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## INSTRUCTOR OPERATING STATION

### List of Failures and Maneuvers

# EC 135

From the Instructor Operating Station in the EC135, there are numerous failures and emergency procedures that can be simulated. Below is a list of failures and emergencies applicable to each system. Each failure, as applicable, contains reference to the FAA Approved EC135 P2+ (EMERGENCY / MALFUNCTION CHECKLIST).

## ENGINES

- **Quick Start:** Enables engine to be taken up to operating RPM. NOTE: Engine switch position must be in *Idle* or *Flight* position for this function to work properly. Generally used after completion of Total Engine Failure.
- **Quick Stop:** Enables engine to be shut down immediately. NOTE: Engine switch position can be in *Idle* or *Flight* position and this function shuts the engine down regardless.
- **Start Condition:** Enables the respective engine to experience 4 possible start conditions: Normal, Igniter Failed, Hot, or Hung.
- **Oil Pressure Scaler:** Enables oil pressure gauge to indicate high or low pressures. NOTE: Normal oil pressure readings correspond to 1.00 on the instructor's scaler. Inputting higher or lower numbers here will cause higher and lower pressure indications respectively. **ENG OIL P** light will illuminate when oil pressure reaches <5 bar. \*\*Refer to respective *Emergency Procedures* for **ENG OIL P.**
- **Oil Temperature Scaler:** Enables oil temperature gauge to indicate high or low temperatures. NOTE: Normal oil temperature readings correspond to 1.00 on the instructor's scaler. Inputting higher or lower numbers here will cause higher and lower temperature indications respectively. No CAD light will illuminate when the engine oil temperature climbs above its limit, *however*, \*\*Reference [Emergency/Malfunction Checklist \(Engine Oil Temperature High 3.4.10\)](#)
- **Total Failure:** Enables engine to be shut down completely in flight. Used for simulated engine failures.
- **High Pressure Fuel Pump:** Enables failure of engine driven high pressure fuel pump. NOTE: This will cause a complete engine failure.
- **Priming Fuel Pump:** Enables failure of the prime pump.

## **ENGINES (Cont)**

- **Forward XFER Pump:** Simulates failure of Forward XFER Pump.  
NOTE: This light illuminates after the XFER Pump has been deprived of fuel for 3 minutes.  
\*\*Refer to respective *Emergency Procedure for **F PUMP FWD.***
- **Aft XFER Pump:** Simulates failure of Aft XFER Pump.  
NOTE: This light illuminates after the XFER Pump has been deprived of fuel for 3 minutes.  
\*\*Refer to respective *Emergency Procedure for **F PUMP AFT.***
- **Exceed Reset:** Allows the instructor to reset any engine LIMIT indications. Used when engine limits have been exceeded and need to be reset to resume training.
- **FADEC Fail:** Enables instructor to fail respective FADEC system for engine 1 or 2. The fuel metering valve is blocked. The following functions of the respective engine are Inop: Automatic acceleration, N1, TOT, and torque limiter. FLI needle of affected engine disappears.  
\*\*Refer to respective *Emergency Procedure for **FADEC FAIL.***
- **FADEC Degrade:** Enables instructor to degrade respective FADEC system for engine 1 and/or 2. This failure indicates a change or loss of a number of governing functions.  
\*\*Refer to respective *Emergency Procedure for **FADEC MINR.***
- **FLI Fail:** Enables failure of the First Limit Indicator system. This results in the loss of two out of three signals (N1, Tq, TOT) of the same engine, and the loss of the FLI needle of the respective engine.  
\*\*Refer to respective *Emergency Procedure for **FLI FAIL.***
- **FLI Degrade:** Enables the degradation of the First Limit Indicator system. This results in the loss of one engine parameter, and the FLI needle of the respective engine remains visible.  
\*\*Refer to respective *Emergency Procedure for **FLI DEGR.***
- **Oil Filter:** Allows simulation of engine oil filter contamination. Normal on start-up.  
\*\*Refer to respective *Emergency Procedure for **ENG O FILT.***

## **ENGINES (Cont)**

- **Fuel Filter:** Allows simulation of a contaminated engine fuel filter. Be prepared for engine failure.  
\*\*Refer to respective *Emergency Procedure* for **FUEL FILT.**
- **Fuel Pressure:** Allows simulation of a *low* engine fuel pump inlet pressure.  
\*\*Refer to respective *Emergency Procedure* for **FUEL PRESS.**
- **Engine Fire:** Allows simulation of over temperature in engine compartment (engine fire). Warning bell sounds and fire light illuminates.  
\*\*Refer to respective *Emergency Procedure* for **FIRE.**
- **Drive Shaft:** Simulated drive shaft failure. Results will be a drop in Rotor RPM. *Affected engine* will have a torque drop to zero and an N2 increase. *Normal engine* will have an increase of Torque, N1 and TOT. Establish OEI flight and perform single engine emergency shutdown on affected engine. Land as soon as practicable.  
\*\*Reference [Emergency/Malfunction Checklist \(Engine Overspeed Driveshaft Failure 3.4.8\).](#)
- **Governor Overspeed:** Simulated governor failure. HIGH ROTOR RPM warning may come on. Nro and N2 increase. The affected engine will experience an increase in torque, N1 and TOT while the normal engine will experience a decrease in torque, N1 and TOT. Adjust collective lever to maintain N2 and Nr within limits. Identify the affected engine and reduce torque with the twist grip until the normal engine takes the load. Readjust the collective lever to stay within limits. Now, **again**, adjust the twist grip of the affected engine to 20 to 30% torque. Land as soon as practicable.  
\*\*Reference [Emergency/Malfunction Checklist \(Engine Overspeed - Governor Failure 3.4.9\).](#)
- **Chip Detection:** Allows simulation of engine chip light. If equipped with Chip Burn System, attempt to burn the chip.  
\*\*Refer to respective *Emergency Procedure* for **ENG CHIP.**
- **Chip Circuit:** This allows for a failure of the Continuity check of the cables and connectors to the detector. This failure should be identified on initial power up of the aircraft on the CAD display check prior to engine start. The indication on the CAD will be **ENG CHIP CT.**  
\*\*Refer to respective *Emergency Procedure* for **ENG CHIP CT.**



## INSTRUCTOR OPERATING STATION

### List of Failures and Maneuvers

## *EC 135*

### **ENGINES (Cont)**

- **Torque Runaway:** Currently has no function.

### **ENGINE GAUGE OFFSET**

- **N1 RPM:** Enables the instructor to simulate the offset of N1 values between engine 1 and 2. Indication is only available on the FLI (N1) readout when it is not the limiting factor.
- **Torque:** Enables the instructor to simulate the offset of Torque values between engine 1 and 2. Indication will be seen on the FLI (TRQ) readout and on the FLI needle when it is the limiting factor.
- **TOT:** Enables the instructor to simulate the offset of TOT values between engine 1 and 2. Indication is only available on the FLI (TOT) readout when it is not the limiting factor.
- **Oil Pressure:** Enables the instructor to manipulate the displayed gauge value of the corresponding Oil Pressure indication of Engine 1, Engine 2 and Main Gear Box.
- **Oil Temperature:** Enables the instructor to manipulate the displayed gauge value of the corresponding Oil Temperature of Engine 1, Engine 2 and Main Gear Box.

## ROTORS

- **Main Rotor Chip:** Allows simulation of the **XMSN CHIP** caution on the CAD display. If equipped with Chip Burn System, attempt to burn the chip.  
\*\*Refer to respective *Emergency Procedure* for **XMSN CHIP**.
- **Tail Rotor Drive:** Allows simulation of a tail rotor drive shaft failure. Conditions/Indications associated with this condition are:  
No directional response after pedal inputs and complete loss of tail rotor thrust.  
\*\*Reference [Emergency/Malfunction Checklist \(Tail Rotor Failure Conditions 3.6.1 or 3.6.2\)](#).
- **Tail Rotor Pitch:** Allows simulation of a tail rotor Fixed-pitch condition (Stuck pedal). Conditions/Indications associated with this condition are:  
No directional response after pedal inputs but tail rotor thrust is still provided.  
\*\*Reference [Emergency/Malfunction Checklist \(Tail Rotor Failure Conditions 3.6.2\)](#).
- **Tail Rotor Chip:** Allows simulation of the **TRGB CHIP** caution on the CAD display. If equipped with Chip Burn System, attempt to burn the chip.  
\*\*Refer to respective *Emergency Procedure* for **TRGB CHIP**.
- **Transmission Chip Circuit:** This allows for a failure of the continuity check of the cables and connectors to the chip detector. This failure should be identified on initial power up of the aircraft on the CAD display check prior to engine start. The indication on the CAD will be **XMSN CHIP CT**.  
\*\*Refer to respective *Emergency Procedure* for **XMSN CHIP CT**.
- **Tail Rotor Gearbox Chip Circuit:** This allows for a failure of the continuity check of the cables and connectors to the chip detector. This failure should be identified on initial power up of the aircraft on the CAD display check prior to engine start. The indication on the CAD will be **TRGB CHIP CT**.  
\*\*Refer to respective *Emergency Procedure* for **TRGB CHIP CT**.

