SEER-EOS 2.1 Release Notes

Welcome to the SEER-EOS 2.1 release. Please use this booklet as a supplement to your existing user guide and as a guide to the new SEER-EOS features and enhancements.

For SEER-H/ SEER-IC features and enhancements please refer to SEER-H Release Notes in the TOOLS folder.

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SEER-EOS 2.1

Feature Updates

Name Changes

Name of model: “SEER-Spyglass” to “SEER-EOS”.

The formal name of the model is “SEER for Electro Optical Systems Pro”.

Name of work element types:

- “Optical Telescope Assembly” to “Optical Device”
- “Focal Plane Array” to “Detector

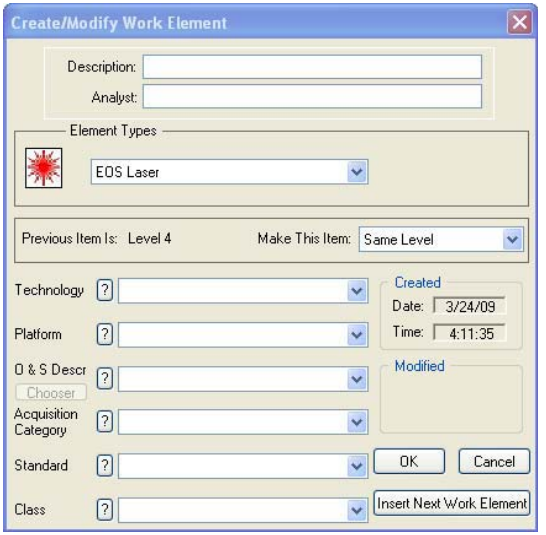
Name of Technologies:

- Optical Device
  - “Large Astronomical” to “Large Astronomical Telescope”
  - Large Astronomical Lightweight” to “Large Astronomical Lightweight Telescope”
  - “Camera Optical Assembly” to “Camera Optical Assembly or Optical Bench”
- Detector
  - “Custom Linear Gallium Nitride” to “Linear Gallium Nitride”

New Work Element Types - Laser

Laser is added to the list of EOS work element types; a total of 7 EOS work element types are now available for estimating costs.

“Laser” is an acronym for Light Amplification by Stimulated Emission of Radiation. Typically, when electrically stimulated a laser emits a narrow, low-divergence, almost single wavelength beam of radiant energy. Some lasers operate in the visible spectrum; some operate in the infrared or at other wavelengths.



Laser types estimated by SEER-EOS are:

1. Laser Diode
2. Diode Pumped NdYAG Laser

Laser Diode

Laser diodes are semiconductor devices that have the property of emitting a closely directed energy beam at essentially a single wavelength when electrically excited. They have dozens of uses, including laser printers, bar-code readers, image scanning, combustion ignition, laser surgery, industrial machining, and direct energy weaponry.

Diode Pumped NdYAG Laser

NdYAG (neodymium-doped yttrium aluminum garnet) is a crystal that is used as a lasing medium for solid-state lasers. NdYAG lasers are optically pumped (i.e., excited) using a flash lamp or a laser diode. They typically emit light at 1064 nm wavelength, but can be designed to emit light at several other infrared wavelengths as well. They have many uses, including laser range finders, dentistry, flow visualization, cutting and welding metals, and ophthalmology.

New Technologies

New technologies are added to Optical Devices, Detectors, Coolers, and Mechanisms.

Optical Device (OD)

Refractive Telescope

A telescope that captures images by means of refractions of radiant energy through lenses. Typically a set of concentric refractive optics for fields up to about 10-20 degrees for a flat output field. Usually color corrected over the visible spectrum. Most commonly used in the visible spectrum, but useful in the infrared spectrum using special lens materials. Suited to many acquisition and tracking missions in space and in the atmosphere.

Refractive Telescope

A telescope that captures images by means of reflections of radiant energy from concave mirrors. Typically Ritchey-Chretien, Dall-Kirkham or Schmidt optics. Suited to many acquisition and tracking missions in space and in the atmosphere.

