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Panel Session V - Kistler K-1 Reusable Aerospace Vehicle

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The Future Is Reusable Aerospace Vehicles

Kistler K-1 Reusable Aerospace Vehicle



Presented To The 41st Space Congress, Panel Session V - Commercial Use of Spaceports

April 28th, 2004



K-1 Program Overview

The Future Is Reusable Aerospace Vehicles

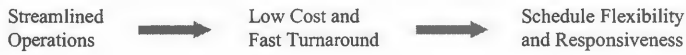
Kistler's Objective is to Develop Fully Reusable Two Stage Aerospace Vehicles For Low-Priced Commercial Space Delivery and ISS Resupply



K-1 Vehicle Features

The Future Is Reusable Aerospace Vehicles

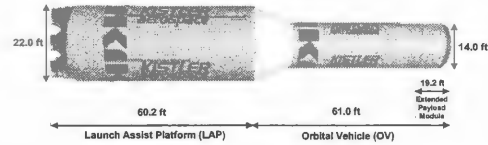
- Vehicle Stages Designed for 100 Flights
- Designed for 9-Day Turnaround, with 3-Day Response Time Possible
- Both Stages Return to Launch Site for Refurbishment and Reuse
- Horizontal Vehicle Processing and Checkout
- Integrated Vehicle Health Management System
- Fleet of Vehicles



K-1 Program Overview

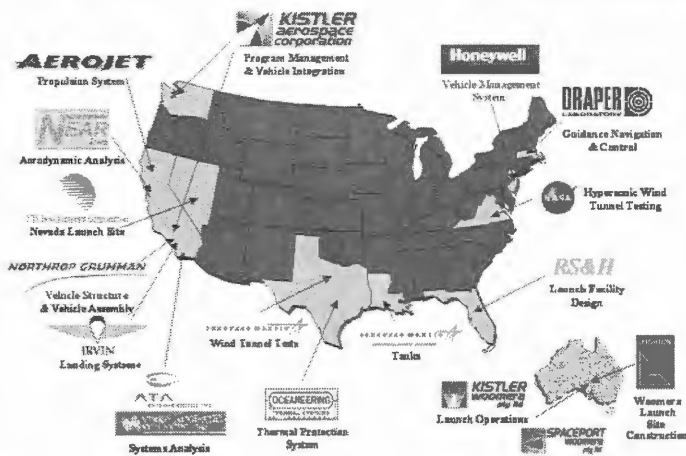
The Future Is Reusable Aerospace Vehicles

- K-1 vehicle 1 is ready for integration and launch
 - 75% hardware, 85% design, 100% Guidance Navigation & Control (GN&C) software complete
 - Over \$500 million in private capital invested
- Hardware on hand and testing status supports confidence that the K-1 vehicle will be delivered on time and on budget
- K-1 addresses multiple market applications, e.g.,
 - 12,500 lbm to LEO due east
 - 7,000 lbm upmass to ISS and 2,000 lbm downmass from ISS
- Existing technologies and the experienced K-1 team assures the accomplishment of the K-1 mission



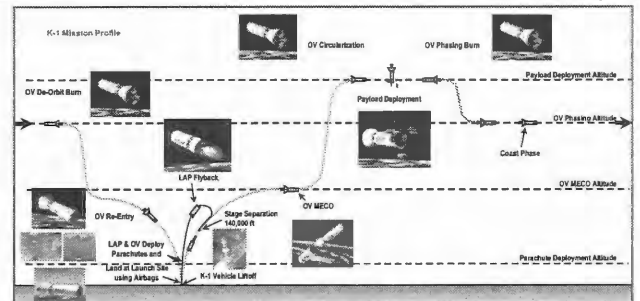
K-1 Contractor Team Represents Best of Industry

The Future Is Reusable Aerospace Vehicles



K-1 Mission Profile Overview

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Event	Time	Event	Time	Event	Time
LAP Ignition	0:00:00	OV Ignition	0:02:27	OMS Phasing Burn #1	1:38:31
LAP Boost C.O.	0:00:30	OV C.O.	0:04:58	OMS Phasing Burn #2	1:39:56
Separation	0:02:29	OMS Re-entry Burn	2:54:27	Re-entry Interface	2:54:27
LAP Restart	0:02:34	OMS Insertion Burn	0:50:23	Payload Deployment	2:54:22
LAP Flyback C.O.	0:02:54	Payload Deployment	1:05:00	OV Landing	2:54:04
LAP Landing	0:10:27				

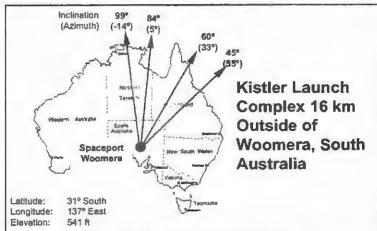


Australia Launch Site Status



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- Contracts Executed for Site Design and Construction
- Launch Site Design Completed by Leighton Contractors and RS&H
- Environmental Approval Received March 1998
- Launch Operations Contract Signed April 1998
- Native Title Agreement Signed
- Site Ground Breaking July 1998
- Export License Approved November 1998



