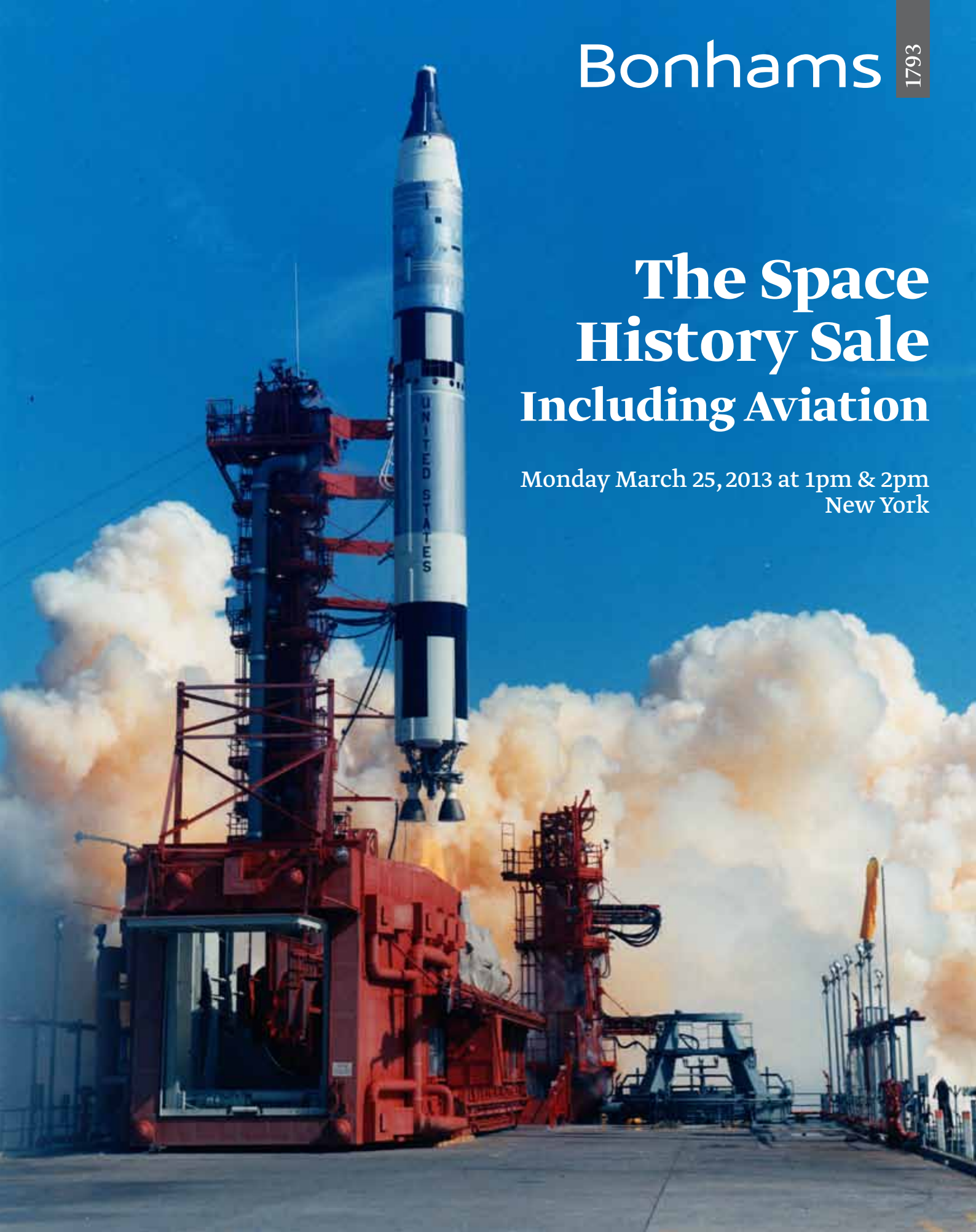


Bonhams

1793

The Space History Sale Including Aviation

Monday March 25, 2013 at 1pm & 2pm
New York



**The Space History Sale
Including Aviation**
Monday March 25, 2013 at 1pm & 2pm
New York

Bonhams

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

Preview

Friday March 22, 10am to 5pm
Saturday March 23, 12pm to 5pm
Sunday March 24, 12pm to 5pm
Monday March 25, 10am to 1pm

Bids

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

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

Sale Number: 20944
Lots 1 - 325

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/20944

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

Illustrations

Front cover: Lot 88
Inside front cover: Lot 152
(actual size)
First session page: Lot 24
Second session page: Lot 150
Inside back cover: Lot 211
(actual size)
Back cover: Lot 307

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 \$50,000 OF THE BID PRICE, 20% OF THE AMOUNT OF THE BID PRICE ABOVE \$50,000 UP TO AND INCLUDING \$1,000,000, AND 12% OF THE AMOUNT OF THE BID PRICE OVER \$1,000,000, and (c) unless the purchaser is exempt by law from the payment thereof, any California, Arizona, Connecticut, 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 thereof, (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. 3550.

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, Connecticut, 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 Monday April 1 without penalty. After April 1 collection of lots will be by appointment only. Please call +1 (212) 644 9001 at least 24 hours in advance to make an appointment.

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.

CONTACTS

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and available 24 hours a day, 7 days a
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- Auction and Preview Information
- Directions to Bonhams's salesrooms
- Automated Auction Results

*** Indicates saleroom**

Foreword

These are exciting times for collectors of space history artifacts. In September 2012, the President signed into law a bill clarifying once and for all that Mercury, Gemini, and Apollo crew members have “full ownership of and clear title to” any expendable item used in their missions. Furthermore, the Federal Government will have “no claim or right to ownership” to artifacts that have subsequently been sold, traded or gifted by the astronauts. On a more somber note, the first man on the Moon passed away in August, perhaps symbolic of the end of an era.

Partly as a result of the new legislation, Bonhams 2013 Space History Sale is one of our best to date. We have a significant number of important flown flight plan pages, with an emphasis on Apollo 11 and 13, as well as intriguing lunar surface artifacts consigned by Apollo 15’s Dave Scott and others.

The sale opens, however, with fifty lots relating to early aviation and the history of flight. The highlights are two Wilbur Wright items: the first a charming and rare autograph letter from Wright to one of his first French pupils, Paul Tissandier (“You will be recordman of the world!”), the second a typescript of one of the final essays written by Wilbur before his sudden death, signed by him and annotated by Orville. Given the strength of our aviation offerings, we are delighted to be able to host a lecture by Dr. Peter L. Jakab, Associate Director at the Smithsonian National Air and Space Museum on Sunday, March 24 at 3pm in our New York galleries. Dr. Jakab will share the exciting story of how two seemingly ordinary bicycle makers created the first airplane and then presented their invention to the world. He will explain how the aeronautical achievements of Wilbur and Orville Wright laid the foundation of modern aerospace engineering and, within a single lifetime, led to humans walking on the Moon in 1969. We do hope that you will be able to attend the lecture; an invitation is included in this catalog.

A small group of items on early astronomy, von Braun’s rocket experiments, and rocketry in general – including a very large model of the USSR’s answer to the Saturn V – leads us into Project Mercury and the Gemini Program. As well as a range of signed items and flown emblems, we are delighted to include a flag flown on Gemini 10 by Michael Collins, consigned directly by him.

With a brief nod to NASA’s unmanned Ranger and Surveyor programs that paved the way for manned Moon landings, we move into Apollo. The Apollo 11 section is packed with important flown artifacts and documents, including a signed Beta cloth emblem, a postal cover, and checklist and flight plan sheets marked up by Armstrong, Aldrin and Collins. Lot 152 is a CSM engine burn update data sheet extensively annotated by Neil Armstrong while in lunar orbit and one of only two he used during the entire mission. We are also offering a pair of sheets from the lunar module’s Guidance and Navigation Dictionary, used to set up the computer for its “Powered Ascent” from the surface of the Moon and the rendezvous with the command module (lot 154). The only film camera notes of the entire mission were recorded by Armstrong prior to re-entry on flight plan page 3-126, which turned out to be one of the longest notations he made during Apollo 11 (lot 156).

Similarly important documents can be found amongst the Apollo 13 material, including a sheet from the lunar module Contingency Checklist with the most extensive engine burn notes Jim Lovell made during the mission (lot 211). Moving on to Apollo 15, a wonderful consignment from mission commander Dave Scott includes the lunar module pilot’s ill-fated “yo-yo” – the retractable tether used by Jim Irwin near Hadley Rille which broke during one of his extra-vehicular activities (lot 235). Another item exposed to the lunar environment is the Beta cloth cover of Scott’s backup Oxygen Purge System.

Marking the symbolic end of the Space Race is lot 284, the important certificate signed in space during the Apollo-Soyuz Test Project by all five members of the American and Soviet crew. Only four such certificates were signed, and with one in the Smithsonian and two believed to be held by the International Aeronautical Federation, this is surely the only example in private hands.

The Space History Sale previews in our New York galleries from March 22-24. Please do not hesitate to contact us if you have questions or would like condition reports; since most of the material is in excellent condition, we have usually not given condition details in the cataloging. We look forward to hearing from you, and hope to see you at Dr. Jakab’s lecture on the afternoon before the sale.

Matthew Haley, Specialist for this sale, New York

Order of Sale

Aviation at 1pm.....1 - 52

Space History at 2pm53 - 325

Astronomy & Rocketry53 - 63

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Gemini, Surveyor & Ranger85 - 116

Apollo Program through Apollo 10117 - 149

Apollo 11150 - 195

Apollo 12 through 17196 - 280

Skylab, Apollo-Soyuz & Later Programs281 - 312

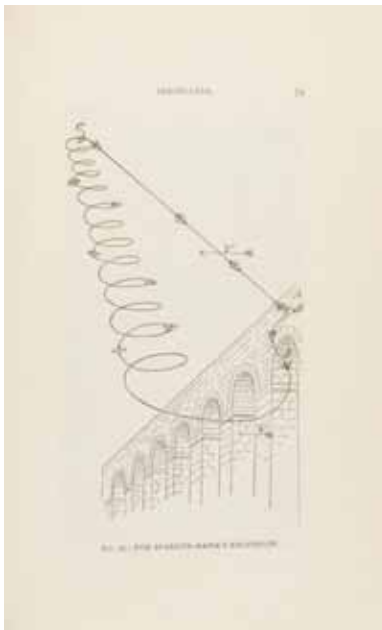
Beyond Earth’s Orbit313 - 325

Aviation

March 25, 2013 at 1pm

Lots 1 - 52





1



2



3

1

TWO EARLY OCTAVE CHANUTE PUBLICATIONS.

1. *Aerial Navigation*. New York: Railroad and Engineering Journal, 1891. 36 pp. 7½ x 4½ inches. Several steel-engraved illustrations. Original orange printed wrappers. Upper wrapper and title instamped with date that the lecture was delivered, May 2, 1890. Lightly rubbed.
2. *Progress in Flying Machines*. New York: the American Engineer and Railroad Journal, [1894]. iv, [2], 308 pp. 9 x 6 inches. Original blue-gray cloth, gilt device on upper cover of Lilienthal in flight. Lightly rubbed.

FIRST EDITIONS. Applying his engineering background, Chanute collected all the data that he could find from flight pioneers around the world. He published this as a series of articles in *The Railroad and Engineering Journal* from 1891 to 1893, and collected them together in the present volume. This is the most systematic global survey of fixed-wing heavier-than-air aviation research published up to that time.

\$1,500 - 2,000

2

CHANUTE AND THE FIRST AIRCRAFT SOLD TO FRANCE.

CHANUTE, OCTAVE. 2 Autograph Letters Signed ("O. Chanute"), 2½ pp recto and verso, in French, 11 x 8½ inches, Chicago, IL, December 21, 1904 and February 28, 1905, to Jacques Balsan of Paris, on Chanute stationery ("Wood preserving a specialty"). Together with printed invoice accomplished in manuscript from William A. Avery, Carpenter, Chicago, February 23, 1905, made out to Balsan with charges for "crating aeroplane," etc.

During a visit to Paris in April 1903, the French-born Chicagoan Chanute met the aviator Jacques Balsan at a meeting of the Aéro-Club de France. By November, Balsan had ordered a glider from Chanute. Somewhat testily, Chanute writes to him at the end of 1904 (translated): "*The glider you ordered on November 6, 1903, was finished (except for the fabric) in March 1904, the time at which you were coming to America. Receiving no letter from you, I had to take the glider at my own expense.*" He writes that he covered the glider, and it was flown by Avery at the St. Louis World's Fair in September of that year. "*I received your telegram of September 24 and I replied that I would be in St. Louis from October 3 for a week. When I arrived, you had already left for New York, saying you would be back in a few days. After which I heard nothing.*" "*The glider is back here [in Chicago]. It is in good shape, but it will cost you 500 francs if you want it.*" Chanute's grumpy letter was clearly successful, for in the second letter he gives detailed information about the shipping of the glider to Paris. In 1925, Balsan donated the glider to the Paris Air Museum, and it remains on display at Le Bourget.

\$5,000 - 6,000

3

WRIGHT—SOME AERONAUTICAL EXPERIMENTS.

1. *Some Aeronautical Experiments*. December, 1901. 489-510 pp. 11 half-tone illustrations, 8 after photographs of the Wright brothers' glider, and 2-line diagrams in text. Upper wrapper and following 2 leaves repaired at extremities, spine restored.
 2. *Experiments and Observations on Soaring Flight*. August, 1903. 400-417 pp. 8 illustrations after photographs. Top edge of lower wrapper repaired, spine restored.
- Both in: *Journal of the Western Society of Engineers*. Chicago: the Society. Volume VI, no 6 and volume VIII, no 4. 9 x 6 inches. Original gray printed wrappers. Together in custom solander box.

The first item being the **FIRST EDITION OF THE WRIGHT BROTHERS' FIRST PUBLISHED REPORT** of their trial flights with motorless gliders at Kitty Hawk. Wilbur Wright gives an account of the brothers' achievements up to that point, the most recent being the successful flights of a manned glider at the Kill Devil Hills, four miles south of Kitty Hawk, in the summer of 1901. The paper was read to the Western Society of Engineers on September 18, 1901, at the instigation of its president Octave Chanute [1832-1910]. The French-born Chanute's own gliding experiments in 1896 and 1897 paved the way for the Wrights' later successes. Chanute, the brothers' earliest and most important patron, introduced Wright's paper with remarks on advances in motor design. The plates in the first essay show "*The 1900 Machine*," "*Kite Soaring*," "*A Bottom View*," "*Starting a Flight*," "*A High Glide*," "*A Low Glide*," "*Soaring*," and "*Landing*." Within six months of the publication of the second article, the brothers would achieve a successful motorized flight.

\$3,000 - 5,000

4

FABRIC FROM THE KITTY HAWK FLYER, 1903.

1. Swatch of fabric, 1½ x 1¼ inches, mounted on a printed certificate signed by Lester D. Gardner, a publisher of aviation journals and a friend of Orville Wright. The certificate made out to William van Dusen, and framed. Spotting.
2. The pilot's log book of George W. van Dusen of Newtown, CT, beginning September 6, 1960, with his signature on several pages but also that of A. William van Dusen. With autographs on the rear endpapers of EDDIE RICKENBACKER, RALPH CONNINGTON, HENRY VICKERS, JIMMY DOOLITTLE, and others. Lightly rubbed.

Orville Wright reassembled the Kitty Hawk machine for its first public exhibition in 1916, at the Massachusetts Institute of Technology. Finding the original fabric could not be used, he substituted new fabric and kept some of the original fabric. On his death in 1948, Orville's executors discovered the fabric and asked Gardner, who had also been on the board of M.I.T., to distribute sections to aeronautical luminaries. William van Dusen was the first Publicity Director for Pan American Airways Corporation.

\$3,500 - 4,500

5

BEGINNING OF HUMAN FLIGHT—ORVILLE'S COPY.

The Beginnings of Human Flight. New York: [the Wright Company, 1916].

9 x 6 inches. 4 pp brochure, illustration after a photograph of the December 17, 1903 flight at Kitty Hawk.

Brochure produced upon the exhibition of the 1903 Flyer at the Massachusetts Institute of Technology, coinciding with the dedication of several new buildings from June 11-14, 1916. The final page has the circular inkstamp of the private library of Orville Wright, signed by the co-executor Miller.

\$1,500 - 2,000

6

CHARLES TAYLOR—MAKER OF FIRST WRIGHT ENGINE.

2 letters relating to Charles E. Taylor [1868-1956], who built the 12hp engine of the 1903 Wright Brother airplane.

Taylor was originally hired to work on Wright bicycles, but soon turned his attention to designing a high power-to-weight ratio engine for the 1903 Flyer. He continued working for the Wright Company until 1920, and later became involved in the defense industry in California. By 1955 he was in poor health and short of money; the Aviation Industries Association raised a campaign to look after him.

Comprising a typed letter signed from the Director of the Western Region of the AIA to a donor Vern Carstens, chief test pilot at the Beech Aircraft Corporation in Wichita, KS, dated January 16, 1956; typed letter signed from Taylor's secretary-nurse, dated January 24, 1956, expressing personal thanks to Carstens, stressing that Taylor *"has never lost his interest in airplanes or the people who make them and the Great Boys who fly them,"* and enclosing a 2-inch square swatch of fabric as a gift (albeit without indicating from which aircraft it comes; it bears little resemblance to the fabric of the 1903 Flyer). Taylor died six days after this letter. Together with a copy of a newspaper report.

\$500 - 800

7

WRIGHT BROTHERS AT HUFFMAN PRAIRIE.

1. Black and white photograph, 6 x 11 inches, touched up for publication, inkstamp of agency Pacific & Atlantic Photos on verso.
2. Partial Typed Letter Signed ("Wilbur & Orville Wright. O.W.") in Orville's hand, 1 p, 11 x 8 inches, [November 17, 1905], to Georges Besançon, the publisher of *Aérophile*.

The Wrights began using Huffman Prairie, northeast of Dayton, OH, in 1904, and made about 150 flights at the field in 1904-1905. The present image shows a Flyer moments before the engine is fired up. In accompanying partial letter, the Wright brothers explain that *"the claim often made in the 19th century that the lack of sufficiently light motors alone prohibited man from the empire of the air was quite unfounded. At the speed which birds usually employ, a well designed flyer can in actual practice sustain a gross weight of 30 kilograms for each horse power of the motor, which gives ample margin for such motors as might easily have been built 50 years ago."* The foot of the letter lists witnesses, including the owner of Huffman Prairie, Torrence Huffman.

See illustration overleaf.

\$3,500 - 4,500



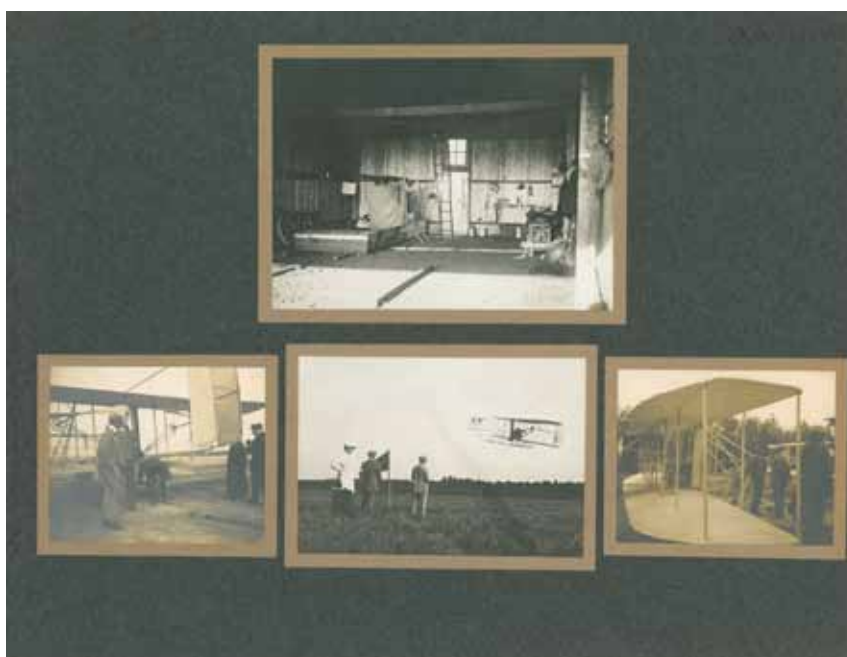
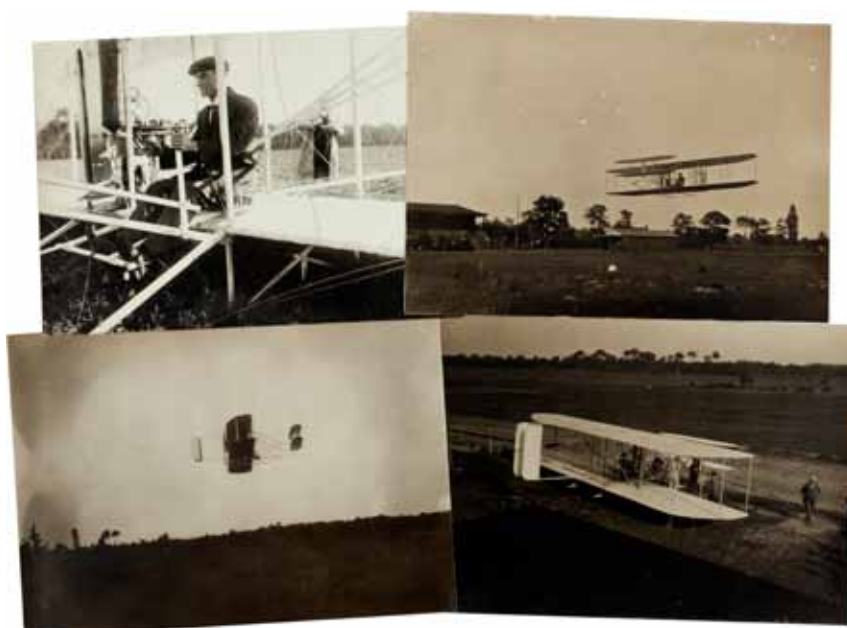
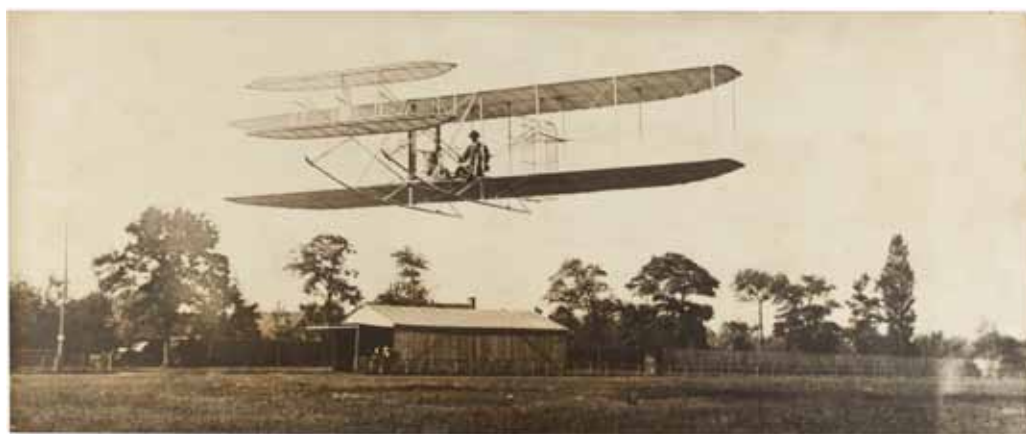
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5



6





11



12

8

WILBUR SOARS AT HUNAUDIERES, LE MANS.

Tinted black and white photograph, 9¾ x 23½ inches.

A large and rare vintage panoramic photo of Wilbur Wright flying over Hunaudières, where he "captured the attention of the world during a single week of flying" (Crouch and Jakab, *The Wright Brothers and the Invention of the Aerial Age*, pp 166-172).

\$2,500 - 3,500

9

WRIGHT AT HUNAUDIERES, AUGUST 1908.

Group of 4 black and white photographs, 5 x 7 inches, 3 with inkstamped credits on verso of M. Rol, the fourth with credit of M. Branger.

Wilbur made his first flight in Europe on August 8, at Hunaudières racecourse at Le Mans. He wrote to his brother the following day, "I finished the machine yesterday far enough to enable me to make a little flight ... A number of people had come down from Paris, including two Russian officers who have been waiting there for several weeks by instruction of their government ... I made two rounds of the field in a little less than two minutes and landed in front of the grand stand."

Comprising the Flyer being prepared at the race track; the machine aloft (2, one with grand stand visible below); and Wilbur at the controls (possibly taken at Camp d'Auvours a week or two later).

\$2,500 - 3,500

10

WRIGHT AT CAMP D'AUVOURS, AUGUST 1908.

Group of 8 black and white photographs, 4 x 5 inches and smaller, mounted on 2 album leaves.

An attractive collection of images of Wilbur Wright's activities at Camp d'Auvours, 11 kilometers east of Le Mans, where he began to fly on August 21, 1908. Includes images of the interior of the makeshift hangar; aloft; working on the aircraft; towing the Flyer across the airstrip behind a car.

\$2,500 - 3,500

11

WRIGHT AT CAMP D'AUVOURS, 1908.

Group of 15 black and white photographs, 5 x 7 inches and other sizes, inkstamps on verso of Rol, Photographie du Journal, Branger, and Théodoresco.

"Wilbur made his first flight at Camp d'Auvours on August 21. The atmosphere was electric.... Wilbur was aloft every day, breaking records as soon as he set them" (Crouch and Jakab, *The Wright Brothers and the Invention of the Aerial Age*, pp 166-172).

Comprising 2 images of the Flyer aloft, one dating from October 3 when Wilbur made a 55 minute flight; Wilbur with Léon Bollée, the car manufacturer who lent Wright shop space and mechanics to work on the Flyer; 2 of Bollée's mechanics; Wilbur in conversation with Bollée, the Brothers' agent in France Hart O. Berg, and another; a nervous group, Wilbur at the center; Berg talking to officials from the government commission; Berg explaining Flyer features to Henry White, US Ambassador to France; Mrs Berg inspecting the Flyer; 4 portraits of Wilbur; 2 spliced photographs prepared for publication; a postcard of Wilbur in flight at Hunaudières.

\$3,000 - 5,000

12

ORVILLE CONVINCES THE ARMY HE CAN FLY.

Black and white photograph, 3½ x 9½ inches, with inkstamped credit on verso of Harris & Ewing and photo agency information.

Orville's first demonstration to the Army of a 2-man "Heavier-than-air Flying Machine" was on September 3, 1908, at Fort Myer, VA. Over the next two weeks several records were set, but on the 17th a crash seriously injured Orville and killed his passenger Lt. Thomas E. Selfridge.

The Wrights went back to the drawing board, and returned to Fort Myer the following summer with an improved aircraft, the Wright Military Flyer. The present image shows Orville in flight with spectators below, on July 30, 1909, when he averaged a speed of 42.58mph over a flight distance of 44 miles. With these results, the Army agreed to pay the Wright brothers \$25,000 for the Wright Military Flyer with a bonus of \$2,500 for each mile per hour over 40mph.

\$700 - 900



13

DINER OFFERT PAR L'AÉRO-CLUB DE FRANCE
en l'honneur de
WILBUR WRIGHT
 Le 5 Novembre 1908, dans la Salle des Fêtes de l'Automobile-Club de France

Signature :

Wilbur Wright



MENU

Coupons d'Alouette
Crispe de Volaille Préparée
Tondu de Filet de Sole Velouté
Sole de Bretagne à la Dauphine
Foies gras sur canapé
Mariage de la pomme
Mousse de Jambon au Xérès
Solade de saumon
Glace d'Orléans - Wilbur Wright
Framboise - Fraîche - Desserts
Café - Liqueurs

Vins

Saint-Sébastien et Lampion en carafe
Bonnes Sauternes 1893 - Volnay 1894
Champagne G. H. Mann, cuvée rouge

PENDANT LE DINER :

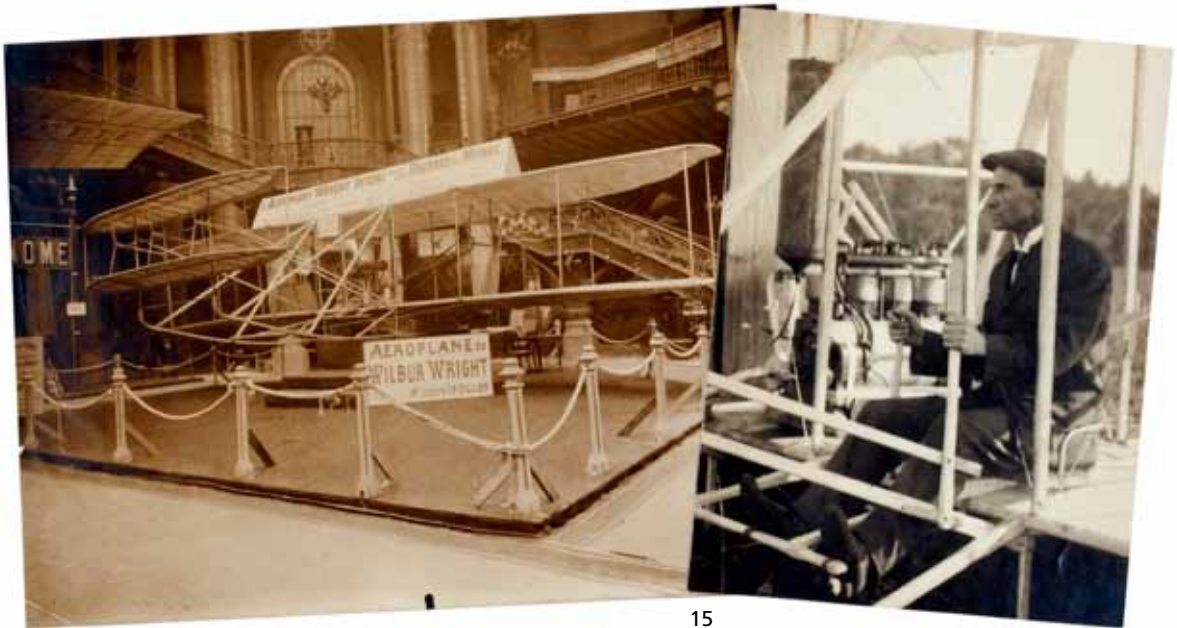
Concert par la Musique du 104 Régiment d'Infanterie
 Chef : M. H. Vioz

1. RÉJA, marche	Benoit
2. LA POUPÉE DE NUREMBERG	Kaan
3. DIVERTISSEMENT	H. Vioz
4. LA VOLIÈRE, polka pour petite fille	Dionisi
5. LES DEUX PIGEONS (à l'orchestre) 3 Deux hongroises	Mancini
6. POLKA POUR CLARINETTES	Mancini
(Solos : MM. VIOLETTE, ARDUS, BARAULT, WALTER, FARRUCI et PUFFE)	
7. LES COQUELICOTS, valse	H. Vioz
8. POLKA POUR QUATRE PISTONS	Mancini
(Solos : MM. GARNIER, sous-chef, 1 ^{er} prix de Composition, CHARTIER, VIOLETTE et ROBINSON)	

* * *

Les Etapes de l'Aviation en France (Film des avions (Gaston), Poché et Léprieux)

14



15

13

WRIGHT'S RECORD FLIGHT, OCTOBER 10, 1908.

Group of 4 black and white photographs, 5 x 7 inches, with inkstamped credits on verso of M. Rol, Jacques Boyer, and Photographie du Journal.

Wilbur's contract with the French syndicate required that within the space of one week he make two flights carrying a passenger for fifty kilometers. With his flights on October 3 and 6 of 1908, he achieved this feat and secured a \$100,000 prize. On October 10, he broke his own record for the duration of a flight, remaining aloft for one hour and nine minutes, with Paul Painlevé as passenger.

Images include Wilbur making final adjustments to the Flyer; preparing the launch rail; the airplane ready on the rail; Wilbur and Painlevé aloft. Also included are a manuscript testimonial confirming the details of the flight (unsigned, in an unidentified hand), and a typed letter signed from a fact-checking reporter at *Le Temps* to Paul Tissandier, October 12, 1908. \$2,500 - 3,500

14

1908 PARIS DINNER MENU—SIGNED BY WILBUR.

Single-sheet menu, "*Dîner offert par l'Aéro-Club de France en l'honneur de Wilbur Wright*," 12 x 9½ inches, printed specially for a dinner on November 5, 1908, with illustrations reproducing photographs of Wilbur in flight and the arrival of delegates from the Club by balloon at Camp d'Auvours. Some faint pink crayon outlining, horizontal crack at center where folded repaired with tape on verso, a few chips and corner losses.

SIGNED by WILBUR WRIGHT, and with pencil caricature of him tipped-on at lower left corner.

While Orville was recovering from a near-fatal crash at Fort Myer, Wilbur was the toast of Paris, attending numerous dinners in his honor after successful demonstrations at Hunaudières and Auvours. At this Aéro-Club dinner, Wilbur famously confessed "that in 1901 I said to my brother Orville that man would not fly for fifty years. Two years later we ourselves made flights."

\$5,000 - 7,000

15

WRIGHT FLYER AT THE PARIS AIR SHOW, 1908.

2 black and white photographs, 7 x 9 and 7 x 5 inches, the larger with inkstamp on verso of M. Rol.

The Paris Air Show started in December 1908 as part of the 11th Paris Automobile Show, then held in the Grand Palais in the heart of Paris. The first *Salon international de l'aéronautique* featured aircraft by several manufacturers.

Comprising: the Wright Flyer in the Grand Palais, this the example used at Pau and elsewhere, and given by Wilbur to the backer Lazare Weiller; Wilbur at the controls of that aircraft, probably at Camp d'Auvours in the summer of 1908.

\$1,000 - 1,500

16

1908 PARIS AIR SHOW REPORT.

Rapport sur le Premier Salon de l'Aéronautique, Grand Palais, Paris, Décembre 1908. Paris: Librairie des Sciences Aéronautiques, [1908]. 11 x 8½ inches. [3]-92, [4], [8] ad pp. Illustrations after photographs.

Modern quarter morocco, original printed wrappers bound in.

Featuring aircraft of various types, including dirigibles, monoplanes and biplanes, as well as details of their engines, all photographed within the splendid interior of the Grand Palais.

\$800 - 1,200

17

FOR THE CONQUEST OF THE AIR.

LUPIN, artist. *Pour la Conquête de l'air. For the Conquest of the Air.* Paris: L. Monroq, [1908]. Color lithograph, image 10 x 17½ inches on 14½ x 22 inch sheet. Printed title below in French and English. Depicting jousting between Henri Farman and Wilbur Wright, the latter riding on the shoulders of his sponsor Lazare Weiller, the former sitting atop airplane designer Gabriel Voisin.

\$500 - 700

18

WILBUR WRIGHT EN PLEIN VOL.

SEROUART, A., artist. *L'aéroplane de Wilbur Wright en plein vol.* [N.p.: c.1908.] Color offset lithograph, 13 x 8 inches on 17 x 12 inch sheet, signed in the image.

\$500 - 700



19

19

JUNE BUG AND CURTISS NO. 1.

Group of 4 black and white photographs, 4½ x 6½ inches and smaller.

Provenance: the first from the aeronautical collection of Thomas G. Foxworth (light inkstamp on verso).

The June Bug was designed by Curtiss and built by the Aerial Experiment Association. It was tested in Hammondsport, New York at Stony Brook Farm, where Curtiss flew it successfully on three out of four attempts on June 21, 1908. In doing so, he won the first aeronautical prize ever awarded in the United States, the Scientific American Cup. The Curtiss No. 1 was the first airplane delivered by the new Herring-Curtiss Company, on May 29, 1909.

Comprising: Curtiss at the controls of the June Bug; the airplane in flight; similar images of the No. 1 by H.M. Benner, both SIGNED by GLENN CURTISS.

\$2,000 - 3,000

20

SILVER DART, 1908.

Group of 4 black and white photographs, 4½ x 6½ inches and smaller.

The Canadian-born Douglas McCurdy joined Alexander Graham Bell's Aerial Experiment Association in 1907. The following year, he helped another AEA member, Glenn Curtiss, set up the Curtiss Aeroplane and Motor Company. The Silver Dart was the culmination of the AEA's efforts. Tested in Hammondsport, NY, it was then shipped to Bras d'Or Lake in Nova Scotia where, on February 23, 1909, McCurdy became the first British subject to fly an aircraft in the British Empire.

Comprising the Silver Dart at Hammondsport during testing, October, 1908; the same, November; another, probably November or December; a Curtiss aeroplane making an ocean flight at Atlantic City, SIGNED by MCCURDY.

\$1,500 - 2,500



20

21

ORIGINAL ILLUSTRATION OF CURTISS IN FLIGHT.

RUDAUX, HENRI EDMOND. Large depiction of Glenn Curtiss in profile winning the Gordon Bennet Cup in 1909 at Reims, gouache on textured paper, 11 x 29 inches on larger sheet, signed lower right. Very faint spotting. Matted together with 4 black and white photographs, each approximately 4 x 5 inches.

Henri Rudaux [1870-1927] is known particularly for his posters of Mercedes motorcars, but he also depicted key events in aviation.

\$3,000 - 5,000

22

BLERIOT CHASES CURTISS—1909 BENNETT CUP.

2 large black and white photographs, each approximately 10 x 12 inches, mounted.

Detailed and striking telephoto shots of Glenn Curtiss flying his Curtiss No 2 and Louis Blériot in hot pursuit in his Blériot XII, during the first Gordon Bennett Trophy race in August 1909. The time trial was held during the *Grande Semaine d'Aviation* at Reims, and consisted of two laps of the 10 kilometer circuit. Curtiss won this first competition, completing the course in 15 minutes and 50 seconds; Blériot took six seconds longer. The Trophy was funded by the eponymous publisher of the *New York Herald*.

\$1,500 - 2,500

23

GLENN CURTISS COLLECTION.

A substantial collection of photographs, documents and ephemera relating to Glenn Curtiss. Images including portraits of Curtiss (2, one tipped onto a sheet with a pencil signature of Curtiss); photographs and postcards of Curtiss at Reims, 1909 (approximately 25, 3 being SIGNED); Curtiss and his aircraft shortly before the May, 1910 Albany-New York flight; detail of the 8-cylinder motor; Curtiss, Post and McCurdy; at San Diego in 1911 (3); his "Hydroplane" at Cap d'Antibes (2); the Type 3 aircraft; the Type 4 (3); his pupil Eugene Burton (2); the hydroplane at Chicago, Christmas Day, 1912 (2); the new biplane at Chicago, 1913 (3); the trans-Atlantic flight, 1914 (2). Documents comprise the official program of the *Grande semaine d'aviation de la Champagne*, August 22-29, 1909; 2 typed letters signed from the Assistant Director of the Curtiss-Wright Corporation, Charles I. Morton, April 1 and May 8, 1952, to a Parisian asking about Curtiss's history.

\$3,000 - 5,000



22



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24

WORLDS COLLIDE AT PAU, 1909.

Black and white photograph, 7½ x 10 inches, mounted.

Wilbur Wright and a passenger soar over hay carts pulled by bullocks, as two farmers look upwards in awe: the manual age and the engine age in sharp juxtaposition. See a similar image offered in these rooms on April 26, 2012 (lot 1010).

\$2,000 - 3,000

25

PAU 1909: A MAN AND HIS FLYING MACHINE.

Black and white photograph, 7 x 9½ inches, mounted.

A crowd of fascinated spectators watch Wilbur Wright as he glides a few feet above ground.

\$1,500 - 2,500

26

WRIGHT AND A ROYAL DISPLAY.

Black and white photograph, 6 x 9 inches, laid on board and irregularly trimmed.

SIGNED and dated by ORVILLE WRIGHT in lower left corner: "*Pau, March 17th, 1909, Orville Wright.*" The sleepy town of Pau in the south of France became a hub of activity in the spring of 1909, as royal families and heads of state came to see the Wright Brothers fly. This image shows King Edward VII (second standing from left), King Alfonso XIII (fourth) and Orville Wright (fifth). J.P. Morgan and King Victor Emmanuel III also rushed to Pau.

\$3,000 - 5,000

27

THE WRIGHTS AT PAU, 1909.

Group of 4 black and white photographs, 4½ x 7 inches or similar, 3 with inkstamped credits on verso of J. Thézard, M. Rol and M. Branger, together with autograph note SIGNED by ORVILLE WRIGHT in pencil, to Paul Tissandier, on Hotel Gassion stationery.

WITH A NOTE FROM ORVILLE WRIGHT TO HIS PUPIL, reading "*M. Tissandier, We are not going to Cassis till afternoon. O. Wright.*"

Images include Katherine and Orville feeding a bullock, INSCRIBED by KATHERINE WRIGHT "*To Madame de Lambert, my good friend, Katherine Wright*"; the students with Orville; Katherine in the pilot's seat with Wilbur standing by; the three siblings out for a stroll.

\$3,500 - 4,500

28

PILOT TRAINING, PAU, EARLY 1909.

Group of 4 black and white photographs, 5 x 7 inches, 3 with inkstamped credits on verso of M. Rol.

In the summer of 1908, while Orville was working on convincing the American authorities of the efficacy of their machine, Wilbur was trying to fulfill the criteria set by the brothers' European backers. One stipulation was that the Wrights had to train three pilots.

Wilbur started training three students in Auvours in October 1908, but, joined by Orville and their sister Katherine, he began in earnest in 1909 at Pau in the south of France.

Comprising Wilbur and the students Capitaine Lucas de Girardville, Comte Charles de Lambert, and Paul Tissandier; Orville with Tissandier and de Lambert, demonstrating the controls; towing out an airplane; Lambert and Wilbur in flight.

\$2,500 - 3,500



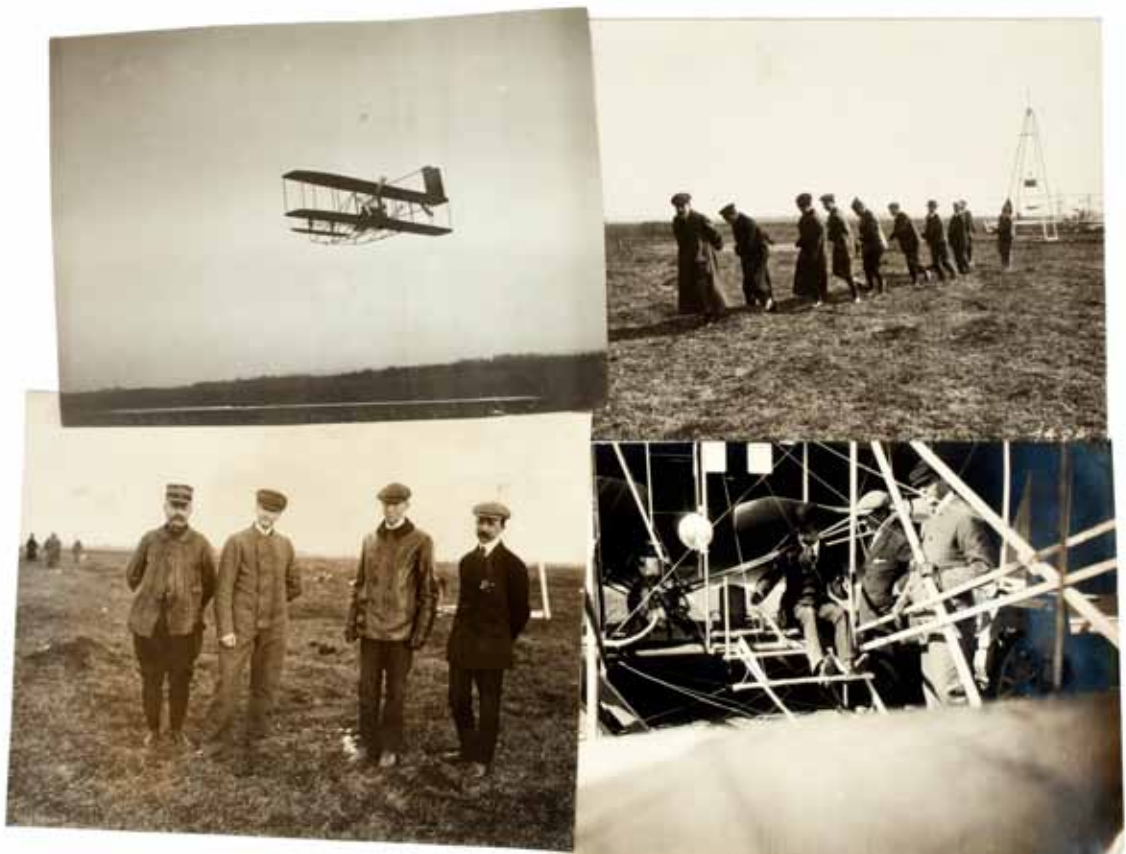
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again. Before you permit a pupil to fly alone be very sure to caution him to rise not higher than three or four meters from the ground. They should rise higher only after they have learned to land safely from any height with the motor stopped.

Since we arrived home we have been very busy at work on a new machine to use at Ft Myer. We hope Orville will begin flying there about the 20th of June, but we may be delayed a few days.

We have never had any doubts but that you would do good work on the flyer, and your long flights have not been surprising to us. No doubt, before the year ends you will be recordman of the world! We wish you continued success.

With best regards from my mother and my sister as well as myself.

Yours truly
Wilbur Wright.

29

29

WILBUR WRIGHT TO PAUL TISSANDIER.

"YOU WILL BE RECORDMAN OF THE WORLD!"

Autograph Letter Signed ("Wilbur Wright"), 4 pp recto and verso (conjoined leaves), 6 x 5 inches, Dayton, OH, June 6, 1909, to the brothers' first pupil, the Frenchman Paul Tissandier, on personal letterhead, with transmittal envelope.

AUTOGRAPH LETTERS BY WILBUR WRIGHT, WHO DIED OF TYPHOID FEVER IN 1912, ARE OF THE UTMOST RARITY. The present letter, to a key collaborator and with early date and lengthy aviation content, is highly important.

In the summer of 1908, while Orville was working on convincing the American authorities of the efficacy of their machine, Wilbur was focusing on the stipulations of the syndicate of European investors who demanded that Wright train three pilots. The students were Comte Charles de Lambert, Paul Tissandier [1881-1945], and Capitaine Lucas de Girardville. Wilbur started training the three students in Auvours in October 1908, but, joined by Orville and their sister Katherine, he began in earnest in the spring of 1909 at Pau in the south of France.

On May 18, after the Wrights' return to America, Tissandier had written to Wilbur from Paris, in broken English, that "I am now French recordman. I have turn round during 1 hour and four minutes and have made sixty kilometers." Tissandier thereby became the first person after the Wright brothers to fly for over an hour. He explained that he was still using the "old flyer which is at this time a little wear out," that he had a new engine, that he was struggling with carrying a passenger and with

piloting the Flyer from Wright's seat, and that nonetheless all the credit for the records should go to the Flyer and its creators. (Wilbur and Orville Wright Papers at the Library of Congress; General Correspondence; digital ID mwright-03235.)

Wilbur replies, noting that "you say that you are still using the old machine, though it is almost worn out. I was told that the machine which was erected at Paris under the direction of my brother, was sent to Pau and used there instead of the old one. Was not this done? If not, where was it sent? Who has it now?"

"You ought to have a good machine for teaching purposes. Then you could stay in the air with your pupil about 20 minutes each time, and teach them in less than ten lessons." He explains the benefits of longer lessons, and warns, "Before you permit a pupil to fly alone be very sure to caution him to rise not higher than three or four meters from the ground. They should rise higher only after they have learned to land safely from any height with the motor stopped."

Wilbur relays news—that Orville hopes to begin flying a new machine at Fort Myer before the end of the month—and reassures Tissandier "We have never had any doubts but that you would do good work on the flyer, and your long flights have not been surprising to us. No doubt, before the year ends, you will be recordman of the world!"

Not in *Miracle at Kitty Hawk* (1972), ed. Kelly, and apparently unpublished.

