DAIMLER NORTH AMERICA CORPORATION, MERCEDES-BENZ USA, LLC, AND MERCEDES-BENZ U.S. INTERNATIONAL, INC.

v.

Stragent, LLC

Case Nos:

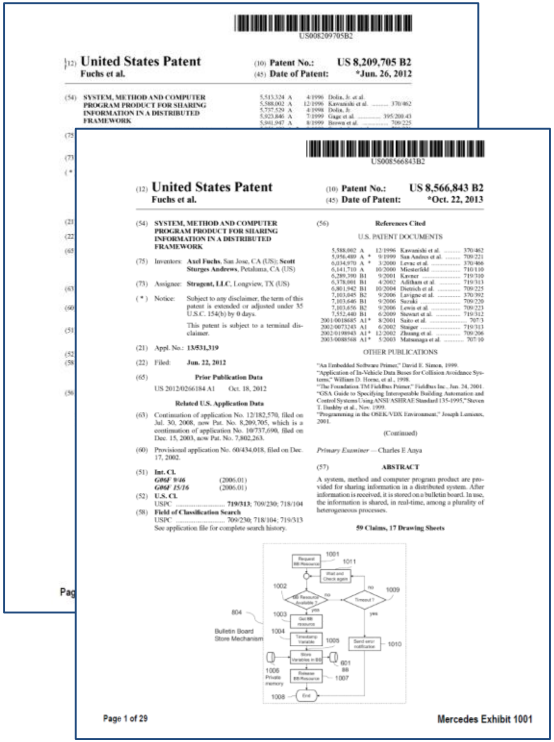
IPR2017-01502, Patent No. 8,209,705

IPR2017-01503, -01504 Patent No. 8,566,843

Petitioners' Demonstratives

Overview of the '843 and '705 Patents

'1502/'1503/'1504 Petition at 2-5/1-5/1-5



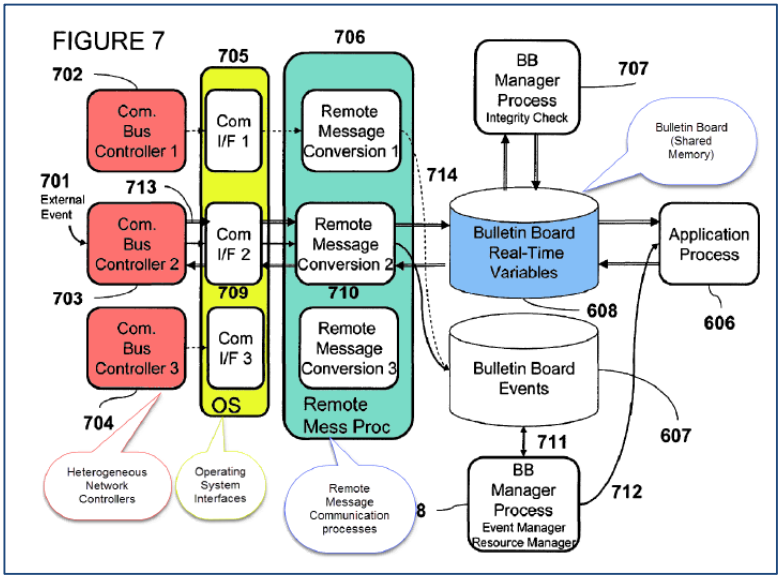
(57) **ABSTRACT**

A system, method and computer program product are provided for sharing information in a distributed system. After information is received, it is stored on a bulletin board. In use, the information is shared, in real-time, among a plurality of heterogeneous processes.

'1502 Petition at 2; Ex. 1001 ('705 Patent) at Abstract)
'1503/'1504 Petition at 1/1; Ex. 1001 ('843 Patent) at Abstract);

Overview of the ‘843 and ‘705 Patents

‘1502/ ‘1503/ ‘1504 Petition at 2-5/1-5/1-5



‘1502 Petition at 3; Ex. 1001 (‘705 Patent) at Fig. 7;
‘1503/’1504 Petition at 2/2; Ex. 1001 (‘843 Patent) at Fig. 7

> Continuing with FIG. 7, the communication procedure is described. In the given example, an external event (**701**) on communication controller **2** (**703**) triggers the operating system to notify the remote message communication process (**706**) that data is available. The notification may be a flag, a call-back routine, an event, or any other operating signal. The associated remote message conversion method **2** (**710**) extracts the data (e.g. real time variables) from the message PDU and stores the data in the bulletin board (**608**). It may also store the associated event as variable in the bulletin board and signal the bulletin-board event manager that new data is available.
>
> The bulletin event manager then notifies the application process (**606**) with the appropriate mechanism. In addition, the event manager may trigger the sampling of local signals using the local signal communication process (**605**) described in FIG. **6**. Finally the bulletin event manager may trigger the bulletin board manager (**707**) to perform integrity checks or generate additional events based on the change of the state variables.

‘1502 Petition at 3-4; Ex. 1001 (‘705 Patent) at 7:4-23;
‘1503/1504 Petition at 2-3/3-4; Ex. 1001 (‘843 Patent) at 7:4-23

> In practice these layers are typically represented in a message by “header” bits that contain information about that layer of the network being used to send the message.
>
> Using this model, each communicated message may be processed at each layer to remove (and use) the associated header information for that level.

‘1502 Petition at 3; Ex. 1001 (‘705 Patent) at 6:43-49;
‘1504 Petition at 3; Ex. 1001 (‘843 Patent) at 6:43-49

> In an alternate embodiment of the remote message communication process (**706**) any remote process can access data via a single network interface. This approach requires a network layer in each processing node and therefore adds overhead to communications. To communicate between two heterogeneous networks, this process may then be repeated in reverse by adding back the header information for the various layers of the second network, and eventually putting the message onto the second network’s physical link. The remote message communication manager (**706**) then can be simplified to only one message assembly and disassembly mechanism.

‘1502 Petition at 3; Ex. 1001 (‘705 Patent) at 7:38-49

Overview of the ‘843 and ‘705 Patents

‘1502/’1503/’1504 Petition at 2-5/1-5/1-5

Prosecution History: Miesterfeld

‘843 Patent
Filed 6/22/2012

cont.

‘705 Patent
Filed 7/30/2008

Miesterfeld cited in an IDS after claims were allowed.

‘1502/’1504 Petition at 4-5/4-5;

cont.

‘263 Patent
Filed 12/15/2003

prov.

‘018 Prov. App.
Filed 12/17/2002

‘1502 Petition at 4-5; Ex. 1004 (Koopman decl. summarizing ‘263 File History), Ex. 1003 (‘705 File History); ‘1503/’1504 Petition at 4/4-5; Ex. 1004 (‘843 File History), Ex. 1005 (Koopman decl. summarizing ‘263 and ‘705 File Histories)

Form 1449 (Modified)

Information Disclosure Statement By Applicant

(Use Several Sheets if Necessary)

Atty. Docket No. SVIPGP061A
Application No.: 12/182,570
Applicant: Fuchs et al.
Filing Date: 7/30/2008
Group Art Unit: 2194

U.S. Patent Documents

Examiner Initial	No.	Patent No.	Date	Patentee	Class	Sub-Class	Filing Date
	A	2002/0073243	6/13/2002	Staiger, Dieter E.	719	313	12/4/2001
	B	7,552,440	6/23/2009	Stewart, et al.	719	312	9/28/1999
	C	5,956,489	9/21/1999	San Andres, et al.	709	221	1/16/1996
	D	6,289,390	9/11/2001	Kavner, Gene D.	719	310	11/12/1998
	E	6,378,001	4/23/2002	Aditham, et al.	719	313	6/18/1997
	F	6,801,942	10/5/2004	Dietrich, et al.	709	225	9/15/2000
	G	6,141,710	10/31/2000	Miesterfeld, Frederick	710	110	12/15/1998
	H	6,034,970	3/7/2000	Levac, et al.	370	466	7/2/1997
	I	7,103,045	9/5/2006	Lavigne, et al.	370	392	3/5/2002

‘1504 Petition at 4; Ex. 1004 (‘843 File History at 133-151 (IDS)).

Miesterfeld does not disclose virtually all of the limitations of the Challenged Claims, as purported by the Petitioner and as will be established below. Further, there is absolutely no evidence whatsoever in the record that the “examiner’s consideration of applicants’ IDS, was not *substantively* considered”

‘1502 Petition 5; see also ‘1504 Petition at 4-5 (“Miesterfeld reference was not subject to any substantive rejections or review.”).

Instituted Grounds – '843 and '705 Patents

'1502/'1503/'1504 Inst. Dec. at 32/17/18

IPR2017-01502, '705 Patent

#	Ground for Challenge
1	Posadas, Stewart, and Wense Render Claims 8-19 Obvious
2	Miesterfeld, Stewart, and Wense Render Claims 8-19 Obvious

'1502 Petition at 8

IPR2017-01503, '843 Patent

#	Ground for Challenge
1	Claims 52-58, 2-29, and 31-46 are obvious over Posadas, Stewart, and Wense
2	Claims 59 and 30 are obvious over Posadas, Stewart, Wense, and Zhao
3	Claims 52 and 53 are obvious over Posadas, Stewart, Wense, and Upender

'1503 Petition at 7

IPR2017-01504, '843 Patent

#	Ground for Challenge
1	Claims 2-29, 31-46 and 52-58 are obvious over Miesterfeld, Stewart, and Wense.
2	Claim 59 and 30 are obvious over Miesterfeld, Stewart, Wense, and Zhao.
3	Claim 53 is obvious over Miesterfeld, Stewart, Wense and Upender.

'1504 Petition at 8

Miesterfeld – Background

'1502/'1504 Petition at 9-10/8-9

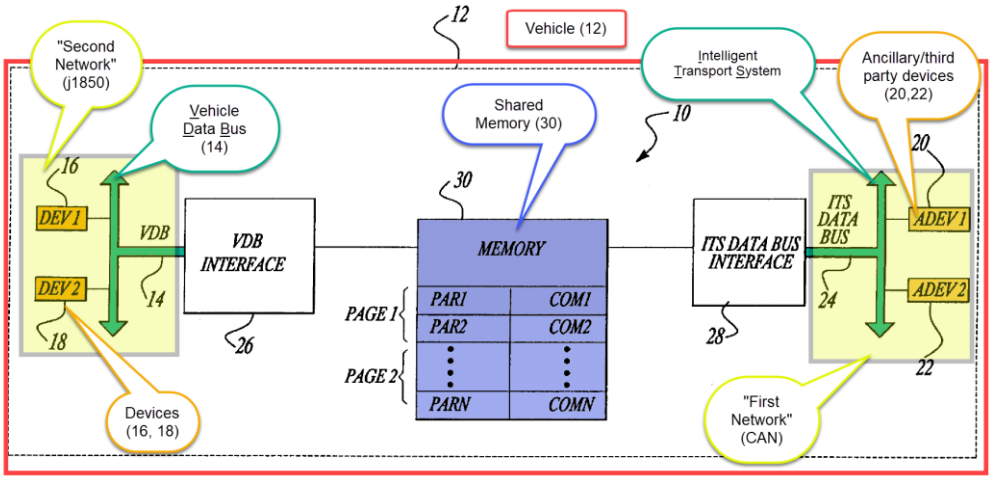


Fig-1

'1502 Petition at 10; Ex. 1009 (Miesterfeld) at Fig. 1;
'1504 Petition at 9; Ex. 1010 (Miesterfeld) at Fig.. 1

[57] **ABSTRACT**

A data exchange gateway for enabling the exchange of data between a vehicle data bus (VDB) and an intelligent transportation system (ITS) data bus. The gateway includes a memory accessible by both a VDB interface and an ITS data bus interface so that data and commands may be shared between each respective bus through the shared memory.

'1502 Petition at 55; Ex. 1009 (Miesterfeld) at Abstract);
'1504 Petition at 18; Ex. 1010 (Miesterfeld) at Abstract)

With respect to the present invention, it is desirable to provide a data exchange system between VDB **14** and ITS data bus **24**. To effect such an exchange, a vehicle data bus (VDB) interface **26** reads and writes data from VDB **14**. VDB interface **26** enables the exchange of data between memory **30** and VDB **14**. Similarly, ITS data bus interface **28** enables data exchange between memory **30** and ITS data bus **24**.

'1502 Petition at 57; Ex. 1009 (Miesterfeld) at 3:18-25;
'1504 Petition at 20; Ex. 1010 (Miesterfeld) at 3:18-25

Miesterfeld – Background

'1502/1504 Petition at 9-10/8-9

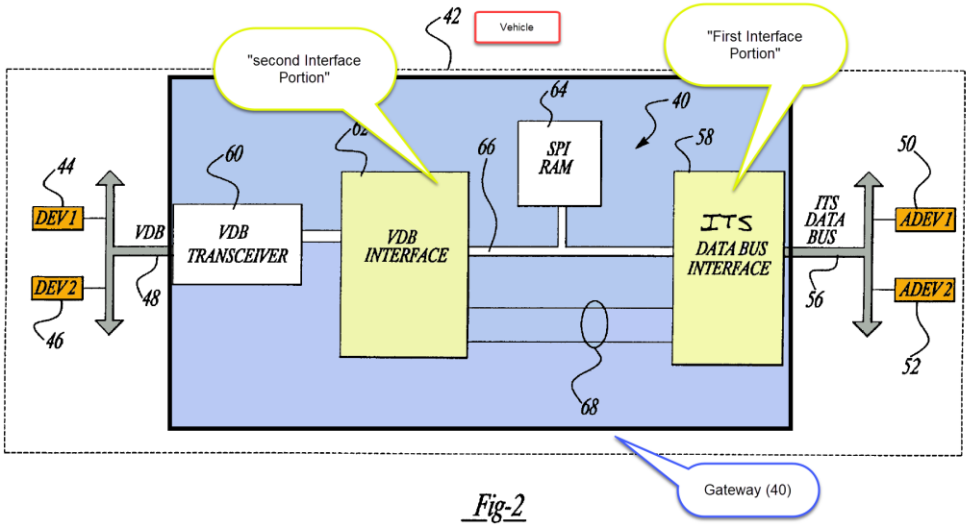


Fig-2

'1502 Petition at 62; Ex. 1009 (Miesterfeld) at Fig. 2;
'1504 Petition at 14; Ex. 1010 (Miesterfeld) at Fig. 2

FIG. **2** depicts a second embodiment of the ITS gateway **40** implemented on a vehicle **42**. Similarly, as described with respect to FIG. **1**, vehicle **42** includes vehicle control devices **44**, **46**. Data exchange occurs between devices **46**, **48** via vehicle data bus (VDB) **48**. Also as described with respect to FIG. **1**, vehicle **42** may include one or more ancillary control devices **50**, **52**. Ancillary control devices **50**, **52** exchange data via an intelligent transportation system (ITS) data bus **56**.

'1502 Petition at 61-62; Ex. 1009 (Miesterfeld) at 3:50-57
'1504 Petition at 44; Ex. 1010 (Miesterfeld) at 3:50-58

Posadas – Background

'1502/'1503 Petition at 8-9/8-9

2. YAIR ROBOT ARCHITECTURE

The backbone of YAIR is the CAN bus (Bosch, 1991), a fieldbus initially developed for the automotive industry that is actually being used in numerous technological areas, specially in mobile robotics, due mainly to its reliability and versatility. Its medium access mechanism, its multimaster capability, and the ability to detect transmission errors make it suitable for distributed real-time systems. Sensor modules and computing nodes use the bus to share the sensory information.

'1502 Petition at 27; Ex. 1006 (Posadas) at 11;
'1503 Petition at 39; Ex. 1007 (Posadas) at 11

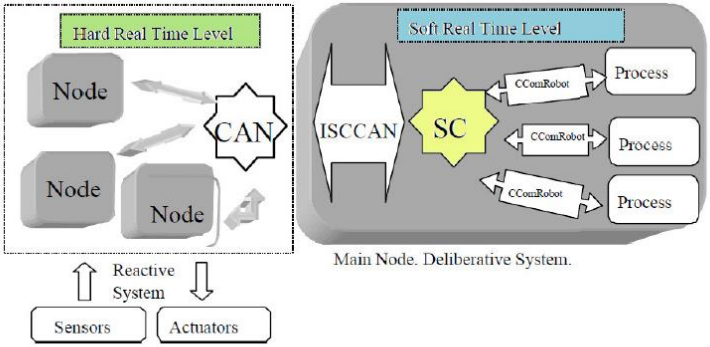


Fig. 1: Communication System Structure

'1502 Petition at 9; Ex. 1006 (Posadas) at Fig. 1;
'1503 Petition at 9; Ex. 1007 (Posadas) at Fig. 1

The communications system presented includes two communication models: one model is vertical and based on the CAN bus – a fieldbus that enables real-time features; the second model is hybrid-horizontal and supported by a distributed blackboard system (SC) (Posadas, et al., 1997). The SC software enables the main robot controller (Windows NT based) to communicate transparently through different channels: CAN, ethernet, DDE, RS232, and so on.

'1502 Petition at 8; Ex. 1006 (Posadas) at 8;
'1503 Petition at 8; Ex. 1007 (Posadas) at 8

The SC makes an internal representation of the data objects using a distributed blackboard architecture (Penny, 1989). The data structure that forms the blackboard is continually updated with the changing values of the objects through the SC established channels.

'1502 Petition at 25; Ex. 1006 (Posadas) at 10;
'1503 Petition at 22; Ex. 1007 (Posadas) at 10

Posadas – Background

'1502/'1503 Petition at 8-9/8-9

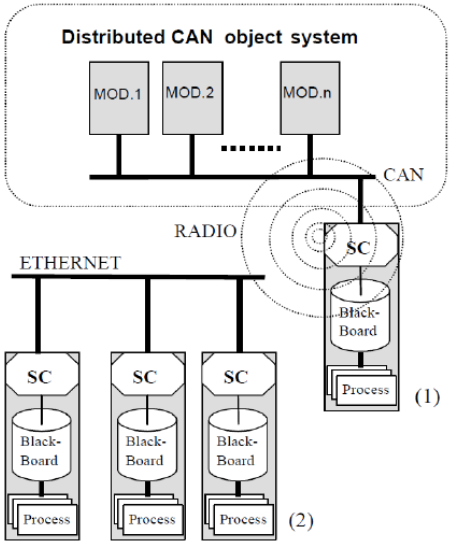


Fig. 4: Distributed blackboard structure.

'1502 Petition at 14; Ex. 1006 (Posadas) at Fig. 4;
'1503 Petition at 12; Ex. 1007 (Posadas) at Fig. 4

> Each computer node in the CAN network serves data to its running processes through the homogeneous SC software interface. The gateway software ISCCAN performs specific translations between CAN protocol and SC data.

'1502 Petition at 21; Ex. 1006 (Posadas) at 11;
'1503 Petition at 19; Ex. 1007 (Posadas) at 11

> The mapped mode allows processes running in every node in the IP network access to the CAN information through the SC software and the defined notification scheme.

'1502 Petition at 52; Ex. 1006 (Posadas) at 11;
'1503 Petition at 44; Ex. 1007 (Posadas) at 11

Stewart – Background

'1502/'1503/'1504 Petition at 10-11/9-10/9-10

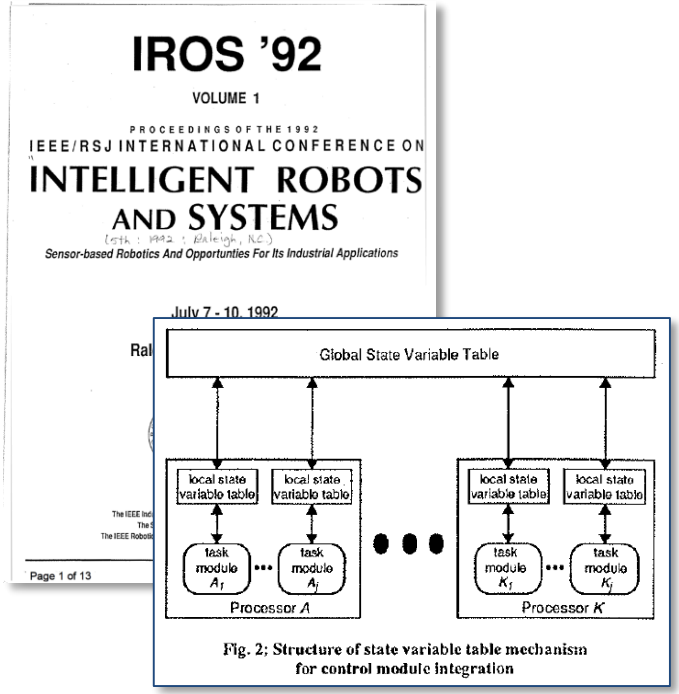


Fig. 2; Structure of state variable table mechanism for control module integration

'1502 Petition at 56; Ex. 1007 (Stewart) at 7;
'1503/'1504 Petition at 14/52; Ex. 1008 (Stewart) at 7

> *Abstract*—In this paper we develop a framework for integrating real-time software modules that comprise a reconfigurable multi-sensor based system. Our framework is based on the proposed concept of a global database of state information through which real-time software modules exchange information. This

'1502 Petition at 10; Ex. 1007 (Stewart) at 6;
'1503/'1504 Petition at 9/10; Ex. 1008 (Stewart) at 6

> The simplest multiprocessor synchronization method is the *spin-lock*, which uses an atomic *test-and-set* (TAS) operation. The TAS instruction reads the current lock value from memory, then writes *1* into that location. If the original value is *0*, then the task acquires the lock, otherwise the lock is not obtained, and the task must try again.

'1502 Petition at 15; Ex. 1007(Stewart) at 11;
'1503/'1504 Petition at 13/18; Ex. 1008 (Stewart) at 11

> As an alternative, a time-out mechanism is used, so that if the lock is not gained within a pre-specified time or number of retries, then the transfer is not performed. The maximum waiting time for the lock is then the time-out period, which is also equal to *polling_time* * *max_number_of_retries*. For most tasks in a control system, missing an occasional cycle is not be critical. In such a case, the value from the previous cycle still remains in the local table, and will be used during the next cycle. When using the time-out mechanism, error handlers should be installed to detect tasks that suffer successive time-out errors. Discussion on handling these errors is beyond the scope of this paper.

'1502 Petition at 20; Ex. 1007 (Stewart) at 11;
'1503/1504 Petition at 17-18/22; Ex. 1008 (Stewart) at 11

Wense – Background

'1502/'1503/'1504 Petition at 11/8/10-11

Building Automotive LIN Applications

H.-C. von der Wense, A. J. Pohlmeyer*

Motorola GmbH
Schatzbogen 7
81829 Munich, Germany
Phone
Email

Motor
41700
North

Phone
Email

Keyw
multip

1 Introduction

In the last few years following trend in automotive electronic design could be noticed: More and more functions have been put into the car and more and more of these functions are enabled by local intelligence. The key for those distributed systems is multiplex networking.

Several multiplex protocols have established in the car and each of the protocols has its specific domain. Most popular of these protocols is CAN with its domains as engine control network and main control network in the body control area. MOST[1], D2B and FireWire[2] are the top candidates in the area of Infotainment. Time Triggered Protocols, such as TTP[3], Flexray[4], and Byteflight[5] are the preferred communication carriers for safety control systems, such as braking and steering. In the low end communication area LIN[6] has become the top candidate. Typical applications for LIN are in the area of cost critical distributed body electronics where the performance and versatility of CAN is not required.

'1502 Petition at 36; Ex. 1008 (Wense) at 10-11;
'1503/'1504 Petition at 32/34; Ex. 1009 (Wense) at 10-11

> LIN has been developed to serve as local subnet to networks with higher performance such as CAN and thus replace hard wiring.

'1502 Petition at 70; Ex. 1008 (Wense) at 13;
'1503/'1504 Petition at 29-30/56; Ex. 1009 (Wense) at 13

> Time Triggered Protocols, such as TTP[3], Flexray[4], and Byteflight[5] are the preferred communication carriers for safety control systems, such as braking and steering. In the low end communication area LIN[6] has become the top candidate.

