

Monitoring tool

IARC 7th

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Hoz.

Prototype A

- Graph Image is static just show the graph.
- There is a menu bar in left side. It is unable to move.
- Every window has a determined place in Monitoring tool.
- Easier to implement.

Initial Screen



STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- Mission_Planner**
 - ▶ Open messages log
 - ▶ Show messages evolution
 - ▶ Make Graphics
 - ▶ Show Mission Map

- Flight Controller**
 - █ State_Map_Estimator
 - █ Grid_Detector
 - █ Robot_Detector
 - █ Camera_Processor
 - █ Pose_Estimator
 - █ Pilot Driver
 - █ Odometry Driver
 - █ Camera_Driver

Debug Console
View Panel
Clear
Load
Save

Camera Driver → Camera Processor (RealImageOnFlight)

Camera Processor → Robot Detector (CameraFrameAbstraction)

Robot Detector → State Map Estimator (RobotStateAbstraction)

Grid Detector → Camera Processor (CameraFrameAbstraction)

Grid Detector → State Map Estimator (GridStateAbstraction)

State Map Estimator → Mission Planner (StateMapAbstraction)

State Map Estimator → Flight Controller (StateMapAbstraction)

Mission Planner → Flight Controller (ActionRequest)

Flight Controller → Pilot Driver (FlightOrder)

Pilot Driver → Camera Driver (ActionConfirmation)

Odometry Driver → Pose Estimator (Odometry Change)

Pose Estimator → Grid Detector (UAVPositionMap)

Grid Detector → Pose Estimator (UAVPositionChange)

Error Description

This panel is currently empty.

Error Case 1a Simulation

Error Scene

UAV is flying over the field and camera detect one position and Pose Estimator another different, creating a wrong position. The distance between the new position and old position can not be reached in the time elapsed.



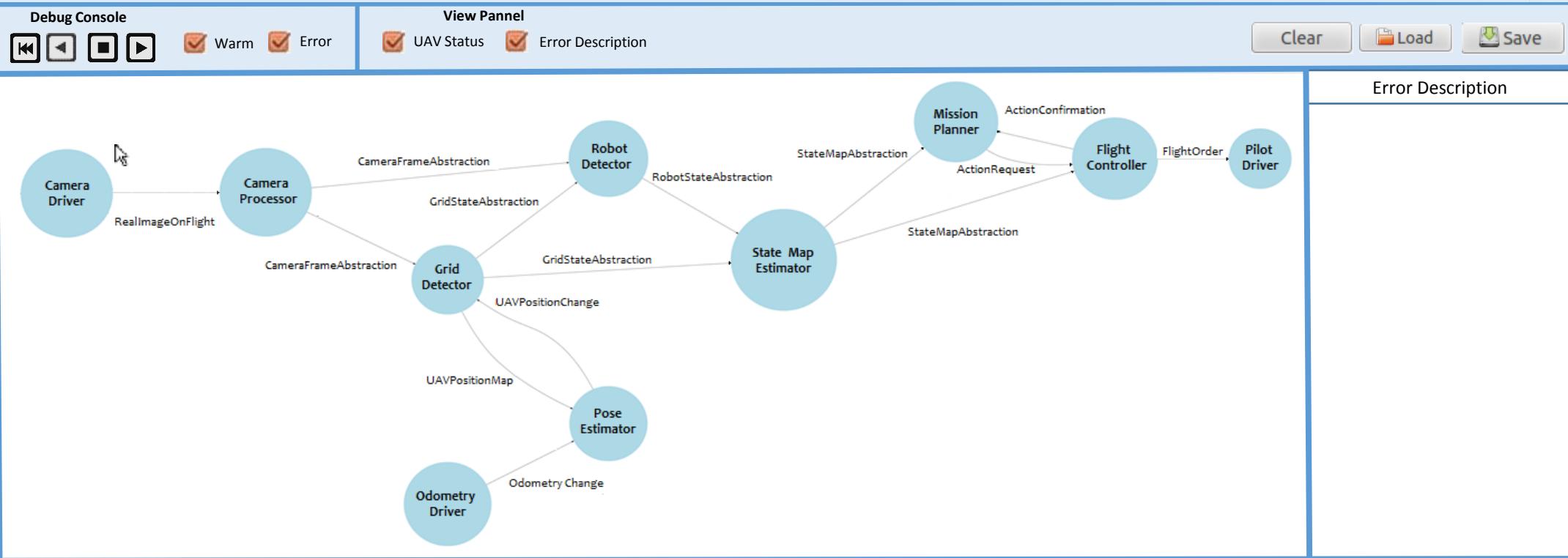
STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

Mission_Planner

- ▶ Open messages log
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- ▶ Make Graphics
- ▶ Show Mission Map

Flight Controller

- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator
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Error Description



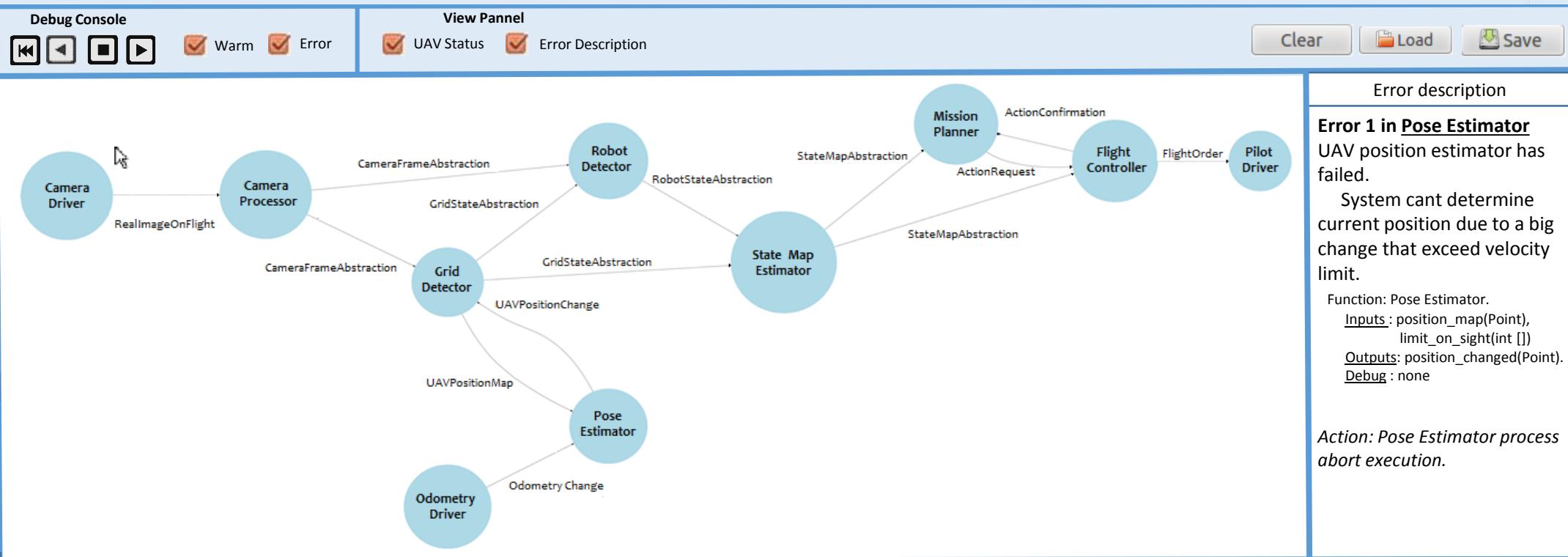
STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

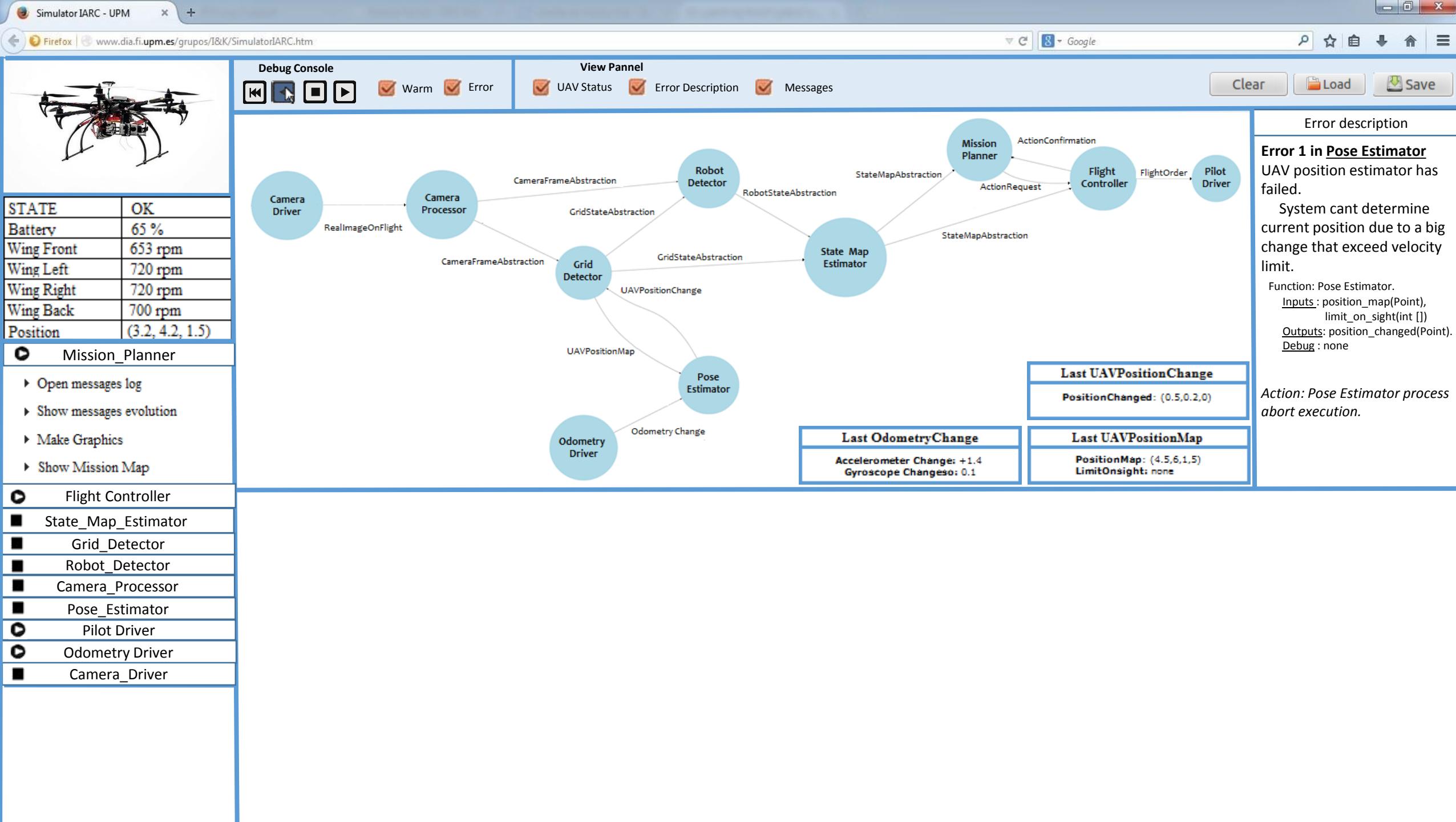
Mission_Planner

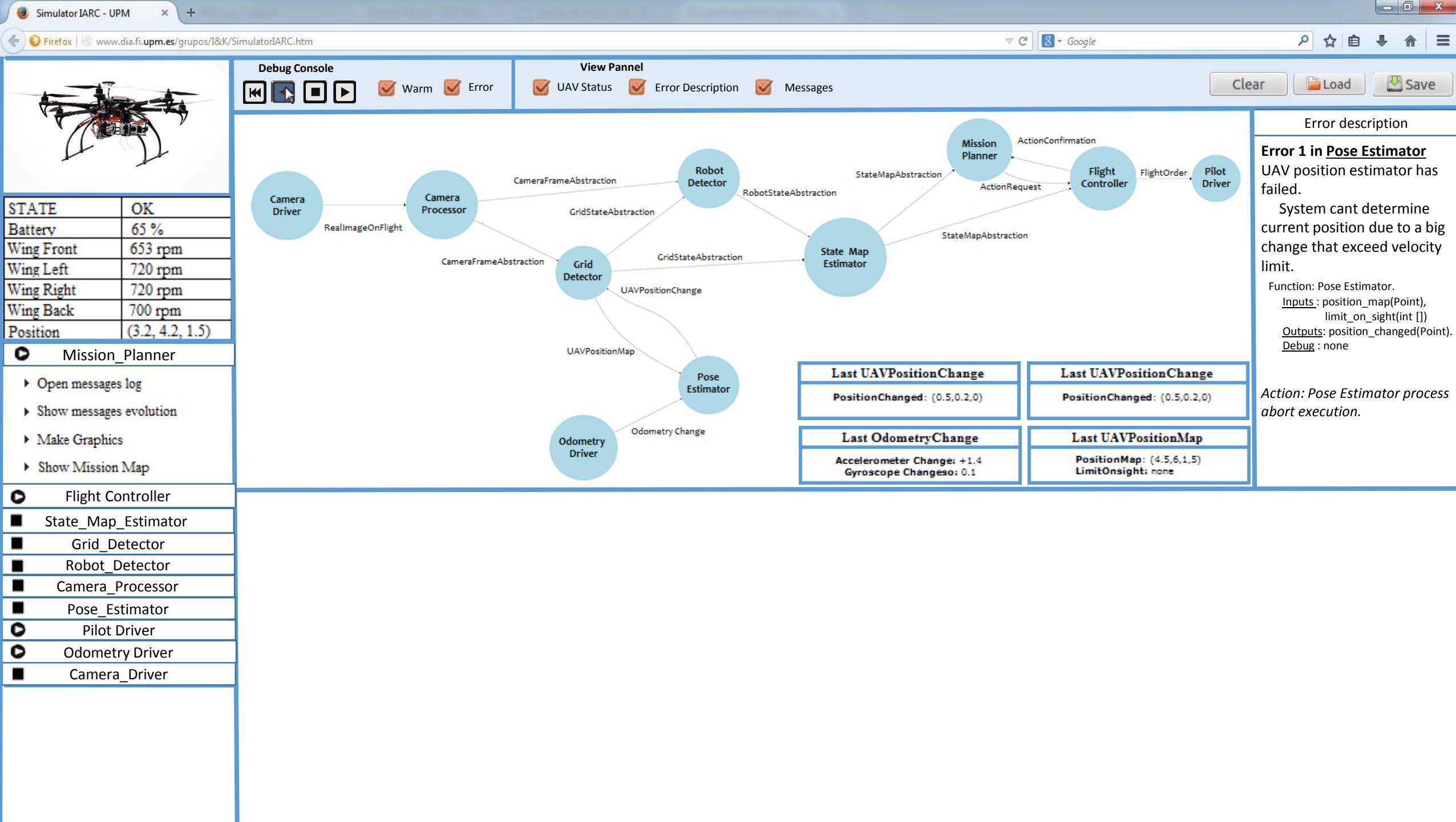
- ▶ Open messages log
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Flight Controller

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Position	(3.2, 4.2, 1.5)

Mission_Planner

- ▶ Open messages log
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Flight Controller

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Debug Console

 Warm
 Error

View Panel
 UAV Status
 Error Description
 Messages
Clear
Load
Save

```

graph TD
    subgraph UAV_Status [UAV Status]
        CD[Camera Driver] -- "RealimageOnFlight" --> CP[Camera Processor]
        CP -- "CameraFrameAbstraction" --> RD[Robot Detector]
        CP -- "GridStateAbstraction" --> GD[Grid Detector]
        RD -- "RobotStateAbstraction" --> SME[State Map Estimator]
        GD -- "GridStateAbstraction" --> SME
        SME -- "UAVPositionMap" --> PE[Pose Estimator]
        PE -- "Odometry Change" --> OD[Odometry Driver]
        PE -- "UAVPositionChange" --> SME
        SME -- "StateMapAbstraction" --> MP[Mission Planner]
        SME -- "StateMapAbstraction" --> FC[Flight Controller]
        MP -- "ActionRequest" --> FC
        FC -- "ActionConfirmation" --> MP
        FC -- "FlightOrder" --> PD[Pilot Driver]
    end

```

Last UAVPositionChange
 PositionChanged: (0.5,0.2,0)

Last OdometryChange
 Accelerometer Change: +1.4
 Gyroscope Change: 0.1

Last UAVPositionMap
 PositionMap: (4.5,6,1.5)
 LimitOnsight: none

Error description

Error 1 in Pose Estimator
 UAV position estimator has failed.
 System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
 Inputs : position_map(Point), limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.



STATE	OK
Battery	65 %
Wing Front	653 rpm
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Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

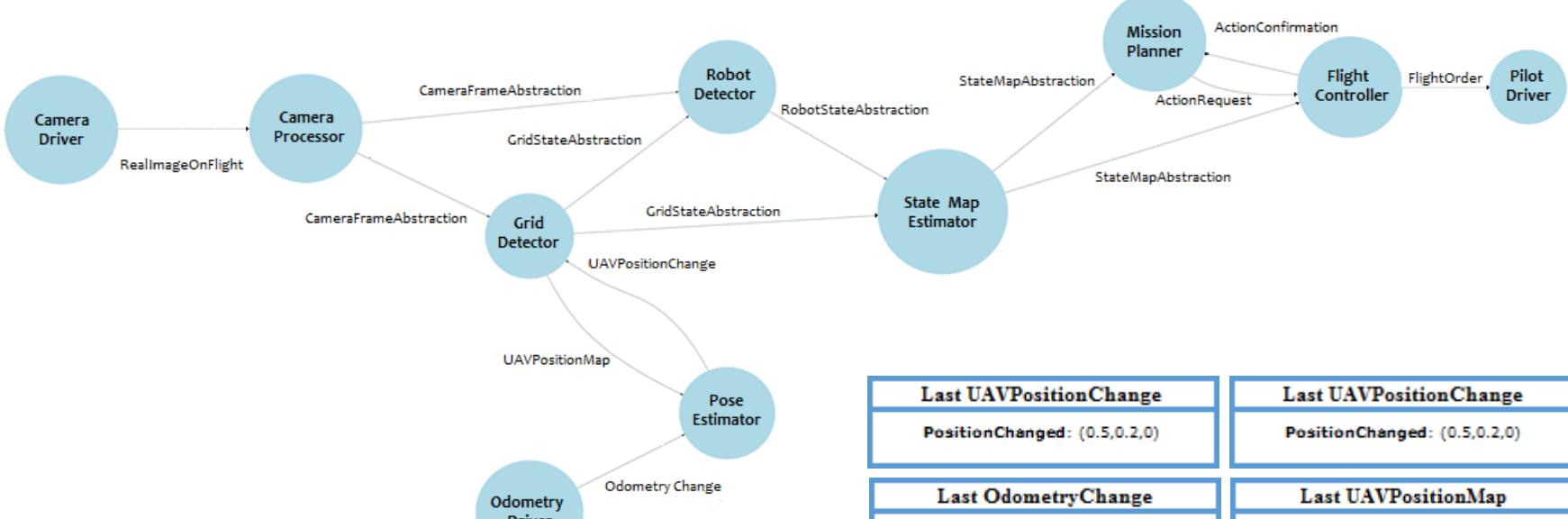
- Mission_Planner
- Flight Controller
- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator

- ▶ Open messages log
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- ▶ [Show Mission Map](#)

- Pilot Driver
- Odometry Driver
- Camera_Driver

Debug Console
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UAV Status Error Description Messages



```

graph TD
    subgraph UAV_Sensors [UAV Sensors]
        CameraDriver((Camera Driver))
        CameraProcessor((Camera Processor))
        GridDetector((Grid Detector))
        RobotDetector((Robot Detector))
        OdometryDriver((Odometry Driver))
    end

    subgraph UAV_Processors [UAV Processors]
        StateMapEstimator((State Map Estimator))
        PoseEstimator((Pose Estimator))
        MissionPlanner((Mission Planner))
        FlightController((Flight Controller))
        PilotDriver((Pilot Driver))
    end

    subgraph UAV_Mission_Planning [UAV Mission Planning]
        MissionPlanner
        FlightController
        PilotDriver
    end

    CameraDriver -- "RealImageOnFlight" --> CameraProcessor
    CameraProcessor -- "CameraFrameAbstraction" --> RobotDetector
    CameraProcessor -- "CameraFrameAbstraction" --> GridDetector
    GridDetector -- "GridStateAbstraction" --> RobotDetector
    GridDetector -- "GridStateAbstraction" --> StateMapEstimator
    RobotDetector -- "RobotStateAbstraction" --> StateMapEstimator
    StateMapEstimator -- "UAVPositionChange" --> PoseEstimator
    StateMapEstimator -- "UAVPositionMap" --> PoseEstimator
    PoseEstimator -- "Odometry Change" --> OdometryDriver
    OdometryDriver -- "Odometry Change" --> StateMapEstimator
    MissionPlanner -- "ActionRequest" --> FlightController
    FlightController -- "ActionConfirmation" --> MissionPlanner
    FlightController -- "FlightOrder" --> PilotDriver
    
```

Error description

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UAV position estimator has failed.
System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
 Inputs : position_map(Point),
 limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.

Last UAVPositionChange	Last UAVPositionChange
PositionChanged: (0.5,0.2,0)	PositionChanged: (0.5,0.2,0)
Last OdometryChange	Last UAVPositionMap
Accelerometer Change: +1.4	PositionMap: (4.5,6,1.5)
Gyroscope Change: 0.1	LimitOnsight: none

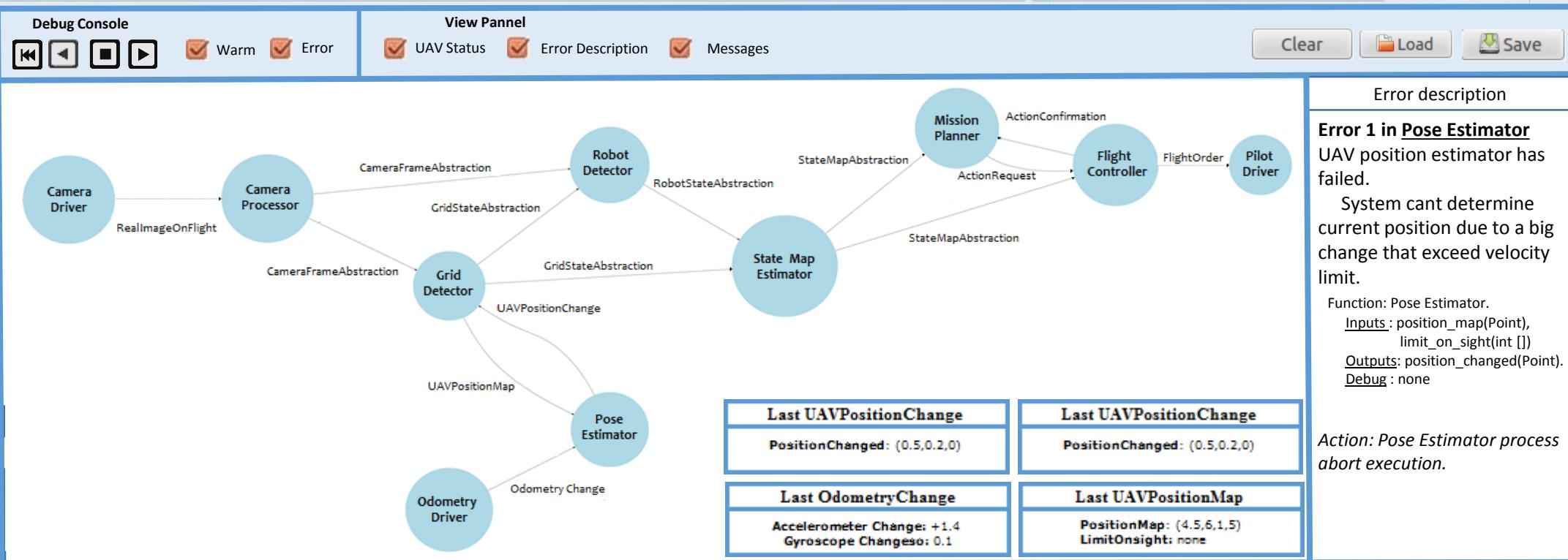


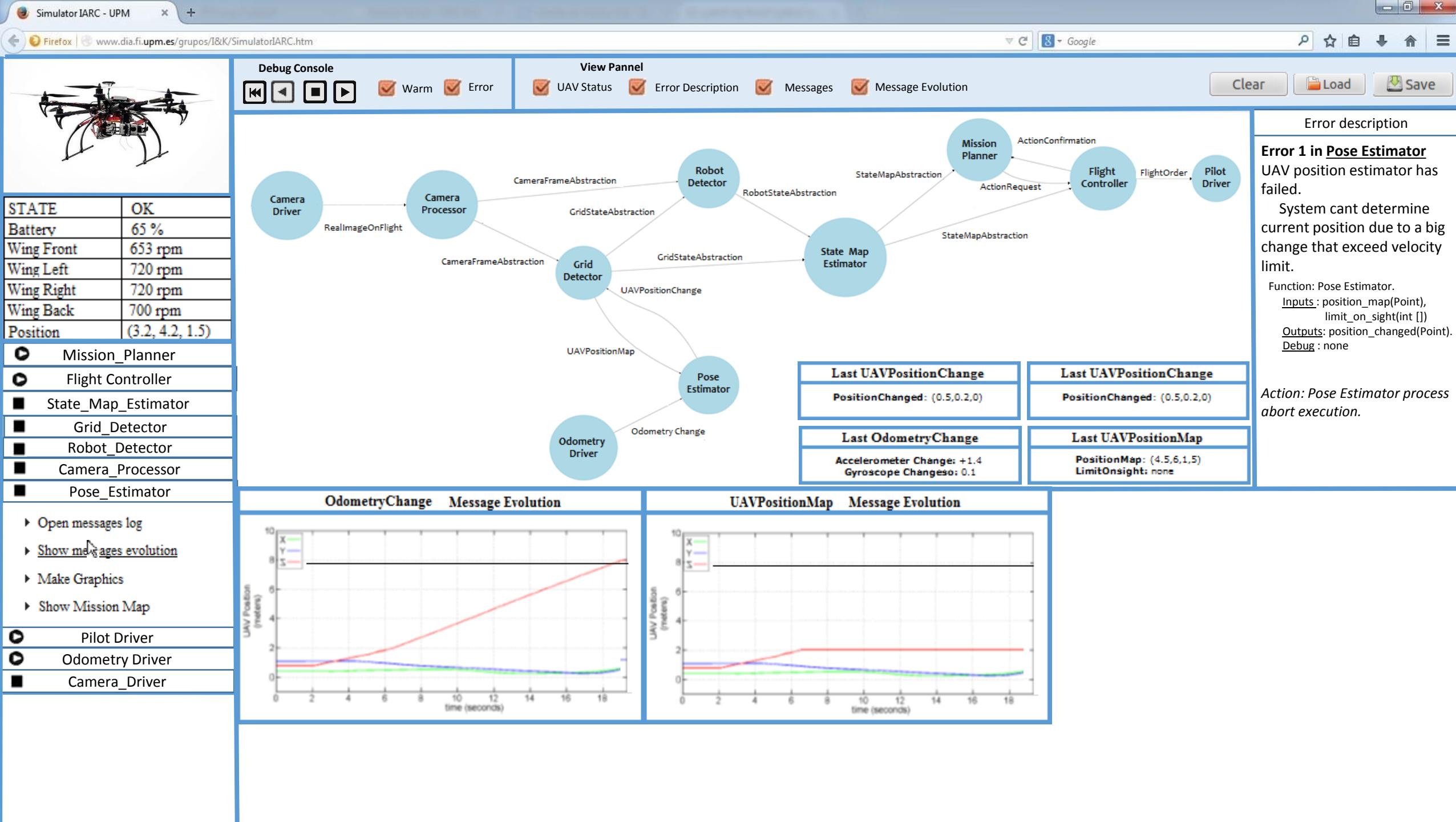
STATE	OK
Battery	65 %
Wing Front	653 rpm
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Position	(3.2, 4.2, 1.5)

