

FOR REFERENCE ONLY

# **Transport Jet Airlines**

AQP Instructional Systems Development (ISD)  
Methodology

(Template)

**ADVANCED QUALIFICATION PROGRAM  
INSTRUCTIONAL SYSTEMS DEVELOPMENT METHODOLOGY**

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## 1.0 INTRODUCTION

This Instructional Systems Development Methodology document describes the approach to be followed by Transport Jet Airlines for development and maintenance of all Advanced Qualification Program (AQP) curriculums. The methodology currently applies only to pilot, instructor and evaluator programs, but may be expanded in the future to include other personnel, such as flight attendants and dispatchers, as well as their instructors and evaluators. This approach follows the guidance of AC 120-54, Advanced Qualification Program, AC 120-35, Line Operational Simulations, and FAA 8400.10, Aviation Safety Inspector's Handbook. While partial descriptions of this approach are contained in other Transport Jet Airlines AQP documents, to include the Implementation and Operations Plan (I&O Plan), Job Task Analysis (JTA), and Qualification Standards (QS), this document includes an overview of the entire curriculum development process.

## 2.0 OVERVIEW

This document is divided into two sections. The first section, Curriculum Development Procedures, describes Transport Jet Airlines approach for general curriculum development activities across all AQP courses. The second section, Line Operational Simulation (LOE) Methodology, describes our approach for developing line operational simulation scenarios based on the event-set methodology described in the above referenced documents. These approaches, taken together, satisfy the ten minimal ISD requirements called out in AC 120-54:

1. Develop a Job Task Listing.
2. Analyze that listing to determine essential skill and knowledge requirements (either directly or by reference).
3. Determine which skill and knowledge requirements must be trained and tested.
4. Develop Qualification Standards that define acceptable operational performance levels.
5. Develop proficiency objectives that capture all training requirements.
6. Develop tests that measure proficiency in skill and knowledge areas.
7. Provide instructional programs that teach and test training requirements.
8. Establish and maintain an audit trail of explicit links between task requirements, training requirements, training and evaluation activities, and evaluation results.
9. Measure student proficiency against proficiency objectives and Qualification Standards for all curriculums.

10. Revise the training program based on student performance levels on an ongoing basis. This data (stored in the Performance/Proficiency Data Base) will be collected and reported to the FAA on a monthly basis.

The most complex AQP curriculums developed by Transport Jet Airlines are those designed for pilot training, so the descriptions and examples in this document are based primarily on the development and maintenance of the pilot courses. Where other course development methodologies, such as those for instructors or evaluators, differ from the pilot course methodologies, they will be described by exception. Therefore, unless otherwise noted, these procedures will apply to the development of all AQP curriculums.

Transport Jet Airlines will employ the classical ADDIE (Analysis, Design, Development, Implementation, and Evaluation) version of the ISD process, which follows a generally linear process during initial curriculum development. The general activities associated with each of these five stages are as follows:

## **2.1 ANALYSIS**

The following activities comprise the analysis process at Transport Jet Airlines:

1. Develop a job task listing.
2. Analyze job tasks to determine component or prerequisite skills and knowledge for each job task.
3. Examine student demographic data and perform instructor/evaluator assessments to determine which skills and knowledge will be trained and/or tested in each curriculum.
4. Develop proficiency objectives, to include the specification of real-world conditions and standards, for all tasks, subtasks, and CRM components, as well as higher-level elements, where appropriate.
5. Develop enabling objectives, to include the specification of academic conditions and standards, where appropriate, for CRM components, elements, and for skills and knowledge, as required.
6. Assess criticality, currency, media requirements, and evaluation strategy for proficiency objectives, as required.
7. Develop Job Task Analysis and Qualification Standards documents for each duty position.

## **2.2 DESIGN**

The following activities comprise the design process at Transport Jet Airlines:

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1. Allocate proficiency objectives among major AQP curriculums: Indoctrination, Qualification and Continuing Qualification.
2. Append enabling objectives to their parent proficiency objectives.
3. Cluster and sequence objectives into lessons according to media and method considerations.
4. Cluster and sequence lessons into modules, modules into segments, and segments into curriculums.
5. Develop a Curriculum Outline for each major AQP curriculum.
6. Design the performance data collection and analysis system to support crewmember, instructor and evaluator performance.

### **2.3 DEVELOPMENT**

The following activities comprise the development process at Transport Jet:

1. Develop teaching and testing materials, activities, events and data collection forms for crewmember, instructor and evaluator curriculums.
2. Develop the data collection and analysis system.
3. Train instructors and evaluators, using Instructor and Evaluator AQP curriculums, to train and evaluate crewmember AQP curriculums.
4. Conduct small group tryouts of crewmember curriculums.
5. Collect and analyze student performance data.
6. Report de-identified data to the FAA.
7. Revise materials, activities, events, and the data collection and analysis system as applicable. Conduct additional small group testing, if required.

## **2.4 IMPLEMENTATION**

The following activities comprise the implementation process at Transport Jet:

1. Implement curriculums for all crewmembers, instructors and evaluators.
2. Collect and analyze performance data on all students, instructors and evaluators.
3. Report de-identified data to the FAA.
4. Revise materials, activities, events, and data collection and analysis system as applicable.

## **2.5 EVALUATION**

The following activities comprise the evaluation process at Transport Jet:

1. Assessment and review all analyses, processes, products, data, reports and activities completed as part of the analysis, design, development and implementation activities.
2. Analysis and review of all performance data on crewmembers, instructors and evaluators.

## **3.0 CURRICULUM DEVELOPMENT PROCEDURES**

Most of the curriculum development activities at Transport Jet Airlines are captured in three of the six document types required by AC 120-54: Job Task Analysis, Qualification Standards, and Curriculum Outline. These documents contain the following fields:

### **3.1 JOB TASK ANALYSIS**

This document contains a numbered hierarchy containing all of the tasks, subtasks, elements, CRM components, skills and knowledge required by a jobholder (pilot, dispatcher, flight attendant, instructor or evaluator) to perform his or her job in a satisfactory manner. Where seat or duty position specific tasks are included, these are specified (captain, first officer, pilot flying, and pilot monitoring). Skills and knowledge not specifically listed are included by reference, to include document, and section or chapter.

