

FIRST ISSUE

THE NEW

12<sup>th</sup>

**MAD**

No. 178

Dec. 1975

**LOWERS  
ITS  
MAGNITUDES!**

MAINLY

17<sup>th</sup>



# Operations Concept

by  
P. Amico  
ESO



# Talk Synopsis (disclaimer!)

This talk presents a new operation model tailored to the specific needs of a (yet to be approved) instrument unlike any at ESO and the first of its kind ever.

The operation model is based on the ESO standard one, but it significantly diverges from it. I will explain it going top-down: from the general into the more specific into even finer details. I will make comparisons between the two models and give examples on the way.

We hope the proposed model will be the starting point of the general discussion tomorrow.



## Previously on MAD...

- The MAD operation model used in SD1-3 works: efficient and stable.
- Average acquisition times are similar to other VLT facility instruments.
- We proved that 2 stars asterisms work.
- Expert team: we learnt and improved along the way (e.g. performance versus property of asterisms).
- Optimists: we think there is room for improvements. We think we can go down to 17th!

# VLT General Operations (GO) Model

- 11 Facility instruments operated in Service Mode (SM) and Visitor Mode (VM).
- Visiting Instruments (VIs):
  - “The Visitor Focus has been reserved to permit innovative observations by teams using stand-alone instruments, free from a substantial fraction of the requirements for fully automated VLT general use instruments”
  - “VIs shall be operated exclusively in Visitor Mode.”
  - “VIs data shall not enter the VLT data flow system.”



# Proposed MAD-MAX GO Model (vis-a`-vis a VI Model)

## Modified Visiting Instrument (MVI)

- Available for a limited period of time.
- Available to the whole ESO community.
- Fully supported by the ESO archive.
- Supports "... observational capabilities not covered by other VLT instruments, or a largely superior performance in at least one valuable and sufficiently extensive scientific application. It has the capability to react quickly to new scientific and/or technical opportunities."
- "Speed shall be a major criterion."
- Free from a substantial fraction of the requirements for fully automated VLT.
- Operated in SM only by the MAD team.

# Goals of the MAD MAX model

Achieving unique science and collecting high quality data in the most economic and fastest way.

1. Maximize the on sky efficiency while keeping operational flexibility.
2. Minimize changes to the current model but improve some key areas.
3. Optimize the scientific output without committing to a long operation lifetime.

# 1. MAXIMIZE efficiency!

It can be done **using** a larger parameters space than the standard ESO:

Observational parameters (users)

