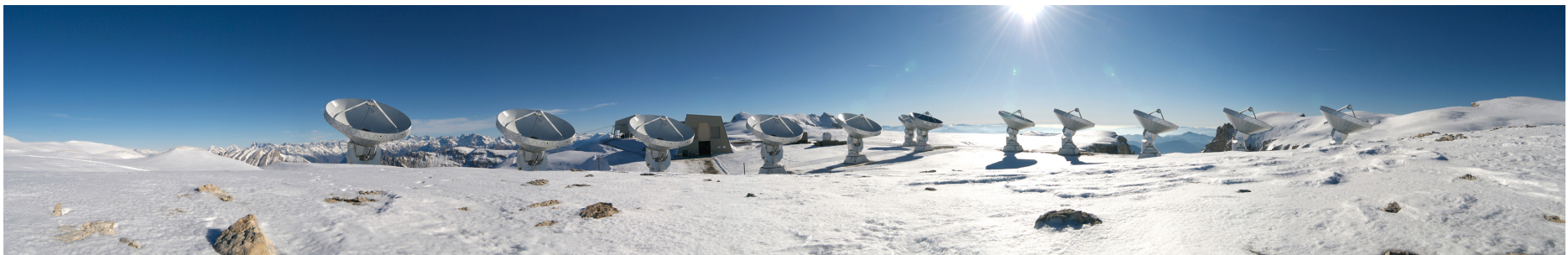




## IRAM Information Flow

IRAM, Emmanuel Reynier,  
Sebastien Bardeau,  
Jérémie Boissier, Carsten Kramer,  
& Jérôme Pety



