My history . . .

1970- BA
1974- RW in California
1981- RC, moved to Minnesota
1986- NW
2006- Sabre-Consultant
2007- China
2008- Japan, Brazil, Egypt
2009- Egypt, Chile, Venezuela
2009- Metron Aviation,
     Principle Subject Matter Expert – Airline Operational Control
1974 - 2010
Tough life at Metron Aviation . . .
Air Carrier Operations

the process conducted by the air carrier to transport payload (passengers and cargo) by aircraft from one airport to another airport:

• Operation management
• Air commerce
• Aircraft maintenance
• Personnel training
• Operation resource provision
Air Carrier Operations

The inputs are:

- Aircraft acquisition
- **Aircraft information**
- Airport information
- ATC information
- Employees
- Operational supplies
- Payload information
- Resource information
- Safety data
- Topographical information
- Weather information
Air Carrier Operations

The execution of this activity is governed by a set of regulations or constraints related to the government, the air carrier and its environment:

– Air carrier business plan
– ATC instructions
– Government regulations and oversight
– Personnel qualification requirements
– International agreements

A set of resources are needed to support the execution of the activity:

– Air carrier operation resources
– Airports and airport management
– ATC facilities
– Contractor support
– Original Equipment Manufacturer (OEM) support
Part 121 Air Carrier Regulations

TITLE 14--Aeronautics and Space

CHAPTER I--FEDERAL AVIATION ADMINISTRATION, DEPARTMENT OF TRANSPORTATION

SUBCHAPTER G--AIR CARRIERS AND OPERATORS FOR COMPENSATION OR HIRE: CERTIFICATION AND OPERATIONS

PART 121--OPERATING REQUIREMENTS: DOMESTIC, FLAG, AND SUPPLEMENTAL OPERATIONS

Subpart A--GENERAL

§121.1 Applicability.
§121.2 Compliance schedule for operators that transition to part 121; certain new entrant operators.
§121.4 Applicability of rules to unauthorized operators.
§121.7 Definitions.
§121.11 Rules applicable to operations in a foreign country.
§121.15 Carriage of narcotic drugs, marijuana, and depressant or stimulant drugs or substances.

Subpart E--APPROVAL OF ROUTES: DOMESTIC AND FLAG OPERATIONS

§121.91 Applicability.
§121.93 Route requirements: General.
§121.95 Route width.
§121.97 Airports: Required data.
§121.99 Communications facilities—domestic and flag operations.
§121.101 Weather reporting facilities.
§121.103 En route navigation facilities.
§121.105 Servicing and maintenance facilities.
§121.106 ETOPS Alternate Airport: Rescue and fire fighting service.
§121.107 Dispatch centers

Subpart G--MANUAL REQUIREMENTS

§121.131 Applicability.
§121.133 Preparation.
§121.135 Manual contents.
§121.137 Distribution and availability.
§121.139 Requirements for manual aboard aircraft: Supplemental operations.
§121.141 Airplane flight manual.
### Subpart H—AIRCRAFT REQUIREMENTS

| §121.151        | Applicability.                                      |
| §121.153        | Aircraft requirements: General.                    |
| §121.155        | [Reserved]                                         |
| §121.157        | Aircraft certification and equipment requirements. |
| §121.159        | Single-engine airplanes prohibited.                |
| §121.161        | Airplane limitations: Type of route.               |
| §121.162        | ETOPS Type Design Approval Basis.                  |
| §121.163        | Aircraft proving tests.                            |

---

### Subpart L—AIRPLANE PERFORMANCE OPERATING LIMITATIONS

| §121.171        | Applicability.                                      |
| §121.172        | General.                                            |
| §121.175        | Airplanes: Reciprocating engine-powered: Weight limitations. |
| §121.177        | Airplanes: Reciprocating engine-powered: Takeoff limitations. |
| §121.179        | Airplanes: Reciprocating engine-powered: En route limitations: All engines operating. |
| §121.181        | Airplanes: Reciprocating engine-powered: En route limitations: One engine inoperative. |
| §121.183        | Part 25 airplanes with four or more engines: Reciprocating engine powered: En route limitations: Two engines inoperative. |
| §121.185        | Airplanes: Reciprocating engine-powered: Landing limitations: Destination airport. |
| §121.189        | Airplanes: Turbine engine powered: Takeoff limitations. |
| §121.191        | Airplanes: Turbine engine powered: En route limitations: One engine inoperative. |
| §121.193        | Airplanes: Turbine engine powered: En route limitations: Two engines inoperative. |
| §121.198        | Cargo service airplanes: Increased zero fuel and landing weights. |
| §121.199        | Nontransport category airplanes: Takeoff limitations. |
| §121.201        | Nontransport category airplanes: En route limitations: One engine inoperative. |
| §121.203        | Nontransport category airplanes: Landing limitations: Destination airport. |
| §121.205        | Nontransport category airplanes: Landing limitations: Alternate airport. |
| §121.207        | Provisionally certificated airplanes: Operating limitations. |
### Part 121

#### Subpart J—SPECIAL AIRWORTHINESS REQUIREMENTS

- $121.211$ Applicability.
- $121.213$ [Reserved]
- $121.215$ Cabin interiors.
- $121.217$ Internal doors.
- $121.219$ Ventilation.
- $121.221$ Fire precautions.
- $121.223$ Proof of compliance with $121.221$.
- $121.224$ Propeller deicing fluid.
- $121.227$ Pressure cross-feed arrangements.
- $121.229$ Location of fuel tanks.
- $121.231$ Fuel system lines and fittings.
- $121.233$ Fuel lines and fittings in designated fire zones.
- $121.235$ Fuel valves.
- $121.237$ Oil lines and fittings in designated fire zones.
- $121.239$ Oil valves.
- $121.241$ Oil system drains.
- $121.243$ Engine breather lines.
- $121.245$ Fire walls.
- $121.247$ Fire-wall construction.
- $121.249$ Cowlings.
- $121.251$ Engine accessory section diaphragm.
- $121.253$ Powerplant fire protection.
- $121.255$ Flammable fluids.
- $121.257$ Shutoff means.
- $121.259$ Lines and fittings.
- $121.261$ Vent and drain lines.
- $121.263$ Fire-extinguishing systems.
- $121.265$ Fire-extinguishing agents.
- $121.267$ Extinguishing agent container pressure relief.

#### Subpart K—INSTRUMENT AND EQUIPMENT REQUIREMENTS

- $121.269$ Extinguishing agent container compartment temperature.
- $121.271$ Fire-extinguishing system materials.
- $121.273$ Fire-detection systems.
- $121.275$ Fire detectors.
- $121.277$ Protection of other airplane components against fire.
- $121.279$ Control of engine rotation.
- $121.281$ Fuel system independence.
- $121.283$ Induction system ice prevention.
- $121.285$ Carriage of cargo in passenger compartments.
- $121.287$ Carriage of cargo in cargo compartments.
- $121.289$ Landing gear: Aural warning device.
- $121.293$ Special airworthiness requirements for nontransport category airplanes type certificated after December 31, 1964.
- $121.295$ Location for a suspect device.

