



Bonhams

The Space History Sale

Tuesday April 8, 2014
New York

123:47
TIG-35

Don Helmets & Gloves
Attach Restraints

V48E

01 46 12012 DAP Config
PRO

06 47 10837 LM Wt
CSM Wt
PRO

GUID CONT - PGNS
MODE CONTROL (PGNS) - AUTO
V77E

P12E
06 33 124:22:00 TIG ASC
(124:23:21.3)
PRO

06 76 VH Final
()
 H Dot Final
()
 Xrng
()
PRO

06 74 : TFI
 Yaw
 Pitch
ET - Set/Up

*232 R +00600 Ins Alt
*465 R +00320 Ins H Dot
*410 R +00000 Orb Ins

*547 R +0 Lunar Align Az
Correction
*623 + 0E +Z Along CSM Plane

Basic Date June 16, 1969
Changed June 25, 1969
"A"

LM-5

NOTES BY T. Buzz Aldrin WHILE ON THE MOON

The Space History Sale

Tuesday April 8, 2014 at 1pm
New York

Bonhams

580 Madison Avenue
New York, New York 10022
bonhams.com

Preview

Friday April 4, 10am to 5pm
Saturday April 5, 10am to 5pm
Sunday April 6, 10am to 5pm
Monday April 7, 10am to 7pm
Tuesday April 8, 10am to 12.30pm

Bids

+1 (212) 644 9001
+1 (212) 644 9009 fax

To bid via the internet please
visit www.bonhams.com

Sale Number: 21425
Lots 1 - 269

Catalog: \$35

Inquiries

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Automated Results Service
+1 (800) 223 2854

Online bidding will be available
for this auction. For further
information please visit:
www.bonhams.com/21425

Please see pages 2 to 6
for bidder information including
Conditions of Sale, after-sale
collection and shipment.

Illustrations

Front cover: Lot 56
Inside front cover: Lot 212
Session page: Lot 160
Inside back cover: Lot 213
Back cover: Lot 50

CONDITIONS OF SALE

The following Conditions of Sale, as amended by any published or posted notices or verbal announcements during the sale, constitute the entire terms and conditions on which property listed in the catalog shall be offered for sale or sold by Bonhams & Butterfields Auctioneers Corp. and any consignor of such property for whom we act as agent. If live online bidding is available for the subject auction, additional terms and conditions of sale relating to online bidding will apply; see www.bonhams.com/WebTerms for the supplemental terms. As used herein, "Bonhams," "we" and "us" refer to Bonhams & Butterfields Auctioneers Corp.

1. As used herein, the term "bid price" means the price at which a lot is successfully knocked down to the purchaser. The term "purchase price" means the aggregate of (a) the bid price, (b) a PREMIUM retained by us and payable by the purchaser EQUAL TO 25% OF THE FIRST \$100,000 OF THE BID PRICE, 20% OF THE AMOUNT OF THE BID PRICE ABOVE \$100,000 UP TO AND INCLUDING \$2,000,000, AND 12% OF THE AMOUNT OF THE BID PRICE OVER \$2,000,000, and (c) unless the purchaser is exempt by law from the payment thereof, any California, Arizona, Colorado, Connecticut, Florida, Georgia, Illinois, Massachusetts, Nevada, New York, Pennsylvania, Texas, Washington, D.C., Washington state, or other state or local sales tax (or compensating use tax) and other applicable taxes.

2. On the fall of the auctioneer's hammer, the highest bidder shall have purchased the offered lot in accordance and subject to compliance with all of the conditions set forth herein and (a) assumes full risk and responsibility therefor, (b) if requested will sign a confirmation of purchase, and (c) will pay the purchase price in full or such part as we may require for all lots purchased. No lot may be transferred. Any person placing a bid as agent on behalf of another (whether or not such person has disclosed that fact or the identity of the principal) may be jointly and severally liable with the principal under any contract resulting from the acceptance of a bid.

Unless otherwise agreed, payment in good funds is due and payable within five (5) business days following the auction sale. Whenever the purchaser pays only a part of the total purchase price for one or more lots purchased, we may apply such payments, in our sole discretion, to the lot or lots we choose. Payment will not be deemed made in full until we have collected good funds for all amounts due.

Payment for purchases may be made in or by (a) cash, (b) cashier's check or money order, (c) personal check with approved credit drawn on a U.S. bank, (d) wire transfer or other immediate bank transfer, or (e) Visa, MasterCard, American Express or Discover credit, charge or debit card. A processing fee will be assessed on any returned checks. Please note that the amount of cash notes and cash equivalents that can be accepted from a given purchaser may be limited.

The purchaser grants us a security interest in the property, and we may retain as collateral security for the purchaser's obligations to us, any property and all monies held or received by us for the account of the purchaser, in our possession. We retain all rights of a secured party under the California Commercial Code. If the foregoing conditions or any other applicable conditions herein are not complied with, in addition to other remedies available to us and the consignor by law, including without limitation, the right to hold the purchaser liable for the purchase price, we at our option may either (a) cancel the sale, retaining as liquidated damages all payments made by the purchaser or (b) resell the property, either publicly or privately, and in such event the purchaser shall be

liable for the payment of any deficiency plus all costs and expenses of both sales, our commission at our standard rates, all other charges due hereunder, attorneys' fees, expenses and incidental damages. In addition, where two or more amounts are owed in respect of different transactions by the purchaser to us, to Bonhams 1793 Limited and/or to any of our other affiliates, subsidiaries or parent companies worldwide within the Bonhams Group, we reserve the right to apply any monies paid in respect of a transaction to discharge any amount owed by the purchaser. If all fees, commissions, premiums, bid price and other sums due to us from the purchaser are not paid promptly as provided in these Conditions of Sale, we reserve the right to impose a finance charge equal to 1.5% per month on all amounts due to us beginning on the 31st day following the sale until payment is received, in addition to other remedies available to us by law.

3. We reserve the right to withdraw any property and to divide and combine lots at any time before such property's auction. Unless otherwise announced by the auctioneer at the time of sale, all bids are per lot as numbered in the catalog and no lots shall be divided or combined for sale.

4. We reserve the right to reject a bid from any bidder, to split any bidding increment, and to advance the bidding in any manner the auctioneer may decide. In the event of any dispute between bidders, or in the event the auctioneer doubts the validity of any bid, the auctioneer shall have sole and final discretion either to determine the successful bidder or to re-offer and resell the article in dispute. If any dispute arises after the sale, our sales records shall be conclusive in all respects.

5. If we are prevented by fire, theft or any other reason whatsoever from delivering any property to the purchaser or a sale otherwise cannot be completed, our liability shall be limited to the sum actually paid therefor by the purchaser and shall in no event include any compensatory, incidental or consequential damages.

6. If a lot is offered subject to a reserve, we may implement such reserve by bidding on behalf of the consignor, whether by opening bidding or continuing bidding in response to other bidders until reaching the reserve. If we have an interest in an offered lot and the proceeds therefrom other than our commissions, we may bid therefor to protect such interest. CONSIGNORS ARE NOT ALLOWED TO BID ON THEIR OWN ITEMS.

7. All statements contained in the catalog or in any bill of sale, condition report, invoice or elsewhere as to authorship, period, culture, source, origin, measurement, quality, rarity, provenance, importance, exhibition and literature of historical relevance, or physical condition ARE QUALIFIED STATEMENTS OF OPINION AND NOT REPRESENTATIONS OR WARRANTIES. No employee or agent of Bonhams is authorized to make on our behalf or on that of the consignor any representation or warranty, oral or written, with respect to any property.

8. All purchased property shall be removed from the premises at which the sale is conducted by the date(s) and time(s) set forth in the "Buyer's Guide" portion of the catalog. If not so removed, daily storage fees will be payable to us by the purchaser as set forth therein. We reserve the right to transfer property not so removed to an offsite warehouse at the purchaser's risk and expense, as set forth in more detail in the "Buyer's Guide." Accounts must be settled in full before property will be released. Packing and handling of purchased lots are the responsibility of the purchaser. Bonhams can provide packing and shipping services for certain items as noted in the "Buyer's Guide" section of the catalog.

9. The copyright in the text of the catalog and the photographs, digital images and illustrations of lots in the catalog belong to Bonhams or its licensors. You will not reproduce or permit anyone else to reproduce such text, photographs, digital images or illustrations without our prior written consent.

10. These Conditions of Sale shall bind the successors and assigns of all bidders and purchasers and inure to the benefit of our successors and assigns. No waiver, amendment or modification of the terms hereof (other than posted notices or oral announcements during the sale) shall bind us unless specifically stated in writing and signed by us. If any part of these Conditions of Sale is for any reason invalid or unenforceable, the rest shall remain valid and enforceable.

11. These Conditions of Sale and the purchaser's and our respective rights and obligations hereunder are governed by the laws of the State of California. By bidding at an auction, each purchaser and bidder agrees to be bound by these Conditions of Sale. Any dispute, controversy or claim arising out of or relating to this agreement, or the breach, termination or validity thereof, brought by or against Bonhams (but not including claims brought against the consignor by the purchaser of lots consigned hereunder) shall be resolved by the procedures set forth below.

Mediation and Arbitration Procedures

(a) Within 30 days of written notice that there is a dispute, the parties or their authorized and empowered representatives shall meet by telephone and/or in person to mediate their differences. If the parties agree, a mutually acceptable mediator shall be selected and the parties will equally share such mediator's fees. The mediator shall be a retired judge or an attorney familiar with commercial law and trained in or qualified by experience in handling mediations. Any communications made during the mediation process shall not be admissible in any subsequent arbitration, mediation or judicial proceeding. All proceedings and any resolutions thereof shall be confidential, and the terms governing arbitration set forth in paragraph (c) below shall govern.

(b) If mediation does not resolve all disputes between the parties, or in any event no longer than 60 days after receipt of the written notice of dispute referred to above, the parties shall submit the dispute for binding arbitration before a single neutral arbitrator. Such arbitrator shall be a retired judge or an attorney familiar with commercial law and trained in or qualified by experience in handling arbitrations. Such arbitrator shall make all appropriate disclosures required by law. The arbitrator shall be drawn from a panel of a national arbitration service agreed to by the parties, and shall be selected as follows: (i) If the national arbitration service has specific rules or procedures, those rules or procedures shall be followed; (ii) If the national arbitration service does not have rules or procedures for the selection of an arbitrator, the arbitrator shall be an individual jointly agreed to by the parties. If the parties cannot agree on a national arbitration service, the arbitration shall be conducted by the American Arbitration Association, and the arbitrator shall be selected in accordance with the Rules of the American Arbitration Association. The arbitrator's award shall be in writing and shall set forth findings of fact and legal conclusions.

(c) Unless otherwise agreed to by the parties or provided by the published rules of the national arbitration service:

(i) the arbitration shall occur within 60 days following the selection of the arbitrator;

CONDITIONS OF SALE - CONTINUED

(ii) the arbitration shall be conducted in the designated location, as follows: (A) in any case in which the subject auction by Bonhams took place or was scheduled to take place in the State of New York or Connecticut or the Commonwealth of Massachusetts, the arbitration shall take place in New York City, New York; (B) in all other cases, the arbitration shall take place in the city of San Francisco, California; and

(iii) discovery and the procedure for the arbitration shall be as follows:

(A) All arbitration proceedings shall be confidential;

(B) The parties shall submit written briefs to the arbitrator no later than 15 days before the arbitration commences;

(C) Discovery, if any, shall be limited as follows: (I) Requests for no more than 10 categories of documents, to be provided to the requesting party within 14 days of written request therefor; (II) No more than two (2) depositions per party, provided however, the deposition(s) are to be completed within one (1) day; (III) Compliance with the above shall be enforced by the arbitrator in accordance with California law;

(D) Each party shall have no longer than eight (8) hours to present its position. The entire hearing before the arbitrator shall not take longer than three (3) consecutive days;

(E) The award shall be made in writing no more than 30 days following the end of the proceeding. Judgment upon the award rendered by the arbitrator may be entered by any court having jurisdiction thereof.

To the fullest extent permitted by law, and except as required by applicable arbitration rules, each party shall bear its own attorneys' fees and costs in connection with the proceedings and shall share equally the fees and expenses of the arbitrator.

Limited Right of Rescission

If within one (1) year from the date of sale, the original purchaser (a) gives written notice to us alleging that the identification of Authorship (as defined below) of

such lot as set forth in the **BOLD TYPE** heading of the catalog description of such lot (as amended by any saleroom notices or verbal announcements during the sale) is not substantially correct based on a fair reading of the catalog (including the terms of any glossary contained therein), and (b) within 10 days after such notice returns the lot to us in the same condition as at the time of sale, and (c) establishes the allegation in the notice to our satisfaction (including by providing one or more written opinions by recognized experts in the field, as we may reasonably require), then the sale of such lot will be rescinded and, unless we have already paid to the consignor monies owed him in connection with the sale, the original purchase price will be refunded.

If, prior to receiving such notice from the original purchaser alleging such defect, we have paid the consignor monies owed him in connection with the sale, we shall pay the original purchaser the amount of our commissions, any other sale proceeds to which we are entitled and applicable taxes received from the purchaser on the sale and make demand on the consignor to pay the balance of the original purchase price to the original purchaser. Should the consignor fail to pay such amount promptly, we may disclose the identity of the consignor and assign to the original purchaser our rights against the consignor with respect to the lot the sale of which is sought to be rescinded. Upon such disclosure and assignment, any liability of Bonhams as consignor's agent with respect to said lot shall automatically terminate.

The foregoing limited right of rescission is available to the original purchaser only and may not be assigned to or relied upon by any subsequent transferee of the property sold. The purchaser hereby accepts the benefit of the consignor's warranty of title and other representations and warranties made by the consignor for the purchaser's benefit. Nothing in this section shall be construed as an admission by us of any representation of fact, express or implied, obligation or responsibility with respect to any lot. THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY AGAINST BONHAMS FOR ANY REASON WHATSOEVER IS THE LIMITED RIGHT OF RESCISSION DESCRIBED IN THIS SECTION.

"Authorship" means only the identity of the creator, the period, culture and source or origin of the lot, as the case may be, as set forth in the **BOLD TYPE** heading of the print catalog entry. The right of rescission does not extend to: (a) works of art executed before 1870 (unless these works are determined to be counterfeits created since 1870), as this is a matter of current scholarly opinion which can change; (b) titles, descriptions, or other identification of offered lots, which information normally appears in lower case type below the **BOLD TYPE** heading identifying the Authorship; (c) Authorship of any lot where it was specifically mentioned that there exists a conflict of specialist or scholarly opinion regarding the Authorship of the lot at the time of sale; (d) Authorship of any lot which as of the date of sale was in accordance with the then generally-accepted opinion of scholars and specialists regarding the same; or (e) the identification of periods or dates of creation in catalog descriptions which may be proven inaccurate by means of scientific processes that are not generally accepted for use until after publication of the catalog in which the property is offered or that were unreasonably expensive or impractical to use at the time of such publication.

Limitation of Liability

EXCEPT AS EXPRESSLY PROVIDED ABOVE, ALL PROPERTY IS SOLD "AS IS." NEITHER BONHAMS NOR THE CONSIGNOR MAKES ANY REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, AS TO THE MERCHANTABILITY, FITNESS OR CONDITION OF THE PROPERTY OR AS TO THE CORRECTNESS OF DESCRIPTION, GENUINENESS, ATTRIBUTION, PROVENANCE OR PERIOD OF THE PROPERTY OR AS TO WHETHER THE PURCHASER ACQUIRES ANY COPYRIGHTS OR OTHER INTELLECTUAL PROPERTY RIGHTS IN LOTS SOLD OR AS TO WHETHER A WORK OF ART IS SUBJECT TO THE ARTIST'S MORAL RIGHTS OR OTHER RESIDUAL RIGHTS OF THE ARTIST. THE PURCHASER EXPRESSLY ACKNOWLEDGES AND AGREES THAT IN NO EVENT SHALL BONHAMS BE LIABLE FOR ANY DAMAGES INCLUDING, WITHOUT LIMITATION, ANY COMPENSATORY, INCIDENTAL OR CONSEQUENTIAL DAMAGES.

SELLER'S GUIDE

SELLING AT AUCTION

Bonhams can help you every step of the way when you are ready to sell art, antiques and collectible items at auction. Our regional offices and representatives throughout the US are available to service all of your needs. Should you have any further questions, please visit our website at www.bonhams.com/us for more information or call our Client Services Department at +1 (800) 223 2854 ext. 33550.

Auction Estimates

The first step in the auction process is to determine the auction value of your property. Bonhams' world-renowned specialists will evaluate your special items at no charge and in complete confidence. You can obtain an auction estimate in many ways:

- Attend one of our Auction Appraisal Events held regularly at our galleries and in other major metropolitan areas. The updated schedule for Bonhams Auction Appraisal Events is available at www.bonhams.com/us.
- Call our Client Services Department to schedule a private appointment at one of our galleries. If you have a large collection, our specialists can travel, by appointment, to evaluate your property on site.
- Send clear photographs to us of each individual item, including item dimensions and other pertinent information with each picture. Photos should be sent

to Bonhams' address in envelopes marked as "photo auction estimate". Alternatively, you can submit your request using our online form at www.bonhams.com/us. Digital images may be attached to the form. Please limit your images to no more than five (5) per item.

Consigning Your Property

After you receive an estimate, you may consign your property to us for sale in the next appropriate auction. Our staff assists you throughout the process, arranging transportation of your items to our galleries (at the consignor's expense), providing a detailed inventory of your consignment, and reporting the prices realized for each lot. We provide secure storage for your property in our warehouses and all items are insured throughout the auction process. You will receive payment for your property approximately 35 days after completion of sale.

Sales commissions vary with the potential auction value of the property and the particular auction in which the property is offered. Please call us for commission rates.

Professional Appraisal Services

Bonhams specialists conduct insurance and fair market value appraisals for private collectors, corporations, museums, fiduciaries and government entities on a daily basis. Insurance appraisals, used for insurance purposes, reflect the cost of replacing property in today's retail market. Fair market value appraisals are used for estate, tax and family division purposes and reflect prices paid by a willing buyer to a willing seller.

When we conduct a private appraisal, our specialists will prepare a thorough inventory listing of all your appraised property by category. Valuations, complete descriptions and locations of items are included in the documentation.

Appraisal fees vary according to the nature of the collection, the amount of work involved, the travel distance, and whether the property is subsequently consigned for auction.

Our appraisers are available to help you anywhere and at any time. Please call our Client Services Department to schedule an appraisal.

Estate Services

Since 1865, Bonhams has been serving the needs of fiduciaries – lawyers, trust officers, accountants and executors – in the disposition of large and small estates. Our services are specially designed to aid in the efficient appraisal and disposition of fine art, antiques, jewelry, and collectibles. We offer a full range of estate services, ranging from flexible financial terms to tailored accounting for heirs and their agents to world-class marketing and sales support.

For more information or to obtain a detailed Trust and Estates package, please visit our website at www.bonhams.com/us or contact our Client Services Department.

BUYER'S GUIDE

BIDDING & BUYING AT AUCTION

Whether you are an experienced bidder or an enthusiastic novice, auctions provide a stimulating atmosphere unlike any other. Bonhams previews and sales are free and open to the public. As you will find in these directions, bidding and buying at auction is easy and exciting. Should you have any further questions, please visit our website at www.bonhams.com or call our Client Services Department at +1 (800) 223 2854 ext. 3550.

Catalogs

Before each auction we publish illustrated catalogs. Our catalogs provide descriptions and estimated values for each "lot." A lot may refer to a single item or to a group of items auctioned together. The catalogs also include the dates and the times for the previews and auctions. We offer our catalogs by subscription or by single copy. For information on subscribing to our catalogs, you may refer to the subscription form in this catalog, call our Client Services Department, or visit our website at www.bonhams.com/us.

Previews

Auction previews are your chance to inspect each lot prior to the auction. We encourage you to look closely and examine each object on which you may want to bid so that you will know as much as possible about it. Except as expressly set forth in the Conditions of Sale, items are sold "as is" and with all faults; illustrations in our catalogs, website and other materials are provided for identification only. At the previews, our staff is always available to answer your questions and guide you through the auction process. Condition reports may be available upon request.

Estimates

Bonhams catalogs include low and high value estimates for each lot, exclusive of the buyer's premium and tax. The estimates are provided as an approximate guide to current market value based primarily on previous auction results for comparable pieces, and should not be interpreted as a representation or prediction of actual selling prices. They are determined well in advance of a sale and are subject to revision. Please contact us should you have any questions about value estimates.

Reserves

Unless indicated by the \square symbol next to the lot number, which denotes no reserve, all lots in the catalog are subject to a reserve. The reserve is the minimum auction price that the consignor is willing to accept for a lot. This amount is confidential and does not exceed the low estimate value.

Auction House's Interest in Property Offered at Auction

On occasion, Bonhams may offer a lot in which it has an ownership interest, in whole or in part. Such property, if any, is identified in the catalog with a \blacktriangle symbol next to the lot number.

Similarly, Bonhams may have an economic interest in a lot beyond its commission as a result of making an advance against anticipated proceeds to the consignor which is secured by the consigned property or where it has guaranteed the consignor a minimum auction price for consigned property. Such property, if any, is identified in the catalog with a \circ symbol next to the lot number.

Bidding at Auction

At Bonhams, you can bid in many ways: in person, via absentee bid, over the phone, or via Bonhams' live online bidding facility. Absentee bids can be submitted in person, online, via fax or via email.

Valid Bonhams client accounts are required to participate in bidding activity. You can obtain registration information online, at the reception desk or by calling our Client Services Department.

By bidding at auction, whether in person or by agent, by absentee bid, telephone, online or other means, the buyer or bidder agrees to be bound by the Conditions of Sale.

Lots are auctioned in consecutive numerical order as they appear in the catalog. Bidding normally begins below the low estimate. The auctioneer will accept bids from interested parties present in the saleroom, from telephone bidders, and from absentee bidders who have left written bids in advance of the sale. The auctioneer may also execute bids on behalf of the consignor by placing responsive or consecutive bids for a lot up to the amount of the reserve, but never above it.

We assume no responsibility for failure to execute bids for any reason whatsoever.

In Person

If you are planning to bid at auction for the first time, you will need to register at the reception desk in order to receive a numbered bid card. To place a bid, hold up your card so that the auctioneer can clearly see it. Decide on the maximum auction price that you wish to pay, exclusive of buyer's premium and tax, and continue bidding until your bid prevails or you reach your limit. If you are the successful bidder on a lot, the auctioneer will acknowledge your paddle number and bid amount.

Absentee Bids

As a service to those wishing to place bids, we may at our discretion accept bids without charge in advance of auction online or in writing on bidding forms available from us. "Buy" bids will not be accepted; all bids must state the highest bid price the bidder is willing to pay. Our auction staff will try to bid just as you would, with the goal of obtaining the item at the lowest bid price possible. In the event identical bids are submitted, the earliest bid submitted will take precedence. Absentee bids shall be executed in competition with other absentee bids, any applicable reserve, and bids from other auction participants. A friend or agent may place bids on your behalf, provided that we have received your written authorization prior to the sale. Absentee bid forms are available in our catalogs, online at www.bonhams.com/us, at offsite auction locations, and at our San Francisco, Los Angeles and New York galleries.

By Telephone

Under special circumstances, we can arrange for you to bid by telephone. To arrange for a telephone bid, please contact our Client Services Department a minimum of 24 hours prior to the sale.

Online

We offer live online bidding for most auctions and accept absentee bids online for all our auctions. Please visit www.bonhams.com/us for details.

Bid Increments

Bonhams generally uses the following increment multiples as bidding progresses:

\$50-200	by \$10s
\$200-500	by \$20/50/80s
\$500-1,000	by \$50s
\$1,000-2,000	by \$100s
\$2,000-5,000	by \$200/500/800s
\$5,000-10,000	by \$500s
\$10,000-20,000	by \$1,000s
\$20,000-50,000	by \$2,000/5,000/8,000s
\$50,000-100,000	by \$5,000s
\$100,000-200,000	by \$10,000s
above \$200,000	at auctioneer's discretion

The auctioneer may split or reject any bid at any time at his or her discretion as outlined in the Conditions of Sale.

Currency Converter

Solely for the convenience of bidders, a currency converter may be provided at Bonhams' auctions. The rates quoted for conversion of other currencies to U.S. Dollars are indications only and should not be relied upon by a bidder, and neither Bonhams nor its agents shall be responsible for any errors or omissions in the operation or accuracy of the currency converter.

Buyer's Premium

A buyer's premium is added to the winning bid price of each individual lot purchased, at the rates set forth in the Conditions of Sale. The winning bid price plus the premium constitute the purchase price for the lot. Applicable sales taxes are computed based on this figure, and the total becomes your final purchase price.

Unless specifically illustrated and noted, fine art frames are not included in the estimate or purchase price. Bonhams accepts no liability for damage or loss to frames during storage or shipment.

All sales are final and subject to the Conditions of Sale found in our catalogs, on our website, and available at the reception desk.

Payment

All buyers are asked to pay and pick up by 3pm on the business day following the auction. Payment may be made to Bonhams by cash, checks drawn on a U.S. bank, money order, wire transfer, or by Visa, MasterCard, American Express or Discover credit or charge card or debit card. All items must be paid for within 5 business days of the sale. Please note that payment by personal or business check may result in property not being released until purchase funds clear our bank. For payments sent by mail, please remit to Cashier Department, 220 San Bruno Avenue, San Francisco, CA 94103.

Sales Tax

California, Arizona, Colorado, Connecticut, Florida, Georgia, Illinois, Nevada, New York, Massachusetts, Pennsylvania, Texas, Washington state and Washington DC residents must pay applicable sales tax. Other state or local taxes (or compensating use taxes) may apply. Sales tax will be automatically added to the invoice unless a valid resale number has been furnished or the property is shipped via common carrier to destinations outside the states listed above.

Shipping & Removal

Bonhams can accommodate shipping for certain items. Please contact our Cashiers Department for more information or to obtain a quote. Carriers are not permitted to deliver to PO boxes.

International buyers are responsible for all import/export customs duties and taxes. An invoice stating the actual purchase price will accompany all international purchases.

Collection of Purchases

Please arrange for the packing and transport of your purchases prior to collection at our office. If you are sending a third party shipper, please request a release form from us and return it to +1 (212) 644 9009 prior to your scheduled pickup. To schedule collection of purchases, please call +1 (212) 644 9001.

Handling and Storage Charges

Please note that our offices have requirements for freight elevator usage. Please contact us to schedule an elevator appointment for pickup of any large or awkward items. Bonhams will hold all purchased lots in our gallery until Friday April 18 without penalty. After April 18 collection of lots will be by appointment only. Please call +1 (212) 644 9001 at least 24 hours in advance to make an appointment.

Storage charges of \$5 per lot, per day will begin accruing for any lots not collected by the 31st day after the auction.

Bonhams reserves the right to remove uncollected sold lots to the warehouse of our choice at the buyer's risk and expense. Handling and storage fees will apply.

Auction Results

To find out the final purchase price for any lot following the sale, please call our automated auction results line at +1 (800) 223 2854 ext. 3400. All you need is a touch-tone telephone and the lot number. Auction results are usually available on the next business day following the sale or online at www.bonhams.com/us.

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- Auction and Preview Information
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Foreword

We are very pleased to be presenting our sixth annual Space History Sale, taking place this year to coincide with the 50th anniversary of the first flight in the Gemini Program. As the second United States human space flight program, Gemini developed critical techniques which in turn led to the great success of the Apollo Program, most notably in the areas of rendezvous, docking and Extra Vehicular Activities (EVAs). The crew mission emblem came of age with Project Gemini, and we have four rarely available emblems from Gemini, each of which was flown on its respective mission: Thomas Stafford's Gemini 6 emblem (lot 128), Wally Schirra's GTA-6 emblem (lot 129), Stafford's Gemini IX emblem (lot 131), and Gordon Cooper's Gemini XII emblem (lot 134).

The sale opens with a selection of beautiful telescopes and globes, including what is perhaps the only surviving example of a pneumatically-driven telescope (lot 4), and a very fine Denoyer-Geppert lunar globe manufactured in 1969 (lot 6). We have an excellent selection of both American and Russian hardware including a flown docking panel from the MIR space station (lot 28) and several parts from a Lunar Module which was slated for a Moon landing (lots 37-45). We have a number of fine Russian and American models in the sale, such as a five-foot tall model of the Vostok rocket (lot 22), an oversized model of the Lunokhod 2 Rover (lot 26), and several rare internal NASA and NASA contractors' models including the Saturn IB Rocket (lot 46), the Lunar Module (lot 47), a Command Service Module with escape tower (lot 48), and the Apollo Applications Program Cluster Configuration (lot 50).

We note the passing of Mercury Astronaut Scott Carpenter last October. He was a member of the first generation of American space heroes, selected by NASA in 1959 along with fellow astronauts Cooper, Glenn, Grissom, Schirra, Shepard, and Slayton. Ironically, the oldest selected Mercury Astronaut, John Glenn, is the only surviving member of the first astronaut corps, beating the then under 40 age requirement for the program by just 2 years. We have a number of items relating to these early heroes of space flight, including a strong selection of signed photographs, books, and flown objects, as well as one item we are particularly excited about: a cover layer from an iconic phase two Mercury-era space suit (lot 56).

We have been able to gather a wide range of photographs, brochures, and other period items that reflect the excitement and fascination of America's initial step into space. Most are signed by, or have multiple signatures of these early pioneers who paved the way and enabled America to win the Space Race with the Apollo 11 landing of July 1969. We are very excited to

be able to include this year a number of rare and important items flown on the historic Apollo 11 mission, including Command Module Pilot Michael Collins' flown crew-signed Beta Cloth Emblem (lot 210) consigned to us directly by Collins, a flown US flag carried by Buzz Aldrin (lot 211), a flight plan sheet containing extensive notes made by Neil Armstrong which was carried on and used during the mission (lot 213) and a flown Lunar Surface Checklist Sheet which contains one of the most extensive sets of notations made while on the Moon (lot 212).

Playing a large role in our sale this year is a section titled Space Flight Photography. The section opens with two important flown items: a Motion Pictures Sight Ring used by James Irwin on Apollo 15, which is perhaps the only lunar surface ring still in private hands (lot 139), as well as a Skylab Extreme UV Spectroheliograph Film Magazine (lot 141). The section includes several excellent archives of vintage NASA photographs from various missions, as well as Lunar Orbiter Photographs (lots 173-178), Lunar Surface Panorama Negatives, Motion Pictures Film from the Maurer Data Acquisition Cameras, and Hasselblad Film Positives.

Some other highlights include an excellent selection of flown United States flags, such as James Irwin's large US Flag which was carried to the lunar surface (lot 271), and a rare set of three flown American flags as part of the Apollo Program's top level award (lot 294), as well as an exceptionally rare photolithograph of the moonrise signed by all twelve Moonwalkers, plus a lunar globe signed by eight Moonwalkers.

It was only two years ago that President Obama signed into law a bill clarifying that Mercury, Gemini, and Apollo crew members have "full ownership of and clear title to" any expendable item used in their missions, and furthermore that the Federal Government will have "no claim or right to ownership" to artifacts that have subsequently been sold, traded, or gifted by the astronauts. Partly as a result of this legislation, this is one of our best Space History Sales to date.

The Space History Sale will preview in our New York galleries April 4-7, and we look forward to seeing you. Since the material offered in the sale is generally in excellent or fine condition, we have for the most part not given condition details in our descriptions. For condition information, or for information on bidding, please contact any member of the department.

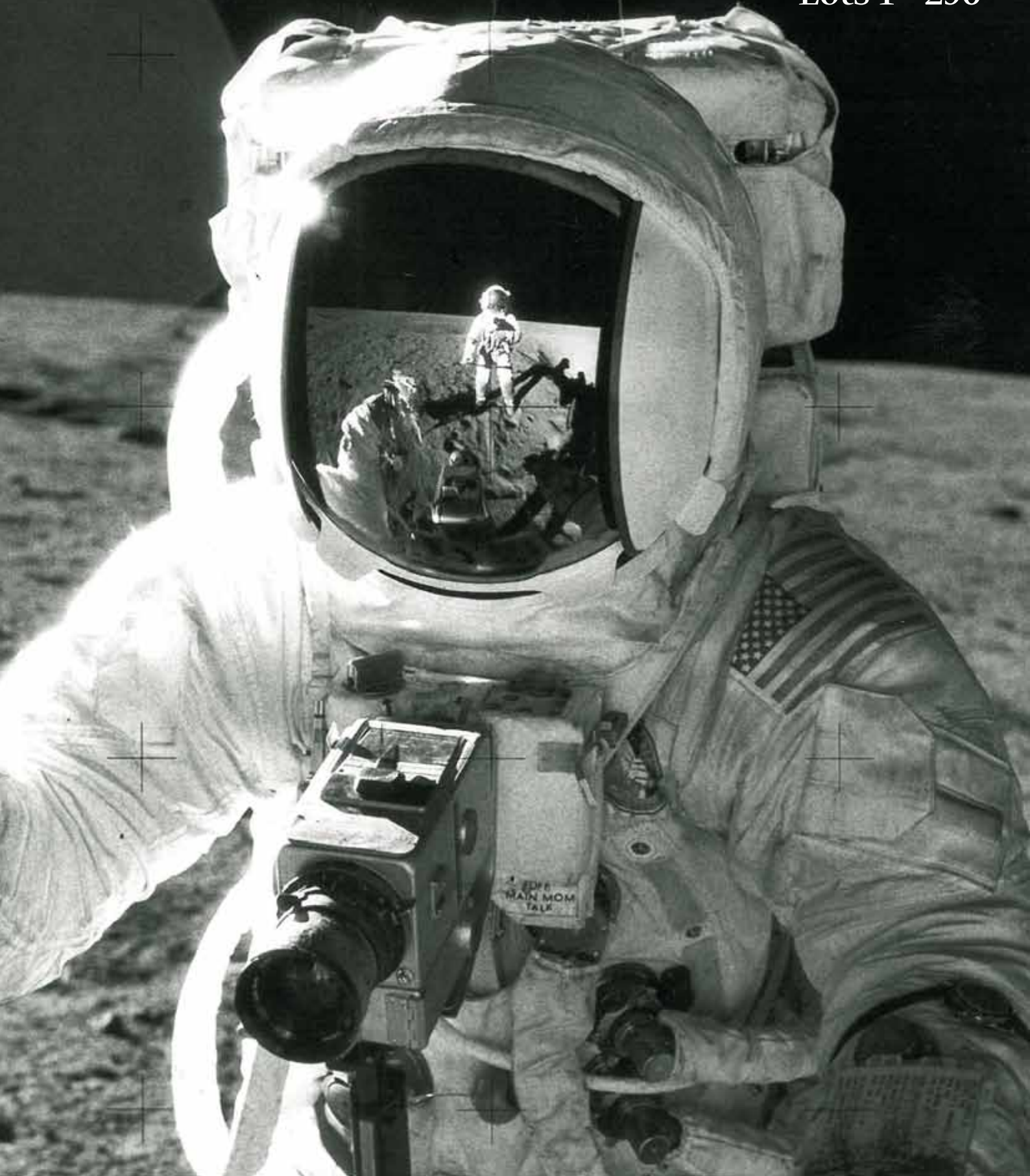
Cassandra Hatton, Senior Specialist

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The Space History Sale

Lots 1 - 296





TELESCOPES AND GLOBES

- 1
MERZ, G. & S.
- 2
MEYROWITZ, PAUL, retailer.

A 2-inch refracting telescope, c.1865, by Merz of Munich, brass, with brass and steel stand, 910 mm long, stand 1100 mm high, with lens cap.

Munich-based Georg Merz [1793-1867] and Joseph Mahler took over the Utzschneider & Fraunhofer company in 1839. On Mahler's death, Merz continued the business with his sons. After 1858, the firm was known as G. & S. Merz, and was one of the most renowned German makers of microscopes and optical and astronomical instruments of the second half of the 19th century.

\$3,000 - 4,000

A 4-inch refracting telescope, America, c.1890, signed by the retailer "Paul A. Meyrowitz, 389 5th Ave., New York City," brass, sighting scope, with wood tripod base, 1400 mm long, the base 1500 mm high, housed in original wood case together with 4 additional lenses, right-angle finder, and lens cap, one joint of tripod repaired.

Provenance: Astronomical Society of Harrisburg (engraved plaque on one leg of tripod, probably second half 20th century).

\$4,000 - 5,000



3
MOGEY, WILLIAM AND DAVID.

A 3-inch refracting telescope, Bayonne, NJ, c.1900, signed on the focus knob "W. & D. MogeY | Bayonne, N.J.," brass, with wood tripod base, 1200 mm long, the base 1350 mm high, housed in original wood case, with cap. *Provenance:* Harrisburg Natural History Society (engraved plaque on one leg of tripod, probably second half 20th century).

William MogeY began his career in the optics and astronomy industry in 1882 in New York. In 1888, his brother joined the business, and in 1893 they moved to larger premises in Bayonne, where they remained until 1911. The present model is listed in MogeY's 1932 catalog as "E-130," with a price of \$165 (p 18).

\$2,500 - 3,500



4
LOHMANN BROTHERS.

A rare 5-inch pneumatic-drive refracting telescope, Greenville, OH, c.1918, signed "Lohmann Bros. | Makers | Greenville, Ohio," pale blue-painted brass, sighting scope, steel headset, with wood tripod base, 1800 mm long, the base 1900 mm high, some paint loss. Lacking 5-inch objective lens.

PERHAPS THE ONLY SURVIVING EXAMPLE OF A PNEUMATICALLY-DRIVEN TELESCOPE. The Lohmann Brothers emigrated from Germany to America around 1890, and initially concentrated on basic engineering and woodworking. Not many of their telescopes are known to exist. Lohmann's advertisements in the magazine *Scientific Monthly* featured the present design of telescope, described as "5-in. with pneumatic clock"—an unusual form of drive mechanism allowing the observer to track his subject in the night sky (vol 9 no 3, September, 1919, and vol 10 no 2, January, 1920). The advertisements seem to show a pneumatic bulb on a cord, not present here.

\$5,000 - 7,000



5

**5
HANDMADE JUPITER GLOBE.**

Large Jupiter globe, produced by the astronomical artist Ralph Turner probably in Sheridan, OR, 1974. Signed "RT 1974" at north pole. Airbrush and pastel on fiberglass cast globe, with triangular grid in black ink. Diameter 18 inches. Metal loop for hanging at top.

AN IMPOSING AND DETAILED HAND-PAINTED GLOBE, developed using photographs from Pioneer 9.
\$1,500 - 2,500

**6
DENOYER-GEPPERT LUNAR GLOBE.**

Denoyer-Geppert Lunar Globe. [Chicago, IL, c.1969.]
Diameter 16 inches (406 mm). Scale 135 miles per inch. Metal stand.

"In 1969, to commemorate the Apollo 10 mission, Denoyer Geppert designed a special lunar globe that the astronauts of the mission presented to President Nixon. Contracted by NASA, Denoyer Geppert created the first complete Moon globe, using the Apollo 10 film footage and photographs of the far side of the moon. 200 first edition globes of this type were produced, the first of which went to President Nixon and four others to special members of Congress" (*American Globe Preservation Society*, AMGS Newsletter, March 2012, p 4). The present globe is an early edition, showing the landing sites for Apollo 11 (July 20, 1969) and 12 (November 19, 1969). Later editions show up to Apollo 16 (April 21, 1972).
\$2,000 - 3,000



6

**7
1960s MOON GLOBE.**

Pergamon Moon Globe. Oxford, London, New York and Paris: [produced by Paul R  th Verlag, Leipzig for] Pergamon Press, [c.1963]. Diameter 13 inches (330 mm). Scale 1:10,400,000. Mounted within metal graduated half circle and on wood stand.

Based on the photography of Luna-3, the first space probe to photograph another planetary body, and the source of our first sight of the far side of the Moon. The cartouche reads in part: "the map material was prepared by the Central Research Institute of Geodesy, Aerial Photography and Cartography together with the Shternberg State Astronomic Institute of the U.S.S.R." Only two of the gores remain blank as photography had not reached that far at the time of publication.

\$500 - 800

RUSSIAN PROGRAMS

8

SIGNED BY THE FIRST MAN IN SPACE, THE FIRST WOMAN IN SPACE, THE FIRST PERSON TO CONDUCT AN EVA, AND THE FIRST COSMONAUT TO FLY IN SPACE TWICE.

KOMAROV, FEOKTISTOV, EGOROV, editors. [Zvezdograd No. 1. Almanac of Art and Literature of the House of Officers.] Zvezdograd: [n.p.], 1964. 8vo. 80 pp. Original illustrated wrappers. Upper cover re-attached with tape, covers edge-worn and soiled, dust jacket taped directly to book. Signed and inscribed on title.

FIRST EDITION OF THE FIRST VOLUME OF THIS COSMONAUT-PRODUCED JOURNAL, SIGNED BY YURI GAGARIN, VLADIMIR KOMAROV, VALENTINA TERESHKOVA, AND ALEXEI LEONOV with inscription to Orest Chernyi-a, a soldier in one of the military regiments attended by the cosmonauts. Additionally inscribed and signed to Orest by one of the authors. Zvezdograd (Star City) is the common name of an area in Moscow Oblast which has been home to the Yuri Gagarin Cosmonaut Training Center since the 1960s. The almanac, edited by three cosmonauts, collected together short stories, poems and songs by young authors about space exploration.

WITH: Black and white photograph, 5 by 3 inches, of Orest posing with Gagarin, Komarov and several soldiers.

\$1,500 - 2,500



8

9

FIRST PANORAMIC VIEW OF THE LUNAR SURFACE—SIGNED BY 16 COSMONAUTS.

[First Panoramas of the Lunar Surface.] Moscow: [Academy of Science], 1967. Folio (8 1/2 by 11 1/2 inches). 100 pp. Text in Russian. Blue publisher's cloth lettered in silver. Spine lightly sunned, some light soiling to covers. Vol 1 (all published).

FIRST EDITION SIGNED BY 16 EARLY COSMONAUTS, INCLUDING GAGARIN, TITOV, BYKOVSKY, POPOVICH, NIKOLAEV, LEONOV, BELAYEV, BEREGOV, KHRUNOV, KUBASOV, ELISEEV, and SHATALOV. Also signed by Kamanin, who was the head of the cosmonaut program.

Features the first panoramic photographs of the Lunar surface, which were taken by the Luna-9 automatic station February 3, 1966. Luna 9 was the first spacecraft to achieve a soft landing on the Moon, or any planetary body other than Earth, and to transmit photographic data to Earth. The landing spot was the western edge of the Ocean of Storms (Oceanus Procellarum) on the Moon at 64.5 degrees W, 7 degrees N. Topics covered include, equipment, on-board systems, flight dynamics, results from studies of the panoramas of the lunar surface, mapping of surroundings of the spacecraft, and morphology of the landing area.

\$3,000 - 5,000



9

10

SIGNED BY 10 SOVIET COSMONAUTS.

Large vintage color photograph, 11 by 7 inches, 1965.

Early photograph of 11 Soviet cosmonauts, SIGNED BY GAGARIN, TITOV, NIKOLAEV, POPOVICH, BYKOVSKY, BELAYEV, TERESHKOVA, KOMAROV, YEGOROV AND FEOKTISTOV. Inscribed on verso to Colonel Scheglov, veteran of 16th the airborne Army, dated August 1, 1965.

\$3,000 - 5,000



10



11

11 SOVIET COSMONAUTS.

Collection of:

1. Post Card booklet featuring photos of 16 Soviet Cosmonauts, SIGNED BY GHERMAN TITOV, ANDRIAN NIKOLAYEV, PAVEL POPOVICH, VALERY BYKOVSKY, VALENTINA TERESHKOVA, ALEKSEI LEONOV, GEORGY BEREGOVVOY, VLADIMIR SHATALOV, YEVGENY KHRUNOV, ALEKSEI YELISYEV, and BORIS VOLYNNOV.

2. Two signed photographs of Andrian Nikolayev (1 color 4½ by 6½ inch, 1 black & white 3½ by 5½ inch) and three 5 by 3½ inch vintage color photographs of Andrian Nikolayev and Vitaly Sevastyanov's visit to the United States.

3. NASA official report of the "Visit to the United States, Soviet Cosmonauts Andrian Nikolayev and Vitali Sevastyanov. October 18-28, 1970", as well as two official invitations to luncheons celebrating the cosmonauts addressed to Mr. Walter Pennino.

Provenance: Lieutenant Col. Walter Pennino. Pennino (1915-1998) was the director of NASA's public relations program, and did the advance work for foreign goodwill tours made by astronauts.

\$2,000 - 3,000



12

12 NIKOLAYEV'S VOSTOK TO SOYUZ MEMORABILIA.

Small collection of items relating to Nikolayev's flights aboard Vostok 3 and Soyuz 9:

1. 3 black and white photographs, 5 by 3½ inches, of the cosmonaut in uniform, SIGNED and INSCRIBED on verso, together with autograph statement signed relating to the photos.

2. Color photograph, 4 by 5½ inches, of Nikolayev, Sevastyanov, and Buzz Aldrin, SIGNED by all three and INSCRIBED on verso by Nikolayev: "This picture was taken in 1970 in the US."

3. Black and white photograph, 7 by 9 inches, of Russian and American space travelers at the Cosmonaut Training Center, SIGNED by BILL ANDERS of Apollo 8.

4. 11 autopen lithographs of Apollo crews.

5. 33 rpm American record entitled "Sounds of Rockets."

6. Bound group of *Izvestia* and *Pravda* newspapers relating to Nikolayev's flights, with autograph statement signed by Nikolayev.

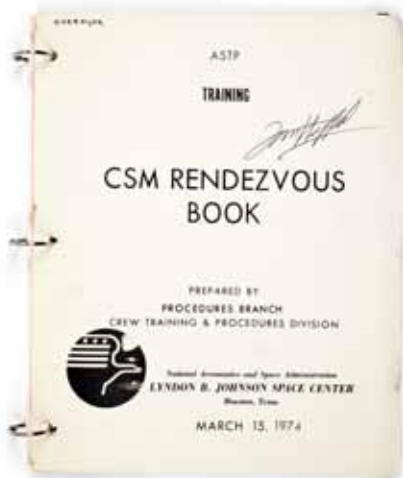
Provenance: Sotheby's New York, March 16, 1996, lot 169.

Andrian G. Nikolayev flew on two space flights: Vostok 3 (effectively becoming the third Soviet cosmonaut) and Soyuz 9. On both, he set new endurance records for the longest time a human being had remained in orbit. He was married to Valentina Tereshkova, the first woman to fly in space.

\$800 - 1,200



13



14



15



16

13 FILIPCHENKO'S ASTP FILES.

Group of items from the collection of cosmonaut Anatoly V. Filipchenko, backup crew member for Soyuz 19 that was part of the Apollo-Soyuz Test Project:

1. GREEN, W.F., and others. *Apollo-Soyuz Test Program: Orientation*. N.p.: Space Division, Rockwell International, May 1973. Approximately 170 pp. 8½ by 11 inches. Photocopied manual, text in English and Russian. Stapled.
2. Related documents on the Docking Module, Environmental Control Systems, and a *Glossary of Conversational Expressions between Cosmonauts and Astronauts*.
3. Folding time-chart for ASTP, in Russian, 7 by 55 inches. Bound in green cloth.
4. Collection of 7 photocopied or carbon typescript documents relating to ASTP including a transcript of Apollo 17 communications. Some annotations in Filipchenko's hand.
5. FILIPCHENKO, A.V. [In Russian:] *Nadezhzhaja Orbita. [Reliable Orbit.]* Moscow: 1978. With 3 inscribed photographs.
6. 4 programs and brochures from the Space Future Forum held in Moscow in 1987.
7. Black and white photograph, 10 by 11½ inches, of approximately 40 delegates to the Forum, signed by many including Tereshkova, Leonov, Shatalov, and others.

Provenance: Sotheby's New York, March 16, 1996, lot 179.

Many items SIGNED by ANATOLY FILIPCHENKO.

\$2,000 - 3,000

14 MANUALS FOR THE APOLLO-SOYUZ TEST PROJECT.

1. *ASTP Training: CSM Rendezvous Book*. Upwards of 65 pp. 10 x 8 inches. 8 tabbed sections including Dock/Undock, several data pad grids for use during maneuvers or navigational alignments. Some pages in Russian. With a black and white photograph, 8 x 10 inches, showing an ASTP joint training session with this and other documents in use.
 2. *ASTP ... Reference ... Docking Module Checklist*. 160 pp. 10 x 8 inches. 4 tabbed sections covering first to fourth transfers. 2-column parallel text in Russian and English.
- Both Houston, TX: LBJ Space Center, March 15 and May 12, 1975. Punched and bound with three and one metal rings respectively.
- Provenance:* From the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

BOTH SIGNED BY TOM STAFFORD on upper cover. Both manuals were used by astronaut Robert Overmyer during flight training and mission support. He was part of the Apollo Support Crew during ASTP.

\$800 - 1,200

The following lot was originally in the collection of Astronaut Thomas Stafford.

15 TOM STAFFORD'S ASTP FLOWN BETA CLOTH.

FLOWN Apollo Soyuz crew emblem, 3 ½ inches in diameter. Printed on a white Beta cloth section 5 ½ inches square. Displayed with a Typed Letter Signed by TOM STAFFORD from his business stationery.

The beta emblem is SIGNED by TOM STAFFORD, D.K. SLATON, VANCE BRAND, ALEXEI LEONOV, and VALERY KUBASOV. Additionally INSCRIBED and SIGNED: "Flown on ASTP, 15-24 July 1975, Tom" [Stafford].

TOM STAFFORD'S January 30, 1990 signed provenance letter reads: "This Apollo-Soyuz Beta cloth emblem was carried in space on the historic Apollo-Soyuz Test Project during 15 – 24, 1975. It was placed in my personal preference kit (PPK) on board the Apollo command module. Beta cloth material was designed for fire protection was used in our Apollo spacesuits."

\$1,500 - 2,500

16 PERFORMING EXPERIMENTS AFTER THE FIRST INTERNATIONAL HAND-SHAKE IN SPACE.

Color photograph, 8 by 10 inches.

SIGNED by VALERY KUBASOV.

Soyuz flight engineer Valery Kubasov conducts experiments inside the Apollo Soyuz Docking Module during the July 1975 ASTP flight.

\$150 - 250



17

17

COOPERATION IN SPACE. SIGNED BY NIXON, KISSINGER AND THE FULL APOLLO-SOYUZ CREW.

14 by 11 inch vintage photograph of the official Kremlin reception celebrating the official visit of the President Richard Nixon to the Soviet Union. WITH: 1 by 1½ inch first day of issue 8¢ Copernicus postmark on 8½ by 11 inch "Cooperation in Space" certificate stamped "Washington DC, Apr. 23, 1973. First day of issue."

