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Levels of Automation Advantages & Disadvantages

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June 2nd , 2015

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the evolution of mobility

AGENDA



Automation Dependency (Complacency , Addiction etc...)



Advantages & Disadvantages



Levels of Automation – Tier Module



Going Forward

FOX NEWS – Jul 2013 .



VOA – Nov. 2013 .



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**Aviation Authority Warns of 'Overreliance' on Autopilots
CAA says pilots need more training to keep their manual
flying skills sharp**

November 29, 2014 – International Business Times

"It's also vital that pilots do not become over reliant on automated systems and are able to retain the high level of flying skills required to operate as a qualified commercial airline pilot." UKCAA

December 1, 2014 – Aviation Maintenance & Technology

“Operating highly automated jets during demanding situations still tends to significantly increase the pilots task complexity and workload”

February 2014 – Flight Safety Foundation Automation Vulnerabilities

Asiana Crash Hearing Draws Attention to Pilots' Automation 'Addiction'

Dec 11, 2013



Air France Flight 447 Crash Causes in Part Point to Automation Paradox – Final Report July 5th, 2012



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8 4 GOLDEN RULE OF AVIATION

AVIATE

NAVIGATE

COMMUNICATE

AUTOMATE

AGENDA



Automation Dependency (Complacency , Addiction etc...)



Advantages & Disadvantages



Levels of Automation – Tier Module



Going Forward

Automation Dependency

Automation Advantages

- **Precision, Safety & Efficiency**
- **Never distracted**
- **Immune to fatigue**
- **Situational Awareness**
- **Reduces direct operational involvement**
- **Follows instruction without argument**
- **Reduces workload ?**

Automation Disadvantages

- **Automation -DM nil**
- **Garbage in / Garbage out**
- **Complacency/Sense of Security**
- **Situational Awareness**
- **Over reliability/reliance**
- **Inflexible**
- **Distraction**
- **Airmanship / Manual Flight Skills**
- **Silent failures (WOW)**
- **Does not respond to **NOW****

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AUTOMATION DEPENDENCY

IN SYNC - SYNCHRONIZE

Automation(Pilot)

Human (Pilot)

Automation	Pilot
<ul style="list-style-type: none">1-Perform routine and repetitive tasks2-Store , display and erase information3-Computability ability (quickly)4-Handles complex operations5-Multi task	<ul style="list-style-type: none">1-Detect visual and acoustic energy2-Percieve patterns of light/sound3-Improvise / flexibility procedures4-Inductive Reasoning(evaluates)5-Excersises Judgment

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Butter Finger Syndrome

- Pushing the wrong button – right time
- Pushing the right button – wrong time
- Pushing the right buttons – wrong sequence
- Thinking that an automated function is off – WHEN ITS ON
- Thinking that an automated function is on – BUT ITS OFF
- Automation Bias – following the choice of the least cognitive effort (processing & interpretation of information)

AGENDA



Automation Dependency (Complacency , Addiction etc...)



