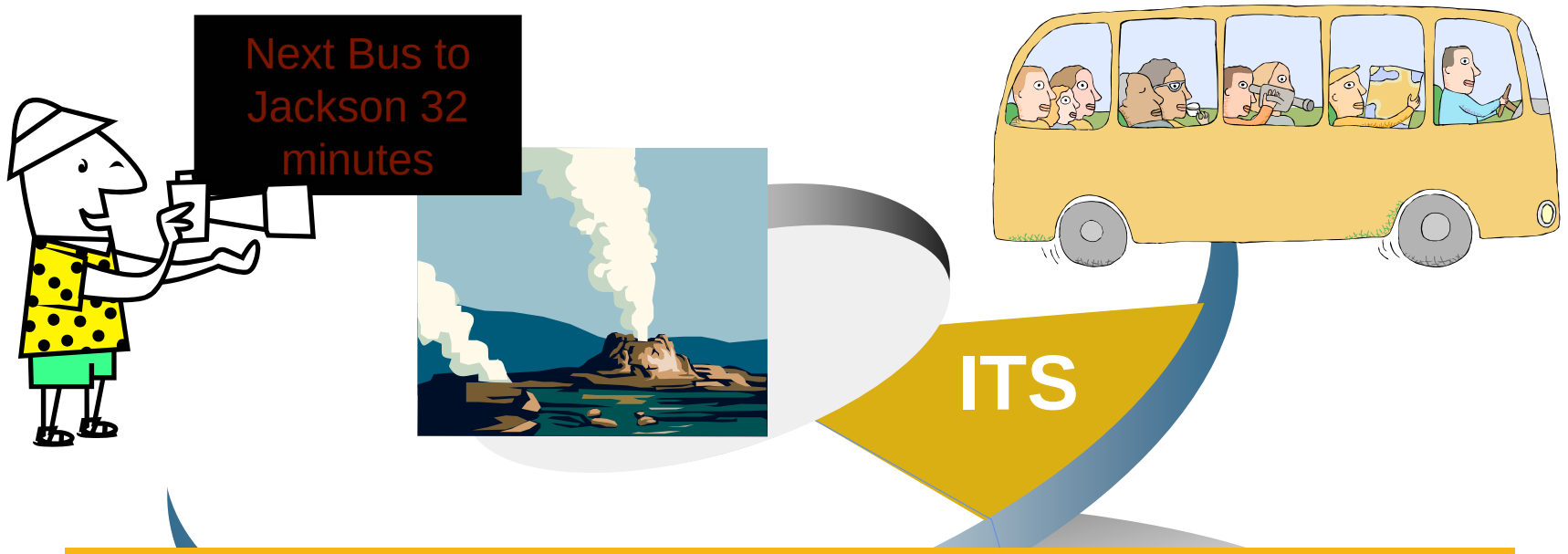
TRANSPORTATION COOPERATIVE TECHNOLOGY COMPONENT (ITS 101)

Lisa Ballard, P.E.

Definition of ITS

- **I**ntelligent **T**ransportation **S**ystems use advanced sensor, computer, electronic and communications technologies to improve the safety and efficiency of the surface transportation system

Information System: Making Assets & Options Visible and Accessible



Enable any visitor or resident to immediately recognize how to get from "A" to "B" using an attractive alternative to the private vehicle

CURRENT
TRANSPORTATION SOLUTIONS

Trip planning (based on MT One Stop Shop)

Fixed routes
Flex routes

Google Maps

Other services

Listing of resources (region wide)
Fixed route
Demand response
Rideshare
Private & public

Fixed and flex routes have itineraries

1)
2)
3)

by phone

by web

Demand response request transferred to provider (phone & web)

