

# PayloadSDK Functions

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# Version history

| Version | Publish date | Description                 |
|---------|--------------|-----------------------------|
| v1.0.0  | 05/23/2025   | Add format SD card function |

# Connection functions

## sdkInitConnection

- Brief: Initialize the connection to the payload via UDP or UART.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: True if connection successful, False otherwise (bool)

## checkPayloadConnection

- Brief: Check the connection to the payload within a specified timeout period.

| Param   | Type  | Range | Default Value | Description        |
|---------|-------|-------|---------------|--------------------|
| timeout | float | > 0   | 5.0           | Timeout in seconds |

- Return: True if connection successful, False otherwise (bool)

## sdkQuit

- Brief: Close the connection and stop the data receiving thread.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

# Camera Control functions

## setPayloadCameraParam

- Brief: Set the parameter value for the payload's camera.

| Param       | Type | Range  | Default Value | Description                |
|-------------|------|--|---------------|----------------------------|
| param_id    | str  | None   | None          | Parameter ID               |
| param_value | int  | None   | None          | Parameter value            |
| param_type  | int  | (1) MAV_PARAM_TYPE_UINT8<br>(2) MAV_PARAM_TYPE_INT8<br>(3) MAV_PARAM_TYPE_UINT16<br>(4) MAV_PARAM_TYPE_INT16<br>(5) MAV_PARAM_TYPE_UINT32<br>(6) MAV_PARAM_TYPE_INT32<br>(7) MAV_PARAM_TYPE_UINT64<br>(8) MAV_PARAM_TYPE_INT64<br>(9) MAV_PARAM_TYPE_REAL32<br>(10)MAV_PARAM_TYPE_REAL64 | None          | Data type of the parameter |

- Return: None

## setPayloadCameraMode

- Brief: Set the operating mode for the camera

| Param | Type | Range  | Default Value | Description |
|-------|------|--|---------------|-------------|
| mode  | int  | (0) CAMERA_MODE_IMAGE<br>(1) CAMERA_MODE_VIDEO | None          | Camera mode |

- Return: None

## setPayloadCameraCaptureImage

- Brief: Request the camera to capture an image.

| Param      | Type | Range | Default Value | Description                          |
|------------|------|-------|---------------|--------------------------------------|
| interval_s | int  | >= 0  | 0             | Interval between captures in seconds |

- Return: None

setPayloadCameraStopImage

- Brief: Stop the interval image capturing process.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

setPayloadCameraRecordVideoStart

- Brief: Start video recording.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

setPayloadCameraRecordVideoStop

- Brief: Stop video recording.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

setCameraZoom

- Brief: Adjust the camera's zoom level.

| Param      | Type  | Range  | Default Value | Description  |
|------------|-------|--|---------------|--------------|
| zoom_type  | float | (0) ZOOM_TYPE_STEP<br>(1) ZOOM_TYPE_CONTINUOUS<br>(2) ZOOM_TYPE_RANGE  | None          | Type of zoom |
| zoom_value | float | zoom_type equal ZOOM_TYPE_STEP and equal ZOOM_TYPE_CONTINUOUS<br>(-1) ZOOM_OUT<br>(0) ZOOM_STOP<br>(1) ZOOM_IN | None          | Zoom value   |
| zoom_value | float | zoom_type equal ZOOM_TYPE_RANGE<br>from 0.0% to 100.00%  | None          | Zoom value   |

- Return: None

setCameraFocus

- Brief: Adjust the camera's focus.

| Param       | Type  | Range  | Default Value | Description   |
|-------------|-------|--|---------------|---------------|
| focus_type  | float | (1) ZOOM_TYPE_CONTINUOUS<br>(4) FOCUS_TYPE_AUTO  | None          | Type of focus |
| focus_value | float | zoom_type equal ZOOM_TYPE_CONTINUOUS<br>(-1) FOCUS_OUT<br>(0) FOCUS_STOP<br>(1) FOCUS_IN<br>(2) FOCUS_AUTO | 0             | Focus value   |