'1502 Petition at 39-40; Ex. 1008 (Wense) at 11;
'1503/'1504 Petition at 35-36/35-36; Ex. 1009 (Wense) at 11

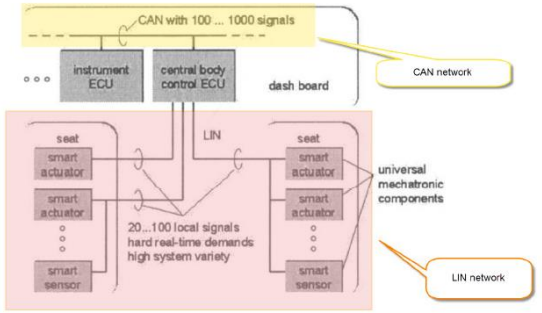
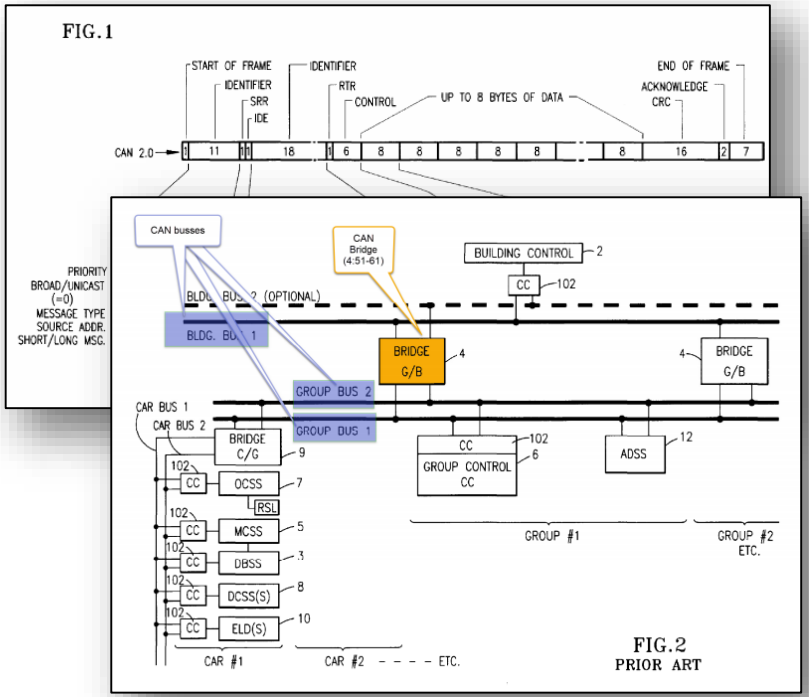


Fig. 3. LIN as subnet of CAN

'1502 Petition at 70; Ex. 1008 (Wense) at Fig. 3;
'1503/'1504 Petition at 30/32; Ex. 1009 (Wense) at Fig. 3

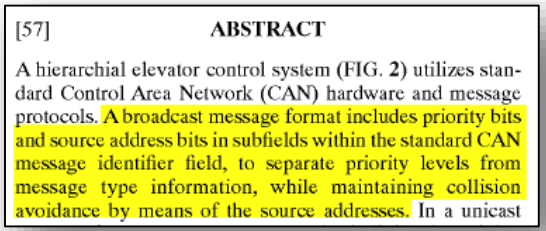
Upender – Background

'1503/'1504 Petition at 8/11-12



'1503/'1504 Petition at 79-80/80-81; Ex. 1038 (Upender) at 2-3

- Filed on Sept. 16, 1994 and issued on Dec. 29, 2009
- Upender discloses a system that utilizes a gateway that bridges two CAN networks that use the "standard CAN message identifier field."



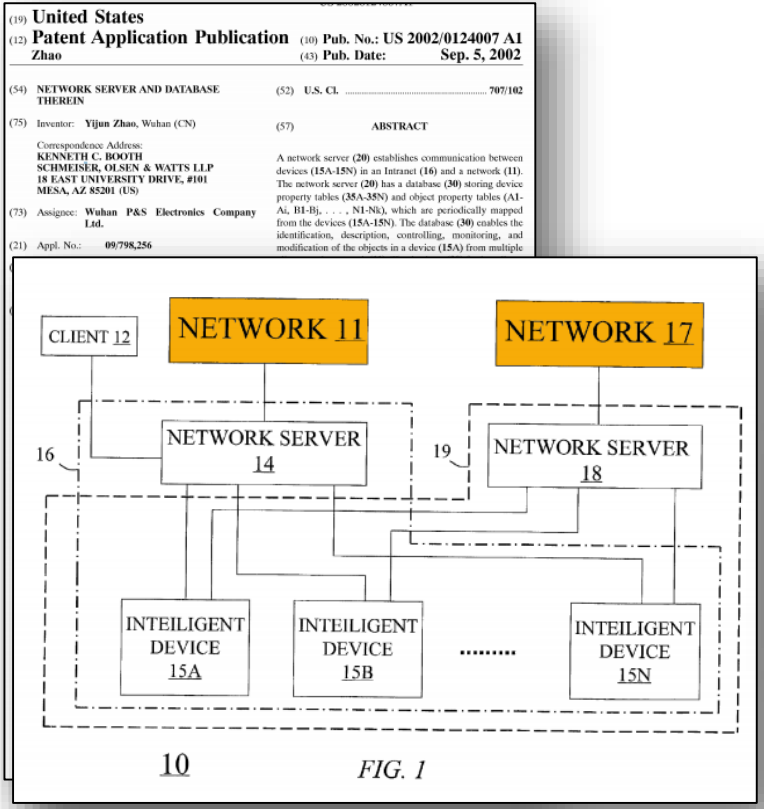
[57] **ABSTRACT**

A hierarchial elevator control system (FIG. 2) utilizes standard Control Area Network (CAN) hardware and message protocols. A broadcast message format includes priority bits and source address bits in subfields within the standard CAN message identifier field, to separate priority levels from message type information, while maintaining collision avoidance by means of the source addresses. In a unicast

'1503/'1504 Petition at 79/11-12; Ex. 1038 (Upender) at Abstract

Zhao – Background

'1503/'1504 Petition at 8/11



(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0124007 A1**

Zhao (43) **Pub. Date: Sep. 5, 2002**

(54) **NETWORK SERVER AND DATABASE THEREIN**

(52) **U.S. Cl.** **707/102**

(75) Inventor: **Yijun Zhao**, Wuhan (CN)

(57) **ABSTRACT**

Correspondence Address:
KENNETH C. BOOTH
SCHMEISER, OLSEN & WATTS LLP
18 EAST UNIVERSITY DRIVE, #101
MESA, AZ 85201 (US)

(73) Assignee: **Wuhan P&S Electronics Company Ltd.**

(21) Appl. No.: **09/798,256**

A network server **(20)** establishes communication between devices **(15A-15N)** in an Intranet **(16)** and a network **(11)**. The network server **(20)** has a database **(30)** storing device property tables **(35A-35N)** and object property tables (A1-Ai, B1-Bj, . . . , N1-Nk), which are periodically mapped from the devices **(15A-15N)**. The database **(30)** enables the identification, description, controlling, monitoring, and modification of the objects in a device **(15A)** from multiple

'1503/'1504 Petition at 74-78/74-78; Ex. 1039 (Zhao) at Fig. 1

- Filed on Mar. 2, 2001 and issued on Sept. 5, 2002
- Zhao discloses a network topology between multiple networks and devices.

[0026] It should be understood that communication system **10** is not limited to that described herein above. Particularly, communication system **10** is not limited to having two network servers as shown in **FIG. 1**. In accordance with the present invention, communication system **10** may include any number of network servers, e.g., one, three, four, etc., forming any number of Intranets. Different network servers may be coupled to the same or different networks.

'1503/'1504 Petition at 74-78/74-78; Ex. 1039 (Zhao) at ¶26

'705 and '843 Patents: Claim Construction

'1502/'1503/'1054 Reply at 3-4/3-5/3-5; '1502/'1503/'1504 PO Resp. at 16/14/12

Terms Identified for Claim construction			
Term	**PO's Positions**	**Petitioner's Position**	**Board's FWD**
"Real Time"	***No dispute:*** "any response time that may be measured in milli- or microseconds, and/or is less than one second." ('1502/'1503/'1504 Petition at 6/5/6; '1502/'1503/'1504 at PO Response at 17/15/13)		Responses that occur in less than one second. ('457/'458 FWD at 10/10)
"sharing the information"	"Completing the delivery of information to a destination" ('1502/'1503/'1504 PO Response. at 16/14/12) "Partake of, use, experience, occupy, or enjoy with others; to have in common." ('1502/'1503/'1504 PO Response. at 16/14/12)	"making the information available to another process" ('1502/'1503/'1504 Reply at 3-4/3-4/3-4)	"making the information available to another process" ('457 FWD at 10-11; '458 FWD at 10-11)
"Protocol"	"a set of rules or procedures utilizing preexisting agreement as to how information will be structured an how each side will send and receive it for transmitting information between electronic devices." ('1502/'1503/'1504 PO Response at 17/14/12-13)	"A standard that Specifies the format of data as well as the rules to be followed in transmitting it." ('1502/'1503/'1504 Reply at 4/4/4-5)	
"second network"	"the second network utilizing a second different protocol which is the recipient of the "shared" information connected to the storage resource." ('1502/'1503/'1504 PO Response at 18,43/16/14)	BRI; the term is readily understandable on its face and does not require a specific construction ('1502/'1503/'1504 Reply at 5/5/5)	
"diagnostic mode"	"an alternative mode of operation, distinct from normal operations, that still allows inspection of the system while it is running." Cannot be a temporary implementation. ('1502 PO Response at 18-19; 42-43)	"A mode designed to determine whether a computer system is functioning properly or to detect programming errors." ('1502 Reply at 5-7,18-19)	

‘705 and ‘843 Patents: Claim Construction - “Sharing”

‘1502/’1503/’1054 Reply at 3-4/3-5/3-5; ‘1502/’1503/’1504 PO Resp. at 16/14/12

Dr. Miller (PO’s Expert)

15 Q Explain to me your process of construing
16 the word "sharing."
17 A I looked it up in the dictionary.

‘1502/’1503/’1504 Replies at 2; Ex. 1039/1043/1043 (Miller 2018 Dep.) at 27: 15-17

17 Q So in term of when terms should be given
18 their ordinary meaning, when they have their ordinary
19 meaning, you go to a dictionary.
20 Is that your understanding?
21 A No. I didn't say that. I said in this
22 specific case, I felt that the term "shared" should
23 be given the ordinary meaning of the word.
24 Q My question, then, is why? Why in this
25 particular case? What makes you decide that in this
1 particular case sharing should be given this ordinary
2 meaning?
3 A Well, I was under the impression that that
4 was what I was supposed to opine.

‘1502/’1503/’1504 replies at 2; Ex. 1039/1043/1043 (Miller 2018 Dep.) at 28:17-29:4

the information on a bulletin board. *Id.* at 8 (citing Ex. 1036 ¶ 32). We agree with Petitioner’s claim construction analysis and agree that the broadest reasonable interpretation of “sharing the information” is “making the information available to another process.”

‘1502/’1503 /’1504 Reply at 4/4/4; 458 FWD at 10-11; ‘457 FWD at 10-11

‘705 and ‘843 Patents: Claim Construction - “Sharing”

‘1502/’1503/’1054 Reply at 3-4/3-5/3-5; ‘1502/’1503/’1504 PO Resp. at 16/14/12

Dr. Miller (PO’s Expert)

Q Are computers described as experiencing information?

A I think that's a really vague question. I don't know if -- I mean, I don't see why they couldn't be. I don't recall if I heard it described as such.

Q Do computers experience anything?

A I believe so.

Q Computers aren't sentient, are they?

A I guess you're getting into A debatable topic here with recent developments.

Q With regard to the '843 patents, is there any relevance to the phrase "experience" when it comes to sharing? Computers in the '843 patent don't experience anything. Is that fair?

A I don't know. Like I said, it's a generic term. I feel we spent a lot of time on this term "shared." We're talking about more than one process being able to use similar data.

‘1502 Reply at 3-4; Ex. 1039 (Miller 2018 Dep.) at 145:2-146:15;
’1503/’1504 Reply at 3-4; Ex. 1043 (Miller 2018 Dep.) at 145:2-146:15

the information on a bulletin board. *Id.* at 8 (citing Ex. 1036 ¶ 32). We agree with Petitioner’s claim construction analysis and agree that the broadest reasonable interpretation of “sharing the information” is “making the information available to another process.”

‘1502/’1503 /’1504 Reply at 4/4/4; 458 FWD at 10-11; ‘457 FWD at 10-11

‘705 and ‘843 Patents: Claim Construction - “Sharing”

‘1502/’1503/’1054 Reply at 3-4/3-5/3-5; ‘1502/’1503/’1504 PO Resp. at 16/14/12

Dr. Miller (PO’s Expert)

Q BY MR. GLASS: Sitting here today, in the context of these opinions, the '502, '503, and '504 petition, sharing the information requires completing delivery of information to a destination.

Is that your opinion?

A Yes, I think that it needs to be placed into a storage resource.

Q And, in your opinion, placing into a storage resource means completing delivery of information to a destination?

A So I -- I feel like these are along the same lines and consistent, yes.

‘1502/’1503/’1504 Reply at 2; Ex. 1039/1043/1043 (Miller 2018 Dep.) at 45:20-46:6

the information on a bulletin board. *Id.* at 8 (citing Ex. 1036 ¶ 32). We agree with Petitioner’s claim construction analysis and agree that the broadest reasonable interpretation of “sharing the information” is “making the information available to another process.”

‘1502/’1503 /’1504 Reply at 4/4/4; 458 FWD at 10-11; ‘457 FWD at 10-11

‘705 and ‘843 Patents: Claim Construction - “Sharing”

‘1502/’1503/’1054 Reply at 3-4/3-5/3-5; ‘1502/’1503/’1504 PO Resp. at 16/14/12

Q Sure. So "to partake of," that's -- "to partake of, use, experience, occupy, or enjoy with others," any one of those phrases would refer to sharing in your opinion; correct?

MR. PAZUNIAK: Objection. Ridiculous.

MR. GLASS: I agree, it is ridiculous. Go ahead.

MR. PAZUNIAK: Your questions are ridiculous.

MR. GLASS: Counselor, stop with the coaching.

MR. PAZUNIAK: I'm not coaching. I'm responding to your comment.

Q BY MR. GLASS: Your definition of sharing is "to partake of, use, experience, occupy, or enjoy with others"; correct?

A That's what I used there, yes. And since that's the end of a question, I'd request to take a break now.

Q If you don't mind, I'd like to finish this off. The witness is walking away from the table, so we will take a break.

‘1502/’1503/’1504 Replies at 2; Ex. 1039/1043/1043 (Miller 2018 Dep.) at 32:3-34:12

Dr. Miller (PO’s Expert)

‘705 and ‘843 Patents: Claim Construction - “Protocol”

‘1502/’1503/’1504 Reply at 4/4-5/4-5; ‘1502/’1503/’1504 PO Response at 17/14-15/12-13

PO:

Third, the term “protocol” in this case, as generally in computer science, means a set of rules or procedures utilizing preexisting agreement as to how information will be structured and how each side will send and receive it for transmitting information between electronic devices. The Patent identifies UDP/IP, TCP/IP, RTP, HTTP, SOAP and JAVA as examples of “standard protocols.”

‘1502/’1503/’1504 PO Response at 17/14-15/12-13

Petitioner:

to another process.” IPR457, 10-11; Ex. 1042, ¶48. With respect to “protocol,” PO provides no support for its construction. “Protocol” is a well-understood term in computer science—namely, it is “a standard that specifies the format of data as well as the rules to be followed in transmitting it.” Ex. 1045, Webster’s New World Computer Dictionary (10th ed., 2003); Ex. 1042, ¶29. This definition is in accord with how the notion of a protocol is described in the 843 patent. Ex. 1001, 4:1-6; 5:45-64; Ex. 1042, ¶29. This term should be construed according to this meaning under the BRI. However, regardless of which definition is applied, the prior art expressly discloses each and every limitation of the claims. *Id.*

‘1503 Reply at 4-5; 1502/’1504 Reply at 4,4-5 (same)

Dr. Koopman:

29. For purposes of the reply, I have also been asked to render an opinion on the term “protocol,” a term used in claim 51. “Protocol” is a well-understood term in computer science. A “protocol” is “a standard that specifies the format of data as well as the rules to be followed in transmitting it.” Webster’s New World Computer Dictionary (10th ed., 2003). This definition is in accord with how the notion of a protocol is described. Ex. 1001, 4:1-6; 5:45-54.

‘1502/’1503/’1504 Reply at 4/4-5/4-5; Ex. 1038/1042/1042 (Koopman Dec.) at ¶ 28/29/29

‘705 and ‘843 Patents: Claim Construction - “Second Network”

‘1502/‘1503/‘1504 Reply at 5/5/5; ‘1502/‘1503/‘1504 PO Resp. at 18/15-16/13-14

PO:

> In general, the language is plain, and the ordinary meaning applies. However, it is important to consider the words “the second network.” That term clearly refers to the second network described in the antecedent limitations, which is the network referenced in limitation 51i as the second network utilizing a second different protocol which is the recipient of the “shared” information connected to the storage resource.

‘1503 PO Response at 16; see ‘1502 PO Response at 18 (same); ‘1504 PO Response at 14 (same).

Claim 51i and m,n,o:

> wherein the apparatus is operable such that the information is capable of being shared in real-time utilizing a second network protocol associated with a second network, and the control unit includes:

> a second interface for interfacing with the second network, the second interface including a second interface-related first component for receiving second data units and a second interface-related second component, the control unit being operable such that the second data units are processed after which processed second data units are provided, where the second network is at least one of the Controller Area Network type, the Flexray network type, or the Local Interconnect Network type.

‘1502/‘1503/‘1504 PO Response at 18/15/13-14

‘705 and ‘843 Patents: Claim Construction - “Diagnostic Mode”

‘1502 Reply at 5-7; ‘1502 PO Response at 18-19

- PO: “an alternative mode of operation, distinct from normal operations, that still allows inspection of the system while it is running.” Cannot be a temporary implementation. (‘1502 PO Response at 18-19; 42-43)

- PO improperly reads the specification into the claims:

> 5) The concept that an embedded communication and computing network can run in multiple modes in order to provide for a guaranteed deterministic behavior of the system. This property can be achieved by only allowing change to the configuration and/or the functions (SW code) in a secured configuration and upgrade mode. If the network is booted in the normal operating mode, all processors execute the existing code and only allow data sharing through the bulletin boards. The emergency or debug mode lets the network run in a fail-safe reduced operation mode or in a diagnostic mode that allows inspection of the system, while it is running. For each operating mode, the gateway can store a processing image on the bulletin board. The advantage of this procedure is that only the communication hubs need to deal with secure data transfer and encryption while the peripheral nodes in the network can be relative simple in design.

‘1502 Reply at 5-7, Ex. 1001 (‘705 Patent) at 11:51-67

  - No mention of “alternative,” “distinct” or “permanent”

‘1502 Reply at 5-7

  - No exclusion of “temporary” modes

‘1502 Reply at 5-7

‘705 and ‘843 Patents: Claim Construction - “Diagnostic Mode”

‘1502 Reply at 5-7; ‘1502 PO Response at 18-19

- Dr. Koopman:

> 32. I do not agree with this definition. A “diagnostic mode” is a well-understood term to a POSITA, and simply means, in the context of networking, a mode that is designed to determine whether a computer system is functioning properly or to detect programming errors.

‘1502 Reply at 5-7; Ex. 1038 (Koopman Reply Decl.) ¶ 32

- PO’s expert:

> Would it be reasonable to say that diagnostic mode is a mode that is designed to determine whether a computer system is functioning properly or to detect programming errors?
>
> THE WITNESS: I think that's -- that's one or a couple different potential uses of a diagnostic mode.

‘1502 Reply at 7; Ex. 1039 (Miller 2018 Depo.) at 66:21-67:3 (objections omitted)

‘843 and ’705 Patents: Posadas

‘1502/’1503 Petition at 12-51/10-83

Claim 51	
No.	**Claim Limitation**
51a	An apparatus, comprising:
51b	a control unit configured for:
51c	identifying information associated with a message received utilizing a first network protocol associated with a first network;
51d	issuing a storage resource request in connection with a storage resource and determining whether the storage resource is available;
51e	determining whether a threshold has been reached in association with the storage resource request;
51f	in the event the storage resource is not available and the threshold associated with the storage resource request has not been reached, issuing another storage resource request in connection with the storage resource;
51g	in the event the storage resource is not available and the threshold associated with the storage resource request has been reached, sending a notification; and
51h	in the event the storage resource is available, storing the information utilizing the storage resource;
51i	wherein the apparatus is operable such that the information is capable of being shared in real-time utilizing a second network protocol associated with a second network, and the control unit includes:
51j	a first interface for interfacing with the first network,
51k	the first interface including a first interface-related first component for receiving first data units and a first interface-related second component, the control unit being operable such that the first data units are processed after which processed first data units are provided,
51L	where the first network is at least one of a Controller Area Network type, a Flexray network type, or a Local Interconnect Network type;
51m/n	and a second interface for interfacing with the second network, the second interface including a second interface-related first component for receiving second data units and a second interface-related second component, the control unit being operable such that the second data units are processed after which processed second data units are provided,
51o	where the second network is at least one of the Controller Area Network type, the Flexray network type, or the Local Interconnect Network type.

‘1503 Petition, App. A at A-1 to A-2

- PO: ‘843 (claims 2, 4, 8-14, 16-29, 33, 35-37, 41-43, 45, 46, 54-58) and ‘705 (claims 9, 12-17 and 19) not obvious over Posadas because:
  - No motivation to combine Posadas with Stewart
    (See, e.g., ‘1502/’1503 PO Response at 25/22)
  - No sharing of “the information” on a “second network” *(See, e.g., ‘1502/’1503 PO Response at 31-32/29-30)*
  - Stewart does not disclose “***sending a notification***.” *(See, e.g., ‘1502/’1503 PO Response at 30-31/27)*
  - Same arguments raised in the ‘457 and ‘458 petition and rejected by the Board

‘843 and ’705 Patents: Miesterfeld

‘1502/’1504 Petition at 51-87/13-84; ‘1502/’1503 Reply at 19-28/5-27

Claim 51	
No.	**Claim Limitation**
51a	An apparatus, comprising:
51b	a control unit configured for:
51c	identifying information associated with a message received utilizing a first network protocol associated with a first network;
51d	issuing a storage resource request in connection with a storage resource and determining whether the storage resource is available;
51e	determining whether a threshold has been reached in association with the storage resource request;
51f	in the event the storage resource is not available and the threshold associated with the storage resource request has not been reached, issuing another storage resource request in connection with the storage resource;
51g	in the event the storage resource is not available and the threshold associated with the storage resource request has been reached, sending a notification; and
51h	in the event the storage resource is available, storing the information utilizing the storage resource;
51i	wherein the apparatus is operable such that the information is capable of being shared in real-time utilizing a second network protocol associated with a second network, and the control unit includes:
51j	a first interface for interfacing with the first network,
51k	the first interface including a first interface-related first component for receiving first data units and a first interface-related second component, the control unit being operable such that the first data units are processed after which processed first data units are provided,
51L	where the first network is at least one of a Controller Area Network type, a Flexray network type, or a Local Interconnect Network type;
51m/n	and a second interface for interfacing with the second network, the second interface including a second interface-related first component for receiving second data units and a second interface-related second component, the control unit being operable such that the second data units are processed after which processed second data units are provided,
51o	where the second network is at least one of the Controller Area Network type, the Flexray network type, or the Local Interconnect Network type.

‘457 Petition, App. A at 1

- PO: ‘843 (claims 2, 4, 7-14, 17-23, 25-29, 33, 35, 36-43, 45-49 54-58) and ‘705 (9, 12-17 and 19) not obvious over Miesterfeld:
  - No motivation to combine Wense or Stewart *(‘1502/’1504 PO Response at 44-59/19-59)*
  - Stewart does not disclose “***sending a notification***” *(‘1502/’1504 PO Response at 49-50/23-25)*
  - Does not share “the” information with a “second network” *(‘1502/’1504 PO Response at 53/25-27)*
  - Miesterfeld does not disclose a CAN bus *(See, e.g.,‘1502 PO Response at 14, 53/29,43)*
  - Same arguments raised in the ‘457 and ‘458 petition and rejected by the Board

‘705 (7c,d,e) and ‘843 (51d,f,g) Patents: A POSITA Would Have Combined Posadas/Miesterfeld and Stewart

‘1502/1503 Petition at 15-18/14-17; ‘1502/’1503 Reply at 7-9/5-7

The Board has already rejected PO’s arguments:

> Petitioner presents a rationale for one of ordinary skill in the art to have combined Posadas, Stewart, and Wense. Pet. 21–23, 40–45. For example, regarding the combination of Posadas and Wense, Petitioner contends, *inter alia*, both relate to distributed systems in a multiplex networking environment and the combination of their teachings would have been predictable. *Id.* at 40, 42 (citing Ex. 1009, 10, 11). Regarding the combination of Posadas and Stewart, Petitioner contends, *inter alia*, both are in the same field of endeavor (real-time distributed control systems) and use similar techniques to solve the same problem (i.e., a shared memory architecture to exchange information between the hybrid control modules that make up a real-time distributed system). *Id.* at 21–22 (citing Ex. 1007, 8; Ex. 1008, 6, 8, 11, 12).

‘1502/’1503/’1504 Reply at 2-4/2-8/2-3, ‘457 FWD at 26, ‘458 FWD at 28-29

> Patent Owner contends there is no basis for combining Posadas and Stewart to arrive at the invention of claim 51. PO Resp. 28–30 (citing Ex. 2004 ¶¶ 30, 33). According to Patent Owner, Petitioner provides no explanation why a skilled artisan would have combined Posadas’s blackboard system with Stewart’s non-blackboard system. *Id.* at 28–30 (citing Ex. 2004 ¶¶ 34–39).

‘1502/’1503/’1504 Reply at 2-4/2-8/2-3, ‘457 FWD at 26-27, ‘458 FWD at 29

> Petitioner contends a blackboard is simply a specific type of shared memory and the operations described by Stewart are fundamental features that could apply to any shared memory environment, e.g., determining whether memory is available before writing is a basic process that is not specific to any memory architecture. Reply 20 (citing Ex. 1037 ¶¶ 59–60). According to Petitioner, Stewart’s spin locks were well-known, simple tools to access shared memory and application to Posadas would have been straightforward. *Id.* at 20–21 (citing Ex. 1037 ¶¶ 61–62; Ex. 1005 ¶¶ 97, 98).

