

LARGE BOX SCOOP
USED FOR APOLLO 11 EVA CREW TRAINING

**SUBJECT AUCTION
SCOOP**

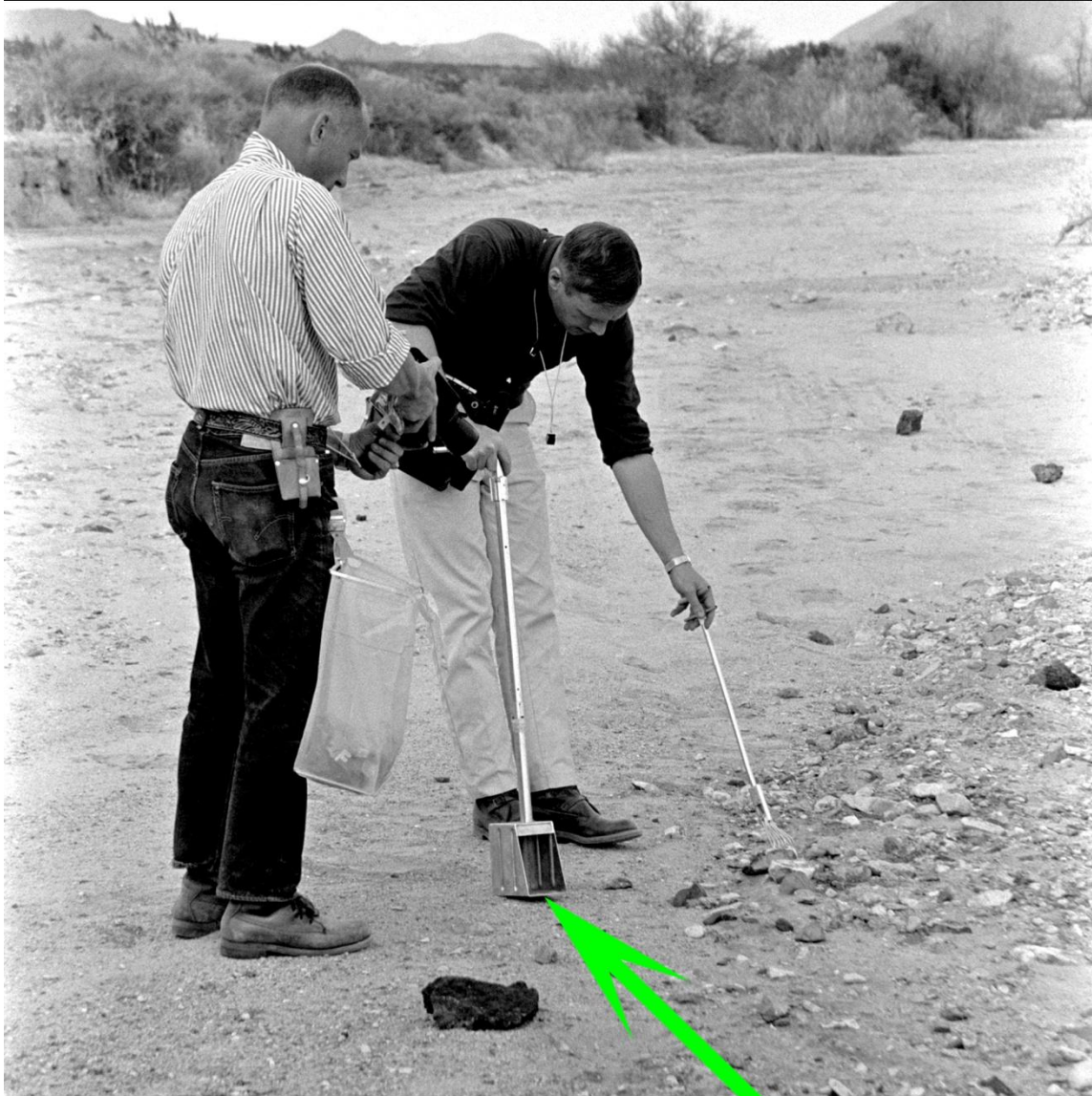


BACKGROUND

In the mid-1960s, the Apollo program was moving quickly across all areas of spacecraft and launch vehicle design and testing, ground support equipment, mission planning, lunar site selection, astronaut training and related matters. The design of the lunar sampling tools and sampling procedure was developed by the U.S. Geologic Survey's (USGS) Field Geology Team. The USGS was headquartered in Flagstaff, Arizona. The

facilities and geology of the surrounding area was ideal for astronaut training and design development of the sampling tools including the **LARGE BOX SCOOP** and collection equipment.