The results of the task analysis process are reported to the FAA in two separate documents. The breakdown of tasks and subtasks into subordinate or supporting skills and knowledge, referred to in AC 120-54 as learning analysis, is reported in the document entitled Job Task Analysis. The assessment of the tasks and subtasks in terms

of various factors used in training and evaluation, referred to in AC 120-54 as task factor analysis, is reported in the document entitled AQP Qualification Standards.

### **3.2 QUALIFICATION STANDARDS**

All major activities listed in the task analysis are translated into training objectives. Tasks become Terminal Proficiency Objectives (TPOs) by (1) expanding the task statement into a more detailed performance statement, (2) appending all of the conditions and contingencies, abnormal and emergency procedures that could complicate the performance of the task in line operations, and (3) appending all of the procedural and maneuvers standards that define satisfactory performance of the task. The process of moving from tasks to TPOs may result in either consolidation or expansion of the original task list, so there may be more, or fewer, TPOs than tasks. A similar process is used to translate subtasks into Supporting Proficiency Objectives (SPOs). Once this process is complete, a qualification standard is developed for each TPO and SPO.

Each qualification standard contains: the numbered and labeled TPO or SPO (to include the performance statement, conditions, and standards), the duty positions and references from the job task analysis document, ratings for criticality and currency (required for TPOs, optional for SPOs), media for training and/or evaluation, and the evaluation strategy (train to proficiency, Systems Validation, Procedures Validation and Maneuvers Validation, LOE, or line check). In the case of instructor/evaluator qualification standards many factors either do not apply, or must be modified to be relevant: conditions, contingencies, abnormal/emergency procedures, criticality, currency, media, and evaluation strategy.

### **3.3 CURRICULUM OUTLINE**

The task analysis defines the broad performance goals of the training program, the qualification standards define the broad outlines of how those goals will be taught and tested, and the curriculum outline lays out those goals in an organized and sequential manner. The TPOs, SPOs and EOs (enabling objectives) are sequenced and clustered into lessons, the lessons sequenced and clustered into modules, the modules sequenced and clustered into segments, and the segments sequenced and organized into curriculums. This may be done in either a bottom-to-top or top-to-bottom fashion, as appropriate.

The curriculum outline is not a syllabus. The curriculum outline captures the organization of the curriculum in terms of order (sequence) and organization (clustering into segments, modules and lessons). It allows the FAA and Transport Jet Airlines to agree upon what each curriculum will look like before significant course development work begins.

## 4.0 LINE OPERATIONAL SIMULATION (LOE) METHODOLOGY

This section describes the methodology used by Transport Jet Airlines to develop line operational simulations.

The environment that provides the best opportunity to combine CRM and technical skills is Line Operational Simulations (LOE). LOE is an environment that is structured to allow and encourage the application of technical and CRM concepts to a situation that enables conceptual knowledge to be translated into working knowledge. Instead of being programmed with a solution, the crew can manage the operational environment and process available information to learn its limits, properties, and operational relevance.

LOE scenarios are best designed to be operationally relevant, believable, and a good test of the crew's CRM skills. LOE training is systematically developed and is intended to simulate actual situations on the line that require good crew skills for effective problem resolution and decision-making. LOE scenario design is enhanced at Transport Jet because there is a strong foundation in CRM concepts and awareness in the organization.

### SCENARIO DESIGN PROCESS - OVERVIEW

#### Safety

The LOE philosophical change from traditional, individual-pilot maneuver proficiency to crew-oriented line training has as its genesis the fact that at least 70% of the airline accidents and incidents over the past several decades can be attributed to inadequacies in skills related to crew coordination, workload management, and decision making. Therefore, the issue of human factor errors, as they relate to management and leadership on the flight deck, has become an important part of training and checking. The overall objective of LOE is to improve total flight crew performance by combining CRM and technical skills, thereby preventing incidents and accidents during operational flying. LOE scenarios should address all aspects of line flying to include; operational environment situations, system anomalies, CRM, automation and error management issues.

#### Realism

Realism is necessary to insure that scenarios reflect actual company procedures as well as aircraft systems operations and are viewed as believable by the participants. In addition to high fidelity full flight simulators, flight training devices, and supporting flight paperwork that enhance realism, the scenario events should reflect real world conditions.

#### LOE vs. LOFT

Line Operational Evaluation contains elements similar to those in LOFT; i.e., line environment, complete crew, scenarios that are objective based, real world, real time and should run uninterrupted. It is crucial to point out to managers, instructors, evaluators and crewmembers that LOFT is *Flight Training* and LOE is *Flight Evaluation*. While most training organizations have a history of no-jeopardy LOFT, Line Operational Evaluations (LOEs) have the same level of jeopardy as a traditional maneuvers-based pilot "check ride."

The concept of the LOE is an evaluation of individual and crew performance in a flight training device or flight simulator conducted during real time line operational simulation under an approved AQP program. The total crew concept allows crewmembers to use their full resources and professional skills to obtain a safe and complete outcome to their flight. Transport Jet will only administer the LOE after full transition to AQP.

### **Scenario Standardization**

Each LOE scenario will contain FAA approved “Event Sets” that have been developed to emphasize a subset of Proficiency Objectives (TPOs/SPOs) and CRM Objectives. For this reason, it is very important that the Line Operational Simulations must be conducted as they are written. Normally, each event set of a LOE scenario should emphasize a group of TPOs/SPOs tied together with CRM objectives. The introduction or deletion of either tasks or conditions in an attempt to further challenge an effectively functioning crew is unacceptable.

### **Difficulty Equivalency**

The use of multiple LOE scenarios in a fleet is recommended so that the actual events in each script are not familiar to the crewmembers. Also, multiple scenarios will sample a broad range of technical & CRM skills. However, the relative difficulty of each scenario should be similar. The total rating values for each LOE scenario will be maintained within a prescribed range of values, to be determined by the Training Manager.