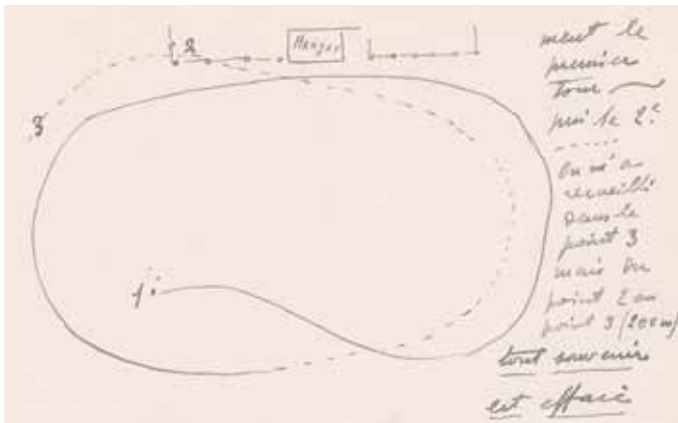
\$35,000 - 45,000



Dayton O. June 6

My dear Mr. Tissandier,

We were very glad to receive your nice letter, and to know that you were having such good success with your flying work. I notice that you say that you are still using the old machine, though it is almost worn out! I was told that the machine which was erected at Paris under



30

30 AN ITALIAN WRIGHT PILOT TO ANOTHER.

CALDERARA, MARIO. Autograph Letter Signed ("Mario Calderara"), in French, 8 pp recto and verso, conjoined leaves, 7 x 4 inches, Rome, May 11, 1909, to Paul Tissandier, with transmittal envelope. Together with 3 black and white photographs, each 4½ x 6½ inches.

Wilbur Wright came to Rome in April 1909 and, after having carried many VIPs as passengers on his machine at an airstrip at nearby Centocelle, gave lessons to Mario Calderara. He also gave a few lessons to Lieutenant Umberto Savoja, with the plan that Calderara would continue his instruction. Giovanni Pirelli, the tire manufacturer, had taken a flight with Wright and provided funding for an aviation club in Rome that would purchase a Flyer. Calderara wrote to Tissandier, one of Wright's very first pupils, less than a week after a serious air crash that left him concussed. The Italian explains: *"after the departure of M. Wright I have made several flights without incident. My landings were not always the most elegant, but they sufficed. I believed myself a master of the aircraft."* However, he begs the advice of Tissandier or the Comte de Lambert, since the other day he had an alarming crash. Providing a diagram of his flight, he explains that his last recollection is being at "point 2" on the diagram at a height of 4 or 5 meters from the earth. *"They found me at point 3, but from point 2 to point 3 (200m), every memory is blank ... I remember no shock, no descent; I awoke in my bed."* Upset and confused, he lists his injuries and regrets that the airplane suffered more damage. In desperation, he asks if Tissandier or Lambert have any idea how the crash might have occurred: *"We are the three Wright pilots in Europe; that justifies [my writing to you]."* The photographs show: Wright in conversation outside the Italian factory where Flyers were being manufactured; a Flyer under construction, with Wright's second Italian pilot Savoja in attendance; Wright and a passenger in flight in Italy (postcard).

\$3,000 - 4,000



31

31 ORVILLE WRIGHT IN BERLIN, 1909.

Group of photographs, postcards, and a document relating to Orville Wright's activities in Berlin, Germany, September 4-20, 1909. Comprising:

1. 4 black and white photographs, 4½ x 6 inches, with inkstamp of the Grebrüder Haekel on verso, showing: Orville in conversation with Chief of the Prussian general staff, von Moltke; Orville stood within the frame of his aircraft; men dragging the Model A along with press corps in front; Orville's first flight at Tempelhof Field with crowds looking on.
2. 4 real photo postcards, 3½ x 5½ inches, by AngeF. Photochemie (2), Gustav Liersch, and M. Vogel, showing: Orville taking off; in flight, with circular vignette portrait; with the Crown Prince Wilhelm, and others, in front of the Model A and a car (2).
3. Typed invitation, September 6, 1909, to a celebration of Wright at the Hotel Central, SIGNED in pencil on verso by ORVILLE WRIGHT and airship designer AUGUST VON PARSEVAL. Lightly toned overall and with tape repairs to a hole on recto and verso.

Orville made 19 flights at Tempelhof Field, drawing crowds of up to 200,000 people. His flights came in the wake of Count Zeppelin's triumphant airship flight over Berlin the previous month. Orville recaptured several world records for altitude, duration, and duration with a passenger.

\$3,000 - 4,000

32 FALL 1909 PARIS AIR RACE—SIGNED BY ORVILLE.

1. Official program for the *Grande Quinzaine d'Aviation de Paris*, October 7-21, 1909, printed in red and black throughout, original textured paper wrappers, lightly rubbed, ink and pencil notes inside wrappers.
2. Group of 3 black and white photographs and one postcard, 5 x 6 inches and smaller, inkstamped credits on verso of Rol and Branger.

The program SIGNED by ORVILLE WRIGHT. On October 10, 1909, Charles de Lambert took virtually all the prizes at the *Grande Quinzaine d'Aviation*. Jubilant and cavalier, he flew a victory lap over the city of Paris—the first time that anyone had done so. Images include a grandstand and milling crowds; wide-angle view of the field as de Lambert flies by; de Lambert at low altitude, SIGNED by DE LAMBERT (postcard); Eugene Lefebvre in flight near the timing post during the August 22-29, 1909, *Grande Semaine d'Aviation de la Champagne*.

\$2,500 - 3,500



32



33



34

33

FIRST SALES BROCHURE FOR A WRIGHT PLANE.

1. *Flugmaschine Wright G.m.b.H.* Berlin: G. Braunbeck, [1909]. 10 x 7 inches. 12 pp. Illustrations after photographs. Original green wrappers, covers printed in silver. Spine lightly rubbed, minor fading to extremities.

2. Typed letter with stamped signature, on company stationery, Berlin, January 8, 1910, enclosing the brochure and drumming up interest in air shows.

3. Two black and white photographs, 5 x 7 inches, with company inkstamp on verso, being close-ups of the engine and cockpit.

Provenance: the first item Marcel Bekus [1888-1939], Warsaw-born anarchist, participant in the Russian 1905 revolution, historian of revolution and Socialism, anti-fascist, and friend to the avant-garde (small inkstamp on verso of title); dispersed with the rest of his library by his grandson in 1985.

Flugmaschine Wright was the second Wright aircraft company established in Europe, after the C.G.N.A. Established in June 1909, it acquired the exclusive rights to manufacture Flyers in Germany and to sell them there and in other parts of Northern Europe.

The American Wright company was not incorporated until November 1909, and no sales brochure appears to have been issued by the C.G.N.A. prior to this German publication. Rare, with only four copies cited in OCLC, and with unusual provenance.

\$2,000 - 3,000

34

LOS ANGELES INTERNATIONAL AIR MEET, 1910.

Group of 5 black and white photographs, one 7 x 8 inches, the others mostly 3 x 5 inches.

The Los Angeles International Air Meet, January 10-20, 1910, was among the earliest airshows in the world and the first major airshow in the United States. It was held in Los Angeles County, at Dominguez Field in present-day Carson.

Images include a composite view of the Field by Graham Photo Co., showing various dirigibles, a Curtiss biplane, and Louis Paulhan who dominated the competitions; a Blériot airplane in tent; another Blériot; men posing in front of an airplane (2).

\$1,000 - 1,500

35

MOISANT BROTHERS.

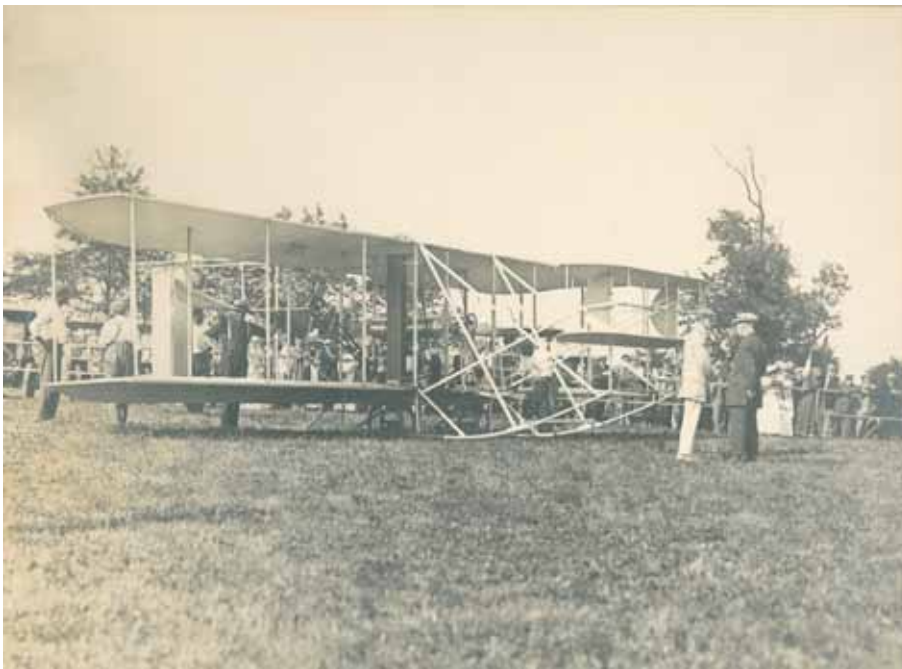
Collection of black and white photographs, documents and ephemera relating to John and Alfred Moisant, images include John and his cat Miss Paris, the first cat to fly over the English Channel; the two brothers; Moisant's monoplane (2, one signed and dated Paris, May 15, 1910); his aluminum and steel airplane at Issy-les-Moulineaux and elsewhere (6, plus one photogravure postcard); crossing the Channel (5, plus 3 postcards); French pilots leaving Paris by train for America, December 1910; events at the December 1910 Air Race in New Orleans (6, including 2 of Moisant's fatal flight in his attempt to win the Michelin Cup and its \$4,000 prize, when he was thrown from his Blériot monoplane and landed on his head; visit of the Moisant International Aviators to El Paso, 1912 (4); ditto, to Mexico City; Roland Garros, Edmond Audemars, and Barrier at Havana, Cuba.

Documents comprise a 2-page typed application form for John's entry into the Fêtes d'Aviation de Nancy, completed in manuscript (apparently in Moisant's hand) and SIGNED by him at foot, dated August 5, 1910; a typed letter SIGNED by John, same place and date, to the aircraft manufacturer Borel & Cie., qualifying the financial terms of his engagement at Nancy; a typed letter SIGNED by Alfred, May 15, 1911, on Moisant International Aviators stationery, to Edmond Audemars of the Société Commerciale Franco-Américaine, discussing the manufacture of Moisant airplanes, their flight school, and exhibitions in the Midwest.

John Moisant took flying lessons from Blériot, and built the first all-metal aircraft, in 1909. With his brother, Alfred Moisant, he formed the Moisant International Aviators, a flying circus which went barnstorming around the United States. He met his death in New Orleans in an air crash.

See illustration overleaf.

\$6,000 - 8,000



36

36
WRIGHT BIPLANE WITH WHEELS, ASBURY PARK, NJ.

Large black and white photograph, 10 x 13 inches, in period window mount, captioned below.

A detailed photograph of the first appearance of a Wright airplane with wheels under the skids, on August 10, 1910. The Wright Company had entered into a contract with the Aero and Motor Club of Asbury Park, NJ, to provide Wright aircraft at the August aviation meet. The brothers had experimented with wheeled skids on July 21, in Dayton. The airplane was damaged on August 10 when its pilot, Walter Brookins, swerved to avoid photographers, stalled, and hit several spectators.

\$2,000 - 3,000



38

37
CHARLES ROLLS CROSSES THE CHANNEL TWICE.

1. Autograph Letter Signed ("C.S. Rolls"), 1 p, 10 x 8 inches, London, June 10, 1910, in French, to Paul Tissandier, on personal stationery. Together with a similar typed letter with stamped signature.
2. Group of 3 black and white photographs and one postcard, 7 x 9 inches and smaller, inkstamps on verso of Branger and Illustration Bureau.

Shortly after his record-breaking non-stop return trip over the English Channel, and a month before his death in a plane crash, the co-founder of Rolls Royce writes to a fellow pioneer asking which type of valves he is using in his engine and suggesting changing them occasionally. Images include Rolls suiting up with buoyancy aid; his Wright aircraft being led out onto the airstrip; distant view of him over the cliffs of Dover; rounding the lighthouse at Calais (postcard).

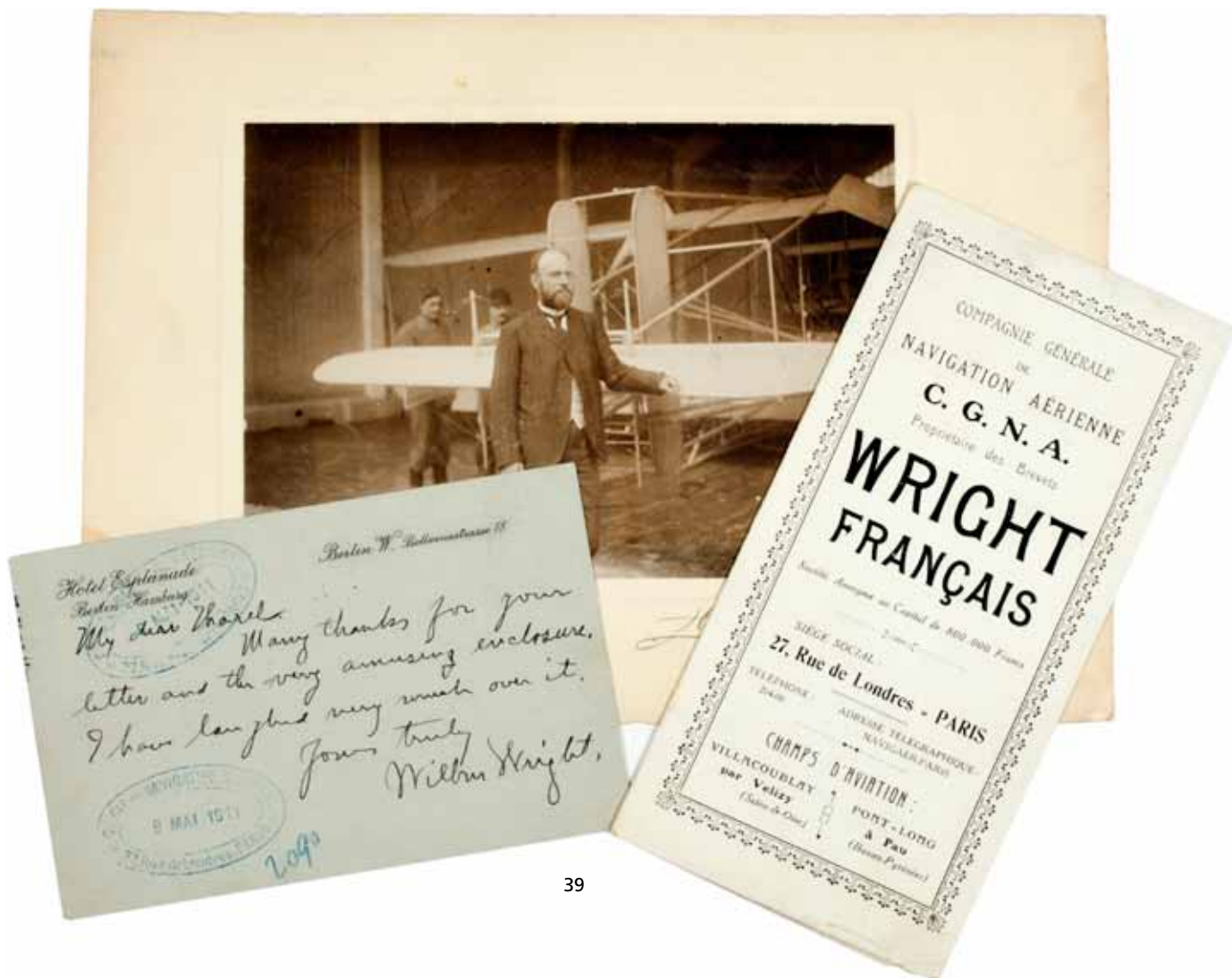
\$4,000 - 6,000

38
BELMONT PARK AIR MEET, NEW YORK, 1910.

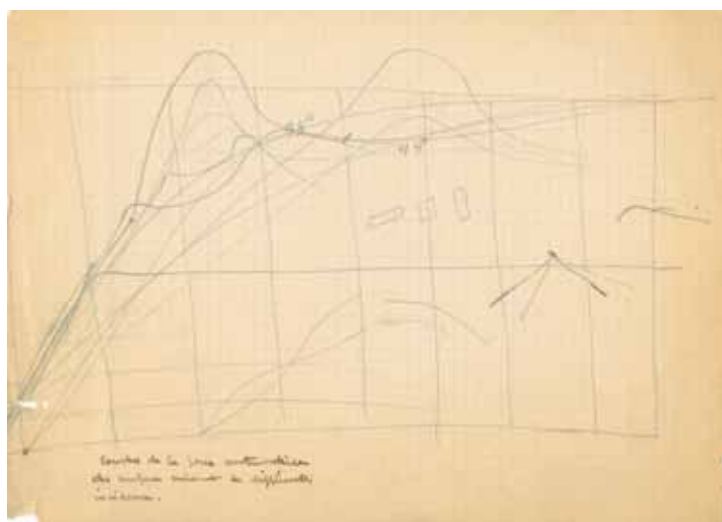
Group of 7 black and white photographs, various sizes, around 4 x 6 inches. Together with the *Official Programme of the International Aviation Tournament at Belmont Park, October 22 to 30, 1910*, issued by the Aero Corporation of New York. Program worn, one leaf torn through and another torn with loss.

Images include Orville Wright and Hubert Latham; the 65hp engine in the new Wright, probably the Baby Grand; a nonchalant Claude Grahame-White; 2 further portraits of him, one with the Gordon Bennett Trophy which he secured at Belmont; his 100hp Blériot; engine closeup of an unidentified machine.

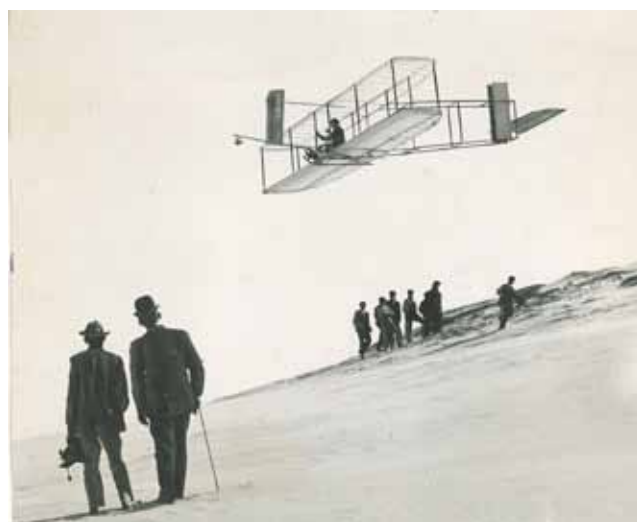
\$1,200 - 1,500



39



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41

39

WILBUR WRIGHT AND THE COMPAGNIE.

1. Autograph Note Signed ("Wilbur Wright"), 1 p, postcard, Berlin, May 6, 1911, to Georges Tharel, a director of the Compagnie Générale de Navigation Aérienne (C.G.N.A.), thanking him for a letter and enclosure and saying it amused him.
2. Sepia-toned photograph of Tharel posing by a Flyer, 4½ x 7 inches laid on larger mount, signed below by photographer Henri Manuel.
3. Small printed leaflet regarding the C.G.N.A., 4 pp, Paris, c.1911, 2 illustrations after photographs.

Founded by Lazare Weiller, the C.G.N.A. licensed the rights to manufacture and sell Wright airplanes in France. Autograph letters by Wilbur of any length are rare, as he died in May 1912 from typhoid.

\$4,000 - 6,000

40

SKETCHES BY WILBUR WRIGHT FOR TISSANDIER.

Two sheets of graph paper, 18 x 12 inches and 7 x 4 inches, with extensive pencil sketches recto and verso, and annotations in ink by Paul Tissandier. Some chipping and short tears at edges, lightly toned.

"SKETCH DONE BY WILBUR WRIGHT AT MY HOME IN PARIS. JUNE 1911, PAUL TISSANDIER."

An intriguing group of diagrams apparently used in the instruction of the Wright brothers' pupil Tissandier. Consisting of around seven diagrams, mostly captioned in Tissandier's hand in French. On the larger sheet, all apparently in Wilbur's hand (*"fait par Wilbur Wright"*): cross-section showing a stick figure with a rudimentary wing (probably an allusion to one of the Kitty Hawk gliders); *"Map of the area where Kitty Hawk was, where he had his first experiences"*; map of the airstrip at Dayton, so captioned; indistinct sketches showing a wing in profile; loosely-delineated *"graph of the lift-generating force of surfaces at different incidences."*

On the smaller sheet: another plan of the Dayton aerodrome, by Orville and so captioned; *"Sketch of the tests that Wilbur and Orville made to find out the best form for the uprights of the machine, sketch made at my home by Orville Wright in December 1910, Paul Tissandier."*

Orville left the US for Europe in November 1910, and found both the German and French Wright companies struggling financially. Wilbur followed in March of the following year, to testify in a French patent suit in Paris and to train pilots in Germany.

\$4,000 - 5,000

41

ORVILLE AND THE 1911 GLIDER AT KILL DEVIL HILLS.

Group of 11 black and white photographs, 5½ x 7 inches and slightly smaller, most with inkstamped credit on verso of the P-J Press Bureau of Philadelphia.

In 1911 Orville Wright returned to the Kill Devil Hills with a new glider, accompanied by his English friend Alec Ogilvie. The glider had what is now considered a "conventional tailplane" rather than the front mounted elevator. The pilot also was seated with hand controls, rather than lying prone in a cradle, as with the original gliders. On October 24, 1911, Orville soared above Kill Devil Hill for 9 minutes 45 seconds, handily breaking the brothers' previous record of just over one minute, set in 1903. The new record stood for ten years.

Images include a team assembling the glider in front of the hangar; Orville measuring the course with a rangefinder; Wright and Alec Ogilvie working on the machine (4); carrying the glider up the hill for the start; in flight at some altitude (3); a minor accident.

\$3,000 - 5,000

42

WRIGHT BROTHERS AND THE PATENT WAR.

Small group of documents relating to the Wrights' legal battles over patents with Glenn Curtiss and others, comprising:

1. *Circuit Court of the United States ... The Wright Company, Complainant, against the Herring-Curtiss Company and Glenn Curtiss, Defendants... Opinion by John R. Hazel ... The Wright Company, Complainant, against Louis Paulhan, Defendant. Opinion by Samuel Hand.* New York: C.G. Burgoyne, [1910]. 16 pp. 9 x 6 inches. Printed wrappers. Wrappers dust-soiled, previously folded vertically.
 2. Typescript, 22 pp recto only, 12½ x 8½ inches, being a transcript of the cross-examination of Wilbur Wright, September 13-16, 1911.
 3. Carbon copy typescript, 32 pp recto only, 10½ x 8 inches, being a French translation of the judgment handed down by the District Court of New York on February 21, 1913, in the case Wright Company against Herring-Curtiss Company.
 4. Typescript, 26 pp recto only, 12 x 8 inches, being a summary of the proceedings in the District Court on February 21, 1913, and the Circuit Court of Appeals on January 13, 1914, with 2 black and white photographic reproductions of diagrams of the Flyer.
- All somewhat toned and brittle.

The Wright brothers sued Curtiss for infringing their patent by profiting from flying or selling aircraft that used ailerons, and also sued foreign aviators who flew at US exhibitions, including the leading French aviator Louis Paulhan. The patent war came to an end in 1917 when the US Government realized the legal disputes were affecting the supply of airplanes so vitally needed in the ongoing war. The Government stepped in and enforced a patent pool that would lower licensing fees but provide a stream of revenue to Wright and Curtiss.

\$2,000 - 3,000

4
DID ADER FLY?

General Mensier's Report.

Mr. Ernest Archdeacon has at last received General Mensier's report of the tests of Clement Aders Aviation Apparatus. Following is the report in its entirety:

General Mensier's Report.

Paris, October 21, 1897.

Report of the Trials of Mr. Clement Aders Aviation Apparatus.

Mr. Ader having notified the Minister of War by letter, July 21, 1897, that the Apparatus of Aviation which he had agreed to build under the conditions set forth in the Convention of July 24, 1894 was ready, and therefore, requesting that trials be undertaken before a Committee appointed for this purpose as per the decision of August 4, The Committee was appointed as follows;

Division General Mensier, Chairman, Division General Delambre Inspector General of the Permanent Works for Coast Defense, Member of the Technical Committee of the Engineering Corps; Colonel Laussedat, Director of the Conservatoire des Arts et Metiers; Sarrau, Member of the Institute, Professor of Mechanical Engineering at the Polytechnique School; Leaute, Member of the Institute Professor of Mechanical Engineering at the Polytechnique School.

Colonel Laussedat gave notice at once that his health and work as Director of the Conservatoire des Arts et Metiers did not permit him to be a member of the Committee; The Minister therefore, accepted his resignation, September 24 and decided not to replace him.

Later on, however, on the request of the Chairman of the Committee, the Minister appointed a new member, General Grillon, commanding the Engineer Corps of the Military Government of Paris.

To carry on the trials which were to take place at the Camp of Satory, the Minister ordered the Governor of the Military forces of Paris to requisition from the Engineer Corps on request of the Chairman of the Committee, the men necessary to prepare the grounds at Satory.

After an inspection made on the 16th an *aerodrome* was chosen. Mr. Ader's idea was to have it of circular shape with a width of 40 meters and an average diameter of 450 meters. The preliminary work, laying out the grounds, interior and exterior circumference, etc. was finished at the end of August; The work of smoothing off the grounds began September 1, with 45 men and two rollers and was finished on the day of the first tests October 12.

The first meeting of the Committee was held August 18 in Mr. Ader's workshop; the object being to demonstrate the machine to the Committee and give the members all the information possible on the tests that were to be held. After a careful examination and after having heard all the explanation, by the inventor, which were deemed useful and necessary, the Committee decided that the



44

43

WILBUR WRIGHT'S TYPED DRAFT OF AN ESSAY.

Typed Manuscript Signed ("Wilbur Wright") at foot of the final page, 10 pp, 11 x 8½ inches, [Dayton, 1912], being an emended early draft of Wilbur's essay entitled "*Clement Ader—What He Did,*" with additions and corrections by Orville Wright in ink and pencil notations by an unidentified editor from the Aero Club of America *Bulletin*, soiled.

Provenance: the Otto Kallir Collection of Aviation History, Sotheby's New York, June 14, 1993, lot 103.

ONE OF THE FINAL ESSAYS BY WILBUR WRIGHT BEFORE HIS SUDDEN DEATH ON MAY 30, 1912, WITH NOTES BY ORVILLE.

Wright's essay concerns the French engineer, Clement Ader, and pertains to the brothers' priority in their invention of a flying machine. In his words, "*after the possibility of human flight had been demonstrated by the Wright brothers, claims began to be made that the Ader machine before being wrecked had flown nearly one thousand feet in 1897. After a time a systematic attempt was begun to establish by constant repetition a legend which might eventually displace the truth. But the friends of M. Santos Dumont, who claimed the honor of being the first man to fly within the borders of France, became aroused and a heated controversy arose. At length M. Archdeacon succeeded in obtaining permission of the French Ministry of War to publish the official report of the Commission which supervised the trials of the Ader machine in 1897....*" The official report, which Wright quotes in its entirety here, unambiguously states that the Ader machine never took flight.

The essay was published under the title "What Clement Ader Did" in the Aero Club of America *Bulletin*, volume 1 no 3, New York, May 1912, pp. 17-19. A copy of the *Bulletin* is included in the lot.

According to the Chief Archivist of Wright State University at Dayton, only seven Wilbur Wright articles were published. Five of the typescripts are at WSU or the Library of Congress; two, including the present example, were part of the Otto Kallir collection; the remaining Kallir typescript is believed to have been sold privately circa 2003.

\$25,000 - 35,000

44

SELLING THE WRIGHT FLYERS, 1912.

Wright Flyers. New York: [the Wright Company, c.1912].

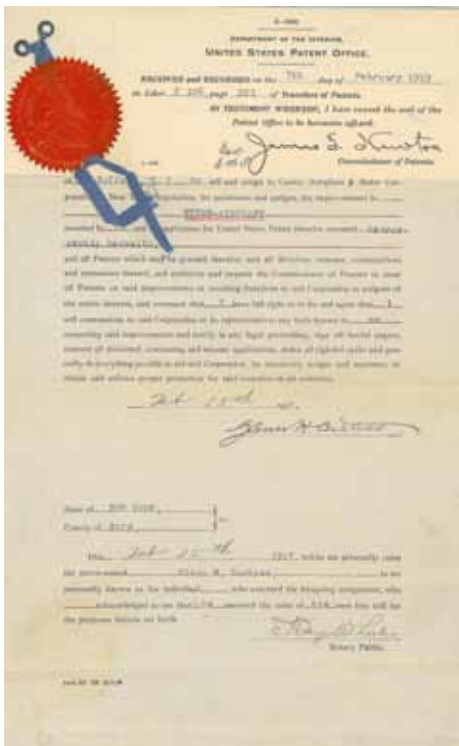
Brochure, 6 x 4 inches. 16 pp. Illustrations after photographs. Original printed wrappers, upper cover with tipped-on illustration of the Flyer in flight. Very light rubbing.

A charming brochure, listing the features of Flyer models B, C, and D, and promoting the School of Aviation ("*No Charges for Breakage*"), the fee for which has been reduced in manuscript.

\$1,500 - 2,500



45



47



48



49

45

NEW YORK FROM THE AIR, 1912.

Group of 3 black and white photographs, 5 x 7 inches, with inkstamped credits on verso of M. Rol.

THE FIRST IMAGES OF NEW YORK FROM THE AIR. Frank Coffyn was from a wealthy banking family, and was taught to fly by Wilbur Wright in Dayton in May, 1910. He flew with the Wright Exhibition Team, and in January of 1912 he was commissioned to shoot the first aerial footage of New York City. Comprising an aerial view of the Statue of Liberty; Coffyn in front of his flying boat; the machine in icy water just before taking off.

\$1,500 - 2,500

46

2,000 MILES UP THE MISSISSIPPI.

Group of 5 black and white photographs, approximately 4 x 6 inches, with inkstamped credits and captions on verso of M. Rol.

Tony Jannus [1889-1916] was an early American pilot who in 1912 flew the first airplane from which a parachute jump was made. Later that year, Jannus set a 1,900-mile overwater flight record following the Missouri and Mississippi Rivers from Omaha to New Orleans in a Benoist Land Tractor Type XII mounted with floats.

Images include a view in flight over the river; Jannus checking the propeller; an oval portrait; a biplane flying boat, identified in the caption as Gyro-powered and called *Columbia* (perhaps the *Miss Columbia* manufactured by Washington); and a Thomas Flying Boat belonging to aviation evangelist Alfred Lawson, who used it to commute from Seidler's Beach, NJ, to 75th Street in New York City.

\$600 - 800

47

CURTISS' HYDRO-AIRCRAFT PATENT.

1. Printed document, 1 p, 12½ x 8 inches, executed February 15, 1917, accomplished in typescript and manuscript, being an assignment by Glenn Curtiss of "*the improvements in Hydro-aircraft*" and the associated patents to the Curtiss Aeroplane and Motor Corporation of New York, SIGNED by CURTISS, notarized, and docketed with US Patent Office seal.
2. 3 black and white photographs, 5 x 6½ inches, being two images of Curtiss' NC-4 flying boat and one close-up of an NC-4 engine.

In 1917, the US Navy commissioned Curtiss to design a long-range flying boat to hold a crew of five. In May, 1919, the resulting NC-4 became the first aircraft of any kind to fly across the Atlantic Ocean (albeit with a stop at the Azores). By flying from Massachusetts via Halifax to Lisbon, the NC-4 also flew from mainland-to-mainland of North America and Europe. The NC-4 is on loan from the Smithsonian to the National Museum of Naval Aviation in Pensacola, FL.

\$5,000 - 7,000

48

LINDBERGH MEMORABILIA.

1. A square fragment of silver-coated textile, 4 x 6½ inches, believed to be from the Spirit of St. Louis. Inscribed on the verso in pencil "Morceau de toile du Spirit of St. Louis de Lindbergh, mai 1927," compared favourably alongside another fragment held by Paris' Le Bourget Air and Space Museum.
2. Two Lindbergh-flown postal covers, postmarked Tucson, AZ, September 23, 1927, and Saint Louis, MO, February 20, 1928, the former torn and repaired with tape, the latter with enclosed letter.
3. Commemorative woven silk bookmark, manufactured by the Warner Woven Label Co. of Patterson, NJ.
4. Black and white photograph, 5 x 7½ inches, inkstamp on verso of M. Rol, showing the Spirit of St. Louis at Le Bourget, May 23, 1927.
5. WEBB, A.C. Etching of the Spirit of St. Louis in flight, 9¾ x 6¼ inches, signed A.C. Webb lower right, titled "*New York-Paris, May 20-21, 1927*" and numbered 26/100, matted.

The Spirit of St. Louis was almost torn to shreds by souvenir-hunters when it landed at Le Bourget, outside Paris. "Within minutes of his turning off the magneto switch, [Lindbergh] was besieged in his small cockpit by people.... He could feel his beloved airplane move from the onrush and pressure of the people and the cracking of wood stringers on the side of the fuselage, the ripping of the fuselage fabric, the yelling and screaming" (Ev Cassagneres, *The Untold Story of the Spirit of St. Louis*, p 84).

\$2,000 - 3,000

49

LINDBERGH PHOTOGRAPHS.

Group of approximately 28 black and white photographs, various sizes, 10 x 8 inches and smaller, mostly press photographs with captions printed or pasted on verso, a little curled and dog-eared, a handful of copy prints.

Images include a relaxed Lindbergh, hands in pockets; with Chamberlin and Byrd; the instrument panel; with Anne and French air minister Pierre Cot; his reception at the Hotel de Ville; with dignitaries; with French aviator René Fonck; the Spirit of St. Louis near the hangars at Le Bourget.

\$2,000 - 3,000



50

50 RICHARD EVELYN BYRD COLLECTION.

Small group of documents and photographs relating to Byrd, comprising:

1. 4 Typed Letters Signed ("R.E. Byrd," "Dick Byrd"), 4 pp recto only, 10½ x 8½ inches, Massachusetts, August, 1927-December, 1938, to the journalist Daniel Rochford, mostly of fairly brief content, together with a letter from Rochford to Byrd in 1927 relating to a Trans-Atlantic fund.
2. Typed Letter from the office of the Governor of Massachusetts relating to the welcoming home of Byrd after his 1933-35 Antarctic Expedition.
3. Dinner menu for a meal in honor of Byrd at the Hotel Astor, June 25, 1930 ("Coupe of melon South Pole," "Brook Trout in Jelly à la Byrd"), and seating list for the same. Together with invitation to the 1935 welcome home dinner.
4. Postal cover with "Byrd Antarctic Expedition II" cachet and Little America, Antarctica, January 30, 1935 postmark.
5. 4 black and white photographs, 7 x 9 inches and smaller, of: the Antarctic Expedition II Curtiss-Wright Condor (2); the Lockheed Vega used by Amelia Earhart to cross the Atlantic on May 20, 1932, but lent to the polar aviator Bernt Balchen to confuse the press; Byrd.

\$2,000 - 3,000

51 AMERICAN AVIATORS.

Collection of approximately 72 black and white photographs, various sizes, mostly around 5 x 7 inches. Most with printed captions pasted on verso.

Images include Frank Hawks and his wife with a sister aircraft of the Spirit of St. Louis, in 1927; several others of Hawks; Mr and Mrs J.L. O'Donnell before a New York-Spokane race in 1927; Ruth Elder; Beryl Hart; Jack O'Meara landing in Havana; the seaplane Calcutta; Roy W. Ammel; skydiver Frank Brooks; Russell L. Maugham; Robert J. Cantwell; Parker D. Cramer; Harold Bromley; Walter Lees and Frederic Brossy; Charles A. Levine; Bernt Balchen, Clarence Chamberlin, and others; Errol Boyd; Harold June of a Byrd expedition; Harry Richman; Green Flash taking off; a tiny Knight Twister; Jimmy Doolittle with the Harmon Trophy.

\$1,500 - 2,500



52

52

IGOR SIKORSKY ARCHIVE.

1. Typed Letter Signed ("W.W. Cargill"), 2¼ pp, 11 x 8 inches, Bridgeport, CT, June 4, 1930, to J.T. Trippe, President of Pan American Airways, offering to sell him a Sikorsky Amphibion Type S-39, on Sikorsky stationery. Together with a glossy brochure for the same; a folding schematic; approximately 34 black and white photographs, 8 x 10 inches, on printing-out paper, showing the S-39 and its components in detail.
2. Large black and white photograph, 11 x 20 inches, of the first annual dinner of the American Helicopter Society in 1944. Laid on board with tears and creases mostly at extremities, several attendees identified in ink.
3. Original illustration of the Sikorsky S-55 helicopter with vignette portrait of Igor Sikorsky, gouache and airbrush on board, 18 x 22 inches, signed lower right ("R.W. Hibbs, '44").
4. 8 black and white photographs of the S-55, 6 being 11 x 14 inches, 2 being 16 x 20 inches.
5. 4 black and white photographs of Goldsborough, Islamoff and Curtin of the ill-fated 1926 Fonck attempt to cross the Atlantic, and the engine of the Sikorsky S-35 in which they hoped to do so, mostly 8 x 6 inches.

\$1,500 - 2,500

...ed to the Moon aboard Apollo XI
July 1969

Space History

March 25, 2013 at 2pm

Lots 53 - 325



Michael
Hallman

Book



53



54



55

Astronomy & Rocketry

53

ALBUMEN PRINT OF THE MOON FROM 1874.

DRAPER, HENRY. 1837-1882, attributed. "Clavius, the moons diameter 30 inches," probably from Hastings-on-Hudson, NY, February 28, 1874, albumen print mounted, 8 x 7 inches (205 x 180 mm), titled and inscribed in pencil "Voigtlander 16305," framed.

BY THE FIRST MAN TO TAKE A CLEAR PHOTOGRAPH OF THE MOON? The attribution to Draper is uncertain, but he is known to have been using a Voigtlander lens for astrophotography around this time. A doctor, he was also a keen astronomer and directed an expedition to photograph the 1874 transit of Venus. "16305" is almost certainly the serial number of the lens, indicating it was manufactured in 1870.

\$1,500 - 2,500

54

THE MOON AT 167 HOURS.

HENRY, PAUL P. AND PROSPER M. The Moon at 167 hours, from the Paris Observatory, March 27, 1890, albumen print mounted, 15½ x 11½ inches (395 x 290 mm), captioned above and below in ink.

Astronomers at the Paris Observatory, the brothers Henry inherited in 1872 a project begun twenty years earlier—the mapping of the heavens by means of painstaking observation, calculation, and notation. From 1884 they began to employ photography in their task, and developed an extraordinarily precise mechanism for tracking stars across the night sky during exposures as long as one hour. They were thus able to photograph stars so distant and faint that they had hitherto been invisible to the eye.

\$1,500 - 2,500

55

THE MOON AT 215 HOURS.

HENRY, PAUL P. AND PROSPER M. The Moon at 215 hours, from the Paris Observatory, March 29, 1890, albumen print mounted, 15½ x 11½ inches (395 x 290 mm), captioned above and below in ink.

\$1,500 - 2,500



56

**56
THE GREAT NEBULA IN ORION.**

Black and white photograph of the Great Nebula in Orion, by Andrew Ainslie Common. Gelatin silver print, mounted, printed first quarter 20th century. 11½ x 9½ inches. Captioned on mount in ink, and with pasted-on typed label recording the donation of this print by Miss V.M. Common in 1937. Framed.

Photographed by Common [1841-1903] through his 5-foot reflector, completed in 1889 and modified in 1891. The present photograph, according to an ink caption on the mount, was taken "about 1890." After Common's death, the telescope was purchased by Harvard College Observatory for \$20,000.

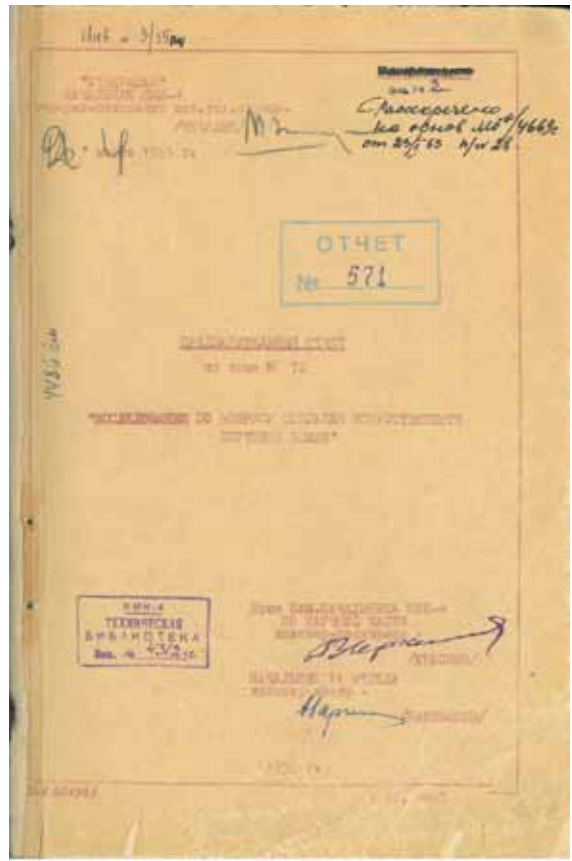
\$1,000 - 1,500

**57[□]
VON BRAUN ON SPACE AND PHYSICS.**

Typed Sentiment Signed ("Wernher von Braun"), 1 p, 9 x 7½ inches.

SIGNED by von Braun: "Everything in space obeys the laws of physics. If you know these laws, and obey them, space will treat you kindly. And don't tell me man doesn't belong out there. Man belongs wherever he wants to go - and he'll do plenty well when he gets there."

\$400 - 600



58

**58
EXTREMELY EARLY SOVIET REPORT ON SATELLITES.**

TIKHONRAVOV, MIKHAIL KLAVDIEVICH. 1900-1974. [The Research on the Problem of Creating an Artificial Earth Satellite.] [Moscow]: Scientific Research Institute No. 4, March 29, 1955 but with additions to April 2, 1955. 445 pp. Mimeographed typescript. Numerous diagrams, including two folding, 3 pasted-in gelatin silver print photographs. 11½ x 8¼. Bound in blue cloth (considerably frayed). Number 2 from an edition of 5; declassification stamps dated January, 1963.

A top secret preliminary report issued only a few months after Sergei Korolev proposed the development of an Earth-orbiting satellite to the Minister of Defense, thus initiating the *Sputnik 1* project. The equivalent American project was not announced until July of 1955. Tikhonravov identifies himself as principal investigator at the close of the introduction; he went on to become a pioneer of spacecraft design under Korolev at OKB-1. Chapter include, "Launching a Satellite into Orbit," "Perturbations of a Satellite's Orbit," "The Problem of Descent," "Approximate Characteristics of a Radio Communication Complex," "Grounding of Preliminary Requirements for Optical Means of Measuring Satellite's Coordinates," "The Simplest Automatic Satellite," and, chillingly, "Probable Accuracy of Hitting the Target when Throwing Loads from Orbit."

\$6,000 - 8,000

**59[□]
ON THE THRESHOLD OF SPACE.**

Gli eroi della stratosfera. Naples: G. Scarpati, 1956. Color lithographed poster. 55 x 33½ inches. Laid on linen.

Italian poster for the movie *On the Threshold of Space*, directed by Robert D. Webb and starring Guy Madison, Virginia Leith and John Hodiak. The movie is an historical depiction of high-altitude tests done to prepare the US for space travel.

\$500 - 700



61

60[□]

THIOKOL'S VERSION OF THE V-2 ROCKET.

Spool of 16mm motion picture film, in metal canister with paper label titled twice in ink, including "Copy of RMI-Thiokol V-2 film."

Believed to be footage of the testing of a V-2 based Thiokol rocket, possibly the Thiokol Recruit or Sergeant, described in 1958 by *New Scientist* as "a solid-fuel V2." Wernher von Braun was closely involved in the project. It was also in 1958 that Thiokol merged with Reaction Motors Inc. (RMI).

Sold together with a scale model of an RVX1-5 nose cone that was fired by a USAF Thor-Able missile in 1959. This re-entry vehicle was the first such vehicle recovered by the United States after an intercontinental-range flight. The model 7 inches long and mounted on stand with plaque, and manufactured by Avco Research and Advanced Development.

\$300 - 500



61 (reverse)

61[□]

SOVIET SURFACE-TO-AIR MISSILE ENGINE.

Liquid propellant sustainer powerplant, designed by the bureau of celebrated rocket engine designer Alexei M. Isayev. 39 x 14 x 14 inches, approximately 140lb 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.

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.

\$2,500 - 3,500



62

USSR'S ANSWER TO THE SATURN V.

Very large model of the Soviet N1-L3 rocket, one of two examples produced by Energia Corporation. Resin and metal. The rocket itself 56 inches tall x 13½ inches at widest point (grid fins), raised slightly on stand. Scale 1:72.

Development on the N1 rocket began in 1959, under the direction of Sergei Korolev. It was designed to deliver a payload beyond Earth orbit, and ultimately to the Moon; the N1-L3 model would carry the L3 lunar payload, consisting of an Earth departure stage and a lunar landing assist stage, in addition to a single-cosmonaut lunar lander and a two-cosmonaut lunar orbiter. By November of 1967, a mock-up was complete and on the launch pad.

The completed N1 was very slightly shorter than the Saturn V, but had a greater lift-off thrust. The N1 was made up of three stages, each of which had a conical liquid oxygen tank topped off with a spherical kerosene tank. The first stage carried some thirty engines, and the resulting complex plumbing proved problematic.

As a result of its technical difficulties, in turn due to lack of funding for full-up testing, the N1 never successfully completed a test flight. All four unmanned launches out of 12 planned tests ended in failure, each before first-stage separation. The longest flight lasted 107 seconds, just before first stage separation. Two test launches occurred in 1969, one in 1971 and the final one in 1972.

The tallest rocket model we have handled, and a striking relic of the Soviet lunar program.

\$8,000 - 12,000

63

LITTLE JOE BLUEPRINTS.

1. "Little Joe Capsule & Adapter," blueprint, July 14, 1959. 21 x 35 inches. Framed.

2. "Little Joe Capsule—Shot No. 1 (Only)," blueprint, NASA Langley Research Center, June 12, 1959. 24 x 55 inches. The capsule is shown in different orientations and with cutaways. Framed.

Little Joe was an unmanned American solid-fueled booster rocket used for eight launches from 1959–1960 from Wallops Island, VA, to test the launch escape system and heat shield for Project Mercury capsules.

\$800 - 1,200

Project Mercury & Vostok

64

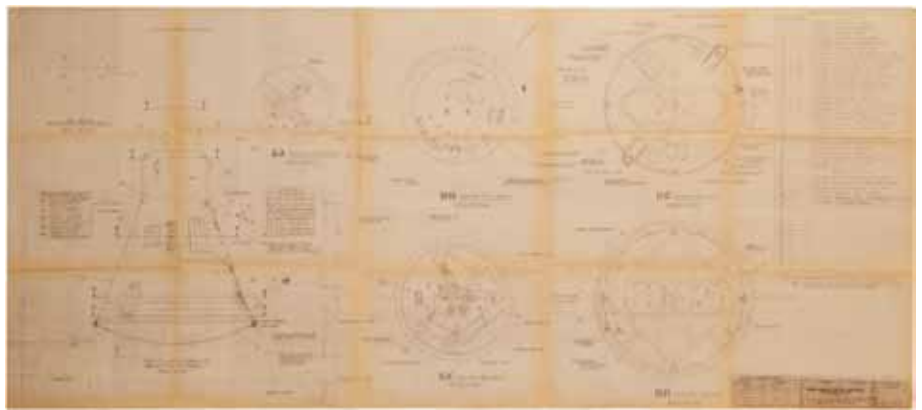
SCHIRRA, DOUGLAS F3D, AND THE SIDEWINDER.

LEYDENFROST, ALEXANDER, artist. Douglas F3D Skyknights in flight over a bombed factory, oil on canvas, 20 x 31 inches, signed lower left.

