Status of RadLab
and
Recent Database Development(s)

J. Miller

Open Science Data Repository

The NASA Open Science Data Repository (OSDR) enables access to space-related data from experiments and missions that investigate biological and health responses of terrestrial life to spaceflight. The goal of OSDR is to enable multi-modal and multi-hierarchical fundamental space life science data be reused toward basic science, applied science, and operational outcomes for space exploration and knowledge discovery. These data include 'omics, phenotypic, physiological, behavioral, hardware, environmental telemetry; raw, processed; tabular, text, code, bioimaging, and video.

https://www.nasa.gov/osdr/

NASA Open Science Data Repository (OSDR)

Biospecimen Sharing Program (BSP)

Rodent tissues from Flight and Ground investigations.

NASA Biological Institutional Scientific Collection (NBISC)

Non-human specimens and space microbial cultures

Ames Life Sciences Data Archive (ALSDA)

mission, project, and imaging data

GeneLab (GL)

omics data

NASA Internal Program

Open-Source Science Programs

Open Science Data Repository Search

Search Datasets: iss

Sort By: Title (Ascending)

Items per page: 25 | 1 – 7 of 7

General Search Filters

Data Source

- [x] GeneLab
- [ ] ALSDA
- [ ] ESA
- [ ] NIH GEO
- [ ] EBI PRIDE

Show more

Data Type

- [x] Study
- [ ] Experiment
- [ ] Subject
- [ ] Biospecimen
- [ ] Payload
- [ ] Mission
- [ ] Hardware
- [ ] Vehicle

Study Search Filters

Project Type

- [ ] Ground
- [x] Spaceflight
- [ ] High Altitude

Assay Type

- [ ] Amplicon Sequencing Assay
- [ ] Bisulfite Sequencing
- [ ] Behavior
- [ ] Behavior (Gait)
- [ ] Behavior (Locomotion)

Show more

Study
OSD-514

Artificial gravity partially protects space-induced neurological deficits in Drosophila melanogaster

Organisms	Factors	Assay Types	Release Date	Description
Drosophila melanogaster	Sex Spaceflight Altered Gravity	transcription profiling protein expression profiling	08-Sep-2022	Spaceflight poses risks to the central nervous system (CNS), and understanding neurological responses is important for future missions. We report CNS changes in Drosophila aboard the International Spa...

Highlights: International Space Station (*ISS*)... We would like to thank the flight crew for technical assistance aboard the *ISS*.... The MVP-Fly01 mission was launched on SpaceX-14 to the *ISS* at 20:30 UTC (Coordinated Universal Time)... Flies were kept in the MVP hardware throughout the 34-day mission on the *ISS*.... *cgene*

Study
OSD-207

Correlated Gene and Protein Expression in heads from Drosophila reared in microgravity

Organisms	Factors	Assay Types	Release Date	Description
Drosophila melanogaster	Spaceflight Genotype Strain	transcription profiling protein expression profiling	30-Nov-2018	Omics analyses of RNA and protein isolated from heads of microgravity reared adult Drosophila.

Highlights: International Space Station (*ISS*)... Flies launched to the International Space Station (*ISS*) as well as ground controls were housed in polystyrene... day mission and were stored aboard the Dragon capsule that was docked and sharing atmosphere with the *ISS*... conditions in ground-based incubators with temperature and humidity controlled to levels recorded on the *ISS*... *cgene*

Study
OSD-588

Drosophila parasitoids go to space: Unexpected effects of spaceflight on hosts and their parasitoids - Drosophila data

Organisms	Factors	Assay Types	Release Date	Description
Drosophila melanogaster	Spaceflight Genotype Developmental Stage Infection	transcription profiling	02-Jan-2024	In this study, fruit flies and their parasitic wasps were sent to the ISS to examine changes in host immunity and parasite virulence. Key findings from this work are as follows: (a) Spaceflight spiked...

Highlights: International Space Station (*ISS*)... The *ISS* crew installed the samples into the Columbus Module endcone with the CTB lid open to promote... The radiation dosimeter on the *ISS* was the COL1A2 Radiation Assessment Detector, *ISS*-RAD, that detects... In this study, fruit flies and their parasitic wasps were sent to the *ISS* to examine changes in host... *cgene*

There is a need for data and metadata on instruments and experiment environments to provide context for and facilitate analysis of biology data.