### **Event Sets**

Traditionally, evaluators have relied on the administering of abnormal and emergency procedures in a simulator to determine overall airman proficiency. While this approach guarantees proficiency in the technical aspects of handling the aircraft, it does not address crew management and environmental management issues, which account for most of our industry's accidents. For that reason, the LOE scenario consists of a series of "Event Sets" rather than one or two abnormal conditions.

The event set is a group of TPOs/SPOs with conditions, forming situations that are part of the scenario, and are inserted into a LOE session for validating specific training objectives. The scenario event set is a relatively independent segment of a scenario made up of several elements including an event trigger, distracters and supporting events. The following is a description of these elements.

- **Event Trigger:** the condition or conditions under which the event is fully activated. The trigger can be compared to failing an engine in a traditional maneuver check or toxic fumes in the cabin. When the engine is failed the pilot is expected to perform the single engine procedure. When the event trigger is activated the crew is expected to respond with specific CRM and technical skills necessary to successfully complete the event set.
- **Distracters:** conditions inserted within the event set time frame that are designed to divert the crew's attention from other events that are occurring or that are about to

occur. Issues such as cabin crew communication, increased ATC communication, route modifications and minor systems problems are examples of distracters.

- **Supporting Events:** other events taking place within the event set designed to further the objectives; both CRM and Technical objectives. For example, if the crew is obtaining information on the most suitable place to land, a supporting event could be the deteriorating weather developing during this event set.
- **Conditions:** describe the range of circumstances under which the event set will unfold. Conditions may include the natural environment (ceiling, visibility, wind, turbulence, etc.), the operational environment (NAVAID inoperative, fuel status, conflicting air traffic, gate change, passengers not seated, etc.) and operational contingencies (abnormal and emergency).

In keeping with the concept of realism, these event sets are created by the LOE developer from consultations with fleet Examiners/Instructors, Flight Operations Quality Assurance (FOQA), and other safety reports, such as ASRS, and world-wide aviation incident/accident databases of actual incidents/occurrences from line operations.

### **Training Device**

Generally, an LOE will be conducted in a full flight simulator (FFS). However, flight training devices (FTDs) may be used, if all established success criteria for the specific LOE can be observed, and the specific LOE has been approved by the FAA POI for use in a flight training device.

### **Process Summary**

The process methodology shall be approved by the Extended Review Team (the FAA POI and AFS-230), while the POI and his staff approve each individual LOE. (Note, however, that SPOT is an exception to this requirement for FAA approval.)

This process is outlined below:

1. Identify the primary CRM and Technical Objectives to be addressed in the scenario
  2. Identify possible incidents that will elicit the behavior required by the training objectives selected for the scenario
  3. Develop event sets by specifying event conditions, triggers, and distracters, as well as supporting events
  4. Define success criteria for the LOE, and each event set within it
  5. Develop the first draft LOE scenario on paper
  6. Fly the LOE scenario, revise as needed, and receive POI approval
  7. Train instructors/evaluators to administer LOE scenario
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These 7 steps include the following activities:

#### **4.1 PRIMARY CRM AND TECHNICAL OBJECTIVES**

Like all training and evaluation activities that comprise an AQP curriculum, the line operational scenario is developed to achieve specific and identifiable performance objectives. The unique feature of the LOE is its ability to integrate both technical and CRM objectives into a single training or evaluation activity. The first step in the development process is, therefore, the identification of the objectives.

These “primary” objectives are not the TPOs and SPOs that form the building blocks of all AQP curriculums, but are instead higher-level themes that describe overall scenarios or event sets within those scenarios. Each LOE will have one or more overall objectives or themes, as will each event set within that LOE. It is at the next lower level that events within each event set represent the TPOs and SPOs identified in the qualification standards.

The primary focus of the LOE will be either CRM or CRM integration. Pure technical performance is trained and tested elsewhere in the curriculum using other instructional strategies. Transport Jet Airlines will select overall scenario themes based on actual incidents, suspected problems or rotating topic areas. Although we will use an iterative process for deriving objectives, we will focus primarily on a top down approach, identifying the overall LOE objective(s) first, the event set objective(s) second, and finally the event objectives.

Once the overall LOE and event set objectives are set, we will begin to specify the objectives for each event. In the case of technical objectives, these are the TPOs and SPOs previously developed for each curriculum, and captured in the qualification standards. These objectives may be more or less challenging, depending on the set of conditions from any abnormal or emergency situation that is selected from each qualification standard for use within a scenario. In the case of CRM objectives, Transport Jet Airlines has identified, as part of the qualification standard for each technical TPO and SPO, those CRM markers and observable behaviors most relevant to the performance of the activity.

In maneuvers-based training, we will continue to build our simulator sessions based primarily on the selection of technical tasks. We will select the TPOs and SPOs that represent important pilot skills. But in the case of LOE, we will select high level CRM and CRM integration objectives and themes first, and then determine which particular technical TPOs or SPOs will be included to elicit, or provide the context for, that CRM objective. Once we select a high level objective, such as situational awareness, we can select from a wide range of different technical tasks or maneuvers to elicit that situational awareness.

## 4.2 POSSIBLE INCIDENTS

Once the overall objectives of a scenario have been determined, we will identify candidate incidents or situations that will elicit behaviors from the crew that are identified in the training objectives. One strategy will be to search existing databases (ASAP, FOQA, LOEA, NTSB, etc.) for actual line operational incidents. Another approach will include examining AQP data for poor performance in training, checking or line operations. Other approaches include using frequently misused or misunderstood sections of the flight manual, or addressing areas of maintenance problems identified in training, checking or line operations.

While these data sources focus primarily on operational abnormalities and emergencies, many CRM skills are also elicited by normal, routine operations. Transport Jet Airlines will not, therefore, limit its “trigger” events to abnormal operations, but will also allow for routine CRM activities. Trigger events are described in the next section.