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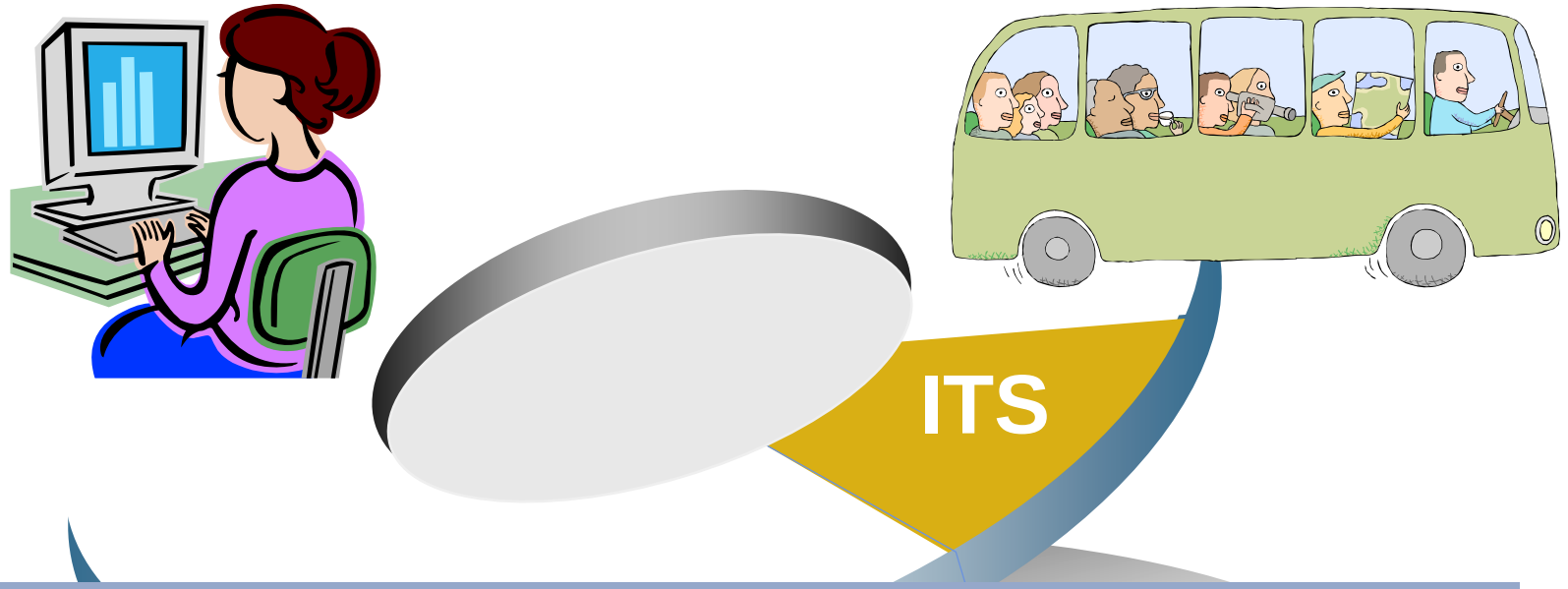
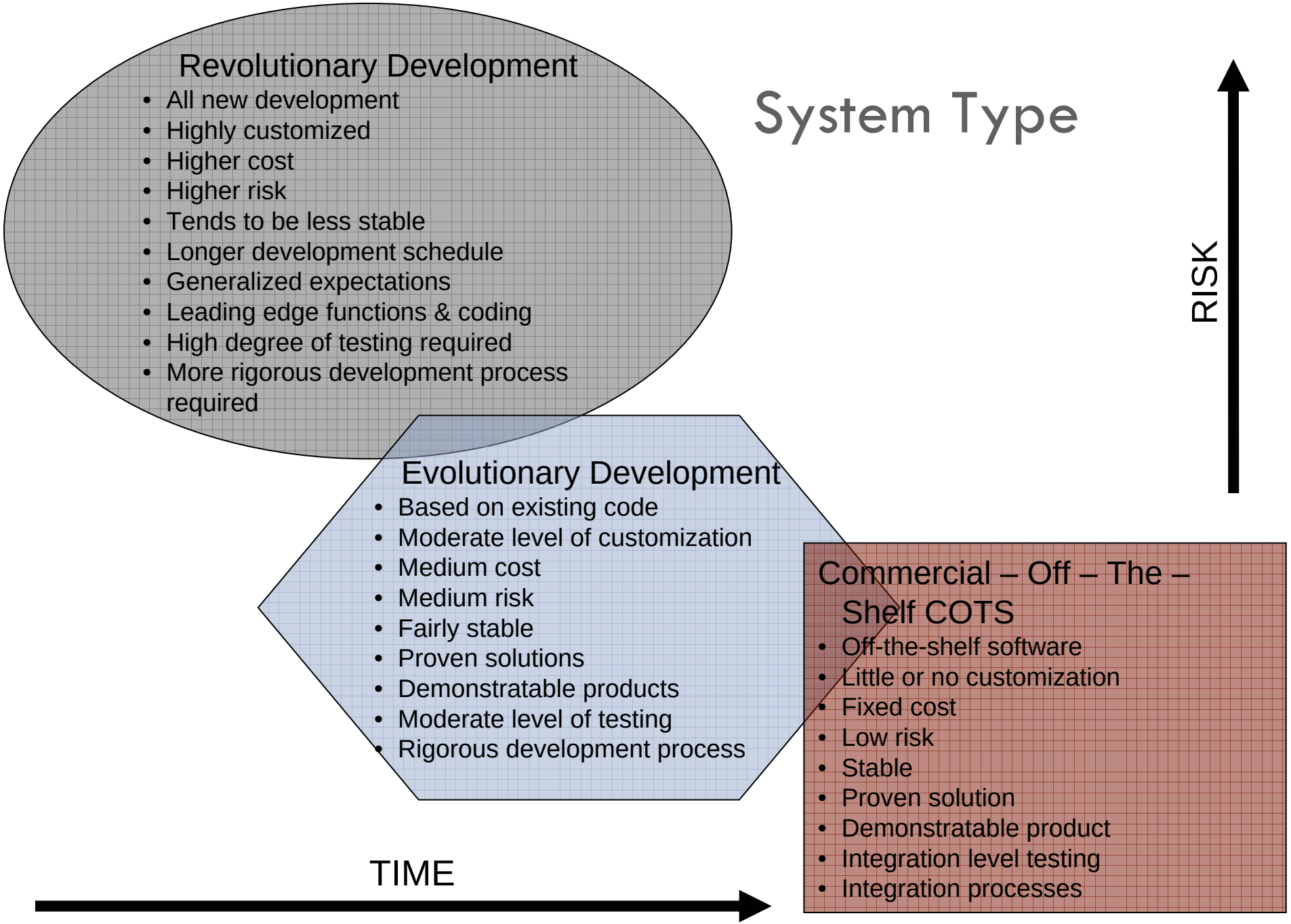


