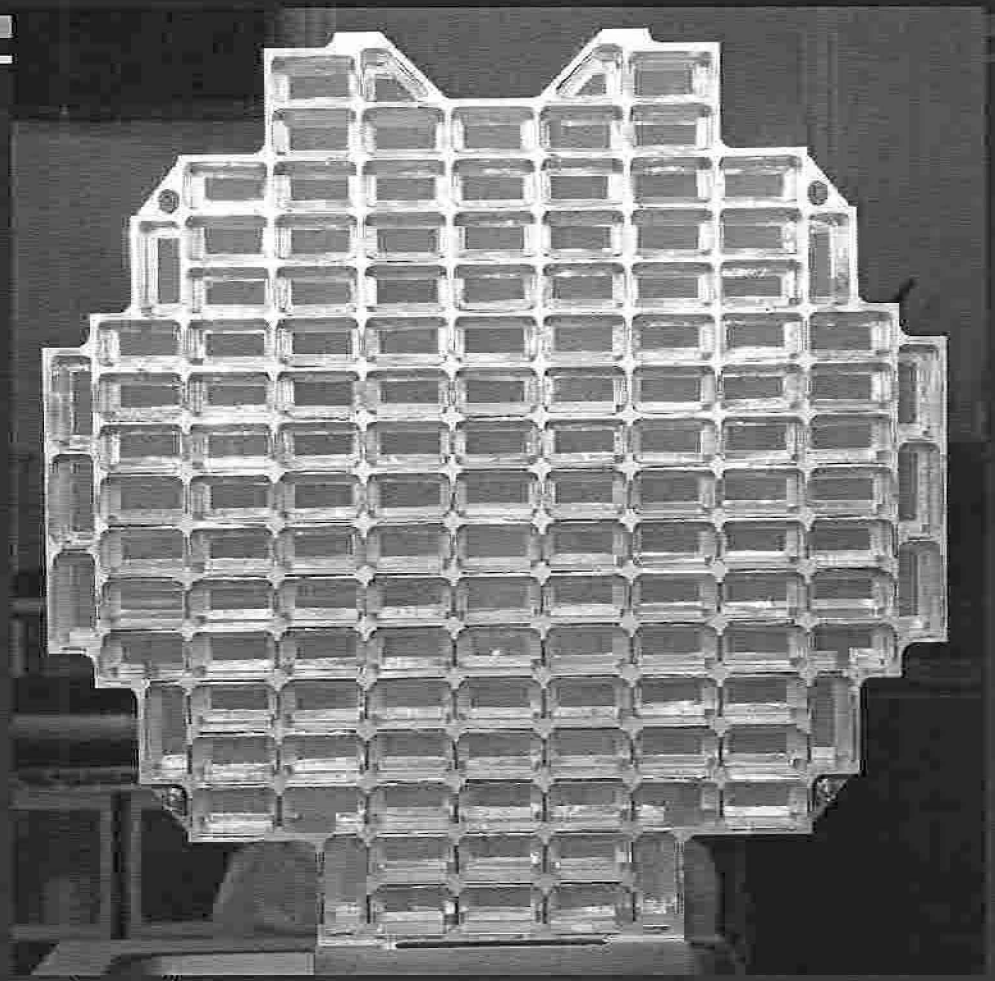
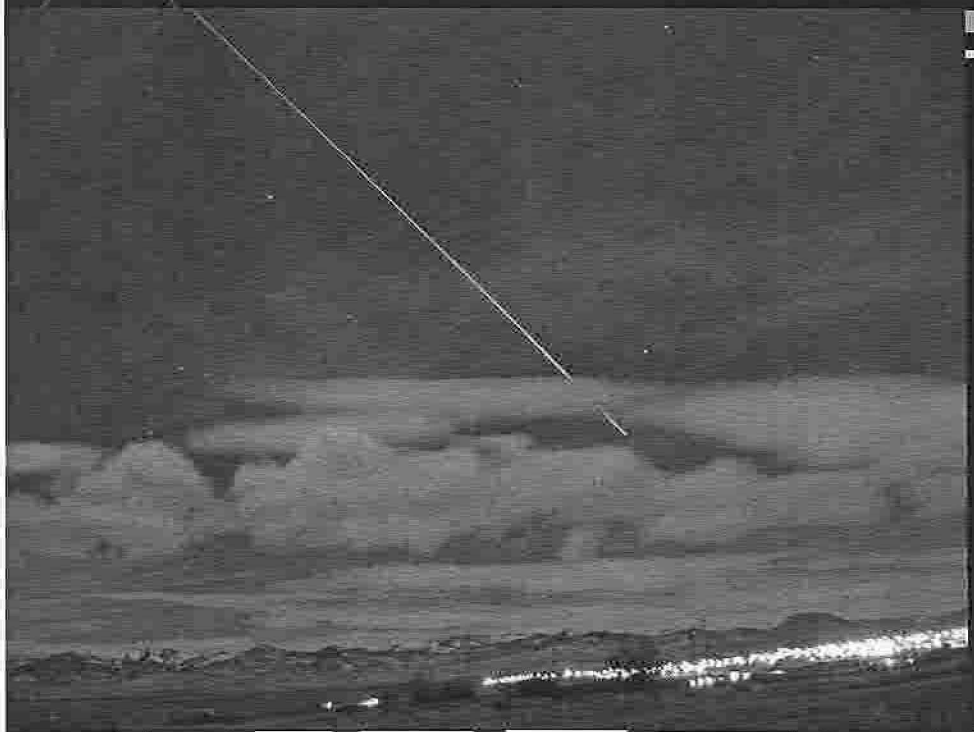
STARDUST WILD 2
Sample Processing



