Health-Ready Components and Systems

Peter H. Grau
Program Manager

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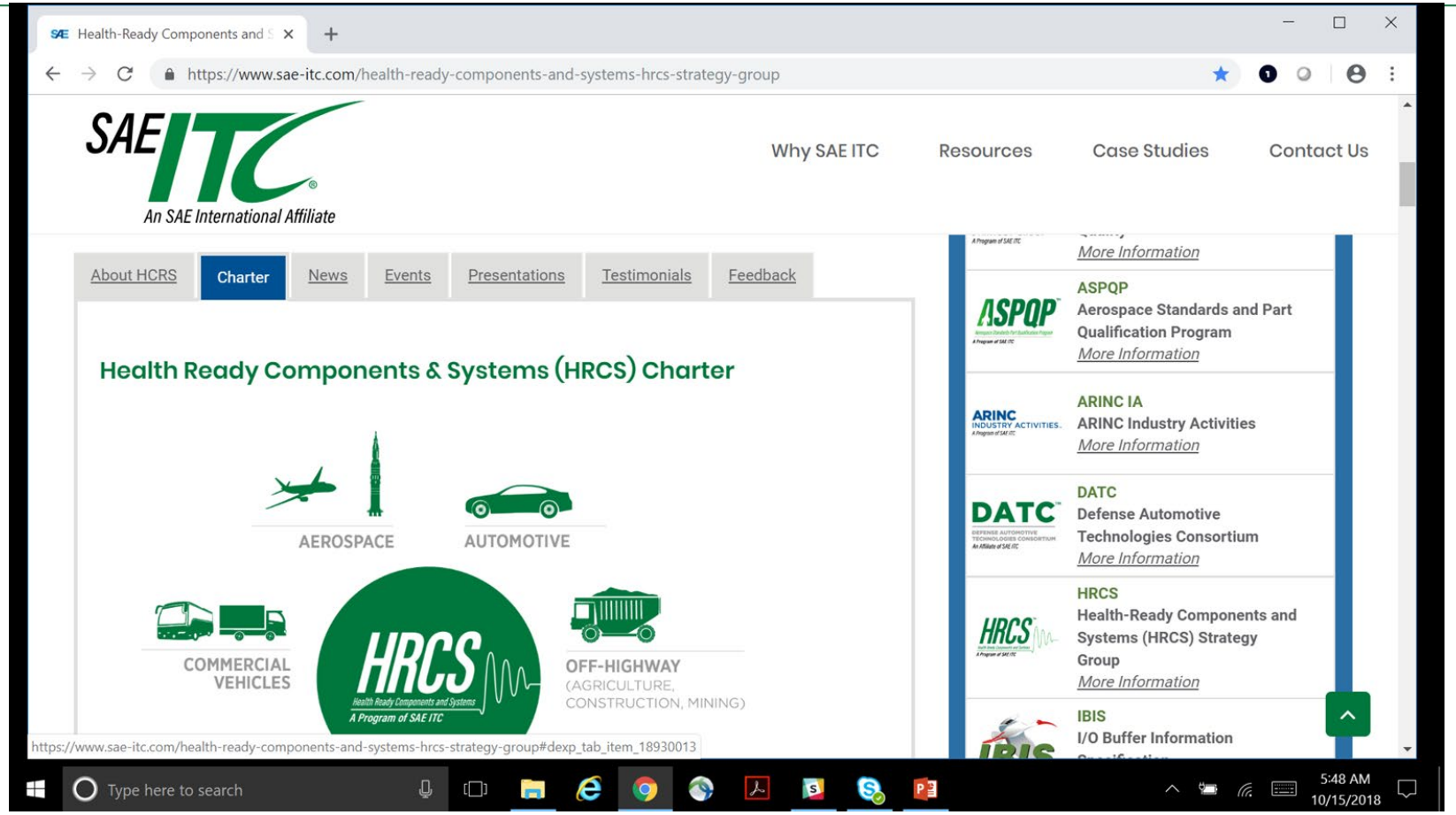
SAE ITC®
An SAE International Affiliate

Collaborative Innovation.
Trusted Implementation.

PRESENTATIONS AT UPCOMING CONFERENCES

- IEEE International Conference on PHM June 17-19, 2019 (Burlingame, CA)
- EFB Users Forum June 25-27, 2019 (Chicago, IL)
- PHM Society Asia-Pacific Conference July 23-25, 2019 (Beijing, China)
- PHM Society Annual Conference September 21-26, 2019 (Scottsdale, AZ)
- IIM Innovations In Mobility October 29-31, 2019 (Novi, MI)

WEBSITE DEVELOPMENT



https://www.sae-itc.com/health-ready-components-and-systems-hrcs-strategy-group

WHY WE PROVIDE REGISTRIES AND DATABASES

- Provide assurance that a consistent process was followed and information is correct.
- Enable participants to find information they are seeking in a cost effective manner.
- Ensure a neutral, unbiased approach.
- Provide contacts for more information or issue resolution.
- Share costs.
- Leverage shared knowledge and technology

IVHM CAPABILITY *(VEHICLE LEVEL)* (SOURCE: SAE JA6268™)

Illustrating industry evolution in use of diagnosis & prognosis for vehicle maintenance

SAE Level	Vehicle Health Capability	Narrative Description	Participation in Repair Actions	Key Data Resources	Availability of Logged &/or Real-Time Data	Use of Supporting Models	IVHM System Characteristics
Manual Diagnosis & Repair Process performed by Technician							
0	Limited On-Vehicle Warning Indicators	Service actions for scheduled maintenance or when Operator notices problems or is alerted by indicator lights or simple gages.	**Operator/Driver & Service Tech**	On-Vehicle Measurements & Observation	N/A	Paper-based Manuals	Only Manual Diagnostic Tools & No Condition-Based Services
1	Enhanced Diagnostics Using Scan Tools	Service techs gain added diagnostic insight using automated scanners to extract vehicle operating parameters & diagnostic codes.	Operator/Driver & Service Tech	**On-Vehicle & Service Bay/ Depot Tools**	Logged Diagnostic Codes & Parameters available to Service Tech	Paper-based Manuals	On-Board Diagnostics Available
2	Telematics Providing Real-Time Data	Service techs gain real-time vehicle data via remote monitoring of vehicle to more completely capture issues.	Operator/Driver, Service Tech & Remote Support Center Advisor	On-Vehicle, Service Bay / Depot & Cloud Data	**Telematic Data Available to Service Tech with Diagnostics Info**	Paper-based Manuals	On-Board & Remote Data Available
Diagnosis & Repair Augmented by Prognosis & Predictive Analytics							
3	Component Level Proactive Alerts	Operator and service techs are provided with component health status (R/Y/G) before problem occurs . Limited condition-based maintenance.	Operator/Driver, Service Tech & Cloud-Based Services	On-Vehicle, Service Bay & Cloud Data	Telematic Data Available to Service Tech with Diagnostics Info	**Addition of Component-Level Health Models**	Component-Level Health Predictions
4	Integrated Vehicle Health Mgmt.	Operator and service techs are provided with system or vehicle level health indicators before problems occur with remaining useful life estimated. Condition-based maintenance.	Operator/Driver, Service Tech & Cloud-Based Services	On-Vehicle, Service Bay & Cloud Data	Telematic Data Available to Service Tech with Diagnostics Info	Addition of Vehicle-Level Health Models	**Vehicle-Level Health Management**
5	Self-Adaptive Health Mgmt.	Self-adaptive control and optimization to extend vehicle operation and enhance safety in presence of potential or actual failures.	Operator/Driver, Service Tech & Cloud-Based Services	On-Vehicle, Service Bay & Cloud Data	Telematic Data Available to Service Tech with Diagnostics Info	Addition of Vehicle-Level Health Models	**IVHM Capability Integrated into Vehicle Controls**