## SYSTEMS

### FUEL

- **Fuel Quantity Scaler:**  
Allows the manipulation of the fuel quantity in the **MAIN** tank only. This is not a precision quantity manipulation. Precision main tank fuel manipulation can be performed on the Loading Page.
- **Left Supply Tank Fuel:**  
Allows the activation of the **FUEL** light on the Center CAD display. The **LOW FUEL 1** light also illuminates on the Warning Panel.  
\*\*Refer to respective  
*Emergency Procedure for*  
**LOW FUEL 1 and/or FUEL.**
- **Right Supply Tank Fuel:**  
Allows the activation of the **FUEL** light on the Center CAD display. The **LOW FUEL 2** light also illuminates on the Warning Panel.  
\*\*Refer to respective  
*Emergency Procedure for*  
**LOW FUEL 2 and/or FUEL.**
- **Fuel Quantity:** Allows the failure of the Fuel Quantity indication system on the CAD. The **F QTY FAIL** light illuminates on the Center CAD lane and the Fuel quantity display is inoperative.  
\*\*Refer to respective  
*Emergency Procedure for*  
**F QTY FAIL.**

### HYDRAULIC

- **Hydraulic Pump 1:** Allows the failure of the #1 Hydraulic system. The **HYD PRESS** light illuminates on the Left side of the CAD display.  
*Note: The pedals will have normal sensitivity since they are boosted by the #2 Hydraulic system.*  
\*\*Refer to respective  
*Emergency Procedure for*  
**HYD PRESS.**
- **Hydraulic Pump 2:** Allows the failure of the #2 Hydraulic system. The **HYD PRESS** light illuminates on the Right side of the CAD display.  
*Note: Yaw servo boost is lost. The pedals will become stiff and require increased forces to operate, but yaw controllability is unaffected.*  
\*\*Refer to respective  
*Emergency Procedure for*  
**HYD PRESS.**
- **Yaw SAS:** Allows the failure of the Yaw SAS. The **YAW SAS** light will illuminate on the Center CAD lane. Attempt to reset the Yaw SAS by pushing the P&R/P-D/Y RST switch (located on the cyclic stick) to the right. If light remains....  
\*\*Refer to respective  
*Emergency Procedure for*  
**YAW SAS.**

## EC 135

### HYDRAULIC (Cont)

- **Pitch/Roll SAS:** Allows the failure of the Pitch and Roll SAS system. The **P/R SAS** light will illuminate on the Center CAD lane. Attempt to reset the Pitch and Roll SAS by pushing the P&R/P-D/Y RST switch (located on the cyclic stick) to the left. If light remains....  
**Corrective Action:** Monitor system performance.
- **Pitch Dampner:** Allows the failure of the Pitch Damper. The **P DAMPER** light will illuminate on the Center CAD lane. Attempt to reset the Pitch Damper by pushing the P&R/P-D/Y RST switch (located on the cyclic stick) up. If light remains....  
**Corrective Action:** Monitor system performance.
- **Hand Pump:** Not functioning at this time.

### ICING

- **Icing:** Allows simulation of Icing conditions. When this is activated, the torque required will increase simulating ice accumulation on the Rotor Blades.
- **Icing Accumulation Rate:** This function is directly linked to the **Icing** function above. It allows the instructor to increase or decrease the rate at which ice accumulation occurs.

- **Pitot Tube Icing:** Enables the instructor to simulate a pitot tube that has been blocked. The false indications of a Pitot Static system with a blocked pitot tube will be encountered on the #1 or #2 respective system that is simulated as blocked. Once blockage is recognized,  
**\*\*Reference**  
[Emergency/Malfunction Checklist \(Pitot/Static Port Failure 3.7.2\).](#)
- **Ice Detection:** This function does not work at this time.

### MISCELLANEOUS

- **Air Data Computer:** Allows the failure of the #1 and/or #2 Air Data Computer. An **ADC 1** failure will result in discrepancy arrows on both the Airspeed and Altimeter indicators on the Primary Flight Display (PFD). These arrows can be removed by switching the ADC selector from N to 2 on the Reconfiguration Unit (RCU). An **ADC 2** failure will result in both the Airspeed and Altimeter indicators failing. A red box containing **ADC 2** will appear over both the Airspeed and Altimeter indicators. These boxes can be removed and indications restored by moving the ADC selector from N to 1 on the RCU.



## INSTRUCTOR OPERATING STATION

### List of Failures and Maneuvers

## *EC 135*

### *MISCELLANEOUS (Cont)*

- **Static Air Source:** Enables the instructor to simulate a Static Air Source that has been block. The false indications of a Pitot Static system with a blocked Static Air Source will be encountered on the #1 or #2 respective system that is simulated as blocked. Once blockage is recognized,  
\*\*Reference  
Emergency/Malfunction Checklist (Pitot/Static Port Failure [3.7.2](#)).
- **Trim Runaway:** Allows the instructor to simulate a trim system malfunction. This will result in unsymmetrical cyclic stick forces. If this occurs, press the TRIM REL (Force Trim) switch on the cyclic to reduce cyclic stick forces.  
\*\*Reference  
Emergency/Malfunction Checklist (Cyclic Trim Actuator Failure/Runaway [3.7.1](#)).
- **Trim Switch:** Allows the instructor to simulate a trim switch failure. This causes the 4-way BEEP TRIM (ATT TRIM) switch on the cyclic to fail. The TRIM REL switch continues to work, but beep trim is no longer available.  
\*\*Reference  
Emergency/Malfunction Checklist (Cyclic Trim Actuator Failure/Runaway [3.7.1](#)).
- **Cargo Smoke:** Simulates smoke in the cargo compartment. A red light **CARGO SMOKE** illuminates on the Warning Panel and an audio tone sounds.
- **Fire Bottles:** Allows the instructor to recharge the fire bottle once they have been discharged.

# *FLIGHT INSTRUMENTS*

## **EFIS**

- **PFD Display:** Allows the instructor to fail the Primary Flight Display (PFD). As a result, the information that was displayed on the PFD will be repositioned down to the Navigation Display (ND). The composite mode will appear on the functioning screen.
- **ND Display:** Allows the instructor to fail the Navigation Display (ND). As a result, the information that was displayed on the ND will be moved up to the PFD in the form of the composite mode.
- **FCDM:** This allows the instructor to fail both Flight Control Display Modules independent of each other.
  - An **FCDM 1** failure will result in a **CHECK FCDM** message on both the PFD and ND. To remove this message, change the FCDM selector on the RCU from N to 2.
  - An **FCDM 2** failure will result in a loss of information on both the PFD and ND with a red message **FCDM 2** on each screen. To remove this message, change the FCDM selector on the RCU from N to 1.
- **ICP:** Enables the instructor to fail either ICP 1 or ICP 2. This will cause the pilot to be unable to control the instruments from the respective failed control panel.

## **AHRS**

- **AHRS Unit:** Allows the instructor to fail the Attitude and Heading Reference System.
  - Failure of **AHRS 1** will cause two caution lights to illuminate on the center CAD display. These caution indications are **GYRO** and **P/R SAS**. Discrepancy arrows will illuminate on the top of both right side PFD and ND displays. Removal of the discrepancy arrows is accomplished by moving the RCU (AHRS) selector from the N to the 2 position. The **GYRO** and **P/R SAS** lights remain on the center CAD display.
  - Failure of **AHRS 2** will cause a **GYRO** caution light in the center CAD display. The Attitude Indicator and Directional Gyro will disappear on the right side PFD and ND, and the Autopilot will decouple. The Attitude Indicator and Directional Gyro indications can be reacquired on the right side PFD and ND by moving the RCU (AHRS) selector from the N to the 1 position. Upper modes of the Autopilot, however, will still remain inoperative.

