Objectives

• Understand the format and content layout of NATOPS Section 3

• Be familiar with common terms associated with handling emergencies

• Understand the three basic rules to handling an airborne emergency

• Be familiar with PR0112 Emergency Procedures Review Supplemental Handout
NATOPS Layout
(Section III)

• Contains Emergency Procedures
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(Section III)

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• “Hatched Pages”
  • Easy to identify emergency procedure sections
  • Same hatched format in NATOPS, PCL, and Quadfold
NATOPS Layout
(Section III)

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  • Easy to identify emergency procedure sections
  • Same hatched format in NATOPS, PCL, and Quadfold

• Assumes knowledge of Section I (Systems) & Section V (Limitations)
NATOPS Layout  
(Section III)

- Table of Contents
  - Lists emergencies by phase of flight (ground, takeoff, in-flight, etc.)
  - Quickest method to find a particular procedure
NATOPS Layout (Section III)

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- Introduction
  - Frames the chapter & sets forth guidance
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  • Defines Critical Action Items (Memory Items vs Boldface)
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  - Defines what constitutes a suitable landing area
Title of the document: "NATOPS Layout (Section III)"

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  - Defines what constitutes a suitable landing area
  - Defines terms of urgency to landing (Possible vs Practical)
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  • Frames the chapter & sets forth guidance
  • Gives the basic rules for handling an emergency
  • Defines Critical Action Items (Memory Items vs Boldface)
  • Defines what constitutes a suitable landing area
  • Defines terms of urgency to landing (Possible vs Practical)
  • Identifies proper circuit breaker usage
NATOPS Layout
(Section III)

• Individual Emergency Procedures
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(Section III)

- Individual Emergency Procedures
  - Listed by title & is the same used in PCL
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• May identify when to use the particular procedure
• May contain an amplifying discussion on diagnosing the problem or execution of the procedure
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  - Will have associated steps of the procedure (asterisk items identified)
NATOPS Layout
(Section III)

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  • Listed by title & is the same used in PCL
  • May identify when to use the particular procedure
  • May contain an amplifying discussion on diagnosing the problem or execution of the procedure
  • Will have associated steps of the procedure (asterisk items identified)
  • Will have any notes, warnings, or cautions associated with the procedure
  • Steps & Notes/Warnings/Cautions found in PCL also
NATOPS Layout
(Section III)

- **EICAS Message Table**
  - Listed by color (Red, Amber, White, Green)
  - Identifies cause for message
  - Lists page reference for further analysis
**NATOPS Layout**

(Section III)

- **EICAS Message Table**
  - Listed by color (Red, Amber, White, Green)
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  - Lists page reference for further analysis

- **Critical Action Items Table**
  - Lists all critical action items for aircraft
  - Shows both Memory Items & Boldface
Terms & Definitions

• Need to be familiar with common terms & definitions used throughout the manual

• Located in several places (ii, iii, 3-3)

• Provide an understanding in the application of procedures in the NATOPS manual
Terms & Definitions

• Sound Judgement (pg. ii)
  • A sort-of disclaimer or release
  • Acknowledges that a book cannot cover all situations
  • Puts importance on the use of sound judgement over blind obedience
  • Acknowledges that the situation may dictate modified procedures
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• Permissible Operations
  • Indicates that book tells you what you CAN do
  • Other operations are prohibited and are at the discretion of the user’s
    Command for authorization
Terms & Definitions

• Warnings, Cautions, and Notes
  • Warnings:

An operating procedure, technique, etc. which could result in personal injury or loss of life if not carefully followed
Terms & Definitions

• Warnings, Cautions, and Notes
  
  • **Warnings:**
    An operating procedure, technique, etc. which could result in personal injury or loss of life if not carefully followed
  
  • **Caution:**
    An operating procedure, technique, etc. which could result in damage to equipment if not carefully followed
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• Warnings, Cautions, and Notes

• Warnings:
   An operating procedure, technique, etc. which could result in personal injury or loss of life if not carefully followed

• Caution:
   An operating procedure, technique, etc. which could result in damage to equipment if not carefully followed

• Note:
   An operating procedure, technique, etc. which is considered essential to emphasize
**Terms & Definitions**