Operational parameters

Instrumental parameters

# 1. MAXIMIZE efficiency!

- Larger set of observational parameters

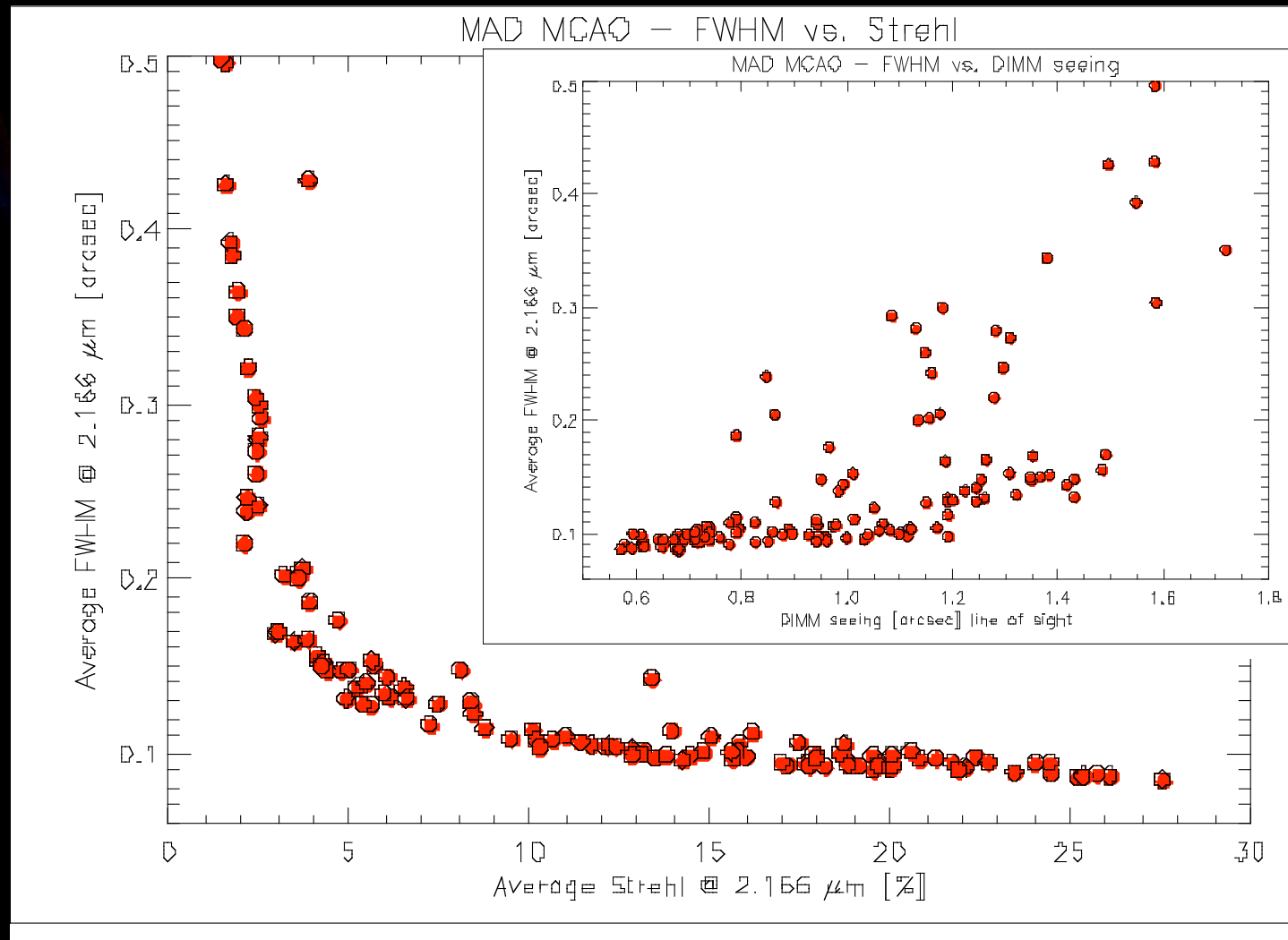
~~M~~oon, ~~air~~mass, transparency, SR + FWHM (on data),  
NGSs spectral type, geometry and magnitude  
balance of the asterisms.



# Importance of the spectral type

Spectral type	V magnitude difference at fixed Zero Point
<b>B0V</b>	<b>-0.4</b>
<b>B5V</b>	<b>-0.3</b>
<b>A0V</b>	<b>-0.2</b>
<b>F0V</b>	<b>-0.1</b>
<b>G0V</b>	<b>0.0</b>
<b>K0V</b>	<b>+0.1</b>
<b>K5V</b>	<b>+0.3</b>
<b>M0V</b>	<b>+0.5</b>

# SR versus seeing for MCAO



# 1. MAXIMIZE efficiency!

- Larger set of observational parameters

Moon, airmass, transparency, SR + FWHM, NGSs  
Spectral type, geometry and magnitude balance of  
the asterisms.

- Larger set of operational parameters

$\tau_0$  (value and trend), relative strength of GL/FA,  
jet stream (current and forecasted).

