STPA analysis of Sample Analysis

Just an example of analisys

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Step One - Purpose of the Analysis

Goals

G-1: Goal One

Assumptions

A-1: Assumption One

Losses

L-1: Loss One

L-2: Loss Two

System-level Hazards

H-1: Hazard One [L-1]

H-2: Hazard Two [L-1] [L-2]

H-3: Hazard Three [L-1]

Systel-level Safety Constraints

SSC-1: Safety Constraint One [H-1]

SSC-2: Safety Constraint Two [H-2]

Step Two - Control Structure

Controller controller A

Responsibilities:

R-1: Responsability One. [SSC-1]

R-2: Responsability Two. [SSC-2]

Outgoing connections

controller A -> actuator

Control actions: cmd_01, cmd_02

controller A -> higher-level controller

Incoming connections

sensor -> controller A

Feedbacks (variables and values):

feed_sensor (feed_sensor_01, feed_sensor_02)

external system -> controller A

Feedbacks (variables and values):

ext_info (ext_info_01, ext_info_02)

higher-level controller -> controller A

Controller higher-level controller

Responsibilities:

Outgoing connections

higher-level controller -> controller A

Control actions: cmd_ctrl_02, cmd_ctrl_01

higher-level controller -> controlled process

Control actions: cmd_hlc_01, cmd_hlc_02

Incoming connections

controller A -> higher-level controller

Feedbacks (variables and values):

feed_ctrl (feed_ctrl_01, feed_ctrl_02)

controlled process -> higher-level controller

Feedbacks (variables and values):

feed_cp (feed_cp_01, feed_cp_02)

TEST-VAR (a, b)

Controller controller B (external of analysis)

Responsibilities:

Outgoing connections

controller B -> external system

Incoming connections

sensor -> controller B

Actuator actuator

Outgoing connections

actuator -> controlled process

Incoming connections

controller A -> actuator

Sensor sensor

Outgoing connections

sensor -> controller A

sensor -> controller B

Incoming connections

controlled process -> sensor

External System external system

Outgoing connections

external system -> controller A

Incoming connections

controller B -> external system

Controlled Process controlled process

Outgoing connections

controlled process -> sensor

controlled process -> higher-level controller

Incoming connections

actuator -> controlled process

higher-level controller -> controlled process

Input: input_01, input_02

Output: output_01, output_02

Environmental Disturbances: Environmental Disturbances

Step Three - Unsafe Control Actions

Unsafe Control Actions (UCA) and Safety Constraints (SC)

Recommendation 1: (Controller: controller A - Control Action: cmd_01)

UCA-1: controller A provided in wrong order cmd_01 in any context. [H-1]

Description:

SC-1: controller A must not provide in wrong order cmd_01 in any context.

Recommendation 2: (Controller: controller A - Control Action: cmd_01)

UCA-2: controller A stopped too soon cmd_01 when feed_sensor is feed_sensor_01, ext_info is ext_info_02. [H-3]

Description: HAzard in some situation.....

SC-2: controller A must not provide to soon cmd_01 when feed_sensor is feed_sensor_01, ext_info is ext_info_02.

Recommendation 3: (Controller: controller A - Control Action: cmd_01)

UCA-3: controller A not provided cmd_01 when feed_sensor is feed_sensor_02, ext_info is ext_info_01. [H-2]

Description:

SC-3: controller A must provide cmd_01 when feed_sensor is feed_sensor_02, ext_info is ext_info_01.

Recommendation 4: (Controller: controller A - Control Action: cmd_01)

UCA-4: controller A provided cmd_01 when feed_sensor is feed_sensor_02. [H-3][H-2]

Description:

SC-4: controller A must not provide cmd_01 when feed_sensor is feed_sensor_02.

Recommendation 5: (Controller: controller A - Control Action: cmd_01)

UCA-5: controller A provided cmd_01 in any context. [H-3][H-2]

Description:

SC-5: controller A must not provide cmd_01 in any context.