Prior to his NASA career, Schirra served in the Navy and as a test pilot. At China Lake Naval Ordnance Test Station, in California, he tested weapons systems such as the Sidewinder missile. During one flight, he fired a Sidewinder and the missile "doubled back" and started to chase his jet. Schirra, through skillful flying, avoided the Sidewinder.

INSCRIBED by WALLY SCHIRRA "Wally Schirra, 1952 - first kill with Sidewinder at China Lake (kill was a B-17!)"

This painting appeared in the 1964 Burt Lancaster motion picture *Seven Days in May*.
\$1,500 - 2,500



63



64

65

MERCURY CAPSULE.

1. Pencil sketch of the Mercury capsule, April 27, 1959, signed by Dusty Carter. 11 x 15½ inches. Shows the capsule in profile, with detailed diagram of the launch escape tower. Framed.

2. "General Mercury Model," blueprint, McDonnell Aircraft Corporation, March 6, 1959. 11 x 17 inches. Cross section of the Mercury capsule and launch escape tower assemblage, by R. Kolenkiewicz. Pencil annotations on recto and verso. Framed.

\$700 - 900

66

MERCURY ASTRONAUTS—SIGNED.

Black and white photograph, 8 x 10 inches, with printed NASA identification information along upper border.

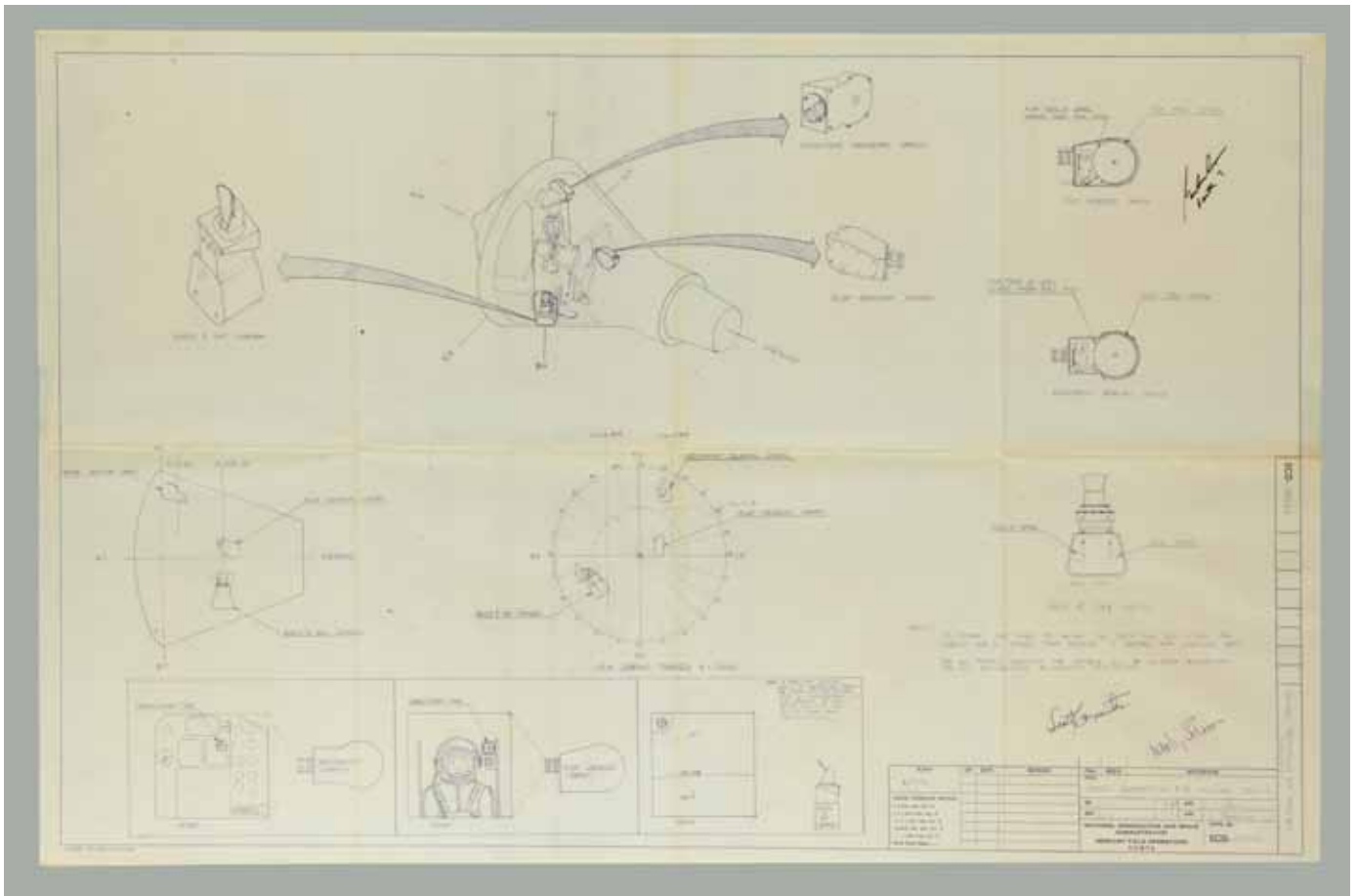
The seven Mercury Astronauts pose with a Mercury-Atlas rocket model.

SIGNED by SCOTT CARPENTER, GORDON COOPER, JOHN GLENN, WALLY SCHIRRA, ALAN SHEPARD, and D.K. SLAYTON.

\$1,500 - 2,500



66



67

67

ORIENTATION OF THE MERCURY FLIGHT CAMERAS.

"Camera Orientation for Mercury Capsules," blueprint, NASA Mercury Field Operations, DWG. No. SCD-100023, January 3-4, 1961, 22 x 34 inches, scale "None."

The blueprint provides details of the locations and viewing angles for all three Mercury spacecraft onboard film cameras. Additionally, the Earth and Sky Camera, Pilot Observation Camera, and Instrument Observing Camera are shown with their respective film reel covers removed. The latter two are 16mm motion picture cameras.

SIGNED by SCOTT CARPENTER, WALLY SCHIRRA, and GORDON COOPER who has added "Faith 7."
\$7,000 - 9,000

The following lot was originally in the collection of Astronaut Walter M. "Wally" Schirra.

68

SCHIRRA'S APOLLO CREW SELECTION MEMO.

THE BEGINNING OF THE ASTRONAUT "PECKING ORDER." Wally Schirra's original carbon review copy of a 26 June 1961 NASA Space Task Group Memorandum to the NASA Langley Field Director Floyd Thompson. The memo is titled: *"Proposal for Apollo crew selection and training"* and consists of five carbon sheets, each being rubber stamped "CONFIDENTIAL."

Created to respond to a NASA Headquarters crew selection study and just weeks after President John F. Kennedy's announced goal to land on the Moon. Primary authors Alan B. Shepard and Donald K. Slayton state on the first sheet that *"requirements are key to selection and training, plus having considerable impact on spacecraft design, it appears that a definition of crew requirements at the earliest possible date would serve to place all crew factors in their proper perspective."* Desirable scientific disciplines should be included with a logical approach to cross-train to the extent necessary. This approach in crew selection *"would eliminate controversy between various factions of the scientific community, political appointees, and all other pressure groups with an assumed interest."*

Based on the presently stated mission objective, which is landing on the moon, limited observation and exploration, and safe return, the following three-man crew seems logical and effective for the operational phases..." which are discussed in detail on sheet 2. The bottom of sheet 2 has space for the signatures of Shepard and Slayton.

Sheet 3 is titled *"Enclosure 1"* and lists qualifications such as education levels, age, physical size, and aircraft flight experience for the roles of *"Spacecraft Commander/Pilot, Navigator/Copilot, and System Manager."*

Sheets 4 and 5 list additional selection requirements including *"18 months general training, 6 months specific mission training"* for the first Saturn C-3 and Nova flights. *"Mercury Astronauts can phase in as aircraft commanders approx. 6 months ahead of any launch preparation..."* and *"Navigator/copilots are considered potential spacecraft commanders."* The number of astronauts needed is listed as 12 by January 1963, 9 more by July 1963 and 3 more by July 1964, thus increasing the total in the Astronaut Corps to 31 (24 plus the original 7). Wally Schirra has made a manuscript correction of *"4, C-1B flights"* to part I, section b. Additionally, there is a 13 x 11 inch confidential milestone sheet showing crew scheduling for C-1 Orbital, C-B Elliptical and NOVA Lunar Landing missions beginning in mid-1964 to the end of 1967.

This memo gives some of the earliest recorded insight to what eventually evolved into the "pecking order" of the Astronaut Corps, where the most senior astronauts (Mercury), could greatly influence the crew assignments for future space flights.

The first sheet has been INSCRIBED and SIGNED by WALLY SCHIRRA with: *"From my Apollo collection - Wally Schirra."*

\$1,000 - 1,500

69

TRACKING CHART FOR SCHIRRA'S FLIGHT—SIGNED.

MA-8 Tracking and Communications Networks. NASA Goddard Space Flight Center, 1962. Flight chart. 27 x 23 inches, folded to 9 x 11 inches for distribution.

Dual global maps illustrate the orbital ground track for the Mercury spacecraft and the network routing for spacecraft communications. The orbit tracking map shows the ground station coverage areas and with the other map showing the network routing between tracking ships and fixed ground stations. Additional illustrations and text describe tracking functions and flight phases of the mission.

SIGNED by WALLY SCHIRRA with *"[Sigma] 7"* near the upper left corner.

\$700 - 900

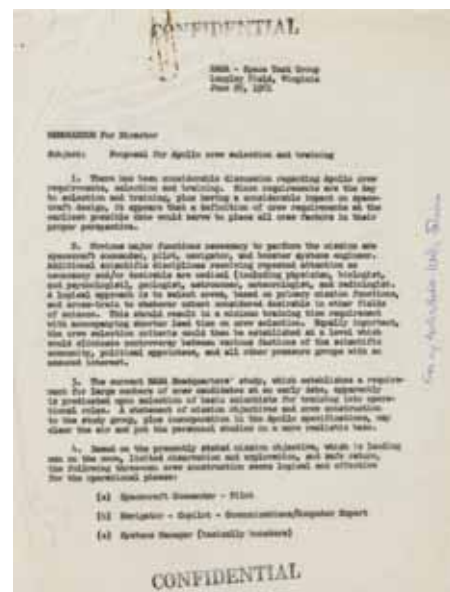
70

MERCURY SPACECRAFT—SIGNED.

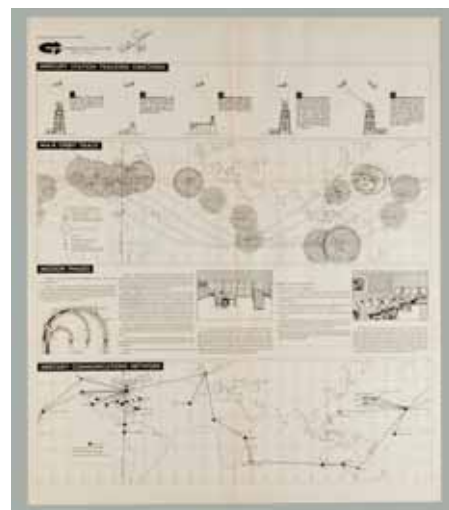
Color photograph, 10 x 8 inches.

A detailed artist's drawing of the Mercury spacecraft with the large red escape tower attached. SIGNED by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA. Each have added their Mercury spacecraft names and launch dates. Cooper has added *"The Mercury Spacecraft"* at the upper left corner.

\$1,200 - 1,800



68



69



70



71



73



72



74



75



76

71

MERCURY STAMP FIRST DAY COVER—SIGNED.

Postal envelope with a Cape Canaveral, Florida postmark dated February 20, 1962, the launch date of John Glenn's "Friendship 7" flight. Postmark additionally reads: "First Day of Issue."

SIGNED by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA.
\$700 - 900

72

JOHN GLENN AND FRIENDSHIP 7.

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

Astronaut Glenn poses with artist Cece Bibby while she paints the "Friendship 7" logo onto his Mercury spacecraft.

SIGNED by JOHN GLENN.
\$300 - 400

73

CARPENTER CLOSE-UP.

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

Astronaut Carpenter poses for a close-up wearing his space suit and helmet.

SIGNED by SCOTT CARPENTER.
\$200 - 250

74

CARPENTER'S LAUNCH.

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

The Mercury-Atlas 7 rocket rises past the launch gantry carrying Carpenter on his three-orbit flight.

SIGNED and INSCRIBED: "Scott Carpenter, MA - 7."
\$150 - 250

75

SCHIRRA TRAINING.

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

Wally Schirra seen inside a Navy pressure chamber wearing his space suit during training for his Sigma 7 flight.

SIGNED by WALLY SCHIRRA.
\$250 - 350

76

SCHIRRA'S LAUNCH.

Color photograph, 10 x 8 inches.

Bright yellow flames from the Mercury-Atlas 8 rocket are seen just seconds into the Sigma 7 flight.

SIGNED and INSCRIBED: "Wally Schirra, [Sigma] 7, Oct '62."
\$400 - 600

77

SCHIRRA SPEAKS TO JFK and OTHERS.

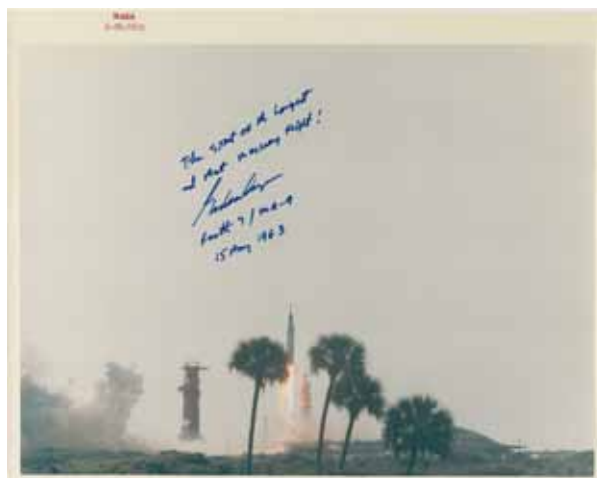
Black and white photograph, 10 x 8 inches, printed NASA captions on verso.

Wally Schirra speaks on the telephone on the USS *Kearsarge* just after completing his six orbit Sigma 7 flight.

SIGNED by WALLY SCHIRRA.
\$250 - 350



77



78A



79



78

**78
MERCURY AND APOLLO ASSEMBLAGE.**

Three items mounted together, two being flown:
 1. Flown Christian flag, 4 x 6 inches, made of silk. Together with autograph note SIGNED by GORDON COOPER stating "These flags were flown in this sealed packet in my flight suit pocket on MA-9."
 2. Flown on Apollo 14, a small segment of Mylar, ½-inch square, mounted on printed card signed by Terry Slezak of the Lunar Receiving Laboratory Decontamination Team, stating "The attached material was part of the outer skin of the Apollo 14 Spacecraft that carried astronauts Shepard, Mitchell, and Roosa on their history flight to the Moon."
 3. Photographic map showing routes of EVAs 1 and 2 of Apollo 16. Photographically printed on plastic, 10½ x 8 inches. SIGNED and INSCRIBED "Used in A-16 training, Charlie Duke."
 Matted together with two color photographs and framed to 22 x 32 inches.

A CHRISTIAN FLAG APPROPRIATELY FLOWN ON "FAITH 7" in 1963, framed with Apollo artifacts.
\$2,000 - 3,000

**78A
THE BEST MERCURY FLIGHT!**

Color photograph, 8 x 10 inches, with a red NASA ID number at the upper border and printed NASA captions on verso. Vintage print on "A Kodak Paper."

A wide-angle camera view of the Mercury-Atlas 9 launch.
 INSCRIBED and SIGNED: "The start of the longest and best Mercury flight, Gordon Cooper, Faith 7 / MA - 9, 15 May 1963."
 See illustration on preceding page.
\$500 - 700



80

**79
COOPER—PHOTOGRAPHER IN ORBIT.**

Color photograph, 8 x 10 inches, with a NASA ID number at the upper border and printed NASA captions on verso. Vintage print on "A Kodak Paper."

Cooper uses his onboard Hasselblad camera with an 80mm f2.8 lens containing 120 FPC 309 Ansco color film. The photograph is of the west coast of Burma.
 INSCRIBED and SIGNED: "Faith 7 mission photo, Gordon Cooper."
 See illustration on preceding page.
\$400 - 600

**80
ORIGINAL MERCURY SEVEN.**

Large color photograph, 14 x 11 inches, c.1959, printed later.

The historic photograph of all seven Mercury astronauts in their silver space suits.
 SIGNED by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA.
\$2,000 - 3,000

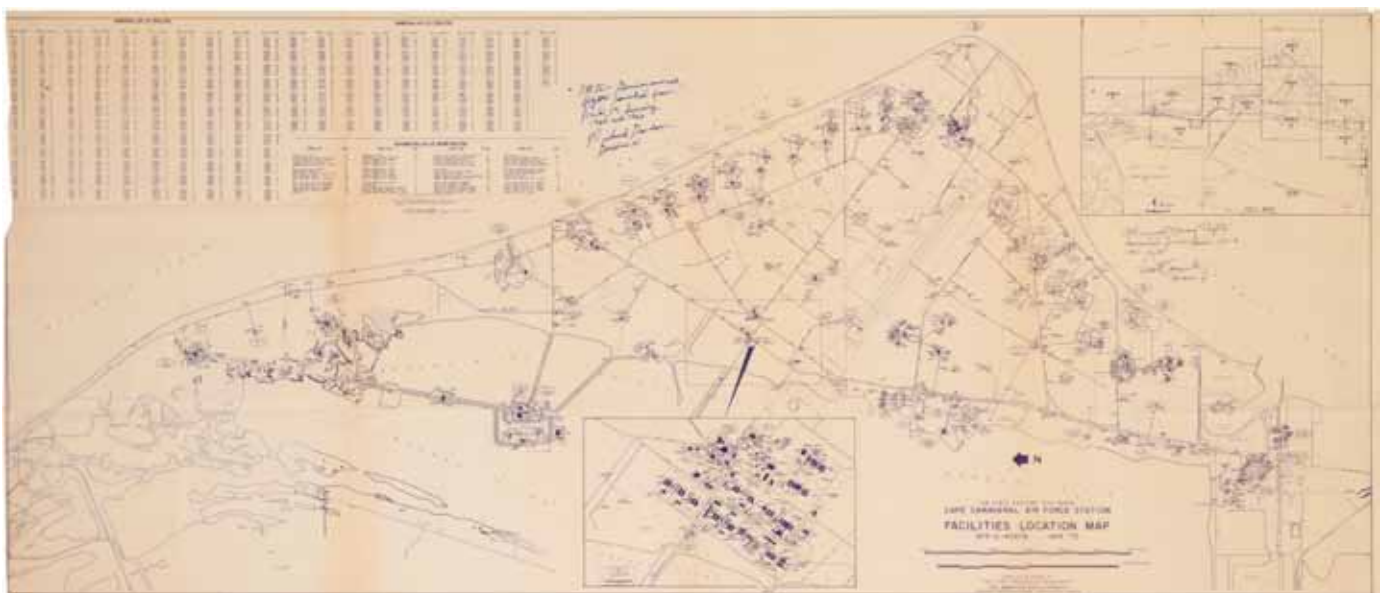
**81
MERCURY SEVEN FLYERS.**

Large color photograph, 11 x 14 inches, c.1960, printed later.

An F-106 fighter jet used for flight training is the back-drop for the seven Mercury astronauts wearing their respective military service flight suits. This single photograph was a major factor that prompted NASA to standardize flight suits to the now well-known light blue fabric.
 SIGNED by SCOTT CARPENTER, GORDON COOPER, and WALLY SCHIRRA. Cooper has added: "The Mercury Seven Astronauts."
\$1,500 - 2,500



81



82



84

**82
CAPE CANAVERAL LAUNCH PAD MAP—SIGNED.**

Air Force Eastern Test Range, Cape Canaveral Air Force Station Facilities Location Map. Compiled and drawn by the Facilities Engineering Department of Pan American World Airways, Aerospace Services Division, April 1975. Scale 3 inches to 1 statute mile. 21½ x 49 inches.

All roads, buildings, and launch pads are drawn with the beach shore defining the top (eastern) boundary. Other facilities shown are heating plants, communications centers, fuel storage (solid, liquid, and gas) sites, the "Skid Strip" (aircraft runway), and the famous Cape Canaveral Lighthouse. Included is an alphabetical list of major facilities and an overall numerical list of facilities with over 700 entries.

Boldly INSCRIBED and SIGNED near the Mercury astronauts' launch sites: "All manned Mercury flights launched from Pads 5 & 14. Scott Carpenter, Aurora 7."

INSCRIBED and SIGNED near Launch Complex 19: "All ten Gemini manned flights launched from Pad 19 during 1965 and 1966. Richard Gordon, Gemini XI."

See illustration on preceding page.

\$3,500 - 4,500

**83[□]
MOON SHOT—SIGNED BY SHEPARD.**

Moon Shot: the Inside Story of America's Race to the Moon. Atlanta, GA: Turner, 1994. 382 pp. 9½ x 6½ inches. Original boards, dust-jacket.

SIGNED by ALAN SHEPARD on the title page.

\$300 - 400



85

**84
STAR CITY—SIGNED BY GAGARIN.**

[In Russian:] *Zvezdograd. Literaturno-hudozhestvennyi.* [Star City. Literary Almanac.] N.p.: 1964.

7½ x 5 inches. 80 pp. Original printed wrappers, dust-jacket. Lightly rubbed.

SIGNED and INSCRIBED on the title page by YURI GAGARIN, VLADIMIR KOMAROV, and BORIS YEGOROV.

\$1,500 - 2,000

**85
1964 NEW YORK WORLD'S FAIR—SPACE PARK.**

2 fanciful artist's impressions of interiors at the New York World's Fair, ink, watercolor and gouache on board and paper mounted on board, 20 x 29 and 18 x 24 inches. The smaller with label of Donald Deskey Associates of Madison Avenue.

One image shows visitors in a circular tunnel, with manned and unmanned spacecraft hanging above; the other depicts an exhibit called "Earth and its Satellite" Deskey was a celebrated designer and architect, whose archives are now in the Cooper-Hewitt National Design Museum. Ironically, he had also been involved in the 1939 New York World's Fair, the theme of which was "Building the World of Tomorrow."

\$600 - 800



86

Gemini, Surveyor & Ranger

The following lot was originally in the collection of Astronaut James McDivitt.

86

CARRIED FOUR DAYS ON GEMINI FOUR.

FLOWN United States flag, silk, 4 x 6 inches. Displayed on 13 x 10 inch blue mat board with a 5½ x 8 inch double-image photolithograph of Edward White's spacewalk performed on the first day of the flight. Both the flag and photolithograph are removable from the mat board.

The June 1965 Gemini IV mission was the longest and most ambitious US space flight to that date. Under Command Pilot James McDivitt's direction on the third spacecraft orbit, astronaut Edward White made the first United States Extra-Vehicular Activity (EVA), commonly known as a "spacewalk." White floated free of the Gemini IV spacecraft for just over 20 minutes using a hand-held compressed gas device that assisted his movements.

The flag is INSCRIBED and SIGNED: "Flown on Gemini IV, Jim McDivitt" along two of the six white bars.

\$3,500 - 4,500



87

The following lot was originally in the collection of Astronaut Charles Conrad.

87

CONRAD'S MISSION EMBLEM CARRIED ON GEMINI 5.

8 DAYS OR BUST—THE U.S. NOW LEADS IN SPACE EXPLORATION.

Flown Gemini 5 cloth crew emblem, 4 inches in diameter. Mounted on a 6½ x 8½ inch Typed Letter Signed by CHARLES CONRAD.

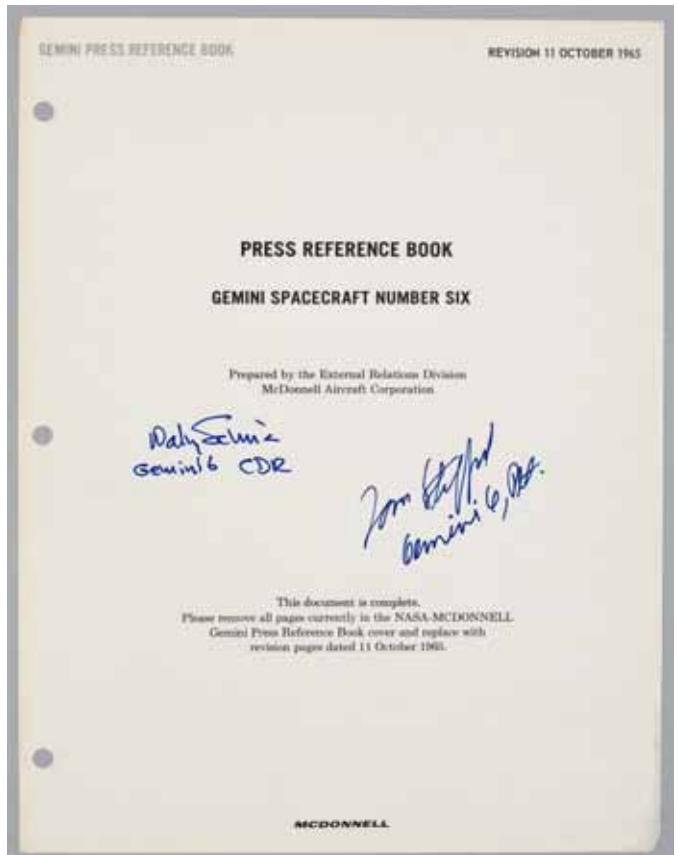
CHARLES CONRAD'S signed provenance letter reads: "This Gemini 5 cloth patch was one of the few originals made in 1965. It was the first American crew designed manned space flight patch. I was mission pilot with fellow astronaut Gordon Cooper as commander. We were also the first crew to have a mission designed patch worn on our space suits. This patch flew on the Gemini 5 mission during August 21 to 29, 1965. It is from my personal collection.

The idea for the cover wagon came from a wooden model that a Cooper family member had whittled. We felt it was the best way to symbolize the pioneering spirit of this early Gemini flight. The eight days or bust wording was a natural addition. However, NASA Administrator James Webb wanted the wording removed because any flight time short of eight days might have been viewed as a mission failure. We were directed to cover that wording with a layer of cloth. Our mission completed all eight days and Gemini 5 marked the beginning of the American's lead in manned space exploration."

\$4,000 - 6,000



88



90



91



93



89

**88
EIGHT DAYS OR BUST—CREW SIGNED.**

Large color photograph, 16 x 20 inches.

A stunningly sharp photograph of the Gemini 5 launch from Cape Canaveral. INSCRIBED and SIGNED: *"Eight Days or Bust, Charles Conrad"* and *"Gemini 5 Launch, 21 Aug 1965, Gordon Cooper."*

\$2,500 - 3,500

**89
YOU NEED A SHAVE!—CREW SIGNED.**

Color photograph, 10 x 8 inches.

The Gemini 5 astronauts have time for a humorous verbal exchange after recovery by the USS Lake Champlain.

INSCRIBED and SIGNED: *"You need a shave! Charles Conrad,"* and *"Maybe tomorrow! Gordon Cooper."*

\$800 - 1,200

The following two lots were originally in the collection of Astronaut Thomas Stafford.

**90
STAFFORD'S MCDONNELL PRESS REFERENCE BOOK—SIGNED.**

STAFFORD ON TRAINING AND THE 24 G ESCAPE.

Gemini Press Reference Book, Gemini Spacecraft Number Six. St. Louis, MO: October 11, 1965.

129 pp. 11 x 8½ inches. Unbound loose leaf with 21 tabbed section dividers.

With THOMAS P. STAFFORD'S signed provenance letter, reading in part: *"Enclosed is a McDonnell Aircraft Corporation issued press reference manual about my Gemini 6 spacecraft. It is superbly illustrated and describes the technical nature of the Gemini Program in a clearly understandable manner ... Reviewing this manual reminds me of the intense training we in the Astronaut Corps undertook during this period in the 1960s. Wally Schirra and I trained for the first planned rendezvous mission with an Agena target vehicle. Our Agena was launched on an Atlas rocket during the morning of October 25, 1965, but failed to reach orbit. NASA management then approved a different flight, Wally and I would rendezvous with Gemini 7 to be launched in early December 1965. Our training schedule was modified to accomplish the planned tasks for this new mission...."*

An interesting section of his manual covers the Gemini ejection system ... The Gemini spacecraft used ejection seats to provide the only means of emergency escape during launch or after earth re-entry. The seats were rocket propelled, with a thrust of nearly 24 times earth gravity (G's). Many of us in the Astronaut Corps had serious concerns about using this system with such a powerful 'kick in the pants.' I am glad Wally did not light that system when our Gemini Titan launch vehicle shut down on the pad on December 12, 1965. We probably would have survived the ejection but I doubt we would be in physical condition to ever fly in space again...."

SIGNED and INSCRIBED with their individual flight titles by WALLY SCHIRRA and TOM STAFFORD on the title page.

\$1,200 - 1,800



92

**91
STAFFORD'S GEMINI COVER—ARMSTRONG-SIGNED.**

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

With THOMAS P. STAFFORD'S signed provenance letter, reading: *"The Gemini envelope displayed below came 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 launched 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.

\$5,000 - 7,000

**92
GEMINI 6 CREW WITH STAR GLOBE.**

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

Astronauts Schirra and Stafford perform rendezvous training with the aid of a celestial globe.

SIGNED by WALLY SCHIRRA and TOM STAFFORD.

\$600 - 800

**93
FIRST SPACE RENDEZVOUS.**

Color photograph, 11 x 14 inches.

The iconic view of the Gemini 7 spacecraft taken during the historic first manned spaceflight rendezvous.

SIGNED by WALLY SCHIRRA, and INSCRIBED and SIGNED: *"Photo by Tom Stafford."*

\$2,000 - 3,000

**94
DRAFT COPY FOR NEIL ARMSTRONG'S COMMENTS.**

"Comment draft chapter of Gemini narrative history, Chapter 16: Trials of Agena and Gemini VIII," NASA/MSC, loose leaf memo, 91 pp, date stamped September 22, 1969. With a 3-page distribution list and occasional manuscript line marks and cross-outs.

An internal distribution memo containing the Gemini 8 chapter of what became *On the Shoulders of Titans*. *"Armstrong"* is printed on the cover page with a red underline at the *"CB/Neil A. Armstrong"* typed line of the distribution list.

\$700 - 900



97



95



96



98



99



100

**95
GEMINI 9 LAUNCH GAG—WE TRY HARDER.**

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

Astronauts Stafford and Cernan break the tension with two gag posters during on the second of three Gemini 9 launch attempts.

SIGNED by TOM STAFFORD and GENE CERNAN.

\$500 - 700

**96
ANGRY ALLIGATOR.**

Color photograph, 10 x 8 inches.

The docking target vehicle for Gemini 9 is shown with the aerodynamic shroud only partly open, making any docking attempt impossible.

Astronaut Stafford made the comment that the vehicle "looks like an angry alligator" during the flight.

INSCRIBED and SIGNED: *"The Angry Alligator, Tom Stafford, GT - 9 Cdr,"* and SIGNED by GENE CERNAN with *"Gemini IX"* added.

\$700 - 900

The following lot is directly from the collection of Astronaut Michael Collins.

**97
AMERICAN FLAG CARRIED ON GEMINI 10.**

Flown United States flag, made from silk, 4 by 6 inches, inscribed on the lower 3 white stripes.

Gemini 10 docked with an Agena vehicle and then used its propulsion system to fire both vehicles into orbit with an apogee of 413 miles. Agena's thrust was powerful: John Young remarked, "When that baby lights, there's no doubt about it!"

The flag SIGNED by MICHAEL COLLINS (with *"pilot"*) and INSCRIBED *"Carried aboard Gemini X to a World Altitude Record, July 1966."*

Together with Collins' manuscript certification, confirming that the flag *"was flown aboard Gemini Ten in July 1966 in my Personal Preference Kit and has been in my possession since then."*

\$5,000 - 7,000



101

**98
OUT TO LAUNCH.**

Color photograph, 10 x 8 inches.

The Gemini XI crew walks toward the crew transfer van prior to their launch on September 12, 1966.

INSCRIBED and SIGNED: *"Out to Launch, Charles Conrad, Gemini XI CDR,"* and *"Richard Gordon, Gemini XI Plt."*

\$800 - 1,200

**99
THE RIDE 'EM COWBOY SPACEWALK.**

Color photograph, 8 x 10 inches.

A frame enlargement from the 16mm motion sequence camera showing EVA Astronaut Richard Gordon as he "lassoos" a tether to the Agena docking target vehicle. Commander Conrad remarked "Ride 'em cowboy" to Gordon during the EVA. The crew later used the Agena to achieve a then record altitude of some 850 miles.

INSCRIBED and SIGNED: *"Gemini XI EVA, Sept 1966, Richard Gordon."*

\$300 - 400

**100
ALDRIN'S SPACEWALK.**

Color photograph, 10 x 8 inches.

James Lovell photographs Buzz Aldrin during his Gemini 12 spacewalk.

SIGNED and INSCRIBED: *"BUZZ ALDRIN, GT - 12."*

\$500 - 700

**101
GEMINI PROGRAM HIGHLIGHTS—SIGNED BY 13.**

Color photolithograph, 8 x 10 inches, being a composite of 5 images, printed captions below and on verso.

With the signatures of 13 of the 16 Gemini astronauts.

SIGNED by NEIL ARMSTRONG, BUZZ ALDRIN, MIKE COLLINS, GORDON COOPER, JIM MCDIVITT, JAMES LOVELL, GENE CERNAN, DAVE SCOTT, WALLY SCHIRRA, FRANK BORMAN, JOHN YOUNG, RICHARD GORDON and TOM STAFFORD. Cooper has added *"GT5"* and Armstrong *"To Sean, all the best."*

\$4,000 - 6,000



102



104



106

106
PHOTOGRAPHY FROM THE FIRST GEMINI FLIGHTS.
THE BEGINNINGS OF THE ASTRONAUT AS PHOTOGRAPHER.
Earth Photographs from Gemini III, IV, and V. NASA SP-129.
 Washington: 1967.
 266 pp. 11½ x 9 inches. Original red cloth.

Illustrated are over 200 full-format 70mm color photographs taken during the first three manned Gemini flights. These flights clearly proved man's ability to record the important Earth surface features visible through the spacecraft windows. An appendix lists all orbital photographs taken in sequence on their respective flights.

INSCRIBED and SIGNED: "Gemini V photos by Gordon Cooper" and "& Charles Conrad" on the title page.

\$700 - 900



107

107
PHOTOGRAPHY FROM THE LAST GEMINI FLIGHTS.
THE ASTRONAUT PERFECTS HIS ROLE AS PHOTOGRAPHER.
Earth Photographs from Gemini VI through XII. NASA SP-171.
 Washington: 1968.
 327 pp. 11½ x 9 inches. Original red cloth.

Illustrated are nearly 250 full-format 70mm color photographs taken during the last seven manned Gemini flights. Included are the high altitude images from Gemini XI which show the curvature of the Earth's limb. A long appendix lists all orbital photographs taken in sequence on their respective flights.

INSCRIBED and SIGNED: "Gemini 6 photos by Wally Schirra," "and Tom Stafford," and with additional inscription "Gemini 12 photos by Buzz Aldrin and Crew." All on the title page.

\$1,200 - 1,800



108

108

CAMERA'S USE IN SPACE EXPLORATION.

CORTRIGHT, EDGAR M., editor. *Exploring Space with a Camera*. NASA SP-168. Washington: 1968. 214 pp. 11½ x 9 inches. Original blue cloth.

Contains the most remarkable images of the Earth and planets taken to date by both astronauts and robotic spacecraft. Detailed photographic captions are written by various scientists and engineers directly involved in obtaining these images. Several captions are written by the Mercury and Gemini astronauts. Stunning photographs of the moon from Ranger, Lunar Orbiter, and Surveyor are included.

INSCRIBED and SIGNED, all on the half title, "Aurora 7 photos by Scott Carpenter," "Faith 7 mission photos by Gordon Cooper," "Gemini 5 mission photos by Gordon Cooper" "& Charles Conrad," "Gemini VI and IX photos by Tom Stafford and crews," "GT - XI Photos by Richard Gordon."

\$2,000 - 3,000



109

109

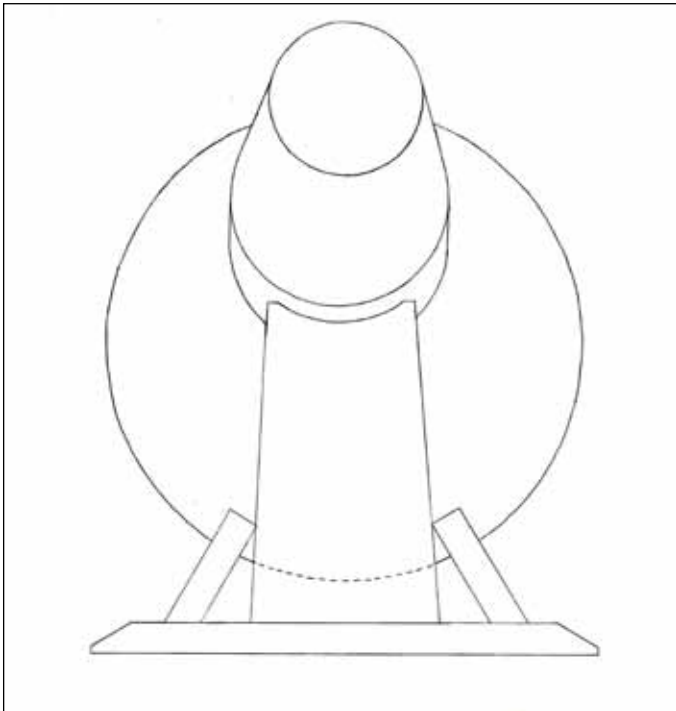
SPECIAL PUBLICATION BY THE SPACE CAMERA MAKER.

Hasselblad 3. 1966. 32 pp. 9½ x 8 inches. Booklet with heavy card stock cover, staple binding.

Covers the flights that carried Hasselblad cameras beginning with Wally Schirra's Sigma 7. Hasselblad's role in obtaining some the best photographs ever taken in space is described. Over 25 Hasselblad photographs are illustrated including several from the Gemini 4 spacewalk and the Gemini 6 and 7 rendezvous. One Hasselblad was even lost in orbit, during Michael Collins' spacewalk on Gemini 10.

INSCRIBED and SIGNED on pastedown, "Gemini V Mission Photos, Gordon Cooper" "& Charles Conrad," "Tom Stafford, Gemini 6 - 9, Photos," "Wally Schirra" (with "GT-6"), "Buzz Aldrin" (with "GT-12"). Additionally SIGNED by GORDON COOPER on the Space Flight Log page.

\$1,500 - 2,500



110



110

110

LARGE GEMINI SPACECRAFT MASTER MOLD MODEL.

Large 1/8 scale model of the Gemini spacecraft by Atkins and Merrill's Engineering Model and Mock-Up Division of Sudbury, MA. Made from solid acrylic with a gray color coating, 18 inches tall, 11½ inches wide at the base, and weighing 25 pounds. Information recorded in black marker on the base reads: "NASA, NASw 803, Gemini 1/8, 64-M-4-2." Horizontal grooves accurately represent the Inconel heat shield panels on the outer skin of the Gemini spacecraft.

The model's construction was initiated by the 803rd contract issued by NASA Headquarters (NASw 803) in 1964 for the amount of \$50,000 to Atkins and Merrill, Inc. It was part of an overall Cold War effort to exhibit models of the United States vehicles responsible for space achievements to a world audience in cooperation with the USIA (United States Information Agency). This model is the master mold which allowed copies to be created for multiple exhibit purposes. The creation of this master represented approximately 40% of the contract's value due partly to the hand-tooling required. It was created without the use of computer aided design and manufacture (CAD/CAM). Sketches by Atkins and Merrill for a suggested display stand are included.

\$7,000 - 9,000



111



111



111



111

111

GEMINI AND APOLLO HASSELBLAD POSITIVES.

A group of film strips of duplicate positives from various Hasselblad magazines taken during the Gemini 4, Apollo 8, and Apollo 9 missions. Over 200 individual frames. Segments contain an average of 10 Hasselblad frames and are all housed inside protective sleeves. Most Apollo images have their associated Apollo frame number printed below the film sprocket holes.

The Gemini 4 images feature Earth terrain photography from magazine 8 and others. Apollo 8 positives feature Earth images from deep space, some with different camera lens filters. Apollo 9 includes images of the crew members inside the Command Module, Rusty Schweickart's spacewalk (EVA), orbital views of the Lunar Module, and Earth orbital images. Additionally there are S065 Experiment images: Multispectral Terrain Photography. The S065 Experiment consisted of an array of four Hasselblad cameras with each using a different combination of lens filters and film types.

\$6,000 - 8,000

112[□]

GEMINI POSITIVES.

Three film strips of duplicate positives from Gemini missions. Approximately 30 frames. Housed in protective sleeves.

One strip features Earth terrain photography from magazine 8 on Gemini 4 with majority of frames showing curvature of the Earth. Another strip is unlabeled but also shows curvature of the Earth, this time with landmasses unclouded. The other strip is labeled as magazine 11 from Gemini 11 with three frames showing Agena.

\$300 - 500

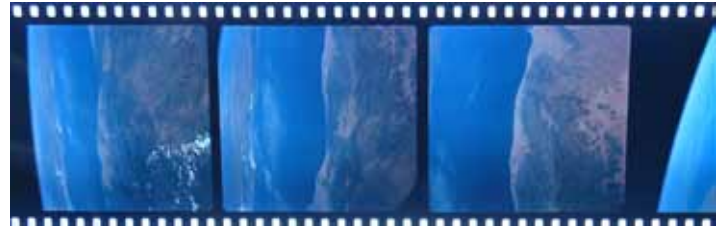
113[□]

RANGER PROGRAM.

2 large spools of 35mm film containing duplicate negatives of photographs taken by Ranger VIII and IX, in period boxes.

The Ranger Program (1961-1965) aimed to obtain high-resolution images of the lunar surface. Nine missions flew, of which seven carried cameras. The spacecraft were designed to fly directly into the Moon's surface, beaming back image after image until final impact. The radio signals beamed back by the Ranger probes were received at NASA's Goldstone station in California, projected onto kinescopes, and transferred onto 35mm film.

\$300 - 500



114[□]

RANGER AND LUNAR ORBITER PROGRAMS.

10 volumes relating to NASA investigations of the Moon, mostly 14 x 10 inches, cloth-bound, comprising: *The Moon as Viewed by Lunar Orbiter*, SP-200; *Lunar Orbiter Photographic Atlas*, SP-206; *Atlas and Gazetteer of the Near Side*, SP-241; *Guide to Lunar Orbiter Photographs*, SP-242; *Ranger VII Photographs of the Moon: Part I, Camera 'A' Series*, SP-61; [-] *Part II, Camera 'B' Series*, SP-62; [-] *Part III, Camera 'P' Series*, SP-63; *Ranger VII, Part II: Experimenters' Analyses*, Technical Report 32-700; *Ranger VIII Photographs of the Moon*, SP-111; *Ranger IX Photographs of the Moon*, SP-112.

\$300 - 500

115

SURVEYOR PROJECT—LUNAR SCIENTIFIC MODEL.

Surveyor Project: Lunar Scientific Model. Pasadena, CA: JPL, December 15, 1966.

11 x 9 inches. Numerous diagrams, charts, and illustrations, single-sheet and 4-sheet folding maps in pocket at front. Tapped, punched, and in original 3-ring binder.

"The lunar scientific model is designed to provide the latest scientific data on properties of the Moon which are of interest for engineering purposes." (preface).

\$800 - 1,200

116

SURVEYOR PROJECT REPORTS.

22 volumes relating to the Surveyor Project, published by NASA or by JPL, 1966-1969. Approximately 11 x 8½ inches. The first mentioned spiral-bound, one in cloth, the others in printed wrappers. Comprising, Surveyor 1: *Preliminary Results*, June 30, 1966; *A Preliminary Report*, NASA SP-126; *Mission Report, Part II: Scientific Data and Results; Part III: Television Data*. Surveyor 3: *A Preliminary Report*, NASA SP-146; *Part I: Mission Description; Part II: Scientific Results; Part III: Television Data, Addendum*. Surveyor 5: *A Preliminary Report*, NASA SP-163; *Preliminary Results, Technical Report 32-1235; Part II: Science Results; Atlas of Surveyor 5 Television Data*, SP-341 (cloth-bound). Surveyor 6: *A Preliminary Report*, NASA SP-166; *Part II: Science Results; Part III: Television Data*. Surveyor 7: *A Preliminary Report*, NASA SP-173; *Part I: Mission Description; Part II: Science Results; Part III: Television Data*. Additionally: *The Surveyor Experimental Test Laboratory; Surveyor Project Final Report: Part II, Science Results; Surveyor Program Results*, SP-184.

\$300 - 500



117

Apollo Program through Apollo 10

117

SPACE TREATY—SIGNED BY 10 SPACE TRAVELERS.

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space. Hicksville, NY: S.M. Kessler, 1967. Single sheet, 11 x 17 inches, folded at center. With first day of issue postmark (KSC, September 29, 1967) for the twin 5-cent Gemini postage stamp.

The treaty was unanimously approved by the United Nations in December 1966, and signed in Washington, London and Moscow on January 27, 1967.

SIGNED on the reverse by ALAN BEAN, GENE CERNAN, CHARLES CONRAD, CHARLIE DUKE, DAVE SCOTT, ALAN SHEPARD, TOM STAFFORD, JOHN YOUNG, ALEXEI LEONOV, and VALERY KUBASOV.

\$1,500 - 2,500



118

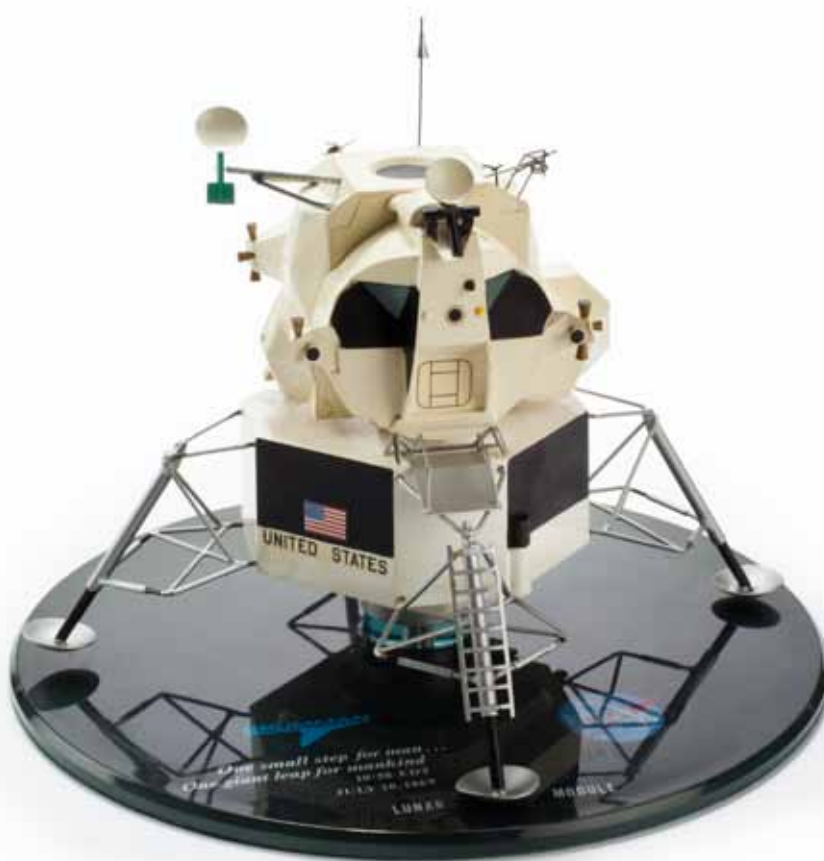
118

ROCKWELL SPACECRAFT MODEL.

Model of the Command/Service Module (CSM) with escape tower and connecting lattice structure. The CSM stands 10½ 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 represent 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.

\$5,000 - 7,000



119

119

GRUMMAN LUNAR MODULE MODEL.

