Resulting line sensitivity at representative frequency[?]:** 26.7 mJy/beam
 → **Resulting continuum sensitivity[?]:** 87.1 microJy/beam
 → **Tsys range over the bandwidth:** 213.3 - 290.2 K

Setup Management System: Workflow

Local Contact - Scientific Validator - Scheduler

Summer 2021 - NOEMA
My proposals

About
Contact us
Contributors

Back Previous setup Next setup

Send message only Re-open to SV Validate setup Duplicate Show setup

Setup S21AA001

created → edited → opened to SV → validated by SV → validated by LC → sent for observation

Project: S21AA
PMS proposal: S21AA
PDF file (5MB max): pdf
Letter: s21aa.html

Observing mode: Detection
Requested sensitivity: 26.7133mJy/177.4kHz
On source time (h): 2.08

Local contact: Jeremie Boissier
PIs: Nathan Roth
Scientific validator: Nathan Roth

Setup comment[?]:
Cometary Observations. Check time constraint and calibrators please.

Message history:

Scientific Validator

[2021/06/09 18:30, Validate]

Local Contact

[2021/06/08 17:42, Open to SV]
→ Hi Nathan,
Here is a new version with a corrected spectral setup, I think the CS line was missed in the original one.
If this is fine for you I will proceed.

Jeremie

[2021/06/09 00:55, Cancel open to SV]
→ I take back the setup to put CH3OH instead of CS

[2021/06/09 00:56, Open to SV]
→ New version uses original spectral setup

Message: Send message only Re-open to SV Validate setup

Sources

Add a source Upload sources Validate Save catalog as

+	[?]	Epoch	RA	DEC	Visr (km/s)
☐		A1-14-jun	J2000 10:33:27.890	54:40:22.400	0.0
☑		A1-20-jun	J2000 10:31:06.950	53:32:43.900	0.0
☐		A1-01-jul	J2000 10:29:19.180	51:29:09.200	0.0
☐		A1-14-jul	J2000 10:30:35.560	49:06:48.400	0.0
☐		A1-30-jul	J2000 10:35:55.140	46:20:51.900	0.0
☐		A1-10-nov	J2000 12:05:44.140	34:02:36.400	0.0
☐		A1-20-nov	J2000 12:28:02.320	33:02:00.100	0.0
☐		A1-30-nov	J2000 13:14:22.860	30:24:35.600	0.0
☐		A1-08-jun	J2000 10:36:57.140	55:47:21.800	0.0
☐		C2021A1_Nov	J2000 13:06:00.000	30:58:00.000	-29.8
☐		C2021A1_June	J2000 10:40:00.000	57:00:00.000	-12.1
☐		C2021A1_July	J2000 10:28:00.000	50:25:00.000	-14.7

IRAM Information Flow

J.Pety, 2023

Next step: Data Management System

Indexation/visualization/distribution of data products

- First version will deliver science ready data products of completed IRAM Large Programs.
- Collaboration with Obs. de Paris to use the YAFITS tool.
- Started early 2021.
- To be delivered this year.

History → Data Management System / Show programs

Large programs

Project	Release↓	PMS	# dataset
ORION-B (Outstanding Radio-Imaging of OriO-N-B)	2022-06-01	124-16	92
GEMS (Gas phase elemental abundances in molecular clouds)	2022-01-12	006-17	1
CLAWS (CO Line Atlas within the Whirlpool galaxy Survey)	2021-05-19	055-17	21
BASSCO (The BAT AGN Spectroscopic Survey in CO)	2020-06-23	071-17	0
CALYPSO (Continuum and Lines in Young ProtoStellar Objects)	2020-02-04	U052	161
EMPIRE (EMIR Multiline Probe of the ISM Regulating Galaxy Evolution)	2019-06-11	206-14	186
PHIBSII (Molecular Gas at the Peak Epoch of Galaxy Formation)	2019-05-03	X053	540
ORION A CO	2018-03-20	010-04	2
XCOLDGASS (a legacy survey of molecular gas in the local Universe)	2017-10-20	188-12	869
ASAI (Astrochemical Surveys At IRAM)	2017-06-30	012-12	36
M33 CO (The complete CO(2-1) map of M33)	2016-03-03	225-10	5
PAWS (PdBI Arcsecond Whirlpool Survey)	2013-08-13	T057	25
W43HERO (W43 Hera/EmIR Observations)	2013-06-14	057-09	11
PHIBSI (Star Forming Histories and Gas Fractions of Galaxies from z=1-3)	2013-03-21	U0DE	181
COLDGASS (CO Legacy Database for GASS)	2012-09-26	228-09	367
HERACLES (HERA CO Line Extragalactic Survey)	2011-12-15	212-08	193
ILS (IRAM Lensing Survey)		TOCC	1

