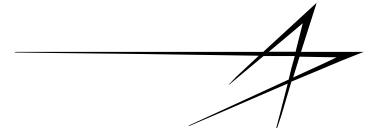
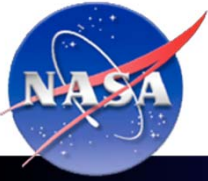


## *Background on the CHHQ*

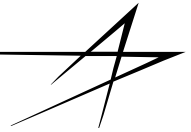


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- ◆ Handling Qualities: those qualities or characteristics of a flight vehicle that govern the ease and precision with which a pilot can perform tasks required to support a mission
- ◆ The CHHQ scale is a tool that allows pilots to rate aircraft handling qualities after they “fly” a craft.
- ◆ CHHQ ratings reflect the pilot’s aggregated perception of their ability to perform a task given:
  - Stability and control characteristics of the aircraft
  - Cockpit interfaces
  - The vehicle environment
  - Stress on the pilot (e.g., time pressure, task complexity)
- ◆ For this evaluation we are focusing on the control tasks and not auxiliary tasks or interfaces.

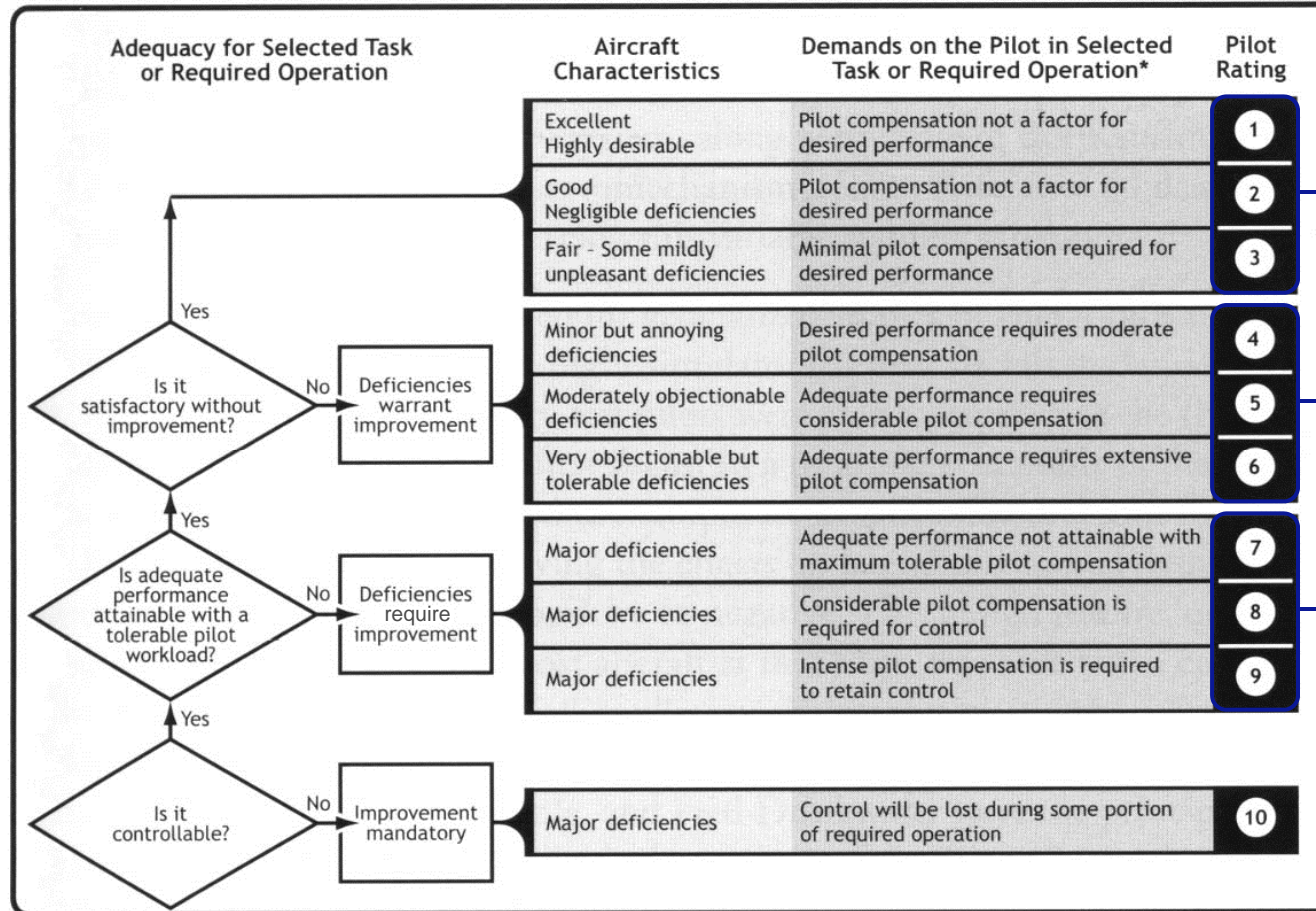


# The Cooper-Harper HQ Rating Scale



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## Handling Qualities Rating Scale

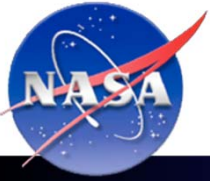


Level 1

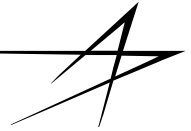
Level 2

Level 3

\* Definition of required operation involves designation of flight phase and/or subphases with accompanying conditions.