Provenance: From the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

SIGNED BY RICHARD NIXON, HENRY KISSINGER, TOM STAFFORD, VANCE BRAND, DONALD SLAYTON, KAROL "BO" BOBKO, ALEXEI LEONOV AND VALERI KUBASOV.

A very rare image of an unprecedented moment in history, the official Kremlin reception hosted by Brezhnev on Nixon's visit to the Soviet Union, at which the Apollo-Soyuz crew were official guests. In attendance with Nixon were Henry Kissinger, soviet officials Brezhnev, Suslov, Gromyko & HN Kosygin who signed the Cooperation in Space agreement in 1972 for the Soviet Union.

\$3,000 - 5,000



18

18

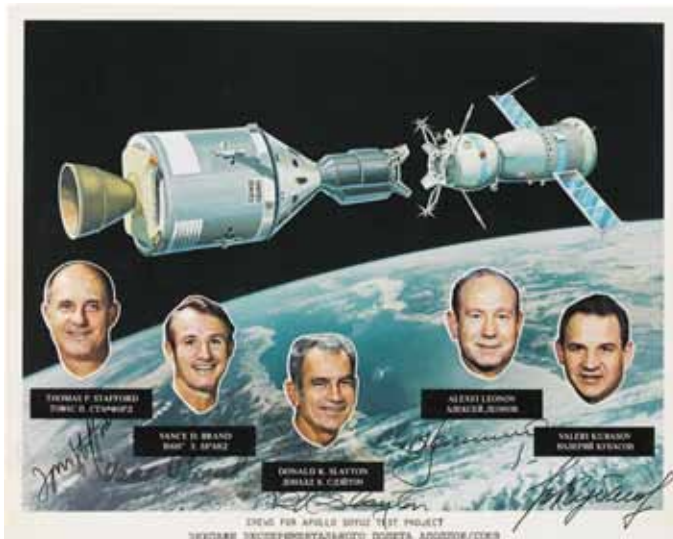
DOCKING MODULE BLUEPRINT—SIGNED.

"Modification Decals, DM Russian Nomenclature." Large blueprint, 21 by 85 inches folded to 8 by 11 inches, illustrating the Docking Module (DM) and Command Module hatches, intercom system, pressurization modification and related gauges, and a locator diagram of the DM systems. All components labeled in English and Russian. Together with a color photograph, 8 by 10 inches, showing an ASTP training session with the present blueprint in use.

Provenance: From the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

SIGNED BY TOM STAFFORD near the center. Since the Apollo Command Module and the Soyuz spacecraft had incompatible docking and pressurization systems, the DM was created to allow them to link up. The photograph shows the classroom during language instruction where Forostenko and other interpreters worked with the Apollo crew to familiarize them with DM terminology using this blueprint.

\$600 - 900



19

19

SIGNED BY THE ENTIRE CREW OF HISTORY'S FIRST INTERNATIONAL SPACE MISSION.

Color photolithograph, 8 x 10 inches, printed caption along bottom margin with NASA text on verso, in English & Russian.

SIGNED BY TOM STAFFORD, VANCE BRAND, DEKE SLAYTON, ALEXEI LEONOV, and VALERI KUBASOV. The Apollo-Soyuz Test Project in 1975 was the last of the Apollo Missions, carrying Tom Stafford, Vance Brand, Deke Slayton, Alexei Leonov and Valeri Kubasov, symbolically ending the Space Race.

\$800 - 1,200



20

20

END OF THE SPACE RACE.

FLOWN FLAGS FROM ASTP, THE SYMBOLIC END OF THE SPACE RACE, BEING AMERICAN AND SOVIET FLAGS FLOWN ABOARD THE APOLLO AND SOYUZ SPACECRAFTS. Presentation plaque comprising two flown flags, each 4 by 6 inches, mahogany and metal, the flags behind lucite panels, 21 by 17 inches.

With wording in English and Russian, the plaque reads in part: "Presented to the Honorable Nelson A. Rockefeller. These flags were flown aboard the Apollo and Soyuz spacecraft during the world's first International Manned Space Flight, July 1975. They symbolize the ability of nations to work together successfully in space as well as on earth."

Rockefeller was an early avid supporter of the space race, especially during his role as adviser to president Eisenhower.

The Space Race essentially began in 1957 with the launch of Sputnik 1, and was arguably "won" in 1969 when the USA put a man on the moon. But it was not until the Apollo-Soyuz Test Project in 1975 that the two competitors literally shook hands in Earth's orbit.

This final Apollo mission carried Tom Stafford, Vance Brand, and Deke Slayton. On board the Soyuz were Alexei Leonov and Valery Kubasov. On July 17, 1975, the two spacecraft docked, and the commanders, Stafford and Leonov, shook hands through the open hatch of the Soyuz, a moment whose symbolism cannot be overstated. The astronauts and cosmonauts then conducted experiments, exchanged certificates, flags and gifts, and ate together.

\$3,000 - 6,000



21

21

FLOWN TO MIR FROM THE SOVIET UNION, RETURNED TO EARTH AFTER A NEW RUSSIAN ERA.

Crew-signed envelope, stamped multiple times on-board MIR, having travelled 300 million miles and orbited earth over 10,000 times.

SIGNED BY VASILI TSIBLIYEV, GENNADI MANAKOV, ALEXANDER POLESHUK AND TOKTAR AUBAKIROV of Kazakhstan WHILE ON MIR, as well as by FRANZ VIEHBOECK from Austria, and JEAN-PIERRE HAIGNERE from France while in-orbit, and later by SERGEI KRIKALYOV. This Soviet envelope which was printed in 1988 to commemorate 30 years of the Gagarin Cosmonaut Training Center in Star City, has had a remarkable journey. In 1990 postage was added and it was first stamped commemorating the April 12th launch of Gagarin. Then it was launched to the MIR space station, when it was first crew signed and stamped with the on-board MIR stamps on October 4th, 1991, including the two beautiful MIR stamps in the upper left corner. While remaining in orbit for about 2 years, further on-board crew signatures and MIR Orbital Space Station stamps were added on October 10th, 1991, July 3rd, 1993 and July 22nd, 1993.

Highly experienced Russian cosmonaut Sergei Krikalyov signed later since he wasn't able to sign onboard during very turbulent times for his homeland. After a 10 month stay on MIR from May 1991 through March 1992, Krikalyov returned to Russia after the fall of the Soviet Union, which earned him the widely known nickname "the last Citizen of the USSR".

\$3,000 - 5,000



RUSSIAN MODELS, HARDWARE AND ENGINES

22

VOSTOK SPACE ROCKET MODEL.

Glass reinforced plastic and metal model, 58 inches tall, on wood and metal stand, together 62 inches tall. 1:25 scale, NPO Energia, 1990s.

A very highly detailed model made for exhibition purposes by NPO Energia, the Russian company that manufactured the actual Vostok. Vostok was a family of rockets derived from the Soviet R-7 Semyorka, designed for the human spaceflight program. The rocket was used to launch the first artificial satellite, Sputnik, and the first manned spacecraft in history on April 12, 1961, carrying Yuri Gagarin on board. It had 20 main engines clustered in fours which developed a million pounds (453,000 kg) of thrust. The Vostok series included six launches over a two-year period. The final two missions in June 1963 by Vostok 5, followed two days later by Vostok 6, carrying Valentina Tereshkova, the first woman in space, were notable in that the two spacecraft traveled at times only 3 miles (4.8 km) apart, setting the stage for future space dockings between orbiting vehicles.
\$10,000 - 15,000

23²

VOSTOK SPACECRAFT MODEL.

Resin and metal model, 4 inches in length, mounted on 4 by 6 inch wooden base, made in Canada, 1980s.

1/48 scale model of the spacecraft used for the first human spaceflight, on April 12, 1961, carrying with it the first man to fly into space, Yuri Gagarin. SIGNED on base BY ALEXEY LEONOV and VALENTINA TERESHKOVA.
\$400 - 600

22



26

24[□]

SOVIET PROTON ROCKET MODEL.

Polished aluminum model with brass details, 17 inches tall, mounted on 6 inch wide hexagonal lucite base, unknown manufacturer, 1960s.

Proton has been one of the most successful heavy booster rockets in the history of space flight. The first Proton rocket was launched in 1965, with the unmanned Soviet circumlunar spaceflights, prior to the US Apollo 8 mission, and is still used to this day. Aside from the numerous probes to Mars, Venus, the Moon, it is most famous for having launched the Salyut space stations, the Mir expansion modules and core segment, as well as the Zvezda and Zarya modules of the International Space Station.

\$500 - 800

25

SOYUZ ROCKET MODEL.

Hand-painted aluminum model, 28 inches tall on wooden and metal base, together 32 inches tall, Samara, 1960s.

A highly detailed model of the most recognizable and frequently used of the Russian rockets, made by Samara, the factory that produces the actual Soyuz rockets. Used to launch the Soyuz spacecraft as part of the Soyuz program, it was first flown in 1966, and was developed from the earlier Voshkod rocket.

\$1,200 - 1,800

26

LUNOKHOD 2 LUNAR ROVER MODEL.

Plastic, resin and metal model, 14 by 11 by 7 inches, on wooden stand. A very fine, highly detailed and accurate 1:7 scale model manufactured by NPO Lavochkin, 1990s. Complete with Solar panel cover lifted with full stop. The large antenna can change the angle of tilt and rotate around the axis of the base, wheels rotate.

A very highly detailed model made for exhibition purposes by NPO Lavochkin, the Russian company that manufactured the actual Lunokhod. In January 1973, the Soviet Union's Lunokhod-2 moon rover touched down on the Moon at the start of a 4-month mission to explore the geology of the lunar surface. It is still on the Moon, but is no longer owned by Russia. In 1993, hard pressed for cash in the wake of the Soviet collapse and teetering on the brink of closure, the Lavochkin Space Design Company that built the rover auctioned it off at Sotheby's to the American collector Richard Garriott, son of a NASA astronaut who also became a paying guest on the ISS in 2008.

\$10,000 - 15,000



27

27

ANGARA 5P SPACE ROCKET MODEL.

ONE OF ONLY TWO MODELS MADE.

Large hand-made metal, plastic and resin model, 39 inches tall on thick wooden base, together 45 inches, MB Krunichev, 1990s.

A high quality, highly detailed hand-made large 1:72 scale model of the Russian space rocket Angara 5P, developed by the Moscow-based Krunichev State Research and Production Space Center. One of two models made for the MAKS 2008 exhibition at the International Aviation and Space Show near Moscow. The Angara is a two-stage rocket, 712-ton booster, with the "P" designation denoting that the rocket is "piloted" or "manned." Both the Angara 5 and 7 are designed for launching manned spacecraft. It is likely that the Angara 5P could become the main carrier of any projected Russian manned spacecraft during most of the 2020s.

\$6,000 - 9,000

28

MIR SPACE STATION CONTROL PANEL.

A KEY PIECE OF HARDWARE FROM THE MIR SPACE STATION.

Control panel, aluminum and steel painted light blue, with plastic push buttons, glass light panels, digital display. *исполнение* [execution] button with metal safety switch cover. 16 by 9 1/2 by 7 inches. Mounted to metal display stand.

Provenance: Displayed at the 2000 World's Fair in Hannover, Germany as part of the Russian MIR Toru Control Centre exhibit.

One of three control panels for the TORU docking system on MIR, which consisted of a sensor board, a PU PBS control panel, and this, the PVK Control Panel. Together, these three devices, along with a tv monitor and joysticks, were responsible for the manual docking and undocking of spacecraft attached to the space station. The TORU system was a manually teleoperated rendezvous control system which served as a back-up to the automatic Kurs system. Not only was it used on MIR, but also on Salyut, and the International Space Station (ISS). The system was famously used in the disastrous docking attempt of the Russian unmanned cargo spacecraft *Progress M-34*, which collided with the MIR space station in 1997.

\$4,000 - 6,000

29

CREW COUCH SHOCK ABSORBER USED ON SOYUZ 23, THE FIRST SOVIET "SPLASHDOWN."

THE ABORTED FLIGHT LANDS ON A FROZEN LAKE DURING A RUSSIAN BLIZZARD.

FLOWN cosmonaut crew couch shock absorber made of aluminum and other metals, 29 inches long and 2 1/2 inches in diameter. Fittings at three different locations allow placement inside the Soyuz spacecraft on the crew seat assigned to cosmonaut Valery Rozhdestvenskiy. Several stenciled markings (in Russian) read in part (translated): "Shock absorber cover n. 564. Remove before flight". With a Typed Letter Signed by ROBERT ROZHDESTVENSKIY.

Valery Rozhdestvenskiy's signed provenance letter in Russian reads (translated): "Upon completion of the flight on Soyuz-23, during which an emergency situation had occurred (due to which the connection with the space station Salyut-5 failed), me and Zudov landed not in the designated point on the land, but on the lake Tengiz. Amortization of the chair #564 did not function, and after I investigated the reasons of this failure I took this chair home as a souvenir. Signed: Robert Rozhdestvenskiy."

Rozhdestvenskiy was selected for the cosmonaut program in 1965 and served as flight engineer on Soyuz 23 with commander cosmonaut Vyacheslav Zudov. Soyuz 23 was launched on October 14, 1976 for a planned long duration mission on the Salyut 5 space station. Problems with the automatic docking system during rendezvous on October 15 forced the crew to abort the mission and return to earth the following day, October 16. Soyuz 23 landed on the nearly frozen lake in the dark during near blizzard conditions. Their landing parachute soon began to sink and drag the spacecraft below the waterline. This caused difficulty for the recovery crews to actually locate Soyuz 23 and it was not until the next morning that the crew was actually rescued.

\$1,500 - 2,500



28



29



31

30[□]

SOVIET HYPERSONIC TECHNOLOGY.

KHOLOD [COLD] FLYING LABORATORY MODEL.

Wooden model, 16 inches tall, on wooden stand 4 inches wide, unknown manufacturer, 1990s.

The main component of Kholod was a hypersonic ramjet engine capable of accelerating to several Mach at an altitude of 12-20 miles. This rocket was the Soviet Union's first realistic test of hypersonic technology, and was not launched until 1991.

\$300 - 500

31[□]

SOVIET SURFACE-TO-AIR MISSILE ENGINE.

Liquid propellant sustainer powerplant, designed by the bureau of celebrated rocket engine designer Alexei M. Isayev. 39 by 14 by 14 inches, approximately 140 lbs when crated. Constructed of various alloys, one duct with cloth tape insulation and paper label reading "20[Cyrillic D]6510-30/3," various inspection marks mostly in red. Apparently unfired. On custom stand.

Alexei Isayev specialized in small-scale, liquid-fuelled rocket engines for Soviet manned and unmanned spacecraft. From 1957 to 1967 his engines powered the rockets carrying the first artificial satellites, the first man in space, and the first unmanned probes to the Moon and Venus. At the same time, in the 1950s, he was working on engines for surface-to-air missiles (SAMs) and air-to-sea missiles. The present engine is for a S-75 Dvina, a high-altitude, command-guided, SAM. Since its first deployment in 1957 it has become the most widely-deployed air defense missile in history. The missile came to the world's attention when an S-75 battery, using the newer, longer-range and higher-altitude V-750VN missile shot down the U-2 spy plane of Francis Gary Powers as he was flying over the Soviet Union on May 1, 1960. A Soviet missile crew in Cuba used an S-75 on October 27, 1962 to shoot down the U-2 flown by Rudolf Anderson—the only combat death of the Cuban Missile Crisis. Technically S-75 refers to the complete battery, the missile itself being known as a V-750. The missile is in two stages, consisting of a solid-fuel booster and a storable liquid-fuel upper stage. The booster fires for about 4–5 seconds and the main engine for about 22 seconds, by which time the missile is traveling at about Mach 3. The present engine is from the upper stage. The American U-2 spy plane flew at high altitudes, and for the S-75 to reach it, a more powerful engine was needed; the present engine is a version of that high-power rocket. An unusual artifact of the Cold War and a reminder that the space programs were largely an offshoot of military research and development.

\$6,000 - 9,000



32



33

AMERICAN ENGINES, HARDWARE AND MODELS

32

AMERICAN BALLISTIC MISSILE TECHNOLOGY.

POLARIS MISSILE NOSE CONE EJECT ROCKET MOTOR.

Steel inert solid fuel rocket motor. 12½ inches long, 5 inches in diameter.

Provenance: Property of an institution.

Used for separating the nose cone from booster of the Polaris missile.

The Polaris was a solid-fuel nuclear-armed two-stage submarine launched ballistic missile. Built during the Cold War for the United States Navy by Lockheed Martin, the Polaris had its first test launch at Cape Canaveral on January 7, 1960.

While it was not the first submarine launched nuclear missile, its use of solid-propellant propulsion was considered revolutionary, as it permitted a substantial reduction in the size of the missile. Not only was the Polaris substantially smaller and lighter than earlier ballistic missiles, it also benefited from a superior launch system, enabling the missile to be propelled to the surface from a fully submerged submarine. Prior to this, in order to launch a missile, submarines had to surface, placing them at risk of being detected. The Polaris was so successful, that it was later adopted by the British and became the pillar of its nuclear deterrent force during the 1970s and 80s.

\$1,200 - 1,500

33

LAUNCHING THE SATURN V.

APOLLO SATURN V J-2 ENGINE ACTUATOR VALVE.

Steel propellant utilization valve. 6 inches tall, 5 inches in diameter. 7 pounds 8 ounces. Manufactured by Rocketdyne, part number: "251010-11", serial number: "1L68". 40/115 volt 400 cycle system.

An electrically operated, two-phase, motor-driven, oxidizer-transfer valve and is located at the oxidizer turbo pump outlet volute. The propellant utilization valve ensures the simultaneous exhaustion of the contents of the propellant tanks. During engine operation, propellant level sensing devices in the vehicle propellant tanks control the valve gate position for adjusting the oxidizer flow to ensure simultaneous exhaustion of fuel and oxidizer.

\$800 - 1,000



34

**34
SATURN V TRANSPORTATION ARCHIVE INCLUDING ORIGINAL
ILLUSTRATION ART BY THE VON BRAUN TEAM.**

A compelling archive of plans, original illustration art, schematics and negatives used to make the Saturn V Transportation Manual. Designed under the direction of Werner Von Braun and Arthur Rudolph at the Marshall Space Center in Alabama, the Saturn V was a multistage liquid-fueled launch vehicle that launched from the Kennedy Space Center. To this day it remains the heaviest, tallest, and most powerful rocket ever operated. Due to its vast size, transportation of rocket stages from the Marshall Space Flight Center (and later from the Michoud Assembly Facility near New Orleans) to the Kennedy Space Center proved to be a true logistical challenge. The first two stages were so large they had to be transported via barge, with the S-IC traveling down the Mississippi to the Gulf of Mexico, and the S-II, which was constructed in California, traveling via the Panama Canal.

1. Group of 24 original hand-colored illustrations (18—30 by 40 inches, 5—23 by 29 inches, 1—20 by 15 inches) for the Saturn Transportation Manual.
2. Four 16 by 30 inch hand drawn plans in pen, ink and gouache for docking facilities.
3. Two 19 by 24 inch schematics in pen, ink and pencil on tracing paper of the operator's console for the Saturn V transport vehicle.
4. Three 17 by 27 inch illustrations in pen & ink on paper of the preservation kits for the S-IV, S-IC and S-II stages of the Saturn V rocket, plus one 17 by 27 inch illustration of the R&D Instrumentation Trailer.
5. Six assembly and operator's diagrams ranging in size from 22½ by 28½ inches to 24 by 30 inches, including diagrams of the front dolly assembly, hose & cable assemblies, and the front & rear operator's consoles.
6. Group of three hand-colored illustrations (2—22 by 18 inches, 1—24½ by 18 inches) with illustrated mylar overlays depicting "Redstone-Preserved Level 'A'"; "Jupiter Preserved to level 'A'", and a water transport tank.
7. Collection of 60 negatives ranging in size from 9 by 7 inches to 24 by 11 inches for the Stage Transportation S-IC Operating Instructions and Maintenance Manual, which was put out by the Special Transportation Branch Test Laboratory of the George C. Marshall Space Flight Center of NASA.

\$5,000 - 8,000



35

**35
WERNER VON BRAUN.**

Black and white photograph, 8 by 10½ inches, of Werner von Braun inspecting a camera. Framed.

WITH: *NASA Facts*. Houston: NASA/MSC, 1972. 8 by 10½ inch pamphlet. 4 pp. Illustrated in black & white. An informational leaflet on SKYLAB, the manned orbital scientific space station, which was proposed by the famous rocket engineer Werner von Braun.

BOTH SIGNED BY WERNER VON BRAUN.

\$1,000 - 1,500

**36[□]
GRUMMAN LUNAR MODULE ARCHIVE.**

1. *NASA/GRUMMAN Apollo Lunar Module*. Rare original transgraphic Lunar module brochure printed in Germany for Grumman, ca.1967. With 7 mylar sheets each printed on both sides in color, stapled inside a gray printed folder. Folder includes flap listing the 118 LM parts detailed on the overlays. With three samples of thermal blanket attached to front cover. 8 by 10 inches.
2. *Apollo Lunar Module Primary Guidance, Navigation and Control System. Student Study Guide. LM PGNCs. Level II. Familiarization Course F3100*. Milwaukee: AC Electronics, 1967. 8 by 10½ inches.
3. *Lunar Module Final Assembly Subsystem Installation*. New York: Grumman Aircraft Engineering Corporation, 1966. 11 by 8½ inches.
4. *Grumman in Space*. New York: Grumman Aircraft Engineering Corporation, ca. 1967. 12 by 8 inches.
5. *Lunar Excursion Module for project Apollo* brochure. 8½ by 11 inches.
6. *Apollo 11. The Lunar Landing* brochure. 4¼ by 9¾ inches.
7. *Lunar Module Subsystem Assembly and Installations*. New York: Grumman Aircraft Engineering Corporation, 1967. 8½ by 11 inches.
8. *Grumman Horizons*, Vol. 4, No. 2, 1964. 8½ by 11 inches.

Provenance: Property of an institution.

\$600 - 900



36

Lots 37-45 are all from a Lunar Module slated for a Moon landing which was later cancelled.

37

CONTROLLING THE GRUMMAN APOLLO LUNAR MODULE.

LUNAR MODULE PILOT RIGHT SIDE MAIN CONTROL AND DISPLAY PANEL.

Aluminum alloy panel with titanium fittings and fasteners. 15 by 24½ by 2 inches. Part numbers: "LDW 340-21136-1, LDW 340-21135-3, AS8YNO, 1998.32.08".

Provenance: Property of an institution.

The control and display panel is arguably one of the most important parts of the Lunar Module, as it enables the astronauts to monitor and manage the Lunar Module subsystems and to control the vehicle manually during separation, docking, and landing. Centered and canted between the flight stations, it housed controls and displays related to flight control, main propulsion, and engine thrust control, as well as warning lights.

See illustration overleaf.

\$2,000 - 3,000

38

GRUMMAN APOLLO LUNAR MODULE DESCENT STAGE INSULATION.

DESCENT STAGE THERMAL BLANKET SECTION.

Consisting of aluminized polyimide (Kapton-H film), aluminized polyester (mylar), fiberfax, inconel mesh, nickel foil, and mylar tape. 12 by 15 inches, one side with 12 inch velcro strip.

Provenance: Property of an institution.

The thermal blanket played a key role in protecting the descent stage. Part of the thermal shield, it was used in conjunction with a titanium heat shield to protect the bottom of the descent stage from engine heat, as well as part of the protection for the engine compartment. The titanium shields coupled with the thermal blankets were mounted on supports which kept them at least a half inch away from the main structure.

\$2,500 - 3,500



38

39

GRUMMAN APOLLO LUNAR MODULE LANDING GEAR MAIN COMPONENT.

LUNAR MODULE PRIMARY LANDING STRUT, THE LARGEST PIECE OF THE LANDING GEAR ASSEMBLY.

Made from aluminum alloy, with titanium fittings and fasteners. 8½ feet tall, 7 inches in diameter. Part numbers: "LTM320M50505-1 and LTM320M50506-1". Complete with both telescoping sections.

Provenance: Property of an institution.

The largest piece of the landing gear assembly. The landing gear assemblies of the Lunar Module extend from the front and rear of both sides of the descent stage. They consist of struts, trusses, a footpad, as well as a locking and deployment mechanism. The left, right, and aft footpads have a lunar surface sensing probe. The landing gear not only buffers the impact of the lunar landing, but also prevents the vehicle from tipping over, and supports it during lunar stay and lunar launch. The lunar surface landing probes are stowed against the primary strut until the landing gear is deployed.

See illustration overleaf.

\$5,000 - 7,000

40

GRUMMAN APOLLO LUNAR MODULE LANDING GEAR COMPONENT.

SECONDARY LANDING LEG STRUT.

Made from aluminum alloy, with titanium fittings and fasteners. 4 feet 10 inches in length, 4½ inches in diameter. Part number: "TM320M51578-1 RR-67751 SN-9".

Provenance: Property of an institution.

The second largest part of the Lunar Module landing gear. The secondary struts support the primary struts, and resist longitudinal compression.

See illustration overleaf.

\$3,000 - 5,000



41

GRUMMAN APOLLO LUNAR MODULE LANDING GEAR STRUCTURAL COMPONENT.

LANDING LEG DEPLOYMENT TRUSS SIDEFRAME ASSEMBLY.

Made from aluminum alloy, with titanium fittings & fasteners. 2 feet 10 inches by 2 feet and one half inch. Connector measures 10 inches. Part numbers: "LDW320ML0910-1, LDW320M10906-1, LDW320M10905-5, and LDW320M23903-3".

Provenance: Property of an institution.

At Earth launch, the landing gear is in a retracted position, and upon operation of the landing gear deployment switch, the landing gear uplocks are explosively released while the springs in the deployment mechanism extend the landing gear. The truss sideframe assembly is a key component in maintaining stability during landing leg deployment.

\$1,500 - 2,000

42

EXITING THE LUNAR MODULE.

PAIR OF INGRESS/EGRESS PORCH HANDRAILS.

Aluminum alloy handrails. Each 5 feet in length, 1 inch in diameter.

Provenance: Property of an institution.

The porch handrails are attached to the egress platform located directly outside of the forward hatch of the Lunar Module. It is through this hatch that the astronauts and equipment are transferred from the Lunar Module onto the Lunar surface. The astronauts hold onto the handrails while traversing the egress platform before descending the ladder onto the Lunar surface.

\$3,000 - 5,000

43

GRUMMAN APOLLO LUNAR MODULE ASCENT STAGE COMPONENT.

ASCENT STAGE REAR SUPPORT TRUSS.

Made from aluminum alloy, with titanium fittings and fasteners. 5 feet 2 inches long, 4 inches in diameter. Part number: "LDW820M10901-1 SNHMP58 ASS'Y # 1". With original protective plastic shipping casing, 2 feet, 9.5 inches, labeled "Critical Part".

Provenance: Property of an institution.

An integral component which ensured the support and stability of the Ascent Stage. The Ascent stage of the Lunar Module was the control center and the manned portion of the lunar lander which consisted of three main sections; the aft equipment bay, the midsection, and the crew compartment.

\$2,000 - 3,000

44

GRUMMAN APOLLO LUNAR MODULE ASCENT STAGE PROPULSION COMPONENT.

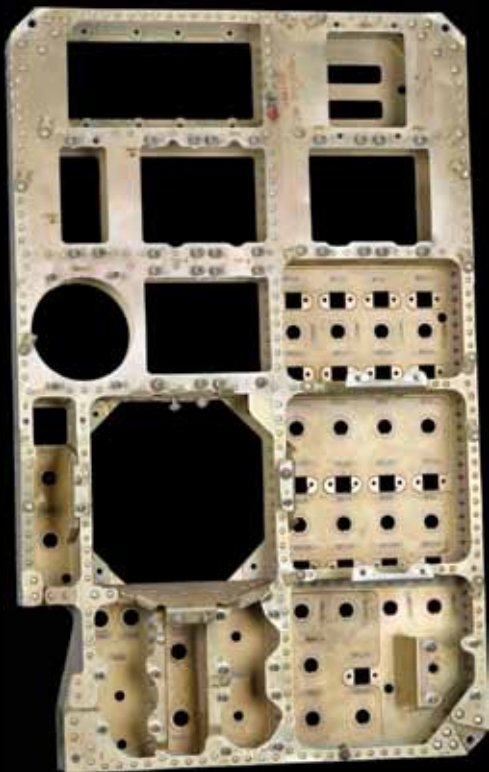
ASCENT STAGE OXYDIZER TANK SUPPORT MOUNT.

Made from aluminum alloy, with titanium fittings and fasteners. 1 foot 9 inches by 2 feet 9 inches. Part numbers: "LDW280M10462-9" and "LDW280M10463-9 Ser. No A07-1". Stamped March 2, 1967.

Provenance: Property of an institution.

An integral piece of the ascent stage, which supported and stabilized the oxydizer tank. This tank was a key component in the propulsion of the ascent stage. The oxydizer used was Nitrogen Tetroxide (N_2O_4). It was stored in a tank separate from the fuel, which was a blend of hydrazine (N_2H_4) and unsymmetrical dimethylhydrazine (UDMH). The oxydizer was injected into the fuel in a ratio of 1.6 to 1 by weight, giving the ascent engine a thrust of 3,500 pounds - enough to launch the ascent stage from the lunar surface into its selected orbit.

\$1,200 - 1,800



37



44



41



42



45

45 LEARNING TO CONTROL THE SPACE SHUTTLE. PILOT'S RIGHT SIDE R2 CONSOLE PANEL FROM NASA SPACE SHUTTLE SIMULATOR.

Consisting of metal, aluminum alloy, copper, plastic, and plastic covered wire, front with 67 toggle switches, one with red plastic safety cover, associated circuitry on back of panel. 29 by 17 inches.

Provenance: Property of an institution.

Located directly below the pilot's right arm, panel R2 contains controls for engine power, boiler power, hydraulic main pump pressure, Auxiliary Power Unit pre-starts, hydraulic circulating pumps, Auxiliary Power Unit fuel tank valves, and boiler nitrogen supply amongst others.

\$2,000 - 3,000

46

SATURN IB ROCKET MADE BY THE MARSHALL SPACE FLIGHT CENTER GRAPHICS AND MODELS BRANCH.

FIRST STAGE SHOWS THE GENIUS OF WERNHER VON BRAUN AND HIS DESIGN TEAM.

The longest flight program of any Saturn rocket – flown from 1966 to 1975.

High fidelity Saturn IB rocket and Apollo spacecraft model made from metal, plastics, and wood. Standing approximately 30 inches tall, displayed on and removable from a 5 ½ inch square beveled edged wood base. Scale is 1:96. The model has five detachable parts – S-IB first stage, S-IVB second stage, Service Module, Command Module, and Launch Escape System. The base of the first stage has eight highly detailed four-color H-1 rocket engines plus eight stabilization fins painted in combinations of black and white. Red decals on a white background vertically spell “UNITED STATES” on four of the eight long cylinder shaped fuel tanks. One tank has a “S-IB” red decal. The top of this stage has an interior clear plastic plate which allows viewing of all 9 tanks (1 center surrounded by 8) with alternating yellow and green painted tops.

The second stage has three white and red ullage motors, used to assist stage separation and to settle rocket fuel propellants during flight. Also at the base of this stage are two black/white/red Auxiliary Propulsion System Module pods that performed attitude control and other functions for the second stage. There are four large sets of red “USA” vertical decals with one that reads “S-IVB / IB.” The top black ring is labeled “Instrument Unit.” When removed from the first stage, the single silver and red J-2 rocket engine is visible. The Service Module, Command Module, and Launch Escape System all have red identification decals and are all detachable.

RARELY AVAILABLE MODEL OF THE LAUNCH VEHICLE WITH A 100 PERCENT SUCCESS RATE WHICH CARRIED THE FIRST MEN OF APOLLO INTO EARTH ORBIT.

America was shocked into space flight reality when the Soviet Union orbited *Sputnik 1* during October 1957. The United States response with a Vanguard rocket two months later resulted in a fireball on the launch pad. Dr. Wernher von Braun and his engineering team gained tremendous credibility when they orbited Explorer 1 in January 1958 using the Jupiter-C, part of the Redstone rocket family. While still working for the U.S. Army, von Braun pushed for the creation of a large booster using a cluster design of exiting rocket stages, which would shorten development time to counter growing Soviet rocket capability. The NASA Marshall Space Flight Center (MSFC) in Huntsville, Alabama was established on the grounds of the U.S. Army's Redstone Arsenal and officially dedicated by President Dwight Eisenhower in September 1960. MSFC was the lead NASA center for Saturn development and directed by von Braun from 1960 to 1970.

What evolved from von Braun's initial efforts was the first vehicle of the Saturn family, the Saturn I, a stage that clustered eight Redstone fuel tanks around a single and slightly larger diameter Juno (Redstone/Jupiter-C derivative) rocket tank. These tanks fueled eight “H-1” rocket engines which delivered a lift-off thrust of some 1.5 million pounds. The Saturn I had a perfect string of ten successful launches between 1961 and 1965, with the last five carrying “boilerplate” (non-functional) Apollo Command and Service Modules (CSM). President John F. Kennedy's speech the day before the assassination referred that the upcoming fifth Saturn I launch (January 1964) would exceed the Soviet rocket lift capability.

NASA's need to test heavier fully operational Apollo spacecraft prior to any lunar voyage required the development of a more powerful second stage for the Saturn I. This new stage was called the Saturn IV-B (S-IVB) which utilized liquid oxygen and liquid hydrogen. The S-IVB had a newly developed “J-2” rocket engine which produced over 200,000 pounds of thrust. This new combination of stages was called the Saturn IB rocket.

The Saturn IB also had a 100 percent success rate during ten flights, the last six being manned missions. The first and third were unmanned tests of the CSM starting in 1966, with the fourth an unmanned test of the Lunar Module. The second flight was an extensive test of the S-IVB stage. During October 1968, the Saturn IB carried Apollo 7 into earth orbit, the first manned Apollo flight testing the CSM for some 11 days, commanded by Wally Schirra, one of the seven Mercury Astronauts. During 1973, three Saturn IB's carried three different crews and CSM's to a rendezvous with the Skylab Space Station. With an ironic ending from its Space Race roots, the IB launched the final manned Apollo CSM to an orbital rendezvous and docking (ASTP) with a Soviet manned Soyuz spacecraft during July 1975. And fittingly, Mercury Astronaut Donald K. “Deke” Slayton, grounded since 1962 due to a heart murmur, finally made it into space serving as Docking Module Pilot during that 1975 ASTP flight.

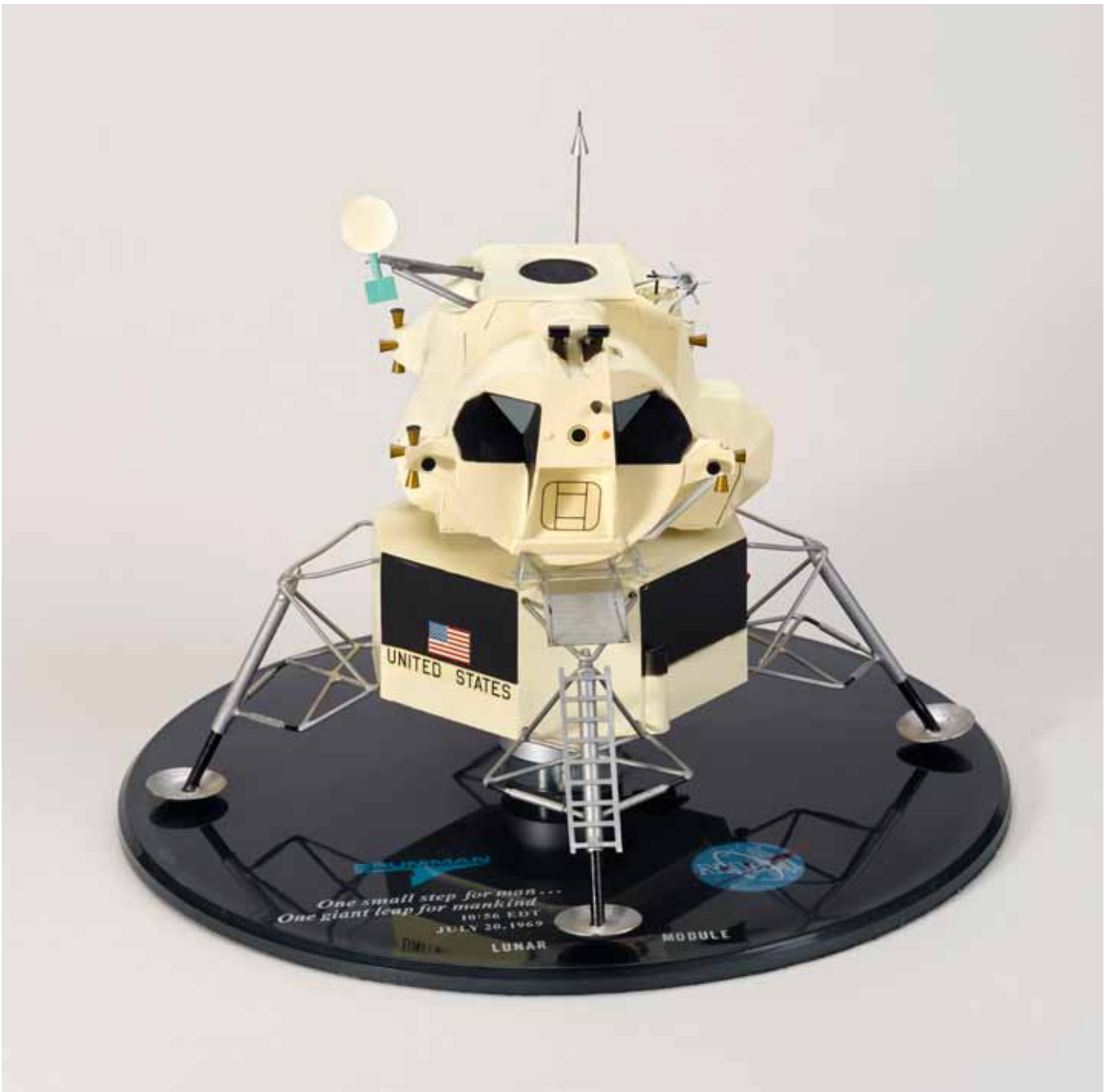
\$10,000 - 15,000



46



46 (details)



47

47

OFFICIAL CONTRACTOR SPACECRAFT MODEL ISSUED BY GRUMMAN.

SPECIAL BASE HAS NEIL ARMSTRONG'S FIRST WORDS FROM THE MOON.

Model of the Lunar Module (LM) made from injected-molded plastic for the Grumman Aircraft Engineering Corporation (GAEC) of Bethpage, Long Island, NY. GAEC was the prime NASA contractor for the Lunar Module (LM).

The model stands 7 inches tall with four landing legs some 8 inches apart. The upper Ascent Stage is detachable from the lower Descent Stage. The complete model is removable from a 10 1/2 inch circular base which has NASA and Grumman logos and the wording: "LUNAR MODULE." Additionally, the base has Neil Armstrong's first words after stepping onto the moon of: "One small step for man... One giant leap for mankind" and the time / date of: "10:56 EDT, JULY 20, 1969."

The LM made one unmanned and one manned earth orbital flight and carried out eight manned lunar missions of which six landed on the moon.

\$4,000 - 6,000



48

48

OFFICIAL CONTRACTOR SPACECRAFT MODEL ISSUED BY NORTH AMERICAN ROCKWELL.

THE VEHICLE THAT COMPLETED JFK'S GOAL – TO RETURN SAFELY TO THE EARTH.

Model of the Command/Service Module (CSM) with escape tower and connecting lattice structure.

The CSM stands 10 ½ inches tall and is 4 inches in diameter displayed on a circular 7-inch base.

Made from injected-molded plastic and white painted metal by the Walter J. Hyatt Company for North American Rockwell, prime NASA contractor for the CSM.

Decals define the locations of the crew side hatch, windows, and the Command Module (CM) attitude control rocket engines. The Service Module (SM) has four attitude control rocket engines which are 1-inch long and extend some 3/8-inch off the body of the SM. Decals define additional structures on the SM. The large Service Propulsion System engine bell is visible through a clear viewing section along the base. The circular plastic base has a large decal that reads: "Apollo Spacecraft – North American Rockwell." The base, CM, SM and escape tower are all detachable.

\$4,000 - 6,000



49



49 (details)

49

RETURNING SAFELY TO EARTH – THE AEROASSIST FLIGHT EXPERIMENT MODEL.

PROPOSED VEHICLE COULD PERHAPS BE USED BY FUTURE MARS ASTRONAUTS.

Large two part high-fidelity prototype model of the Aeroassist Flight Experiment (AFE) vehicle made of metal, painted wood, and plastic. The free-flying component has an 8 x 8 x 2 1/2 inch diameter blunted elliptical cone with gray and white markings to represent Thermal Protection System (TPS) tiles. A hexagon shaped propulsion unit 6 x 6 x 3 1/2 inches in size rests inside the cone with a silver and black solid fuel rocket motor at the center. This unit has four multi-nozzle attitude control thrusters and a Space Shuttle "robot arm" grapple pin fixture. The second part is a Space Shuttle "U-shaped" payload bay pallet 9 x 12 x 5 inches with a metal berthing platform rising 2 inches off the pallet base and is 5 inches square. The solid rocket motor fits within a circular opening on the platform. The pallet has two sets of orbiter attach fittings that are used to secure the pallet inside the payload bay.

Both model components fit inside a foam-lined dark blue custom carrying case 16 x 10 x 8 inches in size. A metal tag on the case reads: "National Aeronautics and Space Administration, Marshall Space Flight Center, Huntsville, Alabama. Graphics and Models Branch. Aeroassist Flight Experiment (AFE). Scale 1:20." With diagrams of the proposed flight paths for the vehicle.

Plans for the AFE originated in the 1980s as a Space Shuttle launched and released free flying vehicle to test deceleration techniques of high earth orbiting vehicles. One flight scenario would have the solid rocket motor accelerate AFE into a high speed entry through the earth's atmosphere. The vehicle would begin to slow moving through the atmosphere with the lowest altitude being around 250,000 feet above the earth. The Thermal Protection System (TPS), the same as used on the Space Shuttle, would prevent heating damage.

AFE's trajectory would allow retrieval via the Space Shuttle's robotic arm using the grapple pin fixture.

This experiment was to prove that future space transport vehicles could safely return from geostationary orbit some 22,200 miles above earth with extended applications for vehicles returning from the Moon and perhaps even Mars. Various issues including funding problems forced the cancellation of this flight projects in the late 1990s. Models for this type of mission are thus exceeding rare.

\$6,000 - 8,000



50



50 (details)

50

SATURN APOLLO APPLICATIONS CLUSTER CONFIGURATION MODEL.

VERY RARE ORIGINAL CONTRACTOR'S MODEL OF THE APOLLO APPLICATIONS CONFIGURATION IN ORIGINAL CASE.

Model made by the NASA-George C. Marshall Space Flight Center (MSFC) Graphic Engineering and Models Branch in Huntsville, Alabama ca. 1968. Metal, wood, and plastic, partly transparent, 1/96 scale, 12½ inches tall. The AAP Cluster features: an Orbital Workshop (OWS) section with cut-out portion giving a view onto the activities on three crewmen on two separate platform levels as well as an instrument panel, exercise bicycle, and chair. With two removable OWS Solar Array Panels, Instrumentation Unit (IU) section with removable partially transparent nose-cone, fixed spacecraft Lunar Module Adapter (SLA), Airlock Module, Structural Transition Section, and Multiple Docking Adapter. Also included are a Command Service Module (CSM) section, a Lunar Module (LM) section with Apollo Telescope Mount and four ATM Solar Array Panels. The CSM and LM can be placed in the "docked" position via push-snap connectors located on the Multiple Docking Adapter. Fixed onto a wooden base along with a ground crew member, with MSFC plaque. The whole fitting into an original 16 by 11 by 6½ inch foam-lined wood carrying case,

painted blue, with decals reading "A.A.P. No. 30" and "FRAGILE," U.S. Government Shipment Label dated 7-12-68, as well as original address labels from the George Marshall Space Flight Center addressed to the Transportation Officer at NASA.

Provenance: Ms. Rose A. Benas, a member of the special staff of the Manned Space Flight Administration, NASA.

During the mid-1960s, the Apollo Applications Program (AAP) had envisioned not only Earth orbital survey missions but lunar orbit mapping and extended lunar landing flights. Through the later 1960s, AAP was scaled back to Earth orbit operations and utilized the tanks inside the S-IVB. They would not contain fuel but could be turned into a habitable module with scientific equipment stored inside prior to launch. This program, known as SKYLAB, had three manned missions, with visits from a total of nine astronauts from 1973-74.

\$5,000 - 8,000



51

51

LITTLE JOE.

Model in wood, plastic, and metal. 24 inches tall, with detachable capsule, escape tower, and central escape rocket painted in white, silver, black and red, unknown manufacturer, ca. 1960.

"Little Joe" was an unmanned solid-fueled booster rocket designed to test the Mercury spacecraft's structure and performance against aerodynamic loads during low altitude flight. It was the first rocket designed for the sole purpose of qualifying manned spacecraft, and was one of the first launch vehicles to use the rocket cluster principle. It was used for a total of eight launches from 1959-1960. Designed by Max Faget and Paul Purser, the rocket, which had a four rocket cluster, got its nickname "Little Joe" from the dice game craps, where a roll of double deuces is referred to as a "Little Joe."

\$3,000 - 5,000



52

52

NORTH AMERICAN X-15, THE FIRST SPACEPLANE.

A 1/15th scale model, fiberglass and polyester resin on metal stand, 39½ inches long, 18 inch wingspan. Manufactured by Gene Young Effects, 1970s.

The North American X-15 was an experimental rocket-powered high speed aircraft operated by both NASA and the United States Air Force. In the early 1960s, the X-15 set records for both altitude and speed, flying to the edge of outer space. With Robert White as its pilot, it attained a maximum speed of 4,520 miles per hour, the world record for one of the fastest speeds obtained by a manned aircraft. Other notable pilots of the X-15 include Pete Knight, and Neil Armstrong, who obtained a speed of 3,989 miles per hour.

\$4,000 - 6,000



53

53

ROCKWELL X-30 SPACE PLANE.

Fiberglass model, 40½ inches long, 13½ wingspan, on plexiglass stand. Tip of nose chipped. Manufactured for NASA by Wonderworks, 1980s.

Large model of the Rockwell X-30 NASP (National Aero-Space Plane), a single-stage-to-orbit spacecraft. While there was a significant amount of development work put into the place, a prototype was never made, and the program was cancelled in the early 1990s. The X-30 was to be a scram-jet based aircraft, with a maximum speed of Mach 8.

\$4,000 - 6,000

54[□]

MERCURY ATLAS, TITAN II, AND MERCURY REDSTONE MODELS.

Collection of four model rockets, plastic, resin and wood, all manufactured in Canada, 1990s.

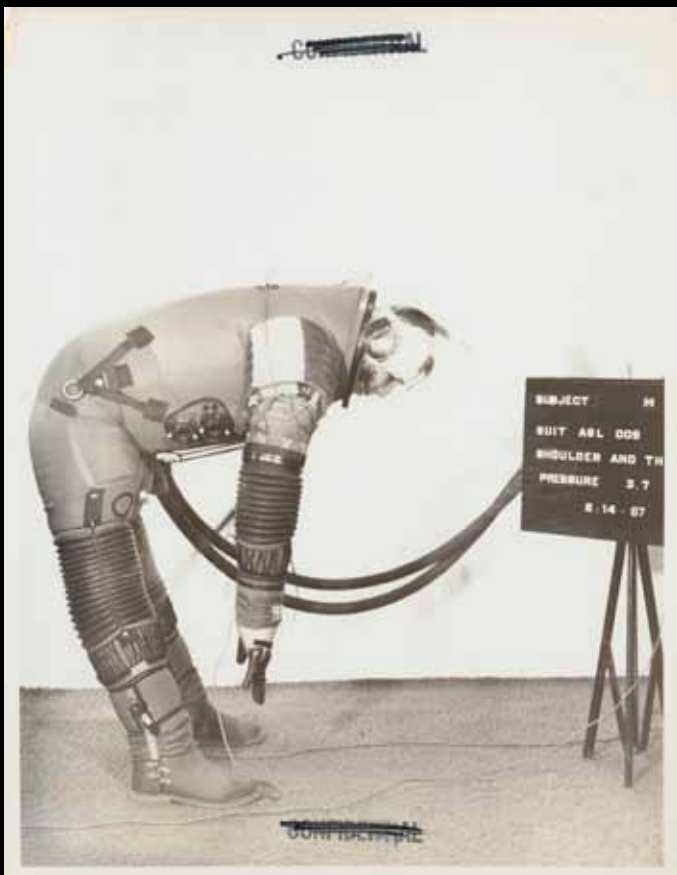
1. *MERCURY REDSTONE*. 1/48 scale model, 19 inches tall, on wooden base with brass plaque. The Mercury Redstone was the first American manned space booster, and was used for six sub-orbital Mercury flights from 1960-61, two being manned.

2. *MERCURY ATLAS*. 1/48 scale model, 24 inches tall on plastic base. Signed on base by Wally Schirra (signature almost illegible). The Mercury Atlas rocket was used for the four manned flights subsequent to those launched by the Mercury Redstone rocket.

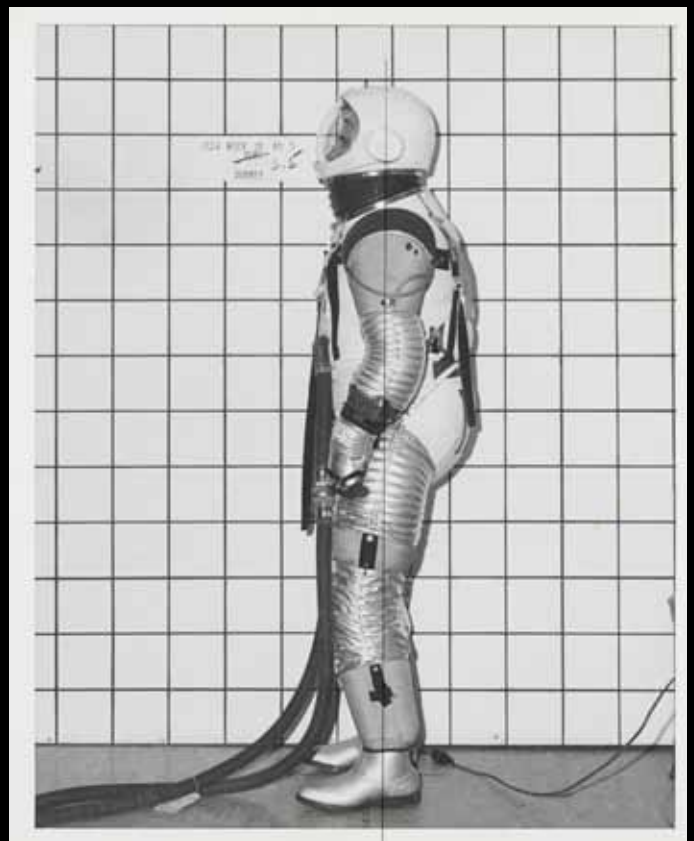
3. *TITAN II*. 1/48 scale model, 27 inches tall, on wooden base. Signed by Wally Schirra and Guenter Wendt. Titan II was the Gemini spacecraft launch vehicle. It was used to launch two unmanned and ten manned Gemini missions for NASA between 1964 and 1966.