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 pads some 8 inches apart. The upper Ascent Stage is detachable from the lower Descent Stage. The complete model is removable from a 10½ 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 and the date and time he spoke them.

The LM made one unmanned and one manned Earth orbital flights and carried out eight manned lunar missions of which six landed on the Moon.

\$4,000 - 6,000



120

120

LION BROTHERS CREW MISSION EMBLEMS.

Cloth crew mission emblems, 18 total with sizes from 3½ to 5 inches in diameter. Embroidered by Lion Brothers of Owens Mills, Maryland beginning in 1967.

Emblems for the 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. The Skylab series of emblems changed the hallmark method to the first letters of the flight crew's last name. The Apollo Soyuz has "ASTP" in the Earth ocean surrounded by clouds.

\$1,500 - 2,500



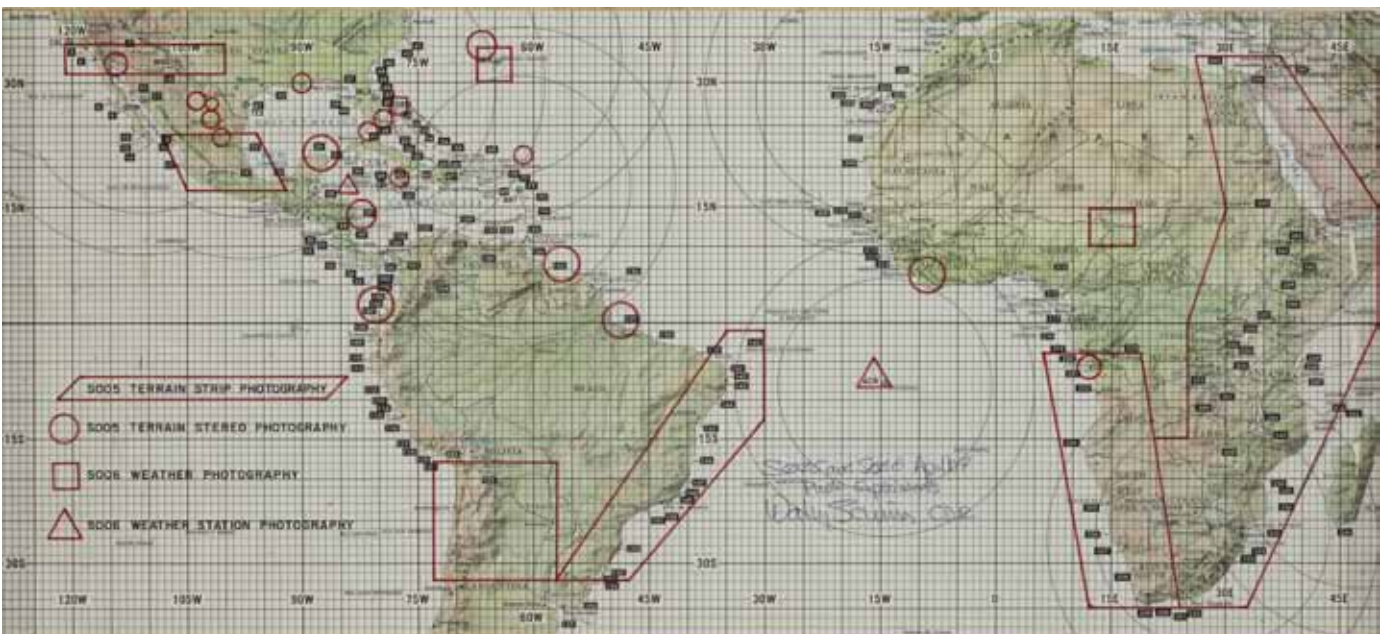
121



123



122



124

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

121

COOPER'S TOPOGRAPHIC LUNAR MAP.

REMARKS ON NOT COMMANDING A LUNAR MISSION.

Mare Nectaris – Mare Imbrium. Color lithographed lunar map in modified stereographic projection by the Army Map Service, Corps of Engineers. Edition 1, first printing, February 1962. Tinted primarily tan, orange, and brown. 52 x 41 inches. Scale 1:2,500,000 with contour intervals every 1,000 meters.

A very early lunar chart designed to assist geologic studies with a lunar name index on the reverse side. All named features in each one degree area have their associated selenodetic reference coordinates. Features were compiled from stereophotographic methods from photographs taken at the Paris Observatory between 1896 to 1907. With GORDON COOPER'S signed provenance letter which reads: *"This Topographic Lunar Map chart titled Mare Nectaris – Mare Imbrium was made when I was training in the Mercury Program back in 1962. It covers an area of the Moon between 40 degrees North and South latitude, 320 degrees to 0, and 0 to 40 degrees longitude. Featured are prominent craters, the highland areas, and mare. It is interesting to note that all the manned lunar landings occurred on the area covered by this chart. I used many charts like this during my geology training in preparations for Apollo, where I served as back-up commander for Apollo 10. I hoped to command my own mission to the Moon but the reduced number of Apollo mission and the astronaut office politics of those days dictated otherwise. This chart is inscribed with GC-12 on the lower right corner."*
\$1,200 - 1,800

The following four lots were originally in the collection of Astronaut Walter M. "Wally" Schirra.

122

SCHIRRA'S APOLLO 1 TRAINING CHART—SIGNED.

Apollo Flight Chart, Base Chart. Prepared by the USAF Aeronautical Chart and Information Center for NASA. First edition, January 1967. 10 x 40 inches. Coverage area is 38 degrees North and South latitude, with a full 360 degrees of longitude. Scale 1:40,000,000. With a typed letter on Wally Schirra's personal Rancho Santa Fe, CA, letter head.

Schirra's provenance letter reads: *"Enclosed with this note is a chart I used during training as back-up Commander for the Apollo 1 mission. It is chilling to read that this chart was printed in early January 1967. On the 27th of that month, my good friend Gus Grissom and his crew of Ed White and Roger Chaffee were killed in a spacecraft fire at Pad 34 at the Kennedy Space Center. It would take NASA and our Space Industry team almost 22 months to analyze and correct all the problems associated with the Apollo spacecraft.*

I was then selected to command the first manned Apollo flight which was named Apollo 7. Walt Cunningham, Donn Eisele, and I flew an eleven day earth orbit mission during October 1968. All the hard work paid off and I called the flight a 101 percent success!

I have written and signed this chart with: 'Apollo 1 Training Chart, Wally Schirra, Back-up CDR, Apollo 1' in the Indian Ocean area."

\$2,000 - 3,000

123

WALLY SCHIRRA'S PILOT SUNGLASSES.

SCHIRRA ON SPORTS CARS AND MORE! Standard-issue military sunglasses by General Optical, in gold-colored metal with straight-prong supports and green-gray lenses. With a Typed Letter Signed by WALLY SCHIRRA on his personal Rancho Santa Fe, CA, letterhead.

WALLY SCHIRRA'S signed provenance reads: *"Enclosed with this letter is my pair of straight prong sunglasses I wore during training during the days of Gemini and Apollo. I also wore them while driving various sports cars. We had access to "loaner" cars such as the Chevrolet Corvette. I remember a crew photo session prior to my Apollo 7 flight driving a Corvette and wearing a long white scarf. A lot of jokes were being exchanged but I topped them all with a "well hung" remark. Personally, my preference in sports cars was for an Austin-Healy which I owned prior to driving the "loaner." I liked the light touch feel of the Austin, it was a lot like flying a fighter aircraft or nimble spacecraft like the Gemini and Apollo. I later bought a second hand Maserati. I liked it a lot more than a used Ferrari I owned in 1963, a year after my Mercury flight. I kept the Ferrari for less than a year. Most of us in the Astronaut Corps had the itch to keep moving on the ground as fast as we were able to fly in orbit."*

\$2,500 - 3,500

124

SCHIRRA'S APOLLO 7 ORBITAL PHOTO CHART—SIGNED.

Apollo S00 Series Synoptic Photography Training Chart. 1968. A double-sided Earth chart mounted on 9 x 20 inch heavy board. A translucent orbital path indicator can be placed over the board and rotated length wise to place the ground tracks in the proper position on the chart. With a typed letter on Wally Schirra's personal Rancho Santa Fe, CA, letterhead.

Schirra's provenance letter reads: *"Enclosed with this note is a chart I used during training for the Apollo 7 eleven day earth orbit mission flown in October 1968. I was commander of this first manned Apollo mission and flew with Donn Eisele and Walt Cunningham. Two major scientific objectives for this flight were the experiments defined as S005 – Synoptic Terrain Photography and S006 – Synoptic Weather Photography. S005 called for my crew to obtain high quality photographs of selected land and ocean areas for geographic, geologic, and oceanographic studies. This training chart has red circles marking specific earth surface areas for us to target and large geometric shapes for areas of broad interest....*

S006 called for photographing up to 27 basic categories of weather phenomena. Targets are marked with squares and triangles in red on this training chart. I vividly remember seeing and photographing Typhoon Gloria and Hurricane Gladys during the flight....

Overall, Donn, Walt, and I took more than 500 Hasselblad photographs as directed by the black rectangular box numbers located all over this two sided chart....

I wrote the following on the chart after the flight – 'S005 and S006 Apollo 7 Photo Experiments, Wally Schirra, CDR.'"

The inscription and signature are at the South Atlantic Ocean area of the chart.

\$2,500 - 3,500



125

125

SCHIRRA'S APOLLO 7 LAUNCH PHOTO—SIGNED.

Color photograph, 10 x 8 inches, with printed NASA captions on verso. Vintage print on "A Kodak Paper." With a typed letter on Wally Schirra's personal Rancho Santa Fe, CA, letterhead.

WALLY SCHIRRA'S provenance letter reads: "Enclosed with his letter is an 8 x 10 inch color photograph of my Apollo 7 launch with a large tracking antenna in the foreground. I was commander of this mission serving with fellow astronauts Walt Cunningham and Donn Eisele. We started our eleven day orbital journey on October 11, 1968. I have signed this photograph near the upper left corner and added 'Apollo 7 CDR, Oct 1968.'"

\$700 - 900



126

126

FLAG CARRIED ON APOLLO 7—THE FIRST MANNED APOLLO FLIGHT.

FLOWN United States flag, made from silk, 4 x 6 inches, mounted together with an example of the crew patch and 2 color photographs, and framed to 12 x 15 inches. Slight discoloration to lower extremities of mount.

A period NASA presentation.

\$3,000 - 5,000



127



128

127
APOLLO 8 LUNAR CHART—"IN THE BEGINNING...."
THE FIRST MEN IN LUNAR ORBIT READ FROM GENESIS.
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, December 2, 1968. 14 x 58 inches. Scale 1:7,500,000. 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.

Identical to the chart issued to Frank Borman, William Anders, and James Lovell for the flight - having the SKB 32100097-301 part number printed inside a legend block. That 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.

INSCRIBED and SIGNED: "*In The Beginning..., JAMES LOVELL, Apollo 8, December 1968.*" This inscription references the Apollo 8 crew's reading from the Book of Genesis during Christmas Eve in 1968 while in lunar orbit.
\$2,000 - 3,000



129

128
FLOWN AROUND THE MOON—APOLLO 8 SHEET.
 Flown on Apollo 8, *Updates* book, "Earth Orbit Block Data." A single sheet printed recto and verso. NASA/MSC, November 26, 1968. 8 x 5 inches.

A sheet from the flown *Updates* checklist (part number SKB32100042-201), taken on the historic flight of Apollo 8 around the Moon.

SIGNED by Jim Lovell with "Apollo 8."

\$1,200 - 1,800

129
EARTHRISE.
 Large color photolithographed on gloss paper, 11 x 13½ inches on larger sheet. Framed.

One of the most iconic space photographs.
 SIGNED below by JIM LOVELL (with "Apollo 8, 13") and INSCRIBED "*Earthrise from Apollo Eight, 12/24/68.*"

\$1,000 - 1,500



130

The following lot is directly from the collection of Astronaut Michael Collins.

130

APOLLO 8 CHRISTMAS EVE PRAYER.

"A Christmas Eve Prayer from Lunar Orbit, December 24, 1968."

Single sheet, 8 x 11 inches, reproducing Frank Borman's prayer and the first 8 verses of Genesis. With Apollo 8 postage stamp in a blank area postmarked "First Day of Issue," Houston, May 5, 1969.

SIGNED by BILL ANDERS, JIM LOVELL and FRANK BORMAN.

\$1,000 - 1,500

The following lot was originally in the collection of Astronaut James A. McDivitt.

131

UNITED STATES FLAG CARRIED ON APOLLO 9.

Flown United States Flag, silk, 4 x 6 inches. Displayed on a 15½ x 12 inch mat board with an 8 x 10 inch Apollo 9 crew-signed photolithograph. Both the flag and photolithograph are removable from the mat board.

Apollo 9 was the first manned flight of the Lunar Module (LM). James McDivitt and Rusty Schweickart flew the LM some 12 miles higher and over 100 miles away from the Command/Service Module during tests of the LM's Descent and Ascent engines and other subsystems. Schweickart also performed the first EVA of the Apollo Program.

The flag is INSCRIBED and SIGNED: "Flown on Apollo 9, Jim McDivitt" along two of the six white bars. The photolithograph is SIGNED by JIM MCDIVITT, DAVE SCOTT, and RUSTY SCHWEICKART.

\$3,500 - 4,500



132

132

APOLLO 9 SATURN V FLIGHT MANUAL—CREW SIGNED.

Saturn V Flight Manual - SA 504. NASA/MSFC, January 25, 1969.

Upwards of 255 pp. Half-tone illustrations of fuel tanks, rocket engines, vehicle stages, and other structures. 10 ½ by 8 inches. Original printed wrappers, punched.

An authoritative reference to the Saturn V moon rocket, for the use of the flight crew and their support crews.

SIGNED and INSCRIBED with their individual Apollo 9 roles by DAVE SCOTT, JIM MCDIVITT, and RUSTY SCHWEICKART.

\$1,000 - 1,500

133

FLOWN HEAT SHIELD SEGMENT—APOLLO 9.

An segment of heat shield, approximately 1½ inches long. Encased in a lucite block in the shape of half a Command Module, with background featuring Apollo 9 emblem and "Space Division, North American Rockwell," the reverse with mission details including "Temp. of H/S Ablator 4012°F."

\$1,000 - 1,500

134

ASTRONAUT MEAL TIME.

Color photograph, 10 x 8 inches, with a red NASA ID number at the upper border. Vintage print on "A Kodak Paper."

Astronaut Rusty Schweickart tastes space food during training.

INSCRIBED and SIGNED: "Ummm - Good! Rusty Schweickart."

\$400 - 600

135

SECOND MANNED SATURN V LAUNCH.

Black and white photograph, 10 x 8 inches, with NASA printed text on verso.

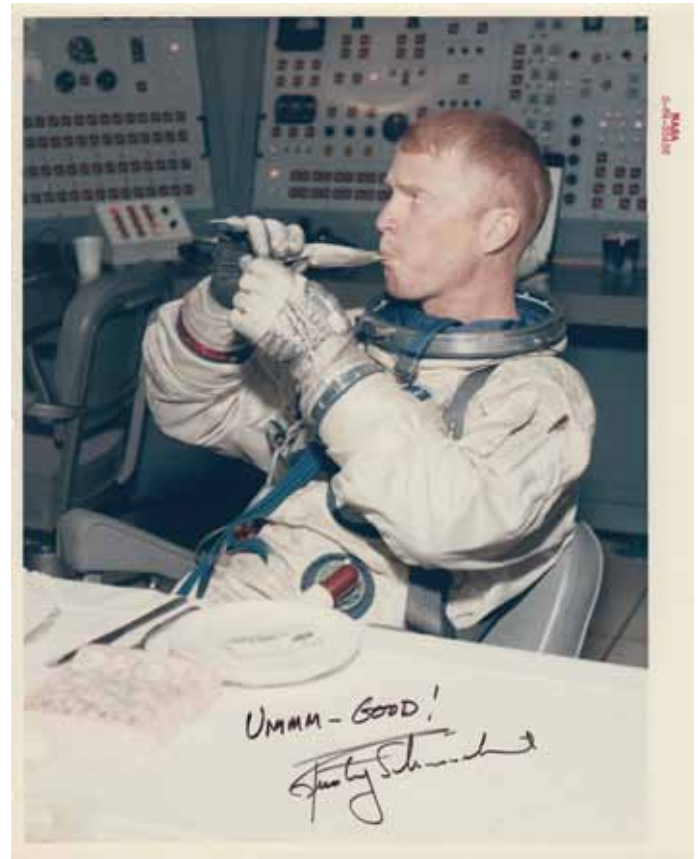
The Saturn V rocket lifts the Apollo 9 crew off Pad 39A at the Kennedy Space Center on March 3, 1969.

INSCRIBED "GREAT RIDE, Rusty Schweickart" and further SIGNED by JAMES A. MCDIVITT and DAVE SCOTT.

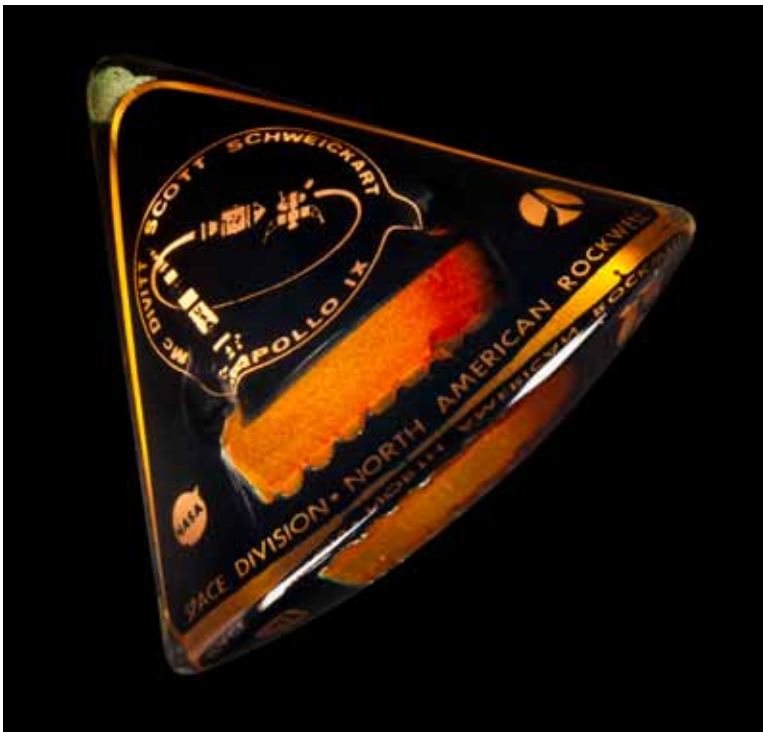
\$600 - 800



131



131



133



135



136

136

SYMBOLS OF THE APOLLO X LM CREW—SIGNED.

Two "Snoopy" astronaut dolls, produced in China by Determined Distributions of San Francisco for United Feature Syndicate, 1969. Made from plastic and textile, each 10 inches tall. Both with their original display boxes.

The *Peanuts* comic strip character Snoopy in a space suit and helmet. Snoopy was adopted by NASA with the full blessing of creator Charles Schulz 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. As symbols of their flight, the back of the dolls' helmets have been inscribed and signed by these astronauts. Apollo X Command Module Pilot John Young named his spacecraft "Charlie Brown."

One doll helmet is INSCRIBED and SIGNED "Snoopy, LM-4 Call Sign, Tom Stafford, Apollo X Cdr, May 69"; the other "Snoopy LM-4, Gene Cernan, Apollo X LMP."

\$3,000 - 4,000

137

SNOOPY—MANNED FLIGHT AWARENESS COLLECTION.

INCLUDING LARGE "EYES ON THE STARS" DECAL.

A collection of eight period decals ranging from 3 to 10 inches in size. All feature "SNOOPY" and most convey messages about flight safety. The majority were made by Vitachrome, Inc. of Rosemead, CA for NASA. Including:

1. An oversize 10-inch "Eyes on the Stars" plus a 3-inch version of the same.
2. SMEAT with the crew member names of the 1972 Skylab test.
3. Zero in on Safety in '72: 3 decals with Snoopy riding a CSM and the printed signatures of one astronaut including John Young of Apollo 16 and Gene Cernan / Harrison Schmitt of Apollo 17.
4. Zero in on Safety in '73: 1 decal of a space walking Snoopy with the Skylab Space Station in the background and the printed signature of Joe Kerwin.
5. Apollo Soyuz Space Teams featuring Snoopy and a Russian bear in space suits riding their respective spacecrafts.

\$600 - 800

The following two lots were originally in the collection of Astronaut Thomas P. Stafford.

138

FASTEST FLOWN US FLAG, FROM APOLLO X MISSION.

CARRIED IN LUNAR MODULE SNOOPY.

Flown United States flag, silk, 4 x 6 inches. Displayed between paragraphs of a Typed Signed Letter by THOMAS P. STAFFORD.

Accompanied by THOMAS P. STAFFORD'S signed provenance letter, dated May 18, 1999, which reads: *"The United States flag displayed below was flown to the Moon on the Apollo X mission during May 18-26, 1969. I was commander of this mission which tested critical flight maneuvers that would enable Apollo 11 to make the first lunar landing just two months later in July 1969. I carried this flag inside our Lunar Module named "Snoopy" where Gene Cernan and I approached within 50,000 feet of the lunar surface. Just prior to the beginning of the Apollo X reentry into the Earth's atmosphere, John Young, Gene, and I - as well as this flag - 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 an astronaut crew returns from Mars sometime during the next century."*

The flag is INSCRIBED and SIGNED: *"Flown to the moon on Apollo X, Tom Stafford."*

\$7,000 - 9,000

139

STAFFORD'S LUNAR MODULE FLOWN BETA EMBLEM.

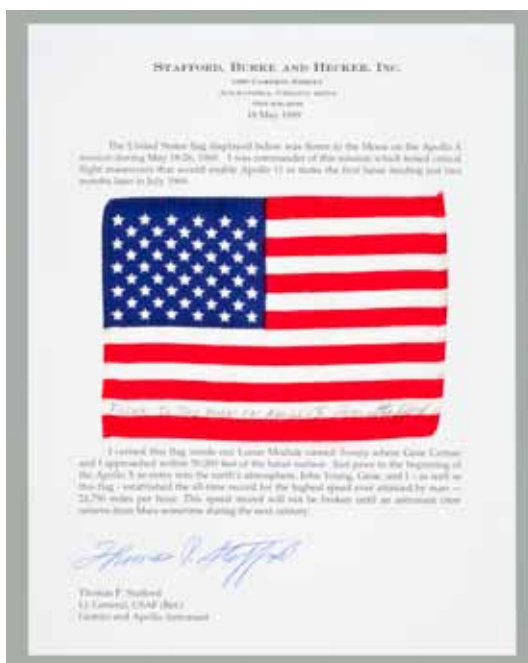
Flown crew Beta emblem, carried on the Apollo 10 lunar orbital flight on board the lunar module Snoopy, 9 inches square.

Accompanied by TOM STAFFORD'S signed provenance letter, dated January 30, 1990, which reads: *"Enclosed is an Apollo 10 Beta cloth emblem. It is exactly the same emblem worn on our Apollo 10 spacesuits and the same material used as the fire protection layer of the Apollo suits. It was carried onboard the Lunar Module "Snoopy" to within 50,000 feet of the Moon's surface during May 18 - 26, 1969 flight of Apollo 10."*

\$2,500 - 3,500



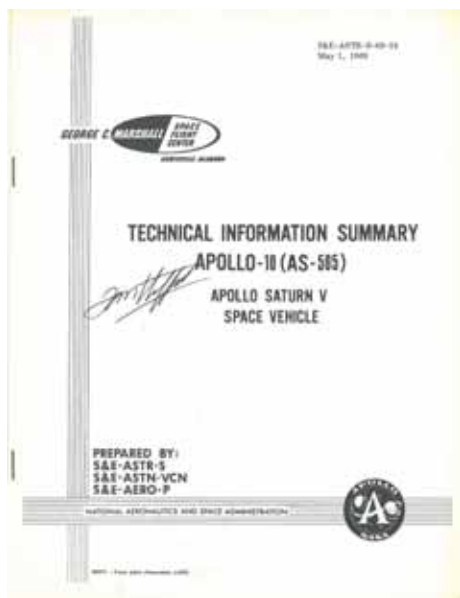
137



138



139



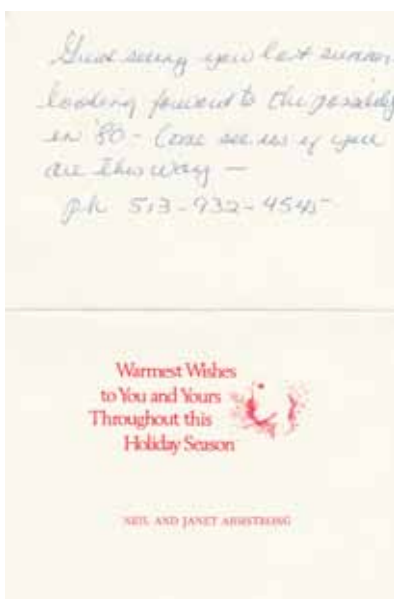
140



141



142



144



146



149

The following lot is directly from the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

140

STAFFORD'S APOLLO 10 MANUALS.

1. *Technical Information Summary, Apollo 10.* Approximately 94 pp. Provides details on the Saturn V, CSM and LM.
2. *Recovery Requirements, Apollo 10.* Upwards of 50 pp. Punched. Covers operations for NASA and DoD retrieval of CM from the Pacific Ocean. Both Houston, TX: MSFC, May 1 & 2, 1969. 8 x 11 inches. Stapled.

Both SIGNED by TOM STAFFORD on upper covers. Stafford gave the two manuals to Forostenko to familiarize him with the Apollo mission style.

\$1,000 - 1,500

141

HASSELBLAD PHOTOS FROM APOLLO 10.

Roll of slide film, being duplicate black and white positives from Hasselblad magazines O, P, Q, R, S and T. 70mm wide x several feet long. On metal reel, in period canister.

Includes numerous close-ups of the lunar surface. Over 500 frames in total.

\$1,500 - 2,500

142²

BILL BALDWIN'S BOUND APOLLO 10 PRESS KIT.

Press Kit... Project: Apollo 10. Washington, DC: NASA, May 6, 1969.

106 pp printed recto only. 10½ x 8 inches.

Numerous diagrams and illustrations. Period cloth, upper cover gilt lettered "Bill Baldwin."

An explanation of mission events and objectives, written for the press corps. Bill Baldwin joined NASA in 1963, and managed the writing group handling astronaut public relations and technical presentations throughout the Gemini and early Apollo programs. He produced presentations for many of the top NASA engineers and created the first in-depth public documents regarding the Gemini spacecraft, in collaboration with Wally Schirra.

SIGNED by GENE CERNAN with "Apollo X LMP" on title page.

\$300 - 500



143

The following two lots were originally in the collection of Astronaut Thomas P. Stafford.

143

NEIL ARMSTRONG LETTER TO GENERAL STAFFORD.

ARMSTRONG, NEIL. Typed Letter Signed ("Neil"), 1 p, 11 x 8½ 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 of the Apollo Soyuz Test Project (ASTP). That flight took place some 18 months later during July 1975.

\$4,000 - 6,000

144

THE ARMSTRONGS SEND A CARD TO THE STAFFORDS.

ARMSTRONG, NEIL AND JANET. Holiday card, 4 x 5½ inches folded, with postal envelope bearing a Cincinnati, OH postmark (December 18, 1979) and return address label, hand addressed to Lt. Gen. and Mrs. T.P. Stafford of Norman, Oklahoma.

Printed text on the card reads: "Warmest Wishes to You and Yours Throughout this Holiday Season, NEIL AND JANET ARMSTRONG."

Janet Armstrong's manuscript note reads: "Great seeing you last summer – looking forward to possibility in '80 – Come see us if you are this way – [phone number]."

\$800 - 1,200



145

145

APOLLO 10 CHART—TRAIL-BLAZING FOR APOLLO 11.

Apollo Translunar / Transearth Trajectory Plotting Chart (ATT), Apollo Mission 10. First edition, 15 April, 1969. 24 X 20 inches.

The chart is centered on a north polar view of the Earth and displays the May and June 1969 orbital path of the Moon around the Earth. The Apollo 10 trajectory to the Moon and back is plotted with events such as earth launch, translunar injection, lunar and earth coast phases, lunar orbit insertion, and transearth injection shown. Two note blocks provide a detailed description of the mission and have mission elapsed times of all major events. Boldly INSCRIBED and SIGNED: "Blazing the trail for a Lunar Landing, Tom Stafford, Apollo X CDR."

\$2,000 - 3,000

146

SPACE SUIT DEVELOPMENT PHOTOGRAPHS.

Large collection of approximately 99 color and black and white photographs, mostly 10 x 8 inches, 1960s, on various types of paper, one or two being NASA photographs but the majority International Latex Corporation (ILC), some with inkstamps or credits on verso and a handful with annotations.

A surreal 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 the designer and producer of the space suit pressure garment 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. Together with a 1961 illustrated report by George P. Durney for ILC on "Parallel Diffuser System and Integration with Universal Combat Clothing System."

\$700 - 900

147

SIX MOON GLOBES.

1. REPLOGLÉ. *The Moon*. [1969.] Metal globe with metal stand. 6 inch diameter. ORIGINAL BOX AND BOOKLET, entitled *The Story of the Moon* by Robert I. Johnson.

2. CRAM, GEORGE. *Cram's Moon Globe*. 10½ inch diameter. ORIGINAL BOX.

3. EDMUND SCIENTIFIC. *Mini-Moon*. [1961.] 12 inch diameter. Relief globe. Dark side of the moon still left entirely blank.

4. Untitled metal moon globe, produced shortly after Apollo 11. 9 inch diameter.

5. RAND MCNALLY. *Lunar Globe*. 12 inch diameter.

6. CHEIN. Untitled metal moon globe. Apollo sites marked through Apollo 5. 9 inch diameter.

\$800 - 1,200

148²¹

COUNTDOWN.

Conto alla rovescia. Rome: Policrom / Edizione Italiana, 1968. Color lithographed poster, 55 x 39½ inches. Laid on linen.

Poster for the Italian version of *Countdown*, a 1968 film directed by Robert Altman based on the novel *The Pilgrim Project* by Hank Searls. It stars James Caan and Robert Duvall as astronauts vying to be the first American to walk on the Moon as part of a rush program to beat the Soviet Union.

\$500 - 700

149

EARLY APOLLO EARTH PHOTOGRAPHY.

NICKS, ORAN W., editor. *This Island Earth*. NASA SP-250. Washington: 1970.

182 pp. 11½ x 9 inches. Original dark red cloth.

Illustrates vivid Earth photographs obtained by the Apollo 7 through 11 crews while in Earth orbit and translunar space. Included are the first manned space flight images taken with multi-spectral cameras. Features nearly 200 photographs. INSCRIBED and SIGNED on the title page "Apollo 7 photos by Donn Eisele," "Walt Cunningham" "® Wally Schirra," "Apollo XI Photos by Buzz Aldrin & Crew."

\$1,200 - 1,800

Apollo 11

The following lot was originally in the collection of Apollo 11 Command Module Pilot Michael Collins.

150

COLLINS' FLOWN CREW-SIGNED APOLLO 11 EMBLEM.

A RARE FLOWN ARMSTRONG-SIGNED MISSION ARTIFACT.

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

SIGNED by the Apollo 11 crew: NEIL ARMSTRONG, MICHAEL COLLINS, and BUZZ ALDRIN. Additionally inscribed by Collins above the emblem with: *"Carried to the moon aboard Apollo XI, July 1969."* One of the very few flown mission artifacts signed by the first man to step on the Moon, Neil Armstrong. With MICHAEL COLLINS' manuscript provenance note, reading: *"I certify that the enclosed 6" by 6" Beta cloth Apollo XI crew patch, signed by Neil Armstrong, Buzz Aldrin, and myself, is from my Personal Preference Kit flown to the moon in 1969. All three signatures date back to 1969. I added the inscription at the top approx. 25 years later. Michael Collins, Nov. 1, 2004."*

\$60,000 - 80,000

*Carried to the Moon aboard Apollo XI
July 1969*



Neil Armstrong
Michael Collins
Buzz Aldrin

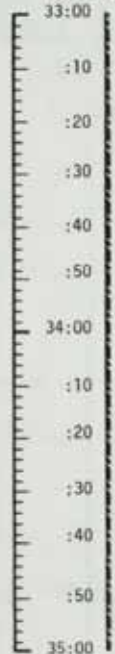
150 (actual size)

MCC-H

1830 EDT

FLIGHT PLAN

NOTES



Exit w/proc in

R-261 R090-000
HG P+28 Y 271

TV

O₂ FUEL CELL PURGE
CO₂ FILTER CHANGE NO.3
(5 INTO A, STORE 3 IN B5)

PTC

Flown
TO THE
MOON
T. Buzz Aldrin

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	33:00 - 35:00	2/TLC	3-23

MSC Form 20 (May 69)

FLIGHT PLANNING BRANCH

MCC-H

UPDATE
BLOCK DATA

(2030 EDT)

FLIGHT PLAN

NOTES

RECORD BLOCK DATA-
LOI-5 FLYBY TO
PRIME CLA

EAT PERIOD - ALL

REPORT LM/CM ΔP 1.1
REINITIATE CSM PURGE
(IF REQUIRED)NOTE: THE LENGTH OF THE SECOND CSM CABIN PURGE
WILL BE DETERMINED REAL TIME BASED ON THE
LM LEAK RATE ENSURING LM O₂ PURITY REQUIRE-
MENTS ON THE LUNAR SURFACE

PRESLEEP CHECKLIST

- CREW STATUS REPORT (RADIATION, MEDICATION)
- ✓ CYCLES O₂ & H₂ FANS
- ✓ CHLORINATE POTABLE WATER
- ✓ SELECT NORMAL LUNAR CONFIG EXCEPT: (FOR COAST ASLEEP)
- ✓ S-BD NORMAL MODE VOICE - OFF
- ✓ S-BD AUX TAPE - OFF
- ✓ LAPE RCOR FWD - OFF
- GO TO HSA OR CONTINUE OMNI
- ✓ OPS PER MSFN
- OMNI OPS
- ✓ S-BD ANT OMNI - OMNI
- ✓ S-BD ANT OMNI - B
- HI GAIN OPS
- HI GAIN ANT BEAM - NARROW
- HI GAIN ANT TRACK - REACQ
- S-BD ANT-HI GAIN
- VERIFY:
- WASTE MNGT OVBD DRAIN-OFF ✓
- WASTE STOW VENT VLV-CLOSED ✓
- EMERG CABIN PRESS VLV-BOTH ✓
- SURGE TK O₂ VLV-ON ✓
- ✓ REPRESS PACK O₂ VLV-OFF
- ✓ LM TUNNEL VENT VLV-LM/CM ΔP
- ✓ POT H₂O HTR - OFF
- AUTO RCS JET SELECT (16) - OFF ✓

COR 11005
CMP 10006
LMP 09007

ONBOARD READOUT	
BAT C	37.1
PYRO BAT A	32.1
PYRO BAT B	32.1
RCS A	82
B	84
C	85
U	87
DC IND SEL TO MNA OR MNB	

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	35:00 - 37:00	2/TLC	3-24

MSC Form 20 (May 69)

FLIGHT PLANNING BRANCH

CARRIED TO THE MOON ON APOLLO XI

T. Buzz Aldrin

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

151

FLOWN APOLLO 11 FLIGHT PLAN SHEET.

ALDRIN AND COLLINS RECORD FLIGHT DATA AND NOTES, AS NEIL ARMSTRONG NARRATES AND DIRECTS TV SHOWING THE EARTH FROM SOME 130,000 MILES OUT IN SPACE.

Flown Apollo 11 Flight Plan sheet, page 3-23/3-24, a single sheet printed recto and verso. NASA/ MSC, July 1, 1969. 8 x 10½ inches. Extensive notations by Aldrin and status checks by Collins. With a Typed Letter Signed by BUZZ ALDRIN.

During this period of the Apollo 11 mission, Neil Armstrong and the Apollo 11 crew sent a live television transmission to Earth which was broadcast by the commercial television networks and distributed to the rest of the world.

BUZZ ALDRIN'S signed provenance letter reads in part: *"During the events on page 3-23, we were in PTC or Passive Thermal Control. This was a means to evenly distribute the heat from sunlight shinning on our CSM/LM docked combination. We simply rotated around the common axis that passed through both the CSM and LM. We stopped this PTC for the schedule TV transmission to Earth. Just before the scheduled TV, I recorded: 'Exit w/ proc. in, R-261, P-090, 000, HG P+28, Y271' which was the new attitude for our spacecrafts and pointing instructions for the high gain antenna. We were some 130,000 nautical miles from the earth, moving away at over 3,000 feet per second. Commander Neil Armstrong narrated most of our television transmission which featured views of the Earth. We then provided the viewers a tour of the Command Module showing various instrument panels, computer read-outs, and other equipment. Mike Collins then made the three left-handed check marks denoting the completion of our carbon dioxide filter change.*

On page 3-24, we had our evening meal and I checked-off over 15 items on our Presleep Checklist and crossed-out four others. I then recorded the radiation exposure values of: 'CDR 11005, CMP 10006, LMP 09007.' The last item I did was to complete the Onboard Readout data block by entering: '37.1, 37.1, 37.1' for the battery values and '82, 84, 85, 87' for the RCS A, B, C, D values. This page has been in my private collection since 1969. I have written on page 3-23: 'Flown to the Moon' and signed that page. Additionally, I have written on page 3-24: 'Carried to the Moon on Apollo XI' and signed it along the bottom part of that page."

A copy of the flight plan cover is included.

\$15,000 - 20,000

Basic Date APRIL 5, 1969
Changed JULY 10, 1969 - B CSM UPDATES

P30 MANEUVER									
SET STARS		TEI 4				PURPOSE			
						PROP/GUID			
		+ 79320				WT N47			
R ALIGN		- 00055				P TRIM N48			
P ALIGN		+ 00060				Y TRIM			
Y ALIGN		+ 00094				HRS GETI			
		+ 00030				MIN N33			
		+ 02749				SEC			
ULLAGE 2 Jet		+ 3138.0				ΔV X N81			
16 s.		+ 0347.5				ΔV Y			
		- 0103.2				ΔV Z			
		X X X -				R			
UNDocked		X X X 034				P			
NO LOI 2		X X X				Y			
		+				H _A N44			
		+				H _P			
		+				ΔVT			
HORIZON/WINDOW		X X X .				BT			
		X				ΔVC			
		X X X X				SXTS			
		+				SFT			
		+				TRN			
CARRIED TO THE MOON ON AULLAX		X X X				BSS			
Buzz Aldrin		X X				SPA			
		X X X				SXP			
OTHER		0				LAT N61			
		+				LONG			
		+				RTGQ EMS			
		+				V10			
		+				GET 0.05G			

152

152

FLOWN APOLLO 11 CSM MANEUVER CARD.

SOME OF NEIL ARMSTRONG'S MOST EXTENSIVE FLIGHT NOTES, INCLUDING ALDRIN'S ACTUAL BURN DATA FOR MCC-5.

Flown Apollo 11 CSM Updates Checklist, P(Program) 30 data grid, a single sheet printed recto and verso. NASA/MSC, April 5, 1969, updated July 10, 1969. 5½ x 8 inches. Extensive notations by all three Apollo 11 crewmen. With a Typed Letter Signed by BUZZ ALDRIN.

FLOWN APOLLO 11 CSM P(Program) 30 SHEET, ONE OF ONLY TWO USED BY ARMSTRONG DURING THE MISSION.

During this period of the mission, the Apollo 11 crew had just successfully entered orbit of the Moon. Neil Armstrong recorded the TEI-4 data information during the early parts of the second lunar orbit. The reverse side data was recorded by Mike Collins during the fourth lunar orbit. The MCC (Mid Course Correction) 5 burn data was recorded by Buzz Aldrin just after the TransEarth Injection during their return home to Earth. This single P-30 sheet contains some of the most critical flight maneuver data recorded during the entire flight and is the only one with data recorded by all three Apollo 11 crew members.

BUZZ ALDRIN'S signed provenance letter reads: "The data card which accompanies this letter is from the Apollo 11 CSM Updates, Part No. SKB32100080-330, S/N 1001, a manual flown in the Command Module Columbia during the first lunar landing mission during July 16 to 24, 1969. It is a P30 maneuver card that is in a column and grid format for recording data to perform spacecraft engine burns.

This card has data that Neil Armstrong recorded for the TEI 4 (Transearth Injection) lunar orbit number 4 as read to him from Mission Control at about 79 hours into our mission. Neil logged 11 data entries including the purpose - 'TEI 4,' our spacecraft weight (WT) of '38320' pounds, engine trim angles of '-0.55' and '+0.60,' the actual time for the burn in hhh mm ss.ss - '084:30:27.49,' the change in velocity (deltas Vx, Vy, and Vz) of '+3138.0, +0347.5, -0103.2.' The P value of '034' is the angle for the IMU (Inertial Measurement Unit) for the maneuver. Neil then wrote: '2 Jet, 16 sec.' which meant we would use just 2 of the reaction control engines for 16 seconds to set the proper ullage for our main propellant tanks. Neil also wrote the purpose for the pad 'Undocked NO LOI 2.' TEI 4 was a contingency burn to return home, if required, if we did not have a LOI (Lunar Orbit Insertion) number 2 burn. We could then undock and perform this TEI burn to return home. This pad update was actually the second one we recorded for TEI 4. During the LOI 1 burn, we used a bit more propellant than expected, thus we needed updated figures for the contingency TEI 4 burn.

P30 MANEUVER			
D - Vega SET STARS		MCC 5	PURPOSE
R ALIGN 007		RCS	PROP/GUID
P ALIGN 144		+ 26025	WT N47
Y ALIGN 068		0 0	TRIM N48
ULLAGE 2200		0 0	Y TRIM
4 Q		+ 0 0 150	HRS GET1
		+ 0 0 29	MIN N33
		+ 0 54.53	SEC
		+ 0004.8	ΔV _X N81
		+ 0000.1	ΔV _Y
		X X X 075	R
		X X X 159	F
		X X X 328	Y
		+ 0023.0	HA N44
		+ 0004.8	ΔVT
HORIZON/WINDOW		X X X 0:11	BT
		X 0004.8	ΔVC
		X X X X 0.3	SXTS
		+ 090.8	SFT
		+ 38.2	TRN
		X X X	BSS
		X X	SPA
		X X X	SXP
OTHER		+ 0 11.02	LAT N61
		- 172.04	LONG
		+ 1180.3	RTGO EMS
		+ 36275	V10
		195:03:33	GET 0.05G

Basic Date: JUL 5, 1969
Changed: JULY 10, 1969 - B CSM UPDATES

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On the other side of this card, there is an identical P30 grid which has three different burn pads. Mike Collins recorded the first entry in pencil for TEI 11 around 83 hours and 30 minutes into the mission. Neil and I were in the LM completing communication checks at that time. Mike logged the following starting with PURPOSE all the way through to the R, P, and Y blocks: 'TEI 11, SPS/G&N, 37200, -0.60, +0.47, 098, 05, 24.22, +4144.8, +0371.9, -0242.2, N/A, 020, N/A.' Mike then wrote: '2 jet :16, use B & D, Undocked, present CSM WT (weight) 37,002 #.' This pad was for a contingency return home that could be done during lunar orbit 11 and we planned to use 2 reaction control jets (B and D) for 16 seconds for the needed ullage.

Mike then wrote the TEI 30 pad at the right side margin based on our own spacecraft navigational data. The PURPOSE through to the R, P, and Y blocks recorded information was: '30, SPS/G&N, 36639, -0.72, +0.51, 135, 24, 40.00, +3217.8, +0603.6, -0130.4, 0 (then lined out), 064, (then another line out).' His last entry on the right margin was 'LOI REFSMMAT' which was the basis of this data.

The actual implemented burn on this side was the MidCourse Correction burn number 5 which occurred at 150 hours 29 minutes into the mission. This was sent to me at around 148 hours 45 minutes. I logged over 20 values which included the purpose and propulsion/guidance - 'MCC 5, RCS/G&N,' our spacecraft weight (WT) of '26025' pounds, engine trim angles were not needed, the scheduled time for the burn in hhh:mm:ss.ss - '150:29:54.53,' the change in velocity (deltas V_x, V_y, and V_z) of '-0004.8, +0000.1.' The R, P, and Y values of '075, 159, 328,' for the angles used by the IMU (Inertial Measurement Unit). We did not need HA (Apogee) but HP (Perigee) was '+0023.0.' Total velocity (delta VT) was '0004.8,' Burn Time (BT) in minutes and seconds of '0:11' and our premaneuver setting (delta VC) was '0004.8.' The next 3 values of '03, 090.8, 38.2' were star, shaft, and trunnion settings for the sextant. Additionally I recorded Lat and Long values of '+11.02, -172.04' with a Range To GO of '1180.3' and Inertial Velocity (V10) of '36275' with an end of mission Ground Elapsed Time (GET) of '195:03:33' in hhh:mm:ss.

Then I wrote the flight notes of: 'D & Vega' for stars Deneb and Vega, with an alignment of '007, 144, 068.' The '4 Q' meant we would use only the 4 reaction control engines for the course correction. The burn was successful which enabled us to splashdown very close to the USS Hornet, our prime recovery ship.

I have written 'Carried to the Moon on Apollo XI' and signed my name on the TEI-4 side of the card. This page has been in my private collection since my return from the Moon in July 1969." \$70,000 - 90,000

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ARMSTRONG AND ALDRIN VERIFY EAGLE'S STATUS.

CARRIED TO THE LUNAR SURFACE.

Flown Apollo 11 LM Activation Checklist, page ACT-50/ACT-51, a single sheet printed recto and verso. NASA/MSC, May 26, 1969, updated July 4, 1969. 5½ x 8 inches. With a Typed Letter Signed by BUZZ ALDRIN.

During this period of the mission, Armstrong and Aldrin were in the final stages of Lunar Module checks before they separated from Command Module Columbia to begin their descent to the lunar surface. They performed a critical Reaction Control Subsystem (RCS) test. Any problems could potentially scrub the planned lunar landing.

BUZZ ALDRIN'S signed provenance letter reads in part: *"Enclosed with this letter is a sheet numbered ACT-50 and Act-51 from the Apollo 11 LM Activation Checklist. The entire checklist was carried to the Moon on the flight of Apollo 11 during July 16 to 24, 1969. Then the checklist, including this sheet, was taken to the surface of the Moon in Lunar Module Eagle during the first lunar landing on July 20, 1969. It lists some critical flight tests performed by Commander Neil Armstrong.*

Side ACT-50 has the last two parts in the 'RCS (Reaction Control Subsystem) PRESSURIZATION.' This subsystem used a group of four small rocket engines attached at four equal distant points outside on our Ascent Stage to provide Eagle's attitude control during flight. We recycled the 'SYS A&B ASC(cent) FEED' switches and completed the other three steps of part 5. Neil and I then checked the 'TEMP/PRESS Mon' values in part 6. All pressures and temperatures were as expected. At about 99 hours and 24 minutes into the mission, we started the 'RCS CHECKOUT' by setting the proper circuit breakers 'CB' to either open or closed and configured other switches.

Side ACT-51 has the remaining steps of part 2 and parts 3, 4, and 5 of the RCS checkout. These steps included Neil's check of his 'CDR ACA' or Attitude Controller Assembly. He did a series of checks including roll right and left commands, pitch up and down inputs, then yaw left and right commands. We completed this series of test with less than 3 hours before Eagle landed on the lunar surface. If our RCS rockets failed to perform properly, it could have prevented Neil Armstrong and myself from becoming the first humans to land and walk on the Moon....

This sheet has been in my private collection since 1969. On side ACT-50, I have written: 'Flown to the lunar surface on Apollo XI' and signed it along the right side. I have signed my name on side ACT-51."