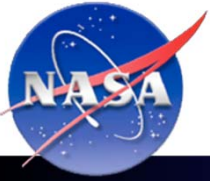


# Usage of Cooper-Harper Rating Scale

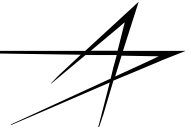


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- ◆ Cooper-Harper scale yields a rating of pilot compensation (effort) to achieve a specific level of performance.
- ◆ Assess performance for composite of two data runs (option for third data run)
  - Classify overall performance as desired, adequate, or inadequate
  - This classification is based not just on quantitative assessment of end-point performance, but also on qualitative assessment of how the vehicle got to the end-point.
- ◆ Pilot should always walk through the flow logic of the Cooper-Harper chart, keeping the following points in mind:
  - Desired performance
    - CHR 1 – 7 can be given, based on level of pilot compensation to attain desired performance
  - Adequate performance
    - CHR 5 – 7 can be given, based on level of pilot compensation to attain adequate performance
  - Inadequate performance
    - CHR 8 or 9 can be given, based on level of pilot compensation for control
    - CHR 10 is given if control is lost
  - Ratings of 3.5, 6.5, and 9.5 cannot be accepted
  - Although discouraged, other half-ratings (e.g., 4.5) will be accepted.

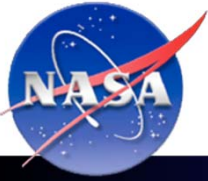


# The NASA TLX Workload Scale

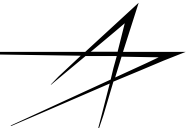


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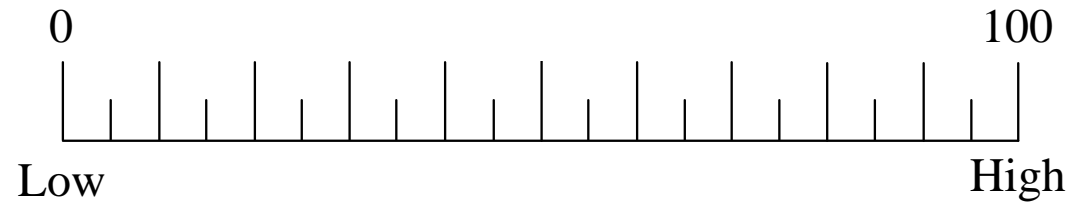
- ◆ The NASA Task Load Index (TLX) is a tool used to rate the workload required to complete a given task.
- ◆ Workload is the amount of attention and effort required to perform the task (the demands of the task).
- ◆ 6 categories are used to describe the workload experienced in performing a task:
  - Mental and perceptual load
  - Physical load
  - Temporal load
  - Performance success
  - Effort required
  - Degree of frustration experienced.
- ◆ For example: If you have to monitor several displays simultaneously that are updating very rapidly and it is difficult to detect a change, the task may require high levels of effort to accomplish. This task may be perceptually taxing, but not very hard physically. Alternately, having to fight the yoke to turn an aircraft may be more physically demanding and less mentally taxing.
- ◆ During the debrief we will ask you to tell us how important you think each of the 6 TLX factors were in your task performance, which will help us in interpreting the ratings you provide.
- ◆ Using your ratings and the relative importance of each category, we can calculate the workload the task imposes.



# The NASA TLX Workload Scale



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<u>Category</u>	<u>Description</u>
<b>Mental Demand</b>	How much mental and perceptual activity was required? e.g., thinking, deciding, calculating, remembering, looking, searching
<b>Physical Demand</b>	How much physical activity was required? e.g., pushing, pulling, turning, controlling, activating
<b>Temporal Demand</b>	How much time pressure did you feel due to the rate or pace at which the tasks or task elements occurred?
<b>Performance</b>	How successful do you think you were in accomplishing the goals of the task set by the experimenter (or yourself)?
<b>Effort</b>	How hard did you have to work (mentally and physically) to accomplish your level of performance?
<b>Frustration</b>	How did you feel during the task? e.g., insecure, discouraged, irritated, stressed, and annoyed vs. secure, gratified, content, relaxed, and complacent