

Blue Prints to Tire Tracks
March 4, 2000

Development of the Mars 2001 Mission

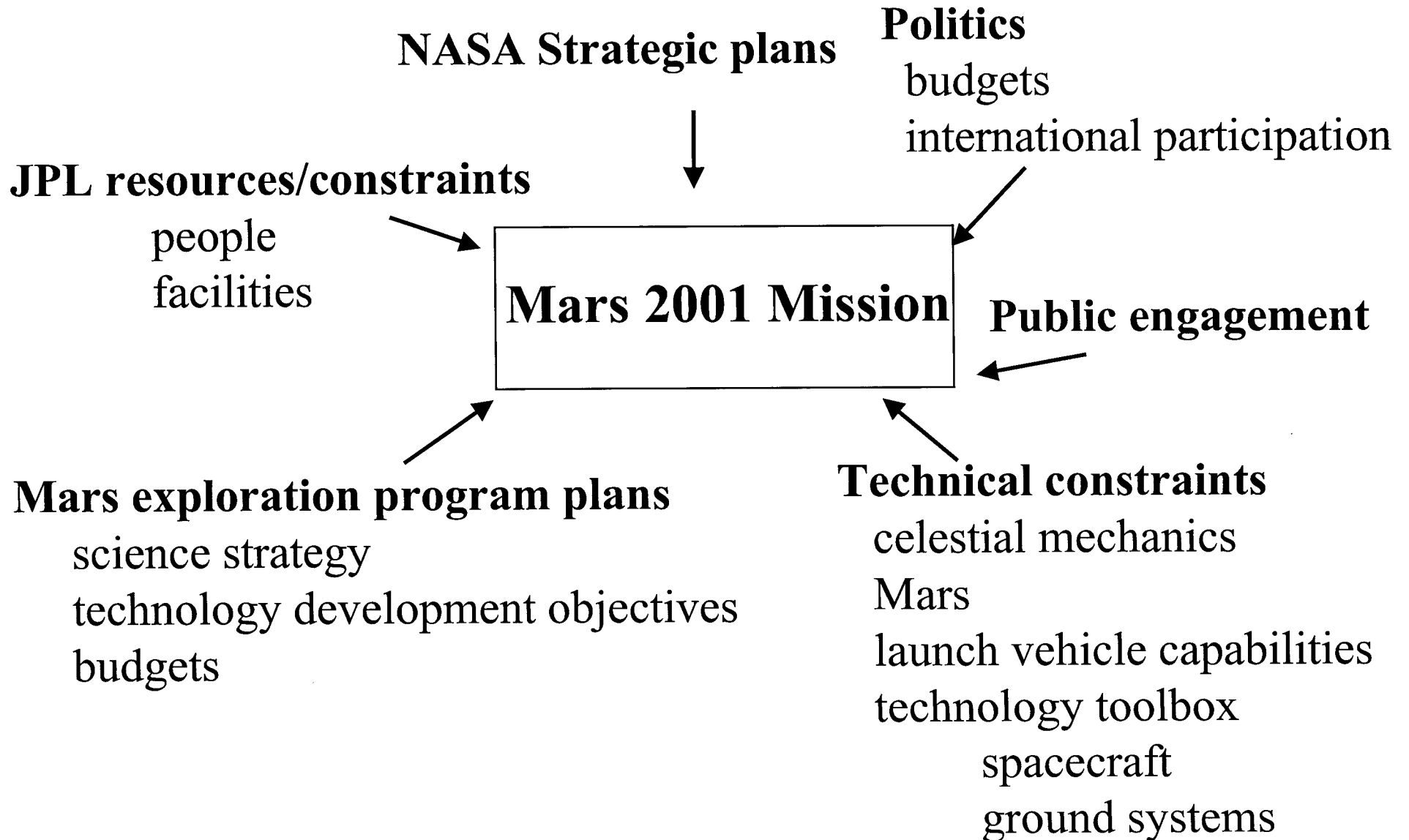
Lynn Lowry

Project Engineer

Outline

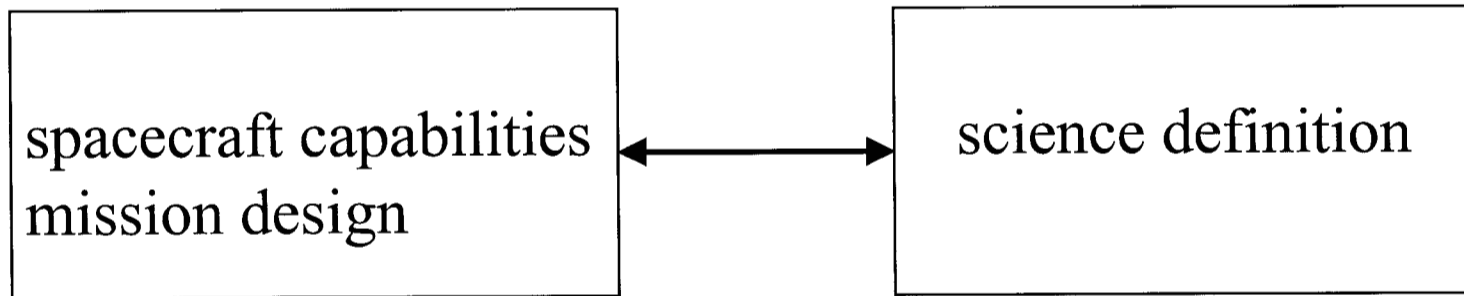
- Describe the formulation/development cycle of the Mars 2001 mission
- Summarize the skills needed to successfully respond to the development processes/environment(one person's opinion)

Early Formulation



Early Mission Concept Development

Spacecraft functionality/mission design characteristics respond to requirements/constraints and are iterated with the science community



Phase “A” Preliminary Spacecraft/ Mission Design

- science instrument accommodation capabilities
 - mass, volume, power
- data return capabilities
- mission lifetime
- launch/arrival dates
- mission environments
 - thermal
 - radiation
 - dynamics



NASA Announcement of Opportunity for Science Instruments

Phase “B” Preliminary Spacecraft/ Mission Design

- science payload accommodation
 - physical, power, data processing,...
 - project risk identification/trades
 - system requirements reviews
 - has the project incorporated the requirements established by the stakeholders?

Phase “C/D”

