Document on Standards and Recommended Practises for Flight Inspection & Flight Validation Organisations

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ICASC Operational Requirements of Flight Inspection & Flight Validation Organisations

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Introduction

Flight Inspection and Flight Validation represents a rather demanding operational environment in aviation. Its very nature translates into a certain amount of risk elements – which are covered in one of the following chapters - that have to be identified, addressed and subsequently mitigated in order to achieve a safe and reliable flight operation.

The tools to mitigate these risks are wide and varied. This document represents ICASC's Standards and Recommended Practises (SARPs) that tries to identify these tools, concentrating on the organisational set-up and environment of a flight inspection entity. Each chapter contains ICASC recommendations for addressing risk mitigation. The idea is to arrive at a common set of tools that are useful in achieving the goal of a safe flight inspection flight operation.

This document primarily deals with flight operation aspects. For further guidance on technical requirements to set up a Flight Inspection organisation refer to ICASC Doc "ICASC Technical Requirements for Flight Inspection Service Providers" of April, 2014.

A. General Set-up

Objective: paramount to a safe execution of flight inspection missions is a coherent set-up of the organisation, where size, staff numbers, management, equipment, mission profile and theatre of operations are in line, and no ambiguities exist, i.e. staff numbers or other resources insufficient for the intended missions to be flown over the year. Government organisations might have a tendency to be over-bureaucratic and/or underfunded; private organisations might have a tendency to be overly ambitious in economic terms; both tendencies will put unnecessary stress on the organisation and must be avoided.

ICASC Recommendations:

A1. Have a clearly defined set-up, where size, staff numbers, management, equipment, mission profile and theatre of operations are in line with the intended operation, and no ambiguities exist.

A2. Due to the fact that flight inspection missions are time-critical, ICASC recommends to have a back-up solution in place in case the own resources (aircraft, qualified staff) are unavailable.

B. Organisational Set-up

Objective: the organisational set-up, in a way, clearly reflects if an organization is aware of what it is doing and is organizing itself accordingly. The items in questions below go along that line. A clearly defined path of accountability, and a management structure that goes in line with it, are paramount.

ICASC Recommendations:

B1. Establish an organizational set-up that follows the requirements below in a clear and unambiguously manner.

B2. Establish a clear way of communication that set-up, best in a comprehensive Operations Manual OM.

B3. Publish a clearly defined Statement of Work

B4. Establish a clearly defined path of accountability and management structure. Communicate this structure unambiguously

B5. Establish a clearly defined path of responsibilities: Clearly establish asset allocation, position titles, roles and responsibilities, training requirements, as well as Operational Control and Maintenance.

B6. Establish Operational Control and maintain it.

B7. Publish a clearly defined set of rules, procedures and best practises, best laid down in an OM

B8. Establish a clearly defined Change Management / Administration and Program Management Plan in place.

B9. Establish an Emergency Response Plan in place

C. Safety Philosophy / Safety Management System

Objective: A Safety Philosophy, and accompanying Safety Management System (SMS), are the formalized approach of an organization on how to implement safety, clearly defining risk identification methods and tools, risk communication and mitigation strategies, lines of responsibilities and accountability, which are precursors for demonstrating proper organizational risk awareness and increasing overall mission effectiveness. The Safety philosophy of an organization must be a top-down approach, spearheaded by management with a demonstrated and unwavering commitment independent profits and mission success rates. . The SMS should be part an integral part of the OM (preferred option, to avoid over-complexity), or may be a stand-alone document. The associated Reporting System (RS) does not have to be overly complex with sophisticated forms, as long as it is formalized in one way at all. Just Culture has to be clearly communicated, promoted and executed under all circumstances. Just Culture in the context of aviation means a culture within an entity / organisation that is tailored towards identifying / mitigating risk through an atmosphere of open communication, transparency and non-punitive action, with a clear focus of avoiding / mitigation weak spots within the organisation instead of apportioning blame.

ICASC Recommendations:

C1. Have a Safety Philosophy and a Safety Management System that reflects that Safety Philosophy

C2. Live the top-down-approach to safety even in (economically) harsher times.

C3. Encourage a healthy communication on mishaps by a viable Reporting System (RS) and an actively lived Just Culture.

C4. Avoid over-complexity by integrating the SMS into the OM.