‘1502/’1503/’1504 Reply at 2-4/2-8/2-3, ‘457 FWD at 27, ‘458 FWD at 29

‘705 (7c,d,e) and ‘843 (51d,f,g) Patents: A POSITA Would Have Combined Posadas/Miesterfeld and Stewart

‘1502/1503 Petition at 15-18/14-17; ‘1502/’1503 Reply at 7-9/5-7

The Board has already rejected PO’s arguments:

> We agree that Stewart’s memory management techniques are fundamental techniques applicable to shared memory environments and Petitioner’s reasoning is thus supported by sufficient rational underpinning. *See KSR*, 550 U.S. at 418. In particular, we credit Dr. Koopman’s testimony as being more persuasive than Dr. Miller’s testimony on this point. *See* Ex. 1037 ¶¶ 59–62; Ex. 1005 ¶¶ 97, 98; Ex. 2004 ¶¶ 30–39.

‘1502/’1503/’1504 Reply at 8-9/6-7/7‘457 FWD at 26-28; ‘458 FWD at 29-30

‘705 (7c,d,e) and ‘843 (51d,f,g) Patents: A POSITA Would Have Combined Posadas/Miesterfeld and Stewart

‘1502/1504 Petition at 54-58;17-22; ‘1502/’1504 Reply at 19-20/5-6

The Board has already rejected PO’s argument against combining Miesterfeld with Stewart:

PO:

> Petitioner argues that Stewart discloses this limitation, and that a skilled artisan would combine Miesterfeld and Stewart. Pet. at 17-22. This is incorrect. Miesterfeld discloses a system where communication access to the shared memory is hardware-based:

‘1504 PO Response at 21; ‘1502 PO Response at 45

> Petitioner ignores this aspect of Miesterfeld. Yet, Miesterfeld’s requirement of these handshake lines 68a, 68b is inconsistent with Stewart. Petitioner has not explained how to mediate this inconsistency between Miesterfeld and Stewart. Exh. 2006, ¶51.

‘1504 PO Response at 23; ‘1502 PO Response at 48

The Board:

> We agree with Petitioner that Miesterfeld discloses determining a timeout. *See id.* at 59 (citing Ex. 1010, 6:46–50). Further, for the reasons discussed *supra* with respect to the previous ground, we agree with Petitioner that Stewart teaches the remainder of the memory-related limitations. *See id.* at 59, 62–63 (citing Ex. 1008, 6, 7, 9).

> Patent Owner contends one of ordinary skill in the art would not have combined Miesterfeld and Stewart because Miesterfeld’s handshake lines are inconsistent with Stewart. PO Resp. 48–51 (citing Ex. 1010, 3:67–4:3, 5:32–43; Ex. 2004 ¶¶ 65–68). As Petitioner contends, however, Patent Owner provides no analysis identifying any technical incompatibility. Reply 26. Additionally, we are persuaded by Petitioner’s argument that handshaking and spin-locks are ordinary design choices used to arbitrate access to a stored resource. *Id.* (citing Ex. 1037 ¶¶ 75, 76).

‘1502/’1504 Reply at 19-20/5-6; 457 FWD at 33, 40; ‘458 FWD at 41, 50

‘705 (7c,d,e) and ‘843 (51d,f,g) Patents: A POSITA Would Have Combined Posadas/Miesterfeld and Stewart

‘1502/1503 Petition at 15-18/14-17; ‘1502/’1503 Reply at 7-9/5-7

Dr. Koopman
(Expert for Petitioner)

126. ***The use of the memory access arbitration techniques expressly disclosed in Stewart were well-known, simple design choices to one of ordinary skill in the art:*** Determining whether memory is available before writing to it is a basic, fundamental operation that was well-known to those of skill in the art since the availability of multitasking computers. *See* Section VI.B.2, *supra*. So too are the other limitations for which Petitioner cites Stewart, specifically, limitations 51d-h. These limitations amount to no more than simple, preexisting tools that one of ordinary skill in the art designing a computer system that used shared memory would have been very familiar with, and would have considered using them as nothing more than a simple, trivial design choice. *See* Section VI.B.3, *supra*.

‘1503 Petition at 14-15; Ex. 1005 (Koopman Decl..) at ¶126;
‘1502 Petition at 16-17; Ex. 1004 (Koopman Decl..) at ¶132

127. ***Combining Posadas with Stewart would have been a predictable combination:*** Posadas expressly describes a system that allows messages to be passed between different modules on heterogeneous networks. Ex. 1007, 8-9. The spin locking mechanism with retry and timeout described in Stewart was one of many very well-known and well-understood memory access arbitration techniques that one of ordinary skill in the art would have known could be added to the shared memory architecture of Posadas. *See* Section VI.B.3, *supra*. A person of ordinary skill would be aware of the benefits of using Stewart’s spin locking mechanism because spin locking mechanisms were well known in the art. These are basic concepts in software development and programming and taught as good practice in undergraduate software engineering and programming courses. *Id.*

‘1503 Petition at 15; Ex. 1005 (Koopman Decl..) at ¶127;
‘1502 Petition at 17; Ex. 1004 (Koopman Decl..) at ¶133

128. ***Combining Posadas with Stewart would have yielded no unexpected results:*** Combining Posadas and Stewart would have yielded predictable results. Specifically, one of ordinary skill in the art would have readily understood that combining the two references would allowed the different control modules in Posadas to write information to and from shared memory without interference. *Id.* The combination would also have ensured that the control modules would continually attempt to read and write data to shared memory until successful. *Id.* Similarly, the combination of the teachings of Posadas and Stewart would not have resulted in any inoperable combination because it would simply be adding a well-known spin locking mechanism to the multiprocessor sensory-based architecture in Posadas. *Id.*

‘1503 Petition at 15-16; Ex. 1005 (Koopman Decl..) at ¶128;
‘1502 Petition at 17-18; Ex. 1004 (Koopman Decl..) at ¶134

‘705 (7c,d,e) and ‘843 (51d,f,g) Patents: A POSITA Would Have Combined Posadas/Miesterfeld and Stewart

‘1502/1504 Petition at 54-58;17-22; ‘1502/’1504 Reply at 19-20/5-6

Dr. Koopman
(Expert for Petitioner)

249. ***Both Miesterfeld and Stewart are in the same field of endeavor:*** Both Miesterfeld and Stewart relate to real-time distributed computer control systems with a shared memory architecture. Ex. 1009, Abstract, 3:15-49, 6:31-7:16 and Ex. 1007, 6 at Abstract, 8, 11-12.

‘1502 Petition at 55; Ex. 1004 (Koopman Decl.) at ¶249;
‘1504 Petition at 18; Ex. 1005 (Koopman Decl.) at ¶133

251. ***Both Miesterfeld and Stewart use similar techniques to solve the same problem:*** As described above, both Miesterfeld and Stewart use a shared memory architecture to exchange information between the hybrid control modules that make up a real-time distributed system, such as that of a robot. Moreover, both Miesterfeld and Stewart use a retry loop to continually re-request access to a storage resource (*i.e.*, the “HIGH” exit arc from block 122 of Miesterfeld that leads back to block 122 in a loop). *See*, Ex. 1009, 6:33-40, Fig. 4; Ex. 1007, 11.

‘1502 Petition at 56; Ex. 1004 (Koopman Decl.) at ¶251;
‘1504 Petition at 19; Ex. 1005 (Koopman Decl.) at ¶135

252. ***The use of the memory access arbitration techniques expressly disclosed in Stewart were well-known, simple design choices to one of ordinary skill in the art:*** Determining whether memory is available before writing to it is a basic, fundamental operation that was well-known to those of skill in the art since the availability of multitasking computers. So too are the other limitations for which Petitioners cite Stewart, specifically, limitations 7d and 7f. These limitations amount to no more than simple, preexisting tools that one of ordinary skill in the art designing a computer system that used memory would have been very familiar with, and would have considered using them as nothing more than a simple, trivial design choice.

‘1502 Petition at 56-57; Ex. 1004 (Koopman Decl.) at ¶252;
‘1504 Petition at 19-20; Ex. 1005 (Koopman Decl.) at ¶136

‘705 (7c,d,e) and ‘843 (51d,f,g) Patents: A POSITA Would Have Combined Posadas/Miesterfeld and Stewart

‘1502/1504 Petition at 54-58;17-22; ‘1502/’1504 Reply at 19-20/5-6

PO argues that the existence of “handshake lines” in Miesterfeld would prevent a POSITA from combining it with Stewart

PO:

> Petitioner ignores this aspect of Miesterfeld. Yet, Miesterfeld’s requirement of these handshake lines 68a, 68b is inconsistent with Stewart. Petitioner has not explained how to mediate this inconsistency between Miesterfeld and Stewart. Exh. 2006, ¶104.

‘1502 PO Response at 48; ‘1504 PO Response at 21-23

> 103. Petitioner ignores this aspect of Miesterfeld. Yet, Miesterfeld’s requirement of these handshake lines 68a, 68b is inconsistent with Stewart. Petitioner has not explained how to mediate this inconsistency between Miesterfeld and Stewart.

‘1502 PO Response at 48, Ex. 2006 (Miller Decl.) at ¶ 103;
‘1504 PO Response at 23, Ex. 2006 (Miller Decl.) at ¶ 51

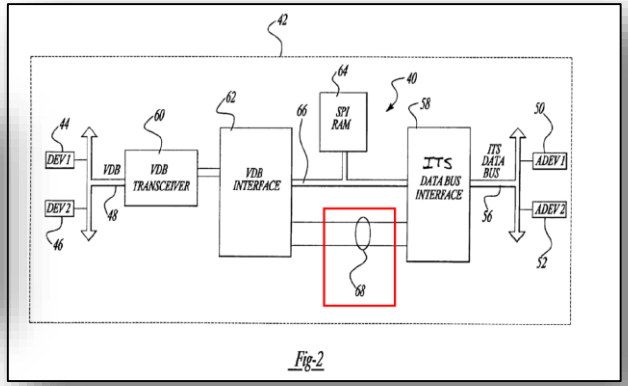


Fig-2

‘1502 PO Response at 47; ‘1504 PO Response at 22

‘705 (7c,d,e) and ‘843 (51d,f,g) Patents: A POSITA Would Have Combined Posadas/Miesterfeld and Stewart

1502/1504 Petition at 54-58;17-22; ‘1502/’1504 Reply at 19-20/5-6

Using a spin-lock (Stewart) vs. handshake (Miesterfeld) would have been nothing more than a ***well-known technique*** that would have ***yielded predictable results***:

253. ***Combining Miesterfeld with Stewart would have been a predictable combination:*** Miesterfeld expressly describes a system that allows messages to be passed between different modules on heterogeneous networks. Ex. 1009, 1:6-10, 3:18-4:10, Figs. 1-2. The spin locking mechanism with retry and timeout described in Stewart was a well-known and well-understood memory access arbitration technique that one of ordinary skill in the art would have known could be added to the shared memory architecture of Miesterfeld. A person of ordinary skill would be aware of the benefits of using Stewart’s spin locking mechanism because spin locking mechanisms were well known in the art. These are basic concepts in software development and programming and taught as good practice in undergraduate software engineering and programming courses. *Id.*

‘1502 Petition at 17; Ex. 1004 (Koopman Decl.) at ¶253;
‘1504 Petition at 20; Ex. 1005 (Koopman Decl.) at ¶137

254. ***Combining Miesterfeld with Stewart would have yielded no unexpected results:*** The combination of the teachings of Miesterfeld and Stewart would have also yielded predictable results. Specifically, one of ordinary skill in the art would have readily understood that combining the two references would allow the different control modules in Miesterfeld to write information to and from shared memory without interference. *Id.* The combination would also have ensured that the control modules would continually attempt to read and write data to shared memory until successful. *Id.* Similarly, the combination of the teachings of Miesterfeld and Stewart would not have resulted in any inoperable combination because it would simply be adding a spin locking mechanism to the sensory-based architecture in Miesterfeld. *Id.*

‘1502 Petition at 17-18; Ex. 1004 (Koopman Decl.) at ¶254;
‘1504 Petition at 21; Ex. 1005 (Koopman Decl.) at ¶138

‘705 and ‘843 Patents: Enablement

‘1502/’1504 Reply at 21-22/8-10

In an obviousness combination the references themselves need not enable the combination or the challenged claims:

PO’s enablement argument has also been rejected as a matter of law. IPR457, 22 (“even a non-enabling disclosure is prior art for all it teaches for purposes of determining obviousness.” IPR457, 22). In any event, Miesterfeld discloses PO’s alleged conversion. In particular, the ITS bus converts data from ITS, stores it in shared memory, and then the VDB interface checks for stored data and shares it by preparing a VDB message onto the VDB bus—*i.e.*, it retrieves ITS data and formats it into a VDB message. Ex. 1010, 4:34-37; 7:29-31; Ex. 1042 ¶ 41.

‘1502/’1504 Reply at 9/21

We also agree with Petitioner that Patent Owner’s assertion that Posadas is not an enabling disclosure is conclusory and without evidentiary support. *See id.* at 17. Further, as Petitioner observes, even a non-enabling disclosure is prior art for all it teaches for purposes of determining obviousness. *Id.* (citing *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1357 (Fed. Cir. 2003) (“[A] reference need not be enabled; it qualifies as a prior art, regardless, for whatever is disclosed therein”)). For the reasons explained above, Posadas sufficiently describes real-time sharing between two networks to support an obviousness determination. *Id.*

‘457/’458 FWD at 22-23/24

‘705 and ‘843 Patents: Enablement

‘1502/’1504 Reply at 21-22/8-10

In an obviousness combination the references themselves need not enable the combination or the challenged claims:

[48] On appeal, Amgen argues that there should be no presumption of enablement in this case because under § 282 courts only presume the claimed subject matter in a patent is enabled. Thus, Amgen argues, because only the unclaimed disclosures of Sugimoto are at issue here, no presumption of enablement should apply. This argument is not relevant, however, because, as reasoned below, we do not only rely on § 282 as the source for a presumption. Instead, relying on our precedent, we hold a presumption arises that both the claimed and unclaimed disclosures in a prior art patent are enabled.

Amgen v. Hoechst, 314 F.3d 131, 1355 (Fed. Cir. 2003)

[53] Our review is not yet finished, however, because it is apparent from the ***1357** district court's opinion that TKT relied upon Sugimoto to assert invalidity of the patents in suit under both § 102 and § 103. In its obviousness inquiry, the district court disregarded Sugimoto because it concluded it was not enabled. *Id.* at 114 n. 29, 57 USPQ2d at 1480 n. 29. Under § 103, however, a reference need not be enabled; it qualifies as a prior art, regardless, for whatever is disclosed therein. *See Symbol Techs., Inc. v. Opticon, Inc.,* 935 F.2d 1569, 1578, 19 USPQ2d 1241, 1247 (Fed.Cir.1991); *Reading & Bates Constr. Co. v. Baker Energy,* 748 F.2d 645, 652, 223 USPQ 1168, 1173 (Fed.Cir.1984). Therefore, the district court's obviousness holdings with respect to Sugimoto are vacated and remanded. On remand, the district court should reconsider obviousness with respect to Sugimoto, but should do so without reference to whether Sugimoto is enabled, as enablement of the prior art is not a requirement to prove invalidity under § 103.

Amgen v. Hoechst, 314 F.3d 131, 1357 (Fed. Cir. 2003)

PO’s new evidence to support its enablement argument:

> [2] To serve as an anticipating reference, the reference must enable that which it is asserted to anticipate. “A claimed invention cannot be anticipated by a prior art reference if the allegedly anticipatory disclosures cited as prior art are not enabled.” *Amgen, Inc. v. Hoechst Marion*

Elan Pharm., Inc. v. Mayo, 346 F.3d 1051, 1054 (Fed. Cir. 2003)

2121.01 Use of Prior Art in Rejections Where Operability is in Question [R-08.2012]

“In determining that quantum of prior art disclosure which is necessary to declare an applicant’s invention ‘not novel’ or ‘anticipated’ within **section 102**, the stated test is whether a reference contains an ‘enabling disclosure’... .” *In reHoeksema,* 399 F.2d 269, 158 USPQ 596 (CCPA 1968). The disclosure in an assertedly anticipating reference must provide an enabling disclosure of the desired subject matter; mere naming or description of the subject matter is insufficient, if it cannot be produced without undue experimentation. *Elan Pharm., Inc. v. Mayo Found. For Med. Educ. & Research,* 346 F.3d 1051, 1054, 68 USPQ2d 1373, 1376 (Fed. Cir. 2003) (At issue was whether a prior art reference enabled one of ordinary skill in the art to produce Elan’s claimed transgenic mouse without undue experimentation. Without a disclosure enabling one skilled in the art to produce a transgenic mouse without undue experimentation, the reference would not be applicable as prior art.). A reference contains an “enabling disclosure” if the public was in possession of the claimed invention before the date of invention. “Such possession is effected if one of ordinary skill in the art could have combined the publication’s description of the invention with his [or her] own knowledge to make the claimed invention.” *In re Donohue,* 766 F.2d 531, 226 USPQ 619 (Fed. Cir. 1985).

I. 35 U.S.C. 102 REJECTIONS AND ADDITION OF EVIDENCE SHOWING REFERENCE IS OPERABLE

It is possible to make a **35 U.S.C. 102** rejection even if the reference does not itself teach one of ordinary skill how to practice the invention, i.e., how to make or use the article disclosed. If the reference teaches every claimed element of the article, secondary evidence, such as other patents or publications, can be cited to show public possession of the method of making and/or using. *In re Donohue,* 766 F.2d at 533, 226 USPQ at 621. See **MPEP § 2131.01** for more information on **35 U.S.C. 102** rejections using secondary references to show that the primary reference contains an “enabling disclosure.”

II. 35 U.S.C. 103 REJECTIONS AND USE OF INOPERATIVE PRIOR ART

“Even if a reference discloses an inoperative device, it is prior art for all that it teaches.” *Beckman Instrumentsv.LKB Produkter AB,* 892 F.2d 1547, 1551, 13 USPQ2d 1301, 1304 (Fed. Cir. 1989). Therefore, “a non-enabling reference may qualify as prior art for the purpose of determining obviousness under **35 U.S.C. 103**.” *Symbol Techs. Inc. v. Opticon Inc.,* 935 F.2d 1569, 1578, 19 USPQ2d 1241, 1247 (Fed. Cir. 1991).

MPEP § 2121.01

‘705 (7g) and ‘843 (51i) Patents: Posadas Teaches sharing “the information” with a “second network”

‘1502/’1503 Petition at 20-24/18-22; ‘1502/’1503 PO Response at 31-34/28-31; ‘1502/’1503 Reply at 10-12/8-10

The Board has already found that Posadas discloses sharing “the information” with a second network:

Petitioner contends Posadas discloses a first network (CAN) and a “second network” that is one of Ethernet, DDE, RS232, “and so on” (i.e., Posadas discloses the limitation “where the second network is at least one of the Controller Area Network, the Flexray network, or the Local Interconnect Network”). Pet. 37 (citing Ex. 1007, 8, Fig. 4). Petitioner further contends one of ordinary skill at the time of the alleged invention would have understood that networks other than CAN, DDE, Ethernet, or RS232 could be used as the “second” network and two such networks were LIN and FlexRay. *Id.* at 38. Petitioner contends LIN and FlexRay were well-known

‘1502/’1503 Reply at 3-4/2, 10, 20-21, ‘457 FWD at 24-25

Patent Owner contends Posadas does not disclose the second network and there is no indication that Posadas’s ISCCAN and SC are interfaces for data units arriving from two separate networks. PO Resp. 21–22 (citing Ex. 2004 ¶¶ 21, 23). According to Patent Owner, Posadas discloses a distributed blackboard for sharing “processed first data units” but there is no second interface that receives messages from a second source which are then processed to create “processed second data units.” *Id.* at 22–23 (citing Ex. 2004 ¶¶ 42–43).

‘1502/’1503 Reply at 3-4/2, 10, 20-21, ‘457 FWD at 25

As Petitioner notes, there is no dispute between the parties that Posadas shares data from a first network (CAN) to a second network (Ethernet). Reply 1. Patent Owner, however, improperly reads into the claim a limitation that requires sharing data in the reverse direction—from the second network (Ethernet) to the first network (CAN). *See id.* at 10–11 Moreover, Petitioner points out that Posadas describes sharing in the revers direction. *Id.* at 11–13. In particular, Posadas’s SC system requires a

‘1502/’1503 Reply at 3-4/2, 10, 20-21, ‘457 FWD at 25

‘705 (7g) and ‘843 (51i) Patents: Posadas Teaches sharing “the information” with a “second network”

‘1502/’1503 Petition at 20-24/18-22; ‘1502/’1503 PO Response at 31-34/28-31; ‘1502/’1503 Reply at 10-12/8-10

The Board has already rejected PO’s position on “the” information:

> We also agree with Petitioner that construction of “the information is capable of being shared” does not encompass delivery of the information to storage, which is addressed in other limitations of claim 51, and need not be read into the limitation at issue. *See* Tr. 9:18–21. Furthermore, the description of “information” as “capable of being stored *or* shared” in the ’843 patent Specification is consistent with storage and sharing being distinct concepts. *See* Ex. 1001, col. 3, ll. 56–59 (emphasis added). In addition, the inclusion of an embodiment in that Specification that does not appear to require storage of the shared information reinforces our conclusion. Ex. 1001, col. 3, ll. 51–55; *see* Tr. 8:7–12, 12:1–14.

IPR2017-00677 FWD at 20

> We find it unnecessary to construe the entire (unparsed) limitation set forth above, which includes elements such as “real-time,” for which Patent Owner has proposed an independent construction. Rather, it is sufficient to construe “the information is capable of being shared,” with the full limitation further limiting the format used. In construing “the information is

IPR2017-00677 FWD at 19

‘705 (7g) and ‘843 (51i) Patents: Posadas Teaches sharing “the information” with a “second network”

‘1502/’1503 Petition at 20-24/18-22; ‘1502/’1503 PO Response at 31-34/28-31; ‘1502/’1503 Reply at 10-12/8-10

Posadas:

The communications system presented includes two communication models: one model is vertical and based on the CAN bus – a fieldbus that enables real-time features; the second model is hybrid-horizontal and supported by a distributed blackboard system (SC) (Posadas, et al., 1997). The SC software enables the main robot controller (Windows NT based) to communicate transparently through different channels: CAN, ethernet, DDE, RS232, and so on. The coupling between these two models is possible using an application interface. The SC behaviour has been verified executing an application (a probabilistic data fusion algorithm) that uses the space/time tagged sensory information broadcast from different modules to decide the optimal trajectory of the robot, and avoid obstacles found during its walk.

‘1502/’1503 Reply at 20/19-20; Ex. 1006 (Posadas) at 8

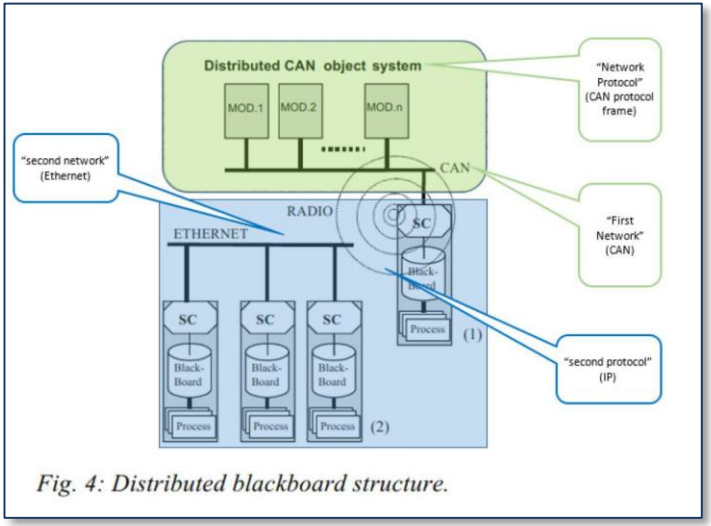


Fig. 4: Distributed blackboard structure.

‘1502/’1503 Reply at 11/9

PO:

In short, Petitioner completely ignores that the limitation requires that “the information” is obtained via a first network using a first protocol, and then shared with a second network using a second and different protocol. When you travel on the same one lane road to and from two destinations, you are retracing the same path using the same road, not using a different road.

‘1502/1503 PO Response at 33/30

‘705 (7g) and ‘843 (51i) Patents: Posadas Teaches sharing “the information” with a “second network”

‘1502/’1503 Petition at 20-24/18-22; ‘1502/’1503 PO Response at 31-34/28-31; ‘1502/’1503 Reply at 10-12/8-10

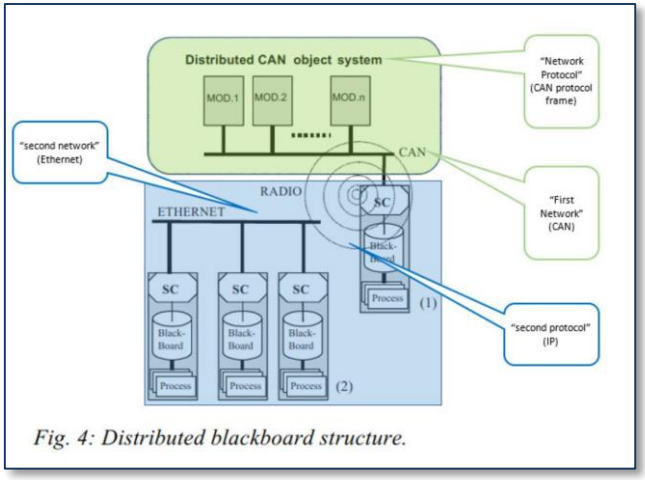


Fig. 4: Distributed blackboard structure.