May 10th 2023 - Bologna

# 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.

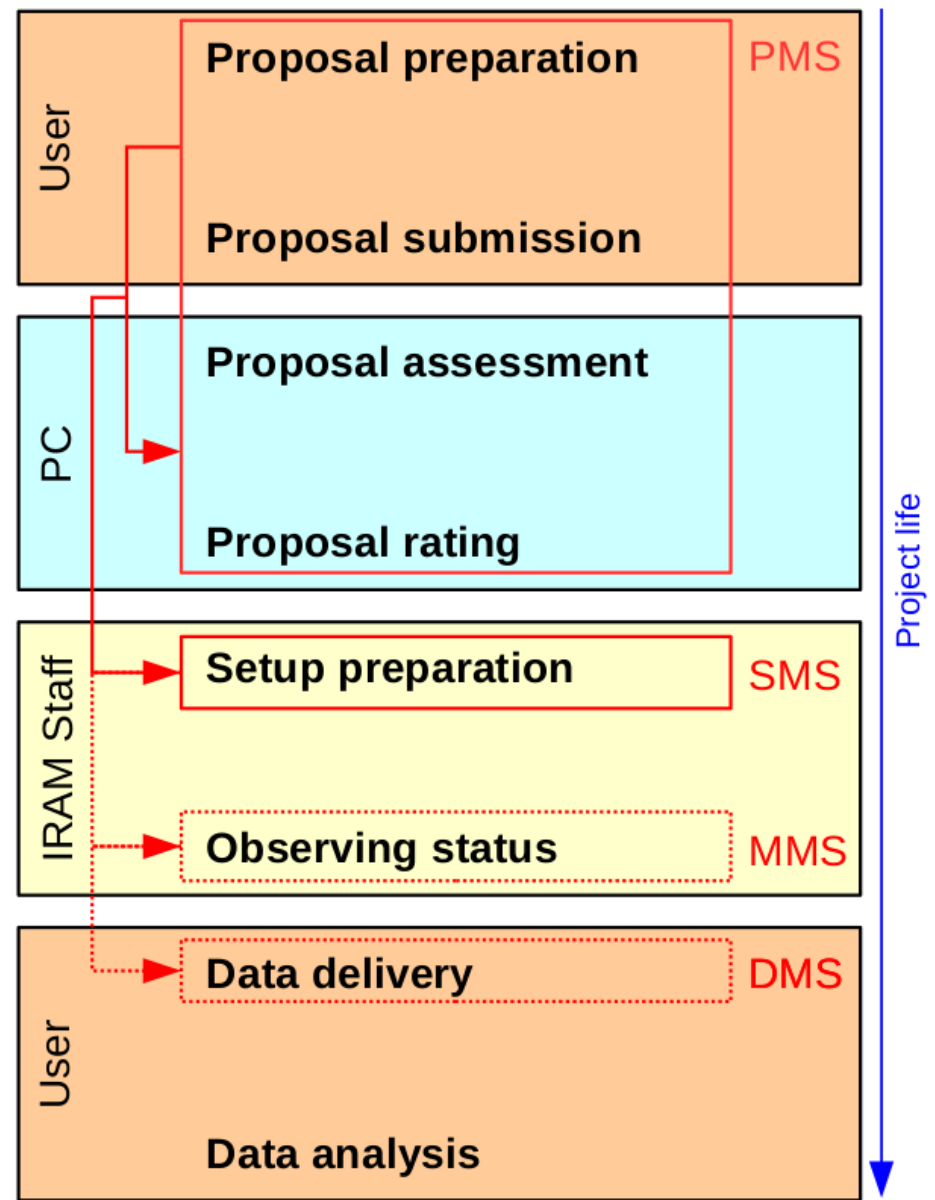
## Monitoring Management System

- Schedule and monitor observations.
- 30m.