- Return: None

getPayloadCameraSettingList

- Brief: Request the list of all camera parameters.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

getPayloadCameraSettingByID

- Brief: Request the value of a specific camera parameter by ID.

| Param    | Type | Range | Default Value | Description  |
|----------|------|-------|---------------|--------------|
| param_id | str  | None  | None          | Parameter ID |

- Return: None

getPayloadCameraSettingByIndex

- Brief: Request the value of a camera parameter by index.

| Param | Type | Range | Default Value | Description     |
|-------|------|-------|---------------|-----------------|
| idx   | int  | None  | None          | Parameter index |

- Return: None



getPayloadCameraMode

- Brief: Request the current mode of the camera.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

getPayloadCameraInformation

- Brief: Request detailed information about the camera.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

getPayloadCameraStreamingInformation

- Brief: Request information about the camera's video stream.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

getPayloadStorage

- Brief: Request information about the camera's storage (SD card).

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

getPayloadCaptureStatus

- Brief: Request the current capture status of the camera.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

setParamRate

- Brief: Set the message rate for a specific parameter.

| Param       | Type | Range | Default Value                        | Description                                       |
|-------------|------|-------|--------------------------------------|---|
| param_index | int  | None  | Valid indices from<br>PAYLOAD_PARAMS | Index of the parameter                            |
| time_ms     | int  | None  | ≥ 0                                  | Time interval between messages in<br>milliseconds |

- Return: None

# Gimbal Control functions

## setPayloadGimbalParamByID

- Brief: Set the value of a gimbal parameter by ID.

| Param       | Type  | Range | Default Value | Description     |
|-------------|-------|-------|---------------|-----------------|
| param_id    | str   | None  | None          | Parameter ID    |
| param_value | float | None  | None          | Parameter value |

- Return: None

## setGimbalSpeed

- Brief: Set the speed or angle for move gimbal

| Param     | Type         | Range                            | Default Value | Description                  |
|-----------|--------------|----------------------------------|---------------|------------------------------|
| spd_pitch | float        | -90 to 90                        | None          | Pitch speed/angle in degrees |
| spd_roll  | float        | -180 to 180                      | None          | Roll speed/angle in degrees  |
| spd_yaw   | float        | -180 to 180                      | None          | Yaw speed/angle in degrees   |
| mode      | input_mode_t | (1)INPUT_ANGLE<br>(2)INPUT_SPEED | None          | Input mode                   |

- Return: None

## getPayloadGimbalSettingList

- Brief: Request the list of all gimbal parameters

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

## getPayloadGimbalSettingByID

- Brief: Request the value of a specific gimbal parameter by ID.

| Param    | Type | Range | Default Value | Description  |
|----------|------|-------|---------------|--------------|
| param_id | str  | None  | None          | Parameter ID |

- Return: None

getPayloadGimbalSettingByIndex

- Brief: Request the value of a gimbal parameter by index.

| Param | Type | Range | Default Value | Description     |
|-------|------|-------|---------------|-----------------|
| idx   | int  | None  | None          | Parameter index |

- Return: None

sendPayloadGimbalCalibGyro

- Brief: Send command to calibrate the gimbal's gyro.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

sendPayloadGimbalCalibAccel

- Brief: Send command to calibrate the gimbal's accelerometer.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

sendPayloadGimbalCalibMotor

- Brief: Send command to calibrate the gimbal's motor.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

sendPayloadGimbalSearchHome

- Brief: Send command to search for the gimbal's home position.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

sendPayloadGimbalAutoTune

- Brief: Send command to auto-tune the gimbal.

| Param  | Type | Range      | Default Value | Description                      |
|--------|------|------------|---------------|----------------------------------|
| status | bool | True/False | None          | True to enable, False to disable |

- Return: None

# FFC Control Functions

## setPayloadCameraFFCMode

- Brief: Set the FFC mode for the camera.

| Param | Type | Range | Default Value | Description                   |
|-------|------|-------|---------------|-------------------------------|
| mode  | int  | 0-1   | None          | FFC mode (0: Manual, 1: Auto) |