‘1502/’1503 Reply at 11/9

Dr. Miller (PO’s Expert)

you agree that data does flow from the CAN network, the deliberative system to -- I'm sorry -- from the CAN network reactive system into the SC deliberative system. Is that fair?

A Yeah, I agree that there is data that is going from the CAN to the SC, their communication system.

Q Okay. And as data goes from CAN to SC, it goes first through the SC silo that's labeled "1" in Figure 4. Is that fair?

A I mean, looking at Figure 4, that is what seems to happen, yes.

Q And then the SC shown in "1" communicates with the silo -- things you call silos -- I'll just call them silos -- in "2" via an ethernet radio. Is that fair?

A It seems, looking at the figure, that it's something along those lines.

‘1502/’1503 Reply at 10-12/8-10; Ex. 1039/1043 (Miller 2018 Depo.) at 99:11-100:6

‘705 (7g) and ‘843 (51i) Patents: Posadas Teaches sharing “the information” with a “second network”

‘1502/’1503 Petition at 20-24/18-22; ‘1502/’1503 PO Response at 31-34/28-31; ‘1502/’1503 Reply at 10-12/8-10

PO:

> In short, Petitioner completely ignores that the limitation requires that “the information” is obtained via a first network using a first protocol, and then shared with a second network using a second and different protocol. When you travel on the same one lane road to and from two destinations, you are retracing the same path using the same road, not using a different road.

‘1502/’1503 PO Response at 33/30

> Petitioner first argues that the formats on the two networks are the same, stating that “bit-by-bit copies of CAN messages are received by the CAN network (*e.g.*, the first data units) and sent out to the Ethernet network.” Pet. at 38. But this is contradictory, because the frame formats employed in CAN networks and Ethernet networks are *different*. *See, e.g.* Pet. at 38 (Petitioner’s subsequent argument in respect to Claim 53). Irrespective of Petitioner’s reading of the claim, data units on Posadas’ respective CAN and Ethernet networks cannot have the same format. Exh. 2006, ¶83.

‘1502/’1503 PO Response at 31-34/36

‘705 (7g) and ‘843 (51i) Patents: Posadas Teaches sharing “the information” with a “second network”

‘1502/’1503 Petition at 20-24/18-22; ‘1502/’1503 PO Response at 31-34/28-31; ‘1502/’1503 Reply at 10-12/8-10

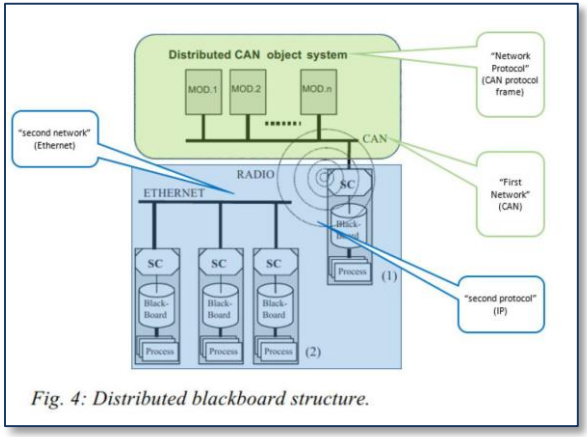


Fig. 4: Distributed blackboard structure.

‘1502/’1503 Reply at 11/9

Dr. Koopman
(Expert for Petitioner)

140. It is my opinion that Posadas expressly discloses this limitation. As discussed above, Posadas expressly discloses two networks; a first network that is a Controller Area Network (“CAN”), and a second network that is either CAN, Ethernet, DDE, RS232, “and so on.” Ex. 1007, 8. Data between these two networks is shared using an “application interface” referred to as “ISCCAN.” *Id.* (“The coupling between these two models is possible using an application interface.”); *id.*, 11 (“The distributed blackboard generated by the SC software ***is extensive to the data in the CAN network***. Each computer node in the CAN network serves data to its running processes ***through the homogeneous SC software interface.*** The gateway software ***ISCCAN performs specific translations between CAN protocol and SC data***.”). The two networks and protocols are expressly shown in Fig. 4 (*id.*, 10):

‘1503 Petition at 18-22 ; Ex. 1005 (Koopman Decl.) at 140
‘1502 Petition at 20-24; Ex. 1004 (Koopman Decl.) at 147

43. Fig. 4 and the accompanying description in the specification (*see* Ex. 1007, 10-11)) shows information flows between the CAN network and the Ethernet network. All information must first flow through the SC storage shown in (1) – the only SC that is physically connected to the CAN network. This information is then distributed over the wireless Ethernet network to processes connected to the Ethernet labeled (2). Thus, “the” information from the first (CAN) network is shared, in real-time, through SC (1), to the other SC storage (2), utilizing a second network protocol (Ethernet). It is my understanding that this is precisely how Patent Owner’s Expert interpreted Posadas, and how the Board likewise found in the ‘457 proceeding. Ex. 1043, 99:11–100:6; *see also id.*, 95:3-8; 96:7-24; IPR457, 20; 24-27.

‘1503 Petition at 18-22; Ex. 1042 (Koopman Reply Decl.) at 43;
‘1502 Petition at 20-24; Ex. 1043 (Koopman Reply Decl.) at 47

‘705 (7g) and ‘843 (51i) Patents: Miesterfeld Teaches sharing “the information” with a “second network”

‘1502/’1504 Petition at 59-61, 66-77/22-25,28-30; ‘1502/’1504 Reply at 20-23/8-10

The Board has already rejected PO’s “no second network” argument against Miesterfeld:

PO:

> As shown in Petitioner’s above annotated figure, Petitioner merely inserts a label of what it argues to two alleged protocols, but does not or explain why they are different. Nothing in Miesterfeld states that VDB and ITS are different protocols, in part because VDB is not a recognized protocol.

‘1504 PO Response at 26; ‘1502 PO Response at 51

The Board:

> Petitioner contends Miesterfeld discloses that the second network is a J1850 network “or any other industry standard as may be required.” Pet. 71 (citing Ex. 1010, 4:6–10). Moreover, Petitioner contends Miesterfeld expressly directs one of ordinary skill in the art that other networks beyond J1850 may be used and one obvious replacement for a J1850 network was the Local Interconnect Network, or “LIN.” Pet. 71–72 (citing Ex. 1010, 9:60–63). Petitioner further contends Wense describes the use of LIN with CAN. *Id.* (citing Ex. 1009, 13; Fig 3). We agree.

‘1502/’1504 Reply at 21/8-9; 457/458 FWD at 39/49,

‘705 (7g) and ‘843 (51i) Patents: Miesterfeld Teach sharing “the information” with a “second network”

‘1502/’1504 Petition at 59-61, 66-77/22-25,28-30; ‘1502/’1504 Reply at 20-23/8-10

PO’s own expert agreed a gateway “converts”:

Q BY MR. GLASS: You see this is the same dictionary you used earlier in construing the word "sharing"; right?

A Yeah.

Q Do you see the definition of "gateway"?

A I do.

Q And it says, "A device that connects networks using different communications protocols so that information can be passed from one to the other. A gateway both transfers information and converts it to a form compatible with the protocols used by the receiving network."

Do you see that?

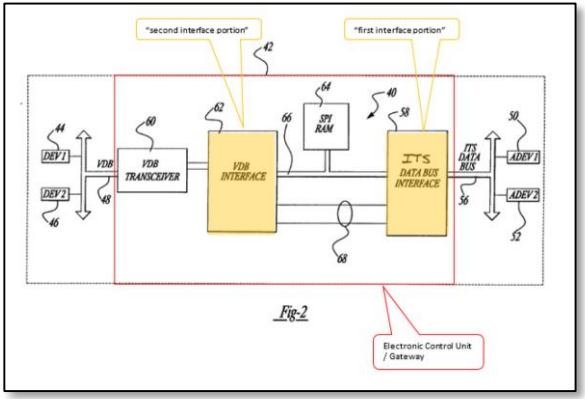
A I do.

Q Do you think that's a reasonable definition for gateway?

A Well, apparently, yes.

‘1502/’1504 Reply at 21-22/9-10; Ex. 1039 (Miller 2018 Dep.) at 71:12-72:3

[54] **INTERFACING VEHICLE DATA BUS TO INTELLIGENT TRANSPORTATION SYSTEM (ITS) DATA BUS VIA A GATEWAY MODULE**



‘1502/’1504 Petition at 62/14; Ex. 1009 (Miesterfeld) at Title and Fig. 2

‘705 (7g) and ‘843 (51i) Patents: Miesterfeld Teach sharing “the information” with a “second network”

“1502/’1504 Petition at 59-61, 66-77/22-25,28-30; ‘1502/’1504 Reply at 20-23/8-10

Miesterfeld expressly teaches converting ITS messages into VDB messages:

Preferably, SPI RAM **64** includes at least 256 bytes of memory which are allocated into slots that are reserved for specific bytes of data. Specific memory locations are preferably allocated for data/commands received from VDB **48** to be used by ITS data bus **56** and for data/commands received from ITS data bus **56** to be transmitted to VDB **48**. Data is preferably loaded into SPI RAM **64** serially by first serially loading an address in which the data will be placed and then loading the data into SPI RAM **64**. SPI RAM **64** also preferably includes an enable pin to enable more than one RAM chip to be placed on SPI bus **66**.

When ITS data bus interface **58** issues a command, it must first write the command word or words to SPI RAM **64** using the procedure as described above with respect to FIG. **4**. In

‘1502/’504 Reply at 21/9; Ex. 1009 (Miesterfeld) 4:34-37; 7:29-31

73. Moreover, Miesterfeld also discloses Patent Owner’s alleged conversion. In particular, the ITS bus converts data from ITS, stores it in shared memory, and then the VDB interface checks for stored data and shares it by preparing a VDB message on the VDB bus—*i.e.*, it retrieves ITS data and formats it into a VDB message. Ex. 1009, 4:34-37, 7:29-31.

‘1502/’1504 Reply at 21/9; Ex. 1038/1042 (Koopman Reply Decl.) ¶ 73 / 41

‘705 (7 l,m,n) and ‘843 (51 m,n,o) Patents: Posadas/Miesterfeld Teach a “second” network

‘1502/’1504 Petition at 68/27-28;‘1502/’1504 Reply at 22-23/10-12

- PO:

> Posadas does not disclose these limitations. Petitioner’s arguments for these limitations completely ignore the language of the claim limitations. The limitations refer to “the second network.” That “the second network” clearly refers to the second network described in the antecedent limitation as the second network utilizing a second different protocol which is the recipient of the “shared” information connected to the storage resource, where the second network is different from the first network.

‘1502/’1503 PO Response at 34-37/31-34

- None of the challenged claims require the second network to “receive” shared information

‘1502/’1503 Reply at 5

- Even so, Posadas discloses sharing the information with the second network

‘1502/’1503 Reply at 10-12/8-10

'705 (7 l,m,n) and '843 (51 m,n,o) Patents: Posadas/Miesterfeld Teach a "second" network

'1502/'1504 Petition at 68/27-28;'1502/'1504 Reply at 22-23/10-12

- PO's arguments for claims 7 l,m,n ('705 patent) and claims 21-23, 26-29, 38, 39, 41, 57, 58 ('843 patent) exclusively rely on the "no CAN" argument

- The Board has already found that Miesterfeld discloses a CAN network:

> Petitioner further contends Miesterfeld discloses an "IDB" bus as an example of a specific ITS data bus and, by definition, IDB runs on CAN. Pet. 70 (citing Ex. 1009, 9:55–58; Ex. 1004 ¶¶ 85–88, 254–55). Petitioner contends the IDB bus disclosed as an ITS data bus in Miesterfeld is a CAN network (i.e., Miesterfeld discloses the limitation "the first network is at least one of a Controller Area Network, a Flexray network, or a Local Interconnect Network"). *Id.*
>
> According to Patent Owner, Miesterfeld refers solely to IDB, which is not CAN:

'1502/'1504 Reply at 22-23/10-12; '457/458 FWD at 35-37/45-47

> We have considered the contentions of Petitioner and Patent Owner, and we find that Petitioner presents persuasive evidence that, at the time of the invention, one of ordinary skill in the art would have understood that the Miesterfeld IDB bus is a CAN bus. Pet. 67–68 (citing Ex. 1010, 9:55–58; Ex. 1005 ¶¶ 85–88, 254–55); PO Resp. 1, 51–52 (citing Ex. 2004 ¶ 69–72); Reply 23–24 (citing Ex. 1037 ¶¶ 66–68). In particular, J2355 expressly teaches the use of CAN as it describes implementing the ITS data bus using "[e]xisting specifications such as the emerging SAE CAN Task Force specification . . . may fit ITS requirements and will be considered during the standards development process." Reply 23–24 (citing Ex. 2002, 8). Moreover, J2355 refers to the forthcoming IDB-C specification (J2366) stating that "[e]volutionary changes to these [J2355] requirements, the technical details of implementation, and performance specifications will be dealt with in ***SAE J2366*** and related documents (emphasis added)." *Id.* (citing Ex. 2002, 3; Ex. 1037 ¶ 66, 68). We find Petitioner presents persuasive evidence that, contrary to Patent Owner's contention, J2355 is not incompatible with CAN. *Id.*

'502/504 Reply at 22-23/10-12; '457/458 FWD at 37-38/46-47,

‘705 (7 l,m,n) and ‘843 (51 m,n,o) Patents: Posadas/Miesterfeld Teach a “second” network

‘1502/’1504 Petition at 68/27-28;‘1502/’1504 Reply at 22-23/10-12

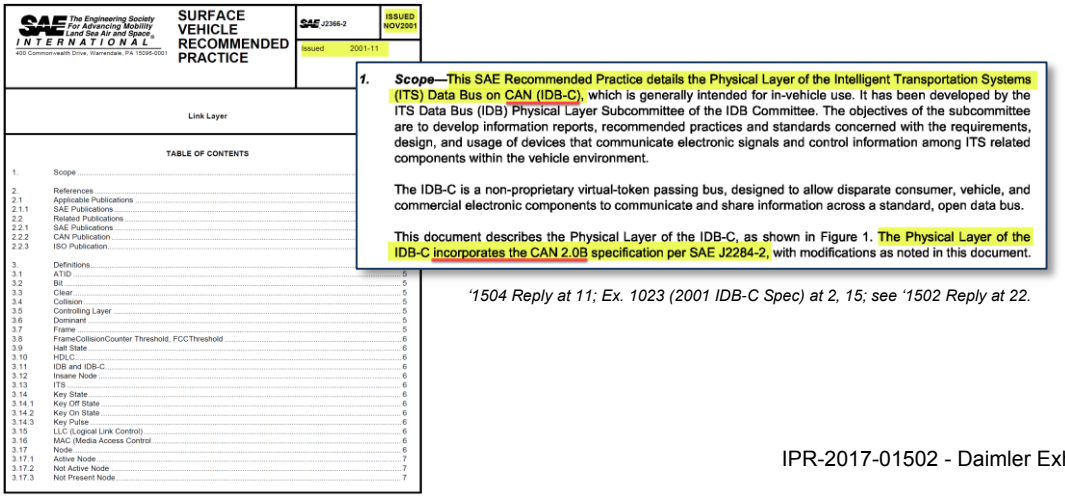
- ***No Dispute***: Miesterfeld teaches an IDB network:

> Further, the present invention enables any of a number of ITS data buses, such as D^{2}B, USB, IDB, Firewall, and the like, with no additional circuitry and requires only a single validation process for any of these buses.

(‘1502/’1504 PO Response at 12-13/28)

‘1502 Petition at 66; Ex. 1009 (Miesterfeld) at 9:55-58;
‘1504 Petition at 28; Ex. 1010 (Miesterfeld) at 9:55-58

- SAE J2366-2 describes ***in 2001*** IDB as using CAN ***at the time of the invention:***



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SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J2366-2 ISSUED NOV2001
Issued 2001-11

Link Layer

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3.15 LLC (Logical Link Control) 6
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3.17 Node 6
3.17.1 Active Node 7
3.17.2 Not Active Node 7
3.17.3 Not Present Node 7

1. **Scope**—This SAE Recommended Practice details the Physical Layer of the Intelligent Transportation Systems (ITS) Data Bus on CAN (IDB-C), which is generally intended for in-vehicle use. It has been developed by the ITS Data Bus (IDB) Physical Layer Subcommittee of the IDB Committee. The objectives of the subcommittee are to develop information reports, recommended practices and standards concerned with the requirements, design, and usage of devices that communicate electronic signals and control information among ITS related components within the vehicle environment.

The IDB-C is a non-proprietary virtual-token passing bus, designed to allow disparate consumer, vehicle, and commercial electronic components to communicate and share information across a standard, open data bus.

This document describes the Physical Layer of the IDB-C, as shown in Figure 1. The Physical Layer of the IDB-C incorporates the CAN 2.0B specification per SAE J2284-2, with modifications as noted in this document.

‘1504 Reply at 11; Ex. 1023 (2001 IDB-C Spec) at 2, 15; see ‘1502 Reply at 22.

‘705 (7 l,m,n) and ‘843 (51 m,n,o) Patents: Posadas/Miesterfeld Teach a “second” network

1502/’1504 Petition at 68/27-28;‘1502/’1504 Reply at 22-23/10-12

- SAE J2366-2 describes the IDB standard that existed ***at the time of the invention*** as using the CAN protocol:

47. I understand Patent Owner introduces an earlier version of the IDB specification published before Miesterfeld—“Standard J2355_199710” (“J2355”)—which it contends is somehow “incompatible with CAN.” R. 28. But J2355 expressly teaches the use of CAN, as the Board has already also expressly found. ‘457 pPaper 34, at 35-36. Section 5.1.4 describes implementing the ITS data bus using “[e]xisting specifications such as the emerging SAE CAN Task Force specification . . . may fit ITS requirements and will be considered during the standards development process.” Ex. 2002, 8. (emphasis added). Indeed, CAN is the only network protocol mentioned in J2355 for use with the ITS data bus. J2355 even refers to the forthcoming IDB-C specification (J2366), stating that “[e]volutionary changes to these requirements, the technical details of implementation, and performance specifications will be dealt with in SAE J2366 and related documents.” Ex. 2002, 3 (emphasis added). Ex. 1037, ¶¶ 69,71.

‘1504 Reply at 12 (Ex. 1042 (Koopman Reply Decl.), ¶47); see ‘1502 Reply at 22, (Ex. 1038 (Koopman Reply Decl.), ¶75)

157. Claim elements 511 requires:

where the first network is at least one of a Controller Area Network type, a Flexray network type, or a Local Interconnect Network type

158. It is my opinion that Miesterfeld expressly discloses this limitation. Specifically, Miesterfeld discloses an “IDB” bus as an example of a specific ITS data bus. *Id.*, 9:55-58. By definition, IDB runs on CAN. A POSA would appreciate that a reference to the ITS Data Bus protocol refers to the SAE J2366 Family of ITS Data Bus (IDB) Protocol Standards (Ex. 1032):

The ITS Data Bus (IDB) is a common communications network interface for in-vehicle components including consumer electronic devices such as navigation systems, satellite radio receivers, and other devices. The IDB is a serial communications bus, based on the industry standard for Controller Area Networks (CAN) that allows consumers to add or upgrade their devices over the lifetime of their vehicle.

See also Ex. 1023 (SAE J2366-1) at § 1, ¶ 3 (disclosing that the IDB physical layer “incorporates the CAN 2.0B specification per SAE J2284-2, with modifications.”); Ex. 1024 (SAE J2366-2) at § 3.11 (disclosing that “the Link Layer protocol for the IDB-C, [is] a low speed network based on CAN 2.0B.”); *see also*, Section VI.B.1.f, *supra*.

159. Thus, the “IDB” bus disclosed as an ITS data bus in Miesterfeld is a CAN bus as required by this limitation.

‘1504 Petition at 27-28; Ex. 1005 (Koopman Decl.) at ¶ 158; see ‘1502 Reply at 22, (Ex. 1038 (Koopman Reply Decl.), ¶75)

- PO misapplies the law by arguing that a POSITA would only have considered the ***1997*** version of the IDB standard (JS2355):

> “A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious ***at the time the invention was made*** to a person having ordinary skill in the art to which said subject matter pertains.”

‘1504 Reply at 11-12 (citing 35 U.S.C. § 103(a) (pre-AIA); see ‘1502 Reply at 20-23

‘705 (7 l,m,n) and ‘843 (51 m,n,o) Patents: Posadas/Miesterfeld Teach a “second” network

‘457 Petition at 67-68; ‘458 Petition at 70; ‘458 PO Resp. at 23-24; ‘458 PO Resp. at 22-24

- PO argues that a POSITA reading Miesterfeld would have only considered the ***1997*** version of the IDB spec

  (‘1504 Resp. at 28-29; ‘1502 Resp. at 53-54)

- The 1997 Standard:

> 5.1.4 ITS DATA BUS—Since it is impractical to attempt to get all vehicle OEMs to adopt a single multiplex data bus for all their vehicle systems, and to allow the retrofit of electronics to the vehicle after it is shipped, the IDB is added to allow multiple devices from different vendors to be connected to the vehicle systems via the gateway controller. To meet the previous requirements, the IDB is a self-configuring, peer-to-peer, multi-drop network supporting at least a 115 Kbps data rate. Existing specifications such as the emerging SAE CAN Task Force specification (a 500 Kbps unshielded twisted pair implementation) may fit ITS requirements and will be considered during the standards development process.

‘1502/‘1504 Reply at 22-23/11-12, Ex. 2002 (IDB 1997 Spec) at 8; ‘1503 Reply at 1-3, 8, ‘458 FWD at 45-47

- The 1997 version of the IDB standard also refers to the 2001 version:

> 4. ***Functional Requirements of the ITS Data Bus***—These requirements were developed through an iterative consensus process. Evolutionary changes to these requirements, the technical details of implementation, and performance specifications will be dealt with in SAE J2366 and related documents.

‘1502/‘1504 Reply at 22-23/10-12, Ex. 2002 (IDB 1997 Spec) at 3; ‘1503 Reply at 1-3, 8, ‘458 FWD at 45-47

‘705 (7f) and (51g) ‘843 Patents: Stewart Teaches “Sending a Notification”

‘1502/’1503 Petition at 20/17-18; ‘1502/’1503 Reply at 9-10/7-8

PO:

> Thus, Stewart does not disclose “sending a notification.” Petitioner’s suggestion that Stewart’s reference to “error handler” constitutes “causing an error notification to be sent” is merely unfounded and erroneous speculation. The typical meaning of an “error handler” is a mechanism that forestalls errors if possible, and then recovers from errors when they occur without terminating the

‘1502/’1503/’1504 PO Response at 30/27/23-25

The Board has already rejected this argument:

> Tr.), 16:13–24:10, 35:16–39:6, 43:19–45:6, 48:19–24. We have reviewed the arguments of Petitioner and Patent Owner and we note as particularly relevant the deposition testimony of Patent Owner’s declarant, Dr. Miller, in which Dr. Miller agreed with Petitioner that an error handler functions to handle an error after it has been detected:
>
> Q. So an error handler handles the error after it’s already occurred; right?
>
> A. Yes.
>
> Q. So it doesn’t prevent it before it happens; right?
>
> A. No.
>
> Ex. 1040, 122:18–123:5.

‘1502/’1503/’1504 Reply at 9-10/7-8/6-8, ‘457 FWD at 18; ‘458 FWD at 19

‘705 (7f) and (51g) ‘843 Patents: Stewart Teaches “Sending a Notification”

‘1502/’1503 Petition at 20/17-18; ‘1502/’1503 Reply at 9-10/7-8

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‘1502/’1503/’1504 PO Response at 30/27/23-25

PO’s Expert:

> Q. So an error handler is generally called when an error occurs; right?
>
> THE WITNESS: Yes.

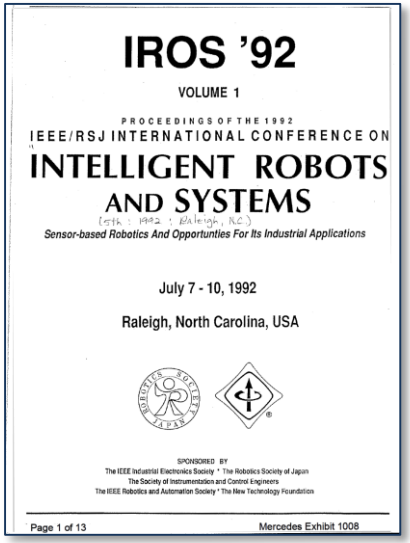
‘1502/’1503/’1504 Reply at 9/5/7; Ex. 1040/1044/1044 Miller 2017 Dep.) at 117:7-25 (objections omitted)

> Q. All right. Now, you used the word "forestall" here. Now, forestall means to prevent; right?
>
> MR. PAZUNIAK: Objection. Form.
>
> THE WITNESS: That's not the way that I used the word. If that actually is what that means, that wasn't my intent.
>
> BY MR. WYCKOFF:
>
> Q. Okay. So an error handler catches an exception after it's already thrown; right? Sorry.
>
> An error handler catches an error after it's already happened; right?
>
> MR. PAZUNIAK: Objection. Form.
>
> THE WITNESS: So you're using the word "catch." So instead, I would prefer to say that an error handler handles the error after it occurs.