\$25,000 - 35,000

Basic Date May 26, 1969
 Changed June 20, 1969

ACT-50

- 5 RECYCLE: SYS A&B ASC FEED 2(2) - CLOSE
 : SYS A&B ASC FEED 1(2) - OPEN
 : SYS A&B THR PAIR
 QUADS(8)-OPEN
 : CRSFD - CLOSE
 : SYS A&B MAIN SOV-OPEN
- 6 TEMP/PRESS MON - OXID MANF (172-186 psi)
 - FUEL MANF (172-186 psi)
 - PRPLNT (40°-100°/172-186 psi)
 - He (2670-3300 psi)
 Read He Pressure To MSFN

99:24* RCS CHECKOUT

- 1 CB(16) INST: CWEA - OPEN
 - CLOSE
 DES. REG Warning Lt - OFF
 Cycle TEMP MONITOR
 CB(11) STAB/CONT: ATT DIR CONT-CLOSE
- 2 GUID CONT - PGNS
 DEADBAND - MAX
 ATT/TRANSL - 4 JET

*FLOWN TO THE LUNAR
 SURFACE ON APOLLO XI
 T. Buzz Aldrin*

RCS CHECKOUT

RCS CHECKOUT

ACT-51

- MODE CONT: PGNS - ATT HOLD
 ATTITUDE CONTROL (3) - PULSE
 ACA/4 JET (CDR) - DISABLE
 TTCA/TRANSL - ENABLE
 CSM Min Deadband, ATT Hold
 Verify HBR with MSFN
- 3 V48E
 F 01 46 Verify DAP Configuration
 (32012)
 PRO
 V34E
- 4 V77E
 V15 NOIE, 42E (RATE CMD CHECK OF CDR
 ACA TO LGC, ACA PULSE COLD FIRE
 IN CES)
 CDR ACA (To soft stop, pause at null)
 Roll Right - R3 00051
 Roll Left - 77726
 Pitch Up - R1 00051
 Pitch Down - 77726
 Yaw Right - R2 77726
 Yaw Left - 00051
 CSM Wide Deadband ATT HOLD
- 5 Verify CSM Roll Jets OFF And Tunnel Vented To Zero
 V76E (MIN IMP CHECK OF CDR ACA TO LGC,
 ACA COLD FIRE CES VOLTAGE, SEC
 RCS COIL HOT FIRE 4-JET IN AGS)

T. Buzz Aldrin

Basic Date May 26, 1969
 Changed June 20, 1969

PCNS-15
P06 PCNS PWR DOWN

1 F 30 23 V37E 06E
00062 POWER DOWN LOC
PRO Until STBY Lt - ON

12 POWERED ASCENT
HELIUM MON - PRESS 2
PRINT TEMP/PRESS MON - ASC
APS/RCS PROPELLANT - INTERCONNECT
THROTT/JETS - JETS
ATT/TRANSL - 4 JETS
BAL CPL - ON
DAP - SET

V37E 1ZE

*PROG Lt - ON
*V05809E 00210 IMU
* NOT OPERATING
* 00220 IMU
* NOT ALIGNED
* KEY REL
* RSET

2 F 06 33 TIG(AS) (hrs,min.,01sec)
PRO

3 F 06 76 V(NOR),V(VEET),CROSS RANGE (.1fps,.1mm)
PRO

F 50 25 R1 00203 PCNS AUTO
* NOT SELECTED
* (AUTO) GUID CONT - PCNS*
* PMS - AUTO
* PRO
* (BYPASS) ENTR

4 06 74 TFI, FINAL FDAI YAW, PITCH ANGLES (min-sec,.01")
RECORD YAW
PITCH
SET EVENT TIMER TO TFI

Basic Date Changed May 29, 1969

LM-5

224 - 904

1 Buzz Aldrin

PCNS-16

CMPT ACTY Lt - ON

*PROG Lt - ON
V05809E,1703 TIG SLIPPED
*RSET, KEY REL

CMPT ACTY Lt - OFF

-1:00 MASTER ARM - ON

-1:35 DSKY BLANKS

-1:30 06 74 TFI, FINAL FDAI YAW, PITCH ANGLES (min-sec,.01")
(AVE G ON)

-1:05 F 99 74 ENGINE ON ENABLE
(AUTO) ABORT STAGE-PUSH
ENG ARM - ASC
PRO (IGN when TFI=00)
(TERMINATE) V34E

5 06 74 TFI, FINAL FDAI YAW, PITCH ANGLES (min-sec,.01")

IGN 06 63 VI, HDOT, H (.1fps, ft)
ENG START - PUSH
Monitor attitude maneuver
to recorded ball angles

BAL CPL - OFF (after pitch mnvr)

X-axis override restored
at HDOT = 40 fps plus 1/2 sec

VI increasing
HDOT increasing then decreasing
H increasing

V16 N77E (When VI > TRD fps)

Basic Date Changed May 29, 1969 June 23, 1969

LM-5

1 Buzz Aldrin

PCNS-17

6 16 77 TG,V(Y) (min-sec,.1fps)
N85E

7 16 85 VG XYZ (LM) (.1fps)

VGX-200fps MAIN SOV SYS A - OPEN
MAIN SOV SYS B - OPEN
SYS A ASC FEED 2-CLOSE
SYS B ASC FEED 2-CLOSE

VGX-50fps ENG ARM - OFF

APS OFF

NULL COMPONENTS
KEY RELEASE

8 F 16 63 VI,HDOT,H (.1fps,ft)
ABORT STAGE - RESET
ENG STOP - PUSH, RESET

NOTE VI _____ fps
HDOT _____ fps
H _____ ft
PRO

9 F 16 85 VG XYZ (LM) (.1fps)
(DISPLAY ORB PARAM) V82E To 10
(TERM) PRO To 11

10 F 16 44 APO ALT, PER ALT, TFF (.1mm,min-sec)

NOTE APO ALT _____ mm
PER ALT _____ mm
TFF _____ min-sec
PRO To 9

11 F 37

FLOWN TO THE LUNAR
SURFACE ON APOLO XI
USED FOR ASCENT

1 Buzz Aldrin

Basic Date Changed May 29, 1969

LM-5

PCNS-18

P20 RENDZ NAV

V95E
V37E 20E
(TO TERM-V56E)
(SV OPTION, V80E LM, V81E CSM)
(If Pointing Error < 15° To 4, Mnvr with No Display)

2 F 50 18 REQUEST MNVR TO FDAI RPY ANGLES (.01")
(TO ADJUST ROLL) MNVR
ATT HOLD
MODE CONT: PCNS - ATT HOLD
PRO to 2
(AUTO) GUID CONT - PCNS
MODE CONT: PCNS - AUTO
PRO
(MAN) MODE CONT: PCNS - ATT HOLD
MNVR
MODE CONT: PCNS - AUTO
PRO
(BYPASS) ENTR To 4 (To 9 If Entered From 91 Via V32E)
(To 6 If Entered From 6 Via ENTR)

3 06 18 AUTO MNVR TO FDAI RPY ANGLES (.01")
Monitor Auto Mnvr To 2

4 RR MODE: LGC To 7 (To 8 If From 6 or 9 via No)
SLEW or AUTO To 5

5 F 50 25 00201 RR ACQ MODE
(AUTO) RR MODE LGC
PRO To 4
(MAN) ENTR

6 F 50 25 00205 SLEW RR for LOCK-ON
(LOCK) RR-LGC:
No Track Lt - OUT, wait 10 Sec
PRO To 4
(NO LOCK) MNVR
ENTR To 2

F 05 09 501 RR out of mode limits
* (REQUEST MNVR) V32E To 2*

Basic Date Changed May 29, 1969

LM-5

1 Buzz Aldrin

ARMSTRONG AND ALDRIN READY TO LEAVE THE MOON.**2-PAGE ALDRIN LETTER DESCRIBES LUNAR EXPERIENCE.**

Two flown sheets from the Apollo 11 LM G & N Dictionary, 4 pp, being "PGNS-15" to "PGNS-18," each printed recto and verso. NASA/MSC, May 29, 1969, updated June 23, 1969. Each 8 by 5½ inches. With a Typed Letter Signed by BUZZ ALDRIN.

BUZZ ALDRIN'S two page signed provenance letter reads: "Enclosed with this letter are two sheets numbered PGNS-15/16 and PGNS-17/18 from the Apollo 11 LM G and N Dictionary, Part No. SKB32100074-361, S/N 1001. It is part of the entire document that was carried to the lunar surface in Lunar Module Eagle on the first lunar landing mission during July 16 to 24, 1969. These sheets are from the Primary Guidance and Navigation Section (PGNS) and have computer procedures to perform the lunar lift-off to enable Neil Armstrong and I to leave the Moon. These are some of the most significant pages from the entire dictionary. Page PGNS-15 has the P06 or PGNS Power Down Program steps to put the flight computer into a standby mode. The most important steps are the ones listed under P12 POWERED ASCENT. This was the program to enable lift-off from the Moon. Neil Armstrong and I were ready to implement these steps immediately after our lunar landing on July 20 if an emergency arose. We also had this page available during predetermined abort periods throughout our lunar stay if an early lift-off was needed. The lunar landing was an experience I will always remember. As we say in NASA, all was 'nominal' until our instrument LM panel flashed a '1202' program alarm. Neil and I asked Mission Control about this because we had never seen it before in any simulation. After some very tense moments, Houston finally radioed that we were 'GO on that alarm.' That was good news but not that reassuring when a few seconds later the same alarm occurred. The alarm coincided when I keyed the computer for the difference between our radar based altitude versus the computer guidance system's value. The alarm indicated that the computer was overloaded with too many tasks. About 3 minutes later, an additional alarm '1201' flashed. Mission Control told us that it was of the same type as the '1202' and that we were still 'GO' for landing. Some eight minutes into our descent engine burn, we started our most challenging part of the landing—the approach phase sequence. We were behind on flight tasks due to the distractions caused by the alarms. Neil was monitoring our instruments and the visual view out his window. He constantly cross-checked Eagle's descent rate with the descent rate data grid from our LM Timeline Book. We had just pitched over and got our first good view of a landing area. We were farther down range than expected. I had to focus on the computer descent readouts as Neil monitored the area the computer was targeting for landing. Neil's flying tasks suddenly became more complicated because the computer was sending us into a large crater containing and surrounded by boulders. At about 500 feet above the lunar surface, Neil Armstrong entered the commands to manually fly Eagle to the lunar surface with computer support. He slowed the descent rate to just a few feet per second and studied the surrounding terrain. Neil asked me about our fuel status and I indicated we had 8 percent remaining. I was then able to glance outside and began to understand why the landing sequence was taking longer than planned—the craters, rocks, and boulders seemed to be everywhere. Mission Control radioed we had '60 seconds' of fuel remaining. I made more data calls. Then '30 seconds' rang in our headsets. Neil was almost to the surface when a haze of dust was kicked up by engine exhaust. He

could not see the surface and had to locate something just above the dust cloud. Finally, Neil was able to see a rock that appeared fixed in the stream of dust. This gave him a surface reference and he expertly nulled out a slight backward drifting motion and corrected for a small sideways drift. Just as Neil placed Eagle gently on the lunar surface, I spoke the first words from the Moon: 'CONTACT LIGHT!' This was the indicator light on our control panel that told us that Eagle had touched the lunar surface. We only had about 20 seconds of fuel remaining onboard.

We immediately called out and performed the engine stop, safety commands, and secured our attitude control equipment. Then Neil radioed the words most people remember hearing from the Moon: 'Tranquility Base here, the Eagle has landed.' Neil and I shook hands. The flight plan actually had a rest period scheduled before our planned surface exploration. Needless to say, Neil and I had an abundance of energy and adrenaline surging through our bodies after this historic event and starting a rest period was the last thing on our minds. Neil asked and received concurrence from Mission Control to start the EVA activities about 5 hours earlier than was written in the flight plan. The preparations in configuring our space suits and other equipment took a bit longer than planned but we soon began the depressurization of Eagle's cabin to allow us to open the hatch and step onto the lunar surface. At 109 hours and 24 minutes, which was 10:56 pm EDT on July 20, Neil Armstrong became the first human to step upon the Moon. He then said: 'That's one small step for a man, one giant leap for Mankind.'

Some 19 minutes after Neil's first step, I started down Eagle's ladder and set foot upon the Moon. Not as well known as Neil's words but very appropriate, I spoke after stepping on the surface: 'Magnificent Desolation.' The lunar surface was indeed desolate, but had a striking beauty all its own. Gray was the dominant color, but that color changed in tone as I turned to various sun angles. Walking on the lunar surface was not difficult to get accustomed to and I found the ballistic type trajectory of the surface dust kicked up by my boots fascinating to observe on this airless world. Walking and exploring on the Moon was something only eleven others experienced during the 20th century.

After a short rest period, Neil and I started the steps to return to lunar orbit. Most of the procedures were done via the Lunar Surface Checklist which included realignment steps for our navigational equipment and an actual countdown to lunar lift-off. The steps from page PGNS-15 were used to properly set up our computer for the P12 Powered Ascent Program. The steps on PGNS-16 are exactly the same as the last minute of the countdown from our Lunar Surface Checklist. While that checklist ended at 'ENG START – PUS' to start lift-off, page PGNS-16 has all the expected events and steps during our actual flight profile from the lunar surface. This page as well as PGNS-17 was a reassuring guide to have as we made our way to lunar orbit. The next phase was the complicated rendezvous sequence listed on page PGNS-18 which has the start of the P20 RENDZ NAV or rendezvous navigation. Almost 4 hours after lunar lift-off, we finally joined up and docked with Mike Collins in Columbia. Along the side of page PGNS-15 I have written: 'Flown to the lunar surface on Apollo XI. Used for Ascent.' I have signed that page plus signed page PGNS-16. On page PGNS-17 I have written: 'Flown to the lunar surface on Apollo XI. Used for Ascent.' I have signed that page and signed page PGNS-18."

\$70,000 - 90,000



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ARMSTRONG AND CREW RETURNING HOME. ALDRIN REFLECTS ON MISSION.

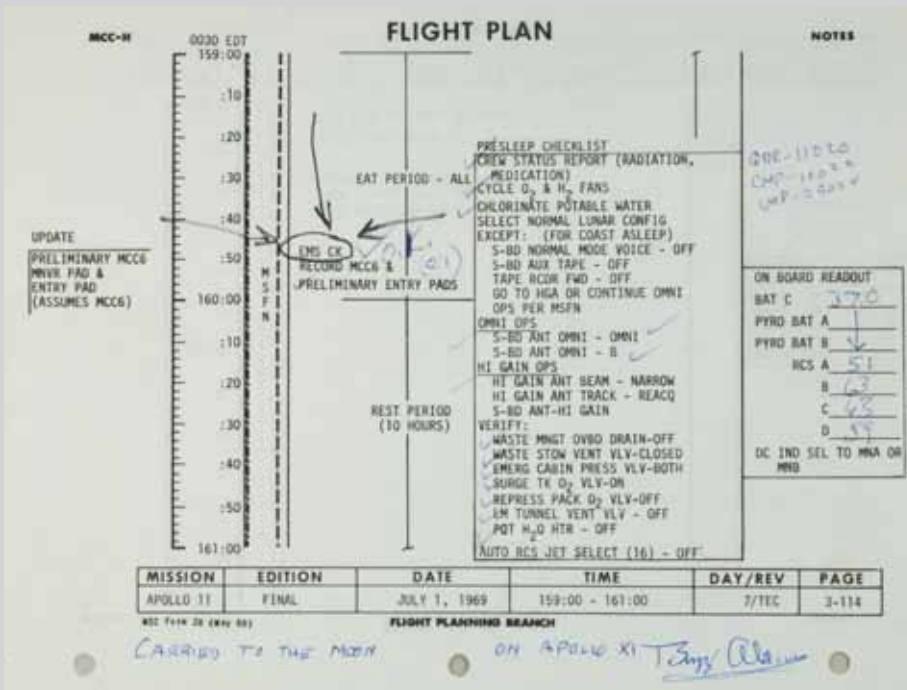
Flown Apollo 11 Flight Plan sheet, page 3-113/3-114, a single sheet printed recto and verso. NASA/MSC, July 1, 1969. 8 x 10½ inches. Extensive notations by Neil Armstrong. With a Typed Letter Signed by BUZZ ALDRIN.

BUZZ ALDRIN'S signed provenance letter reads in part: "Enclosed with this letter is a sheet numbered 3-113 and 3-114 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 157 to the beginning of hour 161 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 and completed the MCC5 (Mid Course Correction) burn number 5 to refine our trajectory back to Earth. The burn accomplished exactly what we and Mission Control wanted, a precise placement to our entry corridor into the Earth's atmosphere. We had some open time as noted on page 3-113. We had just completed a television transmission to viewers on Earth and were beginning to get set for our upcoming sleep period. Neil Armstrong marked through and checked off the steps associated with our hatch tunnel and logged that we changed out a carbon dioxide filter at '159:31' in the mission. 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. Page 3-114 shows we were having our evening meal plus preps for our sleep period. Neil Armstrong recorded our radiation exposure of: 'CDR - 11020, CMP - 10022, LMP - 09024' and logged in the On Board Readout box: '37.0 ---, 51, 63, 63, 59.' The first three numbers, all the same, were the battery values and the last four were Reaction Control System values. Neil then checked off over ten steps in our Presleep Checklist. We had clearly circled and pointed to the EMS CK (Entry Monitor System) check out. We did this prior to the sleep period and Neil wrote: 'O. K. (0.1)' and checked it complete. This system would be used during our reentry into the earth's atmosphere.... This page has been in my private collection since 1969. I have written on page 3-113: 'Flown to the Moon' and signed 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.

\$25,000 - 35,000



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ARMSTRONG LOGS CAMERA DATA.

RECORDING COLUMBIA'S RE-ENTRY.

Flown Apollo 11 Flight Plan, page 3-126/3-127, a single sheet printed recto and verso. NASA/ MSC, July 1, 1969. 8 x 10½ inches. Extensive notations by Neil Armstrong. With a Typed Letter Signed by BUZZ ALDRIN.

THE ONLY CAMERA DATA INFORMATION RECORDED DURING APOLLO 11—LOGGED BY NEIL ARMSTRONG.

BUZZ ALDRIN'S signed provenance letter reads in part: "Enclosed with this letter is a sheet numbered 3-126 and 3-127 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 182 to the beginning of hour 186 of the mission. Page 3-126 has the first 2 hours of our last rest period of the mission. A few hours before this time, Mission Control radioed instructions for motion picture camera settings. We were to use these settings for proper photography of Columbia's re-entry the next day, 24 July 1969. Neil Armstrong recorded this information on the left side of 3-126 which reads: '- CIN - F11/250, 6 FPS, 7 FT.' These notes were for us to use an exposure setting of: f 11, 1/250 of a second running at 6 frames per second with the focus at 7 feet to view the entry fireball. Neil's notes of: 'F 2.0 / 1/60, 6 FPS, 50 FT, CHUTES' were for us to photograph the parachute opening using an exposure of f 2.0, 1/60 of a second at 6 frames per second with the focus at 50 feet. Neil's last photography notes were: 'INT, F 16 / 1/500, 6 FPS, 7 FT., F 28/50.' These were different settings in case the film magazine we ended up using had already been used for interior shots. In that case, we would have an exposure of f 16, 1/500 of a second at 6 frames per second and a focus of 7 feet for the fireball. For the parachutes, it would be f 2.8, 1/60 of a second, focus at 50 feet. This was one of Neil Armstrong's most extensive set of notes made in the entire flight plan.

In the notes column on the right side of 3-126, Neil recorded the radiation readings for each crew member. These notes read 'CDR - 11023, CMP - 10025, LMP - 09027.' He also checked off 9 steps of the Pre Sleep Checklist. Page 3-127 lists hours 184 to the beginning of hour 186 which were hours 3 and 4 of this rest period. We were a bit busy getting ready for re-entry and Neil and myself only got 5.5 hours of sleep. Michael Collins did a bit better and got a total of 7 hours of sleep.

This page has been in my private collection since 1969. I have written on page 3-126: 'Carried to the Moon on Apollo XI' and signed it near the bottom of that page. I have also signed page 3-127."

Additionally, a copy of the flight plan cover is enclosed.

\$40,000 - 60,000

MCC-H 2330 EDT 182:00

FLIGHT PLAN

NOTES
CDR - 11023
CMP - 10025
LMP - 09027

PRE SLEEP CHECKLIST

CREW STATUS REPORT
[RADIATION, MEDICATION
CYCLE O₂ & H₂ FANS
CHLORINATE POTABLE WATER
SELECT COMM NORMAL CONFIGURATION
EXCEPT:
S-BD NORMAL MODE VOICE SW - OFF
S-BD SQUELCH - ENABLE
S-BD AUX TAPE - OFF
S-BD ANT - OMNI
S-BD ANT OMNI - B
TAPE REOR FWD - OFF
VERIFY:
WASTE MNGT OVID DRAIN - OFF
WASTE STOWAGE VENT VLV - CLOSED
EMERG CABIN PRESS VLV - BOTH
SURGE TK O₂ VLV - ON
DEPRESS PACK O₂ VLV - OFF
POT H₂O HTR - OFF
AUTO RCS JET SELECT (16) - OFF

REST PERIOD (7 HOURS)

Carried to The Moon on Apollo XI
T. Buzz Aldrin

PTC

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	182:00 - 184:00	B/TEC	3-126

REC Form 36 (May 68) FLIGHT PLANNING BRANCH

MCC-H 0130 EDT 184:00

FLIGHT PLAN

NOTES

Flown to the Moon on Apollo XI
T. Buzz Aldrin

REST PERIOD (7 HOURS)

PTC

P23-NO COMM (5 SETS)
TE1 + 50 (185:30)
ALPHERATZ (01), ENH (01)
MIRFAX (10), ENH (01)
ALDEBARAN (11), ENH (01)
CAPELLA (12), ENH (01)
CAPELLA (12), ENH (01)

MISSION	EDITION	DATE	TIME	DAY/REV	PAGE
APOLLO 11	FINAL	JULY 1, 1969	184:00 - 186:00	B/TEC	3-127

REC Form 36 (May 68) FLIGHT PLANNING BRANCH



157

The following lot is directly from the collection of Apollo 11 Command Module Pilot Michael Collins.

157

POSTAL COVER TAKEN TO THE MOON—APOLLO 11.

Flown postal cover, postmarked at Webster, TX, August 11, 1969. 3½ x 6½ inches. Featuring color-printed cachet of the crew on the lunar surface. Hand-stamp reading "Delayed in quarantine at Lunar Receiving Laboratory, M.S.C.—Houston, Texas."

FLOWN TO LUNAR ORBIT ON THE FIRST MANNED MOON LANDING. The Apollo 11 crew carried a limited number of postal covers on their mission. When returned to Earth, the covers, along with the astronauts, went into quarantine as a precaution against any contamination from lunar exposure. SIGNED by NEIL ARMSTRONG, MICHAEL COLLINS and BUZZ ALDRIN, additionally INSCRIBED at the upper margin by Collins "Carried aboard the Moon Spacecraft Apollo 11," and accompanied by a manuscript note by Collins reading in full: "I hereby certify that the attached Manned Spacecraft Center Stamp Club cover, numbered by me as C-55, was flown to the Moon in July 1969 in my personal preference kit, and has been in my possession ever since. Michael Collins, Apollo XI CMP, 23 Jan. 2013."

\$25,000 - 35,000



158

The following two lots were originally in the collection of Astronaut Buzz Aldrin.

158 LIFE INSURANCE FOR THE APOLLO 11 FAMILIES. A CREW SIGNED LAUNCH POSTAL COVER.

Apollo 11 Life Insurance Cover measuring approximately 4 x 6 inches with a color crew emblem cachet. Kennedy Space Center (KSC) postmark of July 16, 1969, the launch date for Apollo 11. Numbered on the verso by Aldrin with his identifier number "BA07." 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 flight.

With BUZZ ALDRIN'S provenance letter which he describes the history behind this envelope: "This postal cover with the Apollo 11 emblem cachet 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 an identifier of BA07 written on the reverse side. It was signed by the Apollo 11 crew - Neil Armstrong, Michael Collins, and myself prior to our launch back in 1969. The cover was postmarked on the launch day of Apollo 11 at the Kennedy Space Center on July 16, 1969. Four days later, on July 20, Neil Armstrong and I became the first humans to land and walk on another celestial body - the Moon."

\$8,000 - 12,000



159

159 A CREW SIGNED LUNAR LANDING POSTAL COVER. LIFE INSURANCE FOR THE APOLLO 11 FAMILIES.

Apollo 11 Life Insurance Cover measuring approximately 4 x 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 "BA21." 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...."

The cover displayed above has been in my private collection since 1969 and has the identifier of BA21 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."

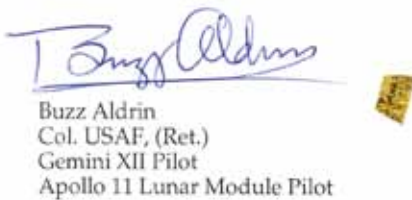
\$8,000 - 12,000



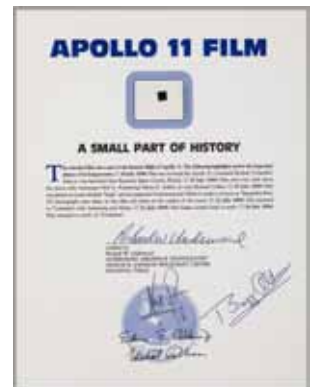
160



161



The segment placed here is 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.



164

160

ARMSTRONG-SIGNED POSTAL COVER.

Postal envelope with a Fleetwood cachet featuring the flag-planting, Apollo 11 crew, and the words "*Commemorating First Men on the Moon.*" 3½ x 6½ inches. Postmarked twice, with July 20, 1969 "*Moon landing*" mark and September 9, 1969 at Washington, DC. Also with "*First Man on the Moon*" postage stamp and first day of issue cancellation.

SIGNED by NEIL ARMSTRONG.

\$2,000 - 3,000

The following three lots were originally in the collection of Astronaut Buzz Aldrin.

161

ANNOTATED BY NEIL ARMSTRONG.

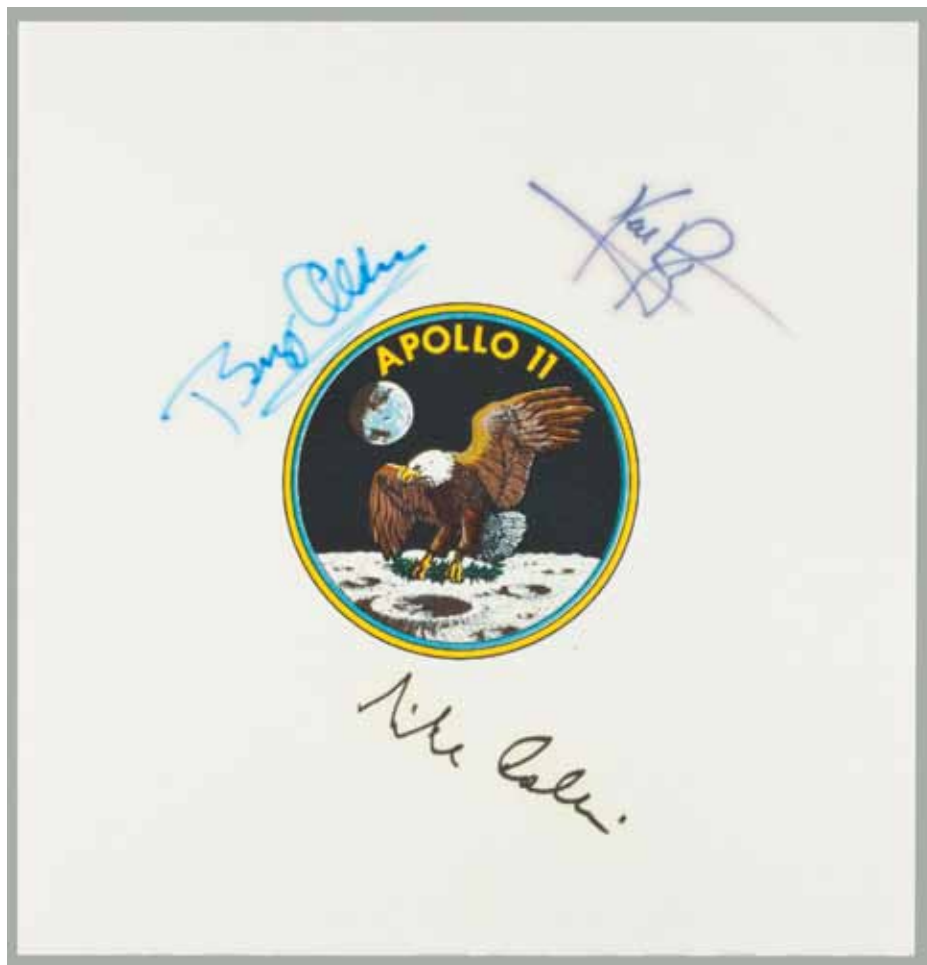
HIS RESPONSIBILITIES DURING SATURN V LAUNCH.

Apollo 11 Launch Operations Checklist, page 2-5 / 2-6, a single sheet printed recto and verso. NASA/MSC, April 15, 1969, revised June 27, 1969. 8 x 5½ inches. Annotated in ink by Neil Armstrong. With a Typed Letter Signed by BUZZ ALDRIN.

BUZZ ALDRIN'S provenance letter reads in part: "Accompanying this letter is a page numbered 2-5 and 2-6 from the CSM 107 (Apollo 11) Launch Operations Checklist, SKB32100080-306. The pages are part of the complete manual that was used in the Command Module simulator ... 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 simulator was an excellent learning device and this checklist was an important tool to insure our correct performance. Both sides of this checklist page list boost events starting at T + 6 minutes and 15 seconds into powered flight through the loss of communications at the Bermuda tracking station. Major events include cut-off of the inboard S-II engine (IECO), shut down of the outboard S-II engines (OEEO), Staging, SIVB ignition, and orbit insertion ... Neil Armstrong made the two time corrections on page 2-5."

INScribed and SIGNED: "Used in training for Apollo XI, BUZZ ALDRIN" on page 2-5.

\$1,200 - 1,500



165

162

ALDRIN'S FLOWN APOLLO 11 CM SKIN SEGMENT.

An approximately ½ x ¼ inch foil segment mounted on a 3½ x 8 inch Typed Note Signed by BUZZ ALDRIN. The material was used as a thermal layer on the very outer surface of the Command Module and was exposed to the vacuum of space during the entire flight.

BUZZ ALDRIN'S Typed Note Signed reads: *"The segment placed here is 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."*

\$600 - 800

163

ALDRIN-SIGNED CHECK.

Check issued by the Laguna Bank of Laguna Beach, CA for Aldrin's RECON business account. 2½ x 6 inches. Payable to US Sprint in the amount of \$182.50 and signed by BUZZ ALDRIN.

\$250 - 350

164

FLOWN APOLLO 11 HASSELBLAD FILM SEGMENT—SIGNED.

A ¼ by ¼ inch segment of 70mm Hasselblad camera film displayed on an 11 x 8 ½ inch certificate. The Apollo 11 emblem with printed signatures of the crew are 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 certified by the signature of Richard W. Underwood, a Supervisory Aerospace Technologist at the Johnson Space Center.

SIGNED by BUZZ ALDRIN.

\$1,500 - 2,000

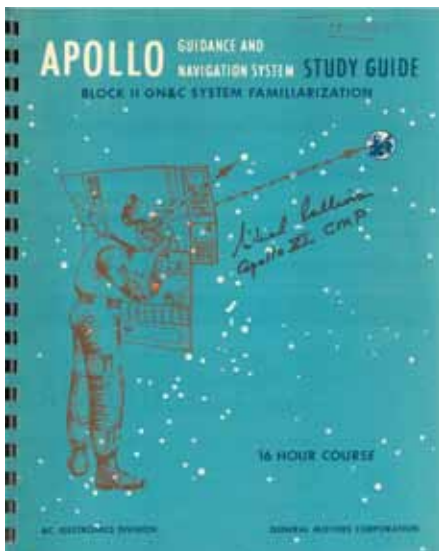
165

SIGNED BY THE ENTIRE APOLLO 11 CREW.

Apollo 11 Beta cloth crew emblem, 3½ inches in diameter, printed on white Beta cloth 9 inches square. The emblem features a bald eagle carrying an olive branch above the lunar surface with the earth in the background.

SIGNED by NEIL ARMSTRONG, MICHAEL COLLINS, and BUZZ ALDRIN.

\$8,000 - 12,000



166

166

APOLLO NAVIGATION SYSTEM STUDY GUIDE.

Apollo Guidance & Navigation System, Block II, Student Study Guide. Command Module PGNCs Familiarization Course 216. Milwaukee, WI: AC Electronics Division of General Motors, September 1, 1965. Over 200 pp. 11 x 8½ inches. Numerous folding tables and diagrams. Original printed card stock covers, spiral binding.

General Motors developed and delivered the inertial guidance and navigation systems for the entire Apollo program. An unusual and early publication. SIGNED by MICHAEL COLLINS on upper cover, with *"Apollo XI CMP."*
\$800 - 1,200

167

APOLLO 11 FIRST DAY POSTAL COVER—SIGNED.

Postal envelope with a Fleetwood cachet featuring images of the Apollo 11 emblem and crew with an astronaut placing a US flag on the lunar surface. Two "First Day of Issue" postmarks dated *"Moon Landing, 20 JUL 1969"* and *"Washington DC, 9 SEP 1969"* for the just-issued "First Man on the Moon" 10-cent Air Mail stamp (affixed to envelope).

SIGNED by NEIL ARMSTRONG and MIKE COLLINS.
\$4,000 - 6,000

168

TRANQUILITY BASE, JULY 20, 1969.

Large color photograph, 16 x 20 inches.

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. Boldly INSCRIBED and SIGNED: *"Tranquility Base, July 20, 1969, Buzz Aldrin."*
\$2,500 - 3,500



167

169

THE APOLLO 11 CREW.

Color photolithograph, 8 x 10 inches. Printed NASA text on lower margin and on verso.

The space-suited Neil Armstrong, Michael Collins, and Buzz Aldrin pose for a crew picture. SIGNED by BUZZ ALDRIN.
\$500 - 700

170

ARMSTRONG AND ALDRIN TRAIN FOR LUNAR TASKS.

Black and white photograph, 10 x 8 inches, with NASA text printed on verso.

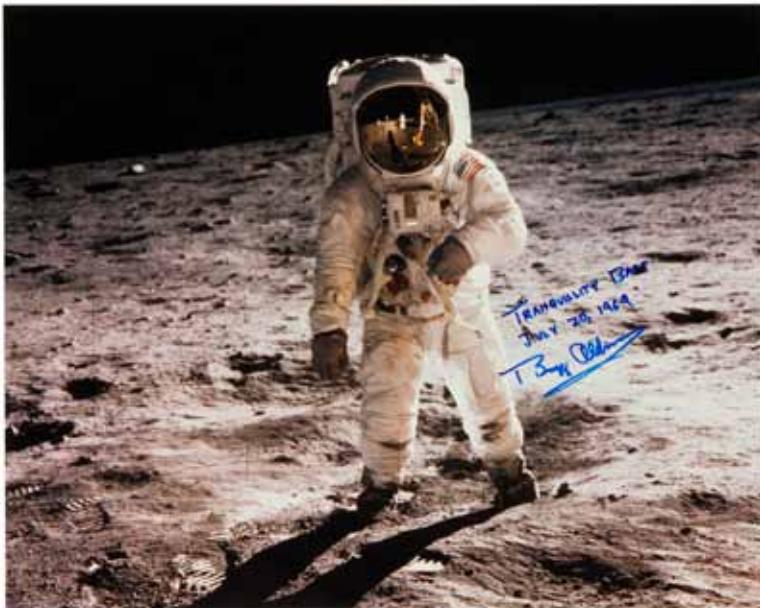
Space-suited Neil Armstrong and Buzz Aldrin practice lunar surface EVA (Extra-Vehicular Activity) procedures prior to the Apollo 11 flight. INSCRIBED and SIGNED: *"EVA Training, BUZZ ALDRIN."*
\$1,000 - 1,500

171

THE ONLY WAY TO FLY TO THE CAPE.

Black and white photograph, 10 x 8 inches, with NASA text printed on verso.

Buzz Aldrin and Mike Collins are seated inside the dual cockpit of a NASA T-38 jet after arrival at Patrick Air Force Base near Cape Canaveral. INSCRIBED and SIGNED: *"Mike and I in a T-38 during Apollo XI training, BUZZ ALDRIN."*
\$800 - 1,200



168



170



169



171



172



173



174



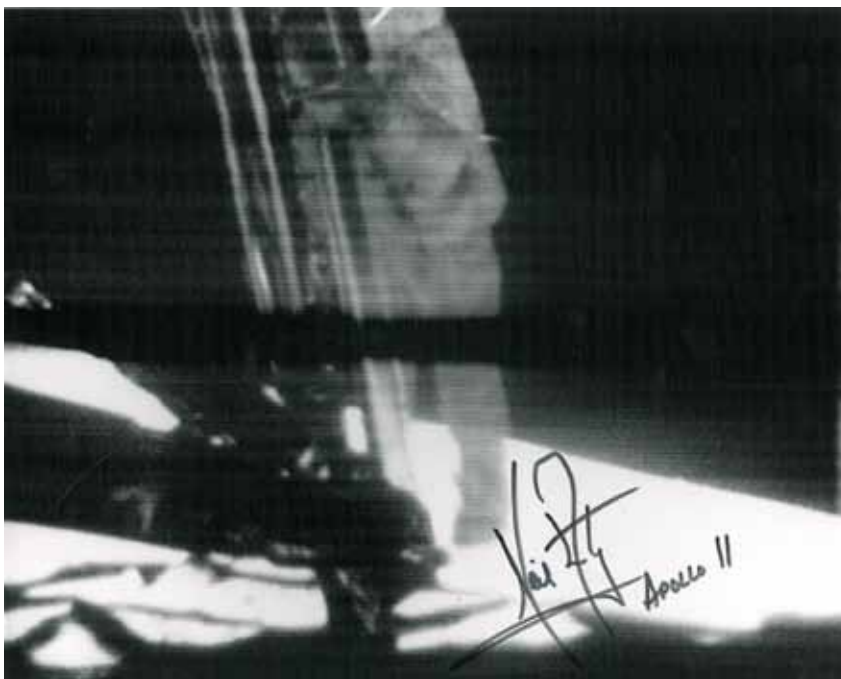
176



177



178



175

**172
LAUNCH MORNING BREAKFAST WITH NEIL
AND BUZZ.**

Black and white photograph, 8 x 10 inches, with NASA text printed on verso.

Neil Armstrong and Buzz Aldrin are seen during breakfast in the astronaut crew quarters prior to the Apollo 11 launch on July 16, 1969.

SIGNED by BUZZ ALDRIN.

\$1,000 - 1,500

**173
MONITORING EAGLE'S DESCENT.**

"LM Descent Monitoring Chart - Sheet 2, 16 July 1969 Launch Date - Landing Site No. 2," Long photographic chart on plastic, 73½ x 8½ inches on 7 taped-together sheets. A label pasted on the reverse reads "Training copy, updated 26 June."

SIGNED by MICHAEL COLLINS with "Apollo XI, July 20, 1969." The first two sheets are at 1:2,500,000 scale, while the remainder are at 1:630,000 scale. The majority of this photographic chart marks events beginning 4 minutes before the LM's Power Descent Initiation (PDI), counting down in white lettering at one minute intervals. The actual point of PDI is labeled and occurs near the chart center. An increasing time count is labeled at 20 second intervals until T + 4 minutes to the far left. During the flight period on this chart, Eagle was face down which allowed Armstrong and Aldrin to view these lunar features outside their windows.

\$1,500 - 2,500

**174
ARMSTRONG SNAPS ALDRIN INSIDE THE
LUNAR MODULE.**

Color photograph, 10 x 8 inches.

Neil Armstrong photographs Aldrin during lunar module checks prior to the first lunar landing.

SIGNED and INSCRIBED: "Buzz Aldrin, Apollo XI LMP."

\$800 - 1,200

**175
ARMSTRONG DESCENDS THE LADDER—
SIGNED.**

Black and white photograph, 8 x 10 inches.

ARMSTRONG CLIMBS DOWN THE LADDER FROM EAGLE TO THE LUNAR SURFACE. An image from the telecast by the Apollo 11 lunar surface camera, mounted on the descent stage of the lunar module Eagle. The black bar running through the center of the picture is an anomaly in the television ground data system at the Goldstone Tracking Station.

SIGNED by NEIL ARMSTRONG with "Apollo 11." Signed examples of this image are extremely rare, and much less frequently seen than white space suit portraits.

\$8,000 - 12,000

**176
ALDRIN DESCENDS TO THE LUNAR SURFACE.**

Color photograph, 8 x 10 inches with NASA identification number at upper border. Full-frame 70mm Hasselblad image, vintage print using "A Kodak Paper."

Neil Armstrong photographs Buzz Aldrin on the LM ladder just prior to his first step on the moon.

SIGNED by BUZZ ALDRIN with "LMP" added.

\$1,500 - 2,500



179

**177
ALDRIN AND OLD GLORY—MISSION
PLAQUE INSCRIPTION.**

Color photograph, 8 x 10 inches.

The unforgettable picture by Neil Armstrong of Buzz Aldrin standing next to the United States flag on the lunar surface. His inscription is part of the text of the special plaque left on the lunar lander descent stage, still on the Moon.

Boldly SIGNED and INSCRIBED: "We came in peace for all mankind, Buzz Aldrin, Apollo XI LMP."

\$2,000 - 3,000

**178
ALDRIN SETS UP EXPERIMENTS ON THE
MOON.**

Color photograph, 8 x 10 inches with NASA identification number at upper border. Full-frame 70mm Hasselblad image, vintage print using "A Kodak Paper."

Neil Armstrong photographs Buzz Aldrin during status checks of experiments he and Armstrong have just placed on the lunar surface.

SIGNED and INSCRIBED: "Buzz Aldrin, Apollo XI LMP."

\$1,500 - 2,000

**179
MONITORING EAGLE'S ASCENT.**

"LM Ascent Monitoring Charts. Sheet 3B." Aeronautical Chart and Information Center of the USAF for NASA, 1969. 12 x 36 inches. Showing landing site number 2.

SIGNED by MICHAEL COLLINS with "Apollo XI CMP, July 1969."

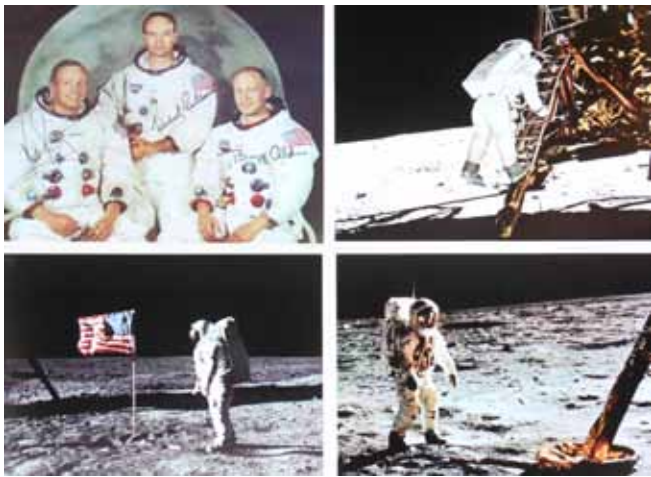
\$1,000 - 1,500



180



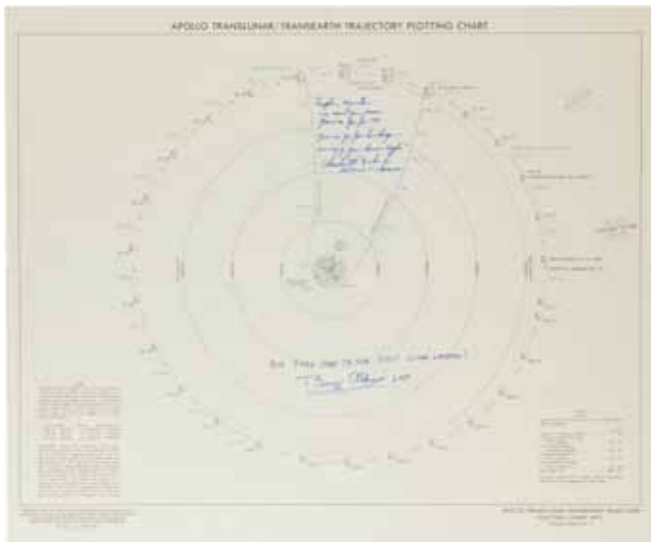
181



182



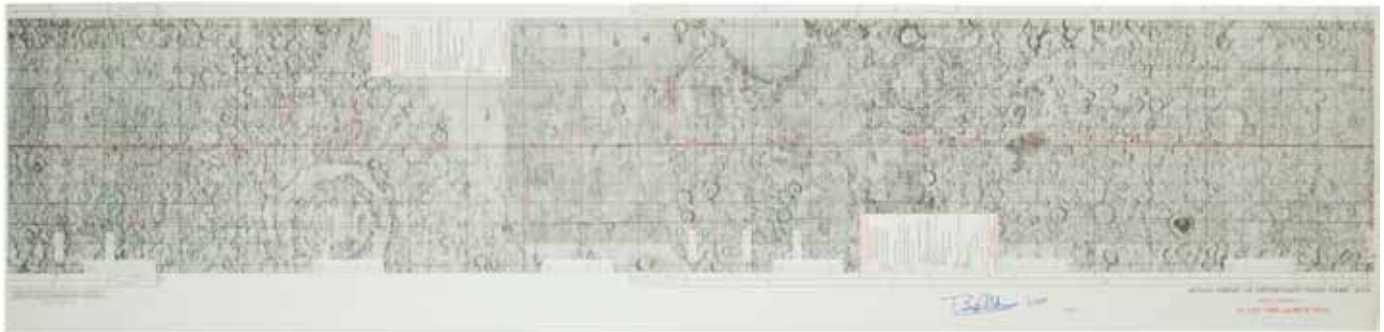
183



184



186



185

**180
EAGLE'S RETURN TO LUNAR ORBIT.**

Color photograph, 8 x 10 inches with NASA identification number at upper border. Full-frame 70mm Hasselblad image, vintage print using "A Kodak Paper."

Michael Collins photographs the Eagle Ascent Stage soon after Armstrong and Aldrin lifted off the lunar surface on July 21, 1969. The Earth is seen rising in the background.

SIGNED and INSCRIBED: "Buzz Aldrin, Apollo XI."
\$1,500 - 2,000

**181
MAGNIFICENT DESOLATION.**

Large color photograph, 16 x 20 inches.

Neil Armstrong's classic photograph of Buzz Aldrin standing on the Moon, inscribed with Aldrin's first words after stepping onto the moon. Boldly INSCRIBED and SIGNED: "Magnificent Desolation. Buzz Aldrin."

\$2,000 - 3,000

**182
LARGE-FORMAT APOLLO 11 LITHOGRAPH COLLECTION.**

Large color photolithographs, all 16 x 20 inches. Nine identical sets each of nine different lithographs from the first lunar landing. Each set in its original clear plastic distribution sleeve. Additionally there is a partial set with several duplications, having 11 total lithographs. Plus eight identical color lithographs of the Apollo 8 "Earthrise" image.

In all, 100 lithographs.

The images include the Apollo 11 crew in spacesuits with printed autographs; Aldrin before stepping onto the moon; Aldrin and Armstrong as they deploy the US flag; Aldrin and the US Flag; Aldrin with experiments; Aldrin walking near the LM; the iconic image of Aldrin on the moon; US flag after the moonwalk; and Eagle in lunar orbit returning from the moon.

\$700 - 900

**183
THE BEGINNING OF THE APOLLO 11
MOON JOURNEY.**

Apollo Earth Orbit Chart (AEO), Apollo 11 Mission... for July 1969 Launch Dates. Color Earth maps, 3 sheets. 13½ x 41 ½ 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.

A group 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 to 108 degrees. Circular plots along the orbital ground tracks indicated communication tracking sites with red circles denoting tracking ships.

\$600 - 800

**184
APOLLO 11 TRAJECTORY CHART—WE
COPY YOU DOWN.**

Apollo Translunar / Transearth Trajectory Plotting Chart (ATT), Apollo Mission 11. June 23, 1969, 24 X 20 inches.

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.

Boldly INSCRIBED and SIGNED "Our Road Map to the First Lunar Landing! Buzz Aldrin, LMP," and "Eagle, Houston, We read you now ... You're go for PDI ... You're go for landing ... We copy you down Eagle, Charles M. Duke, Jr., Apollo 11 CAPCOM."