Explore Search NASA News & Events Multimedia NASA+ LIVE

OSDR Home About Data & Tools Research & Resources Services Working Groups Engage with Us Help

- Data Repository
- Submission Portal
- Workspace
- FASTWork
- Biospecimen Search Tool
- Data Visualization
- RadLab
- Environmental Data App
- Environmental Data
- API

Open Science Repository

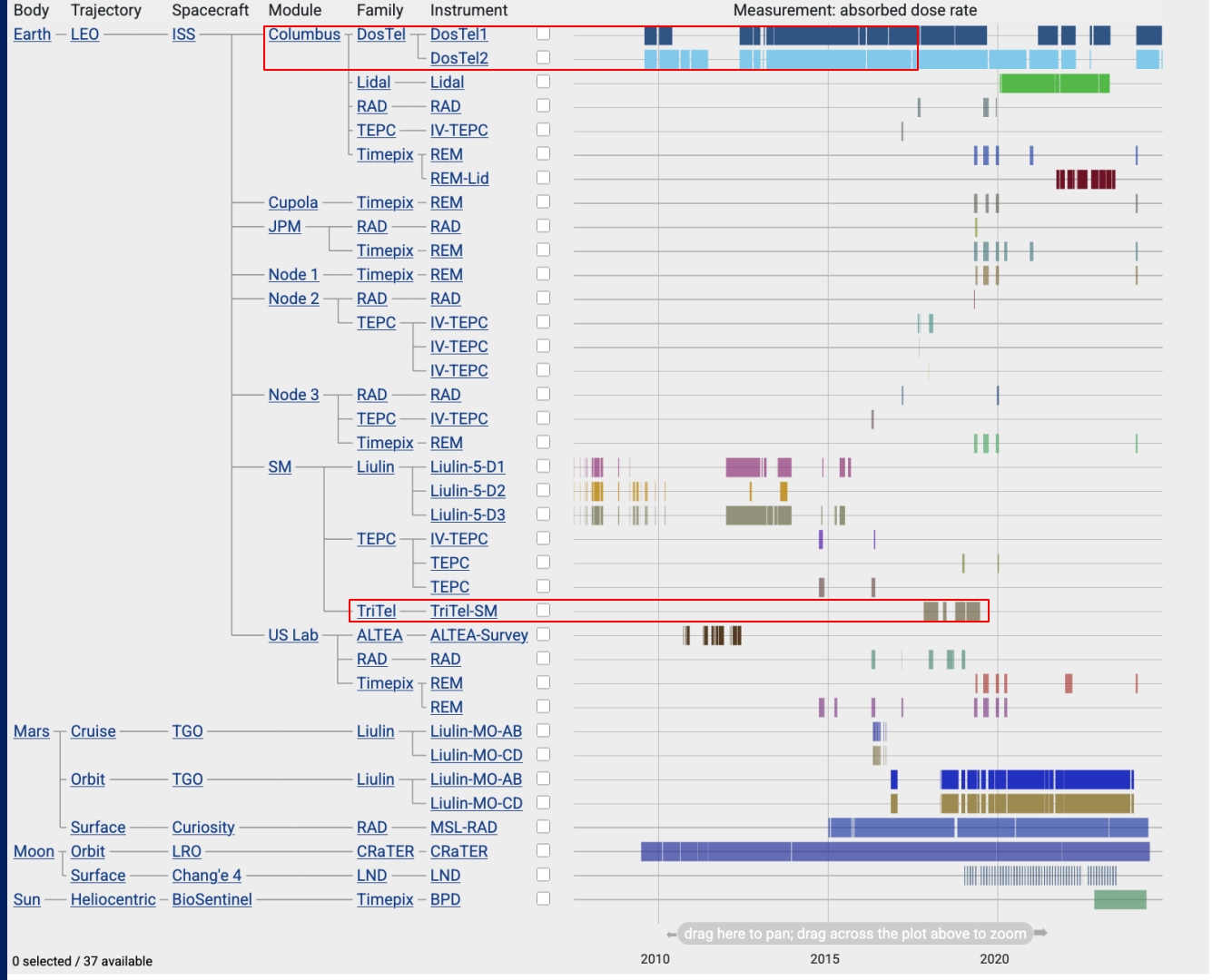
The NASA Open Science Data Reposit
enables access to space-related data f
experiments and missions that investig
and health responses of terrestrial life
spaceflight. The goal of OSDR is to ena
modal and multi-hierarchical fundame
science data be reused toward basic s
science, and operational outcomes for space
exploration and knowledge discovery. These data
include 'omics, phenotypic, physiological, behavioral,
hardware, environmental telemetry; raw, processed;
tabular, text, code, bioimaging, and video.

