

Addressing Safety & Performance Aviation



SSA versions for Aviation
Report options

psyfactors

Suite 615, 370 St Kilda Rd Melbourne Vic 3004 Australia ph: +613 9645 9800

The Situational Safety Awareness Test[©]

Peter N.Rosenweg MAPS, MCOP, AMA, AAvPA Human Factors Psychologist

© 2001 - 2016

Psyfactors Pty Ltd Suite 615, 370 St Kilda Rd Melbourne Vic Australia 3004

ph: +61 3 9645 9800

November 25, 2016

SSA Test Versions for Aviation

All Apprentices V5.0

General Graduates V 5.0

Ground crew Equipment Operator V 2.1a

Aviation Equipment Maintenance V1.1c

Security Personnel V5.0

Security Supervisors V5s

Aviation Pilot (Trainee) V4.0b2.1

Professional & Instructor Pilot V5.0

Cabin Crew V5.0

Cabin Crew Manager V5.0

Air Traffic Controller V4.0b2.1

Terminal & Customer Care V 5.0a

Situational Awareness is a function of Positive Self-Regulation

Self-regulation is a construct that comprises various behaviours, mental and emotional states. Self-regulation can act in a way that can be both explicit and overtly deliberate, involve unconscious decisions and irresistible impulses. Self-regulation can also be reflexive, adaptive or defensive, inescapably mediated by the context, intensity and urgency of the needs of the moment. Additionally, self-regulation can be heavily influenced by social normative and moralistic constraints in deciding behaviour.

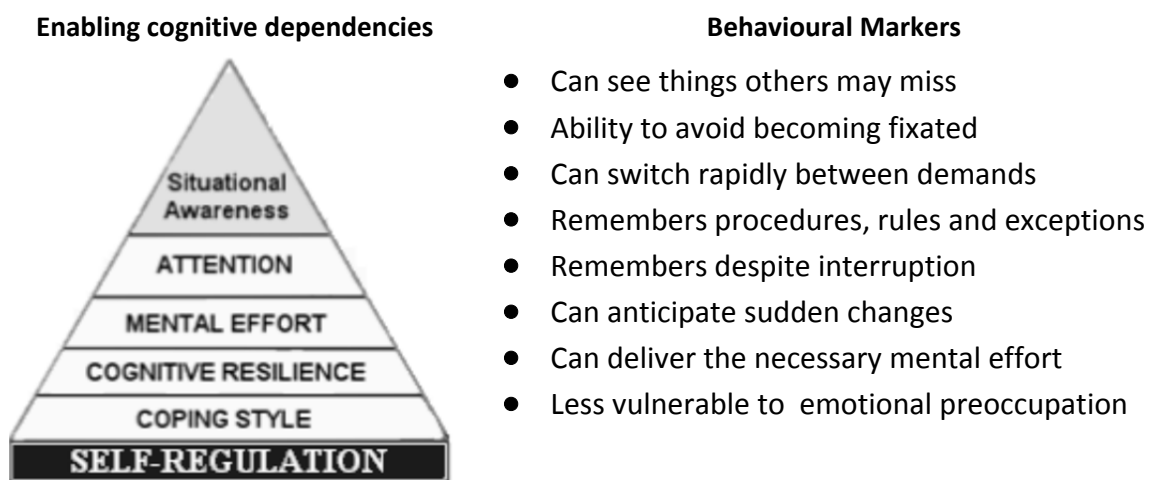


Figure 1. Model and hierarchy of dependencies and behavioural markers

Self-regulation is different to self-control which is a narrower set of behaviours that are more directly involved with inhibiting and overriding unwanted impulses and reactions. The ability to self-regulate to develop a competent ability to manage the self, is crucial for social, academic and occupational achievement. Self-regulation allows the individual to adapt to fulfil intent through their executive or mental faculties, the cognitive control of attention and management of emotion. Self-regulation skills and strategies provide the cognitive resources to withstand difficulties, distractions and overload in the achievement of objectives. The limitation of mental energy and capacity for effort prompts the need to be able to recover mental energy through self-regulating strategies, which act as the underlying executive directing the alerting and orienting facets of attention necessary for situational safety awareness.

Self-regulation is trainable so that mental effort can be improved or recovered when needed through the exertion of 'effortful control'. As an executive process self-regulation intersects the two different mental states of 'introspection' and the more pragmatic and externally directed action form of coping. As an executive function it also underlies cognitive resilience, the ability to recover from adversity or overload and to continue to function as required.

