

Fatigue Risk Management in Air Traffic Services ...an InfoTech Solution

Presented by Jitender Singla



Fatigue Risk Management in ATS ...an InfoTech Solution



Jitender Singla
General Manager
(ATS)
Laminaar Aviation
Infotech

Experiences :

- Air Traffic Controller for 22 years
- Head of ATS units at two airports in India
- Joint Director (ATS) at national level
- Head (Airport Ops Services) at Mumbai International Airport

Scope

- Introduction
- Systematic approach and compliance with:
 - Fatigue Risk Management System (FRMS) – ICAO Annex 11, Doc 9966
 - Safety Management System (SMS) – ICAO Doc 9859
- Implementation of FRMS in ATCOs Scheduling
- Benefits of Automation
- Conclusion



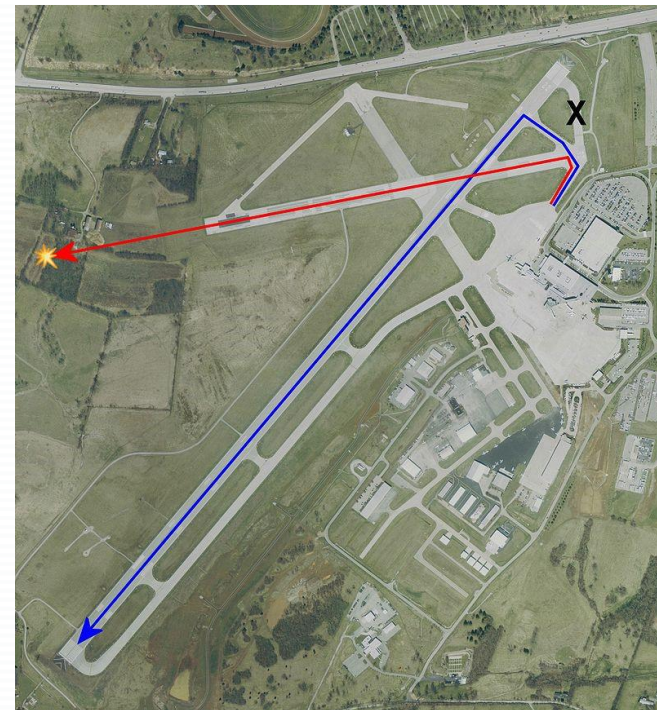
Comair 5191

- **Date:** 27 August 2006; **Time:** 06:07 AM
- **Airport:** Blue Grass Airport, Lexington, Kentucky (U.S.)
- **Aircraft:** Bombardier CRJ-100
 - RWY In use – **22** (Length - 7,003 feet, equipped with HIRL)
 - **RWY Used: RWY 26 (Length : 3,500 feet, Unlighted)**
 - POB – 50; Survivor – 01