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

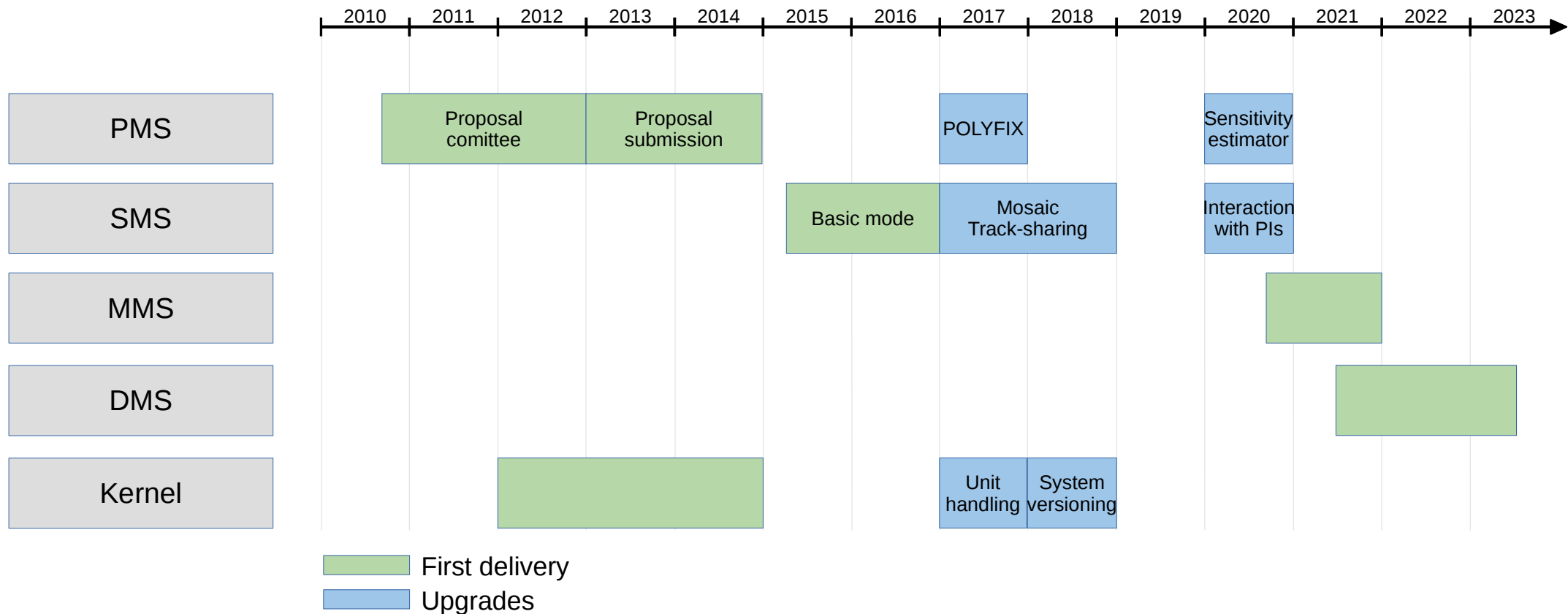
## Data Management System

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

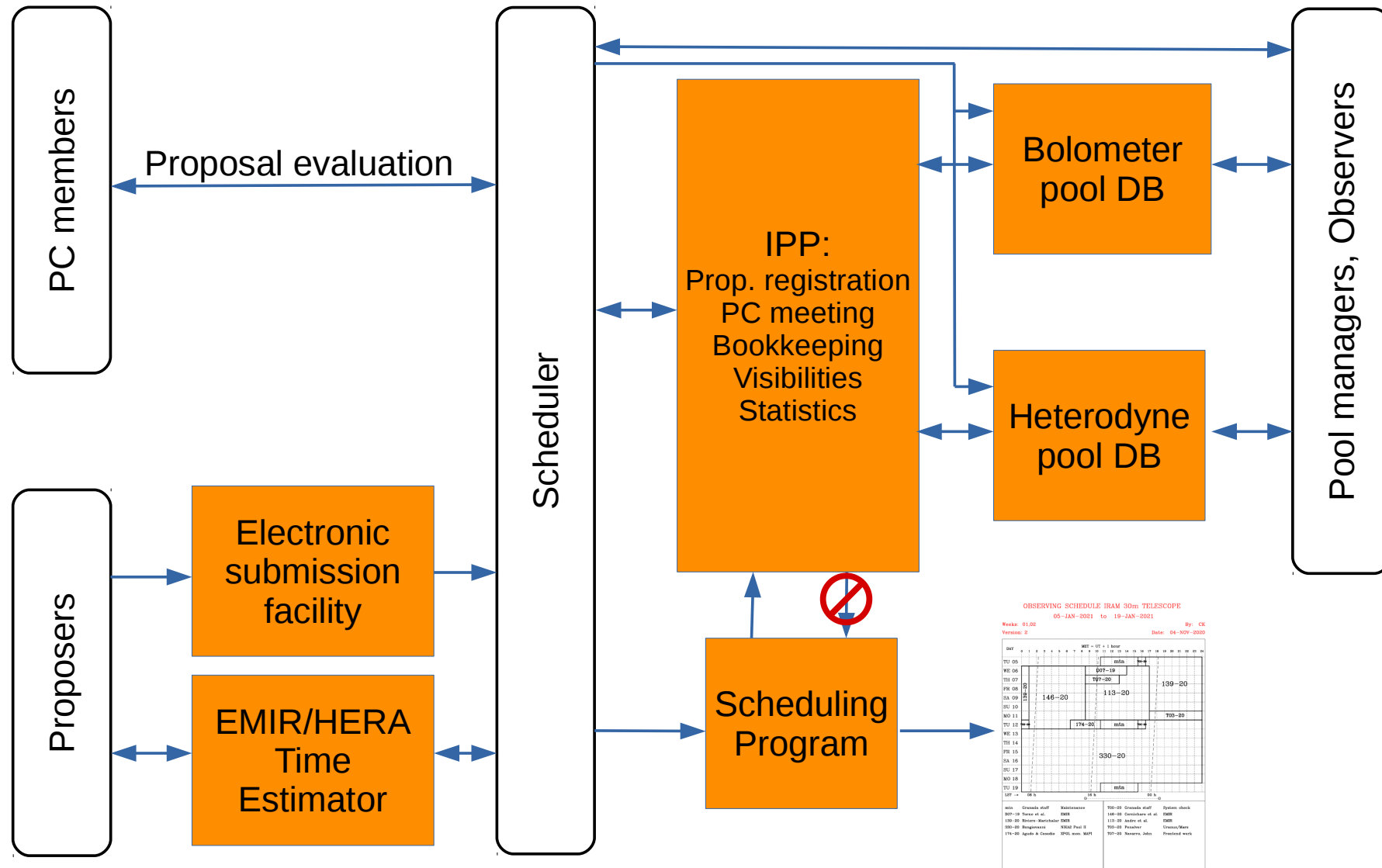