**AHRS (Cont)**

- **Vertical Gyro:** This allows the instructor to fail both the #1 and #2 vertical gyros.
  - Failure of the **#1 GYRO** will cause the **GYRO** and **P/R SAS** lights to illuminate on the center CAD display. The Autopilot is in a degraded mode at this point. A discrepancy arrow will illuminate on the top of the Attitude Indicator on the right side PFD. The discrepancy arrow can be removed by moving the RCU (AHRS) selector from the N to the 2 position.
  - Failure of the **#2 GYRO** will cause the GYRO light to illuminate on the center CAD display. The Autopilot will automatically decouple when this occurs. A discrepancy arrow illuminates on the top of where the Attitude Indicator should be on the right side PDF. The Attitude Indicator on the right side PDF is inoperative and a red **AHRS 2** illuminates on the right side PDF and ND. All discrepancies can be removed by moving the RCU (AHRS) selector from N to 1. Autopilot upper modes remain unavailable.
- **Directional Gyro:** Allows the instructor to fail both Directional Gyros.
  - Failure of **DG #1** results in a **GYRO** light illuminating on the center CAD display and a discrepancy arrow illuminating on top of the right side ND. This arrow can be removed by moving the RCU (AHRS) selector from the N to the 2 position.
  - Failure of **DG #2** results in a **GYRO** light illuminating on the center CAD display. A discrepancy arrow appears on top of the right side ND and the Directional Gyro is inoperative. This arrow can be removed and the Directional Gyro restored by moving the RCU (AHRS) selector from the N to the 1 position.
- **Vertical Speed:** Allows the instructor to fail the vertical speed indications.
  - Failure of the **#1 Vertical Speed** indication is only visible on the right side PFD by identifying that the Autopilot is degraded. The left side PFD has lost the VSI indication. Moving the RCU (ADC) selector from the N to the 2 position will restore the VSI to the left side PFD.
  - Failure of the **#2 Vertical Speed** indication will cause the loss of the VSI indication on the right side PFD. Autopilot shows that it is degraded. Moving the RCU (ADC) selector from the N to the 1 position will restore the VSI to the right side PFD.

### **AHRS (Cont)**

- **Altimeter:** Allows the instructor to fail the altimeter indications.
  - Failure of the **#1 Altimeter** will result in a red **ADC 1** light on the Altimeter on the left PFD. The altimeter on the right PFD will have a discrepancy arrow displayed. Both PFD discrepancies will be removed by moving the RCU (ADC) selector from the N to the 2 position.
  - Failure to the **#2 Altimeter** will result in a red **ADC 2** light on the Altimeter on the right PFD. The altimeter on the left PFD will have a discrepancy arrow displayed. Both PFD discrepancies will be removed by moving the RCU (ADC) selector from the N to the 1 position.
- **VEMD Processor 2:** Allows the instructor to fail the VEMD 2 processor. When this occurs, the lower VEMD screen will go blank or display an abnormal appearance. The upper VEMD will read **LANE 2 FAILED PRESS OFF 2** under the properly functioning FLI display. When the lower screen is turned off, the lane fail message disappears. The lost VEMD information can be viewed by pressing the SCROLL button on the right of the VEMD display.  
**\*\*Reference RFM Section 3 (Emergency Procedures 3.3.2).**
- **CAD Processor:** Allows the instructor to fail the CAD display. When this occurs, the CAD screen will go blank or display an abnormal appearance. The upper VEMD will read **CAD FAILED PRESS OFF**. The lower VEMD screen will default to displaying limited CAD information. Some standard CAD caution lights will no longer be able to be displayed, and the fuel indication is no longer available. The lost VEMD information can be viewed by pressing the SCROLL button on the right of the VEMD display.  
**\*\*Reference RFM Section 3 (Emergency Procedures 3.3.3).**

### **CENTRAL PANEL DISPLAY SYSTEM**

- **VEMD Processor 1:** Allows the instructor to fail the VEMD 1 processor. When this occurs, the upper VEMD screen will go blank or display an abnormal appearance. The lower VEMD will read **LANE 1 FAILED PRESS OFF 1**. When the upper screen is turned off, its information is transferred to the lower VEMD screen. The lost VEMD information can be viewed by pressing the SCROLL button on the right of the VEMD display.  
**\*\*Reference RFM Section 3 (Emergency Procedures 3.3.1).**

***CENTRAL PANEL (Cont)  
DISPLAY SYSTEM***

- **VEMD Fan:** Allows the instructor to simulate a VEMD Fan failure. This occurs when a failure of the VEMD fan has been detected during a CPDS EXTERNAL TEST on power up. Because of the failure a **VEMD FAN** light will illuminate on the center CAD display.  
\*\*Refer to respective  
*Emergency Procedure for  
**VEMD FAN.***
- **CAD Fan:** Allows the instructor to simulate a CAD Fan Failure. This occurs when a failure of the CAD fan has been detected during a CPDS EXTERNAL TEST on power up. When this occurs, a **CAD FAN** light illuminates on the center CAD display.  
\*\*Refer to respective  
*Emergency Procedure for  
**CAD FAN.***
- **CPDS Overheat:** Allows the instructor to simulate a CPDS Overheat situation. This occurs when the normal operating temperature of the instrument panel is exceeded. When this occurs, a **CPDS OVHT** light will illuminate on the center CAD display.  
\*\*Refer to respective  
*Emergency Procedure for  
**CPDS OVHT.***

**STANDBY**

- **Airspeed:** Allows the instructor to fail the standby Airspeed indicator.  
Note: Initiation of this failure will cause the Airspeed needle to freeze at its current location.
- **ADI:** Allows the instructor to fail the Standby Attitude Indicator.  
Note: A red flag appears when this function is initiated.
- **Altimeter:** Allows the instructor to fail the standby Altimeter.  
Note: Initiation of this failure will cause the Altimeter indication to freeze at the indicated altitude at the time of failure.
- **Tach:** Allows the instructor to fail the N2 tachometer indication for both engine #1 and engine #2.

## AVIONICS

- **COM:** Enables the failure of COM 1 and/or COM 2.  
This function is used to simulate two-way radio communications failure procedures for both VFR and IFR flight.
- **Audio Panel:** Enables the failure of the #1 Audio Panel and/or #2 Audio Panel.  
Note: With an Audio Panel #1 failure, communication from the left seat is not possible. With an Audio Panel #2 failure, communication from the right seat is not possible.
- **NAV:** Enables the failure of the #1 NAV and/or #2 NAV systems.  
Note: The loss of the #1 NAV system will result in the NAV source #1 on the ND to show failed (Ex. **VOR 1**). The loss of the #2 NAV system will result in the NAV source #2 on the ND to show failed (Ex. **ILS 2**).
- **Glideslope:** Allows the instructor to fail the Glideslope indication on both systems #1 and #2 independent of each other.  
Note: The loss of Glideslope #1 will cause a **GS 1** message to appear on the NAV 1 glideslope indication. The loss of Glideslope #2 will cause a **GS 2** message to appear on the NAV 2 glideslope indication.
- **ADF:** Allows the instructor to fail the Automatic Direction Finder on the aircraft.
- **DME:** Allows the instructor to fail the Distance Measuring Equipment on the aircraft.  
Note: This failure will cause the loss of Distance, Time to Target, and Speed information on the ND when the NAV Source is indicating NAV Source #1 or NAV Source #2.
- **Marker:** Allows the instructor to simulate a Marker Beacon out of service.
- **Autopilot:** Allows the instructor to initiate an Autopilot failure.  
Note: This failure cuts off complete Autopilot function. The pilot must fly “hands on” in order to control the Aircraft.
- **Audio Panel Primary Power:** Allows the instructor to fail the primary power source supplying the Audio Panel.  
Note: With an Audio Panel #1 power failure, communication from the left seat is not possible. With an Audio Panel #2 power failure, communication from the right seat is not possible.

## **GPS**

- **Receiver Failure:** Allows the instructor to fail one of the two GPS units in the aircraft. The #1 GPS unit will be inoperative when this failure is initiated. GPS data can still be utilized using the #2 GPS unit.
- **Visible Satellites:** Allows the instructor to reduce the number of visible satellites that the GPS receivers can acquire. The number of satellites can be reduced until RAIM is not available on the GPS units.
- **Generator:** Enables the failure of Generator #1 and/or Generator #2. Failure of a generator is followed by a **GEN DISCON** light illuminating in the respective CAD column.  
\*\*Refer to respective *Emergency Procedure* for **GEN DISCON**.
- **Inverter:** Enables the failure of Inverter #1 and/or Inverter #2. Failure of an inverter is followed by both an **INVERTER** and **P/R SAS** light illuminating in the respective CAD column.  
Note: If Inverter #1 fails, place the inverter switch to the #2 Inverter. This will restore the P/R SAS. If Inverter #2 fails, place the inverter switch to the #1 position. This will restore the P/R SAS.