- $121.335$ Passenger information requirements, smoking prohibitions, and additional seat belt requirements.
- $121.337$ Public address system.
- $121.339$ Crewmember interphone system.
- [Reserved]
- $121.325$ Instruments and equipment for operations under IFR or over-the-top.
- $121.327$ Supplemental oxygen: Reciprocating engine powered airplanes.
- $121.329$ Supplemental oxygen for sustenance: Turbine engine powered airplanes.
- $121.331$ Supplemental oxygen requirements for pressurized cabin airplanes: Reciprocating engine powered airplanes.
- $121.333$ Supplemental oxygen for emergency descent and for first aid; turbine engine powered airplanes with pressurized cabins.
- $121.335$ Equipment standards.
- $121.337$ Protective breathing equipment.
- $121.339$ Emergency equipment for extended over-water operations.
- $121.340$ Emergency flotation means.
- $121.341$ Equipment for operations in icing conditions.
- $121.342$ Pitot heat indication systems.
- $121.343$ Flight data recorders.
- $121.344$ Digital flight data recorders for transport category airplanes.
- $121.344a$ Digital flight data recorders for 10-19 seat airplanes.
- $121.345$ Radio equipment.
- $121.346$ Flight data recorders: filtered data.
- $121.347$ Communication and navigational equipment for operations under VFR, over routes navigated by pilotage.
- $121.347a$ Communication and navigational equipment for operations under VFR, over routes not navigated by pilotage or for operations under IFR or over the top.
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>§121.351</td>
<td>Communication and navigation equipment for extended over-water operations and for certain other operations.</td>
</tr>
<tr>
<td>§121.353</td>
<td>Emergency equipment for operations over uninhabited terrain areas: Flag, supplemental, and certain domestic operations.</td>
</tr>
<tr>
<td>§121.354</td>
<td>Terrain awareness and warning system.</td>
</tr>
<tr>
<td>§121.355</td>
<td>Equipment for operations on which specialized means of navigation are used.</td>
</tr>
<tr>
<td>§121.356</td>
<td>Collision avoidance system.</td>
</tr>
<tr>
<td>§121.357</td>
<td>Airborne weather radar equipment requirements.</td>
</tr>
<tr>
<td>§121.358</td>
<td>Low-altitude windshear system equipment requirements.</td>
</tr>
<tr>
<td>§121.359</td>
<td>Cockpit voice recorders.</td>
</tr>
<tr>
<td>§121.360</td>
<td>Ground proximity warning-glide slope deviation alerting system.</td>
</tr>
<tr>
<td>§121.377</td>
<td>Maintenance and preventive maintenance personnel duty time limitations.</td>
</tr>
<tr>
<td>§121.378</td>
<td>Certificate requirements.</td>
</tr>
<tr>
<td>§121.379</td>
<td>Authority to perform and approve maintenance, preventive maintenance, and alterations.</td>
</tr>
<tr>
<td>§121.380</td>
<td>Maintenance recording requirements.</td>
</tr>
<tr>
<td>§121.380a</td>
<td>Transfer of maintenance records.</td>
</tr>
</tbody>
</table>

**Subpart M—AIRMAN AND CREWMEMBER REQUIREMENTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>§121.381</td>
<td>Applicability.</td>
</tr>
<tr>
<td>§121.383</td>
<td>Airman: Limitations on use of services.</td>
</tr>
<tr>
<td>§121.385</td>
<td>Composition of flight crew.</td>
</tr>
<tr>
<td>§121.387</td>
<td>Flight engineer.</td>
</tr>
<tr>
<td>§121.389</td>
<td>Flight navigator and specialized navigation equipment.</td>
</tr>
<tr>
<td>§121.391</td>
<td>Flight attendants.</td>
</tr>
<tr>
<td>§121.393</td>
<td>Crewmember requirements at stops where passengers remain on board.</td>
</tr>
</tbody>
</table>

**121.395 Aircraft dispatcher: Domestic and flag operations.**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>§121.397</td>
<td>Emergency and emergency evacuation duties.</td>
</tr>
</tbody>
</table>

**Subpart N—TRAINING PROGRAM**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>§121.400</td>
<td>Applicability and terms used.</td>
</tr>
<tr>
<td>§121.401</td>
<td>Training program: General.</td>
</tr>
<tr>
<td>§121.402</td>
<td>Training program: Special rules.</td>
</tr>
<tr>
<td>§121.403</td>
<td>Training program: Curriculum.</td>
</tr>
<tr>
<td>§121.404</td>
<td>Compliance dates: Crew and dispatcher resource management training.</td>
</tr>
<tr>
<td>§121.405</td>
<td>Training program and revision: Initial and final approval.</td>
</tr>
<tr>
<td>§121.406</td>
<td>Credit for previous CRM/DRM training.</td>
</tr>
<tr>
<td>§121.407</td>
<td>Training program: Approval of airplane simulators and other training devices.</td>
</tr>
</tbody>
</table>

Training courses using airplane simulators and other training devices.
Qualifications: Check airmen (airplane) and check airmen (simulator).
Qualifications: Flight instructors (airplane) and flight instructors (simulator).
Initial and transition training and checking requirements: Check airmen (airplane), check airmen (simulator).
Initial and transition training and checking requirements: flight instructors (airplane), flight instructors (simulator).

**Crewmember and dispatcher training requirements**

<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>§121.415</td>
<td>Crewmember emergency training.</td>
</tr>
<tr>
<td>§121.417</td>
<td>Differences training: Crewmembers and dispatchers.</td>
</tr>
<tr>
<td>§121.418</td>
<td>Pilots and flight engineers: Initial, transition, and upgrade around training.</td>
</tr>
<tr>
<td>§121.419</td>
<td>Flight navigators: Initial and transition ground training.</td>
</tr>
<tr>
<td>§121.420</td>
<td>Flight attendants: Initial and transition ground training.</td>
</tr>
<tr>
<td>§121.421</td>
<td><strong>121.422 Aircraft dispatchers</strong>: Initial and transition ground training.</td>
</tr>
<tr>
<td>§121.423</td>
<td>Pilots: Initial, transition, and upgrade flight training.</td>
</tr>
<tr>
<td>§121.424</td>
<td>Flight engineers: Initial and transition flight training.</td>
</tr>
<tr>
<td>§121.425</td>
<td>Flight navigators: Initial and transition flight training.</td>
</tr>
<tr>
<td>§121.426</td>
<td>Recurrent training.</td>
</tr>
<tr>
<td>§121.427</td>
<td><strong>121.429 [Reserved]</strong></td>
</tr>
</tbody>
</table>
Part 121...

Subpart O—CREWMEMBER QUALIFICATIONS

§121.431 Applicability.
§121.432 General.
§121.433 Training required.
§121.434 Operating experience, operating cycles, and consolidation of knowledge and skills.
§121.437 Pilot qualification: Certificates required.
§121.438 Pilot operating limitations and pairing requirements.
§121.439 Pilot qualification: Recent experience.
§121.440 Line checks.
§121.441 Proficiency checks.
§121.443 Pilot in command qualification: Route and airports.
§121.444 Pilot in command airport qualification: Special areas and airports.
§121.447 [Reserved]
§121.453 Flight engineer qualifications.

Subpart P—AIRCRAFT DISPATCHER QUALIFICATIONS AND DUTY TIME

§121.461 Applicability.
§121.463 Aircraft dispatcher qualifications

Subpart Q—FLIGHT TIME LIMITATIONS AND REST REQUIREMENTS: DOMESTIC OPERATIONS

§121.470 Applicability.
§121.471 Flight time limitations and rest requirements: All flight crewmembers.

Subpart R—FLIGHT TIME LIMITATIONS: FLAG OPERATIONS

§121.480 Applicability.
§121.481 Flight time limitations: One or two pilot crews.
§121.482 Flight time limitations: Two pilots and one additional flight crewmember.
§121.483 Flight time limitations: Three or more pilots and an additional flight crewmember.
§121.487 Flight time limitations: Pilots not regularly assigned.
§121.489 Flight time limitations: Other commercial flying.
§121.491 Flight time limitations: Deadhead transportation.
§121.493 Flight time limitations: Flight engineers and flight navigators.