← For some, this could be on-board recording

SAE JA6268™ THREE REGISTRATION STAGES (NOTE: NOW AT COMPONENT/SUBSYSTEM LEVEL)

Stage 1: *Functional Self Assessment*

Stage 2: *Failure Modes Assessment*

Stage 3: *Detailed Design Assessment*

Note:

- *Stage 1 is intended to provide a provisional registration with a low barrier to entry. All Stage 1 information will be recorded in online HRCS Registry.*
- *Stages 2 & 3 are enhanced by seeking an OEM/ integrator to validate the more detailed supplier-provided assessments. Stage 2 & 3 submissions should be accompanied by Stage 1 info as well to populate registry. Stage 2 & 3 completion will be noted in HRCS Registry but the additional data will not be loaded since it contains potentially proprietary info.*

SAE HRCS HEALTH-READY COMPONENTS REGISTRY

Stage 1

*All examples and associated numbers in this presentation are for illustrative purposes only.

ISO FUNCTIONAL REFERENCE MODEL *(INDIVIDUAL COMPONENT LEVEL)**

*(adapted for use) ISO13374-1 (2002). Condition Monitoring and Diagnostics of Machines, Geneva, Switzerland

IVHM Functional Block	Description	IVHM Process Stage
Data Acquisition (DA)	This function collects the sensor data and health state information from the equipment internal monitors, the system data bus or data recorder.	**Sense** **Acquire**
Data Manipulation (DM)	This function processes and transforms the sensor data and health state information collected by the DA.	**Transfer**
State Detection (SD)	This function evaluates equipment state conditions against normal operating profiles and generates normal or abnormal condition indicators.	**Analyze**
Health Assessment (HA)	This function provides information to determine the current state of health of equipment.	
Prognostics Assessment (PA)	This function provides future state of health, performance life remaining, or remaining useful life (usage) indicators.	
Advisory Generation (AG)	This function provides actionable information to operational and maintenance personnel or external systems.	**Act**

STAGE 1: FUNCTIONAL SELF-ASSESSMENT, PART A

Part A only requires 6 entries (0-100%) to estimate Health-Readiness for each of the ISO categories

IVHM Functional	Common IVHM Function or Process	General Description	% Coverage of Field Failures (if not provided, enter 0)
Data Acquisition (DA)	Data Management	System function and process to control, protect, manage, deliver and enhance the value of health state data and information for the user community.	0
	Data Transfer Interface	System function or system to download or communicate raw data, health state indicators and information for consumption by downstream systems.	
	Data Capture	System function may be a specialized data acquisition module that has analog feeds from sensors, collects processed data from a data bus or provides the software interface to a smart sensor.	
Data Manipulation (DM)	Feature Extraction	System function to manipulate data and compute certain statistical indicators from degradation (predictor) parameters.	0
	Data Normalization	System function to manipulate data and compute a limited range of values within a norm.	
	Data Processing	System function to manipulate data to compute health state indicator(s) or extract information for down stream systems.	
State Detection (SD)	Parametric Data Analysis	System function to process degradation parameter data streams captured in a predefined event, anomaly condition or using external equipment.	0
	Onboard Diagnostics	A dedicated system function for self-diagnostics and reporting of system failures.	
	Built-in-test (BIT)	The integrated system function that monitors and controls system self-tests to detect and report system failures to downstream systems.	
Health Assessment (HA)	BIT Filtering & Correlation	System function and process to manage false alarms, fault persistence and correlate primary and secondary diagnostic trouble (BIT) codes to operational capabilities.	0
	Fault Isolation Analysis	System function and process to resolve reported failure ambiguities using model-based diagnostics or multiple data observations.	
Prognostics Assessment (PA)	Time-to-fail Assessment	System function to monitor, record, assess and report equipment degradation parameter data and produce predicted performance life remaining estimates.	0
	Usage Monitoring & Assessment	System function to monitor, record, assess and report equipment life usage parameter data and produce predicted remaining useful life estimates.	
Advisory Generation (AG)	Decision Support Analysis	System function and process for the transformation and analysis of health state data and information to produce prescriptive actions for the user community.	0
	Health Reporting	System function to monitor, record and report health state data and information for consumption by downstream systems.	
	Caution Warning Indicators	System function to monitor, record, assess and report safety critical equipment failures and produce caution and warning indications for operators.	

STAGE 1: FUNCTIONAL SELF-ASSESSMENT, PART B

Part B asks 7 Supplemental Questions for Covered Failure Modes Identified in Part A to quantify sophistication

- **For Data Acquisition and Manipulation**
  - Machine readable info exchange?
  - Machine readable conversion of raw inputs into engineering units?
  - Severity of failures?
- **For State Detection & Health Assessment**
  - Health indicators identified?
  - Relationships/Models Identified?
  - Diagnostic Metrics?
- **For Prognostics Assessment & Advisory Generation**
  - Average advance notice (RUL—Remaining Useful Life)?
  - Typical Standard Deviation for RUL?
  - Prognostic Metrics?

SAE HRCS HEALTH-READY COMPONENTS REGISTRY

Stage 2

*All examples and associated numbers in this presentation are for illustrative purposes only.

Similar to Stage 1 but based on each individual failure mode instead of aggregate performance

STAGE 2: FAILURE MODES ASSESSMENT

Failure Mode Descrip-tion	% Field Failures	Severity of Failure (5-1)	Avg Cost of Repairs (CPV) $	Health Indicators ID'd (describe)	Relationships / Models ID'd (describe)	Machine Readable Information Exchange? (Y/N)	Machine Readable Conv of Raw Inputs to Eng Units? (Y/N)	Data Acquisition & Manipulation (DA & DM) % Coverage for Given Failure Mode	State Detection & Health Assesment (SD & HA) % Coverage for Given Failure Mode	Prognostics Assessment & Advisory Generation (PA & AG) % Coverage for Given Failure Mode
						<select>	<select>	0.0%	0.0%	0.0%
						<select>	<select>	0.0%	0.0%	0.0%
						<select>	<select>	0.0%	0.0%	0.0%
						<select>	<select>	0.0%	0.0%	0.0%
						<select>	<select>	0.0%	0.0%	0.0%

• • •

Stated RUL Units:

- ○ Hours
- ● Days
- ○ Weeks
- ○ Months
- ○ Cycles (flights/trips/starts)
- ○ Engine Hrs
- ○ Operation Hrs
- ○ Other: _____

SAE HRCS HEALTH-READY COMPONENTS REGISTRY

Stage 3

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STAGE 3: DETAILED DESIGN ASSESSMENT (~16 RELATIONAL TABLES)

Stage 3 is the most complete, providing design data. Stage 3 still under development.

