AZDORA

DISCOS towards CI

ICT@INAF, Cefalù, Ottobre 2015

Marco Bartolini - bartolini@ira.inaf.it

on behalf of the DISCOS team

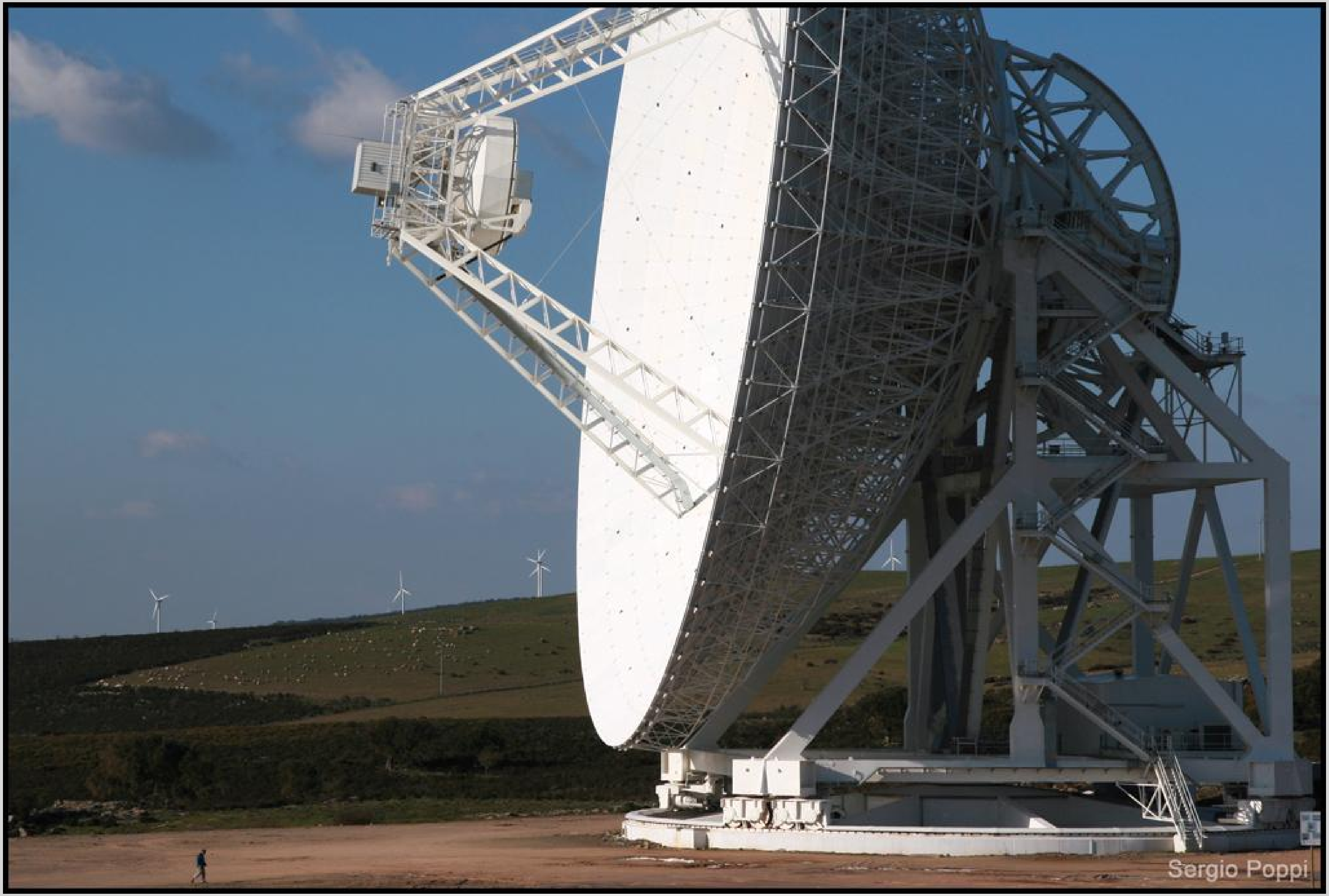
Outline

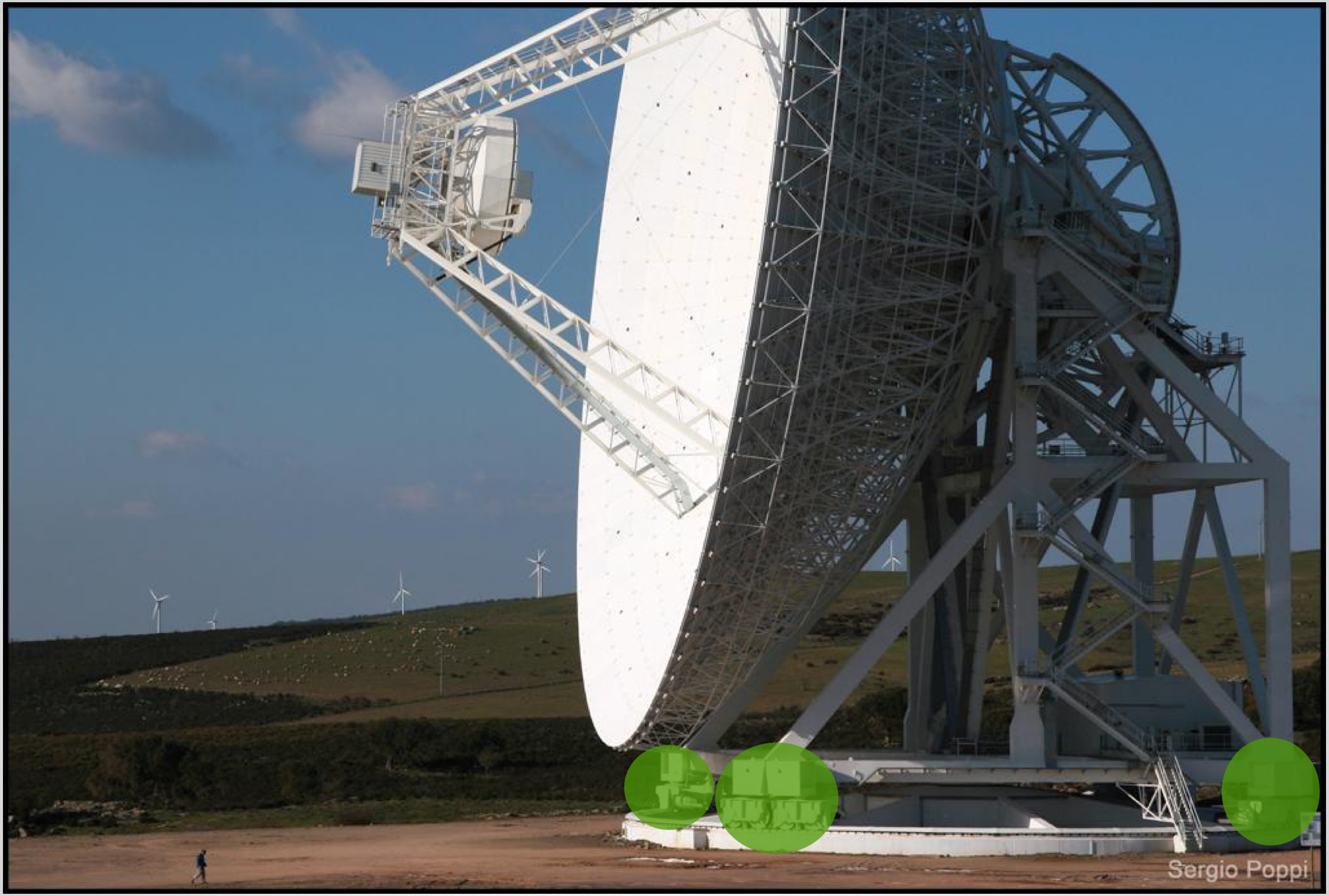
- DISCOS
- Continuous Integration
- Why CI?
- How CI?
- ICT related

DISCOS

Development of Italia Single-dish COntrol Sofware

- Started at SRT with the development of Nuraghe control software
- Installed at INAF radiotelescopes of SRT, Medicina and Noto
- based on ACS framework developed at ESO http://www.eso.org/~almamgr/AlmaAcs/


Sergio Poppi



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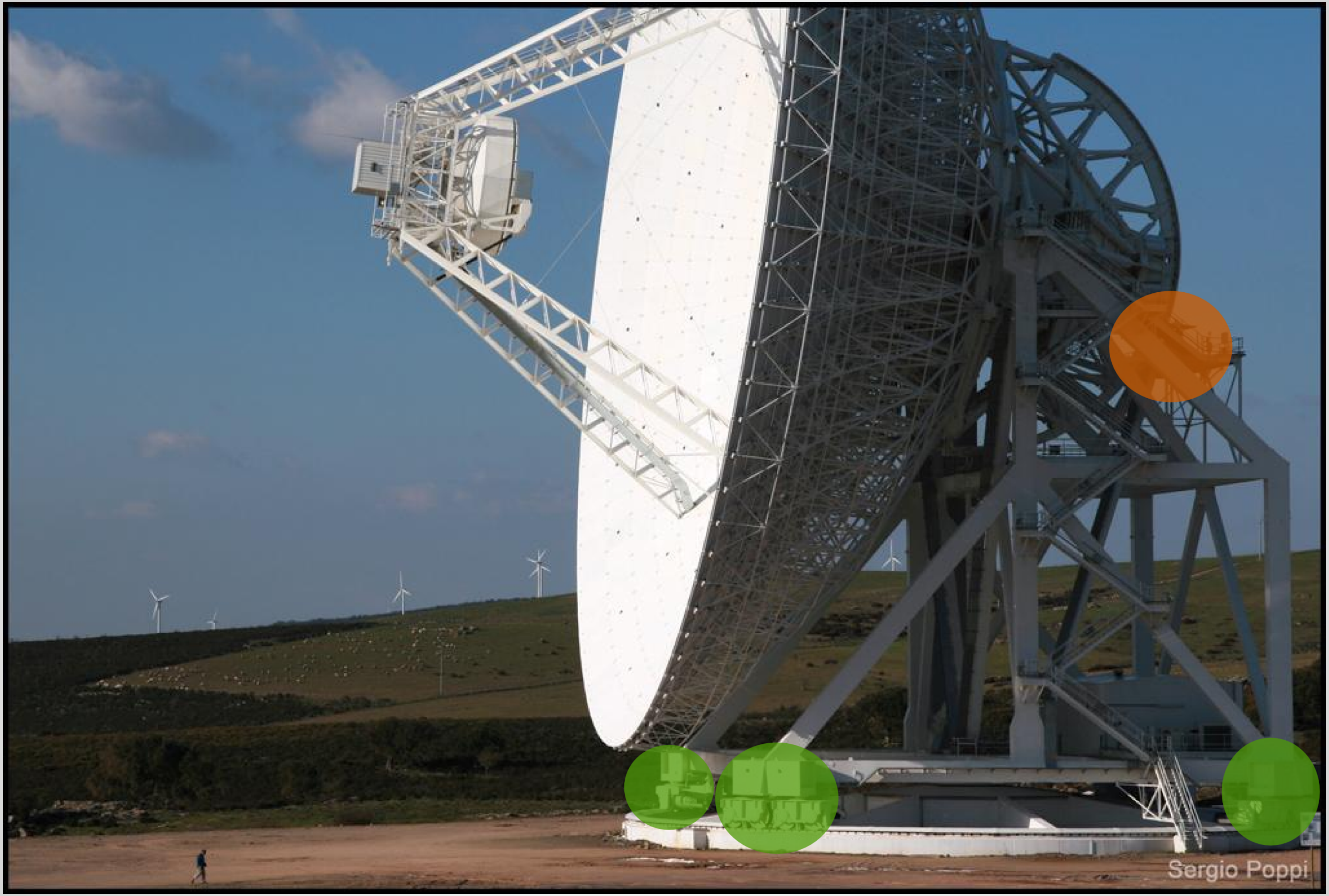