## 4.3 DEVELOP EVENT SETS

The building blocks of an LOE are the event sets. Each event set consists of a group of TPOs and/or SPOs with associated conditions. It is the selection of the particular set of conditions (from the extensive list included with each qualification standard) that gives the event, and the event set, its character. The components of each event set include the trigger, the distracter and the supporting events.

The even trigger is the condition, change or situation that initiates the primary objective of the event set. This may be an engine failure, notification of a passenger’s medical problem, or simply the transition into a phase of flight with a significant increase in workload. Using a stimulus-response paradigm, the event trigger is the stimulus that elicits the desired response, which consists of the series of CRM and technical activities required by the TPOs and SPOs that make up the event set.

Every event set has some sort of trigger, or initiating cue, even if it is only a transition from one phase of flight to the next. However, not all event sets have distracters. A distracter is a condition, or set of conditions, inserted into the event set to divert the crew’s attention from other events that are, or soon will, occur. The crew is expected to maintain their focus and priorities, in spite of competing activities, such as route changes or minor system problems. Distracters provide a realistic context for the LOE, by challenging the crew at a number of levels. All scenarios will have distracters, even if all event sets do not.

Supporting events include all of the other events that occur during the event set, and are designed to further the objectives of that event set. While trigger events are often the primary “problem” that the crew faces during an event set, and distracters are often designed as the primary “complication” to the solution of that trigger problem, supporting

events are the context, or backdrop, for the trigger and the distracter. An event set, which may contain 4-8 events, is likely to have one trigger event and perhaps one distracter event, with all remaining events being supporting events.

#### **4.4 DEFINE SUCCESS CRITERIA**

While LOFT and SPOT are ungraded scenarios, the LOE is a graded event and clear criteria for grading are established for each individual LOE. The overall LOE itself is always assessed according to the following global criteria, which are widely used within the AQP community: (1) the aircraft will land safely, (2) the flight crew will either remain within legal limits or exercise appropriate emergency authority, (3) the flight will either remain within standard operating parameters or justify deviations, (4) the crew will take appropriate actions in a timely manner, and (5) the successful outcome of each activity, maneuver or procedure will never be in doubt.

In addition to these global criteria, which apply to all LOEs, each event set within each LOE will have its own, unique set of success criteria. Crews who fail to meet these criteria will be retrained and re-evaluated. The grading scales described in the prologue to the pilot qualification standards (1-5 for technical tasks) will be applied to each event set. Technical standards will match those listed in the applicable qualification standards, while CRM standards will be expressed as the CRM observable behaviors listed in the applicable qualification standards.

It is important to note that this entire development process is iterative. The initial list of objectives may be modified as the incident databases are mined for relevant events. The initial list of events, as well as the criteria used to evaluate them, may change as the scenarios are assembled and tested. The process is one of successive iterations until the Transport Jet Airlines AQP staff is satisfied, and the POI has approved the final scenario.

#### **4.5 DEVELOP FIRST DRAFT LOE SCENARIO**

Before the scenario can be tested in the simulator it must be developed on paper. In the case of Transport Jet Airlines, this paperwork includes a worksheet, a script, a set of student paperwork, and a data collection form for each event set. The worksheet allows the developer to document, in shorthand form, the primary components of each event set: (1) the events (to include trigger, distracter, and supporting events), (2) the TPOs and SPOs, (3) the conditions, and (4) the success criteria (to include both technical and CRM). These success criteria are listed in summary form. While a complex qualification standard might list 15 technical and 5 CRM standards for a single TPO, an event set summary containing 4-5 TPOs might have a total of only 5 technical and maybe 3 CRM success criteria. Because of the high levels at which groups of TPOs and SPOs are summarized, it is often necessary to actually observe the scenario being flown before the most appropriate wording for the success criteria may be developed. Therefore, the development of the supporting paperwork is an iterative process.

The full LOE script will be based on the worksheet. This script document includes instructor notes, briefing points, and LOE summary, the objectives, and a full script. The script itself includes all directions to the instructor and the pilots, as well as a script of all communications to the crew (gate agent, dispatch, ATC, flight attendant, etc.). The student paperwork package will include all required documents, such as dispatch release, NOTAMS, flight plan, runway analysis, weather, manifest, and pre-departure clearances.

The data collection form for the LOE will be drafted in two sections. First, the summary section (pass/fail) will be for recording the administrative and technical data for the overall scenario. The second, a detailed section, will be for recording the pilot performance for each event set. Each event set will be graded 1 through 5, as well as the overall LOE. These grades, however, are not arithmetically linked. While the event set grade should correlate in a general way with the grades of its component events, it is not determined through any mathematical combination of those event grades. The whole (event set) may be greater or less than the sum of its parts (events).

#### **4.6 FLY THE LOE SCENARIO**

Transport Jet Airlines will validate and enhance each draft scenario by flying it with a full crew of instructors who are unfamiliar with it. Evaluators, including the POI or his representative, will observe the LOE, evaluate the scenario and all of its supporting paperwork, and recommend changes or enhancements, if necessary. If appropriate, we will revise the LOE and fly it again, with a new crew of instructors. The scenario will be evaluated again, for its merits in meeting the training/evaluation objectives, for the level of facilitator skill required to administer it successfully, and for an equivalent level of difficulty relative to other scenarios. In fairness to the pilots, it is important that LOEs, particularly qualification LOEs, be of equal difficulty. The final test should include the FAA POI, or his representative, who must approve each scenario before it is implemented.

#### **4.7 TRAIN INSTRUCTORS/EVALUATORS TO ADMINISTER LOE SCENARIO**

As part of its AQP instructor/evaluator training program, Transport Jet Airlines will train its instructor/evaluator staff to administer SPOT, LOFT and LOE scenarios. In addition, each instructor/evaluator will be trained to administer each new scenario before it is implemented.

#### **4.8 ADMINISTRATION**

##### **Phase of Flight Definitions for LOE**

Transport Jet will use eight event sets for each leg of a complete LOE scenario. These event sets are defined by the following phases of flight.