Enable providers and funding agencies to plan and operate these transportation options in a cost effective manner

CURRENT
TRANSPORTATION SOLUTIONS

6

Approach



Source: FHWA DMS Procurement Workshop

Key ITS Concepts

- Operations-based approach
  - ITS must be used
  - ITS must be maintained
- Need-based approach
  - ITS targeted to solve specific problems
- Systems engineering approach
  - Integration must be considered

Lessons Learned

- Planning and coordination is time-intensive
- Involve multiple stakeholders beyond DOTs in process
- Recognize institutional issues early
- Develop effective management teams and layers
- Regional philosophy through coordination and integration
- Maintenance and operations are key

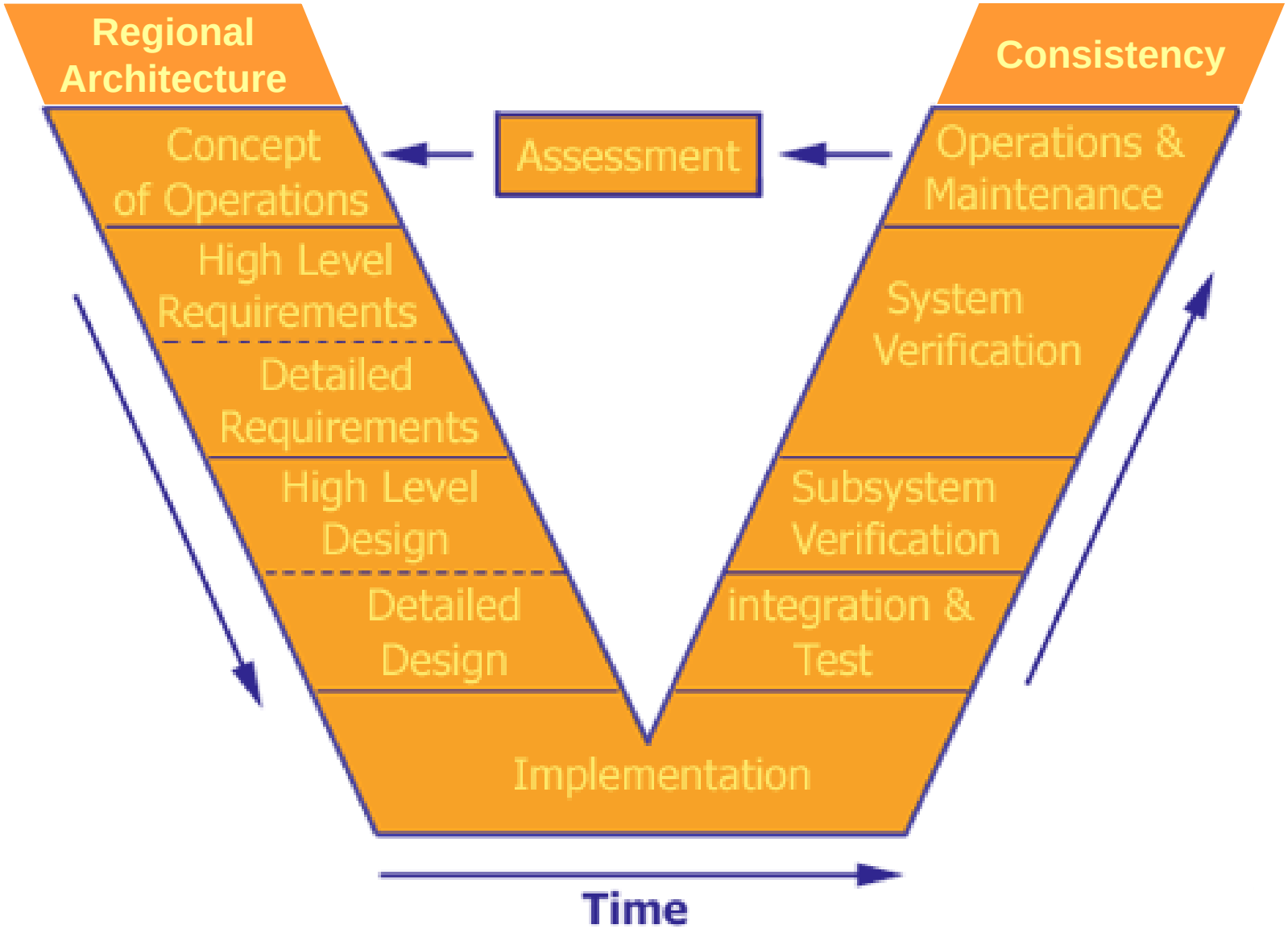
Best Way to Mitigate Risks

- Plan up front as much as possible
  - Project Plan
  - Concept of Operations
  - Requirements
  - Design
- Use existing systems where feasible
- Staff in place

Systems Engineering

- A way of deploying integrated systems that reflect short-term and long-term needs
- A set of management and technical processes and tools/techniques whose purpose is to ensure systems are built
  - To work
  - To satisfy the needs of their intended customers