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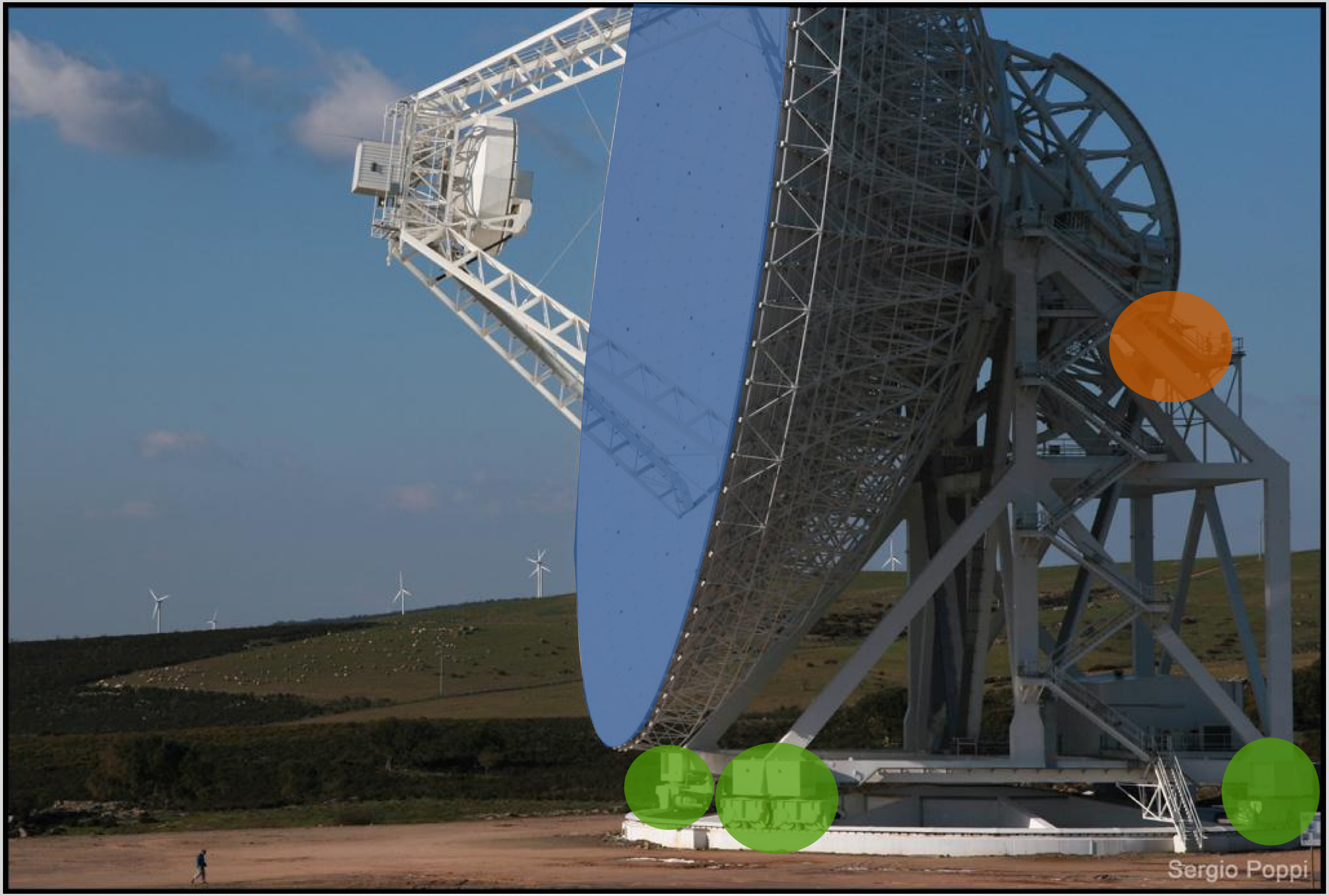

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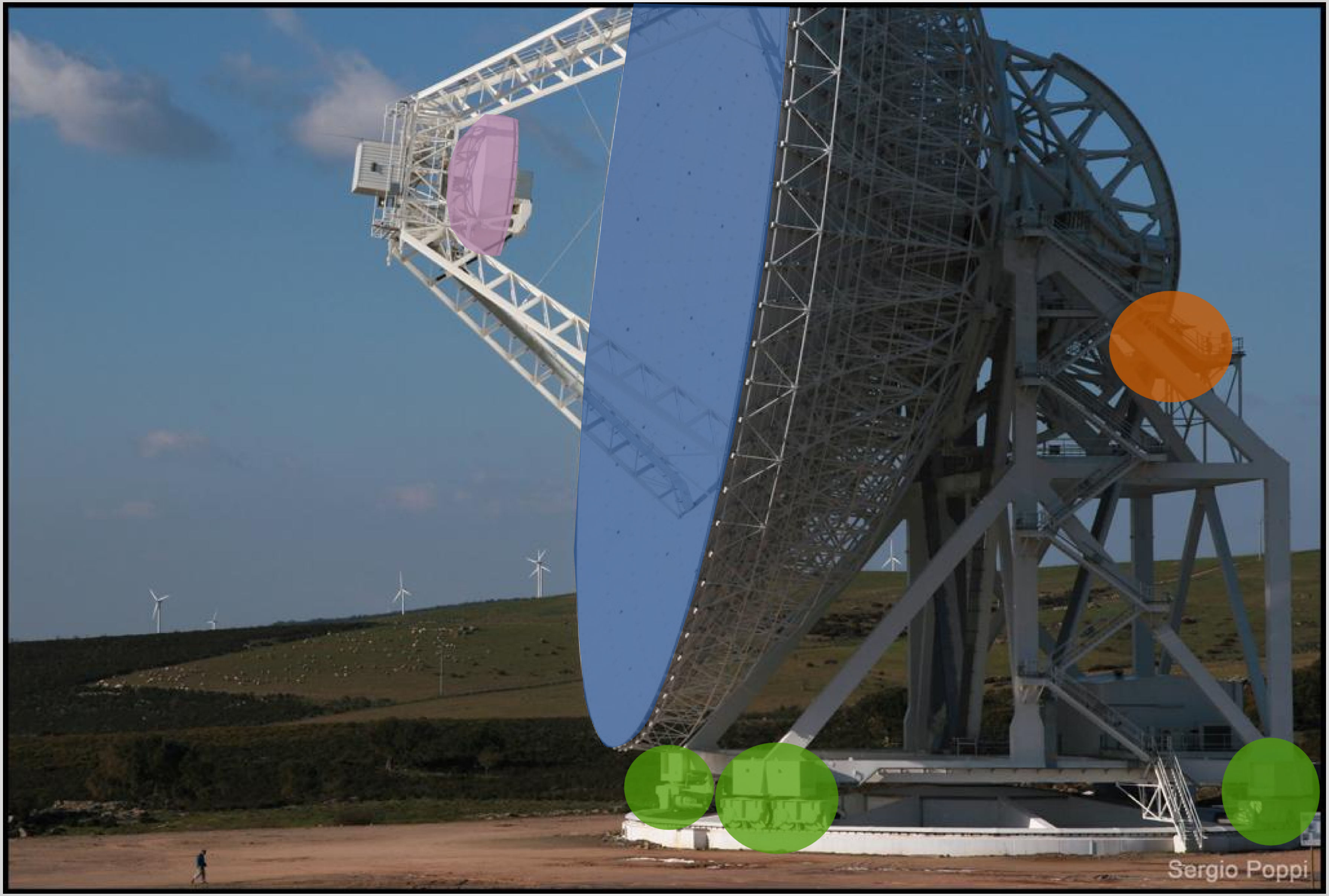

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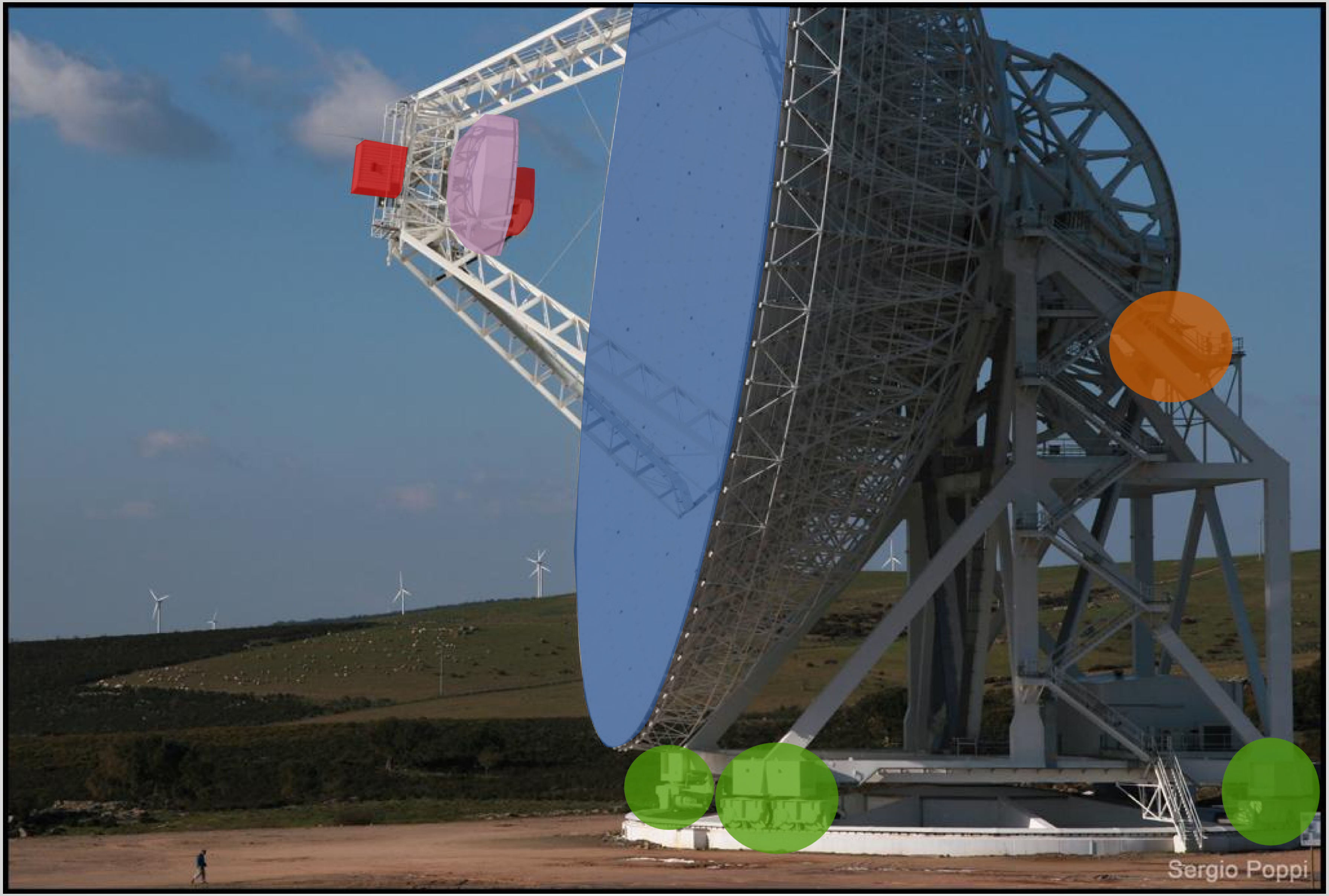