**Predeparture, Push back, and Taxi**

This phase begins with the crew's arrival at dispatch and ends when the airplane is cleared for takeoff, and the Before Takeoff Checklist is complete.

**Takeoff**

This phase begins when the airplane moves for takeoff and ends when the airplane establishes a climb configuration.

**Climb**

This phase begins when the aircraft is reconfigured for climb.

**Cruise**

This phase begins at the cruise altitude top-of-climb point, and ends when the airplane descends below the cruise altitude for arrival at its' destination.

**Descent and Hold**

This phase begins after the airplane descends below the cruise altitude for arrival at destination and ends at the Initial Approach Fix (IAF), commencement of radar vectors to the Final Approach Fix (FAF), or when cleared for a visual approach.

**Approach**

This phase begins at the Initial Approach Fix (IAF), commencement of radar vectors to the Final Approach Fix (FAF), or when cleared for a visual approach. The phase ends when the airplane descends below the Decision Height (DH) on a precision approach, MDA/VDP on a non-precision approach, or 200 feet AGL on a visual approach, with the intent of landing. Further, the missed approach procedure is included in this phase of flight.

**Landing**

The phase begins when the airplane descends below the DH on a precision approach, MDA/VDP on a non-precision approach, or 200 feet AGL on a visual approach, with the intent of landing, touches down, rolls out and clears the runway.

**Taxi and Parking**

This phase begins after the aircraft is turned off the runway and is been cleared to taxi by ATC. The phase ends when the flight crew leaves the airplane after parking (usually at the gate), or when the aircraft is evacuated (as applicable).

## 4.9 SCENARIO DESIGN METHODOLOGY

The purpose of this section is to provide the framework for developing LOE scenarios for use in Transport Jet's Curriculum. The methodology described creates scenarios from a systematic approach that provides consistency to LOE design. The framework described here for developing LOE scenarios is based on the concept of an event set. With the LOE scenario now defined by event sets, scenario validation is performed at the event set level rather than

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limiting validation to the overall LOE.

This systematic approach to LOE construction will enable the LOE Scenario Developer to design, develop and validate the scenario content prior to its acceptance as a training/evaluation tool. The LOE design methodology is described as follows.

**Step 1: Identify Primary CRM Categories/Skills/Behaviors and Integrate these with the Primary Technical Training Objectives**

*1.1 Identify the primary CRM categories and the related skills.*

These will usually be selected by the Fleet Training Manager from the fleet's qualification or continuing qualification training program.

*1.2 Identify the observable behaviors for each CRM skill identified in step 1.1. Complete Event Worksheet*

Each of the major CRM categories is divided into skills, each with a series of easily identifiable and observable behaviors. The standard behaviors are described using generic phrases (e.g. "closes loop for communications"), rather than by specific phrases (e.g. "reads back to ATC"), to give an indication of the type of behavior which should be observed, rather than particular behaviors. This is intended to simplify the data gathering and analysis system. At this stage of LOE development, it is sufficient to state just these generic phrases. In step 5 it will become necessary to describe the particular behavior expected in the event set that relates to the generic behaviors identified in this step.

*1.3 Identify the primary technical training objectives. These will usually be selected by the Fleet Training Manager from the fleet's Qualification or Continuing Qualification program.*

**Step 2: Identify Possible Incidents That Will Produce the Training Objectives.**

*2.1 Identify incidents through a search of Transport Jet line operations incidents. Other sources of information may also provide relevant data, for example, ASAP, FOQA, LOEA, VDRP or the ASRS database.*

*2.2 Develop a preliminary list of relevant incidents and events*

*2.3 Refine this list and correlate these situations with the CRM categories / skills / and behaviors. Complete Event Set Worksheet.*

**Note:** This list and synopsis of relevant events, apart from being used as a design tool, should be included in an instructor handout as background facilitation material for the LOE debrief model used by Transport Jet. Refer to attached appendices.

**Step 3: Determine and Specify the LOE Event Set Objectives**

*3.1 LOE event set objectives should attempt to incorporate several of the CRM categories/skills/observable behaviors described in Step 1. Specify these objectives on*

*an Event Set Worksheet*

An example of a Recurrent LOE event set objective could be, “To train the use of advance decision making in solving operational problems that have no rule or book solution.”

- 3.2 *TPOs/SPOs should then be identified and specified on the Event Set Worksheet to serve as suitable backdrops from which to showcase the selected management skills.*

An example of TPOs/SPOs that may be used to verify the event set objective stated above could be, “Perform Fuel Leak Procedure”, “Perform Diversion to En-route airport”.

**Step 4: Create Event Sets**

- 4.1 *Specify, on an Event Set Worksheet, conditions appropriate to the TPOs/SPOs identified in Step 3 of this document.*

This process will serve to elicit the desired CRM skills / observable behaviors and will facilitate the development of event set triggers, distracters, and supporting events.

- 4.2 *Specify on the Event Set Worksheet the event trigger(s), distracter(s) and supporting event(s).*

- 4.3 *Establish and Specify on the Event Set Worksheet a difficulty rating for the event set*

The difficulty is type specific, and is established by the Fleet Training Manager and SMEs, in agreement with the AQP Manager.