Advantages & Disadvantages

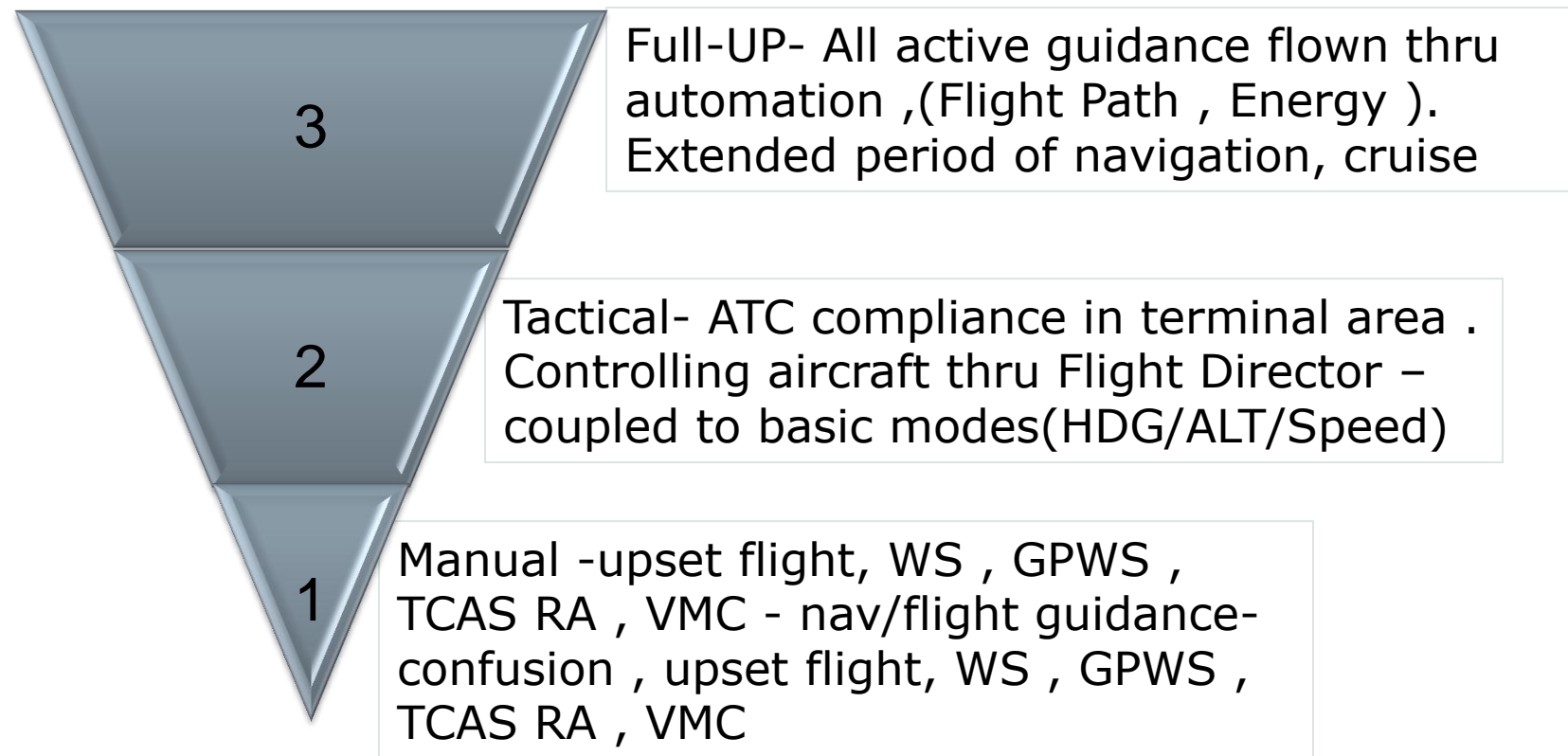


Levels of Automation – Tier Module



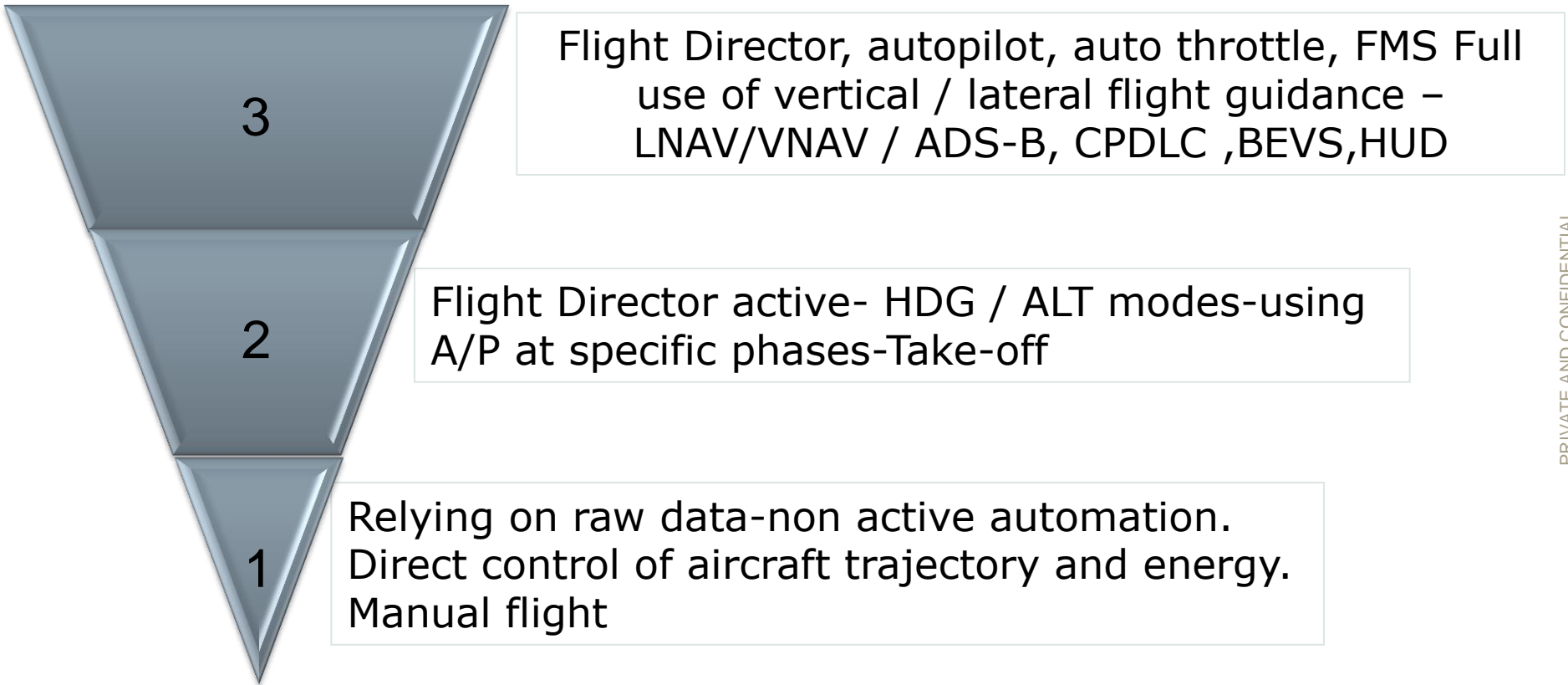
Going Forward

Automation Tier Module₂- Defined



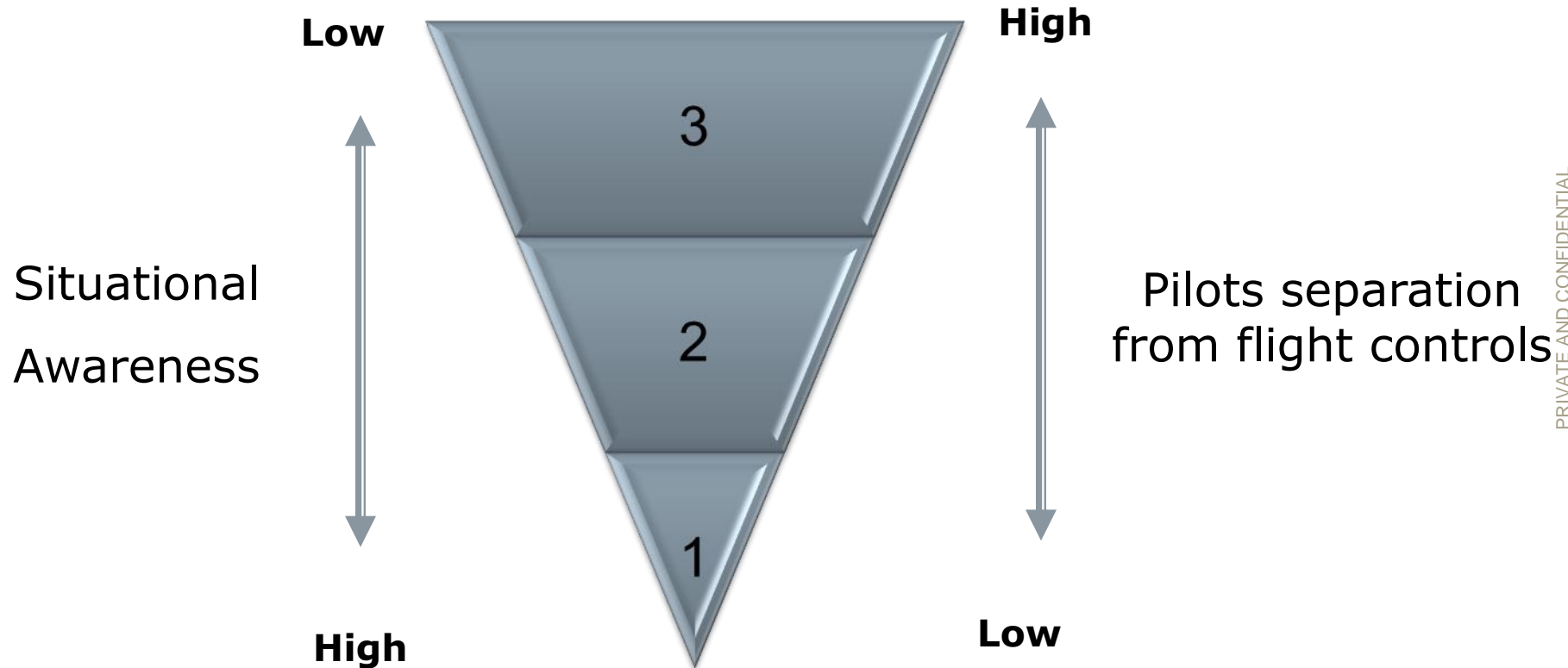
AUTOMATION DEPENDENCY

Automation Tier Module₂ - Cockpit



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AUTOMATION DEPENDENCY



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Automation Dependency (Complacency , Addiction etc...)



Advantages & Disadvantages



Levels of Automation – Tier Module




Going Forward

AUTOMATION DEPENDENCY

Going Forward

- Aviate(PFD), Navigate (MFD) , Communicate (RTU) and Automate(FMS-A/T, FCP , CDU etc..)
- Head Up / Head Down . Defined and incorporated in SOP's .Critical SA
- Navigation/ Automation Mode Accuracy
- Correct level of Automation

Going Forward (2)

- III - Informed , Involved , Initiate 
 - Informed – Monitor , Cross check , STAY in – the – loop , STAY informed