Subpart S—FLIGHT TIME LIMITATIONS: SUPPLEMENTAL OPERATIONS

§121.500 Applicability.
§121.503 Flight time limitations: Pilots: airplanes.
§121.505 Flight time limitations: Two pilot crews: airplanes.
§121.507 Flight time limitations: Three pilot crews: airplanes.
§121.509 Flight time limitations: Four pilot crews: airplanes.
§121.511 Flight time limitations: Flight engineers: airplanes.
§121.513 Flight time limitations: Overseas and international operations: airplanes.
§121.515 Flight time limitations: All airmen: airplanes.
§121.517 Flight time limitations: Other commercial flying: airplanes.
§121.519 Flight time limitations: Deadhead transportation: airplanes.
§121.521 Flight time limitations: Crew of two pilots and one additional airman as required.
§121.523 Flight time limitations: Crew of three or more pilots and additional airman as required.
§121.525 Flight time limitations: Pilots serving in more than one kind of flight crew.

Subpart T—FLIGHT OPERATIONS

§121.531 Applicability.
§121.533 Responsibility for operational control: Domestic operations.
§121.535 Responsibility for operational control: Flag operations.
§121.537 Responsibility for operational control: Supplemental operations.
§121.538 Aircraft security.
§121.539 Operations notices.
§121.541 Operations schedules: Domestic and flag operations.
§121.542 Flight crewmember duties.
§121.543 Flight crewmembers at controls.
§121.545 Manipulation of controls.
§121.547 Admission to flight deck.
§121.548 Aviation safety inspector’s credentials: Admission to pilot’s compartment.
§121.548a DOD Commercial Air Carrier Evaluator’s Credential.
§121.549 Flying equipment.
§121.550 Secret Service Agents: Admission to flight deck.
§121.551 Restriction or suspension of operation: Domestic and flag operations.
§121.553 Restriction or suspension of operation: Supplemental operations.
§121.555 Compliance with approved routes and limitations: Domestic and flag operations.
§121.557 Emergencies: Domestic and flag operations.
§121.559 Emergencies: Supplemental operations.
Part 121 . . .

§121.561 Reporting potentially hazardous meteorological conditions and irregularities of ground facilities or navigation aids.
§121.563 Reporting mechanical irregularities.
§121.565 Engine inoperative. Landing, reporting.
§121.567 Instrument approach procedures and IFR landing minimums.
§121.569 Equipment interchange. Domestic and flag operations.
§121.570 Airplane evacuation capability.
§121.571 Briefing passengers before takeoff.
§121.573 Briefing passengers: Extended overwater operations.
§121.574 Oxygen for medical use by passengers.
§121.575 Alcoholic beverages.
§121.576 Retention of items of mass in passenger and crew compartments.
§121.577 Stowage of food, beverage, and passenger service equipment during airplane movement on the surface, takeoff, and landing.
§121.578 Cabin ozone concentration.
§121.579 Minimum altitudes for use of autopilot.
§121.580 Prohibition on interference with crewmembers.
§121.581 Observer's seat. En route inspections.
§121.582 Means to discreetly notify a flightcrew.
§121.583 Carriage of persons without compliance with the passenger-carrying requirements of this part.
§121.584 Requirement to view the area outside the flightdeck door.
§121.585 Exit seating.
§121.586 Authority to refuse transportation.
§121.587 Closing and locking of flightcrew compartment door.
§121.589 Carry-on baggage.
§121.590 Use of certificated land airports in the United States.
## Part 121

### Subpart U—Dispatching and Flight Release Rules

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>121.591</td>
<td>Applicability.</td>
</tr>
<tr>
<td>121.593</td>
<td>Dispatching authority: Domestic operations.</td>
</tr>
<tr>
<td>121.595</td>
<td>Dispatching authority: Flag operations.</td>
</tr>
<tr>
<td>121.597</td>
<td>Flight release authority: Supplemental operations.</td>
</tr>
<tr>
<td>121.599</td>
<td>Familiarity with weather conditions.</td>
</tr>
<tr>
<td>121.601</td>
<td>Aircraft dispatcher information to pilot in command: Domestic and flag operations.</td>
</tr>
<tr>
<td>121.603</td>
<td>Facilities and services: Supplemental operations.</td>
</tr>
<tr>
<td>121.605</td>
<td>Airplane equipment.</td>
</tr>
<tr>
<td>121.607</td>
<td>Communication and navigation facilities: Domestic and flag operations.</td>
</tr>
<tr>
<td>121.609</td>
<td>Communication and navigation facilities: Supplemental operations.</td>
</tr>
<tr>
<td>121.611</td>
<td>Dispatch or flight release under VFR.</td>
</tr>
<tr>
<td>121.613</td>
<td>Dispatch or flight release under IFR or over the top.</td>
</tr>
<tr>
<td>121.615</td>
<td>Dispatch or flight release over water: Flag and supplemental operations.</td>
</tr>
<tr>
<td>121.617</td>
<td>Alternate airport for departure.</td>
</tr>
<tr>
<td>121.619</td>
<td>Alternate airport for destination: IFR or over-the-top: Domestic operations.</td>
</tr>
<tr>
<td>121.621</td>
<td>Alternate airport for destination: Flag operations.</td>
</tr>
<tr>
<td>121.623</td>
<td>Alternate airport for destination: IFR or over-the-top: Supplemental operations.</td>
</tr>
<tr>
<td>121.624</td>
<td>ETOPS Alternate Airports.</td>
</tr>
<tr>
<td>121.625</td>
<td>Alternate Airport weather minima.</td>
</tr>
<tr>
<td>121.627</td>
<td>Continuing flight in unsafe conditions.</td>
</tr>
<tr>
<td>121.628</td>
<td>Inoperable instruments and equipment.</td>
</tr>
<tr>
<td>121.629</td>
<td>Operation in icing conditions.</td>
</tr>
<tr>
<td>121.631</td>
<td>Original dispatch or flight release, redispoch or amendment of dispatch or flight release.</td>
</tr>
<tr>
<td>121.633</td>
<td>Considering time-limited systems in planning ETOPS alternates.</td>
</tr>
<tr>
<td>121.635</td>
<td>Dispatch to and from refueling or provisional airports: Domestic and flag operations.</td>
</tr>
<tr>
<td>121.637</td>
<td>Takeoffs from unlisted and alternate airports: Domestic and flag operations.</td>
</tr>
<tr>
<td>121.639</td>
<td>Fuel supply: All domestic operations.</td>
</tr>
<tr>
<td>121.641</td>
<td>Fuel supply: Nonturbine and turbo-propeller-powered airplanes: Flag operations.</td>
</tr>
<tr>
<td>121.643</td>
<td>Fuel supply: Nonturbine and turbo-propeller-powered airplanes: Supplemental operations.</td>
</tr>
<tr>
<td>121.645</td>
<td>Fuel supply: Turbine-engine powered airplanes, other than turbo propeller: Flag and supplemental operations.</td>
</tr>
<tr>
<td>121.646</td>
<td>En-route fuel supply: flag and supplemental operations.</td>
</tr>
<tr>
<td>121.647</td>
<td>Factors for computing fuel required.</td>
</tr>
<tr>
<td>121.649</td>
<td>Takeoff and landing weather minimums: VFR: Domestic operations.</td>
</tr>
<tr>
<td>121.651</td>
<td>Takeoff and landing weather minimums: IFR: All certificate holders.</td>
</tr>
<tr>
<td>121.652</td>
<td>Landing weather minimums: IFR: All certificate holders.</td>
</tr>
<tr>
<td>121.653</td>
<td>[Reserved]</td>
</tr>
<tr>
<td>121.655</td>
<td>Applicability of reported weather minimums.</td>
</tr>
<tr>
<td>121.656</td>
<td>Flight altitude rules.</td>
</tr>
<tr>
<td>121.657</td>
<td>Initial approach altitude: Domestic and supplemental operations.</td>
</tr>
<tr>
<td>121.659</td>
<td>Initial approach altitude: Flag operations.</td>
</tr>
<tr>
<td>121.661</td>
<td>Responsibility for dispatch release: Domestic and flag operations.</td>
</tr>
<tr>
<td>121.663</td>
<td>Load manifest.</td>
</tr>
<tr>
<td>121.665</td>
<td>Flight plan VFR and IFR: Supplemental operations.</td>
</tr>
</tbody>
</table>
### Part 121 . . .