D. Flight Operations : Operating Limits

Objective: Operating limits form an essential part of any safety philosophy. The minimum objectives to be covered are set below. It is paramount that the operating criteria be directly related to the organization's mission set. Here, a balance between safety and operational requirements has to be struck: Minima with an excessively high threshold will enhance safety, but will limit the operation up to a point where providing a reliable service to the customer will be impossible. The goal is efficient risk mitigation as there is no way to eliminate risk all together

Again, operating limits have to be accepted by all stakeholders from top down; raising minima and expecting the same productivity output, for instance, will not be a realistic prospect.

Therefore, operating limits should be set after careful study of the operational environment to be expected, equipment to be used and crew qualification considered. The limits have to be open, transparent, clearly communicated and no ambiguities must exist between the organization's ambitions and targets and its operating limits.

ICASC Recommendations:

D1. Have Operating Limits established according to the objectives above.

D2. Operating limits must reflect and bring in line the organization's objectives with mission profile, equipment, and crew requirements, especially in the light of qualification, training, recurrency status and FTLs.

D3. The Operating Limits must reflect the operational environment of the organisation

D4. Have established Flight and Rest Time Limitations (FTLs)

D5. FTLs must reflect individual operational circumstances and requirements of the affected organisation.

D6. Have Weather minima defined

D7. Have Minimum Equipment status and requirements defined

D8. Have defined Crew qualification, training and recurrency standards

D9. Have Airport criteria established

D10. Have defined Security criteria

D11. Have Night Ops specified

D12. Have established a clear, unambiguously method of communicating these limitations, best via OM

E. Equipment

Objective: Picking the proper equipment is an essential factor affecting safety on flight inspection / flight validation missions.
Aircraft: In light of the wide variety of flight calibration missions and theatres of operation, there is no one-size-fits-all solution in picking the right aircraft, however, the selected aircraft type should be able to fly the mission required without restrictions (i.e. fuel load, payload), in order not to pressure crews into accepting risks beyond means of mitigation, just to get the mission done. The aircraft selected must be capable of handling the environmental conditions of the intended theatre of operations (weather hazards, heat, cold, icing conditions, etc.).
The performance of the aircraft selected must be in line with the task at hand, this concept is even more important for Flight Validation missions, where the performance of the validation aircraft must be commensurate with the performance of the aircraft that will later fly the validated procedures.
The FIS to be used must be commensurate with the task at hand, and must be integrated with fixed aerials that are subject to regular on-aircraft-calibration.
Maintenance Maintenance must be fully integrated into the safety philosophy, executed by appropriately qualified and trained staff, at the proper intervals.
The flight inspection aircraft in use should be maintained and upgraded to the current, mission-specific requirements.
The paramount driver behind the Cockpit Environment is the requirement to provide maximum Situational Awareness. Glass cockpits, suitable Flight Management Systems (FMS), interface between FIS and cockpit, TCAS, EGPWS all work towards that goal.
The Environmental System of the aircraft used must be capable of coping with the environmental conditions of the theatre of operation (sufficient cooling, heating, etc.).

ICASC Recommendations:

E1. Aircraft utilised must be in line with mission profile and mission environment.

E2. ICASC recommends multi engine aircraft for flight inspection / flight validation missions.

E3. Aircraft in use should be upgraded, and must be maintained, to the current, mission-specific requirements.

E8. In case the aircraft is used for Flight Validation Missions as well, the FMS must be capable of handling all relevant ARINC424 formats used on the new procedure under validation, and must be capable of depicting them properly; the autopilot must be capable of following these signals

E9. TCAS

E10. In case an EGPWS is installed, there must be means available to silence it on flight inspection missions in order to avoid nuisance alarms.

E11. The environmental system of the aircraft must be capable of coping with the environmental conditions of the theatre of operation, both in terms of cooling and heating, in order to cater for requirements both of the crew as well as integrity requirements of the FIS Nav receivers.

E12. The FIS must be integrated with fixed aerials, which are in turn subject to regular, on-board calibrations (see chapter F for FIS Requirements)

E13. For Flight Validation Missions, the use of Pre-Production-databases for the relevant Flight Management System FMS is required

F. Crewing

Objective: Defining adequate crew qualification and composition and finding the staff that meet these requirements is an essential part of the overall safety concept of a flight inspection organization.

ICASC Recommendations:

F1. Define crew qualification and skill sets required for the intended mission profile.