**Step 5: Estimate Success Criteria in Each Event Set.**

- 5.1 *Estimate and Specify on the Event Set Worksheet the success criteria in the form of technical skills / observable behaviors and CRM skills / observable behaviors related to the LOE objectives.*

- 5.2 *Specify on the Event Set Worksheet an overview of the event set, including the phase of flight.*

- 5.3 *Distribute the Event Set Worksheet to appropriate personnel (Subject Matter Experts [SMEs], CRM Coordinators, or Designated Examiners (DEs) for review of the estimated technical and CRM success criteria.*

- 5.4 *Upon completion of the review in Step 5.3, the LOE Developer will produce, a “Preliminary LOE Event Set” form for validation.*

**Step 6: Preliminary Approval of Event Sets**

- 6.1 *The LOE developer will submit the “Preliminary LOE Event Set” form to the AQP Manager.*
- 6.2 *The AQP Manager will review, approve and submit to the Fleet Training Manager for review, comment and/or approval.*

*Upon Fleet Manager’s approval of the “Preliminary LOE Event Sets”, the LOE developer will develop an LOE Scenario Worksheet for evaluation in the simulator.*

**Step 7: Build and Fly A Preliminary LOE for Event Set Validation and Enhancement of Success Criteria**

- 7.1 *The LOE developer will now validate and enhance the estimated success criteria of the “Preliminary LOE Event Sets”.*

This validation generally will be done in a Level C simulator or Level D, as appropriate. This will be accomplished with a full crew of pilots who are not familiar with these event sets and selected subject matter experts, one of whom will be the LOE developer. During this validation, the pilots involved are not being evaluated. They are in no jeopardy. The SMEs will observe each event set and enter comments to confirm, add or make deletions to the estimated success criteria. Transport Jet will notify its’ FAA POI sufficiently in advance to allow monitoring of this simulator validation.

- 7.2 *From this simulator validation, the LOE developer, in conjunction with the SMEs inputs, will produce Interim LOE Event Sets. These will be recorded on the “Interim LOE Event Set” form.*

- 7.3 *The interim event set success criteria will be annotated on the” Interim Grade Sheet”.*

It is our intention to build an event set library. In addition, once the FAA has approved an event set, the LOE developers at Transport Jet will enter it into their event set library for use in the future. The AQP Manager is responsible for maintaining the database of approved event sets.

**Step 8: Develop the Final Scenario Around FAA Approved and/or Company Validated Event Sets.**

- 8.1 *Using prior FAA approved and/or company validated Event Sets, the LOE developer can proceed with the creation of an entire LOE scenario.*

This will entail blending the Event Sets together and making them flow logically into one another. This can be planned utilizing the “LOE Scenario Event Set Summary”

The creation is accomplished by the use of appropriate scripting, which controls the event occurrence time line. The scripting of a scenario includes; detailed simulator setup, normal communications and directions from ATC, operations, ground crew,

flight attendants, maintenance, and ATIS/WX information.

The script should concentrate on realistic inputs that support the flight profile as well as variations determined during scenario development. The script must allow for crew decisions other than the “expected” response. The crew must be given the flexibility to “play out their hand” to a logical conclusion. Examples include scripting possible diversions and changes in routing.

All LOE scenarios will be tightly scripted to maximize standardization in scenario delivery methodology and in the data collection process.

- 8.2 *In addition to the LOE Scenario Script, the LOE developer will generate all the LOE scenario paperwork. This will include load sheet, fuel slip, complete set of flight papers that include NOTAMS, flight plans, weather, and maintenance logbooks, etc.*

### **Step 9: Final Evaluation and Validation of the Scenario.**

- 9.1 *The final evaluation and validation of the LOE scenario will be conducted in a FFS, or a FTD, as approved for that purpose.*

If available, line pilots should be utilized for this evaluation. If line pilots are not available, use instructors who are not familiar with the scenario. During this validation, the pilots involved are not being evaluated. They are in a no jeopardy environment. The validation will be performed by the LOE developer and selected SMEs. SMEs can include Instructors/Examiners. Transport Jet will notify its’ FAA POI sufficiently in advance to allow FAA monitoring of this simulator validation.

The evaluation and validation should confirm the following:

- Objectives of the LOE are met
- The training device used is appropriate for the evaluation
- The data collection instrument (grade sheet) is appropriate for the scenario
- Difficulty equivalency relative to other LOE scenarios is determined. The LOE Developer and the AQP Training Manager will assure the LOE scenario has similar difficulty equivalence to the other LOE scenarios in the fleet’s curriculum.
- Errors / problems are eliminated and the scenario enhanced

**Step 10: Make Final Modifications to LOE Scenario**

10.1 *The LOE developer will make the necessary corrections and produce a Final LOE scenario package to be submitted to the FAA for approval.*

This Final LOE Scenario package will include the following:

- LOE Approval Document that includes a summary of all the event sets
- Detail of each Event Set recorded on the Final LOE Event Set form
- Final Grade Sheet for each event set
- Complete script for the LOE
- Complete set of flight papers for the LOE

**Step 11: FAA Event Set and Scenario Approval**

11.1 *The LOE scenario is now sent to the Fleet Training Manager for review and approval.*

11.2 *The Fleet Training Manager will evaluate each scenario regarding goals, objectives, and training device to be utilized.*

11.3 *Once approved by the Fleet Training Manager the scenario will be submitted to the FAA POI for final approval.*

After the FAA approves the individual Event Sets and the LOE Scenario, subsequent minor corrections to the script or supporting paperwork can be made without FAA approval as long as the overall success criteria is not altered. The FAA may audit the LOE Scenarios used in any curriculum at any time, and may conduct surveillance inspections of the training at any time.

## Appendix I: Event Set Worksheet Number \_\_

| OVERVIEW:                             |               |            | SUCCESS CRITERIA                          |                                     |
|---------------------------------------|---------------|------------|-------------------------------------------|-------------------------------------|
| Phase of Flight:                      |               |            |                                           |                                     |
|                                       | TPOs and SPOs | Conditions | Technical Skills and Observable Behaviors | CRM Skills and Observable Behaviors |
| <u>Trigger:</u>                       |               |            |                                           |                                     |
| <u>Distracters:</u>                   |               |            |                                           |                                     |
| <u>Supporting Events:</u>             |               |            |                                           |                                     |
| <u>Difficulty Equivalency Rating:</u> |               |            |                                           |                                     |

Reviewed by SME:

Name and Staff No: \_\_\_\_\_ Date: \_\_\_\_\_

Name and Staff No: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix II: LOE Event Set Worksheet (Example)**

| <b>PREFLIGHT, PUSH BACK AND TAXI</b>                                                                                                                                                                         |                                                                                                                                                                                                        |                                                                                                                 | <b>SUCCESS CRITERIA</b>                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                   |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                                                                              | <b>TPOs and SPOs</b>                                                                                                                                                                                   | <b>Conditions</b>                                                                                               | <b>Technical Skills and Observables</b>                                                                                                                                                                                                                                                                                                                                                  | <b>CRM Skills and Observables</b>                                                                                                                                                                                                                                                 |
| <u>Trigger:</u><br><br>Weight and Balance Adjustment and Runway Change<br><br><u>Distracters:</u><br><br>ATC Comm.<br><br><u>Supporting Events:</u><br><br>None<br><br><u>Difficulty Equivalency Rating:</u> | Perform Check-in/Dispatch operations<br><br>Perform Safety and Preflight Inspection Operations.<br><br>Perform Gate Departure/Engine Start Operations.<br><br>Perform Taxi / Before Takeoff Operations | Weather at departure station is no problem.<br><br>Weather at destination has high winds forecasted with gusts. | Proficient in use of FMS. (____) *<br><br>Accomplishes normal checklists IAW SOP. (____) (____) (____)<br><br>Correctly identifies abnormal and accomplishes proper procedures, if appropriate. (____)<br><br>Properly evaluates environmental conditions for takeoff. (____) (____)<br><br>Conducts ground operations appropriate for existing weather conditions. (____) (____) (____) | Captain requests First Officer to verify data for change of runway. (____)<br><br>Captain demonstrates awareness of destination weather and informs crew during briefings. (____)<br><br>First Officer communicates the changes to weight and balance for passenger count. (____) |

\*(Task/Qual. Standard/Objective number)

Reviewed by SME:

 Name and Staff No: \_\_\_\_\_ Date: \_\_\_\_\_  
 Name and Staff No: \_\_\_\_\_ Date: \_\_\_\_\_

**Appendix III: LOE Scenario Work Sheet #\_\_\_\_\_**

| <b>OBJECTIVE:</b>                                                                                   |                 |
|-----------------------------------------------------------------------------------------------------|-----------------|
| City Pair: _____ TOGW: _____<br>Take off WX: _____<br>Landing WX: _____<br>Misc. information: _____ |                 |
| <b>Event Set Number</b>                                                                             | <b>Overview</b> |
| Event Set #<br>1XX                                                                                  |                 |
| Event Set #<br>2XX                                                                                  |                 |
| Event Set #<br>3XX                                                                                  |                 |
| Event Set #<br>4XX                                                                                  |                 |
| Event Set #<br>5XX                                                                                  |                 |
| Event Set #<br>6XX                                                                                  |                 |
| Event Set #<br>7XX                                                                                  |                 |
| Event Set #<br>8XX                                                                                  |                 |

## Appendix IV: LOE Grade Sheet (Example)

Transport Jet

Twin Jet LOE \_\_\_\_

## GRADE SHEET (Example)

| Rate<br>Crew<br>1-5 | Not<br>Obs. | Preflight, Pushback, and Taxi                                                                                 | Pilot Flying: | <input type="checkbox"/> CAPT | Event Set # 107<br><input type="checkbox"/> F/O |
|---------------------|-------------|---------------------------------------------------------------------------------------------------------------|---------------|-------------------------------|-------------------------------------------------|
|                     |             | a. Proficient in use of FMS. (____)                                                                           |               |                               |                                                 |
|                     |             | b. Accomplishes normal checklists IAW SOP. (____) (____) (____)<br>(____) (____)                              |               |                               |                                                 |
|                     |             | c. Uses available assets to determine legalities for flight. (____) (____)                                    |               |                               |                                                 |
|                     |             | d. Captain conducts thorough preflight briefing, and provides opportunity for others to make input. (____).   |               |                               |                                                 |
|                     |             | e. Crew discusses the correct takeoff/climbout procedures for this departure prior to takeoff. (____)         |               |                               |                                                 |
|                     |             | f. Crew discusses the impact of passenger count change and updates new weight and balance information. (____) |               |                               |                                                 |
|                     |             | g. Key operational decisions are clearly communicated among crewmembers. (____)                               |               |                               |                                                 |

  

|      |           |     |     |           |     |
|------|-----------|-----|-----|-----------|-----|
| CAPT | Technical | CRM | F/O | Technical | CRM |
|      |           |     |     |           |     |

COMMENTS: required for all items graded 1, 2 or not observed. Please identify by item number. Requested for items graded 5.

|  |
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|                             |                           |                                                                                                                                   |
|-----------------------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|
| <b>Rate</b><br>Crew 1-<br>5 | <b>Not</b><br><b>Obs.</b> | <b>DESCENT Event Set # 6</b><br><br><b>Pilot Flying:</b> <input type="checkbox"/> Left Seat <input type="checkbox"/> Right Seat   |
|                             |                           | <b>a. Proficient in use of FMS and AFDS. (---)</b>                                                                                |
|                             |                           | <b>b. Accomplishes descent/arrival, approach briefing, normal checklists procedures IAW SOP.</b>                                  |
|                             |                           | <b>c. Ensures all non-normal checklists are completed prior to commencing approach. (___)</b>                                     |
|                             |                           | <b>d. Ensures that flight attendants and passengers are prepared for landing and possible evacuation (___)</b>                    |
|                             |                           | <b>e. Crew verbalizes a plan, to include bottom lines and a backup plan. (___)</b>                                                |
|                             |                           | <b>f. Crew is assertive when voicing concerns, deviations from the original plan and when nearing/reaching bottom lines (___)</b> |
|                             |                           | <b>g. Crew plans and briefs automation modes and configurations (___)</b>                                                         |
|                             |                           | <b>h. Inform appropriate personnel of emergency situation; keeps cabin crew and passengers informed and updated (___)</b>         |

| Pilot #1 | Technical | CRM |
|----------|-----------|-----|
|          |           |     |

| Pilot #2 | Technical | CRM |
|----------|-----------|-----|
|          |           |     |