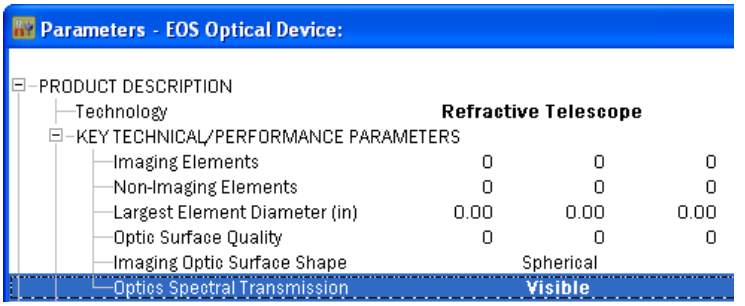
Reflective Telescope with Scanning Mirror

A reflective telescope equipped with a mirror that regularly changes direction with respect to the telescope axis so as to effectively enlarge the field of view of the telescope. Typically Ritchey-Chretien, Dall-Kirkham or Schmidt optics. Suited to many acquisition and tracking missions in space and in the atmosphere.

Mapping of All...Telescopes to new Refractive/ Reflective Telescopes

Four technologies (All Refractive Wide Field, All Reflective Narrow Field, All Reflective Wide Field, and All Reflective Lightweight) in EOS 2.0 are removed from EOS 2.1. These technologies are replaced with new technologies (Refractive Telescope, Reflective Telescope, and Reflective Telescope with Scanning Mirror). Projects (with these old telescopes) built in H7.0 will be automatically mapped to new technologies as follows:

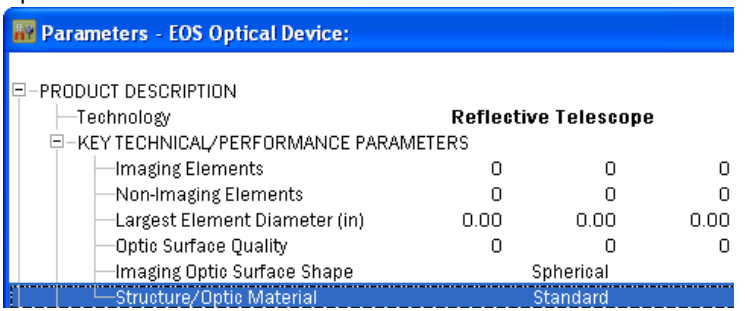
- All Refractive Wide Field ➔ Refractive Telescope with “Optics Spectral Transmission” set as “Visible”.



Parameters - EOS Optical Device:

PRODUCT DESCRIPTION			
Technology	**Refractive Telescope**		
KEY TECHNICAL/PERFORMANCE PARAMETERS			
Imaging Elements	0	0	0
Non-Imaging Elements	0	0	0
Largest Element Diameter (in)	0.00	0.00	0.00
Optic Surface Quality	0	0	0
Imaging Optic Surface Shape		Spherical	
Optics Spectral Transmission		**Visible**	

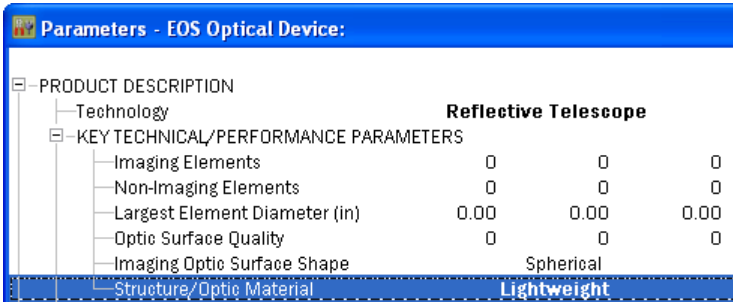
- All Reflective Narrow Field/ All Reflective Wide Field ➔ Reflective Telescope with “Structure/ Optic Material” set as “Standard”.



Parameters - EOS Optical Device:

PRODUCT DESCRIPTION			
Technology	**Reflective Telescope**		
KEY TECHNICAL/PERFORMANCE PARAMETERS			
Imaging Elements	0	0	0
Non-Imaging Elements	0	0	0
Largest Element Diameter (in)	0.00	0.00	0.00
Optic Surface Quality	0	0	0
Imaging Optic Surface Shape		Spherical	
Structure/Optic Material		Standard	

- All Reflective Lightweight ➔Reflective Telescope with “Structure/ Optic Material” set as “Lightweight”.



Parameters - EOS Optical Device:

PRODUCT DESCRIPTION			
Technology	**Reflective Telescope**		
KEY TECHNICAL/PERFORMANCE PARAMETERS			
Imaging Elements	0	0	0
Non-Imaging Elements	0	0	0
Largest Element Diameter (in)	0.00	0.00	0.00
Optic Surface Quality	0	0	0
Imaging Optic Surface Shape		Spherical	
Structure/Optic Material		**Lightweight**	

Note: New telescopes are designed with new data sets; hence, estimate differences may be observed.