## **ELECTRICAL**

- **Avionics Master Switch:** Allows the instructor to fail both Avionic Master Switches.
  - Failure of Avionics Master Switch #1 results in a full failure of all systems linked to the Avionics #1 system. This will cause the loss of the GPS #1, AHRS 1, ADC 1, etc). The remaining information on the right side PFD and ND shows discrepancies. These discrepancies can be removed by moving the selectors on the RCU to the 2 positions respectively.
  - Failure of Avionics Master Switch #2 results in a full failure of all systems linked to the Avionics #2 system. This will cause the loss of the GPS #2 and a complete failure of all indicating systems on the right side PFD and ND. These can be restored by moving the selectors on the RCU to the 1 positions respectively.
- **NiCD Batt. Thermal Runaway:** Allows the instructor to simulate a battery temperature runaway. When this occurs, a **BAT TEMP** light will illuminate on the Warning panel.  
\*\*Refer to respective *Emergency Procedure* for **BAT TEMP**.
- **Battery Voltage:** Allows the instructor to simulate a low battery voltage. This function is used prior to starting the Aircraft. This situation necessitates an External Power Unit start.  
Note: When battery voltage is below 24 Volts, and EPU start is required.

### ***ELECTRICAL (Cont)***

- **Battery Discharge:** This function allows the instructor to discharge the battery voltage at a specified rate. Again this function is used prior to starting the Aircraft. This can be used as the pilot is running through the Normal Checklist for Pre-start Checks. With the BAT DISCH light on the voltage will drop as the pilot runs through the Pre-start Checks. This will simulate the need to double check the BAT voltage immediately prior to engine start.
- **External Power:** This simulates whether the external power source is connected or disconnected. This also allows the simulation of an **EPU DOOR** light.  
\*\*Refer to respective  
*Emergency Procedure for*  
**EPU DOOR.**
- **Electrical Load:** This function allows the instructor to specify the amount of load that is being placed on the battery. This is used to increase the rate at which the BAT is being discharged in the above **Battery Discharge** function.

### ***ELECTRICAL FUSE***

- **Essential Bus:** Allows the instructor to simulate a failure of Essential Bus 1 (FUSE) and/or Essential Bus 2 (FUSE).

- **High Load Bus:** Allows the instructor to simulate a failure of High Load Bus 1 (FUSE) and/or High Load Bus 2 (FUSE).
- **Essential Bus Batt Feeder:** Enables the failure of the Essential Bus Batt Feeder 1 (FUSE) and/or Essential Bus Batt Feeder 2 (FUSE).
- **Shed Bus:** Enables the instructor to fail Shed Bus 1 (FUSE) and/or Shed Bus 2 (FUSE).

### ***ELECTRICAL CONTACTOR***

- **Bus Tie:** Enables the failure of the Bus Tie contactor. When this occurs, a **BUSTIE OPN** light will illuminate on the respective CAD column.  
\*\*Refer to respective  
*Emergency Procedure for*  
**BUSTIE OPN.**
- **Essential Bus:** Enables the failure of the Essential Bus 1 (CONTACTOR) and/or Essential Bus 2 (CONTACTOR).
- **High Load Bus:** Enables the failure of the High Load Bus 1 (CONTACTOR) and/or High Load Bus 2 (CONTACTOR).
- **High Power:** Enables the failure of the High Power 1 (CONTACTOR) and/or High Power 2 (CONTACTOR).

***ELECTRICAL (Cont)***

**CONTACTOR**

- **Shedding Bus:** Enables the failure of the Shed Bus 1 (CONTACTOR) and Shed Bus 2 (CONTACTOR).  
- Failure of Shed Bus 1 will result in two caution lights illuminating on the CAD display. **PITOT HTR** and **HOR BAT**. The Standby Horizon Battery has either totally discharged or is being supplied by the emergency battery as in a dual generator failure.  
\*\*Refer to respective *Emergency Procedure* for **PITOT HTR**.  
- Failure of Shed Bus 2 will result in the loss of the Radio Altimeter. This will be represented by a **RA** light illuminated on both the PFD and ND.
- **Starter:** Allows the failure of the Starter 1 (CONTACTOR) and/or Starter 2 (CONTACTOR).  
Note: If this contactor is failed prior to start, the **STARTER** light will illuminate in the respective side of the CAD display, and the starter will not engage.  
\*\*Refer to respective *Emergency Procedure* for **STARTER**.
- **Battery:** Enables the failure of the Battery (CONTACTOR).  
When this occurs, a **BAT DISCON** light will illuminate on the center CAD display.  
\*\*Refer to respective *Emergency Procedure* for **BAT DISCON**.

**ELECTRICAL BUSES**

- **Essential:** Allows the instructor to fail the Essential Bus 1 and/or the Essential Bus 2. All systems attached to the respective bus will be lost unless a secondary power supply is available for that system.
- **High Load:** Allows the instructor to fail the High Load Bus 1 and/or the High Load Bus 2. All systems attached to the respective bus will be lost unless a secondary power supply is available for that system.
- **Primary:** Allows the instructor to fail the Primary Bus 1 and/or Primary Bus 2. All systems attached to the respective bus will be lost unless a secondary power supply is available for that system.  
Note: The BUSTIE OPN light will illuminate for the respective Bus lost.  
\*\*Refer to respective *Emergency Procedure* for **BUSTIE OPN**.
- **Shedding:** Allows the instructor to fail the Shed Bus 1 and/or Shed Bus 2. All systems attached to the respective bus will be lost unless a secondary power supply is available for that system.
- **Battery:** Allows the instructor to fail the Battery Bus bar. The **BAT DISCON** and **BUSTIE OPN** caution lights illuminate on the CAD display.  
\*\*Refer to respective *Emergency Procedure* for **BAT DISCON and BUSTIE OPN**.

## ***CIRCUIT BREAKERS***

### **AC/SHED/BATT BUS**

#### **AC BUS I**

- **AHARS I:** Allows the instructor to cause the AHRS I circuit breaker to release. Caution indications will be a **P/R SAS** light on the center CAD display.
- **ROLL SAS:** Allows the instructor to cause the ROLL SAS circuit breaker to release. Caution indications will be a **P/R SAS** light on the center CAD display.
- **ADF:** Allows the instructor to cause the ADF circuit breaker to release. No caution lights illuminate, but Automatic Direction Finder does not function.
- **MKR:** Allows the instructor to cause the MKR circuit breaker to release. No caution lights illuminate, but the Marker Beacons will not function.
- **RAD ALT:** Allows the instructor to cause the RAD ALT circuit breaker to release. A **RA** warning is displayed on both the PFD and ND displays, and the radio altimeter is no longer functional.

#### **AC BUS II**

- **PITCH SAS:** Allows the instructor to cause the PITCH SAS circuit breaker to release. Caution indications will be a **P/R SAS** light on the center CAD display.
- **DME:** Allows the instructor to cause the DME circuit breaker to release. If flying in any navigation source other than NMS, DME information will not be available.

#### **SHED BUS II**

- **XFER-A PUMP:** Allows the instructor to cause the XFER-A PUMP circuit breaker to release. After a time laps of 3 minutes, a caution indication of **F PUMP AFT** will illuminate on the center CAD display.  
\*\*Refer to respective *Emergency Procedure* for **F PUMP AFT**.
- **SHED BUS 2:** Allows the instructor to cause the SHED BUS 2 circuit breaker to release. A **RA** warning is displayed on both the PFD and ND displays, and the radio altimeter is no longer functional.
- **BLW PEL:** Allows the instructor to cause the BLW PEL circuit breaker to release. No caution lights illuminate.

***SHED BUS II (Cont)***

- **AHRS 2:** Allows the instructor to cause the AHRS 2 circuit breaker to release. A **GYRO** light illuminates on the center CAD display, and both the Attitude Indicator and Directional Gyro are lost on the right side PFD and ND. The RCU can be used to reconfigure accordingly.
- **ADC 2:** Allows the instructor to cause the ADC 2 circuit breaker to release. Both the Airspeed Indicator and Altimeter are lost on the right side PFD (an **ADC 2** light illuminates on both indicators). The RCU can be used to reconfigure accordingly.
- **AP 2:** Allows the instructor to cause the AP 2 circuit breaker to release. As long as the AP 1 circuit breaker has no issue, the Autopilot will continue to function.

***BATT BUS***

- **STDBY HOR:** Allows the instructor to cause the STDBY HOR circuit breaker to release. The Standby Horizon will have a red flag representing a failure of the instrument.
- **ELT:** Allows the instructor to cause the ELT circuit breaker to release. No caution lights illuminate, but the ELT will be functioning properly.