# Observation Management System:

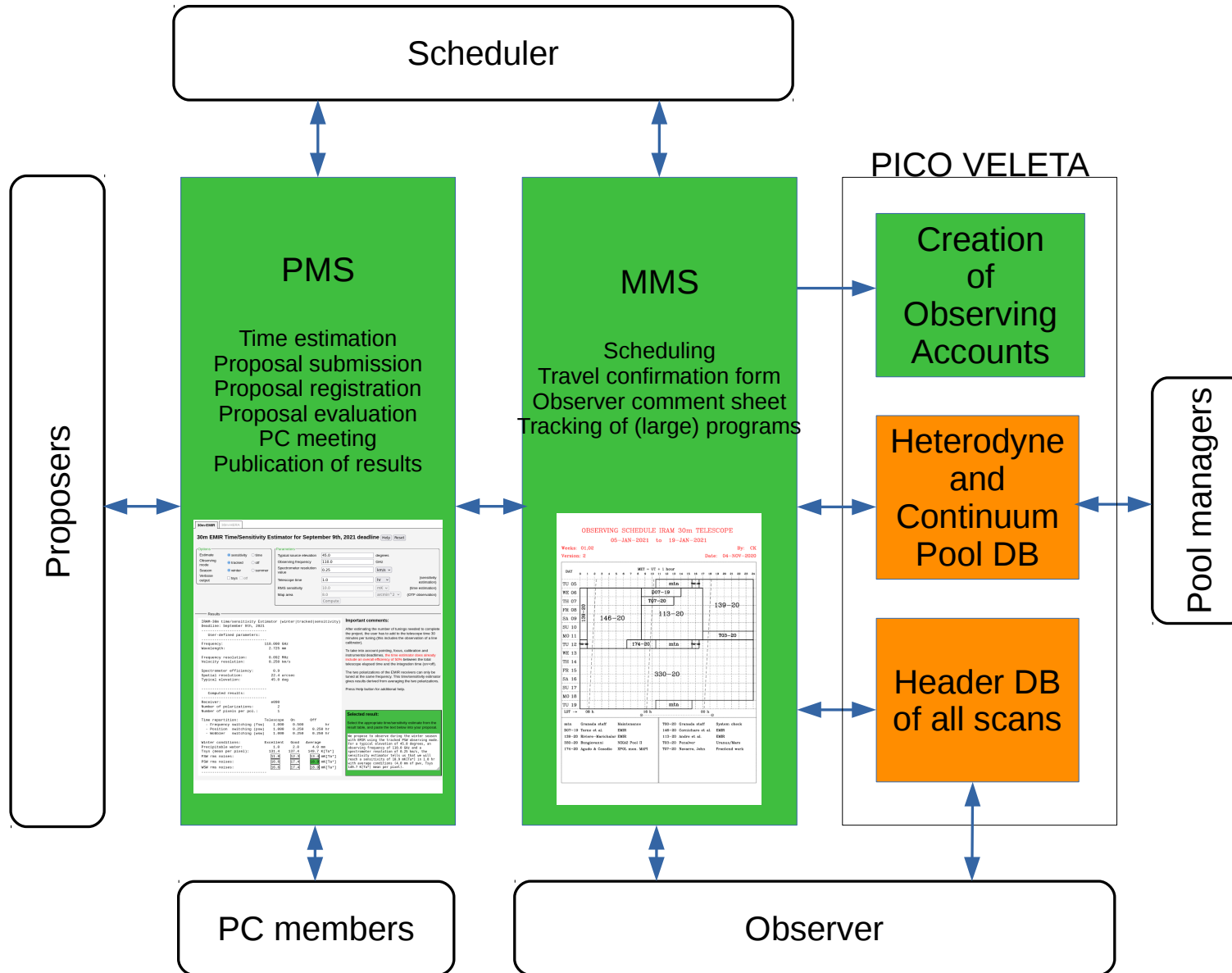
## III. Timescales



# 30m status before OMS, ie, before 2010

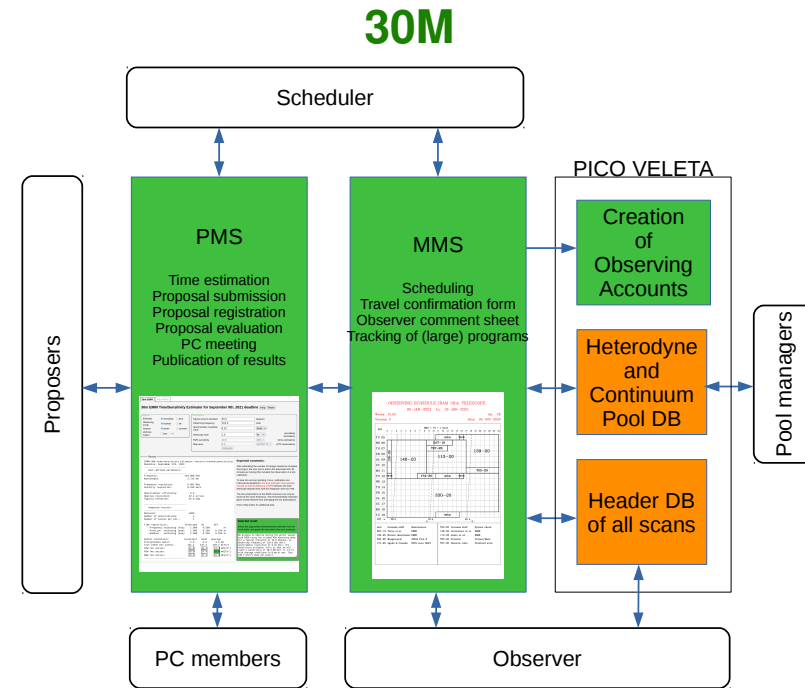
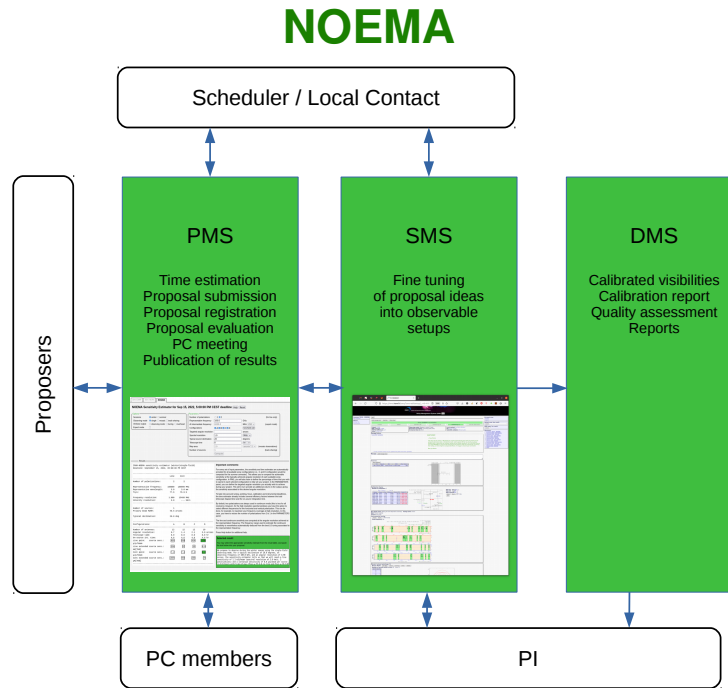


