NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

February 21, 2015

Attachment 8 – WK2 Training Syllabus

OPERATIONAL FACTORS

DCA15MA019

Scaled Composites Flight Operations

WK2 Second-in-Command (SIC) Requirements and Training Plan

WK2 SIC – The Legal Requirements

- FAR §91.531 – Turbojet-powered multiengine airplanes that require two pilots dictates the 2nd pilot must have an SIC designation
- The SIC must meet the qualifications delineated in §61.55

SIC Requirements For WK2*

- §61.55
  - (1) At least a private pilot certificate with multi-engine land rating; *and*
  - (2) An instrument rating if the flight is under IFR (IMC or outside the R2508) ; *and*
  - (3) An LOA for flight operations outside CONUS
  - (4) Meet FAA currency requirements (next slide)

NOTE: §61.55 (f) states the (d) [currency] & (e) [SIC rating] requirements are waived *if* the SIC is:

1. Designated as a "WK2 SIC in training" and on a dedicated training flight (essential crew only and no payload/cargo) *or*
2. Has a Commercial or ATP with ME-Land rating and is conducting:
   1. Flight test, evaluation flight, or ferry flight *and is*
   2. Not carrying any person or property other than required for the conduct of the flight

SIC Currency Requirements

- Within the previous 12* calendar months:
  - Become familiar with the following information:
    - Operational procedures applicable to the engine, equipment, and systems.
    - Performance specifications and limitations.
    - Normal, abnormal, and emergency operating procedures.
    - Flight manual.
    - Placards and markings.

*Accomplishment within **Due Month** or +/- 1 month window is credited for being accomplished in the **Due Month**

WK2 SIC Currency Requirements (cont'd)

- Performed and logged pilot time in WK2 or the WK2 sim:
  - Three takeoffs and three landings to a full stop as the sole manipulator of the flight controls
  - Engine-out procedures and maneuvering with an engine out while executing the duties of pilot in command; and
  - Crew resource management training.

NOTE: meeting the above requirements must be conducted

- During day VFR/IFR
- Without any pax or property other than required for the conduct of the flight

SIC LOA/Type Rating

- All training must be accomplished within the previous 12 months
  1. The instructor must sign the applicant's logbook or training record after each lesson in accordance with §61.51(h)(2). In lieu of the trainer, it is permissible for the Director of Flight Operations to verify the applicant's training records and that the training was given, and make the required endorsement.
  2. The trainer or qualified management official must make an endorsement in the applicant's logbook that states "[Applicant's Name and Pilot Certificate Number] has demonstrated the skill and knowledge required for the safe operation of the Model 348 WhiteKnightTwo, relevant to the duties and responsibilities of a second in command."
  3. If the applicant's flight experience and/or training records are in an electronic form, the applicant must present a paper copy of those records containing the signature of the trainer or qualified management official to an FAA Flight Standards District Office or Examiner.
  4. The applicant must complete and sign an Airman Certificate and/or Rating Application, FAA Form 8710–1, and present the application to an FAA Flight Standards District Office or to an Examiner.
  5. The person who provided the ground and flight training to the applicant must sign the "Instructor's Recommendation" section of the Airman Certificate and/or Rating Application, FAA Form 8710–1. In lieu of the instructor, it is permissible for the Director of Flight Operations to sign the applicant's FAA Form 8710–1.
  6. The applicant must appear in person at a FAA Flight Standards District Office or to an Examiner with his or her logbook/training records and with the completed and signed FAA Form 8710–1.

NOTE: There is no practical test required for the issuance of the "SIC Privileges Only" pilot type rating.

WK2 SIC Program

- Ground Training
  - Academics
  - POH review
  - Simulator
  - Cockpit procedures training (in aircraft)
- Flight Training
  - Normal
    - VFR operations
      - WK2 only
      - Payload (SS2) operations
    - IFR operations
  - Emergency Training
    - Engine Failure/Fire
    - Runaway Trim
    - No speedbrake landing
    - V1 cuts
    - Rapid Decompression/Emergency Descent
    - Miscellaneous EP's – Hyd, Elec, Fuel, ECS, Engine, Drop

Academic Training Modules

- Aircraft General
  - Overview
  - Unique characteristics
  - Limitations
    - Offset fuselage handling considerations
    - Steering and braking considerations
    - Low and high speed handling qualities
    - Low L/D (SS2) approaches
- Systems
  - Flight Controls (1°, 2°, trim)
  - Landing gear and steering
  - Engine
  - Hydraulic
  - Electrical
  - Avionics
  - Fuel
  - Environmental Control and Life Support
- Operational Employment
  - CRM importance and standardization
  - Handling qualities
  - VFR operations
  - IFR operations

Flight Controls

- Primary flight controls
  - General
  - Mechanical
  - Trim
    - Elevator
    - Roll
    - Yaw
  - Speedbrakes

Landing Gear and Steering

- General Description
- Normal Operation
- Emergency Operation
- Steering
- Air/Ground Sensing System
- Brake System
  - Components
  - Manual braking
  - Anti-Skid braking
    - BIT
    - Differences in normal, skid control, and emergency operations
  - Failure modes

Engines

- Overview
- FADEC
- Throttle Quadrant
- MFD Display
- Normal Procedures
- Cautions and Warnings
- Emergency Procedures

Auxiliary Power Unit

- Overview
- Operation
  - Start / Run / Shutdown
    - Start envelope
    - Run envelope
  - APU Generator
    - Normal Procedures and Gottchas
  - APU Bleed Air
    - Normal Procedures and Gottchas
  - Fire Detection and Extinquishing

Hydraulic System

- Overview of System A and B
  - Fluid
  - Reservoirs
  - Pumps
  - Shutoff valves
  - Accumulators
- MFD Display
- MFD Caution and Warnings

Electrical System

- Systems Architecture Overview
- Main and Main Cabin Busses
- Non-Essential Busses
- Triple Fed Bus
- Circuit protection and C/B panels
- Controls and Indicators
- Limitations
- Normal Procedures
- Abnormal and Emergency Procedures

Avionics

- Overview
- Theory of Operation
  - DUAs
    - Overview
    - Electrical power
    - Bus A and B
  - MFDs
    - Data Exchange
    - PFD/MFD
    - System pages
  - Inertial Navigation System
  - Comm/Nav
  - L3 GH-3100 SADI

Fuel

- Overview
  - Tank quantities and location
  - Boost Pumps
  - Motive Flow
  - Cross Transfer, Wing Fill, & Fuselage Isolate
- Normal Procedures
- Gotchas
  - Electrical control of valves
  - Switch control of boost pumps via RCCBs
- Emergency Procedures

Environmental Control and Life Support Systems

- Overview
  - Bleed Manifold supply and demands
  - ECS Manifold supply and demands
  - Primary / Alternate / Emergency Pressurization methods
  - Cabin Isolation valve
  - APU bleed air use and prohibitions
- ECS Control and Indications
  - Switch and valves
  - TTOP/PYLD Control
  - Cabin Pressurization control and dump
- MFD Indications
  - ECS Pages
  - Cautions and Warnings
- Normal Procedures
- Emergency Procedures

Operating Limitations

- Time of Day and Weather Restrictions
- Maneuver limit load factors
- Airspeed / Mach
- Runway Field Length
- Wind Limits
- Brake temperatures

Payload System

- Drop System
  - Overview
  - MFD Display
  - Normal Procedures
  - Cautions and Warnings
- Payload ECS
  - TTOP/PYLD control
  - Gotchas
- Payload Bleed Air Heat
- Payload Electrical Heat\
- Drop Checklist review

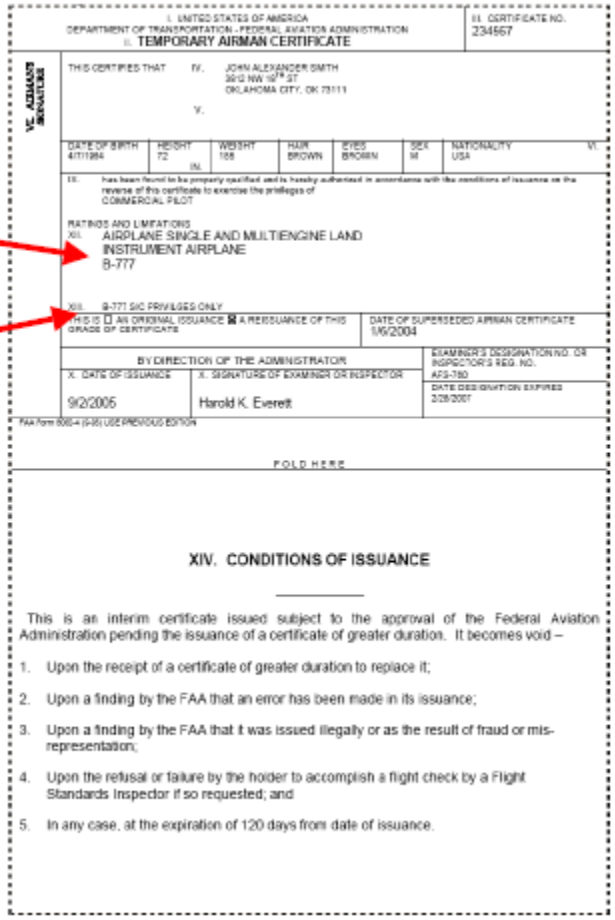
Lighting System

- Wingtip position and strobes
- Landing and Taxi Lights
- Cockpit flood lighting
- MFD brightness control
- Control and power of the lights
- Normal procedures

SIC Type Rating Temporary Airman Certificate

Type Rating

SIC Limitation



I. UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
II. TEMPORARY AIRMAN CERTIFICATE

III. CERTIFICATE NO. 234567

VII. AIRMAN'S SIGNATURE

THIS CERTIFIES THAT IV. JOHN ALEXANDER SMITH
3912 NW 10TH ST
OKLAHOMA CITY, OK 73111
V.

DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX	NATIONALITY VI.
4/7/1984	72 IN.	165	BROWN	BROWN	M	USA

VII. has been found to be properly qualified and is hereby authorized in accordance with the conditions of issuance on the reverse of this certificate to exercise the privileges of
COMMERCIAL PILOT

RATINGS AND LIMITATIONS
XII. AIRPLANE SINGLE AND MULTIENGINE LAND
INSTRUMENT AIRPLANE
B-777

XIII. B-777 SIC PRIVILEGES ONLY

THIS IS ☐ AN ORIGINAL ISSUANCE ☒ A REISSUANCE OF THIS GRADE OF CERTIFICATE — DATE OF SUPERSEDED AIRMAN CERTIFICATE 1/6/2004

BY DIRECTION OF THE ADMINISTRATOR — EXAMINER'S DESIGNATION NO. OR INSPECTOR'S REG. NO. AFS-780

X. DATE OF ISSUANCE	X. SIGNATURE OF EXAMINER OR INSPECTOR	DATE DESIGNATION EXPIRES
9/2/2005	Harold K. Everett	3/28/2007

FAA Form 8060-4 (9-95) USE PREVIOUS EDITION

FOLD HERE

XIV. CONDITIONS OF ISSUANCE

This is an interim certificate issued subject to the approval of the Federal Aviation Administration pending the issuance of a certificate of greater duration. It becomes void –

1. Upon the receipt of a certificate of greater duration to replace it;
2. Upon a finding by the FAA that an error has been made in its issuance;
3. Upon a finding by the FAA that it was issued illegally or as the result of fraud or misrepresentation;
4. Upon the refusal or failure by the holder to accomplish a flight check by a Flight Standards Inspector if so requested; and
5. In any case, at the expiration of 120 days from date of issuance.