P. Tsou, D.E. Brownlee,
G. J. Flynn, F. Hörz,
L. Keller, K. McKeegan,
S. A. Sandford,
and M. E. Zolensky

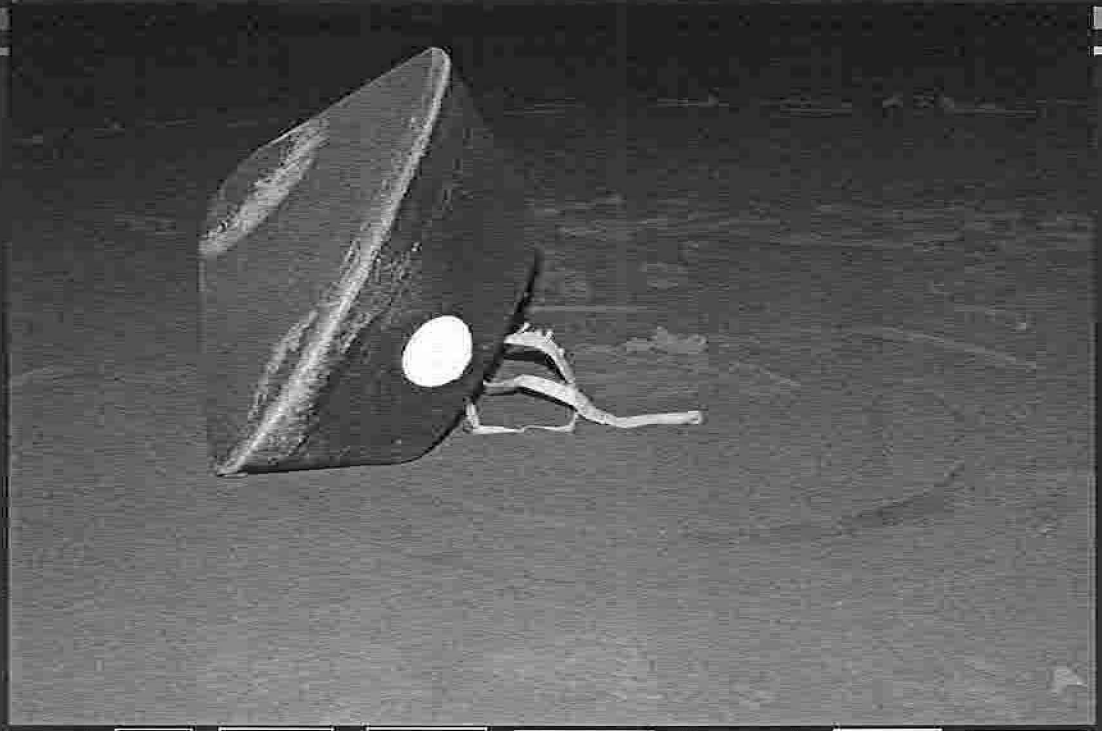
November 3, 2006
Sharp, Arms Caltech

Sample Flow



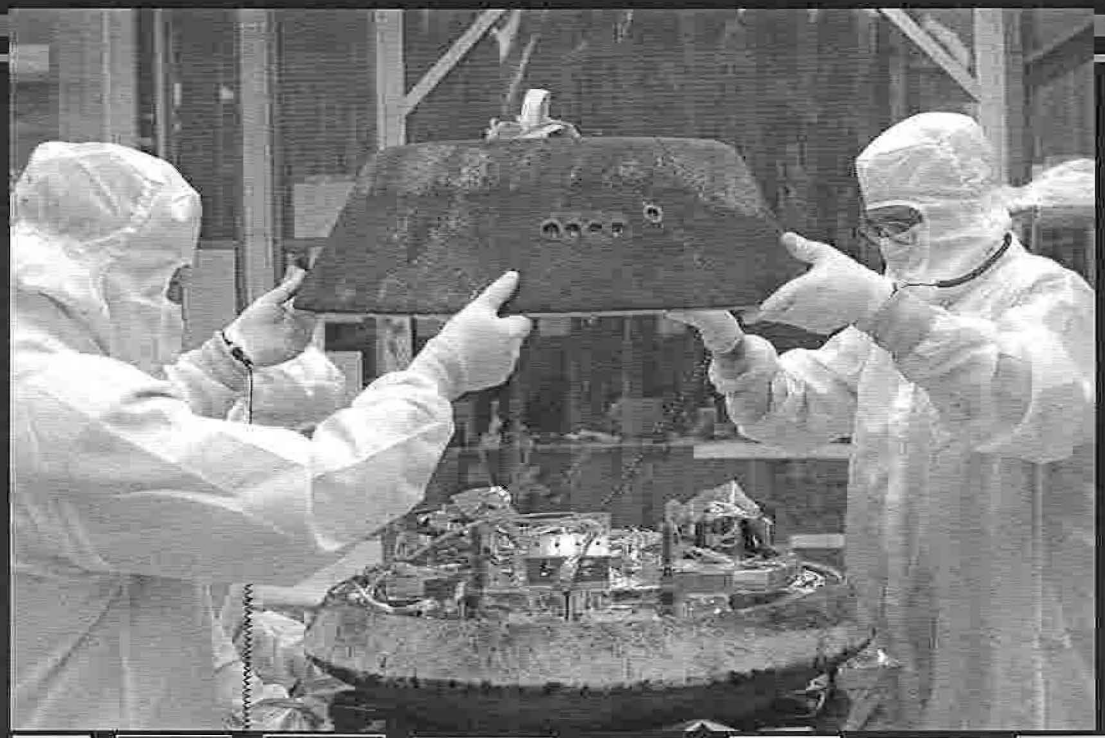
Sample Return Capsule Reentry → SRC Land → SRC Open → Sample Canister Ship → Sample Canister Opened → Sample Tray Assembly Separation → Level 1 Docum. → Level 2 Docum. → Foil Cell Removal → Level 3 Docum. → Sample Prep. → Optical / Comp. / Min-Pet / Isotopes / Organics / Foil Cratering