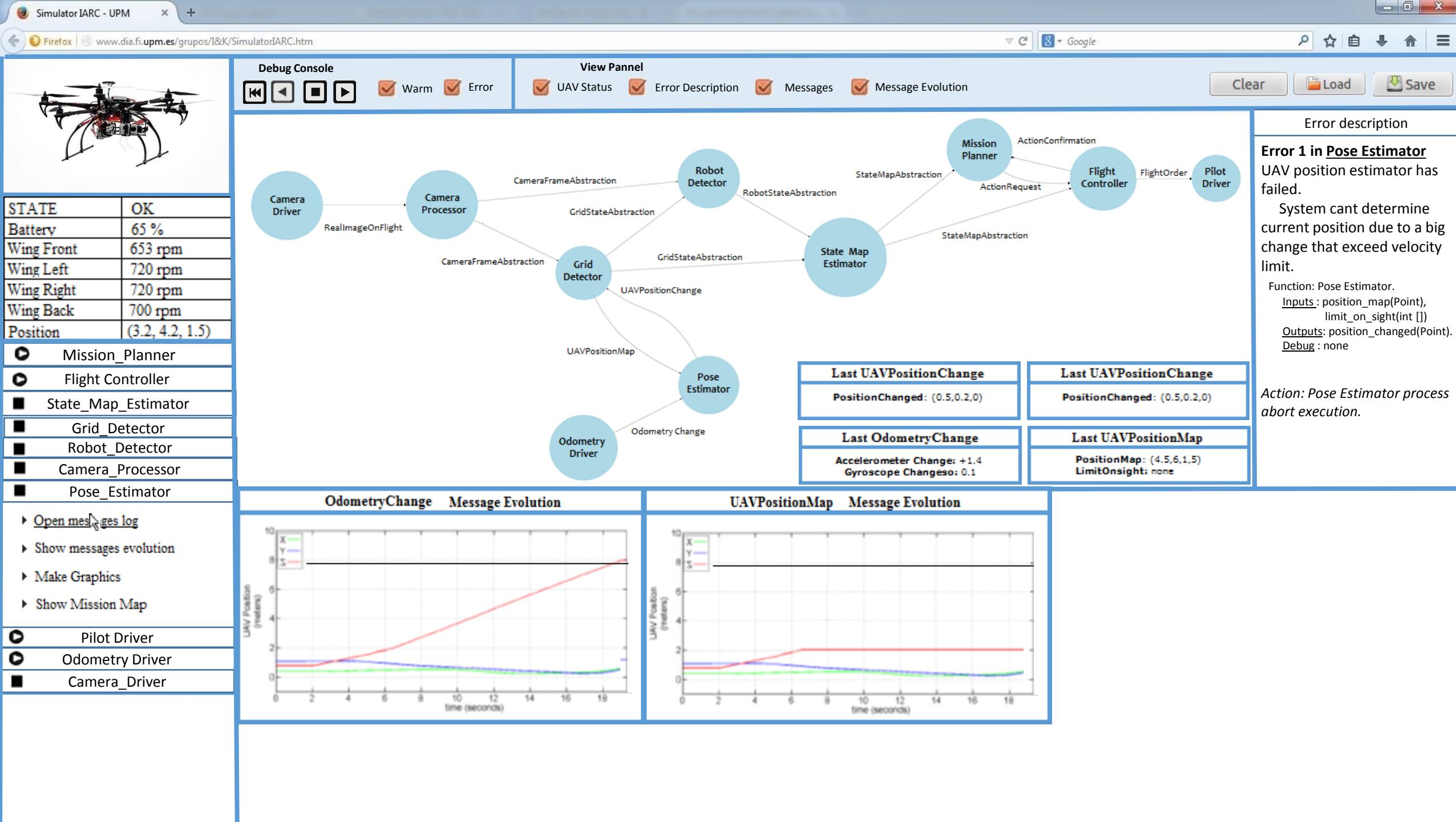
- Mission_Planner
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- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator

- ▶ Open messages log
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Position	(3.2, 4.2, 1.5)

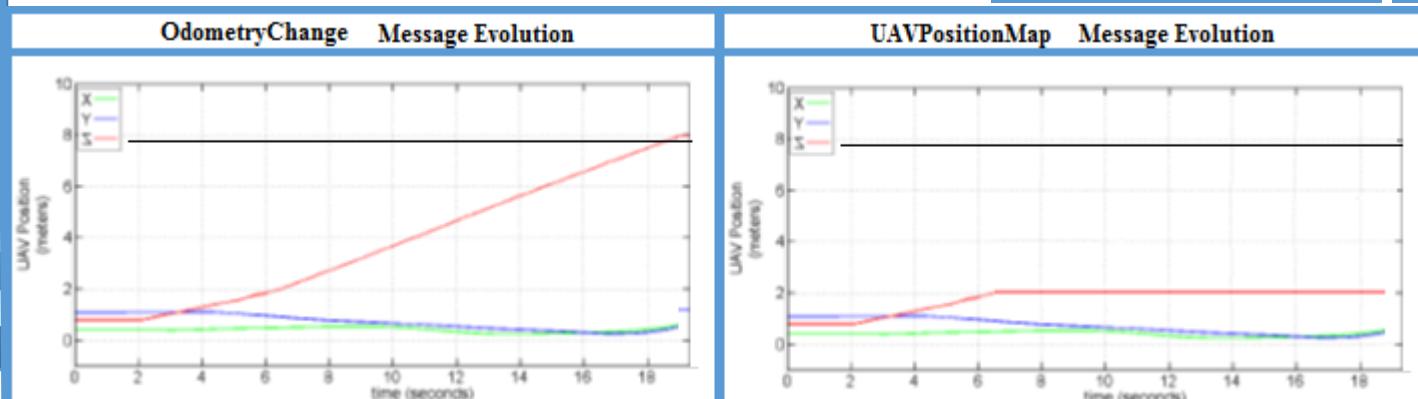
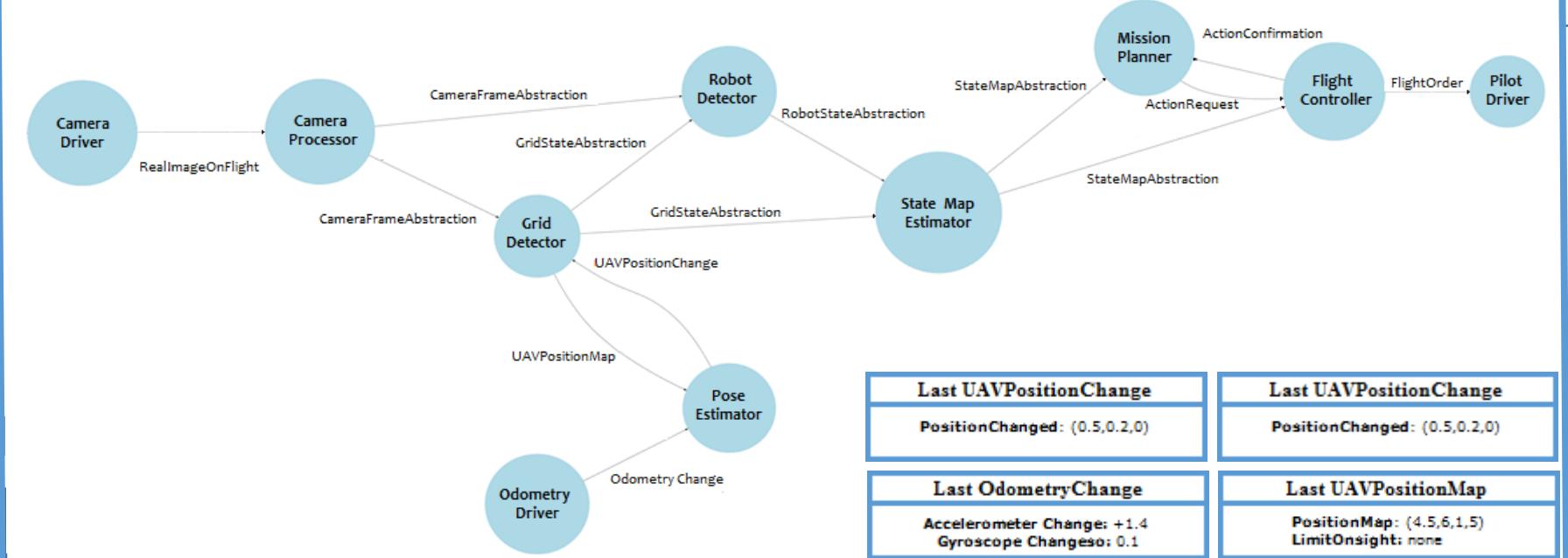
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- Pilot Driver
- Odometry Driver
- Camera_Driver

Debug Console Clear Load Save

View Panel UAV Status Error Description Messages Message Evolution Messages Log



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.341747}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.341747}

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 Inputs : position_map(Point), limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.



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Position	(3.2, 4.2, 1.5)

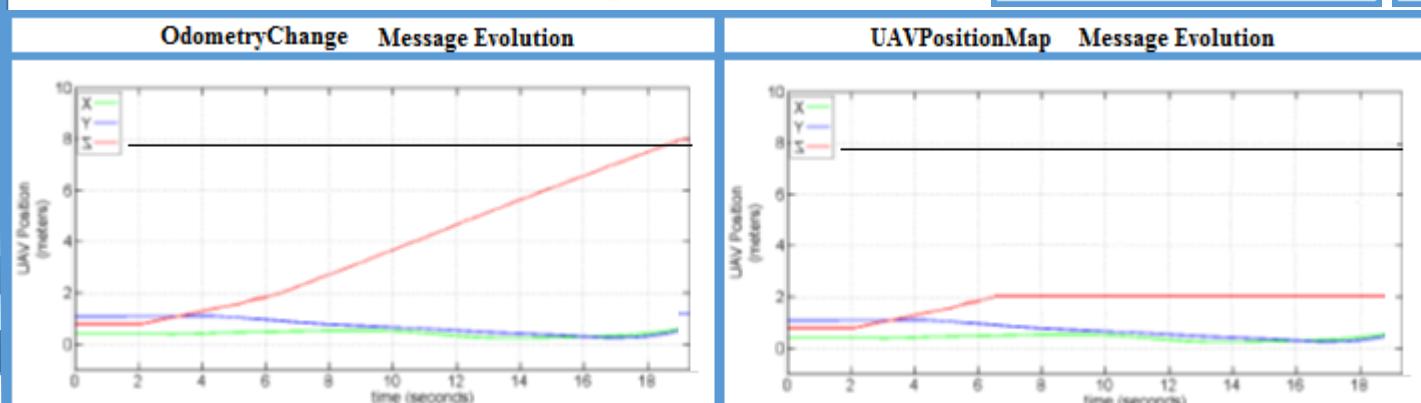
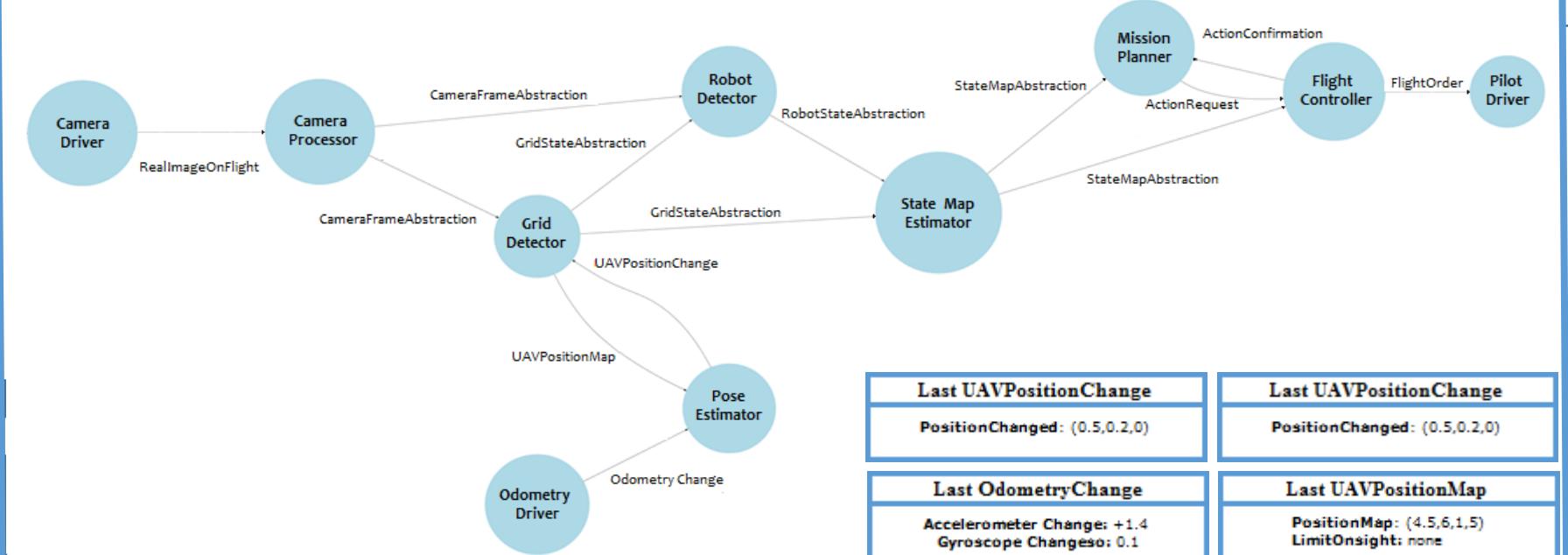
- Mission_Planner
- Flight_Controller
- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator

- ▶ Open messages log
- ▶ Show messages evolution
- ▶ Make Graphics
- ▶ [Show Mission Map](#)

- Pilot_Driver
- Odometry_Driver
- Camera_Driver

Debug Console Clear Load Save

View Panel UAV Status Error Description Messages Message Evolution Messages Log



Log . Odometry Change

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 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
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 Inputs : position_map(Point), limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

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Position	(3.2, 4.2, 1.5)

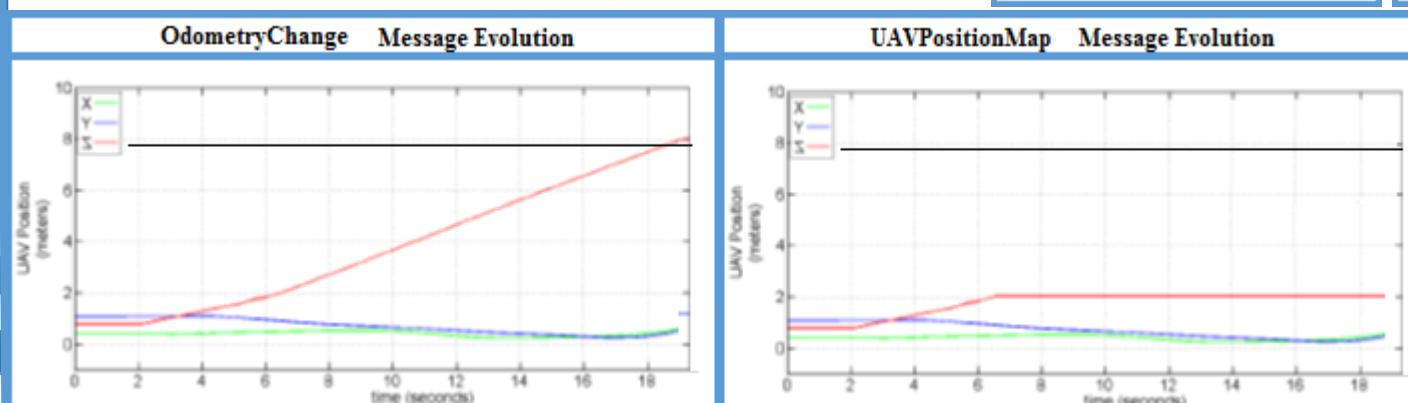
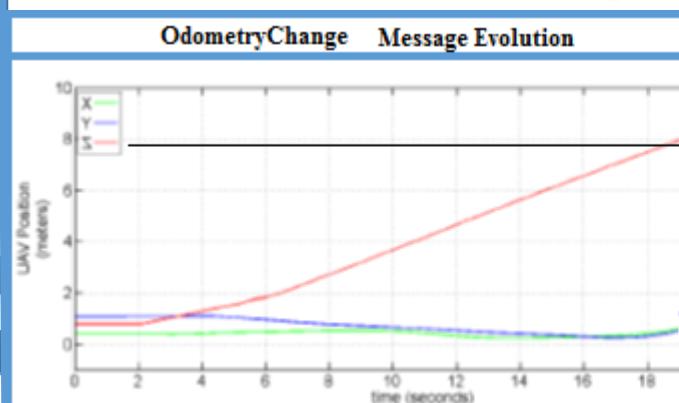
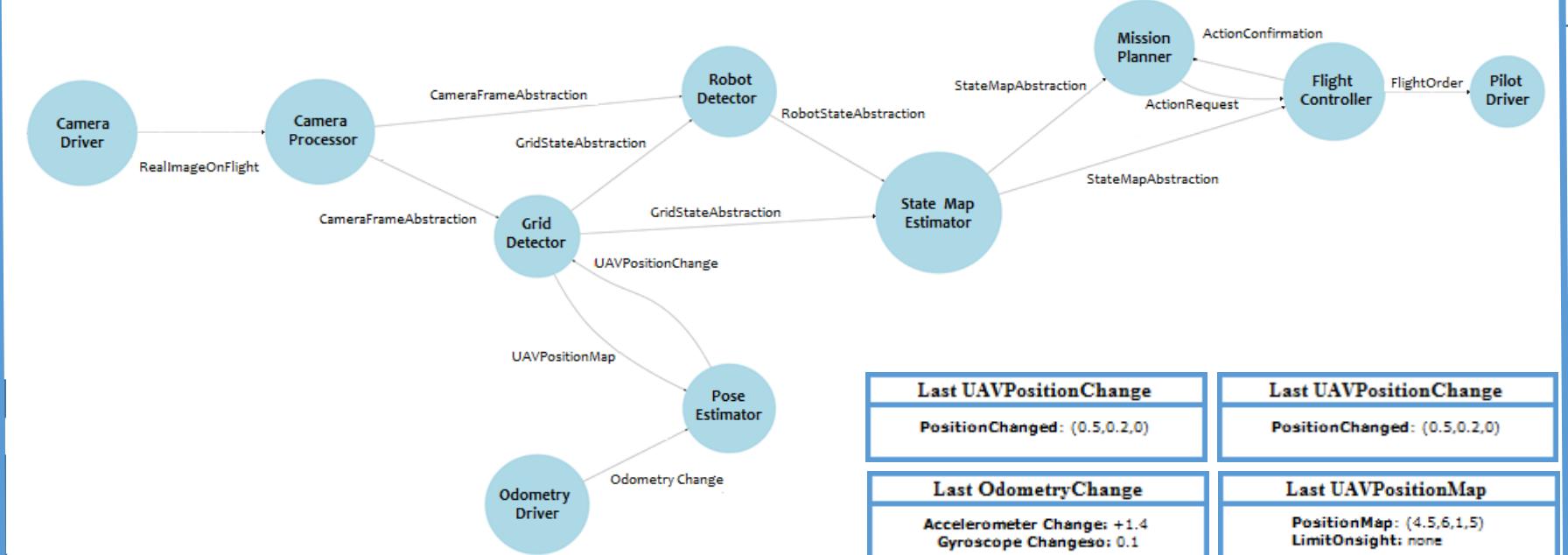
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- ▶ Make Graphics
- ▶ [Show Mission Map](#)

- Pilot Driver
- Odometry Driver
- Camera_Driver

Debug Console [Back] [Forward] [Stop] [Run] Warm Error

View Panel UAV Status Error Description Messages Message Evolution Messages Log Mission Map Clear Load Save

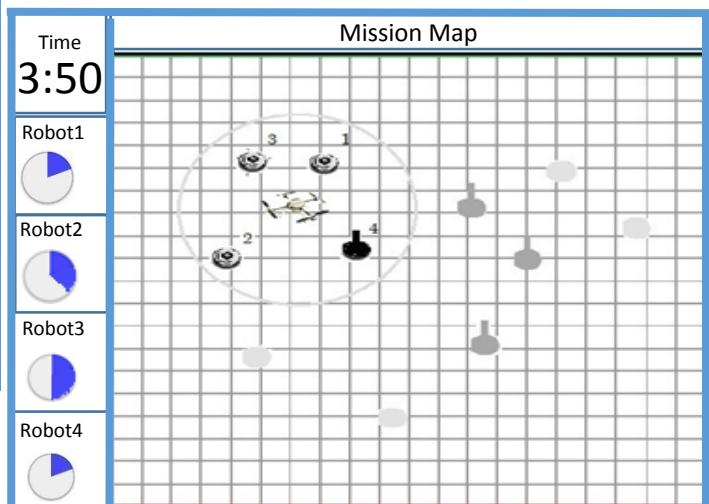


Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}





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Position	(3.2, 4.2, 1.5)

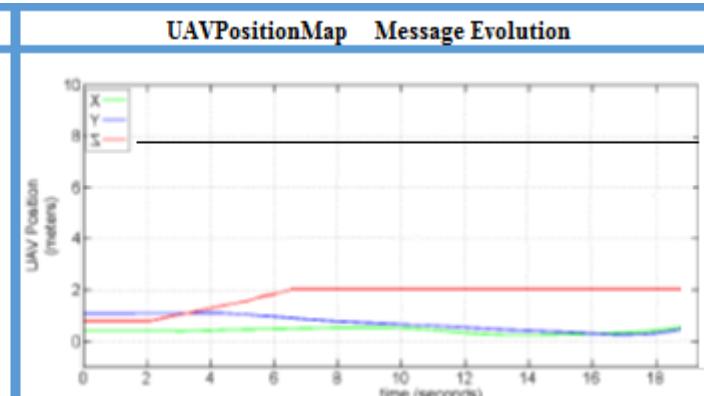
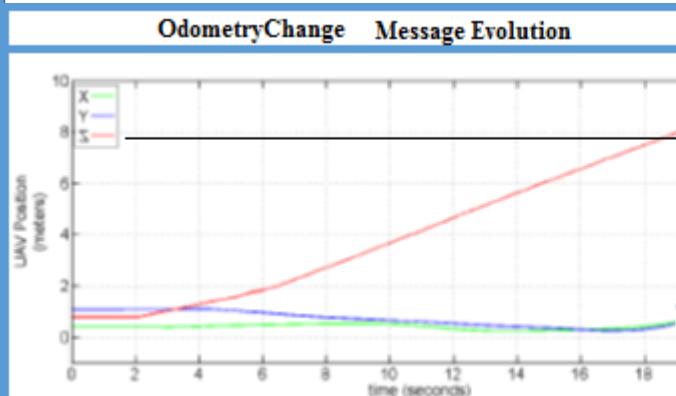
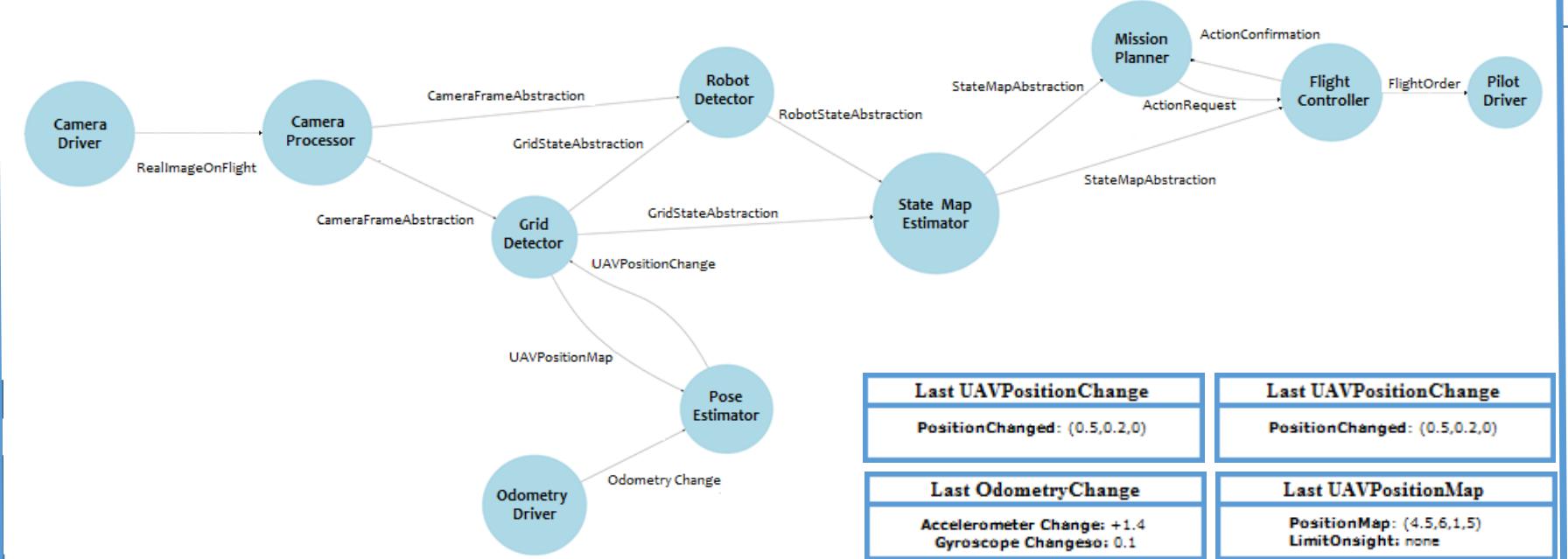
- Mission_Planner
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- ▶ Open messages log
- ▶ Show messages evolution
- ▶ Make Graphics
- ▶ Show Mission Map

- Pilot Driver
- Odometry Driver
- Camera_Driver

Debug Console [Back] [Forward] [Stop] [Run] Warm Error

View Panel UAV Status Error Description Messages Message Evolution Messages Log Mission Map Clear



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

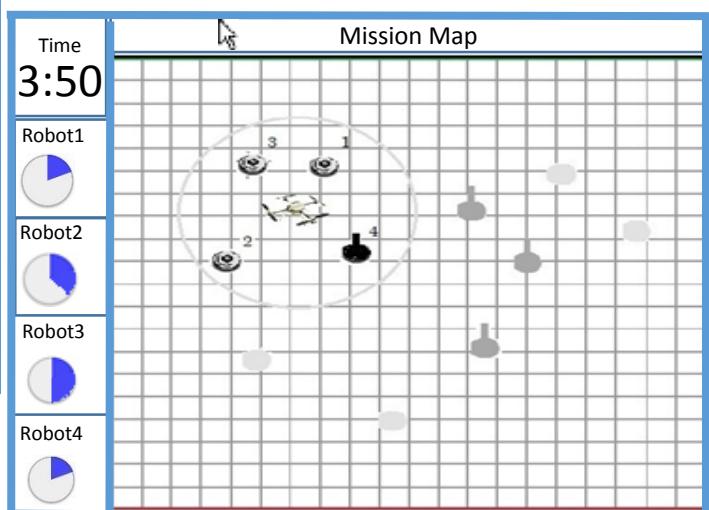
Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.3417471}

Error description

Error 1 in Pose Estimator
 UAV position estimator has failed.
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Function: Pose Estimator.
 Inputs : position_map(Point), limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.





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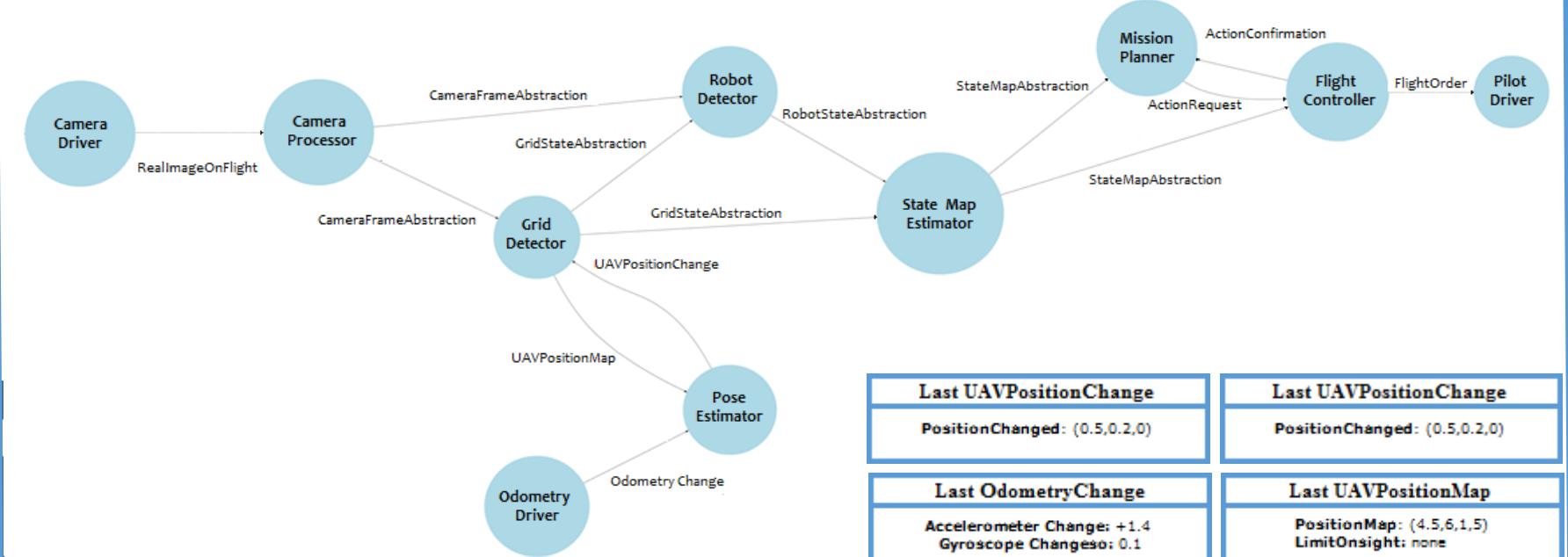
Debug Console

◀ ▶ ⌛ ⌚ Warm Error

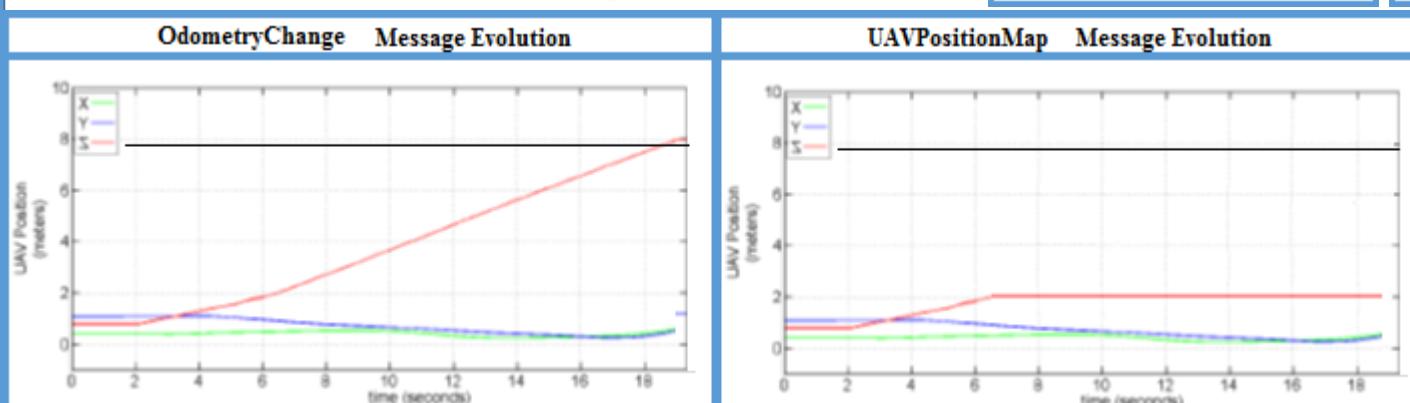
View Panel

UAV Status Error Description Messages Message Evolution Messages Log

Clear **Load** **Save**



Last UAVPositionChange	Last UAVPositionChange
PositionChanged: (0.5,0.2,0)	PositionChanged: (0.5,0.2,0)
Last OdometryChange	Last UAVPositionMap
Accelerometer Change: +1.4 Gyroscope Change: 0.1	PositionMap: (4.5,6,1.5) LimitOnsight: none



Log . Odometry Change	Log . UAVPositionMap
Obstaculo cerca distancia: {2.446153} Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500 Direccion NEGATIVA Obstaculo cerca distancia: {2.3417471}	Obstaculo cerca distancia: {2.446153} Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500 Direccion NEGATIVA Obstaculo cerca distancia: {2.3417471}

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Inputs : position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Pose Estimator process abort execution.