#### Subpart V—RECORDS AND REPORTS

| §121.681 | Applicability. |
| §121.683 | Crewmember and dispatcher record. |
| §121.685 | Aircraft record: Domestic and flag operations. |
| §121.687 | Dispatch release: Flag and domestic operations. |
| §121.689 | Flight release form: Supplemental operations. |
| §121.691 | [Reserved] |
| §121.693 | Load manifest: All certificate holders. |
| §121.695 | Disposition of load manifest, dispatch release, and flight plans: Domestic and flag operations. |
| §121.697 | Disposition of load manifest, flight release, and flight plans: Supplemental operations. |

#### Subpart W—CREWMEMBER CERTIFICATE, INTERNATIONAL

| §121.721 | Applicability. |
| §121.723 | Surrender of international crewmember certificate. |

#### Subpart X—EMERGENCY MEDICAL EQUIPMENT AND TRAINING

| §121.801 | Applicability. |
| §121.803 | Emergency medical equipment. |
| §121.805 | Crewmember training for in-flight medical events. |

#### Subpart V—ADVANCED QUALIFICATION PROGRAM

| §121.901 | Purpose and eligibility. |
| §121.903 | General requirements for Advanced Qualification Programs. |
| §121.905 | Confidential commercial information. |
| §121.907 | Definitions. |
| §121.909 | Approval of Advanced Qualification Program. |
| §121.911 | Indocuration curriculum. |
| §121.913 | Qualification curriculum. |
| §121.915 | Continuing qualification curriculum. |
| §121.917 | Other requirements. |
| §121.919 | Certification. |
| §121.921 | Training devices and simulators. |
| §121.923 | Approval of training, qualification, or evaluation by a person who provides training by arrangement. |
| §121.925 | Recordkeeping requirements. |

#### Subpart Z—HAZARDOUS MATERIALS TRAINING PROGRAM

| §121.1001 | Applicability and definitions. |
| §121.1003 | Hazardous materials training: General. |
| §121.1005 | Hazardous materials training required. |
| §121.1007 | Hazardous materials training records. |

#### Subpart AAAIRWORTHINESS AND SAFETY IMPROVEMENTS

| §121.1101 | Purpose and definition. |
| §121.1103 | [Reserved] |
| §121.1105 | Aging airplane inspections and records reviews. |
| §121.1107 | Repairs assessment for pressurized fuselages. |
| §121.1109 | Supplemental inspections. |
| §121.1111 | Electrical wiring interconnection systems (EWIS) maintenance program. |
| §121.1113 | Fuel tank system maintenance program. |
| §121.1117 | Flammability reduction means. |

#### Subpart BB—[RESERVED]

| §§121.1200–121.1399 | [Reserved] |
Part 121 . . .

Subpart CC—[RESERVED]

§§121.1400-121.1499

Appendix

Appendix A to Part 121—First Aid Kits and Emergency Medical Kits

Appendix B to Part 121—Airplane Flight Recorder Specification

Appendix C to Part 121—C-46 Nontransport Category Airplanes

Appendix D to Part 121—Criteria for Demonstration of Emergency Evacuation Procedures Under 121.291

Appendix E to Part 121—Flight Training Requirements

Appendix F to Part 121—Proficiency Check Requirements

Appendix G to Part 121—Doppler Radar and Inertial Navigation System (INS): Request for Evaluation; Equipment and Equipment Installation; Training Program; Equipment Accuracy and Reliability; Evaluation Program

Appendix H to Part 121—Advanced Simulation

Appendix I—J to Part 121—[Reserved]

Appendix K to Part 121—Performance Requirements for Certain Turbopropeller Powered Airplanes

Appendix L to Part 121—Type Certification Regulations Made Previously Effective

Appendix M to Part 121—Airplane Flight Recorder Specifications

Appendix N to Part 121—[Reserved]

Appendix O to Part 121—Hazardous Materials Training Requirements for Certificate Holders

Appendix P to Part 121—Requirements for ETOPS and Polar Operations
Manage Air Carrier Operations

This function directs, schedules, and coordinates the following component activities of air carrier operations:

- Perform air transportation
- Perform aircraft maintenance
- Perform personnel training
- Provide air carrier operation resources
- Provide directives
- Define requirements and controls
- Establish performance standards for execution of activities
- Monitor compliance with company policies and procedures
- Monitor compliance with any required regulations
Air commerce means interstate, overseas, or foreign air commerce or the transportation of mail by aircraft or any operation, or navigation of aircraft within the limits of any Federal airway, or any operation or navigation of aircraft which directly affects, or which may endanger safety in, interstate, overseas, or foreign air commerce.

Air carrier means a person who undertakes directly by lease, or other arrangement, to engage in air transportation.

Aircraft means a device that is used or intended to be used for flight in the air.
Aircraft Maintenance

Perform Aircraft Maintenance (CFR Part 1)

Maintenance means:

- Inspection
- Overhaul
- Repair
- Preservation
- replacement of parts

This function inspects and maintains aircraft to prevent deterioration of the inherent safety and reliability levels of the equipment to ensure the aircraft is in safe and efficient condition for flight services. This process includes aircraft evaluation and scheduled/nonscheduled maintenance.
Perform Personnel Training

This function plans, designs, implements, and evaluates an array of procedures, methods, and practices to improve work force capabilities to meet mission/workload requirements and increase/maintain individual employee knowledge, skills, and abilities.
Provide Air Carrier Operation Resources

This function allocates and supplies:

– Aircraft
– Automation
– Budget
– Equipment
– Facilities
– Information
– Infrastructure
– Materials
– Parts
– Personnel
– Publications
– Tools
– and any other required resources
The Aircraft Dispatcher

American Airlines SOC, DFW

Pilot
Air Traffic Controller
Dispatcher

The Safety PAD

Three Legged Stool
What is a Dispatcher?

A **certificated** airman who has joint responsibility with the pilot in command for the safety and operational control of flights under his/her control.
FAA Requirement to be Certificated . . .

Sec. 65.51 Certificate required (effective Apr 6, 2000)
(a) No person may act as an Aircraft Dispatcher (exercising responsibility with the pilot in command in the operational control of a flight) in connection with any civil aircraft in air commerce unless that person has in his personal possession an Aircraft Dispatcher certificate issued under this subpart.

Sec. 65.53 Eligibility requirements: General.
(a) To be eligible to take the Aircraft Dispatcher knowledge test, a person must be at least 21 years of age.
(b) To be eligible for an Aircraft Dispatcher certificate, a person must--
(1) Be at least 23 years of age;
(2) Be able to read, speak, write, & understand English;
(3) Pass the required knowledge test prescribed by 65.55;
(4) Pass the required Practical test prescribed by 65.59; &
(5) Comply with the requirements of 65.57.
Sec. 65.57 Experience requirements.