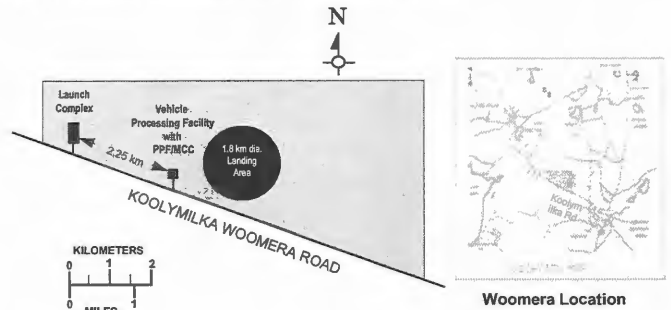
Woomera Ground Breaking July 1998



Launch Site Overview

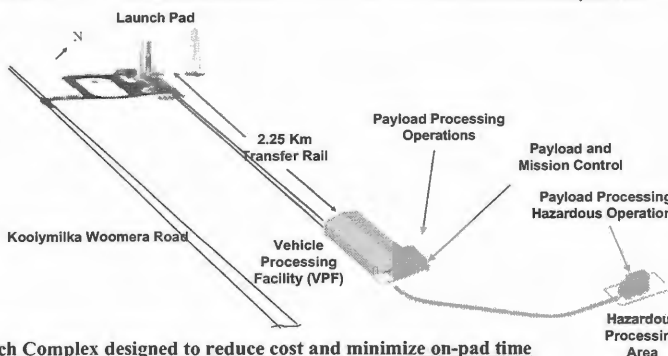
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- Kistler leasehold from Government of South Australia (30 square km)
- 18 km northwest of Woomera Village
- In Woomera Prohibited Area (127,000 square km)



Launch Complex Overview

The Future Is Reusable Aerospace Vehicles



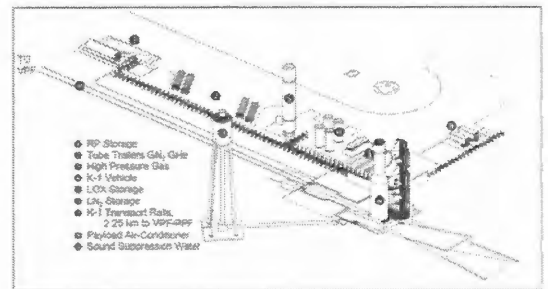
Launch Complex designed to reduce cost and minimize on-pad time

- Six hours rollout to launch
- Minimum required support equipment
- Simple, reliable launch complex



Launch Complex

The Future Is Reusable Aerospace Vehicles



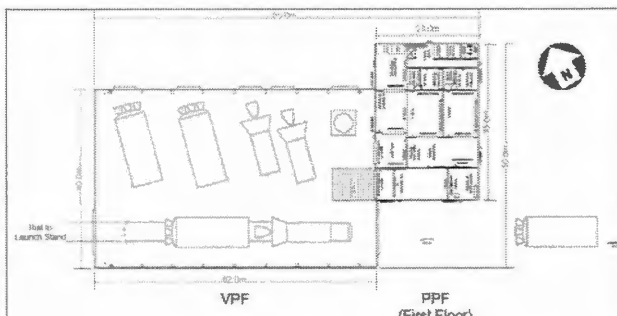
- Rail system is used to transport the vehicle from the VPF to the launch stand
- Erector is used to move the vehicle to an upright position on the launch ring
- Fueling operations are completed in 3 hours while final functional checks are performed
- Entire process from VPF rollout to launch takes approximately 6 hours



Vehicle Processing Facility (VPF)

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- Payload and Mission Control and Payload Processing integral to VPF
- Design provides efficient horizontal processing of K-1 vehicle
- Sufficient space to accommodate 3 K-1 vehicles and payload modules
- Large bay doors at each end of the VPF allow for entrance and exit
 - Rails provided from VPF to launch pad for vehicle transport
- Provides required equipment to support vehicle check-out



Kistler Use of Spaceports

The Future Is Reusable Aerospace Vehicles

- Kistler is presently planning to operate out of Kistler-developed spaceports
 - Utilize existing infrastructure (e.g. utilities and facilities)
 - Develop K-1 launch complex
- Kistler's commercial RLV requires a flexible, inviting environment
 - Wide-open, flat spaces are required for landing and recovery operations
 - Friendly regulatory environment
 - Use "Range on the Vehicle," e.g. accommodate advanced, GPS-based, autonomous flight termination systems
- Kistler is extremely interested in any spaceport that can provide the flexible environment required to operate a commercial RLV