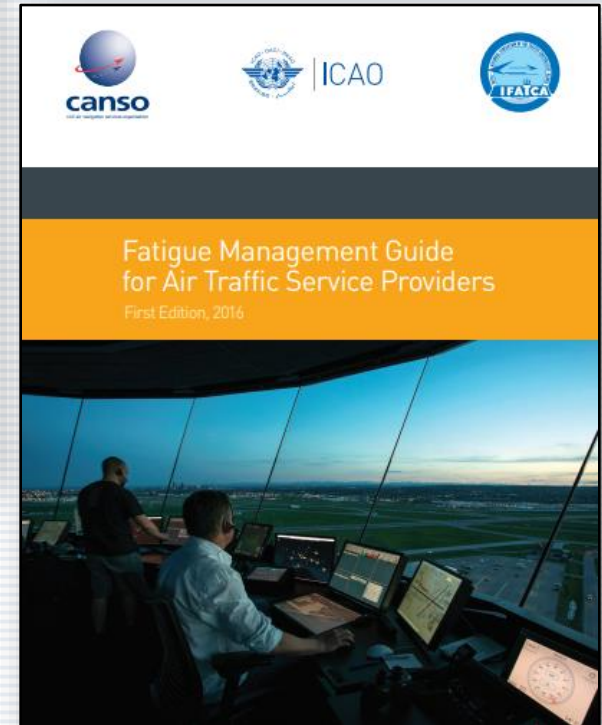
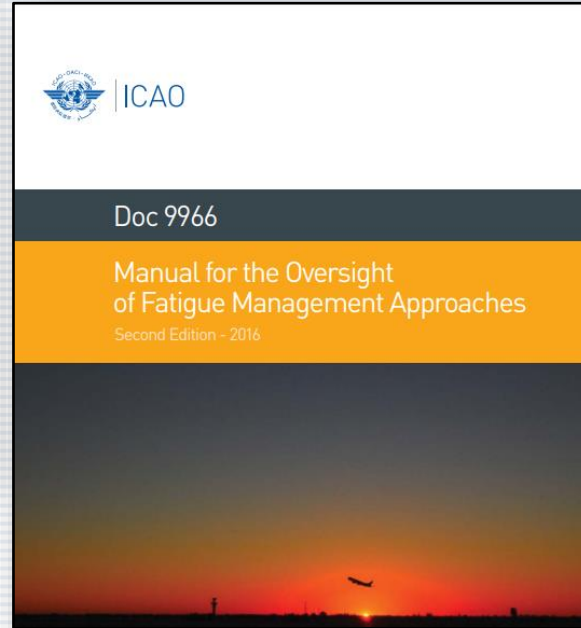
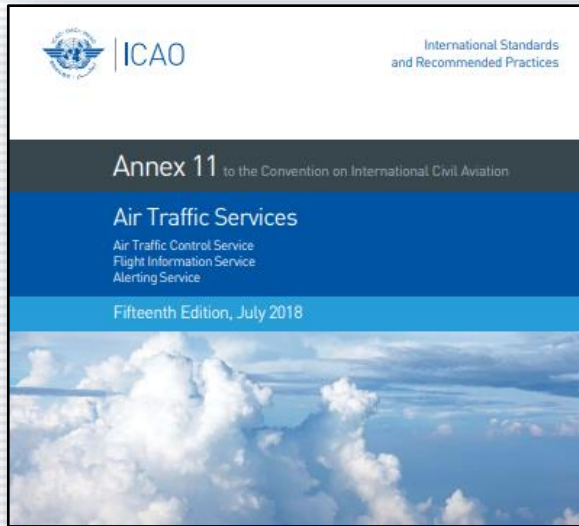
Tower Controller's Duty :