Sample Flow



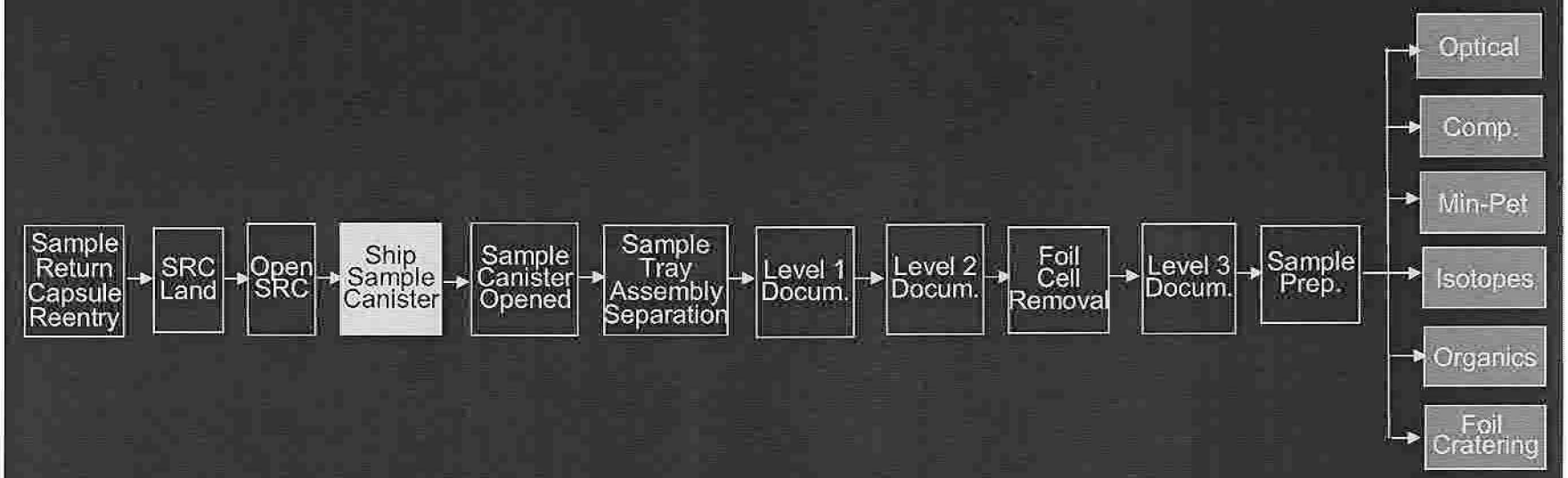
Sample Return Capsule Reentry → SRC Land → Open SRC → Ship Sample Canister → Sample Canister Opened → Sample Tray Assembly Separation → Level 1 Docum. → Level 2 Docum. → Foil Cell Removal → Level 3 Docum. → Sample Prep. → Optical, Comp., Min-Pet, Isotopes, Organics, Foil Cratering

Sample Flow



Sample Return Capsule Reentry → SRC Land → Open SRC → Ship Sample Canister → Sample Canister Opened → Sample Tray Assembly Separation → Level 1 Docum. → Level 2 Docum. → Foil Cell Removal → Level 3 Docum. → Sample Prep. → Optical, Comp., Min-Pet, Isotopes, Organics, Foil Cratering

Sample Flow


Sample Return Capsule Reentry
SRC Land
Open SRC
Ship Sample Canister
Sample Canister Opened
Sample Tray Assembly Separation
Level 1 Docum.
Level 2 Docum.
Foil Cell Removal
Level 3 Docum.
Sample Prep.
Optical
Comp.
Min-Pet
Isotopes
Organics
Foil Cratering

Sample Flow

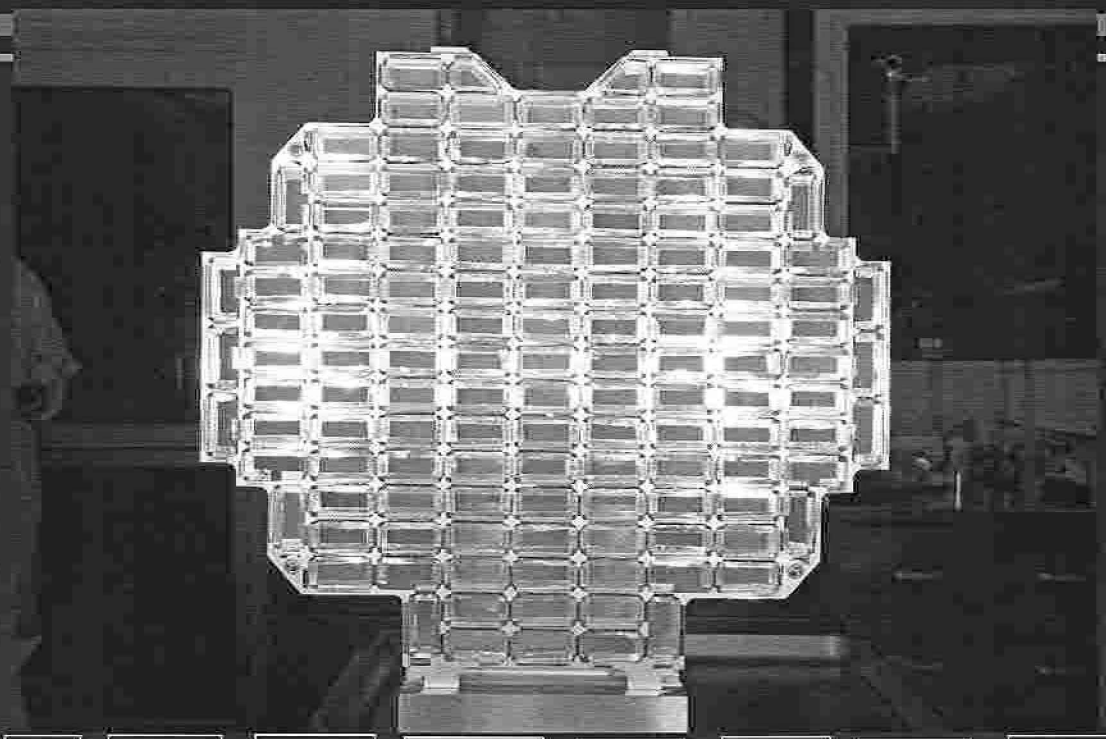
Sample Return Capsule Reentry → SRC Land → Open SRC → Ship Sample Canister → Sample Canister Opened → Sample Tray Assembly Separation → Level 1 Docum. → Level 2 Docum. → Foil Cell Removal → Level 3 Docum. → Sample Prep. →

- Optical
- Comp.
- Min-Pet
- Isotopes
- Organics
- Foil Cratering

Sample Flow

Sample Return Capsule Reentry → SRC Land → Open SRC → Ship Sample Canister → Sample Canister Opened → Sample Tray Assembly Separation → Level 1 Docum. → Level 2 Docum. → Foil Cell Removal → Level 3 Docum. → Sample Prep. → Isotopes / Organics / Foil Cratering

