tion in the number of people on the se-
quence team. As a result, the uplink
product generation process is signifi-
cantly streamlined and mission risk is sig-
nificantly reduced. Autogen is used for
operations of MRO, Mars Global Sur-
vveyor (MGS), Mars Exploration Rover
(MER), Mars Odyssey, and will be used
for operations of Phoenix. Autogen Ver-
tion 3.0 is the operational version of Au-
togen including the MRO adaptation for
the cruise mission phase, and was also
used for development of the aerobraking
and mapping mission phases for MRO.

This program was written by Forest Fisher,
Roy Gladding, and Teerapat Khanampompan
for NASA’s Jet Propulsion Laboratory.

This software is available for commercial
licensing. Please contact Karina Edmonds
of the California Institute of Technology at
(626) 395-2322. Refer to NPO-43638.

Generating Scenarios When Data Are Missing
NASA’s Jet Propulsion Laboratory, Pasadena, California

A computer program implements the
algorithm described in “Hypothetical
Scenario Generator for Fault-Tolerant Di-
agnosis” (NPO-42516), NASA Tech Briefs,
Vol. 31, No. 6 (June 2007), page 71. To re-
capitulate: the Hypothetical Scenario
Generator (HSG) is being developed in
conjunction with other components of
artificial-intelligence systems for auto-
mated diagnosis and prognosis of faults
in spacecraft, aircraft, and other complex
engineering systems. The HSG accepts,
as input, possibly incomplete data on the
current state of a system (see figure).

The HSG models a potential fault sce-
nario as an ordered disjunctive tree of
conjunctive consequences, wherein the
ordering is based upon the likelihood
that a particular conjunctive path will be
taken for the given set of inputs. The
computation of likelihood is based partly
on a numerical ranking of the degree of
completeness of data with respect to satis-
faction of the antecedent conditions of
prognostic rules. The results from the
HSG are then used by a model-based arti-
ficial-intelligence subsystem to predict re-
alistic scenarios and states.

This program was written by Mark James
and Ryan Mackey of Caltech for NASA’s Jet
Propulsion Laboratory. Further information
is contained in a TSP (see page 1).

This software is available for commercial
licensing. Please contact Karina Edmonds
of the California Institute of Technology at
(626) 395-2322. Refer to NPO-43097.

CASPER Version 2.0
NASA’s Jet Propulsion Laboratory, Pasadena, California

The Continuous Activity Scheduling
Planning Execution and Replanning
(CASPER) computer program has been
updated to version 2.0. A prototype ver-
sion was reported in “Software for Con-
tinuous Replanning During Execution”
(NPO-20972), NASA Tech Briefs, Vol. 26,
No. 7 (April 2002), page 67. To recapit-
ulate: CASPER is designed to perform
automated planning of interdependent
activities within a system subject to re-
quirements, constraints, and limitations
on resources.

In contradistinction to the traditional
concept of batch planning followed by
execution, CASPER implements a con-
cept of continuous planning and replan-
ing in response to unanticipated changes (including failures), integrated
with execution. Improvements over
other, similar software that have been in-
corporated into CASPER version 2.0 in-
clude an enhanced executable interface
to facilitate integration with a wide
range of execution software systems and
supporting software libraries; features to
support execution while reasoning
about urgency, importance, and im-
pending deadlines; features that enable
accommodation to a wide range of com-
puting environments that include vari-
ous central processing units and ran-
dom-access-memory capacities; and im-
proved generic time-server and
time-control features.

This program was written by Steve Chien,
Gregg Rabideau, Daniel Tran, Russell
Knight, Caroline Chouinard, Tara Estlin,
Daniel Gaines, Bradley Clement, and An-
thony Barrett of Caltech for NASA’s Jet
Propulsion Laboratory.

This software is available for commercial
licensing. Please contact Karina Edmonds
of the California Institute of Technology at
(626) 395-2322. Refer to NPO-41987.