4. Another *TITAN II* 1/48 scale model on wooden base. 27 inches tall.

\$800 - 1,200



55 (part lot)



55 (part lot)

SPACESUITS AND FLIGHT EQUIPMENT

55

SPACE SUIT DEVELOPMENT PHOTOGRAPHS.

Collection of 70 photographs (67 black and white, 3 color), mostly 10 by 8 inches, 1960s, on various types of paper, a few being NASA photographs, but the majority International Latex Corporation (ILC), some with inkstamps or credits on verso and a handful with annotations.

Provenance: George P. Durney (1923-98), the Apollo suit project manager, often referred to as the "Father of the Space Suit."

A fascinating group of images showing tests at ILC's laboratories into the flexibility of various forms of space suit. Since the beginning of the Apollo Program, ILC has been a lead designer and producer of space suit pressure garments for NASA. ILC began delivering spacesuits for the Apollo program in 1966, but was forced into competition with Hamilton Standard. In their technical focus, these photographs inadvertently veer from Monty Python at one extreme to contemporary art at the other.

\$700 - 1,000



55 (part lot)

MERCURY ERA SPACESUIT.

AN EXCELLENT EXAMPLE OF THE COVER LAYER FOR THE FAMOUS SILVER SPACESUIT OF THE MERCURY PROGRAM.

Cover layer from a Phase 2 Mercury era space suit, with early model "widow's peak" helmet, gloves, and mock-up boots. Aluminized nylon, approximately 63 inches tall. Detachable hard fiberglass helmet with aluminum helmet sealing ring, hinged polycarbonate visor securing to aluminum flange, lambskin ear cups, plastic communications microphone with part number "Roamwell Corp. 10387", rubber, plastic and metal electrical cable with part number "Deutsch DM 9609-12P", electrical cable helmet connector with part number "REDAR-281-W3, Bethesda, MD", rubber life support hose by R.E. Darling Co., with part number "REDAR 279-W2 CURED12-60". Neck with aluminum helmet sealing ring, two 4½ inch long vertical zippers, webbed nylon straps with metal snaps running from back to front of neck. The sleeves with four break-lines sewn into the shoulders, strap and buckle adjustments running parallel from elbow to wrist, adjustable lacing from shoulder to wrist covered with zip-up stretchable nylon cloth panels. Detachable gloves with aluminum sealing rings, strap and buckle adjustments around wrists and palms, as well as steel retention bars across palms to reduce pressurized ballooning. Upper entry zipper passing across chest, running from left shoulder to lower right waist, lower entry zipper running from right side of crotch, up around back and across hips to right hip, webbed nylon cross-chest strap, NASA Patch to right side of chest. Legs with four break-lines sewn into the knees, breathable mesh panels behind knees, 5 inch vertical zippers at ankles, elastic stirrups. Back with large lace adjustments covered with zip-up stretchable nylon cloth panel. No tags, helmet worn, visor cracked, several small holes and tears to fabric, stirrups torn, lace covers torn, cloth rubbed and discolored in places, gloves worn.

The first of the United States' manned flight programs, Project Mercury aimed successfully to place a spacecraft into earth orbit. Fabrication of the Mercury suits was started in 1959, and NASA selected the B.F. Goodrich Company for the task. The Mercury space suit was basically a modified version of the U.S. Navy's Mark IV high altitude pressure suit, with the most notable modification being an aluminized nylon outer layer to assist thermal control. The suits were very snug fitting, and the Phase 1 suits provided limited mobility while pressurized, especially in terms of bending the arms and legs—in the second Phase of the suit, break-lines were sewn into the shoulders, knees and elbows to alleviate some of the difficulties in movement. "The fabric was made by the Minnesota Mining and Manufacturing Company (3M), and the silver color came from an aluminized powder coating glued to the green nylon fabric used for the exterior layer, prior to suit construction. Unfortunately, during the intervening years, this coating has in most instances, worn away. Many of these early spacesuits now have brown and green patches where the aluminized coating has deteriorated and the glue and nylon have begun to show through, and give the appearance of being 'rusty'" (Amanda Young, *Spacesuits. The Smithsonian National Air and Space Museum Collection*. p 30). \$8,000 - 12,000





57 (details)

57

NASA A6L PROTOTYPE SPACESUIT.

Early stage two-piece A6L spacesuit Thermal Micrometeoroid Garment (TMG) Cover Layer Jacket and Trouser Assembly, "A6L-205050-01, SN 016" and "017", Latex International Corporation, 1967. Consisting of an outer layer of high temperature resistant nylon (HT-1) as a protective layer, two alternating layers of perforated aluminized mylar and marquisette spacer, five layers of perforated aluminized mylar separated by layers of unwoven dacron for thermal protection, followed by one layer of neoprene coated ripstop for micrometeoroid impact shock absorption. JACKET: 34 inches long, neck with 9½ inch tall collar, chest with two 8 by 5 inch velcro loop patches extending from pectoral area to top of shoulders, right arm with velcro patch stowage pocket, left arm with a 2 by 1 inch rectangular port near wrist, both wrists with velcro adjusters. Sturdy 25 inch-long metal-tooth zipper running from chin to waist with two pull tabs, each with nylon and velcro pull, two 6½ inch-long ports at chest on either side of zipper, 24 by 13 inch zipper guard flap sewn down on left side and attaching with velcro on right side, flap with central pouch with 1 inch wide port covered with beta cloth flap, two interior elastic and snap-hook fasteners (which attach to D-Rings on waist of pants). Two interior 6 by 1 inch velcro loop strips running along lower part of spine. TROUSERS: 38 inches long. Elasticized waist, 4 by 2 inch velcro hook patch at back of waist-band, D-rings on left and right side of waist-band attached with webbed nylon, snap-hook attached to area between crotch and waist band with webbed nylon, left leg with 36 inch

long plastic-tooth zipper running complete length from waist-band to ankle, pull tab with nylon and velcro pull, zipper with 36 by 4 inch guard flap sewn down on right side and attaching with velcro on left. Right leg with 26 inch long plastic-tooth zipper running partial length of leg from upper thigh to ankle, pull tab with nylon and velcro pull, zipper guard flap sewn down on left side and attaching with velcro on right side. Jacket and trousers both with Latex International Corporation labels detailing serial and model numbers, jacket label dated 2/67, trousers 3/67. Both labels marked "Class III" with red pen.

Manufactured by the Latex International Corporation, the A6L was essentially the flight version of the A5L suit, and was designed to prevent micrometeoroids from puncturing the inner pressure bladder worn by astronauts during EVAs. Until the tragic Apollo 1 fire in 1967, the A6L was the suit configuration intended for use on the lunar surface. The fire triggered a review of the suit's design, which resulted in modifications including a beta-cloth fire-protection layer, as well as the suit being changed from a two piece into a one piece configuration. The A6L configuration never ended up being used on the lunar surface, and essentially became an Apollo training and developmental stage for the A7L series of suits. The A7L's first flight use was on Apollo 7, and first EVA use during Apollo 9.

\$8,000 - 12,000



58

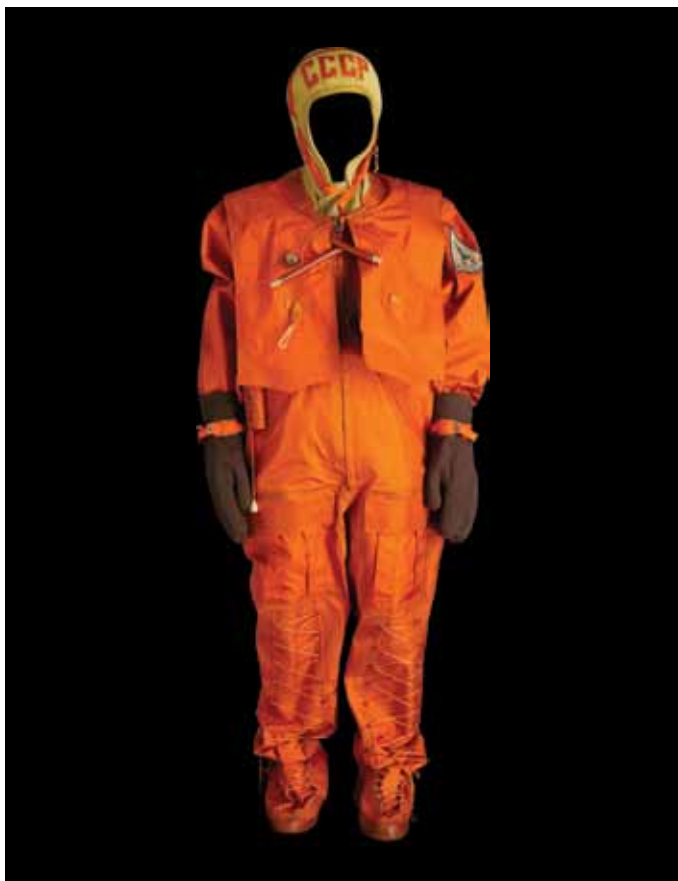
SOVIET FULL PRESSURE STRIZH RESCUE SPACESUIT.

Full pressure spacesuit, manufactured by NPP Zvezda, ca. 1988. Olive flame-retardant nylon canvas with light blue and silver trim, inner pressure bladder of Kapron and resin, approximately 65 inches tall. Integral pressurized hood/helmet with hinged polycarbonate visor securing to aluminum flange anodized in gold with blue anodized hinges, attached inflatable collar. Trussed sleeves with adjustable articulating cables and webbed belt lashings, pressure gauge at wrist on left sleeve. Detachable gloves securing to aluminum flanges anodized in gold, gloves with webbed nylon adjusters to backs of palms, palms with leather pads and rubber fingertips. Lace-up front with double v-front zip closure, lace-up crotch covered with velcro triangular placket, lace-up back with velcro closure. A support sling wraps from chest to back using webbed nylon belts and leather-backed metal buckles and clasps. Pressure equalization valve at center of chest, lower torso with anodized aluminum umbilical attachments for electricity, oxygen, and coolant, with attached cables and hoses. Left leg with zipping utility pocket to thigh, right leg with velcro utility pocket to thigh, both shins with elastic and velcro utility pockets, integral boots of light blue nylon canvas. Protective canvas bag for visor with sewn on name-tag indicating that this suit was made for cosmonaut Petrovich.

The *Strizh* [Swift] spacesuit was developed for the crew of the Russian *Buran* reusable spacecraft to be used during Intervehicular Activity (IVA). Additionally designed to protect the cosmonauts during possible ejections from the *Buran* spacecraft, it allowed for ejections up to an altitude of 30km and speeds up to Mach 3. The *Buran* included ejection seats, which, along with the *Strizh* suits, were tested in a series of five launches from 1988-1990. The first unmanned mission of the *Buran* spacecraft included two dummies outfitted in *Strizh* suits, which both shared a single BRS-1 portable life support system, which would provide up to 24 hours of oxygen in the event of cabin depressurization. Two *Buran* spacecraft were manufactured, but only the unmanned craft was ever launched, as the program was cancelled following the collapse of the Soviet Union. Although the *Buran* program was cancelled, the *Strizh* suit is still the standard for use in all Russian non-pressurized high-altitude aircraft. Abramov & Pavlovich, *Russian Spacesuits*, p. 352

\$15,000 - 20,000





59

59

EMERGENCY "FOREL" HYDROSUIT ISSUED TO COSMONAUT ALEXANDER VICTORENKO.

BACK-UP SURVIVAL HYDROSUIT FOR THE COMMANDER OF THE SOYUZ TM-3 FLIGHT. A "Forel" [Trout] flotation suit made of rubberized orange nylon with watertight cuffs and foam rubber hood labeled "CCCP" above the forehead. A totally integrated suit with boots and legs having extensive lacing. A self-inflating life preserver is attached to the front chest with dual manual inflation tubes plus an emergency beacon signaling device. The suit also has a pair of large removable insulated water tight gloves and a triangular emblem on the upper left arm featuring a rocket rising from the earth and "CCCP" lettering. The suit is opened via a large vertical metal front zipper along the torso. The inner liner has an identification tag in Russian, which translated, reads in part: "Trout. N. 0350569. Size p.4."

The "Forel" suit was designed to protect a cosmonaut during emergency landings in water, shallow swamps, or snow conditions. The cosmonaut would put on the suit prior to exit of the spacecraft. Emergency exit training in water always used the hydrosuits.

Provenance: Zvezde, the manufacturer; Sotheby's, Russian Space History, New York, December 11, 1993, lot 365. With a Sotheby's folio containing both English and Russian language certificates which read: "This is to certify that FOREL (Trout) hydrosuit N 0350569 is the original hydrosuit of cosmonaut Alexander VICTORENKO manufactured at RD&PE ZVEZDA in 1985. The hydrosuit was used as a back-up one during flights of the SOYUZ TM spacecraft. Signed: G.I. SEVERIN, General Designer – General Director RD&PE ZVEZDA."

Alexander Victorchenko's first space mission was Soyuz TM-3 during July 1987, a flight to the MIR space station. He later commanded the Soyuz TM-8 mission of September 1989.

\$2,500 - 3,500



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EARLY TROUSER PROTOTYPE OF THE SPACE SHUTTLE IN-FLIGHT CABIN CREW SUIT.

Space Shuttle crew trousers, light blue fabric, having a large multi-function pocket on the left thigh, a long zippered pocket on the right thigh and two large expanding type zippered pockets below knee level. Manufactured for NASA by the International Latex Corporation (ILC) of Dover, Delaware. An ILC Dover – Houston Division sewn label reads: "ITEM: TROUSERS, PART NO. 10101-20002-01, SERIAL NO. N/A, SIZE: S/L, CODE ID: 74897, MFG: 3/6/79, CONTRACT NO. NAS9-15485." An additional separate red label reads: "CAUTION – MATERIAL USED IN THIS GARMENT DOES NOT MEET FLAMMABILITY REQUIREMENTS OF SHUTTLE PROGRAM." Both labels are on the interior fly zipper seam.

These trousers are an early generation prototype that very closely matches the final design used during Space Shuttle flights of the early 1980s.

\$700 - 900

61

COFFEE OR TEA? SPACE SHUTTLE DRINK CONTAINERS.

Two square plastic containers, 4 x 4 inches with hollow interiors 1 ¾ inches deep. Each with identification labels that read in part: "KONA COFFEE w/ CREAM, 8 oz hot water * 2 – 5 min" and "TEA, 8 oz hot or cold water." Both are stamped "TRAINING" in red.

A layer of freeze-dried coffee or powered tea is inside the container cavity. Expandable clear plastic covers drink material and will expand when hot water is injected via a port opening on one corner. This opening allows a drink straw to be inserted after re-hydration. Both have blue Velcro hooks on the outer base.

\$200 - 300



61

62

SURVIVAL EQUIPMENT CARRIED BY COSMONAUT YURI ARTYUKHIN ON SOYUZ 14.

FLOWN Soyuz 14 life preserver consisting of dual orange 12 inch wide and 34 inch tall inflatable underarm "water wing" floats, each having a 7 by 4 by 2 inch gray nylon container with snap closures. An open container allows viewing of one float, and each has a sewn label which reads (translated): "28 ASP-74 Right/Left Float, OTK 81835109." Compressed gas cylinders inflate the floats via pull strings, but dual tubes allow manual inflation in case of cylinder failure. An approximately 18 inch long nylon strap connects the float containers.

A copy of a Russian manuscript letter signed by Mr. Sukov (head of the Cosmonaut Rescue Crew) reads (translated): "In July 1977, I was participating in the preparation of the crew for the spaceships. Space engineer and a crew member of Souz-14, U.L. Artuhin gave me as a gift several objects that took important place in successful completion of the space flight. The objects are: cellular [sputnikovaya] radio station #3445, flashlight FM 1n1231008." Sukov later received this life preserver.

Artyukhin was the flight engineer aboard Soyuz 14 and flew with command cosmonaut Pavel Popovich during July 1974. They docked to the orbiting Salyut 3 space station and spent over 15 days testing various military space flight applications. Artyukhin died on August 4, 1998.
\$700 - 900

63

RESCUE EQUIPMENT CARRIED BY COSMONAUT ALEKSEI GUBAREV ON SOYUZ 17.

FLOWN Soyuz 17 cosmonaut survival radio and beacon. A metal base unit 6 by 4 1/2 by 2 inches, houses electrical components of the radio and beacon with markings that read in part (translated): "Bottle Discharge (SEE OUR PHOTO FOR MORE INFO) on the metal base unit." Additional markings on a white band along an approximately 12 inch diameter inflatable spherical base of the buoy reads: "KOMAR - 2M No. 08800-10886700." A bright orange inflatable triangular cone buoy approximately 20 inches tall is attached to the sphere which can be inflated automatically or manually. The base has two pull strings and a 12 inch long power umbilical. Included is a 6 inch long orange sleeve that contains an articulated antenna and additional equipment. The inflated buoy would float in case of an emergency landing on water. The beacon and radio were still useful if the spacecraft touchdown occurred in a remote land area to assist search and rescue crews.

The antenna case and buoy sphere have been SIGNED by ALEKSEI GUBAREV.

Gubarev was selected as a cosmonaut in 1963 and Soyuz 17 was his first space flight, flying with cosmonaut Georgi Grechko. They docked their Soyuz 17 spacecraft to the orbiting Salyut 4 space station and worked for over 29 days during January/February 1975. His second spaceflight was Soyuz 28 in 1978.

\$1,000 - 1,500



62



63



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HYGIENE KIT CARRIED BY GROUP 1 COSMONAUT VALERY BYKOVSKY ON SOYUZ 22.

RECORD HOLDER OF THE LONGEST SOLO SPACEFLIGHT – VOSTOK 5 – 4 DAYS 23 HOURS. FLOWN Soyuz 22 cosmonaut personal hygiene bag with blue draw-string and velcro top. Cylindrical shape 5½ by 9 inches. Stenciled lettering on bag reads in part: "Kit. Personal Hygiene-3/ Wet towels/ No. 369". Enclosed are two wet towels with cellophane-type wrapping with red text that reads in part: "Kit. Personal Hygiene. Wet Towel" and bear the serial numbers 13E8809050 and 13E8809012. Issued to Soviet Group 1 Cosmonaut Valery Bykovsky.

Hygiene bag SIGNED by VALERY BYKOVSKY.

A copy of a Russian manuscript letter signed by BYKOVSKY reads (translated): "Personal hygiene products. Moisture wipes #886. Wet towels #342 and #369. These products of personal hygiene were with me in open space during space flight on spaceship Soyuz-22 from 15-23 September 1976. Signed: Pilot-Cosmonaut USSR, Twice-Honored Hero of USSR, V.F. Bykovsky."



66

Valery Bykovsky was selected with the first group of Soviet cosmonauts in 1960 and was the pilot of Vostok 5 during June 1963, the longest solo manned space flight in history. Soyuz 22 was Bykovsky's second space mission with a duration of 7 days 21 hours and was launched on September 15, 1976. Orbiting in a very high inclination of some 64 degrees, it was thus impossible to dock with the then flying Salyut space station. This has led to speculation that Soviet Soyuz 22 was flown to observe then scheduled NATO activities in Norway. Bykovsky last space mission was Soyuz 31, a 67 day flight beginning in November 1978. See illustration on preceding page.

- \$500 - 700

65

COSMONAUT SURVIVAL MACHETE.

Large 14 inch machete consisting of a long 9 inch triangular blade having a sharpened fore-edge and head with a 4 ½ removable black rubber handle. A long heavy weave nylon string is attached to the handle which is removable from the blade base via two screw pins. The blade is numbered "376 5959" and is housed in a gray nylon sheath having Velcro closures and belt loop. The sheath is stenciled: "Hok-mayete", [knife-machete].

All Russian Soyuz flights carried a machete identical to the present one to assist the cosmonaut crew after a remote unscheduled landing. A versatile tool with the ability to cut brush and small trees, loosen soil, and defend against wild animals.

\$500 - 700

66

US NAVY FLIGHT HELMET SIGNED BY LOVELL AND BEAN.

White US Navy APH-6 flight helmet with single visor assembly, dark tinted visor, adjustable chin strap, styrene liner with leather pads, earcup assemblies and rubber communications cable. Sierra Engineering Co, size large, 1960s.

SIGNED AND INSCRIBED: "CAPTAIN JAMES A. LOVELL JR. GEMINI 7, 12, AP. 11, 8, 13. JAMES LOVELL" on left half, and "CAPTAIN ALAN L BEAN. APOLLO 12, SKYLAB II (SL-3) ALAN BEAN" on right.

\$3,000 - 5,000



67

67

SOVIET HIGH ALTITUDE PRESSURE HELMET.

Metal, rubber, plastic, cloth and lambskin, with cloth tag. An original GS-h 6A high altitude pressure helmet, size N2M, product number 0641968, ca.1970. Complete with visor, padding, locking neck-ring with rubber gasket, integrated communications package (2 headphones and boom microphone) and oxygen hose.

These helmets were typically used on MiG-21, MiG-23, and MiG-25 fighter/interceptor airplanes, which flew at an altitude of 10,000 meters or higher.

\$400 - 600



68



70



69

PROJECT MERCURY

68

LIFE INTRODUCES THE ASTRONAUTS—SIGNED.

LIFE Magazine. New York: Time-Life, September 14, 1959.
Over 170 pp. 14 by 11 inches. Original printed wrappers.

SIGNED by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA on the front cover.

The complete issue featuring all the Mercury astronauts on the front cover. Each of the seven astronauts has written an article on important aspects of the Mercury space flight program and his desire to participate. Extensively illustrated with early training photographs. Time-Life held an exclusive contract to publish the story of the astronauts.

\$600 - 800

69

THE ORIGINAL MERCURY SEVEN IN SPACE SUITS—SIGNED.

Large color photograph, 20 by 16 inches, c. 1959, printed later.

The iconic photograph of all 7 Mercury Astronauts in their silver space suits.

SIGNED BOLDLY by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA. Cooper has added "*The Original Seven*" along the upper left corner.

\$2,500 - 3,500

70

EARLY MERCURY BOOKLET—SIGNED.

Exploring Space... Project Mercury. Langley Field, Virginia: NASA, 1960.
12 pp. 5 by 8 inches. Original blue wrappers.

SIGNED by GORDON COOPER and WALLY SCHIRRA, with each adding their Mercury mission flight name.

Describes the future Project Mercury space missions and introduces the astronauts that will carry out those flights. Photographs and artist illustrations of the spacecraft, booster rockets, and mission support elements are included.

\$400 - 600

71

MCDONNELL MERCURY BROCHURE—SIGNED.

Project Mercury. 4 pp. 11 by 9 inches.

SIGNED and INSCRIBED with their respective mission designations: "*SCOTT CARPENTER, Aurora 7*"; "*GORDON COOPER, Faith 7*" and "*WALLY SCHIRRA, Σ7*."

Descriptions of all critical Mercury flight phases are provided with eight artist illustrations. The cover portrays the Mercury spacecraft in earth orbit with the moon seen in the distance.

See illustration overleaf.

\$600 - 800



71



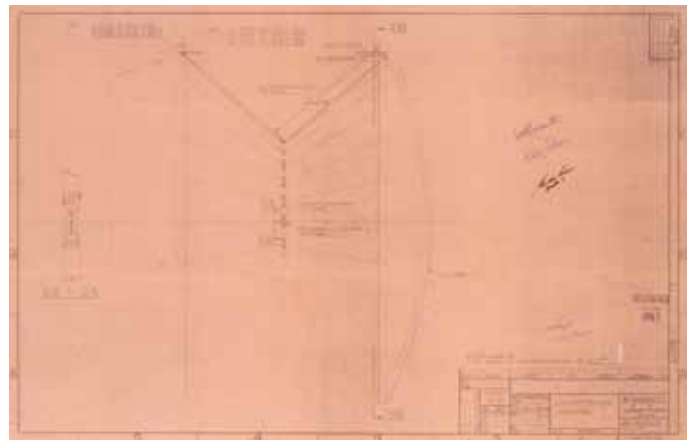
72



73



74



75

72 EARLY MERCURY COMMUNICATIONS AND TRACKING BOOKLET—SIGNED.

Communications for Mercury. Sandia Corporation, 1961.
12 pp. 6 1/2 by 8 1/2 inches. Original tan wrappers.

SIGNED and INSCRIBED with their individual Mercury Atlas (MA) number: "SCOTT CARPENTER MA-7, GORDON COOPER MA-9" and "WALLY SCHIRRA, MA-8."

Future communications roles for the Bell System, Western Electric, Sandia, and other subsidiaries are explained in detail along with artist illustrations showing various Mercury flight phases. The Mercury world-wide tracking network is made from a combination of land lines, submarine cables, and radio links. Plans are described how astronaut voice and spacecraft telemetry will be processed over the tracking network.

\$500 - 700

73 LARGE MERCURY SPACECRAFT LITHOGRAPH—SIGNED.

Large Color Lithograph, 22 by 12 inches. McDonnell Aircraft Corporation, 1963.

BOLDLY SIGNED by SCOTT CARPENTER and WALLY SCHIRRA under their individual flight logo.

An artist illustration of the Mercury spacecraft and red escaped tower is centered between Mercury mission logos with flight dates, three on each side. Text along the bottom edge reads: "MERCURY SPACECRAFT, Designed and built by McDONNELL, St. Louis for the National Aeronautics and Space Administration."

\$800 - 1,200

The following lot was originally in the collection of Astronaut Gordon Cooper.

74 COOPER'S MERCURY CAPSULE AND TOWER DIAGRAM—SIGNED.

Capsule and Tower Separation Distance plot diagram. McDonnell Aircraft Corporation, St. Louis 3, Missouri, February 18, 1959. 17 by 11 inches.

INScribed and SIGNED: "From my notebook, GORDON COOPER, Faith 7."

Three center of gravity (CG) points are plotted with labels of: "CG Capsule, CG Tower," and "CG Capsule and Tower" within a diagram outline of the space vehicle. A "Path of Capsule CG" and "Path of Tower CG" time and range (distance) plot illustrates the separation distance projected for each vehicle component. During normal launch profiles, the escape tower would separate some two and a half minutes after launch. If using a Redstone rocket, that would be after the Redstone engine shutdown. The Atlas rocket would still be under powered flight for an additional two and a half minutes.

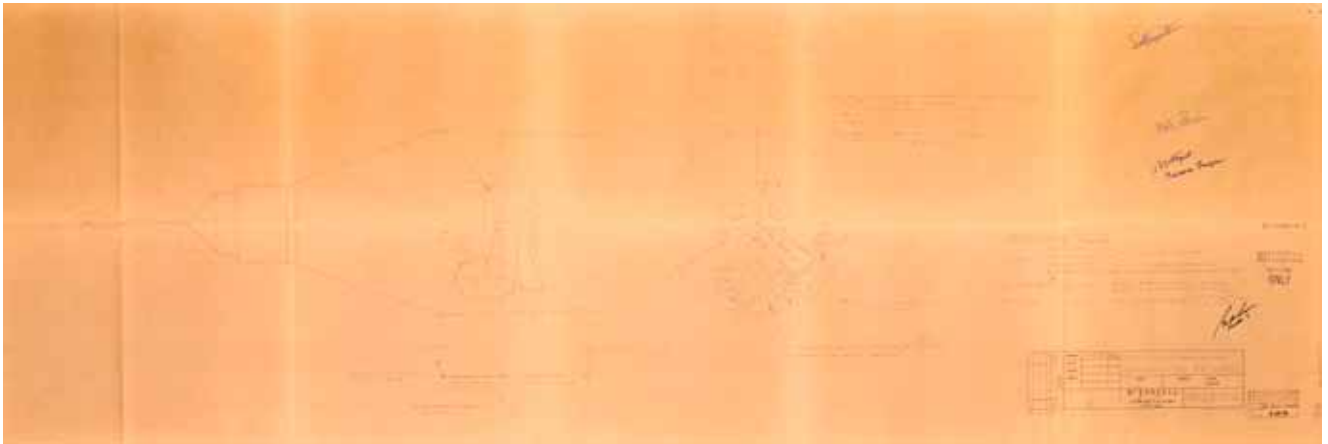
\$600 - 800



77 (detail)



79



76

**75
MERCURY HEAT SHIELD DRAWING
BLUEPRINT—SIGNED.**

E. O. Extension Drawing blueprint. McDonnell Aircraft Corporation, St. Louis, MO, March 24-25, 1961. 22 by 34 inches, 1/4 scale. Stamped: "Reference Only, APR-5, 1961."

BOLDLY SIGNED by SCOTT CARPENTER and WALLY SCHIRRA. **SIGNED** and **INSCRIBED**: "GORDON COOPER, Faith 7" and "MAX FAGET, Mercury Designer."

Illustrated is a deployed Mercury heat shield showing the locations of spacecraft main base ring, clamp, and spring assemblies with the latter two having an enlarged drawing. These assemblies would allow deployment of a "landing bag" between the spacecraft and heat shield which would lessen the vehicle's impact during a planned ocean "splashdown" or possible unscheduled solid surface landing.
\$1,200 - 1,800

**76
MERCURY ESCAPE / ABORT CONCEPT
BLUEPRINT—SIGNED.**

Study - Rocket Arrangement Configuration No. 9D (Finless Adapter) blueprint. McDonnell Aircraft Corporation, St. Louis, MO, April 28, 1961. 18 by 53 inches, 1/10 scale. Two date stamps for May 17 and June 8, 1961.

BOLDLY SIGNED by SCOTT CARPENTER and WALLY SCHIRRA. **SIGNED** and **INSCRIBED**: "GORDON COOPER, Faith 7" and "MAX FAGET, Mercury Designer."

Two drawings, side and aft, of the Mercury spacecraft show the proposed location a posigrade rocket package to separate the vehicle from the either a Redstone or Atlas rocket during an emergency. The normal escape tower forward of the spacecraft has been replaced with an aerodynamic spike, providing overall weight reduction. The proposed posigrade rockets would be either Thiokol Patriots or Rocketdyne P-4's. This configuration called for astronaut escape from the pad and up to 20,000 feet altitude via an ejection seat.
\$1,000 - 1,500

**77
MERCURY PARAGLIDER CONCEPT
BLUEPRINT—SIGNED.**

Geometry Layout, Mercury Paraglider Control blueprint. McDonnell Aircraft Corporation, St. Louis, MO, May 22, 1961. 36 by 81 inches, 1/20 scale.

BOLDLY SIGNED and **INSCRIBED**: "MAX FAGET, Mercury Designer" near the right side edge of the blueprint.

Top, aft, and side views of the Mercury spacecraft with a deployed paraglider wing are drawn with locations of lateral and longitudinal control lines. Center of gravity points are marked on the spacecraft. After re-entry through the earth's atmosphere, the vehicle's heat shield would be lowered in such a way to provide a skid-type landing gear.

\$700 - 900

78 No lot



80

79

ORIGINAL MERCURY SEVEN—SIGNED BY SIX.

Large black & white photograph, 11 x 14 inches, ca.1959, later printing on Kodak paper, depicting the original Mercury 7 astronauts in civilian clothing examining a model of the Mercury Atlas.

SIGNED BY ALAN SHEPARD, SCOTT CARPENTER, JOHN GLENN, GORDON COOPER, WALLY SCHIRRA, and DEKE SLAYTON.

See illustration on preceding page.

\$2,500 - 3,500

80

MERCURY FRIENDSHIP 7 CAPSULE.

Vintage color photograph, 8½ by 11 inches, of an illustration of the Mercury Friendship 7 re-entry capsule's sea landing.

SIGNED BY JOHN GLENN, SCOTT CARPENTER, ALAN SHEPARD, WALLY SCHIRRA, GORDON COOPER and DEKE SLAYTON.

\$1,500 - 2,500

81

A DECADE OF ACHIEVEMENT, MERCURY TO APOLLO—SHEPARD SIGNED POSTAL ENVELOPE.

FEATURES POSTMARKS FROM THREE SPACE FLIGHT MILESTONE EVENTS. An air mail postal envelope having a red, white, and blue outer border with a pre-printed 7-cent air mail stamp. Patrick Air Force Base (AFB) postmark dated May 5, 1961, the launch day of Alan Shepard's *Freedom 7* flight.

SIGNED BY ALAN SHEPARD.

Patrick AFB is located some 20 miles south of Cape Canaveral and often used by NASA/Contractor postal enthusiasts for postmarks of early space program events. This envelope has addition postmarks from Cape Canaveral on January 31, 1971 – Shepard's Apollo 14 launch date and May 5, 1971 – the 10th anniversary of his *Freedom 7* flight. An inner ear disorder grounded Shepard almost 10 years. A high risk operation corrected the disorder and he was returned to active astronaut flight status which enabled him to command the Apollo 14 lunar landing mission.

\$700 - 900



81

82

FLOWN MERCURY SPACECRAFT LIBERTY BELL 7 BOLT.

A flown component from the *Liberty Bell 7* spacecraft, the Mercury-Redstone 4 mission, being a ¾ inch long bolt. Encased in an 4 ½ by 5 by 1 ½ inch lucite block with a description of: "This is an original component from Liberty Bell 7 Mercury spacecraft, recovered from the Atlantic Ocean on July 20, 1999, from a depth of 16,043 feet." An image of the refurbished *Liberty Bell 7* spacecraft is to the left of the bolt. With original presentation box.

Included is a 3 by 4 inch dual leaf Certificate of Authenticity from the Kansas Cosmosphere and Space Center (KCSC) which reads in part: "On July 21, 1961, with a 15-minute suborbital flight of the Mercury spacecraft *Liberty Bell 7*, Gus Grissom became the second American in space. The flight was by-the-book until splashdown in the Atlantic Ocean when the explosive-powered hatch jettisoned prematurely, flooding the capsule. Grissom scrambled out of the spacecraft and nearly drowned in the swells. With the spacecraft full of water, the weight was too much for the recovery helicopter. *Liberty Bell 7* was released and the spacecraft sank three miles to the bottom of the ocean floor.... The preservation of *Liberty Bell 7* represented one of the biggest restoration challenges to date for the Cosmosphere. Every one of the nearly 25,000 parts of *Liberty Bell 7* had to be removed, disassembled, cleaned and then put back together. The item you have acquired could not be reinstalled in the spacecraft because of the corroded condition of the component to which it was originally attached."

\$1,000 - 1,500



82



85

**85
FLOWN LIBERTY BELL 7 FILM.**

A 1 ½ inch long segment of 16mm motion picture film encased in an 8 ½ by 3 by 2 inch Lucite block. A description below the film reads: "This is an original piece of film from Liberty Bell 7's pilot observation camera which captured all the movements of astronaut Gus Grissom as he became the second American in space. Issued in commemoration of the 40th anniversary of the flight July 21, 1961 – July 21, 2001." Dual images inside the Lucite feature the fully restored Liberty Bell 7 on the right and Gus Grissom prior to his sub-orbital flight on the left. Limited edition number 589 of 1000 with original presentation box.

The Liberty Bell 7 sank just after splashdown in 1961 when the explosive entry/exit hatch detonated prematurely. The spacecraft was recovered at a depth of over 16,000 feet by a privately funded operation in 1999.
\$500 - 700

**84[□]
MERCURY ATLAS LAUNCH.**

Vintage color photograph, 8½ by 11 inches, of the launch of the Mercury Atlas M-A2 rocket, an unmanned suborbital Mercury capsule test on February 24, 1961.

SIGNED BY JOHN GLENN and WALLY SCHIRRA to Lou.
WITH: Black and white NASA photograph, A 7½ by 9½ inches, of Gus Grissom standing in front of the Liberty Bell capsule in his spacesuit. Signed by Betty Grissom.
\$400 - 600



83



86

**85
MERCURY STAR CHART. SIGNED BY KRANZ.**

Rectangular star chart, 3¾ x 10 inches. Laminated, one hole punched at head of chart.

SIGNED BY GENE KRANZ. Part of a full set of charts used by the Mercury astronauts. The chart was used in conjunction with a clear plastic overlay which was in the shape of a spacecraft window. By doing so, the astronaut was able to have the same view as would an astronaut from the space capsule window.

\$600 - 800

**86
JOHN GLENN SIGNED MERCURY LAUNCH POSTAL COVER.**

Postal envelope having a blue cachet illustrating John Glenn and describing his three orbit flight. Cape Canaveral, Florida postmark dated 20 February 1962, with: "First Day of Issue."

SIGNED by JOHN GLENN and GORDON COOPER. SIGNED and INSCRIBED: "JAMES E. WEBB, Adm. NASA, 1961-68."

\$500 - 700

**87
SIGNED MERCURY STAMP FIRST DAY POSTAL COVER.**

Postal envelope with a Cape Canaveral, Florida postmark dated 20 February 1962, the launch date of John Glenn's "Friendship 7" flight. The cancel was made over a block of four 4-cent "US Man in Space Project Mercury" stamps that were just issued on this date.

SIGNED by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA.
\$600 - 800



84



87



90



90



90

88

JOHN GLENN PRE-LAUNCH.

Black and white vintage photograph 8 x 10 inches, of John Glenn in his space suit pre-launch, leaving the crew quarters at Hanger S for transport by van to Pad 14 alongside NASA technician Joe W. Schmitt, and astronaut personal physician, Dr. William K. Smith.

SIGNED BY JOHN GLENN, DR. WILLIAM K. DOUGLAS, and JOE W. SCHMITT. The photo, taken the morning of February 20, 1962, depicts the moment after John Glenn had received his final medical exam by Dr. Douglas, and had been helped into his suit by Schmitt.

WITH: Litho, 8 x 10 inches, of the Mercury 7 in front of an F-106, SIGNED BY WALLY SCHIRRA.

\$200 - 300

89

JOHN GLENN TOURS EUROPE.

Archive of 51 vintage black & white photographs ranging in size from 4½ by 7 inches to 8 x 10 inches. Many with descriptive labels affixed to versos.

Provenance: Lieutenant Col. Walter Pennino. Pennino (1915-1998) was the director of NASA's public relations program, and did the advance work for foreign goodwill tours made by astronauts.

Depicting John Glenn's tour of Europe, including photos with Mrs. Glenn, Glenn addressing the British Interplanetary Society, the Glenns with British Prime Minister Wilson, Glenn giving a press conference at the American Embassy in London, amongst many others.

\$1,500 - 2,500

90

ORIGINAL MERCURY 7 PHOTOS AND ORBITAL CHART. SIGNED.

Two signed photographs and signed Mercury orbital chart matted and framed together to 42 by 33 inches:

1. Large color photograph, 14 by 11 inches, featuring the classic image of the Mercury 7 in front on an F-106. SIGNED BY SCOTT CARPENTER, GORDON COOPER, JOHN GLENN, WALLY SCHIRRA, ALAN SHEPARD, AND DEKE SLAYTON.

2. Large color photograph, 8½ by 11 inches, featuring the launch of the Mercury Redstone Rocket. SIGNED BY ASTRONAUTS GORDON COOPER, JOHN GLENN, ALAN SHEPARD, SCOTT CARPENTER, DEKE SLAYTON, AND WALLY SCHIRRA; SCIENTISTS GUENTER WENDT AND KONRAD DANNENBERG, as well as Gus Grissom's widow Betty Grissom.

3. "Mercury Orbit Chart MOC-3," color map of Earth, Aeronautical Chart and Information Center, December, 1961, 8½ by 33 inches. SIGNED BY JOHN GLENN, SCOTT CARPENTER, AND DEKE SLAYTON. Chart plotting the all three orbits of Scott Carpenter's MA-7 Aurora 7 space flight.

\$6,000 - 9,000

91

CARPENTER AT THE CAPE.

Color photograph, 10 by 8 inches.

SIGNED and INSCRIBED: "SCOTT CARPENTER, Aurora 7."

Astronaut Carpenter wearing his space suit and helmet in front of a large tracking antenna at Cape Canaveral.

\$200 - 300

92

A DRIVE TO THE LAUNCH PAD.

Black and white photograph, 10 by 8 inches, printed NASA captions on verso.

SIGNED by SCOTT CARPENTER.

Carpenter is behind the wheel of an automobile as he drives to Launch Complex 14 to inspect his Atlas rocket and the Aurora 7 Mercury spacecraft.

\$200 - 300

93

CARPENTER EXITS THE MERCURY SPACECRAFT.

Black and white photograph, 10 by 8 inches, printed NASA captions on verso.

SIGNED by SCOTT CARPENTER.

Carpenter, in full spacesuit, practices egress (exiting) procedures with a Mercury spacecraft.

\$200 - 300

94

LANDING A BIT LONG DOWNRANGE.

Black and white photograph, 8 by 10 inches, printed NASA captions on verso.

SIGNED by SCOTT CARPENTER.

The *Aurora 7* spacecraft is seen floating in the Atlantic Ocean. Due to both pilot error and spacecraft mechanical problems, Carpenter landed some 250 miles past his target. Several hours passed before he was safely recovered.

\$200 - 300

95

DADDY'S DAY AT WORK.

Black and white photograph, 10 by 8 inches, printed NASA captions on verso.

SIGNED by SCOTT CARPENTER.

Carpenter stands with his daughter Candy next to his *Aurora 7* spacecraft after the flight.

\$200 - 300

96

CARPENTER DESCRIBES HIS FLIGHT FOR LIFE MAGAZINE – SIGNED.

LIFE Magazine. New York: Time-Life, June 8, 1962.

Over 170 pp. 13 by 11 inches. Original printed wrappers.

SIGNED by SCOTT CARPENTER on the front cover.

The complete issue featuring a Carpenter headline on the front cover. The 15 page article has several color photographs from space taken by Carpenter plus several by LIFE staff photographers. Carpenter writes a detailed story of his experience including the near disastrous re-entry which reads in part: *"This has been the greatest day of your life. You've got nobody to blame for being in this spot but yourself. If you do right, you may make it. If you don't do right, you're just going to buy the farm."* Carpenter did struggle and landed some 250 miles away from his target but made no real estate purchases that day.

\$300 - 400

97

CARPENTER DESCRIBES THE FIREFLY PHENOMENON—SIGNED.

The Earth-Orbiting Flight of Astronaut Carpenter. NASA, 1962. 8 pp. 8 by 10 inches.

BOLDLY SIGNED by SCOTT CARPENTER on the front cover.

Illustrated with several fully captioned training, flight, and post-flight photographs. Direct comments from Carpenter include: *"The launch was much easier, much smoother than I had been led to believe ... They (Fireflies) look like snow, like a small snowflake that's caught in an eddy, in a rising air current. They have random movements, they are brilliant – more brilliant than any star ... Each time I hit the capsule a cloud of particles would fly off ... The capsule must be covered with frost, and that rap on the side would knock the frost off."* His mission experiments and recovery are also described.

\$300 - 400



89 (part lot)



91



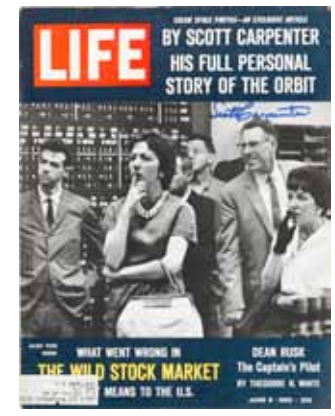
93



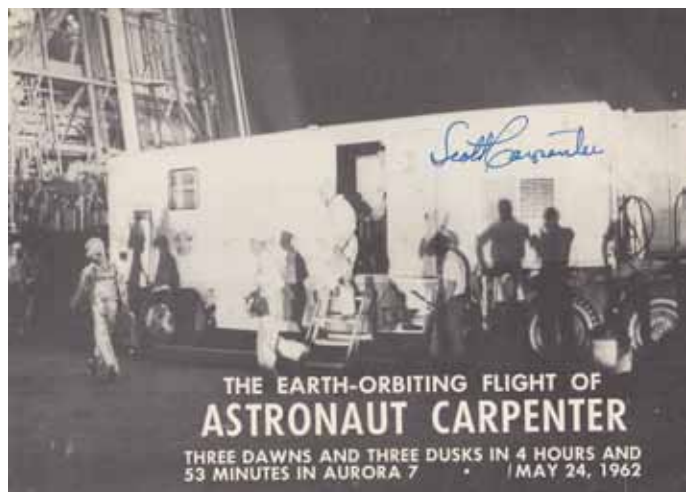
94



95



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97



98



99

98

CARPENTER REPLACES SLAYTON TO FLY MISSION—SIGNED.

Astronaut M. Scott Carpenter, *Aurora 7*. Washington: GPO/NASA for the Manned Spacecraft Center, 1962. 40 pp. 10 by 8 inches. Original blue printed wrappers.

BOLDLY SIGNED by SCOTT CARPENTER on the front cover.

Carpenter's family, astronaut selection, spacecraft tests, and *Aurora 7* post flight astronaut tours are just some subjects of the over 70 captioned photographs. One topic is training and Carpenter's actual flight assignment reading: "The study requirements on all astronauts are great but those of the prime and backup pilot are much heavier... In Carpenter's case this was more condensed since he was named to replace Donald K. 'Deke' Slayton as prime pilot in mid-March (1962) when it was determined that the latter had an irregular heart beat and a board of civilian cardiologists recommended that he not fly the mission." Pictures of Carpenter's return to his home state of Colorado are included.

\$300 - 500



100



102

99

NASA AND SCOTT CARPENTER—SIGNED.

Large halftone illustrations with captions. NASA, 1962. 9 pp. 10 ½ by 8 inches. Sheets with single staple binding having full page images.

SIGNED by SCOTT CARPENTER on the first sheet.

Features classic images of Scott Carpenter in his space suit, moving to the launch pad, the actual Atlas launch, Mission Control, and his return.

\$200 - 300

100

CARPENTER SIGNED ORBITAL FLIGHT REPORT.

Results of the Second United States Manned Orbital Space Flight, May 24, 1962. Washington: GPO/NASA SP-6, 1962. 107 pp. Illustrations and diagrams, 10 by 8 inches. Original blue printed wrappers.

SIGNED and INSCRIBED: "SCOTT CARPENTER, *Aurora 7*" on the front cover.

Flight results include spacecraft systems, photography and space science experiments, re-entry and recovery issues, plus a pilot's report by Carpenter. Comparisons with John Glenn's *Friendship 7* flight are noted. Describes the *Aurora 7* spacecraft (capsule number 18) and the Atlas launch vehicle performance. An appendix provides the complete flight (air to ground) communications transcript.

\$300 - 400



101

101

SCHIRRA SPACE SUIT PORTRAIT.

Color photograph, 8 by 10 inches.

SIGNED and INSCRIBED: "WALLY SCHIRRA, Σ7."

Schirra poses in his Mercury space suit in front of a scale Mercury spacecraft model and world map in the background.

\$200 - 300



105

102

SCHIRRA CLOSE-UP.

Color photograph, 10 by 8 inches.

SIGNED by WALLY SCHIRRA.

Schirra smiles for the camera while wearing his space suit and helmet during Σ7 training.

\$200 - 300

103

SCHIRRA SIGNED ORBITAL FLIGHT REPORT.

Results of the Third United States Manned Orbital Space Flight, October 3, 1962. Washington: GPO/NASA SP-12, 1962. 120pp. Illustrations and diagrams, 10 by 10 inches. Original blue printed wrappers.

SIGNED and INSCRIBED: "WALLY SCHIRRA, Σ7" on the front cover.

Covers flight results including the Σ7 spacecraft (capsule number 16) and launch vehicle performance, mission operations, aeromedical analysis, plus a pilot's report by Schirra. An appendix provides the complete flight (air to ground) communications transcript.

\$300 - 400

104

SCHIRRA, WALLY and RICHARD N. BILLINGS.

Schirra's Space. Annapolis: U.S. Naval Institute Press, 1988. 8 by 6 inches. Original paper wrappers.

SIGNED by WALLY SCHIRRA on the half title page.

Schirra's autobiography with pointed opinions covering the space race of the 1960's and the then current Space Shuttle program.

\$150 - 200

105[□]

MERCURY ATLAS 8 ORBITAL CHART—SIGNED BY WALLY SCHIRRA.

"Mercury Orbit Chart MOC-4," color map of Earth, Aeronautical Chart and Information Center, June 1962, 8½ by 33 inches. Scattered pencil notations, 4 creases at folds, repaired tear, very light soiling and toning.

SIGNED CHART PLOTTING ALL SIX ORBITS OF WALLY SCHIRRA'S MA-8 Σ7 SPACE FLIGHT.

\$600 - 900

106

WHO'S THE BEST PILOT?

Color photograph, 10 by 8 inches.

INSCRIBED and SIGNED by COOPER: "Who's the best pilot I ever saw? You're looking at him, GORDON COOPER."

Gordon Cooper poses with a scale model of the Mercury spacecraft with a United States flag in the background.

\$400 - 600

107

SPACE HELMET ADJUSTMENTS.

Black and white photograph, 10 by 8 inches, NASA caption on verso.

INSCRIBED and SIGNED by COOPER: "Easy on the helmet, Al! GORDON COOPER."

Gordon Cooper is seated wearing his space suit and helmet while fellow astronaut Alan Shepard and a suit technician put in place a helmet visor protector.

\$300 - 400

108

ROCKET ERECTION – GET IT UP!

Color photolithograph, 10 by 8 inches.

INSCRIBED and SIGNED by COOPER: "Get it UP! GORDON COOPER."

Gordon Cooper's Atlas rocket is raised into launch position at Launch Complex 14, Cape Canaveral.