ISO 13374 (OSA-CBM) Implementation Level / SAE JA6268™ Interface Name			Data Acquisition (DA)	Data Manipulation (DM)	State Detection (SD)	Health Assessment (HA)	Prognostic Assessment (PA)	Advisory Generation (AG)
Design-Time Interfaces	1	Table of Corrective Actions	X	X	X	X	X	X
	2	Table of Interfaces	X	X	X	X		
	3	Table of Parameters	X					
	4	Table of Failure Modes	X	X	X			
	5	Table of Condition Indicators		X	X			
	6	Table of Health Indicators			X	X	X	
	7	Table of Predictive Indicators				X	X	
	8	Table of Reported State/Mode Indicators	X	X	X	X	X	
	9	Table of Loadable Software and Data Files	X	X	X	X	X	X
	10	Table of Automatically Reported Configuration Indicators			X	X	X	X
	11	Table of Internally Managed Data Recordings			X	X	X	X
	12	Table of Suggested, Externally Managed, Data Recordings	X	X				
	13	Table of Suggested, Externally Executed Algorithms	X	X				
	14	Table of Corrective Actions to Health Indicator Relationships	X	X	X	X	X	
	15	Table of Corrective Actions to Interface Anomaly Relationships	X	X	X			
	16	Table of Indicator to State/Mode Validity Relationships	X	X	X			

*All examples and associated numbers in this presentation are for illustrative purposes only.

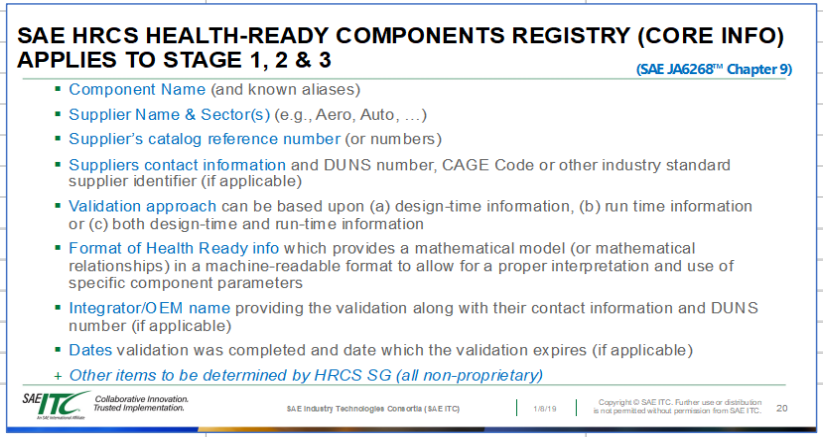
SAE HRCS HEALTH-READY COMPONENTS REGISTRY

Registry WILL NOT contain any proprietary information (only Stage 1 information will be included regardless of the Stage completed.)

HRCS DATABASE REGISTRATION BADGES

GARRETT TURBOCHARGER STAGE 1 REGISTRATION

SAE HRCS JA6268™ Registration	HRCS Stage Being Submitted	1
Core Info Required for All Submissions (Stages 1, 2 or 3)		Fill in Grey Boxes
Field	Description / Examples	Response
Component Name	Antilock Brake System	**Turbocharger with Electic Boost**
Known Aliases	ABS	**eTurbo**
Supplier Name	XYZ Company	**Garrett**
Sector	Automotive	**Automotive**
Catalog Reference Number(s)	12 3456 7890	**891839-0001**
Supplier Contact Name	John Doe	**Tim Felke**
Supplier Contact email	john.doe@xyz.com	tim.felke@garrettmotion.com
Supplier Contact Phone	+1 (888) 123-4567	+1 (602) 510-3518
Supplier Contact Address		**La Piece 16, 1180 Rolle, Switzerland**
Supplier Website	xyz.com	https://www.garrettmotion.com/
DUNS Number (if applicable)		
CAGE Code (if applicable)		
Other Industry Standard Supplier Identifier (if applicable)		
Primary Validation Approach	Combined Design & Run-Time Info	**Combined Design & Run-Time Info**
OEM or Integrator Name	Giant Motors Company	
OEM/Integrator Contact Name	Jane Doe	
OEM/Integrator Contact email	jane.doe@giant.com	
OEM/Integrator Contact Phone	+1 (888) 123-4567	
OEM/Integrator Contact Address		
OEM/integrator Website	giant.com	
OEM/Integrator DUNS Number (if applicable)		
OEM/Integrator CAGE Code (if applicable)		
OEM/Integrator Other Industry Standard Supplier Identifier (if applicable)		



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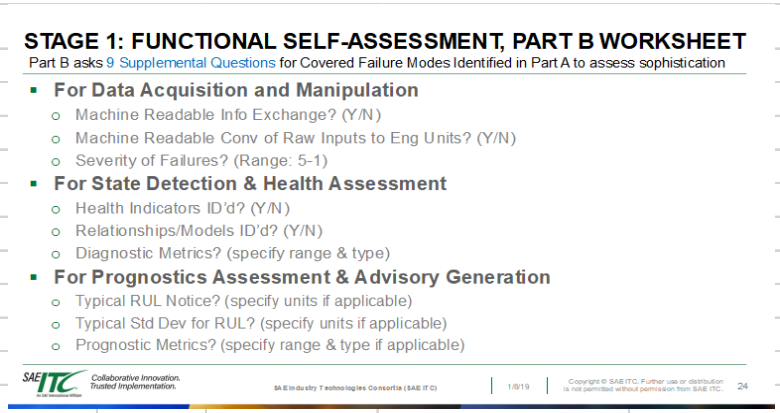
	Run-Time Info Only	Automotive
	Combined Design & Run-Time Info	Commercial
		Off-Highway
	<select>	Marine
	1	Defense
	2	Rail
	3	

GARRETT TURBOCHARGER STAGE 1 REGISTRATION

IVHM Functional	Common IVHM Function or Process	General Description	% Coverage of Field Failures (if not provided, enter 0)
Data Acquisition (DA)	Data Management	System function and process to control, protect, manage, deliver and enhance the value of health state data and information for the user community.	95
	Data Transfer Interface	System function or system to download or communicate raw data, health state indicators and information for consumption by downstream systems.	
	Data Capture	System function may be a specialized data acquisition module that has analog feeds from sensors, collects processed data from a data bus or provides the software interface to a smart sensor.	
Data Manipulation (DM)	Feature Extraction	System function to manipulate data and compute certain statistical indicators from degradation (predictor) parameters.	90
	Data Normalization	System function to manipulate data and compute a limited range of values within a norm.	
	Data Processing	System function to manipulate data to compute health state indicator(s) or extract information for down stream systems.	
State Detection (SD)	Parametric Data Analysis	System function to process degradation parameter data streams captured in a predefined event, anomaly condition or using external equipment.	90
	Onboard Diagnostics	A dedicated system function for self-diagnostics and reporting of system failures.	
	Built-in-test (BIT)	The integrated system function that monitors and controls system self-tests to detect and report system failures to downstream systems.	
Health Assessment (HA)	BIT Filtering & Correlation	System function and process to manage false alarms, fault persistence and correlate primary and secondary diagnostic trouble (BIT) codes to operational capabilities.	85
	Fault Isolation Analysis	System function and process to resolve reported failure ambiguities using model-based diagnostics or multiple data observations.	
Prognostics Assessment (PA)	Time-to-fail Assessment	System function to monitor, record, assess and report equipment degradation parameter data and produce predicted performance life remaining estimates.	75
	Usage Monitoring & Assessment	System function to monitor, record, assess and report equipment life usage parameter data and produce predicted remaining useful life estimates.	
Advisory Generation (AG)	Decision Support Analysis	System function and process for the transformation and analysis of health state data and information to produce prescriptive actions for the user community.	85
	Health Reporting	System function to monitor, record and report health state data and information for consumption by downstream systems.	
	Caution Warning Indicators	System function to monitor, record, assess and report safety critical equipment failures and produce caution and warning indications for operators.	