Positive self-regulation enabling the behavioural markers leading to greater situation awareness is measured by the suite of SSA tests.

Recruiters and OHS professionals have an imperative need to assess the safety competency of recruits and employees to avoid placing individuals in harm's way. The approach to determining safety and performance readiness embraces the observation that:

“Safety incidents are probabilistic and elimination pathways may reduce the severity of events and their frequency but their ultimate likelihood can only be delayed by vigilance understanding and through an active projection of possible events” (Endsley 1995).

Measures of safety have previously and unsuccessfully relied on inferential measures such as the individuals 'Attitudes' and the 'Culture' that influenced them or on normative personality profiles that generalised performance. By contrast the SSA methodology delivers an array of empirically derived measures based on an extensive job risk analysis.

The essential ability to 'see - anticipate - avoid' peril was identified by teams of researchers addressing critical contexts like air combat, space shuttle and nuclear plant operations amongst others, as the ability of the individual to respond safely and competently to events in a timely manner. The phrase 'Situational Awareness' (SA) was coined in the late 1960's and generally defined as the person's ability to perceive, understand and project outcomes in what is going on around them. Endsley (1995) defined the issue as

1. **Perception – Seeing.** The first step in achieving SA involves accurately seeing what is going on around you, what the people equipment and systems are doing including incoming information and mentally perceiving the implications.
2. **Comprehension – Understanding.** Perception is followed by understanding the situation elements with respect to the operating goals to form a total picture of the environment.
3. **Projection - Thinking ahead.** The capacity to project the future actions or outcomes of the elements in the environment at least in the short term.

SA was further identified as being underpinned by the ability to process mentally when under various distracting influences. In other words, before a person could bring their knowledge, skills and abilities to bear on a situation, they needed to have an open and unencumbered mental pathway to those skills. Key aspects of situational awareness are the ability to avoid fixation, able to shift focus rapidly, make the right decisions by remaining vigilant and responsive to what is happening in the environment and with the self, both mentally and physically.

The blockage to remembering or responding in a coordinated and timely manner was termed 'Cognitive Failure' (Broadbent et al, 1982) and resulted from influences like, fatigue, over load, under load, illness, distraction, emotional states, environmental extremes etc., producing functional losses in perception, judgment, response and coordination, in particular, at the moment of greatest need, resulting in errors and omissions in operations (Byrne & Parasuraman, 1996).

Functional Question Types in the SSA Aviation Surveys depicting essential neuropsychological measures in context. Choice reaction speed, memory, multitasking and coordination.

Instructions: How many images can you remember and match?

Lapsed time in seconds: 53

TOTAL TIME=0 secs | TRIES LEFT=10 | HITS=0

TOTAL TIME=21 secs | TRIES LEFT=10 | HITS=0

Make a 180 degree rate one turn keeping constant speed and altitude using the up and down and left right arrow keys on your keyboard.

You begin with 100 points which are deducted for each persistent fault.

You may have one practice session to become familiar with the controls.

Comms: Start your right turn now.

SSA for AVIATION ENVIRONMENTS



SSA INV (Supervisors) v3.1 test is a 121 question test of abilities and perceptions relative to the performance required of a fully functioning supervisor with responsibility for large scale assets.

This instrument is used primarily for assessing the capacity for the management of safe behaviour at command level through the person's non-technical safety skills through their ability to see and understand external risks, maintain attention of surrounding events, function with coordinated and reasoned action and to generally remain vigilant of any human factors degrading performance, the focus of the supervisors test is in achieving safety through others through understanding of the limiting human factors and effective crew resource management principles.



The SSA INV (CABIN CREW MANAGER) V5.0 is a 140 question test of abilities and perceptions relative to the performance required of a fully functioning professional cabin crew manager with responsibility for passenger management.

Whilst the test addresses similar aspects to the general supervisors and manager test, this instrument emphasises the person's non- technical safety skills through their ability to see and understand external risks, maintain attention of surrounding events, function with coordinated and reasoned action and to generally remain vigilant of any system or passenger emergencies and staff human factors performance in a tight highly contained personal space.