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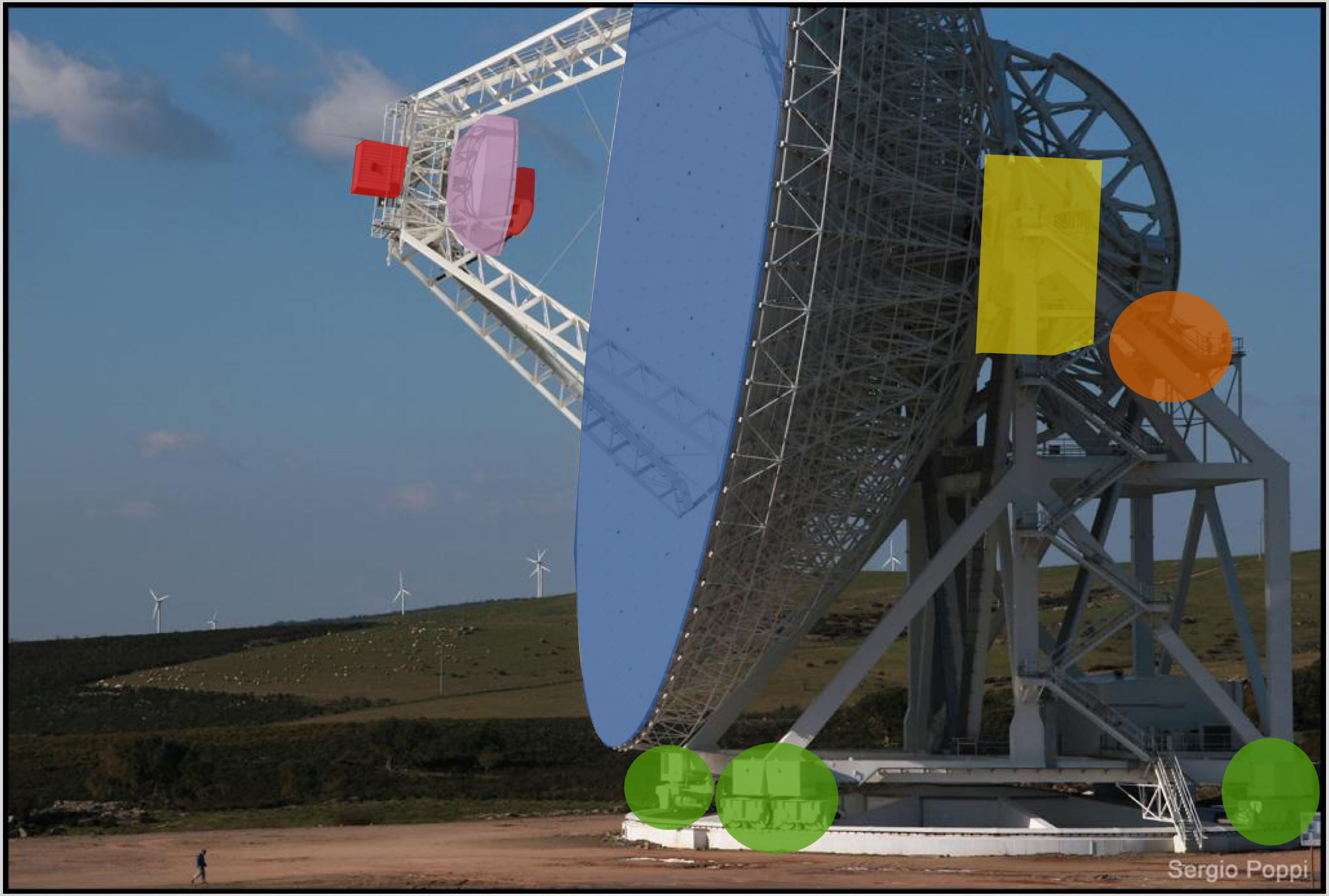

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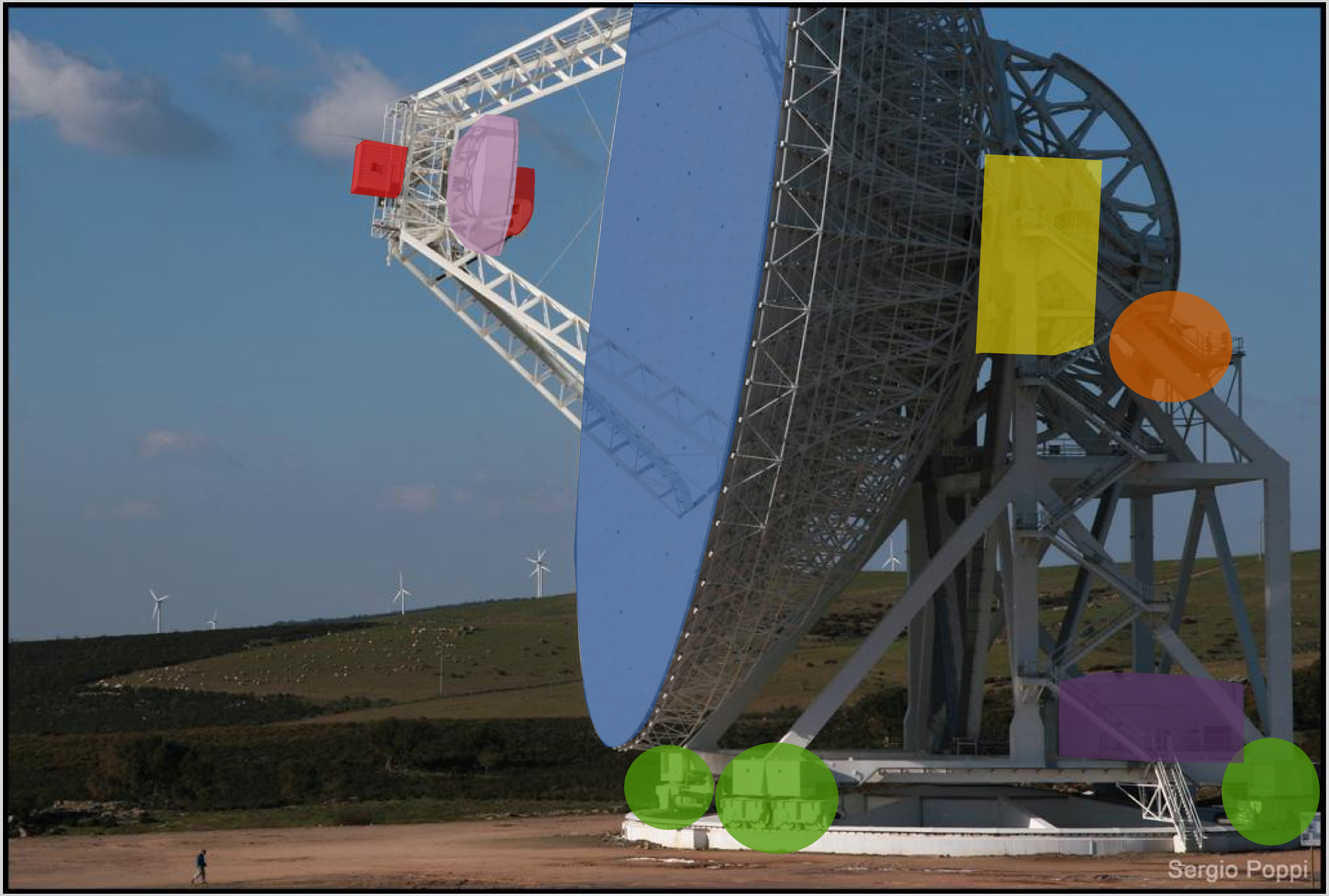

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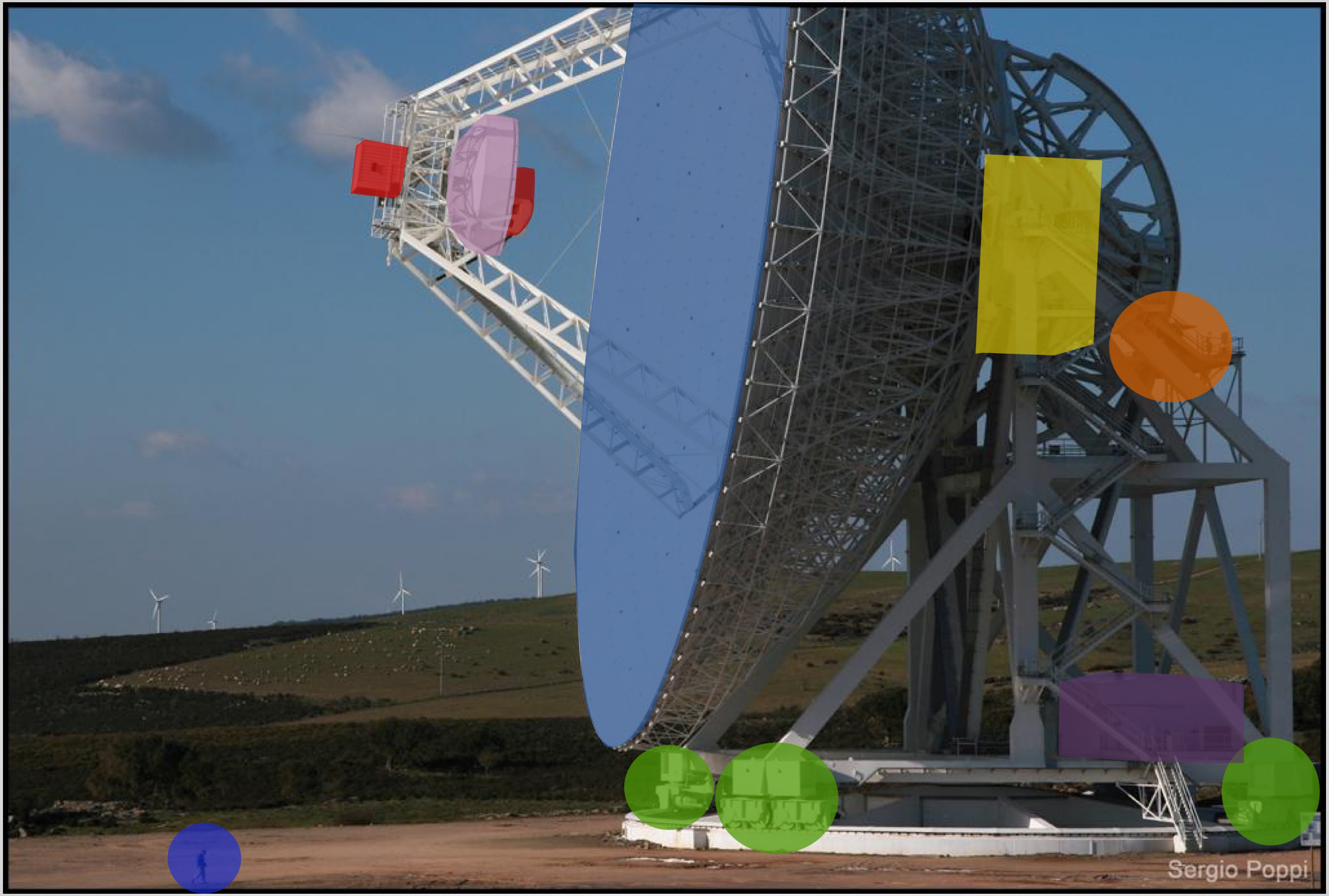

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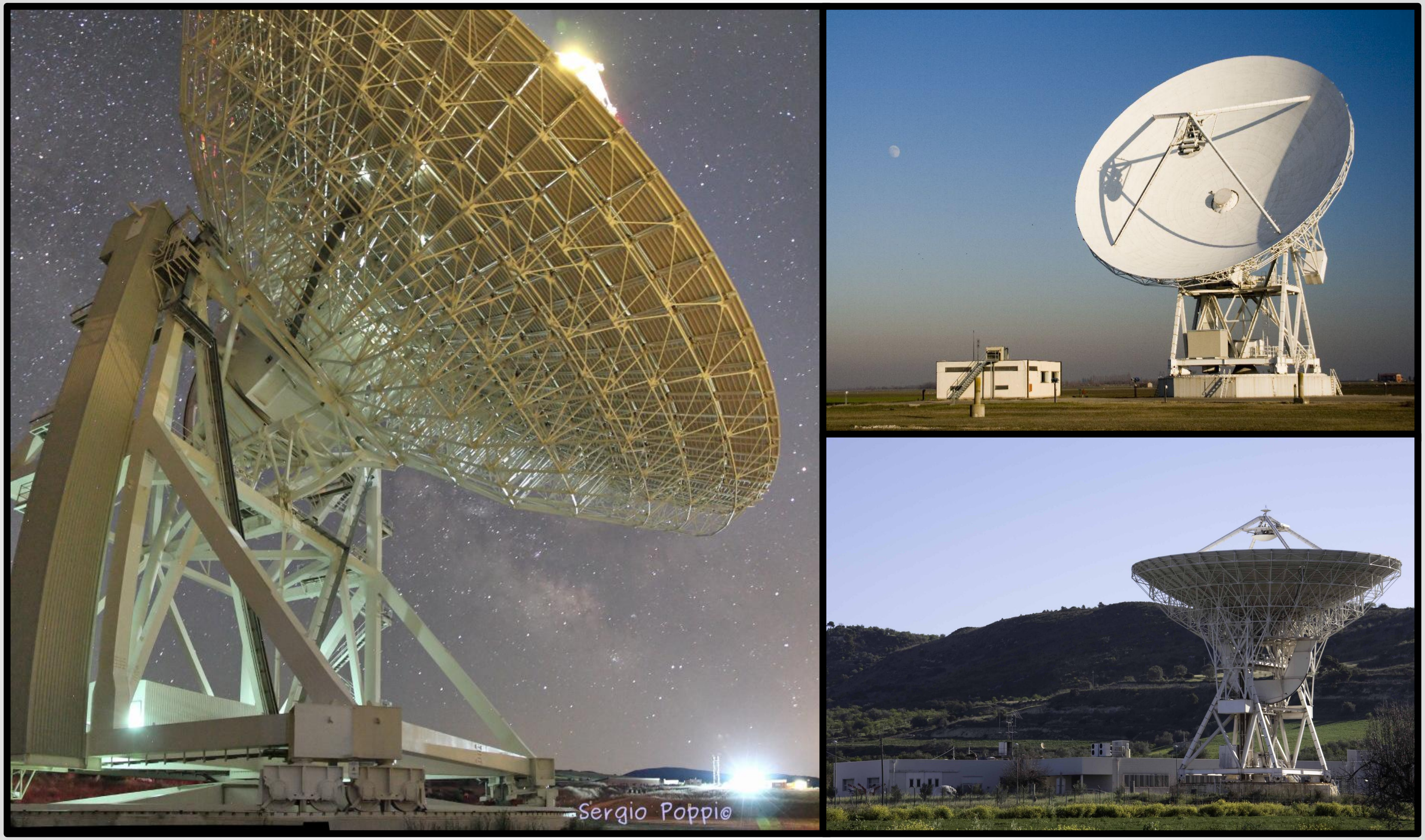
Sergio Poppi©

Carlo Migoni, Andrea Orlati, Marco Buttu, Marco Bartolini, Simona Righini, Antonietta Fara, Sergio Poppi

INAF - ORA (Medicina e OAC)

DISCOS is Big and Growing

How big?