https://www.nasa.gov/osdr/

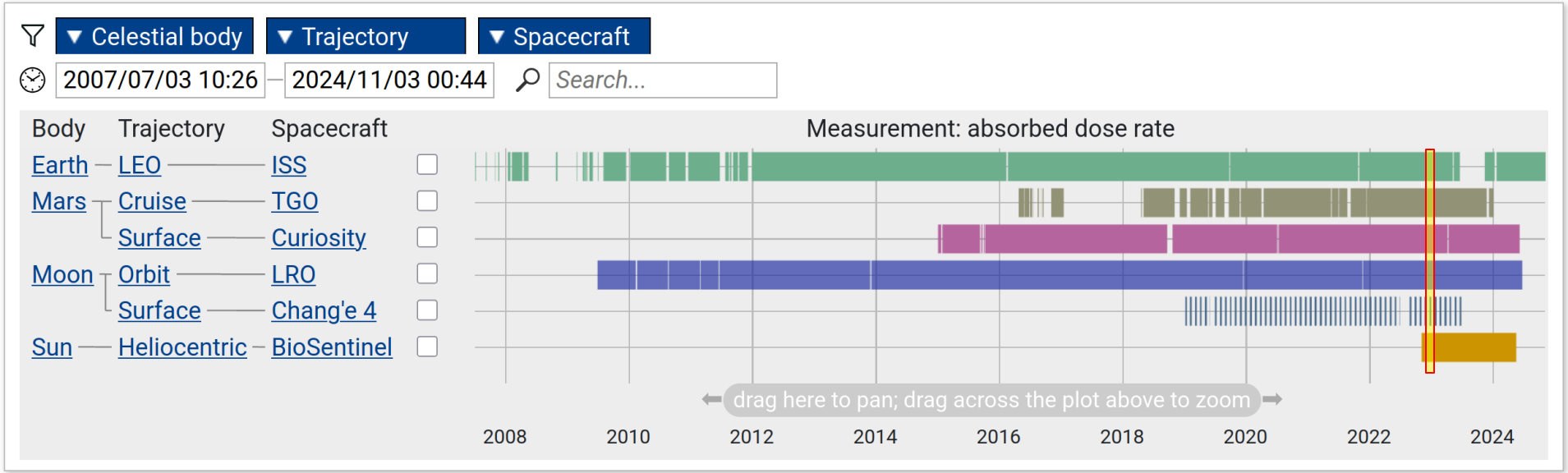
RadLab

Grigorev *et al.*,
LSSR **43** 29 (2024)

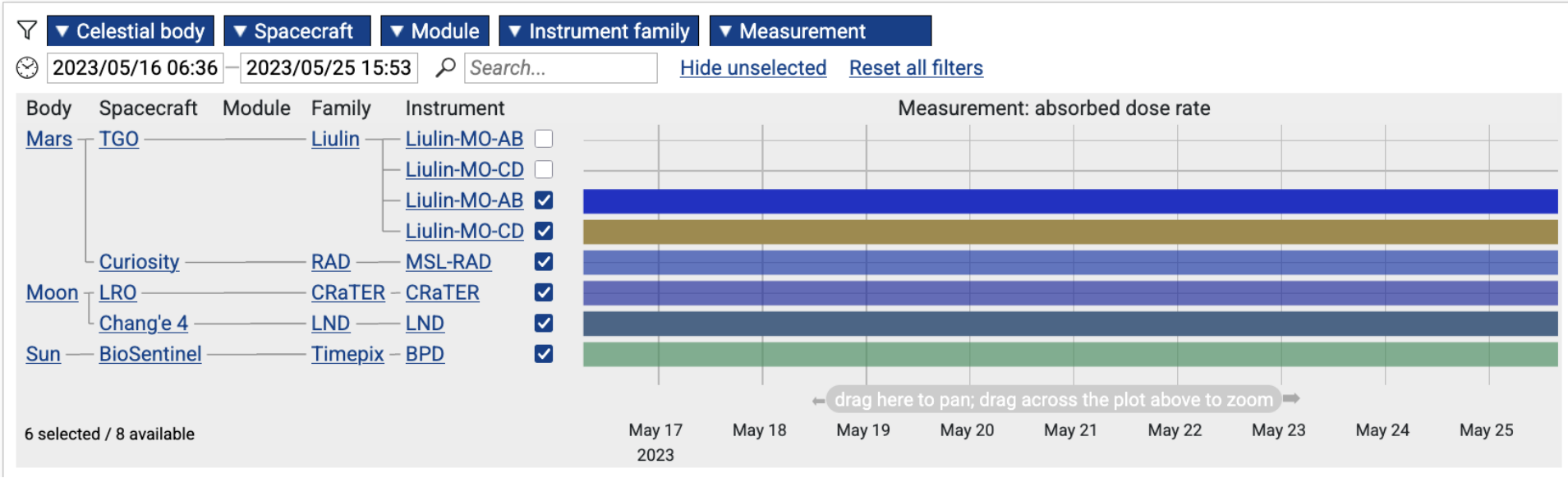
https://wrmiss.org/workshops/twentyseventh/Grigorev.pdf