GARRETT TURBOCHARGER STAGE 1 REGISTRATION

SAE HRCS JA6268™ Registration		
Function Self-Assessment, Stage 1, Part B Worksheet		Fill in grey boxes
Field	Description / Examples	Response
For Data Acquisition and Manipulation		
Machine Readable Info Exchange? (select)	XLS templated form	XLS templated form
Machine Readable Conv of Raw Inputs to Eng Units? (select)	source code	XLS templated form
Severity of Failures? (Range: 5-1)	5-3	
For State Detection & Health Assessment		
Health Indicators ID'd? (Y/N)	Y	Y
Relationships/Models ID'd? (Y/N)	Y	N
Diagnostic Metrics 1? (specify range & type)	30-40%	10-20%
Type for Above	NTF (NFF)	NTF (NFF)
Diagnostic Metrics 2? (specify range & type)		1.7
Type for Above		Ambiguity Group Size
For Prognostics Assessment & Advisory Generation		
Typical RUL Notice?	14.0	30.0
Units for Above	Days	Days
Typical Std Dev for RUL? (specify units if applicable)	4.0	10.0
Units for Above	Days	Days
Prognostic Metrics 1? (specify range & type if applicable)	99%	91%
Type for Above	TPR	TPR
Prognostic Metrics 2? (specify range & type if applicable)	90%	0.10%
Type for Above	FPR	FPR



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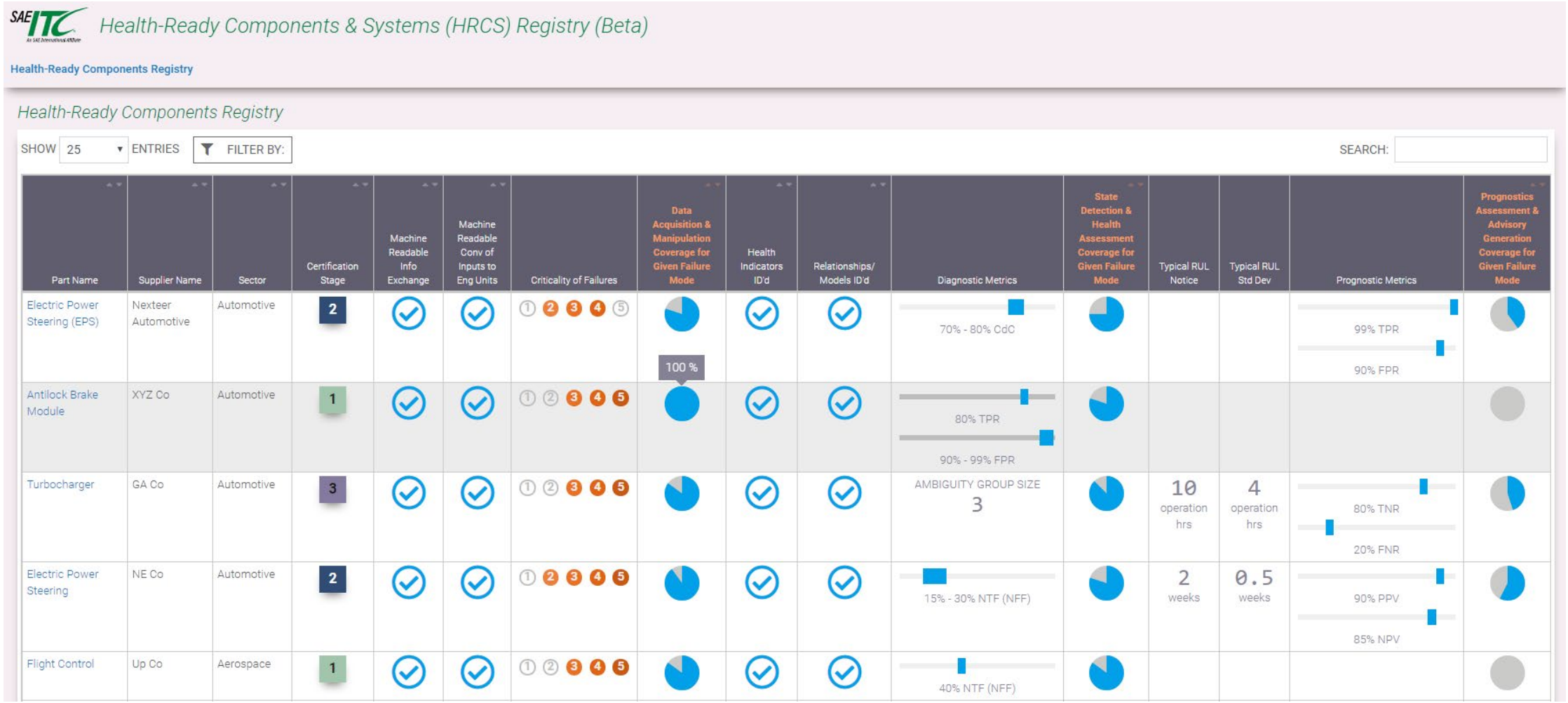
N	Days	FPR	XLS templated form
	Weeks	TNR	ACCDB templated form
	Months	FNR	MS Word templated tables
	Cycles	PPV	XML templated form
	Engine Hrs.	NPV	source code
	Cycles	FDR	pseudo code
	Engine Hrs.	FOR	
	Operation Hrs.	Cd Coverage	
	Other	NTF (NFF)	
		Ambiguity Group Size	
		RUL Std Dev	