Morning (0630 – 1430 hrs.) + Night Shift: 2330 hrs. onwards

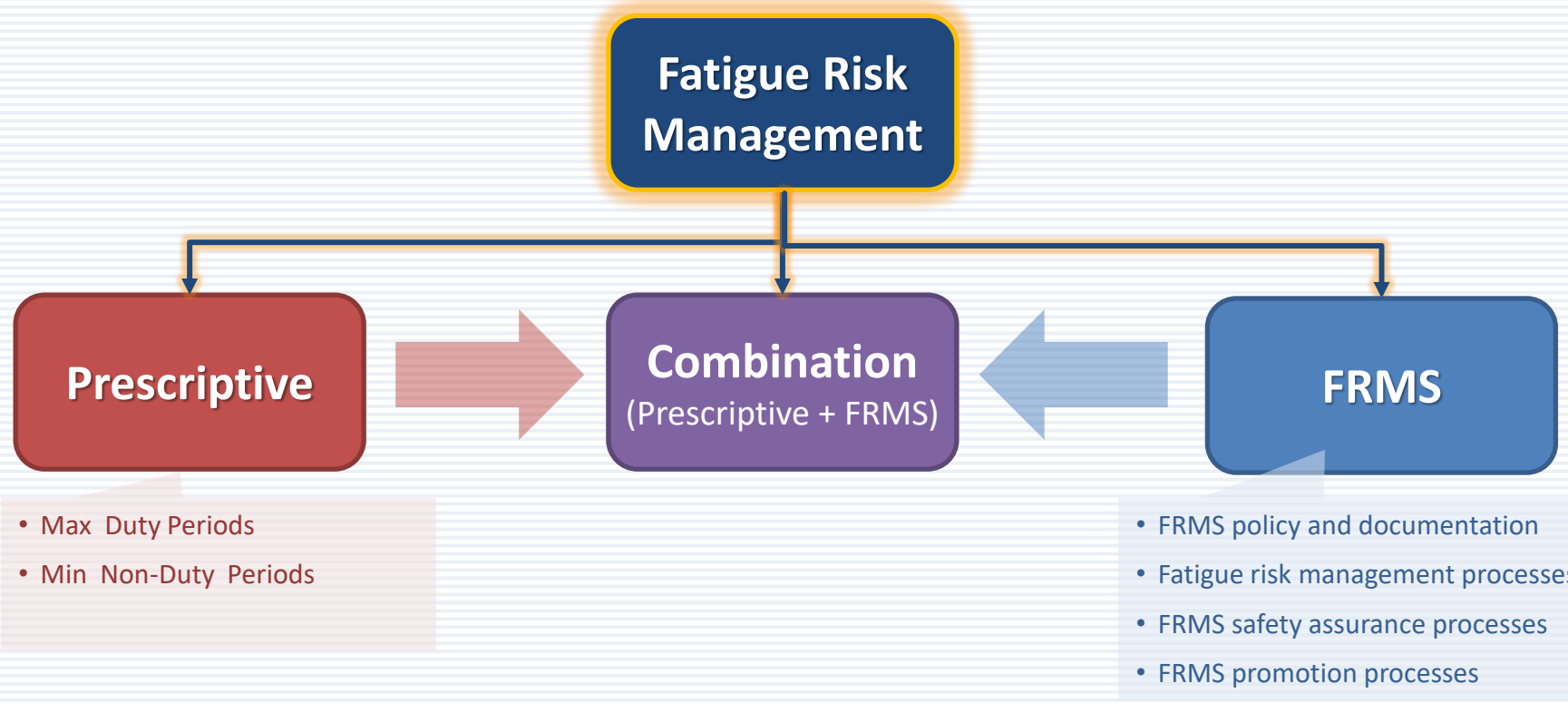
Actual rest in last 24 hrs. : **Only 02-hour** before night duty