  - To meet acceptable cost and schedule parameters

Systems Engineering "VEE" Diagram



Example

Sample vision (Modoc County, CA)

Source: MAP Program Guidance Version 1.0

Modoc County Transportation Commission

Virtual and physical **One-Stop Shop**
to help folks who need a ride

(with tools for those providing the ride)

Plan a trip	Make a trip
Reserve a trip	Pay for a trip

Assist customers to …

- Find a ride or plan travel using any available transportation service
- Plan long-distance travel using
  - Public transit and intercity services,
  - Commercial passenger carriers, or
  - 'Flex' services (periodic or infrequent).
- Consider alternative travel options (e.g. ridesharing, carpool, etc.)
- Book a trip or make reservations
- Pay for a ride – using electronic payment card

Source: MAP Program Guidance Version 1.0
Modoc County Transportation Commission

Help operators to … (manage daily activities)

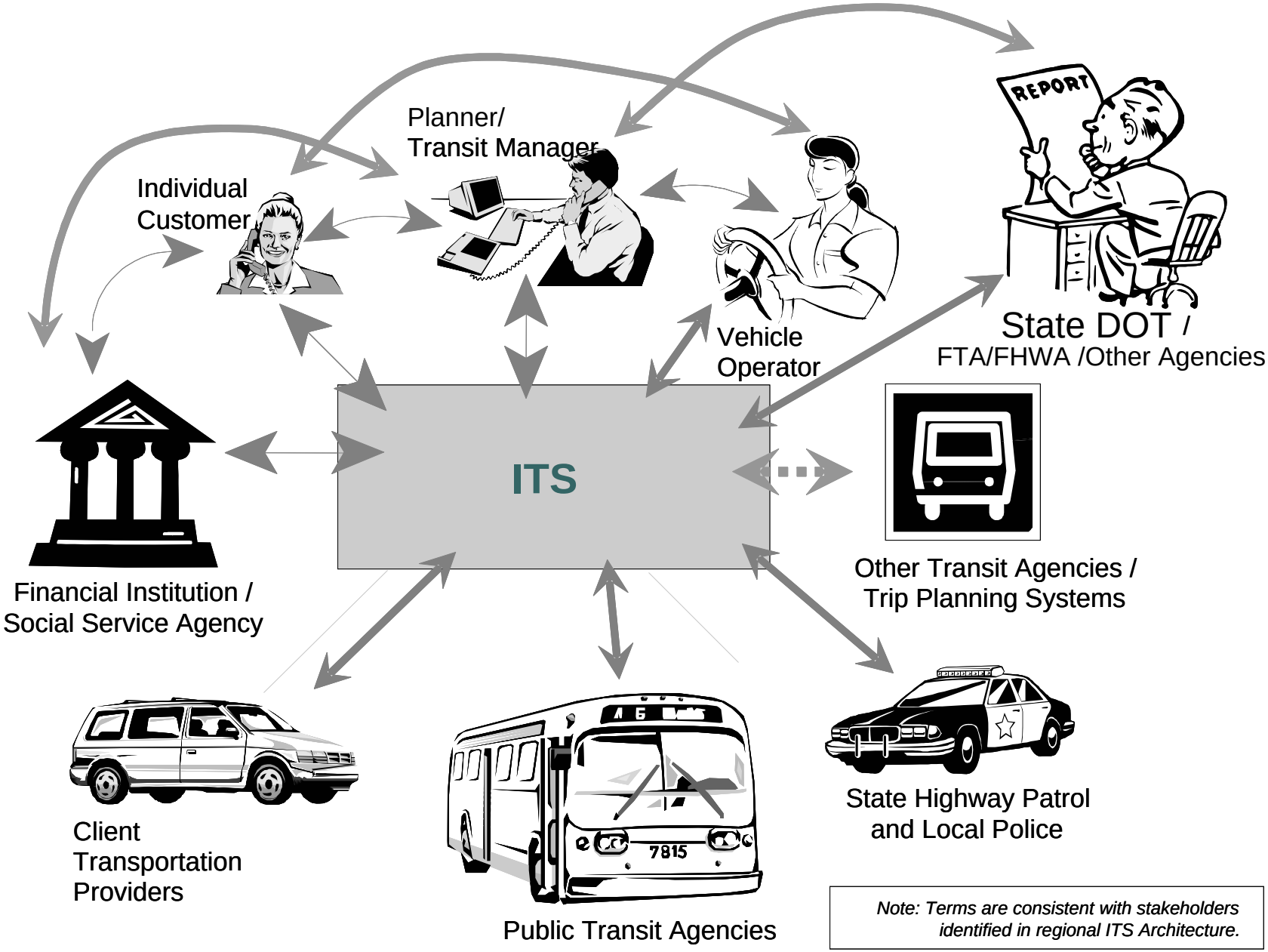
- Support day-to-day operating activities
- Monitor budget and finances
- Bill funding agencies
- Post special trips and travel options
- Manage client (eligibility) information
- Prepare reports – management, performance, and compliance requirements