Detector

Linear InGaAs

One dimensional array consisting of detectors that can be tailored to work in either of two spectral ranges: 0.9-1.67 and 0.9-2.55 microns. The spectral ranges are tailored by varying to ratios of materials in the alloys. Estimates include focal plane array and attached wiring harness.

Area InGaAs

Two dimensional arrays consisting of detectors that can be tailored to work in either of two spectral ranges: 0.9-1.67 and 0.9-2.55 microns. The spectral ranges are tailored by varying to ratios of materials in the alloys. Estimates include focal plane array and attached wiring harness.

Area Bicolor HgCdTe

The Area Bicolor HgCdTe is a two dimensional array suitable for dual-band infrared detection in the 3-5 and 8-12 micron ranges. Estimates include focal plane array and attached wiring harness.

Area Microbolometer

The Area Microbolometer is a two dimensional array of uncooled thermal sensors. It is used primarily to detect infrared radiation in the range 8-13 microns. The radiation, upon striking the detector material, heats it, changing its electrical resistance. The resistance change is measured and converted into an image, Estimates include focal plane array and attached wiring harness.

Cooler

Joule-Thompson with Pressure Vessel

A single stage cooler based on the Joule-Thompson effect, in which the temperature of a gas is either increased or decreased by letting it expand freely, with the gas doing no external work. For cooling, the gas must be below its Joule-Thompson inversion temperature. Estimates include cooler mechanism and assembly and attached wiring harness but no extended plumbing. They do not include temperature control electronics.

Mechanism

One-Axis Piezoelectric Actuator

A one-axis linear actuator based on the piezoelectric effect. Typically used for micro-positioning. Estimates include the device itself and the attached wiring.

New Parameters

The following parameters are new and can be set at the EOS work element level where applicable.

Parts Count

Parts count refers to the number of discrete parts that must be used to create the final subassembly, not including permanent and/or removable fasteners, shims, retainers, sealants, adhesives, and metallic or chemical surface finishes. Integral off-the-shelf components shall be counted as a single part.
Available for the following work element types:

- Optical Device
- Cooler
- Mechanism
- Calibrator

Environment

Within a particular platform environment, there can be various levels of environmental stress. Choice of one of these levels does not affect either development or production cost, but will affect the estimate of mean-time-between-failures (MTBF), which will in turn affect support cost (part of O&S cost).

Typically, some types of hardware are more severely affected by certain stresses than they are by others. Example: Most semi-conductor electronics can be severely damaged by exposure to high temperatures. However, a steel structure may not suffer any damage at even higher temperatures.

The stresses most often considered by reliability engineers include sand and dust, salt spray, moisture, radiation, temperature extremes, thermal shock, mechanical shock, vibration, exposure to contaminants, friction, mishandling, abuse, and fungus. When making your choice from among the four Environment options following, consider the stresses likely to be most damaging to the particular hardware, and whether and to what extent they will be encountered.
The following are the Environment choices:

Dormant Hardware is non-operational and quiescent most of the time. May be stored in a protected or partially protected environment.

Benign Hardware is exposed only or mostly to the least severe operational environment likely to be encountered by the vehicle.

Moderate Hardware is exposed only or most frequently to the mid-range of operational environments likely to be encountered by the vehicle.

Severe Hardware is exposed only or frequently to the most severe operational environments likely to be encountered by the vehicle.

Vehicle

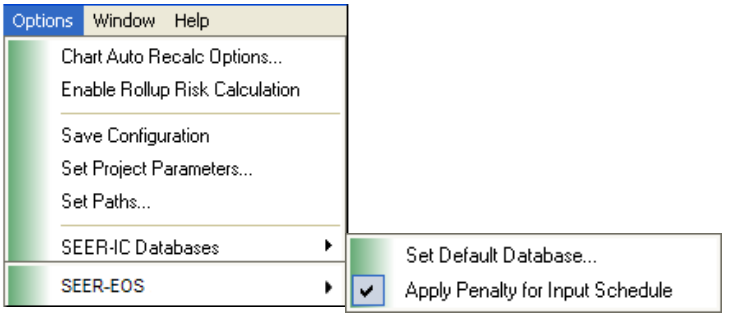
This parameter enables users to choose a platform from which the electro optical system will operate.