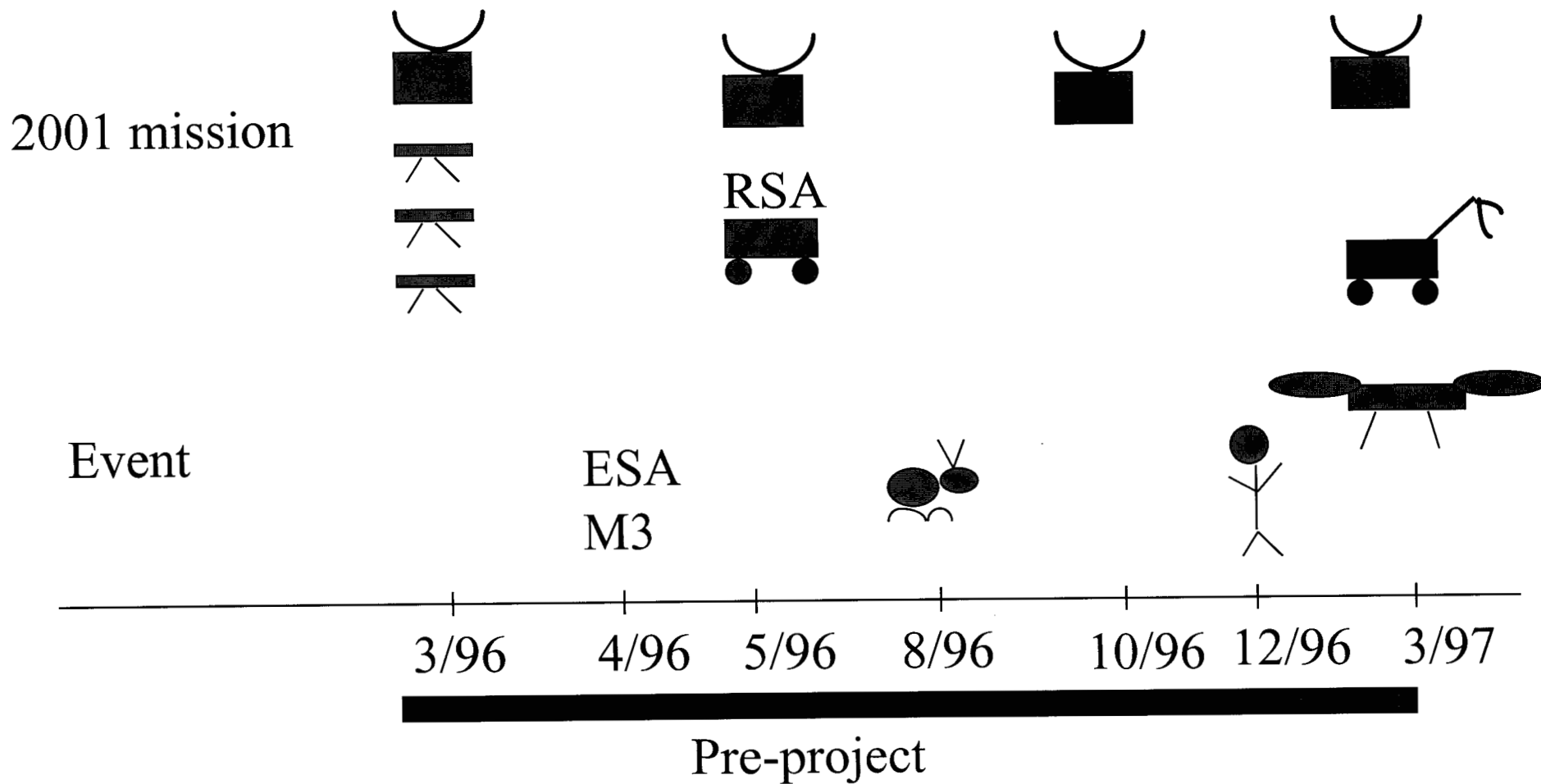
Design/Analysis/Integration/Test/Launch

- Preliminary design
- Procurements
- Detailed design and analysis
- Fabrication
- Assembly
- Test
- Launch