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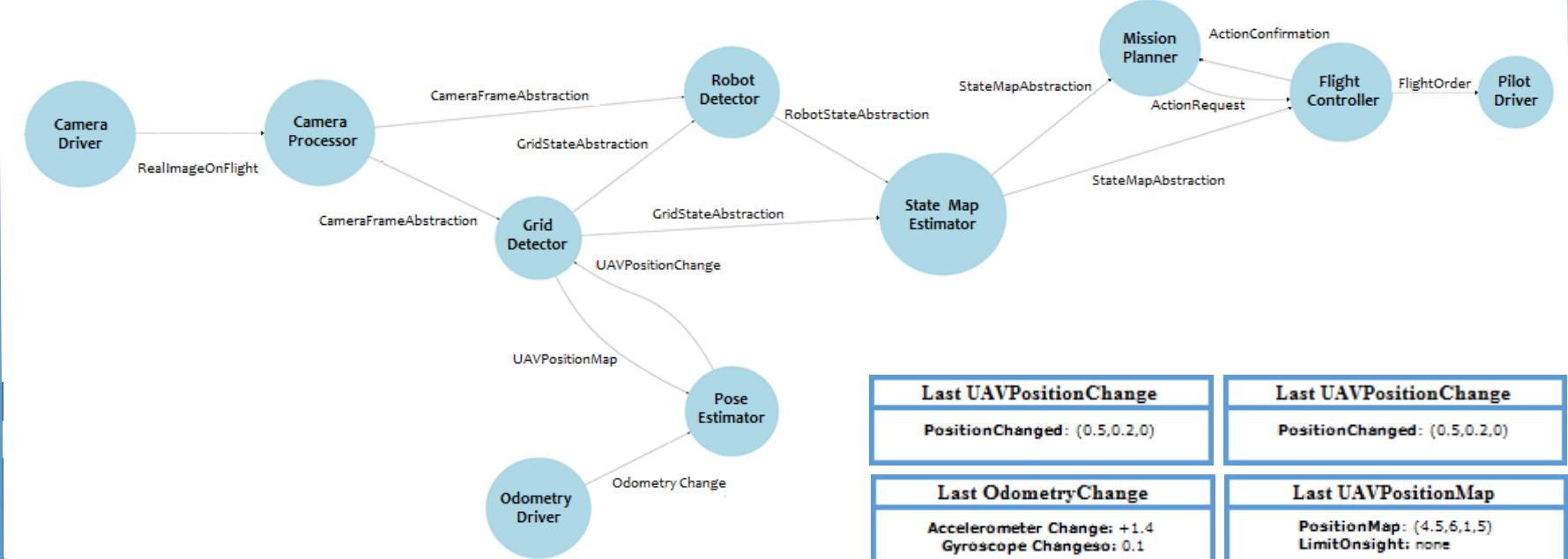
Debug Console

Back | Forward | Stop | Play | Warm | Error

View Panel

UAV Status | Error Description | Messages | Message Evolution | Messages Log

Clear | Load | Save



Error description

Error 1 in Pose Estimator

UAV position estimator has failed.

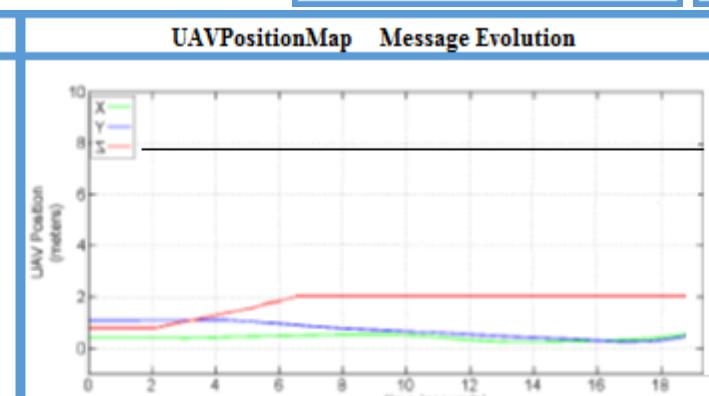
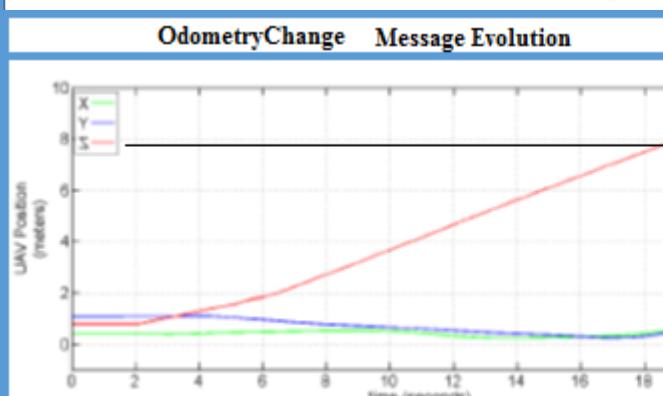
System can't determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.

Inputs : position_map(Point), limit_on_sight(int [])

Outputs: position_changed(Point). Debug : none

Action: Pose Estimator process abort execution.



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.3417471}



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Battery	65 %
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Position	(3.2, 4.2, 1.5)

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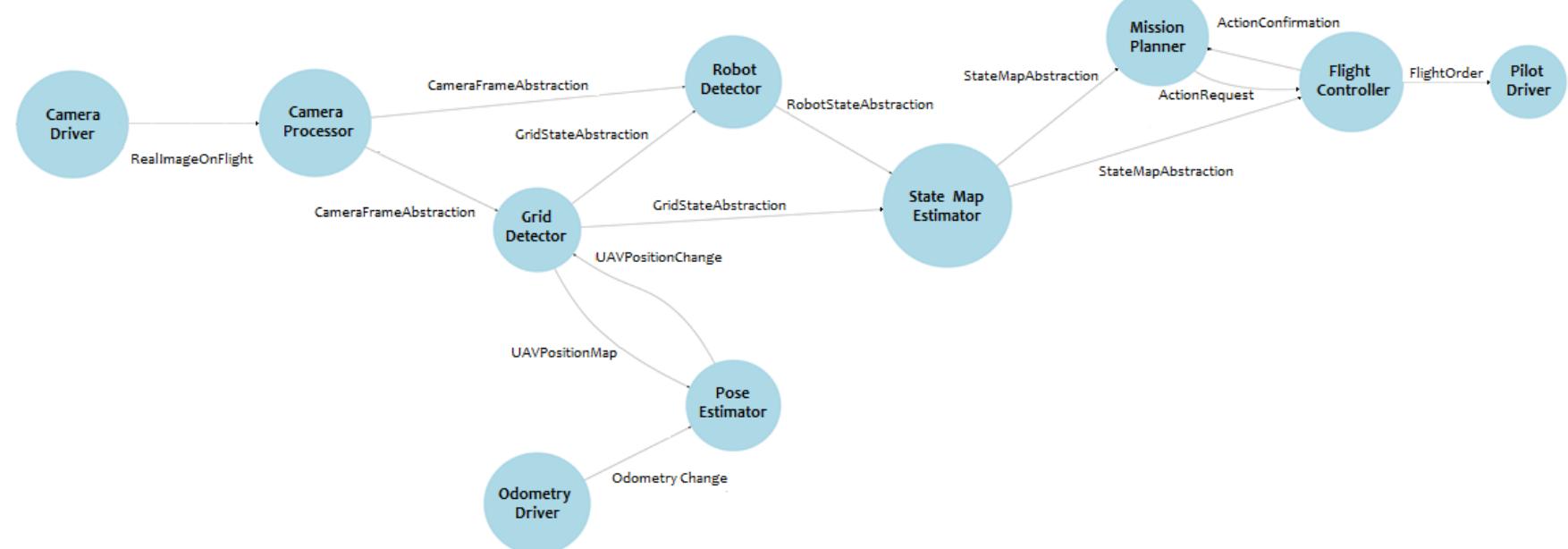
Debug Console

Back | Forward | Stop | Play | Warm | Error

View Panel

UAV Status | Error Description | Message Evolution | Messages Log

Clear | Load | Save



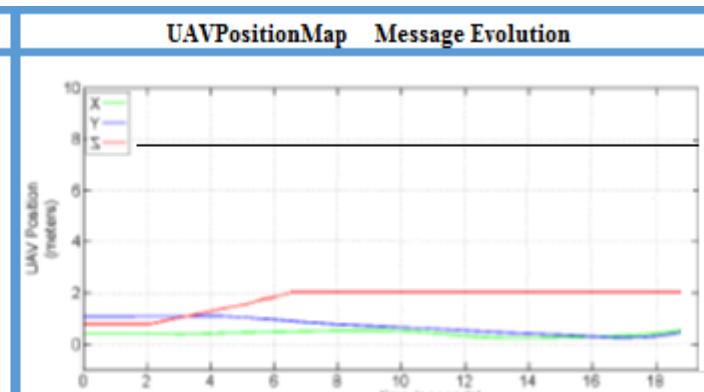
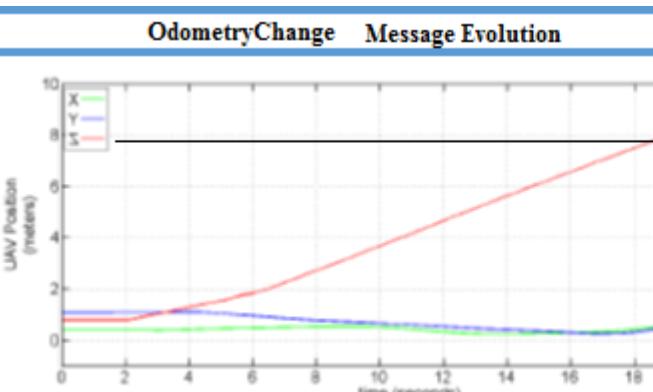
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System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Pose Estimator process abort execution.



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}



STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- Mission_Planner
- Flight Controller
- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator

- ▶ Open messages log
- ▶ Show messages evolution
- ▶ Make Graphics
- ▶ Show Mission Map

- Pilot Driver
- Odometry Driver
- Camera_Driver

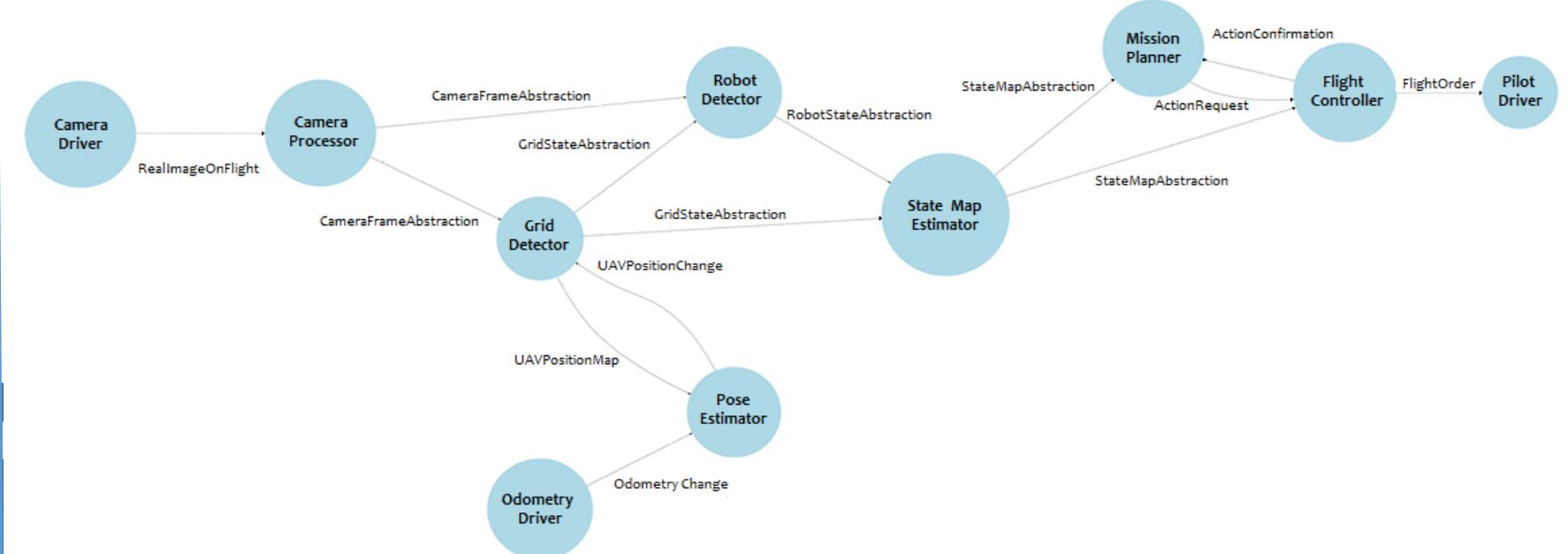
Debug Console

◀ ▶ ⏪ ⏩ ⏴ ⏵ Warm Error

View Panel

UAV Status Error Description Message Evolution Messages Log

Clear **Load** **Save**



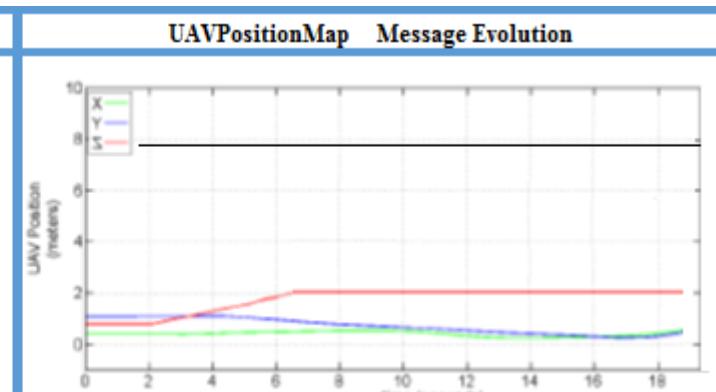
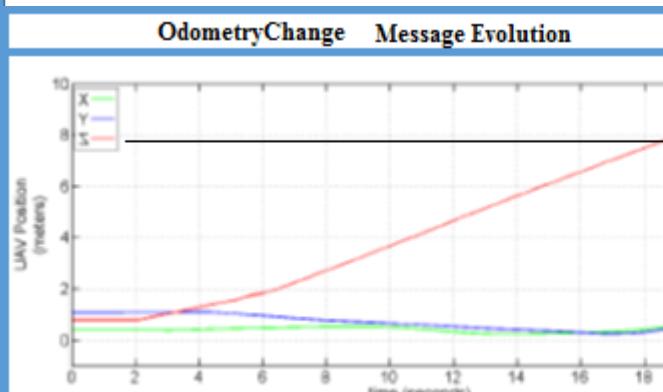
Error description

Error 1 in Pose Estimator
UAV position estimator has failed.

System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Pose Estimator process abort execution.



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}



STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- Mission_Planner
- Flight Controller
- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator

- ▶ Open messages log
- ▶ Show messages evolution
- ▶ Make Graphics
- ▶ Show Mission Map

- Pilot Driver
- Odometry Driver
- Camera_Driver

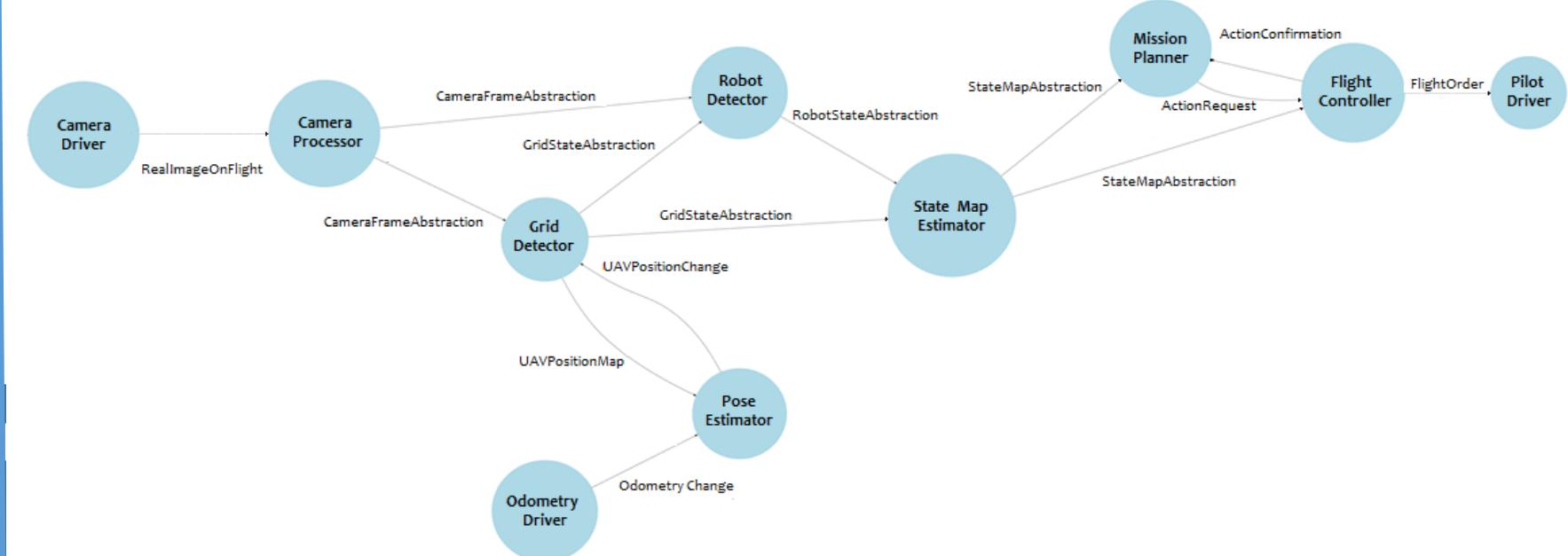
Debug Console

Back | Forward | Stop | Play | Warm | Error

View Panel

UAV Status | Error Description | Messages Log

Clear | Load | Save



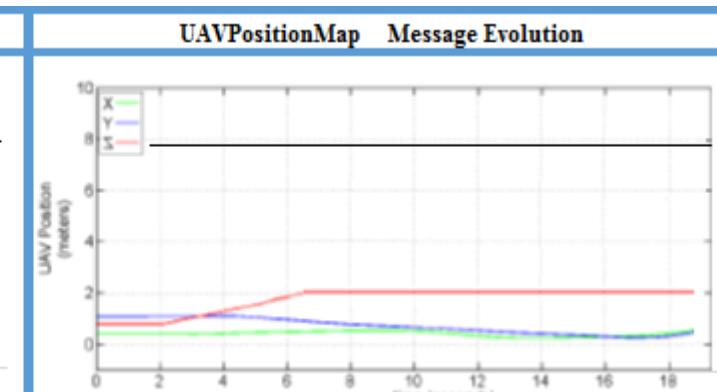
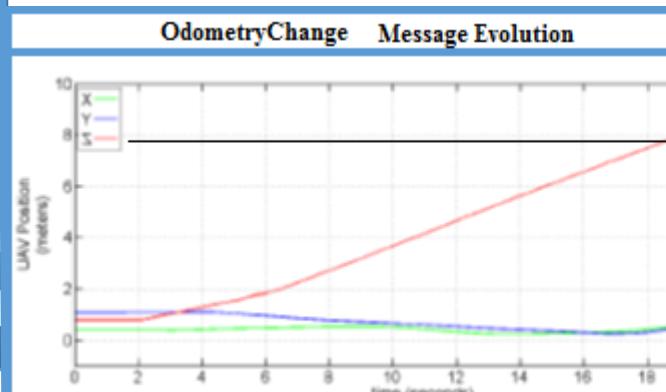
Error description

Error 1 in Pose Estimator
UAV position estimator has failed.

System can't determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Pose Estimator process abort execution.



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}



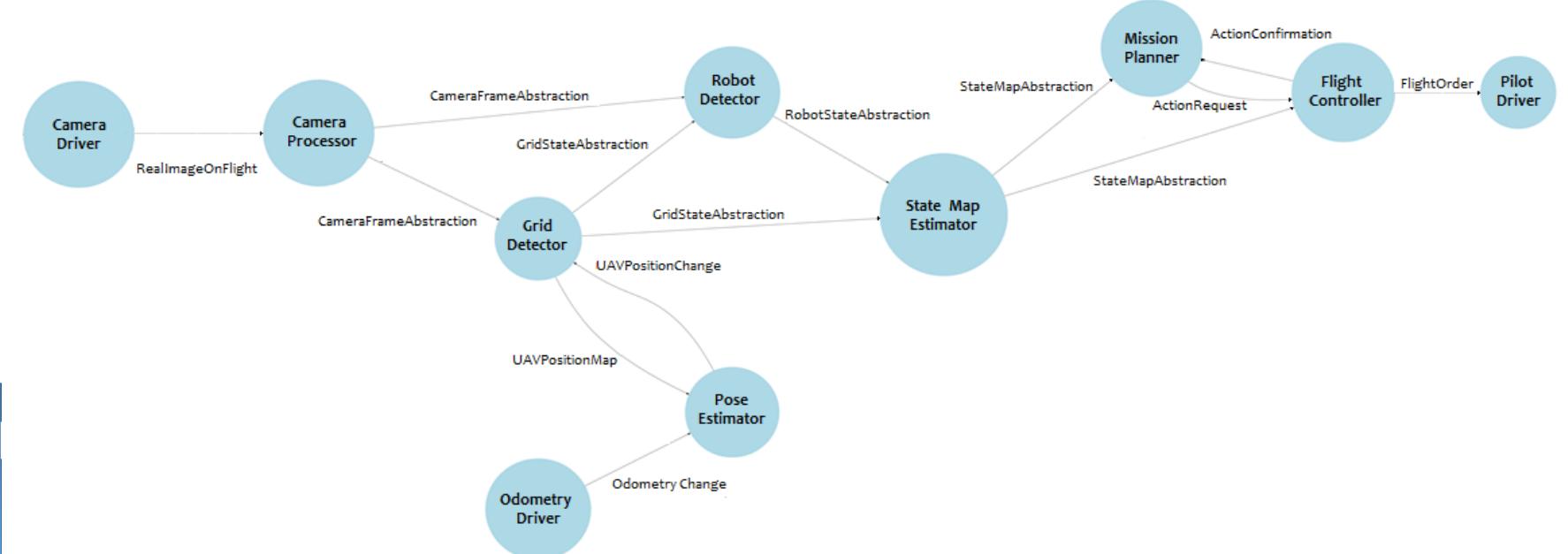
STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- Mission_Planner
- Flight Controller
- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator
- Pilot Driver
- Odometry Driver
- Camera_Driver

- ▶ Open messages log
- ▶ Show Taked Pictures
- ▶ Make Graphics
- ▶ Show Mission Map

Debug Console Clear Load Save

View Panel UAV Status Error Description Message Evolution Messages Log



Error description

Error 1 in Pose Estimator

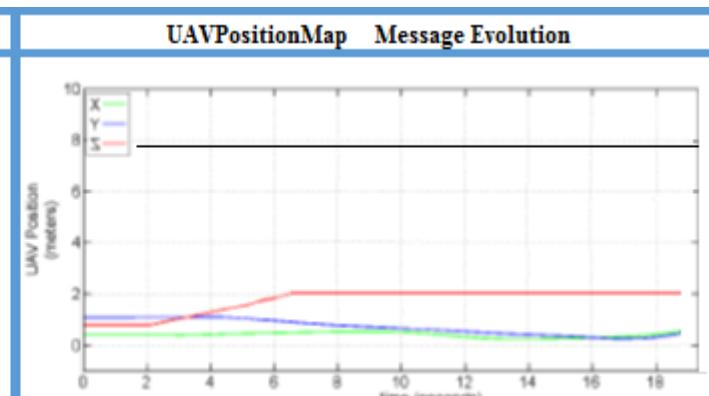
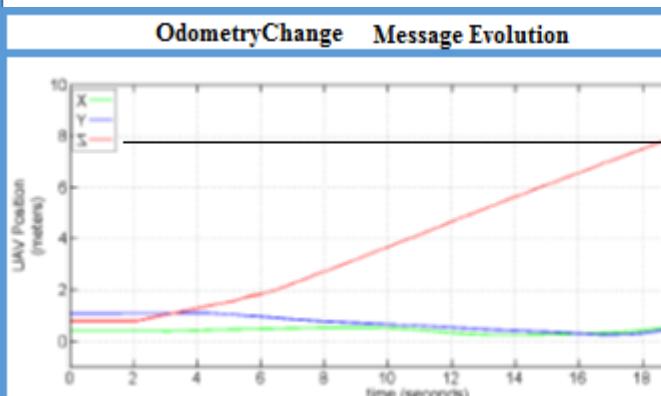
UAV position estimator has failed.

System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.

Inputs: position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug: none

Action: Pose Estimator process abort execution.



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
 Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
 Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
 Direccion NEGATIVA
 Obstaculo cerca distancia: {2.3417471}



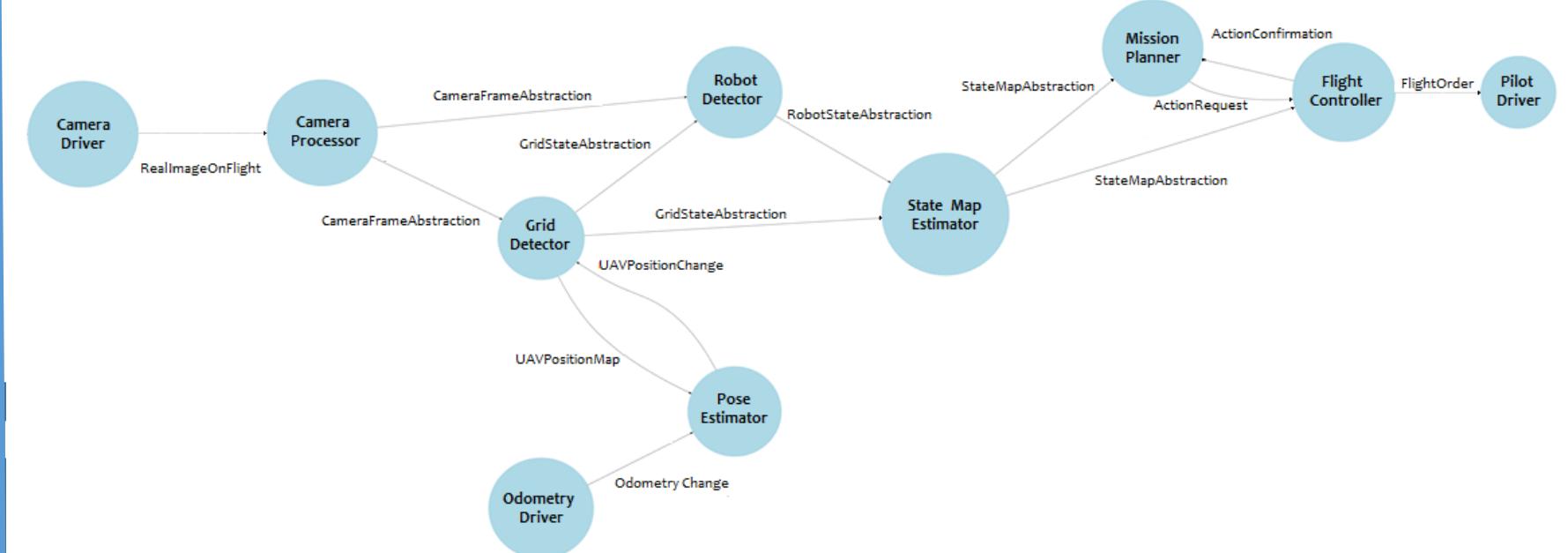
STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- Mission_Planner
- Flight Controller
- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator
- Pilot Driver
- Odometry Driver
- Camera_Driver

- ▶ Open messages log
- ▶ Show Takeoff Pictures
- ▶ Make Graphics
- ▶ Show Mission Map

Debug Console Warm Error

View Panel UAV Status Error Description Message Evolution Messages Log



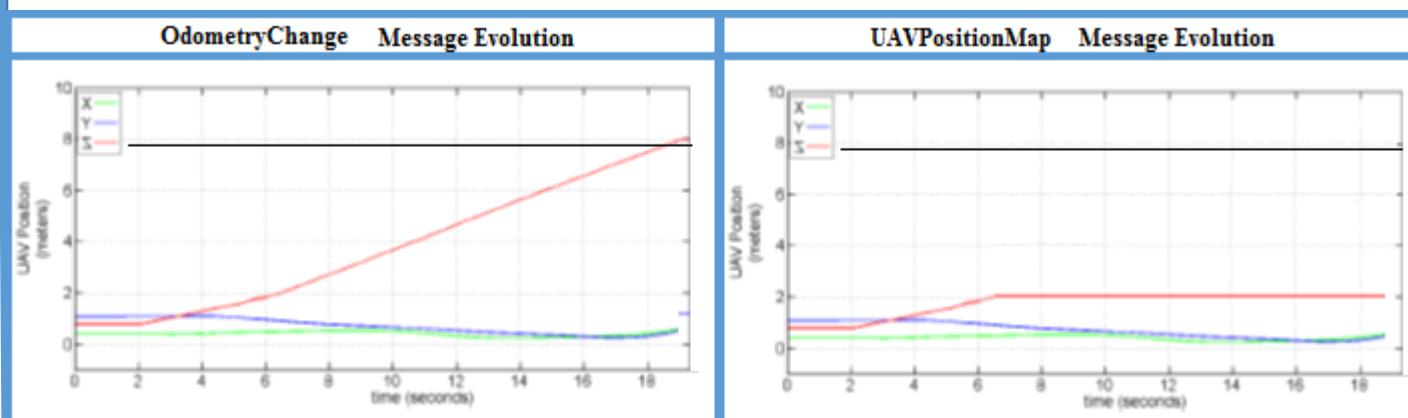
Error description

Error 1 in Pose Estimator
UAV position estimator has failed.