# 30m status at end of 2021

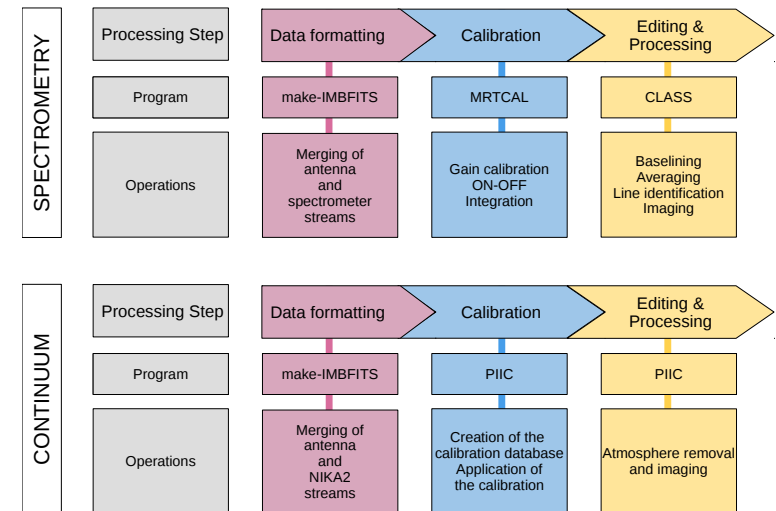
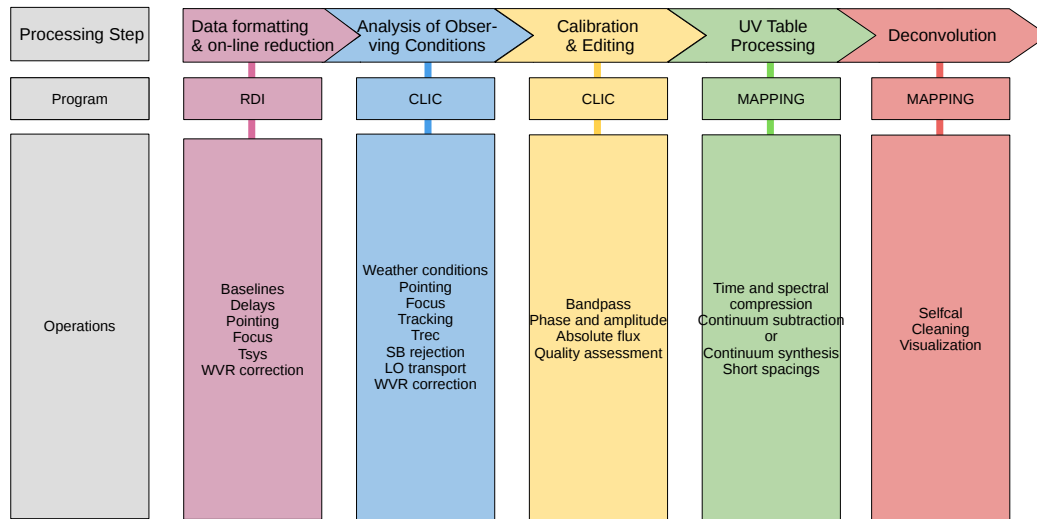