**APOLLO 11 ASTRONAUTS
ARMSTRONG AND ALDRIN USING
LARGE BOX SCOOP IN FLAGSTAFF, AZ
DURING EARLY APOLLO 11
GEOLOGICAL TRAINING**



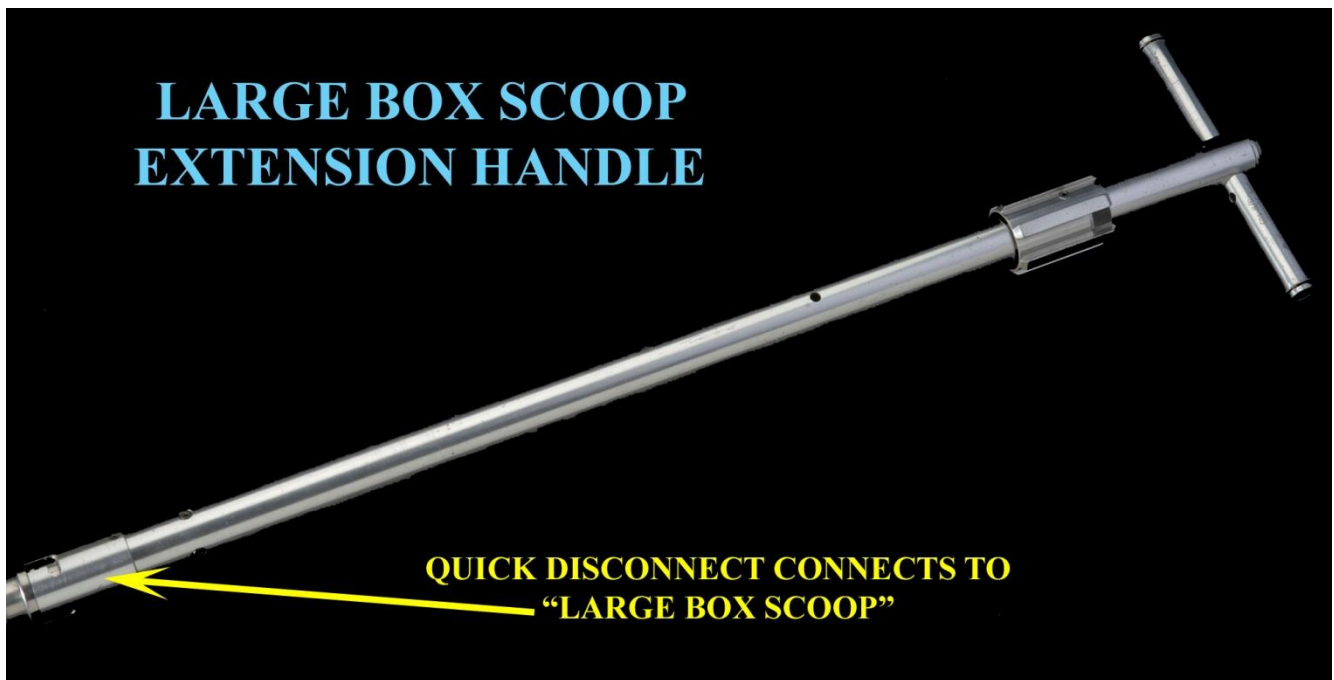
LARGE BOX SCOOP

Members of the USGS team in Flagstaff coordinated efforts with the Manned Spacecraft Center Flight Crew Systems Division which performed tests on supplied prototypes. The finished lunar sampling tools and related equipment for the lunar landing missions were manufactured at MSC, which was equipped to do so.

The principal sampling tool used on Apollo 11, 12 and 14 was the large **LARGE BOX SCOOP**. It was fabricated of 6061 aluminum sheet metal and had a handle approximately 9.5" inches long. To this handle could be attached an extension handle to minimize astronaut bending during sampling

The **LARGE BOX SCOOP** was designed of material rugged enough to do the job, yet light enough to conform to the weight and space limitations of the lunar module stowage area. The limitations imposed on the movements of a crewman while wearing a pressurized space suit also had to be considered. Therefore, the scoop was designed with a quick-disconnect fitting to enable the crewman to attach or detach an extension handle with a minimum of difficulty. A knurled section was provided to improve the crewman's grasp. Prime consideration was given to the selection of the metals and lubricants used in the construction of the scoop to avoid elements and isotopes that might contribute to serious geochemical contamination (such as lead, strontium, etc.)