System can't determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Pose Estimator process abort execution.



Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.341747}

Log . UAVPositionMap

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.341747}



STATE	OK
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- Mission_Planner
- Flight Controller
- State_Map_Estimator
- Grid_Detector
- Robot_Detector
- Camera_Processor
- Pose_Estimator
- Pilot Driver
- Odometry_Driver
- Camera_Driver

- ▶ Open messages log
- ▶ Show Taken Pictures
- ▶ Make Graphics
- ▶ Show Mission Map

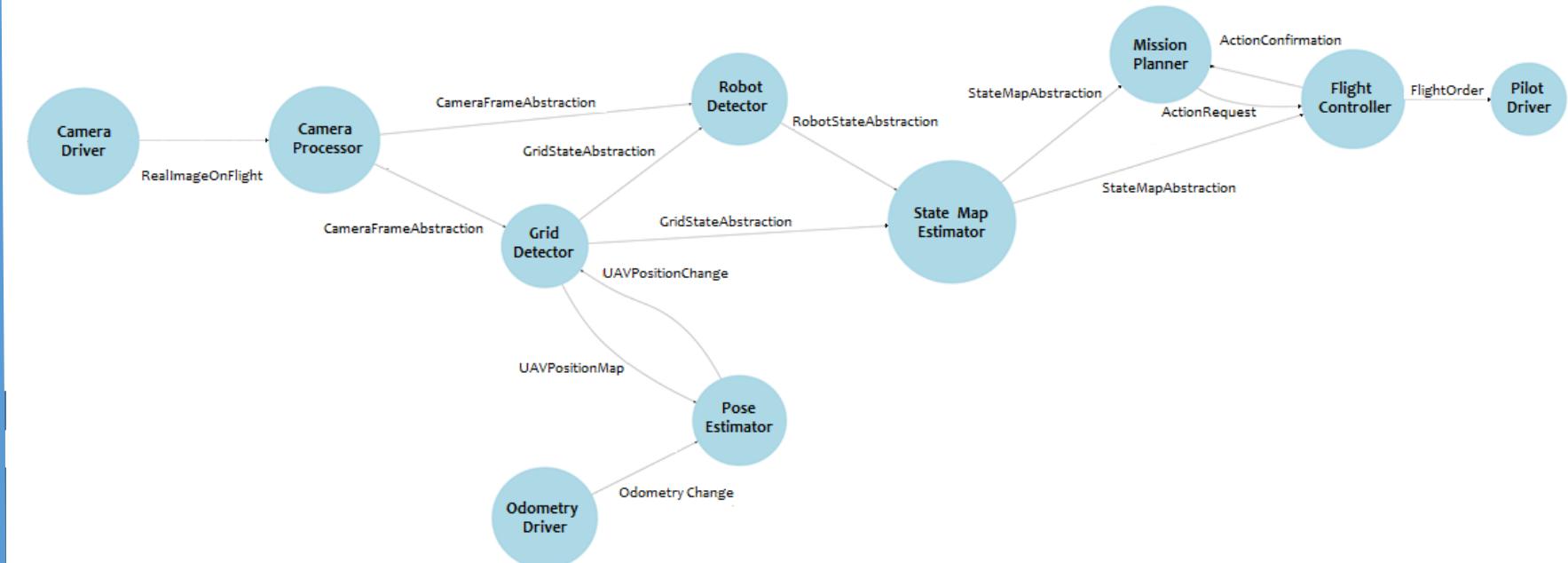
Debug Console

◀ ▶ ⏪ ⏩ ⏴ ⏵ Warm Error

View Panel

UAV Status Error Description Message Evolution Messages Log Captured Pictures

Clear **Load** **Save**



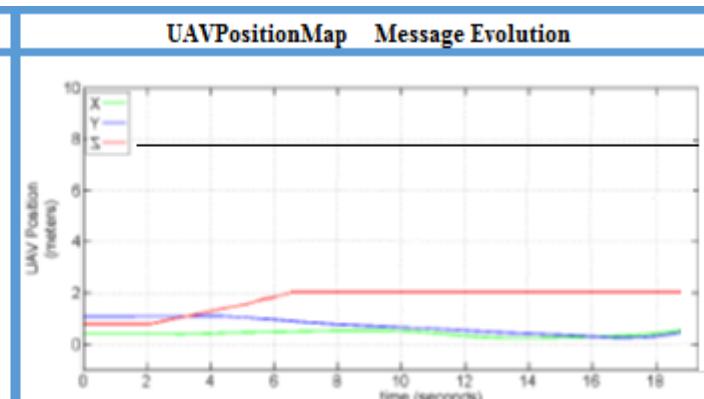
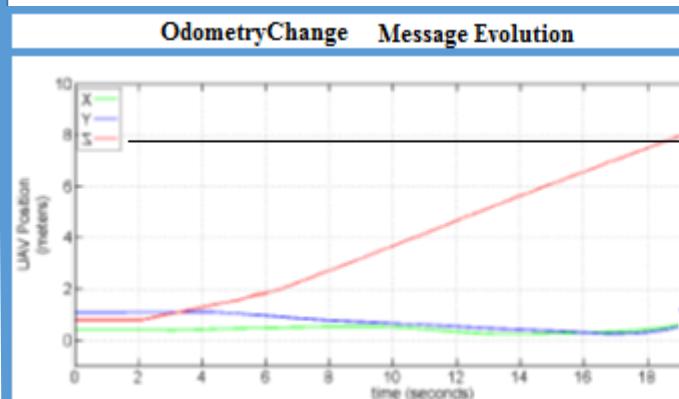
Error description

Error 1 in Pose Estimator
UAV position estimator has failed.

System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Pose Estimator process abort execution.

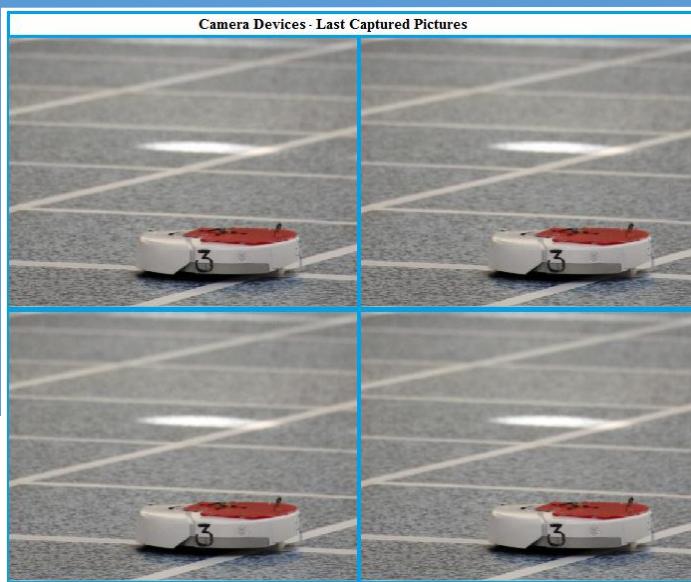


Log . Odometry Change

Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}

Log . UAVPositionMap

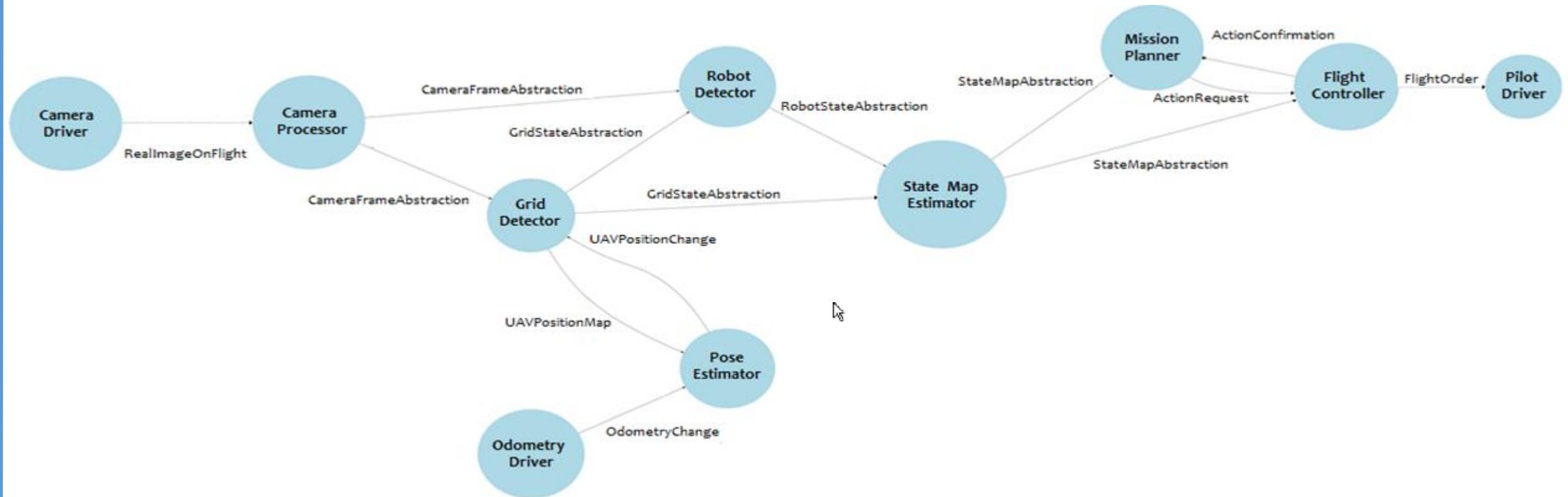
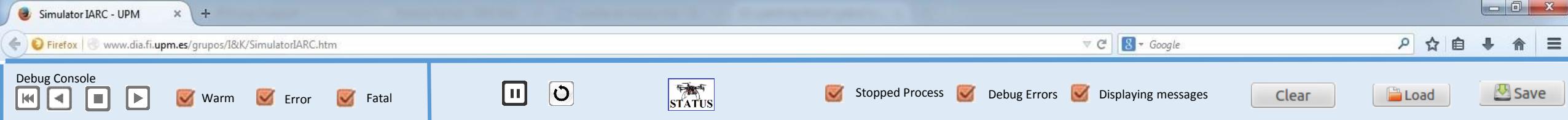
Obstaculo cerca distancia: {2.446153}
Posicion UAV: x: 5.7338 y:13.4662 z:1.5000 dir:-0.7390
Posicion obstacle: x:5.4165 y:11.9347 z:0.0500
Direccion NEGATIVA
Obstaculo cerca distancia: {2.3417471}



Prototype B

- Graph Image is dinamic.
- There is a inside the picture, is able to interact with picture. Show an option or another depends on the scene.
- Every window can be in any place and moved like Windows of Microsoft system.
- More difficult to implement.

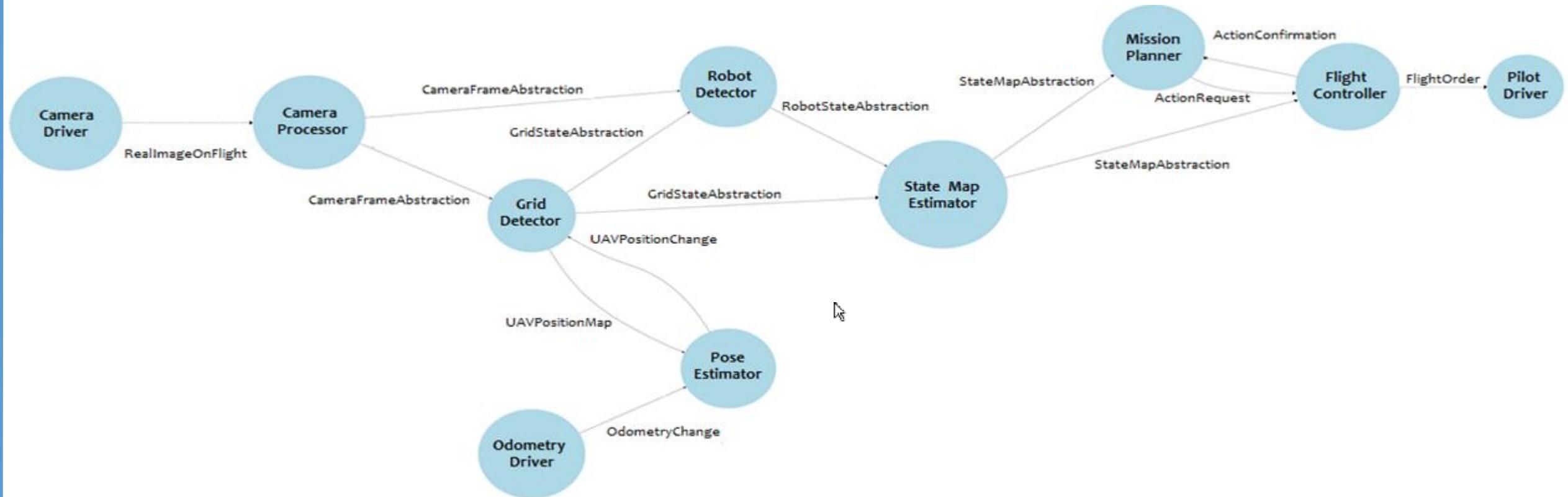
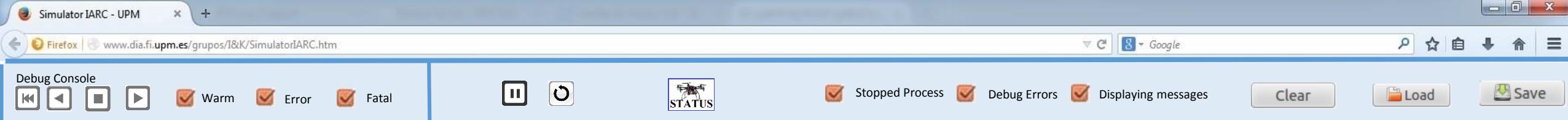
Initial Screen

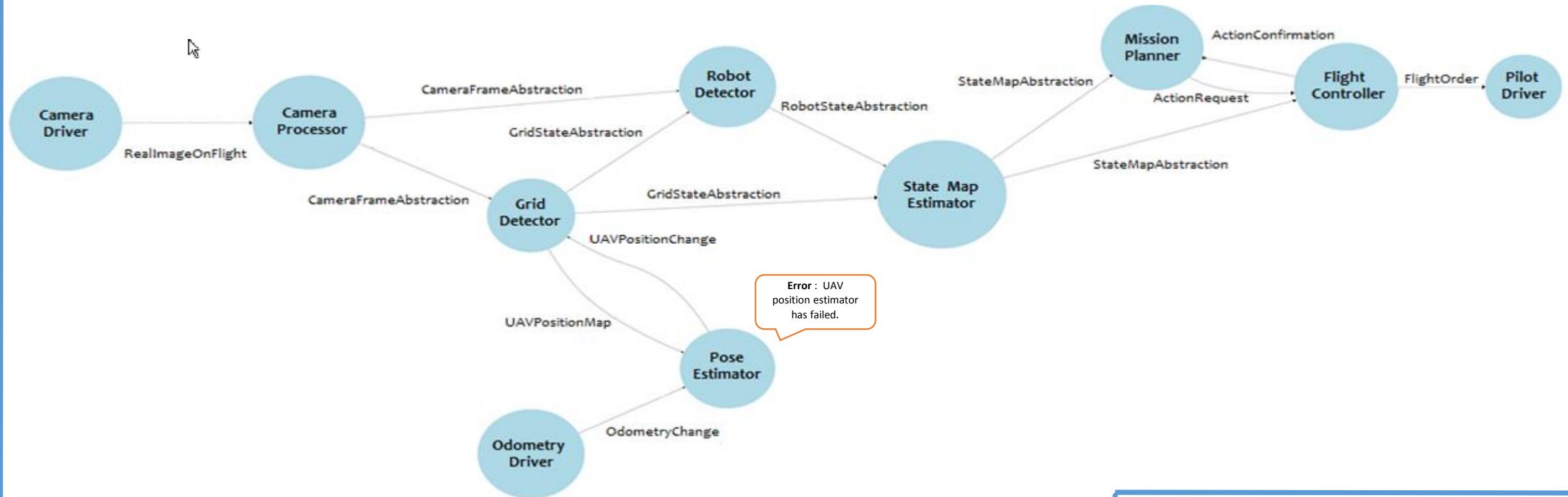


Error Case 1b Simulation

Error Scene

UAV is flying over the field and camera detect one position and Pose Estimator another different, creating a wrong position. The distance between the new position and old position can not be reached in the time elapsed.



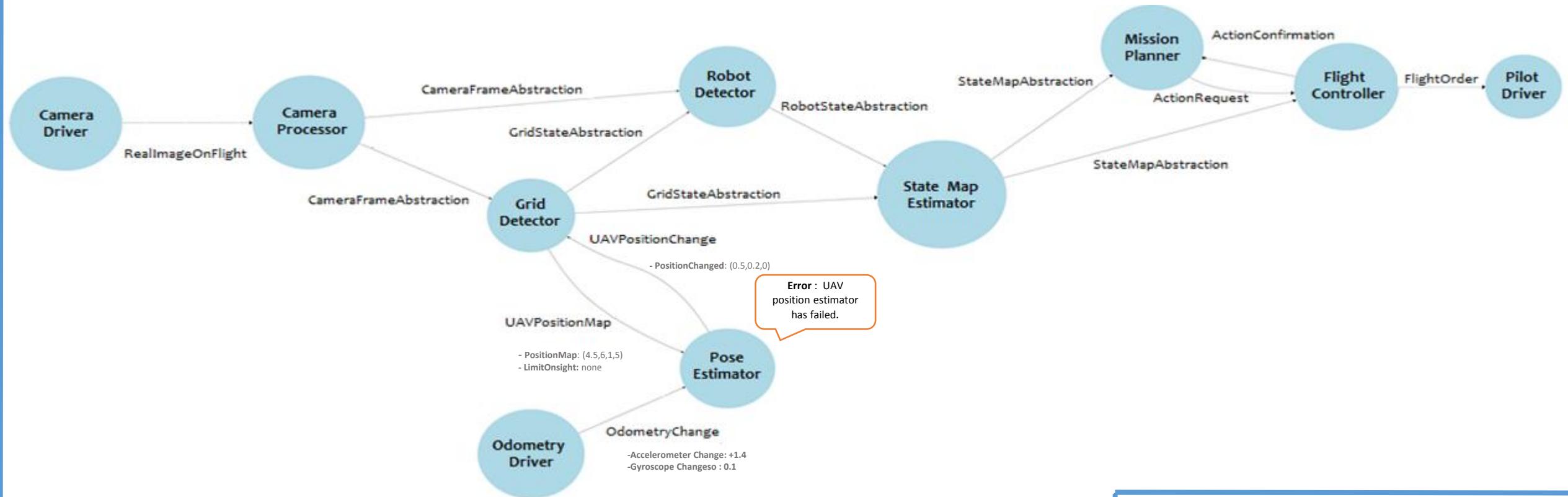


mission status

Error: UAV position estimator has failed.
 System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
 Inputs : position_map(Point), limit_on_sight(int [])
 Outputs : position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.

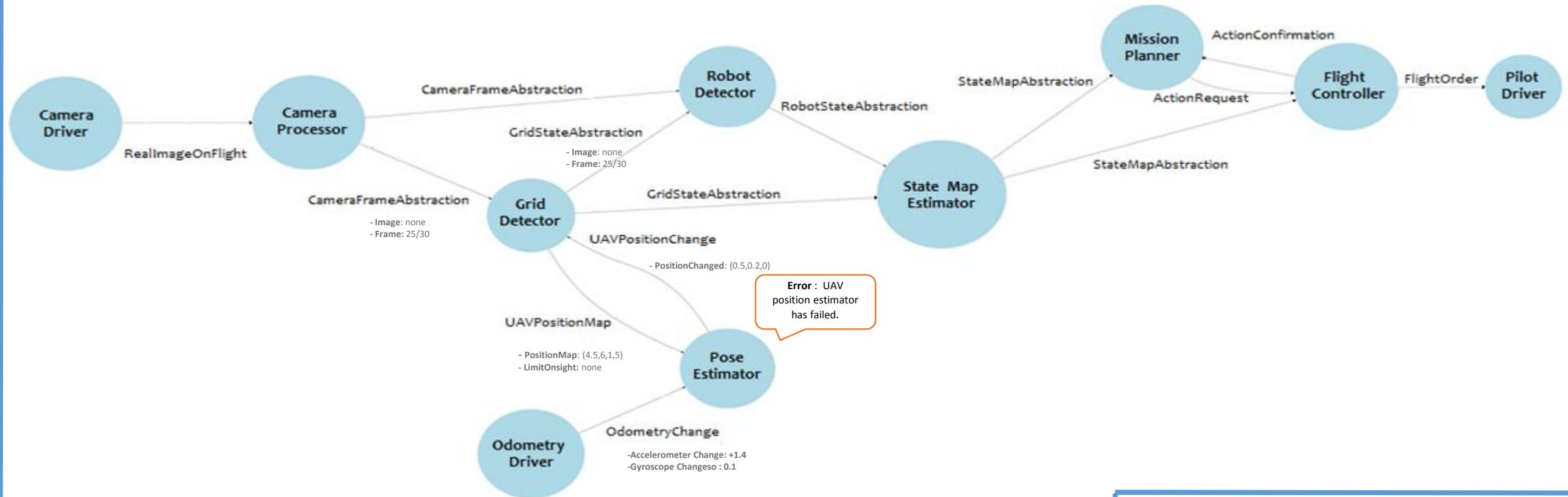


mission status

Error: UAV position estimator has failed.
 System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
 Inputs : position_map(Point), limit_on_sight(int [])
 Outputs : position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.

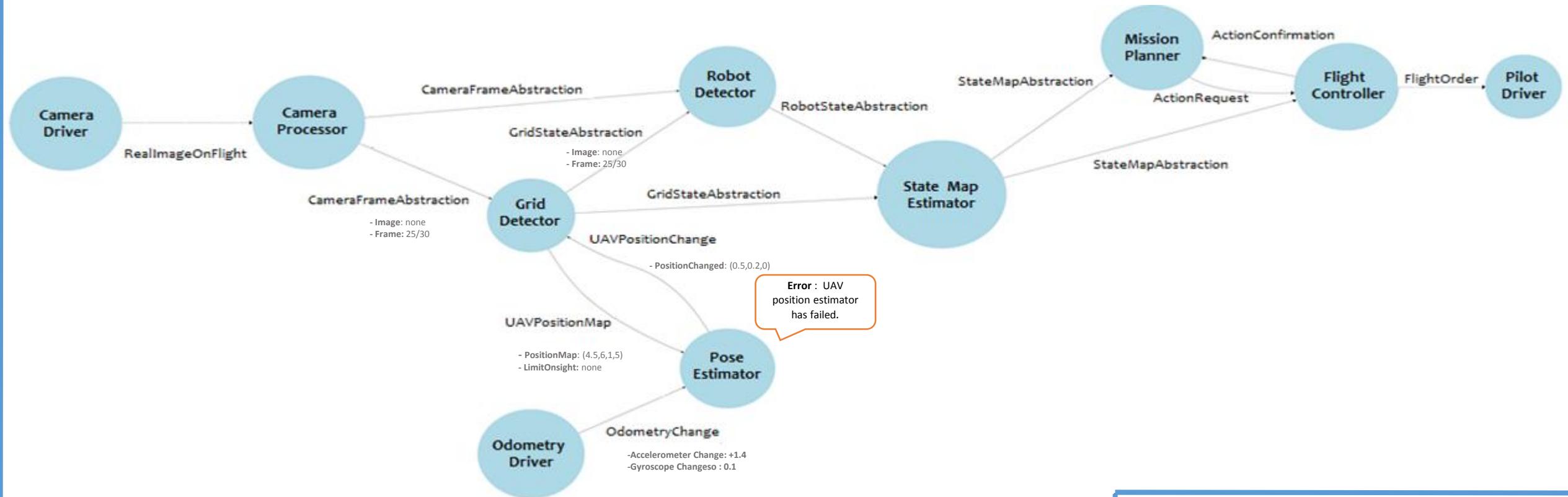


mission status

Error: UAV position estimator has failed.
 System cant determine current position due to a big change that exceed velocity limit.

Function: Pose Estimator.
 Inputs: position_map(Point), limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.

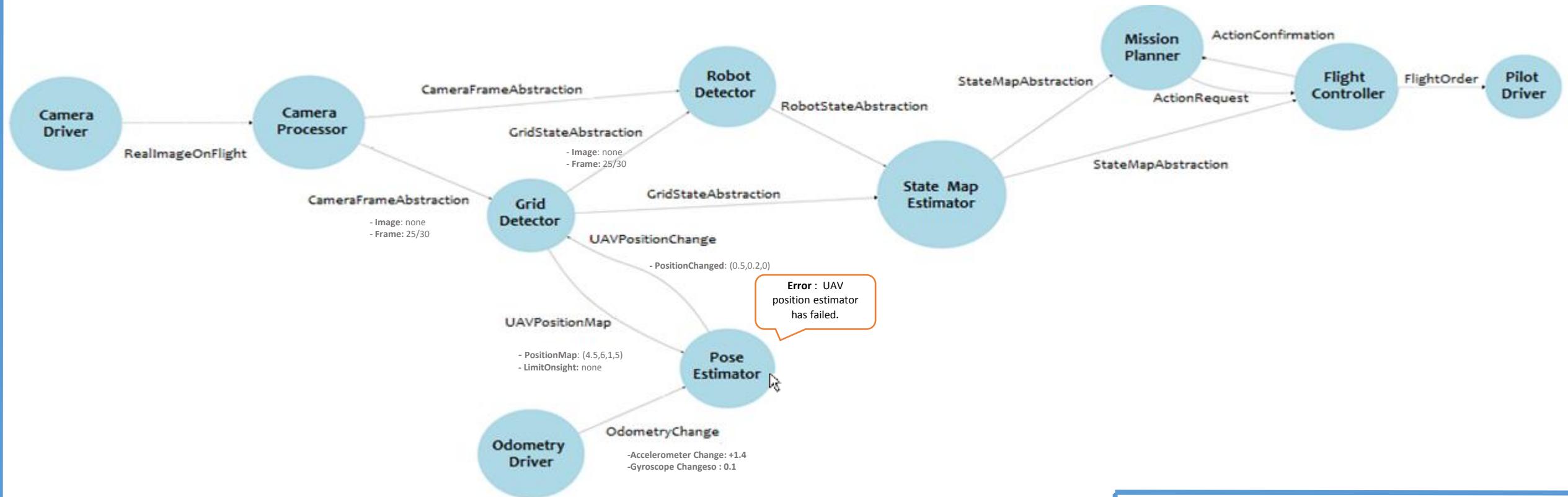


Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Error: UAV position estimator has failed.
 System cant determine current position due to a big change that exceed velocity limit.
 Function: Pose Estimator.
 Inputs : position_map(Point), limit_on_sight(int [])
 Outputs : position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.

