

## Measures of stress/strain on controllers

Hugh David  
Eurocontrol Experimental Centre  
Bp 15 Bretigny-sur-Orge  
France

Type	Method	Stress/Strain Measure	Duration of Measure	Portability	Observer Effect	False Risk	Bias Risk	Ethical Problems	Setup cost	Running Cost	Staff Needed	Analysis Cost	Analysis Speed	Data Automation	Analysis Automation	Status	Recom- mendation
System	Operational Records	Stress	Minutes	No	No	Nil	Nil	OK	Low	Low	Low	Low	Fast	Used	Yes	Standard	Use
Subjective	NASA-TLX	Both	Hours	Yes	No	Low	Low	OK	Low	Low	Low	Low	moderate	Possible	Used	Standard	Use
Subjective	On-Line SA	Strain	Minutes	No	No	Low	Moderate	OK	High	Low	Low	Moderate	Fast	Required	Required	Standard	Use
Subjective	Debriefing	Strain	Hours	Yes	Yes	Moderate	Moderate	OK	Low	Low	Low	Moderate	Fast	No?	No	Standard	Use
Subjective	Questionnaires	Strain	Days	Yes	No?	Moderate	Moderate	OK	Low	Low	Low	Low	Slow	Possible	Used, but	Standard	Use
System	Embedded tasks	Strain	Minutes	No	No	Low	Low	OK	High	Low	Low	Moderate	Fast	Required	Required	Tested	Use
Subjective	Subjective fatigue	Strain	Hours	Yes	No	Low	Low	OK	Low	Low	Low	Low	moderate	Possible	Possible	Tested	Use
Observation	Activity analysis	Stress	Minutes	Yes	Yes	Low	Moderate	OK	Low	Low	Low	Moderate	Fast	No?	Yes	Tested	Use
Observation	Postural Analysis	Stress	Minutes	Yes	Yes	Moderate	Moderate	OK	Low	Low	Low	Low	Fast	No?	Yes	Tested	Use
Subjective	Speed log	Strain	Days	Yes	No	Low	High	OK	Low	Low	Low	Low	moderate	Possible	Possible	Tested	Use
Physiological	Blood Pressure	Strain	Minutes	No	No	Low	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Physiological	Body Fluids	Strain	Hours	No	No?	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Observation	Behaviour	Strain	Hours	Yes	Yes	High	High	Privacy	Low	Low	Low	Low	Fast	Possible	Possible	Tentative	Test
Observation	Alphabet Sound	Stress	Days	Yes	No?	Low	Moderate	OK	High	Low	Low	Low	Fast	Possible	Used	Tentative	Test
Electro/physiology	Heart rate	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Electro/physiology	Sinusarrhythmia	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Electro/physiology	Brain Rhythms	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Electro/physiology	Evoked Potential	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Electro/physiology	Alpha Rhythm	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Electro/physiology	Theta Rhythm	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Electro/physiology	Delta Rhythm	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	High	Slow	Used	Used	Tentative	Test
Observation	Eye movement	Stress	Minutes	No	No	Moderate	Nil	OK	High	High	High	High	Slow	Used	Used	Tested	Test
Observation	Sleep	Strain	Days	Yes	No	High	Low	Medical	Low	Low	Low	Low	Slow	Used	Used	Tested	Test
Electro/physiology	Respiration rhythm	Strain	Minutes	No	No	Moderate	Nil	Medical	High	High	High	Moderate	Slow	Used	Used	Tested	Test
Electro/physiology	Muscle Tension	Strain	Minutes	No	Yes?	Moderate	Moderate	OK	High	High	High	High	slow	Used	Used	Dubious	Repeat
Electro/physiology	Skin Resistance	Strain	Minutes	No	No	High	Nil	Medical	High	High	High	High	Slow	Used	Used	Dubious	Repeat
Observation	Terror	Strain	Minutes	No	No	Moderate	Low	OK	High	High	High	High	Slow	Used	Used	Dubious	Repeat
Subjective	Peer assessment	Strain	Days	Yes	Yes	Moderate	High	Privacy	Low	Low	Low	Low	Fast	No?	No	Standard	Repeat
Subjective	Structured Interview	Strain	Days	Yes	Yes	Moderate	Moderate	Privacy	Low	High	High	High	Slow	No?	No	Standard	Repeat
Subjective	Operational Reasoning	Strain	Hours	Yes	No	High	Low	OK	Low	Low	Low	Low	moderate	Possible	Possible	Tested	Repeat
Subjective	Konzentrations-Leistung	Strain	Hours	Yes	No	High	Low	OK	Low	Low	Low	Low	Fast	Required	Required	Tested	Repeat
Subjective	On-line SWAT	Strain	Minutes	No	No	Low	High	OK	High	Low	Low	Moderate	Fast	Required	Required	Tested	Repeat