SIC LOA Applications

Complete Section I

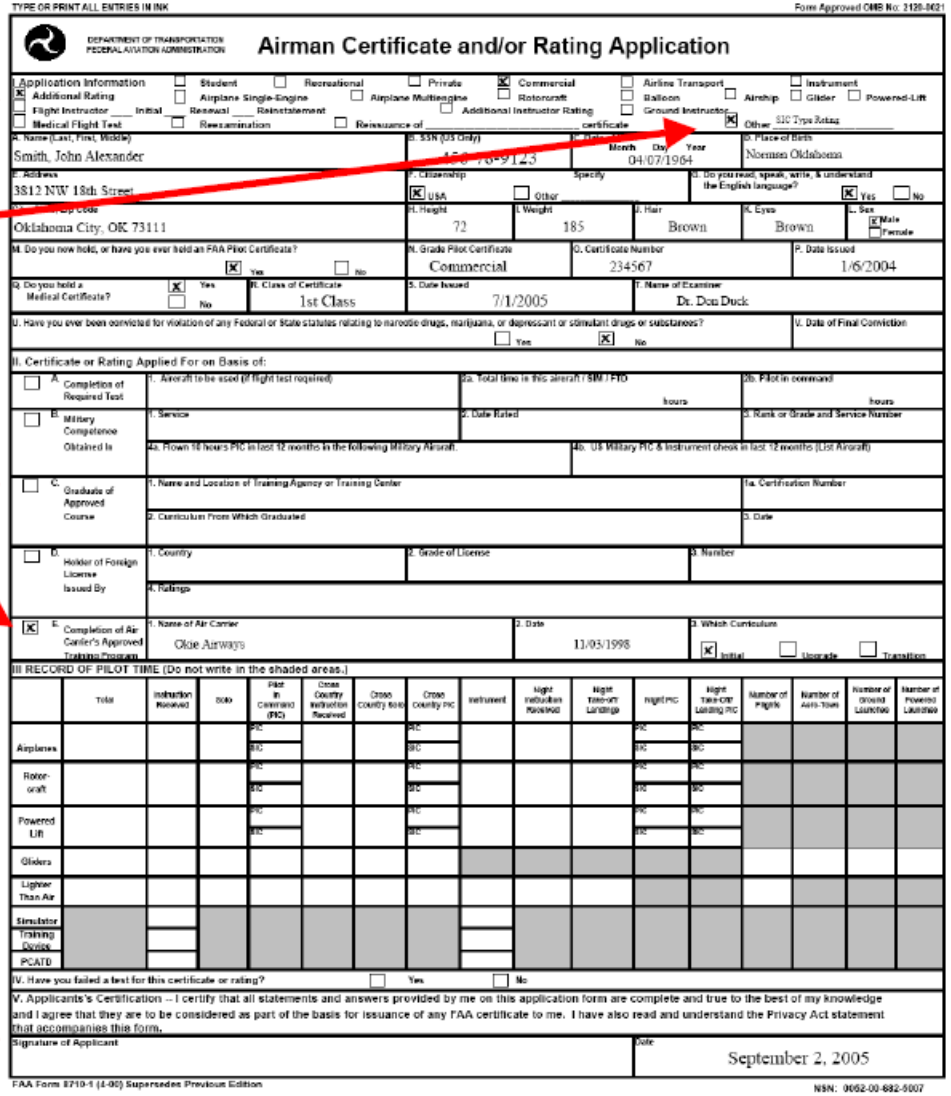
Check “Other” and type “SIC Letter of Authorization”

Leave Blank

Leave Blank

Completion of Section III is recommended but not required

Sign and Date



TYPE OR PRINT ALL ENTRIES IN INK

Form Approved OMB No. 2120-0021

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Airman Certificate and/or Rating Application

I. Application Information — Student; Recreational; Private; [X] Commercial; Airline Transport; Instrument; [X] Additional Rating; Airplane Single-Engine; Airplane Multiengine; Rotorcraft; Balloon; Airship; Glider; Powered-Lift; Flight Instructor ___ Initial ___ Renewal ___ Reinstatement; Additional Instructor Rating; Ground Instructor; Medical Flight Test; Reexamination; Reissuance of ___ certificate; [X] Other SIC Type Rating

A. Name (Last, First, Middle): Smith, John Alexander
B. SSN (US Only): 456-78-9123
C. Date of Birth (Month Day Year): 04/07/1964
D. Place of Birth: Norman Oklahoma
E. Address: 3812 NW 18th Street
F. Citizenship: [X] USA; Other ___ Specify
G. Do you read, speak, write, & understand the English language? [X] Yes; No
Oklahoma City, OK 73111
H. Height: 72
I. Weight: 185
J. Hair: Brown
K. Eyes: Brown
L. Sex: [X] Male; Female
M. Do you now hold, or have you ever held an FAA Pilot Certificate? [X] Yes; No
N. Grade Pilot Certificate: Commercial
O. Certificate Number: 234567
P. Date Issued: 1/6/2004
Q. Do you hold a Medical Certificate? [X] Yes; No
R. Class of Certificate: 1st Class
S. Date Issued: 7/1/2005
T. Name of Examiner: Dr. Don Duck
U. Have you ever been convicted for violation of any Federal or State statutes relating to narcotic drugs, marijuana, or depressant or stimulant drugs or substances? Yes; [X] No
V. Date of Final Conviction:

II. Certificate or Rating Applied For on Basis of:

A. Completion of Required Test — 1. Aircraft to be used (if flight test required); 2a. Total time in this aircraft / SIM / FTD ___ hours; 2b. Pilot in command ___ hours
B. Military Competence Obtained In — 1. Service; 2. Date Rated; 3. Rank or Grade and Service Number; 4a. Flown 10 hours PIC in last 12 months in the following Military Aircraft; 4b. US Military PIC & Instrument check in last 12 months (List Aircraft)
C. Graduate of Approved Course — 1. Name and Location of Training Agency or Training Center; 1a. Certification Number; 2. Curriculum From Which Graduated; 3. Date
D. Holder of Foreign License Issued By — 1. Country; 2. Grade of License; 3. Number; 4. Ratings
[X] E. Completion of Air Carrier's Approved Training Program — 1. Name of Air Carrier: Okie Airways; 2. Date: 11/03/1998; 3. Which Curriculum: [X] Initial; Upgrade; Transition

III RECORD OF PILOT TIME (Do not write in the shaded areas.)

	Total	Instruction Received	Solo	Pilot in Command (PIC)	Cross Country Instruction Received	Cross Country Solo	Cross Country PIC	Instrument	Night Instruction Received	Night Take-off/Landings	Night PIC	Night Take-off/Landing PIC	Number of Flights	Number of Aero-Tows	Number of Ground Launches	Number of Powered Launches
Airplanes				PIC / SIC			PIC / SIC				PIC / SIC	PIC / SIC				
Rotor-craft				PIC / SIC			PIC / SIC				PIC / SIC	PIC / SIC				
Powered Lift				PIC / SIC			PIC / SIC				PIC / SIC	PIC / SIC				
Gliders																
Lighter Than Air																
Simulator / Training Device / PCATD																

IV. Have you failed a test for this certificate or rating? Yes; No

V. Applicants's Certification -- I certify that all statements and answers provided by me on this application form are complete and true to the best of my knowledge and I agree that they are to be considered as part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.

Signature of Applicant

Date: September 2, 2005

FAA Form 8710-1 (4-00) Supersedes Previous Edition

NSN: 0052-00-682-5007

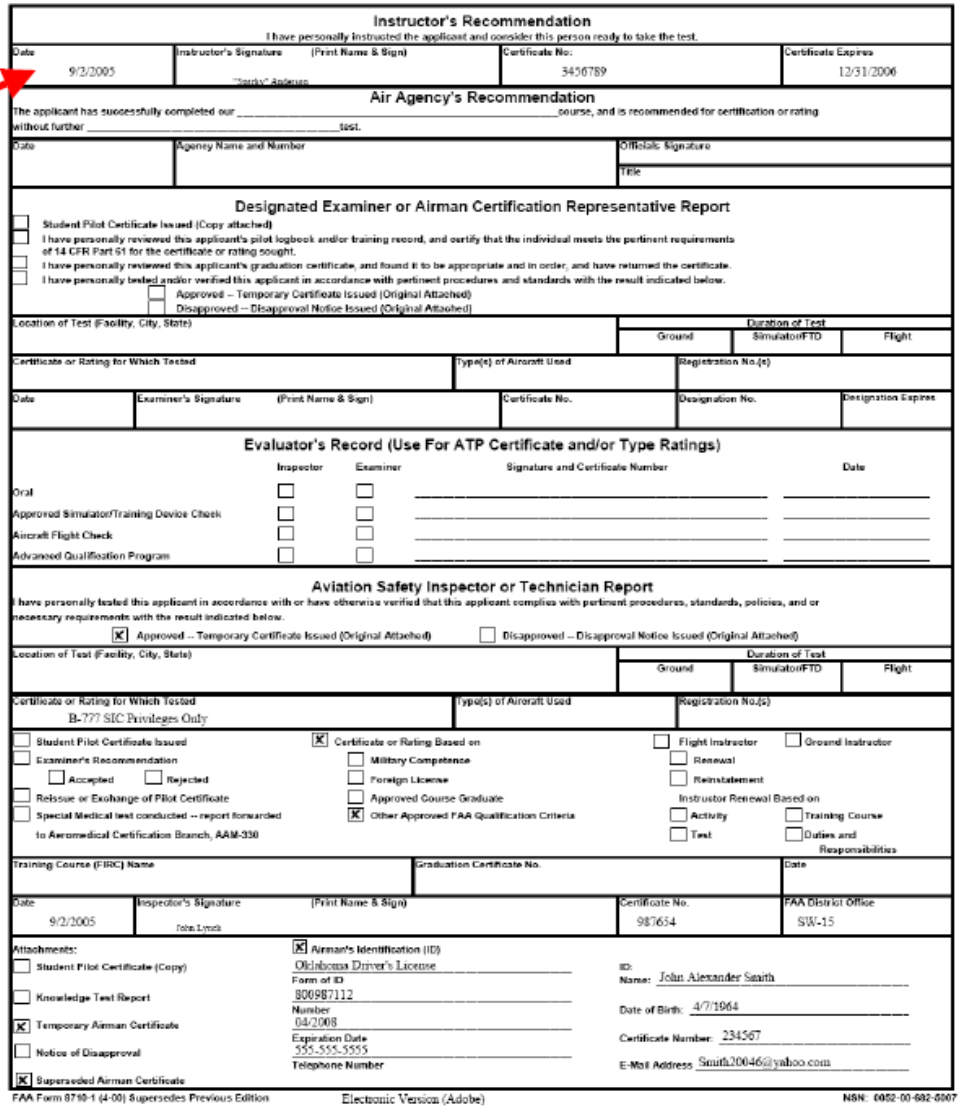
When Completed by an FAA Inspector

Instructor's Recommendation must be completed.