\$300 - 400



103



106



107



108



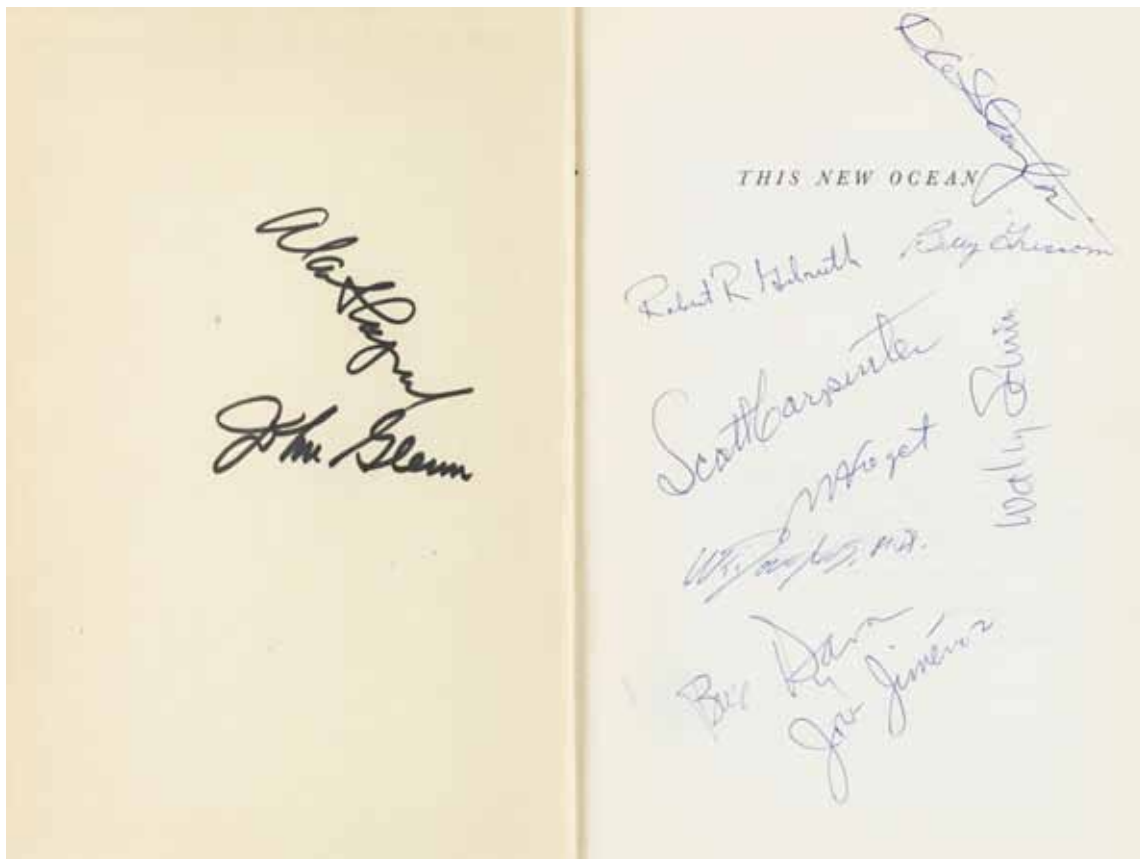
109



110



112



113

109

COOPER SIGNED ORBITAL FLIGHT REPORT WITH MERCURY SUMMARY.

Project Mercury Summary Including the Results of the Fourth United States Manned Orbital Space Flight, May 15 and 16, 1963. Washington: GPO/NASA SP-45, 1963. 444pp. Illustrations and diagrams, 10 by 8 inches. Original blue printed wrappers.

SIGNED by GORDON COOPER on the front cover. INSCRIBED and SIGNED by COOPER with: "The longest and best Mercury flight! Faith 7, 15/16 May 1963, GORDON COOPER" on the title page.

Results from all Mercury flights (manned and unmanned) and their respective boosters (Little Joe, Redstone, Atlas) are included with an extensive text devoted to Faith 7 events. Overall spacecraft development and mission support are covered with chapters on reliability, safety, trajectory analysis, and the world wide tracking network. Special sections on astronaut training and performance are included. There are six appendices with one providing a complete flight (air to ground) communications transcript of the Faith 7 mission.

See illustration on preceding page.

\$500 - 700

110

COOPER MADE YOUNGER—SIGNED.

LIFE Magazine. New York: Time-Life, May 24, 1963. Over 110 pp. 13 by 11 inches. Original printed wrappers.

SIGNED by GORDON COOPER on the front cover.

The complete issue featuring a space suited Gordon Cooper prior to his launch on the front cover. An eleven page article describes Cooper's flight with photographs and text. Included is a story on relativity describing how Cooper aging process slowed down due to his speed in earth orbit.

See illustration on preceding page.

\$300 - 400

111

THE COOPERS REUNITED IN HAWAII—SIGNED.

LIFE Magazine. New York: Time-Life, May 31, 1963. Over 96 pp. 13 by 11 inches. Original printed wrappers.

INSCRIBED and SIGNED: "In Hawaii after the Faith 7 mission, GORDON COOPER" on the front cover.

The complete issue featuring a close-up of Cooper and his wife Trudy on the front cover. Contains several photographs from Capitol Hill and White House visits plus family images. An article by Trudy Cooper describes her family's activities during her husband's 34 hour, 22 orbit space flight.

\$300 - 400

112²

MERCURY ATLAS 9 ORBITAL CHART—SIGNED BY GORDON COOPER.

"Mercury Orbit Chart MOC-6," color map of Earth, Aeronautical Chart and Information Center, February 1963, 10½ by 35½ inches. 4 creases where folded, 2 nearly imperceptible closed tears, recto light toned and soiled.

SIGNED CHART PLOTTING ALL THE ORBITS OF GORDON COOPER'S MA-9 FAITH 7 SPACE FLIGHT. See illustration on preceding page.

\$600 - 900

113

HISTORY OF PROJECT MERCURY—SIGNED

This New Ocean. A History of Project Mercury. NASA SP-4201. Washington: Government Printing Office, 1966.

681 pp. Illustrations & diagrams, two folding charts. 10 by 7½ inches. Original cloth.

SIGNED BY ASTRONAUTS JOHN GLENN, SCOTT CARPENTER, WALLY SCHIRRA, ALAN SHEPARD, AND DEKE SLAYTON, Mercury Capsule designer MAXIME FAGET, first director of NASA's Manned Spacecraft Center ROBERT R. GILRUTH, personal physician to the Mercury 7 astronauts WILLIAM K. DOUGLAS, BETTY GRISSOM, and American comedian BILL DANA (once with his own name, and once in the name of the fictional character he created and performed, astronaut JOSÉ JIMÉNEZ).

\$1,500 - 2,500



114

114

COOPER, L. GORDON, ET AL.

The Astronauts, Pioneers in Space. New York: Golden Press and Life, 1961. 93 pp. Illustrated, 10 by 7 inches. Original pictorial boards.

SIGNED exactly as SCOTT CARPENTER, L. GORDON COOPER Jr., and WALTER M. SCHIRRA Jr. on the title page.
ADDITIONALLY SIGNED exactly as SCOTT CARPENTER and L. GORDON COOPER Jr. on their individual title chapter page.

Each Mercury astronaut writes on a particular flight phase or flight preparation. With extensive illustrations, diagrams, and photographs of Mercury training.

\$700 - 900

115

MYRUS, DON.

Keeping Up with the Astronauts: the Story of Man's Greatest Adventures in Outer Space Including the John Glenn and Scott Carpenter Flights. New York: Grosset and Dunlap, 1962. 93 pp. Illustrations and diagrams, 11 by 9 inches. Original pictorial boards.

SIGNED by SCOTT CARPENTER on the front cover.

Describes the fundamental procedures to support and fly a Mercury mission with extensive images of the orbital flights of Glenn and Carpenter.

\$200 - 300

116

GURNEY, GENE.

Americans in Orbit, The Story of Project Mercury. New York: Random House, 1962. 190 pp. Illustrated, 9 by 6 inches. Original cloth.

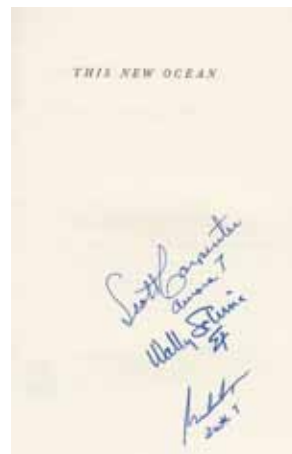
SIGNED and INSCRIBED: "SCOTT CARPENTER, *Aurora 7*; GORDON COOPER, *Faith 7*" and "WALLY SCHIRRA, $\Sigma 7$ " on the frontispiece featuring the astronauts in front of an F-106 jet.

Includes a brief history of rocketry, unmanned space exploration, and current Soviet space efforts. Major emphasis is on U.S. astronaut tests, training, and flights through John Glenn's *Friendship 7*.

\$400 - 600



116



118

117

CARPENTER, M. SCOTT, ET AL.

We Seven. By the Astronauts Themselves. New York: Simon and Schuster, 1962. Illustrated, 8½ by 6 inches. Original cloth.

FIRST EDITION. SIGNED and INSCRIBED with their individual Mercury spacecraft names by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA on half title.

Each astronaut has written multiple chapters on his program development support assignment and personal training experiences. Shepard, Grissom, Glenn, and Carpenter have chapters on their actual space flights.

\$500 - 700

118

A MERCURY FLIGHT CONTROLLER'S BOOK—SIGNED.

SWENSON, LOYD S., JAMES M. GRIMWOOD and CHARLES C.

ALEXANDER. *This New Ocean. A History of Project Mercury.*

Washington: GPO/NASA SP-4201, 1966. 681 pp. Illustrations and diagrams, two folding charts. 10 by 7 ½ inches. Original cloth.

SIGNED AND INSCRIBED on the half-title page: "SCOTT CARPENTER, *Aurora 7*; GORDON COOPER, *Faith 7*" and "WALLY SCHIRRA, $\Sigma 7$."

INSCRIBED and SIGNED on the front endpaper: "Received from NASA Jan 30, 1967, Carl R. Huss."

Provenance: From the library of Carl Huss, NASA Mercury Retrofire Controller. Includes a 6 by 8 inch black and white photograph of Huss at his Mercury Mission Control Retrofire station with John Glenn seated to his left.

One of the most detailed publications ever written on Project Mercury. Subjects include early design and flight concepts, spacecraft and booster development, test flights, and mission support. All six manned Mercury flights are reviewed in minute detail.

\$600 - 800

119

FINAL MERCURY CONFERENCE PROGRAM—SIGNED.

Mercury Program Summary. Houston: NASA Manned Spacecraft Center, 1963. Illustrations and charts, 16 pp. 16 by 11 ½ inches. Newspaper-type format.

SIGNED and INSCRIBED: "SCOTT CARPENTER, *Aurora 7*; *Faith 7*, GORDON COOPER and WALLY SCHIRRA, $\Sigma 7$ " on the upper front page.

Issued for the Project Mercury Summary Conference held October 3 and 4, 1962 in Houston, Texas with the agenda timeline on the first page. Some of the topics covered are the beginning of NASA, astronaut selection and training, the Mercury Control Center, spacecraft checks done in Hangar "S," science experiments, and recovery operations. With a five page chronology listing Little Joe flight tests, beach aborts, Redstone and Atlas rocket flights.

\$500 - 700



119



120



121



122 (part lot)

120

THE MERCURY SPACECRAFT—SIGNED.

Color photograph, 10 by 8 inches.

SIGNED and INSCRIBED with their individual mission and dates as: "SCOTT CARPENTER, *Aurora 7*, 5/62; WALLY SCHIRRA, *Sigma 7*, 10/62; GORDON COOPER, *Faith 7*, 5/63." Cooper has added "The Mercury Spacecraft" along the upper left corner.

A detailed artist drawing of the Mercury spacecraft showing the pilot window, retro rockets, and the Rene 41 structural shingles making up the outer skin. The large red escape tower attached to the forward end.

\$1,200 - 1,800

121

THE SIX MERCURY MISSION EMBLEMS.

Cloth crew emblems, six total, all circular and 4 inches in diameter.

The Mercury astronauts never had a dedicated mission emblem to place on their individual space suits, only the NASA "meatball" emblem and leather name tag. Each Mercury spacecraft, however, did have its individual name and logo painted onto the outer skin, usually just below the spacecraft window. This set of cloth emblems was made a few years after the program ended and is a high fidelity representation of the exact logo from each manned spacecraft. Additionally, each astronaut's own initials are woven near the "5 o'clock" position of their emblem. For example, the "FREEDOM 7" emblem has the initials "ABS" for Alan Bartlett Shepard. Included is an 8 by 10 inch color image by McDonnell that features these logos and other flight information.

\$700 - 900

122^a

PROJECTS MERCURY & APOLLO.

Collection of 20 color positives and 2 negatives (5 by 4 inches and 4 by 5 inches) featuring various images from the Mercury and Apollo missions, including the Mercury Redstone launch, the iconic image of Dave Scott saluting the American flag on the lunar surface, the *Freedom 7* capsule, a view of Earth from space, close ups of the *Liberty Bell 7* capsule, the iconic images of the Mercury 7 in their spacesuits, as well as in front of the F-106, and the iconic Apollo 11 crew photo to name but a few.

\$200 - 300

PROJECT GEMINI

123

PROJECT GEMINI—FIRST DAY POSTMARK—SIGNED BY SCOTT, STAFFORD, SLAYTON, CERNAN AND BEAN.

1½ by 1 inch New York World's Fair 5¢ postmark, mounted to certificate with stamp "World's Fair. Apr. 22 1964. N.Y., First Day of Issue."

Provenance: From the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

SIGNED BY ALAN BEAN, GENE CERNAN, DAVE SCOTT, DEKE SLAYTON, AND TOM STAFFORD.

\$1,200 - 1,800

124

GUS GRISSOM'S GEMINI 3 MISSION EMBLEM.

THE UNSINKABLE MOLLY BROWN! Circular cloth mission emblem, approximately 3 ½ inches in diameter. The crew names surround a Gemini spacecraft floating on water. Mounted on a Typed Letter Signed by MRS. GUS (BETTY) GRISSOM.

BETTY GRISSOM'S signed provenance letter reads: *"The attached cloth emblem is one of the originals made at the request of my husband for his Gemini 3 flight. Gus had lost his Mercury capsule after a short circuit blew the hatch. 'Molly Brown,' the unsinkable heroine from the Broadway musical, seemed the best choice by my husband for the name of his Gemini spacecraft. NASA never officially named Gemini 3 'Molly Brown,' but the name was enthusiastically used by the press during coverage of the March 23, 1965 flight."*

\$1,500 - 2,500

125

CHARLES CONRAD'S MEDALLION FLOWN ON GEMINI 5.

FLOWN Gemini 5 medallion made of sterling silver, 1 inch in diameter. The crew mission emblem is on the obverse with the mission dates of "August 21 – 29, 1965" engraved on the reverse. Affixed to (and removable from) a 5½ by 6½ inch Typed Card Signed by CHARLES CONRAD.

CHARLES CONRAD's signed provenance card reads: *"This sterling silver Gemini 5 medallion flew in space from August 21 to 29, 1965. Gemini 5 was my first space mission and the second for Gordon Cooper who was mission commander. The covered wagon reflects the pioneering spirit of this early Gemini flight. This medallion became a part of history when we completed the record breaking eight day flight. Our successful completion of Gemini 5 marked the beginning of the U.S. lead in manned space exploration. The medallion is from my personal collection."*

Not only a moonwalking astronaut with Apollo 12, Conrad commanded Gemini 11 in 1966 and the 28 day Skylab I flight of 1973.

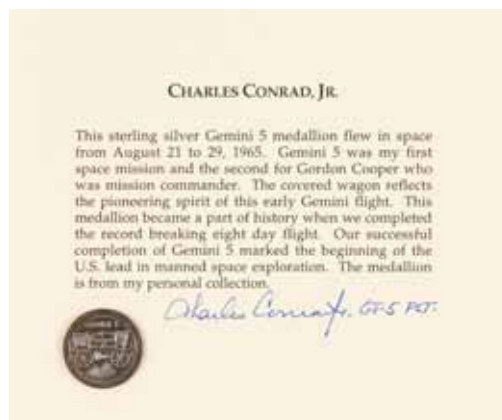
\$1,500 - 2,000



123



124



125



126



127 (part lot)



130



128

126

THE "EIGHT DAYS OR BUST" CREW—SIGNED.
Color photograph, 8 by 10 inches.

SIGNED and INSCRIBED: "GORDON COOPER, *Gemini V Cdr*" and "CHARLES CONRAD, *Gemini V PLT*."

Cooper and Conrad pose wearing their Gemini space suits and helmets.
\$400 - 600

127

COOPER SIGNED DOCUMENTS FROM HIS COLLECTION.

Gemini Program Flight Summary Report, Gemini Missions I, II, III, IV, V, VI-A, and VII. Houston: NASA Manned Spacecraft Center (MSC-G-R-66-5), July 1966. 30 pp. 10 ½ by 8 inches. Heavy card stock with staple binding. Having manuscript underlining and other notations by Cooper on pages 17, 18, and 20, being part of the Gemini V summary.

INSCRIBED and SIGNED: "My personal copy - GORDON COOPER" on the front cover.

Additionally, Alternate GT-5 Menu. Cooper's MSC Astronaut Office internal distribution copy dated August 15, 1965. 4 pp. Single staple binding. Lists various meals (A, B, C) and the alternating flight days for each. Protein content, calories, and water amount needed for rehydration are examples of tabulated data recorded.

INSCRIBED and SIGNED: "From my collection - GORDON COOPER" along the top of the first sheet.
\$400 - 600

128

THOMAS STAFFORD'S FLOWN GEMINI 6 CREW MISSION EMBLEM.

CARRIED ON THE FIRST MANNED RENDEZVOUS MISSION. FLOWN cloth crew mission emblem taken on the flight by Gemini 6 Pilot Thomas Stafford. Approximately 4 by 4 inches, hexagonal, and features two Gemini spacecraft in a rendezvous-type formation with a stitched outline using background stars to form the number "6." Mounted between paragraphs on a Typed Letter Signed by THOMAS P. STAFFORD from his business stationery. Displayed with an approximately 10 by 8 inch color dual image photolithograph of the historic rendezvous with Gemini 7 and SIGNED by WALLY SCHIRRA and TOM STAFFORD. All mounted on and removable from a 13 ½ by 20 ½ inch blue mat board.

WITH THOMAS P. STAFFORD'S signed provenance letter, reading in part: "This Gemini 6 crew emblem is one that I carried into space on December 15, 1965. The emblem became a part of history when Gemini 6 completed the world's first manned space flight rendezvous with Gemini 7 later that day. This flight technique was one of the most significant capabilities demonstrated in the Gemini Program. Spacecraft rendezvous later became the flight method to accomplish a lunar landing and return. Commander Wally Schirra and I completed our mission on December 16.

The emblem has been in my private collection since 1965. The star constellations of Gemini and Orion as well as the star Sirius are shown on the patch which represents the celestial background where the rendezvous occurred. We patterned our own constellation of a "6" using that background."

\$4,000 - 6,000



129

129

WALLY SCHIRRA'S FLOWN GTA-6 MISSION EMBLEM.

DESIGN REFLECTS THE ORIGINAL PLAN FOR A MANNED RENDEZVOUS. FLOWN GTA-6 cloth crew mission emblem taken on the flight by mission commander Wally Schirra. Approximately 4 by 4 inches, hexagonal. Mounted between paragraphs on a Typed Letter Signed by WALLY SCHIRRA from his personal stationery. Displayed with an approximately 10 by 8 inch Gemini 6 color launch photograph SIGNED by WALLY SCHIRRA and TOM STAFFORD. All mounted on and removable from a 13 1/2 by 20 1/2 inch light blue mat board.

WALLY SCHIRRA'S signed provenance letter which reads in part: "The GTA-6 or Gemini Titan Agena - 6 crew emblem displayed below was carried into space during December 15 and 16, 1965 on the Gemini 6 mission. I was flight commander while Tom Stafford served as pilot. GTA-6 was the original mission designation with a flight plan calling for our Gemini spacecraft to rendezvous and dock with an Agena target vehicle. That sequence is illustrated with the number "6" on the emblem. We would fly into orbit using a Titan rocket some 90 minutes after an Atlas rocket launched the Agena toward orbit. On October 25, 1965 the Atlas rocket worked fine, but the Agena's engine failed to ignite properly ... Our flight was canceled that day but a plan for a rendezvous with the next Gemini flight was devised and accomplished in less than two months. This emblem became a part of history when we completed the world's first manned space flight rendezvous with Gemini 7 on December 15, 1965. This flight technique was one of the most important capabilities developed in the Gemini Program. I decided to carry a few of our original mission emblems as a reminder of the efforts made by the NASA - Industry team that made this historic event possible."

\$3,000 - 5,000

130

TRAINING FOR A SPACE RENDEZVOUS—SIGNED.

Color photograph, 10 by 8 inches.

SIGNED and INSCRIBED: "WALLY SCHIRRA, GT - 6."

Commander Wally Schirra is seated inside his Gemini 6 spacecraft during training exercises for the first manned rendezvous mission.

\$200 - 300



131

131

THOMAS STAFFORD'S FLOWN GEMINI IX EMBLEM.

MULTIPLE LAUNCH ATTEMPTS AND AN ANGRY ALLIGATOR. FLOWN cloth crew mission emblem taken on the flight by Gemini IX Pilot Thomas Stafford. Approximately 3 1/2 by 4 inches, shield-shaped. Featuring a Gemini spacecraft in docking configuration with an Agena target vehicle and space walking astronaut. A large roman numeral "IX" is embroidered on a blue background above the crew names. Mounted between paragraphs on a Typed Letter Signed by THOMAS P. STAFFORD from his business stationery.

THOMAS P. STAFFORD'S signed provenance letter reads: "Displayed below is a crew emblem I carried on the Gemini IX mission during June 3 to 6, 1966. I was spacecraft commander with Gene Cernan serving as pilot. During our flight we completed a rendezvous with a target vehicle but the vehicle's protective launch shroud failed to jettison. I called it the 'Angry Alligator' because of the jaw shaped appearance of the shroud.

The flight was originally assigned to fellow astronauts Elliott See and Charles Bassett. Unfortunately they lost their lives in a T-38 jet crash. Since Gene and I were the back-up crew, we were assigned the prime crew positions.

The emblem illustrates the objectives of our mission - a docking with an Agena target vehicle and performing a spacewalk. Our Agena never reached orbit on our first launch attempt, then a computer failure scrubbed the second attempt to reach the new "ATDA" target vehicle just placed into orbit. But the third time was the charm as we finally reached orbit on June 3.

Gene's spacewalk proved to be almost as difficult after his helmet face plate fogged over and he became virtually blind. With some difficulty, he was able to return to the spacecraft cabin. We then both struggled to close the hatch. There was still a lot to learn about working outside a spacecraft in 1966."

\$5,000 - 7,000



132

**132
STAFFORD'S GEMINI PROGRAM LAUNCH COVER – WITH NEIL ARMSTRONG SIGNATURE.**

Postal envelope with an Orbit Covers cachet featuring images of all the Gemini Astronauts. Cape Canaveral, Florida postmark dated 11 November 1966, the launch date of the last manned flight, Gemini 12. The envelope is displayed between paragraphs of a Typed Letter Signed by THOMAS STAFFORD from his business stationery.

THOMAS P. STAFFORD'S signed provenance letter reads: *"The Gemini envelope displayed below comes from my personal collection. The envelope was postmarked on the launch date of the last manned flight, Gemini 12 – November 11, 1966. This envelope was signed by Neil Armstrong, Buzz Aldrin, Charles Conrad, and Gordon Cooper during a gathering at my Seabrook, Texas residence. Gemini was a fast paced, dynamic program where the NASA and Industry team launch ten manned spacecraft in just 21 months. I was privileged to fly two of these missions, Gemini 6 and Gemini 9. Neil, Buzz and Charles (Pete) would all later walk on the moon during the Apollo Program with Neil having the honor of being the first man to step onto the lunar surface."*

SIGNED by NEIL ARMSTRONG, BUZZ ALDRIN, CHARLES CONRAD, and GORDON COOPER.

\$4,000 - 6,000



133

**133
CHARLES CONRAD'S MEDALLION CARRIED ON GEMINI 11.**

ONE OF THE FEW GOLD-PLATED MEDALLIONS FROM THE MISSION. FLOWN Gemini 11 medallion made of gold-plated sterling silver, 1 by ¾ inches. The crew mission emblem is on the obverse with the engraving of *"Gemini XI, Sept. 12 – 15, 1966,"* the mission dates. Affixed to (and removable from) a 5 by 6 1/2 inch Typed Card Signed by CHARLES CONRAD.

CHARLES CONRAD's signed provenance card reads: *"This gold plated sterling silver medallion flew aboard the Gemini XI spacecraft during September 12-15, 1966. The mission accomplished a rendezvous in less than one orbit of the earth and set a world altitude record 850 miles. It is from my personal collection."*

Conrad, of course, was one of just twelve men to walk on the Moon. He also has the distinction of being one of only four astronauts to fly two Gemini missions and one of only three astronauts to fly four space missions prior to Space Shuttle flights starting in 1981.

\$1,500 - 2,500



134

**134
BACK-UP COMMANDER GORDON COOPER'S FLOWN
GEMINI XII EMBLEM.**

WITH DETAILS ON THE LUNAR LANDING ASSIGNMENT THAT NEVER OCCURRED. FLOWN cloth crew mission emblem from the flight of Gemini XII. Circular, 3 inches in diameter. Featuring a Gemini spacecraft below a large roman numeral "XII" and the crew names. An embroidered crescent moon is symbolic of the next goal, the Apollo Program and a lunar landing. Mounted on a Typed Letter Signed by GORDON COOPER from his personal stationery and displayed with a 10 by 8 inch Gemini XII spacewalk (EVA) color photograph INSCRIBED and SIGNED: "Gemini XII EVA, NOV '66, BUZZ ALDRIN." All mounted on and removable from a 13 by 19 1/2 inch black mat board.

GORDON COOPER'S signed provenance letter reads: "The crew emblem displayed with this letter was carried into space on the Gemini XII mission during November 11 to 15, 1966. I was back-up commander for the flight crew of James Lovell and Edwin E. "Buzz" Aldrin. Gemini XII docked with an Agena target vehicle and Buzz made a few spacewalks. We finally figured out how to do spacewalks the right way by that time and Buzz performed his assigned tasks beautifully. Gemini XII was a mighty fine ending to a flight program that made ten successful manned space flights.

"I then moved over to the lunar landing effort and was assigned as back-up commander for the Apollo 10 mission. That flight demonstrated all the steps needed for the first lunar landing by Apollo 11 except for the final 50,000 feet to the surface. I then expected to have a mission assigned to me for a lunar landing flight but management "politics" and a "tight" alliance between some of the Original Seven guys never allowed that assignment to occur."

\$4,000 - 6,000



135



136

**135
GEMINI 12 CREW HORISING AROUND—SIGNED BY CERNAN.**

Extremely rare vintage NASA color photograph, 10 by 8 inches, ca. 1966 of the Gemini 12 Crew posing with a mock-up of the Gemini spacecraft, in a hilarious version of NASA image S66-46955, Cernan holding a tobacco pipe, Cooper holding a tobacco pipe and slide-rule in one hand, a push broom in the other, Aldrin holding the body of a camera, and Lovell holding the lens, his left hand in a gun position pointed at his temple, the four with large genuine smiles.

Provenance: From the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

SIGNED and INSCRIBED: "TO DOCTOR 'Z'-YOU SHOULD HAVE THIS TO WORK WITH!! GENE CERNAN." A wonderful image, giving us great insight into the personalities of these fun-loving astronauts. "Doctor Z" refers to Anatole Forostenko, who was given the nickname "Dr. Zhivago" by Tom Stafford. Stafford and Cernan were of course close friends, so Cernan was familiar with Forstenko's nickname.

\$600 - 800

**136
THE ENDING OF THE TEN MANNED FLIGHT GEMINI PROGRAM.**

Color photograph, 8 by 10 inches.

INSCRIBED and SIGNED: "The end of Gemini, BUZZ ALDRIN, GT XII PLT."

Space suited Gemini XII astronauts Buzz Aldrin and James Lovell address the recovery team after their successful four day space mission. This was the last flight of the Gemini Program after ten successful manned missions.

\$600 - 800



137



138

137
LARGE GEMINI POSTER—SIGNED, INCLUDING TWO GEMINI CREWS.
Gemini Pictorial. NASA Facts. Washington: GPO/NASA, October 1966.
 21 by 47 inches, folded. Twenty color images illustrate all aspects of the Gemini flight program. Descriptive text and captions are located the left and right sides of the poster.

SIGNED and INSCRIBED with their individual Gemini flight number(s) by: BUZZ ALDRIN, CHARLES CONRAD, RICHARD GORDON, WALLY SCHIRRA, and TOM STAFFORD. The last four astronauts are the crews of GEMINI 11 and 6.
\$1,000 - 1,500

138
GEMINI FLOWN MATERIAL.
 Rare presentation of ten flown relics encased in a 3¾ by 2¾ inch lucite display.
 Includes material from Gemini 3, Gemini IV, Gemini V, Gemini VI-A, Gemini VII, Gemini VII, Gemini IX-A, Gemini X, Gemini XI, and Gemini XII.
\$1,500 - 2,500

SPACE FLIGHT PHOTOGRAPHY

The following lots focus on activities and results of the astronaut as space photographer. Motion pictures, hand-held still and high resolution photography are just some of the material listed. Reference and illustrated literature is included plus actual flight camera hardware used in earth orbit and on the lunar surface.

JAMES IRWIN (1930-1991). He was accepted to the United States Naval Academy and graduated with a degree in Naval Science in

1951. He chose to enter the United States Air Force and became a test pilot and also earned a Master Degree in Aeronautical Engineering from the University of Michigan in 1957. Jim was selected as a NASA astronaut in 1966. In 1969 he served as a support crew member for Apollo 10, then back-up Lunar Module Pilot (LMP) for Apollo 12. Jim was selected to the prime crew for the fourth lunar landing mission and flew as LMP on the Apollo 15 mission during 1971, becoming the eighth man to walk on the moon.

139

MOTION PICTURE RING SIGHT USED ON THE MOON DURING APOLLO 15.

PERHAPS THE ONLY LUNAR SURFACE RING SIGHT STILL IN PRIVATE HANDS. FLOWN Maurer DAC (Data Acquisition Camera) sighting ring. Circular metal ring, 1¼ inches in diameter with an optical component at the center. A flat metal "shoe" guide allows the ring to be mounted at the top back corner of the 16mm Maurer motion picture camera. An approximately ½ inch square of white Velcro is attached at the top. Part Number *SEB3310031-204* and Serial Number *1051* are engraved around inner metal circular section of the sight. With a Typed Letter Signed by MRS. JAMES B. IRWIN. Plus two sheets copied from the Apollo 15 equipment stowage list and a diagram showing parts and numbers of the DAC camera system including the ring sight.

MRS. IRWIN'S signed provenance letter reads: *"The enclosed camera ring sight was flown to the surface of the moon during the flight of Apollo 15. It was used by my late husband James B. Irwin inside the Lunar Module (LM) which was named Falcon. The Data Acquisition Camera (DAC) camera was mounted along Jim's viewing window located at the interior right-hand side of the LM. That camera recorded the undocking of Falcon from Command/Service Module Endeavor, then Falcon's descent past the Apennine Mountains. It captured views of Hadley Rille just prior to the LM's touchdown on the lunar surface. During the lift-off from the moon, Falcon flew directly over the Rille and Jim was able to record some magnificent views of this unusual lunar feature.*

The ring sight has the following engravings: "P/N (Part Number) SEB3310031-201, S/N (Serial Number) 1051" on one side and S/N 1051 on the opposite side. As described in the spacecraft operations manual,

the ring sight was "an accessory used on the 16 mm camera as an aiming aid when the camera is hand-held. The concentric light and dark circular rings, as seen superimposed on the view, aid the user in determining the angular field of view of the sight. It is attached to the camera by its shoe sliding into a C rail. It is also used on the 70 mm camera."

Additionally, enclosed with this letter is a copy of page 48 from the official equipment listing by NASA titled: "Apollo Stowage List, Mission J-1, CM-112/LM-10, APOLLO 15, August 10, 1971 – Final Release, This Issue Documents the AS-FLOWN Configuration."

Page 48 contains equipment from "List B" which has items placed inside the Lunar Module prior to the Apollo 15 launch from the Kennedy Space Center on July 26, 1971. The ring sight is the second to last item listed on page 48 and includes the part number, stowage location, and unit weight. This camera ring sight was on the lunar surface for over 66 hours between July 31 and August 2, 1971. It is perhaps the only lunar surface ring sight kept by any Apollo astronaut because it was part of flight equipment slated to stay in the Lunar Module. After the LM crew re-docked with Endeavor, the lunar rocks and other essential equipment was transferred over to the Command Module.

The LM was then de-orbited and crashed back into the moon as part of a seismic experiment to understand the composition of the moon's surface. This ring sight was stored out of daylight since light passes through the ring."

\$20,000 - 30,000



139 (enlarged)



141

140

DETAILS ON THE SKYLAB S082A SPECTROHELIOGRAPH CAMERA AND MAGAZINE.

Three volumes, all having sections describing the S082A camera, other solar observation equipment, and earth observing cameras plus other science equipment. All published and released by GPO and NASA. Each has their original paper wrappers. 10 by 8 and 9 by 6 inches in size.

Skylab, A Guidebook, EP-107. 1973. 245 pp. *Skylab Experiments.* August 1972. 212 pp. *Skylab New Reference.* March 1973. Over 250 pp.

\$250 - 350

141

FLOWN SKYLAB EXTREME UV SPECTROHELIOGRAPH FILM MAGAZINE.

Film magazine S082A, manufactured by Ball Brothers Research Corp. Flown with the Skylab payload on an unmanned Saturn V rocket in 1973, the last flight to launch in the Apollo program. Part number: "36360-501, serial number: "CMIOA002". Complete with Canister Assembly case (also flown), part number: "26852-1", serial number: "AFIOA-003-HRE". Housed in the original two part NASA hard storage case, fitted with breather valve at the bottom half and large temperature gauge on the lid, with 4 rubber enforced handles, 8 latch clamps, and 2 hasp & staple latches. Original metal NASA George C Marshall Space Flight Center label reading: "Assy No. 90MO4547-1, Cont. No. NAS8-29430, Serial No. 008", 4 original NASA stickers reading "Critical Space Item, Handle with Extreme Care". Lid with original shipping label from the Kennedy Space Center to Ball Research Corp., original NASA parts tag dated 10-4-73 affixed to lid, numerous inventory stickers, neon yellow sticker to lid stating "Turn in excess ECN 0543780," small metal NASA MSFC tag with number 110018 to lid. Provenance: US General Services Administration sale number 41QSI13909, lot #6.

A flown film magazine from the extreme ultraviolet spectroheliograph (S082A), which was used in conjunction with the Apollo Telescope Mount (ATM) on the Skylab mission to photograph the Sun and its spectra. There were four film cameras flown on the ATM, and the magazines containing the film were loaded via Extra Vehicular Activity (EVA). After being exposed, the magazines were then unloaded via another EVA. The XUV spectroheliograph, which was manufactured for the Naval Research Laboratory, produced simultaneous monochromatic images of the entire sun over a broad range of the extreme ultraviolet spectrum. While on Skylab, it acquired a total of 1023 useful exposures, most of which were of extreme scientific interest. Included in this lot is the original camera storage record dated 12/4/73.

PLEASE NOTE: This item may be subject to ITAR restrictions.

\$5,000 - 8,000



142



143



144



145



146 (part lot)

142

SCHIRRA BUYS HIS OWN HASSELBLAD CAMERA AND TAKES IT ON HIS Σ7 FLIGHT. THE FIRST HASSELBALD FLOWN IN SPACE.

Color photograph, 8 by 10 inches, with a Patrick Air Force Base, Florida, AFMTC Photographic Lab information stamp on verso. Vintage printing on paper with the "EKC" watermark.

SIGNED by WALLY SCHIRRA. He has added the Sigma symbol painted on his spacecraft along with the number 7.

Schirra's photograph shows the earth's limb with bright white clouds contrasting with darkness of space.

\$400 - 600

143

COOPER STUDIES THE EARTH FROM SPACE—ORBITAL VIEW SIGNED.

Color photograph, 8 by 10 inches, with a NASA ID number at the upper border and printed NASA captions on verso. Vintage printing on "A Kodak Paper" with full 70mm Hasselblad image, 7 ¼ by 7 ¼ inches.

INSCRIBED and SIGNED: "Faith 7 photo by: GORDON COOPER."

Cooper has photographed the coast of Pakistan and Iran west of Karachi. His Hasselblad camera had an 80mm f2.8 lens using 120 FPC 309 Ansco color (thin base) film.

\$400 - 600

144

FAITH 7 MERCURY ATLAS 9 EARTH AND SKY VIEWS FROM ORBIT—SIGNED.

Color photolithograph titled "MA-9 Earth Sky," 10 by 8 inches, featuring four captioned images of the earth taken by Gordon Cooper during his 22 orbit – 34 hour flight in 1963.

INSCRIBED and SIGNED: "Photos by: GORDON COOPER."

Photographs are Western Tibet, Tibetan lake areas, Northern Luzon, and the Hankow-Yangtze region.

\$200 - 300

145

SPACE PHOTOGRAPHERS STUDY THE EARTH—SIGNED.

LIFE Magazine. New York: Time-Life, September 24, 1965.

Over 125 pp. 13 by 11 inches. Original printed wrappers.

INSCRIBED and SIGNED: "Nice shot Gordo! CHARLES CONRAD, GT 5 Plt" on the front cover and "I took this photo while over Baha, CA. GORDON COOPER, GT 5 Cdr" on the front cover.

The complete issue featuring a magnificent orbital view of Baha California on the front cover. Contains 10 pages of captioned color photographs plus individual articles by Cooper and Conrad describing all the details of their eight day mission.

\$700 - 900

146

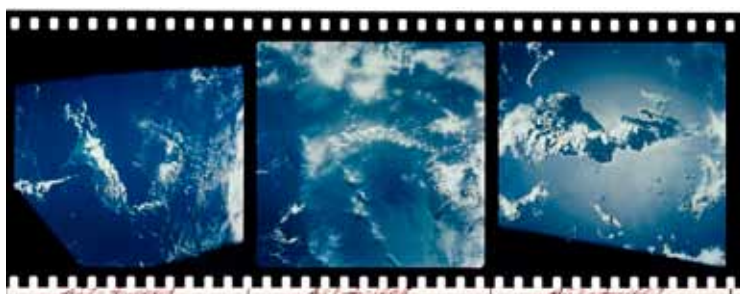
APOLLO 7-10.

An archive of 88 primarily vintage NASA photographs c. 1968, detailing various aspects of the Apollo 7, 8, 9, & 10 missions, the majority being 8 x 10 inches.

An excellent and wide-ranging collection of early Apollo photographs, comprising:

- Apollo 7: 3 black & white photographs (2 spacecraft & 1 of astronaut Eisele); 4 color photos on Kodak paper (4 spacecraft with earth in background, 1 astronaut); 15 vintage color hand annotated highly detailed pre-mission photos of the interior of the Apollo 7 spacecraft.
- Apollo 8: 4 color photographs (2 shots of the earth from space; 8 black & white photos of the surface of the moon, including of Tsiolkovskiy crater; 7 black & white photographs including several of the Saturn V rocket.
- Apollo 9: 18 black & white photographs including images of tests on the LM, details of the Saturn V rocket, the LM from the CSM, earth from space, numerous shots of the LM and CSM with either earth or space in the background, capsule splashdown, the Apollo 9 crew on the LM, and a portrait of astronaut Dave Scott; 10 color photographs including 1 crew photo, 5 views of the earth from space, 2 shots of the LM over earth, 1 shot of the CSM over earth, and a shot of Dave Scott conducting an EVA.
- Apollo 10: 9 black & white photos, including 2 photos of the lunar surface, 1 of the proposed Apollo 11 landing site during a televised broadcast, a view of the LM from the CM, the Apollo 10 spacecraft after re-entry, details of the LM and the CSM, portraits of Cernan and Stafford; 8 color photos including a rare close up of the docking of the LM, the CSM over the lunar surface, shots of the earth from space.

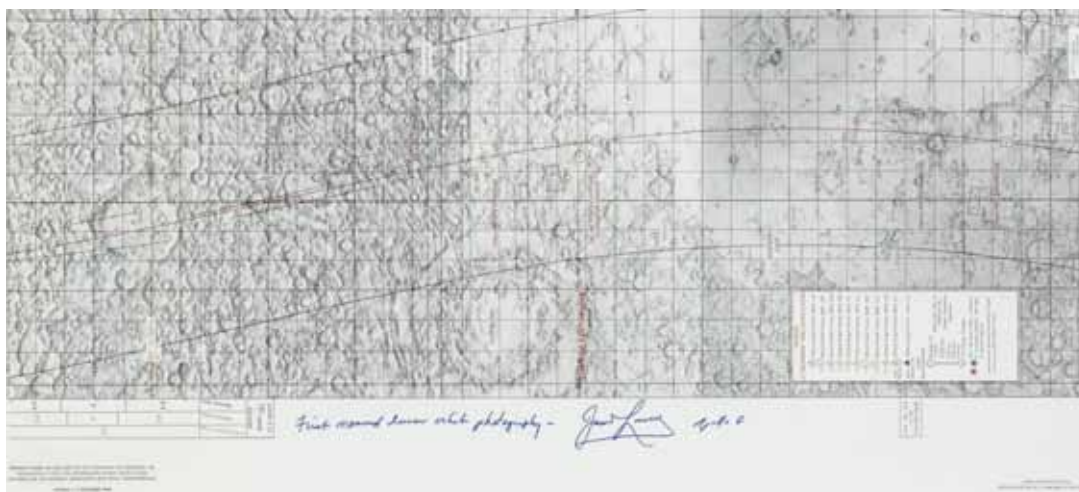
\$1,500 - 2,500



147 (part lot)



148



149 (detail)

147[□]

APOLLO 7 HASSELBLAD COLOR FILM POSITIVES.

A strip of duplicate positives in color from the astronauts' Hasselblad cameras. October 22, 1968.

6 frames from Magazine N-04, frames 1607-1612, 2¾ by 19 inches. Consisting of orbital photos of the Earth, depicting Cumulus, cumulus-nimbus, cirrus, towering-cumulus, small cumulus, and alto-cumulus clouds over the Schouten-Ellanden Islands, Cape Nelson, New Guinea, the Solomon Sea, Woodlark Island, the Gulf of Thailand, Borneo Island, Makasser Straight, and parts of Indonesia.

The Apollo 7 mission carried only one 70 mm camera. It made a total of 533 exposures on 9 magazines of film lettered M-P. 35 of the images were in black & white, and 498 were in color.

\$400 - 600

148

APOLLO 8'S HASSELBLAD POSITIVES.

Roll of slide film, being duplicate positives from Hasselblad magazines A, B, and F. 70mm wide x a few feet long. On metal reel, in period canister.

Comprising: Magazine A (78 color images, 6 orbital) being primarily color shots of the earth and of the surface of the moon; Magazine B (152 color images, 58 orbital) being primarily of the surface of the moon; Magazine F (46 color images) being various shots of the earth.

\$3,000 - 5,000

149

"FIRST MANNED LUNAR ORBIT PHOTOGRAPHY" SIGNED APOLLO MOON ORBIT CHART.

IMAGES OF THE EARTH FROM THE MOON INSPIRE HOPE FOR MAN DURING A TURBULENT YEAR - 1968.

Apollo Target of Opportunity Flight Chart (ATO), Apollo Mission 8, 21 December 1968 Launch Date. Aeronautical Chart and Information Center of the USAF for NASA. Part number SKB 32100097-301. First Edition, 2 December 1968. 14 by 58 inches. Scale 1:7,500,000.

INSCRIBED and SIGNED: *"First Manned Lunar Orbit Photography, JAMES LOVELL, Apollo 8."*

The Apollo 8 lunar flight during Christmas 1968 brought home some of the most inspirational images of the earth ever recorded from space. The turbulent year of 1968 bore witness to the assassinations of Robert F. Kennedy and Martin Luther King. Riots were common in many major cities. The Vietnam War appeared to have no end. The Apollo 8 earth and lunar photographs gave hope to many that man could move forward with peaceful intentions for life on earth.

The Apollo 8 crew of Frank Borman, William Anders, and James Lovell used an identical chart like this during their flight as denoted by the SKB 32100097-301 part number printed inside a legend block. This block has either circular or triangular symbol indicators with nine different colors defining either a 250mm or 80mm single frame photography targets. There are over 50 numbered photographic targets plotted.

An important task for this 10 orbit lunar mission was to photograph possible future Apollo landing sites and areas of scientific interest. A full line plot of the median lunar orbit ground track is shown in red. Near side and far side lunar shadow terminator areas have line marker ticks plotted perpendicular to the spacecraft orbital path. The limit of earth shine is plotted near the 75W longitude spot.

\$2,500 - 3,500



151



152 (part lot)

150

IMAGES OF THE APOLLO 8 HASSELBLAD CAMERA PHOTOGRAPHY. IMAGES LABELED AND ILLUSTRATED SIX TO A PAGE. *Analysis of Apollo 8 Photography and Visual Observations.*

Washington: GPO/NASA SP-201, 1969.

337 pp. 11 by 8 1/2 inches. Original illustrated wrappers with four 10 1/2 by 58 inch folded lunar orbit photography chart indexes stored in a sleeve pocket mounted on the interior rear end paper.

Information presented was compiled by photographic experts at the NASA Manned Spacecraft Center using internal reports plus those of university and associated government agencies. Includes a flight observation report written by the Apollo 8 crew with descriptions from their critical items (observation) checklist. The astronauts carried Kodak Ektachrome film types SO-368 MS, SO-168 EF, and SO -121 High-resolution Aerial, plus Type 3400 Panatomic X and Type 2485 High-speed recording. A sub-chapter describes these film types and their associated chemical processing.

All flight 70mm Hasselblad camera magazine images are illustrated in a six per page format with their individual frame ID's and a "North" directional vector indicator. An appendix defines the latitude - longitude location and the direction, f-stop, shutter speed, with general description/notes of each image in a line - column format. Three of the included 10 by 58 inch lunar orbit photography index charts plot the areas of and frame ID's for the 70mm stereographic / targets of opportunity which were made from film magazines A, B, C, D, E, and G. The additional index chart plots the locations of four 16mm Maurer motion picture sequence photography from magazines H, I, J, and Q.

\$400 - 600

151

SPACE PHOTOGRAPHERS RECORD IMAGES OF THE DYNAMIC EARTH.

NICKS, ORAN W., editor. *This Island Earth*. Washington: GPO/NASA SP-250, 1970. 182 pp. 11 1/2 by 9 inches. Original dark red cloth.

INSCRIBED and SIGNED on the title page: "Apollo 7 photos by: Donn Eisele [printed by Cunningham], WALT CUNNINGHAM" then SIGNED with ampersand by WALLY SCHIRRA. Additionally INSCRIBED and SIGNED: "Apollo 11 Photos by BUZZ ALDRIN & Crew."

Illustrated with nearly 200 photographs featuring spectacular images taken by the Apollo 7 through 11 crews. In addition there are rarely seen multi-spectral images taken by early earth observing satellites plus unusual photographs from Mercury and Gemini manned spaceflights.

\$1,200 - 1,500

152

GEMINI AND APOLLO HASSELBLAD POSITIVES—OVER 400 FRAMES.

Numerous Hasselblad 70 mm color transparencies taken during the Gemini 4, Apollo 8, and Apollo 9 missions. The large roll is segmented into strips containing an average of 10 individual Hasselblad frames. Most Apollo images have their associated AS (Apollo Saturn) frame number printed below the film sprocket holes. Over 400 individual frames, all housed in protective sleeves.

The Gemini 4 images feature earth terrain photography from magazine 8 and others. Apollo 8 Hasselblad photographs feature earth images from deep space, some with different camera lens filters.

Apollo 9 frames include images of the crew members inside the Command Module, astronaut Rusty Schweickart's spacewalk (EVA), orbital views of the Lunar Module, and numerous earth orbital images. Additionally there are S065 Experiment images - Multispectral Terrain Photography. S065 experiment consisted of an array of four Hasselblad cameras with each using a different combination of lens filters and film types.

\$3,000 - 4,000



154

153

FYLING HIGH OVER THE EARTH—APOLLO 9 CREW SIGNED IMAGE.
Color photograph, 8 by 10 inches, with a NASA ID number at the upper border. Vintage printing on "A Kodak Paper" with full 70 mm Hasselblad image, 7 ¼ by 7 ¼ inches.

SIGNED by JAMES McDIVITT, DAVE SCOTT, and RUSTY SCHWEICKART.
\$400 - 600

154

APOLLO 10'S HASSELBLAD POSITIVES.

Roll of 70mm slide film, being duplicate positives from Hasselblad magazines M and N. On metal reel, in period canister.

Comprising: Magazine M (165 color images, 81 orbital) being shots of earth, shots of the lunar module including the LM approaching the command module, and shots of the surface of the moon; Magazine N (133 color images, 4 orbital) includes shots of the flyby sequence, the Command Service Module from the Lunar Module, earthrise, the surface of the moon, the astronauts in the CSM, and the earth.

\$3,000 - 5,000

155

APOLLO 11 COLOR HASSELBLAD FILM POSITIVES.

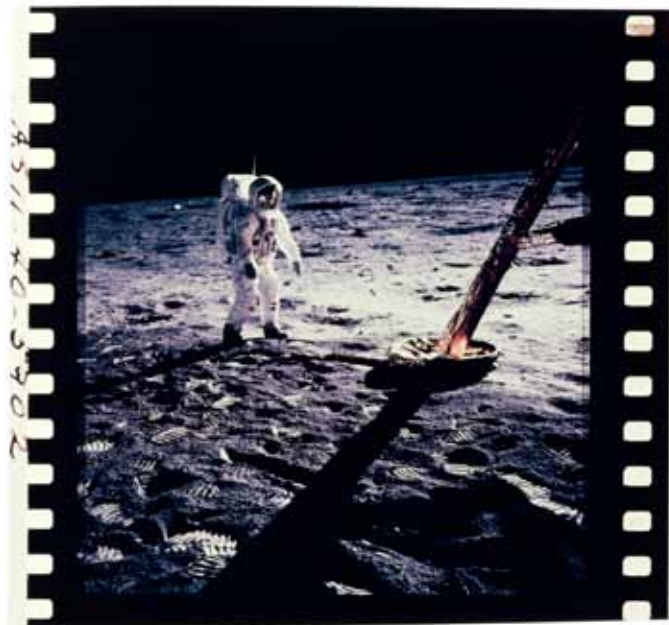
Group of 31 duplicate color positives from magazines R-37 and S-40 in the astronauts' Hasselblad cameras, both single frames, and strips of varying sizes. July 21, 1969.

1. Magazine R, 4 frames: 5437 (Tranquility Base), 5458 (Horizon, Thruster), 5528 (Neil Armstrong Inside Spacecraft), & 5551 (Thrusters, Seismometer, Laser Reflector).

2. Magazine S, 28 frames:

5866 (Aldrin Descending Ladder), 5867 (Aldrin Descending Ladder), 5868 (Aldrin Descending Ladder), 5869 (Aldrin on Lunar Surface), 5870 (Lunar Surface with Lunar Module Strut), 5871 (Lunar Surface Through Lunar Module Structure), 5872 (Erection of Solar Wind Experiment), 5873 (Lunar Module with Flag and Astronaut), 5878 (Footprint), 5879 (Astronaut Boot), 5880 (Astronaut Boot, Small crater on Surface), 5898 (partial - Lunar Module Ladder and Plaque), 5899 (Lunar Module Ladder and Plaque), 5900 (Lunar Module Strut), 5901 (Lunar Module Strut), 5902 (Lunar Module Strut, Astronaut), 5942 (Astronaut Carrying Experiment Packages), 5943 (Astronaut Carrying Experiment Packages), 5944 (Astronaut Carrying Experiment Packages), 5946 (Astronaut Assembling Seismic Equipment), 5947 (Astronaut Assembling Seismic Experiment), 5949 (Astronaut Assembling Seismic Experiment), 5950 (Seismometer), 5951 (Astronaut, Seismometer), 5952 (Laser Target, Lunar Module), 5953 (Seismic Experiment), 5954 (Small Crater with Rocky Bottom), 5955 (Small Crater with Rocky Bottom).