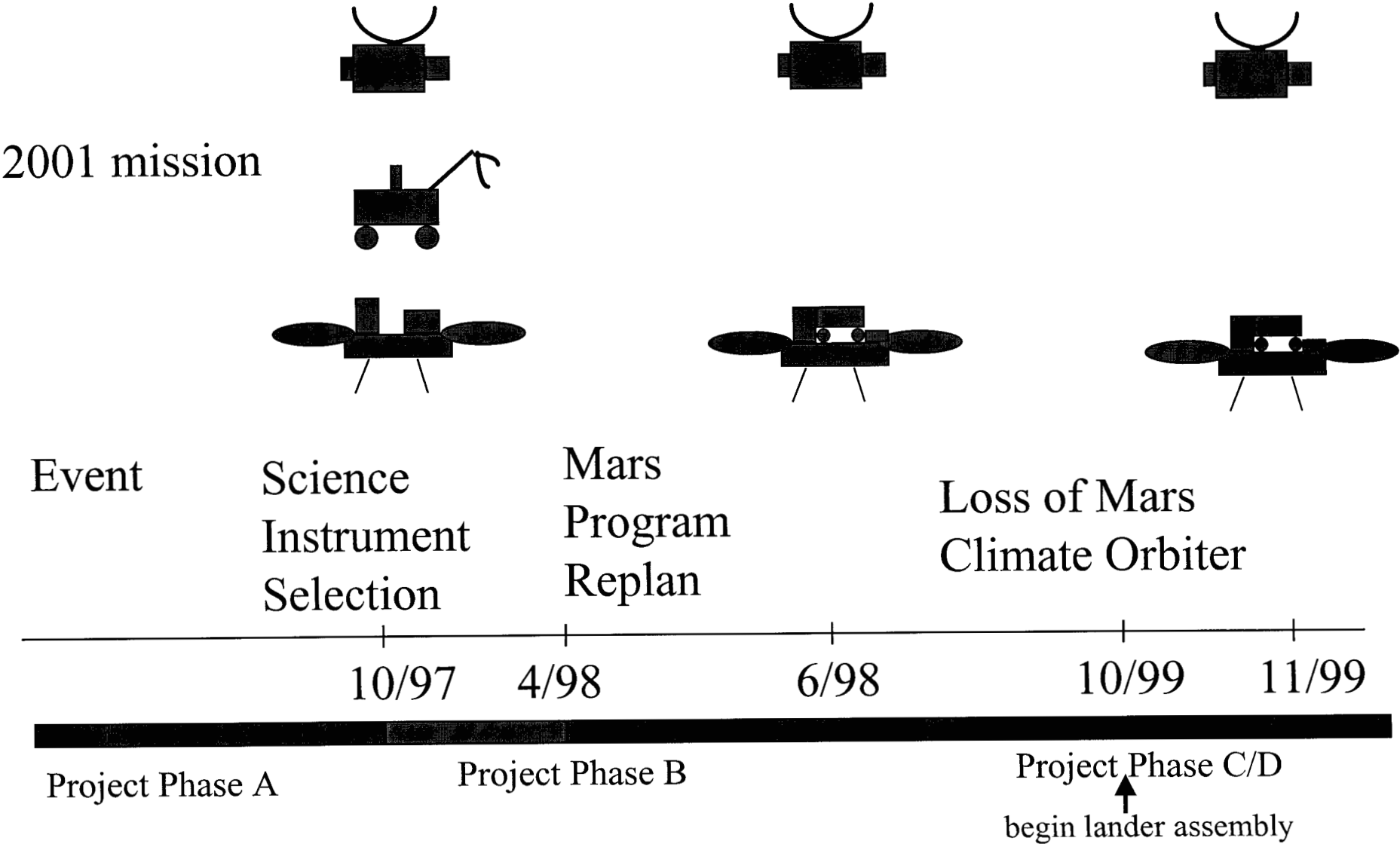
Phase “E” Operations

- Get to the planet
- Operate the science instruments/operate the spacecraft
- return the data
- disseminate the science data
- **KNOWLEDGE**

Pictorial History of the MSP2001 Mission

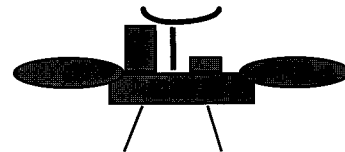


Pictorial History of the MSP2001 Mission



Pictorial History/Future of the MSP2001 Mission

2001 mission



Event

Loss of Mars
Polar Lander

Mars
Program
Replan

12/99

3/00

4-5/01

1-2/02

5/02

1/05

Project Phase C/D

begin orbiter assembly



launch

Project Phase E

orbit/landing landed mission over

Skills development-(otherwise known as a really good resume)

- Technical -understand the system
- Planning- understand the interrelationship of activities
- Teamwork
 - divide and conquer
 - communication
 - interpersonal skills
 - motivation
 - leadership
 - compromise
- Ability to respond to “surprises”
 - clearly defined roles/boundaries/rules are needed for order, but creativity and flexibility are needed to respond to surprises and get back on the track
- Ability to organize data, identify pros and cons of options, draw conclusions and challenge those conclusions