Source: MAP Program Guidance Version 1.0
Modoc County Transportation Commission

Help transportation agencies to …

- Coordinate services among operators - scheduling, dispatching, reserving seats, posting special trips, and identifying other travel options
- Monitor performance and manage costs
- Facilitate short-term and long-range planning
- Assess unmet transportation needs
- Inventory human service, tribal, and community transportation needs and resources

Source: MAP Program Guidance Version 1.0
Modoc County Transportation Commission



Note: Terms are consistent with stakeholders identified in regional ITS Architecture.

Source: MAP Program Guidance Version 1.0
Modoc County Transportation Commission

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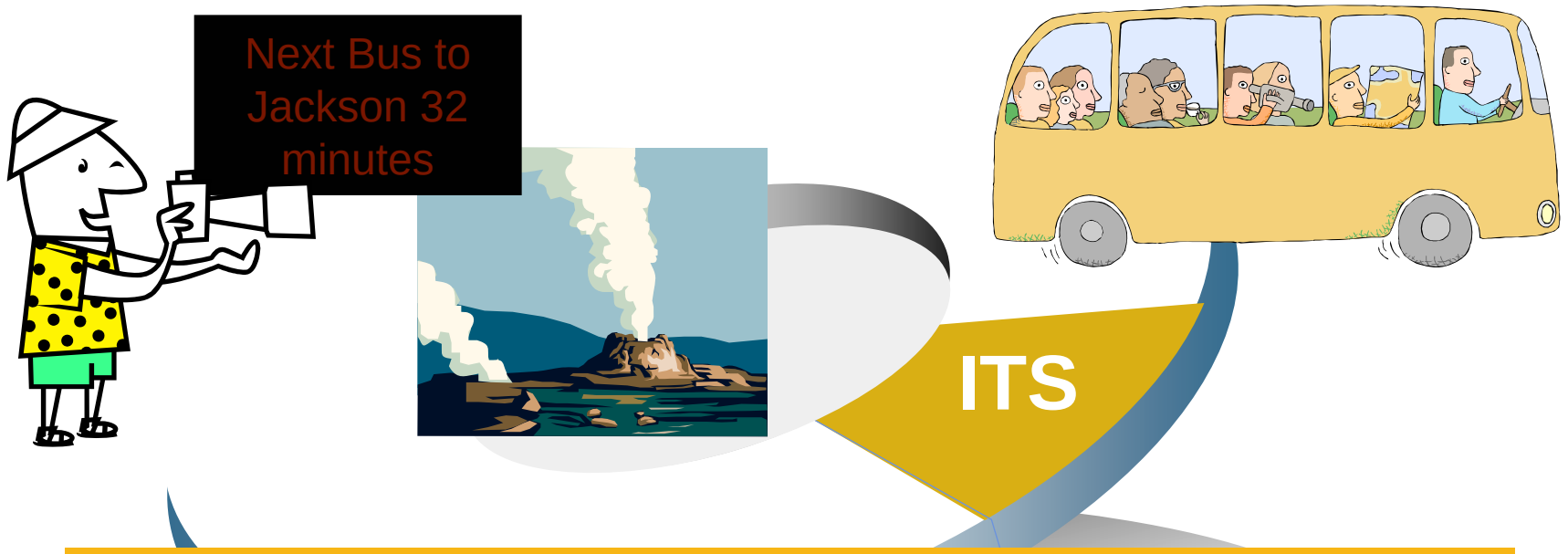