***SHED BUS I***

- **IC-AMP:** Allows the instructor to cause the IC-AMP circuit breaker to release. No caution lights illuminate.
- **VHF TX 1:** Allows the instructor to cause the VHF TX 1 circuit breaker to release. No caution lights illuminate, but it is no longer possible to transmit using the #1 VHF radio.
- **NMS 1:** Allows the instructor to cause the NMS 1 circuit breaker to release. The #1 GPS powers down immediately, and any navigation provided to the NMS from GPS #1 is lost. Note: Change the GPS switch from GPS #1 to GPS #2 to restore NMS navigation capability.
- **TETRA (TAC):** Allows the instructor to cause the TETRA (TAC) circuit breaker to release. No caution lights illuminate.
- **DMM TEST:** Allows the instructor to cause the DMM TEST circuit breaker to release. No caution lights illuminate.
- **FUZZ BURN:** Allows the instructor to cause the FUZZ BURN circuit breaker to release. No caution lights illuminate, but the Fuzz burning function will be unavailable.

***SHED BUS I (Cont)***

- **HOR BAT:** Allows the instructor to cause the HOR BAT circuit breaker to release. The caution **HOR BAT** illuminates on the center CAD display. The standby Horizon has a 60 minute minimum emergency power supply. When a red flag appears on the gauge, do not use any longer.
- **GSM:** Allows the instructor to cause the GSM circuit breaker to release. No caution lights illuminate.
- **ICS 3:** Allows the instructor to cause the ICS 3 circuit breaker to release. No caution lights illuminate.
- **SHED BUS 1:** Allows the instructor to cause the SHED BUS 1 circuit breaker to release. All systems tied into the **SHED BUS I** will be inoperative.
- **PITOT HTR-CP:** Allows the instructor to cause the PITOT HTR-CP circuit breaker to release. The **PITOT HTR** caution illuminates on the CAD display. Left pitot heater fails.  
\*\*Refer to respective  
*Emergency Procedure for*  
**PITOT HTR.**
- **LDG LIGHT: PWR:** Allows the instructor to cause the LDG LIGHT:PWR circuit breaker to release. No caution lights illuminate, but the (Search light) will not function.
- **LDG LIGHT: CONT:** Allows the instructor to cause the LDG LIGHT: CONT circuit breaker to release. No caution lights illuminate.

- **POS LT:** Allows the instructor to cause the POS LT circuit breaker to release. No caution lights illuminate, but the Position lights will not function.
- **TRIM ACT:** Allows the instructor to cause the TRIM ACT circuit breaker to release. No caution lights illuminate, but the beep trim on the cyclic will not function.

***ESS BUS I***

- **APMS/DTS:** Allows the instructor to cause the APMS/DTS circuit breaker to release. No caution lights illuminate.
- **AP 1:** Allows the instructor to cause the AP 1 circuit breaker to release. As long as the AP 2 circuit breaker has no issue, the Autopilot will continue to function.
- **ADC 1:** Allows the instructor to cause the ADC 1 circuit breaker to release. Discrepancy arrows illuminate on both the Airspeed indicator and Altimeter on the right side PFD. Use the RCU to reconfigure as necessary.
- **AHARS 1:** Allows the instructor to cause the AHARS 1 circuit breaker to release. Discrepancy arrows illuminate on both the Artificial Horizon and Directional Gyro on the right side PFD and ND. Use the RCU to reconfigure as necessary.

**ESS BUS I (Cont)**

- **BLW PEL:** Allows the instructor to cause the BLW PEL circuit breaker to release. No caution lights illuminate.
- **WIPER:** Allows the instructor to cause the WIPER circuit breaker to release. No caution lights illuminate, but the wiper will not function.
- **P/R SAS:** Allows the instructor to cause the P/R SAS circuit breaker to release. The **P/R SAS** light illuminates on the center CAD display. Monitor system performance.
- **TRIM REL:** Allows the instructor to cause the TRIM REL circuit breaker to release. No caution lights illuminate, but the Force Trim release switch will no longer function.
- **FCDS 2 BACKUP:** Allows the instructor to cause the FCDS 2 BACKUP circuit breaker to release. No caution lights illuminate, but the FCDS 2 no longer has a back-up.
- **FCDM 1:** Allows the instructor to cause the FCDM 1 circuit breaker to release. The left side Flight Control Display Modules go blank and the right side FCDM informs the pilot to CHECK FCDM. Use the RCU to reconfigure as necessary.
- **ND 1:** Allows the instructor to cause the ND 1 circuit breaker to release. This causes the loss of the left side Navigation Display, but its information is automatically moved up to the PFD in the form of the composite mode.
- **PFD 1:** Allows the instructor to cause the PFD 1 circuit breaker to release. This causes the loss of the left side Primary Flight Display, but its information is automatically moved down to the ND where the composite mode now displays navigation information.
- **VENT SYS: PWR:** Allows the instructor to cause the VENT SYS:PWR circuit breaker to release. No caution lights illuminate, but the VENT SYS will no longer function.
- **VENT SYS: CONT:** Allows the instructor to cause the VENT SYS: CONT circuit breaker to release. No caution lights illuminate, but the VENT SYS will no longer function.
- **CKPT LT:** Allows the instructor to cause the CKPT LT circuit breaker to release. No caution lights illuminate, but the cockpit light will no longer function.
- **MASTER 1:** Allows the instructor to cause the MASTER 1 circuit breaker to release. No caution lights illuminate.
- **ESS BUS 1:** Allows the instructor to cause the ESS BUS 1 circuit breaker to release. All systems tied into the **ESS BUS 1** will be inoperative, and respective caution lights will illuminate.
- **ICS 1:** Allows the instructor to cause the ICS 1 circuit breaker to release. No caution lights illuminate, but the ICS system will no longer function.

**ESS BUS I (Cont)**

- **ROLL SEMA:** Allows the instructor to cause the ROLL SEMA circuit breaker to release. No caution lights illuminate, but the Roll SEMA will no longer function.
- **YAW SEMA:** Allows the instructor to cause the YAW SEMA circuit breaker to release. No caution lights illuminate, but the Yaw SEMA no longer functions.
- **XFER-F PUMP:** Allows the instructor to cause the XFER-F PUMP circuit breaker to release. After 3 minutes, the **F PUMP FWD** will illuminate.  
\*\*Refer to respective *Emergency Procedure* for **F PUMP FWD.**
- **ENG 1: N2:** Allows the instructor to cause the ENG 1: N2 circuit breaker to release. No caution lights illuminate. The N2 indication remains displayed because of its redundant power source.
- **ENG 1: PRIME-P:** Allows the instructor to cause the ENG 1: PRIME-P circuit breaker to release. No caution light illuminates, but the Engine 1 Prime pump no longer functions.
- **ENG 1: FIRE-D:** Allows the instructor to cause the ENG 1: FIRE-D circuit breaker to release. No caution light will illuminate, but the Engine 1 fire detection system will no longer function.
- **ENG 1: FUEL-V:** Allows the instructor to cause the ENG 1: FUEL-V circuit breaker to release. No caution light will illuminate, but the Engine 1 fuel valve will no longer function.
- **ENG 1: IGN:** Allows the instructor to cause the ENG 1: IGN circuit breaker to release. No caution lights illuminate, but the Engine 1 igniters will no longer function.
- **ENG 1: START:** Allows the instructor to cause the ENG 1: START circuit breaker to release. No caution light illuminates, but the Engine 1 starter will no longer function.
- **ENG 1: FADEC:** Allows the instructor to cause the ENG 1: FADEC circuit breaker to release. No caution light illuminates  
Note: The FADEC system still operates in this case because of the redundant power supply provided to the FADEC from the engine driven alternator.
- **HTG MOTOR:** Allows the instructor to cause the HTG MOTOR circuit breaker to release. No caution lights illuminate, but the Heater Motor will no longer function.
- **SYS 1: FIRE-E:** Allows the instructor to cause the SYS 1: FIRE-E circuit breaker to release. No caution lights illuminate, but in the case of a fire, the fire extinguisher on system 1 will not function.