‘1502 Reply at 10; Ex. 1040 (Miller 2017 Dep.) at 122:9-23
‘1503 Reply at 8; Ex. 1044 (Miller 2017 Dep.) at 122:9-23
‘1504 Reply at 8; Ex. 1039 (Miller 2017 Dep.) at 122:9-23

‘705 (7f) and (51g) ‘843 Patents: Stewart Teaches “Sending a Notification”

‘1502/’1503 Petition at 20/17-18; ‘1502/’1503 Reply at 9-10/7-8



IROS ’92

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AND SYSTEMS

Sensor-based Robotics And Opportunities For Its Industrial Applications

July 7 - 10, 1992

Raleigh, North Carolina, USA

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Page 1 of 13 Mercedes Exhibit 1008

‘1502 Petition at 20; Ex. 1007 (Stewart) at 1;
‘1503/’1504 Petition at 17-18/10; Ex. 1008 (Stewart) at 1;

Without a bounded waiting time locking mechanism, it is not possible to guarantee that tasks will get the data they require on time, every time. As an alternative, a time-out mechanism is used, so that if the lock is not gained within a pre-specified time or number of retries, then the transfer is not performed. The maximum waiting time for the lock is then the time-out period, which is also equal to *polling_time* * *max_number_of_retries*. For most tasks in a control system, missing an occasional cycle is not be critical. In such a case, the value from the previous cycle still remains in the local table, and will be used during the next cycle. When using the time-out mechanism, error handlers should be installed to detect tasks that suffer successive time-out errors. Discussion on handling these errors is beyond the scope of this paper.

‘1502 Petition at 20; Ex. 1007 (Stewart) at 11 of 13 (330);
‘1503/’1504 Petition at 17-18/22; Ex. 1008 (Stewart) at 11 of 13 (330)

Id. Regarding the statement in Stewart that “discussion on handling these errors is beyond the scope of this paper,” Petitioner contends further details were unnecessary because error handlers were basic tools. *Id.* at 19.

‘1502/’1503/’1504 Reply at 9-10/7-8/6-8, ‘457 FWD at 18; ‘458 FWD at 18

‘705 (7f) and (51g) ‘843 Patents: Stewart Teaches “Sending a Notification”

‘1502/’1503 Petition at 20/17-18; ‘1502/’1503 Reply at 9-10/7-8

A POSITA would understand that “error handlers” send notifications:

‘1502/’1503/’1504 Reply at 9-10/ 7-8/6-8

Dr. Koopman:

37. As I explained in my first declaration, Stewart expressly discloses sending a notification. Specifically, Stewart describes the use of “error handlers” that receive such a notification when an error occurs. In my opinion, error handlers have a well-understood meaning in the art. They include code that is notified and executed when an error occurs. As I understand it, Stragent’s own expert agreed with my understanding of error handlers. I understand Dr. Miller recognized that error handlers “are generally ***called when an error occurs.***” Ex. 1043, 114:7- 116:10.

‘1503/’1504 Reply at 7-8/6-8; Ex. 1042 (Koopman Decl.) at ¶¶ 36-39;
‘1502 Reply at 9-10; Ex. 1038 (Koopman Decl.) at ¶¶ 40-43

Dr. Miller:

Q. So an error handler handles the error after it's already occurred; right?
A. Yes.
Q. So it doesn't prevent it before it happens; right?
A. No.

‘1503/’1504 Reply at 7-8/6-8; Ex. 1044 (Miller 2017 Dep.) at 122-123;
‘1502 Reply at 9-10; Ex. 1040 (Miller 2017 Dep.) at 122-123

Q. There needs to be some kind of mechanism that changes the program control flow -- there needs to be some mechanism for changing program control flow to call the handler; right?
THE WITNESS: So I don't quite understand the question. There needs to be some recognition of an error, and then something to deal with it.

‘1503/’1504 Reply at 7-8/6-8 ; Ex. 1044 (Miller 2017 Dep.) at 114:7-116:10;
‘1502 Reply at 9-10; Ex. 1040 (Miller 2017 Dep.) at 114:7-116:10

‘705 (7f) and (51g) ‘843 Patents: Stewart Teaches “Sending a Notification”

‘1502/’1503 Petition at 20/17-18; ‘1502/’1503 Reply at 9-10/7-8

PO’s new evidence:

> **[6] [7]** To establish that a prior art reference inherently —rather than expressly—discloses a claim limitation, “the limitation at issue necessarily must be present, or [is] the natural result of the combination of elements explicitly disclosed by the prior art.” *Par Pharm.*, 773 F.3d at 1196. Here, Custopharm argues that the vehicle formulation was “necessarily present” in the Articles because it was later revealed to be the actual formulation the authors of the Articles used in their reported clinical studies. We disagree.

‘Endo Pharm. V. Custopharm Inc., 894 F.3d 1374, 1381 (Fed. Cir. 2018); *Southwire Co. v. Cerro Wire,* 870 F.3d 1306, 1310-11 (Fed. Cir. 2017) (same proposition)

PO is incorrect:

> **[13] [14]** A person of ordinary skill at the time of the invention interprets the prior art using common sense and appropriate perspective. *KSR*, 550 U.S. at 421, 127 S.Ct. 1727.

Unigene Labs v. Apotex, 655 F.2d 1352, 1361 (Fed. Cir. 2011)

> Our suggestion test is in actuality quite flexible and not only permits, but *requires,* consideration of common knowledge and common sense. *See, e.g., In re Kotzab,* 217 F.3d 1365, 1369 (Fed.Cir.2000) (“A critical step in analyzing the patentability of claims pursuant to section 103(a) is casting ***1368** the mind back to the time of invention, to consider the thinking of one of ordinary skill in the art, guided only by the prior art references and the then-accepted wisdom in the field.”);

Dystar Textilfarben GmbH v. C.H. Patrick., 464 F.3d 1356, 1367 (Fed. Cir. 2006)

> I believe that it would better reflect the concept of obviousness to speak in terms of “*from* the prior art” rather than simply “*in* the prior art.” The word “from” expresses the idea of the statute that we must look at the obviousness issue through the eyes of one of ordinary skill in the art and what one would be presumed to know with that background. What would be obvious to one of skill in the art is a different question from what would be obvious to a layman. An artisan is likely to extract more than a layman from reading a reference.

In Re Oetiker, 977 F.2d 1443, 14487 (Fed. Cir. 1992) (Nies, Concurring)

‘843 and ’705 Patents: Dependent claims

‘1502/’1503 Petition at 42-51/38-83

- PO raises claim-specific arguments against Posadas and Miesterfeld only with respect to certain claims
  - **‘1503 Petition/ (‘843 patent):**
    - Posadas: Claim specific arguments raised only for claims 3, 5-7, 15, 31, 34, 38, 39, 40, 44, 52, 53 and 59
  - **‘1504 Petition/ (‘843 patent):**
    - Miesterfeld: Claim specific arguments raised only for claims 3, 5, 6, 15, 16, 24, 31, 32, 34, 44, 52, 53, and 59
  - **‘1502 Petition/ (‘705 patent):**
    - Posadas/Miesterfeld: Claim specific arguments for claims 8, 10, 11, 18

‘843 (claim 3) and ’705 (claim 8) Patents: Posadas/Miesterfeld disclose a bulletin board

‘1502/’1503/’1504 Petition at 42,77-78/47-48/45

‘843 claim 3:

> **3**. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the storage resource includes a bulletin board resource.

‘705 claim 8:

> **8**. The non-transitory computer-readable medium as recited in claim **7**, wherein the storage resource includes a bulletin board.

- PO:
  - Posadas’s “distributed blackboard” and Miesterfeld’s memory are not a “bulletin boards” *’1502/’1503/’1504 PO Response at 37-38/38-39/34-35*
  - PO’s arguments are based on improperly importing a single statement from the spec into the claims *’1502/’1503/’1504 Reply at 12-13/13-14/15-18*
  - Both Posadas and Miesterfeld disclose a bulletin board even under PO’s overly restrictive construction *’1502/’1503/’1504 Reply at 12-13/13-14/15-18*

‘843 (claim 3) and ’705 (claim 8) Patents: Posadas/Miesterfeld discloses a bulletin board

‘1502/’1503/’1504 Petition at 42,77-78/47-48/45

- PO impermissibly compares the patent specification
- to the prior art:
- The ‘843 specification:

‘1502/’1503 PO Resp. at 38/38-39

This is incorrect, because the term “bulletin board” is not the same as Posadas’ distributed blackboard. The Patent states:

The approach uses a common, or shared storage system that is connected to all of the system networks through network interfaces. A critically important feature of the bulletin board approach is that the complexity of the bulletin board grows linearly with the number of networks (as opposed to as N(N-1) for the gateway approach), and in one-to-many situations the number of message transformations is half that of the standard networking approach.

Exh. 1001, 7:30-37. The bulletin board is also depicted in Figure 6.

In contrast, Posadas has distributed blackboard, where every silo has its own SC interface, processor and only part of the entire blackboard.

‘1502/’1504 PO Resp. 55/35

Miesterfeld’s shared memory “mailboxes” are distinguishable from the bulletin board required by Claim 8, because the “mailboxes” are incapable of accommodating “electronic messages, file, and/or other data that are of general interest and/or addressed to no particular person/process.” Miesterfeld’s “mailboxes” store exclusively predetermined content and lack the generality and flexibility of a bulletin board:

At design time, various hierarchies of memory management can be applied. In practice it is more efficient to allow each sub network and subsystem to place system variable data into local bulletin boards. This is because many system variables are primarily used only within their subsystem or sub network. By placing local information in a shared memory (local bulletin board), it can be used by multiple processes on this processor node. A group bulletin board allows devices on a sub-network to share information with a minimum of network traffic. A system bulletin board allows access to system-wide variables and information.

In one embodiment, both past and present instances of the information may be stored on the bulletin board. As an option, the information may be replicated among a plurality of the bulletin boards. Optionally, first information may be processed utilizing a first bulletin board and stored utilizing a second bulletin board. Still yet, the bulletin boards may be hierarchical.

‘1502 Reply at 13; Ex. 1001 (‘705 patent) at 1:33-40;
‘1503 Reply at 13-14; Ex. 1001 (‘843 patent) at 1:33-40;
‘1504 Reply at 17; Ex. 1001 (‘843 patent) at 1:33-40

‘1502 Reply at 13; Ex. 1001 (‘705 patent) at 6:22-33;
‘1503 Reply at 13-14; Ex. 1001 (‘843 patent) at 6:22-33;
‘1504 Reply at 17; Ex. 1001 (‘843 patent) at 6:22-33

‘843 (claim 3) and ’705 (claim 8) Patents: Posadas/Miesterfeld disclose a bulletin board

1502/’1503/’1504 Petition at 42,77-78/47-48/45

- Posadas discloses a Bulletin Board even under PO’s narrow construction
- PO’s expert:

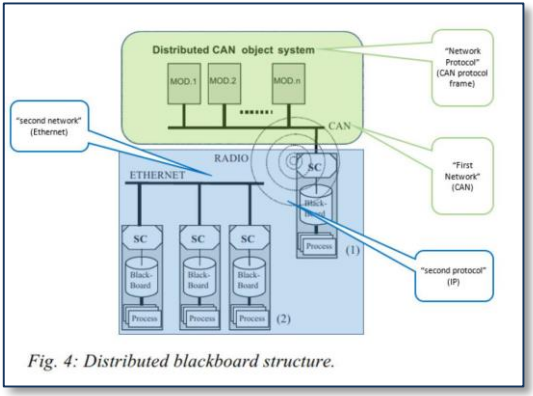


Fig. 4: Distributed blackboard structure.

Dr. Miller (PO’s Expert)

you agree that data does flow from the CAN network, the deliberative system to -- I'm sorry -- from the CAN network reactive system into the SC deliberative system. Is that fair?

A Yeah, I agree that there is data that is going from the CAN to the SC, their communication system.

Q Okay. And as data goes from CAN to SC, it goes first through the SC silo that's labeled "1" in Figure 4. Is that fair?

A I mean, looking at Figure 4, that is what seems to happen, yes.

Q And then the SC shown in "1" communicates with the silo -- things you call silos -- I'll just call them silos -- in "2" via an ethernet radio. Is that fair?

A It seems, looking at the figure, that it's something along those lines.

’1502 Reply at 13; Ex. 1039 (Miller 2018 Dep.) at 99:11-100:6; ’1503 Reply at 13; Ex. 1039 (Miller 2018 Dep.) at 99:11-100:6

‘843 (claim 3) and ’705 (claim 8) Patents: Posadas/Miesterfeld disclose a bulletin board

1502/’1503/’1504 Petition at 42,77-78/47-48/45

- Miesterfeld discloses a Bulletin Board even under PO’s narrow construction
- The memory described in the ‘843/’705 patent is ***the same*** as Miesterfeld’s memory:

57. I understand the Patent Owner further argues that Miesterfeld is different because it uses the word “predetermined” to describe its memory is likewise a distinction without a difference. R. 55. This is an inaccurate understanding of Miesterfeld. Miesterfeld uses the word “predetermined” to describe how its data is organized, and is not in any way limiting on the type of data that is stored, or how it is (or is not) addressed. Indeed, I do not understand the claim language or specification to preclude placing data in certain locations in memory. In fact, this is how bulletin boards work, including the one in the ‘843 patent. Each data variable value is stored in a known location, which is “predetermined” (i.e, a fixed location) in an ordinary bulletin board, so that all processes accessing the bulletin board know where to read or write that particular data value. To the contrary, the ‘843 patent expressly describes using similar predetermined locations as Miesterfeld. 6:4-10. This is precisely how bulletin boards work, including the one in the ’843 patent.

‘1504 Reply at 17-18, Ex. 1042 (Koopman Reply Decl.) at ¶ 57;
‘1502 Reply at 23-26; Ex. 1038 (Koopman Reply Decl.) at ¶ 80

The memory of the bulletin board is subdivided into areas that nodes on each external network can read from and write into and other areas that an external network may only read from. The data contained in the bulletin board may be stored in volatile or non-volatile memory. Each data entry may consist of one value or an array of values that also may represent a time series.

‘1502/’1504 Reply at 25-26/17-18, Ex. 1001 (‘705/’843 patent) at 6:4-10

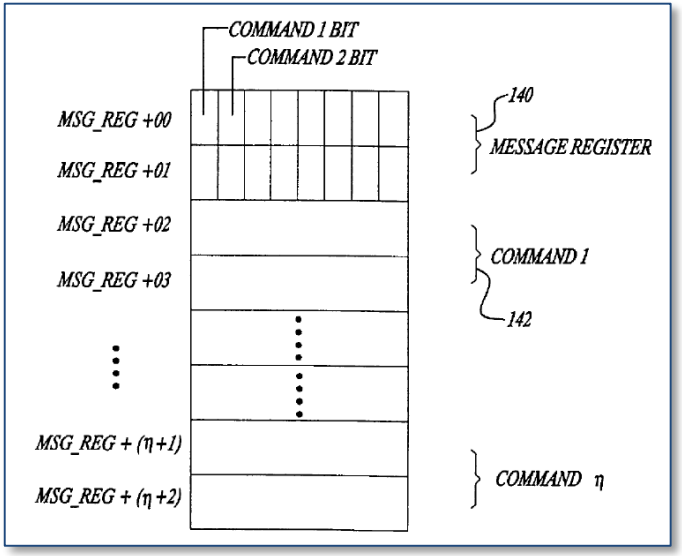
‘843 (claim 3) and ’705 (claim 8) Patents: Posadas/Miesterfeld disclose a bulletin board

‘1502/’1503/’1504 Petition at 42,77-78/47-48/45

- Miesterfeld meets PO’s “Bulletin Board” requirements – it stores data that is addressed to “no particular person/process” – as admitted by PO’s expert:

Q That's not my question.
My question is: Is there a field defined in Figure 5 for the process ID destination of the data that should -- that the command should be delivered to?
A So regardless of whether there is or is not, which I could say there is not shown in that figure, that doesn't mean that certain locations are not designated for the different data buses.
Q But you agree that there is no express field in that figure? It's not shown in the figure?
A I already answered that question.
Q Whether you think there might be other aspects that may describe that, it's not expressly described in that figure?
A I already answered that question.

‘1504 Reply at 15-16, Ex. 1043 (Miller 2018 Dep.) at 87:20-25; 1502 Reply at 23-24, Ex. 1039 (Miller 2018 Dep.) at 87:20-25



‘1504 Reply at 15-16, Ex. 1010 (Misterfeld) fig. 5; 1502 Reply at 23-24, Ex. 1009 (Misterfeld) fig. 5

‘843 (claim 3) and ’705 (claim 8) Patents: Posadas/Miesterfeld disclose a bulletin board

'1502/'1503/'1504 Petition at 42,77-78/47-48/45

- Miesterfeld meets PO’s “Bulletin Board” requirements – Miesterfeld stores “electronic messages, file, and/or other data that are of general interest/”

Miesterfeld stores both (1) “files” and (2) “and/or other data:

Further, the mailboxes can be grouped into pages, Page 1, Page 2 for subject specific data, such as manufacturer specific data, engine related data, transmission related data, and the like. Similar pagination may be implemented for arranging command mailboxes into pages.

‘1504 Reply at 15-18, Ex. 1010 (Miesterfeld) at 3:35-39;
‘1502 Reply at 23-26, Ex. 1009 (Miesterfeld) at 3:35-39

Just like the ‘843 patent:

At design time, various hierarchies of memory management can be applied. In practice it is more efficient to allow each sub network and subsystem to place system variable data into local bulletin boards. This is because many system variables are primarily used only within their subsystem or sub network. By placing local information in a shared memory

‘1504 Reply at 17, Ex. 1001 (‘843 patent) at 6:22-25;
‘1502 Reply at 25, Ex. 1001 (‘843 patent) at 6:22-25

‘843 (claim 32) and ’705 (claim 10) Patents: Posadas/Miesterfeld disclose temporally isolated processes

‘1502/’1503/’1504 Petition at 43-44, 79-80/64-65/66-67; ‘1502/’1504 Reply at 13-16, 26-27/23-24

‘843 claim 32:

> **32**. The non-transitory computer-readable medium as set forth in claim **31**, wherein the computer program product is operable such that the first network and the second network are heterogeneous networks, and each of a plurality of different processes process the information in a manner that is isolated from temporal characteristics associated with the heterogeneous networks.

‘705 claim 10:

> **10**. The non-transitory computer-readable medium as recited in claim **7**, wherein the computer program product is operable such that at least one of the different processes process the information in a manner that is isolated from temporal characteristics associated with at least one of a plurality of heterogeneous networks.

- PO raises an “antecedent basis” argument based on independent claims;
  ‘1502/’1504 PO Response at 38-39/44-47
- The independent claims are not challenged here, and based on Board’s ’457/’458 rulings they are unpatentable *‘1502/’1504 Reply at 13-15, 26-27/23-24*
- Both Posadas and Miesterfeld are temporally isolated *‘1502/’1503/’1504 Petition at 43-44, 79-80/64-65/66-67; ‘1502/’1504 Reply at 13-16, 26-27/23-24*
- PO’s Expert admitted Miesterfeld was temporally isolated *‘1502 Reply at 26-27; Ex. 1039 (Miller 2018 Dep.) at 80:8-81:24; ‘1504 Reply at 23; Ex. 1043 (Miller 2018 Dep.) at 80:8-81:24*

‘843 (claim 32) and ’705 (claim 10) Patents: Posadas/Miesterfeld disclose temporally isolated processes

‘1502/’1503/’1504 Petition at 43-44, 79-80/64-65/66-67; ‘1502/’1504 Reply at 13-16, 26-27/23-24

- PO admits “process” of claim 10 is the same as “processing” of 7j/7m
- The Board has already found claim 7 unpatentable
- PO raised identical arguments in connection claims 7/32 against Miesterfeld
  ’1502 PO Response at 56; ‘1504 PO Response at 46

network. Pet. at 43-44. Petitioner ignores the antecedent basis of the “different processes” of Claim 10, which lie in claim elements 7j and 7m. The “processing” in the context of the claim is the processing of the “first interface-related first layer messages” and the “second interface-related first layer messages.” Petitioner refers to “processes” broadly, without a tether to the language of the claim, and has not shown that the “processing,” “translat[ion],” or “defined filtering” of Posadas are in relation to any interface-related first-layer message, or for that matter “isolated from temporal characteristics associated with at least one” network. Exh. 2006, ¶90.

‘1502/’1504 PO Response at 39/45-47

Petitioner does not address or point to any “processing” in the context of the claim language at all. Petitioner ignores the antecedent basis of the “different processes” of Claim 10, which lie in claim elements 7j and 7m. The “processing” in the context of the claim is the processing of the “first interface-related first layer messages” and the “second interface-related first layer messages.” Petitioner’s

‘1502/’1504 PO Response at 56/45-47

‘843 (claim 32) and ’705 (claim 10) Patents: Posadas/Miesterfeld disclose temporally isolated processes

‘1502/’1503/’1504 Petition at 43-44, 79-80/64-65/66-67; ‘1502/’1504 Reply at 13-16, 26-27/23-24

- Posadas’s networks are temporally isolated – it discloses two networks (CAN and Ethernet) that operate at different data rates

54. In the context of claim 10, it is my opinion that “isolated” means that the process execution timing is not based on the temporal characteristics of a network. Posadas uses two networks – a CAN and Ethernet network – which operate at different bitrates. *See, e.g.,* Ex. 1006 at 8. These networks interface through an ISCAAN. Pet., 42-43. Because the networks operate at different bit rates, the system simply would not operate if they were not temporally isolated by the ISCCAN. *Id.* Indeed, this comports with Posadas’s explanation that “***any Windows application*** (local or remote) can access the communication system with all the necessary communications hidden (including CAN),” as they would be unable to access CAN data with necessary communications hidden if those windows processes were ***not*** temporally isolated. Ex. 1006, 9. More specifically, Posadas’s bulletin board

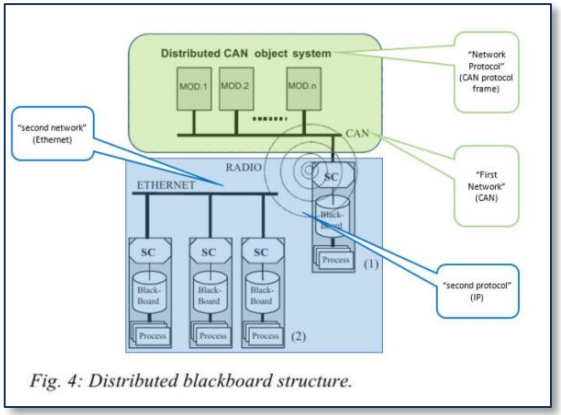


Fig. 4: Distributed blackboard structure.

‘1502 Reply at 15; Ex. 1038 (Koopman Reply Decl.) at ¶54; ‘1503 Reply at 8-10; Ex. 1042 (Koopman Reply Decl.) at ¶41-44

‘843 (claim 32) and ’705 (claim 10) Patents: Posadas/Miesterfeld disclose temporally isolated processes

‘1502/’1503/’1504 Petition at 43-44, 79-80/64-65/66-67; ‘1502/’1504 Reply at 13-16, 26-27/23-24

- Data processed from blackboard through ISCCAN through Ethernet bus in 100 and 300 ms periods

During the test, the REC process was running in a node outside the CAN network and communicated through a wireless IP network and the described SC+ISCCAN facilities. We obtained good communications performance running REC tasks with the following periodicity.

- Obtain odometric information: 100ms
- Send control action: 100ms
- Obtain ultrasonic information: 300ms
- Obtain infrared information: 300ms

‘1502/’1503 Reply at 11/15; Ex. 1006 (Posadas) at 154 (11 of 13)

- Data processed on CAN bus every 8, 10, or 50 ms period

Two processes are executed to validate the low-level communication system. A local version of the reactive control application described above is running in the main processor. The motion control module runs another obstacle avoiding algorithm. CAN analysis latencies require fixed transmission period times and efficient CPU scheduling to guarantee this supposition. Consequently, in the following analysis, the deadline processes are supposed to be guaranteed. The definition of these analysed applications is:

- Local reactive application, threads:
  - Obtain odometric information: 8 ms
  - Obtain ultrasonic information: 50 ms
  - Obtain infrared information: 10 ms

‘1502/’1503 Reply at 15/19; Ex. 1006 (Posadas) at 156 (13 of 13)

As PO’s expert admitted, Miesterfeld expressly discloses temporal isolation:

So in that paragraph, there's no -- the writing to the VDB bus does not take into account the speed of the network, whatever that may be?

A Yeah. Looking at that paragraph, that's true.

Q And it also likewise doesn't take into account the rate of the ITS bus, whatever that may be; right?

A Yeah, I would agree with that.

‘1502 Reply at 26, Ex. 1039 (Miller 2018 Dep.) at 80:8-81:24;
‘1504 Reply at 23, Ex. 1043 (Miller 2018 Dep.) at 80:8-81:24

In a preferred mode of the invention, VDB interface **62** utilizes two criteria to determine when to attempt to transmit a message onto VDB **48**. First, VDB interface **62** will only attempt to initiate a transmission onto VDB **48** after 40 milliseconds have past since VDB interface **62** last successfully initiated a VDB transmission. Second, VDB interface **62** will wait until VDB **48** is idle before attempting to transmit a message onto VDB **48**. Note that VDB interface **62** may need to arbitrate for control of VDB **48** when attempting a transmission.