- **Shall, Will, Should, and May…**
  - **Shall & Will** – Indicate mandatory compliance
Terms & Definitions

• Shall, Will, Should, and May...
  • Shall & Will – Indicate mandatory compliance
  • Should – Indicates non-mandatory compliance but highlights a desired or preferred method
Terms & Definitions

• Shall, Will, Should, and May...
  • Shall & Will – Indicate mandatory compliance
  • Should – Indicates non-mandatory compliance but highlights a desired or preferred method
  • May – Indicates a suggested means of accomplishment
• Suitable Landing Area
  • Hard surface runway, taxiway, over/underrun
Terms & Definitions

- Suitable Landing Area
  - Hard surface runway, taxiway, over/underrun
  - Landing on an unprepared surface or ditching is not recommended (lawyer speak/legal coverage)
Terms & Definitions

- Suitable Landing Area
  - Hard surface runway, taxiway, over/underrun
  - Landing on an unprepared surface or ditching is not recommended (lawyer speak/legal coverage)
  - FWOP directs length of runway (3,000’ for emergencies)
Terms & Definitions

- Land As Soon As Possible
- Declare an emergency
Terms & Definitions

• Land As Soon As Possible
  • Declare an emergency
  • Land at nearest suitable airfield considering:
    • Severity of emergency
    • Weather conditions
    • Field facilities
    • Ambient lighting
    • Command Guidance

INTRODUCTION

AIR FORCE TO 17-485-1
NAVY NAV AIR A3-880A-49/880100

DEFINITIONS

Land As Soon As Possible

An emergency shall be declared and a landing attempted at the nearest suitable airfield, considering the severity of the emergency, weather conditions, field facilities, and other factors which can affect the safe execution of landing.

CRITICAL ACTION (US AIR FORCE)

The pilot should immediately execute a rapid go-around and land at the nearest suitable airfield. This action may necessitate a reduction in altitude to achieve a safe landing. Command guidance should be sought.

CRITICAL ACTION (US NAVY)

Emergency procedures should follow the emergency action checklist, which includes immediate reduction of altitude to achieve a safe landing. Command guidance should be sought.

NONCRITICAL ACTION

These actions may be taken in an attempt to reduce the severity of the emergency. Actions include:

- Reduce power
- Reduce throttle
- Reduce landing gear

CAUTION

If your throttle breaks in flight, result in uncontrolled motion.
Terms & Definitions

- **Land As Soon As Possible**
  - Declare an emergency
  - Land at nearest suitable airfield considering:
    - Severity of emergency
    - Weather conditions
    - Field facilities
    - Ambient lighting
    - Command Guidance
  - Have a very good reason for passing up an airfield!
Terms & Definitions

- Land As Soon As Practical
- Emergency conditions are less urgent
Terms & Definitions

• Land As Soon As Practical
  • Emergency conditions are less urgent
  • May not need to declare an emergency
Terms & Definitions

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  • An immediate landing may not be required
Terms & Definitions

- **Land As Soon As Practical**
- Emergency conditions are less urgent
- May not need to declare an emergency
- Mission will be terminated
- An immediate landing may not be required
- Leans heavily on the use of sound judgement to determine what to do
EP Basic Rules

• Three rules to handling an EP
EP Basic Rules

- Three rules to handling an EP
  - Maintain aircraft control
  - Analyze the situation and take proper action
  - Land as soon as conditions permit

INTRODUCTION
The sections contain procedures that follow in the event of an emergency. These procedures will assist maintain safety of the crew and aircraft. As a result, any normal or operating procedures will be abandoned. Although the procedures outlined are common, they are not absolute; please use your own judgment when confronted with an emergency.

CRITICAL ACTION (US AIR FORCE)

- In the event of a critical emergency, all personnel must take immediate action. The critical emergency will be determined by the situation.

CRITICAL ACTION (US NAVY)

- The critical emergency will be determined by the situation.

HYPOTHETICAL ACTION

- These actions are examples of actions that may be taken in case of an emergency.
EP Basic Rules

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- They provide a solid framework for initially handling/walking thru an emergency when it happens
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- Need to have the steps committed to memory and understand the process in each step
EP Basic Rules

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- They provide a solid framework for initially handling/walking thru an emergency when it happens

- Need to have the steps committed to memory and understand the process in each step

- Steps are meshed like the gears of a machine – there will be overlapping of the steps
Maintain Aircraft Control

• The most important step for any EP!!
Maintain Aircraft Control

• The most important step for any EP!!