**ESS BUS I (Cont)**

- **SYS 1: FUEL-L:** Allows the instructor to cause the SYS1: FUEL-L circuit breaker to release. No caution light illuminates, but if the fuel level in the left supply tank is drained to exhaustion, the **LOW FUEL 1** warning light will not function. Note: The **FUEL** light on the CAD display will still function. \*\*Refer to respective *Emergency Procedure for **FUEL**.*
- **SYS 1: HYD-P:** Allows the instructor to cause the SYS 1: HYD-P circuit breaker to release. This will cause the loss of the Hydraulic System 1 and the illumination of the **HYD PRESS** light on the left CAD display. \*\*Refer to respective *Emergency Procedure for **HYD PRESS**.*
- **SYS 1: WARN:** Allows the instructor to cause the SYS 1: WARN circuit breaker to release. No caution lights will illuminate. Note: The Warning Unit will still function, but only if the SYS 2: WARN circuit breaker is still fully seated. The Warning Unit is powered by both Essential Bus 1 and Essential Bus 2 for redundancy.
- **SYS 1: CAD:** Allows the instructor to cause the SYS 1: CAD circuit breaker to release. No caution lights will illuminate. Note: The CAD display will still function, but only if the SYS 2: CAD circuit breaker is still fully seated. The CAD is powered by both Essential Bus 1 and Essential Bus 2 for redundancy.
- **SYS 1: VEMD:** Allows the instructor to cause the SYS 1: VEMD circuit breaker to release. No caution lights will illuminate. Note: The VEMD displays will still function, but only if the SYS 2: VEMD circuit breaker is still fully seated. The VEMD displays are powered by both Essential Bus 1 and Essential Bus 2 for redundancy.

## **ESS BUS II**

- **YAW:** Allows the instructor to cause the YAW circuit breaker to release. The **YAW SAS** and **GYRO** light illuminate on the center CAD display. Monitor system performance.  
\*\*Refer to respective *Emergency Procedure* for **YAW SAS**.
- **MAST MM:** Allows the instructor to cause the MAST MM circuit breaker to release. This will cause the loss of the Mast Moment indicator on the VEMD screen containing the FLI.  
Note: The loss of the Mast Moment indicator limits the EC135 to a ground sloping in any direction  
(Maximum of 6 degrees)
- **NMS 2:** Allows the instructor to cause the NMS 2 circuit breaker to release. The #2 GPS powers down immediately, and any navigation provided to the NMS from GPS #2 is lost.  
Note: Change the GPS switch from GPS #2 to GPS #1 to restore NMS navigation capability.
- **NMS BLW:** Allows the instructor to cause the NMS BLW circuit breaker to release. The GPS cooling blowers will no longer function.
- **ATC 2:** Allows the instructor to cause the ATC 2 circuit breaker to release. The Transponder will cease to function immediately.
- **PFD 2:** Allows the instructor to cause the PFD 2 circuit breaker to release. The information on the Primary Flight Display *is not lost* on the right side PFD because of the redundant power supplied to the PFD 2 system.
- **ND 2:** Allows the instructor to cause the ND 2 circuit breaker to release. The information on the Navigation Display *is not lost* on the right side ND because of the redundant power supplied to the ND 2 system.
- **FCDM 2:** Allows the instructor to cause the FCDM 2 circuit breaker to release. The right side Flight Control Display Modules *do not* go blank as in the case of the loss of FCDM 1 on ESS BUS I. This is because of the redundant power supplied to the FCDM 2 system.
- **INSTR LT:** Allows the instructor to cause the INSTR LT circuit breaker to release. No caution lights will illuminate, but the Instrument lights will no longer function.
- **LDG:** Allows the instructor to cause the LDG circuit breaker to release. No caution lights will illuminate, but the Landing Light will no longer function.
- **A-COLL:** Allows the instructor to cause the A-COLL circuit breaker to release.

***ESS BUS II (Cont)***

- **GROUND REL:** Allows the instructor to cause the GROUND REL circuit breaker to release. No caution lights illuminate, but the system is no longer functional.
- **PITCH DAMP:** Allows the instructor to cause the PITCH DAMP circuit breaker to release. The **P DAMPER** and **GYRO** lights illuminate on the center CAD display. The conditions associated with these lights is the loss of the Pitch Damper and a sensor such as AHRS or a rate gyro. Monitor system performance.
- **LDG LT FIX: PWR:** Allows the instructor to cause the LDG LT FIX: PWR to release. No caution lights illuminate, but the (Fixed landing light) will not function.
- **LDG LT FIX: CONT:** Allows the instructor to cause the LDG LT FIX: CONT circuit breaker to release. No caution lights illuminate.
- **VHF TX 2:** Allows the instructor to cause the VHF TX 2 circuit breaker to release. No caution lights illuminate, but transmitting from the #2 VHF radio will no longer be possible.
- **ICS 2:** Allows the instructor to cause the ICS 2 circuit breaker to release. No caution lights illuminate, but the ICS #2 system will no longer function.
- **ROTOR RPM:** Allows the instructor to cause the ROTOR RPM circuit breaker to release. No caution lights illuminate, but the Rotor RPM indication is lost.
- **ESS BUS 2:** Allows the instructor to cause the ESS BUS 2 circuit breaker to release. All systems tied into the **ESS BUS 2** will be inoperative, and respective caution lights will illuminate.
- **MASTER 2:** Allows the instructor to cause the MASTER 2 circuit breaker to release. No caution lights illuminate.
- **ENG 2: FADEC:** Allows the instructor to cause the ENG 2: FADEC circuit breaker to release. No caution light illuminates  
Note: The FADEC system still operates in this case because of the redundant power supply provided to the FADEC from the engine driven alternator.
- **ENG 2: START:** Allows the instructor to cause the ENG 2: START circuit breaker to release. No caution light illuminates, but the Engine 2 starter will no longer function.
- **ENG 2: IGN:** Allows the instructor to cause the ENG 2: IGN circuit breaker to release. No caution lights illuminate, but the Engine 2 igniters will no longer function.

**ESS BUS II (Cont)**

- **ENG 2: FUEL-V:** Allows the instructor to cause the ENG 2: FUEL-V circuit breaker to release. No caution light will illuminate, but the Engine 2 fuel valve will no longer function.
- **ENG 2: FIRE-D:** Allows the instructor to cause the ENG 2:FIRE-D circuit breaker to release. No caution light will illuminate, but the Engine 2 fire detection system will no longer function.
- **ENG 2: PRIME-P:** Allows the instructor to cause the ENG 2: PRIME-P circuit breaker to release. No caution light illuminates, but the Engine 2 Prime pump will no longer function.
- **ENG 2: N2:** Allows the instructor to cause the ENG 2: N2 circuit breaker to release. No caution lights illuminate. The N2 indication remains displayed because of its redundant power source.
- **PIT HTR ST HTR:** Allows the instructor to cause the PIT HTR ST HTR circuit breaker to release. The **PITOT HTR** caution illuminates on the CAD display. Right pitot heater fails and the static heater as well.  
\*\*Refer to respective  
*Emergency Procedure for*  
**PITOT HTR.**
- **SYS 2: VEMD:** Allows the instructor to cause the SYS 2: VEMD circuit breaker to release. No caution lights will illuminate. Note: The VEMD displays will still function, but only if the SYS 1: VEMD circuit breaker is still fully seated. The VEMD displays are powered by both Essential Bus 1 and Essential Bus 2 for redundancy.
- **SYS 2: CAD:** Allows the instructor to cause the SYS 2: CAD circuit breaker to release. No caution lights will illuminate. Note: The CAD display will still function, but only if the SYS1: CAD circuit breaker is still fully seated. The CAD is powered by both Essential Bus 1 and Essential Bus 2 for redundancy.
- **SYS 2: WARN:** Allows the instructor to cause the SYS 2: WARN circuit breaker to release. No caution lights will illuminate. Note: The Warning Unit will still function, but only if the SYS 1: WARN circuit breaker is still fully seated. The Warning Unit is powered by both Essential Bus 1 and Essential Bus 2 for redundancy.
- **SYS 2: HYD-P:** Allows the instructor to cause the SYS 2: HYD-P circuit breaker to release. This will cause the loss of the Hydraulic System 2 and the illumination of the **HYD PRESS** light on the left CAD display.  
\*\*Refer to respective  
*Emergency Procedure for*  
**HYD PRESS.**

**EC 135**

**ESS BUS II (Cont)**

- **SYS 2: FUEL-L:** Allows the instructor to cause the SYS2: FUEL-L circuit breaker to release. No caution light illuminates, but if the fuel level in the right supply tank is drained to exhaustion, the **LOW FUEL 2** warning light will not function. Note: The **FUEL** light on the CAD display will still function. \*\*Refer to respective *Emergency Procedure* for **FUEL**.
- **SYS 2: FIRE-E:** Allows the instructor to cause the SYS 2: FIRE-E circuit breaker to release. No caution lights illuminate, but in the case of a fire, the fire extinguisher on system 2 will not function.
- **INV 2:** Allows the instructor to cause the INV 2 circuit breaker to release. The cautions **P/R SAS** and **INVERTER** appear on the CAD display. Monitor system performance and place the inverter switch to the remaining inverter.
- **HTG CONT:** Allows the instructor to cause the HTG CONT circuit breaker to release. No caution lights illuminate, but the heating system will no longer function.