‘1502 Reply at 26, Ex. 1009 (Miesterfeld) at 8:50-60;
‘1504 Reply at 23, Ex. 1010 (Miesterfeld) at 8:50-60

’705 Patent claim 11: Posadas/Miesterfeld disclose sharing the information with an operating system *‘1502 Petition at 44-45, 80-81; ‘1502 Reply at 16-17*

‘705 claim 11:

> **11**. The non-transitory computer-readable medium as recited in claim **7**, wherein the computer program product is operable such that the information is shared with an operating system.

PO– no motivation to combine:

system. *See* Pet. at 45. Petitioner’s argument–that one of ordinary skill would have seen the substitution of the Chimera II real-time operating system for Windows NT as a “simple and obvious design choice”–overlooks the fact that Stewart’s Chimera II operating system was confined to a single bus. *See* Exh. 1007 at §IV, p.329. Adaptation of a real-time operating system to a multiple-bus apparatus would have required undue experimentation and would not, contrary to Petitioner’s assertion, have been an obvious design choice. Exh. 2006, ¶92.

‘1502/’1503 Reply at 40-41, 57-58/ 43

PO’s expert:

real-time operating system. *See* Pet. at 45. Petitioner’s argument–that one of ordinary skill would have seen the substitution of the Chimera II real-time operating system for Windows NT as a “simple and obvious design choice”–overlooks the fact that Stewart’s Chimera II operating system was confined to a single bus. *See* Exh. 1007 at §IV, p.329. Adaptation of a real-time operating system to a multiple-bus apparatus would have required undue experimentation and would not, contrary to Petitioner’s assertion, have been an obvious design choice.

‘1502/’1503/Reply at 40-41, 57-58/ 43, Ex. 2006 (Miller Decl.) at ¶ 92/ 104

- PO raises the same “single bus” argument for both Posadas and Miesterfeld

  ‘1502/’1503 Reply at 40-41, 57-58/ 43
- The Board has already rejected this argument

  ‘1502 Reply at 16-17, 458 FWD at 29-30

'705 Patent claim 11: Posadas/Miesterfeld disclose sharing the information with an operating system *'1502 Petition at 44-45, 80-81; '1502 Reply at 16-17*

PO's Stewart motivation to combine argument has already been rejected by the Board:

> Petitioner presents a rationale for one of ordinary skill in the art to have combined Posadas, Stewart, and Wense. Pet. 21–24, 42–47. For example, regarding the combination of Posadas and Wense, Petitioner contends, *inter alia*, both relate to distributed systems in a multiplex networking environment and the combination of their teachings would have been predictable. *Id.* at 42–47 (citing Ex. 1009, 10, 11). Regarding the combination of Posadas and Stewart, Petitioner contends, *inter alia*, both are in the same field of endeavor (real-time distributed control systems) and use similar techniques to solve the same problem (i.e., a shared memory architecture to exchange information between the hybrid control modules that make up a real-time distributed system). *Id.* at 21–24 (citing Ex. 1006, 8; Ex. 1008, 6, 8, 11, 12).

'1502 Reply at 12 (Posadas); '1502 Pet. at 68-77, 87 (Miesterfeld); 458 FWD at 28-30, 29-50; '457 FWD at 26, 39-41

> We agree that Stewart's memory management techniques are fundamental techniques applicable to shared memory environments and Petitioner's reasoning is thus supported by sufficient rational underpinning. *See KSR*, 550 U.S. at 418. In particular, we credit Dr. Koopman's testimony as being more persuasive than Dr. Miller's testimony. *See* Ex. 1036 ¶¶ 59–62; Ex. 1004 ¶¶ 97, 98; Ex. 2004 ¶¶ 30–39.

'1502 Reply at 16; '1502 Pet. at 68-77, 87 (Miesterfeld); '458 FWD at 29-30, 49-50; '457 FWD at 27, 39-41

Dr. Koopman:

> 58. Perhaps Dr. Miller doesn't offer an explanation because the notion that Stewart is somehow incompatible with Posadas because it uses a single bus is incorrect. A POSITA would expect most, if not all, real-time operating systems to be capable of handling multiple communication buses. As I explained in detail in my previous declarations, combining elements of Posadas and Stewart would have required only a trivial substitution, and would have required no more than ordinary skill. Ex. 1004, 63-64. Windows NT is a soft real-time operating system by virtue of the fact that deliberative messages passing through the main controller or bridge are soft-real time. Ex. 1006, 11, *see also* 1004, 70. The main controller uses windows NT to communicate through both CAN and radio Ethernet. *Id.*, 9. Therefore, Windows NT is a soft real time operating system that would be capable of handling multiple buses.

'1502 Reply at 17; Ex. 1036 (Koopman Decl.) at ¶ 58; '1502 Pet. at 68-77, 87, Ex. 1004 at ¶ 295-303

'705 Patent claim 11: Posadas/Miesterfeld disclose sharing the information with an operating system *'1502 Petition at 44-45, 80-81; '1502 Reply at 16-17*

Dr. Koopman:

59. I understand that Patent Owner further argues that Posadas does not "share" information with the Windows NT operating system itself. I disagree with this conclusion. I understand that Stragent's expert testified, "[b]y the development of the SC system, the Windows NT processes have access to the high-level distributed data." Ex. 1039, 104:8-105:3; Pet. at 45, citing Ex. 1006 at 9. I agree with Stragent's expert. Windows NT would have access to the high-level distributed data, and therefore, a POSITA would understand Posadas to teach that such information is "shared" with the Windows NT operating system.

'1502 Reply at 17; Ex. 1038 (Koopman Decl.) at ¶ 59

PO's Expert:

But he does at least state that the Windows NT processes have access to the distributed data?

THE WITNESS: So if I understand what you're saying, so it's -- so within the Windows NT processes -- I'm sorry. Take that back.

By the development of the SC system, the Windows NT processes have access to the high-level distributed data.

'1502 Reply at 17; Ex. 1039 (Miller 2018 Dep.) at 104:19-105:6 (objections omitted)

Posadas:

The communications system presented includes two communication models: one model is vertical and based on the CAN bus – a fieldbus that enables real-time features; the second model is hybrid-horizontal and supported by a distributed blackboard system (SC) (Posadas, et al., 1997). The SC software enables the main robot controller (Windows NT based) to communicate transparently through different channels: CAN, ethernet, DDE, RS232, and so on. The coupling between these two models is possible using an application interface.

4. DISTRIBUTED BLACKBOARD SYSTEM (SC)

High-level access to distributed data in WinNT processes has been provided by the development of a system (SC) that hides communication details behind a uniform bind-notification interface (Fig. 4).

- Main control node. This is an embedded PC under Windows-NT. It has a digital colour camera, a floating point DSP board, a full CAN interface, and radio ethernet link that provides external IP communication. Currently, this module runs a control application whose main purpose is fusing sensor data to obtain an escape vector for collision avoidance (Braintenberg, 1984)

'1502 Petition at 45; Ex. 1006 (Posadas) at 151-152

'705 Patent claim 18: Posadas/Miesterfeld disclose a "diagnostic mode"

'1502 Petition at 49-50, 85; '1502 Reply at 17-19, 27-28

'705 claim 18:

> **18**. The non-transitory computer-readable medium as recited in claim **7**, wherein the computer program product is operable such that multiple modes of operation are enabled, wherein at least one of the modes includes a diagnostic mode.

- PO's "diagnostic mode" argument is based on its flawed claim construction position
  '1502 PO Response at 41-43, 58-59
- But even applying that position, claim 18 is disclosed by both Posadas and Miesterfeld
  '1502 Reply at 5-7, 17-19, 27-28

’705 Patent claim 18: Posadas/Miesterfeld disclose a “diagnostic mode”

‘1502 Petition at 49-50, 85; ‘1502 Reply at 17-19, 27-28

Posadas’s “rec” module is an alternative mode and is not temporary:

Dr. Koopman:

63. As I discussed above, I do not understand term “diagnostic mode” to require temporariness nor permanency, and I do not agree with either of Patent Owner’s proposed constructions of claim 18. Nonetheless, if Patent Owner’s “permanent” claim construction theory were accepted, it is my opinion that Posadas still discloses Patent Owner’s alleged second mode of operation—the REC module’s purpose is “to stress the system to evaluate its performance,” in other words, “an alternate mode of operation, distinct from normal operations, that still allows inspection of the system while it is running.” Ex. 1006, 11. Performance cannot be evaluated via a test without inspecting the system while it is running, and inclusion of a “diagnostic socket,” which is a hardware attachment to Posadas’s circuit, indicates permanent diagnostic capability.

‘1502 Reply at 18-20; Ex. 1038 (Koopman Reply Decl.) ¶¶63-64

Posadas:

6. TESTING PROTOTYPE

To validate the communication system, a module for reactive control based on a local map has been built. This module is called REC and is shown in Figure 5. It obtains sensory information and sends control actions to the robot using the defined communication structure (SC+ISCCAN).

The REC test bed has been designed to stress the communication system in order to evaluate its performance. Reactive control actions for avoiding obstacles are computed from local map data that consist of a bundle of vectors. Each vector offers information regarding obstacle’s proximity, as well as time and probability properties used in data fusion.

These control periods are slow and force the robot to move slowly during the test.

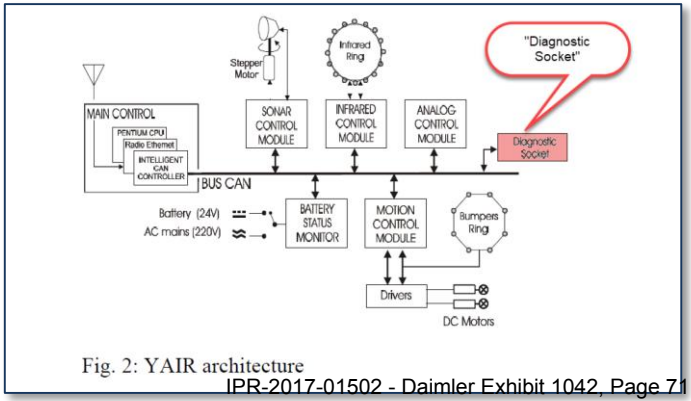


Fig. 2: YAIR architecture

‘1502 Petition at 49-50; Ex. 1006 (Posadas) at 154-155

'705 Patent claim 18: Posadas/Miesterfeld discloses a "diagnostic mode"

'1502 Petition at 49-50, 85; '1502 Reply at 17-19, 27-28

Miesterfeld's "diagnostic system" is an alternative mode and is not temporary:

Dr. Koopman:

85. Miesterfeld notes that third-parties provide the diagnostic systems. I understand this explanation to means that OEM equipment will not have the diagnostic system being referred to. Therefore, OEM without a diagnostics system would reasonably be considered a first mode, and OEM with a diagnostics system would reasonably be considered a second mode. Furthermore, I, as well as a POSITA, would also understand that any such diagnostic equipment necessarily operates while the system is running to allow inspection of the system. *Id.*

'1502 Reply at 27; Ex. 1038 (Koopman Reply Decl.) at ¶ 85

Miesterfeld:

In addition to the above-discussed vehicle systems, third party manufacturers design devices which require vehicle data as input in order to operate the device or implement some additional feature on the vehicle. For example, third party manufacturers may provide navigation systems, diagnostic systems, internet interface systems, personal computer interface systems, and the like for receiving data. In some applications, these systems may also seek to control vehicle functions where appropriate and safe.

'1502 Petition at 85; Ex. 1010 (Miesterfeld) at 1:31-40

’843 Patent claims 5,6: Posadas/Miesterfeld disclose addressing data to no particular / available to any number of processes *‘1503/’1504 Petition at 48-49/’46-47; ‘1503/’1504 Reply at 14/18*

‘843 claims 5 and 6:

5. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the storage resource stores messages that are addressed to no particular process.

6. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the storage resource stores messages available by any number of processes.

- PO’s “partial copy” argument against Posadas is based on a misreading of the claims incorrect *‘1503 PO Response at 39-40*
- Neither claim requires “all processes” have access to the data *‘1503 Reply at 14*
- Miesterfeld discloses claims 5/6 for the same reasons discussed with regards to claim 3 *‘1504 PO Response at 34-35; ‘1504 Reply at 18*

’843 Patent claims 5,6: Posadas/Miesterfeld disclose addressing data to no particular / available to any number of processes *‘1503/’1504 Petition at 48-49/’46-47; ‘1503/’1504 Reply at 14/18*

Dr. Koopman:

58. Posadas discloses that “[i]t is important to emphasize that the processes, ***independently of their location***, have only to execute local access to the corresponding SC program instance in order to contact all the system.” Posadas at 153 (emphasis added). Posadas also discloses a mapped mode where messages can be accessed. Ex. 1007, 11.

59. Further, I understand Posadas messages to be organized by the transmitter and not the receiver, so by definition they are addressed to no particular process. A POSITA would know this, as the first network is CAN; CAN headers do not have destination fields. Ex. 1013, 38. Additionally, as I explain above with respect to limitation 51g, Posadas discloses a central storage location that satisfies this claim limitation.

‘1503 Reply at 14; Ex. 1042 (Koopman Reply Decl.) at ¶¶57-59

Posadas:

The ISCCAN gateway supports communication of the CAN raw data, as well as the mapped mode that consists of a bi-directional mirroring of CAN identifiers and objects in the distributed blackboard. The mapped mode allows processes running in every node in the IP network access to the CAN information through the SC software and the defined notification scheme.

The SC system requires a program instance to be executed in each computer belonging to the configuration. The programs instance will communicate with each other to control and update the distributed data. As a result, each computer has a partial copy of the blackboard. It is important to emphasise that the processes, independently of their location, have only to execute local accesses to the corresponding SC program instance in order to contact all the system.

- ❑ Provision of the necessary software support so that any Windows application (local or remote) can access the communication system with all the necessary communications hidden (including CAN).

‘1503 Pet. at 48-49, ‘1503 Reply at 14, 20; Ex. 1007 (Posadas) at 152-154 (9-11 of 13)

’843 Patent claim 7: Posadas disclose that the storage resource is a “section” of storage *‘1503 Petition at 49-50; ‘1503 Reply at 15*

‘843 claim 7

> **7**. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the storage resource is a section of a storage.

> 1007, Fig. 3. The “shared memory” and the “distributed blackboard” are quite different. Moreover, the multiple locations to which Petitioner points (M1, M2, the distributed blackboard) are not a subsection of “a” storage but are multiple independent memory locations, some of which (the distributed blackboard elements) hold copies of the same variables. Posadas does not disclose a storage resource which is “***a***” section of “***a*** storage”. Exh. 2006, ¶97.

‘1503 PO Response at 41

- Nothing in claim 7 precludes the “shared memory” and “distributed memory” from being the claimed “storage resource.” *‘1503 Reply at 6, 14-15*

’843 Patent claim 7: Posadas discloses that the storage resource is a “section” of storage *‘1503 Petition at 49-50; ‘1503 Reply at 15*

Posadas’s “storage resource” includes the “shared memory” and the “distributed Blackboard”

(1503 Pet. at 11, 39, Ex. 1007 (Posadas) at Figs. 3 and 4)

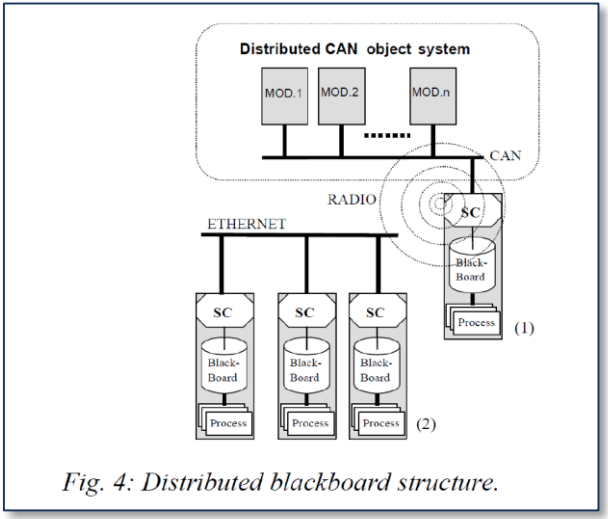


Fig. 4: Distributed blackboard structure.

‘1503 Pet. at 11-13, 49, ‘1503 reply at 15, Ex. 1007 (Posadas) at Figs. 3 and 4)

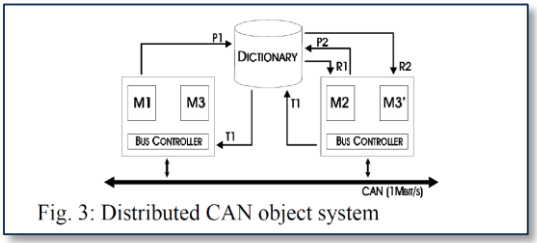


Fig. 3: Distributed CAN object system

5. SC-CAN GATEWAY

The distributed blackboard generated by the SC software is extensive to the data in the CAN network. Each computer node in the CAN network serves data to its running processes through the homogeneous SC software interface. The gateway software ISCCAN performs specific translations between CAN protocol and SC data.

‘1503 Pet. at 12-13; Ex. 1004 (Koopman Decl.) at ¶129; Ex. 1007 (Posadas) at 153

The “shared memory” and “distributed blackboard” are both “sections” of memory

’843 Patent claims 7: Posadas discloses that the storage resource is a “section” of storage *‘1503 Petition at 49-50; ‘1503 Reply at 15*

Posadas further subdivides its shared memory into dictionaries that also qualify as sections

(1503 Pet. at 49-50; Ex. 1007 (Posadas) at Figs. 3 and 4)

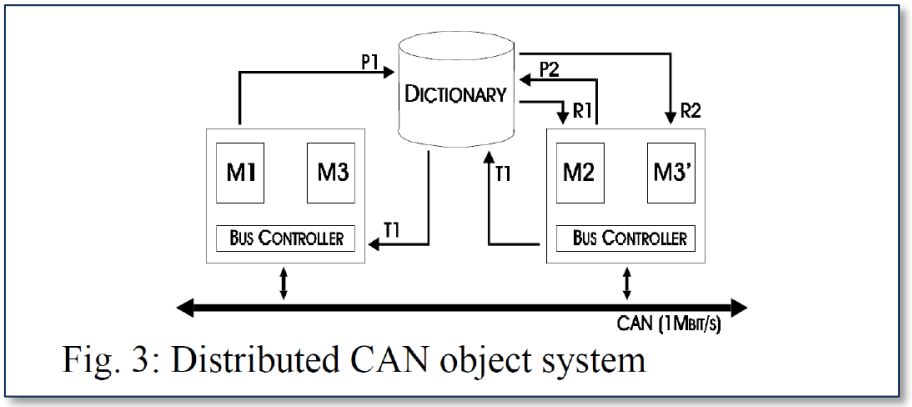


Fig. 3: Distributed CAN object system

‘1503 Pet. at 49-50; ‘1503 reply at 15;Ex. 1007 (Posadas) at Fig. 3

'843 Patent claims 7: Posadas discloses that the storage resource is a "section" of storage *'1503 Petition at 49-50; '1503 Reply at 15*

No restriction on whether the storage resource must exclude a "blackboard":

1. A non-transitory computer-readable medium storing a computer program product for sharing information, the computer program product, comprising:

code for allowing receipt of information associated with a message received utilizing a first network protocol associated with a first network;

code for causing a determination as to whether a storage resource is available;

code for determining whether a threshold has been reached and causing a request in connection with the storage resource if the threshold has not been reached;

code for, in the event the threshold has been reached, causing an error notification to be sent;

code for, in the event the storage resource is available, causing storage of the information utilizing the storage resource; and

code for causing the information to be shared by:

in real-time, sharing the information utilizing at least one message format corresponding to a second network protocol associated with a second network;

wherein the computer program product is associated with an electronic control unit with a plurality of interface portions including:

'1503 Reply at 15

PO's argument ignores claim 3:

3. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the storage resource includes a bulletin board resource.

'1503 Reply at 15

‘843 claim 15:

> **15**. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the determining, causing, and threshold are each associated with a middleware layer that sits under an application layer.

> Stewart’s integration of the state variable table *into the operating system* is not consistent with a definition of a “middleware layer” in the context of the ‘843 Patent, as the written description of the ‘843 Patent clearly distinguishes a middleware layer from a real-time operating system layer. *See* ‘843 Patent Fig.4. Moreover, “middleware layer” receives its name from the concept of being “in the middle,” as in, being between two other layers. Stewart’s Fig. 2 does not label the global state variable table as being “middleware,” and does not place it between two

‘1503 PO Response at 45; ‘1504 PO Response at 38

- PO’s argument is not supported by the ‘843 patent spec

‘1503/’1504 Reply at 16-17/18-20

- PO misinterprets Stewart

‘1503/’1504 Reply at 16-17/18-20

PO’s expert agreed that the ‘843 patent described middleware/RTOS as part of the same “embedded software”:

Q Now, let's look at, I believe, Figure 4. Yes, Figure 4. Figure 4 is focusing exclusively on the embedded software; correct?

A Yes.

Q And, again, the embedded software in 302 includes the application of the middleware, RTOS, device drivers, and the HAL; correct?

A Yes.

Q And they're all shown as being part of the same embedded software, 302; is that correct?

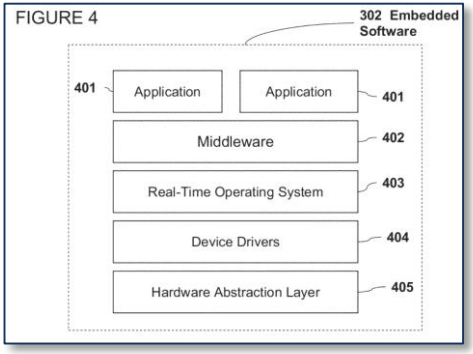
A That's what Figure 4 is showing.

Q Now, in Figure 4, there is a real-time operating system shown.

Do you see that, 403?

A Yes.

‘1503 Reply at 16-17; Ex. 1043 (Miller 2018 Dep.) at 132:5-11; ‘1504 Reply at 20; Ex. 1043 (Miller 2018 Dep.) at 132:5-11



‘1503 Reply at 16-17; Ex. 1001 (‘843 patent) at Fig. 4; ‘1504 Reply at 18-20; Ex. 1001 (‘843 patent) at Fig. 4

In one embodiment, the middleware can directly interface with the input/output mechanisms of the hardware without utilizing an operating system (**403**) or hardware abstraction layer (**405**).

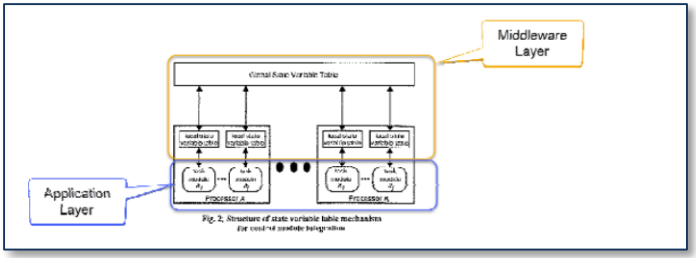
Another embodiment of the middleware utilizes a preemptive multitasking operating system with explicit control of resources. In an alternate embodiment, the middleware can be built with a static multitasking scheme with implicit resource management or be part of a single task system.

‘1503 Reply at 16-17; Ex. 1001 (‘843 patent) at 4:54-62; ‘1504 Reply at 18-20; Ex. 1001 (‘843 patent) at 4:54-62

Even if PO is correct, Stewart discloses middleware that is separate from the RTOS:

Obviously, a real-time operating system (RTOS) is part of this software environment. However, it is also necessary to have a layer of abstraction between the RTOS and control algorithms that makes the implementation efficient, allows for easily expanding and/or changing the control strategies, and reduces development costs by incorporating the concept of reusable software. The development of this layer of abstraction is further motivated by the realization that real-time control systems are typically implemented in open-architecture multiprocessor environments. Several issues, such as configuring reusable modules to perform a job, allocating modules to processors, communicating between various modules, synchronizing modules running on separate processors, and determining correctness of a configuration, arise in this context.

‘1503 Reply at 16-17; Ex. 1008 (Stewart) at 325;
‘1504 Reply at 18-20; Ex. 1008 (Stewart) at 325



‘1503 Reply at 16-17; Ex. 1008 (Stewart) at Fig. 2;
‘1504 Reply at 18-20; Ex. 1008 (Stewart) at Fig. 2

’843 Patent claim 16: Miesterfeld provides information to a plurality of software or hardware operations ‘1504 Petition at 53; ‘1504 Reply at 20-21

‘843 claim 16:

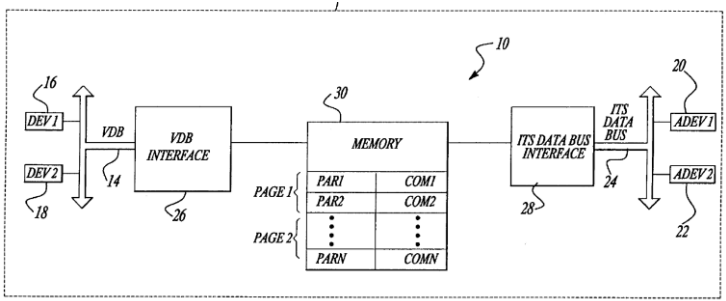
> **16**. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the sharing includes providing the information to a plurality of software or hardware operations that share the storage resource.