C++ Project	KNCSS
KDE	22000
Firefox	13000
PHP	2580
LibreOffice	864
ImageMagick	566
GIT	370
BASH	175

Totals grouped by language (dominant language first):

cpp:	383778 (72.59%)
xml:	85988 (16.26%)
ansic:	30854 (5.84%)
python:	26607 (5.03%)
sh:	1328 (0.25%)
fortran:	144 (0.03%)
perl:	14 (0.00%)

Total Physical Source Lines of Code (SLOC) = 528713

Development Effort Estimate, Person-Years (Person-Months) = 144.68 (1,736.17)

generated using David A. Wheeler's 'SLOCCount'.

statistics by www.openhub.net

DISCOS on

- New subversion server nuraghe-devel
- SRT: 2 production servers (2 development servers)
- MED: 3 production servers
- NT: 1 production server
- How many development servers? at least 6 but others spread around
- 7 release tags

DISCOS on

- New subversion server nuraghe-devel
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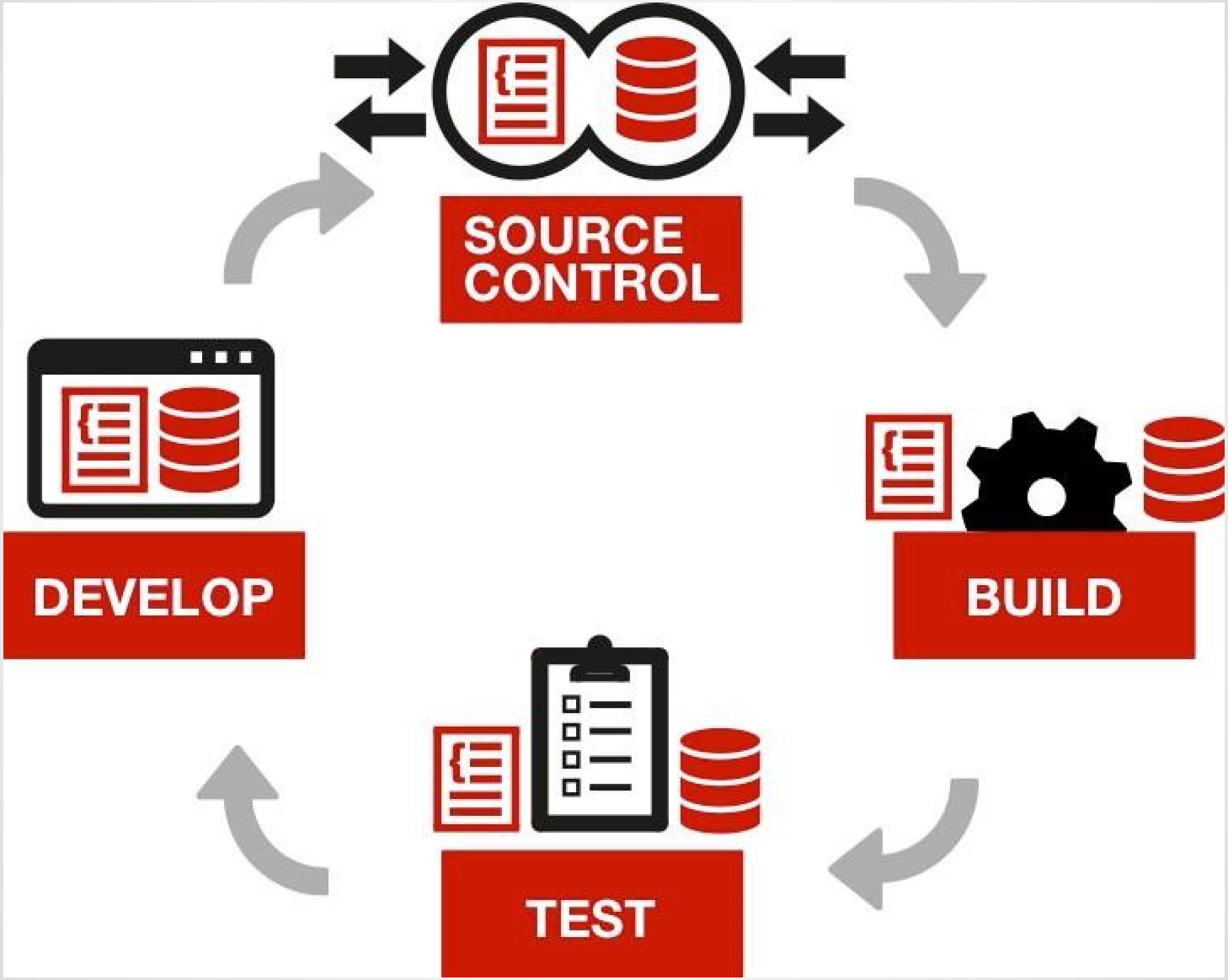
98 Hardware - Software possible configurations

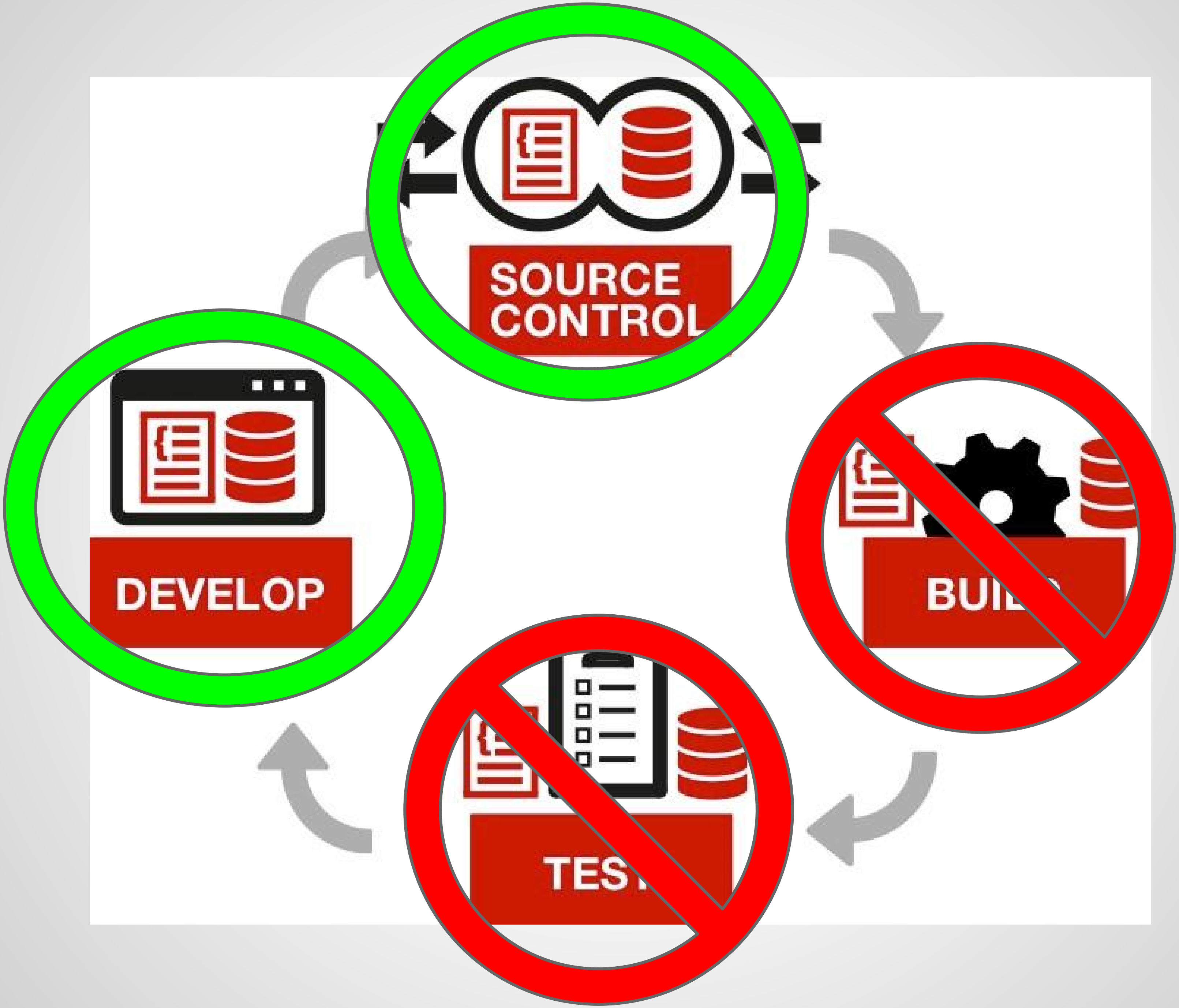
DISCOS needs superpowers

In the perfect world …
… everything is automated

“How long does it take to deploy a change that involves a single line of code into production?”

Continuous Integration

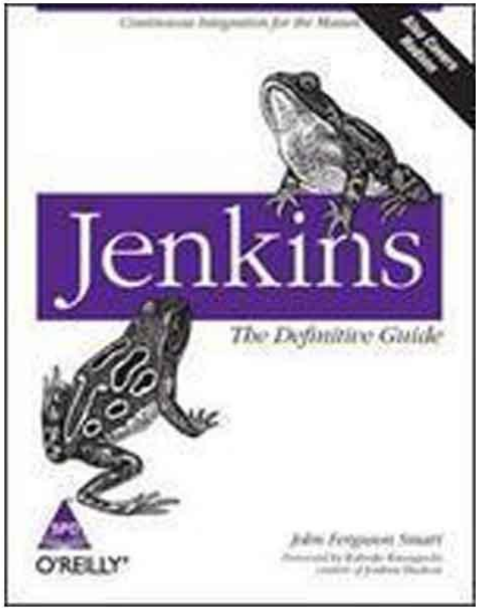

SOURCE CONTROL
BUILD
TEST
DEVELOP


SOURCE CONTROL
BUIL
TES
DEVELOP

CI adoption steps

According to “jenkins the definitive guide”