NOTE: In lieu of the instructor, the Director of Flight Operations can sign the training records or logbook and make the required endorsement.

If the Temporary Certificate is issued by an FAA Inspector, check Approved and complete Certificate or Rating for which Tested block, Other Approved FAA Qualification Criteria and the last line of the Report.

Complete the Identification Verification.



Instructor's Recommendation

I have personally instructed the applicant and consider this person ready to take the test.

Date	Instructor's Signature (Print Name & Sign)	Certificate No:	Certificate Expires
9/2/2005	"Jerry" Anderson	3456789	12/31/2006

Air Agency's Recommendation

The applicant has successfully completed our _____ course, and is recommended for certification or rating without further _____ test.

Date	Agency Name and Number	Officials Signature / Title

Designated Examiner or Airman Certification Representative Report

- ☐ Student Pilot Certificate Issued (Copy attached)
- ☐ I have personally reviewed this applicant's pilot logbook and/or training record, and certify that the individual meets the pertinent requirements of 14 CFR Part 61 for the certificate or rating sought.
- ☐ I have personally reviewed this applicant's graduation certificate, and found it to be appropriate and in order, and have returned the certificate.
- ☐ I have personally tested and/or verified this applicant in accordance with pertinent procedures and standards with the result indicated below.
  - ☐ Approved – Temporary Certificate Issued (Original Attached)
  - ☐ Disapproved – Disapproval Notice Issued (Original Attached)

Location of Test (Facility, City, State)	Duration of Test: Ground	Simulator/FTD	Flight

Certificate or Rating for Which Tested	Type(s) of Aircraft Used	Registration No.(s)

Date	Examiner's Signature (Print Name & Sign)	Certificate No.	Designation No.	Designation Expires

Evaluator's Record (Use For ATP Certificate and/or Type Ratings)

	Inspector	Examiner	Signature and Certificate Number	Date
Oral	☐	☐		
Approved Simulator/Training Device Check	☐	☐		
Aircraft Flight Check	☐	☐		
Advanced Qualification Program	☐	☐		

Aviation Safety Inspector or Technician Report

I have personally tested this applicant in accordance with or have otherwise verified that this applicant complies with pertinent procedures, standards, policies, and or necessary requirements with the result indicated below.

☒ Approved – Temporary Certificate Issued (Original Attached) ☐ Disapproved – Disapproval Notice Issued (Original Attached)

Location of Test (Facility, City, State)	Duration of Test: Ground	Simulator/FTD	Flight

Certificate or Rating for Which Tested	Type(s) of Aircraft Used	Registration No.(s)
B-777 SIC Privileges Only		

- ☐ Student Pilot Certificate Issued
- ☐ Examiner's Recommendation
  - ☐ Accepted ☐ Rejected
- ☐ Reissue or Exchange of Pilot Certificate
- ☐ Special Medical test conducted -- report forwarded to Aeromedical Certification Branch, AAM-330
- ☒ Certificate or Rating Based on
  - ☐ Military Competence
  - ☐ Foreign License
  - ☐ Approved Course Graduate
  - ☒ Other Approved FAA Qualification Criteria
- ☐ Flight Instructor ☐ Ground Instructor
  - ☐ Renewal
  - ☐ Reinstatement
  - Instructor Renewal Based on
    - ☐ Activity ☐ Training Course
    - ☐ Test ☐ Duties and Responsibilities

Training Course (FIRC) Name	Graduation Certificate No.	Date

Date	Inspector's Signature (Print Name & Sign)	Certificate No.	FAA District Office
9/2/2005	John Lynch	987654	SW-15

Attachments:
- ☐ Student Pilot Certificate (Copy)
- ☐ Knowledge Test Report
- ☒ Temporary Airman Certificate
- ☐ Notice of Disapproval
- ☒ Superseded Airman Certificate

☒ Airman's Identification (ID)
Oklahoma Driver's License
Form of ID
800987112
Number
04/2008
Expiration Date
555-555-5555
Telephone Number

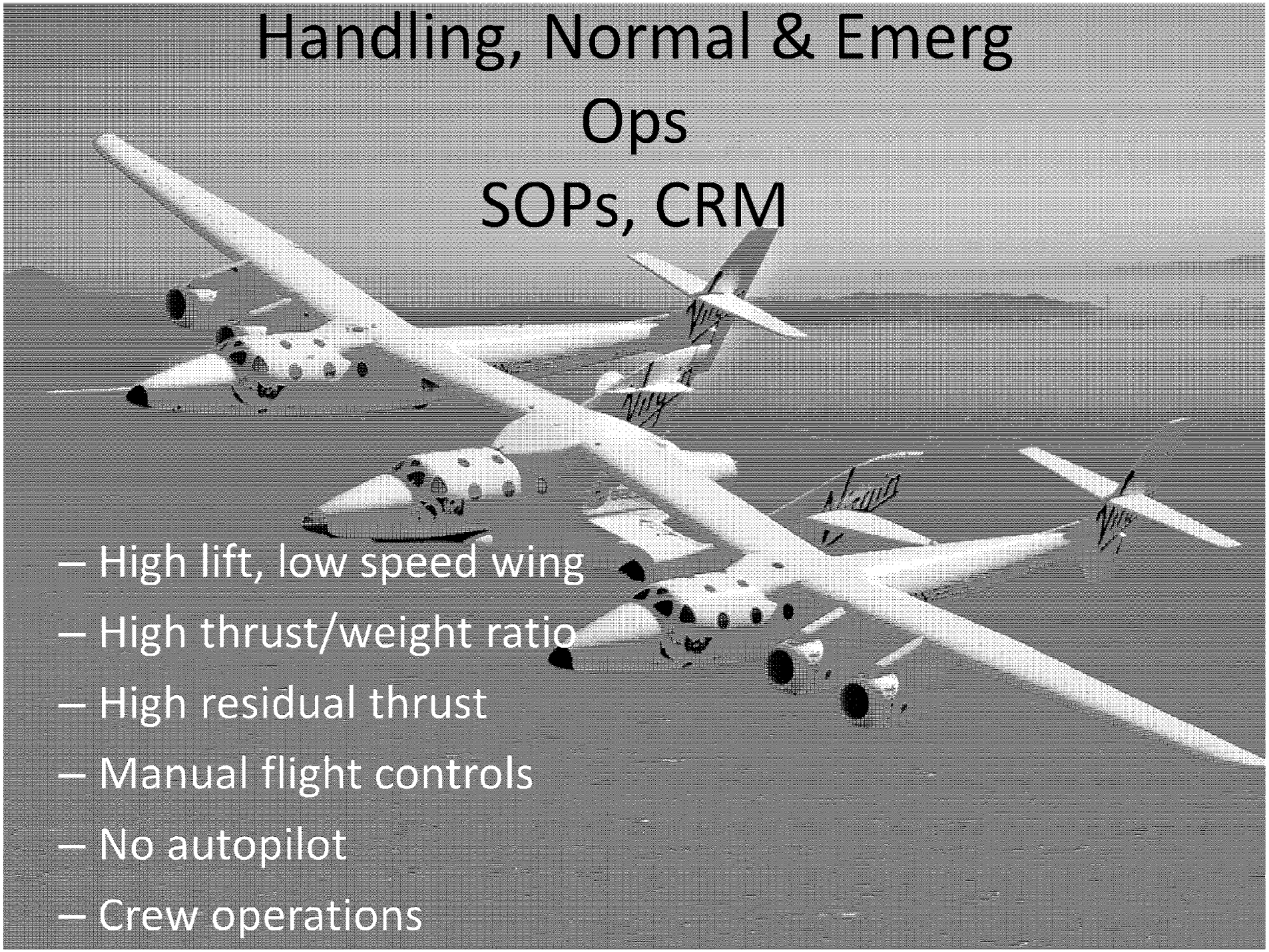
ID:
Name: John Alexander Smith
Date of Birth: 4/7/1964
Certificate Number: 234567
E-Mail Address: Smith20046@yahoo.com

FAA Form 8710-1 (4-00) Supersedes Previous Edition — Electronic Version (Adobe) — NSN: 0052-00-682-0007

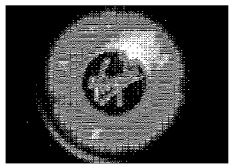
FAA's Process Summary

- 1) The SIC pilot type rating applicant receives familiarization training under 61.55(b) from a qualified pilot in command or an authorized flight instructor who holds the aircraft type rating on his/her pilot certificate.
- 2) The trainer signs the applicant's logbook or training record after each lesson in accordance with 61.51(h)(2). *In lieu of the trainer, it is permissible for a qualified management official within the organization to sign the applicant's training records or logbook and make the required endorsement.* See 61.55 for the definition of a qualified management official.
- 3) The trainer or qualified management official makes an endorsement in the applicant's logbook that states ''[Applicant's Name and Pilot Certificate Number] has demonstrated the skill and knowledge required for the safe operation of the [Type of Aircraft], relevant to the duties and responsibilities of a second-in-command.''
- 4) The applicant completes and signs an Airman Certificate and/or Rating Application, FAA Form 8710-1, and presents the application and a paper copy of the training records containing the signature of the trainer or qualified management official to a FSDO or Examiner.
- 5) The person who provided the ground and flight training to the applicant must sign the "Instructor's Recommendation" section of FAA Form 8710–1.
- 6) The applicant must appear in person at FSDO or to an Examiner with his or her logbook/training records and with the completed and signed FAA Form 8710–1.
- The FAA Airman Certification Branch has developed application and certification procedures to be used in expediting the process of applying for an SIC type rating.

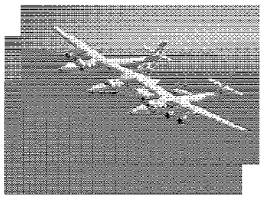
Handling, Normal & Emerg Ops SOPs, CRM



- High lift, low speed wing
- High thrust/weight ratio
- High residual thrust
- Manual flight controls
- No autopilot
- Crew operations