Sample Flow



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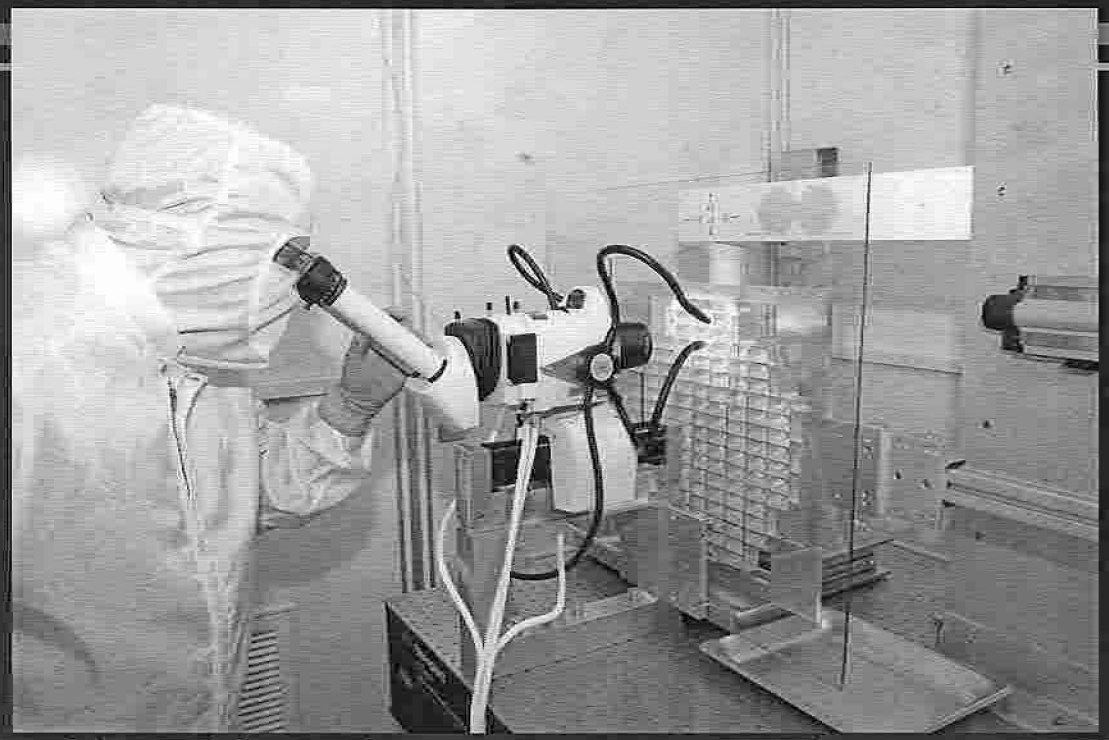
Sample Flow



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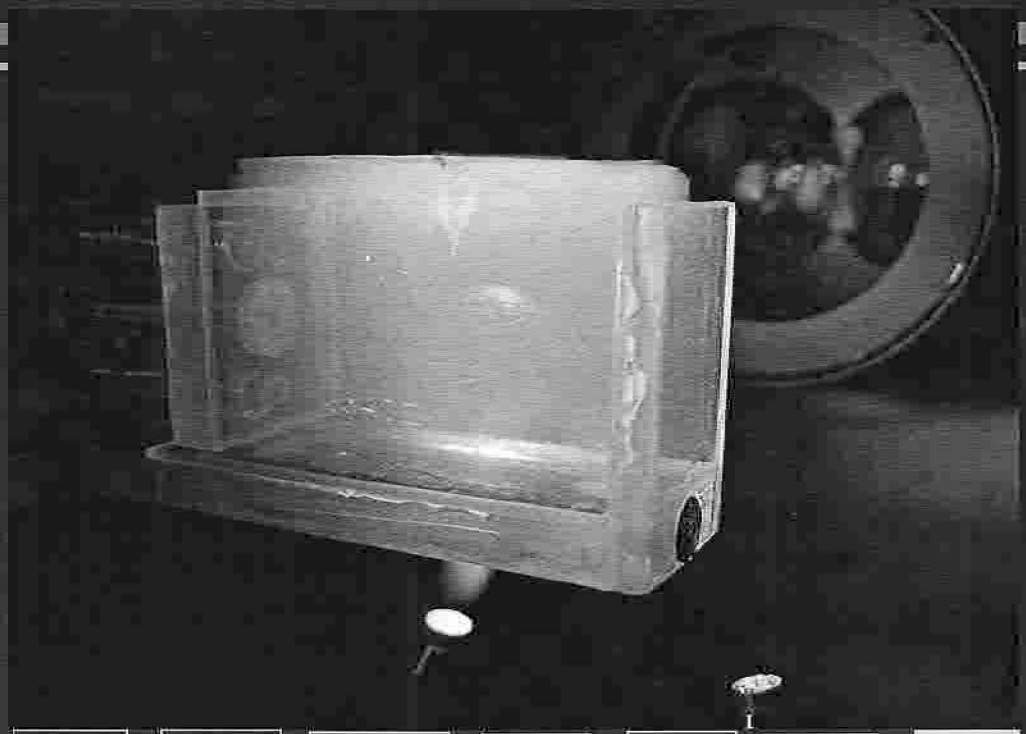
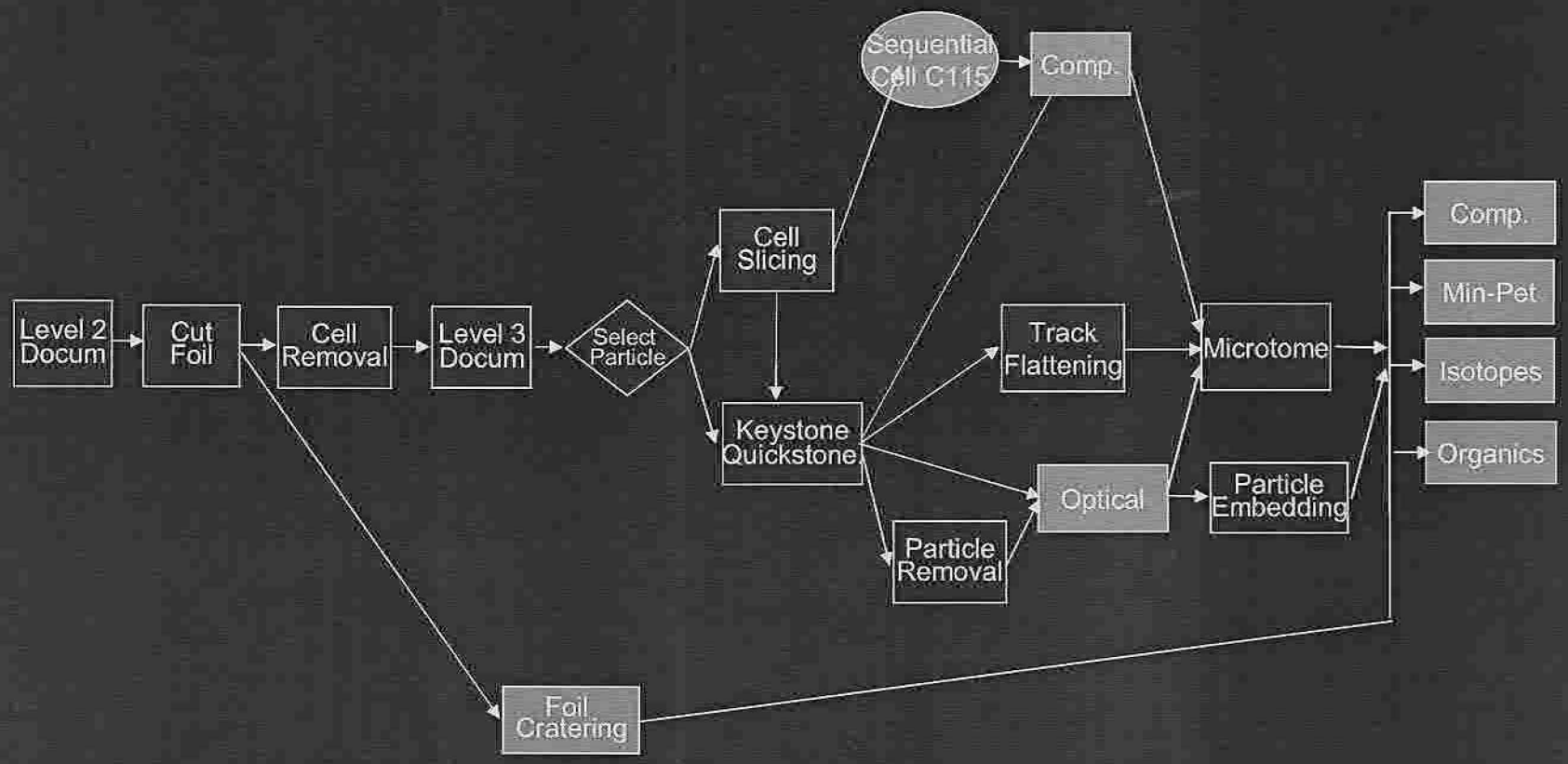
Sample Flow

