Requirements and Test Cases from Use Case 5

Copied from D1.2...

Use Case 5 Requirements

Requirement ID	Corresponding evaluation scenario ID(s)	Textual Description	Supporting information
UC5_R_1	VALU3S_WP1_Aerospace_1	Under sensor faults, while tracking pilot commands, control objectives shall be satisfied (e.g. settling time, overshoot, and steady state error will be within predefined, acceptable limits)	Safety
UC5_R_2	VALU3S_WP1_Aerospace_1	Under sensor faults, during regulation of nominal system operation (no change in pilot input), control objectives shall be satisfied (e.g. settling time, overshoot, and steady state error will be within predefined, acceptable limits)	Safety
UC5_R_3	VALU3S_WP1_Aerospace_1	Under sensor faults, while tracking pilot commands, operating limit objectives shall be satisfied (e.g. respecting upper limit in shaft speed)	Safety
UC5_R_4	VALU3S_WP1_Aerospace_1	Under sensor faults, during regulation of nominal system operation (no change in pilot input), operating limit objectives shall be satisfied (e.g. respecting upper limit in shaft speed)	Safety

Requirement ID	Corresponding evaluation scenario ID(s)	Textual Description	Supporting information
UC5_R_5	VALU3S_WP1_Aerospace_2	Under mechanical fatigue conditions, while tracking pilot commands, control objectives shall be satisfied (e.g. settling time, overshoot, and steady state error will be within predefined, acceptable limits)	Safety
UC5_R_6	VALU3S_WP1_Aerospace_2	Under mechanical fatigue conditions, during regulation of nominal system operation (no change in pilot input), control objectives shall be satisfied (e.g. settling time, overshoot, and steady state error will be within predefined, acceptable limits)	Safety
UC5_R_7	VALU3S_WP1_Aerospace_2	Under mechanical fatigue conditions, while tracking pilot commands, operating limit objectives shall be satisfied (e.g. respecting upper limit in shaft speed)	Safety
UC5_R_8	VALU3S_WP1_Aerospace_2	Under mechanical fatigue conditions, during regulation of nominal system operation (no change in pilot input), operating limit objectives shall be satisfied (e.g. respecting upper limit in shaft speed)	Safety

Requirement ID	Corresponding evaluation scenario ID(s)	Textual Description	Supporting information
UC5_R_9	VALU3S_WP1_Aerospace_3	Under low probability hazardous events, while tracking pilot commands, control objectives shall be satisfied (e.g. settling time, overshoot, and steady state error will be within predefined, acceptable limits)	Safety
UC5_R_10	VALU3S_WP1_Aerospace_3	Under low probability hazardous events, during regulation of nominal system operation (no change in pilot input), control objectives shall be satisfied (e.g. settling time, overshoot, and steady state error will be within predefined, acceptable limits)	Safety
UC5_R_11	VALU3S_WP1_Aerospace_3	Under low probability hazardous events, while tracking pilot commands, operating limit objectives shall be satisfied (e.g. respecting upper limit in shaft speed)	Safety
UC5_R_12	VALU3S_WP1_Aerospace_3	Under low probability hazardous events, during regulation of nominal system operation (no change in pilot input), operating limit objectives shall be satisfied (e.g. respecting upper limit in shaft speed)	Safety

Requirement ID	Corresponding evaluation scenario ID(s)	Textual Description	Supporting information
UC5_R_13	VALU3S_WP1_Aerospace_4	While tracking pilot commands, controller operating mode shall appropriately switch between nominal and surge / stall prevention operating state	Safety
UC5_R_14	VALU3S_WP1_Aerospace_4	During regulation of nominal system operation (no change in pilot input), controller operating mode shall appropriately switch between nominal and surge / stall prevention operating state	Safety

Use Case 5 Test cases

Test case ID	Corresponding requirement ID(s)	Textual Description	Supporting information
UC5_TC_1	UC5_R_1	**Preconditions**: Aircraft is in operating mode M and sensor S value deviates at most +/ R % from nominal value **Input conditions / steps**: Observed aircraft thrust is at value V1 and pilot input changes from A1 to A2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting control objectives (settling time, overshoot, steady state error)	Safety

Test case ID	Corresponding requirement ID(s)	Textual Description	Supporting information
UC5_TC_2	UC5_R_1	**Preconditions**: Aircraft is in operating mode M and sensor S value is not available (sensor is out of order) **Input conditions / steps**: Observed aircraft thrust is at value V1 and pilot input changes from A1 to A2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting control objectives (settling time, overshoot, steady state error)	Safety
UC5_TC_3	UC5_R_2	**Preconditions**: Aircraft is in operating mode M and sensor S value deviates at most +/ R % from nominal value **Input conditions / steps**: Observed aircraft thrust is at value V1 and perturbations in nonpilot input cause it to change to V2 **Expected results**: Observed aircraft thrust returns to value V1, respecting control objectives (settling time, overshoot, steady state error)	Safety
UC5_TC_4	UC5_R_2	**Preconditions**: Aircraft is in operating mode M and sensor S value is not available (sensor is out of order) **Input conditions / steps**: Observed aircraft thrust is at value V1 and perturbations in nonpilot input cause it to change to V2 **Expected results**: Observed aircraft thrust returns to value V1, respecting control objectives (settling time, overshoot, steady state error)	Safety