1) No build server
2) Nightly builds
3) Nigthly builds and Basic Automated Tests
4) Enter the metrics
5) Getting more serious about testing
6) Automated Acceptance Tests and More Automated Deployment
7) Continuous Deployment (Delivery)



http://www.wakaleo.com/books/jenkins-the-definitive-guide

CI adoption steps

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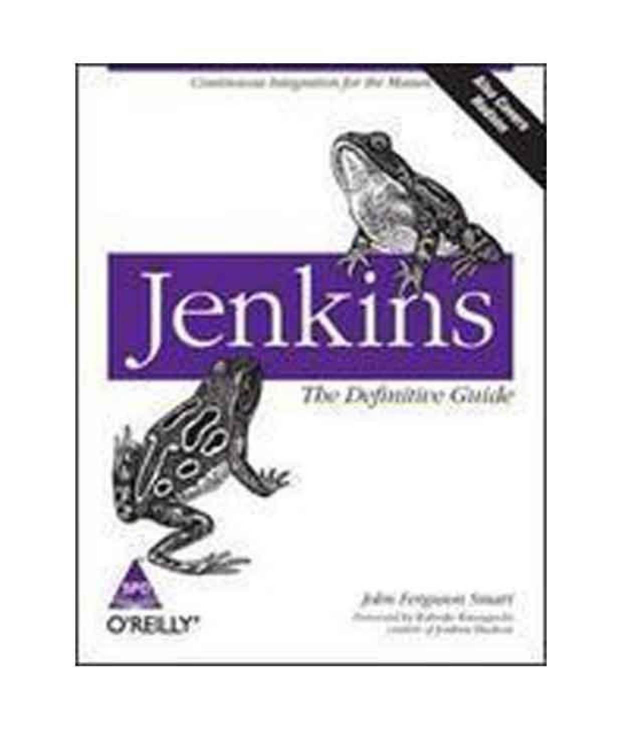


http://www.wakaleo.com/books/jenkins-the-definitive-guide

A common environment

- Developers must run on the same environment
- The build server must be built on a solid and shared basis
- Production servers must share the same configuration as the build server
- Effective tests need to run on the same environment as the production servers

AZDORA

Azdora

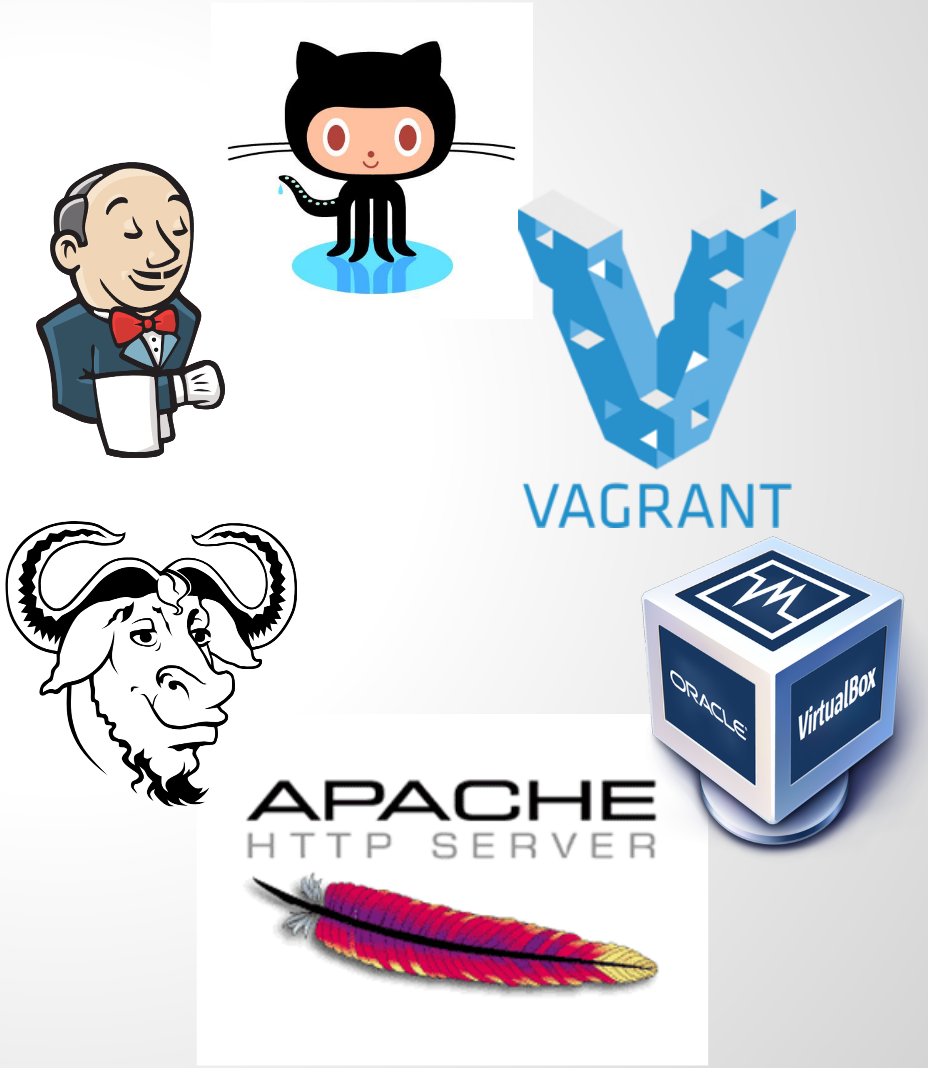
Automated build server

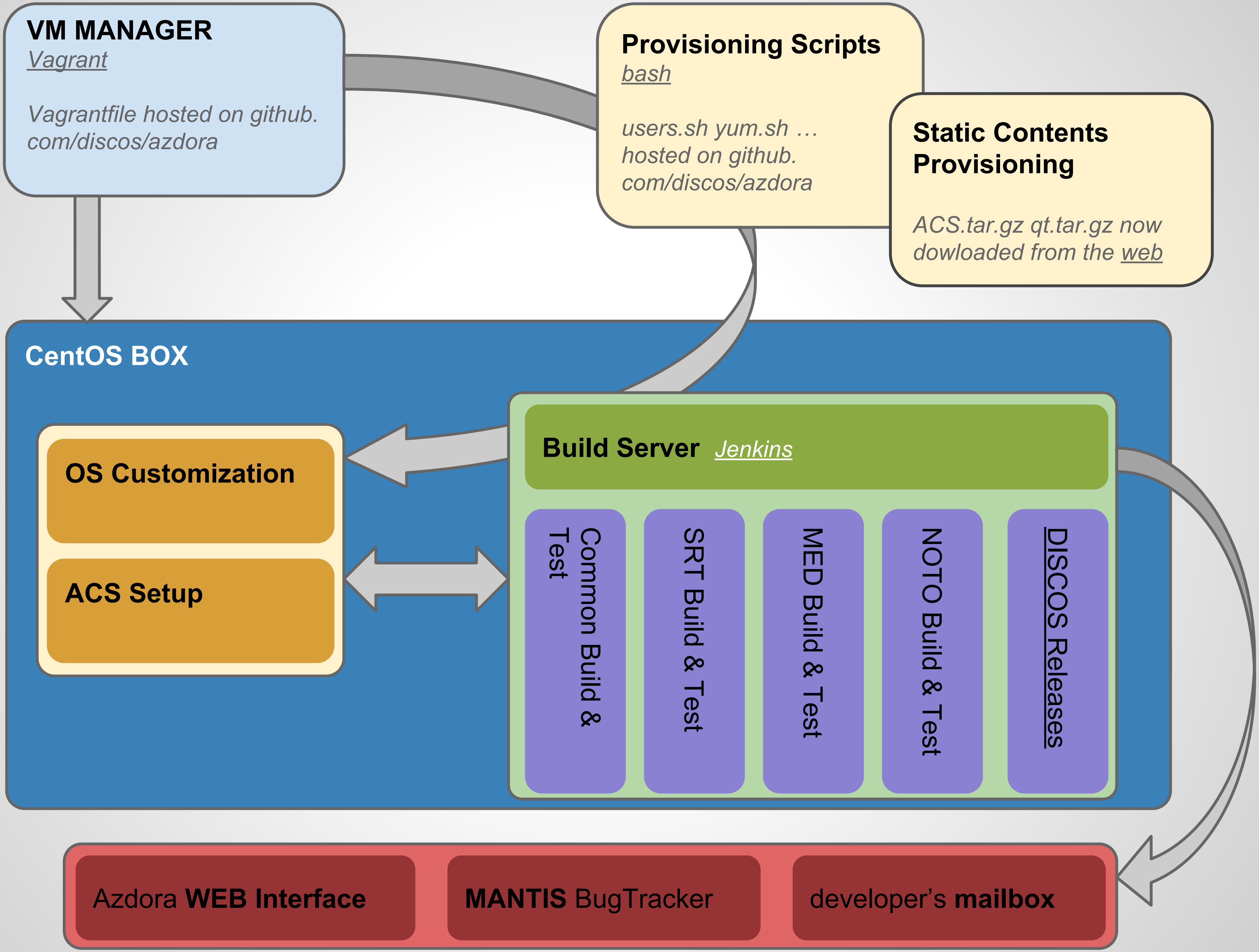
Azdora

- Our first **build server**
- Completely automated setup of a virtual machine with ACS installed and configured along with all necessary dependencies
- Jenkins installation for continuous integration
- Already configured for accessing nuraghe-devel, mantis BT , github ready
- Born for testing but can evolve into our standard management platform

Azdora technology stack

- Github
- Vagrant
- Virtualbox
- http file server
- bash provisioning
- jenkins CI





VM MANAGER
Vagrant

Vagrantfile hosted on github.com/discos/azdora

Provisioning Scripts
bash

users.sh yum.sh …
hosted on github.com/discos/azdora

Static Contents Provisioning

ACS.tar.gz qt.tar.gz now dowloaded from the web

CentOS BOX

OS Customization

ACS Setup

Build Server *Jenkins*

Common Build & Test

SRT Build & Test

MED Build & Test

NOTO Build & Test

DISCOS Releases

Azdora **WEB Interface**

MANTIS BugTracker

developer's **mailbox**

1.The Server

Vagrant https://www.vagrantup.com/

- Command line utility
- Automatically creates virtual machines
- Commands for managing VMs
- Automatically share resources between VM and host
- Automatic network configuration
- Flexible VM provisioning
- Work with VBox, VMWare, Docker, Hyper-V
- more than this … vagrant share, vagrant push …

Build env creation automation

- Automatically create and configure a VirtualBox VM
- Add a new Centos5 base box
- Configure the Virtual Machine properties
- Install base OS on the virtual machine
- install every defined customization (users, packages,...)
- run the Virtual Machine

```
$ git clone https://github.com/discos/azdora.git
$ cd azdora
$ vagrant up
```

2. Provisioning

BASH provisioning

- organized in different files, stored in a github repo
- define users
- configure guest os, yum, python packages
- install ACS
- can use an HTTP or FTP (or …) server for downloading correct dependency files (i.e. QT, modbus …)
- can be re-executed on the running VM

BASH provisioning alternatives

Python
Fabric

SALTSTACK

CHEF™

Static content provisioning

- Large files: ACS.tar.gz, qt-X11, jenkins-backup needed during installation
- Cannot use svn or git for those contents
- Now downloaded from the web when needed and stored by azdora for next use
- Can we host those somewhere?
- Should be publicly accessible, or at least network accessible in some protected way usable by provisioning scripts

Vagrant + Virtualbox

- testing and development can run on this platform
- Provisioning scripts can also run on production machines

- cannot deploy virtualbox machine in production environment

Docker alternative to VBox

- docker is based on linux containers and a stratified filesystem
- It could be used in production as in testing!
- Vagrant is compatible with docker
- maybe worth a check … www.docker.com

Docker alternative to VBox

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Any Experience?