Standard programs

Project	Release↓	PMS	# dataset
NUGA (Nuclei of GALaxies)	2018-03-26		33
M31 CO (Molecular Gas in the Andromeda galaxy)	2012-01-31		3
AGB ATLAS			2
PULS (PdBI U/LIRG Legacy Survey)			2

Current user: pety
Logout

Search:
Go

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DMS: Indexation based on standardized FITS and VO keywords

Fits header

SIMPLE	1
BITPIX	-32
NAXIS	3
NAXIS1	325
NAXIS2	434
NAXIS3	80
EXTEND	1
DATAMIN	-1.8345071
DATAMAX	65.57428
BUNIT	K (Tmb)
CTYPE1	RA---ARC
CRVAL1	85.226125
CDELTA1	-0.002499999938946
CRPIX1	290.2036383598
CROTA1	14
CUNIT1	deg
CTYPE2	DEC--ARC
CRVAL2	-2.466666666667
CDELTA2	0.002499999938946
CRPIX2	131.4116126225
CROTA2	14
CUNIT2	deg
CTYPE3	VRAD
CRVAL3	10500
CDELTA3	500
CRPIX3	40.5
CROTA3	0
CUNIT3	m
OBJECT	ORION-B
RADESYS	FK5
RA	85.226125
DEC	-2.466666666667
EQUINOX	2000
ALTRPIX	40.5
ALTRVAL	115267164714.9
LINE	12CO(1-0)
RESTFREQ	115271202000
IMAGFREQ	92228430704.19
VELREF	257
SPECSYS	LSRK
BMAJ	0.008611110970294
BMIN	0.008611110970294
BPA	0
TELESCOP	30M
ORIGIN	GILDAS CUBE
DATE	2023-02-28T11:35:42.428

VO header

software_version	dev
dataprodct_type	cube
dataprodct_subtype	???
calib_level	3
access_format	image/fits
access_estsize	44078
target_name	ORION-B
s_ra	85.48280605537744
s_dec	-2.180881551542907
s_fov	1.351999714865601
s_region	ICRS (Polygon 86.0 -2.6 85.2 -2.8 85.0 -1.8 85.7 -1.6)
s_xel1	325
s_xel2	434
s_resolution	30.99999949305836
s_pixel_scale	8.999999780205600
em_ucd	em.freq
em_min	115263608058.9960
em_max	115278795941.0040
em_res_power	599584.9160000000
em_xel	80
pol_states	/I/
facility_name	IRAM

DMS: Query page

Search form

Author(s)[?]:

Objects:

Lines:

RA[?]:

DEC[?]:

Radius[?]:

Frequency range[?]:

Full text[?]:

redshift

Advanced texts[?]:

Advanced[?]:

Ok

Cancel

Projects:

[Previous](#) [Next](#) [Expand](#) [First](#) [Last](#) 

Project	SMS project	Status	# dataset
BASSCO (The BAT AGN Spectroscopic Survey in CO)		created	0
PHIBSII (Molecular Gas at the Peak Epoch of Galaxy Formation)		created	540
XCOLDGASS (a legacy survey of molecular gas in the local Universe)		created	869
PHIBSI (Star Forming Histories and Gas Fractions of Galaxies from z=1-3)		created	181
COLDGASS (CO Legacy Database for GASS)		created	367
ILS (IRAM Lensing Survey)		created	1
HERACLES (HERA CO Line Extragalactic Survey)		created	193

DMS: Workflow between PI team and IRAM to import dataset and document them

History → Data Management System / Show programs / ORION-B

Edit Attach file Full screen

created → edited → ask for publishing → published



ORION-B (Outstanding Radio-Imaging of Orion-B)
PIs: Jérôme Pety, Maryvonne Gerin
<https://www.iram.fr/~pety/ORION-B>
First data release (DR1) - 2022 June 1st

Project

Contacts: Jérôme Pety, Maryvonne Gerin
Emails: pety@iram.fr, maryvonne.gerin@observatoiredeparis.psl.eu
Large program proposal: 124-16
Prototype proposal(s): 018-16, 122-15, 145-14, 022-14, 019-13

▾ **Abstract**

These data represent the ORION-B first public data release. They consists of IRAM-30m EMIR position-position-velocity cubes of 18 lines over a field of view of 0.9 square degree towards the portion of the Orion B cloud that contains the Horsehead nebula and the NGC 2023 and NGC 2024 HII regions.