- Return: None

## setPayloadCameraFFCTrigg

- Brief: Trigger FFC calibration for the camera.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

# GPS function

## sendPayloadGPSPosition

- Brief: Send GPS position information to the payload.

| Param    | Type                          | Range | Default Value | Description                 |
|----------|-------------------------------|-------|---------------|-----------------------------|
| gps_data | mavlink_global_position_int_t | None  | None          | GPS position data structure |

- Return: None

# System Time function

## sendPayloadSystemTime

- Brief: Send system time information to the payload.

| Param         | Type                  | Range | Default Value | Description                |
|---------------|-----------------------|-------|---------------|----------------------------|
| sys_time_data | mavlink_system_time_t | None  | None          | System time data structure |

- Return: None



# SD Card function

## setFormatSDCard

- Brief: Format the camera's SD card.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

# Object Tracking function

## setPayloadObjectTrackingParams

- Brief: Set parameters for object tracking functionality.

| Param | Type  | Range         | Default Value | Description      |
|-------|-------|---------------|---------------|------------------|
| cmd   | float | (0)TRACK_IDLE | None          | Tracking command |
|       |       | (1)TRACK_ACT  |               |                  |
|       |       | (2)TRACK_LOST |               |                  |
| pos_x | float | None          | 960           | X position       |
| pos_y | float | None          | 540           | Y position       |

- Return: None

# Parameter Request functions

## requestParamValue

- Brief: Request the value of a specific parameter.

| Param       | Type | Range | Default Value | Description     |
|-------------|------|-------|---------------|-----------------|
| param_index | int  | None  | None          | Parameter index |

- Return: None

## sendPayloadRequestStreamRate

- Brief: Send a request for the message rate of a parameter.

| Param   | Type | Range | Default Value | Description                   |
|---------|------|-------|---------------|-------------------------------|
| index   | int  | None  | None          | Parameter index               |
| time_ms | int  | None  | None          | Time interval in milliseconds |

- Return: None

## requestMessageStreamInterval

- Brief: Request the message rate for all parameters with a set msg\_rate.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

# Message Handler functions

## payload\_recv\_handle

- Brief: Main loop to receive and process MAVLink messages.

| Param | Type | Range | Default Value | Description |
|-------|------|-------|---------------|-------------|
| None  | None | None  | None          | None        |

- Return: None

## \_handle\_msg\_param\_ext\_value

- Brief: Handle the PARAM\_EXT\_VALUE message from MAVLink.

| Param | Type                            | Range | Default Value | Description     |
|-------|---------------------------------|-------|---------------|-----------------|
| msg   | MAVLink_param_ext_value_message | None  | None          | MAVLink message |

- Return: None

## \_handle\_msg\_command\_ack

- Brief: Handle the COMMAND\_ACK message from MAVLink.

| Param | Type                        | Range | Default Value | Description     |
|-------|-----------------------------|-------|---------------|-----------------|
| msg   | MAVLink_command_ack_message | None  | None          | MAVLink message |

- Return: None

## \_handle\_msg\_camera\_information

- Brief: Handle the CAMERA\_INFORMATION message from MAVLink.

| Param | Type                               | Range | Default Value | Description     |
|-------|------------------------------------|-------|---------------|-----------------|
| msg   | MAVLink_camera_information_message | None  | None          | MAVLink message |

- Return: None

## \_handle\_msg\_camera\_stream\_information

- Brief: Handle the CAMERA\_STREAM\_INFORMATION message from MAVLink.

| Param | Type                                     | Range | Default Value | Description     |
|-------|--|-------|---------------|-----------------|
| msg   | MAVLink_video_stream_information_message | None  | None          | MAVLink message |

- Return: None

`_handle_msg_storage_information`

- Brief: Handle the STORAGE\_INFORMATION message from MAVLink.

| Param | Type                                | Range | Default Value | Description     |
|-------|-------------------------------------|-------|---------------|-----------------|
| msg   | MAVLink_storage_information_message | None  | None          | MAVLink message |