3. Jenkins

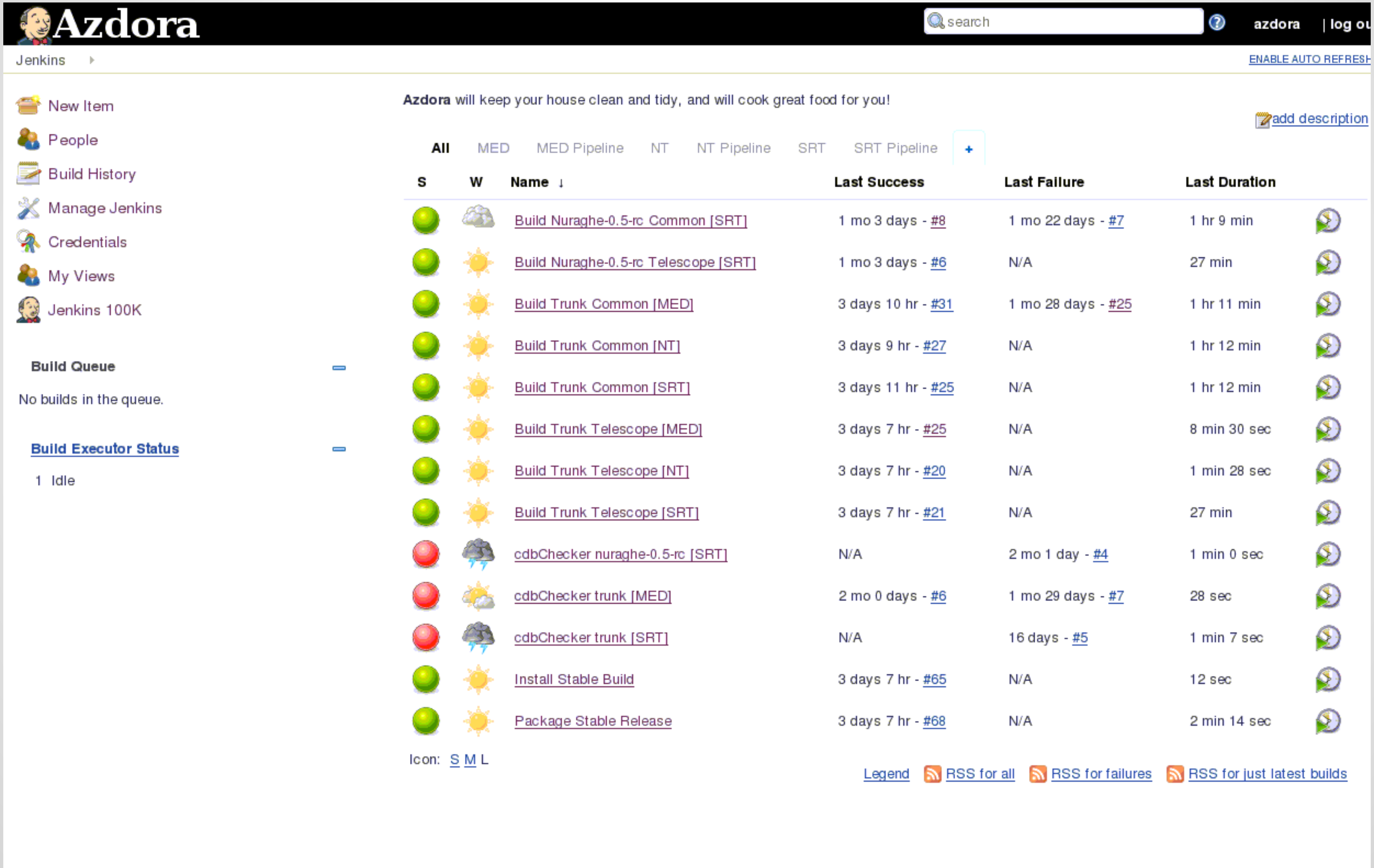
Jenkins https://jenkins-ci.org/

- Automatic build server/job runner
- Java web application, can be deployed on its own server or any servlet container (glassfish, tomcat …)
- 100K running instances around the world
- Good community support
- Rich plugin ecosystem

Jenkins in Azdora

- Installed by provisioning script jenkins.sh , uses an official rpm package
- Automated jobs (everything) integrated with our source code repository and bug tracking system
- runs as a service on the VM
- Backup and restore jenkins configuration via plugin

Jenkins interface



Azdora

search

azdora | log ou

Jenkins

ENABLE AUTO REFRESH

- New Item
- People
- Build History
- Manage Jenkins
- Credentials
- My Views
- Jenkins 100K

Build Queue

No builds in the queue.

Build Executor Status

1 Idle

Azdora will keep your house clean and tidy, and will cook great food for you!

add description

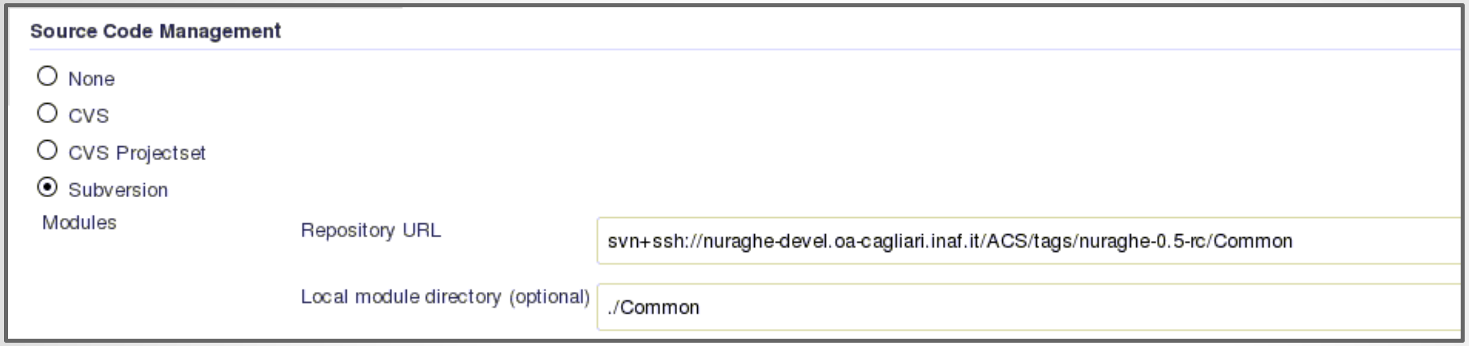
All MED MED Pipeline NT NT Pipeline SRT SRT Pipeline +

S	W	Name ↓	Last Success	Last Failure	Last Duration
🟢	☁	Build Nuraghe-0.5-rc Common [SRT]	1 mo 3 days - #8	1 mo 22 days - #7	1 hr 9 min
🟢	☀	Build Nuraghe-0.5-rc Telescope [SRT]	1 mo 3 days - #6	N/A	27 min
🟢	☀	Build Trunk Common [MED]	3 days 10 hr - #31	1 mo 28 days - #25	1 hr 11 min
🟢	☀	Build Trunk Common [NT]	3 days 9 hr - #27	N/A	1 hr 12 min
🟢	☀	Build Trunk Common [SRT]	3 days 11 hr - #25	N/A	1 hr 12 min
🟢	☀	Build Trunk Telescope [MED]	3 days 7 hr - #25	N/A	8 min 30 sec
🟢	☀	Build Trunk Telescope [NT]	3 days 7 hr - #20	N/A	1 min 28 sec
🟢	☀	Build Trunk Telescope [SRT]	3 days 7 hr - #21	N/A	27 min
🔴	⛈	cdbChecker nuraghe-0.5-rc [SRT]	N/A	2 mo 1 day - #4	1 min 0 sec
🔴	⛅	cdbChecker trunk [MED]	2 mo 0 days - #6	1 mo 29 days - #7	28 sec
🔴	⛈	cdbChecker trunk [SRT]	N/A	16 days - #5	1 min 7 sec
🟢	☀	Install Stable Build	3 days 7 hr - #65	N/A	12 sec
🟢	☀	Package Stable Release	3 days 7 hr - #68	N/A	2 min 14 sec

Icon: S M L

Legend RSS for all RSS for failures RSS for just latest builds

Jenkins Jobs

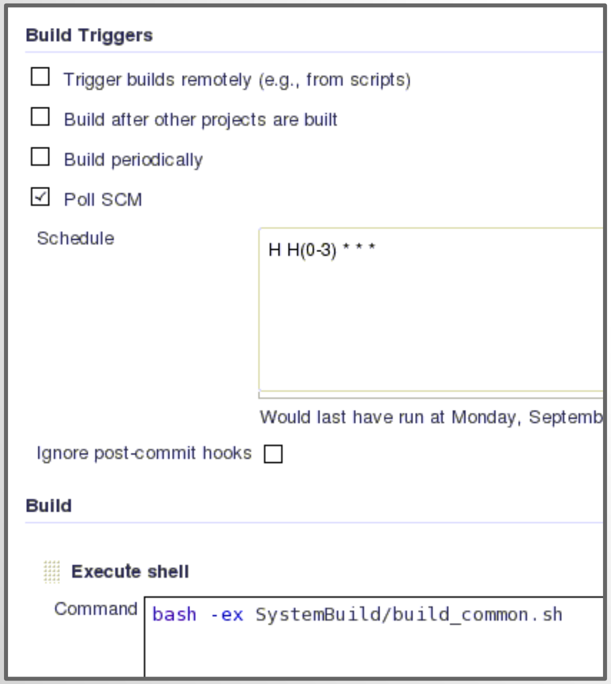


Source Code Management

○ None
○ CVS
○ CVS Projectset
● Subversion

Modules

Repository URL	svn+ssh://nuraghe-devel.oa-cagliari.inaf.it/ACS/tags/nuraghe-0.5-rc/Common
Local module directory (optional)	./Common



Build Triggers

□ Trigger builds remotely (e.g., from scripts)
□ Build after other projects are built
□ Build periodically
☑ Poll SCM

Schedule: H H(0-3) * * *

Would last have run at Monday, Septemb

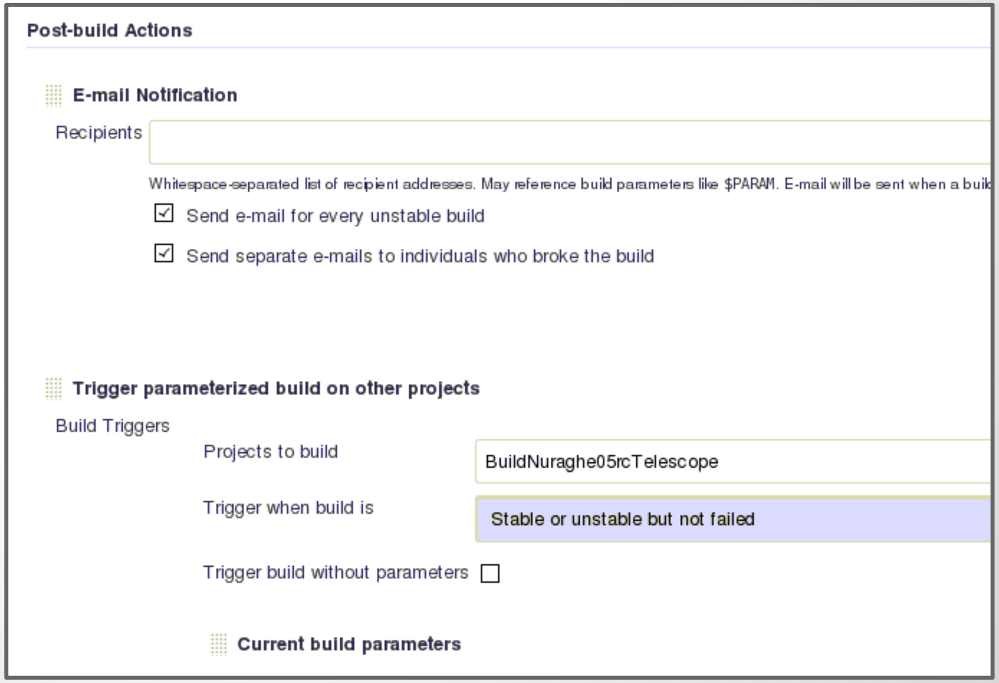
Ignore post-commit hooks □

Build

Execute shell

Command:

```
bash -ex SystemBuild/build_common.sh
```



Post-build Actions

E-mail Notification

Recipients

Whitespace-separated list of recipient addresses. May reference build parameters like $PARAM. E-mail will be sent when a buil

☑ Send e-mail for every unstable build
☑ Send separate e-mails to individuals who broke the build

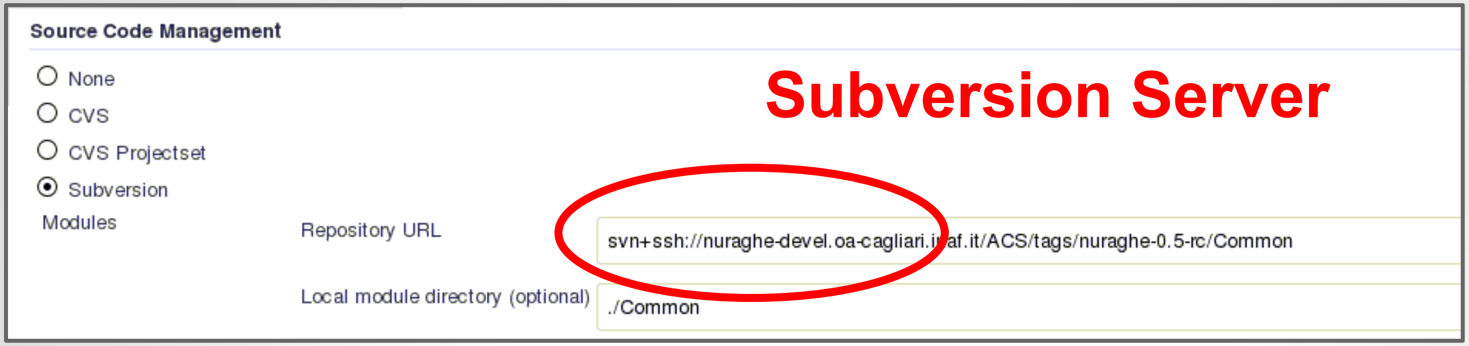
Trigger parameterized build on other projects