The extension handle was used to increase the astronaut's reach by adding 58.4 centimeters of handle length to the scoop. The lower end of the extension handle had a quick-disconnect mount and lock for scoop attachment. The upper end was fitted with a sliding tee handle to facilitate any twisting operations. The scoop had an appearance similar to the bucket of a power shovel. The subject auction **LARGE BOX SCOOP** was used during Apollo 11 EVA training to practice collection of the Apollo 11 mission required **BULK SAMPLE** and **DOCUMENTED SAMPLES**.



APOLLO 11 MISSION PURPOSE:

The primary purpose of the Apollo 11 mission was to perform a manned lunar landing and return. Subordinate objectives were to perform limited selenological inspection, photography, survey, evaluation and **soil sampling** during the lunar stay.

APOLLO 11 LUNAR SURFACE OPERATION OBJECTIVES IN ORDER OF PRIORITY:

- 1) Photographs of the landing area through the LM cabin window.
- 2) Contingency sample collection.

3) EVA evaluation

4) LM Inspection

5) **BULK SAMPLE COLLECTION (USING THE SUBJECT AUCTION LARGE BOX SCOOP)**

6) Deployment of experiments

7) **DOCUMENTED SAMPLE COLLECTION (USING THE SUBJECT AUCTION LARGE BOX SCOOP)**

SOIL AND ROCK SAMPLE COLLECTIONS

Contingency Sample Collection:

The Contingency Sample Collection was a simple task which could be accomplished within a few minutes early in the EVA timeline. This assured the return of a small sample in a contingency situation where a crewman may remain on the surface for only a short period of time. One to two kilograms of loose material would be collected near the LM ladder with the material placed in a contingency sample bag that was to be stowed in the crewman's suit pocket to be carried into the LM ascent stage when the crewman ingressed.

BULK SAMPLE COLLECTION (reference below photos):

The Bulk Sample Collection required at least 10 kilograms of unsorted surface soil and selected rock chunks to be placed in a special container, an Apollo Lunar Sample Return Container (SRC), providing a near vacuum environment for its return to the Lunar Receiving Laboratory (LRL). Apollo Lunar Hand tools (ALHT), including the subject **LARGE BOX SCOOP**, stowed in the MESA with the SRC will be used to collect this large bulk sample near the MESA in Quad 4 of the LM. A **spring scale** (stowed in the SRC) is to be hooked to the left front of the MESA. A large **bulk sample bag** is then attached to the scale. The subject **LARGE BOX SCOOP** is then connected to the aforementioned extension handle. The **SCOOP** is then used to scoop up the required bulk sample. It should be noted, as part of the bulk sample collection, that tongs are also to be used to pick up rock chunks. As each scoop of loose material and each rock sample is collected, it will be placed into the **large sample bag hooked to the scale**. The crewman (CDR) was instructed to collect rocks and loose material simultaneously and attempt to collect equal volumes of rocks and loose material

DCUMENTED SAMPLE COLLECTION (reference below photos)

The documented sample collection, like that of the bulk sample collection, will involve a large mass of lunar material placed into an SRC for return to earth. However, the documented sample differed significantly in content and in its collection process. As the name implies, the documented sample collection involved the documentation of the individual samples and the area from which they were taken. The crew were required to examine, describe, photograph and collect rock fragments and loose material samples and place them individually in pre-numbered **small sample bags**. The samples in the small bags were to be placed in a **large bag** for transfer to and stowage in a separate documented sample SRC. The large sample bag is hooked to the suit of the LMP. The documented sample collection also included a core tube sample to get an aseptic and stratified sample. At each sample collection site, a gnomon and an Apollo Lunar Surface Close-Up Camera and the Hasselblad camera is used to photograph the sample site. Both the subject **LARGE BOX SCOOP** and tongs were to be used to gather the documented samples.

KSC SUBJECT LARGE BOX SCOOP HISTORY

When Apollo 11 EVA Crew Training activity was transferred from MSC to KSC on June 4th, 1969, responsibility for maintaining the life support equipment including PLSS Cryopacks, OPSs and all other related EMU training hardware was given to myself and my team along with supporting all EVA crew training activities.

