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## A cloud-based computing infrastructure for the HERD cosmic-ray experiment

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The HERD experiment will perform direct cosmic-ray detection at the highest ever reached energies, thanks to an innovative design that maximizes the acceptance, and its placement on the future Chinese Space Station which will allow for an extended observation period.”

Significant computing and storage resources are foreseen to be needed in order to cope with the necessities of a large community driving a big experimental device with an energy reach above PeV for hadrons and multi-TeV for electrons and positrons. For example, at PeV energies Monte Carlo simulations require a massive amount of computing power, and very large simulated data sets are needed for detector performance studies like electron-proton rejection.

The HERD computing infrastructure is currently being investigated and prototyped in order to provide a flexible, robust and easy to use cloud-based computing and storage platform. It is based on technical solutions originally developed by the “Dynamic On Demand Analysis Service” (DODAS) framework in the context of projects such as INDIGO-DataCloud, EOSC-hub and XDC. It allows to seamlessly access both commercial and institutional cloud resources, in order to efficiently make use of opportunistic resources to cope with high-demand periods (like full dataset reprocessings and specialized Monte Carlo productions), as well transparently integrate with with on-premise computing resources managed by an HTCondor batch system. The cloud platform also allows for an easy and efficient deployment of services for the collaboration like calendar, document server, code repository etc. making use of available, free open source solutions. Finally, an Indigo-IAM instance provides a Single-Sign-On service for access control for the whole infrastructure.

An overview of the current status and of the future perspectives will be presented.

### Significance

This contribution is about the first-ever, fully-cloud-based platform for data processing of a space-based cosmic-ray experiment. The presented technical solutions are innovative for the field and are a significant advancement in the definition of the computing model of the HERD experiment.

### References

### Experiment context, if any

HERD

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