An applicant for an Aircraft Dispatcher certificate must present documentary evidence satisfactory to the Examiner that he has the experience prescribed in par (a) of this section or accomplished the training prescribed in par (b) of this section as follows:

(a) A total of at least 2 years experience in the 3 years before the date of application, in any 1 of, or combination of:

(1) In military aircraft ops as a--
   (i) Pilot;
   (ii) Flight navigator;
   (iii) Meteorologist.

(2) In aircraft ops conducted under Part 121 as--
   (i) An assistant in dispatching air carrier aircraft, under the direct supervision of a certificated Dispatcher;
   (ii) A pilot;
   (iii) A flight engineer;
   (iv) A meteorologist.
(3) In aircraft ops as--
   (i) An Air Traffic Controller; or
   (ii) A Flight Service Station Specialist.
(4) In aircraft ops, performing other duties that the Examiner finds provides equivalent experience.

(b) A statement of graduation issued or revalidated under 65.70 showing that he has successfully completed an approved Aircraft Dispatcher course.

Sec. 65.59 Skill requirements.
An applicant for an Aircraft Dispatcher certificate must pass a practical test given by an Examiner, with respect to any 1 type of large aircraft used in air carrier ops. The practical test must be based on the Aircraft Dispatcher Practical Test Standards on items in App A of this part.

Airline Ground Schools (AGS)
Danny Mortensen
800-824-4170
www.agschools.com
What does a dispatcher do?

American Airlines SOC, DFW

- Issues Dispatch release to authorize a flight
- Monitors all phases of flight
- Monitors weather
- Delays, diverts or cancels flights if safety jeopardized
What do dispatchers do . . .

Dispatchers usually work for an airline

Airlines have a product – their schedule

Dispatchers attempt to **operate** that schedule
Airline operational timeline

**PRODUCTION**
- Crew
- Fleet
- Maintenance
- Schedule
- Other

**OPERATIONS**
- Cost Control
- Crew Track
- Customer Service
- Maintenance
- Revenue
- Safety
- Schedule
- Other

**Tactical Changes**

<table>
<thead>
<tr>
<th>5 yrs +</th>
<th>5 yrs to 3 yrs</th>
<th>36 months to 72 hours</th>
<th>72 hours to right now</th>
</tr>
</thead>
</table>

Operate Safely
Run the Schedule
Minimize Costs
Manage Disruptions
Protect Revenue
Schedule Recovery
“Right now” from previous slide

Right now ---

This is where dispatcher BEGINS to function

Right now to about 24 hours from now…

Longest international flights running 16 hours or more

Preparation for flight release begins 3 or 4 hours prior to STD

STD is the Scheduled Departure Time
Flight Release, Flight Monitoring

Dispatcher creates a “dispatch release”

Pilot in Command (PIC) and Dispatcher agree to the terms of the flight release

PIC and Dispatcher sign the release

Dispatcher monitors the progress of the flight to ensure that the terms of the release are being honored

Dispatcher will advise the PIC of any changes to the terms or conditions; weather, navaids, airspace constraints, threats, etc

PIC and Dispatcher must remain in agreement that the flight can operate and continue to operate safely, otherwise an emergency condition exists

Dispatcher is the primary communication point for all in-flight emergencies
Primary Duties of a Dispatcher

- Analyze route of flight
- Plan alternate airports, if required, for
  - Departure
  - Enroute
  - Destination
- Determine fuel load
- Check MEL/CDL data for performance restrictions
- Check MEL/CDL data for route restrictions
- Check crew qualifications
- Assess ATC constraints
- Issue dispatch release
- Monitor the progress of each flight
**Scope**

Approximately 28,000 air carrier flights daily (DOT 2010)

Each one must be initiated by a dispatcher (the dispatch release)

*Initiate*: to begin, set going, or originate

Each one must be conducted by a dispatcher

*Conduct*: to direct in action or course, to lead or guide, to manage

Each one flown by a pilot in command and a co-pilot

Each one provided with separation by air traffic control

65,000 pilots  
15,000 controllers  
1,000 dispatchers
Dispatcher work station
Dispatcher work station . . .
NWA Systems Ops Control (SOC)
Who a dispatcher works with . . .

Internal (Company) departments:
Air Cargo Specialist
Aircraft Coordinator
Airline Air Traffic Control Coordinator
Airport Customer Service Coordinator
Automation Support
Corporate Security
Flight Operations Representative
In-Flight Service Representative
Maintenance Coordinator
Meteorologist (Surface, Upper Air)
Navigation Database Analyst
Reservations Coordinator
System Reroute Crews Coordinator
Technical Analyst - Maintenance
External agencies

Air Traffic Control
  ATCSCC
  ARTCC
  Tracon
  ATCT

Airport Management and Port Authorities

Aircraft and Engine Manufacturers

Vendors and Suppliers

Medical support facilities

Homeland Security – TSA

Law Enforcement Agencies, including Federal Air Marshals (FAM)

Immigration and Customs Enforcement – ICE
Different dispatcher roles

Assistant Dispatcher

Dispatcher
  - Domestic
  - International

Chief dispatcher

Check dispatcher

ATC coordinator

Shift supervisor
  - Also called Coordinator or Shift Manager at some airlines
# Boring list of FARs

http://ecfr.gpoaccess.gov/cgi/t/text/text-idx?c=ecfr&tpl=/ecfrbrowse/Title14/14cfr121_main_02.tpl

<table>
<thead>
<tr>
<th>FAR</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>121.107</td>
<td>dispatch centers</td>
</tr>
<tr>
<td>121.395</td>
<td>aircraft dispatcher</td>
</tr>
<tr>
<td>121.415</td>
<td>training requirements</td>
</tr>
<tr>
<td>121.422</td>
<td>initial and transition ground training</td>
</tr>
<tr>
<td>121.463</td>
<td>aircraft dispatcher qualifications</td>
</tr>
<tr>
<td>121.465</td>
<td>duty time limitations</td>
</tr>
<tr>
<td>121.533</td>
<td>responsibility for operational control, domestic air carrier</td>
</tr>
<tr>
<td>121.557</td>
<td>emergencies</td>
</tr>
<tr>
<td>121.593</td>
<td>dispatching authority</td>
</tr>
<tr>
<td>121.599</td>
<td>familiarity with weather conditions <em>(on the route to be flown)</em></td>
</tr>
<tr>
<td>121.601</td>
<td>dispatcher information to the pilot in command <em>(all, additional, hazardous / before and during)</em></td>
</tr>
<tr>
<td>121.619</td>
<td>alternate for destination</td>
</tr>
<tr>
<td>121.627</td>
<td>continuing flight in unsafe conditions <em>(reference back to 121.557)</em></td>
</tr>
<tr>
<td>121.639</td>
<td>fuel supply</td>
</tr>
<tr>
<td>121.647</td>
<td>factors for computing fuel required</td>
</tr>
<tr>
<td>121.663</td>
<td>responsibility for dispatch release</td>
</tr>
<tr>
<td>121.687</td>
<td><strong>dispatch release</strong> <em>(contents)</em></td>
</tr>
<tr>
<td>121.693</td>
<td>load manifest</td>
</tr>
</tbody>
</table>
§ 121.687 Dispatch release: Flag and domestic operations.

• (a) The dispatch release may be in any form but must contain at least the following information concerning each flight:
  – (1) Identification number of the aircraft.
  – (2) Trip number.
  – (3) Departure airport, intermediate stops, destination airports, and alternate airports.
  – (4) A statement of the type of operation (e.g., IFR, VFR).
  – (5) Minimum fuel supply.
  – (6) For each flight dispatched as an ETOPS flight, the ETOPS diversion time for which the flight is dispatched.