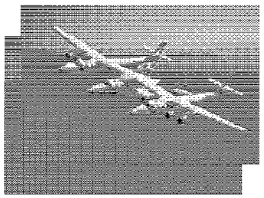


Handling, Normal Ops, Emergency Ops, SOPs, CRM



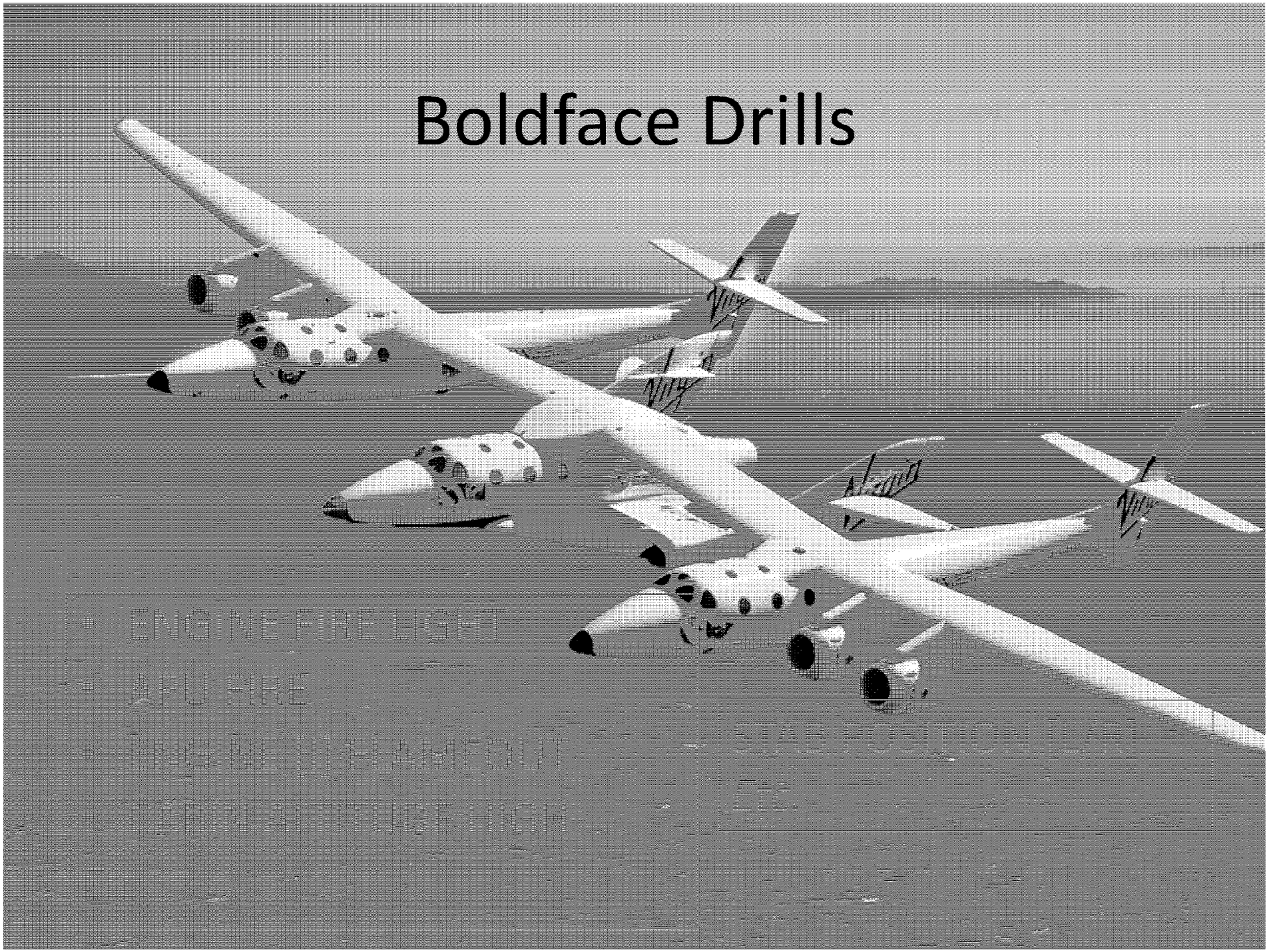
- Start-up
  - Ground crew procs
- Ground ops
  - Large wingspan
  - Poor FOV
  - 53ft between main gears
  - High residual thrust
  - Directional control
  - No park brake
  - Door procedures

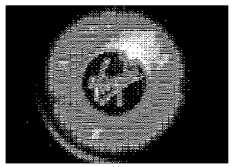
Handling, Normal Ops, Emergency Ops, SOPs, CRM



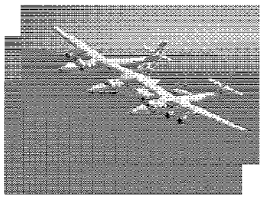
- T/O
  - Normal Ops
  - Take-off CRM, Engine failure on T/O
- Climb
- Descent
- Approach
  - Sim SS2
  - Normal
  - Engine Out
- Landing
  - T&Gs, Full-stop

Boldface Drills





Boldface Drills



ENGINE FIRE LIGHT

1. Throttle – Idle

2. Engine Fire Light – PUSH

If fire indications continue

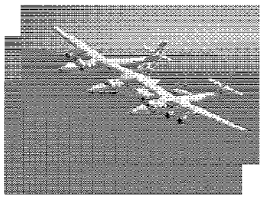
3. Eng Fire extinguisher ARM Light – PUSH

APU FIRE

1. APU* Fire Light - Push

3. APU Fire Extinguisher ARM Light – PUSH

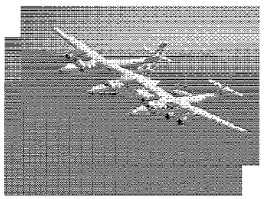
Boldface Drills



L/R WAGS FIRE LIGHT

1. **L/R WAGS FIRE LIGHT - PUSH**
2. **L/R WAGS FIRE EXTINGUISHER ARM LIGHT – PUSH**

Boldface Drills



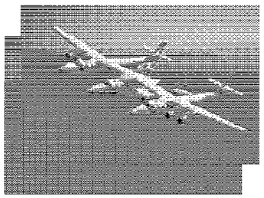
CABIN ALTITUDE HIGH (>10,000ft +/- 500ft)

1. **Oxygen Masks and Regulators – ON, 100%**

ENG [i] FLAMEOUT

1. **FAILED Eng Boost - ON**

Boldface Drills

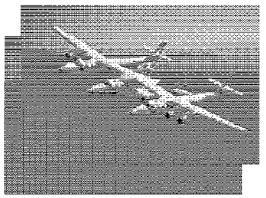


STAB POSITION [L/R]

If Stabs are Moving Uncommanded

1. **L + R Stab ACT CBs - PULL (C1R 7 C2R)**

Boldface Drills



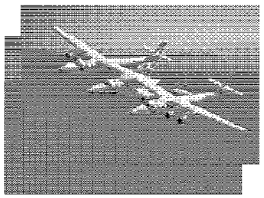
ELECTRICAL SYSTEMS FIRE/SMOKE FUMES

1. Oxygen – 100%

TRIM RUNAWAY

1. L/R Stab ACT CB's – Pull C1R 7 C2R (Blue hats)

Boldface Drills

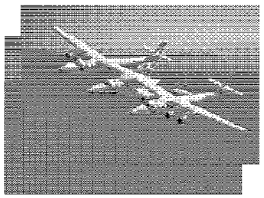


HOT START

If ITT is rapidly passing through (b) (4) *or exceeds* (b) (4)

1. Engine START switch – START (momentarily)

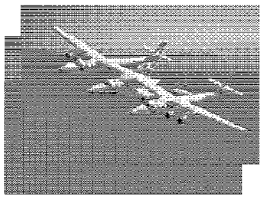
Boldface Drills



EMERGENCY DESCENT

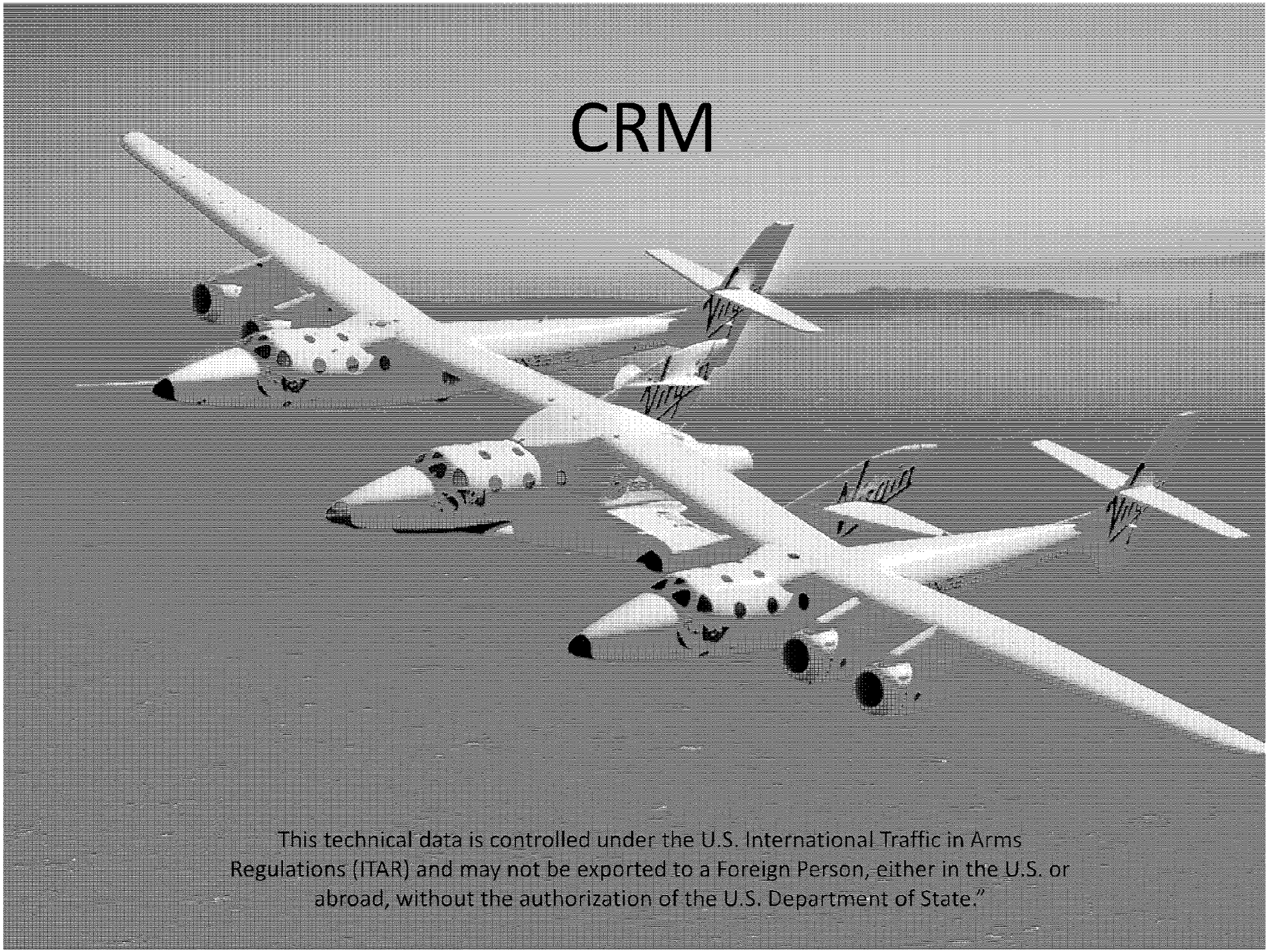
1. Throttles – IDLE
2. SPEEDBRAKES – EXTEND (OUTBD as well if not mated)
3. LANDING GEAR – DOWN
4. Attitude – Pushover to Mmo/Vmo
5. Consider spiraling to increase rate of descent

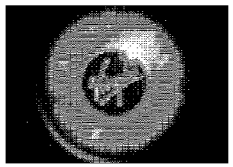
Boldface Drills



TAKE-OFF EMERGENCIES

CRM





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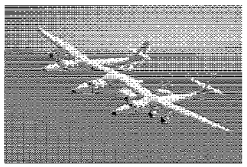
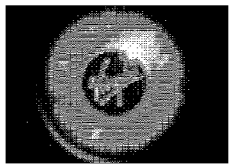
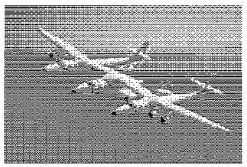


- Ethos
- Normal Procedures and Operations
- Abnormal Procedures
- Emergency Procedures