Build Triggers

Projects to build	BuildNuraghe05rcTelescope
Trigger when build is	Stable or unstable but not failed
Trigger build without parameters	□

Current build parameters

Jenkins Jobs



Subversion Server

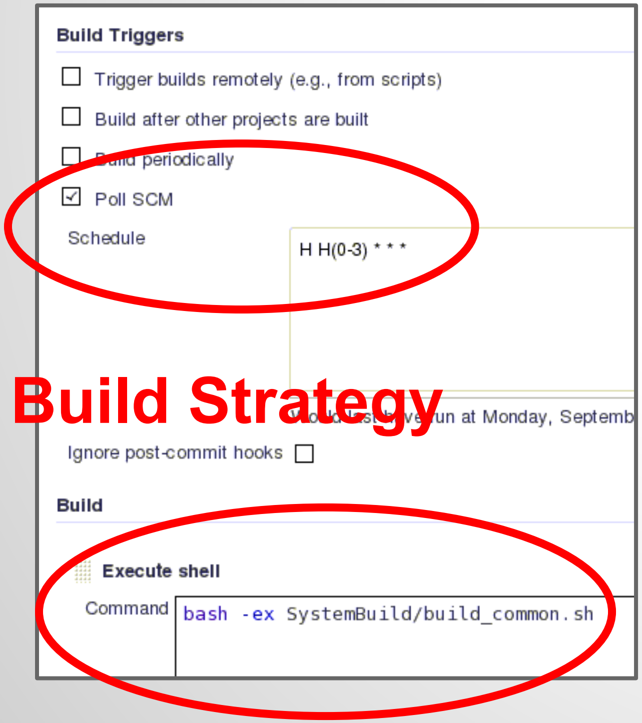
Source Code Management

○ None
○ CVS
○ CVS Projectset
● Subversion

Modules

Repository URL: svn+ssh://nuraghe-devel.oa-cagliari.inaf.it/ACS/tags/nuraghe-0.5-rc/Common

Local module directory (optional): ./Common



Build Strategy

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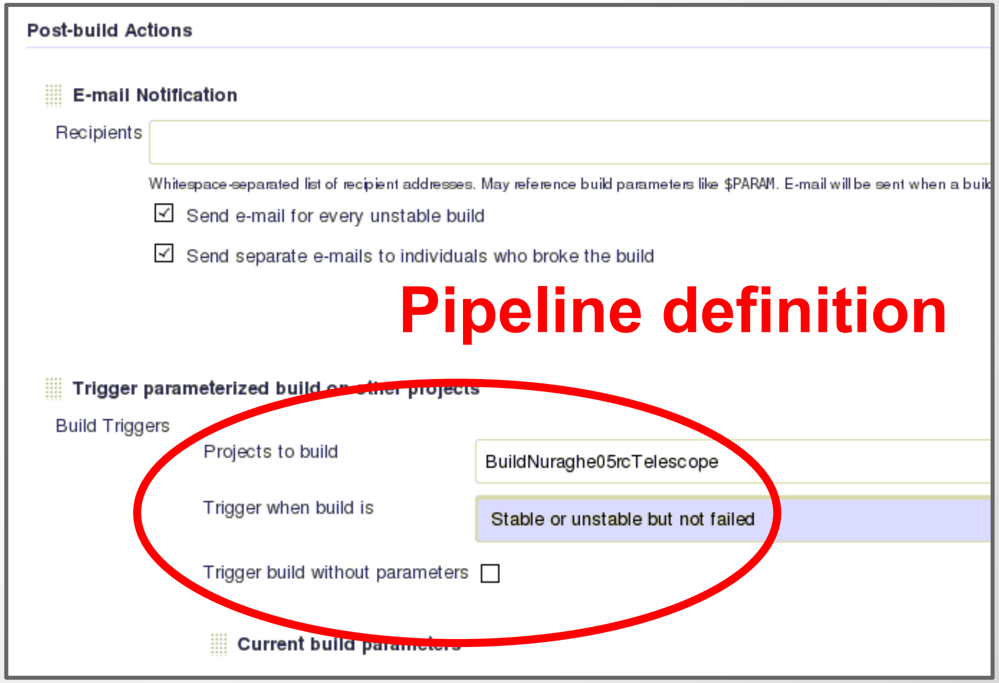

Pipeline definition

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Build Triggers

Projects to build: BuildNuraghe05rcTelescope

Trigger when build is: Stable or unstable but not failed

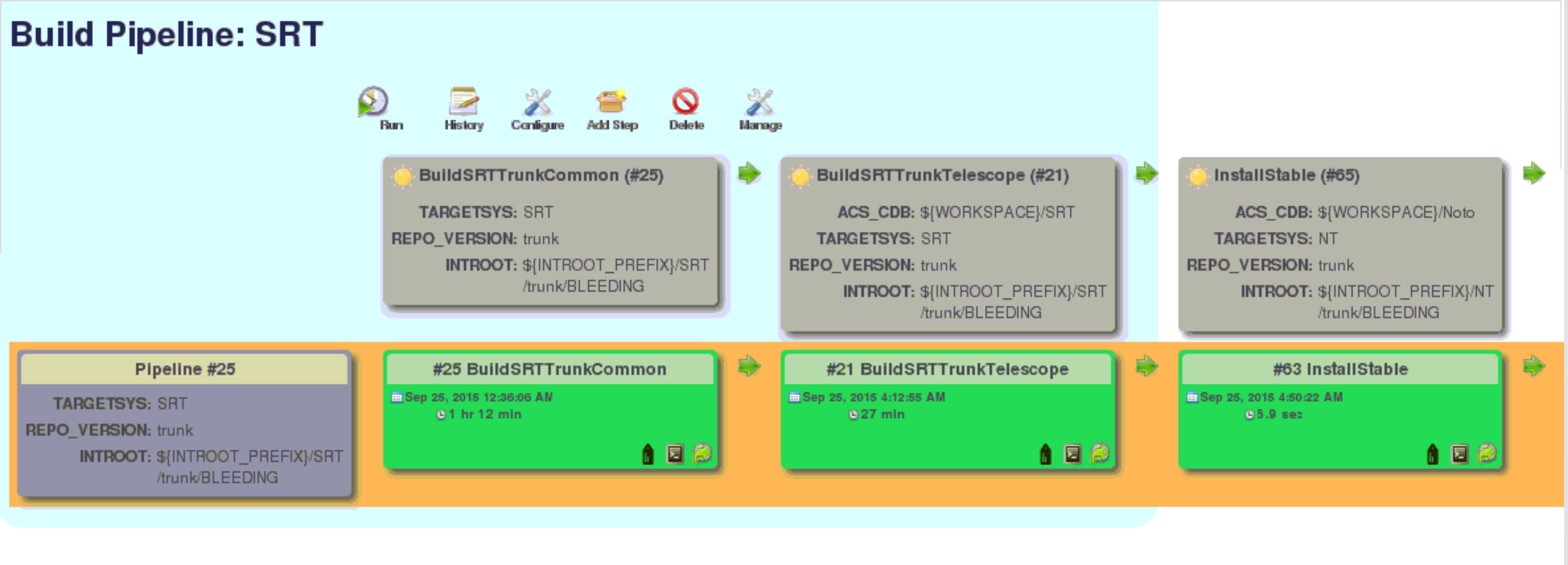
Trigger build without parameters □

Current build parameters

Jenkins pipelines

- Each night checks for new commit
- If there have been commits, updates the trunk and tries to build it
- Repeat for SRT, MED, NT
- if build is stable install the resulting introot for later packaging
  - If build fails sends an email the authors of the changes
- Package the installation together with other meta informations into a .tar.gz file

Jenkins SRT pipeline



Build Pipeline: SRT

BuildSRTTrunkCommon (#25)

TARGETSYS: SRT
REPO_VERSION: trunk
INTROOT: ${INTROOT_PREFIX}/SRT/trunk/BLEEDING

BuildSRTTrunkTelescope (#21)

ACS_CDB: ${WORKSPACE}/SRT
TARGETSYS: SRT
REPO_VERSION: trunk
INTROOT: ${INTROOT_PREFIX}/SRT/trunk/BLEEDING

InstallStable (#65)

ACS_CDB: ${WORKSPACE}/Noto
TARGETSYS: NT
REPO_VERSION: trunk
INTROOT: ${INTROOT_PREFIX}/NT/trunk/BLEEDING

Pipeline #25

TARGETSYS: SRT
REPO_VERSION: trunk
INTROOT: ${INTROOT_PREFIX}/SRT/trunk/BLEEDING

#25 BuildSRTTrunkCommon

Sep 25, 2015 12:36:06 AM
1 hr 12 min

#21 BuildSRTTrunkTelescope

Sep 25, 2015 4:12:55 AM
27 min

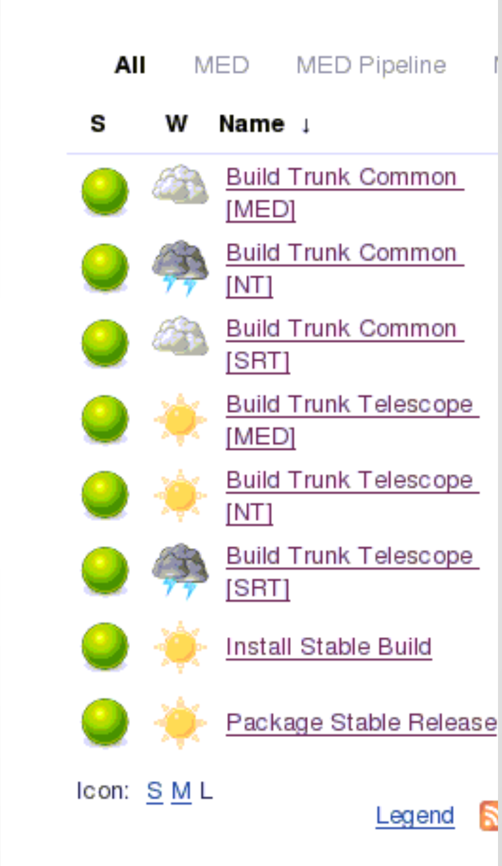
#63 InstallStable

Sep 25, 2015 4:50:22 AM
5.9 sec

Trunk stability

- First step has been to achieve stability in the building of the trunk branch

- Developers are alerted via email upon errors and issues are automatically closed by the server



All MED MED Pipeline

S	W	Name ↓
●	☁	Build Trunk Common [MED]
●	⛈	Build Trunk Common [NT]
●	☁	Build Trunk Common [SRT]
●	☀	Build Trunk Telescope [MED]
●	☀	Build Trunk Telescope [NT]
●	⛈	Build Trunk Telescope [SRT]
●	☀	Install Stable Build
●	☀	Package Stable Release

Icon: S M L

Legend

Trunk stability

- First step has been to achieve stability in the building of the trunk branch

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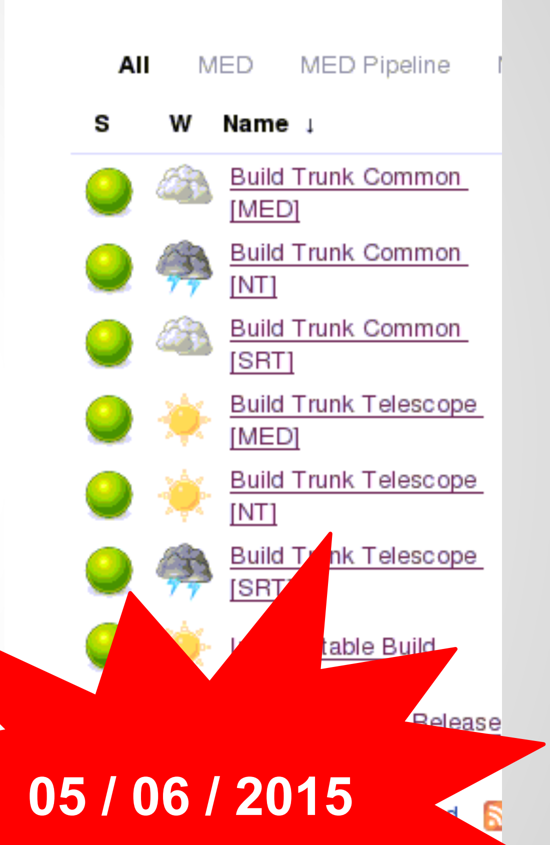