• (b) The dispatch release must contain, or have attached to it, weather reports, available weather forecasts, or a combination thereof, for the destination airport, intermediate stops, and alternate airports, that are the latest available at the time the release is signed by the pilot in command and dispatcher. It may include any additional available weather reports or forecasts that the pilot in command or the aircraft dispatcher considers necessary or desirable.
Dispatchers and Weather

Dispatcher

- Release and monitor
- Compute fuel required
- Provide information to the PIC, including hazardous weather

Single biggest disruption to air carrier operations is ‘weather’

Dispatchers are the largest consumers of weather information in aviation

Dispatchers rely heavily on professional meteorologists to interpret and predict risk due to weather

PIC responsible for the safety of the aircraft in flight
Basic Weather Studies

The earth’s motion and its effects on weather

Analysis of regional weather types, characteristics and structures:

- Maritime
- Continental
- Polar
- Tropical
Analysis of the following local weather types, characteristics, and structures or combinations thereof:

• Coastal
• Mountainous
• Island
• Plains

The following characteristics of the atmosphere:

• Layers
• Composition
• Global Wind Patterns
• Ozone
And...

Pressure:
- Temperature Effects on Pressure
- Altimeters
- Pressure Gradient Force
- Pressure Pattern Flying Weather

Wind:
- Major Wind Systems and Coriolis Force
- Jetstreams and their Characteristics
- Local Wind

Clouds:
- Composition
- Formation
- Dissipation
- Types and Associated Precipitation
- Use of Cloud Knowledge in Forecasting
Fog:
- Causes, Formation, and Dissipation
- Types

Ice:
- Causes, Formation, and Dissipation
- Types

Stability/Instability:
- Temperature Lapse Rate, Convection.
- Adiabatic Processes
- Lifting Processes
- Divergence
- Convergence
And...

Turbulence:
- Jetstream Associated
- Pressure Pattern Recognition
- Low Level Windshear
- Mountain Waves
- Thunderstorms
- Clear Air Turbulence

Airmasses:
- Classification and Characteristics
- Source Regions
- Use of Airmass Knowledge in Forecasting

Fronts:
- Structure and Characteristics, Both Vertical and Horizontal
- Frontal Types
- Frontal Weather Flying

Theory of Storm Systems:
- Thunderstorms
- Tornadoes
- Hurricanes and Typhoons
- Microbursts
- Causes, Formation, and Dissipation
Weather, Analysis, and Forecasts

Surface observations, by certified observer or automated observations

Terminal Forecasts

Significant En route Reports and Forecasts
- Pilot Reports
- Area Forecasts
- Sigmets
- Airmets
- Center Weather Advisories
- Weather Imagery
- Surface Analysis
- Weather Depiction
- Significant Weather Prognosis
And…

Winds and Temperature Aloft
Tropopause Chart
Composite Moisture Stability Chart
Surface Weather Prognostic Chart
Radar Meteorology
Satellite Meteorology
Other charts as applicable

Meteorological Information Data Collection Systems
Data Collection, Analysis, and Forecast Facilities

Service Outlets Providing Aviation Weather Products

Weather Related Aircraft Hazards:
Crosswinds and Gusts
Contaminated Runways
Restrictions to Surface Visibility
Turbulence and Windshear
Icing
Thunderstorms and Microburst
Volcanic Ash
Why so much emphasis on weather . . .
Must be over-water equipped . . .
Note to self about plowing water . . .
Weather increases risk...
Nice day, gusty crosswind . . .

Photo of Boeing 737-524 N18611

- **Type:** Boeing 737-524
- **Registration:** N18611
- **Photographer:** NTSB
- **Date:** 21 DEC 2008
- **Operator:** Continental Air Lines
- **Taken at:** Denver International Airport, CO (DEN/KDEN)
Shared Weather Information

PIC and Dispatcher have access to the same weather information, more or less, until the cockpit door is closed.

From that point on, the PIC has eyeballs, radar and radio/ACARS for further updates.

Dispatcher role is to monitor weather and provide useful updates in a safe and timely manner so that the flight can operate, or continue to operate as planned.

PIC provides updates through Pilot Reports (PIREPS) which are entered into the system.

PIC will often provide report directly to dispatch, which may not be entered into the system, but will be shared with other company flights.
Limitations

The Dispatcher has the ability to send significant weather changes / updates to the cockpit in text form.

Graphical weather displays and their two-way transmission on high on the list of desired technological advances.

Yes, the passenger in the back can have better access to weather data than the PIC while the aircraft is en route.
Weather information in cockpit

The PIC does not need to know ALL the weather

Weather information required in the cockpit changes depending on the actual weather phenomena and the stage of flight:
- Departure
- En route
- Arrival

Pilots want information on anything that impacts the decision to operate

It is all about risk assessment and risk management

High risk weather types include:
- Area Convective Activity
- Icing
- Turbulence
- Volcanic Ash
- Wind Shear
Air Carrier reaction to high risk weather

Air carrier goal is to operate the system

System is comprised of individual flights

Each flight requires a specific decision to operate

Some risk is acceptable – it can be VERY subjective

If the origin weather is unacceptable: delay

If the origin and destination are suitable, but en route weather is or is potentially unacceptable: reroute

If the flight is en route and the destination weather renders it unacceptable: hold for improvement, or divert
It is really quite simple . . .

There are only two things you can do with an aircraft in the air:

Keep going where you were going, or

Go somewhere else.
... Time for a break?
Dispatch workload distribution
Routine day for dispatcher

Arrive early

Brief self on weather in the ‘sector’

Check shift turnover log for any significant information
  • Major weather events
  • Company policy bulletins
  • ATC issues

Discuss status of current operation with dispatcher being relieved

Note any off-nominal items in progress and expected
  • MEL
  • CDL
  • etc
“Typical” sector
Routine day

Accept the shift

Plan workload

Stay current on developments

Release flights

Apply Performance Restrictions

Monitor active flights

Manage any off-nominal events
Traffic displays – situational awareness

LaGuardia, Kennedy, Newark and Teterboro arriving and departing flights

Copyright (c) 2007 Flight Explorer, Inc. 10/07/2010 04:24pm EDT

www.flightexplorer.com
Traffic and overlays
US Commercial traffic
Monkey wrenches in a dispatcher’s day

Weather
- Turbc
- LCV – Low Ceiling and Visibility
- Diversions

Technical issues
- Aircraft
- Navaids
- NOTAMS

ATC issues
- Ground stops
- Ground Delay Programs
- Reroutes

Stupid Human Tricks
- Passengers are high on the list
- Everybody is guilty at some time in a career…
Deviation vs. Reroute

Dispatcher is responsible for providing weather and other information for ‘the route to be flown’ (Part 121)

If a flight deviates from the planned route, then the PIC and Dispatcher are no longer in agreement

What is a deviation?

We do not expect the PIC to consult with the Dispatcher unless (general guidelines)

- Route changes by more than 100 nm, or
- Altitude changes by +/- 4,000 feet, or more, or
- Flight plan time changes by +/- 15 minutes

Dispatchers consider these to be ‘Reroutes’

Reroutes require authorization, due to regulations
Definitely a Reroute!

Extensive ATC SWAP Reroute

Filed Route

This ATC reroute was issued to this flight just prior to departure. It added 4 and 1/4 hours of flying time to the flight plan. The aircraft had insufficient fuel for this route. Shortly after takeoff, the aircraft was returned to its filed routing.