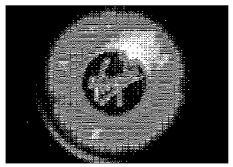


CRM

Ethos

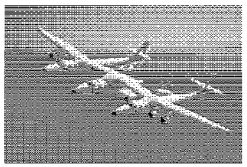


- What is CRM?
  - Maximizing the safety and efficiency of the flight by using all available resources (human, hardware, information.)
  - *TEAMWORK*

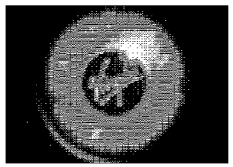


CRM

Ethos



- VG/TSC resources:
  - Pilots, FTE
  - Other crew (mated ops, chase?)
  - Crew chief (and his team)
  - Maintainers, engineers, ATC, fire crews
  - MCC
  - Pilots on the ground
  - Scaled



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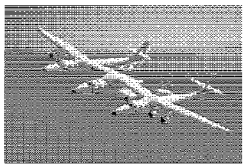
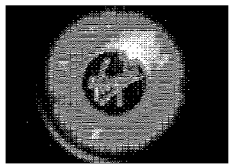


- The two man cockpit:
  - Standard phraseology (avoid ambiguity)
    - PF commands, "Gear down"; PM responds, "Speed checked, gear down"
  - Standard procedures
    - Leave gear down in the close pattern
    - MCT above 120KEAS
  - Cross-checking
    - PF does not command gear down without checking speed; PM checks speed before selecting gear down.
  - Back-up
    - ATC issues a descent altitude restriction. Passing 1,000ft above PF calls, "One to go." Passing 1,000ft to go, if PF has not made the call, the PM calls, "Altimeters."
  - Task sharing
    - On final approach speed slows below Vref. PM calls, "Speed."



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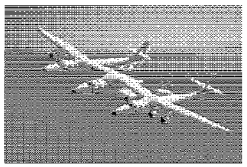
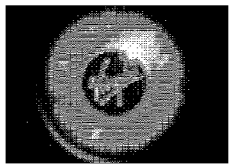
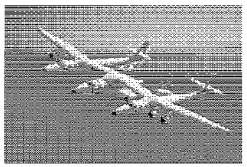


- The two man cockpit, contd.:
  - Information transfer, problem solving, decision making, maintaining situational awareness
    - Communicate your intentions, keep everyone involved and up to speed. (Mated - don't forget the other crew!)
  - Interpersonal relationships
    - "Check your ego at the door". No need to prove yourself.
    - Don't fly the aircraft for the PNF. Balance monitoring and safety against being over-bearing.
  - Aviate, navigate, communicate
  - Look out
  - An understood operational philosophy

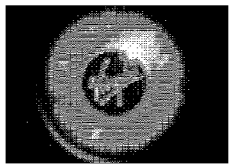


CRM

Normal Procedures and Operations



- Operational philosophy
  - PIC, PF and PM. Left seat/right seat.
  - Mated operations
  - PF
    - The handling pilot
    - Directs and controls the flight
    - Makes the decisions, communicating intentions
    - Calls for check lists
    - Commands services and system inputs
  - PM:
    - The non-handling pilot
    - Reads the check lists, when called to do so by the PF
    - Monitors the PNF's actions and the safety of the vehicle
      - Calls deviations from the plan; calls approaching limits.
    - Operates systems as called for by PF. Confirms actions carried out.
      - PF, "Direct to High Key 270"; PM, "Direct High Key 270 selected."
    - Handles the R/T
    - Makes PF job easier, reduces his workload to allow him to concentrate on flying
  - GOM, SOTM
  - SOPs
  - CRM



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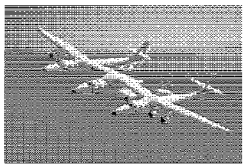
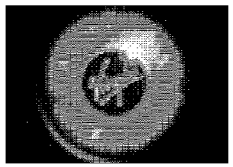
Ethos



- Potential problem areas:
  - Single seat background;
  - Used to being in command; want to be in command; *need* to be in command
  - Believing “the hype”



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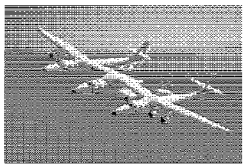
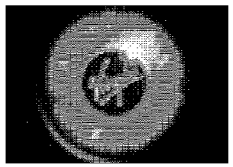


SOPs - Normal Procedures

- Planning and preparation
- VG/TSC briefing guide
- External inspection
- Initial cockpit checks
- Emergency brief
- Start-up
- (Taxi)



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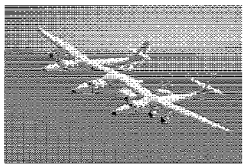
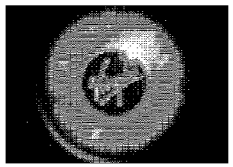


SOPs - Normal Procedures

- Take-off
- Climb
- Pre-launch
- Launch
- Post-launch
- Recovery
- Landing
- Taxi and shutdown



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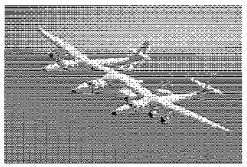
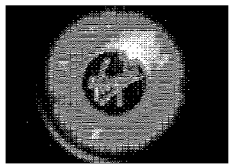
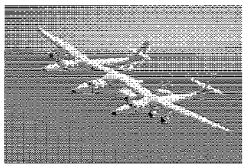


SOPs - Abnormal Procedures

- Aborted launch, mated recovery
- Chase
- Diversion

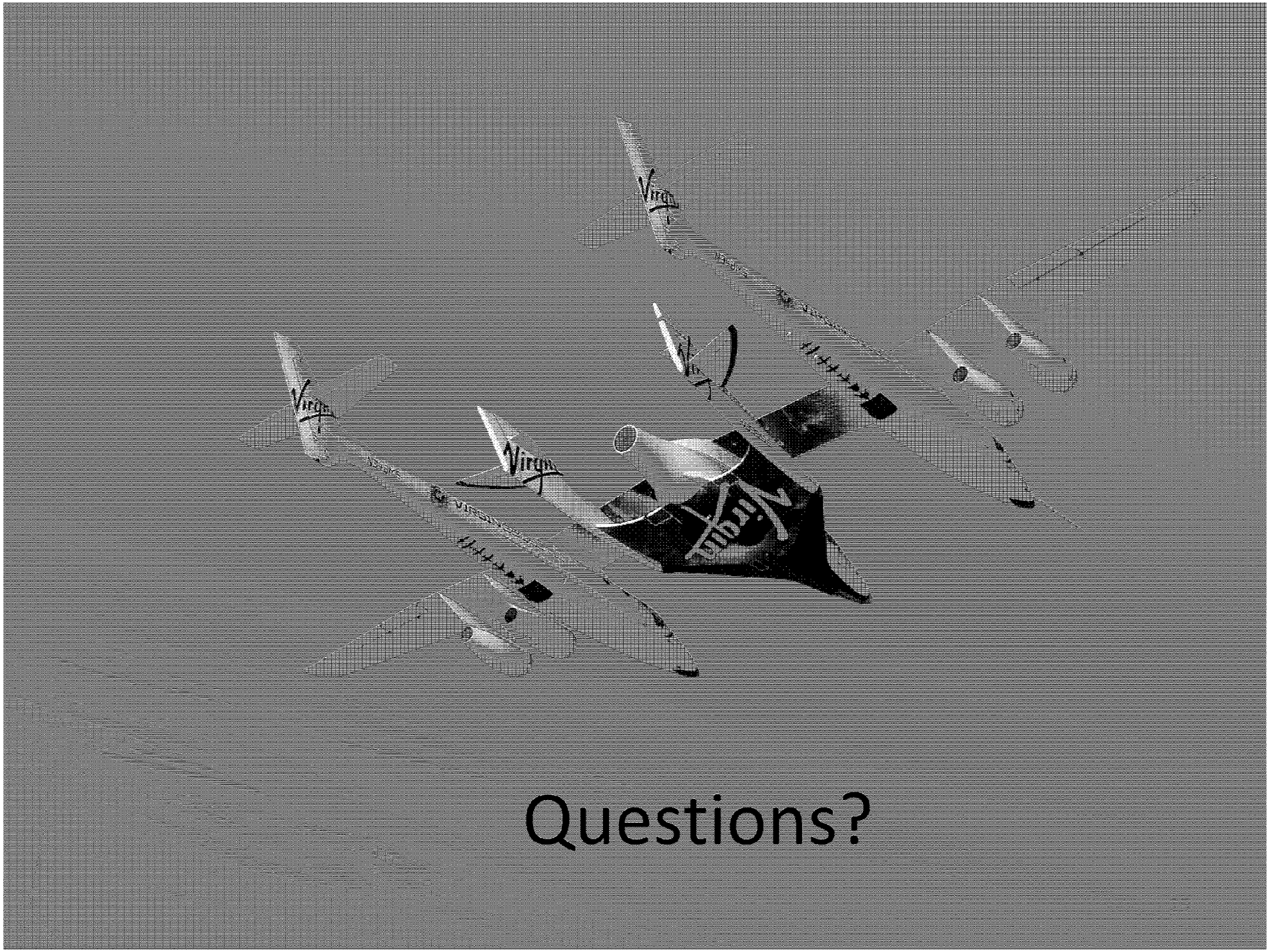
CRM





SOPs – Emergency Procedures

- EFATO
- SE approach
- Emergency descent



FLIGHT TRAINING EVENT RECORD

1. NAME	2. AIRCRAFT	3. CREW POSITION	4. TYPE OF TRAINING
	WK2	□PILOT □FTE □Other	□PIC □SIC □FTE □Other

TRAINING EVENTS	Qty Req	DATE1	DATE2	DATE3
Ground Operations				
a) Mission Preparation	3			
b) Preflight	3			
c) Normal Checklist Use	3			
d) Avionics / MFD set-up	3			
e) Starting procedures	3			
f) Taxi and Before Takeoff	3			
g) Post-landing and Shutdown	3			
VFR Day Operations				
a) Takeoff	3			
b) Climbout / Departure	3			
c) Approach to Stall	3			
d) Slow Flight	3			
e) High KEAS cruise FL200-280 @ (b) (4) KEAS	2			
f) Normal turns (30 deg bank)	3			
g) Steep turns (45 deg bank)	3			
h) Wind-up turns (<90 deg bank and <3.0g)	2			
i) High Altitude HQ (>FL500)	2			
j) High Altitude Engine response	2			
k) Normal Descent (D-IOOI)	2			
l) Emerg Descent (D-OOOO) (b) (4) KEAS	2			
m) VFR approach	3			
n) Touch and Go landings	6			
o) Missed approach	2			
p) SS2 approaches	3			
q) Full stop landing	3			
IFR Day Operations				
a) Enroute Descent (U-IXXI)	2			
b) Active leg (MFD and G 530)	2			
c) Direct to leg (MFD and G 530)	2			
d) ILS (MFD and L3)	2			
e) VOR (MFD and L3)	2			
f) RNAV/GPS (L3)	2			
g) Holding	1			
Emergency Procedures				
a) Engine out landing	2			
b) Post V1 cut	1			
c) Engine out go-around	1			
d) Inflight airstart	1			
e) Crew Resource Management	3			
f) Judgment	3			
g) Situational Awareness	3			
h) Ground Egress	1			
i) Bailout (ground discussion and practice)	1			