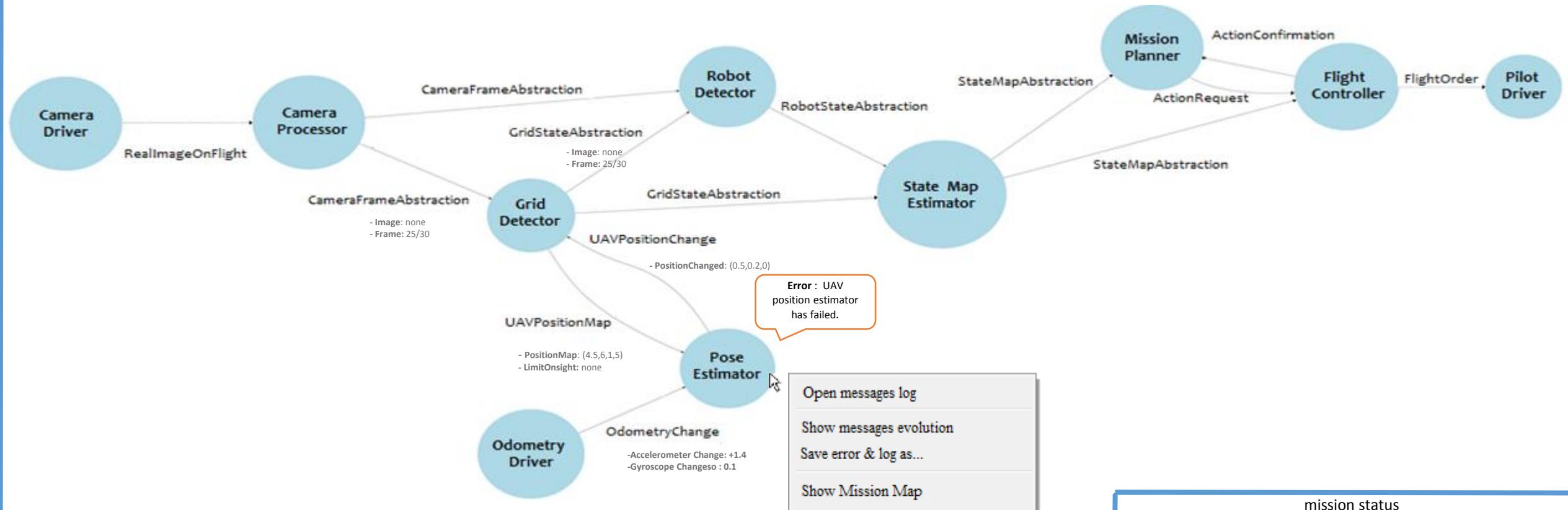


Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Error: UAV position estimator has failed.
 System cant determine current position due to a big change that exceed velocity limit.
 Function: Pose Estimator.
 Inputs: position_map(Point), limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.



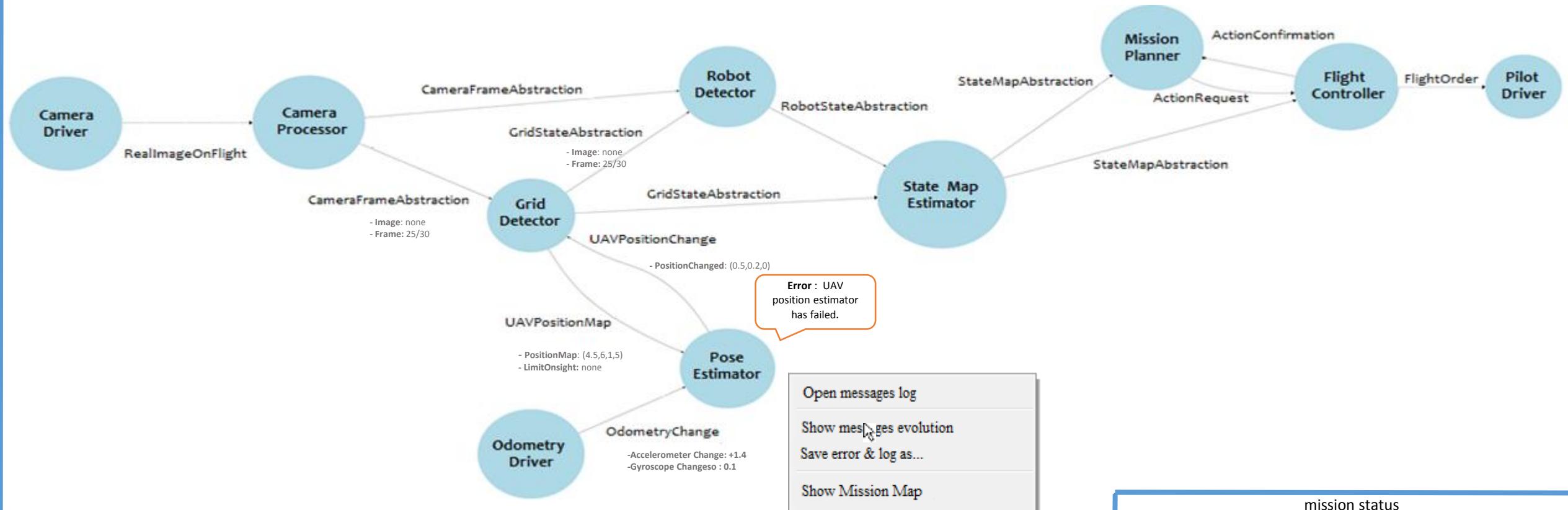
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- Open messages log
- Show messages evolution
- Save error & log as...
- Show Mission Map
- Show last data...
- Option X

mission status

Error: UAV position estimator has failed.
System cant determine current position due to a big change that exceed velocity limit.
Function: Pose Estimator.
Inputs: position_map(Point), limit_on_sight(int []).
Outputs: position_changed(Point).
Debug : none

Action: Pose Estimator process abort execution.



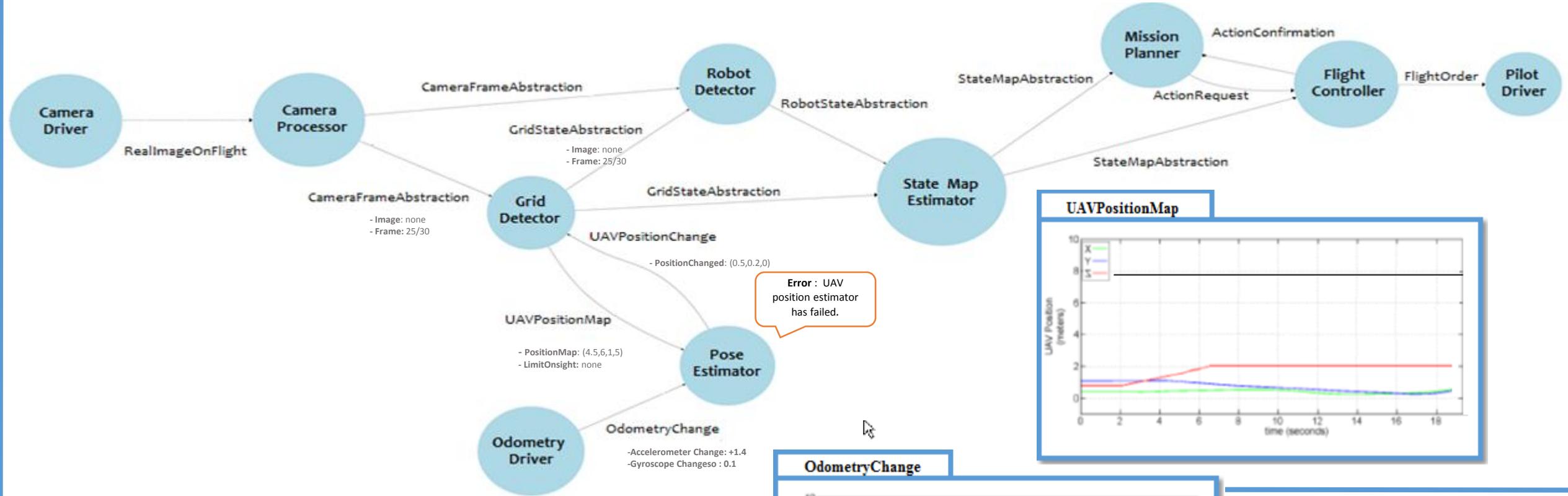
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

- [Open messages log](#)
- [Show messages evolution](#)
- [Save error & log as...](#)
- [Show Mission Map](#)
- [Show last data...](#)
- [Option X](#)

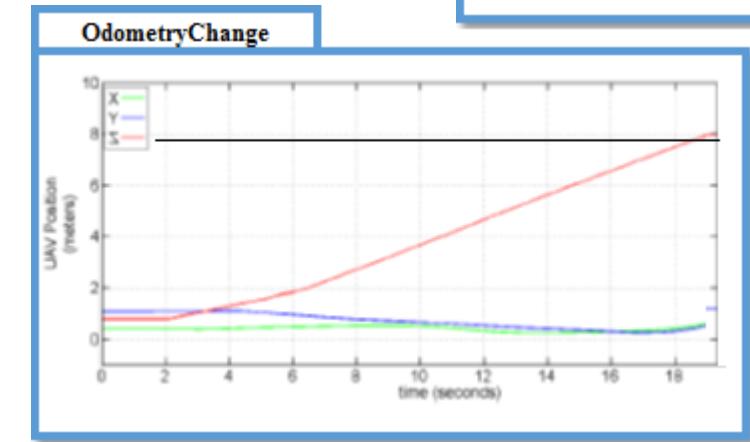
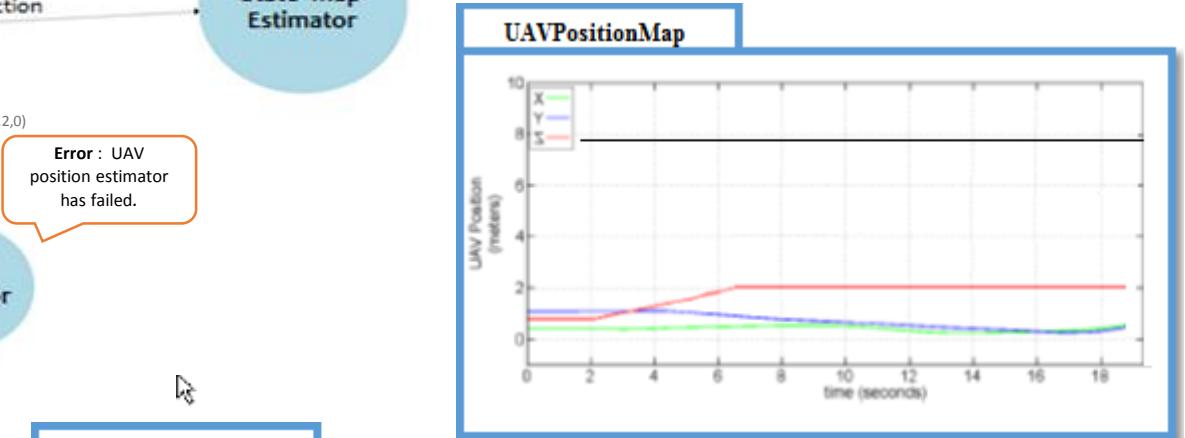
mission status

Error: UAV position estimator has failed.
 System cant determine current position due to a big
 change that exceed velocity limit.
 Function: Pose Estimator.
 Inputs: position_map(Point), limit_on_sight(int [])
 Outputs: position_changed(Point).
 Debug : none

Action: Pose Estimator process abort execution.



Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

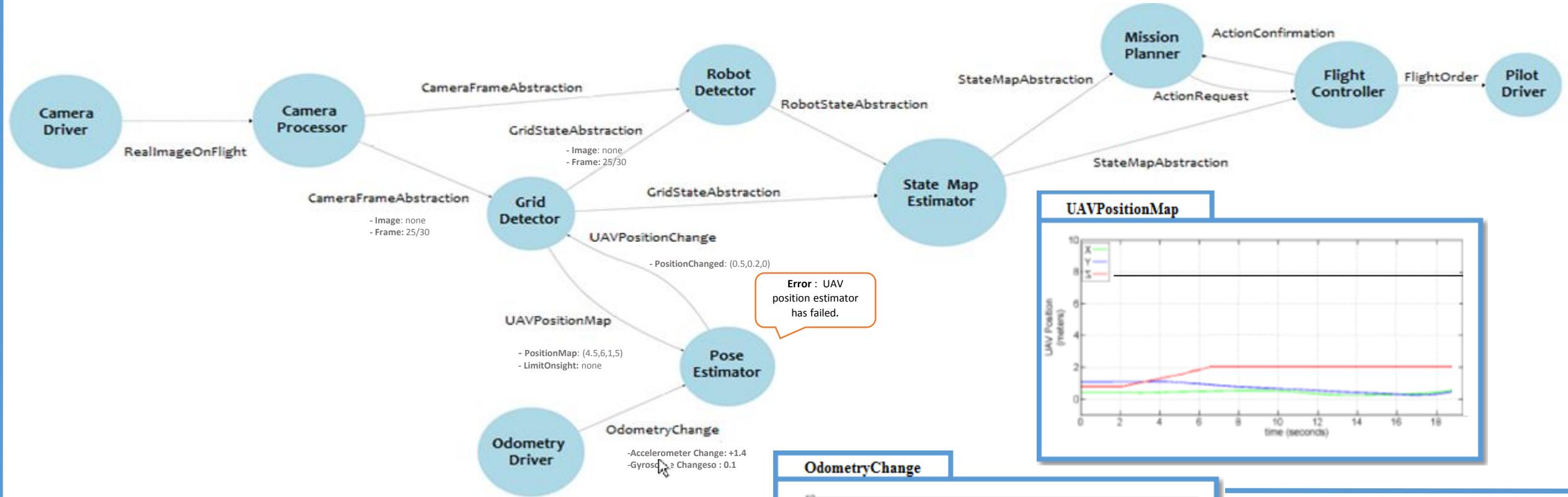


mission status

position estimator has failed.
can't determine current position due to a big
that exceed velocity limit.

tion: Pose Estimator.
`gets`: position_map(Point), limit_on_sight(int [])
`puts`: position_changed(Point).
`ug`: none

Pose Estimator process abort execution.



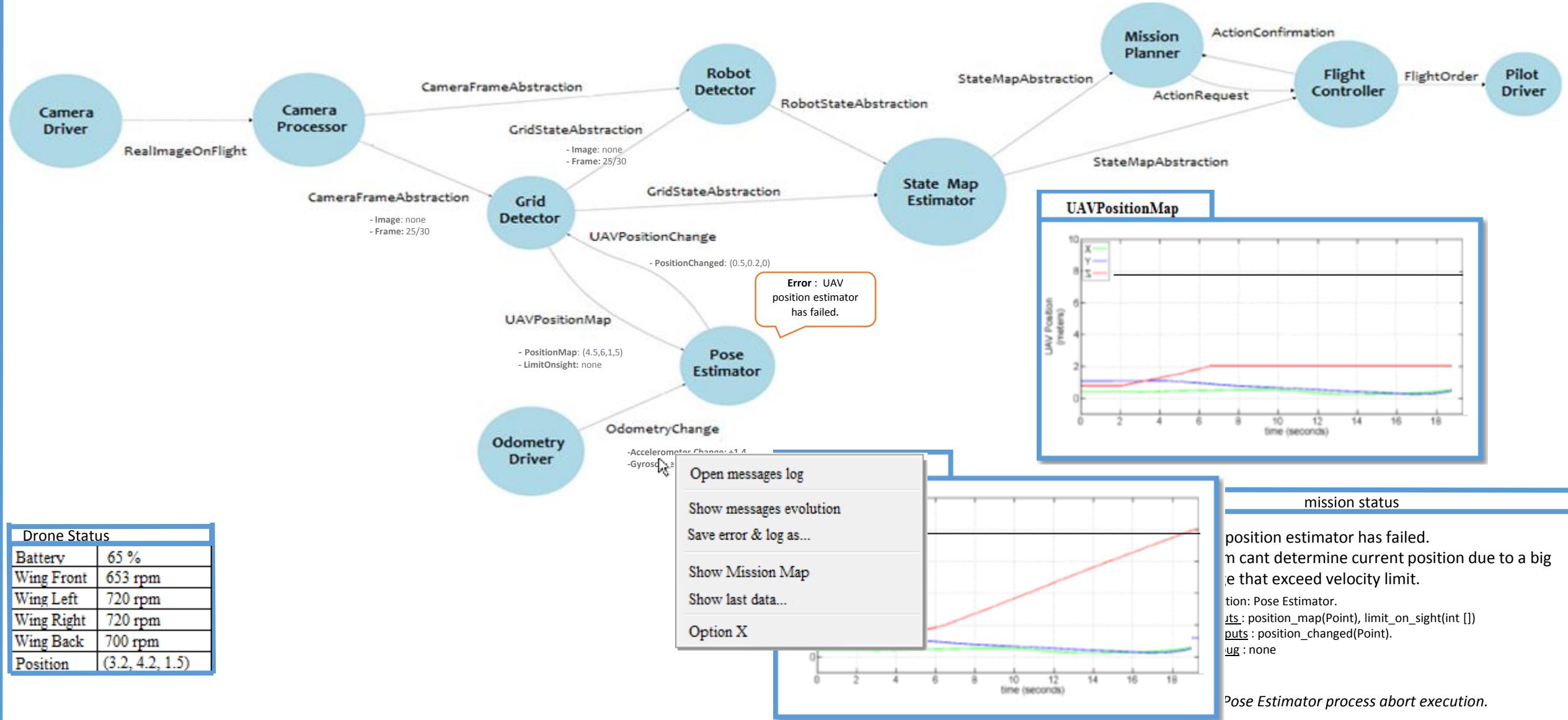
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

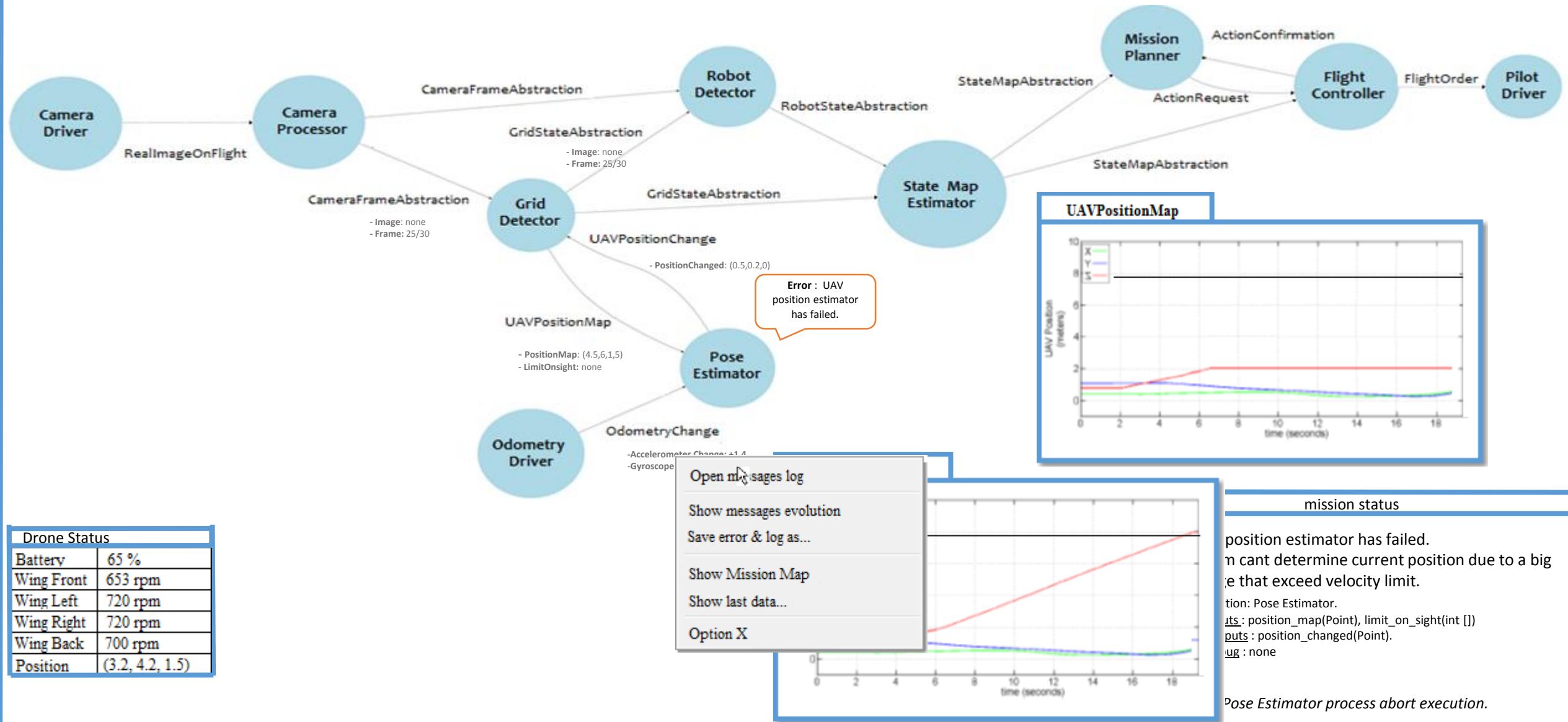
mission status

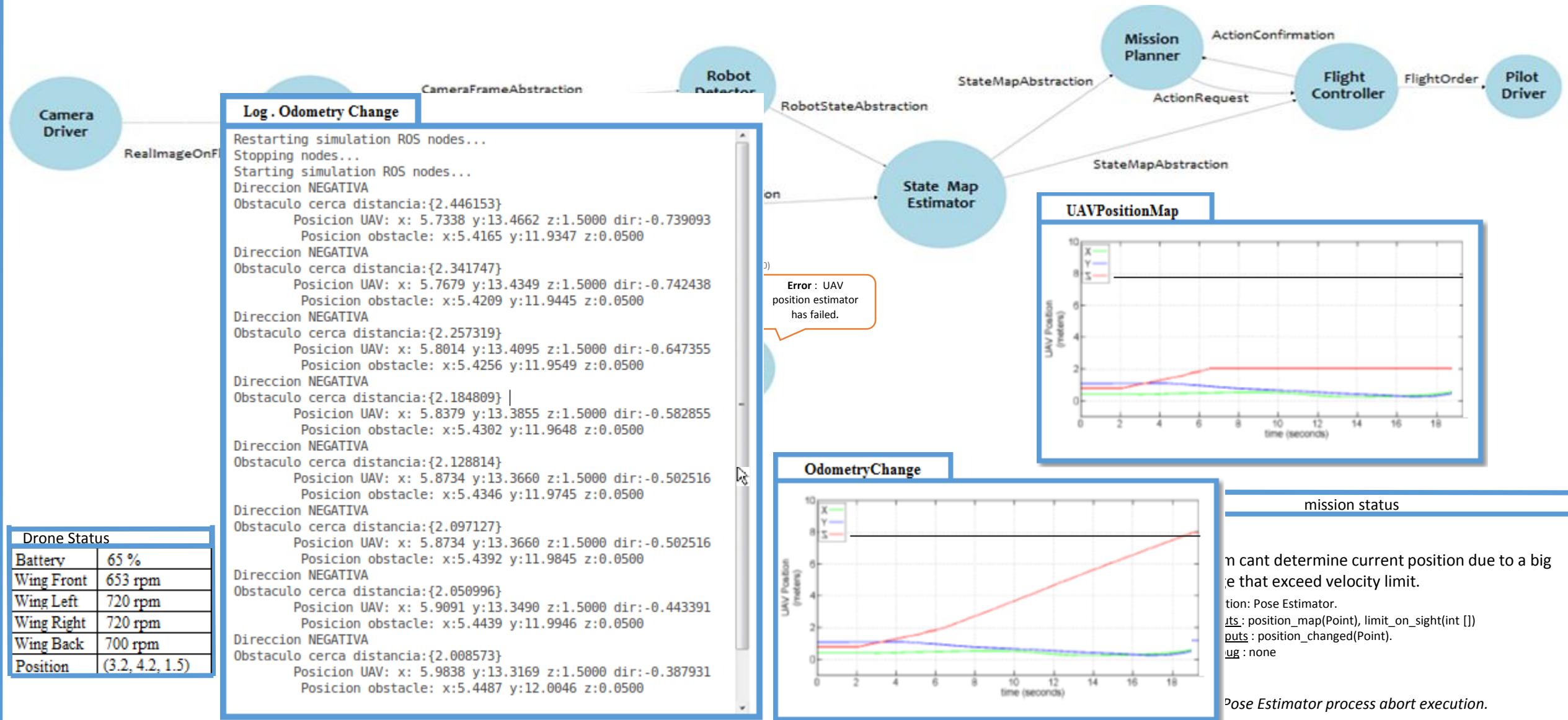
position estimator has failed.
can't determine current position due to a big
that exceed velocity limit.

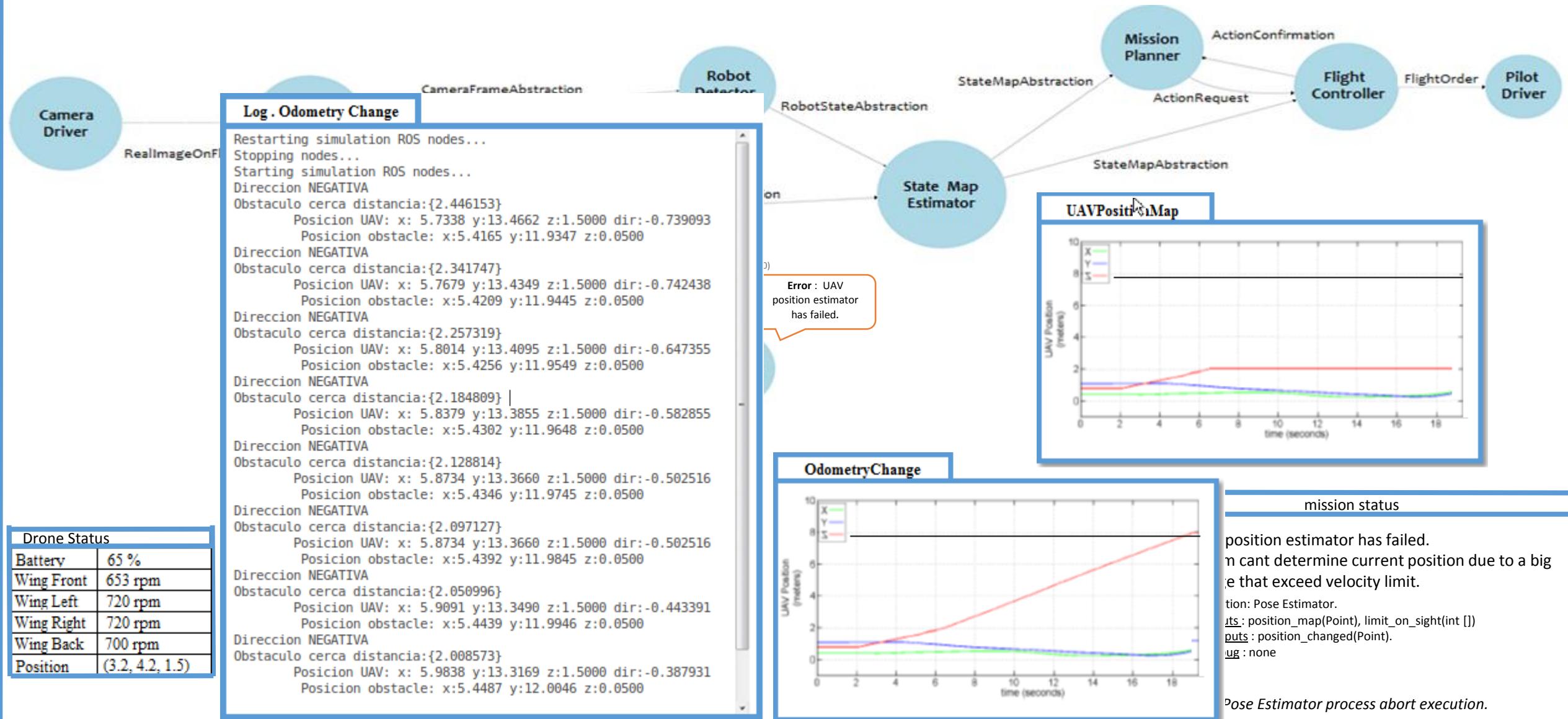
tion: Pose Estimator.
uts : position_map(Point), limit_on_sight(int [])
puts : position_changed(Point).
ug : none

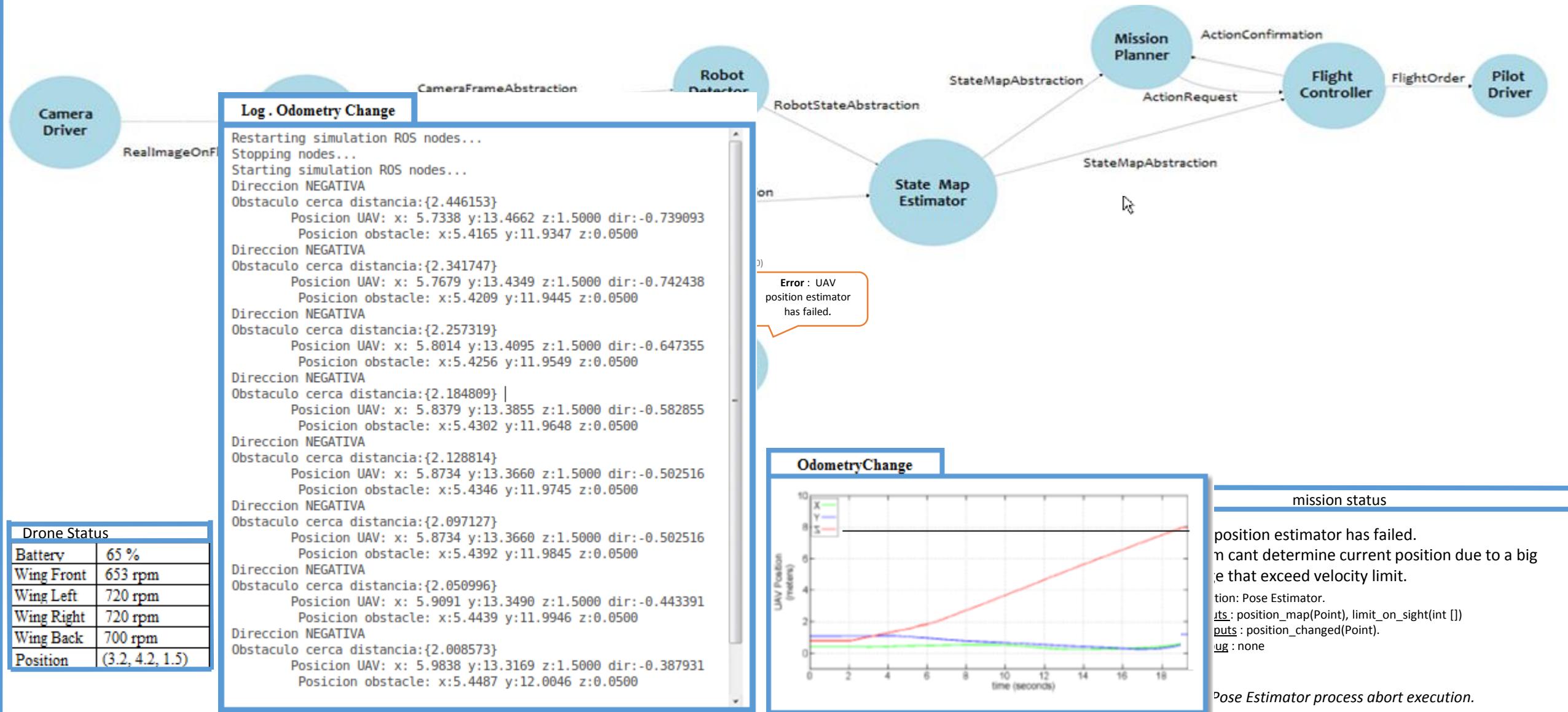
Pose Estimator process abort execution.