ATC SWAP Route
Several FAA Administrative Law findings have held that the PIC must get concurrence from his or her dispatcher before accepting a reroute.
Decision making concerns

Pilot
- Safety
- Crew and Passenger Comfort
- Economics

ATC
- Safe Separation of Known Traffic

Dispatcher
- Safety
- On Time
- Crew and Passenger Comfort and Convenience
- Economics
Dispatch Resources

Worldwide Communications capability
  • phone patch capability for
    – medical
    – technical
    – passenger handling
    – crew management

Current and forecasted weather

Maintenance support

Local and Federal security contacts

Direct communications with ATC facilities
What does a dispatcher DO??

**Flight planning**
- safe
- efficient
- maintain the schedule

**Weight limitations**
- OEW or BOW
- ZFW
- MLW
- MTOW
  - Runway limit
  - Climb limit

**Release the flight**
- Weather
- NOTAMS
- ATC
- Fuel
Weight Limits

DC9-30

- OEW 64,000
- Max fuel 24,600
- MZFW 87,000
- MLW 99,000
- MTOW 108,000

Planned Payload:

- 100 passengers 18,500
- 60 checked bags 1,800
- Freight and mail 3,700
- Total payload 24,000

Are we good to go?
Weight limits

OEW (64,000) + Payload (24,000) exceeds MZFW limit (87,000) by 1,000 lbs

So, limit the payload to 23,000

Flight plan leads to a flight release:
  • Burn 13,000
  • Reserve 4,000
  • Alternate 2,200
  • Contingency 1,900
  • Total 21,100

Fuel 21,100 + Payload 23,000 lbs… are we legal?
Weight limits

Airplane, plus payload, plus fuel

64,000 plus 23,000 plus 21,100 = 107,100

MTOW is 108,000, so we are good to go.

Note: depending on runway, environment and other factors

Airplane gets airborne, calls dispatch, says the gear won’t retract.

WWDD – What Will Dispatch Do?
“Where are you and how much fuel do you have on board?”

What is the significance of this question?

Two things you can do with an aircraft in flight… (slide 61)

1. Keep going where you were going – is this an option?

2. Go somewhere else – why, where, why again, and when?
Holiday flight crash lands

A holiday flight en route to Germany from Greece with some 150 passengers and crew on board has been forced to make a crash landing in Vienna after it ran out of fuel.

Twenty-six passengers were injured as the Airbus 310 was evacuated using emergency slides.

Hapag-Lloyd flight HF 3378 reported an emergency 20 km (13 miles) from Vienna, when it lost power in both its engines while over neighbouring Hungary.

The plane managed to reach Vienna's Schwechat airport, where it glided towards the runway.

However, it touched down on the grass apron just before the tarmac and hit some equipment before coming to a halt to one side of the runway.

"Inexplicable"

The plane, chartered by German company Hapag-Lloyd, was flying from Crete to Hannover.

A company spokesman said the plane had simply run out of fuel for "inexplicable" reasons.

But he added that the pilot of the plane was one of their most experienced.

The plane had already suffered one technical problem shortly after take-off from Crete, when the pilot was unable to retract the landing gear and decided to divert the flight to Munich.

None of the injured passengers was seriously hurt.
Hannover? Munich? Vienna?
Technical assistance was available and consulted

Crew relied on fuel computation from Flight Management Computer

FMC assumed the aircraft was properly configured

Nobody on the ground did the math

Dispatch authority non-existent in Europe
Mechanical failure . . .

This Part 121 Domestic flight took off from Springfield, IL, enroute to Carbondale, IL, on what should have been a 40-45 minute flight. A couple of minutes after their takeoff, a historically problematic left engine-driven electrical generator failed. In response, one of the flight crewmembers inadvertently disconnected the right generator (the only remaining good one), leaving the aircraft with only about 30 minutes worth of battery power available to complete the 40-45 minute night flight. (The HS-748 turboprop aircraft involved did not have an APU installed.) Although the weather was good at the takeoff point, it was poor at the intended destination, with embedded thunderstorms in the area. The flight took off from Springfield at about 20:20:00, and the CVR transcript (as per NTSB AAR85-03) shows:
Don’t say a ### thing to ... dispatch

[INT-1 PIC; INT-2 F/O]

20:40:38
INT-1: Whatever you do don’t if you would don’t say anything to dispatch.

20:40:43
INT-1: Don’t say a ### thing to them.

INT-2: Roger that.

INT-1: Not nothing.

20:40:53
INT-2: The less you tell them about anything the better off you are.

INT-1: That’s right.

Battery power was depleted at about 20:53:00, and the aircraft crashed shortly afterwards near Pickneyville, IL, killing all aboard.
Technical assistance

Technical assistance was available, but not consulted

Crew interaction very revealing – captain dictates, other complies and re-affirms captain’s decision

Procedures not followed
What Would Dispatch Do?

Pilot calls and describes the problem

Dispatcher recommends a return to Springfield, where the weather was good, rather than trying to continue to Carbondale, where the weather was bad, and which was beyond the range of the battery life

Pilot in command is the final authority for the operation of the aircraft, and could certainly refuse the recommendation, but that is somewhat doubtful, given that the PIC initiated the call for assistance

If PIC refused, my next move would be to have the chief pilot on the radio with him to discuss his future beyond the life of the battery, or

Contact ATC, declare an emergency, and request a return to Springfield

Would this be legal?
Could be a bad day . . .

Too bums on this plane #98 from H.K. on 11 March. Will go of at 9:30 P.M. HKT time.

Can only be delayed by Mohammed.

It will meet plane in Honolulu before he time. U.S. must close to Sharm.
Crisis Center

Discuss the threat

Conference in the ‘experts’

Discuss the value of the threat

Discuss options

Reach conclusion

Have some food brought in ....
How about Chinese . . .
Other value of dispatch . . .

Dispatchers attempt to operate the schedule

- Safely
- On time

Delays occur

- Weather
- Technical
- Air Traffic Management

Dispatchers can reduce delay
Direct Costs

In 2008, **129 million system delay minutes** are estimated by ATA to have driven nearly **$10 billion** in direct aircraft operating costs for scheduled U.S. passenger airlines.

($9.556 billion for 129 million minutes = $74.08 per minute average)

[Note: Yet-to-be-published analysis by various academic entities suggest that the costs to operators may have been closer to $17 billion, after factoring the cost of "block creep." ]

**This means that delay or ‘block creep’ is 70% more expensive than routine block time.**

$17 billion for 129 million minutes = $131.78 per minute average
Dispatcher Pay and Cost of Delay

Top of scale US Air Carrier Dispatcher pay = $100,000
Works about 200 shifts = $500 per shift

Delay cost = $131.78 per minute

If a dispatcher saves about 4 minutes of delay, per shift,
Then dispatch pays for itself.
Almost got my name right . . .

3,000,000 minutes
$132 a minute….  

$396,000,000 saved!

Aviation term for this type of award is

____________________
Conclusion

In today’s environment, the aircraft dispatcher has the most information available regarding the safe operation of the flight.

Future Net Centric capabilities will change this dynamic so that all members of the Safety Triad will be able to make decisions based on shared information.
Dispatcher Professional Organization

www.dispatcher.org
Dispatcher, according to ADF

A licensed airman certificated by the Federal Aviation Administration
Jointly responsible with the Pilot in command for the safety of flight
Exercises operational control over flights under his/her authority
Authorizes, regulates and controls commercial flights according to government and company regulations to expedite and ensure safety of flight
Also responsible for passenger service and the economies of operation
Analyzes and evaluates meteorological information to identify potential safety hazards
Selects the most desirable route of flight, and considers the economies of operation
Computes the amount of fuel required for the safe completion of flight according to aircraft type, distance of flight, maintenance limitations, weather conditions and minimum fuel requirements prescribed by regulations and company policy
Prepares flight plans containing necessary information, including
- Maximum allowable takeoff and landing weights
- Weather reports
- Field conditions
- NOTAMS
- Any additional information s/he considers necessary
Prepares and signs the dispatch release, which is the legal document authorizing the flight.
Dispatcher, according to ADF . . .