In addition, my team was asked to store and maintain the Apollo 11 crew training subject auction **LARGE BOX SCOOP** used during EVA training activities. As it was explained to me by CSD, the scoop, when used to scoop rocks during Apollo 11 training at MSC, developed unwanted edge nicks. The concern was that a sharp edge

caused by a nick could create an unacceptable risk to the crew and/or support personnel. After an incident (during preparation for an EVA crew training exercise at MSC) resulting in a cut to the finger of a member of the EVA training support team, the scoop was inspected after every crew training EVA exercise and, if necessary, was repaired (sharp edged nicks smoothed out) at an MSC fabrication facility.

I suggested that any necessary repairs (on the scoop) at KSC could be accomplished at the KSC Bendix facility. Since I, as PLSS/OPS Crew Training Mission Manager, had an ongoing relationship with the Bendix facility at KSC (Bendix was responsible for charging our PLSS cryopacks and assisting in cryopack repairs before and after all EVA training activities), I suggested that we could expedite any and all repairs necessary to the subject **SCOOP**.

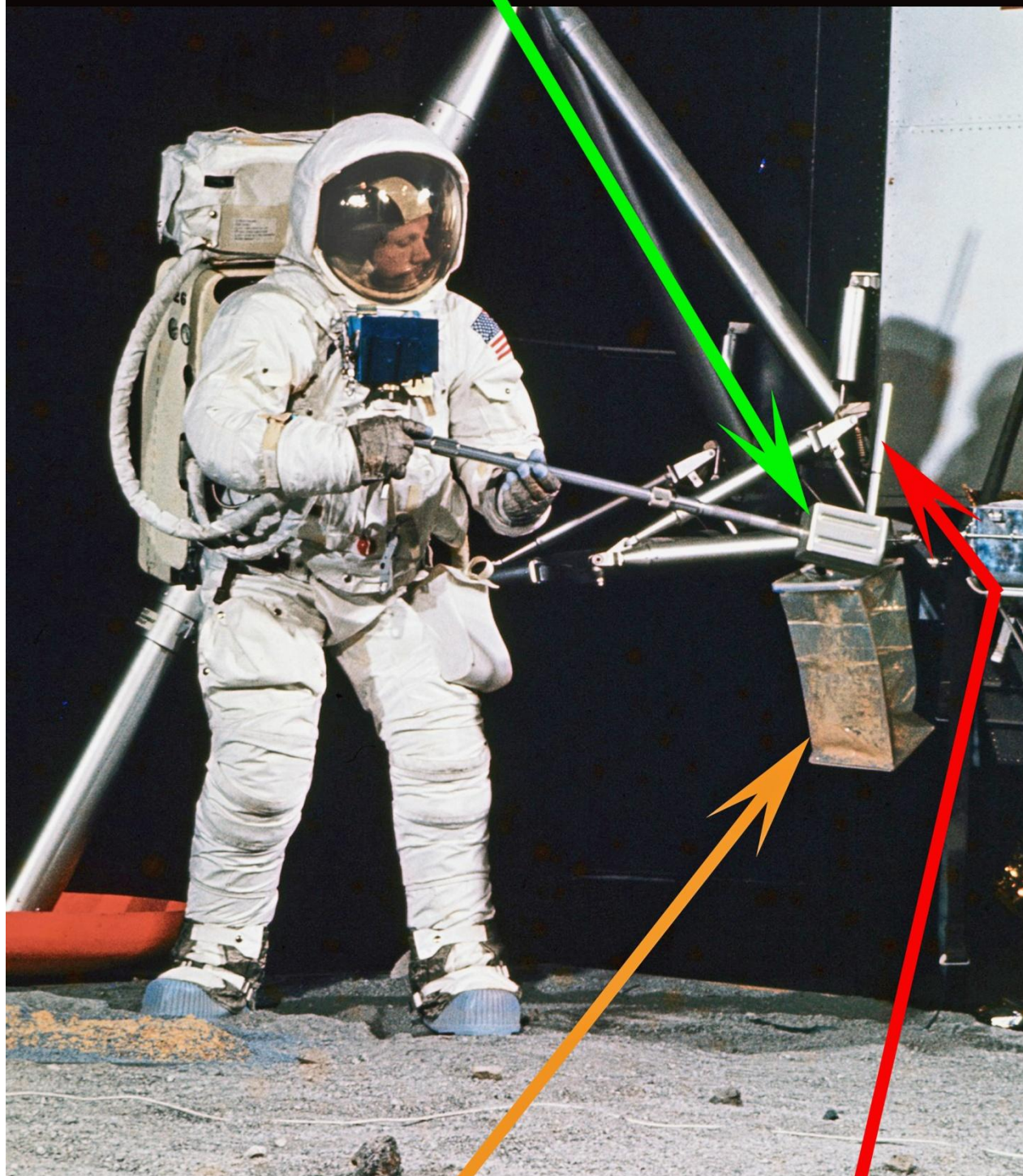
The subject auction **LARGE BOX SCOOP** was used for all KSC Apollo 11 crew training EVA activities by both Astronauts Armstrong and Aldrin.