▸ **Methods**

▸ **Acknowledgments**

▸ **References**

DMS: Automated link with proposal information

History → Data Management System / Show programs / ORION-B / 124-16

Print Save as PDF Resubmit this proposal

Proposal 124-16 (pdf)

Title: ORION B: The anatomy of a Giant Molecular Cloud
PIs: Jérôme Pety, Maryvonne Gerin
CoIs: Emeric Bron, Viviana Guzman Veloso, Jan Orkisz, Sebastien Bardeau, Javier R. Goicoechea, Pierre Gretier, Franck Le Petit, François Levrier, Harvey Liszt, Karin Öberg, Nicolas Peretto, Evelyne Roueff, Albrecht Sievers, Pascal Tremblin
Total requested time: 550.0 (Emir)
Continuation: 019-13, 022-14, 145-14, 122-15, 018-16

Proposal history:
 The proposal committee granted us about 300 hours of IRAM 30-meter time to map slightly more than 1.5 square degree in the western edge of the Orion B molecular cloud (projects 019-13, 022-14, 145-14, 122-15, and 018-16) from 72 to 80 GHz and 84 to 116 GHz, i.e., almost all the 3 mm band. A first set of 4 papers analyzing the data set acquired in 2013 and 2014 are either published or submitted. The first results were presented in the ISM symposium in Zermatt on September 2015, SWASS on July 2016, Exceter on August 2016, and we will continue to advertise them in the coming year. These works made high use of the number of detected species and the high spectral resolution. The region mapped up to now is strongly illuminated in far UV with a mean $G_0 = 45$ (ISRF, Habing 1968), since massive stars illuminate the molecular cloud both from the outside and from the inside. The reached conclusions are thus biased towards such conditions. In order to broaden our conclusions, we now propose to observe the same frequency ranges in both filamentary structures (1.5 square degree) and translucent gas (another 1.5 square degree) that are in much quieter regions with a typical $G_0 = 4$. This will help improve our understanding of the chemistry and physics at stake in the Orion B molecular cloud.

Abstract:
 Molecular emission often provides the best and sometimes only constraints on the physical processes that govern star formation. Common molecules like CO (isotopologues), HCO+, HCN, H2H+, CH3OH, H2CO, DCO+, N2D+, DCN provide constraints on density, temperature and illumination structures. The utility of these molecular probes is currently limited, however, by lack of comprehensive data sets that connects emission patterns with small and large-scale physical structures quantitatively. To address this we have acquired a 3 mm spectral-image cube of the UV illuminated western edge of the Orion B molecular cloud. We here propose to extend the spatial coverage from 15 to 45% of Orion B, in order to sample the full range of physical conditions characterizing high-mass star forming regions, instead of being biased towards the high UV illumination of the western edge. The ultimate goal of this project is to develop Orion B as a template for galactic and extra-galactic studies by correlating chemical and physical structures across the full 3mm band. This will allow us to calibrate popular molecular probes, developing their full potential as tools to understand star formation, near and far.

Sources and setups
Sources: Download sources

Id [?]	Epoch	RA	DEC	Vlsr (km/s)
Horsehead	J2000	05:40:54.270	-02:28:00.000	10.5

Technical sheets:

Emir		Rec. time	Grade	
<input checked="" type="checkbox"/>	Time: 550.00 hours	550.0	A	view

Frontend/Backend setups:

Setup	Band [?]	Species/Transition	Frequency [?] GHz	Receiver band [?]	T _A * [?] mK	Rms [?] mK	ΔV [?] km/s	Backends [?]
1	E0 (3mm)	Any	76.5	LI	> 300.0	120.0	0.764	FTS200
2	E0 (3mm)	Any	90.0	LI	> 300.0	103.0	0.65	FTS200
3	E0 (3mm)	Any	97.5	LI	> 300.0	102.0	0.6	FTS200

Observing parameters:

Setup	Observing mode	Size X	Size Y	Switch mode	PWV [?] mm	Time [?] hours	Repetition [?]	Remark
1	OTF	103.9	103.9	PSW	4	130.0	1	
2	OTF	103.9	103.9	PSW	4	180.0	1	
3	OTF	103.9	103.9	PSW	4	220.0	1	

Number of receiver tunings: 40

Session: Winter **Proposal category:** Large program **Scientific category:** High-mass star formation, Intermediate-mass star formation, Low-mass star formation, Pre-stellar cores, Infra-Red Dark Clouds (IRDC), Astrochemistry, Inter-Stellar Medium (ISM)/Molecular clouds, Photon-Dominated Regions (PDR)/X-Ray Dominated Regions (XDR), HII regions


Scheduling constraints:
 We definitely need stable weather and we thus ask to avoid foggy spring afternoons when the snow melts.