The following are the platform choices:

Space Unmanned
Space Manned
Air Unmanned
Air Manned
Missile

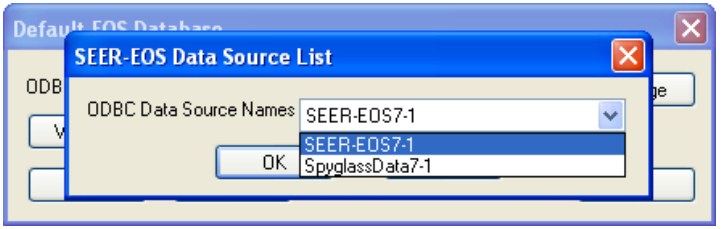
Database Updates

Two data files are now available for computing estimates – Spyglass2-1-1.mdb and Spyglass2-1.mdb. DSNs are set up to read these data files. SEER-EOS7-1 is set as the default DSN; but it can be changed from Options/ SEER-EOS/ Set Default Database.



ODBC Data Source Names: SEER-EOS7-1
It uses data file Spyglass2-1-1.mdb with the latest Development Schedule updates.

ODBC Data Source Names: SPYGLASSDATA7-1
It uses the same data file Spyglass2-1.mdb in SEER-H 7.1.45 initial release.



Knowledge Base Updates

SEER-EOS is upgraded from a “space” only model to a model that can also estimate electro-optical system used on missiles, unmanned and manned aircrafts.

Air Unmanned
Air Manned
Missile

Output Updates

MTBF (Mean-Time-Between-Failure)

MTBF estimating capability is added to SEER-EOS 2.1 since SEER-EOS can now also estimate non-space platforms. Expenses related to traditional maintenance activities can now be included in the estimates.

Maintenance Updates & Useful Information

Initial Release

- ☐ Source data has been updated in a new data file Spyglass2-1.mdb.
- ☐ New DSN Spyglassdata7-1 is now set up to read data file Spyglass2-1.mdb.
- ☐ Old data file Spyglass2-0.mdb is now obsolete in this release; it is only compatible with H7.0.50.
- ☐ Database folder is now renamed from “SPYGLASS” TO “EOS”
- ☐ Penalty on input schedule is now applied to EOS elements.

Maintenance Release

- ☐ Source data for computing Development Schedule has been updated in a new data file Spyglass2-1-1.mdb
- ☐ New DSN SEER-EOS7-1 is now set up to read data file Spyglass2-1-1.mdb
- ☐ Penalty on input schedule can now be turned on/ off.
- ☐ Spyglass 2.0 Optical Telescope Assembly technology “Camera Optical Assembly” is now correctly mapped to SEER-EOS 2.1 Optical Device technology “Camera Optical Assembly or Optical Bench” in Windows XP.
- ☐ Development Labor Cost for Laser elements is now reported correctly where there is no wraps/ fee.
- ☐ Throughput material cost is no longer calibrated.
- ☐ Input schedule is no longer calibrated.

Upgrade Information

Installation Configuration

- You do not have to uninstall SEER-H 7.0 to install/ upgrade SEER-H 7.1. In fact, it is recommended that you maintain your SEER-H 7.0 installation. We do recommend, however, that you uninstall any beta release versions you have installed.
- You can no longer install as a “Me only” user. Installation of SEER-H 7.1 will always be done as an “All user” operation, and will require administrative privileges to do so.
- “Network” Install option has been renamed to “Server”.
- Flexible export templates will now be stored in the “EXPORT TEMPLATES” folder.
- Inflation tables will now be stored in the “INFLATION TABLES” folder.
- Labor Allocations Templates will now be stored in the “LABOR ALLOCATIONS” folder.
- The “SAMPLES” folder has been renamed to “PROJECTS”
- SEER-H.INI is split into SEER-H Settings .INI and SEER-H Properties.INI.
- Implementation of new license file License_SEER-H.lic to replace license.dat.
- If you already have SEER-H 7.1 initial release installed, the installer will perform a minor upgrade. Any new and most up-to-date user files will be installed during the process.

File Upconvert

- Your SEER-H files from 7.0 can be used in this 7.1 version. However, project files saved in 7.1 will no longer be compatible with 7.0. It is recommended that backups of your project files be made before you use them in 7.1.