PHOTOS OF APOLLO 11 ASTRONAUTS ARMSTRONG AND ALDRIN USING THE SUBJECT AUCTION LARGE BOX SCOOP DURING EVA CREW TRAINING ACTIVITIES

BULK SAMPLE COLLECTION



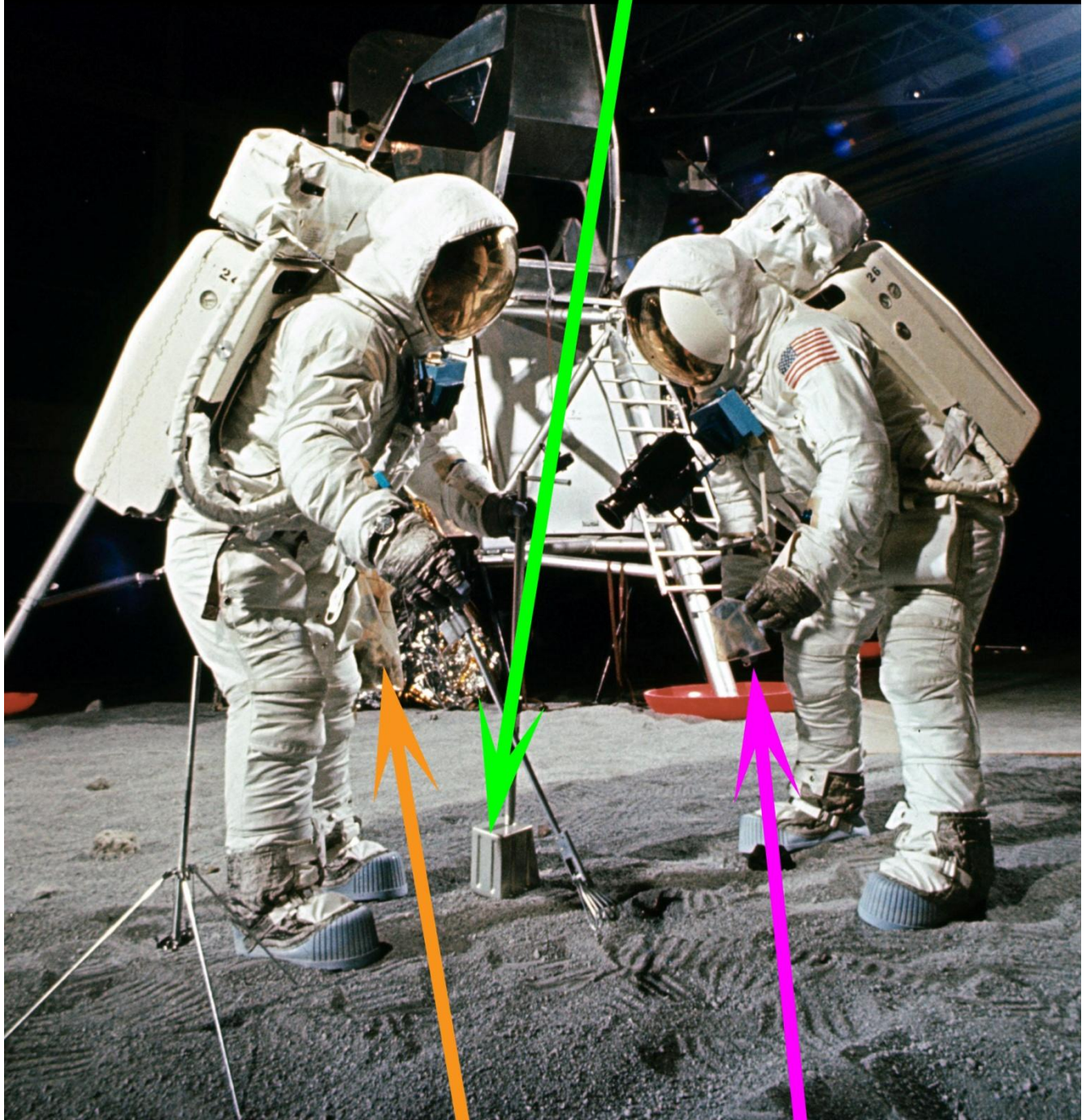
SUBJECT AUCTION SCOOP



**BULK
SAMPLE BAG**