# Two imbricated workflows

Project



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  arcmin<sup>2</sup> (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 $\mu$ Jy/beam |
| Line extended source sens.: | 120  | 30   | 8.0 mK[Tmb]        |
| Cont point source sens.:    | 7.9  | 7.9  | 7.9 $\mu$ Jy/beam  |
| Cont extended source sens.: | 970  | 240  | 64 $\mu$ 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  $\mu$ Jy/beam (spectral resolution of 3.0 km/s, 2 polarizations) and a continuum sensitivity of 7.9  $\mu$ 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 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  $G_0 \sim 4$ . 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<br>Frontend/Backend setups: |                |                    |                      |                   |                            |                   |                | 550.0        | A     | <a href="#">view</a> |
| Setup  | Band [?]       | Species/Transition | Frequency [?]<br>GHz | Receiver band [?] | T <sub>A</sub> * [?]<br>mK | Rms [?]<br>mK     | ΔV [?]<br>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 [?]<br>mm              | Time [?]<br>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](#)

# Monitoring Management System: Scheduling a two-weeks period

[Back](#)
[Previous](#)
[Next](#)
[Save as PDF](#)
[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

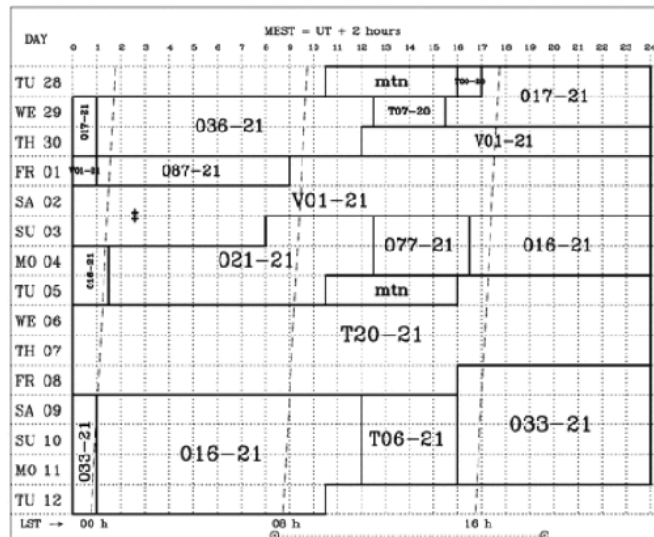
28-SEP-2021 to 12-OCT-2021

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      |      | 033-21 | 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 Velocity<sub>1</sub>**  
     $V_{LSR} = .0 \text{ km s}^{-1}$   
     $V_{Dop} = -13.6 \text{ km s}^{-1}$   
     $V_{LSR} = -12.100 \text{ km s}^{-1}$