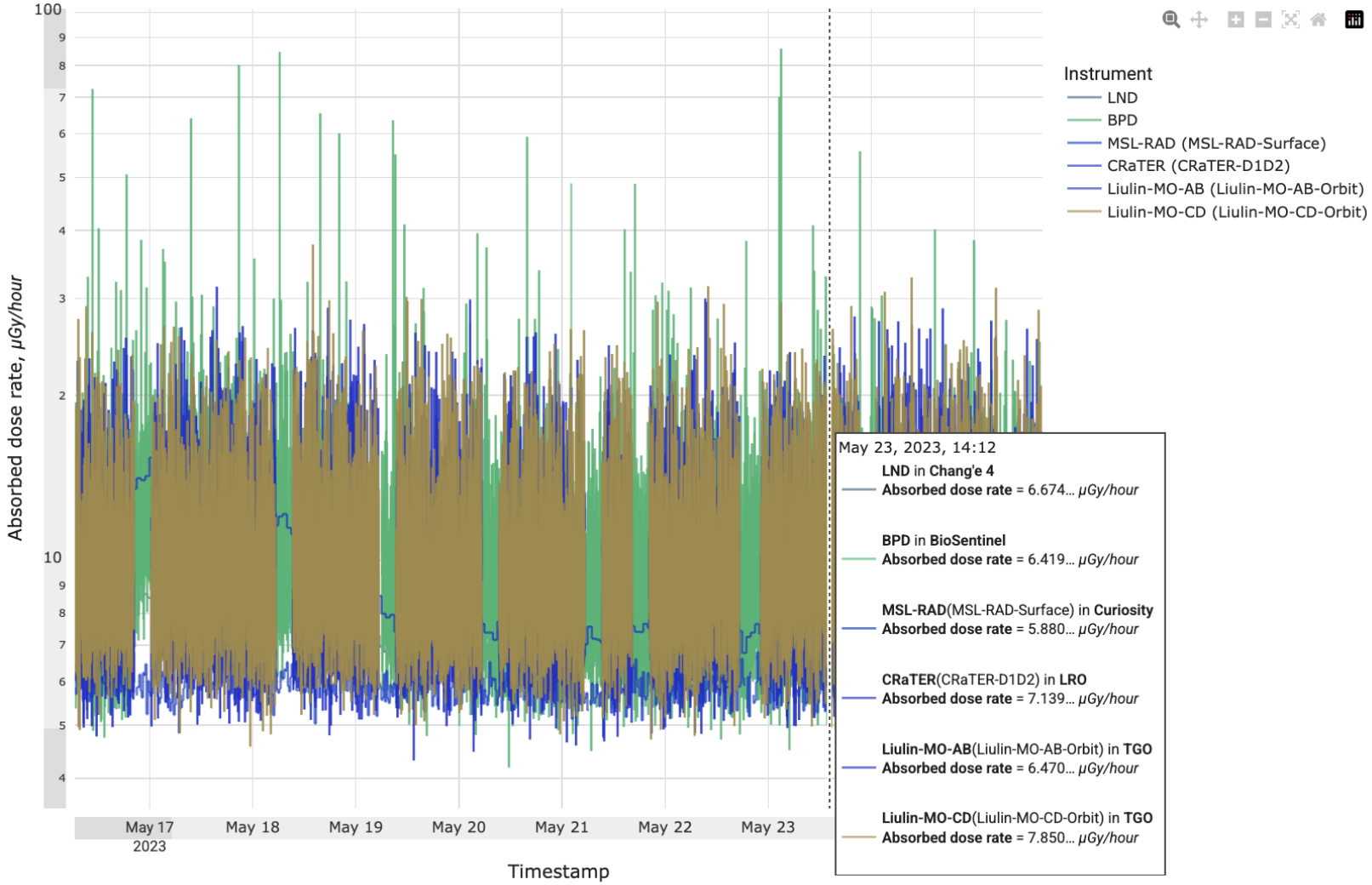


RadLab – LEO and BLEO

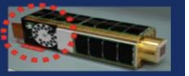


RadLab – BLEO


Celestial body
Spacecraft
Module
Instrument family
Measurement
2023/05/16 06:36
2023/05/25 15:53
Search...
Hide unselected
Reset all filters
Body
Spacecraft
Module
Family
Instrument
Mars
TGO
Liulin
Liulin-MO-AB
Liulin-MO-CD
Liulin-MO-AB
Liulin-MO-CD
Curiosity
RAD
MSL-RAD
Moon
LRO
CRaTER
CRaTER
Chang'e 4
LND
LND
Sun
BioSentinel
Timepix
BPD
6 selected / 8 available
Measurement: absorbed dose rate
drag here to pan; drag across the plot above to zoom
May 17
2023
May 18
May 19
May 20
May 21
May 22
May 23
May 24
May 25


Absorbed dose rate, µGy/hour
100
9
8
7
6
5
4
3
2
10
9
8
7
6
5
4
May 17
2023
May 18
May 19
May 20
May 21
May 22
May 23
Timestamp
Instrument
LND
BPD
MSL-RAD (MSL-RAD-Surface)
CRaTER (CRaTER-D1D2)
Liulin-MO-AB (Liulin-MO-AB-Orbit)
Liulin-MO-CD (Liulin-MO-CD-Orbit)
May 23, 2023, 14:12
LND in Chang'e 4
Absorbed dose rate = 6.674... µGy/hour
BPD in BioSentinel
Absorbed dose rate = 6.419... µGy/hour
MSL-RAD(MSL-RAD-Surface) in Curiosity
Absorbed dose rate = 5.880... µGy/hour
CRaTER(CRaTER-D1D2) in LRO
Absorbed dose rate = 7.139... µGy/hour
Liulin-MO-AB(Liulin-MO-AB-Orbit) in TGO
Absorbed dose rate = 6.470... µGy/hour
Liulin-MO-CD(Liulin-MO-CD-Orbit) in TGO
Absorbed dose rate = 7.850... µGy/hour


GeneSat Payload


O/OREOS SEVO Payload


ELM Imager (Europa Life Micros...