SCALE

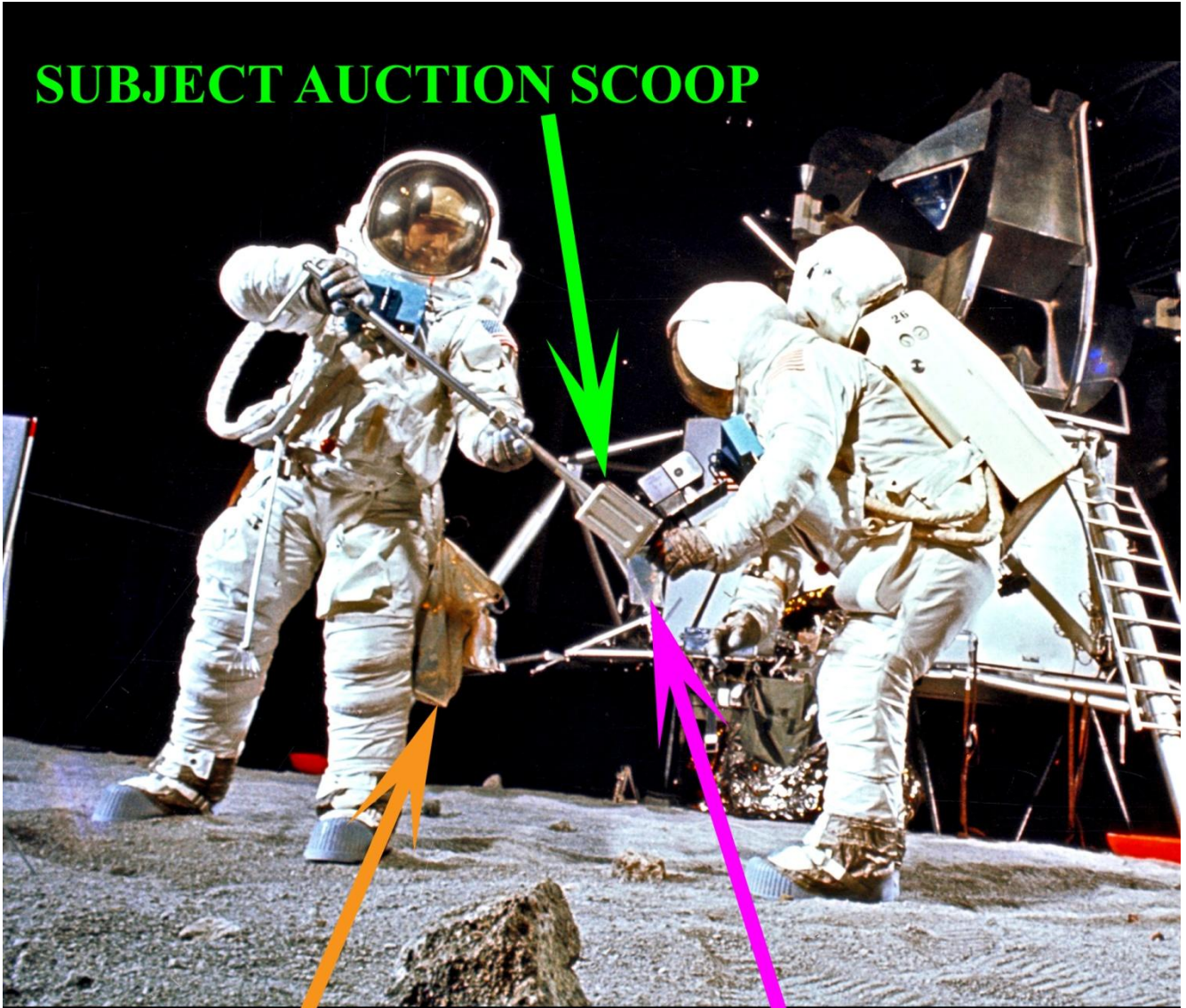
SUBJECT AUCTION SCOOP



**LARGE DOCUMENTED
SAMPLE BAG**

**SMALL
DOCUMENTED
SAMPLE BAG**

SUBJECT AUCTION SCOOP



**LARGE DOCUMENTED
SAMPLE BAG**

**SMALL
DOCUMENTED
SAMPLE BAG**