# Checking the jet stream...

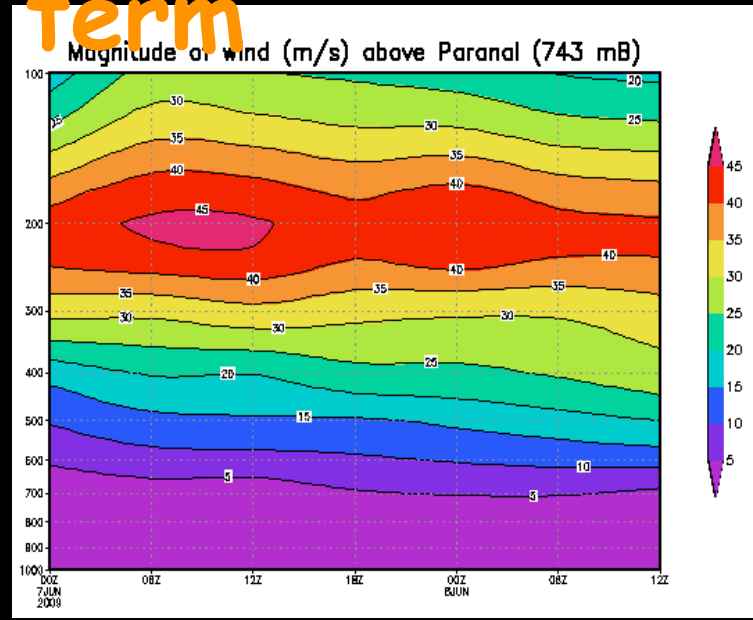
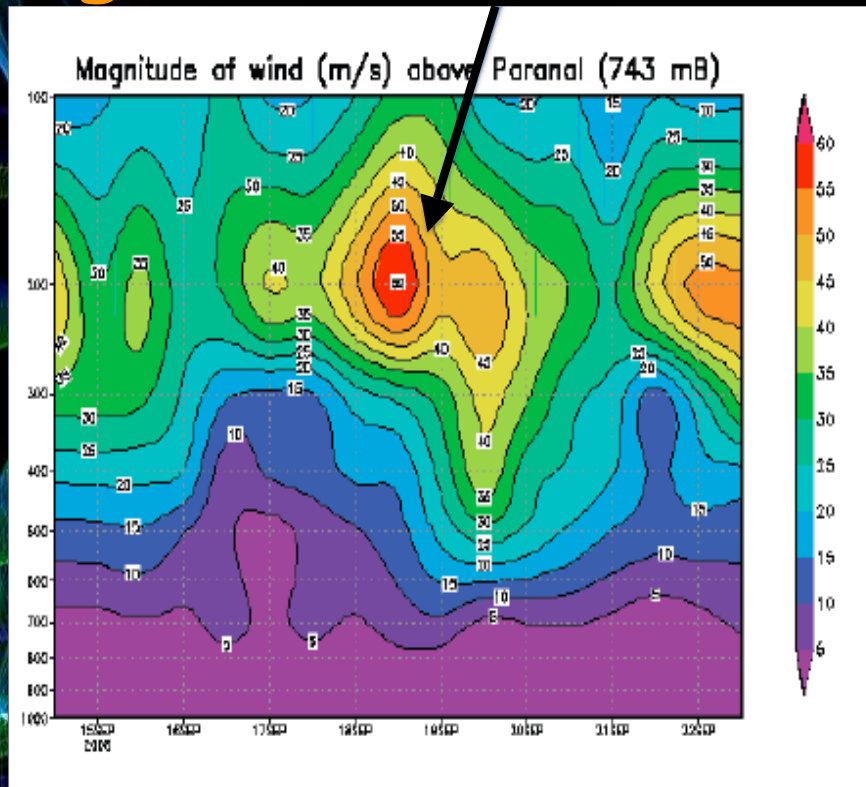
...long term