The SSA INV (Cabin Crew) v5.0 test is SSA AVIATION (Cabin Crew) v5.0 is an 108 question survey of the capacity to maintain presence of mind, recover rapidly from adverse events, to competently invoke emergency procedures and

manage passengers whilst inflight. This instrument is used primarily for assessing mental functioning and basic capacity for recovery and maintenance of attention for safe behaviour relative to systems malfunctions or passengers' issues and stresses.

SSA INV SUPERVISORS V3.1

ATTENTION AND RECOVERY

- Positive Recovery Skills
- Mental Alertness
- Manages Fatigue

THREAT AND ERROR MANAGEMENT SKILLS

- Anticipates Defends
- Understands Human Error
- Risk Perception

FUNCTIONAL ABILITIES

- Perception Projection
- Working Memory

TEAM RESOURCES MANAGEMENT SKILLS

- Participative Style
- Team Safety Orientation
- Emotional Intelligence

SAFETY PERSPECTIVE

- Responsible for Safety
- Risk Sensitivity
- Safety Conscientiousness

SSA INV CABIN CREW MANAGERS V5.0

ATTENTION AND RECOVERY

- Positive Recovery Skills
- Mental Alertness
- Manages Fatigue

THREAT AND ERROR MANAGEMENT SKILLS

- Anticipates Defends
- Understands Human Error

FUNCTIONAL ABILITIES

- Perception Projection
- Working Memory

TEAM RESOURCES MANAGEMENT SKILLS

- Participative Style
- Team Safety Orientation
- Emotional Intelligence

SAFETY PERSPECTIVE

- Responsible for Safety
- Risk Sensitivity
- Safety Conscientiousness

SSA AVIATION Cabin Crew V5.0

PERSONAL STATUS

- Emotional Resilience
- Mental Alertness
- Manages Fatigue

PASSENGER MANAGEMENT

- Emotional Intelligence

SAFETY BEHAVIOURS

- Threat Error Management
- Safety Self Awareness

SAFETY PREFERENCES

- Responsible for Safety
- Risk Avoidance



The SSA (AVIATION Pilot) v4.0b2.1 test is a 100 question test of ability to perform at the level of a well-functioning and normal pilot in training, relative to the growing performance required of a professional pilot. This instrument is used

primarily for assessing mental functioning and basic capacity for safe behaviour ultimately as pilot in command with responsibility for people and high value assets. The SSA test addresses the person's non-technical safety skills through their ability to see and understand external risks, maintain attention of surrounding events, function with coordinated and reasoned action as ultimately required for professional pilots.

SSA (AVIATION Pilot) v4.0b2.1 (Trainee)

- ATTENTION AND RECOVERY**
 - Personal Resilience
 - Mental Alertness
 - Manages Fatigue
- FUNCTIONAL ABILITIES**
 - Executive Functioning
 - Choice Reaction Time
 - Working Memory
- SELF MANAGEMENT**
 - Impulse Control
 - Defensive Safety Habits
 - Safety Conscientiousness
 - Safety Perspective
 - Personal Responsibility



SSA INV (PROFESSIONAL PILOT) V5.0

test is a 162 question test of abilities and perceptions relative to the performance required of a fully functioning professional Pilot or Instructor with responsibility

for large scale assets or trainee pilots under instruction. This instrument is used primarily for assessing the capacity for the management of situational awareness leading to safe behaviour at command level, in self and others.

SSA INV (PROFESSIONAL PILOT) V5.0

- ATTENTION AND RECOVERY**
 - Positive Recovery Skills
 - Mental Alertness
 - Manages Fatigue
- THREAT AND ERROR MANAGEMENT SKILLS**
 - Anticipates Defends
 - Understands Human Factors
- FUNCTIONAL ABILITIES**
 - Perception Projection
 - Working Memory
 - Executive Functioning
 - Choice Reaction Time
- TEAM RESOURCES MANAGEMENT SKILLS**
 - Team Safety Orientation
 - Participative Style
 - Interpersonal Judgement
 - Emotional Intelligence
- SAFETY PERSPECTIVE**
 - Responsible for Safety
 - Risk Sensitivity
 - Safety Conscientiousness

The test addresses the person's non-technical safety skills through their ability to see and understand external risks, maintain attention of surrounding events, function with coordinated and reasoned action and to generally remain vigilant of any human factors degrading performance, in addition to positive crew management skills.