Wetlab-2


MVP-Cell(Space Races)

Space Physical and Life-sciences Archive of Scientific Hardware (SPLASH)*

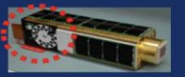
A new open-access OSDR database for instrumentation used for space experiments in biological and physical sciences related to human space flight.

Aims:

- **Aid interpretation of biology data by providing details of hardware to supplement descriptions in the literature**
- **Facilitate design of experiments by providing users with a comprehensive understanding of what capabilities already exist; reduce "wheel reinvention"**

*Funded by an internal development grant from the NASA Division of Biological and Physical Sciences in the Science Mission Directorate


GeneSat Payload


O/OREOS SEVO Payload


ELM Imager (Europa Life Micros...


Wetlab-2

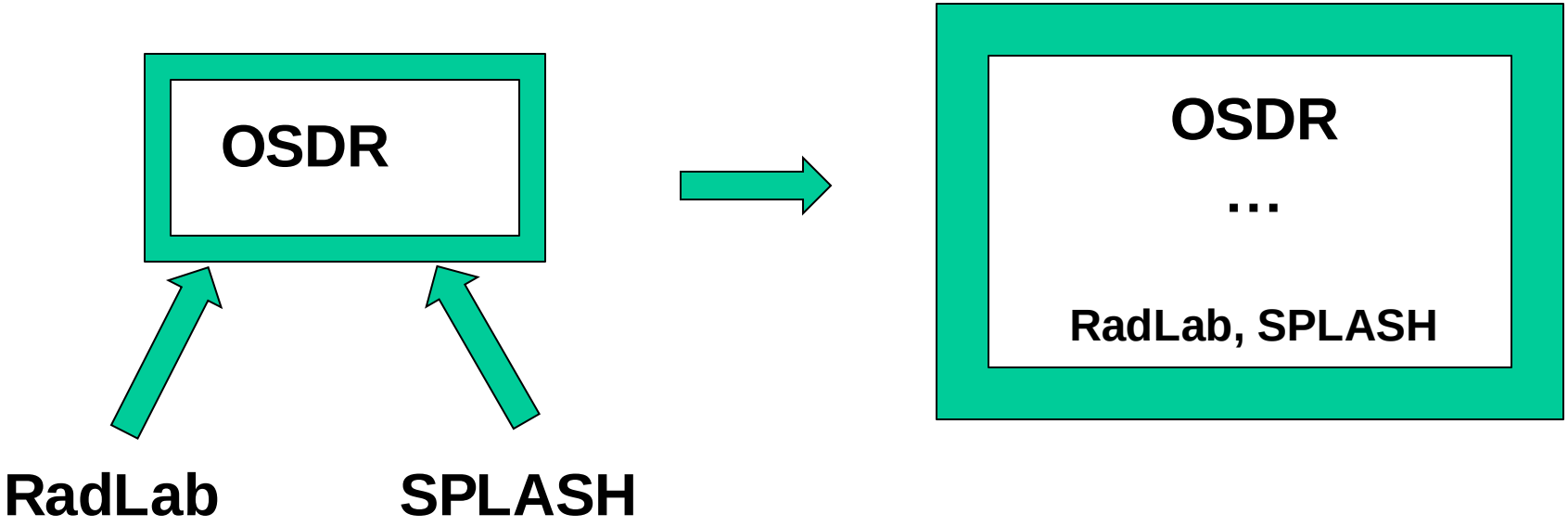

MVP-Cell(Space Races)

- **Features:.**
  - Technical specifications for each instrument, operational logistics, history, literature links, images and other relevant information organized in an accessible and searchable manner.
  - Keyword searches and filtering
  - Instrument intercomparisons
  - currently limited to instruments used for biological (non-human) and physical sciences only, with a TRL of 8-9 (has flown or is ready to fly).
  - Submission portal for hardware designers/vendors

Current status

- **Currently in pilot phase, available internally at NASA Ames**
  - 64 instruments
  - ~80 data fields
- **Planned for late 2025:**
  - Additional user testing
  - Content updates
  - User guide development
  - Public release on OSDR (pending additional resources)
- **We welcome expressions of interest from potential users and information about additional instruments to incorporate**

Contact: Dr. Jessica Lee (jessica.a.lee@nasa.gov)


OSDR
RadLab
SPLASH
OSDR
…
RadLab, SPLASH

RadLab

- S. Costes
- S. D'Angiolillo*
- K. Grigorev
- J. Miller
- L. Narici
- R. Williams*