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       |

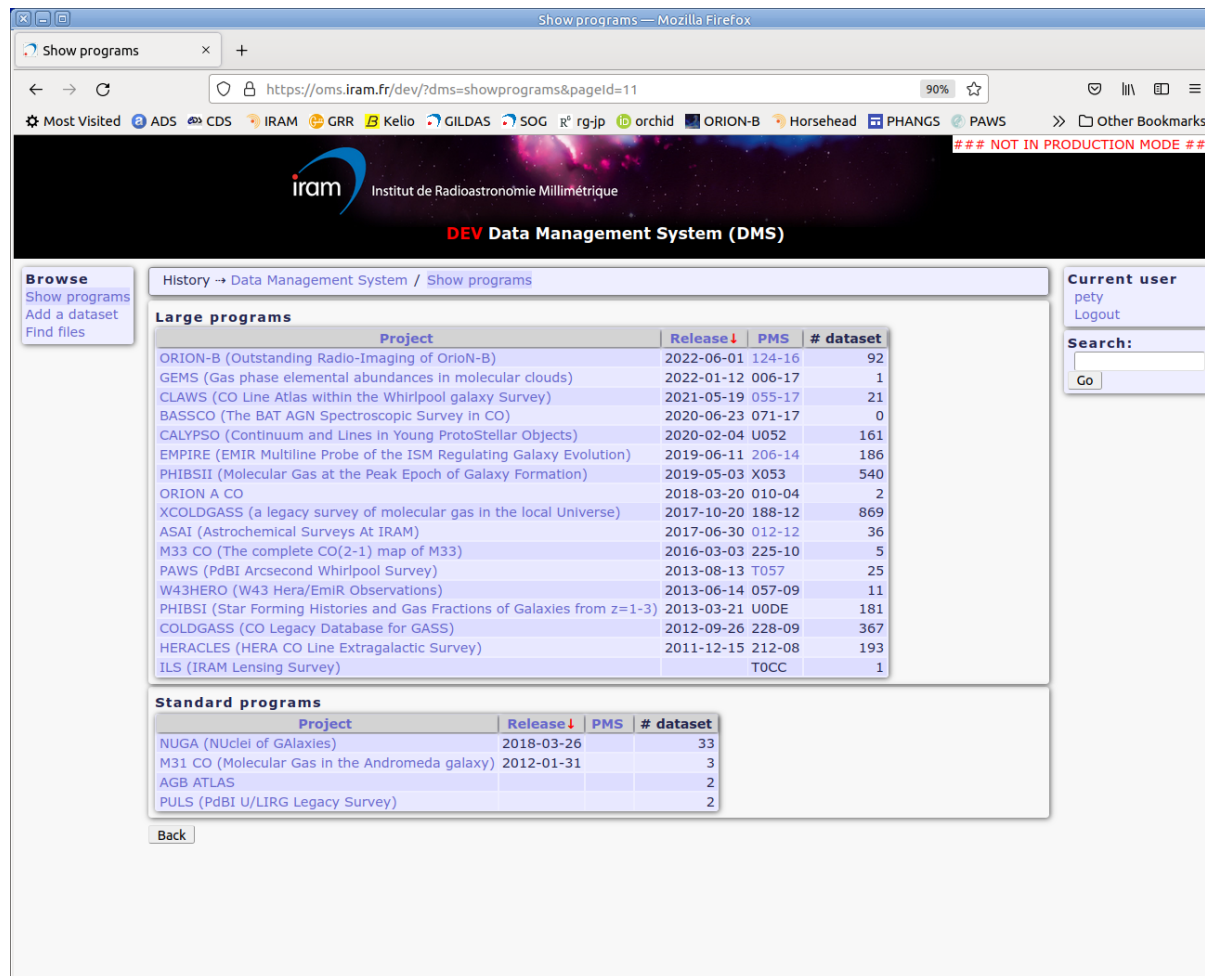
IRAM Information Flow

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

Back

# 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 |
|--|-------------|---------|-----------|
| <a href="#">BASSCO (The BAT AGN Spectroscopic Survey in CO)</a>                          |             | created | 0         |
| <a href="#">PHIBSII (Molecular Gas at the Peak Epoch of Galaxy Formation)</a>            |             | created | 540       |
| <a href="#">XCOLDGASS (a legacy survey of molecular gas in the local Universe)</a>       |             | created | 869       |
| <a href="#">PHIBSI (Star Forming Histories and Gas Fractions of Galaxies from z=1-3)</a> |             | created | 181       |
| <a href="#">COLDGASS (CO Legacy Database for GASS)</a>                                   |             | created | 367       |
| <a href="#">ILS (IRAM Lensing Survey)</a>  |             | created | 1         |
| <a href="#">HERACLES (HERA CO Line Extragalactic Survey)</a>                             |             | 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](mailto:pety@iram.fr), [maryvonne.gerin@observatoiredeparis.psl.eu](mailto: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     | <a href="#">view</a> |

**Frontend/Backend setups:**

| Setup | Band [?] | Species/Transition | Frequency [?] GHz | Receiver band [?] | T <sub>A</sub> * [?] 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](mailto:pety@iram.fr), [maryvonne.gerin@observatoiredeparis.psl.eu](mailto: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:

[Gaudel 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](#)

IRAM Information Flow

J.Pety, 2023

# DMS: List of products for potential downloads



**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](mailto:pety@iram.fr), [maryvonne.gerin@observatoiredeparis.psl.eu](mailto: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

[?] 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  | <a href="#">download/header</a> |
| moment-area-noise  | ORION-B | 12CN(1-0) | 113.490970 GHz |           | 31.00 " | 30M       | K (Tmb).km | 557 kB | <a href="#">download/header</a> |
| moment-area-noise  | ORION-B | 12CN(1-0) | 0.000000 Hz    |           | 31.00 " | 30M       | K (Tmb).km | 557 kB | <a href="#">download/header</a> |
| moment-area-signal | ORION-B | 12CN(1-0) | 0.000000 Hz    |           | 31.00 " | 30M       | K (Tmb).km | 557 kB | <a href="#">download/header</a> |
| moment-area-signal | ORION-B | 12CN(1-0) | 113.490970 GHz |           | 31.00 " | 30M       | K (Tmb).km | 557 kB | <a href="#">download/header</a> |