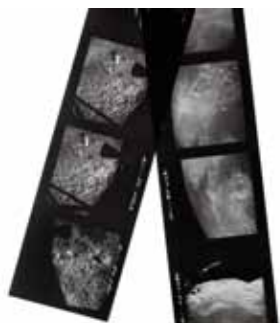
WITH: Printed "Note to Apollo Correspondents, July 23, 1969." 1 p., and 2 additional color positives, 1 of NASA Johnson Space Center image 569-40308, depicting Armstrong and Aldrin planting the American flag on the Moon (television image), and an unidentified location on the surface of the Moon.



155 (part lot)



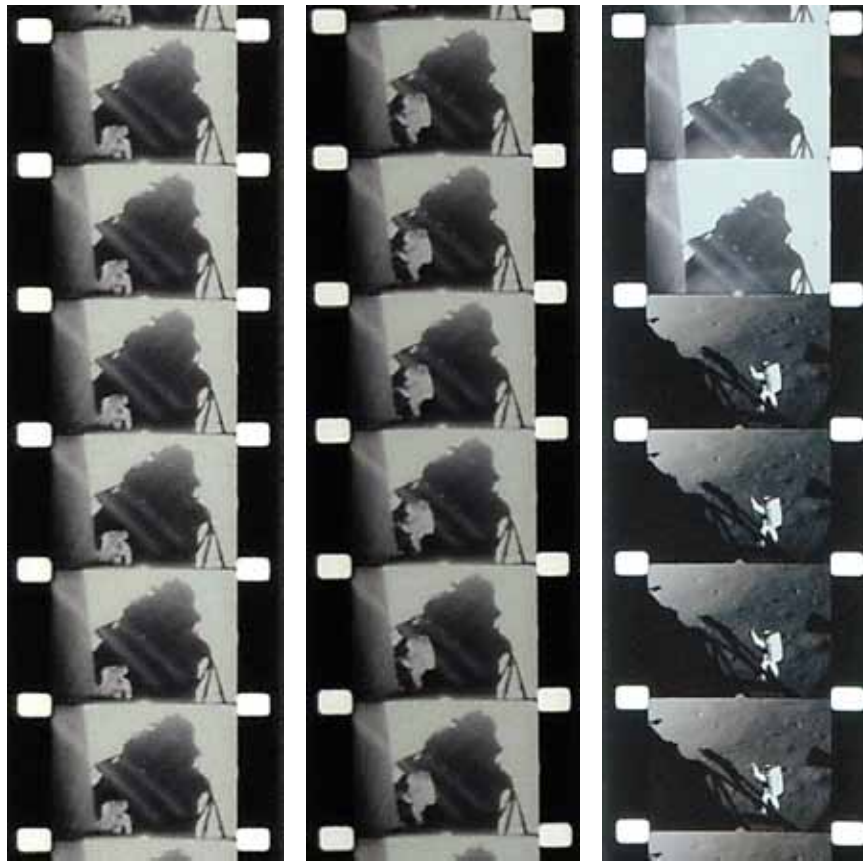
153



156

There were four 70mm cameras carried to the moon on the Apollo 11 mission. These cameras made a total of 1407 exposures on 9 magazines of film, lettered N-V, with 857 of the images on black and white film, and 550 on color film.

\$1,200 - 1,800



157 (part lot)

156[□]

APOLLO 11 HASSELBLAD FILM POSITIVES.

A pair of strips of duplicate positives in black & white from the astronauts' Hasselblad cameras. July 21, 1969.

1. Magazine Q, 8 frames on single strip: frames 5801-5808, 2¾ by 20 inches. Depicting the Lunar Module thrusters, the shadow of the Lunar Module, the tv camera, and the American Flag on the Lunar surface.
2. Magazine V, 9 frames on single strip: frames 6225-6233. 2¾ by 22 inches. Depicting the Lunar surface, including the area south of Mare Crisium, crater Goclenius (at the west edge of Mare Fecunditatis), and craters Messier, Messier A, and Messier B.

\$400 - 600

157

FLIGHT MOTION PICTURES TAKEN BY NEIL ARMSTRONG AND HIS CREW.

INCLUDES ARMSTRONG'S FIRST STEP ONTO THE MOON.

An internal NASA/Manned Spacecraft Center (MSC) duplicate film roll of scenes taken during the Apollo 11 flight by the 16mm Maurer Data Acquisition Cameras (DAC). Spooled onto a metal reel housed in a period canister, 11 inches in diameter. The MSC Film Form 511 Film Can Label (May 68) on the canister reads in part: "Date: 7-20-69, Photographer: Apollo XI Crew, Type of Film: 7388 Print, Footage: 800 feet, Process: COLOR PRINT (via stamp), Subject: Apollo XI Mission Film Magazines A, C, J, M, & L."

Actual magazine sequence on the reel and scene descriptions from each magazine are as follows:

Magazine A - Panoramic views of the earth, sequences of crew activity inside the Command Module (CM) *Columbia*, and docking by the Command/Service Module (CSM) *Columbia* to the Lunar Module (LM) *Eagle*.

Magazine C - Lunar Module (LM) *Eagle* undocking sequence from CSM *Columbia* to begin the lunar landing.

Magazine J - The Moonwalk. Initial sequence of the ExtraVehicular Activity (EVA, or Moonwalk) showing Neil Armstrong descending the LM ladder with his first step onto the lunar surface and his subsequent surface exploration. The DAC 16mm camera was mounted inside the LM at Aldrin's right-hand triangular viewing window.

Magazine L - Taken by Armstrong and Aldrin inside Lunar Module *Eagle* after history's first moonwalk showing the lunar surface, U.S. Flag, and footprints. Lunar orbit views after *Eagle*'s lunar liftoff, with some overexposed segments. *Eagle* tracking *Columbia* prior to docking.

Magazine M - Sunrise and sunset views of the earth after returning from the Moon and *Columbia*'s re-entry into the earth's atmosphere.

\$6,000 - 8,000



158 (part lot)

158

FLIGHT FILM OF ARMSTRONG AND ALDRIN RAISING OLD GLORY ON THE MOON.

EAGLE RETURNS SAFELY FROM LUNAR SURFACE.

An internal NASA/Manned Spacecraft Center (MSC) duplicate film roll of scenes taken during the Apollo 11 flight by the 16mm Maurer Data Acquisition Cameras (DAC). Spooled on a metal reel housed in a period canister, 12 inches in diameter. The MSC Film Form 492 Film Can Label (Rev. Oct 66) on the canister reads in part: "Date: 7-31-69, Photographer: Apollo XI, Type of Film: 7388 Print, Footage: 880 feet, Process: COLOR PRINT (via stamp), Subject: Apollo XI Mags K, G, B, E, H, D, F."

Actual magazine sequence on the reel and scene descriptions from each magazine are as follows:

Magazine K – The Moonwalk. ExtraVehicular (EVA or Moonwalk) activities by Armstrong and Aldrin including sample collecting, planting the United States Flag, and television camera setup. The DAC 16mm camera was mounted inside the LM at Aldrin's right-hand triangular viewing window.

Magazine G – Frames of crew cabin activity and Lunar Module (LM) *Eagle* tracking Command/Service Module (CSM) *Columbia*. Lunar orbit views near craters Taruntius G and H then Maskelyne Craters B and G.

Magazine H – Taken by Armstrong and Aldrin during *Eagle's* ascent from the lunar surface. Views of large craters Sabine, Schmidt, Godin, and others.

Magazine B - Activity by Armstrong and Aldrin inside *Columbia* then scenes of floating from *Columbia* to inside *Eagle* with Aldrin performing checks. Scenes of Collins shaving in *Columbia*.

Magazine D – Command/Service Module (CSM) *Columbia* tracking of Lunar Module (LM) *Eagle* (ascent stage only) as *Eagle* maneuvers into docking position after lunar liftoff. The earth is visible from lunar orbit at the very end of this magazine.

Magazine E – High oblique images covering large parts of the Moon including Mare Smythii, Mare Crisium, and craters Langrenus and Humbolt. Filmed from *Columbia* just after Transearth Injection (TEI) and leaving lunar orbit.

Magazine F – High to low oblique panoramic scenes of the lunar farside, orbital views near *Eagle's* landing site, and additional far side lunar surface images.

\$6,000 - 8,000

159

ASTRONAUT PHOTOGRAPHY OF THE MOON—SIGNED.

Musgrove, Robert G., editor.

Lunar Photographs from Apollos 8, 10, and 11. NASA SP-246.

Washington: GPO/NASA SP- 246, 1971. 119 pp. 10½ by 8 inches.

Original cloth gilt.

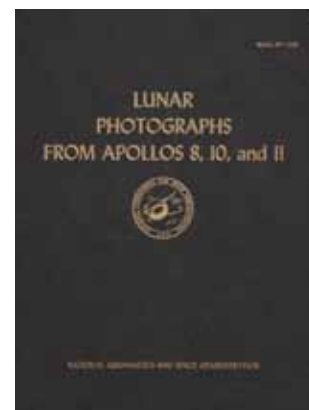
INSCRIBED and SIGNED: "Apollo Eleven photos by BUZZ ALDRIN & Crew" on the half title page.

Features dozens of lunar surface pictures taken from orbit during Apollo 8 and 10, and over 30 Apollo 11 moon walk pictures. Each picture has a detailed caption and the individual NASA photographic ID. Includes a detailed photographic index.

\$1,500 - 2,000



159



159

160

APOLLO 12.

An archive of 211 primarily vintage NASA photographs ca.1969, detailing various aspects of the Apollo 12 mission, the majority being 8 by 10 inches.

An excellent and wide-ranging collection of Apollo 12 photographs, including:

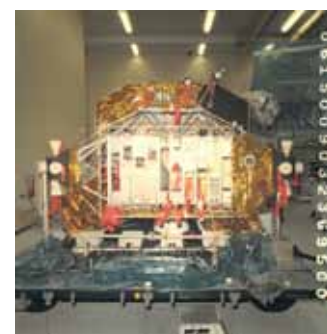
- 113 black and white photos detailing the Lunar Module, the Apollo 12 crew and their families, the Saturn V rocket and its launch, EVA traverse maps, the landing site, EVA activities, Surveyor III, splashdown & recovery, lunar rock samples & the testing of the samples, amongst other subjects.

- 26 photos of or taken by Surveyor III.

- 19 vintage color 8 by 8 inch photos.

- 53 color photos of the surface of the moon, the Lunar Module, EVA activities, and other subjects. Includes amongst these are numerous iconic images, such as Bean & Conrad descending the ladder of the LM onto the lunar surface, very rare LM6 intrepid construction photos, Pete Conrad placing the American flag on the lunar surface, and Alan Bean on the lunar surface surrounded by the mysterious unexplained blue halo.

\$2,500 - 3,500



160 (part lot)

161

APOLLO 13 & 14.

An archive of 171 primarily vintage NASA photographs c. 1970 and 1971, detailing various aspects of Apollo missions 13 and 14, the majority being 8 by 10 inches.

A varied collection of photographs of great interest, comprising:

Apollo 13: 14 black and white photographs including several moon walk simulations, photos of the the LM plaque, the launch vehicle, interior shots of the LM, shots of the capsule recovery, as well as 10 color photos which include images of the launch vehicle, the Apollo XIII emblem, the CSM, the moon, an original crew photo (with Mattingly who was later replaced by Swigert), the LM plaque, and a very rare image of the lunar equipment in the descent stage of the LM.

-Apollo 14: 36 color images, including shots of the astronauts conducting EVAs, various photos of the LM on the lunar surface, details on the launch vehicle, a rare shot of the LM upon docking, capsule splashdown, a detail of the docking probe, a rarely seen beautiful shot of the sun shining on the American flag next to the LM on the lunar surface, 2 highly sought after images of Alan B. Shephard next to the deployed American flag on the lunar surface, as well as one of him shielding his eyes from the sun (taken by astronaut Mitchell from within the LM). 110 black and white photographs including 2 highly coveted shots of Alan B. Shephard standing next to the deployed American flag on the lunar surface, images of the crew practicing deployment of the lunar surface experiment package, various shots of the crew, back-up crew, engineers, and crew with their families, various simulation exercises for EVA activities, water egress training, details of the exteriors of the LM and CSM, launch details, moon rocks, as well as of images of experiments, equipment, the lunar module, astronauts on the lunar surface.

\$2,000 - 3,000



161 (part lot)



162 (part lot)



162

SHEPARD AND MITCHELL PLANT THE US FLAG AND BEGIN LUNAR EXPLORATION.

DIFFICULTIES DURING THE INITIAL DOCKING COULD HAVE SCRUBBED THE LUNAR LANDING. An internal NASA/Manned Spacecraft Center (MSC) duplicate film roll of scenes taken during the Apollo 14 flight by the 16mm Maurer Data Acquisition Cameras (DAC). Spooled on a metal reel housed in a period canister, 12 ½ inches in diameter. The MSC Film Form 2138 Film Can Label (May 66) on the canister reads in part: "*FILM LENGTH: 980 feet, TYPE FILM: COLOR PRINT (via stamp), Subject: Apollo XIV Mags G, H, AA, CC, BB, D, A, C.*"

Brief scene descriptions from each magazine are as follows:

- Magazine G** – Heat flow experiments performed by Stuart Roosa inside Command Module *Kitty Hawk*.
 - Magazine H** – Liquid transfer experiment, crew activity inside the Command Module, crew eating, Alan Shepard shaving.
 - Magazine AA** – Lunar Module *Antares* descent and landing on the lunar surface.
 - Magazine CC** – EVA I (Moonwalk) lunar surface activities, Shepard films Mitchell as he descends the LM ladder and sets foot on the Moon. Shepard and Mitchell plant the United States Flag. Start of Apollo Lunar Surface Experiment Package (ALSEP) deployment.
 - Magazine BB** - Lunar Module *Antares* lift-off from the lunar surface, U.S. flag visible, lunar surface scenes during climb to lunar orbit.
 - Magazine D** - CSM *Kitty Hawk* views of LM (ascent stage) *Antares* after lunar liftoff and docking with CSM.
 - Magazine A** - CSM *Kitty Hawk* views of the docking attempts with LM *Antares* just after TransLunar Injection to the Moon (CSM transposition and docking). The first several tries were unsuccessful. If this docking failed, the lunar landing would have been scrubbed.
 - Magazine C** – LM undocking from CSM prior to the lunar landing.
- \$2,500 - 3,500



163 (part lot)



163

APOLLO 14 MOTION PICTURES OF THE MOON AND LUNAR EXPLORATION.

ALAN SHEPARD IS THE ONLY MERCURY ASTRONAUT TO WALK ON THE MOON.

An internal NASA/Manned Spacecraft Center (MSC) duplicate film roll of scenes taken during the Apollo 14 flight by the 16mm Maurer Data Acquisition Cameras (DAC). Spooled on metal a reel housed in a period canister, 9½ inches in diameter. The MSC Film Form 2138 Film Can Label (May 66) on the canister reads in part: "*FILM SIZE: 16 mm, FILM LENGTH: 611 feet, TYPE FILM: COLOR PRINT (via stamp), Subject: Apollo XIV Mags EE, B, GG, F, X, E, & I.*"

Brief scene descriptions from each magazine are as follows:

- Magazine EE** – EVA I (Moonwalk) lunar surface activities, deployment of the Apollo Lunar Surface Experiment Package (ALSEP).
 - Magazine B** – Lunar surface as seen from orbit and landmark tracking taken by CSM *Kitty Hawk*.
 - Magazine GG** – Views of CSM *Kitty Hawk* from LM *Antares* after lunar liftoff and prior to docking.
 - Magazine F** – Waste water dump into space.
 - Magazine X** – Crew activity inside the Command Module.
 - Magazine E** – Crew activity inside the Command Module, scenes of Alan Shepard.
 - Magazine I** - Re-entry of the Command Module *Kitty Hawk* into earth's atmosphere.
- \$2,500 - 3,500

164

LUNAR SURFACE PANORAMA NEGATIVE—APOLLO 15.

Roll of negatives of photographs taken by the panoramic camera in the Scientific Instrument Module (SIM) Bay of the Apollo 15 CSM. Duplicate negative from the original negative. 9½ inches wide by 350 feet long. On metal reel, in original canister with label reading: "Apollo 15. Mag: Pan ... Frames: 9347 to 9391 ... Date: 3 Aug 1972. Direct Neg Rectified."

Copies of the first Apollo SIM Bay negatives, showing the lunar surface as seen from the Apollo 15 Command Module Endeavour. This was the first Apollo mission to use a panoramic camera to photograph long sections of the surface, 205 by 13 miles, on 4 foot by 4½ inch strips of film. The film take-up cassette was removed from the panoramic camera by the Command Module Pilot during trans-Earth trajectory, and was returned to Earth in the Command Module. This roll duplicates the original negatives at 1:1 scale.
\$700 - 1,000

165

APOLLO 15 MOTION PICTURES OF HADLEY RILLE DURING THE LUNAR LANDING AND LIFT-OFF.

INCLUDES DOCKING PHASES AND THE FIRST LAUNCH OF A "SUB-SATELLITE" WHILE IN LUNAR ORBIT.

An internal NASA/Manned Spacecraft Center (MSC) duplicate film roll of scenes taken during the Apollo 15 flight by the 16mm Maurer Data Acquisition Cameras (DAC). Spooled on a metal reel housed in a period canister, 11 inches in diameter. The MSC Film Form 2138 Film Can Label (May 66) on the canister reads in part: "FILM SIZE: 16 mm, FILM LENGTH: 900 feet, FILM TYPE: COLOR PRINT (via stamp), Subject: Apollo 15 Onboard Film Mags – AA, BB, B, C, JJ, J, & K."

Brief scene descriptions from each magazine are as follows:

Magazine AA –Lunar orbit and Lunar Module (LM) *Falcon's* landing on the moon with Hadley Rille visible on the horizon.

Magazine BB – LM *Falcon's* lift-off from the Moon, flying over Hadley Rille with multiple boulders, then lunar surface tracking.

Magazine B – LM *Falcon* undocking as seen from Command Service Module (CSM) *Endeavor*.

Magazine C – CSM *Endeavor* tracks LM *Falcon's* ascent stage during rendezvous, then docking.

Magazine JJ – Limb of the Moon and the launch of the lunar "sub-satellite" seen from *Endeavor*.

Magazine K – Re-entry of the Command Module *Endeavor* into earth's atmosphere.

Magazine J – Command Module parachute deployment.

\$2,500 - 3,500

166

GUIDES FOR ALL ORBITAL PHOTOGRAPHY FROM APOLLOS 15 AND 17.

EIGHTEEN FOLDED MAPS PLOT PHOTOGRAPHY FROM LUNAR ORBIT.

Apollo Mission 15 Lunar Photography Index Maps. Dept. of Defense, Aeronautical Chart and Information Center, USAF for NASA, March 1972. Ten folded maps. *Apollo Mission 17 Lunar Photography Index Maps.* St. Louis: Defense Mapping Agency Aerospace Center, USAF for NASA, November 1973. Eight folded maps. Both 19 by 13 inches, blue card stock covers with staple bindings. All maps unfold to 19 by 57 inches except map 8 from Apollo 17 being 19 by 25 inches. All are scale 1:5,500,000 and first editions. Based on photographic information supplied by the Manned Spacecraft Center Mapping Sciences Branch.

Both sets of maps plot the orbits and lunar surface footprint of acquired photographic images using colored geometric figures. Camera types include the large format Panoramic, large format Mapping, 70mm Hasselblad, and the 16mm Maurer motion picture. Apollo 17 also has coverage of the flown 35mm Nikon camera. Each map has a legend which lists a group of camera frame numbers associated with each orbital pass using different colors, either red, purple, green, or black. This enhances individual footprint clarity when images occasionally overlap.

\$600 - 800



164



165 (part lot)

167[□]

**LUNAR SURFACE PANORAMA NEGATIVE—
APOLLO 16.**

Roll of negatives of photographs taken by the panoramic camera in the Scientific Instrument Module (SIM) Bay of the Apollo 16 CSM. Direct negative copied from the original negative. Approx. 9½ inches wide by 350 feet long. On metal reel, in original canister with label reading: "Apollo 16. Mag: pan ... Frames: 5095 to 5139... Date: Nov 7 1972. Master POS. [Stamped over:] Direct neg. Rectified."

Apollo 16 CSM Casper's view of the lunar surface, reproduced at twice the size of the original negative.

\$700 - 1,000

168

**APOLLO 16 MOTION PICTURES AND THE
LUNAR ROVER "GRAND PRIX."**

LUNAR SCENES FROM THE ROVER AND A DEEP SPACE EVA TO RETRIEVE CAMERA FILM. An internal NASA/Manned Spacecraft Center (MSC) duplicate film roll of scenes taken during the Apollo 16 flight by the 16mm Maurer Data Acquisition Cameras (DAC). Spooled on a metal reel housed in a period canister, 11 inches in diameter. The MSC Film Form 2138 Film Can Label (May 66) on the canister reads in part: "PRINT ROLL NO: Roll #1, FILM SIZE: 16 mm, TYPE FILM: COLOR PRINT (via stamp), Subject: Apollo 16 Mags BB, FF, P, O, Q, R, & T."

Brief scene descriptions from each magazine are as follows:

Magazine BB - Command Service Module (CSM) Casper lunar surface landmark tracking, Lunar Module (LM) *Orion* docking as seen from the Casper after *Orion*'s lunar liftoff, full phase of the Moon as seen after TransEarth Injection (TEI) and heading home.

Magazine FF - Deep space EVA (spacewalk) by astronaut Ken Mattingly to retrieve mapping camera film located in the Service Module's Scientific Instrument Module (SIM) Bay.

Magazine P - EVA I (moonwalk) film of the Lunar Roving Vehicle (LRV or Rover) "Grand Prix." Charles Duke uses the DAC camera to film John Young driving the LRV at high speeds over the lunar surface.

Magazine O - LM *Orion*'s lunar surface lift-off, Descent Stage seen on surface, and views of Casper's Scientific Instrument Module (SIM) Bay prior to docking.

Magazine Q - DAC mounted on Rover, lunar surface views while the Rover is traveling to exploration areas (Station 4) during EVA II. The Rover's TV camera can be seen in the field of view during the drives.

Magazine R - DAC mounted on Rover, lunar surface views while the Rover is traveling to several exploration areas (Stations 5, 6, 8, 9 and 10). Several close-ups of John Young working near Rover.

Magazine T - DAC mounted on Rover during EVA III, lunar surface views while the Rover is traveling to Stations 11 and 13.

\$2,500 - 3,500

169

**APOLLO 16'S MOTION PICTURES OF ORION'S
UNDOCKING AND LUNAR LANDING.**

*JOHN YOUNG ON THE LUNAR SURFACE PLUS
THE RETURN OF "CASPER" TO EARTH.*

An internal NASA/Manned Spacecraft Center (MSC) duplicate film roll of scenes taken during the Apollo 16 flight by the 16mm Maurer Data Acquisition Cameras (DAC). Spooled on a metal reel housed in a period canister, 11 inches in diameter. The MSC Film Form 2138 Film Can Label (May 66) on the canister reads in part: "PRINT ROLL NO: Roll #2, FILM SIZE: 16 mm, TYPE FILM: COLOR PRINT (via stamp), Subject: Apollo 16 Mags N, AA, CC, EE, GG. T-914-50."

Brief scene descriptions from each magazine are as follows:

Magazine N - Command Service Module (CSM) Casper views from Lunar Module (LM) *Orion* just after undocking prior to the lunar landing. Landing sequence from *Orion* and lunar touchdown. John Young observed from LM window working outside on the lunar surface at the beginning of the first EVA (moonwalk).

Magazine AA - CSM Casper records the initial docking with LM *Orion* just after TransLunar Injection to the Moon (CSM transposition and docking).

Magazine CC - LM *Orion* undocking as seen from the CSM.

Magazine EE - Landmark tracking of the lunar surface from the CSM.

Magazine GG - Re-entry of the Command Module Casper into earth's atmosphere.

\$2,500 - 3,500

170

APOLLO 16 LUNAR MODULE CLOSE OUT.

An archive containing 188 black and white and 24 color NASA photos on Kodak paper. Majority 8 by 10 inches, c. 1972.

A spectacular collection, comprising images covering nearly every angle and detail imaginable of the close out of the Apollo 16 Lunar Module, inside and out. The images, of which the color photos are particularly rare, include numerous high detail shots of the LM interior, such as astronauts Young and Duke's stowed Personal Life Support Systems, various shots of the hardware, electronics, restraint systems, control systems, and webbing, ascent/descent stage assemblies, LRV stowage pallet with all of its equipment, as well as equally detailed shots of the exterior of the LM, covering every piece of LM hardware.

\$1,500 - 2,500

171[□]

**LUNAR SURFACE PANORAMA NEGATIVE—
APOLLO 17.**

Roll of negative film from the panoramic camera in the Scientific Instrument Module (SIM) Bay of the Apollo 17 CSM. Master negative from the original negative. Approx. 9½ inches wide by 350 feet long. On metal reel, in original canister with label reading: "Apollo 17. Frames: 1916 to 1950. Date: 3 Aug 1973. Master. Direct Neg."

Showing the lunar surface as seen from the Command Module. The panoramic camera photographed long sections of the surface, 205 by 13 miles, on 4 foot by 4½ inch strips of film. The film take-up cassette was removed from the panoramic camera by the Command Module Pilot during trans-Earth trajectory, and was returned to Earth in the Command Module. This system was first used on Apollo 15.

\$700 - 1,000

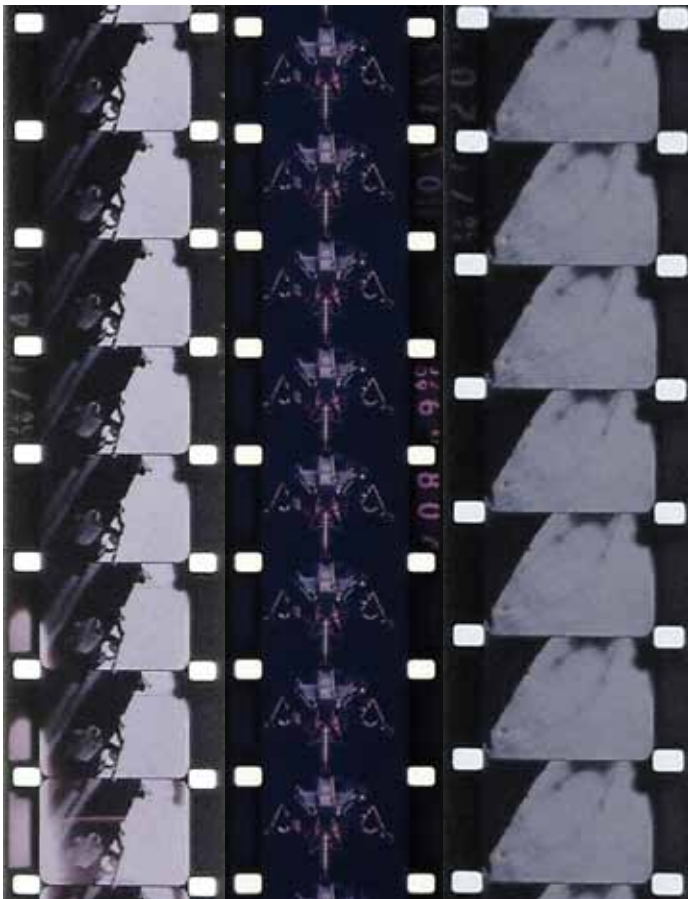
172

**THE EXACT LOCATIONS OF EARTH
PHOTOGRAPHY TAKEN BY
SHUTTLE ASTRONAUTS.**

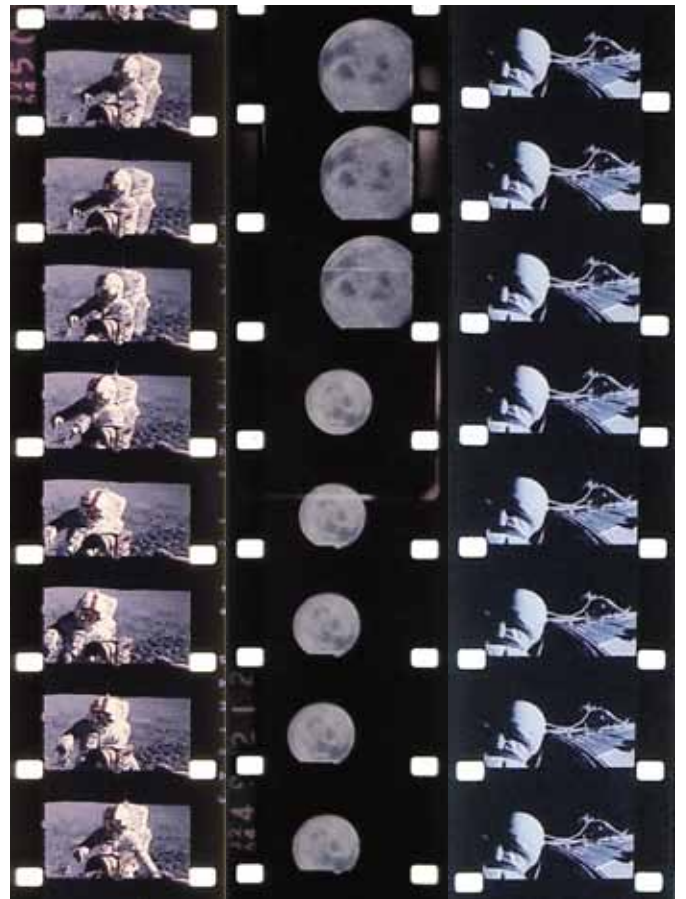
STS Earth Observations Photography Summary Map. St. Louis: Defense Mapping Agency Aerospace Center for NASA. A group of eleven folded earth maps, all 10 ½ by 52 inches and first editions. Dates range from July 1984 to April 1991. Each have camera, film, and a map summary description on the first fold panel. Flights are Space Transportation System (STS or Shuttle) 41B, 41C, 51D, 51G, 51I, 29, 30, 31, 32, 34, and 38. Plus *Catalog of Space Shuttle Photography, STS-1, STS-2, STS-3, STS-4.* Albuquerque: Technology Application Center, University of New Mexico. 51 pp. 11 by 8 ½ inches. Yellow card stock with staple binding. A listing of film frame numbers with a brief description in a line by line format for the first four shuttle flights.

Space Transportation System (STS or Shuttle) flown cameras described are the 70mm Hasselblad and Linhof Aero Technika. Film types include Kodak Ektachrome 6017 aerial ASA 64 and 5 inch Kodak Aerochrome MS 2448. The maps are described containing: "... the center point positions and frame numbers, printed in red, for Earth Observations photographs acquired... Nadir latitude and longitude coordinates are shown for photographs that could not be located (printed in blue at Shuttle's orbit position). Where a large number of photographs were acquired over a small area, the points are enclosed within a box with the frame numbers in bracketed outside...."

\$400 - 600



168 (part lot)



169 (part lot)



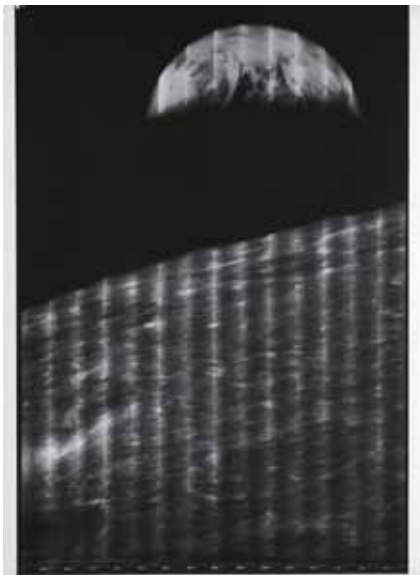
170 (part lot)



170 (part lot)



170 (part lot)



173

173

LUNAR ORBITER I.

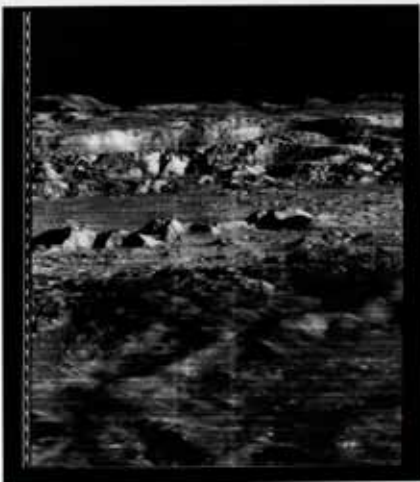
THE FIRST IMAGE OF THE EARTH AS SEEN FROM THE MOON.

Silver gelatin print, 13½ by 10½ inches, on Kodak paper. August 23, 1966. NASA image number 67-H-218, GRIN database number GPN-2000-001588.

Taken from Lunar Orbiter I on its 16th orbit just before passing behind the moon. The Lunar Orbiter cameras were a technological feat that almost defies belief. Each Orbiter carried a Kodak camera equipped with two lenses, a lower resolution (or wide-angle) 80 mm lens, and a 610mm high-resolution (or telephoto) lens. Each exposure resulted in two simultaneous photographs, a wide-angle view, and a telephoto view. The exposures were made onto a roll of 70 mm film, which was moved during exposure to compensate for the spacecraft's velocity.

The film was then processed on board the Orbiter, by a method Kodak invented called Bimat—somewhat akin to the Polaroid process. Next, the developed film passed through an analog scanner which transmitted the data back to Earth by radio (technology largely derived from television broadcasting and developed by the R&D wing of CBS). The data was gathered by three NASA Deep Space Network receiving stations: Goldstone, CA; South Africa, or later Madrid, Spain; and Woomera, Australia. The data was then sent on to the Army Map Service and NASA Langley. The video signal was converted into variations of light on a cathode ray tube, and the image produced was captured on positive film by a 35 mm camera. Each film positive is known as a framelet, and the Orbiter's original photograph is recreated by placing the framelets side by side. That film positive is considered zero-generation, and from it were produced negatives, from them contact prints, and so forth.

\$1,000 - 2,000



174

174

LUNAR ORBITER II.

"THE PICTURE OF THE CENTURY".

Silver gelatin print, 20 by 24 inches. Image II-162-H3, high resolution. November 24, 1966.

The iconic image featuring a dramatic view looking into the heart of Copernicus crater, hailed at the time by *Life* Magazine as "The Picture of the Century." Until this moment, the few images of the lunar surface were taken from perpendicular to the surface - this was the first time that an image was taken at an oblique angle, providing the first ever glimpse of the rugged and foreboding lunar surface. Truly an astonishing image, a direct parallel can be drawn to the images produced by Galileo after viewing the surface of the moon through his telescope. Launched on November 6, 1966, Lunar Orbiter II was tasked with completing a photographic survey program for Apollo landing sites. It produced 211 photographs during 40 orbits.

Illustrated in Cortright, *Apollo Missions to the Moon*, chapter 5.

\$1,000 - 1,500



175

175

LUNAR ORBITER III.

AN OBLIQUE VIEW OF KEPLER CRATER.

Black and white photograph, 20 by 22½ inches. Image III-162-M, medium resolution. February 25, 1967.

A beautiful oblique view of Kepler crater. Launched on February 5, 1967, Lunar Orbiter III (LO3) produced 211 photographs taken during 54 orbits, only 75% were successfully transmitted back to earth. Essentially a site-confirmation mission, LO3 had the task of re-photographing 12 potential landing sites identified by Lunar Orbiters I and II. NASA was able to utilize the photograph data to narrow the landing site selection down to 8 possibilities. Aside from potential landing sites, LO3 also took imagery of secondary sites of scientific interest on the far side of the moon and at higher latitudes on the lunar nearside.

\$700 - 1,000

176

LUNAR ORBITER III.

DIRECT OVERHEAD VIEW OF TSIOLKOVSKY CRATER.

Silver gelatin print, 23 by 20 inches. Image III-121-M, medium resolution. February 19, 1967.

An absolutely stunning image of Tsiolkovsky crater on the far side of the moon, showing the lunar equator and the south pole on the horizon.

\$1,000 - 1,500

177

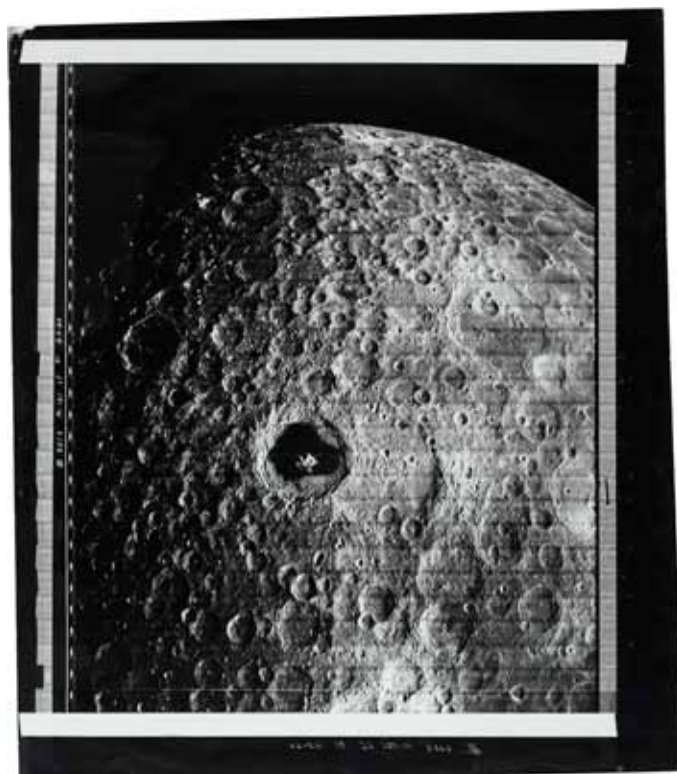
LUNAR ORBITER IV.

ENTIRE LUNAR DISC, WITH TSIOLKOVSKY CRATER AT CENTER.

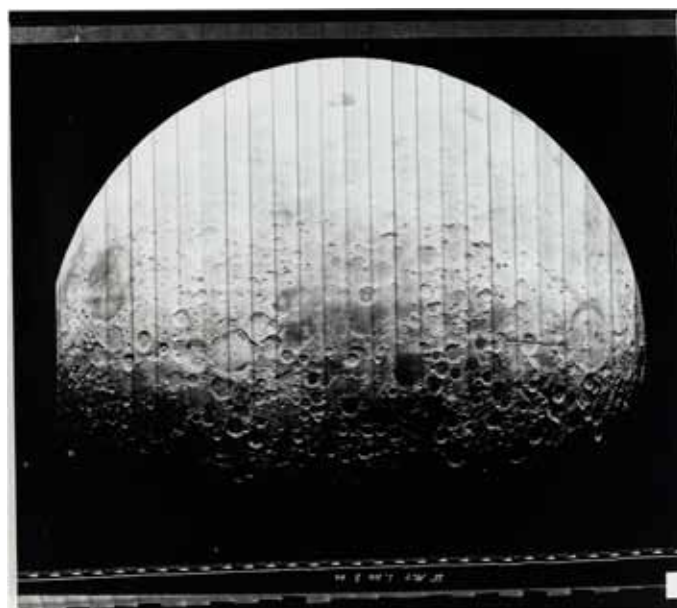
Silver gelatin print, 20½ by 18 inches. Image IV-0096-M, medium resolution, May, 1967.

A striking photograph showing the entire lunar disc, with Tsiolkovsky crater at center near limb. The objective of Lunar Orbiter IV (LO4) was to provide an expanded photographic survey of the lunar surface, providing far higher resolution imagery than was available from ground based telescopes. Launched on May 4, 1967, LO4 completed 30 successive orbits and took 199 exposures which covered 99% of the lunar surface. Illustrated in: Cortright, p. 109.

\$1,000 - 1,500



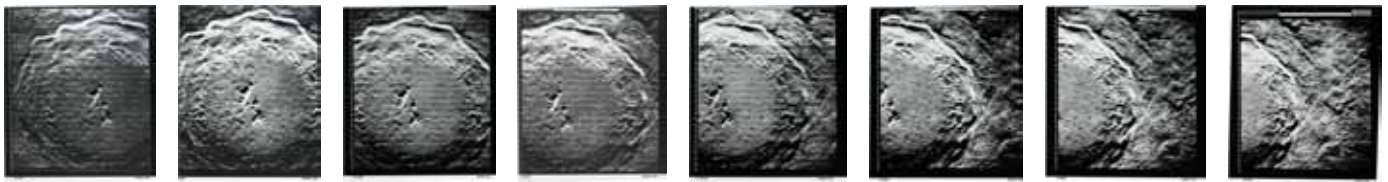
176



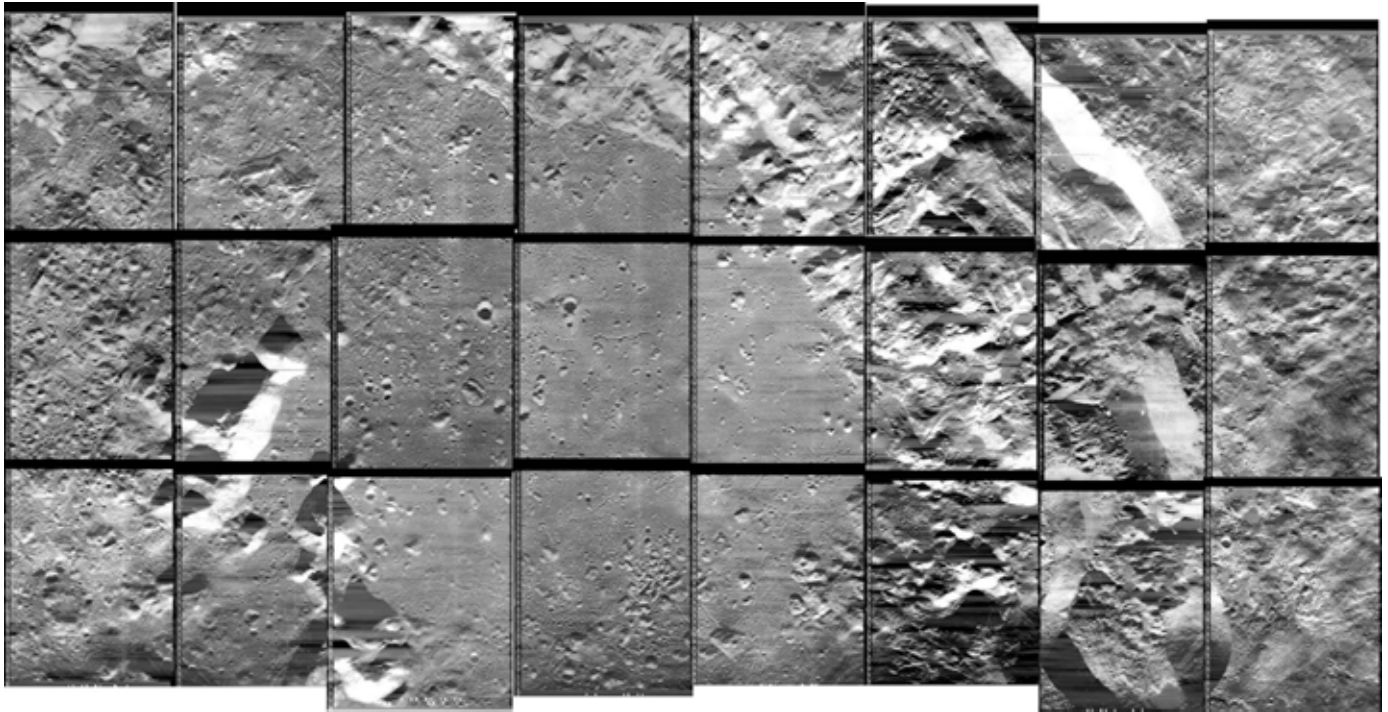
177



179 (part lot)



178 (part lot)



178 (panorama assembled for reference)

178

LUNAR ORBITER V PANORAMA.

THE MOST COMPREHENSIVE VIEW OF CRATER COPERNICUS.

Together 32 silver gelatin prints, each 17 by 22 inches. Full suite of images V-150 through V-157, each complete with medium resolution images M, and high resolution images H1, H2, and H3.

An incredible complete suite of images taken by Lunar Orbiter V of Copernicus crater and its immediate environs. Includes 24 high resolution images, comprising views of the central peaks, the crater floor, and the local ejecta blanket, as well as 8 medium resolution images of the crater in its entirety. The 24 high resolution images together form a fantastic 5½ foot wide by 11¼ foot long panoramic shot, being the most extensive photograph of crater Copernicus to be shot by Lunar Orbiter V.

Launched on August 1, 1967, Lunar Orbiter V was the final LO mission, and was tasked with taking additional detailed photographs of potential Apollo landing sites. It took a total of 174 photographs during 69 orbits. Between August 6 and 18 it took 174 photographs during 69 orbits.

\$5,000 - 8,000

179

VIKING LANDER II.

SURFACE OF MARS.

Five silver gelatin prints showing various views of the martian surface, each 5 by 10½ inches. March 2, 20, and 22, 1978. IPL PIC IDs 77/03/02/025352, 77/03/02/030108, 77/03/20/214851, 77/03/20/214431, 77/03/22/001559.

A striking group of five images from the JPL Images Processing Laboratory taken from cameras 1 and 2 of the Mars Viking Lander II. "The Viking orbiter cameras returned over 9000 images of Mars during the 6-month nominal mission. Digital image processing was required to produce products suitable for quantitative and qualitative scientific interpretation. Processing included the production of surface elevation data using computer stereophotogrammetric techniques, crater classification based on geomorphological characteristics, and the generation of color products using multiple black-and-white images recorded through spectral filters. The Image Processing Laboratory of the Jet Propulsion Laboratory was responsible for the design, development, and application of the software required to produce these 'second-order' products" (Ruiz, Elliot, Yagi, et al. "IPL processing of the Viking Orbiter Images of Mars", *Journal of Geophysical Research*, Vol. 82, Issue 28, p. 4189, September 30, 1977). See illustration on preceding page.

\$700 - 1,000

APOLLO PROGRAM THROUGH APOLLO 10

180

THE APOLLO CHRONOLOGY—SIGNED BY A MEMBER OF EVERY FLIGHT CREW.

THIRTEEN APOLLO ASTRONAUT SIGNATURES OVER 4 VOLUMES. The Apollo Spacecraft: A Chronology. Washington: GPO/NASA SP-4009. 1969-1978.

Four volumes. 269, 277, 268, and 463 pp. 10 ¼ by 8 inches. Original red printed wrappers.

Volume I - SIGNED and INSCRIBED: "WALLY SCHIRRA, S/C (spacecraft) 101, Apollo 7" and SIGNED by FRANK BORMAN.

Volume II - SIGNED and INSCRIBED: "DAVE SCOTT, S/C 104 Apollo 9, S/C 112 Apollo 15" and "TOM STAFFORD, S/C 106 Apollo X" also "FRED HAISE, Apollo 13 S/C 109."

Volume III - SIGNED and INSCRIBED: "BUZZ ALDRIN, S/C 107 Apollo XI; CHARLES CONRAD, CSM (Command Service Module) 108 Cdr; RICHARD GORDON, CSM 108 CMP; ALAN BEAN, CSM 108 LMP; and "FRED HAISE, Apollo 13 S/C 109."

Volume IV - SIGNED and INSCRIBED: "EDGAR MITCHELL, Apollo 14; AL WORDEN, CSM 112 Apollo 15; CHARLES M. DUKE, JR. CSM 113 Apollo 16" and "GENE CERNAN, CSM 106 Apollo X, CSM 114 Apollo XVII."

The day-by-day, year-by-year history of the development and flights of the Apollo spacecraft, including the Command/Service Module, Lunar Module, the Launch Escape System, and other related components. Mission management and early flight profiles are addressed with extensive additional information found in multiple appendices.

\$3,500 - 4,500

181

APOLLO EXPEDITIONS TO THE MOON—SIGNED BY 14 ASTRONAUTS.

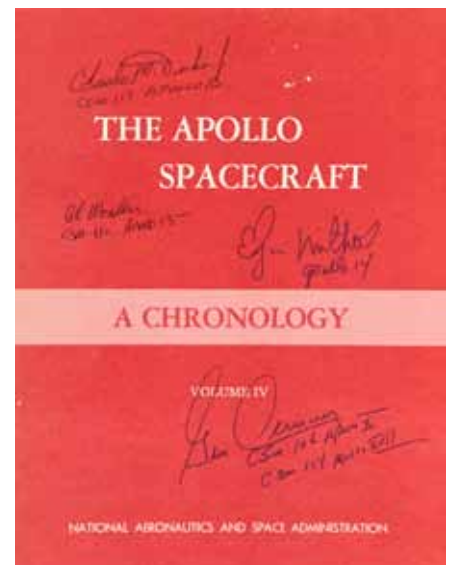
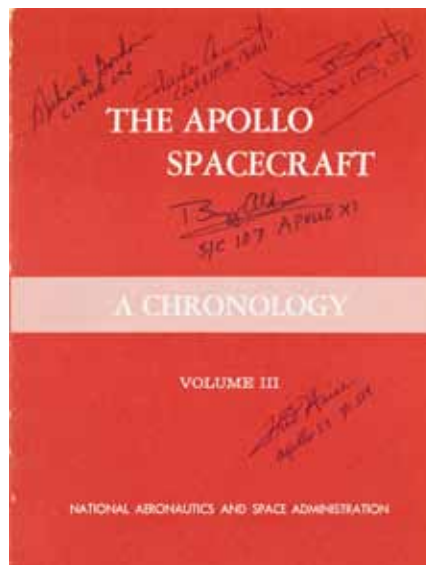
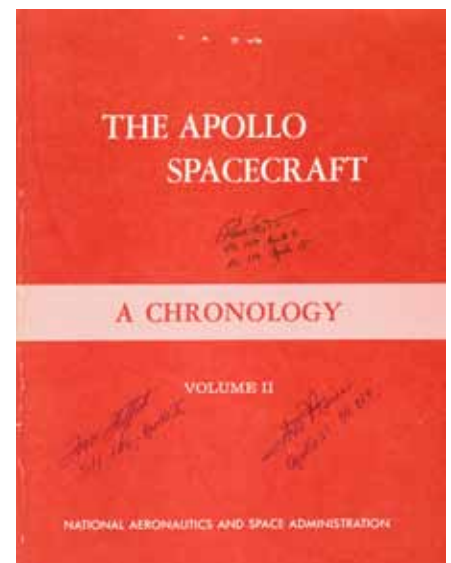
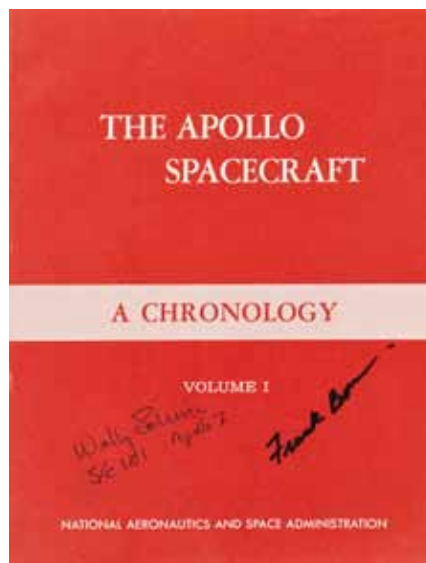
SIGNATURES REPRESENT ALL MANNED FLIGHTS – APOLLO 7 THROUGH 17.