WK2 – APU / TOW OPERATOR TRAINING RECORD

1. NAME	2. AIRCRAFT WK2	3. CREW POSITION □PILOT □FTE □Other	4. TYPE OF TRAINING □PIC □SIC □FTE □Other

Aircraft (General)	Instructor	Date
a) Overview		
b) Electrical system configuration		
c) Hydraulic Brake System		
d) Auxiliary Power System (APU)		
e) APU Fire Detection and		
f) Heavy weight tow/taxi considerations		
g) Comm considerations		
a. Military helmet or modified headset		
b. Becker comm panel set-up		
c. Comm radio set up (NOTE – ground crew's wireless net picks up ALL tuned radio frequency (COM1,2, & 3)		
Normal Procedures		
a) Preflight		
b) APU Start		
c) Taxi		
d)		
e)		
Emergency Procedures		
a) APU fire		
b) Tug brake failure		
a)		
b)		
c)		

WK2 – APU / TOW OPERATOR TRAINING RECORD			
1. NAME	2. AIRCRAFT WK2	3. CREW POSITION □PILOT □FTE □Other	4. TYPE OF TRAINING □PIC □SIC □FTE □Other

Scaled Composites Flight Operations

WK2 APU Operator Requirements and Training Plan

WK2 System Study

Hydraulic System

WK2 APU Operator Program

- Ground Training
  - Academics
  - Cockpit procedures training (in aircraft)
  - Emergency / What-if Training

Duty Pilot Responsibility

- Ensure the vehicles are being operated in a safe manner and in accordance with the planned timeline prior to the actual flight crews arrival. These duties would include:
  - Be at the aircraft 15 minutes prior to the planned tow time to ensure the aircraft and all required maintenance equipment and vehicles are prepped and ready for the tow (flight line trucks have tall ladders, pads to protect SS2 wings, ground power unit, and light-alls)
  - Starts the APU prior to the tow (to provide electrical power to the mated pair) and monitors APU operation until it is shut down when ground power is ready for hook-up at the lineup and wait position
  - Ensures the brake accumulators are charged prior to towing (dry motor the engines if required)
  - Is the brake rider in TTOP for the tow
  - Makes Tower/Unicom calls as appropriate for the tow and monitors for other aircraft and vehicular traffic
  - Maintains communication with the control room and the tug driver so as to ensure the mated pair is parked in the lineup and wait position with good TM reception.
  - Is the single-point contact for the test conductor, crew chief, and ATC

Academic Training

- Hydraulics / Braking
- APU
- Engine Dry Motoring
- Comm

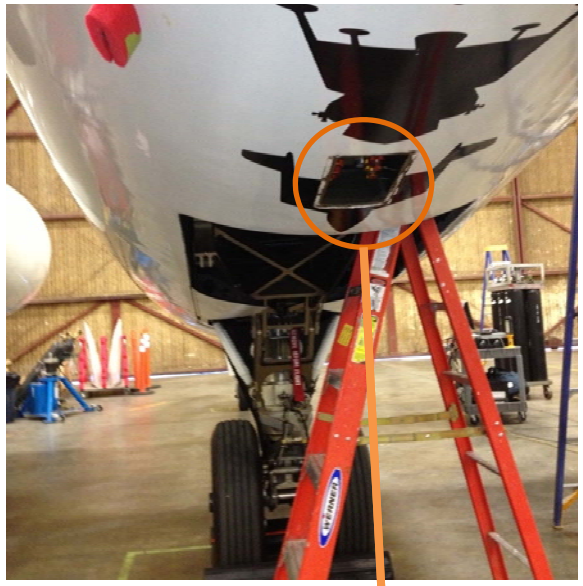
Hydraulic System

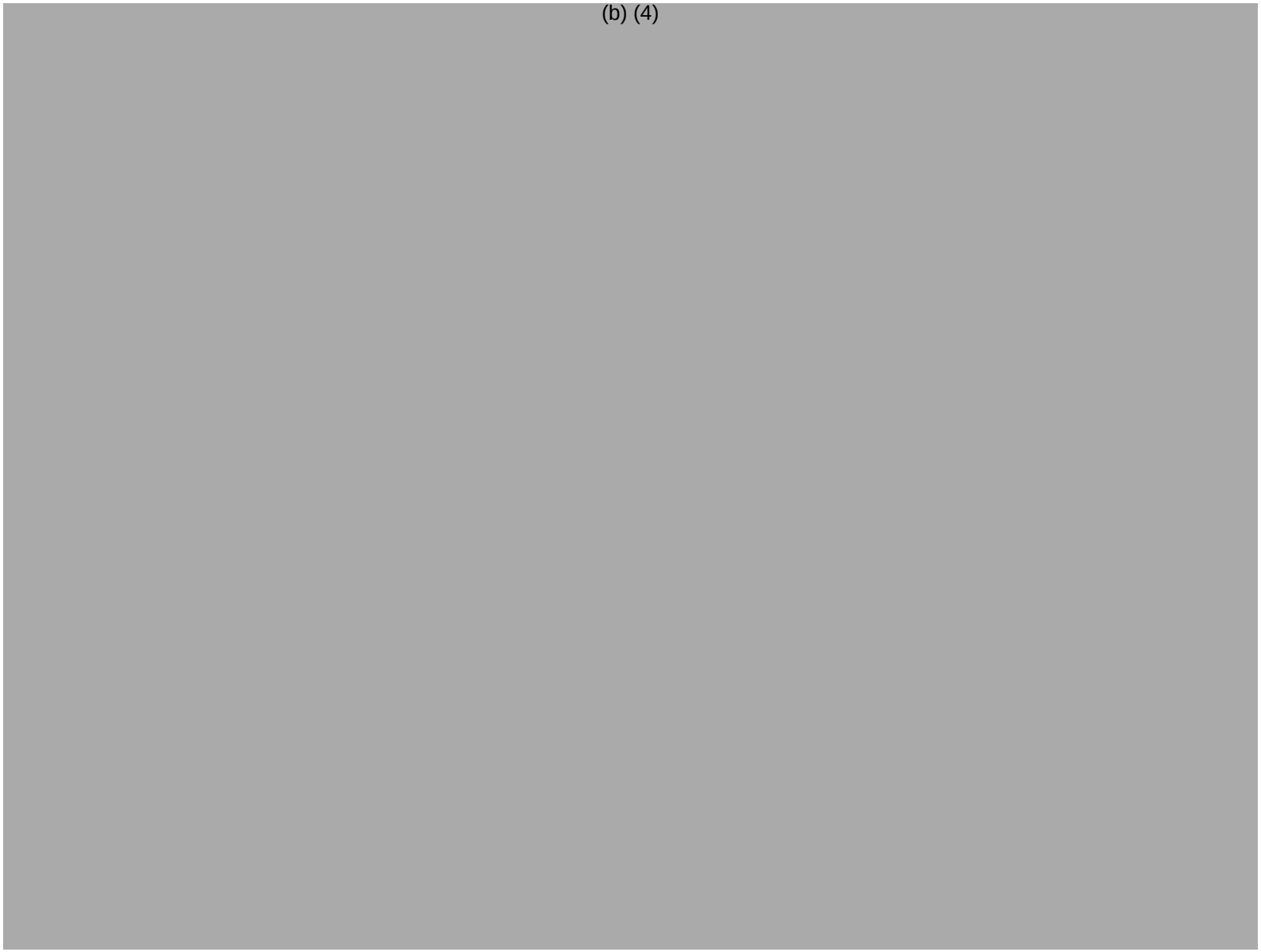
(b) (4)

TITLE			
Hydraulic Power System Layout			
SIZE	DWG NO	REV	SHEET
B	WK2-60W003	O	1 OF 2

Pilot's-Side Brake System

- Requires HYD A accumulators to be charged
- Six applications (only one is needed!)
- Works even though no system pressure on MFD
- Preflight to ensure > (b) (4) PSI




(b) (4)

System Overview

- System A
  - Made of the following main components:
    - EDP rated a (b) (4) GPM
    - SOV
    - Filter module
    - Dampener
    - Reservoir
      - (b) (4) cubic inch ((b) (4) gal), bootstrap design
      - Integrated system accumulator pre-charged to (b) (4) psi
      - Maintained at approx. (b) (4) of max fill on the ground due to fluid levels in the gear system when extended
        - » Protection for overfill condition
  - Feeds brakes and landing gear

Landing Gear and Steering

- Heavyweight taxi limit -- (b) (4) kgs for sharp turns
- B

Engines

- Overview
- FADEC
- Throttle Quadrant
- MFD Display
- Normal Procedures
- Cautions and Warnings
- Emergency Procedures

Auxiliary Power Unit

- Overview
- Operation
  - Start / Run / Shutdown
    - Start envelope
    - Run envelope
  - APU Generator
    - Normal Procedures and Gottchas
  - APU Bleed Air
    - Normal Procedures and Gottchas
  - Fire Detection and Extinquishing

Electrical System

- Systems Architecture Overview
- Main and Main Cabin Busses
- Non-Essential Busses
- Triple Fed Bus
- Circuit protection and C/B panels
- Controls and Indicators
- Limitations
- Normal Procedures
- Abnormal and Emergency Procedures

Avionics

- Overview
- Theory of Operation
  - DUAs
    - Overview
    - Electrical power
    - Bus A and B
  - MFDs
    - Data Exchange
    - PFD/MFD
    - System pages
  - Inertial Navigation System
  - Comm/Nav
  - L3 GH-3100 SADI

Fuel

- Overview
  - Tank quantities and location
  - Boost Pumps
  - Motive Flow
  - Cross Transfer, Wing Fill, & Fuselage Isolate
- Normal Procedures
- Gotchas
  - Electrical control of valves
  - Switch control of boost pumps via RCCBs
- Emergency Procedures

Environmental Control and Life Support Systems

- Overview
  - Bleed Manifold supply and demands
  - ECS Manifold supply and demands
  - Primary / Alternate / Emergency Pressurization methods
  - Cabin Isolation valve
  - APU bleed air use and prohibitions
- ECS Control and Indications
  - Switch and valves
  - TTOP/PYLD Control
  - Cabin Pressurization control and dump
- MFD Indications
  - ECS Pages
  - Cautions and Warnings
- Normal Procedures
- Emergency Procedures

Operating Limitations

- Time of Day and Weather Restrictions
- Maneuver limit load factors
- Airspeed / Mach
- Runway Field Length
- Wind Limits
- Brake temperatures

Payload System

- Drop System
  - Overview
  - MFD Display
  - Normal Procedures
  - Cautions and Warnings
- Payload ECS
  - TTOP/PYLD control
  - Gotchas
- Payload Bleed Air Heat
- Payload Electrical Heat\
- Drop Checklist review