## Appendix V: AQP Grading Criteria

As in traditional training, technical skills proficiency is graded against Transport Jet's published SOPs for technical observables; including instrument rating tolerances. A significant departure from traditional measures of non-technical skills proficiency is the concept that errors are inevitable, and like internal and external threats to safety, it is their management that is graded.

| GRADE |                       | CRITERIA                                                                                                                                                                                                                                    |
|-------|-----------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1     | Unsatisfactory        | Major deviations from the prescribed qualification standards occur that are not recognized or corrected. Individual or crew performance could result in hull LOEs or LOEs of life. CRM skills are not effective.                            |
| 2     | Below Standard        | Deviations from the prescribed qualification standards occur that are not recognized or corrected. Individual or crew performance is safe but would be unsatisfactory if diminished by any amount. CRM skills are not completely effective. |
| 3     | Standard with debrief | Deviations occur from the prescribed qualification standards that are recognized and most corrected. Individual or crew performance meets expectations. CRM skills are effective.                                                           |
| 4     | Standard              | Minor deviations occur from the prescribed qualification standards that are recognized and corrected in a timely manner. Individual or crew performance meets expectations. CRM skills are clearly effective.                               |
| 5     | Excellent             | Performance remains well within the prescribed qualification standards. Individual or crew performance, management and CRM skills are exemplary.                                                                                            |

## Appendix VI – AQP Maneuver Validation Grade Sheet (Example)

### Instructions:

1. A rating is required for every maneuver performed. Always rate the maneuver the first time it is attempted.
2. A rating of '0' (Not Observed) automatically deems the MV as 'INCOMPLETE'.
3. A "Reason" code, the number of repeats and a comment are required for a '1' rating.
4. Reason codes and comments are optional but recommended for ratings of 2-4.
5. Give an overall rating of 'Complete' or 'Incomplete'.

|         |                 |                       |                  |                         |                |             |
|---------|-----------------|-----------------------|------------------|-------------------------|----------------|-------------|
| Rating: | 0=Not Observed  | 1=Unsatisfactory      | 2=Below Standard | 3=Standard with debrief | 4=Standard     | 5=Excellent |
| Reason: | S=Systems Know. | T=Technique/Execution | P=Procedural     | C=Crew Coord.           | R=Problem Rec. | O=Other     |

  

| Captain PF / First Officer PNF<br><i>*Denotes First Look Maneuvers</i>                                                                                                       |          | TPO # | Rating (0-5) | Reason Code | No. of Repeats | Comments<br>(Continue on back if necessary) |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-------|--------------|-------------|----------------|---------------------------------------------|
| Perform a normal takeoff (Low Vis, 500 RVR)                                                                                                                                  | CA       |       |              |             |                |                                             |
| * Perform a non-precision approach (Flt Ctr)                                                                                                                                 | CA       |       |              |             |                |                                             |
| <input type="checkbox"/> VOR <input type="checkbox"/> LOC <input type="checkbox"/> NDB <input type="checkbox"/> BC <input type="checkbox"/> ASR <input type="checkbox"/> LDA |          |       |              |             |                |                                             |
| Perform normal landing (crosswind)                                                                                                                                           | CA       |       |              |             |                |                                             |
| * Perform an engine out after V1 takeoff                                                                                                                                     | CA       |       |              |             |                |                                             |
| Perform ILS approach CAT I engine out                                                                                                                                        | CA       |       |              |             |                |                                             |
| Perform a rejected landing                                                                                                                                                   | CA       |       |              |             |                |                                             |
| Perform landing / go-around windshear below 1000 feet AGL                                                                                                                    | CA       |       |              |             |                |                                             |
| First Officer PF / Captain PNF<br><i>*Denotes First Look Maneuvers</i>                                                                                                       |          | TPO # | Rating (0-5) | Reason Code | No. of Repeats | Comments<br>(Continue on back if necessary) |
| Perform a normal takeoff (Low Vis, 500 RVR)                                                                                                                                  | FO       |       |              |             |                |                                             |
| * Perform a non-precision approach (Flt Ctr)                                                                                                                                 | FO       |       |              |             |                |                                             |
| <input type="checkbox"/> VOR <input type="checkbox"/> LOC <input type="checkbox"/> NDB <input type="checkbox"/> BC <input type="checkbox"/> ASR <input type="checkbox"/> LDA |          |       |              |             |                |                                             |
| Perform normal landing (crosswind)                                                                                                                                           | FO       |       |              |             |                |                                             |
| * Perform an engine out after V1 takeoff                                                                                                                                     | FO       |       |              |             |                |                                             |
| Perform ILS approach CAT I engine out                                                                                                                                        | FO       |       |              |             |                |                                             |
| Perform a rejected landing                                                                                                                                                   | FO       |       |              |             |                |                                             |
| Perform landing / go-around windshear below 1000 feet AGL                                                                                                                    | FO       |       |              |             |                |                                             |
| Crew Events                                                                                                                                                                  |          | TPO # | Rating (0-5) | Reason Code | No. of Repeats | Comments<br>(Continue on back if necessary) |
| Perform taxi out (Low Vis, 500 RVR)                                                                                                                                          | CA<br>FO |       |              |             |                |                                             |
| Takeoff with windshear after V1                                                                                                                                              | CA<br>FO |       |              |             |                |                                             |
| * Perform a rejected takeoff                                                                                                                                                 | CA<br>FO |       |              |             |                |                                             |
| * Apply system operation procedures (FMC)                                                                                                                                    | CA<br>FO |       |              |             |                |                                             |
| Perform monitored approach CAT II (Autoland, 1000 RVR)                                                                                                                       | CA<br>FO |       |              |             |                |                                             |
| Perform monitored approach CAT III (Low Altitude Missed, 300 RVR)                                                                                                            | CA<br>FO |       |              |             |                |                                             |
| Perform Missed Approach                                                                                                                                                      | CA<br>FO |       |              |             |                |                                             |

OVERALL MV RATING: Captain: ( ) Complete ( ) Incomplete—Submit OP-100 form

First Officer: ( ) Complete ( ) Incomplete—Submit OP-100 form

Check when data entry completed (office use only)