

ON-AIRPLANE UPRT EXERCISES FOR INSTRUCTORS

Aircraft Handling Characteristics (Objective: to introduce the aircraft and the concept of 'flying by feel')

| | <i>Trainee Mistakes</i> | <i>Instruction Notes</i> |
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| Exercise 1: Rolling, yawing, pitching | Control inputs not decisive enough or too abrupt. No UP rudder causing nose to drop and an increase in airspeed. | Trainee is nervous anticipating UPRT. First time using a stick. Promote looking all sides to practice spatial awareness . |
| Exercise 2: 60° banking turn | No nose-up nudge prior to roll. Abrupt application of rudder. | Mention commercial airliners must use gentle rudder inputs . |
| Exercise 3: Rolling hands-off using rudder | Rudder inputs too strong. Startles during steep nose-up attitudes anticipating a stall. | Point out startle if it happens and discuss gentle rudder inputs when flying airliners. |
| Exercise 4: Experience - Simple Aileron Roll | No pitch-up prior to rolling causing diving roll. Looks only ahead. Indecisive control inputs. Difficulty finding wings level after 360° roll. | Aileron rolls build confidence and spatial awareness and should be flown prior to stalls. Trainee should look out all sides throughout the roll. |

Nose-High Recovery Exercises (Objective: to teach recovery from upsets that cause the aircraft to pitch up)

| | <i>Trainee Mistakes</i> | <i>Instruction Notes</i> |
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| Exercise 1: Lowering nose using PITCH | Does not announce 'Nose High' and 'Auto-Pilot/Throttle OFF'. Weak, delayed control inputs. Does not realize nose is pitching up until airplane is pitched 90°. | Discuss necessity to turn auto-functions OFF. Discuss view turning to sky, in airliners ground will disappear except when looking sideways. |
| Exercise 2: Lowering nose using ROLL | Too much roll entering Spiral Dive. Too little roll, stalling the airplane. | Set up entry speed. Discuss Spiral Dive on slow recovery, stall after too early recovery. |
| Exercise 3: Lowering nose using YAW | Abrupt rudder application, stressing vertical stabilizer and leading to Spiral Dive. Indecisive rudder application losing airspeed (not really a problem). | Discuss Spiral Dive and potential for rudder damage on airliners. Explain that 'at the top' airplane will never stall when unloaded even at speeds far below V_S . *** Trainee will likely startle if airplane follows high-amplitude sinusoidal flightpath; is ok, just point out startle as it happens. |

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| Exercise 4: Stall Recovery | Due to prior training, student is tense before/during recovery, focuses too much on altitude loss , possibly startles . Does not RELEASE, LEVEL, NUDGE, PULL. Exit speed too low, entering a secondary stall . Does not recognize spin onset. | Emphasize following OEM stall recovery . Discuss approach to stall and buffet. Teach to feel the AoA in the fingertips and not worry about altitude loss . To put him at ease, remind trainee he already recovered from a 'stall' during Exercise 3. |
| Exercise 5: Stall with late recovery into high G | Pulls early into secondary stall . | Ask trainee to execute ten or so stall recoveries in a row (falling-leaf). For that purpose, start at high altitude, e.g. 5,000 AGL. |
| Exercise 6: Stall with early recovery into Secondary Stall | Pulls too late having to bleed-off too much airspeed. | Encourage 'playing around', pulling & releasing with the index finger and feeling stall onset & recovery in the fingertip, respectively. <i>*** Throughout every lesson, emphasize gaining control by: RELEASE, LEVEL, NUDGE, PULL.</i> |
| Exercise 7: Stall with Incipient Spin | Trainee startles and does not release resulting in developed spin. | Trainee will be nervous due to previous training to avoid spins at all cost; re-assure him/her. |

Nose-Low Recovery Exercises (Objective: to teach recovery from upsets that cause the aircraft to pitch down)

| | <i>Trainee Mistakes</i> | <i>Instruction Notes</i> |
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| Exercise 1: Lifting nose using PITCH | Does not announce 'Nose Low' or 'Auto-Pilot/Throttle OFF'. Control inputs not decisive or too abrupt. Wings not level prior to pull-out. Slow recovery and airspeed approaching V_{ne} . | Discuss if it is really necessary to turn auto-functions OFF. Explain V_{ne} and G-Force. Discuss view turning to ground, in airliners the sky will likely have disappeared. |
| Exercise 2: Banking past 60° | Startle. Wings not rolled to level before pulling nose up. Failure to roll back the shortest route. Student 'pulls through' into a Split-S approaching V_{ne} . | Causes: wake vortices, rotor clouds, systems malfunctions. CAUTION: If near inverted, student might 'pull through' and inadvertently execute a high-speed Split-S. |
| Exercise 3: Spiral Dive Recovery | Startle. Wings not rolled to level prior to pulling nose up. | Discuss 2.5 G-limitation on airliners. |

Specialized Maneuvers (Objective: teach unloading, spatial awareness & build confidence without negative transfer)

| | <i>Trainee Mistakes</i> | <i>Instruction Notes</i> |
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| Exercise 1: Wing-Over | Pilot does not trust airplane's aerodynamic capabilities and heavily controls it at the top without completely unloading . | This exercise builds trust in the airplane. Pilots should unload at the top, feeling the airplane fly itself around into a 180° heading change (right turn requires some rudder). |
| Exercise 2: Half-loop, unloading at the top | Trainee not looking sideways. Not unloading at the inverted top. Does not roll wings to level-upright prior to pulling nose up and allows the airspeed to rapidly approach V_{ne} . | Emphasize the importance of unloading when spatially disoriented; commercial airliners have positive static control and will wind cock to a zero AoA if you let them. Discuss the importance of rolling wings to level-upright prior to pulling the nose up. |
| Exercise 3: Spin | Trainee startles and does not RELEASE, NUDGE, LEVEL, PULL. | Emphasize OEM spin recovery . Trainee will be startled . |
| Exercise 4: Inverted Flight | Nose drops while trying to maintain inverted horizontal level flight approaching V_{ne} . Reduced cognitive ability while flying upside down. | Point out the difficulty of cognitive processes while upside down. Discuss the effect that -1 G can have on aircraft systems and the potential for malfunctions. CAUTION: Student might 'pull through' and inadvertently execute a high-speed Split-S. |
| Exercise 5: Creating lift flying sideways (Knife Edge Maneuver) | Lets nose drop below horizon. | Discuss enormous loads put on vertical stabilizer and rudder. |
| Exercise 6: Coordinated Aileron Roll | Does not synchronize lift creation through all four axes. | High level of skill required for proper execution. |
| Exercise 7: Various maneuvers: Reverse Cuban 8 Hammerhead Immelmann Avalanche Etc. | Enjoy! | At this stage, let the trainee decide what he/she wants to explore. Talented trainees may even string maneuvers together into a routine. |

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