- PO: Miesterfeld does not disclose sharing information with a “plurality of software or hardware operations.” ‘1504 PO Response at 39
- Spec is clear information on the ITS bus is shared with a plurality of hardware operations ‘1504 Reply at 20-21
- PO’s expert agreed ‘1504 Reply at 20-21

’843 Patent claim 16: Miesterfeld provides information to a plurality of software or hardware operations ‘1504 Petition at 53; ‘1504 Reply at 20-21

- Miesterfeld: data on ITS is shared with hardware devices

In operation, VDB interface **62** controls data flow between VDB **48** and SPI RAM **64**. In particular, VDB interface **62** examines data on VDB **48** to determine if it is pertinent to ITS data bus **56** and to determine the appropriate location in SPI RAM **64** to write the data. In such instances, VDB interface **62** writes its data to a selected, specific memory location, such as to memory locations PAR1, PAR2, PARN, as described in FIG. **1**. Further, VDB interface **62** obtains commands from memory locations COM1, COM2, . . . , COMN in SPI RAM **64** and determines whether the command is appropriately formed for transmission on VDB **48**. VDB interface **62** also coordinates read/write functions with ITS data bus interface **58** through a handshake procedure in order to avoid collisions between read/write activities of the respective vehicle data bus interface **62** and ITS data bus interface **58**. VDB interface **62** is also responsible for insuring security of the data placed on VDB **48** by insuring that only appropriate data is written to SPI RAM **64**. VDB interface **62** also insures security of VDB **48** by inspecting commands prior to placing any the command on VDB **48**.



‘1504 Petition. at 53; ‘1504 Reply at 20-21; Ex. 1010 (Miesterfeld) at Fig. 1

Devices **20**, **22**, referred to as ancillary devices, represent such add-on devices as were described in the background herein. Data exchange may occur between devices **20**, **22** through ITS data bus **24**.

With respect to the present invention, it is desirable to provide a data exchange system between VDB **14** and ITS data bus **24**. To effect such an exchange, a vehicle data bus (VDB) interface **26** reads and writes data from VDB **14**. VDB interface **26** enables the exchange of data between memory **30** and VDB **14**. Similarly, ITS data bus interface **28** enables data exchange between memory **30** and ITS data bus **24**.

‘1504 Petition at 53; ‘1504 Reply at 20-21; Ex. 1010 (Miesterfeld) at 4:11-32; 2:66-3:16

- PO’s Expert:

24 Q Now, attached to the VDB bus, there are --
25 you see 44 and 46 in Figure 2, DEV 1 and DEV 2?
10 Q And those devices, 16 and 18, write data or
11 read data from the VDB bus; is that correct?
12 A The specification says, "One or plurality
13 of devices 16, 18, one or both of which write data to
14 or read data from VDB 14."

‘1504 Reply at 20-21, IPR2017-01502 Daimler Exhibit 1042 (Deposition Exhibit 1004)

’843 Patent claim 24: Miesterfeld discloses a “communications interface”

‘843 claim 24:

24. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the first interface-related first layer part or the second interface-related first layer part includes at least one of a controller, a communication interface, or an operating system interface; and

the first interface-related second layer part or the second interface-related second layer part includes at least one of a remote message conversion layer, a communication interface, or an operating system interface.

- PO: Miesterfeld’s ITS data bus is not a “communications interface” *‘1504 Response at 41*
- PO misinterprets Miesterfeld *‘1504 Reply at 21-22*
- PO’s expert agreed that Miesterfeld’s ITS data bus is a communications interface *‘1504 Reply at 21-22*

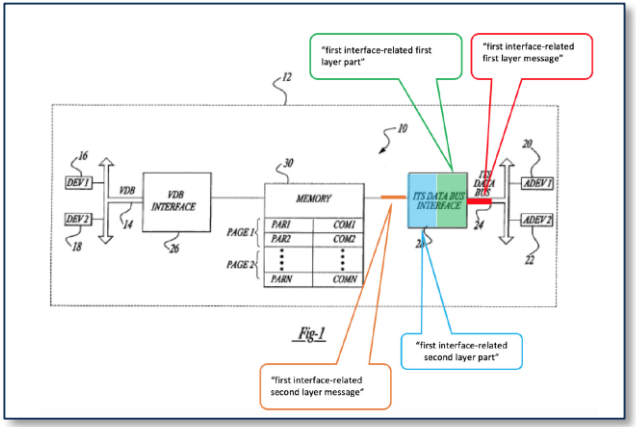
’843 Patent claim 24: Miesterfeld discloses a “communications interface”

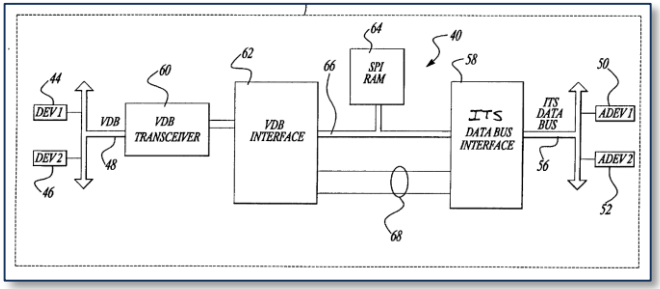
- Miesterfeld’s “ITS data bus interface” is a communications interface:

Similarly, ITS data bus interface **28** enables data exchange between memory **30** and ITS data bus **24**.

Data exchange between VDB **48** and ancillary or ITS data bus **56** occurs through the gateway **40** comprising vehicle data bus (VDB) transceiver **60**, vehicle data bus (VDB) interface **62**, and memory or serial peripheral interface random access memory (SPI RAM) **64**, and ITS data bus interface **58**. SPI RAM **64** is preferably arranged as described above with respect to memory **30**. SPI bus **66** interconnects VDB interface **62** and ITS data bus interface **58** with SPI RAM **64**.

‘1504 Pet. at 58, ‘1504 Reply at 21-22, Ex. 1010 (Miesterfeld) at 3:23-25; 3:59-67





‘1504 Pet. at 58, ‘1504 Reply at 21-22, Ex. 1010 (Miesterfeld) Figs. 1 and 2

’843 Patent claim 24: Miesterfeld discloses a “communications interface”

- PO’s expert:

So the ITS data bus interface 68 -- 62 and the VDB interface or both communication interfaces to the SPI bus 66?

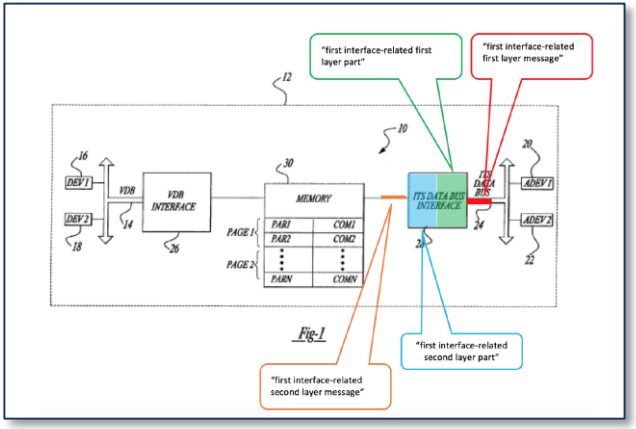
A With one correction, you said 68 when you were referring to the VDB interface, and I believe you misspoke. It was 62.

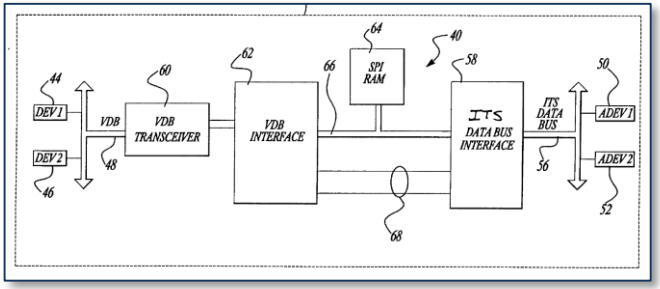
Q You're correct.

It's fair to say that the ITS data bus and ITS data bus interface and the VDB interface communicate with SPI RAM 64 through the SPI bus 66. Is that true?

A Yes.

‘1504 Reply at 21-22 Ex. 1042 (Miller Tx) at 78:15-79:12





‘1504 Pet. at 58, 1504 Reply at 21-22, Ex. 1010 (Miesterfeld) Figs. 1 and 2

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’843 Patent claim 31: Stewart discloses “semaphores” *‘1503 Petition at 64; ‘1503 Reply at 17-18; ‘1504 Petition at 65-66; ‘1504 Reply at 17-18*

‘843 claim 31:

> **31**. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the storage resource is protected utilizing semaphores.

- PO: Stewart “teaches away” from remote semaphores *‘1503 PO Response at 47, ‘1504 PO Response at 45*
- Stewart expressly teaches the use of multiple types of semaphores, including spin locks and remote-semaphores *‘1503 Reply at 18, ‘1504 Reply at 22*
- PO’s expert agrees *‘1503 Reply at 18, ‘1504 Reply at 22*

’843 Patent claim 31: Stewart discloses “semaphores” *‘1503 Petition at 64; ‘1503 Reply at 17-18; ‘1504 Petition at 65-66; ‘1504 Reply at 22*

- Stewart expressly teaches remote semaphores and spin-locks (another type of semaphore):

> The simplest multiprocessor synchronization method is the *spin-lock*, which uses an atomic *test-and-set* (TAS) operation. The TAS instruction reads the current lock value from memory, then writes *1* into that location. If the original value is *0*, then the task acquires the lock, otherwise the lock is not obtained, and the task must try again. The read and write portions of the instruction are guaranteed to be atomic, even among multiple processors. To release the lock, *0* is written to the memory location. The number of bus transfers required to acquire and release the spin-lock is $\Delta = 2r + 1$, where r is the number of retries needed to obtain the lock.

> Next, an appropriate locking mechanism must be selected. Simple mechanisms like local semaphores and only locking the CPU cannot be used, because they are only valid for single-processor applications. Multiprocessor mechanisms available include spin-locks [15], message passing, remote semaphores [23], and the multiprocessor priority ceiling protocol [20].

‘1503 Pet. at 64, ‘1503 Reply at 18, ‘1504 Pet. at 65-66,‘1504 Reply at 22, Ex. 1008 (Stewart) at 11

’843 Patent claim 31: Stewart discloses “semaphores” *‘1503 Petition at 64; ‘1503 Reply at 17-18; ‘1504 Petition at 65-66; ‘1504 Reply at 22*

- Both experts agree that a “spin lock” is a semaphore:

Dr. Koopman:

67. I understand Patent Owner argues Stewart not only fails to disclose semaphores, but it teaches away. R. 46-47. I completely disagree. While Stewart does state use of remote semaphores require “significant overhead,” in my opinion, Stewart certainly recognizes that they can be used. In the next paragraph, Stewart discloses use of spin locks, which is a type of semaphore. Moreover, I understand that it is not disputed that Stewart discloses the use of spin locks. Moreover Stragent’s expert agreed that spin-locks use the same test-and-set mechanism that is central to the operation of a semaphore, and described the operation of a spin-lock in a way exactly matches the operation of a semaphore having a maximum count of one. Ex. 1043, 1:3-112:9.

‘1503 Reply at 18, ‘1504 Reply at 22, Ex. 1042 (Koopman Reply Decl.) at ¶67

PO’s Expert:

Q So back in 2002, if someone came up to you and said, "What's a spin-lock," you probably wouldn't be able to answer that without looking at Stewart?
A Perhaps.
Q And is it fair to say that a spin-lock is a way to arbitrate access to shared resources?
A Yeah, that's one way that you can.
Q And it does so by using -- in this case, by using what Stewart calls a TAS, test-and-set?
A That's right.

‘1503 Reply at 18, ‘1504 Reply at 22, Ex. 1043 (Miller 2018 Dep.) at 111:3-12

’843 Patent claim 31: Stewart discloses “semaphores” *‘1503 Petition at 64; ‘1503 Reply at 17-18; ‘1504 Petition at 65-66; ‘1504 Reply at 22*

- Stewart does not “teach away” from semaphores:

> The message passing, remote semaphores, and multiprocessor priority ceiling protocol all require significant overhead, which is typically an order of magnitude greater than the data transfer itself. For example, the remote semaphores in Chimera II take a minimum of 44 µsec for the locking and unlocking operations, and as much as 200 µsec if the lock is not obtained on the first try and forces the task to block [23]. A typical transfer, on the other hand, may consist of 6 joint positions and 6 joint velocities, for a total of 12 transfers. On a

‘1503 Pet. at 64, ‘1503 Reply at 18, ‘1504 Pet. at 65-66,‘1504 Reply at 22, Ex. 1008 (Stewart) at 11

’843 Patent claim 34: Posadas/Miesterfeld disclose “different processes” *‘1503 Petition at 66-67; ‘1503 Reply at 18-19; ‘1504 Petition at 68; ‘1504 Reply at 24*

‘843 claim 34

> **34**. The non-transitory computer-readable medium as set forth in claim **32**, wherein the computer program product is operable such that the different processes are updated with the information at a first rate that differs from a second rate with which the different processes send the information to the storage resource.

- PO: claim 34 requires that a process is updated at a rate that is different than it sends the information *‘1503 PO Response at 47-48, ‘1504 PO Response at 47-48*

- This is incorrect– the claim expressly requires updating ***different processes*** at a first rate the differs from a second rate which the ***different processes*** send information

‘1503 Reply at 18-19; ‘1504 Reply at 24

> During the test, the REC process was running in a node outside the CAN network and communicated through a wireless IP network and the described SC+ISCCAN facilities. We obtained good communications performance running REC tasks with the following periodicity.
>
> - ❑ Obtain odometric information: 100ms
> - ❑ Send control action: 100ms
> - ❑ Obtain ultrasonic information: 300ms
> - ❑ Obtain infrared information: 300ms

‘1503 Reply at 18-19, Ex. 1007 (Posadas) at 11

> Two processes are executed to validate the low-level communication system. A local version of the reactive control application described above is running in the main processor. The motion control module runs another obstacle avoiding algorithm. CAN analysis latencies require fixed transmission period times and efficient CPU scheduling to guarantee this supposition. Consequently, in the following analysis, the deadline processes are supposed to be guaranteed. The definition of these analysed applications is:
>
> - ❑ Local reactive application, threads:
>   - Obtain odometric information: 8 ms
>   - Obtain ultrasonic information: 50 ms
>   - Obtain infrared information: 10 ms

‘1503 Reply at 18-19, Ex. 1007 (Posadas) at 13

’843 Patent claim 34: Posadas/Miesterfeld disclose “different processes” *‘1503 Petition at 66-67; ‘1503 Reply at 18-19; ‘1504 Petition at 68; ‘1504 Reply at 24*

‘843 claim 34

> **34**. The non-transitory computer-readable medium as set forth in claim **32**, wherein the computer program product is operable such that the different processes are updated with the information at a first rate that differs from a second rate with which the different processes send the information to the storage resource.

- Miesterfeld also discloses “different processes” *‘1504 Reply at 24*

> Preferably, the time period between selecting the desired memory page and reading/writing data to SPI RAM **64** (between steps **130** and **132**) is less than 5 microseconds. Following the read/write operation, control proceed to block **136** where ITS data bus interface **58** sets SRAA low. Control ends at block **138**.

> In a preferred mode of the invention, VDB interface **62** utilizes two criteria to determine when to attempt to transmit a message onto VDB **48**. First, VDB interface **62** will only attempt to initiate a transmission onto VDB **48** after 40 milliseconds have past since VDB interface **62** last successfully initiated a VDB transmission. Second, VDB interface **62** will wait until VDB **48** is idle before attempting to transmit a message onto VDB **48**. Note that VDB interface **62** may need to arbitrate for control of VDB **48** when attempting a transmission.

‘1504 Pet. at 68, ‘1504 Reply at 24, Ex. 1010 (Miesterfeld) at 6:52-65, 8:51-60

’843 Patent claim 38 : Posadas discloses “PDUs” *‘1503 Petition at 68-69; ‘1503 Reply at 19-20*

‘843 claim 38

> **38**. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the first interface-related first layer messages, the first interface-related second layer messages, the second interface-related first layer messages, and the second interface-related second layer messages include protocol data units (PDUs).

- PO: Posadas’s “SC” and “ISSCAN” are “nonstandard,” and it is “likely that SC data and SC objects are not encapsulated” such that they are not PDUs.

  ‘1503 PO Response at 51

- PO’s argument misinterprets the claims– PDUs are simply data, a position ***both*** experts agree with

  ‘1503 Petition at 68-69, ‘1503 Reply at 19-20

’843 Patent claim 38 : Posadas discloses “PDUs” *‘1503 Petition at 68-69; ‘1503 Reply at 19-20*

- Both experts agree that a “PDU” is simply “data” :

Dr. Koopman:

72. First, a “PDU” or “Packet Data Unit” (sometimes interchangeably referred to as a “Protocol Data Unit”) is simply the actual data that’s being transmitted in a network frame, and specifically excludes header information that is stripped off by “processing” at the network interface. (*See, e.g.*, Ex. 1007, 6:33-47. I understand that Dr. Miller acknowledged this during his cross examination. Ex. 1043, 69:20–70:11. Therefore, claim 38 simply requires a limitation already implicitly required by claim 1: that the first/second layer messages include data. As I discussed above in this declaration, Posadas discloses sending data from the CAN network to the Ethernet network, and back again. Therefore, a person of skill in the art would recognize that Posadas describes sending a “PDU.”

‘1503 Reply at 19-20; Ex. 1042 (Koopman Reply Decl.) ¶ 72

PO’s Expert:

Q BY MR. GLASS: Based on your review of the patent, a PDU represents the remaining data packet once the layers are processed; correct?

THE WITNESS: Let me explain that. In the patent, yeah, they refer to packet data unit networking. There's different layers. Each layer has its own protocol which has headers and possibly trailers as well, which has information concerning that specific protocol.

The PDU, which is the protocol data unit, is the data that's left after stripping the header and the trailers for that specific protocol. So there still could be headers and trailers for the protocols that are put within that one because it's a layering scheme.

‘1503 Reply at 19-20; Ex. 1043 (Miller 2018 Dep.) at 68:7-22

’843 Patent claim 38 : Posadas discloses “PDUs” *‘1503 Petition at 68-69; ‘1503 Reply at 19-20*

- Even if PDUs were not data and were “encapsulated,” this is disclosed by Posadas

‘1503 Reply at 20

Dr. Koopman:

73. In regard to Patent Owner’s argument that “it is likely that SC data and SC objects are not encapsulated,” I do not understand claim 38, or any other claim, to state a requirement that the protocol data units are “encapsulated.” Nonetheless, in my opinion, the data in Posadas is encapsulated. As I discussed above, Posadas transmits data over either a CAN or Ethernet network; data must first be encapsulated in appropriate network protocol in order to be transmitted. Otherwise transmission would not be possible. Therefore, a person of ordinary skill in the art would understand Posadas to disclose the limitation of claim 38.

‘1503 Reply at 19-20; Ex. 1042 (Koopman Reply Decl.) ¶ 73

‘843 claim 39

> **39**. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the first interface-related first layer messages and the first interface-related second layer messages are different in terms of at least one aspect of headers thereof.

- PO: messages in Posadas do not “appear” to be processed; they “likely” retain their CAN header information. *PO Response at 51-52*
- The Board has already found that “processing” is disclosed by Posadas in finding claim 1 unpatentable. *‘1503 Reply at 20-21, 457 FWD at 23-25, 29-30*
- Posadas discloses ASCII-HEX processing *‘1503 Petition at 69-70; ‘1503 Reply at 20-21*

’843 Patent claim 39 : Posadas discloses “processing” *‘1503 Petition at 69-70; ‘1503 Reply at 20-21*

- PO: Posadas does not “appear” to disclose processing *PO Response at 52*
- The Board has already ruled that it does:

> Regarding “the first interface including,” Petitioner contends this limitation describes how network-specific messages (CAN frames) are processed so that the data within those messages can be stored in memory. Pet. 30–31 (citing Ex. 1001, Fig. 7, 6:33–7:4). More specifically, Petitioner contends this limitation requires that the interface include a “first component” that receives “first data units” (CAN frame) that are processed, after which processed first data units are provided. *Id.*

> Petitioner contends Posadas discloses this limitation wherein the CAN protocol message frames (“first data units”) are used to transport data from a Communications Object (COB). *Id.* (citing Ex. 1007, 10). Petitioner contends this CAN frame is transmitted by the bus controller and received by the CAN network interface logic in the ISCCAN interface—the claimed “first interface-related first component.” *Id.* Petitioner contends the gateway software ISCCAN performs specific translations between CAN protocol and SC data wherein the transformed format used to store the data in the blackboard are the “processed first data units.” *Id.*

> In view of the above, we find Petitioner has shown, by a preponderance of the evidence, that claim 51 is unpatentable over Posadas, Stewart, and Wense.

‘1503 Reply at 20-21, 457 FWD at 23-25; 28

’843 Patent claim 39 : Posadas discloses “processing” *‘1503 Petition at 69-70; ‘1503 Reply at 20-21*

- The Board’s ruling is well-supported; Posadas’s ASCII-HEX processing ***is*** processing

77. ASCII-HEX is unquestionably a form of processing. ASCII-HEX is a well-known process whereby each single byte of data (here, the CAN data) is processed into two bytes of ASCII data (here, the SC data), with each byte of ASCII data being an alphanumeric character representation of a 4-bit (half-byte) value of the original binary data. Based on my contemporaneous experience using ASCII-HEX conversions, a POSITA would appreciate that this is a form of processing (i.e., taking data in one form and producing different data that not only has a different format, but is a different number of bytes).

‘1503 Reply at 20-21, Ex. 1042 (Koopman Reply Decl.) ¶ 77

78. By way of example, consider the hexadecimal value 0x4A, having an equivalent binary value of 01001010. This 8-bit binary value fits in an 8 bit byte in CAN binary data. An ASCII-HEX conversion process would first convert the first four bits (0100) into the ASCII character “4” which in typical 8-bit storage format has an 8-bit binary value hexadecimal 0x34 equal to binary value 00110100. Next, the conversion process would take the second four bit value from the initial CAN binary byte, 1010 and convert it to an ASCII character “A,” which has a value of hexadecimal 0x41, and a corresponding binary value of 01000001. Thus, the ASCII-HEX conversion from binary to ASCII would transform a single 8-bit data value of hexadecimal 0x4A into the corresponding human-readable character representation “4A” which is a pair of two bytes having values 0x34 (ASCII “4”) and 0x41 (ASCII “A”).

‘1503 Reply at 20-21, Ex. 1042 (Koopman Reply Decl.) ¶ 78

’843 Patent claim 40: Posadas discloses “processing” *‘1503 Petition at 70-71; ‘1503 Reply at 21-22*

‘843 claim 40

40. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the processing includes conversion; the first interface-related first layer messages are related to the first interface-related first layer by virtue of being received thereby; and the first interface-related second layer part carries out the processing of the first interface-related first layer messages.

- PO ***ignores*** that Posadas expressly discloses “translations” (‘1503 Pet. at 70-71)
- PO argues instead that ASCII-HEX is not “processing” *‘1503 PO Response at 53-54*
- For the same reasons as ASCII-HEX is processing in connection with claim 39, it is processing in claim 40 *‘1503 Reply at 21-22*

’843 Patent claim 40: Posadas discloses “processing” *‘1503 Petition at 70-71; ‘1503 Reply at 21-22*

- PO misrepresents Posadas’s teachings:

> Petitioner is incorrect. Posadas discloses that SC data is merely the CAN binary stream (i.e. “raw” CAN data) *represented* in ASCII-HEX notation – this is the function of the ISSCAN software. As already noted in discussing Claims 38 and 39, any “processing” of the SC data (“raw” CAN binary) takes place in individual processes *after* distribution of the SC data, not within the ISSCAN interface layer. *See* ¶¶ 0-0, *supra*.

‘1503 PO Response at 53

- Posadas:

> 5. SC-CAN GATEWAY
>
> The distributed blackboard generated by the SC software is extensive to the data in the CAN network. Each computer node in the CAN network serves data to its running processes through the homogeneous SC software interface. The gateway software ISCCAN performs specific translations between CAN protocol and SC data.

‘1503 Petition at 70-71

- Dr. Koopman:

> 291. It is my opinion that Posadas expressly discloses each of these limitations. Regarding (i), Posadas describes that “[t]he gateway software ISCCAN performs specific translations between CAN protocol and SC data.” Ex. 1007,11. These translations constitute a “conversion.”

‘1503 Petition at 70-71, Ex. 1005 (Koopman Decl.) at ¶291

- PO also argues instead that ASCII-HEX is not “processing” *‘1503 PO Response at 53-54*
- For the same reasons as ASCII-HEX is processing in connection with claim 39, it is processing in claim 40 *‘1503 Reply at 21-22*

'843 claims 44, 52 and 53

44. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the first interface-related second layer messages and the second interface-related first layer messages have a same format.

52. The apparatus as set forth in claim **51**, wherein the apparatus is operable such that the processed first data units and the second data units have a same format.

53. The apparatus as set forth in claim **51**, wherein the apparatus is operable such that the processed first data units and the second data units are the same data units.