• If you hit the ground...the EP is over

Eastern Airlines Flight 401, a Lockheed L1011, crashed into the Everglades on 29 Dec 1972 killing 101 people. Flight crew were preoccupied with a burnt-out landing gear indicator and did not notice the aircraft descending into the ground. How did three very qualified crewmembers allow this to happen?

Who was maintaining aircraft control?
Maintain Aircraft Control

- What does it mean?
  - Get the aircraft to a de-conflicted, stable state where you can move on to Step 2 and analyze the situation
  - The more aggressive of a maneuver means more attention on aircraft control prior to moving on
Maintain Aircraft Control

• What does it mean?
  • Get the aircraft to a de-conflicted, stable state where you can move on to Step 2 and analyze the situation
  • The more aggressive of a maneuver means more attention on aircraft control prior to moving on

• Possible scenarios (to name a few)
  • Takeoff (on the runway) – begin an abort
  • Takeoff (with sufficient runway remaining) – land back on runway or possibly continue takeoff
  • Takeoff (with insufficient runway remaining) – continue takeoff and return to land or eject if unable to remain in air
  • In Area (straight & level) – continue straight and level
  • In Area (middle of maneuver) – return to wings level flight (unusual attitude recovery?)
  • Low altitude – Zoom to get away from ground
Maintain Aircraft Control

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• Possible scenarios and where you could be are vast and each has numerous possible actions to maintain aircraft control. Think through your reactions for the most critical areas before something happens
Maintain Aircraft Control

• As a technique, some Instructors advocate the beginning of the PEL to maintain aircraft control
  • Accomplish the “Turn, Climb, Clean” steps of the PEL procedures
  • Exchange altitude for airspeed (zoom maneuver) and head toward nearest airfield or turn downwind if in pattern
  • Hedge the bet that it could be something serious (like an engine problem) and time is critical
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• NATOPS Zoom Maneuver
  • Description located in Engine Failure During Flight EP
  • Above 150 KIAS: 2 G pull up to a 20° climb angle until 145 KIAS and then a 0 – 0.5 G pushover to capture 125 KIAS
  • Below 150 KIAS: Level deceleration to catch 125 KIAS
  • Contains Low Altitude Zoom Capability Charts & Tabular Data
    • Note conditions (PCL in Cut-Off, Clean, 2 sec delay before initiating zoom)
    • Note that 240 KIAS vs 200 KIAS gives double to near-double the zoom altitude
  • Aggressive maneuver requiring attention to aircraft control!
Maintain Aircraft Control

• Technique Zoom Maneuver
  • Raise nose to put cowling on horizon (approx. 10° NH) while turning for nearest airfield...then catch 125 KIAS glide
  • In line with PEL steps: Turn (toward airfield), Climb (nose to horizon), Clean (check aircraft clean configuration)
  • Amount of nose up is commensurate with amount of airspeed (higher airspeed = higher nose up)
  • Less aggressive allowing you to move on to analyzing step quicker
  • Good if not low level where altitude and upward vector is not critical (NATOPS zoom best for low level)
Maintain Aircraft Control

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• **Other Considerations**
  - Maintaining aircraft control is directly linked with knowing your surroundings (good SA)
    - What are the current flight parameters
    - Where is nearest airfield
    - What are the weather conditions
  - Look outside the cockpit (a lot of bells and whistles to draw your attention inside)
  - Don’t rush into analyzing the situation...make sure you have control of the aircraft
Analyze the Situation & Take Proper Action

• Move to this step once aircraft control is maintained
  • Different EP & conditions allow you to get to this step quicker
  • More aggressive aircraft maneuvering will delay getting to this step
Analyze the Situation & Take Proper Action

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  • More aggressive aircraft maneuvering will delay getting to this step

• Not a “separate” step done by itself in isolation
  • Continue to maintain aircraft control while adding this step
  • May have to stop analyzing/acting to go back to aircraft control
  • Like-wise, as you move to Land as soon as conditions permit...you will continue to analyze the situation & take proper action
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• Analyzing the situation is more than just looking at lights & gauges
  • Consider the cockpit indications or warnings
  • Consider external indications such as sounds, vibrations, or control feel
  • Consider the weather conditions
  • Consider the flight regime you are in (low vs high, near airfield vs away, slow vs fast, etc.)
Analyze the Situation & Take Proper Action