60 m/s

...short

term

h  
-  
e  
-  
s  
+  
50



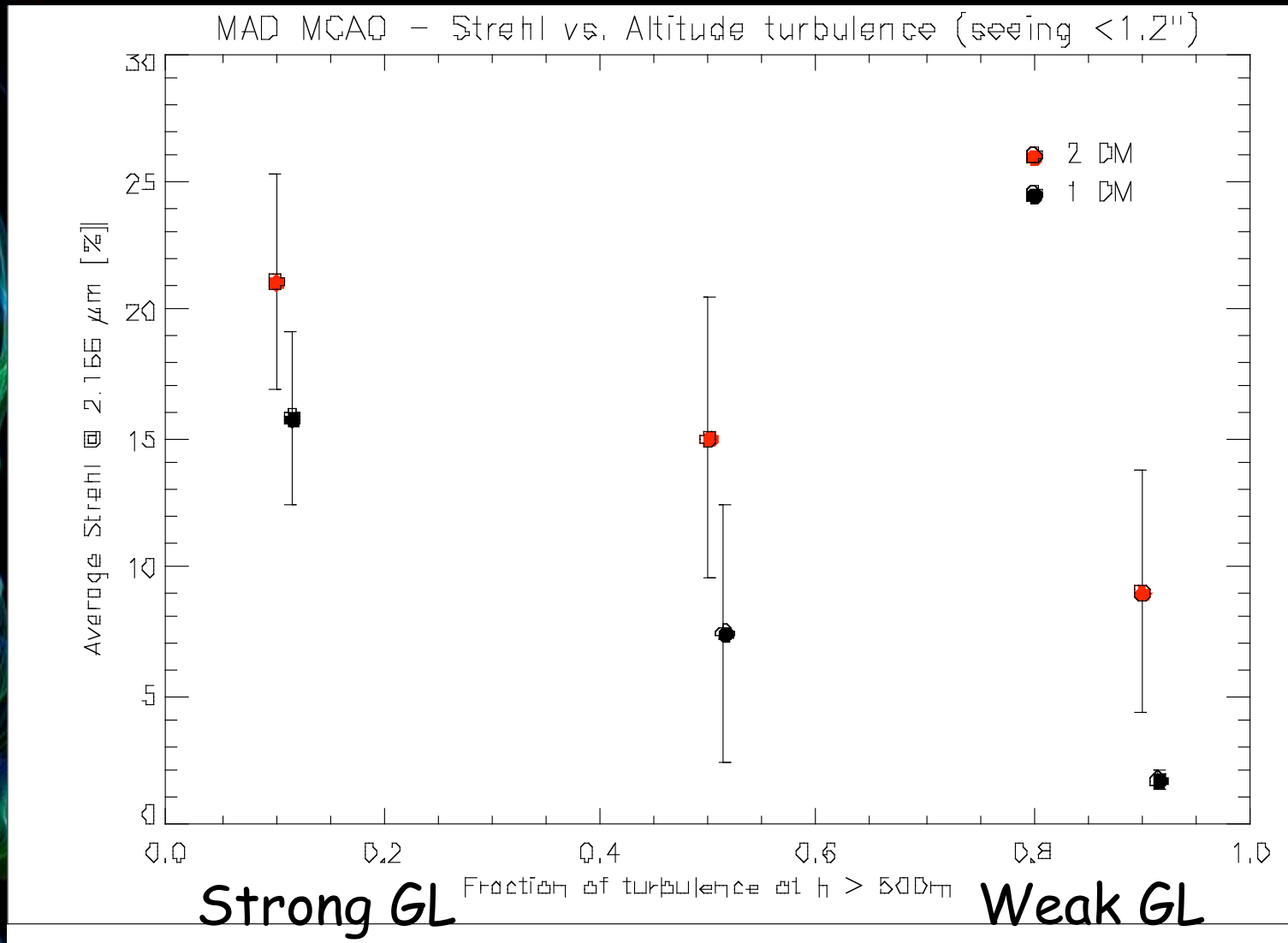
1 week

36 hours

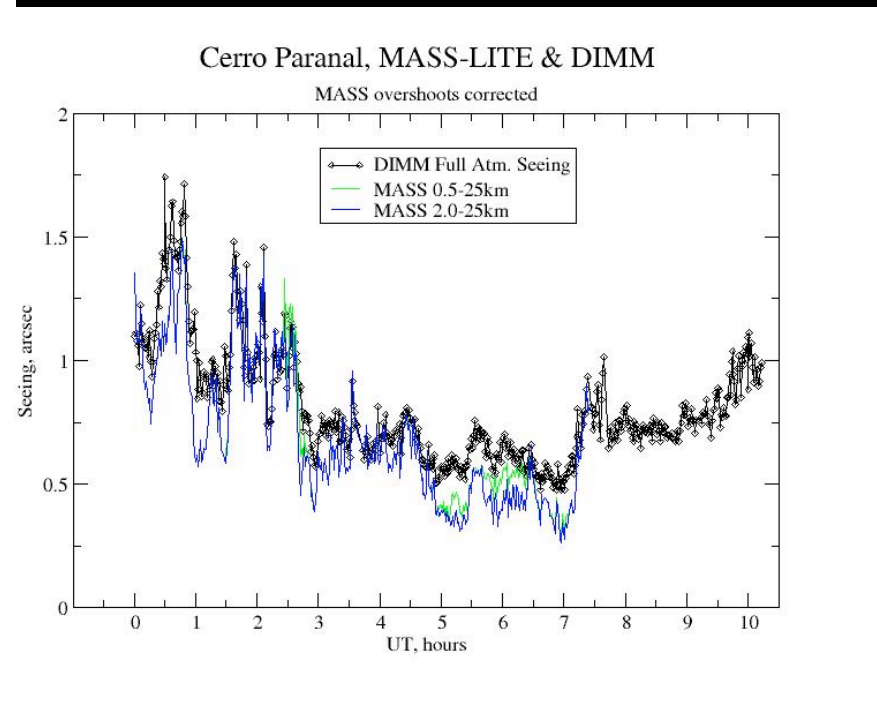
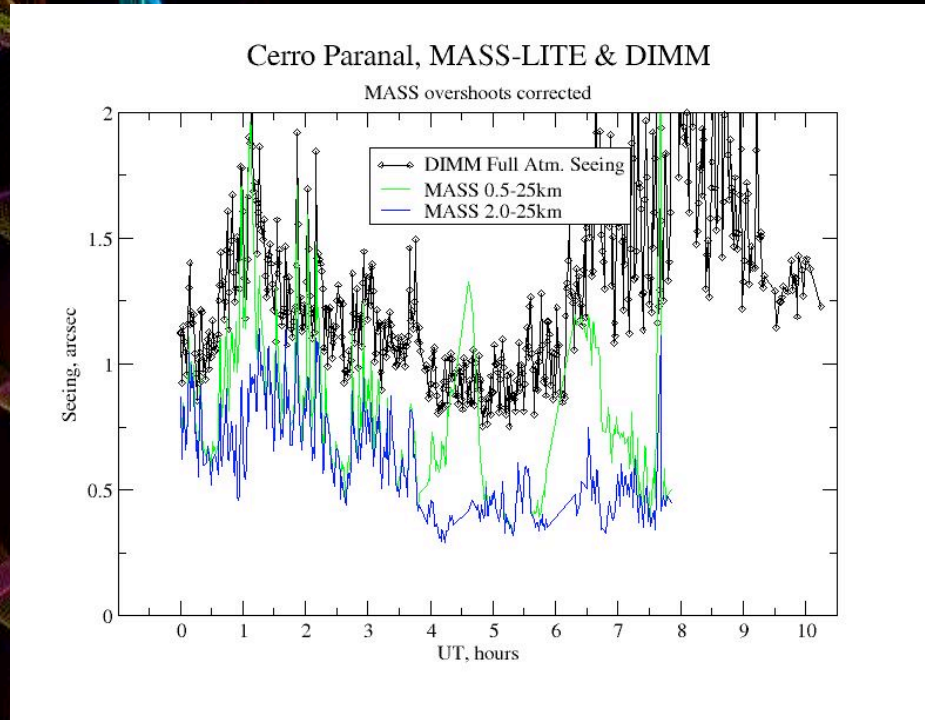




# Ground Layer vs. Free Atmosphere



# Ground Layer vs. Free Atmosphere



# 1. MAXIMIZE efficiency!

- Larger set of observational parameters

Moon, airmass, transparency, SR + FWHM, NGSs  
Spectral type, geometry and magnitude balance of the asterisms.