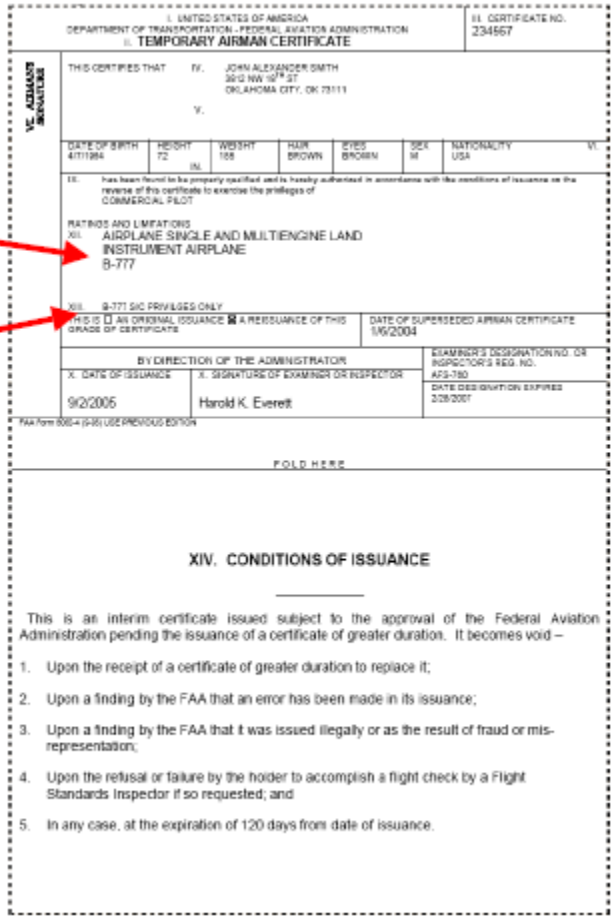
Lighting System

- Wingtip position and strobes
- Landing and Taxi Lights
- Cockpit flood lighting
- MFD brightness control
- Control and power of the lights
- Normal procedures

SIC Type Rating Temporary Airman Certificate

Type Rating

SIC Limitation



I. UNITED STATES OF AMERICA
DEPARTMENT OF TRANSPORTATION - FEDERAL AVIATION ADMINISTRATION
II. TEMPORARY AIRMAN CERTIFICATE

III. CERTIFICATE NO. 234567

IV. SIGNATURE

THIS CERTIFIES THAT IV. JOHN ALEXANDER SMITH
3912 NW 10TH ST
OKLAHOMA CITY, OK 73111
V.

DATE OF BIRTH	HEIGHT	WEIGHT	HAIR	EYES	SEX	NATIONALITY	VI.
4/11/1964	72 IN.	168	BROWN	BROWN	M	USA	

VII. has been found to be properly qualified and is hereby authorized in accordance with the conditions of issuance on the reverse of this certificate to exercise the privileges of
COMMERCIAL PILOT

RATINGS AND LIMITATIONS
XII. AIRPLANE SINGLE AND MULTIENGINE LAND
INSTRUMENT AIRPLANE
B-777

XIII. B-777 SIC PRIVILEGES ONLY

THIS IS ☐ AN ORIGINAL ISSUANCE ☒ A REISSUANCE OF THIS GRADE OF CERTIFICATE
DATE OF SUPERSEDED AIRMAN CERTIFICATE 1/6/2004

BY DIRECTION OF THE ADMINISTRATOR
EXAMINER'S DESIGNATION NO. OR INSPECTOR'S REG. NO. AFS-780

X. DATE OF ISSUANCE	X. SIGNATURE OF EXAMINER OR INSPECTOR	DATE DESIGNATION EXPIRES
9/2/2005	Harold K. Everett	3/28/2007

FAA Form 8060-4 (9-95) USE PREVIOUS EDITION

FOLD HERE

XIV. CONDITIONS OF ISSUANCE

This is an interim certificate issued subject to the approval of the Federal Aviation Administration pending the issuance of a certificate of greater duration. It becomes void –

1. Upon the receipt of a certificate of greater duration to replace it;
2. Upon a finding by the FAA that an error has been made in its issuance;
3. Upon a finding by the FAA that it was issued illegally or as the result of fraud or misrepresentation;
4. Upon the refusal or failure by the holder to accomplish a flight check by a Flight Standards Inspector if so requested; and
5. In any case, at the expiration of 120 days from date of issuance.

SIC LOA Applications

Complete Section I

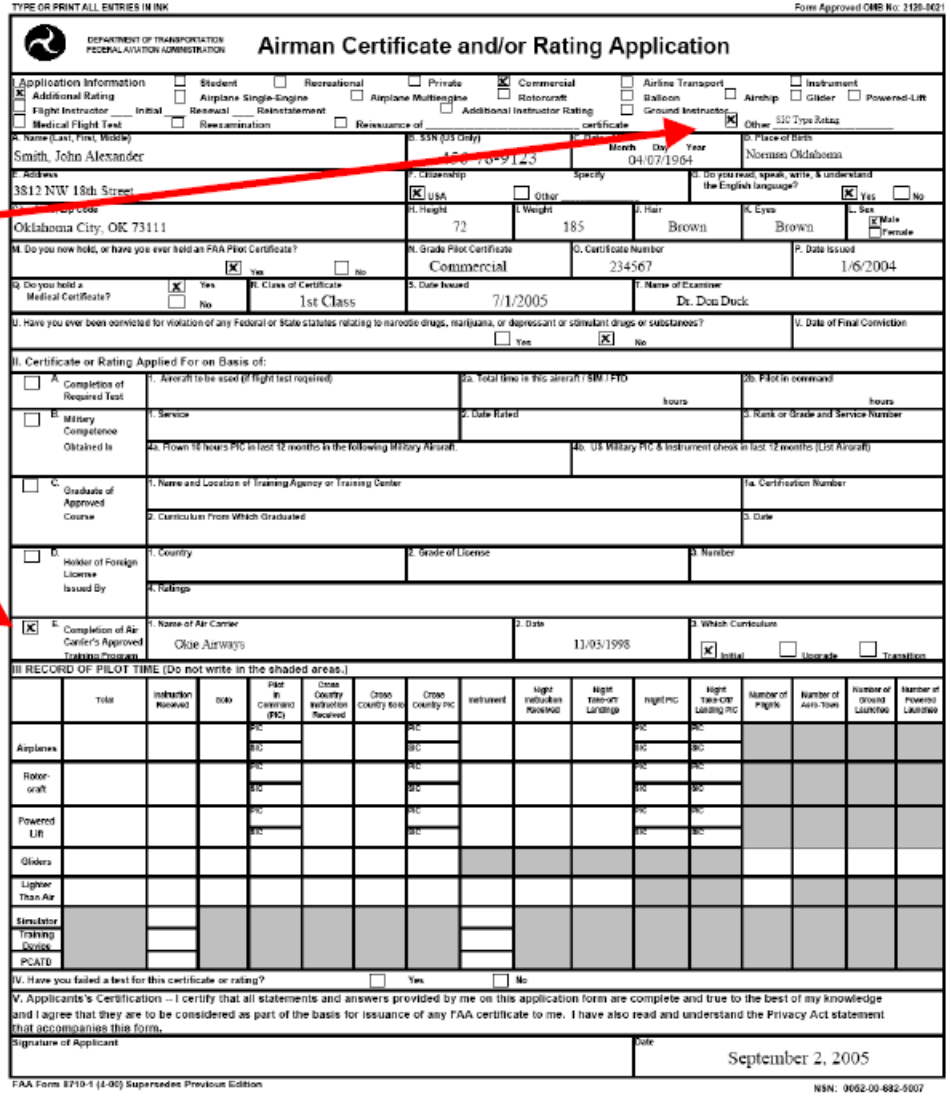
Check “Other” and type “SIC Letter of Authorization”

Leave Blank

Leave Blank

Completion of Section III is recommended but not required

Sign and Date



TYPE OR PRINT ALL ENTRIES IN INK

Form Approved OMB No. 2120-0021

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

Airman Certificate and/or Rating Application

I. Application Information — Student; Recreational; Private; Commercial; Airline Transport; Instrument; Additional Rating; Airplane Single-Engine; Airplane Multiengine; Rotorcraft; Balloon; Airship; Glider; Powered-Lift; Flight Instructor ___ Initial ___ Renewal ___ Reinstatement; Additional Instructor Rating; Ground Instructor; Medical Flight Test; Reexamination; Reissuance of ___ certificate; Other: SIC Type Rating

A. Name (Last, First, Middle): Smith, John Alexander
B. SSN (US Only): 456-78-9123
C. Date of Birth (Month, Day, Year): 04/07/1964
D. Place of Birth: Norman Oklahoma
E. Address: 3812 NW 18th Street
F. Citizenship: USA; Other; Specify
G. Do you read, speak, write, & understand the English language? Yes; No
City, State, Zip Code: Oklahoma City, OK 73111
H. Height: 72
I. Weight: 185
J. Hair: Brown
K. Eyes: Brown
L. Sex: Male; Female
M. Do you now hold, or have you ever held an FAA Pilot Certificate? Yes; No
N. Grade Pilot Certificate: Commercial
O. Certificate Number: 234567
P. Date Issued: 1/6/2004
Q. Do you hold a Medical Certificate? Yes; No
R. Class of Certificate: 1st Class
S. Date Issued: 7/1/2005
T. Name of Examiner: Dr. Don Duck
U. Have you ever been convicted for violation of any Federal or State statutes relating to narcotic drugs, marijuana, or depressant or stimulant drugs or substances? Yes; No
V. Date of Final Conviction:

II. Certificate or Rating Applied For on Basis of:

A. Completion of Required Test — 1. Aircraft to be used (if flight test required); 2a. Total time in this aircraft / SIM / FTD: hours; 2b. Pilot in command: hours
B. Military Competence Obtained In — 1. Service; 2. Date Rated; 3. Rank or Grade and Service Number; 4a. Flown 10 hours PIC in last 12 months in the following Military Aircraft; 4b. US Military PIC & Instrument check in last 12 months (List Aircraft)
C. Graduate of Approved Course — 1. Name and Location of Training Agency or Training Center; 1a. Certification Number; 2. Curriculum From Which Graduated; 3. Date
D. Holder of Foreign License Issued By — 1. Country; 2. Grade of License; 3. Number; 4. Ratings
E. Completion of Air Carrier's Approved Training Program — 1. Name of Air Carrier: Okie Airways; 2. Date: 11/03/1998; 3. Which Curriculum: Initial; Upgrade; Transition

III RECORD OF PILOT TIME (Do not write in the shaded areas.)

	Total	Instruction Received	Solo	Pilot in Command (PIC)	Cross Country Instruction Received	Cross Country Solo	Cross Country PIC	Instrument	Night Instruction Received	Night Take-off/Landings	Night PIC	Night Take-Off/Landing PIC	Number of Flights	Number of Aero-Tows	Number of Ground Launches	Number of Powered Launches
Airplanes				PIC / SIC			PIC / SIC				PIC / SIC	PIC / SIC				
Rotor-craft				PIC / SIC			PIC / SIC				PIC / SIC	PIC / SIC				
Powered Lift				PIC / SIC			PIC / SIC				PIC / SIC	PIC / SIC				
Gliders																
Lighter Than Air																
Simulator / Training Device / PCATD																

IV. Have you failed a test for this certificate or rating? Yes; No

V. Applicants's Certification -- I certify that all statements and answers provided by me on this application form are complete and true to the best of my knowledge and I agree that they are to be considered as part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.