• Analysis may affect aircraft control
  • As you analyze & gather data, it may direct a different way of maintaining aircraft control
  • Try not to assume what the problem is – a mindset can cause the wrong reaction
Analyze the Situation & Take Proper Action

• Analysis may affect aircraft control
  • As you analyze & gather data, it may direct a different way of maintaining aircraft control
  • Try not to assume what the problem is – a mindset can cause the wrong reaction

• Other additional help for analysis
  • Another aircraft
  • In-Flight Guide (IFG)
  • Flight Information Handbook (FIH)
  • Runway Duty Officer (RDO)
  • Flight Duty Officer (FDO)
  • Air Traffic Control (ATC)
Analyze the Situation & Take Proper Action

• Take proper action according to the analysis
Analyze the Situation & Take Proper Action

• Take proper action according to the analysis

• If there are critical action items associated
  • Do the memory items in order and as directed by NATOPS
  • If time exists after the memory items, get into PCL and accomplish “clean up” items (those steps that are not memory items)
Analyze the Situation & Take Proper Action

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• If there are critical action items associated
  • Do the memory items in order and as directed by NATOPS
  • If time exists after the memory items, get into PCL and accomplish “clean up” items (those steps that are not memory items)

• If there are no critical action items associated
  • Go directly to the PCL and execute the steps
  • Be familiar with steps prior to executing (read the instructions first!)
Analyze the Situation & Take Proper Action

- PR0112 Emergency Procedures Review Supplemental Handout
  - Help you with the analysis and proper actions for various Eps
  - Doesn’t get into Maintaining Aircraft Control or Land as Soon as Conditions Permit steps
Analyze the Situation & Take Proper Action

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  • Help you with the analysis and proper actions for various Eps
  • Doesn’t get into Maintaining Aircraft Control or Land as Soon as Conditions Permit steps

• Helps to take into account all of the book information and knowledge in the analysis
Analyze the Situation & Take Proper Action

- **PR0112 Emergency Procedures Review Supplemental Handout**
  - Helps you with the analysis and proper actions for various Eps
  - Doesn’t get into Maintaining Aircraft Control or Land as Soon as Conditions Permit steps

- Helps to take into account all of the book information and knowledge in the analysis

- Helps “wire” your brain in a logical manner
Analyze the Situation & Take Proper Action

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- Helps to take into account all of the book information and knowledge in the analysis

- Helps “wire” your brain in a logical manner

- Need to really know these and practice them BEFORE executing in the sim or aircraft (doesn’t get easier while flying)
Land As Soon As Conditions Permit

• The final step
  • Wide open guidance by the phrase – leaves it open to the situation and checklist
  • You will still be Maintaining Aircraft Control
  • You will continue to Analyze the Situation & Take Proper Action (updating as needed)
Land As Soon As Conditions Permit

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  • Wide open guidance by the phrase – leaves it open to the situation and checklist
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• PCL/Critical Action Items dictate time constraints and/or a way to proceed
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• PCL/Critical Action Items dictate time constraints and/or a way to proceed
  • Time constraints:
    • Land as Soon Possible
    • Land as Soon as Practical
    • Normally found in the checklist for the EP...Critical Action Items do not normally have these phrases associated
Land As Soon As Conditions Permit

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    • Land as Soon as Practical
    • Normally found in the checklist for the EP...Critical Action Items do not normally have these phrases associated

• How to proceed to the landing:
  • Precautionary Emergency Landing (PEL) – Have some power available (how much power is the question)
  • Forced Landing – Power is not available (you are a large glider)
  • Eject – PEL or Forced Landing is not an option or landing conditions are unsatisfactory
  • One of these ways normally dictated in the Critical Action Items...PCL can also incorporate one of these
Conclusion

• Understand the format and content layout of NATOPS Section 3

• Be familiar with common terms associated with handling emergencies

• Understand the three basic rules to handling an airborne emergency

• Be familiar with PR0112 Emergency Procedures Review Supplemental Handout