F2. As a minimum requirement for commanders, and in line with ICAO Doc 9906
Vol 6, ICASC recommends the following qualifications as a guideline:

- CPL/IR or ATPL
- Current type rating for the type to be flown on mission
- Total flight time > 1.500 hrs
- Command time > 400 hrs
- Flight Inspection Pilot > 2 years

F3. Define adequate selection process

F4. Use adequate tools for the selection process.

F5. Minimum crew on Flight Inspection / Flight Validation missions: 2 pilots, or define applicable means of compliance

F6. Define crew composition.

F7. Define status of Cabin Crew / Nav Aid Inspectors .

G. Operational Status

Objective: A number of flight inspection missions are outside the normal operating envelope of the aviation community (i.e., in some countries, flying below the Minimum Safety Altitude, night flying activities, special Noise Certificates, or waivers from these Noise Certificates, etc.). In many case this stipulates a requirement for official approval of these kinds of operations.

ICASC Recommendations:

G1. Have Operational status defined and approved by Regulator / Authorities

G2. It is recommended that the affected flight inspection organisation applies for all relevant approvals or “waivers” by the appropriate authorities, to minimize ambiguities and potential risk of violating rules and regulations, which in turn is essential to reduce workload and stress on crews

H. Quality Management System (QMS)

Objective: A Quality Management System (QMS) is an essential part of any flight inspection organization. Most regulatory frameworks address this requirement – an AOC holder is required to set up a QMS, for instance. A QMS is highly desirable for tracking the performance of, and thus providing integrity for, the flight inspection mission itself, thus providing clarity on issues like ownership of calibration reports, data integrity, and postflight processing.

ICASC Recommendations:

H1. Have a QMS in place, including a relevant Audit program and procedures defining how to act on audit findings.

H2. ICASC recommends the QMS be an integral part of the overall OM of an organization, thus reducing complexity in the organization’s documentation.

I. Operations Manual

Objective: The Operations Manual (OM) is the central document of an organisation as it defines all aspects of the flight operation and communicating the way it intends to do business with all relevant stakeholders. Its format, structure and extent, to a certain degree, will be driven by the individual requirements of the regulator in charge of that particular entity.
Numerous layouts and templates for an OM exist within the industry; however, the industry standard is outlined below:

ICASC Recommendations:

I1. Have an OM in place as the central way to document and communicate the scope of work and how to accomplish it.

I2. The OM should be concise and limited to the absolute minimum necessary, in order to avoid over-complexity, which in turn would only create a work atmosphere of ambiguity and unnecessary workload.

I3. The OM must incorporate all operational circumstances organizational operations.

I4. Minimum objects to be covered:

- Organisational set-upResponsibilities and accountabilities
- Theatre of Operations
- Aircraft related subjects (Minimum Equipment List (MEL), navigation equipment, etc.)
- Limitations and Minima
- Crewing
- Operational Procedures, Normal and Abnormal
- All weather operations
- Flight and Rest Time Limitations
- Training
- Security

J. Crew Resource Management (CRM) / Team Resource Management (TRM) / Crew Coordination Concept (CCC)

Objective: Crew Resource Management (CRM), and a Crew Coordination Concept (CCC) defines how a crew is to work together, and clearly defines the roles and responsibilities of each crew member. It clearly describes the communication involved in executing these tasks and should be reinforced by Standard Operating Procedures (SOPs) and Checklists (see chapter 11 & 12 of this document). The CRM system, however, does not only define the cooperation between cockpit members, it also should encompass procedures and communication between cockpit and cabin, and it should define the interface between the flight crew and the rest of the company, like tasking / scheduling, management, maintenance, etc. This holistic approach in CRM is of great importance to create a working environment that takes into account all requirements to accomplish the organization's mission profile safely and reliably. It effectively translates into a Team Resource Management (TRM).

ICASC Recommendations:

J1. Have a CRM / CCC in place.

J2. Base it on a holistic approach that does not only cover aspects of flight crew coordination, but all other relevant stakeholders within the organization as well.

J3. CRM should be holistic, = Total Resource management (TRM), i.e. encompasses cabin crew and rest of organization as well.

K. Standard Operating Procedures (SOPs)

Objective: Standard Operating Procedures (SOPs) describe how certain aspects of the scope of work are handled by whom, and at what time. SOPs govern aspects like cockpit work, crew coordination, checklist philosophy, but also issues like how to execute certain calibration profiles, how to schedule tasks, write reports, etc. SOPs should be commensurate with the task at hand. They should be concise, transparent, and whenever possible, be an integral part of the OM.