HRCS DATABASE- STAGE 1 MULTIPLE LISTINGS



SAE ITC *Health-Ready Components & Systems (HRCS) Registry (Beta)*

Health-Ready Components Registry

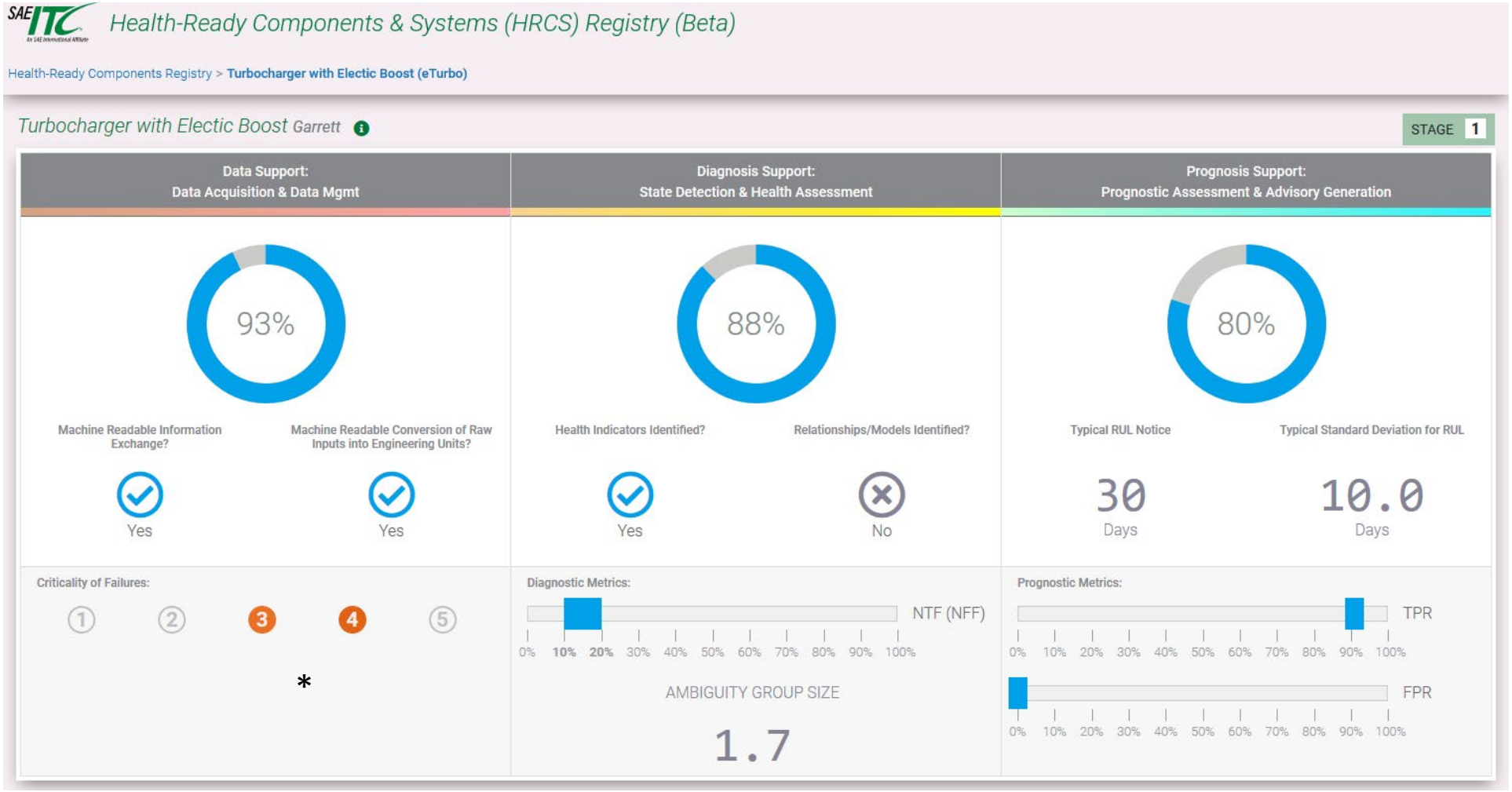
Health-Ready Components Registry

SHOW 25 ENTRIES FILTER BY: SEARCH:

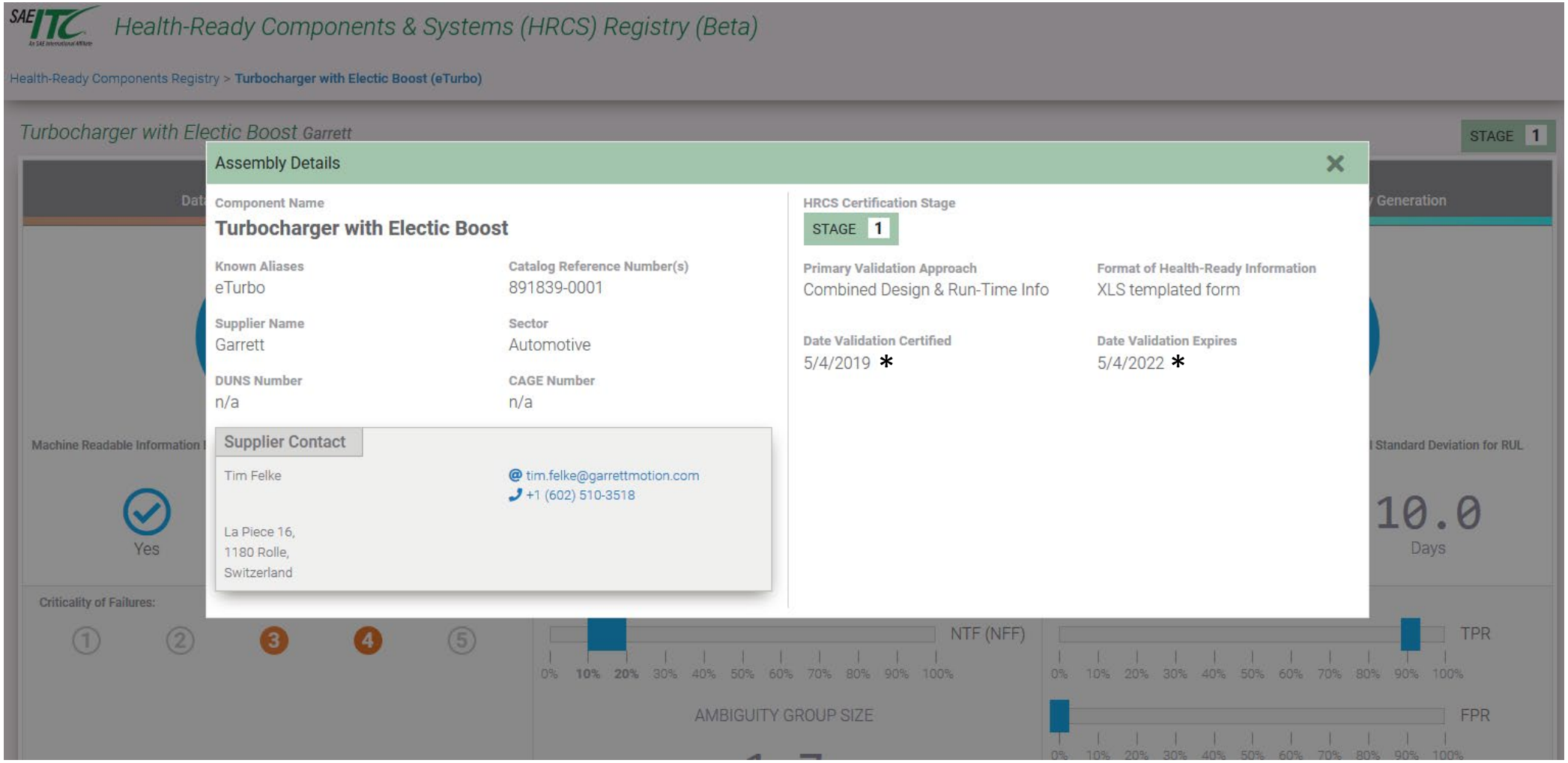
Part Name	Supplier Name	Sector	Certification Stage	Machine Readable Info Exchange	Machine Readable Conv of Inputs to Eng Units	Criticality of Failures	Data Acquisition & Manipulation Coverage for Given Failure Mode	Health Indicators ID'd	Relationships/ Models ID'd	Diagnostic Metrics	State Detection & Health Assessment Coverage for Given Failure Mode	Typical RUL Notice	Typical RUL Std Dev	Prognostic Metrics	Prognostics Assessment & Advisory Generation Coverage for Given Failure Mode
Electric Power Steering (EPS)	Nexteer Automotive	Automotive	2	✓	✓	2 3 4	100 %	✓	✓	70% - 80% CdC				99% TPR 90% FPR	
Antilock Brake Module	XYZ Co	Automotive	1	✓	✓	3 4 5		✓	✓	80% TPR 90% - 99% FPR					
Turbocharger	GA Co	Automotive	3	✓	✓	3 4 5		✓	✓	AMBIGUITY GROUP SIZE 3		10 operation hrs	4 operation hrs	80% TNR 20% FNR	
Electric Power Steering	NE Co	Automotive	2	✓	✓	2 3 4 5		✓	✓	15% - 30% NTF (NFF)		2 weeks	0.5 weeks	90% PPV 85% NPV	
Flight Control	Up Co	Aerospace	1	✓	✓	3 4 5		✓	✓	40% NTF (NFF)					

