PSYCHOPHYSIOLOGICAL STRAIN ASSESSMENT
II. A STUDY IN AWACS PILOTS PERFORMING SIMULATED AND REAL FLIGHTS

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Introduction: Until now, no standardized procedure exists for psychophysiological strain assessment in pilots during simulated and real flights.

Objective: This study was undertaken to **quantify and scale the strain** AWACS pilots are exposed to during simulator and real flights in order to obtain an **objective** measure of in-flight strain.

Methods: For this purpose, the method of **"deindividualized strain analysis"** by Johannes (see abstract Johannes) was used in 18 AWACS pilots. Non-invasive physiological measures were collected using the HealthLab System, which is a mobile modular multisensor system for monitoring, handling and analyzing psychophysiological data. All pilots underwent 3 different study phases: psychophysiological baseline diagnostics, a simulated flight and a real flight both standardized to the possible extent and consisting of 22 different flight phases. In 15/18 participants, complete sets of data could be obtained from all study phases of interest.

Results: The measuring system proved to be reliable and suitable to collect physiological parameters under all flight conditions. The physiological data showed inter- and intraindividually comparable differences under various measurement conditions. Single parameters revealed individual differences. As expected, all flight maneuvers tested resulted in a diversity of strain in pilots. Air-to-air refueling turned out to be significantly more wearing than all other flight maneuvers with respect to single parameters (i.e. heart rate $(F_{(4,10)} = 14.101; p=.000)$, skin conductance level $(F_{(4,10)} = 4.561; p=.024))$ and the so-called psychophysiological arousal value (PAV) $(F_{(4,10)} = 11.101; p=.001)$, which was used as an integral parameter of strain. On average, the degree of strain in the simulator was comparable to that of real flights. In novices, however, strain in real flights was substantially higher than in simulator flights.

Conclusions: The described method, which was used in flight for the first time, **allows to portray strain** during selected flight phases and to **compare interindividual differences** and thus supplements traditional psychological strain analysis methods.

EDUCATIONAL OBJECTIVES:
Psychophysiological strain assessment, non-invasive psychophysiological monitoring with the HEALTHLAB System