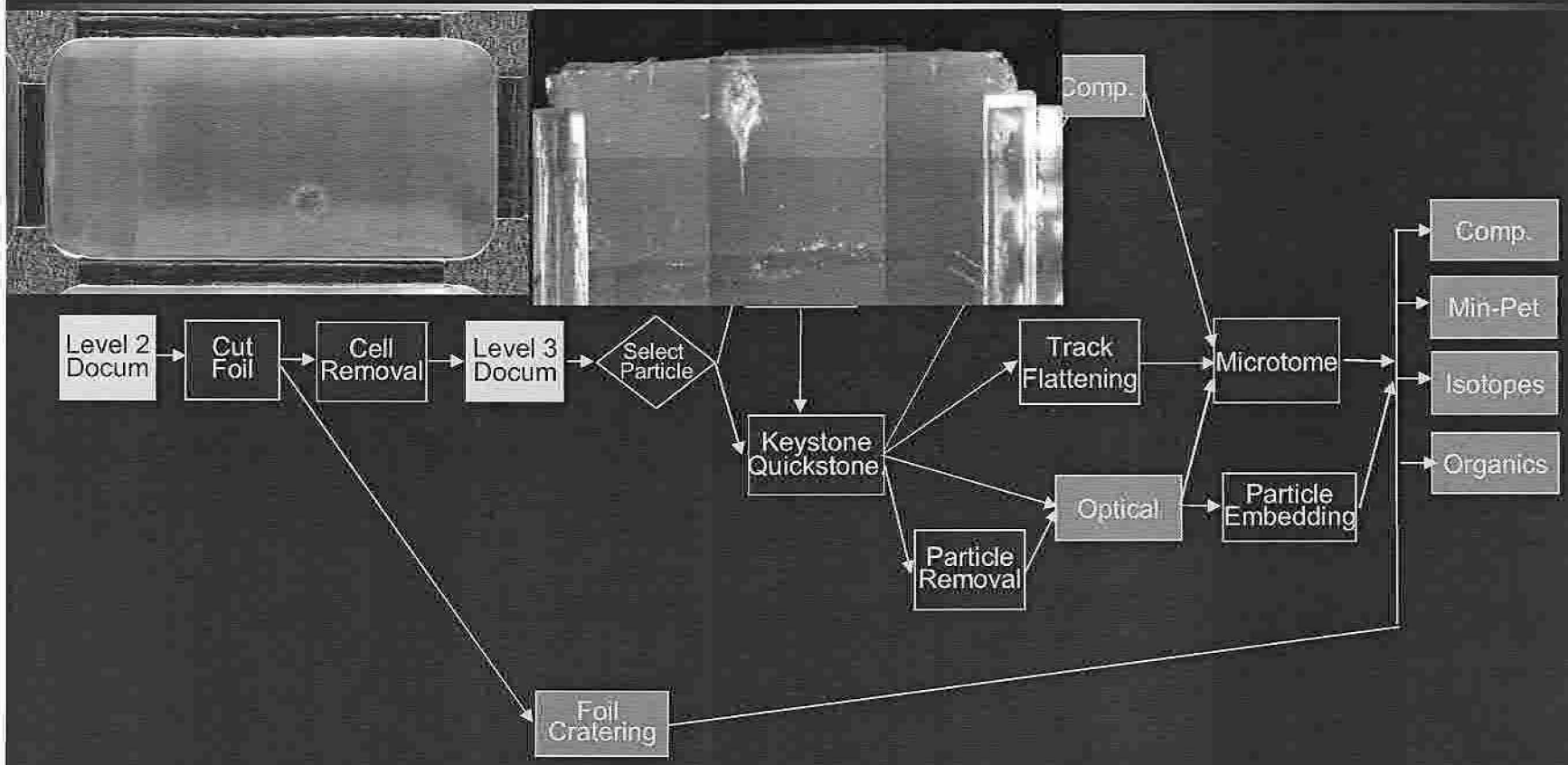


Sample Return Capsule Reentry → SRC Land → Open SRC → Ship Sample Canister → Sample Canister Opened → Sample Tray Assembly Separation → Level 1 Docum. → Level 2 Docum. → Foil Cell Removal → Level 3 Docum. → Sample Prep. → Optical, Comp., Min-Pet, Isotopes, Organics, Foil Cratering