PI note:
 This project is part of the PhD thesis of Jan Orkisz under the direction of Jérôme Pety and Maryvonne Gerin. Emeric Bron and Viviana Guzman are two post-docs who devote a significant fraction of their time on the project.

Date: 2016-09-15 12:26:36

[Back](#)

DMS: PI can link publication DOIs



ORION-B (Outstanding Radio-Imaging of Orion-B)
PIs: Jérôme Pety, Maryvonne Gerin
<https://www.iram.fr/~pety/ORION-B>
First data release (DR1) - 2022 June 1st

Project

Contacts: Jérôme Pety, Maryvonne Gerin
Emails: pety@iram.fr, maryvonne.gerin@observatoiredeparis.psl.eu
Large program proposal: 124-16
Prototype proposal(s): 018-16, 122-15, 145-14, 022-14, 019-13

▸ **Abstract**

▸ **Methods**

▸ **Acknowledgments**

▼ **References**

The observing strategy, data reduction, and associated data products are described in the following peer-reviewed article(s):

[Pety et al., 2017, Astronomy and Astrophysics](#)


These data were used in at least the following peer-reviewed studies:

[Gudel et al., 2023, Astronomy and Astrophysics](#)
[Bron et al., 2021, Astronomy and Astrophysics](#)
[Gratier et al., 2021, Astronomy and Astrophysics](#)
[Roueff et al., 2021, Astronomy and Astrophysics](#)
[Orkisz et al., 2019, Astronomy and Astrophysics](#)
[Bron et al., 2018, Astronomy and Astrophysics](#)
[Gratier et al., 2017, Astronomy and Astrophysics](#)
[Orkisz et al., 2017, Astronomy and Astrophysics](#)

Other related articles:

[Lombardi et al., 2014, Astronomy and Astrophysics](#)
[Schneider et al., 2013, The Astrophysical Journal](#)

DMS: List of products for potential downloads



ORION-B (Outstanding Radio-Imaging of OriON-B)
PIs: Jérôme Pety, Maryvonne Gerin
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Contacts: Jérôme Pety, Maryvonne Gerin
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Large program proposal: [124-16](#)
Prototype proposal(s): [018-16](#), [122-15](#), [145-14](#), [022-14](#), [019-13](#)

▸ Abstract

▸ Methods

▸ Acknowledgments

▸ References

[?] line ↔ product ↕

12cn10

Key ↑	Object	Line	Freq.	Cdelt3	Beam	Telescope	Unit	Size	
cube	ORION-B	12CN(1-0)	113.490970 GHz	500.0 m/s	31.00 "	30M	K (Tmb)	43 MB	download/header
moment-area-noise	ORION-B	12CN(1-0)	113.490970 GHz		31.00 "	30M	K (Tmb).km	557 kB	download/header
moment-area-noise	ORION-B	12CN(1-0)	0.000000 Hz		31.00 "	30M	K (Tmb).km	557 kB	download/header
moment-area-signal	ORION-B	12CN(1-0)	0.000000 Hz		31.00 "	30M	K (Tmb).km	557 kB	download/header
moment-area-signal	ORION-B	12CN(1-0)	113.490970 GHz		31.00 "	30M	K (Tmb).km	557 kB	download/header