 - Involved – Active role in automation , normal/abnormal failure modes. SA!
 - Initiate- TURN IT OFF ! Choose appropriate level of automation to maintain safety of flight. Revert to manual flight . MAKE the choice clearly apparent to the crew.
- Training – Re-evaluate Standards DOC 24(Skill Test and DOC 29 (CRM).
 - Recognise , detect and deal with situations in non-normal automation degradation. Intervention Point
 - Less “ how it works” to “ how to respond to failures “.
 - Better defined checklists for abnormal malfunctions

AUTOMATION DEPENDENCY

Going Forward (3)

- Automation Interface – NOT a common language
 - 60 % of ALL accidents has identified as a leading factor
- Manual Handling Error
- Incorrect Upset handling Recovery Technique
 - Inappropriate control inputs
 - Lack of manual handling after Autopilot /Auto thrust disconnect or combination of
 - Lack of recognition of any disconnection of Autopilot/Auto thrust or combination of resulting in poor monitoring of energy and speeds
 - Re-active ----Watching things happen vs.
Pro-active----Making things happen

We remain Pilots – not Automation Managers

- We must be able to choose our level of automation based on flight conditions. Moving from Tier 1 thru 3 during all phases of flight
- When descending thru MDA on A/P , it a natural instinct to push “ ALT ” ? Or should we disconnect A/P and immediately return MDA .
- Tactile connected to aircraft below 10,000 – even with A/P
- Recognize human factor issues such as – absorption (single task focused) , fixation (locked on) , complacency (over relying)
- Famous last words: “ what’s it doing ?” (would rather hear) “ why did it do that”

Automation Dependency



The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency. The second is that automation applied to an inefficient operation will magnify the inefficiency.

(Bill Gates)

izquotes.com

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AUTOMATION DEPENDENCY

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Q&A