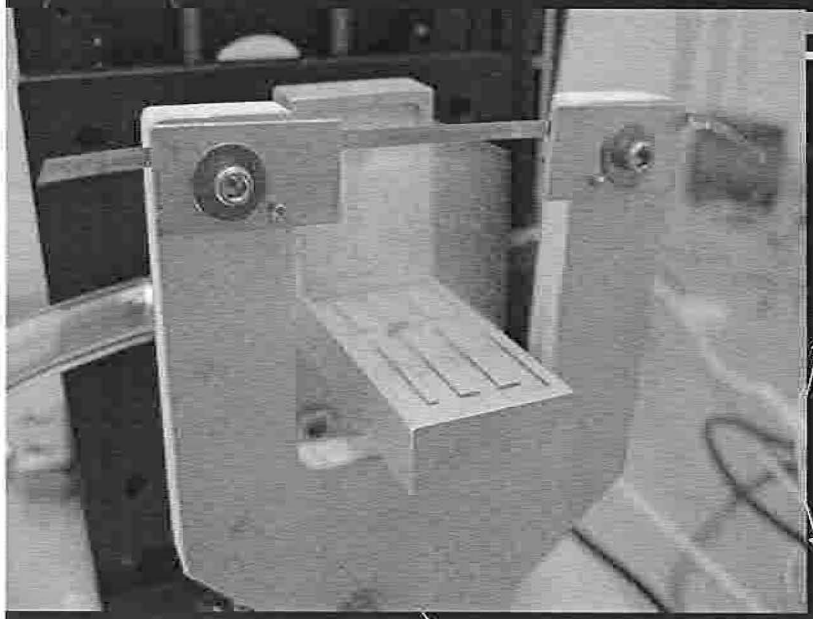
Sample Preparation

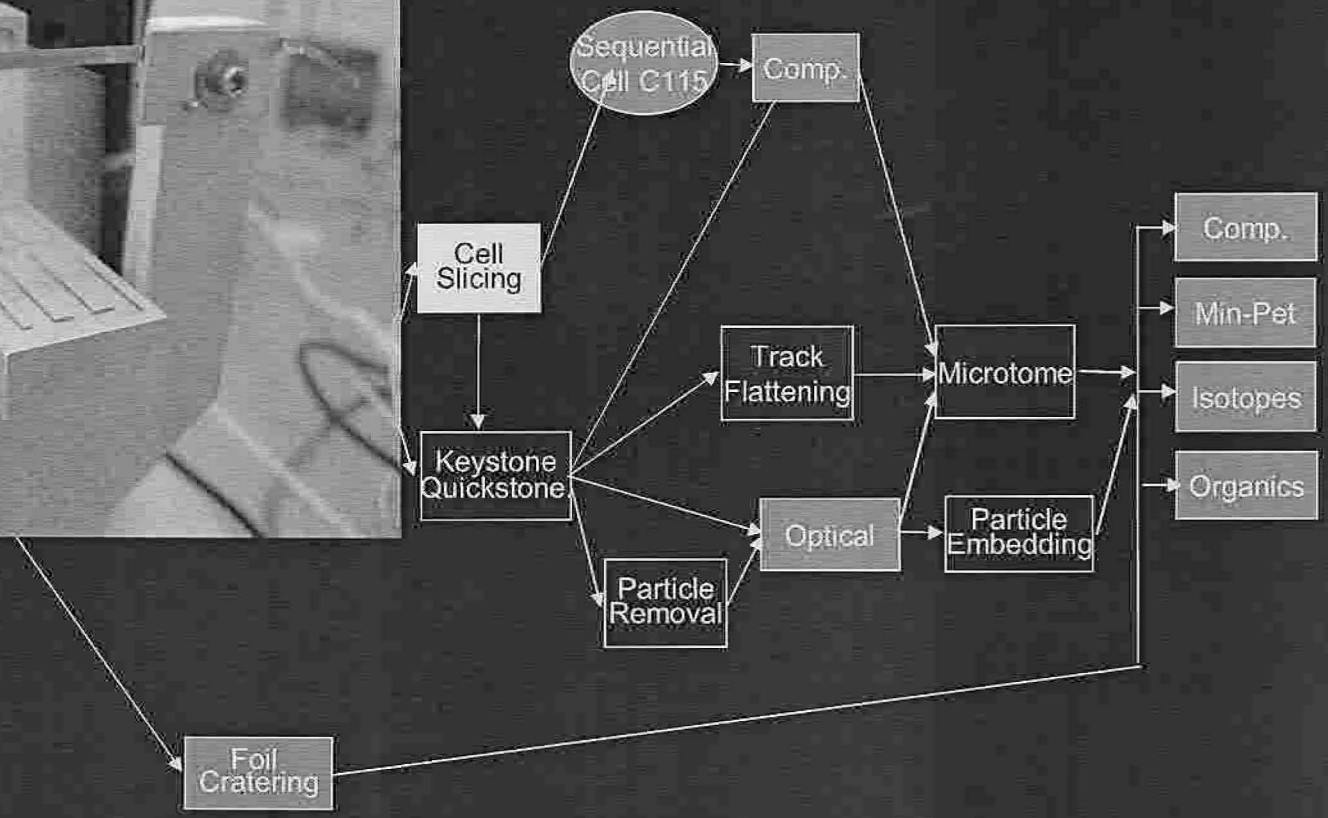


Sample Preparation

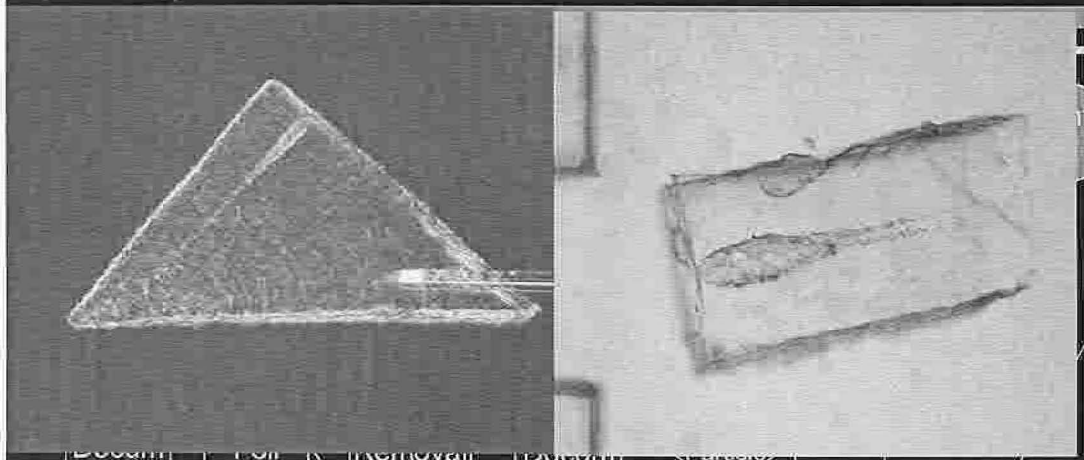


Sample Preparation

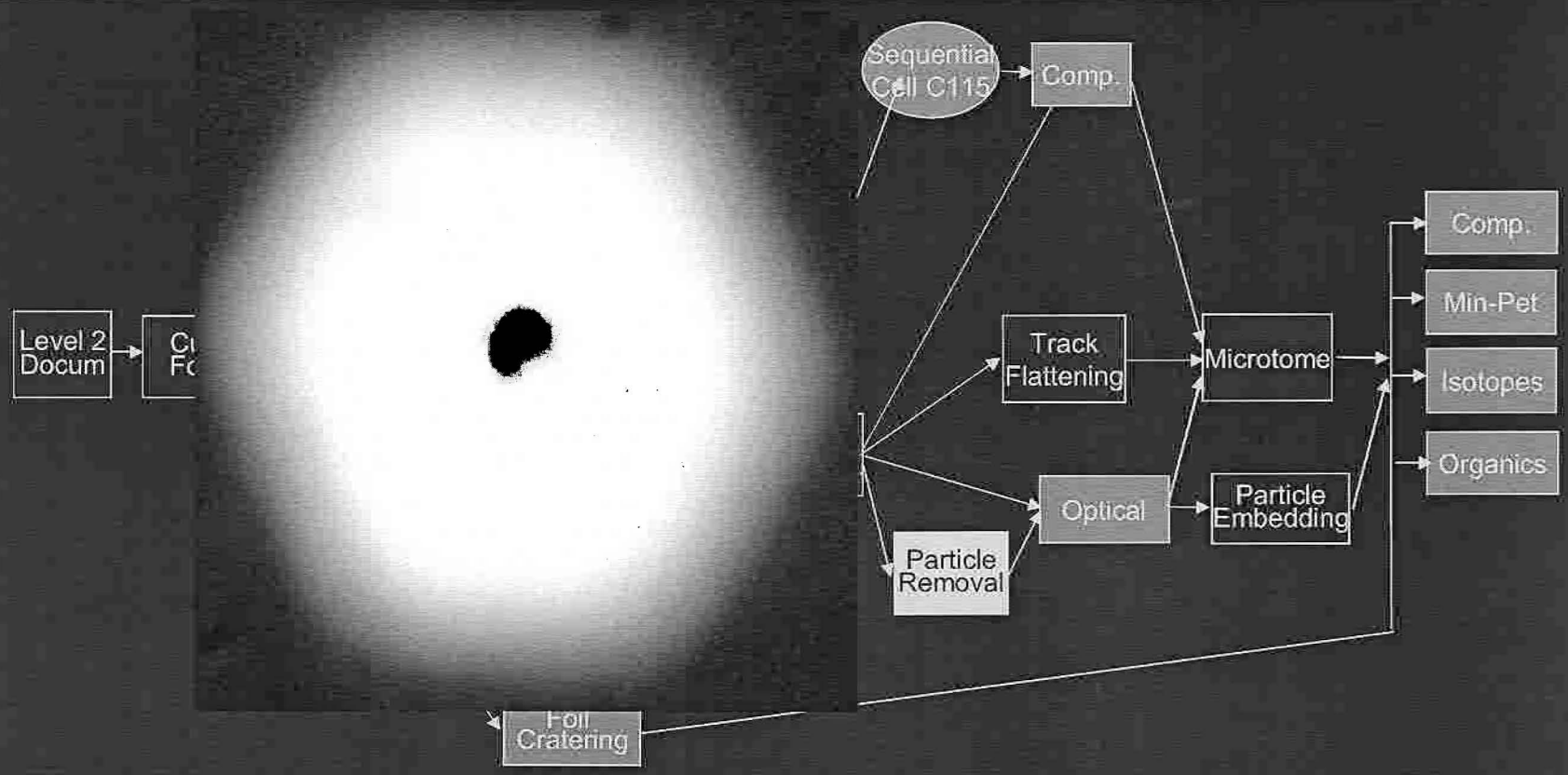




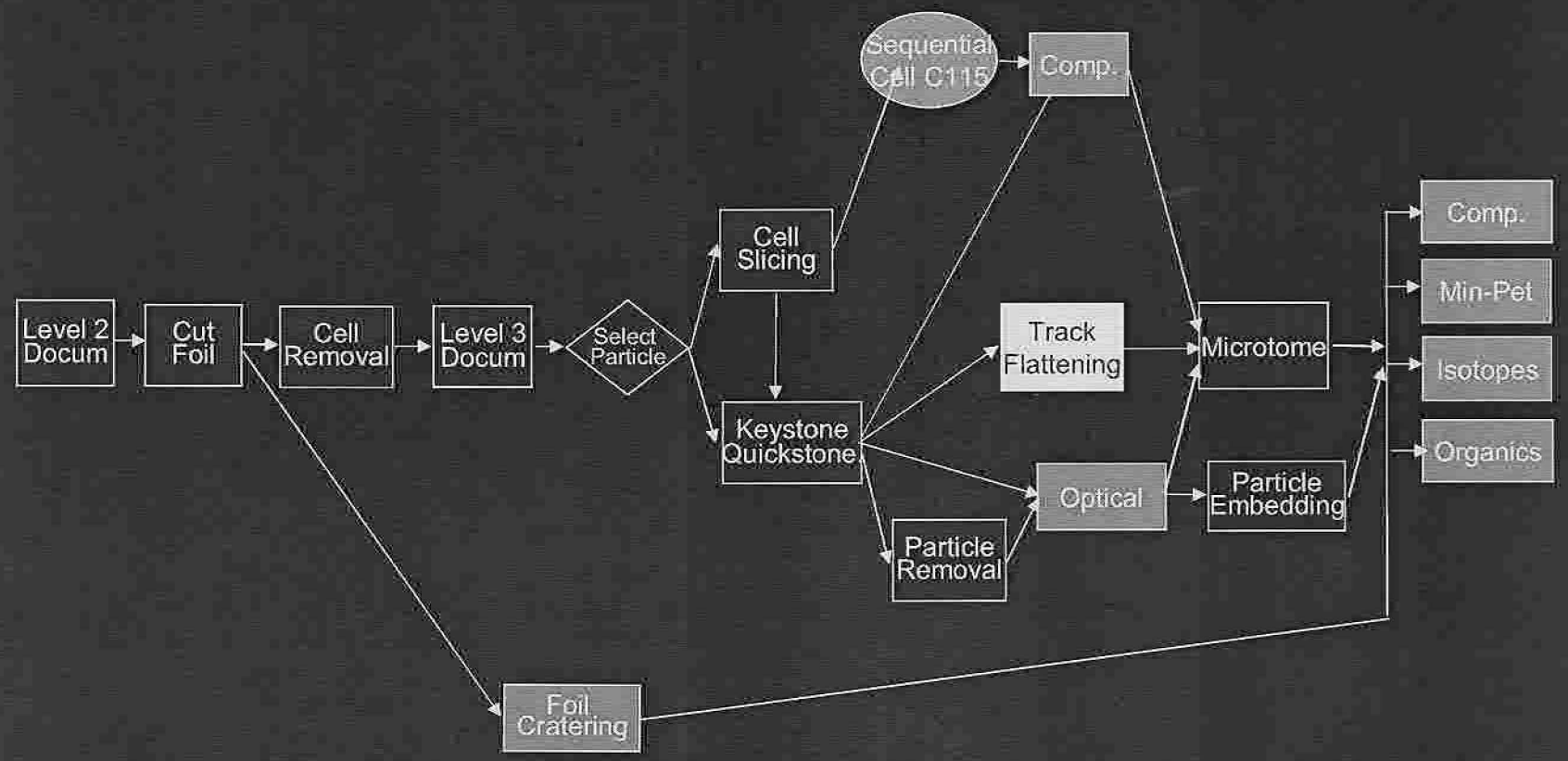
Sample Preparation



Sample Preparation



Sample Preparation



Sample Preparation

Level 2 Docum → Cut Foil → Cell Removal → Level Docu

Microtome → Comp. / Min-Pet / Isotopes / Organics

Particle Embedding → Comp. / Min-Pet / Isotopes / Organics

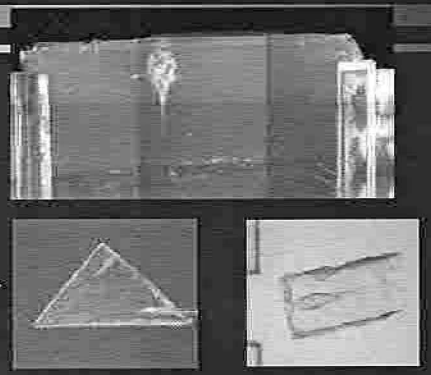
Foil Cratering → Comp. / Min-Pet / Isotopes / Organics

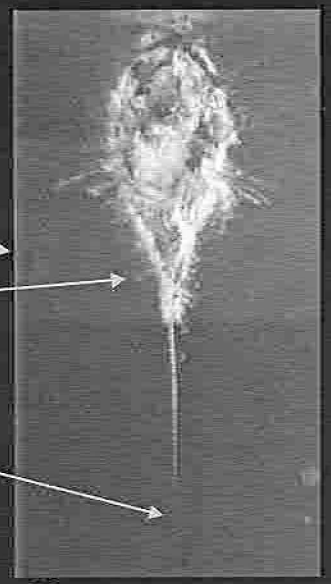
SAMPLE PREP. TEAM

- Flight Tray Separation
  - F. Horz, T. See, P. Tsou, L. Keller, S. Sandford,