Test case ID	Corresponding requirement ID(s)	Textual Description	Supporting information
UC5_TC_5	UC5_R_3	**Preconditions**: Aircraft is in operating mode M and sensor S value deviates at most +/ R % from nominal value **Input conditions / steps**: Observed aircraft thrust is at value V1 and pilot input changes from A1 to A2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety
UC5_TC_6	UC5_R_3	**Preconditions**: Aircraft is in operating mode M and sensor S value is not available (sensor is out of order) **Input conditions / steps**: Observed aircraft thrust is at value V1 and pilot input changes from A1 to A2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety
UC5_TC_7	UC5_R_4	**Preconditions**: Aircraft is in operating mode M and sensor S value deviates at most +/ R % from nominal value **Input conditions / steps**: Observed aircraft thrust is at value V1 and perturbations in nonpilot input cause it to change to V2 **Expected results**: Observed aircraft thrust returns to value V1, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety

Test case ID	Corresponding requirement ID(s)	Textual Description	Supporting information
UC5_TC_8	UC5_R_4	**Preconditions**: Aircraft is in operating mode M and sensor S value is not available (sensor is out of order) **Input conditions / steps**: Observed aircraft thrust is at value V1 and perturbations in nonpilot input cause it to change to V2 **Expected results**: Observed aircraft thrust returns to value V1, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety
UC5_TC_9	UC5_R_5	**Preconditions**: Aircraft is in operating mode M and system parameter P deviates at most +/ R % from nominal value **Input conditions / steps:** Observed aircraft thrust is at value V1 and pilot input changes from A1 to A2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting control objectives (settling time, overshoot, steady state error)	Safety
UC5_TC_10	UC5_R_6	**Preconditions**: Aircraft is in operating mode M and system parameter P deviates at most +/ R % from nominal value **Input conditions / steps**: Observed aircraft thrust is at value V1 and perturbations in nonpilot input cause it to change to V2 **Expected results**: Observed aircraft thrust returns to value V1, respecting control objectives (settling time, overshoot, steady state error)	Safety

Test case ID	Corresponding requirement ID(s)	Textual Description	Supporting information
UC5_TC_11	UC5_R_7	**Preconditions**: Aircraft is in operating mode M and system parameter P deviates at most +/ R % from nominal value **Input conditions / steps**: Observed aircraft thrust is at value V1 and pilot input changes from A1 to A2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety
UC5_TC_12	UC5_R_8	**Preconditions**: Aircraft is in operating mode M and system parameter P deviates at most +/ R % from nominal value **Input conditions / steps**: Observed aircraft thrust is at value V1 and perturbations in nonpilot input cause it to change to V2 **Expected results**: Observed aircraft thrust returns to value V1, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety
UC5_TC_13	UC5_R_9	**Preconditions**: Aircraft is in operating mode M I**nput conditions / steps**: Observed aircraft thrust is at value V1, pilot input changes from A1 to A2, and outside air pressure abruptly changes from P1 to P2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting control objectives (settling time, overshoot, steady state error)	Safety

Test case ID	Corresponding requirement ID(s)	Textual Description	Supporting information
UC5_TC_14	UC5_R_10	**Preconditions**: Aircraft is in operating mode M **Input conditions / steps**: Observed aircraft thrust is at value V1, small perturbations in nonpilot input cause it to change to V2, and outside air pressure abruptly changes from P1 to P2 **Expected results**: Observed aircraft thrust returns to value V1, respecting control objectives (settling time, overshoot, steady state error)	Safety
UC5_TC_15	UC5_R_11	**Preconditions**: Aircraft is in operating mode M **Input conditions / steps**: Observed aircraft thrust is at value V1, pilot input changes from A1 to A2, and outside air pressure abruptly changes from P1 to P2 **Expected results**: Observed aircraft thrust changes and settles to value V2, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety
UC5_TC_16	UC5_R_12	**Preconditions**: Aircraft is in operating mode M **Input conditions / steps**: Observed aircraft thrust is at value V1, small perturbations in nonpilot input cause it to change to V2, and outside air pressure abruptly changes from P1 to P2 **Expected results**: Observed aircraft thrust returns to value V1, respecting operating limit objectives (e.g. upper limit in shaft speed)	Safety

Test case ID	Corresponding requirement ID(s)	Textual Description	Supporting information
UC5_TC_17	UC5_R_13	**Preconditions**: Aircraft is in nominal operating mode **Input conditions / steps**: Pilot input changes from A1 to A2, causing surge / stall avoidance indicator signal to be set **Expected results**: Aircraft switches to surge / stall prevention operating mode	Safety
UC5_TC_18	UC5_R_13	**Preconditions**: Aircraft is in surge / stall prevention operating mode I**nput conditions / steps**: Pilot input changes from A1 to A2, causing surge / stall avoidance indicator signal to be cleared **Expected results**: Aircraft switches to nominal operating mode	Safety
UC5_TC_19	UC5_R_14	**Preconditions**: Aircraft is in nominal operating mode **Input conditions / steps**: Perturbations in nonpilot input cause surge / stall avoidance indicator signal to be set **Expected results**: Aircraft switches to surge / stall prevention operating mode	Safety
UC5_TC_20	UC5_R_14	**Preconditions**: Aircraft is in surge / stall prevention operating mode **Input conditions / steps**: Perturbations in nonpilot input cause surge / stall avoidance indicator signal to be cleared **Expected results**: Aircraft switches to nominal operating mode	Safety