Duke's words are exactly as transmitted (slightly abbreviated here) to Lunar Module Eagle during the historic landing sequence.

\$2,500 - 3,500

**185
FIRST LUNAR LANDING ORBITAL
PHOTOGRAPHY TARGETS.**

Apollo Target of Opportunity Flight Chart (ATO), Apollo Mission 11, 16 JULY 1969 Launch Date. SKB 32100097-301, 2nd edition, June 26, 1969. 14 x 58 inches. Scale 1:7,5000,000. Full line plot of the median lunar orbit ground track is shown in red with near side and far side lunar shadow terminator areas having line marker ticks plotted perpendicular to the spacecraft orbital path.

Identical to the chart issued to Armstrong, Aldrin, and Collins for the flight, having the SKB 32100097-301 part number printed in two identical legend blocks. Those blocks define film exposure settings with various lens and symbol definitions for 250mm and 80mm single frame photography. Landmark data is defined with a checkpoint vector arrow and initial point triangle. There are nearly 100 numbered photographic targets plotted. The targets represent possible future Apollo landing sites and areas of scientific interest.

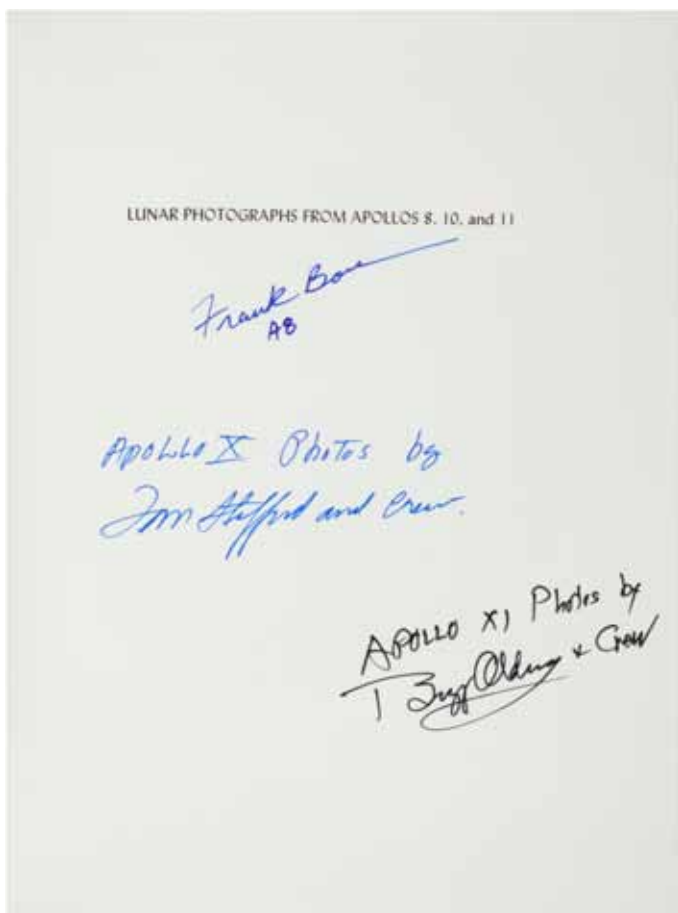
SIGNED and INSCRIBED: "Buzz Aldrin, LMP."
\$2,500 - 3,500

**186
APOLLO 11 LANDING SITE CHART—SIGNED.**

Julius Ceasar, Lunar Shaded Relief – LSR 60. Defense Mapping Agency for NASA. With a detailed legend with a gridded full sphere lunar near side locator image. First edition, September 1978. 22 x 29 inches, scale 1:1,000,000.

The sixtieth chart of the LSR series featuring approximately half of the Mare Tranquillitatis with all surrounding craters, wrinkled ridges, and highland areas shown. The Apollo 11 landing site near the bottom center. INSCRIBED and SIGNED: "First Lunar Landing, July 20, 1969, Buzz Aldrin." He has marked the Apollo 11 landing site with a large "X."

\$3,000 - 4,000



187

187

LUNAR PHOTOGRAPHY BY THE ASTRONAUTS—SIGNED.

MUSGROVE, ROBERT G., editor. *Lunar Photographs from Apollo 8, 10, and 11*. NASA SP-246. Washington: 1971. vii, 119 pp. 10½ x 8 inches. Original cloth gilt.

Includes 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.

INSCRIBED and SIGNED: "FRANK BORMAM, A-8"; "Apollo 10 photos by TOM STAFFORD & Crew"; "Apollo XI photos by BUZZ ALDRIN & Crew"; all on the half title.

\$3,000 - 4,000



188

188

THE GOODWILL DISC.

MESSAGES FROM PLANET EARTH.

A circular silicon disc, manufactured by the Semi-Conductor Division of Sprague Electric Company of North Adams, Massachusetts. 1½ inches diameter but with one flattened edge, wafer-thin, one side coated in blueish-purple coating, etched lettering "From Planet Earth ... July 1969" visible to the naked eye, and an array of microscopic etching, the reverse gray-colored.

As well as the American flag and the "We came in peace for all mankind" plaque, Neil Armstrong and Buzz Aldrin also left a silicon disc on the lunar surface. That disc was manufactured by Sprague, an established NASA contractor with more than 50,000 components in Apollo spacecraft. Commissioned by NASA's Electronics Research Center, it carried messages from 73 world leaders, gathered in a frantic rush by NASA and the State Department in the weeks before the launch date.

The messages were photographed, reduced 200 times, and etched onto the surface of the disc just like integrated circuits. The example carried on Apollo 11 and now on the Moon's surface, like its sister in the Smithsonian, was encased in a protective aluminum holder, with eleven sides symbolizing Apollo 11.

It is unclear how many of the discs were produced. In addition to the examples on the surface of the Moon and in the Smithsonian, probably only a handful exist. The present example belonged to a member of the etching team at Sprague; he was also responsible for placing the lunar surface disc in its aluminum case. A prototype disc without all the messages was sold in these rooms on April 26, 2012 (lot 1202). The present example is identical to that on the Moon and is from the final run that also included a message from the Pope.

The discs have been the subject of a recent book by Tahir Rahman, *We Came in Peace: The Untold Story of the Apollo 11 Silicon Disc* (2007).

\$5,000 - 7,000



189

**189
LUNAR MODULE ORIGINAL ILLUSTRATION.**

MION, PIERRE, artist. The Apollo lunar module, with its lunar surface sensing probes visible, and the structure partly cut away to show the astronauts inside at their controls, gouache on paper, laid on board, signed lower right ("Mion"), 21 x 17 inches.

Attractive image of a lunar module by Mion, whose works are included in the NASA fine art collection and the Smithsonian. This illustration is presumed to have been commissioned by *National Geographic*, Mion's major client in the late 1960s.

\$1,000 - 1,500



190

**190
CBS TV COVERS THE FIRST LUNAR LANDING—SIGNED.**

BYRNE, JAMES, editor. *10:56:20 PM EDT 7/20/69*. Columbia Broadcasting System, 1970.

169 pp. 11 x 10 inches. Original cloth with special multiple crater embossed 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," and "Buzz Aldrin, Apollo XI," both on the title page.

\$2,500 - 3,500



191



192

191

WHITE SPACE SUIT PORTRAIT.

Color photolithograph of Neil Armstrong in white space suit, 8 x 10 inches, with NASA captions along lower border and on verso.

SIGNED by NEIL ARMSTRONG.

\$1,500 - 2,500

192

ARMSTRONG-SIGNED CARICATURE.

Printed caricature of Neil Armstrong seated on a crescent Moon, on 9¼ x 6¾ inch sheet, with printed quote below from Armstrong, "The difference between eternity and life is about one hundredth of an inch of rubber."

SIGNED and INSCRIBED by Armstrong "Best wishes to Ray Bravo, Neil Armstrong."

\$800 - 1,200

193

HOW-TO GUIDE TO THE APOLLO CSM.

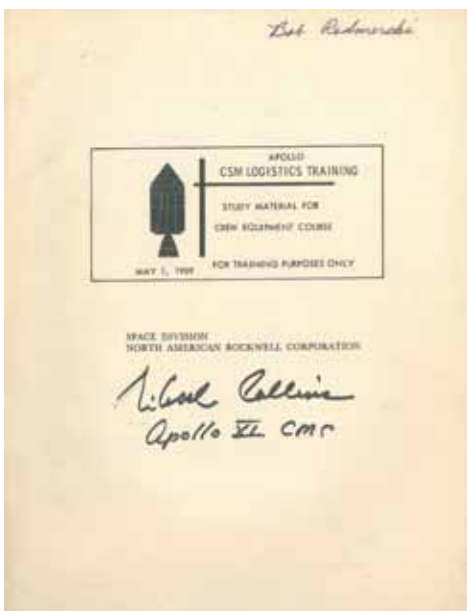
Apollo CSM Logistics Training. Study Material for Crew Equipment Course. [Downey, CA]: Space Division, North American Rockwell, [April 15, 1969].

Approximately 250 pp. 11 x 8½ inches.

Printed on pink paper, many illustrations after photographs. Original printed wrappers.

Designed to familiarize the astronauts with the interior of the Apollo CSM and its components, systems and apparatus. An unusual publication. SIGNED by MICHAEL COLLINS with "Apollo XI CMP" on upper cover.

\$800 - 1,200



193



194

194

LUNAR RELIEF MAP—SIGNED BY COLLINS.

"Mare nectaris and vicinity." Plastic lunar relief map in color, low-lying areas in blue, highlands in yellow and brown, Army Map Service, provisional edition, 1961, 13½ x 10 x 1 inches. Matted.

SIGNED by MICHAEL COLLINS with "Apollo XI, July 20, 1969" near the Tranquility Base landing site.

\$1,500 - 2,000

195

FLOWN MANNED FLIGHT AWARENESS MEDALLIONS.

A substantial collection of 50 Apollo 11 Manned Flight Awareness (MFA) medallions, made from a blended alloy metal, being 1½ inches in diameter. 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."

A substantial quantity of medallions, made in part from metal flown on Apollo 11.

\$2,500 - 3,500



196

Apollo 12 through 17

The following three lots were originally in the collection of Apollo 12 Commander Charles Conrad.

196

CONRAD'S APOLLO 12 MISSION EMBLEM.

OVER 31 HOURS ON THE LUNAR SURFACE.

Flown Apollo 12 cloth emblem, 4 inches in diameter. Features a multi-sailed clipper ship above the lunar surface and four stars: three for the Apollo 12 crew and one for Astronaut Clifton Williams who would have been the flight's Lunar Module Pilot had he not died in a T-38 jet crash in 1967. The emblem is display above paragraphs on a Typed Letter Signed by CHARLES CONRAD.

CHARLES CONRAD'S signed provenance letter reads in part: *"The above patch was from the first group ever made. It does not have the white outer border between the blue and gold threads. That was added to the additional production runs of the patch. Those runs had minor variations in thread shades, placement of the background stars, and the thickness of the dust trail behind the clipper ship above the moon ... The blue and gold colors are symbolic for my all Navy crew. We were launched to the moon on November 14, 1969. Alan Bean and I made the second lunar landing of the Apollo program on November 19. This patch was carried in the lunar module and spent over 31 hours on the lunar surface. The Apollo XII mission lasted just over 10 days, ending with splashdown on November 24, 1969."*

\$8,000 - 12,000



197



198



199



199

197

CONRAD'S FLOWN LUNAR SURFACE 70MM FILM SEGMENT.

70mm Hasselblad camera film segment, 1/2 x 1/4 inch. Placed onto a certificate issued and signed by Richard W. Underwood, Supervisory Aerospace Technologist at the Manned Space Center.

The film segment was taken from Hasselblad camera film that was out on the lunar surface during one of the two moon walks. The certificate is INSCRIBED and SIGNED: "From my personal collection, CHARLES CONRAD." Additionally SIGNED by ALAN BEAN. \$800 - 1,200

198

CONRAD'S SCHEDULED TO BE FLOWN POSTAL COVER.

Envelope measuring approximately 4 x 6 inches with a color crew emblem cachet and Navy wings. Kennedy Space Center postmark on November 14, 1969, the launch date of Apollo 12. Mounted on a Typed Card Signed by CHARLES CONRAD.

CHARLES CONRAD'S provenance card reads: "This Apollo XII crew cover was signed by the entire Apollo XII crew just days before our launch on November 14, 1969. The set of covers were originally planned to be flown on our flight to the moon. However, we collectively agreed not to fly them to avoid favoritism due to multiple requests to fly a variety of covers in our personal preference kits. This cover is from my personal collection. Charles Conrad, Jr., CDR Apollo XII." \$700 - 900

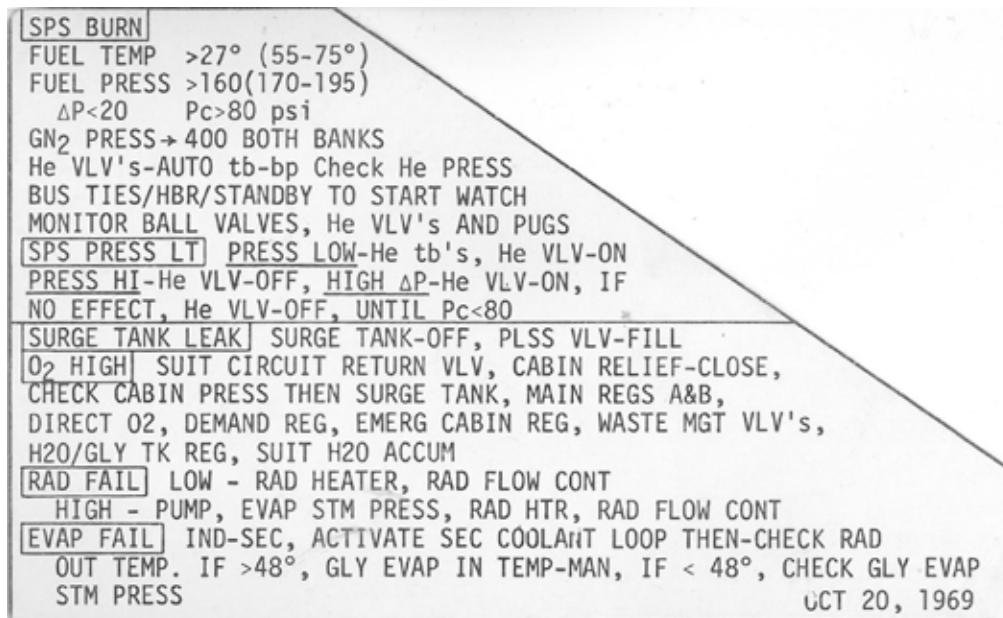
199

FLOWN ON APOLLO 12—LAUNCH CHECKLIST PAGE.

Flown on Apollo 12, CSM Launch Checklist, pp 3-1 and 3-2. A single tabbed sheet printed recto and verso. NASA/MSO, October 6, 1969, changed October 27, 1969. 8 x 5 1/2 inches.

Carried to the Moon in command module Yankee Clipper, this checklist sheet lists procedures prior to the CSM's separation from the booster. SIGNED and INSCRIBED by ALAN BEAN: "This was my launch [check]list. All the black marks are mine and I made them in Nov 1969. Alan Bean, Apollo 12." Bean's check marks, made during the flight, run down the left side, and he has additionally added three numbers in one space. Further SIGNED and INSCRIBED by RICHARD GORDON, "Flown on Apollo XII, Richard Gordon, CMP."

\$2,500 - 3,500



200



201

200

CUE CARD CARRIED ON APOLLO 12.

Flown on Apollo 12, instrument panel data card, dated October 20, 1969. 3½ x 6 inches. 3 patches of Velcro on verso.

A cue card from Apollo 12's command module instrument panel, listing details of the Service Propulsion System (SPS) burn, and the procedures for a surge tank leak and other eventualities. With a certificate signed by RICHARD GORDON stating that the card was "utilized by me on the Apollo 12 mission."

\$2,000 - 3,000

201

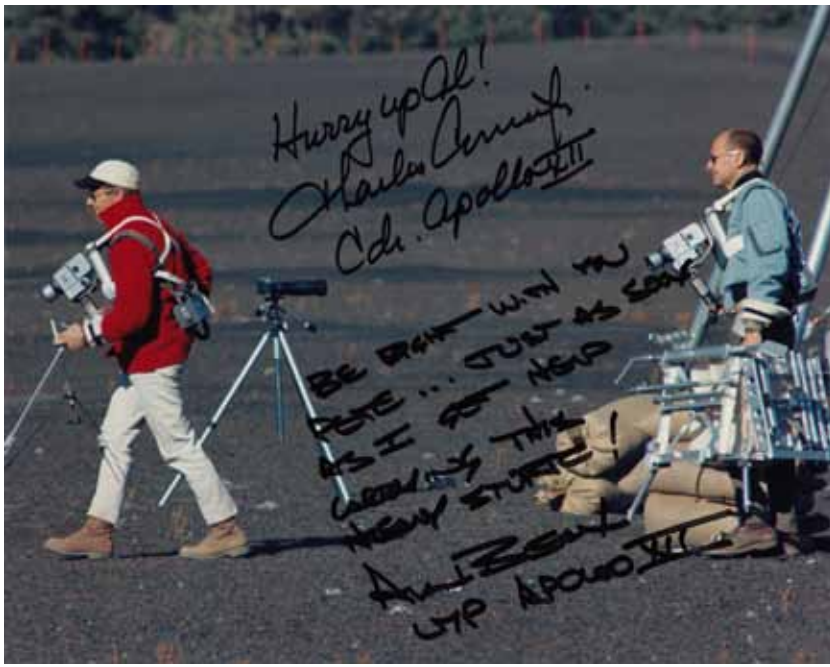
INSIDE THE LUNAR MODULE TRAINER AT KSC.

Color photograph, 8 x 10 inches, with NASA identification number at upper border. NASA text on verso, vintage print using "A Kodak Paper."

A special "fisheye" lens provides a unique view inside the Kennedy Space Center Lunar Module Trainer as Charles Conrad and Alan Bean train for Man's second lunar landing attempt.

SIGNED by CHARLES CONRAD and ALAN BEAN.

\$1,200 - 1,800



202



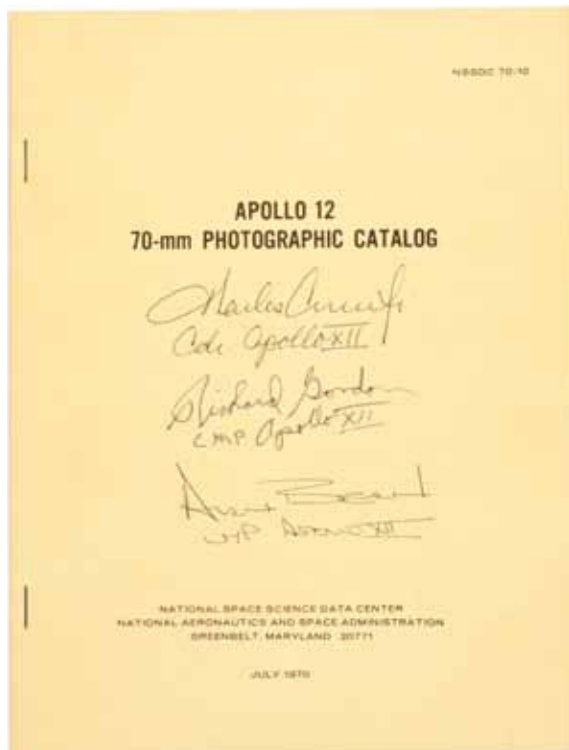
203



204



206



205

**202
CONRAD JOKES WITH BEAN DURING EVA
TRAINING.**

Color photograph, 10 x 8 inches.

Apollo 12 moon walkers Conrad and Bean are photographed during EVA training exercises. Conrad waltzes off leaving Bean to struggle with the lunar hand tool carrier.

INSCRIBED and SIGNED, "Hurry up Al! Charles Conrad, Cdr. Apollo XII"; "Be right with you Pete ... Just as soon as I get help carrying this heavy stuff! Alan Bean, LMP Apollo XII."

\$700 - 900

**203
CONRAD RAISES OLD GLORY ON THE MOON.**

Color photograph, 10 x 8 inches.

Alan Bean photographs Charles Conrad at the very moment he unfurls the Stars and Stripes on the lunar surface.

SIGNED and INSCRIBED: "CHARLES CONRAD, Apollo XII Cdr."

\$1,000 - 1,500

**204
CLOSE-UP DURING THE MOON WALK.**

Black and white photograph, 10 x 8 inches.

Alan Bean is seen with a lunar sample container and his chest-mounted Hasselblad camera during the second EVA on Apollo 12. Photographer Charles Conrad's reflection is clearly visible on Bean's helmet visor.

SIGNED by ALAN BEAN, CHARLES CONRAD, and RICHARD GORDON.

\$1,000 - 1,500

**205
LUNAR PHOTOGRAPHY—EVERY
MOONWALK FRAME.**

Apollo 12 70-mm Photographic Catalog.

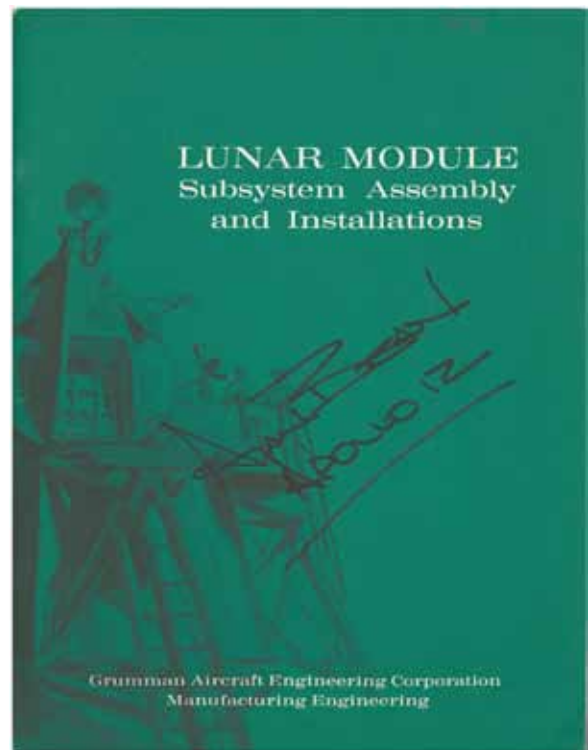
Greenbelt, MD: National Science Data Center, July 1970.

Over 300 pp, almost all half-tone illustrations from film magazines, 6 images per page. 10½ x 8 inches. Card stock covers, stapled.

A catalog containing every usable image of Hasselblad 70mm film frames taken on the lunar surface by Conrad and Bean. Includes almost all others taken during lunar orbit and translunar coast phases of the mission. Lunar surface images include the U.S. flag and science experiment deployments, geologic core tube locations, and close-ups of the Surveyor 3 spacecraft just 600 feet from the LM. A final section has all lunar surface panoramas in horizontal assembled form and an overall panorama location map.

Boldly SIGNED by CHARLES CONRAD, RICHARD GORDON, and ALAN BEAN with each adding their Apollo 12 crew member designation, all on the front cover.

\$2,000 - 3,000



207

**206^d
PLAN FOR MAN'S SECOND LUNAR LANDING.**

Apollo 12 Flight Plan, Final AS-507/CSM-108/LM-6. Houston, TX: NASA/MSC, October 15, 1969.

Over 240 pp. 10½ x 8 inches with 4 fold-out sheets. Heavy card stock covers, punched, stapled.

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.

SIGNED and INSCRIBED by ALAN BEAN with "Lunar Module Pilot" on the front cover.

\$800 - 1,200

**207^d
GRUMMAN LUNAR MODULE BROCHURE.**

Lunar Module: Subsystem Assembly and Installations. [Bethpage, NY]: Grumman Aircraft Engineering Corporation, December 1967.

52 pp on heavy card stock. 11 x 8½ inches. Illustrations throughout in green and black, one folding table. Original green printed wrappers. A handful of early pencil annotations.

Includes instructions on assembling the Lunar Module and preparing the two stages for shipping by air to Kennedy Space Center. SIGNED and INSCRIBED by ALAN BEAN with "Apollo 12" on the upper cover.

\$300 - 500



208

The following two lots were originally in the collection of Apollo 13 Commander James Lovell.

208

LOVELL'S FLOWN APOLLO 13 EMBLEM.
INTENDED TO BE TAKEN TO THE LUNAR SURFACE.
 Flown cloth crew mission emblem carried on the flight by Commander James Lovell. Approximately 4 inches in diameter and mounted on a Typed Letter Signed by JAMES LOVELL. The emblem is displayed with a 10 x 8 inch Apollo 13 launch photolithograph, all matted to 12 x 18 inches. Both the emblem/letter and photolithograph are removable from the mat board.

JAMES LOVELL'S SIGNED provenance letter reads: *"The attached patch was flown in the Command Module Odyssey during the April 11-17, 1970 flight of Apollo XIII. It was one of the few planned to be carried to the lunar surface aboard the Lunar Module Aquarius. On April 13, 1970, however, the Service Module oxygen tank number 2 exploded, which caused a loss of power and breathing oxygen to Odyssey. The Apollo XIII lunar landing mission was aborted, and Aquarius was used as a 'lifeboat' during our flight around the moon and back to earth.*

Artist Luman Winter designed the Apollo XIII patch after a mural he painted for the St. Regis Hotel in New York. The mural had four horses with one falling behind. It was quite appropriate because at the last moment Ken Mattingly was replaced on the flight."

The Apollo 13 launch photograph is SIGNED and INSCRIBED: *"James Lovell, Apollo 13 CDR, FRED HAISE, Apollo 13 LMP."*
\$5,000 - 7,000

209

LOVELL'S FLOWN APOLLO 13 BETA EMBLEM—SIGNED.

Flown Apollo 13 Beta emblem, 4 inches in diameter featuring three horses racing from the Earth to the Moon. Printed on Beta cloth, 7½ inches square. Displayed below a 5½ x 6 inch color photograph of the Apollo 13 Service Module showing the extensive damage caused by the oxygen tank explosion. Both the Beta cloth and photograph are removable from the mat board.

The Beta cloth is INSCRIBED and INITIALED below the emblem by JAMES LOVELL: *"This Beta emblem went to the moon on the flight of Apollo 13, J.L."*

SIGNED next to the emblem by FRED HAISE and JAMES LOVELL.
\$5,000 - 7,000



209



Fred W. Haise
April 11, 2005

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 35 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

210

The following five lots were originally in the collection of Apollo 13 Lunar Module Pilot Fred Haise.

210

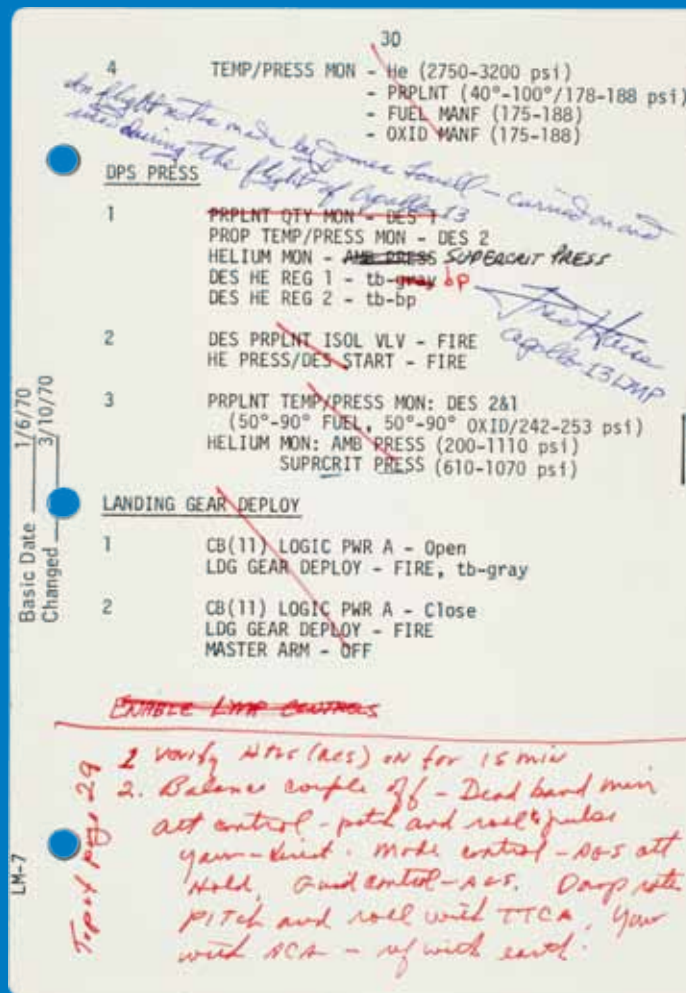
STARS AND STRIPES INTENDED FOR LUNAR SURFACE.

Flown United States flag, made from silk, 4 by 6 inches, inscribed on the lowest white bar: "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



211

211

LOVELL'S MOST EXTENSIVE BURN NOTES.

Flown on Apollo 13, LM-7 Contingency Checklist, page 30. A single sheet printed recto only. NASA/MSO January 6, 1970, updated March 10, 1970. 8 x 5½ inches. Extensive annotations made during the mission in red ink by James Lovell and in black ink by Fred Haise. With a Typed Letter Signed by FRED HAISE.

All was well during the Apollo 13 mission until Mission Control asked the crew to start a standard procedure to stir the Service Module (SM) fuel cell oxygen tanks for the first time during the mission. Because of damaged wiring, an electrical arc within oxygen tank number 2 caused the tank to overheat, increasing tank pressure to a point where it exploded. Within seconds the crew observed a series of caution and warning lights on their Command Module (CM) control panel and radioed to Houston – “We’ve had a problem here.”

The next hour of flight was spent trouble-shooting the problems with the fuel cells. Those cells needed oxygen from the tank whose explosion caused damage to associated plumbing, electrical connections, and to the adjacent oxygen tank number 1. The rapid loss of pressure and power forced Mission Control to have the crew to close the fuel cell reactant valves—a step that could not be reversed. When the crew did this they knew that the lunar landing was lost.

The CM was rapidly running out of oxygen and battery power. The crew needed to save navigational data stored in the CM computer and transfer that data to the LM. The crew reviewed all activation steps to rapidly power-up the LM, including these steps on the last page of the “30 Minute Activation” section.

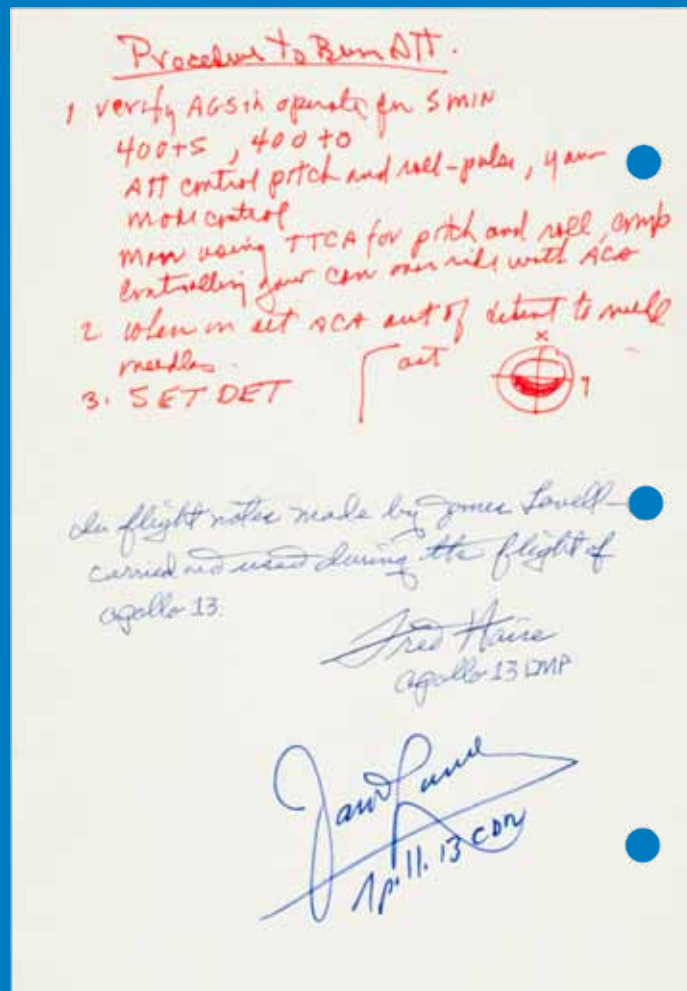
Their Fra Mauro landing site location required the astronauts to fly Apollo

13 into a lunar orbit that would not automatically return them to Earth in case of a mishap. Lovell and Lunar Module Pilot Fred Haise were able to put Apollo 13 back onto a “free-return trajectory” at about 61 hours and 30 minutes into the flight, some 5½ hours after the explosion. This ensured they would arrive back near the Earth but not that they would have sufficient power and oxygen to survive the trip.

Another LM engine burn some 2 hours after they passed around the Moon enabled them to arrive at Earth with power and oxygen to survive the flight. However, to precisely enter the Earth’s atmosphere at the time, speed, and angle required to live through the atmospheric heating effects of re-entry, required a course correction NASA call MCC-5 or Mid-Course Correction number 5. This particular engine burn was well dramatized in the 1995 movie “Apollo 13.”

FRED HAISE’S September 20, 2007 signed provenance letter reads in part: “Accompany this letter is a sheet numbered page 30 from the Apollo 13 LM-7 Contingency Checklist that was carried and extensively 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 and coolant conservation was paramount in order for us to survive the amount of time required to return to the Earth.

Commander James Lovell used this sheet to record critical spacecraft attitude procedures to allow us to accurately perform the Mid-Course Correction burn number 5 (MCC-5). He wrote over 100 words and numbers on both sides of this sheet plus drew a diagram of our Crewman Optical Alignment Sight (COAS) device. These entries were the longest set of in-flight notes made by Jim on a single sheet relating to Lunar Module



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(LM) Descent Engine burns during the entire flight. Additionally, this sheet has Jim's 10 updates to existing printed steps, some which he marked out later in the flight.

This sheet is from the 30 minute activation section which was designed to rapidly power-up our Lunar Module 'Aquarius.' The side numbered 30 has the 'DPS PRESS' or the Descent Propulsion System pressurization steps. I changed the 'AMB PRESS' to 'Supercrit Press' using black ink and Jim changed the 'tb-gray' to 'tp-bp' or barber pole using red ink. He also made the five red mark-out lines including the large one in the 'LANDING GEAR DEPLOY' section. These were steps that were not necessary to perform. At about 100 hours and 15 minutes into the flight, Mission Control sent up several additional steps to prepare for the MCC-5 burn. Jim recorded this information at the bottom third of page 30 which had blank space. He wrote: '1. Verify htrs (heaters) (RCS) on for 15 min. 2. Balance couple off - Deadband min, att (attitude) control - pitch and roll to pulse, yaw - direct. Mode Control - AGS (Abort Guidance System) att hold, Guid(ance) Control AGS. Damp rate pitch and roll with TTCA (Thrust Translation Controller Assembly). Yaw with ACA (Attitude Controller Assembly) - ref (reference) with earth.' Along the side of this writing, Jim wrote: 'Top of page 29.' These steps would allow the best way to dampen out our rotational movements as we terminated the Passive Thermal Control (PTC) to get ready for the burn. PTC was a slow rotation that helped equalized the temperature extremes on our CSM and LM. These steps were used in conjunction with steps printed on page 29.

The back side of page 30 was totally blank which allow Jim to make the additional extensive notes of: 'Procedures to Burn Att (Attitude). 1. Verify AGS in operate for 5 Min, 400 + 5, 400 + 0, ATT control pitch and roll -

pulse, yaw Mode Control. Man(euver) using TTCA for pitch and roll, Cmp (computer) controlling yaw, can override with ACA. 2. When in att ACA, out of detent to null needles. 3. SET DET.' These steps told us that we were to verify that our Abort Guidance System (AGS) had been operational for at least 5 minutes to warm all components. Then define our LM body axis alignment using computer commands of 400 plus 5, then 400 plus. Next we were to set the control modes for the LM in pitch, roll, and yaw. Our ACA would stop yaw movement using spacecraft instrumentation needles. The 'SET DET' or Set Detents told us to use our Alignment Optical Telescope (AOT) which was a periscope type of device with a complete azimuthal view around the LM that was set at fixed 60 degrees stops known as detents. For this midcourse correction, the Sun would be located through the AOT at detent 2, providing us with a point of reference. Another device was the LM COAS which would be mounted at Jim's forward LM window. Jim sketched a diagram of how he expected to see the Earth through the eye piece of the COAS. He drew an X and Y axis with the "horns" of the Earth's shadow touching the Y axis. As Jim maneuvered the LM to the proper burn attitude, he was to align the view of the Earth in the COAS exactly as he sketched. Our preparations and MCC-5 burn went according to plan by using the notes logged on this sheet.

After the flight I wrote and signed both sides of this sheet in blue ink with: 'In flight notes made by James Lovell - carried and used during the flight of Apollo 13, Fred Haise, Apollo 13 LMP.' James Lovell has signed the back side of this page and added 'Apollo 13 CDR.' This sheet has been in my personal collection since 1970. It is an extremely significant artifact that records some of the most important events and procedures James Lovell, Jack Swigert, and I performed in order to safely return to earth."

\$70,000 - 90,000

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 & ERR NEEDLES MOVING IN SAME
DIRECTION IN SAME QUADRANT*

Basic Date 1/6/70
Changed

LM-7

*carried around the moon on Apollo 13
Fred Haise Apollo 13 LMP*

DOCKED APS BURN

212

212

DOCKED APS BURN.

Flown on Apollo 13, LM-7 Contingency Checklist, pp. 20 and 21. A single sheet printed recto and verso. NASA/MSF January 6, 1970, updated February 9, 1970. 8 x 5½ inches. With a Typed Letter Signed by FRED HAISE.

The crew of Apollo 13 successfully used their Lunar Module descent engine to safely return them to Earth. If that engine had not had sufficient fuel or thrust to completely make the return trip, then the ascent stage engine would have been employed to make up the difference. Astronaut Haise indicated while writing the letter for this artifact that if indeed the APS had been need for the return home, it would have been the most demanding flight scenario ever imagined for Apollo and he was glad that they did not have to employ these steps to return home.

FRED HAISE'S September 20, 2007 signed provenance letter reads in part: "Accompanying 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

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 TMR
 PRO

Basic Date 1/6/70
 Changed 2/9/70

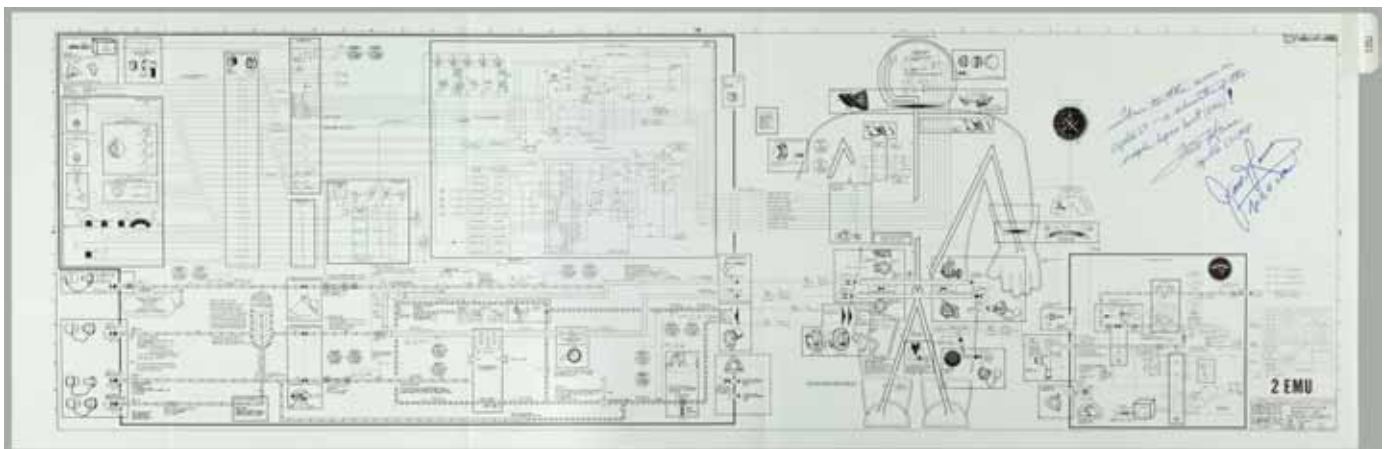
*Carried around the
 moon on Apollo 13!
 Fred Haise
 Apollo 13 LMP*

LM-7

DOCKED APS BURN

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."

\$25,000 - 35,000



213

**213
SPACE SUIT SCHEMATIC CARRIED ON APOLLO 13.**

Flown Extravehicular Mobility Unit Detailed Schematic, 2 EMU, a drawing from the Apollo 13 LM *Systems Data Book*. NASA/MSC, April 1969. Single folded sheet, 10½ x 36 inches, with an "EMU" tab.

This schematic is the one single flown sheet from Apollo 13 that contains precise engineering information on the crew's space suits. An enlarged outline of the 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 gauges, 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.

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," and further SIGNED and INSCRIBED, "James Lovell, Apollo 13 CDR."

\$20,000 - 30,000

**214
FRED HAISE'S POTATO SOUP CARRIED ON APOLLO 13.**

Flown packet of dehydrated Potato Soup, 7 x 8 inches. An attached identification label reads: "POTATO SOUP, 5 oz. hot water, 5 – 15 minutes, 058" with an inspection stamp. On the reverse side an additional tag reads: "SERIAL NO. FAU 473." Included is a Typed Letter Signed by FRED HAISE.

Potato Soup carried on the Apollo 13 flight but not consumed. With FRED HAISE'S April 11, 2005 signed provenance letter which reads in part: "Accompanying this letter is a 'Potato Soup' food packet that was carried around the moon on the flight of Apollo 13 during April 11 to 17, 1970 ... The small blue Velcro squares on each side of the packet indicates that this food was originally assigned to myself, the Lunar Module Pilot.... Several food items were never eaten during the flight due to an oxygen tank explosion in Service Module which, among other things, caused an electrical power loss to the Command Module. That power loss eliminated the ability to supply and heat water for food rehydration. James Lovell, Jack Swigert, and myself mainly consumed the 'wet pack' type of foods during the Apollo 13 mission. Those foods did not require rehydration to eat.

This food packet has been in my personal space artifact collection since 1970 which is now 35 years after the dramatic flight of Apollo 13. The flight was scheduled to be the third manned lunar landing mission, but those plans were aborted due to the above mentioned 'problem.' I have written 'Flown around the moon on Apollo 13, Fred Haise, LMP' on the front side of this packet below the 'Potato Soup' label."

\$6,000 - 8,000



215



214



216

**215
FLOWN FILM EQUIPMENT STOWAGE STRAP—SIGNED.**

Flown A8 (AFT 8) Command Module equipment locker stowage strap. Made of heavy weave synthetics, 1 x 14½ inches with a dual snap connector at one end. The woven material has a partly legible ID stamp of "V36 780023 11" plus one inspection stamp.

FLOWN ON APOLLO 13. The A8 locker was mounted on the aft bulkhead of the Command Module below the crew couches. This locker had four 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, EXERCISER, and PILOT PREFERENCE KIT. This particular strap was used in conjunction with other equipment to aid stowage of the Hasselblad 70mm film magazines on Apollo 13. Included are copies of NASA transfer and Smithsonian Air and Space Museum deaccession papers plus an image of the actual flown A8 locker.

The strap has been SIGNED and INSCRIBED: "FRED HAISE, Apollo 13."

\$3,500 - 4,500

**216
SIGNATURES OF THE ORIGINAL APOLLO 13 ASTRONAUTS.**

Postal envelope, 3½ x 6½ inches, with an Apollo 13 crew emblem cachet.

SIGNED by JAMES LOVELL, KEN MATTINGLY, and FRED W. HAISE, the original Apollo 13 crew.

\$700 - 900

**217
APOLLO 13 OPERATIONS—CSM UPDATES.**

Apollo 13 CSM 109 and Subsequent, Apollo Operations Handbook, Command and Service Modules, Volume 2, Operational Procedures. NASA/MSC: December 15, 1969, changed January 14, 1970.

Over 80 pp. 10½ x 8 inches, loose leaf having one staple.

This is a page update issued for the Apollo Operations Handbook. Page layout consists of the astronaut station location, exact procedure, which spacecraft panel to perform this procedure, and general remarks about the procedure. Several pages have a flow-chart diagrams providing an overview of trouble shooting steps for various systems. These include Guidance and Navigation, the Service Propulsion System, and several attitude control type pressurization problem diagrams.

SIGNED and INSCRIBED "FRED HAISE, LMP" on the front cover.

See illustration overleaf.

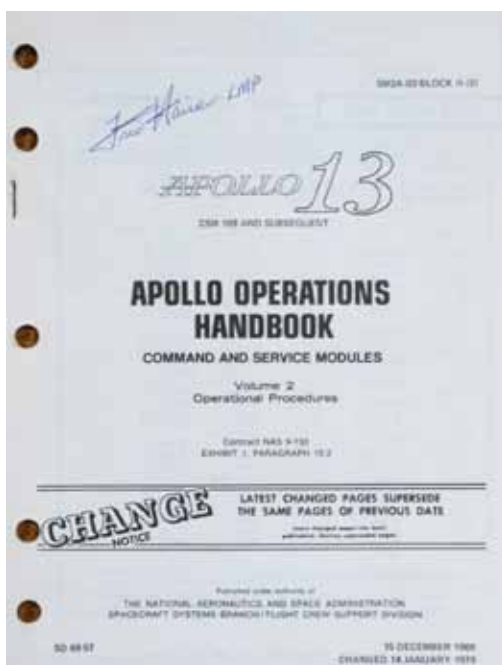
\$600 - 800



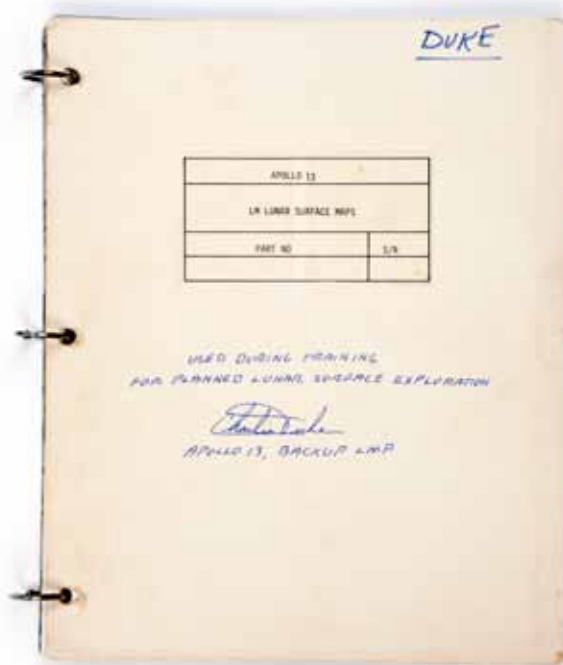
218



219



217



221



220

218

LUNAR ORBIT PHOTO TASKS FOR APOLLO 13—SIGNED.

Lunar Orbital Science Flight Chart, Chart E, 2 of 3, Apollo Mission 13, REV 19 through 39, 11 APRIL 1970 Launch Date. Color lunar map, first edition, February 2, 1970. 27 x 57 inches. Scale 1:2,500,000 with nautical mile distance markers found in four locations. Color-coded orbital vectors show which photographic targets have priorities during each orbit. Near-side lunar shadow terminator areas are shown with long red line marker ticks for orbits 20, 30, and 40 which are perpendicular to the spacecraft orbital path.

This extensively detailed near-side chart has the Apollo 13 landing site ellipse marked in red near the left center section. Photographic targets include the Apollo 11 landing site and the Sensorinus crater group during a direct overpass on orbit 27. The Apollo 13 landing site at Fra Mauro is the major photo target for orbit 26. Over 15 other photo targets are marked in blue, orange, green, brown, black, or red with either long directional arrows, triangles, or circled cross-marks.

SIGNED and INSCRIBED: "FRED HAISE, Apollo 13 LMP."
\$5,000 - 7,000

219

MORE LUNAR ORBIT PHOTO TASKS FOR APOLLO 13.