SSA Inv (Aviation Maintenance) V1.1c test is a 120 question test of ability to perform at the level of a well-functioning and normal adolescent or adult, relative to the performance required of an technician engaged in precision aviation maintenance and repair.

This instrument is used primarily for assessing mental functioning and the capacity for sustained safe behaviour and performance.

SSA Inv AVIATION MAINTENANCE V1.1c

- ATTENTION AND RECOVERY**
 - Personal Resilience
 - Mental Alertness
 - Manages Fatigue
- FUNCTIONAL ABILITIES**
 - Executive Functioning
 - Perceptual Acuity
 - Decision Speed Accuracy
 - Working Memory
 - Detail Orientation
- SELF MANAGEMENT**
 - Defensive Safety Habits
 - Safety Self Awareness
- SAFETY PERSPECTIVE**
 - Responsible for Safety
 - Risk Perspective
 - Safety Conscientiousness

The SSA test addresses the person's non-technical self-management and safety skills through their ability to see and understand external risks, maintain attention of surrounding events, function with coordinated and reasoned action and to generally remain vigilant of any human factors elements degrading performance.



The SSA INV (APPRENTICE) v5.0 is a 75 question test of ability to perform safely at the level of a normal adult.

This instrument is used for assessing mental functioning and basic capacity for safe behaviour in personnel with little workplace experience or safety training such as apprentices and also for

assessing functional ability of injured workers on return to work, in hazardous environments,.



The SSA INV (GRADUATES) v5.0 test is a 105 question test of ability to perform at the level of a well-functioning and normal adolescent or adult, relative to the growing performance required of a professional in training.

This instrument is used primarily for assessing mental functioning and basic capacity for safe behaviour amongst candidates with limited work experience.



The **SSA SELF-REGULATION SURVEY (V5.1)** is a 96 item survey of capacity for sustainable performance for the achievement of objectives in any role, as indicated by key markers that represent positive self-management in coping with the pressures of role

stressors and growing fatigue, belief in one own's ability and capacity to persevere and take direct action with what is needed. Self-regulation has been demonstrated to be the key marker for occupational success.



The SSA Inventory (Mobile Equipment Operator) v2.1a test is a 105 question test of ability to perform at the level of a well-functioning and normal adolescent or adult, relative to the alert performance required of a mobile equipment or driver in airfield and baggage operations.

This instrument is used primarily for assessing mental functioning and basic capacity for safe behaviour and consistency of performance as an operator of equipment and processes that require good attention and coordination skills for movement between high value assets.

SSA INV APPRENTICE v5.0

75items 30min

SELF MANAGEMENT

- Defensive Safety Habits
- Safety Self Awareness
- Understands Fatigue

FUNCTIONAL ABILITIES

- Executive Functioning
- Perceptual Acuity
- Accuracy and Coordination
- Working Memory

MENTAL STATUS

- Stress & Coping Status

SSA INV GRADUATES v5.0

105items 30min

ATTENTION AND RECOVERY

- Personal Resilience
- Mental Alertness
- Manages Fatigue

FUNCTIONAL ABILITIES

- Executive Functioning
- Perceptual Acuity
- Accuracy and Coordination
- Working Memory

SELF MANAGEMENT

- Defensive Safety Habits
- Safety Self Awareness

SAFETY PERSPECTIVE

- Responsible for Safety
- Risk Perspective
- Safety Conscientiousness

SSA SELF-REGULATION SURVEY (V5.0)

PERSONAL ROBUSTNESS

- Direct Action Oriented
- Positive Coping Habits
- Self Esteem
- Manages Fatigue

STRESS COPING STATUS

- Alertness Clarity
- Emotional Coping
- Maintains Relationships
- Role Stress Coping
- Workload Coping

SSA INV MOBILE EQUIPMENT OPERATOR v2.1a

105items 30min

ATTENTION AND RECOVERY

- Personal Resilience
- Mental Alertness
- Manages Fatigue

SELF MANAGEMENT

- Defensive Safety Habits
- Safety Self Awareness

FUNCTIONAL ABILITIES

- Executive Functioning
- Perceptual Acuity
- Response Accuracy and Coordination
- Working Memory

SAFETY PERSPECTIVE

- Responsible for Safety
- Risk Perspective
- Safety Conscientiousness



The SSA Inv (AVIATION SECURITY) v5.0 test is a 105 question test of ability to perform at the level of a well-functioning and normal adult, relative to the performance required of a security professional in airport operations. This instrument is used primarily for assessing

mental functioning and basic capacity for safe behaviour, alertness, vigilance and attention recovery skills in addition to effective customer interaction skills amongst candidates applying for sensitive security positions.