Signature of Applicant

Date: September 2, 2005

FAA Form 8710-1 (4-00) Supersedes Previous Edition

NSN: 0052-00-682-5007

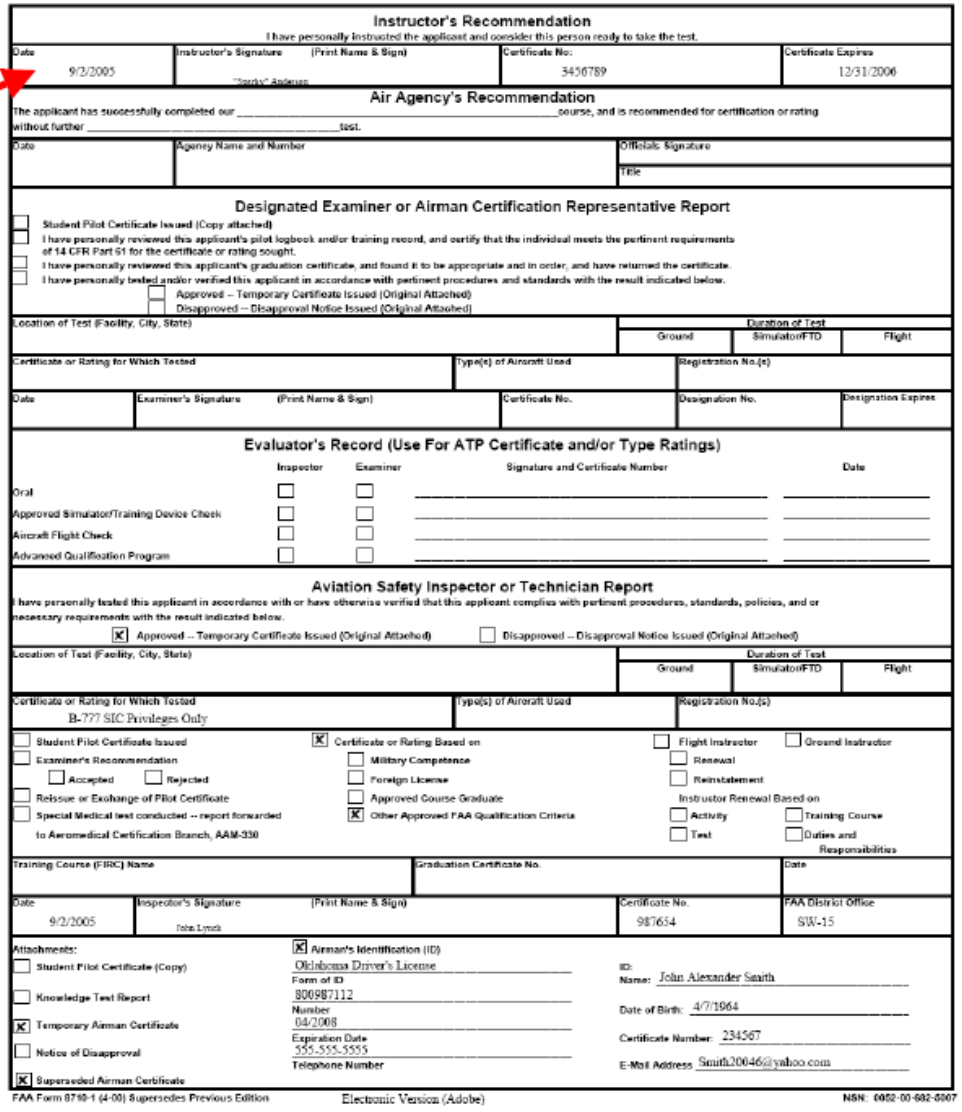
When Completed by an FAA Inspector

Instructor's Recommendation must be completed.

NOTE: In lieu of the instructor, the Director of Flight Operations can sign the training records or logbook and make the required endorsement.

If the Temporary Certificate is issued by an FAA Inspector, check Approved and complete Certificate or Rating for which Tested block, Other Approved FAA Qualification Criteria and the last line of the Report.

Complete the Identification Verification.



Instructor's Recommendation

I have personally instructed the applicant and consider this person ready to take the test.

Date	Instructor's Signature (Print Name & Sign)	Certificate No:	Certificate Expires
9/2/2005	"Jerry" Anderson	3456789	12/31/2006

Air Agency's Recommendation

The applicant has successfully completed our _____ course, and is recommended for certification or rating without further _____ test.

Date	Agency Name and Number	Officials Signature / Title

Designated Examiner or Airman Certification Representative Report

- ☐ Student Pilot Certificate Issued (Copy attached)
- ☐ I have personally reviewed this applicant's pilot logbook and/or training record, and certify that the individual meets the pertinent requirements of 14 CFR Part 61 for the certificate or rating sought.
- ☐ I have personally reviewed this applicant's graduation certificate, and found it to be appropriate and in order, and have returned the certificate.
- ☐ I have personally tested and/or verified this applicant in accordance with pertinent procedures and standards with the result indicated below.
  - ☐ Approved – Temporary Certificate Issued (Original Attached)
  - ☐ Disapproved – Disapproval Notice Issued (Original Attached)

Location of Test (Facility, City, State)	Duration of Test: Ground	Simulator/FTD	Flight

Certificate or Rating for Which Tested	Type(s) of Aircraft Used	Registration No.(s)

Date	Examiner's Signature (Print Name & Sign)	Certificate No.	Designation No.	Designation Expires

Evaluator's Record (Use For ATP Certificate and/or Type Ratings)

	Inspector	Examiner	Signature and Certificate Number	Date
Oral	☐	☐		
Approved Simulator/Training Device Check	☐	☐		
Aircraft Flight Check	☐	☐		
Advanced Qualification Program	☐	☐		

Aviation Safety Inspector or Technician Report

I have personally tested this applicant in accordance with or have otherwise verified that this applicant complies with pertinent procedures, standards, policies, and or necessary requirements with the result indicated below.

☒ Approved – Temporary Certificate Issued (Original Attached) ☐ Disapproved – Disapproval Notice Issued (Original Attached)

Location of Test (Facility, City, State)	Duration of Test: Ground	Simulator/FTD	Flight

Certificate or Rating for Which Tested	Type(s) of Aircraft Used	Registration No.(s)
B-777 SIC Privileges Only		

- ☐ Student Pilot Certificate Issued
- ☐ Examiner's Recommendation
  - ☐ Accepted ☐ Rejected
- ☐ Reissue or Exchange of Pilot Certificate
- ☐ Special Medical test conducted -- report forwarded to Aeromedical Certification Branch, AAM-330
- ☒ Certificate or Rating Based on
  - ☐ Military Competence
  - ☐ Foreign License
  - ☐ Approved Course Graduate
  - ☒ Other Approved FAA Qualification Criteria
- ☐ Flight Instructor ☐ Ground Instructor
  - ☐ Renewal
  - ☐ Reinstatement
  - Instructor Renewal Based on
    - ☐ Activity ☐ Training Course
    - ☐ Test ☐ Duties and Responsibilities

Training Course (FIRC) Name	Graduation Certificate No.	Date

Date	Inspector's Signature (Print Name & Sign)	Certificate No.	FAA District Office
9/2/2005	John Lynch	987654	SW-15

Attachments:
- ☐ Student Pilot Certificate (Copy)
- ☐ Knowledge Test Report
- ☒ Temporary Airman Certificate
- ☐ Notice of Disapproval
- ☒ Superseded Airman Certificate

☒ Airman's Identification (ID)
Oklahoma Driver's License
Form of ID
800987112
Number
04/2008
Expiration Date
555-555-5555
Telephone Number

ID:
Name: John Alexander Smith
Date of Birth: 4/7/1964
Certificate Number: 234567
E-Mail Address: Smith20046@yahoo.com

FAA Form 8710-1 (4-00) Supersedes Previous Edition Electronic Version (Adobe) NSN: 0052-00-682-0007

FAA's Process Summary

- 1) The SIC pilot type rating applicant receives familiarization training under 61.55(b) from a qualified pilot in command or an authorized flight instructor who holds the aircraft type rating on his/her pilot certificate.
- 2) The trainer signs the applicant's logbook or training record after each lesson in accordance with 61.51(h)(2). *In lieu of the trainer, it is permissible for a qualified management official within the organization to sign the applicant's training records or logbook and make the required endorsement.* See 61.55 for the definition of a qualified management official.
- 3) The trainer or qualified management official makes an endorsement in the applicant's logbook that states ''[Applicant's Name and Pilot Certificate Number] has demonstrated the skill and knowledge required for the safe operation of the [Type of Aircraft], relevant to the duties and responsibilities of a second-in-command.''
- 4) The applicant completes and signs an Airman Certificate and/or Rating Application, FAA Form 8710-1, and presents the application and a paper copy of the training records containing the signature of the trainer or qualified management official to a FSDO or Examiner.
- 5) The person who provided the ground and flight training to the applicant must sign the "Instructor's Recommendation" section of FAA Form 8710–1.
- 6) The applicant must appear in person at FSDO or to an Examiner with his or her logbook/training records and with the completed and signed FAA Form 8710–1.
- The FAA Airman Certification Branch has developed application and certification procedures to be used in expediting the process of applying for an SIC type rating.

AIRCRAFT or SIMULATOR GRADESHEET

1. NAME	2. AIRCRAFT WK2	3. CREW POSITION □PILOT □FTE □Other	4. TYPE OF TRAINING □PIC □SIC □FTE □Other

SIM #___ or FLIGHT #____	Instructor	Date
MISSION OVERVIEW:		
STRENGTHS:		
WEAKNESSES:		
RECOMMENDATIONS FOR NEXT SIM/FLIGHT:		

INSTRUCTOR'S SIGNATURE	DATE
TRAINEE'S SIGNATURE	DATE
DIR FLIGHT OPERATIONS' SIGNATURE	DATE

SIM #___ or FLIGHT #____	Instructor	Date
MISSION OVERVIEW:		
STRENGTHS:		
WEAKNESSES:		
RECOMMENDATIONS FOR NEXT SIM/FLIGHT:		

INSTRUCTOR'S SIGNATURE	DATE
TRAINEE'S SIGNATURE	DATE
DIR FLIGHT OPERATIONS' SIGNATURE	DATE

SIMULATOR TRAINING EVENT RECORD

1. NAME	2. AIRCRAFT	3. CREW POSITION	4. TYPE OF TRAINING
	WK2	□PILOT □FTE □Other	□PIC □SIC □FTE □Other

TRAINING EVENTS	Qty Req	DATE1	DATE2
VFR Day Operations			
a) Takeoff	1		
b) Climbout / Departure	1		
c) Approach to Stall	1		
d) Slow Flight	1		
e) High KEAS cruise FL200-280 @ (b) (4) KEAS	1		
f) Normal turns (30 deg bank)	1		
g) Steep turns (45 deg bank)	1		
h) Wind-up turns (<90 deg bank and <3.0g)	1		
i) High Altitude HQ (>FL500)	1		
j) Normal Descent (D-IOOI)	2		
k) Emergency Descent (D-OOOO) (b) (4)	2		
l) VFR approach	3		
m) Touch and Go landings	4		
n) Missed approach	2		
o) SS2 approaches	1		
p) Full stop landing	1		
q) Engine failure on takeoff @ V1	2		
r) Engine out approach	1		
s) Engine out waveoff	1		
IMC Operations			
a) 3° glidepath to RWY aimpoint with 200 ft ceiling (for S.A. only)	1		
b)			
c)			
d)			
e)			
f)			