ICASC Recommendations:

K1. Define SOPs to describe how certain aspects of the scope of work are handled by whom, and at what time within the organization.

K2. Keep SOPs concise and transparent.

K3. SOPs must be in line with other documents, like the OM, CCC, checklists, etc.

L. Checklists

Objective: Checklists form an enormously important part of the operating environment. It is a well-known fact that the manufacturer's checklists, especially when the aircraft in question is certified for single pilot operations, are often less then optimal in a normal aviation environment for reasons of over-complexity and length. These checklists reflect legal and liability issues, which might be well required to keep the manufacturer from harm in legal terms, however, focusing on these legal aspects unfortunately renders these checklists almost useless. As check lists are vital for crew procedural standardization every operator is called upon to design checklists that do reflect its individual needs. Depending on the regulatory environment it might be necessary to get the altered checklist approved by the respective regulator.

ICASC Recommendations:

L1. Define checklists in a way as to reflect the operational environment the specific missions are flown in.

L2. Avoid over-complexity.

L3. The checklists have to be in line with SOPs and other procedures laid down in the OM.

L4. They have to be workable under all circumstances the organization is flying in!

L5. Both Normal and Abnormal / Emergency Checklists should be defined by operator

L6. Checklist philosophy: Do vs. Follow-up Checklists

M. Training & Checking

Objective: The importance of training in aviation in general, and in flight inspection in particular, cannot be overstated. Every flight inspection organization should establish a training scheme, covering both initial as well as recurrent training, and execute it rigorously. This translates into a certain commitment from all stakeholders involved, including management, as training inevitably has cost implications. The training regime should not only cover flight crews, but all other staff members involved in flight operations as well. It must reflect the individual, mission specific requirements, that are not normally covered by a routine training program provided by training organizations.

Aspects to be covered are addressed by the following items:

ICASC Recommendations:

M1. Define and implement training scheme for both initial as well as recurrent training.

M2. Training should be regime described (i.e. in Part D of OM)

M3. Training must reflect and be in line with other organization's documents, like OM, CCC, Checklists, etc.

M4. Training should cover not only crew training, but all pertinent aspects of organization's activities, like OPS, scheduling, etc.

M5. ICASC strongly recommends use of suitable qualified simulators for flight training, both initial as well as recurrent, to the maximum extent possible

M6. Whenever possible, customized training programs should be employed,

M7. Training should always be a top-down commitment

M8. Training should reflect the equipment to be used

M9. For No-Tech-Training: Cabin Crews should be involved as well

N. Risk Mitigation Strategy

Objective: The Risk Mitigation Strategy of an organisation is a pro-active approach, via a risk assessment, of the individual risks associated with a specific mission, with the goal to arrive at a strategy to minimize or avoid these risks all together. Any risk mitigation strategy shall address the external circumstances of the operation: where do we operate, doing what with whom? How is the terrain, how is the infrastructure (fuel / de-icing / hangar available)? How well is ATC organized, is radar coverage given? Who on a specific mission will be point of contact for the company? Who for the crew? How is the security situation on site / in country? Whenever possible, these data should be collated prior bidding for a tender; marketing or management should try to find out as much information as possible prior committing to a task, in order to reduce crew pressure on site later.
Crew fatigue is another major issue to be addressed: At what point fatigue hits will very much depend on the type of mission flown (for instance, ILS low level work, in general, is more stressful than airway work at high altitudes), the aircraft being used (Cockpit equipment available, space available on board, susceptibility to turbulence, temperature control) and the environment operated in (poor ATC? poor infrastructure, i.e. refueling a major undertaking? Night flying involved?). Thus, geographical and climatological conditions of theatre of operation, length of deployment, transit times and other factors, like aircraft and cockpit equipment or even accommodation should be taken into account when executing a risk assessment and designing a risk mitigation strategy (which, in this case, would be an organization-specific a FTL scheme).

ICASC Recommendations:

N1. Have a Risk Mitigation Strategy in place as a good indicator of one's organization being aware of its mission profile and its associated risk.

N2. It should, as a minimum, have the factors cited above covered.

N3. The external circumstances of operation and associated risk must always be identified.

N4. A Risk Assessment should always be completed prior to bidding for a contract.

N5. As a risk reduction exercise, a FTL scheme should be in place.

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