- Each of these claims simply require ***data*** on the first network be the same/have the same format as ***data*** on the second network *'1503 Petition at 38-39, 73, 78-83; '1503 Reply at 10-13, 23-24; '1504 Petition at 39-40, 73, 79-84; '1504 Reply at 12-14, 24-27*
- PO incorrectly argues the claims require ***data*** on one network to be the same/have the same format as ***entire network frames*** *'1503 PO Response at 35-36, 54-55, '1504 PO Response at 29-30, 52-53*
- Even if PO is correct, Posadas/Miesterfeld discloses these limitations, and PO ***fails to address*** Upender, which also discloses these limitations. *'1503 Reply at 23-24, '1503 Reply at 26-27*

'843 Patent claim 44, 52 and 53: Posadas/Miesterfeld disclose same data units/data units with the same format *'1503 Petition at 38-39, 73, 78-83; '1503 Reply at 10-13, 23-24; '1504 Petition at 39-40, 73, 79-84; '1504 Reply at 12-14, 24-27*

- PO's position is contrary to the specification – the '843 patent is related to making ***data*** available from one network to another:

A system, method and computer program product are provided for sharing information in a distributed system. After information is received, it is stored on a bulletin board. In use, the information is shared, in real-time, among a plurality of heterogeneous processes.

'1503 Reply at 11-12, '1504 Reply at 14, Ex. 1001 ('843 patent) at 1:29-33

Continuing with FIG. **7**, the communication procedure is described. In the given example, an external event (**701**) on communication controller **2** (**703**) triggers the operating system to notify the remote message communication process (**706**) that data is available. The notification may be a flag, a call-back routine, an event, or any other operating signal. The associated remote message conversion method **2** (**710**) extracts the data (e.g. real time variables) from the message PDU and stores the data in the bulletin board (**608**). It may also store the associated event as variable in the bulletin board and signal the bulletin-board event manager that new data is available.

'1503 Reply at 11-12, '1504 Reply at 14, Ex. 1001 ('843 patent) at 7:4-15

Using this model, each communicated message may be processed at each layer to remove (and use) the associated header information for that level. Once all layers are processed the remaining packet data unit (PDU) represents the datum or core information carried by the overall message. In one embodiment, each communication controller has an associated communication interface and an associated remote message conversion mechanism. For instance communication bus controller **2** (**703**) has an associated communication interface **2** (**709**), and an associated remote message conversion **2** (**710**).

'1503 Reply at 11-12, '1504 Reply at 14, Ex. 1001 ('843 patent) at 6:47-57

'843 Patent claim 44, 52 and 53: Posadas/Miesterfeld discloses same data units/data units with the same format *'1503 Petition at 38-39, 73, 78-83; '1503 Reply at 10-13, 23-24; '1504 Petition at 39-40, 73, 79-84; '1504 Reply at 12-14, 24-27*

- The spec ***never*** describes "data" being the same/having the same format as an entire network frame
- This would make no sense – under PO's interpretation, there would be no need for "processing"

In fact, if the Patent Owner's interpretation were true, data units would not need to be "processed" at the second network. If the data transmitted from the first network already included the network headers required at the second network, there would be no need to process to remove or add second network headers. Use of the term of the term "processing" would be superfluous.

'1503 Reply at 10-13, '1504 Reply at 12-14, Ex. 1042 (Koopman Reply Decl.) at ¶51

52. In terms of the previously discussed envelope analogy, if an incoming message on the first network arrives in a double envelope, the first network interface removes the outer envelope. But the Patent Owner's interpretation of the claims requires the letter to remain sealed inside the inner envelope the entire time and be sent as-is onto the second network. Since the envelope for the second network was already in place before the arrival of the package, and there is no envelope being created for use on the second network, there is no "processing" taking place in the gateway for that second network interface.

'1503 Reply at 10-13, '1504 Reply at 12-14, Ex. 1042 (Koopman Reply Decl.) at ¶52

'843 Patent claim 44, 52 and 53: Posadas/Miesterfeld disclose same data units/data units with the same format *'1503 Petition at 38-39, 73, 78-83; '1503 Reply at 10-13, 23-24; '1504 Petition at 39-40, 73, 79-84; '1504 Reply at 12-14, 24-27*

- Even if PO's interpretation were correct, Posadas expressly discloses data that is the same as network frames *'1503 Reply at 10-13*

- Posadas expressly discloses transmitting "CAN raw data" (*e.g.*, an entire CAN frame) wrapped in an Ethernet frame– an interpretation PO's expert admitted was correct

Posadas:

The ISCCAN gateway supports communication of the CAN raw data, as well as the mapped mode that consists of a bi-directional mirroring of CAN identifiers and objects in the distributed blackboard. The mapped mode allows processes running in every node in the IP network access to the CAN information through the SC software and the defined notification scheme.

'1503 Reply at 10-13; Ex. 1007 (Posadas) at 11

PO's Expert:

Q What is CAN raw data?

A So it's referring to CAN, which is a protocol. So when it says the CAN raw data, it seems like it's referring to the entire PDU, protocol data unit. It's not clear when it says raw data what it's referring to.

Q When you say the protocol -- I may have been mixed up on this before. When you say the "protocol unit," you're referring to the payload or the entire CAN frame?

A I would be saying the entire CAN frame. I

'1503 Reply at 10-13; Ex. 1043 (Miller 2018 Dep.) at 96:25-97:24

’843 Patent claim 44, 52 and 53: Posadas/Miesterfeld/Upender discloses same data units/data units with the same format *‘1503 Petition at 38-39, 73, 78-83; ‘1503 Reply at 10-13, 23-24; ‘1504 Petition at 39-40, 73, 79-84; ‘1504 Reply at 12-14, 24-27*

- The ’1503/’1504 petition raised an alternative ground based on Upender

‘1503 Pet. at 78-83, ‘1504 Pet. at 79-84

- PO has failed to respond to this ground in the ’1503 (Posadas) petition:

> As already discussed in Ground 1, Petitioner has misread the language of Claims 52 and 53. *See* § VIII.B**Error! Reference source not found.**, *supra*. Miesterfeld cannot disclose what the language of the claims requires, and Upender cannot salvage that problem.

‘1503 PO Response at 59

- In the ’1504 (Miesterfeld) petition, PO included an identical paragraph, relying on Miesterfeld-based arguments *‘1504 PO Response at 58*
- PO has not raised any Upender-specific arguments

’843 Patent claims 30 and 59: A POSITA would have combined Zhao with Posadas/Miesterfeld

‘1503 Petition at 74-78; ‘1503 Reply at 22-23, ‘1504 Petition at 74-79; ‘1504 Reply at 25-26

’843 claims 30 and 59:

30. The non-transitory computer-readable medium as set forth in claim **1**, wherein the computer program product is operable such that the information is processed utilizing the storage resource, where the information is originally received in a first message format corresponding to the first network protocol, to create, in real-time, messages in at least two other message formats including a second message format corresponding to the second network protocol and a third message format corresponding to a third network protocol, where the first network protocol is different than either of the second and third network protocols.

59. The apparatus as set forth in claim **51**, wherein the apparatus is operable such that the information is originally received in a first message format corresponding to the first network protocol and processed to create, in real-time, messages in at least two other message formats including a second message format corresponding to the second network protocol and a third message format corresponding to a third network protocol, where the first network protocol is different than either of the second and third network protocols.

- PO: a POSITA would not have combined Zhao with either Posadas or Miesterfeld, because it is not related to real-time *‘1503 PO Response at 55-58, ‘1504 PO Response at 54-57*
- Zhao expressly discloses real-time, uses similar techniques to solve the same problem as Posadas and Miesterfeld *‘1503 Petition at 74-78; ‘1503 Reply at 22-23, ‘1504 Petition at 74-79; ‘1504 Reply at 25-26*

’843 Patent claims 30 and 59: A POSITA would have combined Zhao with Posadas/Miesterfeld

‘1503 Petition at 74-78; ‘1503 Reply at 22-23, ‘1504 Petition at 74-79; ‘1504 Reply at 25-26

- PO argues Zhao is different than ***Miesterfeld,*** even though ground 2 relies on Posadas:

> This raises the question of which network protocols, in this context, would be of interest to the person of ordinary skill. Miesterfeld is directed to a problem involving real-time control in an embedded deterministic network, whereas Zhao is directed to connecting various devices to the Internet, a non-deterministic network which does not guarantee response times (or guarantee responses at all). Ex. 1039, ¶ 0002.

‘1503 PO Response at 56

- With respect to both Posadas and Miesterfeld:
  - Both involve the same protocols: Ethernet, RS232 and CAN

‘1503 Petition at 74-78; ‘1503 Reply at 22-23, ‘1504 Petition at 74-79; ‘1504 Reply at 25-26

  - A POSITA would have readily combined Zhao with both Posadas or Miesterfeld

‘1503 Petition at 74-78; ‘1503 Reply at 22-23, ‘1504 Petition at 74-79; ‘1504 Reply at 25-26

’843 Patent claims 30 and 59: A POSITA would have combined Zhao with Posadas/Miesterfeld

‘1503 Petition at 74-78; ‘1503 Reply at 22-23, ‘1504 Petition at 74-79; ‘1504 Reply at 25-26

- With respect to ***Posadas and Miesterfeld,*** Zhao relates to the ***same*** network protocols– RS-232, CAN, and Ethernet:

> **[0024]** The connections between network server **14** and intelligent devices **15A-15N** in Intranet **16** may be wired and wireless connections. By way of example, network server **18** is a mobile server. Thus, the connections between network server **18** and intelligent devices **15A-15N** in Intranet **19** are wireless. The wired communications can be either serial or parallel signal transmissions. Examples of serial signal transmissions include asynchronous data transmissions following the RS-232 and RS-485 serial communication standard published by the Electronic Industries Alliance (EIA), high speed serial transmission following the IEEE 1394 serial data transmission standard published by the Institute of Electrical and Electronics Engineers (IEEE), Universal Serial Bus (USB), Controller Area Network Bus (CANBus), Consumer Electronics Bus (CEBus), Home Phoneline Network Association (HomePNA), interoperable networks following the Home Audio Visual Interoperability (HAVI) standard, Ethernet, etc. The serial signal transmissions are typically more cost efficient and more reliable than parallel signal transmissions. However, the parallel signal transmissions are usually faster than the serial signal transmissions. Examples of wireless communications include radio frequency (RF) communication, Bluetooth communication, and infrared (IR) communication.

‘1503 Reply at 22-23, ‘1504 Reply at 25-26, Ex. 1039 (Zhao) at ¶ 24

’843 Patent claims 30 and 59: A POSITA would have combined Zhao with Posadas/Miesterfeld *‘1503 Petition at 74-78; ‘1503 Reply at 22-23, ‘1504 Petition at 74-79; ‘1504 Reply at 25-26*

- Zhao uses shared databases just like Posadas and Miesterfeld, and is real time, and is “OS independent”:

Shared database

Real Time

OS independent

[0074] By now it should be appreciated that a network server for communicating between a network and intelligent devices in an intelligent device communication network has been provided. In accordance with the present invention, the network server generates a database that includes device object tables and object property tables mapped from the intelligent devices in the intelligent device communication network. The database enables the identification, description, controlling, monitoring, and modification of the devices by a client on the network. In accordance with the

When desired, the real time read and write commands enable the client to access the intelligent devices timely. The database further provides an object oriented communication process in the intelligent device communication network. The communication process in accordance with the present invention is application platform, operating system, and device communication protocol independent. The network server and the intelligent devices in the intelligent device communication network have a master-slave relationship, which provides reliable and robust communication links between the network server and the intelligent devices.

‘1503 Reply at 22-23, ‘1504 Reply at 25-26, Ex. 1039 (Zhao) at ¶ 74; see also ‘1503 Pet. at 77, ‘1504 Pet. at 77, Ex. 1039 (Zhao) at ¶ 82

‘705 Challenged Claims

Claim 1	
No.	**Claim Limitation**
1a	A method for sharing information, the method comprising:
1b	allowing receipt of information associated with a message, utilizing a first network protocol associated with a first network;
1c	causing a determination as to whether a storage resource is available;
1d	in the event the storage resource is not available, determining whether a timeout has been reached and causing a re-request in connection with the storage resource if the timeout has not been reached;
1e	in the event the timeout has been reached, causing an error notification to be sent;
1f	in the event the storage resource is available, causing storage of the information utilizing the storage resource;
1g	and causing the information to be shared by: in real-time, sharing the information utilizing at least one message format corresponding to a second network protocol associated with a second network which is different from the first network protocol;
1h	wherein the method is associated with an electronic control unit with at least one gateway function, and a plurality of interface portions including:
1i	a first interface portion for interfacing with the first network,
1j	the first interface portion including a first interface-related first layer part for receiving first interface-related first layer messages and a first interface-related second layer part, the first interface-related first layer messages being processed after which first interface-related second layer messages are provided,
1k	where the first network is at least one of a Controller Area Network, a Flexray network, or a Local Interconnect Network;
1l	and a second interface portion for interfacing with the second network,
1m	the second interface portion including a second interface-related first layer part for receiving second interface-related first layer messages and a second interface-related second layer part, the second interface-related first layer messages being processed after which second interface-related second layer messages are provided,
1n	where the second network is different from the first network and is at least one of the Controller Area Network, the Flexray network, or the Local Interconnect Network.
Claim 7	
7a	A non-transitory computer-readable medium storing a computer program product for sharing information, the computer program product comprising:
7b	computer code for allowing receipt of information associated with a message, utilizing a first network protocol associated with a first network;
7c	computer code for causing a determination as to whether a storage resource is available;
7d	computer code for, in the event the storage resource is not available, determining whether a timeout has been reached and causing a re-request in connection with the storage resource;
7e	computer code for, in the event the storage resource is available and the timeout has not been reached, causing storage of the information utilizing the storage resource;
7f	computer code for, in the event the timeout has been reached, causing an error notification to be sent;
7g	and computer code for causing the information to be shared by: in real-time, sharing the information utilizing at least one message format corresponding to a second network protocol associated with a second network which is different from the first network protocol;
7h	wherein the computer program product is associated with an electronic control unit with at least one gateway function, and a plurality of interface

‘1502 Pet. at A-1, A-2

‘705 Challenged Claims (cont.)

	portions including:
7i	a first interface portion for interfacing with the first network,
7j	the first interface portion including a first interface-related first layer part for receiving first interface-related first layer messages and a first interface-related second layer part, the first interface-related first layer messages being processed after which first interface-related second layer messages are provided,
7k	where the first network is at least one of a Controller Area Network, a Flexray network, or a Local Interconnect Network;
7l	and a second interface portion for interfacing with the second network,
7m	the second interface portion including a second interface-related first layer part for receiving second interface-related first layer messages and a second interface-related second layer part, the second interface-related first layer messages being processed after which second interface-related second layer messages are provided,
7n	where the second network is different from the first network and is at least one of the Controller Area Network, the Flexray network, or the Local Interconnect Network.

Claim 8
The non-transitory computer-readable medium as recited in claim 7, wherein the storage resource includes a bulletin board.
Claim 9
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that the first interface-related second layer part carries out the processing of the first interface-related first layer messages.
Claim 10
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that at least one of the different processes process the information in a manner that is isolated from temporal characteristics associated with at least one of a plurality of heterogeneous networks.
Claim 11
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that the information is shared with an operating system.
Claim 12
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that objects are generated based on a change of state of the information stored on the storage resource.
Claim 13
The non-transitory computer-readable medium as recited in claim 12, wherein the objects include at least one of flags, events, signals, and interrupts.
Claim 14
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that the real-time involves a response time that is measured in milliseconds.
Claim 15
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that the real-time involves a response time that is measured in microseconds.
Claim 16
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that the real-time involves a response time that is less than 1 second.
Claim 17
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is part of an apparatus including a plurality of layers including at least two of an application layer, a middleware layer, a real-time

‘1502 Pet. at A-3, A-4

‘705 Challenged Claims (cont.)

operating system layer, a device driver layer, and a hardware abstraction layer.
Claim 18
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that multiple modes of operation are enabled, wherein at least one of the modes includes a diagnostic mode.
Claim 19
The non-transitory computer-readable medium as recited in claim 7, wherein the computer program product is operable such that at least a portion of the message is processed at each of a plurality of layers.

‘1502 Pet. at A-5

‘843 Challenged Claims

Claim 51	
No.	**Claim Limitation**
51a	An apparatus, comprising:
51b	a control unit configured for:
51c	identifying information associated with a message received utilizing a first network protocol associated with a first network;
51d	issuing a storage resource request in connection with a storage resource and determining whether the storage resource is available;
51e	determining whether a threshold has been reached in association with the storage resource request;
51f	in the event the storage resource is not available and the threshold associated with the storage resource request has not been reached, issuing another storage resource request in connection with the storage resource;
51g	in the event the storage resource is not available and the threshold associated with the storage resource request has been reached, sending a notification; and
51h	in the event the storage resource is available, storing the information utilizing the storage resource;
51i	wherein the apparatus is operable such that the information is capable of being shared in real-time utilizing a second network protocol associated with a second network, and the control unit includes:
51j	a first interface for interfacing with the first network,
51k	the first interface including a first interface-related first component for receiving first data units and a first interface-related second component, the control unit being operable such that the first data units are processed after which processed first data units are provided,
51L	where the first network is at least one of a Controller Area Network type, a Flexray network type, or a Local Interconnect Network type;
51m	and a second interface for interfacing with the second network,
51n	the second interface including a second interface-related first component for receiving second data units and a second interface-related second component, the control unit being operable such that the second data units are processed after which processed second data units are provided,
51o	where the second network is at least one of the Controller Area Network type, the Flexray network type, or the Local Interconnect Network type.
Claim 52	
The apparatus as set forth in claim 51, wherein the apparatus is operable such that the processed first data units and the second data units have a same format.	
Claim 53	
The apparatus as set forth in claim 51, wherein the apparatus is operable such that the processed first data units and the second data units are the same data units.	
Claim 54	
The apparatus as set forth in claim 51, wherein the apparatus is operable such that the processing involves headers.	
Claim 55	
The apparatus as set forth in claim 51, wherein the apparatus is operable such that the first network and the second network are heterogeneous networks.	
Claim 56	
The apparatus as set forth in claim 51, wherein the apparatus is operable such that the second network protocol is different than the first network protocol.	
Claim 57	
The apparatus as set forth in claim 51, wherein the apparatus is operable such that the second network protocol is different than the first network protocol such that rates thereof are different	
Claim 58	
The apparatus as set forth in claim 51, wherein the apparatus is operable such	

‘1503 Pet. at A-1, A-2

‘843 Challenged Claims (cont.)

that the second network protocol is different than the first network protocol, and the at least one message format corresponding to the second network protocol is different than a particular message format corresponding to the first network protocol, such that the information is converted from the particular message format to the at least one message format.	
Claim 59	
The apparatus as set forth in claim 51, wherein the apparatus is operable such that the information is originally received in a first message format corresponding to the first network protocol and processed to create, in real-time, messages in at least two other message formats including a second message format corresponding to the second network protocol and a third message format corresponding to a third network protocol, where the first network protocol is different than either of the second and third network protocols.	
Claim 1	
1a	A non-transitory computer-readable medium storing a computer program product for sharing information, the computer program product, comprising:
1b	code for allowing receipt of information associated with a message received utilizing a first network protocol associated with a first network;
1c	code for causing a determination as to whether a storage resource is available;
1d	code for determining whether a threshold has been reached and causing a request in connection with the storage resource if the threshold has not been reached;
1e	code for, in the event the threshold has been reached, causing an error notification to be sent;
1f	code for, in the event the storage resource is available, causing storage of the information utilizing the storage resource; and
1g	and code for causing the information to be shared by: in real-time, sharing the information utilizing at least one message format corresponding to a second network protocol associated with a second network;
1h	wherein the computer program product is associated with an electronic control unit with a plurality of interface portions including:
1i	a first interface portion for interfacing with the first network,
1j	the first interface portion including a first interface-related first layer part for receiving first interface-related first layer messages and a first interface-related second layer part, the computer program product being operable such that the first interface-related first layer messages are processed after which first interface-related second layer messages are provided,
1k	where the first network is at least one of a Controller Area Network type, a Flexray network type, or a Local Interconnect Network type;
1L	and a second interface portion for interfacing with the second network,
1m	the second interface portion including a second interface-related first layer part for receiving second interface-related first layer messages and a second interface-related second layer part, the computer program product being operable such that the second interface-related first layer messages are processed after which second interface-related second layer messages are provided,
1n	where the second network is at least one of the Controller Area Network type, the Flexray network type, or the Local Interconnect Network type.
Claim 2	
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the determination as to whether the storage resource is available is made utilizing an initial request in connection with the storage resource.	
Claim 3	
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource includes a bulletin board resource.	
Claim 4	
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource includes a shared memory.	

‘1503 Pet. at A-3, A-4

‘843 Challenged Claims (cont.)

Claim 5
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource stores messages that are addressed to no particular process.
Claim 6
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource stores messages available by any number of processes.
Claim 7
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource is a section of a storage.
Claim 8
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource involves a database.
Claim 9
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the request is a re-request.
Claim 10
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the request is a storage resource request.
Claim 11
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the request is repeated until the storage resource is available unless a certain time beyond the threshold has elapsed.
Claim 12
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the request is another storage resource request.
Claim 13
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the request is for access to the storage resource.
Claim 14
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the determining, causing, and threshold are each associated with a same layer of processing.
Claim 15
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the determining, causing, and threshold are each associated with a middleware layer that sits under an application layer.
Claim 16
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the sharing includes providing the information to a plurality of software or hardware operations that share the storage resource.
Claim 17
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the electronic control unit is equipped with at least one gateway function.
Claim 18
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the real-time involves a response time that is measured in milliseconds.
Claim 19
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the real-time involves a

‘1503 Pet. at A-5, A-6

‘843 Challenged Claims (cont.)

response time that is measured in microseconds.
Claim 20
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the real-time involves a response time that is less than 1 second.
Claim 21
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first network or the second network is of the Controller Area Network type.
Claim 22
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first network or the second network is of the Flexray network type.
Claim 23
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first network or the second network is of the Local Interconnect Network type.
Claim 24
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first interface-related first layer part or the second interface-related first layer part includes at least one of a controller, a communication interface, or an operating system interface; and the first interface-related second layer part or the second interface-related second layer part includes at least one of a remote message conversion layer, a communication interface, or an operating system interface.
Claim 25
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first interface portion and the second interface portion are each separate portions of a same apparatus.
Claim 26
The non-transitory computer-readable medium as set forth in claim 1, wherein

the computer program product is operable such that the first network and the second network are heterogeneous networks.
Claim 27
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the second network protocol is different than the first network protocol.
Claim 28
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the second network protocol is different than the first network protocol such that rates thereof are different.
Claim 29
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the second network protocol is different than the first network protocol, and the at least one message format corresponding to the second network protocol is different than a particular message format corresponding to the first network protocol, such that the information is converted from the particular message format to the at least one message format.
Claim 30
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the information is processed utilizing the storage resource, where the information is originally received in a first message format corresponding to the first network protocol, to create, in real-time, messages in at least two other message formats including a second message format corresponding to the second network protocol and a third message format corresponding to a third network protocol, where the first network protocol is different than either of the second and third network protocols.
Claim 31
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource is protected utilizing semaphores.

‘1503 Pet. at A-7, A-8

‘843 Challenged Claims (cont.)

Claim 32
The non-transitory computer-readable medium as set forth in claim 31, wherein the computer program product is operable such that the first network and the second network are heterogeneous networks, and each of a plurality of different processes process the information in a manner that is isolated from temporal characteristics associated with the heterogeneous networks.
Claim 33
The non-transitory computer-readable medium as set forth in claim 32, wherein the computer program product is operable such that the information is stored in response to interrupts associated with the different processes.
Claim 34
The non-transitory computer-readable medium as set forth in claim 32, wherein the computer program product is operable such that the different processes are updated with the information at a first rate that differs from a second rate with which the different processes send the information to the storage resource.
Claim 35
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the storage resource is operable so as not to require a network layer translation of messages.
Claim 36
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the threshold includes a timeout.
Claim 37
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the threshold includes a time-related threshold.
Claim 38
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first interface-related first layer messages, the first interface-related second layer messages, the second interface-related first layer messages, and the second interface-related second layer messages include protocol data units (PDUs).
Claim 39
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first interface-related first layer messages and the first interface-related second layer messages are different in terms of at least one aspect of headers thereof.
Claim 40
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the processing includes conversion; the first interface-related first layer messages are related to the first interface-related first layer by virtue of being received thereby; and the first interface-related second layer part carries out the processing of the first interface-related first layer messages.
Claim 41
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the message includes a protocol data unit (PDU).
Claim 42
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the message includes a header.
Claim 43
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first interface-related first layer part is associated with a layer that is below another layer associated the first interface-related second layer part.
Claim 44
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first interface-related second layer messages and the second interface-related first layer messages have a same format.

‘1503 Pet. at A-9, A-10

‘843 Challenged Claims (cont.)

Claim 45
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that the first interface-related second layer messages and the second interface-related first layer messages are a same messages.
Claim 46
The non-transitory computer-readable medium as set forth in claim 1, wherein the computer program product is operable such that a waiting period is implemented between re-requests for the storage resource.

‘1503 Pet. at A-11