- Larger set of operational parameters

$\tau_0$  (value and trend), relative strength of GL/FA,  
jet stream (current and forecasted).

- Larger set of instrument parameters

Filtered modes, spot centering, IM parameters setups

# COST: limiting the operations to black-belt AO Observers

A Black Belt is just a White Belt that Never Gave Up



Black belt AO observers







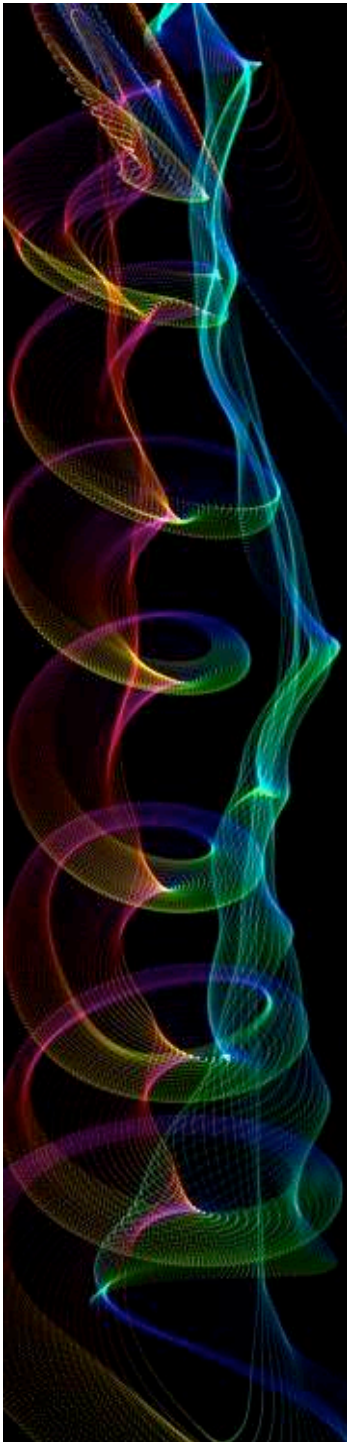
## 2. MINIMIZE changes wrt MAD!