- Level 1 Documentation
  - R. Markovitz, P. Tsou, S. Sandford, L. Keller
- Level 2 & 3 Documentation
  - F. Horz, T. See, J. Warren, R. Bastien, A. Westphal, C. Snead
- Aerogel Cell Removal
  - F. Horz, T. See, P. Tsou, J. Warren, S. Sandford
- Aerogel Cell Processing
  - D. Brownlee, H. Ishii, A. Westphal, C. Snead
- Extract Particle, Microtoming
  - C. Snead, K. Messenger, G. Matrait, M. Zolensky

Sample Nomenclature

- Cell
- Keystone/Quickstone
  - Particle
  - Track
  - Fragment/Grain
  - Terminal Particle





Track # - Sample

Sample	Track #	Sample	Track #	Sample	Track #	Sample	Track #	Sample	Track #	Sample	Track #
FC3	1	FC13	17	C2054	28	C2044	40	C2044	52	C2052	66
FC3	2	C2115	18	C2054	29	C2044	41	C2027	55	C2126	67
FC4	3	C2115	18	C2054	30	C2044	42	C2009	56	C2126	68
FC5	5	C2115	19	C2115	31	C2044	43	C2009	57	C2027	69
FC5	6	C2115	20	C2027	32	C2004	44	C2009	58	C2009	70
FC5	7	C2115	21	C2115	33	C2115	45	C2009	59	C2009	71
FC6	10	C2115	22	C2115	34	C2115	45	C2009	60	C2009	72
FC8	12	C2115	23	C2054	35	C2115	45	C2009	61	C2009	73
FC9	13	C2115	24	C2044	36	C2126	46	C2009	62		
FC10	14	C2054	25	C2044	37	FC13	47	C2009	63		
FC11	15	C2054	26	C2044	38	C2027	48	C2009	64		
FC12	16	C2054	27	C2044	39	C2027	49	C2086	65		

CONCLUSIONS

- Wild 2 Samples Exceeds All Expectations
- Aerogel Exceeded Design Goals
- Aluminum Foil Exceeded Design Goals
- Low Cost Sample Return Mission Can Be Very Worthwhile and Successful
- 'Faster, Better, Cheaper' is 'Faster, Better, Cheaper'
- Successful Mission Requires Successful Teams