This report is required by law (7 USC 2143). Failure to report according to the regulations can result in an order to cease and desist and to be subject to penalties as provided for in Section 2150.

See reverse side for additional information.

Interagency Report Control No 0180-DOA-AN

UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE

1200

ANNUAL REPORT OF RESEARCH FACILITY
(TYPE OR PRINT)

1. REGISTRATION NO. 93-F-0006

Laris FORM APPROVED OMB NO. 0579-0036 MC

2. HEADQUARTERS RESEARCH FACILITY *(Name and Address, as registered with USDA, include Zip Code)*

NASA/Ames Research Center
Animal Care Facility
MS 261-1
Moffett Field, CA 94035-1000

3. REPORTING FACILITY (List all locations where animals were housed or used in actual research, testing, teaching, or experimentation, or held for these purposes. Attach additional sheets if necessary.)

FACILITY LOCATIONS *(Sites)*

NASA Ames Research Center

REPORT OF ANIMALS USED BY OR UNDER CONTROL OF RESEARCH FACILITY *(Attach additional sheets if necessary or use APHIS FORM 7023A.)*

A. Animals Covered By The Animal Welfare Regulations	B. Number of animals being bred, conditioned, or held for use in teaching, testing, experiments, research, or surgery but not yet used for such purposes.	C. Number of animals upon which teaching, research, experiments, or tests were conducted involving no pain, distress, or use of pain-relieving drugs.	D. Number of animals upon which experiments, teaching, research, surgery, or tests were conducted involving accompanying pain or distress to the animals and for which appropriate anesthetic, analgesic, or tranquilizing drugs were used.	E. Number of animals upon which teaching, experiments, research, surgery or tests were conducted involving accompanying pain or distress to the animals and for which the use of appropriate anesthetic, analgesic, or tranquilizing drugs would have adversely affected the procedures, results, or interpretation of the teaching, research, experiments, surgery, or tests. *(An explanation of the procedures producing pain or distress in these animals and the reasons such drugs were not used must be attached to this report).*	F. TOTAL NO. OF ANIMALS (Cols. C + D + E)
4. Dogs					
5. Cats					
6. Guinea Pigs					
7. Hamsters					
8. Rabbits	23	0	511	0	511
9. Non-human Primates	8	12	0	0	12
10. Sheep					
11. Pigs					
12. Other Farm Animals					
13. Other Animals					
chinchillas	2	0	14	0	14
gerbils	7	0	22	25	47

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ASSURANCE STATEMENTS

1) Professionally acceptable standards governing the care, treatment, and use of animals, including appropriate use of anesthetic, analgesic, and tranquilizing drugs, prior to, during, and following actual research, teaching, testing, surgery, or experimentation were followed by this research facility.

2). Each principal investigator has considered alternatives to painful procedures.

3) This facility is adhering to the standards and regulations under the Act, and it has required that exceptions to the standards and regulations be specified and explained by the principal investigator and approved by the Institutional Animal Care and Use Committee (IACUC). A summary of all such exceptions is attached to this annual report. In addition to identifying the IACUC-approved exceptions, this summary includes a brief explanation of the exceptions, as well as the species and number of animals affected.

4) The attending veterinarian for this research facility has appropriate authority to ensure the provision of adequate veterinary care and to oversee the adequacy of other aspects of animal care and use.

CERTIFICATION BY HEADQUARTERS RESEARCH FACILITY OFFICIAL
(Chief Executive Officer or Legally Responsible Institutional Official)

I certify that the above is true, correct, and complete (7 U S C Section 2143).

SIGNATURE OF C.E.O. OR INSTITUTIONAL OFFICIAL	NAME & TITLE OF C.E.O. OR INSTITUTIONAL OFFICIAL *(Type or Print)*	DATE SIGNED
[redacted] (b)(6) (b)(7)(C)	[redacted] (b)(6) (b)(7)(C)	11/22/99

APHIS FORM 7023 (AUG 91) (Replaces VS FORM 18-23 (OCT 88), which is obsolete)

PART 1 - HEADQUARTERS

Justification for Column E entries:
Tests which may cause pain or distress and for which the use of anesthetic, analgesic, or tranquilizing drugs would have adversely affected the animals, procedures, results, or interpretation:

Note: All of the following procedures are outlined in the approved animal care and use protocol and were discussed and approved by the Ames Research Center Institutional Animal Care and Use Committee.

The ultimate goal of the experiments with gerbils is to increase the understanding of the adaptive or compensatory processes that, from a clinical perspective, allow individuals to adjust to the loss of inner ear function following injury or disease, and from a space medicine perspective, allow astronauts to operate effectively after several days in a new gravitational environment. The information obtained from this and future studies will contribute to the development of treatments to facilitate the compensatory or adaptation process so that it will occur more rapidly, thus decreasing the period of dysfunction in patients and astronauts. A total of 25 gerbils were used in each procedure.

Centrifugation: 25

The gerbil is a standard model for neurophysiological and morphological/histochemical studies of how the vestibular system, including the gravity sensors, functions, because the sensors and their neural connections to the brain are easily accessible to surgical manipulation in the gerbil, but not the rat or the mouse. Gerbils were previously used in altered G experiments to confirm that normal gerbils will adapt readily to hyper G and show modification in vestibular reflexes following hyper G exposure. Further, it was previously confirmed that animal well-being was not compromised by the standard hyper G exposure paradigm. In order to investigate the vestibular system reaction to hyper G, it was necessary to centrifuge animals at 1.5G for several days.

While initial exposure to centrifugation may be stressful and cause some slight discomfort, previous studies demonstrate that after 2 to 4 days of exposure to hyper G, gerbils begin to gain weight and return to normal levels of activity, feeding and drinking, and other signs of stress disappear. The mild stress at the beginning of exposure is thought to be an integral part of adaptation and associated with the initiation of the process. Analgesia or anesthesia during exposure to centrifugation would invalidate the study because it would impact the voluntary movements of the animals required for normal sensory-motor adaptation, and normal neural function during this process of adaptation. Animals were observed, handled, and weighed daily and if the well-being of any animal was compromised, i.e. unexpected weight loss, inability to move around the cage, or failure to thrive, it would have been removed from the study. All of the gerbils did adapt within two to four days of initiation of centrifugation.

Swimming Test: Species: Gerbil Number: 25

Swimming was used as an indicator of vestibular function and as part of selection criteria for centrifugation. Only animals showing normal swimming behavior were chosen for centrifugation.

Any stress caused by swimming is minimized because water in the swim tank is maintained near body temperature (35 - 37°C) and the duration of swimming is brief (<20 sec). Furthermore, swimming is a part of the normal behavioral repertoire of the rodent. The use of tranquilizers would impact vestibular and neuromuscular circuitry, invalidating the testing and potentially endangering the well-being of the subjects .

11/17/99