SPLASH

- K. Brahma*
- J. Lee
- D. Lopez
- J. Miller
- A. Wanlass*
- R. Williams*

* NASA student intern

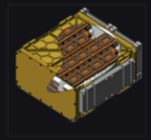
Droplist

BLEO Hardware Database — Catalog

Keyword search

Expand

Instrument/Platform Name	OPERATIONS	Category
Optical Density/Colorimetric Measurement[next-gen PharmaSat/ EcAMSat/SESLO/PowerCell]	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
BioSentinel / BioSentinel II Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads



BioSentinel is a fully autonomous satellite designed to study radiation exposure on yeast -- ARC

Droplist

More details

GeneSat Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
GraviSat Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
SporeSat Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
O/OREOS SEVO Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
GEMM:Gene Expression Measurement Module	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
ELM Imager (Europa Life Microscope)	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	Search-for-Life Payloads
MICA (Microfluidic Icy-world Chemical Analyzer)	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	Search-for-Life Payloads

Instruments per page 25 1 – 25 of 64

Droplist

BLEO Hardware Database — Details

BioSentinel / BioSentinel II Payload

Background/Purpose

BioSentinel is a fully autonomous satellite designed to study radiation exposure on yeast

General | Specifications | Research | Logistics

OPERATIONS	Category	Operator/Vendor
FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads	ARC

Availability	Flight Heritage	Age	Study	Study
plans available - no extra units	not flown yet	New	OSD-624	OSD-626

Return

last updated on 7/9/2024, 3:54:42 AM by *Jessica Lee*

Droplist

BLEO Hardware Database — Catalog

Keyword search

Instrument/Platform Name	OPERATIONS	Category
Optical Density/Colorimetric Measurement[next-gen PharmaSat/ EcAMSat/SESLO/PowerCell]	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
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GeneSat Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
GraviSat Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
SporeSat Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
O/OREOS SEVO Payload	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
GEMM:Gene Expression Measurement Module	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	CubeSat Payloads
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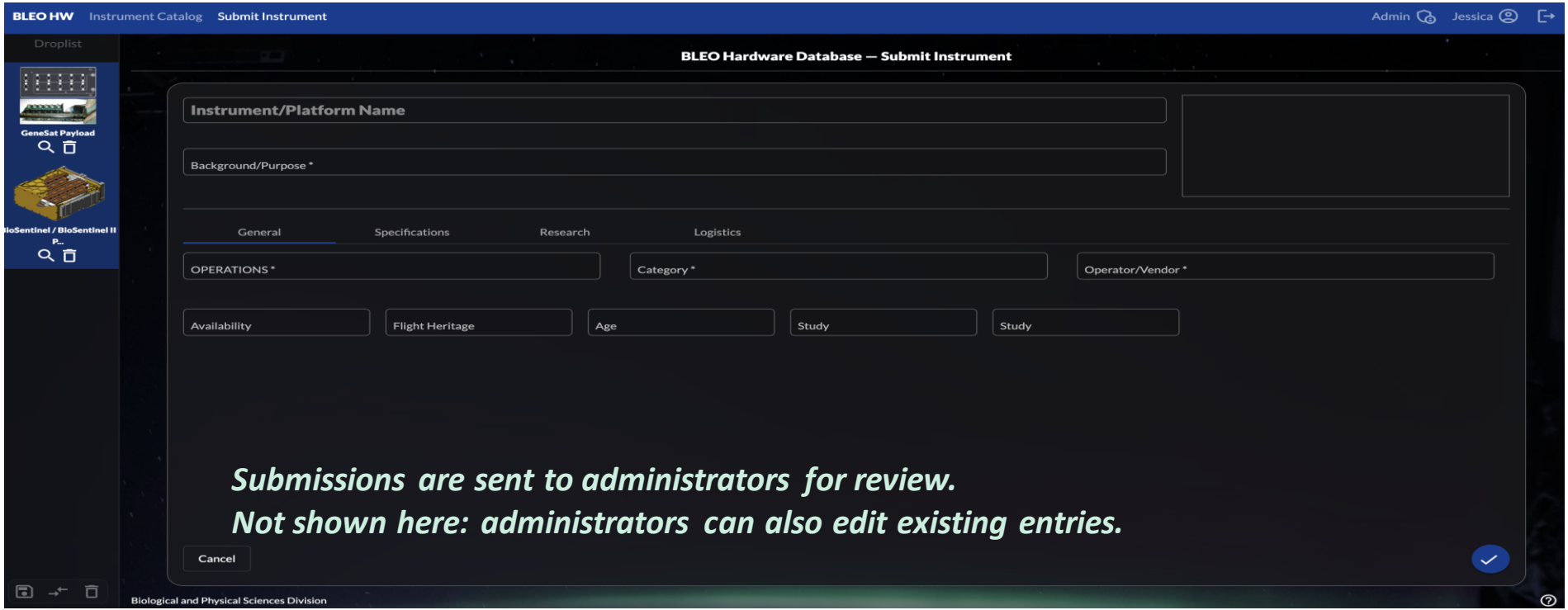
MICA (Microfluidic Icy-world Chemical Analyzer)	FULL AUTONOMY + NO SAMPLE RETURN REQUIRED	Search-for-Life Payloads
Single-Cassette Bioculture System (with imaging config)	MINIMAL CREW TIME; NO SAMPLE RETURN REQ'D.	Culturing, Growth, Microscopy