Delays or cancels flights if unsafe conditions exist
Monitors weather, aircraft position reports, aeronautical navigation charts and electronic displays to ensure safe progress of flights
Updates the pilot in command of significant changes to weather, flight plan, navaids, traffic and threats to ensure safe progress of flights
Recommends flight plan alternatives, such as changing course, altitude and, if required, instigating en route landing in the interest of safety (and economy)
Originates and disseminates flight information to other company personnel, including station and reservations. This is the source of information that is provided to the travelling public.
Has undergone extensive training and earned an Aircraft Dispatcher’s certificate, having passed both an extensive oral exam and the comprehensive Dispatch test, administered by the FAA. These tests are equivalent to the same Air Transport Pilot (ATP) written and oral exams that an airline captain must successfully complete.
Participates in regular recurrent training courses covering aircraft systems, company operations policy, meteorology, Federal Air Regulations, air traffic management procedures, emergency procedures, and other topics, as required by FAA.
Subject to an annual desk check by company supervisory dispatcher
Subject to random drug and alcohol testing
This is how Delta Air Lines operates nearly 700 aircraft and their business aviation flights from one central location in Atlanta.

Typical of all major airlines in the US.

Concept has spread around the world.

Dispatch authority not regulated outside US and Canada.
Operations Control Center
Built in 1993 and remodeled to make room for Northwest Airlines

Over 375 people, representing 18 departments, make up the OCC staff.

Personnel on duty: Mornings – 160; Afternoons 100; Midnights 50.

There is a fully-functional backup site in the event something should occur requiring evacuation of this facility.
## Delta Operations Control Center

### Strategy and Coordination

<table>
<thead>
<tr>
<th>Duty Director</th>
<th>Sector Managers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customers</td>
<td>Flight</td>
</tr>
<tr>
<td>Airport Customer Service</td>
<td>Flight Control Load Control</td>
</tr>
<tr>
<td>Reservations Operations</td>
<td>Air Logistics</td>
</tr>
<tr>
<td>Revenue Management</td>
<td>Radio</td>
</tr>
<tr>
<td></td>
<td>Air Navigation Engineering</td>
</tr>
</tbody>
</table>

### Operating Environment

<table>
<thead>
<tr>
<th>Meteorology</th>
<th>ATC</th>
<th>Security</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Briefing room / Emergency Command Center

Used for daily briefings to communicate the status of the airline and allow for all participants to share information.

Can be set up in 30 minutes to become the Emergency Command Center (ECC).
Flight Control / Domestic Ops

Provides dispatching and operational control over all domestic daily flight operations in accordance with FARs and Company policy.
ATC Coordination

ATC Managers
Senior Dispatcher
Shuttle

Providing a single Delta voice in Air Traffic Control (ATC) activities, the ATC desks perform the process of ATC coordination and initiative management.
Meteorology

Responsible to prepare and disseminate surface, wind turbulence, and thunderstorm forecasts while monitoring the environment in which Delta flight operations occur.
Cross-functional OCC team that manages the strategic and tactical decisions related to the safe, secure, reliable use of the corporate assets and resources for the highest level of service to our Customers and efficiency for the corporation.
Manages the positioning of all aircraft in Delta’s fleets to ensure the requirements and restrictions of flight schedule are met and to allow for compliance of all maintenance requirements and restrictions.
Communications

Worldwide communications 24 hours per day for Delta flights and other airlines. Radio operators are responsible for air-ground communications concerning flight movement and safety.
Load Control Center

Provide payload and fuel distribution services, and produce final departure documents for all Delta flights. Resolve weight and balance issues to ensure regulatory compliance, optimize payload and maintain on time integrity.
Crew Tracking

Tracking Delta pilot and flight attendant crews to ensure affected flight(s) operate in a timely manner and that each crew member maintains legalities.

Crew Accommodations: responsible for ensuring that hotel and transportation needs of layover crews are met.
International Dispatch

Provides dispatching and operational control over all the international daily flight operations in accordance with Federal Aviation Regulations and Delta company policy.
Single point of contact for all maintenance assistance for Delta’s operating fleet. Responsible for near term maintenance planning aspects to ensure viability and efficiency of the aircraft layover program.
Irregular Operations

Severe weather (thunderstorms, crosswinds)

Winter weather events

Natural disasters (hurricanes, earthquakes, floods, volcanoes)

Man-made disasters (terrorism, power outages, labor disputes)

DOT 3 Hour Tarmac Rule

Air Traffic Control Issues & Airport/Facility Outages

Incidents/accidents

Turbulence

System outages

Mechanical problems

Emergencies

Unruly Passengers

Threats / Unusual Behavior
The Recent Eruption of Eyjafjallajokull in Iceland

17,000 – 21,000 of the usual 28,000 daily flights that operate through European airspace were cancelled for several days in a row. Delta cancelled 70-90 flights per day during the eruption. No flight activity in all of Northern Europe in the picture on the right.
Trans-Atlantic Route Structure
Volcanic Ash Forecast
August 2003 Blackout

Airports including Detroit, Cleveland, and all of the major New York City airports were closed or on severely limited operations during the blackout.
These pictures show damage to the runway at Seattle’s Boeing Field and the Control Tower at Seattle-Tacoma International airport.
Airports will normally close ahead of a hurricane. However, dispatchers alter routes for aircraft operating across the storm’s path. Dispatchers must also monitor the impacts hurricanes have on communications and air traffic control facilities.
Dispatchers must be aware of labor issues which can have an impact on their flights. In some cases, the dispatchers must act to mitigate the affects of these issues.
Winter Weather Events
Runway Excursion

Initiated abort
Runway Excursion
Think Outside the Box!
Nothing is Impossible!
While powerless to stop acts of terrorism, the Aircraft Dispatcher has a prominent role in handling acts of terrorism once they occur.
Delta’s Worldwide Traffic
Delta’s Flights over North America
Route Monitoring Tool
Severe Weather
Thank you for the opportunity

Dispatch is the critical safety element in commercial aviation

Interesting history (to me) behind US Air Commerce and Dispatchers

No mention of history in your course curriculum …

So . . .
Homework!

Due on 10-25-2010

Write a short paper (500-800 words) on the history of aviation in the United States.

I would be impressed if you include and explain the significance of Congressional Acts in one or all of the following years:

1926  1934  1938  1958  1967

(Do not just cut and paste from eNotes!)

okeeffe@metronaviation.com
Extra Slides . . .
Sources of Weather Information

From 8400.10

Title 14 of the Code of Federal Regulations (14 CFR) Parts 91, 121 and 135 require certificate holders to use weather reports and forecasts from specified sources. Pilots and other persons responsible for operational control must have enough weather information to determine whether a flight can be accomplished in compliance with 14 CFR. Weather information systems must provide all weather information required by 14 CFR.

Part 121 requires operators conducting operations within the 48 contiguous states to use reports prepared by the NWS or Sources approved by the NWS.

Recent FAA audit revealed a large number of airlines using unapproved sources for operational decisions (internet).

Innovation outpaces regulation.
ATL Diversion Scenario
This picture was taken the day after downtown Atlanta was struck by a tornado.
Cool slide . . .

Flights in and out of Dallas Fort-Worth
Color-coded by Altitude
Low Altitude - High Altitude