Error 1b: UAV position estimator has failed.

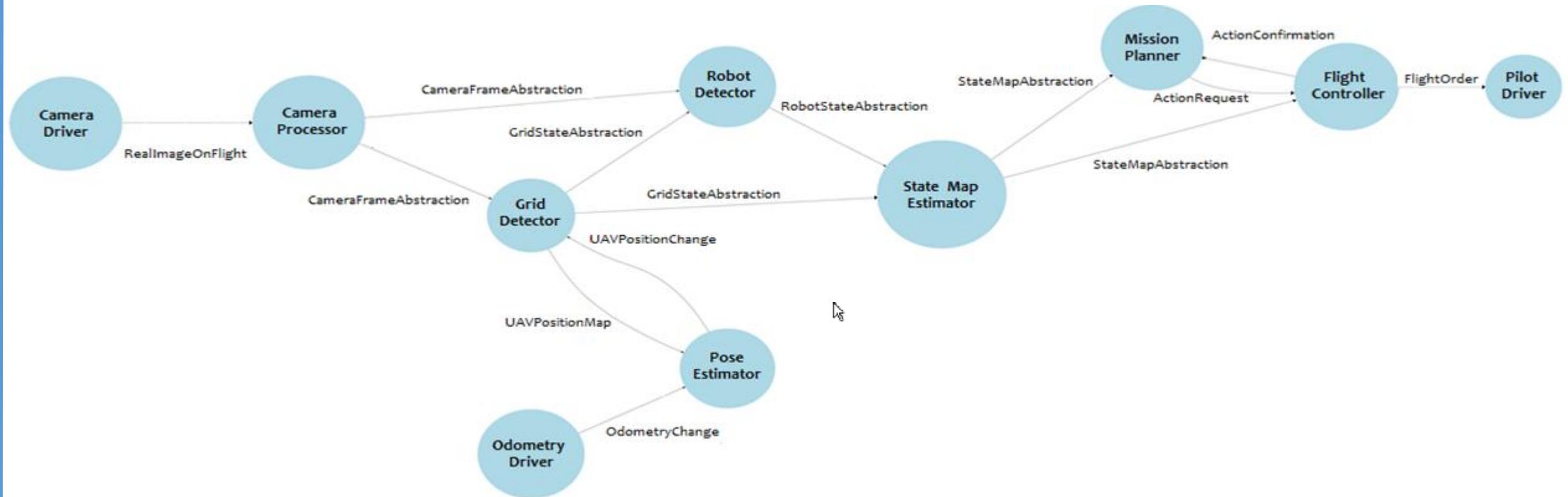
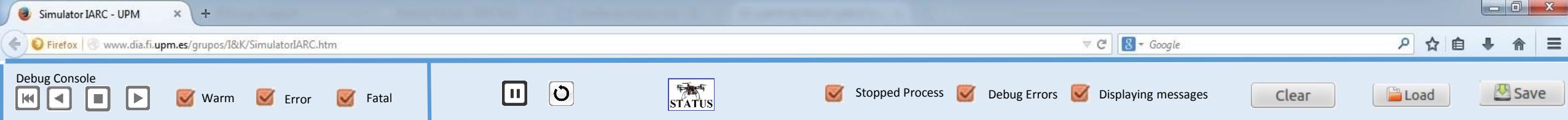
Possible Similar list Errors:

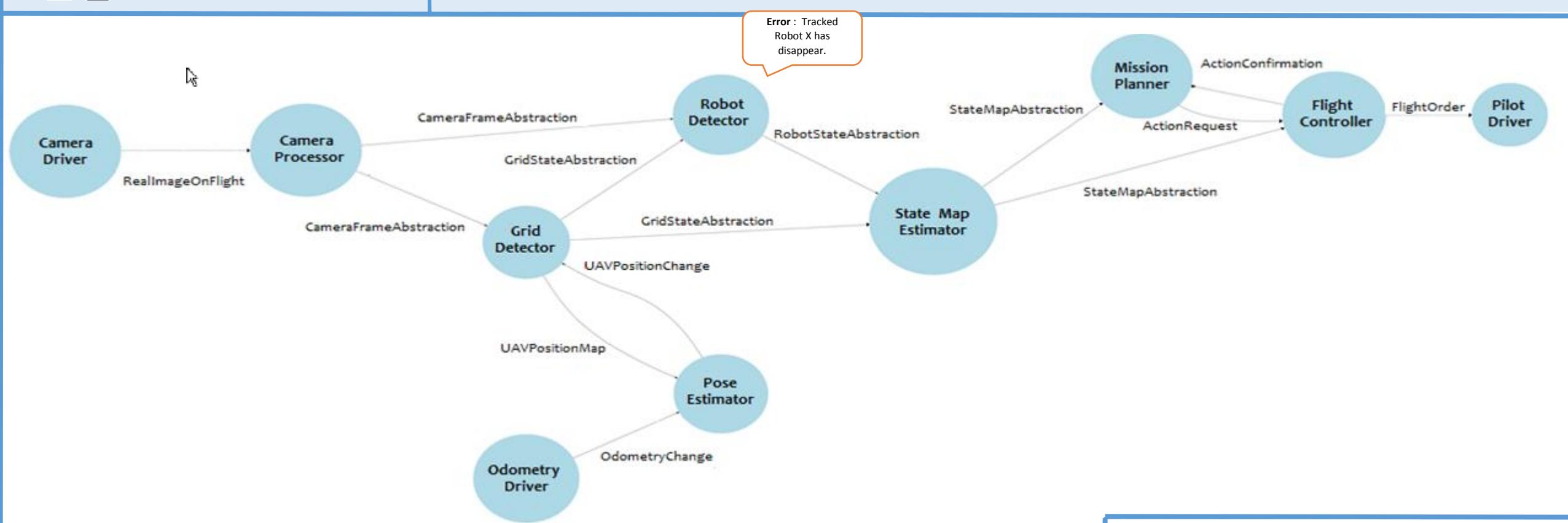
- *Odometry Driver could not be initialized.*
- *Odometry Driver has been restarted without permission.*
- *Odometry Driver process abort execution.*
- *OdometryChange is an empty message.*
- *Pose Estimator is a stop process and it has been restarted.*
- *Pose Estimator could not be initialized.*

Error Case 2b Simulation

Error Scene

UAV is tracking a robot and suddenly UAV stop and take other way due to a robot detector input failure.



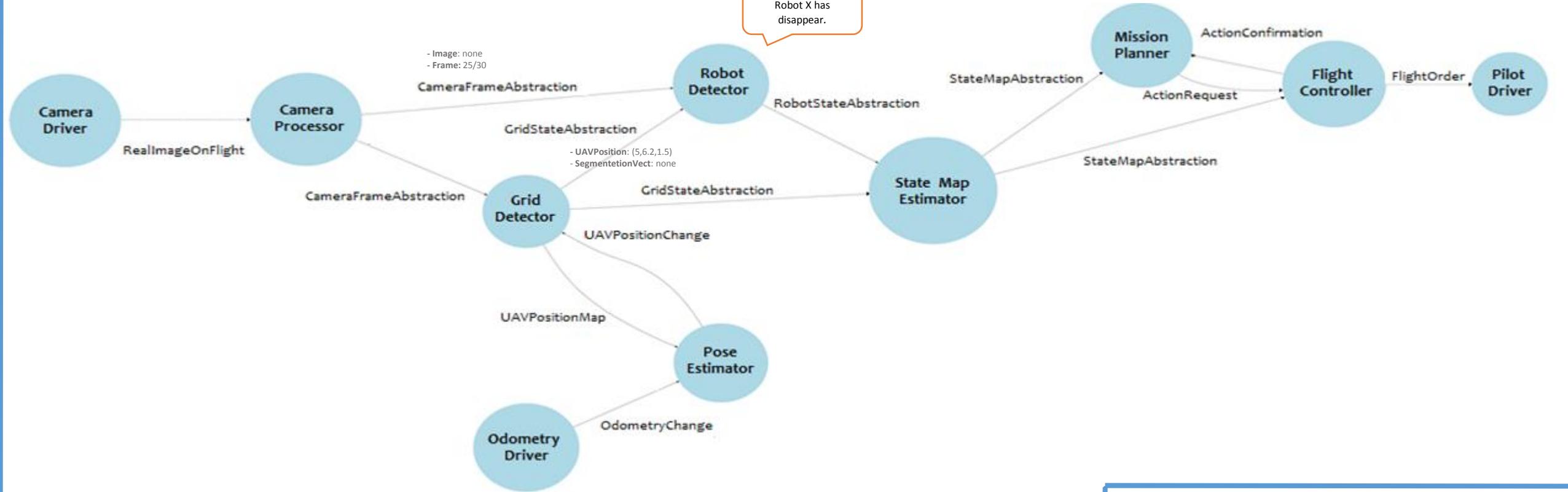
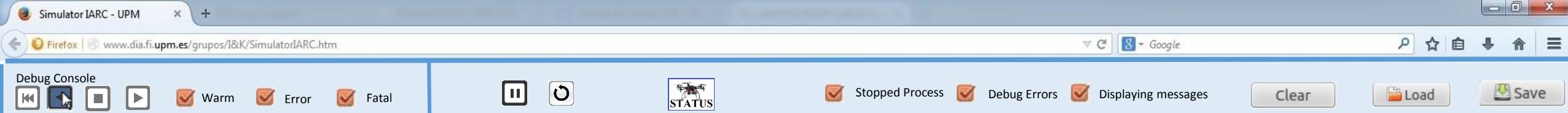


mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs : position_changed(Point).
Debug : none

Action: Exception was throw.

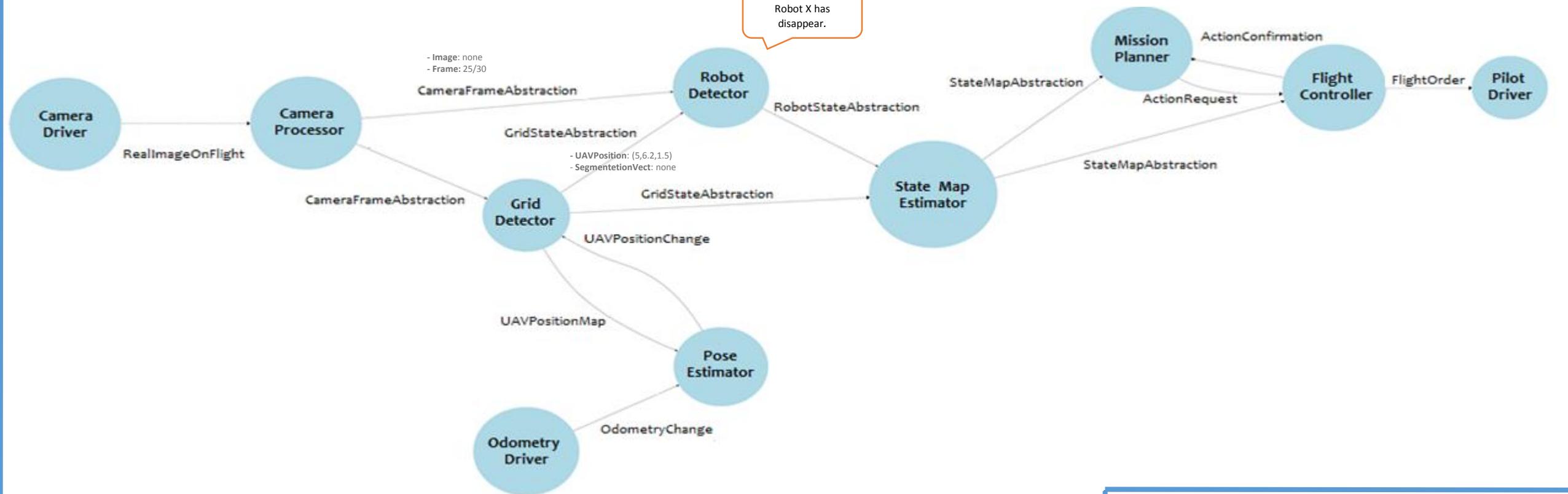
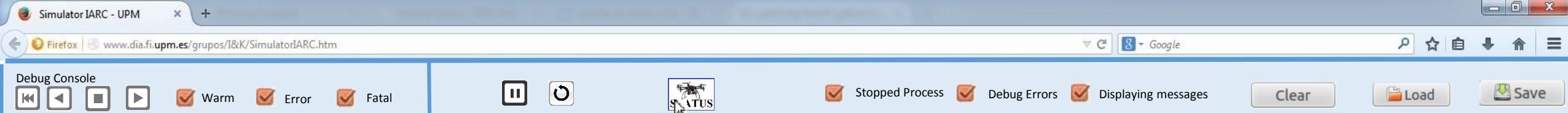


mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs : position_changed(Point).
Debug : none

Action: Exception was throw.

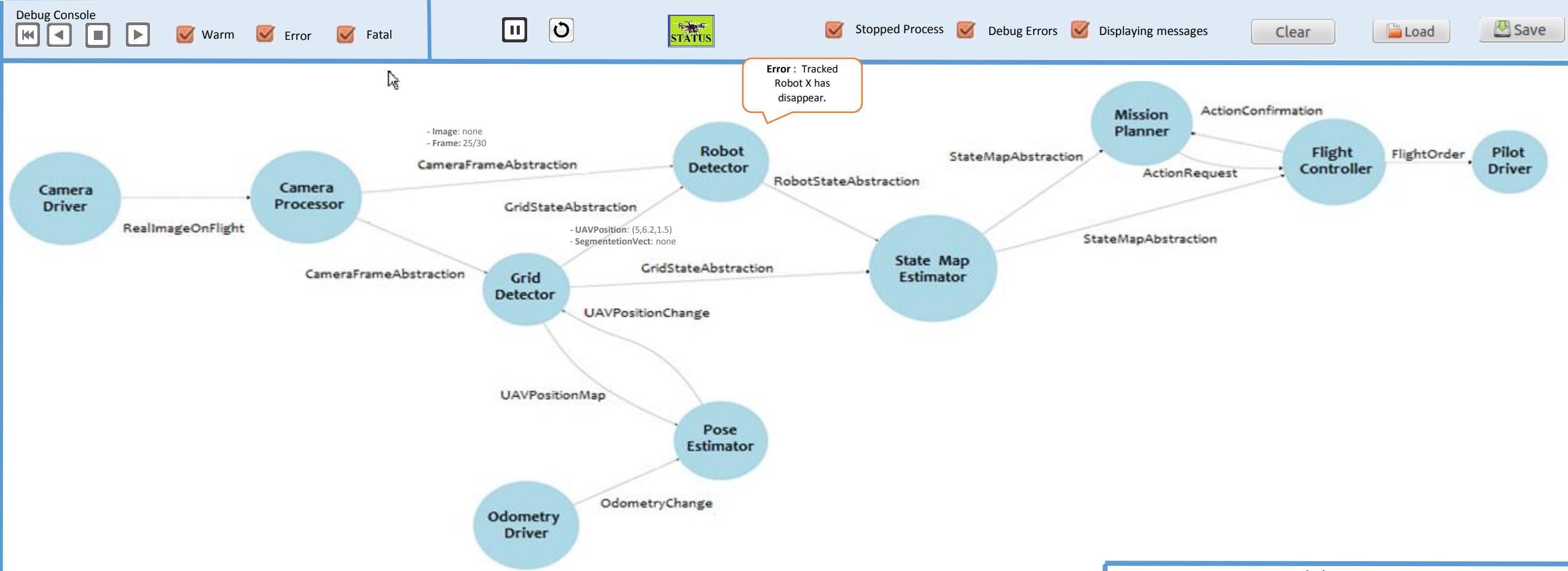


mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs : position_changed(Point).
Debug : none

Action: Exception was throw.



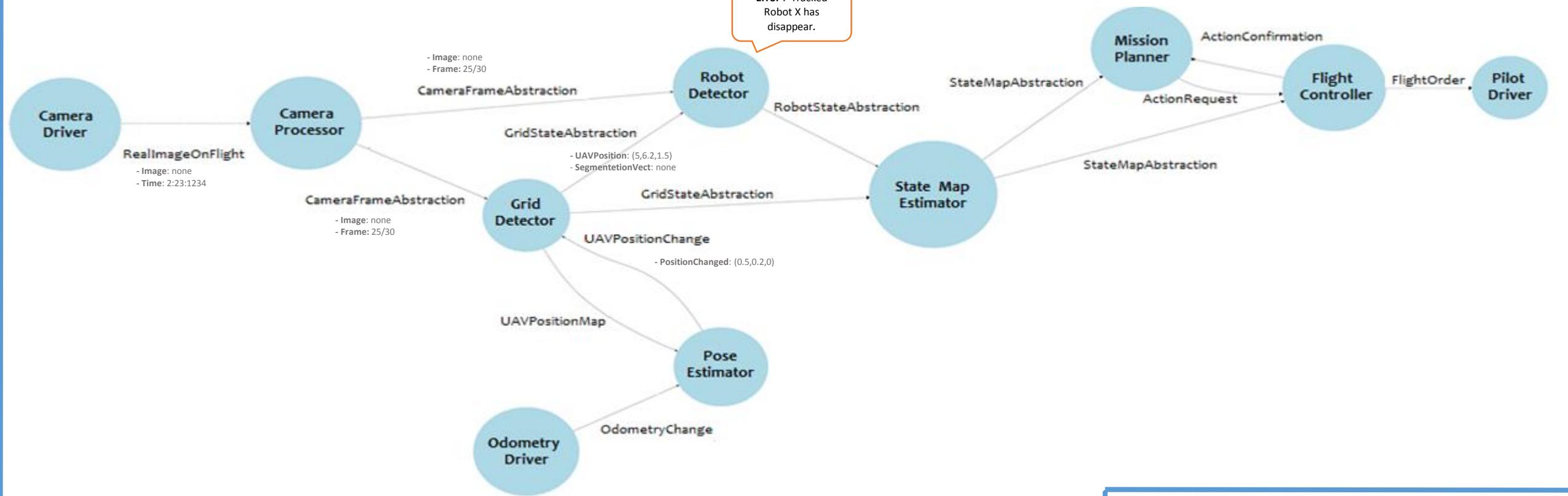
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs : position_changed(Point).
Debug : none

Action: Exception was throw.



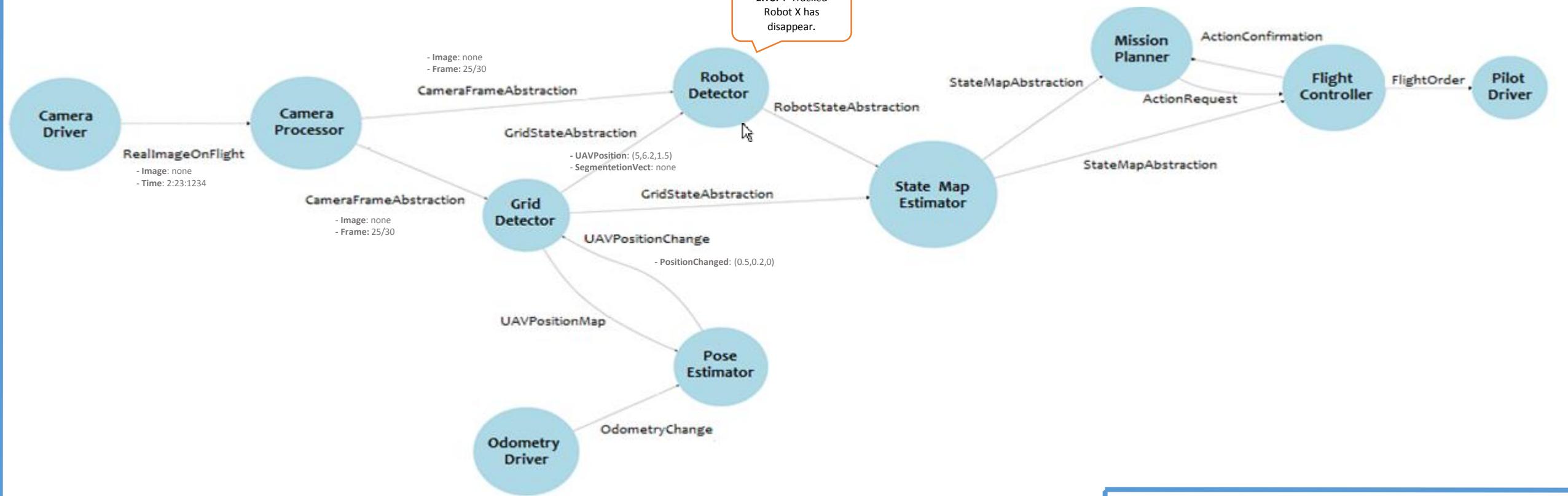
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs : position_map(Point), limit_on_sight(int [])
Outputs : position_changed(Point).
Debug : none

Action: Exception was throw.



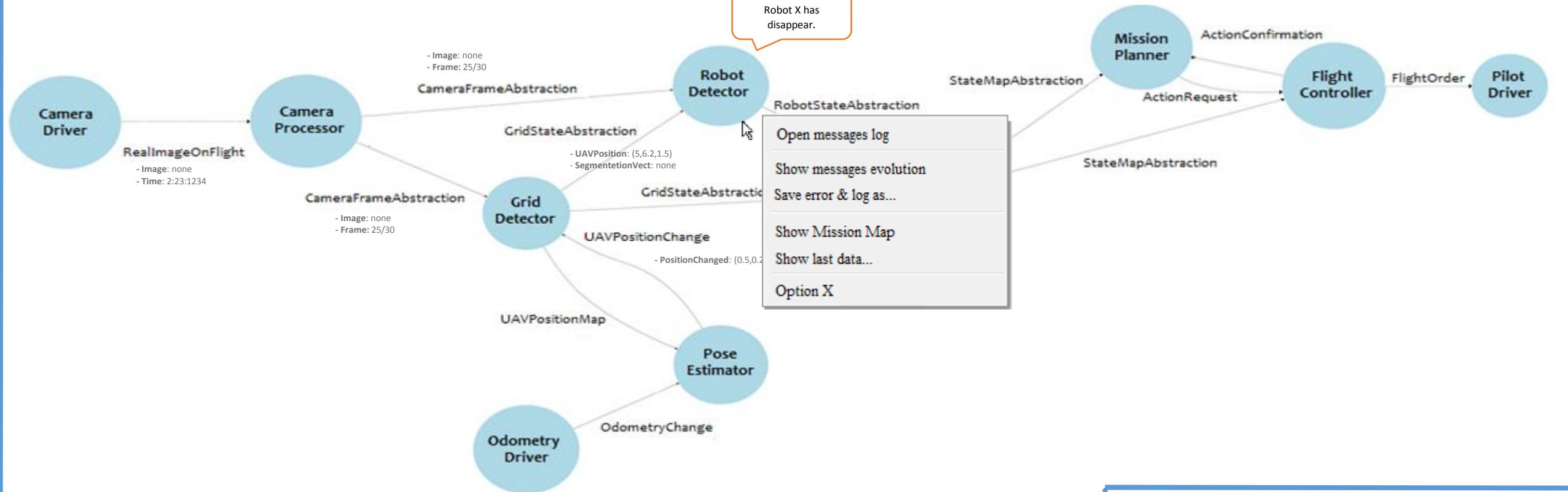
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs: position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Exception was throw.



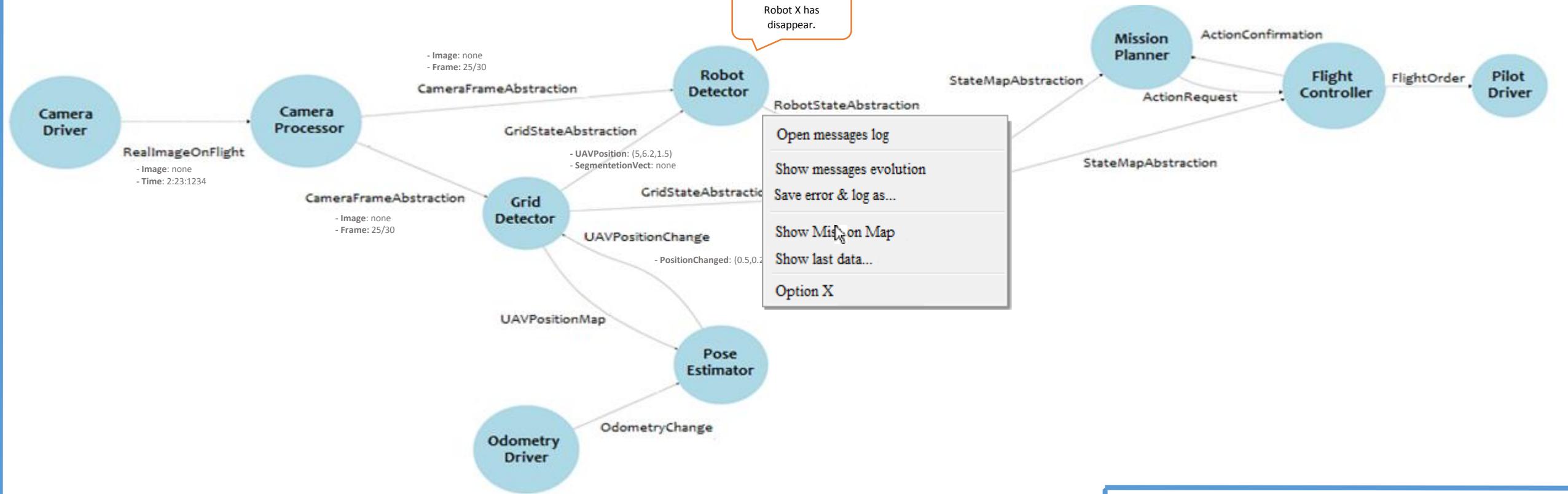
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs: position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Exception was throw.