All MED MED Pipeline

S	W	Name ↓
●		Build Trunk Common [MED]
●		Build Trunk Common [NT]
●		Build Trunk Common [SRT]
●		Build Trunk Telescope [MED]
●		Build Trunk Telescope [NT]
●		Build Tr nk Telescope [SRT
●		table Build
		Release

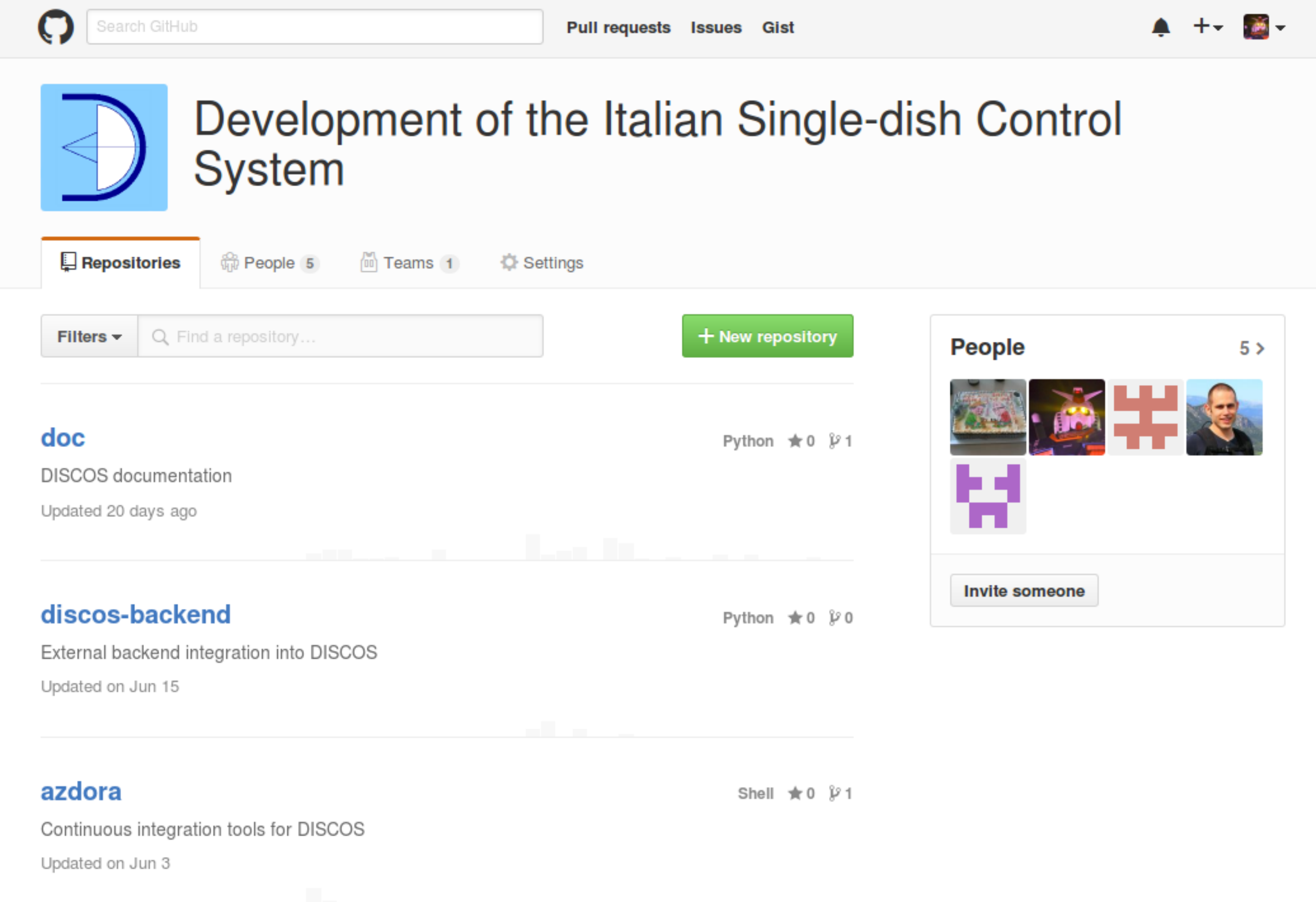
05 / 06 / 2015

Other ICT infrastructures

DISCOS Github organization

- Academic&Research license
- 10 free private repositories
- Teams and permissions
- RST formatted project documentation and user manuals
- Minor Projects
- http://github.com/discos
- GIT vs SVN -> 130MB vs 3GB
- Some basic tools for project management

DISCOS Github page



Development of the Italian Single-dish Control System

doc — Python ★0 1

DISCOS documentation

Updated 20 days ago

discos-backend — Python ★0 0

External backend integration into DISCOS

Updated on Jun 15

azdora — Shell ★0 1

Continuous integration tools for DISCOS

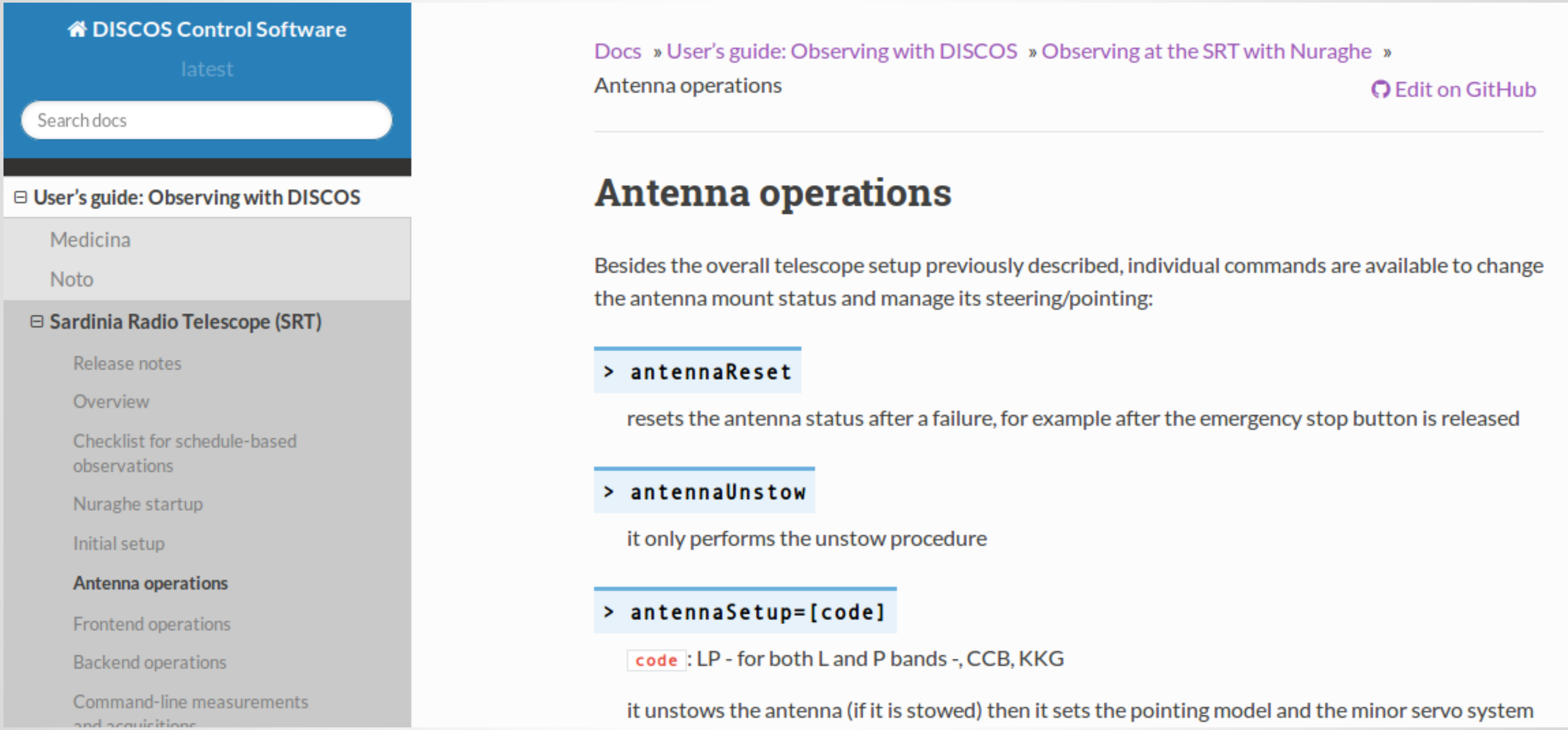
Updated on Jun 3

HOWTO LICENSE???

Readthedocs

- github integration
- completely free
- automatic documentation generation
- automatic documentation hosting
- consistent documentation style
- http://discos.readthedocs.org

Readthedocs example



DISCOS Control Software
latest
Search docs
⊟ User's guide: Observing with DISCOS
Medicina
Noto
⊟ Sardinia Radio Telescope (SRT)
Release notes
Overview
Checklist for schedule-based observations
Nuraghe startup
Initial setup
Antenna operations
Frontend operations
Backend operations
Command-line measurements and acquisitions
Docs » User's guide: Observing with DISCOS » Observing at the SRT with Nuraghe » Antenna operations
Edit on GitHub

Antenna operations

Besides the overall telescope setup previously described, individual commands are available to change the antenna mount status and manage its steering/pointing:

```
> antennaReset
```

resets the antenna status after a failure, for example after the emergency stop button is released

```
> antennaUnstow
```

it only performs the unstow procedure

```
> antennaSetup=[code]
```

`code` : LP - for both L and P bands -, CCB, KKG

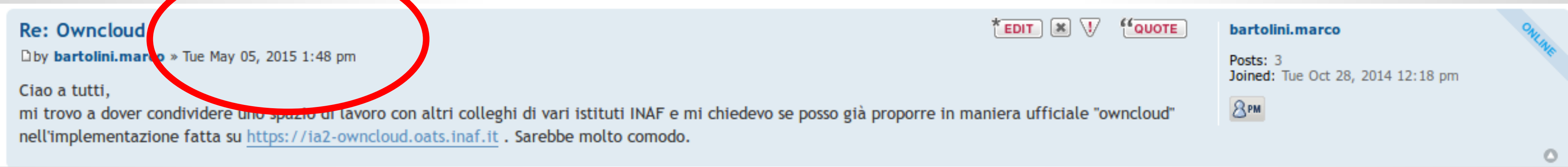
it unstows the antenna (if it is stowed) then it sets the pointing model and the minor servo system

Build Server

- Only one server for both SVN and Jenkins VM
- Each build takes 1h
- Many builds per night, VM cannot execute parallel builds
- SVN is slow and Jenkins also

ICT Forum

- Last year I’m among the best contributors ;)
- It did not work, shell we reconsider this instrument?



Re: Owncloud

by bartolini.marco » Tue May 05, 2015 1:48 pm

Ciao a tutti,
mi trovo a dover condividere uno spazio di lavoro con altri colleghi di vari istituti INAF e mi chiedevo se posso già proporre in maniera ufficiale "owncloud" nell'implementazione fatta su https://ia2-owncloud.oats.inaf.it . Sarebbe molto comodo.

bartolini.marco

Posts: 3
Joined: Tue Oct 28, 2014 12:18 pm

DVCSs

Distributed Version Control Systems

- After last ICT workshop I circulated a document about DVCS that raised some interest (see forum)
- On the ICT-Forum it seems to prevail an “homemade github” option
- Nobody did anything, we opened a working github organization
- Are we sure we have the manpower to manage in-house installations?

Supercomputing

- RAW data rate of 10GB/sec. < D < 128GB/sec.
- Needs realtime data reduction
- Mainly based on FPGA and GPU technologies deployed on dedicated hardware.

The End