Fatigue Management Manuals

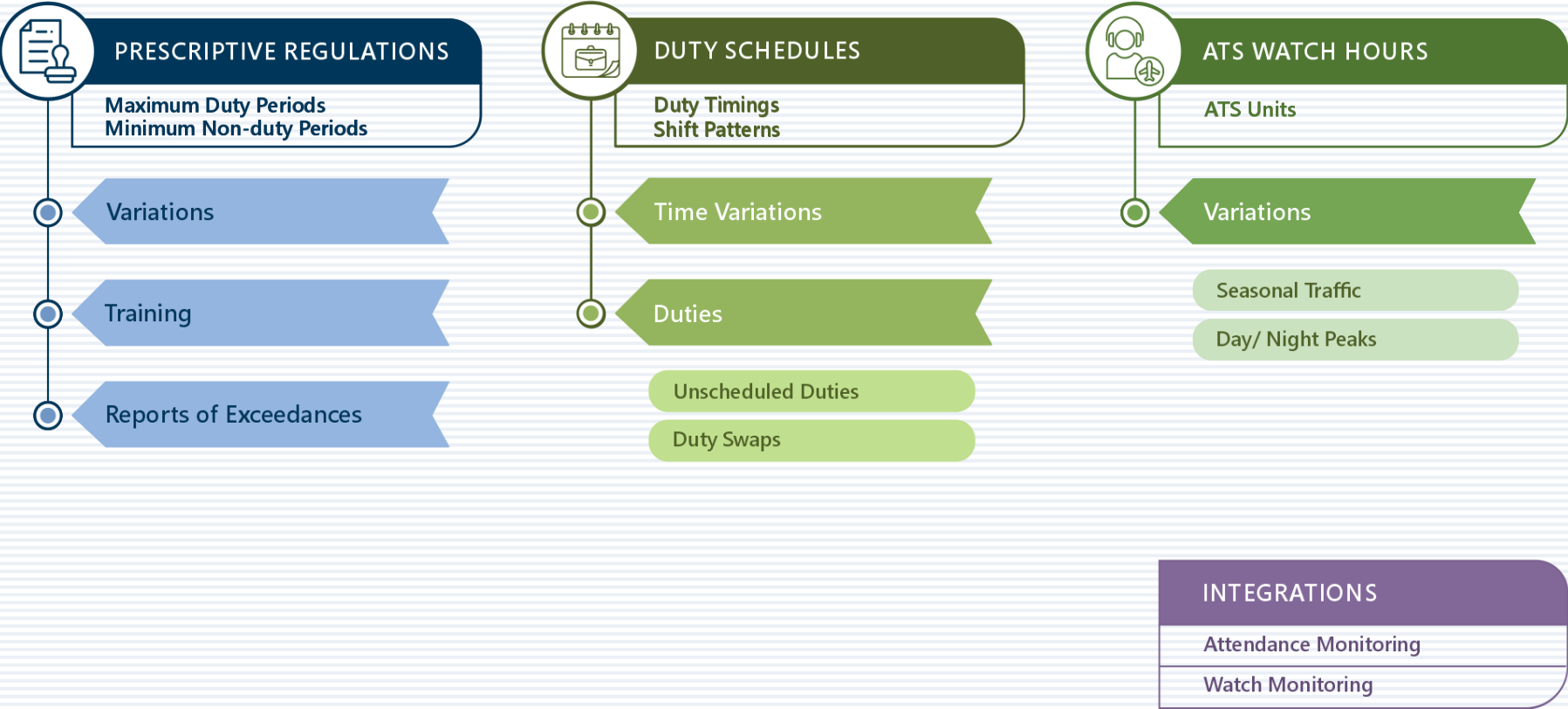


Approaches for Fatigue Risk Management



Prescriptive Fatigue Management Regulation

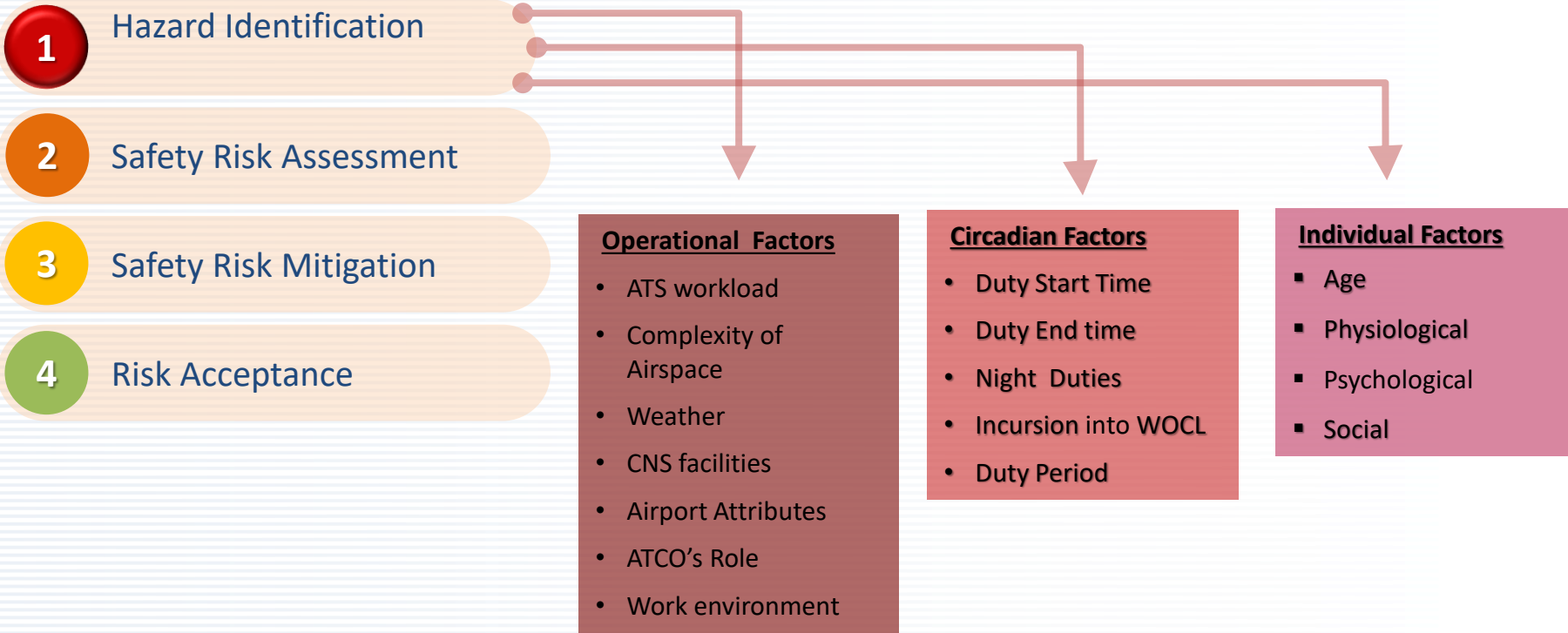




FRMS Regulations



Hazard Identification



Safety Risk assessment

- 1 Hazard Identification
- 2 Safety Risk Assessment
- 3 Safety Risk Mitigation
- 4 Risk Acceptance

Table 2. Example safety risk severity table

Severity	Meaning	Value
Catastrophic	<ul style="list-style-type: none">Aircraft / equipment destroyedMultiple deaths	A
Hazardous	<ul style="list-style-type: none">A large reduction in safety margins, physical distress or a workload such that operational personnel cannot be relied upon to perform their tasks accurately or completelySerious injuryMajor equipment damage	B
Major	<ul style="list-style-type: none">A significant reduction in safety margins, a reduction in the ability of operational personnel to cope with adverse operating conditions as a result of an increase in workload or as a result of conditions impairing their efficiencySerious incidentInjury to persons	C
Minor	<ul style="list-style-type: none">NuisanceOperating limitationsUse of emergency proceduresMinor incident	D
Negligible	<ul style="list-style-type: none">Few consequences	E

Table 3. Example safety risk matrix

Table 1. Safety risk probability table			Table 3. Example safety risk matrix					
Likelihood	Meaning	Value	Safety Risk	Severity				
			Probability	Catastrophic A	Hazardous B	Major C	Minor D	Negligible E
Frequent	Likely to occur many times (has occurred frequently)	5	Frequent 5	5A	5B	5C	5D	5E
Occasional	Likely to occur sometimes (has occurred infrequently)	4	Occasional 4	4A	4B	4C	4D	4E