INSTRUCTOR OPERATING STATION  
List of Failures and Maneuvers  
*EC 135*

**APPENDIX I**

**ENGINES SCREEN SHOT:**

Engines		One		Two		One		Two	
Quick Start	<input type="button" value="Start"/>	<input type="button" value="Start"/>			FADEC Fail	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Quick Stop	<input type="button" value="Stop"/>	<input type="button" value="Stop"/>			FADEC Degrade	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Start Condition	<input type="text" value="Normal"/>	<input type="text" value="Normal"/>			FLI Fail	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Oil Pressure Scaler	<input type="text" value="1.00"/>	<input type="text" value="1.00"/>			FLI Degrade	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Oil Temperature Scaler	<input type="text" value="1.00"/>	<input type="text" value="1.00"/>			Oil Filter	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Total Failure	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal			Fuel Filter	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
High Pressure Fuel Pump	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal			Fuel Pressure	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Priming Fuel Pump	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal			Engine Fire	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Forward XFER Pump	<input type="checkbox"/> Normal				Drive Shaft	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Aft XFER Pump	<input type="checkbox"/> Normal				Governor Overspeed	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
Exceed Reset	<input type="button" value="Reset"/>				Chip Detection	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
					Chip Circuit	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		
					Torque Runaway	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal		

  

Engine Gauge Offset		One		Two		Main Gear Box	
N1 RPM	<input type="text" value="0.00"/>	%	<input type="text" value="0.00"/>	%			
Torque	<input type="text" value="0.00"/>	%	<input type="text" value="0.00"/>	%			
TOT	<input type="text" value="0.00"/>	°C	<input type="text" value="0.00"/>	°C			
Oil Pressure	<input type="text" value="0.00"/>	psi	<input type="text" value="0.00"/>	psi	<input type="text" value="0.00"/>	psi	
Oil Temperature	<input type="text" value="0.00"/>	°C	<input type="text" value="0.00"/>	°C	<input type="text" value="0.00"/>	°C	

  

Rotors		
Main Rotor Chip	<input type="checkbox"/> Normal	
Tail Rotor Drive	<input type="checkbox"/> Normal	
Tail Rotor Pitch	<input type="checkbox"/> Normal	
Tail Rotor Chip	<input type="checkbox"/> Normal	
Transmission Chip Circuit	<input type="checkbox"/> Normal	
Tail Rotor Gearbox Chip Circuit	<input type="checkbox"/> Normal	



# INSTRUCTOR OPERATING STATION

## List of Failures and Maneuvers

### EC 135

#### SYSTEMS SCREEN SHOT:

**Systems**

*Fuel*

Fuel Quantity Scaler	<input type="text" value="1.0"/>
Main Tank Fuel	<input type="checkbox"/> Normal
Left Supply Tank Fuel	<input type="checkbox"/> Normal
Right Supply Tank Fuel	<input type="checkbox"/> Normal
Fuel Quantity	<input type="checkbox"/> Normal

*Icing*

Icing	<input type="checkbox"/> Off
Icing Accumulation Rate	<input type="text" value="0.0"/> In/Hr
	<i>One</i> <i>Two</i>
Pitot Tube Icing	<input type="checkbox"/> Normal <input type="checkbox"/> Normal
Ice Detection	<input type="checkbox"/> Normal

*Hydraulic*

Hydraulic Pump 1	<input type="checkbox"/> Normal
Hydraulic Pump 2	<input type="checkbox"/> Normal
Yaw SAS	<input type="checkbox"/> Normal
Pitch/Roll SAS	<input type="checkbox"/> Normal
Pitch Dampner	<input type="checkbox"/> Normal
Hand Pump	<input type="checkbox"/> Off

*Miscellaneous*

	<i>One</i> <i>Two</i>
Air Data Computer	<input type="checkbox"/> Normal <input type="checkbox"/> Normal
Static Air Source	<input type="checkbox"/> Normal <input type="checkbox"/> Normal
Trim Runaway	<input type="checkbox"/> Normal
Trim Switch	<input type="checkbox"/> Normal
Cargo Smoke	<input type="checkbox"/> Normal
Rotor Wash Visual Effect	<input type="checkbox"/> Disabled
Fire Bottles	<input type="text" value="Recharge"/>

INSTRUCTOR OPERATING STATION  
List of Failures and Maneuvers  
*EC 135*

**FLIGHT INSTRUMENTS SCREEN SHOTS:**

Flight Instruments			
<i>EFIS</i>			
	<i>One</i>		<i>Two</i>
PFD Display	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
ND Display	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
FCDM	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
ICP	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
<i>AHRS</i>			
	<i>One</i>		<i>Two</i>
AHRS Unit	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
Vertical Gyro	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
Directional Gyro	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
Vertical Speed	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
Altimeter	<input type="checkbox"/> Normal		<input type="checkbox"/> Normal
<i>Central Panel Display System</i>			
		<i>Standby</i>	
VEMD Processor 1	<input type="checkbox"/> Normal	Airspeed	<input type="checkbox"/> Normal
VEMD Processor 2	<input type="checkbox"/> Normal	ADI	<input type="checkbox"/> Normal
CAD Processor	<input type="checkbox"/> Normal	Altimeter	<input type="checkbox"/> Normal
VEMD Fan	<input type="checkbox"/> Normal	Tach	<input type="checkbox"/> Normal
CAD Fan	<input type="checkbox"/> Normal		
CPDS Overheat	<input type="checkbox"/> Normal		
Done			

INSTRUCTOR OPERATING STATION  
List of Failures and Maneuvers  
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**AVIONICS SCREEN SHOT:**

Avionics		
	<i>One</i>	<i>Two</i>
COM	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Audio Panel	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
NAV	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Glideslope	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
ADF	<input type="checkbox"/> Normal	
DME	<input type="checkbox"/> Normal	
Marker	<input type="checkbox"/> Normal	
Autopilot	<input type="checkbox"/> Normal	
Audio Panel Primary Power	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
<hr/> <i>GPS</i> <hr/>		
Receiver Failure	<input type="checkbox"/> Normal	
Visible Satellites	<input type="text" value="12"/>	
<input type="text" value=""/> <input type="button" value="OK"/>		



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List of Failures and Maneuvers

*EC 135*

**ELECTRICAL SCREEN SHOT:**

Electrical					
	<i>One</i>	<i>Two</i>	<i>Electrical Contactor</i>		
Avionics Master Switch	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	Bus Tie	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Generator	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	Essential Bus	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Inverter	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	High Load Bus	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
NiCd Batt. Thermal Runaway	<input type="checkbox"/> Normal		High Power	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Battery Voltage	<input type="checkbox"/> Normal		Shedding Bus	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Battery Discharge	<input type="checkbox"/> Off		Starter	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
External Power	Disconnected ▾		Battery	<input type="checkbox"/> Normal	
Electrical Load	0.0 %		<i>Electrical Buses</i>		
<i>Electrical Fuse</i>			Essential	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Essential Bus	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	High Load	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
High Load Bus	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	Primary	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Essential Bus Batt Feeder	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	Shedding	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal
Shed Bus	<input type="checkbox"/> Normal	<input type="checkbox"/> Normal	Battery	<input type="checkbox"/> Normal	
<div style="display: flex; justify-content: space-between; align-items: center;"> <span>0</span> <input style="width: 100px;" type="text"/> <span>0</span> </div> <div style="text-align: center; margin-top: 5px;"> <input type="button" value="Done"/> </div>					

**CIRCUIT BREAKERS SCREEN SHOT:**

ESS BUS I		ESS BUS II		AC/SHED/BATT BUS	
<u>AC BUS I</u>		<u>SHED BUS I</u>			
AHARS 1	<input checked="" type="radio"/> Normal	IC-AMP	<input checked="" type="radio"/> Normal		
ROLL SAS	<input checked="" type="radio"/> Normal	VHF TX 1	<input checked="" type="radio"/> Normal		
<u>AC BUS II</u>					
PITCH SAS	<input checked="" type="radio"/> Normal	NMS 1	<input checked="" type="radio"/> Normal		
<u>SHED BUS II</u>					
XFER-A PUMP	<input checked="" type="radio"/> Normal	TETRA (TAC)	<input checked="" type="radio"/> Normal		
ADF	<input checked="" type="radio"/> Normal	DMM TEST	<input checked="" type="radio"/> Normal		
MKR	<input checked="" type="radio"/> Normal	FUZZ BURN	<input checked="" type="radio"/> Normal		
RAD ALT	<input checked="" type="radio"/> Normal	HOR BAT	<input checked="" type="radio"/> Normal		
DME	<input checked="" type="radio"/> Normal	GSM	<input checked="" type="radio"/> Normal		
SHED BUS 2	<input checked="" type="radio"/> Normal	ICS 3	<input checked="" type="radio"/> Normal		
BLW PEL	<input checked="" type="radio"/> Normal	SHED BUS 1	<input checked="" type="radio"/> Normal		
AHRS 2	<input checked="" type="radio"/> Normal	PITOT HTR-CP	<input checked="" type="radio"/> Normal		
ADC 2	<input checked="" type="radio"/> Normal	LDG LIGHT: PWR	<input checked="" type="radio"/> Normal		
AP 2	<input checked="" type="radio"/> Normal	LDG LIGHT: CONT	<input checked="" type="radio"/> Normal		
<u>BATT BUS</u>		POS LT	<input checked="" type="radio"/> Normal		
STDBY HOR	<input checked="" type="radio"/> Normal	TRIM ACT	<input checked="" type="radio"/> Normal		
ELT	<input checked="" type="radio"/> Normal				