**12co10**

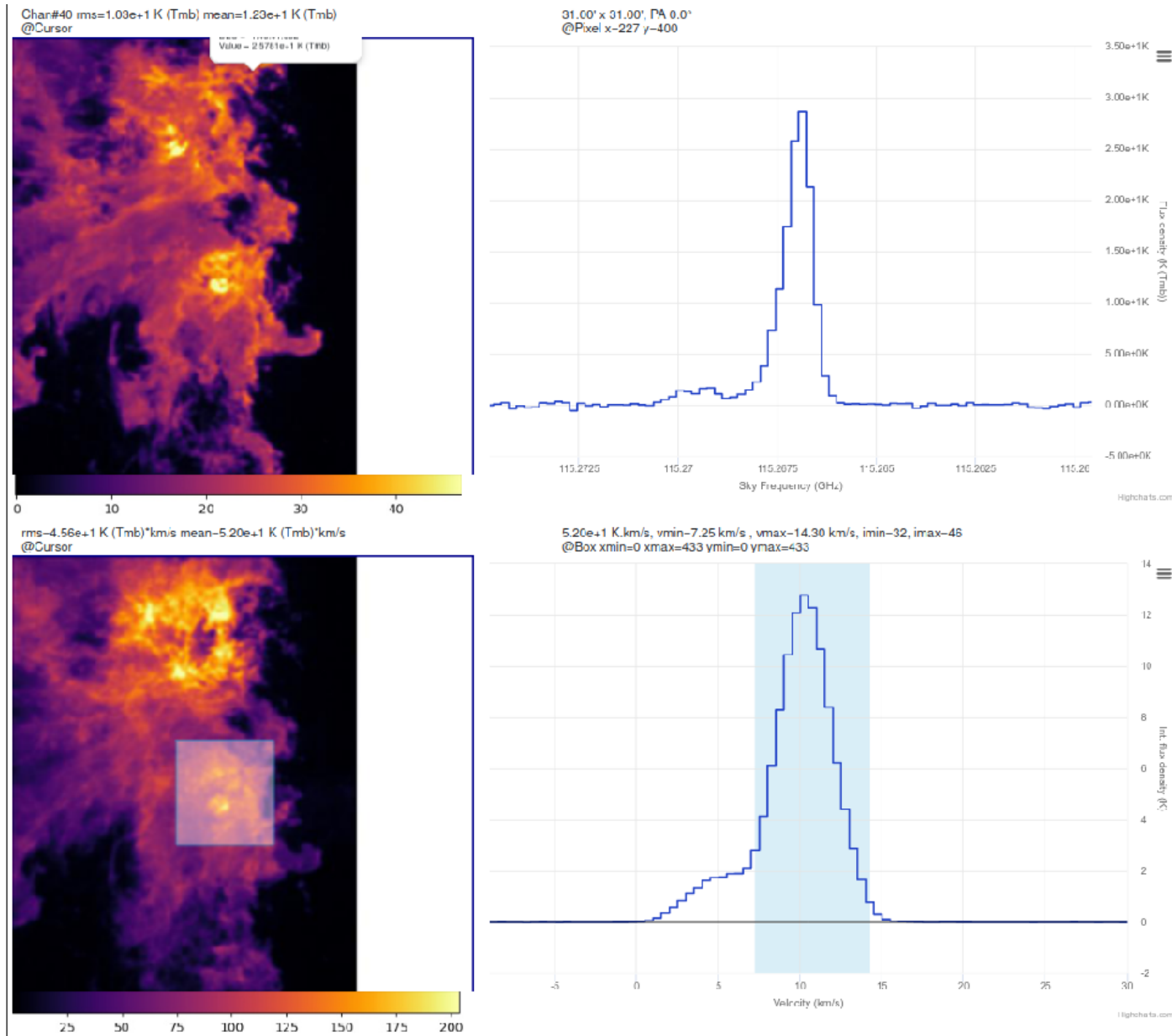
| Key ↑              | Object  | Line      | Freq.          | Cdelt3    | Beam    | Telescope | Unit       | Size   |                                 |
|--------------------|---------|-----------|----------------|-----------|---------|-----------|------------|--------|---------------------------------|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

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.