Lunar Orbital Science Flight Chart, Chart F, 2 of 3, Apollo Mission 13, REV 40 through 46, 11 APRIL 1970 Launch Date. Color lunar map, first edition, February 2, 1970. 27 x 57 inches. Scale 1:2,500,000 with nautical mile distance markers found in four locations. The full ground path of orbit 41 is marked in green with orbit 46 marked in blue. Color-coded orbital vectors show which photographic targets have priorities during each orbit. Near-side lunar shadow terminator areas are shown with long red line marker ticks for orbits 40 and 46 which are perpendicular to the spacecraft orbital path.

The Apollo 13 landing site ellipse is marked in red to the north of this series of orbital tracks showing how the spacecraft orbit progresses over the lunar surface. Photographic targets for Descartes (the future Apollo 16 landing site), Davy Rille and crater series, Flamsteed P crater wall, Parry Rille, craters are marked in purple, orange, blue, and green. About a dozen other photo targets are marked in blue or red with either long directional arrows or circled cross-marks.

SIGNED and INSCRIBED: "FRED HAISE, Apollo 13 LMP."
\$5,000 - 7,000

220

COMPLETE LUNAR ORBIT PHOTO PLANS FOR APOLLO 13.

Lunar Orbital Science Contingency Flight Chart (LSC), Apollo Mission 13, 11 April 1970 Launch Date. Color lunar map, first edition, March 4, 1970. 14 x 58 inches. Scale 1:7,500,000. Full line plots of lunar orbit ground tracks are shown with multiple colors depending on which particular orbit is plotted. Near-side and far-side lunar shadow terminator areas are shown with long green line marker ticks for orbits 1, 15, 30, and 45. Earthshine limits are shown for orbits 1 and 46. All are plotted perpendicular to the spacecraft orbital path.

Identical to the chart issued to Lovell, Haise, and Swigert for the flight, having the SKB 32100082-326 part number printed in a legend block near the lower center. This chart locates the surface "targets of opportunity" with numerous colored geometric markings defining surface locations to observe and photograph. Additional color codes specify camera lenses to use, either 80 or 250 mm. A graph plot provides information on sextant photography with the associated shutter speeds.

SIGNED and INSCRIBED: "FRED HAISE, Apollo 13 LMP."
\$4,000 - 6,000

221

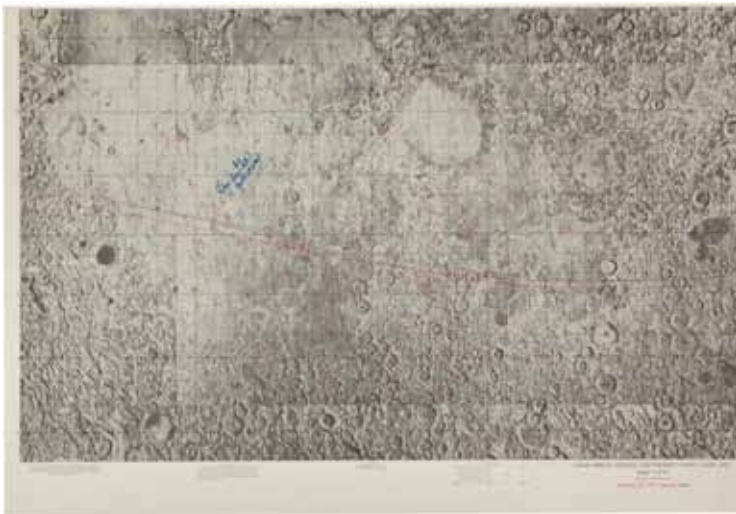
DUKE'S LUNAR SURFACE PHOTOGRAPHIC MAPS.

Apollo 13. LM Lunar Surface Maps. US Army Topographic Command for NASA, [1970].

41 photographic charts on plastic, mostly printed recto and verso. 11 x 8 inches. Card stock covers, tabbed, punched, and bound with three metal rings. Small marginal waterstaining to last 4 charts.

SIGNED and INSCRIBED by Charles Duke on upper cover: "Used during training for planned lunar surface exploration. Charles Duke, Apollo 13, backup LMP." Also with his name in block capitals at upper right corner of cover. These photographic charts on durable plastic were produced in very limited quantities and intended exclusively for crew training purposes.

\$2,000 - 3,000



224



226



225



227



229



230

222

THE REAL APOLLO 13 MOVIE.

Roll of color positive motion picture film, magazines A, AA, GG, FF, and K. 16mm wide x 650 feet long. In original canister with label reading "Color Optical Master. Apollo XIII Onboard."

Includes views of the outside world and interior shots. The Apollo 13 crew had a 16mm motion picture camera on board.

\$2,500 - 3,500

223

LIFE—JIM LOVELL AND APOLLO 13.

Cover of *Life* magazine for April 24, 1970, with portrait of Lovell. Color lithograph, 13 x 10 inches. Framed.

SIGNED by JIM LOVELL.

\$300 - 500

224

LUNAR PHOTO TARGET OBJECTIVES FOR APOLLO 14.

Lunar Orbit Science Contingency Flight Chart (LSC), Sheet 1 of 2, Apollo Mission 14, January 31, 1971 Launch Date. Color lunar map, First Edition, December 4, 1970. 28 x 41 inches. Sheet covers the entire Earth-facing side of the moon.

Identical to the flown version except for the following as noted on this chart: "Apollo 14 Flight On-Board Chart Format. The Apollo 14 flight crew on-board operational chart latitudinal coverage is limited to +/- 40 degrees. The 360 degree longitudinal coverage has been folded into ten equal panels labeled 1 through 10. Panel folding marks and panel numbers are located south of the 40 degree North latitude graticule line." The Apollo 14 orbital ground path is plotted in a range defined by three color curves, red, blue, and purple. There are over 100 photo target cross-marks in red starting with number 35 and ranging up to number 200. The landing site at Fra Mauro is clearly marked with a red ellipse and it is photo target number 157. Photographic targets include craters Copernicus, Goddard, Humboldt, Cassini, Aristarchus, Kepler, Flamsteed, and the Palitzsch Valley. All mare areas have photo targets including the Sea of Tranquility. Boldly SIGNED and INSCRIBED near his landing site ellipse: "EDGAR MITCHELL, Apollo 14 LMP." **\$2,000 - 3,000**

225

LANDING SITES AS SEEN FROM ORBIT—SIGNED.

CSM Orbit Monitor Chart (CDM), Sheet 4 of 4, Apollo Mission 14 – Site Fra Mauro, January 31, 1971 Launch Date. Lunar map, second edition, December 7, 1970. 16 x 39 inches. Scale 1:650,000.

The lunar surface area featured on this map is identical to the flown map with the only difference being that the flown version was connected into a continuous loop then folded for "accordion-type" viewing capability. This high resolution map shows surface features as small as 1,000 feet and has the ground tracks of orbits 3 and 12 plotted as full length continuous white lines. Large white numbers of "16, 17, 18, 19, 20" are equally spaced to provide panel sequencing numbers when folded accordion style. A legend in the white bottom border area defines the shape of markings for the terminator, initial point, folding ticks, and the Command Module on-board chart limits. The landing ellipses for both the Apollo 12 and 14 sites are clearly marked.

Boldly SIGNED and INSCRIBED near his landing site ellipse: "EDGAR MITCHELL, Apollo 14 LMP."

\$2,000 - 3,000

226

TARGET POINT FOR ALAN SHEPARD—SIGNED.

Apollo 14 Landing Site – Fra Mauro. Published by the U.S. Army Topographic Command for NASA, 1971. 17 x 22 inches. Scale 1:8,000.

The chart uses a shaded relief drawing with a large landing ellipse having the Fra Mauro landing site at the center. The Lunar Module approach path is plotted with 1,000 foot markers from the center point. A cross range line is plotted perpendicular from the approach path with 1,000 markers. Key approach sequence identification craters are labeled including Cone, Triplet, and Star. Boldly INSCRIBED and SIGNED: "We were 'Right on the Landing Site,' Edgar Mitchell, Apollo 14 LMP." The landing site remark is a quote made by Commander Alan Shepard just after his pin-point landing.

\$2,000 - 3,000

227

SITE CHART OF THE THIRD LUNAR LANDING—SIGNED.

Fra Mauro. Published by the U.S. Army Topographic Command for NASA. 17 x 22 inches. Scale 1:10,000.

The chart is compiled from Lunar Orbiter photography which clearly shows Cone Crater. This crater was the prime objective of the second moon walk. The planned and actual landing site was just west of Triplet Crater. Apollo 14 Lunar Module Pilot Edgar Mitchell has marked the exact point with an "X." INSCRIBED and SIGNED: "Fra Mauro Base, Apollo 14. Edgar Mitchell, Feb 1971." **\$1,500 - 2,000**

228

CSM LAUNCH CHECKLIST FOR APOLLO 14.

Apollo 14, CSM 110. Revision A. CSM Launch Checklist. Houston, TX: NASA/MSC, December 21, 1970.

Approximately 60 pp on card stock. 8 x 6 inches. Tabbed, punched, and bound with three metal rings.

This manual lists the events that occurred during the Saturn V launch and has specific steps to be carried out by the flight crew. Sections cover boost preps, launch trajectory, launch aborts, boost, orbit insertion and orbital check-outs, TLI preps, and booster (S-IV-B) separation. An emergency section printed on pink paper covers the MODE I to IV aborts. The last sections cover Earth re-entry procedures in the event that the flight remained in Earth orbit and did not travel to the Moon. This checklist was produced in limited quantities and was not intended for public distribution but rather for crew training. SIGNED by EDGAR MITCHELL (with "Apollo 14 LMP") on upper cover. **\$800 - 1,200**

229

ALAN SHEPARD WITH THE UNITED STATES FLAG.

Color photolithograph, 8 x 10 inches, with NASA captions along lower border and on verso.

Apollo 14 Commander Alan Shepard is photographed just after he placed the United States flag onto the lunar surface.

INSCRIBED and SIGNED: "Photo by Edgar Mitchell, Apollo 14 LMP."

\$400 - 600

230

APOLLO 14 RETURNS FROM MOON—CREW SIGNED.

Black and white photograph, 8 x 10 inches.

Printed NASA/HQ press release captions on verso.

Three large 83 foot diameter parachutes support the Apollo 14 Command Module just prior to splashdown in the Pacific Ocean after a 10 day lunar landing flight.

SIGNED by ALAN SHEPARD, STUART A. ROOSA, and EDGAR MITCHELL.

\$1,500 - 2,000



231

231

APOLLO 14 SATURN V FLIGHT MANUAL—SIGNED.

Saturn V Flight Manual - SA 509. NASA/MSFC, August 15, 1969, changed January 1, 1971.

Upwards of 255 pp. Half-tone illustrations of fuel tanks, rocket engines, vehicle stages, and other structures. 10 ½ by 8 inches. Original printed wrappers.

An authoritative reference to the Saturn V moon rocket, for the use of the Apollo 14 astronauts and their support crews.

Subjects covered are vehicle performance data, the emergency detection system, vehicle stages, range safety and guidance instrumentation, the lunar mission profile, and ground launch support facilities.

SIGNED by EDGAR MITCHELL with "Apollo 14 LMP."

\$800 - 1,200

232

TRAIL TO ANTARES.

Large color photograph, 16 x 20 inches. Mounted on board.

Tracks from the Lunar Rover lead to Apollo 14's lunar module.

SIGNED and INSCRIBED "Edgar Mitchell, Apollo 14 LMP, Antares."

\$1,500 - 2,500

233

MITCHELL PHOTOGRAPHS THE LUNAR SURFACE.

Large black and white photograph, 16 x 20 inches. Mounted on board.

A distant view of the Apollo 14 lunar module Antares.

SIGNED and INSCRIBED "Edgar Mitchell photographer, Apollo 14."

\$1,500 - 2,500



232



233



234

234

BUDDY SECONDARY LIFE SUPPORT SYSTEM.

An Apollo Buddy Secondary Life Support System (BSLSS), consisting of: 2 water hoses, 8½ feet long and 3/8 inch inside diameter, to carry coolant flow between working PLSS and the other crew member; flow-dividing connector on one end of the double hose, being a PLSS water connector coupled with a receptacle to accept a PLSS water connector, blue-anodized aluminum; a 4½ foot restraint tether with hooks for attachment to the pressure garment assembly, i.e. at the astronaut's hips; a Beta cloth thermal sheath the length of the hoses, with locking tether clips 2 feet from each end; a Beta cloth thermal pouch for stowage of the assembly on the PLSS during EVA and in the LM cabin during non-EVA periods, 17 x 12 x 1½ inches. In final form, one end of the double hose would be fitted with a normal PLSS water connector.

RARE APOLLO BACKUP LIFE SUPPORT SYSTEM. Objectives for the Apollo missions 11, 12 and 13 required the astronauts to be no further than a half-hour's jog from the lunar module. In the event that one astronaut's Portable Life Support System (PLSS) "backpack" failed, the Oxygen Purge System (OPS) mounted on top of the failed PLSS could provide CO² purging and cooling for long enough to allow the astronauts to reach the LM.

Apollo 15 through 17 involved the lunar rover, and excursions much farther from the LM. In the event of a PLSS failure, the crew would have difficulty returning to the LM in time. Hence the Buddy Secondary Life Support System.

The BSLSS was a set of hoses and connectors which allowed the astronaut with the functioning PLSS to share cooling water with his partner; the stricken astronaut could then run his OPS in low-flow mode and run it for twice as long as in high-flow. It is a similar idea to divers sharing scuba equipment.

The BSLSS was first used on Apollo 14, where it was stashed in the Modularized Equipment Transporter (MET), the cart towed around the lunar surface. On Apollo 15 through 17, it hung off the back of the seats on the lunar rover. In use, it would strap onto the lower part of the PLSS. Fortunately, none of the moonwalkers needed to use the BSLSS. As Jack Schmitt commented, "it rings a very vague bell that we had something called a Buddy SLSS, and the fact that neither of us remembers much about it shows how much we felt we'd need it!"

\$15,000 - 25,000

The following nine lots are directly from the collection of Apollo 15 Commander Dave Scott.

235

THE APOLLO 15 LMP'S LUNAR SURFACE "YO-YO."

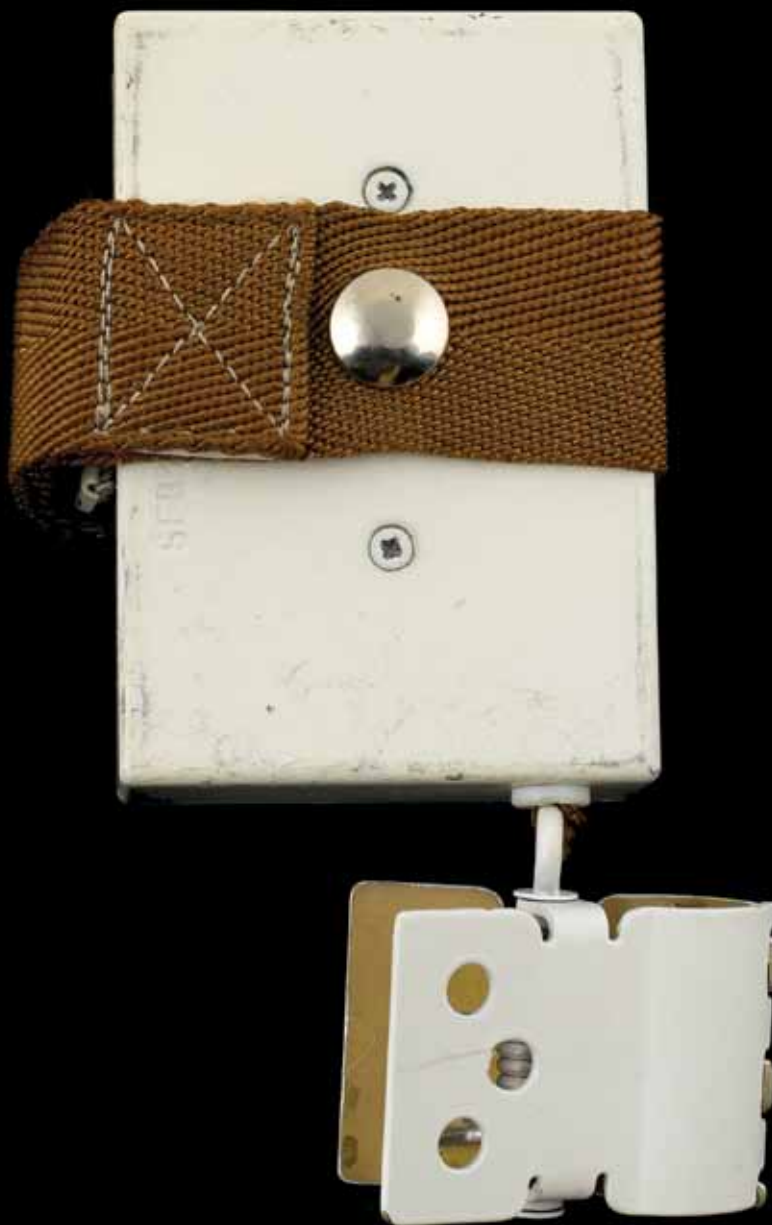
Flown on Apollo 15, an EVA Retractable Tether ("Yo-yo"), the main unit approximately 4 x 3 x 1 inches, the clamp 2 x 1½ x 1½ inches. The clamp attached to the unit by a slender, 35-inch retractable brown cord. 1-inch brown nylon webbing strap for attaching the unit to the right strap of the PLSS. The main unit with part number "SEB33100291-303" and serial number "1025." The clamp with part number "SEB33100292-303" and serial number "1030," and wording "Assy. not for flight."

USED DURING LUNAR SURFACE EVAS BY JIM IRWIN, LUNAR MODULE PILOT. As DAVE SCOTT explains in his SIGNED provenance letter, "The EVA Retractable Tether ('Yo-yo') is a small, pull-cord attachment clamp used for general purpose item retention during lunar surface operations. The unit is strapped to the astronaut's suit and readily available for use ... The tether cord of the Yo-yo assembly is kept under constant tension by the retractor mechanism and fastened securely to the tether clamp ... The tether clamp is a double jawed, spring closure mechanism with an incorporated eyelet for attachment to the tether cord....

"The purpose of the Yo-yo was to enable the astronaut to carry certain tools attached to his spacesuit and readily available without having to carry them by hand. These include the scoop and the tongs, both of which were used by Jim Irwin in sampling rocks and soil near Elbow crater on the Moon during EVA-1. This Yo-yo was also used for the Universal Hand Tool (UHT) to assist in ALSEP deployment (Boyd Bold release)." The Apollo Lunar Surface Experiments Package (ALSEP) comprised a set of scientific instruments placed by the astronauts at the landing site of each of the five Apollo missions to land on the Moon following Apollo 11. Parts of the ALSEP were spring-loaded and would deploy automatically after removing several "Boyd Bolts" with the screwdriver-like UHT. Scott continues, "However during the ALSEP deployment, this particular Yo-yo failed when the string connecting the clamp broke at its attach point on the clamp, and the clamp was lost on the Moon. We returned the Yo-yo to Earth; and subsequent disassembly after the mission showed that both the bowline and the figure-eight knot attaching the cord to the clamp had untied, thus allowing the cord to retract into the housing ... After this post-mission analysis the Yo-yo was reassembled to its current configuration (however the original clamp was replaced in this assembly). An improved clinch knot was installed on large Yo-yos for subsequent missions." As noted in the *Apollo 15 Mission Report* (chapter 14, 5.7), both retractable tethers failed during lunar surface operations; the Commander's tether cord broke during the first extravehicular activity, and the tool clamp came off the end of the Lunar Module Pilot's tether. At 122:21:18 during the mission, Commander Scott exclaimed "My yo-yo doesn't cut it out here. Huh. My yo-yo's broken. There went my yo-yo."

An elaborate item of lunar surface equipment, with unusual history.

\$50,000 - 70,000



235 (actual size)



236

236

UTILITY LIGHT CORD—APOLLO 15 LUNAR MODULE.

Flown on Apollo 15, a Lunar Module Utility Light Cord. Consisting of coiled clear-coated copper wire, approximately 38 inches long when coiled but highly extendible, the cable cut at one end but with Beta cloth-covered six-pin Bendix electrical connector. Two snap-button affixed nylon and Velcro tabs along the cord, for mounting to wall of spacecraft.

ELECTRICAL COMPONENT CARRIED TO THE LUNAR SURFACE. With provenance note SIGNED by DAVE SCOTT, explaining “I hereby certify that the Lunar Module Utility Light Cord included with this letter was used aboard the Lunar Module ‘Falcon’ during Apollo 15 ... The portable Utility Light was used to provide extra lighting inside the Lunar Module during three days of lunar surface activities as well as during the night side of lunar orbits. It was also used to illuminate the tunnel that connected the LM to the CSM. The cord connected the Utility Light to the LM overhead light panel and switches provided one-step dimming for light-intensity control. These lights were used for additional panel lighting, search of remote locations in the spacecraft, and reading. The lights used two miniature incandescent lamps in a machined Teflon housing which acts as a thermal and electrical insulator ... The cord was transferred from the LM to the CSM after rendezvous and docking in lunar orbit.”

A large and weighty component of a lunar module.

\$12,000 - 18,000

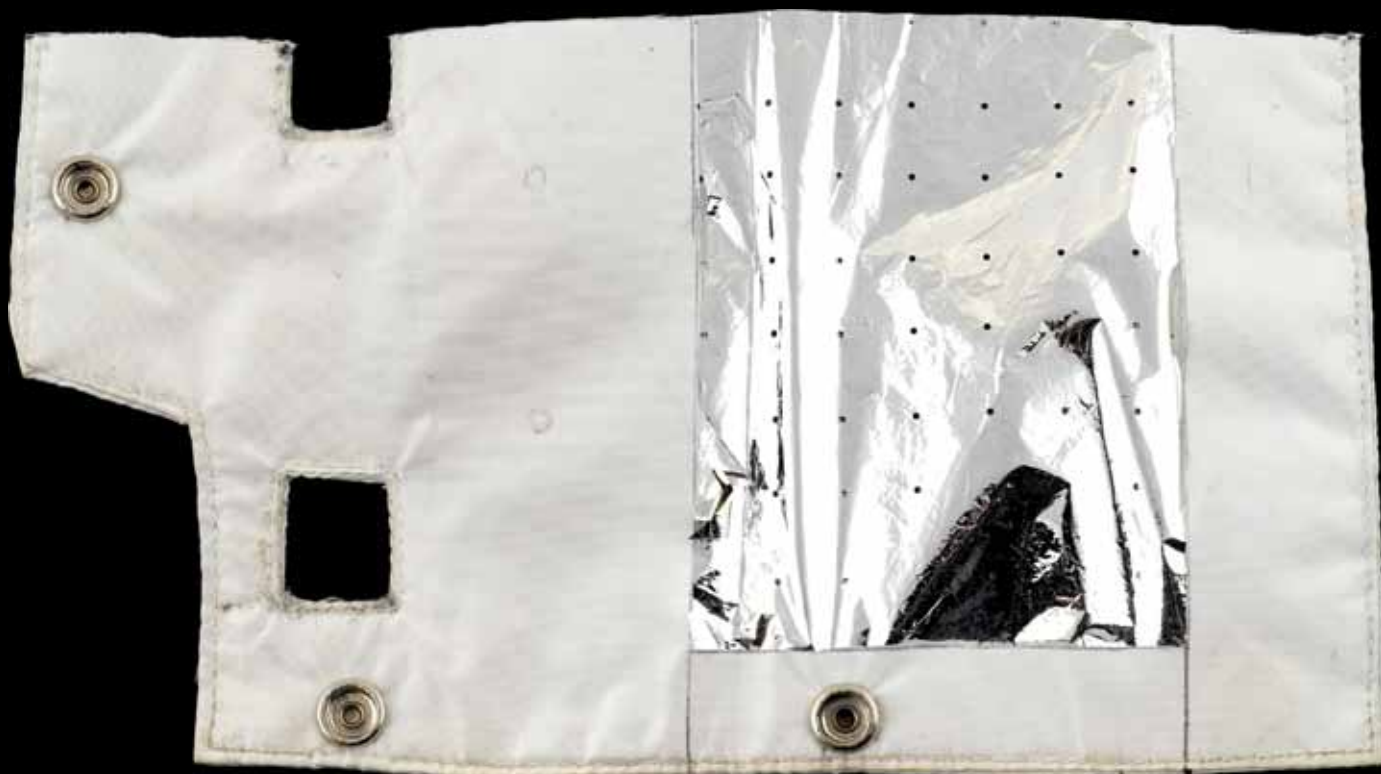
237

EXPOSED TO LUNAR ENVIRONMENT ON THREE EVAS.

Beta cloth and thermal shield segment, approximately 6 x 9 inches, with 6 metal snap-buttons along edges.

PART OF THE OXYGEN PURGE SYSTEM COVER USED ON THREE EVAS ON THE LUNAR SURFACE, AND ONE TRANS-EARTH EVA. The OPS supplies oxygen purge flow and pressure control in the event of a failed of the Portable Life Support System (PLSS) during extra-vehicular activity. As DAVE SCOTT explains in his SIGNED provenance note, “the OPS is an assembly of two spheres of oxygen mounted as a unit on top of the [PLSS] strapped to the back of the astronaut on the lunar surface or carried separately attached by straps to the lower front torso of the suit to supply oxygen during emergency EVA transfer from the Lunar Module to the Command Module in lunar orbit.” Scott certifies that “the segment of beta cloth included with this letter partially covered the [OPS] that I used for three EVAs on the lunar surface during Apollo 15 ... The OPS with this beta cover segment was also used by Al Worden during his Trans-Earth EVA” In completing his three excursions to Endeavor’s scientific instrument module bay, Worden retrieved film cassettes from the panoramic and mapping cameras, performing the first deep-space EVA, and reported his personal observations of the general condition of equipment housed there. The present section of OPS cover was exposed to the lunar surface for over 18 hours, and to the vacuum of space for 38 minutes.

\$20,000 - 30,000



237



237 (reverse)



238

238

LUNAR MODULE-FLOWN ALIGNMENT SIGHT BULB.

Flown on Apollo 15, a Crewman Optical Alignment Sight (COAS) space light bulb assembly, being a ½-inch diameter filament bulb protected by sprung plastic sheath, mounted on a knurled gray metal circular knob. Approximately 2 inches high x 1½ inches in diameter. Manufactured by Jay-El Products of Gardena, CA, with part number "850258-1" and lot number "04950L 643A01 131."

AN OPTICAL COMPONENT FLOWN TO THE LUNAR SURFACE on board the Apollo 15 Command Module Falcon. With DAVE SCOTT'S SIGNED provenance note, stating that *"this light bulb assembly consists of a light bulb mounted inside a housing that is inserted into the COAS to illuminate the optical reticle used for docking alignment. The Crewman Optical Alignment Sight (COAS) is an alignment aid that provides fixed line-of-sight attitude reference between the Lunar Module and the Command Module as well as the horizon (Earth and Moon) and stars ... An essential element of the COAS is the reticle lighting and intensity control. The COAS is used during both daylight and darkness operations, including a broad range of illumined backgrounds. To ensure this capability during a mission, a spare bulb assembly was carried aboard the spacecraft."* One function of the COAS was to enable the Lunar Module to redock with the Command Module after leaving the lunar surface. Scott's letter illustrates the position of the present assembly in a series of photographs and diagrams.

\$8,000 - 12,000



239

239

SLEEPING SOUNDLY ON THE MOON—APOLLO 15.

Flown on Apollo 15, a lunar module hammock hook and strap, consisting of an alloy clip, approximately 3 inches long, with sprung 'jaw,' stitched onto a strap of 1-inch wide mid-brown nylon webbing. Faint serial number on back of clip, reading approximately "LDW-48519719-1."

VITAL PIECE OF EQUIPMENT TO ENSURE THE APOLLO 15 CREW PERFORMED AT FULL CAPACITY.

As DAVE SCOTT explains in his SIGNED provenance note, *"Apollo 15 was the first lunar exploration mission during which the crew had to learn how to 'live' (rather than 'stay') on the Moon. Our expedition of three full days on the Moon was twice as long as previous missions and restful sleep was absolutely essential for us to perform at maximum capacity during each of three full days of intense EVA activities. During previous missions, the crew had only two brief rest periods during which they remained in their stiff and bulky spacesuits. However, to work for three long days, we decided that we needed to live as close to normal conditions as practical. Therefore, we planned our work-sleep cycles according to our normal circadian rhythm (i.e., on Houston time); and because we had high confidence in the Lunar Module systems, especially the cabin pressure integrity against the harsh lunar vacuum, we decided to remove our spacesuits at the end of each day and sleep in our constant wear garments (underwear). At the conclusion of each day's activities, we hooked hammocks to the LM bulkhead using two small hooks attached to beta cloth straps sewn into the hammocks (... on Apollo 15 the straps on the hook were brown). Because of the 1/6 G environment, we only weighed 30 pounds and sleep in the hammocks was sound and restful; we averaged about six hours a night. On the third morning, prior to stowing the hammocks I cut the hook/straps from my hammock and returned them to Earth as mementos of living for three days on the Moon."*

\$8,000 - 12,000



240



241

240
LARGE US FLAG CARRIED ON APOLLO 15.
 Flown United States flag, silk, 11 x 17 inches.

A particularly large flown flag, carried to the Moon on board Apollo 15's Command Module Endeavor. With DAVE SCOTT'S SIGNED provenance note, stating that this flag "was flown around the Moon for 6 days (74 orbits)." He explains in detail the high points of the mission: "*Jim Irwin and I landed the lunar module 'Falcon' on the Moon between Hadley Rille and the Apennine Mountains, an area located on the southeast edge of Mare Imbrium (Sea of Rains). Using the first Lunar Roving Vehicle (LRV) we travelled 27.9km (17.3 miles) conducting three separate excursions to explore unique geological features in three distinct locations.*"
\$5,000 - 7,000

241
SCOTT'S US FLAG CARRIED ON MULTIPLE MISSIONS.
 Flown US flag, linen, 4 x 5½ inches.

FLOWN ON APOLLO 9, THEN TO THE SOUTH POLE, AND FINALLY TO THE SURFACE OF THE MOON. With DAVE SCOTT'S SIGNED provenance note, giving details of the three expeditions: "*I was Command Module Pilot on Apollo 9 ... the first test flight of the complete Apollo lunar landing mission architecture, including all spacecraft and life support systems.... 'I was a member of a NASA contingent of six on an official visit to Antarctica from 9 through 15 January 1970 ... The objective of the visit was to observe human operations and scientific research in a remote and hostile environment as parallels to similar activities on the Moon and in space ... Throughout the journey, I carried the attached United States flag in the pocket of my parka as a symbol of exploration. Apollo 15 was the fourth manned lunar landing and the first 'J' mission extended scientific exploration of the Moon.*" Scott continues, "*I hereby certify that the United States flag included with this letter ... is from my personal collection and was flown aboard Apollo 9, March 3-13, 1969; then carried to the South Pole, Antarctica, January 9-15, 1970, and then flown to the lunar surface during Apollo 15, July 26 - August 7, 1971.*"
 Flags flown to the lunar surface are rare; those with an additional history of exploration like this one, scarcer still.
\$12,000 - 18,000



242

**242
CREW PATCH—CARRIED TO THE LUNAR SURFACE.**

Flown Apollo 15 emblem, cloth, 4 inches in diameter. Featuring the Apollo 15 crew insignia designed by Emilio Pucci, and with silver thread on craters to the right forming the Roman numerals "XV."

Flown in the Apollo 15 Lunar Module Falcon, down onto the surface of the Moon. With DAVE SCOTT'S SIGNED provenance note, reading in part: *"I hereby certify that the Apollo 15 patch (with silver 'XV') included with this letter was carried to the surface of the Moon aboard the Lunar Module 'Falcon' during Apollo 15, the first extended scientific exploration of the Moon."*

He continues with detail on the achievements of Apollo 15, and some key statistics including *"the longest lunar surface stay time"* and *"the largest payloads ever placed into Earth and lunar orbits."*

Only a very limited number of these special patches were produced, with the Roman numeral "XV" embroidered in silver thread over the landing site. **\$7,000 - 9,000**

**243[□]
APOLLO 15 BETA CLOTH EMBLEM.**

Apollo 15 emblem, 3½ inches in diameter, featuring the crew insignia designed by Emilio Pucci, with three chevrons over a background of the landing site. Printed on Beta cloth, 9 inches square.

SIGNED by DAVE SCOTT, AL WORDEN and JIM IRWIN.
\$600 - 800



243

The following lot was originally in the collection of Apollo 15 Astronaut James Irwin.

**244
IRWIN'S FLOWN APOLLO 15 ROBBINS MEDALLION.
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. Serial number 050 is engraved along the medallion rim. With a Typed Letter Signed by Mrs. MARY IRWIN.

MARY IRWIN'S October 8, 2007 signed provenance letter reads in part: *"The medallion enclosed with this letter 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 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 medallion 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. 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 and is serial number 050 of the Apollo 15 set. In addition, a copy of the original medallion distribution list with serial numbers written by my husband's own hand is included."

\$15,000 - 20,000



244 (enlarged)



244A

244A

FLOWN ROUND THE MOON ON ENDEAVOUR.

Flown United States flag, made from silk, 4 by 6 inches.

INSCRIBED on the reverse "Flown aboard Endeavour" and SIGNED by AL WORDEN with "Apollo 15 CMP, July 26, 1971."

\$2,000 - 4,000

245

MAPPING CAMERAS SENT TO LUNAR ORBIT.

"J-MISSION SIM BAY SM 112/113 COMMON," large blueprint, 18 x 11 inches, of the Scientific Instrument Module (SIM) Bay located in the Service Module. Exact details of SM (Service Module) 112/113 (for Apollo 15 and 16) are illustrated.

The blueprint identifies the location of the PAN Camera made by ITEK and the Mapping Camera made by Fairchild. These two cameras used large film cassettes which required the Apollo Command Module Pilot to make an EVA (spacewalk) to physically retrieve the film prior to Earth re-entry. This EVA occurred after the CSM left lunar orbit and was returning to the Earth. While in lunar orbit, a Particles and Field SubSatellite (seen at the lower left) was launched from the bay to measure the lunar environment from an altitude varying from 60 to 85 miles. Other scientific instruments that collected data during lunar orbit are shown including the Alpha and X-Ray Spectrometer, Gamma Ray and Mass Spectrometers, and a Laser Altimeter.

The letter "J" refers to type of Apollo mission having the most complex engineering and scientific objectives. They used the longest duration Apollo vehicles of the program.

SIGNED and INSCRIBED "Al Worden, Apollo 15. First Deep Space EVA" at the bottom center of the blueprint.

\$800 - 1,200



247

246

IRWIN, OLD GLORY, AND MOUNT HADLEY—SIGNED.

Color photolithograph, 8 x 10 inches, with a printed caption along the bottom margin.

James Irwin salutes the United States flag next to the lunar rover and in front of Lunar Module Falcon.

INSCRIBED and SIGNED: "His love from the Moon, Jim Irwin."

\$700 - 900



248

247

HADLEY RILLE WITH SCOTT'S DESCRIPTION.

Black and white photograph, 8 x 10 inches, with a printed NASA text on verso.

A fascinating view looking into Hadley Rille revealing boulders and dramatic shadowing.

INSCRIBED and SIGNED: "Spectacular! Must be seen in 3D – and with the eye. Dave Scott, Apollo 15."

\$1,000 - 1,500

248

JIM IRWIN—BACK ON EARTH.

Black and white photograph, 8 x 10 inches, with printed NASA text on verso.

Jim Irwin exits Command Module Endeavor after the first three day lunar surface exploration mission of the Apollo Program.

INSCRIBED and SIGNED "Back on Earth and very happy, Jim Irwin, Apollo 15" with a crescent moon drawing.

\$1,000 - 1,500

249

APOLLO 15 LUNAR LANDING POSTAL COVER—SIGNED.

Postal envelope with an Apollo 15 crew emblem cachet issued by the NASA Manned Spacecraft Center Stamp Club. Houston, TX postmark dated "30 JUL 1971."

SIGNED by DAVE SCOTT, AL WORDEN, and JIM IRWIN.

\$400 - 600



249



250

250

APOLLO 15 RECOVERY SHIP BASEBALL CAP.

A dark blue baseball cap with an embroidered emblem which reads: "USS OKINAWA APOLLO 15." An interior label reads: "Don Alleson, Rochester, NY. 85% Wool, 15% Nylon, Large. 7 1/8 - 7 1/4 - 7 3/8."

These ball caps were available to personnel on the *Okinawa* during the Apollo 15 recovery operations. It is identical to the type worn onboard by Scott, Irwin, and Worden just after their splashdown. The Apollo 15 crew had the addition of "scrambled egg" embellishments on the cap visors in recognition of their military rank.

\$500 - 700

251

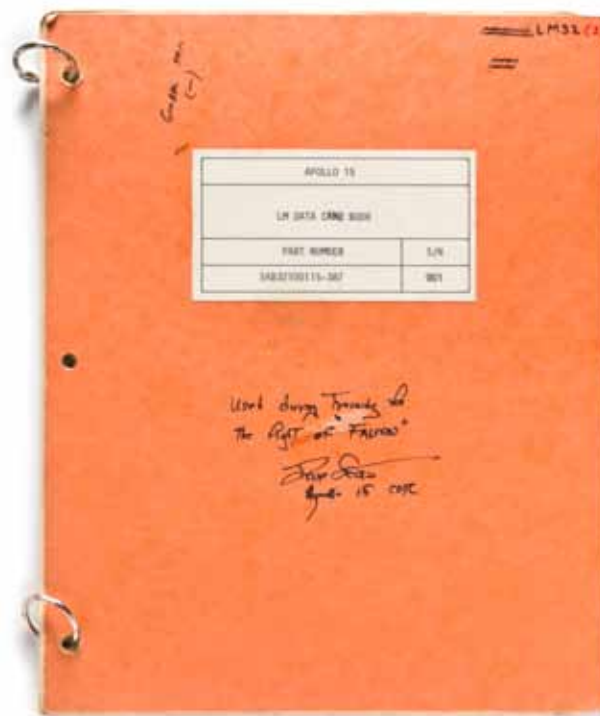
APOLLO 15 LM DATA CARD BOOK—USED IN TRAINING.

Apollo 15. LM Data Card Book. Part Number SKB32100115-387. S/N 001. [June 10, 1971.] Approximately 28 pp, printed on tabbed card stock. 10½ x 8 inches. Card stock covers, punched, and bound with two metal rings. Small glue mark in inscription area.

SIGNED and INSCRIBED: "Used during training for the flight of 'Falcon.' Dave Scott, Apollo 15 CDR."

Filled with numerous ink annotations and amendments, some of which are only a week before launch date. The most extensive notes are to the LM Activation Card, the Lunar Surface Card, the Abort/Ascend Card, and the Direct TPI Card, where tables have been filled in. There are a couple of further annotations to the cover, one of which refers to "Gimbal trim." The *LM Data Card Book* is also found with a more normal-looking pale green NASA/MSO logo'd cover.

\$1,500 - 2,500



251

252

APOLLO 15—ROAD MAP TO THE MOON.

Apollo 15. CSM Lunar Landmark Maps. Printed June, 1971.

28 photographic charts on plastic (3 of which are folding and show details near the landing site at Hadley-Apennine, a few pasted back-to-back), interspersed with several printed text leaves. 11 x 8 inches. Card stock covers, tabbed, punched, and bound with three metal rings.

SIGNED and INSCRIBED: "A roadmap to the Moon. This is the backup copy of my lunar landmark map. Al Worden, Apollo 15."

Contains several unusual simulated oblique views of the lunar surface as it would be seen from the command module, and several exercises requiring the astronaut to identify or describe certain topographical features. These photographic charts on durable plastic were produced in very limited quantities and intended exclusively for crew training purposes.

\$2,000 - 3,000



252



255



256



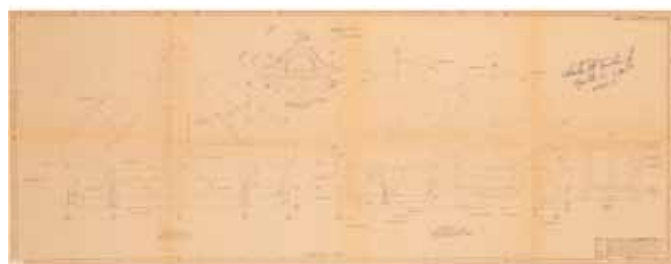
262



257



259



261

253[□]

APOLLO 15 HASSELBLAD POSITIVES.

Roll of slide film, being 60 frames of duplicate positives from Hasselblad magazines used on Apollo 15. 70mm wide x a few feet long. In period canister.

A fantastic selection of images from Apollo 15, including Jim Irwin saluting the flag, the Rover, setting up experiments, bootprints, the LM, and views of the lunar surface from orbit.

\$600 - 800

254[□]

LUNAR TRAJECTORY NOTES—FIRST ROVER MISSION.

Apollo 15 Lunar Trajectory Notes. MSC Internal Note No. 71-FM-232. Houston, TX: NASA/MS, June 30, 1971.

xiv, 216 pp. Diagrams throughout. 10½ x 8 inches. Card stock covers, punched and stapled.

Includes several illustrations after cartoons by "South," showing the astronauts in amusing scenarios including seeing aliens driving a Willys Jeep on the moon.

SIGNED by DAVE SCOTT with "CDR Apollo 15" on upper cover.

\$700 - 900

255

CHARLIE DUKE—FRONT PAGE NEWS.

Black and white photograph, 8 x 10 inches, with a printed NASA text on verso.

Charlie Duke scans the headlines of a Florida newspaper during breakfast before the Apollo 16 launch.

INSCRIBED and SIGNED: "A great way to make the news, Charlie Duke."

\$500 - 700

256

THE WESTERN U.S. PHOTOGRAPHED FROM APOLLO 16.

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

The western United States as seen by the Apollo 16 crew just after their third stage rocket engine firing to head toward the moon.

SIGNED and INSCRIBED: "CHARLES M. DUKE, Jr., Apollo 16 LMP."

\$400 - 600

257

CASPER IN LUNAR ORBIT.

Color photograph, 8 x 10 inches, with NASA identification number at upper border. Full frame 70mm Hasselblad image, vintage print using "A Kodak Paper."

Apollo 16 Command-Service Module Casper is photographed in lunar orbit above large rugged craters by Charles Duke in the Lunar Module Orion.

INSCRIBED and SIGNED: "Photo by Charlie Duke, Apollo 16 LMP."

\$800 - 1,200

258

A SALUTE TO THE FLAG IN THE LUNAR HIGHLANDS.

Color photograph, 8 x 10 inches, with NASA identification number at upper border. Full frame 70mm Hasselblad image, vintage print using "A Kodak Paper."

Apollo 16 Lunar Module Pilot Charles Duke salutes the United States flag with Lunar Module Orion, the lunar rover, and Stone Mountain in the background.

INSCRIBED and SIGNED: "At Descartes, Charles M. Duke, Jr., Apollo 16, April 1972."

\$700 - 900

259

A LUNAR SPEED RECORD!

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

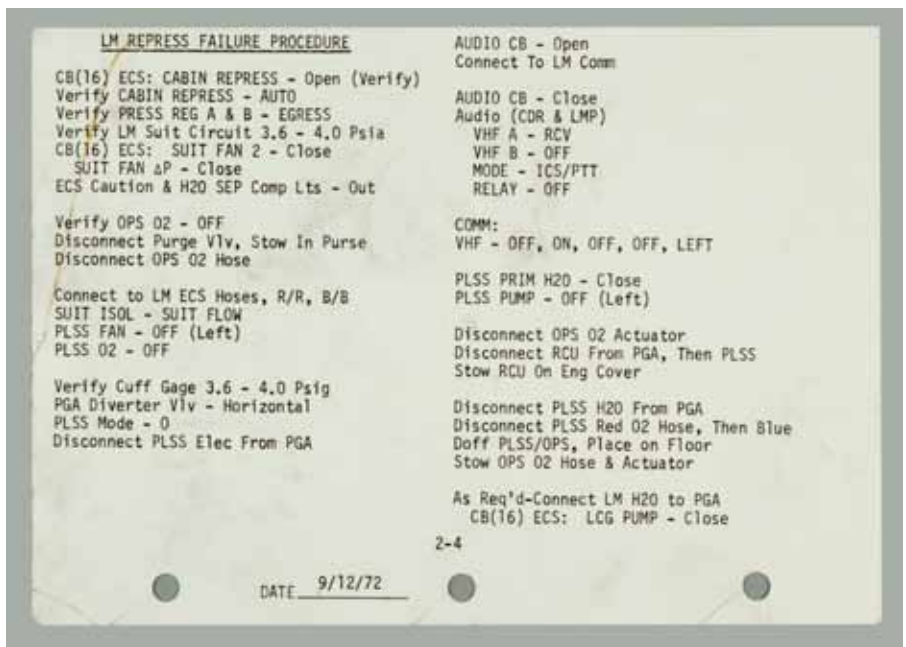
Charles Duke photographs John Young as he sets a lunar speed record driving the lunar rover.

INSCRIBED and SIGNED: "Almost 11 MPH! A Lunar Speed Record! Photo by Charles M. Duke, Jr., Apollo 16 LMP."

\$600 - 800



263



263

260[□]

LUNAR SURFACE PANORAMA IMAGES—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 flown negative. 9½ inches wide x many feet long. On metal reel, in original canister with label reading "Apollo 16. Mag: pan ... Frames: 4097 to 4148 ... Date: 11 Oct 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. Each frame appears to be approximately 70 inches long, showing the lunar surface at huge detail.

\$500 - 700

261

LUNAR ROVER BLUEPRINT—SIGNED BY A DRIVER.

"Configuration Control Qual. and Flight Units, Lunar Roving Vehicle," blueprint, Boeing, Seattle, WA, March 16, 1970. 16 x 40 inches. Scale ½ and as noted. Framed.

Blueprint showing the folded wheels of the lunar rover, and how it fits into the LM. SIGNED by CHARLES DUKE and INSCRIBED "Apollo 16 LMP, LRV-2."

\$600 - 800

262[□]

APOLLO 16—EXPLORING DESCARTES.

Apollo 16 Final Lunar Surface Procedures. Houston, TX: NASA/MSC, March 16, 1972.

457 pp. 4 folding tables. 10½ x 8 inches. Card stock covers, punched, stapled.

SIGNED by CHARLES DUKE (with "Apollo 16 LMP") and INSCRIBED "Exploring Descartes" on cover.

The minute-by-minute plans of John Young and Charles Duke for their three lunar drives using the Lunar Rover. Includes: descriptions of the Lunar Rover, ALSEP equipment, and lunar surface tools; geological sampling objectives at the Cayley formation and the Descartes mountain area; EVA tasks in the exact form of the crew's EVA cuff checklists (but unlike in the cuff checklists, 'gag' illustrations are not included); 10 Rover traverse maps like those carried on the Lunar Rover; a space suit equipment malfunction checklist.

\$800 - 1,200

263

HEAVILY SOILED WITH LUNAR DUST.

Flown to the lunar surface on Apollo 17, LM Lunar Surface Checklist, pp 2-3 and 2-4. A single sheet printed recto and verso. NASA/MSC, September 12, 1972. 8 x 5½ inches.

EXTENSIVELY HANDLED JUST PRIOR TO AND AFTER EACH OF APOLLO 17'S THREE EVAS. The checklist gives the procedure for "transition to one-man EVA," in the case of something preventing both crew members from venturing onto the lunar surface. On the reverse are instructions for "LM repress failure procedure."

As Gene Cernan explains in the letter of certification that accompanies the checklist sheet, "This particular page ... had special meaning to Jack Schmitt and I while on the surface, as it would have been needed for reference had only one of us been able to go out for a moonwalk due to the failure of one of our PLSS backpacks. Thankfully these emergency procedures were not needed as both life-supporting backpacks worked exactly as designed. After our last moonwalk, while safely back inside the LM, Jack and I commented on the special significance of this very page from the Moon to Bob Parker (CAPCOM):

172:05:43 Cernan: Hey, Jack and I are going to frame this page 2-3, cut it down the middle and each take half.

172:05:58 Schmitt: I'm going to take the front half. Gene will take the back half.

When back on Earth, we never got around to cutting this page in half, and luckily we never had to make that tough decision as to which one of us would have gone out for that one-man moonwalk.