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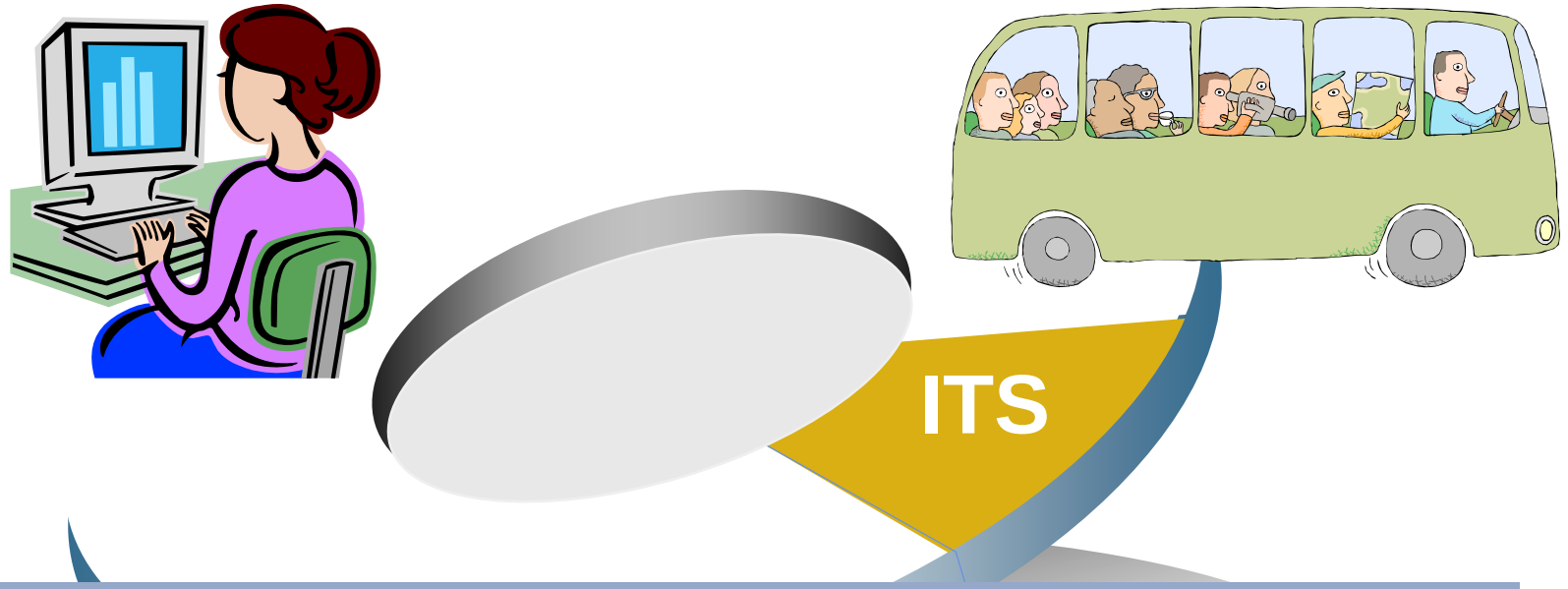