HRCS DATABASE- ACTUAL LISTINGS*

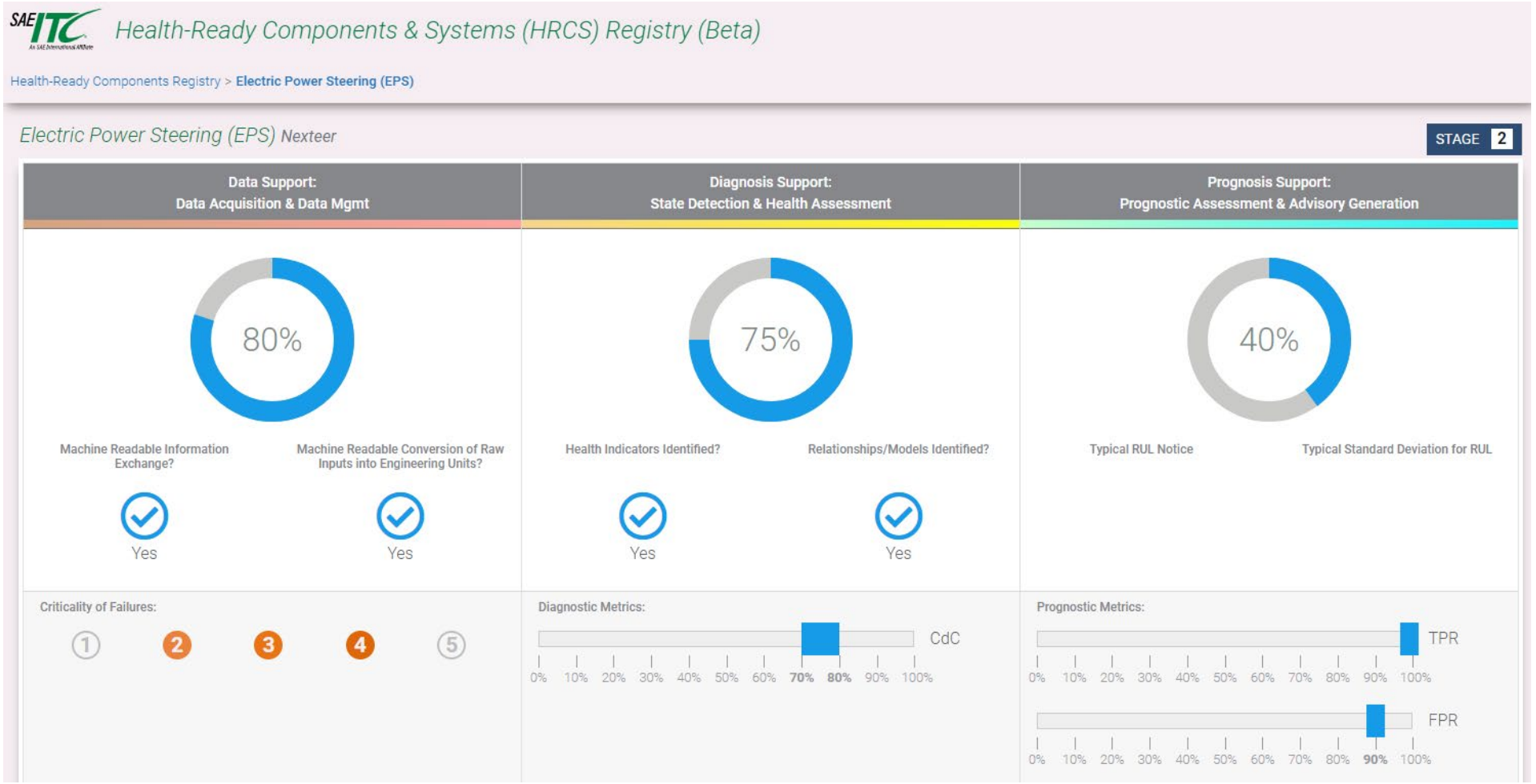
HRCS DATABASE- STAGE 1 LISTING DETAIL



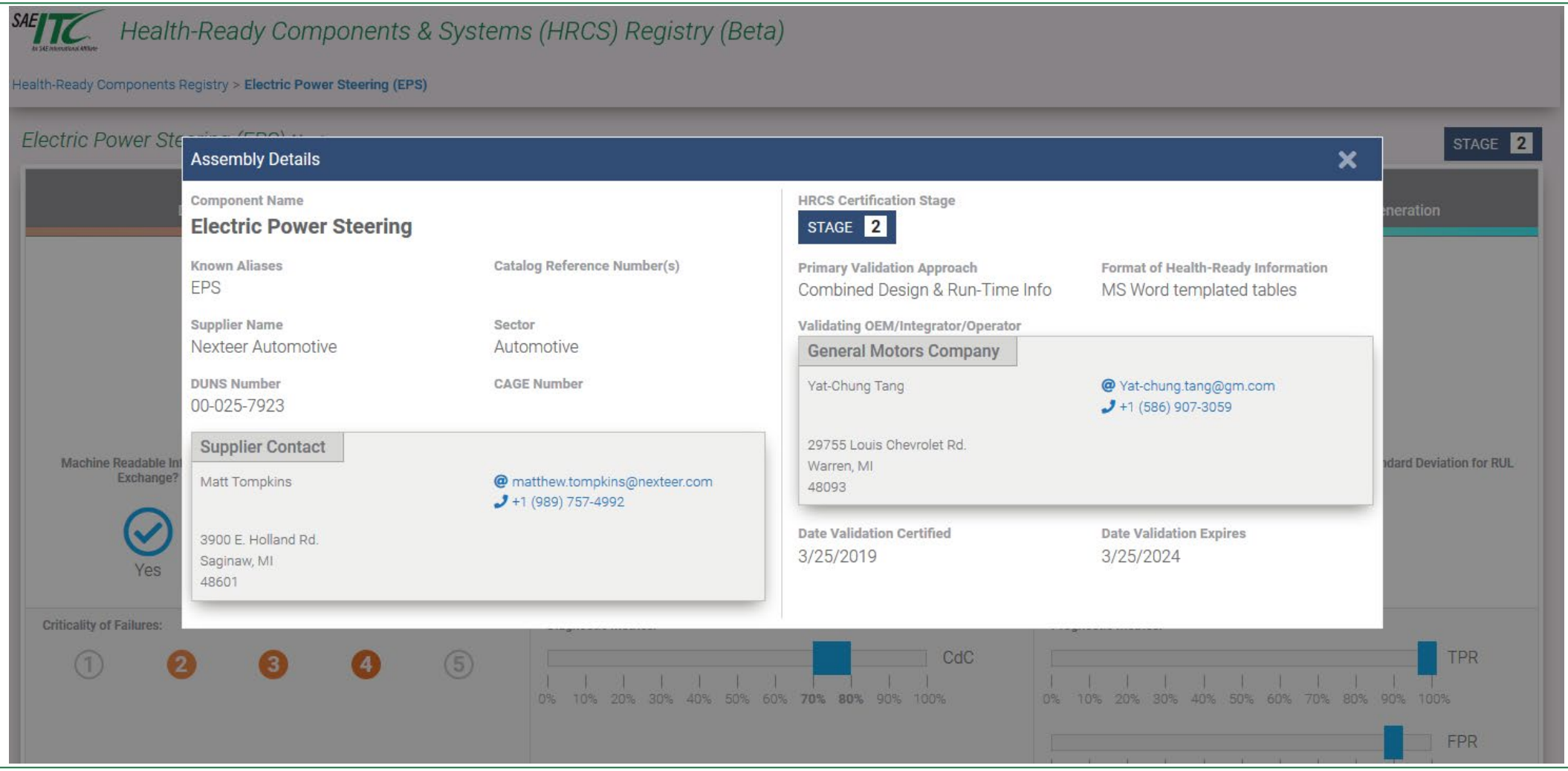
HRCS DATABASE- LISTING CORE INFORMATION



HRCS DATABASE- STAGE 2 LISTING DETAIL



HRCS DATABASE- LISTING CORE INFORMATION



CONSORTIUM DEVELOPMENT

Mission

SAE Industry Technologies Consortia (ITC) enables organizations to connect, collaborate and positively impact global industries by empowering implementation of precompetitive solutions and innovative technologies.

Vision

We are a trusted global leader in consortia-based collaborative tools and services for highly technical industries' operations and supply chain, especially automotive and aerospace.

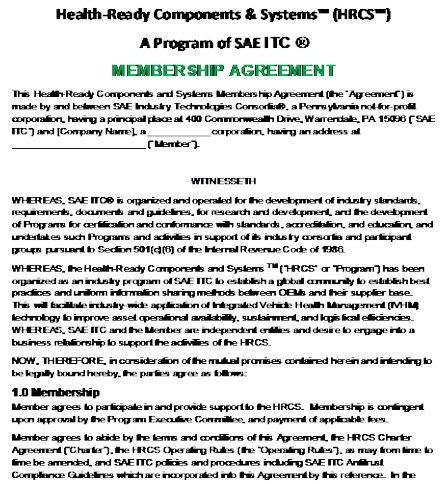
Collaborative Innovation. Trusted Implementation.

HRCS DATABASE AND OTHER ACTIVITIES

- Listings:
  - All new listings during calendar 2019 free of charge for one year from listing date
  - Discounted listing fees commensurate with membership level
  - SAE Badges by Stage (registration level) for improved product branding
- Conference with HRCS track and exhibition later in 2019

HRCS MEMBERSHIP AGREEMENT

HRCS™
Health Ready Components and Systems
A Program of SAE ITC


Health-Ready Components & Systems™ (HRCS™)

A Program of SAE ITC ®

MEMBERSHIP AGREEMENT

This Health-Ready Components and Systems Membership Agreement (the "Agreement") is made by and between SAE Industry Technologies Consortia®, a Pennsylvania not-for-profit corporation, having a principal place at 400 Commonwealth Drive, Warrendale, PA 15096 ("SAE ITC") and [Company Name], a _____ corporation, having an address at _____ ("Member").

WITNESSETH

WHEREAS, SAE ITC® is organized and operated for the development of industry standards, requirements, documents and guidelines, for research and development, and the development of Programs for certification and conformance with standards, accreditation, and education, and undertakes such Programs and activities in support of its industry consortia and participant groups pursuant to Section 501(c)(3) of the Internal Revenue Code of 1986.