SSA INV AVIATION SECURITY v5.0

105items 35min

ATTENTION AND RECOVERY

- Personal Resilience
- Mental Alertness
- Manages Fatigue

SELF MANAGEMENT

- Defensive Safety Habits
- Safety Self Awareness

FUNCTIONAL ABILITIES

- Executive Functioning
- Perceptual Acuity
- Decision Accuracy & Speed
- Working Memory

SAFETY PERSPECTIVE

- Responsible for Safety
- Risk Perspective
- Safety Conscientiousness



SSA Inventory Version V5.0 (R) (remedial) is a 44 item short test focused on the key functional abilities related to the maintenance and recovery of attention, perception, judgment and responses required to exhibit and maintain situational safety awareness in the workplace.

SSA INVENTORY VERSION V5.0 (R)

44items 30min

ATTENTION AND RECOVERY

- Manages Fatigue
- Impulse Management
- Mental Alertness

FUNCTIONAL ABILITIES

- Executive Functioning
- Working Memory
- Choice Reaction Speed



The SSA Resilience Test V1.5, is a 66 item diagnostic instrument that assesses an individual's adequacy of managing stress reactions, fatigue and responsiveness relevant to the maintenance of performance and situational safety awareness in the workplace. The adequacy of results for this test is determined

SSA RESILIENCE V1.5

66items 10min

STRESS COPING SKILLS

- Copes Emotionally
- Manages Role Stress
- Copes With Workload

CAPACITY FOR SELF MANAGEMENT

- Manages Fatigue
- Positive Coping Habits
- Maintains Mental Alertness

according to the needs of the environment and purpose.



The WORKPLACE CLIMATE SURVEY (General) (Bullying & Harassment) is a 75 item diagnostic test that assesses an individual's experience of being targeted by malevolent behaviour . The survey points to reasons for breakdown in

WORKPLACE CLIMATE SURVEY General Industrial (Bullying & Harassment)

78 items untimed

TARGETED (Victimising) BEHAVIOUR

- Control tactics
- Duration and Severity
- Performance prevention tactics
- Risk to employees safety
- Violations Excessive Behaviour

interpersonal relationships, role performance and safety.



SSA (TERMINAL & CUSTOMER CARE) V5.0a inventory is an 86 question pre-interview and diagnostic screen for personnel engaged in customer and liaison management activities. The test comprises critical

SSA TERMINAL CUSTOMER CARE OFFICER V5.0a

POSITIVE SELF MANAGEMENT

- Resilience
- Maintains Mental Alertness
- Manages Fatigue
- Managing Role Stress

RELATIONSHIP ORIENTATION

- Attitudes to Others
- Emotional Intelligence

COMPETENCIES

- Ease in Communicating
- Interpersonal Judgement
- Reasoning Logic Skills
- Working Memory

attributes, non-technical skills and behaviours essential for positive functioning and in maintaining satisfactory relationships with internal and external contacts.

SSA Training & Development



Human Factors Online Training for workers V1.1a The SSA Training course for operators is an untimed and approximate 120 minute and 100 page program of identification, exploration and assessment of key human factors concepts with interactive and video examples. It is designed to be combined with the

SSA test as a training extension. The SSA training addresses the perspective, behaviours and human limitations that affect the ability to maintain attention, function with coordinated and reasoned action and to generally remain vigilant of situations and circumstances impacting safe performance. Recommended for recruiters and inductees who need to expand their understanding of human factors in assessment of risk.

SSA TRAINING for OPERATORS V1.1a

UNDERSTANDING HUMAN FACTORS

Topics:

1. Understanding Human Error
2. Identification of human factors
3. Reviewing a case
4. Perceived Work Load
5. Effect of Fatigue, Age & Drugs
6. Safety behaviours checklist



Human Factors Online Training for Supervisors V2.0A The SSA Training course for Supervisors is an untimed and approximate 180+ minute and 120 page program of identification, exploration and assessment of key human factors concepts with interactive and video examples. It is designed to address

'Achieving Safety Through Others'

In addition to the human factors content of the operator course, the supervisor course improves the ability for supervisors to detect signs of early warning in breakdown of SA in the team. The training also provides a template for interaction using personality and communication styles. Recommended for supervisors in safety critical industries who need to expand their understanding and potential actions in managing risk.