12co10

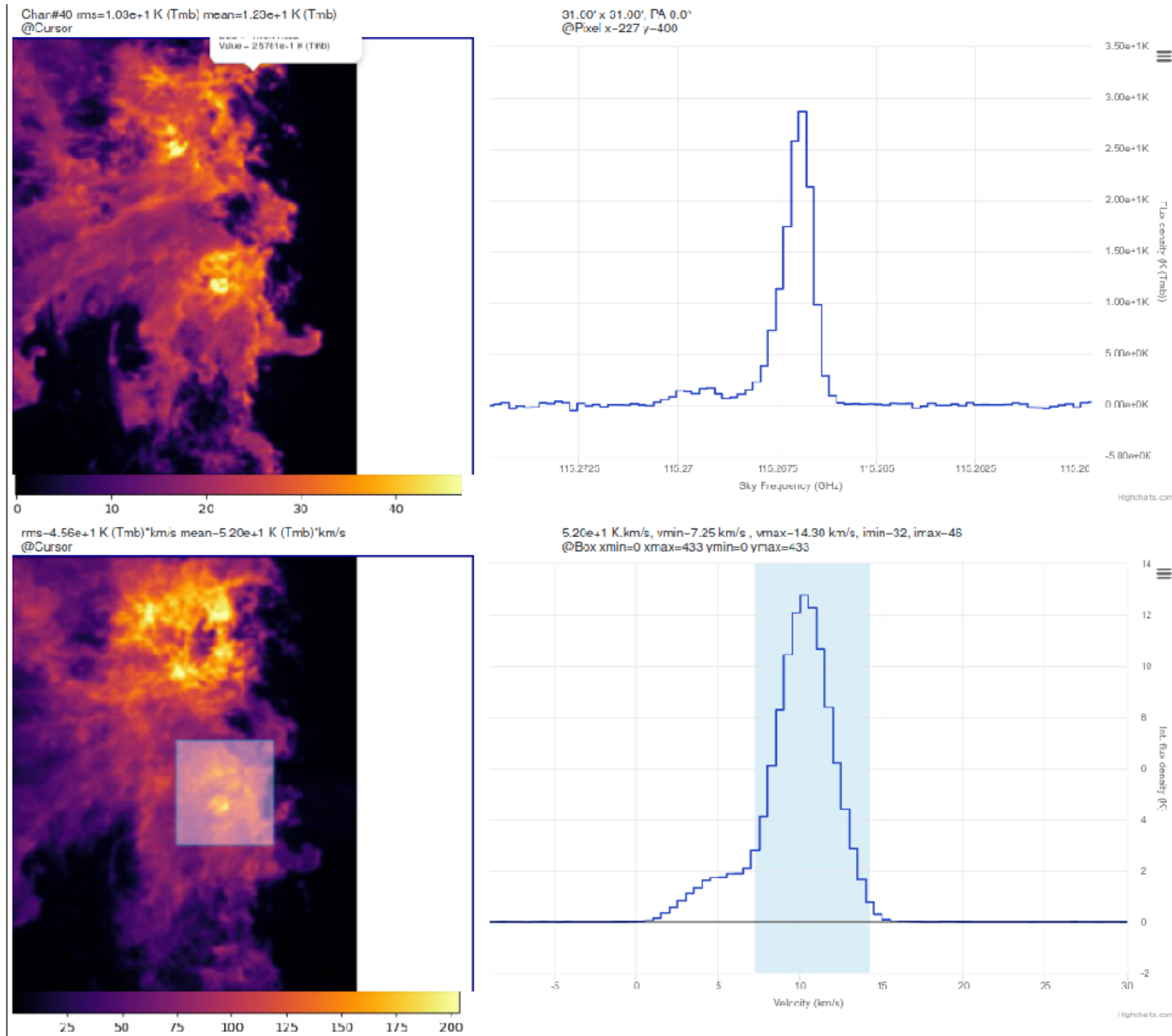
Key ↑	Object	Line	Freq.	Cdelt3	Beam	Telescope	Unit	Size	
cube	ORION-B	12CO(1-0)	115.271202 GHz	500.0 m/s	31.00 "	30M	K (Tmb)	43 MB	download/header
moment-area-noise	ORION-B	12CO(1-0)	115.271202 GHz		31.00 "	30M	K (Tmb).km	557 kB	download/header
moment-area-noise	ORION-B	12CO(1-0)	0.000000 Hz		31.00 "	30M	K (Tmb).km	557 kB	download/header
moment-area-signal	ORION-B	12CO(1-0)	0.000000 Hz		31.00 "	30M	K (Tmb).km	557 kB	download/header
moment-area-signal	ORION-B	12CO(1-0)	115.271202 GHz		31.00 "	30M	K (Tmb).km	557 kB	download/header

IRAM Information Flow

J.Pety, 2023

DMS: Interactive pre-visualization \Rightarrow YAFITS

P.Salome, N.Moreau, Y.-A.Ba, M.Caillat



Towards a modern information flow at IRAM

Bits and pieces have been prepared for the last 15+ years.

Next step To nimbly glue all this together.

A manageable amount of additional resources (manpower, internet bandwidth) is required because of all the preparatory work.

Timescales Regular releases over the next 5 years. Additional IRAM manpower (1 software engineer) will speed things up.