WHEREAS, the Health-Ready Components and Systems ™ ("HRCS" or "Program") has been organized as an industry program of SAE ITC to establish a global community to establish best practices and uniform information sharing methods between OEMs and their supplier base. This will facilitate industry wide application of Integrated Vehicle Health Management (IVHM) technology to improve asset operational availability, sustainment, and logistical efficiencies.

WHEREAS, SAE ITC and the Member are independent entities and desire to engage into a business relationship to support the activities of the HRCS.

NOW, THEREFORE, in consideration of the mutual promises contained herein and intending to be legally bound hereby, the parties agree as follows:

1.0 Membership

Member agrees to participate in and provide support to the HRCS. Membership is contingent upon approval by the Program Executive Committee, and payment of applicable fees.

Member agrees to abide by the terms and conditions of this Agreement, the HRCS Charter Agreement ("Charter"), the HRCS Operating Rules (the "Operating Rules"), as may from time to time be amended, and SAE ITC policies and procedures including SAE ITC Antitrust Compliance Guidelines which are incorporated into this Agreement by this reference. In the

Click for full document

Health-Ready Components & Systems™ (HRCS™)

A Program of SAE ITC ®

MEMBERSHIP AGREEMENT

This Health-Ready Components and Systems Membership Agreement (the "Agreement") is made by and between SAE Industry Technologies Consortia®, a Pennsylvania not-for-profit corporation, having a principal place at 400 Commonwealth Drive, Warrendale, PA 15096 ("SAE ITC") and [Company Name], a _____ corporation, having an address at _____ ("Member").

HRCS FEE SCHEDULE

HRCS™
Health Ready Components and Systems
A Program of SAE ITC

Health-Ready Components & Systems™ (HRCS™)

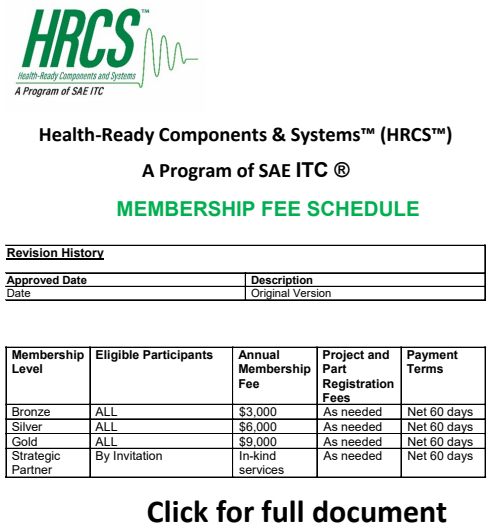
A Program of SAE ITC ®

MEMBERSHIP FEE SCHEDULE

Revision History

Approved Date	Description
Date	Original Version

Membership Level	Eligible Participants	Annual Membership Fee	Project and Part Registration Fees	Payment Terms
Bronze	ALL	$3,000	As needed	Net 60 days
Silver	ALL	$6,000	As needed	Net 60 days
Gold	ALL	$9,000	As needed	Net 60 days
Strategic Partner	By Invitation	In-kind services	As needed	Net 60 days



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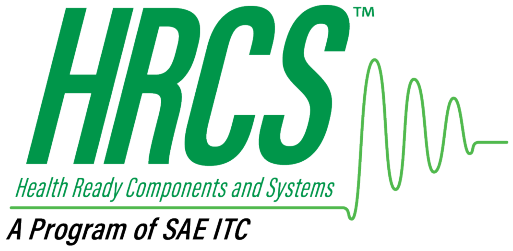
HRCS OPERATING RULES



Health-Ready Components & Systems™ (HRCS™)