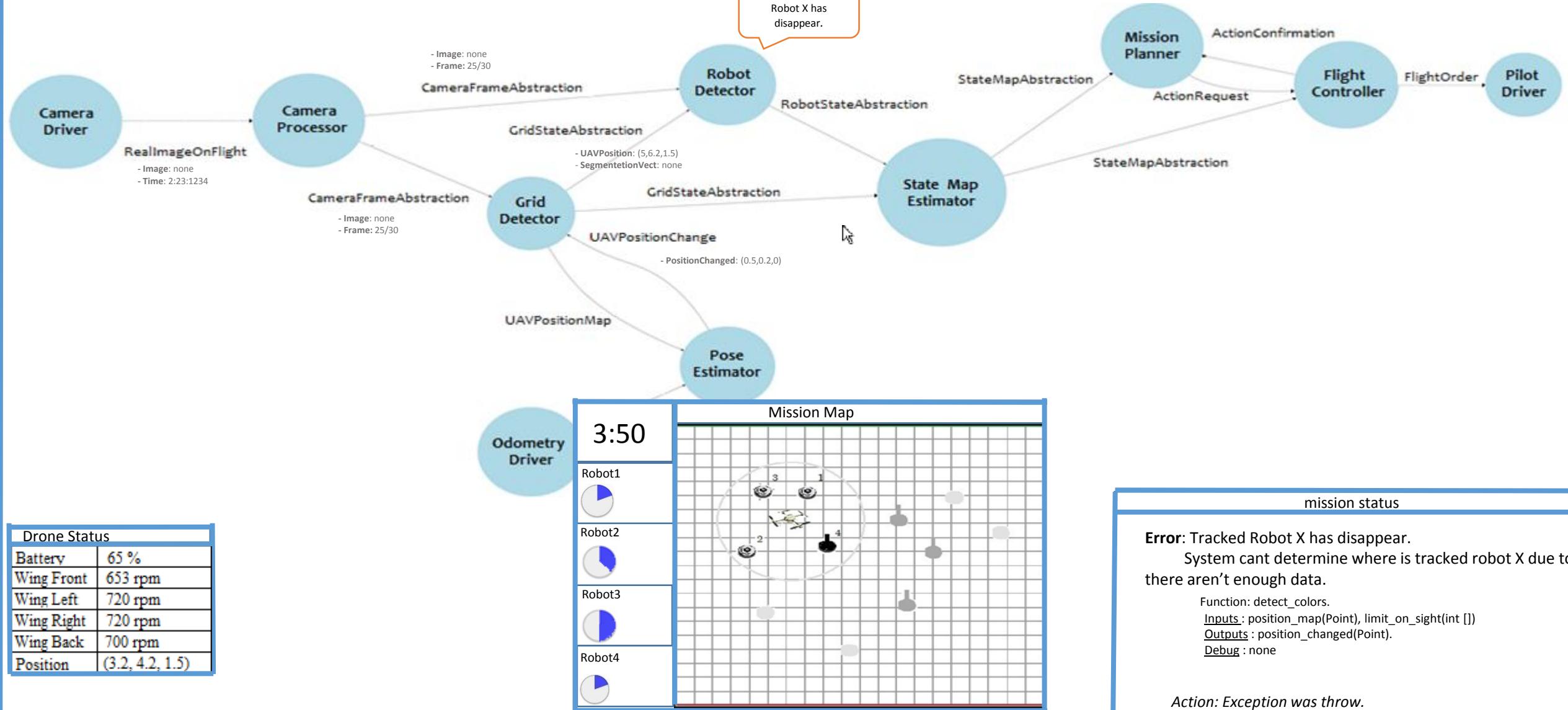
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

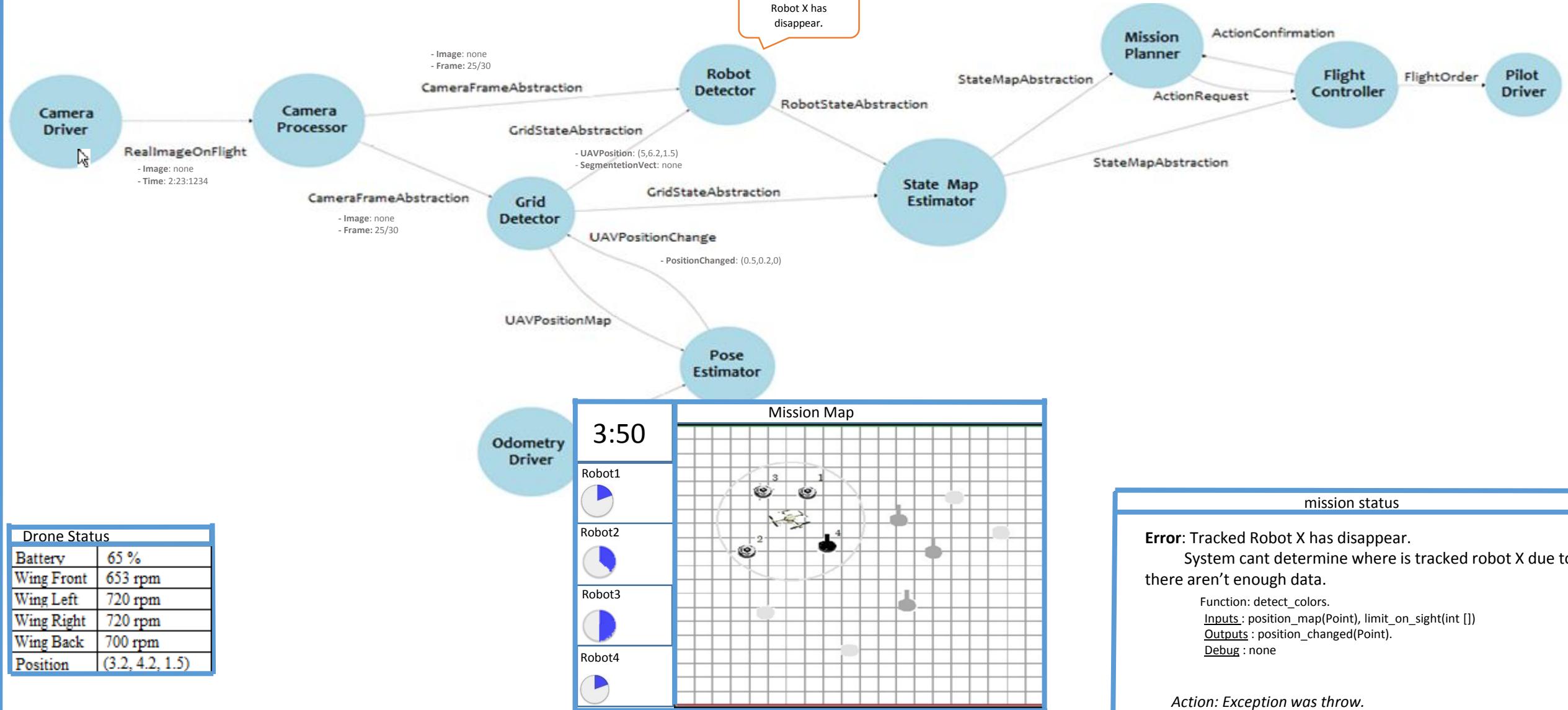
mission status

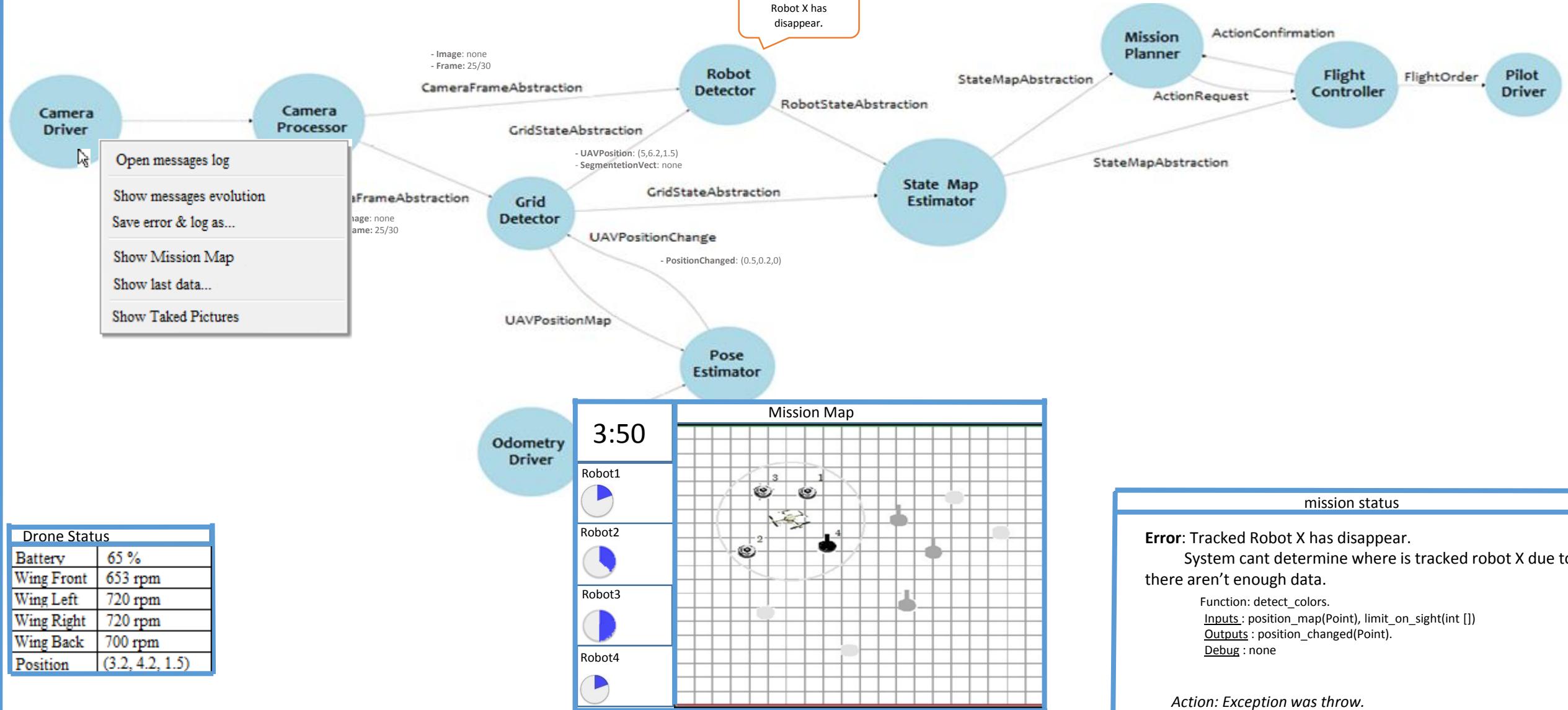
Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

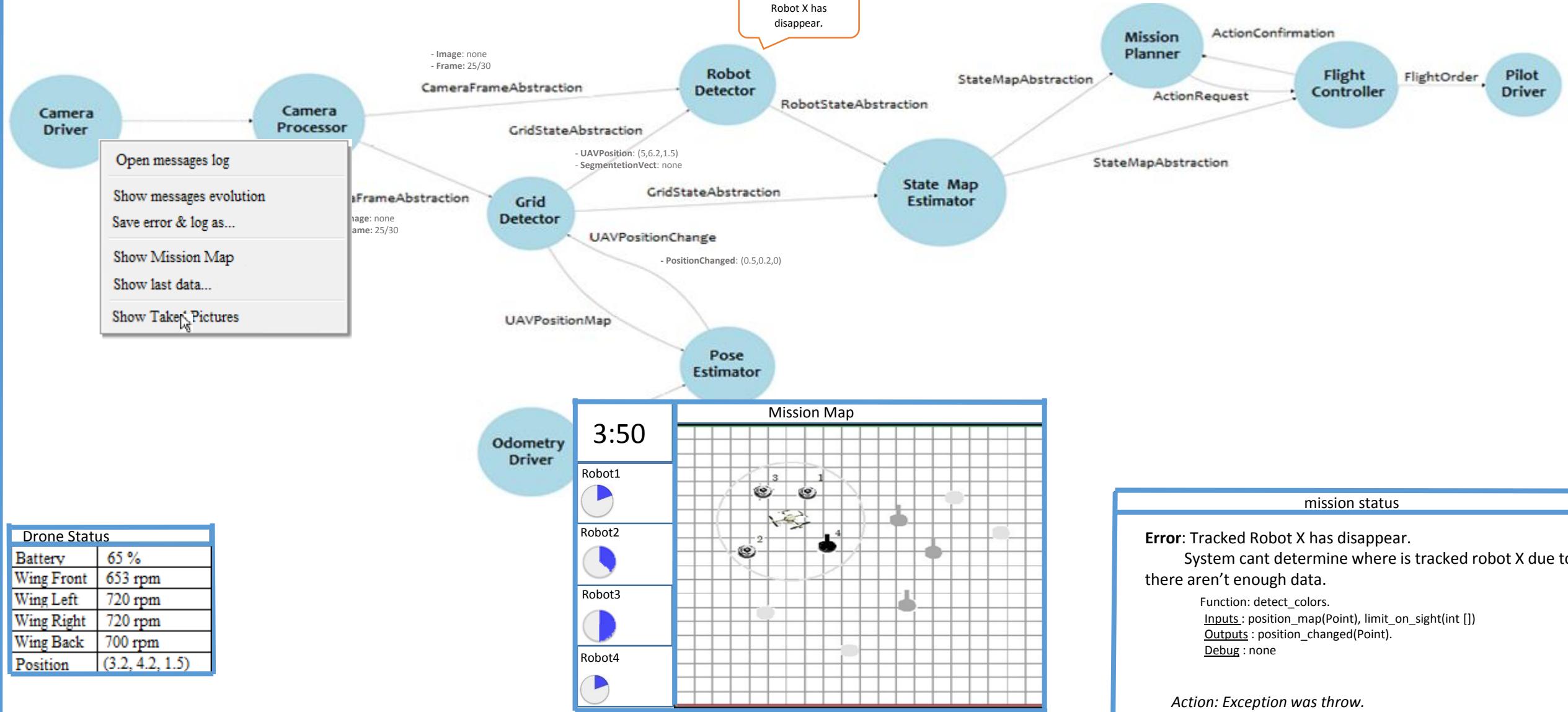
Function: `detect_colors`.
Inputs: `position_map(Point)`, `limit_on_sight(int [])`
Outputs: `position_changed(Point)`.
Debug: none

Action: Exception was throw.









Debug Console



Warm Error Fatal



Stopped Process

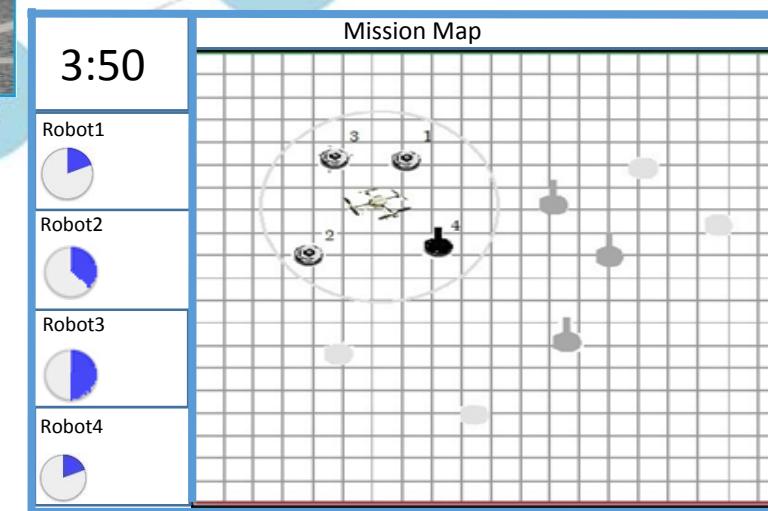
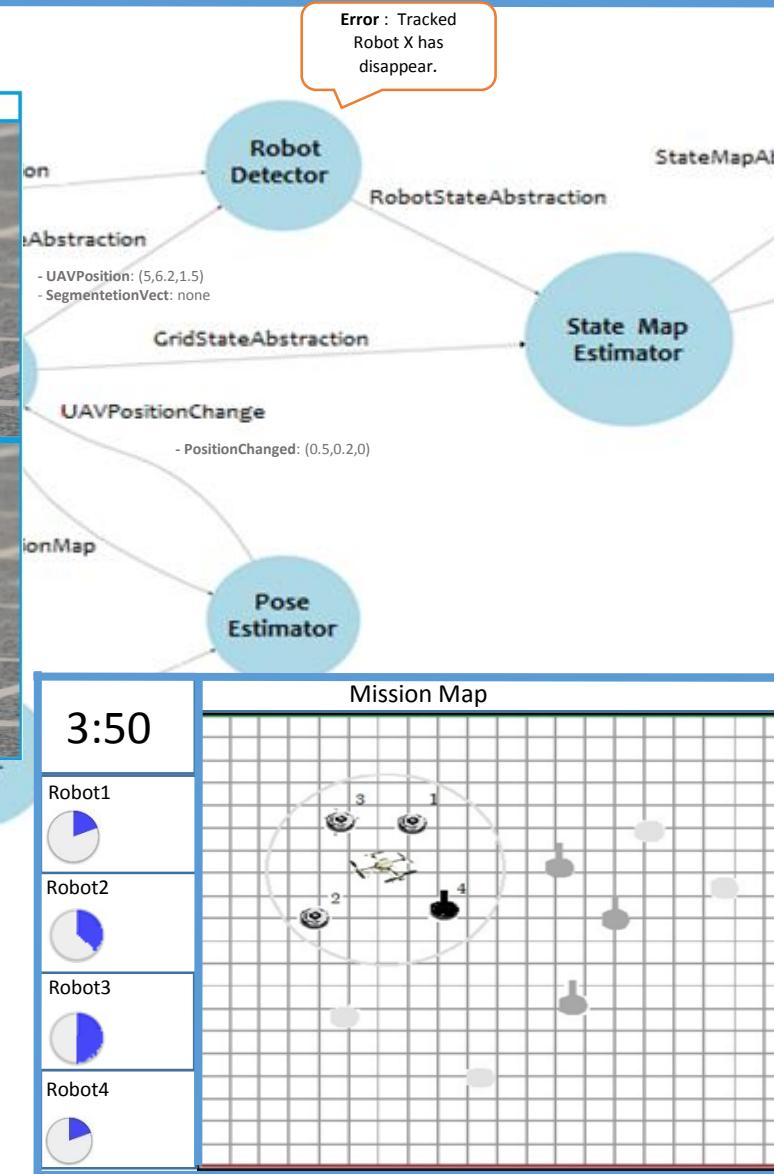
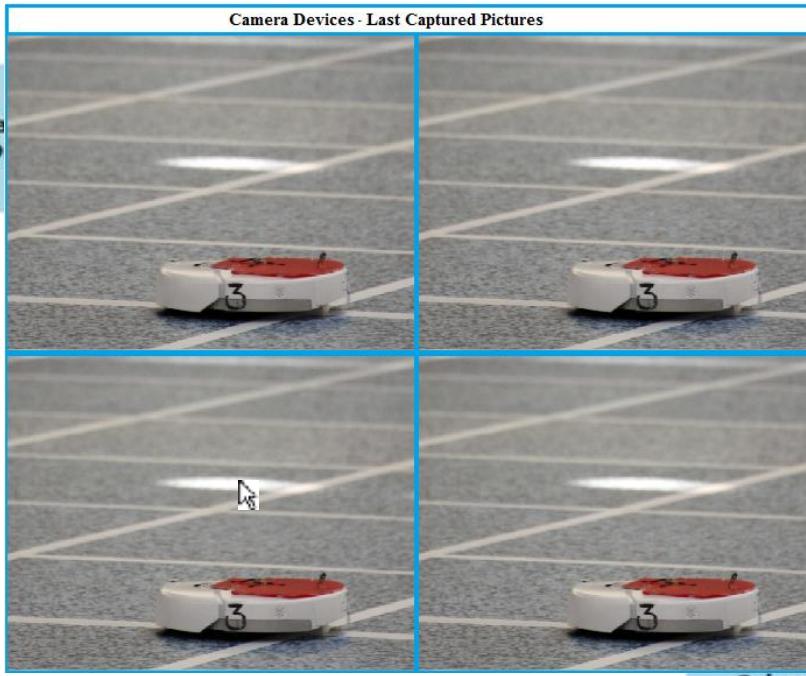
Debug Errors

Displaying messages

Clear

Load

Save



Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Error: Tracked Robot X has disappear.
System cant determine where is tracked robot X due to there aren't enough data.

Function: detect_colors.
Inputs: position_map(Point), limit_on_sight(int [])
Outputs: position_changed(Point).
Debug : none

Action: Exception was throw.

Error 2b: Tracked Robot X has disappear.

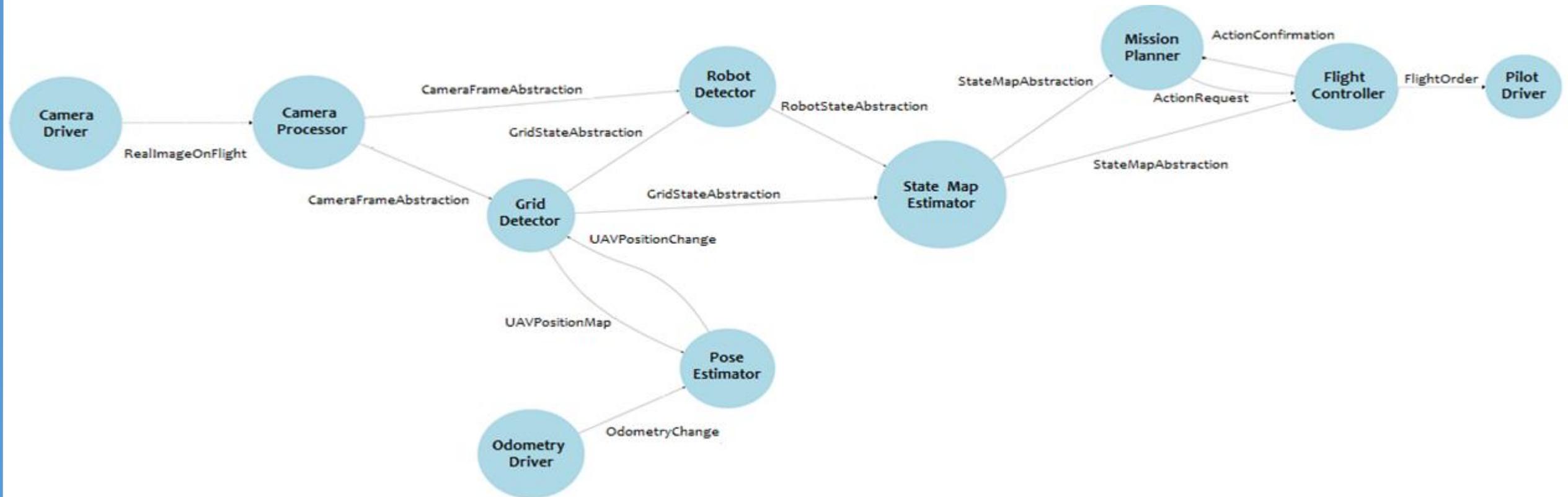
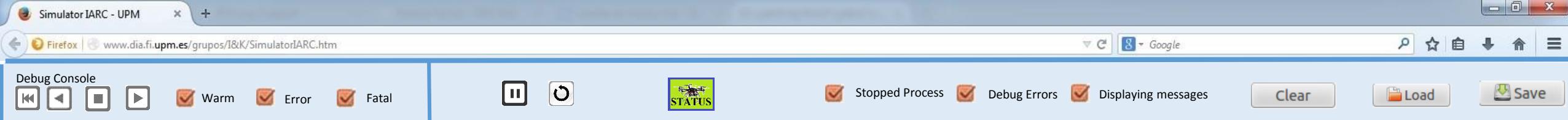
Possible Similar list Errors:

- *CameraFrameAbstraction is an empty message.*
- *No CameraFrameAbstraction has been sent.*
- *RobotDetector can not determine any robot in the frame.*
- *RobotDetector can not mark tracked robot in the map.*
- *RobotDetector algorithm has failed.*

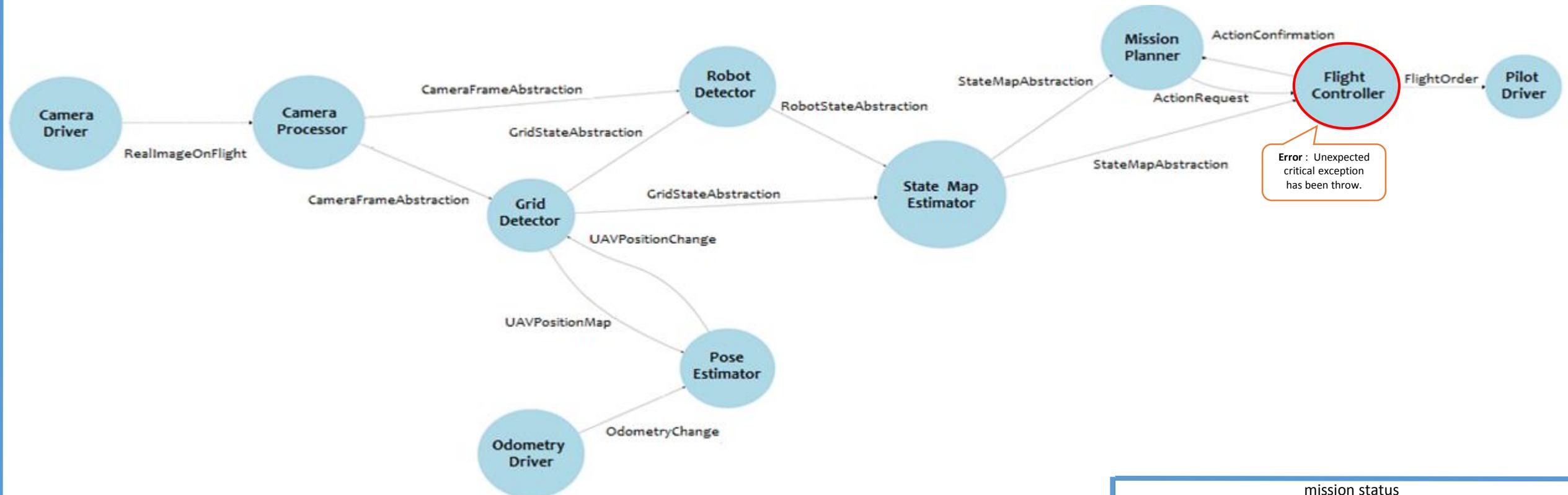
Error Case 3b Simulation

Error Scene

UAV is flying over the field and suddenly is going down or staying in a hover position without change or response. This is produced by a ROS failure in one or more nodes.



Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)



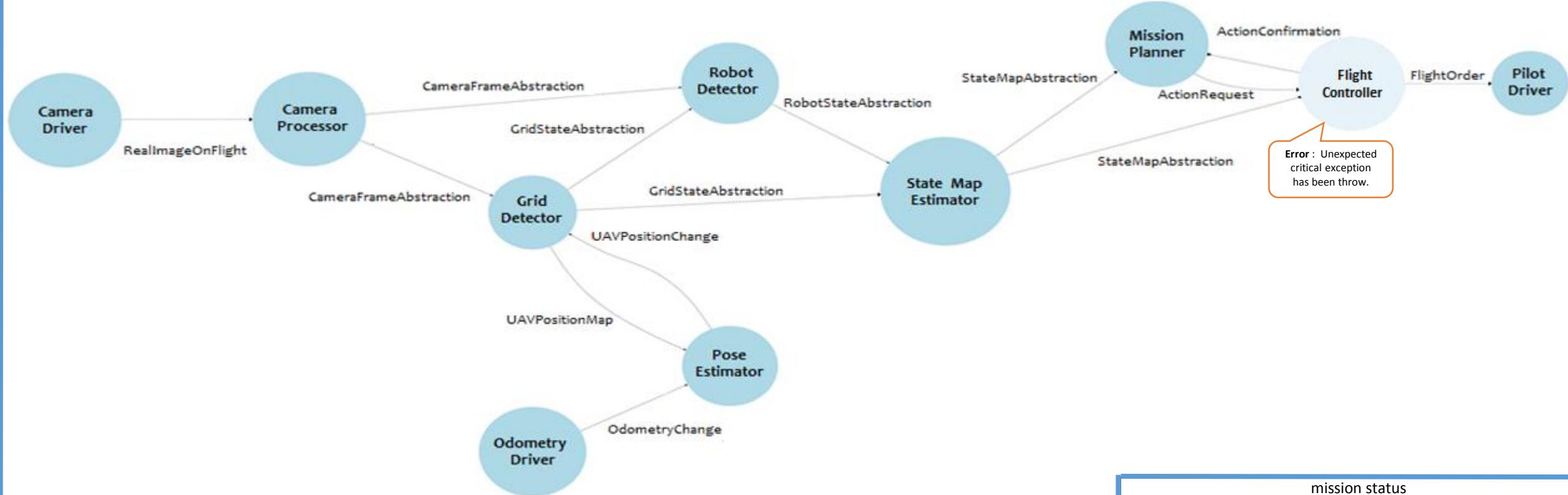
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Critical Error: Unexpected exception has been throw.
ROS runtime environment did not respond and limit time has been reached.

Function: act.
Inputs: uav (uavState), targets (TargetRobotState[]), obstacles(ObstacleRobotState[]) ()perception_state,
Outputs: status(int).
Debug : none

Action: All processes have died.



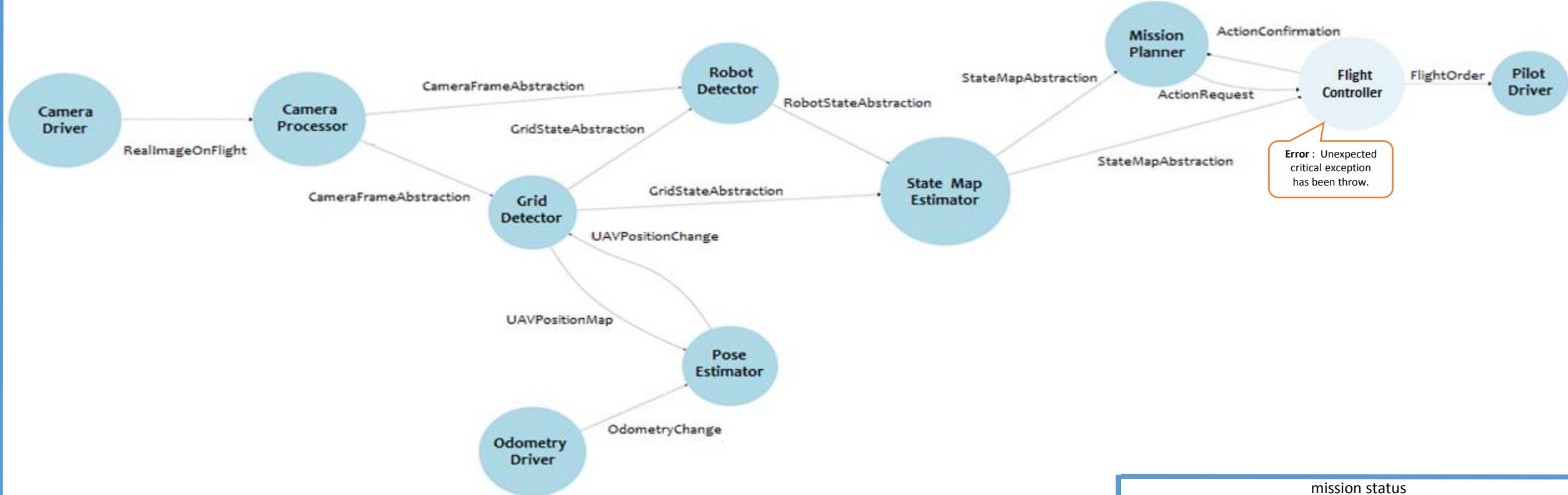
Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Critical Error: Unexpected exception has been throw.
ROS runtime environment did not respond and limit time has been reached.