Due to the heavy use of this checklist, the clearly visible dark smudges on both sides of this page are, indeed, smudges of actual lunar dust from the Taurus-Littrow Valley!"

The sheet itself with hand-stamp reading "Landed on the Moon aboard the Apollo 17 LM 'Challenger,'" and SIGNED by GENE CERNAN. Also included is a photograph of Cernan with this sheet, a one-page mission transcript detailing the above conversation of the last men on the Moon about this sheet, and a set of both iconic and lesser-known images from the Apollo 17 mission in digital format.

\$5,000 - 7,000

264

PRESENTED BY CHRIS KRAFT TO JAMES FLETCHER.

Desktop presentation comprising three flown flags, each 4 x 6 inches, and accompanying plaques, mahogany, the flags behind lucite panels. 13 x 13 x 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. James C. Fletcher, NASA Administrator and *"an outstanding civil servant,"* by Christopher C. Kraft, Director of Johnson Space Center. 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. 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—becoming the only individual to lead 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: *"This space reserved for Space Shuttle flag."* Probably the presentation of a Shuttle flag was overlooked in 1981, and when Fletcher returned to NASA after the 1986 Challenger disaster, it would surely have been deemed inappropriate. In all likelihood, Fletcher did receive the US flag reserved for him by Kraft on STS-1 prior to 1986 but never added it to this presentation, preferring to retain the thoughtful plaque from Kraft.

Mission Control at Johnson Space Center has recently been renamed in Kraft's honor. 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.

\$8,000 - 12,000

265

SPACE SUIT ANYONE?

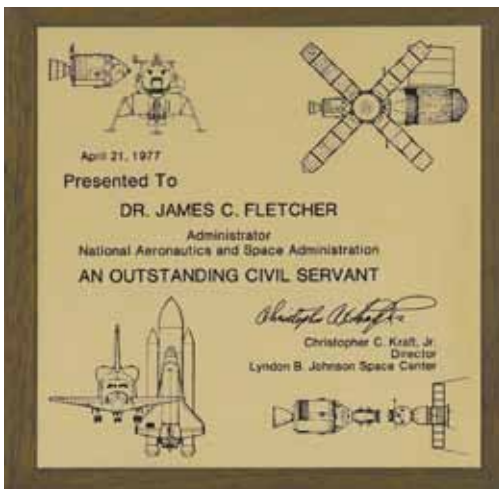
Black and white photograph, 10 x 8 inches, with printed NASA text on verso.

Apollo 17 Command Module Pilot Ron Evans tests reach limits in his Apollo space suit. INSCRIBED and SIGNED: *"How is this for overhead reach – Ron Evans, Apollo 17, Apr 86."*

\$700 - 900



264



264



265



266



267



270



271

**266
CERNAN SALUTES THE LAST STARS AND STRIPES.**

Large color photograph, 16 x 20 inches.

Apollo 17 Commander Gene Cernan holds and salutes the last United States flag placed on the lunar surface.

Boldly INSCRIBED and SIGNED: "Last Man on the Moon, GENE CERNAN, Apollo XVII CDR, Dec 1972."

\$2,000 - 3,000

**267
THERE IS ORANGE SOIL!**

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

A close-up to the orange lunar soil discovered by Apollo 17 Lunar Module Pilot Harrison Schmitt during the last moon walk of the Apollo Program. SIGNED by HARRISON H. SCHMITT.

\$700 - 900

**268[□]
APOLLO 17 LUNAR ORBIT CHART.**

"Apollo Lunar Orbit Chart (ALO), Apollo Mission 17 for December 6, 1972 Launch Date." Defense Mapping Agency for NASA. Color lunar map, first edition, October 13, 1972. 12 x 40½ inches.

Boldly SIGNED by GENE CERNAN with "Apollo XVII CDR."
\$500 - 700

**269[□]
APOLLO 17 EARTH ORBIT CHART.**

"Apollo Earth Orbit Chart (AEO), Apollo Mission 17 for December 6, 1972 Launch Date." Defense Mapping Agency for NASA. Color Earth map, first edition, October 16, 1972. 13 x 42 inches.

Circular plots in black represent the ground station communication coverage areas with ones in red being the ocean station tracking ships. Orbital paths are also shown. SIGNED by GENE CERNAN with "Apollo XVII CDR."
\$500 - 700

**270
HARRISON SCHMITT WITH THE LUNAR MODULE.**

Large color photograph, 16 x 20 inches. Mounted on board.

SIGNED and INSCRIBED "Gene Cernan, Apollo XVII, photographer."

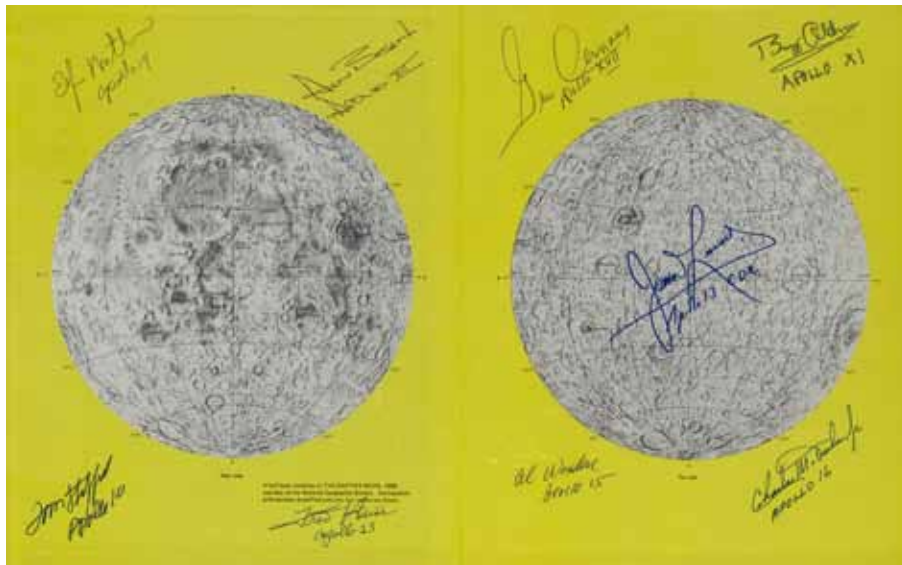
\$1,500 - 2,500

**271
MOON BOULDER.**

Large color photograph, 16 x 20 inches. Mounted on board.

Scientist-Astronaut Harrison H. Schmitt is photographed standing next to a huge, split boulder during the third Apollo 17 EVA at the Taurus-Littrow landing site on the Moon. SIGNED and INSCRIBED "Gene Cernan, Apollo XVII, photographer."

\$1,500 - 2,500



275

272

LAST MAN.

Large black and white photograph, 16 x 20 inches. Mounted on board.

Showing the use of the Lunar Rover during Apollo 17.

Boldly SIGNED and INSCRIBED "Gene Cernan, Apollo XVII, Last Man on the Moon!"

\$1,500 - 2,500

273

FAREWELL TO A FULL MOON—DECEMBER 1972.

SIGNED BY TEN APOLLO LUNAR VOYAGERS.

Color photograph, 7½ x 7½ inch full frame 70mm Hasselblad image on an 8 x 10 inch "Manufactured by Kodak" sheet with a red NASA identification number and text at the left margin. NASA text on verso.

The last full moon seen from space in the 20th Century by the crew of Apollo 17 as they coast toward home after three days on the lunar surface.

SIGNED by BUZZ ALDRIN, ALAN BEAN, CHARLES CONRAD, CHARILE DUKE, RICHARD GORDON, FRED HAISE, EDGAR MITCHELL, DAVE SCOTT, TOM STAFFORD, and AL WORDEN. Each has inscribed his individual Apollo flight number.

\$2,500 - 3,500

274

WE CHOOSE TO GO TO THE MOON.

Large color photograph, 20 x 16 inches.

A collage showing the prime crews from Apollo 10 through 17, with an oblique view of the Moon behind.

SIGNED by a crew member from each of the missions: BUZZ ALDRIN, RICHARD GORDON, ALAN BEAN, EDGAR MITCHELL, DAVE SCOTT, AL WORDEN, JAMES LOVELL, CHARLIE DUKE, and GENE CERNAN, all but the first two adding their Apollo mission number.

\$800 - 1,200

275

APOLLO PHOTOGRAPHIC VIEWS FROM LUNAR ORBIT.

SIGNED BY ONE OF EVERY LUNAR FLIGHT CREW.

MASURSKY, HAROLD, G.W. COLTON and FAROUK EL-BAZ, editors. *Apollo Over the Moon: A View from Orbit*. NASA SP-362. Washington: GPO, 1978. vii, 255 pp. 12 x 9 inches. Color pictorial cloth binding.

The pages provide a striking visual presentation of key orbital photographs obtained from every Apollo lunar mission. All photographs have informative captions and image IDs with many having a kilometer distance bar and north directional arrow. A detailed description with drawings of the ITEK Panoramic Camera and Fairchild Metric Camera is included. These camera systems were carried in the Scientific Instrument Module (part of the Service Module) on the last three Apollo flights. A photographic data appendix lists all of the book's frame numbers, their latitude, sun elevation, camera tilt, lens focal length, film and frame type. SIGNED and INSCRIBED with their individual Apollo flight number by BUZZ ALDRIN, ALAN BEAN, GENE CERNAN, CHARLES M. DUKE, FRED HAISE, JAMES LOVELL, EDGAR MITCHELL, TOM STAFFORD, and AL WORDEN.

\$3,500 - 4,500

276

THE HISTORY OF MANNED APOLLO LUNAR SPACECRAFT.

SIGNED BY TWELVE APOLLO ASTRONAUTS.

BROOKS, C.G., J.M. GRIMWOOD and L.S. SWENSON. *Chariots for Apollo: A History of Manned Lunar Spacecraft*. NASA SP-4205. Washington: GPO, 1979. xvii, 538 pp. 10 x 7 inches. Cloth.

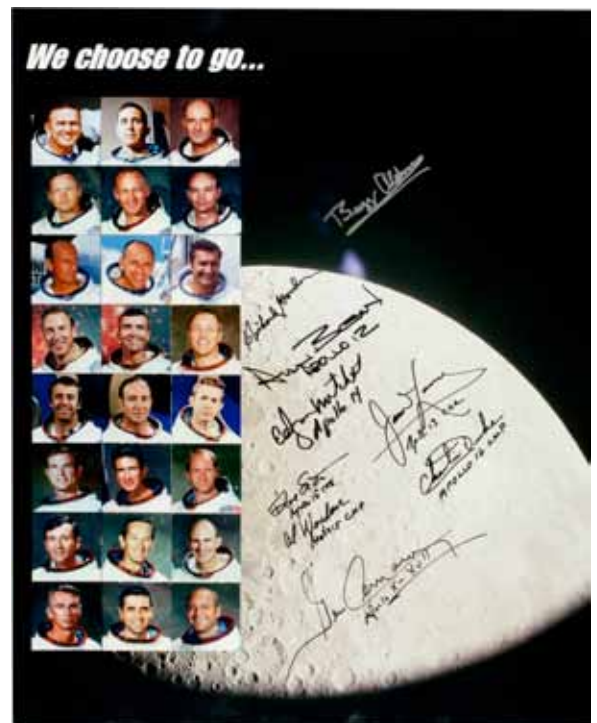
Describes the development and construction of the Apollo Command and Service Modules by NASA and North American Aviation. The evolution of NASA's lunar mission architecture dictated the developments of the Lunar Module whose construction task was awarded to Grumman Aircraft of Bethpage, Long Island, New York. Progress and results from actual spacecraft flights are covered including unmanned missions, the first manned flight of Apollo 7 commanded by Wally Schirra, and the first manned flight of the Lunar Module on Apollo 9. The three lunar flights of Apollo 8, 10, 11 are described in the context of how all the previous efforts enabled these flights to be successfully completed.

SIGNED and INSCRIBED with their individual Apollo flight number(s) by ALAN BEAN, GENE CERNAN, WALT CUNNINGHAM, CHARLES M. DUKE, GORDON COOPER, RICHARD GORDON, FRED HAISE, EDGAR MITCHELL, TOM STAFFORD, AL WORDEN and WALLY SCHIRRA on the frontispiece verso. SIGNED by BUZZ ALDRIN on the frontispiece photograph of him walking on the lunar surface.

\$3,000 - 4,000



273



274



272



276



281

Skylab, Apollo-Soyuz, & Later Programs

The following lot was originally in the collection Astronaut Charles Conrad.

281

28 DAYS IN ORBIT—CONRAD'S SKYLAB I EMBLEM.

LETTER GIVING 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

282

BETA CLOTH EMBLEMS.

Group of 19 emblems printed on sections of Beta cloth, the sections mostly 9 x 9 inches but a few smaller, comprising: crew emblems for Apollo 7-17; crew emblems for Skylab 1-3; the NASA "meatball"; two sizes of US flags; Snoopy SMEAT emblem (Skylab Medical Experiments Altitude Test), and a commemorative postal cover for the same issued by the NASA MSC Stamp Club; spoof emblem for Engle, Brand and Kerwin's simulated mission using the Block II thermal vacuum test article 2TV-1, with NASA red "vector" replaced by a roadrunner (a bird that doesn't fly). Together with 2 stapled-together swatches of Beta cloth, micrometeorite and thermal protection "sandwich."

\$500 - 700

283[□]

HASSELBLAD PHOTOS FROM SKYLAB 2.

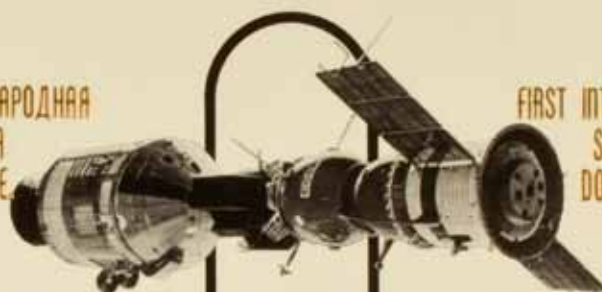
Roll of slide film, being 28 frames of duplicate positives from Hasselblad magazines. 70mm wide x a few feet long.

Includes several aerial views of Earth features, and the crew at work and play.

\$600 - 800

ПЕРВАЯ МЕЖДУНАРОДНАЯ
СТЫКОВКА
В КОСМОСЕ

FIRST INTERNATIONAL
SPACE
DOCKING



СВИДЕТЕЛЬСТВО

Настоящим удостоверяется, что в 19 часов 09 минут по московскому времени и в 12 часов 09 минут по вашингтонскому времени 17 июля 1975 года экипажи космических кораблей Союза Советских Социалистических Республик и Соединенных Штатов Америки успешно состыковали свои корабли "Союз" и "Аполлон" на орбите вокруг Земли. Экипажи кораблей выражают надежду, что первый международный космический полет пилотируемых кораблей навсегда останется в истории человечества живым примером сотрудничества их стран на благо всех народов.

Геннадий Николаевич Коробов
ГЕННАДИЙ "КОРБ" / SOYUZ CREW



CERTIFICATE

This is to certify that at 12 hours 09 minutes Washington time, and 19 hours 09 minutes Moscow time, on July 17, 1975, flight crews of the United States of America and the Soviet Socialist Republic successfully docked their Apollo and Soyuz Spacecraft in earth orbit. They share the hope that this first International Manned Space Flight will stand in the light of history as a significant advance in the ability of their nations to work together in ways that advance the interests of people everywhere.

Thomas P. Stafford
DR. S. S. Langton
Vance D. Brand
APOLLO CREW / ЭКИПАЖ "АПОЛЛОНА"

THE SPACE MAGNA CARTA.

Printed certificate featuring an illustration of the linked Apollo and Soyuz spacecraft, with mission insignia below. Text in English and Russian. 9 x 12 inches. Light rubbing to very extremities, right corners very slightly bumped, one 3mm nick to top edge.

Provenance: Christie's East, September 18, 1999, lot 208.

ONE OF ONLY FOUR COPIES, and the symbolic end of the Space Race.

SIGNED IN SPACE by TOM STAFFORD, DEKE SLAYTON, VANCE BRAND, VALERIE KUBASOV, and ALEXEI LEONOV.

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 orbit. The Project would see the docking of an Apollo spacecraft with its Soyuz counterpart, using a special docking module attached to the Command Module.

This final Apollo mission carried Tom Stafford, Vance Brand, and Deke Slayton. On board the Soyuz were Alexei Leonov and Valery Kubasov. Leonov, particularly, had been a key player in the Space Race, as he was the first man to walk in space in 1965. Similarly, Slayton had been selected as one of the original Mercury 7. 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 image of détente in space was powerful, although the reality on Earth was more problematic: even organizing a joint press conference involved six months of negotiations.

Nonetheless, one of their first tasks was to sign four copies of a certificate—two for the Americans and two for the Russians. The document notes that *"the flight crews ... share the hope that this first International Manned Space Flight will stand in the light of history as a significant advance in the ability of their nations to work together in ways that advance the interests of people everywhere."*

Of the four copies of this document, two copies had English text on the left and Russian on the right, and two had the reverse. Each country submitted one copy of the document to the International Aeronautical Federation as part of the documentation of the historic flight. NASA transferred the remaining American certificate (with English on the left side) to the Smithsonian in 1976, where it is currently either on loan or in storage. The present fourth copy is the Russian one, brought back by Leonov and Kubasov, and surely the only copy in private hands.

See also image overleaf of the certificate-signing.

\$60,000 - 100,000



Рис. 11. Подписание свидетельства о том, что в космос космический корабль «Союз — Аполлон» (СССР — США) 17 июля 1975 г.

Fig. 11. The signing of the certificate on the Soyuz — Apollo (USSR — USA) docking in space on July 17, 1975.

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285

WORLD RECORDS OF THE ASTP MISSION.

File on Absolute World and World Records of the World's First Joint Flight of the Soyuz (USSR) and Apollo (USA) Spacecraft on the Apollo-Soyuz Test Project... July 15-19, 1975. Baikonur, Moscow, and Cape Canaveral: [USSR Aerosports Federation and USA National Aeronautics Association], 1975.

Approximately 100 pp. 12 x 9 inches. Text in Russian and English. 36 black and white photographs mounted, some of which reproduce diagrams. Original blue vinyl covers, gilt lettered. Extremities very slightly rubbed. *Provenance:* Christie's East, September 18, 1999, lot 209.

THE OFFICIAL FLIGHT REPORTS FOR THE INTERNATIONAL AERONAUTICAL FEDERATION, one of eight copies reproduced, only two of which were bound in blue.

The French *Fédération Aéronautique Internationale* is responsible for

USA NATIONAL AERONAUTICAL ASSOCIATION (Member of International Aeronautical Federation)			
ASTP Apollo commander's report			
Record classification:	World Absolute — Duration, Distance in Linked and Group Flight; Altitude, Mass in Linked Flight. Earth Orbit World Category — Duration, Distance in Linked and Group Flight; Altitude, Mass in Linked Flight. For Vehicles with Four or More Astronauts.		
Date of attempt:	July 15, 1975		
Vehicle commander:	Nationality:	License No.:	
Brig. Gen. T. P. Stafford	U. S. A.	475-75	
Mark and type of vehicle:	S4-210 Saturn (B-30 (First Stage), S-IVB-210 (Second Stage)), CRM-111 (Manned)		
Identification marks or numbers:	United States and U. S. A. Flag		
I hereby certify that I was aboard the above vehicle at the time it was launched from the Earth's surface, remained aloft during the period stated herein, and was returned to the Earth's surface at the location indicated below:			
Launch site:	Kennedy Space Center, Florida, USA		
Latitude:	29°36'30" N	Longitude:	27°23'45" E
On (date):	July 15, 1975	At (time):	185600 GMT
Return site:	Pacific Ocean West of Hawaii		
At (location):	USS New Orleans LPB-11	At (time):	21:18:24 GMT
On (date):	July 24, 1975		
Vehicle commander:		 T. P. Stafford	

285

maintaining records of aeronautical and astronautical achievements. Anyone claiming a record must submit detailed technical information and affidavits to the FAI. The present volume is the official report prepared jointly by the US and Soviet authorities.

With multiple statements in both English and Russian signed by I.G. Borisenko of the USSR Aerosports Federation and Carl R. Huss of the US National Aeronautical Association, bearing witness to various aspects of the mission. Also with two copies each, both SIGNED, of the reports of: ALEXEI LEONOV; VALERY KUBASOV; TOM STAFFORD; and the three Apollo crew members together.

Additionally SIGNED and INSCRIBED on the front free endpaper by Bob Brecker, Peter Frank, Carl Huss, Kenneth Kleinbrecht, Chris Kraft, Glenn Lunney, Sig Sjöberg, and Deke Slayton.

\$10,000 - 15,000



286



287



288

The following lot is directly from the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

286
STAR CHART CARRIED AND USED ON ASTP.
"CSM Deorbit Star Chart, July 15, 1975 Launch," photographically printed on plastic, 8 x 16 inches, with stars and major constellations, and with the Earth, Moon, Sun, and planets colored by hand. The recto with two polar star charts. Framed.

Showing the exact celestial positions of key stars for the CSM navigational equipment realignment, prior to deorbit. With a typed letter SIGNED by TOM STAFFORD stating in part that "this black background Star Chart was one of the ones that flew with the flight crew equipment packets aboard the Apollo 18 Command Module of the Apollo-Soyuz Test Project July 15-24, 1975 ... During the mission we referred to these charts."

\$4,000 - 6,000

The following two lots were originally in the collection Astronaut Thomas Stafford.

287
STAFFORD'S FLOWN ASTP APOLLO CREW EMBLEM.
Flown Apollo Soyuz cloth crew emblem, 4 inches in diameter. Displayed between paragraphs on a Typed Letter Signed by TOM STAFFORD.

TOM STAFFORD'S January 30, 1990 signed provenance letter reads: "This Apollo-Soyuz cloth emblem displayed below 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."

\$2,000 - 3,000

288
TOM STAFFORD'S ASTP FLOWN BETA CLOTH.
Flown Apollo Soyuz crew emblem, 3½ inches in diameter. Printed on a white Beta cloth section 5½ inches square. Displayed with a Typed Letter Signed by 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 - 2,000



289



291



290



293

**289
US FLAG CARRIED ON APOLLO-SOYUZ
TEST PROJECT.**

Flown United States flag, made from silk, 4 x 6 inches.

SIGNED by VANCE BRAND, ALEXEI LEONOV, VALERY KUBASOV, and TOM STAFFORD (who has added "Flown on ASTP, July 1975").

\$1,500 - 2,500

**290
THE SOYUZ CREW READY FOR LAUNCH.**

Black and white photograph, 10 x 8 inches.

Space suited Aleksei Leonov and Valery Kubasov pose next to the crew transfer van prior to their Soyuz launch on July 15, 1975. The three member Apollo crew launched later that same day. On July 17 the first international spaceflight docking occurred.

SIGNED by ALEKSEI LEONOV and VALERY KUBASOV.

\$500 - 700

**291
ASTP COMMANDER SIGNED STAMP SHEET.**

A full sheet of 10 cent Apollo Soyuz stamps, 10 x 9 inches, featuring two different artist renderings of the space vehicles in earth orbit.

SIGNED by TOM STAFFORD and ALEXEI LEONOV.

\$600 - 800

**292
LAST PATH FOR APOLLO—COMMANDER'S
INSCRIPTION.**

ASTP Earth Observation Map, Training Edition. Color earth map, 19 x 40 inches. Circular plots indicated the limits of ground communication stations. The orbit inclination from the equator is 51.75 degrees.

A series of orbital ground tracks are plotted with medium blue shadowing. Each interior black line is numbered and is 15 orbits apart from the next line. This inclination from the equator was the greatest of any flown Apollo vehicle program. INSCRIBED and SIGNED: "Orbital paths of the 1st US - Russian Docking Flight - ASTP. Tom Stafford, Apollo CDR."

\$1,500 - 2,000

**293
ARTIST IN ORBIT.**

Color photograph, 8 x 10 inches.

Soyuz Commander Alexei Leonov is photographed during the Apollo-Soyuz mission after completing a sketch of Apollo Commander Tom Stafford. The sketch was given to Stafford during the flight.

SIGNED by ALEXEI LEONOV.

\$300 - 400

The following 4 lots are directly from the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

**294
MANUALS FOR THE APOLLO-SOYUZ TEST
PROJECT.**

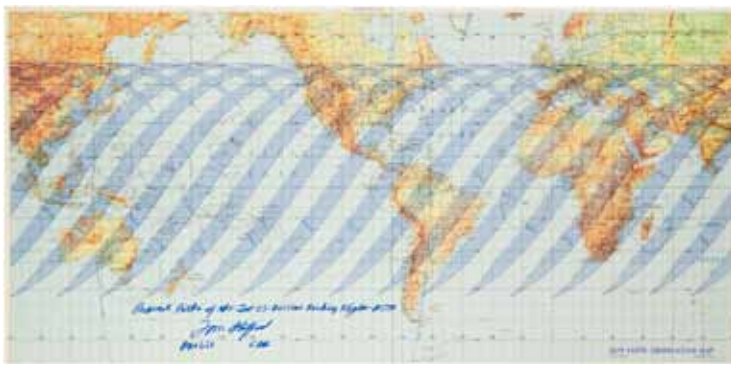
1. *ASTP Training: CSM Rendezvous Book.* Upwards of 65 pp. 10 x 8 inches. 8 tabbed sections including Dock/Undock, several data pad grids for use during maneuvers or navigational alignments. Some pages in Russian. With a black and white photograph, 8 x 10 inches, showing an ASTP joint training session 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.

Both manuals were used by astronaut Robert Overmyer during flight training and mission support. He was part of the Apollo Support Crew during ASTP.

Each manual SIGNED by TOM STAFFORD on upper cover.

\$1,200 - 1,800



292



294



294



297



298



298



298

295

DOCKING MODULE BLUEPRINT—SIGNED.

"Modification Decals, DM Russian Nomenclature." Large blueprint, 21 x 85 inches folded to 8 x 11 inches, illustrating the Docking Module 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 x 10 inches, showing an ASTP training session with the present blueprint in use.

Since the Apollo CM 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 Forstenko and other interpreters worked with the Apollo crew to familiarize them with DM terminology using this blueprint. SIGNED by TOM STAFFORD near the center.

\$700 - 900

296

STAFFORD'S ASTP CLASSROOM RUSSIAN MANUAL.

Russian: *Glossary of the Russian Basic Course*. N.p.: Defense Language Institute, August 1970.

Upwards of 300 pp. 10 x 8 inches. Plastic comb-type binding. Together with *Apollo-Soyuz Astronyms: Acronyms and Terms Used in Air-to-Ground Communication* (Houston, TX: Aeronutronic Ford Corporation, [1975]), a 96 pp booklet.

This Russian glossary was originally designed to train DoD personnel for eavesdropping on Soviet communications during the Cold War. It found a new use during ASTP in enabling peaceful cooperation between the two superpowers.

The first item SIGNED and INSCRIBED "To Anatole, thanks for all of your great help! General Tom Stafford." The booklet also SIGNED by Stafford.

\$500 - 700

297

ASTP POSTER INSCRIBED BY STAFFORD IN RUSSIAN.

Apollo-Soyuz Test Project. Washington, DC: GPO for Nasa Facts, [1975]. Color lithographed poster with text panel, mission diagram and 4 illustrations. 40 x 48 inches, folded to 13¼ x 16 inches.

SIGNED and INSCRIBED in Russian next to the astronauts and cosmonauts shaking hands, "Greetings, Valery! How are things with you? Tom Stafford."

\$600 - 800

298^a

SPACE POSTERS.

Group of 3 posters:

- [In Russian:] *Sovmestnyj Sovetsko-Sirijskij Polet*. [Joint Soviet-Syrian Mission.] Moscow: Plakat, 1987. Color offset lithographed poster after P. Shegerian, 26½ x 19 inches.
- [In Russian:] *Sovmestnyj Polet Kosmonavtov SSSR i Mir—Socialisticheskii Internacionalizm v Dejstvii*. [Joint Flight Cosmonauts and the World—Socialist Internationalism in Action.] Moscow: Plakat, 1981. Color lithographed poster after S.B. Raev, 25½ x 19 inches.
- 2001: *Uzay Yolu Macerasi*. 2001: *Space Odyssey...* Yönetmen: Stanley Kubrick. [Turkey]: Yılmaz Ofset Basimevi, [c.1968]. Color offset lithographed poster after the design by Robert McCall, 39 x 27 inches. Laid on linen. Poster for the Turkish-dubbed version of Kubrick's sci-fi masterpiece.

\$600 - 800



299

299 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 85 ll. 8½ x 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 x 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:] *Nadezhnaya 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 x 11½ inches, of approximately 40 delegates to the Forum, signed by many including Tereshkova, Leonov, Shatalov, and others.

Many items SIGNED by ANATOLY FILIPCHENKO.
\$4,000 - 6,000



300



300

300 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 x 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 x 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 x 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.

\$1,500 - 2,500



302

The following lot is directly from the collection of Anatole Forostenko, chief Russian language instructor for the ASTP astronauts.

**301
ALEXEI LEONOV'S SIGNED ASTP BASEBALL CAP.**
Baseball cap with Apollo-Soyuz patch on front, cotton, manufactured by Toppers of Philadelphia. Together with an open pack of "Apollo Soyuz" cigarettes manufactured by Philip Morris, the design for the pack being by Alexei Leonov.

The cap worn by Leonov during a visit to Disney World in Florida with the other ASTP cosmonauts. SIGNED by prime crew members ALEXEI LEONOV and VALERY KUBASOV, and additionally by backup crew members ANATOLY FILIPCHENKO, NIKOLAI RUKAVISHNIKOV, VLADIMIR DZHANIBEKOV, BORIS ANDREEV, YURI ROMANENKO, and ALEXANDER IVANCHENKO, as well as VLADIMIR SHATALOV and VALERY BYKOVSKII who flew in Vostok 5. The cigarette pack also SIGNED by Leonov.

\$500 - 700

302 COSMONAUTS.

Collection of postcards and photographs of cosmonauts, including: signed postcards of TITOV, BYKOVSKY, LEONOV, SHATALOV, HRUNOV, NIKOLAEV, and POPOVICH; postcard of a group portrait, signed by SHONIN, VOLKOV, FILIPCHENKO, KUBASOV, GORBATKO, SHATALOV, and ELISEEV; several postal covers and associated ephemera; album containing 11 black and white photographs, 5 x 7 inches, of Gagarin being fêted; album containing 22 color and black and white photographs, mostly 4 x 6 inches, relating to Soyuz 11.

\$500 - 700

303

SOVIET EVA SPACESUIT GLOVE.

Right glove from an "Orlan" (Bald Eagle) EVA space suit. Nylon glove lined with rubber, anodized aluminum wrist coupling, insulated nylon gauntlet, pebbled rubber grip pads, flap with velcro closures at back of hand, 15½ inches in length, serial number at hem. Printed table of time remaining and pressure levels stitched onto wrist area.

The first spacewalk using an Orlan suit took place on December 20, 1977, on the Soviet space station Salyut 6, during the Soyuz 26 mission. The press table only appears on right-hand gloves.

\$1,500 - 2,500



301



303

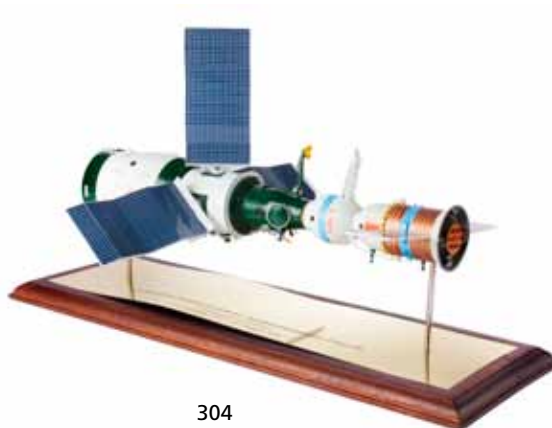
304

DOCKED SALYUT-SOYUZ MODEL.

Large model of docked Salyut 6-Soyuz 26, made for Khrushchev Space Center. Metal and resin. 17 inches long x 9 high x 13 wide including solar panels. On lacquered wood base, with engraved plaque reading (in Russian) "Orbital Space Station Salyut 6 — Spacecraft Soyuz 26. The First Expedition. December 10, 1977— March 16, 1978."

Salyut 6 was the Soviet space station, prior to Mir, and was in operation for almost five years. Soyuz 26 took the first long-duration crew to Salyut. A problem with the docking hatch had prevented Soyuz 25 from connecting successfully. An extremely detailed model.

\$4,000 - 6,000



304



305

305[□]

GAGARIN POSTERS.

1. [Poster featuring image of Gagarin and a long quotation.] Moscow: Plakat, 1975. Color lithographed poster, 42 x 26 inches. Some creases and softness.

2. 12.4.1961. [Similar poster, with the same quotation.] Moscow: Plakat, 1987. Color lithographed poster, 39 x 26 inches. Faded, creases.

\$400 - 600



306

306[□]

SOVIET COSMONAUTICA.

[In Cyrillic:] *Sovetskaja kosmonavtika. Albom-vystavka / Putevoditel' po vystavke. [Soviet Cosmonautica. Album and Exhibition / Exhibition Guide.]* Moscow: Dosaaf, 1976. 2 parts: 10 x 5½ inch Guide, original printed wrappers; 15 x 12 inch portfolio containing suite of 91 loose plates in 6 folders comprising portraits, biographies, technical charts, photographs of missions, etc. A few slight creases, portfolio rubbed.

This album was produced as a kind of ready-made exhibition to be mounted in schools and military bases, allowing citizens across the whole Soviet Union to see the wonders of their space program.

\$500 - 700



307



308

307

LARGE SPACE PLANE WIND TUNNEL MODEL.

Model of a delta-wing orbiter with twin wing-tip vertical tails, manufactured by North American Rockwell, c.1971. Wood and paint, 33 inches from nose to tail, wingspan 20 inches. Flag, "United States," and NASA decals. Displayed vertically on custom stand.

A product of the research that was taking place in the 1970s with the goal of producing a reusable shuttle. The present model was designed for wind tunnel tests, and is unusually large and striking. See illustration on back cover and on preceding page.

\$5,000 - 7,000

308

TILE FLOWN ON FIRST SIX CHALLENGER MISSIONS.

Challenger-flown LRSI (Low-temperature Reusable Surface Insulation) tile, 6 x 6 inches. Part no V070-391039-043, serial no 008455. Accompanied by "Flown Hardware" tag, printed and completed in manuscript, reading "Orbiter No 099, STS Number 17," (referring to its 17th processing flow), dated November 13, 1984.



309

The present tile was flown on the first six flights of Challenger: STS-6 (the maiden voyage), STS-7, 8, 41-B, 41-C, and 41-G, before being replaced. These tiles would cover the upper wing near the leading edge. They are also used in selected areas of the forward, mid, and aft fuselage, vertical tail, and the OMS/RCS pods. They protect areas where reentry temperatures are below 1,200°F. The white color is by design and helps to manage heat during orbit when the orbiter is exposed to direct sunlight. LRSI tiles are reusable for up to 100 missions with refurbishment, 100 missions also being the design lifetime of each orbiter. White tiles are rarely available on the market.

Please note that US State Department regulations prohibit the export of Shuttle tiles outside the United States.

\$2,000 - 3,000

309

DOLLAR BILL SIGNED BY THE CHALLENGER CREW.

One dollar bill, series 1981 A, serial number F66853585D, 2½ x 6 inches.

SIGNED by all seven crew members of the ill-fated Challenger flight STS-51-L. The tenth mission for Challenger, it ended in disaster when, 73 seconds after lift-off on January 28, 1986, the vehicle experienced a catastrophic structural failure.

Inscribed "To Rachel" and signed by MIKE SMITH, DICK SCOBEE, ELLISON ONIZUKA, RON MCNAIR, GREG JARVIS, CHRISTA MCAULIFFE, and JUDY RESNIK.

\$1,000 - 1,500



311

310

No lot

311

COSMONAUT KALERI'S TRAINING SUIT GLOVE.

Left hand glove from a "Sokol KV-2" ("Falcon" in Russian) pressure suit, manufactured by Zvezda. White nylon, leather palm, rubber digits. Cuff of blue anodized aluminum. Initials "K.A. Yu." near wrist.

Aleksandr Yuriyevich "Sasha" Kaleri is a veteran of extended stays on the Mir Space Station and the International Space Station. Born in Latvia, he has spent the second-longest time in space of any person. The present glove was used by him in training for one of his missions, and has his initials (in Russian order) on the wrist.

SIGNED on the back of the hand by Czechoslovak cosmonaut VLADIMIR REMEK, and German astronauts REINHOLD EWALD and GERHARD THIELE.

\$1,200 - 1,800



312

312

MODEL OF FOTON M2 SATELLITE.

Metal and plastic, on stained wood base with plaque. The satellite 5 inches long, approximately 7 inches high.

The Foton M2 was launched from the Baikonur Cosmodrome in Kazakhstan on May 31, 2005, and carried a scientific payload on behalf of the European Space Agency. The design of the satellite was based on the much earlier Vostok and included a re-entry capsule to bring experiments and samples back to Earth.

\$600 - 800

Beyond Earth's Orbit

313[□]

PLANET MERCURY—ATLAS.

DAVIES, MERTON E., AND OTHERS. *Atlas of Mercury*. [Washington, DC?]: Office of Space Sciences, NASA, December 1976. Oblong folio (280 x 340 mm). iv, [1], 19 pp, 100 original black and white photographs numbered 20-120 (plus 9 duplicate plates at end), [1], 121-127 pp. Punched and in original 12-ring cloth binder. Ownership inscription on title, title with hole-strengtheners, index leaf holes a little ragged, binding lightly rubbed.

A photographic atlas of Mercury, derived from Mariner 10 imagery. "Of all the firsts, undoubtedly the outstanding achievement of the Mariner 10 mission was the spectacular unveiling of the planet Mercury.... Using a narrow-angle television camera, it could take only postage-stamp-size pictures of the surface. But it could flash them back to Earth with such rapidity that it was possible to map the entire lighted portion of the planet with excellent resolution" (Robert S. Kraemer, introduction). Believed to be one of only 250 copies printed; a second edition, with lithographs rather than real photographs, appeared in 1978.

\$600 - 800

314[□]

ATLAS OF THE SURFACE OF VENUS.

KOTELNIKOV, V.A., editor. [In Russian:] *Atlas poverhnosti Veneri*. [Atlas of the Surface of Venus.] Moscow: Head Office of the Geodesic and Cartographic Ministry, 1989. 328 pp. 20 x 14 inches. Numerous color and monochrome illustrations including approximately 360 half-page reproductions of photographs of the surface. Original cloth, dust-jacket, in publisher's original packaging.

\$100 - 150

315

EARLY MARS CHART.

National Aeronautics and Space Administration Mars Chart. U.S. Army Topographic Command for NASA. First edition, August 1970. 29 x 36 inches. Scale 1:25,000,000.

The equatorial and polar regions are illustrated based mainly on Earth telescopic observations with all major Martian regions identified. Photographic telemetered images from the 1969 Mariner 6 and 7 close encounter fly-bys are printed in an overlay type format. Those imaged areas are mainly at the equatorial to the south polar region. Other areas of this chart were compiled from Mariner 4 image data obtained in 1965 and the far encounter images from both Mariners 6 and 7. The large bottom border area contains general physical data for Mars, a photographic coverage grid, and other chart technical information.

\$1,500 - 2,500

316

MARS SCIENTIFIC MODEL.

MICHAUX, C.M., and R.L. NEWBURN. *Mars Scientific Model*. JPL Document No. 606-1. Pasadena, CA: JPL, March 1, 1972. 11 x 9 inches. Several folding plates, some printed in color with transparent overlays. Folding charts in pocket at front. Tabbed, punched, and in original vinyl 3-ring binder.

A loose-leaf update of the work first published in 1968. "Our intent in the new edition of this document had been to present a summary of knowledge about Mars shortly before the time of arrival of Mariner 9" (Preface). The title on the binder states "Volume 1," but the work appears complete and we have not been able to locate a second volume in institutions.

\$600 - 800

317

MARS AND PLANETARY EXPLORATION PHOTOGRAPHS.

A collection of 50 official NASA black and white photographs, all 8 x 10 inches.

Many are Mars orbital images from the Mariner and Viking missions, plus surface images from the Viking landers. Additional images of Jupiter, Saturn, and their moons are from the Voyager series missions. The "Face on Mars" image is included.

\$600 - 800

318[□]

MARINER IV.

Collection of approximately 46 bulletins, reports, and memoranda related to Mariner IV, including the following: 31 issues of JPL's *Mariner Mars Bulletin*; "Mariner 64 Encounter Playback Data," July 16, 1965; "Mariner Mars 1964 Handbook" (Technical Memorandum 33-265); "Mariner IV Handbook" (Technical Memorandum 33-406); "Mariner IV Pictures of Mars" (Technical Report 32-884); "The Voyage of Mariner IV" (Technical Report 32-958). For a full listing, please download the condition report for this lot from bonhams.com/20944.

\$400 - 600

319[□]

MARTIAN AND LUNAR REPLOGLE GLOBES.

Matched pair of metal globes, 6 inches in diameter. Plastic stands. Mars globe is 1 inch = 700 miles and Moon globe is 1 inch = 360 miles.

\$400 - 600

320[□]

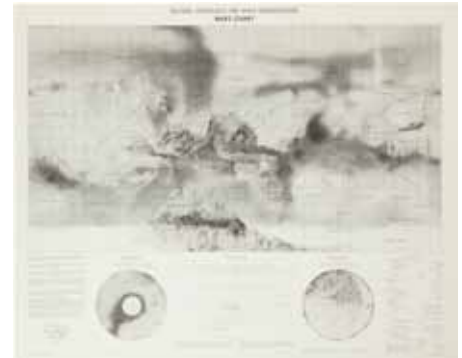
THREE SOVIET GLOBES.

1. [LIPSKY, Y.N.] Moon globe, c.1967, 13½ inch diameter. Plastic stand.
2. Mars globe, 9½ inch diameter. Plastic stand.
3. Mars globe, 4½ inch diameter. Plastic.

\$400 - 600



313



315



317



318



322

321

SIX REPLOGLE GLOBES.

1. Mars globe, 8½ inch diameter. Wooden stand.
2. Mars globe, 6 inch diameter. Metal with metal stand.
3. Mercury globe, 6 inch diameter. Wooden stand.
4. Celestial globe, 6 inch diameter. Metal with plastic stand.
5. Moon globe, 6 inch diameter. [1967.] Metal.
6. Moon globe, 4½ inch diameter. [1981.]

\$1,200 - 1,800

322

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 IX.

\$3,000 - 5,000

323^a

JOURNEY TO THE FAR SIDE OF THE SUN.

Doppia immagine nello spazio. Rome: Rotolitografica, 1969. Color lithographed poster, 55 x 39½ inches. Laid on linen.

Poster for the Italian version of the 1969 British movie *Doppelgänger*, known outside Europe as *Journey to the Far Side of the Sun*, directed by Robert Parrish. In the film, a joint European-NASA mission to investigate a planet in a position parallel to Earth behind the Sun ends in disaster with the death of one astronaut. The surviving astronaut discovers that the planet is a mirror image of Earth.

\$500 - 700

324^a

CELESTIAL GLOBE.

Celestial globe of Russian manufacture, 7 inches in diameter, c.1958. Constellations captioned in Roman characters. Held within metal meridian and equatorial rings, and contained in wood case, 10 x 10 x 10 inches, with Russian labels inside and Russian metal plaques on front.

\$150 - 250

325

NASA TRANSPARENCIES.

Group of approximately 200 color transparencies of NASA photographs, each image 4 x 3 inches on 5 x 4 inch sheet. Images 1960s-1980s, printed 1980s. Mostly with NASA reference numbers in margin, some accompanied by printed captions.

Includes: Jupiter's Great Red Spot, various unmanned rocket launches, deep space features, Martian surface photographed by Viking lander, various probes in the lab, Mission Control at Houston, and an unusual modified Sikorsky aircraft with NASA/DARPA livery.

\$700 - 900

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Coins & Banknotes	4	<input type="checkbox"/> \$100	<input type="checkbox"/> \$140
Entertainment Memorabilia & Collectables	3	<input type="checkbox"/> \$120	<input type="checkbox"/> \$150
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European Paintings	3	<input type="checkbox"/> \$120	<input type="checkbox"/> \$150
Fine & Rare Wine and Whisky (5 Wine and 2 Whisky)	7	<input type="checkbox"/> \$280	<input type="checkbox"/> \$350
Fine Asian Works Of Art	7	<input type="checkbox"/> \$280	<input type="checkbox"/> \$350
Fine Books & Manuscripts	4	<input type="checkbox"/> \$160	<input type="checkbox"/> \$200
Fine Jewelry	8	<input type="checkbox"/> \$320	<input type="checkbox"/> \$400
Fine Oriental Rugs & Carpets	4	<input type="checkbox"/> \$160	<input type="checkbox"/> \$200
Fine Watches	3	<input type="checkbox"/> \$120	<input type="checkbox"/> \$150
Fine Writing Instruments	2	<input type="checkbox"/> \$50	<input type="checkbox"/> \$70
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
Native American & Tribal Art	3	<input type="checkbox"/> \$120	<input type="checkbox"/> \$150
Natural History	3	<input type="checkbox"/> \$120	<input type="checkbox"/> \$150
Maritime Paintings & Decorative Arts	2	<input type="checkbox"/> \$80	<input type="checkbox"/> \$100
Photographs	2	<input type="checkbox"/> \$80	<input type="checkbox"/> \$100
Prints	2	<input type="checkbox"/> \$80	<input type="checkbox"/> \$100
Space History	1	<input type="checkbox"/> \$40	<input type="checkbox"/> \$50
All Categories	94	<input type="checkbox"/> \$3,760	<input type="checkbox"/> \$4,700
Estate auctions are held monthly in San Francisco and Los Angeles. Catalogs for estate auctions are partially illustrated and available approximately one week prior to the auction.			
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(Attendee / Absentee / Online / Telephone Bidding)

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Sale title:		Sale date:													
Sale no.		Sale venue:													
General Bid Increments: <table border="0"> <tr> <td>\$10 - 200by 10s</td> <td>\$10,000 - 20,000by 1,000s</td> </tr> <tr> <td>\$200 - 500by 20 / 50 / 80s</td> <td>\$20,000 - 50,000by 2,000 / 5,000 / 8,000s</td> </tr> <tr> <td>\$500 - 1,000by 50s</td> <td>\$50,000 - 100,000by 5,000s</td> </tr> <tr> <td>\$1,000 - 2,000by 100s</td> <td>\$100,000 - 200,000by 10,000s</td> </tr> <tr> <td>\$2,000 - 5,000by 200 / 500 / 800s</td> <td>above \$200,000at the auctioneer's discretion</td> </tr> <tr> <td>\$5,000 - 10,000by 500s</td> <td>The auctioneer has discretion to split any bid at any time.</td> </tr> </table>				\$10 - 200by 10s	\$10,000 - 20,000by 1,000s	\$200 - 500by 20 / 50 / 80s	\$20,000 - 50,000by 2,000 / 5,000 / 8,000s	\$500 - 1,000by 50s	\$50,000 - 100,000by 5,000s	\$1,000 - 2,000by 100s	\$100,000 - 200,000by 10,000s	\$2,000 - 5,000by 200 / 500 / 800s	above \$200,000at the auctioneer's discretion	\$5,000 - 10,000by 500s	The auctioneer has discretion to split any bid at any time.
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Customer Number		Title													
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Company name (to be invoiced if applicable)															
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March 19, London

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March 25, New York

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April 10, London

Roy Davids: Part III

May 8, London

Roy Davids: Part IV

June 18, London

Books, Maps, Manuscripts
& Historical Photographs

June 25, New York

Fine Books & Manuscripts
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June 25, New York

Northwest America & the Arctic,
including the Library of Dr. William Priester

June 26, New York

Russian Literature & Works on Paper

October 16, Los Angeles & New York

Fine Books & Manuscripts

December 9, New York

Fine Books & Manuscripts

December 9, New York

Printed & Manuscript Judaica

Samuel Gurney Cresswell. *A Series of Eight Sketches in Colour... of the Voyage of H.M.S. Investigator*. London: 1854.
To be offered June 25