Achieve maximum economy of resources for both the upgrade and the operations at the VLT.

We can keep services such as technical feasibility, user support, full archive support provided that we concentrate them in the hands of the MAD tiger team (i.e. experts with no need of re-training)

→ Speed is a major factor!



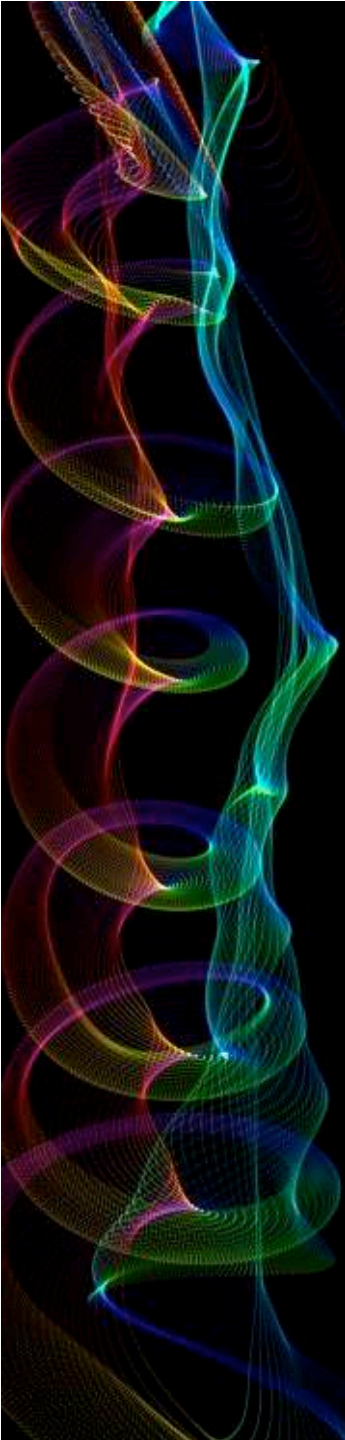


The MAD Tiger team

**COST: forgo full VLT standardization**







### 3. OPTIMIZE scientific output! (and make unique science)

- Integrated scientific program where targets are grouped into categories ("buckets": solar system planets, bulge clusters, etc) and selected to represent a complete sample and/or produce original results.
- Observing strategy tailored to each "bucket" to produce unique (quality-wise) datasets and cover maximum number of scientific observables (e.g same targets, different DITs).
- This model requires the community as a whole (or divided into "bucket"-members) to propose an integrated scientific program.

## COST:

1. supporting a different proposal "submission-observations-data distribution" cycle than the ESO standard.
2. Strategic (and active) contribution of the "external" MAD community.

The watchful MAD scientific community







# MAD MAX Ops model: examples of refined principles

- SM fashion, but flexible = users requested to provide larger set of parameters and parameter ranges, when applicable.
- Black-belt observers=scheduling blocks.
- Operated when weather conditions are compatible with science requirements, no "C" classification.
- Integrated operation model for technical feasibility, user support, observations.
- Minimal set of of templates = no need to implement use of tools (P2PP).
- Buckets = No A/B/C/special priority classes.

# Additional POSSIBLE principles

- Immediate release of data to the bucket members.
- Observations prioritized by scientific importance inside each target category ("buckets"), but flexible priorities among buckets to match conditions when on sky or time critical events.
- One call for proposal before start of operations, but implementation of DDT-like schema for novel ideas.

# Executive Summary

The proposed MADMAX operations model:

Follows some basic SM rules

Has the flexibility granted to a VI

Relaxes standardization constraints

Proposes "bucket" science

Enjoys some operational freedom

Escapes bad-weather losses } "expert" mode

Boosts efficiency

Needs your input tomorrow  
during the discussion!



# Questions?