Function: act.
Inputs: uav (uavState), targets (TargetRobotState[]), obstacles(ObstacleRobotState[]) ()perception_state,
limit_on_sight(int [])
Outputs: status(int).
Debug : none

Action: All processes have died.



Drone Status	
Battery	65 %
Wing Front	653 rpm
Wing Left	720 rpm
Wing Right	720 rpm
Wing Back	700 rpm
Position	(3.2, 4.2, 1.5)

mission status

Critical Error: Unexpected exception has been throw.
ROS runtime environment did not respond and limit time has been reached.

Function: act.
Inputs : uav (uavState), targets (TargetRobotState[]), obstacles(ObstacleRobotState[]) ()perception_state,
limit_on_sight(int [])
Outputs : status(int).
Debug : none

Action: All processes have died.

Error 3b: Unexpected exception has been throw.

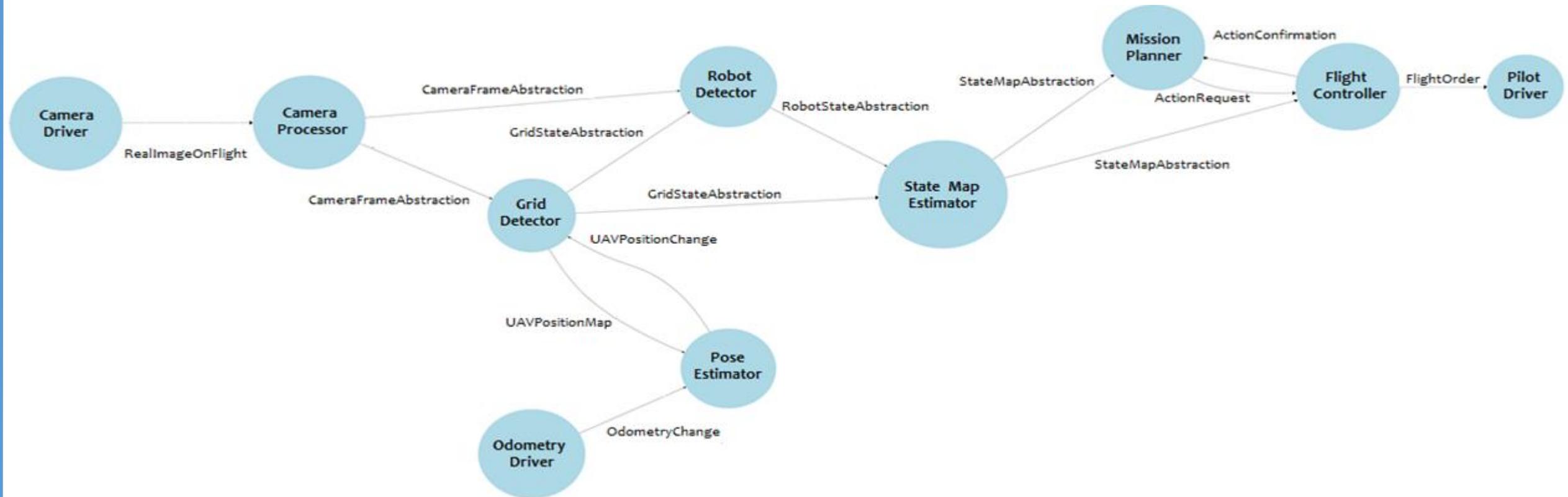
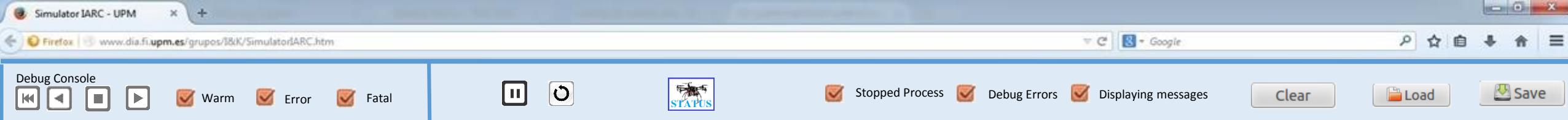
Possible Similar list Errors:

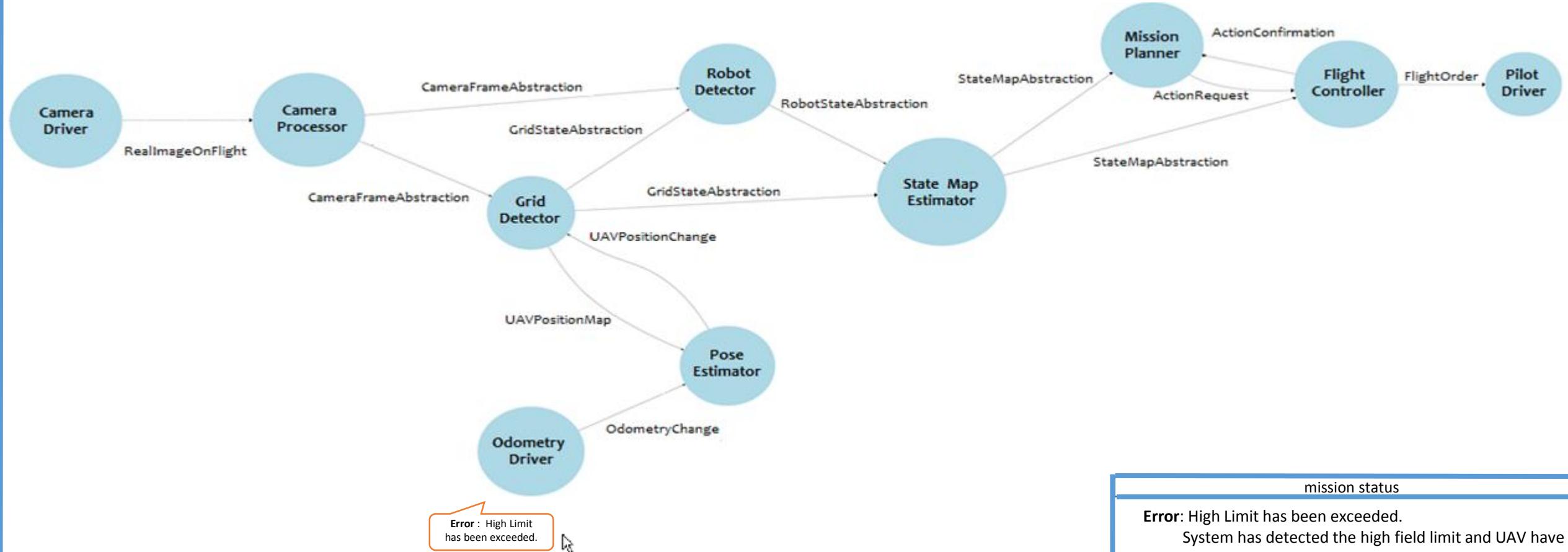
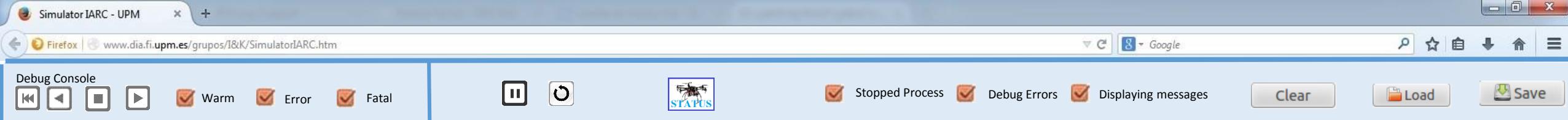
- *ROSSystem has been stoped.*
- *ROSSystem can not send or receive any message on port X.*
- *ROSCore has already been lunched and just can be once at same time.*
- *ROSSystem was killed by user.*

Error Case 4b Simulation

Error Scene

UAV is flying over the field and suddenly go up and exceeds the high limit. High Sensor failed and produced an unespected action.



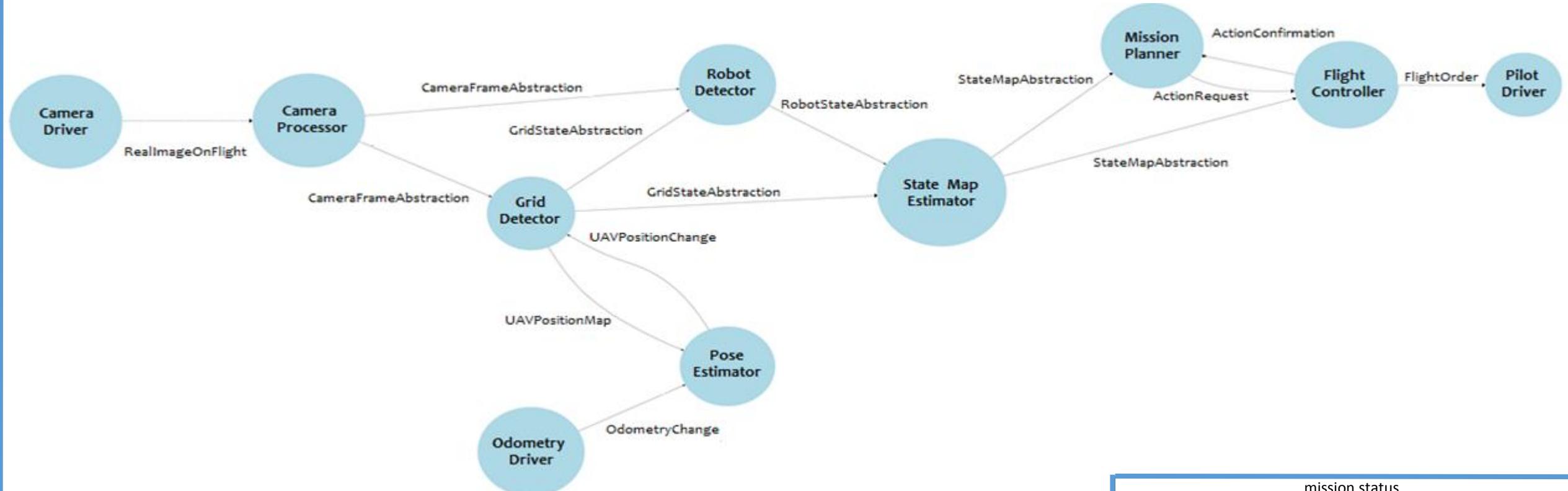


mission status

Error: High Limit has been exceeded.
System has detected the high field limit and UAV have to go down immediatly ROS runtime environment did not respond and limit time has been reached.

Function: receiveRay.
Inputs : double time
Outputs : status(int).
Debug : none

Action: UAV force to land.



Error : High Limit has been exceeded.

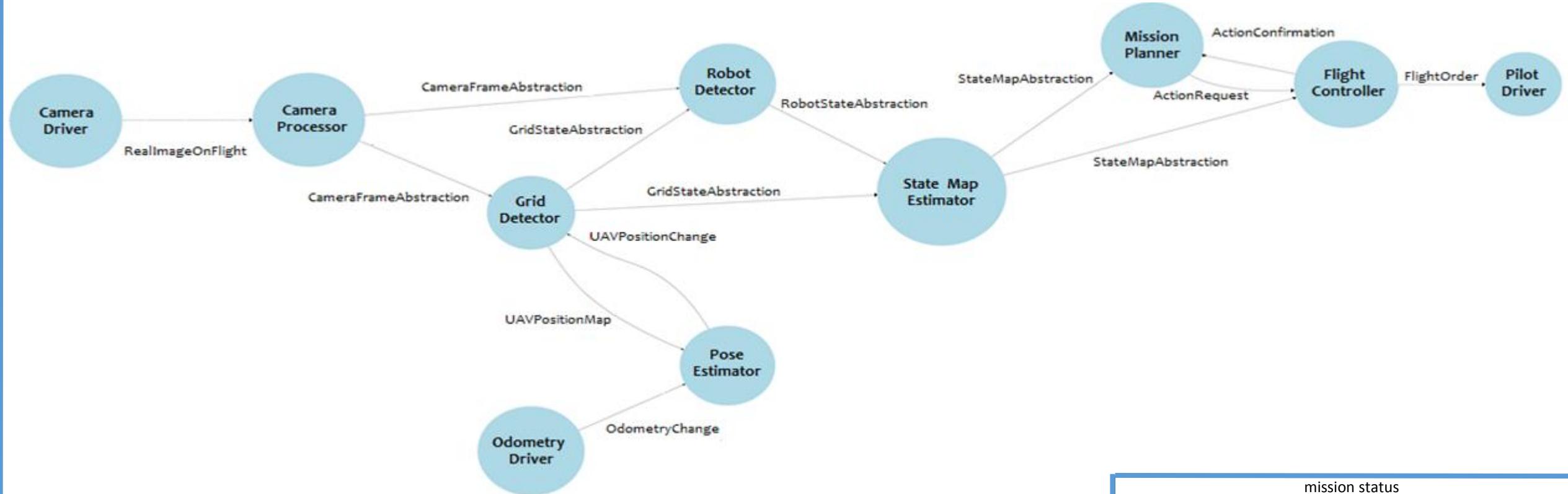
- [Open messages log](#)
- [Show messages evolution](#)
- [Save error & log as...](#)
- [Show Mission Map](#)
- [Show last data...](#)
- [Option X](#)

mission status

Error: High Limit has been exceeded.
System has detected the high field limit and UAV have to go down immediatly ROS runtime environment did not respond and limit time has been reached.

Function: `receiveRay`.
Inputs : double time
Outputs : status(int).
Debug : none

Action: UAV force to land.



Error : High Limit has been exceeded.

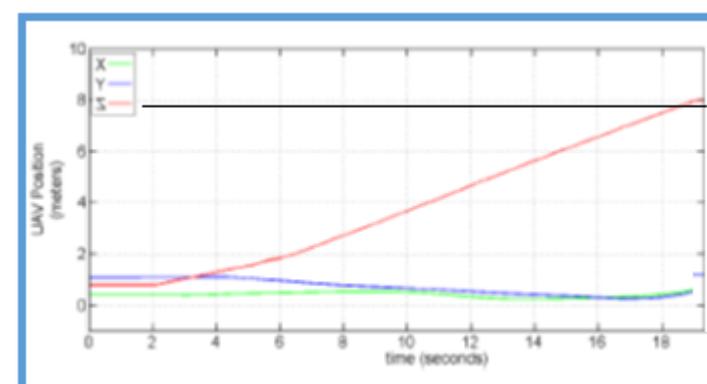
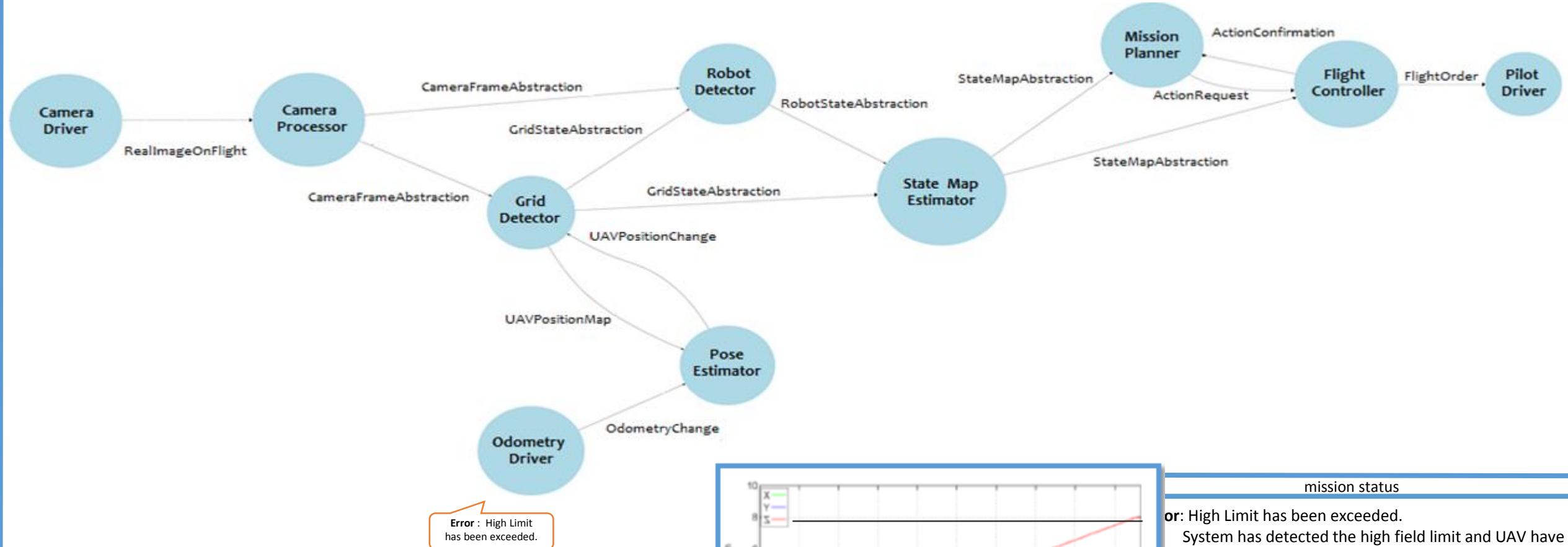
- [Open messages log](#)
- [Show messages evolution](#)
- [Save error & log as...](#)
- [Show Mission Map](#)
- [Show last cfa...](#)
- [Option X](#)

mission status

Error: High Limit has been exceeded.
System has detected the high field limit and UAV have to go down immediatly ROS runtime environment did not respond and limit time has been reached.

Function: receiveRay.
Inputs : double time
Outputs : status(int).
Debug : none

Action: UAV force to land.



mission status
or: High Limit has been exceeded.
System has detected the high field limit and UAV have go down immediately ROS runtime environment did not pond and limit time has been reached.

Function: receiveRay.
Inputs : double time
Outputs : status(int).
Debug : none

Action: UAV force to land.

Error 4b: High Limit has been exceeded.

Possible Similar list Errors:

- *Odometry Driver has lost the high reference.*
- *Odometry Driver has receive date out of range.*
- *Odometry Driver can not determine current position.*

Questions We have

- How uav CPU and assistant CPU distribute workload.
- Size of final messages and size of uav memory (if it have).
- CPU power can we use in uav and commucation WIFI.
- Tools used in Vision4AUV.
- Other uses that you will need.

ANNEX: Others Designes

First Design

Simulator IARC - UPM

Firefox www.dia.fi.upm.es/grupos/I&K/SimulatorIARC.htm Google

flight_controller

- mov. graph
- graph1
- graph2
- graph3
- pos. graph
- vel. graph

perception_system

mission_planner

simulator_scene

message map

```

    graph TD
        PS((Perception_system)) -- "/Perceived_state" --> FC((Flight_controller))
        PS -- "/Simulated_state" --> SS((Scene_simulator))
        FC -- "/Action_request" --> MP((Mission_planner))
        MP -- "/Actor_confirmation" --> FC
        SS -- "/Pose_changes" --> FC
        SS -- "/Simulated_state" --> SD((Scene_drawer))
    
```

log tasks

- >Action 1: Find
- >Action 2: Find
- >Action 3: Find
- >Action 4: GetClose
 - robotID: 1
- >Action 5: GetClose
 - robotID: 1
- >Action 6: GetClose
 - robotID: 1
- >Action 7: Touch
 - robotID: 1

mission map

Object properties

1		Position: (8.66,15.8) Time to reach: 4.124 Out: False Reached collided: False Reached cycle: End Reached direction: N Data timestamp: 15.281 Dangerous pos: False
2		Position: (8.66,15.8) Time to reach: 4.124 Out: False Reached collided: False Reached cycle: End Reached direction: N Data timestamp: 15.281 Dangerous pos: False
3		Position: (8.66,15.8) Time to reach: 4.124 Out: False Reached collided: False Reached cycle: End Reached direction: N Data timestamp: 15.281 Dangerous pos: False
4		Position: (8.66,15.8) Time to reach: 4.124 Out: False Reached collided: False Reached cycle: End Reached direction: N Data timestamp: 15.281 Dangerous pos: False

mission status

STATE : perception error in camera 3.

parameters:

light intensity : 0.14
frequency

flight_controller

wings rpm - graph1

Bode Diagram

Magnitude (dB)

Phase (deg)

Frequency (Hz)

reserved_node

- graph 2

noise

15%

high

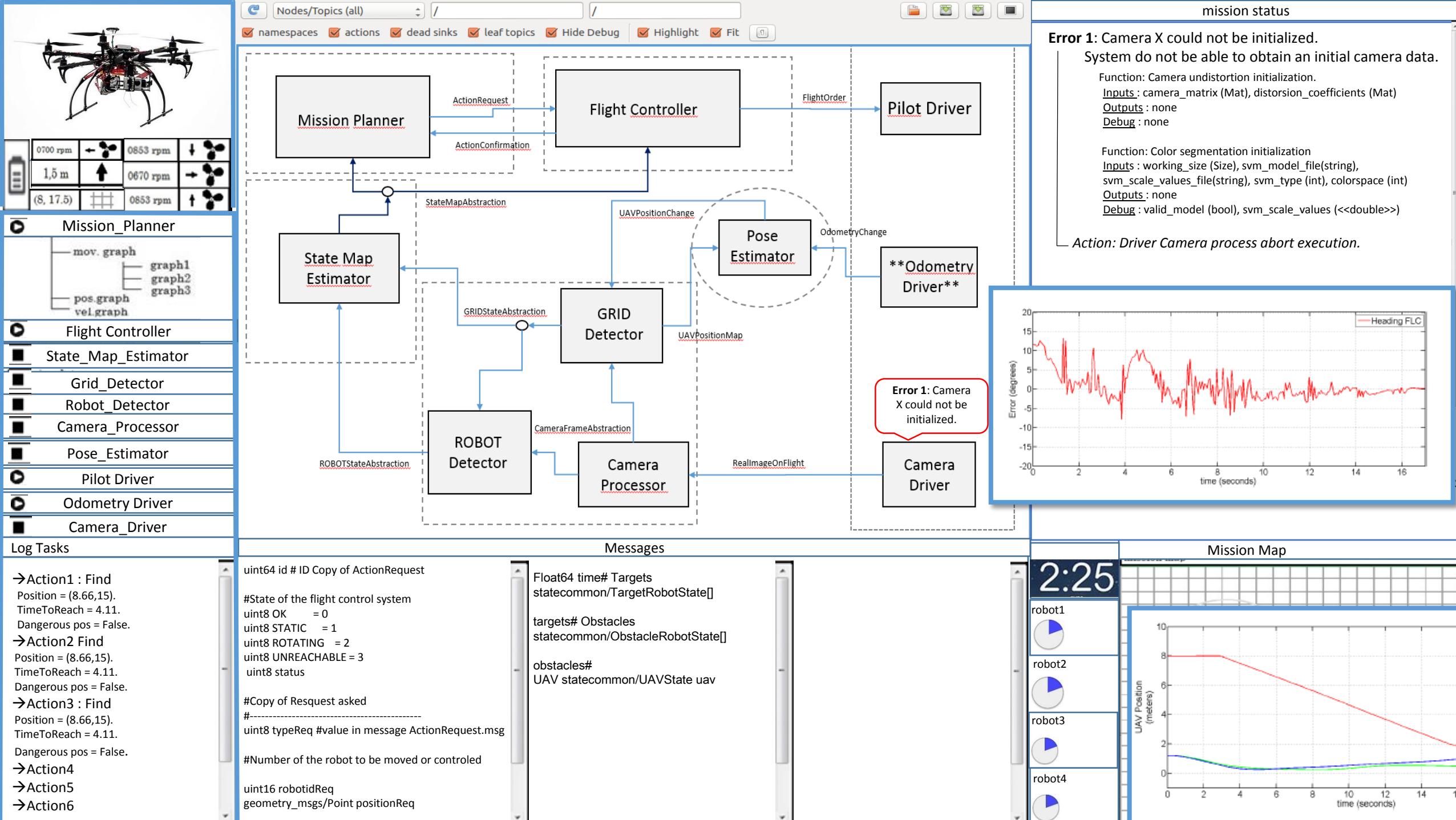
15%

light Intensity

noise - graph 1

light Intensity - graph 1

Second Design



Third Design

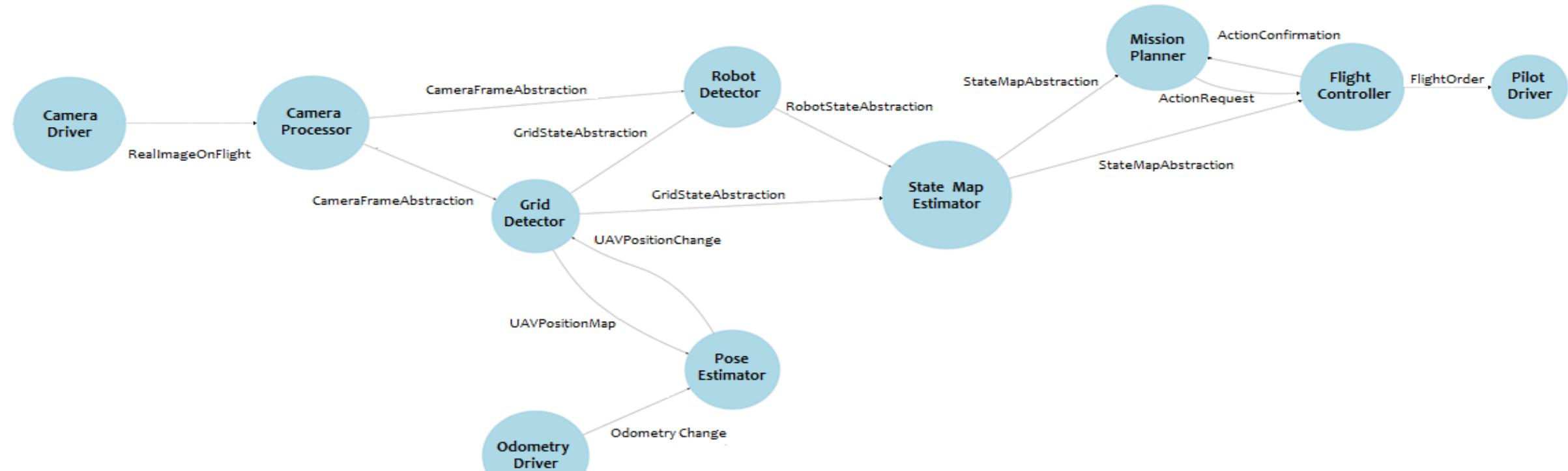

 Warm Error Fatal

 Stopped Process Debug Errors Displaying messages

Clear

Load

Save

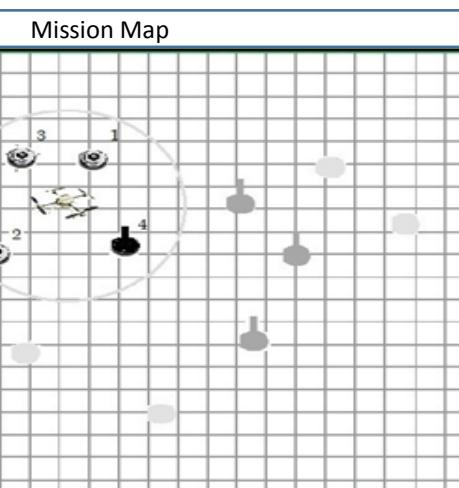


Drone Status	
 65% 0 rpm 0 rpm 0 m 0 rpm (10, 0) 0 rpm	

Log Tasks	
<ul style="list-style-type: none"> →Action1 : Find Position = (8.66,15). TimeToReach = 4.11. Dangerous pos = False. →Action2 Find Position = (8.66,15). TimeToReach = 4.11. Dangerous pos = False. →Action3 : Find Position = (8.66,15). TimeToReach = 4.11. Dangerous pos = False. →Action4 →Action5 →Action6 	

mission status

TIME
0:00
Robot 1
Robot 2
Robot 3
Robot 4



Vision System Errors and Example Monitor Performance in Real Environment

Simulated Environment	Real Environment
<ul style="list-style-type: none"> + We can select the process that we want to initialise. + We can stop and restart process in execution time. + Programmers could visualize message in order to respond and identify themselves errors. 	<ul style="list-style-type: none"> + We can select the process that we want to initialise. - We can stop and restart process in execution time. - Programmers could not have enough time to visualize message in order to respond and identify themselves errors. - Solution1: Save in a file messages and errors. But with this solution we can not solve errors in execution time.... - Solution2: Monitoring tool could have predefinite actions to solve basic errors. → Difficulty: Monitoring tool should be able to make difference between several errors and act accordingly.