Instruments per page 25 1 – 25 of 64

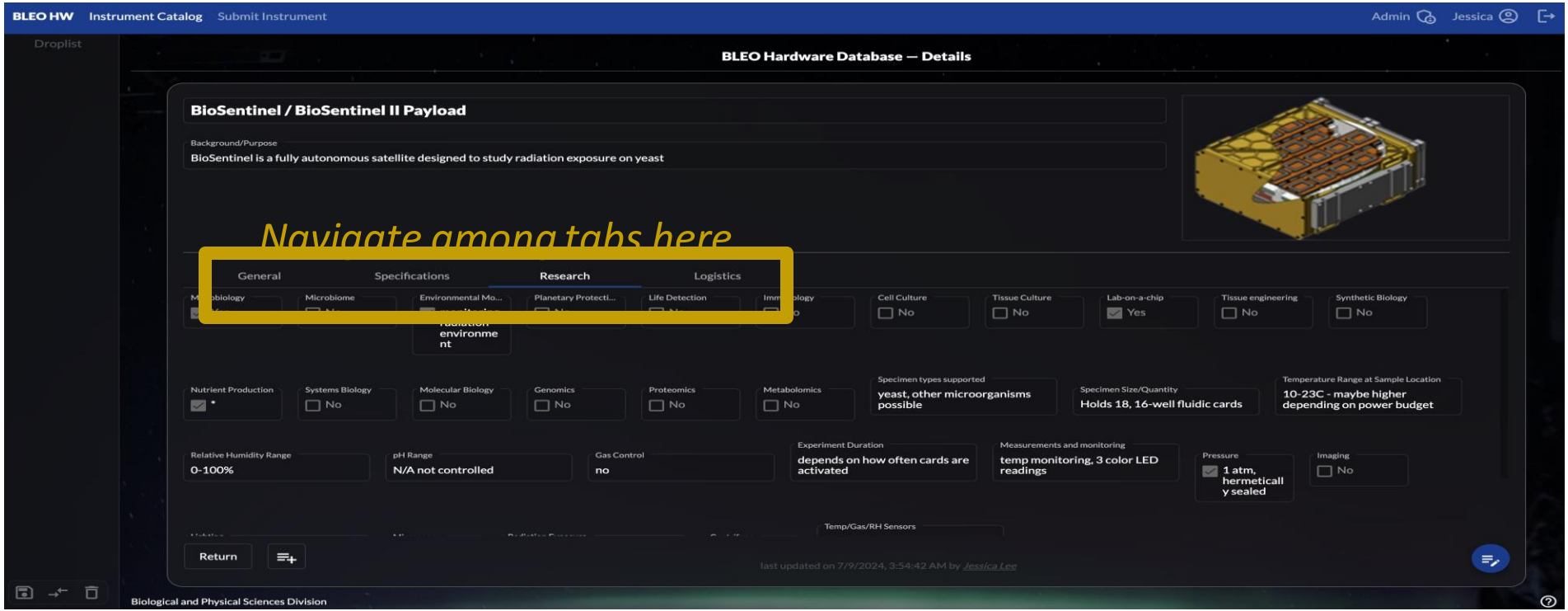
"Compare instruments" button

Compare 2 instruments | Add to droplist | Reset

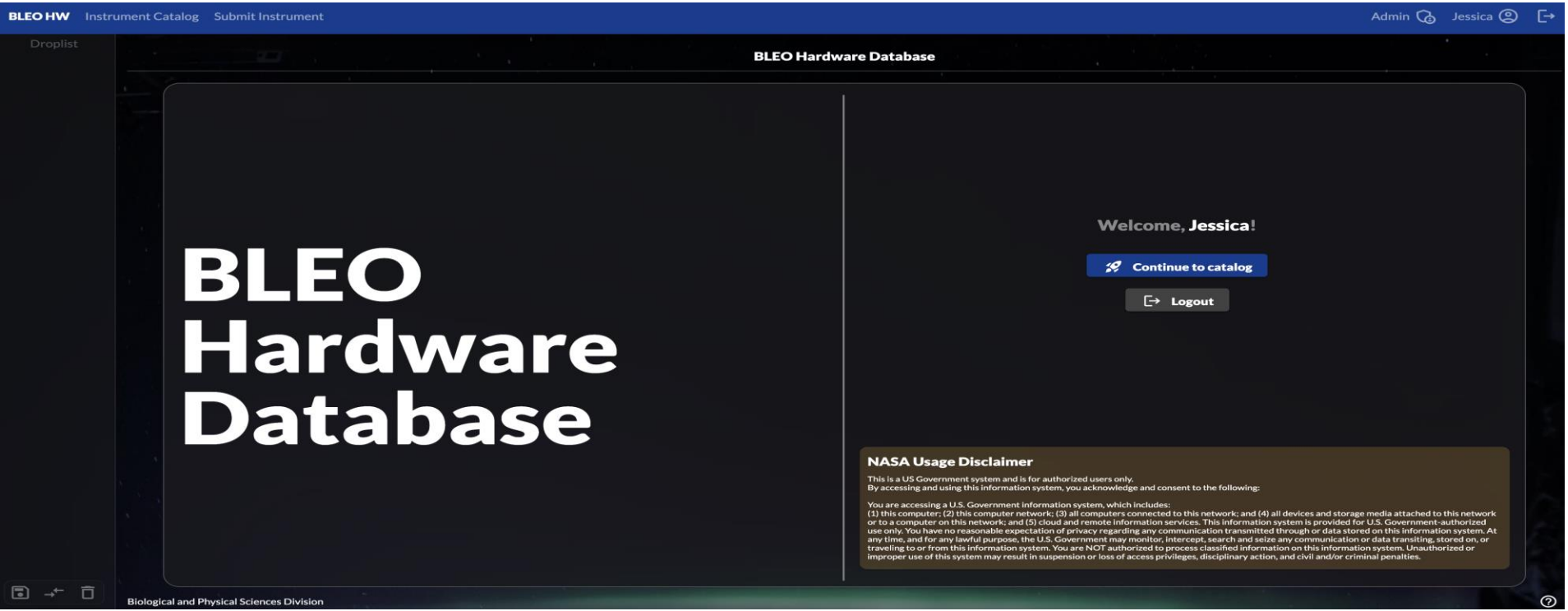
Users can submit new instruments.