INSTRUCTOR OPERATING STATION

List of Failures and Maneuvers

*EC 135*

CONTINUED:

Circuit Breakers			
ESS BUS I		ESS BUS II	AC/SHED/BATT BUS
APMS/DTS	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ROLL SEMA <input checked="" type="radio"/> <input type="checkbox"/> Normal
AP 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	YAW SEMA <input checked="" type="radio"/> <input type="checkbox"/> Normal
ADC 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	XFER-F PUMP <input checked="" type="radio"/> <input type="checkbox"/> Normal
AHARS 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ENG I: N 2 <input checked="" type="radio"/> <input type="checkbox"/> Normal
BLW PEL	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ENG I: PRIME-P <input checked="" type="radio"/> <input type="checkbox"/> Normal
WIPER	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ENG I: FIRE-D <input checked="" type="radio"/> <input type="checkbox"/> Normal
P/R SAS	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ENG I: FUEL-V <input checked="" type="radio"/> <input type="checkbox"/> Normal
TRIM REL	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ENG I: IGN <input checked="" type="radio"/> <input type="checkbox"/> Normal
FCDS 2 BACKUP	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ENG I: START <input checked="" type="radio"/> <input type="checkbox"/> Normal
FCDM 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	ENG I: FADEC <input checked="" type="radio"/> <input type="checkbox"/> Normal
ND 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	HTG MOTOR <input checked="" type="radio"/> <input type="checkbox"/> Normal
PFD 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	SYS I: FIRE-E <input checked="" type="radio"/> <input type="checkbox"/> Normal
VENT SYS: PWR	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	SYS I: FUEL-L <input checked="" type="radio"/> <input type="checkbox"/> Normal
VENT SYS: CONT	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	SYS I: HYD-P <input checked="" type="radio"/> <input type="checkbox"/> Normal
CKPT LT	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	SYS I: WARN <input checked="" type="radio"/> <input type="checkbox"/> Normal
MASTER 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	SYS I: CAD <input checked="" type="radio"/> <input type="checkbox"/> Normal
ESS BUS 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	SYS I: VEMD <input checked="" type="radio"/> <input type="checkbox"/> Normal
ICS 1	<input checked="" type="radio"/>	<input type="checkbox"/> Normal	



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List of Failures and Maneuvers

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CONTINUED:

Circuit Breakers					
ESS BUS I		ESS BUS II		AC/SHED/BATT BUS	
YAW	5	<input type="checkbox"/>	Normal	ESS BUS 2	5 <input type="checkbox"/> Normal
MAST MM	5	<input type="checkbox"/>	Normal	MASTER 2	5 <input type="checkbox"/> Normal
NMS 2	5	<input type="checkbox"/>	Normal	ENG II: FADEC	5 <input type="checkbox"/> Normal
NMS BLW	5	<input type="checkbox"/>	Normal	ENG II: START	5 <input type="checkbox"/> Normal
ATC 2	5	<input type="checkbox"/>	Normal	ENG II: IGN	5 <input type="checkbox"/> Normal
PFD 2	5	<input type="checkbox"/>	Normal	ENG II: FUEL-V	5 <input type="checkbox"/> Normal
ND 2	5	<input type="checkbox"/>	Normal	ENG II: FIRE-D	5 <input type="checkbox"/> Normal
FCDM 2	5	<input type="checkbox"/>	Normal	ENG II: PRIME-P	5 <input type="checkbox"/> Normal
INSTR LT	5	<input type="checkbox"/>	Normal	ENG II: N 2	5 <input type="checkbox"/> Normal
LDG	5	<input type="checkbox"/>	Normal	PIT HTR ST HTR	5 <input type="checkbox"/> Normal
A-COLL	5	<input type="checkbox"/>	Normal	SYS II: VEMD	5 <input type="checkbox"/> Normal
GROUND REL	5	<input type="checkbox"/>	Normal	SYS II: CAD	5 <input type="checkbox"/> Normal
PITCH DAMP	5	<input type="checkbox"/>	Normal	SYS II: WARN	5 <input type="checkbox"/> Normal
LDG LT FIX: PWR	5	<input type="checkbox"/>	Normal	SYS II: HYD-P	5 <input type="checkbox"/> Normal
LDG LT FIX: CONT	5	<input type="checkbox"/>	Normal	SYS II: FUEL-L	5 <input type="checkbox"/> Normal
VHF TX 2	5	<input type="checkbox"/>	Normal	SYS II: FIRE-E	5 <input type="checkbox"/> Normal
ICS 2	5	<input type="checkbox"/>	Normal	INV 2	5 <input type="checkbox"/> Normal
ROTOR RPM	5	<input type="checkbox"/>	Normal	HTG CONT	5 <input type="checkbox"/> Normal

Done



INSTRUCTOR OPERATING STATION

List of Failures and Maneuvers

*EC 135*

**APPENDIX II**

***Maneuvers approved for Evaluation:***

Area of Operation	FTD	Aircraft
<b>PREFLIGHT PROCEDURES</b>		
Preflight Inspection (cockpit only)	X	X
Preflight Inspection		X
Powerplant Start (normal)	X	X
Powerplant Start (alternate start procedures)	X	X
Abnormal Starts and Shutdowns	X	
Taxing- Ground		X
Taxing- Hover		X
Pretakeoff Checks	X	X
<b>TAKEOFF AND DEPARTURE PHASE</b>		
Normal and Crosswind Takeoff		X
From Ground		X
From Hover		X
Running		X
Instrument Takeoff	X	X
Powerplant Failure During Takeoff	X	X
Rejected Takeoff		X
Instrument Departure	X	X
<b>INFLIGHT MANEUVERS</b>		
Steep Turns	X	X
Powerplant Failure- Multi-Engine Helicopters	X	X
Recovery from Unusual Attitudes		X
Settling With Power		X
<b>INSTRUMENT PROCEDURES</b>		
Instrument Arrival	X	X
Holding	X	X
Normal – all engines operating	X	X
Manually controlled- one or more engines inoperative	X	X
Precision Approach (Normal)	X	X
Precision Inst. Approach (Manual/Pwrpint Fail)	X	X



INSTRUCTOR OPERATING STATION

List of Failures and Maneuvers

**EC 135**

Nonpercision Approach	X	X
One or more engines inoperative	X	X
Missed Approach (Normal)	X	X
Stability augmentation system failure	X	X
Missed Approach (Powerplant Failure)	X	X
<b>LANDING AND APPROACHES TO LANDING</b>		
Visual Approaches (normal steep, shallow)	X	X
Landings		X
Approach and Landing with Simulated Powerplant Failure		X
Rejected Landing		X
<b>NORMAL AND ABNORMAL PROCEDURES</b>		
Powerplant	X	X
Fuel System	X	X
Electrical System	X	X
Hydraulic System	X	X
Environmental System	X	X
Fire Detection and Extinguisher Systems	X	X
Automatic Flight Control System, Electronic Flight Instrumentation System, and Related Subsys.	X	X
Flight Control System	X	X
Anti-ice and Deice System	NA	
Aircraft and Personal Emergency Equipment	X	X
Loss of Tail Rotor Effectiveness		X
Others, as determined by make, model or series	X	X
<b>EMERGENCY PROCEDURES</b>		
Emergency Decent	X	X
Inflight Fire and Smoke Removal	X	X
Emergency Evacuation	X	X
Ditching		X
Autorative Landing		X
<b>POSTFLIGHT PROCEDURES</b>		
After-Landing Procedures	X	X
Abnormal/Emergency Procedures	X	X
Rotor Brake Operation	X	X
Parking and Securing		X