Recommendation 6: (Controller: controller A - Control Action: cmd_01)

UCA-6: controller A provided in wrong order cmd_01 when ext_info is ext_info_01. [H-1]

Description:

SC-6: controller A must not provide in wrong order cmd_01 when ext_info is ext_info_01.

Recommendation 7: (Controller: higher-level controller - Control Action: cmd_ctrl_01)

UCA-7: higher-level controller provided in wrong order cmd_ctrl_01 when feed_ctrl is feed_ctrl_01, feed_cp is feed_cp_01. [H-2]

Description:

SC-7: higher-level controller must not provide in wrong order cmd_ctrl_01 when feed_ctrl is feed_ctrl_01, feed_cp is feed_cp_01.

Step Four - Loss Scenarios and Recommendations

R-1 (controller A Process Model in controller A): UCA-1

Type: Unsafe controller behavior

Cause: Current state of controller A Process Model is wrong.

Recommendation: The process model of controller A must represent the controlled process.

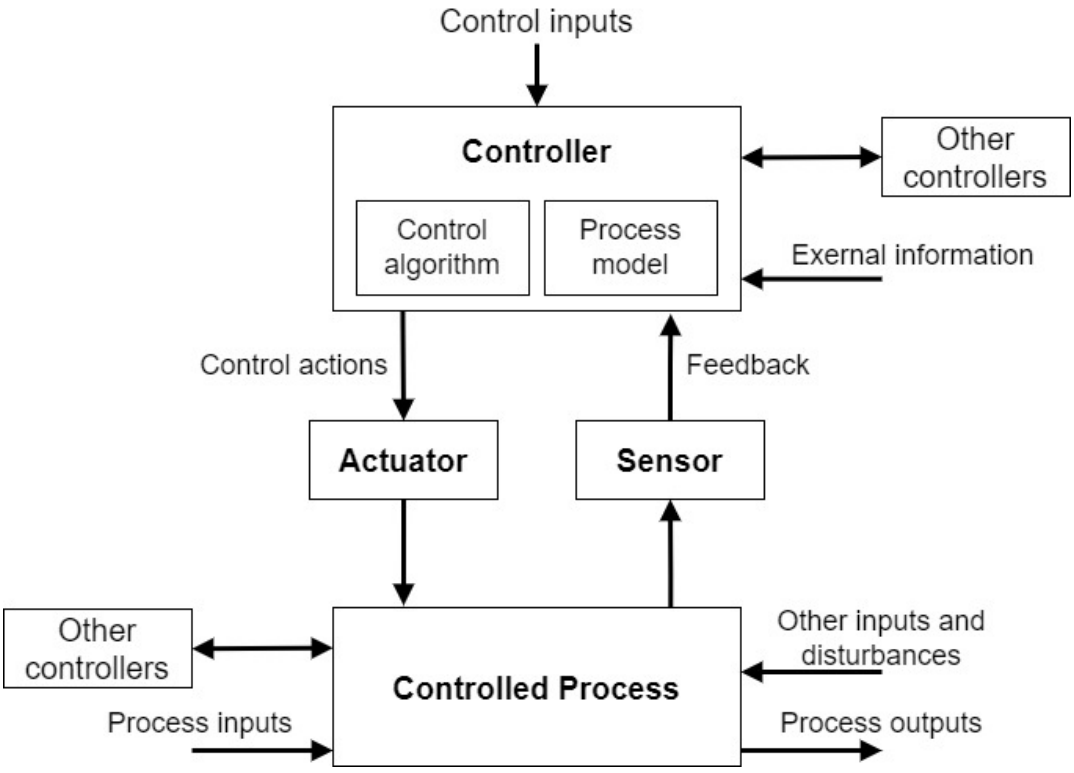
Mechanism:

Link with energy

actuator -> controlled process

controlled process -> sensor

Show control structure images


Control inputs
Controller
Control algorithm
Process model
Other controllers
Exernal information
Control actions
Feedback
Actuator
Sensor
Other controllers
Other inputs and disturbances
Controlled Process
Process inputs
Process outputs