Cortwright, Edgar M., ed. *Apollo Expeditions to the Moon.* NASA SP-350. Washington: GPO/ NASA SP-350. 1975. 313 pp. Illustrated. 12 by 9 inches. Color pictorial cloth binding.

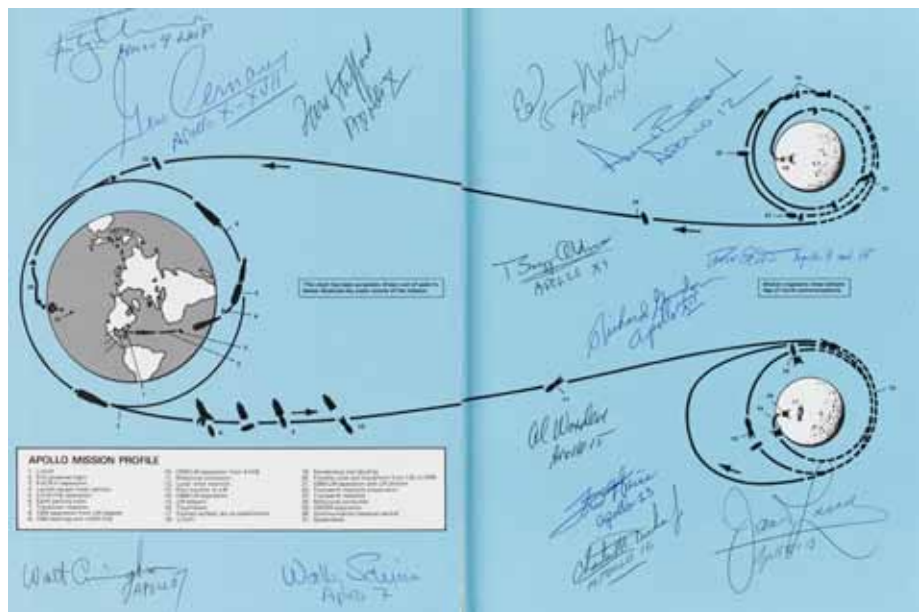
SIGNED and INSCRIBED with their individual Apollo flight number(s) added by: BUZZ ALDRIN, ALAN BEAN, GENE CERNAN, WALT CUNNINGHAM, CHARLES M. DUKE, Jr., RICHARD GORDON, FRED HAISE, JAMES LOVELL, EDGAR MITCHELL, WALLY SCHIRRA, RUSTY SCHWEICKART, DAVE SCOTT, TOM STAFFORD, and AL WORDEN.

Signatures appear on the front endpapers which has an artist's drawing of the Apollo mission profile from the earth to the moon and return. Astronaut written chapters include those by Aldrin, Collins, Conrad, Lovell, and Shepard. Other contributors include Wernher von Braun and Chris Kraft.

\$4,000 - 6,000



180



181



182

**182
BENDINI, SILVIO, WERNHER VON BRAUN &
FRED WIPPLE.**

*EARLY LARGE FORMAT PUBLICATION SIGNED
BY ELEVEN NASA ASTRONAUTS.*

MOON, Man's Greatest Adventure. New York:
Abrams, 1973. 267 pp. 15 by 12 inches.
Original blue cloth.

On the color frontispiece, the iconic image of
Aldrin on the lunar surface photographed by
Armstrong, **BOLDLY SIGNED** and **INSCRIBED**
by the former: "BUZZ ALDRIN, Apollo Eleven,
July 20, 1969."

Additionally **SIGNED** and **INSCRIBED** with
their individual missions and/or flight titles by:
ALAN BEAN, SCOTT CARPENTER, GORDON
COOPER, WALT CUNNINGHAM, CHARLES M.
DUKE, Jr., RICHARD GORDON, FRED HAISE,
EDGAR MITCHELL, WALLY SCHIRRA, and TOM
STAFFORD on the title page.

One of the earliest large format books about
the Moon and general space exploration
with beautiful color illustrations. The Space
Age is covered year-by-year starting at 1957
with Sputnik, then includes Gagarin's flight,
the Mercury Program, Gemini Program, and
unmanned lunar orbiters and landers. Numerous
pages are devoted to the three-man Project
Apollo and the ultimate success of the first lunar
landing – Apollo 11.
\$5,000 - 7,000



182

**183
KENNEDY SPACE CENTER APOLLO SATURN
LAUNCH VIEWING BADGES.**

ISSUED TO VIP'S, GUESTS, AND THE PRESS CORPS.

A collection of nine multi-colored Apollo –
Saturn V launch viewing badges issued by the
Kennedy Space Center between 1969 and
1971, all being 2 ½ by 4 inches. Most feature
the corresponding Apollo crew mission emblem
on the front side. Several have the statement
of: "The National Aeronautics and Space
Administration cordially welcomes you to the
launch of Apollo ... This credential is issued to
the bearer for his sole, exclusive, personal use,
and is not transferable. After launch, it may
be kept as a souvenir of the mission" on the
reverse side. All have individual serial numbers
stamped on the reverse side.

The badges include: APOLLO 9 Viewing Stand
Guest, APOLLO 10 Viewing Stand Guest,
APOLLO 10 Guest, APOLLO 11 5th Anniversary
PRESS, Apollo XIII Launch, APOLLO 14 Launch,
APOLLO 15 Launch, APOLLO 16 Launch, and
Apollo 17 Launch.

\$400 - 600



184

**184
APOLLO, SKYLAB, and ASTP LION BROTHERS
CREW MISSION EMBLEMS.**

Cloth crew mission emblems, 19 total with sizes
from 3 ½ to 5 inches in diameter. Embroidered
by Lion Brothers of Owens Mills, Maryland
beginning in 1967.

Crew emblems for all Apollo, Skylab, and ASTP
missions. These cloth emblems are noted for
their detailed artistry and exceptional quality of
the official NASA crew designs. The Apollo 12
through 17 emblems have hallmarks in the form
of their respective mission number "hidden" in
the embroidery. Hallmarks are located in Apollo
12's Clipper ship dust trail, in a horse mane just
below the sun for Apollo 13, upside-down in
the white lunar surface for Apollo 14, just above
the "D" in Worden on the Apollo 15 emblem,
under the gold vector on the right for Apollo
16, and in the shoulder of god Apollo for Apollo
17. The Skylab series of emblems changed the
hallmark method to the first letter of the flight
crew's last name.

Skylab I has the "CKW" placed to the right of
the Skylab space station, Skylab II has the "BGL"
upside-down in the sun just above the "S" in
Skylab, and for Skylab 3 the "CGP" makes up part
of the green leaves of the tree inside the large "3."
The oval Skylab Program logo emblem is a
period emblem most likely not made by Lion
Brothers.

The Apollo Soyuz emblem with crew names has
"ASTP" in the earth ocean surrounded by clouds.
\$1,500 - 2,000



185

185
28 DAYS IN ORBIT—CHARLES CONRAD'S SKYLAB I MISSION EMBLEM.
 CONRAD'S LETTER PROVIDES DETAILS ON A RECORD BREAKING FLIGHT.
 FLOWN Skylab I cloth emblem, 4 inches in diameter. Features the Skylab Space Station in orbit above the earth as our planet eclipses the sun. The emblem is display above paragraphs on a Typed Letter Signed by CHARLES CONRAD.

CHARLES CONRAD'S signed provenance letter reads in part: "I was the commander of the first manned flight to Skylab. The mission was delayed ten days in order to make plans for repairing the damage that occurred just minutes into the launch of Skylab, also known as the SL-1 mission. This patch was carried with us during the launch of the SL-2 vehicle on May 25, 1973, and flew in space for 28 days. My crew and I made the repairs during that time to enable a full duration mission. We returned to earth on June 22, 1973."
\$2,500 - 3,500



186

186
SKYLAB II "WIVES PATCH"—ONE OF ONLY 320 MADE.
 ONE OF THE MOST SOUGHT AFTER EARLY EMBROIDERED EMBLEMS.
 Circular Skylab II "Wives Patch," 4 inches in diameter. Features a nude female in front of a combination half sun and half earth with the flight crew members' wives first names. Displayed with a 4 inch limited edition color decal of the same design. Matted and framed, 16 by 13 inches.

Skylab II Wives Decal (number 1659) is SIGNED "ARDIS" (Ardis Shanks, co-designer and artist) and INSCRIBED and SIGNED "JACQUES" (co-designer and production coordinator).

The emblem follows the same base design of the actual Skylab II flight crew (SL-3 mission) emblem with the exception of Leonardo da Vinci's "Vitruvian Man" being replaced by "vitruvian woman." Additionally, the crew's wives first names were used – SUE (Bean), HELEN-MARY (Garriott), and GRATIA (Lousma) – following the same name order as their husbands.

This was a "secret" project to surprise their husbands during their 59 day mission by placing some of the decals inside various Command Module lockers. The total number cloth emblem "Wives Patches" was based on a humorous additive process which included the length of actual/planned Skylab flights, launch dates, crew ages, and the average age of Sue, Helen-Mary, and Gratia which was "18".
\$1,000 - 1,500



187

187
THE MATERIAL THAT ALLOWED SKYLAB TO BE A FLIGHT SUCCESS.
 Skylab Sunshade Material. Two samples, each approximately ½ by 1 inch, showing the front and back of the material used during the Skylab space station rescue operations. Both are mounted onto an 11 by 8 inch display certificate which has images of the sunshade assembly and after it was deployed in space to protect Skylab. Sample number 727 of 2500.

The certificate reads: "The attached are samples of Skylab sunshade material. It was constructed from ½ mil Mylar, the Du Pont trademark name for polyester film. The Mylar was aluminized and then bonded to 1.1 ounce weight nylon ripstop. During the unmanned launch of the Skylab space station (SL-1 mission) on May 14, 1973, a shield designed to protect Skylab from micro-meteoroids and temperature extremes was torn off due to aerodynamic forces. The temperatures inside Skylab soon soared to well over 100 degrees F.

Ground support crews devised a method of erecting a parasol sunshade. It was deployed by the first manned flight called Skylab I (SL-2 mission) insuring a successful 28 day flight. The Skylab II crew (SL-3 mission) later installed a larger and improved sunshade during a 59 day flight. The sunshade material enabled all three manned missions to take place, allowing a successful completion of the Skylab program."

\$100 - 150



188

188

THE SATURN V MOON ROCKET—SIGNED BY LUNAR VOYAGERS.

Saturn V Apollo Flight Configuration. The Boeing Company, Space Division, Launch Systems Branch, Huntsville, AL. 1 March 1967. Large half-tone drawing lithograph, 17 by 11 inches.

SIGNED and INSCRIBED with their individual Apollo Saturn (AS) flight number: "RICHARD GORDON, AS 507, Apollo XII; FRED HAISE, AS 508 Apollo 13; AL WORDEN, AS 510 Apollo 15."

The 363 foot Saturn V rocket is illustrated with views of internal structures and has over 100 individual components and/or systems identified. Items listed are broken down relative to rocket stages and spacecraft with their respective manufactures which includes: S-I Stage (Boeing), S-II Stage (North American Aviation), S-IVB Stage (Douglas), Instrument Unit (IBM), Spacecraft (North American Aviation). The massive F-1 and J-2 rocket engines with their fuel tank structures are clearly visible. A six foot man is shown next to an F-1 engine to vividly convey the size of the Moon Rocket.

\$600 - 800

189

FLOWN HEAT SHIELD SEGMENT FROM THE FIRST FLIGHT TEST OF A COMMAND MODULE.

A segment of heat shield approximately 1 inch square. Encased in a Lucite block in the shape of a half Command Module (CM) with two dimples to replicate the placement of the CM's two rendezvous windows. The North American Aviation's Space and Information Systems Division spiral logo is found above the segment. The reverse side has a label which reads: "Apollo Ablator, 18000 MPH Re-entry, 26 FEB 1966."



189

This heat shield segment was part of test samples removed after the return of the Apollo Saturn 201 test flight of February 26, 1966. This was an unmanned test of the Command/Service Modules using the Saturn IB rocket. The space-exposed end of the shield has been charred black due to the intense heat of re-entry through the earth's atmosphere.

\$800 - 1,200

190

LARGE PORTRAIT SIGNED BY APOLLO 1 ASTRONAUT ROGER B. CHAFFEE.

DISPLAYED IN THE NASA MANNED SPACECRAFT CENTER AUDIO VISUAL OFFICE.

Large color photograph, approximately 12 by 10 inches, of Roger Chaffee wearing a business suit and mounted onto 19 by 15 inch white display board. Signed by ROGER B. CHAFFEE.

INSCRIBED and SIGNED: "Best Regards to Audio-Visual, ROGER B. CHAFFEE."



190

Chaffee was selected by NASA as part of the third group of astronauts in 1963. In March of 1966, he was chosen for his first space flight by NASA to be pilot with the Apollo 1 crew scheduled for launch in early 1967. Tragically, he died with Virgil Grissom and Edward White during a flash fire inside the Apollo 1 spacecraft on January 27, 1967.

\$1,200 - 1,800

191

GORDON COOPER'S APOLLO 1 CREW EMBLEM.

RECEIVED JUST PRIOR TO THE DEATHS OF GRISSOM, WHITE, AND CHAFFEE.

Circular Apollo 1 crew emblem, 3 1/2 inches in diameter. Features a Command/Service Module in earth orbit with the moon in the distance. Displayed with a Typed Letter Signed by GORDON COOPER from his personal stationery.

GORDON COOPER'S signed provenance letter reads: *"The Apollo 1 cloth crew "patch" displayed with this letter was given to me by Virgil "Gus" Grissom in 1966 and is one of the first production runs of this emblem. Gus and I were both selected by NASA in 1959 as part of the Mercury "Original Seven" Astronauts. Gus flew the second manned Mercury flight in 1961, a 15 minute sub-orbital flight using a Redstone rocket. He then commanded the first manned Gemini flight in March 1965 called Gemini 3. Gus started extensive training for Apollo flights and was selected to command Apollo 1 in early 1966.*

It came as a shock to us in the Astronaut Office as well as the entire nation and the world that he with crew members Edward White and Roger Chaffee were killed in a spacecraft fire on the launch pad on January 27, 1967. Gus and the Apollo 1 crew gave their lives to help the United States reach the goal of landing on the moon by the end of 1969."

\$1,200 - 1,800

192

RUNNING TESTS WHILE INSIDE THE APOLLO 1 SPACECRAFT—SIGNED.

Color photograph, 10 by 8 inches.

INSCRIBED and SIGNED: *"Checking out Apollo 1, WALT CUNNINGHAM."*

Walter Cunningham is seen wearing his Apollo A1C space suit through a side window of the Apollo 1 spacecraft. The prime crew of Apollo 1 - Grissom, White, and Chaffee would die in this vehicle just a few weeks later.

\$200 - 300

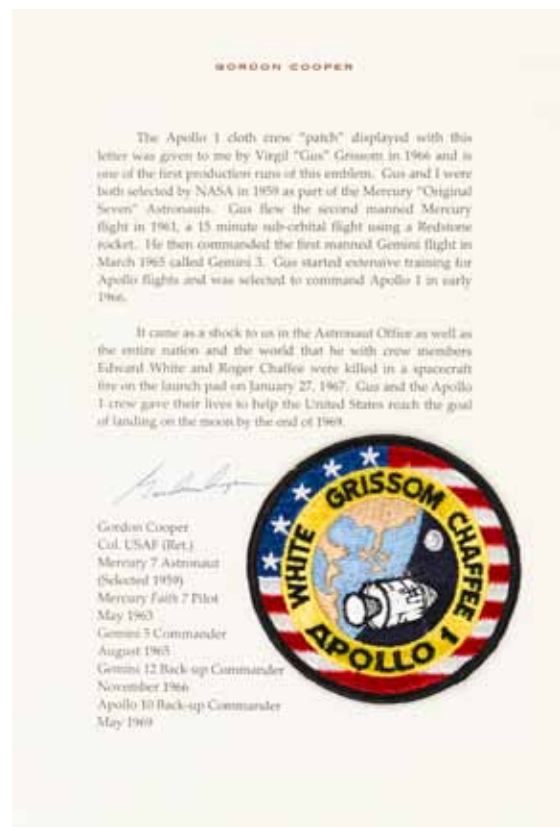
193

DOCKING COLLAR ABLATIVE MATERIAL FROM THE APOLLO VII COMMAND MODULE.

Ablative Material Flown on Apollo VII. A segment of ablative material approximately 1/4 by 1 inch in size. Mounted on an 11 by 8 inch color display certificate with multiple captioned images and illustrations describing how ablative material was used during the mission. Sample number 255 of 500. With copies of NASA/MSC transfer papers to the Smithsonian's National Air and Space Museum (NASM) and NASM deaccession papers. Plus a copy of the *"Temporary Parts Removal Tag"* which reads in part: *"Part Number: V36-316046, Authority: ASHUR 101543, Model: Ablative Ring, Mark for shipment of: PFT SIC 101."*

The certificate reads in part: *"Attached is a section of ablative heat shield material that was flown on the flight of Apollo VII during October 11 - 22, 1968. Apollo VII was the first manned Apollo flight and a major test of the command and service modules in earth orbit. This ablative material was one of the several ring sections that surrounded the docking collar of the command module. It was designed to dissipate heat by vaporizing during atmospheric re-entry, protecting the docking collar area from temperature extremes. This ablative heat shield is a composite material of a phenol resin impregnated onto woven linen material. This sample made 163 orbits of the earth during the Apollo VII mission."*

\$300 - 500



191



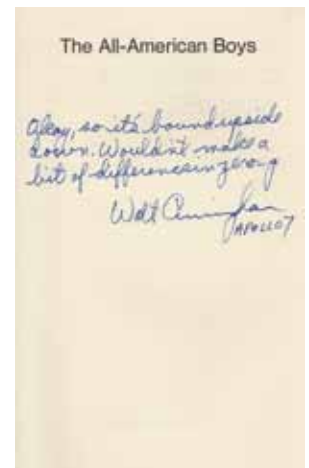
192



193



194



196



195



197



198

194

"A BEAUTIFUL BALLOON"—SIGNED APOLLO 7 LAUNCH PHOTOGRAPH.

Black and white photograph, 10 by 8 inches, with printed NASA captions on verso.

INSCRIBED and SIGNED: "It was a beautiful balloon – WALT CUNNINGHAM, Apollo 7."

The Saturn IB rocket carrying the Apollo 7 spacecraft lifts-off the pad at Launch Complex 34 on October 11, 1968. It was the first manned Apollo flight following a 21 month investigation and delay due to the Apollo 1 spacecraft fire.

See illustration on preceding page.

- \$300 - 400

195

APOLLO 7 CREW SIGNED POSTAL ENVELOPE.

RELEASED BY NASM FOR THE 5TH ANNIVERSARY OF THE APOLLO 7 MISSION.

Postal envelope featuring a color cachet of the Apollo 7 crew emblem issued by the Smithsonian Institution – National Air and Space Museum (NASM). Postmark later on October 11, 1968, at the NASA Headquarters postal facility in Washington, D.C. This was the 20th anniversary of the launch.

SIGNED BY WALLY SCHIRRA, DONN EISELE, and WALT CUNNINGHAM.

The cover is number 9 of a series of commemorative envelopes released by the NASM and has a fact sheet on the Apollo 7 mission plus an information card about the next envelope planned to be released for this series.

\$1,000 - 1,500

196

READABLE IN ZERO-G, CUNNINGHAM'S ALL-AMERICAN BOYS.

CUNNINGHAM, WALTER. *The All-American Boys*. New York: Macmillan, 1977.

321 pp. 9½ by 6½ inches. Cloth with dust jacket. Production error has caused the book to be bound upside-down.

FIRST EDITION, INSCRIBED and SIGNED: "Okay, so it's bound upside down. Wouldn't make a bit of difference in zero-g. WALT CUNNINGHAM, Apollo 7." Inscription perhaps unique.

The first candid look at the early Astronaut Corps by an astronaut who was a member of that select fraternity. Cunningham was chosen by NASA to be in the third group of astronauts during 1963. Many chapter titles state the opinionated and concise synopsis of the subject matter at hand – "You Lucky Sonofabitch, Astropolitics, Riding the Hero Trail, and There's One Born Every Minute." A real look at the astronaut "boy scout image" is covered with the chapter "Don Juan the Astronaut."

See illustration on preceding page.

- \$500 - 700

197

FINAL FLIGHT PLAN FOR FIRST MANNED FLIGHT TO THE MOON.

Apollo 8 Flight Plan, Final AS-503/CSM-103. Houston, TX: NASA/MSC, November 22, 1968.

Over 240 pp. 10½ x 8 inches. Blue heavy card stock covers, punched, stapled. Provenance: Lieutenant Col. Walter Pennino. Pennino (1915-1998) was the director of NASA's public relations program, and did the advance work for foreign goodwill tours made by astronauts.

SIGNED BY FRANK BORMAN, JAMES LOVELL AND BILL ANDERS on front cover to Walt Pennino. Includes: Flight plan description and notes including scheduled communication tests; Detailed timeline covering Launch, Translunar Insertion, Lunar Orbit Insertion, Transearth Insertion and Reentry; Analysis of consumables including of the Service and Command Module's Reaction Control Subsystems, Cryogenics, Service Propulsion System, and average electrical powerloads; Detailed Test Objectives; and a summary flight plan.

\$1,500 - 2,500

198

APOLLO 8—SATURN V FLIGHT MANUAL. SIGNED BY LOVELL.

Saturn V Flight Manual. MSFC-MAN-503. Huntsville, Alabama: NASA/MSFC, April 1, 1968.

8 by 10¾ inches. 270 pp. Cream card stock covers, punched with binder rings. Upper cover detached, stain running through lower edge of last 30 or so pages. Ownership inscriptions of V.F. Smith to upper cover.

SIGNED "FIRST FLIGHT TO THE MOON/ JAMES LOVELL/APOLLO 8." The Apollo 8 Saturn V Flight Manual was the authoritative reference for the Saturn V rocket. Early versions of this document (SA-503) are rarely offered for the historic, first manned flight to the moon. Divided into ten sections, it included information on emergency procedures, mission control monitoring, and ground support interface, as well as details on the three stages of the rocket, amongst other topics.

\$800 - 1,000

199

APOLLO 8—FIRST FLIGHT TO THE MOON. SIGNED BY LOVELL & BORMAN.

"Apollo Translunar/Transearth Plotting Chart (ATT). Apollo Mission 8." Manned Spacecraft Center, Mapping Sciences Laboratory.

23½ x 19¾ inches. Diagram with extensive annotations. First edition, 11 December 1968.

SIGNED and INSCRIBED: "FIRST FLIGHT TO THE MOON. JAMES LOVELL. APOLLO 8 CMP. DECEMBER 1969" and "FRANK BORMAN. APOLLO 8 CDR." The chart features a North polar view of the Apollo 8 flight profile and displays the December 20-January 28th orbital path of the moon around the Earth. Events such as Earth Launch, Translunar Injection, Lunar Orbit Insertion to Transearth Injection, and Ocean Touchdown are listed. This was the first manned Apollo flight to go to the moon.

\$1,200 - 1,800

200

APOLLO 8. SIGNED BY THE CREW.

ZIMMERMAN, ROBERT. *Genesis. The Story of Apollo 8: The First Manned Flight to Another World.* New York: Four Walls Eight Windows, 1998.

9 x 6 inches. Original cloth and boards, dust jacket.

SIGNED BY JAMES LOVELL, FRANK BORMAN AND BILL ANDERS.

\$1,200 - 1,800

201

THE APOLLO 9 CREW – FIRST MEN TO FLY THE LUNAR MODULE.

Color photolithograph, 8 by 10 inches, of the Apollo 9 crew in white space suits with their Apollo Saturn V launch vehicle in the background.

SIGNED by JAMES MCDIVITT, DAVE SCOTT, and RUSTY SCHWEICKART.

\$400 - 600

202

APOLLO 9- THE PLAN FOR THE FIRST MANNED LM FLIGHT. SIGNED BY THE CREW.

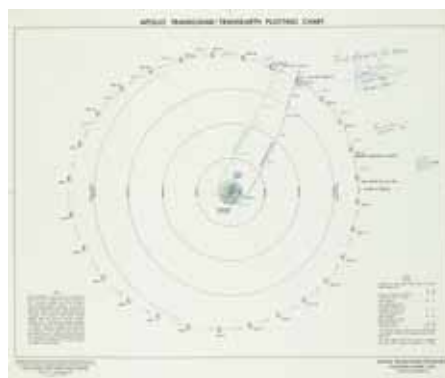
Final Apollo 9 Flight Plan, AS-504/CSM-104/LM-3. Houston, TX: NASA/ MSC, February 3, 1969.

8 by 10½ inches. Approximately 380 pp. Folding Summary Flight Plan with Apollo 9 insignia. Light blue card stock covers, punch and stapled at spine.

SIGNED BY DAVE SCOTT, JAMES MCDIVITT, AND RUSTY SCHWEICKART on upper cover.

The step-by-step timeline for the road-test of the first lunar module flight. Divided into six sections, it gives a general flight plan description, covers the numerous updates to the CSM and LM, gives a detailed timeline as well as detailed test objective activities, and includes both a communications plan and a consumables analysis.

\$1,200 - 1,400



199



200



201



202



205



205 (detail)



203

203
APOLLO 9 CIRCULAR STAR CHART—
SIGNED BY MCDIVITT.

Durable plastic circular star chart printed on both sides, 9½ inches in diameter, number "SKB 32100056-201 SIN 1005". Manuscript notations in Mcdivitt's hand adding the location of Jupiter to one side, and the locations of Jupiter, Saturn, and Venus to the other.

SIGNED and INSCRIBED: "USED DURING TRAINING/ JIM MCDIVITT/ APOLLO 9 CDR." The chart was designed for NASA by the United States Air Force in 1967.

\$800 - 1,000

204
APOLLO 10 SATURN V FLIGHT MANUAL.
SIGNED BY CERNAN.

Saturn V Flight Manual. SA 505. MSFC-MAN-505. Huntsville, Alabama: NASA/MSFC, April 10, 1969. 8 by 10¾ inches. 250 pp. Cream card stock covers, punched. Light foxing to covers, small red mark to upper cover as well as an effaced ownership inscription. Round ink stamp "Received. April 14 1969" to upper cover.

SIGNED and INSCRIBED "GENE CERNAN/APOLLO X". The Saturn V flight manual is divided into 10 sections with two appendices. The first is a general description of the rocket, the second gives details on its performance, the third covers emergency detection and procedures, the fourth-sixth cover the S-IC, S-II and S-IVB stages, the seventh covers the instrument unit, the eighth the ground support interface, the ninth gives details on mission control monitoring, and the tenth section covers mission variables and constraints.

\$700 - 1,000

205
MASCOT OF THE APOLLO X LM CREW—
SIGNED.

Snoopy Astronaut doll, produced in China by Determined Distributions of San Francisco for United Feature Syndicate, 1969. Made from plastic and textile, 10 inches tall. With original red and blue distribution and display box.

Doll helmet back side is INSCRIBED and SIGNED: "Snoopy LM-4, GENE CERNAN, Apollo X LMP"

The *Peanuts* comic strip character *Snoopy* in a space suit and helmet. *Snoopy* was adopted by NASA with the full blessing of creator Charles Shultz as the Manned Flight Awareness (MFA) Program mascot. The program used *Snoopy* as a "spokesperson" to emphasize such topics as flight safety and good quality control during spacecraft manufacturing.

The Apollo X LM crew of Stafford and Cernan named their Lunar Module *Snoopy* partly to bring greater recognition to the MFA program. Apollo X Command Module Pilot John Young named his spacecraft *Charlie Brown*.

\$1,500 - 2,500

206
SNOOPY COLLECTION INCLUDING POSTERS.

A collection of ten vintage decals ranging from 3 ½ to 4 inches in size. All feature *SNOOPY* wearing a space suit conveying messages about flight "SAFETY" or "TEAM" camaraderie. All were made by Vitachrome, Inc. of Rosemead, CA for NASA.

1. Three hexagon shaped decals with *Snoopy* riding a CSM and the printed signature of one astronaut, either Alan Shepard, Dave Scott, or Al Worden. Issued in 1971.
2. Two SMEAT (Skylab Medical Experiment Altitude Test) decals with the crew member names of this 56 day Skylab flight simulation during 1972 Skylab.
3. Zero in on Safety in '73 – three decals of a space walking *Snoopy* with the Skylab Space Station in the background and the printed signatures of one astronaut, either Charles Conrad, Joe Kerwin, or Gerry Carr.
4. Apollo Soyuz Space Teams featuring *Snoopy* and a Russian bear in space suit riding their respective spacecrafts.

Additionally two posters – *Snoopy Returns to Space*. 22 by 17 inches, featuring a space suited *Snoopy* riding on top of Space Shuttle *Columbia* with stars in the background. Issued prior to the first launch of the Space Shuttle in 1981. Priority One, Mission Success, A Team Effort. 34 by 22 inches. A space suited *Snoopy* uses a pointer to aim a Space Shuttle during launch to emphasize the importance of team effort.

\$200 - 300



207

207

**FASTEST FLOWN LARGE UNITED STATES FLAG CARRIED ON THE APOLLO 10 MISSION.
FLOWN INSIDE LUNAR MODULE SNOOPY.**

FLOWN United States flag, silk, 8 by 11 inches. Displayed above a Typed Signed Letter by THOMAS P. STAFFORD and autographed mission photograph. Matted and framed, 18 by 18 inches.

Accompanied by THOMAS P. STAFFORD'S signed provenance letter which reads: "The large United States flag displayed above was flown to the Moon on the Apollo 10 space mission during May 18 to 26, 1969. Apollo 10 was the first flight of the Lunar Module to orbit the Moon. I served as commander of this mission and carried this flag inside our Lunar Module which was code-named Snoopy. Gene Cernan and I tested all of Snoopy's flight systems including radar and guidance, descent and ascent engines as well as electrical and life support. The photograph to the right, which I have autographed, shows Snoopy returning from the 50,000 foot close approach of the lunar surface. This flag went along with us during that most important flight objective. Apollo 10 accomplished critical flight maneuvers that enabled Apollo 11 to make the first lunar landing just two months later on July 20, 1969.

Just prior to the beginning of the Apollo 10 reentry into the earth's atmosphere, John Young, Gene and I, along with this large United States flag, established the all-time record for the highest speed ever attained by man — 24,790 miles per hour. Therefore, this flag is one of the fastest flown space artifacts carried on our mission. This speed record will not be broken until an astronaut crew returns from Mars sometime during the 21st century."

\$12,000 - 18,000



208

208

STAFFORD'S FASTEST FLOWN BETA CLOTH EMBLEM CARRIED IN LUNAR MODULE SNOOPY.
 FLOWN on the Apollo X lunar flight, a crew Beta emblem approximately 9 inches square.

Accompanied by THOMAS P. STAFFORD'S signed provenance letter which reads: *"Enclosed with this letter is an Apollo X Beta cloth crew emblem flown on the flight of Apollo X during May 18 to 26, 1969. I was commander of this flight which carried the first lunar module named SNOOPY to lunar orbit.*

This Beta emblem was carried in SNOOPY as Gene Cernan and I descended to within 50,000 feet of the lunar surface. We perform all tasks needed for the next flight, Apollo 11, except the actual lunar landing. Gene and I proved that the planning teams had correctly established the procedures for lunar operations, with just a few exceptions that were later corrected for Apollo 11.

The beta emblem has the distinction of one of the fastest flown artifacts from space travel. During the Apollo X reentry, my fellow crew members, Gene Cernan and John Young, and I established the all-time record for the highest speed ever attained by man — 24,790 miles per hour. This speed record will not be broken until a crew of astronauts return from Mars sometime during the 21st century."

\$2,500 - 3,500



University of Cincinnati

Cincinnati, Ohio 45221

December 5, 1973

Brig. Gen. Thomas P. Stafford, USAF
Deputy Director (FCOD)
NASA Johnson Space Center
Houston, Texas 77058

Dear Tom:

I've been watching your progress in Russia by way of the news accounts, which indicate that you're making progress. I hope things are going as well as they seem.

Thanks so much for sending the book. Could you have your secretary forward me Georgi's address, please?

Jan joins me in sending our best to all the Staffords this holiday season.

Sincerely,

Neil A. Armstrong
Professor of
Aerospace Engineering

MAA/rb

209

209

NEIL ARMSTRONG LETTER TO GENERAL THOMAS STAFFORD.

ARMSTRONG, NEIL.

Typed Letter Signed ("Neil"), 1 p, 11 by 8 1/2 inches, University of Cincinnati, [December 5, 1973], to Brig. General Thomas P. Stafford, Deputy Director Flight Crew Operations Directorate (FCOD) at the NASA Johnson Space Center, Houston, Texas.

Reading in full: "Dear Tom, I've been watching your progress in Russia by way of the news accounts, which indicate that you're making progress. I hope things are going as well as they seem.

Thanks so much for sending the book. Could you have your secretary forward me Georgi's address, please?

Jan joins me in sending our best to all the Staffords this holiday season.

Neil A. Armstrong, Professor of Aerospace Engineering"

During this period in 1973, General Stafford was taking part in planning for his command the Apollo Soyuz Test Project (ASTP). That flight flew some 18 months later during July 1975.

\$3,000 - 5,000

APOLLO 11

MICHAEL COLLINS (b. 1930) was an Air Force test pilot who was selected as part of the third group of fourteen astronauts in 1963. He is one of only 24 people to have gone to the Moon, and has flown in space twice. His first flight was in *Gemini 10*, in which Collins undertook two EVAs. He was then the Command Module pilot for *Apollo 11*, orbiting the Moon while Armstrong and Aldrin made the first lunar landing. He retired from NASA in 1970, taking a job first as the Assistant Secretary for Public Affairs with the Department of State before becoming the director of the National Air and Space Museum, a position he held for 8 years. He then became undersecretary of the Smithsonian Institution, which he left after two years to become Vice President of LTV Aerospace, before eventually starting his own business.

210

COLLINS' FLOWN CREW-SIGNED APOLLO 11 EMBLEM. A RARE FLOWN ARMSTRONG-SIGNED MISSION ARTIFACT.

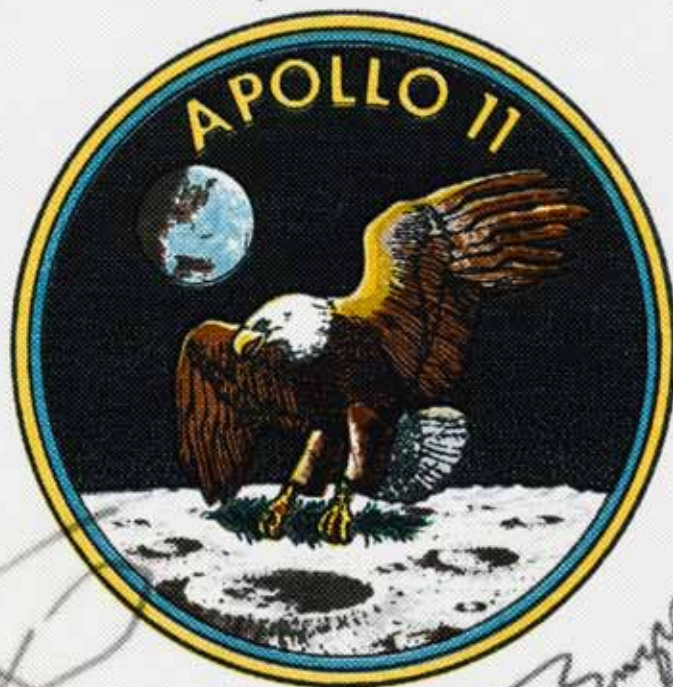
Flown Apollo 11 crew mission emblem, 3½ inches in diameter, printed on Beta cloth, 6 inches square.

Flown on Apollo 11 and into lunar orbit. SIGNED by the Apollo 11 crew: NEIL ARMSTRONG, MICHAEL COLLINS, and BUZZ ALDRIN. Additionally inscribed by Collins above the emblem: *"Carried to the moon aboard Apollo XI, July 1969."* This is the emblem that was worn on all the Apollo 11 crew members' space suits — an eagle flying above the surface of the moon carrying an olive branch.

With MICHAEL COLLINS' manuscript provenance note reading: *"I certify that the enclosed crew-signed Beta cloth patch was flown to the moon aboard Apollo XI in July 1969, and has been in my possession ever since. Michael Collins, CMP. February 15, 2014."*

\$40,000 - 60,000

*Carried to the Moon aboard Apollo XI
July 1969*



Michael Collins

Edgar S. Snodgrass

210 (actual size)

The following six lots were originally from the collection of Astronaut Buzz Aldrin.

211

UNITED STATES FLAG CARRIED BY BUZZ ALDRIN ON APOLLO 11.

FLOWN United States Flag, made of silk, 4 by 6 inches. Mounted on a color 12 by 10 inch NASA certificate which reads: *"This flag traveled to the Moon with Apollo 11, the first manned lunar landing, July 20, 1969. APOLLO 11, July 16 – 24, 1969, ARMSTRONG – ALDRIN – COLLINS."* The bottom edge has the first words by Neil Armstrong after stepping on the Moon: *"One small step for a man, one giant leap for mankind."* The Apollo 11 crew emblem is surrounded by printed signatures of the crew. Matted and framed, 17 by 15 inches. With a Typed Letter Signed by BUZZ ALDRIN.

BUZZ ALDRIN'S signed provenance letter reads: *"This United States flag was carried to the Moon during July 16 to 24, 1969 on the Apollo 11 mission. The flag was carried in the command module 'Columbia' and is approximately four by six inches in size. The lunar module 'Eagle' with Neil Armstrong and myself aboard made the first lunar landing on July 20, 1969."*

It is mounted on an original NASA certificate with printed signatures of the Apollo 11 crew and reads: 'This flag traveled to the Moon with Apollo 11, the first lunar landing, July 20, 1969.' Our mission emblem of an eagle flying above the Moon is illustrated above Neil's first words after stepping onto the lunar surface of: "One Small Step For A Man, One Giant Leap For Mankind."

The flag has been in my private collection since our return from the Moon in July 1969."

\$20,000 - 30,000



THIS FLAG TRAVELED TO THE MOON WITH APOLLO 11, THE FIRST MANNED LUNAR LANDING, JULY 20, 1969

APOLLO 11

JULY 16 - 24, 1969

ARMSTRONG • COLLINS • ALDRIN



Neil Armstrong

Michael Collins

Buzz Aldrin

"ONE SMALL STEP FOR A MAN, ONE GIANT LEAP FOR MANKIND"

SUR-58

123:47
TIG-35

Don Helmets & Gloves
Attach Restraints
V48E

01 46 12012 DAP Config
PRO

06 47 10837 LM Wt
CSM Wt
PRO

GUID CONT - PGNS
MODE CONTROL (PGNS) - AUTO
V77E

P12E
06 33 124:22:00 TIG ASC
(124:23:21.3)
PRO

06 76 _____ VH Final
()
_____ H Dot Final
()
_____ Xrng
()
PRO

06 74 _____ TFI
_____ Yaw
_____ Pitch
ET - Set/Up

*232 R +00600 Ins Alt
*465 R +00320 Ins H Dot
*410 R +00000 Orb Ins

*547 R +0 Lunar Align Az
Correction
*623 + 0E +Z Along CSM Plane

LM-5

NOTES BY Buzz Aldrin WHILE ON THE MOON

Basic Date June 16, 1969
Changed June 25, 1969
"A"

212

212

FLOWN APOLLO 11 LUNAR SURFACE CHECKLIST SHEET HAVING ONE OF THE MOST EXTENSIVE SETS OF NOTATIONS MADE WHILE ON THE MOON.

BOTH SIDES HAVE CRITICAL DATA RECORDED ON THE MOON TO ENABLE ARMSTRONG AND ALDRIN TO LEAVE THE LUNAR SURFACE.

The pen used for these annotations engages the broken power breaker that activates their ascent rocket engine.

FLOWN Apollo 11 Lunar Surface Checklist, page SUR-58/SUR-59, a single sheet printed recto and verso. NASA/MSC, June 16, 1969, updated June 25, 1969. 5½ by 8 inches. Extensive annotations in ink by BUZZ ALDRIN. With a Typed Letter Signed by BUZZ ALDRIN.

BUZZ ALDRIN'S signed provenance letter reads: "Accompanying this letter is a sheet numbered SUR-58 and SUR-59 from the Apollo 11 LM Lunar Surface Checklist, Part No. SKB32100074-363, S/N 1001. The checklist was taken to the Moon on the flight of Apollo 11 during July 16 to 24, 1969. Then the entire checklist, including this sheet, was carried to the surface of the Moon in Lunar Module Eagle during the first lunar landing on July 20, 1969. This is one of the few sheets that actually has some mission notes made during our lunar surface stay. They were written just hours before leaving the Moon after history's first manned lunar surface exploration.

Side SUR-58 has the steps Neil Armstrong and I performed at 35 minutes before Lunar Module Eagle's liftoff from the Moon. We both put on our space suit helmets and gloves, then attached the cord-type restraints to our space suits. Mission Control sent us our current LM weight which I recorded as "10837" in the blank spot provided. We then received the updated TIG ASC or time for the LM Ascent Stage engine ignition of "124:22:00" in hours:minutes:seconds of Ground Elapsed Time. This was one of the most important event times recorded during our flight. Neil and I then completed the remaining step on side SUR-58.

SUP-59

123:53
TIC-30

*400 + 4E Lunar Align

CB(11) RCS SYS A: QUAD 4,3,2,1 TCA (4)-Close
STAB/CONT: AELD - Close

Prop Dec → EPS: INV 1 - Close
Hel Reg/clos → CB(16) RCS SYS B: QUAD 1,2,3,4 TCA (4)-Close
STAB/CONT: AELD - Close

Prop Disp → X POINTER SCALE (2) - HI MULT
Rate/Err Mon (2) - LDC RDR/CMPTTR
Eng Over/Logic close → ATT MON - PGNS
GUID CONT - PGNS
MODE SEL - AGS
RNG/ALT MON - ALT/ALT RT
RATE SCALE - 25"/SEC
ACA PROP (2) - ENABLE
ENG ARM - OFF
ATT/TRANSL - 4 JETS
BAL CPL - ON
ASC He REG 162 tb(2)-gray
ABORT - Reset
ABORT STAGE - Reset
ENGINE STOP (2) - Reset
PRPLNT TEMP/PRESS - ASC
HELIUM MON - ASC PRESS 1

SYS A&B QUAD 1,2,3,4 (8) tb-gray
SYS A&B ASC FEED 162 tb(4)-bp
SYS A&B MAIN SOV tb(2)-gray
CRSFD tb-bp
TEMP/PRESS MON - OXID MANF
GLYCOL - PUMP 1
SUIT FAN - 1
O2/H2O QTY MON - ASC 1
ATTITUDE MON - AGS
RADAR TEST - OFF
RR MODE - ~~OFF~~ → SLEW
DEAD BAND - MIN
ATTITUDE CONTROL (3) - MODE CONT
MODE CONTROL (Both) - AUTO
TEMP MONITOR - RNDZ RDR
RCS SYS A/B-2 QUAD 1,2,3,4 - AUTO

Basic Date June 16, 1969
Changed June 25, 1969 "A"

LM-5

NOTES BY MYSELF WHILE ON THE LUNAR SURFACE DURING APOLLO XI Buzz Aldrin

212 (reverse)

Side SUR-59 has a long list of steps we performed at 30 minutes before liftoff. At about 2.5 hours before liftoff, Mission Control send us additional steps I logged as: "Prop Dec ----> Hel Reg/close" and "Prop Disp ---->, Eng Over/Logic close." The first instruction was to close the propulsion helium regulator vent circuit breaker on panel 11. The second addition was to close the propellant display engine override logic circuit breaker on panel 16. These new settings allowed one last venting of the helium tank of the Descent Propulsion Section. The final note I made on this side was to set the Rendezvous Radar to the "SLEW" position and marked out the LGC or LM Guidance Computer setting.

A few hours earlier, after we returned to the LM interior once completing the first lunar moon walk, I noticed that the ascent engine arming breaker push/pull switch was broken. Apparently during movement wearing our large space suit "backpacks," either Neil or I bumped into this panel and broke off that particular switch. This switch was the direct means of arming our ascent engine which would allow us to leave the lunar surface. Mission Control verified that the switch was open, meaning that the engine was currently unarmed. If we could not get the engine armed, we would be stranded on the Moon. They advised us to leave the switch in the open position until the timeline called for it to be engaged. I started to think of ways to activate the switch if pushing it by hand failed. As it turned out, the very pen I used to record these notes was the perfect tool to engage this circuit breaker.

This sheet has been in my private collection since 1969. I have written on side SUR-58: "Notes by Buzz Aldrin while on the Moon." On side SUR-59, I have written: "Notes by myself while on the lunar surface during Apollo XI" and signed it along the right side of that page."

\$35,000 - 45,000

CARRIED TO THE MOON ON APOLLO XI *T. Buzz Aldrin*

MCC-H

FLIGHT PLAN

NOTES

1530 EDT
150:00



MNVR TO BURN ATT ✓

SXT STAR CK 07 ✓

EMS ΔV TEST ✓ -20.2

SM RCS MON CK ✓

GDC ALIGN TO IMU ✓

MCC5 ΔV=NOMINALLY ZERO 4.6 ✓

SM RCS MON CK ✓

SPS MON CK

V66-TRANS CSM STATE VECTOR TO LM SLOT ✓

BURN STATUS REPORT ✓

BATTERY CHARGE, BATTERY A

PTC ESTABLISHED IN
G & N P, Y +30° DB
R RATE OF 0.3/SEC

BURN STATUS REPORT

X	X		•	•	ΔTIG
X	X		•	•	BT
					V _{gx}
X	X	X			R
X	X	X			P
X	X	X			Y
+			•	0	V _{gx}
+			•	2	V _{gy}
+			•	1	V _{gz}
+			•	2	ΔV _c
X	X	X			FUEL
X	X	X			OX
X	X	X			UNBAL

START PTC
P 270° Y 0

PTC

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	150:00 - 151:00	7/TEC	3-109

MSC Form 29 (May 69)

FLIGHT PLANNING BRANCH

from prev page.

213

APOLLO 11 FLIGHT PLAN SHEET CARRIED ON AND USED DURING THE MISSION.

EXTENSIVE NOTES MADE BY ARMSTRONG TO REFINE THEIR TRAJECTORY HOME.

FLOWN *Apollo 11 Flight Plan*, page 3-109/3-110, a single sheet printed recto and verso. NASA/ MSC, July 1, 1969. 8 by 10½ inches. Extensive notations and checks by NEIL ARMSTRONG. With a Typed Letter Signed by BUZZ ALDRIN.

During this period of the mission, Neil Armstrong and the Apollo 11 crew were placing Command/ Service Module Columbia into the proper attitude to perform the MCC-5 spacecraft burn.

BUZZ ALDRIN'S signed provenance letter reads: "Enclosed with this letter is a sheet numbered 3-109 and 3-110 from the *Apollo 11 Flight Plan*, Part No. SKB32100080-350, S/N 1001. It is part of the entire document that was carried to the Moon in Command Module Columbia on the first lunar landing mission during July 16 to 24, 1969. This sheet is from the detailed timeline section and covers from hour 150 to the beginning of hour 153 in the mission.

The previous day, July 21, Neil Armstrong and I had left the lunar surface after an approximately 22 hour stay and surface excursion. Once we completed rendezvous, we started preparations to return home to earth. Our Transearth Injection (TEI) engine burn had to work. If it did not, Neil, Michael Collins, and myself would remain in lunar orbit, never to return.

The TEI burn did work and we were able to get several hours rest afterwards. At about 147 hours into the mission, Mission Control gave us a wake-up call. After the post sleep activities, we prepared for the MCC5 (Mid Course Correction) burn number 5 to refine our trajectory back to earth. Mike Collins made the 4.8 second burn while Neil Armstrong recorded the information on

MCC-H

FLIGHT PLAN

NOTES

1630 EDT
151:00

:10
:20
:30
:40
:50
152:00
:10
:20
:30
:40
:50
153:00

M
S
F
N

FOV=3°
GET=152:00

PTC

P23-NO COMM, (5 SETS)
 TEI + 15:30 (152:00)
 DIPHDA (02), EFH
 DIPHDA (02), EFH
 NAVI (03), ENH
 MIRFAK (10), ENH
 ALDEBARAN (11), ENH
 Y67 R₁ + 30000
 R₂ + 00004
 R₃ + 00003

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	151:00 - 153:00	7/TEC	3-110

MSC Form 20 (May 69) FLIGHT PLANNING BRANCH

213 (reverse)

page 3-109. Neil checked-off each step when completed prior to and after the burn. He logged the values of: "03, -20.2, 4.8" and wrote in the Burn Status Report box: "0, ?, PAD, .0, .2, .1, .2." The burn accomplished exactly what we and Mission Control wanted, a precise placement to our entry corridor into the earth's atmosphere. Neil's final note of "from prev page" relates to instructions for charging Columbia's battery "A."

Page 3-110 shows an illustration of what the earth looked like through our optical navigation equipment. This would help us during a realignment of the nav system after the MCC-5. The pace of events up to that time had been very rapid. During the period outlined on this sheet, we did have a chance to reflect on the accomplishments of the past few days – making the first lunar landing, the first lunar surface excursion, lift-off from the Moon, the lunar orbit rendezvous, and the start of our return home.

The flight plan was probably the single most important document related to the success of our mission. It provided a time schedule of crew activities and spacecraft maneuvers to accomplish the first lunar landing.

This page has been in my private collection since 1969. I have written on page 3-109: 'Carried to the Moon on Apollo XI' and signed it along the top of that page. I have also written on page 3-114: "Carried to the Moon on Apollo XI" and signed my name along the bottom of that page. Additionally, a copy of the flight plan cover is enclosed."

\$30,000 - 40,000



214

214

APOLLO 11 CREW SIGNED POSTAL COVER - LIFE INSURANCE FOR THE FAMILIES.

ONE OF THE FEW INSURANCE COVERS THAT BEAR MICHAEL COLLINS SIGNATURE IN BLACK INK.