HUMAN FACTORS FOR SUPERVISORS V2.0A

Topics:

- 1 What is this about?
- 2 What hazards?
- 3 Common human factors?
- 4 You are the investigator
- 5 Identifying loss of SSA
- 6 Getting the message across
- 7 How do I keep them safe?



HF Incident Investigations for Supervisors . The training focuses on individual safety readiness, understanding human factors dimensions in the workplace. Investigation techniques and reporting of incidents.

The course provides a scenario based experience in conducting a

rapid human factors risk analysis preparatory to achieving the skills to identify cause in a primary workplace investigation, with further exploration of compilation and presentation of forensic evidence for the court room.

HF INCIDENT INVESTIGATIONS FOR SUPERVISORS V2.0

- Step 1.** Assessment of personal readiness.
- Step 2.** HF online training program
- Step 3.** Conduct risk analysis with **HFPlus+**
- Step 4.** Interactive incident investigation.
- Step 5.** Task re-design using CT analysis
- Step 6** Identifying witness bias.
- Step 7** Presenting the 'evidence'.

SMART - A Single Training Mechanism to Improve Self-Regulation

Self Management & Attention Recovery Training



Self-regulation training develops the ability to manage the self in the achievement of objectives. SR is a crucial competency for social, academic and occupational achievement. It allows the individual to adapt more readily and easily to the demands of the moment so as to fulfil intentions by controlling fatigue, attention and the management of emotion.

SMART is the difference between high and low performers

Self-regulation skills and strategies free up cognitive resources to better withstand difficulties, distractions and overload. It is most useful at the moment of sudden demand or crisis, when faced with fatigue and overload.

The ability to recover mental energy through a self-regulating strategy is a decisive attribute that can result in success in situations that would otherwise result in failure. SR is the necessary foundation for performance in general and situational safety awareness in particular.

Basic self-regulation is an easily trainable skill so that mental effort can be improved or recovered on cue when needed, through a simple and instantaneous technique.

As an executive process - self-regulation skills are independent of personality style. As an executive function self-regulation underlies cognitive resilience, the ability to recover from adversity or overload and to continue to function as required.

To deliver greater:

- -Vigilance
- -Multitasking
- -Memory recall
- -Resilience
- -Anticipate changes
- -Mental energy & effort
- -Manage emotions

Benefits of the training includes short time to master, no ongoing cost, a method that generalises to performance and , instant results.

Suitable for all personnel in safety critical industries

SMART SURVEY & TRAINING

Basic outline of the program involves a baseline assessment followed by an initial sequence of ten 30 minute sessions over 10 days.

BASELINE ASSESSMENT

- Mental Alertness
- Manages Fatigue
- Work Load Strain
- Executive Functioning
- Working Memory
- Choice Reaction Speed

RART DAILY TRAINING EXERCISES

- Daily Exercises 1 - 10
- Progress & Review

SSA

Report options

Reports on individuals and groups

Short reports	Summary of results, graphical comparison against criteria, strengths and weaknesses, test or survey structure. Suitable for advisory purposes.
Full Reports	Extended results including summary, graphical comparison against criteria, strengths and weaknesses, assisted interview guide with prompts and key behaviours, full scale performance results, test or survey structure.
Training needs	Summary key training needs, graphical comparison of results against benchmark, sample and population means. Results narrative and advisory.
Group reports	Aggregated results showing description and result comparison against sample, population and benchmark criteria.
Ranked tables	Group table of ranked raw scores and index showing percentage achieved criteria for each scale.

Analytics Reports on test/survey administration

Group statistics tables	Full descriptive stats including means, deviations, error, and item performance by time.
Graphical results	Line graph of result against criteria, Graph of Z scores all scales.
Comparison of groups	Comparison of selected groups on selected criteria on line graph of results
Correlations of results	Table of inter-correlations showing results probability and certainty.

Pricing by report set:

- Standard Set: includes – The test, Short report, Ranked comparison tables, Verification certificate.
- Recruiter Set: includes the standard options plus the Full interviewing report, Training needs.
- Administrators' Set: performance report includes Group narrative reports, Full graphical and tabular analysis outputs with correlation tables.