

Constellation Updates

EDDA Meeting

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Constellation v0.6 Release

Triangulum Australe

- Faster data transmission (breaking changes for API and HDF5 output)
- Satellite template repositories for C++ and Python, including updated documentation
- Constellation available as docker image
- Improved logging output in Python
- Many other minor additions and improvements

Check out the release notes for more details!



Release Roadmap Towards 1.0

- Paper submission gives a deadline for 1.0 release mentioned in the paper
- Most required features for first stable release already implemented
- Release plan:
 - v0.6.1 (Triangulum Australe): CDTP fixes and improved Windows support
 - v0.7 (Reticulum): Dictionaries in configuration, YAML support, Telemetry GUI
 - v0.8 (Caelum): CHIRP2, Python satellites in Docker+Flatpak
 - v1.0 (Corona Australis): Stable API
- Goal: v0.7 in autumn 2025, v1.0 in spring 2026

Dictionaries in the Configuration

Use cases where a flat configuration is not sufficient

- Currently, the configuration consists of key-value pairs (KVPs) with strings as keys and scalars or non-nested lists
- This is not sufficient for some use cases, support nesting / dictionaries has been requested multiple times
- Example: power supply with more than one channel, where each channel has multiple options (e.g. HAMEG / HMP 4040)
- Dictionaries in the configuration major goal for the next release
- List of dictionaries and nested lists stay unsupported

Satellite Type

Satellite Name

Currently not possible!

```
[HAMEG.PSU1]
ip = "192.168.0.42"
port = 5025

[HAMEG.PSU1.channel_1]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0

[HAMEG.PSU1.channel_2]
name = "Chip Supply"
enabled = true
voltage = 3.3
current_limit = 0.5

[HAMEG.PSU1.channel_3]
enabled = false

[HAMEG.PSU1.channel_4]
enabled = false
```

Dictionaries in the Configuration

Problems with dictionaries

- Currently we support default parameters:
 - for all satellites
 - for satellite of a specific type
- In TOML: top-level parameters or under [TYPE] section
- The **problem**: how do we know if [HAMEG.channel_1] is a dictionary which applies to all HAMEG satellites, or a satellite called channel_1?
- Various possible solutions for pros and cons

=> We need your input and opinions!

Let us know via [mail](#) or in the [GitLab issue](#)

```
[HAMEG]
_role = "TRANSIENT"
port = 5025

[HAMEG.channel_1]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0

[HAMEG.PSU1]
ip = "192.168.0.101"

[HAMEG.PSU2]
ip = "192.168.0.102"

[HAMEG.PSU3]
ip = "192.168.0.103"

[HAMEG.PSU4]
ip = "192.168.0.104"
```

Dictionaries in the Configuration

Option 1: no dictionaries possible as default

- Dictionaries not allowed as default values
- Everything not a dictionary is thus a default value
- Advantages:
 - Best readability
- Disadvantages:
 - Not possible to set defaults for certain scenario, e.g. 10 HAMEGs where channel 1 always provide the same 5V voltage
 - Not obvious to operators what is and is not possible as default

OK



```
[HAMEG]
_role = "TRANSIENT"
port = 5025
```

Not OK



```
[HAMEG.channel_1]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0

[HAMEG.PSU1]
ip = "192.168.0.101"

[HAMEG.PSU2]
ip = "192.168.0.102"

[HAMEG.PSU3]
ip = "192.168.0.103"

[HAMEG.PSU4]
ip = "192.168.0.104"
```

Dictionaries in the Configuration

Option 2: use a special section for default values

- All default values are in a special section (e.g. defaults or _defaults)
- Advantages:
 - Dictionaries can be defaults
- Disadvantages:
 - Readability not ideal
 - Restrictions on satellite names
- Which keywords to use?

Not a satellite



```
[HAMEG._defaults]
_role = "TRANSIENT"
port = 5025

[HAMEG._defaults.channel]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0
```

Satellite



```
[HAMEG.PSU1]
ip = "192.168.0.101"

[HAMEG.PSU2]
ip = "192.168.0.102"

[HAMEG.PSU3]
ip = "192.168.0.103"

[HAMEG.PSU4]
ip = "192.168.0.104"
```


Dictionaries in the Configuration

Option 1 in TOML and YAML

```
[HAMEG]
_role = "TRANSIENT"
port = 5025

[HAMEG.PSU1]
ip = "192.168.0.101"

[HAMEG.PSU1.channel_1]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0

[HAMEG.PSU2]
ip = "192.168.0.102"

[HAMEG.PSU2.channel_1]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0
```

```
HAMEG:
  _role: TRANSIENT
  port: 5025

  PSU1:
    ip: 192.168.0.101
    channel_1:
      name: 5V Logic
      enabled: true
      voltage: 5.0
      current_limit: 1.0

  PSU2:
    ip: 192.168.0.102
    channel_1:
      name: 5V Logic
      enabled: true
      voltage: 5.0
      current_limit: 1.0
```

Dictionaries in the Configuration

Option 2 in TOML and YAML

```
[HAMEG._defaults]
_role = "TRANSIENT"
port = 5025

[HAMEG._defaults.channel_1]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0

[HAMEG.PSU1]
ip = "192.168.0.101"

[HAMEG.PSU2]
ip = "192.168.0.102"

[HAMEG.PSU3]
ip = "192.168.0.103"

[HAMEG.PSU4]
ip = "192.168.0.104"
```

```
HAMEG:
  _defaults:
    _role: TRANSIENT
    port: 5025
    channel_1:
      name: 5V Logic
      enabled: true
      voltage: 5.0
      current_limit: 1.0

  PSU1:
    ip: 192.168.0.101

  PSU2:
    ip: 192.168.0.102

  PSU3:
    ip: 192.168.0.103

  PSU4:
    ip: 192.168.0.104
```

Dictionaries in the Configuration

Option 2 in TOML and YAML with different keyword

```
[HAMEG.defaults]
_role = "TRANSIENT"
port = 5025

[HAMEG.defaults.channel_1]
name = "5V Logic"
enabled = true
voltage = 5.0
current_limit = 1.0

[HAMEG.PSU1]
ip = "192.168.0.101"

[HAMEG.PSU2]
ip = "192.168.0.102"

[HAMEG.PSU3]
ip = "192.168.0.103"

[HAMEG.PSU4]
ip = "192.168.0.104"
```

```
HAMEG:
  defaults:
    _role: TRANSIENT
    port: 5025
    channel_1:
      name: 5V Logic
      enabled: true
      voltage: 5.0
      current_limit: 1.0

  PSU1:
    ip: 192.168.0.101

  PSU2:
    ip: 192.168.0.102

  PSU3:
    ip: 192.168.0.103

  PSU4:
    ip: 192.168.0.104
```