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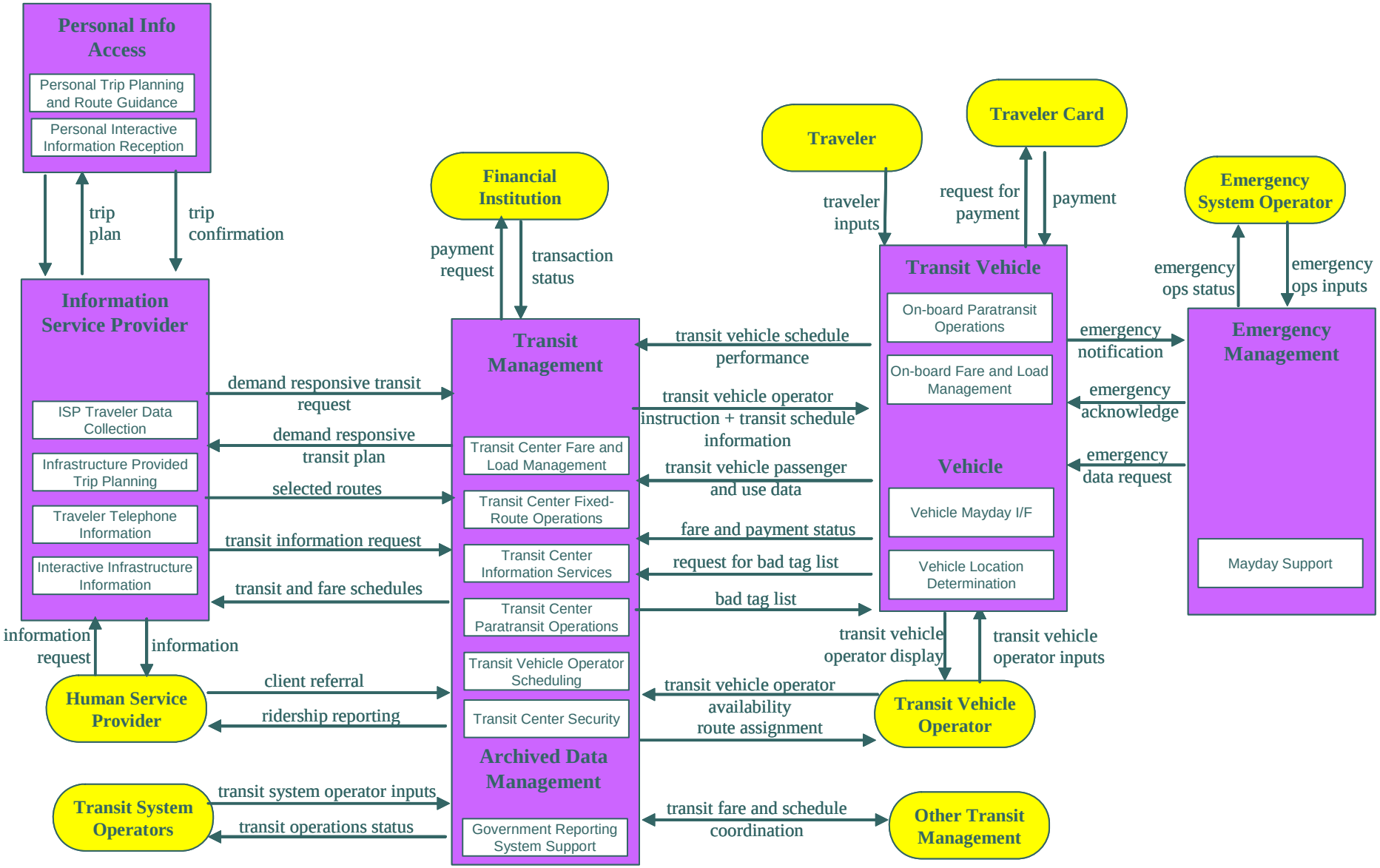
Data Packages from National ITS Architeture

AD 1	ITS Data Mart
APTS 2	Transit Fixed-Route Operations
APTS 3	Demand Response Transit Operations
APTS 4	Transit Passenger and Fare Management
ATIS 2	Interactive Traveler Information
ATIS 5	ISP Based Route Guidance


Personal Info Access
Personal Trip Planning and Route Guidance
Personal Interactive Information Reception
trip plan
trip confirmation
Information Service Provider
ISP Traveler Data Collection
Infrastructure Provided Trip Planning
Traveler Telephone Information
Interactive Infrastructure Information
information request
information
Human Service Provider
Transit System Operators
Financial Institution
payment request
transaction status
Transit Management
demand responsive transit request
demand responsive transit plan
selected routes
transit information request
transit and fare schedules
client referral
ridership reporting
transit system operator inputs
transit operations status
Transit Center Fare and Load Management
Transit Center Fixed-Route Operations
Transit Center Information Services
Transit Center Paratransit Operations
Transit Vehicle Operator Scheduling
Transit Center Security
Archived Data Management
Government Reporting System Support
transit vehicle schedule performance
transit vehicle operator instruction + transit schedule information
transit vehicle passenger and use data
fare and payment status
request for bad tag list
bad tag list
transit vehicle operator availability
route assignment
transit fare and schedule coordination
Other Transit Management
Traveler
traveler inputs
Traveler Card
request for payment
payment
Transit Vehicle
On-board Paratransit Operations
On-board Fare and Load Management
Vehicle
Vehicle Mayday I/F
Vehicle Location Determination
transit vehicle operator display
transit vehicle operator inputs
Transit Vehicle Operator
Emergency System Operator
emergency ops status
emergency ops inputs
Emergency Management
Mayday Support
emergency notification
emergency acknowledge
emergency data request