- Return: None

`_handle_msg_camera_capture_status`

- Brief: Handle the CAMERA\_CAPTURE\_STATUS message from MAVLink.

| Param | Type                                  | Range | Default Value | Description     |
|-------|---------------------------------------|-------|---------------|-----------------|
| msg   | MAVLink_camera_capture_status_message | None  | None          | MAVLink message |

- Return: None

`_handle_msg_camera_settings`

- Brief: Handle the CAMERA\_SETTINGS message from MAVLink.

| Param | Type                            | Range | Default Value | Description     |
|-------|---------------------------------|-------|---------------|-----------------|
| msg   | MAVLink_camera_settings_message | None  | None          | MAVLink message |

- Return: None

`_handle_msg_mount_orientation`

- Brief: Handle the MOUNT\_ORIENTATION message from MAVLink.

| Param | Type                              | Range | Default Value | Description     |
|-------|-----------------------------------|-------|---------------|-----------------|
| msg   | MAVLink_mount_orientation_message | None  | None          | MAVLink message |

- Return: None

`_handle_msg_param_value`

- Brief: Handle the PARAM\_VALUE message from MAVLink.

| Param | Type                        | Range | Default Value | Description     |
|-------|-----------------------------|-------|---------------|-----------------|
| msg   | MAVLink_param_value_message | None  | None          | MAVLink message |

- Return: None

`_handle_msg_debug`

- Brief: Handle the MSG\_DEBUG message from MAVLink.

| Param | Type                  | Range | Default Value | Description     |
|-------|-----------------------|-------|---------------|-----------------|
| msg   | MAVLink_debug_message | None  | None          | MAVLink message |

- Return: None

\_handle\_msg\_command\_ext\_ack

- Brief: Handle the COMMAND\_EXT\_ACK message from MAVLink.

| Param | Type                          | Range | Default Value | Description     |
|-------|-------------------------------|-------|---------------|-----------------|
| msg   | MAVLink_param_ext_ack_message | None  | None          | MAVLink message |

- Return: None

# Helper functions

## to\_rad

- Brief: Convert angle from degrees to radians.

| Param | Type  | Range | Default Value | Description      |
|-------|-------|-------|---------------|------------------|
| deg   | float | None  | None          | Angle in degrees |

- Return: Angle in radians (float)

## to\_deg

- Brief: Convert angle from radians to degrees.

| Param | Type  | Range | Default Value | Description      |
|-------|-------|-------|---------------|------------------|
| rad   | float | None  | None          | Angle in radians |

- Return: Angle in degrees (float)

## mavlink\_euler\_to\_quaternion

- Brief: Convert Euler angles to quaternion.

| Param | Type  | Range | Default Value | Description            |
|-------|-------|-------|---------------|------------------------|
| roll  | float | None  | None          | Roll angle in radians  |
| pitch | float | None  | None          | Pitch angle in radians |
| yaw   | float | None  | None          | Yaw angle in radians   |

- Return: Quaternion [w, x, y, z] (list)



# Callback functions

## regPayloadStatusChanged

- Brief: Register a callback to receive notifications when the payload status changes.

| Param    | Type     | Range | Default Value | Description  |
|----------|----------|-------|---------------|--|
| callback | Callable | None  | None          | Function that takes payload_status_event_t and List[float] as parameters |

- Return: None

## regPayloadParamChanged

- Brief: Register a callback to receive notifications when a payload parameter changes.

| Param    | Type     | Range | Default Value | Description  |
|----------|----------|-------|---------------|--|
| callback | Callable | None  | None          | Function that takes payload_status_event_t, str, and List[float] as parameters |

- Return: None

## regPayloadStreamChanged

- Brief: Register a callback to receive notifications when the payload's video stream information changes.

| Param    | Type     | Range | Default Value | Description  |
|----------|----------|-------|---------------|--|
| callback | Callable | None  | None          | Function that takes payload_status_event_t, str, and List[float] as parameters |

- Return: None