Remote	Unlikely to occur, but possible (has occurred rarely)	3	Remote 3	3A	3B	3C	3D	3E
Improbable	Very unlikely to occur (not known to have occurred)	2	Improbable 2	2A	2B	2C	2D	2E
Extremely improbable	Almost inconceivable that the event will occur	1	Extremely improbable 1	1A	1B	1C	1D	1E

Safety Risk Mitigation



- Caffeine
- Nap at work
- Additional break periods
- Rest before duty
- Higher Experience
- Additional Supervision
- Additional ATCO

Risk Acceptance

- 1 Hazard Identification
- 2 Safety Risk Assessment
- 3 Safety Risk Mitigation
- 4 Risk Acceptance

Safety Risk Index Range	Safety Risk Description
5A, 5B, 5C, 4A, 4B, 3A	INTOLERABLE
5D, 5E, 4C, 4D, 4E, 3B, 3C, 3D, 2A, 2B, 2C, 1A	TOLERABLE
3E, 2D, 2E, 1B, 1C, 1D, 1E	ACCEPTABLE

- Acceptable
- Tolerable
- Intolerable

FRMS : Process Overview



NIGHT SHIFT

MORNING SHIFT

DAY SHIFT

NIGHT SHIFT

Time →	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Traffic Density																								
Weather																								
CNS facilities																								
Airport attributes																								
Circadian																								
MITIGANTS																								
Rest Before duty																								
Nap at Work																								
Higher Experience																								
Addl ATCO																								
RESIDUAL RISK																								
Weather																								
Traffic Intensity																								
Traffic Type																								
Equipment																								
Fatigue																								
FRMS-BASED ROSTER (Pre)																								
ATCO-1																								
ATCO-2																								
ATCO-3																								
ATCO-4																								
ATCO-3																								