Apollo 11 Life Insurance Cover measuring approximately 4 by 6 inches with a cachet featuring two astronauts exploring the lunar surface. Postmarked at Houston, Texas on the date of the Apollo 11 lunar landing and moon walk, July 20, 1969. Numbered on the verso by Aldrin with his identifier number "BA11." The envelope is displayed between paragraphs of a Typed Signed Letter by BUZZ ALDRIN.

SIGNED by NEIL ARMSTRONG, MICHAEL COLLINS, and BUZZ ALDRIN prior to their Apollo 11 lunar landing mission.

With BUZZ ALDRIN'S provenance letter which he describes the history of this cover: *"This Manned Spacecraft Center Stamp Club postal cover with a lunar exploration scene and a small Apollo 11 emblem is one of the "insurance covers" signed by the Apollo 11 crew prior to our launch in July 1969. Since we were unable to obtain adequate life insurance due to the high risk nature of being an astronaut, we signed this group of covers and evenly distributed them to our families for safe keeping while we performed our mission. If an unfortunate event prevented our safe return, the covers would have provided a limited financial means of support to our families.*

The cover displayed above has been in my private collection since 1969 and has the identifier of BA11 written on the reverse side. It was signed by the Apollo 11 crew—Neil Armstrong, Michael Collins, and myself prior to our launch. The cover was postmarked on the lunar landing day of Apollo 11 at Houston, Texas, on July 20, 1969. Just a few hours after landing, Neil Armstrong and I became the first humans to walk on another celestial body—the Moon."

\$8,000 - 12,000

215

ALDRIN'S CREW USED LAUNCH CHECK LIST TRAINING SHEET – LAUNCH TRAJECTORY.

HOW ARMSTRONG'S CREW RESPONDED TO DANGERS DURING THE SATURN V LAUNCH.

Apollo 11 Launch Operations Checklist, page L / 2-4A – 2-4B, a single sheet printed recto and verso. NASA/MS, June 26, 1969, revised July 5, 1969. 8 by 5½ inches. With a Typed Letter Signed by BUZZ ALDRIN.

BUZZ ALDRIN'S provenance letter reads in part: "Accompanying this letter is a page numbered 2-4A and 2-4B from the CSM 107 (Apollo 11) Launch Operations Checklist, SKB32100080-306... This section in particular was extensively used by Neil Armstrong and Michael Collins who sat in the left and center seats during the Saturn V launch phase. Neil had the command responsibility to initiate an abort if the launch profile deviated from the planned events outlined in this checklist.

The launch profile was the most intense training we as a crew performed together. The simulator teams would give us all types of warning messages and problems to solve during a simulated launch. The simulator was an excellent learning device and this checklist was an important tool to insure our correct performance. This training was a key step which enabled our flight to make the first manned lunar landing on July 20, 1969.

Side 2-4A has two tables listing the spacecraft guidance angles and our computer display for inertial velocity, altitude rate, and altitude during each 30 second interval of our Saturn V launch profile. Side 2-4B plots our altitude rate versus inertial velocity at potential abort periods.

I kept this checklist after our mission as a reminder of all the training that took place back in 1969...."

INSCRIBED and SIGNED: "Used in training for Apollo XI, BUZZ ALDRIN" on page 2-4A.

\$800 - 1,200

216

ALDRIN'S FLOWN APOLLO 11 COMMAND MODULE SKIN SEGMENT.

An approximately ¼ by ¼ inch foil segment mounted on a 3 by 8 inch Typed Note Signed by BUZZ ALDRIN. The material was used as a thermal layer on the very outer surface of Command Module Columbia and was exposed to the vacuum of space during the entire flight and almost 60 hours in lunar orbit.

BUZZ ALDRIN'S Typed Note Signed reads: "The segment placed here in Mylar insulation removed from Command Module Columbia after our return from the moon and the first lunar landing mission of Apollo XI – July 16 to 24, 1969. This flown segment is from my personal collection. BUZZ ALDRIN, Col USAF, (Ret.), Gemini XII Pilot, Apollo 11 Lunar Module Pilot."

\$700 - 900

217

APOLLO 11 FLOWN SPACE TREATY.

Originally from the personal collection of Command Module Pilot Michael Collins, a 5½ by 3¼ inch printed copy on parchment paper of the "Treaty of Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies."

This treaty, which forms the basis for international space law, was carried to the moon on the historic Apollo 11 mission by Michael Collins. Article 1 reads: "The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind." Included is certificate of authenticity signed by Collins.

\$3,000 - 5,000

Basic Date: June 26, 1969
 Chained: 7 5, 1969 REV 1

Time from Start counts, S.A.S., minutes	SC 107 pitch angle, N deg	BUZZ Analysis		
		Inertial velocity, ft/sec	Altitude rate, ft/sec	Altitude, ft
00:00,0	90	1340	0	0,0
00:30,0	86	1389	296	0,7
01:00,0	80	1845	830	3,4
01:30,0	48	3025	1486	9,1
02:00,0	33	3069	2193	18,1
02:30,0	38	6305	2378	26,0
02:40,0***	34	7869	2824	30,7
03:00,0	21	8020	3028	33,9
03:30,0	21	9264	2837	44,8
04:00,0	28	9835	2175	56,8
04:30,0	25	10484	1817	66,6
04:50,0	22	12232	1482	76,8
05:00,0	19	12083	1178	81,4
05:30,0	18	13040	908	88,6

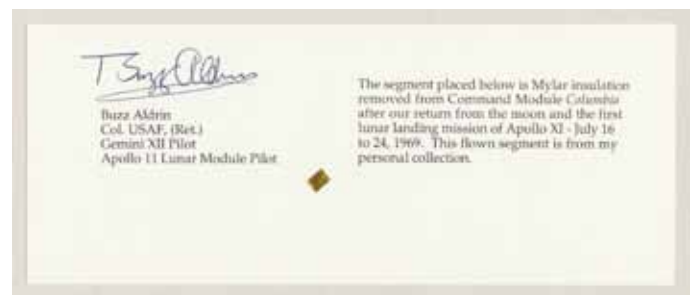
Time from Start counts, S.A.S., minutes	SC 107 pitch angle, N deg	BUZZ Analysis		
		Inertial velocity, ft/sec	Altitude rate, ft/sec	Altitude, ft
06:00,0	13	14154	672	90,3
06:30,0	10	15320	488	93,4
07:00,0	6	16677	330	95,5
07:30,0	3	18214	271	97,0
08:00,0	3	19714	234	98,3
08:30,0	359	20968	238	99,6
09:00,0	353	22233	249	100,8
09:11,4****	354	22747	270	101,3
09:30,0	350	22982	198	102,1
10:00,0	366	23370	104	102,9
10:30,0	363	24107	25	103,3
11:00,0	360	24711	-2	103,3
11:30,0	338	25343	-12	103,3
11:40,1*****	338	25582	0	103,3

*** SC 107 engine engine count (TTC)
 **** SC 107 engine engine count (TTC)
 ***** SC 107 engine engine count (TTC)

Used in training for Apollo XI
 Buzz Aldrin
 Listing of personnel and equipment.

LAUNCH TRAJECTORY

215



216



217



218



219



220

**218
FLOWN APOLLO 11 GOLD PLATED MANNED FLIGHT
AWARENESS MEDALLION.**

VERY RARE GOLD PLATED VIP EDITION.

Apollo 11 Manned Flight Awareness (MFA) Medallion, 1½ inches in diameter, metal plated in gold. The obverse features an astronaut standing on the lunar surface with the US flag, surrounded by the wording "The Eagle Has Landed, July 20, 1969." The reverse reads: "This medallion contains metal from spacecrafts Columbia and Eagle that took Astronauts Armstrong, Aldrin, and Collins on their historic Apollo 11 mission that resulted in the first landing of Man on the Moon."

\$800 - 1,200

**219
FLOWN APOLLO 11 HASSELBLAD FILM SEGMENT.**

70mm Hasselblad camera film segment, ¼ by ¼ inch, displayed on an 11 by 8½ inch certificate titled "APOLLO 11 FILM, A Small Part of History." The Apollo 11 emblem with printed signatures of the crew is at the bottom center.

The certificate reads in part: "The attached film was a part of the historic flight of Apollo 11 ... Film was placed in Lunar Module Eagle and accompanied Armstrong and Aldrin to the surface of moon at Tranquility Base. 107 photographs were taken on this film roll while on the surface of the moon." The certificate is signed by Richard W. Underwood, a Supervisory Aerospace Technologist at the Johnson Space Center.

\$700 - 1,000

**220
APOLLO 11 CREW PHOTO.**

Color photolithograph, 8 by 10 inches, of the Apollo 11 crew in their white space suits in front of a lunar backdrop, the crew's names with caption "Prime Crew of the Fifth Manned Apollo Mission" printed along bottom white margin. Matted and framed.

SIGNED BY NEIL ARMSTRONG, MICHAEL COLLINS, and BUZZ ALDRIN.
\$5,000 - 8,000

**221
APOLLO 11. SIGNED BY THE CREW.**

Print, 11 by 14 inches, featuring three separate images of Neil Armstrong, Michael Collins and Buzz Aldrin, as well as illustrations of an Apollo 11 astronaut patch, and the plaque that was left on the moon.

SIGNED BY NEIL ARMSTRONG, BUZZ ALDRIN AND MICHAEL COLLINS.
\$5,000 - 7,000

**222
NEIL ARMSTRONG ON THE MOON.**

Color photograph, 7¼ by 6¾ inches, mounted to board. Provenance: Lieutenant Col. Walter Pennino. Pennino (1915-1998) was the director of NASA's public relations program, and did the advance work for foreign goodwill tours made by astronauts.

SIGNED BY NEIL ARMSTRONG, MICHAEL COLLINS AND BUZZ ALDRIN, and inscribed on the mount: "To Walt Pennino, your 'advances' in support of, and your help in crunches are greatly appreciated. Long have we toured. Long may we tour. The Apollo 11 Crew."
\$5,000 - 8,000



Plaque left on the Moon, July 20, 1969



Apollo 11 Astronaut Patch



Astronaut Neil A. Armstrong, Commander, Apollo 11



Astronaut Michael Collins, Command Module Pilot, Apollo 11

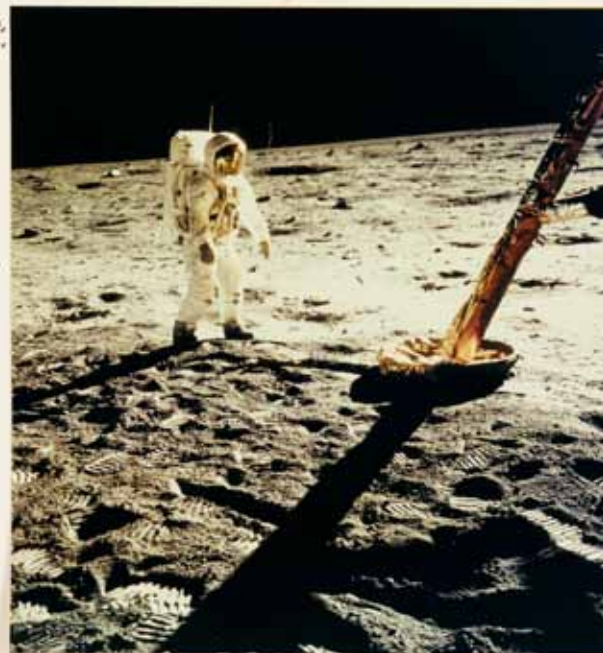


Astronaut Edwin E. Aldrin, Jr., Lunar Module Pilot, Apollo 11

National Aeronautics and Space Administration

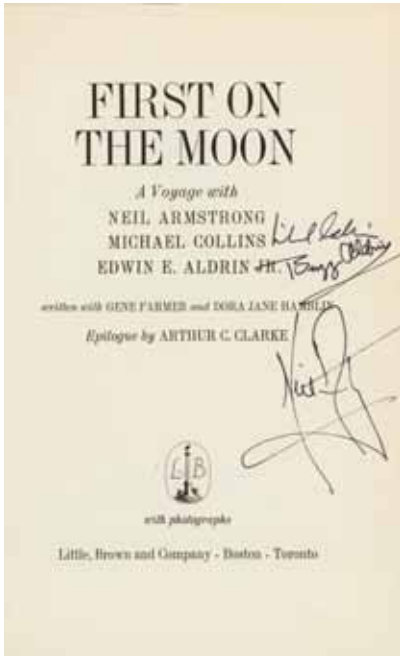
221

TO WALT BUNNING,
YOUR "ADVANCES"
IN SUPPORT OF
AND YOUR HELP
IN CRUNCHES
ARE GREATLY
APPRECIATED.
LONG HAVE
WE TOURED.
LONG MAY
WE TOUR.
THE Apollo 11
CREW.



Michael Collins
Edwin E. Aldrin, Jr.

222



223

223

APOLLO 11. CREW SIGNED.

First on the Moon. A Voyage with Neil Armstrong, Michael Collins, Edwin E. Aldrin, Jr. Boston: Little, Brown & Company, [1970].
Original stamped black cloth, dust jacket.
Provenance: From the collection of Walter Pennino.

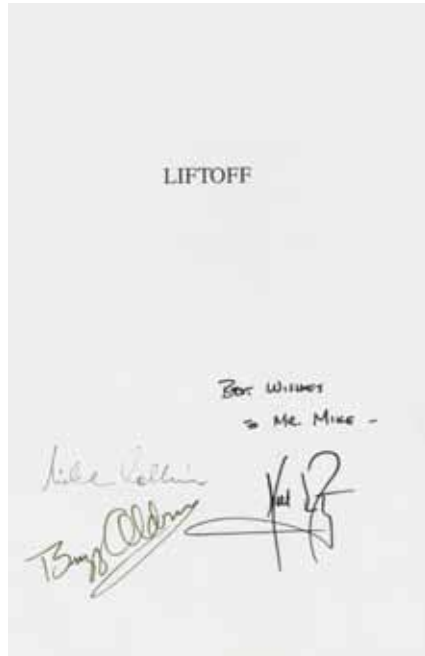
FIRST EDITION, SIGNED BY ARMSTRONG, ALDRIN & COLLINS ON TITLE.
\$2,500 - 3,500

224

APOLLO 11. SIGNED BY THE CREW.

COLLINS, MICHAEL. *Liftoff. The Story of America's Adventure in Space.*
New York: Grove Press, 1988.
10 by 7 inches. Original cloth and boards, dust-jacket.

FIRST EDITION, SIGNED BY BUZZ ALDRIN, MICHAEL COLLINS, AND SIGNED
AND INSCRIBED BY NEIL ARMSTRONG: "Best wishes. To Mr. Mike."
\$3,000 - 5,000



224



225

225

NEIL ARMSTRONG LETTER

ARMSTRONG, NEIL. Typed Letter Signed ("Neil"), 1 p, 11 by 8½ inches, Cardwell International Ltd, Office of the Chairman, Lebanon, Ohio, August 24, 1981, to Lieutenant Col. Walter Pennino, former director of NASA's public relations program.

Reading in full: "Dear Walt: Please forgive the delayed response to your letter. I have been traveling a good bit and am consequently behind in the correspondence department. Apparently the Percheron is more a bronc than a draft horse. I was sorry to hear of the accident and wish them well. It's difficult to be certain from the information you provided, but my immediate impression is that the participants are insufficiently qualified and experienced. I do believe that the concept is possible, but good people are mandatory. As I am deeply involved in my current associations, I cannot, as this time, visualize circumstances in which I would be available to consider Mr. Hannah's invitation. Janet joins me in sending our best. Sincerely, Neil A. Armstrong."

WITH: Copy correspondence from Pennino in which he discusses the impending launch schedule for the Percheron Project (a low cost commercial test vehicle funded by Space Services, Inc. whose first launch failed due to an on-pad explosion without lift-off). Pennino additionally relays a job offer as CEO of Space Services, Inc. to Armstrong.
\$1,200 - 1,800



226

226 NEIL ARMSTRONG LETTER

ARMSTRONG, NEIL. Typed Letter Signed ("Neil"), 1 p, 11 by 8½ inches, Lebanon, Ohio, May 4, 1987, to retired Lieutenant Col. Walter Pennino, former director of NASA's public relations program.

Reading in full: "Dear Walt, Thanks for the note. I have maintained a consistent policy over the years. I do not encourage nor prohibit the use of my name in public roads, buildings, etc. I will not participate personally, by phone, or correspondence in any program, ceremony, or fund raising activity of any institution that uses my name, and I would feel most uncomfortable in such a role. It's a policy that has served me well over the years and I intend to maintain it. All the best. Sincerely, Neil A. Armstrong."

After retiring from NASA and the US government, Pennino (1915-1998) ran his own PR firm in Virginia.

\$1,200 - 1,800



227

227 ARMSTRONG SIGNED PHOTOGRAPH.

NASA vintage color photograph, 7 by 9¼ inches, of Neil Armstrong in his white space suit. On original white mount. Framed to 11 by 14 inches. Provenance: From the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

SIGNED and INSCRIBED on mount: "TO DR. ANATOLE FOROSTENKO- WITH ALL GOOD WISHES- NEIL ARMSTRONG."

\$5,000 - 7,000



228

**228
ARMSTRONG STEPS DOWN TO THE MOON.**

Vintage NASA color photograph, 10 by 8 inches, of Neil Armstrong descending the ladder of the Lunar Module to step onto the lunar surface.

SIGNED BY NEIL ARMSTRONG.
\$6,000 - 8,000

**229
APOLLO 11 - EAGLE OVER THE MOON. SIGNED BY COLLINS AND ALDRIN.**

Color photograph, 16 by 20 inches, of the ascent stage of lunar module *Eagle* flying over the lunar surface with an earthrise in the background.

SIGNED BY MICHAEL COLLINS AND BUZZ ALDRIN.
\$1,500 - 2,500

**230
TRANQUILITY BASE, JULY 20, 1969.**

Large color photograph, 16 by 20 inches, matted and framed.

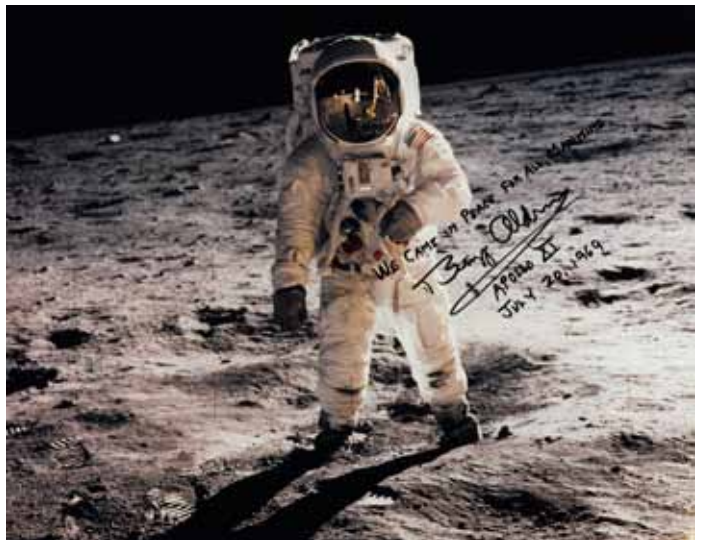
INSCRIBED and SIGNED: *"We came in peace for all mankind, Buzz Aldrin, Apollo XII, July 20, 1969."* The Apollo Program's most iconic image, taken by Neil Armstrong: Buzz Aldrin standing on the Moon. Inscribed with the date of Man's first lunar landing and first step onto the lunar surface.
\$3,000 - 4,000

**230A
TRANQUILITY BASE, JULY 20, 1969.**

Color photograph, 13½ by 10½ inches, mounted on board.
Provenance: Lieutenant Col. Walter Pennino. Pennino (1915-1998) was the director of NASA's public relations program, and did the advance work for foreign goodwill tours made by astronauts.

INSCRIBED AND SIGNED on mount: *"To Walt and Martha. A proud moment for an American at Tranquility Base. With best wishes, Buzz Aldrin, Apollo 11."*

The Apollo Program's most iconic image, taken by Neil Armstrong: Buzz Aldrin standing on the Moon.
\$600 - 1,000



230

**231
THE APOLLO 11 MOON ROCKET STANDS READY TO SEND MEN TO THE FIRST LUNAR LANDING.**

Color photolithograph, 10 by 8 inches with NASA descriptive text along the lower border and on verso.

SIGNED by BUZZ ALDRIN with *"AS-506, Apollo XI"* added.

The Apollo Saturn 506 vehicle is seen at the Kennedy Space Center Launch Complex 39-A while undergoing final preparations to send the first men to a landing on the Moon.

\$700 - 900

**232
ALDRIN POSES FOR NEIL ARMSTRONG.**

Color photolithograph, 8 by 10 inches, with NASA descriptive text along the lower border and on verso.

SIGNED and INSCRIBED: *"BUZZ ALDRIN, Apollo XI LMP."*

The iconic image from the Apollo 11 flight, Buzz Aldrin pauses for Neil Armstrong's photograph.

\$800 - 1,200

**233
ALDRIN WITH THE STARS AND STRIPES ON THE LUNAR SURFACE.**

Color photolithograph, 8 by 10 inches, with NASA descriptive text along the border and on verso.

Boldly SIGNED and INSCRIBED: *"BUZZ ALDRIN, LMP."*

Aldrin stands with the United States flag. The most significant image from the lunar landing that symbolizes the accomplishment of John F. Kennedy's goal of landing a man on the moon.

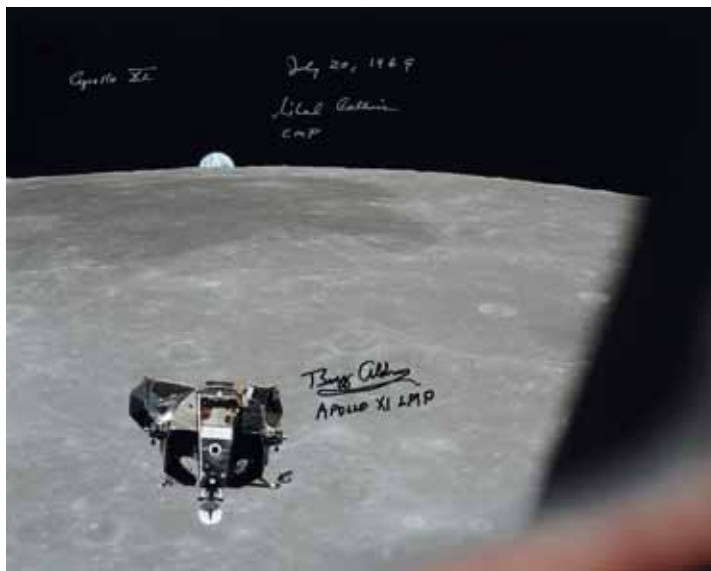
\$800 - 1,200

**234
ALDRIN SETS UP THE LUNAR EXPERIMENTS.**

Color photolithograph, 8 by 10 inches, with text along lower border.

SIGNED : *"BUZZ ALDRIN, Apollo XI LMP."*

Neil Armstrong photographs Buzz Aldrin during status checks of experiments he and Armstrong have just placed on the lunar surface.
\$800 - 1,200



229



230A



231



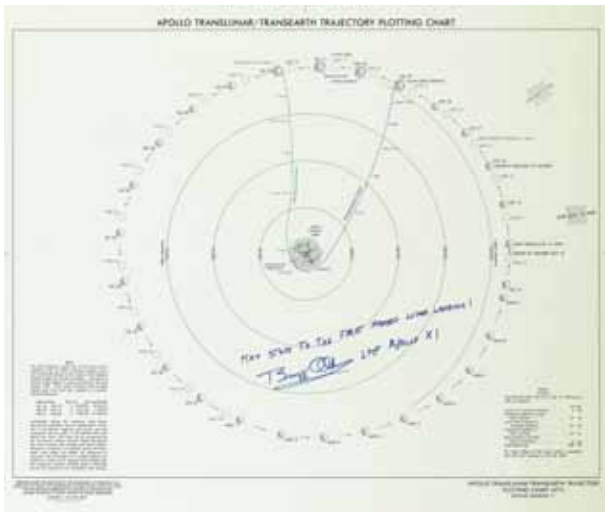
233



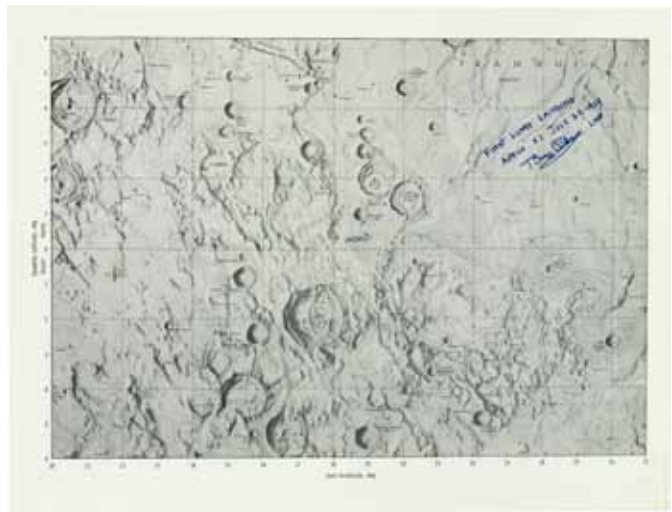
234



235 (part lot)



236



237

APOLLO 11 CHARTS.

All charts were made for NASA by Aeronautical Chart and Information Center (ACIC) of the United States Air Force (USAF), unless otherwise noted. These charts were designed for use by astronauts and flight planner/controllers for training and flight support use. Earth and lunar orbit charts have full 360 degree longitudinal coverage and latitude coverage from usually from 45 degrees north and south from the equator.

235

CHARTS TO BEGIN A JOURNEY TO THE MOON.

Apollo Earth Orbit Chart (AEO), Apollo 11 Mission... for July 1969 Launch Dates. Color Earth maps, 3 sheets. 13½ by 41½ inches each. Sheet 1 plots all of the first orbit, sheet 2 plots the second orbit and the nominal Translunar Injection (TLI) ground track, and sheet 3 plots the third orbit including the back-up TLI path.

Sheet one SIGNED by BUZZ ALDRIN with "LMP" added.

Sheet two INSCRIBED: "GO or NO GO?" by Aldrin.

Sheet three INSCRIBED and SIGNED: "GO for TLI, BUZZ ALDRIN."

A series of three earth charts plotting the launch and orbital path of Apollo 11 after lift-off from the Kennedy Space Center. Orbital paths on all three sheets illustrate the full launch direction azimuth from 72 (planned azimuth for an on time launch) to 108 degrees. Circular plots along the orbital ground tracks indicated communication tracking sites with red circles denoting tracking ships.

\$1,500 - 2,000

236

KEY STEPS FOR A LUNAR LANDING - SIGNED APOLLO 11 TRAJECTORY CHART.

Apollo Translunar / Transearth Trajectory Plotting Chart (ATT), Apollo Mission 11. June 23, 1969, 24 BY 20 inches.

BOLDLY INSCRIBED and SIGNED: "Key steps to the First Lunar Landing! BUZZ ALDRIN, LMP."

The chart is centered on a north polar view of the Earth and displays the July/August 1969 orbital path of the moon around the Earth. The Apollo 11 flight profile is plotted and events such as earth launch, translunar injection, lunar and earth coast phases, lunar orbit insertion, lunar landing - liftoff, and transearth injection are included.

\$2,000 - 3,000

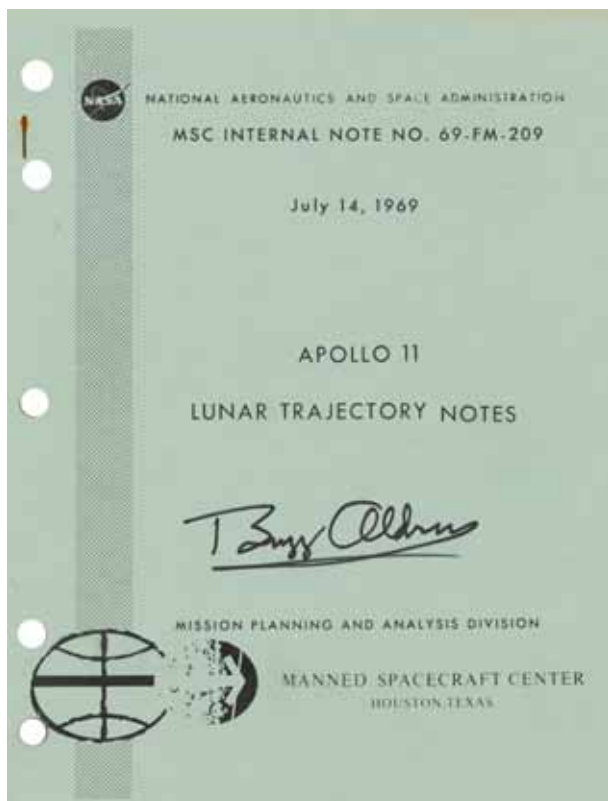
237

FIRST LUNAR LANDING CHART - SIGNED.

A chart of the Mare Tranquillitatis and surrounding areas, captioned "MSC - 6132 - 69." Lunar east longitude is marked in degrees from 10 to 27 along the bottom and latitude is marked from 0 to 6 degrees north and south.

INSCRIBED and SIGNED: "First Lunar Landing, Apollo XI, July 20, 1969, BUZZ ALDRIN, LMP." He has marked the Apollo 11 landing site with a large "X."

\$2,500 - 3,500



238



239

238

APOLLO 11 - LUNAR TRAJECTORY NOTES. SIGNED BY ALDRIN.

Apollo 11 Lunar Trajectory Notes. MSC Internal Note No. 69-FM-209.
Houston: NASA/Manned Spacecraft Flight Center, July 14, 1969.
8 by 10½ inches. 168 pp. Many folding charts and plans. Light green card stock covers, punched and stapled. Small touch of rust to upper cover from staple, a few small rust marks to lower cover.

SIGNED BY BUZZ ALDRIN on front cover. The Apollo 11 Lunar Trajectory Notes were designed to "to provide the layman with general information about the design of lunar trajectories and specific information about the Apollo 11 mission." This document contains several illustrations that detail many interesting mission milestones including lunar orbit rendezvous, lunar ground tracks, LM powered descent and ascent profiles depicted in foldout diagrams, detailed times for all major mission events, and much more including abort modes, free return trajectories and trans-lunar injection.

\$800 - 1,000

239

CBS TELEVISION COVERS THE FIRST LUNAR LANDING.

Byrne, James, ed., and the staff at CBS News.
10:56:20 PM EDT 7/20/69. Columbia Broadcasting System, 1970. 169 pp. 11 by 10 inches. Original cloth with special multiple embossed crater dust jacket.

A special CBS News publication that allows the reader to relive their extensive television coverage of the historic first moon landing. Launch day through splashdown are covered with a narrative that includes direct transcripts from the reporting correspondents. The center section of the book has a pictorial essay, consisting of a series of small color television screens placed on 48 special color plates. Wally Schirra began his co-anchor career with Walter Cronkite during this mission and there are numerous small TV images of their reporting. Astronaut and other guests during the coverage include William Anders, Frank Borman, Tom Stafford, Arthur C. Clarke, Ray Bradbury, Keir Dullea, Robert Heinlein, Leo Krupp, Sir Bernard Lovell, William Pickering, and Orson Welles.

SIGNED and INSCRIBED: "WALLY SCHIRRA, *Apollo 7, CBS Co-anchor with Walter*" (Cronkite).

SIGNED and INSCRIBED: "BUZZ ALDRIN, *Apollo XI.*" Both on the title page.
\$2,000 - 3,000



Photograph taken on the occasion of the third casting of this boot, also November of 1969.

240

ALDRIN'S MOON BOOT.

NUMBER TWO OF ONLY THREE KNOWN CASTINGS OF BUZZ ALDRIN'S MOON BOOT. Plaster casting painted green and brown. 22 by 17 by 2 inches. Aldrin's signature cast in plaster, "Second Casting of Moon Boot Print. Nov. 1969" in pen presumably in the artist's hand.
Provenance: Jo Mead, by descent to the present owners.

Cast by Chicago artist Jo Mead, the first was done for the Smithsonian, and the third for the Illinois Masonic Medical Center. Signed # 2 November, 1969. Cast by Chicago artist Jo Mead.

\$20,000 - 30,000



240

APOLLO 12 THROUGH 17

The following lot was originally from the collection of Apollo 12 Commander Charles "Pete" Conrad.

241

CONRAD'S LUNAR MODULE STOWAGE STRAP EMBEDDED WITH LUNAR DUST.

OVER 31 HOURS ON THE LUNAR SURFACE.

FLOWN Apollo XII Lunar Module (LM) Interim Stowage Strap. Brown teflon fabric with two sets of snap buttons and two velcro hook patches. 10 inches long and $\frac{3}{4}$ inch wide. A beta cloth identification label reads: "PIN (part number) SEB 33100015-302, S/N (serial number) 1138." With a Manuscript Card Signed by CHARLES CONRAD.

CHARLES CONRAD'S signed provenance manuscript note reads: *"This 'Interim Stowage Strap,' Part Number SEB 33100015-302, Serial Number 1138 was flown to the lunar aboard the Lunar Module Intrepid during the flight of Apollo XII. It was used to secure lunar exploration equipment and logged over 31 hours on the moon's surface during November 19 – 20, 1969. The strap is listed on page 63 of the Apollo XII stowage list. It has been in my personal collection since I returned from the moon."*

After Apollo XII's Lunar Module *Intrepid* landed on the Moon, astronauts Conrad and Bean conducted two extensive surface explorations. Spending over 8 hours out on the surface, they accumulated a large amount of lunar dust on their space suits and flight equipment. During their 31-hour surface stay, this strap was exposed to lunar dust when handled by the LM crew inside *Intrepid*.

A copy of page 63 from the Apollo XII stowage list is included, together with a typed analysis of the embedded lunar material, being written on Conrad's personal stationery.

\$25,000 - 35,000

CHARLES CONRAD, JR.

THIS "INTERIM STOWAGE STRAP", PART NUMBER SEB
33100015-302, SERIAL NUMBER 1138 WAS FLOWN
TO THE LUNAR ABORD THE LUNAR MODULE INTREPID
DURING THE FLIGHT OF APOLLO XII. IT WAS USED
TO SECURE LUNAR EXPLORATION EQUIPMENT AND
LOGGED OVER 31 HOURS ON THE MOON'S SURFACE
DURING NOVEMBER 19-20, 1969. THE STRAP IS
LISTED ON PAGE 63 OF THE APOLLO XII STOWAGE
LIST. IT HAS BEEN IN MY PERSONAL COLLECTION
SINCE I RETURNED FROM THE MOON.

Charles Conrad, Jr.
COMMANDER, APOLLO XII





*This flag was carried to the
moon by the crew of Apollo 12*

November 19, 1969

Ocean of Storms



242

242

UNITED STATES FLAG CARRIED TO THE MOON ON APOLLO 12.

CERTIFICATE SIGNED BY THE ENTIRE APOLLO 12 CREW.

FLOWN United States flag, made of silk, 4 by 6 inches. Mounted on a 12 by 9 inch NASA certificate which reads: "This flag was carried to the moon by the crew of Apollo 12, November 19, 1969, Ocean of Storms."

The certificate is SIGNED by CHARLES CONRAD, RICHARD GORDON, and ALAN BEAN.

The bottom of the certificate bears a 2 ½ inch by 3 inch metal replica of the plaque on the forward landing leg of Lunar Module *Intrepid* which landed on November 19, 1969.

\$8,000 - 12,000

243

SPACE SUIT OXYGEN HOSE SEGMENTS FLOWN AND USED DURING APOLLO XII.

Flown to the Moon on Apollo XII. Two samples, approximately ¼ inch and a 1 ½ inch curved section of one the Apollo XII space suit oxygen hose assemblies. Both are mounted onto an 11 by 8 inch display certificate with a color image of the Apollo XII crew. There are multiple captioned illustrations of how the oxygen hose assembly was used during the mission. Sample number 707 of 1500. With copies of NASA/MSM transfer papers to the Smithsonian's National Air and Space Museum (NASM) and NASM deaccession papers.

The certificate reads in part: "The attached material is a section of the Apollo Space Suit Oxygen Hose Assembly and was flown to the Moon on APOLLO XII during November 14-24, 1969. Apollo XII was the second of six successful lunar landing missions during the Apollo program. The hose material was constructed from a flexible silicone rubber material and supplied breathing oxygen to the Apollo XII crew members during the Saturn V launch and the command and lunar module docking phases. They were also available for space suit emergency support during the entire flight. While not connected to the space suits, the hoses provided a conduit of fresh air to the cabin. This material was in the command module Yankee Clipper and made 45 orbits of the Moon. After the Apollo XII mission, parts of the oxygen hose assemblies were analyzed. The hoses were cut into six inch segments, and some were then split in half. The attached materials are shavings from this procedure." See illustration overleaf.

\$400 - 600

244

LIGHTING DOES STRIKE THE SAME PLACE TWICE – AT THE APOLLO XII SATURN V.

CREW SIGNED APOLLO XII LAUNCH PHOTOGRAPH.

Color photograph, 10 by 8 inches, of the Apollo XII Saturn V launch during a rainstorm on November 14, 1969. The launch tower and spacecraft access arm are clearly visible surrounded by a dark angry sky.

INSCRIBED and SIGNED: "Apollo XII Launch! RICHARD GORDON, CMP." SIGNED and INSCRIBED: "CHARLES CONRAD, Apollo XII Cdr" and "ALAN BEAN, LMP."

Some 36 seconds after liftoff while passing through heavy cloud cover, the Saturn V triggered a lightning discharge emanating from the first stage and down to the ground. Then at 52 seconds, a second strike occurred. These events caused multiple spacecraft systems to go off-line and disrupt telemetry to Mission Control. A knowledgeable flight controller suggested flipping a rarely used control panel switch with the phrase "SCE (Signal Conditioning Equipment) to Aux" (the auxiliary position). Luckily, Alan Bean was familiar with the location, saving valuable seconds during the potential crisis. Various Command/Service Module systems had to be reset, but the Saturn V itself was unaffected and continued to power the crew into earth orbit.

\$1,000 - 1,500

245

"PETE" CONRAD'S ONE SMALL STEP – THE NEIL ARMSTRONG QUOTE BET.

Color photograph, 10 by 8 inches, of Apollo XII Commander Charles "Pete" Conrad as he begins his descent down the Lunar Module (LM) ladder to the lunar surface. Taken by Alan Bean while still inside the LM.

INSCRIBED and SIGNED: "Man, that may have been a small one for Neil but that's long one for me! CHARLES CONRAD, Cdr, Apollo XII," his first words as he stepped off the last rung of the LM ladder and onto the lunar surface.

Pete Conrad was only 5 feet 6 inches in height and the last rung of the LM ladder was some three feet above the surface. That always presented a challenge to Conrad during training. When Italian reporter Oriana Fallaci inquired if Armstrong's first words from the moon were a directive from NASA, Conrad emphatically told her certainly not. To prove it, Conrad bet Fallaci that he would say this humorous quote as his own first words to a live world-wide television audience. Pete Conrad won the bet! – but was never able to collect!

\$3,000 - 5,000



244



245



246



243

246

ALAN BEAN ON LUNAR SURFACE.

Large black and white photograph, 16 by 20 inches. Mounted on board.

Showing Alan Bean photographing the plus-y footpad of the Lunar Module, with the TV camera in the background, Pete Conrad's footsteps visible in the foreground.

SIGNED and INSCRIBED: "ALAN BEAN, APOLLO 12" and "MICHAEL GORDON, APOLLO XII CMP".

\$2,000 - 3,000

247

APOLLO 12- PLANS FOR MAN'S SECOND LUNAR LANDING. SIGNED BY BEAN.

Apollo 12 Flight Plan, Final AS-507/CSM-108/LM-6. Houston, TX: NASA/MSO, October 15, 1969.

8 by 10½ inches. Approximately 240 pages, with 4 fold-out sheets. Light blue card stock covers, punched and stapled at spine.

SIGNED BY ALAN BEAN. Includes: general flight plan notes including space suit wearing schedules, communications and power periods, photographic nomenclature, and various equipment operations schedules; mission objectives which are mainly focused on the lunar surface activities; mission timeline, including contingency plans in the case of trouble extracting the LM, docking issues, or the failure of the LM descent engine.

\$700 - 1,000



248

248

APOLLO 12- ASCENT MONITORING CHART. SIGNED BY BEAN.

8 by 29 inch chart consisting of four 8 by 6½ inch connected sections. From "Apollo 12 Lunar Landmark Maps (CSM)" training booklet. Punched at top.

SIGNED: "ALAN BEAN/ APOLLO 12 LMP". This chart identifies several lunar landmarks and mission control points, the pseudo landing sites, landing site 5, and Fra Mauro. The present map details the Lansberg crater, located on the *Mare Insularum*, located approximately 60 km away from the Apollo 12 landing site.

\$800 - 1,000



Fred W. Haise

May 15, 2007

The United States flag displayed below was carried around the moon on the flight of Apollo 13 during April 11 to 17, 1970. The flag was stowed in my Lunar Module Personal Preference Kit (PPK) and was scheduled to be taken to the lunar surface during third manned lunar landing. However, at about 56 hours into the mission, an oxygen tank explosion in our Service Module caused a major loss of electrical power to the Command Module. Jack Swigert first radioed: *OK, Houston, we've had a problem here.* Then Commander James Lovell clearly called Mission Control with: *Houston, we've had a problem!*



This event caused a scrub of the lunar landing and forced us to move into the Lunar Module in order to survive a four day journey around the moon and return back to earth. Countless individuals from NASA and our contractor teams worked around-the-clock to ensure our safe return.

The flag has been in my personal space artifact collection since 1970 which is now 37 years after the dramatic flight of Apollo 13. I have written "Flown around the moon on Apollo 13, Fred Haise, LMP" along the lowest white bar.

Sincerely,

Fred W. Haise
Apollo 13 Lunar Module Pilot

249

FRED HAISE (b. 1933). Fred Haise was a Marine Corps fighter pilot who joined NASA as a test pilot in 1959. He was part of the fifth group of astronauts selected by NASA in 1966. He was back-up Lunar Module Pilot (LMP) for Apollo 8 and Apollo 11. During April 1970, he flew as the LMP on the Apollo 13 mission which had to abort the planned third lunar landing due to an oxygen tank explosion in the Service Module. Mr. Haise then served as back-up Commander for Apollo 16 in 1972 and would have commanded Apollo 19 if that mission had not been cancelled due to funding constraints. During 1977, Fred Haise commanded five Space Shuttle Enterprise landing tests. He retired from NASA in 1979.

249

STARS AND STRIPES PLANNED BY FRED HAISE TO BE TAKEN TO THE LUNAR SURFACE ON APOLLO 13.

FLOWN United States flag, made from silk, 4 by 6 inches, inscribed on the lowest white bar with: "Flown around the moon on Apollo 13, Fred Haise, LMP." Displayed between paragraphs on a Typed Letter Signed by FRED HAISE.

FRED HAISE'S April 11, 2005 signed provenance letter reads in part: "The United States flag displayed below was carried around the moon on the flight of Apollo 13 during April 11 to 17, 1970. The flag was stowed in my Lunar Module Personal Preference Kit (PPK) and was scheduled to be taken to the lunar surface during the third manned lunar landing. However, at about 56 hours into the mission, an oxygen tank explosion

in our Service Module caused a major loss of electrical power to the Command Module. Jack Swigert first radioed: *OK, Houston, we've had a problem here.* Then Commander James Lovell clearly called Mission Control with: *"Houston, we've had a problem!"*

The event caused a scrub of the lunar landing and forced us to move into the Lunar Module in order to survive a four day journey around the moon and return back to earth. Countless individuals from NASA and our contractor teams worked around-the-clock to ensure our safe return."
\$15,000 - 20,000



250

250

FRED HAISE'S FLOWN APOLLO 13 BETA CLOTH EMBLEM - SIGNED.

FLOWN Apollo 13 Beta emblem, 4 inches in diameter. Printed on Beta cloth, 8 inches square.

INSCRIBED and SIGNED below the emblem: *"Flown to the Moon on Apollo 13, FRED HAISE, Apollo 13 LMP."*

The Apollo 13 astronauts had artist Lumen Winter create an emblem from an idea the crew had of the mythical god Apollo driving a horse drawn chariot across the sky dragging the sun behind him. Winter's design features three horses traveling from the earth to the moon, symbolizing the Apollo crew of three astronauts.

\$3,500 - 4,500

The following two lots were originally from the collection of Apollo 13 Lunar Module Pilot Fred Haise.

251

THE LAST CONTINGENCY TO RETURN HOME – A BURN OF THE LM'S ASCENT ENGINE.

THE DOCKED APS BURN STEPS.

FLOWN on Apollo 13, LM-7 Contingency Checklist, pp. 20 and 21.

A single sheet printed recto and verso. NASA/MSC January 6, 1970, updated February 9, 1970. 8 by 5 ½ inches. With a Typed Letter Signed by FRED HAISE.

Both sides have been INSCRIBED and SIGNED: *"Carried around the Moon! FRED HAISE, Apollo 13 LMP."*

The Apollo 13 crew lost the use of their primary rocket engine, the Service Module's (SM) Service Propulsion System (SPS), due to an oxygen tank explosion some 55 hours into the mission. This forced the crew to use their Lunar Module (LM) with its separate oxygen and power as a "life boat" to survive. They needed the LM's rocket engines to place them back onto a trajectory that would allow them to be in the precise place to safely enter the earth's atmosphere. The larger Descent Propulsion System (DPS), designed to land the LM on the Moon, had sufficient fuel to make the engine burns needed for the nearly 4 days to return to the earth. However, if the DPS failed or encountered problems, the only other large engine available was the Ascent Propulsion System (APS), originally designed to lift two lunar landing astronauts off the Moon. This sheet has the steps the crew needed to perform as a last hope procedure to return safely to the earth.

Consensus within the Astronaut Corps and mission controllers is that if indeed the APS was needed for the return home, it would have been the most demanding flight scenario ever undertaken during an Apollo mission.

FRED HAISE'S September 20, 2007 signed provenance letter reads in part: *"Accompany this letter is a sheet numbered 20 and 21 from the Apollo 13 LM-7 Contingency Checklist carried and used on the flight of Apollo 13 during April 11 to 17, 1970. Our flight was scheduled to be the third lunar landing mission but had to be aborted after a Service Module oxygen tank explosion. During this emergency, electrical power conservation was paramount in order for us to survive the amount of time required to return to the Earth. Commander Jim Lovell would have used this sheet to perform any LM Ascent Propulsion System burns to get our crippled CSM and docked LM back to Earth if our LM descent engine failed.*

The top of side 20 is labeled "DOCKED APS BURN" and would be used primarily for an abort during insertion into lunar orbit if our descent engine did not provide sufficient velocity to escape from the lunar gravity environment. The center of this side has an illustration of our FDI or Flight Director Attitude Indicator on the LM control panel. It also describes the flight method for "PITCH Error" then "ROLL Needle Left" with steps I should perform immediately after APS ignition. I made the additional notes in red ink of: "If rate & err needles moving in same direction in same quadrant."

The side numbered 21 has a series of steps including battery, circuit breaker, and switch settings. Various systems were set to "ON" or "OFF" with some "OPEN" or "CLOSED." The steps after "400+5" were to load and verify the actual burn values including time and attitude.

After the flight I wrote and signed side 20 and 21 in blue ink with: "Carried around the Moon! Fred Haise, Apollo 13 LMP." This sheet has been in my personal collection since 1970. It is a significant artifact from the Apollo 13 mission."

\$20,000 - 30,000

DOCKED APS BURN

If DPS Contains Insufficient ΔV To Complete A MODE II Abort, This Procedure May Be Entered Immediately Upon Termination of DPS Burn.

APS BURN TECH

- * If PITCH Error Needle Goes Down,
- * LMP Thrust Aft (Pull Out On TTCA).
- * If ROLL Needle Left, CDR Thrust
- * Right (Push Right ON TTCA).
- * See FDAI Picture Below.



- * When APS Ignition Occurs, LMP
- * Should Immediately Thrust Aft To
- * Maintain Control. Use Of PITCH
- * ATTITUDE CONTROL Switch To MODE
- * CONT Will Provide An Assist, IF

RATE & CDR NEEDLES MOVING IN SAME DIRECTION IN SAME QUADRANT

Basic Date 1/6/70
Changed

DOCKED APS BURN

LM-7

*Carried around the moon on Apollo 13
Fred Haise Apollo 13 LMP*

251

If Required:

- BAT 5,6 - ON, tb (2) - gray
- Verify BAT Current
- BAT 1,3 - OFF/RESET,
- tb (2) - bp

CB(11&16) STAB/CONT:AELD (2)-CLOSE
EPS:ASC ECA CONT (2) - CLOSE

HELIUM MON - ASC PRESS 1&2
PRPLNT TEMP/PRESS MON - ASC
ASC He REG 1&2, tb(2) - gray

MASTER ARM - ON
ASC He SEL - BOTH
He PRESS:ASC - FIRE
MASTER ARM - OFF

DES H2O - CLOSE
WATER TANK SEL - ASC
ASC H2O - OPEN
DES O2 - CLOSE
CABIN REPRESS - CLOSE
#1 ASC O2 - OPEN

Verify ASC BATS Have been On For 20 Min
BAT 2,4 - OFF/RESET, tb-bp
DES BATS - DEADFACE, tb-bp

400+5

V37E 30E
N33 TIG
PRO
N81 ΔV X, Y, Z
PRO
N42 Ha, Hp, ΔV
PRO
N45 M, TFI, MGA

SET EVNT THR
PRO

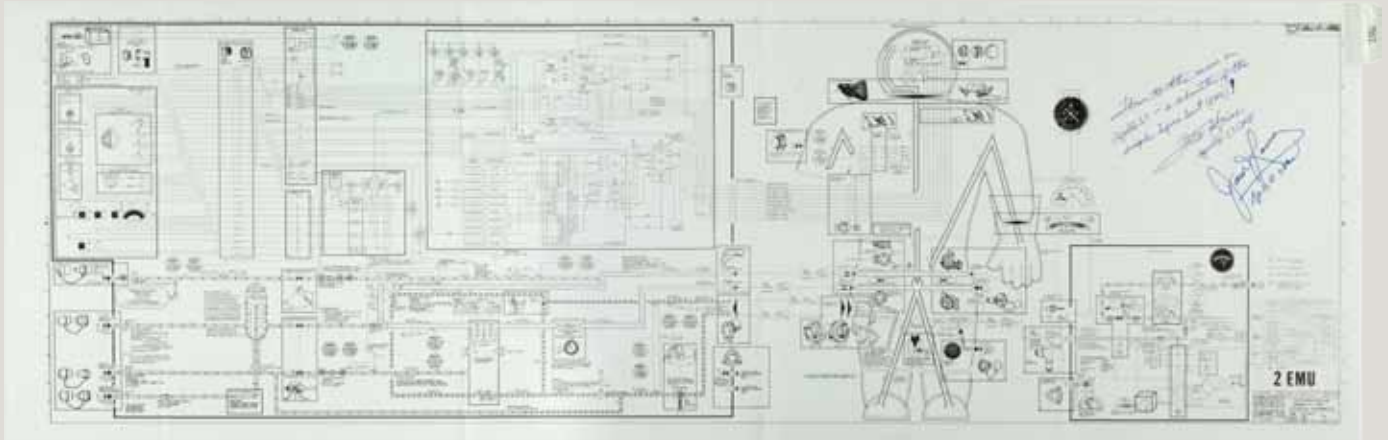
Basic Date 1/6/70
Changed 2/9/70

DOCKED APS BURN

LM-7

*Carried around the moon on Apollo 13!
Fred Haise
Apollo 13 LMP*

251 (reverse)



252

252

SPACE SUIT SCHEMATIC CARRIED ON APOLLO 13.