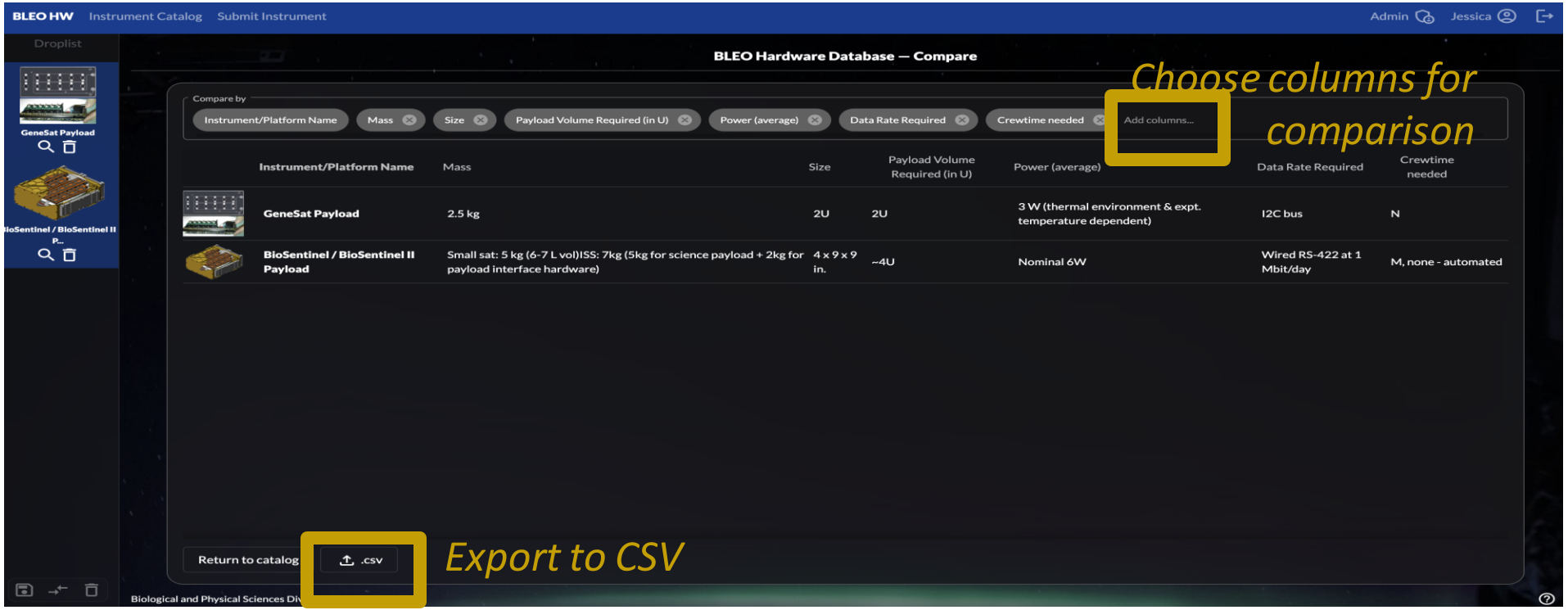
Each instrument page has multiple tabs; each tab has multiple fields.



Landing page



Instrument comparison is customizable. Results can be exported as a spreadsheet.



Catalog View