9:41

< Home Personal Bio-rhythm

PERSONAL DETAILS DATA INPUT

25-May-2020 (Mon)

What time did you go to bed last night? 23:00

What time did you wake up? 06:00

Hours of Sleep: 07:00

How alert did you feel when you wake up? 6 - Some sign of SI

How long did it take you to fall asleep? 15-30 mins

How many times did you wake up during the night? 1-2

Naps Taken: 14:00 to 15:00

Save Clear

Powered by ARMIST

Last Sync: 02-Dec-2020 11:56

9:41

< Home Personal Bio-rhythm

PERSONAL DETAILS DATA INPUT

Type of Data Input: Personal Data

> KSS

Actual Profile Default Profile

1 2 3 4 5 6 7 8 9

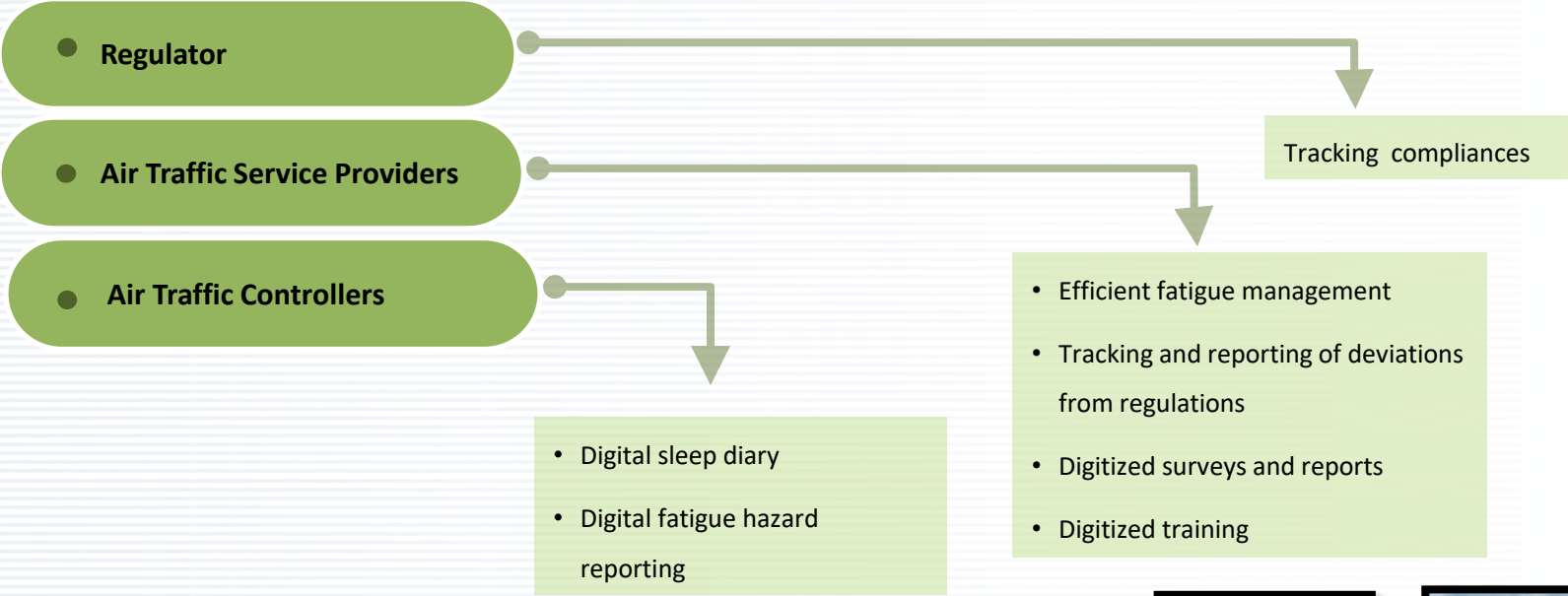
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Load Default Profile

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Benefits of Automation



Thank You!

Welcome to the booth for detailed discussions