Sample Requirements

Equipment Package	ID	Requirement	Center
Government Reporting Systems	5	The center shall provide the applicable archived data to satisfy governm...	Transit
Infrastructure Provided Trip Planning	7	The center shall ge... transit services, incl... requirements for trav...	
Planning		times and transfer points.	
Infrastructure Provided Trip Planning	7	The center shall generate **route**... ransit services, including fares, schedules and re... for travelers with special needs.	ISP
Infrastructure Provided Trip Planning	11	The center shall **exchange route segment information** with other centers outside the area served by the local center.	ISP
Infrastructure Provided Trip Planning	14	The center shall provide the capability for the traveler to **confirm the proposed trip plan.**	ISP

Teams to provide other requirements / functions

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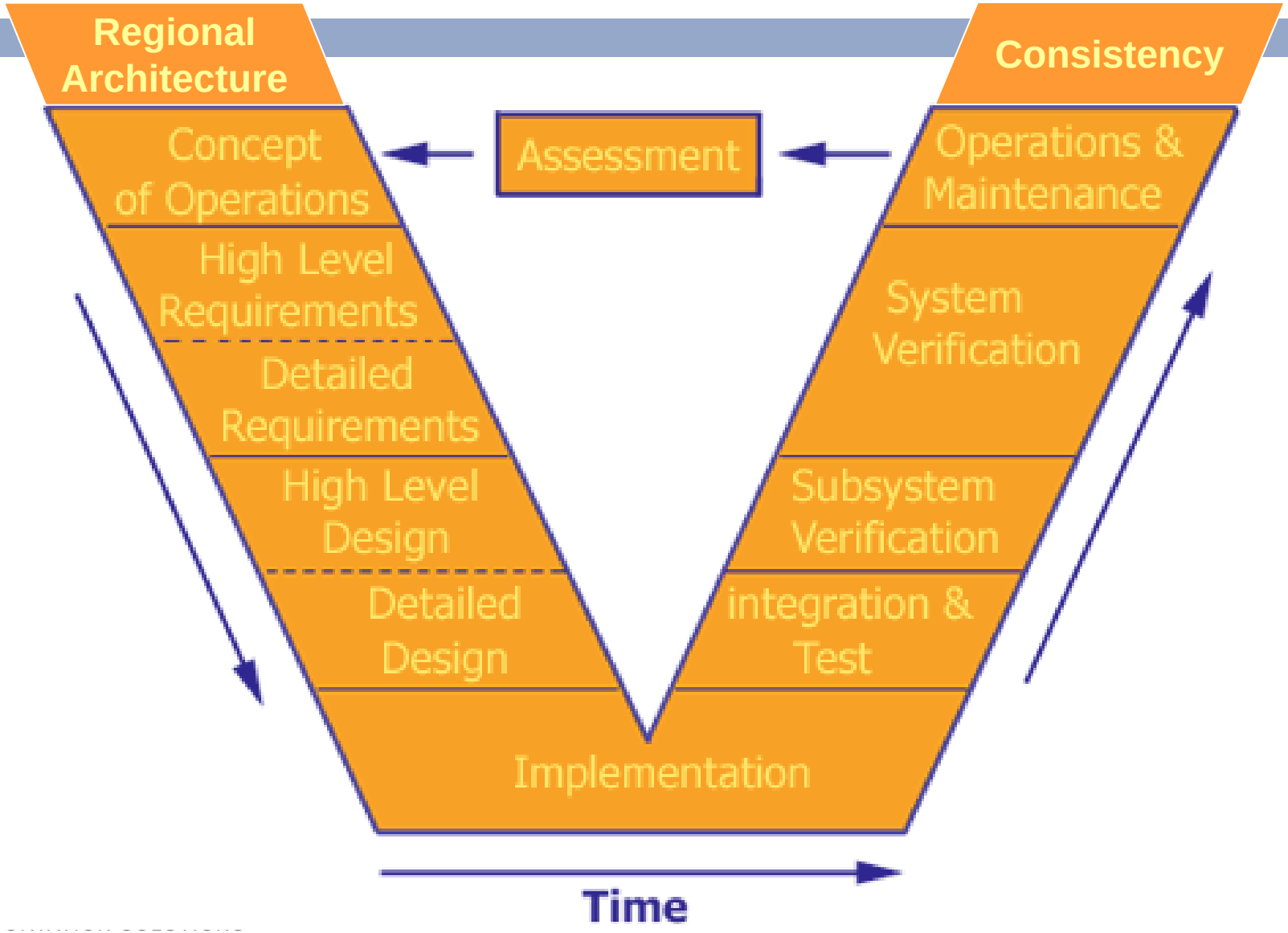

Phase 1 Approach

- Requirements
- High Level Design
- Research available technologies
  - Functions
  - Costs
  - Interoperability
- Low hanging fruit

Team contribution (as a start)

From the perspective of…

- Riders
- Buy rides for other
- Providers
- Agencies
- Others

What functions do they need?

- Planning a trip
- At the stop
- On board
- Post trip
- Reports or data
- Other