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OPERATING RULES

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OPERATING RULES

SAE ITC ANTITRUST

HRCS™
Health Ready Components and Systems
A Program of SAE ITC

SAE ITC®
An SAE International Affiliate

ANTITRUST COMPLIANCE GUIDELINES
INTRODUCTION

The SAE Industry Technology Consortia ("Consortia") Antitrust Compliance Guidelines (the "**Guidelines**") are intended to assist the members of the Consortia in complying with the antitrust laws and rules of conduct that may apply to the Consortia's activities. These Guidelines are intended to accomplish two objectives:

HRCS APPLICATION FORM

HRCS™
Health Ready Components and Systems
A Program of SAE ITC

Application for Membership

Company / Organization	
Address Where Incorporated or Registered	
Primary Contact Name	
Primary Contact Email	
Primary Contact Phone	

HRCS CHARTER AGREEMENT

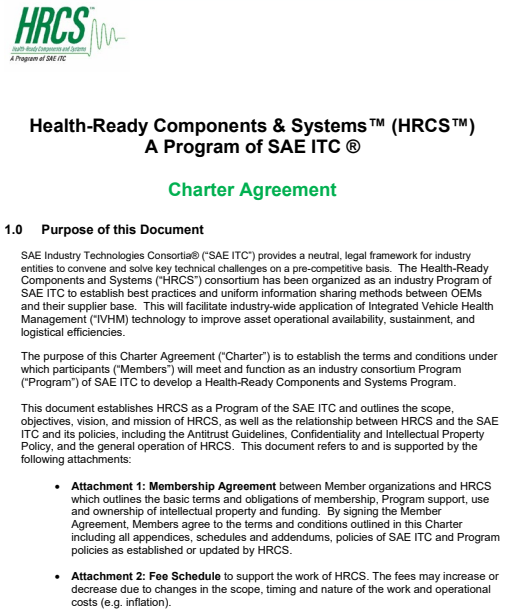
HRCS™
Health Ready Components and Systems
A Program of SAE ITC

Health-Ready Components & Systems™ (HRCS™)
A Program of SAE ITC ®

Charter Agreement

1.0 Purpose of this Document

SAE Industry Technologies Consortia® (“SAE ITC”) provides a neutral, legal framework for industry entities to convene and solve key technical challenges on a pre-competitive basis. The Health-Ready Components and Systems (“HRCS”) consortium has been organized as an industry Program of SAE ITC to establish best practices and uniform information sharing methods between OEMs and their supplier base. This will facilitate industry-wide application of Integrated Vehicle Health Management (“IVHM) technology to improve asset operational availability, sustainment, and logistical efficiencies.



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The purpose of this Charter Agreement (“Charter”) is to establish the terms and conditions under which participants (“Members”) will meet and function as an industry consortium Program (“Program”) of SAE ITC to develop a Health-Ready Components and Systems Program.

This document establishes HRCS as a Program of the SAE ITC and outlines the scope, objectives, vision, and mission of HRCS, as well as the relationship between HRCS and the SAE ITC and its policies, including the Antitrust Guidelines, Confidentiality and Intellectual Property Policy, and the general operation of HRCS. This document refers to and is supported by the following attachments:

- **Attachment 1: Membership Agreement** between Member organizations and HRCS which outlines the basic terms and obligations of membership, Program support, use and ownership of intellectual property and funding. By signing the Member Agreement, Members agree to the terms and conditions outlined in this Charter including all appendices, schedules and addendums, policies of SAE ITC and Program policies as established or updated by HRCS.
- **Attachment 2: Fee Schedule** to support the work of HRCS. The fees may increase or decrease due to changes in the scope, timing and nature of the work and operational costs (e.g. inflation).

Click for full document

HRCS MEMBERSHIP BENEFITS AND PRICING

Membership Category	Leadership Voting	Corporate Member Voting	Complimentary Parts Listing	Webpage/ Promotion	Program Documents	Online/ WebExTraining	Event Promotion/ Recognition	Registry Electronic Access	HRCS Events	Sponsorship rates	Annual Fee
Bronze	No	Yes	3	Listing	10% discount	10% discount	Yes	10% discount	10% discount	10% discount	$3K
Silver	No	Yes	6	Listing +Link	25% discount	25% discount	Yes	25% discount	25% discount	25% discount	$6K
Gold	Yes	Yes	9	Logo + Listing +2 links	50% discount	50% discount	Yes	50% disocunt	50% discount	50% discount	$9K

Membership term will be a calendar year but initial year will be prorated for partial year

HRCS DATABASE COMPONENT PRICING

Membership Category	Initial Setup Fee	2019 Listing	3yr Listing Fee	3yr Listing Bundle (of 10)
Non-member	$200	Complimentary	$300	$2,500
Bronze	$100	Complimentary	$270	$2,250
Silver	$50	Complimentary	$225	$1,875
Gold	Complimentary	Complimentary	$150	$1,250

HRCS STRATEGY GROUP POTENTIAL ACTIVITIES

HRCS Activities and Objectives Roadmap

1. Strategy (Communications, Prioritization, Deployment, Standards, Trial Use Pilot Projects, etc.)
2. Communication, branding, and marketing actions (e.g., websites, press releases, social media, certification badges to use in ads, etc.)
3. Development of an HRCS database. The database will list components, their capabilities, and certification stage
4. Establishing a voting and membership policy, meeting cadence, and rules
5. Liaison with SAE committees (e.g., SAE HM-1, OBD-II, E-32, and ARINC Industry Activities, etc.) and other standards organizations
6. Liaison with government organizations and regulatory bodies to review requirements relating to the flow down of Health-Ready Component requirements to the supply chain
7. Development and coordination of HRCS characterization training, certification training, JA6268™ training, liaison/endorsement of providers
8. Guidance for applicable tool development to support implementation (e.g., registries, databases, data exchange tools, training, etc.)
9. Deployment actions (timing, execution)
10. Management of third-party service providers
11. Program Participant Agreement Appendix (HRCS Strategy Group contracted work)
12. Funding/finances - budget & invoicing and what it supports/limitations

WHY JOIN THESE EFFORTS IN THE HRCS SG?

- Creation of the **Health-Ready Component Registry** to give visibility to SAE JA6268™ health-ready components and to create a cross industry movement to take advantage of IVHM.
- Subcommittees to agree on **specific document interchange content and format descriptions** building on existing documents (like GM's ICD component description file and ARINC's standard documents) that could be augmented to include better support for health-ready components.
- Agreed upon **actions to put SAE JA6268™ into practice** by going down a level from the high-level content captured in JA6268™.
- Subcommittees to tackle **terminology/lexicon/vocabulary** in important industry domains
- **Shared training efforts** in support of JA6268™ application in standardized ways

ADDITIONAL BENEFITS OF MEMBERSHIP

- Protection of operating in a legally protected environment
- Establish key relationships and trusted networks
- Voting privileges for all Consortium activities
- Free access to Consortium specifications and publications
- Discounted listing fees for HRCs in the registry
- Discounted event attendance
- Professional training courses and development
- Implement strategic business improvements and innovative technologies
- Co-develop, publish, and gain access to standards, tools, products, programs, and services

HOW CAN YOU GET INVOLVED NOW?

- Sign and return the **Membership Agreement**
- Submit components for listing in the database. **Note: Stage 1 is easy and complimentary for 12 months for new listings submitted in calendar 2019**
- Volunteer to participate in consortium development
- Submit pilot program recommendations
- Share membership benefits and low cost entry with appropriate individuals in your company for action and signature
- Please return suggestions to Peter Grau at: peter.grau@sae-itc.org

QUESTIONS?

THANK YOU!