FLOWN *Extravehicular Mobility Unit Detailed Schematic*, 2 EMU, drawing from the Apollo 13 LM Systems Data Book. NASA/MS, April 1969. Single folded sheet, 10 1/2 by 36 inches, with an "EMU" tab.

INSCRIBED with a humorous comment and SIGNED: "*Flown to the moon on Apollo 13 - A schematic of the simple Space Suit (EMU)! FRED HAISE, Apollo 13 LMP.*"

SIGNED and INSCRIBED: "*JAMES LOVELL, Apollo 13 CDR.*"

This schematic carried on the flight of Apollo 13 is the one single item containing precise engineering information on the crew's space suits. An enlarged exaggerated outline of the space suit is shown with all subsystems that supply the power and life support functions. Labeled drawings include the helmet latching device, communications headset, ventilation diverter and pressure relief valves, oxygen and cooling water connectors, pressure gages, clip restraints, and the biomedical injection patch. Also shown are schematics of the Oxygen Purge System (OPS), extensive details of current flows for the astronaut biomed system, and components of the main oxygen and liquid cooling systems. Additionally, there is a full face drawing of an Omega Speedmaster wrist watch and relative suit placement.

The oxygen and cooling was provided to the Apollo space suit by Command or Lunar Module onboard systems if needed while worn inside these vehicles or with the Portable Life Support System (PLSS a.k.a. "backpack") while out of the lunar surface.

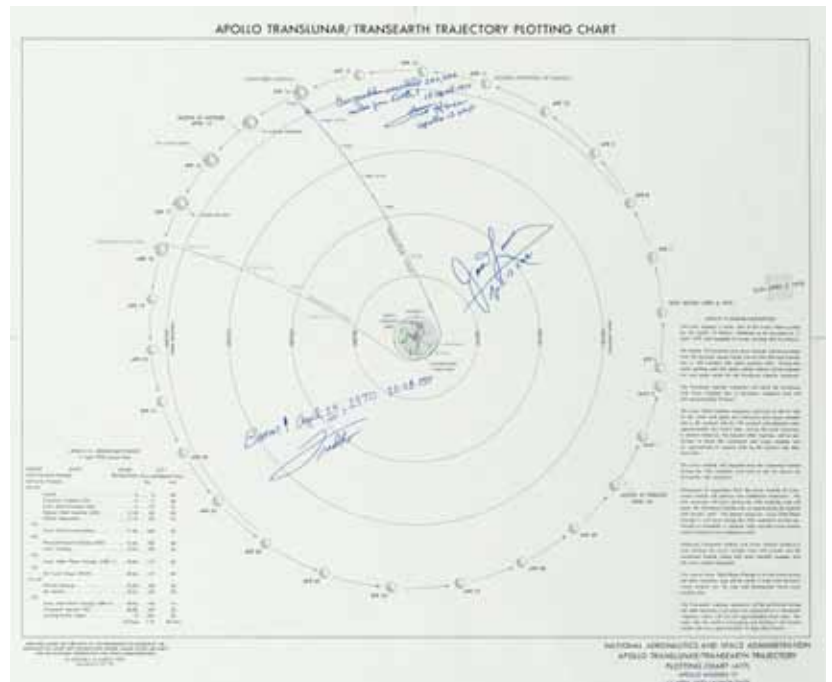
\$15,000 - 20,000



253



254



255

253
FLOWN FILM EQUIPMENT STOWAGE STRAP FROM APOLLO 13 – SIGNED.
 FLOWN A8 (AFT 8) Command Module equipment locker stowage strap. Made of heavy weave synthetics, 1 by 9 ¼ inches with a dual snap connector at one end. The woven material has a partly readable ID stamp of "V36 780023 51" plus one inspection stamp.

The strap has been SIGNED and INSCRIBED: "FRED HAISE, Apollo 13."

The A8 locker was mounted on the aft bulkhead of the Command Module below the crew couches. This particular strap came from the lower right-hand compartment and assisted securing 70mm Low Light Level Film Magazines and Crew Preference Kits (PPKs). The locker had three other storage areas with outer doors labels which included: "RETURN 70MM CAMERA, 70MM FILM MAG, LUNAR SURF CAMERA, 16MM MAG, TRANSFER BAG, DECONTAM BAG, ROCK SAMP CONTAINER, HEADSET, and EXERCISER." Included are copies of NASA transfer and Smithsonian Air and Space Museum deaccession papers plus an image of the actual flown A8 locker.
\$3,000 - 4,000

254
FLOWN AROUND THE MOON ABOARD APOLLO 13.
FLOWN SWATCH OF SEAT FABRIC FROM THE APOLLO 13 COMMAND MODULE.
 Armalon fabric swatch, 1 by 1 inches, mounted to a 4½ by 6½ inch certificate, certificate slightly toned within mat.

Mounted to certificate and SIGNED BY FRED HAISE, JIM LOVELL, AND JACK SWIGERT.

Armalon was a material that consisted of multiple layers of fiberglass Beta cloth which were impregnated and covered with Teflon. This material was used for the body support covering in the Apollo Command Module *Odyssey*, specifically the crew couches. The certificate reads in full: "Seat Fabric From APOLLO 13 Command Module 'ODYSSEY'. Launched April 11, 1970. Splashdown April 17, 1970. D. Llorente. Presented for your sustained excellent performance and vital personal involvement as a member of the Space Team. Our personal thanks for a job well done." A small handful of such presentations were given to the NASA contractor employees who worked around the clock to bring the Apollo 13 crew home safely. David Llorente was a lead thermal engineer for Rockwell on the Apollo Command Module program.
\$1,000 - 1,500

255
BOOM! APRIL 13, 1970 – NOT YOUR TYPICAL DAY IN SPACE.
Apollo Translunar / Transearth Trajectory Plotting Chart (ATT), Apollo Mission 13.
 Diagram in color with extensive annotations and astronaut signatures. First Edition, March 16, 1970. 24 by 20 inches.

INSCRIBED and SIGNED: "Our 'problem' occurred 200,000 miles from earth! 13 April 1970, FRED HAISE, Apollo 13 LMP." He has marked an "X" where the explosion occurred along the flight path and added: "Boom! April 13, 1970, 10:08 pm EST, Fredo" with the number 13 underlined to emphasize the coincidental numbering of the flight and date.

Additionally SIGNED and INSCRIBED: "JAMES LOVELL, Apollo 13 CDR."

A striking illustration of how far away from Earth the Apollo 13 spacecraft was when the Service Module's oxygen tank exploded. The complex steps of a lunar mission are illustrated from a north polar view. Earth launch, lunar and earth coast phases, lunar orbit insertion, lunar landing - liftoff, the transearth injection, and earth return are all dimensionally illustrated.
\$2,000 - 3,000



256



258



257



259

256
EX LUNA, SCIENTIA – FROM THE MOON, KNOWLEDGE – SIGNED POSTAL COVER.
SIGNATURES OF THE ORIGINAL APOLLO 13 CREW.
Postal envelope, 3 ½ by 6 ½ inches, with an Apollo 13 crew emblem cachet and images of the crew. Kennedy Space Center postmark dated April 11, 1970, the launch date of Apollo 13. The Latin phrase "Ex Luna, Scientia" is part of the crew emblem.

SIGNED by JAMES LOVELL, KEN MATTINGLY, and FRED W. HAISE.
\$2,000 - 3,000

257
THE LUNAR LIFEBOAT PRIOR TO LAUNCH – SIGNED.
Black and white photograph, 10 by 8 inches, blue NASA captions on verso.
INSCRIBED and SIGNED: "LM – 7 tests, FRED HAISE, Apollo 13 LMP."
LM – 7 was the 7th flight qualified Lunar Module built by the Grumman Engineering and Aircraft Corporation.

The Apollo 13 Lunar Module Ascent Stage under goes tests prior to launch at the Kennedy Space Center. This vehicle enabled the Apollo 13 crew to survive the long trip back to earth after the oxygen tank explosion.
\$300 - 400

258

SAFE RETURN, THE APOLLO 13 CREW GIVES THANKS – SIGNED.

Black and white photograph, 8 by 10 inches, blue NASA captions on verso.

SIGNED by JAMES LOVELL and FRED W. HAISE.

The Apollo 13 crew pause during a prayer given by *USS Iwo Jima* Chaplain R. E. Jerauld after their successfully recovery. The Apollo 13 crew struggled in space for 4 days after an oxygen tank explosion that forced cancellation of the planned third manned lunar landing.

\$500 - 700

259

ASTRONAUT SWIGERT NOW ELECTED TO CONGRESS, TYPED LETTER SIGNED.

JACK SWIGERT DIES BEFORE HE CAN TAKE OFFICE.

SWIGERT, JOHN LEONARD (JACK). Typed Letter Signed ("Jack"), 1p, 8 ½ by 5 ½ inches, JLS letterhead [November 1, 1982], to John L. Evangelisti of Dover, NJ.

Reading in full: "Dear John, I want to personally thank you for your continued support. Your generous contribution of \$1. has enabled us to buy the best television and radio time for the General Election. Your kindness and generosity to me and my campaign for Congress means so much to me and I am deeply grateful."

Jack Swigert won the 6th Congressional District in the fall 1982 election but suddenly died of cancer in December 1982, eight days before beginning his congressional term.

\$800 - 1,200

260

APOLLO 13. SIGNED BY LOVELL AND HAISE.

16 by 20 inch black and white photograph of the damaged Apollo 13 service module.

SIGNED and INSCRIBED: "HOUSTON, WE'VE HAD A PROBLEM! JAMES LOVELL. APOLLO 13" and "BANG - APRIL 13, 1970. FRED HAISE. APOLLO 13".
\$1,500 - 2,500

261

APOLLO 13 RECOVERY.

Large black and white photograph, 16 by 20 inches. Mounted on board.

Showing the famous Apollo 13 recovery scene, with the Navy Helicopter 66 of HS-4 hovering over the Apollo 13 command module *Odyssey* with the *USS Iwo Jima* in the background.

SIGNED: "FRED HAISE APOLLO 13 LMP."

\$1,500 - 2,500

262

APOLLO 13. SIGNED BY LOVELL.

Final Apollo 13 Flight Plan. AS-508/CSM-109/LM-7. Houston: NASA/ Manned Spacecraft Flight Center, March 16, 1970.

8 by 10½ inches. Over 280 pp. Pink card stock covers, punched, one staple at spine. Cover sheet separated at staple.

SIGNED AND INSCRIBED: "HOUSTON, WE'VE HAD A PROBLEM! JAMES LOVELL APOLLO 13 CDR".

The flight plan is divided into six sections covering general information, mission objectives, a detailed timeline, consumables, abbreviated timeline, and alternate missions. The detailed timeline is the most extensive section (over 190 pages) and lists activities in a column format for all three astronauts. Each page in this section usually details one hour of flight time, rest periods are usually 2 hours per page.

\$2,000 - 2,500



260



261



262

263

APOLLO 13 STOWAGE LIST.

Apollo Stowage List. Mission AS 508 CM 109/LM-7. Apollo 13. WITH: Apollo Stowage List Revision Notice. Houston: NASA Manned Spacecraft Center, April 7, 1970.

8 by 10½ inches. 134; 39, [3] pp. Cream card stock covers, stapled at upper left corner. Small tape repair at staple to front cover.

SIGNED AND INSCRIBED: "*JAMES LOVELL. APOLLO 13*" AND "*EUGENE KRANZ 'FLIGHT'*". Complete with the 39 page Stowage list revision notice. The Command Module/Lunar Module Stowage list was a detailed inventory of every single item that was to be on the Apollo 13 Command/Lunar Module, and included anything from gear such as harnesses, stowage bags, voice recorders, batteries and data cards, to food items and utensils.

\$700 - 1,000

264

APOLLO 13. SIGNED BY LOVELL AND HAISE.

Apollo 13 Mission Report. MSC-02680. Houston: NASA Manned Spacecraft Center, September 1970.

8 by 10½ inches. 168 pp. Stapled into yellow cardstock covers.

SIGNED and INSCRIBED "*FRED HAISE. APOLLO 13 LMP*" and "*JAMES LOVELL. APOLLO 13 CDR*". A complete report which details all aspects of the mission, including the mission objectives, details on the Command and Service Module performance, the Lunar Module performance, the Pilot's Report, and the Anomaly Summary.

\$700 - 900

265

APOLLO 13 FRA MAURO FOLDING CHART. SIGNED BY LOVELL.

10½ by 26½ inch, 1: 630,000 scale folding chart of Fra Mauro, dated April 11, 1970, punched at top. With a handful of notations in blue and red ink.

SIGNED: "*JAMES LOVELL/ APOLLO 13 CDR*". The mission objective of the ill-fated Apollo 13 mission was to explore the Fra Mauro formation, a highland area of the moon, names after the 80 kilometer diameter crater located within the area.

\$600 - 800

266

APOLLO 13 AND 14 LANDMARK MAPS. SIGNED BY LOVELL AND MITCHELL.

Together three landmark map sections:

1. APOLLO 13. "Landmark 13-3. 30° elevation. Simulated Oblique ACIC 2-28-70. 11 April 1970. Launch date". 8 by 10½ inch black & white map. SIGNED "*JAMES LOVELL/ APOLLO 13 CDR*".

2. APOLLO 14. "Landmark Targets 3 & 4. January 31, 1971." Printed November 19, 1971. 8 by 10½ inch black & white map. WITH: "Landmark Target 3. January 31, 1971. Ed. MSC-1". Scale 1: 1,250,000. 8 by 10½ inch black & white map. SIGNED: "*EDGAR MITCHELL/ APOLLO 14/ LMP*".

\$800 - 1,200

267

APOLLO 14- FINAL FLIGHT PLAN.

Apollo 14 (Jan 31, 1971) AS-509/CSM-110/LM-8 Final Flight Plan.

Houston, TX: NASA/MSC, December 2, 1970.

8½ by 11 inches. Approximately 350 pp. Light blue card stock covers, punched. housed in black vinyl binder.

SIGNED: "*EDGAR MITCHELL/APOLLO 14 ASTRONAUT*". The final flight plan for the Apollo 14 flight, which details all aspects of the mission, including the mission objectives, the Earth Orbit Phase, the Translunar Injection Phase, the Translunar Coast Phase, the Lunar Orbit/Descent Phase, the Lunar Surface Phase, the Rendezvous/TEI and the Entry Interface amongst other topics.

\$800 - 1,000

268

SHEPARD FLIES AGAIN, ALMOST A FULL 10 YEARS SINCE FREEDOM 7.

CREW SIGNED APOLLO 14 LAUNCH CLOSE-UP PHOTOGRAPH.

Black and white photograph, 10 by 8 inches, with printed NASA/Kennedy Space Center press release captions on verso. Shepard was reinstated to flight status after an operation corrected his inner ear disorder.

SIGNED BOLDLY by ALAN SHEPARD, STUART A. ROOSA, and EDGAR MITCHELL.

A remote sequence camera at the 360 foot launch tower takes this image of the Apollo 14 Saturn V rocket just after lift-off from the pad. Swing arms providing electrical and other connections to the Saturn V are seen moving away from the rocket as it begins to roar past the launch tower. Apollo 14's launch was delayed some 40 minutes to prevent another "lightning strike incident" like that of Apollo 12.

\$1,500 - 2,000

269

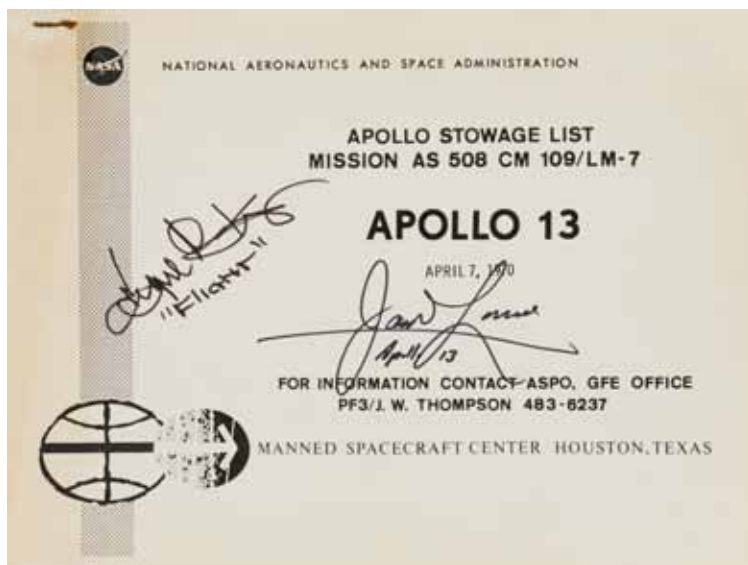
APOLLO 14 AND THE UNITED STATES FLAG ON THE MOON AT FRA MAURO.

Large color photograph, 16 by 20 inches.

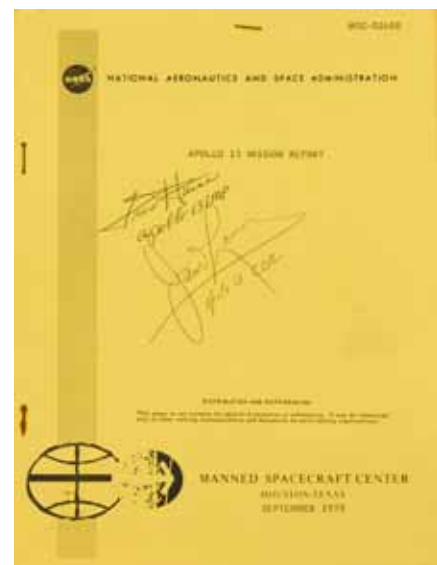
SIGNED and INSCRIBED: "*EDGAR MITCHELL, Apollo 14 LMP, Fra Mauro Base, Feb. 1971.*"

Astronaut Edgar Mitchell stands next to the United States flag on the lunar surface. Taken during the first lunar moon walk by Alan Shepard.

\$400 - 600



263



264



265



266 (part lot)



267



268



269



HIGH FLIGHT

NON-PROFIT ORGANIZATION

The United States flag displayed below was carried in Lunar Module *Falcon* down to the lunar surface during the flight of Apollo 15. My husband James Irwin with David Scott were the fourth Apollo crew to land on and explore the Moon's surface. The flag was on the lunar surface inside *Falcon* for over 67 hours between July 30 and August 2, 1971.



Included is a copy of the manuscript note written by Commander Dave Scott to Jim which reads in part: "8 Flags + 2 patches - 1/3 of those that reached Hadley (Delta)... Dave."

Sincerely,

Mrs. James B. (Mary) Irwin

6660 Delmonico Drive, Suite D444 • Colorado Springs, CO 80919 • 719-262-9393

270

JAMES IRWIN (1930-1991). Jim was born in Pittsburgh, Pennsylvania and lived in the area until age 10. In 1947, he graduated from East High School in Salt Lake City, Utah. He was accepted to the United States Naval Academy and graduated with a degree in Naval Science in 1951. He chose to enter the United States Air Force and became a test pilot and also earned a Master Degree in Aeronautical Engineering from the University of Michigan in 1957. Jim was selected as a NASA astronaut in 1966. In 1969 he served as a support crew member for Apollo 10, then back-up Lunar Module Pilot (LMP) for Apollo 12. Jim was selected to the prime crew for the fourth lunar landing mission and flew as LMP on the Apollo 15 mission during 1971, becoming the eighth man to walk on the moon.

270

JAMES IRWIN'S UNITED STATES FLAG TAKEN TO THE LUNAR SURFACE.
FLOWN United States flag, made from silk, 4 by 6 inches. Displayed between paragraphs on a Typed Letter Signed by MRS. JAMES B. IRWIN.

MRS. IRWIN's signed provenance letter reads: "The United States flag displayed below was carried in Lunar Module *Falcon* down to the lunar surface during the flight of Apollo 15. My husband James Irwin and David Scott were the fourth Apollo crew to land on and explore the Moon's surface. The flag was on the lunar surface inside *Falcon* for over 67 hours between July 30 and August 2, 1971.

Included is a copy of the manuscript note written by Commander Dave Scott to Jim which reads in part: "8 Flags + 2 patches - 1/3 of those that reached Hadley (Delta)... Dave."

\$8,000 - 12,000



271

271

JAMES IRWIN'S LARGE UNITED STATES FLAG CARRIED TO THE LUNAR SURFACE.

FLOWN United States flag, made from silk, 7½ by 11½ inches. Carried to the lunar surface during Apollo 15. With a Typed Letter Signed by MRS. JAMES B. IRWIN.

MRS. IRWIN's signed provenance letter reads: *"The large United States flag enclosed with this letter was flown to the surface of the moon during the Apollo 15 mission in 1971. It is one of the largest flags to make it down to the surface of the moon, being approximately 7½ by 11½ inches. It stayed over 66 hours on the moon between July 30 and August 2, 1971."*

My late husband, James Irwin with David Scott were the fourth Apollo crew to land on and explore the moon's surface. They were the first Apollo astronauts to make use of the Lunar Roving Vehicle and traveled some 17 miles during three separate EVAs or Extra Vehicular Activity, commonly known as "moonwalks."

Included is a copy of the manuscript note written by Commander Dave Scott to Jim which states: *'Jim: 8 Flags + 2 patches – 1/3 of those that reached Hadley (Delta) on 1 Aug. 71'.*

\$10,000 - 15,000



272

272

CARRIED AND USED ON THE LUNAR SURFACE BY JAMES IRWIN.

FLOWN Utility Towel Assembly. Medium size Beta Cloth bag, 6 by 8 inches having a zipper top and identification tag. With a Typed Letter Signed by MRS. JAMES B. IRWIN.

MRS. IRWIN's signed provenance letter dated 10 March 2007 reads: *"This Beta cloth Lunar Module Utility Towel Assembly was used by my late husband, Astronaut James Irwin, while he was on the Moon during the Apollo 15 mission. The bag has an identification label that reads: "LM Utility Towel Assy., Mfg. By: B. Welson Co., P/N: SEB4210080-202, S/N: 1123, Date of Mfg.: 2/19/68."*

The bag held cleaning towels for Jim's use while he was inside the Lunar Module. This piece of equipment spent over 66 hours on the lunar surface. Apollo 15 was launched on 26 July 1971 and returned to earth on 7 August 1971. It was the fourth lunar landing of the Apollo Program."

\$7,000 - 9,000

273

CHEWING GUM CARRIED TO THE LUNAR SURFACE ON APOLLO 15.
FLOWN packet of chewing gum contained in unopened clear plastic, approximately 1 inch square. With a Typed Letter Signed by MRS. JAMES B. IRWIN.

MRS. IRWIN's signed provenance letter reads: *"The gum packet displayed below was carried to the lunar surface on the flight of Apollo 15 by my late husband, Astronaut James Irwin. Jim and Dave Scott made three lunar surface explorations between July 31 and August 2, 1971. They used a lunar rover to explore some 17 miles of the moon's surface.*

This unused gum packet spent over 66 hours on the lunar surface. Apollo 15 was launched on 26 July 1971 and returned to earth on 7 August 1971. It was the fourth lunar landing of the Apollo Program."

\$2,500 - 3,500



273 (enlarged)

274

CASSETTE PLAYER EARPHONE ASSEMBLY FLOWN ON APOLLO 15.
USED IN COMMAND MODULE ENDEAVOR. FLOWN gray earphone device being 39 inches long with jack plug at the opposite end. With a Typed Letter Signed by MRS. JAMES B. IRWIN.

MRS. IRWIN's signed provenance letter reads: *"This earphone was carried and used by my late husband, Astronaut James Irwin during his flight to the moon – the Apollo 15 mission of July and August 1971. It was used in conjunction with an audio cassette player which played a selection of music tapes. Most of Jim's time during the flight was accounted for down to the second, but there were brief periods prior to or after planned sleep and/or during meal periods that would allow listening to tapes through this earphone inside Command Module Endeavor.*

Apollo 15 was launched on 26 July 1971 and returned to earth on 7 August 1971. It was the fourth lunar landing of the Apollo Program and the first used of the Lunar Roving Vehicle. Jim spent over 66 hours on the lunar surface and was the eighth man to set foot upon the moon."

\$2,000 - 3,000



274

275

USED BY JAMES IRWIN WHILE TRAVELING TO THE MOON – UTILITY TOWEL ASSEMBLY BAG.

FLOWN CM Utility Towel Assembly. Medium to large size Beta Cloth bag, 8 x 4¾ inches with zipper top and blue identification tag. With a Typed Letter Signed by MRS. JAMES B. IRWIN.

MRS. IRWIN's signed provenance letter reads: *"This Beta cloth was bag was carried on the flight of Apollo 15 and made over 70 orbits around the moon. The bag has an identification label that reads: "CM Utility Towel Assy., Mfg. By: B. Welson Co., PIN: SEB4210079-206, S/N: 1114, Date of Mfg.: 2/27/68.*

The bag held cleaning towels for Jim's use while he was inside the Command Module named Endeavor. Apollo 15 was launched on 26 July 1971 and returned to earth on 7 August 1971. It was the fourth lunar landing of the Apollo Program."

\$3,500 - 4,500



275



276 (actual size)

276

FLOWN APOLLO 15 ROBBINS MEDALLION SET IN A MULTI-DIAMOND PENDANT.

ONE OF ONLY 127 CARRIED ON THE MISSION. FLOWN Apollo 15 Robbins medallion made from sterling silver, 1¼ inches in diameter. The crew mission emblem is on the obverse with the mission dates on the reverse. Set within a pendant ornament marked 14k, which has 26 bead set diamonds weighing approximately 1.43 carat. Overall diameter is 1 7/8 inches. With a Typed Letter Signed by MRS. JAMES B. IRWIN and a copy of a jewelry appraisal written in 1980.

MRS. IRWIN'S signed provenance letter reads in part: *"The medallion set within the diamond pendant ornament was carried to the Moon during July 26 to August 7, 1971 on Apollo 15, which was the fourth manned lunar landing mission. The flight employed the first use of the Lunar Roving Vehicle on the Moon's surface. It was the first flight to make three separate surface explorations by my late husband Astronaut James Irwin and mission commander David Scott.*

There were only a total of 127 silver medallions carried on the flight. Due to a spelling error of the landing site name, 177 of the 304 medallions originally struck were returned to the Robbins Company to correct the error. Because of the length of this process, they could not be corrected prior to the Apollo 15 launch date and were not flown. The 127 medallions that were flown with the error contain the initials of the Apollo 15 mission emblem designer, Italian Emilio Pucci. His initials are just above the "R" in Worden's name.

This medallion has been in our private collection since 1971 and was set within the ornament that same year. The Apollo 15 mission emblem is on the front with the mission launch, lunar landing, and return dates engraved on the back. It is one of the Robbins series of flown Apollo medallions."

The jewelry appraisal done on March 12, 1980 values this Robbins medallion with diamond surround at \$4,350.00.

\$10,000 - 15,000



277 (actual size)

277

UNAUTHORIZED POSTAL ENVELOPE CARRIED TO THE LUNAR SURFACE ON APOLLO 15.

NEVER APPROVED BY NASA BEFORE THE FLIGHT.

FLOWN Apollo 15 postal cover, 3 ½ by 6 ½ inches, having a cachet of the Apollo 15 crew emblem, a CSM blazing ahead of a red, white, and blue contrail, and early Army Air Corps pilot wings with a dual blade propeller. Additionally, there are two postmarks, one from the Kennedy Space Center (KSC) dated July 26, 1971 (launch date) and the other from the U.S.S. Okinawa dated August 7, 1971 (splashdown and crew recovery date). The upper left-hand corner reads: "This envelope was carried to the moon aboard the Apollo 15. #22 of 400 to the lunar surface in L.M. Falcon."

A COMPLEX HISTORY AND PERHAPS MOST CONTROVERSIAL OF LUNAR SURFACE ARTIFACTS.

All personal flight crew items planned for flight on an Apollo mission were required to be submitted in writing for NASA approval. This envelope is one of the set not reported by Commander David Scott prior to the Apollo 15 mission. During the very early hours of July 26, 1971, this group of covers was postmarked with the Kennedy Space Center post office stamp cancelling machine, stored in a fire-retardant Beta cloth bag, then presented to Commander Scott. He stored the envelopes in one of his spacesuit pockets and carried them to the lunar surface. After recovery, the recently issued space theme "Decade of Achievement" dual 8-cent stamp was added and cancelled on the USS Okinawa.

Background: Sometime in 1970, a German stamp dealer named Herman Sieger made contract with David Scott through a third party. Sieger wanted around 100 envelopes to be carried to the lunar surface and

offered the three Apollo 15 crew members compensation to be held in a German savings account. The actual number of covers was increased to 400, with the crew keeping 298, less 2 that were damaged and not flown. Instructions were given to Sieger not to sell his 100 covers until after the end of the Apollo Program.

However, virtually all of those 100 covers were sold before the end of 1971. Around mid-summer 1972, this story came to the attention of the world press. A U.S. government investigation led to the confiscation of the remaining covers. NASA stated at the time: "The Apollo 15 crew exercised poor judgment in their actions. Therefore, Astronauts Scott, Worden and Irwin will be reprimanded and their actions given due consideration in their selection for future assignment."

In the early 1980's, Apollo 15 crew member Al Worden took the lead and got an out-of-court settlement from NASA for the return of the confiscated covers. Once returned, the Apollo 15 crew signed individual notarized affidavits dated 19 July 1983 certifying that each cover was flown to the lunar surface. The fact that the U.S. Postal Service had plans for NASA to carry over 200,000 special postal covers on a Space Shuttle flight during 1983 no doubt helped change the space agency's hard stance against the Apollo 15 crew.

Included with cover #22 is this affidavit SIGNED by ALFRED M. WORDEN, DAVID R. SCOTT, and JAMES B. IRWIN. The NASA confiscated serial number 079, noted on the affidavit, appears to recto of envelope.
\$6,000 - 8,000

St. Francis of Assisi.

Lord, make me a channel of thy peace,
that where there is hatred,
I may bring Love;
that where there is wrong,
I may bring Forgiveness;
that where there is discord,
I may bring Harmony;
that where there is error
I may bring Truth;
that where there is doubt,
I may bring Faith;
that where there is despair,
I may bring Hope;
that where there are shadows,
I may bring thy Light;
that where there is sadness,
I may bring Joy.
Lord, grant that I may seek rather
to comfort, than to be comforted,
To understand rather than to be understood,
To love, than to be loved;
For
It is by giving that one receives,
It is by self forgetting that one finds,
It is by forgiving that one is forgiven;
It is by dying that one awakens to Eternal Life



278 (reference photo for microfilm)

278

ST. FRANCIS OF ASSISI POEM CARRIED ON APOLLO 15 BY JAMES IRWIN.

FLOWN micro film being 1½ centimeters square in size, preserved in the original Microseal card with viewing window. With a Typed Letter Signed by MRS. JAMES B. IRWIN and the full size 4 by 5¼ inch matted poem which was photographed to make the micro film image.

MRS. IRWIN's signed provenance letter reads in part: "This St. Francis of Assisi poem was carried inside Command Module Endeavor by my late husband Astronaut James Irwin. It traveled to moon starting on July 26, 1971 and made over 70 lunar orbits. On August 7, 1971, the Apollo 15 crew returned to earth carrying this micro-film with them, all spending over 295 hours in space".

\$1,500 - 2,500



279 (reference photo for microfilm)



280

279

IRISH BLESSING CARRIED ON APOLLO 15 BY JAMES IRWIN.

FLOWN micro film being 1½ centimeters square in size, preserved in the original Microseal card with viewing window. With a Typed Letter Signed by MRS. JAMES B. IRWIN and the full size 5¼ by 4 inch matted poem which was photographed to make the micro film image.

MRS. IRWIN's signed provenance letter reads in part: "This Irish blessing was carried inside Command Module Endeavor by my late husband Astronaut James Irwin. It traveled to moon starting on July 26, 1971 and made over 70 lunar orbits. On August 7, 1971, the Apollo 15 crew returned to earth carrying this micro-film with them, all spending over 295 hours in space. This Irish blessing was important to Jim because his Irish grandparents came to America in the late 1850s."

\$1,500 - 2,500

280

APOLLO 15—CREW.

Three color photographs depicting Dave Scott saluting the American flag on the lunar surface (6¾ by 5½ inches), Dave Scott driving the Lunar Roving Vehicle away from the Lunar Module (6¾ by 5½ inches), and the launch of the Saturn V rocket (13¼ by 6½ inches), mounted together on board.

Provenance: Lieutenant Col. Walter Pennino. Pennino (1915-1998) was the director of NASA's public relations program, and did the advance work for foreign goodwill tours made by astronauts.

SIGNED on board BY DAVE SCOTT, AL WORDEN and JIM IRWIN with inscription "To Walt Pennino with warmest personal regards from the crew of Apollo 15 and many thanks to a really good advance man."

\$1,200 - 1,800



281

281

DAVE SCOTT SALUTES THE FLAG.

Color photograph, 10½ by 13½ inches, mounted to board.

Provenance: From the collection of Walt Pennino.

SIGNED on board BY DAVE SCOTT, AL WORDEN, AND JIM IRWIN, with inscription: "To Walt Pennino with warm personal regards and sincere appreciation for your many contributions to the success of the Apollo 15 Terrestrial Voyages, Jan 15-Feb 1, 1972."

One of the iconic images of the Apollo Program; Dave Scott saluting the American flag on the lunar surface. Inscribed with the date of Man's first lunar landing and first step onto the lunar surface.

\$800 - 1,200

282

A FUZZY DAY ON THE MOON—SIGNED.

Black and white photograph, 8 by 10 inches, with printed NASA text on verso.

INSCRIBED and SIGNED: "A Fuzzy Day on the Moon, JIM IRWIN, Apollo 15." Irwin has drawn a crescent moon after his name.

The image was taken from a live TV picture as broadcast from Apollo 15's lunar rover. Jim Irwin is standing on the Moon with the large Hadley mountains in the background.

\$1,000 - 1,500

283

APOLLO 15 LUNAR SURFACE PROCEDURES. SIGNED BY SCOTT.

(For All Launch Dates). Apollo 15 Final Lunar Surface Procedures. Houston: NASA/Manned Spacecraft Flight Center, July 9, 1971.

8 by 10½ inches. 409 pp. Cream card stock covers, punched, with two staples at spine. traces of rust from staples, small hole near foot of spine affecting front cover and first two pages.

SIGNED and INSCRIBED: "EXPLORING HADLEY APENNINE/ DAVE SCOTT/ APOLLO 15 CDR." The manual for the Apollo 15 lunar surface procedures. A significant document for the first Apollo "J" class mission utilizing the lunar rover for extended exploration of the landing region, divided into three main sections. The first, a mission description, includes the mission objectives, mission lunar surface priorities, EVA requirements, a description of the lunar landing site, lists the scientific objectives, and covers the lunar surface activity for the 67 hour stay. The second section details the nominal lunar surface EVA, including information on the EVA timeline procedures, lunar surface photography data, the geological equipment, EVA traverses, and the Lunar Rover. The third section contains a contingent plan, which outlines the various one and two man traverses to be executed by the astronauts. The appendix contains numerous figures, charts and graphs.

\$800 - 1,000



282

284

FRED HAISE'S APOLLO 16 TRAINING MANUALS—SIGNED.

HAISE SERVED AS BACK-UP COMMANDER FOR APOLLO 16. Two training manuals, one for Lunar Module (LM) simulator use, the other for the Command Service Module (CSM) simulator.

LM Malfunction Procedures, Basic, Apollo 16 & 17, All Launch Dates.

NASA/MSC. December 2, 1971. Over 96 pp. 10 ½ by 8 inches, 14 tabbed sections. Card stock covers with three 1 ¼ inch loose-leaf binding rings.

INSCRIBED and SIGNED: "My personal training copy – FRED HAISE, Apollo 16 BU CDR" on the front cover.

Steps for LM systems trouble shooting are designed as flow-chart style diagrams with columns labeled: "Symptom, Procedure, and Remarks." Lunar Module systems included are Guidance/Navigation, both primary and abort, Descent Propulsion, Ascent Propulsion, Communications, Environmental Control, Cameras (16mm and 70mm), and the Lunar Roving Vehicle.

CSM Updates, Basic, Apollo 16 & 17, All Launch Dates. NASA/MSC.

November 15, 1971. Over 70 pp. 8 by 6 inches, 9 tabbed sections. Card stock covers with heavy weight sheets having two 1 ¼ inch loose-leaf binding rings.

INSCRIBED and SIGNED: "My personal training copy – FRED HAISE, Apollo 16 BU CDR" on the front cover.

Each tabbed section contains several task specific grid format data entry "pads" designed to be filled in with "real time" data sent from Mission Control or calculated on board. These values or numbers would enable the CSM to perform various maneuvers during flight. Included are P30 (Program) Maneuver, P37 Block Data, Earth Orbit Block Data, P27 Update, and P24 Landmark Tracking. Additional sections with Flight Plan Update sheets, Photo Logs for 70mm, 16mm and 35mm cameras have large horizontal grids for manuscript data entries.

\$600 - 800



283



284 (part lot)



286 (part lot)



289

285

SATURN V LAUNCH AND LUNAR FLIGHT—THREE CUE CARDS USED BY FRED HAISE.

All cue cards are INSCRIBED and SIGNED on the reverse side with:

"Apollo 16 CSM panel cue card used during training by – FRED HAISE, Apollo 16 BU CDR."

"SATURN BOOST," issued on March 8, 1972, 5 by 3 ½ inches. "NOMINAL SIVB TLI 2" and "Manual SIVB TLI 2" cue cards, both issued on February 10, 1972 and both are 4 by 2 ½ inches. All designed for the planned (and actual) April 16, 1972 launch date of Apollo 16. Each have column headers in black bold print such as DET (Digital Event Timer), the Greek symbol Theta (for flight path angle), VI (Velocity Indicator), H "dot" (rate of altitude change), and H (current altitude). The column values are either in minutes/seconds, degrees, feet, or nautical miles.

\$500 - 700

286

EMERGENCY, ABORTS & MORE—THREE CUE CARDS USED BY FRED HAISE AND HIS CREW.

All cue cards are INSCRIBED and SIGNED on the reverse side having several Velcro hooks with: "Apollo 16 CSM training panel cue card" or "Apollo 16 CSM panel cue card used during training – FRED HAISE, Apollo 16 BU CDR."

1. "EMER(GENCY) CAB REPRESS," issued on March 8, 1972, 6 ½ by 5 inches. List steps to properly re-pressurize the Command Module during a spacecraft emergency plus steps on how to vacuum transfer the Environmental Control System – "VAC XFER TO ECS."

2. "EPS/ECS ABORTS," issued on December 13, 1971, 4 by 6 inches having a partly triangular shape. Provides steps for the EPS (Electrical Power System) Aborts such as an uncontrolled main electrical bus short circuit or loss of Service Module power. Other steps list recovery for fuel cell loss and loss of cabin and/or space suit pressure. The latter would be associated with the ECS (Environmental Control System).

3. Spacecraft component locator, issued on March 8, 1972. A 3 ½ inch circular cue card plotting the relative positions of CSM equipment including attitude thrusters, high gain antenna, omni antennas, waste dump nozzles, plus the CM window locations.

\$500 - 700

287

FRED HAISE'S SKYLAB MISSION CONTROL BADGE.

A two-color Mission Control Viewing Room entrance badge, 2 ¼ by 4 inches. With a Typed Letter Signed by FRED HAISE.

FRED HAISE'S May 15, 2006 signed provenance letter reads in part: "Displayed with this letter is a laminated badge issued to me during the SL-2 mission back in May and June 1973. It was to permit entrance into the Viewing Room next to the Mission Control Center (MCC) at the Johnson Space Center in Houston, Texas. The badge has my name 'F.W. Haise Jr' in bold type along the bottom.

Pete (Conrad) and his crew made a few spacewalks to free a jammed solar panel to enable a full duration 28 day mission."

\$200 - 300

288

FRED HAISE'S ASTP MISSION CONTROL BADGE.

A two-color Mission Control Viewing Room entrance badge, 2 ¼ by 4 inches. With a Typed Letter Signed by FRED HAISE.

FRED HAISE'S May 15, 2006 signed provenance letter reads in part: "Displayed with this letter is a laminated badge issued to me during the Apollo/Soyuz mission back in July 1975. It was to permit entrance into the Viewing Room next to the Mission Control Center (MCC) at the Johnson Space Center in Houston, Texas. The badge has my name 'F.W. Haise Jr' in bold type along the bottom.

... I wanted to observe this mission when my schedule permitted. Tom Stafford commanded the Apollo spacecraft and Aleksei Leonov commanded the Soyuz. The flight was the last Apollo mission for the United States."

\$200 - 300

289

THE LUNAR GRAND PRIX.

Color photolithograph, 8 by 10 inches, printed caption along bottom margin with NASA text on verso.

INSCRIBED and SIGNED: "Photo by CHARLIE DUKE, Apollo 16 LMP."

Charles Duke photographs John Young as he drives the lunar rover during "high speed" tests.

\$400 - 600



290

290

US FLAG CARRIED ON THE LAST MANNED MISSION TO THE MOON.

FLOWN Apollo 17 United States flag, made from silk, 4 by 6 inches. Mounted on a certificate with an Apollo 17 image of the full earth and drawings of Apollo, Skylab, ASTP, and Shuttle space vehicles. Displayed with a night view of the Apollo 17 – Saturn V rocket on the launch pad in black and white. All mounted on and removable from a 13 by 19 ½ inch black mat board.

The certificate reads: "This flag was carried to the Moon aboard the spaceship America, Apollo XVII, December 7 – 19, 1972."

During March 1988, the approximately 10 x 8 inch photograph was SIGNED and INSCRIBED: "RON EVANS, Apollo 17, Mar 88." Evans was Command Module Pilot of America.

\$7,000 - 9,000

291
LAST MAN ON THE MOON—CERNAN SALUTES THE LAST STARS AND STRIPES.

Large color photograph, 16 by 20 inches.

Boldly INSCRIBED and SIGNED: "*Last Man on the Moon, GENE CERNAN, Apollo XVII CDR, Dec. 1972.*"

Apollo 17 Commander Gene Cernan holds and salutes the last United States flag placed on the lunar surface.

\$2,000 - 3,000



291

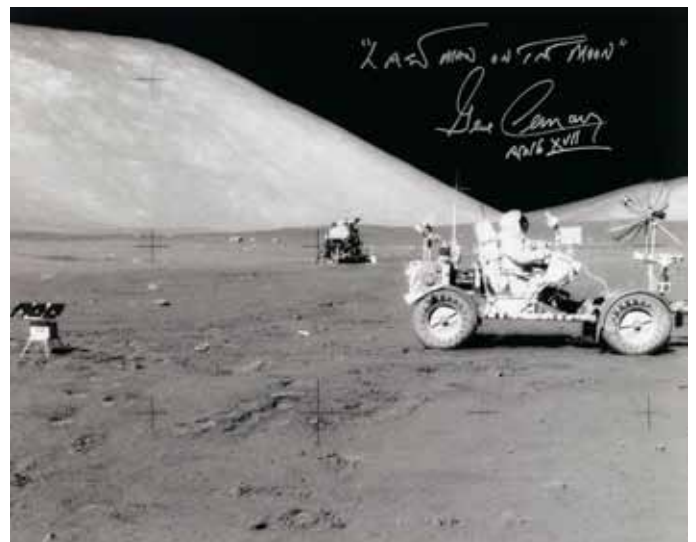
292
LAST MAN ON THE MOON.

Large black and white photograph, 16 by 20 inches. Mounted on board.

Showing the use of the Lunar Rover during Apollo 17.

SIGNED and INSCRIBED in silver pen: "'Last Man on the Moon' Gene Cernan, Apollo XVII".

\$2,000 - 3,000



292

293
HARRISON SCHMITT AND THE AMERICAN FLAG.

Color photograph 9¼ by 7¼ inches, matted and framed.

SIGNED to matte BY GENE CERNAN, RON EVANS, and HARRISON H. SCHMITT. The iconic image taken by Gene Cernan of Apollo 17 lunar module pilot Harrison Schmitt looking at the American flag at the beginning of their first EVA.

\$700 - 1,000



293



294 (front view)



294 (top view)



294 (back view)

294

APOLLO'S TOP LEVEL AWARD WITH FLOWN FLAGS.

Desktop presentation from Johnson Space Center Director Chris Kraft to NASA Administrator Dr. James C. Fletcher, comprising three flown flags, each 4 x 6 inches, and accompanying plaques. Mahogany, the flags behind lucite panels. 13 by 13 by 6 inches. The Apollo-Soyuz Test Project flag with white areas rather reddened.

WITH FLOWN AMERICAN FLAGS FROM APOLLO 17, SKYLAB 2, AND ASTP—key missions in which Fletcher was intimately involved. The upper plaque records the presentation on April 21, 1977 to Dr. Fletcher, *"an outstanding civil servant,"*. Four smaller plaques detail the flown US flags and highlight all human space flight programs and the specific missions which were under Fletcher's leadership: Apollo 14, 15, 16, 17 and ASTP, all Skylab missions, and the Space Shuttle program. The gift was made on the occasion of Fletcher's retirement, although he would later return to NASA as Administrator in the wake of the Challenger disaster. Not only did Fletcher lead NASA during its most iconic historical moments, he is also the only individual to have served as the leader of NASA twice.

The fourth side of the presentation leaves room for a flag from the Shuttle program: Fletcher gained the approval of the Nixon administration in 1972 to develop the Space Shuttle as the continuation of human space flight after the Apollo program. The first manned Shuttle flight did not take place until 1981, some four years after Fletcher's retirement, so a plaque in the form of a detailed letter from Kraft acts as a place-holder, titled: *"This space reserved for Space Shuttle flag."* In all likelihood, Fletcher did receive the US flag reserved for him by Kraft on STS-1 but never added it to this presentation, preferring to retain the very thoughtful plaque from Kraft.

Mission Control at Johnson Space Center has recently been renamed in Kraft's honor, known as the "father of Mission Control Houston", he paved the way to land a man on the moon. Included in the lot is a program from the dedication ceremony, and a set of both iconic and lesser-known images in digital format of the Space Shuttle program and the Apollo missions these flags flew on.

\$6,000 - 8,000



APOLLO 16 CSM VIEWED FROM LM WITH EARTH RISE

295

295

MOONWALKERS—ALL 12.

NASA color photograph, 10 by 8 inches, of the Apollo 16 Command Module orbiting the moon with an Earth rise in the background.

EXTREMELY RARE, SIGNED BY ALL 12 MOONWALKERS: ALAN BEAN, ALAN SHEPHARD, NEIL ARMSTRONG, BUZZ ALDRIN, GENE CERNAN, CHARLIE DUKE, HARRISON SCHMITT, JIM IRWIN, EDGAR MITCHELL, CHARLES CONRAD, DAVE SCOTT, and JOHN YOUNG to Simon. Photographs signed by all of the men who walked on the surface of the moon in the 20th century are impossible to duplicate today as only 8 of the moonwalkers are still living. They are extremely rare and desirable. In this photograph, all 12 men have signed on the image of the lunar surface.

\$12,000 - 18,000



296

296

MOONWALKERS - LARGE LUNAR GLOBE SIGNED BY 8, PLUS 3 OTHERS WHO FLEW TO THE MOON.

Replogle Lunar Globe. Chicago, c. 1980. 12 inches in diameter, 180 mi. per inch scale. Plastic stand.

SIGNED and INSCRIBED BY BUZZ ALDRIN, CHARLES DUKE, ALAN BEAN, HARRISON SCHMITT, GENE CERNAN, ED MITCHELL, DAVE SCOTT, AND JOHN YOUNG, all next to their respective lunar landing spots, as well as on the far side of the globe by JAMES LOVELL, RICHARD GORDON, and AL WORDEN. This is the first globe of its kind that we have seen, no other globe signed by any Moonwalkers can be found in the auction records.

\$15,000 - 25,000

End of Sale

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You instruct us to execute each absentee bid up to the corresponding bid amount indicated above.

* Emergency Bid: A maximum bid (exclusive of Buyer's Premium and tax) to be executed by Bonhams only if we are unable to contact you by telephone or should the connection be lost during bidding.

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California & American Paintings & Sculpture	5	<input type="checkbox"/> \$200	<input type="checkbox"/> \$250
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Entertainment Memorabilia & Collectables	3	<input type="checkbox"/> \$120	<input type="checkbox"/> \$150
European & American Furniture & Decorative Arts	8	<input type="checkbox"/> \$320	<input type="checkbox"/> \$400
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Japanese Works of Art	2	<input type="checkbox"/> \$80	<input type="checkbox"/> \$100
Modern & Contemporary Art and Made In California	6	<input type="checkbox"/> \$240	<input type="checkbox"/> \$300
Motor Cars, Motorcycles & Automobilia	6	<input type="checkbox"/> \$330	<input type="checkbox"/> \$390
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A Mary Blair concept painting for *Alice in Wonderland*
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One of about 50 lots on the history of digital computing to be offered in this auction.

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ON APOLLO XI

T. S. ...

MCC-H

1530 EDT
150:00

FLIGHT PLAN

NOTES



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SXT STAR CK

07 ✓

EMS ΔV TEST

✓ -20.2

SM RCS MON CK ✓

GDC ALIGN TO IMU ✓

MCC5 ΔV-NOMINALLY ZERO

4.6 ✓

SM RCS MON CK ✓
SPS MON CK

V66-TRANS CSM STATE VECTOR
TO LM SLOT ✓
BURN STATUS REPORT ✓

BATTERY CHARGE, BATTERY A

PTC ESTABLISHED IN
G & N P, Y +30° DB
R RATE OF 0.3/SEC

BURN STATUS REPORT

X	X			0	ΔTIG
X	X			?	BT
					V _{gx}
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X	X	X			P
X	X	X		3.00	Y
X	X	X			V _{gx}
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+				2	V _{gz}
+				1	ΔV _c
+				2	FUEL
X	X	X			OX
X	X	X			UNBAL
X	X	X			

START PTC
P 270° Y 0

PTC

from prev page

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	150:00 - 151:00	7/TEC	3-109

MSC Form 28 (May 69)

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